Final Wetland Habitat Mitigation & Monitoring Plan for the

Lake Calavera Trails Master Plan Boardwalk Improvement Project




AUGUST 2012

PREPARED FOR:

City of Carlsbad
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Contact: Liz Ketabian

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Habitat Restoration Specialist

LAKE CALAVERA TRAILS MASTER PLAN
BOARDWALK IMPROVEMENT PROJECT
FINAL WETLAND HABITAT MITIGATION AND MONITORING PLAN

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EXECUTIVE SUMMARY

The City of Carlsbad (City) proposes the construction of approximately 1000' of boardwalk as part of improvements to the existing multi-use recreation trail system within the City owned 262-acre Lake Calavera Preserve (Preserve). Improvements and maintenance to the existing multi-use recreational trails and viewpoints in the Lake Calavera Preserve are being implemented as part of the Lake Calavera Trails Master Plan.

The proposed boardwalk system will replace informal trails developed within jurisdictional wetlands upstream of Lake Calavera, including a crossing at a tributary to Agua Hedionda Creek (Calavera Creek) and a secondary creek tributary. The boardwalk will elevate trail users above the wetland and out of the creek preventing sedimentation of wetland waters, tramping vegetation and compacting native soil. The boardwalk trail would be enhanced and widened in accordance with the City's *Habitat Management Plan for Natural Communities in the City of Carlsbad* (HMP, Adopted 2004) and per the guidelines outline in this Final Wetland Habitat Mitigation and Monitoring Plan (HMMP). The boardwalk will serve to protect functions of the wetland, while providing services which benefit the public by allowing interaction within this fragile ecosystem.

Construction of the boardwalk would be funded through the City of Carlsbad Capital Construction Improvements Program. The construction of the boardwalk would be broken up into two phases. The first phase would cover the majority of the boardwalk running through the main creek area. A second phase would be associated with a small tributary drainage in the southeast portion of the project, which is currently slated as an Eagle Scout project. These two phases will be handled separately by the city for construction, but are being permitted together with the resource agencies.

Impacts to jurisdictional aquatic resources for the boardwalk project includes impacts to 0.10-acre of permanent and 0.06-acre of temporary impact to ACOE and CDFG jurisdictional wetlands, totaling 0.16-acre of impacts. Additionally, 0.05 acre of CDFG only wetlands will be permanently impacted and 0.04-acre will be temporarily impacted. Impacts to upland vegetation include 0.016 acre of permanent impacts and 0.003 acres of temporary impacts, for a total of 0.019 acre to Diegan coastal sage scrub and disturbed habitat. Project impacts are significant per the City's HMP and require project mitigation measures be implemented to reduce impacts to a level below significant.

Impacts to U.S. Army Corps of Engineers (ACOE), California Department of Fish and Game (CDFG), and Regional Water Quality Control Board (RWQCB) jurisdictional wetlands, as well as associated uplands will be mitigated through on-site creation, restoration and enhancement. Vegetation communities that will be created (established), restored and enhanced on site include

southern willow scrub, freshwater marsh, southern coast live oak riparian forest and Diegan coastal sage scrub. A total of 0.51 acres of combined jurisdictional wetlands will be created, restored and/or enhanced, with an additional 0.05 acres of DCSS will be created in order to serve as a buffer to the created wetland mitigation areas in the north east portion of the project. Mitigation will be obligated to a 5-year maintenance and monitoring period until established performance criteria is achieved and accepted by the resource agencies.

1.0 DESCRIPTION OF THE LAKE CALAVERA PRESERVE TRAIL BOARDWALK PROJECT

The City of Carlsbad (City) proposed boardwalk trail is part of improvements to the existing multi-use recreation trail system within the City owned Lake Calavera Preserve (Preserve). The approximate 262-acre Lake Calavera Preserve is located in the northeastern corner of the City of Carlsbad, San Diego County, within unsectioned lands of the Agua Hedionda land grant on the southeastern portion of the United States Geological Survey (USGS) 7.5' San Luis Rey, California Quadrangle (Figures 1 and 2).

The Lake Calavera Trails Master Plan (Master Plan) was approved by the City in January, 2010. The Master Plan includes improvements and maintenance to approximately 6-miles of existing trails, to accommodate hikers and non-motorized bicyclists. The proposed project would prevent this uncontrolled loss of habitat through the implementation of an improved and managed trail system designed to follow portions of the existing trail system.

The proposed elevated boardwalk trail will replace informal trails developed within jurisdictional wetlands upstream of Lake Calavera, including a crossing at a tributary to Agua Hedionda Creek (Calavera Creek) and a secondary creek tributary. The boardwalk will elevate trail users above the wetland and out of the creek preventing sedimentation of wetland waters, tramping vegetation and compacting native soil. The boardwalk will serve to protect functions of the wetland, while providing recreational benefit to the public by allowing a more manageable interaction within this fragile ecosystem. Restoring degraded wetlands from informal egress and designating one trail will greatly improve the biological functions of the creek and wetland areas.

The boardwalk trail would be designed and implemented in accordance with the City's *Habitat Management Plan for Natural Communities in the City of Carlsbad*, Section F2 and F3 (HMP, Adopted 2004) and designated as a Type B trail. Type B boardwalk trails are intended for pedestrians and bicyclists. The three segments of this trail type cross over site drainages, or are located within an area that receives seasonal saturation; thus, 3 segments of boardwalk are proposed to be constructed to enable safe year around crossing by trail users.

From shortest to longest, the length of boardwalk required at each segment range from approximately 25, 278, to 649 feet; the width and horizontal clearance of each boardwalk segment would be 6 feet (with an overall construction zone of 8 feet. This width includes an elevated edging along each edge of the boardwalk for safety and to meet ADA requirements. It is anticipated that the construction of all boardwalks would require an impact width of 8 feet (construction zone); thus, the outer foot on either side of the construction zone are considered temporary impacts (two feet total), which would be revegetated as part of the mitigation program.

Boardwalks are proposed to replace an existing highly trafficked informal trail system established through sensitive wetlands, which includes user-constructed bridges made from driftwood debris and salvaged construction materials. In addition, during months of high rainfall, users avoid saturated areas by trampling on adjacent native vegetation. The construction of boardwalks would prevent trail widening and ensure that users stay within the designated trail.

Construction of the boardwalk would be funded the City of Carlsbad Capital Construction Improvement Program and possibly grant funds that are currently in process for the project. However, the project is not dependent on the grant funds in order to move forward once permit entitlements are obtained.

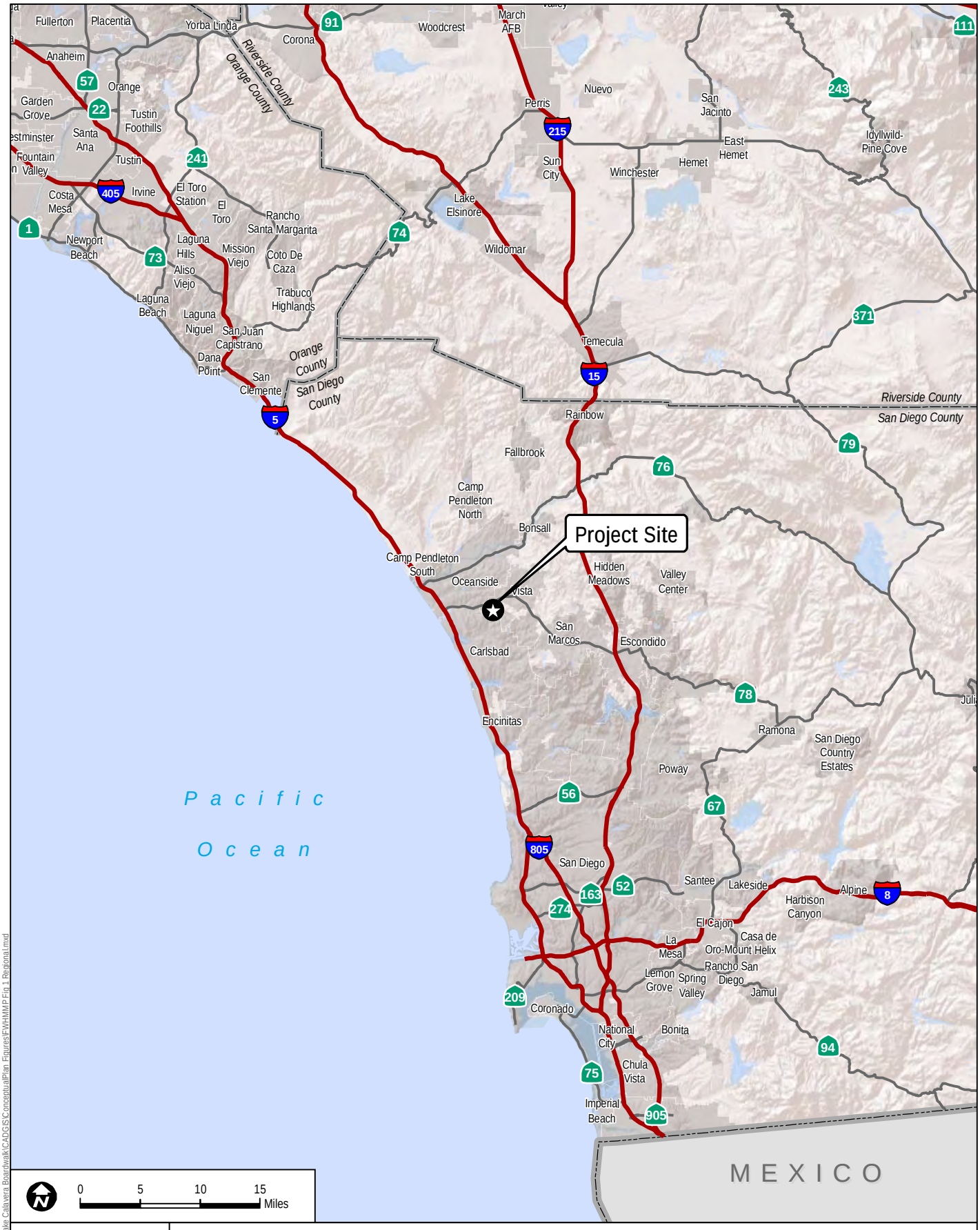
Impacts to U.S. Army Corps of Engineers (ACOE), California Department of Fish and Game (CDFG), and Regional Water Quality Control Board (RWQCB) jurisdictional wetlands will be mitigated for through on-site wetland creation, restoration and enhancement of jurisdictional wetland vegetation communities. This document provides a conceptual plan for the on-site wetlands mitigation and associated uplands restoration and follows the general compensatory mitigation requirements as outlined by ACOE in the Federal Register (73 FR 19594–19705).

1.1 Applicant/Permittee

City of Carlsbad
Parks and Recreation Department
799 Pine Ave. Suite 200
Carlsbad, California 92008
Contact: Ms. Liz Ketabian
Phone.760.434.2978
Fax. 760.434.5088

1.2 Responsible Parties (Financial Assurances)

Dudek prepared this Final Wetlands Habitat Mitigation and Monitoring Plan (HMMP) in support of the City's permit applications to ACOE, CDFG, and RWQCB. If the permits are granted by the resource agencies, the City will be financially responsible for the costs associated with the implementation, monitoring, maintenance, and long-term protection of mitigation and restoration areas as defined in this plan. The City will also be responsible for all costs associated with completion of the mitigation and restoration requirements herein. Further, The City will provide access to the project areas for Restoration Ecologists, Habitat Restoration Contractor, and permitting agency officials.



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AUGUST 2012

FIGURE 1

Regional Map

Lake Calavera Trials Master Plan Boardwalk Improvement Project - Final Wetland Habitat Mitigation and Monitoring Plan

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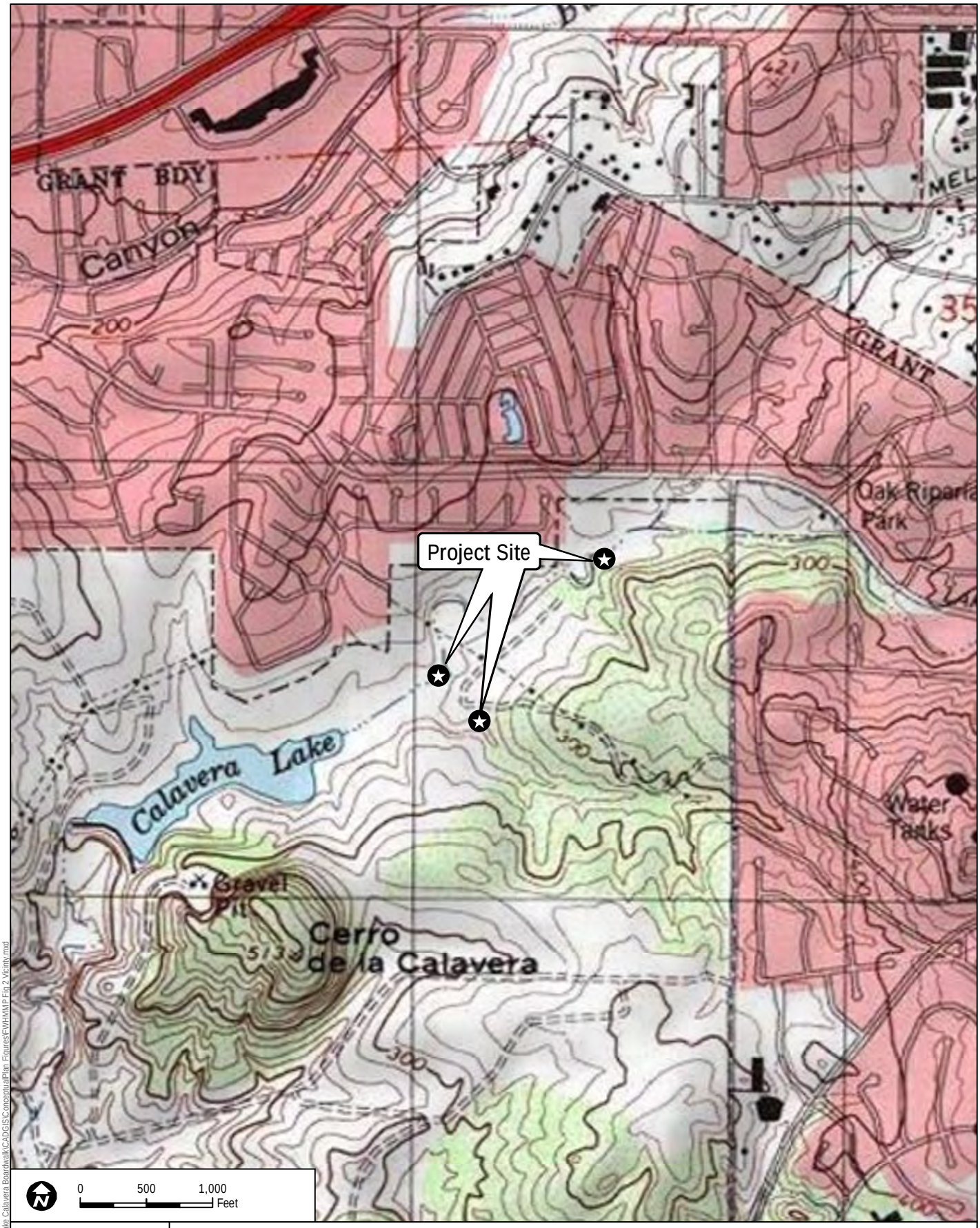

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AUGUST 2012

SOURCE: USGS 7.5-Minute Series Quadrangle.

FIGURE 2

Vicinity Map

Lake Calavera Trials Master Plan Boardwalk Improvement Project - Final Wetland Habitat Mitigation and Monitoring Plan

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The City will select a qualified Restoration Ecologist to monitor boardwalk installation, mitigation and long-term maintenance of the mitigation and restoration areas. The Restoration Ecologist and the City will review all aspects of the pertinent contract documents including, but not limited to, boardwalk installation plans and specifications, restoration plans and specifications, site protection, contractor submittals, scheduling of formal site observations, lines of communication, and persons with inspections, and stop work authority prior to project implementation. The City, in consultation with the Restoration Ecologist will oversee and coordinate implementation of boardwalk installation and this HMMP, including conducting or overseeing field work for project installation and monitoring during the 5-year maintenance and monitoring period. The Restoration Ecologist will possess specific knowledge and project-level experience with wetlands establishment and enhancement projects, and at least 5 years of wetlands restoration experience in California.

The Restoration Ecologist also will be required to advise all project personnel of the on-site construction restrictions resulting from the proposed implementation of boardwalk installation and this HMMP, and the presence or potential presence of sensitive species and vegetation communities within or adjacent to the project area, as well as known biological related dangers on site (e.g., rattlesnakes, bee hives, poison oak, etc.). Information about federal, state, and local laws relating to these biological resources will be discussed as part of the environmental education program. Access and staging areas will be established outside of environmentally sensitive areas. Project installation monitoring will occur throughout the boardwalk and restoration site construction period. Monitoring time may increase or decrease as required by field conditions and construction activities.

The City will hire a contractor (Habitat Restoration Contractor) to conduct the restoration in conjunction with boardwalk installation. If the City chooses to hire a separate contractor for boardwalk construction/installation, the City and contractor shall coordinate the boardwalk construction concurrent with restoration activities. The City will coordinate the installation of the boardwalk in the small southeasterly tributary drainage, separately from the main boardwalk construction.

The Habitat Restoration Contractor will be a qualified, licensed company, with experience in native habitat restoration and maintenance. During the implementation phase, the Habitat Restoration Contractor will be responsible for performing project installation, including site preparation, grading, seeding, planting, erosion control, and other tasks as directed by the City, Restoration Ecologist and as described in this HMMP. During the 5-year monitoring phase, the Habitat Restoration Contractor will be responsible for irrigation, weed control, erosion control, trash removal, replanting, and other tasks as directed by the City, Restoration Ecologist and as described in this HMMP.

1.3 Regional Resource Planning Context

Projects located within the City's jurisdiction will be subject to the finalized, adopted version of the HMP. The proposed project site is located within a proposed hardline conservation area of the City's HMP preserve system. With the final approval of the HMP in 2004, the Lake Calavera Project site receives the same conservation status as existing hardline areas and thus is designated as open space (Adopted 2004, Section D, page D-14). Implementation of the project mitigation measures shall be required to reduce impacts to a level below significance and ensure consistency with the Multiple Habitat Conservation Program (MHCP).

The Lake Calavera trails Master Plan, including the segments of proposed boardwalk trails, have undergone CEQA review and a Mitigated Neg. Dec was filed on January 27, 2010 for HMP 09-05 for Doc. # 100020. The State Cleaning house number is 200907109. A copy of the Notice of Determination for the MND and the Mitigation Measures for the Lake Calavera Trails Master Plan are attached as Appendix A and referenced herein.

2.0 EXISTING CONDITIONS (BASELINE INFORMATION)

Biological surveys of the project site were conducted by Merkel & Associates, Inc. (M&A) between 2005 to 2009 to identify the biological resources present and analyze biological impacts throughout the Lake Calavera Trails Study Area. Survey data relevant to the Boardwalk project are included below, as presented in the Lake Calavera Trails Biological Resources Report (Merkel and Associates, 2009). M&A mapped the vegetation on site, performed a jurisdictional wetland delineation, and conducted protocol surveys for the federally listed, endangered vernal pool branchiopods [i.e., San Diego fairy shrimp (*Branchinecta sandiegonensis*)], federally and state listed, endangered least Bell's vireo (*Vireo bellii pusillus*), federally listed, endangered southwestern willow flycatcher (*Empidonax traillii extimus*), and federally listed, threatened coastal California gnatcatcher (*Polioptila californica californica*). In addition, M&A biologists surveyed for the federally listed, threatened thread-leaved brodiaea (*Brodiaea filifolia*).

Dudek Habitat Restoration Specialists John Minchin and Stuart Fraser conducted field surveys within the study area specific to construction of the proposed boardwalk and to evaluate mitigation opportunities (2011). The survey efforts were focused on vegetation, jurisdictional waters, and sensitive plant and animal species. General biological surveys and focused botanical and wildlife studies were also conducted within the study area by M&A. Descriptions included below summarize the results of those surveys. A preliminary plan view layout of the boardwalk with representative photographs taken along the boardwalk alignment are shown on Figure B-1 (Appendix B).

2.1 Physical Conditions

The Boardwalk project area is situated along a USGS unnamed tributary (Calavera Creek) to Agua Hedionda Creek, which occurs approximately one mile southwest of the site. Coordinates locate the project site at 33deg.10'23N and 117deg.16'52" W. The project area is situated northeast and upstream of a man-made earth-fill dam and reservoir (called Lake Calavera) that currently impounds runoff from the upper Calavera Creek watershed. The Boardwalk project area is located in the northeastern portion of the Lake Calavera Preserve with single-family residences located on the north, east and west and an adjacent CDFG preserve to the south.

2.2 Topography

The Boardwalk project area is located within a broad drainage area subject to seasonal flooding and ponding. Elevations within the Boardwalk project area range from approximately 215 feet above mean sea level (AMSL) at the main creek crossing, between 224 and 228 ASML at the upstream tributary crossing and at between 228 and 244 feet ASML in the upstream stretch.

