APPENDIX 9.3

BIOLOGICAL RESOURCES TECHNICAL REPORTS

HELIX
Environmental Planning

Murrieta Hills Project

Habitat Evaluation and Acquisition Negotiation Strategy Biological Analysis

September 12, 2019

Prepared for:
Pulte/BP Murrieta Hills, LLC
2 Technology Drive
Irvine, CA 92618

Prepared by:
HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942

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EXECUTIVE SUMMARY

The Murrieta Hills Specific Plan Amendment area consists of approximately 973.69 acres located in the southern portion of Menifee Valley in an unincorporated portion of Riverside County, California. The project also includes an off-site 18.5-acre study area for McElwain Road that will connect the project to Clinton Keith Road. McElwain Road has been added to the Multiple Species Habitat Conservation Plan (MSHCP) as a Covered Activity through Minor Amendment No. 2017-01. Specifically, the project site is located south of Keller Road and west of Interstate (I-) 215, immediately north of the City of Murrieta. The project is consistent with the MSHCP and associated Habitat Evaluation and Acquisition Negotiation Strategy (HANS).

The property is in Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP. The entire project is within criteria cells, and all cells are part of Cell Group C. The property comprises 973.69 acres of the approximately 1,300-acre Cell Group C. The off-site study area encompasses approximately 18.5 acres adjacent to the southeast corner of the project. The off-site area is not within any MSHCP criteria cells. As of the writing of this report, biological surveys of the off-site area have not been conducted.

The majority (701.7 acres) of the approximately 973.69-acre property is made up of chaparral. The property is primarily undeveloped with approximately 97 acres in the northeast being utilized for crop-based agricultural (e.g., growing wheat and oats). The remains of a small, recently vacated nursery are located near the center of the property, and disturbed areas are located in the center and southeast. The property is crossed by several dirt roads and includes areas that have been disturbed from off-highway vehicle activity, illegal dumping, and various other unauthorized activities. The off-site area is similar to the main property and is made up primarily (9.9 acres) of chaparral. The off-site area includes more disturbed and developed habitats relative to the main property.

The entire site, except for the off-site study areas, is identified by the MSHCP occurring within the Criteria Area Species Survey Area (CASSA) and Narrow Endemic Species Survey Area (NEPSSA). The off-site areas are also within the NEPSSA but does not occur within the CASSA. The Narrow Endemic Plant species are Munz's onion (*Allium munzii*), San Diego ambrosia (*Ambrosia pumila*), many-stemmed dudleya (*Dudleya multicaulis*), spreading navarretia (*Navarretia fossalis*), California Orcutt grass (*Orcuttia californica*), and Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii)*. The Criteria Area species for the site are Davidson's saltscale (*Atriplex serenana* var. *davidsonii*), Parish's brittlescale (*Atriplex parishii*), thread-leaved brodiaea (*Brodiaea filifolia*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), round-leaved filaree (*Erodium macrophyllum*), smooth tarplant (*Centromadia pungens* ssp. *laevis*), and little mousetail (*Myosurus minimus*). No NEPSSA or CASSA plant species were observed during focused surveys conducted on the property in 2008 and 2012. Two individual round-leaved filaree were observed during a rare plant survey in 2006. The two individuals do not represent a population with long-term conservation value.

The term "off-site study area" refers to the area associated with McElwain Road to the south, and "Keller Road outfall" refers to the less than 0.1 acre outfall area to the north. The Keller Road outfall area was surveyed on May 15, 2019. The off-site study area has not yet been surveyed.

Required focused animal surveys were conducted for burrowing owl (*Athene cunicularia*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*). Surveys for these species were conducted in 2006, 2008, and 2012 by HELIX Environmental Planning, Inc. (HELIX) with negative results. An additional burrowing owl survey was conducted by HELIX in 2018, also with negative results (HELIX 2018). No additional focused animal surveys are required. Habitat for least Bell's vireo and southwestern willow flycatcher does not occur in the off-site study areas. The Keller Road outfall areas was included as buffer area in the various burrowing owl surveys. The off-site study area included a minimal amount of habitat with very low potential for burrowing owl. Focused surveys for this area are not recommended, but this area should be included in the pre-construction survey to ensure impacts to burrowing owls are avoided.

The project proposes to conserve habitat in the western, southern, and eastern portions of the site, totaling 607.74 acres. The remainder of the site, including southern willow scrub (0.36 acre), mule fat scrub (0.15 acre), coast live oak woodland (4.71 acres), chaparral (204.3 acres), Riversidean sage scrub (21.2 acres), sage scrub/chaparral ecotone (11.4 acres), non-native grassland (1.7 acres), agriculture (87.6 acres), disturbed habitat (29.6 acres), and developed land (0.7 acre), would be impacted as a result of project implementation. The off-site impact of 4.15 acres are made up of chaparral (2.4 acres), Riversidean sage scrub (0.05 acre), non-native grassland (0.2 acre), disturbed habitat (1.2 acres), and developed (0.3 acre). This includes impacts to 2.10 acres of Riparian/Riverine habitat.

The project is being implemented consistent with the MSHCP based on the following:

- MSHCP Cell Group C criteria call for conservation of 60 to 70 percent or 780 to 910 acres along the northern portion of the site. As the project would conserve 607.74 acres and 62.4 percent of the site, it would contribute to meeting the conservation goals of Cell Group C and would create a live in and migratory habitat east west connection that is consistent with the Cell Group criteria.

- The project is consistent with MSHCP Section 6.1.2 because no vernal pools occur within the proposed project footprint and none of the plants or animal associated with Riparian/Riverine resources occurs on site, and impacts will be mitigated through on-site preservation and off-site mitigation.

- The project is consistent with MSHCP Section 6.1.3 because NEPSSA species are not expected to occur on site and were not observed during focused surveys.

- The project is consistent with MSHCP Section 6.1.4 because it has minimized indirect impacts through the use of best management practices, appropriate buffering, appropriate access and lighting control, and control of exotic species within and adjacent to the preserve.

- The project is consistent with MSHCP Section 6.3.2 because no burrowing owls or active burrow locations were observed on the property during the focused surveys.

Impacts to upland habitats and associated species will be addressed through participation in the MSHCP, and payment of the MSHCP Local Development Mitigation fee of $7,164 per acre for commercial impacts, $2,104 per dwelling unit for residential development of less than eight units per acre, $1,347 per dwelling unit for residential development between 8.1 and 14 dwelling units per acre, and $1,094 per dwelling unit for development greater than 14.1 dwelling units per acre (Regional Conservation Authority 2017, subject to adjustment). The applicant is requesting dedication of 607.74 acres for conservation be offset through MSHCP fee credits up to the value of the land being dedicated for conservation.

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I. INTRODUCTION

The purpose of this report is to provide biological data available on Pulte/BP Murrieta Hills, LLC's proposed Murrieta Hills project Specific Plan Amendment (SPA; No. 4) and General Plan Amendment (GPA00951) located in the City of Murrieta (City), Riverside County, California, and to provide the City, Regional Conservation Authority, and resource agencies with information necessary to determine that the project is consistent with the Multiple Species Habitat Conservation Plan (MSHCP; Dudek and Associates [Dudek] 2003) and the associated Habitat Evaluation and Acquisition Negotiation Strategy (HANS). The Assessor's Parcel Numbers (APNs; Table 1) that make up the site are: 384190001, 384190003, 384190005 to -014, 384200006 to -017, 384210001, and 384210003.

Table 1
ASSESSOR'S PARCEL NUMBERS AND ACREAGE

APN	ACREAGE*
384190001	21.05
384190003	17.94
384190005	20.21
384190006	35.98
384190007	10.06
384190008	10.28
384190009	9.69
384190010	9.96
384190011	10.69
384190012	10.87
384190013	10.25
384190014	10.37
384200006	10.54
384200007	10.43
384200008	10.45
384200009	10.45
384200010	18.53
384200012	11.27
384200013	44.38
384200014	6.14
384200015	11.47
384200016	6.89
384200017	22.72
384210001	617.11
384210002	5.44
384210003	9.83
TOTAL ACREAGE	**974.00****

* Acreage shown is from Riverside County Land Information System (RCLIS) website and is the larger of recorded/mapped acreage shown for Assessor's Parcel Numbers (APNs).

** RCLIS website total is 0.3 acre larger than the HELIX Environmental Planning, Inc. (HELIX) mapped total. The HELIX mapped total is used throughout the remainder of this report.

The property is in Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP. The entire project is within criteria cells, with the exception of the off-site portion of McElwain Road and the Keller Road outfall, and all cells are part of Cell Group C. The property comprises 973.69 acres of the approximately 1,300-acre Cell Group C. Please note that the 973.69 acres includes 1.9 acres of land located around the reservoir located just offsite adjacent to the north-central portion of the site and all of the Keeler Road right-of-way. The term "off-site study area" refers to the area associated with McElwain Road to the south, and "Keller Road outfall" refers to the less than 0.1 acre outfall area to the north.

A. PROJECT LOCATION

The Murrieta Hills Specific Plan Amendment area consists of approximately 973.69 acres located in the southern portion of Menifee Valley in the County of Riverside (County) (Figure 1). Specifically, the project site is located south of Keller Road and west of Interstate (I-) 215 (Figure 2). The property is in Sections 27 and 28, Township 6 South, Range 3 West, as shown on the U.S. Geological Survey (USGS) 7.5-minute Murrieta and Romoland quadrangle maps (Figure 3). The project also includes an 18.5-acre off-site study area for the required circulation improvements that will connect the project to Clinton Keith Road via McElwain Road. McElwain Road has been added as an MSHCP Covered Activity through Minor Amendment No. 2017-01 (RCA 2018).

The dominant soils on the property and on the off-site study area consist of two well-drained soils: Cajalco fine sandy loam and Cienba rocky sandy loam. Other soils present on site include Las Posas and Honcut series loams with some Auld series clay soil in the northeast portion of the property (Knecht 1971). Soil types that occur on the property are known to have clay inclusions. Multiple drainages occur on the property.

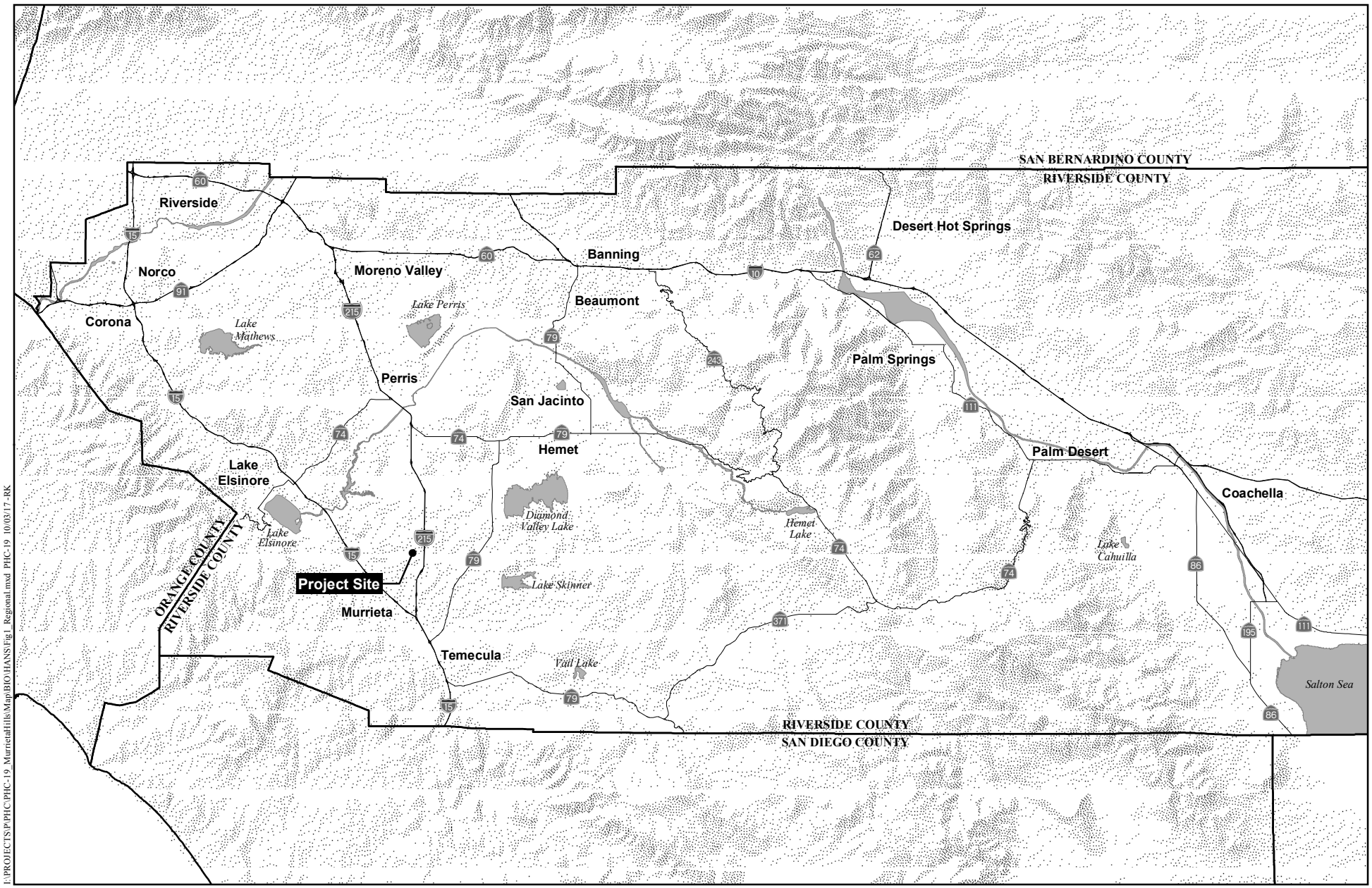
B. LAND USE/SITE HISTORY

The property is primarily undeveloped with approximately 97 acres in the northeast being utilized for crop-based agricultural (e.g., growing wheat and oats). The remains of a small, recently vacated nursery are located near the center of the property, and disturbed areas are located in the center and southeast. The property is crossed by several dirt roads and contains areas that have been disturbed from off-highway vehicle activity, illegal dumping, and various other unauthorized activities. Surrounding uses include undeveloped land, rural and urban residential areas, and I-215. There are two water tanks located adjacent to the west side of the cropland along the northern border of the property.

The off-site study area includes undeveloped land similar to those on site along with disturbed and developed lands associated with the rural residential development that occur adjacent to the proposed extension of McElwain Road, an MSHCP Covered Activity.

C. PROPOSED PROJECT

The project proposes annexation to the City and an amendment to the existing Murrieta Hills Specific Plan SPM-4, approved by the City in 1995, to allow residential and commercial uses, a public park, improved open space, and natural open space. The project also includes a northerly



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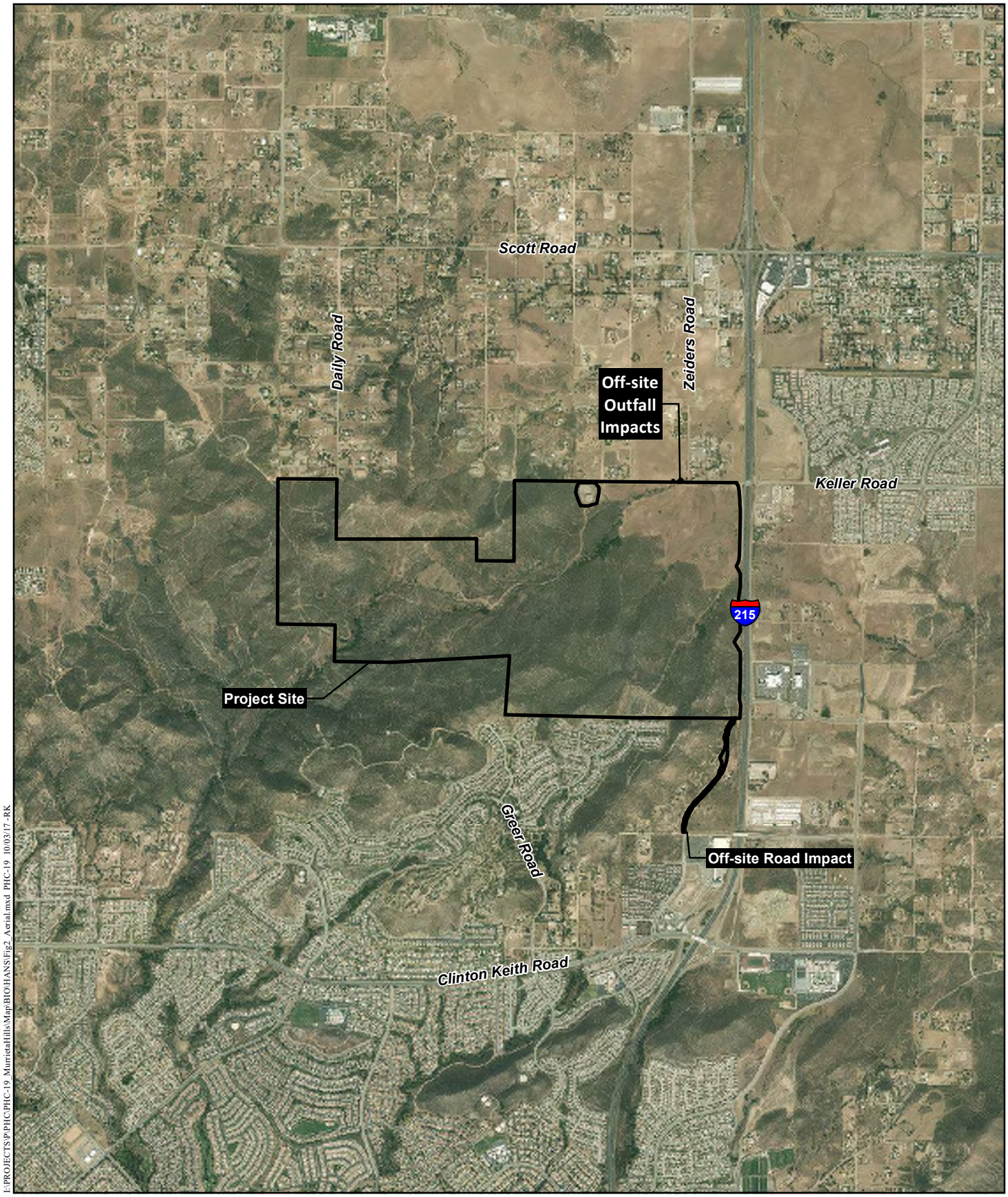
Regional Location Map

MURRIETA HILLS

HELIX Environmental Planning

N 0 10 Miles

Figure 1



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Project Vicinity Map (Aerial Photograph)

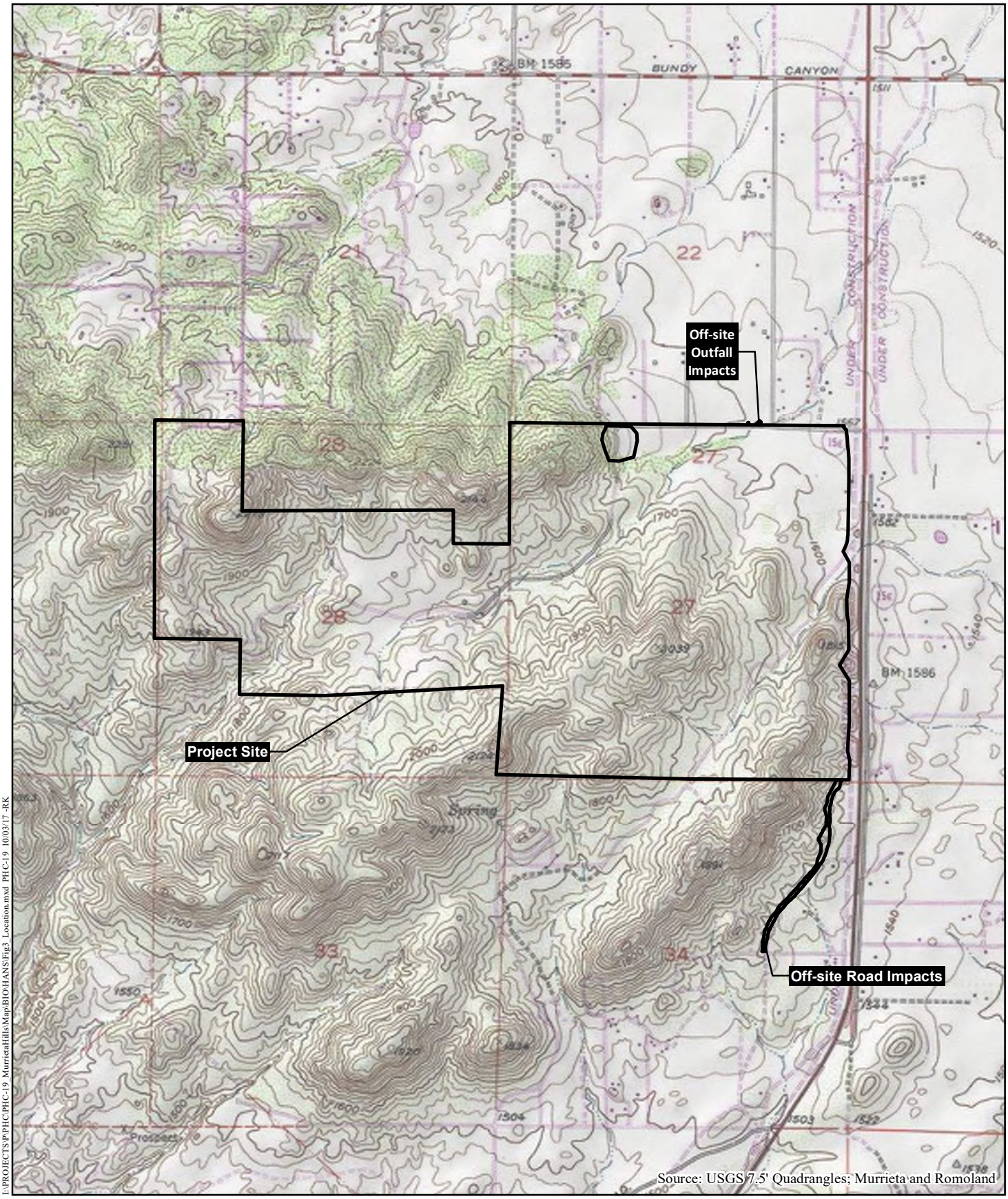
MURRIETA HILLS

HELIX Environmental Planning

N

0 3,000 Feet

Figure 2



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Project Vicinity Map (USGS Topography)

MURRIETA HILLS

HELIX Environmental Planning

N 0 2,000 Feet

Figure 3

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extension of McElwain Road to Keller Road. In addition to the Specific Plan Amendment and annexation to the City, the project will require an amendment to change the existing land use from Rural Mountainous in the Riverside County General Plan to appropriate general plan designations in the City of Murrieta General Plan, a rezone from the Riverside County zone of Rural Residential to appropriate zoning within the City of Murrieta, and one or more tentative subdivision maps.

The conceptual site plan (Figure 4) shows a configuration of approximately:

- 557 single-family detached residential units on lots/pads ranging in size from 4,800 to 10,000 square feet
- 193 multi-family units
- 18 acres of community commercial
- five-acre public park
- 10 acres of Homeowner Association maintained pocket parks and community center
- 39 acres of natural open space outside of MSHCP open space
- 607.74 acres of natural MSHCP open space

The proposed project will result in impacts to approximately 361.76 acres of the 973.69-acre property through grading and fuel modification. Access to the project will be from Keller Road to the north and from Clinton Keith Road via McElwain Road to the south. The existing McElwain Road will be extended to connect to the development, and would impact 4.15 acres off site within the 18.5-acre off-site study area. The off-site portion of McElwain Road is not within MSHCP Criteria Cells. A six foot box culvert will be utilized to convey storm flows under McElwain Road within the conservation area and will facilitate wildlife movement through this area. A second four-foot by four-foot (1.22-meter) box culvert will be placed slightly upslope to facilitate wildlife movement during storm events. The proposed development includes avoiding the majority of the large drainage that runs from the center to the northeast through the linear park. The project includes an outfall structure on the north side of Keller Road for flows from this large drainage. Due to the extent of the Riparian/Riverine resources on the property, total avoidance can be achieved only by minimal or no project alternatives. The linear park is not part of the MSHCP conservation area, and essentially all upland areas within the linear park will be modified for fuel management purposes, consistent with the Fire Protection Technical Report for the project (Dudek 2018). The impacts include 4.4 acres of existing fuel modification associated with the Greer Ranch Development. No trails are proposed in the linear park.

A previous development proposal on the project site was reviewed through the HANS process (JPR 09-02-17-01). Both development and conservation in the western and southern portions of the site have been eliminated from the previous submittal. This HANS report amends the previous report to address the current development proposal as well as comments provided by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife

(CDFW) on the previously approved JPR with a Not Consistent Determination being made at the time by the USFWS and CDFW.

II. METHODS

Project site evaluation involved literature review, on-site habitat assessments, and various surveys. The methods used to evaluate the property are discussed in this section. HELIX Environmental Planning, Inc. (HELIX) conducted biological resources assessments of the Murrieta Hills property in winter 2005, spring 2006, fall 2007, and spring/summer 2008. Rare plant surveys were conducted in May and June 2006, April and June 2008, and May 2012. Burrowing owl (*Athene cunicularia*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*) surveys were conducted in spring and summer 2006, least Bell's vireo and burrowing owl surveys were conducted in 2008 and 2012 (HELIX 2012a and b), and a burrowing owl survey was conducted again in 2018 (HELIX 2018). Additional site surveys were conducted in 2006, 2007, 2012, 2013, 2016. 2018, and 2019 to evaluate the Riparian/Riverine resources that occur on the property and within the off-site impact areas associated with the project. The off-site area was assessed for potential waters via binoculars, aerial photographs, and topographic maps, and the Keller Road outfall was surveyed in May 2019. During all of HELIX's surveys, focused and incidental observations of plant and animal species were noted. Photographs of the project site were also taken. The off-site study area was not surveyed as access was not granted by the landowner to conduct surveys.

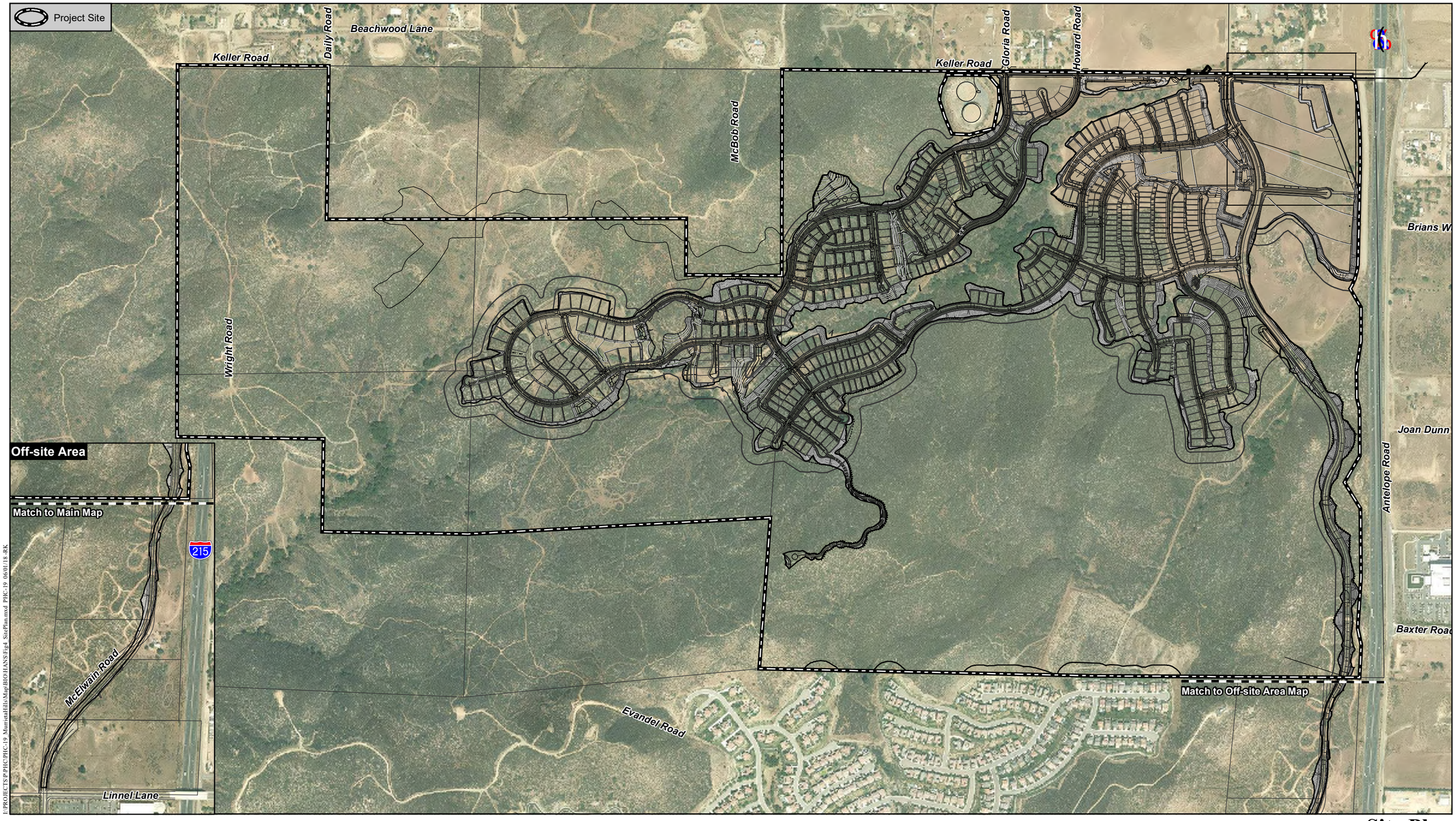
A. VEGETATION MAPPING

Vegetation communities were mapped in accordance with the MSHCP.

B. SENSITIVE PLANTS

The entire property, including the off-site study area, is within Area 4 of Narrow Endemic Plant Species Survey Area (NEPSSA) and Criteria Area Species Survey Area (CASSA). Focused rare plant surveys were conducted in May and June 2006, April and June 2008, and again in May 2012 in accordance with the MSHCP guidance for Area 4 of the NEPSSA and Area 4 of the CASSA. The 2006 plant surveys were conducted by biologist Kelly Volansky, who was assisted by University of California Riverside (UCR) botanist Andrew Sanders and UCR herbarium assistant Teresa Salvato, along with contracted biologist Michelle Balk. The 2008 surveys were conducted by HELIX biologists Doug Allen and Rob Hogenauer. The 2012 survey was conducted by Mr. Hogenauer. The property was assessed for habitat suitable for NEPSSA and CASSA Area 4 species using aerial photography and field reconnaissance. The areas of suitable habitat were then thoroughly surveyed on foot.

The property was surveyed during the blooming periods of the NEPSSA and CASSA target species. The property was surveyed on May 19, 22, 24, 26, 28, and June 2, 6, 7, and 9, 2006. The 2006 survey covered the entire 973.69 acres (in addition to 326 acres no longer part of this project). Approximately 190 person-hours were spent surveying the property for rare plants in 2006. The 2008 surveys were conducted on April 16 and June 11, and focused on those areas



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Site Plan

MURRIETA HILLS

HELIX Environmental Planning

0 800 Feet

Figure 4

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with the potential to support NEPSSA and CASSA species. The 2012 survey was conducted on May 11 and focused on areas with potential to support NEPSSA and CASSA species within the reduced project footprint. Mr. Hogenauer surveyed the Keller Road outfall area on May 15, 2019. The NEPSSA and CASSA Area 4 species and their blooming periods are shown in Tables 2 and 3.

The off-site study area was not surveyed as part of the above NEPSSA surveys as access was not granted by the landowner to conduct surveys.

Table 2
NARROW ENDEMIC PLANT SPECIES SURVEY AREA 4
PLANT SPECIES BLOOMING PERIODS

Scientific Name	Common Name	Blooming Period*
Allium munzii	Munz's onion	April to May
Ambrosia pumila	San Diego ambrosia	none (asexual reproduction)
Dudleya multicaulis	many-stemmed dudleya	May to June (as early as March in coastal locations)
Navarretia fossalis	spreading navarretia	May through June
Orcuttia californica	California Orcutt grass	April to June
Trichocoronis wrightii var. *wrightii*	Wright's trichocoronis	May to September

*Blooming period per the MSHCP.

Table 3
CRITERIA AREA SPECIES SURVEY AREA 4
PLANT SPECIES BLOOMING PERIODS

Scientific Name	Common Name	Blooming Period*
Atriplex parishii	Parish's brittlescale	June to October
Atriplex serenana var. *davidsonii*	Davidson's saltscale	May to October
Brodiaea filifolia	thread-leaved brodiaea	March to June
Centromadia pungens	smooth tarplant	April to November
*California macrophylla (Erodium macrophyllum)***	round-leaved filaree	March to May
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	February to June
Myosurus minimus	little mousetail	April to May

*Blooming period per the MSHCP.
**Species has under gone recent taxonomic changes. Old name used in MSHCP in parenthesis.

C. BURROWING OWL

HELIX biologists Mr. Hogenauer, Zack West, and Zsolt Kahancza surveyed the property for the burrowing owl in 2006 and 2008 (Table 4; Appendix A). Mr. Hogenauer surveyed the property again in 2012. An additional survey was completed in 2018 by Mr. Hogenauer assisted by HELIX biologists Amy Lee and Daniel Torres (HELIX 2018). The burrowing owl surveys were conducted in accordance with the County of Riverside's Burrowing Owl Survey Instructions for the MSHCP (Riverside 2006). The 2012 and 2018 surveys (HELIX 2018) included the area of the property that was formerly in use as a nursery, but excluded some of the previous surveyed grasslands as they were overgrown with shrubs. Transects were walked approximately 30 yards

apart through potential owl habitat located on the property. A 500-foot buffer zone was visually surveyed from the edge of the subject property where owl habitat bordered the property. The Keller Road outfall area was included in the buffer portion of the survey. Biologists walked slowly and methodically, closely checking the areas that met the basic requirements of owl habitat, which include open expanses of sparsely vegetated areas (less than 30 percent canopy cover for trees and shrubs), gently rolling or level terrain, an abundance of small mammal burrows (especially those of California ground squirrel [*Spermophilus beecheyi*]) and/or fence posts, rock, or other low perching locations. All potential owl burrows were checked for signs of recent owl occupation, which include pellets/casting (e.g., regurgitated fur, bones, and insect parts), white wash (excrement), and feathers.

The off-site study area was not included in the burrowing owl surveys. The off-site area has a minimal potential to support burrowing owls. The study area included one acre of grassland that is adjacent to a residence and not typical habitat for burrowing owls. The 18.5-acre study area also includes 4.7 acres of disturbed habitat made up of dirt roads (no burrowing owl potential) and an area adjacent to the existing McElwain Road that appears to have previously been cleared and graded, and currently supports sparse shrubs and relatively dense non-native grasses and mustard. Overall, burrowing owls are not expected to occur within the off-site study area. The off-site study area will be included in the preconstruction burrowing owl survey to avoid potential impacts to burrowing owls.

Table 4
BURROWING OWL SURVEY INFORMATION

Survey	Date	Time	Weather Conditions	Personnel
2018				
1	4/17/18	Start 0600	Clear, 41°F, wind 1-3 mph	Rob Hogenauer
		End 0830	Clear, 50°F, wind 1-3 mph	Amy Lee
	4/19/18	Start 1730	60% clouds, 61°F, wind 3-5 mph	Rob Hogenauer
		End 1845	50% clouds, 58°F, wind 3-5 mph	
2	4/25/18	Start 0550	10% clouds, 48°F, wind 1-3 mph	Rob Hogenauer
		End 0820	Clear, 63°F, wind 1-3 mph	Amy Lee
3	5/22/18	Start 0525	100% clouds, 52°F, wind 2-4 mph	Rob Hogenauer
		End 0740	100% clouds, 53°F, wind 2-4 mph	Daniel Torres
4	5/23/18	Start 0525	100% clouds, 54°F, wind 0-1 mph	Rob Hogenauer
		End 0750	100% clouds, 58°F, wind 0-1 mph	Daniel Torres
2012				
1	6/25/12	0550-0810	Clear, 54˚-72˚ F, wind 0-1 mph	Rob Hogenauer
	0628/12	0530-0750	Clear, 57˚-81˚ F, wind 0-1 mph	Rob Hogenauer
2	06/29/12	0545-0750	Clear, 55˚-76˚ F, wind 0-1 mph	Rob Hogenauer
	7/6/12	0530-0740	Cloudy, 58˚-66˚ F, wind 1-2 mph	Rob Hogenauer
3	7/9/12	0530-0745	Clear, 66-81°F, wind 0-1 mph	Rob Hogenauer
	7/15/12	0550-0730	Clear, 65-71°F, wind 0-1 mph	Rob Hogenauer
4	7/17/12	0545-0740	Cloudy, 57-69°F, wind 1-3 mph	Rob Hogenauer
	7/18/12	0540-0750	Cloudy, 55-71°F, wind 2-4 mph	Rob Hogenauer

Table 4 (cont.) BURROWING OWL SURVEY INFORMATION				
Survey	**Date**	**Time**	**Weather Conditions**	**Personnel**
2008				
1	4/24/08	0600-0830	Partly Cloudy, 48˚-58˚ F, wind 0-4 mph	Rob Hogenauer Zsolt Kahancza
2	4/24/08	0550-0820	Partly Cloudy, 60˚-74˚ F, wind 0-2 mph	Rob Hogenauer Zsolt Kahancza
3	5/5/08	0535-0750	Cloudy, 52˚-56˚ F, wind 1-4 mph	Rob Hogenauer
	5/6/08	0540-0700	Cloudy, 53˚-54˚ F, wind 1-3	
4	5/20/08	0530-0745	Partly Overcast, 62˚-66˚ F, wind 1-5 mph	Rob Hogenauer Zsolt Kahancza
2006				
Assessment	12/20/05	1135-1500	Clear	Rob Hogenauer
1	5/5/06	0550-0810	Cloudy, 54-59°F, wind 0-1 mph	Rob Hogenauer Zsolt Kahancza
	5/8/06	1730-2015	Clear, 59-71°F, wind 2-5 mph	Zack West Zsolt Kahancza
2	7/17/06	0525-0735	Partly cloudy, 70-77°F, wind 0-1 mph	Rob Hogenauer Zack West Zsolt Kahancza
	7/18/06	0650-0825	Clear, 74-84°F, wind 0-1 mph	Zack West Zsolt Kahancza
3	7/27/06	0540-0740	Cloudy, 75-81°F, wind 1-3 mph	Rob Hogenauer
	7/31/06	0545-0705	Cloudy, 71-73°F, wind 1-3 mph	Rob Hogenauer
	8/1/06	0745-0815	Overcast, 72-75°F, wind 2-4 mph	Zack West Zsolt Kahancza
4	8/4/06	0550-0730	Partly cloudy, 64-71°F, wind 0-1 mph	Rob Hogenauer
	8/7/06	0605-0710	Cloudy, 67-69°F, wind 0-1 mph	Rob Hogenauer

The off-site study area was not included in the burrowing owl surveys as access to that area has not been granted. The off-site area has a minimal potential to support burrowing owls. The study area included one acre of grassland that is adjacent to a residence and not typical habitat for burrowing owls. This grassland area resembles a residential yard and the human activity at the location, along with the small size creates a habitat that is not typically utilized by burrowing owls. The study area also includes 4.7 acres of disturbed habitat comprised of dirt roads (no burrowing owl potential) and an area adjacent to the existing McElwain Road that appears to have previously been cleared and graded and currently supports sparse shrubs and relatively dense non-native grasses and mustard. The dirt roads receive regular traffic from the resident, mountain bikes, motorized dirt bikes, and similar human traffic deterring potential use by burrowing owls. The small areas at the southern end of McElwain Road were assessed from the road using binoculars. This area appears to lack burrows, with the exception of an active squirrel burrow adjacent to the road. Debris piles and other man made items that could be used as burrowing owl nesting locations were not observed. Burrowing owls are not expected to occur within the off-site study area. The off-site study area will be included in the pre-construction burrowing owl survey to avoid potential impacts to burrowing owls.

D. LEAST BELL'S VIREO

HELIX biologist Deborah Leonard performed a habitat assessment in 2006, which determined that the property includes habitat with potential to support the least Bell's vireo. These areas consisted of riparian scrub vegetation dominated by shrubby willows (*Salix* spp.) and mule fat (*Baccharis salicifolia*). A small patch of coast live oak woodland was also surveyed since it is immediately adjacent to the riparian scrub. The rest of the riparian habitat on site consists of coast live oak riparian woodland and forest that do not have the vegetative components or structure necessary for the vireo. The 2006 survey consisted of eight individual surveys conducted between May 18 and July 31 by HELIX biologists Ms. Leonard, Kathy Pettigrew, and Shelby Howard (HELIX 2006a; Appendix B). The 2008 surveys were conducted between June 20 and July 30, 2008, by Mr. Hogenauer and Mr. Kahancza (HELIX 2008; Appendix C). The 2012 surveys were conducted between April 29 and July 12, 2012, by Mr. Hogenauer (HELIX 2012a; Appendix D). Surveys were conducted according to the current protocol (USFWS 2001). The off-site study areas do not include habitat with potential to support least Bell's vireo; therefore, surveys for this area are not required. It should be noted that the amount of suitable habitat has decreased significantly since the elimination of the nursery on site, which was providing summer nuisance flows that contributed to riparian vegetation along the main drainage.

E. SOUTHWESTERN WILLOW FLYCATCHER

Ms. Pettigrew performed a habitat assessment in 2006, which determined that the property includes habitat with potential to support the southwestern willow flycatcher. The survey area included the areas surveyed for the vireo. The survey was conducted by HELIX permitted biologists Mr. Howard and Ms. Pettigrew with HELIX biologists Ms. Leonard, Roger Ditrick, and Heather Haney as supervised individuals (HELIX 2006b; Appendix E). Surveys followed the current accepted protocol (USFWS 2000). The off-site study area does not include habitat with potential to support southwestern willow flycatcher; therefore, surveys for this area are not required. It should be noted that the amount of suitable habitat has decreased significantly since the elimination of the nursery on site, which was providing summer nuisance flows that contributed to riparian vegetation along the main drainage. The limited riparian habitat remaining on site is not considered suitable for the southwestern willow flycatcher.

F. RIPARIAN/RIVERINE RESOURCES

The MSHCP defines Riparian/Riverine and Venal Pool habitats as:

- Riparian/Riverine areas are lands that contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.

- Vernal pools are seasonal wetlands that occur in depression areas that have wetland indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetland indicators of hydrology and/or

vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics and the definition of the watershed supporting vernal pool hydrology must be made on an individual basis. Such determinations should consider the length of time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, the uses to which the area has been subjected, and weather and hydrologic records.

Prior to beginning fieldwork, recent aerial photographs (1"=200' scale), USGS topographic maps, and soil surveys (Knecht 1971; USDA 2005) were reviewed to determine the location of potential jurisdictional areas that may be affected by the project. Data were collected in areas that were suspected to be jurisdictional habitats (and where necessary, their upland counterparts) during several field visits from November 9 through December 5, 2007, by HELIX biologists Jack Easton and Doug Allen. The assessment was updated with data collected by HELIX biologist Rob Hogenauer in 2007, 2008, and 2012, and with information collected by Mr. Larry Sward in 2013. The delineation was updated and finalized in 2016 by Mr. Sward. The delineation was verified in the field by CDFW staff Kim Freeburn on June 29, 2016, by the Regional Water Quality Control Board (RWQCB) staff Jean Bandura on May 30, 2018, and USACE project manager Peggy Bartels on July 12, 2018. The area for the off-site Keller Road outfall structure was delineated by Mr. Hogenauer on May 15, 2019. The off-site portion of the Study Area for McElwain Road has not yet been formally delineated. The off-site area was assessed for potential waters via binoculars, aerial photographs, and topographic maps. Data presented regarding waters in the off-site area are estimates.

U.S. Army Corps of Engineers (USACE) wetland boundaries were determined using three criteria (vegetation, hydrology, and soils) established for wetland delineations, as described within the Wetlands Delineation Manual (Environmental Laboratory 1987) and Arid West Regional Supplement (USACE 2006). Plants were identified according to The Jepson Manual: Higher Plants of California (Hickman, ed. 1993). Wetland affiliations of plant species follow the U.S. Fish and Wildlife Service (USFWS) National List of Plant Species that Occur in Wetlands: California (Reed 1988).

Soil samples were evaluated for hydric soil indicators (e.g., hydrogen sulfide [A4], sandy redox [S5], [F1], loamy gleyed matrix [F2], depleted matrix [F3], depleted matrix [F3], redox dark surface [F6], redox depressions [F8], and vernal pools [F9]). Soil chromas were identified according to Munsell's Soil Color Charts (Kollmorgen 1994).

Each sample plot was inspected for primary (e.g., surface water [A1], saturation [A3], water marks [non-riverine, B1], sediment deposits [non-riverine, B2], drift deposits [non-riverine, B3], surface soil cracks [B6], inundation visible on aerial imagery [B7], salt crust [B11], aquatic invertebrates [B13], hydrogen sulfide odor [C1], and oxidized rhizospheres along living roots [C3]) and secondary (e.g., water marks [riverine, B1], sediment deposits [riverine, B2], drift

deposits [riverine, B3], drainage patterns in wetlands [B10], shallow aquitard [D3], and positive FAC neutral test [D5]) wetland hydrology indicators.

Areas were determined to be non-wetland WUS if there was evidence of regular surface flow (e.g., bed and bank) but neither vegetation nor soils criterion was met. Jurisdictional limits for these areas were defined by the ordinary high water mark (OHWM), which is defined in 33 CFR Section 329.11 as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; the presence of litter or debris; or other appropriate means that consider the characteristics of the surrounding areas." The USACE has issued further guidance on the OHWM (Riley 2005), which has also been used for this delineation. OHWM widths were measured to the nearest foot at various locations along the channel.

California Department of Fish and Wildlife (CDFW) jurisdictional boundaries were determined based on the presence of riparian vegetation or regular surface flow. Streambeds within CDFW jurisdiction were delineated based on the definition of streambed as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supporting fish or other aquatic life. Jurisdictional boundaries include watercourses having a surface or subsurface flow that supports riparian vegetation" (Title 14, Section 1.72). This definition for CDFW jurisdictional habitat allows for a wide variety of habitat types to be jurisdictional, including some that do not include wetland species (e.g., oak woodland and alluvial fan sage scrub). Streambed widths were measured to the nearest foot at various locations along the channel.

Sixteen sample plots were studied and soil pits were dug at each of these plots. Standard data forms from the Arid West Supplement (USACE 2006) were completed for each sample plot in the field.

The jurisdictional delineation was then used as the basis for determining Riparian/Riverine and vernal pool resources on the site based on the MSHCP definitions noted above. All areas mapped as CDFW jurisdictional habitat are considered Riparian/Riverine. The off-site study area was not surveyed for jurisdictional features as access was not granted by the landowner to conduct surveys.

A Riparian/Riverine assessment has not been conducted on the off-site study area. The preliminary assessment based on aerial photographic interpretation indicates that the study area includes at least two small ephemeral drainages.

G. NOMENCLATURE

Nomenclature used in this report follows MSHCP naming conventions. Additional nomenclature comes from the following sources. Vegetation community classifications follow Holland (1986), Latin names of plants follow Baldwin et al. (2012), and common names follow Baldwin or the California Native Plant Society (CNPS; 2013). Sensitive plant status follows the CNPS (2013) or the CDFW's California Natural Diversity Database (CNDDB; CDFW 2013a and 2013b). Animal

nomenclature is taken from Crother (2001) for amphibians and reptiles; American Ornithologists' Union (2008) for birds; and Baker et al. (2003) for mammals. Sensitive animal status follows the CDFW CNDDB (2013b and 2013c).

III. RESULTS

A total of 14 vegetation communities occur on site and within the off-site study areas (Figure 5; Table 5). These communities consist of southern willow scrub, mule fat scrub, southern cottonwood-willow riparian forest, coast live oak woodland, chaparral, Riversidean sage scrub, coastal sage scrub/chaparral ecotone, non-native grassland, field cropland, exotic (eucalyptus woodland), disturbed, and developed. There are 12.38 acres of Riparian/Riverine habitats and 964.6 acres of upland habitats on site, along with 0.03 acre of Riparian/Riverine habitats and 18.5 acres of upland habitats in the off-site study area (Table 5).

Table 5
EXISTING VEGETATION COMMUNITIES

Classification*		On-site Acreage†	Off-site Acreage†
Collapsed	**Uncollapsed**		
Riparian scrub	Southern willow scrub	1.54	--
Riparian scrub	Mule fat scrub	0.47	0.03
Riparian Woodland	Southern Cottonwood-willow Riparian Woodland	0.07	--
Woodland and forests	Coast live oak woodland	13.01	--
Chaparral	Chaparral	701.7	9.9
Coastal sage scrub	Riversidean sage scrub	66.6	1.2
Coastal sage scrub/Chaparral‡	Coastal sage scrub/Chaparral‡	32.0	--
Grassland	Non-native grassland	4.4	1.1
Agricultural land	Field cropland	96.7	--
Developed/Disturbed land	Exotic (Eucalyptus Woodland)	0.3	--
Developed/Disturbed land	Disturbed	55.3	4.7
Developed/Disturbed land	Developed	1.6	1.6
	TOTAL	**973.69**	**18.5**

*Collapsed and uncollapsed vegetation communities are terms from MSHCP Table 2-1 and are equivalent to Generalized Category and Specific Sub-Category, respectively.
†Acreage is rounded to the nearest 0.1 except for wetland and Riparian/Riverine habitat that are rounded to the nearest 0.01.
‡Coastal sage scrub/Chaparral is not an MSHCP vegetation community; however, each community that forms this ecotone has an MSHCP vegetation classification.

A. VEGETATION COMMUNITIES

1. Southern Willow Scrub

Southern willow scrub consists of dense, broad-leaved, winter-deciduous stands of trees dominated by shrubby willows in association with mule fat. This habitat occurs on loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows. The herbaceous understory consists of curly dock (*Rumex crispus*), cocklebur (*Xanthium strumarium* var.

canadense), and western ragweed (*Ambrosia psilostachya*). Frequent flooding maintains this early seral community, preventing succession to a riparian woodland or forest (Holland 1986). In the absence of periodic flooding, competition between the willows will intensify as these individuals grow and resources become increasingly scarce. A small percentage of these individuals will survive and form the tree stratum, while most will die or exist as suppressed juveniles in the lower stratum.

On site, southern willow scrub is scattered among the many drainages located throughout the property. Small patches of southern willow scrub that are not mapped occur on the property. Plant species observed in the willow scrub on site include arroyo willow (*Salix lasiolepis*), Goodding's black willow (*S. gooddingii*), mule fat, salt cedar (*Tamarix ramosissima*), and curly dock.

2. Mule Fat Scrub

Mule fat scrub is a depauperate, shrubby riparian scrub community dominated by mule fat and interspersed with shrubby willows. This habitat occurs along intermittent stream channels with a fairly coarse substrate and moderate depth to the water table. Similar to southern willow scrub, this early seral community is maintained by frequent flooding, the absence of which would lead to a riparian woodland or forest (Holland 1986).

On site, mule fat scrub is scattered in a few small pockets along the drainages that occur on site. Some of the small pockets of mule fat scrub are not mapped. Plants species observed in the mule fat scrub on site include mule fat, arroyo willow, willow herb (*Epilobium* spp.), and salt cedar.

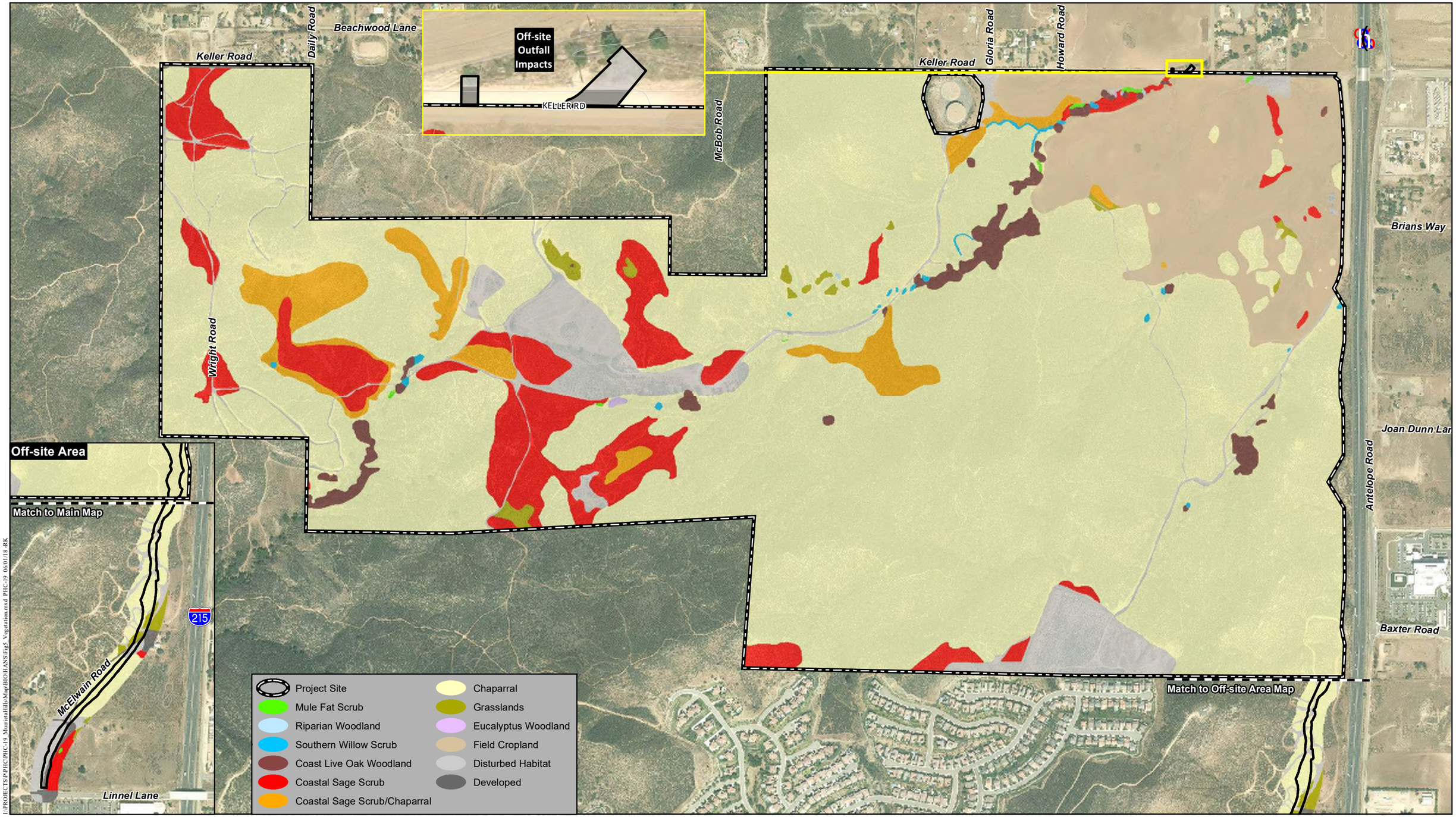
3. Southern Cottonwood-willow Riparian Forest

Southern cottonwood-willow riparian forest is a tall, open, broad-leafed winter-deciduous riparian forests dominated by western cottonwood (*Populus fremontii*) and willows (*Salix* spp.). This habitat occurs along streams. On site there is a small patch of this habitat dominated by western cottonwood, black willow, and arroyo willow.

4. Coast Live Oak Woodland

Coast live oak woodland is an evergreen oak woodland dominated by coast live oak (*Quercus agrifolia*), which reaches 30 to 80 feet in height. In general, the shrub layer is poorly developed but may include toyon (*Heteromeles arbutifolia*), gooseberry (*Ribes* spp.), laurel sumac (*Malosma laurina*), or blue elderberry (*Sambucus nigra* ssp. *caerulea*; Holland 1986). Coast live oak woodland lacks the diversity (cottonwood, willow, sycamore, etc.) present in riparian forest.

On site, coast live oak woodland primarily occurs near the banks of largest drainages within the Salt and Warm Springs creeks watersheds. Plants species observed in this community on site include coast live oak, laurel sumac, poison oak (*Toxicodendron diversilobum*), bromes, giant wildrye (*Leymus condensatus*), and spiny redberry (*Rhamnus crocea*).



Vegetation

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Figure 5

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5. Chaparral

This habitat is represented on site in three of the chaparral subcategories (undifferentiated [mixed], chamise (*Adenostoma fasciculatum*), and red shank [*Adenostoma sparsifolium*]) shown in the MSHCP (Dudek 2003). The sub-associations are described together here as they differ only by the dominant species.

Chaparral consists of broad-leaved sclerophyll shrubs usually between one to three meters tall with occasional patches of bare soil or sage scrub, often with an accumulation of litter. Chaparral is well adapted to repeated fires as many species respond by stump sprouting. Chaparral is the dominant plant on site covering a large portion of the property. On site, chaparral is dominated by chamise with patches dominated by hoary-leaved ceanothus (*Ceanothus crassifolius*), red shank, and black sage (S*alvia mellifera*). The chamise and mixed chaparrals dominate the property, with a small patch of redshank chaparral occurring near the center of the property. Other plants found in the chaparral include: laurel sumac, blue elderberry, California buckwheat (*Eriogonum fasciculatum*), and scrub oak (*Quercus berberidifolia*).

6. Riversidean Sage Scrub

Riversidean sage scrub is a subcategory of coastal sage scrub, a dominant shrub community of California. On site, it is dominated by low-growing shrubs, primarily California buckwheat, but also includes California sagebrush (*Artemisia californica*), deerweed (*Lotus scoparius*), bromes, and oats (*Avena* spp.). The sage scrub occurs in a mosaic with chaparral. Having a large quantity of non-native grasses and forbs, disturbed Riversidean sage scrub areas occur in a mosaic with the Riversidean sage scrub areas.

Small amounts of shrub habitat occur on site that can be neither placed firmly in either the coastal sage scrub or chaparral category. These areas, called ecotone, occur as a blending border between the chaparral and sage scrub. The ecotone areas are mapped as coastal sage scrub/chaparral. The property contains small patches of sage scrub primarily around disturbed areas.

7. Coastal Sage Scrub/Chaparral Ecotone

Coastal sage scrub/Chaparral ecotone is a community that is made up of species of each of these communities (described above) but does not specifically match either community. The ecotone community occurs where the two communities are adjacent to one another. This can also be a transitional community as sage scrub gradually is maturing in a chaparral habitat.

8. Non-native Grassland

Non-native grassland is a dense to sparse cover of annual grasses, often associated with numerous species of showy-flowered native annual forbs. Characteristic species include oats, red brome (*Bromus madritensis* ssp. *rubens*), ripgut (*B. diandrus*), ryegrass (*Lolium* sp.), short-pod mustard (*Hirschfeldia incana*), and other mustards (*Brassica* spp.). The non-native grassland on site occurs in small patches throughout the site in a mosaic with sage scrub and chaparral. Aerial

photography shows that the areas currently containing non-native grassland were once disturbed for agricultural purposes. The majority of the previously disturbed areas now contain sage scrub. A few small patches of grassland similar in species composition to the sage scrub understory are not shown on Figure 5. Species on site include short-pod mustard, bromes, and oats.

9. Field Cropland

Also referred to as agriculture, field cropland is cultivated habitat that has been cleared, disced, or planted with crops. On site, cropland is limited to the disced area in the northeast portion of the site. The disced area in the northeast contains scattered patches with trees or rock outcroppings that are not disced. Trees in this area include coast live oak, Peruvian pepper (*Schinus molle*), and eucalyptus (*Eucalyptus* spp.).

10. Exotic (Eucalyptus Woodland)

Eucalyptus woodland is a non-native woodland, often planted in as a windrow, or for shade or other purposes. Due to the eucalyptus allopathic nature, this community typically has little to no understory and is made up entirely of eucalyptus trees.

11. Disturbed

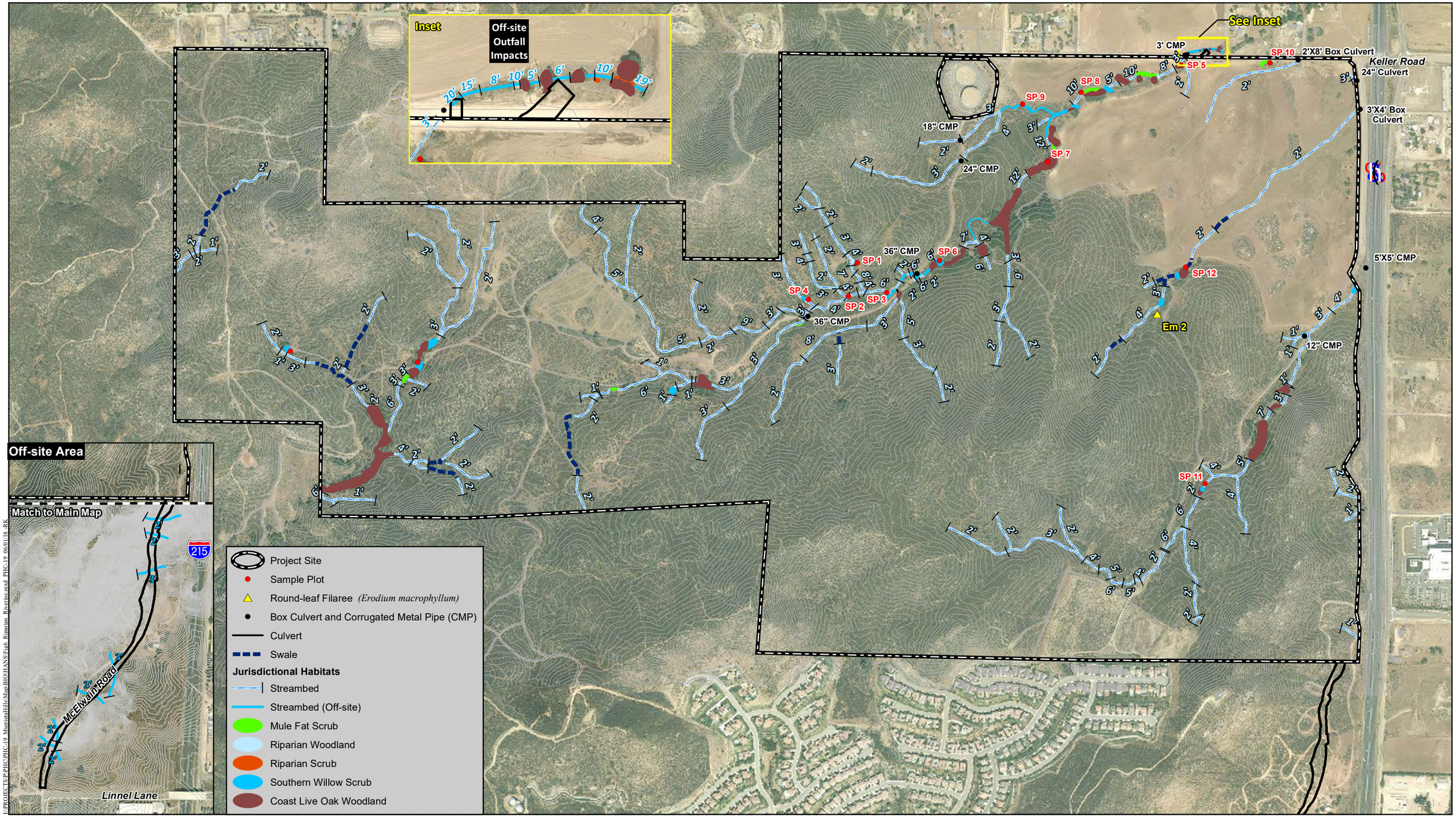
Disturbed habitat is generally made up of areas that exhibit signs of recent disturbance. They usually support little vegetation; however, when there is vegetation present it consists of mostly non-native weed species. Disturbed habitat on site includes a large area on the southeast portion of the site that was cleared of vegetation circa 1990 and then cleared again and graded circa 2005. Additional disturbed habitat includes unimproved roads that cross the property, off-highway vehicle trails, areas of dumped trash, and the nursery located near the center of the property. Plant species observed in the disturbed area include non-native trees such as eucalyptus, Peruvian pepper, athel tamarisk (*Tamarix aphylla*), and olive (*Olea europaea*). The disturbed areas also contain bromes, mustards, and various other plant species similar to the non-native grassland and sage scrub understory.

12. Developed

Developed areas consist of areas that have been paved or contain other man-made structures. Developed areas on site include a water reservoir in the northeast and several small structures located near the center of the property.

B. JURISDICTIONAL AND RIPARIAN/RIVERINE AREAS

Areas under USACE jurisdiction within the project area consist of a total of 2.21 acres and consist entirely of non-wetland WUS. Areas under CDFW jurisdiction within the project area total 12.31 acres, including 1.54 acres of southern willow scrub, 0.47 acre of mule fat scrub, 7.02 acres of coast live oak woodland, 0.07 acre of southern cottonwood-willow riparian forest, and 3.21 acres of streambed. All of the CDFW areas are considered Riparian/Riverine (Figure 6). Areas that were identified as swales are not considered USACE or CDFW jurisdictional areas or



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Riparian/Riverine and CASSA Plant Location Map

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Figure 6

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Riparian/Riverine as confirmed during the delineation field review and approval because they lacked any evidence of flow. The Riparian/Riverine areas include habitat with potential to support least Bell's vireo (Figure 7). No vernal pools were observed or are expected to occur on site.

As stated above in the jurisdictional delineation discussion the off-site area was based on an assessment via binoculars, aerial photographs, and topographic maps. It is anticipated that a small amount of riverine habitat (estimated at 0.04 acre of streambed) occurs within the off-site study area.

C. RARE PLANTS

Rare plant surveys for NEPSSA and CASSA plant species concluded that two individual round-leaved filaree, a CASSA species, occur on site (Figure 8). These two individuals were observed during the initial rare plant survey in 2006. The proposed project impact area was surveyed in 2008 and 2012 for NEPSSA and CASSA plant species and none were observed on site. The location of the original sighting of the round-leafed filaree was given extra attention during the 2008 and 2012 surveys.

The MSHCP requires the project to conduct special assessments for six (6) Narrow Endemic plant species:

- Munz's onion: Munz's onion is restricted to clay and cobbly clay soils associated with Altamont, Auld, Bosanko, Claypit, and Porterville series soils. Munz's onion occurs in scattered locations at Estelle Mountain, Gavilan Plateau, hills of Lake Elsinore to Paloma Valley, and Skunk Hollow/Lake Skinner area. A small area of Altamont clay soils were mapped on site in the northwestern corner of the northern parcel, and clay soil inclusions were noted during project surveys. Focused surveys were negative for this species.

- San Diego ambrosia: San Diego ambrosia is associated with river terraces, vernal pools, and alkali playas on Garretson gravelly fine sandy loams and Las Posas loams in close proximity to Willows series soils. The only known extant populations of this species in Riverside are in the Alberhill area of Lake Elsinore and Skunk Hollow. No Garretson gravelly fine sandy loams or Las Posas loams occur on site, although a small area of Garretson gravelly very fine sand loam does occur in the southwestern portion of the site. This species was surveyed for but not observed. The potential for this species to occur on site is very remote.

- Many-stemmed dudleya: Many-stemmed dudleya is restricted to clay and cobbly clay soils associated with Altamont, Auld, Bosanko, Claypit, and Porterville series soils. This species occurs in scattered locations primarily in the Temescal Canyon, Gavilan Plateau, and Alberhill areas and the Santa Ana Mountains. A small area of Altamont clay soils were mapped on the site, and clay soil inclusions were noted during project surveys. Focused surveys were negative for this species.

- Spreading navarretia: Primary habitat for spreading navarretia is vernal pools/depressions and ditches in areas that once supported vernal pools. Riverside County supports the largest remaining populations, which are associated with the largest areas of available habitat in the U.S. The closest known population is along the San Jacinto River just west of I-215. No vernal pools occur on site or are known from the vicinity. There is no potential for this species to occur on site.

- California Orcutt grass: California orcutt grass is restricted to vernal pools, which do not occur on site. It is known from the Santa Rosa Plateau, Skunk Hollow, and Upper Salt Creek in Riverside County and also occurs in San Diego County. There is no potential for this species to occur within the project boundaries.

- Wright's trichocoronis: According to the MSHCP reference document, the middle section of the San Jacinto River and Salt Creek in the Hemet area represent the two core areas for Wright's trichocoronis. This species is limited to alkali soils, which are not present on site.

Based on the surveys the project conducted, the project site does not contain suitable habitat for any of these Narrow Endemic plant species, and none occurred on the site, or within the Keller Road outfall area.

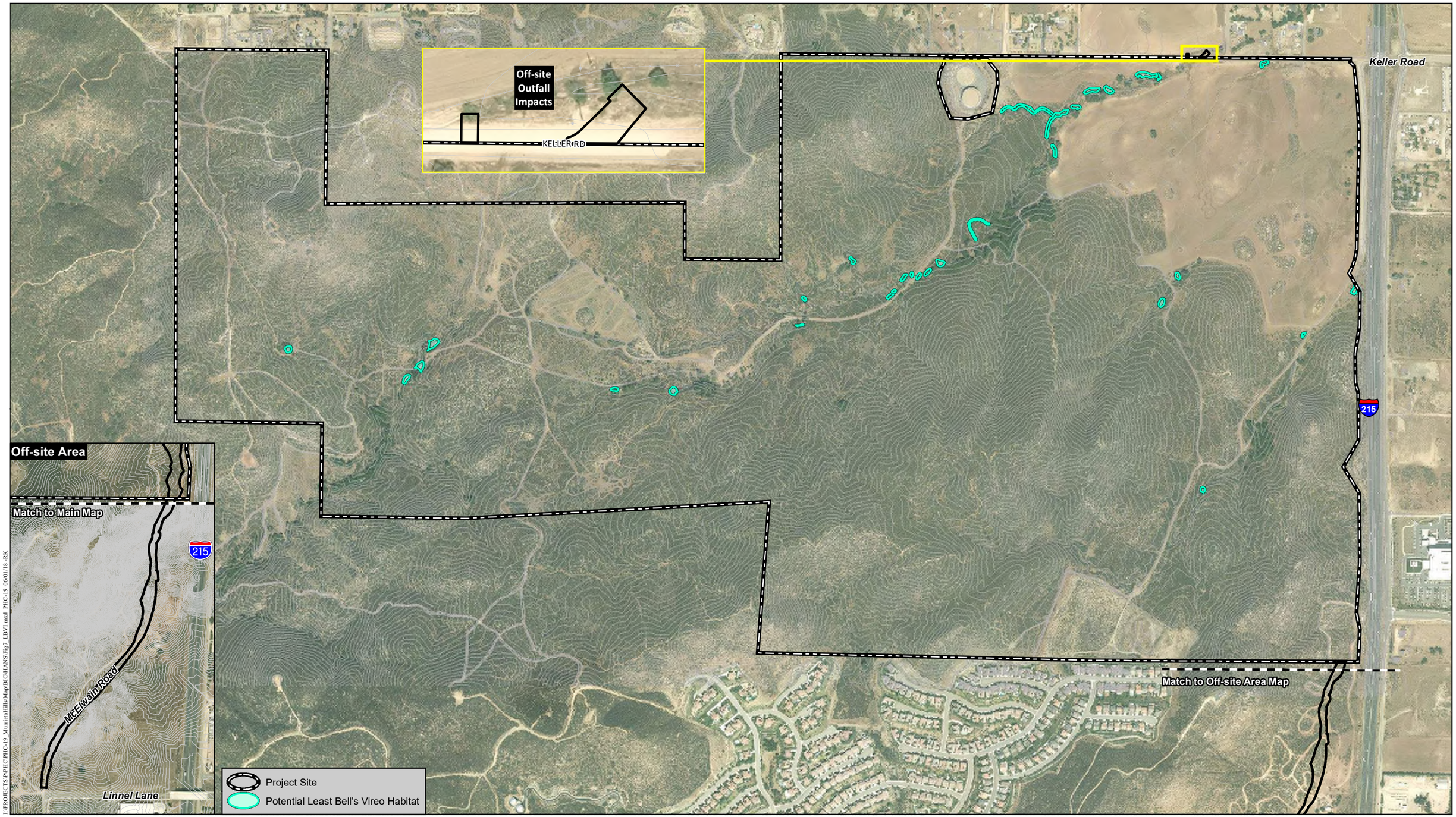
The MSHCP requires the project to conduct special assessments for six Criteria Area plant species in addition to the round-leaved filaree noted above:

- Davidson's saltscale: Davidson's saltscale is known to occur in cismontane southwestern California from Ventura (Ojai), western Orange (Seal Beach, San Joaquin Freshwater Marsh, Newport Backbay), and in western Riverside counties (Dudek 2003). In Riverside County, it is found in the Domino-Traver-Willows soils series in association with alkali vernal pools, annual grassland, playa, and scrub components of alkali vernal plains, none of which occurs on site.

- Parish's brittlescale: Known from San Diego and Riverside counties as well as Baja California, Mexico (Baja), Parish's brittlescale occurs in association with vernal pools, alkali playas, and chenopod scrub, none of which occurs on site.

- Thread-leaved brodiaea: Twelve populations of thread-leaved brodiaea (*Brodiaea filifolia*) are known from Riverside County, with the San Jacinto River and Santa Rosa Plateau areas containing core populations. This species also occurs in San Diego County and is restricted to clay lens soils in annual grasslands and vernal pools. No thread-leaved brodiaea was observed during focused surveys of the site.

- Smooth Tarplant: Smooth tarplant is found in southwestern California and northwestern Baja California, Mexico (Baja) and occurs in San Bernardino, Riverside, and San Diego counties. This species occurs in a variety of habitats, including alkali scrub and playas, riparian woodland, watercourses, and grasslands with alkaline affinities (Dudek 2003; CNPS 2007). No alkali soils are present on site.



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Potential Least Bell's Vireo Habitat

MURRIETA HILLS

HELIX Environmental Planning

0 800 Feet

Figure 7

Keller Road

Cpl 75
Cpp 1680

Cpl 25
Cpp 70
Hp 40

Hp 4
Hp 5

Cpl 10,000
Cpp 30

Cpl 500

Hp 200

Cpl 7
Cpp 350
Dp 50

Cpl 8
Cpp 1,000

Lv 100

Cpl 150

Cpl 4

Cpl 50

Cpp 60

Cpl 500+
Cpp 500+
Hp 160

Cpp 30

Cpl 4

Cpl 6

Cpl 7,000
Hp 200

Cpl 4,000
Cpp 75
Hp 70

Cpl

Cpp

Cpl 3,500

Cpp 15

Hp

Em 2

Cpp

Cpp

Cpp

Cpp 250

Cpp 140

Cpp

Cpl 10
Cpp 150

215

Cpl 450
Cpp 30
Hp 15

Cpl 80

Cpl 2
Hp 10

Off-site Area

Match to Main Map

215

McElwain Road

Linnel Lane

Match to Off-site Area Map

Project Boundary

Extent of Rare Plants

Pie Chart Representing Percentage of Rare Plant Species in Grouping

CASSA Species

Em Round-leaf Filaree *(Erodium macrophyllum)*

MSHCP Covered Species

Cpl Long-spined Spineflower *(Chorizanthe polygonoides longispina)*

Cpp Parry's Spineflower *(Chroizanthe parryi parryi)*

Hp Palmer's Grapplinghook *(Harpagonella palmeri)*

Species Not Covered by MSHCP

Dp Paniculate Tarplant *(Deinandra paniculata)*

Lv Robinson's Pepper Grass *(Lepidium virginicum* var. *robinsonii)*

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HELIX Environmental Planning

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0 800 Feet

Rare Plant Locations

MURRIETTA HILLS

Figure 8

- Coulter's Goldfields Three core populations of Coulter's goldfields are known from Riverside County with the San Jacinto Wildlife Area and southern shores of Mystic Lake supporting the largest remaining population throughout its range. The other two core areas occur along the middle segment of the San Jacinto River and alkali flats between Alberhill and Lake Elsinore. This species also occurs in San Luis Obispo, Santa Barbara, Ventura, Los Angeles and San Diego counties and Baja in marshes, swamps, playas, and vernal pools, none of which occurs on site.

- Little Mousetail: Little mousetail occurs in scattered locations from Orange and San Bernardino counties south to coastal San Diego County from sea level to 1,500 meters elevation. This species occurs in association with vernal pools and within alkali vernal pools and annual grassland components of alkali vernal plains. No alkali soils are present on site.

Based on the surveys the project conducted, the project site does not contain suitable habitat for any of these Criteria Area plant species, except for the round-leaved filaree.

Four sensitive plants that are not NEPSSA or CASSA and are not listed species were also observed on the property (Figure 8).

Approximately 4,536 individual Parry's spineflower (*Chorizanthe parryi* var. *parryi*), a CNPS list 1B.1 sensitive plant, occur on the property. The plants are scattered throughout the property, with the majority (80 percent) occurring on the western portion of the property (Figure 8).

Approximately 26,400 individual long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*), a CNPS list 1B.2 sensitive plant, occur on the property. The plants are primarily scattered throughout the central and western portions of property (Figure 8).

Approximately 745 individual Palmer's grapplinghook (*Harpagonella palmeri*), a CNPS list 4.2 sensitive plant, occur on the property. The plants are scattered and primarily occur in the west and central portions of the property.

Approximately 100 individual Robinson's peppergrass (*Lepidium virginicum* var. *robinsonii*), a CNPS list 4.3 sensitive plant, were observed in the sage scrub/chaparral ecotone habitat located along the west side of the drainage located west of the nursery. This population was searched for during the 2008 rare plants surveys and was not observed.

D. BURROWING OWL

Burrowing owl surveys conducted in 2006, 2008, 2012, and 2018 were all negative for burrowing owl. No sign of current or past use by burrowing owl was observed on the property or within the Keller Road outfall area (Figure 9).

IV. REGIONAL CONTEXT AND MULTIPLE SPECIES HABITAT CONSERVATION PLAN COMPLIANCE

The property is in Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP. The entire project is within criteria cells, and all of the criteria cells on the property occur within Cell Group C (Figure 10). The project occurs on 973.69 acres of the Cell Group. The off-site study area is not within any Criteria Cells or in areas targeted for conservation under the MSHCP. This section refers only to the main property that occurs within Cell Group C.

McElwain Road has been added to the MSHCP as a Covered Activity through Minor Amendment No. 2017-01 (RCA 2018). This includes placement of a six-foot by six-foot box culvert in the channel bottom for wildlife movement, and placement of a second four-foot by four-foot (1.22-meter) box culvert outside of the 100-year floodplain to allow for wildlife movement during high storm events (Figures 11a-c). As part of this Minor Amendment process, McElwain Road's consistency with Section 7.5.1 and 7.5.2 of the MSHCP was included in that analysis. Consistency with both Section 7.5.1 and 7.5.2 are analyzed in Section V.E of this report.

Conservation within Cell Group C will contribute to the assembly of Proposed Linkage 8, and Proposed Constrained Linkage 16. Conservation will focus on chaparral, woodlands, forest, grassland, and sage scrub. Proposed Cell Group C conservation will connect with habitats proposed for conservation in Cell Groups H and I to the south, Cell Group Y to the east, and Cell 5354 to west. The target conservation for Cell Group C is for 60 to 70 percent focusing on the south, central, and eastern portion of the group. The literal interpretation of the cell criteria would result in conservation of between 780 and 910 acres focusing on a strip that runs from the southwest to the east primarily along the southern edge of Cell Group C.

Cell		Acre(s)*	Cell Group Conservation Criteria
Group	Number		
C	5252, 5253, 5254, 5255, 5355, 5356, 5357, 5358	973.69	Conservation within this Cell Group will contribute to assembly of Proposed Linkage 8 and Proposed Constrained Linkage 16. Conservation within this Cell Group will focus on chaparral, woodlands, and forest, a small area of coastal sage scrub, and grassland. Areas conserved within this Cell Group will be connected to coastal sage scrub and chaparral habitat proposed for conservation to the south in Cell Groups H and I and Cell 5460, all in the Southwest Area Plan. Conservation within this Cell Group will range from 60 to 70 percent, focusing on the Cell Group's southern, central, and eastern portions.

Proposed Linkage 8

Proposed Linkage 8 is a part of one of two east-west linkages that connect Core Habitat on the east and west sides of the MSHCP plan area. Linkage 8 provides live-in and dispersal habitat for over 50 pairs of coastal California gnatcatcher. Linkage 8 is designed to provide habitat not only for the Sub Unit 2 planning species mentioned above but also for Linkage 8 planning species

Off-site Area

Match to Main Map

Match to Off-site Area Map

McElwain Road

Linnel Lane

215

Project Site

Burrowing Owl Survey Areas

500-ft Buffer

Potential Burrow

Vegetation

- Mule Fat Scrub
- Riparian Woodland
- Southern Willow Scrub
- Coast Live Oak Woodland
- Coastal Sage Scrub
- Coastal Sage Scrub/Chaparral
- Chaparral
- Grasslands
- Eucalyptus Woodland
- Field Cropland
- Disturbed Habitat
- Developed

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Burrowing Owl Potential Burrows

MURRIETA HILLS

HELIX Environmental Planning

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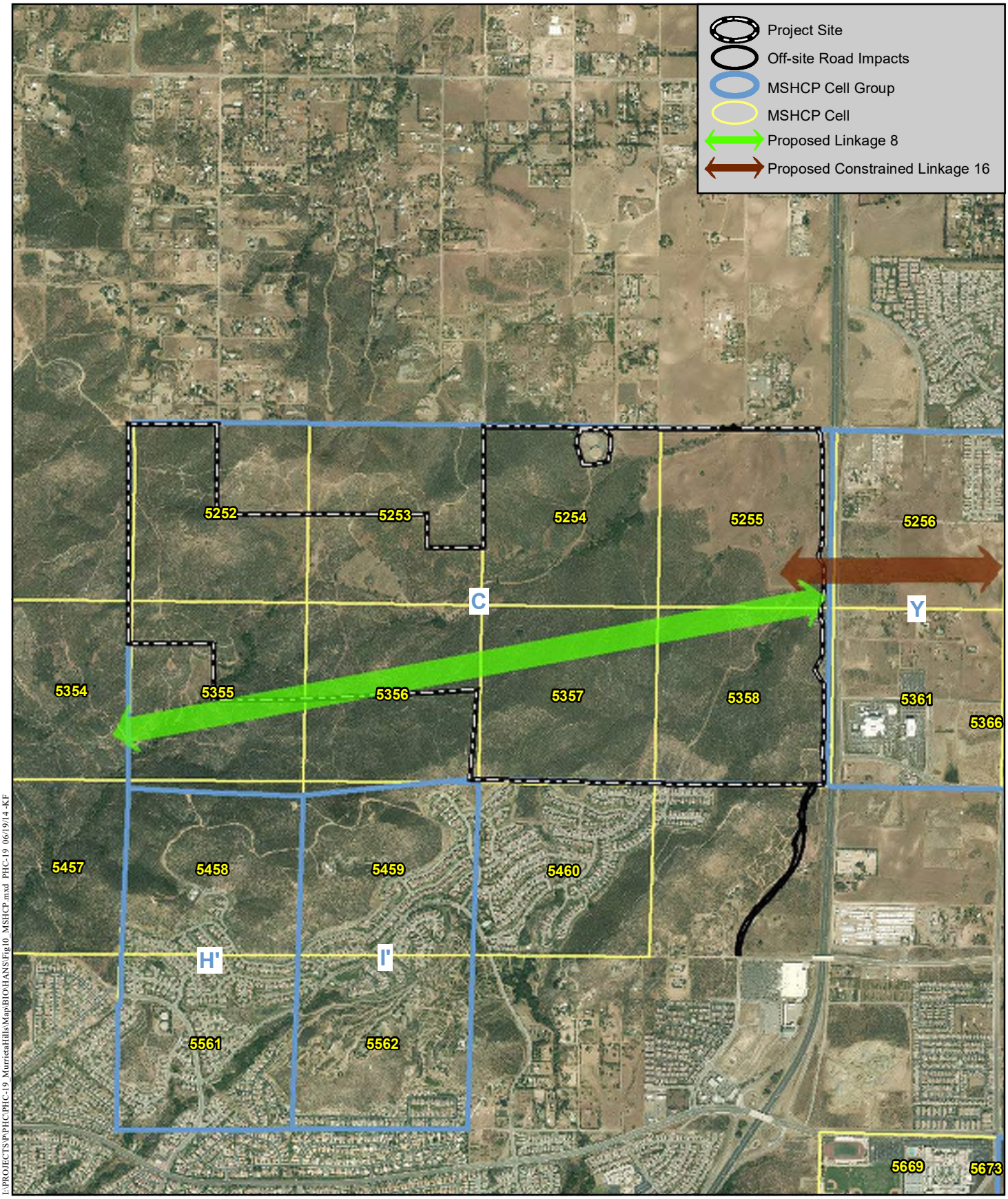
0 800 Feet

Figure 9



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MSHCP Criteria Map

MURRIETTA HILLS

HELIX Environmental Planning

N

0 2,000 Feet

Figure 10

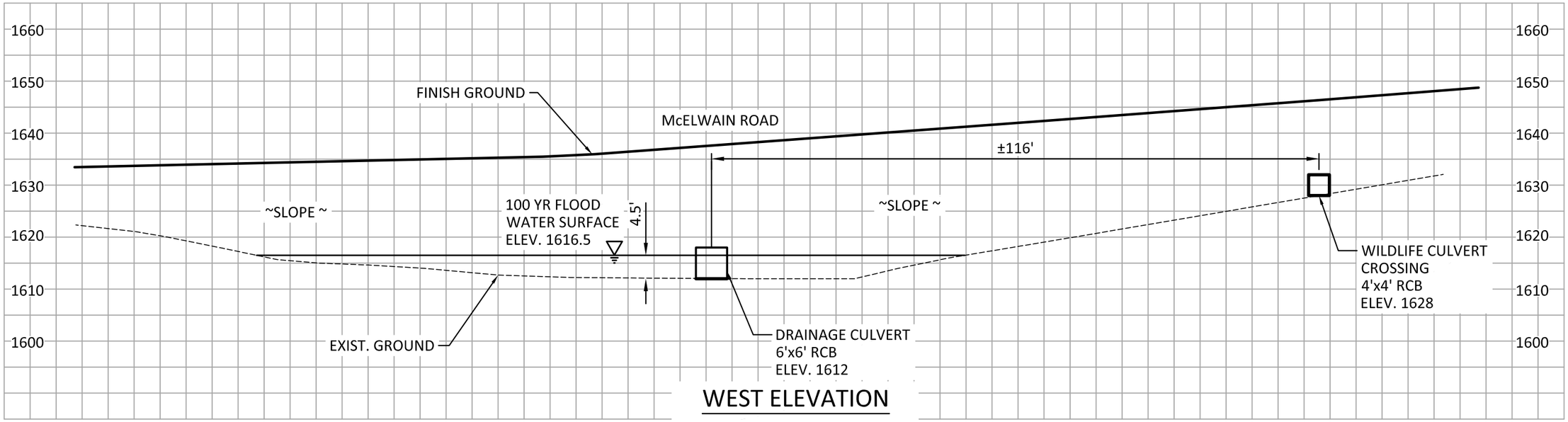
Proposed McElwain Wildlife Undercrossing

MURRIETA HILLS

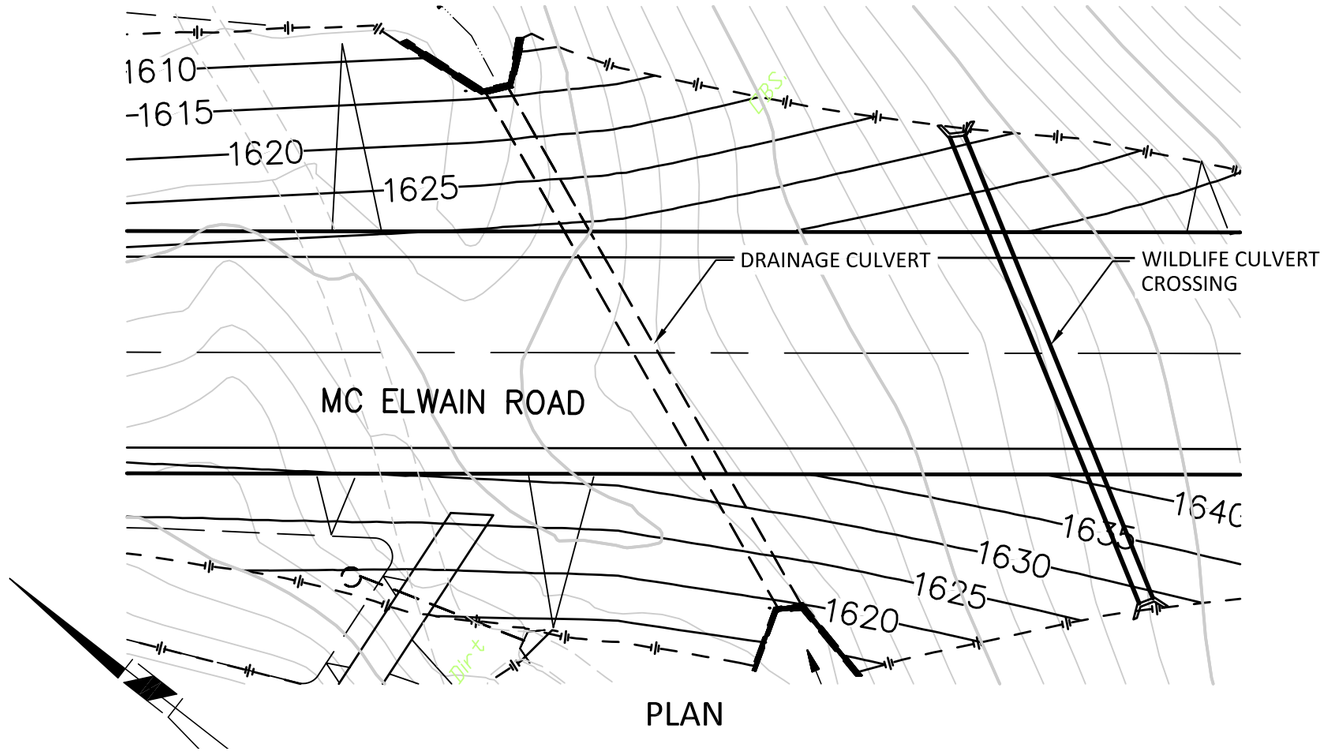
HELIX Environmental Planning

0 100 Feet

Figure 11a



WEST ELEVATION



PLAN

Source: Michael Baker 2018

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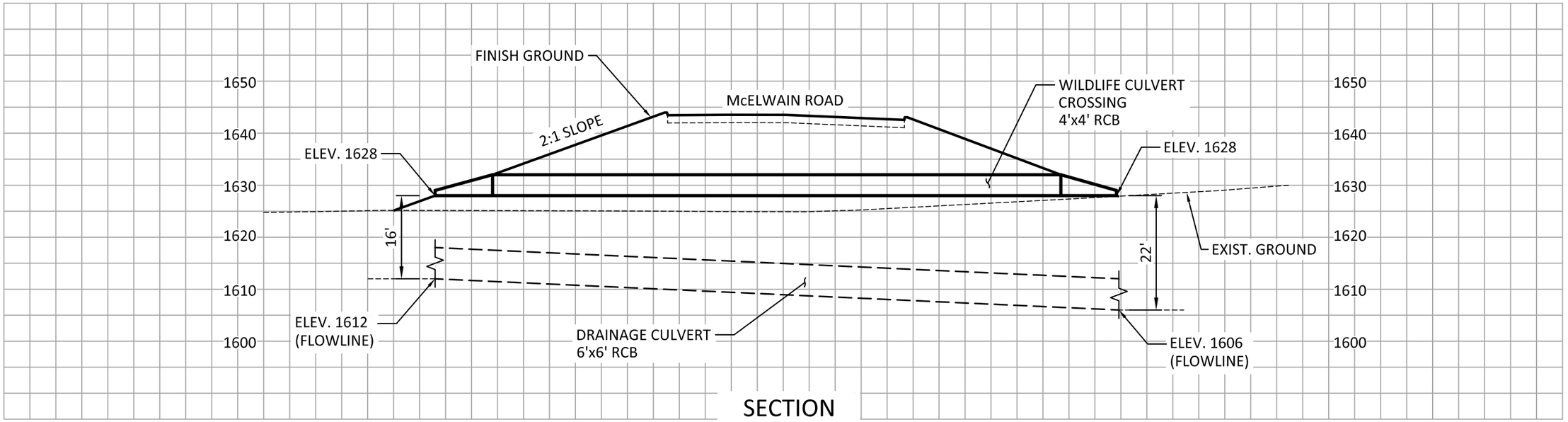
McElwain Road Wildlife Undercrossing Cross-Section

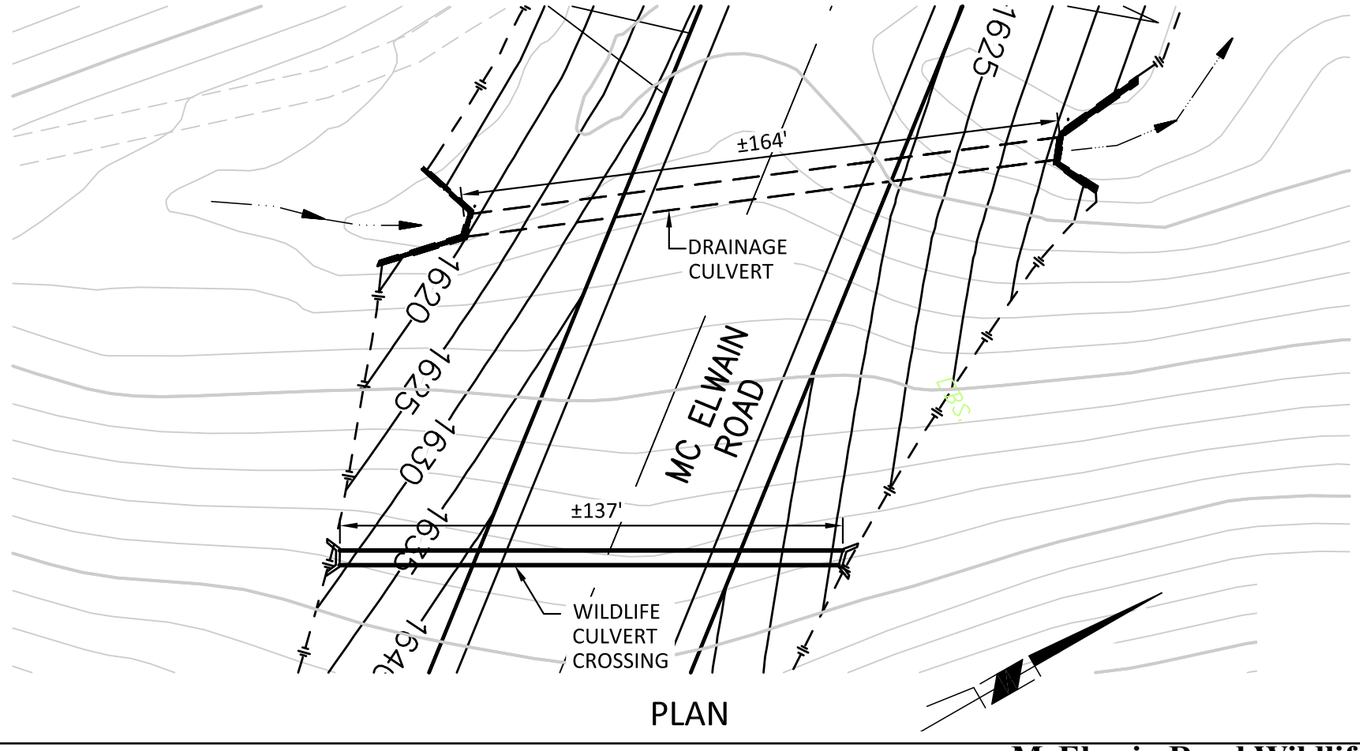
MURRIETA HILLS

HELIX Environmental Planning

Figure 11b



SECTION



PLAN

Source: Michael Baker 2018

McElwain Road Wildlife Undercrossing Road Cross-Section

MURRIETA HILLS

Figure 11c

HELIX Environmental Planning

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such as the southwestern willow flycatcher, least Bell's vireo, Stephens' kangaroo rat (*Dipodomys stephensi*), western pond turtle (*Clemmys marmorata pallida*), loggerhead shrike (*Lanius ludovicianus*), and bobcat (*Lynx rufous*).

Grassland within Linkage 8 provides foraging habitat for a number of raptor species such as the red-tailed hawk (*Buteo jamaicensis*), white-tailed kite (*Elanus leucurus*), and great-horned owl (*Bubo virginianus*). This area has a low ratio edge area to total habitat acreage that contributes to maintaining the high quality habitat in the linkage. Proper treatment of edge conditions, such as limiting domestic predators, lighting, urban runoff and toxics, is necessary to ensure that Linkage 8 maintains high quality habitat (Dudek 2003).

Section 3.1.4 of the MSHCP states that movement corridors are often linear and facilitate movement by providing adequate cover and a lack of physical barriers. Corridors do not provide live-in habitat. By contrast, linkages provide permanent live-in habitat and movement and are capable of sustaining a full range of community/ecosystem processes. For simplicity, the MSHCP has referred to all corridors and linkages as "linkages." Proposed Linkage 8 is designed to provide live-in habitat for the coastal California gnatcatcher and, therefore, its design is as a linkage and not a corridor.

The MSHCP conservation areas have target species but are designed as an interconnected reserve system to protect habitat for all of the 146 MSHCP covered species. Hundreds of other species not covered by the MSHCP, some sensitive (e.g., American badger [*Taxidea taxus*] and long-eared owl [*Asio otus*]) and some not sensitive (e.g., California buckwheat and California ground squirrel) are known to occur in western Riverside County. These plants and animals make up the ecosystem and food chain that are essential for the survival of the target and covered species.

Proposed Constrained Linkage 16

Proposed Constrained Linkage 16 is designed to connect the east side of Linkage 8 to Proposed Core 2 in the Antelope Valley to the east. This linkage is constrained by urban development and agriculture use along its entire length, along with being intersected by I-215. Management of edge conditions in this linkage is critical to maintain habitat in and movement through the linkage. Proposed Constrained Linkage 16 connects to Linkage 8 west of I-215 in the northeast portion of the property. The majority of Proposed Constrained Linkage 16 is located east of I-215, not on the property.

Proposed Conservation

The property consists of 75 percent of Cell Group C. The proposed development occurs in the north-central and northeast portion of Cell Group C, and as such leaves a viable swath of habitat from west to east that will contribute to the assembly of Proposed Linkage 8. The proposed development footprint also leaves additional habitat in the west and northwest that will provide additional foraging and live in habitat within Proposed Linkage 8.

As noted above, the literal interpretation of the Cell criteria would result in conservation of between 780 and 910 acres along the southern, central, and eastern portions of the site. The project proposes to conserve 607.74 acres within Cell Group C along with creating a linear nature park (LNP). The LNP is not part of the MSHCP conservation. The 607.74 acres represent 62.4 percent of the property, which is within the target of 60 to 70 percent conservation for Cell Group C.

A. RARE PLANTS

The survey of the site in 2006 found two individual round-leaved filaree plants, a CASSA Area 4 species (Figure 12). The proposed project includes impacts to sensitive plants in additional to the CASSA species (round-leaved filaree). These impacts include approximately 14,500 (55 percent) long-spined spineflower, 1,500 (33 percent) Parry's spineflower, and 270 (36 percent) Palmer's grapplinghook.

Round-leaved Filaree (CASSA)

Two round-leaved filaree individuals were observed in the northeast quarter of the property near the agricultural land during the 2006 survey. The species was observed in a disc of clay soil near the mapped Auld clay soils. UCR botanist Mr. Sanders noted that low rainfall (approximately 66 percent of normal) in spring 2006 caused unusual growing conditions that have resulted in the plants of the genus *Erodium* (of which this species is formerly of) occurring in smaller numbers. This suggests that it is possible that a slightly larger number of individuals of round-leaved filaree could exist at this location in a normal rainfall year. However, no individuals of this species were observed during rare plant surveys in 2008 with a recorded rainfall of 88 percent of normal, or in 2012 with a rainfall of 63 percent of normal. It is a possibility that the unusually high rainfalls of 2005 (242 percent of average) resulted in a larger that normal growth for round-leaved filaree in 2006.

Based on the MSHCP (Dudek 2013) there are 10 records of this species in the Plan Area. Eight out of the 10 occurrences will be conserved within the MSHCP Conservation Area, and at least 37,663 acres of potential habitat will be conserved.

Based on the data collected over 3 separate years of rare plant surveys and conservation proposed for this species under the MSHCP, the minor potential population of round-leaved filaree located on the property does not have long-term conservation value.

Parry's Spineflower

Parry spineflower will be considered a fully covered species once 10 distinct populations of a minimum of 1,000 individuals are conserved. The project proposes to conserve approximately 66 percent (3,036 individuals) of the plants that occur on the property (Figure 12). This conservation includes a patch of approximately 1,680 individuals, and another of over 500 individuals near the northwest and southwest edges of the property. The conservation also includes a patch of approximately 150 individuals just south of the eastern side of the project impact area. The proposed conservation of over 3,000 individuals that includes a patch of

Keller Road

Cpl 75
Cpp 1680

Cpl 25
Cpp 70
Hp 40

Hp 4
Hp 5

Cpl 10,000
Cpp 30

Cpl 500

Lv 200

Cpl 7
Cpp 350
Dp 50

Lv 100

Cpl 150

Cpl 4

Cpl 50

Cpp 60

Cpl 500+
Cpp 500+
Hp 160

Cpp 30

Cpl 8
Cpp 1,000

Cpl 4

Cpl 450
Cpp 30
Hp 15

Cpl 80

Cpl 7,000
Hp 200

Cpl 4,000
Cpp 75
Hp 70

Cpl

Cpp

Cpl 3,500

Cpl 6

Cpp 15

Hp

Em 2

Cpp 250

Cpp 140

Cpp

Cpp

Cpp

Cpp

Cpl 10
Cpp 150

Cpl 2
Hp 10

215

Off-site Area

Match to Main Map

215

McElwain Road

Linnel Lane

Match to Off-site Area Map

Project Site

Extent of Rare Plants

Pie Chart Representing Percentage of Rare Plant Species in Grouping

CASSA Species

Em Round-leaf Filaree *(Erodium macrophyllum)*

MSHCP Covered Species

Cpl Long-spined Spineflower *(Chorizanthe polygonoides longispina)*

Cpp Parry's Spineflower *(Chroizanthe parryi parryi)*

Hp Palmer's Grapplinghook *(Harpagonella palmeri)*

Species Not Covered by MSHCP

Dp Paniculate Tarplant *(Deinandra paniculata)*

Lv Robinson's Pepper Grass *(Lepidium virginicum* var. *robinsonii)*

Avoidance Area

Fuel Modification Zone 1

Fuel Modification Zone 2

Fuel Modification Zone 3

Oak Fuel Modification Zone

Greer Ranch Fuel Modification Area

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Rare Plant Impacts

MURRIETTA HILLS

HELIX Environmental Planning

0 800 Feet

Figure 12

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approximately 1,680 plants qualifies as one of the 10 populations required to consider this species adequately conserved and covered under the MSHCP.

Additional Sensitive Plants

Long-spined spineflower and Palmer's grapplinghook are fully covered species under the MSHCP. These are fully covered species that do not require species specific mitigation.

B. SENSITIVE ANIMAL SPECIES

Focused animal survey required and conducted on site were for burrowing owl, least Bell's vireo, and southwestern willow flycatcher. Focused burrowing owl and least Bell's vireo surveys were conducted in 2006, 2008, and 2012 by HELIX with negative results. An additional survey for burrowing owl was conducted in 2018 with negative results (HELIX 2018). Surveys for southwestern willow flycatcher were conducted in 2006 with negative results. No other focused animal surveys are required.

C. PROJECT EFFECTS

The project proposes to impact 361.76 acres on site (Figure 13; Table 6), all of which occur in Cell Group C, along with 4.15 acres off site that are not with a Cell or other MSHCP conservation area. This results in 607.74 acres of the property that will contribute to the assembly of the MSHCP conservation area (Figure 14).

The project proposes impacts to 0.97 acre of riparian vegetation and 1.13 acres of unvegetated streambed. The riparian vegetation impacts consist of 0.42 acre of coast live oak woodland, 0.04 acre of riparian woodland, 0.36 acre of southern willow scrub, and 0.15 acre of mule fat scrub (Table 6). The project proposes to avoid impacts to 83 percent of the Riparian/Riverine habitats on the property. The CDFW impacts are identical to the MSHCP Riparian/Riverine habitat impacts (Figures 15a-c). Impacts to CDFW jurisdictional habitats will require a Section 1602 Stream Alteration Agreement from the CDFW.

Table 6
VEGETATION IMPACTS[1]

Community[2]	Existing		Impacted		On-Site Avoidance
	On Site	Off Site	On Site	Off Site	
Southern willow scrub	1.54	-	0.36	0	1.18
Mule fat scrub	0.47	0.03	0.15	0	0.32
Riparian Woodland	0.07	-	0.04	0	0.03
Coast live oak woodland*	13.01	-	4.71[3]	0	8.30
Chaparral	701.7	9.9	204.3	2.4	497.4
Riversidean sage scrub	66.6	1.2	21.2	0.05	45.4
Coastal sage scrub/Chaparral[4]	32.0	-	11.4	0	20.6
Non-native grassland	4.4	1.1	1.7	0.2	2.7
Field cropland	96.7	-	87.6	0	9.1

Table 6 (cont.) VEGETATION IMPACTS[1]					
Community[2]	**Existing**		**Impacted**		**On-Site Avoidance**
	On Site	**Off Site**	**On Site**	**Off Site**	
Exotic (Eucalyptus Woodland)	0.3	-	<0.1	0	0.30
Disturbed	55.3	4.7	29.6	1.2	25.7
Developed	1.6	1.6	0.7	0.3	0.9
TOTAL	**973.69**	**18.53**	**361.76**	**4.15**	**611.93**

* Coast live oak woodland impacts include both upland and wetland-Riparian/Riverine impacts.

[1] Acreage is rounded to the nearest 0.1 acre except for wetland-Riparian/Riverine and areas smaller than 0.1-acre habitats that are rounded to the nearest 0.01 acre.

[2] Streambed acres are included within the upland community acres in which they occur for this table. They are shown in Table 7 for CDFW and Riparian/Riverine impacts

[3] Includes 3.60 acres which is limited to thinning of the understory for fuel management purposes.

