VOLUME 1

Final Habitat Mitigation and Monitoring Plan

Devil's Gate Sediment Removal and Management Project

Pasadena, California
(Los Angeles County)

U.S. Army Corps of Engineers Permit No. SPL-2014-00591-BLR

Prepared for:

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November 2018

30 YEARS
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1.0 INTRODUCTION

The Devil's Gate Reservoir Sediment Removal and Management Project (Project) is located in the City of Pasadena (City) in Los Angeles County (Figure 1-1). More specifically, the Project is located within the upper portion of the Arroyo Seco Watershed within the City's Hahamongna Watershed Park (Figure 1-2). Sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. These activities are granted under the LACFCD Devil's Gate Dam and Reservoir Easement and performed in accordance with CEQA. Since the dam construction in 1920 and prior to the Station Fire in 2009, approximately 10.7 mcy of sediment accumulated in the reservoir and approximately 8 mcy was removed. In the two storm seasons following the Station Fire an additional 1.3 mcy accumulated. While a minimal amount of sediment comes into the reservoir with every storm, most of the sediment comes in large amounts during more intense storm events. The last major Devil's Gate Reservoir sediment removal project occurred in 1994, when 190,000 cy of sediment were removed. Sediment was trucked off site via a maintenance road just west of the dam, which exits on to Oak Grove Drive. Two smaller sediment removal operations also took place with 14,000 cy removed in 2006 and 3,800 cy removed in 2009. The Project, which includes an initial comprehensive removal of 1.7 million cubic yards (cy) of sediment to establish a permanent maintenance area, will restore flood capacity and establish a reservoir management system to maintain the flood control capacity of the reservoir. Subsequently, annual maintenance will be conducted in an established permanent maintenance area to remove accumulated sediment and to ensure continued flood control capacity. Removal of sediment will not occur outside of the boundaries of the permanent maintenance area.

The primary objectives of the Project include:

1) Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events;

2) Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including reservoir management;

3) Removing sediment in front of the dam to facilitate an operational reservoir pool to reduce the possibility of plugging the outlet works with sediment or debris during subsequent storm events;

4) Removing sediment placed at Johnson Field during the Devil's Gate Reservoir Interim Measures Project (IMP);

5) Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern; and,

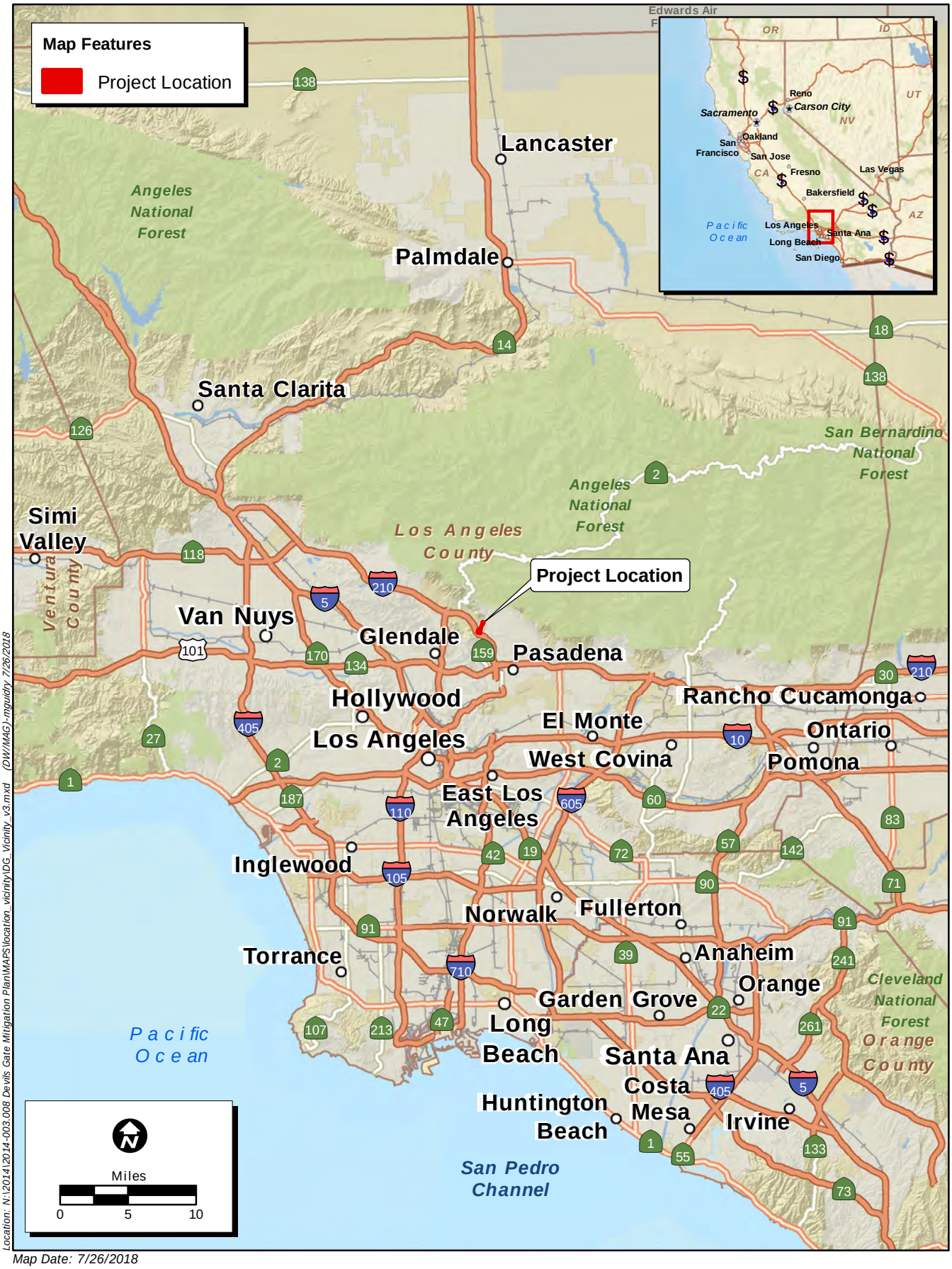
6) Delivering the sediment to placement or reuse facilities that are already prepared and designated to accept such material without native vegetation and habitat removal.

The Los Angeles County Flood Control District (LACFCD) completed an Environmental Impact Report (EIR) for the Project, which was certified by the County of Los Angeles Board of Supervisors on November 12, 2014. A Recirculated EIR (REIR), which includes an initial comprehensive removal of 1.7 million cubic yards (cy) of sediment, was certified by the County of Los Angeles Board of Supervisors on November 7, 2017.

This Habitat Mitigation and Monitoring Plan (HMMP) for U.S. Army Corps of Engineers (USACE) Jurisdictional Waters was prepared by ECORP Consulting, Inc. (ECORP) on behalf of the LACFCD. A HMMP describes the concepts and activities required to implement and maintain the mitigation required to compensate for permanent and temporary impacts to areas regulated by the USACE under the Federal Clean Water Act (CWA). This HMMP is based on the impacts and potential mitigation for the footprint of the approved Alternative 3, Configuration D, Option 2, which was identified as the Environmentally Superior Alternative in the Project EIR. However, slight modifications to the configuration of the upstream boundary of the Project footprint were made in July 2016 to provide additional avoidance of sensitive habitat areas. Slight modifications to the boundary of the permanent maintenance area were also made in April of 2018 to accommodate the design of the smaller project, which includes the initial removal of 1.7 million cy of sediment rather than the initial removal of 2.4 million cy that was included in Alternative 3, Configuration D, Option 2. The revised configuration of the proposed Project is shown on Figure 1-3.

The primary objective of this HMMP is to offset impacts to USACE jurisdictional features during Project implementation and to achieve functional lift through the re-establishment, rehabilitation, and enhancement of the mitigation areas. The HMMP will also offset impacts to California Department of Fish and Wildlife (CDFW) jurisdictional features that overlap with USACE jurisdictional features. As a condition of the Lake or Streambed Alteration Agreement (LSAA) executed between the LACFCD and the CDFW (Notification No. 1600-2015-0263-R5), a Habitat Restoration Plan will also be prepared to describe the specific measures that will be implemented to satisfy the mitigation requirements in the LSAA. The off-site mitigation proposed at the Petersen Ranch Mitigation Bank (Bank) is introduced in this HMMP, however, a HMMP specific to for the off-site mitigation has been prepared by the Bank Sponsor as a condition of the PRM agreement between LACFCD and the Bank owners, and is included in Appendix A. The HMMP documents provide guidance for the long-term monitoring, adaptive management, and protection of the compensatory mitigation sites. The potential on-site mitigation areas described in this HMMP were selected because they are located in the Arroyo Seco Watershed, which is the same watershed where the impacts will occur, and because providing a functional lift within the Arroyo Seco Watershed satisfies the watershed approach set forth in the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources. The location of the mitigation areas is within Devil's Gate Reservoir, where adequate hydrology is available to sustain the mitigation areas for the long-term. Also, siting the compensatory mitigation in Devil's Gate Reservoir provides for the long-term conservation of lands containing aquatic resources that are designated open space and in close proximity to lands owned by the U.S. Forest Service (USFS).

This HMMP provides the necessary information in support of acquiring a permit from the Regional Water Quality Control Board (RWQCB). The RWQCB regulates activities within state and federal Waters under Section 401 of the Clean Water Act (CWA) and the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). Section 401 of the CWA requires that "any applicant for a Federal permit for activities that involve a discharge to Waters of the U.S. (hereafter referred to as WOUS), shall provide the Federal permitting agency a certification from the State in which the discharge is proposed that states that the discharge will comply with the applicable provisions under the Federal Clean Water Act."



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Map Date: 7/26/2018

Service Layer Credits: Sources: Esri, USGS, NOAA

Figure 1-1. Project Vicinity

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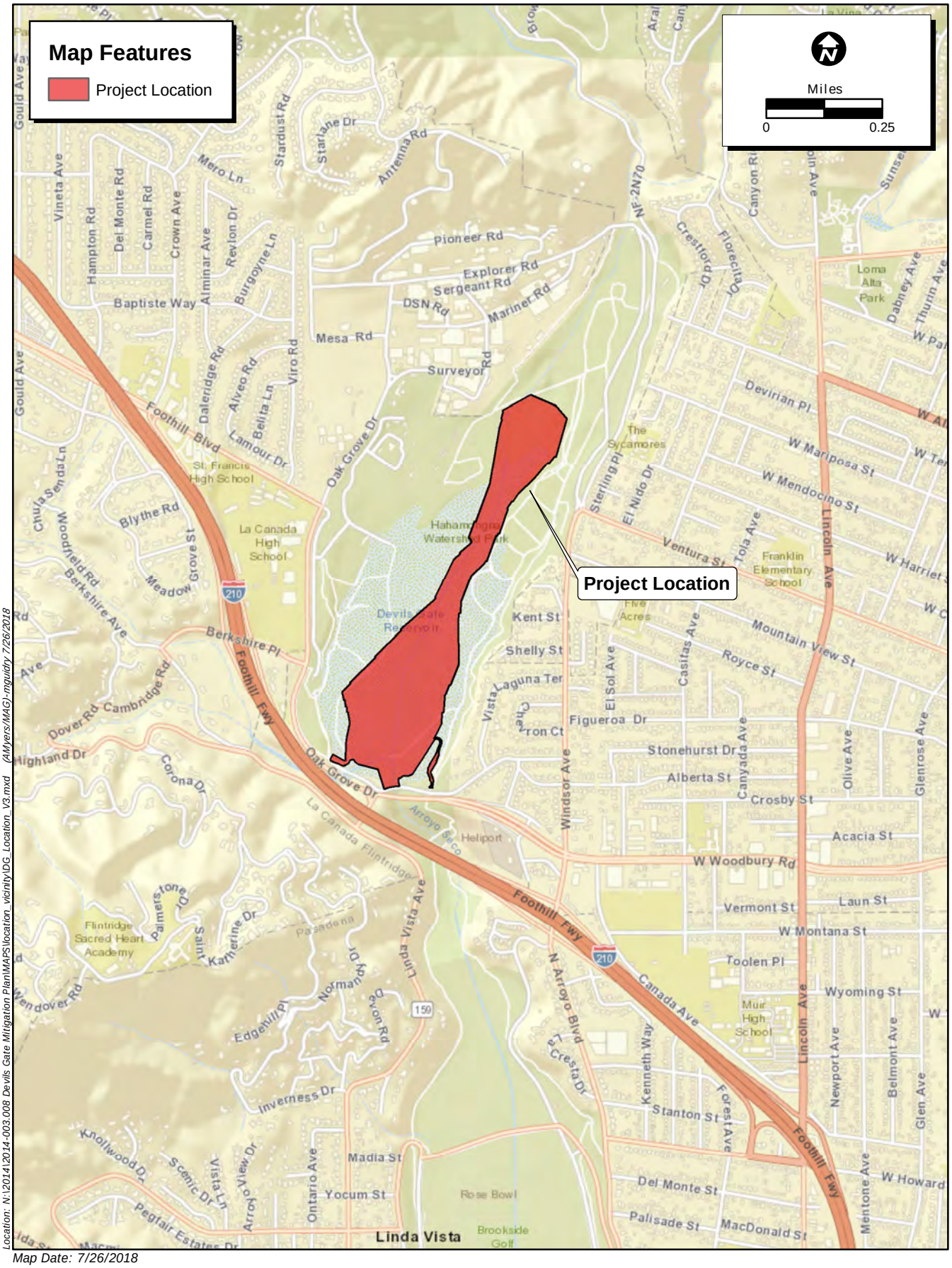

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Map Date: 7/26/2018
Source: ESRI

Figure 1-2. Project Location

Figure 1-3
Proposed Project

Map Features

- Initial Project Footprint [1]
- Annual Maintenance Footprint [1]
- Permanent Impact Area [1]
- Temporary Impact Area [1]
- Side Slopes [1]

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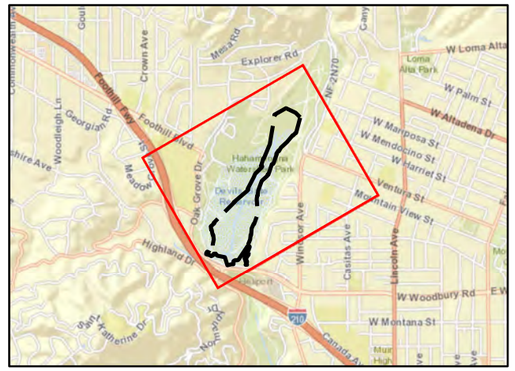

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Scale in Feet
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Photo Source: NAIP 2014
[1] LADPW

Map Date: 7/18/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\aerial_maps\DG_Proposed_Project_V2.mxd (MAG) mguidry 7/18/2018

Therefore, in California, before the USACE will issue a Section 404 permit, applicants must apply for and receive a Section 401 Water Quality Certification or waiver from the RWQCB. Although the Water Quality Certification must be sought for the same effects to WOUS as indicated in a Section 404 permit, certification can also cover effects to water bodies that are not USACE jurisdictional (i.e., isolated wetlands).

This HMMP also provides the necessary information in support of acquiring a Lake or Streambed Alteration Agreement (LSAA) from the CDFW. The HMMP covers the requirements described in the LSAA as issued by CDFW. This includes the preparation of a habitat restoration plan and the creation and restoration of on-site vegetation communities as mitigation for up to 27.83 acres of temporary impacts and 40.80 acres of permanent impacts. Under current California Fish and Game Code Sections 1600–1616, the CDFW regulates projects that propose to (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the CDFW in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, (2) use material from the streambeds designated by the CDFW, or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by the CDFW. This regulation takes the form of a requirement for a LSAA and is applicable to all projects involving state or local government discretionary approvals.

1.1 Brief Description of the Proposed Compensatory Mitigation Project

The Project will initially remove vegetation and 1.7 million cy of sediment from a 65.56-acre area within the reservoir behind Devil's Gate Dam for the purposes of establishing an approximately 42.05-acre permanent maintenance area where sediment will subsequently be removed on an annual basis. Approximately 16.18 acres of temporary impact areas will be restored to native vegetation as part of the compensatory mitigation plan for the Project. The impacts of the Project will include direct impacts to wetlands (1.52 acres) and non-wetland WOUS (32.63 acres) under the jurisdiction of the USACE.

The compensatory mitigation for the Project includes the re-establishment and rehabilitation of 2.13 acres of wetlands and re-establishment, rehabilitation, and enhancement of 8.36 acres of non-wetlands WOUS. In addition, the compensatory mitigation also includes rehabilitation and enhancement of 45.45 acres of riparian and upland buffer habitat within and adjacent to Devil's Gate Reservoir and the areas that will provide mitigation for impacts to wetlands and non-wetland WOUS. The compensatory mitigation areas and adjacent buffer habitats will be protected for the long-term and will be maintained and monitored to ensure the established performance standards are met.

The side slopes of the annual maintenance footprint area (7.34 acres) which are considered part of the permanent impact area, will be replanted with native vegetation, including shrub and annual species associated with riparian scrub and alluvial scrub vegetation communities. Allowing the side slopes of the annual maintenance area to naturally revegetate with native vegetation following the initial sediment removal will provide additional buffer habitat between the areas that are actively managed in the annual maintenance area and the compensatory mitigation areas. The side slopes may be periodically affected by recontouring if large sediment deposits bury portions of the side slopes. In this case, the sediment will be removed and the side slopes will be recontoured and allowed to naturally revegetate.

The Project also includes the replanting of 16.17 acres of temporary impact areas following the sediment removal phase of the Project. Impacts to these areas will be delayed until the final year of sediment removal and then the areas will be replanted with native vegetation shortly thereafter to minimize the temporal impacts in these areas.

The proposed USACE compensatory mitigation for the Project is on-site within Devil's Gate Reservoir and Hahamongna Watershed Park. Besides the reestablishment, rehabilitation, and enhancement of non-wetlands WOUS and buffer habitats, the overall mitigation plan also includes trails closures, narrowing of permanent trails, trash removal, buffer plantings between sensitive habitat and trails, fencing of some trails, public education and outreach, long-term protection of mitigation areas, focused surveys for sensitive and listed species, and maintenance and monitoring of the mitigation areas to ensure the performance standards are met. In addition, adaptive management measures and monitoring are included to ensure the mitigation areas continue to function as planned for the long-term.

In addition to on-site mitigation proposed for the Project, an off-site PRM project will be implemented in future Phase D at the Peterson Ranch Mitigation Bank, an agency-approved mitigation bank. Within the off-site mitigation site, up to 31.23 acres of wetland, riparian, and upland habitats will be converted into mulefat/willow habitats. These enhancements would result in up to 5.94 acres of WOUS uniform re-establishment credits using the Petersen Ranch Bank approved crediting methodology and 5.94 acres of preservation credits. The HMMP prepared for the off-site mitigation is included as Appendix A.

1.2 Objectives

Compensatory mitigation for permanent and temporary impacts and temporal loss of functions and values over time as a result of the time necessary for habitat to grow and meet the performance standards in the mitigation areas will be achieved in accordance with the USACE and U.S. Environmental Protection Agency (EPA) Final Rule (33 Code of Federal Regulations [CFR] parts 325 and 332 and 40 CFR part 230) on Compensatory Mitigation for Losses of Aquatic Resources. In accordance with the guidance provided in the Final Rule, the compensatory mitigation will be based on a watershed approach. This approach emphasizes the improvement or sustainability of aquatic resources in the watershed affected by the Project, which includes the Arroyo Seco Watershed, a sub-watershed of the Los Angeles River Watershed. Discrete objectives for the compensatory mitigation activities include:

- Offsetting 65.56 acres of total impacts, including 13.14 acres of temporary impacts, 1.52 acres of permanent impacts to wetlands, and 34.14 acres of permanent impacts to non-wetland WOUS through on-site mitigation of 2.13 acres of wetlands, 8.36 acres of non-wetland WOUS, and 45.45 acres of riparian and upland buffer habitat,
- Recontouring, grading, planting of native riparian vegetation, and monitoring of mitigation areas while incorporating multi-use recreation in accordance with the HWPMP,
- Increasing the aquatic resource functions for wetlands, WOUS, quality of riparian and upland vegetation communities, habitat connectivity, and riparian habitat structure and diversity,
- Reducing exotic plant species cover and prevalence, and

- Developing mitigation areas that provide suitable habitat for federally and state-listed species, including least Bell's vireo (*Vireo bellii pusillus*).

2.0 SITE SELECTION CRITERIA – ONSITE MITIGATION AREAS

On-site and off-site mitigation areas were selected to offset impacts to CDFW and USACE jurisdictional features during Project implementation. Potential mitigation areas were selected based on the following criteria:

- Potential to locate on-site compensatory mitigation areas in the appropriate parts of the Arroyo Seco Watershed to achieve a functional lift through the re-establishment, rehabilitation, or enhancement of aquatic resources and habitat in important buffer areas;
- Potential to fulfill the watershed approach set forth in the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources;
- Availability of adequate hydrology (both surface and subsurface) to sustain the mitigation areas for the long-term;
- Opportunity to conserve on-site and off-site lands containing aquatic resources that are located in close proximity to existing preserved lands or open space, and;
- Opportunity to conserve on-site lands that may provide suitable habitat for least Bell's vireo, a federally and state listed wildlife species.

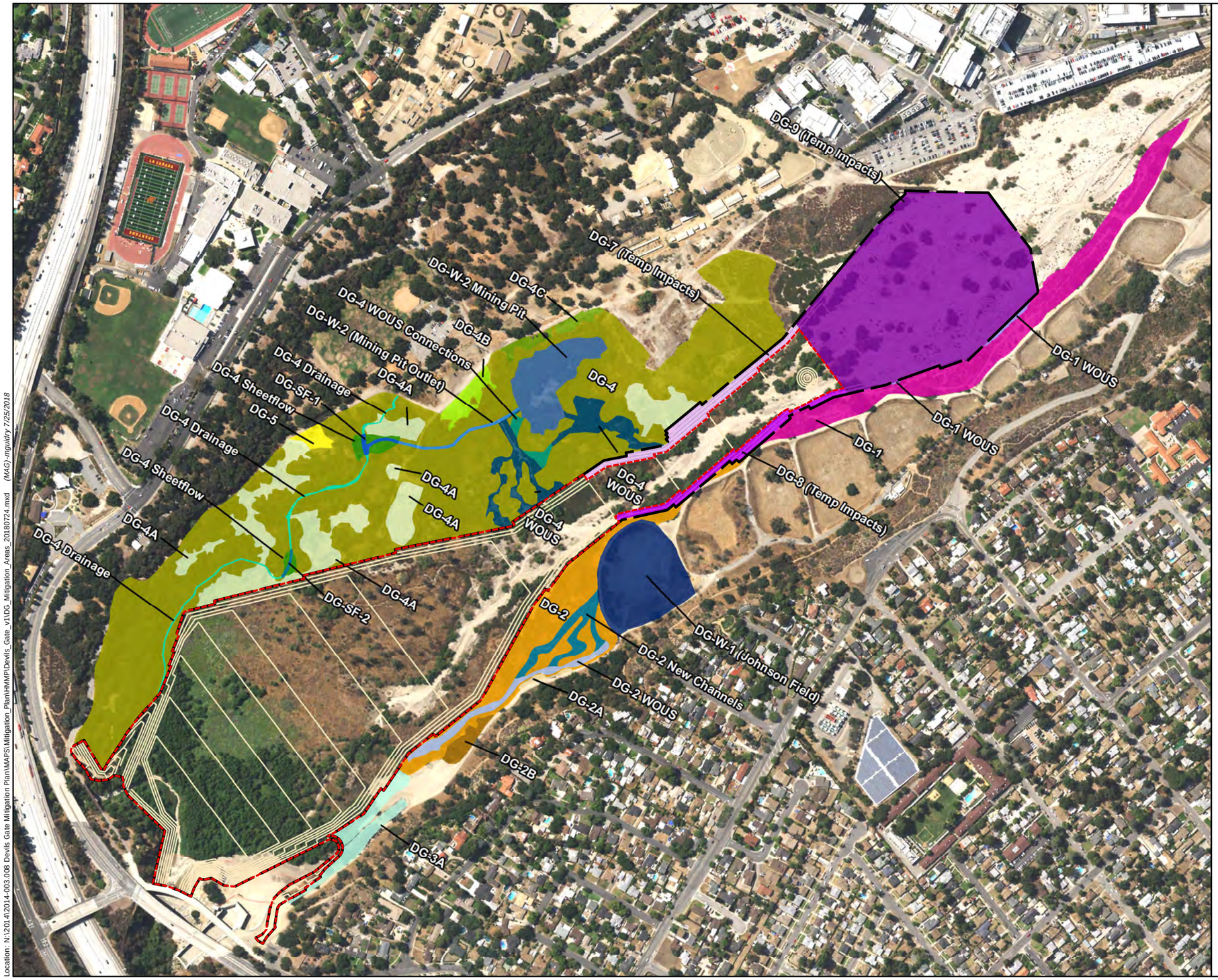
The site selection criteria and the description of the off-site mitigation site at the Petersen Ranch Mitigation Bank are included in Appendix A.

2.1 Watershed Overview

2.1.1 Mitigation Site Location

The on-site areas that are proposed as mitigation for the Project are within Devil's Gate Reservoir and Hahamongna Watershed Park (Figure 2-1). The areas all fall within the 1,070-feet elevation contour HWM that has been identified for the Project. The 1,070-feet HWM is the elevation of the crest of the dam and represents the limit of water held behind the dam. Numerous opportunities for improving the existing habitat in and adjacent to the reservoir were identified. Opportunities include re-establishment and rehabilitation of wetlands, and re-establishment, rehabilitation, and enhancement of non-wetland WOUS. In addition, most of the habitats within the HWM are considered buffer habitat for the wetlands and non-wetland WOUS mitigation areas. The buffer habitats will be restored and enhanced to not only provide protection for the USACE mitigation areas but also to improve the overall function in the Arroyo Seco Watershed. Major components of the activities planned for mitigation areas and buffers include re-establishing former non-wetland WOUS areas that have been impacted by human disturbances and removal of an extensive infestation of invasive and nonnative plant species.

Figure 2-1
Onsite Mitigation Areas Location



Map Features

- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]
- Sediment Removal Excavation Contours [1]

Mitigation Areas

- DG-1
- DG-1 WOUS
- DG-2
- DG-2 New Channels
- DG-2 WOUS
- DG-2A
- DG-2B
- DG-3A
- DG-4
- DG-4 Drainage
- DG-4 Sheetflow
- DG-4 WOUS
- DG-4 WOUS Connections
- DG-4A
- DG-4B
- DG-4C
- DG-5
- DG-7 (Temp Impacts)
- DG-8 (Temp Impacts)
- DG-9 (Temp Impacts)
- DG-SF-1
- DG-SF-2
- DG-W-1 (Johnson Field)
- DG-W-2 (Mining Pit)
- DG-W-2 (Mining Pit Outlet)

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2014-003.008 Devils Gate Mitigation Plan

Scale in Feet
0 600

Photo Source: NAIP 2016
[1] LADPW

Map Date: 7/25/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\Mitigation_Plan\MMP\Devils_Gate_v1\DG_Mitigation_Areas_20180724.mxd (MAG) mguidry 7/25/2018

In addition, rehabilitation of wetland areas will provide both a water quality improvement function in the watershed and will provide additional important habitat that is limited in the area behind the dam. Improvement of the riparian area as a whole will also provide a significant increase in suitable habitat for federally and state listed species, which is limited in the watershed. Focusing the habitat restoration activities on the reservoir as a whole and managing the human activities that are occurring there will also greatly improve the quality and increase the quantity of riparian habitat in areas under the jurisdiction of the CDFW.

2.1.2 General Watershed Condition

The Arroyo Seco Watershed is a sub-watershed of the Los Angeles River watershed, which is a coastal watershed partly within the coastal zone. The watershed drains 47 square miles, approximately two-thirds of which are in the San Gabriel Mountains within the Angeles National Forest. The stream runs 22 miles in a deeply incised canyon, beginning under Strawberry Peak in the San Gabriel Mountains and draining into the Los Angeles River near downtown Los Angeles. Roughly half of this length is contained within the boundaries of the Angeles National Forest.

Major obstacles within the watershed that impede flow between the headwaters and the confluence with the Los Angeles River include Brown Mountain Debris Dam, located seven miles below the Arroyo Seco headwaters, and Devil's Gate Dam, a large flood control facility bisecting the Arroyo Seco five miles downstream of Brown Mountain Dam at the southern end of Hahamongna Watershed Park. Below Devil's Gate Dam, most of the stream has been channelized to increase its capacity to carry floodwaters during winter storms.

Over its 22-mile course, the Arroyo Seco drops from an elevation of nearly 6,100 feet at its headwaters on Strawberry Peak to 320 feet at its confluence with the Los Angeles River. This drop over such a short distance, coupled with heavy rainfalls caused by Pacific storms dropping rain as they hit the San Gabriel Mountains, has produced catastrophic floods in the past. Since 1920, Devil's Gate Dam has served as a critical flood control facility that provides protection for the downstream portion of the Arroyo Seco Watershed.

The Arroyo Seco north of Devil's Gate Dam remains an important contributor to the local water supply as water infiltrating from the Arroyo Seco north of South Pasadena infiltrates to the Raymond Basin Aquifer. This aquifer is a 40-square mile groundwater basin that is one water supply source for the City of Pasadena (City) and other local communities. It also contributes to flows in the Arroyo Seco.

Aside from the Brown Mountain Dam, the character of the upper watershed remains relatively natural. The vegetation of the upper watershed is characterized by Bigcone Spruce Canyon Oak Forest, Southern Sycamore-Alder Riparian Woodlands, and Southern Mixed Chaparral. In this area, the Arroyo Seco and some major tributaries such as Millard Canyon, generally flow year-round, fed by numerous small springs and groundwater discharge. Just upstream of Devil's Gate Dam, the Arroyo Seco travels through an area that supports RAFSS, which is considered a sensitive habitat in southern California. Devil's Gate Reservoir, which was created as a result of the dam operations, supports a large area vegetated with riparian that survives because of the periodic water impoundment behind the dam. The large influx of sediment into the riparian habitat in the reservoir following the Station Fire in 2011 resulted in mortality of many of the

trees and understory vegetation. This disturbance created ample opportunities for invasive and nonnative plants to compete with recovering native vegetation. As a result, invasive and nonnative plants have replaced much of the riparian habitat or the understory below the willows and cottonwoods has become heavily infested with invasive and nonnative plant species.

Downstream of Devil's Gate Dam, most of the Arroyo Seco's natural character has been replaced by concrete-lined channels surrounded by urbanization. Surface waters of the Arroyo Seco are contaminated by urban runoff and the Arroyo Seco is listed on California's CWA 303(d) list of impaired waterways for three contaminants: nutrients/algae, high coliform counts, and trash (State Water Resources Control Board 2002). The high coliform counts and trash are direct results of nonpoint source pollution running into the Arroyo Seco via storm drains from urbanized portions of the watershed.

2.2 Landscape Setting and Position

2.2.1 Landscape Position

The reservoir behind Devil's Gate Dam serves an important flood control function because during storm events it captures stormwater, sediment, and debris from the upper portion of the watershed and from storm drains and runoff that enter from surrounding areas. Devil's Gate Dam allows for retention of stormwater, thus preventing high flows from overwhelming the downstream flood control channel. The San Gabriel Mountains are located to the north of the Project site and are characterized by steep slopes and foothills. The elevations in Devil's Gate Reservoir range between approximately 1,000 and 1,300 feet above mean sea level (amsl) and the lands within the reservoir slope from north to south. The topography in the areas adjacent to the Reservoir is generally flat with a slight incline to the north.

2.2.2 Policies and Surrounding Land Uses

The proposed mitigation areas are located within Devil's Gate Reservoir and the City's Hahamongna Watershed Park (HWP). All of the areas are within existing natural areas in the reservoir, along the banks of the Arroyo Seco, to the north of the Project, and on the eastern edge of the Oak Grove Area of HWP. The area to the north of the mitigation areas includes the natural vegetation in the Arroyo Seco channel. To the west of the mitigation areas is the Oak Grove Park Area of HWP. The City has future improvement plans for portions of HWP, including upgrading portions of the Oak Grove Area, relocation of portions of the disc golf course, and drainage improvements at Berkshire Creek but in general, the existing character and uses of the Oak Grove Area will remain the same as they are currently. Unofficial hiking and equestrian trails do currently traverse through some of the proposed mitigation areas but plans for trails closures and redirection of trails will eliminate impacts associated with the trails in sensitive habitats. The areas to the east and northwest of the mitigation areas are urbanized with residential communities and the Jet Propulsion Laboratory facility. Areas downstream of Devil's Gate Dam are generally urbanized, however patches of native vegetation do occur adjacent to the channel in a few areas within the Central and Lower Arroyo Seco. Two short sections of soft bottom channel are present downstream of the dam: (1) immediately downstream of the dam face, and (2) between Holly Street and W Colorado Boulevard in the City of Pasadena.

2.2.2.1 Hahamongna Watershed Master Plan and Amendment

In 2003, the City prepared and adopted a Master Plan for the Hahamongna Watershed Park (HWP), which established a 300-acre park area that encompasses Devil's Gate Reservoir and portions of the surrounding areas. In 2010, an addendum to the Master Plan was prepared by the City that covered the addition of a 30-acre upland parcel, referred to as the HWP Annex, located in the northwest portion of HWP. The proposed development in the HWP Master Plan included new west and east side spreading basins, multi-use play fields and relocated disc golf course, additional parking areas, widening the stream channel, and habitat restoration activities. The Master Plan also identified a Trail Plan that identified a system of recreational trails through HWP. LACFCD approached the City about planned developments in HWP and potential conflicts with the proposed mitigation for the Devil's Gate Project. Staff from the City stated that the west side basins and the multi-use play fields have been eliminated from the proposed developments in the Master Plan. In 2010, a Pasadena City Council action eliminated the proposed northern multi-use play field. The other proposed multi-use play field has been implicitly removed through separate actions including a re-distribution of Integrated Regional Water Management Plan (IRWMP) grant funds and a shift of funds away from the multi-use field in Hahamongna Watershed Park to a replacement location at John Muir High School. In addition, Pasadena Water and Power is currently developing a plan to improve and expand the spreading basins to the east of the reservoir, and as a result they are no longer pursuing the west side spreading basins. These development projects would have conflicted with the location of the proposed mitigation areas. In addition, LACFCD discussed the Trail Plan with the City staff and expressed concerns about planned trails through proposed locations for the mitigation areas. City staff stated that LACFCD could, as part of their mitigation plan, close trails through the reservoir and through the proposed locations of mitigation areas (Figure 2-2). The City requested that the Perimeter Trail remain open, which does not conflict with the proposed locations of the mitigation areas. All of the proposed mitigation areas are located within the Perimeter Trial. LACFCD also discussed the relocation of some of the disc golf holes to areas outside of the riparian habitat and the proposed mitigation areas to eliminate human disturbances associated with players searching for the discs. The City staff agreed that the disc golf holes will be relocated out of areas within or adjacent to sensitive habitat areas. The orientation of all disc golf holes in this mitigation area will be such that the players are throwing away from the adjacent sensitive habitat areas.

Figure 2-2
Proposed Trail Map

Map Features

- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]
- Arroyo Seco Trail
- Seasonal Trail
- Barriers to Access
- Proposed Sign Location

Mitigation Areas

- DG-1
- DG-1 WOUS
- DG-2
- DG-2 New Channels
- DG-2 WOUS
- DG-2A
- DG-2B
- DG-3A
- DG-4
- DG-4 Drainage
- DG-4 Sheetflow
- DG-4 WOUS
- DG-4 WOUS Connections
- DG-4A
- DG-4B
- DG-4C
- DG-5
- DG-7 (Temp Impacts)
- DG-8 (Temp Impacts)
- DG-9 (Temp Impacts)
- DG-SF-1
- DG-SF-2
- DG-W-1 (Johnson Field)
- DG-W-2 (Mining Pit)
- DG-W-2 (Mining Pit Outlet)

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2014-003.008 Devil's Gate Sediment Removal Project

Scale in Feet
0 600

Photo Source: NAIP 2016
[1] LADPW

Map Date: 7/31/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\meeting_maps_and_analysis\2017-04-13_Trails\DG_Approved_Trails_V3.mxd (MAG) mguidry 7/31/2018

2.2.2.2 General Plan Draft Open Space & Conservation Element

In 2012, the City prepared an update to the General Plan called the Draft Open Space & Conservation Element. The Open Space & Conservation Element established the Arroyo Seco as the City's largest natural open space that extends eight miles from the San Gabriel Mountains to the Los Angeles River. The Arroyo Seco includes three distinct geographic areas, which are also designated as City parks, including HWP, Central Arroyo, and Lower Arroyo. HWP is composed of the lower 320 acres of the total 1,330 acres of the Upper Arroyo Seco. Other than the 90-acre Oak Grove Area, which is dedicated as parkland, the remainder of HWP is largely natural open space that provides passive recreational uses that coexist with the flood management operations of LACFCD in Devil's Gate Reservoir. The goals and objectives of the Open Space & Conservation Element include preserving, restoring, and maintaining the natural character of the Arroyo Seco as a self-sustaining healthy ecosystem of plants and animals. In addition, the goals and objectives also include promoting responsible human interfaces with these unique natural environments in open space planning. The Arroyo Seco is zoned as Open Space (OS) in the Open Space Zoning District. The OS category is for a variety of active and passive public recreational facilities and for City-owned open space facilities. This category also includes natural open space and areas, which have been designated as environmentally and ecologically significant. This designation only applies to lands owned by the City. The Open Space & Conservation Element designates the City's Planning Department as the oversight group for assessing impacts of proposed developments on open space parcels, sensitive species, and habitat areas. In addition, the City's Public Works Department provides ongoing oversight for continuing to preserve and restore the Arroyo Seco. The proposed mitigation areas for the Project are located entirely within the areas the City has zoned as OS and identified as OS in the City's General Plan. In order to change the underlying zoning, the City would have to initiate the City's normal re-zoning process involving public hearings and a City Council adoption. Certain parcels within the proposed mitigation areas are also "dedicated parkland" which is a higher, more restrictive classification. A vote of the people is required to change the designation of these lands.

2.2.2.3 City Municipal Code – Chapter 3.32.100

In addition to the Open Space & Conservation Element, the City's Municipal Code (Chapter 3.32.100) establishes Natural Preservation Areas in the following locations: on the slope banks of the Arroyo Seco, the Lower Arroyo from the south City limit to Holly Street bridge, the flood control channel area west and south of Brookside Park, and the area north of Brookside Golf Course to Devil's Gate Dam (City of Pasadena 2003a). The Municipal Code sets forth the permitted uses and special regulations related to limiting activities within the Natural Preservation Areas. The permitted uses and special regulations apply to the area that includes Devil's Gate Reservoir and the proposed mitigation areas. However, the proposed mitigation areas will be subjected to the more stringent protections and requirements in the permits issued by the USACE, RWQCB, and CDFW.

2.2.3 Connectivity of Proposed On-Site Compensatory Mitigation Areas

The habitat restoration activities conducted at the proposed mitigation areas will improve the function and values in Devil's Gate Reservoir and the Arroyo Seco Watershed and will result in much higher quality habitat than currently exists. Improvement of habitat in the preserved portions of the reservoir will increase the value of the area as a critical linkage, it will buffer the USACE jurisdictional areas, it will

improve the quality and increase the quantity of riparian habitat under the jurisdiction of the CDFW, and it will provide for additional opportunities for wildlife. The reservoir area provides essential habitat connectivity between Flint Wash and the Arroyo Seco located downstream of the dam, Hahamongna Watershed Park, and areas located upstream in the Angeles National Forest. The habitats in the reservoir area and the adjacent HWP function as a critical linkage in a highly developed area. Not only do wildlife species reside in the area but they also use the area for juvenile dispersal, seasonal migration, and home range connectivity. Improving the habitat will greatly increase the quality and quantity of available habitat for least Bell's vireo and southwestern willow flycatcher and potentially for the western yellow-billed cuckoo.

2.2.4 Open Space Areas Abutting On-Site Compensatory Mitigation Areas

The LACFCD holds perpetual property rights over the reservoir and all proposed mitigation areas as recorded through easements granted in May of 1919 and March of 1965. The City, in collaboration with the LACFCD, recognizes the value of the mitigation areas to the HWP and intends to conserve and protect these areas. The City has adopted numerous policy documents relevant to the HWP, such as the Hahamongna Watershed Park Master Plan (2003b), Hahamongna Watershed Park Master Plan Addendum for the Hahamongna Annex (2010), and Open Space & Conservation Element of the General Plan (2012). These documents commit the City to protect native habitats and conserve and protect the natural resources of the Arroyo Seco. The adoption in 2003 of the Hahamongna Watershed Park Master Plan (HWPMP) was the culmination of a five-year community planning process with extensive participation from the LACFCD. The HWPMP is the central guiding document for the City's planning for this area. The City has removed soccer fields from the HWPMP and does not plan to develop areas within the impact area or mitigation areas. The proposed compensatory mitigation areas have a General Land Use designation of Open Space and are zoned Open Space under the City of Pasadena Open Space & Conservation Element of the General Plan.

2.2.5 On-Site Existing and Proposed Buffer Width

The existing and proposed buffer for the proposed mitigation areas includes all of the habitats within Devil's Gate Reservoir that are located outside of the Permanent Maintenance Area and adjacent to the mitigation areas. The proposed buffer width ranges from approximately 25 to 425 feet. The narrowest portion of the proposed buffer is approximately 25 feet on one side of an ephemeral drainage that will be rehabilitated and the buffer will be revegetated with upland vegetation.

2.3 Site-specific Information

2.3.1 Ownership Information

The City is the owner of the underlying lands within Devil's Gate Reservoir where the proposed on-site mitigation areas are located. The LACFCD holds a perpetual flood control easement from the City to operate the Devil's Gate Dam and the associated reservoir, which means the flood control easement does not expire nor does it need to undergo a renewal process after a certain time period has passed. This is a permanent agreement between LACFCD and the City. The City contact information is as follows:

City of Pasadena
100 North Garfield Avenue
Pasadena, California 91109
(626) 744-4000

2.3.2 Existing and Anticipated Sources of Hydrology

The existing sources of water for Devil's Gate Reservoir are inputs from the natural and urbanized areas within the Arroyo Seco Watershed. Water from the natural areas upstream is conveyed into the reservoir through the Arroyo Seco wash and surface flows from areas adjacent to the Arroyo Seco. According to the HWPMP, 23 storm drains also convey flow to the reservoir. Most of these storm drains divert run-off from neighborhoods and businesses into the reservoir. During larger storm events, water is impounded behind the dam for a period of time to allow sediment to drop out of the water column and to provide flood control for downstream areas. In addition to water provided by precipitation and available groundwater, the inundation of the reservoir by the impoundment of water and water flowing through the established natural channels throughout the reservoir provide the necessary moisture for the survival of the riparian habitats in the reservoir.

Water from the Arroyo Seco and storm drains continues to flow to the southernmost point in the reservoir and leaves the reservoir from the outlet structures of the dam. Water flows south of the dam for approximately 8.5 river miles to the Los Angeles (LA) River in Los Angeles near the State Route (SR) 110 and Interstate 5 (I-5) freeway interchange. The LA River continues to flow south for approximately 23.5 river miles to its terminus at the Pacific Ocean in Long Beach.

The anticipated water sources for the proposed mitigation areas, which are located within Devil's Gate Reservoir will primarily continue to be input from precipitation, surface flows from surrounding areas, and periodic inundation. The lowest elevation valve is generally left open prior to the onset of the first rain event of the season. During a rain event, if water pools and the water surface elevation continues to rise, the lowest elevation valve is closed. Two larger slide gates are then operated to manage the reservoir elevation. When inundation in the mitigation areas does occur, the duration will vary depending upon the elevation of the mitigation areas. The duration of inundation is not expected to be long enough to cause mortality of the riparian vegetation unless an exceptional storm season occurs. Groundwater may provide additional support to the mitigation areas but to a far lesser degree. Artificial sources of water in the form of irrigation (such as from a water truck or irrigation system hooked up to a City water source) will be used at some of the on-site mitigation areas in order to help the plants become established. Once the plants are established, the irrigation will be removed. Natural sources of water for the on-site mitigation areas will include groundwater, natural runoff during storm events, inundation when water is held behind the dam, and potentially overflow from upstream percolation basins, which is expected to be rare.

2.3.3 Soil Characteristics

The soil characteristics at the proposed mitigation areas are suitable for the restoration of riparian habitats. The existing habitat type in and adjacent to the mitigation areas is riparian with a predominance of willows, cottonwoods, and mulefat. Those areas dominated by nonnative and invasive species, that likely supported native vegetation prior to the large influx of sediment following the Station Fire, are also

located within the reservoir and would be expected to exhibit similar soil characteristics as the areas dominated by riparian plant species.

The two soil types that have been identified in the reservoir include Ramona Sandy Loam and Hanford Gravelly Loam. Ramona Gravelly Loam consists of fine, well-drained, sandy loam soil formed from the breakdown of granite rock. This type of soil has moderately slow permeability and is typically observed on terraces and in alluvial fans with flat to slightly sloped topography at elevations ranging from 250 feet amsl to 3,500 feet amsl. Hanford Gravelly Sandy Loam consists of well-drained soil typically found on stream bottoms, floodplains, and alluvial fans on slopes from 0 to 15 percent. This soil forms at elevations ranging from 150 feet amsl to 3,500 feet amsl and is primarily from granite and other quartz containing rock.

Because post-sediment removal compensatory mitigation is planned to take place where riparian vegetation communities currently exist, it is presumed that the existing soil type within the Project site will be appropriate for the type of planned mitigation. Soils composition below sediment buildup is presumed to be supportive of riparian vegetation communities. Compensatory mitigation measures taking place at Johnson Field, consisting of removing sediment build up, will presumably expose native soil that can support riparian vegetation communities and reconnect the area to the existing channel.

2.3.4 Strahler Stream Order and Hydrologic Regime

The Strahler Stream Order for the mitigation site is 3. The hydrologic regime of the main channel of Arroyo Seco is intermittent in the Project. However, upstream reaches of the main channel are perennial during most years. Flows within the Project area are usually subsurface except for during storm events where flows occur on the surface. The side channels entering Arroyo Seco are ephemeral and perennial.

2.3.5 Existing Habitat Types and Presence of Known Species or Habitats of Concern

The proposed mitigation areas are located within Devil's Gate Reservoir, just east of the Oak Grove Area of Hahamongna Watershed Park. Table 2.1 lists the existing vegetation communities and land cover types within the mitigation areas and buffer areas. Several habitats of concern are existing in the reservoir, including *Salix gooddingii* Woodland Alliance, *Lepidospartum squamatum* Shrubland Alliance (equivalent of Riversidean Alluvial Fan Sage Scrub), and *Quercus agrifolia* Alliance (coast live oak woodland). These communities contain an abundance of invasive and nonnative plant species including perennial pepperweed (*Lepidium latifolium*), various species of mustards (*Brassica* spp.), thistles, and other weedy species.

Table 2.1 Existing Vegetation Communities
RIPARIAN/FLOODPLAIN
***Salix gooddingii* Woodland Alliance**
Salix gooddingii Woodland Alliance
Salix gooddingii Woodland Alliance - Sparse
Salix gooddingii Woodland Alliance-20% Lepidium latifolium/Xanthium strumarium
Salix gooddingii Woodland Alliance-30% Lepidium latifolium/Xanthium strumarium

Table 2.1 Existing Vegetation Communities
***Baccharis salicifolia* Shrubland Alliance**
Baccharis salicifolia Shrubland Alliance-No Understory
Baccharis salicifolia Shrubland Alliance-20% *Conium maculatum/Lepidium latifolium*
Baccharis salicifolia Shrubland Alliance-30% *Conium maculatum/Lepidium latifolium*
Baccharis salicifolia Shrubland Alliance-40% *Conium maculatum/Lepidium latifolium*
FLOODPLAIN
Lepidospartum squamatum Shrubland Alliance
Lepidospartum squamatum Shrubland Alliance
Lepidospartum squamatum Shrubland Alliance (Sparse)
NATIVE UPLAND
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance-20% Lepidium latifolium
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance-30% Lepidium latifolium
Quercus agrifolia Alliance
Platanus racemosa Woodland Alliance - Disturbed
NONNATIVE/OTHER
Brassica nigra and other mustards Herbaceous Semi-Natural Alliance
Conium maculatum Herbaceous Semi-Natural Alliance
Lepidium latifolium – Conium maculatum Herbaceous Semi-Natural Alliance
Lepidium latifolium Herbaceous Semi-Natural Alliance
Rumex crispus Herbaceous Semi-Natural Alliance (Unofficial Alliance)
Xanthium strumarium Herbaceous Alliance (Unofficial Alliance)
Eucalyptus (*globulus, camaldulensis*) Woodland Semi-Natural Alliance
Fraxinus velutina Forest Alliance (Unofficial Alliance)
Landscaped
Depression/Bare Ground (Associated with Seasonally Wet Area)
Disturbed (Barren/Trails/IMP Area)

Past biological surveys in Devil's Gate Reservoir, where the mitigation areas are located, have documented the presence of migratory least Bell's vireo and southwestern willow flycatcher. Both of these species are federally and state-listed endangered species. Two separate observations of least Bell's vireos and one observation of southwestern willow flycatchers were documented in the western portion of the reservoir during focused surveys for western yellow-billed cuckoo that were conducted in 2015 (Chambers Group 2015a). The locations where the birds were observed are within the areas where habitat will be enhanced through the removal of invasive and nonnative plants. Focused surveys for least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo, and coastal California gnatcatcher (*Polioptila californica californica*) were also completed by ECORP (ECORP 2016b; c) and Leatherman BioConsulting (Leatherman 2016) in 2016. An additional survey for western yellow-billed cuckoo was also conducted by Chambers Group in 2016 (Chambers Group 2016). Migratory vireos were observed early and late in the 2016 season by ECORP but no evidence of nesting was observed. This species was not present in the reservoir between

May 4 and August 1, which is the period when nesting occurs. Chambers Group did not observe least Bell's vireos, western yellow-billed cuckoos, or willow flycatchers during their 2016 surveys. Flycatchers, cuckoos, and California gnatcatchers were not observed during any of the focused surveys conducted in 2016. Additional focused surveys for least Bell's Vireo and southwestern willow flycatcher were conducted in 2017 by ECORP and Leatherman BioConsulting (ECORP 2018). No least Bell's vireo or southwestern willow flycatcher were detected during focused surveys in 2017. Devil's Gate Reservoir is not within Designated Critical Habitat for least Bell's vireo, southwestern willow flycatcher, or coastal California gnatcatcher but does contain limited suitable habitat for the species.