Construction of the dam and creation of the reservoir/impoundment downstream has effected/impacted site physiography. Slopes draining into drainage surrounding the project site are gentle with steep slopes on the flanks of Mount Calavera to the south.

2.3 Soils

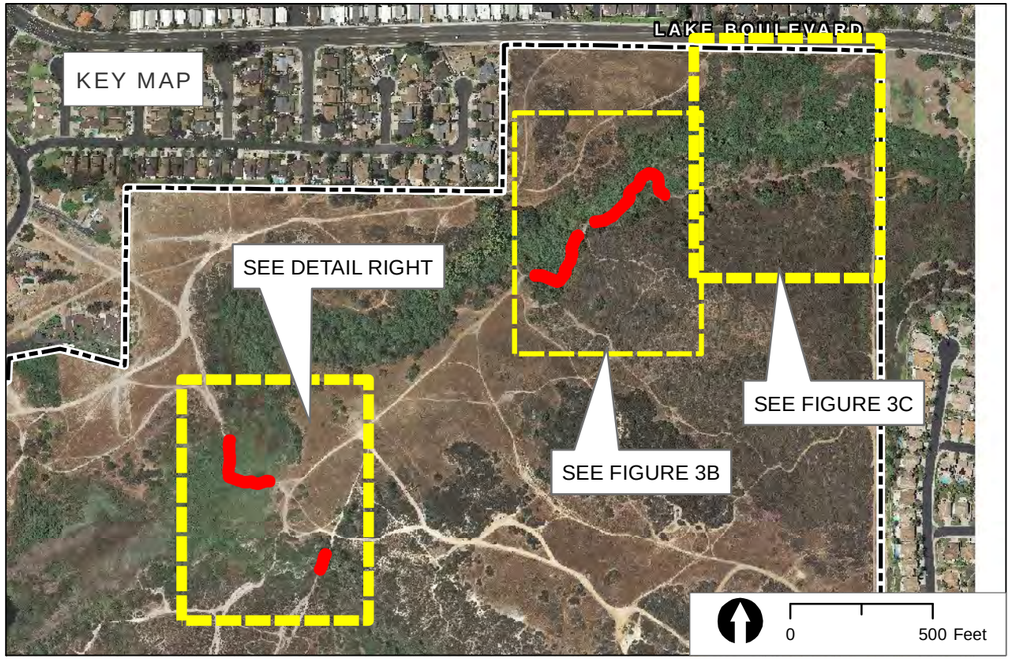
According to Bowman (1973), Salinas clay loams covers 100% of the study area. The Salinas series consists of well drained and moderately well drained clay loams that washed from the Huerhuero complex and Las Flores loamy fine sand. These soils are found in flood plains and alluvial fans and have slopes of 0–9%. In a representative profile, the surface layer is dark grayish brown clay loam and neutral to mildly alkaline to about 22 inches. The subsoil is dark grayish-brown heavy clay loam and clay and mildly alkaline (pH 7.4) to a depth of more than 60 inches. The erosion hazard is slight to moderate.

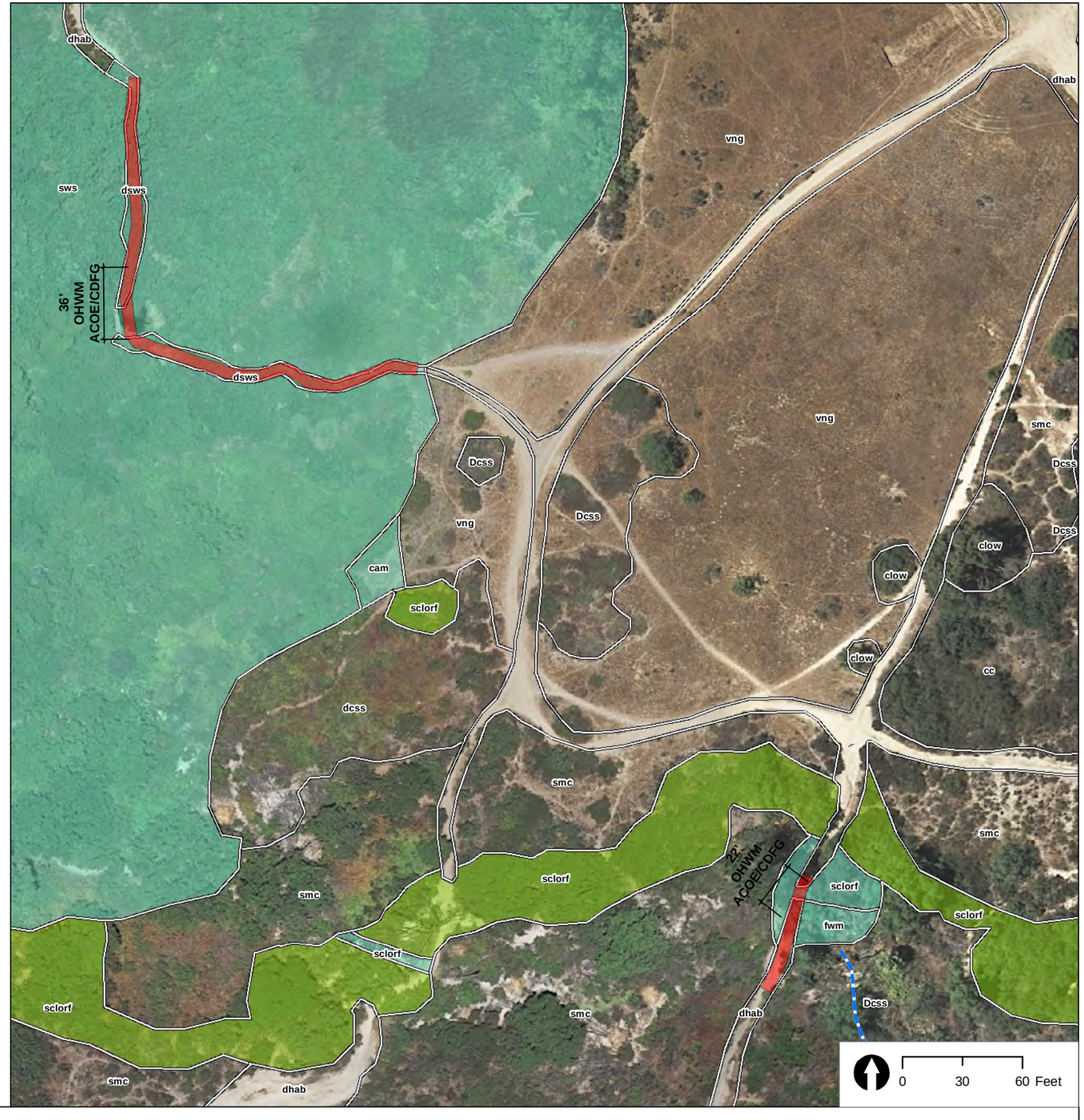
2.4 Vegetation Communities

An analysis of vegetation communities is provided in the Lake Calavera Trails Biology Resources Report (Merkel and Associates 2009). According to this report, and follow-up reconnaissance by Dudek (2011), the project area supports predominantly wetlands habitat with patches of disturbed coastal sage and disturbed habitat (trails). A total of 8 vegetation communities and land covers were identified within the boardwalk and restoration project area, including disturbed wetland, coastal and valley freshwater marsh, southern coast live oak riparian forest, southern willow scrub, mulefat scrub, cismontane alkali marsh, Diegan coastal sage scrub, and disturbed habitat. (Figures 3A, 3B and 3C). Characteristics of the vegetation communities present on site are described below.

2.4.1 Disturbed Wetland

Disturbed Wetland (DW) has been mapped within the proposed boardwalk construction portion of the study area adjacent to southern willow scrub and freshwater marsh. This vegetation community is comprised of open and patchy flora species including non-native and native species. This area is heavily dominated by pampas grass (*Cortaderia jubata*) with several coyote brush (*Baccharis pilularis*) shrubs and non-native annual forb species intermixed. In some cases, heavily compacted and unvegetated areas within ACOE/CDFG or CDFG jurisdictional areas were mapped as disturbed wetland. The majority of trails and pathways located within a designated vegetation community were classified as a ‘disturbed’ variant (i.e., disturbed Southern Willow Scrub).





PreserveBndy

Boardwalk Permanent & Temporary Impacts
(SWS & FWM Revegetation of Temporary Impacts)

Non-Wetland Waters

ACOE/CDFG Jurisdictional Habitat

CDFG Jurisdictional Habitat

VEGCODE, VEGTYPE

Coyote Brush Scr, Diegan Coastal Sage Scrub/Reveg

Dcss, Diegan Coastal Sage Scrub

Dcss/reveg, Diegan Coastal Sage Scrub/Reveg

cam, Cismontane Alkali Marsh

cc, Chamise Chaparral

clow, Coast Live Oak Woodland

cscs, Coastal Sage-Chaparral Scrub

dDcss, Disturbed Diegan Coastal Sage Scrub

dcss, Coyote Brush Scrub

dfwm, Disturbed Coastal and Valley Freshwater Marsh

dhab, Disturbed Habitat

dsclorf, Disturbed Southern Coast Live Oak Riparian Forest

dsws, Disturbed Southern Willow Scrub

dwet, Disturbed Wetland

fwm, Coastal and Valley Freshwater Marsh

mfs, Mule Fat Scrub

nng, Non-native Grassland

nnv, Non-native Vegetation

ow, Open Water

sclorf, Southern Coast Live Oak Riparian Forest

smc, Southern Mixed Chaparral

sws, Southern Willow Scrub

urdev, Urban/Developed

vng, Disturbed Valley Needlegrass Grassland

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AERIAL SOURCE: City of Carlsbad 2009

FIGURE 3A

Existing Conditions with Proposed Boardwalk - West Portion

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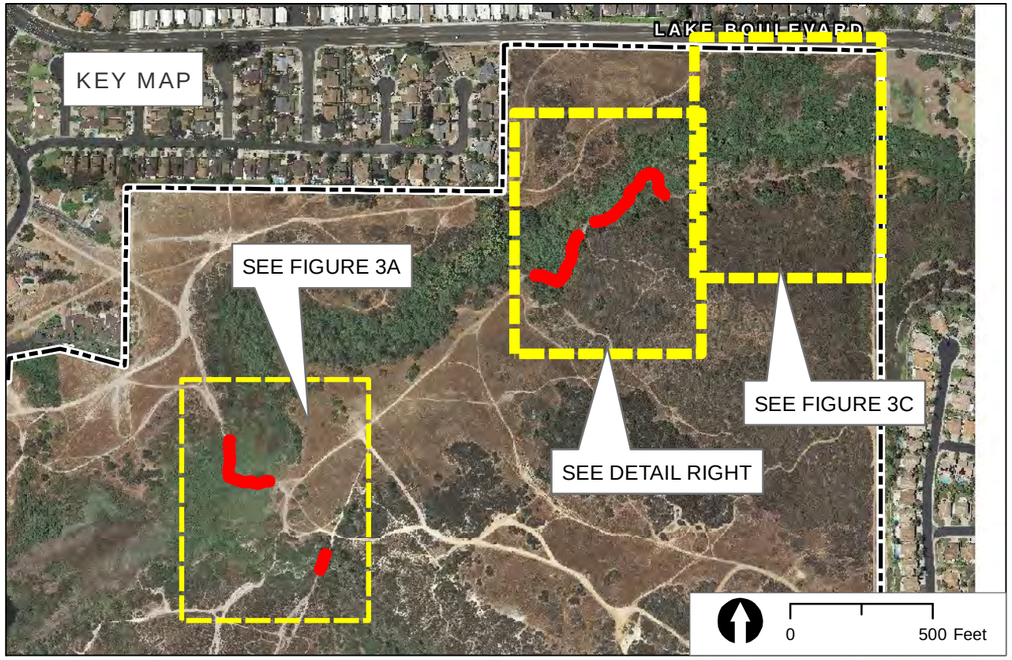

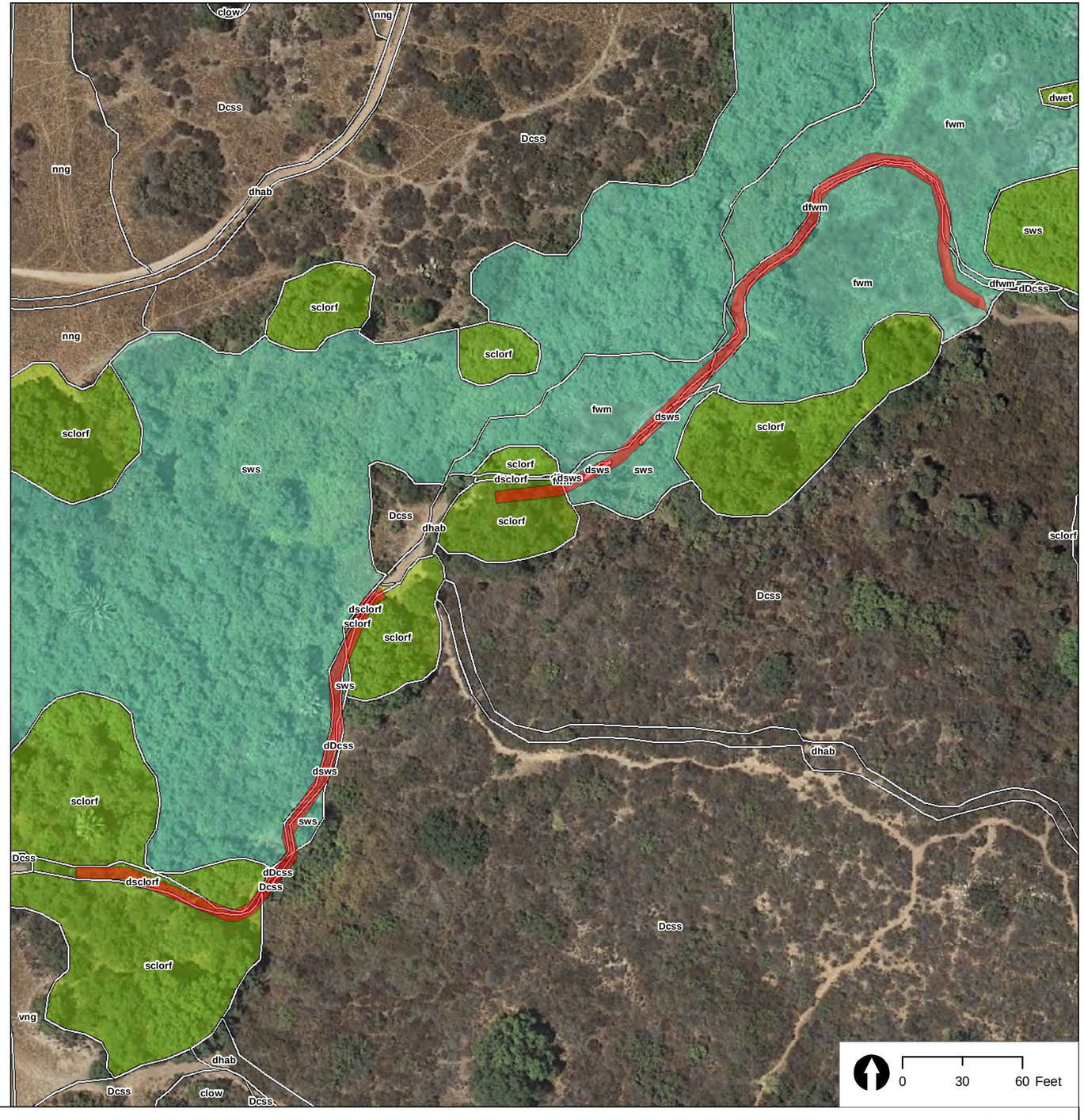

PreserveBndy

Boardwalk Permanent & Temporary Impacts
(SWS & FWM Revegetation of Temporary Impacts)

ACOE/CDFG Jurisdictional Habitat

CDFG Jurisdictional Habitat

VEGCODE, VEGTYPE

Coyote Brush Scr, Diegan Coastal Sage Scrub/Reveg

Dcss, Diegan Coastal Sage Scrub

Dcss/reveg, Diegan Coastal Sage Scrub/Reveg

cam, Cismontane Alkali Marsh

cc, Chamise Chaparral

clow, Coast Live Oak Woodland

cscs, Coastal Sage-Chaparral Scrub

dDcss, Disturbed Diegan Coastal Sage Scrub

dcss, Coyote Brush Scrub

dfwm, Disturbed Coastal and Valley Freshwater Marsh

dhab, Disturbed Habitat

dsclorf, Disturbed Southern Coast Live Oak Riparian Forest

dsws, Disturbed Southern Willow Scrub

dwet, Disturbed Wetland

fwm, Coastal and Valley Freshwater Marsh

mfs, Mule Fat Scrub

nng, Non-native Grassland

nnv, Non-native Vegetation

ow, Open Water

sclorf, Southern Coast Live Oak Riparian Forest

smc, Southern Mixed Chaparral

sws, Southern Willow Scrub

urdev, Urban/Developed

vng, Disturbed Valley Needlegrass Grassland

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AERIAL SOURCE: City of Carlsbad 2009

FIGURE 3B

Existing Conditions with Proposed Boardwalk - East Portion

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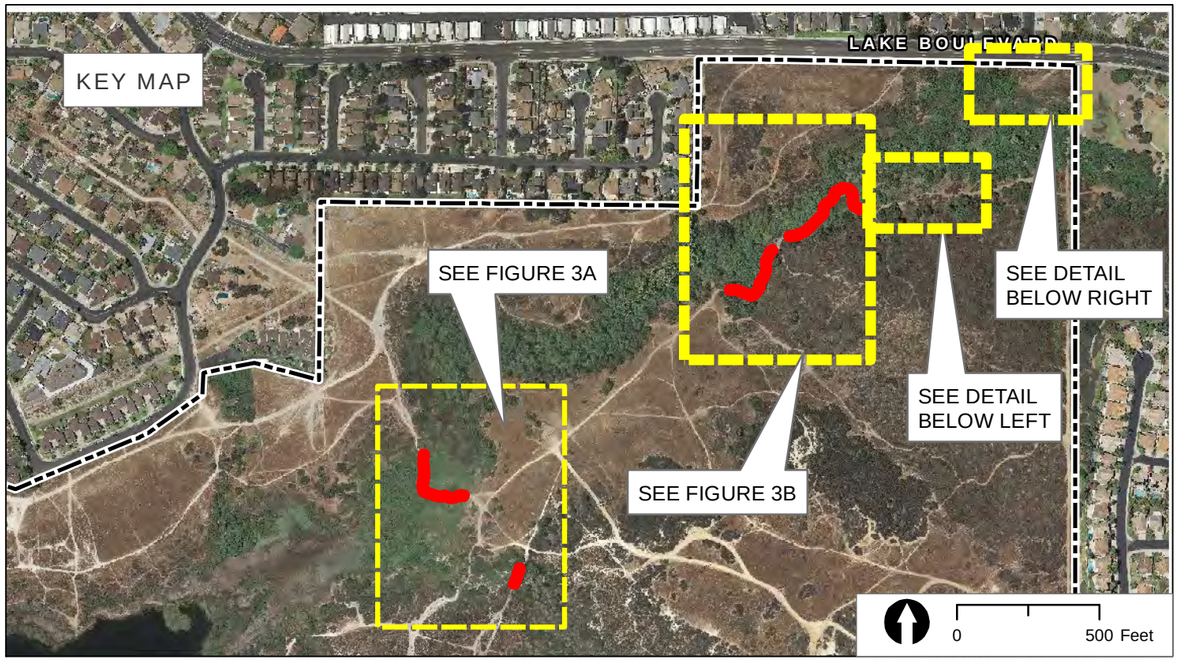

PreserveBndy

Boardwalk Permanent & Temporary Impacts

ACOE/CDFG Jurisdictional Habitat

CDFG Jurisdictional Habitat

VEGCODE, VEGTYPE

Coyote Brush Scr, Diegan Coastal Sage Scrub/Reveg

Dcss, Diegan Coastal Sage Scrub

Dcss/reveg, Diegan Coastal Sage Scrub/Reveg

cam, Cismontane Alkali Marsh

cc, Chamise Chaparral

clow, Coast Live Oak Woodland

cscs, Coastal Sage-Chaparral Scrub

dDcss, Disturbed Diegan Coastal Sage Scrub

dcss, Coyote Brush Scrub

dfwm, Disturbed Coastal and Valley Freshwater Marsh

dhab, Disturbed Habitat

dsclorf, Disturbed Southern Coast Live Oak Riparian Forest

dsws, Disturbed Southern Willow Scrub

dwet, Disturbed Wetland

fwm, Coastal and Valley Freshwater Marsh

mfs, Mule Fat Scrub

nng, Non-native Grassland

nnv, Non-native Vegetation

ow, Open Water

sclorf, Southern Coast Live Oak Riparian Forest

smc, Southern Mixed Chaparral

sws, Southern Willow Scrub

urdev, Urban/Developed

vng, Disturbed Valley Needlegrass Grassland

DUDEK

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AUGUST 2012

AERIAL SOURCE: City of Carlsbad 2009

FIGURE 3C

Existing Conditions - Northeast Corner

Lake Calavera Trials Master Plan Boardwalk Improvement Project - Final Wetland Habitat Mitigation and Monitoring Plan

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2.4.2 Coastal and Valley Freshwater Marsh

Coastal and Valley Freshwater Marsh (FWM) habitat occurs along within the wetland depressions periodically flooded during high water conditions. The portion of this vegetation community present on the project site is dominated by low herbaceous species including Yerba mansa (*Anemopsis californica*) and low emergent monocots including Mexican rush (*Juncus mexicanus*), Spiny rush (*Juncus acutus*), pale spike-sedge (*Eleocharis macrostachya*), broad-leaved cattail (*Typha latifolia*) and California bulrush (*Scirpus californicus*). Other herbaceous species including broad-leaved cattail (*Typha latifolia*), California bulrush (*Scirpus californicus*) and salt marsh fleabane (*Pluchea odorata*) occur in patches.