[4] Coastal sage scrub/chaparral is not an MSHCP vegetation community; however, each community that forms this ecotone has an MSHCP vegetation classification

V. MULTIPLE SPECIES HABITAT CONSERVATION PLAN CONSISTENCY/BIOLOGICAL ISSUES AND CONSIDERATIONS

As noted earlier, the project site is located within Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP. Conservation considerations related to the Criteria Cells in Subunit 2 are:

- Contains a portion of Proposed Constrained Linkage 16
- Contains a portion of Proposed Linkage 8

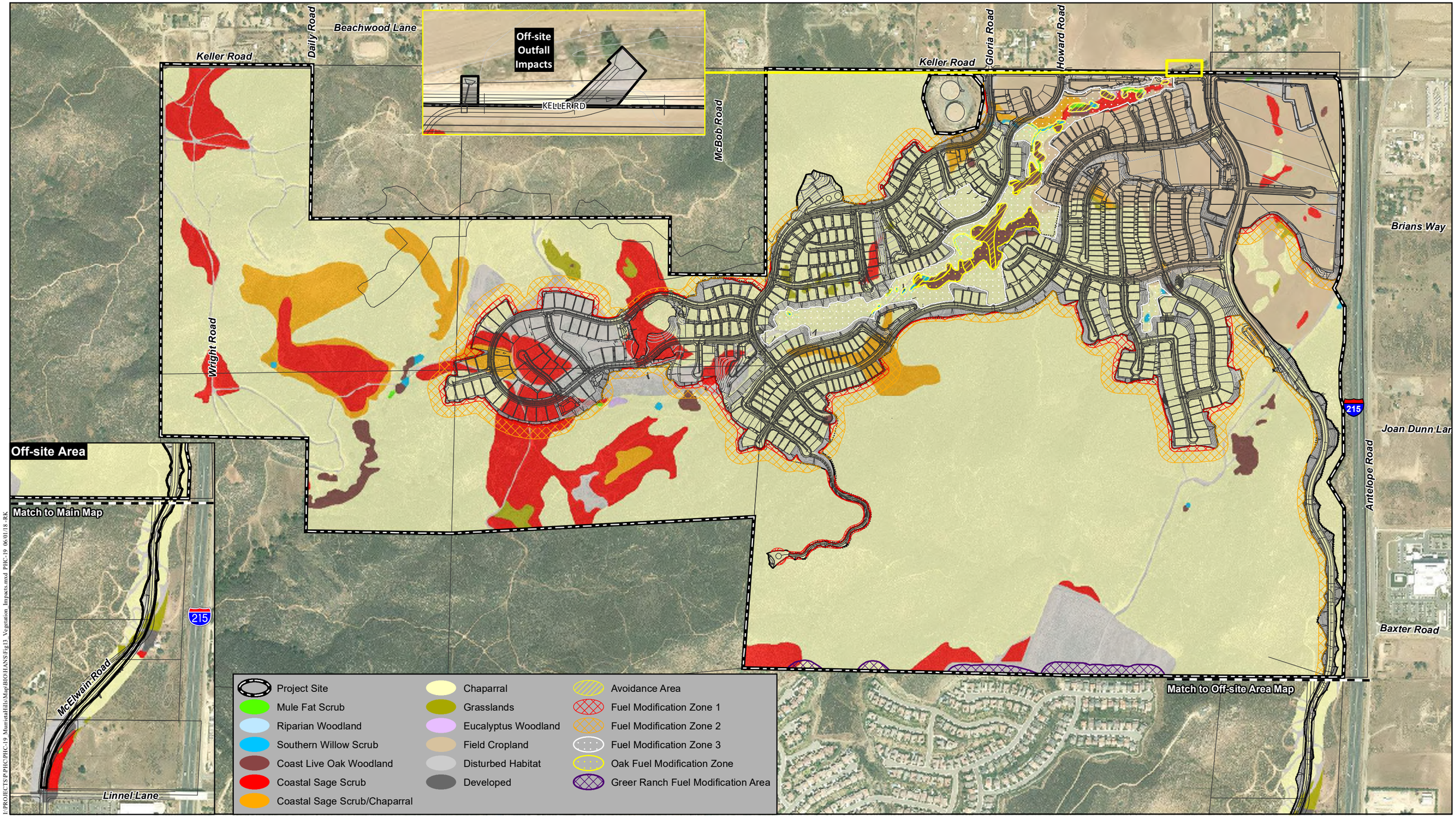
Planning Species include:

- Bell's sage sparrow
- Coastal California gnatcatcher
- Grasshopper sparrow
- Southern California rufous-crowned sparrow
- Quino checkerspot butterfly

Biological Issues and Considerations:

- Contribute to lower Sedco Hills portion of a habitat connection between the new Core Area in Antelope Valley and the Estelle Mountain/Lake Mathews Reserve area.

- Conserve existing populations and habitat of the coastal California gnatcatcher.



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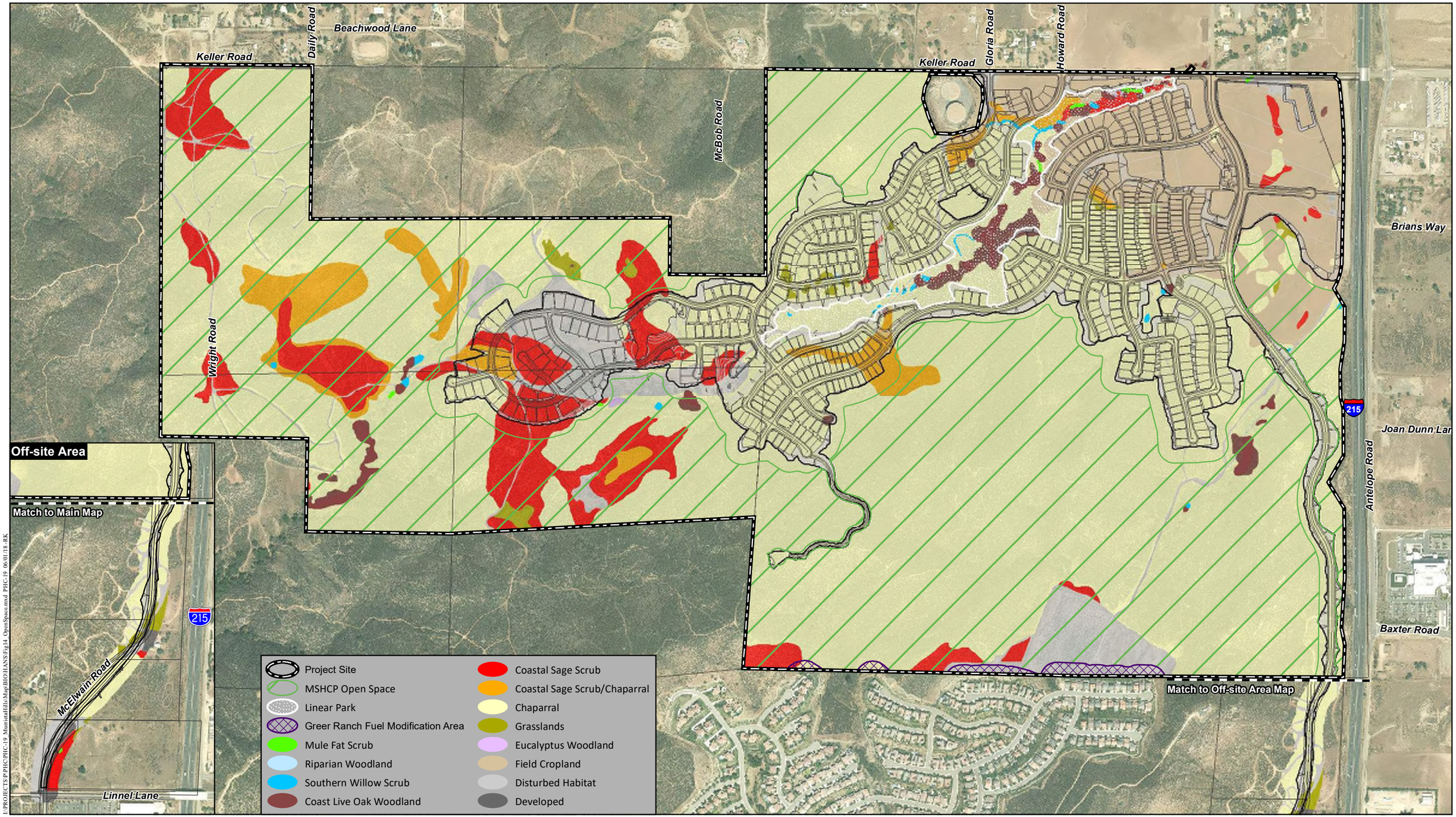
Vegetation/Impacts

MURRIETA HILLS

HELIX Environmental Planning

0 800 Feet

Figure 13



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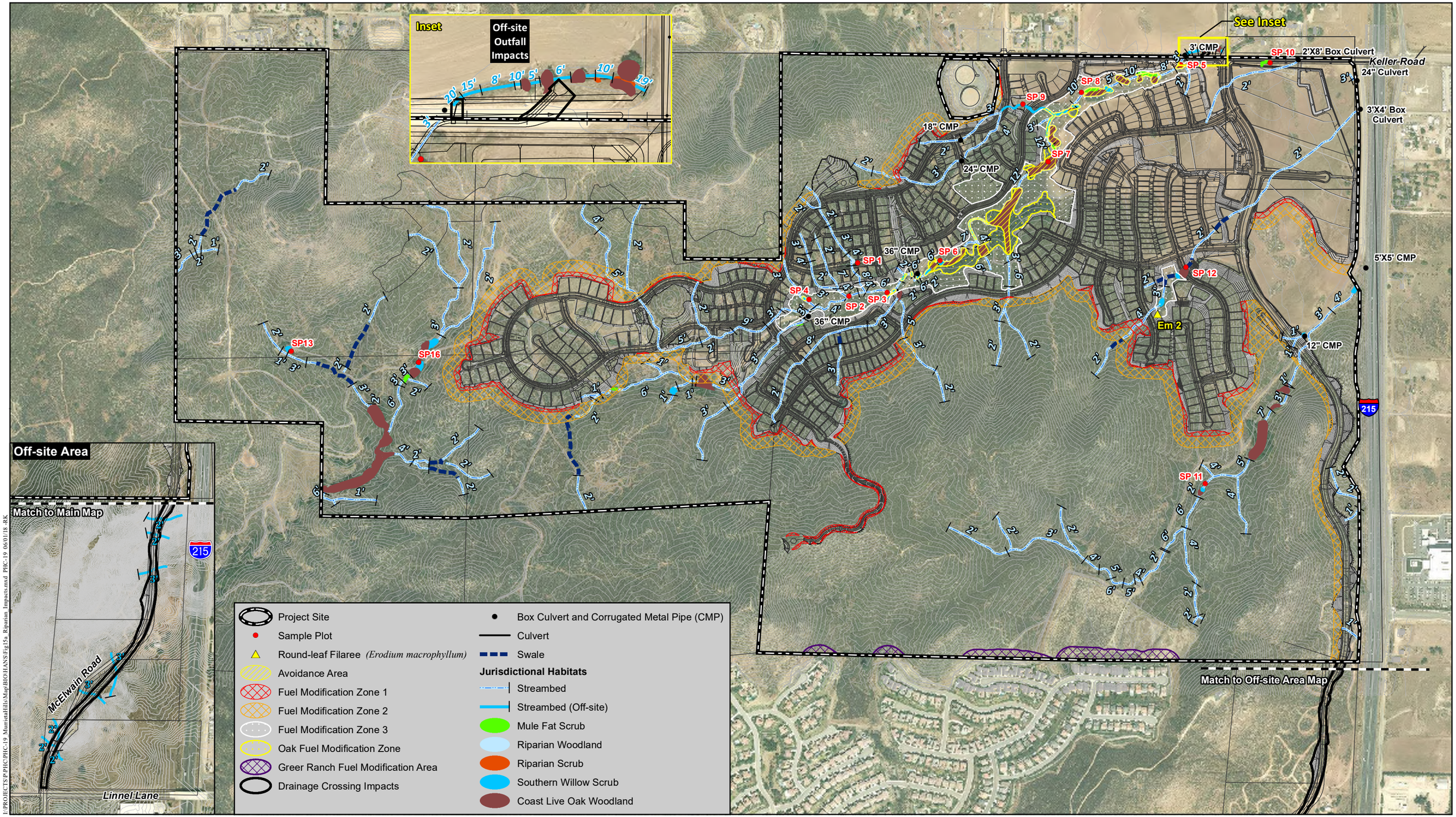
Open Space

MURRIETA HILLS

HELIX Environmental Planning

0 800 Feet

Figure 14



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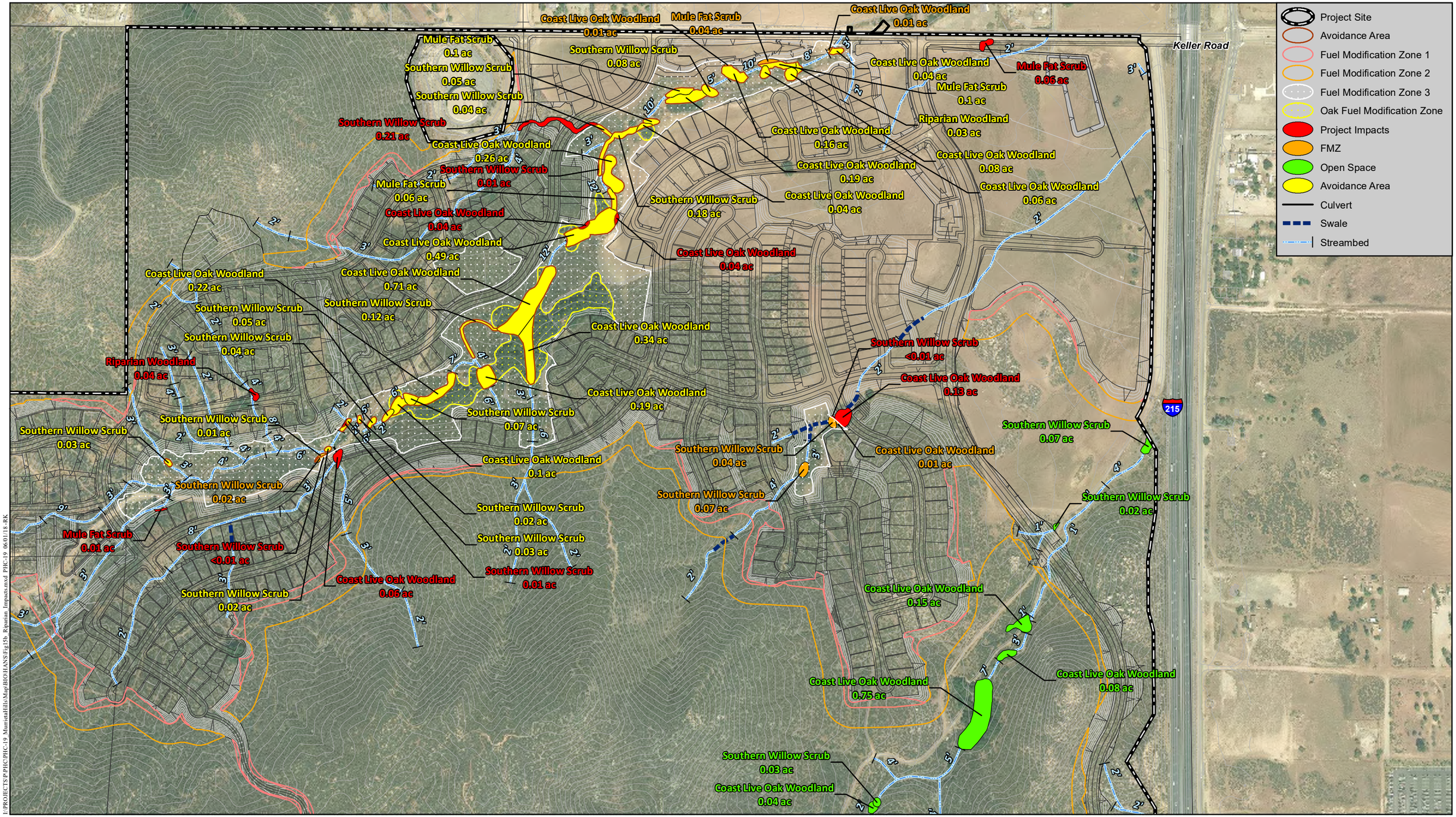
Riparian/Riverine and CASSA Plant Impacts

MURRIETA HILLS

HELIX Environmental Planning

N 0 800 Feet

Figure 15a



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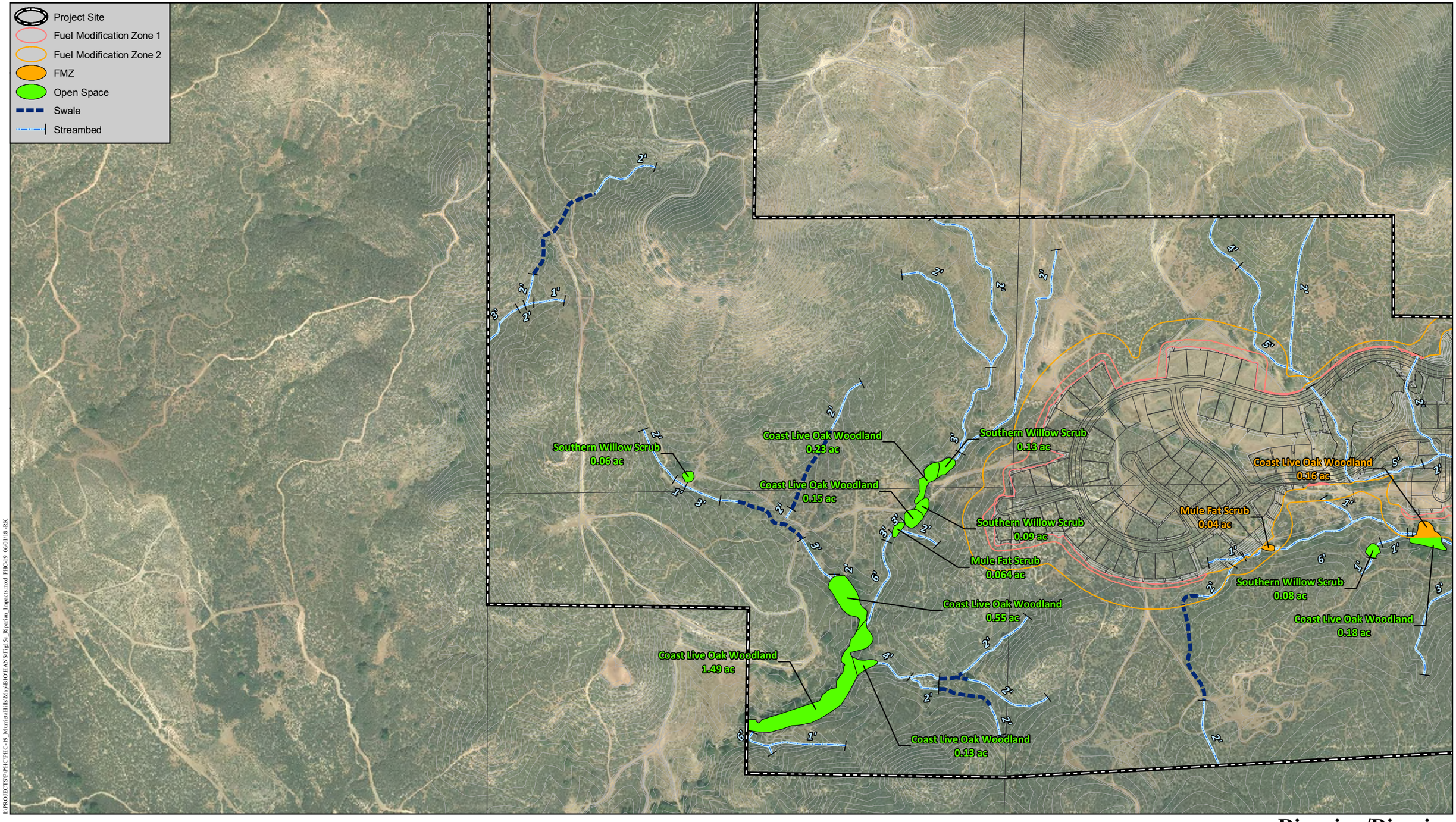
Riparian/Riverine

MURRIETA HILLS

HELIX Environmental Planning

0 450 Feet

Figure 15b



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Riparian/Riverine

MURRIETA HILLS

HELIX Environmental Planning

0 450 Feet

Figure 15c

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- Maintain wetlands for purposes of connection and wildlife dispersal, as well as wetland species Conservation.

- Maintain Core and Linkage Habitat for Quino checkerspot butterfly.

The project occurs at the western end of Proposed Constrained Linkage 16 and on the eastern end of Proposed Linkage 8. The conservation to occur on site (Cell Group C) will contribute to the assembly of Proposed Linkage 8, with a small portion creating a connection to Proposed Constrained Linkage 16. This is due to Proposed Constrained Linkage 16 primarily occurring east of I-215, while the project site is on the west side of I-215. Land to be conserved will connect to proposed conservation to the southwest and east.

The planning species have a moderate to high potential to occur on site, with the coastal California gnatcatcher and southern California rufous-crowned sparrow observed on site. Thirty-three percent of the impacts (117.9 acres) are proposed to occur to agricultural land, disturbed habitat, and developed land that provides little to no habitat for the planning species and only limited foraging habitat for raptors. Sixty-seven percent of the impacts are primarily to high-quality habitat (chaparral, sage scrub, grassland and riparian) with potential to support planning species.

The project avoids impacts to 611.93 acres, including 607.74 acres considered part of the MSHCP preserve, made up of high-quality habitat with potential to support migratory and live in habitat for the planning species and a multitude of other MSHCP covered species. This conservation represents 62.4 percent of the site and will contribute to the assembly of MSHCP conservation area, specifically related to Constrained Linkage 8, and Proposed Constrained Linkage 16. The 62.4 percent on site is consistent with the target conservation of 60 to 70 percent for Cell Group C.

Proposed impacts include the northwestern edge of the portion of Proposed Constrained Linkage 16 that lies west of I-215. This portion of Proposed Constrained Linkage 16 consists of a triangular area adjacent to I-215, designed to connect the existing 5-foot corrugated metal pipe (CMP) culvert under I-215 to Proposed Linkage 8 in the southern half of Cell Group C (Figure 10). This triangular area follows a stream that originates in Cell 5358 and flows under I-215 in the CMP culvert and forms the east-west axis of Proposed Constrained Linkage 16. The proposed impacts to Proposed Constrained Linkage 16 are to a minimal amount in the north edge, outside of the stream channel that forms the basis of the linkage. The revised project footprint avoids an additional 1.8 acres of the linkage. The linkage is at its narrowest where it connects to the five-foot corrugated metal pipe under I-215. The linkage rapidly widens from the five-foot pipe to an area that rapidly increase from approximately 160 feet wide to area that is more than 800 feet wide (Figure 11a). The on-site portion of the linkage is made up of primarily chaparral on the south side of the stream and agriculture (dry crop) on the north. The lands within Proposed Constrained Linkage 16 proposed for impacts are currently used for agriculture.

McElwain Road has been added to the MSHCP as a Covered Activity through Minor Amendment No. 2017-01 (RCA 2018). This includes placement of a six-foot by six-foot box culvert in the channel bottom for wildlife movement, and placement of a second four-foot by

four-foot (1.22-meter) box culvert outside of the 100-year floodplain to allow for wildlife movement during high storm events (Figures 11a-c).

Section 7.5.2 of the MSHCP recommends that culverts be a minimum of 1 to 1.5 meters for medium-sized wildlife that is anticipated to use this linkage and the six- by six-foot culvert proposed exceeds this requirement. The box culvert under McElwain Road would be approximately 164 feet long and would provide direct line of sight from end to end. The four-foot by four-foot (1.22-meter) box culvert will be approximately 137 feet long and provide direct line of site from end to end. The proposed McElwain Road crossing of Proposed Constrained Linkage 16 would be located approximately 850 feet upstream (southwest) of the existing five-foot CMP culvert under I-215, leaving an area of open space between McElwain Road and I-215 too small to function as permanent live-in habitat for large animals. Thus, the proposed McElwain Road crossing would not isolate any significant live-in habitat from the remainder of Proposed Constrained Linkage 16 or Proposed Linkage 8. The proposed culverts under McElwain Road would provide a wildlife crossing that is at least as functional as the existing five-foot-wide, 280-foot-long CMP culvert under I-215, and would not constitute a barrier to any animal that had successfully managed to cross under the freeway.

Based on this assessment, the project is consistent with the conservation goals of Subunit 2 of the Sun City/Menifee Area Plan.

A. CONSISTENCY WITH MULTIPLE SPECIES HABITAT CONSERVATION PLAN SECTION 6.1.2

The proposed project complies with the policies of Section 6.1.2 that protect species associated with vernal pools and Riparian/Riverine areas. No vernal pools exist on site, and no vernal pool species are expected to occur. None of the plant or animal species listed in Section 6.1.2 was observed or expected to occur in the project area.

Section 6.1.2, Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools, states:

> The purpose of the procedures described in this section is to ensure that the biological functions and values of these areas throughout the MSHCP Plan Area are maintained such that Habitat values for species inside the MSHCP Conservation Area are maintained.

Section 6.1.2 of the MSHCP focuses on protection of Riparian/Riverine areas and vernal pool habitats capable of supporting MSHCP covered species, particularly within the identified Conservation Area. The functions of the unvegetated streams on the property are primarily water conveyance, sediment transport, and energy dissipation (hydrologic regime and flood attenuation). These drainages are considered to have limited value because:

- They do not have habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or depend upon soil moisture from a nearby freshwater source;

- They are extremely ephemeral in nature, flowing only during and immediately after storm events; and

- They do not support any of the species targeted for conservation under Section 6.1.2.

The project proposes impact to 0.97 acre of riparian vegetation, made up of 0.42 acre of coast live oak woodland, 0.04 acre of riparian woodland, 0.36 acre of southern willow scrub, 0.15 acre of mule fat scrub, along with 1.13 acres of riverine streambed for a total Riparian/Riverine impact of 2.10 acres (Figures15a-c). The Riparian/Riverine impacts include 0.36 acre of impacts to habitat with potential to support least Bell's vireo (Figure 16). This habitat was determined to not be occupied by least Bell's vireo or southern willow flycatcher. The project proposed in the previous HANS, which was approved under JPR 09-02-17-01 but not implemented, included riparian impacts of 3.16 acres. The current proposal of 0.97 acre of riparian impacts is a 69 percent reduction from the original approved proposed project. Reductions to riparian impacts come from a reduced project extent in the western portion of the property, and elimination of two road crossings in the proposed LNP. Riparian impacts proposed in the current project would occur to isolated and peripheral patches of riparian habitats, while avoiding a contiguous corridor of riparian habitats in the proposed LNP.

Fuel modification planned in proximity of the Riverine resources are not expected to result in complete loss of functions and services associated with Riverine resources, although some reduction in these functions and services may occur. An analysis of potential impacts was prepared by HELIX (2019) and is included as Appendix F to this report. Based on this, impacts have been assessed to 0.5845 acre of Riverine/streambed within Zones 2 and 3, and 0.0188 acre for Zone 1 for a total impact area of 0.6010 acre.

Potential habitat for Vernal pool fairy shrimp, Riverside fairy shrimp and Santa Rosa Plateau fairy shrimp does not occur on the property. The site does include a 4.4-acre patch of clay soils located on the south-southeast edge of the agricultural field. The clay soils have been disturbed from years of discing and dry farming. The clay soils area, along with the rest of the site, does not include vernal pools, ephemeral basins, or similar habitat that could support fairy shrimp. Due to a lack of habitat, Potential habitat for these species does not occur on the property; therefore, no surveys were conducted and these species are not expected to occur on the property.

The project site is in Rough Step Unit 6 of the MSHCP. According to the 2012 Western Riverside County MSHCP Annual Report, all vegetation communities in Rough Step Unit 6 are "in step", though permittees and participating agencies continue to prioritize preservation of riparian scrub, forest, and woodland habitats. The proposed project would preserve 10.21 acres of Riparian/Riverine habitat through avoidance of which 6.11 acres occur within the proposed conservation area.

As noted above, plant and animal species associated with Riparian/Riverine habitats do not occur on site. None of the species covered under Section 6.1.2 occur on site as evident by a lack of potential habitat or where habitat occurs focused surveys have had negative results; therefore, the

Riparian/Riverine habitats on site do not have the habitat values associated with the protection afforded under Section 6.1.2 of the MSHCP.

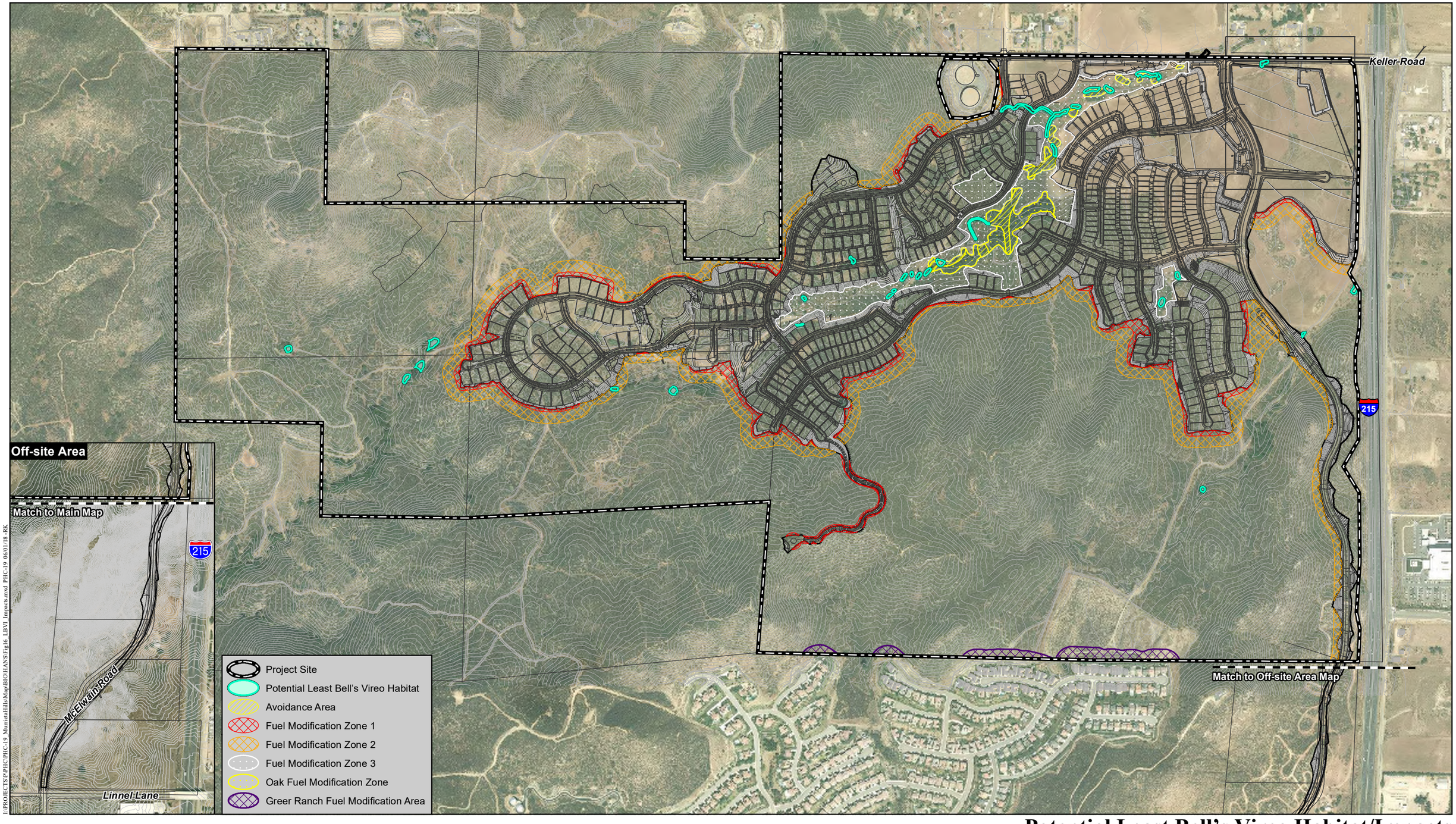
All impacts to Riparian/Riverine resources will be mitigated by a combination of on-site preservation of 10.21 acres of Riparian/Riverine resources, and either off-site restoration, and/or off-site purchase of credits at an approved Mitigation Bank(s).

Mitigation for impacts to Riparian (vegetated) resources will be at a 3:1 ratio, for a total of 2.91 acres. The Riverine resources (unvegetated streambed) within the development footprint will be mitigated at a 2:1 ratio, for a total of 2.26 acres. A total of 5.17 acres of mitigation will be required for the development footprint. An additional 0.4834 acres will be required for impacts to Riverine resources associated with fuel modification zones (Appendix F; Table 7). A total of 5.6534 acres of mitigation will occur via off-site purchase of credits from an approved Mitigation Bank or In Lieu Fee program, off-site habitat restoration, or other mitigation method as approved by the City and other resource agencies. If off-site habitat restoration is proposed, a Habitat Mitigation and Monitoring Program will be prepared and submitted to the City, USFWS, CDFW and RCA for review and approval prior initiating project impacts to Riparian/Riverine resources. The Mitigation Bank and In Lieu Fee options will provide for mitigation within a much broader conservation context with resources that will be of an equal or greater conservation value to the coast live oak woodland, riparian woodland, southern willow scrub, mule fat scrub and streambed resources. and the proposed mitigation bank option is the Riverpark Mitigation Bank. The Riverpark Mitigation Bank provides for re-establishment of alkali playa and vernal pool habitats which are two of the rarest habitat types in the MSHCP. Mitigation for unavoidable impacts to Riparian/Riverine areas will be biologically equivalent to resources being impacted by the proposed project. Mitigation for unavoidable impacts to Riparian/Riverine areas will be biologically equivalent to resources being impacted by the proposed project. There will be a minimum of 6.11 acres of on-site riparian/riverine conservation and 4.10 additional acres of avoidance in the LNP. The 4.10 acres of avoidance within the LNP will be protected via a deed restriction that precludes impacts to these Riparian/Riverine resources.

Table 7
MITIGATION FOR IMPACTS TO RIPARIAN/RIVERINE RESOURCES

Vegetation Type	Impacts*	Mitigation Ratio	Mitigation Required*
Coast live oak woodland	0.42	3:1	1.26
Riparian woodland	0.04	3:1	0.12
Southern willow scrub	0.36	3:1	1.08
Mule fat scrub	0.15	3:1	0.45
Streambed	1.13	2:1	2.26
Streambed (Fuel Modification)	0.6010	See Appendix F	0.4834
TOTAL	**2.701**		**5.6534**

* acres



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Potential Least Bell's Vireo Habitat/Impacts

MURRIETA HILLS

HELIX Environmental Planning

N 0 800 Feet

Figure 16

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B. CONSISTENCY WITH MULTIPLE SPECIES HABITAT CONSERVATION PLAN SECTION 6.1.3

In compliance with Section 6.1.3, this project would not affect any Narrow Endemic Plant Species, since no species are present on site or within the Keller Road outfall area. NEPSSA surveys of the off-site portion McElwain Road shall be conducted prior to grading to insure compliance with Section 6.1.3 of the MSHCP. Survey results shall be provided to the RCA and wildlife agencies for review, and to the City for final approval.

C. CONSISTENCY WITH MULTIPLE SPECIES HABITAT CONSERVATION PLAN SECTION 6.1.4

The following measures will be implemented by the project to minimize the identified potential indirect impacts, including:

- All project runoff will be treated prior to exiting the site to reduce toxins.

- Detention basins proposed within the project footprint will ensure that there is no increase in flows from the project into the Salt Creek or Warm Springs Creek Watershed.

- All project lighting (including that belonging to private property owners) will be required to be selectively placed, directed, and shielded away from conserved habitats along the northern portion of the site. In addition, large spotlight-type backyard lighting directed into conserved habitat will be prohibited.

- No plants included on the California Invasive Plant Council's list of invasive species (or in Table 6-2 of the MSHCP) will be used anywhere on the site, and only native species or non-invasive non-native species will be planted adjacent to conservation areas. A list of prohibited species will be provided to homebuyers.

- The proposed project has been designed so that no additional take of conserved habitat will be necessary for fuel modification purposes. All take is included in project footprint.

- Enclosure fences (wood, tubular steel) shall be installed along the interface where residential development abuts conserved habitat. Signs will be posted at potential access points into the MSHCP conservation area informing residents of the wildlife habitat value of the open space to minimize intrusions. Refer to Figure 4 for an aerial view of on-site and off-site open space.

- Manufactured slopes associated with the proposed site development will not extend into the MSHCP conservation area.

- The above measures would serve to minimize the adverse effects of the project on conservation configuration and would minimize management challenges that can arise from development located adjacent to conserved habitat.

D. CONSISTENCY WITH MULTIPLE SPECIES HABITAT CONSERVATION PLAN SECTION 6.3.2

In compliance with MSHCP Section 6.3.2, the proposed project would not affect burrowing owls, since no individuals or active burrow locations were observed on site, or in the Keller Road outfall area, during focused surveys (HELIX 2018). Focused rare plant surveys in 2006 found two individual round-leaved filaree, a CASSA species. As previously noted, repeat survey in 2008 and 2012 that included an extra focused effort for this species did not observe this species on site.

The two individual round-leaved filaree were observed on a small (less than 0.1 acre) opening in chaparral adjacent to a dirt road. Per the MSHCP reference documentation round-leaved filaree is restricted to open cismontane woodland and valley and foothill grassland habitats (Dudek 2003). The species was not observed on subsequent surveys conducted in 2008 and 2012. The one site population was observed at a maximum size of two individuals.

This species is known primarily from five records in the Gavilan Hills, one record at Lake Mathews, one at Diamond Valley Lake, one along Temescal Wash near Lee Lake, one in French Valley, and one in the foothills of the Agua Tibia Mountains. No core areas have been identified for this species (Dudek 2003). Two of the known populations occur on Bosanko clay soils, while the two individuals were observed on Cajalco rocky fine sandy loam. As the species is typically observed on clay soils, they were most likely on a clay disc inclusion with the Cajalco soil.

Based on the small population, small size of the appropriate habitat, inappropriate surrounding habitat, soils, and that the species was observed during only 1 of the 3 years of plant surveys, the location of the round-leaved filaree does not represent habitat with potential to have long term conservation value for the species.

A pre-construction burrowing owl survey will be conducted within 30 days prior to initiation of on-site project activities in accordance with the County's survey guidelines (Riverside 2006). If burrowing owls have colonized the project site prior to the initiation of construction, the project proponent should immediately inform RCA and the Wildlife Agencies, and may include preparation of a *Burrowing Owl Protection and Relocation Plan*, prior to initiating ground disturbance.

E. CONSISTENCY WITH SECTION 7.5.1 AND 7.5.2

As noted above, McElwain Road (on-site) has been added to the MSHCP as a Covered Activity and is required to show consistency with Section 7.5.1 and 7.5.2 of the MSHCP. Section 7.5.1 of the MSHCP states that the ultimate alignment and design of planned roadways, bridges, and interchanges will be subject to the following design, siting, and construction guidelines (responses to each bullet for both roadways are included below):

- Planned roads will be located in the least environmentally sensitive location feasible, including disturbed and developed areas or areas that have been previously altered.

Alignments will follow existing roads, easements, ROWs, and disturbed areas, as appropriate, to minimize habitat fragmentation.
Status: McElwain Road has been designed to run as close to I-215 as possible to place the roadway in the least environmentally sensitive area while still providing access to the project from the south. This has minimized fragmentation resulting from McElwain Road.

- Planned roads will avoid, to the greatest extent feasible, impacts to Covered Species and wetlands. If wetlands avoidance is not possible, then any impacts to wetlands will require issuance of and mitigation in accordance with a federal 404 and/or state 1600 permits.

  Status: McElwain Road does not impact covered species and wetlands. The roadway does impact non-wetland Riparian/Riverine resources and these impacts are being mitigated in accordance with state and federal permitting requirements.

- Design of planned roads will consider wildlife movement requirements, as further outlined below under Guidelines for Construction of Wildlife Corridors.

  Status: McElwain Road will incorporate requirements consistent with Section 7.5.2 of the MSHCP. Section 7.5.2 of the MSHCP addresses construction of wildlife crossings. Because I-215 is a major impediment to large wildlife (e.g., mountain lion and mule deer), McElwain is not being designed to facilitate movement of these species. McElwain Road will include a six-foot by six-foot box culvert that would provide wildlife crossing under the roadway. Section 7.5.2 of the MSHCP recommends that culverts be a minimum of 1 to 1.5 meters for medium-sized wildlife that are anticipated to use this linkage and the six-foot by six-foot culvert proposed exceeds this requirement. The box culvert under McElwain Road would be approximately 164 feet long and would provide direct line of sight from end to end. The undercrossing is being placed within the drainage that traverses this portion of the site which is the area most likely to be utilized for wildlife movement. A second four-foot by four-foot (1.22-meter) box culvert will be placed above the six-foot by six-foot culvert to allow for wildlife movement during high flow events (Figures 11a-c).

  Section 7.5.2 of the MSHCP in part states:

  - Small and medium sized mammal crossings should be placed at least every 300 meters and small and medium sized mammal crossings should be varied in size to accommodate a variety of mammal species.

    Status: 300 meters is nearly at the southern property boundary when measured from the proposed undercrossing and would only facilitate movement to a narrow strip of habitat between I-215 and McElwain Road. As a result, additional small mammal crossings are not proposed.

  - 1.0 to 1.5 meter culverts should be installed to support medium sized (e.g., coyote, raccoon).

    Status: The undercrossing meets this requirement.

- Smaller, 0.5 to 1.0 meter culverts should be installed for small mammals, reptiles, and amphibians. These smaller structures are preferred by mice, weasels, and other small wildlife.

  Status: The four-foot (1.22-meter) box culvert crossing meets this criteria.

- Dirt, rock, or concrete benches should be installed on at least one side of the large mammal crossing facility in order to allow wildlife to cross during most storm event circumstances.

  Status: As noted, the undercrossing is not intended to facilitate large mammal movement.

The MSHCP also states that "All undercrossings and culverts which are intended to get wildlife usage, will be designed in a manner which allows a dry crossing under nearly all circumstances. This will include designing an elevated bench above the normal high water line or providing a textured gentle slope up the side of the culvert/undercrossing." McElwain Road will include a six-foot by six-foot box culvert in the channel bottom, along with a four-foot by four-foot (1.22-meter) box culvert above the 100 year flood level for an all-weather undercrossing.

Directional fencing shall be provided at the undercrossing to direct wildlife into the undercrossings. Existing vegetation is fairly open at the proposed crossing location. Areas around the openings will be augmented with appropriate native species to facilitate wildlife usage.

- Narrow Endemic Plant Species will be avoided; if avoidance is not feasible, then mitigation as described in the Narrow Endemics Plant Policy will be implemented.

  Status: No Narrow Endemic Plant Species occur within the McElwain Road ROW.
- Any construction, maintenance, and operation activities that involve clearing of natural vegetation will be conducted outside the active breeding season (March 1 through June 30).

  Status: The Project will be conditioned to avoid clearing of vegetation during the breeding season.

- Prior to design and construction of transportation facilities, biological surveys will be conducted within the study area for the facility including vegetation mapping and species surveys and/or wetland delineations. The appropriate biological surveys to be conducted will be based on field conditions and recommendations of the project manager in consultation with a qualified biologist. The results of the biological resources investigations will be mapped and documented. The documentation will include preliminary conclusions and recommendations regarding potential effects of facility construction on MSHCP Conservation Area resources and methods to avoid and minimize impacts to MSHCP Conservation Area resources in conjunction with project siting, design, construction, and operation. The project biologist will work with facility

designers during the design and construction phase to ensure implementation of feasible recommendations.

Status: Surveys have been conducted for McElwain Road. The project biologist has worked with the project design team in developing the alignment and design criteria.

McElwain Road is consistent with Section 7.5.1 of the MSHCP.

F. MULTIPLE SPECIES HABITAT CONSERVATION PLAN FEES

The MSHCP Local Mitigation Development Fee in the amount of $7,164 per acre for industrial or commercial uses, $2,104 per dwelling unit for residential development of less than eight units per acre, $1,347per dwelling unit for residential development between 8.1 and 14 dwelling units per acre, and $1,094 per dwelling unit for development greater than 14.1 dwelling unit per acre (Regional Conservation Authority 2019) must be paid at the time a certificate of occupancy is issued for the residential unit or development project or upon final inspection (whichever occurs first). The applicant is requesting that the dedication of 607.74 acres for conservation be offset through MSHCP fee credits up to the value of the land being dedicated for conservation.

VI. CONCLUSION

The project is being implemented consistent with the MSHCP based on the following:

- MSHCP Cell Group C criteria call for conservation of 60 to 70 percent or 780 to 910 acres along the northern portion of the site. As the project would conserve 607.74 acres and 62 percent of the site, it would contribute to meeting the conservation goals of Cell Group C and would create live in and migratory habitat east west connection and be consistent with the Cell Group criteria. The preservation of lands in the southern half instead of the northern half of Cell Group C has been accepted by the resource agencies as consistent with the goal of assembling Proposed Linkage 8.

- The project is consistent with MSHCP Section 6.1.2 because no vernal pools occur within the proposed project footprint, and none of the plants or animal associated with Riparian/Riverine resources occurs on site, and impacts will be mitigated through on-site preservation and off-site mitigation.

- The project is consistent with MSHCP Section 6.1.3 because NEPSSA species are not expected to occur on site and were not observed during focused surveys. NEPSSA surveys of the off-site portion McElwain Road shall be conducted prior grading to insure compliance with Section 6.1.3 of the MSHCP. Survey results shall be provided to the RCA and wildlife agencies for review, and to the City for final approval.

- The project is consistent with MSHCP Section 6.1.4 because it has minimized indirect impacts through the use of best management practices, appropriate buffering, appropriate

access and lighting control, and control of exotic species within and adjacent to the preserve.

- The project is consistent with MSHCP Section 6.3.2 because no burrowing owls or active burrow locations were observed on the property during the focused surveys. Burrowing owl surveys of the off-site portion McElwain Road shall be conducted prior to grading to insure compliance with Section 6.3.2 of the MSHCP. Survey results shall be provided to the RCA and wildlife agencies for review, and to the City for final approval.

VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: September 12, 2019 SIGNED: _____

Barry L. Jones
Senior Consulting Biologist

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Appendix A

RESULTS OF THE 2006 AND 2008 FOCUSED BURROWING OWL SURVEYS FOR THE MURRIETA HILLS PROJECT

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September 24, 2008 NUR-02

Mr. Rick Robotta
Pulte/BP Murrieta Hills, LLC
c/o Benchmark Pacific
550 Laguna Dr., Ste. B
Carlsbad, CA 92008

Subject: Results of the 2006 and 2008 Focused Burrowing Owl Surveys for the Murrieta Hills Project

Dear Mr. Robotta:

This letter reports the results of the focused burrowing owl (*Athene cunicularia*) surveys conducted in 2008 on the Murrieta Hills property. The result of the 2006 survey is also included in this report. These surveys meet applicable conditions under the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), which was approved in 2003. The MSHCP is a comprehensive planning effort that includes the County of Riverside (County) and 14 cities.

PROPERTY LOCATION

The approximately 1,300-acre project site is located west of Interstate (I-) 215 and south of Keller Road in the community of Menifee, unincorporated Riverside County, California (Figure 1). It is bordered to the east and south by Murrieta City limits and thus is in the City of Murrieta's (City's) sphere of influence proposed for annexation to the City. The site is situated in Sections 27 and 28, Township 6 South, Range 3 West as shown on the U.S. Geological Survey 7.5-minute Murrieta and Romoland quadrangles map (Figure 2).

PROPERTY DESCRIPTION

The intersection of Keller Road and Wright Road forms the northwest corner of the property. Unimproved Shauna Charmain Lane and Scenic View Drive cross the property, which has elevation ranges from approximately 1,575 to 2,251 feet above mean sea level (amsl). The property contains a few gently sloped locations, primarily in the central and northeast portions of the site. The remainder of site contains moderate to steep rugged terrain. Multiple drainages occur on the property. An aerial photograph of the site is attached as Figure 3. The following 37 Assessor's Parcel Numbers parcels make up the site: 384-190-001 to -016, 384-200-001 to -018, and 384-210-001 to -003.

METHODS

Burrowing owl surveys were conducted by HELIX biologists Rob Hogenauer and Zsolt Kahancza in 2006 and 2008. They were assisted by Zack West in 2006. See Table 1 for complete survey dates and conditions. The surveys were performed in accordance with the Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area (County 2006). Habitat with potential to support burrowing owls (Figure 3) was surveyed on foot using transects no greater than 30 yards wide to allow for 100 percent visual coverage of potential habitat. A 500-foot buffer zone was visually surveyed from the edge of the subject property where owl habitat bordered. The biologists walked slowly and methodically, closely checking the areas with the basic characteristics of owl habitat (listed below).

- Open expanses of sparsely vegetated areas (<30% canopy cover for trees and shrubs)
- Gently rolling or level terrain
- An abundance of small mammal burrows, especially those of California ground squirrel (*Spermophilus beecheyi*)
- Fence posts, rock, or other low perching locations

Table 4
SURVEY INFORMATION

Survey	Date	Time	Weather Conditions	Personnel
2008				
1	4/24/08	0600-0830	Partly cloudy, 48°-58° F, wind 0-4 mph	Rob Hogenauer Zsolt Kahancza
2	4/24/08	0550-0820	Partly cloudy, 60°-74° F, wind 0-2 mph	Rob Hogenauer Zsolt Kahancza
3	5/5/08	0535-0750	Cloudy, 52°-56° F, wind 1-4 mph	Rob Hogenauer
	5/6/08	0540-0700	Cloudy, 53°-54° F, wind 1-3 mph	
4	5/20/08	0530-0745	Partly overcast, 62°-66° F, wind 1-5 mph	Rob Hogenauer Zsolt Kahancza
2006				
Assess-ment	12/20/05	1135-1500	Clear	Rob Hogenauer
1	5/5/06	0550-0810	Cloudy, 54-59°F, wind 0-1 mph	Rob Hogenauer Zsolt Kahancza
	5/8/06	1730-2015	Clear, 59-71°F, wind 2-5 mph	Zack West Zsolt Kahancza

Table 4 SURVEY INFORMATION				
Survey	Date	Time	Weather Conditions	Personnel
2006				
2	7/17/06	0525-0735	Partly cloudy, 70-77°F, wind 0-1 mph	Rob Hogenauer Zack West Zsolt Kahancza
	7/18/06	0650-0825	Clear, 74-84°F, wind 0-1 mph	Zack West Zsolt Kahancza
3	7/27/06	0540-0740	Cloudy, 75-81°F, wind 1-3 mph	Rob Hogenauer
	7/31/06	0545-0705	Cloudy, 71-73°F, wind 1-3 mph	Rob Hogenauer
	8/1/06	0745-0815	Overcast, 72-75°F, wind 2-4 mph	Zack West Zsolt Kahancza
4	8/4/06	0550-0730	Partly cloudy, 64-71°F, wind 0-1 mph	Rob Hogenauer
	8/7/06	0605-0710	Cloudy, 67-69°F, wind 0-1 mph	Rob Hogenauer

Potential owl burrows were checked for sign of recent owl occupation, which includes:

- Pellets/casting (regurgitated fur, bones, and insect parts)
- White wash (excrement)
- Feathers

RESULTS

The majority of the site supports dense vegetation and steep terrain not suitable for the burrowing owl (Figure 4). Chaparral is the dominant habitat on the site, with lesser amounts of sage scrub, non-native grassland, riparian and oak woodland, and field croplands.

The property contains approximately 150 acres of potential owl habitat, approximately 100 acres of which is agricultural land located in the northeast corner of the property. An additional 15 acres of disturbed habitat occurs in the southeast quarter of the property, with the remainder of the potential owl habitat occurring in several patches located across the property. The habitats surveyed for the burrowing owl included non-native grassland, field croplands, disturbed habitat, and areas of sage scrub with less than 30 percent ground cover. No owls or owl sign were observed on the property.

The MSHCP specifies that preconstruction surveys for burrowing owls should be conducted for all properties that contain suitable burrowing owl habitat. A preconstruction survey is to take place within 30 days prior to disturbance of the property (Dudek 2003). A list of animal species observed or detected during the surveys is included as Attachment A.

Sincerely,

Rob Hogenauer
Biologist

Enclosures:

Figure 1	Regional Location Map
2	Project Location Map
3	Aerial Photo
4	Transect Map
5 & 6	Site Photos
Attachment A	Animal Species Observed

LITERATURE CITED or REFERENCED

County of Riverside. 2006. Burrowing Owl Survey Instruction for the Western Riverside Multiple Species Habitat Conservation Plan Area. Environmental Programs Department. March 29.

Dudek and Associates. 2003. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Final MSHCP Volume I and II. Prep. for County of Riverside, Transportation and Land Management Agency.

Knecht, A.A. 1971. Soil Survey of Western Riverside Area, California. USDA, Soil Conservation Service, USDI, and Bureau of Indian Affairs in cooperation with UC Agriculture Experiment Station, Washington D.C. 158 pp. plus appendices and maps.

U.S. Department of Agriculture (USDA). 2005. Web Soil Survey. National Resources Conservation Service. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Appendix A
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS*

FAMILY	SCIENTIFIC NAME	COMMON NAME
INVERTEBRATES		
Anthophoridae	*Xylocopa* spp.	carpenter bee
Apiidae	*Apis mellifera mellifera*	honey bee
Formicidae	*Messor* spp.	harvester ant
	Pogonomyrex spp.	harvester ant
Hesperiidae	*Erynnis tristis*	mournful duskywing
Hesperiidae subfamily Pyrginae	*Erynnis funeralis*	funereal duskywing butterfly
Nymphalinae	*Vanessa cardui*	painted lady butterfly
Papilioninae	*Papilio eurymedon*	pale swallowtail butterfly
Pieridae	*Colias* sp.	sulfur butterfly
	Pieris protodice	common white butterfly
	Pieris rapae	cabbage white butterfly
Polyommatinae	*Icaricia acmon*	Acmon blue butterfly
	Leptotes marina	Marine blue butterfly
Riodinidae	*Apodemia mormo virgulti*	Behr's metalmark butterfly
Tenebrionidae	*Eleodes* spp.	darkling beetle
VERTEBRATES		
Reptiles		
Phrynosomatidae	*Sceloporus occidentalis*	western fence lizard
	Uta stansburiana	common side-blotched lizard
Viperidae	*Crotalus ruber*†	red-diamond rattlesnake
Birds		
Accipitridae	*Accipiter cooperii*†	Cooper's hawk
	Buteo jamaicensis	red-tailed hawk
	Circus cyaneus†	northern harrier
	Elanus leucurus†	white-tailed kite
Aegithalidae	*Psaltriparus minimus*	bushtit
Alaudidae	*Eremophia alpestris*†	horned lark
	Eremophila alpestris actia†	California horned lark
Cardinalidae	*Guiraca caerulea*	blue grosbeak
	Pheucticus melanocephalus	black-headed grosbeak
Cathartidae	*Cathartes aura*	turkey vulture
Charadriidae	*Charadrius vociferous*	killdeer
Columbidae	*Columba livia*	rock dove
	Zenaida macroura	mourning dove

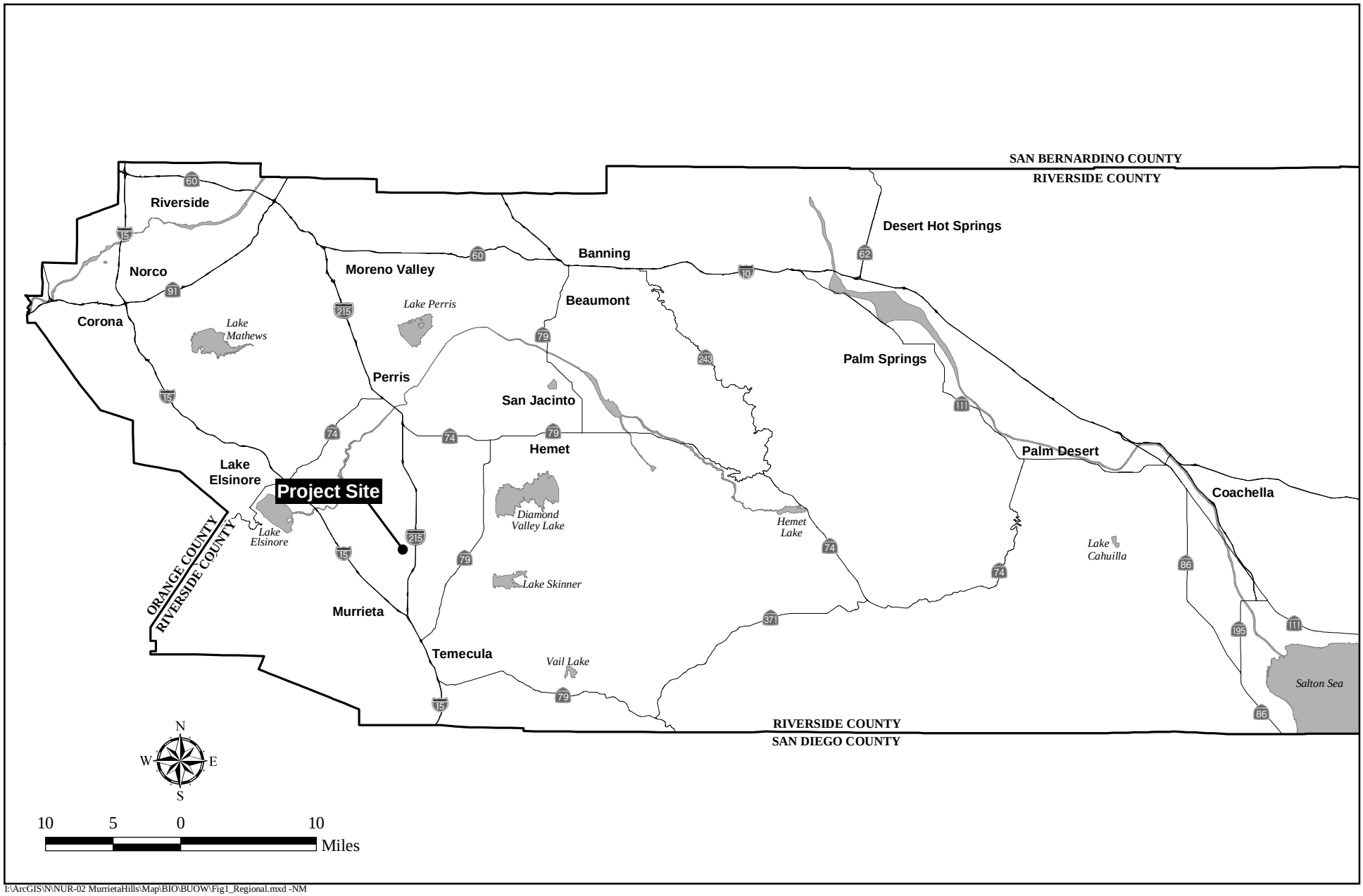
Appendix A (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME
VERTEBRATES		
Birds (cont.)		
Corvidae	*Aphelocoma californica*	western scrub jay
	Corvus brachyrhynchos	American crow
	Corvus corax	common raven
Cuculidae	*Geococcyx californianus*	greater road runner
Emberizadae	*Junco hyernalis*	dark-eyed junco
	Aimophila ruficeps canescens†	southern California rufous-crowned sparrow
	Chondestes grammacus	lark sparrow
	Melospiza melodia	song sparrow
	Pipilo crissalis	California towhee
	Pipilo maculatus	spotted towhee
	Spizella atrogularis	black-chinned sparrow
Falconidae	*Falco sparverius*	American kestrel
Fringillidae	*Carduelis lawrencei*	Lawrence's goldfinch
	Carduelis psaltria	lesser goldfinch
	Carduelis tristis	American goldfinch
	Carpodacus mexicanus	house finch
Icteridae	*Icterus bullockii*	Bullock's oriole
	Molothrus ater	brown-headed cowbird
	Sturnella neglecta	western meadowlark
Mimidae	*Mimus polyglottos*	northern mockingbird
	Toxostoma redivivum	California thrasher
Odontophoridae	*Callipepla californica*	California quail
Paridae	*Baelophus inornatus*	oak titmouse
Parulidae	*Geothlypis trichas*	common yellowthroat
	Vermivora celata	orange-crowned warbler
	Wilsonia canadensis	Wilson's warbler
Picidae	*Caloptes auratus*	northern flicker
	Picoides nuttallii	Nuttall's woodpecker
Ptilogonatidae	*Phainopepla nitens*	phainopepla
Sylviidae	*Polioptila californica californica*†	coastal California gnatcather
Timaliidae	*Chamaea fasciata*	wrentit
Trochilidae	*Calypte anna*	Anna's hummingbird
	Calypte costae†	Costa's hummingbird
	Selasphorus sasin	Allen's hummingbird
Troglodytidae	*Thryomanes bewickii*	Bewick's wren
	Troglodytes aedon	house wren

Appendix A (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME
VERTEBRATES		
Birds (cont.)		
Tyrannidae	*Contopus sordidulus*	western wood-pewee
	Empidonax difficilis	Pacific slope flycatcher
	Myiarchus cinerascens	ash-throat flycatcher
	Sayornis nigricans	black phoebe
	Sayornis saya	Say's phoebe
	Tyrannus verticalis	western kingbird
Vireonidae	*Vireo huttoni*	Hutton's vireo
Mammals		
Canidae	*Canis familiaris*	domestic dog
	Canis latrans	coyote
Cervidae	*Odocoileus hemionus*	mule deer
Equidae	*Equus caballus*	horse
Felidae	*Puma concolor*	mountain lion
Heteromyidae	*Dipodomys* spp.	kangaroo rat
Leporidae	*Lepus californicus bennettii*†	San Diego black-tailed jack rabbit
	Sylvilagus audubonii	desert cottontail
Mephitidae	*Mephitis mephitis*	striped skunk
Muridae	*Neotoma* sp.	desert woodrat
Sciuridae	*Spermophilus beecheyi*	California ground squirrel

*Includes species observed or detected during 2008 and prior years surveys.
†Sensitive species, including animals shown on the Special Animals List (CDFG 2006e)



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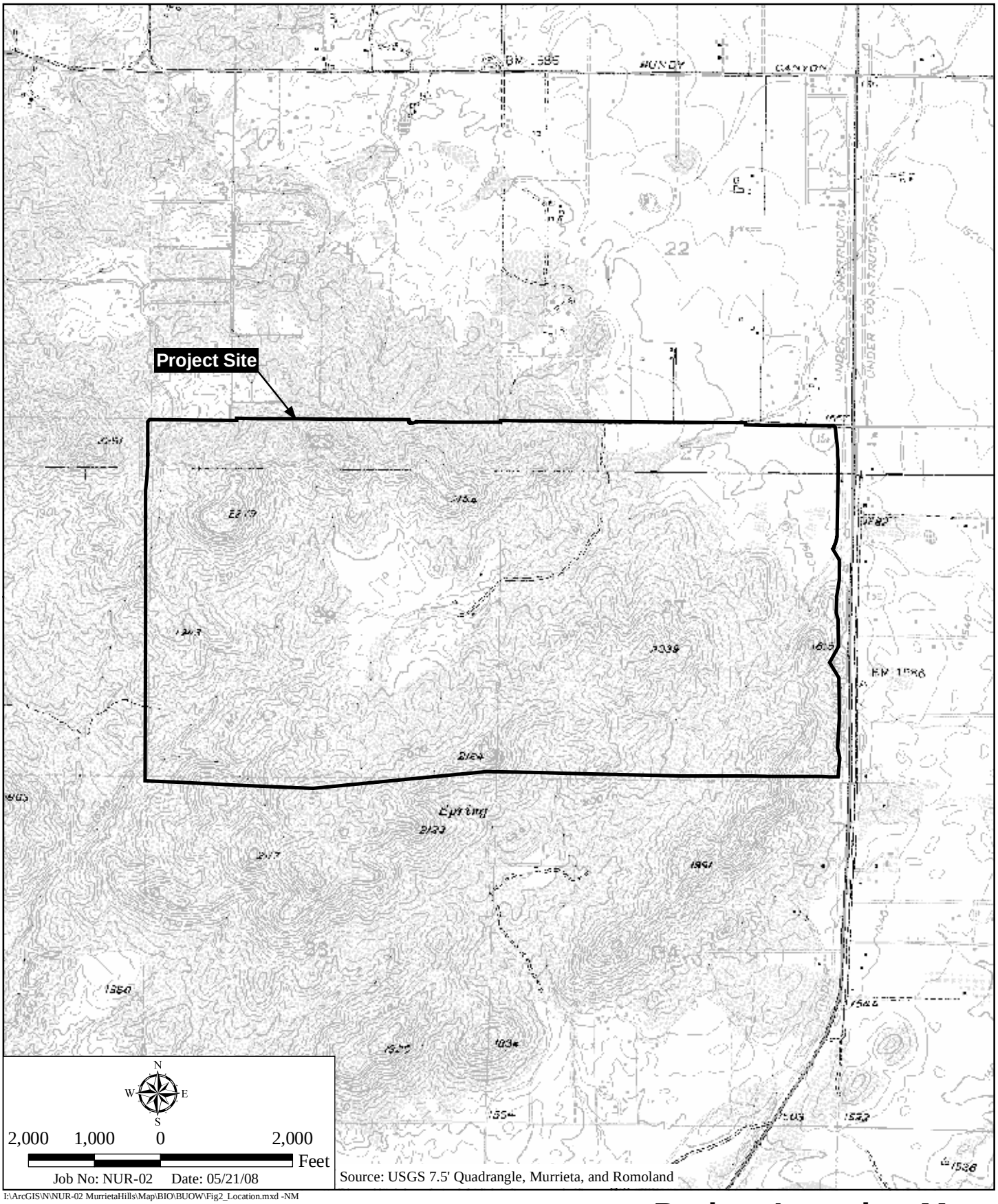
Regional Location Map

MURRIETA HILLS

HELIX

Figure 1



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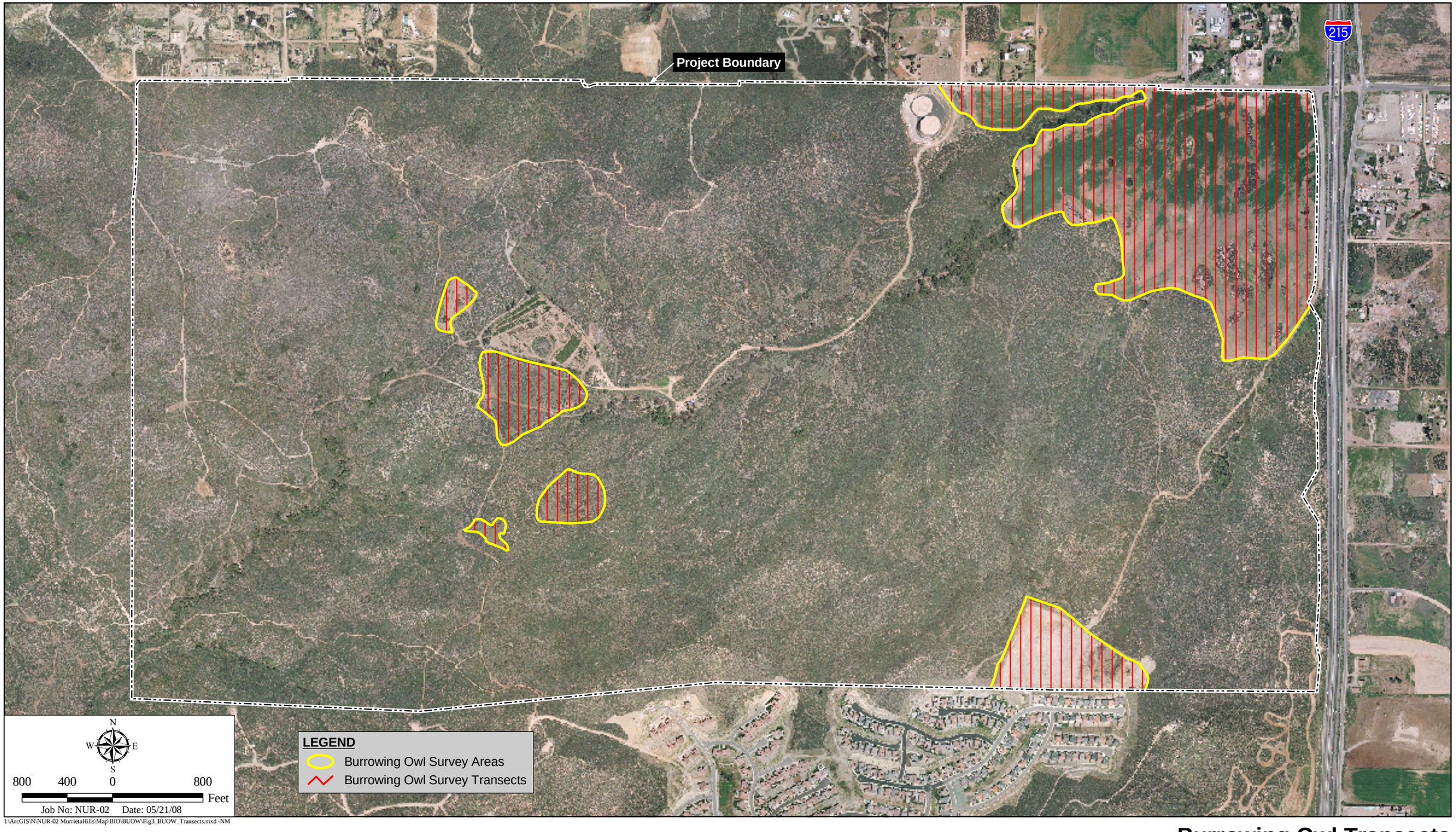
Project Location Map

MURRIETA HILLS

HELIX

Figure 2



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Burrowing Owl Transects

MURRIETA HILLS

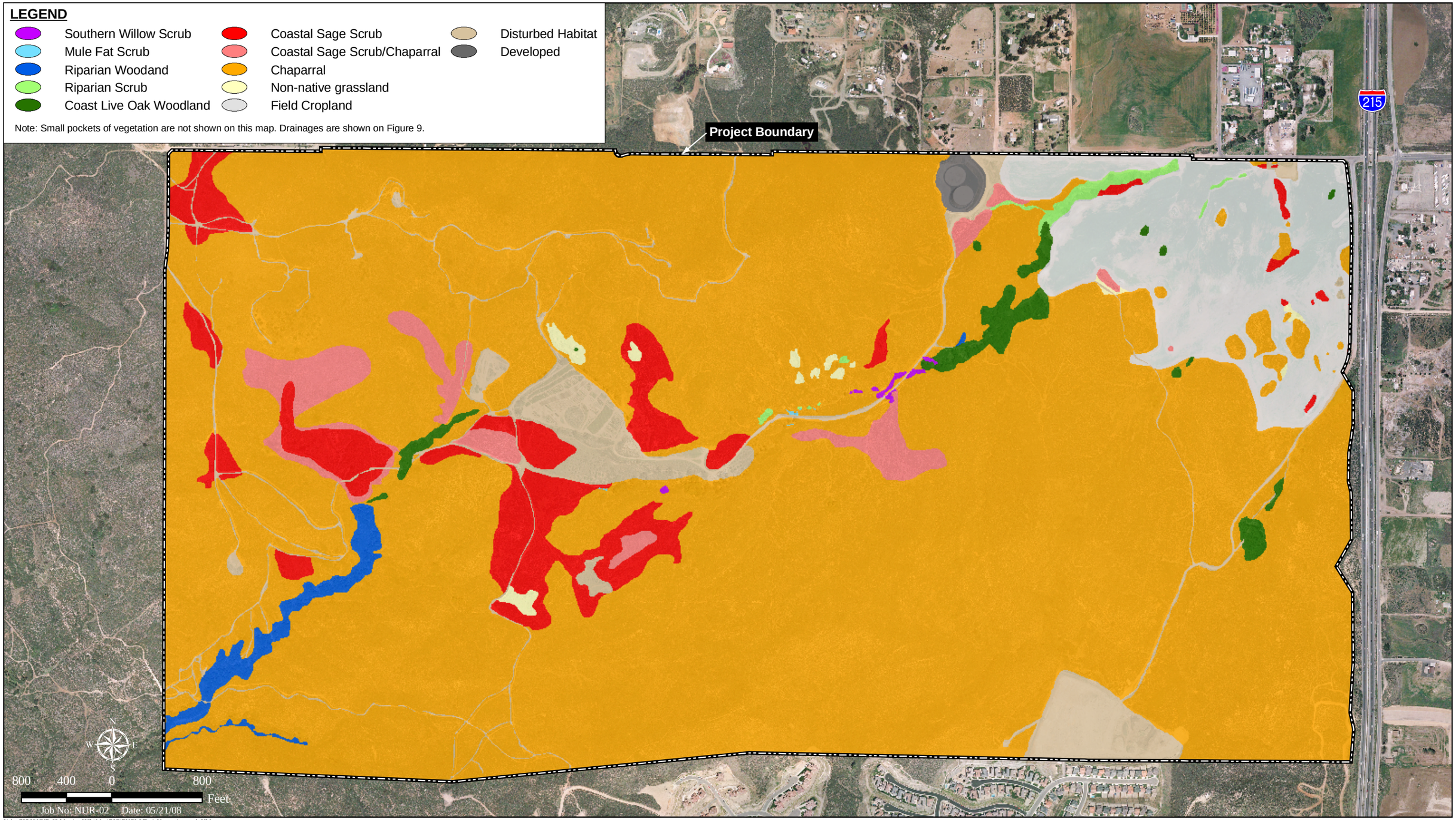
HELIX

Figure 3

LEGEND

- Southern Willow Scrub
- Mule Fat Scrub
- Riparian Woodand
- Riparian Scrub
- Coast Live Oak Woodland
- Coastal Sage Scrub
- Coastal Sage Scrub/Chaparral
- Chaparral
- Non-native grassland
- Field Cropland
- Disturbed Habitat
- Developed

Note: Small pockets of vegetation are not shown on this map. Drainages are shown on Figure 9.



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Vegetation Map

MURRIETA HILLS

Figure 4

HELIX

5a. View to north of agricultural field with rock outcrops visible.

5b. View of disturbed area near the southeast corner of the property.

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Site Photos

MURRIETA HILLS

Figure 5

HELIX

6a. View of disturbed area centrally located on the property.

6b. View of open patches of habitat centrally located on site.

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Site Photos

MURRIETA HILLS

Figure 6

HELIX

Appendix B

YEAR 2006 PROTOCOL LEAST BELL'S SURVEY REPORT FOR MURRIETTA HILLS

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HELIX environmental planning, inc.

7578 El Cajon Boulevard, Suite 200
La Mesa, CA 91941
fax (619) 462-0552
phone (619) 462-1515

Inland Empire Office
phone (951) 328-1700

September 5, 2006 LSA-01

Mr. Daniel Marquez
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, California 92011

Subject: Year 2006 Protocol Least Bell's Vireo Survey Report for Murrieta Hills in unincorporated County of Riverside, California.

Dear Mr. Marquez:

This letter presents the results of a U.S. Fish and Wildlife Service protocol, presence/absence survey conducted by HELIX Environmental Planning (HELIX) for the least Bell's vireo (*Vireo bellii pusillus*) on the 1,306-acre Murrieta Hills site. The site is located west of Interstate 215 and south of Keller Road just north of the City of Murrieta boundary (Figures 1 and 2).

METHODS

Eight site visits were performed according to the schedule in Table 1. The survey covered potential vireo habitat on site that consists of a narrow patch of approximately four acres of riparian scrub vegetation dominated by shrubby willows (*Salix* sp.) and mule fat (*Baccharis salicifolia*). A small patch of coast live oak woodland was also surveyed since it is immediately adjacent to the riparian scrub. The rest of the riparian habitat on site consists of coast live oak riparian woodland and forest that do not have the vegetative components or structure necessary for the vireo. The surveys were conducted on foot by walking along the edges of the habitat patches. Binoculars were used when birds could not be readily identified by unaided eyesight or by sound; no recorded vireo vocalizations were played. The survey was conducted by Deborah Leonard, Kathy Pettigrew, or Shelby Howard of HELIX.

Table 1
SURVEY INFORMATION

Site Visit	Date of Survey	Biologists	Start/Stop Times	Total Acres Surveyed	Weather Conditions (Start/Stop)
1	May 18, 2006	D. Leonard	0750/1050[1]	Approximately 4.0	Clear, 64°F, wind 0-2 mph/Clear, 75°F, wind 2-4 mph
2	May 30, 2006	D. Leonard	0840/0945	Approximately 4.0	Clear, 68°F, wind 2-3 mph/Clear, 72°F, wind 2-3 mph

Table 1
(continued)

Site Visit	Date of Survey	Biologists	Start/Stop Times	Total Acres Surveyed	Weather Conditions (Start/Stop)
3	June 9, 2006	D. Leonard	0800/0945	Approximately 4.0	Overcast, 68°F, wind 0-2 mph/ Overcast, 70°F, wind 0-2 mph
4	June 19, 2006	S. Howard	0715/1050[2]	Approximately 4.0	Clear, 64°F, wind 0 mph/ Clear, 82°F, wind 0-3 mph
5	June 29, 2006	D. Leonard	0800/1100[2]	Approximately 4.0	Clear, 77°F, wind 0-2 mph/Clear, 93°F, wind 2-4 mph
6	July 10, 2006	K. Pertigrew	0800/1100[2]	Approximately 4.0	Clear, 74°F, wind 0-2 mph/Clear, 84°F, wind 0-4 mph
7	July 20, 2006	D. Leonard	0930/1100	Approximately 4.0	Clear, 79°F, wind 2-4 mph/Clear, 94°F, wind 2-4 mph
8	July 31, 2006	D. Leonard	0930/1100	Approximately 4.0	Mostly cloudy,74°F, wind 0-2 mph/ Mostly cloudy, 75°F, wind 3-5 mph

[1]First survey involved more time to check all riparian habitat on site for vireo suitability.
[2]Survey was also for the southwestern willow flycatcher (*Empidonax traillii extimus*), whose potential habitat is greater than that for the least Bell's vireo.

SURVEY RESULTS

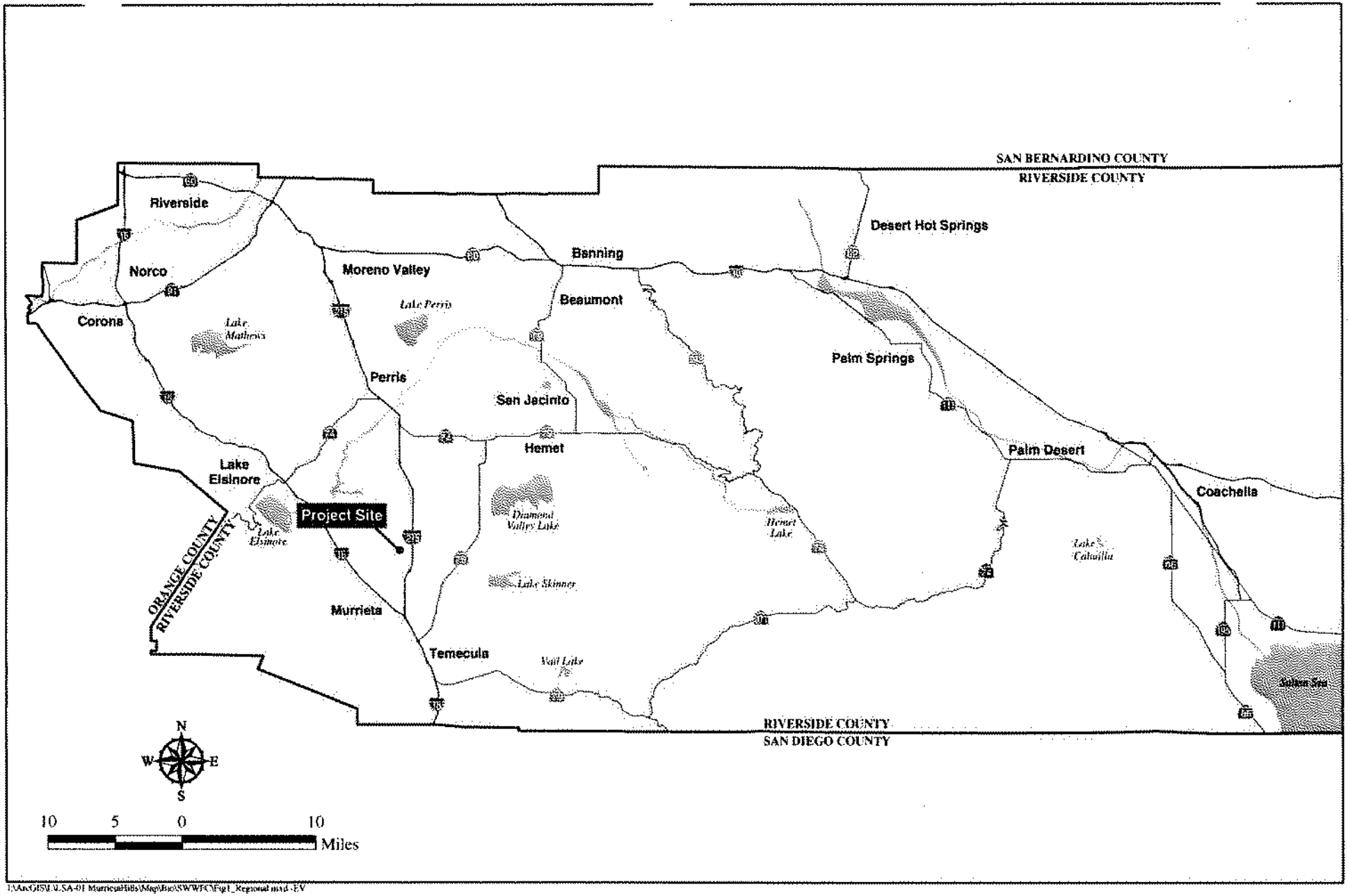
The least Bell's vireo was not found on the Murrieta Hills site. The brown-headed cowbird (*Molothrus ater*) was not observed during the vireo survey, either, but one brown-headed cowbird was observed on site during the southwestern willow flycatcher survey in an area not surveyed for the vireo. Other sensitive bird species were observed in the riparian habitat on site and include white-tailed kite (*Elanus leucurus*) and Cooper's hawk (*Accipiter cooperii*). Please contact us if you have any questions.

We certify that the information in this report and attached exhibits fully and accurately represent our work.

Sincerely,

Deborah Leonard	Kathy Pettigrew	Shelby Howard
Senior Scientist	Biologist	Biologist

Exhibits: Figure 1 Regional Location Map
Figure 2 Project Location Map



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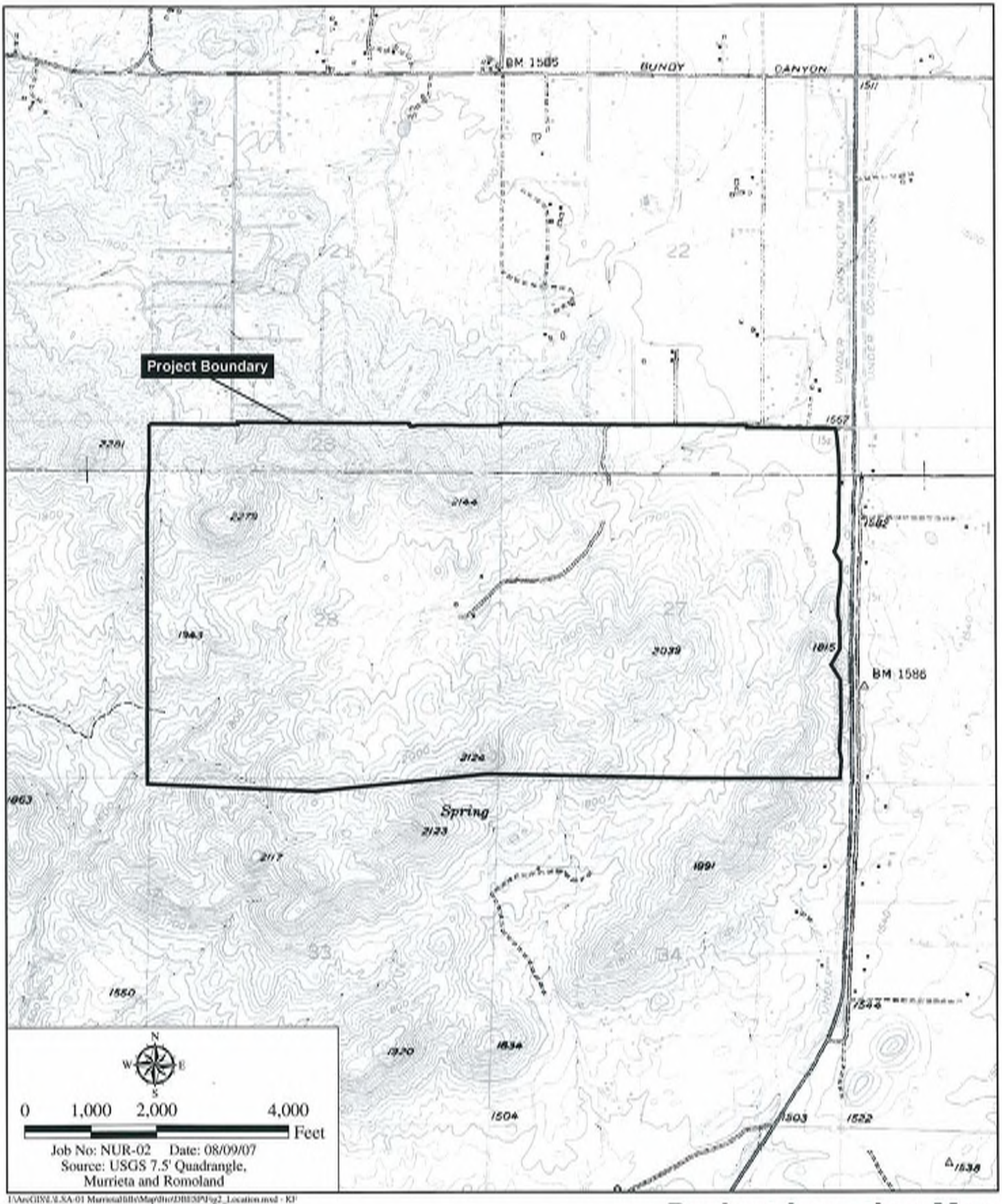
Regional Location Map

MURRIETA HILLS

HELIX

Figure 1



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Project Location Map

MURRIETA HILLS DBESP

HELIX

Figure 2

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Appendix C

2008 LEAST BELL'S VIREO (*VIREO BELLII PUSILLUS*) SURVEY REPORT FOR MURRIETA HILLS

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HELIX environmental planning, inc.

3600 Lime Street, Suite 721
Riverside, CA 92501
fax (951) 328-9978
phone (951) 328-1700

San Diego County Office
phone (619) 462-1515

September 29, 2008 NUR-02

Ms. Sandy Marquez
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, California 92011

Subject: 2008 Least Bell's Vireo (*Vireo bellii pusillus*) Survey Report for Murrieta Hills in Unincorporated County of Riverside, California

Dear Ms. Marquez:

This letter presents the results of a U.S. Fish and Wildlife Service (USFWS) presence/absence protocol survey conducted by HELIX Environmental Planning (HELIX) for the least Bell's vireo on the 1,306-acre Murrieta Hills site. The site is located west of Interstate 215 and south of Keller Road just north of the City of Murrieta boundary (Figures 1 and 2).

METHODS

Eight site visits were performed according to the schedule in Table 1. The survey covered potential vireo habitat on site that consists of a few narrow stands that total approximately 4 acres of riparian scrub vegetation dominated by shrubby willows (*Salix* sp.) and mule fat (*Baccharis salicifolia*). Small stands of coast live oak woodland were also surveyed since they were immediately adjacent to the riparian scrub. The rest of the riparian habitat on site consists of coast live oak riparian woodland and forest that do not have the vegetative components or structure necessary for the vireo. The surveys were conducted on foot by walking along the edges of the habitat patches. Binoculars were used when birds could not be readily identified by unaided eyesight or by sound; no recorded vireo vocalizations were played. The survey effort varied from the USFWS protocol as there was less than 10 days between each survey. The surveys were conducted by HELIX biologists Rob Hogenauer or Zsolt Kahancza.

Table 1
SURVEY INFORMATION

Site Visit	Survey Date	Surveyor	Start/Stop Times	Total Acres Surveyed	Weather Conditions
1	6/20/08	R. Hogenauer	0545-0715	Approximately 4.0	Partly cloudy, 64°-75°F, wind 0-2 mph
2	6/24/08	R. Hogenauer	0650-0800	Approximately 4.0	Clear, 67°-74°F, wind 1-2 mph
3	6/30/08	R. Hogenauer	0620-0715	Approximately 4.0	Clear, 68°-76°F, wind 0-1 mph
4	7/07/08	Z. Kahancza	0640-0745	Approximately 4.0	Clear, 65°-70°F, wind 1-3 mph
5	7/11/08	R. Hogenauer	0625-0735	Approximately 4.0	Clear, 70°-78°F, wind 0-1 mph
6	7/16/08	R. Hogenauer	0655-0800	Approximately 4.0	Clear, 69°-77°F, wind 0-1 mph
7	7/23/08	Z. Kahancza	0948-1050	Approximately 4.0	Clear, 84°-86°F, wind 0-3
8	7/30/08	Z. Kahancza	1020-1100	Approximately 4.0	Clear, 85°-90°F, wind 1-7 mph

SURVEY RESULTS

The least Bell's vireo was not found on the Murrieta Hills site. The brown-headed cowbird (*Molothrus ater*) was not observed during the vireo survey. Other sensitive bird species were observed in the riparian habitat on site and include white-tailed kite (*Elanus leucurus*) and Cooper's hawk (*Accipiter cooperii*).

We certify that the information in this report and attached exhibits fully and accurately represent our work. Please contact us if you have any questions.

Sincerely,

Rob Hogenauer
Biologist

Zsolt Kahancza
Biologist

Attachments: Figure 1 Regional Location Map
2 Project Location Map

Appendix D

2012 LEAST BELL'S VIREO (*VIREO BELLII PUSILLUS*) SURVEY REPORT FOR MURRIETA HILLS

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HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
Suite 200
La Mesa, CA 91942
619.462.1515 **tel**
619.462.0552 **fax**
www.**helixepi**.com

September 10, 2012 NUR-04

Ms. Susie Tharratt
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, California 92011

Subject: 2012 Least Bell's Vireo (*Vireo bellii pusillus*) Survey Report for Murrieta Hills in Unincorporated County of Riverside, California

Dear Ms. Tharratt:

This letter presents the results of a U.S. Fish and Wildlife Service (USFWS) presence/absence protocol survey conducted by HELIX Environmental Planning, Inc. (HELIX) for the least Bell's vireo on the Murrieta Hills site. The site is located west of Interstate 215 and south of Keller Road just north of the City of Murrieta boundary, Riverside County, California (Figures 1 and 2).

METHODS

Eight site visits were performed according to the schedule in Table 1. The survey covered potential vireo habitat on site that consists of a few narrow stands that total approximately 4 acres of riparian scrub vegetation dominated by shrubby willows (*Salix* sp.) and mule fat (*Baccharis salicifolia*). Small stands of coast live oak woodland were also surveyed since they were immediately adjacent to the riparian scrub. The rest of the riparian habitat on site consists of coast live oak riparian woodland and forest that do not have the vegetative components or structure necessary for the vireo. The surveys were conducted on foot by walking along the edges of the habitat patches. Binoculars were used when birds could not be readily identified by unaided eyesight or by sound; no recorded vireo vocalizations were played. The survey effort varied from the USFWS protocol, as there were less than 10 days between each survey. The surveys were conducted by HELIX biologist Rob Hogenauer.

Table 1
SURVEY INFORMATION

SITE VISIT	SURVEY DATE	START/STOP TIMES	TOTAL ACRES SURVEYED	WEATHER CONDITIONS
1	4/29/12	0640-0845	Approximately 4.0	Partly cloudy, 60˚-73˚F, wind 0-2 mph
2	5/9/12	0730-0930	Approximately 4.0	Clear, 67˚- 86˚F, wind 0-2 mph
3	5/18/12	0700-0850	Approximately 4.0	Clear, 68˚- 76˚F, wind 0-1 mph
4	5/27/12	0645-0825	Approximately 4.0	Clear, 56˚- 66˚F, wind 0-1 mph
5	6/6/12	0745-0930	Approximately 4.0	Clear, 73˚- 84˚F, wind 0-3 mph
6	6/18/12	0650-0815	Approximately 4.0	Clear, 71˚- 77˚F, wind 0-2 mph
7	6/29/12	0750-0920	Approximately 4.0	Clear, 76˚- 83˚F, wind 0-2
8	7/12/12	0730-0900	Approximately 4.0	Cloudy, 83˚- 88˚F, wind 1-2 mph

SURVEY RESULTS

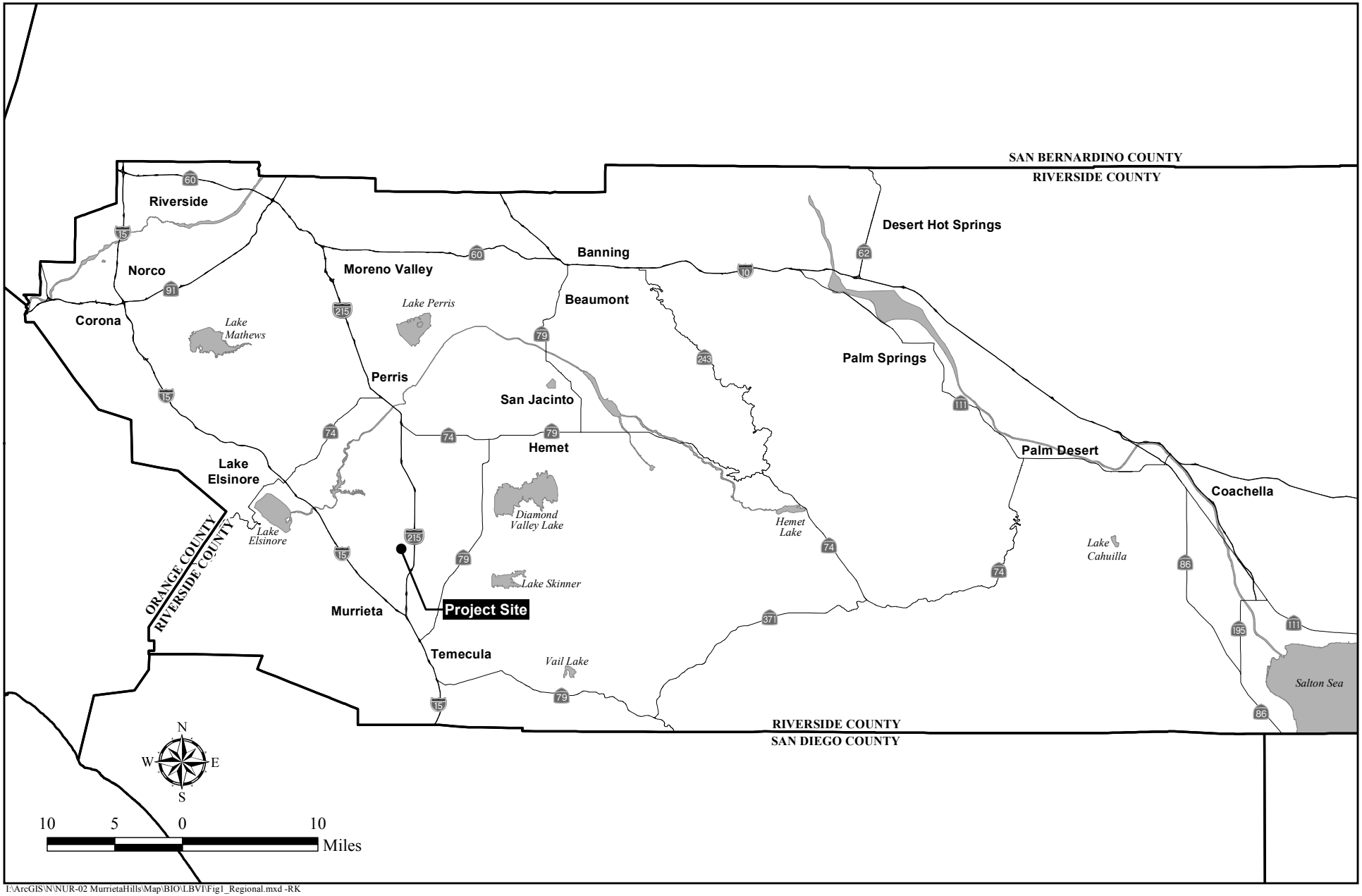
The least Bell's vireo was not found on the Murrieta Hills site. The brown-headed cowbird (*Molothrus ater*) was not observed during the vireo survey. A least Bell's vireo survey conducted in 2008 by HELIX was also negative for both least Bell's vireo and cowbird. Sensitive bird species that were observed in the riparian habitat on site are white-tailed kite (*Elanus leucurus*) and Cooper's hawk (*Accipiter cooperii*).

We certify that the information in this report and attached exhibits fully and accurately represent our work. Please contact us if you have any questions.

Sincerely,

Rob Hogenauer
Biologist

Enclosures:
Figure 1 Regional Location Map
Figure 2 Project Location Map
Attachment A Animal Species Observed or Detected



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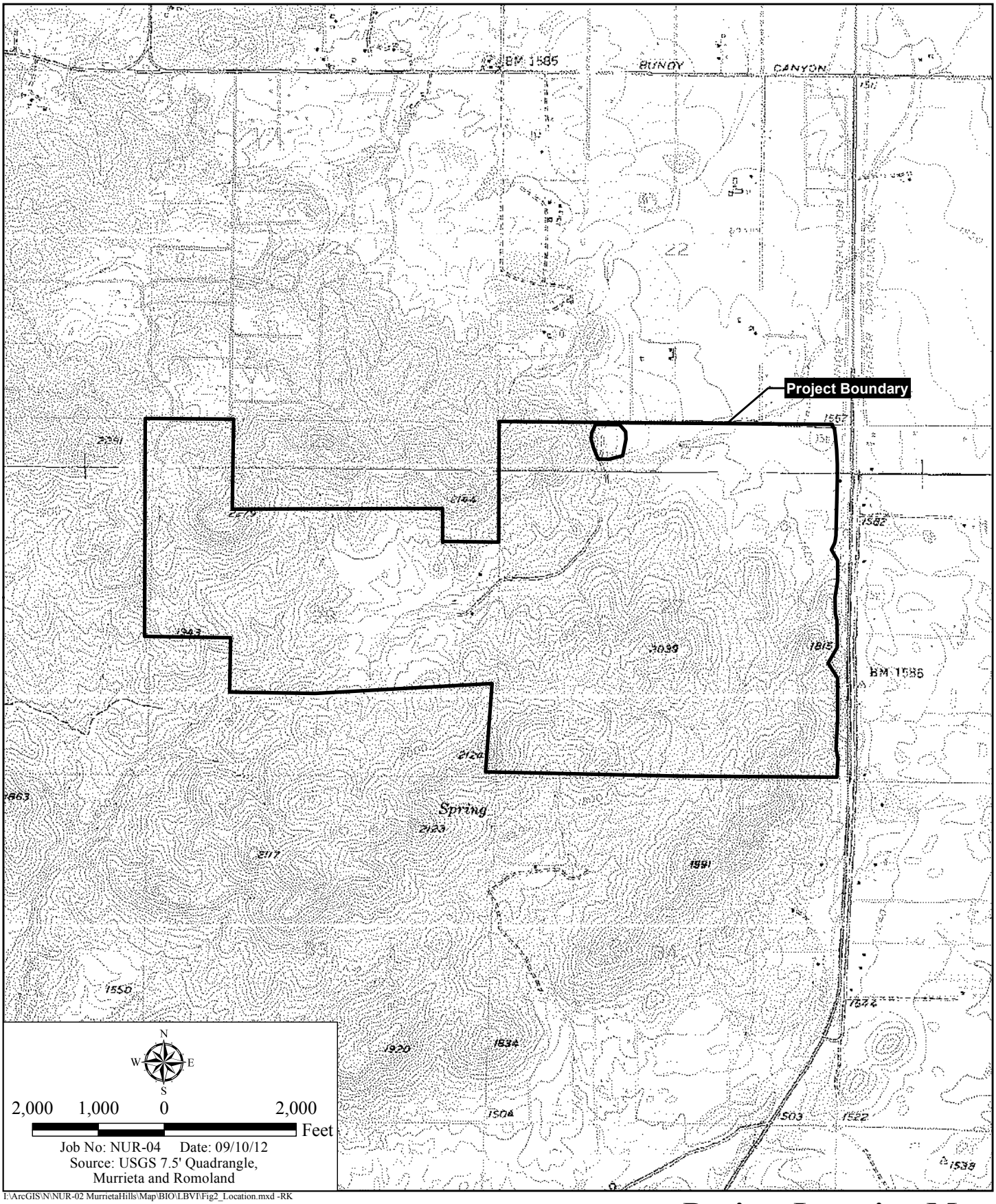
Regional Location Map

MURRIETA HILLS

HELIX Environmental Planning

Figure 1



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Project Location Map

MURRIETA HILLS

HELIX Environmental Planning

Figure 2

Attachment A
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS*

FAMILY	SCIENTIFIC NAME	COMMON NAME
INVERTEBRATES		
Anthophoridae	*Xylocopa* spp.	carpenter bee
Apiidae	*Apis mellifera mellifera*	honey bee
Formicidae	*Messor* spp.	harvester ant
	Pogonomyrex spp.	harvester ant
Hesperiidae	*Erynnis tristis*	mournful duskywing
Hesperiidae subfamily Pyrginae	*Erynnis funeralis*	funereal duskywing butterfly
Nymphalinae	*Vanessa cardui*	painted lady butterfly
Papilioninae	*Papilio eurymedon*	pale swallowtail butterfly
Pieridae	*Colias* sp.	sulfur butterfly
	Pieris protodice	common white butterfly
	Pieris rapae	cabbage white butterfly
Polyommatinae	*Icaricia acmon*	Acmon blue butterfly
	Leptotes marina	Marine blue butterfly
Riodinidae	*Apodemia mormo virgulti*	Behr's metalmark butterfly
Tenebrionidae	*Eleodes* spp.	darkling beetle
VERTEBRATES		
Reptiles		
Phrynosomatidae	*Sceloporus occidentalis*	western fence lizard
	Uta stansburiana	common side-blotched lizard
Viperidae	*Crotalus ruber*†	red-diamond rattlesnake
Birds		
Accipitridae	*Accipiter cooperii*	Cooper's hawk
	Buteo jamaicensis	red-tailed hawk
	Circus cyaneus	northern harrier
	Elanus leucurus	white-tailed kite
Aegithalidae	*Psaltriparus minimus*	bushtit
Alaudidae	*Eremophia alpestris*†	horned lark
	Eremophila alpestris actia†	California horned lark

Attachment A (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME
VERTEBRATES (cont.)		
Birds (cont.)		
Cardinalidae	*Guiraca caerulea*	blue grosbeak
	Pheucticus melanocephalus	black-headed grosbeak
Cathartidae	*Cathartes aura*	turkey vulture
Charadriidae	*Charadrius vociferous*	killdeer
Columbidae	*Columba livia*	rock dove
	Zenaida macroura	mourning dove
Corvidae	*Aphelocoma californica*	western scrub jay
	Corvus brachyrhynchos	American crow
	Corvus corax	common raven
Cuculidae	*Geococcyx californianus*	greater road runner
Emberizadae	*Junco hyernalis*	dark-eyed junco
	Aimophila ruficeps canescens†	southern California rufous-crowned sparrow
	Chondestes grammacus	lark sparrow
	Melospiza melodia	song sparrow
	Pipilo crissalis	California towhee
	Pipilo maculatus	spotted towhee
	Spizella atrogularis	black-chinned sparrow
Falconidae	*Falco sparverius*	American kestrel
Fringillidae	*Carduelis lawrencei*	Lawrence's goldfinch
	Carduelis psaltria	lesser goldfinch
	Carduelis tristis	American goldfinch
	Carpodacus mexicanus	house finch
Icteridae	*Icterus bullockii*	Bullock's oriole
	Sturnella neglecta	western meadowlark
Mimidae	*Mimus polyglottos*	northern mockingbird
	Toxostoma redivivum	California thrasher
Odontophoridae	*Callipepla californica*	California quail
Paridae	*Baelophus inornatus*	oak titmouse
Parulidae	*Geothlypis trichas*	common yellowthroat
	Vermivora celata	orange-crowned warbler
	Wilsonia canadensis	Wilson's warbler
Picidae	*Caloptes auratus*	northern flicker
	Picoides nuttallii	Nuttall's woodpecker
Ptilogonatidae	*Phainopepla nitens*	phainopepla

Attachment A (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME
VERTEBRATES (cont.)		
Birds (cont.)		
Sylviidae	*Polioptila californica californica*	coastal California gnatcatcher
Sylviidae	*Polioptila caerulea*	blue-gray gnatcatcher
Timaliidae	*Chamaea fasciata*	wrentit
Trochilidae	*Calypte anna*	Anna's hummingbird
	Calypte costae	Costa's hummingbird
	Selasphorus sasin	Allen's hummingbird
Troglodytidae	*Thryomanes bewickii*	Bewick's wren
	Troglodytes aedon	house wren
Tyrannidae	*Contopus sordidulus*	western wood-pewee
	Empidonax difficilis	Pacific slope flycatcher
	Myiarchus cinerascens	ash-throat flycatcher
	Sayornis nigricans	black phoebe
	Sayornis saya	Say's phoebe
	Tyrannus verticalis	western kingbird
Vireonidae	*Vireo huttoni*	Hutton's vireo
Mammals		
Canidae	*Canis familiaris*	domestic dog
	Canis latrans	coyote
Cervidae	*Odocoileus hemionus*	mule deer
Equidae	*Equus caballus*	horse
Felidae	*Puma concolor*	mountain lion
Heteromyidae	*Dipodomys* spp.	kangaroo rat
Leporidae	*Lepus californicus bennettii*†	San Diego black-tailed jack rabbit
	Sylvilagus audubonii	desert cottontail
Mephitidae	*Mephitis mephitis*	striped skunk
Muridae	*Neotoma* sp.	desert woodrat
Sciuridae	*Spermophilus beecheyi*	California ground squirrel

*Includes species observed or detected during 2012 and prior years surveys.

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Appendix E

YEAR 2006 PROTOCOL SOUTHWESTERN FLYCATCHER SURVEY REPORT FOR MURRIETA HILLS

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HELIX Environmental Planning, Inc.

7578 El Cajon Boulevard, Suite 200
La Mesa, CA 91941
fax (619) 462-0552
phone (619) 462-1515

Inland Empire Office
phone (951) 328-1700

August 24, 2006 LSA-01

Mr. Daniel Marquez
U.S. Fish and Wildlife Service
6010 Hidden Valley Rd.
Carlsbad, CA 92011

Subject: Year 2006 Protocol Southwestern Willow Flycatcher Survey Report for Murrieta Hills

Dear Mr. Marquez:

This letter presents the results of U.S. Fish and Wildlife Service protocol surveys for the southwestern willow flycatcher (*Empidonax traillii extimus*) conducted by HELIX Environmental Planning, Inc. (HELIX) on the Murrieta Hills project site.

Surveys were conducted to determine the presence or absence of the southwestern willow flycatcher and the least Bell's vireo (*Vireo bellii pusillus*) on the project site. This letter describes the survey methods and results of the flycatcher survey and is being submitted to the USFWS as a condition of HELIX's Threatened and Endangered Species Permit TE778195, under which the surveys were conducted. A separate letter describing the results of the least Bell's vireo surveys will be submitted to the USFWS.

PROJECT LOCATION AND DESCRIPTION

The approximately 1,300-acre project site is located west of Interstate (I) 215 and south of Keller Road in unincorporated Riverside County, California (Figure 1). The site is in the community of Menifee and is bordered to the east and south by the City of Murrieta. The Murrieta Hills specific plan states that the property is to be annexed to the City of Murrieta. The site is situated on Sections 27 and 28, Township 6 South, and Range 3 West as shown on the U.S. Geological Survey 7.5-minute Murrieta and Romoland quadrangle maps (Figure 2). The elevations on site range from approximately 1,575 to 2,251 feet above mean sea level.

The site is separated into three watershed areas; east, central, and west. Each of the watershed areas contains a large main creek/drainage with many associated tributary drainages. Drainage basin A, in the west, is a tributary to Murrieta Creek, which is to the south of the project site. Drainage basin B, located in the center and northeast drainage, is a tributary to Salt Creek, which is to the north of the project site. Drainage Basin C is located in the southeast and is a tributary to Warm Springs Creek, which is to the east of the project site. The riparian habitat associated with these drainage basins was surveyed for the southwestern willow flycatcher.

VEGETATION COMMUNITIES

According to the preliminary vegetation survey by HELIX, and the Murrieta Hills Specific Plan, there are seven vegetation communities on site. These communities are described below according to the vegetation associations and subassociations described in the Western Riverside County Multiple Species Conservation Plan (MSHCP).

Riparian Forest/Woodland/Scrub

On site, rhis habitat contains three subassociations; southern willow scrub, mule far scrub, and riparian forest, which are described below.