2.3.6 Discussion of Water Rights

At Devils Gate Reservoir, the State Water Resources Control Board (SWRCB) shows two water rights, both owned by the City of Pasadena Department of Water and Power.

The City of Pasadena Department of Water and Power owns a pre-1914 right to divert up to 25 cubic feet per second (cfs) of surface water from the Arroyo Seco stream to recharge groundwater. The diversion structure historically diverted streamflows into the intake structure which was designed to accommodate up to 25 cfs of water. The City of Pasadena currently diverts up to 25 cfs of surface water during the dry season but is unable to divert the full allotment of 25 cfs of water during the storm season due to high sediment-laden flows. As such, the existing diversion structure is not capable of consistently diverting the 25 cfs allotment during the storm season. The listed use is for 164,000 domestic hookups. The point of diversion is from a City-owned diversion structure located approximately 1.6 miles upstream of Devil's Gate Dam.

The City of Pasadena Department of Water and Power also holds an appropriative right from 1919 to divert up to 1.8 cfs and a maximum of 238 Acre-Feet (AF) per year for irrigation use. The point of diversion is from the existing Devil's Gate Tunnel which collects percolated water from Devil's Gate Reservoir.

2.4 Summary of Identified Risks

The following sections summarize the risks that have been identified in relation to locating the mitigation areas within a flood control facility.

2.4.1 Proposing Mitigation on Lands Not Owned by the Applicant

- The land within the Devil's Gate Reservoir where both the Project and the on-site mitigation for Project impacts are proposed is government property, owned by the City.
- The Project site has a General Plan Land Use designation of Open Space and is zoned as Open Space under the City of Pasadena General Plan (City of Pasadena 2012).
- The City has granted a perpetual easement to the LACFCD with the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, reservoir, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding waters of the Arroyo Seco for the purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965). This perpetual flood control easement does not expire nor does it

need to undergo a renewal process after a certain time period has passed. This is a permanent agreement between LACFCD and the City.

- The HWPMP, which was adopted in 2003, encompasses approximately 300 acres and includes Devil's Gate Dam and Reservoir. The HWPMP establishes a visionary framework for recreation, water resources, flood management, habitat restoration, and cultural resources in Hahamongna Watershed Park.
- The City is in agreement with implementation of the proposed mitigation within the reservoir and the Hahamongna Watershed Park. The City has stated they will not be implementing development of any facilities within the areas proposed for mitigation by LACFCD.

2.4.2 Long-Term Protection (Legal Agreement)

- Flood Control Easement – As mentioned previously, LACFCD has a perpetual flood control easement and they are granted the right to conduct activities within the boundaries of the easement (Figure 2-3). The Project and the associated mitigation are both consistent with the easement.
- As mandated by the State of California Legislature, LACFCD is perpetually required to maintain the Devil's Gate Dam and Reservoir for flood protection. Once the Project and associated mitigation have been implemented, it will become the new baseline for the Reservoir, and LACFCD will have a permanent responsibility to maintain the site as such.
- LACFCD has worked cooperatively and closely with the USACE on numerous programs and projects for over 100 years. LACFCD is a proven reliable partner. These projects have included the Big Tujunga Wash Mitigation Area, The Tujunga Wash Ecosystem Restoration Project, a 2.5-mile long riparian habitat corridor, and the Los Angeles River/Rio Hondo (LARIO) Trail System Project, an extensive trail system connecting multiple rivers and recreational areas, and Los Angeles County Drainage Area (LACDA).
- Open Space Designation in the Master Plan – As mentioned previously, the area encompassing the proposed mitigation area is designated as Open Space under the City's General Plan.
    - In order to change the underlying zoning, the City would have to initiate the City's normal re-zoning process involving public hearings and a City Council adoption. Certain parcels within the proposed mitigation areas are also "dedicated parkland" which is a higher, more restrictive classification. A vote of the people is required to change the designation of these lands.
- Agreement from City – The City has provided a letter stating that the City will consider the lands as permanent mitigation areas, and that the City is committed to protecting native habitats and conserving the natural resources of the Arroyo Seco. LACFCD has collaborated with the City to determine the most suitable restoration areas and ensure that the proposed mitigation areas are consistent with goals of the HWPMP and the City's General Plan. It is understood by the City that the mitigation areas will be protected by LACFCD in the long-term and will be maintained and monitored by LACFCD to ensure established performance standards are met and maintained.

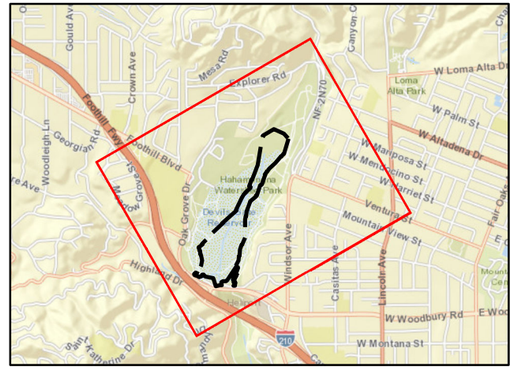
Figure 2-3
Existing Easements Near Project

Map Features

- Project Footprint [1]
- Flood Control Easement [1]
- SCE Overhead Power Easement [1]
- PWP Overhead Power Line [1]
- Exisitng Gas Utility Easement [1]
- Existing Water Utility [1]

Mitigation Areas

- DG-1
- DG-1 WOUS
- DG-2
- DG-2 New Channels
- DG-2 WOUS
- DG-2A
- DG-2B
- DG-3A
- DG-4
- DG-4 Drainage
- DG-4 Sheetflow
- DG-4 WOUS
- DG-4 WOUS Connections
- DG-4A
- DG-4B
- DG-4C
- DG-5
- DG-7 (Temp Impacts)
- DG-8 (Temp Impacts)
- DG-9 (Temp Impacts)
- DG-SF-1
- DG-SF-2
- DG-W-1 (Johnson Field)
- DG-W-2 (Mining Pit)
- DG-W-2 (Mining Pit Outlet)



ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2018-047 Devils Gate Mitigation Plan

Scale in Feet
0 300 600 900

Photo Source: NAIP 2016
[1] LADPW

Map Date: 7/31/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\meeting_maps_and_analysis\2018-04-10_Easements\DG_Easements_20180731.mxd (MAG) mguidry 7/31/2018

- LACFCD anticipates the City will initiate the lengthy process to revise the HWPMP following the implementation of the Project to formally include the preservation of the mitigation areas and remove any mention of outdated conflicting recreational facility plans that have already been eliminated by City Council. The City plans to begin the process to amend the HWPMP following the implementation of the Oak Grove Area Improvements (OGAI) Project. LACFCD will coordinate closely with the City on any amendments to the HWPMP.
- The process to amend the HWPMP includes: City of Pasadena Department of Public Works would (1) prepare the report and proposed revisions, (2) collect input from the community, (3) present the proposals to the Hahamongna Watershed Park Advisory Committee and the Design Commission, and (4) present the proposal to the City Council for adoption. There could be a potential need to complete a CEQA document, which would be based on the extent of the proposed revisions.
- LACFCD is committed to replace any failed mitigation whether in the same location or a different location (See details of the Adaptive Management Plan in Section 11.0)
- Easements – Devil's Gate Reservoir is traversed by several utility easements that include transmission lines and water and gas pipelines. The total acres of easements overlaying the mitigation site is 2.55 acres and each of the easements is described in the following bullets.
    - Southern California Edison maintains overhead lines within a 0.69-acre easement along the western edge and a 0.35-acre easement (Figure 2-3) along the northern edges of the mitigation areas, which include portions of four mitigation areas (DG-1, DG-4, DG-4A, DG-9). The mitigation areas are not anticipated to conflict with Southern California Edison's tree trimming requirements. However, individual trees may need to be trimmed in some cases to comply with Southern California Edison's requirements. All activities conducted in the SCE easements may require a Section 404 permit under the Clean Water Act.
    - Pasadena Water and Power maintains an overhead line along the eastern portion of the mitigation areas (Figure 2-3) and over four mitigation areas (DG-1, DG-4, DG-7, DG-9). The mitigation areas are not anticipated to conflict with Pasadena Water and Power's tree trimming requirements. However, individual trees may need to be trimmed in some cases to comply with Pasadena Water and Power requirements. All activities conducted along the Pasadena Water and Power easement may require a Section 404 permit under the Clean Water Act.
    - The City has an easement containing one water line, a 12" galvanized steel standard screw end line, within the Project boundary (Figure 2-3). The easement is not expected to affect mitigation efforts. However, should maintenance be required within the easement, mitigation efforts may be temporarily impacted. All activities conducted along the City's water line easement may require a Section 404 permit under the Clean Water Act.
    - Southern California Gas Company has a 1.25-acre easement within the mitigation areas containing a 12-inch natural gas line (Figure 2-3). The easement occurs in the same general area as the City's 12" water line. The easement is not expected to affect mitigation efforts.

However, should maintenance be required within the easement, mitigation efforts may be temporarily impacted. All activities conducted along Southern California Gas Company's natural gas line easement may require a Section 404 permit under the Clean Water Act.

- Los Angeles County Sewer District has an easement which contains a sewer main along the southwestern edge of the mitigation areas. The easement is not expected to affect mitigation efforts as it occurs outside the mitigation areas. If activities conducted within the Los Angeles County Sewer District's easement encroach into jurisdictional areas, then a Section 404 permit under the Clean Water Act may be required.

2.4.3 Financial Assurances

- LACFCD has the financial resources to undertake the mitigation and sustained long-term management of the mitigation areas. The LACFCD's primary sources of funding are the ad valorem property tax for the Flood Control District and the Flood Control Benefit Assessment. LACFCD has an average annual budget of approximately $240 million for operations and maintenance of, and improvements to Flood Control facilities and compensatory mitigation for said projects, and a Bond Rating of AAA+. LACFCD has the ability and is committed to making a discrete line item in its annual budgets for the required mitigation and long-term management of the mitigation areas for the Project. Fund designation of $14,000,000 to complete the compensatory mitigation for the Project was approved by the County of Los Angeles Board of Supervisors on November 7, 2017.

- LACFCD has demonstrated success in implementing and managing mitigation projects. A notable mitigation site is the Big Tujunga Wash Mitigation Area, which was established in 2000 and has met the established functional success criteria. LACFCD continues to provide the long-term maintenance and management of the Mitigation Area. The monies required to fund the long-term maintenance and management of the Big Tujunga Wash Mitigation Area are budgeted and dedicated on an annual basis. Another notable mitigation site, is the recently created and very successful Oak Woodland habitat mitigation area at the Santa Anita Sediment Placement Site in Arcadia, California (USACE Permit No. 2008-00370-VEN, LSAA 1600-2008-0173-R5).

- LACFCD has the ability to fund a new mitigation site and acquire property, if necessary, or to provide adaptive management of the proposed mitigation in case the proposed mitigation site fails (See details of the Adaptive Management Plan in Section 11.0).

2.4.4 Hydrology and Flood Control

- **Natural Input from the Watershed** – Hydrology information shows that sub-watersheds on both the western and eastern sides of the reservoir drain directly into the mitigation areas. The volume of water entering the western portion of the reservoir from these sub-watersheds ranges from approximately 33 acre-feet during a two-year storm event to approximately 89 acre-feet during a 50-year storm event. The volume of water entering the eastern portion of the reservoir from these sub-watersheds ranges from approximately 159 acre-feet during a two-year storm event to approximately 450 acre-feet during a 50-year storm event. Precipitation falling directly

on the mitigation areas during storm events will also provide water to the habitats in the mitigation areas.

- **Inundation** – LACFCD will continue to operate Devil's Gate Dam in the same manner that it has been operated in the past. Impounded flows in the reservoir reach the mitigation areas at elevation 1,020 feet. Modeling of the peak storage and flow of a 2- to 5-year frequency storm event that occurred in January of 2008 shows that with the approved configuration for the Project, the peak storage would have been approximately 1,522.40 acre-feet and the elevation within the reservoir would have reached 1,037.10 feet. The modeling for this design storm shows that this size storm would provide natural runoff to much of the mitigation areas in the western and eastern portions of the reservoir, and the mitigation areas could be inundated on a periodic basis during the storm season. Generally, the lowest elevation valve is left open prior to the onset of the first rain event of the season. During a rain event, if water pools and the water surface elevation continues to rise, the lowest elevation valve is closed. Two larger slide gates are then operated to manage the reservoir elevation. Any water present at the end of storm season (April 15) will be released. LACFCD has the ability to regulate the length of time that the mitigation areas would be inundated. LACFCD will ensure that mitigation areas are successful.

- **Other Projects in the Watershed** – All of the projects mentioned here are completely separate projects and have independent utility from the Project. The City's Arroyo Seco Canyon Project consists of improving the City's water intake structure in the canyon portion of Arroyo Seco and expanding the existing spreading basins. The purpose of the project is to allow the City to take its full entitlement of 25 cfs from the Arroyo Seco. Successful implementation of the City's project will only increase diversion during the storm season in which the amount of flows that will be diverted is minimal relative to inflows into the reservoir. It is estimated that during an average storm seasons, if the City utilizes their full entitlement after implementation of their project, 4,980 acre-feet of water will remain in the stream and reach the reservoir and mitigation areas. The City's Non-Potable Water Project involves construction and operation of a new non-potable water distribution system to deliver water from three local supply sources: (1) recycled water produced by the Los Angeles/Glendale Water Reclamation Plant, (2) surface water inflows from two existing tunnels (Devil's Gate and Richardson Springs), and (3) water from the Arroyo Seco stream downstream of Devil's Gate Dam, to customers within the service areas of Pasadena Water and Power, Lincoln Avenue Water Company, Foothill Municipal Water District, and California American Water Company, for landscape irrigation, industrial cooling, and other non-potable uses. The Devil's Gate tunnels that will be utilized by the project are existing tunnels and their use will not have any new impacts to the reservoir.

- **Management of Water Availability for the Mitigation Areas** – LACFCD has the ability and is committed to ensuring adequate water resources are available to sustain the mitigation areas. Supplemental water will be provided to container plantings and pole cuttings during the establishment period. LACFCD will monitor inundation in the mitigation areas to ensure mitigation success. If it is determined that without intervention, the reservoir elevation following a rain event would inundate the mitigation areas longer than the species within the mitigation areas can withstand, LACFCD would operate the outlet valves on the dam to lower the reservoir

elevation. In the event of an extended period of inundation where riparian vegetation is damaged or lost, a damage assessment and adaptive management measures will be implemented to ensure the mitigation areas survive for the long-term. Similarly, in the event of a prolonged drought, LACFCD will continue to monitor the status of the mitigation areas to determine losses or damage caused by lack of precipitation. A damage assessment will be completed and adaptive management measures will be determined and implemented when rainfall events do occur.

2.4.5 Damage Caused by Natural Events On-Site

- Should a natural event occur, such as catastrophic flooding of the mitigation areas or fire, that may damage all or a portion of the mitigation areas, LACFCD will conduct a damage assessment to determine if adaptive management measures are necessary to assist in the recovery of the mitigation areas. The adaptive management measures may include maintenance to keep nonnative and invasive plants from out-competing the recovery of the native vegetation and potentially planting and/or seeding if areas are having difficulty recovering from the damage caused by the natural event. LACFCD has the ability to fund the adaptive management measures to assist the mitigation areas in returning to the intended habitat types.

2.4.6 Damage Caused by LACFCD Activities

- In the event that it becomes necessary for LACFCD to operate the dam in a manner that results in catastrophic or partial damage to the mitigation areas, LACFCD will conduct a damage assessment to determine the adaptive management measures necessary to return the mitigation areas to the intended habitat types. The adaptive management measures may include planting, seeding, watering, maintenance, and monitoring until the mitigation areas achieve the established success criteria. In such situations, any temporal loss would be considered and incorporated appropriately. LACFCD has the ability to fund the adaptive management measures necessary to ensure the mitigation areas return to the intended habitat types and achieve the established success criteria.

- A cowbird trapping program will be implemented for the first three years after the initial sediment removal. If success criteria are not met after the first three years, the program will be implemented for an additional two years. The program will be used to account for loss of overall nesting habitat and riparian understory. The program will use the most recent agency-approved methodology.

2.4.7 Monitoring during Initial Sediment Removal and Annual Maintenance

- Biological monitoring will be conducted during the initial sediment removal phase of the Project and during the annual maintenance period to ensure that the contractors stay within the limits of grading and they do not venture into the mitigation areas. If a contractor were to damage any portion of the mitigation areas, then a damage assessment would be conducted and adaptive management measures would be developed and implemented to ensure the damaged mitigation area achieves the established success criteria.

2.4.8 Mitigation Site Compatibility with Multiple Uses

- The mitigation areas are currently traversed by trails used by hikers, equestrians, bird-watchers, joggers, nature lovers, and people walking their dogs. In general, these passive recreation activities do not create a lot of disturbance. Also, it appears that most of the activities are confined to the existing trails and due to the density of the vegetation in most areas, people generally don't venture far into the vegetation adjacent to the trails. However, loose dogs are present on a relatively frequent basis and they do cause additional disturbances when they venture off the trails and into the adjacent habitat. As part of the mitigation plan, LACFCD intends to close or control the use of the trails that cross through the mitigation areas to decrease the disturbances to the conserved habitat areas. The perimeter trail around the reservoir will remain open. The City has agreed that any trails through the reservoir can be closed as long as the perimeter trail remains open. The mitigation plan for the Project also includes narrowing portions of permanent trails, planting native barrier plants, such as cactus species, along trails to buffer sensitive habitat areas, placing woody debris at strategic locations in mitigation areas to increase functional value, removing trash, posting signs to identify the mitigation areas, and conducting educational outreach. Initially, closing trails will be a challenge but education and outreach will be conducted concurrently to promote awareness of the sensitivity of wildlife to the presence of people and dogs and the importance of conserving the habitat. LACFCD has had great success with educational outreach at the Big Tujunga Wash Mitigation Area.

- The site is open to homeless persons and homeless encampments have the potential to affect the quality of the mitigation areas. Pasadena Police Department (PPD) has a Homeless Persons Policy (Policy 464) that addresses issues pertaining to homeless activity within the City's limits. Specifically, Policy 464.6 addresses impacts to the ecology and natural resources of the City. Regular patrols by PPD will address issues pertaining to homeless persons and encampments in the mitigation areas. Furthermore, the City has an ordinance pertaining to homeless issues, which is found in Chapter 3.24.110 of the Title 3 of the City's Municipal Code.

2.4.9 Survival of the Habitats in the On-Site Mitigation Areas

- Devil's Gate Reservoir historically and currently supports riparian habitat throughout most of the reservoir. The areas where mitigation is planned to occur currently support or did historically support riparian vegetation. The soils present in the mitigation areas are suitable and able to support the vegetation that will be planted in the mitigation areas. Water to support the vegetation in the mitigation areas will be available through a combination of precipitation, surface runoff, and inundation. LACFCD has the ability to manage the amount of water provided to the mitigation areas by controlling the levels of water in the reservoir and the duration of inundation. Initially, container plants and cuttings will be provided with supplemental water until they become established. Once established, they will be able to survive and thrive with the existing water provided from reservoir management and natural sources, such as runoff from areas surrounding the mitigation areas. In the event that a prolonged drought occurs or a catastrophic flood washes out the mitigation areas or inundates the mitigation areas for a prolonged period, a damage assessment will be conducted. Adaptive management measures will be developed and implemented to ensure the mitigation areas meet the success criteria. Trails will be closed in the

mitigation areas to eliminate disturbances caused by the presence of humans and dogs and public outreach and education will be provided to the site users. Regular biological monitoring will be conducted to ensure the contractors don't go outside of the approved grading limits and into the mitigation areas. In addition, the biological monitoring will identify problems within the mitigation areas that will then be rectified by LACFCD. Restoration activities will include the initial removal of nonnative and invasive plants and planting and seeding with native species. Ongoing maintenance will be conducted for the long-term to ensure the nonnative and invasive plants do not out-compete the native plants. Quantitative and qualitative monitoring will be conducted to determine the status and success of the restoration areas. CRAM monitoring will be conducted to compare the mitigation areas to the baseline CRAM values and to ensure the mitigation areas are on a trajectory to meet the projected CRAM values for the post-Project condition. In addition, restoration monitoring will evaluate the variables associated with the vegetation communities as they pertain to least Bell's vireo habitat. Adaptive management will be an ongoing task to ensure the mitigation areas achieve the success criteria and continue to provide habitat for an abundance of wildlife, including the least Bell's vireo, for the long-term.

3.0 BASELINE INFORMATION FOR PROJECT SITE

3.1 Topography and Elevation

South of the San Gabriel Mountains, the Project site is located in the upper portion of the Arroyo Seco watershed. The Project site is located along an approximately 4,754-feet linear section of the Arroyo Seco drainage and alluvial fan, which is an area subject to change and disturbance due to erosion, runoff, and sediment movement. Devil's Gate Dam was built in 1920, following the floods of 1914 and 1916, for the purposes of flood control and water conservation. Once the dam was complete, sediment accumulation behind the dam from mountain runoff raised the ground surface, creating a broad plain between the walls of the Arroyo Seco Canyon. This floodplain slopes gently from the San Gabriel Mountains at approximately 1,100-feet amsl in the northern portion of the Project site to approximately 985-feetabove mean sea level (amsl) at the dam. Topography within the reservoir has been affected by erosion, sediment accumulation, and historical excavation, resulting in irregular patterns. Few areas have level or nearly level terrain. Shallow ridge crests, alluvial fan slopes, and riparian areas can be found within the floodplain.

The 2009 Station Fire burned more than 160,000 acres of the Angeles National Forest. During the fire, approximately 68 percent of the Arroyo Seco watershed (100 percent of the undeveloped watershed) tributary to Devil's Gate Dam and Reservoir was burned, resulting in large amounts of sediment deposition into the reservoir during subsequent storm events. This deposited sediment not only buried vegetation and raised the elevation of the reservoir invert but has made the reservoir susceptible to scouring and instability during major storm events. Attachment 1 of Appendix B shows Devil's Gate Reservoir Profile before the Station Fire (2000 and 2009), after the Station Fire (2011, 2012, and 2014), and after the Project. The vertical scale has been exaggerated in relation to the horizontal scale to view the profiles. The unevenness of the 2009 sediment profile is the result of long-term deposition of sediment and erosion from periodic storm flows. The 2011 sediment profile shows the large influx of sediment resulting from the Station Fire and, other than the interim cleanout of sediment directly upstream of the dam, the large amount of sediment that has continued to persist into 2014. This large sediment inflow

impacts operations of the dam. The Project proposes to lower the elevation of the sediment within the Project boundary, but the slope will still remain gradual, with an average slope of approximately 1.7 percent. The excavation configuration was designed to provide proper drainage characteristics and to be capable of handling future anticipated sedimentation load. The reservoir is a dynamic system, and the exact topography of the excavation area is expected to change with inflows over time, which may include erosion immediately upstream of the excavation area. Mitigation areas are proposed outside of the established OHWM, at or above the 1,020-feet contour.

3.2 Historic and Existing Hydrology

The following explanation of the hydrology is supported by the attachments included in Appendix B.

3.2.1 Water Resources

3.2.1.1 Natural Drainage and Precipitation

Devil's Gate Reservoir is located in the upper portion of the Arroyo Seco watershed. The Arroyo Seco watershed extends approximately 16 miles in length along the centerline of the watershed and 24 miles along the Arroyo Seco from its origin in the Angeles National Forest to the Arroyo Seco's confluence with the Los Angeles River. Approximately 20,400 acres of both residential and undeveloped land drain into Devil's Gate Reservoir. The Arroyo Seco flows freely through a natural creek upstream of the dam, and in an engineered concrete channel from the dam for nine miles downstream to its confluence with the Los Angeles River. Table 3.1 shows the annual rainfall data for this region. In an average season, this area can receive approximately 23 inches of rain per year. The majority of these rain events occur between November and April.

Table 3.1. Total Yearly Rainfall at Devil's Gate Dam

Water Year	Total Rainfall (in.)
1996/1997	16.99
1997/1998	36.46
1998/1999	9.57
1999/2000	15.67
2000/2001	16.31
2001/2002	6.01
2002/2003	18.09
2003/2004	15.1
2004/2005	64.05
2005/2006	25.66
2006/2007	9.35
2007/2008	18.61
2008/2009	12.84
2009/2010	20.1
2010/2011	25.07

Table 3.1. Total Yearly Rainfall at Devil's Gate Dam	
Water Year	**Total Rainfall (in.)**
2011/2012	9.19
2012/2013	11.96
2013/2014	7.75
2014/2015	15.92

3.2.1.2 Surface Runoff

On the western side of the Project site, water flows from west to east into the reservoir. These flows originate from the Oak Grove Area of Hahamongna Watershed Park and the surrounding communities to the west. Appendix B, Attachment 2 shows the tributary drainage areas west of Devil's Gate Reservoir that drain into the reservoir. This attachment also shows the calculated flow and volume from each area into the reservoir for various storm return intervals. A total of 33 acre-feet of storm flows enter the reservoir from the western tributaries during a 2-year frequency storm (Appendix B, Attachment 2). The volume of flows from the western tributaries can reach up to 89 acre-feet during a 50-year frequency storm.

On the eastern side of the Project site, water flows from east to west into the reservoir. These flows originate from the surrounding Altadena communities to the east. Appendix B, Attachment 3 shows the tributary drainage areas east of Devil's Gate Reservoir that drain into the reservoir. A total of 159.33 acre-feet of storm flows enter the reservoir from the eastern tributaries during a 2-year frequency storm (Appendix B, Attachment 3). The volume of flows from the eastern tributaries can reach up to 450.67 acre-feet during a 50-year frequency storm. Although some of the runoff from the eastern tributaries is captured within the Arroyo Seco Spreading Grounds, all of the volume and flow displayed in the table of Attachment 3 is discharged into the reservoir area.

Surface flows from surrounding areas to the west and east of the reservoir remain the primary and most important source of water for the proposed mitigation areas. These tributary areas will provide runoff to the mitigation areas during even an average rain event (2-year frequency). Various outlets along the western and eastern edges of the reservoir supply water to the reservoir and will continue to supply water directly to the mitigation areas.

3.2.1.3 Stream Flows

The Arroyo Seco is a perennial stream and is highly variable due to seasonal rains, with the majority of rain events occurring between November and April (storm season). During the dry summer months, the stream flows can drop below the surface in the deeper alluvial deposits within the reservoir. Appendix B, Attachment 4 shows the contours and estimated flow path of Devil's Gate Reservoir in January 2009, which was prior to the Station Fire. Pre-Station Fire conditions show water flowing from the north end of the reservoir towards the face of the dam through channels that were cut by storm flows. The contours show several braided channels within the north end of the reservoir that converge into one main channel that flows toward the dam, all within the proposed Project boundary. Subsequent to the Project, flows will travel largely the same path through the reservoir. Table 3.2 shows the yearly inflow into Devil's Gate

Reservoir over the past 15 years. Excluding the water year 2004/2005, the average yearly inflow into Devil's Gate Reservoir is approximately 8,400 acre-feet.

Appendix B, Attachments 5 and 6 show the results of a hydrological analysis of Devil's Gate Reservoir after Project implementation. Appendix B, Attachment 5 models the storage and flow of the 2-year frequency design storm with the post-Project conditions. Appendix B, Attachment 6 models the storage and flow of an actual storm-event that occurred in the watershed of Devil's Gate Reservoir in 2008 under post-Project conditions. The 2007/2008 water year was chosen to model for being an average water year in terms of rainfall. The January 4th through January 8th storm represents a 2- to 5-year frequency storm that occurred during the 2007/2008 water year. Based on the peak inflows shown on Attachment 5 and 6, an average rain event (2-year frequency) would provide runoff to the mitigation area. The total inflow during the average rain event would exceed the capacity of the narrow section of the established maintenance area, and therefore, overflow into the adjacent mitigation areas. Appendix B, Attachment 7 shows the reservoir contours after the initial sediment removal is complete.

Table 3.2. Total Yearly Inflow to Devil's Gate Reservoir

Water Year	Total Inflow (acre-feet)
1999/2000	15,792
2000/2001	12,259
2001/2002	1,731
2002/2003	3,137
2003/2004	2,071
2004/2005	134,360
2005/2006	6,573
2006/2007	4,717
2007/2008	13,962
2008/2009	2,579
2009/2010	19,143
2010/2011	33,340
2011/2012	2,298
2012/2013	513

The City of Pasadena Department of Water and Power (PWP) holds a pre-1914 claim to divert up to 25 cfs of surface water from the Arroyo Seco. PWP exercises their right to divert this water every year. Water is captured from the stream at a diversion dam and intake structure approximately 0.4 miles upstream of the former Jet Propulsion Laboratory (JPL) parking lot and piped to PWP's Arroyo Seco Spreading Grounds on the east side of the reservoir. The diversion and intake structure were designed to accommodate up to 25 cfs of water. PWP currently diverts up to 25 cfs of surface water during the dry season but is unable to divert the full allotment of 25 cfs of water during the storm season due to high sediment-laden flows. As such, the existing diversion structure is not capable of consistently diverting the 25 cfs allotment during the storm season where flows of high volume and velocity occur. PWP's water capture efficiency is limited by the amount of precipitation, the high sediment concentration during storm events, and the spreading capacity. Over time, and after the Station Fire, the diversion and intake structures were damaged due to debris flows. The PWP is proposing the Arroyo Seco Canyon Project to restore and improve the diversion

and intake structures and expand their spreading basin capacity. Successful implementation of the PWP project will allow for the successful capture of up to 25 cfs of water into the Arroyo Seco Spreading Grounds and the bypass of debris and sediment that limit capture capacity during high flows. Appendix B, Attachment 8 shows the pre- and post-Project water diversion scheme for an average rain year. The "Available Stream Volume" columns represent the amount of water available in the stream each month during an average year. The "Diversion Without Improvements" columns represent PWP's current monthly diversion during an average year. The "Diversion With Improvements" columns represent the total monthly diversion from PWP that would be possible after the completion of the proposed Project. In an average year, approximately 4,980 acre-feet of water is anticipated to remain in the stream after the PWP diversion allotment. The "Maximum Diversion at 1,508 Acre-Feet/Month" shown on the Attachment represents the maximum volume that could be diverted if PWP constantly diverted 25 cfs from the stream for 24 hours per day, every day of the month, which is extremely unlikely. Under current conditions, PWP diverts their full 25 cfs allotment during the summer months. This diversion rate would not be expected to change following the Project implementation. However, the amount of water PWP is capable of diverting during the storm season would be expected to change to reach their 25 cfs allotment after Project implementation. The amount of water present in the stream during the storm season typically far exceeds the 25 cfs diversion by PWP. For example, hydrologic modeling shows a peak inflow of 3,691.7 cfs during an average rain event (2-year frequency), which is far greater than PWP's 25 cfs diversion. Therefore, the change in the amount of water available in the stream during storm season after Project implementation is anticipated to be negligible. Typically, during the summer months, minimal stream flow reaches PWP's intake. If the level of sediment at the diversion allows for it, the majority of this stream water is diverted to the intake. However, flows that are not diverted and remain in the stream past the diversion structure, have generally been so minimal as to have little effect on the water collected in the reservoir. PWP's project will primarily increase diversion during the storm season in which the amount of flows that will be diverted is minimal relative to inflows into the reservoir. Due to these findings, PWP's Arroyo Seco Canyon Project is not anticipated to impact LACFCD's sediment removal Project or the water availability for the proposed on-site mitigation areas.

3.2.1.4 Water Impoundment behind Devil's Gate Dam

Appendix B, Attachment 9 shows the reservoir contours after the initial sediment removal is complete overlaid on the proposed mitigation areas. Water impounded behind Devil's Gate Dam will begin to inundate the mitigation areas at or above 1,020.00 feet. Most of the mitigation areas are below 1,040.5 feet, which is the lower spillway elevation of the Dam. Table 3.3 identifies the maximum water surface elevation within Devil's Gate Reservoir each year since the 1998/1999 storm season, based on capacity in the basin. The retrofit of Devil's Gate Dam in 1997 lowered the elevation of the spillway ports to 1040.50 feet, and thereby reduced the amount of reservoir storage capacity below the spillway. The table shows the total number of days that the water surface elevation (WSE) was at or above 995.00 feet (indicating a water pool was held behind the dam), the total number of days the WSE was at or above 1,020.00 feet (indicating water pool reached elevation of proposed mitigation areas), the maximum elevation that the water level reached each water year, the number of days at that maximum water elevation, and the reservoir debris storage capacity each year. The number of days when the water level was at or exceeded the 1,020-foot elevation contour varies depending upon the size and frequency of storms. As a result, the

number of days at or above the 1,020-foot contour shown in Table 3.3 does not necessarily indicate consecutive days. Since 2010, a debris pool has been held at the dam after each storm to protect the dam outlets from becoming clogged with debris flows due to the Station Fire. The post-Project dam operations will return to pre-2009 procedures for flood control, and the reservoir capacity below spillway will be approximately 3.0 million cy. As indicated in Table 3.3, the water surface elevation exceeded 1020 ft. 10 out of the 17 years listed in the table. Following initial sediment removal, the reservoir capacity below the spillway will be increased to 3.0 million cy. Due to the increase in reservoir capacity, the frequency of a water surface elevation above 1,020 ft. may change. Appendix B, Attachment 5 models the storage and flow of the 2-year frequency design storm with the new reservoir capacity of 3.0 million cy. During a 2-year frequency design storm, the water surface elevation within the reservoir will reach a maximum of 1,037.1 ft. Based the model, it is estimated that the water surface elevation will exceed 1,020 ft. at least every two years. Although this is the expectation based on available data, the water surface elevation in the reservoir is highly variable, and dependent on the intensity and duration of each storm, as well as the timing, intensity, and duration of subsequent storms.

Water impoundment in the reservoir can have significant benefits to vegetation in the proposed mitigation areas. At lower levels, water impounded behind the dam can permeate the side slopes and provide moisture to vegetation situated at higher elevations. After Project implementation, there will be more capacity within the permanent maintenance area to hold water. This will increase the amount of water allowed to permeate the side slopes and provide soil moisture to the mitigation areas. Estimates of the future average number of days water will be held within Devil's Gate Reservoir have been made based on the reservoir capacity following the initial sediment removal project, along with historic water surface elevation records. It has been estimated that water will be held above 995 ft. an average of approximately 35 days during years of normal seasonal rainfall. It has been estimated that water will be held above 1,020 ft. an average of approximately 3 days during years of normal seasonal rainfall. It should be noted that the length of time water is held within the reservoir is highly variable, and dependent on the intensity and duration of each storm, as well as the timing, intensity, and duration of subsequent storms.

Table 3.3. Water Levels at Devil's Gate

Water Year	Days WSE ≥ 995.0 ft	Days WSE ≥ 1,020.0 ft	Max. Water Elevation (ft amsl)	Days at Max. Water Elevation	Reservoir Capacity below Spillway (MCY)	Reservoir Capacity below Spillway (acre-ft)
1998/1999	35	0	1,009.10	3	2.3	1426
1999/2000	24	0	1,007.30	1	2.3	1426
2000/2001	28	0	1,007.00	1	2.3	1426
2001/2002	0	0	986.00[1]	-	2.3	1426
2002/2003	115	100	1,029.60	2	2.3	1426
2003/2004	50	41	1,028.60	4	2.2	1364
2004/2005	201	131	1,045.40	10[2]	2.2	1364
2005/2006	118	2	1,026.80	2	2.2	1364
2006/2007	0	0	986.00[1]	-	2.2	1364

Table 3.3. Water Levels at Devil's Gate

Water Year	Days WSE ≥ 995.0 ft	Days WSE ≥ 1,020.0 ft	Max. Water Elevation (ft amsl)	Days at Max. Water Elevation	Reservoir Capacity below Spillway (MCY)	Reservoir Capacity below Spillway (acre-ft)
2007/2008	28	16	1,033.10	1	2.2	1364
2008/2009	7	0	1,000.00	3	2.2	1364
2009/2010	119	37	1,036.80	2	1.5	930
2010/2011	124	95	1,039.90	2	1.3	806
2011/2012	122	61	1,030.90	6	1.3	806
2012/2013	120	0	1,018.20	4	1.3	806
2013/2014	87	48	1,034.50	6	1.3	806
2014/2015	134	34	1,028.00	3	1.3	806

[1]Elevation of lowest outlet (no water held)
[2]Days above spillway elevation (1,040.5 ft)

Periodic inundation during large storms will also provide soil moisture that will benefit the surrounding riparian vegetation. Most of the mitigation areas are located between the 1,020 and 1,040 -foot elevation contours (Appendix B, Attachment 9). All mitigation areas below the 1,040-foot contour will be below spillway and subject to potential periodic inundation. As shown in Table 3.3, the number of days when the water level was at or exceeded the 1,020-foot elevation contour has varied each year and significantly increased following the influx of sediment resulting from the Station Fire. When inundation in the mitigation areas does occur, the duration will vary depending upon the elevation of the mitigation areas. The duration of inundation is not expected to be long enough to cause mortality of the riparian vegetation unless an exceptional storm season occurs. In the event that inundation does cause mortality of the vegetation in the mitigation areas, adaptive management measures will be implemented to ensure the mitigation areas meet their success standards and persist for the long term. Appendix B, Attachment 10 shows an aerial view of Devil's Gate Reservoir in June 2009, before the Station Fire. As shown in Table 3.3, stormwater was not held behind the dam at a high elevation for extended periods in the 2008/2009 Water Year. The aerial shows persistent vegetation established throughout the reservoir. Cross sections across the reservoir in 2009 are shown in Appendix B, Attachment 11. A comparison of the riparian vegetation in the aerial in Appendix B, Attachment 10 and the cross sections in Appendix B, Attachment 11 shows that the riparian vegetation is abundant above the 1,020-foot elevation. In addition, riparian vegetation has continued to persist within the reservoir, even after several drought years.

From the summary results shown in Appendix B, Attachment 5, it can be seen that with the post-Project conditions and operation plan, the peak storage and elevation within the reservoir would be 1,522.00 acre-feet and 1,037.10 feet, respectively. This model shows that under the 2-year frequency design storm, the reservoir would be temporarily filled to a level that would inundate the west and east side of the reservoir, including the mitigation areas. From the summary results shown in Appendix B, Attachment 6, it can be seen that with the post-Project conditions and operation plan, the peak storage and elevation within the reservoir would be 1,522.40 acre-feet and 1,037.10 feet, respectively. Any water held above the 1,020-foot contour would temporarily inundate the west and east side of the reservoir, as it currently

does. The duration of the inundation would depend on how long water would need to be held to attenuate the flood flows and the flow rate of water released through the dam. From the two different scenarios modeled for the post-Project conditions, it can be concluded that the western and eastern portions of the reservoir may be temporarily inundated during certain storm events. In the event that inundation causes mortality of the vegetation in the mitigation areas, adaptive management measures would be implemented.

Between March 15 and August 31 (during the breeding season for least Bell's vireos and other birds), Devil's Gate Dam will be operated to limit the potential for inundation of the 79-acre mitigation area. If weather, hydrological forecasts, and reservoir conditions indicate that water held behind the dam may inundated the mitigation site, then the Dam Operator, in consultation with the Operations Section of the Stormwater Engineering Division of LACDPW, will take the steps necessary (including release of water at the maximum possible rate as safe to do so to protect downstream communities), to prevent or to reduce, to the extent possible, the amount of time the mitigation site is inundated. If inundation of the mitigation site does occur, the Restoration Specialist will determine the adaptive management measures necessary to ensure the recovery or replacement of the damaged habitat.

Adaptive management will be employed to address changes in channel morphology. If periods of extended inundation occur and established channels disappear, then those channels will be re-established once drawdown of the reservoir has been completed. It is anticipated that this would entail minor re-contouring with hand tools. If sediment accumulation within channels was such that manual labor is not feasible then small, tracked equipment would be used to re-contour the channel(s). Equipment would likely include mini-skidsteer or mini dozer. In areas where native vegetation had become established prior to inundation, re-establishment of those sections of the channel may only warrant re-contouring with hand-tools.

3.2.1.5 Groundwater

The Project site overlies the Raymond Groundwater Basin (Raymond Basin), which is located within the Los Angeles-San Gabriel Hydrologic Unit. Stream flows that collect in Devil's Gate reservoir and also flows that are diverted to the adjacent City's Arroyo Seco Spreading Grounds contribute to groundwater recharge of the Raymond Basin.

Appendix B, Attachment 12 shows the locations of the JPL monitoring wells adjacent to the reservoir on the west side of the basin and Appendix B, Attachment 13 shows the locations of LACFCD monitoring wells adjacent to the reservoir on the east side of the basin. According to available JPL monitoring well data, water level elevations measured at MW-3 in 2012 ranged from 973 feet to 1,004 feet amsl. Historic groundwater data from the LACFCD monitoring wells show groundwater levels typically stay within 900 to 1,000-feet amsl. Appendix B, Attachment 14 shows the historic groundwater elevations from a LACFCD monitoring well. The groundwater levels in Devil's Gate Reservoir have been fairly consistent over the life of the dam. Appendix B, Attachment 15 shows a comparison over the past 10 years of groundwater levels measured from two of JPL monitoring wells on the north and northwest side of Devil's Gate Reservoir. It can be seen from the graph that the groundwater is generally higher in elevation on the northwest side of the reservoir. This is supported by the groundwater elevation contours shown in Appendix B, Attachment

16. The groundwater elevation contours show a general trend of groundwater flow from the northwest to the southeast of the reservoir.

During a site investigation in 2011 groundwater was encountered during soil borings, shown in Appendix B, Attachment 17, at elevations of 1022, 1019, and 1010 feet, respectively (a depth of 22 to 25 feet below ground surface). The water encountered in the three borings indicates the presence of a perched aquifer at those locations, as depicted in Appendix B, Attachment 18.

The Raymond Basin was adjudicated in 1944. The adjudication established a management strategy that utilizes a fixed "safe-yield" operation. This "safe yield" concept allows an annual fixed amount of water to be used by the water producers served by the Basin. Appointed Watermaster is the Raymond Basin Management Board. Participating water agencies include La Canada Irrigation District, Kinneloa Irrigation District, San Gabriel County Water District, City of Pasadena, City of Alhambra, City of Arcadia, Las Flores Water Company, Lincoln Avenue Water Company, Rubio Canyon Land & Water Association, Valley Water Company, California American Water Company, East Pasadena Water Company, City of Sierra Madre, Sunny Slope Water Company, and Valley Water Company. The Raymond Basin Management Board, with the assistance of the LACFCD, shall determine and account for all water diverted for spreading, the amount spread and available for recapture, and the amount so recaptured. Each party shall have the right to pump from any well in the Monk Hill Subarea (if spread there) or in the Pasadena Subarea (if spread there) an amount of water equal to 80 percent of the amount spread.

The groundwater table is expected to change as a result of this Project. While the PWP is proposing a project to increase water conservation in the region, adjudication of the Raymond Groundwater Basin prevents the over pumping of groundwater by water users. Due to the depth of the groundwater table, groundwater is not expected to be a major source of water for the mitigation areas, except for larger trees such as cottonwood, willow, and velvet ash, which are expected to eventually develop roots that reach the average groundwater depth. Any fluctuations in the groundwater table should not affect the long-term survival of vegetation growing in the mitigation areas. There may be a season, or multiple seasons, of vegetation die-back due to drought conditions however once rainfall returns to average or close to average, then the mitigation areas will rebound. If extreme drought was to occur over more than 10 years then adaptive management would be employed and could include the introduction of supplemental irrigation from reclaimed water sources, for example.

3.2.2 Water Usage by Riparian Plants and Other Native Vegetation

The dominant species of vegetation located on the Project site include black willow (*Salix gooddingii*), Fremont's cottonwood (*Populus fremontii*), and white alder (*Alnus rhombifolia*) in the riparian communities; and scalebroom (*Lepidospartum squamatum*), California buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemisia californica*), and coyote brush (*Baccharis pilularis*) in the upland and RAFSS communities. The dominant plant species associated with riparian communities are considered to be phreatophytes, meaning they obtain the majority of their water from the saturated water table (Robinson 1958). Those that rely mostly on the water table are categorized as obligate phreatophytes, while those that can survive on soil moisture from rainfall as well are categorized as facultative phreatophytes. Although trees such as black willow, cottonwood, and velvet ash would benefit from groundwater access, the majority of plant species will be able to persist from rainfall that charges the

soil with moisture each year. With time, some of these species will grow roots deep enough to take advantage of moisture from groundwater that is available due to capillary action.

Black willows have a root system with both superficial roots and fibrous roots below the surface of the soil and they also grow deeper main root branches. The roots of black willows grow to relatively shallow depths but have been documented growing up to between 7 and 17 feet below the surface of the soil in the arid southwest (Reed 1993). Willows can utilize water in saturated soils resulting from precipitation and surface runoff as well as in the groundwater that they access with the deeper main root branches.

Fremont's cottonwoods have an extensive fibrous root system that allows them to grow very rapidly when their roots are in contact with the water table. While this species usually grows in riparian areas with a high-water table, it will also grow in areas removed from the water table if sufficient water is available during the growing season through precipitation or surface flows (Taylor 2000). A study conducted in Arizona showed that Fremont's cottonwoods obtained approximately 26 to 33 percent of their water from upper soil layers (Snyder and Williams 2000).

White alders are riparian tree species that have extensive fibrous root systems and require a shallow rooting depth to a year-round water source, typically on streambanks. A study in California found that white alders were typically rooted to a depth less than or equal to 1.3 feet above the low water line of stream banks (Fryer 2014). This species is not common in Devil's Gate Reservoir but is mentioned for comparison purposes.

Scalebroom is a deeply-rooted perennial of the RAFSS community. This species has a deep taproot system which can withstand flooding, erosion, and scouring in wash habitats where periodic flooding occurs. California buckwheat and California sagebrush, which are upland plant species, both have fibrous, shallow root systems that extend out beyond their dripline to capture rainfall. California buckwheat has lateral roots that generally extend to three times beyond the dripline and typically reach to depths of less than 4.5 feet below ground surface (Hellmers et al. 1995). Coyote brush has a deep taproot system that typically grows to approximately 10.5 feet below the surface of the soil (Steinberg 2002). This species also has long lateral roots that extend beyond the plant's dripline to capture rainfall.

Based on the characteristics of the dominant plant species at the Project site, the riparian vegetation at the Project site would not be expected to depend solely on groundwater sources. While groundwater can provide a source of water for these plant species, precipitation, surface flows, and inundation are also substantial water sources used by these species, especially when available during the growing season. Considering the historic persistence of riparian vegetation behind Devil's Gate dam and the continued availability of various water sources, including surface flows, precipitation, soil moisture from periodic inundation, and percolation of water through the soils to the groundwater table, riparian vegetation is expected to be able to establish and persist in the mitigation areas. During the initial stages of re-establishment, supplemental irrigation will be supplied to trees, at a minimum, to accelerate growth. If shrubs are observed to initially require supplemental irrigation to assist with growth due to drought conditions, then adaptive management will be employed to address this situation.

3.3 Soil Characteristics

The Project site is located within an alluvial wash near the southern margin of the Transverse Ranges Geomorphic Province with the San Gabriel Mountains and Foothills to the north, the San Rafael Hills to the south, and the La Cañada Valley to the east and west. The Project site lies over quaternary age alluvium consisting of silts, sands, and gravel. Soils found in the Project site have been previously described in the *Jurisdictional Delineation Report, Devil's Gate Reservoir Sediment Removal and Management Project* (Chambers Group 2013a). As described in the report, soils throughout the Project site consist of Ramona Sandy Loam, Hanford Gravely Sandy Loam, and various problematic soils that are result of sediment entering the reservoir.

Ramona Sandy Loam soil consists of fine, well-drained, sandy loam soil formed from the breakdown of granite rock. This type of soil has moderately slow permeability and is typically observed on terraces and in alluvial fans with flat to slightly sloped topography at elevations ranging from 250 feet amsl to 3,500 feet amsl. Hanford Gravelly Sandy Loam consists of well-drained soil typically found on stream bottoms, floodplains, and alluvial fans on slopes from 0 to 15 percent. This soil forms at elevations ranging from 150 feet amsl to 3,500 feet amsl are primarily from granite and other quartz containing rock. Problematic soils consisted of soil profiles with gravel and or fill material such as the excess sediment built up in the Devil's Gate Reservoir.

Because post-sediment removal compensatory mitigation is planned to take place where riparian vegetation communities currently exist, it is presumed that the existing soil type within the Project site will be appropriate for the type of planned mitigation. Soils composition below sediment buildup is presumed to be supportive of riparian vegetation communities. Compensatory mitigation measures taking place at Johnson Field, consisting of removing sediment build up, will presumably expose native soil that can support riparian vegetation communities and reconnect the area with the natural flow of the water system, leading to the creation of a wetlands and non-wetland WOUS.

3.4 Existing Vegetation

Various vegetation mapping efforts have been conducted in Devil's Gate Reservoir to capture the changes that have occurred over time and as a result of sediment being transported into the reservoir. A brief discussion of each mapping effort is included in this section because the earlier efforts (2010, 2013, and 2014) were referenced in the Project EIR. The 2010, 2013, and 2014 versions of the vegetation map and the 2014 vegetation mapping report are included in Appendix C. The newest effort in 2016 is the version used as a reference for the permit negotiations with the USACE, CDFW, and RWQCB.

3.4.1 Vegetation Mapping Efforts

Several vegetation mapping efforts have occurred at the Project site between 2010 and 2016. During these mapping efforts, the total amount of vegetation that was mapped varied from 123.5 to 191.42 acres. The acreage of the communities mapped between 2010 and 2016 does not correlate with the exact Project site impact acreage because areas surrounding the Project site were included in these mapping efforts, which resulted in a larger acreage amount than the Project site impact acreage.

The vegetation communities were first mapped on the Project site in 2010 and then again in 2013. Nine vegetation communities and land cover types were mapped in 2010 and eight were mapped in 2013 and the areas that were mapped differed somewhat between the two years. The vegetation communities are listed below and detailed descriptions of the vegetation communities mapped at that time are included in the Project EIR (Chambers Group 2014a):

- Riversidean Alluvial Fan Sage Scrub (2010, 2013)
- California Sagebrush – California Buckwheat Scrub (2010, 2013)
- Scoured (2010, 2013)
- Escaped Cultivars (2010, 2013)
- Riparian Woodland (2010, 2013)
- Mustard and Annual Brome Semi-Natural Herbaceous Stand (2010, 2013)
- Mulefat Thickets (2010, 2013)
- Disturbed (Barren/Trails) (2010, 2013)
- Coast Live Oak Woodland – Disturbed (2010)

The vegetation map was updated again in 2014 to reflect changes in site conditions and a different vegetation community classification system was used for the 2014 mapping effort (Chambers Group 2014b). A total of 19 vegetation communities and land cover types were mapped within the Project site in 2014 (Table 3.4). Descriptions of each vegetation community and land cover types mapped in 2014 are included in Chambers Group's report, which is included in Appendix C.