Disturbed Freshwater Marsh (dFWM) is present on trails and pathways located within Freshwater Marsh. Site disturbance, including repeated mechanical perturbation has altered the vegetation composition such that the shrub cover percentage is below 10% and there is a high prevalence of compacted soils and impacted vegetation along the trail fringe. All dFWM vegetation is located within ACOE/CDFG jurisdictional wetlands.

2.4.3 Southern Coast Live Oak Riparian Forest

Individual trees, as well as small groves of coast live oak (*Quercus agrifolia*), occur within the Southern Live Oak Riparian Forest (SLORF) habitat areas, which occur along the tributary drainages, and the mesic areas upstream from the reservoir. Most of the oaks are mature trees with a height and similar canopy width ranging from 20–40 feet. The understory includes mostly leaf-litter, which serves to keep the soil and roots of these trees cool and moist during the dry summer months. Along the canopy fringe, several shade-adapted species were detected. Included here were California peony (*Paeonia californica*), checker-bloom (*Sidalcea malvaeflora* ssp. *sparsifolia*) and coast jepsonia (*Jepsonia parryi*).

Disturbed Southern Live Oak Riparian Forest (dSLORF) is present on trails and pathways located within Southern Live Oak Riparian Forest. Site disturbance, including repeated mechanical perturbation has altered the vegetation composition such that the shrub cover percentage is below 10% and there is a high prevalence of compacted soils and impacted vegetation along the trail fringe. dSLORF vegetation communities are located within either ACOE/CDFG or CDFG jurisdictional wetlands.

2.4.4 Southern Willow Scrub

Southern Willow Scrub (SWS) habitat is the predominant vegetation community located along Lake Calavera Creek, upstream from the reservoir. Much of this habitat includes willow species ranging from 20 to 40 feet in height. Included here are arroyo willow (*Salix lasiolepis*), lance-

leaf willow (*Salix lucida* ssp. *lasiandra*) and Goodding's black willow (*Salix gooddingii*). Several small groves of California fan palm (*Washingtonia filifera*) have invaded the upstream portion of the site. In the most mesic locations, freshwater marsh habitat including dense stands of California bulrush and broad-leaved cattail comprise the understory. In drier areas, the understory includes a high diversity of shrub and herbaceous plant species. The shrub layer includes mulefat, narrow-leaved willow (*Salix exigua*), and western poison oak (*Toxicodendron diversilobum*). The herbaceous layer includes yerba mansa, San Diego sedge (*Carex spissa*), and variety of rushes including Mexican rush, mariposa rush (*Juncus dubius*), and the sensitive flora species spiny rush.

Disturbed Southern Willow Scrub (dSWS) is present on trails and pathways located within Southern Willow Scrub. Site disturbance, including repeated mechanical perturbation has altered the vegetation composition such that the shrub cover percentage is below 10% and there is a high prevalence of compacted soils and impacted vegetation along the trail fringe. All dSWS vegetation communities are located within ACOE/CDFG jurisdictional wetlands.

2.4.5 Cismontane Alkali Marsh

Patches of Cismontane Alkali Marsh (CAM) are found in mesic locations upstream of the reservoir. High evaporation and low input of freshwater render these areas somewhat salty. The dominant species of this habitat is yerba mansa (*Anemopsis californica*) and saltgrass (*Distichlis spicata*). Other species present include western ragweed (*Ambrosia psilostachya*), Mexican rush (*Juncus mexicanus*), and spiny rush (*Juncus acutus* ssp. *leopoldii*). Non-native plants such as celery (*Apium graveolens*), annual beard grass (*Polypogon monspeliensis*), and curly dock (*Rumex crispus*) are also present.

2.4.6 Mulefat Scrub

Mulefat Scrub (MFS) occurs in patches upstream of the reservoir and is typically situated between freshwater marsh and upland habitat types such as Diegan coastal sage scrub. It is typically characterized as a monotypic shrub community with mulefat (*Baccharis salicifolia*) as the predominant species. Occasional young willows may also be found in this habitat, though in most cases individual willows are mapped as southern willow scrub. Understory plants include wetland associates such as saltgrass and in shady areas cocklebur (*Xanthium strumarium*).

2.4.7 Diegan Coastal Sage Scrub

Diegan Coastal Sage Scrub (DCSS) habitat on site includes several monotypic stands of coyote brush located moist areas adjacent to southern willow scrub vegetation communities have been mapped as DCSS by M&A. These areas are dominated by coyote brush with very little

understory; however, in more mesic portions of the study area bristly ox-tongue (*Picris echioides*) and western poison oak can be found.

2.4.8 Disturbed Habitat

Areas mapped as Disturbed Habitat (DH) on site follow the MHCP definitions for disturbed habitat. Per this definition, vegetative cover comprises less than 10% of the surface area and there is evidence of soil surface disturbance and compaction (i.e., grading). Some areas may exceed 10% vegetative cover; however, there is soil disturbance and the presence of debris. Disturbed habitat is mapped for the numerous walking/bike trails located outside of ACOE and CDFG jurisdiction wetland areas and for the non-native annual weed dominated slopes located in the northeast corner of the Preserve site.

2.5 Sensitive Biological Resources

Sensitive biological resources are those defined as follows: (1) species that have been given special recognition by federal, state, or local conservation agencies and organizations due to limited, declining, or threatened population sizes; (2) species and habitat types recognized by local and regional resource agencies as sensitive; (3) habitat areas or vegetation communities that are unique, are of relatively limited distribution, or are of particular value to wildlife; and (4) wildlife corridors and habitat linkages. Regulated biological resources may or may not be considered sensitive, but are regulated under local, state, and/or federal laws.

2.5.1 Sensitive Plant Species

An analysis of sensitive flora for the Lake Calavera Preserve is provided in the Lake Calavera Trails Biology Resources Report (Merkel and Associates 2009). According to this report, Spiny rush (*Juncus acutus* spp. *leopoldii*) (CNPS List 4.2)(CNPS, 2001) was identified within the wetland vegetation communities proposed for the boardwalk trail project.

2.5.2 Sensitive Wildlife Species

Surveys for sensitive wildlife were conducted by Merkel and with information provided in the Lake Calavera Trails Biology Resources Report (Merkel and Associates 2009). According to this report, 13 sensitive fauna species were detected within the Lake Calaveras Preserve Site, they include the western spadefoot (*Scaphiopus hammondii*), monarch (Danaus plexippus) , white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), Nuttall's woodpecker (*Picoides nuttallii*), loggerhead shrike (*Lanius ludovicianus*), coastal California gnatcatcher (*Polioptila californica californica*), California thrasher (*Toxostoma redivivum*), yellow warbler (*Dendroica petechia*

brewsteri), yellow-breasted chat (*Icteria virens*), and tricolored blackbird (*Agelaius tricolor*). Although no nests were observed during the surveys, it is possible for the raptor species to nest on-site within southern coast live oak riparian forest or southern willow scrub.

No least Bell's vireos and no southwestern willow flycatchers were detected on the project site during the focused surveys. Brown-headed cowbirds (*Molothrus ater*) were detected within the northeastern portion of the Preserve. Tricolored blackbirds were also detected within the northeastern portion of the study area.

2.5.3 Wildlife Linkages and Corridors

An analysis of habitat linkages and corridors for the Lake Calavera Preserve is provided in the Lake Calavera Trails Biology Resources Report (Merkel and Associates 2009). According to this report, the Lake Calavera Preserve has been identified in the within the Local Facilities Management Zone (LFMZ) 14 (City Adopted 2004). This zone includes Core 3 (approximately 1,163 acres), which contains large areas of coastal sage scrub that support critical populations of the threatened coastal California gnatcatcher and thread-leaved brodiaea. Other sensitive habitats within Core 3 include chaparral, grasslands, and wetland communities. Core 3 has direct linkages to other Core areas including Core 2, Core 4, and Core 5. Downstream of the reservoir, Linkage Area B connects Core 3 to Core 4 (i.e., Agua Hedionda Lagoon and environs).

The Lake Calavera Preserve retains some connectivity between Agua Hedionda Lagoon and Robertson Ranch. El Camino Real, a heavily trafficked highway, separates the back lagoon riparian habitat from Robertson Ranch. In addition, the expansion of College Boulevard has slightly interrupted this corridor. Moreover, habitat north of the El Camino Real now consists of a palm nursery and the agricultural lands of Robertson Ranch. This connection northward is, therefore, tenuous at present, but does not preclude future enhancement, insofar as urban hardscape (other than the road) is not in place. The Lake Calavera Trails study area functions as a wildlife corridor supporting movement of individuals (and thus genetic material) from within Core 3 to adjacent Core areas westward and vice versa.

2.5.4 Sensitive Vegetation Communities and Habitats

An analysis of Sensitive Vegetation and on site is provided in the Lake Calavera Trails Biology Resources Report (Merkel and Associates 2009). A summary of this information is provided below.

2.5.4.1 Wetlands

Wetland habitat types have extremely high wildlife values, are naturally limited in distribution, and also have been substantially depleted within southern California. Numerous species, including several sensitive species, are dependent on these habitats for food, cover, and breeding, and several additional species, although not dependent on these habitats, utilize these areas on a regular basis. The on-site wetlands are considered sensitive due to their high quality habitat, which support many common and sensitive riparian wildlife.

2.5.4.3 Jurisdictional Waters

Details of the jurisdictional wetland delineation performed by M&A, including survey dates and times is provided in the Lake Calavera Trails Biology Resources Report (M&A, 2009). According to this report, the jurisdictional wetland delineation was performed using the routine on-site determination methods noted in the 1987 Army Corps of Engineers' (ACOE) Wetland Delineation Manual (Environmental Laboratory 1987). In addition, the delineation effort was expanded to identify wetlands/non-wetland waters of the U.S. and streambeds under federal and state jurisdiction, respectively. Evidence supporting jurisdictional determinations was recorded on wetland field data forms and depicted in photographs of the data points. Wetland habitats and jurisdictional waterways were plotted on an aerial map (with topographical overlay) of the study area.

2.6 Project Impacts

The construction footprint of the proposed boardwalk, including the temporary impacts associated with installation, was carefully evaluated by M&A (2009) and Dudek (2011) to minimize impacts to biological resources within the Lake Calavera Preserve. The proposed boardwalk footprint was carefully aligned with the existing informal trail present on site. The selected alignment was chosen to minimize impacts to jurisdictional aquatic resources by avoiding existing mature willow, ponding and standing water (as practicable) and mature spiny rush (CNPS List 4.2) plants. Installation of an elevated boardwalk as a trail improvement will promote the natural flow patterns of seasonal wetland flooding below the boardwalk and eliminate impacts to the current wetland substrate; including trampling of herbaceous vegetation, compacting of surface soils and generating sediment from foot and bicycle traffic. The proposed trail alignment also minimizes impacts to sensitive upland vegetation communities by utilizing the existing pathway (disturbed habitat) to the greatest degree possible. Although impacts to sensitive resources were minimized by access route selection and modifications, some impacts to jurisdictional aquatic resources were unavoidable and are described in detail below and depicted in Table 1 and Figures 3A, 3B and 3C.

Impacts to sensitive vegetation communities from implementation of the boardwalk are considered significant per the City's HMP and would require that project mitigation measures be implemented to reduce impacts to a level below significant and achieve a no net loss of wetlands functions and services. Minor impacts to the special status, spiny rush plants are not considered significant, as spiny rush populations in San Diego County are now relatively stable. Furthermore, spiny rush planting has been included as part of the planting palette within this CWMMP.

2.6.1 Impacts to Upland Vegetation Communities and Land Covers

Impacts to disturbed habitat is considered significant per the City's HMP and require project mitigation measures be implemented to reduce impacts to a level below significant. Impacts to upland vegetation communities and land covers form this project are very minor and include 0.016 acre of permanent impacts and 0.003 acres of temporary impacts, for a total of 0.019 acre, as shown in Table 1. As discussed previously, the boardwalk construction zone includes a 6-foot permanent impact and a 2-foot temporary impact zone on the outer 1-foot of either side of the boardwalk. The temporary impact zone will be revegetated/restored in-kind and is discussed further below.

Table 1
Impacts to Upland Vegetation Communities and Land Covers (Acres)

Vegetation Community	Map Code	Permanent	Temporary	Total
Disturbed Habitat	DH	0.016	0.003	0.019

2.6.2 Impacts to Jurisdictional Aquatic Resources

Impacts to jurisdictional aquatic resources from the boardwalk project are shown in Table 2. This includes permanent and temporary impacts to resources under the jurisdiction of the County, ACOE, CDFG, and RWQCB. Impacts to jurisdictional wetlands and non-wetland waters of the U.S./streambed are significant per the City's HMP and will require that project mitigation measures be implemented to reduce impacts to a level below significant and achieve a no net loss of wetlands functions and services.

Combined jurisdictional impacts include 0.15-acre of permanent and 0.10-acre of temporary impact to ACOE and CDFG jurisdictional wetlands, totaling 0.25-acre of impacts. Permanent impacts will occur from the boardwalk's 6-foot permanent impact zone and temporary impacts shall occur from the 2-foot temporary impact zone on the outer 1-foot on either side of the boardwalk to allow for construction access. The temporary impact zone will be restored in-kind and is discussed below. Permanent and temporary impacts specific to wetland vegetation types and land covers is included in Table 2.

Table 2
Impacts to ACOE and CDFG Jurisdictional Wetland Vegetation Communities and Land Covers and CDFG Jurisdictional Waters (Acres)
(Revised 6/26/12 per ACOE impacts assessment)

Vegetation Community	Map Code	Permanent	Temporary	Total
Southern Willow Scrub (ACOE/CDFG)	SWS	0.06	0.02	0.08
Freshwater marsh (ACOE/CDFG)	FWM	0.03	0.03	0.06
Southern Coast Live Oak Riparian Forest (ACOE/CDFG)	SCLORF	0.001	0.001	0.002
	Total	0.10	0.06	0.16
Drainage (CDFG only)		<0.001	<0.001	<0.001
Southern Coast Live Oak Riparian Forest (CDFG only)	SCLORF	0.049	0.039	0.088
	Total	0.05	0.04	0.09

2.6.3 Sensitive Species Direct Impacts

Approximately 10 spiny rush plants would be directly impacted from the Lake Calavera Trails project. Spiny rush populations in San Diego County are now relatively stable despite several decades of losses associated with widespread regional reductions in wetlands. The direct impacts to spiny rush, a California Special Plant, are not considered significant as the loss of these plants is not expected to threaten to eliminate a plant community and thus would not require project mitigation measures. However, the City has agreed to include container plants of spiny rush within the wetland mitigation planting plan (M&A, 2009).

2.7 Biological Functions and Values of Areas to be Impacted

2.7.1 Functions and Services of Jurisdictional Aquatic Resources

Jurisdictional wetland communities that will be impacted by the project are within the Lake Calavera Preserve. Therefore, their functions and services are consistent with the functions and services of the habitat within the overall preserve, which are generally to provide habitat to plant and wildlife species.

The functions and services of jurisdictional wetland communities on site generally include the functions and services typical of natural vegetated wetland and riparian communities, such as dissipation of energy, cycling of nutrients, uptake of elements and compounds, retention of particulates, export of organic carbon, and maintenance of plant and animal communities (e.g., nesting, feeding, and breeding opportunities for various aquatic, terrestrial, and avian animals). Impacts to southern willow scrub will occur to the outer fringe of the willow canopy along the riparian corridor, and will include primarily impacts to the understory vegetation.

The riparian vegetation and marsh, habitats contribute to the site's high biological functions and services. The riparian vegetation, particularly the southern willow scrub, consists of moderately dense vegetation that provides a multi-layer canopy, which supports many common riparian birds, such as yellow-rumped warbler (*Dendroica coronata*), song sparrow (*Melospiza melodia*), lesser goldfinch (*Carduelis psaltria*), common yellowthroat (*Geothlypis trichas*). The on-site wetlands do support several sensitive riparian birds such as the yellow warbler, yellow-breasted chat, and various raptors. Additionally, the smaller ponding areas and abundance of leaf litter beneath the larger stands of willows are expected to provide breeding habitat for various common amphibian species including the Pacific chorus frog (*Pseudacris regilla*) and western toad (*Bufo boreas*). The marsh and open water habitats also contribute to the site's high wildlife diversity and abundance by supporting numerous wildlife species (M&A, 2009).

The disturbed southern willow scrub, disturbed freshwater marsh and disturbed wetland include the informal trails and pathways established over time from recreational user groups located in jurisdictional wetlands. These areas provide very limited functions to plants and wildlife. The functions that they may provide for wildlife are for dispersal routes and migration corridors. Soil impacts include compaction and increased erosion due to recreational traffic. Soil compaction reduces available water holding capacity, infiltration and soil permeability, which increases runoff. It can also impede root growth and soil biological activity. Erosion can cause the loss of topsoil and downstream sedimentation.

Open water exists in the perennial creek, and seasonal ponds and depressions. It provides wildlife function to aquatic species and waterfowl for foraging and nesting. The open water also provides a drinking source for wildlife. Hydrologic functions include long-term surface water storage, subsurface water storage, retention of sediment and organic particulates and moderation of groundwater flow or discharge.

The impacts that will occur to the area mapped as freshwater marsh, and include open water. These areas will be marginally affected. The proposed boardwalk will be elevated above existing open water and allow for the natural movement of flowing water through the project area. Ponded and flowing open water will remain and continue to provide functions and for aquatic species and waterfowl. Thus, the functions of the open water will not be lost.

Enhancement of the trail system through construction of the boardwalk will allow human user groups to enjoy the benefits of the existing ecosystem without the dangers and hazards of the current unimproved conditions of the trail system. Enhancing the trail will also provide increased access opportunities for trail users to learn more about wetlands and their value through the installation of interpretive panel educating trail users along the route.

2.8 Required Mitigation for the Boardwalk Trail Project Impacts (Determination of Credits)

The applied mitigation ratios for impacts to vegetation types including permanent and temporary impacts resulting from the construction of the boardwalk, which is part of the proposed trail system, are consistent with Table 11 of the City's HMP (Adopted 2004) and are shown in Table 3. Mitigation for wetland habitats have been provided, per the requirements of the HMP, but are subject to review under section 404 of the federal Clean Water Act and Section 1600 of the California Fish and Game Code. The HMP allows for impacts to DCSS and disturbed habitat to mitigate out-of-kind within the Calavera Preserve, in order to promote building the preserve system into a larger, contiguous area.

As required of the City's HMP (Adopted 2004), analysis of proposed impacts to wetlands consisted of a three-step process. The first step involved determining whether the impacts are avoidable or unavoidable. Secondly, for unavoidable impacts, the allowable amount of encroachment was determined. The final step involved determining the mitigation for unavoidable impacts.

Table 3
Impacts to ACOE/CDFG Jurisdictional Aquatic Resource/
Uplands and Required Mitigation
(Revised 6/26/12 per ACOE impacts assessment)

Vegetation Community	Impacts		Mitigation Ratio		Required Mitigation (For Permanent Impacts) [1]	Mitigation for Temporary Impacts (restoration In place)
	P	*T*	*P*	*T*		
ACOE Wetlands / CDFG Wetlands						
Southern Willow Scrub (ACOE wetland/ CDFG)	0.06	0.02	3:1	1:1	0.18	0.02
Freshwater marsh (ACOE wetland/ CDFG)	0.03	0.03	2:1	1:1	0.06	0.03
Southern Coast Live Oak Riparian Forest (ACOE wetland/ CDFG)	0.001	0.001	3:1	1:1	0.003	0.001
Open Water (ACOE non-wetland/CDFG)	0.008 (12 LF)	0.008	2:1	1:1	0.016[4]	0.008[4]
Subtotal	*0.10*	*0.06*			*0.26*	*0.06*

Table 3
Impacts to ACOE/CDFG Jurisdictional Aquatic Resource/
Uplands and Required Mitigation
(Revised 6/26/12 per ACOE impacts assessment)

Vegetation Community	Impacts		Mitigation Ratio		Required Mitigation (For Permanent Impacts) [1]	Mitigation for Temporary Impacts (restoration In place)
	P	*T*	*P*	*T*		
CDFG Wetlands Only						
Drainage (CDFG only)	<0.001	<0.001	1.5:1	---	<0.0015[2]	---
Southern Coast Live Oak Riparian Forest (CDFG only)	0.049	0.039	3:1	1:1	0.147	0.039
Subtotal	*0.05*	*0.04*			*0.148*	*0.039*
Total Wetlands (Acoe/CDFG & CDFG Only)	0.15	0.10			0.408	0.099
Uplands						
Disturbed Habitat	0.016	0.003	1:1	---	<0.001[3]	0.003[3]

[1] Mitigation for Permanent impacts requires a minimum of 1:1 wetland creation
[2] Permanent impacts to Non-wetland WOUS will be mitigated through wetland creation
[3] Permanent and temporary impacts to Disturbed Habitat will be mitigated though DCSS restoration
[4] Mitigation for impacts to open water will be provided through freshwater marsh creation and enhancement

3.0 GOALS AND OBJECTIVES OF THE MITIGATION PROGRAM

The goals of the mitigation program are to:

- Satisfy the mitigation requirements of local, state, and federal agencies for impacts to jurisdictional aquatic resources through the creation of ACOE and CDFG jurisdictional wetlands and the restoration (enhancement) of functions and services in currently degraded wetland systems.
- Restore habitat functions to disturbed or degraded upland vegetation communities and increase the functions and values of existing land covers through conversion to viable native upland habitat resilient to exotic invasion.
- To provide an adequate upland buffer (30') for created wetlands at the interface with urban or disturbed areas.
- Remove all non-native, exotic/invasive weed species considered to be highly invasive on the Cal-IPC "Invasive Plant Inventory" lists A and B (2006).
- Prevent any impacts to sensitive wildlife species during implementation of the project construction and long-term maintenance activities.
- Utilize erosion control measures in the form of "Best Management Practices" (BMPs) on the site as conditions necessitate.