Southern Willow Scrub

Southern willow scrub consists of dense, broad-leaved, winter-deciduous stands of trees dominated by shrubby willows (*Salix* spp.) in association with mule fat (*Baccharis salicifolia*). This habitat occurs on loose, sandy or fine gravelly alluvium deposited near stream channels during flood flows. The herbaceous understory consists of curly dock (*Rumex crispus*), cocklebur (*Xanthium strumarium* var. *canadense)* and western ragweed (*Ambrosia psilostachya*). Frequent flooding mainrains this early seral community, prevenring succession to a riparian woodland or forest (Holland 1986). On site, the southern willow scrub is scattered among the many drainages located throughout the property. Plant species observed in the willow scrub on site include arroyo willow (*Salix lasiolepis*), gooding's black willow (*Salix gooddingii*), curly dock, and mule fat.

Mule Fat Scrub

Mule fat scrub is a depauperate, shrubby riparian scrub communiry dominated by mule fat and interspersed wirh shrubby willows. This habitat occurs along inrermittent stream channels with a fairly coarse substrate and moderate depth to the water rable. Similar to southern willow scrub, this early seral community is maintained by frequent flooding, the absence of which would lead to a riparian woodland or forest (Holland 1986). On site, the mule fat scrub is scattered in a few small pockets around the drainages that occur on site. Plants species observed in the mule fat scrub on site include mule fat, arroyo willow, and willow herb (*Epilobium* spp.).

Riparian Forest

Riparian forest occurs along stream banks and can conrain coast live oak (*Quercus agrifolia*), western sycamore (*Platanus racemosa*), Engelmann oak (*Quercus engelmannii*), Freemont's cottonwood (*Populus fremontii*), and several tree willows (*Salix* spp.), along wirh several other tree species. This community may dominate a stream

course or, where springs are present, may appear as scattered clumps of trees within an otherwise upland habitat area. In intermittent and ephemeral streams, the willow and cottonwood species become less common and the coast live oaks move down toward the stream channel (MSHCP). On site, the riparian forest occurs along the three main creeks, one in each watershed area on site. The riparian forest on site contains pockets dominated by coast live oak and other areas that contain a mix of willows, oaks, sycamores and cottonwoods. The understory is comprised of poison oak (*Toxicodendron diversilobum*), shrubby willows, sapling sycamores, sapling oaks, mule fat, giant rye grass (*Leymus condensatus*), rabbit's foot grass (*Polypogon monsplensis*), and several bromes (*Bromus* spp.).

Coast Live Oak Woodland

Coast live oak woodland is an evergreen oak woodland dominated by coast live oak, which reaches 30 to 80 feet in height. In general, the shrub layer is poorly developed, but may include toyon (*Heteromeles arbutifolia*), gooseberry (*Ribes* spp.), laurel sumac (*Malosma laurina*), or blue elderberry (*Sambucus mexicana*), (Holland 1986). The coast live oak woodland lacks the diversity (cottonwood, willow, sycamore, etc.) present in the riparian forest. On site, the coast live oak woodland primarily occurs near the banks of two drainages, one to the east, and the other to the north. Plants species observed in this community on site include coast live oak, laurel sumac, poison oak, Bromes giant rye (*Leymus condensatus)*, and spiny redberry (*Rhamnus crocea*).

Chaparral

This habitat is represented on site by all three of the subassociations, undifferentiated (mixed), chamise, and red shank. The subassociation are described together here as they differ only by the dominant species, or lack thereof. Chaparral consists of broad-leaved shrubs, usually 1 to 3 meters tall, with occasional patches of bare soil or sage scrub. Chaparral is well adapted to repeated fires as many species respond by stump sprouting. Chaparral is the dominant vegetation community on site, covering a large portion of the property. On site, chamise chaparral is overwhelmingly dominated (80%) by chamise (*Adenostoma fasciculatum*), while in the mixed chaparral, chamise may only be slightly dominant. The chamise and mixed chaparrals dominate the property. A small patch of redshank chaparral, dominated by red shank (*Adenostoma sparsifolium*), occurs near the center of the property. Other plants found in the chaparral include hoary leaved ceanothus (*Ceanothus crassifolius*), laurel sumac, blue elderberry, black sage (*salvia mellifera*), California buckwheat (*Eriogonum fasciculatum*), and scrub oak.

Coastal Sage Scrub (including disturbed)

This habitat is represent on site as Riversidean sage scrub, described below.

Riversidean Sage Scrub

Riversidean sage scrub is a subtype of coastal sage scrub, a dominant shrub community of California. On site, it is dominated by low-growing shrubs, primarily California buckwheat, but also includes California sagebrush (*Artemisia californica*), deerweed (*Lotus scoparius*), bromes, and oats (*Avena* spp). The sage scrub occurs in a mosaic with chaparral. Disturbed areas of Riversidean sage scrub, having a large quantity of non-native grasses and forbs, occur in a mosaic with the Riversidean sage scrub areas. Small amounts of shrub habitat occur on site that can be placed firmly in neither the coastal sage scrub or chaparral category. These areas, called ecotone, occur as a blending border between the chaparral and the sage scrub.

Grassland

On site the subassociation of grassland is non-native grassland, described below.

Non-native Grassland

Non-native grassland is a dense to sparse cover of annual grasses, often associated with numerous species of showy-flowered native annual forbs. Characteristic species include: oats, red brome (*Bromus madritensis* ssp. *rubens*), ripgut (*B. diandrus*), ryegrass (*Lolium* sp.), and mustards (*H. incana, Brassica* sp.). The non-native grassland on site occurs in small patches throughout the site in a mosaic with the sage scrub. Species on site include perennial mustard (*Hirschfeldia incana*), bromes, and oats.

Field Cropland

Field cropland, also referred to as agricultural, is cultivated habitat that has been cleared or disced and planted with crops. The ctopland is primatily limited to the disced area in the northeast portion of the site, there is also a small grove of Olive trees located near the center of the property that may have be cultivated in the past but are currently growing wild. The disced area in the northeast has scattered patches, which contain trees or rock outcropping, that are not disced. Trees in this area include coast live oak, Peruvian pepper, eucalyptus and black walnut (*Juglans californica*).

Developed/Disturbed Land

This habitat contains three sub associations, exotic, disturbed, and developed, all are present on site and ate described below.

Exotic

Exotic habitat is also referred to as non-native or ornamental. The non-native woodland consists of species that are have escaped from cultivation, have been

planted for aesthetics or windbreaks, or have been introduced into the wild, not naturally occurring. Areas of non-native woodland are scattered across the sire but primarily occur in the central and northeast portions of the property. Plant species found in these areas include Eucalyptus trees (*Eucalyptus* spp.), Peruvian pepper (*Schinus molle*), and olive (*Olea europaea*).

Disturbed

Disturbed habitat is generally comprised of areas that exhibit signs of recent disturbance. They usually support little vegetation; however, when there is vegetation present, it consists of mostly non-native weed species.

Disturbed habitat on site primarily consists of unimproved roads that cross the property, along with areas of where trash has been dumped.

Developed

Developed areas are those that have been paved or contain other man made structures. Developed areas on site include a water tower in the norrheast, a plant nursery located near the center of the properry, and a mobile residence located near the nursery.

METHODS

Approximately 21 acres of suirable riparian habitat was surveyed by HELIX biologists Shelby Howard and Kathy Pettigrew according to the schedule in Table 1.

Table 1
SURVEY INFORMATION

Survey	Date	Biologists*	Start/Stop Times	Weather Conditions (Start/Stop)
1	5/26/06	K. Pettigrew D. Leonard*	0730/1045	Overcast, 65°F, 0-3 mph/ overcast, 66°F, 0-3 mph
2	6/19/06	S. Howard	0715/1050	Clear, 64°F, 0-3 mph/ clear, 82°F, 0-5 mph
3	6/29/06	K. Pettigrew D. Leonard	0800/1100	Clear, 77°F, 0-3 mph/ clear, 93°F, 2-4 mph
4	7/10/06	K. Pettigrew H. Haney*	0800/1100	Clear, 74°F, 0-3 mph/ clear, 84°F, 0-3 mph
5	7/15/06	K. Pettigrew R. Ditrick*	0700/1000	Clear, 70°F, 0-3 mph/ clear, 83°F, 3-5 mph

*Supervised individual

HELIX biologists Debbie Leonard, Heather Haney, and Roger Ditrick assisted with select surveys as supervised individuals. The survey area (Figure 4) consisted of several linear strips of habitat, which were surveyed by slowly walking parallel to the habitat and playing taped vocalizations of the species approximately every 20 to 30 meters, in accordance with accepted ptotocol.

Willow flycatcher survey and detection forms were filled out and are included as Appendix A. All wildlife species observed or detected during surveys were noted (Appendix B) and all sensitive riparian species were mapped on an aerial photograph of the site (Figure 4).

RESULTS

The willow flycatcher was not observed or detected on the Murrieta Hills project site. Much of the survey area is currently dominated by coast live oak and lacks the significant midstory and understory vegetation with which willow flycatchers are often associated. Sensitive or Multiple Species Habitat Conservation Plan (MSHCP) species observed or detected include the white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), horned lark (*Eremophila alpestris*), southern California rufous-crowned spartow (*Aimophila ruficeps canescens*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), mule deer (*Odocoileus hemionus*) and mountain lion (*Felis concolor*). The brown-headed cowbird (*Molothrus ater*) was also detected on site during one survey.

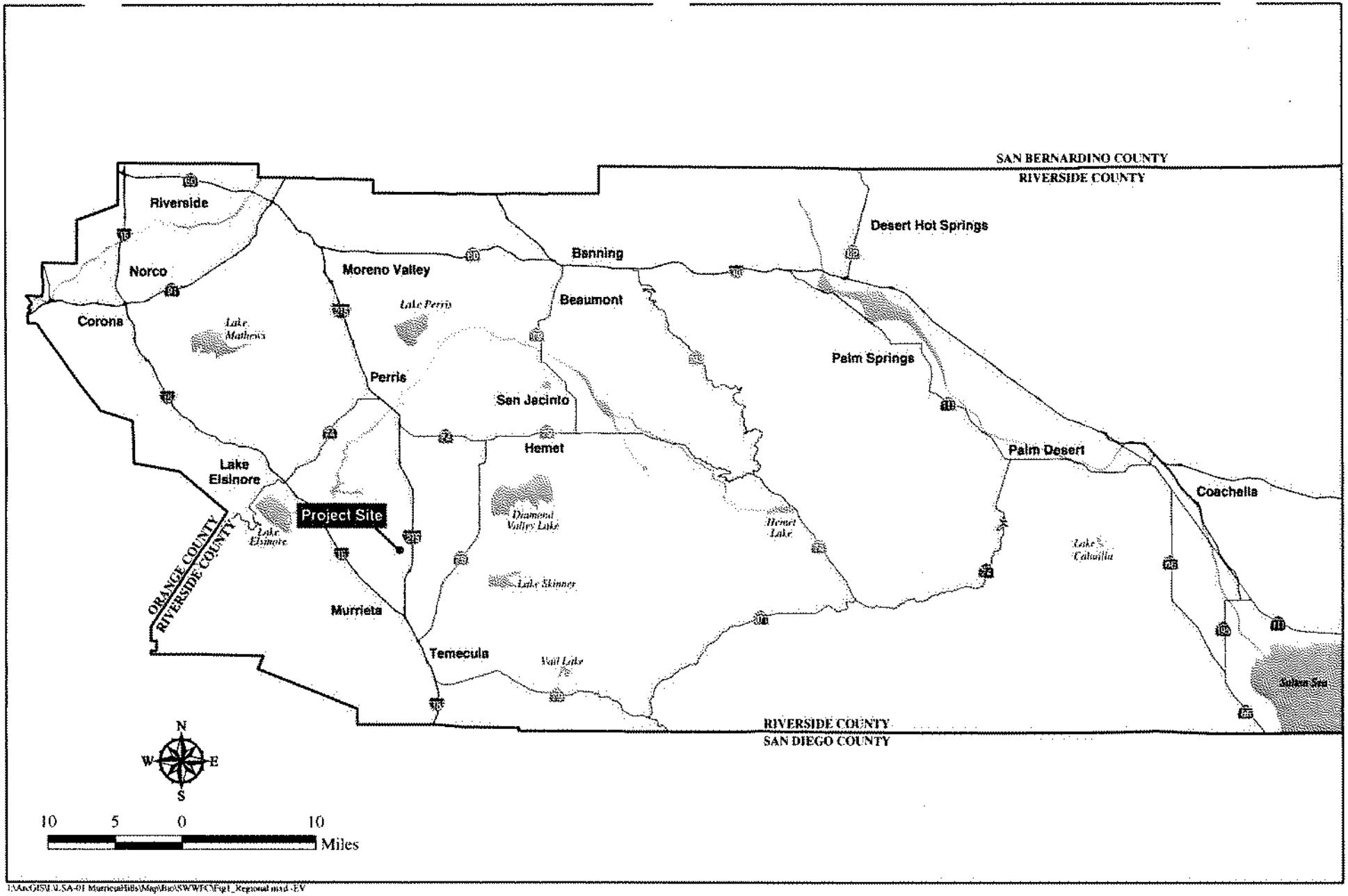
I certify that the information in this survey report and the attached exhibits fully and accurately represent my work.

Sincerely,

Kathy Pettigrew

Kathy Pettigrew
Biologist

Enclosures: Figure 1 Regional Location Map
2 Project Location Map
3 Aerial Photograph
4 Preliminary Vegetation Map/Sensitive Resources
Attachment A Willow Flycatcher Survey and Detection Forms
B Animal Species Observed or Detected
C Riparian Habitat Photos



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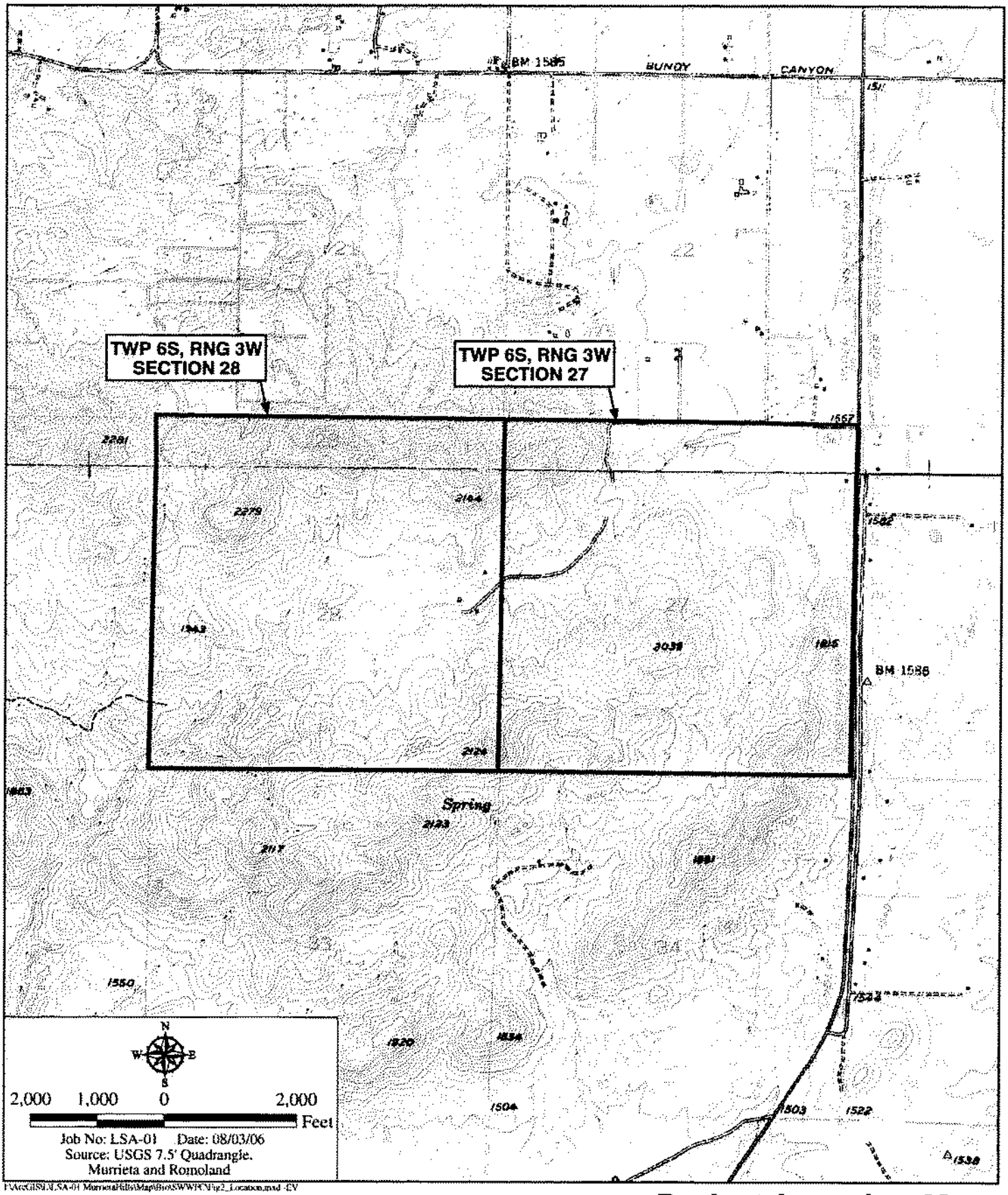
Regional Location Map

MURRIETA HILLS

HELIX

Figure 1



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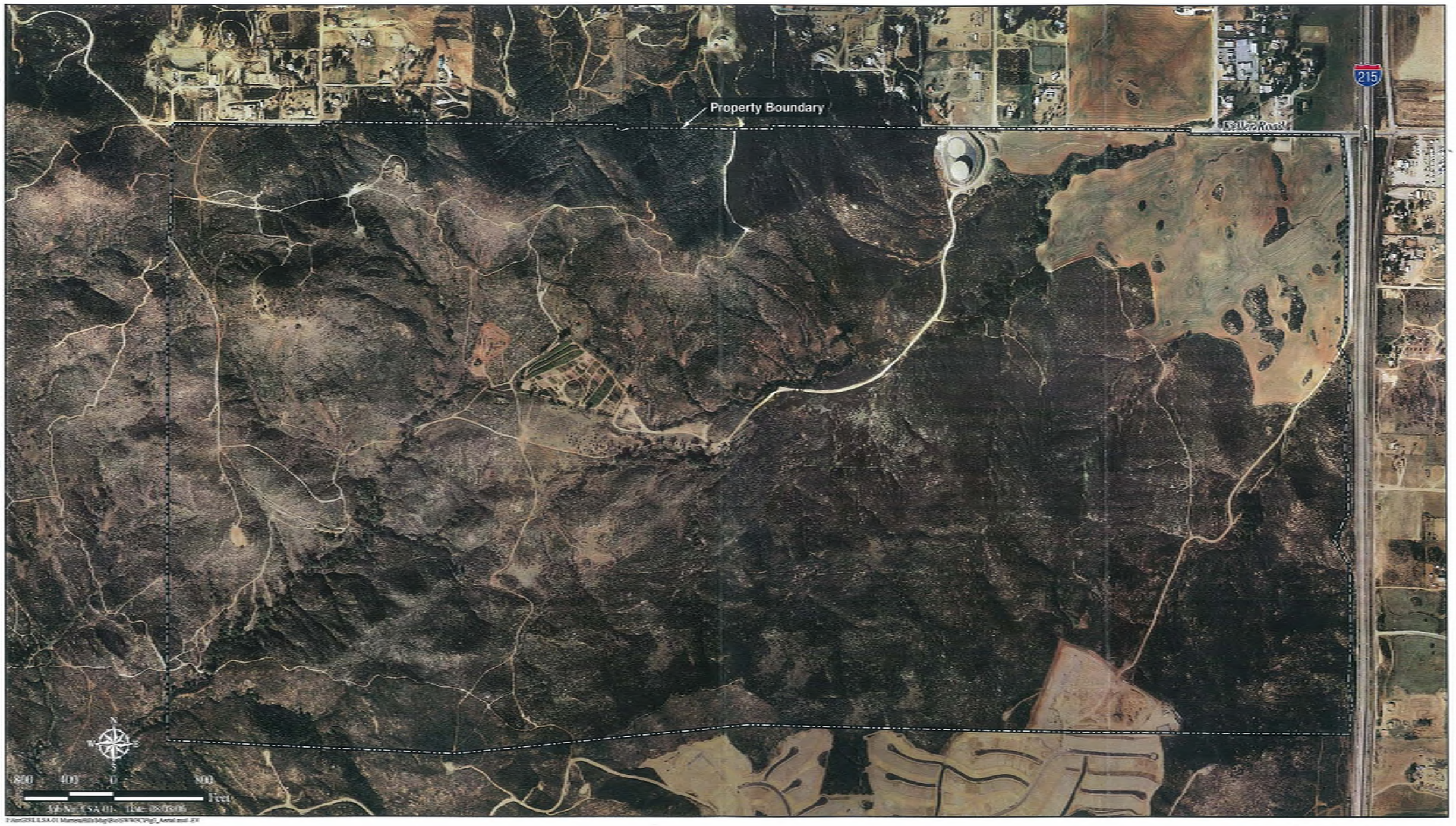
Project Location Map

MURRIETA HILLS

HELIX

Figure 2



Aerial Photograph

MURRIETA HILLS

Figure 3

HELIX

Vegetation

- Riparian Woodland
- Coast Live Oak Woodland
- Riparian Scrub
- Coastal Sage Scrub
- Coastal Sage Scrub/Chaparral
- Chaparral/Coastal Sage Scrub
- Chaparral
- Grasslands
- Rock Outcrop
- Disturbed Habitat
- Agriculture
- Developed

Note: Small pockets of riparian vegetation that occurs on onsite are not displyed on this map. This map will be updated following the Jurisdictional Delineation.

Sensitive Resource

- Cooper's Hawk *(Accipiter cooperii)*
- Mountian Lion Tracks *(Puma concolor)*
- Red-tailed Hawk Nest *(Buteo jamaicensis)*
- White-tailed Kite *(Elanus leucurus)*
- Northern Harrier *(Circus cyaneus)*
- Horned Lark *(Eremophila alpestris)*
- Mule Deer *(Odocoileus hemionus)*
- San Diego Black Tailed Jack Rabbit *(Lepus californicus)*

Southern California Rufous-crowned Sparrow *(Aimophila ruficeps)* Detected Throughout Project Site

Other

- Brown-headed Cowbird *(Molothrus ater)*

Project Boundary

215

N

W E

S

800 400 0 800

Feet

Job No: HSA-01 Date: 08/29/06

Note:
This map is based on site conditions as observed at the time of our field investigations. The information presented herein as developed by visual observation and/or aerial photograph interpretation. Note that both site conditions and applicable regulatory requirements may change.

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Preliminary Vegetation Map/Sensitive Resources

MURRIETA HILLS

HELIX

Figure 4

Attachment A
WILLOW FLYCATCHER SURVEY AND DETECTION FORMS

Fill in the following information completely. Submit original form by August 1st. Retain a copy for your records.

Reporting Individual Kathy Pettigrew Phone # 619-462-1515
Affiliation Helix Environmental Planning, Inc E-mail kathyp@helixep.com
Site Name Murietta Hills Date Report Completed 8/24/11

Did you verify that this site name is consistent with that used in previous years? (Yes) / No (circle one)
If name is different, what name(s) was used in the past? NA
If site was surveyed last year, did you survey the same general area this year? (Yes) No If no, summarize in comments below.
Did you survey the same general area during each visit to this site this year? (Yes) No If no, summarize in comments below.

Management Authority for Survey Area (circle one): Federal Municipal/County State Tribal (Private)
Name of Management Entity or Owner (e.g., Tonto National Forest) _____

Length of area surveyed: ~1.5 (specify units, e.g., miles = (mi), kilometers = km, meters = m)
or ~21ac

Vegetation Characteristics: Overall, are the species in tree/shrub layer at this site comprised predominantly of (check one):

☐ Native broadleaf plants (entirely or almost entirely, includes high-elevation willow)

☒ Mixed native and exotic plants (mostly native)

☐ Mixed native and exotic plants (mostly exotic)

☐ Exotic/introduced plants (entirely or almost entirely)

Identify the 2-3 predominant tree/shrub species: Coast live Oak (Quercus

Average height of canopy (Do not put a range): 30 feet (specify units)

Was surface water or saturated soil present at or adjacent to site? (Yes) / No (circle one)
Distance from the site to surface water or saturated soil: 0-50 feet (specify units)

Did hydrological conditions change significantly among visits (did the site flood or dry out)? Yes (No) (circle one)
If yes, describe in comments section below.

Remember to attach a copy of a USGS quad/topographical map (REQUIRED) of the survey area, outlining the survey site and location of WIFL detections. Also include a sketch or aerial photograph showing details of site location, patch shape, survey route in relation to patch, and location of any willow flycatchers or willow flycatcher nests detected. Such sketches or photographs are welcomed, but DO NOT substitute for the required USGS quad map. Please include photos of the interior of the patch, exterior of the patch, and overall site and describe any unique habitat features.

Comments (attach additional sheets if necessary)

Site was not surveyed in previous years for WIFL (that I am aware of)

WIFL Detection Locations:

Date Detected	N UTM	E UTM	Date Detected	N UTM	E UTM

Willow Flycatcher Survey and Detection Form (revised April, 2004)

Site Name Murrieta Hills State CA County Riverside
USGS Quad Name Murrieta and Romoland Elevation 1575 - 2261 feet / meters (circle one)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ☐ *Yes* ☐ *No*

Site Coordinates: Start: N 480964.146 E 3719050.389 UTM Datum NAD27 (NAD27 preferred)
Stop: N 483679.222 E 3720609.322 UTM Zone 10

***** Fill in additional site information on back of this page *****

Survey # / Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N	Cowbirds Detected? Y or N	Presence of Livestock, Recent sign, If Yes, Describe Y or N	Comments about this survey (e.g., bird behavior, evidence of pairs or breeding, number of nests, nest contents or number of fledges seen; potential threats)
1 Kathy Pettigrew, Debbie Leonard	Date 5/26/06 Start 0730 Stop 1045 Total hrs 3.25	0	0	0	N	N		Threats: Development in area, Dumping of Trash, Evidence of shooting
2 Shelby Haworth	Date 6/19/06 Start 0715 Stop 1050 Total hrs 3.58	0	0	0	N	Y		
3 Kathy Pettigrew, Debbie Leonard	Date 6/29/06 Start 0800 Stop 1100 Total hrs 3	0	0	0	N	N		
4 Kathy Pettigrew, Heather Haney	Date 7/10/06 Start 0800 Stop 1100 Total hrs 3	0	0	0	N	N		
5 Kathy Pettigrew, Roger Dittrick	Date 7/15/06 Start 0700 Stop 1000 Total hrs 3	0	0	0	N	N		

Overall Site Summary (Total **resident** WIFLs only)	Adults	Pairs	Territories	Nests	Were any WIFLs color-banded? Yes No NA
Total survey hrs 15.83	0	0	0	0	If yes, report color combination(s) in the comments section on back of form

Reporting Individual Kathy Pettigrew Date Report Completed 6/24/06
US Fish and Wildlife Service Permit # TE 778195 AZ Game and Fish Department (or other state) Permit # _____

Submit original form by August 1st. Retain a copy for your records.

Attachment B

ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

SCIENTIFIC NAME†	COMMON NAME
INVERTEBRATES	
Lepidoptera	
Apodemia mormo virgulti	Behr's metalmark
Colias sp.	sulphur
Erynnis funeralis	funeral duskywing
Erynnis tristis	mournful duskywing
Leptotes marina	marine blue
Papilio eurymedon	pale swallowtail
Pieris rapae	cabbage white butterfly
Plebejus acmon	acmon blue
Pieris protodice	common white
Vanessa sp.	lady
VERTEBRATES	
Reptiles	
Phrynosomatidae	
Sceloporus occidentalis	western fence lizard
Uta stansburiana	side-blotched lizard
Birds	
Accipitridae	
Accipiter sp. and *A. cooperii*†	Cooper's hawk
Buteo jamaicensis	red-tailed hawk
Circus cyaneus†	northern harrier
Elanus leucurus†	white-tailed kite
Aegithalidae	
Psaltriparus minimus	bushtit
Alaudidae	
Eremophila alpestris†	horned lark
Cardinalidae	
Guiraca caerulea	blue grosbeak
Pheucticus melanocephalus	black-headed grosbeak
Cathartidae	
Cathartes aura	turkey vulture
Columbidae	
Columba livia	rock dove
Zenaida macroura	mourning dove

Attachment B (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

SCIENTIFIC NAME†	COMMON NAME
VERTEBRATES (cont.)	
Birds (cont.)	
Corvidae	
Aphelocoma californica	western scrub jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
Cuculidae	
Geococcyx californianus	greater roadrunner
Emberizidae	
Aimophila ruficeps canescens†	southern California rufous-crowned sparrow
Chondestes grammacus	lark sparrow
Junco hyemalis	dark-eyed junco
Melospiza melodia	song sparrow
Pipilo crissalis	California towhee
Pipilo maculates	spotted towhee
Spizella atrogularis	black-chinned sparrow
Fringillidae	
Carduelis psaltria	lesser goldfinch
Carduelis tristis	American goldfinch
Carduelis lawrencei	Lawrence's goldfinch
Carpodacus mexicanus	house finch
Hirundinidae – Swallows	
unknown	swallow
Icteridae	
Icterus bullockii	Bullock's oriole
Icteridae	
Molothrus ater	brown-headed cowbird
Sturnella neglecta	western meadowlark
Mimidae	
Mimus polyglottos	northern mockingbird
Toxostoma redivivum	California thrasher
Odontophoridae	
Callipepla californica	California quail
Paridae	
Baeolophus inornatus	oak titmouse
Parulidae	
Geothlypis trichas	common yellowthroat
Vermivora celata	orange-crowned warbler
Wilsonia pusilla	Wilson's warbler

Attachment B (cont.)

ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

SCIENTIFIC NAME†	COMMON NAME
VERTEBRATES (cont.)	
Birds (cont.)	
Picidae	
Colaptes auratus	northern flicker
Picoides nuttallii	Nuttall's woodpecker
Ptilogonatidae	
Phainopepla nitens	phainopepla
Sylviidae	
Polioptila sp.	gnatcatcher
Timaliidae	
Chamaea fasciata	wrentit
Trochilidae	
Calypte anna	Anna's hummingbird
Calypte costae	Costa's hummingbird
Selasphorus sasin	Allen's hummingbird
Troglodytidae	
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
Tyrannidae	
Contopus sordidulus	western wood-pewee
Empidonax difficilis	pacific-slope flycatcher
Myiarchus cinerascens	ash-throated flycatcher
Sayornis nigricans	black phoebe
Sayornis saya	Say's phoebe
Tyrannus verticalis	western kingbird
Vireonidae	
Vireo huttoni	Hutton's vireo
Mammals	
Canidae	
Canis familiaris	domestic dog
Canis latrans	coyote (scat)
Cervidae	
Odocoileus hemionus†	mule deer (scat and tracks)
Equidae	
Equus caballus	horse
Felidae	
Felis concolor†	mountain lion (tracks)
Lynx rufus	bobcat (scat)

Attachment B (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

SCIENTIFIC NAME†	COMMON NAME
VERTEBRATES (cont.)	
Birds (cont.)	
Heteromyidae	
Dipodomys sp.	kangaroo rat (tracks)
Leporidae	
Lepus californicus bennettii†	San Diego black-tailed jackrabbit (scat)
Sylvilagus audubonii	desert cottontail (scat and observations)
Mephitidae	
Mephitis mephitis	striped skunk (scat)
Muridae	
Neotoma sp.	woodrat (scat)
Sciuridae	
Spermophilus beecheyi	California ground squirrel (burrows and observations)

†Sensitive species

Coast Live Oak Woodland

Riparian Woodland

Riparian Woodland

Riparian Scrub

Riparian Habitat Photos

MURRIETA HILLS

Attachment C

Appendix F

MURRIETA HILLS FUEL MODIFICATION CLEARING WITHIN AND ADJACENT TO RIVERINE RESOURCES MEMO

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Memorandum

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942
619.462.1515 **tel**
619.462.0552 **fax**
www.**helixepi**.com

Date: July 24, 2019

To: Ron Goldman, City of Murrieta

cc: Rick Robotta, Benchmark Pacific

From: Barry Jones

Subject: Murrieta Hills Fuel Modification Clearing Within and Adjacent to Riverine Resources

HELIX Project: PHC-19

Message:

This memo addresses proposed fuel modification planned in proximity of the Riverine Resources for Murrieta Hills Project and provides an assessment of potential impacts to certain Riverine resources. As more fully described herein, impacts resulting from fuel modification adjacent to Riverine resources are not expected to result in complete loss of functions and services associated with Riverine resources.

Fuel modification or thinning completed in accordance with the project's Fire Protection Technical Report[1] includes the following three general classifications: Fuel Modification Zone (FMZ) 1, FMZ 2, and Internal Oak-dominated Open Space (also known as FMZ 3).

FMZs 1 and 2 occur primarily at the outer edges of development, or the area between development and the preserved habitat. The specifications for treatment of these areas include measures for trees, shrubs, and groundcovers and are spelled out in Table 1, *Fuel Modification Zones 1, 2, and 3: Fire Management Requirements and Specifications*. Approximately 0.0188 acre of Riverine drainages occur in FMZ 1 and approximately 0.1387 acre of Riverine drainages occur in FMZ 2 (Attachment A).

FMZ 3 applies only to the undeveloped corridor along the largest on-site drainage, known as the "Internal Oak-Dominated Open Space" in the project's Fire Protection Technical Report. This corridor is flanked by development along its entire length and treatment is spelled out in Table 1.

[1] Dudek. 2019. Approval Draft. Murrieta Hills FIRE PROTECTION TECHNICAL REPORT, Plan No. SP 012-3164, TTM 35853. July. 112 pp., plus appendices.

Table 1
FUEL MODIFICATION ZONES 1, 2, AND 3: FIRE MANAGEMENT REQUIREMENTS AND SPECIFICATIONS[1]

Fire Management Plan Page/ Section References	FMZ 1 – Section 5.1, Subsection 5.1.1, Pages 42-43	FMZ 2 – Section 5.1, Subsection 5.1.1, Pages 43-44	Internal Oak-Dominated Open Space / FMZ 3 – Section 5.1, Subsection 5.1.2, Pages 44-45
General	All highly flammable native vegetation, especially plant species found on the Prohibited List (Appendix F of the Fire Protection Technical Report) shall be removed. Species targeted for removal include chamise, California sagebrush, coyote bush, yerba santa, buckwheat, telegraph plant, sticky monkeyflower, laurel sumac, and sage (*Salvia*) species. This zone will be planted with drought-tolerant, less flammable plants from the Murrieta Hills Project Plant Palette (Appendix E of the Fire Protection Technical Report), which was prepared by VDLA Landscape architects and reviewed/revised by the authors of the Fire Protection Technical Report.	Represents a 50% thinning zone – 50% less fuel than on adjacent unmaintained preserve areas. Zone 2 areas will include removal of dead/dying vegetation, exotics, and plant species listed on the prohibited plant list. Species targeted for removal include chamise, California sagebrush, coyote bush, yerba santa, buckwheat, telegraph plant, sticky monkeyflower, laurel sumac, and sage (*Salvia*) species. Removal of these components will result in 50% thinning of the existing fuels. As necessary to meet the 50% thinning objective, other plants will be removed to create a mosaic of vegetation with adequate spacing and discontinuity. Large shrubs shall not be cut back hard or hedge them into unnatural shapes (sic).	The area will be maintained as an FMZ through annual maintenance of non-jurisdictional areas so that vegetation does not exceed a height of four inches. All plant species found on the Prohibited List (Appendix F of the Fire Protection Technical Report) shall be removed. There are limited areas within this open space that are jurisdictionally protected by California Department of Fish and Wildlife and will be left unmaintained. All of these areas are beyond 150 feet from adjacent structures. Additionally, should mortality of oaks and or willow trees occur in these jurisdictional areas, from drought, insect, disease or other factors, they will be removed or chipped on site to avoid the accumulation of dead fuels.
Vegetation Layer	**Zone 1**	**Zone 2**	**Zone 3**
Tree	Raise canopy 8 feet or 1/3 the height of mature tree.	Only certain tree species are allowed.[3]	See general requirement above
Shrub	Less than 2 feet tall and at a minimum of 5 feet on center.	Single specimen native shrubs, exclusive of chamise and sage, may be retained, on 20-foot centers.	See general requirement above
Ground Cover	75% of this layer shall be limited to a maximum of height of 18 inches. 25% of this layer may reach a height of 24 inches.	75% of this layer shall be limited to a maximum height of 36 inches. 25% of this layer may reach a maximum height of 48 inches.	See general requirement above

Table 1 (cont.)
FUEL MODIFICATION ZONES 1, 2 AND 3: FIRE MANAGEMENT REQUIREMENTS AND SPECIFICATIONS[1]

Vegetation Layer	Zone 1	Zone 2	Zone 3
Irrigation Requirement	This irrigated high plant moisture zone shall be serviced by a permanent automatic irrigation system that keeps plants hydrated via efficient drip irrigation, as defined by the Project's Landscape Architect.	No irrigation.	No irrigation.
Impact[4]	0.0188 acre	0.1389 acre	0.4435 acre

[1] All work being performed in these fuel management zones is being conducted within the development footprint established through the Murrieta Hills HANS process. Work will be done within and/or adjacent to Riverine resources in Zones 1 and 2 and areas outside of / adjacent to designated riparian/riverine areas of Zone 3, and 20 separate and small areas considered jurisdictional in nature. The total impact to areas considered jurisdictional is approximately 0.6 acre.

[2] Appendix F of Approval Draft. Murrieta Hills Fire Protection Technical Report, Plan No. SP 012-3164, TTM 35853 (Dudek 2018).

[3] All native tree species occurring at Murrieta Hills are included on the list of allowable species.

[4] The function and services of the impacted non-wetland jurisdictional features include groundwater recharge, flood conveyance, sediment transport, and some water quality benefits.
Thinning and pruning of vegetation is not expected to have any effects on the groundwater recharge portion of the function and services because groundwater recharge is a function of surface water, slope and soil permeability and all of these would remain unaffected by the proposed vegetation management.
Flood conveyance is the capacity of a drainage feature to convey storm flows. The proposed vegetation management will not constrict or otherwise inhibit the capacity of these drainages to covey storm flows as and when necessary.
Sediment transport is the fluvial movement of sediments in a stream. The vegetation thinning will reduce vegetative cover adjacent to the streambed and there is the potential for minor increases in sediment entering the avoided streambed.

Fuel Modification. Fuel modification is planned in 19 separate and small areas, all of which are considered jurisdictional (Figures 1 and 2a-g; Table 2, *Fuel Modification Acreages*). The total impact area is approximately 0.6010 acre.

Table 2
FUEL MODIFICATION ACREAGES

Drainage	Fuel Modification Zone			Total
	Zone 1[1]	Zone 2[1]	Zone 3[1]	
1		0.0385[3]	0.3287[2,3,4,5,6]	**0.3672**
1.1			0.0023[6]	**0.0023**
1.2	0.0025[3]	0.0089[3]		**0.0114**
1.3	0.0007[3]	0.0062[3]	0.0514[3]	**0.0583**
1.4			0.0248[3]	**0.0248**
1.5		0.0135[4]		**0.0135**
1.7			0.0061[3]	**0.0061**
1.7.1		0.0003[3]		**0.0003**
1.7.2		0.0023[3]		**0.0023**
1.8			0.0067[3]	**0.0067**
1.9		0.0034[3]	0.0096[3]	**0.0130**

Table 2 (cont.)
FUEL MODIFICATION ACREAGES

Drainage	Fuel Modification Zone			Total
	Zone 1[1]	Zone 2[1]	Zone 3[1]	
1.10	0.0035[3]	0.0453[2,3,7]	0.0038[3]	**0.0526**
1.10.1	0.0015[3]	0.0046[3]		**0.0061**
1.10.2		0.0026[3]		**0.0026**
1.10.3		0.0004[7]		**0.0004**
1.11		0.0001[3]		**0.0001**
3	0.0106[3]	0.0114[3]	0.0101[3]	**0.0321**
4		0.0011[3]		**0.0011**
7		0.0001[3]		**0.0001**
TOTAL	**0.0188**	**0.1387**	**0.4435**	**0.6010**

[1] Vegetation communities noted as follows: [2] coastal sage scrub; [3] chaparral; [4] coastal sage scrub/chaparral; [5] eucalyptus woodland; [6] field cropland; [7] disturbed

Effects of Fuel Modification on Riverine Resources. HELIX Environmental Planning, Inc. (HELIX) staff (i.e., Larry Sward) recently took photos of the areas mapped as Riverine/streambed by HELIX as part of the Habitat Evaluation and Acquisition Negotiation Strategy[2] (HANS) and Determination of Biologically Equivalent or Superior Preservation[3] (DBESP) reports (Attachment A). The locations of the photos were GPS'd with submeter accuracy (Figure 1).

The streambeds mostly support low-growing herbaceous vegetation (Streambeds 1 [lower FMZ], [upper FMZ], 1.3, 1.7.1, 1.7.2, 1.10.1, 3, and 4, 4), or no vegetation whatsoever (Streambeds 1 [upper FMZ], 1.10 [lower FMZ], and 1.10 [upper][4]). There is one streambed that has a few isolated shrubs that may be subject to thinning or vegetation removal (Streambed 1.2.1 [lower FMZ]).

The functions and services of these non-wetland jurisdictional features include: (1) groundwater recharge; (2) flood conveyance; (3) sediment transport; and (4) some potential water quality benefits.

1. **Groundwater Recharge –** Thinning, removal, and pruning of vegetation is not expected to have few, if any effects on groundwater recharge. Ground water recharge is a function of surface water, slope, and soil permeability.

   Ground water recharge is expected to either be unchanged or only minimally impacted by FMZ 2 and 3. Because Zone 1 is irrigated, groundwater recharge would likely increase in Zone 1 which could result in establishment of non-native exotic species in these locations.

[2] Murrieta Hills Project Habitat Evaluation and Acquisition Negotiation Strategy Biological Analysis. Prep for Pulte/BP Murrieta Hills, LLC. May.

[3] Murrieta Hills Project Determination of Biologically Equivalent or Superior Preservation Report. Prep for Pulte/BP Murrieta Hills, LLC. May.

[4] Upper and lower are used in places where a drainage crosses in and out of the FMZ, with the upper location being higher in the watershed.

2. **Flood Conveyance –** Flood conveyance is the capacity of a drainage feature to convey storm flows. The proposed vegetation management will not constrict or inhibit the capacity of these drainages to convey storm flows compared to their current capacity.

   Because vegetation is being thinned or completely removed in portions of Zones 2 and 3, flood conveyance may increase slightly because of potential for increases in runoff from these areas.

3. **Sediment Transport –** Sediment transport is the fluvial movement of sediment in a stream. The proposed vegetation management will not inhibit or restrict the drainages' capacity for sediment transport. The vegetation thinning or removal will reduce vegetative cover adjacent to the streambed and there is the potential for minor increases in sediment entering the avoided streambed.

   Potential minor increases in sediment transport are not expected to significantly increase from its current volumes. There is also the potential for very minor impacts to the streambeds during thinning and removal of the adjacent vegetation in the form of trampling or loosening the soil should workers walk through or drag vegetation across the drainage. Any minor increases in sediment transport from the actual thinning/removal process are also not considered to be significant.

4. **Water Quality Benefits –** Water quality benefits are typically derived from vegetation absorbing pesticides and other pollutants. This is not an important service of these drainages because the limited amount of vegetation in them restricts their capacity to absorb compounds from the runoff.

   Changes in these streams' capacity to provide water quality benefits is expected to be negligible. Based on site specific surveys there are no species identified in Section 6.1.2 of the MSHCP that occur onsite. Section V.B of the DBESP Report for Murrieta Hills provides a full discussion of species covered under Section 6.1.2.

Based on the effect of the FMZs specified vegetation modifications on the functions and services of the areas subject to fuel modification, the applicant is proposing mitigation based on ratios agreed to with the Western Riverside Resource Conservation Authority (RCA) as spelled out in Table 3, *Mitigation Criteria and Mitigation Ratios*.

The mitigation criteria used in Table 3 fall into the following general criteria classifications:

1. **Criteria A**: Upslope of Zone 1. These areas are not expected to be impacted by irrigation from Zone 1 because they are upslope.

2. **Criteria B**: Within 50 feet downslope of Zone 1. These areas may be impacted by irrigation from Zone 1 because they are immediately downslope of Zone 1 where elevation gradient plays a role.

3. **Criteria C**: More than 50 feet downslope of Zone 1. These areas are not expected to be impacted by irrigation from Zone 1 because they are more than 50 feet downslope of Zone 1.

4. **Criteria D**: Vegetation is either chaparral, sage scrub, or grassland.

   These areas could be impacted by higher removal of native species, including chamise (*Adenostoma fasciculatum*), California sagebrush (*Artemisia californica*), coyote bush (*Baccharis pillularis*), yerba santa (*Eriodictyon californicum*), buckwheat (*Eriogonum* sp.), telegraph plant (*Heterotheca grandiflora*), sticky monkeyflower (*Diplacus aurantiacus*), laurel sumac (*Malosma laurina*), and sage (*Salvia*) species.

5. **Criteria E**: Steep slopes. Steeper slope areas increase the potential for erosion.

   These criteria were then combined, and a mitigation ratio attached to each combination based on the potential combined impact on a given drainage. All drainages within Zone 1 will be mitigated at 2:1 and drainages within Zones 2 and 3 will be mitigated at between 0.5:1 and 1:1 with offsite re-establishment (Table 3).

TABLE 3
MITIGATION CRITERIA AND MITIGATION RATIOS

Zone 1 Shall be mitigated at 2:1

MITIGATION CRITERIA					
Mitigation Criteria	**Criteria A: Upslope of Zone 1 [1]**	**Criteria B: Within 50 feet downslope of Zone 1 [2]**	**Criteria C: Greater than 50 feet downslope of Zone 1 [3]**	**Criteria D: Vegetation Type: Chaparral, sage scrub or grassland [4]**	**Criteria E: Steep Slope [5]**

MITIGATION CRITERIA COMBINATIONS								
Mitigation Criteria Combination	**Criteria 1 (A+D+E)**	**Criteria 2 (A+D)**	**Criteria 3 (B+D+E)**	**Criteria 4 (B+D)**	**Criteria 5 (B+E)**	**Criteria 6 (C+D+E)**	**Criteria 7 (C+D)**	**Criteria 8 (C+E)**
Zone 2 Mitigation Ratio	0.75:1	0.5:1	1:1	0.75:1	0.75:1	0.75:1	0.5:1	0.5:1
Internal Oak-dominated Open Space (Zone 3) Mitigation Ratio	0.75:1	0.5:1	1:1	0.75:1	0.75:1	0.75:1	0.5:1	0.5:1

[1] Because it is upslope of Zone 1 no irrigation water flows would be added to the streambed
[2] Because it is within 50 feet and downslope of Zone 1 there is the potential for irrigation water flow to be added to the streambed
[3] Because it is more than 50 feet downslope of Zone 1 no irrigation water flows would be expected to be added to the streambed
[4] Chaparral and sage scrub vegetation are expected to have a majority of the native shrub species removed and there is potential for increased erosion
[5] Steep slopes adjacent to the drainages will increase potential for erosion

Each drainage was reviewed and broken into segments by mitigation criteria combination. A single drainage could consist of multiple segments. The area of each segment was calculated, and the appropriate mitigation ratio applied to the impacts within that given segment.

All Zone 1 areas are automatically mitigated at a ratio of 2:1.

Table 4, *Fuel Modification Mitigation Requirements for Fuel Modification Zones 2 and 3* shows the results of that assessment for Zones 2 and 3.

TABLE 4
FUEL MODIFICATION MITIGATION REQUIREMENTS FOR FUEL MODIFICATION ZONES 2 AND 3

Drainage Number (Mitigation Criteria Combination)[1]	MITIGATION CRITERIA					Mitigation Ratio	Impact (Acres)	Impact (Linear Feet)	Mitigation Requirement
	Criteria A: Upslope of Zone 1	Criteria B: Within 50 feet downslope of Zone 1	Criteria C: Greater than 50 feet downslope of Zone 1	Criteria D: Vegetation Type: Chaparral or sage scrub	Criteria E: Steep Slope				
Drainage 1(1)	x			x	x	0.75:1	0.0051	44	0.0038
Drainage 1(2)	x			x		0.5:1	0.0162	141	0.0081
Drainage 1(3)		x		x	x	1:1	0.1510	1,009	0.1510
Drainage 1(4)		x		x		0.75:1	0.0084	73	0.0063
Drainage 1(6)			x	x	x	0.75:1	0.0598	520	0.0449
Drainage 1(7)			x	x		0.5:1	0.1270	792	0.0635
Drainage 1.1(7)			x	x		0.5:1	0.0023	50	0.0012
Drainage 1.2(1)	x			x	x	0.75:1	0.0089	130	0.0068
Drainage 1.3(1)	x			x	x	0.75:1	0.0062	90	0.0049
Drainage 1.3(3)		x		x	x	1:1	0.0082	50	0.0082
Drainage 1.3(6)			x	x	x	0.75:1	0.0431	255	0.0323
Drainage 1.4(3)		x		x	x	1:1	0.0045	33	0.0045
Drainage 1.4(6)			x	x	x	0.75:1	0.0203	168	0.0152
Drainage 1.5(1)	x			x	x	0.75:1	0.0135	186	0.0101
Drainage 1.7(3)		x		x	x	1:1	0.0046	50	0.0046
Drainage 1.7(6)			x	x	x	0.75:1	0.0015	16	0.0011
Drainage 1.7.1 (2)	x			x		0.5:1	0.0003	6	0.0002
Drainage 1.7.2(1)	x			x	x	0.75:1	0.0023	50	0.0017
Drainage 1.8(3)		x		x	x	1:1	0.0061	66	0.0061
Drainage 1.8(7)			x	x		0.5:1	0.0006	7	0.0003
Drainage 1.9(1)	x			x	x	0.75:1	0.0034	50	0.0026
Drainage 1.9(3)		x		x	x	1:1	0.0042	61	0.0042
Drainage 1.9(6)			x	x	x	0.75:1	0.0054	78	0.0041
Drainage 1.10(1)	x			x	x	0.75:1	0.0227	226	0.0170
Drainage 1.10(3)		x		x	x	1:1	0.0040	120	0.0040
Drainage 1.10(5)		x		x		0.75:1	0.0030	44	0.0023

TABLE 4 (cont.)
FUEL MODIFICATION MITIGATION REQUIREMENTS FOR FUEL MODIFICATION ZONES 2 AND 3

Drainage Number (Mitigation Criteria Combination)[1]	MITIGATION CRITERIA					Mitigation Ratio	Impact (Acres)	Impact (Linear Feet)	Mitigation Requirement
	Criteria A: Upslope of Zone 1	Criteria B: Within 50 feet downslope of Zone 1	Criteria C: Greater than 50 feet downslope of Zone 1	Criteria D: Vegetation Type: Chaparral or sage scrub	Criteria E: Steep Slope				
Drainage 1.10(6)			x	x	x	0.75:1	0.0112	188	0.0084
Drainage 1.10(8)			x		x	0.5:1	0.0080	58	0.0040
Drainage 1.10.1(1)	x			x	x	0.75:1	0.0046	100	0.0035
Drainage 1.10.2(1)	x			x	x	0.75:1	0.0026	38	0.0020
Drainage 1.10.3(7)			x	x		0.5:1	0.0004	17	0.0002
Drainage 1.11	x			x		0.5:1	0.0001	5	0.0001
Drainage 3(1)	x			x	x	0.75:1	0.0114	124	0.0086
Drainage 3(3)		x		x	x	1:1	0.0101	137	0.0101
Drainage 4(2)	x			x		0.5:1	0.0011	15	0.0006
Drainage 7 (2)	x			x		0.5:1	0.0001	3	0.0001
TOTAL							**0.5822**	**5,000**	**0.4458**

Based on the assessment above, impacts to 0.5822 acre of Riverine/streambed within Zones 2 and 3 require 0.4458 acre of mitigation. Zone 1 mitigation totals 0.0376 acre, and when combined with Zones 2 and 3, the total mitigation obligation is 0.4834 acre.

Mitigation will be accomplished through the purchase of 0.4834 re-establishment credits from the Riverpark Mitigation Bank.

Attachments:

Figure 1: Photo Locations
Figures 2a-d: Riparian/Riverine and FMZ
Attachment A: Waters of the U.S. in the Fuel Modification Zone

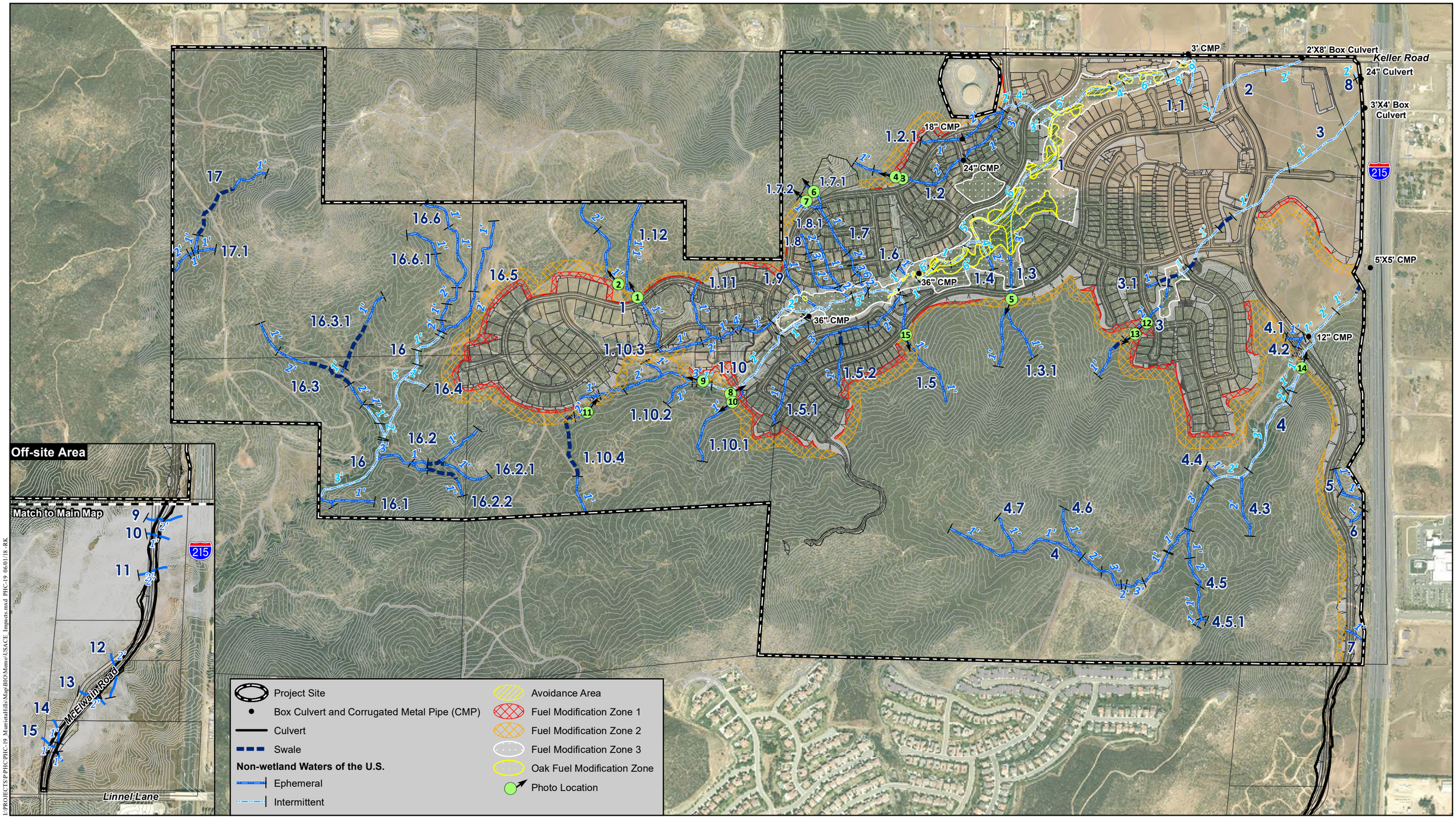

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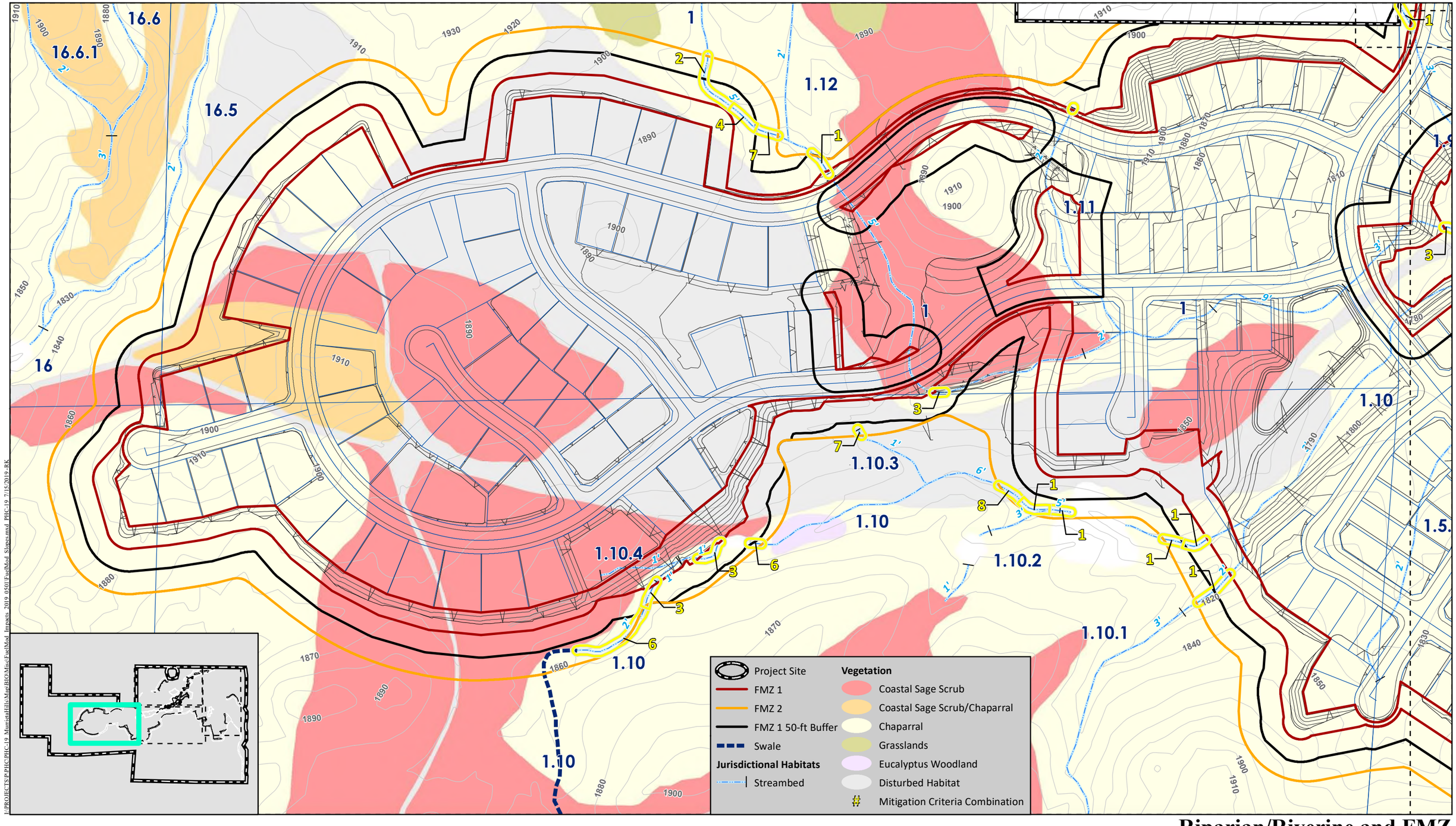
Photo Locations

MURRIETA HILLS

HELIX Environmental Planning



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HELIX Environmental Planning

Riparian/Riverine and FMZ

MURRIETA HILLS

Figure 2a

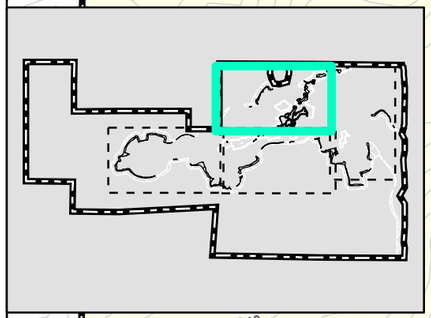
Project Site
FMZ 1
FMZ 2
FMZ 1 50-ft Buffer
Box Culvert and Corrugated Metal Pipe (CMP)

Jurisdictional Habitats

Streambed

Vegetation

Coastal Sage Scrub
Coastal Sage Scrub/Chaparral
Chaparral
Grasslands
Eucalyptus Woodland
Field Cropland
Disturbed Habitat
Mitigation Criteria Combination



1.2.1
1.2
1.7.1
1.7.2
1.7
1.4
1
18" CMP
24" CMP
SP 1
SP 6
SP 7
SP 8
SP 9

Riparian/Riverine and FMZ

MURRIETA HILLS

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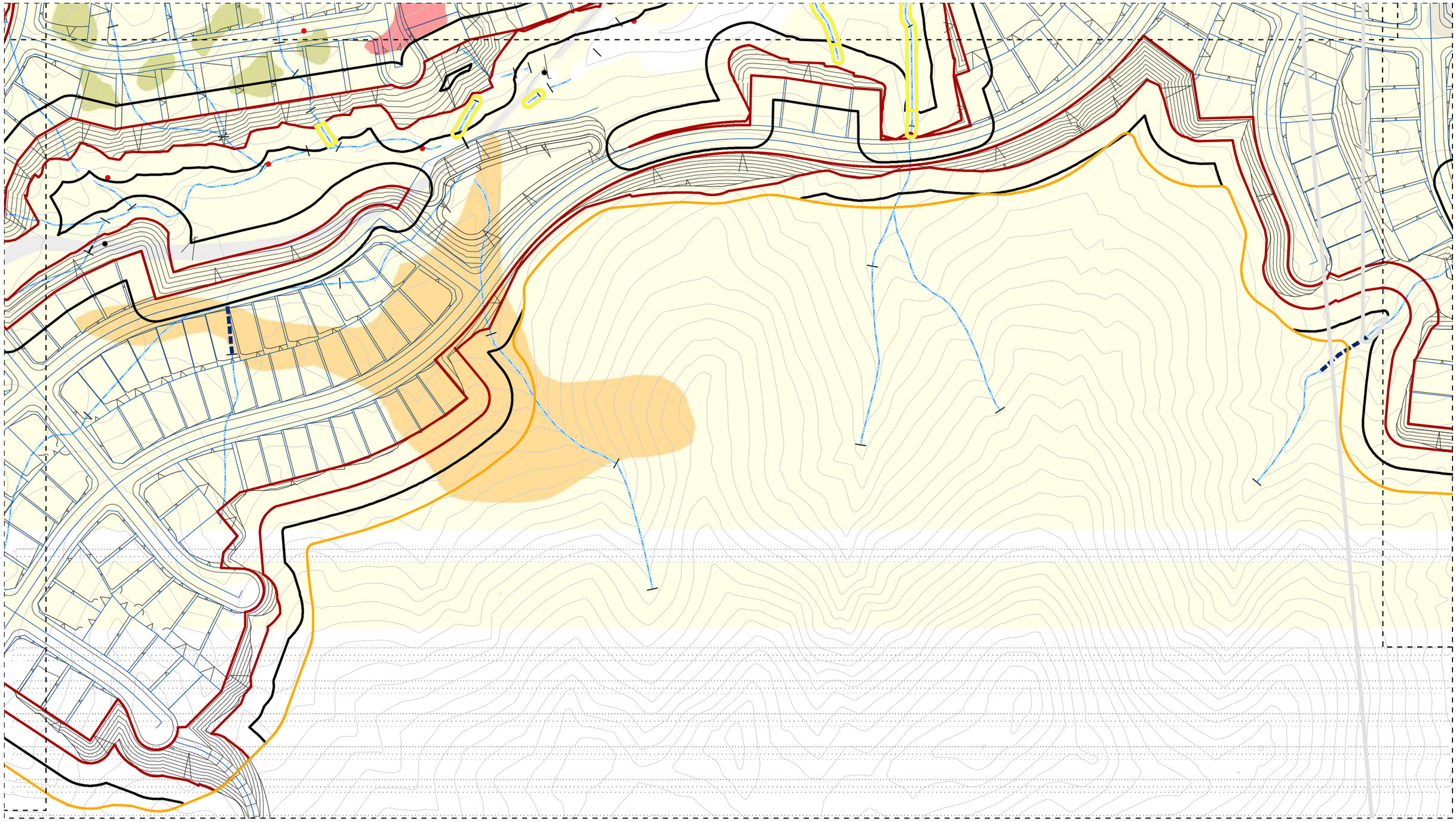
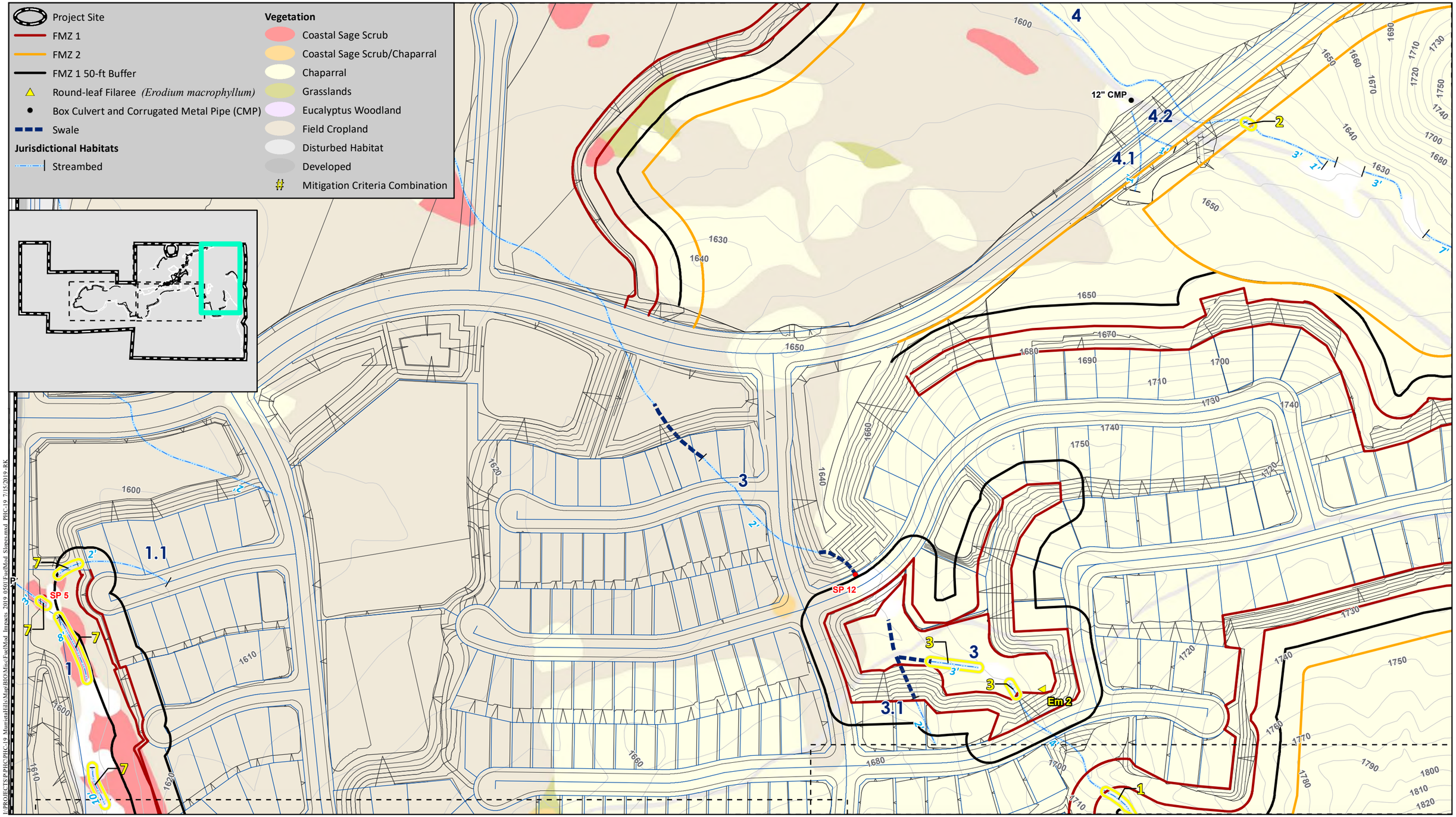
N

0 200 Feet

Figure 2b





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Riparian/Riverine and FMZ

MURRIETA HILLS

HELIX Environmental Planning

Figure 2d

Photo 1. Streambed 1. Looking upstream (lower fuel mod area).

Photo 2. Streambed 1. Looking upstream (upper fuel mod area).

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Photo 3. Streambed 1.2.1. Looking upstream from bottom edge of fuel modification zone 1.

Photo 4. Streambed 1.2.1. Looking upstream from bottom edge of fuel modification zone 2.

Photo 5. Streambed 1.3. Looking upstream.

Photo 6. Streambed 1.7.1. Looking upstream.

Photo 7. Streambed 1.7.2. Looking upstream.

Photo 8. Streambed 1.10. Looking downstream (lower fuel mod area).

Photo 9. Streambed 1.10. Looking downstream (upper fuel mod area).

Photo 10. Streambed 1.10.1. Looking upstream.

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Photo 11. Streambed 1.10.4. Looking downstream.

Photo 12. Streambed 3. Looking upstream from bottom edge of fuel modidfication zone 1.

Photo 13. Streambed 3. Looking upstream from bottom edge of fuel modification zone 2.

Photo 14. Streambed 4. Looking downstream.

Photo 15. Streambed 1.5. Looking upstream.

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HELIX
Environmental Planning

Murrieta Hills Project

Determination of Biologically Superior or Equivalent Preservation

September 12, 2019

Prepared for:
Pulte/BP Murrieta Hills, LLC
2 Technology Drive
Irvine, CA 92618

Prepared by:
HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942

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Murrieta Hills Project

Determination of Biologically Equivalent or Superior Preservation

Prepared for:

Pulte/BP Murrieta Hills, LLC
2 Technology Drive
Irvine, CA 92618

Prepared by:

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September 12, 2019

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Report Date: September 12, 2019

Title: Determination of Biologically Superior or Equivalent Preservation for the Murrieta Hills Property

Project Location: The approximately 973.69-acre project site is located in the southern portion of Menifee Valley. It is located in Sections 27 and 28, Township 6 South, Range 3 West, as shown on the U.S. Geological Survey (USGS) 7.5-minute Murrieta and Romoland quadrangle maps. The project site is located in the City of Menifee, Riverside County, California.

Assessor's Parcel Numbers: The project site is made up of 26 Assessor's Parcel Numbers (APNs): 384190001, 384190003, 384190005 to -014, 384200006 to -017, 384210001, and 384210003.

Owner/Applicant:
Pulte/BP Murrieta Hills, LLC
2 Technology Drive
Irvine, CA 92618
(760) 450-0441

Principal Investigator:
HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942
(619) 462-1515

Report Summary: The approximately 973.69-acre property includes Riparian/Riverine resources and one Criteria Area Species Survey Area species, round-leaved filaree (*California macrophylla*), and is within a Multiple Species Habitat Conservation Plan Conservation Area. Due to the extent and distribution of Riparian/Riverine resources, complete avoidance is not feasible. The proposed project will not result in a loss of function and values to the Riparian/Riverine resources due to the mitigation that will be incorporated into the project design. As only two individuals of round-leaved filaree were present on site in 2006, and none in 2008 or 2012, the lack of surrounding habitat for population expansion and avoidance is not required in order for the project to be consistent with MSHCP Section 6.3.2.

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Murrieta Hills Project
Determination of Biologically Superior or Equivalent Preservation

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I. INTRODUCTION

The purpose of this Determination of Biologically Equivalent or Superior Preservation (DBESP) assessment is to summarize our analysis of Pulte/BP Murrieta Hills, LLC (applicant) Murrieta Hills project compliance with the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP; Dudek and Associates [Dudek] 2003. The property is made up of 26 parcels: Assessor's Parcel Numbers (APNs) 384190001, 384190003, 384190005, 384190006, 384190007, 384190008, 384190009, 384190010, 384190011, 384190012, 384190013, 384190014, 384200006, 384200007, 384200008, 384200009, 384200010, 384200012, 384200013, 384200014, 384200015, 384200016, 384200017, 384210001, 38421002, and 384210003. The property is located within Subunit 2 of the Sun City/Menifee Valley Area Plan (Dudek 2003). This project has not received its 404 Nationwide Permit from the U.S. Army Corps of Engineers (USACE), its Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW), or its 401 Water Quality Certification from the California Regional Water Quality Control Board (RWQCB).

MSHCP Section 6.1.2, Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools, states:

> The purpose of the procedures described in this section is to ensure that the biological functions and values of these areas throughout the MSHCP Plan Area are maintained such that Habitat values for species inside the MSHCP Conservation Area are maintained.

MSHCP Section 6.3.2, Additional Survey Needs and Procedures, states that existing information is not sufficient to consider the species shown in Section 6.3.2 adequately covered under the MSHCP. Surveys are required to provide additional information for these species. The goal in areas that have positive results for the target species and that have long-term conservation value is 90 percent avoidance.

The emphasis is on conservation of habitats capable of supporting MSHCP Covered Species, particularly within the identified Conservation Area. For projects that propose impacts to Riparian/Riverine or vernal pool resources or more than 10 percent of a population of Narrow Endemic Species Survey Area (NEPSSA) or Criteria Area Species Survey Area (CASSA) species with long-term conservation value, a DBESP assessment must be completed to ensure that the proposed alternative provides for "replacement of any lost functions and values of Habitat as it relates to Covered Species." This DBESP analysis provides information necessary for the City to find that the project meets these objectives.

Biological surveys were conducted in 2006, 2007, 2008, 2012, 2013, 2016 and 2018, and a general biological resources assessment report (HELIX 2019a) was prepared for the project site. The information in this biological report was used to aid in preparation of this DBESP. This DBESP analysis provides information necessary for the City of Murrieta (City) to determine if the project meets the MSHCP conservation objectives. In addition, the applicant will coordinate with the USACE, CDFW, and RWQCB to ensure compliance with applicable permitting requirements.

II. DEFINITION OF PROJECT AREA

The Murrieta Hills Specific Plan Amendment area consists of approximately 973.69 acres located in the southern portion of Menifee Valley in unincorporated Riverside County(Figure 1). Please note that the 973.69 acres includes 1.9 acres of land located around the reservoir located just offsite adjacent to the north-central portion of the site and all of the Keeler Road right-of-way. Specifically, the project site is located south of Keller Road and west of Interstate (I-) 215 (Figure 2). The property is in Sections 27 and 28, Township 6 South, Range 3 West, as shown on the U.S. Geological Survey (USGS) 7.5-minute Murrieta and Romoland quadrangle maps (Figure 3).

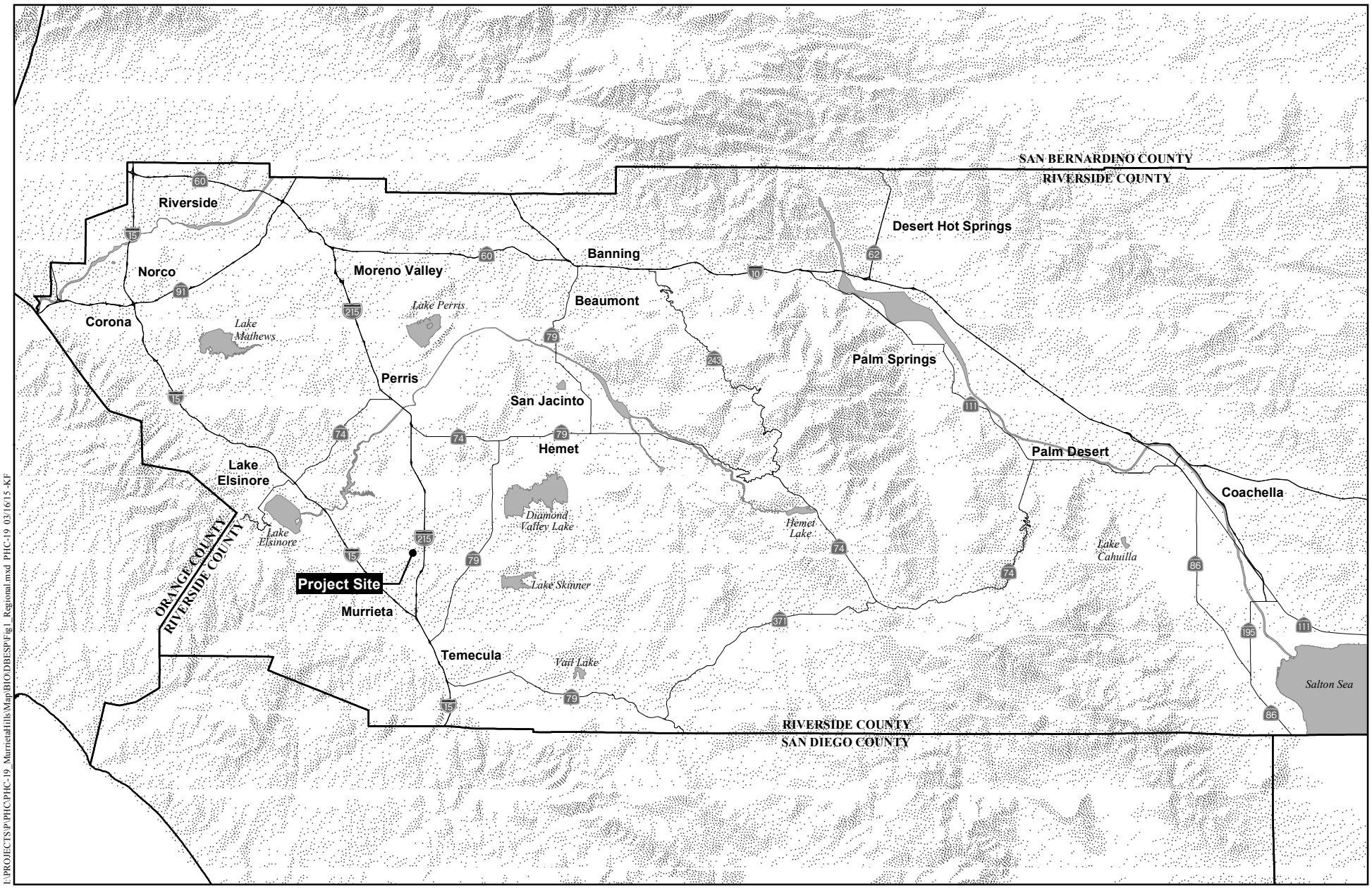
The property is in Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP. The entire project, with the exception of the off-site portion of McElwain Road, is within criteria cells, and all cells are part of Cell Group C. The property comprises 973.69 acres of the approximately 1,300-acre Cell Group C. The offsite area of McElwain Road to the south and Keller Road outfall to the north lie outside of any criteria cells. McElwain Road has been added to the MSHCP as a Covered Activity through Minor Amendment No. 2017-01. The term "off-site study area" refers to the area associated with McElwain Road to the south, and "Keller Road outfall" refers to the less than 0.1 acre outfall area to the north.

The dominant soils on the property consist of two well-drained soils, Cajalco fine sandy loam and Cienba rocky sandy loam. Other soils present on site include Las Posas and Honcut series loams with some Auld series clay soil in the northeast portion of the property (Knecht 1971). Soil types that occur on the property are known to have clay inclusions. Multiple Riparian/Riverine drainages occur on the property.

The property is primarily undeveloped with approximately 97 acres in the northeast being utilized for crop-based agricultural (e.g., growing wheat and oats). The remains of a small, recently vacated nursery are located near the center of the property, and disturbed areas are located in the center and southeast. The property is crossed by several dirt roads and includes areas that have been disturbed from off-highway vehicle activity, illegal dumping, and various other unauthorized activities. Surrounding uses include undeveloped land, rural and urban residential areas, and I-215. There are two water tanks located adjacent to the west side of the cropland along the northern border of the property.

III. PROJECT DESCRIPTION

The project proposes annexation to the City and an amendment to the existing Murrieta Hills Specific Plan SPM-4, approved by the City in 1995, to allow residential and commercial uses, a public park, improved open space, and natural open space. The project also includes a northerly extension of McElwain Road to Keller Road. In addition to the Specific Plan Amendment (SPA; No. 4) and annexation to the City, the project will require an amendment to change the existing land use from Rural Mountainous in the Riverside County General Plan to Specific Plan Area in the City of Murrieta General Plan, a rezone from the Riverside County zone of Rural Residential to the City of Murrieta Specific Plan zone, and one or more tentative subdivision maps.



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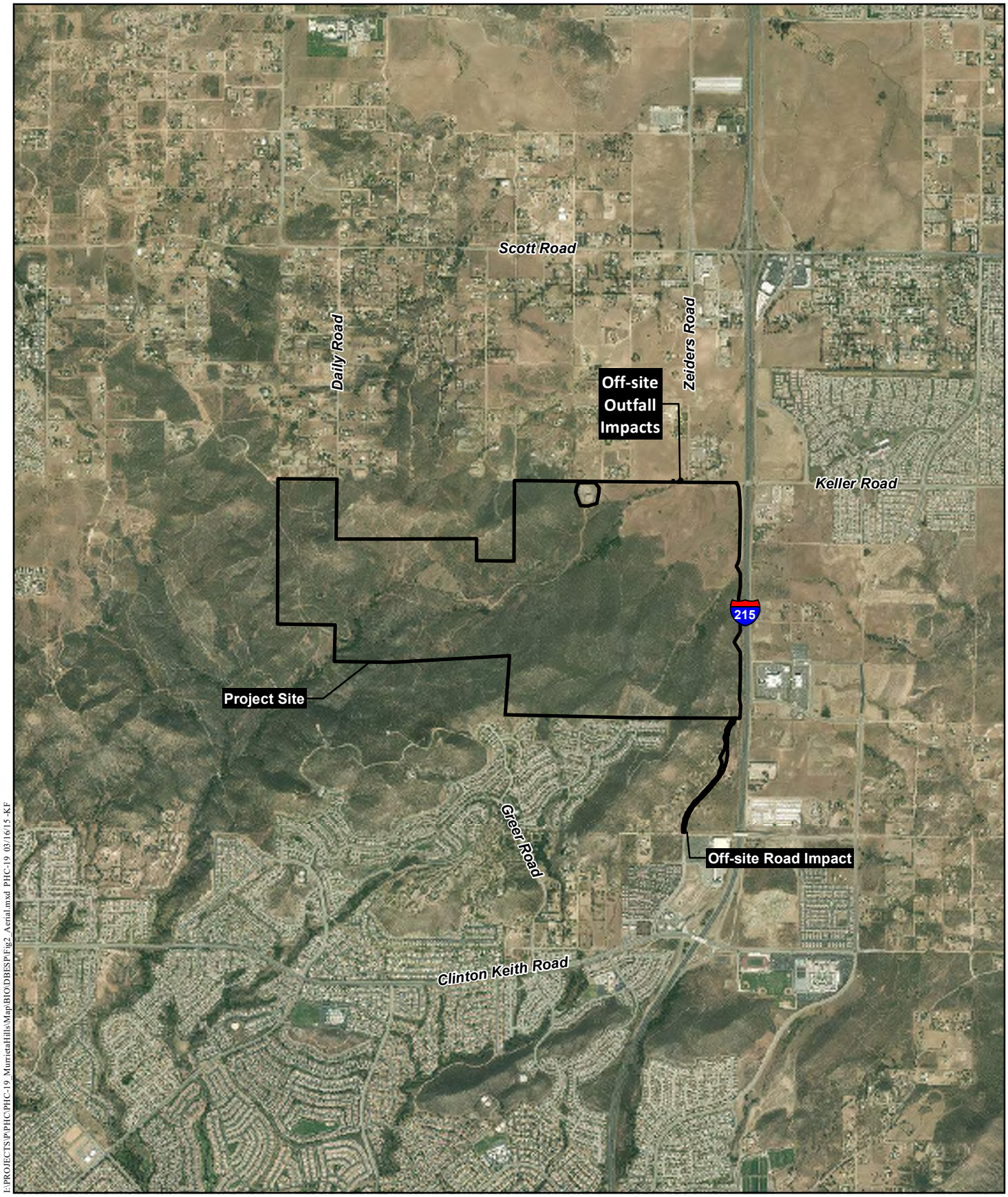
Regional Location Map

MURRIETA HILLS

HELIX Environmental Planning

N 0 10 Miles

Figure 1



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Project Vicinity Map (Aerial Photograph)

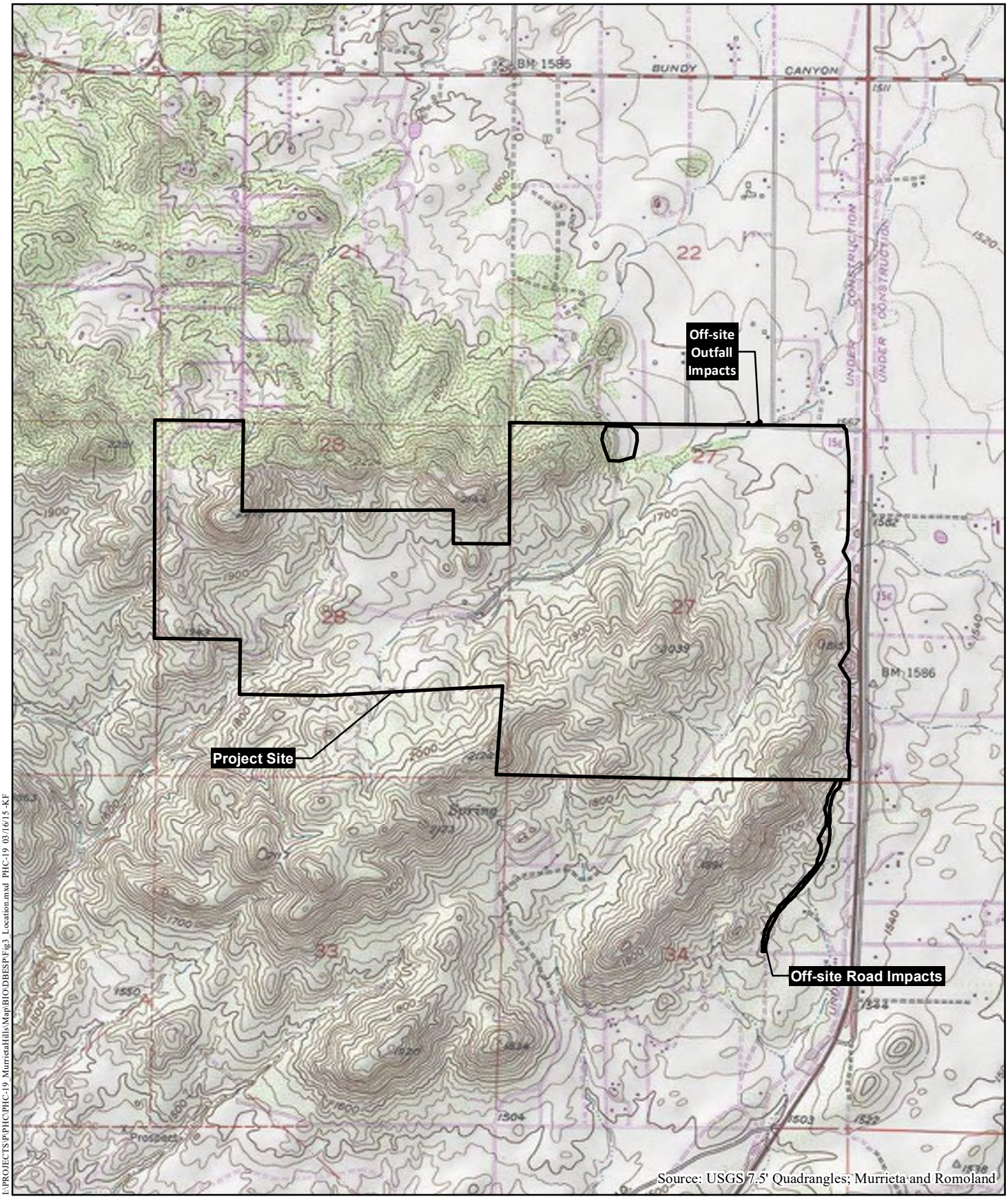
MURRIETA HILLS

HELIX Environmental Planning

N

0 3,000 Feet

Figure 2



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Project Vicinity Map (USGS Topography)

MURRIETA HILLS

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N 0 2,000 Feet

Figure 3

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The conceptual site plan (Figure 4) shows a configuration of approximately:

- 557 single-family detached residential units on lots/pads ranging in size from 4,800 square feet to 10,000 square feet
- 193 multi-family units
- 18 acres of general commercial
- five-acre public park
- 10 acres of Homeowner Association maintained pocket parks and community center
- 37.73 acres of natural open space outside of MSHCP open space
- 607.74 acres of natural MSHCP open space

The proposed project will result in impacts to approximately 361.76 acres of the 973.69-acre property through grading and fuel modification. Access to the project will be from Keller Road to the north and from Clinton Keith Road via McElwain Road to the south. The existing McElwain Road will be extended through the conservation area to connect to the development, and would impact an additional 4.15 acres off site. A six foot box culvert will be utilized to convey storm flows under McElwain Road within the conservation area and will facilitate wildlife movement through this area. A second 4-foot box culvert will be placed slightly upslope to facilitate wildlife movement during storm events. The proposed development includes avoiding the majority of the large drainage that runs from the center to the northeast through the linear park. The project includes an outfall structure on the north side of Keller Road for flows from this large drainage. Due to the extent of the Riparian/Riverine resources on the property, total avoidance can be achieved only by minimal or no project alternatives. The linear park is not part of the MSHCP conservation area, and essentially all upland areas within the linear park will be modified for fuel management purposes, consistent with the Fire Protection Technical Report for the project (Dudek 2019). The impacts include 4.4 acres of existing fuel modification associated with the Greer Ranch Development. No trails are proposed in the linear park.

The project will require a Habitat Evaluation and Acquisition Negotiation Strategy (HANS) for conservation of sensitive lands. A previous development proposal on the project site received an approved HANS (JPR 09-02-17-01), which was never implemented. This previous HANS will be amended to address the current development proposal as well as comments provided by the U.S. Fish and Wildlife Service (USFWS) and CDFW on the previously approved JPR with a Not Consistent Determination being made at the time by the USFWS and CDFW.

IV. METHODS

HELIX conducted biological resources assessments of the Murrieta Hills property in winter 2005, spring 2006, fall 2007, and spring/summer 2008. Surveys for sensitive plants were conducted in May and June 2006, April and June 2008, and May 2012. Least Bell's vireo

(*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) surveys were conducted in spring and summer 2006, least Bell's vireo and burrowing owl surveys were conducted in 2008 and 2012, and an additional burrowing owl survey was conducted in 2018. A Riparian/Riverine and vernal pool assessment was conducted in November 2007. Additional site surveys were conducted in 2012, 2013, 2016, 2018 and 2019 to update the evaluation of Riparian/Riverine resources that occur on the property and within the off-site impact areas associated with the project. The off-site area was assessed for potential waters via binoculars, aerial photographs, and topographic maps, and the Keller Road outfall was surveyed in May 2019. During all of HELIX's surveys, focused and incidental observations of plant and animal species were noted. Photographs of the project site were also taken. The methods used to evaluate the biological resources present on the property are discussed in this section.

Access to the off-site study area has not be granted as of the writing of this report.

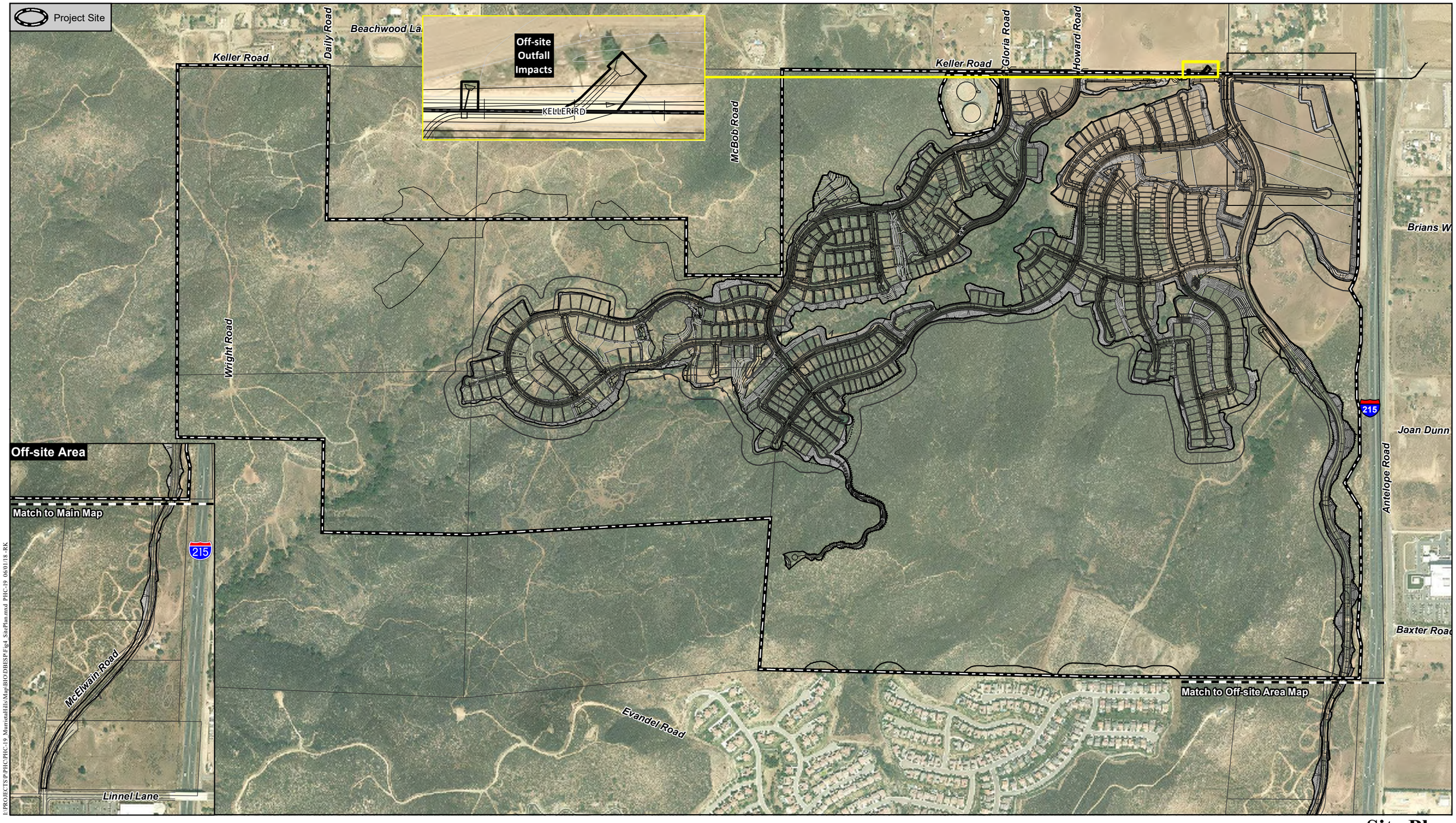
RIPARIAN/RIVERINE AND VERNAL POOL HABITAT ASSESSMENT

The MSHCP defines Riparian/Riverine and Vernal Pool habitats as:

- Riparian/Riverine areas are lands that contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.

- Vernal pools are seasonal wetlands that occur in depression areas that have wetland indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics and the definition of the watershed supporting vernal pool hydrology must be made on an individual basis. Such determinations should consider the length of time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, the uses to which the area has been subjected, and weather and hydrologic records.

HELIX biologist Jack Easton and Doug Allen conducted a jurisdictional delineation in 2007. The resources that were determined to be under CDFW jurisdiction were used as the base for the Riparian/Riverine and vernal pool habitat assessment. The assessment was updated with data collected by HELIX biologist Rob Hogenauer in 2007, 2008, and 2012, and with information collected by Mr. Larry Sward in 2013. The delineation was verified in the field by CDFW on June 29, 2016, by the RWQCB on May 30, 2018, and the USACE on July 12, 2018. The area for the off-site Keller Road outfall structure was delineated by Mr. Hogenauer on May 15, 2019. The off-site portion of the Study Area for McElwain Road has not yet been formally delineated. The



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Site Plan

MURRIETA HILLS

HELIX Environmental Planning

0 800 Feet

Figure 4

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off-site area was assessed for potential waters via binoculars, aerial photographs, and topographic maps. Data presented regarding waters in the off-site area are estimates.

RIPARIAN/RIVERINE PLANTS

The MSHCP requires that all projects are assessed for potential to support sensitive plants associated with Riparian/Riverine and Vernal Pool habitats. The MSHCP lists 23 sensitive plant species that have potential to occur in Riparian/Riverine and Vernal Pool habitats. These species are:

- California black walnut (*Juglans californica* var. *californica*)
- Engelmann oak (*Quercus engelmannii*),
- Coulter's matilija poppy (*Romneya coulteri*),
- San Miguel savory (*Satureja chandleri*)
- spreading navarretia (*Navarretia fossalis*),
- graceful tarplant (*Holocarpha virgata* ssp. *elongata*)
- California Orcutt grass (*Orcuttia californica*),
- prostrate navarretia (*Navarretia prostrate*),
- San Diego button-celery (*Eryngium aristulatum* var. *parishii*),
- Orcutt's brodiaea (*Brodiaea orcuttii*),
- thread-leaved brodiaea (*Brodiaea filifolia*),
- Fish's milkwort (*Polygala cornuta* var. *fishiae*),
- lemon lily (*Lilium parryi*),
- San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior*),
- ocellated Humboldt lily (*L. humboldtii* ssp. *ocellatum*),
- Mojave tarplant (*Deinandra mohavensis*),
- vernal barley (*Hordeum intercedens*),
- Parish's meadowfoam (*Limnanthes gracilis* var. *parishii*),
- slender-horned spineflower (*Dodecahema leptoceras*),
- Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *sanctorum*),
- Brand's phacelia (*Phacelia stellaris*),
- mud nama (*Nama stenocarpum*), and
- smooth tarplant (*Centromadia pungens*)

Narrow Endemic Species Survey Area and Criteria Area Species Survey Area Plants

The property is in a NEPPSA requiring habitat assessment and surveys for NEPSSA Area 4 species: Munz's onion (*Allium munzii*), San Diego ambrosia (*Ambrosia pumila*), many-stemmed dudleya (*Dudleya multicaulis*), spreading navarretia, California Orcutt grass, and Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*). The property is also within a CASSA requiring habitat assessment and surveys for CASSA Area 4 species: thread-leaved brodiaea, Davidson's saltscale (*Atriplex serenana* var. *davidsonii*), Parish's brittlescale (*Atriplex parishii*), smooth tarplant, round leaved filaree (*California macrophylla*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), and little mousetail (*Myosurus minimus* ssp. *apus*).

Focused rare plant surveys were conducted in May and June 2006, April and June 2008, and again in May 2012, in accordance with the MSHCP. The 2006 plant surveys were conducted by biologist Kelly Volansky, who was assisted by University of California Riverside (UCR) botanist Andrew Sanders and UCR herbarium assistant Teresa Salvato, along with contracted biologist Michelle Balk. The 2008 surveys were conducted by HELIX biologists Doug Allen and Rob Hogenauer. The 2012 survey was conducted by Mr. Hogenauer. The property was assessed for habitat suitable for the aforementioned sensitive species using aerial photography and field reconnaissance. The areas of suitable habitat were then thoroughly surveyed on foot. The off-site areas are not within a CASSA.

The rare plant surveys were conducted during the optimal time to identify the target species. This includes the blooming period of the NEPSSA and CASSA species (Tables 1 and 2). The survey included a search for plants associated with Riparian/Riverine habitats. The property was surveyed on May 19, 22, 24, 26, 28, and June 2, 6, 7, and 9, 2006. The 2006 survey covered the entire 973.69 acres (in addition to 326 acres no longer part of this project). Approximately 190 person-hours were spent surveying the property for rare plants in 2006. The 2008 surveys were conducted on April 16 and June 11, and focused on those areas with the potential to support sensitive species. The 2012 survey was conducted on May 11 and focused on areas with potential to support sensitive species within the reduced project footprint. Mr. Hogenauer, in 2012, and Mr. Sward, in 2013, conducted additional site visits that including searching for plants associated with Riparian/Riverine habitats. The off-site study area was not surveyed as part of the above NEPSSA surveys. NEPSSA surveys of the offsite portion McElwain Road shall be conducted prior grading to insure compliance with Section 6.1.3 of the MSHCP. Survey results shall be provided to the RCA and wildlife agencies for review, and to the City for final approval. Plants were identified according to The Jepson Manual: Higher Plants of California (Hickman, ed. 1993). Plant identification was updated using Baldwin et al. (2012).

Table 1
NARROW ENDEMIC SPECIES SURVEY AREA 4
PLANT SPECIES BLOOMING PERIODS

Scientific Name	Common Name	Blooming Period*
Allium munzii	Munz's onion	April to May
Ambrosia pumila	San Diego ambrosia	none (asexual reproduction)
Dudleya multicaulis	many-stemmed dudleya	May to June (as early as March in coastal locations)
Navarretia fossalis	spreading navarretia	May through June
Orcuttia californica	California Orcutt grass	April to June
Trichocoronis wrightii var. *wrightii*	Wright's trichocoronis	May to September

*Blooming period per the Multiple Species Habitat Conservation Plan (MSHCP).

Table 2
CRITERIA AREA SPECIES SURVEY AREA 4
PLANT SPECIES BLOOMING PERIODS

Scientific Name	Common Name	Blooming Period*
Atriplex parishii	Parish's brittlescale	June to October
Atriplex serenana var. *davidsonii*	Davidson's saltscale	May to October
Brodiaea filifolia	thread-leaved brodiaea	March to June
Centromadia pungens	smooth tarplant	April to November
*California macrophylla (Erodium macrophyllum)***	round-leaved filaree	March to May
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	February to June
Myosurus minimus	little mousetail	April to May

* Blooming period per the MSHCP
** Species has under gone recent taxonomic changes. Old name used in MSHCP in parenthesis.

The off-site study area was not surveyed as part of the above NEPSSA and CASSA surveys as access was not granted by the landowner to conduct surveys. The Keller Road outfall area was surveyed by Mr. Hogenauer on May 15, 2019.

Animals

Invertebrates

There are three species of sensitive fairy shrimp that occur in western Riverside County: Riverside fairy shrimp (*Streptocephalus woottoni*), Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*), and vernal pool fairy shrimp (*Branchinecta lynchi*). The property was surveyed for habitat, such as vernal pools or ephemeral ponds, which could support fairy shrimp. Indicators of potential fairy shrimp habitat that were searched for include basins, ruts, cracked mud, algal mats, and drift lines. No suitable habitat occurs within the on-site or off-site study area for these species, and no focused surveys were conducted or are required.

Fish

The Santa Ana sucker (*Catostomus santaanae*) is restricted to the Santa Ana River watershed with year-round flows. No appropriate habitat occurs within the study area.

Birds

Section 6.1.2 of the MSHCP lists five sensitive bird species associated with Riparian/Riverine habitats. The species are bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*). Both the bald eagle and peregrine falcon occur primarily in and adjacent to open water habitats, with the falcon possibly occurring in riparian areas with nearby cliffs for nesting. No suitable habitat occurs on site for the bald eagle. The property does have riparian habitats that could be used by the peregrine falcon, but cliffs that the species would use for nesting do not occur on the property. Bald eagle and peregrine falcon are not expected to occur on the property.

Protocol surveys for least Bell's vireo (USFWS 2001) and southwestern willow flycatcher (USFWS 2000) were conducted and are discussed below.

Least Bell's Vireo

HELIX biologist Deborah Leonard performed a habitat assessment in 2006, which determined that the property included habitat with potential to support the least Bell's vireo at that time. These areas consisted of riparian scrub vegetation dominated by shrubby willows (*Salix* spp.) and mule fat (*Baccharis salicifolia*). A small patch of coast live oak woodland was also surveyed since it is immediately adjacent to the riparian scrub. The rest of the riparian habitat on site consists of coast live oak riparian woodland and forest that do not have the vegetative components or structure necessary for the vireo. The 2006 survey consisted of eight individual surveys conducted between May 18 and July 31 by HELIX biologists Ms. Leonard, Kathy Pettigrew, and Shelby Howard (HELIX 2006a). The 2008 protocol surveys were conducted between June 20 and July 30, 2008, by Mr. Hogenauer and Zsolt Kahancza (HELIX 2008). The 2012 protocol surveys were conducted between April 29 and July 12, 2012, by Mr. Hogenauer (HELIX 2012). The off-site study area does not include habitat with potential to support least Bell's vireo; therefore, surveys for this area are not required. It should be noted that the amount of suitable habitat has decreased significantly since the elimination of the nursery onsite, which was providing summer nuisance flows that contributed to riparian vegetation along the main drainage.

Southwestern Willow Flycatcher and Western Yellow-billed Cuckoo

Ms. Pettigrew performed a habitat assessment in 2006, which determined that the property includes habitat with low potential to support the southwestern willow flycatcher, but does not support habitat with potential to support western yellow-billed cuckoo. The survey area for southwestern willow flycatcher included the areas surveyed for the vireo. The survey was conducted by HELIX permitted biologists Mr. Howard and Ms. Pettigrew with HELIX biologists Ms. Leonard, Roger Ditrick, and Heather Haney as supervised individuals (HELIX 2006b). The off-site study area does not include habitat with potential to support southwestern willow flycatcher; therefore, surveys for this area are not required. It should be noted that the amount of suitable habitat has decreased significantly since the elimination of the nursery onsite, which was providing summer nuisance flows that contributed to riparian vegetation along the main drainage. The limited riparian habitat remaining on site is not considered suitable for the southwestern willow flycatcher.

Burrowing Owl

HELIX biologists Mr. Hogenauer, Zack West, and Mr. Kahancza surveyed the property for the burrowing owl in 2006 and 2008. Mr. Hogenauer surveyed the property again in 2012. An additional survey was completed in 2018 by Mr. Hogenauer assisted by HELIX biologists Amy Lee and Daniel Torres (HELIX 2018). The burrowing owl surveys were conducted in accordance with the County of Riverside's Burrowing Owl Survey Instructions for the MSHCP (Riverside 2006). The area survey included non-native grassland, field croplands, disturbed habitat, and areas of sage scrub with less than 30 percent ground cover. The 2012 and 2018 surveys included

the area of the property that was formerly in use as a nursery, but excluded some of the previous surveyed grasslands as they were overgrown with shrubs. Transects were walked approximately 30 yards apart through potential owl habitat located on the property. A 500-foot buffer zone was visually surveyed from the edge of the subject property where owl habitat bordered the property. Biologists walked slowly and methodically, closely checking the areas that met the basic requirements of owl habitat, which include open expanses of sparsely vegetated areas (less than 30 percent canopy cover for trees and shrubs), gently rolling or level terrain, an abundance of small mammal burrows (especially those of California ground squirrel [*Spermophilus beecheyi*]) and/or fence posts, rock, or other low perching locations. All potential owl burrows were checked for signs of recent owl occupation, which include pellets/casting (e.g., regurgitated fur, bones, and insect parts), white wash (excrement), and feathers.

The Keller Road outfall area was included as part of the buffer area for the burrowing owl surveys. The off-site study area was not included in the burrowing owl surveys. The off-site area has a minimal potential to support burrowing owls. The study area included one acre of grassland that is adjacent to a residence and not typical habitat for burrowing owls. The 18.5-acre study area also includes 4.7 acres of disturbed habitat made up of dirt roads (no burrowing owl potential) and an area adjacent to the existing McElwain Road that appears to have previously been cleared and graded and currently supports sparse shrubs and relatively dense non-native grasses and mustard. Overall, all burrowing owls are not expected to occur within the off-site study area. Burrowing owl surveys of the offsite portion McElwain Road shall be conducted prior grading to insure compliance with Section 6.3.2 of the MSHCP. Survey results shall be provided to the RCA and wildlife agencies for review, and to the City for final approval.