Table 3.4. Vegetation Communities Mapped in 2014

Vegetation Community/Land Cover Type	Total Mapped Acreage
Riparian Woodland (Black Willow Series)	24.9
Mulefat Thickets	23.4
Disturbed Mulefat Thickets	0.6
Early Successional Riparian Woodland (Black Willow/Mulefat Association 3-10 years)	2.1
Riparian Herbaceous	8.8
Coyote Brush – Mulefat Association	0.1
Annual Bur-Sage and Mustard Patch with an Abundance of Dead Wood (Transitional from Disturbed Black Willow Series)	8.4
California Sagebrush – California Buckwheat Scrub	3.1
Disturbed California Sagebrush – California Buckwheat Scrub	3.1
Riversidean Alluvial Fan Sage Scrub	0.1
Coast Live Oak Woodland	-
Coast Live Oak Woodland – Disturbed	0.6
Mustard and Annual Brome Semi-Natural Herbaceous Stand	4.1

Table 3.4. Vegetation Communities Mapped in 2014

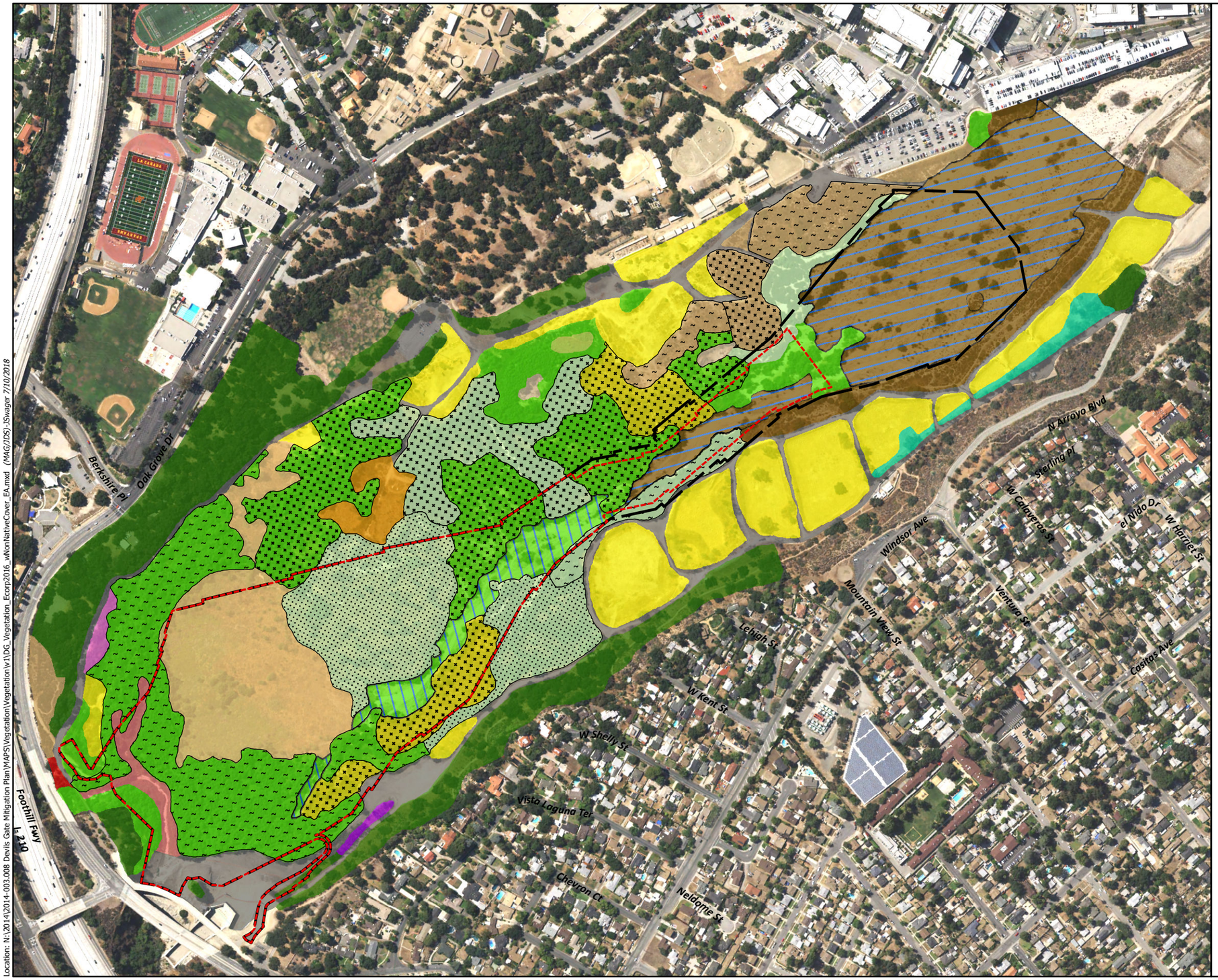
Vegetation Community/Land Cover Type	Total Mapped Acreage
Escaped Cultivars	0.6
Disturbed/Barren	8.5
Scoured	30.6
Poison Hemlock Patches (Semi-Natural Stands)	2.5
Perennial Pepperweed Patches (Semi-Natural Stands)	2
Developed (Structures, Paved Roads)	-
TOTAL	**123.5**

In 2016, the vegetation communities were mapped by ECORP to capture the expanded infestation of nonnative and invasive plant species in the reservoir (ECORP 2016d). Remapping was requested by CDFW for the purposes of identifying the impacts to CDFW jurisdiction and to provide information to support the mitigation ratios. Infestations of nonnatives and invasive species were a focus of the mapping and are reflected in the acreage calculations. The areas occupied by the various percentages of nonnatives and invasives are not shown on the vegetation map to keep the map from becoming too complicated. The 2016 vegetation map (Figure 3-1) is used in the discussion of impacts to wetlands and non-wetland WOUS and in determining the areas where mitigation in the form of restoration can be conducted. Table 3.5 lists total acreage of each vegetation community within the areas that were mapped for the Project. Descriptions of the vegetation communities follow Table 3.5 and the 2016 vegetation mapping report is included as Appendix D.

3.4.1.1 *Salix gooddingii* Woodland Alliance – Undisturbed and Disturbed Black Willow Thickets

A total of approximately 42.65 acres of undisturbed and disturbed *Salix gooddingii* Woodland Alliance, which is also referred to as black willow thickets, is present in the Project area. The undisturbed forms of this alliance generally exhibit an understory comprised of native plant species or exhibit a very sparse and open understory with little or no plant species present. The areas considered undisturbed comprise approximately 11.65 acres or 27 percent of all of the *Salix gooddingii* Woodland Alliances in the Project area. The disturbed forms of this alliance support an understory of native plant species but also support varying percentages of nonnative and invasive plant species. The nonnative and invasive plants in the understory contribute to the degradation of the *Salix gooddingii* Woodland Alliance plant community because they easily out-compete the native plant species. The disturbed forms of this alliance comprise approximately 31.00 acres or 73 percent of all of the *Salix gooddingii* Woodland Alliances in the Project area.

Figure 3-1.
Vegetation Communities (2016)



Map Features

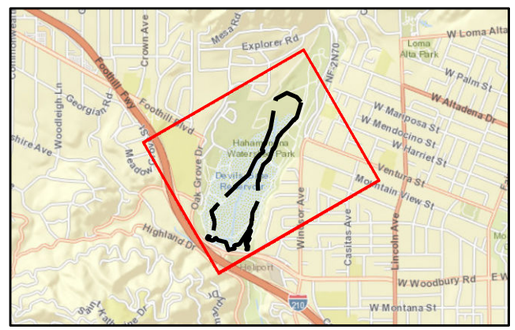
- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]

Vegetation Name

- Artemisia californica - Eriogonum fasciculatum Shrubland Alliance
- Baccharis salicifolia Shrubland Alliance
- Brassica nigra and other mustards Herbaceous Semi-Natural Alliance
- Conium maculatum Herbaceous Semi-Natural Alliance 30% Lepidium latifolium
- Depression/Bare ground
- Disturbed
- Eucalyptus (globulus, camaldulensis) Woodland Semi-Natural Alliance
- Fraxinus velutina Forest Alliance
- Landscaped
- Lepidium latifolium Herbaceous Semi-Natural Alliance
- Lepidium latifolium-Conium maculatum Herbaceous Semi-Natural Alliance
- Lepidospartum squamatum Shrubland Alliance
- Lepidospartum squamatum Shrubland Alliance - Sparse
- Platanus racemosa Woodland Alliance Disturbed
- Quercus agrifolia Woodland Alliance
- Rumex crispus Herbaceous Semi-Natural Alliance
- Salix gooddingii Woodland Alliance
- Salix gooddingii Woodland Alliance - Sparse
- Xanthium strumarium Herbaceous Alliance

% Non-Native Cover

- 20%
- 30%
- 40%



ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2014-003.008 Devil's Gate Sediment Removal Project

Scale in Feet
0 500

Photo Source: NAIP 2016
[1] LADPW

Map Date: 7/10/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\Vegetation\Vegetation\v1\DG_Vegetation_Ecorp2016_wNonNativeCover_EA.mxd (MAC/JDS) JSwager 7/10/2018

Table 3.5. Acreages of Existing Vegetation Communities 2016

Vegetation Community	Total Mapped Acreage
RIPARIAN/FLOODPLAIN	
Salix gooddingii Woodland Alliance	7.45
Salix gooddingii Woodland Alliance - Sparse	4.20
Salix gooddingii Woodland Alliance-20% Lepidium latifolium-Xanthium strumarium	15.88
Salix gooddingii Woodland Alliance-30% Lepidium latifolium-Xanthium strumarium	15.12
***Salix gooddingii* Woodland Alliance**	**42.65**
Baccharis salicifolia Shrubland Alliance-No Understory	2.17
Baccharis salicifolia Shrubland Alliance-20% *Conium maculatum-Lepidium latifolium*	2.04
Baccharis salicifolia Shrubland Alliance-30% *Conium maculatum-Lepidium latifolium*	6.84
Baccharis salicifolia Shrubland Alliance-40% *Conium maculatum-Lepidium latifolium*	14.18
Baccharis salicifolia Shrubland Alliance	**25.23**
Total Riparian	**67.88**
FLOODPLAIN	
Lepidospartum squamatum Shrubland Alliance	5.08
Lepidospartum squamatum Shrubland Alliance (Sparse)	22.19
Lepidospartum squamatum Shrubland Alliance	**27.27**
Total Floodplain	**27.28**
NATIVE UPLAND	
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance	1.88
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance-20% *Lepidium latifolium*	4.38
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance-30% *Lepidium latifolium*	2.08
Quercus agrifolia Alliance	22.80
Platanus racemosa Woodland Alliance - Disturbed	1.58
Total Native Upland	**32.72**
NONNATIVE/OTHER	
Brassica nigra and other mustards Herbaceous Semi-Natural Alliance	23.09
Conium maculatum Herbaceous Semi-Natural Alliance	6.23
Lepidium latifolium – Conium maculatum Herbaceous Semi-Natural Alliance	13.28
Lepidium latifolium Herbaceous Semi-Natural Alliance	1.80
Rumex crispus Herbaceous Semi-Natural Alliance (Unofficial Alliance)	0.30
Xanthium strumarium Herbaceous Alliance (Unofficial Alliance)	1.50
Eucalyptus (*globulus, camaldulensis*) Woodland Semi-Natural Alliance	0.27
Fraxinus velutina Forest Alliance (Unofficial Alliance)	0.46
Landscaped	0.15
Depression/Bare Ground (Associated with Seasonally Wet Area)	0.39
Disturbed (Barren/Trails/IMP Area)	16.08
Total Other	**63.55**
TOTAL	**191.42**

3.4.1.2 *Salix gooddingii* Woodland Alliance

This alliance generally occurs between 0 and 1,640 feet amsl on terraces along large rivers, in canyons, and along rocky floodplains of small, periodic streams, seeps and springs. In this alliance, black willow (*Salix gooddingii*) is dominant or co-dominant in the tree canopy with Fremont's cottonwood (*Populus fremontii*), arroyo willow (*Salix lasiolepis*), red willow (*S. laevigata*), black elderberry (*Sambucus nigra*), and other trees. The shrub layer includes mulefat (*Baccharis salicifolia*), coyote bush (*B. pilularis*), and American dogwood (*Cornus sericea*). This form of *Salix gooddingii* Woodland Alliance, which is considered undisturbed, is dominated by native plant species and the distribution of nonnative plant species in the understory is low. Trees in this alliance are typically smaller than 30 m in height and form an open to continuous canopy. The shrub layer is open to continuous and the herb layer is variable. Within the Project area, this alliance also variously displays an understory/sub-shrub layer co-dominated by perennial pepperweed and poison hemlock (*Conium maculatum*), an understory seasonally dominated by rough cocklebur (*Xanthium strumarium*), a bare-ground understory on the margins of the main channel, and/or an understory of native annuals. The U.S. Fish and Wildlife Service (USFWS) Wetland Inventory (1996) national list recognizes *Salix gooddingii* as a facultative wetland plant. This alliance occupies approximately 7.45 acres within the Project area. This alliance is primarily located along the central portion of the Project area generally surrounding the areas of *Baccharis salicifolia* Shrubland Alliance and *Lepidium latifolium-Conium maculatum* Herbaceous Semi-Natural Alliance.

3.4.1.3 Sparse *Salix gooddingii* Woodland Alliance – Black willow Thickets

This a variation of the *Salix gooddingii* Woodland Alliance in which the vegetation community exists as previously described in the unaltered description but at a greatly diminished cover value. Within the Project area, this alliance displays a sparse understory of native annuals on the borders and within the main channel. Approximately 4.20 acres within the Project area is covered by this alliance and it is generally present along the active channel that conveys water from areas upstream through the reservoir to the dam. This vegetation community is bordered by *Baccharis salicifolia* Shrubland Alliance and *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance.

3.4.1.4 Salix gooddingii Woodland Alliance – Understory 20% *Lepidium latifolium-Xanthium strumarium*

This form of *Salix gooddingii* Woodland Alliance is considered disturbed due to the presence of nonnative and invasive plant species in the understory. The native plant composition is similar to the description above for this vegetation community alliance but the understory is dominated by approximately 20 percent cover of perennial pepperweed (*Lepidium latifolium*) and rough cocklebur (*Xanthium strumarium*). Approximately 15.88 acres of *Salix gooddingii* Woodland Alliance containing approximately 20 percent cover of *Lepidium latifolium* and *Xanthium strumarium* is present in the Project area.

3.4.1.5 *Salix gooddingii* Woodland Alliance – Understory 30% *Lepidium latifolium-Conium maculatum*

This form of *Salix gooddingii* Woodland Alliance is also considered disturbed due to the presence of nonnative and invasive plant species in the understory. The native plant composition is similar to the description above for the *Salix gooddingii* Woodland Alliance but the understory is dominated by

approximately 30 percent cover of *perennial pepper weed* and poison hemlock. Approximately 15.12 acres of *Salix gooddingii* Woodland Alliance containing approximately 30 percent cover of *Lepidium latifolium* and *Conium maculatum* is present in the Project area.

3.4.1.6 *Baccharis salicifolia* Shrubland Alliance – Undisturbed and Disturbed Mulefat Thickets

A total of approximately 25.23 acres of undisturbed and disturbed *Baccharis salicifolia* Shrubland Alliance, which is also referred to as mulefat thickets, is present in the Project area. This alliance occurs in two general forms in the Project area, including one with little or no understory of other plant species and the other with varying percentages of nonnative and invasive plant species in the understory. The areas where the *Baccharis salicifolia* contains little to no understory comprise approximately 2.17 acres or 8 percent of all of the *Baccharis salicifolia* Shrubland Alliances in the Project area. The disturbed forms of this alliance exhibit a codominance of nonnative and invasive plant species. The nonnative and invasive plants in the understory contribute to the degradation of the *Baccharis salicifolia* Shrubland Alliance plant community because they easily out-compete the native plant species. The disturbed forms of this alliance comprise approximately 23.06 acres or 92 percent of all of the *Baccharis salicifolia* Shrubland Alliances in the Project area.

3.4.1.7 *Baccharis salicifolia* Shrubland Alliance – No Understory

This alliance generally occurs between 0 and 1,250 m amsl in mixed alluvium soils in canyon bottoms, floodplains, irrigation ditches, lake margins, and stream channels. In this alliance, *Baccharis salicifolia* is dominant or may be co-dominant with other shrub species including California sagebrush (*Artemisia californica*), tree tobacco (*Nicotiana glauca*), arrow weed (*Pluchea sericea*), sandbar willow (*Salix exigua*), *S. lasiolepis,* laurel sumac (*Malosma laurina*), *and Sambucus nigra.* Additionally, emergent trees including western sycamore (*Platanus racemosa*), *Populus fremontii,* oak (*Quercus* spp.), and willow (*Salix* spp.) may also be present in low cover. Shrubs are typically less than 5 m tall and the canopy is continuous with two tiers at 2 m and 5 m. In addition, the herbaceous layer is usually thin. The USFWS Wetland Inventory national list recognizes *Baccharis salicifolia* as a facultative wetland plant. This alliance, which is present on approximately 2.17 acres of the Project area, is primarily located in the central portion of the Project area and is generally surrounded by the *Salix gooddingii* Woodland Alliance.

3.4.1.8 *Baccharis salicifolia* Shrubland Alliance – 20% *Conium maculatum-Lepidium latifolium*

Within the Project area, this form of the *Baccharis salicifolia* Shrubland Alliance also supports the native plant species discussed for the undisturbed form of the alliance, but it displays an understory/sub-shrub layer co-dominated by approximately 20 percent *Conium maculatum* and *Lepidium latifolium*. Approximately 2.04 acres of this form of disturbed *Baccharis salicifolia* Shrubland Alliance is present in the Project area. This is approximately 8 percent of the total *Baccharis salicifolia* Shrubland Alliances in the Project area.

3.4.1.9 *Baccharis salicifolia* Shrubland Alliance – 30% *Conium maculatum-Lepidium latifolium*

Within the Project area, this form of the *Baccharis salicifolia* Shrubland Alliance also supports the native plant species discussed for the undisturbed form of the alliance, but it displays an understory/sub-shrub layer co-dominated by approximately 30 percent *Conium maculatum* and *Lepidium latifolium*. Approximately 6.84 acres of this form of disturbed *Baccharis salicifolia* Shrubland Alliance is present in the Project area. This is approximately 27 percent of the total *Baccharis salicifolia* Shrubland Alliances in the Project area.

3.4.1.10 *Baccharis salicifolia* Shrubland Alliance – 40% *Conium maculatum-Lepidium latifolium*

Within the Project area, this form of the *Baccharis salicifolia* Shrubland Alliance also supports the native plant species discussed for the undisturbed form of the alliance, but it displays an understory/sub-shrub layer co-dominated by approximately 40 percent *Conium maculatum* and *Lepidium latifolium*. Approximately 14.18 acres of this form of disturbed *Baccharis salicifolia* Shrubland Alliance is present in the Project area. This is approximately 56 percent of the total *Baccharis salicifolia* Shrubland Alliances in the Project area.

3.4.1.11 *Lepidospartum squamatum* Shrubland Alliance – Dense and Sparse Scalebroom Scrub

A total of approximately 27.27 acres of *Lepidospartum squamatum* Shrubland Alliance is present in two forms in the Project area. The two forms include a dense and more mature form that is present on the banks of the upstream portion of the Project area and the other is a sparser form that occurs in the active wash. The denser form occupies approximately 5.08 acres or 18 percent of the total area covered by this alliance and the sparser form covers approximately 22.19 acres or 81 percent.

3.4.1.12 *Lepidospartum squamatum* Shrubland Alliance

This alliance is generally found between 164 and 4,921 feet amsl in intermittently or rarely flooded, low gradient alluvial deposits along streams, washes and fans. In this alliance scalebroom (*Lepidospartum squamatum*) is dominant, or co-dominant, or conspicuous in the shrub canopy in association with burrobrush (*Ambrosia salsola*), *Artemisia californica, Baccharis saicifolia,* brittlebush (*Encelia farinosa*), yerba santa (*Eriodictyon* sp.), *Malosma laurina,* California buckwheat (*Eriogonum fasciculatum*), sugar bush (*Rhus ovata*), poison oak, and other shrubs. The shrubs in this alliance are typically less than 2 m in height and some emergent taller plants may be present at low cover including *Platanus racemosa, Populus* spp., and *Sambucus nigra.* The herbaceous layer varies and may be grassy. This alliance within the Project area may be considered equivalent to a Riversidean Alluvial Fan Sage Scrub described in *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Approximately 5.08 acres of *Lepidospartum squamatum* Shrubland Alliance is present within the Project area. This denser form of the alliance makes up approximately 19 percent of the *Lepidospartum squamatum* Shrubland Alliance in the Project area. This alliance is located along the banks of the channel in the northeastern portion of the Project area and is generally surrounded by the *Brassica nigra* and other mustards Herbaceous Semi-

Natural Alliance, *Baccharis salicifolia* Shrubland Alliance, *Salix gooddingii* Woodland Alliance, and *Artemisia californica - Eriogonum fasciculatum* Shrubland Alliance.

3.4.1.13 Sparse *Lepidospartum squamatum* Shrubland Alliance – Sparse Scalebroom Scrub

This a variation of the *Lepidospartum squamatum* Shrubland Alliance in which the vegetation community exists as described in the unaltered description (see previous) but at a greatly diminished cover value. This community refers to the upstream regions of the riparian corridor where the channel widens and vegetation occurs as single individuals of different taxa or small islands of associated taxa spaced throughout the corridor. The species present tend to be species associated with seasonal water channels and range from medium-sized shrubs (e.g. scale broom) to full-size cottonwoods (*Populus* spp.) and *Salix* spp. While both woodland and shrub species are present, herbaceous species are almost totally lacking. A canopy is lacking except for within the islands of cottonwoods and/or willows. Approximately 22.19 acres of Sparse *Lepidospartum squamatum* Shrubland Alliance is present in the Project area. This is approximately 81 percent of the total acres of *Lepidospartum squamatum* Shrubland Alliance in the Project area. This alliance variation occupies the open wash in the upstream portion of the Project area.

3.4.1.14 *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance – Undisturbed and Disturbed California Sagebrush-California Buckwheat Scrub

A total of approximately 8.34 acres of undisturbed and disturbed *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance, which is also referred to as California sagebrush-California buckwheat scrub, is present in the Project area. The undisturbed form of this alliance generally exhibits an understory comprised of native plant species. The areas considered undisturbed comprise approximately 1.88 acres or 23 percent of all of the *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliances in the Project area. The disturbed forms of this alliance support an understory of native plant species but also support varying percentages of nonnative and invasive plant species. The nonnative and invasive plants in the understory contribute to the degradation of the *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance plant community because they easily out-compete the native plant species. The disturbed forms of this alliance comprise approximately 6.46 acres or 77 percent of all of the *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliances in the Project area.

3.4.1.15 *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance

This alliance is generally found between 820 and 3,115 feet amsl in alluvial or colluvial soils on slopes that are usually steep, south facing, and are rarely flooded or in low-gradient deposits along streams. *Artemisia californica* and *Eriogonum fasciculatum* are co-dominant in the shrub canopy with each species having 30 to 60 percent relative cover. Associated species include chamise (*Adenostoma fasciculatum*), *Malosma laurina,* California ephedra (*Ephedra californica*), lemonade berry (*Rhus integrifolia*), white sage (*Salvia apiana*), and other shrubs present at low cover. The canopy is intermittent to continuous and may be two-tiered with the upper layer less than 5 m and most shrubs less than 2 m. The herbaceous layer varies both seasonally and annually. This alliance, which covers approximately 1.88 acres, is primarily located along the northwestern edge of the Project area with a small patch also located in the southwest portion of the site, adjacent to Oak Grove Drive. In the northwestern areas, this alliance is generally bordered by the

Brassica nigra and other mustards Herbaceous Semi-Natural Alliance, Sparse *Lepidospartum squamatum* Shrubland Alliance, and *Baccharis salicifolia* Shrubland Alliance.

3.4.1.16 *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance – 20% *Lepidium latifolium*

This form of *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance is considered disturbed due to the presence of invasive plant species in the understory. The native plant composition is similar to the description above for this alliance but the understory is dominated by approximately 20 percent cover of *Lepidium latifolium*. Approximately 4.38 acres of *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance containing approximately 20 percent cover of *Lepidium latifolium* is present in the Project area.

3.4.1.17 *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance – 30% *Lepidium latifolium*

This form of *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance is considered disturbed due to the presence of invasive plant species in the understory. The native plant composition is similar to the description above for this vegetation community alliance but the understory is dominated by approximately 30 percent cover of *Lepidium latifolium*. Approximately 2.08 acres of *Artemisia californica-Eriogonum fasiculatum* Shrubland Alliance containing approximately 30 percent cover of *Lepidium latifolium* is present in the Project area.

3.4.1.18 *Quercus agrifolia* Woodland Alliance - Coast Live Oak Woodland

This alliance generally occurs between 0 and 3,937 feet amsl in habitats with deep, loamy, or sandy soils with a high amount of organic matter and on alluvial terraces, canyon bottoms, stream banks, slopes, and flats. In this alliance, coast live oak (*Quercus agrifolia*) is dominant or may be co-dominant in association with other trees including bigleaf maple (*Acer macrophyllum*), boxelder (*A. negundo*), *Platanus racemosa, Populus fremontii,* blue oak (*Quercus douglasii*), valley oak (*Q. lobata*), black oak (*Q. kelloggii*), and *Salix lasiolepis*. The canopy is open to continuous with trees being less than 98 feet tall. A sparse to intermittent shrub layer may be present as well as a sparse to grassy herbaceous layer. Within the Project area, this alliance also variously displays a disturbed bare-ground understory associated with recreational use within the Park, an understory of nonnative grasses and forbs, and/or escaped horticultural cultivars. Approximately 22.80 acres of *Quercus agrifolia* Woodland Alliance is present within the Project area. This alliance is primarily located along the western side in Oak Grove Park and along the eastern side along the base of the hills below the residential development. This alliance generally occurs in the more upland portions of the Project area.

3.4.1.19 Platanus racemosa Woodland Alliance Disturbed – California Sycamore Woodlands

This alliance generally occurs between 0 and 7,874 feet amsl and may be present in gullies, intermittent streams, springs, seeps, stream banks, and terraces adjacent to floodplains that are subject to high-intensity flooding. Soils are rocky or cobbly alluvium with permanent moisture at depth. In this alliance, *Platanus racemosa* is dominant or co-dominant in the tree canopy with white alder (*Alnus rhombifolia*), southern California black walnut (*Juglans californica*), *Populus fremontii, Quercus agrifolia, Quercus lobata,*

Salix exigua, S. gooddingii, S. laevigata, S. lasiolepis, yellow willow (*S. lutea*), Peruvian peppertree (*Schinus molle*), and California bay (*Umbellularia californica*). The canopy is open to intermittent with trees generally being less than 35 m tall. An open to intermittent shrub layer may be present as well as a sparse to grassy herbaceous layer. The USFWS Wetland Inventory national list recognizes *Platanus racemosa* as a facultative wetland plant (USFWS 1998). Within the Project area, this alliance also variously displays a disturbed bare-ground understory associated with recreational use within the Park, an understory of nonnative grasses and forbs, and/or escaped horticultural cultivars. Approximately 1.58 acres of *Platanus racemosa* Woodland Alliance Disturbed is present along the edges of the percolation basins located in the northeastern portion of the Project area. This alliance is generally surrounded by the *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance.

3.4.1.20 *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance – Upland mustards

This alliance generally occurs between 0 and 4,921 feet amsl and may be present in fallow fields, grasslands, roadsides, levee slopes, disturbed coastal scrub, riparian areas, and waste places. In this alliance, black mustard (*Brassica nigra*), common mustard (*B. rapa*), Saharan mustard (*B. tournefortii*), short podded mustard (*Hirschfeldia incana*), Dyer's woad (*Isatis tinctoria*) or wild radish (*Raphanus sativus*) are dominant or co-dominant in the herbaceous layer with emergent trees and shrubs that may be present at low cover. This alliance is dominated by nonnative, invasive grasses. The canopy in this alliance is open to continuous with an herb layer generally less than 3 m tall. Approximately 23.09 acres of *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance is present within the Project area. This alliance occurs throughout the Project area but is more concentrated in the percolation basins on the northeastern side of the Project Area. This alliance is the most dominant nonnative alliance cover within the Project area.

3.4.1.21 Conium maculatum Herbaceous Semi-Natural Alliance – 30 % Lepidium latifolium

This alliance generally occurs between 0 and 3,280 feet amsl and is found in all topography types including wetlands. The USFWS Wetland Inventory national list recognizes *Conium maculatum* as a wetland indicator plant (USFWS 1998). In this alliance, *Conium maculatum,* sweet fennel (*Foeniculum vulgare*), or another nonnative invasive plant of the family *Apiaceae* is dominant or co-dominant. Other nonnative plants are also present in the herbaceous layer and emergent trees and shrubs may be present at low cover. This alliance is dominated by nonnative, invasive plants. The canopy in this alliance is open to continuous with an herb layer generally less than 2 m tall. Approximately 6.23 acres of *Conium maculatum* Herbaceous Semi-Natural Alliance is present within the Project area and approximately 30 percent of the areas covered by this alliance support an understory dominated by *Lepidium latifolium.* This alliance is present in small patches within the Project area adjacent to areas containing *Baccharis salicifolia* Shrubland Alliance and *Salix gooddingii* Woodland Alliance.

3.4.1.22 *Lepidium latifolium – Conium maculatum* Semi-Natural Herbaceous Stand – Poison Hemlock – Perennial Pepperweed Patches (Unofficial Alliance)

This alliance is not listed in *A Manual of California Vegetation,* 2nd Edition. Rather, it is an amalgam of two nonnative alliances from the manual, *Lepidium latifolium* Semi-Natural Herbaceous Stands and *Conium maculatum-Foeniculum vulgare* Semi-Natural Herbaceous Stands. This unofficial alliance was identified to

best describe the areas where *Lepidium latifolium* and *Conium maculatum* are co-dominant in the Project area and it refers to that site only. Both *Lepidium latifolium* and *Conium maculatum* are considered wetland indicator species by the USFWS. A low cover of emergent trees, eucalyptus trees, and shrubs also occur within this alliance, as well as other invasive annuals. Approximately 13.28 acres of this alliance is present within the Project area. This combination land cover type occurs in both the upland and riparian corridor topographies on site and is concentrated in the central and western portions of the site where it is surrounded by the *Salix gooddingii* Woodland and the *Baccharis salicifolia* Shrubland alliances.

3.4.1.23 Lepidium latifolium Herbaceous Semi-Natural Alliance – Perennial Pepperweed Patches

This alliance generally occurs between 0 and 6,233 feet amsl and is found within intermittently and seasonally flooded fresh and saltwater marshes and riparian corridors. The USFWS Wetland Inventory national list recognizes *Lepidium latifolium* as a wetland indicator plant. In this alliance, *Lepidium latifolium* is dominant in the herbaceous layer with emergent trees and shrubs that may be present at low cover. This alliance is dominated by nonnative, invasive plants. The canopy in this alliance is intermittent to continuous with an herb layer generally less than 2 m tall. Approximately 1.80 acres of monotypic *Lepidium latifolium* Herbaceous Semi-Natural Alliance is present in the western portion of the Project area adjacent to areas containing *Baccharis salicifolia* Shrubland Alliance and *Salix gooddingii* Woodland Alliance.

3.4.1.24 Rumex crispus Herbaceous Semi-Natural Alliance – Curly dock patches (Unofficial Alliance)

This alliance is not listed in *A Manual of California Vegetation,* 2nd Edition. The *Rumex crispus* Herbaceous Semi-Natural Alliance is an unofficial alliance to best describe the areas where nonnative curly dock (*Rumex crispus*) seasonally dominates and it refers to this site within the Project area only. This alliance only occurs in a 0.3 acre small, depressional area in the old mining pit in the western portion of the site. The old mining pit receives precipitation and urban run-off and may remain inundated for extended periods. As the water soaks into the ground, the curly dock begins to grow and by the time the water has dried up completely, the entire depression becomes vegetated with this nonnative plant species. The depression in the mining pit where the curly dock occurs is mostly surrounded by the *Salix gooddingii* Woodland alliance on site.

3.4.1.25 Xanthium strumarium Herbaceous Alliance – Cocklebur patches (Unofficial Alliance)

This alliance is not listed in *A Manual of California Vegetation,* 2nd Edition. It is a modification of the existing alliance from that reference called *Persicaria lapathifolia - Xanthium strumarium* Provisional Herbaceous Alliance. The official alliance is characterized by *Xanthium strumarium* or other knotwood species being dominant or co-dominant in the herbaceous layer with other herbaceous species including Devil's beggartick (*Bidens frondosa*), five angled dodder (*Cuscutta pentagona*), barnyard grass (*Echinochloa* spp.), and common spikerush (*Ecleocharis marostachya*). The unofficial *Xanthium strumarium* Herbaceous Alliance occurs in areas in the Project area where *Xanthium strumarium* seasonally dominates and it refers

to this site only. This unofficial alliance occupies approximately 1.50 acres along the frequently flooded stream terraces closest to the dam where the soils are typically clay-rich or silty.

3.4.1.26 Eucalyptus (*globulus, camaldulensis*) Woodland Semi-Natural Alliance – Eucalyptus groves

This alliance generally occurs between 0 and 984 feet amsl and is typically planted as trees, groves, and windbreaks and may become naturalized in uplands and along stream courses. In this alliance, red gum (*Eucalyptus camaldulensis*), blue gum (*E. globulus*), or other gum tree is dominant in the tree canopy. The canopy in this alliance is intermittent to continuous with trees typically less than 164 feet tall. The shrub layer and herbaceous layer are typically sparse to intermittent. Within the Project area, this alliance covers approximately 0.27-acre area near the dam. Nonnative grasses and forbs dominate the understory and the surrounding habitat is classified as disturbed. Eucalyptus trees are also common throughout the portions of the Project area but not in stands that would classify as an alliance.

3.4.1.27 *Fraxinus velutina* Forest Alliance - Velvet Ash Stands (Unofficial Alliance)

This alliance is not listed in *A Manual of California Vegetation,* 2nd Edition. The unofficial *Fraxinus velutina* Forest Alliance best describes areas where velvet ash (*Fraxinus velutina*) trees were dominant. This alliance was identified in a 0.46-acre area in the northwestern corner of the Project area along the edge of the existing road. The small area is otherwise surrounded by the *Salix gooddingii* Woodland alliance on site. Velvet ash also commonly occurs as individuals bordering the perimeter trail on the west side of the Project area.

3.4.1.28 Landscaped

The landscaped cover type refers to ornamental vegetation that does not exist in a natural state; rather the landscaped land cover type contains vegetation that has been planted and is regularly irrigated and maintained. A small 0.15-acre area along the southernmost edge of the Project area adjacent to Oak Grove Drive was classified as landscaped.

3.4.1.29 Depression/Bare Ground (Associated with Seasonally Wet Area)

The depression/bare ground land cover type refers to ground cover within two small areas in the central portion of the Project area that are associated with the seasonally wet areas. These two small areas have a combined area of 0.39 acres. They are seasonally inundated with water and, when dry, are generally bare or are sparsely vegetated.

3.4.1.30 Disturbed

The disturbed land cover type refers to areas where human activities have altered the environmental conditions in such a way that the natural vegetation community has been extirpated and the area is now bare of vegetation or supports a community of nonnative or ruderal plant species. Approximately 16.08 acres within the Project area were classified as the disturbed land cover type. This land cover type exists in the more highly disturbed habitats, in the basins on the eastern side of the Project area, and in the paved and dirt roads and trails.

3.4.2 Special-Status Plant Species

Rare plant surveys were conducted on the Project site for eight special-status plant species that have potential to occur due to presence of suitable habitat: Nevin's barberry (*Berberis nevinii*), Plummer's mariposa lily (*Calochortus plummerae*), Parry's spineflower (*Chorizanthe parryi* var. *parryi*), slender-horned spineflower (*Dodecahema leptoceras*), mesa horkelia (*Horkelia cuneata* ssp. *puberula*), white-rabbit tobacco (*Pseudognaphalium leucocephalum*), Parish's gooseberry (*Ribes divaricatum* var. *parishii*), and Graeta's aster (*Symphyotrichum greatae*). None of these species were observed during the focused surveys (Chambers Group 2014a) and at the time of the surveys, the conclusion was that the Project site does not support any special-status plant species.

3.5 Existing Wildlife Usage

A total of 76 species of wildlife have been documented on the Project site and in immediately surrounding areas during wildlife surveys (Chambers Group 2014a). The Project site provides a large block of natural habitat in the middle of an area dominated by urban and commercial development. As a result, the Project site would be expected to support a relatively high diversity of resident and migratory wildlife species. Species commonly observed throughout the Project site include western toad (*Anaxyrus boreas*), American bullfrog (*Lithobates catesbeianus*), common side-blotched lizard (*Uta stansburiana*), gopher snake (*Pituophis catenifer*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), common raven (*Corvus corax*), northern rough-winged swallow (*Stelgidopteryx serripennis*), desert cottontail (*Sylvilagus audubonii*), and California ground squirrel (*Otospermophilus beecheyi*).

3.5.1 Special-Status Wildlife Species

A number of special-status wildlife species have been observed or have been determined to have a potential to occur on the Project site. According to the Final EIR for the Project (Chambers Group 2014a) and focused surveys conducted in 2015 (Chambers Group 2015a; J. Griffith personal communication, October 8, 2015) (Appendix E), the special-status wildlife species that have been documented on the Project site during various general and focused surveys included least Bell's vireo, southwestern willow flycatcher, yellow warbler (*Setophaga petechia*), two-striped garter snake (*Thamnophis hammondii*), and coast patch-nosed snake (*Salvadora hexalepis virgultea*). Other species of concern that were determined to have a moderate to high potential to occur within the Project site included coast range newt (Taricha torosa) and southwestern pond turtle (*Actinemys pallida*) (Chambers Group 2014a). During focused surveys conducted in 2016 and 2017, two special status species were observed on the Project site, including yellow warbler and yellow-breasted chat (*Icteria virens*).

Focused surveys for least Bell's vireo (ECORP 2016b), southwestern willow flycatcher and western yellow-billed cuckoo (Leatherman 2016), and coastal California gnatcatcher were conducted in 2016 (ECORP 2016c) Additional focused surveys for least Bell's vireo and southwestern willow flycatcher were conducted in 2017 (ECORP 2018). Table 3.6 provides a summary of the focused surveys that have been conducted for listed species between 2010 and 2018. Appendix F includes the 2016 focused survey reports prepared by ECORP and Leatherman for least Bell's vireo, southwestern willow flycatcher and western yellow-billed cuckoo, and coastal California gnatcatchers. Appendix G includes the 2017 focused

survey report prepared by ECORP and Leatherman for least Bell's vireo and southwestern willow flycatcher.

Table 3.6. Summary of Focused Surveys for Listed Species

Dates	Results	Report Reference
Least Bell's Vireo Only Surveys		
May 27-August 19, 2010	Negative for vireo.	Chambers Group 2010
April 17-July 9, 2013	Positive – One unpaired male vireo was identified during 4 of the first 6 surveys. A female was not observed and no nesting behavior was identified.	Chambers Group 2013b
April 20-August 29, 2016	Ten surveys were conducted. A pair observed on first survey and only a male was observed at the same location on the second survey (May 4). Single juvenile observed on August 1 and a male was heard on August 17.	ECORP 2016b
May 18-July 31, 2018	Eight surveys were conducted. The surveys were negative for least Bell's vireo. One migrant willow flycatcher was observed during the survey on May 18, 2018. Two additional post-breeding season surveys will be conducted in August of 2018.	ECORP (Report in Preparation Aug 2018)
Willow Flycatcher and Least Bell's Vireo Combined Surveys		
May 9-July 22, 2014	Negative for vireo (noted in report that the quality of the habitat where vireo was observed in the previous year had declined); One migrant willow flycatcher detected on May 20, but negative for nesting southwestern willow flycatcher.	Chambers Group 2014c
May 3 – July 28, 2017	Negative for both vireo and willow flycatcher.	ECORP 2018
Western Yellow-Billed Cuckoo		
July 25-August 14, 2015	Negative for cuckoo. Two vireo family groups were observed on August 14 and one willow flycatcher family group observed on August 14.	Chambers Group 2015a
September 11, 2015	One vireo observed near ponded area at West Altadena Stormdrain on September 11 during monitoring of the IMP project.	Chambers Group 2015a
June 20-July 31, 2016	Negative for cuckoo.	Chambers Group 2016
Willow Flycatcher and Western Yellow-Billed Cuckoo Combined Surveys		
May 16-August 1, 2016	Negative for both willow flycatcher and cuckoo. Included surveys for least Bell's vireos that were reported in ECORP 2016b.	Leatherman 2016
Coastal California Gnatcatcher Surveys		
April 26-June7, 2016	Negative for coastal California gnatcatcher.	ECORP 2016c

3.5.1.1 Least Bell's Vireo

Eight surveys for least Bell's vireo were conducted according to the USFWS accepted protocols for the Devil's Gate Reservoir site in 2010, 2013, 2014, and 2017 (Chambers Group 2010, 2013b, 2014c, ECORP 2018). Ten surveys were conducted in 2016, which included the eight surveys required by the accepted protocol plus two additional surveys at the end of the summer that were conducted at the request of the USFWS. The additional surveys were conducted in August of 2016 (ECORP 2016b). Eight protocol surveys were also conducted between May 18 and July 31, 2018 and two additional surveys will be conducted in August of 2018 (ECORP, Report in Preparation). The results of all of the vireo surveys are provided in Table 3.6 and the results show that least Bell's vireos are using the Project site during the spring and fall

migration but nesting at the Project site was not documented during any of the focused surveys. The Project site is not located within designated Critical Habitat for this species.

3.5.1.2 Southwestern Willow Flycatcher

Southwestern willow flycatchers had not been documented at the Project site until focused western yellow-billed cuckoo surveys were conducted in 2015 (Chambers Group 2015a). Migratory willow flycatchers have been documented during previously conducted focused surveys (see Table 3.6). Observations of this species in August 2015 in the western portion of the reservoir indicate that the individuals observed were either migratory willow flycatchers or possibly the southwestern willow flycatcher subspecies. Willow flycatchers were not observed during focused surveys in 2017 (ECORP 2018). Nesting territories were not documented during any of the focused surveys. The Project site is not located within designated Critical Habitat for this species.

3.5.1.3 Western Yellow-Billed Cuckoo

Western yellow-billed cuckoo is not listed under the Federal Endangered Species Act but the results of the focused surveys have been included for completeness since the species is listed under the California Endangered Species Act. This species was not observed on the Project site during focused surveys conducted in 2015 and 2016 (Chambers Group 2015a; Leatherman 2016). The habitat on the Project site is not optimal for this species as it contains the appropriate riparian plant species but the habitat patch is likely not large enough to support the presence of this species.

3.5.1.4 Coastal California Gnatcatcher

Coastal California gnatcatchers were not observed on the Project site during focused surveys conducted in 2016 (ECORP 2016c). Limited suitable habitat is present on the Project site. The Project site is not located within designated Critical Habitat for this species.

3.5.2 Wildlife Movement

Even though much of the habitat currently present in the reservoir area behind the dam is disturbed due to the high levels of invasive and nonnative plant species, the area does function as an important area for wildlife. The reservoir area provides essential habitat connectivity between Flint Wash and the Arroyo Seco located downstream of the dam, Hahamongna Watershed Park, and areas located upstream in the Angeles National Forest. The habitats in the reservoir area and the adjacent Hahamongna Watershed Park function as a critical linkage in a highly developed area. Not only do wildlife species reside in the area because the native vegetation provides the necessary cover, forage, and shelter, but wildlife species also use the area for juvenile dispersal, seasonal migration, and home range connectivity. Improving the habitat will greatly increase the likelihood that listed species of wildlife, including least Bell's vireo, southwestern willow flycatcher, and potentially western yellow-billed cuckoo, will establish breeding territories at Devil's Gate, or will use the area on a regular basis during migration or for juvenile dispersal.

3.6 USACE Jurisdictional Areas

The aquatic resources have been described in Jurisdictional Delineation Report, Devil's Gate Reservoir Sediment Removal and Management Project in the City of Pasadena, Los Angeles County, California

(Chambers Group 2013a) and Jurisdictional Delineation Update for the Devil's Gate Reservoir Sediment Removal and Management Project, Los Angeles County, California (ECORP 2016a). According to the 2013 jurisdictional delineation, the USACE wetland boundary was identified as the 1,020-feet contour Ordinary High Water Mark (OHWM), which is the level at which water is released from the dam. In addition, the delineation report defined the limits of USACE jurisdiction by the riparian habitat within the 1,070-feet contour High Water Mark (HWM). The 1,070-feet HWM is the elevation of the crest of the dam and represents the limit of water held behind the dam.

ECORP completed a revised delineation of the areas below the 1,020 feet elevation and in the western portion of the reservoir in August of 2016 (ECORP 2016a). In July of 2018, at the request of the USACE during the 404 Permit process, ECORP expanded the jurisdictional delineation to include the City's percolation basin north of Johnson Field, Johnson Field, and the portion of the reservoir south of Johnson Field. The combined jurisdictional delineation map, which includes Chambers Group's delineation for the areas between the 1,020-feet (OHWM) and 1,070-feet (HWM) elevations and ECORP's delineation for the areas below the 1,020-feet elevation, the western portion of the reservoir and the east side of the reservoir where the percolation basins are located is shown on Figure 3-2. Table 3.7 lists the total acres of wetlands and non-wetland WOUS in the area encompassed by the HWM (1,070 feet). The total acreage of wetlands within the portion of Devil's Gate Reservoir where the jurisdictional delineations were conducted is 3.62 acres. The total acreage of non-wetland WOUS within the same area is 45.86 acres. Table 3.7 also lists the linear feet of non-wetland WOUS present in the area where the delineation was conducted.

Table 3.7. Total Acres of USACE Jurisdictional Areas

Features	Total
Non-wetland Waters	45.86
Linear Feet	20,026
Wetlands	3.62
TOTAL*	49.47

*Total does not include linear feet.

3.7 Impacts of the Project

3.7.1 Impacts to Vegetation Communities

Table 3.8 lists the total acreage of each vegetation community in the entire mapped area (including the mitigation areas) and the vegetation communities that will be subject to permanent and temporary impacts from the Project. The mapped area includes a combination of impact areas, mitigation areas and non-Project areas. A map showing the distribution of these vegetation communities is included as Figure 3-3. Approximately 65.56 acres of vegetation communities and disturbed areas will be impacted within the initial sediment removal area, which includes the areas that will be permanently and temporarily affected by the Project. Permanent impacts to vegetation communities and disturbed areas will occur within the permanent maintenance area, which encompasses approximately 49.38 acres and includes the 42.05-acre routine annual maintenance area and the 7.34-acre episodic maintenance area (or side slopes).

Figure 3-2
USACE Jurisdictional Areas

Map Features

- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]
- Permanent Impact Area [1]
- Temporary Impact Area [1]
- Side Slopes [1]
- Review Area
- 1020' Elevation Contour
- Area Not Delineated (Outside Project Area)
- Culvert
- Culvert (non-functioning)
- Soil Sample Point

Waters of the U.S.[2]

- Non-wetland Waters of the U.S.
- Wetland Waters of the U.S.
- Non-wetland Waters of the U.S. (sheet flow)

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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ENVIRONMENTAL CONSULTANTS

2014-003.008 Devils Gate Mitigation Plan

Scale in Feet
0 500

Photo Source: NAIP 2014
[1] LADPW
[2] ECORP and Chambers Group

Map Date: 7/26/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\Wetland_Mapping\Wetland_Delineation\Devils_Gate\v3\DG_ACoE_Combined_JDFeatures_20180724.mxd (MAG)-mguidry 8/2/2018

Figure 3-3 Vegetation Communities Within and Adjacent to USACE Jurisdictional Areas

Map Features

- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]
- Sediment Removal Excavation Contours [1]
- 1020' Elevation Contour [1]
- Corps Jurisdictional Area

Vegetation Name

- Artemisia californica - Eriogonum fasciculatum Shrubland Alliance
- Baccharis salicifolia Shrubland Alliance
- Brassica nigra and other mustards Herbaceous Semi-Natural Alliance
- Conium maculatum Herbaceous Semi-Natural Alliance 30% Lepidium latifolium
- Depression/Bare ground
- Disturbed
- Eucalyptus (globulus, camaldulensis) Woodland Semi-Natural Alliance
- Fraxinus velutina Forest Alliance
- Landscaped
- Lepidium latifolium Herbaceous Semi-Natural Alliance
- Lepidium latifolium-Conium maculatum Herbaceous Semi-Natural Alliance
- Lepidospartum squamatum Shrubland Alliance
- Lepidospartum squamatum Shrubland Alliance - Sparse
- Platanus racemosa Woodland Alliance Disturbed
- Quercus agrifolia Woodland Alliance
- Rumex crispus Herbaceous Semi-Natural Alliance
- Salix gooddingii Woodland Alliance
- Salix gooddingii Woodland Alliance - Sparse
- Xanthium strumarium Herbaceous Alliance

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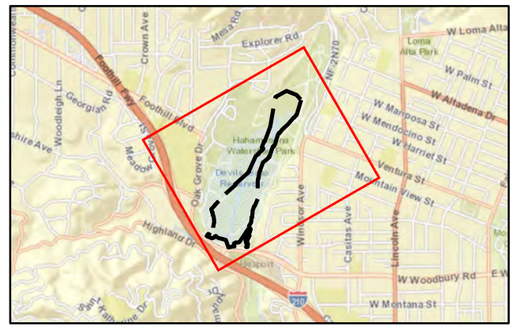

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ENVIRONMENTAL CONSULTANTS

2014-003.008 Devil's Gate Sediment Removal Project

Scale in Feet
0 600

Photo Source: NAIP 2016
[1] LADPW

Map Date: 7/26/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\Vegetation\Vegetation\v1\DG_Vegetation_Ecorp2016_JD_V3.mxd (MAG)-mguidry 7/26/2018

Approximately 16.18 of vegetation communities and disturbed areas will be temporarily affected by the Project as these areas will be restored to native plant communities following the initial sediment removal.