Project objectives are included in Sections 3.1 – 3.3

3.1 Biological Functions and Services to be Created and Enhanced

The restoration plan focuses on increasing the functions and services of the project site through the increasing the functional wetland area through creation of additional wetlands and increasing the functional value of existing degraded jurisdictional wetland area through enhancement.

Wetland creation will include expanding the riparian corridor and active floodplain footprint of the existing tributary (Calavera Creek). Initial assessment indicates that the proposed plan will increase wetland functions in the floodplain in locations where it currently does not exist. The proposed creation area is currently elevated approximately 3–4 feet above the active floodplain with no wetland hydrology (non-jurisdictional ACOE/CDFG wetland) currently present. Based on the proposed design, the excavation/grading of the area and the addition of surface hydraulic inlet/outlet connections from the adjacent wetland (FWM) to the creation area will facilitate a localized increase of floodwater storage. Hydrologic functions, including long-term surface water storage and energy dissipation, are projected to improve from the introduction of seasonal inundation and increased proximity to the groundwater table, as well as the addition of native wetland and transitional wetland vegetation. Dynamic surface water storage and sub-surface

water storage are projected to have a slight increase due to the expanded floodplain area that will receive prolonged saturation and be available for water percolation.

For both the wetland creation and enhancement areas, biogeochemical functions including nutrient cycling, removal of imported elements/compounds, and retention of sediment and organic particulates are all projected to improve due to an increased density of woody plant materials, improved on-site micro-topographic complexity, and accelerated primary productivity resulting from installation trees, shrubs, and herbaceous vegetation, as well as expansion of the freshwater marsh vegetation component. The mitigation sites will provide additional potential for bio-filtration of nutrients and associated constituents on site.

Vegetative functions including maintenance of community type and detrital biomass, both of which are currently absent wetland functions in the creation areas and severely degraded in the restoration areas, will be created as species composition increases, as trees and shrubs dominate more of the total vegetative cover and as natural regeneration of woody plants improves (over time, with seed from plantings and upstream propagules). An establishment of an upland DCSS buffer adjacent to the wetland creation area will protect the wetland creation area from the invasion of non-native weed seed and viable propagules. Maintenance of distribution and abundance of invertebrates and vertebrates are both projected to increase; additional habitat will be created on site for aquatic invertebrates, and additional plant species and resulting leaf-litter biomass will provide enhanced habitats for terrestrial invertebrates. It is also projected that the trophic interactions of vertebrate guilds and species now absent on site will increase with the additional inputs of biomass, seasonal variation of plant materials, improved vertical stratification of vegetation on site, and increased habitat for invertebrates.

3.2 Objectives – Vegetation Communities to be Created and Enhanced

Vegetation communities that will be created and enhanced on site include southern willow scrub, freshwater marsh, southern coast live oak riparian forest and Diegan coastal sage scrub. A total of 0.51 acres of combined ACOE/CDFG and CDFG-only jurisdictional wetland will be created or enhanced with an additional 0.05 acres of DCSS created to serve as an additional buffer to the created wetland mitigation area in the northeastern portion of the site (Table 4 and Figures 4A, 4B and 4C).

Restoration will be implemented to increase the functions and values (i.e., services) of existing degraded ACOE/CDFG and CDFG wetland vegetation communities including FWM, SWS, SCLORF, DCSS and DW. Degraded wetland vegetation communities currently include areas currently degraded from unregulated trail use through the existing wetland and areas dominated by non-native annual weeds and perennial exotic vegetation. Additionally, areas temporarily impacted during boardwalk construction will also be restored in place.

Table 4
Project Impacts and Proposed Mitigation
(Revised 6/26/12 per ACOE impacts assessment)

Vegetation Community	Impacts		Mitigation Ratio		Proposed Mitigation (For Permanent Impacts)			Mitigation for Temporary Impacts (restoration in place)	Mitigation Total (Perm. and Temp.)
	P	*T*	*P*	*T*	*Creation*[1]	*Restoration/ Enhancement*[1]	*Total*		
ACOE Wetlands/CDFG Wetlands									
Southern Willow Scrub (ACOE/CDFG)	0.06	0.02	3:1	1:1	0.11 ac. (N.E. Corner)	0.069 ac. (Trail/Enhan)	0.18 ac.	0.02	0.20
Freshwater marsh (ACOE/CDFG)	0.03	0.03	2:1	1:1	0.06 ac. (N.E. Corner)	0.012 ac. (Trail/Enhan)	0.07 ac.	0.03	0.10
Southern Coast Live Oak Riparian Forest (ACOE/CDFG)	0.001	0.001	3:1	1:1	0.12 ac. (N.E. Corner)	0.040 ac. (Trail/Enhan)	0.16 ac.	0.001	0.161
Open Water (ACOE non-Wetland/ CDFG)	0.008	0.008	2:1	1:1	Part of FWM above.	Part of FWM above.	Part of FWM above.	0.008	0.008
Subtotal	*0.10*	*0.06*	–	–	*0.29*	*0.12*	*0.41*	*0.06*	*0.47*
CDFG Wetlands Only									
Drainage (CDFG only)	<0.001	<0.001	1.5:1	1:1	Part of SWS above.	Part of SWS above.	Part of SWS above.	<0.001	0.001
Southern Coast Live Oak Riparian Forest (CDFG only)	0.049	0.039	3:1	1:1	Part of SCLORF above.	Part of SCLORF above.	Part of SCLORF above.	0.039	0.039
Subtotal	*0.05*	*0.04*	–	–	*See above*	*See above*	*See above*	*0.04*	*0.04*
Grand Total Wetlands (ACOE/CDFG and CDFG Only)	0.15	0.10	–	–	0.29	0.12	0.41	0.10	0.51
Uplands									
Disturbed Habitat	0.016	0.003	1:1	–	0.05 restoration [3]			0.003	0.05

[1] Mitigation for Permanent impacts requires a minimum of 1:1 wetland creation and 2:1 wetland enhancement
[2] Permanent impacts to CDFG Wetlands only will be mitigated through wetland creation and enhancement
[3] Permanent and temporary impacts to Disturbed Habitat will be mitigated for though DCSS restoration in north/east corner at higher ratio

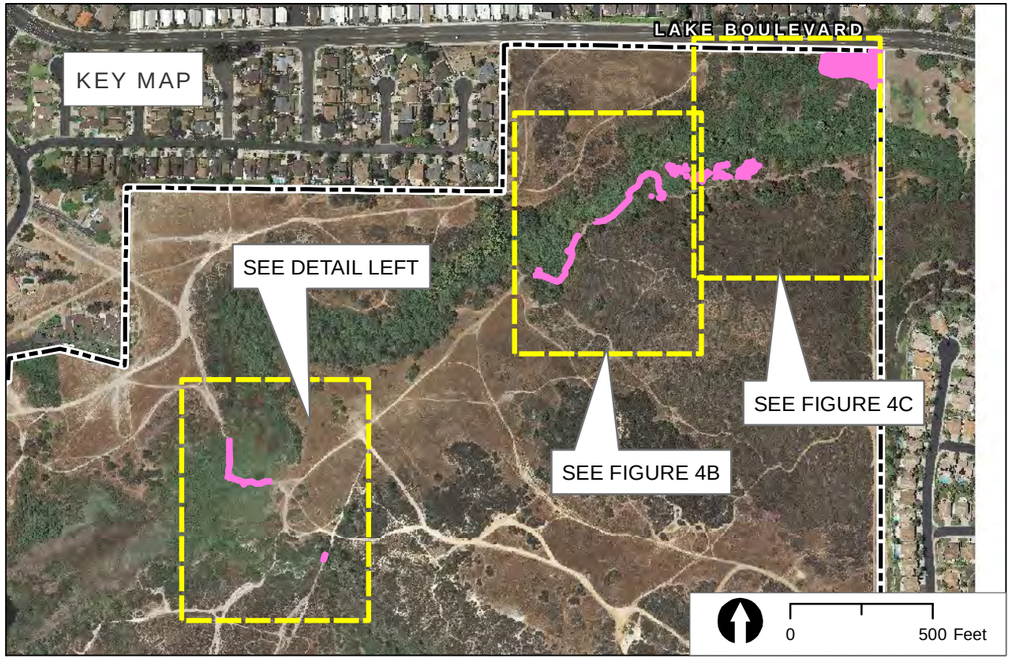
Wetland creation will consist of grading and planting areas of currently existing non-jurisdictional upland disturbed habitat to wetland habitat. These areas include an area adjacent to the proposed eastern boardwalk terminus and the lower slope in the northeast corner of the Preserve. Both creation areas are directly adjacent to ACOE/CDFG jurisdictional FWM

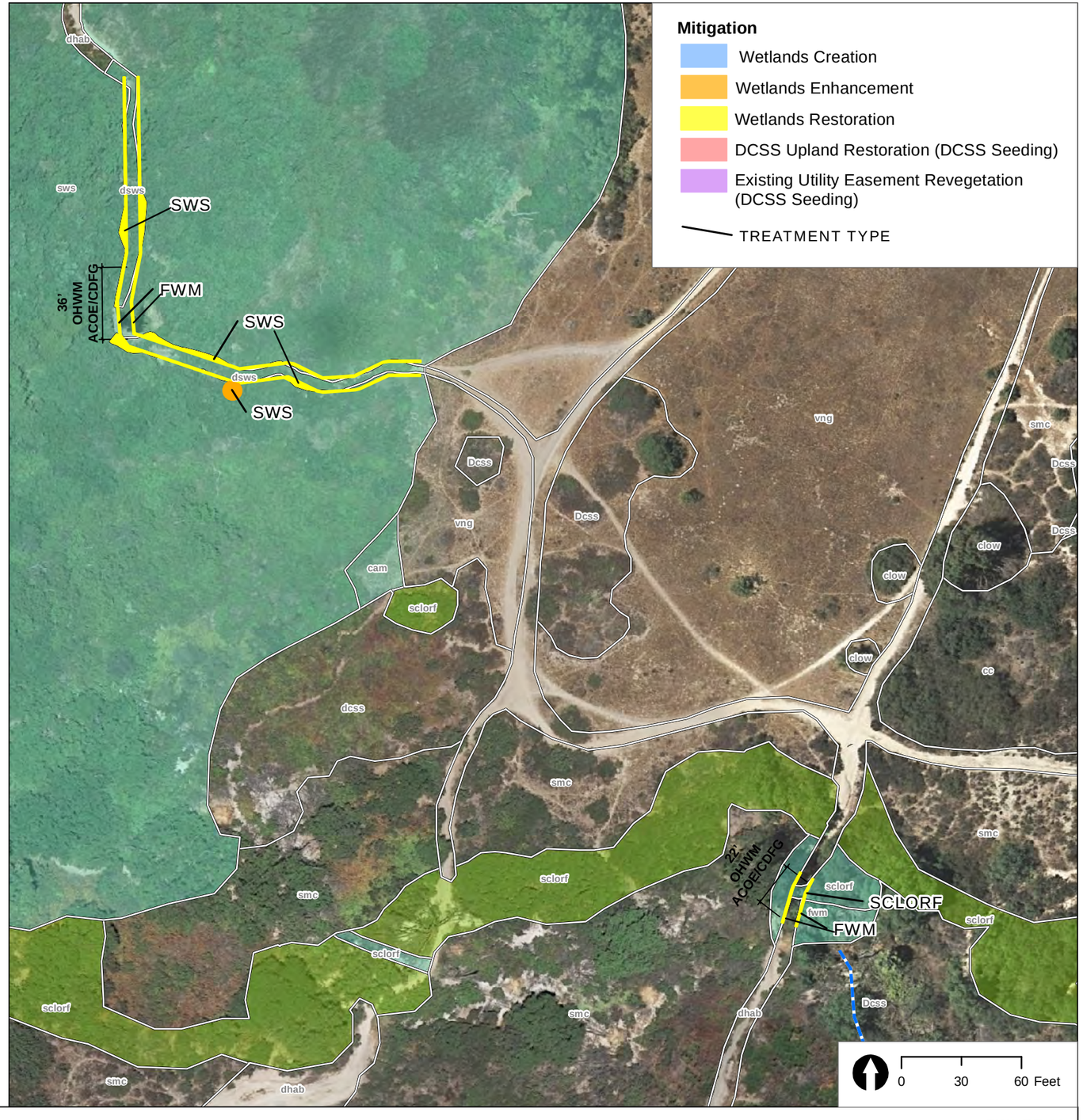
vegetation communities and are expected to receive seasonal floodwater inundation. Vegetation communities proposed for these areas include FWM, SWS and SCLORF. An approximate 20-foot wide upland buffer zone will be included adjacent to the northeastern wetland creation areas to serve to protect the integrity of the restoration efforts, including improved wildlife values and to help eliminate the invasion of weeds and perennial exotics in this area. This buffer will also serve to help mitigate for losses to upland habitat on site.

The evaluation of the success of creating, restoring and enhancing viable native wetland and upland habitat, as described in this CWMMP, will be based on achievement of specific performance criteria, derived from established reference data collected from viable existing reference vegetation communities within the Preserve.

3.3 Final Performance Standards

The final success criteria outlined herein will be used to determine completion of the City's mitigation responsibilities. Success criteria has been developed based on the requirements of the Guidelines for Habitat Creation and Restoration (City of Carlsbad, 2009) including comparison to local reference sites that match the selected restoration site in terms of soil, slope, aspect and vegetation community. Fulfillment of these criteria will demonstrate that the mitigation site has become established and self-sustaining, and that the desired habitat functions and values (i.e., services) are being achieved which will fulfill the long-term goals of the mitigation effort. See Section 6.1 for specific performance standards addressing vegetative cover goals that are intended to guide the restoration efforts, such that final project success is achieved.





Preserve Boundary

Restoration Areas

Non-Wetland Waters

ACOE/CDFG Jurisdictional Habitat

CDFG Jurisdictional Habitat

VEGCODE, VEGTYPE

Coyote Brush Scr, Diegan Coastal Sage Scrub/Reveg

Dcss, Diegan Coastal Sage Scrub

Dcss/reveg, Diegan Coastal Sage Scrub/Reveg

cam, Cismontane Alkali Marsh

cc, Chamise Chaparral

clow, Coast Live Oak Woodland

cscs, Coastal Sage-Chaparral Scrub

dDcss, Disturbed Diegan Coastal Sage Scrub

dcss, Coyote Brush Scrub

dfwm, Disturbed Coastal and Valley Freshwater Marsh

dhab, Disturbed Habitat

dsclorf, Disturbed Southern Coast Live Oak Riparian Forest

dsws, Disturbed Southern Willow Scrub

dwet, Disturbed Wetland

fwm, Coastal and Valley Freshwater Marsh

mfs, Mule Fat Scrub

nng, Non-native Grassland

nnv, Non-native Vegetation

ow, Open Water

sclorf, Southern Coast Live Oak Riparian Forest

smc, Southern Mixed Chaparral

sws, Southern Willow Scrub

urdev, Urban/Developed

vng, Disturbed Valley Needlegrass Grassland

P:\300 Environmental\6967 Lake Calavera Boardwalk\CADGIS

DUDEK

6967-01

AUGUST 2012

AERIAL SOURCE: City of Carlsbad 2009

FIGURE 4A

Proposed Wetlands and Uplands Mitigation - West Portion

Lake Calavera Trials Master Plan Boardwalk Improvement Project - Final Wetland Habitat Mitigation and Monitoring Plan

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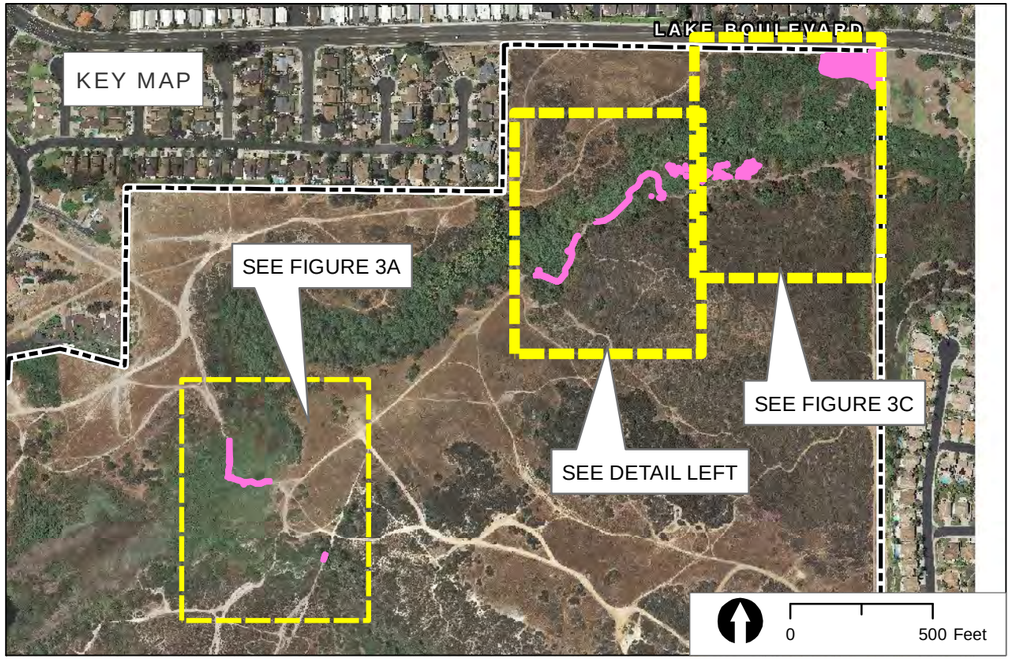