Amphibians

No appropriate habitat for the three amphibian species (arroyo toad [*Bufo californicus*], mountain yellow-legged frog [*Rana muscosa*], or California red-legged frog [*Rana aurora draytonii*]) listed under MSHCP 6.1.2 occurs on site, and none of these species has any potential to occur on site. This property lies outside of the MSHCP survey area for amphibians and no surveys are required.

V. RIPARIAN/RIVERINE RESOURCES

The Riparian/Riverine and vernal pool habitat assessment revealed that vernal pools do not occur on the property. The property does include multiple areas that meet the MSHCP definition of Riparian/Riverine (Figure 5). Major ridgelines divide the property into three watersheds. The watersheds are described below and named according to the off-site stream to which they are tributary.

A. RIPARIAN/RIVERINE HABITAT

The MSHCP defines Riparian/Riverine habitat as:

> "lands which contain Habitat dominated by [trees], shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year."

The Murrieta Hills property has areas that meet the MSHCP definition of Riparian/Riverine. For the purpose of this analysis, the areas that have vegetation dependent on soil moisture are referred to as "riparian." Areas that do not have vegetation dependent on soil moisture but do convey water (primarily during or following a rain event) are referred to as "riverine." Areas that were identified as swales are not considered Riparian/Riverine because they lacked any evidence of flow.

The Riparian/Riverine habitat on the property totals 12.31 acres composed of 9.10 acres of riparian habitats and 3.21 acres of riverine habitat. The riparian habitats are 1.54 acres of southern willow scrub, 0.47 acre of mule fat scrub, 7.02 acres of coast live oak woodland, and 0.07 acre of southern cottonwood-willow riparian forest. The riverine habitat is composed of 3.21 acres of streambed. As stated above in the jurisdictional delineation discussion the off-site area was based on an assessment via binoculars, aerial photographs, and topographic maps. It is anticipated that a small amount of riverine habitat (estimated at 0.04 acre of streambed) occurs within the off-site study area.

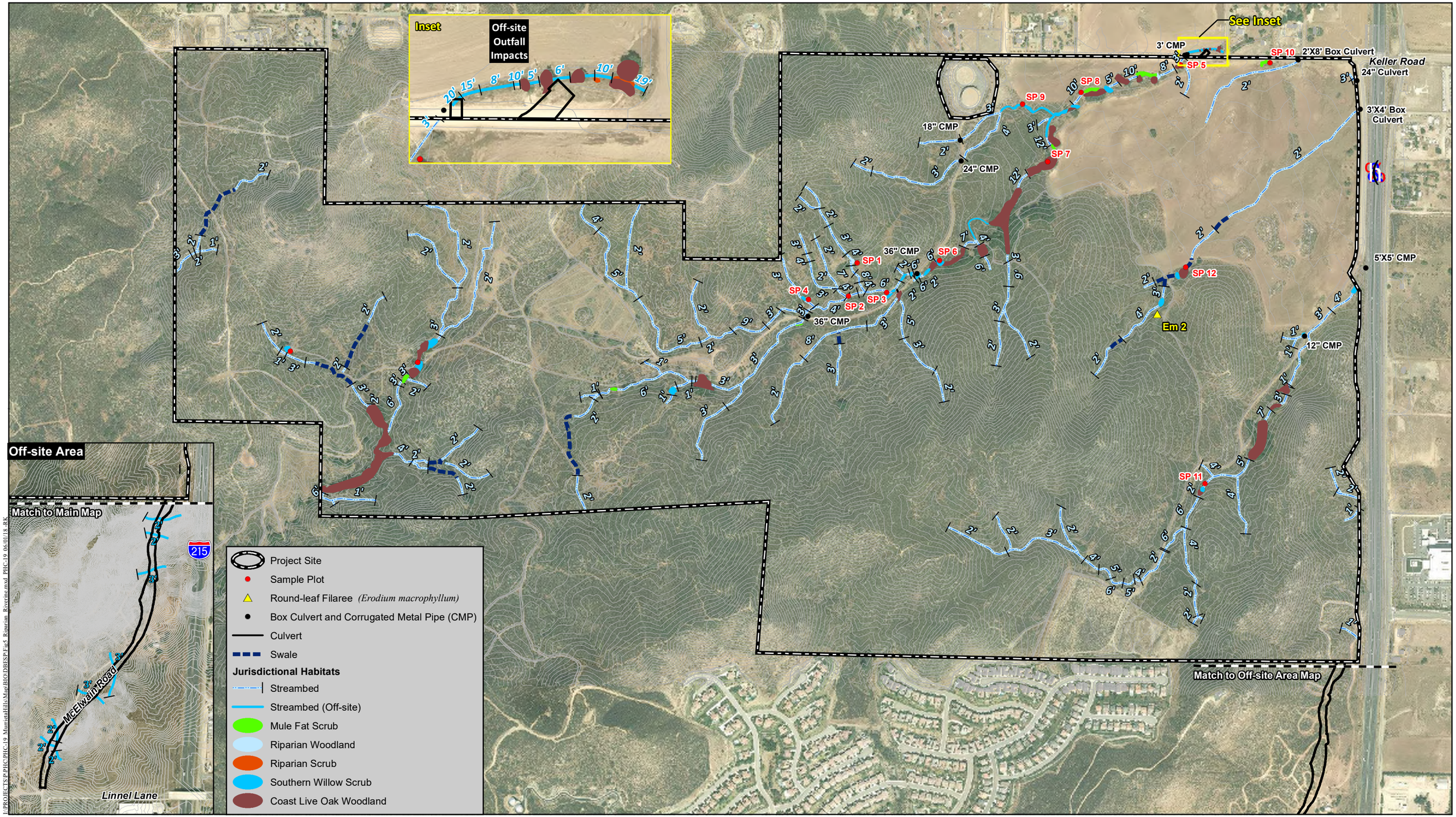
Table 3
RIPARIAN/RIVERINE HABITATS

Habitat	Area (acres)	Length[1] (feet)
Coast Live Oak Woodland	7.02	4,242
Mule Fat Scrub	0.47	474
Southern Cottonwood-willow Riparian Woodland	0.07	56
Southern Willow Scrub	1.54	2,076
Streambed	3.21	43546
TOTAL	**12.31**	**50,394**

[1] Length of drainages provided for overall drainage length. When two or more habitats exist alongside each other, the linear length is divided among the habitats.

1. Salt Creek Watershed

The Salt Creek Watershed is the largest of the three on-site watersheds and occurs in the center and northeastern portions of the property. The Salt Creek Watershed is comprised of a main drainage and multiple tributary drainages. The main drainage begins near the center of the property and drains to the northeast, exiting the property along Keller Road halfway between the water reservoir and I-215. The Salt Creek Watershed forms a portion of the headwaters tributary to Salt Creek.



Riparian/Riverine and CASSA Plant Location Map

MURRIETA HILLS

HELIX Environmental Planning

Figure 7

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The vegetation associated with the main drainage of the Salt Creek Watershed varies. The high point of the drainage (western/southern reach) includes tamarisk, eucalyptus, and a few mule fat, along with a small pocket of willows. The middle reach of the drainage has areas with minimal to no riparian vegetation, along with pockets of sparse riparian scrub comprised of willows and mule fat. The northern/eastern reach of the drainage has dominated by coast live oak woodland with small patches of mule fat scrub.

The smaller drainages that are tributary to the Salt Creek Watershed include minimal riparian vegetation. The tributary drainages that do have riparian vegetation include sparse cover such as a few individual mule fat, willows, or an isolated western cottonwood.

2. Murrieta Creek Watershed

The Murrieta Creek Watershed is located on the western portion of the property. On site, the Murrieta Creek Watershed is comprised of a main drainage that begins just west of the center of the property and drains to the southwest before exiting at the southwest corner of the property. This watershed includes multiple drainages that are tributary to the main drainage. The on-site portion of the Murrieta Creek Watershed is a headwaters area tributary to Murrieta Creek. A small portion of the Murrieta Creek Watershed is located along the southern border of the property.

The vegetation along the main drainage is mostly coast live oak woodland, with the upper elevation (northern) reach including small patches of southern willow scrub and mule fat scrub. The remainder of the tributary drainages contain little to no riparian vegetation.

3. Warm Springs Creek Watershed

The Warm Springs Creek Watershed is the smallest of the on-site watersheds and is located in the southeast portion of the property. The Warm Springs Creek Watershed is comprised of a main drainage and its tributaries that drain to the northeast exiting the property via two 5-foot culverts that pass under I-215 near the south edge of the agricultural field. The on-site portion of the Warm Springs Creek Watershed is a headwaters area tributary to Warm Springs Creek.

The higher elevation (southern) reach of the main drainage contains sparse riparian vegetation primarily consisting of a few scattered mule fat. The middle reach of the main drainage primarily has coast live oak woodland where vegetation occurs. The northern reach of the main drainage includes a few scattered willows and a patch of mule fat scrub. The vegetation adjacent to the culverts has been cleared several times over the years during the mowing that occurs adjacent to I-215.

B. RIPARIAN/RIVERINE AND VERNAL POOL SPECIES

The definition of Riparian/Riverine habitats is based on potential for the habitat to support Riparian/Riverine Covered Species, which are identified in MSHCP Section 6.1.2 and described below.

1. Plants

As discussed above, the MSHCP lists 23 sensitive plant species that have potential to occur in Riparian/Riverine and Vernal Pool habitats. Rare plant surveys conducted on the property in 2006, 2008, and 2012 were negative for Riparian/Riverine plant species. Shrub and tree species such as California black walnut, Engelmann oak, and Coulter's matilija poppy would have been readily identifiable during project surveys but were not found on site. A large number of the species including spreading navarretia, California Orcutt grass, prostrate navarretia, San Diego button-celery, Orcutt's brodiaea, thread-leaved brodiaea, San Jacinto Valley crownscale, and Vernal barley are only known to occur in or are associated with vernal pool or similar habitats that do not occur on the property.

San Miguel savory is associated with rocky and metavolcanic substrates in coastal sage scrub, chaparral, riparian woodland and grassland habitats. This perennial shrub is visible year round and was not observed during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

Graceful tarplant occurs in chaparral, coastal sage scrub, and grasslands. This species primarily occurs on the Santa Rosa Plateau and in the San Mateo Canyon Wilderness. This species was not observed on site during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

Fish's milkwort occurs in shaded area within oak and riparian woodlands, and occasionally is found in chaparral habitat. This species was not observed on site during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

Lemon lily occurs on the banks of seeps, springs, and permanent streams at elevations above 4,000 feet above mean sea level. Habitat for this species does not occur on the property.

Ocellated Humboldt lily is associated with riparian habitat in coastal chaparral and coniferous forests. It is often found on stream benches, but is also known to occur on shaded slopes under oak woodlands. This species was not observed on site during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

Mojave tarplant occurs on vernally mesic clay or silty soils along stream channels and is often found in grassland or chaparral adjacent to riparian scrub habitats. This species is limited to the north-facing slopes of the San Jacinto Mountains. The property is outside of the known range of this species.

Parish's meadowfoam habitat is limited to ephemeral wetlands on mountain slopes. Its only known location within Riverside County is on the Santa Rosa Plateau. The property is outside of the known range of this species.

Slender-horned spineflower occur on mature alluvial scrub habitat on sandy and/or gravelly soils. This species was not observed on site during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

Santa Ana River woolly-star is only found on open washes and alluvial fan scrub that under goes regular scouring that maintains the open shrub land. This species is only known to occur along the banks of the Santa Ana River. No habitat for this species occurs on the property.

Brand's phacelia (*Phacelia stellaris*) occurs in coastal dunes and/or coastal scrub in sandy openings, sandy benches, dunes, sandy washes, or flood plains of rivers at elevations between zero and 1,200 feet. Brand's phacelia is known from two locations on sandy terraces along the Santa Ana River (at Fairmont Park and along a horse trail in the Santa Ana Wilderness Area along the Santa Ana River). This species was not observed on site during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

Mud nama (*Nama stenocarpum*) is restricted to muddy embankments of marshes and swamps and within lake margins and riverbanks (CNPS 2013). Three populations are known from Riverside County, with two occurring along the San Jacinto River (Dudek 2003). This species was not observed on site during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

Smooth tarplant is found in southwestern California and northwestern Baja California, Mexico (Baja), and occurs in San Bernardino, Riverside, and San Diego counties. This species occurs in open spaces within a variety of habitats, including alkali scrub and playas, riparian woodland, watercourses, and grasslands with alkaline affinities (Dudek 2003; CNPS 2013). This species was not observed on site during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

2. Animals

Invertebrates

Potential habitat for Vernal pool fairy shrimp, Riverside fairy shrimp and Santa Rosa Plateau fairy shrimp does not occur on the property. The site does include a 4.4 acre patch of clay soils located on the south-southeast edge of the agricultural field. The clay soils have been disturbed from years of discing and dry farming. The clay soils area, along with the rest of the site, does not include vernal pools, ephemeral basins, or similar habitat that could support fairy shrimp. Due to a lack of habitat, Potential habitat for these species does not occur on the property; therefore, no surveys were conducted and these species are not expected to occur on the property.

Fish

The Santa Ana sucker is restricted to the Santa Ana River watershed with year-round flows. No appropriate habitat occurs within the study area. This species is not expected to occur on the property.

Amphibians

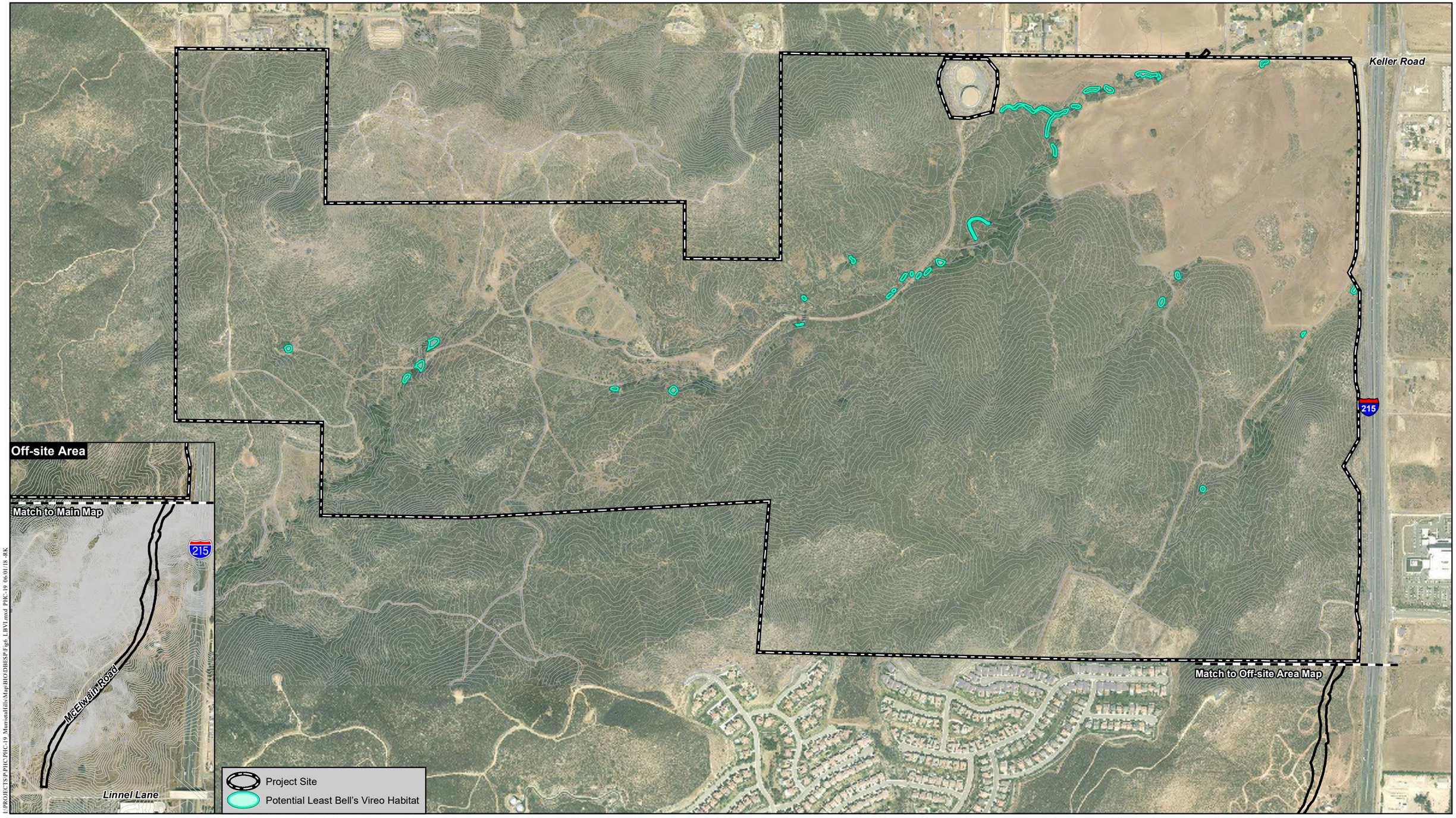
No appropriate habitat for the three amphibian species (arroyo toad, mountain yellow-legged frog, or California red-legged frog) listed under MSHCP 6.1.2 occurs within the study area and none of these species has any potential to occur within the study area.

Birds

The least Bell's vireo (*Vireo bellii pusillus*) is found in riparian scrub, forest, and woodland habitats that typically feature dense cover within one to two meters of the ground and a dense, stratified canopy. It inhabits low, dense riparian growth along water or dry parts of intermittent streams. Typically, the vireo is associated with southern willow scrub, cottonwood forest, mule fat scrub, sycamore alluvial woodland, coast live oak riparian forest, arroyo willow riparian forest, wild blackberry, or mesquite in desert localities. It uses habitat limited to the immediate vicinity of water. The vireo primarily nests in vegetation typically dominated by willows and mule fat but may also use a variety of shrubs, trees, and vines. The property includes habitats with potential to support least Bell's vireo (Figure 6). The project proposes impacts to habitat with potential to support least Bell's vireo, therefore surveys are required and were conducted. The surveys were conducted in 2006, 2008, and 2012, and were all negative for the presence of least Bell's vireo.

The southwestern willow flycatcher (*Empidonax traillii extimus*) is restricted to dense riparian woodlands along streams and rivers with mature, dense stands of willows, cottonwoods (*Populus* spp.), or smaller spring fed or boggy areas with willows or alders (*Alnus* spp.). It breeds in relatively dense riparian habitats. The study area has riparian woodland that has low potential for southwestern willow flycatcher. The southern cottonwood-willow riparian forest that has the most potential to support southwestern willow flycatcher is being avoided. The project does propose impacts to adjacent riparian habitat that has minimal potential to support this species. Surveys were conducted for southwestern willow flycatcher in 2006 with negative results. As the main habitat with potential to support this species is being avoided, additional focused surveys were not conducted. Southwestern willow flycatchers were not observed during the least Bell's vireo surveys conducted on the property. Southwestern willow flycatcher is not expected to occur on the property.

The western yellow-billed cuckoo requires dense, wide riparian woodlands with well-developed understories for breeding. It occurs in densely foliaged, deciduous trees and shrubs, especially willows that are required for roost and nest sites. When breeding, the cuckoo is restricted to river bottoms and other mesic habitats where humidity is high and where dense understory abuts slow-moving watercourses, backwaters, or seeps. Willow is almost always a dominant component of the vegetation. The 2006 habitat assessment concluded that no suitable habitat for this species occurs on the property. The western yellow-billed cuckoo is not expected to occur on the property.



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Potential Least Bell's Vireo Habitat

MURRIETA HILLS

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Figure 6

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VI. NARROW ENDEMIC SPECIES SURVEY AREA AND CRITERIA AREA SPECIES SURVEY AREA SPECIES

The surveys conducted for rare plants resulted in negative finding for NEPSSA plant species, and positive findings for round-leaved filaree (*California macrophylla*), a CASSA species. Two round-leaved filaree individuals were observed in the northeast quarter of the property near the agricultural land during the 2006 survey (Figure 7). The species was observed in a disc of clay soil near the mapped Auld clay soils (Knecht 1971). UCR botanist Mr. Sanders noted that low rainfall (approximately 66 percent of normal) in spring 2006 caused unusual growing conditions that have resulted in the plants of the genus *Erodium* (of which this species is formerly of) occurring in smaller numbers. This suggests that it is possible that a slightly larger number of individuals of round-leaved filaree could exist at this location in a normal rainfall year. However, no individuals of this species were observed during rare plant surveys in 2008 with a recorded rainfall of 88 percent of normal, or in 2012 with a rainfall of 63 percent of normal (National Oceanic and Atmospheric Administration 2012). It is a possibility that the unusually high rainfalls of 2005 (242 percent of average) resulted in a larger that normal growth for round-leaved filaree in 2006.

Based on the MSHCP (Dudek 2003) there are 10 records of this species in the Plan Area. Eight out of the 10 occurrences will be conserved within the MSHCP Conservation Area, and at least 37,663 acres of potential habitat will be conserved.

Based on the data collected over 3 separate years of rare plant surveys and conservation proposed for this species under the MSHCP, the minor potential population of round-leaved filaree located on the property does not have long-term conservation value.

As stated above, the off-site study area was not surveyed as part of the above NEPSSA and CASSA surveys as access was not granted by the landowner to conduct surveys. NEPSSA surveys of the offsite portion McElwain Road shall be conducted prior grading to insure compliance with Section 6.1.3 of the MSHCP. Survey results shall be provided to the RCA and wildlife agencies for review, and to the City for final approval.

The MSHCP requires the project to conduct special assessments for six Narrow Endemic plant species:

- Munz's onion: Munz's onion is restricted to clay and cobbly clay soils associated with Altamont, Auld, Bosanko, Claypit, and Porterville series soils. Munz's onion occurs in scattered locations at Estelle Mountain, Gavilan Plateau, hills of Lake Elsinore to Paloma Valley, and Skunk Hollow/Lake Skinner area. A small area of Altamont clay soils were mapped on site in the northwestern corner of the northern parcel, and clay soil inclusions were noted during project surveys. Focused surveys were negative for this species.

- San Diego ambrosia: San Diego ambrosia is associated with river terraces, vernal pools, and alkali playas on Garretson gravelly fine sandy loams and Las Posas loams in close proximity to Willows series soils. The only known extant populations of this species in Riverside are in the Alberhill area of Lake Elsinore and Skunk Hollow. No Garretson

gravelly fine sandy loams or Las Posas loams occur on site, although a small area of Garretson gravelly very fine sand loam does occur in the southwestern portion of the site. This species was surveyed for but not observed. The potential for this species to occur on site is very remote.

- Many-stemmed dudleya: Many-stemmed dudleya is restricted to clay and cobbly clay soils associated with Altamont, Auld, Bosanko, Claypit, and Porterville series soils. This species occurs in scattered locations primarily in the Temescal Canyon, Gavilan Plateau, and Alberhill areas and the Santa Ana Mountains. A small area of Altamont clay soils were mapped on the site, and clay soil inclusions were noted during project surveys. Focused surveys were negative for this species.

- Spreading navarretia: Primary habitat for spreading navarretia is vernal pools/depressions and ditches in areas that once supported vernal pools. Riverside County supports the largest remaining populations, which are associated with the largest areas of available habitat in the U.S. The closest known population is along the San Jacinto River just west of I-215. No vernal pools occur on site or are known from the vicinity. There is no potential for this species to occur on site.

- California Orcutt grass: California orcutt grass is restricted to vernal pools, which do not occur on site. It is known from the Santa Rosa Plateau, Skunk Hollow, and Upper Salt Creek in Riverside County and also occurs in San Diego County. There is no potential for this species to occur within the project boundaries.

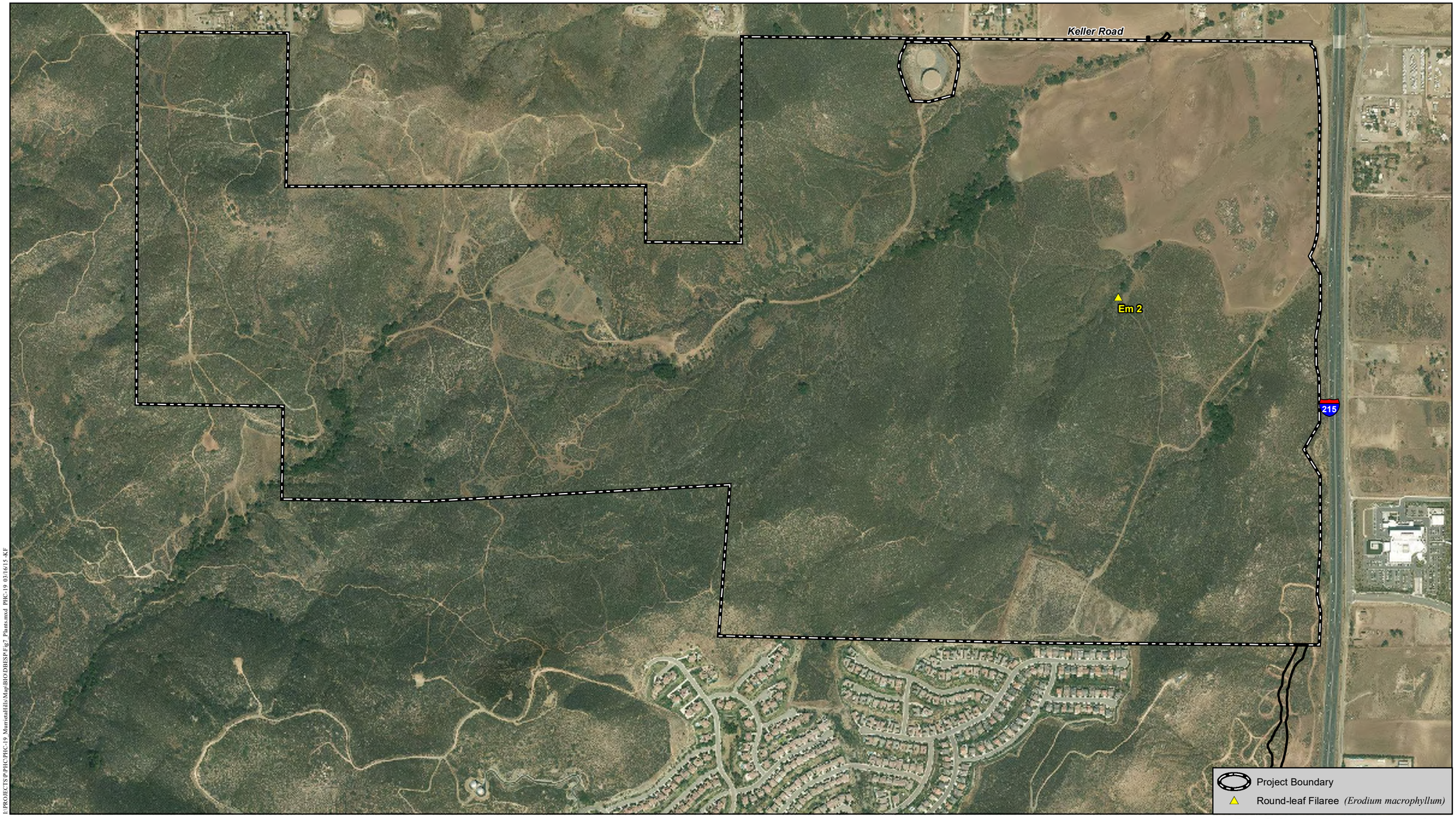
- Wright's trichocoronis: According to the MSHCP reference document, the middle section of the San Jacinto River and Salt Creek in the Hemet area represent the two core areas for Wright's trichocoronis. This species is limited to alkali soils, which are not present on site.

Based on the surveys the project conducted, the project site does not contain suitable habitat for any of these Narrow Endemic plant species, and none occurred on the site.

The MSHCP requires the project to conduct special assessments for six Criteria Area plant species in addition to the round-leaved filaree noted above:

- Davidson's saltscale: Davidson's saltscale is known to occur in cismontane southwestern California from Ventura (Ojai), western Orange (Seal Beach, San Joaquin Freshwater Marsh, Newport Backbay), and in western Riverside counties (Dudek 2003). In Riverside County, it is found in the Domino-Traver-Willows soils series in association with alkali vernal pools, annual grassland, playa, and scrub components of alkali vernal plains, none of which occurs on site.

- Parish's brittlescale: Known from San Diego and Riverside counties as well as Baja California, Mexico (Baja), Parish's brittlescale occurs in association with vernal pools, alkali playas, and chenopod scrub, none of which occurs on site.



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CASSA Plant Location

MURRIETTA HILLS

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0 800 Feet

Figure 7

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- Thread-leaved brodiaea: Twelve populations of thread-leaved brodiaea (*Brodiaea filifolia*) are known from Riverside County, with the San Jacinto River and Santa Rosa Plateau areas containing core populations. This species also occurs in San Diego County and is restricted to clay lens soils in annual grasslands and vernal pools. No thread-leaved brodiaea was observed during focused surveys of the site.

- Smooth Tarplant: Smooth tarplant is found in southwestern California and northwestern Baja California, Mexico (Baja) and occurs in San Bernardino, Riverside, and San Diego counties. This species occurs in a variety of habitats, including alkali scrub and playas, riparian woodland, watercourses, and grasslands with alkaline affinities (Dudek 2003; CNPS 2007). No alkali soils are present on site.

- Coulter's Goldfields Three core populations of Coulter's goldfields are known from Riverside County with the San Jacinto Wildlife Area and southern shores of Mystic Lake supporting the largest remaining population throughout its range. The other two core areas occur along the middle segment of the San Jacinto River and alkali flats between Alberhill and Lake Elsinore. This species also occurs in San Luis Obispo, Santa Barbara, Ventura, Los Angeles and San Diego counties and Baja in marshes, swamps, playas, and vernal pools, none of which occurs on site.

- Little Mousetail: Little mousetail occurs in scattered locations from Orange and San Bernardino counties south to coastal San Diego County from sea level to 1,500 meters elevation. This species occurs in association with vernal pools and within alkali vernal pools and annual grassland components of alkali vernal plains. No alkali soils are present on site.

Based on the surveys the project conducted, the project site does not contain suitable habitat for any of these Criteria Area plant species, except for the round-leaved filaree.

VII. IMPACTS

A. RIPARIAN/RIVERINE HABITATS

As described above, the emphasis of the MSHCP's Riparian/Riverine and vernal pool policy is on conservation of habitats capable of supporting MSHCP Covered Species. The goal of the DBESP process is to determine if the project has in fact provided for a project alternative that results in biologically equivalent or superior preservation. The first priority for Riparian/Riverine habitats that have potential to contribute to the biological values of the MSHCP preserve is avoidance of direct impacts. The originally proposed project footprint included impacts to approximately 498 acres of land that included impacts to 3.16 acres of vegetated riparian habitat (HELIX 2007). The current proposed project has reduced the vegetated riparian impact down to 0.97 acre, over 69 percent reduction in impacts. Proposed Riparian/Riverine impacts composed of 0.42 acre of coast live oak woodland, 0.04 acre of riparian woodland, 0.36 acre of southern willow scrub, 0.15 acre of mule fat scrub, and 1.13 acres of streambed (Figures 8a-c). Total impacts to Riparian/Riverine have been reduced to 2.10 acres.

Fuel modification planned in proximity of the Riverine resources are not expected to result in complete loss of functions and services associated with Riverine resources, although some reduction in these functions and services may occur. An analysis of potential impacts was prepared by HELIX (2019b) and is included as Appendix A to this report. Based on this, impacts have been assessed to 0.5845 acre of Riverine/streambed within Zones 2 and 3, and 0.0188 acre for Zone 1 for a total impact area of 0.6010 acre. The Murrieta Hills Fire Protection Technical Report (Dudek 2019) is provided as Appendix B.

As noted above, plant and animal species associated with Riparian/Riverine habitats do not occur on site. None of the species covered under Section 6.1.2 occur on site as evident by a lack of potential habitat or where habitat occurs focused surveys have had negative results.

The Riparian/Riverine habitats proposed to be impacted do not support Riparian/Riverine target species. The proposed impacts are all within Cell Group C, as is the proposed on site conservation. The functions of the Riverine streams and disturbed wetland within the study area are primarily water conveyance, sediment transport, and energy dissipation (hydrologic regime and flood attenuation). The southern willow scrub, mule fat scrub, and coast live oak woodland provide all of the above along with providing cover for wildlife movement and habitat for nesting birds.

The project proposes impacts to 0.36 acre of impacts to habitat with low potential to support least Bell's vireo (Figure 9). This habitat was determined to not be occupied by least Bell's vireo or southern willow flycatcher.

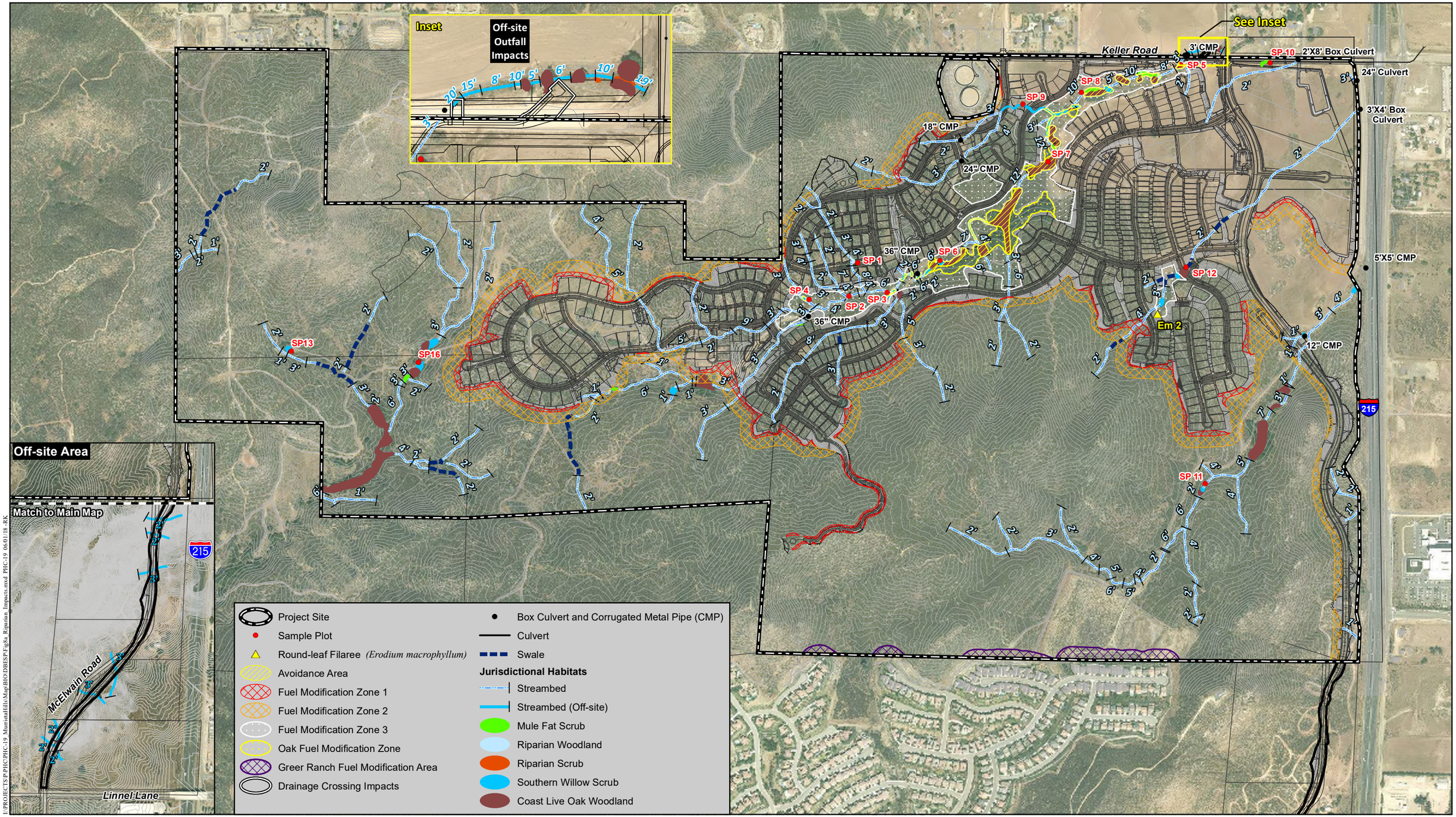
Table 4
RIPARIAN/RIVERINE IMPACTS AND AVOIDANCE
(acres)

Habitat	Existing	Impacted	Avoided
Coast live oak woodland	7.02	0.42	6.60
Southern riparian woodland	0.07	0.04	0.03
Southern willow scrub	1.54	0.36	1.18
Mule fat scrub	0.47	0.15	0.32
Streambed*	3.21	1.13	2.08
Streambed (Fuel Modification)	Included above	0.6010	N/A
TOTAL	**12.31**	**2.7010**	**10.21**

*Streambed existing and impacts include 0.04 acre that occurs off site.

B. NARROW ENDEMIC SPECIES SURVEY AREA AND CRITERIA AREA SPECIES SURVEY AREA IMPACTS

The NEPSSA and CASSA surveys conducted in 2006 resulted in the finding of two individuals of the CASSA species round-leaved filaree. No NEPSSA or CASSA species were observed during the focused surveys conducted in 2008 and 2012. The area in which the round-leaf filaree was located will be impacted by the project (Figure 10).



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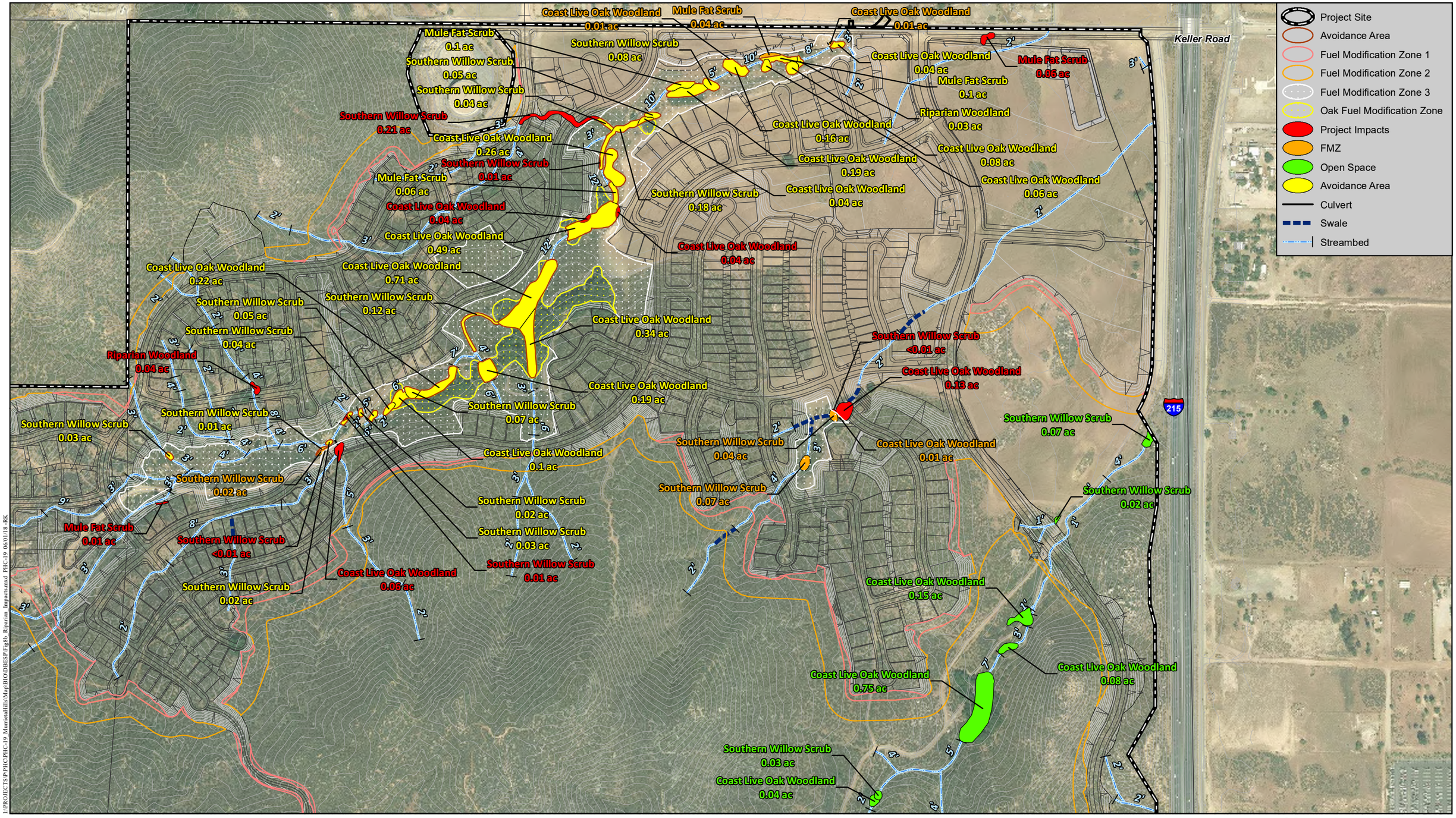
Riparian/Riverine and CASSA Plant Impacts

MURRIETA HILLS

HELIX Environmental Planning

N 0 800 Feet

Figure 8a



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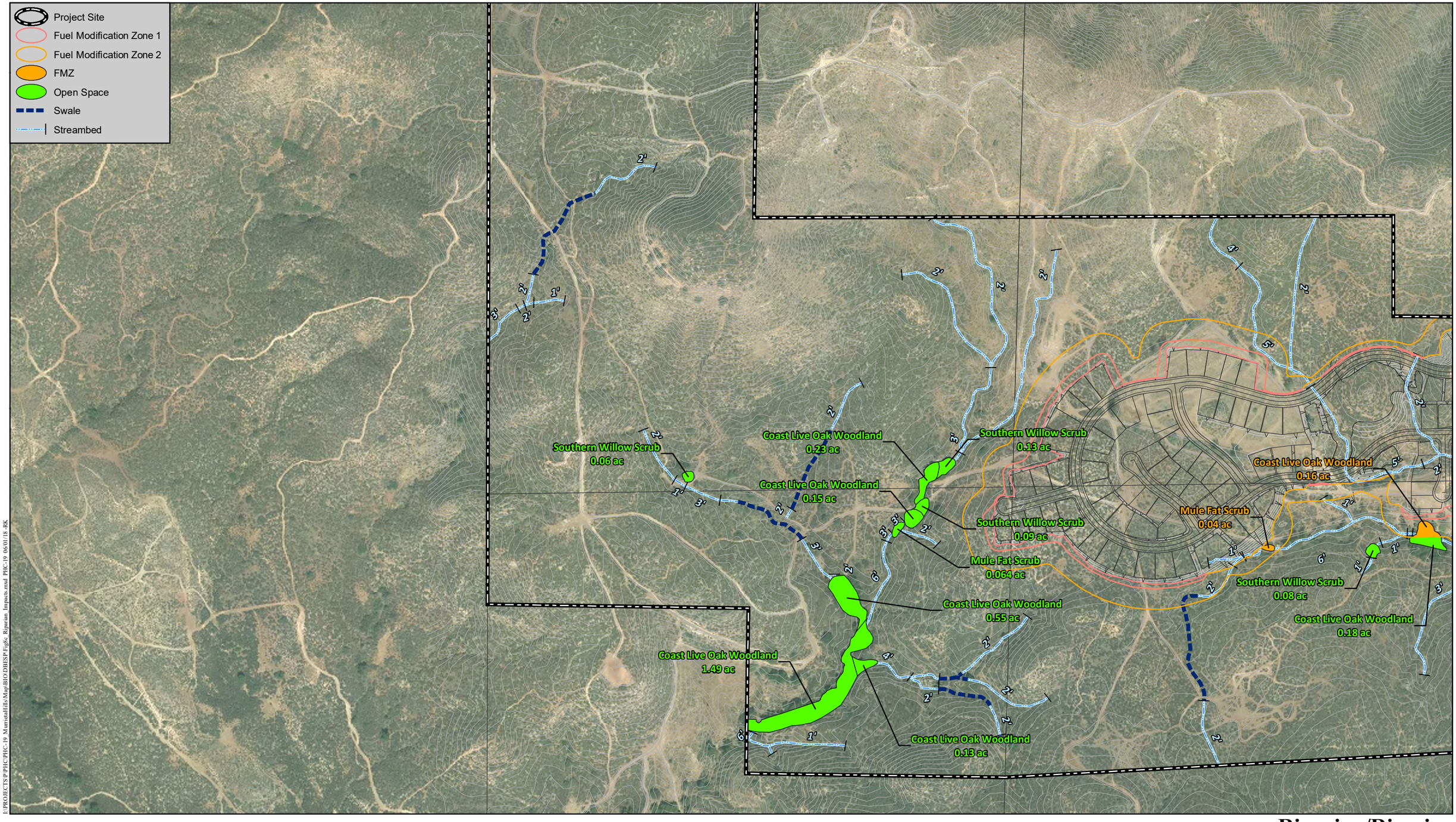
Riparian/Riverine

MURRIETA HILLS

HELIX Environmental Planning

0 450 Feet

Figure 8b



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Riparian/Riverine

MURRIETA HILLS

HELIX Environmental Planning

0 450 Feet

Figure 8c

Keller Road

215

Off-site Area

Match to Main Map

Match to Off-site Area Map

McElwain Road

Linnel Lane

Project Site
Potential Least Bell's Vireo Habitat
Avoidance Area
Fuel Modification Zone 1
Fuel Modification Zone 2
Fuel Modification Zone 3
Oak Fuel Modification Zone
Greer Ranch Fuel Modification Area

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Potential Least Bell's Vireo Habitat/Impacts

MURRIETA HILLS

HELIX Environmental Planning

N

0 800 Feet

Figure 9

Keller Road

Cpl 75
Cpp 1680

Cpl 25
Cpp 70
Hp 40

Hp 4
Hp 5

Cpl 10,000
Cpp 30

Cpl 500

Lv 200

Cpl 7
Cpp 350
Dp 50

Cpl 8
Cpp 1,000

Lv 100

Cpl 150

Cpl 4

Cpl 50

Cpp 60

Cpl 500+
Cpp 500+
Hp 160

Cpp 30

Cpl 4

Cpl 450
Cpp 30
Hp 15

Cpl 80

Cpl 7,000
Hp 200

Cpl 4,000
Cpp 75
Hp 70

Cpl

Cpp

Cpl 3,500

Cpl 6

Cpp 15

Hp

Em 2

Cpp 250

Cpp 140

Cpp

Cpp

Cpp

Cpp

Cpl 10
Cpp 150

Cpl 2
Hp 10

215

Off-site Area

Match to Main Map

215

McElwain Road

Linnel Lane

Match to Off-site Area Map

Project Site

Extent of Rare Plants

Pie Chart Representing Percentage of Rare Plant Species in Grouping

CASSA Species

Em Round-leaf Filaree *(Erodium macrophyllum)*

MSHCP Covered Species

Cpl Long-spined Spineflower *(Chorizanthe polygonoides longispina)*

Cpp Parry's Spineflower *(Chroizanthe parryi parryi)*

Hp Palmer's Grapplinghook *(Harpagonella palmeri)*

Species Not Covered by MSHCP

Dp Paniculate Tarplant *(Deinandra paniculata)*

Lv Robinson's Pepper Grass *(Lepidium virginicum* var. *robinsonii)*

Avoidance Area

Fuel Modification Zone 1

Fuel Modification Zone 2

Fuel Modification Zone 3

Oak Fuel Modification Zone

Greer Ranch Fuel Modification Area

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Rare Plant Impacts

MURRIETTA HILLS

HELIX Environmental Planning

0 800 Feet

Figure 10

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The two individual round-leaved filaree were observed on a small (less than 0.1 acre) opening in chaparral adjacent to a dirt road. Per the MSHCP reference documentation round-leaved filaree is restricted to open cismontane woodland and valley and foothill grassland habitats (Dudek 2003). The species was not observed on subsequent surveys conducted in 2008 and 2012. The one site population was observed at a maximum size of 2 individuals.

This species is known primarily from five records in the Gavilan Hills, one record at Lake Mathews, one at Diamond Valley Lake, one along Temescal Wash near Lee Lake, one in French Valley, and one in the foothills of the Agua Tibia Mountains. No core areas have been identified for this species (Dudek 2003). Eight out of the 10 known occurrences within the MSHCP plan area will be conserved along with 37,663 acres of potential habitat for the species.

Two of the known populations occur on Bosanko clay soils, while the two individuals were observed on Cajalco rocky fine sandy loam. As the species is typically observed on clay soils, they were most likely on a clay disc inclusion with the Cajalco soil.

Based on the small population, small size of the appropriate habitat, inappropriate surrounding habitat, soils, and that the species was observed during only 1 of the 3 years of plant surveys, the location of the round-leaved filaree does not represent habitat with potential to have long term conservation value for the species.

C. RIPARIAN/RIVERINE COVERED SPECIES

None of the species covered under Section 6.1.2 are anticipated to occur within the project area. The streambeds and associated vegetation on site are considered Riparian/Riverine and as these met the MSHCP definition for Riparian/Riverine and are tributary to downstream resources with potential to support sensitive riparian species.

VIII. AVOIDANCE AND MITIGATION

A. AVOIDANCE

MSHCP Section 6.1.2 states:

> "The purpose of the procedures described in this section is to ensure that the biological functions and values of these areas throughout the MSHCP Plan Area are maintained such that Habitat values for species inside the MSHCP Conservation Area are maintained."

The first priority for Riparian/Riverine habitats within Cell Criteria areas that have potential to contribute to MSHCP preserve biological values is avoidance of direct impacts.

The MSHCP states that:

> "[f]or identified and mapped resources not necessary for inclusion in the MSHCP Conservation Area, applicable mitigation under CEQA, which may include federal and state regulatory standards related to wetland functions and values, will be imposed by the Permittees. To ensure that these standards are met, Permittees shall ensure that, through the CEQA process, project applicants develop project alternatives demonstrating efforts that first avoid, and then minimize direct and indirect effects to the mapped wetlands and shall review these alternatives with the Permittee. An avoidance alternative shall be selected, if feasible. If an avoidance alternative is selected, measures shall be incorporated into the project design to ensure the long-term conservation of the areas to be avoided.
>
> If an avoidance alternative is not feasible, a practicable alternative that minimizes direct and indirect effects to Riparian/Riverine areas and vernal pools and associated functions and values to the greatest extent possible shall be selected. Those impacts that are unavoidable shall be mitigated such that the lost functions and values as they relate to Covered Species are replaced as set forth below under the Determination of Biologically Equivalent or Superior Preservation."

The first priority for sensitive habitats under the California Environmental Quality Act (CEQA) and under the MSHCP is avoidance of direct impacts. The project has been redesigned to avoid some impacts to the Riparian/Riverine resources. The previous project footprint would have impacted 5.1 acres of riparian habitat, plus additional riverine habitat. The proposed project reduces the riparian impacts by 66 percent down to 1.07 acres. This reduction in riparian impacts is accomplished through reductions to the extent of the proposed project in the western portion of the property and eliminating two road crossings in the proposed linear natural park. The project avoids impacts to 10.21 acres of Riparian/Riverine habitats. The project avoids 77 percent of the southern willow scrub, 47 percent of the mule fat scrub, 94 percent of the coast live oak woodland (that is riparian habitat), and 65 percent of the streambed. The project avoids 83 percent Riparian/Riverine habitat. According to the 2012 Western Riverside County MSHCP Annual Report, all vegetation communities in Rough Step Unit 6 (which includes the project area) are "in step". The proposed project would preserve 10.21 acres of Riparian/Riverine habitats through avoidance, of which 6.11 acres are part of the proposed conservation area. Impacts are to peripheral and isolated patches of riparian habitat, while preserving a contiguous corridor of riparian habitat in the linear natural park. Total avoidance can be achieved only by minimal or no project alternatives, which render the project infeasible.

B. MITIGATION

Mitigation measures that would result in equivalent or superior preservation of the functions and values of Riparian/Riverine resources impacted by the project are shown here.

Mitigation for impacts to Riparian (vegetated) resources will be at a 3:1 ratio, for a total of 2.91 acres. The Riverine resources (streambed) will be mitigated at a 2:1 ratio, for a total of 2.6434 acres (Table 5). A total of 5.6534 acres of mitigation will occur via off-site purchase of credits from an approved Mitigation Bank or In Lieu Fee program, off-site habitat restoration, or

other mitigation method as approved by the City and other resource agencies. If off-site habitat restoration is proposed, a Habitat Mitigation and Monitoring Program will be prepared and submitted to the City, USFWS, CDFW and RCA for review and approval prior to initiation of impacts to Riparian/Riverine resources. The Mitigation Bank and In Lieu Fee options will provide for mitigation within a much broader conservation context with resources that will be of an equal or greater conservation value to the coast live oak woodland, riparian woodland, southern willow scrub, mule fat scrub and streambed resources. and the proposed mitigation bank is the Riverpark Mitigation Bank. The Riverpark Mitigation Bank provides for re-establishment of alkali playa and vernal pool habitats which are two of the rarest habitat types in the MSHCP. Mitigation for unavoidable impacts to Riparian/Riverine areas will be biologically equivalent to resources being impacted by the proposed project. The 4.10 acres of avoidance within the Linear Nature Park will be protected via a deed restriction that precludes impacts to these Riparian/Riverine resources.

Table 5
MITIGATION FOR IMPACTS TO RIPARIAN/RIVERINE RESOURCES

Vegetation Type	Impacts*	Mitigation Ratio	Mitigation Required*
Coast live oak woodland	0.42	3:1	1.26
Riparian woodland	0.04	3:1	0.12
Southern willow scrub	0.36	3:1	1.08
Mule fat scrub	0.15	3:1	0.45
Streambed	1.13	2:1	2.26
Streambed (Fuel Modification)	0.6010	See Appendix A	0.4834
TOTAL	**2.7010**		**5.6534**

* acres

Mitigation measures to minimize impacts to waters include:

- Use of standard Best Management Practices (BMPs) to minimize the impacts during construction;

- Storage of equipment in upland areas, outside of drainages except as required by project design (restoration, trash removal, etc.);

- Implementation of source control and treatment control BMPs to minimize the potential contaminants that are generated during and after construction. Source control BMPs include landscape planning, roof runoff controls, trash storage areas, use of alternative building materials, and education of future tenants and residents. Treatment control BMPs includes detention basins, vegetated swales (bio-swales), drain inlets, and vegetated buffers. Water quality BMPs will be implemented throughout the project to capture and treat contaminants.

- Keeping the project clean of debris to the extent possible to avoid attracting predators. All food-related trash items shall be enclosed in sealed containers and regularly removed from site.

- Strict limitation of employee activities, vehicles, equipment, and construction material to the proposed project footprint, staging areas, and designated routes of travel.

- Fencing construction limits with orange snow screen and maintenance of exclusion fencing until the completion of construction activities.

Consistency with MSHCP Section 6.1.4

The following measures will be implemented by the project to minimize the identified potential indirect impacts, including:

- All project runoff will be treated prior to exiting the site to reduce toxins.

- Detention basins proposed within the project footprint will ensure that there is no increase in flows from the project.

- All project lighting (including that belonging to private property owners) will be required to be selectively placed, directed, and shielded away from preserved habitats. In addition, large spotlight-type backyard lighting directed into conserved habitat will be prohibited.

- No plants included on the California Exotic Pest Plant Council's list of invasive species (or in Table 6-2 of the MSHCP) will be used anywhere on the site, and only native species will be planted adjacent to open space areas. A list of prohibited species will be provided to homebuyers.

- The proposed project has been designed so that no additional take of conserved habitat, including Riparian/Riverine, will be necessary for fuel modification purposes.

- Enclosure fences (wood, tubular steel) shall be installed along the interface where residential development abuts natural habitat. Signs will be posted at potential access points into the preserve informing residents of the wildlife habitat value of the open space and to minimize intrusions.

- Manufactured slopes associated with the proposed site development will not extend into the MSHCP conservation area.

The above measures would serve to minimize the adverse effects of the project on conservation configuration and would minimize management challenges that can arise from development located adjacent to conserved habitat.

Consistency with MSHCP Section 6.3.2

The project will impact two individuals of the CASSA species, round-leaved filaree. The two individuals were observed in 2006 but were not observed during subsequent surveys conducted in 2008 and 2012. Because this annual species has variability between years as to when plants in the seedbank actually germinate and express themselves, this species is still assumed to be

present in very low numbers. The two individual plants do not constitute a population with long term conservation value. The MSHCP only requires 90 percent avoidance of populations with long term conservation value. The round-leaved filaree population (two plants) was only present in 2006 and was not present during the follow up surveys in 2008 and 2012, and HELIX concludes that the population does not have long term conservation value. No conservation of the round-leaved filaree is planned, and mitigation is not proposed due to the limited size (two plants) of the population and lack of long term conservation value.

A pre-construction burrowing owl survey will be conducted within 30 days prior to initiation of onsite project activities in accordance with the County's survey guidelines (Riverside 2006). If burrowing owls have colonized the project site prior to the initiation of construction, the project proponent should immediately inform RCA and the Wildlife Agencies, and may include preparation of a *Burrowing Owl Protection and Relocation Plan*, prior to initiating ground disturbance. Burrowing owl surveys of the offsite portion McElwain Road shall be conducted prior grading to insure compliance with Section 6.3.2 of the MSHCP. Survey results shall be provided to the RCA and wildlife agencies for review, and to the City for final approval.

IV. CONCLUSION

The project is being implemented consistent with Section 6.1.2 of the MSHCP based on the following:

- No plant species targeted for conservation in Section 6.1.2 are known or expected to occur within the Riparian/Riverine areas being impacted.

- The project has been redesigned resulting in a 66 percent reduction in Riparian/Riverine impacts from the previously approved project and avoids 83 percent of all Riparian/Riverine resources.

- Edge effects (including lighting, noise, trash/debris, urban and stormwater run-off, toxic materials, exotic plant and animal infestation, dust, trampling, and unauthorized recreation) to the MSHCP conservation area shall be minimized by the measures described in Section 6.1.4 and by landscaping, elevation difference, minimization of effects, and compensatory mitigation.

- Mitigation for direct impacts will total 5.6534 acres composed of off-site purchase of credits from an approved Mitigation Bank or In Lieu Fee program, or off-site habitat restoration. On-site conservation of a minimum of 10.21 acres will also result from project implementation. The combination of on-site conservation/avoidance and credits and/or off-site mitigation will offset losses of riparian function and value.

Based on this DBESP assessment, the project is consistent with Section 6.1.2.

X. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: September 12, 2019 SIGNED: _____

Barry Jones
Principal Biologist

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XI. REFERENCES

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Appendix A

FIRE PROTECTION TECHNICAL REPORT

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APPROVAL DRAFT

Murrieta Hills
FIRE PROTECTION TECHNICAL REPORT
Plan No. SP 012-3164, TTM 35853

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EXECUTIVE SUMMARY

This Fire Protection Technical Report (FPTR) has been prepared for the Murrieta Hills Project (Proposed Project) which will be annexed into the City of Murrieta, Riverside County. This FPTR details measures for fire protection which meet or exceed the most recent Murrieta Fire Code or provides compensating measures resulting in same practical effect. The Proposed Project will be required to meet the applicable codes that are in place at time of construction, unless they are less restrictive than those identified herein or have been mitigated through alternative materials and methods. This FPTR provides analysis of the Proposed Project, its potential risk from wildfire, and its potential impact on the Murrieta Fire and Rescue (MFR). Further, it provides requirements, recommendations, and measures to reduce the risk and impacts to acceptable levels, as determined by the fire authority having jurisdiction.

This FPTR also identifies the fire risk associated with the Proposed Project's planned land uses, and identifies requirements for fuel modification, building design and construction and other pertinent development infrastructure criteria for fire protection. The primary focus of this FPTR is providing an implementable framework for suitable protection of the planned structures and the people living and utilizing them. Tasks completed in the preparation of this FPTR include data review, code review, site fire risk analysis, land use plan review, fire behavior modeling, and site specific recommendations.

Where possible, this FPTR incorporates principles of sustainability that are an important component of the Proposed Project. Preservation and conservation of biological resources, including native plant communities, energy and water, along with conservation and maintenance of the site's aesthetics, are important components of the Proposed Project. These project elements have been duly considered and integrated into this FPTR, where they do not lessen fire protection.

The Project site is approximately 972 acres, of which, approximately 325 acres are proposed for the development of a master-planned, residential community with the remaining 647 acres set aside as open space preserve. The Project is located in western Riverside County, north of Temecula, west of Wildomar, and south of Menifee. The Proposed Project will be built in three phases that include nine planning areas and will include single-family and multi-family residential, mixed-use, retail/commercial, park and recreation facilities, and related water, sewer, electrical and roadway infrastructure necessary within a planned community. First response fire and emergency medical services will be provided by Murrieta Fire and Rescue (MFR) from existing Station 4, which is capable of responding to the entire Proposed Project within five minutes travel time.

The structures in the Proposed Project will be built using ignition resistant materials per the most recent City Fire and Building Codes (Chapter 7A – focusing on structure ignition resistance from flame impingement and flying embers in areas designated high fire hazard areas) which are the amended California Fire and Building Codes. These features will be complemented by an improved water availability, capacity and delivery system; multiple fire department and resident ingress/egress roads; monitored defensible space/fuel modification; interior, automatic fire sprinkler systems in all structures, monitored interior sprinklers in applicable structures; and other fire safety measures that will provide properly equipped and maintained structures with a high level of fire ignition resistance. Commercial areas will be required to implement the latest fire and building codes specifically addressing the unique demands of large commercial structures.

The site fire risk analysis resulted in the determination that wildfire has occurred and will likely occur near the Project site again. However, the Project will include ignition resistant landscapes and structures and firefighters will have needed defensible space and access with implementation of specified measures. Based on modeling and analysis of the Project site to assess its unique fire risk and fire behavior, it was determined that the California and Murrieta standard of 100-foot-wide fuel modification zones (FMZs) would be suitable to protect this Proposed Project from the anticipated wildfire that may burn in the fuels adjacent to the developed areas. However, as a requirement exceeding measure, the FMZs will be extended an additional 50 feet, for 150 feet total on the Project's perimeter, providing even greater setback and defensible space that is from 3 ½ to 6 times the modeled wildfire flame lengths, assisting firefighter protection of this community. In addition, perimeter lot rear yards will be considered part of the FMZ areas, providing another 20 feet, on average and increasing FMZs to 170 feet wide.

Project internal areas will include customized FMZs based on the internal open space areas. FMZs, when properly maintained, have proven effective at minimizing structure ignition from direct flame impingement or radiant heat, especially for structures built to the latest ignition resistant codes like the Proposed Project's. The FMZs will be maintained in perpetuity by a funded Community Facilities District or Homeowner's Association (or similarly funded entity), and inspected annually by a 3rd party with a copy of the report sent to MFR, ensuring that the required fuel reduction work occurs. The HOA will enforce the CC&Rs, eliminating the potential for accumulated fuels (both vegetation and personal items) that may lead to wildfire structure ignition.

In addition to the code-required fire protection features, the Project provides additional measures including heat-deflecting landscape walls at strategic locations along evacuation roads and adjacent an internal open space/park to augment the fuel modification zones and to provide additional protection.

Two planning areas, PAs 3 and 7, have been the focus of agency questions whether dead end road lengths are consistent with CCR Title 14 – Fire Safe Regulations. These areas include looped roadways that provide at least two access points, but they are located relatively proximal to the other. As a conservative approach, this FPTR details additional Project specific measures that are provided to mitigate the potential for impaired evacuation from these two planning areas.

ES.1 Findings for Maximum Dead-End Road Length

The proposed project includes lot sizes less than one acre, and therefore would be subject to the maximum dead end road length of 800 feet (SRA Fire Safe Regulations, Title 14, Section 1273.09 – Dead End Roads). Depending on how the dead end road length standard is interpreted, the 800 feet distance may be exceeded for two planning areas, nos. 3 and 7. However, both development areas include two ways in and out and no lot is more than 800 feet to a secondary route. Additionally, there are mitigating factors related to the type of development and the measures provided by the project to address the potential dead end road length issue.

Gov Code 66474.02

California Government Code Section 6647.02 requires project tentative maps located in state responsibility areas (SRA) or very high fire hazard severity zones must make findings before they can be approved. The findings are:

1. A finding supported by substantial evidence in the record that the design and location of each lot in the subdivision, and the subdivision as a whole, are consistent with any applicable regulations adopted by the State Board of Forestry and Fire Protection pursuant to Sections 4290 and 4291 of the Public Resources Code.
2. A finding supported by substantial evidence in the record that structural fire protection and suppression services will be available for the subdivision through any of the following entities:
    a. A county, city, special district, political subdivision of the state, or another entity organized solely to provide fire protection services that is monitored and funded by a county or other public entity.
    b. The Department of Forestry and Fire Protection by contract entered into pursuant to Section 4133, 4142, or 4144 of the Public Resources Code.
3. A finding that to the extent practicable, ingress and egress for the subdivision meets the regulations regarding road standards for fire equipment access adopted pursuant to Section 4290 of the Public Resources Code and any applicable local ordinance.

The applicable codes all include language pertaining to exceptions or modifications when a code requirement cannot be strictly complied with, but a project can be implemented to meet the intent of the code.

The California Code of Regulations, Title 14 Natural Resources, SRA Fire Safe Regulations define the basic wildland fire protection standards of the California Board of Forestry. These regulations apply to projects building in SRA. Title 14 allows exceptions to its standards:

> "Upon request by the applicant, exceptions to standards within this subchapter or local jurisdiction certified ordinances may be allowed by the inspection entity listed in 14 CCR 1270.05, where the exceptions provide the same overall practical effect as these regulations towards providing defensible space. Exceptions granted by the inspection entity listed in 14 CCR 1270.05 shall be made on a case-by-case basis only. Exceptions granted by the inspection entity listed in 14 CCR 1270.05 shall be forwarded to the appropriate CAL FIRE Unit Office that administers SRA fire protection in that county and shall be retained on file at the Unit Office."

The 2016 California Fire Code section [A] 104.8 Modifications also authorizes modifications to the fire code in certain circumstances. This section of the fire code states:

> "Whenever there are practical difficulties involved in carrying out the provisions of this code, the fire code official shall have the authority to grant modifications for individual cases, provided the fire code official shall first find that special individual reasons make the strict letter of this code impracticable and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered into the files of the department of fire prevention."

Based on this FPTR's Project requirements and the allowance in the applicable codes for exceptions, the fire code official (MFR Fire Marshal) grants a modification for the proposed project based on the findings listed below.

The modification for the Project's perceived dead end road length exceedance is based on the project's provision for multiple egress routes through ignition resistant landscapes (buffered from wildland fuel exposure), wider than required fuel modification zones, ongoing maintenance of roads and landscapes, short distances that must be travelled to urban areas, several site-specific measures exceeding code requirements and the ability to temporarily refuge firefighters and residents on site when considered safer than evacuating.

The following special individual reasons make compliance with the strict letter of the Fire Code with respect to maximum dead-end road lengths impractical:

1. Topographical challenges would make construction of a road to the north from the western portion of the project or to the south from the western portion of the project very difficult and biologically impactful. The potential for these routes was analyzed and determined to be infeasible and unnecessary with proposed measures.
2. Open Space Preserve limits and environmental issues constrain the ability to grade a road to the north or south from the western portion of the project without significant impacts to biological habitat.
3. Even if a road to the north or south from the western portion of the project could be constructed, which as noted, would be very difficult, the road would extend through wildland fuels and may not be appropriate for evacuation during a wildland fire that would likely be originating in the open space areas. It is considered safer to evacuate through the Murrieta Hills Community with its ignition resistant and fire adapted landscapes.
4. The project includes multiple egress points to the north with access to north and east-bound existing roads and one egress way to the south.

The intent and purpose of the Fire Code is to protect the public health and safety. The modification for the proposed project complies with this intent for the following reasons:

1. This FPTR includes a plan for early evacuation or as a contingency option when evacuation is considered by responding law and fire officials to be more dangerous, temporarily refuging on site when a wildfire is in the vicinity of the community and could threaten evacuating residents.
2. The plan for evacuation would not interfere with the ability of surrounding property owners to evacuate from their premises because the project would be evacuated only when there is sufficient time to do so safely.
3. The Murrieta Hills Community's HOA will annually hire a 3rd party, qualified FMZ inspector to the approval of the MFR to verify that the FMZs are maintained in a condition that would not facilitate fire spread. This would also reduce the impact of landscaping hanging into the roadways by reviewing size and location of trees and maintaining 13-foot, 6-inch vertical clearance for fire apparatus. This will also eliminate the possibility that the project's landscape, over time, loses its functionality for reducing and minimizing fire intensity and providing defensible space throughout the project. A copy of the report would be sent to MFR, ensuring that the required fuel reduction work occurs. The HOA will enforce the CC&Rs, eliminating the potential for accumulated fuels (both vegetation and

personal items) that may lead to wildfire structure ignition. Any non-compliant item(s) found during the 3rd party inspection will be required to be complied with immediately.

This modification will not lessen health, life, and fire safety requirements for the following reasons. Note that this list includes both required measures (included in the latest Residential, Building and Fire Codes) as well as measures that are above and beyond the requirements. It is important to include both because at one time, many of the now required measures were once used as mitigation for justifying code modifications. These requirements are important components of the ignition restiveness of new communities.

1. The buildings at the project site will use ignition resistant construction materials based on the latest Building and Fire Codes, including:
   - Exterior ignition-resistant walls (required)
   - Class A-rated roof assemblies (required)
   - Dual pane, tempered windows (required)
   - Ember resistant vents and other openings (not required – baffled vents above code requirement)
   - Eave ember protection (required)
   - Underfloor and appendage protection (required)
   - Weep screed protection (required)
2. Interior, automatic fire sprinkler systems will be provided in all structures (required)
3. Customized fuel modification zones exceeding the standard will be provided around all structures. These zones are based on fire behavior modeling and site conditions and are 3 ½ to 6 times as wide as the modeled adjacent flame lengths. (not required by code, however offered as mitigation as part of acceptance of this plan)
4. Roadside fuel modification adjacent all project roads of 20 feet on either side and the southerly McElwain Road including 80 foot wide fuel modification on the westerly side. (code exceeding along McElwain Road)
5. Heat deflecting landscape walls of masonry construction that are six feet in height are provided along strategic perimeter roadways and for interior structures adjacent internal open space. The walls provide a vertical, non-combustible surface in the line of heat, fumes, and flame travel up the slope. Once these fire byproducts intersect the wall, they are deflected upward or, in the case where fuels are lighter, like this project site, the fuels are quickly consumed, heat and flame are absorbed or deflected by the wall, and the fuel

burns out within a short (30 second to two minute) time frame (Quarles and Beall 2002). Vegetation located from the retaining wall to the structure will be limited to irrigated, low volume plantings that will not readily facilitate fire spread. Walls like these have proven to deflect heat and airborne embers and are consistent with NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire – 2008 Edition, Section 5.1.3.3 and A.5.1.3.3 and International Urban Wildland Interface Code (2009, Appendix G). NFPA 1144, A.5.1.3.3 states: "Noncombustible walls and barriers are effective for deflecting radiant heat and windblown embers from structures." These walls and barriers are usually constructed of noncombustible materials (concrete block, bricks, stone, and stucco). See Page 45 for me detail about heat deflecting walls. (not required by code, however offered as mitigation as part of acceptance of this plan – code exceeding where they are determined to provide protection for nearby structures)

6. The project HOA will annually hire a 3rd party wildland urban interface (WUI) inspector to certify that the fuel modification zones meet the intent of the FPTR. A copy of the inspection report will be provided to the MFR each year. Any non-compliant item(s) found during the 3rd party inspection will be required to be complied with immediately. (not required by code, however offered as mitigation as part of acceptance of this plan)
7. Funding will be provided through a Community Facilities District (CFD) or similar funding mechanism to maintain the project's fire protection features such as fuel modification zones in perpetuity. (required)
8. The project will provide funding to MFR and they will, as part of their Cooperative Wildland Fire Agreement, fund the protection for the approximately 647 acres of Open Space areas of the Project. The project recognizes that funding costs may change over time. (not required by code, however offered as mitigation as part of acceptance of this plan)
9. The Community HOA will include an outreach and educational role to coordinate with MFR and to establish a local Fire Safe Council, oversee landscape committee enforcement of fire safe landscaping, ensure fire safety measures detailed in this FPTR have been implemented, educate residents on and prepare community-wide "Ready, Set, Go!" plans (not required by code, however offered as mitigation as part of acceptance of this plan)
10. The project has prepared an evacuation plan and will include a public outreach and education focus. (not required by code, however offered as mitigation as part of acceptance of this plan)
11. The project will follow "Ready, Set, Go!" and use a conservative threshold for early evacuations. (not required by code, however offered as mitigation as part of acceptance of this plan)

12. The project will enable a contingency plan for temporarily refuging residents on site if considered safer than evacuation. (not required by code, but possible in new master planned communities built to fire hardened requirements)

Additional analysis and reasoning informing the conclusions of this FTPR are provided in the following sections. The Findings for same practical effect are discussed in more detail in Section 9.

1 INTRODUCTION

This FPTR has been prepared for the Murrieta Hills community (Proposed Project). The purpose of this FPTR is to evaluate the potential impacts resulting from wildland fire hazards and identify measures necessary to adequately mitigate those risks to a level consistent with City of Murrieta (City) thresholds. Additionally, this plan generates and memorializes the fire safety requirements of the Fire Authority Having Jurisdiction (FAHJ), which will be the Murrieta Fire and Rescue (MFR) upon annexation. The project area is currently located in the unincorporated area of Riverside County, surrounded by the Cities of Menifee, Wildomar, and Murrieta. The Project is currently located within a State Responsibility Area (SRA) within CAL FIRE/Riverside County Fire Department's jurisdiction. However, upon annexation to the City of Murrieta, it is expected that structural fire protection and medical emergency response will be provided by MFR while CAL FIRE will continue to provide wildland fire protection. Requirements and recommendations detailed in this FPTR are based on site-specific characteristics, applicable code requirements, and incorporate input from the project applicant, City planners, and the FAHJ.

As part of the assessment, this plan has considered, amongst other site factors, the property location, topography (including saddles, chutes, chimneys), geology, combustible vegetation (fuel types), unique climatic conditions, fire behavior and fire history. The plan addresses water supply, access (including secondary access where applicable), structural ignitability and fire resistive building features, fire protection systems and equipment, potential impacts to existing emergency services, mitigating fire protection features, defensible space, and vegetation management. This FPTR identifies and prioritizes areas for fuel reduction treatments and recommends the types and methods of treatment that will protect the community and essential infrastructure. This FPTR also recommends measures that property owners and the homeowner's association (HOA) will take to reduce the probability of structure ignition throughout the area addressed by the plan for the life of the project.

The following tasks were performed toward completion of this plan:

- Gather site specific climate, terrain, and fuel data;
- Process and analyze the data using the latest GIS technology;
- Predict fire behavior using scientifically based fire behavior models, comparisons with actual wildfires in similar terrain and fuels, and experienced judgment;
- Analyze and guide design of proposed infrastructure;
- Analyze the existing emergency response capabilities;
- Assess the wildfire risk associated with the Proposed Project and site;

- Collect site photographs and map fuel conditions using 200-scale aerial images. Field observations were utilized to augment existing digital site data in generating the fire behavior models and formulating the recommendations presented in this FPTR. Refer to Appendix A for site photographs of existing site conditions.
- Meet with City fire planners to discuss and resolve identified issues.
- Prepare this FPTR detailing how fire risk will be mitigated through a system of fuel modification, structural ignition resistance enhancements, and fire protection delivery system upgrades.

1.1 Intent

The intent of this FPTR is to provide fire planning guidance and requirements for reducing fire risk and demand for fire protection services associated with the Proposed Project. Further, this FPTR provides justifications for a perceived non-conformance with the fire code regarding dead-end road length and substantiates measures considered to mitigate the non-conformance. To that end, the fire protection "system" detailed in this FPTR includes a redundant layering of measures including: pre-planning, fire prevention, fire protection, passive and active suppression, and related measures proven to reduce fire risk. The fire safety system that will be enacted by the Proposed Project has proven through real-life wildfire encroachment examples throughout southern California to significantly reduce the fire risk associated with this type of Proposed Project.

1.2 Applicable Codes/Existing Regulations

This FPTR demonstrates that the Proposed Project will be in compliance with applicable portions of the City of Murrieta Municipal Code (Chapter 15.24 – Fire Code) and MFR's applicable ordinances[1] or the current fire and building codes at the time of tentative map approval. The Proposed Project will also be consistent with:

- California Public Resources Code 4290 and 4291
- 2016 California Code of Regulations, Title 14 Fire Safe Regulations
- California Government Code 66474.02
- 2016 California Building Code, Chapter 7A
- 2016 California Fire Code, Chapter 49

[1] The last adoption of the Fire Code (2001 edition) with no appendices or amendments to the adoption by MFR was in November 2002 (Ordinance No. 268-02).

- 2016 California Residential Code, Section 237 as adopted by City of Murrieta.

Chapter 7A of the California Building Code focuses primarily on preventing ember penetration into homes, a leading cause of structure loss from wildfires. Thus, it is an important component of the requirements of this FPTR given the Proposed Project's wildland urban interface location which is predominately within an area statutorily designated a High Fire Hazard Severity Zone (HFHSZ) by CAL FIRE (CAL FIRE FRAP 2016), County of Riverside, and City of Murrieta (City of Murrieta 2016). A small portion of the northeast corner of the property is designated as a Moderate Fire Hazard Severity Zone.

Fire hazard designations are based on topography, vegetation, and weather, amongst other factors with more hazardous sites including steep terrain, unmaintained fuels/vegetation, and wildland urban interface locations. Projects situated in HFHSZ's require fire hazard analysis and application of fire protection measures that have been developed to specifically result in defensible communities in these WUI locations. As described in this FPTR, the Proposed Project will meet all applicable Code requirements for building in higher fire hazard areas, or meet the intent of the code through the application of site-specific fire protection measures.

These codes have been developed through decades of after fire structure "save" and "loss" evaluations to determine what causes buildings to ignite or avoid ignition during wildfires. The resulting fire codes now focus on mitigating former structural vulnerabilities through construction techniques and materials so that the buildings are resistant to ignitions from direct flames, heat, and embers, as indicated in the 2016 California Building Code (Chapter 7A, Section 701A Scope, Purpose and Application).

1.3 Proposed Project Summary

1.3.1 Location

The Proposed Project Site is located in unincorporated Riverside County and is bordered by the City of Menifee to the north, the City of Murrieta to the east and south, and the City of Wildomar to the west (Figure 1). More specifically, the approximately 974-acre Murrieta Hills site lies west of Interstate 215 (I-215) and east of Fromer Lane, between Keller Road and Bottle Brush Road. The Proposed Project Site is within Assessor's Parcel Numbers (APN) 384-190-001, 384-190-003, 384-190-005 through 014, 384-200-006 through 010, 384-200-012 through 017, 384-210-001, and 384-210-003. The property is in Sections 27 and 28, Township 6 South, Range 3 West, as shown on the U.S. Geological Survey 7.5-minute Murrieta and Romoland quadrangle maps as depicted in Figure 2.

Regional access to the Murrieta Hills site is provided by I-215 with an existing interchange at Scott Road, one mile to the north, and Clinton Keith Road, roughly two miles to the south. Plans are in

place to provide a new exit off I-215 at Keller Road as another route to the recently constructed hospital east of the I-215. Keller Road provides the main access to the Proposed Project, while Zeiders Road and Gloria Road provide available secondary access although neither road currently fully complies with the applicable Fire Code road requirements.

1.3.2 Current Site and Vicinity Land Use

The site is currently comprised of undeveloped land that has been subject to disturbances from various sources including, a former nursery, off-road vehicles, mountain bikers, trash dumping, and a significant target shooting area. The site is vegetated by chaparral, coastal sage scrub, native oaks and ornamental trees, and riparian scrub. Approximately 97 acres in the northeast portion of the property has been frequently disked for dry-crop farming; e.g., growing wheat and oats. The site contains remnants of an olive orchard, vacated nursery, adjacent windbreak, and old structure. Numerous dirt roads traversing the property were observed throughout the site. Portions of the site are within the Western Riverside County Multiple Species Habitat Conservation Plan (MSCHP) and are subject to an existing Habitat Evaluation and Acquisition Negotiation Strategy (HANS) agreement for the preservation of on-site natural habitat (JPR 09-02017-01; RC14010216; Sub-unit 2, Lower Sedco Hills, Sun City/Menifee Plan, criteria Cell Group C).

Two water reservoir tanks that are owned by Eastern Municipal Water District (EMWD) are located along the Proposed Project's northern boundary. Gas and electric will be provided by Southern California Gas Company and Southern California Edison from existing facilities adjacent to the Proposed Project Site. The project would be served by EMWD from existing water and sewer facilities that are within Keller Road or connect to Zeiders Road, respectively.

Existing land uses surrounding the Proposed Project Site vary from highly urbanized areas to open space lands. Development is primarily concentrated in the Community of Greer Ranch to the south and a new development to the east which includes Loma Linda University Medical Center and MFR Fire Station No. 4. Semi-rural residential lots and agricultural land uses occur to the north. To the west of the Proposed Project Site is undeveloped land that extends to Wildomar-Sedco Hills.

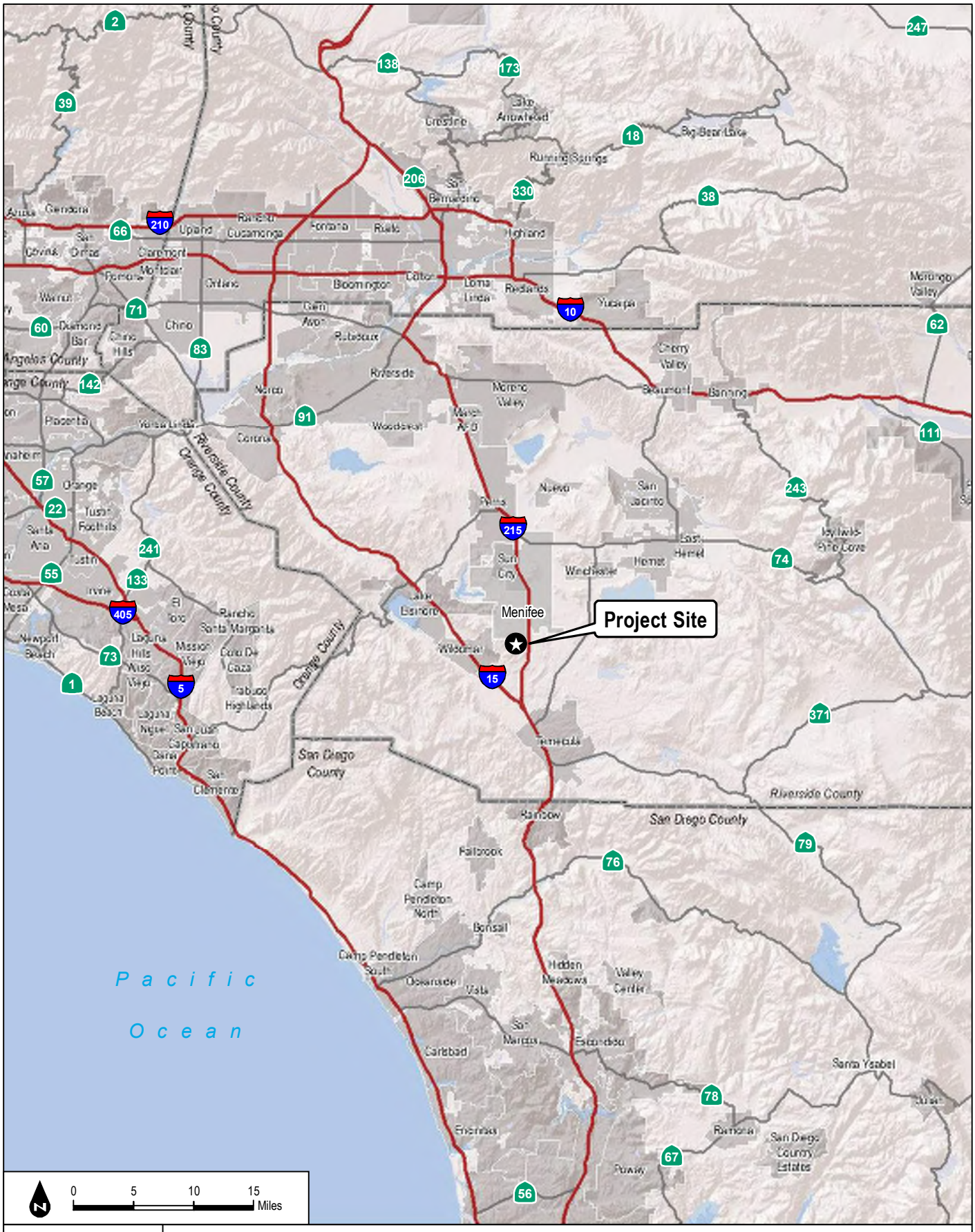

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FIGURE 1
Regional Map

Murrieta Hills Fire Protection Plan

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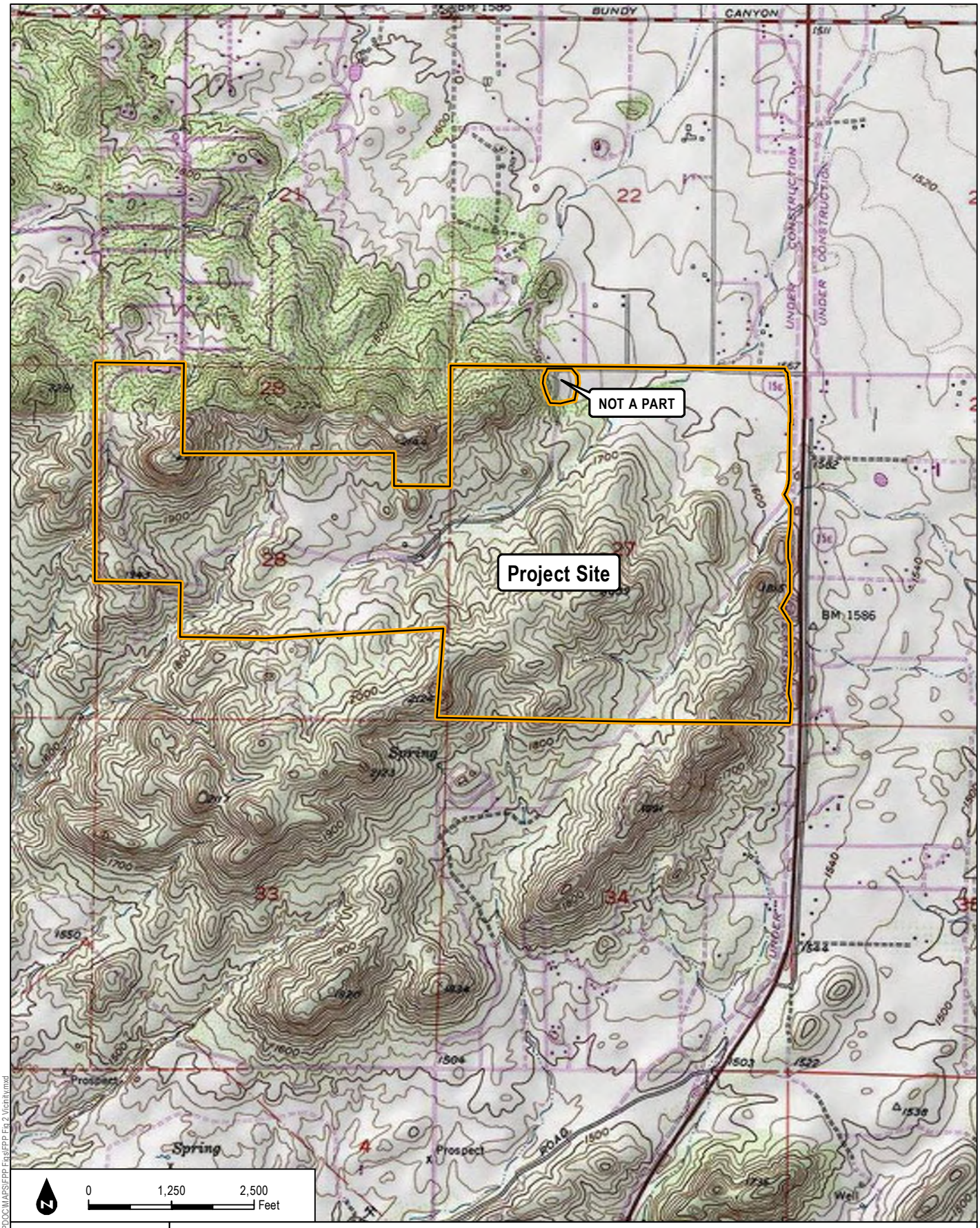

SOURCE: USGS 7.5 Minute Series Topographic Maps

FIGURE 2
Vicinity Map

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Murrieta Hills Fire Protection Plan

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1.3.3 Project Description

The Murrieta Hills project is an amendment to the original Murrieta Hills Specific Plan No. SPM-No. 4, approved by the City of Murrieta on April 18, 1995 under resolution No. 95-353. This resolution allows for single family residential, multi-family residential, commercial, and natural and improved open space on approximately 972 acres. The conceptual development plan for the site is depicted in Figure 3. The Murrieta Hills project also includes construction of a public park, up to three water supply tanks, water quality basins, on-site public streets, and off-site road improvements, as warranted. Primary access into the project would be provided from Keller Road along the northern project boundary. Within the project site, access would be provided by a series of internal roadways connected to Keller Road. The extension of McElwain Road that is proposed parallel to, and just west of I-215, along with future improvements to Keller Road, would connect the existing terminus north of Linnel Lane to Keller Road at Zeiders Road.

The Murrieta Hills project proposes annexation of the development area into the City of Murrieta. An amendment to the City's General Plan is proposed to change the existing land use to Specific Plan Area. A zone change is also proposed to rezone the property to appropriate City of Murrieta Zoning Districts. Table 1 provides a breakdown of the proposed uses with approximate acreages (acreages rounded to the nearest whole number; actual acreages may change slightly as part of final design and engineering):

Table 1
Murrieta Hills Proposed Land Use

Proposed Land Use	Approximate Acreage	No. of Units
Single-Family Detached Residential	198	497
Executive Homes (Future Phase) 10,000 S.F. Average Lot Size	50	60
Multi-Family Residential	13	193
Community Commercial	18	--
Natural Open Space (Excluding HANS)	39	--
Open Space: HANS MSHCP	613	--
Major Roadways (including Caltrans ROW and Street ROW)	41	--
Total	**972**	**750**

Source: Murrieta Hills Specific Plan Amendment, Pulte/BP Murrieta Hills LLC

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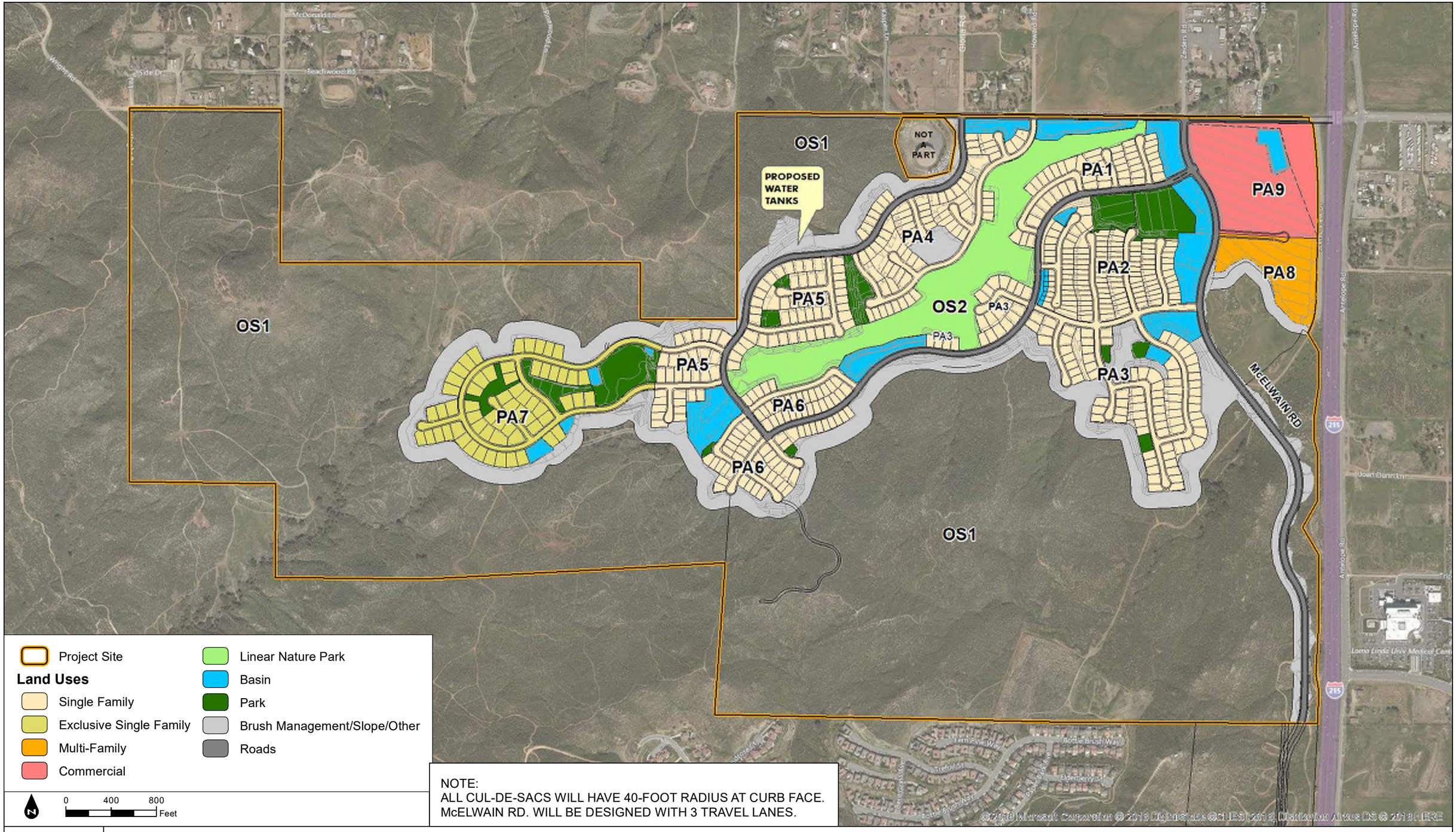

SOURCE: AERIAL-BING MAPPING SERVICE; SITE PLAN-STANTEC 2018

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FIGURE 3

Murrieta Hills Project Site Plan

Murrieta Hills Fire Protection Plan

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2 PROPOSED PROJECT SITE RISK ANALYSIS

2.1 Field Assessment

Following extensive review of available digital site information, including topography, vegetation polygons, fire history, aerial imagery and the Proposed Project's site plan, Dudek fire protection planners conducted a field assessment of the Proposed Project on May 3, 2016, in order to confirm digital data and fill any identified data gaps. Dudek's site assessment was aided by Project biologists who conducted a comprehensive vegetation mapping assignment of the Murrieta Hills property over the course of several years 2005, 2006, 2007, 2008, 2012, 2013, and 2016 (Helix 2016).

Among the field tasks that were completed are:

- Vegetation estimates and mapping refinements
- Fuel load analysis
- Topographic features documentation
- Photograph documentation
- Confirmation/verification of hazard assumptions
- Ingress/egress documentation.

Site photographs were collected (Appendix A: Representative Photographs) and fuel conditions were mapped on aerial images. Field observations were utilized to augment existing site data in generating the fire behavior models and formulating the requirements provided in this FPTR.

2.2 Site Characteristics and Fire Environment

2.2.1 Topography

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread upslope. Terrain that forms a funneling effect, such as chimneys, chute's or saddle's on the landscape can result in especially intense fire behavior. Conversely, flat terrain tends to have little effect on fire spread, resulting in fires that are driven by vegetation and/or wind.

The Project's surrounding topography is varied with prominent knolls and large rock outcroppings throughout the Paloma and Menifee Valleys and steeper hillsides to the west and south of the Proposed Project site. The Murrieta Hills property is characterized by three primary drainages and their associated sub-drainages. The first enters the property midway along its southern boundary and drains to the northeast, exiting the property in its northeast corner and into Paloma and Menifee

Valleys. The second enters the property at the eastern end of its southern boundary and also drains to the northeast, exiting the property in its northeast corner. The third enters the property in the western portion of its northern boundary and drains to the southwest, exiting the property in its southwest corner.

On-site elevations range from 1,568 feet above mean sea level (AMSL) in the northeast corner of the property to 2,278 feet AMSL near the western edge of the property. Slopes range from flat in the northeast corner of the property to moderate and steep along the hillsides and ridges that separate the site's drainages. Large rock outcroppings commonly occur throughout the property's slopes. As previously stated, slope is important relative to wildfire, because steeper slopes typically facilitate more rapid fire spread upslope. In the case of the Proposed Project Site, the steeper slopes are primarily within the areas designated as permanent open space preserve and will not be developed. The site's steeper slopes ascend away from the developed areas of the Proposed Project (vs. situations where development occurs at top of slope). The slopes and drainages are generally in alignment with the extreme Santa Ana wind events, which can influence fire spread by creating wind-driven fires, especially when moving upslope.

2.2.2 Climate

Southwestern Riverside County and the Project Area are influenced by the Pacific Ocean and are frequently under the influence of a seasonal, migratory subtropical high pressure cell over the ocean known as the "Pacific High" (WRCC 2017a). This high pressure cell provides the project site, as all of Southern California, with a Mediterranean climate, characterized by warm summers, mild winters, moderate afternoon breezes and generally fair weather with infrequent rainfall. The climate pattern is occasionally interrupted by extreme periods of hot weather, winter storms, or dry, easterly Santa Ana winds (WRCC 2017) The average high temperature for the project area during fire season is approximately 74.6°F, with summer and early fall months (June–October) reaching up to 91.1°F average high temperature. Almost all of the annual rainfall comes from fringes of mid-latitude storms from late November to early April. Rainfall in the project area varies considerably, measuring on average, 12.5 inches per year. The prevailing wind is an on-shore flow from the Pacific Ocean. Prevailing winds arriving in Temecula, Murrieta, Wildomar, and Menifee from the Pacific Ocean typically cannot make it to these locations because the Santa Ana Mountains pose a significant barrier. Instead, marine air travels into these areas through a low spot in the Santa Ana Mountains near Rainbow Pass (This is just about where the U.S. Border Patrol Station is located on Interstate 15 (I-15)). Likewise, Pacific Ocean air traverses coastal areas in Los Angeles and Orange Counties, then moves east and southeast along Santa Ana Canyon, where State Route 91 is presently located. As a result, the northwest winds converge with the southwest winds in a line near Lake Elsinore that extends east across Sun City and Perris and onto the San Jacinto Valley. This meeting of winds is called the Elsinore Convergence Zone

(WeatherCurrent.com 2016; NOAA 2007) Daytime winds average approximately 6-8 miles per hour (mph) as air moves regionally onshore from the cool Pacific Ocean to the warm Mojave Desert (Murrieta Highlands Specific Plan –SPM-1,92-154).

Additionally, during the summer months, an unusual combination of topography, proximity to the Pacific Ocean 20 to 25 miles to the west, and the hot, dry inland valleys and deserts to the east cause marine air flow eastward over the crest of the Santa Ana Mountains and down through the northeast-facing canyons and drainages of the Elsinore Front. This phenomenon is known as the Elsinore effect. It meant that during the heat of summer, fires burning in the afternoon along the Elsinore Front would typically burn down slope, contrary to most normal fire behavior for that time of day. This down slope movement of air would generally subside around sundown as the valleys and desert areas to the east cooled, at which time fires would reverse direction and begin to burn upslope (Lee 2015). This condition is not applicable at the Proposed Project Site and is therefore not a fire influencer for the fire behavior modeling conducted herein.

The Santa Ana winds do impact the Project site, and hot, dry (Santa Ana) winds, which typically occur in the fall and are usually from the northeast, can gust to 50 miles per hour (mph) or higher. The Santa Ana winds are due to the pressure gradient between high pressure in the plateaus of the Great Basin and lower pressure gradient over the Pacific Ocean (California Climate Change Center 2016). Drying vegetation (fuel moisture of less than 5% for 1-hour fuels is possible) during the summer months becomes fuel available to advancing flames should an ignition occur. Extreme conditions, used in fire modeling for this site, include 92°F temperatures (average high temperature) in summer and maximum sustained winds of up to 46 mph during the fall (See Section 3.1.2.2. Fire Modeling Inputs-Weather). Relative humidity of 12% or less is possible during fire season.

2.2.3 Vegetation

The Murrieta Hills property supports a variety of vegetation types that are relatively common in southwest Riverside County. Fire history data indicates that most of the site's vegetation has not burned for over 100 years. Therefore, the structure of the dominant plant communities is tall, dense, with relatively few species compared to vegetation composition in the period following wildfire. A total of 14 vegetation and land cover types were delineated on site by the project biologist (Helix 2016), which includes one non-fuel land cover type (urban/developed areas). These vegetation and land cover types were verified by Dudek fire protection planners and assigned a fuel model for use during site fire behavior modeling. The vegetation and land cover types and their coverage totals as well as corresponding fuel models are summarized in Table 2.

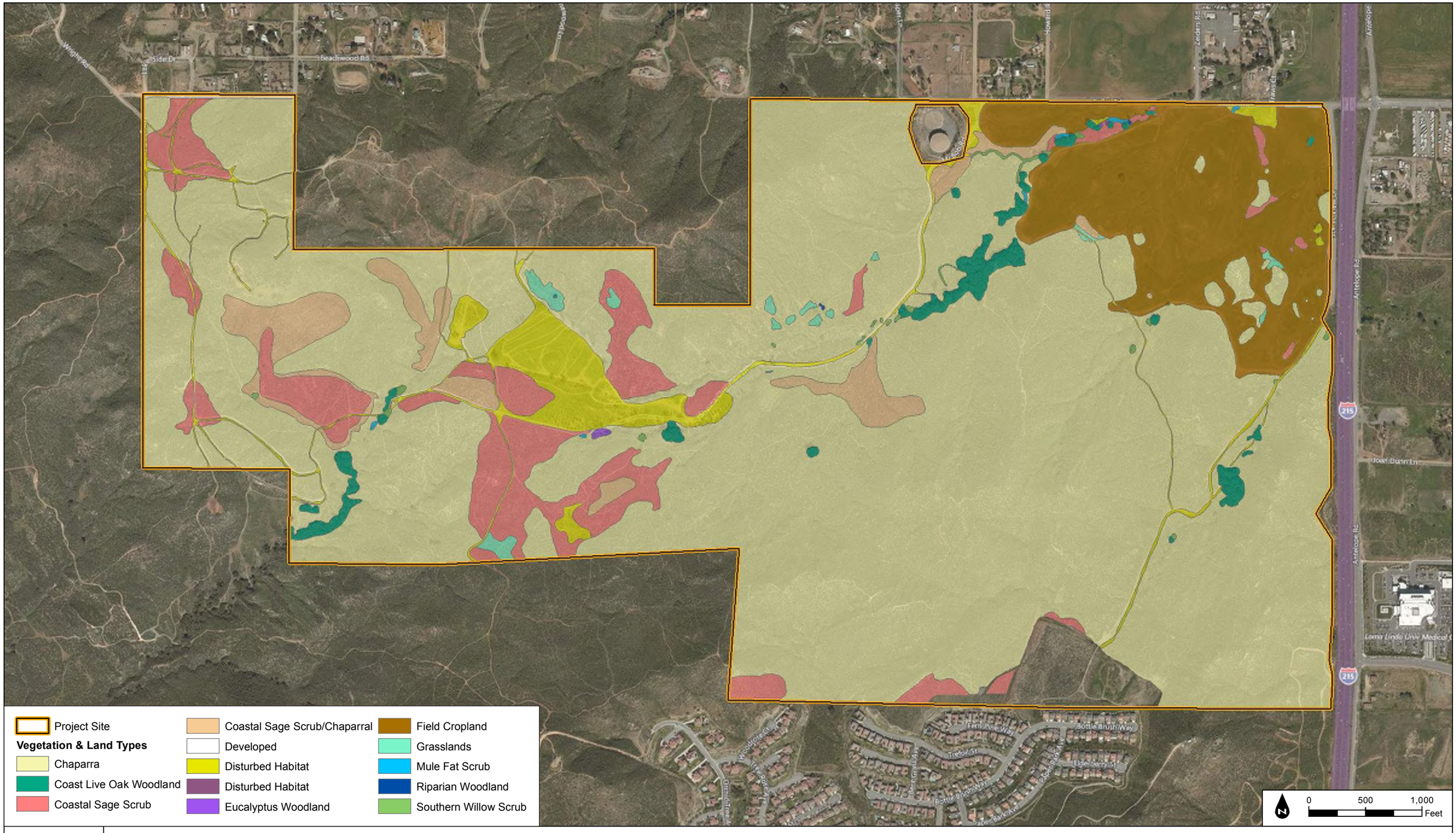
Table 2
Murrieta Hills Project Vegetation and Land Cover Types

Vegetation/Land Cover Type[1]	On-site Acreage[1]	Off-site Acreage[1]	Total On-site Percent Coverage	Corresponding Fuel Model/Canopy Cover Value
Non-Native Communities and Land Covers				
Agriculture	96.7	--	9.9%	GR1/0
Eucalyptus Woodland	0.3	--	0.0 (<0.1%)	TL2/3
Developed	1.6	1.6	0.2%	91/0
Disturbed Habitat	55.3	4.7	5.7%	GR1 or SH1/0
Non-native Grassland	4.4	1.1	0.5%	GR4/0
Upland Scrub and Chaparral				
Chaparral	701.7	9.9	72.1%	SH5/0
Coastal Sage Scrub/Chaparral	32	--	3.3%	SH2/0
Riversidean Sage Scrub	66.6	1.2	6.8%	SH2/0
Woodland				
Coast Live Oak Woodland	13.01	--	01.3%	GS2/3
Riparian				
Mulefat Scrub	0.47	0.03	0.0 (<0.1%)	SH2/0
Southern Cottonwood-Willow Riparian Woodland	0.07	--	0.0 (<0.1%)	SH2/3
Southern Willow Scrub	1.54	--	0.2%	TL8/0
Total	**973.69**	**18.5**	**100.00%**	**N/A**

Source: Helix Environmental Planning 2016
1 Acreage is rounded to nearest 0.1 except for wetland and Riparian/Riverine habitat that are rounded to the nearest 0.01.

As presented, the majority of the vegetation on the Project site is associated chaparral (72.1%), while the remainder of the vegetation cover types individually amount to 1% or less of the total project site, except agriculture (9.9%), coastal sage scrub (6.8%), coastal sage scrub-chaparral ecotone (3.3%), disturbed habitat (5.7%), and oak woodlands (1.3%). The project's vegetation and land coverage is illustrated in Figure 4 and briefly described below.

Project changes to site vegetation types will be associated with grading for development pads and roads and installation of fuel modification areas in strategic locations at the perimeter of the developed project site and around the interior semi-open space/oak-riparian corridor. Site-adjacent vegetation (off-site and adjacent the fuel modification zones) is important relative to wildfire as some vegetation, such as brush and grassland habitats are highly flammable while other vegetation, such as riparian communities or forest understory, are less flammable due to their higher plant moisture content, fuel arrangement, ignition resistance, compact structure, and available shading from overstory tree canopies. The effect vegetation has on fire behavior is substantial and understanding vegetation dynamics is important for developing an effective fuel modification plan as discussed in Section 2.2.4.



SOURCES: AERIAL-BING MAPPING SERVICE; VEGETATION-HUNSAKER 2016

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FIGURE 4

Vegetation and Land Cover Types Map

Murrieta Hills Fire Protection Plan

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2.2.3.1 Site Vegetation and Land Cover Type Descriptions

The following descriptions are adapted from the site's General Biological Resources Assessment Report (Helix 2016).

Non-Native Communities and Land Covers

Agriculture. Agriculture lands supporting active or historical agricultural operation. On site, dry-crop farming is limited to the disked area in the northeast portion of the site. The disked area in the northeast contains scattered patches with trees or rock outcroppings that are not disked. Trees in this area include coast live oak (*Quercus agrifolia*), Peruvian pepper (*Schinus molle*), and eucalyptus (*Eucalyptus* spp.).