Table 3.8. Project Impacts to Vegetation Communities

Vegetation Community	Total Mapped Acreage	Perm. Impacts	Temp. Impacts	Side Slopes (Perm. Impacts)	Total Impact Acreage	*Avoided Areas (acres)*
RIPARIAN						
Salix gooddingii Woodland Alliance	7.46	1.46	0.92	0.80	3.19	*4.27*
Salix gooddingii Woodland Alliance - Sparse	4.20	3.83	0.03	0.31	4.17	*0.03*
Salix gooddingii Woodland Alliance- Understory 20% *Lepidium latifolium-Xanthium strumarium*	15.88	7.73	0.00	1.35	9.09	*6.79*
Salix gooddingii Woodland Alliance- Understory 30% *Lepidium latifolium-Conium maculatum*	15.13	2.62	0.69	0.55	3.87	*11.26*
***Salix gooddingii* Woodland Alliance TOTAL**	**42.67**	**15.65**	**1.65**	**3.02**	**20.32**	***22.35***
Baccharis salicifolia Shrubland Alliance-No Understory	2.17	0.22	0.41	0.00	0.63	*1.54*
Baccharis salicifolia Shrubland Alliance-20% *Conium maculatum-Lepidium latifolium*	2.04	0.76	0.48	0.08	1.32	*0.72*
Baccharis salicifolia Shrubland Alliance-30% *Conium maculatum-Lepidium latifolium*	6.84	0.44	0.00	0.16	0.60	*6.25*
Baccharis salicifolia Shrubland Alliance-40% *Conium maculatum-Lepidium latifolium*	14.18	8.29	0.00	0.98	9.27	*4.91*
***Baccharis salicifolia* Shrubland Alliance TOTAL**	**25.23**	**9.70**	**0.89**	**1.22**	**11.81**	***13.43***
TOTAL RIPARIAN	**67.90**	**25.34**	**2.55**	**4.24**	**32.13**	***35.77***
FLOODPLAIN						
Lepidospartum squamatum Shrubland Alliance	5.08	0.02	0.47	0.00	0.49	*4.60*
Lepidospartum squamatum Shrubland Alliance (Sparse)	22.19	1.95	12.68	0.00	12.68	*7.55*
TOTAL FLOODPLAIN	**27.27**	**1.97**	**13.16**	**0.00**	**15.13**	***12.15***
TOTAL RIPARIAN/ FLOODPLAIN	**95.17**	**27.31**	**15.71**	**4.24**	**47.26**	***47.92***
NATIVE UPLAND						
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance	1.88	0.00	0.00	0.00	0.00	*1.88*

Table 3.8. Project Impacts to Vegetation Communities

Vegetation Community	Total Mapped Acreage	Perm. Impacts	Temp. Impacts	Side Slopes (Perm. Impacts)	Total Impact Acreage	*Avoided Areas (acres)*
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance-20% Lepidium latifolium	4.38	0.00	0.03	0.00	0.03	*4.35*
Artemisia californica –Eriogonum fasciculatum Shrubland Alliance-30% Lepidium latifolium	2.08	0.01	0.09	0.00	0.10	*1.98*
Quercus agrifolia Alliance	22.80	0.06	0.07	0.07	0.13	*22.67*
Platanus racemosa Woodland Alliance - Disturbed	1.58	0.00	0.00	0.00	0.00	*1.58*
TOTAL NATIVE UPLAND	**32.72**	**0.07**	**0.19**	**0.07**	**0.26**	***32.46***
NONNATIVE/OTHER						
Brassica nigra and other mustards Herbaceous Semi-Natural Alliance	23.09	0.00	0.00	0.00	0.00	*23.09*
Conium maculatum Herbaceous Semi-Natural Alliance -30% *Lepidium latifolium*	6.24	2.61	0.31	0.88	3.80	*2.44*
Lepidium latifolium – *Conium maculatum* Herbaceous Semi-Natural Alliance	13.28	10.24	0.00	0.72	10.96	*2.32*
Lepidium latifolium Herbaceous Semi-Natural Alliance	1.80	0.00	0.00	0.00	0.00	*1.80*
Rumex crispus Herbaceous Semi-Natural Alliance (Unofficial Alliance)	0.30	0.00	0.00	0.00	0.00	*0.30*
Xanthium strumarium Herbaceous Alliance (Unofficial Alliance)	1.50	0.67	0.00	0.57	1.24	*0.26*
Eucalyptus (globulus, camaldulensis) Woodland Semi-Natural Alliance	0.27	0.00	0.00	0.00	0.00	*0.27*
Fraxinus velutina Forest Alliance (Unofficial Alliance)	0.46	0.00	0.00	0.00	0.00	*0.46*
Landscaped	0.15	0.00	0.00	0.00	0.00	*0.15*
Depression/Bare Ground (Associated with Seasonally Wet Area)	0.39	0.00	0.00	0.00	0.00	*0.39*
Scoured Channel	5.31	1.12	0.00	0.86	1.98	*3.33*
Disturbed (Barren/Trails/IMP Area)	10.88	0.01	0.06	0.00	0.07	*10.81*
TOTAL OTHER	**63.55**	**13.53**	**0.36**	**3.03**	**16.33**	***42.30***
TOTAL	**191.58**	**42.05**	**16.18**	**7.34**	**65.56**	***126.01***

3.7.1.1 Permanent Impacts

The vegetation communities within the revised boundary of the Permanent Maintenance Area will be removed during the initial sediment removal phase of the Project and will be subject to ongoing disturbance for the duration of the Project. The Project would not result in a loss of WOUS, however, there would be a permanent loss of aquatic resource functions and services. Approximately 42.05 acres of permanent impacts to vegetation communities will occur within the Routine Annual Maintenance area where sediment may be removed on an annual basis. The remaining acres of permanent impact areas (7.34 acres) consist of the side slopes of the Permanent Maintenance Area, which will be created following the initial sediment removal. The side slopes, which are referred to as the Episodic Maintenance Areas, will be allowed to revegetate with native vegetation to create a buffer between the Routine Annual Maintenance Area and adjacent mitigation areas. However, the vegetation that is allowed to grow on the side slopes may be periodically affected if the side slopes need to be reconstructed following sediment removal efforts. Therefore, the impacts associated with the areas on the side slopes are considered permanent impacts to USACE jurisdiction.

The permanent impacts of the Project include the removal of approximately 17.68 acres of areas that are either disturbed, devoid of vegetation, or are dominated by nonnative, invasive, and weedy plant species. In addition, approximately 1.97 acres of RAFSS and 0.14 acre of native upland vegetation communities (0.01 acre of disturbed coastal sage scrub [CSS] and 0.13 acre of oak woodland) will also be affected by the Project. Approximately 18.67 acres of riparian woodland and 10.92 acres of riparian scrub will also be permanently affected by the Project. However, an evaluation of the riparian vegetation communities in spring of 2016 determined that the understory in most of the riparian woodland and riparian scrub throughout the reservoir is dominated by nonnative and invasive plant species, such as perennial pepperweed, poison hemlock, and mustards. In addition, monotypic patches of perennial pepperweed and mustard are scattered throughout the riparian habitats in the reservoir. As a result, the quality of the riparian habitat is degraded and the diversity of wildlife is not what would be expected in riparian habitat where the understory is dominated by native plant species. Approximately 12.26 acres (66 percent) of the riparian woodland and 10.70 acres (98 percent) of the riparian scrub communities that will be permanently impacted are considered disturbed due to the presence of nonnative and invasive plant species in the understory. Approximately 6.41 acres of relatively undisturbed riparian woodland and 0.22 acre of relatively undisturbed riparian scrub will be permanently affected by the Project. The total acreage of permanent impacts to areas that support relatively undisturbed native vegetation communities (riparian, floodplain, and upland) is approximately 8.73 acres, which comprises approximately 18 percent of the vegetation communities within the permanent maintenance area. The permanent impact to areas that support disturbed native vegetation communities includes approximately 22.97 acres, which comprises approximately 46 percent of the Permanent Maintenance Area. Approximately 17.68 acres (36 percent) of the Permanent Maintenance Area is currently composed of nonnative vegetation and disturbed areas.

3.7.1.2 Temporary Impacts

Approximately 16.18 acres of vegetation communities and disturbed areas will be temporarily affected by the Project. This includes the areas located within the Initial Sediment Removal Area but outside of the boundary of the Permanent Maintenance Area. The initial removal of sediment will temporarily impact

approximately 0.96 acre of undisturbed riparian woodland and 0.41 acre of undisturbed riparian scrub. As noted in the discussion of permanent impacts, much of the area covered by riparian woodland and scrub communities contains a high percentage of nonnative and invasive plants and as a result, these areas represent relatively low-quality habitat. Approximately 0.69 acre of disturbed riparian woodland and 0.48 acre of disturbed riparian scrub will also be temporarily removed during the initial sediment removal. Non-riparian native plant communities and floodplain vegetation that will be temporarily affected by the Project also include approximately 0.12 acre of disturbed CSS, and 13.16 acre of RAFSS. An additional 0.36 acre of areas that are either disturbed or are dominated by weedy, invasive, and nonnative vegetation will also be temporarily impacted by the Project. The total temporary impact to areas that support relatively undisturbed native vegetation communities is approximately 14.53 acres, which comprises approximately 90 percent of the temporary impact area. The total temporary impact to areas that support disturbed native vegetation communities is approximately 1.29 acres, which comprises approximately 8 percent of the temporary impact area.

3.7.2 Impacts to USACE Jurisdictional Areas

Table 3.9 lists the permanent and temporary impacts to wetland and non-wetland WOUS under the jurisdiction of the USACE. A total of approximately 1.52 acres of wetlands and 32.63 acres of non-wetland WOUS will be impacted by the Project. The impacts to wetlands include approximately 1.52 acres of permanent impacts and no temporary impacts. Impacts to non-wetland WOUS include approximately 18.77 acres of permanent and 13.14 acres of temporary impacts. Approximately 2.10 acres of wetlands and 13.23 acres of non-wetland WOUS will be avoided by the Project.

Table 3.9. Total Acres and Permanent and Temporary Impacts to USACE Jurisdictional Areas

Features	Permanent Impact	Temporary Impact	Side Slopes (Permanent)	Total Impacts	Avoided	Total
Non-wetland Waters	16.80	13.14	2.69	32.63	13.23	45.86
Linear Feet	4,578	1,066	203	6,027	13,999	20,026
Wetlands	0.81	0.00	0.71	1.52	2.10	3.62
TOTAL*	**17.61**	**13.14**	**3.40**	**34.15**	**15.33**	**49.48**

***Total does not include linear feet.**

Table 3.10 summarizes the impacts to wetlands and non-wetland WOUS subject to USACE jurisdiction, the impact site description for the areas, the total acres of the vegetation communities within the boundaries of the USACE jurisdictional areas, and the acres that will be subject to permanent and temporary impacts from the Project. A map showing the distribution of these vegetation communities in and adjacent to the USACE jurisdictional areas is included as Figure 3-3. The total acreage of the permanent and temporary impacts to wetlands and WOUS resulting from the Project is 34.15 acres.

Table 3.10. Impact Site Description

IMPACT SITE DESCRIPTION										
Pre-Construction Site Conditions							Post-Construction Site Conditions			
Site Description	**Habitat Types**	**Vegetation Communities***	**Cowardin**	**HGM**	**Hydrology**	**CRAM**	**Activity**	**Permanent Loss**	**Temporary Loss**	**Linear Feet**
Wetland Waters of the US										
Project Area	Reservoir	*Conium maculatum* Herbaceous Semi-Natural Alliance 30% *Lepidium latifolium*	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.00	0.00	N/A
	Reservoir	Scoured Channel	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.50	0.00	N/A
	Reservoir	*Salix gooddingii* Woodland Alliance	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.03	0.00	N/A
	Reservoir	Salix gooddingii Woodland Alliance Understory: 20% Lepidium latifolium/Xanthium strumarium	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.34	0.00	N/A
	Reservoir	*Xanthium strumarium* Herbaceous Alliance (unofficial alliance)	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.65	0.00	N/A
							TOTAL	1.52	0.00	
Non-Wetland Waters of the US										
Project Area	Reservoir	Artemisia californica - Eriogonum fasciculatum Shrubland Alliance Understory: 20% Lepidium latifolium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.00	0.01	5,895
	Reservoir	Baccharis salicifolia Shrubland Alliance No understory	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.10	0.32	
	Reservoir	Baccharis salicifolia Shrubland Alliance Understory: 20% Conium maculatum/Lepidium latifolium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.22	0.01	
	Reservoir	Baccharis salicifolia Shrubland Alliance Understory: 30% Conium maculatum/Lepidium latifolium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.08	0.00	
	Reservoir	Baccharis salicifolia Shrubland Alliance Understory: 40% Conium maculatum/Lepidium latifolium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.05	0.00	

Table 3.10. Impact Site Description

IMPACT SITE DESCRIPTION										
Pre-Construction Site Conditions							Post-Construction Site Conditions			
Site Description	Habitat Types	Vegetation Communities*	Cowardin	HGM	Hydrology	CRAM	Activity	Permanent Loss	Temporary Loss	Linear Feet
	Reservoir	Conium maculatum Herbaceous Semi-Natural Alliance 30% Lepidium latifolium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.72	0.00	
	Reservoir	Lepidium latifolium-Conium maculatum Herbaceous Semi-Natural Alliance	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.08	0.00	
	Reservoir	Lepidospartum squamatum Scrubland Alliance - Sparse	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.77	11.86	
	Reservoir	Lepidospartum squamatum Shrubland Alliance	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.00	0.05	
	Reservoir	Quercus agrifolia Woodland Alliance	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.00	0.00	
	Reservoir	Salix gooddingii Woodland Alliance	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.48	0.69	
	Reservoir	Salix gooddingii Woodland Alliance - Sparse	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	4.01	0.02	
	Reservoir	Salix gooddingii Woodland Alliance Understory: 20% Lepidium latifolium/Xanthium strumarium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	6.33	0.00	
	Reservoir	Salix gooddingii Woodland Alliance Understory: 30% Lepidium latifolium/Conium maculatum	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.14	0.18	
	Reservoir	Scoured Channel	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.92	0.00	
	Reservoir	Xanthium strumarium Herbaceous Alliance (unofficial alliance)	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.59	0.00	
							TOTAL:	**19.49**	**13.14**	**5,895**

3.8 USACE Compensatory Mitigation

3.8.1 On-Site Compensatory Mitigation

On-site rehabilitation and re-establishment of wetlands and re-establishment, rehabilitation, and enhancement of non-wetlands WOUS will be the methods used to provide compensatory mitigation for permanent and temporary impacts of the Project on wetland and non-wetland WOUS. The on-site compensatory mitigation will be implemented in a portion of the mitigation areas concurrently with Project implementation to minimize temporal loss of habitat within WOUS and associated buffer areas. The on-site mitigation areas are all located within the HWM for the Project (Figure 2-1). Tables 3.11 and 3.12 summarize the acres of compensatory mitigation and the mitigation methods that will be used to offset the impacts to wetlands and non-wetland WOUS. Table 3.13 lists each of the mitigation areas and the pre- and post-Project conditions. Table 3.14 lists the mitigation and buffer areas and the activities that will be conducted in each of the areas. Figure 3-4 shows the mitigation methods proposed for each of the compensatory mitigation areas as well as identifies the buffer habitats. Approximately 2.13 acres of wetlands will be re-established and approximately 8.36 acres of non-wetland WOUS will be re-established, rehabilitated, and enhanced in multiple areas outside of the Permanent Maintenance Area. The proposed compensatory mitigation also includes rehabilitation and enhancement of approximately 52.79 acres, including 45.45 acres of riparian and upland WOUS buffer habitat and 7.34 acres of side slope buffer habitat (Table 3.12). In addition, approximately 16.17 acres of riparian and RAFSS habitats in the temporary impact areas will be re-established following the completion of the sediment removal phase of the Project. Additional measures that will be implemented to reduce impacts and increase function in the mitigation areas will be closure of unnecessary trails, planting of native barrier plants, such as poison oak (*Toxicodendron diversilobum*) or prickly-pear cactus (*Opuntia littoralis*), in buffers adjacent to permanent trails, and placement of woody debris to increase structural diversity and to provide additional refugia for wildlife and catchment sites for plant seeds. Barrier plants will create a buffer between sensitive habitat and recreational trails to prevent human access into the mitigation areas. Table 3.13 provides the details about the on-site mitigation area descriptions.

Table 3.11. Acres of On-Site Compensatory Mitigation and Mitigation Methods

WOUS Type	Re-Establishment	Rehabilitation	Enhancement	Total
Wetlands	0.00	2.13	0.00	2.13
Non-Wetland WOUS	4.62	1.35	2.39	8.36
Total WOUS	**4.62**	**3.48**	**2.39**	**10.49**

Table 3.12. Acres of On-Site Re-Establishment and Enhancement to WOUS Buffer Areas

Buffer Type	Re-establishment	Rehabilitation	Enhancement	Buffer	Total
Riparian Buffer Areas	0.00	5.72	32.23	2.62	40.57
Upland Buffer Areas	0.00	0.00	4.88	0.00	4.88
Side Slope Buffers	0.00	7.34	0.00	0.00	7.34
Total Buffer Areas	**0.00**	**13.06**	**37.11**	**2.62**	**52.79**
Temporary Impact Areas	16.17	0.00	0.00	0.00	16.17
Total Buffer - Temporary Impact Areas	**16.17**	**13.06**	**37.11**	**2.62**	**68.96**

Figure 3-4. Mitigation Methods Within Mitigation Areas

DG-9 (Temp Impacts)
DG-7 (Temp Impacts)
DG-W-2 Mining Pit
DG-4C
DG-4 WOUS Connections
DG-4B
DG-W-2 (Mining Pit Outlet)
DG-4
DG-4A
DG-4 Drainage
DG-4 Sheetflow
DG-SF-1
DG-5
DG-4 Drainage
DG-4 Sheetflow
DG-4A
DG-4A
DG-4 Drainage
DG-4A
DG-SF-2
DG-4A
DG-4 WOUS
DG-4 WOUS
DG-1 WOUS
DG-1 WOUS
DG-1
DG-8 (Temp Impacts)
DG-W-1 (Johnson Field)
DG-2
DG-2 New Channels
DG-2 WOUS
DG-2A
DG-2B
DG-3A

Map Features

- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]
- Sediment Removal Excavation Contours [1]

Mitigation Type

- Wetland Waters of the U.S. - Re-Establishment (0.13 ac.)
- Wetland Waters of the U.S. - Rehabilitation (2.13 ac.)
- Non-wetland Waters of the U.S. - Enhancement (2.39 ac.)
- Non-wetland Waters of the U.S. - Re-Establishment (18.59 ac.)
- Non-wetland Waters of the U.S. - Rehabilitation (1.35 ac.)
- Upland - Buffer (2.63 ac.)
- Upland - Enhancement (37.12 ac.)
- Upland - Re-Establishment (2.09 ac.)
- Upland - Rehabilitation (5.71 ac.)

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2014-003.008 Devils Gate Mitigation Plan

Scale in Feet
0
600

Photo Source: NAIP 2016
[1] LADPW

Map Date: 8/2/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\Mitigation_Plan\MMP\Devils_Gate_v1\DG_Mitigation_Methods_20180801.mxd (MAG)-mguidry 8/2/2018

Table 3.13. On-Site Mitigation Area Descriptions

ON-SITE MITIGATION AREA DESCRIPTION										
Site #	**Pre-Construction Site Conditions**	**Post-Construction Site Conditions**								
	Habitat Types	**Habitat Types**	**Vegetation**	**Hydrology**	**Mitigation Method**	**Acres**	**Lin. Ft**	**Cowardin**	**HGM**	**CRAM**
Wetland Waters of the US										
DG-W-2 (Mining Pit)	Riparian Woodland/Herbaceous/NN	Riparian Woodland	Salix gooddingii Woodland Alliance	Seasonally Flooded Ephemeral	Rehabilitation	2.13		Palustrine	Riverine	Riverine
TOTAL WETLANDS						**2.13**				
Non-Wetland Waters of the US										
DG-W-2 (Mining Pit Outlet)	Riparian Woodland/Scrub/NN	Riparian Woodland	Salix gooddingii Woodland Alliance	Intermittent	Re-Establishment	0.13		Riverine	Riverine	Riverine
DG-SF-1 (Part of DG-4 Drainage)	Riparian Woodland/Scrub/NN	Riparian Woodland	Salix gooddingii Woodland Alliance	Intermittent	Rehabilitation	0.08		Riverine	Riverine	Riverine
DG-SF-2 (Part of DG-4 Drainage)	Riparian Woodland/Scrub/NN	Riparian Woodland	Salix gooddingii Woodland Alliance	Intermittent	Rehabilitation	0.03		Riverine	Riverine	Riverine
DG-W-1 (Johnson Field)	Disturbed NN Grassland	Riparian Woodland	Salix gooddingii Woodland Alliance	Intermittent	Re-Establishment	3.44		Palustrine	Riverine	Riverine
DG-2 New Channels	Riparian Woodland/Scrub/Herb/NN	Riparian Woodland	Salix gooddingii Woodland Alliance	Intermittent	Re-Establishment	0.83		Riverine	Riverine	Riverine
DG-2 WOUS	Riparian Woodland/Scrub/Herb/NN	Riparian Woodland	Salix gooddingii Woodland Alliance	Intermittent	Rehabilitation	0.75		Riverine	Riverine	Riverine
DG-4-Drainage	Riparian Woodland/Scrub/NN	Riparian Woodland	Salix gooddingii Woodland Alliance	Intermittent	Rehabilitation	0.0.49		Riverine	Riverine	Riverine
DG-4-Sheet Flow	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Salix gooddingii Woodland Alliance/Baccharis salicifolia Shrubland Alliance	Intermittent	Enhancement	0.40		Riverine	Riverine	Riverine
DG-4-WOUS	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Salix gooddingii Woodland Alliance/Baccharis salicifolia Shrubland Alliance	Intermittent	Enhancement	1.88		Riverine	Riverine	Riverine
DG-4-WOUS Connections	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Salix gooddingii Woodland Alliance/Baccharis salicifolia Shrubland Alliance	Intermittent	Re-Establishment	0.22		Riverine	Riverine	Riverine
DG-1-WOUS	Unveg Channel/RAFSS	RAFSS/Scrub	Lepidospartum squamatum Shrubland Alliance/Baccharis salicifolia Shrubland Alliance	Intermittent	Enhancement	0.11		Riverine	Riverine	Riverine
TOTAL NON-WETLAND WOUS						**8.36**				
Riparian Buffers										
	Habitat Types	**Habitat Types**	**Vegetation**	**Hydrology**	**Mitigation Method**	**Acres**	**Lin. Ft**	**Cowardin**	**HGM**	**CRAM**
DG-2	Riparian Scrub/Herb/NN	Riparian Scrub	Baccharis salicifolia Shrubland Alliance	Riparian Terrace	Enhancement	3.83	N/A	Riverine	Riverine	Riverine
DG-2A	Disturbed NN Grassland	Riparian Scrub	Baccharis salicifolia Shrubland Alliance	Riparian Terrace	Buffer	0.10	N/A	Riverine	Riverine	Riverine
DG-2B	Disturbed NN Grassland	Riparian Scrub	Baccharis salicifolia Shrubland Alliance	Riparian Terrace	Buffer	0.38	N/A	Riverine	Riverine	Riverine
Riparian Buffers (cont.)										
DG-3A	Disturbed Riparian Scrub/NN	Oak Riparian Woodland	Quercus agrifolia Woodland Alliance	Riparian Terrace	Buffer	1.15	N/A	Riverine	Riverine	Riverine

Table 3.13. On-Site Mitigation Area Descriptions

ON-SITE MITIGATION AREA DESCRIPTION										
Site #	**Pre-Construction Site Conditions**	**Post-Construction Site Conditions**								
	Habitat Types	**Habitat Types**	**Vegetation**	**Hydrology**	**Mitigation Method**	**Acres**	**Lin. Ft**	**Cowardin**	**HGM**	**CRAM**
DG-4	Disturbed Riparian Woodland/Scrub	Riparian Woodland/Scrub	Salix gooddingii Woodland Alliance/Baccharis salicifolia Shrubland Alliance	Riparian Terrace	Enhancement	28.40	N/A	Riverine	Riverine	Riverine
DG-4A	Lepidium	Riparian Woodland/Scrub	Salix gooddingii Woodland Alliance/Baccharis salicifolia Shrubland Alliance	Riparian Terrace	Rehabilitation	5.46	N/A	Riverine	Riverine	Riverine
DG-4B	Disturbed Riparian Scrub	Riparian Scrub	Baccharis salicifolia Shrubland Alliance	Riparian Terrace	Buffer	0.54	N/A	Riverine	Riverine	Riverine
DG-4C	Disturbed Riparian Scrub/Bare	Riparian Scrub	Baccharis salicifolia Shrubland Alliance	Riparian/Upland Transition	Buffer	0.45	N/A	Riverine	Riverine	Riverine
DG-5	Disturbed/Riparian Scrub	Riparian Woodland/Scrub	Salix gooddingii Woodland Alliance	Riparian Terrace	Rehabilitation	0.26	N/A	Riverine	Riverine	Riverine
TOTAL RIPARIAN BUFFERS						**40.57**				
Non-Aquatic Buffers										
DG-1	Sage Scrub/RAFSS/ Riparian Scrub/NN	Sage Scrub/RAFSS	Eriogonum fasciculatum Shrubland Alliance/Lepidospartum squamatum Shrubland Alliance	Upland	Enhancement	4.88	N/A	N/A	N/A	N/A
TOTAL NON-AQUATIC BUFFERS						**4.88**				
Side Slope Buffers										
Side Slopes	Various Vegetation Communities Disturbed Areas	Riparian Scrub/RAFSS	Lepidospartum squamatum Shrubland Alliance/Baccharis salicifolia Shrubland Alliance	Riparian Slope	Enhancement	**7.34**	N/A	N/A	N/A	N/A
TOTAL SIDE SLOPE BUFFERS						**7.34**				
Temporary Impact Areas										
DG-7	Unveg Channel/Riparian Scrub	Riparian Woodland/Scrub	Salix gooddingii Woodland Alliance/Baccharis salicifolia Shrubland Alliance	Intermittent	Re-Establishment	1.16		Riverine	Riverine	Riverine
DG-8	Unveg Channel/Riparian Scrub	Riparian Scrub	Baccharis salicifolia Shrubland Alliance	Intermittent	Re-Establishment	0.92		Riverine	Riverine	Riverine
DG-9	Disturbed/Unveg Channel/RAFSS	Unveg Channel/RAFSS/ Riparian Scrub	Lepidospartum squamatum Shrubland Alliance/Baccharis salicifolia Shrubland Alliance	Intermittent	Re-Establishment	14.09		Riverine	Riverine	Riverine
TOTAL TEMPORARY IMPACT AREAS						**16.17**				

Table 3.14 Mitigation Method Descriptions for the On-Site Mitigation Areas

Site Description	Mitigation Method	Acreage	Planned Activities Conducted in the On-Site Mitigation Areas
Wetland Waters of the US			
DG-W-2 (Mining Pit)	Rehabilitation	2.13	• Planting and seeding with native riparian species. • Recontour existing soil in select areas to improve conveyance of flows during inclement weather. • Recontour existing soil in select areas to improve distribution of water throughout mitigation area. • Recontour and homogenize existing soil in select areas to improve soil conditions to support riparian trees. • Improve hydrology so that connection with DG-W-2 (Outlet) and existing non-wetland WOUS in DG-4 occurs. • Remove non-native/invasive plant species from approximately 0.6 acre within the mitigation area. • Estimated volume of soil to be manipulated throughout mitigation area is 4,000 cubic yards (cu yd). • Estimated area where soil manipulation will occur is 1.3 acres (ac). • Neither import or export of soil is anticipated.
TOTAL WETLANDS		**2.13**	
Non-Wetland Waters of the US			
DG-W-2 (Mining Pit Outlet)	Re-Establishment	0.13	• Planting and seeding with native riparian species. • Recontour existing soil to improve conveyance of flows during inclement weather. • Recontour existing soil to improve distribution of water throughout mitigation area. • Recontour and homogenize soil to improve soil conditions to support riparian trees. • Improve hydrology so that DW-W-2 can convey flows to DG-4 (Drainage). • Remove non-native/invasive plant species from approximately 0.1 acre within the mitigation area. • Estimated volume of soil to be manipulated throughout mitigation area is 260.0 cu yd. • Neither import or export of soil is anticipated.
DG-SF-1 (Part of DG-4 Drainage)	Rehabilitation	0.08	• Planting and seeding with native riparian species. • Recontour existing soil to improve conveyance of flows during inclement weather. • Recontour existing soil to improve distribution of water throughout mitigation area. • Recontour and homogenize soil to improve soil conditions to support riparian trees. • Remove non-native/invasive plant species from approximately 0.05 acre within the mitigation area. • Estimated volume of soil to be manipulated throughout mitigation area is 31.0 cu yd. • Neither import or export of soil is anticipated.

Table 3.14 Mitigation Method Descriptions for the On-Site Mitigation Areas

Site Description	Mitigation Method	Acreage	Planned Activities Conducted in the On-Site Mitigation Areas
DG-SF-2 (Part of DG-4 Drainage)	Rehabilitation	0.03	• Planting and seeding with native riparian species. • Recontour existing soil to improve conveyance of flows during inclement weather. • Recontour existing soil to improve distribution of water throughout mitigation area. • Recontour and homogenize soil to improve soil conditions to support riparian trees. • Remove non-native/invasive plant species from approximately 0.03 acre within the mitigation area. • Estimated volume of soil to be manipulated throughout mitigation area is 10.0 cu yd. • Neither import or export of soil is anticipated.
DG-W-1 (Johnson Field)	Re-Establishment	3.44	• Planting and seeding with native riparian species. • Recontour existing soil to improve conveyance of flows during inclement weather. • Recontour existing soil to improve distribution of water throughout mitigation area. • Recontour and homogenize soil to improve soil conditions to support riparian trees. • Improve hydrology so that DG-W-1 can convey flows to DG-2 and DG-2 non-wetland WOUS. • Remove non-native/invasive plant species from approximately 1.0 acre within the mitigation area. • Export of soil will occur with a total estimated volume of 34,287 cu yd.
DG-2 New Channels	Re-Establishment	0.83	• Planting and seeding with native riparian species. • Recontour existing soil to improve conveyance of flows during inclement weather. • Recontour existing soil to improve distribution of water throughout mitigation area. • Recontour and homogenize soil to improve soil conditions to support riparian trees. • Improve hydrology so that DG-W-1 can convey flows to DG-2. • Remove non-native/invasive plant species from approximately 0.5 acre within the mitigation area. • Estimated volume of soil to be manipulated throughout mitigation area is 540.0 cu yd. • Neither import or export of soil is anticipated.
DG-2 WOUS	Rehabilitation	0.75	• Planting and seeding with native riparian species. • Recontour existing soil in select locations to improve conveyance of flows during inclement weather. • Improve hydrology so that DG-W-1 can convey flows to the Reservoir. • Remove non-native/invasive plant species from approximately 0.3 acre within the mitigation area. • Neither import or export of soil is anticipated.

Table 3.14 Mitigation Method Descriptions for the On-Site Mitigation Areas

Site Description	Mitigation Method	Acreage	Planned Activities Conducted in the On-Site Mitigation Areas
DG-4-Drainage	Rehabilitation	0.49	• Planting and seeding with native riparian species. • Recontour existing soil to improve conveyance of flows during inclement weather. • Remove non-native/invasive plant species from approximately 0.22 acre within the mitigation area. • Estimated volume of soil to be manipulated throughout mitigation area is 20.0 cu yd. • Neither import or export of soil is anticipated.
DG-4-Sheet Flow	Enhancement	0.40	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 0.42 acre within the mitigation area. • Neither import or export of soil is anticipated.
DG-4-WOUS	Enhancement	1.88	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 1.88 acres within the mitigation area. • Neither import or export of soil is anticipated.
DG-4-WOUS Connections	Re-Establishment	0.22	• Planting and seeding with native riparian species. • Recontour existing soil to improve conveyance of flows during inclement weather. • Recontour existing soil to improve distribution of water throughout mitigation area. • Improve hydrology so that DG-W-2 can convey flows to non-wetland WOUS in DG-4. • Improve hydrology so that a connection is established between two areas of non-wetland WOUS in DG-4. • Remove non-native/invasive plant species from approximately 0.01 acre within the mitigation area. • Estimated volume of soil to be manipulated throughout mitigation area is 20.0 cu yd. • Neither import or export of soil is anticipated.
DG-1-WOUS	Enhancement	0.11	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 0.48 acre within the mitigation area.
TOTAL NON-WETLAND WOUS		**8.36**	
Riparian Buffers			
DG-2	Enhancement	3.83	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 1.1 acres within the mitigation area.
DG-2A	Buffer	0.10	• Planting and seeding with native species. • Remove non-native/invasive plant species from approximately 0.1 acre within the mitigation area.
DG-2B	Buffer	0.38	• Planting and seeding with native species. • Remove non-native/invasive plant species from approximately 0.38 acre within the mitigation area.

Table 3.14 Mitigation Method Descriptions for the On-Site Mitigation Areas

Site Description	Mitigation Method	Acreage	Planned Activities Conducted in the On-Site Mitigation Areas
DG-3A	Buffer	1.15	• Planting and seeding with native riparian (and oak) species. • Remove non-native/invasive plant species from approximately 1.0 acre within the mitigation area.
DG-4	Enhancement	28.40	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 25.0 acres within the mitigation area.
DG-4A	Rehabilitation	5.46	• Planting and seeding with native riparian species. • Recontour existing soil to improve distribution of water throughout mitigation area. • Remove non-native/invasive plant species from approximately 5.0 acres within the mitigation area. • Neither import or export of soil is anticipated.
DG-4B	Buffer	0.54	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 0.54 acre within the mitigation area.
DG-4C	Buffer	0.45	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 0.45 acre within the mitigation area.
DG-5	Rehabilitation	0.26	• Planting and seeding with native riparian species. • Recontour existing soil to improve distribution of water throughout mitigation area. • Recontour and homogenize soil to improve soil conditions to support riparian trees. • Remove non-native/invasive plant species from approximately 0.26 acre within the mitigation area. • Neither import or export of soil is anticipated.
TOTAL RIPARIAN BUFFERS		**40.57**	
Non-Aquatic Buffers			
DG-1	Enhancement	4.88	• Planting and seeding with native species. • Remove non-native/invasive plant species from approximately 3.5 acres within the mitigation area.
TOTAL NON-AQUATIC BUFFERS		**4.88**	
Side Slope Buffers			
Side Slopes	Enhancement	7.34	• Planting and seeding with native species.
TOTAL SIDE SLOPE BUFFERS		**7.34**	
Temporary Impact Areas			
DG-7	Re-Establishment	1.16	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 0.7 acre within the mitigation area.
DG-8	Re-Establishment	0.92	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 0.3 acre within the mitigation area.

Table 3.14 Mitigation Method Descriptions for the On-Site Mitigation Areas

Site Description	Mitigation Method	Acreage	Planned Activities Conducted in the On-Site Mitigation Areas
DG-9	Re-Establishment	14.09	• Planting and seeding with native riparian species. • Remove non-native/invasive plant species from approximately 0.2 acre within the mitigation area.
TOTAL TEMPORARY IMPACT AREAS		**16.17**	

3.8.2 Pre- and Post-Project Onsite Jurisdictional Areas Comparison

Table 3.15 includes a comparison of the pre- and post-Project acres of onsite wetland and non-wetland WOUS. The post-Project anticipated jurisdictional areas are shown on Figure 3-5 and they include the compensatory mitigation areas where the wetland and non-wetland WOUS will be re-established, rehabilitated, and enhanced as well as the upstream areas between the Permanent Maintenance Area boundary and the Initial Sediment Removal Area that are within the banks of the Arroyo Seco. The locations of wetland and non-wetland WOUS within the side slopes are also shown on the figure even though the USACE considers the side slopes as a permanent impact area. The flows paths from wetlands and non-wetland WOUS located outside of the side slopes will continue in their current or similar locations after the side slopes are formed. The LACFCD will monitor and repair erosion of the side slopes as necessary but flows will re-establish after any side slope repairs are completed. The pre-Project jurisdictional areas were delineated without the boundaries of the entire reservoir and were not separated into the various component areas of the Project. As a result, an N/A (Not Applicable) was listed in the table for the pre-Project wetlands and non-wetland WOUS within the potential and side slope areas.

Table 3.15 Comparison of Pre- and Post- Project Onsite Acres of USACE Jurisdictional Areas

Features	Pre-Project Jurisdictional Areas	Post-Project Anticipated Jurisdictional Areas
Non-wetland WOUS	45.86	32.83
Wetlands WOUS	3.62	2.14
Total Wetland and Non-wetland WOUS	49.48	34.97
Potential Non-wetland WOUS*	N/A	41.23
Total Potential Wetland and Non-wetland WOUS*	N/A	41.23
Wetlands WOUS (Side Slopes)	N/A	0.71
Non-wetland WOUS (Side Slopes)	N/A	2.69
Total Wetland and Non-wetland WOUS (Side Slopes)	N/A	3.40
GRAND TOTAL	49.48	79.60

*Potential non-wetland WOUS includes areas where the natural flows will create channels that would be considered non-wetland WOUS and these flowpaths may naturally migrate through the area depending upon flows.

Figure 3.5.
Post-Project Waters of the U.S.

Map Features

- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]
- Review Area

Post-Restoration Waters

- Wetland Waters of the U.S.
- Wetland Waters of the U.S. (Side Slopes)
- Non-wetland Waters of the U.S.
- Non-wetland Waters of the U.S. (Side Slopes)
- Potential Non-wetland Waters of the U.S.

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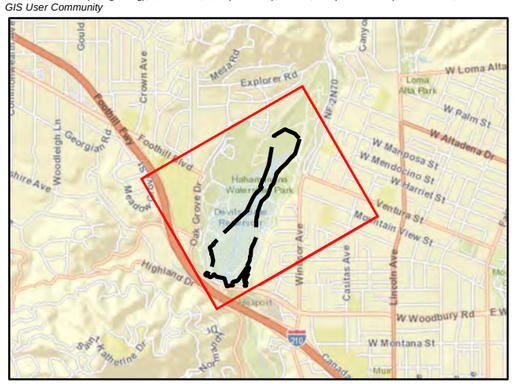

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2014-003.008 Devils Gate Mitigation Plan

Scale in Feet
0 600

Photo Source: NAIP 2016
[1] LADPW

Map Date: 7/31/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\Wetland_Mapping\Wetland_Delineation\Post_Construction_Waters\V1\DG_Waters_Post_Construction_20180731.mxd (MAG)-mguidry 8/2/2018

3.8.3 Proposed Off-Site Compensatory Mitigation

In addition to the on-site compensatory mitigation, LACFCD has negotiated an off-site compensatory mitigation package for a Turnkey PRM project at the Petersen Ranch Mitigation Property, which is located near the unincorporated community of Leona Valley in Los Angeles County. The HMMP for the off-site mitigation is included in Appendix A. Information regarding the proposed off-site compensatory mitigation proposal was provided by Land Veritas and is summarized in this section of the HMMP. The off-site compensatory mitigation project would take place at and surrounding a large sag pond in Area D ("Area D Pond") of the Bank, which has already been approved by the Interagency Review Team ("IRT"). Approximately 5.94 "Uniform Re-establishment" Credits would be generated by expanding the amount of land excluded from cattle grazing and through the enhancement of the wetland riparian, seasonal wetland, and open water habitats present within Area D. The compensatory mitigation project would be located in and around a large, natural sag pond and associated wetland complex in Area D, in the southeast portion of the Petersen Ranch Property. While the Area D Pond is a natural feature, it has been excavated in the past to increase water storage and its hydrology has been supplemented with a mix of well water and piped untreated water obtained from the Elizabeth Lake Mutual Water Company.

The proposed activities will enhance and restore the seasonal wetland, wetland riparian, and open water habitats for the long-term purpose of returning the area to natural functioning. The activities included in the compensatory mitigation project include installing wildlife friendly cattle exclusion fencing, removing and managing invasive plant species, and planting mulefat and willow species. Temporary irrigation would be provided to the planting areas for multiple years and after the new plants are established, it is anticipated that the pond would be filled on an annual basis with supplemental water provided by either the local water district and/or on-site wells. The cattle exclusion fencing will be installed 35 feet away from the Area D Pond, resulting in 31.23 acres of creditable area. The fully-executed LSAA for the Devil's Gate Project requires 25.6 acres of creditable area, so the entire 31.23-acre restoration area may not be required to fulfill the mitigation requirement by the CDFW.

The credits that would be available to be used as off-site compensatory mitigation for impacts of the Devil's Gate Project under Section 404 of the Clean Water Act are listed in Table 3.16. Each "Uniform Re-establishment" Credit is equal to one acre and will provide compensatory mitigation required for the sediment removal activities at the Devil's Gate Dam. Activities within the compensatory mitigation project area will result in enhanced wetland riparian, re-established wetland riparian riparian buffer, enhanced wetland riparian riparian buffer, and preserved wetland riparian upland buffer. Table 3.16. lists the mitigation actions and the corresponding "Uniform Re-establishment" Credits and preservation credits generated by the actions.

Table 3.16. 404 Mitigation Types and Credits as Permittee-Responsible Compensatory Mitigation

Updated Credits for Devil's Gate PRM	Acres	Uniform Re-establishment Credits	Preservation Credits
404 Jurisdictional Areas			
Wetland Riparian Enhanced	17.40	4.35	
404 Jurisdictional Total	17.40	4.35	
404 Buffer Areas			
Wetland Riparian Riparian Buffer Re-established	0.07	0.02	
Wetland Riparian Riparian Buffer Enhanced	7.81	1.56	
Wetland Riparian Upland Buffer Preserved	5.94		5.94
404 Buffer Total	13.82	1.59	5.94
Total[1]	31.23	5.94	5.94

[1] Summing discrepancies due to rounding.

3.8.4 Measures Designed to Create a Beneficial Impact

The total on-site compensatory mitigation package (79.47 acres) proposed to offset the impacts of the Project includes habitat restoration of approximately 72.13 acres located outside of the Permanent Maintenance Area and 7.34 acres on the side slopes in the Episodic Maintenance Area. Figure 3-6 shows the anticipated post-Project distribution of vegetation communities in in the mitigation areas. Table 3.17 lists the anticipated post-Project acreages of the various plant communities in the mitigation areas and in the Episodic Maintenance Areas. The compensatory mitigation Project will improve the function of 2.13 acres of existing wetlands through rehabilitation. In addition, the functions in approximately 8.36 acres of non-wetland WOUS will be greatly improved through the re-establishment of channels and riparian vegetation (4.62 acres), rehabilitation (1.35 acres), and enhancement of 2.39 acres. Approximately 52.79 acres of buffer areas around the wetland and non-wetland WOUS compensatory mitigation areas will also be greatly improved. In addition, 7.34 acres of buffer habitat will be located on the side slopes of the Permanent Maintenance Area and 16.17 acres of temporary impact areas will be restored to the pre-Project vegetation communities. Improvements will result from the removal of nonnative and invasive plant species, closing of trails and actively managing human access through the use of trail designations and public outreach, and restoration of a multi-structured riparian canopy and understory. At present, very little of the habitat in the reservoir is suitable for listed species of birds because of the abundance of invasive and nonnative plants present and a lack of structural diversity that is preferred by the species. Improving the existing habitat and the restoration of additional habitat will provide higher quality habitat that can support an abundant population of least Bell's vireos and potentially support southwestern willow flycatchers (*Empidonax traillii extimus*), western yellow-billed cuckoos (*Coccyzus americanus*), and other sensitive species while also providing an important migration stopover and wildlife movement corridor in a highly urbanized area. An ongoing weed and invasive plant management program will ensure the habitat won't become degraded and will remain a functional habitat area for the long-term.

Figure 3-6
Anticipated Post-Restoration Vegetation Communities

Map Features

- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]

Post-Construction Vegetation

- Artemisia californica - Eriogonum fasciculatum Shrubland Alliance (AcEfSA)
- Baccharis salicifolia Shrubland Alliance (BssA)
- Eriogonum fasciculatum Shrubland Alliance / Lepidospartum squamatum Shrubland Alliance (EfSA/LsSA)
- Lepidospartum squamatum Shrubland Alliance/ Baccharis salicifolia Shrubland Alliance (LsSA/BsSA)
- Quercus agrifolia Woodland Alliance (QaWA)
- Salix gooddingii Woodland Alliance (SgWA)

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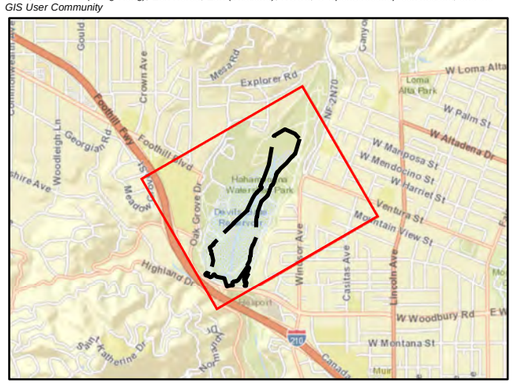

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Scale in Feet
0 600

Photo Source: NAIP 2016
[1] LADPW

Map Date: 7/23/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\meeting_maps_and_analysis\2016-03-22_CDFW_Meeting_Veg_Post_Con\DG_Veg_Post_Construction_20180719.mxd (MAG)-mguidry 7/23/2018

Table 3.17 Anticipated On-Site Post-Restoration Vegetation Communities

Vegetation Community	Riparian	Upland	Upstream RAFSS	Side Slopes	Total
Artemisia californica – Eriogonum fasciculatum Shrubland Alliance	0.00	3.27	0.00	0.00	3.27
Eriogonum facsciculatum Shrubland Alliance/Lepidospartum squamatum Shrubland Alliance	0.00	5.00	0.00	0.00	5.00
Lepidospartum squamatum Shrubland Alliance/Baccharis salicifolia Shrubland Alliance	0.00	0.00	14.09	7.34	21.43
Quercus agrifolia Woodland Alliance	0.00	1.15	0.00	0.00	1.15
Baccharis salicifolia Shrubland Alliance	17.87	0.00	0.00	0.00	17.87
Salix gooddingii Woodland Alliance	30.75	0.00	0.00	0.00	30.75
TOTAL[1]	**48.62**	**9.42**	**14.09**	**7.34**	**79.47**

[1] Rounding accounts for any differences in the total of the vegetation communities in other parts of the HMMP.

The Project area and the associated mitigation areas are encompassed by the Hahamongna Watershed Park, which is heavily used for recreational types of activities, such as hiking, bird watching, horseback riding, and other assorted outdoor activities. As a result, the area is crossed by numerous trails and exhibits evidence of human use (e.g., trash, structures, and damage to natural resources). The mitigation strategy for the Project includes measures designed to reduce the impacts of human presence on the mitigation areas and to protect the wildlife that reside in the habitats, including listed species. The measures include closures of unnecessary trails, narrowing of some of the permanent trails, planting of native barrier plants along trails to buffer sensitive habitat areas, placing woody debris at strategic locations in mitigation areas to increase functional value, removing trash, and conducting educational outreach. These measures in combination with the habitat restoration activities will greatly increase the function and the amount of suitable habitat for sensitive and listed species of wildlife.

3.9 Aquatic Resource Concerns in the Watershed

3.9.1 Devil's Gate CRAM Assessment

The CRAM scoring represents a baseline condition for 2015 for each of the Assessment Areas (AAs) that were assessed (Appendix H). The AAs within Devil's Gate, DG-TEMP, DG-PERM, DG-4, DG-5, and DG-Wetland, which are shown on Figure 3.7, were all categorized as the "riverine: confined" wetland sub-type. The apparent hydrologic flow regime for these areas was considered to be "intermittent." The AAs within impact areas include DG-TEMP, DG-PERM, and DG-Wetland. AAs within the proposed mitigation areas include DG-4 and DG-5, both located west of the Arroyo Seco. A summary of the AAs follows.

Figure 3-7 CRAM Assessment Areas

Map Features

- Project Footprint
- Mitigation Areas
- CRAM Assessment Areas

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Map Date: 7/26/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\meeting_maps_and_analysis\2015-09-24_CRAM_AAs\DG_CRAM_AAs_V3.mxd (DW/MAG) mguidry 7/26/2018

3.9.1.1 DG-TEMP

This AA is located within the area being proposed to be temporarily impacted by the Project. It encompasses a wide section of largely unvegetated streambed along Arroyo Seco. Aside from some scattered floodplain debris within the streambed (logs, rocks, etc.) the stream bottom is composed of course sand. The AA is about 200 meters long and wide. The stream boundaries are vegetated with a mixture of riparian vegetation and drier chaparral vegetation.

3.9.1.2 DG-PERM

Located downstream of DG-TEMP, this AA encompasses a portion of the area being proposed for permanent impact by the Project. The AA is about 200 meters in length and averages about 60 meters in width. The stream segment is narrower than that found in DG-TEMP but supports more vegetation within the stream channel. The gradient of the stream is slightly higher in this section and the riparian vegetation is denser than for DG-TEMP.

3.9.1.3 DG-Wetland

The wetland areas just north of Devil's Gate Dam correspond to the lowest point within the Hahamongna Watershed Park. This AA was chosen because it is located within the permanent impact area for the Project and is within mapped jurisdictional wetlands. The AA is about 100 meters long and 30 meters wide, located within a deep channel that conveys flows from Berkshire Creek and other surrounding urban creeks to the dam. Vegetation within the channel has been scoured, but the sides support a mixture of riparian herbaceous vegetation and bare ground.

3.9.1.4 DG-4

This AA is located west of the Arroyo Seco within more upland portions of the park that support dense riparian vegetation. The AA is about 150 meters long and 70 meters wide. It corresponds to areas being proposed for use in mitigation for the Project. There is a small unvegetated streambed that traverses this section but does not provide substantial contribution to the hydrogeomorphology. The AA supports a mixture of native riparian vegetation along with patches of nonnative vegetation, such as perennial pepperweed.

3.9.1.5 DG-5

This AA is located slightly north of DG-5 and supports similar habitat conditions. The location was chosen because it corresponds to areas being proposed for use in mitigation for the Project. There is a former mine pit located on the northern edge of the AA, but otherwise the hydrology is similar to DG-4. The AA is about 150 meters long and 80 meters wide.