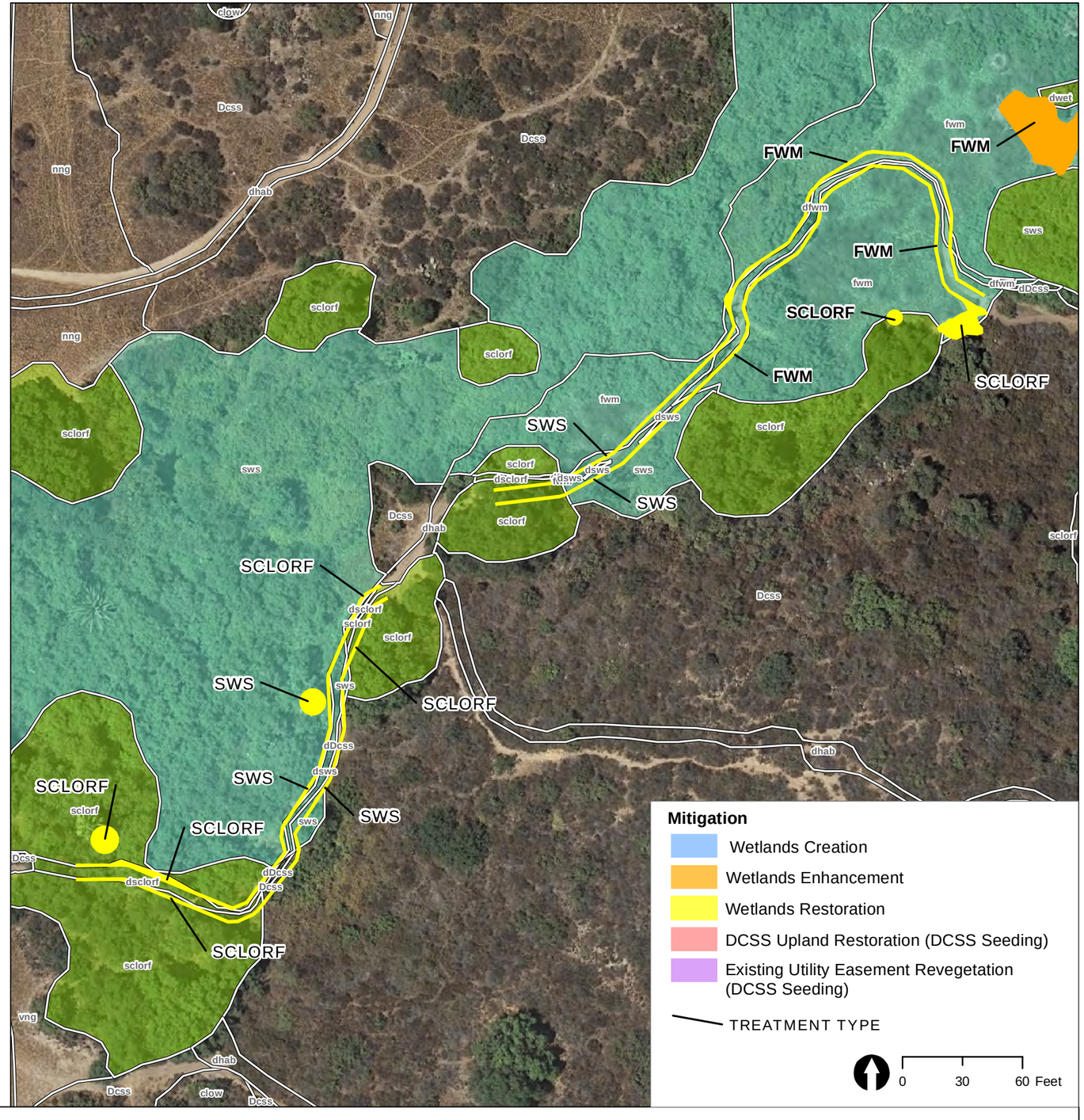

Preserve Boundary

Restoration Areas

ACOE/CDFG Jurisdictional Habitat

CDFG Jurisdictional Habitat

VEGCODE, VEGTYPE

Coyote Brush Scr, Diegan Coastal Sage Scrub/Reveg

Dcss, Diegan Coastal Sage Scrub

Dcss/reveg, Diegan Coastal Sage Scrub/Reveg

cam, Cismontane Alkali Marsh

cc, Chamise Chaparral

clow, Coast Live Oak Woodland

cscs, Coastal Sage-Chaparral Scrub

dDcss, Disturbed Diegan Coastal Sage Scrub

dcss, Coyote Brush Scrub

dfwm, Disturbed Coastal and Valley Freshwater Marsh

dhab, Disturbed Habitat

dsclorf, Disturbed Southern Coast Live Oak Riparian Forest

dsws, Disturbed Southern Willow Scrub

dwet, Disturbed Wetland

fwm, Coastal and Valley Freshwater Marsh

mfs, Mule Fat Scrub

nng, Non-native Grassland

nnv, Non-native Vegetation

ow, Open Water

sclorf, Southern Coast Live Oak Riparian Forest

smc, Southern Mixed Chaparral

sws, Southern Willow Scrub

urdev, Urban/Developed

vng, Disturbed Valley Needlegrass Grassland

DUDEK

6967-01

AUGUST 2012

AERIAL SOURCE: City of Carlsbad 2009

FIGURE 4B

Proposed Wetlands and Uplands Mitigation - East Portion

Lake Calavera Trials Master Plan Boardwalk Improvement Project - Final Wetland Habitat Mitigation and Monitoring Plan

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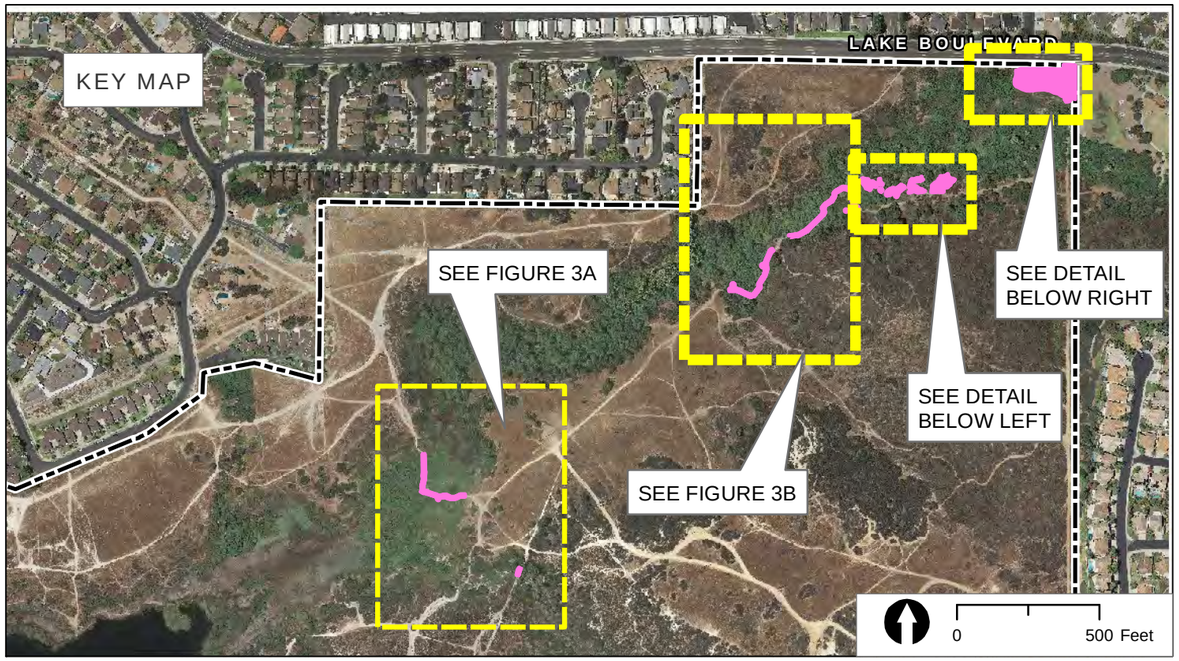


Preserve Boundary

Restoration Areas

ACOE/CDFG Jurisdictional Habitat

CDFG Jurisdictional Habitat

VEGCODE, VEGTYPE

Coyote Brush Scr, Diegan Coastal Sage Scrub/Reveg

Dcss, Diegan Coastal Sage Scrub

Dcss/reveg, Diegan Coastal Sage Scrub/Reveg

cam, Cismontane Alkali Marsh

cc, Chamise Chaparral

clow, Coast Live Oak Woodland

cscs, Coastal Sage-Chaparral Scrub

dDcss, Disturbed Diegan Coastal Sage Scrub

dcss, Coyote Brush Scrub

dfwm, Disturbed Coastal and Valley Freshwater Marsh

dhab, Disturbed Habitat

dsclorf, Disturbed Southern Coast Live Oak Riparian Forest

dsws, Disturbed Southern Willow Scrub

dwet, Disturbed Wetland

fwm, Coastal and Valley Freshwater Marsh

mfs, Mule Fat Scrub

nng, Non-native Grassland

nnv, Non-native Vegetation

ow, Open Water

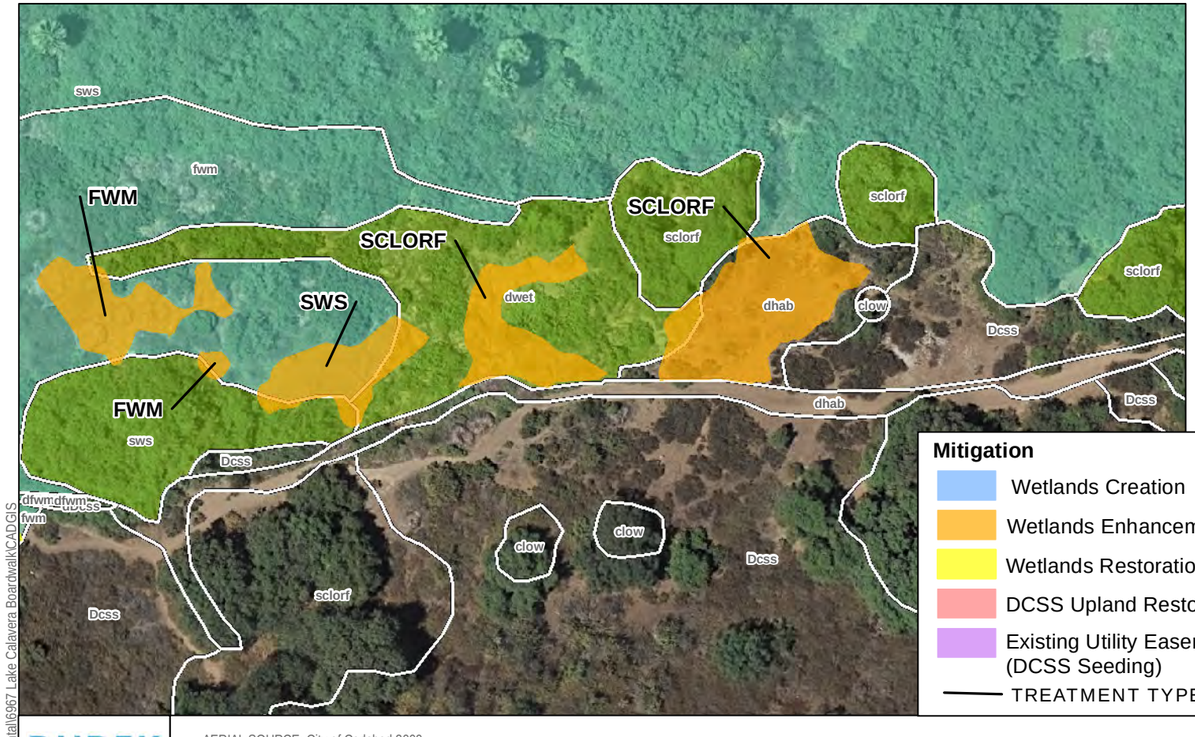
sclorf, Southern Coast Live Oak Riparian Forest

smc, Southern Mixed Chaparral

sws, Southern Willow Scrub

urdev, Urban/Developed

vng, Disturbed Valley Needlegrass Grassland



Mitigation

Wetlands Creation

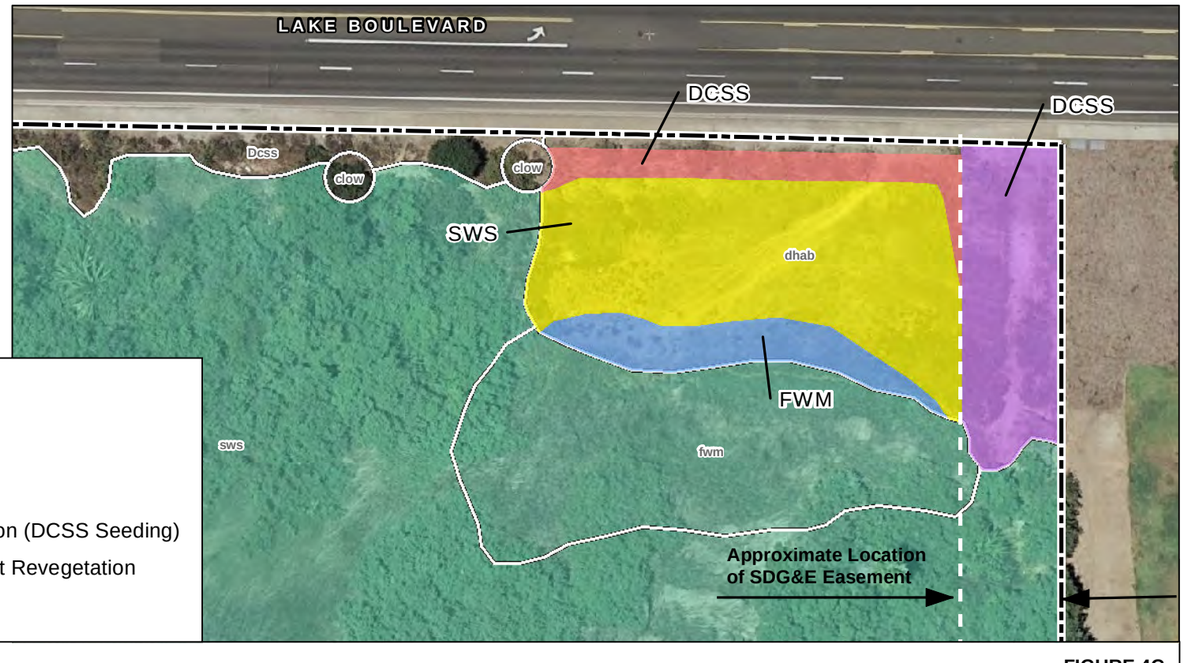
Wetlands Enhancement

Wetlands Restoration

DCSS Upland Restoration (DCSS Seeding)

Existing Utility Easement Revegetation (DCSS Seeding)

TREATMENT TYPE



P:\300 Environmental\6967 Lake Calavera Boardwalk\CAD\GIS

DUDEK

6967-01

AUGUST 2012

AERIAL SOURCE: City of Carlsbad 2009

FIGURE 4C

Proposed Wetlands and Uplands Mitigation - Northeast Corner

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4.0 RESTORATION IMPLEMENTATION PLAN (WORK PLAN)

The restoration/revegetation program shall be implemented per the final construction documents, (i.e., Construction Plans for Lake Calavera Boardwalk Trail and Restoration, Dudek June 2012) included for reference in Appendix C.

The Implementation Plan includes the following:

- Vegetation removal and grubbing prior to grading and construction,
- Exotic/invasive species removals from proposed mitigation/revegetation areas,
- Grading to elevations compatible with the flow gradient of Calavera Creek,
- Applying mulch or other amendments (as necessary to address soil deficiencies) and incorporating into topsoil,
- Installing temporary irrigation system (for wetland creation area and buffer zone area only),
- Weed control through weed reduction (i.e., grow-and-kill) cycles,
- Installing native container plants,
- Applying native seed mix,
- Implementing a 5-year maintenance and monitoring period.

4.1 Rationale for Expecting Project Success (Site Selection)

The wetlands creation areas will be graded to receive overbank flow and flood inundation from Calavera Creek. Creation area grading will be set to the adjacent ACOE/CDFG jurisdictional gradient to allow for normal flood inundation through the reach of Calavera Creek (Figure 5).

Wetland creation, restoration and enhancement is proposed for the vegetation communities that existed prior to temporary impacts or exist directly adjacent to viable native habitat. Thus, it is assumed that the appropriate conditions will be present for re-establishing the same habitats. Creation, restoration and enhancement areas will be planted with species found in adjacent vegetation communities observed successfully growing on site. With the use of plant species adapted to the site conditions, probability of project success is increased.

The natural tendency of native wetland vegetation to recruit into open areas with sufficient soil moisture, combined with container plant installation and a native seed mix application, is expected to result in a significant expansion of native wetland vegetation is all of the project areas.

Exotic/invasive species and weed control measures will be implemented for 5 years after the initial mitigation/revegetation installation, or until the ultimate success criteria have been achieved in

accordance with the Guidelines for Habitat Creation and Restoration (City of Carlsbad, 2009) and this HMMP. Remedial actions and/or adaptive management measures may be required to promote project success. The suppression of exotic/invasive species and weed growth and their reduction over the extended maintenance period will allow establishing native vegetation to become dominant over the non-native plant species throughout the project site. The newly established vegetation will have a positive effect on many aspects of the biological and hydrological functions and values including, sediment entrainment, moderation of flow velocities, carbon storage, shade that will suppress non-native seedling recruitment and moderate water runoff temperatures, and enhancement of wildlife resources. Trash and debris removal will occur as part of the maintenance regime during the maintenance and monitoring period.

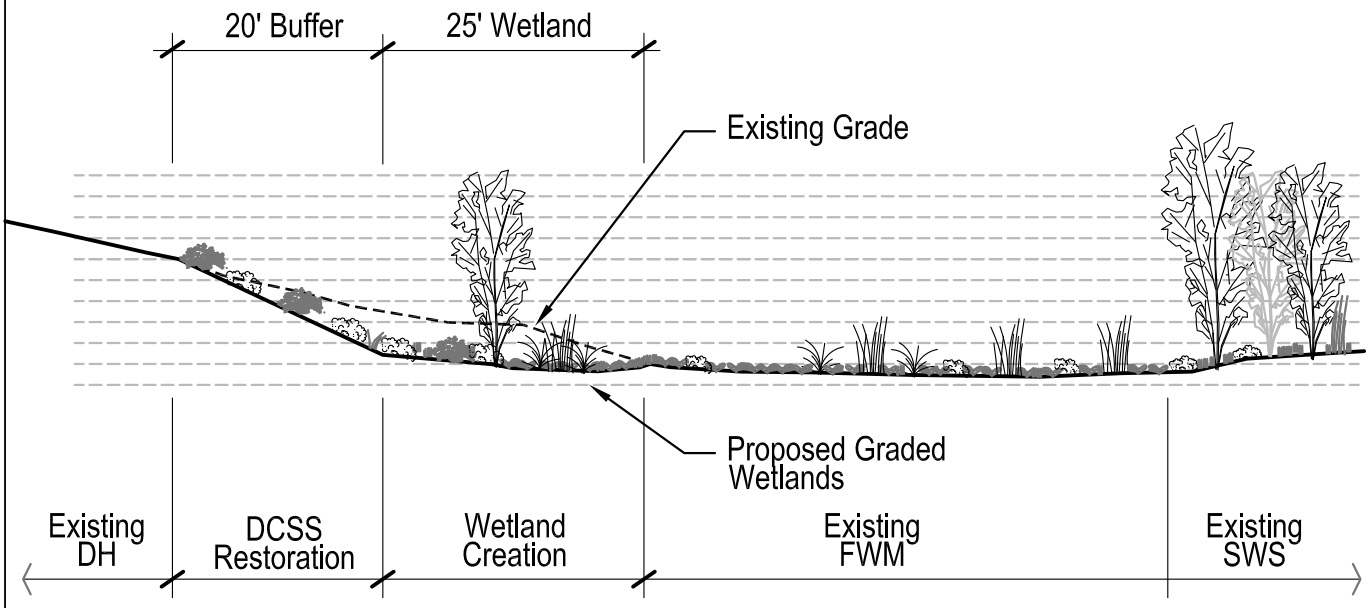
4.2 Existing Resource Impact Avoidance

Per the City's HMP, the use of heavy equipment, equipment that produces noise greater than 60 decibels, equipment that produces a large amount of dust, and removal of trees shall be conducted outside of the raptor and migratory bird breeding season (February 15–September 15) with no vegetation clearing allowed within occupied coastal California gnatcatcher habitat within the breeding season (March 1 and August 15). If this schedule cannot be met, it is recommended that a qualified biologist inspect the trees for nests prior to construction or non-routine maintenance. If an active nest is found, no impacts shall be allowed within 500 for all listed species and 300 feet for non-listed species until all young have fledged.

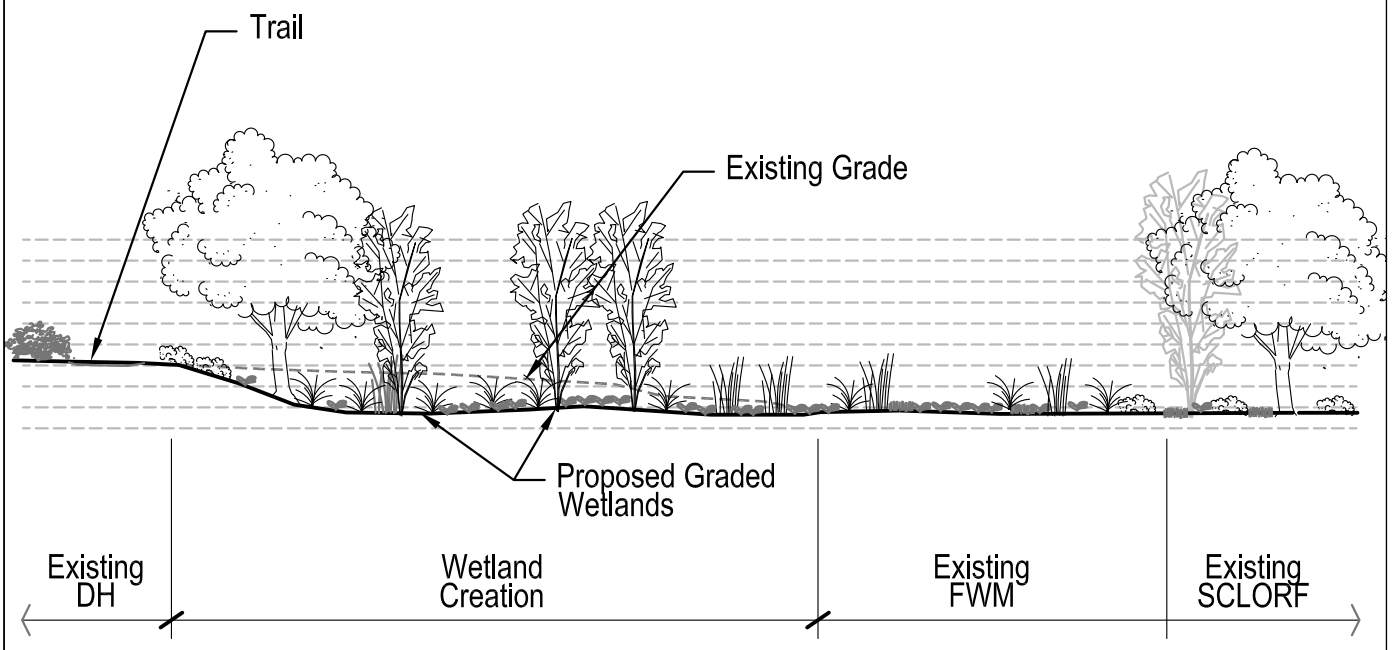
Project construction and maintenance shall comply with the HMP Section F, Preserve Management, and specifically the Recreation and Public Access guidelines contained therein on pages F-11– F-14.