Developed. Developed areas support no native vegetation and may be additionally characterized by the presence of man-made structures, such as buildings or roads. The level of soil disturbance is such that only the most ruderal plant species occur. Developed areas on site include a water reservoir in the northeast and several small structures located near the center of the property.

Disturbed Habitat. This category consists of permanently disturbed land cover consisting of small areas, including unimproved roads that cross the property, off-highway vehicle trails, areas of dumped trash, and the nursery located near the center of the property, which consists of mostly non-native weed species. Additionally, a large area on the southeast portion of the site was cleared of vegetation in 1990 and then cleared again and graded circa 2005. Plant species observed in the disturbed areas include eucalyptus, Peruvian pepper, athel tamarisk (*Tamarix aphylla*), and olive (*Olea europaea*). The disturbed areas also contain bromes, mustards, and various other plant species similar to the non-native grassland and sage scrub understory.

Eucalyptus Woodland. Scattered eucalyptus trees exist on the site, concentrated in the central-western portion of the site and adjacent to the abandoned farm house. Due to the eucalyptus allopathic nature, this community typically has little to no understory and is composed entirely of eucalyptus trees and leaf litter.

Non-Native Grassland. Non-native grassland is a dense to sparse cover of annual grasses, often associated with numerous species of showy-flowered native annual forbs. This vegetative type include oats (*Avena* spp.), red brome (*Bromus madritensis* ssp. *rubens*), ripgut (*B. diandrus*), ryegrass (*Lolium* sp.), short-pod mustard (*Hirschfeldia incana*), and other mustards (*Brassica* spp.). The non-native grassland is primarily located in small patches or islands throughout the site in a mosaic with sage scrub and chaparral.

Upland Scrub and Chaparral

Chaparral. The property is largely covered by chaparral that is dominated by chamise (*Adenostoma fasciculatum*) with patches dominated by hoary-leaved ceanothus (*Ceanothus crassifolius*), and black sage (S*alvia mellifera*). The chamise and mixed chaparrals dominate the property, with a small patch of red shank (*Adenostoma sparsifolium*) chaparral occurring near the center of the property. Other plants found in the chaparral habitat type include laurel sumac (*Malosma laurina*), blue elderberry (*Sambucus nigra mexicana*), California buckwheat (*Eriogonum fasciculatum*), and scrub oak (*Quercus berberidifolia*).

Coastal Sage Scrub/Chaparral Ecotone. Coastal sage scrub/Chaparral ecotone is a community that comprises species of each of these communities (described herein) but does not specifically match either community. The ecotone community occurs where the two communities are adjacent to one another. This can also be a transitional community as sage scrub gradually is maturing in a chaparral habitat.

Riversidean Sage Scrub. Riversidean sage scrub is located in small patches of sage scrub primarily around disturbed areas. On site, it is dominated by low-growing shrubs, primarily California buckwheat (*Eriogonum fasciculatum*), but also includes California sagebrush (*Artemisia californica*), deerweed (*Acmispon glauber*), bromes, and oats). The sage scrub occurs in a mosaic with chaparral. Having a large quantity of non-native grasses and forbs, disturbed Riversidean sage scrub areas occur in a mosaic with the Riversidean sage scrub areas.

Woodland

Coast Live Oak Woodland. Coast live oak woodland is an evergreen oak woodland dominated by coast live oak. On site, coast live oak woodland primarily occurs near the banks of largest drainages within the Salt and Warm Springs creeks watersheds with others scattered in upland areas or within the bottoms of sub-drainages. Plants species observed in this community on site include coast live oak, laurel sumac, poison oak (*Toxicodendron diversilobum*), bromes, giant wildrye (*Leymus condensatus*), and spiny redberry (*Rhamnus crocea*).

Riparian

Mulefat Scrub. On the Murrieta Hills site, mulefat scrub (*Baccharis salicifolia*) is scattered in a few small pockets along the drainages. Plants species observed in the mulefat scrub on site include mulefat, arroyo willow (*Salix lasiolepis*), willow herb (*Epilobium* spp.), and salt cedar (*Tamarix ramosissima*).

Southern Cottonwood-Willow Riparian Woodland. Southern cottonwood-willow riparian forest is a tall, open, broad-leafed winter-deciduous riparian forest dominated by western cottonwood (*Populus fremontii*) and willows (*Salix* spp.). This habitat occurs on the site in two small patches in drainages.

Southern Willow Scrub. This vegetation type is fairly typical of Holland's (1986) Southern willow scrub, described as "dense, broad-leafed, winter-deciduous stands of trees dominated by shrubby willows in association with mulefat." This habitat occurs on loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows. This vegetation is scattered among the many drainages located throughout the property. Plant species observed on site in the willow scrub include arroyo willow, Goodding's black willow (*S. gooddingii*), mulefat, salt cedar, and curly dock (*Rumex crispus*).

2.2.4 Vegetation Dynamics

Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (bark thickness, leaf size, branching patterns), and overall fuel loading. For example, the native shrub species that compose the chaparral communities on site are considered to be less likely to ignite, but would exhibit higher potential hazard (higher intensity heat and flame length) than grass dominated plant communities (fast moving, but lower intensity) if ignition occurred. The corresponding fuel models for each of these vegetation types are designed to capture these differences. Additionally, vegetative cover influences fire suppression efforts through its effect on fire behavior. For example, while fires burning in grasslands may exhibit lower flame lengths and heat outputs than those burning in native shrub habitats, fire spread rates in grasslands are often more rapid.

As described, vegetation plays a significant role in fire behavior, and is an important component to the fire behavior models discussed in this report. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes disrupts plant succession, setting plant communities to an earlier state where less fuel is present for a period of time as the plant community begins its succession again. In summary, high frequency fires tend to convert shrublands to grasslands or maintain grasslands, while fire exclusion tends to convert grasslands to shrublands, over time as shrubs sprout back or establish and are not disturbed by repeated fires. In general, biomass and associated fuel loading will increase over time, assuming that disturbance (fire, grazing, or disking) or fuel reduction efforts are not diligently implemented. It is possible to alter successional pathways for varying plant communities through manual alteration. This concept is a key component in the overall establishment and maintenance of the proposed fuel modification zones on site. The fuel modification zones on this site will consist of irrigated and maintained landscapes as well as thinned native fuel zones that will be subject to regular "disturbance" in the form of maintenance and will not be allowed to accumulate excessive biomass over time, which results in reduced fire ignition, spread rates, and intensity.

Conditions adjacent to the Proposed Project's footprint (outside the fuel modification zones), where the wildfire threat will exist post-development, are currently classified as moderate to high fuel loads due to the higher percentage of chamise chaparral and coastal sage scrub fuels. This climax vegetation state (undisturbed brush stands that are not disturbed for an extended period of 50 years or more) includes more uniform and dense stands of sage scrub-chaparral fuels, which were employed for a conservative modeling approach to represent worst-case (i.e., max fuels) wildfire scenarios around the perimeter of the Project.

2.2.5 Fire History

Fire history is an important component of the site-specific FPTR. Fire history data provides valuable information regarding fire spread, fire frequency, most vulnerable areas, and significant ignition sources, amongst others. Appendix B, *Fire History Exhibit,* illustrates fire history for the Murrieta Hills project vicinity. As presented, there have been 38 fires recorded by fire agencies in the vicinity (within five miles) of the project site, primarily associated with natural open spaces to the west and north. Recorded wildfires within five miles range from four acres to 31,447 (Turner Fire-1980) acres. As suggested by the data, a significant fire history exists in the vicinity of the project site, but most wildfires are contained by initial or extended attack.

Consistent with results throughout large portions of Southern California, Santa Ana wind driven fires present the highest risk of non-containment by initial or extended attack and the occurrence of a major incident. Fire history data was obtained from CAL FIRE's Fire and Resource Assessment Program (FRAP 2015) database. The 38 fires in this five mile area over the last 105 years is not considered a high number for Riverside County. On average, CAL FIRE-Riverside County Fire Department annually responds to approximately 650 wildfires (RCFD 2015) within the County.

Based on fire history, wildfire risk for the project site is associated primarily with a Santa Ana wind-driven wildfire burning or spotting onto the site from the east or north, although a fire approaching from the west during more typical on-shore weather patterns is possible. The Elsinore Effect or convergence is primarily noted along the Santa Ana Mountains to the west of the project area and would not be anticipated to have a significant impact on fire behavior at the Project site, but may result in wind shifts from on-shore to off-shore at or shortly after sunset.

Note that once the Proposed Project is built out, the fire spread patterns will be modified in the project area, as the Proposed Project will represent a large fuel break of maintained and irrigated landscapes, which fire may encroach upon and burn around, but will not burn through the valley and drainages with the same spread patterns as it has in the past.

3 ANTICIPATED FIRE BEHAVIOR

3.1 Fire Behavior Modeling

Following site evaluation and vegetative fuels data collection efforts, fire behavior modeling was conducted to document the type and intensity of fire that would be expected on the project site given characteristic site features including topography, vegetation, and weather. Dudek utilized the BehavePlus software package. BehavePlus provides a tabular output. BehavePlus was utilized for five specific fire scenarios.

3.1.1 Modeling History

Fire behavior modeling has been used by researchers for approximately 50 years to predict how a fire will move through a given landscape (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used for predicting fire behavior on a given landscape. That model, known as "BEHAVE," was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. The current version, BehavePlus, 5.0.5, includes the latest updates incorporating years of research and testing. Numerous studies have been completed testing the validity of the fire behavior models' ability to predict fire behavior given site specific inputs. One of the most successful ways the model has been improved has been through post-wildfire modeling (Brown 1972, Lawson 1972, Sneeuwjagt and Frandsen 1977, Andrews 1980, Brown 1982, Rothermel and Rinehart 1983, Bushey 1985, McAlpine and Xanthopoulos 1989, Grabner, et. al. 1994, Marsden-Smedley and Catchpole 1995, Grabner 1996, Alexander 1998, Grabner et al. 2001, Arca et al. 2005). In this type of study, BehavePlus is used to model fire behavior based on pre-fire conditions in an area that recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of BehavePlus and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling includes a high level of analysis and information detail to arrive at reasonably accurate representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on site specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. Predicting wildland fire behavior is not an exact science. As such, the minute-by-minute movement of a fire will probably never be predictable, especially when considering the variable state of weather and the fact that weather conditions are typically estimated from forecasts made many hours before a fire. Nevertheless, field-tested and experienced judgment in assessing the fire environment, coupled with a systematic method of calculating fire behavior yields surprisingly

accurate results. To be used effectively, the basic assumptions and limitations of fire behavior modeling applications must be understood.

1. First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is the dead fuels less than 0.25 inches in diameter. These are the fine fuels that carry fire. Fuels greater than 1 inch have little effect, while fuels greater than 3 inches have no effect on fire behavior.
2. Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within 6 feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
3. Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, creating their own weather, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
4. Fourth, fire behavior computer modeling systems are not intended for determining sufficient fuel modification zone/defensible space widths. However, it does provide the average length of the flames, which is a key element for determining defensible space distances for minimizing structure ignition.

Although BehavePlus has limitations, it can still provide valuable fire behavior predictions, which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand the relationship of fuels to the fire environment and be able to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur in a particular landscape. The type and quantity will depend upon soil, climate, geographic features, and fire history. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

3.1.2 Modeling Inputs

3.1.2.1 Fuels

The seven fuel characteristics help define the 13 standard fire behavior fuel models (Anderson 1982) and the more recent custom fuel models developed for Southern California (Weise and Regelbrugge 1997). According to the model classifications, fuel models used for fire behavior

modeling (BehavePlus) have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface-to-volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in modeling efforts. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

- Grasses Fuel Models 1 through 3
- Brush Fuel Models 4 through 7, SCAL 14 through 18
- Timber Fuel Models 8 through 10
- Logging slash Fuel Models 11 through 13.

In addition, the aforementioned fuel characteristics were utilized in the recent development of 40 new fire behavior fuel models (Scott and Burgan 2005) developed for use in the BehavePlus modeling system. These new models attempt to improve the accuracy of the 13 standard fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the 40 new fuel models:

- Non-burnable Models NB1, NB2, NB3, NB8, NB9
- Grass Models GR1 through GR9
- Grass shrub Models GS1 through GS4
- Shrub Models SH1 through SH9
- Timber understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4.

For the BehavePlus analyses, fuel model assignments were based on observed field conditions.

3.1.2.2 Weather

Historical weather data for the region was utilized in determining appropriate fire behavior modeling inputs for the MHSPA project site. For this analysis, 50th and 97th percentile fuel moisture and wind speed values were derived from Remote Automated Weather Stations (RAWS) data and utilized in the fire behavior modeling efforts conducted in support of this FPTR. Data from two nearby RAWS was utilized for modeling fire behavior on the Proposed Project site,

including the El Cariso RAWS (located to the west-northwest), and the Santa Rosa Plateau RAWS (located to the south).

To determine weather-related modeling inputs, RAWS fuel moisture and wind speed data were processed utilizing the FireFamily Plus software package, assuming typical (50th percentile) and atypical (97th percentile) weather conditions. Data from the two RAWS was combined into a Special Interest Group (SIG) in the FireFamily Plus software, with data from each station being weighted equally. The project SIG was evaluated from August 1 through November 30 for each year between 1986 and 2015 (extent of available data record) for 97th percentile weather conditions and from June 1 through September 30 for each year between 1986 and 2015 for 50th percentile weather conditions. Data derived from this analysis included 50th and 97th percentile values for 1-hour, 1-hour, and 100-hour fuel moistures, live herbaceous moisture, live woody moisture, and 20-foot sustained wind speed. The weather data was also evaluated to determine the maximum sustained wind speed for the 97th percentile weather scenario.

The fuel moisture and wind speed data resulting from the FireFamily Plus analysis was used in the BehavePlus fire behavior modeling efforts conducted in support of this FPTR. These variable were input directly into the BehavePlus software for that analysis effort. Table 3 presents the wind and fuel moisture input variables in the BehavePlus modeling efforts.

Table 3
Fuel Moisture and Wind Inputs

Variable	Summer Weather Condition (50th Percentile)n	Peak Weather Condition (97th Percentile)
1h Moisture	5%	2%
10h Moisture	6%	3%
100h Moisture	10%	5%
Live Herbaceous Moisture	60%	30%
Live Woody Moisture	87%	59%
20-foot Wind Speed (upslope/downslope)	10 mph (40 mph maximum)	17 mph (46 mph maximum)
Wind Direction	Uphill and downhill	Uphill

3.1.2.3 Slope

Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition

rates. For the BehavePlus analysis, slope values were measured from site topographic maps at the locations of each modeling scenario, and ranged in value between 10% to 25%.

3.1.3 BehavePlus Analysis

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and. To objectively predict flame lengths, intensities, and spread rates, the BehavePlus 5.0.5 fire behavior modeling system (Andrews, Bevins, and Seli 2004) was used in five modeling scenarios and incorporated observed fuel types representing the dominant on-site vegetation (chaparral (Fuel Model SH5)), off-site vegetation on vacant lots to the northeast (short grasslands (fuel model GR4)), measured slope gradients, and wind and fuel moisture values derived from RAWS data sets. Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent the site. The fire modeling inputs and results of the BehavePlus analysis are presented in Table 4.

Table 4
BehavePlus Fire Behavior Modeling Inputs and Results

Fire Scenario[3,4]	Flame Length (feet)[1]	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Chaparral on east-facing, 25% slope				
Offshore Wind (97th Percentile -46 mph max. wind speed)	43.4	20,581	6.3	2.3
Scenario 2: Grassland[2] on flat terrain, <5% slope				
Offshore Wind (97th Percentile -46 mph max. wind speed)	36.6	14,181	14.9	2.0
Scenario 3: Chaparral on South- and West- facing, 15% slopes				
On shore Wind (50th Percentile- 40 mph max. wind speed)	26.6	7,085	3.0	1.5
Scenario 4: Post-Development (97th Percentile Weather)				
Fuel Modification Zone 1 (Fuel Model 8)	3.0	63	<1.0	0.3
Fuel Modification Zone 2 (Fuel Model SH1)	10.3	900	1.4	0.8
Scenario 5: Post-Development (50th Percentile Weather)				
Fuel Modification Zone 1 (Fuel Model 8)	1.8	21	0.07	0.2
Fuel Modification Zone 2 (Fuel Model SH1)	0.07	3	0.02	0.1

Notes:

1 Flame lengths are based on the use of customized shrub fuel models developed for Southern California chaparral that more accurately portrays how chaparral on this site would burn compared to the over-predicting SH-4 model, which has been shown to produce more aggressive fire behavior than typically occurs within Southern California fuels (Weise and Regelbrugge 1997).

2 A moderate fuel load, grass model was assigned to the undeveloped properties to the northeast of the Proposed Project site.

3 Results indicate expected fire behavior for maximum sustained winds. The average, daily sustained on-shore winds was calculated at 10 mph.

4 Results indicate expected fire behavior for maximum sustained winds. The average, daily sustained off-shore winds was calculated at 17 mph.

As presented in Table 4, wildfire behavior in non-treated chaparral, presented as a Fuel Model SH5, represents the most extreme conditions, varying with different wind speeds. In this case, flame lengths can be expected to reach up to approximately 27 feet with 40 mph maximum wind speeds (summer condition) and 43 feet with 46 mph wind speeds (Peak condition). Spread rates for chaparral fuel bed range from 3.0 mph (summer) to 6.3 mph (Peak). Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 1.5 miles (summer condition) to 2.3 miles (Peak condition). Chaparral fuel types can burn intensely and can produce a fast-spreading wildland fire under strong, dry wind patterns as shown for fire scenario 1. This fuel type can also produce higher flame lengths under extreme weather, but does not typically ignite or spread as quickly as light, flashy grass fuels as presented in scenario 2. Table 5 provides information pertaining to interpretation of flame length and its relationship with fireline intensity.

Table 5
Fire Suppression Interpretation

Flame Length (feet)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4	Under 100	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4–8	100–500	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8–11	500–1,000	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11	Over 1,000	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

Source: BehavePlus 5.0.5 Online Documentation, March 16, 2010. BehavePlus Fire Modeling System: Version 4.0 User's Guide (Andrews, Bevins, and Seli 2008)

It should be noted that the results presented in Table 4 depict values based on inputs to the BehavePlus software. While there may be pockets of fuels that would produce larger flame lengths, the average flame lengths across the site's chaparral are predicted to be 43 feet. The model used in this analysis for chaparral is a more recent model designed by the U.S. Forest Service to more accurately represent Southern California chaparral than the original Fuel Model 4 (Anderson 1982). Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

3.1.4 Fire Behavior Summary

3.1.4.1 Existing Condition

As presented in Figure 5, wildfire behavior in non-treated heavy chaparral, modeled as a SH5, varies based on timing of fire. A worst case summer fire (Summer condition) would result in a fire spreading at a rate of up to 3.0 miles per hour (mph). During a fall fire with gusty Santa Ana (Peak condition) winds and low fuel moisture, fire is expected to be fast moving between 6 and 15 mph with highest flame length values reaching approximately 43 feet in specific portions of the property. Spotting is projected to occur up to nearly 1.5 mile during a summer fire and nearly 2.3 miles during a fall fire.

3.1.4.2 Post-development Condition

As presented in Table 4, Dudek conducted modeling of the site for post-FMZ fuel reduction recommendations for this project. Fuel modification includes establishment of irrigated and thinned zones on the periphery of the project's neighborhoods and roads as well as interior landscape requirements. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified for the developed landscape (Fuel Model 0), Fuel Modification Zone 1(Fuel Model 8), and Fuel Modification Zone 2 (Fuel Model SH1). Fuel model assignments for all other areas remained the same as those classified for the existing condition. As depicted, the fire intensity and flame lengths in untreated, biological open space areas would remain the same. Conversely, the FMZ areas experience a significant reduction in flame length and intensity. The 43.4-foot tall flames predicted during pre-treatment modeling during extreme weather conditions are reduced to 10.3 feet tall at the outer edges of the FMZ and to 3.0 feet by the time the inner portions of the FMZ are reached. During summer weather conditions, a fire approaching from the west would be reduced from 27-foot tall flames to less than 2.0 feet tall with low fire intensity due to the higher live and dead fuel moisture contents.

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Scenario Runs #1, #2 & #4

Scenario Runs #3 & #5

BehavePlus Fire Behavior Modeling Results

Fire Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Chaparral on east-facing, 25% slope				
Offshore Wind (97th Percentile -46 mph max. wind speed)	43.4	20,581	6.3	2.3
Scenario 2: Grassland on flat terrain, <5% slope				
Offshore Wind (97th Percentile -46 mph max. wind speed)	36.6	14,181	14.9	2.0
Scenario 3: Chaparral on South- & West- facing, 15% slopes				
On shore Wind (50th Percentile- 40 mph max. wind speed)	26.6	7,085	3.0	1.5
Scenario 4: Post-Development (97th Percentile Weather)				
Fuel Modification Zone 1 (Fuel Model 8)	3.0	63	<1.0	0.3
Fuel Modification Zone 2 (Fuel Model SH1)	10.3	900	1.4	0.8
Scenario 5: Post-Development (50th Percentile Weather)				
Fuel Modification Zone 1 (Fuel Model 8)	1.8	21	0.07	0.2
Fuel Modification Zone 2 (Fuel Model SH1)	0.07	3	0.02	0.1

BehavePlus Fire Behavior Modeling Inputs

Variable	Summer Weather (Onshore Flow)	Peak Weather (offshore/Santa Ana Condition)
Fuel Model	Sh5	Gr4, Sh5
1h Moisture	5%	1%
10h Moisture	6%	2%
100h Moisture	10%	5%
Live Herbaceous Moisture	60%	30%
Live Woody Moisture	87%	59%
20-foot Wind Speed	10 mph (40 mph maximum)	17 mph (46 mph maximum)
Wind Adjustment Factor	0.4	0.4
Slope Steepness	10-15%	10-25%

Project Site

0 600 1,200 Feet

SOURCE: AERIAL-BING MAPPING SERVICE; SITE PLAN-STANTEC 2017

DUDEK

FIGURE 5

BehavePlus Fire Behavior Exhibit

Murrieta Hills Fire Protection Plan

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4 EMERGENCY RESPONSE AND SERVICE

4.1 Fire Facilities

The Proposed Project area is currently located within SRA and, therefore, fire service for the existing Project site is provided by CAL FIRE- Riverside County Fire Department. The project proponent proposes an annexation of the entire project site into the City of Murrieta. Once finalized, MFR will provide initial response to the Proposed Project site. MFR operates four Fire Stations, all of which could respond to a fire or medical emergency at the site. Table 6 presents a summary of the location, equipment, staffing levels, maximum travel distance, and calculated travel time for the four MFR stations. Travel distances are derived from Google road data while travel times are calculated applying the nationally recognized RAND Corporation formula used by the Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard: (T=0.65 + 1.7 D, where T= time and D = distance). The response travel time formula discounts speed for intersections, vehicle deceleration and acceleration, and does not include turnout time.

Table 6
Murrieta Fire and Rescue Responding Stations Summary

Fire Station	Address	Apparatus	Staffing (Total/Station)	Maximum Travel Distance	Travel Time**
1	41825 Juniper Street Murrieta, California 92562	Ladder Truck, Water Tender, Technical Rescue and Lighting and Air	4	8.6 miles*	15 min
2	40060 California Oaks Road Murrieta, California 92562	Type I and III engines***	4	5.6 miles*	10 min
3	39985 Whitewood Road Murrieta, California 92563	Type I and III engines***	4	8.2 miles*	15 min
4	28155 Baxter Road Murrieta, California 92563	Type I and III engines***	4	1.4 miles*	3 min
5	38391 Vineyard Parkway Murrieta, California 92562	Type I and III engines***	4	9.5 miles*	17 min

* Distance measured to Project entrance located on the intersection of Keller Road Road and Zieders Road at the northeastern edge of property.
** Assumes speeds calculated with the ISO drive time formula, where Time = 0.65+1.7(Distance).
*** Engines are cross-staffed by the station engine company

The closest existing MFR Fire Station is FS 4, located at 28155 Baxter Road, which staffs a minimum of three personnel 24 hours per day/seven days per week and houses one Paramedic Engine (Type I) and a cross-staffed, Type III brush engine. Additionally, secondary response could

be provided from Riverside County Fire Department (RCFD) Fire Station #68 and other MFR Fire Stations, as needed.

The City has a signed automatic aid agreement on first alarm or greater with the Riverside County Fire Department. The City is also part of the State of California Master Mutual Aid Agreement. In the event of a major fire, Murrieta is provided one outside resource and that is CAL FIRE. If the Master Mutual Aid Agreement is activated, then other outside resources can be brought into the City, as needed.

The Cooperative Wilfire Agreement between MFR and CAL FIRE that would be funded by the Project to MFR would enable MFR to call on CAL FIRE's full response weight. Vegetation fires require special apparatus and depending on weather and fuel conditions, may require a significant response.

Full MFR response:

- Five Type III engines
- One Battalion Chief
- One mutual aid CAL FIRE Engine to cover City

Full CAL FIRE response:

- Five to 10 Type III engines (depending on dispatch level)
- Battalion Chief
- Three fixed-wing aircraft (two tankers and air attack)
- Dozer
- Two hand crews
- Two helicopters

Additional resources would be available if needed.

4.2 Emergency Response Travel Time Coverage

The City of Murrieta bases its response time goals on the National Fire Protection Association (NFPA) 1710, and the Insurance Service Office. The City's General Plan indicates a response time of 5.5 minutes travel time plus 1 minute for turnout (dispatch time is not addressed). MRF conducted its own analysis and created target response times for various call types with structure fire call responses within 10 minutes (90 seconds dispatch, 60 seconds turnout, 7 minutes and 30 seconds travel, for 90% of the calls and for emergency medical calls, the total

response time to 90% of calls is 8 minutes 30 seconds (Community Risk Assessment – Standards of Cover). Station 4 response time goal currently based on NFPA 1710 and complies 56.1% of the time.

Response travel time to the project site's furthest destination within the backbone streets from MFR fire station 4 would be approximately 4 minutes when the engine is in quarters. The overall response time in Station 4's primary response area is 9 minutes 54 seconds at 90 percentile. Therefore, the Proposed Project achieves the City's target response time standard for first arriving, but it is acknowledged that the actual response time may be longer, according to average response times.

4.3 Estimated Calls and Demand for Service from the Project

The MFR documented the following average emergency calls since

- 2014 – 7,734 calls
- 2015 – 8,326 calls
- 2016 – 8,470 calls
- 2017 – 9,072 calls
- 2018 – 9,456 calls
- 2019 – Jan through May – 4,228 – projected 2019 calls - over 10,000

The realized call volume has increased annually as the City population of approximately 115,000[2] increases (City of Murrieta 2016a). The call volume of 87 per 1,000 persons per year is higher than the national average of approximately 82 calls. For this analysis, the higher (most conservative) per capita call volume of roughly 0.87 will be used for MFR as a conservative approach. Based on the proposed development plans, the project's estimated 2,230 residents (assumes an average of 3.2 occupants per residence for this type of community (US Census Bureau 2017) and 697 households) would generate roughly 201 calls per year (0.6 calls per day), most of which are expected to be medical-related calls (approximately 80% of total emergency incidents).

Station 4 call response levels have been increasing as the City's population increases:

- 2014 – 865 calls
- 2015 – 991 calls

[2] City population total number is from California Department of Finance Demographic Research Unit 2015.

- 2016 – 1,012 calls
- 2017 – 1224 calls
- 2018 – 1,510 calls

Service level requirements are not expected to be significantly impacted with the increase of 201 calls per year (0.6 call per day) for a station (MFR Station 4) that currently responds to roughly 4.1 calls per day (1,510 calls per year (City of Murrieta 2016a), 125 calls per month, 29 calls per week), but would contribute to a cumulative, but mitigated response impact as the number of calls grows to levels that would require additional resources. However, this level is not reached by adding the Murrieta Hills project calls alone. The next closest MFR fire station is station 2. This MFR station responded to 2,805 calls in 2015, or approximately 7.6 calls per day. For reference, a station that responds to 5 calls per day in an urban setting is considered average and 10 calls per day is considered busy. Therefore, the addition of less than one call per day to Station 4's current low call volume is not expected to cause a significant decline in Station 4's level of service.

Development impact fees for Murrieta Hills and other projects that contribute to the cumulative impact on fire service help to support additional resources and provide funding for capital costs necessary to continue providing service at acceptable levels. The Murrieta Hills FPTR also assists MFR by providing a layered, redundant fire protection approach. The FPTR helps ensure that fire events that occur in or around the project are not facilitated toward structures and provides proactive mitigation of catastrophic scenarios, reducing overall impacts and strain on the MFR resources. The requirements described in this FPTR are intended to aid firefighting personnel and minimize the demand placed on the existing emergency service system.

5 FIRE SAFETY REQUIREMENTS – DEFENSIBLE SPACE, INFRASTRUCTURE, AND BUILDING IGNITION RESISTANCE

5.1 Fuel Modification Zones

5.1.1 Zones and Permitted Vegetation

As indicated in preceding sections of this FPTR, an important component of a fire protection system is the fuel modification area. Fuel modification areas are designed to gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of the community's WUI exposed structures, as well as around all structures including:

- All residential and other occupancies
- Open space areas within the community
- Emergency Access Roads or Streets

Based on the modeled extreme weather flame lengths for the Proposed Project, average wildfire flame lengths are projected to be approximately 43 feet high. The fire behavior modeling system used to predict these flame lengths was not intended to determine sufficient fuel modification zone (FMZ) widths, but it does provide the average predicted length of the flames, which is a key element for determining "defensible space" distances for providing fire fighters with room to work and minimizing structure ignition. For this Proposed Project, the FMZ width outside the lot line is 150 feet, a minimum of 3 ½ to almost six times the modeled flame lengths based on the fuel type represented adjacent to the site.

The following FMZ requirements are proposed for the Project's landscapes. In addition to the FMZs meeting defensible space requirements, the entire project landscape will be restricted to lower flammability plant materials as part of a fire adapted community approach. The FMZs and landscaped areas are presented graphically in Appendix D. In addition, the proposed Project plant palette and the Murrieta example acceptable plant list and fuel modification notes are provided in Appendix E.

Fuel Modification Zone Definition

FMZs are designed to provide buffers at perimeter areas of projects or between structures and wildland fuels to reduce fuel available to wildfire. These zones reduce fire spread rates and fire intensity by providing thinned fuels in the outer zones and irrigated, selective plantings in the inner zones. FMZs are typically 100 feet wide. The total width of the majority of FMZs for the Proposed Project will be up to 70% wider when rear yards are included. The rear yards will be considered

FMZs, averaging an additional 20 feet, extending total fuel modification zone to 170 feet in most cases. Therefore, a typical landscape/fuel modification installation for the Proposed Project's perimeter lots exceeds the 100 foot standard, consisting of up to 170-foot wide fuel management area from the structure extending outward towards preserve areas.

This extended FMZ is important as a mitigation for potential wildfire impacts as research has indicated that the closer a fire is to a structure, the higher the level of heat exposure (Cohen 2000). However, studies indicate that given certain assumptions (e.g., 10 meters (33 feet) of low fuel landscape, no open windows), wildfire does not spread to homes unless the fuel and heat requirements (of the home) are sufficient for ignition and continued combustion (Cohen 1995, Alexander et al. 1998). Construction materials and methods can prevent or minimize ignitions. Similar case studies indicate that with nonflammable roofs and vegetation modification from 10–18 meters (roughly 33–60 feet) in southern California fires, 85–95% of the homes survived (Howard et al. 1973, Foote and Gilless 1996).

These results support Cohen's (2000) findings that if a community's homes have a sufficiently low home ignitability (i.e., 2013 California Building Code), the community can survive exposure to wildfire without major fire destruction. This provides the option of mitigating the wildland fire threat to homes/structures at the residential location without excessive wildland fuel reduction and focusing the effort in the areas nearest the structures. Cohen's (1995) studies suggest, as a rule-of-thumb, larger flame lengths and widths require wider fuel modification zones to reduce structure ignition. For example, valid Structure Ignition Assessment Model (SIAM) results indicate that a 20-foot high flame has minimal radiant heat to ignite a structure (bare wood) beyond 33 feet (horizontal distance). Whereas, a 70-foot high flame may require about 130 feet of clearance to prevent structure ignitions from radiant heat (Cohen and Butler 1996). This study utilized bare wood, which is more combustible than the ignition resistant exterior walls for structures built today. The Proposed Project has provided up to 150 feet (plus 20 foot rear yards) for modeled 43 foot tall flame lengths. Therefore, the additional buffer allows for the possibility that longer flame lengths occur and still provides wider setbacks than scientific studies indicate would be necessary.

Other means of providing setback include obstacles, including steep terrain, rock outcroppings, and non-combustible walls, which can block or deflect all or part of the radiation and heat, thus making narrower fuel modification distances possible. This approach is utilized on the Proposed Project interior areas adjacent to the oak-riparian corridor to reduce habitat impacts while providing adequate protection.

As indicated in this report, the FMZs and additional fire protection measures proposed for this project provide a wildfire buffer, and exceed the standard 100 foot wide, two zone standard by up to 70%. The zones are based on a variety of analysis criteria including predicted flame length, fire

intensity (Btu), site topography and vegetation, extreme and typical weather, position of structures on pads, position of roadways, adjacent fuels, fire history, current vs. proposed land use, neighboring communities relative to the proposed project, and type of construction. The fire intensity research conducted by Cohen (1995), Cohen and Butler (1996), and Cohen and Saveland (1997) and Tran et al. (1992) supports the fuel modification proposed for this project.

General Criteria

- All plant material listed on the Murrieta Hills "Fire Protection Technical Report" prohibited plant list (Appendix F) will be prohibited within any Fuel Modification Zone.
- 50%–70% of the overall fuel modification areas shall be planted with deep rooting (below the first 6 inches) plant material, where feasible, based on soil type.
- Debris and trimmings produced by thinning and pruning shall be removed from the site, except for larger woody debris that may be chipped and left on site for weed and erosion control.
- There shall be no hedging of shrubs so that they do not form a means of rapidly transmitting fire from the native growth to the structures.
- Shrubs may be planted in clusters not exceeding a total of 400 square feet (i.e., 20-feet x 20-feet; 10-feet x 30-feet, etc.)
- A distance of no less than the width of the largest shrub's mature spread shall be provided between each shrub cluster.
- Non-shrub avenues devoid of shrubs shall be included to provide a clear access route from toe of slope to top of slope and shall be a minimum width of 6 feet and spaced a distance of 200 linear feet on center.
- Where shrubs or other plants are planted underneath trees, the mature tree canopy shall be maintained at a height no less than three times the shrub or other plant's mature height to break up any fire laddering[3] effect.
- Expanses of native or naturalized grasses shall be cut to within 2 inches in height prior to the end of growing season in April or May.
- Individual clumps of grass can be maintained year-round up to twenty-four inches in height when they are isolated from other fuels or where necessary to stabilize soil and prevent erosion.

[3] Plant material that can carry a fire burning in low-growing vegetation to taller vegetation is called ladder fuel. Examples of ladder fuels include low-lying tree branches and shrubs, climbing vines, and tree-form shrubs underneath the canopy of a large tree.

- Debris and trimmings produced by thinning and pruning of vegetation shall be removed from the site.

Zone 1A- Setback Zone

Zone 1A – Definition

Zone 1A is the first 20 feet (rear yard) from the structure to the lot line for those lots adjacent to natural open space around or within the development footprint. This area will be included in the overall site reduced fuel zones. Homeowners will be responsible for ensuring that rear-yard landscaping is compliant with this FPTR. The project's HOA will include a landscape committee to review and approve landscape plans and provide ongoing education to homeowners regarding fire adapted landscape maintenance.

Zone 1

Zone 1 – Definition:

All public and private areas located between the lot line and 50 feet outward. These areas may be located on public slopes, private open-space lots, public streets, and/or private yards, as defined in the landscape fuel modification exhibit.

Some perimeter lots receive extended Zone 1 FMZs on the manufactured slope or internal common area landscaping. These FMZs exceed the code requirement by providing low fuel densities and irrigated fuels for distances exceeding a standard 50 feet.

Zone 1 – Specific Criteria:

- All highly flammable native vegetation, especially plant species found on the Prohibited List (Appendix F) shall be removed. This zone will be planted with drought-tolerant, less flammable plants from the Murrieta Hills Project Plant Palette (Appendix E), which was prepared by VDLA Landscape Architects and reviewed/revised by the authors of this FPTR.
- This irrigated high plant moisture zone shall be serviced by a permanent automatic irrigation system that keeps plants hydrated via efficient drip irrigation, as defined by the Project's Landscape Architect.
- No tree limb encroachment within 10 feet of a structure or chimney, including outside barbecues or fireplaces.
- Minimum 10 feet between tree canopies.

- Tree maintenance includes limbing-up (canopy raising) 8 feet or one-third the height of a mature tree.
- Additional trees (excluding prohibited or highly flammable species) may be planted as parkway trees on single loaded streets.
- 75% of all groundcover and sprawling vine masses shall be limited to a maximum height of 18 inches.
- 25% of all groundcover and sprawling vine masses may reach a maximum height of 24 inches.
- Ground covers must be of high-leaf moisture content, per accepted industry standards.
- Shrubs shall be less than 2 feet tall, with minimum 5-foot centers, on average.
- Randomly placed approved succulent type plant material may exceed the height requirements, provided that they are spaced in groups of no more than three and a minimum of five feet, on average away from described "clear access routes" and neighboring plantings.
- Vegetation/Landscape Plans shall be in compliance with this FPTR and approved by the City of Murrieta Planning Department.

Zone 2

Zone 2 – Definition

All public and private areas located between the outside edge of Zone 1 and 100 feet outward. These areas may be located on public slopes, private open-space lots, public streets, and/or private yards, as defined in the landscape fuel modification exhibit.

Zone 2 – Specific Criteria

- Represents a 50% thinning zone – 50% less fuel than on adjacent unmaintained preserve areas. Zone 2 areas will include removal of dead/dying vegetation, exotics, and plant species listed on the prohibited plant list. Removal of these components will result in 50% thinning of the existing fuels. As necessary to meet the 50% thinning objective, other plants will be removed to create a mosaic of vegetation with adequate spacing and discontinuity. Large shrubs shall not be cut back hard or hedge them into unnatural shapes.
- All manufactured slopes within this area shall be serviced by a temporary, aboveground automatic irrigation system which will be turned off once the plantings are established, but will remain in place.
- Trees may be located within this zone, provided that they are planted in clusters of no more than three. A minimum distance of no less than 20 feet shall be maintained between the

tree cluster's mature canopies. The trees will be limbed up to maintain vertical separation from understory shrubs.

- Only those trees on the Project Plant List (Appendix E) and/or those approved by the biologist shall be allowed within this zone.
- A person or contractor knowledgeable about the use and maintenance of California native plants should oversee the selection, thinning, and pruning.
- 75% of all groundcover and sprawling vine masses shall be limited to a maximum height of 36 inches.
- 25% of all groundcover and sprawling vine masses may reach a maximum height of 48 inches.
- Randomly placed approved succulent type plant material may exceed the height requirements, provided that they are spaced in groups of no more than three.
- Single specimen native shrubs, exclusive of chamise and sage, may be retained, on 20-foot centers.

5.1.2 FMZ Augmentation

Internal Oak-Dominated Open Space

As depicted in Appendix D, lots adjacent to the internal oak riparian drainage open space will receive additional measures, including heat deflecting walls and dual-tempered pane windows. In addition, the potential severity of a wildfire within this project-internal open space park will be minimized through ongoing fuel treatments. The area will be maintained as an FMZ through annual maintenance of non-jurisdictional areas so that vegetation does not exceed a height of four inches. There are limited areas within this open space that are jurisdictionally protected by California Department of Fish and Wildlife and will be left unmaintained. All of these areas are beyond 150 feet from adjacent structures. Additionally, should mortality of oaks and or willow trees occur in these jurisdictional areas, from drought, insect, disease or other factors, they will be removed or chipped on site to avoid the accumulation of dead fuels.

The preserved woodland vegetation on site includes variable, density oak canopy that will be maintained in a park-like condition with raised canopies (outside the jurisdictional area) and removal of understory ladder fuels. Fire behavior modeling conducted for this project indicates that fires in the oak woodlands would result in roughly 15-foot flame lengths under summer conditions (in the ground fuels beneath and adjacent the oaks). Extreme conditions may result in crown fire, where tree crowns burn and create more intense fire and longer flame lengths. As indicated in this report, the post-treatment flame lengths and fire intensity will be much lower due

to removal of specific species and maintenance of fuel heights at a four inch height for the majority of the internal open space.

The thinned FMZs and additional fire protection measures proposed for this area provide equivalent wildfire buffer, but are not standard zones. Rather, they are based on a variety of analysis criteria including predicted flame length, fire intensity (Btu), site topography and vegetation, extreme, jurisdictional habitat areas, oak woodland canopy, and typical weather, position of structures on pads, adjacent fuels, fire history, and type of construction.

Cultural Resource Preserve Areas

As depicted in Appendix D, two areas that are culturally significant have been preserved within the development footprint. These areas will be maintained at a four inch vegetation height through annual treatments. Depending on the requirements to avoid disturbing the cultural resources, it may be necessary to treat these areas with hand tools, which may include motorized trimmers and saws, instead of wheeled or tracked machines. Additionally, the FMZ area south of the Multi family Planning Area 8 site has been historically disked and the HOA will continue providing FMZ via as-needed mowing.

Heat Deflecting Walls


Example heat deflecting wall

Some of the project's slopes and the elevated lots/pads adjacent the oak drainage areas as well as areas where FMZ is less than 150 feet (see Appendix D), provide an opportunity to place a non-combustible, six foot tall, heat-deflecting wall (or view wall with lower 2 foot block wall and upper 4 feet dual pane, one pane tempered glazing) to provide additional deflection for the most fuel modification area constrained lots. When buildings are set back from slopes, flames spreading up those slopes are deflected vertically and over the structure where cooling occurs, reducing the effects of convective heat on the structure. If a structure cannot be setback adequately, or where the slope is less than 30%, a noncombustible wall can help deflect the flames from the structure (NFPA 2005)[4].

With houses set back from the slope edge, flames, convective heat and firebrands from fires spreading upslope tend to loft over the top of the house rather than directly impacting it, especially with the addition of a non-combustible wall. The duration of radiant heat impact on the downhill

[4] Protecting Life and Property from Wildfire (NFPA 2005). James C. Smalley, Editor. NFPA Wildland Fire Protection. 2005.

facing side of the house is also reduced. An imaginary line extended along the slope depicts the path of the heat (hot air rises) and flame. The structure set back is important to avoid heat and/or flame intersection with the structure.

Heat-deflecting landscape view walls of masonry construction with fire-rated glazing that are six feet in height (roughly lower two feet masonry construction and upper three feet dual pane, one pane tempered glazing or equivalent and meeting Chapter 7A and/or MFR approval) will be incorporated at top of slope/edge of lots adjacent this interior drainage area and along the internal roadways where they traverse undeveloped stretches, graphically depicted in Appendix D. The landscape walls provide a vertical, non-combustible surface in the line of heat, fumes, and flame travel up the slope. Once these fire byproducts intersect the wall, they are deflected upward or, in the case where lighter fuels are encountered, they are quickly consumed, heat and flame are absorbed or deflected by the wall, and the fuel burns out within a short (30 second–2 minute) time frame (Quarles and Beall 2002). Walls like these have proven to deflect heat and airborne embers and are consistent with NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire – 2008 Edition, Section 5.1.3.3 and A.5.1.3.3 and International Urban Wildland Interface Code (ICC 2012). NFPA 1144, A.5.1.3.3 states: "Noncombustible walls and barriers are effective for deflecting radiant heat and windblown embers from structures." These walls and barriers are usually constructed of noncombustible materials (concrete block, bricks, stone, stucco) or earth with emergency access openings built around a development where 30 feet (9 meters) of defensible space is not available.

Exterior Windows

Since the structures will be hardened to wildland urban interface standards, they will be ignition resistant. However, a potentially vulnerable structure component with regard to radiant or convective heat exposure would be the exposed side windows. Determining whether provision for a set back from oak canopy of 30 to 50 feet is adequate requires application of available research. To address this issue, it is worthwhile to examine the structure ignitability modeling, independent ignition experiments, and case studies that support fuel treatments as low as roughly 34 feet from structures, and compare them with the project. Cohens' (1995) structure ignitability model (SIAM) assesses ignitability of bare wood when exposed to a continuous heat source. The model assumes a worst-case condition of a constant 1,700 degrees (F). A constant, maximum heat source is typically not the case during a wildfire due to the movement of a fire, non-uniform vegetation distribution, and the lack of a uniform, constant flame front.

The analysis conducted for this report indicates that the structure setbacks of a minimum of 35 feet from the fuels is consistent with study results for separating the structures from the short-duration heat and flame associated with a fire burning within one of the preserved riparian woodland drainages. The typical

duration of large flames from burning vegetation is on the order of 1 minute and up to several minutes for larger fuels at a specific location (Cohen 1995; Butler et al. 2004, Ramsay and Rudolph 2003). Tests of various glazing products indicate that single pane, tempered glass failure may occur between 120–185 seconds from exposure (University of California 2011; Manzello et al. 2007) but those tests include direct and constant heating that would not be experienced during a wildfire on this site. Depending on the heat applied and the type of glass used in the various studies, the cracking/failure time varied. However, given the short duration of maximum heat (likely several minutes for the oaks), the loss of heat over distance (25 feet minimum), the dual pane, two pane tempered glazing specified for this project, wildfire heat and flame experienced by the windows from the wildland fire is not expected to be enough (in temperature or duration) to cause failure of both panes. Quarles et al. (2010) provides strong endorsement for tempered glass performance. His research and tests conclude that multi-pane (2–3 panes) with at least one pane tempered is well-suited for wildfire exposures. He indicates that tempered glass is at least four times stronger and much more resistant to thermal exposures than normal annealed glass. The use of code required dual pane, one pane tempered glass provides several benefits, with thermal exposure performance the most important for this study. This FPTR requires both panes tempered to improve the strength of the windows.

5.2 Other Vegetation Management

5.2.1 Roadside Fuel Modification Zones (Including Driveways exceeding 150 feet in length)

- High BTU producing, flammable vegetation including shrubs and trees shall be cleared and are prohibited (refer to the prohibited plant list in Appendix F).
- Tree and shrub canopies shall be spaced such that interruptions of tree crowns occur and horizontal spacing of 20 feet between mature canopies of trees or tree groups is maintained. Newly planted trees may be spaced closer due to their smaller crowns, but will require maintenance, and eventually removal of some trees as they mature to maintain the 20 feet crown spacing.
- Grass shall be mowed to at least 4 inches in height.
- Single tree specimens, fire resistive shrubs, or cultivated ground cover such as green grass, succulents or similar plants used as ground covers may be used, provided they do not form a means of readily transmitting fire.
- All roads, including the extension of McElwain Road, in the development will have vegetation clearance of flammable vegetation on each side, as follows:
    1. Fire Access Roads (any road that a responding fire engine would use to access an emergency) – 20 feet from edge of pavement

2. New roads/driveways – 20 feet from edge of pavement
3. McElwain Road – a minimum 80 feet wide on the west side and a minimum of 20 feet wide on the east side, including wider areas at drainage locations due to fill slopes on the western edge.

- Trees may be placed within Roadside Vegetation Management Zones within the developed portions of the Proposed Project. The following criteria must be followed:
  1. Tree spacing to be 20 feet between mature canopies (30 feet if adjacent to a slope steeper than 41%).
  2. Trees must be limbed up one-third the height of mature tree or a minimum of 8-feet, whichever is greater.
  3. No tree canopies lower than 13 feet 6 inches over roadways.
  4. No tree trunks intruding into roadway width.
  5. No trees or other plants on the Prohibited Plant List (Appendix F) are permitted.
  6. No flammable understory is permitted beneath trees.
  7. Any vegetation under trees to be fire resistive and kept to 2 feet in height or below, and no more than one third the height of the lowest limb/branch on the tree.

5.2.2 Trail Vegetation Management

Trails include the community pathways that are all accessible from public roads, the FMZ fire and maintenance pathways at the rear of perimeter lots, and the "optional trail," which may occur along the internal drainage area. Vegetation Management alongside these roads/trails will include maintenance to remove flashy fuels and maintain the trail in a useable, low fuel condition. Clearing weedy species and grasses on the trail and immediately adjacent the trail is specified to maintain an accessible path with low fuel ignition potential. Weather protected trail reader boards shall be installed at the entrance of all trails and pathways which will include educational reading materials relating to the fire threats as well as other public educational materials. The weather protected trail reader board will be constructed with non-combustible building materials. Final locations of all trail boards will be to the approval of the MFR Fire Marshal.

5.2.3 Parks, Open Space, etc.

- Landscaping within parks and maintained open space areas will be in compliance with the guidelines in this plan as fuel modification zone areas.
- These areas will be maintained to Zone 1 standards.

- Open space parks that are intended to remain natural (excluding cultural resource areas and the internal linear park which will be managed at 4-inch fuel heights) will be managed without irrigation in a low fuel condition through thinning, removal of flammable species, and maintenance free of accumulating debris.

5.2.4 Water Detention Basins

Fire-safe vegetation management will be performed within the basins (on basin slopes) on a yearly basis in accordance with the City's weed abatement standards and in compliance with the following guidelines.

- Groundcovers or shrubs included on the basin slopes shall be low-growing with a maximum height at maturity of 36 inches. Single tree specimens or groupings of two to three trees per grouping of fire resistive trees or tree form shrubs may exceed this limitation if they are located to reduce the chance of transmitting fire from vegetation to habitable structures and if the vertical distance between the lowest branches of the large, trees or tree form shrubs and the tops of adjacent plants are three times the height of the adjacent plants to reduce the spread of fire through ladder fuels.
- All trees on basin slopes shall be planted and maintained at a minimum of 10 feet from the tree's mature drip line to any combustible structure.
- Grasses on slopes must be maintained/mowed to 6 inches in height.
- This area shall be maintained annually free of dying and dead vegetation

5.2.4.1 Water Tank

The proposed water tank in Open Space 1 to the south of the Project will be provided fuel modification of 50 feet in width around the tank along with 20 feet of fuel modification alongside both edges of the access roadway. This fuel modification zone area will be maintained along with the remainder of the Project site's fuel modification zones.

5.2.5 Murrieta Hills Preserve Areas

The planned fuel modification zones encompass the analyzed needed buffers and there is no intention or identified need to expand the zones into designated preserve areas. A Homeowners' Association (HOA), or other legal entity approved by the MFR Fire Marshal, ("Approved Maintenance Entity") shall receive approval prior to or conducting vegetation management activities within any jurisdictional or preserve areas from the City, County, and/or the appropriate resource agencies (California Department of Fish and Game (CDFG), U.S. Fish and Wildlife

Service (USFWS), Army Corps of Engineers (ACOE)) prior to conducting Vegetation management activities within any jurisdictional or preserve areas

5.2.6 Private Residential Lots

This FPTR provides direction for community managed and maintained fuel modification zones. It also provides a guide for selecting lower flammability plant material along with planting and maintenance requirements for private lot owners. The 150 feet wide fuel modification zone will be required to be planted with low flammability plantings and/or consist of low fuel densities, consistent with this FPTR. In addition, it is recommended that none of the plant materials listed in Appendix F: Prohibited Plant List in this plan or otherwise known to be especially flammable are allowed to be planted on private lots. This FPTR, or a summary of its key points will be provided to all buyers in a private property owner's guide to living in a fire environment. In addition the Proposed Project Covenants, Conditions, and Regulations (CC&Rs) shall include a reference to the FPTR and the HOA's (or similar entity's) landscape committee shall not approve plans including any of the prohibited plant species to ensure compliance with the FPTR.

5.2.7 Fuel Modification Easement for Greer Ranch

The Greer Ranch community, which is located to the south of Murrieta Hills and its associated open space, had at some point in the past encroached onto Murrieta Hills' property. The encroachment includes three areas of fuel modification zone ranging to 180 feet from Greer Ranch structures as well as a large borrow pit that extends up to 800 feet from the property line. This disturbed area has provided a partial fuel modification zone, but native fuels are repopulating the area, and over time, will establish the need for ongoing maintenance. Greer Ranch appears to have been approved without the necessary off-site easements to maintain fuel modification zones. The Murrieta Hills project, through this FPTR, recognizes the importance for structure protection fuel modification adjacent to the Greer Ranch residences as well as the need for a buffer that minimizes the likelihood that a structure fire in Greer Ranch spreads to the adjacent open space. Therefore, a fuel modification easement will be granted along the property's southern edge, adjacent to the Greer Ranch residences, as indicated in Appendix D: Murrieta Hills Fuel Modification Plan. The easement will be recorded with the County/City Assessor's Office.

5.2.8 Annual Fuel Modification Maintenance

Vegetation management shall be completed annually by May 1 and more often as needed for fire safety, as determined by the MFR. Homeowners and private lot owners shall be responsible for all vegetation management on their lots, in compliance with this FPTR which is consistent with MFR requirements.

The "Approved Maintenance Entity" shall be responsible for and shall have the authority to ensure long term funding, ongoing compliance with all provisions of this FPTR, including vegetation planting, fuel modification on the perimeter and within interior maintained common areas, vegetation management, and maintenance requirements on all private lots, multi-family residences, parks, common areas, roadsides (including Keller Road), and open space under their control (if not considered biological open space). Any water quality basins, flood control basins, channels, and waterways will be kept clear of flammable vegetation, subject to paragraph 6.2.4, above.

5.2.9 Annual FMZ Compliance Inspection

To confirm that the Proposed Project's common areas are being maintained according to the FPTR, the Approved Maintenance Entity shall obtain an inspection and report from a MFR–authorized 3rd-party Wildland Fire Safety Inspector, in May of each year, certifying that vegetation management activities throughout the Proposed Project have been performed pursuant to this FPTR. The 3rd-party Wildland Fire Safety Inspector must be approved by the MFR Fire Marshal prior to entering into an agreement with the company or individual. The 3rd-party Wildland Fire Safety Inspector must submit qualifications and certifications for review. The report will be funded by the Approved Maintenance Entity and submitted to MFR for approval. If the FMZ areas are not compliant, the HOA will have a specified period to correct any noted issues so that a re-inspection can occur and certification can be achieved.

5.2.10 Interior Manufactured Slopes

Interior slopes will be considered "Vegetation Management Areas." These internal slopes will include:

Specific Requirements

- The irrigation and maintenance requirements of standard fuel modification zones apply to these areas.
- The area is completely irrigated or the area is adequately separated from structures.
- Only trees and shrubs from the Project Plant List (Appendix E), and planted in accordance with spacing requirements, can be used on interior manufactured slopes.
- Vegetative under-story must not create a fuel ladder or create the potential for ground fires. Trees shall be limbed up to three times the height of the under-story vegetation height or no vegetation taller than 2 feet in height within 15 feet of trees is allowed.

5.2.11 Construction Phase Fuel Management

Vegetation management requirements shall be implemented at commencement and throughout the construction phase. Vegetation management shall be performed pursuant to the FAHJ on all building locations prior to the start of work and prior to any import of combustible construction materials. Adequate fuel breaks of at least 30 feet shall be created around all grading, site work, and other construction activities in areas where there is flammable vegetation.

- Vegetation management requirements and perimeter FMZs shall be in place along with paved access, and fire hydrants, prior to the combustible construction initiation.
- Vacant lots adjacent to active construction areas/lots will be required to implement vegetation management if they are within 30 feet of the active construction area. Perimeter areas of the vacant lot shall be maintained as a Vegetation Management Zone extending 30 feet from roadways and adjacent construction areas.
- Prior to issuance of a permit for any construction, grading, digging, installation of fences, etc., on a vacant lot, the 30 feet at the perimeter of the lot is to be maintained as a Vegetation Management Zone.
- In addition to the establishment of a 30-foot-wide vegetation management zone prior to combustible materials being brought on site, existing vegetation on the lot shall be reduced by at least 60% upon commencement of construction.
- Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuels shall be removed and trees/shrubs shall be properly limbed, pruned and spaced per this plan.

In addition to the requirements outlined above, the Proposed Project will comply with the following important risk-reducing vegetation management guidelines:

- All new power lines shall be underground for fire safety during high wind conditions or during fires on a right-of-way that can expose aboveground power lines. Temporary construction power lines may be allowed in areas that have been cleared of combustible vegetation.
- A construction fire prevention plan shall be prepared to minimize the likelihood of ignitions and pre-plan the Proposed Project fire prevention, protection and response plan.
- A construction phasing plan will be provided to MFR prior to building permit issuance. The construction phasing plan will illustrate access, water supply and fuel buffers.
- Caution must be used not to cause erosion or ground (including slope) instability or water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation. Fuel reduction work should include removal of above ground biomass only. No uprooting of treated plants/fuels is necessary.

5.3 Road Requirements

5.3.1 Access

5.3.1.1 Access Roads

Site access, including road widths and connectivity, will comply with the requirements of the Murrieta Fire Code, (California Fire Code, Title 24, Part 9, Appendix E – Fire Apparatus Access Roads) with the possible exception of dead end road length. The City has identified PAs 3 and 7 in Phase 2 as potentially exceeding the allowable dead end road length of CCR Title 14 Fire Safe Regulations, resulting in a potential need for additional access or alternatives that provide the same practical effect.

- All fire access and vehicle roadways will be of asphaltic concrete and designed and maintained to support the imposed loads of fire apparatus (not less than 75,000 pounds) that may respond, including Type I engines, Type III engines, ladder trucks, and ambulances. Proposed on-site roads will meet City of Murrieta's Department of Public Works' (DPW) Road Standards. Access roads shall be at a minimum provided first layer of pavement prior to combustible construction occurring.
- On-site, local streets will be constructed to a minimum unobstructed width of 40-foot with parking on both sides of the street (28 feet minimum width unobstructed in commercial areas) and shall be improved with aggregate cement or asphalt paving materials. There shall be at least two points of primary access for emergency response and evacuation from Keller Road along the northern project boundary and at the connections with Zeiders Road and Gloria Road. Additionally, an extension of McElwain Road to Keller Road parallel to, and just west of I-215, is required prior to any construction of any portion of the proposed project. This extension is planned to connect the existing terminus north of Linnel Lane to Keller Road at Zeiders Road. All interior residential streets will be designed to accommodate a minimum of a 75,000-pound fire apparatus.
- Fire access roads for each phase shall meet all Proposed Project approved fire code requirements and/or mitigated exceptions for maximum allowable dead-end distance, paving, and fuel management prior to combustibles being brought to the site. Planning areas 3 and 7 will include several focused measures to compensate for the perceived exceedance of allowable dead end road length.
- On-site fire lane road at commercial buildings (road closest to the building) will be 26 feet wide, per code or as approved by City Fire Marshal.
- Street parking will be provided on one or both sides of residential collector streets, depending on the street width. Parking will be assumed to be 6 to 8 feet in width. Where road widths do not accommodate parking, restrictions will apply, per the DPW Road Modification, and the

streets will be posted with signs stating "No Parking; Fire Lane." Street sections are to be reviewed and approved by the City DPW and the City Fire Marshal.

- Roads with a median or center divider will have 12 feet unobstructed width on both sides of the center median or divider. Center dividers are not permitted on single lane accesses. Emergency fire truck access points will be provided through the center divider at 1,000-foot intervals, where road segment length allows.
- Any dead end roads longer than 150 feet shall have approved provisions for fire apparatus turnaround. Fire apparatus turnarounds will include a turning radius of a minimum 28 feet, measured to the inside edge of improved width.
- Cul-de-sac bulbs are required on dead-end roads in residential areas where roadways serve more than two residences. Cul-de-sacs will be provided with a paved radius of a minimum of 40 feet up to 50 feet to allow for street parking within the cul-de-sac.
- Roadways and/or driveways will provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of each structure.
- Commercial area access roads will be determined at Development Plan processing.
- Roadway design features (e.g., speed bumps, humps, speed control dips, planters, fountains) that could interfere with emergency apparatus response speeds and required unobstructed access road widths will not be installed or allowed to remain on roadways. Traffic Calming features (i.e., raised intersections, intersection neck downs, roundabouts and parallel bay parking with landscape pop-outs) may be allowed, subject to approval by the City's Fire Marshal and City DPW.
- Vertical clearance of vegetation along roadways will be maintained at 13 feet, 6 inches. Vertical clearance in the commercial areas to be clear to the sky to allow aerial ladder truck operation.
- Angle of driveway/roadway approach/departure will not exceed 7° (12%) per Fire Department.
- Road grades exceeding 15% are not permitted, unless approved by the Fire Chief (maximum 20% with mitigations).
- Developer will provide information illustrating the new roads, in a format acceptable to MFR, to update the Fire Department's maps.
- Any roads that have traffic lights shall have City–approved traffic preemption devices (Opticom) compatible with devices on the Fire Apparatus, per MFR.

5.3.1.2 Secondary Access

The project is currently within a fire hazard severity zone and SRA with direct wildfire protection provided by CAL FIRE. The project will be annexed into LRA with structural fire protection provided by MFR. Depending on how this situation is interpreted, California Government Code 66434.02 and California Code of Regulations, Title 14 – Natural Resources, Chapter 7 Fire Protection may apply to this project. Title 14 includes limitations on dead end road length. For projects with parcels zoned for less than one acre, like the Proposed Project, the maximum dead end road length is 800 feet. This potential issue is based on an interpretation of what constitutes secondary access. The Proposed Project does provide secondary access and looped roads that do not dead end, with the exception of a few relatively short cul-de-sacs.

As described, the two main entrances will be off Keller Road in the northern portion of the project. Additional access will be provided off McElwain Road (to be constructed) which is located in a separate portion of the project providing access on the east and southeast portions of the Project. Spacing between the access points are 350 feet between the northcentral access points and 700 feet between the northeastern and northcentral access points. If traffic was all required to use Keller Road to the east during an evacuation, then this situation would not be ideal because all of the traffic would be using the same route and could cause congestion and slower evacuations and/or difficult emergency vehicle ingress. However, McElwain Road may be used to relieve some of the traffic off of Keller Road, depending on the type of fire and whether that route would be considered safe. Additionally, existing Zeiders Road and Gloria Road would both provide accessible routes to the north, connecting with Scott Road one mile north of Keller Road. These roads do not meet the strict definition of the Fire Code, but are passable by passenger vehicles and typical fire engines and could be utilized in an emergency.

A discussion of the dead end road length issue and the Project's meeting the California Government Code 66474.02 Findings is provided in Section 9.0 of this FPTR.

5.3.2 Gates

Access gates are not proposed for this project. Public roads shall not be gated..

5.3.2.1 Traffic Calming

Traffic calming devices including speed bumps, speed humps, or similar shall not be allowed within the Project due to their tendency to slow responding emergency vehicles and potential affect on evacuations.

5.3.3 Driveways

Any structure that is 150 feet or more from a common road in the development shall have a paved driveway meeting the following specifications:

- Grades up to 15% are acceptable. Over 15% and less than 20% are acceptable with surfacing and sub-base consistent with the City's road design guidelines.
- Driveways serving two houses or fewer will be 16 feet wide unobstructed with a fire apparatus turnaround. Driveways serving more than two houses will be 24 feet wide unobstructed;
- Lighted house addresses shall be posted at the entrance to each driveway if house numbers are not visible from the street; and

Identification of roads and structures will comply with Murrieta requirements, as follows:

- All structures shall be identified by street address numbers at the structure. Numbers will be 4 inches in height, 0.5-inch stroke, and located 6 to 8 feet above grade. Addresses on non-residential buildings shall be 6 inches high with 0.5-inch stroke. Numbers will contrast with background and be lighted.
- Multiple structures located off common driveways will include posting addresses on structures, on the entrance to individual driveways, and at the entrance to the common driveway for faster emergency response.
- Structures 100 feet or more from a roadway will include numbers at the entrance to the driveway.
- Proposed roads within the development will be named, with the proper signage installed at intersections to the satisfaction of the Fire Department and the DPW.
- Streets will have street names posted on non-combustible street signposts. Letters/numbers will be 4 inches high, reflective, on a 6-inch-high backing. Signage will be 7 feet above grade. There will be street signs at the entrances to the development, all intersections, and elsewhere as needed subject to approval of the Fire Chief.
- Access roads to private lots to be completed and paved prior to lumber drop and prior to the occurrence of combustible construction.

5.4 Structure Requirements

5.4.1 Ignition-Resistance

This section outlines ignition-resistant construction (for all structures) that will meet the requirements of the most recent California Fire and Building Codes (Chapter 7A). Code updates

are likely to occur before the Proposed Project is fully constructed. As such, building plans must meet the "then-current" California Building Code in effect at the time of building plan submittal.

There are two primary concerns for structure ignition: 1) radiant and/or convective heat and 2) burning embers (NFPA 2008, IBHS 2008). Burning embers have been a focus of building code updates for at least the last decade, and new structures in the WUI built to these codes have proven to be very ignition resistant.

Likewise, radiant and convective heat impacts on structures have been minimized through the CBC Chapter 7A exterior fire ratings for walls, windows and doors. Additionally, provisions for modified fuel areas separating wildland fuels from structures have reduced the number of fuel-related structure losses. As such, most of the primary components of the layered fire protection system provided the Proposed Project are required by City and state codes. However, these requirements are worth listing because they have proven effective for minimizing structural vulnerability to wildfire and, with the inclusion of required interior sprinklers (required in the 2013 Building/Fire Code update), of extinguishing interior fires, should embers succeed in entering a structure. Even though these measures are now required by the latest Building and Fire Codes, at one time, they were used as mitigation measures for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into local and state codes. For instance, San Diego County after-fire assessments, indicate strongly that the building codes are working in preventing home loss: of 15,000 structures within the 2003 fire perimeter, 17% (1,050) were damaged or destroyed. However, of the 400 structures built to the 2001 codes (the most recent at the time), only 4% (16) were damaged or destroyed. Further, of the 8,300 homes that were within the 2007 fire perimeter, 17% were damaged or destroyed. A much smaller percentage (3%) of the 789 homes that were built to 2001 codes were impacted and an even smaller percentage (2%) of the 1,218 structures built to the 2004 Codes were impacted (IBHS 2008). It has been reasoned that by fire officials conducting after-fire assessments that damage to the structures built to the latest codes is likely from unmaintained flammable landscape plantings or objects next to structures or open windows or doors (Hunter 2008). Because the Murrieta Hills HOA will enforce CC&R's, accumulated landscape and personal items will not be allowed and will directly and positively impact the fire resistance and safety of the entire project.

The building codes developed for construction in high and very high fire hazard zones is working to minimize the vulnerability of new residences and other structures to wildfires. There are numerous examples of master planned communities built to ignition resistant standards and include HOA managed fuel modification zones that have been tested by wildfire and functioned as they were intended. The Proposed Project incorporates a fire protection system that has been found by after-action fire reports, independent researchers, as well as USGS researchers (2013) to perform well against wildfires. Newer communities, especially those within jurisdictions that have adopted the latest State Fire and Building

Codes, and that have a well-defined fuel modification zone requirement, perform well against wildfires. Examples include 4S Ranch in San Diego County, Stevenson's Ranch in Santa Clarita, Serrano Heights in Orange County and many others in Southern California.

The following project features are required for new development in WUI areas and form the basis of the system of protection necessary to minimize structural ignitions as well as providing adequate access by emergency responders:

While these standards will provide a high level of protection to structures in this development, and should reduce the potential for ordering evacuations in a wildfire, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

1. Exterior walls of all structures and garages to be constructed with approved non-combustible (stucco, masonry, or approved cement fiber board) or ignition-resistant material from grade to underside of roof system. Wood shingle and shake wall covering is prohibited. Any unenclosed under-floor areas will have the same protection as exterior walls. Per the Building Code, Chapter 7A: Exterior wall coverings to extend from top of foundation to the underside of roof sheathing, and terminate at 2-inch nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure). The underside of any cantilevered or overhanging appendages and floor projections will maintain the ignition-resistant integrity of exterior walls, or projection will be enclosed to grade.
2. Eaves and soffits will meet the requirements of SFM 12-7A-3 or be protected by ignition-resistant materials or non-combustible construction on the exposed underside, per Building Code, Chapter 7A.
3. There shall be no use of paper-faced insulation or combustible installation in attics or other ventilated areas per Building Code.
4. There shall be no use of plastic, vinyl (with the exception of vinyl windows with metal reinforcement and welded corners), or light woods on the exterior.
5. All roofs shall be a Class "A" listed and fire-rated roof assembly, installed per manufacturer's instructions, to approval of MFR. Roofs shall be made tight with no gaps or openings on ends or in valleys, or elsewhere between roof covering and decking, in order to prevent intrusion of flame and embers. Any openings on ends of roof tiles shall be enclosed to prevent intrusion of burning debris. When provided, roof valley flashings shall not be less than 0.019 inch (No. 26 gage galvanized sheet) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of 72 pound ASTM 3909 cap sheet running the full length of the valley (Chapter 7A).

6. No vents in soffits, cornices, rakes, eaves, eave overhangs or between rafters at eaves or in other overhang areas. Gable end and dormer vents to be alternative design resistant to ember penetration. Vents shall be ember resistant (eg., Brandguard or O'Hagin)
7. Vents shall not be placed on roofs unless they are approved for Class "A" roof assemblies (and contain an approved baffle system (such as Brandguard vents) to stop intrusion of burning material) or are otherwise approved.
8. Turbine vents are prohibited.
9. Exterior glazing in windows (and sliding glass doors, garage doors, or decorative or leaded glass in doors) to be dual pane with one tempered pane, or glass block or have a 20-minute fire rating. Glazing to comply with CBC Chapter 7A.
10. Any vinyl frames to have welded corners and metal reinforcement in the interlock area to maintain integrity of the frame certified to ANSI/AAMA/NWWDA 101/I.S 2 97 requirements.
11. Skylights to be tempered glass (CBC, Chapter 7A).
12. Rain gutters and downspouts to be non-combustible. They shall be designed to prevent the accumulation of leaf litter or debris, which can ignite roof edges (CBC, Chapter 7A).
13. Doors to conform to SFM standard 12-7A-1, or shall be of approved noncombustible construction or shall be solid core wood having stiles and rails not less than 13/8 inches thick or have a 20-minute fire rating. Doors to comply with CBC, Chapter 7A. Garage doors to be solid core 1.75-inch-thick wood or metal, to comply with code.
14. Decks and their surfaces, stair treads, landings, risers, porches, balconies to comply with language in CBC, Chapter 7A and be ignition-resistant construction, heavy timber, exterior approved fire retardant wood, or approved non-combustible materials.
15. Decks or overhangs projecting over vegetated slopes are not permitted. Decks to be designed to resist failing due to the weight of a firefighter during fire conditions. There will be no plastic or vinyl decking or railings. The ends of decks to be enclosed with the same type of material as the remainder of the deck.
16. There shall be no combustible awnings, canopies, or similar combustible overhangs.
17. No wood fences to be allowed within 5 feet of structures on any lots. The first 5 feet from a structure will be non-combustible or meet the same fire resistive standards as walls. The exception is that a wood gate may be used adjacent to a structure, if there is a 5-foot length of non-combustible or fire-resistive fencing between the gate and the remainder of the fence where it abuts the structure.

18. All chimneys and other vents on heating appliances using solid or liquid fuel, including outdoor fireplaces and permanent barbeques and grills, to have spark arrestors that comply with the Murrieta Fire Code. The code requires that openings be maximum 0.5 inch. Arrestors shall be visible from the ground
19. Any liquid propane gas LPG tanks (except small barbecue and outdoor heater tanks), firewood, storage sheds, and other combustibles shall be located at least 30 feet from structures. There shall be no flammable vegetation under or within 30 feet of LPG tanks, or tanks shall be enclosed in an approved ignition-resistant enclosure with 10 feet clearance of flammable vegetation around it.
20. Storage sheds and outbuildings to be constructed of approved non-combustible materials, including non-combustible Class A roofs and shall be subject to the same restrictions as the main structure on lot.
21. Additionally, any of the above-listed structures (i.e., outbuildings, storage sheds, and separate unattached garages) that are 250 square feet or more in size shall be equipped with automatic fire sprinklers. Locations, and required fuel modification zones, will be subject to approval of Murrieta Fire Marshal and the Building Official based on size of the structure.

5.4.2 Fire Protection System Requirements

Infrastructure, Structural Fire Protection, and Fire Protection Systems

WUI fire protection requires a systems approach, which includes the components of vegetation management, structural safeguards (both previously addressed), and adequate infrastructure. This section provides recommendations for infrastructure components.

Infrastructure Recommendations

The following conceptual recommendations are made in order to comply with the City's requirements, the California Fire Code, and nationally accepted fire protection standards, as well as additional requirements to assist in providing reasonable on-site fire protection.

Water service will be provided by the Eastern Municipal Ware District (EMWD). Facilities exist within Keller Road. EMWD water tanks exists along the project's northern boundary, which is not a part of this project. Additional upgrades to the system, including up to three water tanks, are being proposed within the Proposed Project site. All water storage and hydrant locations, mains and water pressures will be designed to fully comply with City's Guidelines for Fire Flow.

Signage

- Residence street address numbers will be illuminated.

Fire Hydrants

- Hydrants in the residential areas have been plotted and approved by MFR (Appendix C). Hydrants to be located on the normal Fire Apparatus response side of the road at each intersection and at 300-foot spacing as required by the Fire Chief. Where applicable, hydrants to be located at the entrance to cul-de-sac bulb (not in the bulb itself). Hydrants to be provided on each side of any divided road or highway.
- Commercial area hydrants to be determined at development plan processing.
- The water system for fire protection to be an approved water supply with hydrants and mains. Fire flow in the mains for residential occupancies to be at least 2,500 gallons per minute (gpm) in fire mains with a 20-psi residual pressure for 2 hours. Fire flow for the commercial occupancies to be a minimum of 3,000 gpm in fire mains at 20 psi for 3 hours. No credit for sprinklers is available in wildfire prone areas. The amount of stored water for fire protection to be for the required duration (minimum 2 hours) at the worst-case fire flow at times of maximum peak domestic and commercial demand (including agriculture). Any private water systems to comply with National Fire Protection Association (NFPA) 22 and 24. In addition, fire protection water systems to comply with American Water Works Association Standard M-31; "Distribution Requirements for Fire Protection."
- Hydrants to have one 2 ½-inch and one 4-inch NST outlet and be of bronze construction per the District Fire Code. Hydrants at commercial buildings to have one 4-inch outlet and two 2 ½-inch outlets.
- Hydrants to have a 3×3 concrete pad at base (gravel if dry barrel hydrant) for weed control.
- Reflective blue dot hydrant markers (minimum 3-inch square) to be installed in the street to indicate location of the hydrant. The lateral shut-off valve will be located in the street 10–25 feet in front of hydrant.
- Crash posts will be provided where needed on site areas where vehicles could strike fire hydrants, fire department connections, etc.

Fire Sprinklers

All structures, of any occupancy type, are required by the MFR to have internal fire sprinklers. One- and two-family residences may have NFPA 13-D systems. Enclosed patios porches,

workshops, barns, storage structures, separate unattached garages, RV structures, and auxiliary use rooms over 500 square feet also to have sprinkler protection.

Other occupancies, three or more stories in height, shall have a sprinkler system in compliance with NFPA 13R as amended in Chapter 80, per the 2016 California Fire Code Section. Actual system design is subject to final building design and the occupancy types in the structure. All other occupancies in this development shall have fire sprinklers in compliance with the Fire Code requirements and NFPA 13. All systems other than single-family detached dwelling systems to be remotely supervised to an approved 24/7 alarm company.

Fire Alarm Systems

- All residential units shall have electric-powered, hard-wired smoke detectors in compliance with 2016 CFC.

5.4.3 Additional Requirements and Recommendations Based on Occupancy Type

This section includes conceptual occupancy-specific recommendations based on the type of occupancy.

Additional Commercial and School Building Requirements and Recommendations

All retail, commercial, and office buildings will comply with appropriate Murrieta building codes. Construction in this area will comply with CBC, Chapter 7A, and shall comply with other state requirements for fire safety.

6 EMERGENCY PRE-PLANNING – EVACUATION

Early evacuation for any type of wildfire emergency is the preferred method of providing for resident safety, consistent with the MFR's current approach within the City and County of Riverside. As such, the Proposed Project's HOA will formally adopt, practice, and implement a "Ready, Set, Go!" (International Fire Chiefs Association 2013) approach to site evacuation. The "Ready, Set, Go!" concept is widely known and encouraged by the state of California and most fire agencies. Pre-planning for emergencies, including wildfire emergencies, focuses on being prepared, having a well-defined plan, minimizing potential for errors, maintaining the site's fire protection systems, and implementing a conservative (evacuate as early as possible) approach to evacuation and site uses during periods of fire weather extremes.

6.1 Quick Reference – Wildland Fire Evacuation Plan

Evacuation is a process by which people are moved from a place where there is immediate or anticipated danger, to a safer place, and offered temporary shelter facilities. When the threat passes, evacuees are able to return to their normal activities, or to make suitable alternative arrangements.

Figure 6 illustrates the Emergency Evacuation Routes available to the Murrieta Hills Community. The exhibit highlights the community's backbone interior roads along with primary access points and off-site roads and major traffic corridors leading to designated evacuation areas.

The available evacuation routes for the residents and guests of Murrieta Hills Community are:

1. **Egress to the east via Keller Road –** this is the primary access road and provides access to I-215 and to Gloria Road, Howard Way, Zeiders Road north, and when constructed, to McElwain Road south.
2. **Egress to the north and east via Gloria Road, Ciccotti Street, Howard Way, and Scott Road** – This is a gravel road route that is passable by passenger vehicles, but would require slower speeds. The road extends approximately 1.1 miles from Keller Road where it intersects Scott Road. Scott Road provides options for travel to the west or east on improved, paved roads.
3. **Egress to the north via Zeiders Road** – this road includes section of gravel and paved roadway. The first 0.25 mile north of Keller Road is paved. The middle 0.5 mile is gravel roadway that is driveable by passenger vehicles, but does include rough, rutted roadways and would not be ideal conditions for evacuation. The northernmost 0.25 mile of this road, just south of Scott Road, is paved. Once on Scott Road, travel east or west on improved, paved roads is available.

4. **Egress to the south on McElwain Road** – this egress route intersects Keller Road approximately 0.25 miles west of the I-215. This egress route will be improved, paved and offer three travel lanes for a portion of the route. It will interconnect with existing McElwain Road at Linnel Street. The road continues south to Clinton Keith Road where travel east and west is possible and access to I-215 is nearby.

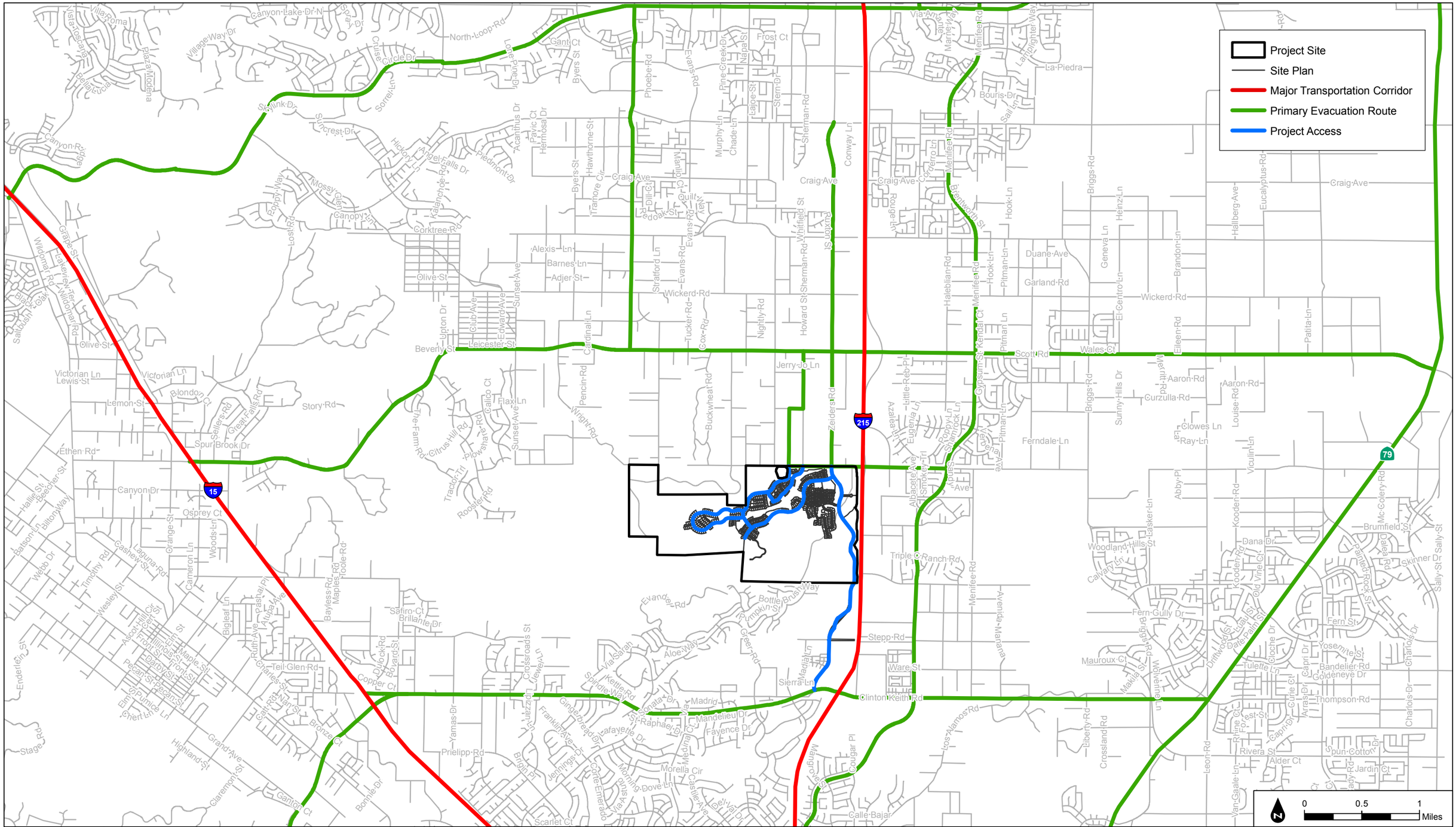
This evacuation plan has been prepared specifically for the Murrieta Hills Project and focuses on wildland fire evacuations, although many of the concepts and protocols will be applicable to other emergency situations. Ultimately, this plan will be used by the Project's Homeowner's Association to educate community residents as to their evacuation approach during wildfires and other similar emergencies.

It is recognized that wildfire and other emergencies are often fluid events and that the need for evacuations are typically determined by 1) on-scene first responders, 2) a collaboration between first responders, law enforcement, and designated emergency response teams, including Office of Emergency Services and the Incident Command established for larger emergency events. As such, and consistent with all emergency evacuation plans, this Emergency Evacuation plan is to be considered a tool that supports existing pre-plans, as available for the area, and provides for citizens who are familiar with the evacuation protocol, but is subservient to emergency event-specific directives provided by agencies managing the event.

6.2 Background

This Murrieta Hills Evacuation Plan has been prepared based on standard operational evacuation planning procedures. Large-scale evacuations are complex, multi-jurisdictional efforts that require coordination between many agencies and organizations. Emergency services and other public safety organizations play key roles in ensuring that an evacuation is effective, efficient, and safe.

Evacuation during a wildfire is not necessarily directed by the fire agency, except in specific areas where fire personnel may enact evacuations on scene. The Murrieta Police Department, Riverside County Sheriff's Department, California Highway Patrol, and other cooperating law enforcement agencies have primary responsibility for evacuations. These agencies work closely within the Unified Incident Command System, with the County Office of Emergency Services, and responding fire department personnel who assess fire behavior and spread, which should ultimately guide evacuation decisions.



SOURCES: AERIAL-BING MAPPING SERVICE, 2016; COUNTY OF RIVERSIDE, 2016

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Figure 6
Fire Evacuation Map

Murrieta Hills Fire Protection Plan

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It is important to note that every evacuation scenario will include some level of unique challenges, constraints, and fluid conditions that require interpretation, fast decision making, and alternatives. For example, one roadway incident that results in blockage of evacuating vehicles may require short-term or long-term changes to the evacuation process. In a worst-cast situation, where evacuees are evacuating late, and fire encroachment is imminent, this can have serious ramifications. This hypothetical scenario highlights the importance of continuing to train responding agencies, model various scenarios, educate the public, and take a very conservative approach to evacuation decision timelines (early evacuation) as well as providing contingency plans.

Equally as important, the evacuation procedures should be regularly updated with lessons learned from actual evacuation events. The authors of this Evacuation Plan recommend that occasional updates are provided, especially following lessons learned from actual incidents, as new technologies become available that would aid in the evacuation process, and as changing landscapes and development patterns occur within and adjacent the Murrieta Hills project that may impact how evacuation is accomplished. At the time of this plan's preparation, there was no encompassing emergency evacuation plan available for the greater region. This Murrieta Hills Wildland Fire Evacuation Plan is consistent with standard evacuation planning and can be integrated into a regional evacuation plan when and if the area officials and stakeholders (MFR, CAL FIRE, Riverside County Fire, Office of Emergency Services, Riverside County Sheriff's Department, and others) complete one.

As demonstrated during large and localized evacuations occurring throughout southern California over the last 15 years, an important component to successful evacuation is early assessment of the situation and early notification via managed evacuation declarations. Riverside County and cities within the county, including Murrieta, utilize the Riverside County Early Warning Notification System to help meet these important factors. Among the methods available to citizens for emergency information are radio, television, social media/internet, neighborhood patrol car PA notifications, and Reverse 911.

The Murrieta Hills community residents will be strongly encouraged to register with Reverse 911. In addition, the community HOA will organize annual evacuation public outreach as well as maintain a fire safe page on the community Web page, including key sections of this Emergency Evacuation Plan and the FPTR, and links to important citizen preparedness information.

6.3 Riverside County Evacuation Planning Summary

This Wildland Fire Evacuation Plan incorporates concepts and protocols practiced throughout southern California counties. The basic protocols are set forth in the California Master Mutual Aid

Agreement, which dictate who is responsible for an evacuation effort and how regional resources will be requested and coordinated.

First responders are responsible for determining initial protective actions before EOCs and emergency management personnel have an opportunity to convene and gain situational awareness. Initial protective actions are communicated to local EOCs and necessary support agencies as soon as possible to ensure an effective, coordinated evacuation.

During an evacuation effort, the designated County Evacuation Coordinator is typically the Sheriff, who is also the Law Enforcement Coordinator. The Evacuation Coordinator will be assisted by other law enforcement and support agencies. Law enforcement agencies, highway/road/street departments, and public and private transportation providers will conduct evacuation operations. Procurement, regulation, and allocation of resources will be accomplished by those designated. Evacuation operations are conducted by the following agencies:

- County Sheriff's Department
- Fire and Rescue
- County Health and Human Services Agency
- Department of Animal Services,
- Department of Planning and Land Use
- Department of Environmental Health
- Department of General Services
- Department of Public Works
- Department of Agriculture, Weights, and Measures
- Department of Parks and Recreation

6.4 Murrieta Hills Evacuation Road Network

Wildfire emergencies that would be most likely to include an evacuation of Murrieta Hills would be large wildfires approaching from the west, south, or north, as these are the areas that include wildland fuels. Areas to the north and east of the site are urbanized or include a mix of grasslands that can support wildfire, and could result in the open space areas around Murrieta Hills igniting. Fires are often wind driven and occur during declared Red Flag Warning days where low humidity and high winds facilitate fire ignition and spread. If a fire starts in the open lands to the east of the Project and is fanned by these fire weather conditions, an early evacuation of the area may occur as many as 24 or more hours prior to actual threatening conditions, depending on the location of

the ignition. Fires occurring on typical weather days, even fires igniting off the local highways or from existing communities, have been very successfully controlled at small sizes within minutes of ignition and would not typically trigger a need to evacuate the project. Partial evacuation or temporary relocation of some neighborhoods could be an option in these cases.

If a wildfire ignited closer to the Murrieta Hills community during weather that facilitates fire spread, where multiple hours are not available for evacuation, a different evacuation approach would need to be explored. It is preferred to evacuate long before a wildfire is near, and in fact, history indicates that many human fatalities from wildfires are due to late evacuations when they are overtaken on roads. Therefore, it is prudent to consider a contingency option. For example, if a wildfire is anticipated to encroach upon the community in a timeframe that is shorter than would be required to evacuate all residents, then options available to responding fire and law enforcement personnel should include 1) partial relocation where residents in perimeter homes on the southern and western portions of the development are temporarily relocated to internal areas or to the commercial areas, 2) Individual neighborhood relocations where residents are temporarily relocated to the commercial area or to developed Murrieta, 3) temporary refuge where residents are instructed to remain in their homes while firefighters perform their structure protection function. Although not a shelter in place community, the structures in Murrieta Hills are ignition resistant, defensible and designed to require minimal resources for protection, which enables these contingency options that may not be available to other nearby communities.

The roads that will be used for ingress and egress from the Murrieta Hills community are described as:

- **Keller Road** – providing primary access to Murrieta Hills, Keller Road provides a 32 foot wide paved roadway with two designated travel lanes that are a minimum of 14 feet wide. Keller Road provides east-west travel beneath the I-15 Freeway to Antelope Road. Antelope Road to the north provides I-15 freeway access (both north and south bound) at Scott Road in the future. Keller Road intersects Zeiders Road and Gloria Road, both providing travel to the north and McElwain Road which provides southbound access.
- **Zeiders Road** – Keller Road intersects Zeiders Road, a 32 foot wide paved surface with shoulders, two designated 12 foot wide travel lanes that extends to the north to Scott Road, but includes a 0.5 mile section of dirt road. This road does not currently comply with fire code road requirements, but is passable.
- **Gloria Road** – Keller Road also intersects Gloria Road, which is a maintained dirt road that intersects Howard Road and travels northward to Scott Road. Neither Gloria or Howard Roads currently comply with fire code road requirements, but are passable.

- **McElwain Road** – McElwain Road will be constructed in phase 1 from Keller Road to Linnell prior to lumber drop to satisfy MFR fire and safety concerns. McElwain will extend to the south approximately 1.6 miles to existing McElwain Road, providing egress to the south to Clinton Keith Road. Clinton Keith Road provides travel to the east or west and access to I-215 and I-15.

Even with roadways that are designed to the code requirements, it is important to note that no region's road infrastructure is designed to accommodate a short-notice, mass evacuation of thousands of people. In order to accommodate this type of evacuation where there is little time available and a large number of people are directed onto available roads, a region would need to provide freeways with many more lanes than even the largest freeways, feeder roads with several or more lanes, and have law enforcement personal at every intersection in the region to keep traffic flowing freely. This is not reasonable or feasible and therefore, requires other approaches.

Among the most important factors for successful evacuations in urban settings is control of intersections downstream of the evacuation area. If intersections are controlled by law enforcement, barricades, signal control, or other means, potential backups and slowed evacuations can be minimized. Another important aspect of successful evacuation is a managed and phased evacuation declaration. Evacuating in phases, based on vulnerability, location, or other factors, enables the subsequent traffic surges on major roadways to be smoothed over a longer time frame and can be planned to result in traffic levels that flow better than when mass evacuations include large evacuation areas at the same time. This plan defers to Law Enforcement and Office of Emergency Services to appropriately phase evacuations and to consider the vulnerability of communities when making decisions. For example, the Murrieta Hills Community will offer its residents a high level of fire safety on site (as detailed in this FPTR) along with options for properly equipped and trained firefighter safety zones and temporary resident on-site refuge (within their well-protected homes) as a contingency, as discussed further in this plan.

The Murrieta Hills planned community interior road network and the existing regional road system that it interconnects, provides multi-directional primary and secondary emergency evacuation routes consistent with most communities in this area. It is likely that major ground transportation corridors in the area will be used as primary evacuation routes during an evacuation effort. Emergency management departments typically evaluate road systems to determine the best routes for fire response equipment and "probable" evacuation routes for relocating people to designated safety areas. The primary roadways that would be used for evacuation from Murrieta Hills are Keller Road, Antelope Road (northbound), Mapelton Avenue, and Scott Road. These roads provide access to or are feeder roads to the nearest major traffic corridor, the I-215 which provides access to the north or south.

During an emergency evacuation from the Murrieta Hills community, the primary and secondary roadways may be providing citizen egress while responding emergency vehicles are inbound. Because the roadways are all designed to meet or exceed Fire Code requirements for unobstructed width, potential conflicts that reduce the roadway efficiency required for smooth evacuations are minimized.

The community's primary evacuation routes are accessed through a series of internal neighborhood roadways, which intersect with the primary ingress/egress roads that intersect off-site primary and major evacuation routes. Based on the existing road network, the community can evacuate to the north (once off site), south, east and west (once off site to the north or south) depending on the nature of the emergency.

Depending on the nature of the emergency requiring evacuation, it is anticipated that the majority of the community traffic would exit the project via Keller Road. From Keller Road, traffic could be directed east, north, or south. In a typical evacuation that allows several hours or more time, all traffic may be directed to the east on Keller Road, then north on Antelope toward Scott Road and the I-15. If less time is available, fire and law enforcement officials may direct some neighborhoods to travel northbound on Zeiders or Gloria Road and others may be directed southward on McElwain Road.

6.4.1 Evacuation Route Determination

Fire and law enforcement officials may identify evacuation points before evacuation routes are announced to the public. Evacuation routes are determined based on the location and extent of the incident and include as many pre-designated transportation routes as possible. Absent direction from fire and/or law enforcement officials, residents would be advised to use the primary access road – Keller Road for evacuations.

6.4.2 Roadway Capacities and Maximum Evacuation Time Estimate

Roadway capacity represents the maximum number of vehicles that can reasonably be accommodated on a road. Roadway capacity is typically measured in vehicles per hour and can fluctuate based on the number of available lanes, number of traffic signals, construction activity, accidents, and obstructions as well as positive effects from traffic control measures.

Each roadway classification has a different capacity based on level of service, with freeways and highways having the highest capacities. Based on traffic estimates from similar roadways, and using peak numbers and a conservative estimate, roads that would be the most likely available to Murrieta Hills residents and their estimated hourly capacities are:

1. Keller Road – 2,600 vehicles/hour
2. Zeiders Road – 500 vehicles/hour

3. Gloria Road – 500 vehicles/hour
4. McElwain Road – 2,600 vehicles/hour

Using these estimates, the length of time it will take for an area to evacuate can be determined by dividing the number of vehicles that need to evacuate by the total roadway capacity. Based on Murrieta Hills' estimated 697 single family homes, and assuming 2.7 cars per household (U.S. Census Bureau 2016), during an evacuation, it is calculated that up to 1,882 vehicles could be evacuating from the residential areas. Commercial areas will add traffic to an evacuation occurring during daytime hours. It is estimated that 200 additional vehicles may be on site at any one time. Therefore, worst case, in a major incident that required full evacuation of the community, it is estimated that up to 2,082 vehicles may be evacuating, although this is a conservative estimate as that number would likely be far lower as many families would likely drive in one vehicle versus in multiple vehicles and depending on the time of day, many of these vehicles may already be off site, such as if a fire occurred during typical work hours.

Based on the internal roadway capacities of at least 2,600 vehicles per hour, four potential egress routes, off-site roadway capacities, and incorporating the lowest capacity roadway in a worst case condition, and discounting the capacity for the possibility that traffic would move slower during some evacuations, it is estimated that between 1 to 2 hours may be necessary for a complete evacuation of Murrieta Hills. The maximum timeframe is a very conservative estimate that may be reduced with law enforcement managing traffic flow and maximizing efficiency by routing neighborhoods out the four available egress routes and then south, north, or west, as appropriate. Up to two hours for complete evacuation is not considered unusual and would be accommodated during large, wind driven wildfires from the east. Wildfires originating closer to the community would allow significantly less time for evacuation, and Murrieta Hills offers decision makers with contingency options, including evacuating or relocating a portion of the community (much lower number of vehicles and faster evacuation time, proportional to the vehicle total being moved).

6.5 Murrieta Hills Resident Fire/Evacuation Awareness

The Murrieta Hills Community HOA will be active in its outreach to residents regarding fire safety and general evacuation procedures. There are aspects of fire safety and evacuation that require a significant level of awareness by the residents and emergency services in order to reduce and/or avoid problems with an effective evacuation. Mitigating potential impediments to successful evacuations requires focused and repeated information through a strong educational outreach program. The Murrieta Hills HOA will engage residents and local fire agencies through a variety of methods.

Key sections of this FPTR and evacuation plan will be provided to each homeowner/HOA member as well as being accessible on the HOA Website. Annual reminder notices will be provided to each homeowner encouraging them to review the plan and be familiar with community evacuation protocols. The HOA will work with local fire agencies to hold an annual fire safety and evacuation preparedness informational meeting. The meeting will be attended by representatives of the fire agencies and important fire and evacuation information reviewed. One focus of these meetings and of the HOA's annual message will be on the importance of each resident to prepare and be familiar with their own "Ready, Set, Go!" evacuation plan. The "Ready, Set, Go!" program is defined at: http://wildlandfirersg.org/ and information about preparing an individual Action Plan is provided in Appendix G.

The focus of the "Ready, Set, Go!" program is on public awareness and preparedness, especially for those living in the wildland-urban interface (WUI) areas. The program is designed to incorporate the local fire protection agency as part of the training and education process in order to insure that evacuation preparedness information is disseminated to those subject to the potential impact from a wildfire. There are three components to the program:

"READY" – Preparing for the Fire Threat: Take personal responsibility and prepare long before the threat of a wildfire so you and your home are ready when a wildfire occurs. Create defensible space by clearing brush away from your home as detailed in this FPTR (Dudek 2017). Use only fire-resistant landscaping and maintain the ignition resistance of your home. Assemble emergency supplies and belongings in a safe spot. Confirm you are registered for Reverse 911. Make sure all residents residing within the home understand the plan, procedures and escape routes.

"SET" – **Situational Awareness When a Fire Starts:** If a wildfire occurs and there is potential for it to threaten Murrieta Hills, pack your vehicle with your emergency items. Stay aware of the latest news from local media and your local fire department for updated information on the fire. If you are uncomfortable, leave the area.

"GO!" – **Leave Early!** Following your Action Plan provides you with knowledge of the situation and how you will approach evacuation. Leaving early, well before a wildfire is threatening your community, provides you with the least delay and results in a situation where, if a majority of neighbors also leave early, firefighters are now able to better maneuver, protect and defend structures, evacuate other residents who couldn't leave early, and focus on citizen safety.

"READY! SET! GO!" is predicated on the fact that being unprepared and attempting to flee an impending fire late (such as when the fire is physically close to the community) is dangerous and exacerbates an already confusing situation. This Murrieta Hills Wildland Fire Evacuation Plan

provides key information that can be integrated into the individual Action Plans, including the best available routes for them to use in the event of an emergency evacuation.

Situation awareness requires a reliable information source. One of the most effective public notification methods is Reverse 911. Riverside County operates a Reverse 911 notification system (Early Warning Notification System) that provides a recorded message over land line telephone systems and cell phones relating to evacuation notices. It is up to individual residents to register their cell phones for the Reverse 911 notification. The registration of cell phones can be done on line at http://countyofriverside.us/residents/emergencies/earlywarningnotificationsystem.aspx.

As part of the Murrieta Hills resident fire awareness and evacuation readiness program, information will be delivered in a variety of methods. The HOA will be responsible to provide and distribute to each homeowner a complete copy of the project's FPTR and this Wildland Fire Evacuation Plan, including materials from the READY! SET! GO! Program. The HOA is also responsible for insuring the distribution of copies of the aforementioned materials to those individuals that purchase properties for re-sales and to the management of multi-family residential and commercial properties. The management of multi-family residential units that do not have individual unit ownership will be responsible for conducting informational sessions regarding the Fire Safety measures and Evacuation Plan details and will be responsible for making copies of the Evacuation Plans available for each unit. As with the multi-family residential properties, management of the commercial properties will be responsible for the dissemination of the Evacuation Plan information to their employees.

As part of the approval of this project, it shall be binding on the HOA to actively participate as a partner with the MFR, the RCFD, and law enforcement and to assist with the coordination and distribution of fire safety information they develop.

6.6 Murrieta Hills Evacuation Procedures

It is estimated that the minimum amount of time needed to move the Murrieta Hills population to urbanized and/or designated evacuation areas may require in excess of one hour to evacuate and up to two or more hours under varying constraints that may occur during an evacuation. This includes additional allowances for the time needed to detect and report a fire, for fire response and on-site intelligence, for Early Warning Notification System and in the field patrol cars announcing evacuations, and for notifying special needs citizens. Wolshon and Marchive (2007) simulated traffic flow conditions in the wildland urban interface (WUI) under a range of evacuation notice lead times and housing densities. To safely evacuate more people, they recommended that emergency managers (1) provide more lead time to evacuees and (2) control traffic levels during evacuations so that fewer vehicles are trying to exit at the same time.

Wildfire emergency response procedures will vary depending on the type of wildfire and the available time in which decision makers (Incident Command, MFR, RCFD, CAL FIRE, and/or County Office of Emergency Management) can assess the situation and determine the best course of action. Based on the community, it's road network, and the related fire environment, the primary type of evacuation envisioned is an orderly, pre-planned evacuation process where people are evacuated from the Murrieta Hills community to more urban areas further from an encroaching wildfire (likely to urban areas to the east, both north and south of the project) well before fire threatens. This type of evacuation must include a conservative approach to evacuating, i.e., when ignitions occur and weather is such that fires may spread rapidly, evacuations should be triggered on a conservative threshold that includes time allowances for unforeseen, but possible, events that would slow the evacuation process.

Evacuation is considered by many to offer the highest level of life protection to the public, but it can result in evacuees being placed in harm's way if the time available for evacuation is insufficient (Cova et al. 2011). An example of this type of evacuation which is highly undesirable from a public safety perspective is an evacuation that occurs when fire ignites close to vulnerable communities. Murrieta Hills is not considered a vulnerable community, however there are vulnerable communities within the region. This type of situation is inherently dangerous because there is generally a higher threat to persons who are in a vehicle on a road when fire is burning in the immediate area than in a well-defended, ignition resistant home. Conditions may become so poor, that the vehicle drives off the road or crashes into another vehicle, and flames and heat overcome the occupants. A vehicle offers little shelter from a wildfire if the vehicle is situated near burning vegetation or catches fire itself. This type of evacuation must be considered a very undesirable situation by law and fire officials in all but the rarest situations where late evacuation may be safer than seeking temporary refuge in a structure (such as when there are no nearby structures, the structure(s) is/are already on fire, or when there is no other form of refuge).

The third potential type of evacuation is a hybrid of the first two. In cases where evacuation is in process and changing conditions result in a situation that is considered unsafe to continue evacuation, it may be advisable to direct evacuees to pre-planned temporary refuge locations, including their own home if it is ignition resistant and defensible, such as those at Murrieta Hills. As with the second type of evacuation discussed above, this situation is considered undesirable, but the evacuation pre-planning must consider these potential scenarios and prepare decision makers at the IC level and at the field level for enacting a contingency to evacuation when conditions dictate.

Indications from past fires and related evacuations throughout Southern California, which has experienced increasingly more frequent and larger fires, are that evacuations are largely successful, even with a generally unprepared populace. It then stands to reason that an informed and prepared

populace would minimize the potential evacuation issues and related risk to levels considered acceptable from a community perspective.

Evacuation orders or notifications are often triggered established and pre-determined model buffers which are based on topography, fuel, moisture content of the fuels and wind direction. Evacuations are initiated when a wildfire reaches or crosses one of these pre-determined buffers. Evacuations can also be very fluid. The incident command, law enforcement and County OES would jointly enact evacuations based on fire behavior.

6.6.1 Murrieta Hills Evacuation Baseline

For purposes of this Evacuation Plan, the first and most logical choice for all of the residents and guests within the boundaries of the Murrieta Hills Community is to adhere to the principals and practices of the "READY! SET! GO!" Program previously mentioned in this document. As part of this program, it is imperative that each resident develop a plan that is clearly understood by all family members and attends the educational and training programs sponsored by the Murrieta Hills HOA and the local fire agencies. In addition, it is imperative that the "READY! SET! GO!" Program information is reviewed on a routine basis along with the accompanying maps illustrating evacuation routes, temporary evacuation points and pre-identified evacuation areas. It must be kept in mind that conditions may arise that will dictate a different evacuation route than the normal roads used on a daily basis.

Residents are urged to evacuate as soon as they are notified to do so or earlier if they feel uncomfortable. Directions on evacuation routes will be provided in most cases, but when not provided, Murrieta Hills residents will proceed according to known available routes away from the encroaching fire. Depending on the type of emergency and the resulting evacuation, it could take as long as two hours or more to complete a community-wide evacuation, based on nationally recognized road capacity standards and competing use of the roads by residents from other areas.

Note: this evacuation plan will require adjustment and continued coordination by the Murrieta Hills HOA and/or developer and Fire/Law enforcement agencies during each of the construction phases. With each phase, the evacuation routes may be subject to changes with the addition of both primary and secondary evacuation routes.

6.6.2 Civilian and Firefighter Evacuation Contingency

As of this document's preparation, no community in California has implemented an official civilian shelter in place option during a wildland fire. Even the communities in Rancho Santa Fe, California which are designed and touted as shelter in place communities, were evacuated during the 2007 Witch Creek Fire. This is not to say that people have not successfully sheltered in place during

wildfire, where there are numerous examples of people sheltering in their homes, in hardened structures, in community buildings, in swimming pools, and in cleared or ignition resistant landscape open air areas. The preference will likely always be early evacuation following the "Ready, Set, Go!" model, but there exists the potential for unforeseen civilian evacuation issues, and having a contingency plan will provide direction in these situations that may result in saved lives. Potential problems during wildfire evacuation from Murrieta Hills include:

- Fires that prevent safe passage along planned evacuation routes
- Inadequate time to safely evacuate
- Fire evacuations during rush hour traffic or when large events are occurring
- Blocked traffic due to accidents or fallen tree(s) or power pole(s)
- The need to move individuals who are unable to evacuate

It is recommended that a concerted pre-planning effort focus on evacuation contingency planning for civilian populations when it is considered safer to temporary seek a safer refuge than evacuation.

6.6.2.1 Fire Fighter Safety Zones

The International Fire Service Training Association (IFTSA; Fundamentals of Wildland Fire Fighting, 3rd Edition) defines Safety Zones as areas mostly devoid of fuel, which are large enough to assure that flames and/or dangerous levels of radiant heat will not reach the firefighting personnel occupying them. Areas of bare ground, burned over areas, paved areas, and bodies of water can all be used as safety zones. The size of the area needed for a safety zone is determined by fuel types, its location on slopes and its relation to topographic features (chutes and saddles) as well as observed fire behavior. Safety zones should never be located in topographic saddles, chutes or gullies. High winds, steep slopes or heavy fuel loads may increase the area needed for a Safety Zone.

The National Wildland Fire Coordinating Groups (NWFCG), Glossary of Wildland Fire Terminology provides the following definitions for Safety Zone and Escape routes

> Safety Zone. An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuelbreaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity.

According to NWFCG, Safety Zone(s):

- Must be survivable without a fire shelter
- Can include moving back into a clean burn
- May take advantage of natural features (rock areas, water, meadows)
- Can include Constructed sites (clear-cuts, roads, helispots)
- Are scouted for size and hazards
- Consider the topographic location (larger if upslope)
- Should be larger if downwind
- Should not include heavy fuels
- May need to be adjusted based on site specific fire behavior

The definition for a safety zone includes provisions for separation distance between the properly equipped and trained firefighter and the flames of at least four times the maximum continuous flame height. Distance separation is the radius from the center of the safety zone to the nearest fuels. For example, considering worst case 43 foot tall flame lengths that may be possible in the fuels adjacent this project, then a 172 foot separation would be required, and more if there were any site-specific features that would result in more aggressive fire behavior. In order to provide 172 feet in all directions, a minimum 2.1 acres is considered necessary for a safety zone to be considered appropriate for one 3 person engine crew during an extreme weather fire.

If one considers the ignition resistant and maintained landscaping within each of the Murrieta Hills neighborhoods, along with the adjacent fuel modification zones that are a minimum of 150 feet wide, and Chapter 7A of California Building Code compliant structures, most of the project's interior roads would provide Safety Zones available to responding firefighters. Potential safety zones likely require additional focused study by MFR and other fire and law enforcement agencies.