3.9.2 CRAM Scoring

CRAM scores are present in accordance with summarized results for each major category on the data sheets. These scores summarize submetric values for buffer and landscape context, hydrology, physical structure, and biotic structure. Summarized Attribute Scores and Overall AA Scores for each of the AAs are displayed in Table 3.18 below. Although CRAM does not directly analyze habitat suitability for sensitive

species, such as least Bell's vireo, it does provide an overall assessment of a given feature which can assist in determining suitability.

Table 3.18. Existing Attribute Scores and Overall AA Scores

Assessment Area	Final Attribute Score				Overall AA Score
	Buffer and Landscape	Hydrology	Physical Structure	Biotic Structure	
Impact Areas					
DG Wetland	48.9	75	50	63.9	59
DG Permanent Impacts	80.9	91.7	25	69.5	67
DG Temporary Impacts	49	83.4	50	41.7	57
Mitigation Areas					
DG 4	49	91.7	62.5	61.2	67
DG 5	55.8	83.3	62.5	61.2	65

3.9.3 Analysis of CRAM Areas Post-Mitigation

After mitigation activities have been completed within the on-site mitigation areas described (DG-4 and DG-5), both the physical structure and biotic structure attributes are expected to improve. Sediment removal activities will result in vegetation removal, temporarily for temporary impact areas and permanently in permanent impact areas. Mitigation activities will result in clearing out of nonnative weeds and planting of native species within the mitigation areas. During mitigation activities, the physical structure of these areas is expected to change due to additional placement of physical habitats and microhabitats (logs, rocks, snags, etc.) to improve the diversity and distribution of these habitat types.

The CRAM score for the Hydrology attribute is expected to improve at Johnson Field (DG-W-1) as physical barriers will be removed to accommodate re-establishment. The Hydrology attribute for the remaining mitigation AAs is not expected to change because no other changes to existing hydrology area being proposed as part of mitigation. Changes outside of the scope of the mitigation may occur over time, however, if there are hydrological changes that occur (unrelated to this Project).

The CRAM scores for the Buffer and Landscape attribute is not expected to change for either the impacts or mitigation AAs, because impacts would not change these attributes and no changes to the surrounding landscape are being proposed as part of the mitigation. Changes outside of the scope of the mitigation may occur over time, however, if there are land use changes that occur (unrelated to this Project).

3.10 Functions and Values

3.10.1 Impact Areas

3.10.1.1 Non-Wetland Waters

The following is an assessment of the functions and values attributable to the identified non-wetland waters in the Project area. This includes portions of the main channel, braided channel, and non-wetland riparian areas as delineated in the 2013 Jurisdictional Delineation Report (Chambers Group 2013a).

Short-term or Long-term Surface Water Storage: The main and braided channels are ephemeral and consist of sandy, well-drained soils (Chambers Group 2013a). Stormwater flows through these features immediately after storms, after which they are dry again, and thus the features do not provide significant short- or long-term (>7 days) surface water storage. The overall function of the reservoir is to provide a combination of flood control and water storage during storm events. Areas within the reservoir supporting riparian vegetation are indicative of higher groundwater and more evidence of surface long-term inundation has been observed in historical aerial photos. These areas, primarily near the dam, have the highest potential for short- and long-term surface water storage.

Subsurface water storage: The majority of the underlying soils of the non-wetland waters in the Project area are well-drained (Chambers Group 2013a), leading to high infiltration rates for stormwater. The majority of water storage function within the reservoir is, therefore, expected to be subsurface. The non-wetland waters likely provide a moderate amount of subsurface water storage.

Moderation of groundwater flow or discharge: The lower gradient of the non-wetland waters in the Project area, coupled with the high amounts of silt and sediment, likely provide some moderation of groundwater flow or discharge by spreading the flows across much of the flood basin. The higher conductivity of the underlying soils may reduce this to some degree.

Dissipation of energy: The main channel flow energy is very high during storm events and lowers quickly immediately afterwards as stormwaters infiltrate the deep alluvial deposits. During the jurisdictional delineation, the channel was observed to have little or no existing vegetation or minimal micro- and macrotopography to hinder water flow velocities during flood events. However, the large woody debris, vegetative structure, and changes in topography that exists in the braided channels and non-wetland riparian areas do provide a moderating effect on water flow velocities during flood events. Part of the purpose of the dam is to slow and detain storm flows to protect life and property downstream within the Cities of Pasadena, South Pasadena, and Los Angeles.

Cycling of nutrients: The abundant riparian vegetation along the main and braided channels is indicative that the nutrient cycle is occurring adjacent to the channels. The channels themselves, however, are non-perennial and lack adequate standing water, vegetation, and aquatic organisms to significantly contribute to nutrient cycling within the watershed.

Removal of elements and compounds: Although newly deposited sediments are present in the main and braided channels, they lack the vegetation and long-term inundation to significantly contribute to the removal of elements (heavy metals) and other compounds. The non-wetland riparian areas, however, have the vegetation, sediment load, and seasonal inundation necessary to moderately contribute to the removal of elements and compounds.

Retention of particulates: The main and braided channels alone lack the vegetation necessary to retain sediment and other particulates but the relatively low gradient of the channels leads to sediment and particulate accumulation. In addition, the non-wetland riparian areas have significant tree, shrub, and herbaceous vegetative communities that can withstand erosive flood events and retain sediments and other particulates.

Export of organic carbon: Due to the lack of vegetation within the main and braided channels, along with accumulated sediment, there is little opportunity for these areas to export organic carbon downstream. Conversely, the non-wetland riparian areas have considerable vegetation and detritus present to significantly contribute to off-site export of organic carbon.

Maintenance of plant and animal communities: The non-wetland waters in the Project area provide little wildlife habitat within them, other than flood-conveyed debris and burrowing substrate. Along the edges of the channels, there are a number of wetland and riparian plant communities of varying levels of succession. Although the lack of long-term inundation in these areas preclude significant macroinvertebrate and other aquatic wildlife populations, the non-wetland riparian areas do support significant wetland and riparian vegetation communities that in turn provide habitat for a high diversity and abundance of wildlife species.

3.10.1.2 Wetland Waters

The following is an assessment of the functions and values attributable to the identified wetland waters within the Project area. Wetland waters are delineated in the 2013 Jurisdictional Delineation Report (Chambers Group 2013a) and the 2016 Updated Delineation Report (ECORP 2016a).

Short-term or Long-term Surface Water Storage: The areas delineated as wetland waters are located at the lowest elevational level of the Project area adjacent to Devil's Gate Dam, consisting of the West Altadena Stormdrain along with lower portions of the channels approaching the dam. The West Altadena Stormdrain collects flows from the adjacent developed area to the east and runoff enters the ponds within this wetland on a nearly year-round basis. Depending on the season and volume of water, these areas provide both short- and long-term (>7 days) storage of surface water.

Subsurface water storage: The majority of the underlying soils of the wetland waters in the Project area consist of deposited sediment at varying depths. The wetland waters likely provide subsurface water storage.

Moderation of groundwater flow or discharge: The lower gradient of the wetland waters in conjunction with the fine sediment substrate and perching of surface water in these areas moderate groundwater flow or discharge.

Dissipation of energy: The wetland waters within the West Altadena Stormdrain portion are ponded and the topography, along with the size of the drain, moderates storm flows. The other wetland areas are located within stream features that do not support adequate vegetative structure and topography to provide any moderating effect on water flow velocities during flood events. However, the dam moderates these flows by allowing water to back up behind it.

Cycling of nutrients: The wetland waters areas are frequently inundated during storm flow events. They also receive supplemental inputs from Berkshire Creek and Flint Wash, from runoff through the Oak Grove Area of Hahamongna Watershed Park, and from urban runoff into the West Altadena Stormdrain. This, in conjunction with the well-established riparian vegetation and remnant detritus present in these areas, likely contribute to moderate nutrient cycling within the watershed. The area near the West Altadena

Stormdrain supports a higher degree of wetland vegetation, due to the ponding, and supports more of these functions than do the other wetland areas.

Removal of elements and compounds: The wetland waters in the West Altadena Stormdrain area have the vegetation, sediment load, and inundation period necessary to moderately contribute to the removal of elements and compounds within the watershed. The other wetland waters areas are small and less vegetated due to scouring that occurs during storms and are expected to have less of this functionality.

Retention of particulates: The wetland waters areas within the West Altadena Stormdrain have significant tree and shrub vegetative communities that can withstand erosive flood events and retain sediments and other particulates. The other wetland waters areas are less vegetated due to scouring that occurs during storms and are expected to have less of this functionality.

Export of organic carbon: The wetland waters area associated with the West Altadena Stormdrain have considerable vegetation and detritus present to moderately contribute to off-site export of organic carbon. The other wetland waters areas are less vegetated due to scouring that occurs during storms and are expected to have less of this functionality.

Maintenance of plant and animal communities: The wetland waters areas associated with the West Altadena Stormdrain currently support riparian woodland and herbaceous plant communities. The seasonal inundation in these areas likely support modest macroinvertebrate and other aquatic wildlife populations. The other wetland waters areas are less vegetated due to scouring that occurs during storms and are expected to have less of this functionality.

3.10.2 Proposed Mitigation Areas

3.10.2.1 Non-Wetland Waters

The following is an estimate of the functions and values that will likely be gained by proposed on-site mitigation for non-wetland waters impacts related to the Project. This includes proposed restoration of portions of the main channel, braided channel, and non-wetland riparian areas within the reservoir.

Short-term or Long-term Surface Water Storage: The proposed main and braided channel portions of the non-wetland waters mitigation areas will primarily serve to convey water and will not provide significant short- or long-term surface water storage. Some of the proposed non-wetland riparian mitigation areas will likely provide some degree of short- and long-term surface water storage.

Subsurface water storage: Subsurface water storage capacity of the proposed non-wetland waters mitigation areas would not likely change significantly from current conditions. These areas will likely provide a moderate amount of subsurface water storage.

Moderation of groundwater flow or discharge: The ability for the proposed non-wetland waters mitigation areas to moderate groundwater flow or discharge would not likely change significantly from current conditions. It is anticipated that they will likely provide some moderation of groundwater flow or discharge.

Dissipation of energy: Proposed mitigation activities at all non-wetland waters mitigation areas will likely increase perennial vegetative cover, micro- and macro-topography, and other structural complexity in these areas. As such, the ability for the proposed non-wetland waters mitigation areas to moderate water flow velocities during flood events will likely improve in comparison to current site conditions.

Cycling of nutrients: Proposed mitigation activities at all non-wetland waters mitigation areas will provide additional vegetative cover, woody debris, and other structural complexity to these areas. It is anticipated that this will significantly improve the nutrient cycling ability of these areas in comparison to current site conditions.

Removal of elements and compounds: Proposed mitigation activities at all non-wetland waters mitigation areas will provide additional vegetative cover, woody debris, and other structural complexity to these areas. Although these areas will still lack long-term inundation, their ability to remove elements (heavy metals) and other compounds will likely improve in comparison to current site conditions.

Retention of particulates: Proposed mitigation activities at all non-wetland waters mitigation areas will provide additional vegetative cover, woody debris, and other structural complexity to these areas. This will improve the ability of these areas to withstand erosive flood events and retain sediments and other particulates.

Export of organic carbon: Proposed mitigation activities at all non-wetland waters mitigation areas will provide additional vegetative cover, woody debris, and other structural complexity to these areas. This will improve the ability of these areas to significantly contribute to off-site export of organic carbon.

Maintenance of plant and animal communities: Proposed mitigation activities at all non-wetland waters mitigation areas will provide additional vegetative cover, woody debris, and other structural complexity to these areas. This will improve the ability of these areas to maintain healthy riparian plant communities and will improve habitat for a high diversity and abundance of wildlife species.

3.10.2.2 Wetland Waters

The following is an estimate of the functions and values that will likely be gained by proposed on-site mitigation for wetland waters impacts related to the Project. This includes proposed wetland creation at Johnson Field and wetland restoration at the former mining pit, Berkshire Creek confluence, and the West Altadena Stormdrain outfall.

Short-term or Long-term Surface Water Storage: Due to proposed mitigation activities, short- and long-term surface water storage capacity will significantly increase at the Johnson Field and in the former mining pit. Minor increases in short- and long-term water storage capacity are anticipated at the Berkshire Creek confluence and the West Altadena Stormdrain outfall areas.

Subsurface water storage: Subsurface water storage capacity of the proposed wetland waters mitigation areas would not likely change significantly from current conditions. These areas will likely provide a moderate amount of subsurface water storage.

Moderation of groundwater flow or discharge: The ability for the proposed wetland waters mitigation areas to moderate groundwater flow or discharge would likely increase due to proposed mitigation activities.

Dissipation of energy: Proposed mitigation activities at all wetland waters mitigation areas will increase vegetative cover and water holding capacity of these areas. As such, the ability of these areas to moderate water flow velocities during flood events will likely improve in comparison to current site conditions. The former mining pit accepts surface water flows from adjacent areas and the depression in the pit provides dissipation of energy as the output allows the flows to spread out and decrease in velocity.

Cycling of Nutrients: Proposed mitigation activities at all wetland waters mitigation areas will provide additional vegetative cover, woody debris, and additional water holding capacity and residence times (Johnson Field and forming mining pit) to these areas. It is anticipated that this will significantly improve the nutrient cycling ability of these areas in comparison to current site conditions.

Removal of elements and compounds: Proposed mitigation activities at all wetland waters mitigation areas will provide additional vegetative cover, woody debris, and additional water holding capacity and residence times (Johnson Field and former mining pit) to these areas. It is anticipated that this will significantly improve the ability of these areas to remove elements (heavy metals) and other compounds in comparison to current site conditions. The wetland waters in the former mining pit area have the vegetation, sediment load, and inundation period necessary to moderately contribute to the removal of elements and compounds within the watershed.

Retention of particulates: Proposed mitigation activities at all wetland waters mitigation areas will provide additional vegetative cover, structural complexity, and additional water holding capacity and residence times (Johnson Field and former mining pit) to these areas. It is anticipated that this will significantly improve the ability of these areas better withstand erosive flood events and retain sediments and other particulates in comparison to current site conditions. The wetland waters areas within the former mining pit have significant tree and shrub vegetative communities that can withstand erosive flood events and retain sediments and other particulates.

Export of organic carbon: Proposed mitigation activities at all wetland waters mitigation areas will provide additional vegetative cover and woody debris to these areas. This will likely improve the ability of these areas to increase production and off-site export of organic carbon in comparison to current site conditions. The wetland waters area associated with the former mining pit have considerable vegetation and detritus present to moderately contribute to off-site export of organic carbon.

Maintenance of plant and animal communities: Proposed mitigation activities at all wetland waters mitigation areas will provide additional vegetative cover, woody debris, structural complexity, and additional water holding capacity and residence times (Johnson Field and former mining pit) to these areas. This will improve the ability of these areas to maintain healthy riparian plant communities and greatly improve habitat for a variety of wildlife species.

3.11 Historic, Existing, and Planned Land Use

The Project site is located within the Hahamongna Watershed Park, which is owned and operated by the City. The northwestern portion of the Project site is adjacent to the California Institute of Technology/National Aeronautics and Space Administration Jet Propulsion Laboratory. To the west of the Project site is La Cañada High School and Hillside School and Learning Center. Single-family residential land use surrounds the Project site to the north, east, and south and the southern portion of the Project site is bordered by Interstate 210 Foothill Freeway. Since its construction in 1920, the Devil's Gate Dam has been used for collecting and holding stormwater to reduce the flow rates and prevent flooding downstream of the dam.

3.12 Public Outreach

Multiple public outreach efforts were conducted for the Devil's Gate Reservoir Sediment Removal Project between 2011 and 2014, in which public input was encouraged for the development of the Environmental Impact Report (EIR). Various public outreach efforts included an extended 45-day scoping period for public input from September 28, 2011 to November 11, 2011. Two public scoping meetings were held on October 5 and 15, 2011. The Draft Environmental Impact Report (DEIR) was released to the public in October of 2013 for an extended review and comment period of 90 days from October 23, 2013, to January 21, 2014. DEIR community meetings were conducted on November 6, 14, and 16, 2013. The FEIR was then released in October of 2014 followed by three informational meetings held on November 1, 3, and 6, 2014. Based on community input regarding the use of alternative project plans with fewer impacts to the environment, an environmentally superior alternative was approved by the Board of Supervisors on November 12, 2014. In addition, three informational open houses were held on October 24, 25, and 28, 2017 and April 30 and May 1, 2018 to share current information on the Project and habitat enhancement plans with the public.

3.13 Baseline Information for Off-Site Mitigation Areas

The HMMP in Appendix A was prepared by Land Veritas Corp as part of the proposal to LACFCD to implement a PRM in a future Phase D at the Petersen Ranch Mitigation Bank. The HMMP includes the mitigation project proposal, location maps, baseline biological information, mitigation project figures and photographs, and compensatory mitigation site evaluation checklist. More detailed information on the Petersen Ranch Mitigation Bank can be found in the Bank Enabling Instrument in the Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS) database (https://ribits.usace.army.mil/).

4.0 MITIGATION WORK PLAN

4.1 Responsible Parties

4.1.1 Restoration Ecologist

The Restoration Ecologist, as appointed by LACFCD, shall be responsible for monitoring the compensatory mitigation areas to ensure Project activities are completed according to the guidelines set forth in this plan and applicable permits. The Restoration Ecologist shall be familiar with all aspects of habitat

restoration and native habitats within southern California. The duties of the Restoration Ecologist shall include overseeing all aspects of work performed by the Restoration Contractor. In addition, the Restoration Ecologist shall have the responsibility of documenting and reporting the progress of the developing riparian community to LACFCD and regulatory agencies, as well as making recommendations on how to meet established performance standards. If necessary, the Restoration Ecologist may also prescribe remedial measures.

4.1.2 Restoration Contractor

The Restoration Contractor responsible for the habitat mitigation implementation and maintenance shall have successfully completed (with documented agency acceptance) a minimum of three mitigation projects (installation and maintenance) involving the installation and maintenance of successful riparian and upland habitats that are comparable to this Project in terms of size, complexity, and species composition. The Restoration Contractor shall provide at least one English-speaking person who is experienced with all aspects of habitat restoration and thoroughly familiar with all aspects of the Project, including equipment and materials being utilized or installed and the best methods for their installation and application. This person shall be present at all times during the completion of this work and shall direct and supervise all work specified herein. The foreman for the Restoration Contractor shall be on site no less than 90 percent of the time that crews are working.

4.2 Description of Mitigation Areas

A description of the proposed compensatory mitigation areas is provided in this section of the HMMP and Figure 2-1 shows the locations of each of the mitigation areas. Appendix I includes photographs of the current conditions in the mitigation areas that will be improved as a result of the implementation of the compensatory mitigation project. The mitigation areas include: wetland and non-wetland WOUS areas and riparian and upland buffer areas. In addition, the temporary impact areas and the side slopes of the Permanent Maintenance Area are also described below. The buffer habitats, the replacement of the habitats in the temporary impact areas, and the planting of vegetation on the sides slopes are all important because these native habitat areas will augment the overall function of the aquatic resources at the site. Figure 3-4 shows the mitigation site and the various mitigation methods that will be applied in each of the mitigation areas. In addition, Table 3.11 provides a description of the activities in each of the mitigation areas and justifies the mitigation method classifications. Appendix J contains design plans for the on-site mitigation areas.

4.2.1 Wetland WOUS Compensatory Mitigation Areas

4.2.1.1 DG-W-2 (Rehabilitation)

DG-W-2 is a 2.13-acre area on the west side of the Reservoir that is included within the overall DG-4 rehabilitation area. The area is located within a topographic depression that was created when the area was historically mined. The majority of DG-W-2 has been delineated as USACE jurisdictional wetlands. This area has a history of inundation following storm events, which is evident in historic aerial photographs. In addition to inundation, the former mining pit receives sheet flows from the Oak Grove Area of Hahamongna Watershed Park through a culvert under the road located to the west of the former mining

pit. Stream flows also historically entered the pit from the east during high flows as evidenced by the presence of jurisdictional non-wetland WOUS sheet flow area located east of the pit.

DG-W-2 currently supports vegetation that is typical of both wetland and riparian habitat. Vegetation within this area is a mix of dock (assumed *Rumex crispus*) in areas with high clay content, surrounded by thickets of mulefat (*Baccharis salicifolia*) and black willow (*Salix gooddingii*) in areas where soil appeared to be higher sand content. Black willow thickets have willows ranging from approximately 10 to 20 feet in height with trunks having diameter at breast height of four to six inches. The area closest to the existing culvert outlet (on western bank) has a prevalence of accumulated soils that seem to range in texture from sand, silty sand, silty clay, clay loam, to sandy loam (determined by visual examination, texture analysis was not performed). Much of this accumulated soil has likely been deposited into this area during storm events. Excavations into the soil profile (by-hand) revealed that accumulated sediments with clays and silts may only be present within the first 12 to 18 inches of soil. Adjacent vegetation communities include disturbed California sagebrush/buckwheat scrub to the north, riparian woodland/mulefat thickets to the south and east and developed areas to the west. Any surface water that flows from DG-W-2 exits to the south and when it encounters a heavily used trail, it is diverted to the south as evidenced by multiple sheet flow channels running east towards the main stream channel of the Reservoir. Evidence of inundation from the south is also present, which is likely a result of Reservoir filling during heavy storms.

The mitigation objective for DG-W-2 is the rehabilitation of riparian woodland and mulefat thicket vegetation communities. Accumulated sediment and the existing berms left over from former mining activities will be re-contoured and debris and unwanted materials will be removed to improve the overall aquatic function of the area. Existing native plants will be avoided to the extent possible during the sediment removal and re-contouring activities. Select areas of DG-W-2 will be graded lower in elevation than the riparian woodland/mulefat thickets in order to convey storm flows to the south in two channels through the mining pit and to connect these with a channel that will convey storm flows further south into DG-W-2(Mining Pit Outlet). If the mitigation area harbors any standing water during the wet season it could become a breeding ground for mosquitos, in which case LACFCD will coordinate with the San Gabriel Valley Mosquito and Vector Control District to implement eradication efforts.

Although cattail/bulrush wetland mitigation is not a goal for DG-W-2, if this type of wetland habitat can be supported then the habitat restoration program will maintain these areas appropriately so that wetland vegetation will become well established and self-sustaining. Wetland vegetation will be planted as appropriate and the perimeter will be planted with willows and mulefat to form a multi-structured riparian habitat. The post-Project condition of this mitigation area will be a higher functioning riparian woodland and mulefat thickets wetland area.

4.2.2 Non-Wetland WOUS Compensatory Mitigation Areas

4.2.2.1 DG-W-1 (Johnson Field) (Re-establishment)

DG-W-1 (Johnson Field) is a 3.44-acre non-operational percolation basin on the east side of the Project. Bounded by an elevated dirt maintenance road on all sides, most of the mitigation area currently consists of disturbed fill of varying grades of sediment and gravel from previous maintenance activities associated with the Interim Management Project to manage sediment behind Devil's Gate Dam. The disturbed

portion of DG-W-1 is dominated by Mustard and Annual Brome Semi-Natural Herbaceous Stand vegetation communities. Other nonnatives present include tocalote (*Centaurea melitensis*), wild radish (*Hirschfeldia incana*), Italian thistle (*Carduus pycnocephalus*), and sparse occurrences of perennial pepperweed (*Lepidium latifolium*). Several escaped cultivars are present within and bordering DG-W-1 including palms (*Washingtonia robusta*) and large eucalyptus trees (*Eucalyptus* spp.).

Based on previous studies, DG-W-1 is not presumed to be USACE-jurisdictional in its current condition. Review of historical aerials available on-line at HistoricAerials.com (2018) suggests that human impacts to the adjacent stream channel (just west of DG-W-1) were very minor up until the early 1960s. The series of approximately 13 percolation basins positioned immediately adjacent to and upstream of DG-W-1 have been used since at least the 1950s. Prior to 1970 the area that now comprises the entire DG-W-1 mitigation area had not been manipulated by humans (on-line aerials were reviewed starting in 1952). Aerial photos prior to 1977 suggest that the proposed DG-W-1 mitigation area was comprised of alluvial scrub sparsely vegetated with tree species, or large shrubs.

In consideration of this information, the mitigation objective for DG-W-1 is re-establishment of the site from disturbed to riparian woodland/southern willow scrub vegetation communities to return the historic functions to this area that was formerly part of the main channel. The mitigation area would be categorized as non-wetland WOUS after the functions are restored. The overall configuration of DG-W-1 is anticipated to be a rounded square (or oval) that is surrounded by the existing berm. The berm will be sloped 1:2 and the lowest portion of DG-W-1 will be a combination of irregularly shaped mounds that have dendritic inlets and uneven topography. Soils will be homogenized and amended as necessary following removal of a portion of the existing stockpiled soil. Decompaction will also occur to achieve a final compaction of 60 to 70 percent. Select areas will be graded to be lower in elevation in order to allow water to collect, and potentially support hydrophytic vegetation. Wetland mitigation is not a goal for DG-W-1, however if wetland habitat can be supported then the habitat restoration program will maintain these areas during the restoration program (e.g., minimizing invasion by non-native plant species) so that native wetland vegetation can persist.

The maintenance road on the west and south sides of DG-W-1 will be re-contoured to have a sloped berm without a flattened top, and a 10-foot-wide channel will be cut at the southeastern corner of the basin so water can flow into DG-2 and percolate into the soil slowly through a series of channels set perpendicular to the flowpath. There is an existing street drain (off of West Kent Street) that outflows at the southeastern corner of DG-W-1 (and into DG-2). This outlet pipe will be redirected at the toe-of-slope so that it instead flows into DG-W-1. There is an existing overflow pipe that allows for water to flow from DG-W-1 to the riparian scrub area just to the south; this will be removed when the flow-through channel is made. To allow water to enter DG-W-1 from the northwest corner, an approximately 2-foot-wide corrugated high-density polyethylene (HDPE) pipe will be installed at the northwestern corner of DG-W-1 at an approximate elevation of 1,035 feet so that if runoff from the San Gabriel Mountains backs-up in the main basin it can flow into DG-W-1. It is anticipated that this may occur for up to a 4- to 8-hour period during 2-year storm events.

4.2.2.2 DG-W-2 (Outlet) (Rehabilitation)

DG-W-2 (Outlet) is a 0.13-acre channel that will be re-contoured to extend from the southwest side of the former mining pit (DG-W-2) and to the south to DG-SF-1. The channel has been disconnected from DG-W-2 by a heavily used trail that causes flows to be diverted and conveyed eastward towards the main drainage channel. Currently, the area where the channel will be rehabilitated is vegetated with a patchy distribution of mulefat scrub and riparian woodland/scrub that is dominated by nonnative species. The understory of the existing habitat contains an abundance of perennial pepperweed and other nonnative plants, as well as, eucalyptus trees.

To improve the function of DG-W-2 and to return the historic flow path to the western portion of the Reservoir, a non-wetland WOUS channel will be re-countoured. The location of where the channel historically exited the former mining pit will remain approximately the same. The channel will be rehabilitated by closing the trail, removing sediment, and re-contouring the channel. The rehabilitated channel will be approximately 475 feet long and the width will be approximately four to 10 feet wide and generally two to four feet deep.

Approximately 0.13 acre of non-wetland WOUS will be rehabilitated, which will result in a return of natural flow from the former mining pit to the western portion of the Reservoir. Existing native plants will be avoided to the extent possible during re-contouring of the channel. Invasive and nonnative plants and weeds will be removed and willows and mulefat will be planted along the banks of the channel. In addition, areas immediately adjacent to the channel will be enhanced in the form of nonnative plant removal. The mitigation objective for DG-W-2 (Outlet) is the rehabilitation of a single stable outflow channel through the DG-4 enhancement area. This area will continue to be USACE non-wetland WOUS but there is a potential that wetland soils may develop over time since the channel will be designed to gently slope toward southwestern portion of the Reservoir.

4.2.2.3 DG-SF-1 and DG-SF-2 (Rehabilitation)

To improve the function of the existing non-wetland WOUS channel in the western portion of the Reservoir, two areas that currently exhibit a dispersed sheet flow will be rehabilitated to improve the function of the WOUS by returning the historic channel connections with the existing channel. The northernmost sheet flow area (DG-SF-1) encompasses approximately 0.08 acre. At the point where the outflow channel from the former mining pit (DG-W-2) enters DG-SF-1, the channel will be connected with the channels that enter from the Oak Grove area. This will provide for continuous conveyance of storm flows that proceed through the western portion of the Reservoir to Berkshire Creek. The southernmost sheet flow area (DG-SF-2) covers an area of approximately 0.03 acre. Re-contouring of this area will also provide for continuous conveyance of storm flows that originate from upstream in the Oak Grove Area and from the former mining pit, eventually outflowing into Berkshire Creek. Reconnecting the entire channel will more efficiently and more regularly convey storm flows through the habitat in the western portion of the Reservoir. Invasive and otherwise nonnative plants will be removed and willows and mulefat will be planted along the banks of the channel. The total acres of non-wetland WOUS channels that will be rehabilitated in the sheet flow areas is 0.11 (DG-SF-1 and DG-SF-2). This area will continue to be USACE non-wetlands WOUS.

4.2.2.4 DG-2 New Channels (Re-establishment)

DG-2 New Channels is a 0.83-acre network of channels that is planned to extend from DG-W-1 (Johnson Field) to DG-2-WOUS. The planned configuration will comprise three main channels that will flow from northwest to the southeast so that moisture can be distributed throughout a large portion of DG-2. The area where these channels will be formed is currently a mix of mulefat thickets and non-native infestations of perennial pepperweed, poison hemlock, and other nonnative species. During formation of the channels avoidance of native plants will be achieved to the maximum extent practicable. Ultimately, the DG-2 New Channels mitigation area will re-establish non-wetland WOUS through DG-2 following mitigation implementation.

Specifically, DG-2 New Channels will be recontoured to improve conveyance of flows during inclement weather. In addition, soil manipulation during formation of channels will improve distribution of water throughout a large portion of DG-2 and improve soil conditions to support growth of riparian trees. Following removal of non-native and invasive plant species from approximately 0.5 acre of DG-2 New Channels, planting and seeding with native riparian trees and shrubs will occur so that black willow woodland can grow and persist and improve the hydrological function of this area.

4.2.2.5 DG-2 WOUS (Rehabilitation)

DG-2 WOUS is a 0.75-acre channel within DG-2 that currently conveys flows from a storm drain that has an inlet at the terminus of West Kent Street and is considered non-wetland WOUS. DG-2 WOUS will convey flows from DG-2 New Channels [and DG-W-1 (Johnson Field)] in a southerly direction until they will intersect with the side slope of the eastern margin of the to the Reservoir. DG-2 WOUS is currently a mix of mulefat thickets and non-native infestations of perennial pepperweed, poison hemlock, and other nonnative species, with sparse occurrences of native riparian trees. During mitigation work in this channel avoidance of native plants will be achieved to the maximum extent practicable. Ultimately, the goal for DG-2 WOUS mitigation area is to rehabilitate non-wetland WOUS that currently exist.

Specifically, DG-2 WOUS will be recontoured in select locations to improve conveyance of flows during inclement weather. In addition, soil manipulation will improve conveyance of water from DW-W-1 (Johnson Field) to the Reservoir. Following removal of non-native and invasive plant species from approximately 0.3 acre of DG-2 WOUS, planting and seeding with native riparian trees and shrubs will occur so that black willow woodland can grow and persist and improve the hydrological function of this area.

4.2.2.6 DG-4-Drainage (Rehabilitation)

An existing non-wetlands WOUS channel extends through the DG-4 mitigation area and it appears that it had a historic connection with the channels extending from the Oak Grove area and the former mining pit (DG-W-2). As previously described for mitigation areas DG-W-2 (Outlet), DG-SF-1, and DG-SF-2, the historic channel connections were diverted into sheet flow areas or by trails at some point in the past. The existing 0.22-acre channel through DG-4 shows evidence of water flows, however, human impacts and debris have degraded this channel in some areas. Trash, a retaining wall sort of structure, and fallen trees and roots are impacting the natural flows. The channel will be recontoured to create a 0.49-acre channel.

The removal of debris will open up areas that can be restored to improve the function of the drainage. The elevation of this drainage from the mining pit (DG-W-2) to its connection with Berkshire Creek will be assessed to determine if widening or deepening the drainage will be necessary. The trash and debris, as well as invasive and nonnative plants, will be removed from this drainage and willows and mulefat will be planted, where appropriate, to rehabilitate the habitats along this drainage and improve the function of the drainage. This area will continue to be USACE non-wetlands WOUS.

4.2.2.7 DG-4-Sheet Flow (Enhancement)

The DG-4-Sheet Flow mitigation area includes the non-wetland WOUS sheet flow portions (0.40 acre) of the DG-SF-1 and DG-SF-2 that are outside of where the non-wetland WOUS channel will be re-established. These sheet flow areas support patches of riparian plant species but perennial pepperweed and other nonnatives are present in monotypic patches and interspersed throughout. The open patches within these sheet flow areas will be enhanced through the removal of invasive and nonnative plants and subsequent planting of willows and mulefat, where appropriate. This area will continue to be USACE non-wetlands WOUS.

4.2.2.8 DG-4-WOUS (Enhancement)

The DG-4-WOUS mitigation area includes an inlet that will be created from the main channel of the arroyo to allow flows from the arroyo to enter the non-wetland WOUS sheet flow portions (1.88 acre) of the inlet to the former mining pit (DG-W-2). These sheet flow areas support patches of riparian plant species but perennial pepperweed and other nonnatives are interspersed throughout. The open patches within these sheet flow areas will be enhanced through the removal of invasive and nonnative plants and subsequent planting of willows and mulefat, where appropriate. This area will continue to be USACE non-wetlands WOUS.

4.2.2.9 DG-4-WOUS Connections (Re-establishment)

DG-4-WOUS Connections comprises two areas with a combined acreage of approximately 0.22-acre. These two mitigation areas serve to re-establish non-wetland WOUS in two locations: (1) from the mining pit to existing non-wetland WOUS located in DG-4, and (2) as a connection between two existing non-wetland WOUS areas within DG-4. Both mitigation areas are on the west side of the Reservoir, within DG-4 and east of DG-W-2 (Mining Pit) and DG-W-2 (Outlet). These two mitigation areas will allow for flows from DG-W-2 to reach existing non-wetland WOUS, and then flow to the side slopes of the western edge of the reservoir. In addition, the second mitigation area will allow flows to move in a southerly direction from existing non-wetland WOUS (when the Reservoir is filled with water) to the other section of non-wetland WOUS immediately to the south. The area where these channels will be formed is currently a mix of sparse riparian tree species, mulefat thickets, and non-native infestations of perennial pepperweed, poison hemlock, and other nonnative species. During formation of these non-wetland WOUS avoidance of native plants will be achieved to the maximum extent practicable. Ultimately, the DG-4-WOUS Connections will re-establish non-wetland WOUS through DG-4 and provide for connections to other existing non-wetland WOUS areas.

Specifically, DG-4-WOUS Connections will be recontoured to improve conveyance of flows during inclement weather. In addition, soil manipulation during formation of channels will improve distribution of water in DG-4 and improve soil conditions to support growth of riparian trees. Following removal of non-native and invasive plant species from approximately 0.01 acre of DG-4, planting and seeding with native riparian trees and shrubs will occur so that black willow woodland can grow and persist and improve the hydrological function of this area.

4.2.2.10 DG-1-WOUS (Enhancement)

An approximately 0.11-acre area of non-wetland WOUS along the western edge of DG-1 will be enhanced to improve the existing riparian woodland and unvegetated channel. The woodland, which is relatively sparsely vegetated, will be enhanced through the removal of nonnative plant species and planting of additional riparian and RAFSS plant species to increase the structural diversity. Because this area is immediately adjacent to the temporary impact area in DG-9, the full extent of the enhancement activities will be determined following the initial sediment removal. This area will continue to be USACE non-wetlands WOUS.

4.2.3 Riparian Buffer Areas

4.2.3.1 DG-2 (Enhancement)

DG-2 is a 3.83-acre area in the eastern portion of the Reservoir located between the Reservoir channel and the pedestrian pathway. Currently, the area consists of a mix of riparian woodland, mulefat thickets, and riparian herbaceous vegetation communities with several areas dominated by exotics including perennial pepperweed, poison hemlock, mustards, wild radish, and Italian thistle. The mitigation objective for DG-2 would be the enhancement of riparian habitat through the removal of nonnative plants and planting and seeding with willows, mulefat, and other riparian species where appropriate.

4.2.3.2 DG-2A (Buffer)

DG-2A is a 0.10-acre area on the easternmost side of the Reservoir immediately adjacent to the pedestrian pathway. The area is on an elevated terrace nearly level with the adjacent pathway and primarily consists of a Mustard and Annual Brome Semi-Natural Herbaceous Stand community dominated by nonnative grasses, mustards, and horehound. Adjacent vegetation communities include pockets of riparian woodland interspersed in mulefat thickets on the west side, disturbed oak woodland bisecting the area, and coast live oak woodland on the east side of the pathway. The mitigation objective for DG-2A is restoration of riparian habitat through the removal of exotics and native planting and seeding where appropriate.

4.2.3.3 DG-2B (Buffer)

DG-2B is a 0.38-acre area on the easternmost side of the Reservoir also adjacent to the pedestrian pathway. The area is a disturbed area that gently slopes away from the pathway and it supports a Mustard and Annual Brome Semi-Natural Herbaceous Stand community dominated by poison hemlock, perennial pepperweed, nonnative grasses, mustards, wild radish, and Italian thistle. Adjacent vegetation communities include pockets of riparian woodland interspersed in mulefat thickets on the west side and

north sides and oak woodland on the east side of the pathway. The mitigation objective for DG-2B is restoration of riparian habitat through the removal of exotics and native planting and seeding where appropriate.

4.2.3.4 DG-3A (Buffer)

DG-3A is a 1.15-acre area in the southeastern portion of the Reservoir located adjacent to the pedestrian pathway and it encompasses the area surrounding the Lower Altadena Drain. The area supports upland habitat and includes a small portion of the riparian habitat around the Lower Altadena Drain. The upland portion of the area is comprised of disturbed riparian/oak woodland that is dominated by large eucalyptus trees with an understory of exotics, including mustards and nonnative grasses. The riparian portion is comprised of riparian woodland, riparian scrub, and wetland habitat, as well as a sparsely vegetated ruderal area. The wetland habitat formed due to urban runoff and is associated with the Lower Altadena Drain. The area within DG-3A is expected to support a perched wetland and willow woodland following the sediment removal and the construction of the side slopes. Following the construction of the side slopes, the flows from the Lower Altadena Drain are expected to descend down the side slopes into the reservoir. The side slope is expected to be wet and will likely support willows and mulefat. The wetland area located south of where the access road will be installed will likely also stay wet and may continue to support willows and mulefat. The mitigation objective for DG-3A, which is the area that surrounds where the Lower Altadena Drain is located, would be the enhancement of riparian/oak woodland communities via the removal of the eucalyptus trees and exotics and native planting and seeding where appropriate.

4.2.3.5 DG-4 (Enhancement)

DG-4 is a 28.40-acre area encompassing the majority of the habitat on the western side of the Reservoir located just north of the dam and east of the paved access road/pathway. Currently, the area is dominated by riparian woodland interspersed with mulefat thickets and riparian herbaceous vegetation communities as well as intermittent transition zones between oak woodland and riparian woodland. Much of the area is infested with large populations of perennial pepperweed along with poison hemlock, wild radish, mustards, and escaped cultivars (eucalyptus, fig trees, purple passionflower vine, and cape ivy). The mitigation objective for DG-4 would be the enhancement of riparian communities through the removal of the exotics and escaped cultivars and native planting and seeding where appropriate. The northernmost portion of DG-4 is vegetated with coastal sage scrub that is heavily infested with nonnative plants. These areas, which are located immediately adjacent to riparian habitats, will fulfill a buffer habitat role and will be enhanced through the removal of nonnative plants and the planting/seeding of additional native plant species to improve the habitat value.

4.2.3.6 DG-4A (Rehabilitation)

The areas that comprise DG-4A include approximately 5.46 acres of patches dominated by monotypic stands of perennial pepperweed. These areas are located within the willow/mulefat thickets mitigation area labelled DG-4 but because they contain almost no native vegetation, they will require a different approach to restore them to native habitat. These areas will require an aggressive approach to eliminate the perennial pepperweed. Following the removal of the pepperweed, some of the areas will be recontoured and the topsoil layer that contains the seed and portions of the invasive plants that could

spread may be removed to facilitate the elimination of these species. The areas will then be revegetated with native species characteristic of the surrounding riparian woodland/scrub. The mitigation objective for DG-4A would be the rehabilitation and the regrowth of riparian communities through the removal of monotypic stands of invasive exotic plants followed by native planting and seeding.

4.2.3.7 DG-4B (Buffer)

DG-4B is a 0.54-acre buffer area on the far west side of the Reservoir immediately adjacent to the pedestrian pathway and east of the Lower Oak Grove Parking Lot. Currently, the area consists of disturbed bare ground with patches of exotic annuals including horehound, mustards, poison hemlock, and perennial pepperweed. Adjacent vegetation communities include mulefat thickets and patches of willow thickets to the north, east, and south and disturbed areas to the west. The mitigation objective for DG-4B is the planting of mulefat thickets/riparian scrub habitat through the removal of the exotics and native planting and seeding where appropriate.

4.2.3.8 DG-4C (Buffer)

DG-4C is a 0.45-acre buffer area on the far west side of the Reservoir immediately adjacent to the pedestrian pathway and northeast of the Oak Grove Park lower parking lot. Currently, the area consists of disturbed riparian scrub habitat with patches of exotic annuals, including nonnative grasses and mustards. Adjacent vegetation communities include willow thickets to the east and south and disturbed areas to the west. The mitigation objective for DG-4C is the enhancement of riparian scrub habitat through the removal of the exotics and native planting and seeding where appropriate.

4.2.3.9 DG-5 (Rehabilitation)

DG-5 is a 0.26-acre area on the far west side of the Reservoir immediately adjacent to the pedestrian pathway and the larger enhancement area DG-4. Currently, the area consists of compacted disturbed bare ground with patches of riparian scrub. Adjacent vegetation communities include riparian woodland on the north, east, and west sides and oak woodland on the opposite side of the pathway to the west. One of the baskets from the disc golf course is located within DG-5 and the area receives fairly regular pedestrian traffic. The mitigation objective for DG-5 is the removal of the disc golf hole, recontouring and decompaction of the soils, and the replanting of riparian woodland/riparian scrub habitat through the removal of the exotics and native planting and seeding where appropriate.

4.2.4 Upland Buffer Areas

4.2.4.1 DG-1 (Enhancement)

DG-1 is a narrow 4.88-acre area located on the east side of channel at the upper end of the Reservoir. Currently, the area consists of disturbed California sagebrush/buckwheat scrub and small patches of RAFSS vegetation along the edges of the Reservoir channel. The area experiences moderate use from pedestrian travel via a narrow secondary trail that runs through the northern portion of the area. The mitigation objective for DG-1 is the enhancement of California sagebrush/buckwheat scrub and RAFSS habitats via the removal of exotics and native planting and seeding where appropriate. The 4.88 acres of the non-riparian habitat in DG-1 would be considered an upland or non-aquatic buffer area.

4.2.5 Permanent Maintenance Area Side Slopes (Enhancement)

The side slopes of the Permanent Maintenance Area (7.34 acres) will be replanted with native vegetation, including shrub and annual species associated with riparian and RAFSS vegetation communities. In addition, mulefat will be allowed to grow on the side slopes to provide foraging habitat for least Bell's vireo and other wildlife species. The side slopes will be seeded and then allowed to grow naturally with only maintenance to control nonnative species. The side slopes may be periodically affected by recontouring if large sediment deposits bury portions of the side slopes. In this case, the sediment will be removed, the side slopes will be recontoured and allowed to naturally revegetate, and the control of nonnative species will continue.

4.2.6 Temporary Impact Areas

4.2.6.1 DG-7 and DG-8 (Re-establishment)

Areas DG-7 and DG-8 are areas (1.16 acres and 0.92 acres, respectively) are located in the upstream, central portion of the Reservoir on either side of the main channel. The majority of both areas were delineated as non-wetland WOUS. These areas will be temporarily impacted during the initial sediment removal phase of the Project and thus will be re-established after the initial sediment removal. Currently, both areas consist of a mix of scoured streambed, riparian woodland, and mulefat thicket habitat types. Adjacent habitat types include scoured streambed, black willow thickets and mulefat thickets. The mitigation objective for DG-7 and DG-8 is replanting and seeding to achieve willow thickets and mulefat thickets in the areas that were temporarily impacted by the initial sediment removal. The majority of these mitigation areas will continue to be USACE non-wetlands WOUS as storm flows will continue to flow through these areas.

4.2.6.2 DG-9 (Re-establishment)

DG-9 is a 14.09-acre area in the upper central portion of the channel that will be temporarily impacted during the initial sediment removal phase of the Project. This area was delineated as non-wetland WOUS and the majority of the area consists of scoured wash with patches of riparian woodland and RAFSS in the interior and California sage/buckwheat scrub on the periphery. The mitigation objective for DG-9 re-establishment through replanting and seeding to achieve RAFSS and riparian scrub in the areas that are temporarily impacted by the initial sediment removal. Because this site is part of the active channel, the actual vegetation that grows in this mitigation area will depend upon site conditions following the initial removal of sediment. The vegetation that grows on the benches created between the active channels will provide suitable habitat for the slender-horned spineflower. After the removal of sediment from DG-9 is completed, the soils will be ripped to create micro-topographic features prior to being seeded with species characteristic of RAFSS. The entire area will be at a lower elevation relative to current conditions. The anticipated morphology of the channel will be braided with multiple terraces and low-flow channels. Where appropriate, willow and mulefat cuttings may be installed and these would be hand-watered until they become established. However, the seeded areas will not be irrigated but the seeding will be conducted just prior to the rainy season to take advantage of winter rains. This area will continue to be USACE non-wetlands WOUS.

4.3 Implementation Schedule

The implementation of the restoration activities in the mitigation areas is anticipated to be conducted in three phases based on the types of activities and the timing of the sediment removal project. The phases are listed below but they will be subject to modifications based on various factors including the difficulty associated with nonnative plant species removal, preparation of final design plans and potential minor changes that may need to occur, progression of the sediment removal project, and potential delays related to weather.

- Phase 1 – Mitigation areas located outside of the permanent maintenance area, excluding DG-W-1 and DG-W-2, but including the sides slopes as they are completed during the sediment removal phase of the project (approximately 57.58 acres)
- Phase 2 – DG-W-1 (Johnson Field) and DG-W-2 (Mining Pit) (approximately 5.70 acres)
- Phase 3 – Temporary impact areas (DG-7, DG-8, and DG-9) (approximately 16.18 acres)

Implementation of Phase 1 will begin concurrently with the Project and will be ongoing for a period of just a few months to approximately three years. Those areas where invasive plants are dominant will take one to two years of eradication before they can be planted with native plants. The side slopes will be formed during the sediment removal phase of the project so the planting of those will be completed concurrently with the sediment removal project. The timing of Phase 2 will be contingent on the completion of the final designs for these mitigation areas and the timing of the sediment removal from DG-W-1 (Johnson Field). The likely scenario for the implementation is one year following the implementation of the Project; however, this may vary depending upon the completion of the sediment removal in DG-W-1. Phase 3 implementation will occur in the appropriate season following the completion of the sediment removal in the temporary impact areas. The timing of the implementation of each phase will generally follow the time frames in the following table.

MITIGATION IMPLEMENTATION	
Time Frame	**Activity**
Implementation	
Site Preparation	
November through September	Nonnative invasive species control
Summer prior to planting	Identification of planting areas
	Soil Management (e.g., testing, grading, de-compaction)
	Irrigation system installation
Planting and Seeding	
October - December	Planting
October – December (1 year after planting has occurred)	Seeding
120-Day Plant Establishment Period	
Monthly	Monitoring (Horticultural, photo-documentation)
Once per week (unless natural rainfall occurs)	Site Irrigation
Monthly	Irrigation System Maintenance
Monthly (at a minimum)	Weed Abatement/Invasive Plant Control
Monthly	Maintenance of site protection measures (if required)
Pre-Completion Site Walk (3 weeks prior to end of PEP)	Establish punch-list of outstanding items; Landscape Contractor has three weeks to complete.
Final Site Walk	Verify punch-list has been completed.
End of Plant Establishment Period	Email Memorandum to LACFCD and Agencies

4.4 Site Preparation

4.4.1 Nonnative Plant Control

4.4.1.1 Perennial Pepperweed

Perennial pepperweed infestations are widespread throughout the proposed mitigation areas within the Reservoir. Infestation densities within the Project area range from near monospecific stands of perennial pepperweed in the DG-4A areas to trace (less than one percent) amounts in other areas. Control methodology within the Project area will be dependent on the level of the infestation and its proximity to native vegetation, sensitive resources, and open water. Control of perennial pepperweed in highly infested areas may take more than five years to achieve full control of the infestations.

Control in Highly Infested Areas

Approximately seven to eight acres within the compensatory mitigation areas are heavily infested with perennial pepperweed at levels greater than 50 percent cover, mostly concentrated in DG-2 and the areas that make up DG-4A. In addition to perennial pepperweed, these highly infested areas typically include other exotics at lower levels such as poison hemlock, mustards, and wild radish interspersed with native vegetation. Control of perennial pepperweed in these areas will require an integrated management approach consisting of mechanical removal via mowing and hand removal, multiple years of herbicide

applications, and installation of native riparian plant species. Soil management may also be required in these areas due to the potential of high concentrations of extract salts being deposited on the soil surface by this species.

Initial control activities for perennial pepperweed in the highly infested areas would involve large-scale mowing to reduce multiple years of thatch that has accumulated in these areas. Mowing of dried plants should occur prior to formation of inflorescences, typically in May. In order to minimize soil compaction, rubber-tired vehicles (i.e., tractors, front-end loaders) with mowing attachments will be used for this task. Hand removal or weed whips will be employed in those areas adjacent to sensitive resources, open water, or native vegetation. All vehicles used in these areas will be cleaned of any dirt or plant material prior to leaving the Project area to avoid spreading any weed seed.

Following reduction of thatch build-up, any re-sprouting perennial pepperweed plants will receive a foliar herbicide treatment, with the goal of treating basal rosettes so that the formation of inflorescences is halted. Any herbicides and associated surfactants used adjacent to open water will be limited to those registered for aquatic use and approved for use in wetland restoration by the regulatory agencies. It is anticipated that an aquatic-approved form of glyphosate (i.e., Aquamaster®) will be for this task. A blue marking dye will be added to allow for the identification of areas sprayed. The location of follow-up treatment areas will be marked with a GPS device since re-treatment will likely be required for one to multiple years. Initially, the heavily infested areas will require intensive herbicide treatment of basal rosettes for up to three years.