4.3 Site Access and Protection

Public access is allowed within the Preserve, and it is anticipated that pedestrians will be passing near the area regularly. For the duration of boardwalk and mitigation installation, it is anticipated that all trails in the immediate area under construction, will be closed until boardwalk and mitigation installation is complete. Temporary trail closure signage will be provided and installed by the City of Carlsbad, and/or their designated Preserve Manager. The limits of the mitigation/restoration areas will be delineated with temporary orange construction fencing and signage to protect the sites during the plant establishment period. The Restoration Ecologist shall inspect all construction fencing prior to construction to avoid unauthorized impacts. This temporary fencing will remain in place and be maintained by the Habitat Restoration Contractor through the first growing season, and longer if necessary as recommended by the Restoration Ecologist.



Northeastern Creation Area (Not to Scale)



Trail Creation Area (Not to Scale)

DUDEK

6967-01
AUGUST 2012

FIGURE 5
Wetland Creation Areas - Cross-Sections

Lake Calavera Trails Master Plan Boardwalk Improvement Project - Final Wetland Habitat Mitigation and Monitoring Plan

P:300.Environmental\6967 Lake Calavera Boardwalk\Conceptual Plan\FIGURES

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4.4 Erosion Control and Best Management Practices

To minimize the potential for loss of soils from the sites during construction and the plant establishment period, silt fences, fiber rolls, and construction fencing may be incorporated into the best management practices (BMPs) based on the Storm Water Pollution Prevention Plan (SWPPP) and Restoration Ecologist's recommendations. Construction BMP's would be implemented according to Appendix B of the Final MHCP Subarea Plan, Volume II.

Project fencing and BMPs affected/lost due to storm flow events will be replaced, modified, or not replaced at the discretion of the Restoration Ecologist.

4.5 Grading and Site Preparation

Site grading will be conducted in the areas designated as wetland creation only. Grading will lower the elevation of existing disturbed habitat (upland) adjacent the existing ACOE/CDFG jurisdictional wetland, establish inlet and outlet elevations and establish appropriate flow gradients across the site. Creation topography shall be established based on reference spot elevations collected in the adjacent ACOE/CDFG jurisdictional wetland areas to ensure correct elevations. Elevations and transitional gradients will be established to accept flood inundation from Calavera Creek and promoting creek flushing and limiting excessive ponding, which may lead to hyper-saline conditions.

The wetland creation sites will be graded down per project plans and specifications, in order to access groundwater for planted vegetation, as well as to create the target hydrologic regime. The site will be graded to allow seasonal inundation. It is anticipated that the predominant hydrology established on site will be through established secondary channels and through the expansion of the active flood zone.

No import soil is anticipated to be necessary for implementation of the restoration plan. Most of the soil removed to create the jurisdictional wetlands will be used on site to fill in eroded areas, elevate the adjacent trail in upland areas, and/or it will be exported to an approved off-site disposal area. Grading will be accomplished to create the optimum conditions for wetland hydrology and wetlands vegetation community development.

The Restoration Ecologist will observe rough and final grades to assess whether the grading complies with the intent of the project design and are adequate to support the target vegetation for the area. The Restoration Ecologist will periodically monitor the site preparation and grading procedures to verify that they stay within the established limits, minimize impacts to existing wetlands and native vegetation, and comply with any applicable resource agency permit conditions.

Excessive soil compaction and/or limited soil fertility may require areas to be mechanically prepared (i.e., ripped and tilled), primarily in areas impacted from recreational traffic. Treatment may require portions of the restoration and compaction areas to be mechanically cross ripped to a depth of between 3 and 6 inches. All compacted trail areas underlying the proposed boardwalk footprint (i.e. permanent impact areas, will be ripped/tilled to help fill in eroded areas and to assist with natural plant recruitment under the boardwalk where possible. Graded areas shall be cross-ripped to allow for application of soil amendments.

Soil fertility deficiencies may require the ripped soil to be treated with the appropriate soil amendments as recommended by soils analysis. Following grading and site preparation/soil manipulation, the surface of the soil shall be fine graded to best facilitate the seed application and mimic the adjacent natural upland topography. Soil samples shall be collected from all creation, restoration and enhancement areas (maximum 3) and submitted for soil analysis to an approved soil laboratory for soil fertility and agricultural suitability analysis. Soil amendments or fertilizers may be incorporated into the soil, container plant backfill mix or hydroseed slurry mix, based on the results of the laboratory analysis and per the Restoration Ecologist's final recommendations.

4.6 Hydrology

Wetland creation is dependent on establishing an appropriate site hydrology. This will be achieved by excavating the areas down to an elevation that will allow the seasonally high stream flows and flood inundation from the slow moving Calavera Creek to enter into the creation areas. To support the establishment of wetland vegetation communities, a hydraulic surface inlet and outlet will be created to provide opportunity for seasonal inundation to flood the northeastern creation site and the grade will be uniformly lowered at the central creation site to accept flood flow inundation during high water conditions (Figure 5).

Excavation within the site is expected to ensure that the entire mitigation site will have sub-surface groundwater or capillary fringe soil moisture present within the root zone of the plants in all vegetation community types. A suitable gradient across the length of northeastern creation area will allow flow through the site and back into the main, existing creek channel.

4.7 Irrigation System Installation

Due to the unpredictable nature of southern California rainy seasons, and to facilitate plant establishment, supplemental irrigation and/or hand watering will be required for the wetland creation and enhancement areas. A temporary irrigation system is recommended for the northeastern wetland creation site and associated upland buffer zone planting area. Hand

watering is required for all restoration and enhancement areas along the constructed boardwalk and adjacent to the upstream trail. Supplemental irrigation and hand watering will only be used during plant establishment, as the goal of the restoration effort is to create native, self-sustaining plant communities that can survive on their own over the long term. Irrigation and hand watering scheduling will be set to promote deep rooting of plant materials, with infrequent, long-duration cycles.

The irrigation system for the northeastern wetland creation area and upland buffer zone will be designed with above-ground components to facilitate removal once the system is decommissioned. The system shall remain in place until the vegetation is established and can survive without supplemental water. The irrigation system will utilize potable water at a local point of connection. The irrigation system will consist of PVC pipe staked on grade at approximately 10 feet on-center and at all corners, providing 100 percent coverage of the northeastern creation area using spray and/or rotor heads where appropriate. Check valves will be installed to eliminate low-head drainage where necessary. All irrigation will be installed by the Habitat Restoration Contractor and per the final revegetation construction documents. All irrigation components shall be removed from the site prior to the end of the five-year period and prior to receiving mitigation sign-off by the ACOE.

Due to limited access and limited water sources within the Preserve, hand watering is recommended for the restoration and enhancement areas located immediately adjacent to Boardwalk construction. The Habitat Restoration Contractor shall be responsible for hand watering all container plants installed in these areas until adequately established. It is anticipated that the high water table and extended periods of soil saturation will facilitate successful establishment of planted container plants and seed with limited supplemental watering.

4.8 Recommended Plant Palettes

A total of four vegetation communities will be established on site: SWS, FWM, SCLORF and DCSS. In general, FWM will be located in areas expecting to be frequently inundated and with soils saturated the majority of the year. SWS will be located in areas that are expected to have appropriate and frequent inundation with seasonal saturated soils. SCLORF species will expect infrequent inundation with the water table close to the surface, with a slight increase in elevation above SWS. It will be created through the addition of community-specific species such as sycamores and coast live oaks. The species selected for the each planting palette include those that are typical for the vegetation community or have been observed within that habitat on site.

After site grading, and irrigation system installation, the planting areas will be prepared and revegetated with the intended native species. Proposed planting palettes are shown in Tables

5–9. All container plants, live stakes, and seed shall originate from coastal San Diego or Orange County to the greatest extent practicable. A combination of above-ground, temporary irrigation system operation and hand watering will be utilized to establish plants the first 3 years after planting.

Table 5
Coastal Valley Freshwater Marsh Plant Palette (0.11 ac.)

Botanical Name	Common Name	Size	Spacing	Composition (approximate)	Estimated Quantity
Anemopsis californica	Yerba mansa	1 gal.	3'	45%	228
Eleocharis machrostachya	Pale spike sedge	1 gal.	1.5'	8%	155
Juncus acutus spp. *leopoldii*	Spiny Rush	1 gal.	4'	30%	88
Juncus mexicanus	Mexican rush	1 gal.	1.5'	9%	193
Scirpus californicus	California bulrush	1 gal.	1.5'	8%	155
			Total	100%	819

Table 6
Southern Willow Scrub Plant Palette (0.20 ac.)

Botanical Name	Common Name	Size	Spacing	Composition (approximate)	*Estimated Quantity*
Canopy Species					
Baccharis salicifolia	Mulefat	1 gal.	6'	15%	33
Platanus racemosa	Western sycamore	1 gal.	20'	30%	7
Salix exigua	Narrow – leaved willow	cutting	6'	10%	27
Salix goodingii	Black willow	cutting	6'	5%	14
Salix lasiolepis	Arroyo willow	cutting	6'	25%	55
			Total	85%	136
Understory Species					
Carex spissa	San Diego sedge	1 gal.	3'	9%	83
Iva hayesiana	San Diego marsh elder	1 gal.	4'	25%	134
Juncus acutus spp. *leopoldii*	Spiny Rush	1 gal.	3'	8%	71
Rosa californica	California wild rose	1 gal.	4'	20%	105
Rubus ursinus	California blackberry	1 gal.	4'	23%	136
			Total	85%	529

Table 7
Southern Coast Live Oak Riparian Forest Plant Palette (0.20 ac.)

Botanical Name	Common Name	Size	Spacing	Composition (approximate)	*Estimated Quantity*
Canopy Species					
Baccharis salicifolia	Mulefat	1 gal.	6'	25%	48
Platanus racemosa	Western sycamore	1 gal.	20'	15%	3
Quercus agrifolia	Coast live oak	1 gal.	18'	50%	11
			Total	90%	62
Understory Species					
Juncus acutus spp. *leopoldii*	Spiny Rush	1 gal.	3'	9%	78
Muhlenbergia rigens	Deer grass	1 gal.	3'	19%	165
Ribes speciosum	Fuschia-flowered gooseberry	1 gal.	4'	5%	24
Rosa californica	California wildrose	1 gal.	4'	18%	88
Rubus ursinus	California blackberry	1 gal.	4'	22%	105
			Total	73%	460

Table 8
Southern Coast Live Oak Riparian Forest/Southern Willow Scrub Seed Mix (0.40 ac.)

Botanical Name	Common Name	Pure Live Seed	Rate #/acre
Ambrosia psilostachya	Western ragweed	6	2.0
Anemopsis californica	Yerba mansa	50	4.0
Artemisia douglasiana	Douglas mugwort	10	2.0
Artemisia palmeri	San Diego sagewort	10	1.0
Carex spissa	San Diego sedge	70	2.0
Eleocharis macrostachya	Pale spike rush	60	2.0
Plantago ovata[1]	Wooly plantain	85	6.0
Leymus triticioides	Wild rye	80	4.0
Juncus bufonius	Toad rush	60	3.0
Juncus mexicanus	Mexican rush	TBD	2.0
Muhlenbergia rigens	Deer grass	60	1.0
		Total	29.0

Note: All hydroseed mixes shall include seed mix indicated in pounds per acre and virgin wood cellulose fiber mulch at 2,000 pounds per acre.
[1]Erosion control and nurse crop species.

Table 9
Diegan Coastal Sage Scrub Seed Mix (0.05 ac.)

Botanical Name	Common Name	Pure Live Seed	Rate #/acre
Artemesia californica	California sagebrush	10	3.0
Bromus carinatus[1]	California brome	85	1.0
Castilleja exserta spp. *exserta*[1]	Purple's owl clover	25	0.5
Encelia californica	California sunflower	24	2.0
Eriophyllum confertifolium[1]	Golden yarrow	25	2.0
Eriogonum fasciculatum	Flat-topped buckwheat	10	5.0
Lasthenia californica[1]	California goldfields	50	0.5
Lotus scoparius	Deer weed	85	3.0*
Lupinus succulentus[1]	Arroyo lupine	90	1.5
Mimulus aurantiacus	sticky monkey flower	2	2.5
Nassela lepida	Foothill needle grass	65	2.0
Nassela pulchra	Purple needle grass	75	2.0
Plantago ovata[1]	Wooly plantain	85	5.0
Salvia mellifera	Black sage	40	2.0
Sisyrinchium bellum[1]	Blue-eyed grass	80	1.5
		Total	31.5

Note: All hydroseed mixes shall include seed mix indicated in pounds per acre and virgin wood cellulose fiber mulch at 2,500 pounds per acre.
[1]Nurse crop species.

It is anticipated that the seed mixes will be installed through a combination of hydroseeding for accessible areas and hand seeding in inaccessible areas. The recommended seed mixes contain several common, native annuals to serve as nurse crops, plus perennial native species that are expected to provide the majority of the cover for the DCSS restoration areas and contribute to the herbaceous understory for the FWM/SWS/SCLORF mitigation areas. Other native species are expected to volunteer into the area from adjacent habitat areas and will contribute to cover, species richness, and habitat value as well over time.

A seed supplier specializing in native species, such as S&S Seeds in Carpentaria, Recon in San Diego, or an approved equal, shall be contracted with to supply the necessary seed. The seed source should be from the local San Diego coastal region.

Appropriate timing of the seed application may decrease the need for supplemental watering and will improve plant establishment. It is anticipated that the construction activities will be completed prior to the rainy season. Seeding at the beginning of the rainy season is ideal. Should hydroseed fail to germinate within a 120-day plant establishment period, the Restoration Ecologist may recommend reapplication of seed in the non-performing areas.

4.9 Planting Materials

After grading and irrigation installation, container plants and cuttings will be installed followed by hydroseeding, as described above. The Restoration Ecologist will inspect and approve all container plants, cuttings and labels for each hydroseed mixture prior to application. The contractor awarded the installation for the restoration program shall provide copies of the seed mix, listing species, quantities, as well as percent of germination rates that are to be provided by the intended seed vendor. Actual seed tags shall be provided at the time of installation.

Standard planting procedures will be employed for the installation of the container stock. Planting holes shall be approximately twice the width of the rootball and as deep. If dry soil conditions exist at the time of plant installation, planting holes will be filled with water and allowed to drain immediately prior to planting. Backfill soil will contain no amendments and fertilizers unless shown in the construction documents, recommended by soil test results and/or by the recommendation of the project biologist.

The cuttings will be installed in the southern willow scrub creation and enhancement areas. The cuttings will be collected from the surrounding riparian habitat. Cuttings will be 12-18 inches long and one-half inch to one inch in diameter. The cuttings will be inserted approximately two-thirds their length into the soil.

Hydroseed shall be applied in a hydromulch slurry containing the specified seed mix, as well as the other specified slurry mix components including virgin wood cellulose fiber mulch, at the specified rates. Fertilizer shall be included in the hydromulch slurry mix based on the results from soil testing and recommendations from an approved soil testing laboratory. The Restoration Ecologist will approve all final fertilizers and amendment applications prior to installation.

4.10 Time Lapse

It is expected that the mitigation areas will require approximately five years to develop into a system that is in a state of equilibrium capable of resisting invasion by weeds and exotic/invasive species. Within approximately the first three years, the created, restored and enhanced wetlands should become self-sustaining, and able to survive on natural rainfall and creek inundation to allow the areas to survive without the need for supplemental irrigation or hand watering. In order to help assure sufficient plant establishment, five years of maintenance and monitoring are planned to ensure that the mitigation areas develop into the intended riparian vegetation communities and are sufficiently established to survive on their own, thereafter.

4.11 Preliminary Schedule

The mitigation program outlined herein, is contingent upon the approval by the ACOE, CDFG, and RWQCB. Upon appropriate approvals, implementation of the mitigation program is anticipated to be implemented according the schedule in Table 10.

Table 10
Proposed Implementation Schedule

Implementation Tasks	Schedule
Main Boardwalk Installation, Grading (creation areas) and Site Preparation (restoration and enhancement areas)	Late Fall /Early Winter of 2012
Irrigation	To be installed after initial weed removal (Fall 2012). Discontinued by the end of Year 3 (Fall 2015) and removed/abandoned at the end of Year 5 (Fall 2017).
Container Planting	Following completion of site prep., Boardwalk installation (Fall/Winter 2012.
Hydroseed and hand seed application	Following container planting (Fall/Winter 2012).
Initial Establishment Period: Assessment of Installation, Seed Germination, and Plant Establishment.	Monthly during initial 120-day period following hydroseeding and container plant installation (Fall/Winter 2012 – Spring 2012).
Site Maintenance	Five years. Bi-monthly during Year 1 and on an as-needed basis during Years 2–5, based on biological monitoring and Biologist's recommendations (Spring 2013– Fall 2017).
Long-term Biological Monitoring	Qualitative monitoring bi-monthly during Year 1, following successful completion of initial (120-day) maintenance period, and quarterly during Years 2–5. Annual quantitative monitoring (transects) in Years 3–5 (Spring 2013 – Fall 2017).
Final Sign-Off	End of Year 5 (or earlier if agreed to by agencies). Based upon achievement of Year 5 standards (Fall/Winter 2017)

4.12 Initial Establishment Period

During the initial (120-day) plant establishment period, following the hydroseed and hand seed applications and container plant installation, the Restoration Ecologist will monitor site conditions, including seedling germination, container plant survival and soil erosion, to determine if the plants are becoming adequately established and to verify whether the hydroseed application has been successful. If the hydroseed application has been successful and adequate germination occurs, then rapid seedling emergence should preclude the need to install additional erosion control devices. Potential remedial actions, if germination is not sufficient, include reseeding, installation of additional erosion control devices, and follow-up weed control.

4.13 As-Built Plan

Upon successful completion of the installation and the initial 120-day plant establishment/maintenance period, the Restoration Ecologist shall submit a report to the ACOE, RWQCB, and CDFG describing the completion of the installation phase and describing the "as-built" status of the mitigation project. The report shall include a reduced set of construction drawings showing the final "as-built" locations of the irrigation system and the final limits of the revegetation areas. A GPS generated map shall be submitted if possible. Photographs shall also be included to document the site at the completion of the installation monitoring period, i.e., end of initial 120-day maintenance period.

4.14 Cost Estimate

It is estimated that the initial cost for installation and initial maintenance of the mitigation/revegetation effort, for the total 0.56-acre area, will cost approximately **$97,500**. This cost estimate includes the installation of temporary protective fencing, grading, weed control, site preparation, signage and fencing, irrigation, hydro-seed and container plant installation, and plant establishment maintenance for the first 120-days following installation. Costs do not include the cost of the actual boardwalk installation.

Long-term maintenance costs for the proposed five-year maintenance period would total approximately **$27,500** including the costs associated with the weed control, irrigation, hand watering and site maintenance. The total cost for the entire mitigation and monitoring program is estimated to be **$125,000** through the end of the five-year period.

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5.0 MAINTENANCE PLAN

All mitigation areas will be subject to the requirements specified in this plan. The City will be responsible for ensuring the maintenance and monitoring of the mitigation sites until the site meets established performance standards.

Because the goal of this plan is to reestablish natural vegetation communities that can support themselves with little or no maintenance, the primary effort of the maintenance plan is concentrated in the first few seasons of plant growth following the creation and enhancement efforts, when weeds can easily out-compete native plants. The intensity of the maintenance activity is expected to subside each year as the native plant materials become more established and as local competition from non-native plants for resources in the restoration areas is minimized through control of non-native plants.

5.1 Maintenance Activities

The long-term maintenance period shall begin upon the successful completion of the initial (120-day plant establishment) maintenance period and shall last for 5 years. The Habitat Restoration Contractor shall be responsible for periodic weed/exotic species treatment and removals, trash and debris removal, irrigation maintenance and adjustment, hand watering, replacement of dead container plants/cuttings, fence and signage maintenance, and similar site maintenance functions during the 5-year maintenance and monitoring period.

5.1.1 Pest Management

Annual weed and non-native exotic control is expected for the Long-term monitoring period. The Restoration Ecologist will advise the Habitat Restoration Contractor as to which pest species to control.

Target weed species include those on the California Invasive Plant Council (Cal-IPC) *California Invasive Plant* Inventory (Cal-IPC 2006). Additional species beyond those listed in the Cal-IPC publication may require control. The Restoration Ecologist will determine any additional species requiring control. Based on the discretion of the Restoration Ecologist, some innocuous, naturalized annual weeds that are common to the area but do not normally out-compete or invade native habitats may be tolerated.

Physical removal of non-native plants, including the roots, may be the best method for those species for which the root system can readily be pulled out with the aboveground portions of the plant. These species will be physically removed before seed-set. If hand removal is possible only after seed-set, then seed heads will be cut off, bagged, and removed from the site prior to the weed removal.