6.6.2.2 Temporary Firefighter Refuge Areas

Firescope California defines a contingency plan when it is not possible to retreat to a safety zone. This contingency includes establishment of firefighter TRA(s), which are defined as:

> A preplanned area where firefighters can immediately take refuge for temporary shelter and short-term relief without using a fire shelter in the event that emergency egress to an established Safety Zone is compromised.

Examples of a TRA may include the lee side of a structure, inside of a structure, large lawn or parking areas, or cab of apparatus, amongst others. Differences between a TRA and a Safety Zone is that TRA's are closer to the immediate firefighting area, are considered a contingency to being able to get to a Safety Zone, do not include a requirement for a large area set back four times the flame lengths of adjacent fuels, and cannot be feasibly pre-planned until firefighters arrive on scene and size up the situation.

Firescope appropriately notes that although Safety Zones and viable Escape Routes shall always be identified in the WUI environment, they may not be immediately available should the fire behavior increase unexpectedly. Often a TRA is more accessible in the WUI environment. A TRA will provide temporary shelter and short-term relief from an approaching fire without the use of a fire shelter and allow the responders to develop an alternate plan to safely survive the increase in fire behavior.

TRAs are pre-planned areas (planned shortly after firefighters arrive on scene) where firefighters may take refuge and temporary shelter for short-term thermal relief, without using a fire shelter in the event that escape routes to an established safety zone are compromised. The major difference between a TRA and a safety zone is that a TRA requires another planned tactical action, i.e., TRAs cannot be considered the final action, but must include self-defense and a move out of the area when the fire threat subsides. A TRA should be available and identified on site at a defended structure. TRAs are NOT a substitute for a Safety Zone. TRA pre-planning is difficult, at best because they are very site and fire behavior specific. For the Murrieta Hills Community, TRAs would likely include navigating into any of the neighborhoods or the commercial area where 150 feet wide fuel modification zones provide defensible space and maintained landscapes are provided, along with ignition resistant residences and wide roads that offer numerous opportunities for TRA.

The entire developed portions of the Murrieta Hills community, but especially the interior areas of neighborhoods, are considered TRAs. This is an important concept because it offers last-resort, temporary refuge of firefighters, and in a worst-case condition, residents. This approach would be consistent with Firescope California (2013) which indicates that firefighters must determine if a safe evacuation is appropriate and if not, to identify safe refuge for those who cannot be evacuated, including civilians.

Each of the site's residences that can be considered for TRA includes the following features:

- Ignition Resistant Construction
- 150 feet wide Fuel Modification Zones
- Annual inspections by 3rd party fuel modification zone inspectors

- Wide roadways with fire hydrants
- Maintained landscapes and roadside fuel modification
- Ember resistant vents
- Interior fire sprinklers

Because there is the possibility that evacuation of the project may be less safe than temporarily refuging on site, such as during a fast-moving, wind driven fire that ignites nearby, including temporary refuge within residences, in the commercial area, or elsewhere on site is considered a contingency plan for Murrieta Hills. This concept is considered a component of the "Ready, Set, Go!" model as it provides a broader level of "readiness" should the ability to execute an early evacuation be negated by fire, road congestion, or other unforeseen issues. Note: this approach would be considered a last-resort contingency during wildfire with the primary focus being on early evacuation.

6.7 Evacuation Plan Limitations

This Wildland Fire Evacuation Plan has been developed based on wildfire and evacuation standards commonly used in southern California and is specifically intended as a guide for evacuations for the Murrieta Hills Community. This plan provides basic evacuation information that will familiarize residents with standard evacuation preparedness protocols as well as travel route options that may be available to them during an emergency. However, because emergencies requiring evacuation have many variables and must be evaluated on a case by case basis, this plan shall be subservient to real-time law enforcement and fire personnel/ agencies' decision making and direction during an emergency requiring evacuation.

This Evacuation Plan promotes the "Ready, Set, Go!" model, adopted by the State of California and many fire agencies statewide, including MFR. The goal is to raise agency and citizen awareness of potential evacuation issues and get a majority of the public "Ready" by taking a proactive stance on preparedness, training drills, and visitor education, and evacuation planning efforts. The Murrieta Hills populace will be "Set" by closely monitoring the situation whenever fire weather occurs and/or when wildland fire occurs, and elevating pre-planned protocol activities and situation awareness. Lastly, officials will implement the plan and mandate that populations "Go" by executing pre-planned evacuation procedures in a conservative manner, i.e., evacuation will occur based on conservative decision points, as proposed in this evacuation plan or when directed by fire and law enforcement personnel, whichever is more conservative. The preferred alternative will always be early evacuation. However, there may be instances when evacuation is not possible, is not considered safe, or is not an option based on changing conditions. For example, should a fire occur and make evacuation from the project ill advised, a contingency plan for

residents will be available. This contingency would include moving people to pre-designated temporary refuge areas until it is safe to evacuate or the threat has been mitigated.

Ultimately, it is the intent of this Evacuation Plan to guide the implementation of evacuation procedure recommendations such that the process of evacuating people from the Murrieta Hills project is facilitated in an efficient manner and according to a pre-defined, practiced evacuation protocol as well as providing a contingency option of temporarily refuging, if evacuation is considered less safe.

It is recommended that the evacuation process is carried out with a conservative approach to fire safety. This approach must include maintaining the Murrieta Hills fuel modification landscape, infrastructural, and ignition resistant construction components according to the appropriate standards and embracing a "Ready, Set, Go!" stance on evacuation. Accordingly, evacuation of the wildfire areas should occur according to pre-established evacuation decision points, or as soon as they receive notice to evacuate, which may vary depending on many environmental and other factors. Fire is a dynamic and somewhat unpredictable occurrence and it is important for anyone living at the wildland-urban interface to educate themselves on practices that will improve safety.

6.8 Wildfire Education

Murrieta Hills residents and occupants of commercial facilities will be provided on-going education regarding wildfire, the evacuation plan, and this FPTR's requirements. This educational information will support the fire safety and relocation features/plans designed for this community. Informational handouts, community Web-site page, mailers, fire safe council participation, inspections, and seasonal reminders are some methods that will be used to disseminate wildfire and relocation awareness information. MFR will be asked to review and approve all wildfire educational material/programs before printing and distribution.

The Murrieta Hills HOA will provide on-going resident education outreach regarding wildfire safety, the "Ready, Set, Go!"[5] pre-planning model, and this FPTR's requirements for the entire master-planned development. Informational handouts, facility Web-site page, mailers, fire safe council participation, inspections, and seasonal reminders are some methods that may be used to disseminate wildfire and relocation awareness information. The HOA will coordinate with MFR and other applicable fire agencies regarding wildfire educational material/programs before printing and distribution.

The Murrieta Hills residents and visitors of commercial and property facilities will be provided homeowners informational brochures at point of sale regarding wildfire and this FPTR's

[5] International Fire Chiefs Association "Ready, Set, Go!" website link: http://wildlandfirersg.org/

requirements. This educational information must include maintaining the landscape and structural components according to the appropriate standards and embracing a “Ready, Set, Go!” stance on evacuation. Of particular importance in this FPTR is the guidance in the types of plants that are allowed or prohibited in landscaped areas and appropriate construction within vegetation management zones.

7 CUMULATIVE IMPACT ANALYSIS

Cumulative impacts from multiple projects within a fire agency's jurisdiction, like MFR can cause fire response service decline and must be analyzed. The Proposed Project represents a substantial development that would increase the existing call volume by 0.6 calls per day, on average. The resulting impact on fire services has been analyzed within this report and despite the population increase and anticipated call volume increase, the existing fire service delivery system is considered to have capacity to serve the Proposed Project. When compared to standard utilization rates for busy (10 calls per day for an urban station) fire stations (Hunt 2010), it is clear there is capacity to serve the Proposed Project.

Despite the relatively low increase in number of calls per year from the Proposed Project, it contributes to the cumulative impact on fire services, when considered with other anticipated projects within the MFR's primary response area.

The City responded to 9,456 calls in 2018 and is anticipated to surpass 10,000 calls in 2019. This equates to an average of 5.5 calls per day per station. Stations 2 and 3 respond to higher call volumes than this average and the other stations respond to fewer. The addition of over 1,000 calls per year, depending on where those calls originate, could result in a significant impact and negatively affect MFR's response capability. The addition of a sixth fire station, which is currently being explored by MFR, would mitigate this additional call volume, but would need to be situated where it could respond to the most new calls, or reduce the load for otherwise busy fire stations.

The Proposed Projects' as well as other area projects that may be approved, provide revenue for fire resources through funding via tax allocations and fire impact fees. This revenue source is expected to fund capital improvements to enhance MFR's response capabilities and at least maintain the current standards for firefighting and emergency response. The City is contemplating constructing a sixth fire station and contributions from the Proposed Project and other City projects could be allocated toward ongoing maintenance of that station. Over the long term, it is anticipated that MFR will be able to perform its mission into the future at levels consistent with the its' internal response time goals.

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8 DETERMINATION OF PROPOSED PROJECT EFFECTS

FPTRs provide an evaluation of the adverse environmental effects a proposed project may have from wildland fire. The FPTR must identify mitigation for identified impacts to ensure that development projects do not unnecessarily expose people or structures to a significant loss, injury or death involving wildland fires. Significance is determined by answering the following guidelines:

Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildland are adjacent to urbanized areas or where residences are intermixed with wildland?

The wildland fire risk in the vicinity of the Proposed Project site has been analyzed according to industry standard Guidelines for Determining Significance. It has been determined that wildfires may occur in wildland areas that surround the project site, but would not be significantly increased in frequency, duration, or size with the construction of the Proposed Project. The Proposed Project would include conversion of fuels to maintained development with designated MFR review of all landscaping and fuel modification areas and highly ignition resistant structures. As such, the site will be largely converted from readily ignited fuels to ignition resistant landscape and structures that are provided defensible space that exceeds local and State of California standards. In addition, the project provides multiple access points for firefighter ingress and resident egress, water and fire flow to code, and other fire protection features, as described throughout this FPTR.

Ignition Resistant Structures

The ignition resistant requirements for new communities built in high or very high fire hazard severity zones have been determined by State and Local Fire agencies to provide acceptable resistance to ignition from the types of wildland fires produced by southern California's wildland fuels, terrain, and weather. San Diego County conducted after-fire assessments that strongly indicate that the building codes are working in preventing home loss. Of the 15,000 structures within the 2003 Cedar fire perimeter, 17% (1,050) were damaged or destroyed. However, of the 400 structures built to the 2001 codes (the most recent at the time), only 4% (16) were damaged or destroyed. Further, of the 8,300 homes that were within the 2007 Witch Creek Fire perimeter, 17% were damaged or destroyed. Only 3% of the 789 homes that were built to 2001 codes were impacted and only 2% of the 1,218 structures built to the 2004 Codes were impacted (IBHS 2008). Many of the newer structures that were lost were due to human error. Similarly, of 194 structures lost or damaged in the Orange County Freeway Complex Fire (2008), there were no structures within the fire perimeter lost that were built to at least the 1996 special fire area codes (similar to the CBC Chapter 7A requirements) enacted by the City of Yorba Linda (OCFA 2008). Those codes required structure hardening against wildfire, but are less restrictive and result in less ignition resistant structures than current San Diego County Building

and Fire Code requirements. Structures built to the 2013 Fire and Building Codes result in highly ignition and ember resistant structures. When combined with maintained fuel modification areas, fire apparatus access, water (fire flow), and an equipped and trained responding fire agency, the result is a defensible project.

Effective Fuel Modification Zones

Provisions for modified fuel areas separating wildland fuels from structures have also reduced the number of fuel-related structure losses by providing separation between structures and heat generated by wildland fuels. The provided 150 foot wide (plus 20 foot backyards) fuel modification zones are designed to not only minimize wildfire encroaching upon the community, but to minimize the likelihood that an ignition from on site spreads into the Preserve by separating the unmaintained vegetation occurring outside the fuel modification zones with that in the FMZs. The FMZs will be maintained on an ongoing basis with the first 50 feet irrigated, resulting in high fuel moisture, which is difficult to ignite (USFS-WFAS 2015). In addition, FMZs provide benefits of reduced fuel densities, lack of fuel continuity, and a reduction in the receptiveness of the landscape to ignition and fire spread. Fires from off site would not have continuous fuels across the development footprint and would therefore be expected to burn around and/or over the developed landscape via spotting. Burning vegetation embers may land on Proposed Project structures, but are not likely to result in ignition based on ember decay rates and the types of non-combustible and ignition resistant materials and venting that will be used within the Proposed Project and the ongoing inspections and maintenance that will occur in perpetuity in the Proposed Project's landscaped and fuel modification areas.

Most of the primary components of the layered fire protection system provided for the Proposed Project are required by MFR. However, they are worth listing because they have been proven effective for minimizing structural vulnerability to wildfire. In addition, interior fire sprinklers which will be provided in all structures (now required by code), have a track record of extremely high reliability (Bukowski, et.al. no date) approaching 98% and statistics indicate that fires in homes with sprinklers resulted in 82% lower property damage and 68% lower loss of life (Hall 2013). Although not designed for wildland fire defense, should embers succeed in entering a structure, sprinklers provide an additional layer of life safety and structure protection.

Even though these measures are now required by the latest Building and Fire Codes, at one time, they were used as mitigation measures for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into the 2007 Building Code and have been retained and enhanced in code updates since then. The following project features are required for new development in WUI areas and form the basis of

the system of protection necessary to minimize structural ignitions as well as providing adequate access by emergency responders:

- Application of the latest adopted ignition resistant building codes;
- Exterior wall coverings are to be non-combustible or ignition resistant;
- Multi- pane glazing with a minimum of one tempered pane;
- Ember resistant vents (recommend BrandGuard, O'Hagin, or similar vents);
- Interior, automatic fire sprinklers to code for occupancy type;
- Modern infrastructure, access roads, and water delivery system;
- Maintained fuel modification areas; and
- Fire apparatus access roads throughout the Project.

Ignition Sources

The types of potential ignition sources that currently exist in the area include overhead power lines, vehicles, roadways, trespassers, and off-site residential neighborhoods. The Proposed Project would introduce potential ignition sources, particularly more people in the area. However, mitigating this increase in potential ignition sources, the Proposed Project would convert nearly 335 acres of ignitable fuels to lower flammability landscape and include better access throughout the site, managed and maintained landscapes, and more eyes and ears on the ground to reduce the likelihood of arson, off-road vehicles, or shooting related fires.

The Proposed Project would comply with the applicable fire and building codes and would include a layered fire protection system designed to current codes and inclusive of site-specific measures that will result in a Proposed Project that is less susceptible to wildfire than surrounding landscapes and that would facilitate fire fighter and medical aid response. These features combined with the ignition resistance construction required result in consistency with Guidelines and a resulting acceptable fire hazard risk.

Would the project result in inadequate emergency access?

The Project includes two areas, PA 3 and PA 7 that include the potential for dead end road lengths exceeding the standard. However, lots in these planning areas are all within 800 feet of roads that provide options to travel in at least two separate directions and the roads that would be used travel through very low hazard landscapes. The intent of the long dead end road standard is to avoid residents and firefighter from having to travel long distances to safer areas through wildland fuels. This community includes managed landscapes, ignition resistant structures, and pavement along with up to

170 foot wide FMZs (including rear yards) at the perimeter of the project, providing a significantly safer route out of the area than is considered in the standard. As a conservative fire planning approach, the Project provides additional fire protection measures throughout the Project to mitigate the potential long dead end roads. Measures provided include:

- Extended fuel modification zones
- Heat deflecting walls along sections of evacuation routes
- FMZ access points for firefighters and maintenance
- An all-weather, maintained trail around Project perimeter for firefighter access
- Elimination of fuels adjacent structures (weep screed protection)
- Additional hardening of structures – ember resistant vents
- Evacuation plan and active HOA outreach
- Others as described in detail in Section 5.3.1.2

The proposed internal looped roadways provide emergency access that includes a minimum of 24 feet (two 12 foot wide, unobstructed travel lanes) and room for parking. Additionally, the roads would provide residents the option to evacuate from at least two egress points from each neighborhood. Depending on the nature of the emergency, residents can exit to the north/northeast along code consistent Keller Road, or along Gloria or Zeiders Roads, neither of which is currently compliant with road standards, but are available and passable. In addition, McEwlain Road will be constructed by the Project and extend to the south, providing a remote ingress/egress route in the opposite direction of the other routes. Further, during emergencies when it is safer to remain on site, temporary refuge would be possible as a last resort, if evacuation was considered unsafe, given the large area of developed landscape that will result from the Proposed Project's construction. The internal roadways from the residences to Keller Road will be provided fuel modified passageways. The Proposed Project will provide a minimum of 20 feet of modified fuel areas along both sides of all on site and McElwain road will receive at least 80 feet of FMZ along the west exposure and at least 20 feet along the easterly side to provide a buffer that will act to reduce ignitions from vehicle related causes and provide set back from wildland fuels.

Evacuation would be focused on early evacuations, long before fire was in the area, following the "Ready, Set, Go!" model, or else contingency options that would be available to this Proposed Project may be determined to be safer than evacuating by responding fire and law enforcement personnel. An evacuation plan will be prepared for the Proposed Project and provided to the residents so that all residents are aware of the evacuation routes, of the fluidity of wildfire events, and of the options that may be presented to them by responding law enforcement and/or fire personnel, Reverse 911, or other

officials. An annual evacuation awareness program will be conducted as well as online access to fire awareness educational material on the Communities' Website.

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance service ratios, response times or other performance objectives for fire protection?

The Proposed Project is projected by Dudek's call volume analysis (utilizing the more conservative between Murrieta's actual (87 calls per 1,000 persons per year) and a national per capita call generation factor of 82 calls per 1,000 persons) to add approximately 201 calls per year to the MFR's existing call load. This is not substantial enough of an increase to require additional resources given that Station 4 currently runs just over four calls per day. Additionally, the nearby location of Station 4 negates the need for additional facilities in terms of meeting the City's emergency travel time standard.

Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

The Proposed Project will be served by the Eastern Municipal Water District (EMWD). Facilities exist within Keller Road. An EMWD water tank exists along the project's northern boundary, which is not a part of this project. Additional upgrades to the system, including up to three water tanks, are being proposed within the Proposed Project site. All water storage and hydrant locations, mains and water pressures will be designed to fully comply with City's Guidelines for Fire Flow per 2016 edition of the California Fire Code as amended by the City of Murrieta.

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9 FINDINGS FOR COMPLIANCE WITH CALIFORNIA GOVERNMENT CODE 66474.02

From a practical standpoint, the dead end road lengths in Title 14 are provided to help ensure that firefighters can safely ingress while citizens are safely egressing (Board of Forestry and Fire Protection 2014). Title 14 lists its road requirements intent as (1273.00. Intent):

> Road and street networks, whether public or private, unless exempted under section 1270.02(e), shall provide for safe access for emergency wildland fire equipment and civilian evacuation concurrently, and shall provide unobstructed traffic circulation during a wildfire emergency consistent with Sections 1273.00 through 1273.11.

Paulos (1991) indicates that the dead end road lengths derived in 1991, and presumably continuing to the 2016 update of Title 14, were:

> "selected to consider safe emergency ingress and egress during a wildfire. Dead-end roads require that civilians and fire fighters exit the road at the same point they entered the road. Like a one-way road, there are many hazardous limitations including being trapped by a wall of flame, falling trees, disabled vehicles, long travel distances before being able to turn around, and the potential for large numbers of vehicles traveling that road. This section limits or reduces the potential dangers of dead-end road to fire fighters and civilians.
>
> The distances were selected to consider the number of turnouts necessary to provide for fire engine passage and the ability to turn around, drive forward and exit the road. In addition, limitations are based on the volume of vehicle traffic that may be present and utilizing a road with only one point of ingress and egress during an emergency. This will allow more rapid evacuation and escape of civilians without conflict with arriving fire resources. The distances and zoning limits the amount of traffic and the distances to be traveled to provide reasonable safety for the fire fighters as described in 1273.08".

Section 1273.08 explains that the road length "limits the distance a CDF engine may face opposing traffic on a one lane road and places a safety egress within a maximum of three minutes of travel (very little time in the face of a fast moving fire storm) at 20 mph." In reality, at 20 mph, an engine could travel 5,280 feet. Thus, If three minutes at 20 mph is the basis for the dead end road lengths, then the entire project meets the intent of the code as all units can exit the project via one of the four available access points within 3 minutes travel. Further, the requirement is most applicable where roads cross fuel beds, are less than 20 feet wide, include extensive unmaintained trees, do

not include opportunities for engine turnaround, and do not include a loop with a second roadway. The roads will be a minimum of 40 feet wide with no parking allowed and will travel through developed and maintained landscapes with perimeter FMZ of 150 feet and roadside FMZ. These factors all but eliminate the possibility that a "wall of flame", falling trees, disabled vehicles, or long travel distances before being able to turn around would be encountered during an evacuation.

This intent is justified and can be implemented in a variety of ways, based on site specific features, project provisions, and planning strategies. However, there is no scientific basis supporting the Title 14 dead end road lengths and the Board of Forestry recently tasked scientists at Cal Poly San Luis Obispo to evaluate the issue and provide recommendations (Cal Poly 2016). The results of that study indicate that the dead end road lengths required in Title 14 are arbitrary and it was recommended that they be abandoned and removed from Title 14 (Cal Poly 2016).

One major weakness with the arbitrary dead end road lengths is that they do not account for site-specific characteristics or provided features that make longer road lengths as safe, or safer than, the listed lengths. For example, a dead end road that is narrow (less than 20 feet) and extends through heavy vegetation into a box canyon, should be limited on how long it is based on civilian and firefighter safety. However, a 40 feet wide road, traveling through developed, maintained landscapes, with connections to roads that provide additional options for travel, should not be constrained in the same manner to the arbitrary length limits. These two scenarios are in sharp contrast and the latter example represents the conditions at the Project site.

The Project meets the arbitrary 800 feet dead end road length requirements for most of the project. Roads within PA 3 and PA 7 form an extension off of the main road loop through the Project, and these portions of the project could be interpreted as dead-ends because the road serving this area is a loop with access points within 250 feet of each other (Figure 3). PA 3 includes an approximately 1,600 feet cul-de-sac and PA 7 includes a nearly 2,700 feet extension from the entrance to the end of the cul-de-sac at the furthest point, but both are accessed by 40 foot wide roads traveling through fuel modified urban landscapes.

Attempting to force this Project's access roads into the Title 14 dead end road length model is tenuous, at best because every Project planning area offers at least two wide travel road options from every lot within 800 feet of that parcel. This negates the potential for constrained fire apparatus access and supports fast community wide evacuations, consistent with Title 14.

Because PAs 3 and 7 are being questioned regarding Title 14 requirements, even though, as described above, it is considered a questionable comparison, this FPTR addresses these planning areas and other key locations throughout the community with additional fire safety enhancements,

as part of a conservative approach, to make a finding that the Proposed Project meets the intent of Title 14 and California Government Code 66474.02.

The fire code official has the authority to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access. The Proposed Project provides secondary access options.

Section 1270.07 of PRC 4290 provides an exception. Paulos (1991) describes the purpose of the exception as: "This is necessary to permit parties to proceed with their project when equal protection can be provided but the action would not otherwise be allowable under the regulations." He goes on to explain "There will be situations occur where fuel conditions, building materials or practices, topography or other factors combine to form a set fire safe conditions which could not have been anticipated in these rules."

> Title 14 also allows exceptions to its standard (Sec.1270.07. Exceptions to Standards):Upon request by the applicant, exceptions to standards within this subchapter or local jurisdiction certified ordinances may be allowed by the inspection entity listed in 14 CCR 1270.05, where the exceptions provide the same overall practical effect as these regulations towards providing defensible space. Exceptions granted by the inspection entity listed in 14 CCR 1270.05 shall be made on a case-by-case basis only.

Title 14 defines exception and same practical effect as:

> An alternative to the specified standard requested by the applicant that may be necessary due to health, safety, environmental conditions, physical site limitations or other limiting conditions such as recorded historical sites, that provide mitigation of the problem. Same Practical Effect: As used in this subchapter means an exception or alternative with the capability of applying accepted wildland fire suppression strategies and tactics, and provisions for fire fighter safety, including:
>
> (a) access for emergency wildland fire equipment,
>
> (b) safe civilian evacuation,
>
> (c) signing that avoids delays in emergency equipment response,
>
> (d) available and accessible water to effectively attack wildfire or defend a structure from wildfire, and
>
> (e) fuel modification sufficient for civilian and fire fighter safety.

The Project provides each of these accepted wildland fire suppression strategies and tactics and provisions for fire fighter safety through a redundant, layered system of protection.

Additional code support for the Proposed Project can be found in the Government Code (Sec 66474.02), which outlines the finding that must be made before a tentative map within a VHFHSZ is approved:

1. A finding supported by substantial evidence in the record that the design and location of each lot in the subdivision, and the subdivision as a whole, are consistent with any applicable regulations adopted by the State Board of Forestry and Fire Protection pursuant to Sections 4290 and 4291 of the Public Resources Code.
2. A finding supported by substantial evidence in the record that structural fire protection and suppression services will be available for the subdivision through any of the following entities:
    a. A county, city, special district, political subdivision of the state, or another entity organized solely to provide fire protection services that is monitored and funded by a county or other public entity.
    b. The Department of Forestry and Fire Protection by contract entered into pursuant to Section 4133, 4142, or 4144 of the Public Resources Code.
3. A finding that to the extent practicable, ingress and egress for the subdivision meets the regulations regarding road standards for fire equipment access adopted pursuant to Section 4290 of the Public Resources Code and any applicable local ordinance.
4. This section shall not supersede regulations established by the State Board of Forestry and Fire Protection or local ordinances that provide equivalent or more stringent minimum requirements than those contained within this section.

Each of these Government Code requirements can be shown to be provided by the Project, or significant mitigations are provided as same practical effect, as discussed in detail in following sections.

The feasibility of providing two additional secondary access roads, one to the north from PA 5 or 7 and one to the east southeast from PA 3 were analyzed. However secondary access routes have proven infeasible based upon this evaluation. The options all include physical challenges, a combination of steep terrain, environmental and biological habitat constraints, necessity for modifications to City roadway standards, dangerous conditions of the secondary access road as it crosses fuel beds, and inability to encroach on MSCP preserve lands.

Since secondary access is not feasible given the constraints described above, the project has developed an alternative approach for secondary access that meets the intent of the code through the implementation of a list of specifically developed measures and features.

A request for an exception, as allowed in Title 14, PRC 4290 and the California Fire Code (Section 503.1.1) to the requirements for dead end road lengths is being requested for the project because the project technically conforms to secondary access requirements, as detailed in this FPTR, but also because additional egress (technically tertiary egress) from two planning areas is infeasible due to unique topographical, geological, and environmental conditions. As described above, the typical mitigation for exceeding the dead end road length is to provide secondary access. Because additional access points are not feasible, the project is proposing meeting the intent of the dead end road length through a combination of site design that allows at least two ways in and out of every neighborhood, site features, and customized measures that provide a system of fire safety above and beyond the already restrictive fire and building code requirements. This system of fire protection includes a redundant layering of measures designed to keep roadways open and passable, and reduce the possibility that wildfire threatens the project. Details are provided in the following section.

The "Findings and Mitigation Conclusion" described below form the basis for the following decisions made by the fire code official: 1) an alternative approach for secondary access has been developed that meets the intent of the code through the implementation of a list of specifically developed measures, and features; and 2) the modification is granted in that the intent and purpose of the fire code will be met by the project and such modification does not lessen health, life, and fire safety requirements.

Findings and Mitigation Conclusion

Summary of Findings and Mitigation for this Project:

In summary, the project is providing code-exceeding measures in various aspects of fire protection and safety that, combined, result in a highly defensible community, offer a means of equivalent egress, as well as contingency planning if evacuation from the site is considered unsafe. The following section provides details for each of the measures that have been developed for this project. Among the most notable of these measures are:

1. From a fire operations perspective, there are four access points into the Project. Two of these access points would provide egress to the north onto Keller Road while the third and fourth provides egress to the south along McElwain Road. Each Planning Area includes at least two roads in and out.

2. The Project is provided additional Fuel Modification on the perimeter by including: 1) 150 feet wide HOA managed perimeter FMZs; 2) 20 feet average rear yards with controlled landscaping, and 3) fuel modification within the central oak-riparian preserve, cultural resource set-asides, and roadsides.
3. The areas within the rear yards adjacent to the Project perimeter and the internal oak/riparian drainage will be considered FMZ areas and will require construction to Chapter 7A of the California building code (ignition resistant construction) for any sheds, gazebos, play equipment, or other structures.
4. The Project's structures will be required to utilize code-exceeding ember resistant vents vs the .25 inch mesh that would typically be required as embers are considered the primary wildfire threat to this Project.
5. The Project provides significant parking along designated roadways and will strictly enforce no parking areas through a contract with a towing company
6. The Project has prepared an evacuation plan and will provide public outreach to its residents through the HOA and annually host fire awareness days with the cooperation of the MFR.

The following list includes important fire protection features proposed by the Project:

Access

- **No Lot is More Than 800 Feet from Roads with Two or More Travel Options.** Each of the Project's residences will be within 800 feet of an intersection where travel in at least two separate directions is possible and travel via either of the options will be through managed landscapes that provide for safer travel than an arbitrary secondary access through an unmaintained fuel bed. The Project's interior roads are estimated to be able to effectively support up to 2,600 vehicles per hour. Keller Road and McElwain Road would be estimated to support up to 2,600 vehicles per hour each. The Project's site plan proposed 697 additional residences. If a conservative estimate of 2.7 cars per household is used (the California average is roughly 2.7 vehicles – U.S. Census Bureau 2016), there would be a total of approximately 1,882 vehicles plus vehicles associated with commercial areas seeking egress, assuming worst case. This estimate assumes a total worst-case scenario of 2,082 vehicles. The actual number of vehicles would likely be much lower than this. For example, if a fire occurred during the daylight hours, many of the vehicles would already be off site. If a fire occurred at night, families are likely to evacuate in one or two vehicles. Conservatively assuming 2.7 vehicles per household are evacuating, assuming evacuations occur through each of the three access points to Keller Road and via McElwain Road, and using the per hour vehicle totals for Keller and McElwain Roads, up to an estimated 2,600 vehicles per hour would be able to exit the area. This would accommodate 2.7 vehicles per residence (full evacuation) within a time frame

of less than 1 hour. If McElwain Road was deemed unsafe to use in an evacuation, then Keller Road would be able to accommodate the Project's 2,082 max vehicles in an estimated one hour. If Zeiders and/or Gloria Roads are utilized, the one hour would be reduced proportionally to under one hour as it is estimated up to 50% of the traffic could be diverted along these roads to the north. Building in time for unanticipated delays is prudent and results in an estimated full evacuation time of one to two hours.

- **Exceeds Fire Code Requirements: No Gates or Speed Bumps.** No gates or speed bumps or humps would be allowed in this project. This would allow traffic flow (ingress and/or egress) to move more rapidly in the case of emergency.
- **Parking Management Plan**. Street parking will be accommodated by wide roads and designated parking areas. Homeowners will need to obtain a parking permit to utilize any of the guest parking overnight. "No Parking" signs will be installed on designated streets within the project. Lastly, a contract with a towing company will be in place so that any vehicle that is illegally parked will be towed within a short timeframe. These efforts are designed to maintain the provided roads as unobstructed travel lanes so that emergency response vehicles are not hindered during responses.
- **Murrieta Hills Exceeds Fuel Modification Zone Standards.** The structures will be a minimum of 150 feet from wildland fuels (typically 170 feet including rear and/or side yards). Fuel Modification Zone setbacks exceed the City and State standard 100 feet. The Proposed Project provides a minimum of 50 feet wide irrigated Zone 1 and 100 feet of thinned Zone 2 (Appendix D).

  The internal oak-riparian corridor will be provided fuel modification to reduce fuels outside jurisdictional areas to 4 inch height. Oak-riparian habitat will be minimally thinned and canopy raised to prevent ladder fuels.

  Fuel modification is necessary to reduce the intensity of a wildfire by reducing the volume and density of flammable vegetation. These areas provide 1) increased safety for emergency fire equipment and evacuating civilians; 2) a point of attack or defense from a wildfire, and 3) strategic siting of fuel modification and greenbelts (Paulus 1991 – Fuel Modification Considerations 9044.5).
- **Formal Landscape Plan – Fire Department Review.** A formal landscaping plan would be required for the project. MFR or a retained fuel modification plan checker will review the plan for consistency with standard fuel modification layout, plant species, plant distribution, irrigation, etc.
- **Annual Inspections.** The designated FMZs Landscaping would be inspected annually and maintained on an ongoing basis. The HOA would annually hire a 3rd party, qualified FMZ

inspector, or would be inspected by MFR. This would assure that the FMZs are maintained in a condition that would not facilitate fire spread. This would also reduce the impact of landscaping hanging into the roadways by reviewing size and location of trees and maintaining 13-foot, 6-inch vertical clearance for fire apparatus. This will also eliminate the possibility that the project's landscape, over time, loses its functionality for reducing and minimizing fire intensity and providing defensible space throughout the project.

- **Restricted Landscaping Adjacent Structures.** An important component of the landscape plan that is not currently required by the State or City Codes is in the area adjacent to the residences' foundations. A one to three foot wide landscape free area would be provided to prevent flame impingement under the stucco along the weep screed and help prevent ember penetration into the structure stucco walls.

Fire Flow – Water Availability

- Water service will be provided by the Eastern Municipal Water District (EMWD). Facilities exist within Keller Road. EMWD water tank exists along the project's northern boundary, which is not a part of this project. Additional upgrades to the system, including up to three water tanks, are being proposed within the Proposed Project site. All water storage and hydrant locations, mains and water pressures will be designed to fully comply with City's Guidelines for Fire Flow per 2016 edition of the California Fire Code as amended by the City of Murrieta.
- **Murrieta Hills Fire Hydrants.** The project will inclcue 95 fire hydrants, spaced approximately every 300 feet along project streets, resulting in significant water access improvements.

Building Ignition Resistance

- **Murrieta Hills Exceeds Chapter 7A (California Building Code) Ignition-Resistant Building Standards.** The project will be subject to Chapter 7A ignition resistant building standards and will exceed those requirements in key areas:
  a. All ventilation for the structures for the development would require ember-resistant vents in addition to 1/8 screening. This exceeds current Building Code requirements.
     i. Vents for all structures will be ember resistant (Brandguard or O'Hagin)
     ii. Dryer vents will be ember resistant
  b. The fuel modification zones for Project perimeter homes and homes adjacent to the internal riparian area, including rear yard areas (total of 170 feet), will be considered limited building zones, which is not required by the code. This designation requires all structures, including

sheds, gazebos, trellises, play equipment, and others to be constructed of ignition resistant materials per Chapter 7A of the California Building Code.

Emergency and Evacuation Planning

- **Murrieta Hills Evacuation Plan.** An Evacuation Plan and Working Guide based on the "Ready, Set, Go!" model has been developed includes the following subjects:
  a. Preparing your home – landscaping and home.
  b. Preparing your communications – 911, contact information, telephone usage, email, radio stations, and useful links using the internet.
  c. Registering home and cell phones with Reverse 911
  d. Preparing yourself and family – emergency routes out.
  e. Preparing for imminent evacuation.
  f. Preparing your pets and animals.
  g. Maps showing exit routes.
  h. Main evacuation routes and public safe zones.
- **Murrieta Hills – Shelter in Place Philosophy (Not Status).** The project will incorporate the same fire protection philosophies as shelter in place communities, but will not seek shelter in place status. Murrieta Hills, like most new communities in southern California, will offer emergency responders the last resort option of temporarily seeking refuge on site and directing residents to remain in their well-protected homes if early, safe evacuation is not possible.

Additional Provided Measures and Project Features That Reduce Risk and Are Integral Components of the Fire Protection System

Access and Roads

- **Availability of Alternative Evacuation Routes.** Currently two off-site northerly ingress/egress routes are available to inbound fire apparatus or outbound residents. These roads do not meet the fire code requirements. Gloria Road is a gravel road that is in condition that vehicles can drive and it would support imposed loads of fire engines. Zeiders Road is paved for portions of the roadway with a half mile long section that is gravel and rutted. Therefore, the Project cannot propose using this road to provide secondary access from the project site. But, the roadway would be available for use to

connect to Scott Road (a public roadway to the north) in an emergency situation should Keller Road not be available.

- **Murrieta Hills Signage/Way Finding Plan.** The project will provide a lighted directory at each neighborhood entrance to assist with navigation through the community. In addition, street signs will be customized for this project and will meet or exceed lettering size. The goal is to provide clear, easy to follow signage to aid emergency response.
- **Murrieta Hills Road Maintenance.** The Project's road will be public, ensuring that the roads are maintained and available to emergency responders for the life of the Project.

Fire Agency Response and Resources

- **HGVS Annual Fire Operation Contribution.** The project will contribute fair-share funding annually toward fire operations through property tax allocations and fire prevention fee payments.
- The project will reimburse MFR for uncured cost associated with a Cooperative Wildfire Agreement with CAL FIRE for wildland fire protection on adjacent preserved land. Funding will be part of CFD/HOA dues and will be paid annually in perpetuity.
- **Fire Station Fast Response Travel Time to Murrieta Hills.** The existing Fire Station 4 is within 4 minutes travel to the most remote portions of the Proposed Project. This is a fast response and will assist in fire control, structure defense, and medical emergencies.

10 CONCLUSION

This FPTR has been prepared for the proposed Murrieta Hills project. This FPTR complies with the requirements of the Murrieta Fire Code (2001) and the 2016 California Fire and Building Codes. The recommendations in this document meet fire safety, building design elements, infrastructure, fuel management/modification, and landscaping recommendations of the applicable codes. The recommendations provided in this FPTR have been designed specifically for the proposed construction of structures within a WUI area. Where the project may not strictly comply with the Code, for dead end road length, alternative materials and methods have been proposed that provide functional equivalency as the code intent. The information provided herein supports the ability of the proposed structures and FMZs to withstand the predicted short duration, low to moderate intensity wildfire and ember shower that would be expected from wildfire burning in the vicinity of the site or within the site's landscape.

When properly implemented on an ongoing basis, the fire protection strategies proposed in this FPTR should significantly reduce the potential fire threat to vegetation on the community and its structures and should assist the fire authority in responding to emergencies in the Proposed Project Site. The Proposed Project's fire protection system includes a redundant layering of protection methods that have been shown through post-fire damage assessments to reduce risk of structural ignition. Modern infrastructure will be provided along with implementation of the latest ignition resistant construction methods and materials. Further, all structures are required to include interior, automatic fire sprinklers consistent with the fire codes. Fuel modification will occur on perimeter edges adjacent preserve areas as well as throughout the interior of the Proposed Project. This is a conceptual plan, which provides enough detail for MFR approval. Detailed plans, such as improvement plans, building permits, etc., demonstrating compliance with the concepts in this plan and with Fire Code requirements shall be submitted to the fire authority at the time they are developed.

Based on the results of this FPTR's analysis and findings, the following FPTR implementation measures will be provided by the Proposed Project as part of the proposed development plan:

1. Preparation of a Construction Fire Prevention Plan detailing the important construction phase restrictions and fire safety requirements that will be implemented to reduce risk of ignitions and pre-plans for responding to an unlikely ignition.
2. Project buildings will be constructed of ignition resistant construction materials based on the latest Building and Fire Codes.
3. Fuel Modification will be provided throughout the perimeter of the site and will be up to 170 feet wide in most locations, including the rear yard areas as part of the modified zone. Maintenance will occur in perpetuity as needed and the HOA will annually hire a 3rd party,

MFR-approved, FMZ inspector to provide annual certification that it meets the requirements of this FPTR.

4. Multiple ingress/egress points are provided the Project including three that are accessed off Zeiders Road and one via McEwlaine Road.
5. Fire apparatus access roads will be provided throughout the community and will vary in width and configuration, but will all provide at least the minimum required unobstructed travel lanes, lengths, turnouts, turnarounds, and clearances.
6. Firefighting staging areas and temporary refuge areas are available throughout the facility as well as along roadways and site green spaces.
7. Water capacity and delivery will provide for a reliable water source for operations and during emergencies requiring extended fire flow.
8. A site-specific evacuation plan has been prepared for the project and will include input and review with MFR, law enforcement and Riverside County Fire department OES.
9. The Community HOA will include an outreach and educational role to coordinate with MFR, oversee landscape committee enforcement of fire safe landscaping, ensure fire safety measures detailed in this FPTR have been implemented, and educate residents on and prepare facility-wide "Ready, Set, Go!" plans.

Ultimately, it is the intent of this FPTR to guide, through code and other project specific requirements, the construction of structures that are defensible from wildfire and, in turn, do not represent significant threat of ignition source for the adjacent native habitat. It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and mitigating actions identified in this report are designed to reduce the likelihood that fire would impinge upon the proposed structures. There are no guarantees that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property. Implementation of the required enhanced construction features provided by the applicable codes and the mitigating fuel modification requirements provided in this FPTR will accomplish the goal of this FPTR to assist firefighters in their efforts to defend these structures and reduce the risk associated with this project's WUI location.

Although the proposed development and landscape will be significantly improved in terms of ignition resistance, it should not be considered a shelter-in-place community. It is recommended that the homeowners or other occupants who may use the facilities at the Murrieta Hills Community adopt a conservative approach to fire safety. This approach must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go!" stance on evacuation. Accordingly, occupants and visitors should evacuate the

area as soon as they receive notice to evacuate, or sooner, if they feel threatened by wildfire. Fire is a dynamic and somewhat unpredictable occurrence and it is important for residents to educate themselves on practices that will improve their personal safety.

The developers, contractors, engineers, and architects are responsible for proper implementation of the concepts and requirements set forth in this Plan. Homeowners and property managers are responsible to maintain their structures and lots as required by this Plan, the Fire Department, and as required by the Fire Code. Alternative methods of compliance with this Plan can be submitted to the fire authority and MFR Fire Marshal for consideration.

It will be extremely important for all homeowners, property managers, and occupants to comply with the recommendations and requirements described and required by this FPTR on their property. The responsibility to maintain the fuel modification and fire protection features required for this Proposed Project lies with the homeowners and business owners. The HOA or similar entity will be responsible for ongoing education and maintenance of the common areas in perpetuity, while the fire authority will enforce the vegetation management requirements detailed in this Plan. Such requirements shall be made a part of deed encumbrances and CC&Rs for each lot, as appropriate.

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APPENDIX A

Photograph Log

MURRIETA HILLS

REPRESENTATIVE PHOTOGRAPHS

Photograph 1. View looking west along Keller Road. The northern Murrieta Hills property boundary is shown on the left-hand side (south side) of road.

Photograph 2. Photograph is taken at intersection of Keller Road and Zeiders Road, looking north.

Photograph 3. Another view of Zeiders Road with road improvements. A Portion of Zeiders Road is dirt, but passable by emergency and passenger vehicles.

Photograph 4. Opposite view as presented in photograph 3 of Zeiders Road looking north.

Photograph 5. View looking to the south along Gloria Road, which is unimproved but passable by emergency and passenger vehicles.

Photograph 6. Opposite view of photograph 5 looking north along Gloria Road

Photograph 7. Dry crop farming is occurring in the northeastern portion of the property. View is looking east toward I-215.

Photograph 8. View to the southeast and along proposed McElwain Road that connects with existing terminus north of Linnel Lane.

Photograph 9. A view of chamise chaparral habitat along western side of proposed McElwain Road.

Photograph 10. View of disturbed habitat located adjacent and north of existing Greer Ranch development.

Photograph 11. View of on-site fuel modification zones, consistent Zone 1 landscaping, protecting Greer Ranch residences along southern border of property.

Photograph 12. Another view of Zone 1 landscaping, looking west.

Photograph 13. A view of transition between chamise chaparral and Coast live oak (*Quercus agrifolia*) woodlands.

Photograph 14. Close-up view of plant species diversity and fuel loading underneath oak woodlands and fringe of eucalyptus tree canopy.

Photograph 15. Photograph of dense, chamise chaparral-covered hillsides. The chamise and mixed chaparral habitat dominates the property.

Photograph 16. Close-up view of chamise –chaparral fuel loading .

Photograph 17. A view of the eucalyptus woodland and leaf litter understory. Grove is located near abandoned structure.

Photograph 18. Close-up photograph of riparian habitat in the central portion of the property.

Photograph 19. A view looking from vacated nursery toward ridgeline in northwestern portion of property. Fuels (primarily coastal sage scrub) on this south-facing slope are less dense

Photograph 20. A significant target shooting area occurs on the property where the nursery used to reside.

Photograph 21. Numerous dirt roads occur on the property. View is looking east toward vacated nursery.

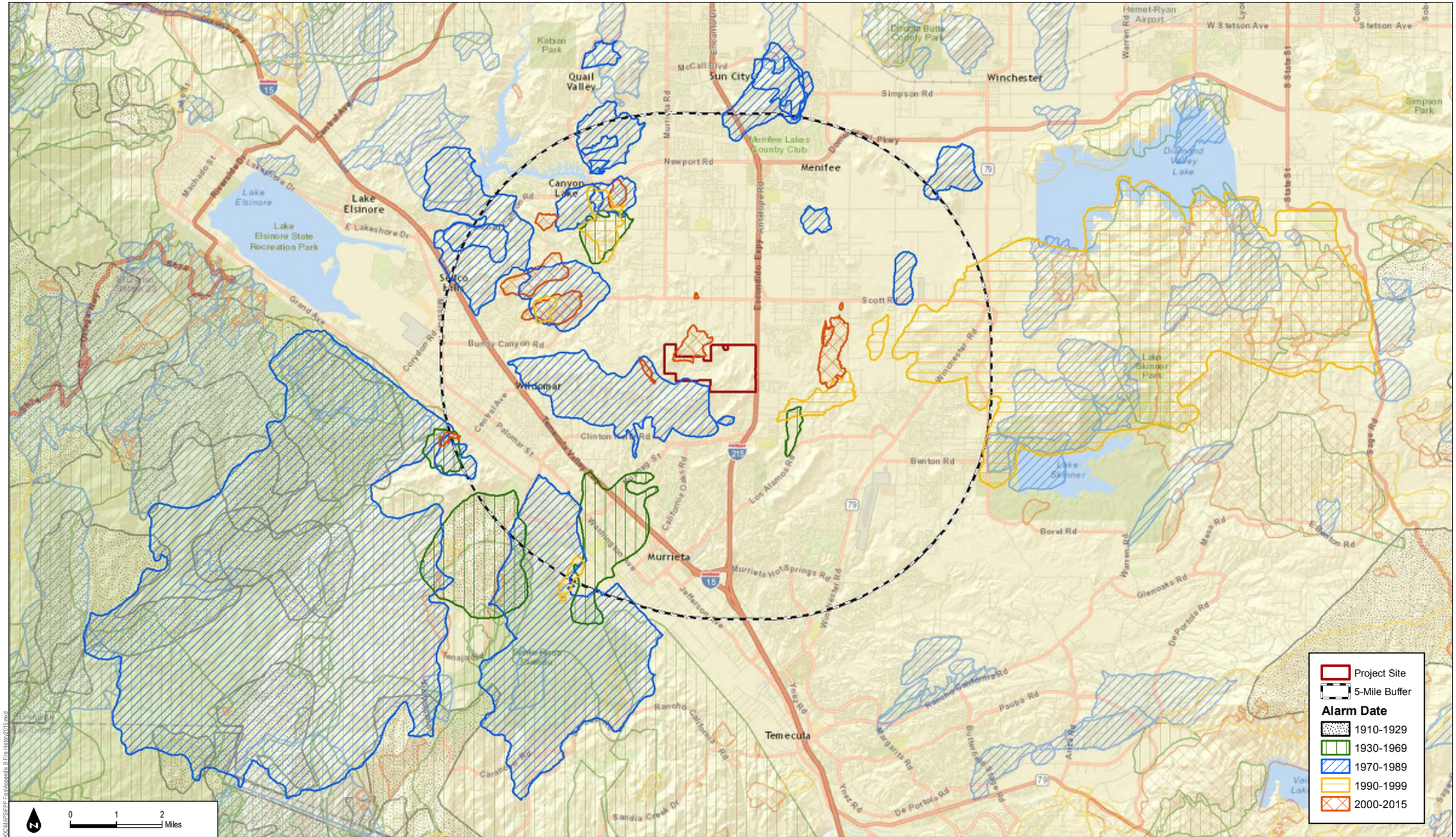
Photograph 22. A view of southwestern portion of property. Vegetation on slopes is coastal sage scrub and chaparral.

Photograph 23. A view of looking west toward Wildomar and Murrieta.

Photograph 24. View looking west. Note Santa Ana Mountains in background.

APPENDIX B

Fire History Exhibit



SOURCE: ESRI; Cal Fire 2015

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APPENDIX B

Project Vicinity Fire History

Murrieta Hills Fire Protection Plan

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APPENDIX C

Murrieta Fire Rescue Approved Residential Hydrant Location Map

Project Site
FMZ Access Point
Linear Park Fire Wall
6-Ft Masonry or View Wall
4-Ft DG Trail

Vegetation Communities
CLOW, Coast Live Oak Woodland
MFS, Mulefat Scrub
RIP, Riparian Woodland
SWS, Southern Willow Scrub

0 150 300 600 Feet

Fuel Modification Zones
Existing CDFW Jurisdictional Areas (Protect-in-Place)
Zone 1: Irrigated Zone
Zone 2: 50% Thinning Zone
Zone 3: Area to be maintained at 4 inches in height
Vegetation Thinning under Oak Canopy
Manufactured Slope
Roadside FMZ (Min. 20-Ft wide)
Fuel Modification Zone Easement (Greer Ranch to maintain this area)
Water Quality Basins (annual maintenance per Fire Protection Plan)
Park
Non-Jurisdictional Coast Live Oak Woodland

MURRIETA FIRE DEPARTMENT
APPROVED
REVIEWED BY: Bill Ruff
DATE: 2/1/18
Approval of these plans shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of the state or county laws
1 of 1
Hydrants only.

Document Path: Z:\Projects\99999\MAPPDOMAPS\FPP Figs\Murrieta\Ills_FMZ_Linear Park 20170117.mxd

DUDEK

SOURCE: SITE PLAN-STANTEC 2017

Murrieta Hills Fire Protection Plan

DRAFT Murrieta Hills Fuel Modification Zones in Linear Park

APPENDIX D

Fuel Modification Zones and Fire Safety Plan

Murrieta Hills Fuel Modification Plan

NOT A PART

Required fuel modification zone would be accomplished by a combination of fuel modification beyond pictured grading extent, heat deflecting wall at top of manufactured slope, and/or irrigated landscape on the development pad (may be landscaping, or other noncombustible surface as roads, parking, recreation, etc.)

SEE INSET LEFT FOR CONTINUATION OF OFFSITE ROADWAY FMZ

OFFSITE ROADSIDE FMZ
NOT A PART OF THIS PROJECT

- Project Site
- Fire Hydrant - Residential
- Fire Hydrant - Commercial and Multi-Family
- FMZ Access Point
- Linear Park Fire Wall
- 6-Ft Masonry or View Wall
- 4-Ft DG Trail

Vegetation Communities

- CLOW, Coast Live Oak Woodland
- MFS, Mulefat Scrub
- RIP, Riparian Woodland
- SWS, Southern Willow Scrub

0 150 300 600 Feet

Fuel Modification Zones

- Existing CDFW Jurisdictional Areas (Protect-in-Place)
- Zone 1: Irrigated Zone
- Zone 2: 50% Thinning Zone
- Zone 3: Area to be maintained at 4 inches in height
- Vegetation Thinning under Oak Canopy
- Manufactured Slope
- Roadside FMZ (Min. 20-Ft wide)
- Roadside FMZ (Min. 20-ft wide, not a part of this project)
- Fuel Modification Zone Easement (Greer Ranch to maintain this area)
- Water Quality Basins (annual maintenance per Fire Protection Plan)
- Park
- Non-Jurisdictional Coast Live Oak Woodland

SOURCE: SITE PLAN-STANTEC 2017

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APPENDIX E

Example Acceptable Landscape Plant Palette

APPENDIX E
Example Acceptable Landscape Plant Palette

Trees and Palms

Botanical Name	Common Name	Entry Feature	Local Streets	Parks	Basins	Transitional/Naturalized	WUCOLS Region 4 Water Use
Aesculus californica	California Buckeye				✓	✓	L
*Arbutus "*Marina"	Strawberry Tree			✓	✓	✓	L
Brahea armata	Blue Hesper Palm	✓		✓			L
Celtis reticulata	Western Hackberry				✓	✓	L
Cercidium microphyllum	Little Leaf Palo Verde	✓		✓		✓	L
Cercis "Forest Pansy"	Eastern Redbud	✓					L
Cercis occidentalis	Western Redbud			✓	✓	✓	L
Chilopsis linearis "Burgundy"	Desert Willow	✓	✓	✓	✓	✓	L
Chitalpa tashkentensis "Pink Dawn"	Chitalpa	✓	✓	✓			L
Dracaena draco	Dragon Tree	✓	✓	✓			L
Fraxinus griffithii	Raywood Ash	✓	✓	✓			M
Geijera parviflora	Australian Willow	✓	✓	✓	✓	✓	M
Juglans californica	Southern California Black Walnut				✓	✓	L
Koelreuteria paniculata	Golden Rain Tree	✓	✓	✓			L
Lagerstroemia indica	Crape Myrtle	✓	✓	✓			M
Laurus nobilis	Sweet Bay	✓	✓	✓	✓	✓	L
Olea europaea "Swan Hill"	Fruitless Olive	✓		✓		✓	L
Parkinsonia "Desert Museum"	Palo Verde			✓	✓	✓	L
Pistacia chinensis	Chinese Pistache	✓	✓	✓			M
*Platanus x acerifolia "*Columbia"	London Plane Tree	✓	✓	✓			M
Platanus racemosa	California Sycamore			✓	✓	✓	M
Populus fremontii	Fremont Cottonwood				✓	✓	M
Prunus ilicifolia	Hollyleaf Cherry			✓	✓	✓	L
Pyrus calleryana	Callery Pear	✓	✓	✓			M

"Aristocrat"							
Quercus agrifolia	Coast Live Oak	✓		✓	✓	✓	L
Quercus ilex	Holly Oak	✓	✓	✓			L
Quercus engelmannii	Engelmann Oak			✓	✓	✓	M
Rhus lancea	African Sumac	✓	✓	✓	✓	✓	L
Sambucus mexicana	Mexican Elderberry			✓	✓	✓	L

Shrubs, Grasses, Succulents, Groundcovers, Vines

Botanical Name	Common Name	Ornamental	Basins	Transitional/Naturalized	WUCOLS Region 4 Water Use
Agave species	Agave	✓		✓	L
Arctostaphylos hookeri	Monterey Carpet Manzanita	✓	✓	✓	L
Atriplex lentiformis brewerii	Salt Bush		✓	✓	L
Baccharis pilularis "Pigeon Point"	Prostrate Coyote Bush	✓	✓	✓	L
Berberis spp.	Barberry	✓			L
Bulbine frutescens	Stalked Bulbine	✓			
Buddleja spp.	Butterfly Bush	✓		✓	L
Caesalpinia gilliessii	Red Bird of Paradise	✓		✓	L
Calliandra californica	Baja Fairy Duster	✓		✓	L
Callistemon "Little John"	Dwarf Bottlebrush	✓			M
Carex praegracilis	Western Meadow Sedge		✓		M
Ceanothus griseus horizontalis	California Wild Lilac	✓	✓	✓	L
*Cistus "*Sunset"	Orchid Rockrose	✓	✓	✓	L
Cistus salvifolius	Sageleaf Rockrose	✓	✓	✓	L
Cordia boissieri	Texas Olive	✓	✓	✓	L
Cordia parvifolia	Little Leaf Cordia	✓	✓	✓	L
Dalea capitata	Gold Dalea	✓	✓	✓	L
Dasylirion wheeleri	Desert Spoon			✓	L
Dodonaea viscosa "Purpurea"	Purple Hop Bush	✓	✓	✓	M
Elaeagnus pungens	Silverberry	✓	✓	✓	L
Encelia farinosa	Brittlebush		✓	✓	L
Eremophila glabra	Emu Bush	✓	✓	✓	L

Shrubs, Grasses, Succulents, Groundcovers, Vines

Botanical Name	Common Name	Ornamental	Basins	Transitional/Naturalized	WUCOLS Region 4 Water Use
Festuca ovina glauca	Blue Fescue	✓			M
Ficus pumila	Creeping Fig	✓			M
Grevillia "Noellii"	Noel"s Grevellia	✓			M
Hardenbergia violacea	Lilac Vine	✓			M
Hesperaloe parviflora	Red Yucca	✓		✓	L
Hesperaloe funifera	Giant Hesperaloe	✓	✓	✓	L
Heteromeles arbutifolia	Toyon	✓	✓	✓	L
Isomeris arborea	Bladderpod		✓	✓	L
Iva hayesiana	Poverty Weed		✓	✓	L
Lantana hyb. "New Gold"	New Gold Lantana	✓			M
Lavandula spp.	Lavender	✓			L
Lavatera assurgentiflora	Tree Mallow	✓	✓	✓	L
Leonotis leonurus	Lion"s Tail	✓	✓	✓	L
Leucophyllum spp.	Texas Ranger	✓	✓	✓	L
Leymus condensatus	Giant Wild Rye		✓	✓	L
Ligustrum japonicum "Texanum"	Texas Privet	✓			M
Lomandra longifolia "Breeze"	Dwarf Mat Rush	✓	✓		M
Lonicera hispidula	Twin Berry	✓			L
Lotus scoparius	Deer Weed		✓	✓	L
Lupinus spp.	Lupine	✓	✓	✓	L/M
Mahonia "Golden Abundance"	Golden Abundance Mahonia	✓			M
Mascagnia macroptera	Yellow Orchid Vine	✓			L
Mimulus aurantiacus	Sticky Monkey Flower		✓	✓	L
Myrtus communis	Common Myrtle	✓			M
Nasella pulchra	Purple Needle Grass	✓	✓	✓	L
Nolina parryi	Parry Beargrass	✓		✓	L
Optunia littoralis	Prickly Pear			✓	L
Parthenocissus tricuspidata	Boston Ivy	✓			M
*Pelargonium "*Red"	Geranium	✓			M
Penstemon spp.	Penstemon			✓	L

Shrubs, Grasses, Succulents, Groundcovers, Vines

Botanical Name	Common Name	Ornamental	Basins	Transitional/Naturalized	WUCOLS Region 4 Water Use
Photinia x fraseri	Fraser"s Photinia	✓			M
Pittosporum spp.	Dwarf Pittosporum	✓			M
Prunus illicifolia	Hollyleaf Cherry	✓	✓	✓	L
Pyracantha spp.	Firethorn	✓			M
Rhamnus californica	Coffee Berry	✓	✓	✓	L
Rhaphiolepis spp.	Indian Hawthorn	✓			M
Rhus ovata	Sugar Bush		✓	✓	L
Ribes aureum gracillimum	Golden Currant		✓	✓	L
Ribes speciosum	Fuschia-Flowered Gooseberry		✓	✓	M
Rosa banksiae	Lady Bank"s Rose		✓	✓	M
Rosa californica	California Rose			✓	L
Rosa "Noare"	Groundcover Rose	✓			M
Rosmarinus species	Rosemary	✓		✓	L
Russellia equisetiformis	Coral Fountain		✓	✓	L
Santolina chamaecyparissus	Lavender Cotton	✓			L
Sedum spp.	Stonecrop	✓			L
Simmondsia chinensis	Jojoba	✓	✓	✓	L
Sisyrinchium bellum	Blue-Eyed Grass	✓	✓	✓	L
Tecoma stans hybrid	Hybrid Tecoma	✓			L
Teucrium fruticans	Bush Germander	✓			L
Teucrium chamaedrys	Grermander	✓			L
Viburnum spp.	Viburnum	✓			M
Vitis californica	California Wild Grape	✓		✓	L
Westringia fruticosa	Coast Rosemary	✓		✓	L
Wisteria sinensis	Chinese Wisteria	✓			M
Yucca species	Yucca	✓	✓	✓	L

Acceptable Plant Species for Fuel Modification and Landscaping for Fire Retardance

Botanical Name	Common Name
California Native Trees	
Aesculus californica	California Buckeye
Cercis occidentalis	Western Redbud
Juglans californica	Black Walnut
Platanus racemosa	California Sycamore
Quercus acutidens	Scrub Oak
Quercus berberidifolia	Scrub Oak
Quercus agrifolia	Coast Live Oak
Quercus englemannii	Engleman Oak
California Native and Low Water Use Shrubs with Moderate to High Fire Retardance	
Ceanothus "Concha"	California Mountain Lilac
Ceanothus "Skylark"	California Mountain Lilac
Ceanothus crassifolius	Hoary-leaved Ceanothus
Cerccocarpus betuloides	Mountain Mahogany
Cistus species	Rockrose
Diplacus puniceus	Red Monkey Flower
Encelia farinosa	Brittlebush
Epilobium californicum	California Fuchsia
Eriogonum fasciculatum	California buckwheat
Heteromeles arbutifolia	Toyon
Keckiella antirrhinoides	Yellow Bush Snapdragon
Keckiella cordifolia	Heart Leaved Penstemon
*Leucophyllum frutescens "*Green Cloud"	Texas Ranger
Mahonia aquifolium	Oregon Grape
Mahonia nevinii	Nevin"s Barberry
Opuntia littoralis	Western Prickly Pear
Rhamnus californica "Eve Case"	Coffeeberry
Salvia mellifera	Black Sage
Senna artemesioides	Feathery Cassia
Senna phyllodenia	Silver Cassia
Rhus ovata	Sugar Bush
California Native and Low Water Use Ground Covers with Moderate to High Fire Retardance	
Artostaphylos hookeri "Monterey Carpet"	Monterey Carpet Manzanita
Baccharis pilularis "Pigeon Point"	Coyote Brush
Ceanothus griseus horizontalis "Yankee Point"	Carmel Mountain Lilac
Juncus patens	California Gray Rush
Myoporum parvifolium	Myoporum
Pentemon centranthifolius	Scalet Bugler
Penstemon eatonii	Firecracker Penstemon
Penstemon heterophyllus	Foothill Penstemon
Penstemon heterophyllus "BOP"	Blue Bedder

Acceptable Plant Species for Fuel Modification and Landscaping for Fire Retardance

Botanical Name	Common Name
Penstemon spectabilis	Beard Tongue
Santolina chamaecyparisis	Lavender Cotton
Santolina virens	Green Santolina
Yucca whipplei	Our Lord"s Candle

CITY OF MURRIETA FUEL MODIFICATION AND BRUSH MANAGEMENT NOTES

1. All habitable structures adjacent to open spaces shall be provided with two zones of brush management.
2. Fire safety in the landscape is achieved by reducing readily flammable fuel adjacent to structures.
3. Expanses of native / naturalized grasses should be cut to within two inches in height prior to the end of the growing season in April or May. Individual clumps of grass may be maintained year-round up to twenty-four inches in height when they are isolated from other fuels or where necessary to stabilize soil and prevent erosion.
4. Responsibility for the required brush management shall be confined to the respective owner's property. Adjacent properties that are primarily undeveloped may require a recorded easement for performing offsite brush management.
5. Ongoing, long-term maintenance of the brush management zones shall be the responsibility of the property owner unless another approved entity (such as a homeowner's association or property management company) has been designated to provide said maintenance.
6. Within Zone I (0 to 50 feet from the structure) all plant material shall be ornamental in nature, including existing California native plants. They shall be irrigated with a permanent irrigation system. All plants in zone I shall be maintained in a healthy, vigorous, and lush condition without excessive dead wood or twigs. Trees and tree canopies shall be kept a reasonable distance away from structures.
7. Within Zone II (50 to 150 feet from the structure) all plant material shall be thinned and pruned seasonally as required by the City of Murrieta Fire Department.
8. Debris and trimmings produced by thinning and pruning shall be removed from the site.
9. All dead and excessively twiggy growth shall be removed from the site.
10. A person knowledgeable about the use and maintenance of California native plants should oversee the selection, thinning and pruning.

11. The progression of work should proceed as follows:
    a. Remove dead Plants
    b. Thin out brush management areas to required coverage
    c. Prune remaining plants
    d. Dispose of mulch debris and trimmings
    e. Do not top trees
    f. Do not cut large shrubs back hard or hedge them into unnatural shapes
12. Vegetation, which is less than 12 years old may not require thinning if the plants have had proper care.
13. Plants and vegetation at 12 years and older requires thinning on a regular basis to lessen the fuel load and maintain erosion control.
14. Vegetation at or around 50 years of age may be considered highly combustible due to dead load and may become explosive. The owner shall contact the City of Murrieta Fire Department for specific fuel modification direction.
15. Thinning requires identification of the California native or naturalized species and a familiarity with their various characteristics such as rooting depth, fuel loads, flammability, as well as habitat and aesthetic value. Thinning should be prioritized as follows:
    a. Invasive, non-native species
    b. Non-California native species
    c. Flammable native species
    d. Native species
    e. Regionally sensitive species
16. After thinning of California native or naturalized vegetation, the fuel load should be further reduced by pruning. Plants shall be pruned to remove dead or twiggy branches or those touching the ground.
17. Pruning shrubs means cutting shrubs in a way that is known as a 'natural cut.' This does not include using gas or electric powered tools. Natural cut is meant to retain a shrub's shape and selectively cut specifically chosen stems to reduce or thin the shrub size by no more than one third (1/3) the height and spread.
18. Trees that reach relative maturity shall be limbed up six (6) feet off the ground. Topping will not be allowed. Dead wood and branches may be removed on an as needed basis. Oak trees should only be pruned in the dry season to prevent the spread of disease. It is

recommended that a tree trimming company, with a staff certified arborist, be on site during the trimming activity to prevent a violation based on damaging protected oak or other California native trees.

19. Broad spectrum herbicides shall not be used in fuel modification zones, except as necessary for spot treatment of invasive species.
20. Shrubs may be planted in addition to approved ground covers. Shrubs shall be spaced so that at maturity not more than 50% of the ground area contains shrubs.
21. See the attached list of acceptable trees, shrubs, perennials and ground cover for a comprehensive list of approved species. Additional species may be allowed, if approved in advance by the City of Murrieta Fire Department and by the City of Murrieta Landscape Architect.

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APPENDIX F

Project Prohibited Plant List

Appendix F
Examples of Prohibited Plants

Botanical Name	Common Name	Comment*
Trees		
Abies species	Fir	F
Acacia species (numerous)	Acacia	F, I
Agonis juniperina	Juniper Myrtle	F
Araucaria species (A. heterophylla, A. araucana, A. bidwillii)	Araucaria (Norfolk Island Pine, Monkey Puzzle Tree, Bunya Bunya)	F
Callistemon species (C. citrinus, C. rosea, C. viminalis)	Bottlebrush (Lemon, Rose, Weeping)	F
Calocedrus decurrens	Incense Cedar	F
Casuarina cunninghamiana	River She-Oak	F
Cedrus species (C. atlantica, C. deodara)	Cedar (Atlas, Deodar)	F
Chamaecyparis species (numerous)	False Cypress	F
Cinnamomum camphora	Camphor	F
Cryptomeria japonica	Japanese Cryptomeria	F
Cupressocyparis leylandii	Leyland Cypress	F
Cupressus species (C. fobesii, C. glabra, C. sempervirens,)	Cypress (Tecate, Arizona, Italian, others)	F
Eucalyptus species (numerous)	Eucalyptus	F, I
Juniperus species (numerous)	Juniper	F
Larix species (L. decidua, L. occidentalis, L. kaempferi)	Larch (European, Japanese, Western)	F
Leptospermum species (L. laevigatum, L. petersonii)	Tea Tree (Australian, Tea)	F
Lithocarpus densiflorus	Tan Oak	F
Melaleuca species (M. linariifolia, M. nesophila, M. quinquenervia)	Melaleuca (Flaxleaf, Pink, Cajeput Tree)	F, I
Olea europea	Olive	I
Picea (numerous)	Spruce	F
Palm species (numerous)	Palm	F, I

Appendix F
Examples of Prohibited Plants

Botanical Name	Common Name	Comment*
Pinus species (P. brutia, P. canariensis, P. b. eldarica, P. halepensis, P. pinea, P. radiata, numerous others)	Pine (Calabrian, Canary Island, Mondell, Aleppo, Italian Stone, Monterey)	F
Platycladus orientalis	Oriental arborvitae	F
Podocarpus species (P. gracilior, P. macrophyllus, P. latifolius)	Fern Pine (Fern, Yew, Podocarpus)	F
Pseudotsuga menziesii	Douglas Fir	F
Schinus species (S. molle, S. terebenthifolius)	Pepper (California and Brazilian)	F, I
Tamarix species (T. africana, T. aphylla, T. chinensis, T. parviflora)	Tamarix (Tamarisk, Athel Tree, Salt Cedar, Tamarisk)	F, I
Taxodium species (T. ascendens, T. distichum, T. mucronatum)	Cypress (Pond, Bald, Monarch, Montezuma)	F
Taxus species (T. baccata, T. brevifolia, T. cuspidata)	Yew (English, Western, Japanese)	F
Thuja species (T. occidentalis, T. plicata)	Arborvitae/Red Cedar	F
Tsuga species (T. heterophylla, T. mertensiana)	Hemlock (Western, Mountain)	F
Groundcovers, Shrubs & Vines		
Acacia species	Acacia	F, I
Adenostoma fasciculatum	Chamise	F
Adenostoma sparsifolium	Red Shanks	F
Agropyron repens	Quackgrass	F, I
Anthemis cotula	Mayweed	F, I
Arbutus menziesii	Madrone	F
Arctostaphylos species	Manzanita	F
Arundo donax	Giant Reed	F, I
Artemisia species (A. abrotanium, A. absinthium, A. californica, A. caucasica, A. dracunculus, A. tridentata, A. pynocephala)	Sagebrush (Southernwood, Wormwood, California, Silver, True tarragon, Big, Sandhill)	F
Atriplex species (numerous)	Saltbush	F, I
Avena fatua	Wild Oat	F
Baccharis pilularis	Coyote Bush	F

Appendix F
Examples of Prohibited Plants

Botanical Name	Common Name	Comment*
Bambusa species	Bamboo	F, I
Bougainvillea species	Bougainvillea	F, I
Brassica species (B. campestris, B. nigra, B. rapa)	Mustard (Field, Black, Yellow)	F, I
Bromus rubens	Foxtail, Red brome	F, I
Castanopsis chrysophylla	Giant Chinquapin	F
Cardaria draba	Hoary Cress	I
Carpobrotus species	Ice Plant, Hottentot Fig	I
Cirsium vulgare	Wild Artichoke	F,I
Conyza bonariensis	Horseweed	F
Coprosma pumila	Prostrate Coprosma	F
Cortaderia selloana	Pampas Grass	F, I
Cytisus scoparius	Scotch Broom	F, I
Dodonaea viscosa	Hopseed Bush	F
Eriodictyon californicum	Yerba Santa	F
Eriogonum species (E. fasciculatum)	Buckwheat (California)	F
Fremontodendron species	Flannel Bush	F
Hedera species (H. canariensis, H. helix)	Ivy (Algerian, English)	I
Heterotheca grandiflora	Telegraph Plant	F
Hordeum leporinum	Wild barley	F, I
Juniperus species	Juniper	F
Lactuca serriola	Prickly Lettuce	I
Larix species (numerous)	Larch	F
Larrea tridentata	Creosote bush	F
Lolium multiflorum	Ryegrass	F, I
Lonicera japonica	Japanese Honeysuckle	F
Mahonia species	Mahonia	F
Mimulus aurantiacus	Sticky Monkeyflower	F
Miscanthus species	Eulalie Grass	F
Muhlenbergia species	Deer Grass	F
Nicotiana species (N. bigelovii, N. glauca)	Tobacco (Indian, Tree)	F, I
Pennisetum setaceum	Fountain Grass	F, I
Perovskia atroplicifolia	Russian Sage	F
Phoradendron species	Mistletoe	F

Appendix F
Examples of Prohibited Plants

Botanical Name	Common Name	Comment*
Pickeringia montana	Chaparral Pea	F
Rhus (R. diversiloba, R. laurina, R. lentii)	Sumac (Poison oak, Laurel, Pink Flowering)	F
Ricinus communis	Castor Bean	F, I
Rhus Lentii	Pink Flowering Sumac	F
Rosmarinus species	Rosemary	F
Salvia species (numerous)	Sage	F, I
Salsola australis	Russian Thistle	F, I
Solanum Xantii	Purple Nightshade (toxic)	I
Silybum marianum	Milk Thistle	F, I
Thuja species	Arborvitae	F
Urtica urens	Burning Nettle	F
Vinca major	Periwinkle	I

*F = flammable, I = Invasive

NOTES:

1. Plants on this list that are considered invasive are a partial list of commonly found plants. There are many other plants considered invasive that should not be planted in a fuel modification zone and they can be found on The California Invasive Plant Council's Website www.cal-ipc.org/ip/inventory/index.php. Other plants not considered invasive at this time may be determined to be invasive after further study.
2. For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.
3. The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is fire resistive.
4. All vegetation used in Vegetation Management Zones and elsewhere in this development shall be subject to approval of the Fire Marshal.
5. Landscape architects may submit proposals for use of certain vegetation on a project specific basis. They shall also submit justifications as to the fire resistivity of the proposed vegetation.

APPENDIX G

"Ready, Set, Go!" Personal Action Plan

READY! SET! GO!

YOUR PERSONAL WILDFIRE ACTION PLAN **Before The Fire**

Get Ready - Create a **DEFENSIBLE HOME.**

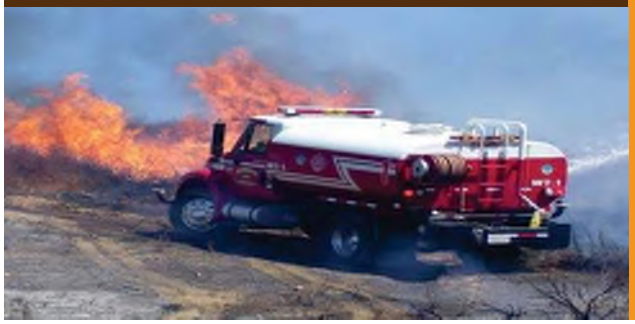
Get Set - Make a **EVACUATION PLAN** with your family.

Go - **LEAVE EARLY** when told to do so.

READY! SET! GO!

Wildfire Action Plan

Saving Lives and Property
Through Advanced Planning



INSIDE

Dear Murrieta Resident,

Our Community lies in the beautiful Murrieta Temecula Valley, surrounded by the Santa Rosa Mountains and Los Alamos hill country. While beautiful living in the urban setting comes with risk.

Wildfires fueled by dry vegetation can be driven into our community by strong Santa Ana winds. Many residents who live in the Wildland Urban Interface do not fully comprehend the impact a wildfire may have on them.

While the Murrieta Fire Department is prepared to protect you and your property from wildfire, we ask the citizens of Murrieta to be proactive and prepare their households and property prior to a wildfire occurring.

The **Ready, Set, Go!** Personal Wildfire Action Plan gives you the information necessary to prepare for such an event. It gives guidance on home retrofitting for fire resistive features as well as information on how to create defensible space while emphasizing early evacuation.

Use this **Ready, Set, Go!** Personal Wildfire Action Plan to educate your family, neighbors, and friends. The City of Murrieta Fire Department appreciates your willingness to take the time to become aware and better prepared next time a wildfire occurs.

Stay safe,

Murrieta Fire & Rescue

"Before The Fire" - "Get READY" - Create a Defensible Home

A defensible home is a home that has the greatest potential for survivability in the event of a wildfire during average wind conditions. Defensible homes are those homes that are in compliance with defensible space requirements or a fuel modification program and have been hardened in accordance with Chapter 7A of the California Building Code.

Natural vegetation has been thinned and/or replaced with fire resistant watered vegetation . This creates a buffer from direct flame impingement of the home. This buffer zone can vary in size depending on the location, vegetation threat, and construction type of the home.

Remove all dead and dying vegetation from your property. Remove tree limbs that overhang your roof. Move fire wood and other combustibles away from the house.

What is Defensible Space ?

Defensible Space is the required space between a structure and the wildland area that, under normal conditions creates a sufficient buffer to slow or halt the spread of wild fire to a structure. It protects the home from igniting due to direct flame impingement and radiant heat. Compliance is essential for structure survivability during wildfire conditions. Defensible space requirements apply to all structures regardless of

- Remove “Ladder Fuels”
- Cut or mow annual grass down to a maximum height of 4 inches.
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from other trees

What is Fuel Modification ?

Fuel modification is an engineered plan/program that protects neighborhoods and consists of a minimum of approximately 170 feet of irrigated and non irrigated zones, setbacks, and a selection of appropriate plant palettes for each. Fuel modification requirements generally do not apply to structures built prior to 1978.

Unmitigated fuel in the form of natural vegetation extending up to the home. A wind driven fire could push a fire from the bottom to the top of the hill in minutes.

Zone 1

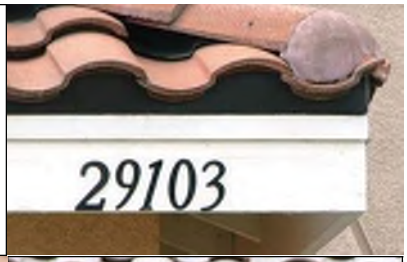
Extends 30 feet out from buildings, structures, decks, etc.

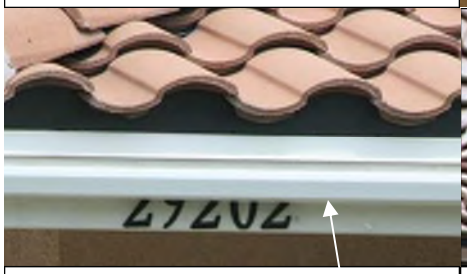
- Remove all dead or dying vegetation
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from structures and other trees
- Remove leaf litter (dry leaves and pine needles) from yard, roof, and rain gutters
- Relocate woodpiles and other combustible materials into Zone 2
- Remove combustible material and vegetation from around and under decks
- Remove or prune vegetation near windows
- Remove “ladder fuels” (low-level vegetation that allows the fire to spread from the ground to the tree canopy). Create a separation between low-level vegetation and tree branches. This can be done by reducing the height of low-level vegetation and/or trimming low tree branches.

Zone 2

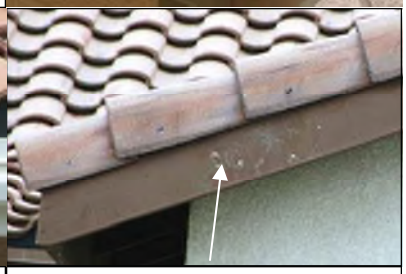
Extends 30-100 feet out from buildings, structures, decks. Reduce the community of fuels by removing dead material and removing and/or thinning vegetation. Minimum spacing between vegetation is 3 times the dimension of the plant.

Make sure Firefighters can identify your home address numbers





House address numbers are obscured by the rain gutter.



House address numbers are missing

Attach 1/8 to 1/4 inch mesh rust resistant metal screen

Clean roof tops and rain gutters

Roof materials may need to be re-placed to regain the initial fire rating.

Burning embers were blown through this vent screen and a fire started in the crawl space of this home.

Breaches in roof tiles have allowed embers to enter and spread fire through out the home

What is a Hardened Home ?

What gives a home the best chance to survive a wild fire are its construction materials and the quality of the defensible space surrounding it. Embers from wild fire find the weak link in your home's fire protection scheme and gain the upper hand because of a small, or overlooked or seemingly inconsequential factor. However, there are measures listed below, each will increase your home's and possibly your families safety and survival during a wildfire.

ROOFS

Roofs are the most vulnerable surface where embers land because they lodge and start a fire. Roof valleys, open ends of barrel tiles, and rain gutters are all a point of entry.

EAVES

Embers gather under open eaves and ignite exposed wood or other combustible material.

VENTS

Embers enter the attic or other concealed spaces and ignite combustible materials. Vents in eaves and cornices are particularly vulnerable, as are any unscreened vents.

WALLS

Combustible siding and other combustible or overlapping materials provide a surface and crevice for embers to nestle and ignite.

WINDOWS & DOORS

Embers can enter gaps in doors, including garage doors. Plants or combustible storage near windows can be ignited from embers and generate heat that can break windows and/or melt combustible frames.

BALCONIES & DECKS

Embers collect in or on combustible surfaces or undersides of decks and balconies, ignite the material, and enter the home through walls or windows.

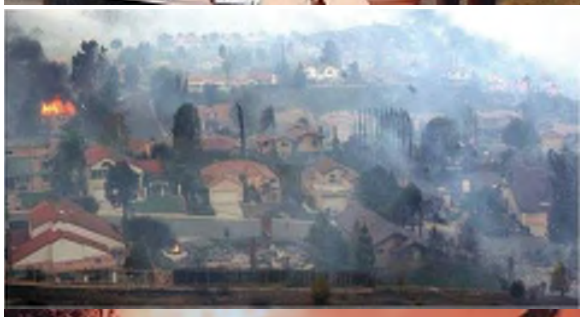
To harden your home even further, consider protecting your home with a residential fire sprinkler system. In addition to extinguishing a fire started by an ember that enters your home, it also protects you and your family 24/7, year-round, from any fire that may start in your home.

Create Your Own Wildfire Action Plan

Your Wildfire Action Plan must be prepared with all members of your household well in advance of a fire. Use these checklists to help you prepare your Wildfire Action Plan.

Each family's plan will be different, depending on their situation.

Once you finish your plan, rehearse it regularly with your family and keep it in a safe and accessible place for quick implementation.



- ◊ Create a Family Disaster Plan that includes meeting locations and communication plans, and rehearse it regularly. Include in your plan the evacuation of large animals, such as horses.
- ◊ Ensure that your family knows where your gas, electric and water main shut-off controls are and how to use them.
- ◊ Plan several different escape routes.
- ◊ Designate an emergency meeting location outside of the fire hazard area.
- ◊ Assemble an emergency supply kit as recommended by the American Red Cross.
- ◊ Appoint an out-of-area friend or relative as a point of contact so that you can communicate with family members who have relocated.
- ◊ Maintain a list of emergency contact numbers posted near your phone and in your emergency supply kit.
- ◊ Keep an extra emergency supply kit in your car in case you can't get to your home because of fire.
- ◊ Have a portable radio or scanner so that you can stay updated on the fire.

Before the Fire Approaches

Make A Kit:

◊ Keep the six “P’s” ready, in case an immediate evacuation is required:

◊ People and pets

◊ Papers, phone numbers, and important documents

◊ Prescriptions, vitamins, and eyeglasses

◊ Pictures and irreplaceable memorabilia

◊ Personal computers (information on hard drive and disks)

◊ “Plastic” (credit cards, ATM cards) and cash

Keep a pair of old shoes and a flashlight handy for a night evacuation.

Alert Family and Neighbors:

◊ Dress in appropriate clothing (i.e., clothing made from natural fibers, such as cotton, and work boots).— Avoid shorts or tank tops

◊ Have goggles and a dry bandana or particle mask handy.

◊ Ensure that you have your brush fire survival kit on hand that includes necessary items, such as a

◊ battery-powered radio, spare batteries, emergency contact numbers, and ample drinking water.

◊ Stay tuned to your TV or local radio stations for updates, or check your Fire Department’s website.

Outside Checklist

◊ Gather up flammable items from the exterior of the house and bring them inside (e.g., patio furniture, children’s toys, doormats, etc.) or place them in your pool, or away from the structure.

◊ Turn off propane tanks.

◊ Connect garden hoses to outside taps.

◊ Don’t leave sprinklers on or water running - they can waste critical water pressure.

◊ Leave exterior lights on.

◊ Back your car into the garage. Shut doors and roll up windows.

◊ Have a ladder available.

◊ Patrol your property and extinguish all small fires.

◊ Seal attic and ground vents with pre-cut plywood or commercial seals.

◊ Unlock gates and lock open electrically operated property entrance gates.

Inside Checklist:

◊ Shut all windows and doors, leaving them unlocked.

◊ Remove flammable window shades and curtains and close metal shutters.

◊ Remove lightweight curtains.

◊ Move flammable furniture to the center of the room, away from windows and doors.

◊ Shut off gas at the meter. Turn off pilot lights.

◊ Leave your lights on so firefighters can see your house under smoky conditions.

◊ Shut off the air conditioning.

"GO" Early

By leaving early, you will give your family the best chance of surviving a wildfire. You also help firefighters by keeping roads clear of congestion, enabling them to move more freely and do their job.

WHEN TO LEAVE

Leave early enough to avoid being caught in fire, smoke, or road congestion. Don't wait to be told by authorities to leave. In an intense wildfire, they may not have time to knock on every door. **If you are advised to leave by media or actual door to door notification, don't hesitate!**

WHERE TO GO

Leave to a predetermined location (it should be a low-risk area, such as a well-prepared neighbor or relative's house, a Red Cross shelter or evacuation center, motel, etc.)

HOW TO GET THERE

Have several travel routes in case one route is blocked by the fire or by emergency vehicles and equipment. Choose an escape route away from the fire.

WHAT TO TAKE

Take your emergency supply kit containing your family and pet's necessary items, such as cash, water, clothing, food, first aid kits, medications, and toys. Also, don't forget valuables, such as your computer, photos, and important documents.

Organize your family members and make arrangements for your pets.

IF YOU ARE TRAPPED: SURVIVAL TIPS

- ◊ Shelter away from outside walls.
- ◊ Patrol inside your home for spot fires and extinguish them.
- ◊ Wear long sleeves and long pants made of natural fibers such as cotton.
- ◊ Stay hydrated.
- ◊ Ensure you can exit the home if it catches fire (remember if it's hot inside the house it is four to five times hotter outside).
- ◊ After the fire has passed, check your roof and extinguish any fires, sparks or embers.
- ◊ Check inside the attic for hidden embers.
  Patrol your property and extinguish small fires.
- ◊ If there are fires that you cannot extinguish with a small amount of water or in a short period of time, call 9-1-1.

Write up your Wildfire Action Plan and post it in a location
where every member of your family can see it.
Rehearse it with your family.

My Personal Wildfire Action Plan

During **High Fire Danger** days in your area, monitor your local media for information on brush fires and be ready to implement your plan. Hot, dry, and windy conditions create the perfect environment for a wildfire.

Important Phone Numbers

Put these #'s in your "contacts" of your phones and school family profile check list

Emergency: _____ _____ _____
_____ _____ _____

School: _____ _____ _____
_____ _____ _____

Family: _____ _____ _____
_____ _____ _____

Friends: _____ _____ _____
_____ _____ _____

When to go: _____
_____

Where to go: _____
_____

How to get there: _____
_____

What to take: _____
_____
_____

Who to tell (before and after)

_____
_____
_____
_____

Tune your radio to 1640 AM for local up to date emergency information

Nonemergency Important Information

Services

Fire
(951) 304-FIRE

Police
(951) 304-COPS

City Hall
(951) 304-CITY

Parks & Recreation
(951) 304-PARK

Library
(951) 304-BOOK

Code Enforcement
(951) 461-6330

County Assessor
(951) 955-6200

Animal Control
(951) 674-0618

Water

Eastern Municipal Water District
(800) 426-3693

Elsinore Valley Water District
(951) 674-3146

Rancho California Water District
(951) 296-6900

Western Municipal Water District
(951) 789-5000

Cable

Time Warner Cable
(888) 683-1000

Verizon FIOS
(877) 500-1243

Hospitals

Rancho Springs Hospital
(951) 696-6000

Inland Valley Regional Medical Center
(951) 677-1111

If you have an emergency call 911

If you have Questions?

Call us at:

(951) 304-FIRE (3473)

Murrieta Fire & Rescue

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Appendix B

MURRIETA HILLS FUEL MODIFICATION CLEARING WITHIN AND ADJACENT TO RIVERINE RESOURCES MEMO

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Memorandum

HELIX Environmental Planning, Inc.
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Date: July 24, 2019

To: Ron Goldman, City of Murrieta

cc: Rick Robotta, Benchmark Pacific

From: Barry Jones

Subject: Murrieta Hills Fuel Modification Clearing Within and Adjacent to Riverine Resources

HELIX Project: PHC-19

Message:

This memo addresses proposed fuel modification planned in proximity of the Riverine Resources for Murrieta Hills Project and provides an assessment of potential impacts to certain Riverine resources. As more fully described herein, impacts resulting from fuel modification adjacent to Riverine resources are not expected to result in complete loss of functions and services associated with Riverine resources.

Fuel modification or thinning completed in accordance with the project's Fire Protection Technical Report[1] includes the following three general classifications: Fuel Modification Zone (FMZ) 1, FMZ 2, and Internal Oak-dominated Open Space (also known as FMZ 3).

FMZs 1 and 2 occur primarily at the outer edges of development, or the area between development and the preserved habitat. The specifications for treatment of these areas include measures for trees, shrubs, and groundcovers and are spelled out in Table 1, *Fuel Modification Zones 1, 2, and 3: Fire Management Requirements and Specifications*. Approximately 0.0188 acre of Riverine drainages occur in FMZ 1 and approximately 0.1387 acre of Riverine drainages occur in FMZ 2 (Attachment A).

FMZ 3 applies only to the undeveloped corridor along the largest on-site drainage, known as the "Internal Oak-Dominated Open Space" in the project's Fire Protection Technical Report. This corridor is flanked by development along its entire length and treatment is spelled out in Table 1.

[1] Dudek. 2019. Approval Draft. Murrieta Hills FIRE PROTECTION TECHNICAL REPORT, Plan No. SP 012-3164, TTM 35853. July. 112 pp., plus appendices.

Table 1
FUEL MODIFICATION ZONES 1, 2, AND 3: FIRE MANAGEMENT REQUIREMENTS AND SPECIFICATIONS[1]

Fire Management Plan Page/ Section References	FMZ 1 – Section 5.1, Subsection 5.1.1, Pages 42-43	FMZ 2 – Section 5.1, Subsection 5.1.1, Pages 43-44	Internal Oak-Dominated Open Space / FMZ 3 – Section 5.1, Subsection 5.1.2, Pages 44-45
General	All highly flammable native vegetation, especially plant species found on the Prohibited List (Appendix F of the Fire Protection Technical Report) shall be removed. Species targeted for removal include chamise, California sagebrush, coyote bush, yerba santa, buckwheat, telegraph plant, sticky monkeyflower, laurel sumac, and sage (*Salvia*) species. This zone will be planted with drought-tolerant, less flammable plants from the Murrieta Hills Project Plant Palette (Appendix E of the Fire Protection Technical Report), which was prepared by VDLA Landscape architects and reviewed/revised by the authors of the Fire Protection Technical Report.	Represents a 50% thinning zone – 50% less fuel than on adjacent unmaintained preserve areas. Zone 2 areas will include removal of dead/dying vegetation, exotics, and plant species listed on the prohibited plant list. Species targeted for removal include chamise, California sagebrush, coyote bush, yerba santa, buckwheat, telegraph plant, sticky monkeyflower, laurel sumac, and sage (*Salvia*) species. Removal of these components will result in 50% thinning of the existing fuels. As necessary to meet the 50% thinning objective, other plants will be removed to create a mosaic of vegetation with adequate spacing and discontinuity. Large shrubs shall not be cut back hard or hedge them into unnatural shapes (sic).	The area will be maintained as an FMZ through annual maintenance of non-jurisdictional areas so that vegetation does not exceed a height of four inches. All plant species found on the Prohibited List (Appendix F of the Fire Protection Technical Report) shall be removed. There are limited areas within this open space that are jurisdictionally protected by California Department of Fish and Wildlife and will be left unmaintained. All of these areas are beyond 150 feet from adjacent structures. Additionally, should mortality of oaks and or willow trees occur in these jurisdictional areas, from drought, insect, disease or other factors, they will be removed or chipped on site to avoid the accumulation of dead fuels.
Vegetation Layer	**Zone 1**	**Zone 2**	**Zone 3**
Tree	Raise canopy 8 feet or 1/3 the height of mature tree.	Only certain tree species are allowed.[3]	See general requirement above
Shrub	Less than 2 feet tall and at a minimum of 5 feet on center.	Single specimen native shrubs, exclusive of chamise and sage, may be retained, on 20-foot centers.	See general requirement above
Ground Cover	75% of this layer shall be limited to a maximum of height of 18 inches. 25% of this layer may reach a height of 24 inches.	75% of this layer shall be limited to a maximum height of 36 inches. 25% of this layer may reach a maximum height of 48 inches.	See general requirement above

Table 1 (cont.)
FUEL MODIFICATION ZONES 1, 2 AND 3: FIRE MANAGEMENT REQUIREMENTS AND SPECIFICATIONS[1]

Vegetation Layer	Zone 1	Zone 2	Zone 3
Irrigation Requirement	This irrigated high plant moisture zone shall be serviced by a permanent automatic irrigation system that keeps plants hydrated via efficient drip irrigation, as defined by the Project's Landscape Architect.	No irrigation.	No irrigation.
Impact[4]	0.0188 acre	0.1389 acre	0.4435 acre

[1] All work being performed in these fuel management zones is being conducted within the development footprint established through the Murrieta Hills HANS process. Work will be done within and/or adjacent to Riverine resources in Zones 1 and 2 and areas outside of / adjacent to designated riparian/riverine areas of Zone 3, and 20 separate and small areas considered jurisdictional in nature. The total impact to areas considered jurisdictional is approximately 0.6 acre.

[2] Appendix F of Approval Draft. Murrieta Hills Fire Protection Technical Report, Plan No. SP 012-3164, TTM 35853 (Dudek 2018).

[3] All native tree species occurring at Murrieta Hills are included on the list of allowable species.

[4] The function and services of the impacted non-wetland jurisdictional features include groundwater recharge, flood conveyance, sediment transport, and some water quality benefits.
Thinning and pruning of vegetation is not expected to have any effects on the groundwater recharge portion of the function and services because groundwater recharge is a function of surface water, slope and soil permeability and all of these would remain unaffected by the proposed vegetation management.
Flood conveyance is the capacity of a drainage feature to convey storm flows. The proposed vegetation management will not constrict or otherwise inhibit the capacity of these drainages to covey storm flows as and when necessary.
Sediment transport is the fluvial movement of sediments in a stream. The vegetation thinning will reduce vegetative cover adjacent to the streambed and there is the potential for minor increases in sediment entering the avoided streambed.

Fuel Modification. Fuel modification is planned in 19 separate and small areas, all of which are considered jurisdictional (Figures 1 and 2a-g; Table 2, *Fuel Modification Acreages*). The total impact area is approximately 0.6010 acre.

Table 2
FUEL MODIFICATION ACREAGES

Drainage	Fuel Modification Zone			Total
	Zone 1[1]	Zone 2[1]	Zone 3[1]	
1		0.0385[3]	0.3287[2,3,4,5,6]	**0.3672**
1.1			0.0023[6]	**0.0023**
1.2	0.0025[3]	0.0089[3]		**0.0114**
1.3	0.0007[3]	0.0062[3]	0.0514[3]	**0.0583**
1.4			0.0248[3]	**0.0248**
1.5		0.0135[4]		**0.0135**
1.7			0.0061[3]	**0.0061**
1.7.1		0.0003[3]		**0.0003**
1.7.2		0.0023[3]		**0.0023**
1.8			0.0067[3]	**0.0067**
1.9		0.0034[3]	0.0096[3]	**0.0130**

Table 2 (cont.)
FUEL MODIFICATION ACREAGES

Drainage	Fuel Modification Zone			Total
	Zone 1[1]	Zone 2[1]	Zone 3[1]	
1.10	0.0035[3]	0.0453[2,3,7]	0.0038[3]	**0.0526**
1.10.1	0.0015[3]	0.0046[3]		**0.0061**
1.10.2		0.0026[3]		**0.0026**
1.10.3		0.0004[7]		**0.0004**
1.11		0.0001[3]		**0.0001**
3	0.0106[3]	0.0114[3]	0.0101[3]	**0.0321**
4		0.0011[3]		**0.0011**
7		0.0001[3]		**0.0001**
TOTAL	**0.0188**	**0.1387**	**0.4435**	**0.6010**

[1] Vegetation communities noted as follows: [2] coastal sage scrub; [3] chaparral; [4] coastal sage scrub/chaparral; [5] eucalyptus woodland; [6] field cropland; [7] disturbed

Effects of Fuel Modification on Riverine Resources. HELIX Environmental Planning, Inc. (HELIX) staff (i.e., Larry Sward) recently took photos of the areas mapped as Riverine/streambed by HELIX as part of the Habitat Evaluation and Acquisition Negotiation Strategy[2] (HANS) and Determination of Biologically Equivalent or Superior Preservation[3] (DBESP) reports (Attachment A). The locations of the photos were GPS'd with submeter accuracy (Figure 1).

The streambeds mostly support low-growing herbaceous vegetation (Streambeds 1 [lower FMZ], [upper FMZ], 1.3, 1.7.1, 1.7.2, 1.10.1, 3, and 4, 4), or no vegetation whatsoever (Streambeds 1 [upper FMZ], 1.10 [lower FMZ], and 1.10 [upper][4]). There is one streambed that has a few isolated shrubs that may be subject to thinning or vegetation removal (Streambed 1.2.1 [lower FMZ]).

The functions and services of these non-wetland jurisdictional features include: (1) groundwater recharge; (2) flood conveyance; (3) sediment transport; and (4) some potential water quality benefits.

1. **Groundwater Recharge –** Thinning, removal, and pruning of vegetation is not expected to have few, if any effects on groundwater recharge. Ground water recharge is a function of surface water, slope, and soil permeability.

   Ground water recharge is expected to either be unchanged or only minimally impacted by FMZ 2 and 3. Because Zone 1 is irrigated, groundwater recharge would likely increase in Zone 1 which could result in establishment of non-native exotic species in these locations.

[2] Murrieta Hills Project Habitat Evaluation and Acquisition Negotiation Strategy Biological Analysis. Prep for Pulte/BP Murrieta Hills, LLC. May.

[3] Murrieta Hills Project Determination of Biologically Equivalent or Superior Preservation Report. Prep for Pulte/BP Murrieta Hills, LLC. May.

[4] Upper and lower are used in places where a drainage crosses in and out of the FMZ, with the upper location being higher in the watershed.

2. **Flood Conveyance –** Flood conveyance is the capacity of a drainage feature to convey storm flows. The proposed vegetation management will not constrict or inhibit the capacity of these drainages to convey storm flows compared to their current capacity.

   Because vegetation is being thinned or completely removed in portions of Zones 2 and 3, flood conveyance may increase slightly because of potential for increases in runoff from these areas.

3. **Sediment Transport –** Sediment transport is the fluvial movement of sediment in a stream. The proposed vegetation management will not inhibit or restrict the drainages' capacity for sediment transport. The vegetation thinning or removal will reduce vegetative cover adjacent to the streambed and there is the potential for minor increases in sediment entering the avoided streambed.

   Potential minor increases in sediment transport are not expected to significantly increase from its current volumes. There is also the potential for very minor impacts to the streambeds during thinning and removal of the adjacent vegetation in the form of trampling or loosening the soil should workers walk through or drag vegetation across the drainage. Any minor increases in sediment transport from the actual thinning/removal process are also not considered to be significant.

4. **Water Quality Benefits –** Water quality benefits are typically derived from vegetation absorbing pesticides and other pollutants. This is not an important service of these drainages because the limited amount of vegetation in them restricts their capacity to absorb compounds from the runoff.

   Changes in these streams' capacity to provide water quality benefits is expected to be negligible. Based on site specific surveys there are no species identified in Section 6.1.2 of the MSHCP that occur onsite. Section V.B of the DBESP Report for Murrieta Hills provides a full discussion of species covered under Section 6.1.2.

Based on the effect of the FMZs specified vegetation modifications on the functions and services of the areas subject to fuel modification, the applicant is proposing mitigation based on ratios agreed to with the Western Riverside Resource Conservation Authority (RCA) as spelled out in Table 3, *Mitigation Criteria and Mitigation Ratios*.

The mitigation criteria used in Table 3 fall into the following general criteria classifications:

1. **Criteria A**: Upslope of Zone 1. These areas are not expected to be impacted by irrigation from Zone 1 because they are upslope.

2. **Criteria B**: Within 50 feet downslope of Zone 1. These areas may be impacted by irrigation from Zone 1 because they are immediately downslope of Zone 1 where elevation gradient plays a role.

3. **Criteria C**: More than 50 feet downslope of Zone 1. These areas are not expected to be impacted by irrigation from Zone 1 because they are more than 50 feet downslope of Zone 1.

4. **Criteria D**: Vegetation is either chaparral, sage scrub, or grassland.

   These areas could be impacted by higher removal of native species, including chamise (*Adenostoma fasciculatum*), California sagebrush (*Artemisia californica*), coyote bush (*Baccharis pillularis*), yerba santa (*Eriodictyon californicum*), buckwheat (*Eriogonum* sp.), telegraph plant (*Heterotheca grandiflora*), sticky monkeyflower (*Diplacus aurantiacus*), laurel sumac (*Malosma laurina*), and sage (*Salvia*) species.

5. **Criteria E**: Steep slopes. Steeper slope areas increase the potential for erosion.

   These criteria were then combined, and a mitigation ratio attached to each combination based on the potential combined impact on a given drainage. All drainages within Zone 1 will be mitigated at 2:1 and drainages within Zones 2 and 3 will be mitigated at between 0.5:1 and 1:1 with offsite re-establishment (Table 3).

TABLE 3
MITIGATION CRITERIA AND MITIGATION RATIOS

Zone 1 Shall be mitigated at 2:1

MITIGATION CRITERIA					
Mitigation Criteria	**Criteria A: Upslope of Zone 1 [1]**	**Criteria B: Within 50 feet downslope of Zone 1 [2]**	**Criteria C: Greater than 50 feet downslope of Zone 1 [3]**	**Criteria D: Vegetation Type: Chaparral, sage scrub or grassland [4]**	**Criteria E: Steep Slope [5]**

MITIGATION CRITERIA COMBINATIONS								
Mitigation Criteria Combination	**Criteria 1 (A+D+E)**	**Criteria 2 (A+D)**	**Criteria 3 (B+D+E)**	**Criteria 4 (B+D)**	**Criteria 5 (B+E)**	**Criteria 6 (C+D+E)**	**Criteria 7 (C+D)**	**Criteria 8 (C+E)**
Zone 2 Mitigation Ratio	0.75:1	0.5:1	1:1	0.75:1	0.75:1	0.75:1	0.5:1	0.5:1
Internal Oak-dominated Open Space (Zone 3) Mitigation Ratio	0.75:1	0.5:1	1:1	0.75:1	0.75:1	0.75:1	0.5:1	0.5:1

[1] Because it is upslope of Zone 1 no irrigation water flows would be added to the streambed
[2] Because it is within 50 feet and downslope of Zone 1 there is the potential for irrigation water flow to be added to the streambed
[3] Because it is more than 50 feet downslope of Zone 1 no irrigation water flows would be expected to be added to the streambed
[4] Chaparral and sage scrub vegetation are expected to have a majority of the native shrub species removed and there is potential for increased erosion
[5] Steep slopes adjacent to the drainages will increase potential for erosion

Each drainage was reviewed and broken into segments by mitigation criteria combination. A single drainage could consist of multiple segments. The area of each segment was calculated, and the appropriate mitigation ratio applied to the impacts within that given segment.

All Zone 1 areas are automatically mitigated at a ratio of 2:1.

Table 4, *Fuel Modification Mitigation Requirements for Fuel Modification Zones 2 and 3* shows the results of that assessment for Zones 2 and 3.

TABLE 4
FUEL MODIFICATION MITIGATION REQUIREMENTS FOR FUEL MODIFICATION ZONES 2 AND 3

Drainage Number (Mitigation Criteria Combination)[1]	MITIGATION CRITERIA					Mitigation Ratio	Impact (Acres)	Impact (Linear Feet)	Mitigation Requirement
	Criteria A: Upslope of Zone 1	Criteria B: Within 50 feet downslope of Zone 1	Criteria C: Greater than 50 feet downslope of Zone 1	Criteria D: Vegetation Type: Chaparral or sage scrub	Criteria E: Steep Slope				
Drainage 1(1)	x			x	x	0.75:1	0.0051	44	0.0038
Drainage 1(2)	x			x		0.5:1	0.0162	141	0.0081
Drainage 1(3)		x		x	x	1:1	0.1510	1,009	0.1510
Drainage 1(4)		x		x		0.75:1	0.0084	73	0.0063
Drainage 1(6)			x	x	x	0.75:1	0.0598	520	0.0449
Drainage 1(7)			x	x		0.5:1	0.1270	792	0.0635
Drainage 1.1(7)			x	x		0.5:1	0.0023	50	0.0012
Drainage 1.2(1)	x			x	x	0.75:1	0.0089	130	0.0068
Drainage 1.3(1)	x			x	x	0.75:1	0.0062	90	0.0049
Drainage 1.3(3)		x		x	x	1:1	0.0082	50	0.0082
Drainage 1.3(6)			x	x	x	0.75:1	0.0431	255	0.0323
Drainage 1.4(3)		x		x	x	1:1	0.0045	33	0.0045
Drainage 1.4(6)			x	x	x	0.75:1	0.0203	168	0.0152
Drainage 1.5(1)	x			x	x	0.75:1	0.0135	186	0.0101
Drainage 1.7(3)		x		x	x	1:1	0.0046	50	0.0046
Drainage 1.7(6)			x	x	x	0.75:1	0.0015	16	0.0011
Drainage 1.7.1 (2)	x			x		0.5:1	0.0003	6	0.0002
Drainage 1.7.2(1)	x			x	x	0.75:1	0.0023	50	0.0017
Drainage 1.8(3)		x		x	x	1:1	0.0061	66	0.0061
Drainage 1.8(7)			x	x		0.5:1	0.0006	7	0.0003
Drainage 1.9(1)	x			x	x	0.75:1	0.0034	50	0.0026
Drainage 1.9(3)		x		x	x	1:1	0.0042	61	0.0042
Drainage 1.9(6)			x	x	x	0.75:1	0.0054	78	0.0041
Drainage 1.10(1)	x			x	x	0.75:1	0.0227	226	0.0170
Drainage 1.10(3)		x		x	x	1:1	0.0040	120	0.0040
Drainage 1.10(5)		x		x		0.75:1	0.0030	44	0.0023

TABLE 4 (cont.)
FUEL MODIFICATION MITIGATION REQUIREMENTS FOR FUEL MODIFICATION ZONES 2 AND 3

Drainage Number (Mitigation Criteria Combination)[1]	MITIGATION CRITERIA					Mitigation Ratio	Impact (Acres)	Impact (Linear Feet)	Mitigation Requirement
	Criteria A: Upslope of Zone 1	Criteria B: Within 50 feet downslope of Zone 1	Criteria C: Greater than 50 feet downslope of Zone 1	Criteria D: Vegetation Type: Chaparral or sage scrub	Criteria E: Steep Slope				
Drainage 1.10(6)			x	x	x	0.75:1	0.0112	188	0.0084
Drainage 1.10(8)			x		x	0.5:1	0.0080	58	0.0040
Drainage 1.10.1(1)	x			x	x	0.75:1	0.0046	100	0.0035
Drainage 1.10.2(1)	x			x	x	0.75:1	0.0026	38	0.0020
Drainage 1.10.3(7)			x	x		0.5:1	0.0004	17	0.0002
Drainage 1.11	x			x		0.5:1	0.0001	5	0.0001
Drainage 3(1)	x			x	x	0.75:1	0.0114	124	0.0086
Drainage 3(3)		x		x	x	1:1	0.0101	137	0.0101
Drainage 4(2)	x			x		0.5:1	0.0011	15	0.0006
Drainage 7 (2)	x			x		0.5:1	0.0001	3	0.0001
TOTAL							**0.5822**	**5,000**	**0.4458**

Based on the assessment above, impacts to 0.5822 acre of Riverine/streambed within Zones 2 and 3 require 0.4458 acre of mitigation. Zone 1 mitigation totals 0.0376 acre, and when combined with Zones 2 and 3, the total mitigation obligation is 0.4834 acre.

Mitigation will be accomplished through the purchase of 0.4834 re-establishment credits from the Riverpark Mitigation Bank.