Control in Low to Moderately Infested Areas

Low to moderate infestations of perennial pepperweed (<1-50% cover) can be found throughout most of the mitigation areas. Within these areas, smaller perennial pepperweed patches and individuals are more sporadically dispersed amongst native vegetation. In mature riparian woodland habitats (DG-4), perennial pepperweed is prolific and in some places, it dominates the understory. In mulefat thicket communities, it is co-dominant with mulefat. Sporadic perennial pepperweed individuals are also present in riparian scrub, California sagebrush/buckwheat scrub habitats, and disturbed habitats.

Due to the close proximity to native vegetation and associated wildlife, use of mowers or vehicles will not be used in these areas. Control of perennial pepperweed in these areas will require a combination of hand removal and spot treatments with herbicides approved for aquatic use. Since perennial pepperweed produces inflorescences concurrently with nesting bird season, a biological monitor will be required to accompany crews when pulling or treating plants in these areas.

4.4.1.2 Other Invasive Plants

Small infestations or isolated individuals of other invasive plants are present in every mitigation area. Of particular concern are incipient populations of giant reed, salt cedar, Spanish broom, pampas grass, and fountain grass. When encountered in the proposed mitigation areas, each species will be managed according to the best control method for that particular species. It is anticipated that the main method of controlling other invasive species will be the cut-spray or cut-daub methods. This has proved very effective when the treatment locations are recorded with GPS and revisited in subsequent seasons. Table

4.1 lists the suite of nonnative and invasive plants species that will be targeted for control in the Project area and the various mitigation areas.

Table 4.1. Nonnative Plant Species Targeted for Control

Scientific Name	Common Name
Acacia spp.	wattle
Ageratina adenophora	thoroughwort
Ailanthus altissima	tree of Heaven
Anthemis cotula	dog fennel
Arundo donax	giant reed (Arundo)
Avena barbata	slim oat
Bacopa monnieri	herb of grace
Bassia hyssopifolia	five-hook bassia
Brassica nigra	black mustard
Bromus diandrus	rip-gut brome
Bromus hordeaceus	soft chess
Bromus madritensis ssp. rubens	foxtail brome
Carduus pycnocephalus	Italian thistle
Carpobrotus chilensis	sea fig
Centaurea melitensis	tocalote
Centaurea solstitialis	yellow starthistle
Chenopodium album	lamb's quarters
Chondrilla juncea	skeleton weed
Cirsium vulgare	bullthistle
Conium maculatum	poison hemlock
Cortaderia selloana or Cortaderia jubata	pampas grass
Cotula coronopifolia	brass buttons
Cynodon dactylon	Bermuda grass
Cytisus scoparius	Scotch broom
Cytisus striatus	Portuguese broom
Dittrichea graveolens	stinkwort
Eucalyptus spp.	gum trees
Euphorbia maculate	spotted spurge
Festuca perennis	Italian rye grass
Ficus carica	common fig
Foeniculum vulgare	fennel
Genista monspessulana	French broom
Hedera canariensis	Canary ivy
Hedera helix	English ivy
Helminthotheca echioides	bristly ox-tongue

Table 4.1. Nonnative Plant Species Targeted for Control

Scientific Name	Common Name
Hirschfeldia incana	short-pod mustard
Hyparrhenia hirta	thatching grass
Lepidium draba	whitetop
Lepidium latifolium	perennial pepperweed
Lobularia maritima	sweet alyssum
Marrubium vulgare	white horehound
Myoporum laetum	Ngaio tree
Nerium oleander	oleander
Nicotiana glauca	tree tobacco
Olea europaea	olive
Oxalis pes-caprae	Bermuda buttercup
Pennisetum clandestinum	Kikuyu grass
Pennisetum setaceum	fountain grass
Polypogon monspeliensis	annual beard grass
Portulaca oleracea	common purslane
Robinia pseudoacacia	black locust
Ricinus communis	castor bean
Rubus armeniacus	Himalayan blackberry
Rumex crispus	curly dock
Salsola tragus	Russian thistle
Schinus molle	Peruvian pepper tree
Schinus terebinthifolius	Brazilian pepper tree
Silybum marianum	milk thistle
Sisymbrium irio	London rocket
Spartium junceum	Spanish broom
Tamarix ramosissima	saltcedar
Tribulus terrestris	puncture vine
Vicia villosa	hairy vetch
Vinca major	vinca
Washingtonia robusta	Mexican fan palm
Xanthium strumarium	cocklebur

4.4.2 General Weed Control

In addition to the control of all invasive nonnative plants, other nonnative annual and perennial plants will be controlled to the greatest extent practicable in the mitigation areas to ensure the success of the restored native plant communities. Hand tools, weed whips, and/or herbicide will be used to achieve this task. The goal is to eliminate weed seedlings before they mature. If flowering parts are present, all cut

material will be collected, bagged, removed from the site, and taken to an approved off-site location for disposal.

4.4.3 Groundwater Depth Monitoring

Habitat mitigation that is planned includes re-establishing habitat types that are typically reliant on the presence of moisture levels that are higher than upland vegetation (i.e., riparian), and the presence of groundwater for some species such as native trees. Groundwater availability for mitigation areas varies and following sediment removals there could be effects on availability of groundwater for species that depend on this water source such as native trees. Riparian shrubs, herbs, and vines are mainly dependent on soil moisture that spikes during the wet season and sometimes deeper in the soil if their roots reach capillary fringes of the groundwater table. Whatever the case may be, the planned mitigation will be supplemented from a perched aquifer that is located on the west side of the sediment removal area and a constant supply of urban runoff that is available on the east side of the sediment removal area.

Regardless of the adequate water availability for mitigation areas, existing groundwater monitoring wells will be monitored throughout the habitat mitigation effort. Groundwater levels may need to be measured several times throughout the year to capture seasonal fluctuations. An adequate number of existing monitoring wells will be monitored to best represent the east and west sides of the sediment removal area.

4.4.4 Soil Testing

Site-specific physical and/or chemical analyses of soils may be required for select proposed mitigation areas, particularly the areas within the Reservoir targeted for habitat re-establishment. Based on several site visits and surveys in recent years, it is evident that native vegetation that is present is in a condition typically seen in areas that aren't as disturbed. This determination supports the assumption that the majority of the mitigation areas will not need soil testing. Mitigation areas DG-W-1 and DG-W-2 should be tested following earthwork and prior to native planting and seeding activities. Soil testing will be similar to an agricultural suitability test and will include an assessment of soil texture, nutrients, pH, and salinity. It is anticipated that DG-W-1 will sustain soil compaction during grading activities; compaction testing is not planned. This site will be de-compacted prior to any planting or seeding with a goal of 60 to 70 percent compaction.

4.4.5 Grading/Contouring

4.4.5.1 DG-W-1 (Johnson Field)

Soil Exportation and Redistribution

The basin has approximately 11,250 cubic yards of sediments that are currently being stockpiled in the center of the site that should be exported off site. These soils will not be used for future habitat restoration/creation.

To support the creation of riparian woodland at this site, the raised trail around the west and south sides of the basin will be abandoned but the soils will remain on site and be incorporated into existing soils at

the site as a substrate for re-establishment (after the 11,250 cubic yards of sediment is removed). Only the portion of the trail that surrounds the site will be abandoned so that the continuum of the trail system on the north and east sides of the basin will not be interrupted. The estimated volume of soil to be removed from the section of abandoned trail is approximately 7,500 cubic yards. The soil that comprises the trail base will be removed up to the margin of the existing native riparian vegetation on the west and south and to grade with base of palm trees.

A Restoration Ecologist will need to be on-site during grading to ensure that the minimum amount of riparian vegetation (i.e., mulefat and elderberry [*Sambucus nigra* ssp. *caerulea*]) is disturbed. The trail soil will be decompacted and homogenized with the upper three feet of soil that remains following export of sediments from the center of the site. Prior to final contouring of the site, all ornamental/nonnative palms will be removed and disposed of legally off site. The site should slope slightly upward to the east with a rise of approximately two to three feet above the existing main channel elevation. In addition, the site should meet flush with the existing riparian habitat that exists to the south and southwestern edges of the site. Following redistribution and homogenization of soils, compaction to no greater than 70 percent should occur.

Modify Existing Culvert

Based on a cursory survey of the area, it appears that West Kent Street currently drains down the hillside and into the riparian zone located southwest of the DG-W-1 site. The culvert currently drains into the DG-2 mitigation area, which is just south of the berm around the DG-W-1 mitigation area. The culvert will be relocated to the southeastern corner of DG-W-1, which may involve re-routing the down-drain from Kent street so that it traverses the existing access road diagonally in a slightly northerly direction. This added input of water during a storm is expected to benefit riparian areas, and still provide water to the riparian area southwest of the site. Installation of a culvert pipe under the existing trail will be necessary and will be conducted in areas that are currently upland. The existing culvert will be left intact. It is recommended to use a minimum width of 18 inches for the culvert pipe (corrugated galvanized steel). The culvert inlet should be fortified wing walls, or other means, so that the potential for erosion is minimized. The culvert will traverse below an existing maintenance road and a cemented cobble-stone drainage will be constructed that ends at toe of slope and connects to the culvert outlet to prevent slope erosion. The cobble-stone drainage will be reinforced with rebar. Slope drainage below the culvert outlet should be a minimum of 6-feet wide and have a concave surface. Cemented rip-rap will be included at the toe of slope as an energy dissipater. Rip-rap zone should be approximately 100 square feet in size. Equivalent materials may be used if erosion control can still be achieved.

4.4.5.2 DG-W-2 (Mining Pit) and DG-W-2 (Mining Pit Outlet)

Improve Existing Culvert

To assist with providing conditions that are conducive to supporting riparian and wetland habitat, improvements to the existing culvert that is present may occur. This will be further evaluated during the final design phase of the Project. The culvert inlet is positioned at the southeastern margin of the adjacent disc golf course and to the west of the Project Area. It appears that during storm events run-off flows from northeast to southwest at a slope of approximately two degrees. The drainage in the immediate

vicinity of the culvert inlet has a width of four to six feet and a depth of two to three feet. The culvert inlet is centered at latitude 34°11'36.91"N, longitude 118°10'29.00"W. The culvert inlet may be fortified with wing walls, or other means, so that the potential for erosion is minimized. The culvert traverses below an existing maintenance road and, if necessary, a cemented cobble-stone drainage will be constructed that ends at toe of slope and connects to the culvert outlet to prevent slope erosion. The cobble-stone drainage will be reinforced with rebar. Slope drainage below the culvert outlet should be a minimum of 6-feet wide and have a concave shape. Cemented rip-rap may be included at the toe of slope as an energy dissipater. The rip-rap zone should be approximately 100 square feet in size. Equivalent materials may be used if erosion control can still be achieved. Existing culvert may be improved so that erosion and increased sedimentation into the mining pit is minimized.

Soil Manipulation and Nonnative Plant Removal

Accumulation of a variety of sediments has occurred over time, the majority of which appear to be from sediment-laden water entering the area from upland areas. However, in the past, inundation of the area has occurred in part due to high flows from the Arroyo Seco that transported sediments from the mountains located to the north. Rather than major exportation of soils from this area, the top four inches of soil should be removed and exported off site only from areas that are dominated by nonnative plant species such as curly dock (nonnative plant). A Restoration Ecologist will need to be present to determine the limits of soil removal and to identify the vegetation that should be avoided. Following removal of nonnative vegetation and its seed bank, a mini skid-steer dozer should be used to break-up the top two to three feet of soil and homogenize it with the sandy substrate that exists lower in the soil profile. Some of the soil will be used to create a mound near the outlet of the culvert. This will serve to bifurcate the flows from the culvert into two channels that will meander through the mining pit. Following homogenization of soils, compaction to no greater than 70 percent should occur. Use of a mini dozer will reduce the impact to existing native vegetation and allow for ease of movement within the work area. The approximate area that would require soil removal and soil mixing is 1.3 acres. The approximate volume of sediments mixed with vegetation that would need to be removed is 690 cubic yards.

Re-Establish Connection to Main Channel and Diversion to the East

The DG-W-2 site is expected to support riparian woodland species, and potentially wetland species, in the future and have some connection to the main channel of the Arroyo Seco. In order to do this, a drainage feature will be created that originates at the southwest margin of DG-W-2 site and flows to the southwest to meet with an existing tributary of the Arroyo Seco. The drainage feature is anticipated to require a length of 750 feet and have a width of six feet and a depth of two feet. The drainage feature should meander slightly to avoid a straight-edge trajectory. In addition, a second outlet that originates from the same location as the channel will be created to convey storm flows to DG-4 WOUS Connections. During storm flows, the channel will be overtopped to allow flows to enter the DG-WOUS area, where flows will be conveyed to the southeast. These flows will naturally move through the existing WOUS areas and will enter the main channel of the arroyo by flowing down the side slopes in the same location as where they currently exist. A Restoration Ecologist will need to be present to determine the most appropriate path to follow. The Restoration Ecologist will flag the centerline of the path prior to creation of the drainage feature.

4.4.5.3 DG-SF-1, DG-SF-2, DG-2 New Channels, DG-2 WOUS, DG-4 Drainage, DG-4-WOUS Connections

Areas DG-SF-1, DG-SF-2, DG-2 New Channels, DG-2 WOUS, DG-4 Drainage, and DG-4-WOUS are expected to support riparian woodland species and have a connection to the main channel of the Arroyo Seco. DG-SF-1 and DG-SF-2 will be recontoured to improve conveyance of flows during inclement weather, improve distribution of water throughout mitigation area, and to improve soil conditions to support riparian trees. A total of approximately 430 feet of the channel will be recontoured within DG-SF-1 and DG-SF-2. DG-2 New Channels will also be recontoured to improve conveyance of flows during inclement weather, improve distribution of water throughout mitigation area, and to improve soil conditions to support riparian trees. A total of approximately 975 feet of the channels will be recontoured with a width of approximately 10 to 20 feet and a depth of 1.5 to 2 feet. Recontouring within DG-2 WOUS and DG-4 Drainage will occur in select areas to improve conveyance of flows during inclement weather. DG-4-WOUS will be recontoured to improve conveyance of flows during inclement weather, improve distribution of water throughout mitigation area, and to improve soil conditions to support riparian trees. In addition, recontouring will occur to improve hydrology so that DG-W-2 can convey flows to non-wetland WOUS in DG-4 and to create a connection between two areas of non-wetland WOUS in DG-4.

4.4.5.4 DG-7, DG-8 and DG-9 (Temporary Impacts)

Areas DG-7, DG-8, and DG-9 are also planned temporary impact areas within the proposed Project boundary where grading and/or contouring may be required to prepare the areas for riparian habitat. Final grading and contouring plans will be addressed in the final Mitigation Site Grading Plan. In DG-7, an inlet weir will be constructed where flows overtopping the existing channel currently enter DG-4 WOUS. The weir will allow water that backs up in the reservoir when the dam gaits are closed to enter the upstream portion of the DG-4 WOUS mitigation area. Water that enters the weir will flow from the main channel, through DG-4 WOUS to the mining pit as it has done in the past. The positioning of the weir will not allow stormflows from the main channel to enter DG-WOUS to avoid having large sediment deposits enter the mitigation areas on the west side of the main channel. The design of the weir will be completed during the final design phase of the Project and will be subject to review and approval by USFWS.

4.4.5.5 DG-4A and DG-5

Areas identified as DG-4A are scattered through mitigation area DG-4 and comprise very disturbed habitat that is dominated by non-native plants species. DG-4A will be recontoured to improve distribution of water throughout the mitigation area following non-native plant abatement. Mitigation area DG-5 is mostly in a disturbed condition with few native species present. This mitigation area will be recontoured to improve distribution of water throughout the area and the soil will be homogenized and decompacted to improve soil conditions to support riparian tree growth.

4.4.6 Decompaction/Ripping

Several of the proposed mitigation areas have significantly compacted soils due to years of pedestrian foot traffic, vehicle traffic, and/or high sediment loads. The majority of these include the on-site mitigation areas within the Reservoir (DG-2A, DG-2B, DG-4B, DG-4C, and DG-5). Prior to planting/seeding activities,

soils on all of these areas will be ripped to a depth of six inches to 12 inches, depending on site conditions and target habitat type.

4.4.7 Soil Amendments

Based on site-specific soil test results (Section 4.4.4), some modification of soil structure or chemistry may be needed at some of the mitigation areas. This may include amendments to adjust pH levels, salinity, organic content, or native soil microorganisms (i.e., mycorrhizae). Specifics will be addressed in the Final HMMP.

4.5 Structural Habitat Features

In order to provide structural heterogeneity, immediate wildlife habitat benefits, and opportunities for additional plant growth, structural habitat features will be placed in select mitigation areas. These features may include rocks/boulders, brush piles, coarse woody debris, standing snags, and/or plant hummocks/sediment mounds. Structural habitat features will be put in place following any required earthwork (i.e., grading, ripping) but before any planting or seeding activities. Final locations of structural features will be addressed in the Final Planting Plan and may be adjusted to suit current site conditions.

Much of the material used for the structural habitat features for the mitigation areas within the Reservoir can be salvaged from those areas impacted by the proposed Project. Logs and other coarse and woody debris will be salvaged from initial vegetation removal activities while rocks and boulders will be salvaged from subsequent excavation activities. Areas within the Project footprint infested with invasive nonnative plants (e.g., perennial pepperweed) will be avoided to minimize further spread of invasive plants.

4.6 Irrigation Specifications

Supplemental irrigation will likely be required to support tree species that are planted. However, any supplemental irrigation systems would be temporary and would be removed once it was determined that the restored habitats were self-sustaining. In order for the proposed mitigation areas to meet the performance standards and subsequently be deemed successful by the regulatory agencies, any restored habitat must be self-sustaining for two consecutive years following the removal of supplemental irrigation. The irrigation system will need to be connected to a municipal water source fitted with a meter, pressure regulator, and back-flow preventer. Emitters will be positioned within irrigation basins of each planted tree and used until it is apparent the tree can survive without supplemental irrigation (i.e., roots have grown to a sufficient depth to reach groundwater).

4.7 Planting Specifications

4.7.1 Desired Vegetation Communities

4.7.1.1 Baccharis salicifolia Shrubland Alliance

Baccharis salicifolia Shrubland Alliance, or riparian scrub, is one of the primary vegetation communities targeted for native planting and seeding activities within many of the proposed mitigation areas. It is one of the dominant plant communities within the Reservoir, often sharing similar species of willows with

adjacent riparian woodland habitats. The planting palette for riparian scrub habitat includes perennial native species such as mulefat, black willow, red willow, arroyo willow, and cottonwood (Table 4.2). The seeding palette includes species such as mugwort, western ragweed, and beardless wild rye, and many other riparian herbaceous species (Table 4.3). These palettes will primarily be used to define those species used for on-site re-establishment and enhancement mitigation areas within the Reservoir. The species composition of the container plant palette and the seed mix may vary depending upon the results of transects conducted in the reference site for this plant community and in the reference site located in occupied least Bell's vireo nesting habitat.

Table 4.2. *Baccharis salicifolia* Shrubland Alliance Planting Palette

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre
Artemisia douglasiana	mugwort	1 gal	100
Baccharis pilularis	coyote brush	1 gal	100
Baccharis salicifolia	mulefat	cutting/1 gal	250
Populus fremontii	Fremont cottonwood	1 gal	100
Rubus ursinus	California blackberry	1 gall	100
Rosa californica	California wild rose	1 gal	100
Salix gooddingii	black willow	cutting/1 gal	200
Salix laevigata	red willow	cutting/1 gal	100
Salix lasiolepis	arroyo willow	cutting/1 gal	100
Sambucus mexicana	Mexican elderberry	1 gal	50
		Total Plants[1]	**1200**

[1] Any native container plant substitutions that may be necessary will be at the discretion of the Restoration Ecologist. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

Table 4.3. *Baccharis salicifolia* Shrubland Alliance Seed Mix

Scientific Name	Common Name	Bulk Lbs /Acre
Ambrosia psilostachya	western ragweed	4
Artemisia douglasiana	mugwort	4
Elymus triticoides	beardless wild rye	4
Urtica dioica ssp. holosericea	hoary nettle	4
Achillea millefolium	yarrow	1
Artemisia dracunculus	tarragon	1
Bromus carinatus	California brome	1
Calystegia macrostegia ssp. intermedia	south coast morning glory	0.5
Cirsium occidentale	western thistle	1
Elymus condensatus	giant wild rye	1
Epilobium canum	California fuschia	0.5
Eriodictyon parryi	poodle-dog bush	0.5

Table 4.3. *Baccharis salicifolia* Shrubland Alliance Seed Mix

Scientific Name	Common Name	Bulk Lbs /Acre
Eschscholzia californica	California poppy	0.5
Galium aparine	cleavers	0.5
Gutierrezia californica	matchweed	0.5
Lupinus bicolor	bicolored lupine	0.5
Lupinus truncata	blunt-leaved lupine	0.5
Monardella breweri ssp. *lanceolata*	mustang mint	0.5
Phacelia cicutaria	caterpillar phacelia	0.5
Phacelia distans	common phacelia	0.5
Phacelia minor	wild Canterbury bells	0.5
Phacelia parryi	Parry's phacelia	0.5
Marah macrocarpa	chilicothe	0.5
Pseudognaphalium californicum	California everlasting	0.5
Rumex hymenosepalus	wild rhubarb	0.5
Vitis girdiana	southern wild grape	1
	Total Bulk Lbs. of Seed[1]	**30**

[1] Prior to finalizing seed order the Restoration Ecologist shall review the percent purity, percent germination, and percent pure live seed per bulk pound to ensure the proper amount of bulk seed is planned for seeding which will result in revision to the amounts listed above. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

4.7.1.2 Salix gooddingii Woodland Alliance

Salix gooddingii Woodland Alliance is another desirable plant community for the mitigation areas because it currently exists within the Reservoir. The planting palette includes species characteristic of this community such as black willow, red willow, Mexican elderberry, mulefat, and mugwort (Table 4.4). The seeding palette includes species such as yerba mansa, mugwort, tall flatsedge, hoary nettle, and many other riparian herbaceous species (Table 4.5). These palettes will primarily be used to define those species used to enhance disturbed riparian woodland mitigation areas within the Reservoir. The species composition of the container plant palette and the seed mix may vary depending upon the results of transects conducted in the reference site for this plant community and in the reference site located in occupied least Bell's vireo nesting habitat.

Table 4.4. *Salix gooddingii* Woodland Alliance Planting Palette

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre
Artemisia douglasiana	mugwort	1 gal	100
Baccharis pilularis	coyote brush	1 gal	100
Baccharis salicifolia	mulefat	cutting/1 gal	250
Populus fremontii	Fremont cottonwood	1 gal	100
Rubus ursinus	California blackberry	1 gall	100
Rosa californica	California wild rose	1 gal	100
Salix gooddingii	black willow	cutting/1 gal	200

Table 4.4. *Salix gooddingii* Woodland Alliance Planting Palette

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre
Salix laevigata	red willow	cutting/1 gal	100
Salix lasiolepis	arroyo willow	cutting/1 gal	100
Sambucus mexicana	Mexican elderberry	1 gal	50
		Total Plants[1]	1200

[1] Any native container plant substitutions that may be necessary will be at the discretion of the Restoration Ecologist. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

Table 4.5. *Salix gooddingii* Woodland Alliance Seed Mix

Scientific Name	Common Name	Bulk Lbs /Acre
Anemopsis californica	yerba mansa	3
Artemisia douglasiana	mugwort	5
Cyperus eragrostis	tall flatsedge	3
Elymus triticoides	beardless wild rye	2
Urtica dioica ssp. holosericea	hoary nettle	3
Achillea millefolium	yarrow	1
Artemisia dracunculus	tarragon	1
Bromus carinatus	California brome	1
Calystegia macrostegia ssp. *intermedia*	south coast morning glory	0.5
Cirsium occidentale	western thistle	1
Elymus condensatus	giant wild rye	1
Epilobium canum	California fuschia	0.5
Eriodictyon parryi	poodle-dog bush	0.5
Eschscholzia californica	California poppy	0.5
Galium aparine	cleavers	0.5
Gutierrezia californica	matchweed	0.5
Lupinus bicolor	bicolored lupine	0.5
Lupinus truncata	blunt-leaved lupine	0.5
Monardella breweri ssp. *lanceolata*	mustang mint	0.5
Phacelia cicutaria	caterpillar phacelia	0.5
Phacelia distans	common phacelia	0.5
Phacelia minor	wild Canterbury bells	0.5
Phacelia parryi	Parry's phacelia	0.5
Marah macrocarpa	chilicothe	0.5
Pseudognaphalium californicum	California everlasting	0.5
Rumex hymenosepalus	wild rhubarb	0.5
Vitis girdiana	southern wild grape	1
	Total Bulk Lbs. of Seed[1]	30

[1] Prior to finalizing seed order the Restoration Ecologist shall review the percent purity, percent germination, and percent pure live seed per bulk pound to ensure the proper amount of bulk seed is planned for seeding which will result in revision to the amounts listed above. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

4.7.1.3 Quercus agrifolia Woodland Alliance

Quercus agrifolia Woodland Alliance, or Coast Live Oak Woodland, is a desired plant community for some of the mitigation areas and components of this community may be intermixed with *Baccharis salicifolia* Woodland Alliance in mitigation areas DG-2A and DG-2B but it will primarily be planted in mitigation area DG-3A. The planting palette includes species characteristic of this community such as poison oak, California blackberry, and California melic (Table 4.6). This palette will primarily be used to define those species used to enhance disturbed coast live oak woodland mitigation areas within the Reservoir. Oak trees may need to be transplanted from impact areas where the access roads will be constructed or additional oaks may need to be planted at oak woodland mitigation areas to compensate for Project impacts. The plant palette in Table 4.6 will also be used at new oak woodland mitigation areas.

Table 4.6. *Quercus agrifolia* Woodland Alliance Planting Palette

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre
Melica imperfecta	California melic	1 gal	100
Polypodium californicum	California polypody	1 gal	100
Quercus agrifolia	coast live oak	1 gal, 5 gal, 10 gal, 15 gal	150[1]
Rubus ursinus	California blackberry	1 gal	100
Ericameria pinifolia	pinebush	1 gal	100
Toxicodendron diversilobum	poison oak	1 gal	100
		Total Plants[2]	**650**

[1] Planting total for oaks calculated at 30 feet on-center. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

[2] Number of plants accounts for potential die-off of approximately 50 percent of planted oaks.

4.7.1.4 Lepidospartum squamatum Shrubland Alliance/Baccharis salicifolia Shrubland Alliance

Lepidospartum squamatum Shrubland Alliance (RAFSS) – *Baccharis salicifolia* Shrubland Alliance is scattered within the upstream portions of the Reservoir and would be re-vegetated in mitigation area DG-9 and on the side slopes of the Episodic Maintenance Area. The planting palette includes species characteristic of this community such as scalebroom (*Lepidospartum squamatum*), mulefat (*Baccharis salicifolia*), prickly-pear cactus, black sage (*Salivia mellifera*), and hairy yerba santa (*Eriodictyon trichocalyx*) (Table 4.7). Potential locations where container plants for scalebroom, mulefat, prickly-pear cactus and hairy yerba santa will be placed in DG-9 will be determined after the completion of the sediment removal in this area but will most likely be located along the edges. Seeding will likely be the primary method used to re-establish the RAFSS in the majority of DG-9 due to the fact that this area will be subject to natural flows and scour. In addition, seeding may also be conducted on portions of the slopes of DG-1 if nonnative plant species removal is conducted and native plant species don't naturally recruit into the areas where the nonnative plants are removed. The plant species in the seed palette are adapted to growing in the active wash. The seeding palette includes California sagebrush, California croton, California buckwheat, slender buckwheat, and threadleaf snakeweed (Table 4.8).

Table 4.7. *Lepidospartum squamatum* Shrubland Alliance/*Baccharis salicifolia* Shrubland Alliance Planting Palette

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre
Artemisia californica	California sagebrush	1	50
Baccharis salicifolia	mulefat	1	100
Eriodictyon trichocalyx	hairy yerba santa	1	50
Eriogonum fasiculatum	California buckwheat	1	50
Lepidospartum squamatum	scalebroom	1	100
Lotus scoparius	deerweed	1	50
Opuntia littoralis	prickly-pear cactus	1	20
Salvia mellifera	black sage	1	50
		Total Plants[1]	**470**

[1] [1] Any native container plant substitutions that may be necessary will be at the discretion of the Restoration Ecologist. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

Table 4.8. *Lepidospartum squamatum* Shrubland Alliance/*Baccharis salicifolia* Shrubland Alliance Seed Mix

Scientific Name	Common Name	Bulk Lbs /Acre
Artemisia californica	California sagebrush	2
Baccharis salicifolia	mulefat	2
Croton californicus	California croton	2
Eriodictyon trichocalyx	hairy yerba santa	2
Eriogonum fasciculatum	California buckwheat	4
Eriogonum gracile	slender buckwheat	5
Gutterrizia microcephala	threadleaf snakeweed	3
Lepidospartum squamatum	scalebroom	3
Lotus scoparius	deerweed	2
Salvia mellifera	black sage	3
Senecio flaccidus	threadleaf ragwort	2
	Total Bulk Lbs. of Seed[1]	**30**

[1] Prior to finalizing seed order the Restoration Ecologist shall review the percent purity, percent germination, and percent pure live seed per bulk pound to ensure the proper amount of bulk seed is planned for seeding which will result in revision to the amounts listed above. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

4.7.1.5 Artemisia californica – Eriogonum fasciculatum Shrubland Alliance

Artemisia californica – Eriogonum fasciculatum Shrubland Alliance is a desired plant community for several of the mitigation areas. The planting palette includes species characteristic of this community such as California sage, buckwheat, deerweed, and white sage (*Salvia apiana*) (Table 4.9). This palette will primarily be used to define those species used to re-establish or enhance disturbed buffer habitats within several of the proposed mitigation areas within the Reservoir. The seeding palette includes California sagebrush, giant wildrye, slender buckwheat, foothill needlegrass, threadleaf snakeweed, and several other species (Table 4.10).

Table 4.9. *Artemisia californica – Eriogonum fasciculatum* Shrubland Alliance Planting Palette

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre
Artemisia californica	California sagebrush	1	150
Encelia californica	California encelia	1	50
Eriogonum fasiculatum	California buckwheat	1	150
Isocoma menziesii var. menziesii	goldenbush	1	20
Lotus scoparius	deerweed	1	50
Malosma laurina	laurel sumac	1	30
Opuntia littoralis	prickly-pear cactus	1	20
Salvia mellifera	black sage	1	50
		Total Plants[1]	520

[1] Any native container plant substitutions that may be necessary will be at the discretion of the Project Restoration Ecologist. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

Table 4.10. Artemisia californica – Eriogonum fasciculatum Shrubland Alliance Seed Mix

Scientific Name	Common Name	Bulk Lbs /Acre
Acmispon glaber	deerweed	8
Artemisia californica	California sagebrush	3
Eriogonum gracile	slender buckwheat	5
Gutterrizia microcephala	threadleaf snakeweed	2
Leymus condensatus	giant wildrye	6
Lupinus bicolor	miniature lupine	4
Nassella lepida	foothill needlegrass	3
	Total Bulk Lbs. of Seed[1]	**31**

[1] Prior to finalizing seed order the Restoration Ecologist shall review the percent purity, percent germination, and percent pure live seed per bulk pound to ensure the proper amount of bulk seed is planned for seeding which will result in revision to the amounts listed above. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

4.7.1.6 Eriogonum fasciculatum Shrubland Alliance – Lepidospartum squamatum Shrubland Alliance

Eriogonum fasciculatum Shrubland Alliance - *Lepidospartum squamatum Shrubland Alliance* is a desired plant community in the mitigation area along the eastern slope between the main channel and the City's percolation basins. The seed mix includes species characteristic of this community such as buckwheat, deerweed, and white sage (*Salvia apiana*) (Table 4.11). This palette will primarily be used to define those species used to re-establish or enhance disturbed buffer habitats within several of the proposed mitigation areas within the Reservoir. The seeding palette includes California sagebrush, giant wildrye, slender buckwheat, foothill needlegrass, threadleaf snakeweed, and several other species.

Table 4.1. Eriogonum fasciculatum Shrubland Alliance - Lepidospartum squamatum Shrubland Alliance Seed Mix

Scientific Name	Common Name	Bulk Lbs /Acre
Acmispon glaber	deerweed	2
Artemisia californica	California sagebrush	3
Eriogonum gracile	slender buckwheat	3
Gutterrizia microcephala	threadleaf snakeweed	2
Leymus condensatus	giant wildrye	5
Lupinus bicolor	miniature lupine	4
Nassella lepida	foothill needlegrass	3
Eriodictyon trichocalyx	hairy yerba santa	2
Eriogonum fasciculatum	California buckwheat	4
Lepidospartum squamatum	scalebroom	2
	Total Bulk Lbs. of Seed	**30**

[1] Prior to finalizing seed order the Restoration Ecologist shall review the percent purity, percent germination, and percent pure live seed per bulk pound to ensure the proper amount of bulk seed is planned for seeding which will result in revision to the amounts listed above. All species substitutions must be approved by USACE, USFWS, CDFW, County, and Restoration Ecologist.

4.8 Identification of Planting Areas

When the final plans for the restoration in the mitigation areas have been approved, the Restoration Ecologist will determine planting locations of live stakes, propagated plants, and native seed based on micro-topography, hydrologic conditions, and current vegetation communities on site. The Restoration Ecologist will demarcate locations where live stakes and propagated plants will be installed.

4.9 Plant Material Procurement

The services of a qualified native plant nursery and seed company will be secured immediately following approval of this Plan. The native plant nursery and native seed company will have a minimum of five years of experience with propagation and seed collection of native riparian plants. Container plants will have container sizes not less than one gallon, with the exception of wetland species which can be procured as plugs (e.g. Ray Leach Cone-tainers™). An additional five percent of the total number of each container species specified for planting will be ordered as a contingency for any container plant mortalities that occur.

Plant material will originate from local sources as is feasible, ideally within the Arroyo Seco and adjacent watersheds originating in the San Gabriel Mountains; sources from Orange County will also be acceptable. Materials should be obtained from areas that have habitat conditions that are similar to those within the Project area. Plant material (i.e., cuttings, seed) will only be harvested from healthy, vigorous donor plants with no obvious signs of damage from insects or disease. Care will be taken to minimize over-harvesting from any one particular donor plant or localized plant community.

The native seed mix will be ordered according to that specified in this Plan. Seed will be of high quality with virtually no weed seed present. The Restoration Ecologist will inspect the seed mix tags of all deliveries of seed to assure that they are up to specifications (i.e., source[s], percent germination, and

purity of seed). Seed quality will be the best obtainable in the year of application for both purity and germination and any seed being stored for future use within the Project area will be kept in a cool, dry place until site application.

4.10 Willow and Mulefat Cuttings/Stakes

Suitable local donor areas will be identified within Devil's Gate Reservoir. Dormant pole cuttings from appropriate species may provide a large percentage of the plant material used for the proposed mitigation areas. To ensure establishment success, cuttings will be harvested from live, dormant plants (i.e., willows) either in late fall, winter, or very early spring before the buds start to break. Willow stakes will be approximately four to five feet long and from one to two-inch diameter at their base, as vigorous young stakes with larger diameters establish more readily and successfully than older or small diameter stakes. A diagonal cut will be made at the base of each stake and the top will be cut horizontally to differentiate the rooting end from the above ground end to aid in installation. Lateral branches will also be removed during harvesting. The willow stakes will be stored (no longer than two weeks) in buckets filled with water and in a cool shaded location until ready for planting.

Immediately prior to installation, the stakes may be dipped in a rooting hormone and then installed in pre-watered holes approximately two to four feet deep or with more than half of the cutting underground. The holes will be backfilled and the soil around the stake tamped-in to insure good soil to stem contact and no air pockets. The willow stakes will be watered immediately following installation. All cuttings will be provided with an emitter from the irrigation system.

4.11 Container Planting Methods

Planting of container plants will occur during the beginning of the wet season, which for southern California typically begins October 1. For best results, plant after the soil is moistened to greater than one foot in depth due to natural rainfall. Avoid planting after February 1; if planting must occur then nesting bird surveys would likely be required. To the extent possible, planting should not occur later than March 1 since climate patterns will not be as conducive to plant establishment as compared to planting during mid-winter. Prior to installation, all plant material will be inspected by the Restoration Ecologist to ensure that container stock is healthy and does not show signs of having pests or disease. If any container stock is in poor condition, it will be rejected.

Container plants will be planted using standard horticultural practices, utilizing a hole twice the diameter and depth of the rootball so that the rootcrown is one inch below grade, except for oak trees, which will be 0.5 to one inch above grade (after soil settles following watering). All plants will be thoroughly watered in their containers before planting. The soil in planting holes will also be wetted with a minimum of one gallon of water before and after planting. The backfill mix will contain native soil, and rocks greater than two inches in diameter will be removed to the extent possible; fertilizer will not be added to backfill. Soil will be tamped-in by hand to collapse air pockets in the backfill. Each planting will be backfilled so that soil is at the same level as it was in its container. Irrigation basins will be formed around the base of each planting. Basins will be a minimum of three feet wide and have a ridge not less than four inches. Container

plants will be planted in ecologically appropriate locations throughout the site and as directed by the Restoration Ecologist.

4.12 Seeding Methods

Seeding with native propagules will be performed after nonnative plant control, earthwork, installation of structural habitat features, and container plant installation has been completed. Due to the heavy infestation of weeds throughout the majority of the site, a delay of one season prior to seeding is proposed. The first year following planting typically involves some replacement planting, intensive weeding efforts, and fine adjustments to the irrigation system. Because of the high foot-traffic that is anticipated, seeding will occur the fall following plant installation. Native seed mixes will be applied using methods appropriate for each location throughout the site. For example, hydroseeding will be used in large expansive areas that are easily accessible for a hydroseed rig. For areas that have an abundance of well-established native habitat, or cannot be accessed by the hydroseed rig, hand seeding will be employed. Hand seeding will be completed with hand-crank spreaders or simply by-hand. The use of a dispersal agent is not necessary, however if rice hulls or wheat bran are used then they must be free of exotic seeds. If a dispersal agent is used, a certification or statement from the vendor will be submitted to the Restoration Ecologist for approval prior to commencing with seed application. Seed will be installed between October 1 and November 30 in order take advantage of natural rainfall throughout the wet season.

4.13 Erosion Control Measures

All proposed mitigation areas are located within floodplains and may be susceptible to flooding and erosion during stormwater events. Erosion control measures shall be installed and maintained per applicable permit conditions (i.e., Storm Water Pollution Prevention Plan) and as appropriate and practicable to avoid increased erosion and/or sedimentation. Best Management Practices (BMPs) may include one or more of the following techniques: fiber rolls, jute netting, silt fencing, and straw or willow wattles. All materials shall be weed-free and subject to approval by the Restoration Ecologist prior to purchase and/or installation. Silt fencing will be monitored regularly and removed or replaced prior to the point when its integrity is compromised (i.e., pieces begin to shred and break off). Straw wattles with plastic mesh will only be used as a temporary measure and must be removed once erosion control is no longer needed.

4.14 Biological Monitoring

Biological monitoring will be performed when mitigation activities are conducted during the breeding bird season (typically from February 15 through September 15) to prevent Project-related impacts to birds nesting within the work areas or immediately surrounding areas, in accordance with the Migratory Bird Treaty Act (USFWS 1918, as amended). Raptors can begin breeding activity, including nesting building, as early as December. A survey for nesting raptors should be conducted in work areas adjacent to mature oaks, eucalyptus, and riparian trees prior to restoration activities that produce noise. In certain cases, it will be necessary to establish a no-work buffer. Monitoring will also be performed if detection of a special-status species is located within or immediately adjacent to work areas and there is a potential for Project-

related impacts to occur to that species. A qualified biologist will perform the biological monitoring to ensure Project-related impacts do not occur to these sensitive biological resources. The biologist will also help enforce the regulations and recommendations pertaining to biological resources in the Project permits and agreements in order to maintain Project compliance with these documents. A daily monitoring log will be maintained, and the biologist will record all wildlife species, with special attention paid to special-status species, and construction activities monitored each day. The biologist will communicate with the appropriate Project personnel regarding the planned activities and any noncompliance issues observed during monitoring.

4.15 120-Day Plant Establishment Period

Following the installation of container plants, the Restoration Ecologist will perform an inspection of the mitigation areas. During the inspection, the Restoration Ecologist will document any issues or outstanding items that need to be addressed by the Restoration Contractor. Once the Restoration Contractor has addressed any issues or outstanding items, the Restoration Ecologist will prepare an As-Built Plan and notify LACFCD and regulatory agencies that initial mitigation activities have been completed in accordance with all applicable plans and permits. At this point, the 120-day Plant Establishment Period (PEP) will commence.

During the 120-day PEP, the Restoration Contractor will provide regular maintenance of all mitigation areas. Maintenance will include tasks such as inspection of irrigation system, nonnative plant control, erosion control, pest control, dead plant replacement, and trash removal. The contractor will make general irrigation system checks once a month during this period.

During the 120-day PEP, the Restoration Ecologist will visit each site at least once per month to conduct horticultural assessments. During these assessments, the Restoration Ecologist will record moisture levels, condition of planted areas, erosion issues, signs of herbivory, insect damage or disease, and signs of anthropogenic disturbance. Photo documentation will occur from permanently established points. The Restoration Ecologist will prepare an e-mail memorandum for LACFCD after each site visit to provide a summary of restoration site conditions, recommended remedial measures if problems arise, and the results of any remedial work performed by the Restoration Contractor. Three weeks prior to the end of the 120-day PEP, a site walk will occur so that a punch-list of outstanding items can be prepared. The Restoration Contractor will have to address all items on the punch-list within the next three weeks following the site walk. At the end of the 120-day PEP, a final site walk will occur with LACFCD, the regulatory agencies, and the Restoration Ecologist to verify all punch-list items have been addressed by the Restoration Contractor. If there are still outstanding items identified during the final site walk, the Restoration Contractor will have an additional two weeks to complete those items. The Restoration Ecologist will verify when outstanding items are completed and will notify LACFCD and regulatory agencies that the 120-day PEP is complete and request approval to enter into the 10-year maintenance and monitoring period.

4.16 Avoidance Measures

4.16.1 Contractor Education

An on-site, pre-construction meeting will be held prior to the commencement of restoration activities to identify sensitive areas and other sensitive resources that may be within or adjacent to the Project areas. All personnel working on the Project will attend at least one contractor education session that will be presented by the Restoration Ecologist or another authorized biologist working on the Project. Contractor education will include topics such as roles and authority of the Biological Monitors, location of designated access routes, special status species that have the potential to occur within or near the Project area, what to do if a special status species is seen, limits of work, and permit obligations. The Restoration Ecologist will provide a copy of this Mitigation Work Plan and any pertinent landscape construction documents to each contractor, along with copies of pertinent resource agency permits.

4.16.2 Preparation of a Nesting Bird Management Plan

A site-specific Nesting Bird Management Plan will be prepared that includes detailed methodologies and definitions that will allow a qualified biologist to monitor and implement nest-specific buffers based on topography, vegetation, species, and individual bird behavior. A Nest Log will be developed that will allow the tracking of each active nest and the ultimate outcome. This plan will be implemented to ensure the protection of common and sensitive bird species during construction and mitigation activities that occur are conducted in the breeding season.

4.16.3 Nesting Bird Surveys

4.16.3.1 Pre-Construction Nesting Bird Surveys and Monitoring

If vegetation removal, mitigation implementation, or maintenance activities are conducted during the nesting bird season (March 15 through August 31), pre-construction nesting bird surveys will be conducted within one week prior to the start of the activities. A minimum of three surveys will be conducted on separate days to determine if least Bell's vireos or southwestern willow flycatchers are nesting within 300 feet of Project boundary with one survey being conducted one-day prior to the initiation of the activities. If no nesting activities are observed within 300 feet of the Project boundary, then vegetation removal, mitigation activities, or maintenance will be allowed to commence. If least Bell's vireo or southwestern willow flycatcher are observed nesting within the 300 feet, then nest monitoring will be initiated, and vegetation removal or other work activities will not be allowed to occur within 300 feet of the nest until the nesting cycle is completed or if the nest fails, as determined by qualified biologist. The qualified biologist will report the results when the nest is either completed or it fails to the USFWS and work will not be allowed to proceed within the 300-foot nesting buffer until the USFWS provides their approval to proceed. The biologist conducting the survey will be a trained ornithologist with at least 40 hours of supervised experience locating vireo and mapping locations in the field. The biologist conducting surveys for southwestern willow flycatcher must hold the appropriate permits to conduct surveys for this species. If nest monitoring is required, then the biologist who conducts the monitoring must hold the appropriate permits to conduct nest monitoring for least Bell's vireo and southwestern willow flycatcher.

The resumes for the biologists and monitors will be submitted to the USFWS for approval at least 7 days prior to initiation of surveys.

4.16.3.2 Periodic Nesting Bird Surveys

Periodic nesting bird surveys will be conducted in adjacent habitat during construction, mitigation implementation, and annual maintenance activities occurring during the breeding bird season. If an active bird nest is found, then the appropriate buffer, which has been identified in the Nesting Bird Management Plan, will be established and the nest will be monitored until the nesting cycle is either completed or the nest fails.

4.16.3.3 Noise Monitoring

Noise levels will be monitored during construction, mitigation implementation (when mechanical equipment is used), and annual maintenance activities occurring during the breeding season of the least Bell's vireo and southwestern willow flycatcher (March 15 through September 15). Construction noise levels will be restricted to below 60 dBA Leq hourly at 100 feet from areas occupied by the vireo. The biological monitor will conduct surveys for least Bell's vireo and southwestern willow flycatcher twice weekly in areas of suitable habitat within 500 feet of proposed activities to determine the presence of nest building activities, egg incubation activities, or brood rearing activities. If vireos or flycatchers are present, noise monitoring will be conducted weekly and will demonstrate that noise levels are less than 60 dBA Leq hourly at specified monitoring locations, no less than 100 feet from the active nest(s) as determined by the biological monitor. Weekly survey reports will be prepared during the nesting season and sent electronically to the USFWS each week that vireos or flycatchers are detected. The weekly reports will identify the location of vireo and/or flycatcher nest areas and territories within 500 feet of the Project.

4.16.4 Focused Surveys for Slender-horned Spineflower

Presence-absence surveys for the slender-horned spineflower (*Dodecahema leptoceras*) will be conducted during the appropriate blooming period (April through June) each year prior to the clearing of the RAFSS habitat in mitigation areas DG-7, Dg-8, and DG-9. The LSAA issued by the CDFW includes a condition for delaying the clearing in the temporary impact areas (DG-7, DG-8, and DG-9 [and DG-3B, which is no longer a mitigation area]) until the third year of sediment removal. Therefore, surveys for slender-horned spineflower will be conducted in Years 1 and 2 of the sediment removal phase of the project.

The slender-horned spineflower is usually found in drought prone alluvial benches subject to only rare flood events and suitable habitat has generally been categorized as alluvial scrub. This habitat is found on sandy and gravelly soils in sandy wash systems where intermittent, scouring flood events occur. In general, the indicator plant associated with habitat where this species is typically found is *Lepidospartum squamatum*. The surveys will be conducted by qualified botanists/biologists who are familiar with this species. A known reference population of slender-horned spineflower will be visited by the surveyors prior to conducting the surveys in the Project area to determine the blooming status of the species. The results of the surveys will be included in the annual reports. If the slender-horned spineflower is found in the Project area, then LACFCD shall notify the USFWS immediately to determine the appropriate avoidance measures.

4.16.5 Brown-headed Cowbird Trapping

Brown-headed cowbird trapping will be conducted by a Qualified Biologist annually in the mitigation site until the performance standards for the implementation of the compensatory mitigation are achieved.

The brown-headed cowbird is a nest parasite, meaning that this species does not build its own nest or tend to its own young. Instead, female cowbirds deposit one or more eggs into a host species' nest, often removing or destroying some of the host eggs. The brown-headed cowbird has a variety of target host species and has been recorded as successfully parasitizing 144 of 220 species in whose nests its eggs have been observed (Ehrlich et al. 1988). Some host species include threatened or endangered species such as the coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher. These species also contend with habitat loss and fragmentation, thereby increasing their risk of being parasitized (Harris 1991; Laymon 1987). Although the majority (approximately 97 percent) of cowbird eggs and nestlings fail to reach adulthood, cowbird parasitism affects host species by reducing the number of successful young. Furthermore, nest abandonment by the host species results in zero production for that breeding pair and therefore the reproductive effort will be significantly lower than that of an unparasitized species (Ehrlich et al. 1988).

Brown-headed cowbird trapping will be conducted by a Qualified Biologist according to the Brown-headed Cowbird Trapping Protocol (Griffith Wildlife Biology 1994), which is the standard protocol accepted by CDFG and USFWS. However, the biologist should remain in contact with the Agencies to verify if the accepted protocol has changed and adopt any modifications. Trapping will be conducted on an annual basis or until the Agencies (as appropriate) modify the protocol and the frequency of trapping is renegotiated. Up to two traps will be set up in and around the mitigation areaa. Trap 1 should be placed in riparian and coastal sage scrub habitats while Trap 2 should be placed in cowbird foraging areas.

Traps will be placed at their trapping locations on or slightly before March 31 of each year but the actual trapping will begin on April 1. Food, water, perches, and shade will be provided inside each trap. A sign will be prominently displayed on the outside of each trap that explains the significance of the trap and urges recreational users to not tamper with the trap. At the beginning of the trapping effort, one male and two female decoy cowbirds will be placed inside the traps. By the end of the first week of April, the preferred ratio of male to female decoys will be established in each trap with at least two males for every three females (up to three males and five females). The traps will be opened on March 31 and operated every day, including holidays, until June 30. Daily servicing activities will include:

- Replenishing and/or cleaning the water source;
- Refilling the feed tray with sunflower-free seed;
- Making repairs to the traps, shade cloths, warning signs;
- Wing-clipping newly captured female cowbirds;
- Adding/removing decoy cowbirds to maintain the appropriate male to female ratio (2:3);
- Removing and releasing non-target native bird species in the traps; and

- Recording all activities and appropriate data on a data sheet.

Traps will be disassembled and returned to storage after June 30. The cowbirds not used as decoys will be euthanized or donated to university research facilities.

4.17 Additional Measures

4.17.1 Preservation of Critical Linkages and Unique Resources

Preservation of unique resources or critical wildlife linkages is an important component of the Mitigation Plan for the Project. As previously described, on-site areas will be restored to improve the function and values and result in much higher quality habitat than currently exists. Improvement of habitat in the preserved portions of Devil's Gate Reservoir will increase the value of the area as a critical linkage and will provide for additional opportunities for wildlife.