Herbicides will be used for the invasive exotic plant species that have root systems that are impractical to remove or that regenerate from small root fragments. Any herbicide use should be conducted using methods that minimize effects to adjacent/desirable native species, such as brush application or spot spraying. Only herbicides registered for aquatic use can legally be used in locations where they might come in contact with open water.

Follow-up control measures will likely be necessary for invasive plant species with extensive root systems that cannot usually be killed with one herbicide application. Follow-up herbicide treatment should be done at the biologically appropriate time when the recovering plants are still relatively small and before they have time to regain strength and vigor.

Invertebrate pests, such as snails, slugs, insects, mites, etc., are not expected to be a problem in the project area but will be controlled by the Habitat Restoration Contractor, if necessary. Vertebrate pests, such as gophers, ground squirrels, rabbits, rats, voles, etc., may become a problem and will be controlled by the Habitat Restoration Contractor, if necessary. Plant diseases could become a problem during the plant establishment period but can generally be prevented or controlled by cultural measures.

Pest control will be conducted following all applicable laws, regulations, label directions, and safety precautions. Should the Habitat Restoration Contractor require specific pest control recommendations, he or she shall consult a licensed pest control adviser. The Habitat Restoration Contractor shall provide reports of all pest control measures implemented at the site, including details of method used, including any pesticide applications. Copies of any written recommendations shall also be provided. The Habitat Restoration Contractor shall provide copies of all pesticide use reports to the appropriate entity to document pesticide use and reporting.

5.1.2 Irrigation System and Hand Watering

The irrigation system shall be checked regularly to ensure proper operation and adequate coverage of the wetland mitigation and upland restoration areas. Problems with the system shall be repaired immediately to reduce potential plant mortality. The frequency and duration of irrigation applications and hand watering shall be adjusted seasonally by the maintenance contractor in coordination with the Restoration Ecologist to meet habitat needs. The irrigation system will be used as necessary during the first 3 years of the long-term maintenance and monitoring period, and will be terminated no later than the end of year three to ensure that the site is self-sustaining for at least two years (i.e., two summers) prior to final sign-off from the resource agencies. All above ground components shall be removed completely from the mitigation area by the end of the fifth year.

Portions of the mitigation site not within the irrigation zone shall require hand watering on a regular basis until container plants have established to self-sustain themselves on existing surface water, the existing water table and seasonal rainfall It is anticipated that non-irrigated areas shall require hand watering on a regular basis throughout the initial Plant Establishment Period and Year One of the long-term maintenance period, and on a periodic basis during the spring, summer and fall of Years Two and Three. Any container plants or cuttings exhibiting unexpected and excessive drought stress shall receive an increase in hand watering until health returns. All mortality attributed to insufficient watering shall require in-kind plant replacement at the cost of the Habitat Restoration Contractor. Hand watering and irrigation is expected to be discontinued at the end of Year Three.

5.1.3 Trash Removal

Trash and debris will be removed from the mitigation areas by hand during maintenance visits. Trash and debris consist of all man-made materials, equipment, or debris dumped, thrown, washed, blown, and left within the mitigation areas. Trash and inorganic debris washed or blown onto the mitigation sites will be removed regularly. Deadwood and leaf litter of native trees and shrubs will not be removed. Downed logs and leaf litter provide valuable micro-habitats for invertebrates, reptiles, small mammals, and birds. In addition, the decomposition of deadwood and leaf litter is essential for the replenishment of soil nutrients and minerals.

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6.0 MONITORING REQUIREMENTS

Monitoring of the restoration areas has a three-fold purpose: (1) To monitor the progress of the mitigation area by assessing quantitative measurements, (percent native and non-native coverage via transect data collection in years 3–5) with the performance guidelines; (2) to direct and monitor the maintenance activities through qualitative (visual observation and evaluation) methods and determine remedial actions in a manner that ensures that appropriate maintenance occurs in a timely manner; and (3) to recommend and implement adaptive management strategies that promote successful attainment of performance criteria. The monitoring shall be performed by a qualified biologist or habitat restoration specialist (Restoration Ecologist).

The Restoration Ecologist shall be responsible for monitoring the activities of the Habitat Restoration Contractor during boardwalk construction, during site clearing and grading operations to assure protection of existing wetland areas that are to remain and be protected, as well as during initial weed control, finish grading, irrigation installation, container planting, hydroseed application, and monthly monitoring during the 120-day plant establishment/maintenance period. The monitor shall also provide bi-monthly monitoring during year one of the maintenance and monitoring period, and quarterly monitoring in years 2–5 of the 5-year maintenance and monitoring period. The Biological Monitor will communicate and co-ordinate with the Habitat Restoration Contractor to assure the timely performance of project activities. The Biological Monitor shall submit an "As-Built" report within 60 days of completion of the installation period (end of 120-day period), and Annual Reports each year by the anniversary date during the five-year monitoring period, to the City, ACOE, CDFG, and RWQCB.

6.1 Performance Standards

Performance standards include minimum growth, survivorship, and vegetative cover target criteria, as well as target functions and values based on established functional wetlands standards. A combination of assessment methods are important to understanding the ecological functioning and, thereby, the success of the mitigation. Performance guidelines outlined herein follow the requirements of the performance standards outlined in the City of Carlsbad developed *Guidelines for Habitat Creation and Restoration* (2009) and include modifications/additions requested by the ACOE.

6.1.1 Performance Standards

The performance guidelines shown in Table 11 are proposed to direct the evaluation of the mitigation area. The primary mitigation goal for this project is to create and enhance wetland vegetation. Therefore, the following restoration coverage guidelines are used as a gauge to

determine whether adequate native plant growth (percentage cover) and weed/exotic control is present to allow for adequate plant growth and establishment. The performance guidelines are viewed as interim project objectives designed to achieve the final mitigation goals. If mitigation efforts fail to meet the performance guidelines in any one year, then the Biological Monitor shall recommend remedial actions to be implemented the following year to enhance the project to a level of conformance with the original guideline. Each monitoring report shall include an assessment of the quantitative and qualitative performance standards in order to document progress of the mitigation site.

Table 11
Performance Guidelines for Created and Enhanced Wetlands Vegetation Communities

Criteria	Year 1	Year 2	Years 3[1]	Year 4[1]	Year 5[1]
Percent Native Cover	30%	40%	60%	75%	90%
Container Plant and Cutting Survival[2]	100%/60%	90%/80%	80%/80%	80%/80%	80%/80%
Maximum Annual Non-Native/Weed Cover	20%	15%	10%	5%	5%
Maximum Perennial Non-Native/Exotic Cover	5%	0%	0%	0%	0%
Average Height of Wetland Tree Species in Feet (Willows, Sycamores, Oaks)	4 ft.	5 ft.	6 ft.	7 ft.	8 ft.

[0] Percentages based upon transect data in years 3–5, visual estimates only in years 1 and 2.

[1] Container Plan Survival/Cutting Survival. Naturally recruiting native species may be counted as credit for replacement of dead container or cutting stock. Any quantity of dead plants exceeding this percentage shall require replacement planting, unless the project meets or exceeds the total native cover performance standard.

Note: It is presumed that the unaccounted for percentage of cover will be unvegetated, or bare ground.

6.1.2 Functional Wetlands Standards

The following general site characteristics must be met by the end of the 5-year maintenance and monitoring period.

Site Must Meet All Three Wetland Parameters

The wetland creation and restoration areas under the jurisdiction of the ACOE must meet the definition of a 3-parameter ACOE-jurisdictional wetlands by the end of the 5-year maintenance and monitoring period. A delineation of the wetland creation areas will be required prior to resource agency sign-off from the ACOE and RWQCB. If it is determined that the wetland creation areas meet the vegetation and hydrology criteria for a ACOE wetland, but are lacking hydric soils, the ACOE may waive, at their discretion, the need to obtain hydric soils prior to sign-off if the site is progressing towards hydric soils and will likely become hydric in the near future.

Site Must Be Self-Sustaining

The mitigation area must be self-sustaining (i.e., able to survive on their own without artificial support) by the end of the 5-year maintenance and monitoring period. Determination of self-sustainability will be the presence of natural growth cycles and healthy wetlands vegetation that has not been irrigated in the preceding two years prior to the end of the 5-year maintenance and monitoring period.

Site Must Show Evidence of Natural Recruitment

The mitigation area must show evidence of natural recruitment of native wetlands and/or riparian species within the mitigation area. This means naturally occurring native species colonize the site in addition to the originally planted container plants or applied seed.

Site Must Show Evidence of Wildlife Use

The mitigation area must exhibit signs or evidence of wildlife use during the final two years of monitoring.

Habitat Contiguity

The mitigation area must contain wetland vegetation that is contiguous with upstream and downstream wetland/riparian habitats. Habitat connectivity and appropriate habitat linkages will provide nesting and foraging habitat for wildlife species.

Hydrologic Regime of Riparian Zone

The mitigation area must contain evidence of natural hydrologic riparian processes such as overbank flow, repeated inundation, scour, or deposition (i.e., wrack lines).

Micro- and Macro-Topographic Complexity

The mitigation area must contain evidence of micro- and macro-topographic complexity such as pits, ponds, hummocks, bars, rills, rock or boulders, bars, braiding, backwaters, and terraces. Topographic complexity will provide greater flood flow modification and flood storage functions.

Biogeochemical Processes

The mitigation area must contain woody debris, leaf litter, or detritus. Expansion of riparian areas will increase natural water quality functions such as uptake of nutrients and toxicants and sediment trapping.

6.1.3 Qualitative Monitoring

Documentation of native vegetation coverage, weed presence, and site progress will be collected during monitoring visits to be used in the annual monitoring report. Qualitative monitoring will also be conducted to assess native plant vigor and development, seedling recruitment from native seed application and natural sources, soil moisture content, presence/absence of plant pests or diseases, erosion and/or drainage conditions on site, presence/absence of non-native or invasive plant species, trash or debris accumulation, wildlife presence/absence, and status of project fencing. All qualitative monitoring visits to the mitigation areas will be documented with a site observation monitoring report, which will be forwarded to the Habitat Restoration Contractor and the City. Any project deficiencies will be noted in the monitoring report, with accompanying recommendations for maintenance and/or remedial actions.

6.1.4 Quantitative Monitoring

Quantitative monitoring via data collection will be conducted to determine native species cover and composition and total non-native species cover and composition.

Quantitative monitoring will be conducted by establishing permanent vegetation 25-meter transects within the mitigation areas at random locations by the Restoration Ecologist at the end of Year Two. These transects will be utilized during years three – five to help determine achievement of the yearly performance standards and compliance with agency and City standards. Permanent photo-documentation stations will also be established along each transect to record the progress of the mitigation site and graphically record plant establishment over the 5-year period.

Transects will be sampled using the point-intercept method. A transect tape will be run between two posts, and vegetative intercept line will be visually projected above and below the tape at every half-meter mark. Transects will be no longer than 25 meters, but may vary in length based upon the location, and size of the individual restoration area. Each herb or shrub that intercepts the projected line will be recorded by species. In addition, all plant species present within the 5-meter-wide “species richness” portion of each transect will be recorded by species. All data will be utilized to determine total percent plant cover, percent native cover, percent non-native cover, and overall species richness and diversity. Quantitative monitoring will be conducted once annually beginning in Year Three and extending through Year Five of the Restoration Project.

7.0 REPORTING

Annual monitoring reports will be submitted to the City, the resource agencies and the Restoration Contractor during the 5-year maintenance and monitoring period of the proposed project. The monitoring reports will describe the existing conditions of the project areas derived from qualitative field observations and quantitative vegetation data collection. The reports will provide a comparison of annual success criteria with field conditions, identify all shortcomings of the project, and recommend remedial measures necessary for the successful completion of the restoration project. Each yearly report will provide a summary of the accumulated data. Annual reports also will include:

- A list of names, titles, and companies of persons who prepared the annual report and participated in monitoring activities
- Prints of biological monitoring photographs, as appropriate
- Maps identifying monitoring areas, planting zones, and weed removal areas, as appropriate
- Quantitative data from transect measurements in years 3 through 5 of the restoration effort.

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8.0 CONTINGENCY MEASURES

If the final success criteria are not met, the Restoration Ecologist and the City will prepare an analysis of the cause(s) of failure within the appropriate annual report and, if determined necessary by the resource agencies, propose contingency measures, including remedial actions and/or adaptive management strategies, to address the problem. The City's maintenance and monitoring obligations will continue until contingency measures are negotiated and implemented to bring the restoration site into compliance with the established standards.

8.1 Adaptive Management

Adaptive management will be implemented in the event of unforeseen or unpredictable circumstances. Due to the complexity and dynamic nature of ecosystems, and anticipation of unexpected events or outcomes, a flexible resource management plan is desirable.

For purposes of this mitigation project, adaptive management is defined as a flexible, iterative approach to the long-term management of biological resources that is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the restoration areas. Adaptive management will include the utilization of regular qualitative assessments and rapid qualitative assessment data gathered in the field prior to and during the restoration effort to assess the health and vigor of vegetation communities within the restoration areas. Rigorous and consistent monitoring is key to effective adaptive management to ensure that the decisions regarding future management are based on accurate assessments of the status of the resources being managed. Following an event that causes damage to all or part of a restoration area, the data will be used in part to drive management considerations for repair of the damaged areas.

It is the intent of the adaptive management strategy in this HMMP to intervene only as necessary to help ensure the conservation of the functions and services of the mitigation sites and the conservation of native vegetation communities and individual native species within the mitigation sites. Remedial measures will only be implemented if it is determined, in consultation between the City, the Restoration Ecologist, and the resource agencies, that there is a risk to the persistence of the functions and services, native vegetation, or native species on site. Achieving the key goals of mitigation completion and establishment of self-sustaining vegetation communities will be the focus of adaptive management decisions. Individual environmental stressors are discussed below, along with an anticipated range of management responses to correct damage that may occur to the mitigation areas.

8.1.1 Herbivory

Some grazing and browsing by native mammals is expected to occur within the mitigation areas. The plant palettes for each vegetation community have been designed to accommodate a moderate level of plant browsing. If browse levels should become elevated (i.e., if significant plant mortality and cover reduction occurs) as indicated by qualitative or quantitative monitoring of the mitigation sites, remedial measures may be recommended. Browse guards (plastic fencing, cages or tree shelters) may be installed around the base young shrubs in affected areas to reduce plant mortality. In addition, remedial planting or seeding may be necessary depending upon the stage of the restoration effort.

8.1.2 Sediment Loss and Erosion Issues

Sediment loss and erosion issues are not a major concern, as wetland mitigation areas are mostly located along the periphery of the drainage, which is subject to lateral flood inundation rather than rapid creek velocities. Erosion may be a concern in areas if abnormal storm events occur and increase creek velocities through the mitigation area, causing excessive scour and sediment deposition. The Diegan coastal sage scrub restoration area is not anticipated for erosion, as it is located on gentle grades. All mitigation areas will be monitored regularly, and if issues develop, recommended remedial actions will be recommended to minimize sediment loss. Such measures may include the installation of silt fencing, straw wattles, gravel bags or other materials to prevent erosion.

8.1.3 Drought

Seasonal drought is a normal annual cycle in San Diego County, and all plant palettes have been designed with drought-tolerant plant species that are capable of withstanding seasonal fluctuations in available moisture. However, an extended drought could potentially occur, including low seasonal rainfall and prolonged high temperatures that may negatively affect the restoration areas (e.g., lower native cover, higher plant mortality, increased potential for pest infestations on site, etc.). Irrigation (including hand watering) will reduce or eliminate the effects of drought on container plants and seedlings during the first 3 years of the restoration effort. Any remedial options that may be necessary after 3 years from the installation date will likely require an additional period of site irrigation to relieve plants from drought stress and/or provide for new seed growth. All irrigation components will be left in place until the end of year five in case remedial seeding and/or container planting is required at a later project date. If the irrigation system is required at a later date, it should be used only as necessary (i.e., periodic watering versus regular daily watering). After successful completion of the restoration effort, the irrigation system will be removed from the site.

9.0 COMPLETION OF MITIGATION

9.1 Notification of Completion

When the City and Restoration Ecologist believe that the final Year Five performance standards have been met, either before, or at the end of the 5-year maintenance and monitoring period, they shall then notify the ACOE, RWQCB, and CDFG upon submitting the annual report and request formal acceptance of the site and release from the permit conditions and any bonds or letters of credit that may have been placed on the project. Release of mitigation obligations before Year 5 will only be considered if Year 5 performance criteria have been met for 2 consecutive years.

9.2 Agency Confirmation

Written acceptance and/or concurrence from the agencies shall be solicited in order to signify and document completion of the mitigation obligations.

Following receipt of the notification of completion from the City, representatives from the ACOE, RWQCB, and CDFG may visit the site to confirm the completion of the mitigation effort.

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10.0 SITE PROTECTION INSTRUMENT (LONG-TERM MANAGEMENT)

The primary focus of this HMMP is on the successful restoration and compensation/mitigation for impacted vegetation communities. The overall management goals of the restoration program are designed to manage the restoration sites such that none of the intended functions and values (i.e., services) of the sites are lost over time, and so that the presence of native habitats and individual native species are conserved.

The Lake Calavera Project site is located within a proposed hardline conservation area of the City's HMP preserve system and receives the same conservation status as existing hardline areas and thus is designated as open space. Once concurrency from the agencies is provided to signify that the mitigation obligations have been completed, the restoration area will be handed over to the preserve manager for Lake Calavera preserve for long term management maintenance and monitoring in accordance with the City's HMP and Open Space Management Plan. Appropriate funding in order to maintain the site will be provided to the Preserve Manager by the permittee.

A draft declaration of restrictive covenant has been written for the preserve and approved by the City. This restricted covenant is currently under review with ACOE legal staff. An ACOE approved deed restriction, or other form of protection deemed appropriate by the ACOE, will be placed over the mitigation site, to be provide protection of the site in perpetuity.

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11.0 REFERENCES

73 FR 19594–19705. Final rule: "Compensatory Mitigation for Losses of Aquatic Resources." April 10, 2008.Merkel & Associates, Inc. 2009. *Lake Calavera Trails Biological Resources Report. Carlsbad, CA.* January 28.

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Cal-IPC (California Invasive Plant Council). 2006. *California Invasive Plant Inventory*. Cal-IPC Publication 2006-02, California Invasive Plant Council: Berkeley, California. http://www.cal-ipc.org/ip/inventory/pdf/Inventory2006.pdf.

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APPENDIX A

MND Notice of Determination
Mitigation Measures

City of Carlsbad
Planning Department

MITIGATED NEGATIVE DECLARATION

CASE NAME: Lake Calavera Trails Master Plan
CASE NO: HMP 09-05
PROJECT LOCATION: An undeveloped, approximately 262-acre site in the northeastern corner of the City of Carlsbad south of Lake Boulevard and east of College Boulevard. The project area surrounds Lake Calavera and is bordered on the north and east by the City of Oceanside.

PROJECT DESCRIPTION: The original Mitigated Negative Declaration (MND) for the LCTMP was circulated for public comment from July 14, 2006 to August 13, 2006 as City project EA 05-09 and SCH #2006071064. Based on comments received, further analysis was completed by the City and changes are proposed for the Lake Calavera Trails Master Plan (LCMP). The revised LCTMP project would establish a formal network of signed, public multi-recreational trails and viewpoints by improving approximately 5 miles of existing trails around Lake Calavera. No new trails would be created by the project and trails would be designated for bicyclists and hikers or hikers only. The trails criss-cross an undeveloped area of approximately 262 acres with a variety of native vegetation. Along with trail improvements, the project proposes information kiosks, viewpoints with interpretive signage, litter receptacles, dog waste stations, picnic tables, and a portable restroom. The project also proposes to establish parameters for trail maintenance. The trail system is and would be accessed at multiple publicly-accessible locations, including from surrounding streets, sidewalks, and other trails. The entire project area is owned by the City of Carlsbad.

DETERMINATION: The City of Carlsbad has conducted an environmental review of the above described project pursuant to the Guidelines for Implementation of the California Environmental Quality Act and the Environmental Protection Ordinance of the City of Carlsbad. As a result of said review, the initial study (EIA Part 2) identified potentially significant effects on the environment, and the City of Carlsbad finds as follows:

☒ Although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on the attached sheet have been added to the project.

☐ The proposed project MAY have "potentially significant impact(s)" on the environment, but at least one potentially significant impact 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. (Mitigated Negative Declaration applies only to the effects that remained to be addressed).

☐ Although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed - **adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project. Therefore, nothing further is required.

A copy of the initial study (EIA Part 2) documenting reasons to support the Negative Declaration is on file in the Planning Department, 1635 Faraday Avenue, Carlsbad, California 92008.