Attachments:

Figure 1: Photo Locations
Figures 2a-d: Riparian/Riverine and FMZ
Attachment A: Waters of the U.S. in the Fuel Modification Zone

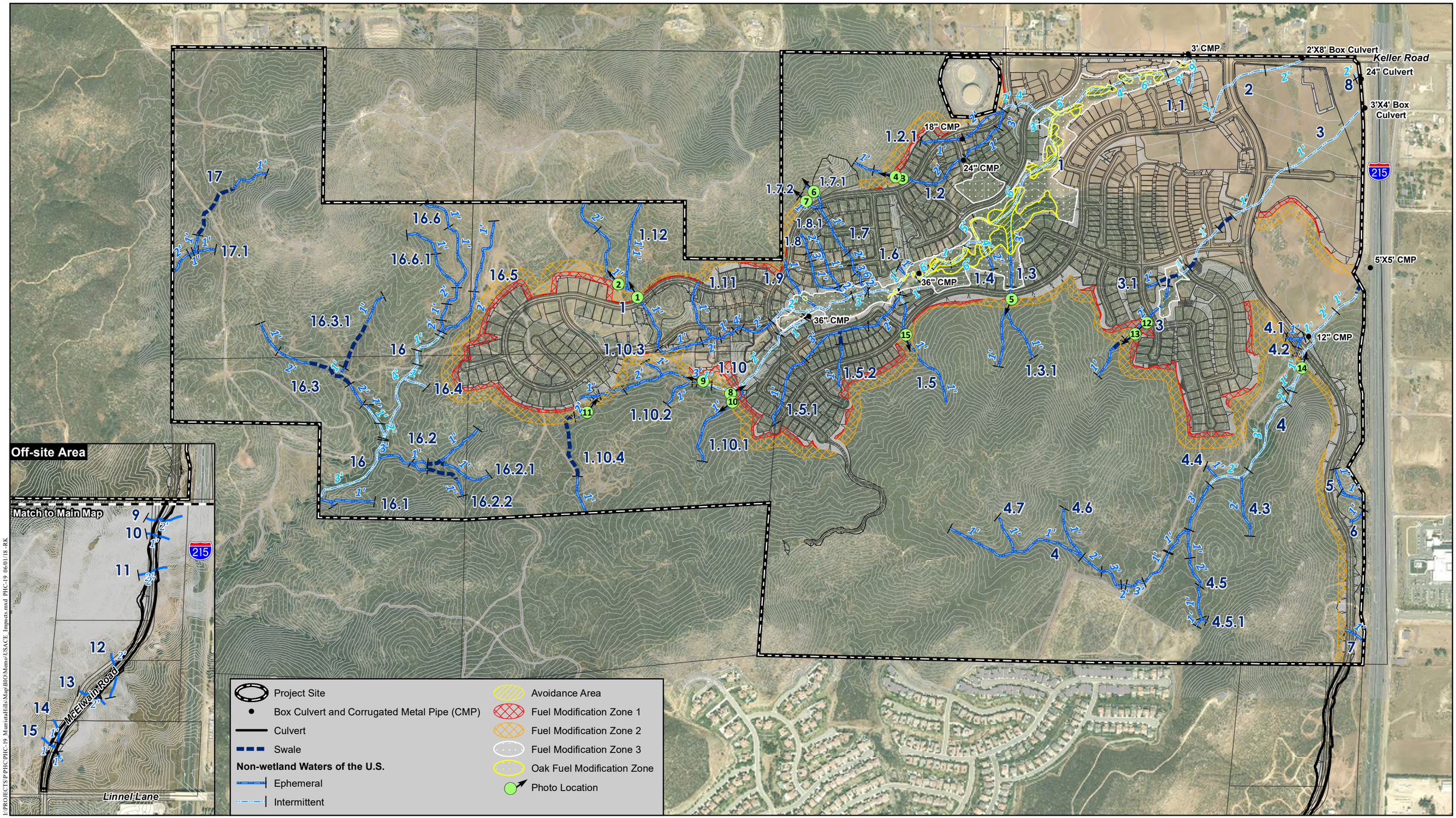

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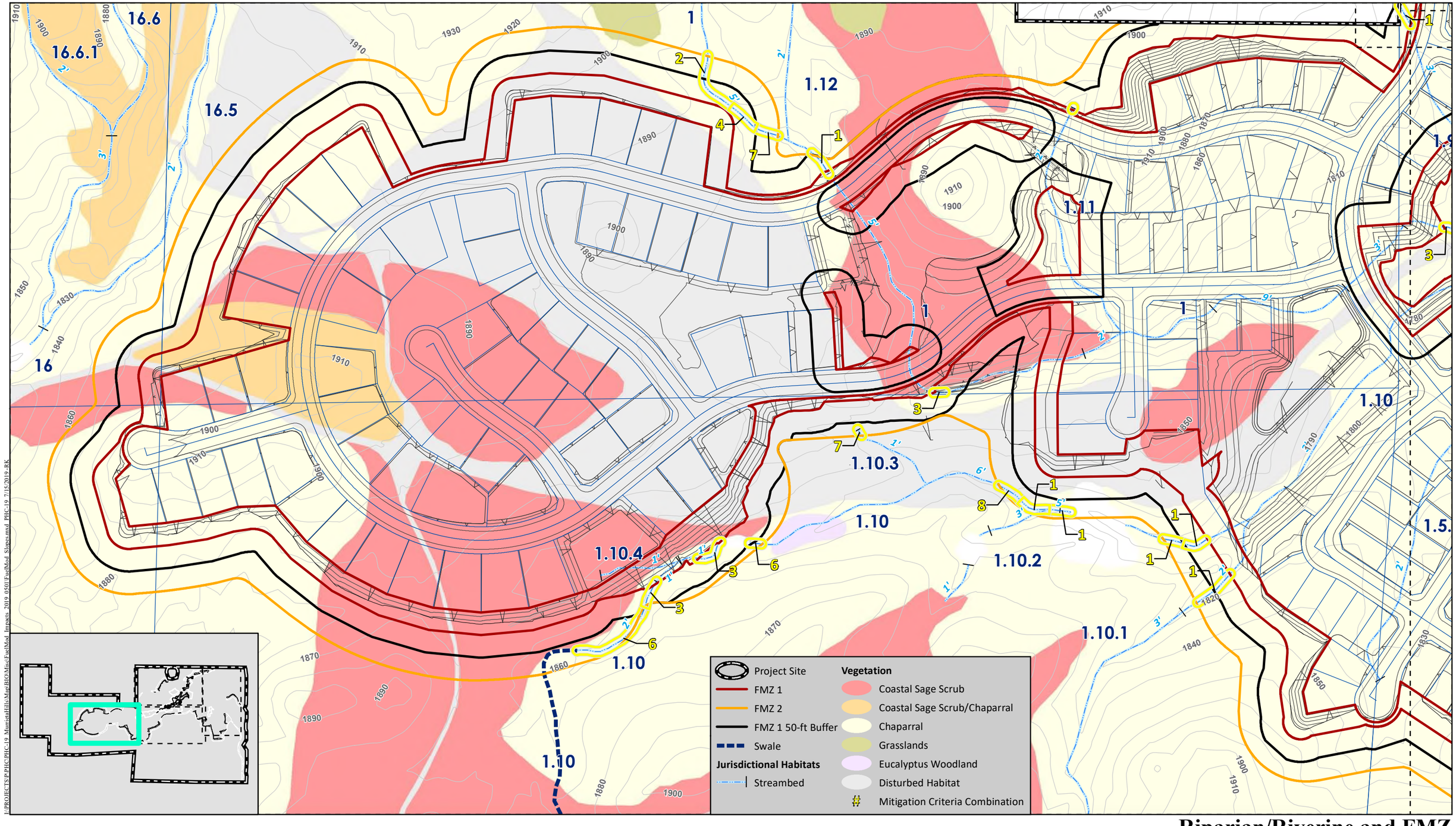
Photo Locations

MURRIETA HILLS

HELIX Environmental Planning



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HELIX Environmental Planning

Riparian/Riverine and FMZ

MURRIETA HILLS

Figure 2a

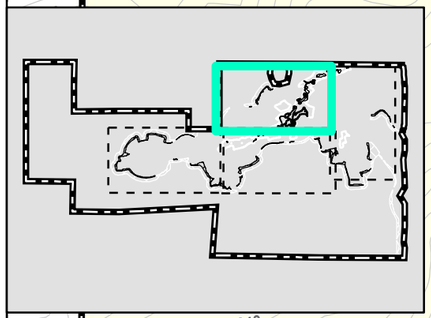
Project Site
FMZ 1
FMZ 2
FMZ 1 50-ft Buffer
Box Culvert and Corrugated Metal Pipe (CMP)

Jurisdictional Habitats

Streambed

Vegetation

Coastal Sage Scrub
Coastal Sage Scrub/Chaparral
Chaparral
Grasslands
Eucalyptus Woodland
Field Cropland
Disturbed Habitat
Mitigation Criteria Combination



1.2.1
1.2
1.7.1
1.7.2
1.7
1.4
1
18" CMP
24" CMP
SP 1
SP 6
SP 7
SP 8
SP 9

Riparian/Riverine and FMZ

MURRIETA HILLS

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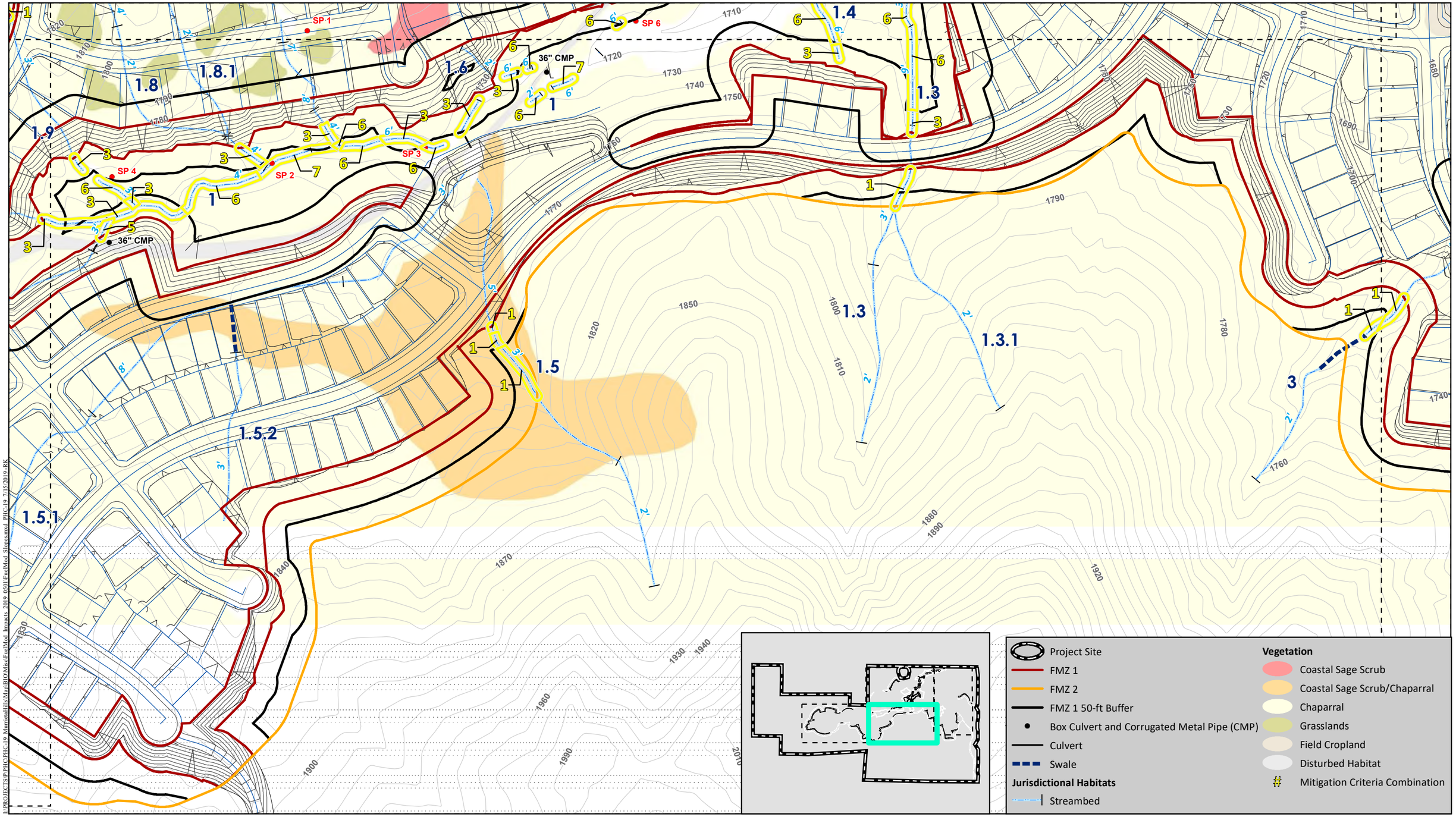
N

0 200 Feet

Figure 2b



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Riparian/Riverine and FMZ

MURRIETA HILLS

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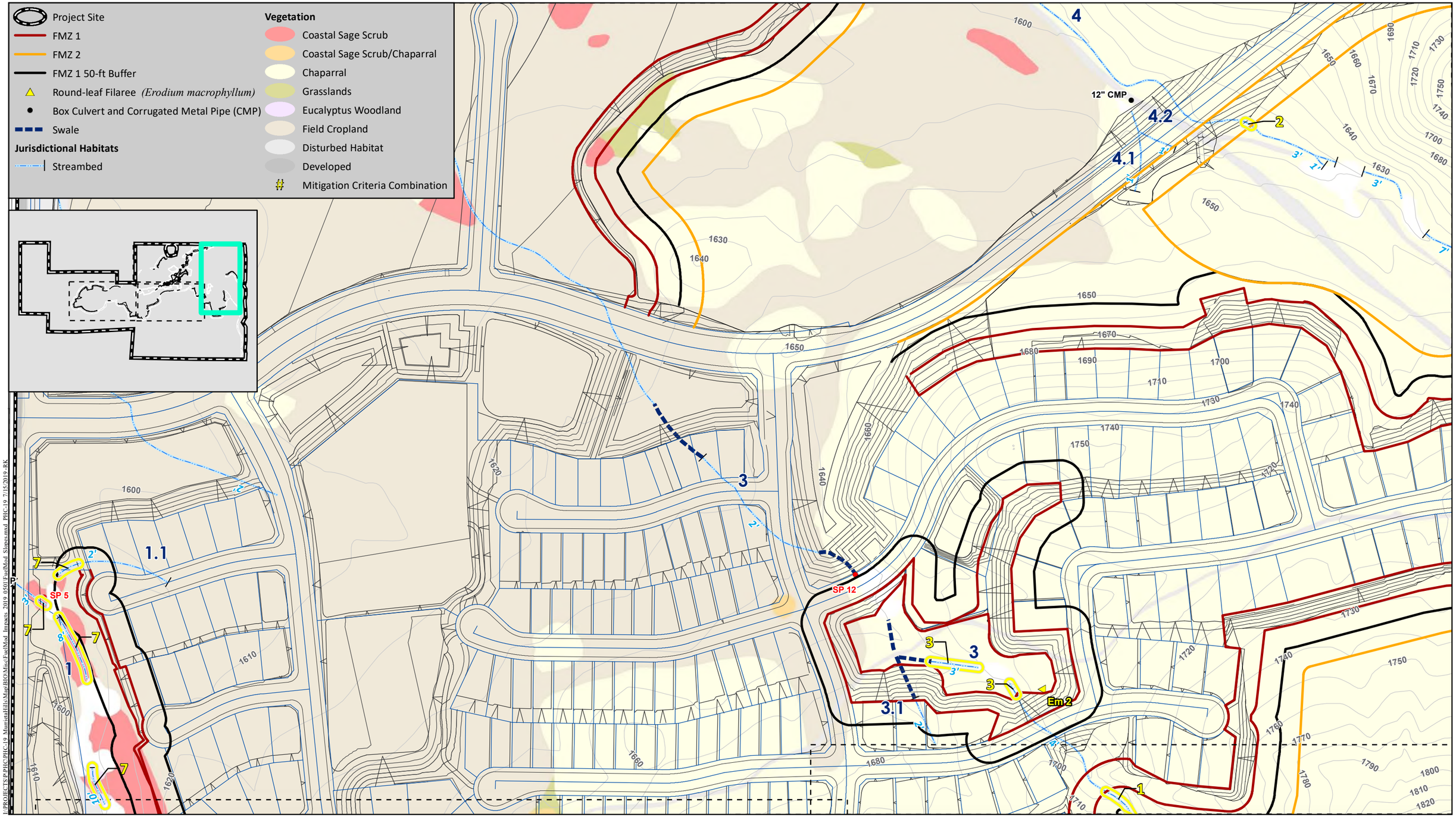
N

0 200 Feet

Figure 2c



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Riparian/Riverine and FMZ

MURRIETA HILLS

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Figure 2d

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Photo 1. Streambed 1. Looking upstream (lower fuel mod area).

Photo 2. Streambed 1. Looking upstream (upper fuel mod area).

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Photo 3. Streambed 1.2.1. Looking upstream from bottom edge of fuel modification zone 1.

Photo 4. Streambed 1.2.1. Looking upstream from bottom edge of fuel modification zone 2.

Photo 5. Streambed 1.3. Looking upstream.

Photo 6. Streambed 1.7.1. Looking upstream.

Photo 7. Streambed 1.7.2. Looking upstream.

Photo 8. Streambed 1.10. Looking downstream (lower fuel mod area).

Photo 9. Streambed 1.10. Looking downstream (upper fuel mod area).

Photo 10. Streambed 1.10.1. Looking upstream.

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Photo 11. Streambed 1.10.4. Looking downstream.

Photo 12. Streambed 3. Looking upstream from bottom edge of fuel modidfication zone 1.

Photo 13. Streambed 3. Looking upstream from bottom edge of fuel modification zone 2.

Photo 14. Streambed 4. Looking downstream.

Photo 15. Streambed 1.5. Looking upstream.

HELIX
Environmental Planning

Murrieta Hills Project

General Biological Resources Assessment

September 12, 2019

Prepared for:
Pulte/BP Murrieta Hills, LLC.
2 Technology Drive
Irvine, CA 92618

Prepared by:
HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942

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Murrieta Hills Project

General Biological Resources Assessment Report

Prepared for:

Pulte/BP Murrieta Hills, LLC
2 Technology Drive
Irvine, CA 92618

Prepared by:

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942

September 12, 2019

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Report Date: September 12, 2019

Title: General Biological Resources Assessment Report for Murrieta Hills Project

Project Location: The approximately 973.69-acre project site is located in the southern portion of Menifee Valley. It is located in Sections 27 and 28, Township 6 South, Range 3 West, as shown on the U.S. Geological Survey 7.5-minute Murrieta and Romoland quadrangle maps. The project site is located in the City of Murrieta, Riverside County, California.

Assessor's Parcel Numbers: The project site comprises 26 Assessor's Parcel Numbers: 384190001, 384190003, 384190005 to -014, 384200006 to -017, 384210001, and 384210003.

Owner/Applicant:
Pulte/BP Murrieta Hills, LLC
2 Technology Drive
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Report Summary:

The Murrieta Hills Specific Plan Amendment area consists of 973.69 acres in Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the Multiple Species Habitat Conservation Plan (MSHCP). The property occurs within the 1,300 acres that compose Cell Group C. Surveys have been conducted for burrowing owl (*Athene cunicularia*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*) all with negative results. The rare plant surveys conducted over several years found two individual round-leaved filaree (*California macrophylla)* in 2006, but none were observed in subsequent surveys in 2008 and 2012. Field work for a delineation of jurisdictional waters and a Riparian/Riverine and vernal pool habitat assessment were also conducted. The project also includes off-site impacts to the south to construct McElwain Road that will connect the project to Clinton Keith Road, and a small off-site impact area to the north of Keller Road for an outfall structure. McElwain Road has been added to the MSHCP as a Covered Activity through Minor Amendment No. 2017-01. The off-site study area encompasses approximately 18.5 acres adjacent to the southeast corner of the project and less than 0.1 acre for the outfall structure north of Keller Road. The off-site areas are not within any MSHCP criteria cells. As of the writing of this report, biological surveys of the southern off-site area have not been conducted.

The project proposes impacts to 361.76 acres, consisting of 357.61 acres on site and 4.15 acres off site, and would avoid 611.93 acres on site, of which 607.74 acres directly contribute to the conservation goals of Cell Group C. The impacts include 0.59 acre under U.S. Army Corps of Engineers jurisdiction, and 2.10 acres of California Department of Fish and Wildlife (CDFW) jurisdiction that is also considered Riparian/Riverine habitat under the MSHCP. Reduction in functions and services associated within streambed within fuel modification zones may occur to an additional 0.6010 acre of MSHCP riverine.

The purpose of this report is to summarize the existing biological data on the property and to address the biological requirements of the California Environmental Quality Act (CEQA) and City of Murrieta for the Murrieta Hill Specific Plan Amendment.

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Murrieta Hills Project
General Biological Resources Assessment

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1.0 INTRODUCTION

This report provides the City of Murrieta (City; California Environmental Quality Act [CEQA] lead agency), resource agencies, and public with current biological data to satisfy review on Pulte Homes' proposed Murrieta Hills project (General Plan Amendment [GPA] 00951) located in the City of Murrieta, Riverside County, California. The report describes sensitive biological resources (including vegetation communities, plants, and animals detected on the project site) and potential direct and indirect project impacts, and proposes mitigation measures to offset those impacts. Consistency with the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP; Dudek and Associates [Dudek] 2003) will also be addressed. The project site comprises the following Assessor's Parcel Numbers (APNs; Table 1): 384190001, 384190003, 384190005 to -014, 384200006 to -017, 384210001, and 384210003.

The off-site study area to the south includes portions of APNs 392250005, -006, 392280001 to -005, and 392280007. The off-site APNs are not included in Table 1. The off-site area to adjacent to Keller Road occurs within the right-of-way for the road and does not have an APN. The term "off-site study area" refers to the area associated with McElwain Road to the south, and "Keller Road outfall" refers to the less than 0.1 acre outfall area to the north.

Table 1
ASSESSOR'S PARCEL NUMBERS (APNs)
AND ACREAGE

APN	ACREAGE*
384190001	21.05
384190003	17.94
384190005	20.21
384190006	35.98
384190007	10.06
384190008	10.28
384190009	9.69
384190010	9.96
384190011	10.69
384190012	10.87
384190013	10.25
384190014	10.37
384200006	10.54
384200007	10.43
384200008	10.45
384200009	10.45
384200010	18.53
384200012	11.27
384200013	44.38
384200014	6.14
384200015	11.47
384200016	6.89

Table 1 (cont.)
ASSESSOR'S PARCEL NUMBERS (APNs)
AND ACREAGE

APN	ACREAGE*
384200017	22.72
384210001	617.11
384210002	5.44
384210003	9.83
TOTAL ACREAGE	**974.00****

*Acreage shown is from Riverside County Land Information System (RCLIS) website and is the larger of recorded/mapped acreage shown for APN.

**RCLIS website total is 0.3 acre larger than the HELIX Environmental Planning, Inc. (HELIX) mapped total. The HELIX mapped total is used throughout the remainder of this report.

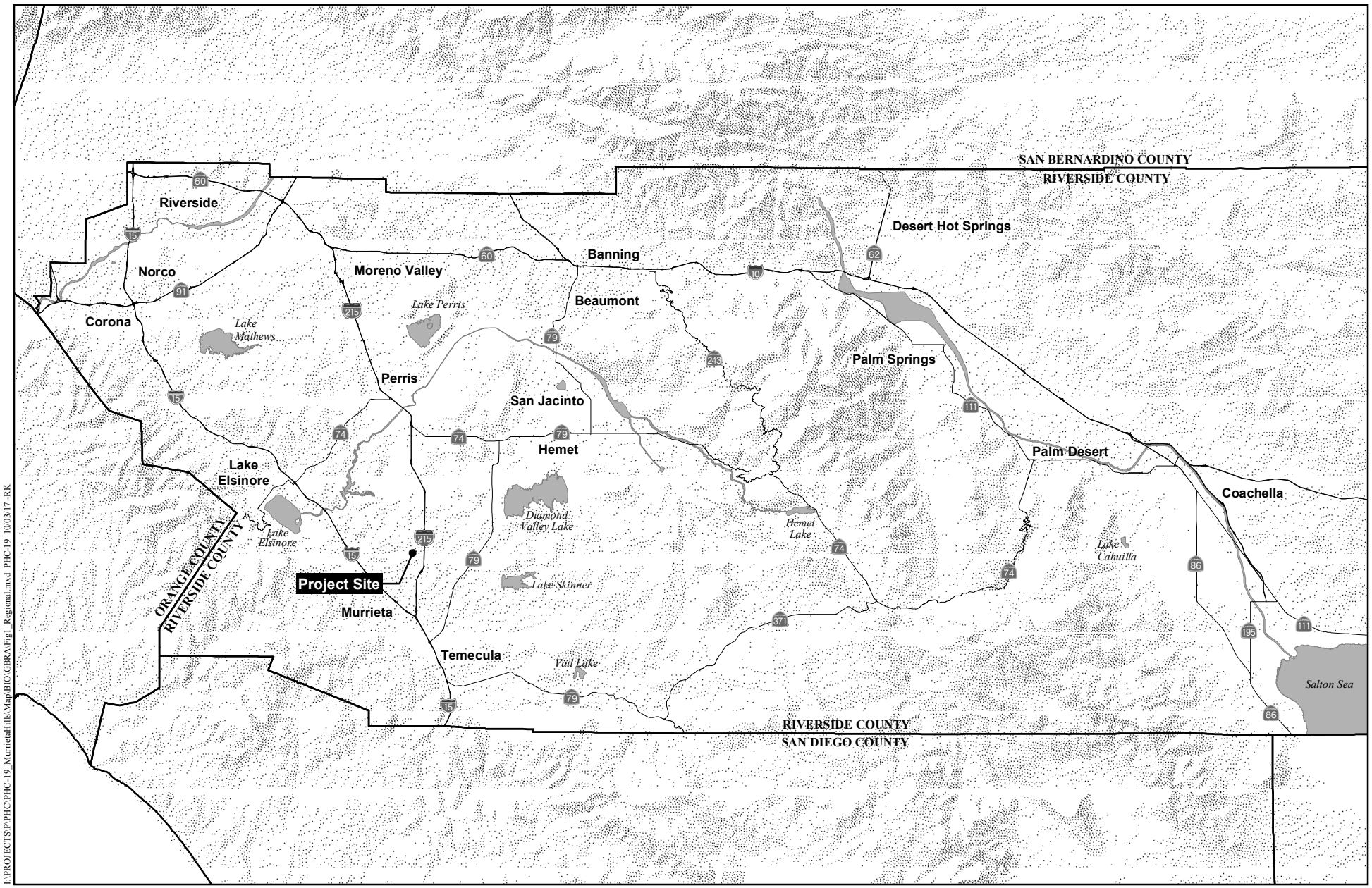
The property is in Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP. The entire project, with the exception of the off-site portion of McElwain Road, is within criteria cells, and all cells are part of Cell Group C. The property comprises 973.69 acres of the approximately 1,300-acre Cell Group C. The offsite portion of McElwain Road lies outside of any criteria cells.

1.1 SITE LOCATION AND DESCRIPTION

The Murrieta Hills Specific Plan Amendment area consists of approximately 973.69 acres located in the southern portion of Menifee Valley in the City (Figure 1). Please note that the 973.69 acres includes 1.9 acres of land located around the reservoir located just offsite adjacent to the north-central portion of the site and all of the Keeler Road right-of-way. Specifically, the project site is located south of Keller Road and west of Interstate (I-) 215 (Figure 2). The property is in Sections 27 and 28, Township 6 South, Range 3 West, as shown on the U.S. Geological Survey (USGS) 7.5-minute Murrieta and Romoland quadrangle maps (Figure 3). The project also includes an 18.5-acre off-site study area for the required circulation improvements that will connect the project to Clinton Keith Road via McElwain Road, along with a small off-site impact area along Keller Road for an outfall structure. McElwain Road has been added as an MSHCP Covered Activity through Minor Amendment No. 2017-01 (RCA 2018).

The dominant soils on the property and off-site study area consist of two well-drained soils: Cajalco fine sandy loam and Cienba rocky sandy loam. Other soils present on site include Las Posas and Honcut series loams with some Auld series clay soil in the northeast portion of the property (Knecht 1971). Soil types that occur on the property are known to have clay inclusions. Multiple jurisdictional drainages occur on the property.

The property is primarily undeveloped with approximately 97 acres in the northeast being utilized for crop-based agricultural (e.g., growing wheat and oats). The remains of a small, recently vacated nursery are located near the center of the property, and disturbed areas are located in the center and southeast. The property is crossed by several dirt roads and includes areas that have been disturbed from off-highway vehicle activity, illegal dumping, and various



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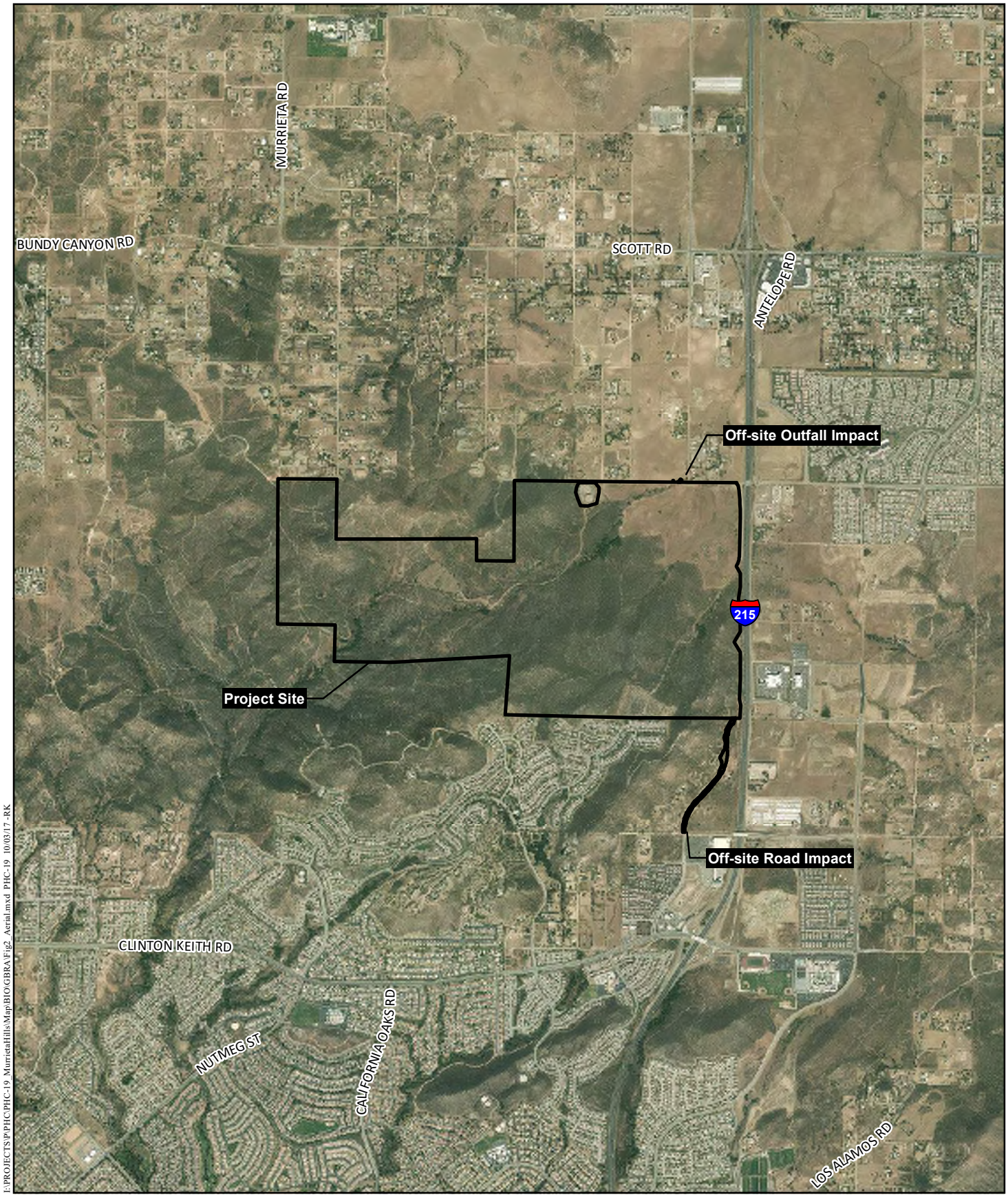
Regional Location Map

MURRIETA HILLS

HELIX Environmental Planning

N 0 10 Miles

Figure 1



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Project Vicinity Map (Aerial Photograph)

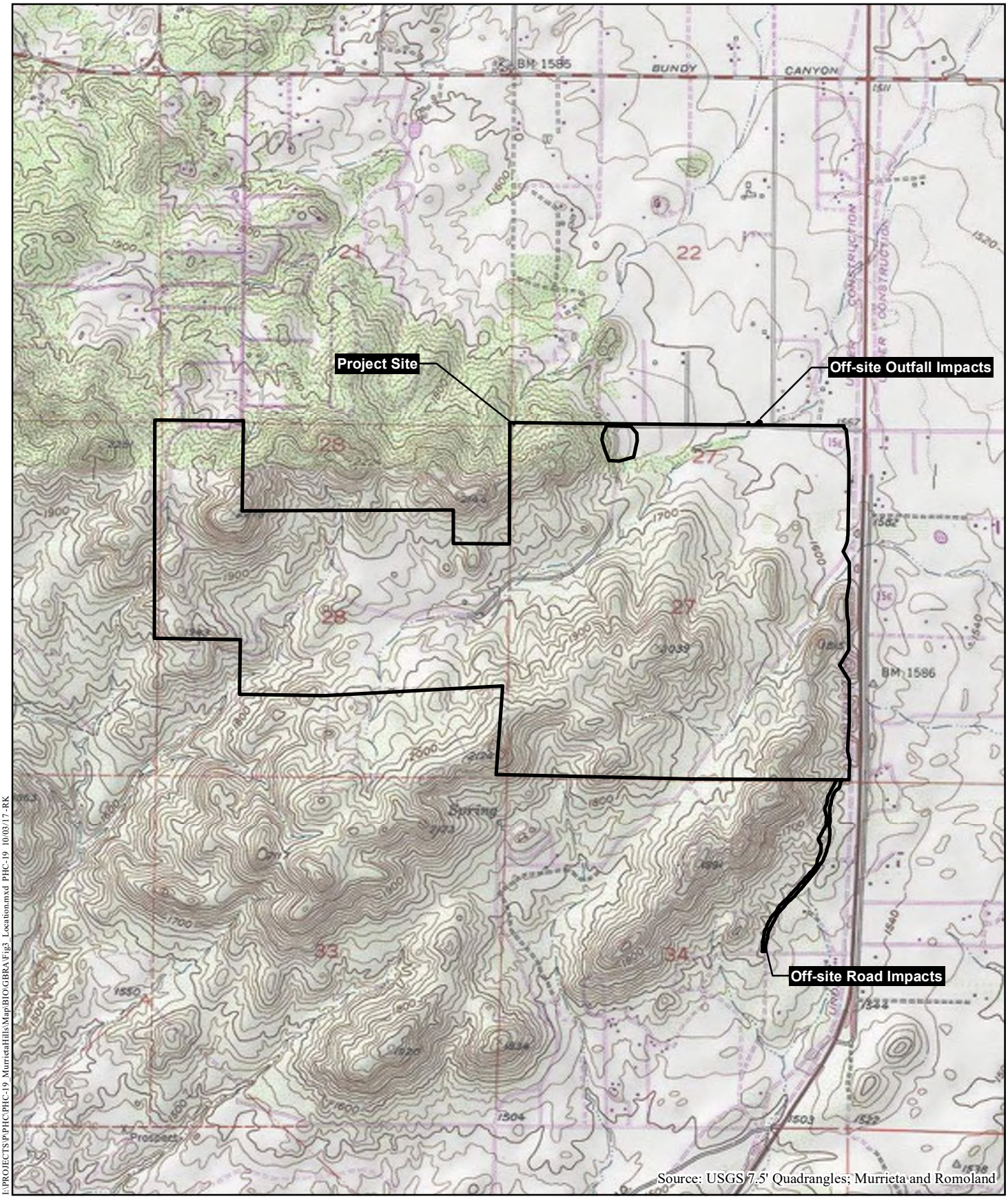
MURRIETA HILLS

HELIX Environmental Planning

N

0 3,000 Feet

Figure 2



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Project Vicinity Map (USGS Topography)

MURRIETA HILLS

HELIX Environmental Planning

0 2,000 Feet

Figure 3

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other unauthorized activities. Surrounding uses include undeveloped land, rural and urban residential areas, and I-215. There are two water tanks located adjacent to the west side of the cropland along the northern border of the property.

The off-site study area includes undeveloped land along with disturbed and developed lands (associated with the rural residential development) that occur adjacent to the proposed extension of McElwain Road, an MSHCP Covered Activity. The Keller Road outfall consists of developed and disturbed lands.

1.2 PROJECT DESCRIPTION

The project proposes annexation to the City and an amendment to the existing Murrieta Hills Specific Plan SPM-4, approved by the City on April 18, 1995 under Resolution No. 95-353, to allow residential and commercial uses, a public park, improved open space, and natural open space (T&B Planning [T&B] 2008). The project also includes a northerly extension of McElwain Road to Keller Road. In addition to the Specific Plan Amendment and annexation to the City, the project will require an amendment to change the existing land use from Rural Mountainous in the Riverside County General Plan to appropriate general plan designations in the City of Murrieta General Plan, a rezone from the Riverside County zone of Rural Residential to appropriate zoning within the City of Murrieta Specific Plan zone, and one or more tentative subdivision maps.

The project description (Michael Baker 2018) and the conceptual site plan (Figure 4) show a configuration of approximately:

- 557 single-family detached residential units on lots/pads ranging in size from 4,800 square feet to 10,000 square feet
- 193 multi-family units
- 18 acres of general commercial
- 5-acre public park
- 10 acres of Homeowner Association maintained pocket parks and community center
- 37.33 acres of natural open space outside of MSHCP open space
- 607.74 acres of natural MSHCP open space

The proposed project will result in impacts to approximately 361.76 acres of the 973.69-acre property. The impacts include 4.4 acres of existing fuel modification associated with the Greer Ranch Development. Access to the project will be from Keller Road to the north and from Clinton Keith Road via McElwain Road to the south. The existing McElwain Road will be extended to connect to the development and will impact 4.15 acres off site within the 18.5-acre off-site study area. The off-site portion of McElwain Road and the Keller Road outfall structure are not within MSHCP Criteria Cells. A 6-foot box culvert will be utilized to convey storm flows

under McElwain Road within the conservation area and will facilitate wildlife movement through this area. A second 4-foot box culvert will be placed slightly upslope to facilitate wildlife movement during storm events. The proposed development includes avoiding the majority of the large drainage that runs from the center to the northeast through the linear park. The project includes an outfall structure on the north side of Keller Road for flows from this large drainage. Due to the extent of the Riparian/Riverine resources on the property, total avoidance can be achieved only by minimal or no project alternatives. The linear park is not part of the MSHCP conservation area, and essentially all upland areas within the linear park will be modified for fuel management purposes, consistent with the Fire Protection Technical Report for the project (Dudek 2019).

The project will require a Habitat Evaluation and Acquisition Negotiation Strategy (HANS) for conservation of sensitive lands. A previous development proposal on the project site received an approved HANS (JPR 09-02-17-01), which was never implemented. This previous HANS will be amended to address the current development proposal as well as comments provided by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) on the previously approved JPR with a Not Consistent Determination being made at the time by the USFWS and CDFW.

2.0 METHODS

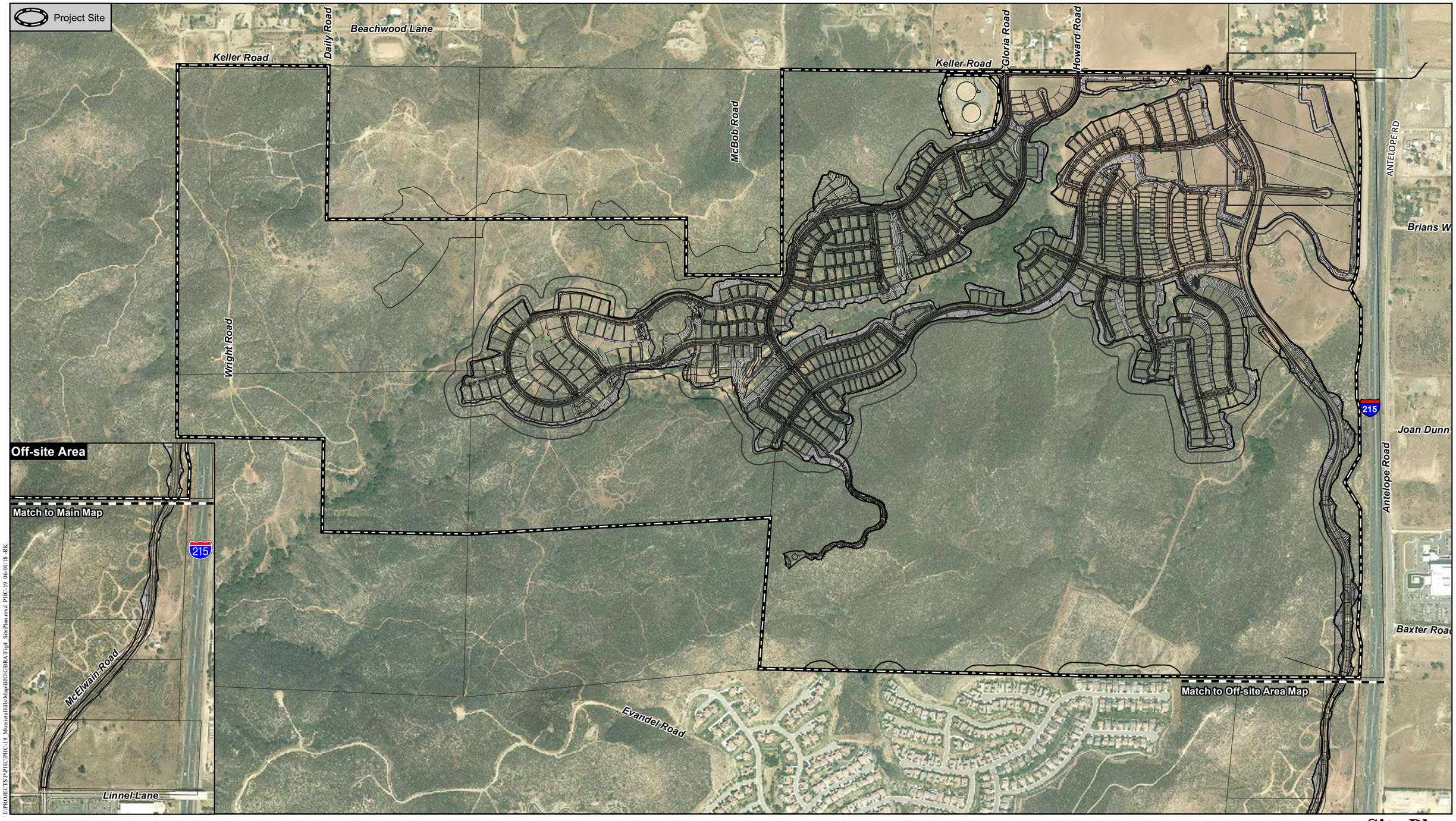
Project site evaluation involved literature review, on-site habitat assessments, and various surveys. The methods used to evaluate the property are discussed in this section.

2.1 NOMENCLATURE AND LITERATURE REVIEW

Nomenclature for this report follows Baldwin et al. (2012) and the California Native Plant Society (CNPS) online database (2015) for plants and the MSHCP (Dudek 2003) for vegetation community classifications, with additional vegetation community information taken Holland (1986). Animal nomenclature follows Emmel and Emmel (1973) for butterflies, Crother (2001) for reptiles and amphibians, American Ornithologists' Union (2008) for birds, and Baker et al. (2003) for mammals. Sensitive plant and animal status is taken from the California Natural Diversity Database (CNDDB) of the California Department of Fish and Wildlife (CDFW; 2013a, b, c, and d). Sensitive plant species habitats and blooming periods are taken from the MSHCP (Dudek 2003). Soils classifications are obtained from Knecht (1971). The CDFW CNDDB (2013a), the CNPS online database (2013), and HELIX in-house database were searched to obtain a list of sensitive animal and plant species with potential to occur on the property.

2.2 FIELD SURVEYS

HELIX conducted biological resources assessments of the Murrieta Hills property in winter 2005, spring 2006, fall 2007, and spring/summer 2008. Rare plant surveys were conducted in May and June 2006, April and June 2008, and May 2012. Burrowing owl (*Athene cunicularia*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*) surveys were conducted in spring and summer 2006, least Bell's



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Site Plan

MURRIETA HILLS

HELIX Environmental Planning

0 800 Feet

Figure 4

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vireo and burrowing owl surveys were conducted in 2008 and 2012, and a burrowing owl survey was conducted again in 2018. A jurisdictional delineation was produced in 2008 (HELIX 2008a), updated in March 2016, and verified in the field with the U.S. Army Corps of Engineers (USACE) and CDFW. Additional site surveys were conducted in 2006, 2007, 2012, 2013, 2016, 2018 and 2019 to evaluate the Riparian/Riverine resources that occur on the property and with the off-site impacts area associated with the project. During all of HELIX's surveys, focused and incidental observations of plant and animal species were noted. The methods used to evaluate the biological resources present on the property are discussed in this section.

2.2.1 Vegetation Mapping

The vegetation communities were mapped in accordance with the MSHCP. Additional information on vegetation communities was obtained from Holland (1986). Plants were identified according to The Jepson Manual: Higher Plants of California (Baldwin et al. 2012) for this general biological resource assessment.

2.2.2 Jurisdictional Delineation

Field work for the 2008 jurisdictional report was done by HELIX biologists Rob Hogenauer, Jack Easton, and Doug Allen. The 2016 update was done by HELIX Principal Biologist Larry Sward and was verified in the field by CDFW staff Kim Freeburn on June 29, 2016, by the Regional Water Quality Control Board (RWQCB) staff Jean Bandura on May 30, 2018, and by USACE project manager Peggy Bartels on July 12, 2018. The off-site study area for McElwain Road was not surveyed for jurisdictional features as access was not granted by the landowner to conduct surveys. The off-site area was assessed for potential waters via binoculars, aerial photographs, and topographic maps. Data presented regarding waters in the off-site area are estimates. The Keller Road outfall area survey was conducted by Mr. Hogenauer in May 2019.

Areas were determined to be non-wetland waters of the U.S. (WUS) if there was evidence of regular surface flow (e.g., bed and bank) but neither the vegetation nor soils criterion was met. Jurisdictional limits for these areas were defined by the ordinary high water mark (OHWM), which is defined in 33 CFR Section 329.11 as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; the presence of litter or debris; or other appropriate means that consider the characteristics of the surrounding areas." The USACE has issued further guidance on the OHWM (Riley 2005), which has also been used for this delineation. The OHWM widths were measured to the nearest foot at various locations along the channel.

The CDFW jurisdictional boundaries were determined based on the presence of riparian vegetation or regular surface flow. Streambeds within CDFW jurisdiction were delineated based on the definition of streambed as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supporting fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports riparian vegetation" (Title 14, Section 1.72). This definition for CDFW jurisdictional habitat allows for a wide variety of habitat types to be jurisdictional, including some that do not include wetland species (e.g., oak

woodland and alluvial fan sage scrub). Streambed widths were measured to the nearest foot at various locations along the channel.

An aerial photo and topography-based delineation of the off-site study indicates that the proposed road alignment crosses at least two ephemeral drainages.

2.2.3 Riparian/Riverine and Vernal Pool Habitat Assessment

The MSHCP defines Riparian/Riverine and Venal Pool habitats as:

- Riparian/Riverine areas are lands that contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.

- Vernal pools are seasonal wetlands that occur in depression areas that have wetland indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics and the definition of the watershed supporting vernal pool hydrology must be made on an individual basis. Such determinations should consider the length of time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, the uses to which the area has been subjected, and weather and hydrologic records.

Least Bell's Vireo

HELIX biologist Deborah Leonard performed a habitat assessment in 2006, which determined that the property included habitat with potential to support the least Bell's vireo at that time. These areas consisted of riparian scrub vegetation dominated by shrubby willows (*Salix* spp.) and mule fat (*Baccharis salicifolia*). A small patch of coast live oak woodland was also surveyed since it is immediately adjacent to the riparian scrub. The rest of the riparian habitat on site consists of coast live oak riparian woodland and forest that do not have the vegetative components or structure necessary for the vireo. The 2006 survey consisted of eight individual surveys conducted between May 18 and July 31, 2006, by HELIX biologists Ms. Leonard, Kathy Pettigrew, and Shelby Howard (HELIX 2006a). The 2008 protocol surveys were conducted between June 20 and July 30, 2008, by HELIX biologists Mr. Hogenauer and Zsolt Kahancza (2008b). The 2012 protocol surveys were conducted between April 29 and July 12, 2012, by Mr. Hogenauer (HELIX 2012). It should be noted that the amount of suitable habitat has decreased significantly since the elimination of the nursery onsite, which was providing summer nuisance flows that contributed to riparian vegetation along the main drainage.

Southwestern Willow Flycatcher and Western Yellow-billed Cuckoo

Ms. Pettigrew performed a habitat assessment in 2006, which determined that the property includes habitat with potential to support the southwestern willow flycatcher, but does not support habitat with potential to support western yellow-billed cuckoo. The survey area for southwestern willow flycatcher included the areas surveyed for the vireo. The survey was conducted by HELIX permitted biologists Mr. Howard and Ms. Pettigrew with HELIX biologists Ms. Leonard, Roger Ditrick, and Heather Haney as supervised individuals (HELIX 2006b). It should be noted that the amount of suitable habitat has decreased significantly since the elimination of the nursery onsite, which was providing summer nuisance flows that contributed to riparian vegetation along the main drainage. The limited riparian habitat remaining on site is not considered suitable for the southwestern willow flycatcher.

Fairy Shrimp

There are three species of sensitive fairy shrimp that occur in western Riverside County: Riverside fairy shrimp (*Streptocephalus woottoni*), Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*), and vernal pool fairy shrimp (*Branchinecta lynchi*). The property was surveyed for habitat (such as vernal pools or ephemeral ponds) that could support fairy shrimp. Indicators of potential fairy shrimp habitat that were searched for included basins, ruts, cracked mud, algal mats, and drift lines. No suitable habitat occurs within the study area, or the Keller Road outfall area, for these species, and no focused surveys were conducted or are required.

Riparian/Riverine Plants

The MSHCP lists 23 sensitive plant species that have potential to occur in Riparian/Riverine and Vernal Pool habitats. These species are:

- California black walnut (*Juglans californica* var. *californica*),
- Engelmann oak (*Quercus engelmannii*),
- Coulter's matilija poppy (*Romneya coulteri*),
- San Miguel savory (*Satureja chandleri*),
- spreading navarretia (*Navarretia fossalis*),
- graceful tarplant (*Holocarpha virgata* ssp. *elongata*),
- California Orcutt grass (*Orcuttia californica*),
- prostrate navarretia (*Navarretia prostrata*),
- San Diego button-celery (*Eryngium aristulatum* var. *parishii*),
- Orcutt's brodiaea (*Brodiaea orcuttii*),
- thread-leaved brodiaea (*Brodiaea filifolia*),
- Fish's milkwort (*Polygala cornuta* var. *fishiae*),
- lemon lily (*Lilium parryi*),
- San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior*),
- ocellated Humboldt lily (*L. humboldtii* ssp. *ocellatum*),
- Mojave tarplant (*Deinandra mohavensis*),
- vernal barley (*Hordeum intercedens*),

- Parish's meadowfoam (*Limnanthes gracilis* var. *parishii*),
- slender-horned spineflower (*Dodecahema leptoceras*),
- Santa Ana River woolly-star (*Eriastrum densifolium* spp. *sanctorum*),
- Brand's phacelia (*Phacelia stellaris*),
- mud nama (*Nama stenocarpum*), and
- smooth tarplant (*Centromadia pungens*).

Rare plant surveys performed for the project included surveying for Riparian/Riverine-associated plant species shown above. The wetland delineation and Riparian/Riverine habitat assessment discussed above also include searching for the aforementioned species. If these species occur, then they are required to be mapped and avoided. If avoidance is not feasible, then a Determination of Biologically Equivalent or Superior Preservation (DBESP) is required to quantify impacts and establish mitigation for the impacted species.

2.2.4 Narrow Endemic Plant Species Survey

The property and the off-site study areas are in a Narrow Endemic Plant Species Survey Area (NEPSSA) requiring a habitat assessment and surveys for NEPSSA Area 4 species: Munz's onion (*Allium munzii*), San Diego ambrosia (*Ambrosia pumila*), many-stemmed dudleya (*Dudleya multicaulis*), spreading navarretia, California Orcutt grass, and Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*). Focused rare plant surveys were conducted in May and June 2006, April and June 2008, and May 2012, in accordance with the MSHCP guidance for Area 4 of the NEPSSA. The 2006 plant surveys were conducted by biologist Kelly Volansky, who was assisted by University of California Riverside (UCR) botanist Andrew Sanders and UCR herbarium assistant Teresa Salvato, along with contracted biologist Michelle Balk. The 2008 surveys were conducted by Mr. Allen and Mr. Hogenauer. The 2012 survey was conducted by Mr. Hogenauer. The Keller Road outfall area was surveyed by Mr. Hogenauer on May 15, 2019. The property was assessed for habitat suitable for NEPSSA Area 4 species using aerial photography and field reconnaissance. The areas of suitable habitat were then thoroughly surveyed on foot.

The property was surveyed during the blooming periods of the NEPSSA target species (Table 2). The property was surveyed on May 19, 22, 24, 26, 28, and June 2, 6, 7, and 9, 2006. The 2006 survey covered the entire 973.69 acres (in addition to 326 acres no longer part of this project). Approximately 190 person-hours were spent surveying the property for rare plants in 2006. The 2008 surveys were conducted on April 16 and June 11, and focused on areas with the potential to support NEPSSA species. The 2012 survey was conducted on May 11 and focused on areas with potential to support NEPSSA species within the reduced project footprint.

Table 2 NARROW ENDEMIC PLANT SPECIES SURVEY AREA 4 PLANT SPECIES BLOOMING PERIODS		
SCIENTIFIC NAME	**COMMON NAME**	**BLOOMING PERIOD***
Allium munzii	Munz's onion	April to May
Ambrosia pumila	San Diego ambrosia	none (asexual reproduction) Survey period is June to September
Dudleya multicaulis	many-stemmed dudleya	May to June (as early as March in coastal locations)
Navarretia fossalis	spreading navarretia	May through June
Orcuttia californica	California Orcutt grass	April to June
Trichocoronis wrightii var. *wrightii*	Wright's trichocoronis	May to September

*Blooming period per the Multiple Species Habitat Conservation Plan (MSHCP).

The off-site study area was not surveyed as part of the above NEPSSA surveys as access was not granted by the landowner to conduct surveys.

2.2.5 Criteria Area Species Survey Area

The property is within a Criteria Area Species Survey Area (CASSA) requiring a habitat assessment and surveys for CASSA Area 4 species: thread-leaved brodiaea, Davidson's saltscale (*Atriplex serenana* var. *davidsonii*), Parish's brittlescale (*Atriplex parishii*), smooth tarplant, round leaved filaree (*California macrophylla*), Coulter's goldfields (*Lasthenia glabrata* spp. *coulteri*), and little mousetail (*Myosurus minimus* ssp. *apus*). Surveys for CASSA Area 4 species occurred concurrently with the surveys for the NEPSSA Area 4 Species. Focused rare plant surveys were conducted in May and June 2006, April and June 2008, and May 2012, in accordance with the MSHCP guidance for Area 4 of the CASSA. The 2006 plant surveys were conducted by Ms. Volansky, who was assisted by Mr. Sanders, Ms. Salvato, and Ms. Balk. The 2008 surveys were conducted by Mr. Allen and Mr. Hogenauer. The 2012 survey was conducted by Mr. Hogenauer. The property was assessed for habitat suitable for CASSA Area 4 species using aerial photography and field reconnaissance. The areas of suitable habitat were then thoroughly surveyed on foot.

The property was surveyed during the blooming periods of the CASSA target species (Table 3). The property was surveyed on May 19, 22, 24, 26, 28, and June 2, 6, 7, and 9, 2006. The 2006 survey covered the entire 974 acres (in addition to 326 acres no longer part of this project). Approximately 190 person-hours were spent surveying the property for rare plants in 2006. The 2008 surveys were conducted on April 16 and June 11, and focused on areas with the potential to support CASSA species. The 2012 survey was conducted on May 11 and focused on areas with potential to support CASSA species within the reduced project footprint.

Table 3
CRITERIA AREA SPECIES SURVEY AREA 4 PLANT SPECIES
BLOOMING PERIODS

SCIENTIFIC NAME	COMMON NAME	BLOOMING PERIOD*
Atriplex parishii	Parish's brittlescale	June to October
Atriplex serenana var. *davidsonii*	Davidson's saltscale	May to October
Brodiaea filifolia	thread-leaved brodiaea	March to June
Centromadia pungens	smooth tarplant	April to November
*California macrophylla (Erodium macrophyllum)***	round-leaved filaree	March to May
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	February to June
Myosurus minimus	little mousetail	April to May

*Blooming period per the MSHCP.
**Species has under gone recent taxonomic changes. Old name used in MSHCP in parenthesis.

The off-site study areas are not within a CASSA survey area.

2.2.6 Burrowing Owl Habitat Assessment and Survey

HELIX biologists Mr. Hogenauer, Zack West, and Mr. Kahancza surveyed the property for the burrowing owl in 2006 and 2008 (Table 4; HELIX 2008c). Mr. Hogenauer surveyed the property again in 2012.[1] An additional survey was completed in 2018 by Mr. Hogenauer assisted by HELIX biologists Amy Lee and Daniel Torres (HELIX 2018). The burrowing owl surveys were conducted in accordance with the County of Riverside's Burrowing Owl Survey Instructions for the MSHCP (Riverside 2006). The area survey included non-native grassland, field croplands, disturbed habitat, and areas of sage scrub with less than 30 percent ground cover. The 2012 and 2018 surveys included the area of the property that was formerly in use as a nursery, but excluded some of the previous surveyed grasslands as they were overgrown with shrubs. Transects were walked approximately 30 yards apart through potential owl habitat located on the property. A 500-foot buffer zone was visually surveyed from the edge of the subject property where owl habitat bordered the property. Biologists walked slowly and methodically, closely checking the areas that met the basic requirements of owl habitat, which include open expanses of sparsely vegetated areas (less than 30 percent canopy cover for trees and shrubs), gently rolling or level terrain, an abundance of small mammal burrows (especially those of California ground squirrel [*Spermophilus beecheyi*]), and/or fence posts, rock, or other low perching locations. All potential owl burrows were checked for signs of recent owl occupation, which include pellets/casting (e.g., regurgitated fur, bones, and insect parts), white wash (excrement), and feathers.

[1] A report for this survey was not prepared.

Table 4
BURROWING OWL SURVEY INFORMATION

SURVEY	DATE	TIME	WEATHER CONDITIONS	PERSONNEL
2018				
1	4/17/18	Start 0600	Clear, 41°F, wind 1-3 mph	Rob Hogenauer Amy Lee
		End 0830	Clear, 50°F, wind 1-3 mph	
	4/19/18	Start 1730	60% clouds, 61°F, wind 3-5 mph	Rob Hogenauer
		End 1845	50% clouds, 58°F, wind 3-5 mph	
2	4/25/18	Start 0550	10% clouds, 48°F, wind 1-3 mph	Rob Hogenauer
		End 0820	Clear, 63°F, wind 1-3 mph	Amy Lee
3	5/22/18	Start 0525	100% clouds, 52°F, wind 2-4 mph	Rob Hogenauer
		End 0740	100% clouds, 53°F, wind 2-4 mph	Daniel Torres
4	5/23/18	Start 0525	100% clouds, 54°F, wind 0-1 mph	Rob Hogenauer Daniel Torres
		End 0750	100% clouds, 58°F, wind 0-1 mph	
2012				
1	6/25/12	0550-0810	Clear, 54˚-72˚ F, wind 0-1 mph	Rob Hogenauer
	0628/12	0530-0750	Clear, 57˚-81˚ F, wind 0-1 mph	Rob Hogenauer
2	06/29/12	0545-0750	Clear, 55˚-76˚ F, wind 0-1 mph	Rob Hogenauer
	7/6/12	0530-0740	Cloudy, 58˚-66˚ F, wind 1-2 mph	Rob Hogenauer
3	7/9/12	0530-0745	Clear, 66-81°F, wind 0-1 mph	Rob Hogenauer
	7/15/12	0550-0730	Clear, 65-71°F, wind 0-1 mph	Rob Hogenauer
4	7/17/12	0545-0740	Cloudy, 57-69°F, wind 1-3 mph	Rob Hogenauer
	7/18/12	0540-0750	Cloudy, 55-71°F, wind 2-4 mph	Rob Hogenauer
2008				
1	4/24/08	0600-0830	Partly Cloudy, 48˚-58˚ F, wind 0-4 mph	Rob Hogenauer Zsolt Kahancza
2	4/24/08	0550-0820	Partly Cloudy, 60˚-74˚ F, wind 0-2 mph	Rob Hogenauer Zsolt Kahancza
3	5/5/08	0535-0750	Cloudy, 52˚-56˚ F, wind 1-4 mph	Rob Hogenauer
	5/6/08	0540-0700	Cloudy, 53˚-54˚ F, wind 1-3	
4	5/20/08	0530-0745	Partly Overcast, 62˚-66˚ F, wind 1-5 mph	Rob Hogenauer Zsolt Kahancza
2006				
Assessment	12/20/05	1135-1500	Clear	Rob Hogenauer
1	5/5/06	0550-0810	Cloudy, 54-59°F, wind 0-1 mph	Rob Hogenauer Zsolt Kahancza
	5/8/06	1730-2015	Clear, 59-71°F, wind 2-5 mph	Zack West Zsolt Kahancza
2	7/17/06	0525-0735	Partly cloudy, 70-77°F, wind 0-1 mph	Rob Hogenauer Zack West Zsolt Kahancza
	7/18/06	0650-0825	Clear, 74-84°F, wind 0-1 mph	Zack West Zsolt Kahancza

Table 4 (cont.) BURROWING OWL SURVEY INFORMATION				
SURVEY	**DATE**	**TIME**	**WEATHER CONDITIONS**	**PERSONNEL**
2006 (cont.)				
3	7/27/06	0540-0740	Cloudy, 75-81°F, wind 1-3 mph	Rob Hogenauer
	7/31/06	0545-0705	Cloudy, 71-73°F, wind 1-3 mph	Rob Hogenauer
	8/1/06	0745-0815	Overcast, 72-75°F, wind 2-4 mph	Zack West Zsolt Kahancza
4	8/4/06	0550-0730	Partly cloudy, 64-71°F, wind 0-1 mph	Rob Hogenauer
	8/7/06	0605-0710	Cloudy, 67-69°F, wind 0-1 mph	Rob Hogenauer

The Keller Road outfall area was included as part of the buffer survey area during the burrowing owl surveys. The off-site study area to the south was not included in the burrowing owl surveys as access to that area has not been granted. The off-site area has a minimal potential to support burrowing owls. The 18.5-acre study area included one acre of grassland that is adjacent to a residence and not typical habitat for burrowing owls. This grassland area resembles a residential yard and the human activity at the location, along with the small size creates a habitat that is not typically utilized by burrowing owls. The study area also includes 4.7 acres of disturbed habitat comprised of dirt roads (no burrowing owl potential) and an area adjacent to the existing McElwain Road that appears to have previously been cleared and graded and currently supports sparse shrubs and relatively dense non-native grasses and mustard. The dirt roads receive regular traffic from the resident, mountain bikes, motorized dirt bikes, and similar human traffic deterring potential use by burrowing owls. The small areas at the southern end of McElwain Road were assessed from the road using binoculars. This area appears to lack burrows, with the exception of an active squirrel burrow adjacent to the road. Debris piles and other manmade items that could be used as burrowing owl nesting locations were not observed. Burrowing owls are not expected to occur within the off-site study area. The off-site study area will be included in the pre-construction burrowing owl survey to avoid potential impacts to burrowing owls.

3.0 RESULTS

Research and survey results are reported here, with their relevance discussed in later sections of this document.

3.1 SOILS

The MSHCP lists nine sensitive soil types as occurring within the Plan Area (Dudek 2003). One of the MSHCP sensitive soils, Auld clay, occurs on the property. Approximately 4.4 acres of Auld clay are mapped on the property. This soil itself is not considered sensitive, but rather the sensitivity is related to its potential as habitat for sensitive plants. The potential rare plant habitat is addressed in the rare plant (NEPSSA and CASSA) portion of this document. Six soil types are mapped on the Murrieta Hills property. The property is primarily (70 percent) mapped as Cajalco rocky fine sandy loam. Other soils mapped on the property in approximate decreasing order of occurrence include Los Posas loam, Cajalco fine sandy loam, Honcut loam, Auld clay, and

Los Posas rocky loam. The off-site area is primarily mapped as Cajalco Rocky fine sandy loam. No clay soils are mapped on the off-site study area.

3.2 VEGETATION COMMUNITIES

A total of 12 vegetation communities, plus developed land, occur on site and within the off-site study areas (Figure 5; Table 5). These communities consist of southern willow scrub, mule fat scrub, southern cottonwood-willow riparian woodland, basin, coast live oak woodland, chaparral, Riversidean sage scrub, coastal sage scrub/chaparral ecotone, non-native grassland, field cropland, exotic (eucalyptus woodland), disturbed, and developed. There are 12.27 acres of Riparian/Riverine habitat and 964.6 acres of upland habitat on site along with 0.11 acre of Riparian/Riverine habitat and 18.5 acres of upland habitat in the off-site study areas. The Riparian/Riverine habitats mentioned above include 3.17 acres and 0.11 acre of respectively of streambed.

Table 5
EXISTING VEGETATION COMMUNITIES

CLASSIFICATION*		ON SITE ACREAGE†	OFF SITE ACREAGE†
Collapsed	**Uncollapsed**		
Riparian scrub	Southern willow scrub	1.54	-
Riparian scrub	Mule fat scrub	0.47	0.03
Riparian Woodland	Southern Cottonwood-willow Riparian Woodland	0.07	-
Woodland and forests	Coast live oak woodland	13.01	-
Chaparral	Chaparral	701.7	9.9
Coastal sage scrub	Riversidean sage scrub	66.6	1.2
Coastal sage scrub/Chaparral‡	Coastal sage scrub/Chaparral‡	32.0	-
Grassland	Non-native grassland	4.4	1.1
Agricultural land	Field cropland	96.7	-
Developed/Disturbed land	Exotic (Eucalyptus Woodland)	0.3	-
Developed/Disturbed land	Disturbed	55.3	4.7
Developed/Disturbed land	Developed	1.6	1.6
	TOTAL	**973.69**	**18.5**

*Collapsed and uncollapsed vegetation communities are terms from MSHCP Table 2-1 and are equivalent to Generalized Category and Specific Sub-Category, respectively.

†Acreage is rounded to the nearest 0.1 except for wetland and Riparian/Riverine habitat that are rounded to the nearest 0.01.

‡Coastal sage scrub/Chaparral is not an MSHCP vegetation community; however, each community that forms this ecotone has an MSHCP vegetation classification.

3.2.1 Southern Willow Scrub

Southern willow scrub consists of dense, broad-leaved, winter-deciduous stands of trees dominated by shrubby willows in association with mule fat. This habitat occurs on loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows. The herbaceous understory consists of curly dock (*Rumex crispus*), cocklebur (*Xanthium strumarium* var.

canadense), and western ragweed (*Ambrosia psilostachya*). Frequent flooding maintains this early seral community, preventing succession to a riparian woodland or forest (Holland 1986). In the absence of periodic flooding, competition between the willows will intensify as these individuals grow and resources become increasingly scarce. A small percentage of these individuals will survive and form the tree stratum, while most will die or exist as suppressed juveniles in the lower stratum.

On site, southern willow scrub is scattered among the many drainages located throughout the property. Plant species observed in the willow scrub on site include arroyo willow (*Salix lasiolepis*), Goodding's black willow (*S. gooddingii*), mule fat, salt cedar (*Tamarix ramosissima*), and curly dock.

3.2.2 Mule Fat Scrub

Mule fat scrub is a depauperate, shrubby riparian scrub community dominated by mule fat and interspersed with shrubby willows. This habitat occurs along intermittent stream channels with a fairly coarse substrate and moderate depth to the water table. Similar to southern willow scrub, this early seral community is maintained by frequent flooding, the absence of which would lead to a riparian woodland or forest (Holland 1986).

On site, mule fat scrub is scattered in a few small pockets along the drainages that occur on site. Some of the small pockets of mule fat scrub are not mapped. Plants species observed in the mule fat scrub on site include mule fat, arroyo willow, willow herb (*Epilobium* spp.), and salt cedar.

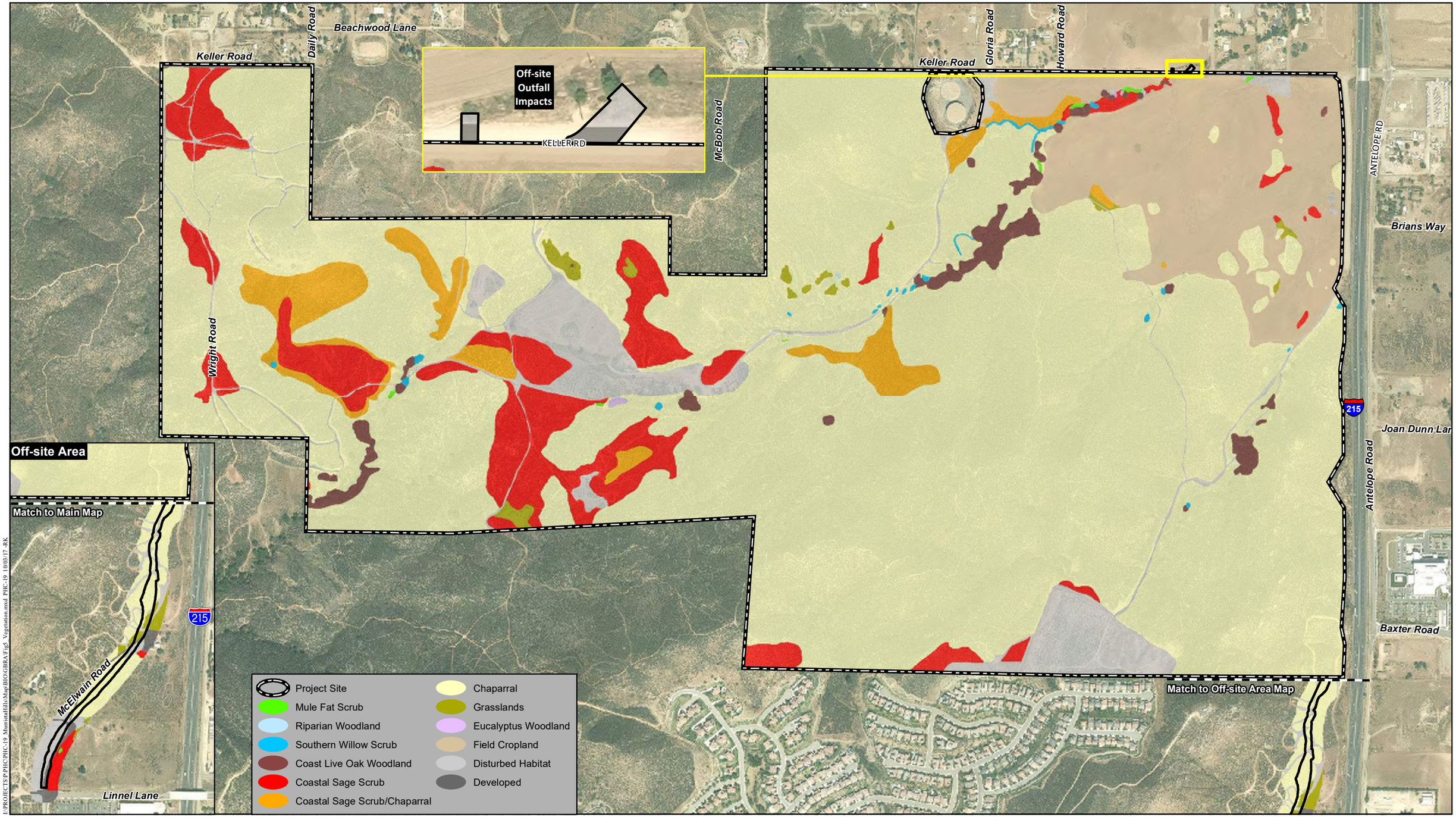
3.2.3 Southern Cottonwood-willow Riparian Woodland

Southern cottonwood-willow riparian forest is a tall, open, broad-leafed winter-deciduous riparian forest dominated by western cottonwood (*Populus fremontii*) and willows. This habitat occurs along streams. On site, there are two small patches of this habitat dominated by western cottonwood.

3.2.4 Coast Live Oak Woodland

Coast live oak woodland is an evergreen oak woodland dominated by coast live oak, which reaches 30 to 80 feet in height. In general, the shrub layer is poorly developed but may include toyon (*Heteromeles arbutifolia*), gooseberry (*Ribes* spp.), laurel sumac (*Malosma laurina*), or blue elderberry (*Sambucus nigra* ssp. *caerulea*) (Holland 1986). Coast live oak woodland lacks the diversity (cottonwood, willow, sycamore, etc.) present in riparian forest.

On site, coast live oak woodland primarily occurs near the banks of largest drainages within the Salt and Warm Springs creeks watersheds as well as adjacent upland areas. Plant species observed in this community on site include coast live oak, laurel sumac, poison oak (*Toxicodendron diversilobum*), bromes, giant wild rye (*Elymus condensatus*), and spiny redberry (*Rhamnus crocea*).



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Vegetation

MURRIETA HILLS

HELIX Environmental Planning

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Figure 5

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3.2.6 Chaparral

This habitat is represented on site in three of the chaparral subcategories (undifferentiated [mixed], chamise [*Adenostoma fasciculatum*], and red shank [*Adenostoma sparsifolium*]) shown in the MSHCP (Dudek 2003). The sub-associations are described together here as they differ only by the dominant species.

Chaparral consists of broad-leaved sclerophyll shrubs usually between one to three meters tall with occasional patches of bare soil or sage scrub, often with an accumulation of litter. Chaparral is well adapted to repeated fires as many species respond by stump sprouting. Chaparral is the dominant plant on site covering a large portion of the property. On site, chaparral is dominated by chamise with patches dominated by hoary-leaved ceanothus (*Ceanothus crassifolius*), red shank, and black sage (S*alvia mellifera*). The chamise and mixed chaparrals dominate the property, with a small patch of redshank chaparral occurring near the center of the property. Other plants found in the chaparral include (laurel sumac, blue elderberry, California buckwheat (*Eriogonum fasciculatum*), and scrub oak (*Quercus berberidifolia*).

3.2.6 Riversidean Sage Scrub

Riversidean sage scrub is a subcategory of coastal sage scrub, a dominant shrub community of California. On site, it is dominated by low-growing shrubs, primarily California buckwheat, but also includes California sagebrush (*Artemisia californica*), deerweed (*Acmispon glaber*), bromes, and oats (*Avena* spp.). The sage scrub occurs in a mosaic with chaparral. Having a large quantity of non-native grasses and forbs, disturbed Riversidean sage scrub areas occur in a mosaic with the Riversidean sage scrub areas.

Small amounts of shrub habitat occur on site that can be neither placed firmly in either the coastal sage scrub or chaparral category. These areas, called ecotone, occur as a blending border between the chaparral and sage scrub. The ecotone areas are mapped as coastal sage scrub/chaparral. The property contains small patches of sage scrub primarily around disturbed areas.

3.2.7 Coastal Sage Scrub/Chaparral Ecotone

Coastal sage scrub/Chaparral ecotone is a community that comprises species of each of these communities (described above) but does not specifically match either community. The ecotone community occurs where the two communities are adjacent to one another. This can also be a transitional community as sage scrub gradually is maturing in a chaparral habitat.

3.2.8 Non-native Grassland

Non-native grassland is a dense to sparse cover of annual grasses, often associated with numerous species of showy-flowered native annual forbs. Characteristic species include oats, red brome (*Bromus madritensis* ssp. *rubens*), ripgut (*B. diandrus*), ryegrass (*Lolium* sp.), short-pod mustard (*Hirschfeldia incana*), and other mustards (*Brassica* spp.). The non-native grassland on site occurs in small patches throughout the site in a mosaic with sage scrub and chaparral. Aerial

photography shows that the areas currently containing non-native grassland were once disturbed for agricultural purposes. The majority of the previously disturbed areas now contains sage scrub. A few small patches of grassland similar in species composition to the sage scrub occur in a mosaic with the sage scrub and are not mapped. Species on site include short-pod mustard, bromes, and oats.

3.2.9 Field Cropland

Also referred to as agriculture, field cropland is cultivated habitat that has been cleared, disked, or planted with crops. On site, cropland is limited to the disked area in the northeast portion of the site. The disked area in the northeast contains scattered patches with trees or rock outcroppings that are not disked. Trees in this area include coast live oak, Peruvian pepper (*Schinus molle*), and eucalyptus (*Eucalyptus* spp.).

3.2.10 Exotic (Eucalyptus Woodland)

Eucalyptus woodland is a non-native woodland, often planted in as a windrow, or for shade or other purposes. Due to the eucalyptus allopathic nature, this community typically has little to no understory and is composed entirely of eucalyptus trees.

3.2.12 Disturbed

Disturbed habitat is generally made up of areas that exhibit signs of recent disturbance. They usually support little vegetation; however, when there is vegetation present it consists of mostly non-native weed species. Disturbed habitat on site includes a large area on the southeast portion of the site that was cleared of vegetation circa 1990 and then cleared again and graded circa 2005. Additional disturbed habitat includes unimproved roads that cross the property, off-highway vehicle trails, areas of dumped trash, and the nursery located near the center of the property. Plant species observed in the disturbed area include non-native trees such as eucalyptus, Peruvian pepper, athel tamarisk (*Tamarix aphylla*), and olive (*Olea europaea*). The disturbed areas also contain bromes, mustards, and various other plant species similar to the non-native grassland and sage scrub understory.

3.2.13 Developed

Developed areas consist of areas that have been paved or contain other man-made structures. Developed areas on site include a water reservoir in the northeast and several small structures located near the center of the property.

3.3 JURISDICTIONAL DELINEATION

No vernal pools were observed or are expected to occur on site. The project straddles three watersheds: Cole Canyon-Murrieta Creek, Menifee Creek, and Warm Springs Creek. The project is situated at the top or very near the top of these watersheds. The off-site portion of the Study Area for McElwain Road has not yet been formally delineated. This off-site area was assessed for potential waters via binoculars, aerial photographs, and topographic maps. The off-site area

for the Keller Road outfall structure was formally delineated. Data presented regarding waters in the off-site area for McElwain Road are estimates.

3.3.1 Federal Jurisdiction

Areas under USACE jurisdiction within the project area consist of a total of 2.15 acres and consist entirely of non-wetland WUS (Figure 6; Table 6). The original jurisdictional delineation report included more jurisdictional habitat due to the original property size being much larger and a now abandoned plant nursery that contributed significant runoff into the drainages. The current numbers reflect the reduced property size. A small amount of non-wetland WUS is anticipated to occur in the southern off-site study area. The drainages in the off-site areas are estimated to total 0.08 acre and are included in the calculations presented here. This includes the less than 0.01 acre from the Keller Road outfall structure.

Table 6
WATERS OF THE U.S.

JURISDICTIONAL AREAS	AREA (acres)	LENGTH[1] (feet)
Non-Wetland		
Streambed-on site	2.13	49,875
Streambed-off site	0.02	500
TOTAL	**2.15**	**50,375**

[1] Length of drainages provided for overall drainage length. If two or more habitats exist alongside each other, length is only provided by one of the habitats.

3.3.2 State Jurisdiction

Areas under CDFW jurisdiction within the project area total 12.31 acres, including 1.54 acres of southern willow scrub, 0.47 acre of mule fat scrub, 7.02 acres of coast live oak woodland, 0.07 acre of riparian woodland, and 3.21 acres of streambed. All of the CDFW areas are considered Riparian/Riverine (Figure 7, Table 7). Areas that were identified as swales are not considered CDFW jurisdictional or Riparian/Riverine because they lacked any evidence of flow. The original jurisdictional delineation report included more jurisdictional habitat due to the original property size being much larger and a now abandoned plant nursery that contributed significant runoff into the drainages. The current numbers are for the reduced property size. Additionally, a small amount of streambed is expected to occur in the southern off-site study area. The drainages in the off-site areas are estimated to total 0.04 acre and are included in the calculations presented here. This includes the less than 0.01 acre from the Keller Road outfall structure.

Table 7
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)
JURISDICTIONAL HABITATS

HABITAT	AREA (acres)	LENGTH[1] (feet)
Coast Live Oak Woodland	7.02	4,242
Mule Fat Scrub	0.47	474
Riparian Woodland	0.07	56
Southern Willow Scrub	1.54	2,076
Streambed	3.21	43,546
TOTAL	**12.31**	**50,394**

[1] Length of drainages provided for overall drainage length. When two or more habitats exist alongside each other, the linear length is divided among the habitats.

3.4 RIPARIAN/RIVERINE AND VERNAL POOL HABITAT ASSESSMENT

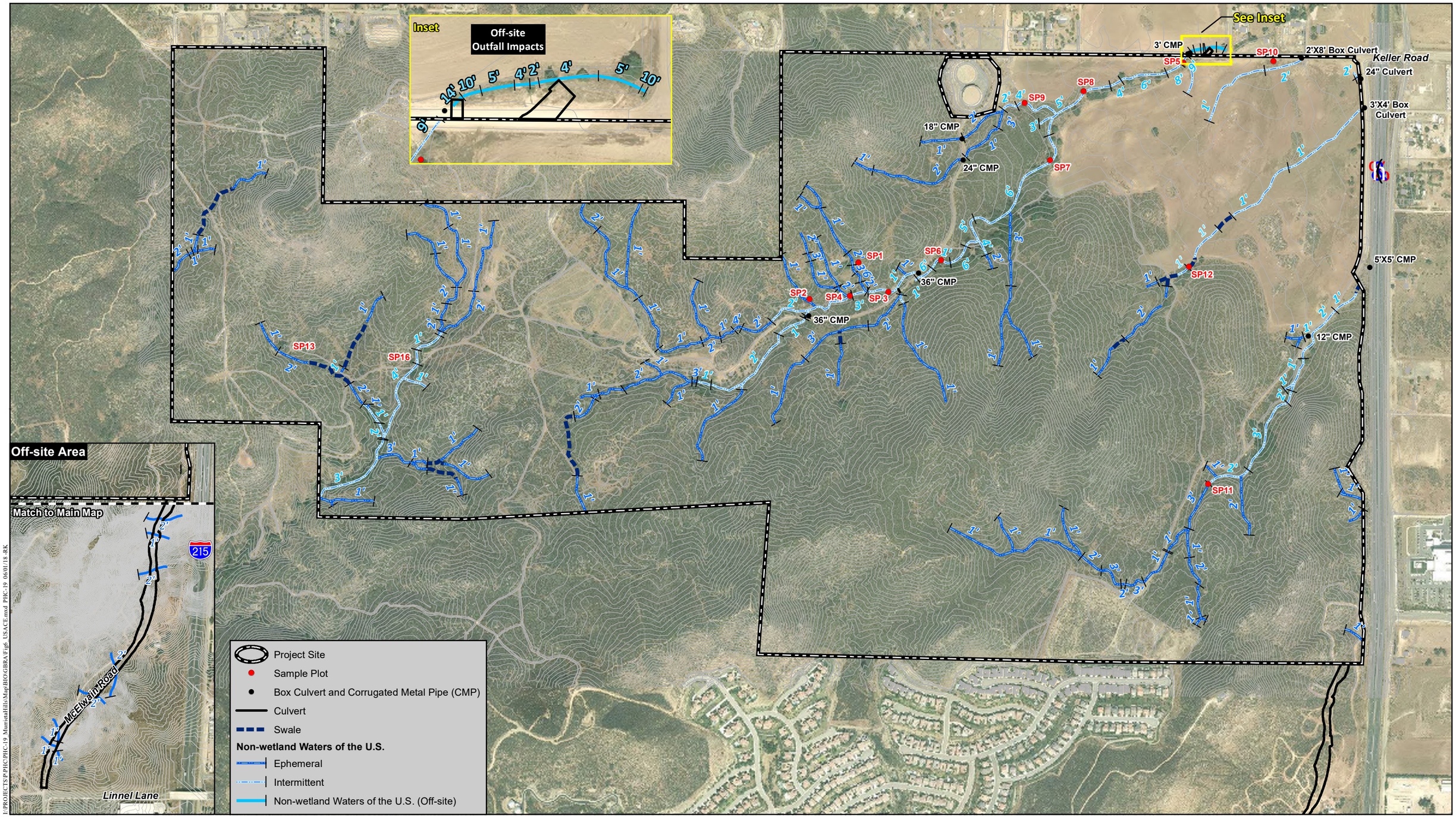
The identification of Riparian/Riverine habitat is based on potential for the habitat to support, or be a tributary to habitat that supports, Riparian/Riverine Covered Species, which are identified in MSHCP Section 6.1.2.

As noted above, the Riparian/Riverine resources are the same at the CDFW jurisdictional areas. The Riparian/Riverine habitat on the property totals 12.38 acres, including 1.54 acres of southern willow scrub, 0.47 acre of mule fat scrub, 0.07 acre of southern coast live oak riparian woodland, 7.02 acres of coast live oak woodland, and 3.21 acres of streambed (Table 7, Figure 7). As stated above in the jurisdictional delineation discussion the off-site area was based on an assessment via binoculars, aerial photographs, and topographic maps. It is anticipated that a small amount of riverine habitat (estimated at 0.04 acre of streambed) occurs within the southern off-site study area.

3.4.1 Birds

The least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo are found in riparian habitats, such as southern willow scrub, cottonwood forest, mule fat scrub, sycamore alluvial woodland, and arroyo willow riparian forest, that typically feature dense cover. A portion of the riparian habitat on site was determined to have potential to support least Bell's vireo (Figure 8) and southwestern willow flycatcher. Habitat for least Bell's vireo, southwestern willow flycatcher and western yellow-billed cuckoo does not occur within the off-site study areas. The habitat assessment conducted in 2006 concluded that habitat with potential to support least Bell's vireo and southwestern willow flycatcher occurs on the property. Western yellow-billed cuckoo habitat does not occur on the property. Protocol least Bell's vireo and southwestern willow flycatcher surveys were conducted in 2006, and the least Bell's vireo surveys were repeated in 2008 and 2012. All surveys were negative for the presence of least Bell's vireo and southwestern willow flycatcher.

The southwestern willow flycatcher is restricted to dense riparian woodlands along streams and rivers with mature, dense stands of willows, cottonwoods (*Populus* spp.), or smaller spring-fed



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Waters of the U.S.

MURRIETA HILLS

HELIX Environmental Planning

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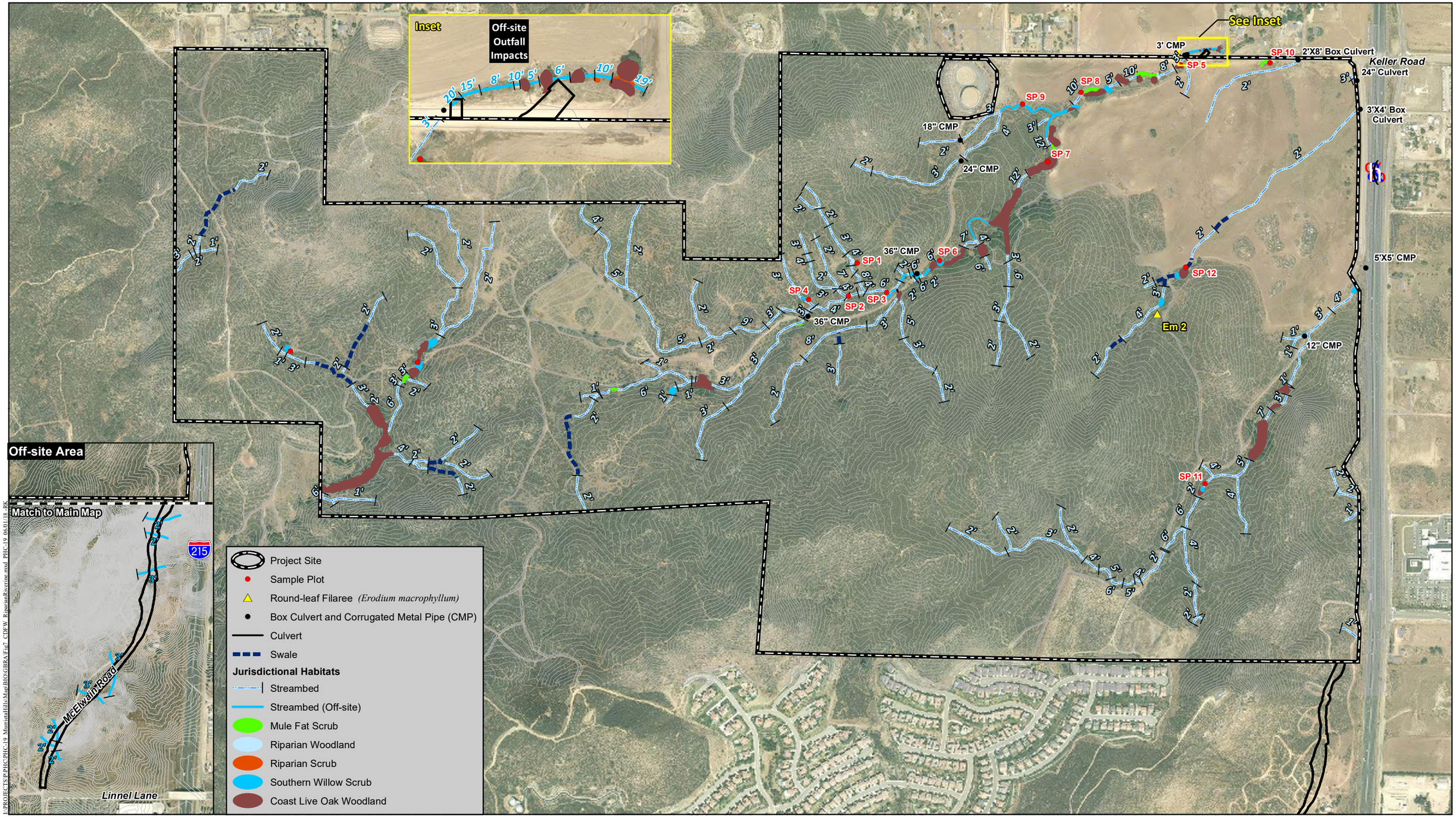
Figure 6



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Riparian/Riverine and CASSA Plant Location Map

MURRIETA HILLS

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Figure 7

Off-site Outfall Impacts

KELLER RD

Keller Road

ANTELOPE RD

215

Off-site Area

Match to Main Map

McElwain Road

Linnel Lane

Match to Off-site Area Map

Project Site

Potential Least Bell's Vireo Habitat

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Potential Least Bell's Vireo Habitat

MURRIETA HILLS

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Figure 8

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or boggy areas with willows or alders (*Alnus* spp.). It breeds in relatively dense riparian habitats. The study area has riparian woodland that has low potential for southwestern willow flycatcher. The southern cottonwood-willow riparian forest that has the most potential to support southwestern willow flycatcher is being avoided. The project does propose impacts to adjacent riparian habitat that has minimal potential to support this species. Surveys were conducted for southwestern willow flycatcher in 2006 with negative results. The riparian habitat has been further reduced on the site as a result of the removal of the nursery, which contributed nuisance flows that resulted in more expansive riparian habitat. The site no longer supports even marginal habitat for this species. Southwestern willow flycatchers were not observed during the least Bell's vireo surveys conducted on the property. Southwestern willow flycatcher is not expected to occur on the property.

Both the bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*) occur primarily in and adjacent to open water habitats, with the falcon possibly occurring in riparian areas. No suitable habitat occurs on site for the bald eagle. Riparian habitats that may provide foraging habitat for falcon occur on site, but potential nesting habitat for the falcon does not occur.

3.4.2 Invertebrates

Vernal pool fairy shrimp occurs throughout the Central Valley and in several disjunct populations in Riverside County. This species exists in vernal pools and other ephemeral basins often located in patches of grassland and agriculture interspersed in Diegan coastal sage scrub and chaparral. Riverside fairy shrimp occurs in Riverside, Orange, and San Diego counties, as well as in northern Baja California, Mexico (Baja). This species is typically found in deeper vernal pools and other ephemeral basins that hold water for long periods of time (30 or more days). Santa Rosa Plateau fairy shrimp are limited to the Santa Rosa Plateau. No vernal pools or ephemeral basins occur on site. The site does include a 4.4 acre patch of clay soils located on the south-southeast edge of the agricultural field. The clay soils have been disturbed from years of discing and dry farming. The clay soils area, along with the rest of the site, does not include vernal pools, ephemeral basins, or similar habitat that could support fairy shrimp. Due to a lack of habitat, none of the sensitive fairy shrimp species is expected to occur. No fairy shrimp surveys are required as fairy shrimp habitat does not occur on the property, within the Keller Road outfall area, or within the off-site study area.

3.4.3 Fish

The Santa Ana sucker (*Catostomus santaanae*) is restricted to the Santa Ana River watershed with year-round flows. The streams on the property lack surface flow for most of the year. This species is not expected to occur on site or within the off-site study areas.

3.4.4 Amphibians

No appropriate habitat for the three amphibian species (arroyo toad [*Bufo californicus*], mountain yellow-legged frog [*Rana muscosa*], or California red-legged frog [*Rana aurora draytonii*]) listed under MSHCP 6.1.2 occurs on site, and none of these species has any potential

to occur on site or in the off-site study areas. This property lies outside of the MSHCP arroyo toad survey area and no surveys are required.

3.4.5 Riparian/Riverine Plant Species

Twenty-three plant species are identified in the MSHCP as potentially occurring in Riparian/Riverine and Vernal Pool habitats. None of the 23 species was observed on the property, or in the Keller Road outfall area, during the Riparian/Riverine and Vernal pool habitat assessment and rare plant surveys. What species that were observed are provided in Appendix A.

Many oak trees were observed on site but none were identified as Engelmann oak. Shrub and tree species such as California black walnut and Coulter's matilija poppy would have been readily identifiable during various project surveys, including the rare plant surveys, but were not found on site. A number of the species, including California Orcutt grass, spreading navarretia, thread-leaved brodiaea, graceful tarplant, prostrate navarretia, San Diego button-celery, Orcutt's brodiaea, Fish's milkwort, lemon lily, San Jacinto Valley crownscale, Mojave tarplant, Brand's phacelia, Santa Ana River woolly-star, vernal barley, and Parish's meadowfoam, occur in habitats that do not occur on the property (e.g., vernal pools) or have distributions well outside of the property. The remaining species have a distribution that includes the property or occur in habitats found on the property and are discussed in greater detail below.

Mud nama is restricted to muddy embankments of marshes and swamps and within lake margins and riverbanks (CNPS 2015). Three populations are known from Riverside County, with two occurring along the San Jacinto River (Dudek 2003). This species was not observed during the rare plant or other surveys conducted on the property and is presumed to be absent from the property.

San Miguel savory is associated with rocky and metavolcanic substrates in coastal sage scrub, chaparral, riparian woodland, and grassland habitats. This perennial shrub is visible year-round and was not observed during the intensive 2006 rare plant survey or during any of the subsequent surveys conducted on the property.

Smooth tarplant is found in southwestern California and northwestern Baja, and occurs in San Bernardino, Riverside, and San Diego counties. This species occurs in open spaces within a variety of habitats, including alkali scrub and playas, riparian woodland, watercourses, and grasslands with alkaline affinities (Dudek 2003; CNPS 2015). This species was not observed during the rare plant or other surveys conducted on the property and is presumed to be absent from the property.

Ocellated Humboldt lily is associated with riparian corridors in coniferous forest and chaparral habitats. Within Western Riverside County, ocellated Humboldt lily is restricted to canyons along the east slope of the Santa Ana Mountains and the north slope of the Palomar Mountains. The riparian habitat on site is not associated with coniferous forest. Some chaparral does occur adjacent to the riparian habitat on site. This species was not observed during the rare plant or other surveys conducted on the property and is presumed to be absent from the property.

Slender-horned spineflower is typically found in mature alluvial scrub with sandy soils but is also found in rocky soils and open chamise chaparral. Ideal habitat is thought to be benches or terraces that receive overbank flow every 50 to 100 years. Potential habitat for this species occurs in some of the chaparral that is adjacent to the large drainages on the property. This species was not observed during the rare plant or other surveys conducted on the property and is presumed to be absent from the property.

3.5 MULTIPLE SPECIES HABITAT CONSERVATION PLAN FOCUSED SURVEYS

3.5.1 Narrow Endemic Plant Species

Rare plant surveys conducted in 2006, 2008, and 2012 were all negative for NEPSSA plant species. No NEPSSA plant species occur on the property. An analysis of each NEPSSA species is provided below.

- Munz's onion: Munz's onion is restricted to clay and cobbly clay soils associated with Altamont, Auld, Bosanko, Claypit, and Porterville series soils. Munz's onion occurs in scattered locations at Estelle Mountain, Gavilan Plateau, hills of Lake Elsinore to Paloma Valley, and Skunk Hollow/Lake Skinner area. A small area of Altamont clay soils were mapped on site in the northwestern corner of the northern parcel, and clay soil inclusions were noted during project surveys. Focused surveys were negative for this species.

- San Diego ambrosia: San Diego ambrosia is associated with river terraces, vernal pools, and alkali playas on Garretson gravelly fine sandy loams and Las Posas loams in close proximity to Willows series soils. The only known extant populations of this species in Riverside are in the Alberhill area of Lake Elsinore and Skunk Hollow. No Garretson gravelly fine sandy loams or Las Posas loams occur on site, although a small area of Garretson gravelly very fine sand loam does occur in the southwestern portion of the site. This species was surveyed for but not observed. The potential for this species to occur on site is very remote.

- Many-stemmed dudleya: Many-stemmed dudleya is restricted to clay and cobbly clay soils associated with Altamont, Auld, Bosanko, Claypit, and Porterville series soils. This species occurs in scattered locations primarily in the Temescal Canyon, Gavilan Plateau, and Alberhill areas and the Santa Ana Mountains. A small area of Altamont clay soils were mapped on the site, and clay soil inclusions were noted during project surveys. Focused surveys were negative for this species.

- Spreading navarretia: Primary habitat for spreading navarretia is vernal pools/depressions and ditches in areas that once supported vernal pools. Riverside County supports the largest remaining populations, which are associated with the largest areas of available habitat in the U.S. The closest known population is along the San Jacinto River just west of I-215. No vernal pools occur on site or are known from the vicinity. There is no potential for this species to occur on site.

- California Orcutt grass: California orcutt grass is restricted to vernal pools, which do not occur on site. It is known from the Santa Rosa Plateau, Skunk Hollow, and Upper Salt Creek in Riverside County and also occurs in San Diego County. There is no potential for this species to occur within the project boundaries.

- Wright's trichocoronis: According to the MSHCP reference document, the middle section of the San Jacinto River and Salt Creek in the Hemet area represent the two core areas for Wright's trichocoronis. This species is limited to alkali soils, which are not present on site.

Based on the surveys the project conducted, the project site does not contain suitable habitat for any of these Narrow Endemic plant species, and none occurred on the site or within the Keller Road outfall area.

3.5.2 Burrowing Owl Habitat Assessment and Survey

Burrowing owl surveys conducted in 2006, 2008, 2012 and 2018 were all negative for burrowing owl. No sign of current or past use by burrowing owl was observed on the property, or within the Keller Road outfall area.

3.5.3 Criteria Area Species

Rare plant surveys for CASSA plant species concluded that two individual round-leaved filaree occur on site. These two individuals were observed during the initial rare plant survey in 2006. The proposed project impact area was surveyed 2008 and 2012 for CASSA plant species and none were observed on site. The location of the original sighting of the round-leafed filaree was given extra attention during the 2008 and 2012 surveys.

An analysis of each CASSA species is provided below.

- Davidson's saltscale: Davidson's saltscale is known to occur in cismontane southwestern California from Ventura (Ojai), western Orange (Seal Beach, San Joaquin Freshwater Marsh, Newport Backbay), and in western Riverside counties (Dudek 2003). In Riverside County, it is found in the Domino-Traver-Willows soils series in association with alkali vernal pools, annual grassland, playa, and scrub components of alkali vernal plains, none of which occurs on site.

- Parish's brittlescale: Known from San Diego and Riverside counties as well as Baja California, Mexico (Baja), Parish's brittlescale occurs in association with vernal pools, alkali playas, and chenopod scrub, none of which occurs on site.

- Thread-leaved brodiaea: Twelve populations of thread-leaved brodiaea (*Brodiaea filifolia*) are known from Riverside County, with the San Jacinto River and Santa Rosa Plateau areas containing core populations. This species also occurs in San Diego County and is restricted to clay lens soils in annual grasslands and vernal pools. No thread-leaved brodiaea was observed during focused surveys of the site.

- Smooth Tarplant: Smooth tarplant is found in southwestern California and northwestern Baja California, Mexico (Baja) and occurs in San Bernardino, Riverside, and San Diego counties. This species occurs in a variety of habitats, including alkali scrub and playas, riparian woodland, watercourses, and grasslands with alkaline affinities (Dudek 2003; CNPS 2007). No alkali soils are present on site.

- Coulter's Goldfields Three core populations of Coulter's goldfields are known from Riverside County with the San Jacinto Wildlife Area and southern shores of Mystic Lake supporting the largest remaining population throughout its range. The other two core areas occur along the middle segment of the San Jacinto River and alkali flats between Alberhill and Lake Elsinore. This species also occurs in San Luis Obispo, Santa Barbara, Ventura, Los Angeles and San Diego counties and Baja in marshes, swamps, playas, and vernal pools, none of which occurs on site.

- Little Mousetail: Little mousetail occurs in scattered locations from Orange and San Bernardino counties south to coastal San Diego County from sea level to 1,500 meters elevation. This species occurs in association with vernal pools and within alkali vernal pools and annual grassland components of alkali vernal plains. No alkali soils are present on site.

Based on the surveys the project conducted, the project site does not contain suitable habitat for any of these Criteria Area plant species, except for the round-leaved filaree.

3.6 OTHER SENSITIVE SPECIES

A six-quadrangle (Lake Elsinore, Wildomar, Romoland, Murrieta, Winchester and Bachelor Mountain) search of the CNDDB was conducted along with an in-house database for sensitive plants and animals that have potential to occur in the project vicinity (Table 8) that were not addressed through the MSHCP surveys noted above.

3.6.1 Plants

There are 31 sensitive plant species, in addition to the aforementioned species, none of which are listed at state or federal level, which were determined to have potential to occur in the project vicinity (Table 8). Five of the sensitive (non-listed) plant species occur within the study area (Figure 9): Parry's spineflower (*Chorizanthe parryi* var. *parryi*), long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*), Palmer's grapplinghook (*Harpagonella palmeri*), paniculate tarplant (*Deinandra paniculata*), and Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*). Three of the sensitive species are widespread on the property and were observed primarily in sage scrub or sage scrub/chaparral ecotone habitats.

Approximately 4,536 individual Parry's spineflower, a CNPS list 1B.1 sensitive plant, occur on the property. The plants are scattered throughout the property, with the majority (80 percent) occurring on the western portion of the property (Figure 9).

Approximately 26,400 individual long-spined spineflower, a CNPS list 1B.2 sensitive plant, occur on the property. The plants are primarily scattered throughout the central and western portions of the property (Figure 9).

Approximately 745 individual Palmer's grapplinghook, a CNPS list 4.2 sensitive plant, occur on the property. The plants are scattered and primarily occur in the west and central portions of the property.

Approximately 50 individual paniculate tarplant, a CNPS list 4.2 sensitive plant, were observed in a disturbed grassy area adjacent to the disturbed habitat west of the nursery in 2006. During the 2008 surveys, less than a dozen paniculate tarplant were observed in the same area and were mixed with a much larger population of fasciculate tarplant (*Deinandra fasciculata*).

Approximately 100 individual Robinson's peppergrass, a CNPS list 4.3 sensitive plant, were observed in the sage scrub/chaparral ecotone habitat located along the west side of the drainage located west of the nursery. This population was searched for during the 2008 rare plants surveys and was not observed.

Table 8
STATUS OF MSHCP, LISTED, AND SENSITIVE SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Plants				
Bottle liverwort (*Sphaerocarpos drewei*)	Not covered	--/-- CNPS List 1B.1	Openings in chaparral, and coastal sage scrub.	Not expected. Not observed during rare plant survey.
Campbell's liverwort (*Geothallus tuberosus*)	Not covered	--/-- CNPS List 1B.1	Mesic soil, in wetlands, vernal pools, grassland, chaparral and coastal scrub.	Not expected. Not observed during rare plant survey. Limited habitat occurs on site.
Chaparral nolina (*Nolina cismontana*)	Not covered	--/-- CNPS List 1B.1	Chaparral and coastal scrub.	Not expected. Not observed during rare plant survey. Though habitat present, species is conspicuous and would have been seen if present.

Keller Road

Cpl 75
Cpp 1680

Cpl 25
Cpp 70
Hp 40

Hp 4
Hp 5

Cpl 10,000
Cpp 30

Cpl 500

Lv 200

Cpl 7
Cpp 350
Dp 50

Cpl 8
Cpp 1,000

Lv 100

Cpl 150

Cpl 4

Cpl 50

Cpp 60

Cpl 500+
Cpp 500+
Hp 160

Cpp 30

Cpl 4

Cpl 450
Cpp 30
Hp 15

Cpl 80

Cpl 7,000
Hp 200

Cpl 4,000
Cpp 75
Hp 70

Cpl

Cpp

Cpl 3,500

Cpl 6

Cpp 15

Hp

Em 2

Cpp 250

Cpp 140

Cpp

Cpp

Cpp

Cpp

Cpl 10
Cpp 150

Cpl 2
Hp 10

Off-site Area

Match to Main Map

215

McElwain Road

Linnel Lane

I:\PROJECTS\P-PHC\PHC-19 MurrietaHills\Map\BIO\GBRA\Fig9 Plants Impacts mxd PHC-19 06/01/18 -RK

Project Site

Extent of Rare Plants

Pie Chart Representing Percentage of Rare Plant Species in Grouping

CASSA Species

Em Round-leaf Filaree *(Erodium macrophyllum)*

MSHCP Covered Species

Cpl Long-spined Spineflower *(Chorizanthe polygonoides longispina)*

Cpp Parry's Spineflower *(Chroizanthe parryi parryi)*

Hp Palmer's Grapplinghook *(Harpagonella palmeri)*

Species Not Covered by MSHCP

Dp Paniculate Tarplant *(Deinandra paniculata)*

Lv Robinson's Pepper Grass *(Lepidium virginicum* var. *robinsonii)*

Avoidance Area

Fuel Modification Zone 1

Fuel Modification Zone 2

Fuel Modification Zone 3

Oak Fuel Modification Zone

Greer Ranch Fuel Modification Area

HELIX Environmental Planning

N

0 800 Feet

Rare Plant Impacts

MURRIETTA HILLS

Figure 9

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Table 8 (cont.)
STATUS OF MSHCP, LISTED, AND SENSITIVE SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Plants (cont.)				
Chaparral sand verbena (*Abronia villosa aurita*)	Not covered	--/-- CNPS List 1B.1	Sandy soils, requires bare ground, not tolerant of weeds.	Not expected. Not observed during rare plant survey. Though appropriate habitat on site, species is conspicuous and would have been seen if present.
Jaeger's milk vetch (*Astragalus pachypus* var. *jaegeri*)	MSHCP Covered	--/-- CNPS List 1B.1	Sandy soils, chaparral, woodland, scrub, grassland.	Not expected. Not observed during rare plant survey.
Mesa horkelia (*Horkelia cuneata* ssp. *puberula*)	Not covered	--/-- CNPS List 1B.1	Chaparral, woodland, and scrub, sandy or gravelly.	Low. Not observed during rare plant survey. Habitat is present on site.
Parry's spineflower (*Chorizanthe parryi* var. *parryi*)	MSHCP Covered (once 10 distinct populations are conserved)	--/-- CNPS List 1B.1	Openings in chaparral and sage scrub, sandy, or rocky soil.	**Present** and widespread on site. Total population approximately 4,356 individuals on site.
Rainbow manzanita (*Arctostaphylos rainbowensis*)	MSHCP Covered (once 10 distinct populations are conserved)	--/-- CNPS List 1B.1	Chaparral.	Not expected. Not observed on site, though species conspicuous year-round.
Tecate cypress (*Hesperocyparis forbesii*)	Not covered	--/-- CNPS List 1B.1	Coniferous forest often associated with chaparral, north facing slopes and clay or gabbro soils.	Not expected. Not observed on site and species is conspicuous year-round.
Felt-leaved monardella (*Monardella hypoleuca* spp. *lanata*)	Not covered	--/-- CNPS List 1B.2	Chaparral and woodland.	Low. Not observed during rare plant survey. Habitat is present on site.