Devil's Gate Reservoir supports habitat that can potentially support eight special-status plant species and 14 sensitive wildlife species, including five listed as state and/or federal threatened or endangered species (Nevin's barberry, slender-horned spineflower, least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo). The Reservoir area provides essential habitat connectivity between Flint Wash and the Arroyo Seco located downstream of the dam, Hahamongna Watershed Park, and areas located upstream in the Angeles National Forest. The habitats in the Reservoir area and the adjacent Hahamongna Watershed Park function as a critical linkage in a highly developed area. Not only do wildlife species reside in the area but they also use the area for juvenile dispersal, seasonal migration, and home range connectivity. Improving the habitat will greatly increase the likelihood that listed species of wildlife, including least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo, will establish breeding territories at Devil's Gate or will utilize the area on a regular basis during migration or for juvenile dispersal.

4.17.2 Modification of the Trail System

4.17.2.1 Preservation of Trails

The proposed mitigation plan will be designed to maintain access to the existing and proposed formal trails within the HWPMP and the vicinity. These include:

- Altadena Crest Trail;
- North Perimeter Trail;
- Gould Canyon Trail;
- East/West Rim Trails;
- Perimeter Trail;
- Flint Wash Trail;
- Dam Observation Trail;

- Arroyo Seco Trail;
- Mountain View Trail; and
- Gabrielino Trail.

In general, the mitigation plan will be consistent with the Trail Plan of the HWPMP (Figure 2-2; Exhibit 3-8, found in the HWPMP) by keeping open the main trails that exist around the perimeter of the reservoir. However, the trail that runs along the west and south side of Johnson Field (DG-W-1) will be eliminated to accommodate re-establishment of riparian habitat in Johnson Field. Elimination of the trail will allow for the new habitat area to be contiguous with existing habitat to the west and south of Johnson Field. The trails along the north and east side of Johnson Field will remain intact.

New trails will not be established between the boundary of the permanent maintenance area and the preserved and restored habitat areas in the reservoir. The existing informal trails that cross through the mitigation areas will most likely be closed to human and equestrian use. However, LACFCD may establish future trails for educational purposes but they would either be located in non-sensitive habitat areas or would only be open in the non-breeding season to avoid impacts to nesting birds. Limiting human disturbance next to the restored and preserved areas is a critical part of the mitigation plan because the goal is to provide high quality habitat that can support a large population of sensitive bird species as other wildlife. The presence of humans and dogs in and adjacent to habitat where these sensitive bird species reside can result in nest failures and could potentially discourage wildlife from using the area.

4.17.2.2 Trail Refinement

Trails over five feet wide may be narrowed and restored along the edges with native plant species. The agencies, including the USFWS and CDFW, have requested that buffer plantings be done along trails to discourage people from going into natural areas and to create visual barriers between the trails and sensitive habitat areas. These buffer plantings will likely include plant species that will deter humans from encroaching into sensitive habitat areas, such as poison oak, cactus, and other species that may create a barrier. In addition, fencing (such as post and cable), large rocks, or other natural barriers, may be placed along the edges of narrowed trails to provide aesthetic value as well as to keep trail users on the established trails.

4.17.2.3 Trail Closures

Secondary trails within the routine annual maintenance footprint area and the proposed mitigation areas may need to be closed to discourage disturbance in the preserved and restored habitat areas. As stated previously, the goal is to preserve and restore high quality habitat areas that will support a large population of sensitive birds and other wildlife. The goal isn't to discourage people from enjoying the beauty of the area, the outdoor experience, or the wildlife that occur in the preserved and restored habitat in the reservoir. Human use of trails through sensitive habitat areas has a high potential to disturb birds and other wildlife as well as cause nest failures. By limiting disturbance by humans, the area will be much more attractive to wildlife and the potential for the successful establishment of large populations of sensitive birds will be much higher. However, as stated previously, LACFCD may establish future trails for

educational purposes but they would either be located in non-sensitive habitat areas or would only be open in the non-breeding season to avoid impacts to nesting birds.

In order to close trails, a combination of methods may be used such as signage, fencing (such as post and cable), placement of large rocks and other natural barriers, planting of selective plants at trail closure points (cactus, poison oak, wild rose, stinging nettles, and other barrier plants), using plant debris/vertical mulch to block trails, and public education (Figure 2-2).

4.17.2.4 Trail Buffer Areas

Buffers will be established along existing trails to discourage site users from entering restored or sensitive habitat areas and to provide some level of protection for wildlife utilizing habitats adjacent to trails. Plantings in buffer areas will likely consist of native plants that will help to keep trail users on the trails, including poison oak, wild rose, stinging nettles, and others that are typically found in riparian habitat areas. Buffer habitat may also be established at the perimeter of the permanent maintenance area to reduce the impacts of maintenance activities on wildlife residing in adjacent habitats.

4.17.2.5 Trails Monitoring

Monitoring of the preserved trails will be conducted on a periodic basis to identify safety issues, such as erosion or fallen trees, the integrity of signage, fencing, or other natural barriers that have been placed to keep trail users on the established, preserved trails, and the presence of trash. In addition, monitoring of closed trails will also be conducted to determine the success of trail closure methods and to repair barriers or re-evaluate trail closure methods if they are not successful. In this case, alternate methods would be developed to close trails and to educate the public about the importance of trail closure. If unauthorized trails are observed during the trails monitoring, then methods will be developed and implemented to close the unauthorized trails.

4.17.2.6 Signage

Signage will be used to identify restoration areas, trails, and off-limits areas and interpretive signs will be placed at strategic locations to inform the site users about the importance of the mitigation areas and the habitat restoration activities. The proposed sign locations are shown on Figure 2-2 and include the following areas:

- On the west side of the Arroyo Seco where the main equestrian trail crosses the channel;
- On the west side of the Arroyo Seco at the junction of the main road to the Oak Grove Park parking lot dead ends near the mining pit;
- On the southwest side of the Project Area at the overlook;
- On the east side of Devil's Gate Dam where the access road enters the Reservoir;
- On the east side of the Reservoir near the location of the Lower Altadena Drain; and,
- On the east side of the Arroyo Seco adjacent to the mitigation area in Johnson Field.

LACFCD will work with the City to establish consistent interpretive signage and other signage for the sediment removal Project and the restoration areas. The proposed signage plan will be consistent with the City's current standards. The signs will be installed within 60 days of Project initiation.

4.17.3 Public Education and Outreach

Public education and outreach is an essential component of the Mitigation Plan because the reservoir area is highly used by the public and it is an important natural area that is enjoyed by site users. LACFCD understands the importance of the area and that it is highly valued by hikers, bird watchers, equestrians, and other interested user groups. In addition, LACFCD also realizes the importance of the site users as stewards of the site and will work with the City and site users to identify issues or problems at the site, such as blockages of preserved trails by fallen trees, erosion of preserved trails, or trash dumping. Periodic presentations and updates will be provided to the agencies, the City, and to advisory groups, such as the Arroyos & Foothills Conservancy and the Altadena Crest Trail Restoration Working Group and the local community, to brief them on the ongoing restoration activities and the status of the Project.

Other community outreach opportunities may include involving school groups or participants in the Tom Sawyer Camp with habitat restoration activities, wildlife inventories, nature walks, or trails cleanup. The program would be developed with input from the City, the community, and site users. Students would be encouraged to fulfill their requirements for volunteer activities through assistance with tasks such as trails cleanup, for example.

Additional outreach opportunities might include hiring staff from the local workforce to assist with invasive plant removal, trash removal, and other habitat restoration activities and maintaining public education signage. This program would need to be developed but hiring local people would help support the City and its residents.

4.17.4 Trash Removal

Trash removal will be conducted on a periodic basis along trails and where necessary in the preserved habitat areas. The monitoring of the trails and monitoring conducted in the restoration areas will identify problem areas where trash may need to be removed. In addition, LACFCD will work with the City to provide covered trash containers at strategic locations to encourage site users to place their trash in containers as opposed to on the ground. A regular program of emptying the trash containers will be implemented.

4.17.5 Installation of Trash Entrapment Device at West Altadena Storm Drain

LACFCD will work with the City to develop and implement a plan to install and maintain a trash entrapment device at the West Altadena Storm drain. A significant amount of trash enters the Arroyo Seco from surrounding communities and particularly at the West Altadena Storm drain. Entrapment and removal of the trash before it enters the Arroyo Seco will decrease the total amount of trash that ends up in the downstream areas and will greatly improve the water quality.

4.17.6 Vector Control

LACFCD will work with the City and San Gabriel Valley Mosquito and Vector Control District (Vector Control) to develop and implement a vector control program on-site. Standing water is not a goal of the restoration activities in the mitigation areas. However, there is a potential that low spots may naturally develop and temporarily hold water in some of the mitigation areas. LACFCD has an on-going contract with Vector Control to treat their facilities to control the mosquitos and to minimize the spread of disease via mosquitos and other vectors. Vector Control will utilize control methods that are safe in areas where sensitive or listed species of aquatic and terrestrial wildlife occur to avoid harming those species, including the least Bell's vireo. Vector Control will not be allowed to cut any vegetation to gain access to areas that need treatment. The LACFCD will ensure that low areas that temporarily hold water are accessible to Vector Control so they can treat the areas for mosquitos and other vectors without the need to cut vegetation and to avoid harming sensitive wildlife. The LACFCD will coordinate with Vector Control to determine a schedule for when they would plan to do treatments in the mitigation site. If treatments are scheduled to occur during the breeding season, then Vector Control will be required to contact the LACFCD prior to entering the mitigation site. The LACFCD will request a map of the locations where Vector Control is planning to conduct treatments to determine if the areas are located near active nests or if the Vector Control staff will have to traverse areas where active nests are located. If so, the LACFCD will arrange to have a Qualified Biologist who is familiar with the active nest locations, accompany the Vector Contol staff to and from the areas where the treatments need to be conducted.

5.0 DETERMINATION OF CREDITS AND PROPOSED MITIGATION

5.1 USACE Jurisdictional Areas

5.1.1 Impacts and Compensatory Mitigation

The on-site compensatory mitigation for this Project will restore function of the reservoir site through re-establishment, rehabilitation, and enhancement of wetland and non-wetland WOUS and enhancement of non-WOUS buffer habitats. Table 5.1 lists the acres and linear feet of permanent and temporary impacts resulting from the Project to non-wetland WOUS and the acres of permanent and temporary impacts to wetlands under the jurisdiction of the USACE. The total impacts to wetland and non-wetland WOUS resulting from the Project is 34.15 acres, which includes 1.52 acres of wetlands and 32.63 acres of non-wetland WOUS.

Table 5.1. Total Acres and Permanent and Temporary Impacts to USACE Jurisdictional Areas

Features	Total USACE Jurisdiction (acres)	Permanent Impact	Temporary Impact	Side Slopes (Permanent)	Total Impacts	*Acreage of Avoided Impacts*
Non-Wetland Waters	45.86	16.80	13.14	2.69	32.63	*13.23*
Linear Feet	**20,026**	**4,758**	**1,066**	**203**	**6,027**	***13,999***
Wetlands*	3.62	0.81	0.00	0.71	1.52	*2.10*
TOTAL*	**49.48**	**17.61**	**13.14**	**3.40**	**34.15**	***15.33***

*Total does not include linear feet and differences in totals from other tables is due to rounding

Impacts to resources that are jurisdictional to USACE will be offset through re-establishment, rehabilitation, and/or enhancement of 12 mitigation areas and 10 riparian and upland buffer areas, all of which are located within the reservoir and immediately adjacent to the reservoir. Each of the mitigation areas are shown on Figure 2-1. Table 5.2 lists the proposed acres of on-site compensatory mitigation for impacts to wetlands and non-wetland WOUS and the associated mitigation methods.

Table 5.2. Acres of On-Site Compensatory Mitigation and Mitigation Methods

Features	Re-Establishment	Rehabilitation	Enhancement	Total
Wetlands	0.00	2.13	0.00	2.13
Non-Wetland WOUS	4.62	1.35	2.39	8.36
Total WOUS:	**4.62**	**3.48**	**2.39**	**10.49**

The Project will impact 1.52 acres of wetlands, which only includes permanent impacts and the proposed compensatory mitigation will result in a total of 2.13 acres of jurisdictional wetlands that will be protected in perpetuity. This includes the rehabilitation of 2.13 acres of wetlands within the jurisdiction of the USACE (DG-W-2).

The Project will also impact 32.63 acres of areas considered non-wetland WOUS, which includes 19.49 acres of permanent impacts and 13.14 acres of temporary impacts. The on-site compensatory mitigation for impacts to non-wetland WOUS includes the re-establishment of 4.62 acres, rehabilitation of 3.48 acres, and enhancement of 2.39 acres of non-wetland WOUS for a total of 8.36 acres.

The total on-site compensatory mitigation proposed for impacts to wetlands and non-wetland WOUS is 10.49 acres. The re-establishment, rehabilitation, and enhancement of wetland and non-wetland WOUS will greatly improve the functions of the mitigation areas by:

- Improving wetlands functions in degraded and disturbed wetlands areas;
- Improving water quality;
- Reconnecting drainages that were cut off by sediment deposition after the Station Fire and by human intervention;

- Removing trash;
- Removing an extensive invasion of nonnative and invasive species;
- Enhancing with native riparian plant species; and,
- Improving habitat for a wide diversity of wildlife species.

Additional on-site compensatory mitigation proposed for impacts to wetlands and non-wetland WOUS includes improvements to the functions of riparian and upland buffer habitats located immediately adjacent to the compensatory wetlands and non-wetland WOUS mitigation areas. Table 5.3 lists the acres of the riparian and upland buffer habitats that are also proposed as compensatory mitigation to offset the impacts to wetlands and non-wetland WOUS. A total of approximately 52.79 acres of riparian and upland buffers are proposed as additional compensatory mitigation to offset Project impacts. Approximately 40.57 acres of non-WOUS, riparian buffer areas will be improved through rehabilitation (5.72 acres) and enhancement (32.23 acres) activities. In addition, approximately 4.88 acres of upland buffer areas will also be improved through enhancement activities. These buffers will serve as visual and vegetated barriers between both wetland and non-wetland WOUS mitigation areas and adjacent trails, development, and human activities. In addition, the enhancement of these buffer areas will greatly improve the quality of the habitats by removing nonnative and invasive species and planting of additional native plant species.

Table 5.3. Acres of On-Site Mitigation Buffer Habitat

Buffer Type	Re-establishment	Rehabilitation	Enhancement	Buffer	Total
Riparian Buffer Areas	0.00	5.72	32.23	2.62	40.57
Upland Buffer Areas	0.00	0.00	4.88	0.00	4.88
Side Slope Buffers	0.00	7.34	0.00	0.00	7.34
Total Buffer Areas	**0.00**	**13.06**	**37.11**	**2.62**	**52.79**
Temporary Impact Areas	16.17	0.00	0.00	0.00	16.17
Total Buffer - Temporary Impact Areas	**16.17**	**13.06**	**37.11**	**2.62**	**68.96**

To offset the temporal loss of habitat, implementation of the habitat restoration activities on a portion of the mitigation areas will be implemented prior to the Project implementation. The impacts to the temporary impact areas (DG-7, DG-8, and DG-9) will be delayed until the final year of sediment removal and then these areas will be replanted with native vegetation shortly thereafter to minimize temporal impacts. Additional measures that will be implemented to reduce impacts and increase function in the mitigation areas include: closure of unnecessary trails, planting of plants in buffers adjacent to permanent trails that will deter human encroachment, and placement of woody debris to increase structural diversity and to provide additional refugia for wildlife and catchment sites for plant seeds. Improvements to mitigation areas located within the buffer habitat will help protect the compensatory mitigation areas from human impacts, invasion by exotic and/or invasive plant species, and provide higher quality contiguous habitat between open space areas for wildlife shelter and movement throughout the region.

The side slopes of the Permanent Maintenance Area (7.34 acres) will be replanted with native vegetation, including shrub and annual species associated with riparian and RAFSS vegetation communities. In addition, mulefat will be allowed to grow on the side slopes to provide foraging habitat for least Bell's vireo and other wildlife species. The side slopes will be seeded and then allowed to grow naturally with only maintenance to control nonnative species. The side slopes may be periodically affected by recontouring if large sediment deposits bury portions of the side slopes. In this case, the sediment will be removed, and the side slopes will be recontoured and allowed to naturally revegetate.

5.1.2 Pre- and Post-Project Onsite Jurisdictional Areas Comparison

Table 5.4 includes a comparison of the pre- and post-Project acres of onsite wetland and non-wetland WOUS. The post-Project anticipated jurisdictional areas are shown on Figure 3-5 and they include the compensatory mitigation areas where the wetland and non-wetland WOUS will be re-established, rehabilitated, and enhanced as well as the upstream areas between the Permanent Maintenance Area boundary and the Initial Sediment Removal Area that are within the banks of the Arroyo Seco. The locations of wetland and non-wetland WOUS within the side slopes are also shown on the figure even though the USACE considers the side slopes as a permanent impact area. The flows paths from wetlands and non-wetland WOUS located outside of the side slopes will continue in their current or similar locations after the side slopes are formed. The LACFCD will monitor and repair erosion of the side slopes as necessary but flows will re-establish after any side slope repairs are completed. The pre-Project jurisdictional areas were delineated without the boundaries of the entire reservoir and were not separated into the various component areas of the Project. As a result, an N/A (Not Applicable) was listed in the table for the pre-Project wetlands and non-wetland WOUS within the potential and side slope areas.

Table 5.4 Comparison of Pre- and Post- Project Onsite Acres of USACE Jurisdictional Areas

Features	Pre-Project Jurisdictional Areas	Post-Project Anticipated Jurisdictional Areas
Non-wetland WOUS	45.86	32.83
Wetlands WOUS	3.62	2.14
Total Wetland and Non-wetland WOUS	**49.48**	**34.97**
Potential Non-wetland WOUS*	N/A	41.23
Total Potential Wetland and Non-wetland WOUS*	**N/A**	**41.23**
Wetlands WOUS (Side Slopes)	N/A	0.71
Non-wetland WOUS (Side Slopes)	N/A	2.69
Total Wetland and Non-wetland WOUS (Side Slopes)	**N/A**	**3.40**
GRAND TOTAL:	**49.48**	**79.60**

*Potential non-wetland WOUS includes areas where the natural flows will create channels that would be considered non-wetland WOUS and these flowpaths may naturally migrate through the area depending upon flows

5.1.3 Off-Site Compensatory Mitigation

Table 5.5. lists the mitigation actions and the corresponding "Uniform Re-establishment" Credits and preservation credits generated by the actions. Detailed information on the off-site mitigation at the Peterson Ranch property is included in Appendix A..

Table 5.5. Off-Site 404 Mitigation Types and Credits as Permittee-Responsible Compensatory Mitigation

Updated Credits for Devil's Gate PRM	Acres	Uniform Re-establishment Credits	Preservation Credits
404 Jurisdictional Areas			
Wetland Riparian Enhanced	17.40	4.35	
404 Jurisdictional Total	17.40	4.35	
404 Buffer Areas			
Wetland Riparian Riparian Buffer Re-established	0.07	0.02	
Wetland Riparian Riparian Buffer Enhanced	7.81	1.56	
Wetland Riparian Upland Buffer Preserved	5.94		5.94
404 Buffer Total	13.82	1.59	5.94
Total*	**31.23**	**5.94**	**5.94**

*summing discrepancies due to rounding.

5.1.4 Onsite Compensatory Mitigation Checklists

For the purposes of Clean Water Act Section 404 permitting, the proposed replacement ratios will be based on the results of the USACE South Pacific Division (SPD) compensatory mitigation ratio checklist. However, the ratio may be revised pending USACE review. The completed checklists are included in Appendix K.

5.2 Beneficial Impact of the Proposed Mitigation

The proposed on-site compensatory mitigation for the Project includes a comprehensive approach to managing the habitats in the Devil's Gate Reservoir for the protection of the compensatory mitigation areas and for the benefit of wildlife species that utilize the area. This comprehensive approach includes the habitat restoration activities that will result in a net gain in higher quality riparian habitat and higher functioning wetlands and non-wetland WOUS as well as the implementation of additional measures designed to improve and protect the mitigation areas for the long-term. The habitats in the reservoir will be improved through the removal of the extensive infestation of nonnative and invasive plant species and the restoration of a multi-layered native riparian canopy and understory, as well as the restoration of CSS and RAFSS. In addition, woody debris piles will be placed at strategic locations in the compensatory mitigation areas to provide additional structural diversity as well as to provide refugia for wildlife and catch sites for seeds. Additional measures will include closing of trails and actively managing human access through the use of trail closures and redirection, trail designations, public outreach and education, trash removal, and monitoring of human impacts. Focused surveys for listed species of wildlife will also be implemented to monitor the usage of the reservoir as a whole by listed species. Monitoring of the

progress of the habitat restoration at the compensatory mitigation areas will continue until the areas meet the performance standards and then long-term monitoring and management will be implemented to identify problems that may require the implementation of adaptive management measures. The goal of the comprehensive approach to managing the habitats in the reservoir is to greatly increase the suitability of the area to support listed wildlife species for the long-term. At present, very little of the habitat in the reservoir is suitable for listed species of birds due to the presence of an abundance of invasive and nonnative plants and a lack of structural diversity that is preferred by the species. Improving the habitat and restoration of additional habitat will provide higher quality habitat that can support an abundant population of least Bell's vireos, southwestern willow flycatchers, western yellow-billed cuckoos, and other sensitive species while also providing an important migration stopover and wildlife movement corridor in a highly urbanized area. Keeping human impacts on established trails located outside of the sensitive habitats will also benefit the wildlife species and will help to reduce disturbances to listed bird species. An ongoing weed and invasive plant management program will ensure that the habitat won't become degraded and will remain a functional habitat area for the long-term. Implementation of the compensatory mitigation program and the long-term protection of the habitats in the reservoir will result in a beneficial impact of the Project.

The proposed off-site compensatory mitigation for the Project will result in the re-establishment, rehabilitation, and enhancement of wetland and non-wetland WOUS and important riparian and upland buffer habitats. The location of the off-site compensatory mitigation project is in an area heavily used by wildlife for migration. The re-establishment, rehabilitation, and enhancement of habitats will create additional opportunities for wildlife that don't currently exist in the immediate area. Wildlife will be able to use the habitats in the mitigation site for foraging, water resources, cover, nesting, and migration.

6.0 DESCRIPTION OF SITE PROTECTION INSTRUMENT

Long-term protection of the on-site mitigation areas identified in this HMMP will be determined and agreed upon between LACFCD and the USACE. LACFCD has obtained written concurrence that the City recognizes the mitigation areas proposed by LACFCD within Devil's Gate Reservoir will be compensatory mitigation for the Project under the requirements of the Section 404 Permit (SPL-2014-00591), the CDFW Lake or Streambed Alteration Agreement (1600-2015-0263-R85), the CDFW Incidental Take Permit (2081-2016-031-05), and the RWQCB Section 401 Certification (15-053), as detailed in the City's letter dated June 19, 2018 (Appendix L).

The on-site mitigation areas are within Devil's Gate Reservoir, which is part of the City's Hahamongna Watershed Park. The City is the sole owner of the underlying property of the mitigation areas and LACFCD holds property rights over the reservoir and all mitigation areas as recorded through easements granted in May of 1919 and March of 1965. The City, in collaboration with LACFCD, recognizes the value of the mitigation areas to the Hahamongna Watershed Park.

LACFCD has held property rights over the reservoir since May 1919 when it was granted its first easement by the City of Pasadena to construct and maintain the dam, spillway, tunnels, and appurtenances. It was later provided an additional perpetual easement in March 1965. These easements have granted LACFCD the right to operate and maintain the dam and reservoir. This included the right to construct, reconstruct,

inspect, maintain, repair and operate a dam, spillway, reservoirs, tunnels, bypasses, channels, embankments, protection works, and appurtenant structures. The proposed compensatory mitigation area will be located within the reservoir, within LACFCD's perpetual easement. LACFCD is committing to perform the compensatory mitigation and to maintain it in perpetuity, as detailed in this HMMP.

In addition, the City has been working for decades to implement policies to protect and enhance the natural character of this alluvial canyon and its rich riparian and stream zone habitats through major community-based planning efforts. The City has adopted numerous policy documents relevant to Hahamongna Watershed Park, such as the Hahamongna Watershed Park Master Plan (2003), Hahamongna Watershed Park Master Plan Addendum for the Hahamongna Annex (2010), and Open Space & Conservation Element of the General Plan (2012).

These documents commit the City to protect native habitats and conserve and protect the natural resources of the Arroyo Seco. The adoption in 2003 of the HWPMP was the culmination of a five-year community planning process with extensive participation from the LACFCD. The HWPMP is the central guiding document for the City's planning for this area. The proposed compensatory mitigation areas have a General Land Use designation of Open Space and are zoned Open Space under the City Open Space & Conservation Element of the General Plan. One of the main goals for the Arroyo Seco under this plan is to "Preserve, restore and maintain the natural character of the Arroyo Seco as self-sustaining healthy ecosystems of plants and animals."

LACFCD, at the Administrative and staff level, has been working with the City in its development of these policy documents and will continue to work closely with the City to ensure future updates to these plans are consistent with the current planned mitigation area. LACFCD has collaborated with the City to determine the most suitable restoration areas and ensure that the proposed mitigation areas are consistent with goals of the HWPMP and the General Plan, including:

- Protecting and enhancing the Hahamongna Watershed Park wildlife corridor linkages to the upper watershed and the downstream reaches of the Arroyo Seco.
- Rehabilitating, enhancing, and reestablishing the historical native plant communities of the Arroyo Seco.
- Developing a grading plan that allows habitat restoration and recreational activities to coexist with flood management and water conservation.

LACFCD will also coordinate with the City as the City develops specific future projects within the Hahamongna Watershed Park to ensure consistency with the mitigation area.

LACFCD plans to re-establish, rehabilitate, and enhance wetland and/or non-wetland WOUS in the on-site mitigation areas. In addition, LACFCD plans to re-establish and enhance riparian and upland buffer habitat within Hahamongna Watershed Park. The mitigation areas will provide a significant increase in the quality of habitat for numerous wildlife species that may occur in the area, including the state and federally protected least Bell's vireo.

The Hahamongna Watershed Park is a valued recreational facility and the mitigation areas are designed to be consistent with the City's planned recreational uses. The mitigation strategy proposed by LACFCD includes a number of measures designed to reduce the impacts of human presence on the mitigation areas and to protect the wildlife that reside in the habitats. The measures include closures of unnecessary trails, planting of native barrier plants along trails to buffer sensitive habitat areas, placing woody debris at strategic locations in mitigation areas to increase functional value, removing trash, and conducting educational outreach. These measures in combination with the restoration and enhancement of habitats will greatly increase the function and the amount of suitable habitat for wildlife.

The on-site mitigation areas will be protected by LACFCD for the long-term and will be maintained and monitored by LACFCD to ensure the established performance standards are met. In order to protect and maintain the natural condition of the mitigation areas, it is the understanding of LACFCD with cooperation from the City that LACFCD will:

- Undertake all reasonable measures to discourage actions by persons that would be inconsistent with the natural condition and objectives of the mitigation areas;
- Cooperate with USACE, CDFW, and RWQCB in the protection of the natural condition of the mitigation areas;
- Undertake construction, maintenance, and monitoring of the approved HMMP on the mitigation areas; and
- Erect signs and other notification features designed to limit access to the mitigation areas or uses of the mitigation site that are not consistent with the permitted uses of the mitigation.

The proposed HMMP is consistent with the City's General Plan and the HWPMP and the City's future plans for Hahamongna Watershed Park. The City Council has taken two separate actions to remove two athletic fields from the adopted HWPMP. The northernmost field was eliminated by the City Council in 2010 and the City Council directed staff to keep the area natural and as is. The Sycamore Grove Field was also removed by the City Council and the funding for the implementation of that field was assigned to an alternate field location at Muir High School (Rosa Laveaga, Email Communication 5-2-18). The City is committed to assisting LACFCD in its efforts to ensure that the conservation values of the mitigation areas are protected.

Although the maintenance responsibility for the mitigation area belongs to LACFCD, the City has indicated that it would undertake all reasonable measures to discourage actions by persons that would be inconsistent with the natural condition and objectives of the mitigation site and to cooperate with other agencies to protect the natural condition of the mitigation site. LACFCD will work with the City to protect the mitigation area and help to ensure the successful development and long-term presence of the mitigation area. This will entail efforts such as communicating when maintenance activities will be conducted by LACFCD, the possible addition of signage within the Hahamongna Watershed Park for the protection of the mitigation area, addition of exclusionary obstacles to discourage or prevent entrance into the mitigation area, and even law enforcement actions, if warranted to protect the site.

The compensatory mitigation for the Project includes proposed on-site habitat restoration within the Devil's Gate Reservoir. The proposed on-site mitigation area is directly adjacent to the proposed impacts and future annual maintenance area. The mitigation area was selected based on watershed needs, likelihood for ecological success, sustainability, as well as consistency with other local and resources agencies' plans for the area. Since the watershed is heavily developed and water in this region is scarce, the project site provides the best option for sustaining long-term habitat restoration.

This proposal is consistent with the ongoing USACE Arroyo Seco Ecosystem Restoration Feasibility Study of which LACFCD is a local partner. This proposal is also consistent with the City of Pasadena (City) Hahamongna Watershed Park Master Plan (Master Plan) and the City's Open Space designation.

LACFCD is currently a partner with USACE to complete the Arroyo Seco Watershed Ecosystem Restoration Feasibility Study (Study). The purpose of the Study is to evaluate opportunities for restoring ecosystem function along the 11-mile reach of the Arroyo Seco. Due the proposed Project and associated mitigation within Devil's Gate Reservoir, USACE excluded Devil's Gate Reservoir from the limits of the Study.

The Arroyo Seco watershed is currently suffering from a variety of water resource and related land resource problems. Without significant human efforts to restore the watershed conditions in the Arroyo Seco, they are likely to worsen. The on-site habitat restoration will benefit the watershed as a whole, which is consistent with the USACE watershed approach to support sustainability or improvement of aquatic resources in a watershed (33 CFR 332.2). The on-site mitigation will benefit the watershed and offset losses of aquatic resource functions caused by the Project activities.

The proposed on-site mitigation area is within the Devil's Gate Reservoir, which is jurisdictional to CDFW. Under Section 1602 of the California Fish and Game Code (CFGC), CDFW regulates activities that would divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. CDFW has jurisdiction over riparian habitats (e.g., southern willow scrub) associated with watercourses. Jurisdictional areas are generally delineated by the outer edge of riparian vegetation or at the top of the bank of streams or lakes, whichever is wider.

In the case of Devil's Gate Reservoir, the entire reservoir below the elevation of the crest of the dam (1070 feet above mean sea level) is within the CDFW jurisdiction. Per Fish and Game Code, Section 1602, "An entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake" prior to notifying CDFW. Should any entity propose a conflicting action within the on-site mitigation area, that entity would be required to notify CDFW. Per CFGC Section 1603(a), "After the notification is complete, the department shall determine whether the activity may substantially adversely affect an existing fish and wildlife resource." If the proposed activity would negatively affect the restored habitat area, CDFW would not issue an agreement for the proposed activity.

Similarly, much of the proposed on-site mitigation area is within waters of the United States, jurisdictional to USACE. If any activity was proposed within the waters of the United States within Devil's Gate Reservoir, a permit would be required pursuant to Section 404 of the Clean Water Act. Any proposed development within this mitigation area, therefore, would be specifically subject to USACE review and approval. Because such an approval would be directly inconsistent with our compensatory mitigation obligations in the 404

permit, the USACE could not issue such a permit. Thus, such regulatory requirements provide further protection to that area.

LAFCD has demonstrated success in implementing mitigation projects as well as a history of maintaining established mitigation areas. Examples include the Big Tujunga Wash Mitigation Area and the Oak Woodland Habitat Mitigation Area at the Santa Anita Sediment Placement Site. LACFCD is committed to maintaining all established mitigation sites in perpetuity.

As part of the compensatory mitigation for the Devil's Gate Reservoir Sediment Removal and Management Project (Project), the Los Angeles County Flood Control District (District) has proposed on-site habitat restoration within Devil's Gate Reservoir. The proposed on-site mitigation sites are directly adjacent to the proposed impacts and future annual maintenance area. The mitigation site was selected based on watershed needs, likelihood for ecological success, sustainability, as well as consistency with other local and resources agencies' plans for the area. Since the watershed is heavily developed and water in this region is scarce, the project site provides the best option for sustaining mitigation. This proposal is consistent with the ongoing U.S. Army Corps of Engineers (Corps) Arroyo Seco Ecosystem Restoration Feasibility of which the District is a local partner. This proposal is also consistent with the City of Pasadena (City) Hahamongna Watershed Park Master Plan (Master Plan), and the City's Open Space designation, and the City's future plans for the area.

The District is currently a partner with the U.S. Army Corps of Engineers to complete the Arroyo Seco Watershed Ecosystem Restoration Feasibility Study (Study). The purpose of the Study is to evaluate opportunities for restoring ecosystem function along the 11-mile reach of the Arroyo Seco. Due the proposed Project and associated mitigation within Devil's Gate Reservoir, the Corps excluded Devil's Gate Reservoir from the limits of the Study. The Arroyo Seco watershed is currently suffering from a variety of water resource and related land resource problems. Without significant human efforts to restore the watershed conditions in the Arroyo Seco are likely to worsen. The District maintains the position that the on-site habitat restoration will benefit the watershed as a whole, which is consistent with the Corps watershed approach to support sustainability or improvement of aquatic resources in a watershed (33 CFR 332.2). The on-site mitigation will benefit the watershed and offset losses of aquatic resource functions caused by the Project activities.

For decades, the City has implemented policies to protect and enhance the natural character of this alluvial canyon and its rich riparian and stream zone habitat through major community-based planning efforts. The City has adopted numerous policy documents relevant to HWP, such as the Hahamongna Watershed Park Master Plan (2003), Hahamongna Watershed Park Master Plan Addendum for the Hahamongna Annex (2010), and Open Space & Conservation Element of the General Plan (2012). The District has collaborated with the City to determine the most suitable restoration areas and ensure that the proposed mitigation sites are coherent with the goals of the Master Plan. Through a letter to the District, dated June 19, 2018, the City has committed to protecting the on-site mitigation areas within Devil's Gate Reservoir.

The proposed compensatory mitigation area is located within the District's perpetual Flood Control Easement on the City of Pasadena's property. The City of Pasadena is the owner of the underlying lands

within Devil's Gate Reservoir where the mitigation areas are located. The District holds a flood control easement from the City to operate the Devil's Gate Dam and the associated reservoir. LACFCD holds property rights over the reservoir and the mitigation site as recorded through easements granted in May of 1919 and March of 1965. Long-term management and oversight of the on-site mitigation will be the responsibility of the District. The perpetual easement was granted for the purposes of flood control, water conservation, and reservoir maintenance, including the right to construct, reconstruct, inspect, maintain, repair and operate a dam, spillway, reservoirs, tunnels, By-passes, channels, embankments, protection works, and appurtenant structures for the purpose of controlling, confining, storing and conserving water.

A Long-Term Management Plan (LTMP) is currently being prepared pursuant to 33 CFR 332.7(d)(2). For the on-site mitigation area, the LTMP will serve an alternative to an Integrated Natural Resource Management Plan (INRMP). Per 33 CFR 332.7(a)(1), "For government property, long-term protection may be provided though federal facility management plans or integrated natural resource management plans."

The proposed on-site mitigation area is within the Devil's Gate Reservoir, which is jurisdictional to the California Department of Fish and Wildlife (CDFW). Under Section 1602 of the California Fish and Game Code (CFGC), CDFW regulates activities that would divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. CDFW has jurisdiction over riparian habitats (e.g., southern willow scrub) associated with watercourses. Jurisdictional areas are delineated by the outer edge of riparian vegetation or at the top of the bank of streams or lakes, whichever is wider. In the case of Devil's Gate Reservoir, the entire reservoir below the elevation of the crest of the dam (1070 feet above mean sea level). Per Fish and Game Code, Section 1602, "An entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake" prior to notifying CDFW. Should any entity propose a conflicting action within the on-site mitigation area, that entity would be required to notify CDFW. Per CFGC Section 1603(a), "After the notification is complete, the department shall determine whether the activity may substantially adversely affect an existing fish and wildlife resource." If the activity proposed is within an established mitigation area, CDFW would not issue an agreement for the proposed activity.

Similarly, much of the proposed on-site mitigation area is within waters of the United States, jurisdictional to the Corps. If an activity was proposed within the water of the United States within Devil's Gate Reservoir, a permit would be required pursuant to Section 404 of the Clean Water Act.

The District has demonstrated success in implementing mitigation projects as well as a history of maintaining established mitigation sites. Examples include the Big Tujunga Wash Mitigation Area and Oak Woodland Habitat Mitigation Area at the Santa Anita Sediment Placement Site. The District is committed to maintaining all established mitigation sites in perpetuity.

Since the area is government property: (1) the District has a permanent responsibility to maintain the site, (2) the District will always need to comply with environmental conditions including those for Section 404 and CFGC Section 1600, (3) the District has a longstanding productive partnership with the Corps; and (4) the District requests that the Corps accept the compensatory mitigation's long-term management plan

and the provisions in the Section 404 Permit as the appropriate available mechanism to provide long-term protection as required by 33 C.F.R § 332.3(a)(1).

The off-site compensatory mitigation site will be protected according to a Conservation Easement approved prior to, or concurrently with the permit for the Project and the CE would be separate from the approved BEI documentation. The CE would protect the conservation values of the mitigation site in perpetuity.

7.0 MAINTENANCE PLAN

At the conclusion of the 120-day establishment period, the maintenance period for the on-site mitigation areas will commence. The maintenance period is anticipated to vary between five and ten years for some of the mitigation areas as the implementation of the mitigation may be staggered due to the need to conduct multiple rounds of nonnative plant species removal in some mitigation areas. In addition, the impacts to some of the temporary impact areas may occur early in the Project implementation while others may occur near the end of the sediment removal process. The maintenance period will be clearly documented for each of the mitigation areas. Maintenance of the mitigation areas will be performed in accordance with all Project permits and requirements until established performance standards have been achieved. Maintenance tasks include, but are not limited to, irrigation, irrigation system maintenance, nonnative plant control, remedial measures, erosion control, trash removal, and site protection.

7.1 Maintenance Schedule

The timing and frequency of most maintenance tasks will be determined by site-specific conditions (e.g., nonnative plants, irrigation requirements), recommendations from the Restoration Ecologist, and established performance standards. A tentative schedule for typical maintenance tasks is provided in Table 7.1.

Table 7.1. Maintenance Schedule

Time Frame	Activity
Year 1	
Twice per month (May-Aug)	Site Irrigation
Monthly (Sept-May)	
Every two months	Irrigation System Maintenance
Quarterly (minimum) or As Necessary	Weed Abatement/Invasive Plant Control
As Required (Dec-Feb)	Supplemental plantings
As Required	Maintenance of site protection measures
Years 2-5	
As-needed	Site Irrigation*
As-needed	Irrigation System Maintenance
Quarterly or As Necessary	Weed Abatement/Invasive Plant Control
As Required (Dec-Feb)	Supplemental plantings
As Required	Maintenance of site protection measures

Table 7.1. Maintenance Schedule

Time Frame	Activity
Years 6-10 (if necessary)	
As-needed	Site Irrigation*
As-needed	Irrigation System Maintenance
Quarterly or As Necessary	Weed Abatement/Invasive Plant Control
As Required	Maintenance of site protection measures

*Irrigation will be suspended accordingly in riparian and upland sites so that these sites are off of irrigation for two years prior to being signed off as successful

7.2 Irrigation

During the first year following initial planting, container plants will be irrigated at least twice per month if the areas have not received any rain. However, the frequency of irrigation may need to be adjusted based on site conditions and climatic conditions. The Maintenance Contractor will verify that all container plantings have received sufficient water during each irrigation event. The Restoration Monitor will conduct periodic checks to also verify that sufficient water has been applied during irrigation. Following the first year of the maintenance period, the Restoration Ecologist will annually assess each mitigation area to determine whether supplemental irrigation will continue or if it is no longer required.

The Maintenance Contractor will be responsible for the regular maintenance and repair of the irrigation system. General system checks will be made at least every month from April to November, and as needed at other times of the year, to ensure the system is operating efficiently and that container plants are receiving adequate water. The restoration monitor will also verify that the irrigation system is operating correctly during periodic monitoring events. Once the Restoration Ecologist has determined that supplemental irrigation is no longer required, all aboveground parts of the irrigation system will be removed from the mitigation areas.

7.3 Nonnative Plant Management

7.3.1 Invasive Plants

All nonnative invasive plants ranked as High or Moderate in the California Invasive Plant Inventory (Cal-IPC 2006) will be controlled and suppressed during the maintenance period. A concerted effort will be made to eradicate invasive species that were present prior to implementation. Control of these species within the mitigation areas, the routine annual maintenance area, and the episodic maintenance area will be an ongoing task throughout the five to ten-year maintenance period. The management of perennial pepper weed infestations within the Reservoir will be a multi-year endeavor that will likely take five or more years to achieve adequate control. The level of effort will be determined by annual monitoring results and the current status of site performance standards. All control methods will be implemented according to requirements and restrictions addressed in the Mitigation Work Plan (Section 4.0).

7.3.2 General Weed Control

In addition to the control of all invasive nonnative plants, other nonnative annual and perennial plants will be controlled in the mitigation areas to reduce competition with natives. Hand tools, string-trimmers, and/or herbicide will be used to achieve this task with the goal of eliminating weeds before they mature and/or produce flowers. Weeds adjacent to installed container plantings and existing native plants will be removed by hand without the use of herbicide. All control methods will be implemented according to requirements and restrictions addressed in the Mitigation Work Plan (Section 4.0).

If the mitigation areas develop a dense growth of annual nonnative grasses or herbs, string-trimmers will be used to cut down plants before production of flowers. The Restoration Ecologist and Maintenance Contractor will determine whether or not follow-up application with herbicide is necessary. If flowering parts are present, all cut material will be collected, bagged, removed from the restoration site, and disposed at a local landfill.

7.4 Maintenance of the Side Slopes

The maintenance activities related to sediment removal and repair of the side slopes will only occur after large storm events that damage portions of the side slopes or when erosion compromises a section of the side slopes. The maintenance activities will be limited ot the locations where sediment has accumulated and will only consist of the removal of accumulated sediment and repair of the side slopes. The vegetation buried by sediment may be removed during recontouring. The LACFCD does not anticipate that all 7.34 acres of the side slopes will need to be repaired in the same season or that repair will be necessary on a frequent basis. The primariy purpose of the side slope maintenance is not to remove vegetation, but only to repair the sides slopes so they can revegetate with native plant species.

Regular maintenance on the side slopes will include the removal of nonnative and invasive plant species to limit the spread of these species into the mitigation site. This maintenance will be conducted at the same time that maintenance activities are conducted in the mitigation site. Maintenance will typically occur on a quarterly basis and will include the use of string-trimmers, herbicides, and hand-pulling of weeds near native plants. A Restoration Monitor will be present during the maintenance activities in the mitigation site and on the side slopes. The intended vegetation on the side slopes is a mix of riparian scrub (mulefat and other shrubby species) and RAFSS, which hwill provide foraging opportunities for least Bell's vireo and other wildlife species and will create a buffer between the annual maintenance area and the mitigation site. The Restoration Monitor will ensure that the Landscape Contractor's crew only remove plant species that are appropriate for removal (i.e., nonnative and invasive species).

If recontouring of any portion of the sides slopes is necessary, the Restoration Specialist wil evaluate the need to reseed the side slopes after the recontouring is completed. The vegetation that grows on the side slopes is expected to provide a good seed bank in the soils so after the recontouring is completed, the nonnative and invasive plant species will be controlled to allow the native plants to revegetation naturally. If the vegetation on the side slopes does not successfully germinate and grow, then reseeding of the sides slopes may be conducted. The Restoration Specialist will monitor the repaired portions of the sides slopes to evaluate if reseeding is necessary and when it would be appropriate.

7.5 Pest Control

The Restoration Ecologist and Maintenance Contractor will monitor the mitigation areas for signs of insects, diseases, or herbivory of container plants. Plants that are severely diseased or infested with insects may be removed and replaced. Although not required, if exclusionary fencing or plant cages are installed to protect container plants, they will be monitored and repaired or replaced if damaged. Existing cages around installed container plants will be removed or enlarged, as appropriate, if the plants begin to outgrow them or the Restoration Ecologist determines the plantings can survive without protection.

7.6 Supplemental Planting and Seeding

In the event established Project performance standards (e.g., native plant cover) are not being met, the Restoration Ecologist may direct the Maintenance Contractor to install additional container plants or perform additional seeding. Replacement plantings, seeding, and installation practices will follow requirements and restrictions as addressed in the Mitigation Work Plan (Section 4.0).

7.7 Trash and Debris Removal

Trash, and debris that may compromise the success of the restoration areas, will be removed from the mitigation areas, including trash brought in by storm flow, during regularly scheduled maintenance activities throughout the 10-year maintenance period. The contractor will exercise care so that trash removal activities minimize or avoid impacts to cuttings or established native vegetation in the mitigation areas. Trash will be removed from the areas and disposed of in a landfill.

7.8 Erosion Control

Erosion control measures that have been installed will be monitored and repaired throughout the maintenance period. If the Restoration Ecologist identifies any new erosion issues, additional temporary, low-impact erosion control measures may be installed. Once it has been determined by the Restoration Ecologist that there is sufficient vegetation established within the mitigation areas, the temporary erosion control devices will be removed.

7.9 Site Protection

Existing site protection (e.g., exclusionary fences, barriers, signs) will be monitored and repaired throughout the maintenance period. If unauthorized access into the mitigation areas occurs, the Restoration Ecologist will consult with LACFCD to determine if additional site protection measures are required. In addition, LACFCD will coordinate closely with the City of Pasadena to ensure that future development plans in HWP do not affect the mitigation site, either directly or indirectly. If recreational uses in the surrounding areas are negatively affecting the mitigation site, then LACFCD will work with the City of Pasadena to develop measures to elimate the negative impacts.

7.10 Tree Trimming within Existing Easements

LACFCD will coordinate with the existing easement holders about the timing and the extent of tree trimming that may be required within the existing easements. If the easement holders determine that tree

trimming is necessary during the nesting season, the LACFCD will implement all of the same mitigation measures and avoidance and minimization measures that are required during sediment removal and habitat restoration activities. These measures include pre-construction surveys, focused surveys for least Bell's vireos and other nesting birds and monitoring during construction and habitat restoration activities. The purpose of the surveys and monitoring is to ensure that least Bell's vireo and other nesting birds are not affected by any activities being conducted in the sediment removal area or the mitigation areas. In addition, monitoring during tree-trimming activities will be conducted by LACFCD to ensure that the easement holders do not affect nesting birds or do not unnecessarily damage the habitats in the mitigation site.

8.0 ECOLOGICAL PERFORMANCE STANDARDS

This section defines a set of annual performance standards, or success criteria, for evaluating the successful restoration (re-establishment, rehabilitation, or enhancement) of native habitat within the proposed on-site mitigation areas. These performance standards are observable or measurable physical, hydrological, and biological attributes that will be used to determine if the proposed mitigation areas are meeting established objectives. These standards will also be used to gauge when and to what extent remedial measures will be required to ensure the success of the areas.

The performance standards will be measured on an annual basis beginning one-year following initial mitigation activities in the mitigation areas. All mitigation areas will not be implemented at the same time based on the Project schedule. Site performance standards are dependent on the mitigation type (re-establishment, rehabilitation, or enhancement) and the target vegetation community. If the performance standards are not achieved in 5 years for the riparian mitigation areas and ten years for the upland mitigation areas, then monitoring and adaptive management measures (if applicable) will continue until the performance standards are met. Site specific performance standards and annual targets are presented in tabular format in Appendix M. Table 8.1 shows the performance standards and each standard is described briefly below.

Table 8.1 Performance Standards and Descriptions

Category	Performance Standard	Description
Physical-1	Structural Patch Richness	The site must contain target % or more of the number of structural patch types found at the selected reference site.
Physical-2	Sediment/Topographic Stability	Formation of substantial rills and gullies is minimized and normal sheet flow during inclement weather does not cause substantial sediment transport to lower elevations.
Fauna-1	Wildlife Use Monitoring	Target riparian/aquatic wildlife species present within the boundary of mitigation site, including approved buffer, equal to at least 80% of reference site by year 5.
Flora-1	Survivorship	Target survivorship of tree, shrub, and herb strata container plants. (Annually until minimum of 3 years post-irrigation success)
Flora-2	Native Plant Cover	Total cover of native species (tree, shrub, and herb strata).
Flora-3	Nonnative Plant Cover	Total cover of nonnative species (tree, shrub, and herb strata).
Flora-4	Native Plant Species Richness	Target native species richness values of tree, shrub, and herb strata.

8.1 Performance Standards

8.1.1 Physical

8.1.1.1 Structural Patch Richness

Structural patch richness is a measure of the number of different types of physical surfaces or features within a given site that may provide habitat for aquatic, wetland, or riparian species. This may include, but is not limited to debris wrack lines, cobbles/boulders, large woody debris, plant hummocks/sediment mounds, and/or standing snags. Structural patch richness will be evaluated every three years for all mitigation areas using the Riverine CRAM structural patch richness worksheet. Baseline conditions will be collected during year 1, following installation. See Section 8.1.3 below for details regarding performance standards for flora. In addition, the restoration of habitat for least Bell's vireo shall have a similar plant species diversity and structural composition as the least Bell's vireo reference site.

8.1.1.2 Sediment and Topographic Stability

Mitigation areas are meant to be graded, planted and seeded in a way that will maximize the ecological function of the site. If the surface topography is graded appropriately, rainfall will be able to infiltrate the soil and recharge mitigation areas with soil moisture. Additionally, grading of channels in appropriate locations throughout the site will convey larger volumes of runoff that originate from off site, or from sheet flow within the site. The site will be maintained and monitored so that substantial rills and gullies are not allowed to form and normal sheet flow during inclement weather does not cause substantial sediment transport to lower elevations.

8.1.2 Fauna

8.1.2.1 Wildlife Use Monitoring

The wildlife use within the mitigation areas and buffer habitats will be determined through a series of general biological surveys and focused surveys for special-status species. Over 48 acres of potentially suitable habitat for least Bell's vireo, a federally listed species, is anticipated within the mitigation areas. The wildlife use of the mitigation areas and the buffer habitats will be evaluated every three years and compared to the corresponding reference site in order to track the success of mitigation with reference to wildlife habitat quality. Monitoring methodology is detailed in Section 9.0.