ADOPTED: January 25, 2010, pursuant to Administrative Approval

ATTEST:

Don Neu

DON NEU
Planning Director

100020

Notice of Determination

To: ☐ Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044

☒ SD County Clerk
Attn: Linda Kesina
Mail Stop A-33
1600 Pacific Highway
San Diego, CA 92101

From: **CITY OF CARLSBAD**
Planning Department
1635 Faraday Avenue
Carlsbad, CA 92008
(760) 602-4600

Project No: HMP 09-05

Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Lake Calavera Trails Master Plan
Project Title

2009071090	City of Carlsbad, Pam Drew	(760) 602- 4644
State Clearinghouse No.	**Lead Agency, Contact Person**	**Telephone Number**

An undeveloped, approximately 262-acre site in the northeastern corner of the City of Carlsbad south of Lake Boulevard and east of College Boulevard. The project area surrounds Lake Calavera and is bordered on the north and east by the City of Oceanside.

Project Locations (include County)

Name of Applicant: City of Carlsbad
Applicant's Address: 1635 Faraday Avenue, Carlsbad, CA 92008 (County of San Diego)
Applicant's Telephone Number: 760-602-4644
Project Description: The original Mitigated Negative Declaration (MND) for the Lake Calavera Trails Master Plan (LCTMP) was circulated for public comment from July 14, 2006 to August 13, 2006 as City project EA 05-09 and SCH #2006071064. Based on comments received, further analysis was completed by the City and changes are proposed for the LCTMP. The revised LCTMP project would establish a formal network of signed, public multi-recreational trails and viewpoints by improving approximately 5 miles of existing trails around Lake Calavera. No new trails would be created by the project and trails would be designated for bicyclists and hikers or hikers only. The trails criss-cross an undeveloped area of approximately 262 acres with a variety of native vegetation. Along with trail improvements, the project proposes information kiosks, viewpoints with interpretive signage, litter receptacles, dog waste stations, picnic tables, and a portable restroom. The project also proposes to establish parameters for trail maintenance. The trail system is and would be accessed at multiple publicly-accessible locations, including from surrounding streets, sidewalks, and other trails. The entire project area is owned by the City of Carlsbad.

This is to advise that the City of Carlsbad has approved the above described project on January 25, 2010, and has made the following determination regarding the above described project.

1. The project **will not** have a significant effect on the environment
2. A **Mitigated** Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures **were** made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan **was** adopted for this project.
5. A statement of Overriding Considerations **was not** adopted for this project.
6. Findings **were** made pursuant to the provisions of CEQA.

This is to certify that the final **Mitigated Negative Declaration** with comments and responses and record of project approval is available to the General Public at THE CITY OF CARLSBAD.

Don Neu — 1-25-10
DON NEU, Planning Director — Date

Date received for filing at OPR:

PROJECT NAME: LAKE CALAVERA TRAILS MASTER PLAN FILE NUMBERS: HMP 09-05

APPROVAL DATE:

The following environmental mitigation measures were incorporated into the Conditions of Approval for this project in order to mitigate identified environmental impacts to a level of insignificance. A completed and signed checklist for each mitigation measure indicates that this mitigation measure has been complied with and implemented, and fulfills the City's monitoring requirements with respect to Assembly Bill 3180 (Public Resources Code Section 21081.6).

Mitigation Measure	Monitoring Type	Monitoring Department	Shown on Plans	Verified Implementation	Remarks
BIOLOGICAL RESOURCES **BIO-1**: Mitigation for permanent and temporary impacts to upland communities will be mitigated by debiting the appropriate acreage at the Lake Calavera Mitigation Parcel. The Lake Calavera property was identified in the City's Habitat Management Plan as a public project mitigation parcel for municipal projects. The total acreage available for credit at its inception was 186.55 acres. That acreage is available to mitigate for habitat impacts from City projects on an acre-for-acre basis regardless of the type of habitat being impacted, except for gnatcatcher occupied coastal sage scrub, southern maritime chaparral, maritime succulent scrub, and wetlands. The mitigation provided for each City project by the Lake Calavera parcel is tracked and reported on an annual basis in the City's HMP Annual Report. As of the end of the last reporting period (October 2008), a total of 183.8 acres of mitigation land was still available. The City plans to mitigate for impacts to gnatcatcher occupied sage scrub through on-site mitigation and the preparation of an MMRP, as described above. Until the MMRP is submitted, please refer to the On-site Revegetation Recommendations section of the revised Biological Resources Report (January 28, 2009) for a	Project-Prior to Grading	Planning Department and Biological Monitor			

Explanation of Headings:
Type = Project, ongoing, cumulative.
Monitoring Dept. = Department, or Agency, responsible for monitoring a particular mitigation measure.
Shown on Plans = When mitigation measure is shown on plans, this column will be initialed and dated.
Verified Implementation = When mitigation measure has been implemented, this column will be initialed and dated.
Remarks = Area for describing status of ongoing mitigation measure, or for other information.
RD - Appendix P.

Mitigation Measure	Monitoring Type	Monitoring Department	Shown on Plans	Verified Implementation	Remarks
tentative map of suitable areas for sage scrub mitigation as well as appropriate planting material (attached). The mitigation acreage would include a minimum 1:1 creation component within the immediate vicinity of occupied coastal sage scrub, with the goal of creating suitable habitat for the gnatcatcher. This mitigation plan will include details regarding grading, irrigation design, and planting specifications, as well as maintenance and monitoring procedures. The plan will also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria. Mitigation for impacts to riparian/wetland communities will be achieved through on-site creation, restoration, and/or enhancement within the Lake Calavera Mitigation Parcel. Mitigation shall include a 1:1 creation component in accordance with the "no net loss" wetlands policy in the Carlsbad HMP. Temporary impacts will be mitigated at a 1:1 ratio through restoration or enhancement.					

Explanation of Headings:
Type = Project, ongoing, cumulative.
Monitoring Dept. = Department, or Agency, responsible for monitoring a particular mitigation measure.
Shown on Plans = When mitigation measure is shown on plans, this column will be initialed and dated.
Verified Implementation = When mitigation measure has been implemented, this column will be initialed and dated.
Remarks = Area for describing status of ongoing mitigation measure, or for other information.
RD - Appendix P.

Mitigation Measure	Monitoring Type	Monitoring Department	Shown on Plans	Verified Implementation	Remarks

Table 2
Mitigation Ratios for Impacted Vegetation Communities and Jurisdictional Habitats

Vegetation Community	HMP Habitat Group[2]	Mitigation Ratio[1]		Total Impacts (Acreage)[1]			Mitigation (Acreage)		
		P	T	PI	TI	Total	P	T	Total
Disturbed Wetland	Group A	2:1	1:1	0.002	—	0.002	0.004	—	0.004
Coastal and Valley Freshwater Marsh	Group A	2:1	1:1	0.05	0.05	0.10	0.10	0.05	0.15
Southern Coast Live Oak Riparian Forest	Group A	3:1	1:1	0.05	0.04	0.09	0.15	0.04	0.19
Mule Fat Scrub	Group A	2:1	—	0.001	—	0.001	0.002	—	0.002
Southern Willow Scrub	Group A	3:1	1:1	0.02	0.02	0.04	0.06	0.02	0.08
Non-Wetland Waters of the U.S./Streambed (Drainages)	Group A	1.5:1	—	0.001	—	0.001	0.002	—	0.002
Total Wetland[3]:				**0.12**	**0.11**	**0.23**	**0.32**	**0.11**	**0.43**
Disturbed Valley Needlegrass Grassland	Group B	3:1	—	0.02	—	0.02	0.06	—	0.06
Diegan Coastal Sage Scrub	Group C	2:1	1:1	0.11	0.02	0.13	0.22	0.04	0.26
Southern Mixed Chaparral	Group D	1:1	—	0.05	—	0.05	0.05	—	0.05
Chamise Chaparral	Group D	1:1	—	0.02	—	0.02	0.02	—	0.02
Non-native Grassland	Group E	0.5:1	—	0.22	—	0.22	0.11	—	0.11
Disturbed Habitat	Group F	0.1:1	—	4.93	0.01	4.94	0.49	—	0.49
Total Upland:				**5.35**	**0.03**	**5.38**	**0.95**	**0.04**	**0.99**
GRAND TOTAL:				**5.47**	**0.14**	**5.61**	**1.27**	**0.15**	**1.42**

[1] P=Permanent, T=Temporary; PI= Permanent Impact, TI=Temporary Impact.
[2] Group A habitats are associated with wetlands. Group C habitats are occupied by coastal California gnatcatcher.
[3] Impacts to wetland habitats are subject to review under Section 404 of the federal Clean Water Act or under Section 1602 of the California Fish and Game Code. Mitigation ratio varies by type of habitat and subject to change. Mitigation for permanent impacts to wetland communities would require a minimum of 1:1 creation; the remaining mitigation could occur in the form of enhancement. It is recommend that mitigation for temporary impacts occur in the form enhancement and occur in place of the temporary impact.

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RD - Appendix P.

Mitigation Measure	Monitoring Type	Monitoring Department	Shown on Plans	Verified Implementation	Remarks
BIO-2: Per the City's HMP, no clearing or non-routine maintenance of occupied coastal California gnatcatcher habitat shall occur within the breeding season, between March 1 and August 15. If this schedule cannot be met, it is recommended that a qualified biologist inspect the shrubs for nests prior to construction or non-routine maintenance. Trail maintenance activities are listed within Table 1, page 4 of the Citywide Trail Maintenance Plan (City 2002). Non-routine maintenance work would be classified as activities that require the use of the following: heavy equipment, equipment that produces noise greater than 60 decibels, equipment that produces a large amount of dust, trail closure, and removal of trees. If an active nest is found, no impacts shall be allowed within 500 feet or until all young have fledged.	Project – Prior to any Construction	Planning Department and Biological Monitor			
BIO-3: Construction and non-routine maintenance work should be conducted outside of the raptor and migratory bird breeding season (typically February 15 – September 15). Trail maintenance activities are listed within Table 1, page 4 of the Citywide Trail Maintenance Plan (City 2002). Non-routine maintenance work would be classified as activities that require the use of the following: heavy equipment, equipment that produces noise greater than 60 decibels, equipment that produces a large amount of dust, trail closure, and removal of trees. If this schedule cannot be met, it is recommended that a qualified biologist inspect the trees for nests prior to construction or non-routine maintenance. If an active nest is found, no impacts shall be allowed within 500 for all listed species and raptors, and 300 feet for non-listed species or until all young have fledged.	Project – Prior to any Construction	Planning Department and Biological Monitor			
BIO-4: Construct barrier fencing to restrict human access along trails within sensitive areas, while still allowing for wildlife movement.	Project- During Construction	Park Planner & Construction Contractor			

Comment [RLH1]: Does it really say this in the HMP? According to federal survey protocol, the breeding season runs from February 15 - August 30.

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Mitigation Measure	Monitoring Type	Monitoring Department	Shown on Plans	Verified Implementation	Remarks
BIO-5: Construct barrier fencing to restrict access to trails that have been closed.	Project-During Construction	Park Planner & Construction Contractor			
BIO-6: Maintenance of the Lake Calavera Trails project will comply with the Citywide Trail Maintenance Plan (City 2002). Trails shall be maintained on a regular basis, particularly in the rainy season, to prevent soil erosion and sedimentation from entering the adjacent wetlands and affecting water quality.	Project-During Construction & Post Construction	Park Planner			
BIO-7: Waterbars should be installed on steep trails to prevent accelerated runoff and erosion. Please refer to previous Table 1 for the approximate location of these structures.	Project-During Construction	Construction Contractor			
BIO-8: Impacts to jurisdictional wetlands and non-wetland waters of the U.S./streambed shall require the following permits by regulatory federal and state agencies: 1) ACOE, CWA, Section 404 permit for placement of dredged or fill material within waters of the U.S., 2) RWQCB, CWA, Section 401 state water quality certification/waiver for an action that may result in degradation of waters of the State, and 3) CDFG, California Fish and Game Code, Section 1602 agreement for alteration of a streambed. The mitigation for impacts to jurisdictional resources must occur in the form of creation or creation combined with enhancement; however, the mitigation cannot result in a net-loss of wetland habitat or wetland functions and values. Therefore, a minimum 1:1 creation ratio must be applied toward any jurisdictional impacts.	Project-Prior to Any Construction	Planning Department			

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BIO-9: The development of a conceptual mitigation, maintenance, and monitoring plan will be required for the wetland mitigation. This plan is a requirement of both the federal and state wetland permit applications and must be submitted with the required permit applications. This plan should include details regarding grading, irrigation design, and planting specifications, as well as maintenance and monitoring procedures. The plan should also outline yearly success criteria and remedial measures should the mitigation effort fall short of the success criteria. Any wetland mitigation that cannot be achieved through on-site restoration and enhancement should be performed off-site, but preferably within the same local watershed; however, off-site mitigation may require higher mitigation ratios. Alternatively, the mitigation obligations may also be satisfied by participating in a fee-based mitigation program through a wetland mitigation bank. The proposed mitigation is subject to the resource agencies' review and discretion; thus, the mitigation obligations for the impacts to jurisdictional wetland habitats may change from what has been recommended here. Until a conceptual plan is submitted for permitting, please refer to the On-site Revegetation Recommendations section of this report for a tentative map of suitable areas for wetland mitigation as well as appropriate planting material.	Project-Prior to Any Construction	Planning Department and Biological Consultant			
BIO-10: Prior to construction activities, all wetland areas within or adjacent to construction areas should be encompassed by orange environmental fencing to protect them from construction as determined appropriate by the biological monitor and the Land Manager. A qualified biologist shall inspect all construction fencing prior to construction and shall monitor construction (grading) activities to avoid unauthorized impacts.	Project-Prior to Any Construction	Construction Contractor and Biological Monitor			

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BIO-11: Project construction, operations, use, and maintenance shall comply with the HMP Section F, Preserve Management, and specifically the Recreation and Public Access guidelines contained therein on pages F-11 through F-14.	Project-During and After All Construction Activities	Park Planner			
GEOLOGY AND SOILS **GEO-1:** Construction BMPs would be implemented according to Appendix B of the Final MHCP Subarea Plan, Volume II.	Project-Prior to Any Construction	Construction Contractor			
GEO-2: A qualified biologist shall inspect all construction fencing prior to construction and shall monitor construction (grading) activities to avoid unauthorized impacts.	Project-Prior to and During All Construction Activities	Biological Monitor			
GEO-3: Erosion control shall be adequate to ensure that areas disturbed by the project remain stable and do not erode during rain events.	Project-Prior to and During All Construction Activities	Construction Contractor			
GEO-4: Spoil, trash, or any debris shall be removed off-site to an approved disposal facility.	Project-Prior to and During All Construction Activities	Construction Contractor			
GEO-5: All construction area limits shall be clearly delineated prior to construction activity with orange construction fencing or silt fencing to ensure that construction activity remains within the defined construction limits. Fencing shall not interfere with wildlife movement.	Project-Prior to and During All Construction Activities	Construction Contractor and Biological Monitor			
GEO-6: The project biologist shall provide direction to construction personnel regarding the need to avoid impacts to adjacent sensitive areas. All construction/grading plans shall be made available to crews in the field showing these conditions.	Project-Prior to and During All Construction Activities	Biological Monitor			

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HYDROLOGY AND WATER QUALITY **HYDRO-1:** The City shall implement all maintenance operations of permanent BMPs as outlined in Section 2.5 [Maintenance of Municipal Separate Storm Sewer System (MS4) of their Jurisdictional Urban Runoff Management Plan (JURMP)]. The City's Contractor is responsible for maintenance of construction BMPs. In particular, silt fencing or other sediment trapping devices shall be installed and maintained in order to prevent runoff from entering the water systems during construction activities.	Project-Prior to and During All Construction Activities	Construction Contractor			

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APPENDIX B

Preliminary Boardwalk Alignment (Plan and Photographs)

Proposed Elevated Boardwalk (6' Width)
Total Area - 0.04 Ac. (1670 sf/278 lf)
Est. Modular Sections (6'x8') - 32

Creek Crossing - Replace bridge

Palm to be removed
(Wetland Enhancement)

Location 1 - Western Creek Crossing

Proposed Elevated Boardwalk (6' Width)
Total Area - 0.004 Ac. (154 sf/25 lf)
Est. Modular Sections (6'x8') - 5

Tributary crossing

Location 3 - Southeast Boardwalk (Tributary Crossing)
By Others (Not in Contract)

NOTE: CONSTRUCTION OF THIS AREA TO BE HANDLED BY THE CITY AS A SEPARATE CONTRACT.

N

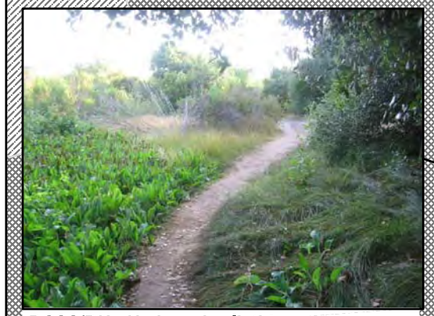
20 0 Feet

ACOE/CDFG JURISDICTIONAL HABITATS
CDFG ONLY JURISDICTIONAL HABITATS

Proposed Elevated Boardwalk (6' Width)
Total Area - 0.09 Ac. (3,894 sf/649 lf)
Impact Area - 0.12 (5,192 sf) incl. temp impacts
Est. Modular Sections (6'x8') - 76

FWM -Upstream location

Pampas Grass to be removed
(Wetland Enhancement)



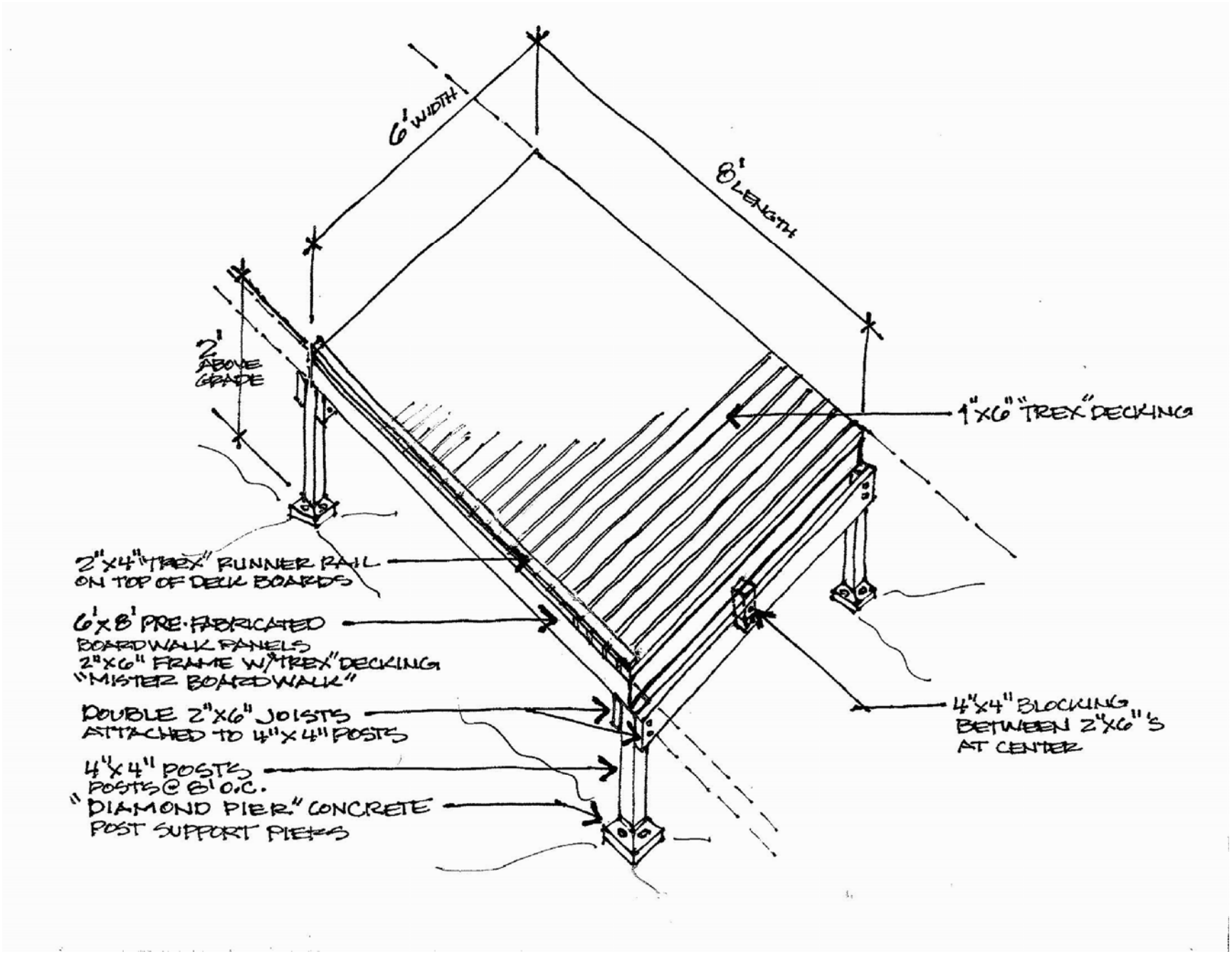
DCSS/DH - No boardwalk this section

FWM - Ponded Crossing

Palm to be removed
(Wetland Enhancement)

SCLORF/SWS - downstream location

Location 2- Eastern Wetland Boardwalk



DUDEK

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August 2011

FIGURE B-2

Typical Boardwalk Construction Detail (Post and Panel)

APPENDIX C

Construction Plans for Lake Calavera Boardwalk Trail and Restoration