8.1.3 Flora

8.1.3.1 Survival

Survival is a measure of how many container plants or willow or mulefat stakes installed have survived since initial installation. Survival will be evaluated annually to determine the number of surviving container stock and cuttings. Survival of plantings will be 95 percent at the end of Year 1, 90 percent at the end of Year 2, and 80 percent for Years 3 through 5. Should survival fall below the performance standard then supplemental planting will be required. Monitoring methodology is detailed in Section 9.0.

8.1.3.2 Native Plant Cover

Native plant cover is a measure of the percent aerial coverage of native plant species (tree, shrub, and herb strata) on a given site. Total native plant cover for each mitigation area will be evaluated on a yearly basis and compared to the corresponding target values determined at the reference sites in order to track the success of mitigation with reference to native vegetative cover. For the least Bell's vireo habitats in the mitigation site, an offsite reference site that is occupied by least Bell's vireo will be used to determine the target 5 Year performance standard for native plant cover. The values for percent cover of the native tree, shrub, and herb layers will be determined at the reference site in Year 1 of the implementation of the restoration project. The actual percent cover of native plants in each of the layers (tree, shrub, and herb) and the total overall cover used for the performance standard in the least Bell's vireo habitat in the mitigation site will be determined when the reference site is established. The target values for native cover will be 100 percent of the values determined at the reference site and those values will be used as the target throughout the interim management period. The 5 Year performance standard for the non-vireo riparian habitats is 75 percent of the reference sites. The 5 Year native cover performance standard for the *Quercus agrifolia* Woodland Alliance is 50 percent of the reference site and the 10 Year cover standard is 70 percent of the reference site. The long-term goal for oak woodland would be to achieve 90 percent of the reference site. The Year 5 cover standard for the *Lepidospartum squamatum* Shrubland Alliance, *Eriogonum fasciculatum* Shrubland Alliance, and *Artemisia californica* Shrubland Alliance is 75 percent of the reference sites and the 10 Year cover standard is 90 percent of the cover determined at the reference sites. Monitoring methodology is detailed in Section 9.0.

8.1.3.3 Nonnative Plant Cover

Nonnative plant cover is a measure of the percent areal coverage of nonnative (exotic) plant species (tree, shrub, and herb strata) on a given site. Total nonnative plant cover for each mitigation area will be evaluated on a yearly basis and compared to the corresponding reference site in order to track the success of mitigation with reference to nonnative vegetative cover. The nonnative plant cover in least Bell's vireo habitat will be no more than five percent during Years 1 through 5. Year 1 – 25 percent annual herbaceous species/grasses; 15 percent woody species/perennial herbs; and 5 percent Cal-IPC Moderate or High Threat invasive species; Year 2 – 15 percent annual herbaceous species/grasses; 10 percent woody species/perennial herbs; and 3 percent Cal-IPC Moderate or High Threat invasive species; Year 3 – 10 percent annual herbaceous species/grasses; 5 percent woody species/perennial herbs; and 2 percent Cal-IPC Moderate or High Threat invasive species; Year 4 – 10 percent annual herbaceous species/grasses; 5 percent woody species/perennial herbs; and 1 percent Cal-IPC Moderate or High Threat invasive species; and Year 5 – 10 percent annual herbaceous species/grasses; 5 percent woody species/perennial herbs; and 0 percent Cal-IPC Moderate or High Threat invasive species. For areas Monitoring methodology is detailed in Section 9.0.

8.1.3.4 Native Plant Species Richness

Native plant species richness is a measure of the number of different native plant species represented on a given site. Native plant species richness for each mitigation area will be evaluated on a yearly basis and compared to the corresponding reference site in order to track the success of mitigation. By Year 5 the

site must have 100 percent of the species present in the respective reference sites. Monitoring methodology is detailed in Section 9.0.

8.2 Reference Sites

Reference sites will be established to define effective, objective, and realistic annual performance standard targets for the proposed on-site mitigation areas. These sites will be established in unimpaired habitats that most closely resemble those habitats targeted for rehabilitation, re-establishment, or enhancement within each mitigation area. The proposed reference sites are shown on Figure 8-1. Reference sites for the CRAM evaluations have already been established and are described in the CRAM report in Appendix H.

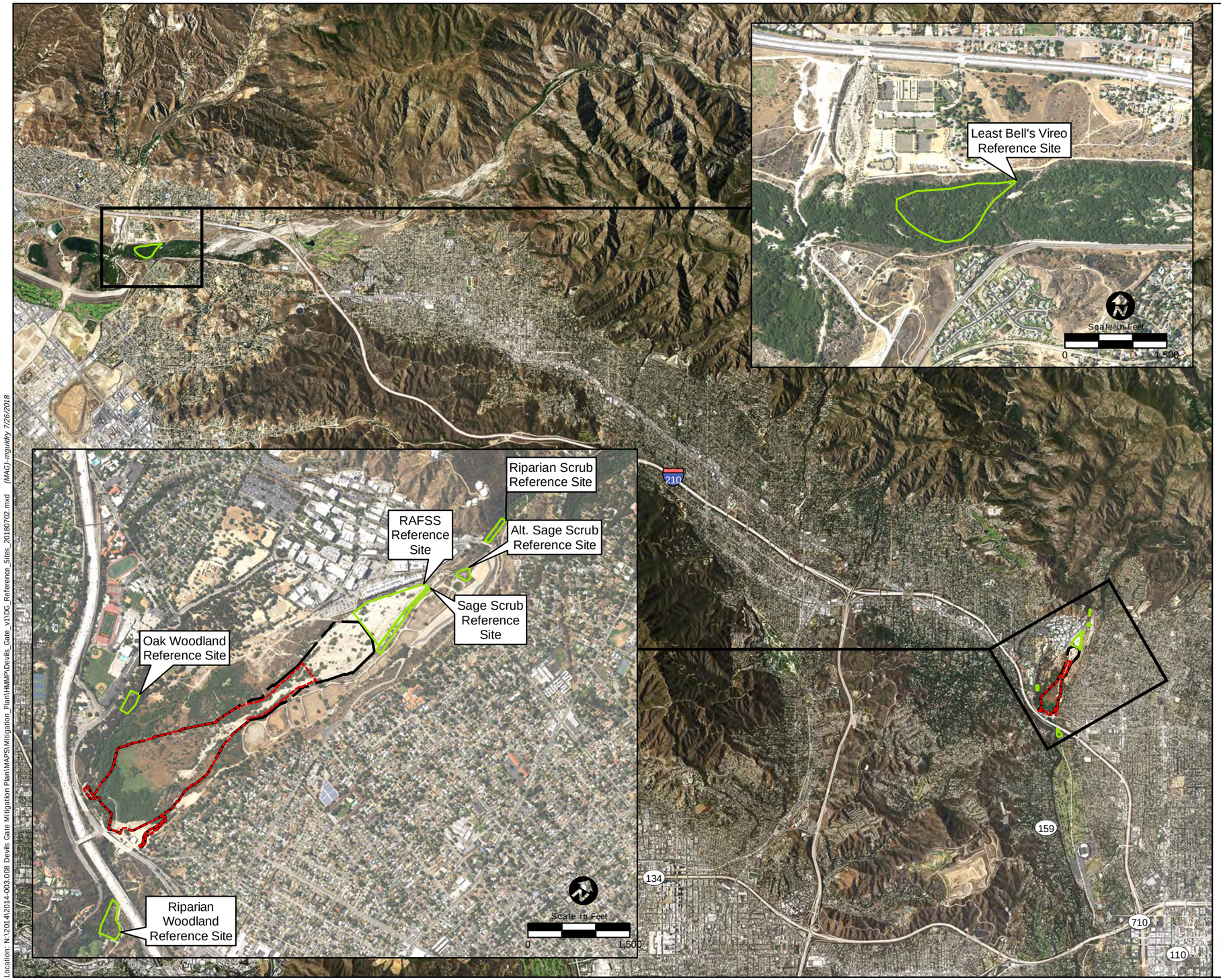
The preliminary selection of the reference site for occupied least Bell's vireo habitat is based on known locations of this species. However, the actual location will be determined in the spring when the vireos arrive back to their nesting grounds. Collaboration with both the USFWS and CDFW on the actual location of the reference site for occupied least Bell's vireo habitat will be conducted through a site visit to evaluate the quality of the habitat and to determine if the location represents a suitable reference site. The least Bell's vireo reference site will be used to establish realistic targets for the performance standards that will be used during the interim management period. The least Bell's vireo reference site may be monitored during the interim management period to track the status of the habitat and occupation by least Bell's vireo.

Reference sites will be established for each vegetation community type targeted for mitigation, including *Baccharis salicifolia* Shrubland Alliance, *Salix gooddingii* Woodland Alliance, *Quercus agrifolia* Woodland Alliance, *Lepidospartum squamatum* Shrubland Alliance, *Eriogonum fasciculatum* Shrubland Alliance, and *Artemisia californica* Shrubland Alliance. In addition, a separate reference site will be established in Salix gooddingii Woodland Alliance habitat that is known to support the nesting activities of the least Bell's vireo. The actual locations of the reference sites will be established in conjunction with the initiation of mitigation activities, but the first monitoring of the reference sites will be conducted during the spring season when plants are actively growing. The monitoring at the reference sites will include evaluating structural patch richness, percent cover of native and nonnative plant species, native plant species richness, and wildlife use monitoring. CRAM will also be performed at each of the riparian habitat reference sites in conjunction with the CRAM performed at the mitigation areas.

8.3 Non-Achievement of Performance Standards

If, after 5 years, the performance standards have not been met in all or a portion of the mitigation areas, then the LACFCD will re-evaluate site conditions and implement additional mitigation offsetting measures (e.g., supplemental planting of native riparian vegetation, alteration of the flow regime) or pursue an alternative strategy (e.g., new location), as approved the by USACE and the Carlsbad Field Office of the U.S. Fish and Wildlife Service (CFWO). For each year of delay in meeting performance standards onsite or initiating an alternative strategy off-site, the LACFCD will restore/enhance, preserve, and manage an additional acre for each acre of riparian vegetation that has not met the performance standards for the least Bell's vireo.

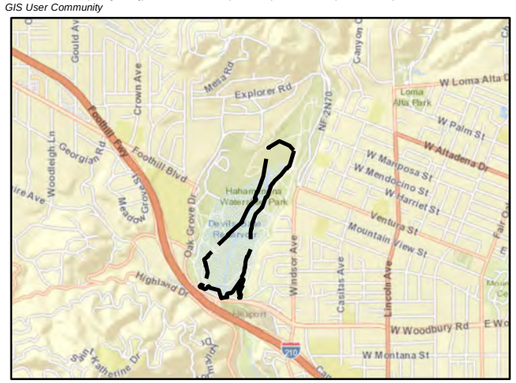
Figure 8-1
Proposed Reference Sites



Map Features

- Initial Sediment Removal Footprint [1]
- Permanent Maintenance Footprint [1]
- Reference Site

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community



ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2014-003.008 Devil's Gate Sediment Removal Project

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Photo Source: NAIP 2016
[1] LADPW

Map Date: 7/26/2018

Location: N:\2014\2014-003.008 Devils Gate Mitigation Plan\MAPS\Mitigation_Plan\HMP\Devils_Gate_v1\DG_Reference_Sites_20180702.mxd (MAG)-mguidry 7/26/2018

9.0 MONITORING PROGRAM

The following is a description of the monitoring program intended to provide information on whether the proposed on-site mitigation areas are meeting annual objectives and established ecological performance standards. The information gathered during monitoring events will also be used to determine whether remediation or adaptive management is necessary to achieve site objectives. The following program includes monitoring frequency, duration, types of monitoring, methodologies, and reporting requirements.

Monitoring of each on-site mitigation area will be conducted annually using a combination of horticultural and botanical monitoring methodologies in addition to photo documentation. Relevant reference site conditions (i.e., botanical monitoring) will also be collected concurrently with mitigation area conditions to provide a standard in which local and regional changes in biological and environmental conditions can be taken into account. The monitoring program for the mitigation areas that support riparian habitat is intended to be a five-year program to meet the performance standards. For the RAFSS and the other upland communities, the monitoring program may be extended up to 10 years to meet the performance standards because the plant species in the upland communities tend to be slower growing than the plant species in the riparian communities.

9.1 Monitoring Methodology

Table 9.1 shows the monitoring schedule and each component is discussed individually below.

Table 9.1. Monitoring Schedule

Activity	Time Frame
Horticultural Monitoring	Year 1 – Monthly
	Years 2 and 3 – Quarterly
	Years 4 and 5 - Twice per Year
	Years 6 through 10 – Twice per Year
Botanical Monitoring	Annually (May-August)
Faunal Diversity Monitoring	Annually
Groundwater and Hydrologic Monitoring	Twice per Year
CRAM Assessments	Every 3 years
Focused Species Surveys	Annually
Photodocumentation	Annually

9.1.1 Horticultural Monitoring

Horticultural (qualitative) monitoring will be conducted at each on-site mitigation area by a Restoration Specialist. Data collected during horticultural monitoring events will include, but not be limited to, soil conditions (e.g., moisture), seed germination, presence of volunteer native species, nonnative plant species, significant disease or pest problems, vandalism, and any erosion issues. All observations and any data collected will be logged onto a monitoring form and photo documentation will occur as needed, and from permanent photo-stations. A Restoration Specialist will conduct horticultural monitoring at each

mitigation area once every month during the first year following implementation, quarterly during Years 2 and 3, semi-annually (i.e., twice per year) during Years 4 and 5, and semi-annually in Years 6 through 10 for the upland communities or until the performance standards are met.

9.1.2 Botanical Monitoring

Botanical (quantitative) monitoring will also be conducted at each on-site mitigation area by a Restoration Specialist. Botanical monitoring events will provide quantifiable data to assist with determining progress towards established performance standards. Monitoring will be conducted once a year between May and August with a goal of monitoring at the same time each year. Scrub habitat reaches peak growth sometime between April and June and riparian habitat reaches its peak growth sometime between June and August. Data collected during botanical monitoring events will include container plant survival, total native and nonnative plant cover, structural diversity (tree, shrub and herb strata), and native plant species richness.

Survival will be determined by counting installed plantings and will be conducted annually until Year 5. Any plantings that appear to be dying, or plantings confirmed dead, will be marked with biodegradable flagging. Results of survival counts will be noted on botanical monitoring forms.

Native and nonnative plant cover determinations will be ascertained using a modified point-line intercept method collected along established transect lines. Data will be collected every 0.5 m, starting at 0.5 m. Each plant species that touches a sampling dowel vertically projected to the ground will be recorded. If the canopy of a plant overlaps with the sampling dowel, that species will also be recorded; this includes tree species with a canopy well overhead. If several species were recorded at one sampling point, they were given a fraction of the number 1. For example, if three species are present at the 17.5-m mark on a given transect, they will each be given a 1/3 or 0.333 value for that sampling point. Bare ground, rock, and litter will be recorded for positions along the transect that have no plant overlap. Species occurrence along each transect will be totaled and divided by the number of sampling points and multiplied by 100 to derive the percent cover (total cover) along that transect. If bare ground, rock, and litter are recorded, these values will be deducted from the total number of plant-transect intersections (a.k.a., hits).

Transects will have a maximum length of 100-meters and be established at one 100-meter transect per acre. If a mitigation area is between 0.5 acre and 1.0 acre then the maximum transect length will be 25 meters and there will be no more than three transects established. If a mitigation area is less than 0.5 acre (e.g., DG-5) then the maximum transect length will be 25 meters and there will be no more than two transects established. Mitigation areas with an area of greater than three acres, such as DG-4, will have a maximum of five 100-meter transects established. Transect locations will be selected and permanently marked with metal stakes fitted with caps for safety. Transect locations will be recorded using a Global Positioning System (GPS) device at the beginning of the Plant Establishment Period (PEP). These same transects will be monitored during Year 1 through Year 5 for the riparian mitigation areas and Year 1 through 10 for the upland mitigation areas or until the performance standards are met. Photos will also be taken from the start and end of each transect whenever data is collected. Botanical monitoring will occur concurrently at established reference sites to obtain accurate data in which to measure annual performance standard targets. All collected data will be entered in the field onto datasheets.

In addition, the Relevé vegetation sampling protocol developed by the California Native Plant Society and CDFW will be used to supplement quantitative data collection. Specifically, the CDFW-CNPS Protocol for the Combined Vegetation Rapid Assessment and Relevé Field Form will be used (CDFW-CNPS 2016). In shrub dominated habitat a 400 square meter plot will be used and in tree dominated habitat a 1,000 square meter plot will be used. A total of one plot per every three acres will be established for habitats covering large areas (such as DG-4). If a habitat type covers less than three acres, then one plot per acre will be used.

9.1.3 Wildlife Use Monitoring

9.1.3.1 Faunal Diversity Monitoring

To monitor the use of the on-site restoration/enhancement areas by native wildlife species, seasonal wildlife surveys will be conducted on an annual basis in the spring and fall. These surveys will be optimally timed during the height of spring and fall migration periods to document the highest and most diverse number of species using the areas. A qualified biologist will document all species observed, detected, and/or heard during the surveys and a master wildlife compendium will be maintained to document the wildlife identified using the restoration/enhancement areas. This may coincide with the annual botanical monitoring event and with the pre-construction and focused species surveys conducted for the Project.

9.1.3.2 Focused Species Surveys

The Project design includes multiple pre-construction surveys and nest monitoring surveys for least Bell's vireos to ensure that Project activities (during the sediment removal phase) do not result in direct or indirect impacts to this species. Protocol-level surveys for least Bell's vireos will be coordinated with pre-construction and nest monitoring surveys to ensure that the status of this species throughout the reservoir is determined on an annual basis during the first five years. Protocol-level surveys may also be conducted for other federally-listed species known to occur or with a potential to occur in the reservoir annually for the first five years after implementation. At present, these additional species may include southwestern willow flycatcher, western yellow-billed cuckoo, and coastal California gnatcatcher. Focused protocol surveys will be conducted in accordance with the most up-to-date and widely-accepted survey protocols established for each of the target species.

At the completion of restoration, there is estimated to be approximately 50 acres of potential habitat for the federally listed least Bell's vireo (Figure 3-6).

9.1.4 Groundwater and Hydrologic Monitoring

Groundwater monitoring wells have been established and are regularly monitored at locations north (Jet Propulsion Laboratory monitoring wells) and east (City monitoring wells) of Devil's Gate Reservoir. LACFCD will acquire the groundwater level data from both JPL and the City each year during the wet and dry seasons. These data will be provided to the Restoration Ecologist along with historic groundwater data for inclusion in the annual report. The Restoration Ecologist will provide a discussion of the groundwater levels in the annual report and will identify if any unusual fluctuations have occurred. If the mitigation areas are exhibiting difficulties that may relate to the unusual fluctuations in groundwater levels, then

adaptive management measures may need to be implemented. Adaptive management measures for the following potential risks and uncertainties may need to be implemented (see Section 11.0 for specific adaptive management measures):

- Flooding
- Fire
- Site Failures

LACFCD currently monitors the flow of water entering Devil's Gate Reservoir, the elevation levels where water is held behind the dam, and the duration of inundation at various elevation levels. These data will be continued to be monitored on an annual basis and will be reported in the annual reports. In the annual report, the Restoration Ecologist will provide a discussion of the success of the restoration areas as it relates to the hydrology information.

Focused monitoring will be conducted at mitigation areas DG-W-1 and DG-W-2, where wetland conditions may develop if regular inputs of storm water runoff occur in these areas. If it is evident that wetland conditions may be present based on presence of hydrophytic vegetation, a qualified biologist will perform an informal wetland delineation to verify wetland conditions, following the guidelines of the USACE Arid West Supplement. These areas will continue to be tracked and if wetland conditions persist for more than five years, then a formal wetland delineation may be conducted. If it is evident that a wetland determination may be warranted, then a preliminary wetland determination may be completed, followed by a request for concurrence from USACE.

9.1.5 California Rapid Assessment Method (CRAM) Monitoring

CRAM is a scientifically defensible, rapid assessment method designed to assess ambient conditions of wetland habitats within California. It is also a common tool used, in conjunction with other monitoring methodologies, to assess the performance of compensatory mitigation and restoration projects such as the proposed mitigation Project. CRAM assesses ecological attributes such as site hydrology, physical structure, and biotic structure and provides a score in reference to similar unimpaired habitat types within California.

Following the implementation of on-site mitigation activities, a certified CRAM practitioner will conduct assessments three years after the implementation of the restoration activities in the riparian mitigation areas at the previously established CRAM sites. CRAM monitoring will continue during the long-term management phase of the Project. Additional CRAM sites may be established in appropriate locations in the mitigation areas and these will also be monitored until the performance standards are met in the riparian habitats and then CRAM monitoring will also occur as part of the long-term monitoring phase of the Project. CRAM assessments will be conducted during the same timeframe during the years it is conducted. CRAM scores obtained during these monitoring events will be compared to baseline CRAM scores taken in 2015 and used to track habitat re-establishment and function. Individual CRAM metrics such as Structural Patch Richness can also be used separate from the overall score to track the progress of specific site ecological functions. The Structural Patch Richness metric measures the number of different patch types within a given AA and can provide insight into how the AA is functioning. The Plant

Community metric measures the number of plant layers, number of co-dominant species and percent invasion. This metric can identify the types of plants growing as well as invasive species outbreaks within a given AA.

9.1.6 Photodocumentation

Permanent photo point stations will be established at each on-site mitigation area to provide a visual record of progress over time at each site. The geographic coordinates of each photo station will be recorded with a GPS unit and digital photos will be taken from these points during each monitoring event throughout the monitoring period. Additional photos will be taken throughout each site that are representative of current site conditions or show issues that need to be addressed. Photos will be provided as an appendix to each annual report. The location and exact number of photo points will be determined during the PEP.

9.2 Reporting Requirements

9.2.1 Completion of Initial Construction

An email notification will be submitted to the Agencies following the completion of each phase of compensatory mitigation implementation. It is anticipated that more than three phases will be necessary due to logistical reasons. The following information will be included:

- Date(s) all compensatory mitigation construction activities were completed;
- Modifications (if any) to the originally-approved schedule for future mitigation monitoring, implementation and reporting pursuant to final approved mitigation plan;
- Summary of compliance status with each special condition of associated permits or verification (including any noncompliance previously having occurred or currently occurring and corrective actions taken to achieve compliance);
- Photographs of the habitats constructed at the compensatory mitigation site. For those aspects directly associated with pre-existing WOUS, before photos shall also be provided;
- One copy of "as built" drawings for the entire compensatory mitigation Project prepared in accordance with SPD Map and Drawing Standards. These will be updated with each phase that is completed.

9.2.2 Annual Reporting

Annual reports for the on-site compensatory mitigation areas will be prepared for each of the monitoring years following the PEP or until the regulatory agencies (USACE, USFWS, CDFW, and RWQCB) deem the mitigation site successful. At a minimum, annual reports will include the following information and all information as required within Project permits:

- Description of restoration activities (e.g. site preparation, plant installation and overview of planting effort, number of replaced plants and/or recruits, when activities were conducted);

- Description of maintenance activities (e.g. nonnative plant control, irrigation, trash removal);
- Current site conditions (e.g. percent survival, percent cover, hydrology, methods used to assess parameters);
- Current status and progress of the site with regard to meeting all of the mitigation success criteria;
- Any problems or issues noted during the monitoring and steps taken to address them;
- Wildlife species compendium;
- Special-status species documentation, if any;
- Coordination with agencies; and
- Photo documentation.

9.2.3 Mitigation Completion

Upon achieving the on-site mitigation success criteria, the Restoration Ecologist will prepare a notification memorandum for the LACFCD and regulatory agencies. The letter will provide information that verifies the successful completion of the 10-year mitigation effort for each mitigation area and request concurrence from the LACFCD and regulatory agencies. In order to be released from further mitigation and monitoring responsibilities, LACFCD must receive written confirmation from the regulatory agencies that the required on-site mitigation has met all the success criteria and that the mitigation is deemed as complete.

If a mitigation area has exhibited consistent performance for five years and has been without irrigation for three years and meets or exceeds performance standards for the last three consecutive years of the five-year period (in comparison with reference site), then LACFCD may request early sign-off. It is anticipated that even when subjected to the effects of global warming, there may be some mitigation areas that excel in comparison with other areas of the site. The typical length of a habitat mitigation program is five years; the proposed mitigation time-frame for this Project is five years for the mitigation areas supporting riparian habitats and up to ten years for the mitigation areas supporting upland vegetation.

9.2.4 Estimate of Level of Effort to Implement the Monitoring Tasks

Table 9.2 provides a detailed description of the monitoring tasks, responsible parties, frequencies, hours estimate, and approximate costs. The costs in the tables do not include the implementation costs associated with the services provided by the Landscape Contractor.

Table 9.2. Monitoring Program Costs

Task Name	Description	Responsibility	Frequency	Schedule	Level of Effort	Cost per Unit*	Cost	Total Cost
Horticultural Monitoring	Data collected during horticultural monitoring events will include, but not be limited to, soil conditions (e.g., moisture), seed germination, presence of volunteer native species, nonnative plant species, significant disease or pest problems, vandalism, and any erosion issues. All observations and any data collected will be logged onto a monitoring form and photo documentation will occur as needed, and from permanent photo-stations.	Restoration Specialist	Monthly during the first year following implementation, quarterly during Years 2 and 3, twice per year during Years 4 and 5, and twice per year during Years 6 through 10 for the upland communities or until the performance standards are met	Spring – Schedule may shift as needed	Biologist: 900 hours GIS: 35 hours	$100/hour $100/hour	$90,000 $3,500	**$93,500**
Botanical (Quantitative) Monitoring	Botanical monitoring events will provide quantifiable data to assist with determining progress towards established performance standards. Data collected during botanical monitoring events will include container plant survival, total native and nonnative plant cover, structural diversity (tree, shrub and herb strata), and native plant species richness.	Restoration Specialist	Annually between Year 1 and Year 10	May – August	Biologist: 40 hours per year for 10 years GIS: 9.5 hours per year for 10 years	$100/hour $100/hour	$40,000 $9,500	**$49,500**
Faunal Diversity Monitoring	Purpose of these surveys is to monitor the use of the on-site restoration/enhancement areas by native wildlife species.	Qualified Biologist	Two surveys annually between Year 1 and Year 10	Spring and Fall	Biologist: 40 hours per year for 10 years GIS: 8 hours per year for 10 years	$100/hour $100/hour	$40,000 $8,000	**$48,000**
Focused Species Surveys	Perform protocol-level surveys for least Bell's vireo.	Qualified Biologist	Eight surveys conducted annually between Year 1 and Year 5	April – June	Biologist: 120 hours per year for 5 years GIS: 16 hours per year for 5 years	$100/hour $100/hour	$60,000 $8,000	**$68,000**
Brown-headed Cowbird Trapping	Removal of parasitic cowbirds until performance standards are met.	Qualified Biologist	April 1 through July 15 annually until performance standards are met	April - July	Biologist: 106 trapping days per year for 5 years	$100/hour	$44,000	**$220,000**
Groundwater and Hydrologic Monitoring	LACFCD will acquire the groundwater level data from both JPL and the City each year during the wet and dry seasons. These data will be provided to the Restoration Ecologist along with historic groundwater data for analysis. Focused monitoring will be conducted at mitigation areas DG-W-1 and DG-W-2, where wetland conditions may develop if regular inputs of storm water runoff occur in these areas.	LACFCD, Restoration Specialist	Twice per year between Year 1 and Year 10	Wet and dry seasons	Biologist: 60 hours per year for 10 years GIS: 20 hours per year for 10 years LACFCD: 60 hours per year for 10 years	$100/hour $100/hour $100/hour	$60,000 $20,000 $60,000	**$140,000**
CRAM Monitoring	Conducting CRAM assessments at the wetlands and non-wetlands waters of the U.S. mitigation areas.	Certified CRAM Practitioner	Every three years; Year 1 and Year 4	Spring	Biologist: 180 hours in Year 1 and Year 4 GIS: 22 hours in Year 1 and Year 4	$100/hour $100/hour	$36,000 $4,400	**$40,400**
Photodocumentation	Permanent photo point stations will be established at each on-site mitigation area to provide a visual record of progress over time at each site.	Qualified Biologist	Conducted annually during monitoring events	N/A	Biologist: 10 hours per year for 10 years GIS: 2 hours per year for 10 years	$100/hour $100/hour	$10,000 $2,000	**$12,000**
Initial Construction Reporting	An email notification will be submitted to the Agencies following the completion of each phase of compensatory mitigation implementation.	LACFCD, Restoration Specialist	After each mitigation implementation phase	After each mitigation implementation phase	Biologist: 16 hours per year for 5 years	$100/hour	$8,000	**$8,000**
Annual Reporting	Annual reports for the on-site compensatory mitigation areas will be prepared for each of the monitoring years following the PEP or until the regulatory agencies (USACE, USFWS, CDFW, and RWQCB) deem the mitigation site successful. At a minimum, annual reports will include the following information and all information as required within Project permits.	LACFCD, Restoration Specialist	Annually between Year 1 and Year 10	Due February 15 of the following year	Biologist: 50 hours per year for 10 years GIS: 12.5 hours per year for 10 years LACFCD: 50 hours per year for 10 years	$100/hour $100/hour $100/hour	$50,000 $12,500 $50,000	**$112,500**
Mitigation Completion Reporting	Upon achieving the on-site mitigation success criteria, the Restoration Ecologist will prepare a notification memorandum for the LACFCD and regulatory agencies. The letter will provide information that verifies the successful completion of the 10-year mitigation effort for each mitigation area and request concurrence from the LACFCD and regulatory agencies.	LACFCD, Restoration Specialist	After success criteria is achieved	After success criteria is achieved	Biologist: 50 hours LACFCD: 46 hours	$100/hour $100/hour	$5,000 $4,600	**$9,600**
							GRAND TOTAL	**$565,300**

*This is an average assumed rate; costs would likely go up over time based on cost of living increases

10.0 LONG-TERM MANAGEMENT PLAN

The USACE has requested the submittal of a comprehensive Long-Term Management Plan (LTMP) that not only addresses how the mitigation areas will be managed for the long-term but also addresses how LACFCD will manage the flood control facility at Devil's Gate Reservoir to be consistent with the long-term protection of the mitigation areas. This section briefly discusses the contents of the LTMP for the on-site mitigation site and how the site will be managed after the success criteria have been achieved to ensure the mitigation areas will be ecologically sustainable and suitable as habitat for native wildlife and plant species. The comprehensive LTMP is included in Appendix N.

10.1 Site Protection and Management

Long-term management and oversight of the on-site mitigation areas will be the responsibility of LACFCD after the success criteria and/or performance standards have been met. The objective of the LTMP is to ensure that the performance standards continue to be achieved for the long-term, the WOUS continue to function as planned in the HMMP, the target vegetation communities and vegetative structure continue to exist to support the least Bell's vireo, and the habitats are sustained for the long-term. Long-term protection of the mitigation areas from development, human-related disturbance, and infringement will also be the responsibility of LACFCD.

The detailed LTMP will describe the measures that will be implemented by LACFCD to manage and maintain the on-site mitigation areas in perpetuity and in conjunction with the operation of the flood control facility at Devil's Gate Reservoir. The components of the LTMP will include a focus on measures designed to reduce the impacts of human presence on the mitigation areas, to ensure the mitigation areas continue to function as intended, and to protect the wildlife that reside in the habitats in the mitigation areas. The following paragraphs describe the types and frequency of monitoring and maintenance activities that will be conducted to determine the stability and ongoing trends of the WOUS, including wetlands, the riparian habitats, and the population of least Bell's vireos and potentially southwestern willow flycatchers that may inhabit the mitigation site.

10.1.1 Water Availability

For the long-term, the operation of Devil's Gate Dam will continue to be the same. Generally, the lowest elevation valve is left open prior to the onset of the first rain event of the season. During a rain event, if water pools and the water surface elevation continues to rise, the lowest elevation valve is closed. Two larger slide gates are then operated to manage the reservoir elevation. Any water present at the end of storm season (April 15) will be released. If the reservoir experiences significant sediment inflows, the dam operations may need to be altered until the sediment is removed. This altered operation plan typically includes holding a debris pool after each storm to protect the dam outlets from becoming clogged with debris flow.

Based on the historic existing hydrology described in Section 3.2, it is expected that enough water will be available to support the mitigation areas long-term. If extreme drought was to occur over more than 10 years then adaptive management would be employed and could include the introduction of supplemental irrigation from reclaimed water sources.

10.1.2 Quarterly Mitigation Site Monitoring

Quarterly monitoring visits will be conducted to assess the mitigation site condition, degree of erosion, invasion of exotic or invasive plant and wildlife species, degree of human impacts (trash, unauthorized trail use, presence of domestic pets and livestock in unauthorized areas, and damage to vegetation), maintenance issues, evidence of use by native wildlife species, status of signs and barriers, and general changes in the mitigation sites that may trigger the need to investigate the conditions in more detail. During the quarterly monitoring, each of the mitigation areas will be assessed, field notes will be recorded on the conditions and issues that need attention, and plant and wildlife species observed will be recorded. A quarterly monitoring report will be prepared that includes the results of the monitoring and recommendations for addressing any issues observed. The quarterly monitoring reports will be provided to the native landscape contractor for their reference and to provide guidance regarding maintenance issues that need to be addressed. If maintenance issues are necessary, the biologist will coordinate with the landscape contractor to complete the maintenance and will ensure that it has been completed. The verification of the completion of the maintenance issues will be included in the next quarterly monitoring report. The quarterly monitoring reports will be included in the annual report.

10.1.3 Groundwater Monitoring

Every year, LACFCD will conduct quarterly monitoring of a portion of the existing groundwater wells located near Devil's Gate Reservoir and the mitigation site. The monitoring will be conducted during each season of the year (Winter, Spring, Summer, and Fall) and the results will be included in the annual report. In addition, the results will be used to compare groundwater levels on a seasonal basis and on a year-to-year basis since the Project's inception. The comparisons of the groundwater levels will be compared to observable trends in the health of the vegetation in the mitigation areas. The groundwater level comparisons will be documented in the annual reports.

10.1.4 Annual Monitoring and Reporting

An annual monitoring visit will be conducted during the spring of each year in order to assess the mitigation site in the active growing season and to assess presence of annual native and nonnative plant species. The annual monitoring visit will constitute one of the quarterly monitoring visits and the mitigation site will be assessed in the same way as described for the quarterly monitoring visits. In addition, photographs will be taken from established photo-point locations in order to do a comparison with photographs from previous annual monitoring visits.

Annual reports will be prepared and will include a description of all the monitoring activities conducted throughout the year and the results of the monitoring. In those years when focused monitoring is conducted for listed species, vegetation condition, and functional assessments, the results of those survey will be included in the annual report. In addition, the reports will identify problems or issues observed during the monitoring and the necessary recommendations or methods needed to resolve the problems or issues. The annual report will also describe the actions taken to resolve the problems or issues and will discuss any adaptive management measures implemented throughout the monitoring year. The reports will be submitted to the resources agencies on an annual basis for review and comment.

10.1.5 Focused Surveys for Listed Species

Focused surveys will be conducted for least Bell's vireo and southwestern willow flycatcher every three years according the current agency-accepted protocols for conducting the surveys. If additional species that are known to occur or that have a high potential to occur in the mitigation site are listed as candidate, threatened, or endangered by the resources agencies, then focused surveys will be conducted on three-year cycle and will coincide with the years when the focused surveys are conducted for least Bell's vireo and southwestern willow flycatcher. During these surveys, other species of wildlife occurring in Devil's Gate Reservoir and the mitigation site will be recorded. The wildlife survey will consist of recording the species of wildlife observed and the evidence of the presence of wildlife species (burrows, tracks, scat, and etc.). The results of the focused surveys will be included in the annual reports corresponding to the years when the surveys are conducted.

10.1.6 Quantitative Vegetation Monitoring

Quantitative monitoring of the vegetation communities will be conducted in each of the mitigation areas and the reference sites every three years. The methods used to conduct the quantitative monitoring of the vegetation will follow accepted protocols for determining structural patch richness, percent cover of native and nonnative plant species, and native plant species richness. The results will be compared to the performance standards and to previous quantitative monitoring efforts in the mitigation areas to ensure the mitigation areas are sustaining the target habitats. In addition, the comparison will be used to look for trends or changes in the vegetation communities over time. The results will be used to determine if adaptive management measures are necessary to improve the plant cover, vegetation structure, or species richness in the mitigation areas. The results of the quantitative monitoring be included in the annual reports corresponding to the years when the quantitative monitoring is conducted.

10.1.7 Functional Assessment Monitoring

Functional assessment monitoring will be conducted every three years, and those years will coincide with when the quantitative vegetation monitoring is conducted. The methods used to conduct the functional assessment will follow the CRAM guidelines unless a different and more appropriate functional assessment method has been developed and accepted by the resources agencies. The results of the functional assessment monitoring will be compared to the baseline conditions and to previous functional assessments conducted since the Project's inception to look for trends. The comparisons will be used to determine if adaptive management measures are necessary to improve the functions in the mitigation areas. The results will be included in the annual report prepared the year the functional assessment is conducted.

10.1.8 Vegetation, Barrier, and Trails Maintenance

Maintenance visits will be conducted by the native landscape contractor three times per year for the purpose of removing nonnative plant species, repairing or replacing barriers to human encroachment, and maintaining or installing materials used to close unauthorized trails. If the maintenance activities are scheduled to occur during the breeding season, then a pre-construction survey will be conducted by qualified biologists to determine if areas where bird nests are located will need to be avoided during the

maintenance activities. In addition, biological monitors will be present on site during all maintenance activities to ensure that native plants are not removed and to ensure nesting birds and other wildlife are not harmed during the maintenance activities. The results of the maintenance will be documented by the biologist and included in the subsequent quarterly monitoring report.

10.1.9 Adaptive Management

Adaptive management measures will be implemented if, during monitoring, the mitigation areas do not demonstrate that the performance standards are continuing to be met or if unforeseen circumstances damage the mitigation sites. Adaptive management measures may include but not be limited to correctively grading areas if hydrologic or other conditions negatively affect the mitigation sites, replanting with the same or different plant species, or installing additional barriers to deter human encroachment into the mitigation areas. The success of the adaptive management measures will be monitored during quarterly and annual monitoring visits as well as during the quantitative vegetation monitoring and functional assessments, as applicable. The implementation of adaptive management measures and the results will be documented in the annual monitoring reports.

10.2 Long-term Financing Mechanisms

A Property Analysis Record (PAR) will be performed to determine the necessary amount of money required for long-term management activities on an annual basis and the PAR will be included in the LTMP. This money will then be allocated within the annual budget of the Flood Control Fund. The LACFCD's primary sources of funding are the ad valorem property tax for the Flood Control District and the Flood Control Benefit Assessment. LACFCD has a Bond Rating to AAA+, and an average annual budget of approximately $240 million for operations and maintenance of, and improvements to Flood Control facilities and compensatory mitigation for said projects. LACFCD has the ability and is committed to making a discrete line item in its annual budgets for the long-term management of the mitigation areas for the Project. Financial assurances are the responsibility of the LACFCD.

10.3 Responsible Parties

10.3.1 Applicant/Permittee:

Los Angeles County Flood Control District
P.O. Box 1460
Alhambra, California 91802-1460

10.3.2 Long-term Manager:

Los Angeles County Flood Control District
P.O. Box 1460
Alhambra, California 91802-1460

11.0 ADAPTIVE MANAGEMENT PLAN

Adaptive management is a method used to address unexpected changes in site conditions, responsibilities, or performance of a mitigation site. The goal of adaptive management is to actively adjust the approach or methods so that the on-site compensatory mitigation Project achieves its objectives and ecological performance standards. Problems that might prompt the need for adaptive management include a failure of the mitigation site to attain interim and/or final performance standards, fire, storm events with unusually high levels of runoff, substantial new exotic plant or wildlife infestations, and human-related disturbances such as extreme trespassing or vandalism.

The Restoration Ecologist will analyze site progress as part of the regularly scheduled monitoring at the mitigation areas and will suggest remedial measures to address unforeseen changes in site conditions or other components of the mitigation Project. Minor problems, such as trash, vandalism, isolated instances of plant mortality, or small-scale weed or pest infestations will be addressed and resolved when they are discovered. Specific monitoring will be conducted after unusual events, such as a large storm event or fire, to document damage to the mitigation areas. If changes in the management of the mitigation areas are necessary due to the unforeseen circumstances or damage, then the Restoration Ecologist will develop an approach to address and rectify the problems. Resolution of minor problems will be documented in the annual reporting and will not require separate notification to USACE.

If unforeseen changes noted during monitoring will result in a substantial change to the management of the mitigation areas, LACFCD will be notified immediately and an adaptive approach can be developed in a timely manner to address such changes. Largescale corrective measures, such as regrading part or all of the compensatory mitigation areas, replanting more than 20 percent of the areas to improve species cover or diversity, or supplemental soil amendments may require notification to USACE. LACFCD is ultimately responsible for the success of the implementation and will take corrective action if any component is not achieving the performance standards.

USACE will be notified if performance standards are not met at any of the mitigation areas in a monitoring year. If modifications are necessary to USACE-approved HMMP or LTMP to improve success at the mitigation areas, then the modifications may need to be approved by USACE prior to implementation.

11.1 Potential Risks and Uncertainties

11.1.1 Flooding

The proposed on-site mitigation areas are located within a flood control facility that has experienced high stormwater flows in the past. As such, there is the potential risk of flooding that may result in large-scale damage to container plantings, loss of irrigation systems, site erosion, and channel instability. The specific triggers that will be used to make decisions regarding inundation impacts to plants species in the mitigation areas will include number of days of inundation, depth of the inundation, and visible signs of damage observed during monitoring. The maximum number of days of inundation will be limited to 30 days because black willow can survive extended periods of inundation. However, mulefat and some of the other species cannot withstand the same duration of inundation as black willow. In addition, the depth of inundation will have a bearing on the number of days of allowable inundation. Plants inundated at a one-

foot depth can survive longer than if they were inundated at a three-foot depth, for example. Therefore, if inundation does occur, LACFCD will coordinate with the Monitoring Biologist to determine the approximate depth of inundation and will record the date the inundation began.

Between March 15 and August 31 (during the breeding season for least Bell's vireos and other birds), Devil's Gate Dam will be operated to limit the potential for inundation of the 79-acre mitigation area. If weather, hydrological forecasts, and reservoir conditions indicate that water held behind the dam may inundated the mitigation site, then the Dam Operator, in consultation with the Operations Section of the Stormwater Engineering Division of LACDPW, will take the steps necessary (including release of water at the maximum possible rate as safe to do so to protect downstream communities), to prevent or to reduce, to the extent possible, the amount of time the mitigation site is inundated. If inundation of the mitigation site does occur, the Restoration Specialist will determine the adaptive management measures necessary to ensure the recovery or replacement of the damaged habitat. For the first two years of the restoration project, the RE will notify CDFW within 24 hours of making the determination of the appropriate course of action. CDFW may subsequently reconsider this notification requirement after the first two years of the restoration project.

If large scale events occur that require corrective actions, then the CDFW, USFWS, and USACE will be notified within 24 hours of discovery. The proposed corrective measures will be thoroughly documented in a report that will be provided to CDFW, USFWS, and USACE for review and approval.

11.1.1.1 Corrective Measures

In the event site damage does occur, LACFCD and regulatory agencies will be notified prior to the implementation of any corrective measures. Such measures may include, but are not limited to:

- Re-grading/contouring part or all of the damaged mitigation site;
- Installation of additional container plantings or native seed;
- Repair or replacement of damaged irrigation systems; or,
- Installation of additional erosion BMPs.

11.1.2 Fire

Although uncommon for riparian habitats, there is the potential risk of damage to the on-site mitigation areas from wildfire. Impacts from wildfire may include loss of container plantings and existing native vegetation, damage to irrigation systems or exclusionary barriers, potential for nonnative plant infestations, and/or potential for large-scale erosion from subsequent stormflows.

11.1.2.1 Corrective Measures

In the event a wildfire does occur within any of the proposed mitigation areas, LACFCD and regulatory agencies will be notified prior to the implementation of any corrective measures. Such measures may include, but are not limited to:

- Installation of additional container plantings or native seed;

- Repair or replacement of damaged irrigation systems or exclusionary barriers;
- Additional nonnative plant control measures; or,
- Installation of additional erosion BMPs.

11.1.3 Site Failures

Given the unpredictable nature of restoration projects, there is always the potential for site failure in the form of large-scale die-off of container plants due to drought or insufficient site hydrology to support target communities, unmanageable infestations of nonnative species, or other unforeseen issues. Monitoring of the health of the target communities, groundwater levels, and natural precipitation will trigger the need for corrective measures. Triggers will include: annual plant mortalities that are not offset by natural recruitment or volunteers of the same plant species; a negative trend in native tree species cover for a three-year period; and, slow growth of tree species (e.g., less than 2.5 feet of vertical growth per year, on average, until the trees achieve the typical maximum size for each particular species.

11.1.3.1 Corrective Measures

In the event of significant site failures, LACFCD and regulatory agencies will be notified prior to the implementation of any corrective measures. Such measures may include, but are not limited to:

- Apply supplemental irrigation if extended periods of drought occur or if natural rainfall is less than what would be required to sustain the target communities;
- Re-grading/contouring part or all of the affected mitigation area;
- Adding supplemental soil amendments;
- Installation of additional container plantings or native seed;
- Changes in water regime behind the dam if water availability is low or inundation is prolonged;
- Trail closures or installation of additional barriers if human-caused impacts are damaging the mitigation areas; or
- Siting of new mitigation area as additional compensation.

12.0 FINANCIAL ASSURANCE

As a public agency, LACFCD cannot enter into the typical funding arrangement, such as an endowment fund, that would typically be used to ensure monies are available to implement the measures in the HMMP and the LTMP. LACFCD has the ability to budget the necessary funding to conduct the required maintenance and monitoring of the mitigation areas and to continue to implement the minimization and mitigation measures on an annual basis for both the short-term and long-term activities. The PAR provides the line-item budget for tasks necessary to conduct the required maintenance and continued implementation. The budget will be allocated by LACFCD division, and by labor and contract costs for each task.

LACFCD has the financial resources to undertake the mitigation and sustained long-term management of the mitigation areas. LACFCD's primary sources of funding are the ad valorem property tax for the Flood Control District and the Flood Control Benefit Assessment. LACFCD has an average annual budget of approximately $240 million and a Bond Rating of AAA+. The monies required to implement the HMMP will be secured in a budget line item designated for the Devil's Gate Reservoir Habitat Mitigation Project, as shown in the Flood Fund Fiscal Year 2017-2018 Budget Designations (Appendix O). Table 12.1 provides the detailed line-item cost estimate to implement the compensatory mitigation project.

Following the implementation of the HMMP, when the Project transitions into the long-term management period, the annual maintenance and monitoring costs (costs to implement the LTMP for the Project) will be allocated in the budget annually, using the same budget line item designation for the Devil's Gate Reservoir Habitat Mitigation Project. Any required additional funding will be reallocated during the fiscal year to meet contract costs and future budgeting will include funding to cover increased costs as determined by expenditure reports. This is consistent with how LACFCD budgets annual maintenance costs for their Big Tujunga Wash Mitigation Area and the Santa Anita Oak Woodland Habitat Revegetation/Mitigation Program. LACFCD has demonstrated their commitment to maintaining their mitigation areas, and will continue to monitor, maintain, protect, and preserve all mitigation areas, including the mitigation within Devil's Gate Reservoir.

Table 12.1. Line-Item Costs to Implement the On-site Compensatory Mitigation Project

IMPLEMENTATION	
Biological Tasks & Coordination	
Environmental Awareness Training	$7,000
Rare Plant Survey	$5,750
Prepare Nesting Bird Management Plan	$6,300
Nesting Bird Surveys	$23,000
Biological Monitoring	$40,370
Noise Monitoring	$13,870
Implementation (Coordination/Observation)	$48,720
Subtotal Biological Tasks & Coordination	**$145,010**
Site Preparation, Planting, Seeding, Irrigation, etc.	
Subtotal Habitat Mitigation Implementation	**$4,487,640**
MAINTENANCE	
Biological/Other Tasks & Coordination	
Coordination	$80,350
Biological Monitoring	$118,770
Periodic Nesting Bird Surveys	$76,750
Noise Monitoring	$62,250
Trails Monitoring	$29,770
Groundwater and Hydrologic Monitoring (up to 10 years)	$140,000
CRAM - Riparian (Every 3 Yrs after Implementation)	$40,400
Public Education & Outreach and Signs	$45,325

Table 12.1. Line-Item Costs to Implement the On-site Compensatory Mitigation Project	
IMPLEMENTATION	
Biological Tasks & Coordination	
Cowbird Trapping (up to 5 years)	$220,000
Faunal Diversity Monitoring (up to 10 years)	$48,000
Focused Species Surveys (i.e., LBVI; up to 5 years)	$68,000
Subtotal Biological/Other Tasks & Coordination	**$1,149,615**
Mitigation Area Maintenance	
Subtotal Maintenance (5- and 10-Year Regime)	**$2,480,000**
MONITORING	
120 Day Plant Establishment Period	
Establish Monitoring Transects	$4,100
Monthly Horticultural Monitoring	$22,100
Pre-Completion Site Walk	$10,400
Final Site Walk	$10,400
Subtotal 120-Day Plant Establishment Period	**$47,000**
Annual Monitoring	
Photodocumentation (10 years)	$12,000
Horticultural	$93,500
Botanical	$49,500
Subtotal Annual Monitoring	**$155,000**
REPORTING	
Initial Construction Reporting	$8,000
Post Implementation and As Builts	$14,100
Quarterly	$16,000
Annual (10 years)	$112,500
Mitigation Completion Memos	$9,600
Subtotal Reporting	**$160,200**
MEETINGS	
In Person	$29,000
Phone	$40,400
Subtotal Meetings	**$69,400**
Total Estimated Mitigation Cost	**$8,693,865**
Contingency (20%)	$1,738,773
Total Estimated Mitigation Cost w/Contingency	**$10,432,638**

General Exclusions: Offsite mitigation, Modify / improve existing culverts, rip-rap, removal of top 4" of soil, erosion control installation/maintenance/removal, trail installation/maintenance, trash entrapment device, trash container upkeep/maintenance, vector control, cost of water, bonds, repair due to acts of God, war, vandalism or neglect/damage by Owner or others, waivers of subrogation and additional insurance endorsements.

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