Table 8 (cont.)
STATUS OF MSHCP, LISTED, AND SENSITIVE SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Plants (cont.)				
Gander's ragwort (*Senecio ganderi*)	Not covered	--/SR CNPS List 1B.2	Chaparral, burn and gabbroic outcrops.	Not expected. Not observed during rare plant survey.
Hammitt's clay-cress (*Sibaropsis hammittii*)	MSHCP Covered	--/-- CNPS List 1B.2	Mesic sites in grassland often surrounded by chaparral.	Not expected. Not observed during rare plant surveys. Limited habitat occurs on site.
Intermediate mariposa lily (*Calochortus weedii* var. *intermedius*)	MSHCP Covered	--/-- CNPS List 1B.2	Rocky, chaparral, scrub, grassland.	Low. Not observed during rare plant survey. Habitat present on site.
Long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*)	MSHCP Covered	--/-- CNPS List 1B.2	Chaparral, sage scrub, grassland, often in clay soils.	**Present** in large numbers; multiple populations on site. One population estimated at 10,000 individuals, with a total of approximately 26,400 individuals on site.
Parry's tetracoccus (*Tetracoccus dioicus*)	Not covered	--/-- CNPS List 1B.2	Chaparral and coastal scrub.	Low. Not observed during rare plant survey. Potential habitat occurs on site.
San Bernardino aster (*Symphyotrichum defoliatum*)	Not covered	--/-- CNPS List 1B.2	Vernal mesic grassland, seeps, meadows, marshes, and swamps	Not expected. Not observed during rare plant surveys. Limited potential habitat occurs on site.
Santa Lucia dwarf rush (*Juncus luciensis*)	Not covered	--/-- CNPS List 1B.2	Vernal pools, meadows, streamsides	Not expected. Not observed during rare plant surveys. No vernal pool habitat on site.

Table 8 (cont.)
STATUS OF MSHCP, LISTED, AND SENSITIVE SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Plants (cont.)				
Southern mountains skullcap (*Scutellaria bolanderi* ssp. *austromontana*)	Not covered	--/-- CNPS List 1B.2	Woodland, chaparral, mesic.	Not expected. Not observed during rare plant survey. Typically occurs at 1,800 feet above mean sea level or higher.
Nevin's barberry (*Berberis nevinii*)	CASSA	--/-- CNPS List 1B.2	Chaparral, woodland, scrub, riparian scrub, sandy or gravelly soil.	Not expected. Not observed on site during rare plant survey. Species visible year-round.
Sticky-leafed dudleya (*Dudleya viscida*)	FS	--/-- CNPS List 1B.2	Chaparral, scrub, coastal bluffs, rocky.	Low to not expected. Not observed during rare plant survey. Habitat does occur on site. Property not on Forest Service land.
Wiggins' cryptantha (*Cryptantha wigginsii*)	Not covered	--/-- CNPS List 1B.2	Coastal scrub on clay soils.	Not expected. Not observed during rare plant survey. Limited amount of clay soil on site.
Intermediate monardella (*Monardella hypoleuca* ssp. *intermedia*)	Not covered	--/-- CNPS List 1B.3	Chaparral, woodland, lower coniferous forest often on steep slopes.	Not expected. Not observed during rare plant survey.
Ramona horkelia (*Horkelia truncata*)	Not covered	--/-- CNPS List 1B.3	Clay, woodland and chaparral.	Low to not expected. Not observed during rare plant survey. Small amount of suitable habitat on site.
Salt spring checkerbloom (*Sidalcea neomexicana*)	Not covered	--/-- CNPS List 2.2	Alkaline mesic soils, chaparral, coastal and desert scrub, playas.	Not expected. Not observed during rare plant survey.

Table 8 (cont.) STATUS OF MSHCP, LISTED, AND SENSITIVE SPECIES				
SPECIES	**MSHCP DESIGNATION***	**SENSITIVITY STATUS***	**HABITAT**	**STATUS ON SITE**
Plants (cont.)				
White rabbit tobacco (*Pseudognaphalium leucocephalum*)	Not covered	--/-- CNPS List 2B.2	Riparian woodland, coastal scrub, chaparral with sandy gravelly soils.	Not expected. Not observed during rare plant survey.
California ayenia (*Ayenia compacta*)	Not covered	--/-- CNPS List 2B.3	Desert scrub	Not expected. Not observed during rare plant survey. No habitat on site.
Palmer's grapplinghook (*Harpagonella palmeri*)	MSHCP Covered	--/-- CNPS List 4.2	Clay soil, chaparral, sage scrub, and grassland.	**Present.** Several populations totaling approximately 745 individuals in scattered locations on site.
Paniculate tarplant (*Deinandra paniculata*)	Not covered	--/-- CNPS List 4.2	Scrub and grassland, vernally mesic.	**Present.** One population of 50 individuals observed on site west of the nursery.
Payson's jewel-flower (*Caulanthus simulans*)	MSHCP Covered	--/-- CNPS List 4.2	Chaparral and coastal scrub in disturbed or frequent burn areas with rocky slopes.	Not expected. Not observed during rare plant survey.
Plummer's mariposa lily (*Calochortus plummerae*)	MSHCP Covered	--/-- CNPS List 4.2	Coastal scrub, chaparral, grassland, and woodland on granitic or alluvial soil.	Not expected. Not observed during rare plant surveys.

Table 8 (cont.) STATUS OF MSHCP, LISTED, AND SENSITIVE SPECIES				
SPECIES	**MSHCP DESIGNATION***	**SENSITIVITY STATUS***	**HABITAT**	**STATUS ON SITE**
Plants (cont.)				
Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*)	Not covered	--/-- CNPS List 4.3	Openings in chaparral and sage scrub, typically dry sites.	**Present.** One population of 100 individuals observed west of the nursery.

*Refer to Appendix C for a listing and explanation of status, sensitivity, and MSHCP codes.

3.6.2 Animals

There are 40 sensitive animals historically known to occur in the vicinity of the study area beyond those addressed through the MSHCP above, three of which are listed at the state or federal level (Table 9). The animal species that were observed are provided in Appendix B. Seven of the 40 species were observed in the study area, none of which is a listed species. The coastal California gnatcatcher (*Polioptila californica californica*), federally listed as threatened and a California state species of concern, was observed on the site. San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), Cooper's hawk (*Accipiter cooperii*), and red-diamond rattlesnake (*Crotalus ruber*) are California state species of concern, and were observed in the study area. The unlisted species, white-tailed kite (*Elanus leucurus*), a CDFW fully protected species, and California horned lark (*Eremophila alpestris actia*), a CDFW watch list species, are present in the study area. All of these species are fully covered under the MSHCP and require no mitigation other than compliance with the MSHCP. Of the remaining 33 species, there are two species that are listed at the federal and/or state level: Stephens' kangaroo rat (*Dipodomys stephensi*) and Quino checkerspot butterfly (*Euphydryas editha quino*). Both are federally listed as endangered, with the Stephens' kangaroo rat also being state listed as threatened and the Quino checkerspot butterfly being a California state species of concern. Both of these species are covered species under the MSHCP. Compliance with the MSHCP, including payment of associated fees, mitigates potential impacts to Stephens' kangaroo rat and Quino checkerspot butterfly.

Coastal California gnatcatchers were incidentally observed during the burrowing owl, rare plant, and least Bell's vireo surveys. The coastal California gnatcatchers observed were observed moving through the edges of the chaparral that border the field cropland in the northeastern portion of the property. The chaparral on the edge of the field cropland includes a high percentage of sage scrub species.

Table 9
STATUS OF MSHCP, LISTED, AND SENSITIVE ANIMAL SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Invertebrates				
Quino checkerspot butterfly (*Euphydryas editha quino*)	MSHCP Covered, Planning Species	FE/CSC	Open areas, sparse vegetation, flowers. Host plants include *Plantago* spp., *Antirrhinum coulterianum*, *Cordylanthus rigidus*.	Moderate. Species known to occur in area. Host plants and nectar sources found on property.
Amphibians				
Western spadefoot (*Scaphiopus hammondii*)	MSHCP Covered	--/CSC	Grassland, sage scrub, or occasionally chaparral. Standing water, puddles, vernal pools, needed for reproduction.	Low. Limited habitat on site.
Reptiles				
Coast horned lizard (*Phrynosoma coronatum blainvillei*)	MSHCP Covered	--/CSC	Grassland, scrub, chaparral, woodland.	High. Species observed on nearby sites. Habitat present on site.
Coast patch-nosed snake (*Salvadora hexalepis virgultea*)	Not covered	--/CSC	Coastal and desert scrub, chaparral, washes. A generalist.	Moderate. Habitat for species occurs on site.
Coast range newt (*Taricha torosa torosa*)	Not covered	--/CSC	Grassland, woodland associated with ponds, slow-moving streams.	Low. Some habitat occurs on site, but species uncommon in area.
Orange-throated whiptail (*Cnemidophorus hyperythrus*)	MSHCP Covered	--/CSC	Chaparral, sage scrub, grassland, woodland, riparian areas.	High. Property contains appropriate habitat.

Table 9 (cont.)
STATUS OF MSHCP, LISTED, AND SENSITIVE ANIMAL SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Reptiles (cont.)				
Red-diamond rattlesnake (*Crotalus ruber*)	MSHCP Covered	--/CSC	Heavy brush, boulders, can use a variety of habitats. Prey density a determining factor.	**Present.** Habitat occurs on site, and species observed.
Two-striped garter snake (*Thamnophis hammondii*)	Not covered	--/CSC	Stream course with adjacent dense vegetation.	Moderate. Property contains preferred habitat.
Western pond turtle (*Clemmys marmorata pallida*)	MSHCP Covered, Planning Species	--/CSC	Slow-moving streams, ponds, reservoirs, other water bodies deeper than 6 feet with logs or other submerged cover.	Low. No deep pools on site. Species could use property for migration.
Coastal western whiptail (*Cnemidophorus tigris stejnegeri*)	MSHCP Covered	--/--	Open rocky areas with sparse vegetation usually scrub or grassland.	High. Habitat occurs on site. Species locally common.
Rosy boa (*Lichanura trivirgata*)	Not covered	--/--	Rocky chaparral hillsides, canyons, desert scrub.	Moderate. Property contains habitat for species.
San Bernardino ringneck snake (*Diadophis punctatus modestus*)	Not covered	--/--	Moist habitats. woodlands, farms, grassland, chaparral.	Moderate. Habitat occurs on the property.
San Diego banded gecko (*Coleonyx variegatus abbotti*)	MSHCP Covered	--/--	Deserts scrub to chaparral; micro-habitat desert species.	Low. Chaparral and potential microhabitats occur on site.

Table 9 (cont.)
STATUS OF MSHCP, LISTED, AND SENSITIVE ANIMAL SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Reptiles (cont.)				
San Diego ringneck snake (*Diadophis punctatus similis*)	Not covered	--/--	Moist habitats. woodlands, farms, grassland, chaparral.	Moderate. Habitat occurs on the property.
Birds				
Coastal California gnatcatcher (*Polioptila californica californica*)	MSHCP Covered, Planning Species	FT/CSC	Coastal sage and other low scrub.	**Present:** Multiple pairs occur through property.
Bell's sage sparrow (*Amphispiza belli belli*)	MSHCP Covered, Planning Species	--/CSC	Evenly spaced sage scrub.	Moderate. Habitat occurs on the property.
Coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*)	MSHCP Covered	--/CSC	Scrub, desert thickets, and areas with large branching cacti.	Low. Property contains limited amounts of cacti.
Cooper's hawk (*Accipiter cooperii*)	MSHCP Covered	--/CSC	Forest and woodland habitats. Will forage in grasslands.	**Present:** Species observed on site.
Ferruginous hawk (*Buteo regalis*)	MSHCP Covered	--/CSC	Large areas of open grassland or shrub with elevated nest sites.	Low to moderate. Habitat occurs on site. Species uncommon.
Golden eagle (*Aquila chrysaetos*)	MSHCP Covered	--/CSC	Open country, prefers mountains or hills.	Low to moderate. Habitat occurs on site. Species uncommon.
Grasshopper sparrow (*Ammodramus savannarum*)	Planning Species; additional conservation required to become adequately covered	--/CSC	Grassland with some shrubs and patchy bare ground.	Low to moderate. A few areas with suitable habitat occur on site.

Table 9 (cont.)
STATUS OF MSHCP, LISTED, AND SENSITIVE ANIMAL SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Birds (cont.)				
Loggerhead shrike (*Lanius ludovicianus*)	MSHCP Covered, Planning Species	--/CSC	Open ground, short vegetation, pastures, agriculture.	Moderate. Habitat for species occurs on site.
Long-eared owl (*Asio otus*)	Not covered	--/CSC	Oak woodland, riparian areas, or other dense trees.	Moderate. Habitat for species occurs on site.
Northern harrier (*Circus cyaneus*)	MSHCP Covered	--/CSC	Meadows, grassland, scrub, rarely in woodland. Roosts on ground.	Low to moderate. Some potential habitat occurs on site.
Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)	MSHCP Covered, Planning Species	--/CSC	Hillsides, with grassland, sage scrub, or chaparral.	**Present.** Species observed on site.
Tricolored blackbird (*Agelaius tricolor*)	MSHCP Covered	-ST/CSC	Grassland, cropland with nearby water.	Low to moderate. Some habitat occurs on site.
White-faced ibis (*Plegadis chihi*)	MSHCP Covered, Planning Species	--/CSC	Shallow marshes, spoils banks, meadows, marshes.	Not expected. No habitat observed on the property.
California horned lark (*Eremophila alpestris actia*)	MSHCP Covered	--/--	Grassland, agriculture fields, and disturbed fields.	**Present.** Species observed in northeast portion of site.
White-tailed kite (*Elanus leucurus*)	MSHCP Covered	--/--	Grassland, agriculture with nearby woodland for nesting.	**Present.** Several observed on the property.

Table 9 (cont.)
STATUS OF MSHCP, LISTED, AND SENSITIVE ANIMAL SPECIES

SPECIES	MSHCP DESIGNATION*	SENSITIVITY STATUS*	HABITAT	STATUS ON SITE
Mammals				
Stephen's kangaroo rat (*Dipodomys stephensi*)	MSHCP Covered, Planning Species	FE/ST	Open areas with sparse perennial cover and loose soil.	Low to not expected. Limited habitat occurs on site.
American badger (*Taxidea taxus*)	Not covered	--/CSC	Upland grasslands, meadows, field.	Low. Small amount of habitat occurs on site.
Dulzura pocket mouse (*Chaetodipus californicus femoralis*)	Not covered	--/CSC	Grassland and chaparral ecotone, sage scrub.	Low. Limited grassland on site.
Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)	MSHCP Covered; property not in survey area	--/CSC	Fine sandy soils with sparse vegetation.	Low. Minimal habitat occurs on site.
San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)	MSHCP Covered	--/CSC	Primarily open scrub with short grasses.	**Present.** Species observed in several locations on site.
San Diego desert woodrat (*Neotoma lepida*)	MSHCP Covered	--/CSC	Scrub and desert, rock outcrops, or areas of dense cover.	High. *Neotoma* sp. observed on site. Habitat on site.
San Diego pocket mouse (*Chaetodipus fallax fallax*)	MSHCP Covered	--/CSC	Sage scrub and grassland, sandy soils.	Low. Limited sandy soils on site.
Southern grasshopper mouse (*Onychomys torridus ramona*)	Not covered	--/CSC	Grassland and sparse sage scrub.	Low to not expected. Only known in Riverside between Diamond Valley Lake and Lake Skinner.

Table 9 (cont.) STATUS OF MSHCP, LISTED, AND SENSITIVE ANIMAL SPECIES				
SPECIES	**MSHCP DESIGNATION***	**SENSITIVITY STATUS***	**HABITAT**	**STATUS ON SITE**
Mammals (cont.)				
Western mastiff bat (*Eumops perotis californicus*)	Not covered	--/CSC	Rocky areas, cliff faces, known to roost in buildings.	Low. Limited roosting areas on site.
Bobcat (*Lynx rufous*)	MSHCP Covered, Planning Species	--/--	Rocky and brushy areas near water.	High to expected. Site contains habitat. Species relatively common.
Western yellow bat (*Lasiurus xanthinus*)	Not covered	--/--	Desert grassland and scrub with an associated water feature.	Low. Site not typical habitat of species, which is uncommon in area.

*Refer to Appendix C for a listing and explanation of status, sensitivity, and MSHCP codes

4.0 REGULATORY CONTEXT

4.1 FEDERAL GOVERNMENT

Administered by the USFWS, the federal Endangered Species Act (ESA) provides the legal framework for the listing and protection of species (and their habitats) identified as being endangered or threatened with extinction. Actions that jeopardize endangered or threatened species and the habitats upon which they rely are considered a "take" under the ESA. Section 9(a) of the ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" and "harass" are further defined in federal regulations and case law to include actions that adversely impair or disrupt a listed species' behavioral patterns.

Sections 4(d), 7, and 10(a) of the federal ESA regulate actions that could jeopardize endangered or threatened species. Section 7 describes a process of federal interagency consultation for use when federal actions may adversely affect listed species. A biological assessment is required for any major construction activity if it may affect listed species. In this case, take can be authorized via a letter of biological opinion, issued by the USFWS for non-marine related listed species issues. A Section 7 consultation is required when there is a nexus between federally listed species' use of the site and impacts to USACE jurisdictional areas. Section 10(a) allows issuance of permits for "incidental" take of endangered or threatened species. The term "incidental" applies if the taking of a listed species is incidental to and not the purpose of an otherwise lawful

activity. The MSHCP is the Section 10(a) permit for this portion of Riverside County, including the subject property.

All migratory bird species that are native to the United States or its territories are protected under the Migratory Bird Treaty Act (MBTA), as amended under the MBTA of 2004 (FR Doc. 05-5127). This law is generally protective of migratory birds from the direct physical take of the species.

Federal wetland regulation (non-marine issues) is guided by the Rivers and Harbors Act of 1899 and the Clean Water Act (CWA). The Rivers and Harbors Act deals primarily with discharges into navigable waters, while the purpose of the CWA is to restore and maintain the chemical, physical, and biological integrity of all WUS. Permitting for projects filling WUS (including wetlands and vernal pools) is overseen by the USACE under Section 404 of the CWA. Projects may be permitted on an individual basis or may be covered under one of several approved Nationwide Permits. Individual Permits are assessed individually based on the type of action, amount of fill, etc. Individual Permits typically require substantial time (often longer than six months) to review and approve, while Nationwide Permits are pre-approved if a project meets appropriate conditions. A CWA Section 401 Water Quality Certification, which is administered by the State Water Resources Control Board, must be issued prior to any 404 Permit. This project will require an Individual Permit.

4.2 STATE OF CALIFORNIA

The California ESA is similar to the federal ESA in that it contains a process for listing of species and regulating potential impacts to listed species. Section 2081 of the California ESA authorizes the CDFW to enter into a memorandum of agreement for take of listed species for scientific, educational, or management purposes. The MSHCP is the regional section 2081 for this portion of the County, including the subject property. The golden eagle (*Aquila chrysaetos*) and white-tailed kite are considered State Fully Protected Species. Fully Protected species may not be taken or possessed at any time and no state licenses or permits may be issued for their take except for collecting these species necessary for scientific research and relocation of the bird species for the protection of livestock (Fish and Game Code Sections 3511, 4700, 5050, and 5515).

The Native Plant Protection Act (NPPA) enacted a process by which plants are listed as rare or endangered. The NPPA regulates collection, transport, and commerce in plants that are listed.

The California ESA followed the NPPA and covers both plants and animals that are determined to be endangered or threatened with extinction. Plants listed as rare under NPPA were designated threatened under the California ESA.

The California Fish and Game Code (Section 1600 et seq.) requires an agreement with CDFW for projects affecting riparian and wetland habitats through issuance of a Streambed Alteration Agreement. The proposed project impacts will require a 1602 Agreement from CDFW.

4.3 WESTERN RIVERSIDE MULTIPLE SPECIES HABITAT CONSERVATION PLAN

The MSHCP is a comprehensive multi-jurisdictional effort that includes Riverside County and multiple cities, including the City of Corona in western Riverside County. Rather than address sensitive species on an individual basis, the MSHCP focuses on the conservation of 146 species, proposing a reserve system of approximately 500,000 acres and a mechanism to fund and implement the reserve system (Dudek 2003). Most importantly, the MSHCP allows participating entities to issue take permits for listed species so that individual applicants need not seek their own permits from the USFWS and/or CDFW. The MSHCP was adopted on June 17, 2003, by the Riverside County Board of Supervisors. The Incidental Take Permit was issued by both the USFWS and CDFW on June 22, 2004. The City is the lead agency/permittee, as this property is being annexed to the City.

As noted above, the project is within Cell Group C, Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP (Figure 10). The site is required to show MSHCP compliance through specific habitat assessments, applicable biological surveys, and the provision of an MSHCP compliance analysis. The off-site study areas are not within the MSHCP conservation area, Criteria Cells, or a Cell Group.

McElwain Road has been added to the MSHCP as a Covered Activity through Minor Amendment No. 2017-01 (RCA 2018). This includes placement of a 6-foot by 6-foot box culvert in the channel bottom for wildlife movement, and placement of a second 6-foot box culvert outside of the 100-year floodplain to allow for wildlife movement during high storm events (Figures 11a-c). As part of this Minor Amendment process, McElwain Road's consistency with Section 7.5.1 and 7.5.2 of the MSHCP was included in that analysis. Consistency with both Section 7.5.1 and 7.5.2 are analyzed in Section 5.3.8 of this report.

4.3.1 Multiple Species Habitat Conservation Plan Conservation

As noted above, the project in within Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP. The project is entirely within criteria cells and all cells are part of Cell Group C. The Subunit and associated Cell Group C have specific planning species, biological concerns, and conservation criteria.

Planning species are covered species identified for which a given portion of the MSHCP Conservation Area habitat is specifically targeted to conserve.

Planning species include:

- Bell's sage sparrow, Coastal California gnatcatcher, Grasshopper sparrow, Southern California rufous-crowned sparrow, and Quino checkerspot butterfly

Biological issues and considerations are:

- Contribute to lower Sedco Hills portion of a habitat connection between the new Core Area in Antelope Valley and the Estelle Mountain/Lake Mathews Reserve area.
- Conserve existing populations and habitat of the coastal California gnatcatcher.
- Maintain wetlands for purposes of connection and wildlife dispersal, as well as wetland species conservation.
- Maintain Core and Linkage Habitat for Quino checkerspot butterfly.

Conservation considerations related to the Criteria Cells in Subunit 2 are:

- Contains a portion of Proposed Constrained Linkage 16
- Contains a portion of Proposed Linkage 8

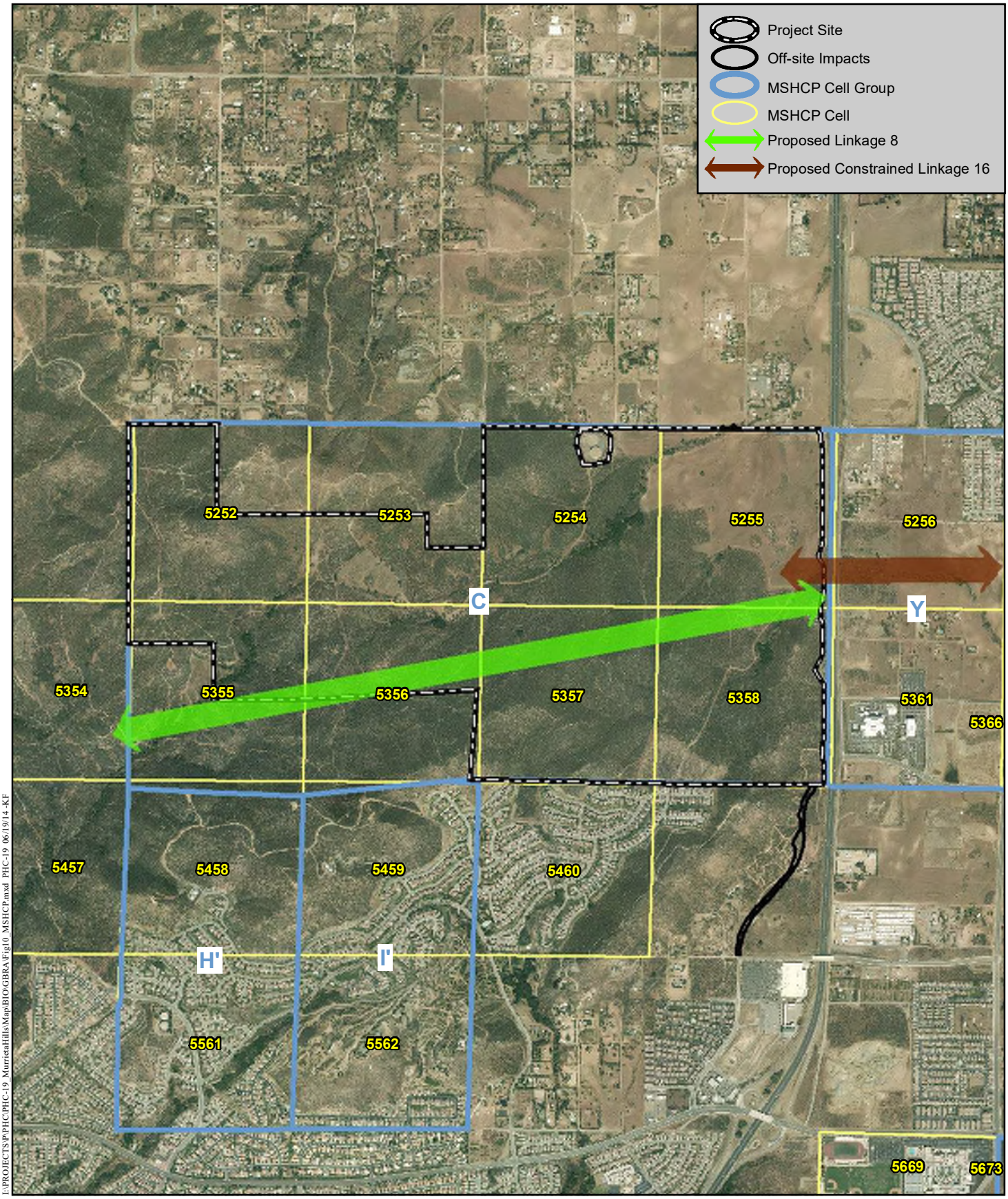
Conservation within Cell Group C will contribute to the assembly of Proposed Linkage 8 and Proposed Constrained Linkage 16. Conservation will focus on chaparral, woodlands, forest, grassland, and sage scrub. Proposed Cell Group C conservation will connect with habitats proposed for conservation in Cell Groups H' and I' to the south, Cell Group Y to the east, and Cell 5354 to west. The target conservation for Cell Group C is 60 to 70 percent focusing on the south, central, and eastern portion of the group (Table 10). The literal interpretation of the cell criteria would result in conservation of between 780 and 910 acres focusing on a strip that runs from the southwest to the east primarily along the southern edge of Cell Group C.

Table 10
CONSERVATION CRITERIA FOR MSHCP CELLS
ON THE MURRIETA HILLS PROPERTY

CELL		ACRE(S)	CELL GROUP CONSERVATION CRITERIA
Group	Number		
C	5252, 5253, 5254, 5255, 5355, 5356, 5357, 5358	973.69	Conservation within this Cell Group will contribute to assembly of Proposed Linkage 8 and Proposed Constrained Linkage 16. Conservation within this Cell Group will focus on chaparral, woodlands, and forest, a small area of coastal sage scrub, and grassland. Areas conserved within this Cell Group will be connected to coastal sage scrub and chaparral habitat proposed for conservation to the south in Cell Groups H' and I' and Cell 5460, all in the Southwest Area Plan. Conservation within this Cell Group will range from 60 to 70 percent, focusing on the Cell Group's southern, central, and eastern portions.

Proposed Linkage 8

Proposed Linkage 8 is a part of one of two east-west linkages that connect Core Habitat on the east and west sides of the MSHCP plan area. Linkage 8 provides live-in and dispersal habitat for



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MSHCP Criteria Map

MURRIETTA HILLS

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Figure 10

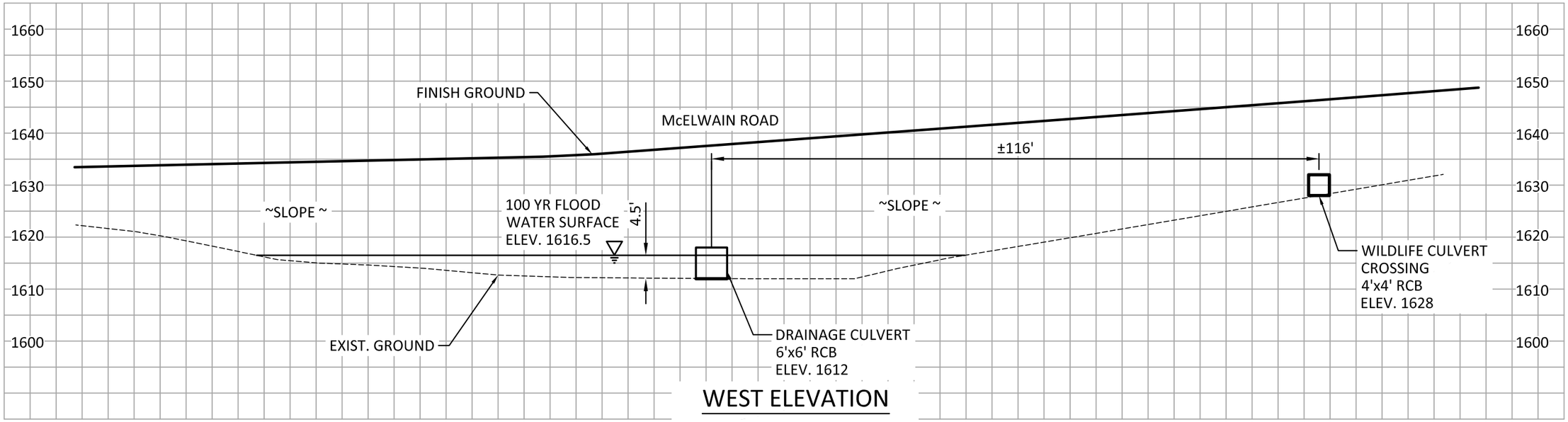
Proposed McElwain Wildlife Undercrossing

MURRIETA HILLS

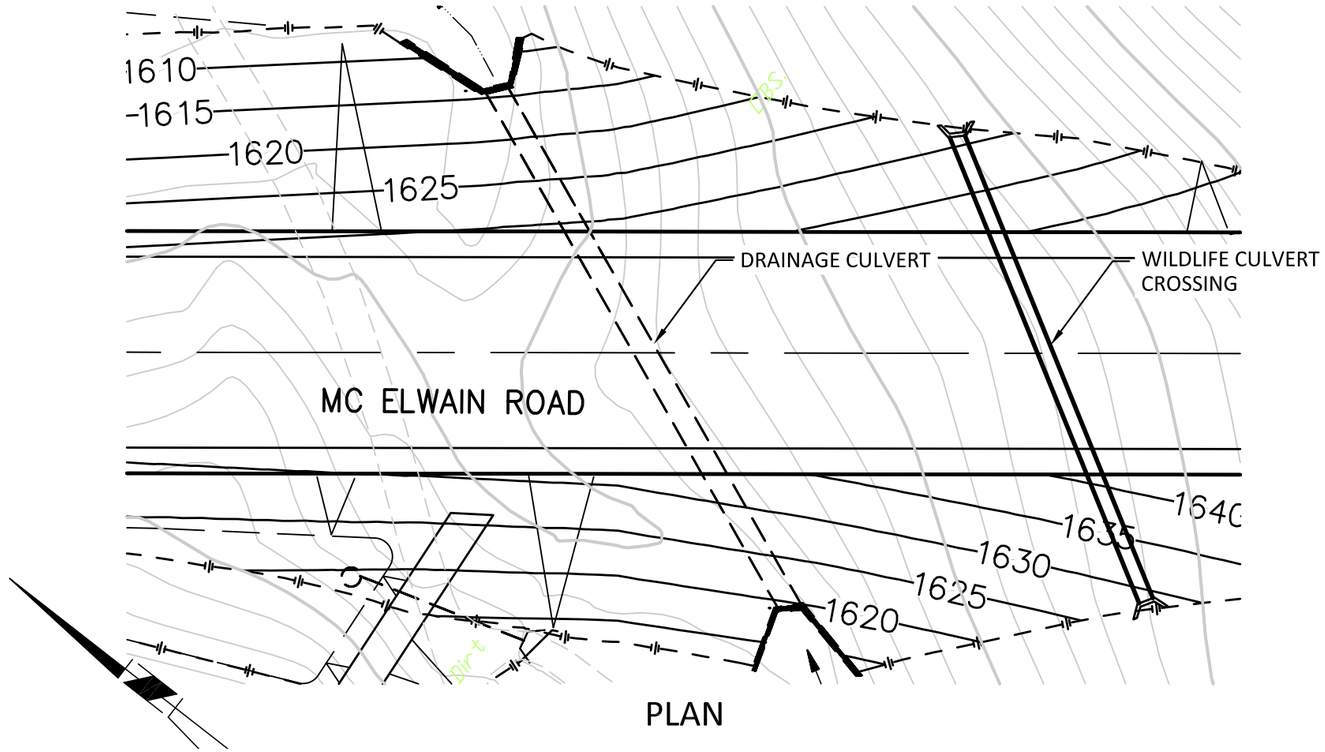
HELIX Environmental Planning

0 100 Feet

Figure 11a



WEST ELEVATION



PLAN

Source: Michael Baker 2018

McElwain Road Wildlife Undercrossing Cross-Section

MURRIETA HILLS

Figure 11b

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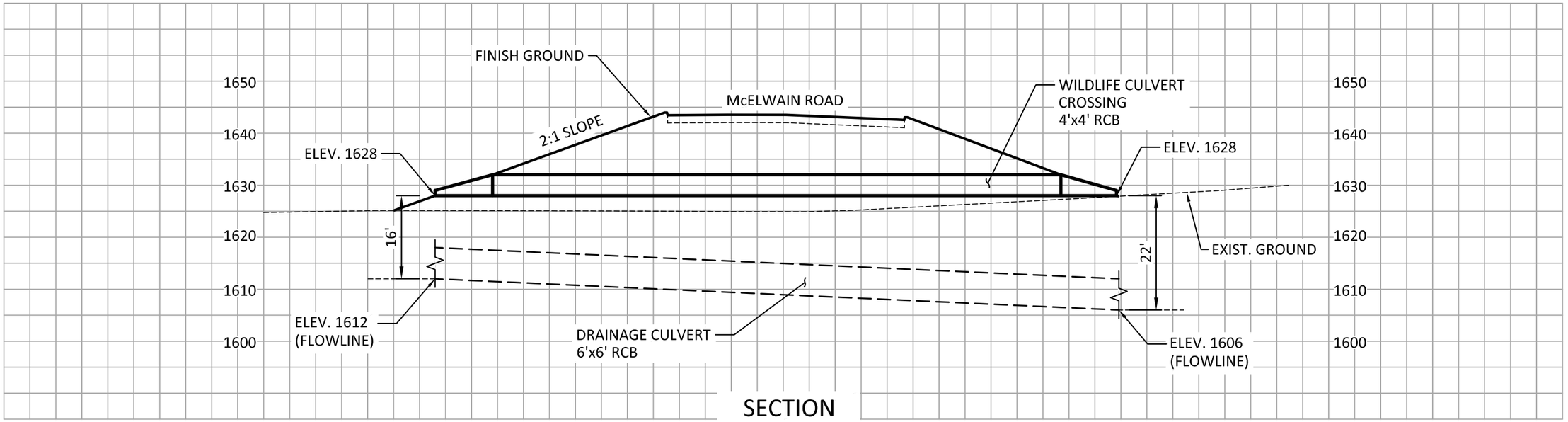
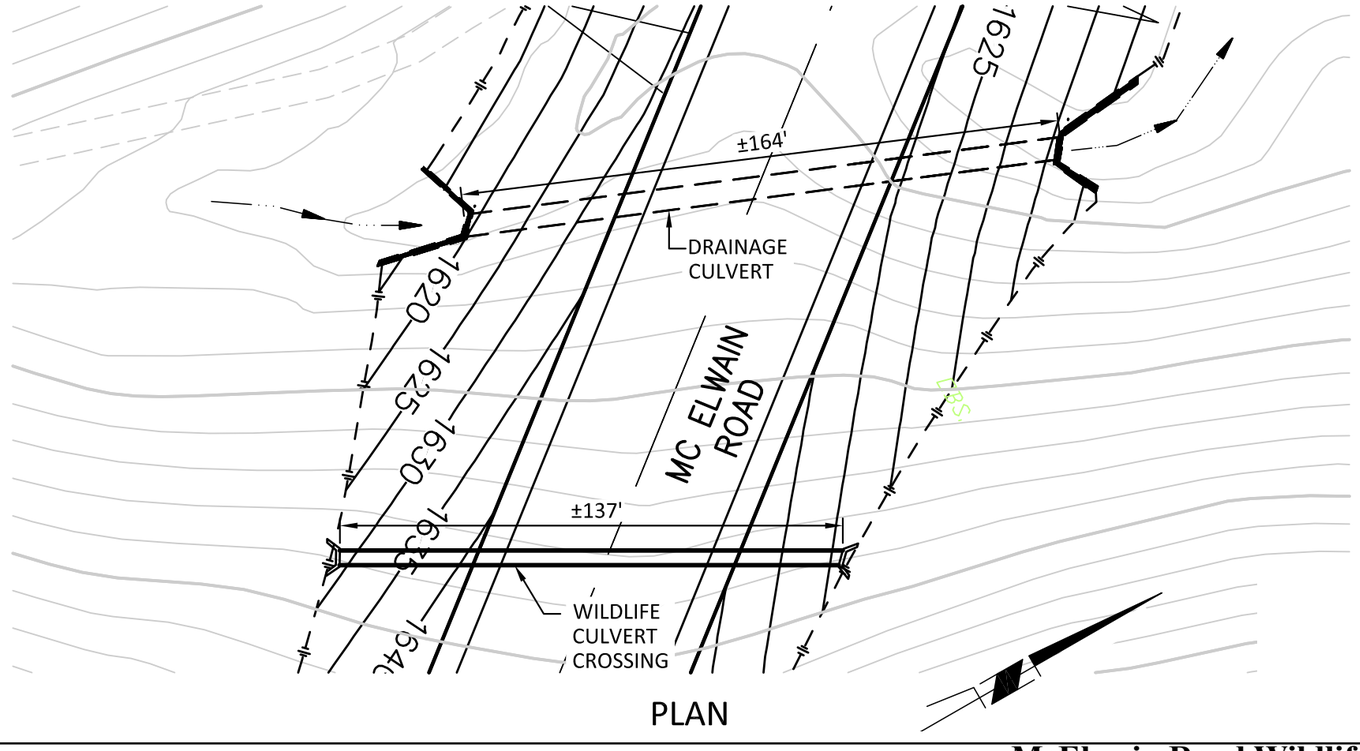


SECTION



PLAN

Source: Michael Baker 2018

McElwain Road Wildlife Undercrossing Road Cross-Section

MURRIETA HILLS

Figure 11c

HELIX Environmental Planning

over 50 pairs of coastal California gnatcatcher. Linkage 8 is designed to provide habitat not only for the Subunit 2 planning species mentioned above but also for Linkage 8 planning species such as the southwestern willow flycatcher, least Bell's vireo, Stephens' kangaroo rat, western pond turtle (*Clemmys marmorata pallida*), loggerhead shrike (*Lanius ludoviciannus*), and bobcat (*Lynx rufous*).

Grassland within Linkage 8 provides foraging habitat for a number of raptor species such as the red-tailed hawk (*Buteo jamaicensis*), white-tailed kite, and great-horned owl (*Bubo virginianus*). This area has a low ratio edge area to total habitat acreage that contributes to maintaining the high-quality habitat in the linkage. Proper treatment of edge conditions, such as limiting domestic predators, lighting, urban runoff and toxics, is necessary to ensure that Linkage 8 maintains high quality habitat (Dudek 2003).

Section 3.1.4 of the MSHCP states that movement corridors are often linear and facilitate movement by providing adequate cover and a lack of physical barriers. Corridors do not provide live-in habitat. By contrast, linkages provide permanent live-in habitat and movement and are capable of sustaining a full range of community/ecosystem processes. For simplicity, the MSHCP has referred to all corridors and linkages as "linkages." Proposed Linkage 8 is designed to provide live-in habitat for the coastal California gnatcatcher and, therefore, its design is as a linkage and not a corridor.

The MSHCP conservation areas have target species but are designed as an interconnected reserve system to protect habitat for all of the 146 MSHCP covered species. Hundreds of other species not covered by the MSHCP, some sensitive (e.g., American badger [*Taxidea taxus*] and long-eared owl [*Asio otus*]) and some not sensitive (e.g., California buckwheat and California ground squirrel) are known to occur in western Riverside County. These plants and animals compose the ecosystem and food chain that are essential for the survival of the target and covered species.

Proposed Constrained Linkage 16

Proposed Constrained Linkage 16 is designed to connect the east side of Linkage 8 to Proposed Core 2 in the Antelope Valley to the east. This linkage is constrained by urban development and agriculture use along its entire length, along with being intersected by I-215. Management of edge conditions in this linkage is critical to maintain habitat in and movement through the linkage. Proposed Constrained Linkage 16 connects to Linkage 8 west of I-215 in the northeast portion of the property. The majority of Proposed Constrained Linkage 16 is located east of I-215, not on the property.

Proposed Conservation

The property consists of 75 percent of Cell Group C. The proposed development occurs in the north-central and northeast portion of Cell Group C, and as such leaves a viable swath of habitat from west to east that will contribute to the assembly of Proposed Linkage 8. The proposed development footprint also leaves additional habitat in the west and northwest that will provide additional foraging and live-in habitat within Proposed Linkage 8.

As noted above, the literal interpretation of the Cell criteria would result in conservation of 780 to 910 acres along the southern, central, and eastern portions of the site. The project proposes to conserve 607.74 acres within Cell Group C along with creating a linear nature park (LNP). The LNP is not part of the MSHCP conservation. The 607.74 acres represent approximately 62 percent of the property, which is within the target of 60 to 70 percent conservation for Cell Group C.

4.4 ADDITIONAL SURVEYS (MSHCP SECTION 6.3.2)

Surveys for CASSA Area 1 plant species in 2006 found 2 individual round-leaved filaree plants. Subsequent rare plant surveys in 2008 and 2012 were negative for CASSA plant species. The burrowing owl surveys conducted in 2006, 2008 and 2012 were negative. No burrowing owls or sign of burrowing owl occupation was observed during any of the surveys. The property is not occupied by burrowing owl. The property is not within an amphibian survey area or a mammal survey area.

Round-leaved Filaree (CASSA)

Two round-leaved filaree individuals were observed in the northeast quarter of the property near the agricultural land during the 2006 survey. The species was observed in a disc of clay soil just south of the field cropland, near the mapped Auld clay soils. Mr. Sanders noted that low rainfall (approximately 66 percent of normal) in spring 2006 caused unusual growing conditions that have resulted in the plants of the genus *Erodium* (of which this species is formerly of) occurring in smaller numbers. This suggests that it is possible that a slightly larger number of individuals of round-leaved filaree could exist at this location in a normal rainfall year. However, no individuals of this species were observed during rare plant surveys in 2008 with a recorded rainfall of 88 percent of normal, or in 2012 with a rainfall of 63 percent of normal. It is a possibility that the unusually high rainfalls of 2005 (242 percent of average) resulted in a larger that normal growth for round-leaved filaree in 2006.

Based on the MSHCP (Dudek 2003) there are 10 records of this species in the Plan Area. Eight out of the 10 occurrences will be conserved within the MSHCP Conservation Area, and at least 37,663 acres of potential habitat will be conserved.

Based on the data collected over 3 separate years of rare plant surveys and conservation proposed for this species under the MSHCP, the minor potential population of round-leaved filaree located on the property does not have long-term conservation value.

5.0 IMPACTS

This section describes potential direct and indirect impacts associated with the proposed project. Direct impacts immediately alter the affected biological resources such that those resources are eliminated temporarily or permanently. Indirect impacts consist of secondary effects of a project, including noise, decreased water quality (e.g., through sedimentation, urban contaminants, or fuel release), fugitive dust, colonization of non-native plant species, animal behavioral changes,

and night lighting. The magnitude of an indirect impact can be the same as a direct impact; however, the effect usually takes a longer time to become apparent. Vegetation thinning for fuel management purposes is considered a direct impact in this analysis.

According to Appendix G of the CEQA Guidelines, project impacts to biological resources would be considered significant if they would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any special status species in local or regional plans, policies, or regulations, or by the CDFW and/or USFWS.

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

5.1 VEGETATION COMMUNITIES

The project proposes to impact 360.96 acres on site (Figure 12; Table 11), all of which occurs in Cell Group C, along with 4.15 acres off site that are not with a Cell or other MSHCP conservation area. The impacts are made up of 285.18 acres of development and 79.93 acres of fuel modification zones (FMZ) including the 4.15 acres of off-site impacts result from the construction of McElwain Road for secondary access to the project. The 79.93 acre of FMZs includes 4.4 acres of fuel modification that have already occurred as part of the adjacent Greer Ranch Development to the south. Additional details on the FMZs are included in Section 5.3.7. A total of 611.93 acres will not be directly impacted by the development or brush management, of which 607.74 acres will contribute to the assembly of the MSHCP conservation area (Figure 12). The project includes a LNP proposed to include 3.86 acres of natural riparian habitat and 2.86 acres of oak woodland that will be avoided. Approximately 3.31 acres of oak trees will have vegetation cleared under their canopy and are considered impacted from an acreage perspective. The remaining 19.44 of open space with maintained to a height of four inches and is included in the fuel modification impact total. This LNP occurs in the middle of the development and is not included in the acreage that will contribute to the assembly of the MSHCP conservation area. The project also includes two additional natural open space areas of 3.1 acres and 1.7 acres that will also be maintained to a height of four inches.

The proposed on-site impacts are to: 0.36 acre of southern willow scrub, 0.15 acre of mule fat scrub, 0.04 acre of riparian woodland, 4.71 acres of coast live oak woodland (0.43 acre of which is Riparian/Riverine habitat and 3.31 acres of which is limited to thinning of the understory for fuel management purposes), 1.13 acres of streambed, 203.5 acres of chaparral, 21.2 acres of Riversidean sage scrub, 11.4 acres of coastal sage scrub/chaparral, 1.7 acres of non-native grassland, 87.6 acres of field cropland, less than 0.1 acre of eucalyptus woodland, 29.6 acres of disturbed habitat, and 0.7 acre of developed land. Off-site impacts are to: 2.4 acres of chaparral, 0.05 acre of Riversidean sage scrub, 0.3 acre of non-native grassland, 1.2 acres of disturbed habitat, and 0.3 acre of developed land (Table 11).

Table 11
VEGETATION IMPACTS[1]

COMMUNITY[2]	EXISTING		IMPACTED		ON-SITE AVOIDANCE
	ON SITE	OFF SITE	ON SITE	OFF SITE	
Southern willow scrub	1.54	-	0.36	0	1.18
Mule fat scrub	0.47	0.03	0.15	0	0.32
Riparian Woodland	0.07	-	0.04	0	0.03
Coast live oak woodland*	13.01	-	4.71[3]	0	8.30
Chaparral	701.7	9.9	204.3	2.4	497.4
Riversidean sage scrub	66.6	1.2	21.2	0.05	45.4
Coastal sage scrub/ Chaparral[4]	32.0	-	11.4	0	20.6
Non-native grassland	4.4	1.1	1.7	0.2	2.7
Field cropland	96.7	-	87.6	0	9.1
Exotic (Eucalyptus Woodland)	0.3	-	<0.1	0	0.30
Disturbed	55.3	4.7	29.6	1.2	25.7
Developed	1.6	1.6	0.7	0.3	0.9
TOTAL	**973.69**	**18.53**	**361.76**	**4.15**	**611.93**

*Coast live oak woodland impacts include both upland and wetland-Riparian/Riverine impacts.

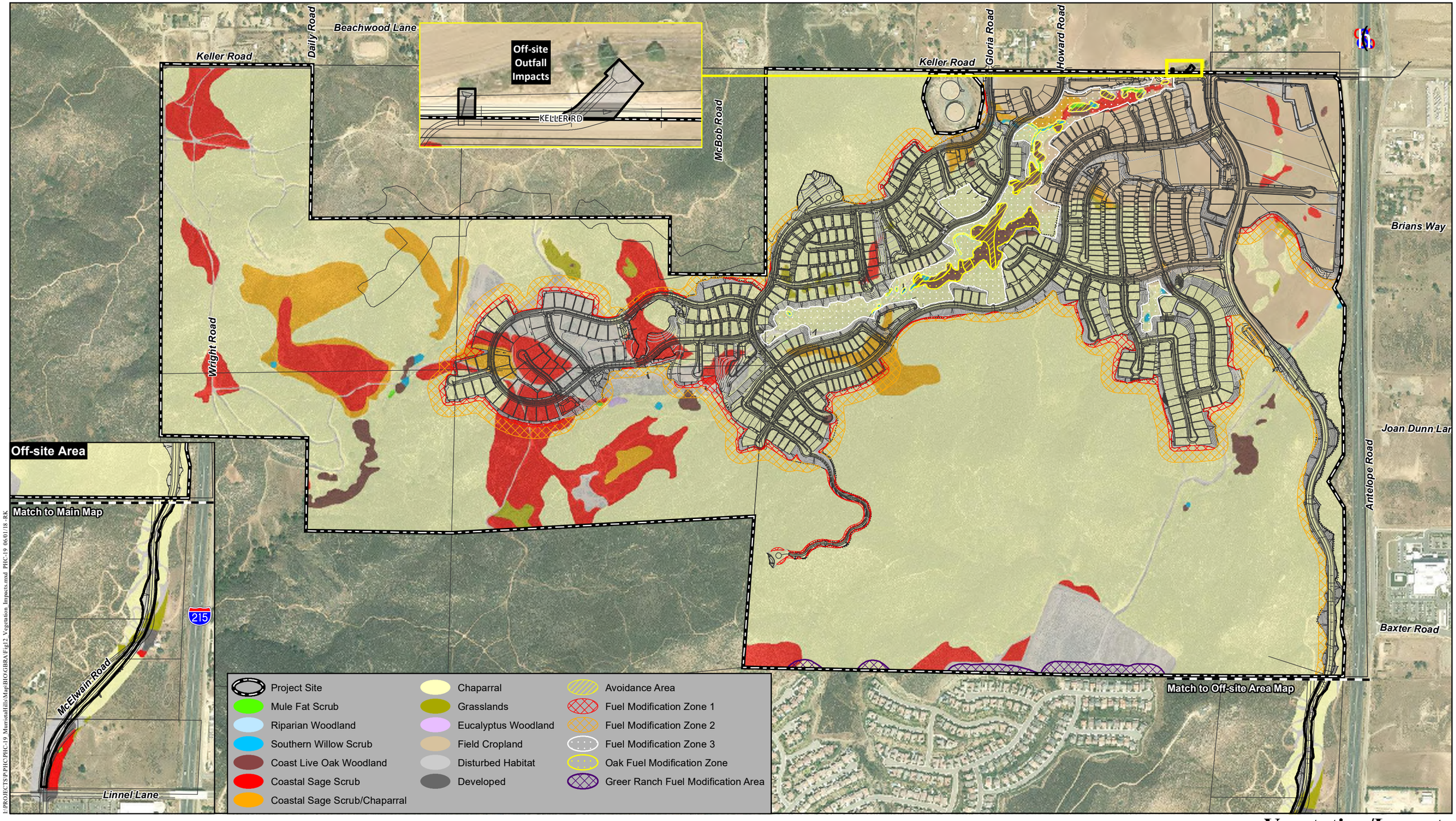
[1] Acreage is rounded to the nearest 0.1 acre except for wetland-Riparian/Riverine and areas smaller than 0.1-acre habitats that are rounded to the nearest 0.01 acre.

[2] Streambed acres are included within the upland community acres in which they occur for this table. They are shown in Tables 13 and 14 for CDFW and Riparian/Riverine impacts

[3] Includes 3.60 acres which is limited to thinning of the understory for fuel management purposes.

[4] Coastal sage scrub/chaparral is not an MSHCP vegetation community; however, each community that forms this ecotone has an MSHCP vegetation classification

Impacts to native Riparian/Riverine habitats including southern willow scrub, mule fat scrub, coast live oak woodland, and streambed are considered significant. Impacts to upland habitats including chaparral, Riversidean sage scrub, coastal sage scrub/chaparral, non-native grassland, and field cropland are also considered significant. The proposed mitigation for these impacts (discussed below) reduces the level of these impacts to less than significant.



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Vegetation/Impacts

MURRIETA HILLS

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Figure 12

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5.2 JURISDICTIONAL WATERS IMPACTS

Impacts to waters that are under federal or state jurisdiction are summarized below.

5.2.1 Federal Jurisdictional Waters

The project proposes impacts to a total of 0.59 acre of non-wetland WUS, made up of 0.57 acre on site and 0.02 acre off site. (Figure 13, Table 12). These impacts will require a permit from the USACE under Section 404 of the CWA and a Section 401 Water Quality Certification from the RWQCB. These impacts are considered significant.

The areas of USACE jurisdictional habitat within the FMZ are not included as impacts as no fill is proposed. USACE non-wetland waters within the FMZ total 0.33 acre.

Table 12
U.S. ARMY CORPS OF ENGINEERS IMPACTS AND AVOIDANCE

HABITAT	ON SITE		IMPACTED		AVOIDED*	
	Acres	Linear Feet	Acres	Linear Feet	Acres	Linear Feet
Non-wetland waters of U.S.	2.13	49,875	0.57	16,096	1.56	33,779
Non-wetland waters of U.S.- off site	0.02	500	0.02	500	0.02	1,524
TOTAL	**2.15**	**50,375**	**0.59**	**16,596**	**1.56**	**33,779**

*avoidance total does not include avoided off-site areas

5.2.2 California Department of Fish and Wildlife Jurisdictional Habitat

The project proposes impacts to 2.10 acres of CDFW jurisdictional habitats made up of 2.06 acres on site and 0.04 acre off site. The impacts are comprised of 0.42 acre of coast live oak woodland, 0.04 acre of riparian woodland, 0.36 acre of southern willow scrub, 0.15 acre of mule fat scrub, and 1.10 acres of streambed (Table 13). The streambed impacts include 0.04 acre that occur off site.

Fuel modification planned in proximity of the Riverine resources are not expected to result in complete loss of functions and services associated with Riverine resources, although some reduction in these functions and services may occur. An analysis of potential impacts was prepared by HELIX (2019) and is included as Appendix D to this report. Based on this, impacts have been assessed to 0.5845 acre of Riverine/streambed within Zones 2 and 3, and 0.0188 acre for Zone 1 for a total impact area of 0.6010 acre.

The CDFW impacts are identical to the MSHCP Riparian/Riverine habitat impacts (Figure 14). Impacts to CDFW jurisdictional habitats will require a section 1602 Stream Alteration Agreement from the CDFW. These impacts are regarded as significant.

Table 13
CDFW IMPACTS AND AVOIDANCE

COMMUNITY	EXISTING		IMPACTED		AVOIDED	
	Acres	Linear Feet	Acres	Linear Feet	Acres	Linear Feet
Coast live oak woodland	7.02	4,242	0.42	151	6.60	4,091
Riparian Woodland	0.07	56	0.04	31	0.03	25
Southern willow scrub	1.54	2,076	0.36	530	1.18	1,546
Mule fat scrub	0.47	474	0.15	217	0.32	257
Streambed	3.17	43,046	1.09	15,390	2.08	27,656
Streambed (Fuel Modification)	Included above	Included above	0.6010		N/A	N/A
On-site Total	**12.27**	**49,894**	**2.6610**	**16,319**	**10.21**	**33,575**
Streambed-off site*	0.04	500	0.04	500		
TOTAL	**12.31**	**50,394**	**2.7010**	**16,819**	**10.21**	**33,575**

* off site avoided streambed not included in avoidance totals.

5.3 MULTIPLE SPECIES HABITAT CONSERVATION PLAN IMPACTS/ CONSISTENCY

As noted earlier, the project site is located within Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP (Figure 10). Conservation considerations related to the Criteria Cells in Subunit 2 are:

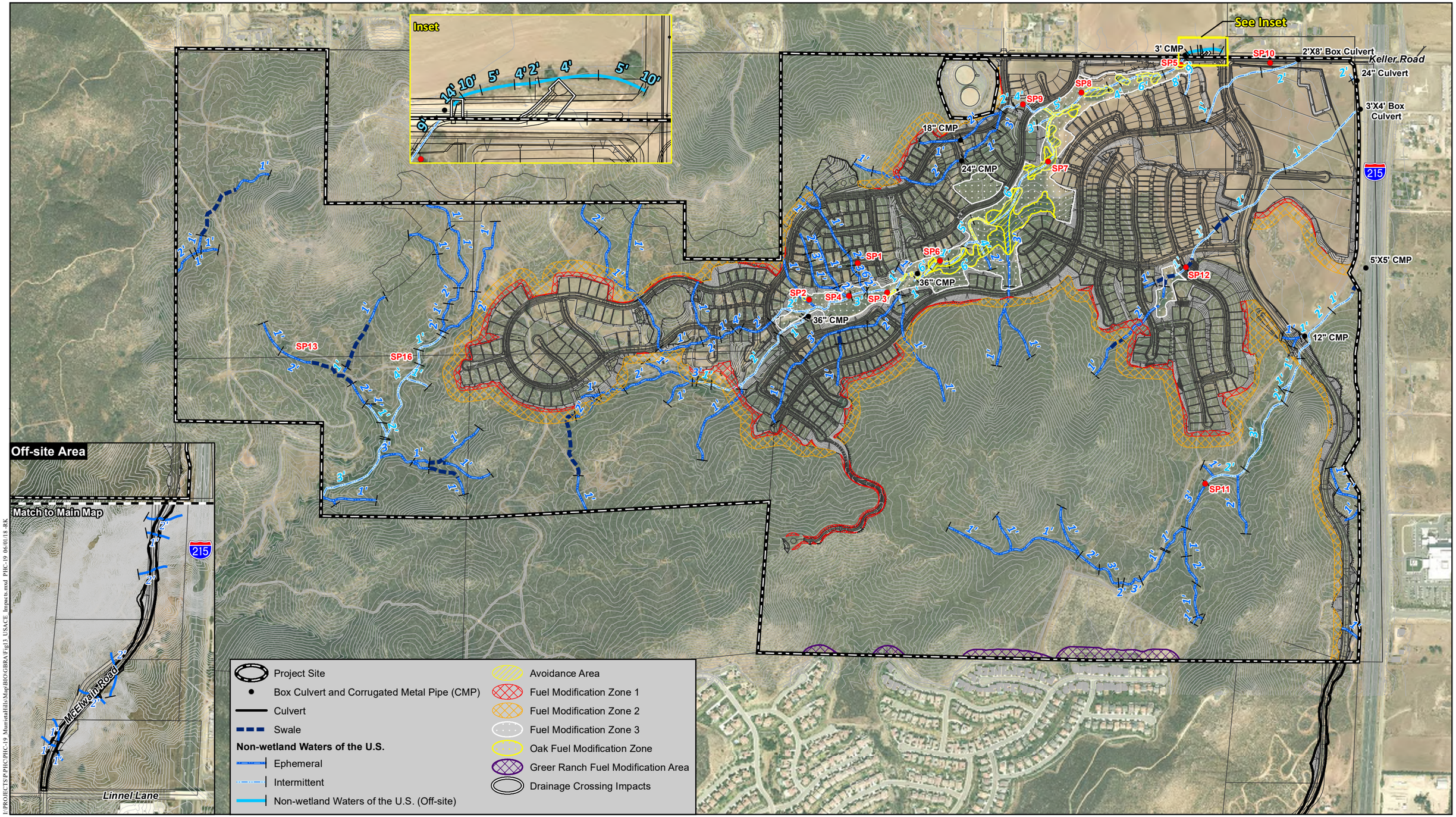
- Contains a portion of Proposed Constrained Linkage 16
- Contains a portion of Proposed Linkage 8

Planning species include:

- Bell's sage sparrow
- Coastal California gnatcatcher
- Grasshopper sparrow
- Southern California rufous-crowned sparrow
- Quino checkerspot butterfly

Biological issues and considerations are:

- Contribute to lower Sedco Hills portion of a habitat connection between the new Core Area in Antelope Valley and the Estelle Mountain/Lake Mathews Reserve area.
- Conserve existing populations and habitat of the coastal California gnatcatcher.
- Maintain wetlands for purposes of connection and wildlife dispersal, as well as wetland species conservation.



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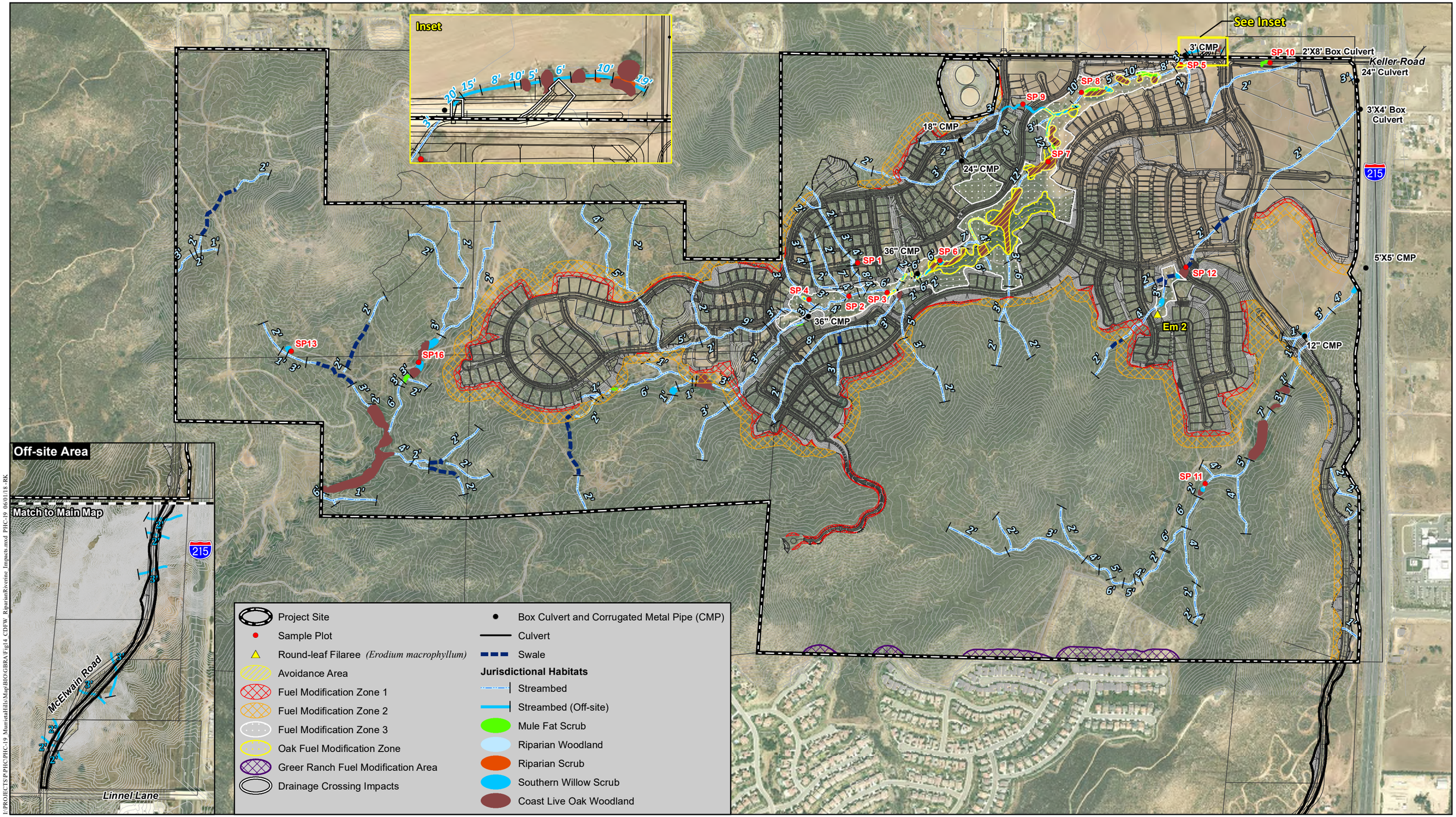
Waters of the U.S./Impacts

MURRIETA HILLS

HELIX Environmental Planning

N 0 800 Feet

Figure 13



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Riparian/Riverine and CASSA Plant Impacts

MURRIETA HILLS

HELIX Environmental Planning

N 0 800 Feet

Figure 14

- Maintain Core and Linkage Habitat for Quino checkerspot butterfly.

The project occurs at the western end of Proposed Constrained Linkage 16 and on the eastern end of Proposed Linkage 8 (Figure 10). The conservation to occur on site (Cell Group C) will contribute to the assembly of Proposed Linkage 8, with a small portion creating a connection to Proposed Constrained Linkage 16. This is due to Proposed Constrained Linkage 16 primarily occurring east of I-215, while the project site is on the west side of I-215. Land to be conserved will connect to proposed conservation to the southwest and east.

The planning species have a moderate to high potential to occur on site, with the coastal California gnatcatcher and southern California rufous-crowned sparrow observed on site. Thirty one percent of the impacts (112.7 acres) are proposed to occur to agricultural land and disturbed habitat that provides little to no habitat for the planning species and only limited foraging habitat for raptors. Sixty nine percent of the impacts are primarily to high-quality habitat (chaparral, sage scrub, grassland, and riparian) with potential to support planning species.

The project avoids impacts to 611.93 acres, including 607.74 acres considered part of the MSHCP preserve, made up of high-quality habitat with potential to support migratory and live-in habitat for the planning species and a multitude of other MSHCP covered species (Figure 12). This conservation represents 62 percent of the site and will contribute to the assembly of MSHCP conservation area, specifically related to Constrained Linkage 8, and Proposed Constrained Linkage 16. The 62 percent on site is consistent with the target conservation of 60 to 70 percent for Cell Group C.

Proposed impacts include the northwestern edge of the portion of Proposed Constrained Linkage 16 that lies west of I-215. This portion of Proposed Constrained Linkage 16 consists of a triangular area adjacent to I-215, designed to connect the existing 5-foot corrugated metal pipe (CMP) culvert under I-215 to Proposed Linkage 8 in the southern half of Cell Group C (Figure 10). This triangular area follows a stream that originates in Cell 5358 and flows under I-215 in the CMP culvert and forms the east-west axis of Proposed Constrained Linkage 16. The proposed impacts to Proposed Constrained Linkage 16 are to a minimal amount in the north edge, outside of the stream channel that forms the basis of the linkage. The revised project footprint avoids an additional 1.8 acres of the linkage. The linkage is at its narrowest where it connects to the foot-foot corrugated metal pipe under I-215. The linkage rapidly widens from the five-foot pipe to an area that rapidly increase from approximately 160 feet wide to area that is more than 800 feet wide (Figure 10). The on-site portion of the linkage is made up of primarily chaparral on the south side of the stream and agriculture (dry crop) on the north. The lands within Proposed Constrained Linkage 16 proposed for impacts are currently used for agriculture.

McElwain Road has been added to the MSHCP as a Covered Activity through Minor Amendment No. 2017-01 (RCA 2018). This includes placement of a 6-foot by 6-foot box culvert in the channel bottom for wildlife movement, and placement of a second 6-foot box culvert outside of the 100-year floodplain to allow for wildlife movement during high storm events (Figure 10).

Section 7.5.2 of the MSHCP recommends that culverts be a minimum of 1 to 1.5 meters for medium-sized wildlife that is anticipated to use this linkage and the 6- by 6-foot culvert proposed

exceeds this requirement. The large box culverts under McElwain Road would be approximately 200 feet long and would provide direct line of sight from end to end. The 4-foot box culvert will be approximately 140 feet long and provide direct line of site from end to end. The proposed McElwain Road crossing of Proposed Constrained Linkage 16 would be located approximately 850 feet upstream (southwest) of the existing five-foot CMP culvert under I-215, leaving an area of open space between McElwain Road and I-215 too small to function as permanent live-in habitat for large animals. Thus, the proposed McElwain Road crossing would not isolate any significant live-in habitat from the remainder of Proposed Constrained Linkage 16 or Proposed Linkage 8. The proposed culverts under McElwain Road would provide a wildlife crossing that is at least as functional as the existing five-foot-wide, 280-foot-long CMP culvert under I-215, and would not constitute a barrier to any animal that had successfully managed to cross under the freeway.

Based on this assessment, the project is consistent with the conservation goals of Subunit 2 of the Sun City/Menifee Area Plan.

5.3.3 Consistency with MSHCP Section 6.1.2

The proposed project complies with the policies of Section 6.1.2 that protect species associated with vernal pools and Riparian/Riverine areas. No vernal pools exist on site or within the off-site areas, and no vernal pool species are expected to occur. None of the plant or animal species listed in Section 6.1.2 was observed or expected to occur in the project area or off-site areas.

Section 6.1.2, Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools, states:

> "The purpose of the procedures described in this section is to ensure that the biological functions and values of these areas throughout the MSHCP Plan Area are maintained such that Habitat values for species inside the MSHCP Conservation Area are maintained."

Section 6.1.2 of the MSHCP focuses on protection of Riparian/Riverine areas and vernal pool habitats capable of supporting MSHCP covered species, particularly within the identified Conservation Area. The functions of the streams on the property are primarily water conveyance, sediment transport, and energy dissipation (hydrologic regime and flood attenuation). These drainages are considered to have limited value because:

- They do not have habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or depend upon soil moisture from a nearby freshwater source;

- They are extremely ephemeral in nature, flowing only during and immediately after storm events; and

- They do not support any of the species targeted for conservation under Section 6.1.2.

The project proposes impacts to 0.97 acre of riparian vegetation and 1.13 acres of streambed for a total Riparian/Riverine impacts of 2.10 acres. The riparian vegetation impacts consist of 0.42 acre of coast live oak woodland, 0.04 acre of riparian woodland, 0.36 acre of southern willow scrub, and 0.15 acre of mule fat scrub. Fuel modification planned in proximity of the Riverine resources are not expected to result in complete loss of functions and services associated with Riverine resources, although some reduction in these functions and services may occur. An analysis of potential impacts was prepared by HELIX (2019) and is included as Appendix D to this report. Based on this, impacts have been assessed to 0.5845 acre of Riverine/streambed within Zones 2 and 3, and 0.0188 acre for Zone 1 for a total impact area of 0.6010 acre (Table 14). The project proposes to avoid impacts to 83 percent of the Riparian/Riverine habitats on the property. As noted above, plant and animal species associated with Riparian/Riverine habitats do not occur on site or within the Keller Road outfall area. None of the species covered under Section 6.1.2 occur on site as evident by a lack of potential habitat or where habitat occurs focused surveys have had negative results.

Table 14
RIPARIAN/RIVERINE IMPACTS
(acres)

HABITAT	EXISTING	IMPACTED	AVOIDED
Coast live oak woodland	7.02	0.42	6.60
Southern Riparian Woodland	0.07	0.04	0.03
Southern willow scrub	1.54	0.36	1.18
Mule fat scrub	0.47	0.15	0.32
Streambed*	3.21	1.13	2.08
Streambed (Fuel Modification)	Included above	0.6010	N/A
TOTAL	**12.31**	**2.7010**	**10.21**

*Streambed impacts include 0.04 acre that occurs off site.

The project proposes impacts to 0.36 acre of impacts to habitat with potential to support least Bell's vireo (Figure 15). This habitat was determined to not be occupied by least Bell's vireo or southern willow flycatcher.

Potential habitat for Vernal pool fairy shrimp, Riverside fairy shrimp and Santa Rosa Plateau fairy shrimp does not occur on the property or within the off-site study areas. The site does include a 4.4-acre patch of clay soils located on the south-southeast edge of the agricultural field. The clay soils have been disturbed from years of discing and dry farming. The clay soils area, along with the rest of the site, does not include vernal pools, ephemeral basins, or similar habitat that could support fairy shrimp. Due to a lack of habitat, Potential habitat for these species does not occur on the property; therefore, no surveys were conducted and these species are not expected to occur on the property.

All impacts to Riparian/Riverine resources will be mitigated by a combination of on-site preservation of 10.24 acres of Riparian/Riverine resources, and either off-site restoration, and/or off-site purchase of credits at an approved Mitigation Bank(s).

5.3.4 Consistency with MSHCP Section 6.1.3

In compliance with Section 6.1.3, this project would not affect any Narrow Endemic Plant Species, since no species are present on site, or within the Keller Road outfall area. NEPSSA surveys of the offsite portion McElwain Road shall be conducted prior to grading to insure compliance with Section 6.1.3 of the MSHCP. Survey results shall be provided to the RCA and wildlife agencies for review, and to the City for final approval.

5.3.5 Consistency with MSHCP Section 6.1.4

The following measures will be implemented by the project to minimize the identified potential indirect impacts, including:

- All project runoff will be treated prior to exiting the site to reduce toxins.

- Detention basins proposed within the project footprint will ensure that there is no increase in flows from the project into the Salt Creek, Murrieta Creek, or Warm Springs Creek watersheds.

- All project lighting (including that belonging to private property owners) will be required to be selectively placed, directed, and shielded away from conserved habitats along the open space borders of the development. In addition, large spotlight-type backyard lighting directed into conserved habitat will be prohibited.

- No plants included on the California Invasive Plant Council's list of invasive species (or in Table 5-2 of the MSHCP) will be used anywhere on the site, and only native species or non-invasive non-native species will be planted adjacent to conservation areas. A list of prohibited species will be provided to homebuyers.

- The proposed project has been designed so that no additional take of conserved habitat will be necessary for fuel modification purposes. All take is included in project footprint.

- Enclosure fences (wood, tubular steel) shall be installed along the interface where residential development abuts conserved habitat (Figure 14). Signs will be posted at potential access points into the MSHCP conservation area informing residents of the wildlife habitat value of the open space to minimize intrusions. Refer to Figure 4 for an aerial view of the proposed development and on-site and nearby undeveloped land.

- Manufactured slopes associated with the proposed site development will not extend into the MSHCP conservation area.

The above measures would serve to minimize the adverse effects of the project on conservation configuration and would minimize management challenges that can arise from development located adjacent to conserved habitat.

Keller Road

Off-site Area

Match to Main Map

215

McElwain Road

Linnel Lane

Project Site
Potential Least Bell's Vireo Habitat
Avoidance Area
Fuel Modification Zone 1
Fuel Modification Zone 2
Fuel Modification Zone 3
Oak Fuel Modification Zone
Greer Ranch Fuel Modification Area

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Potential Least Bell's Vireo Habitat/Impacts

MURRIETA HILLS

HELIX Environmental Planning

N

0 800 Feet

Figure 15

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5.3.6 Consistency with MSHCP Policy Section 6.3.2

In compliance with MSHCP Section 6.3.2, the proposed project would not affect burrowing owls, since no individuals or active burrow locations were observed on site, or within the Keller Road outfall area, during focused surveys (HELIX 2018). Focused rare plant surveys in 2006 found two individual round-leaved filaree, a CASSA species. As previously noted, repeat surveys in 2008 and 2012 that included an extra focused effort for this species did not observe this species on site. Based on the data collected over three separate years of rare plant surveys, the minor potential population of round-leaved filaree located on the property does not have long-term conservation value.

5.3.7 Fuels Management (MSHCP Section 6.4)

The proposed project site includes an MSHCP Conservation Area and, consistent with Section 6.4 of the MSHCP, the FMZ is included within the project impact limits and will not extend into the habitat that is proposed to contribute to the MSHCP Conservation Area. The 80.73 acres of fuel management zone is included in the 361.76 acres of proposed impacts.

The FMZ is made up of 3.31 acres of oak tree trimming (FMZ 3), 23.33 acres of open space to maintained to a height of four inches (FMZ 3), 40.59 acres of thinning 50 percent of the vegetation (FMZ 2), and 9.11 acres that will be irrigated (FMZ 1), along with 4.4 acres of existing FMZ associated with the adjacent Greer Ranch Development. The thinning and irrigated zones total 49.7 acres located around the exterior perimeter of the project development. The remainder of the fuel management zone impacts (26.64 acres) occurs within the LNP and other open space within the development footprint.

5.3.8 Consistency with Section 7.5.1 and 7.5.2

As noted above, McElwain Road (on-site) has been added to the MSHCP as a Covered Activity and is required to show consistency with Section 7.5.1 and 7.5.2 of the MSHCP. Section 7.5.1 of the MSHCP states that the ultimate alignment and design of planned roadways, bridges, and interchanges will be subject to the following design, siting, and construction guidelines (responses to each bullet for both roadways are included below):

- Planned roads will be located in the least environmentally sensitive location feasible, including disturbed and developed areas or areas that have been previously altered. Alignments will follow existing roads, easements, ROWs, and disturbed areas, as appropriate, to minimize habitat fragmentation.

Status: McElwain Road has been designed to run as close to I-215 as possible to place the roadway in the least environmentally sensitive area while still providing access to the project from the south. This has minimized fragmentation resulting from McElwain Road.

- Planned roads will avoid, to the greatest extent feasible, impacts to Covered Species and wetlands. If wetlands avoidance is not possible, then any impacts to wetlands will require issuance of and mitigation in accordance with a federal 404 and/or state 1600 permits.

Status: McElwain Road does not impact covered species and wetlands. The roadway does impact non-wetland Riparian/Riverine resources and these impacts are being mitigated in accordance with state and federal permitting requirements.

- Design of planned roads will consider wildlife movement requirements, as further outlined below under Guidelines for Construction of Wildlife Corridors.

Status: McElwain Road will incorporate requirements consistent with Section 7.5.2 of the MSHCP. Section 7.5.2 of the MSHCP addresses construction of wildlife crossings. Because I-215 is a major impediment to large wildlife (e.g., mountain lion and mule deer), McElwain is not being designed to facilitate movement of these species. McElwain Road will include a 6-foot by 6-foot box culvert that would provide wildlife crossing under the roadway. Section 7.5.2 of the MSHCP recommends that culverts be a minimum of 1 to 1.5 meters for medium-sized wildlife that are anticipated to use this linkage and the 6-foot by 6-foot culvert proposed exceeds this requirement. The box culvert under McElwain Road would be approximately 150 feet long and would provide direct line of sight from end to end. The undercrossing is being placed within the drainage that traverses this portion of the site which is the area most likely to be utilized for wildlife movement. A second 4-foot box culvert will be placed above the 6-foot by 6-foot culvert to allow for wildlife movement during high flow events (Figure 10).

Section 7.5.2 of the MSHCP in part states:

- Small and medium sized mammal crossings should be placed at least every 300 meters and small and medium sized mammal crossings should be varied in size to accommodate a variety of mammal species.

Status: 300 meters is nearly at the southern property boundary when measured from the proposed undercrossing and would only facilitate movement to a narrow strip of habitat between I-215 and McElwain Road. As a result, additional small mammal crossings are not proposed.

- 1.0 to 1.5-meter culverts should be installed to support medium sized (e.g., coyote, raccoon).

Status: The undercrossing meets this requirement.

- Smaller, 0.5 to 1.0 meter culverts should be installed for small mammals, reptiles, and amphibians. These smaller structures are preferred by mice, weasels, and other small wildlife.

Status: The 4-foot box culvert crossing meets this criteria.

- Dirt, rock, or concrete benches should be installed on at least one side of the large mammal crossing facility in order to allow wildlife to cross during most storm event circumstances.

Status: As noted, the undercrossing is not intended to facilitate large mammal movement.

The MSHCP also states that "All undercrossings and culverts which are intended to get wildlife usage, will be designed in a manner which allows a dry crossing under nearly all circumstances. This will include designing an elevated bench above the normal high water line or providing a textured gentle slope up the side of the culvert/undercrossing." McElwain Road will include a 6-foot by 6-foot box culvert in the channel bottom, along with a 4-foot box culvert above the 100-year flood level for an all-weather undercrossing.

Directional fencing shall be provided at the undercrossing to direct wildlife into the undercrossings. Existing vegetation is fairly open at the proposed crossing location. Areas around the openings will be augmented with appropriate native species to facilitate wildlife usage.

- Narrow Endemic Plant Species will be avoided; if avoidance is not feasible, then mitigation as described in the Narrow Endemics Plant Policy will be implemented.

Status: No Narrow Endemic Plant Species occur within the McElwain Road ROW.

- Any construction, maintenance, and operation activities that involve clearing of natural vegetation will be conducted outside the active breeding season (March 1 through June 30).

Status: The Project will be conditioned to avoid clearing of vegetation during the breeding season.

- Prior to design and construction of transportation facilities, biological surveys will be conducted within the study area for the facility including vegetation mapping and species surveys and/or wetland delineations. The appropriate biological surveys to be conducted will be based on field conditions and recommendations of the project manager in consultation with a qualified biologist. The results of the biological resources investigations will be mapped and documented. The documentation will include preliminary conclusions and recommendations regarding potential effects of facility construction on MSHCP Conservation Area resources and methods to avoid and minimize impacts to MSHCP Conservation Area resources in conjunction with project siting, design, construction, and operation. The project biologist will work with facility designers during the design and construction phase to ensure implementation of feasible recommendations.

Status: Surveys have been conducted for McElwain Road. The project biologist has worked with the project design team in developing the alignment and design criteria.

McElwain Road is consistent with Section 7.5.1 of the MSHCP.

5.4 NESTING BIRDS

Development of the proposed project could disturb or destroy active migratory bird nests including eggs and young. Disturbance to or destruction of migratory bird eggs, young, or adults is in violation of the MBTA and is, therefore, considered to be a potentially significant impact.

5.5 SENSITIVE PLANTS

The proposed project includes impacts to sensitive plants in additional to the CASSA species (round-leaved filaree). These impacts include approximately 14,850 (56 percent) individual long-spined spineflower, 1,500 (33 percent) Parry's spineflower, 270 (36 percent) Palmer's grapplinghook, and 50 paniculate tarplant.

Long-spined spineflower and Palmer's grapplinghook are fully covered species under the MSHCP that do not require species specific mitigation. Both species will benefit from on-site conservation: 11,510 individuals of long-spined spineflower and 3,040 individuals of Palmer's grapplinghook.

Parry's spineflower will be considered a fully covered species once 10 distinct populations of a minimum of 1,000 individuals are conserved. The project proposes conservation of approximately 66 percent (3,056 individuals) of the plants that occur on the property (Figure 9). This conservation includes a patch of approximately 1,680 individuals, and another of over 500 individuals near the northwest and southwest edges of the property. The conservation also includes a patch of approximately 350 individuals near the western edge of the proposed impact area, and a patch of approximately 150 individuals just south of the eastern side of the project impact area. The proposed conservation of over 3,000 individuals that includes a patch of approximately 1,680 plants qualifies as one of the 10 populations required to consider this species adequately conserved and covered under the MSHCP.

Paniculate tarplant is not an MSHCP covered species. It is a CNPS list 4.2 sensitive plant species. CNPS list 4 is a watch list of plant species that are not rare on a statewide basis but are limited in distribution or uncommon enough that their status should be monitored. Impacts to 100 individual paniculate tarplant are not significant, and do not require species specific mitigation.

5.6 SENSITIVE ANIMALS

San Diego black-tailed jackrabbit, southern California rufous-crowned sparrow, Cooper's hawk, and red-diamond rattlesnake are California state species of concern, and were observed in the study area. The unlisted species, white-tailed kite, a CDFW fully protected species, and California horned lark, a CDFW watch list species, are present in the study area. All of these species are fully covered under the MSHCP and do not require species specific mitigation. The MSHCP does not cover impacts to nesting birds that are protected under the MBTA. Impacts to nesting birds such as Cooper's hawk, southern California rufous-crowned sparrow, white-tailed kite, and all other birds protected under the MBTA are considered significant.

6.0 MITIGATION

6.1 RIPARIAN/RIVERINE

The proposed mitigation for Riparian/Riverine resources is also the proposed mitigation for the impacts to 2.7010 acres of CDFW jurisdictional habitats. This mitigation will also more than cover the impacts to 0.59 acre of WUS. The final mitigation for impacts to waters of the State and WUS will be determined by the appropriate agencies during the permitting process. Mitigation for impacts to Riparian (vegetated) resources will be at a 3:1 ratio, for a total of 2.91 acres. The Riverine resources (streambed) will be mitigated at a 2:1 ratio, for a total of 2.26 acres (Table 15). An additional 0.4834 acres will be required for impacts to Riverine resources associated with fuel modification zones (Appendix D). A total of 5.6534 acres of mitigation will occur via off-site purchase of credits from an approved Mitigation Bank or In Lieu Fee program, off-site habitat restoration, or other mitigation method as approved by the City and other resource agencies.

If off-site habitat restoration is proposed, a Habitat Mitigation and Monitoring Program will be prepared and submitted to the City, USFWS, CDFW and RCA for review, with the City having final approval authority. The Mitigation Bank and In Lieu Fee options will provide for mitigation within a much broader conservation context with resources that will be of an equal or greater conservation value to the coast live oak woodland, riparian woodland, southern willow scrub, mule fat scrub and streambed resources. The proposed mitigation bank option is the Riverpark Mitigation Bank. The Riverpark Mitigation Bank provides for re-establishment of alkali playa and vernal pool habitats which are two of the rarest habitat types in the MSHCP. Mitigation for unavoidable impacts to Riparian/Riverine areas will be biologically equivalent to resources being impacted by the proposed project. Mitigation for unavoidable impacts to Riparian/Riverine areas will be biologically equivalent to resources being impacted by the proposed project. There will be a minimum of 6.11 acres of on-site riparian/riverine conservation and 4.10 additional acres of avoidance in the LNP. The 4.10 acres of avoidance within the LNP will be protected via a deed restriction that precludes impacts to these Riparian/Riverine resources.

Table 15
MITIGATION FOR IMPACTS TO RIPARIAN/RIVERINE RESOURCES

VEGETATION TYPE	IMPACTS*	MITIGATION RATIO	MITIGATION REQUIRED*
Coast live oak woodland	0.42	3:1	1.26
Riparian woodland	0.04	3:1	0.12
Southern willow scrub	0.36	3:1	1.08
Mule fat scrub	0.15	3:1	0.45
Streambed	1.13	2:1	2.26
Streambed (Fuel Modification)	0.6010	See Appendix D	0.4834
TOTAL	**2.7010**		5.6534

* acres

Mitigation measures to minimize impacts to waters include:

- Standard Best Management Practices (BMPs) will be used to minimize the impacts during construction (See also Section 5.3.3 above);

- Equipment will be stored in upland areas, outside of drainages except as required by project design (restoration, trash removal, etc.);

- Source control and treatment control BMPs will be implemented to minimize the potential contaminants that are generated during and after construction. Source control BMPs include landscape planning, roof runoff controls, trash storage areas, use of alternative building materials, and education of future tenants and residents. Treatment control BMPs includes detention basins, vegetated swales (bio-swales), drain inlets, and vegetated buffers. Water quality BMPs will be implemented throughout the project to capture and treat contaminants.

- To avoid attracting predators, the project shall be kept clean of debris to the extent possible. All food related trash items shall be enclosed in sealed containers and regularly removed from site.

- Employees shall strictly limit their activities, vehicles, equipment and construction material to the proposed project footprint, staging areas, and designated routes of travel.

- Construction limits shall be fenced with orange snow screen and exclusion fencing should be maintained until the completion of construction activities.

- 0.39 acre of the Riparian/Riverine impacts are proposed to be limited to vegetation removal, with no ground impacts.

6.2 NESTING BIRDS

The clearing of vegetation shall occur outside of the bird breeding season (February 15 to August 31), unless a qualified biologist demonstrates to the satisfaction of the City that all nesting is complete through completion of a Nesting Bird Clearance Survey. A Nesting Bird Clearance Survey report shall be submitted to the City for review and approval prior to initiating clearing and grubbing during the breeding season. Clearing of upland vegetation outside of the bird breeding season will not require a nesting bird clearance survey.

Additionally, raptors (birds of prey such as Cooper's hawk and white-tailed kite) are known to begin nest building in January or February. If vegetation clearing is to occur between January 1 and February 15, a nesting raptor survey will be conducted. A buffer zone will be established by the biologist for any active raptor nest that is found to prevent impact to nesting raptors.

6.3 LANDSCAPING

No species on List 6.2 of the MSHCP (Appendix C of the MSHCP) shall be utilized on the site (including any hydroseed mix used for interim erosion control) for consistency with Section 6.1.4 of the MSHCP.

6.4 MITIGATION FEES

The MSHCP Local Mitigation Development Fee in the amount of $7,164 per acre for industrial or commercial uses, $2,104 per dwelling unit for residential development of less than eight units per acre, $1,347 per dwelling unit for residential development between 8.1 and 14 dwelling units per acre, and $1,094 per dwelling unit for development greater than 14.1 dwelling unit per acre (Regional Conservation Authority 2019) must be paid at the time a certificate of occupancy is issued for the residential unit or development project or upon final inspection (whichever occurs first). The applicant is requesting that the dedication of 607.74 acres for conservation be offset through MSHCP fee credits up to the value of the land being dedicated for conservation.

6.5 BURROWING OWL

A pre-construction burrowing owl survey will be conducted within 30 days prior to initiation of onsite project activities in accordance with the County's survey guidelines (Riverside 2006). If burrowing owls have colonized the project site prior to the initiation of construction, the project proponent should immediately inform RCA and the Wildlife Agencies, and may include preparation of a *Burrowing Owl Protection and Relocation Plan*, prior to initiating ground disturbance.

7.0 CERTIFICATION/QUALIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: September 12, 2019 SIGNED: _____

Barry L. Jones
Senior Consulting Biologist

Fieldwork Performed By:

Doug Allen	M.S., Biology (Conservation Ecology), San Diego State University, 1996 B.S., Biology, San Diego State University, 1983
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Appendix A

Plant Species Observed

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Appendix A
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
DICOTYLEDONES			
Amaranthaceae	*Amaranthus albus**	White tumbleweed	uncommon
	*Amaranthus blitodes***	prostrate amaranth	scarce to uncommon
	Amaranthus palmeri	Palmer's amaranth	scarce
	*Amaranthus retroflexus**	rough pig weed	scarce
	Malosma laurina	laurel sumac	scarce
	Rhus aromatic	Basket brush	uncommon
	*Schinus molle**	Peruvian pepper tree	uncommon
	Toxicodendron diversilobum	poison oak	common
Apiaceae	*Apiastrum angustifolium*	Mock parsely	uncommon
	Daucus pusillus	American wild carrot	uncommon
	Lomatium dasycarpum	wooly lomatium	scarce to uncommon
	Sanicula crassicaulis	pacific sanicle	scarce
Apocynaceae	*Nerium oleander**	oleander	scarce
Asteraceae	*Acourtia microcephala*	sacapellote	scarce
	Ancistrocarphus filagineus	Wooly fishhooks	scarce
	*Anthemis cotula**	mayweed	uncommon
	Artemisia californica	California sagebrush	uncommon
	Baccharis pilularis	coyote brush	scarce
	Baccharis salicifolia	mule fat	scarce
	Baccharis salicina	emory baccharis	scarce
	Bebbia juncea var. *aspera*	sweetbush	scarce
	Brickellia californica	brickellbrush	scarce
	*Carthamus tinctorius**	safflower	cultivated
	*Centaurea melitensis**	Tocalote/Maltese star thistle	scarce
	Chaenactis artemisiifolia	artemisia pincushion	scarce
	Chaenactis glabriuscula	yellow pincushion	scarce
	*Cirsium vulgare**	bull thistle	scarce
	Corethrogyne filaginfolia	California aster	common
	*Cotula australis**	Australian brassbuttons	scarce
	Deinandra fasciculata	fascicled tarplant	common
	Deinandra kelloggii	Kellogg's tarplant	uncommon
	Deinandra paniculata†	paniculate tarplant	uncommon
	Encelia farinosa	brittlebush	scarce

Appendix A (cont.)
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
DICOTYLEDONES			
Asteraceae (cont.)	*Erigeron canadensis*	horseweed	uncommon
	Erigeron foliosus	leafy daisy	uncommon
	Eriophyllum confertiflorum	golden-yarrow	common
	Eriophyllum multicaule	many-stem wooly sunflower	scarce
	Gnaphalium palustre	western marsh cudweed	scarce
	Gutierrezia californica	San Joaquin snakeweed	uncommon
	Hazardia squarrosa	sawtooth goldenbush	uncommon
	*Hedypnois cretica**	crete weed	locally common
	Helianthus annuus	annual sunflower	scarce
	Helianthus gracilentus	slender sunflower	uncommon
	*Hypochaeris glabra**	smooth cat's-ear	common
	*Lactuca serriola**	wild lettuce	uncommon
	Lasthenia coronaria	royal goldfields	scarce
	Layia platyglossa	tidy tips	scarce
	Logfia arizonica	Arizona filago	uncommon
	Logfia californica	fluffweed	uncommon
	*Logfia gallica**	narrowleaf filago	uncommon
	*Matricaria discoidea**	pineapple weed	scarce
	*Matricaria globifera**	clustered chamomille	locally common
	Microseris douglasii	Douglas's microseris	scarce
	Microseris heterocarpa	grassland stebbinsoseris	uncommon
	Microseris lindleyi	silverpuffs	fairly common
	Porophyllum gracile	odora	scarce
	Pseudognaphalium biolettii	biclolor cudweed	scarce
	Pseudognaphalium canescens	white everlasting	scarce
	*Pseudognaphalium luteoalbum**	weedy cudweed	scarce
	Pseudognaphalium stramineum	cotton-batting plant	scarce
	Rafinesquia californica	California plumseed	scarce
	*Senecio vulgaris**	common groundsel	scarce
	*Sonchus asper**	prickly sow-thistle	uncommon
	*Sonchus oleraceus**	common sow-thistle	scarce

Appendix A (cont.)
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
DICOTYLEDONES (cont.)			
Asteraceae (cont.)	*Stephanomeria virgata*	virgate wreath-plant	uncommon
	Stylocline gnapholoides	everlasting nest straw	scarce
	Tetradymia comosa	cotton thorn	scarce
	Pseudognaphalium californicum	California everlasting	uncommon
Boraginaceae	*Amsinckia intermedia*	common fiddleneck	fairly common
	Amsinckia retrorsa	harvest fiddleneck	scarce
	Cryptantha intermedia	nievitas	uncommon
	Cryptantha microstachys	Tejon cryptantha	uncommon
	Cryptantha muricata	pointed cryptantha	scarce
	Harpagonella palmeri†	Palmer's grapplinghook	locally common
	Pectocarya linearis	sagebrush combseed	fairly common
	Pectocarya penicillata	winged pectocarya	scarce
	Pectocarya recurvata	curvenut combseed	scarce
	Plagiobothrys canescens	valley popcornflower	scarce
	Plagiobothrys collinus	Cooper's popcornflower	scarce
Brassicaceae	*Brassica tournefortii**	mustard	scarce
	*Capsella bursa-pastoris**	shepard's purse	scarce
	Caulanthus heterophyllus var. *pseudosimulans*	San Diego wild cabbage	scarce
	*Hirschfeldia incana**	shortpod mustard	common
	*Lepidium didymum**	lesser swinecress	scarce
	Lepidium virginicum var. *robinsonii*†	Robinson's pepperweed	scarce
	*Raphanus sativus**	wild radish	locally common
	*Sisymbrium irio**	london rocket	scarce
	*Sisymbrium orientale**	Indian hedgemustard	scarce
Cactaceae	*Cylindropuntia californica*	cane cholla	scarce
Campanulaceae	*Nemacladus ramosissimus*	Nuttall's threadplant	scarce
Caprifoliaceae	*Sambucus nigra* ssp. *caerulea*	blue elderberry	uncommon
Caryophyllaceae	*Cerastium glomeratum**	sticky chickweed	uncommon
	Herniaria hirsuta ssp. *cinerea**	hairy rupturewort	scarce
	Loeflingia squarrosa	spreading pygmyleaf	scarce

Appendix A (cont.)
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
DICOTYLEDONES (cont.)			
Caryophyllaceae (cont.)	*Silene antirrhina*	sleepy silene	scarce
	*Silene gallica**	common catchfly	scarce
	*Spergularia rubra**	ruby sandspurry	scarce
	Spergularia sp.	sandspurry	scarce
	*Stellaria media**	common chickweed	scarce
Chenopodiaceae	*Chenopodium berlandieri*	pitseed goosefoot	scarce
	Chenopodium desiccatum	aridland goosefoot	scarce
	*Chenopodium murale**	nettleleaf goosefoot	uncommon
	*Kochia scoparia**	Mexican fireweed	scarce
	*Salsola tragus**	prickly Russian thistle	scarce
Convolvuaceae	*Calystegia macrostegia*	morning glory	scarce
	*Convolvulus arvensis**	field bindweed	scarce
Crassulaceae	*Crassula connata*	pygmy-weed	scarce
	Dudleya lanceolata	lanceleaf liveforever	scarce
Cucurbitaceae	*Marah macrocarpus*	wild cucumber	uncommon
Cuscutaceae	*Cuscuta californica*	chaparral dodder	uncommon
Euphorbiaceae	*Croton setigerus*	dove weed	common
	Euphorbia albomarginata	rattlesnake weed	scarce
	*Euphorbia peplus**	petty spurge	scarce
	Euphorbia polycarpa	smallseed sandmat	uncommon
Fabaceae	*Acmispon americanus*	spanish clover	fairly common
	Acmispon brachycarpus	foothill deervetch	fairly common
	Acmispon glaber	deer weed	uncommon
	Acmispon micranthus	grab lotus	uncommon
	Acmispon strigosus	bishop's lotus	scarce
	Astragalus gambelianus	Gambel's dwarf milkvetch	scarce
	Lupinus bicolor	miniature lupine	uncommon
	Lupinus microcarpus	Parish stream lupine	scarce
	Lupinus truncatus	collar lupine	scarce
	*Medicago polymorpha**	bur-clover	scarce
	*Melilotus indicus**	annual yellow sweetclover	scarce

Appendix A (cont.)
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
DICOTYLEDONES (cont.)			
Fagaceae	*Quercus agrifolia*	coast live oak	locally abundant
	Quercus berberidifolia	scrub oak	scarce
Gentianaceae	*Zeltnera venusta*	canchalagua	scarce
Geraniaceae	*California macrophylla*†	round-leaved filaree	scarce
	*Erodium botrys**	long-beak filaree	scarce
	*Erodium cicutarium**	red-stem filaree	common
	*Erodium moschatum**	green-stem filaree	scarce
Hydrophyllaceae	*Emmenanthe penduliflora*	whispering bells	uncommon
	Eucrypta chrysanthemifolia	common eucrypta	fairly common
	Phacelia cicutaria	caterpillar phacelia	fairly common
	Phacelia minor	wild Canterbury bell	scarce
Lamiaceae	*Marrubium vulgare**	horehound	scarce
	Salvia apiana	white sage	scarce
	Salvia columbariae	chia	scarce
	Salvia mellifera	black sage	abundant
	Scutellaria tuberosa	Danny's skullcap	scarce
	Stachys rigida	rough hedgenettle	uncommon
	Trichostema lanceolatum	vinegar weed	uncommon
Malvaceae	*Abutilon theophrasti**	velvetleaf	scarce
	Malacothamnus fasciculatus	chaparral mallow	uncommon
	*Malva parviflora**	cheeseweed	scarce
Myrtaceae	*Eucalyptus amplifolia**	cabbage gum	uncommon
	*Eucalyptus camaldulensis**	red gum	scarce
Nyctaginaceae	*Mirabilis laevis*	desert wishbone-bush	scarce
Oleaceae	*Olea europaea**	olive	scarce
Onagraceae	*Camissonia californica*	California suncup	scarce
	Camissoniopisis hirtella	Santa Cruz island suncup	uncommon
	Camissoniopsis bistorta	southern suncup	scarce
	Clarkia purpurea	purple clarkia	scarce
	Epilobium ciliatum	fringed willowherb	scarce
	Clarkia epilobioides	canyon clarkia	scarce
Papaveraceae	*Dicentra chrysantha*	golden eardrops	scarce
	Eschscholzia californica	California poppy	scarce

Appendix A (cont.)
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
DICOTYLEDONES (cont.)			
Plantaginaceae	*Plantago erecta*	plantain	locally common
Plantanaceae	*Platanus racemosa*	western sycamore	scarce
Polemoniaceae	*Allophyllum* sp.	false gilyflower	scarce
	Eriastrum filifolium	lavender woollystar	scarce
	Eriastrum sapphirinum	sapphire woollystar	scarce
	Gilia sp.	gilia	scarce
	Navarretia atractyloides	hollyleaf pincushionplant	uncommon
Polygonaceae	*Chorizanthe coriacea*	leather spineflower	scarce
	Chorizanthe fimbriata	fringed spineflower	uncommon
	Chorizanthe parryi sp. *parryi*†	Parry's spineflower	uncommon
	Chorizanthe polygonoides var. *longispina*†	long-spined spineflower	uncommon
	Eriogonum fasciculatum ssp. *foliolosum*	leafy buckwheat	abundant
	Eriogonum fasciculatum ssp. *polifolium*	rosemary flat-topped buckwheat	uncommon
	Eriogonum gracile	slender woolly buckwheat	uncommon
	Eriogonum thurberi	Thurber's buckwheat	scarce
	Pterostegia drymarioides	California thread-stem	uncommon
	*Rumex crispus**	curly dock	uncommon
Pontederiaceae	*Eichhornia crassipes**	common water hyacinth	scarce
Portulacaceae	*Calandrinia ciliata*	fringed redmaids	uncommon
	Calyptridium monandrum	sand-cress	scarce
	Claytonia parviflora	streambank springbeauty	uncommon
	Claytonia perfoliata	miners lettuce	scarce
	*Portulaca oleracea**	purslane	scarce
Primulaceae	*Anagallis arvensis**	scarlet pimpernel	scarce
Ranunculaceae	*Delphinium parryi*	blue larkspur	scarce
Rhamnaceae	*Ceanothus crassifolius*	hoary leafed ceanothus	common
	Rhamnus crocea	spiny redberry	scarce

Appendix A (cont.)
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
DICOTYLEDONES (cont.)			
Rosaceae	*Adenostoma fasiciculatum*	chamise	abundant
	Adenostoma sparsifolium	red shank	scarce
	Heteromeles arbutifolia	toyon	scarce
Rubiaceae	*Galium angustifolium*	narrow-leaved bedstraw	uncommon
	*Galium aparine**	goosegrass	common
	Galium porrigens	graceful bedstraw	uncommon
Salicaceae	*Populus fremontii*	western cottonwood	scarce
	Salix gooddingii	Goodding's black willow	scarce
	Salix laevigata	red willow	scarce
	Salix lasiolepis	arroyo willow	uncommon
Salviniaceae	*Salvinia molesta**	giant water fern	scarce
Scrophulariaceae	*Antirrhinum coulterianum*	Coulter's snapdragon	scarce
	Antirrhinum kelloggii	Kellogg's snapdragon	scarce
	Antirrhinum nuttallianum	violet snapdragon	scarce
	Castilleja affinis ssp. *affinis*	purple owl's clover	scarce
	Castilleja exserta	exserted Indian paintbrush	scarce
	Cordylanthus rigidus	stiffbranch bird's beak	uncommon
	Keckiella antirrhinoides	snapdragon penstemon	uncommon
	Mimulus aurantiacus	bush monkey flower	scarce
	Mimulus brevipes	hillside monkey-flower	uncommon
	Mimulus cardinalis	scarlet monkey-flower	uncommon
	Mimulus floribundus	many-flowered monkey flower	scarce
	Mimulus guttatus	seep monkey flower	uncommon
	Mimulus pilosus	false monkey flower	scarce
	Nuttallanthus texanus	Texas toadflax	scarce
	Penstemon spectabilis	beard-tongue	scarce
	Scrophularia californica	California figwort	uncommon
	Veronica anagallis-aquatica	water speedwell	scarce
Selaginaceae	*Selaginella bigelovii*	bushy spikemoss	scarce
Simaroubaceae	*Ailanthus altissima**	tree of heaven	scarce

Appendix A (cont.)
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
DICOTYLEDONES (cont.)			
Solanaceae	*Datura wrightii*	jimson weed	scarce
	*Nicotiana glauca**	tree tobacco	scarce
	Nicotiana quadrivalvis	Indian tobacco	uncommon
	Solanum americanum	American black nightshade	scarce
	Solanum xanti	purple nightshade	uncommon
Tamaricaceae	*Tamarix aphylla**	athel tamarisk	scarce
	*Tamarix ramosissima**	saltcedar	scarce
Typhaceae	*Typha latifolia*	broad-leaved cattail	scarce
Ulmaceae	*Ulmus parvifolia**	chinese elm	scarce
Verbenaceae	*Verbena lasiostachys*	western vervain	uncommon
MONOCOTYLEDONES			
Juncaceae	*Juncus balticus*	Baltic rush	scarce
	Juncus bufonius	toad rush	scarce
	Juncus textilis	basket rush	scarce
	Juncus triformis	Yosemite dwarf rush	scarce
	Juncus xiphioides	Irishleaf rush	scarce
Liliaceae	*Allium haematochiton*	redskin onion	scarce
	Calochortus splendens	lilac mariposa	uncommon
	Dichelostemma capitatum	blue dicks	uncommon
	Hesperoyucca whipplei	our Lord's candle	uncommon
	Hesperolinon micranthum	smallflower dwarf-flax	locally fairly common
Poaceae	*Arundo donax**	giant reed	scarce
	*Avena barbata**	slender wild oat	uncommon
	*Avena fatua**	wild oat	common
	*Avena sativa**	cultivated oat	cultivated
	*Bromus diandrus**	ripgut grass	uncommon
	*Bromus hordeaceus**	soft brome	common
	Bromus madritensis ssp. *rubens**	red brome	common
	*Bromus tectorum**	cheat grass	scarce
	*Cynodon dactylon**	Bermuda grass	scarce
	Elymus condensatus	giant wild rye	uncommon
	Elymus glaucus	blue wild rye	scarce

Appendix A (cont.)
PLANT SPECIES OBSERVED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME	SITE ABUNDANCE
MONOCOTYLEDONES (cont.)			
Poaceae (cont.)	*Festuca microstachys*	desert fescue	scarce
	*Festuca myuros**	rat-tail fescue	fairly common
	*Festuca octoflora**	six-weeks' fescue	uncommon
	*Hordeum murinum**	mouse barley	uncommon
	*Lamarckia aurea**	goldentop grass	scarce
	Melica frutescens	woody melicgrass	scarce
	Melica imperfecta	smallfower melicgrass	uncommon
	Muhlenbergia microsperma	littleseed muhly	scarce
	Muhlenbergia rigens	deer grass	scarce
	*Phalaris paradoxa**	hood canarygrass	scarce
	*Poa annua**	annual bluegrass	scarce
	*Polypogon monspeliensis**	rabbitsfoot grass	scarce
	*Schismus barbatus**	Mediterranean schismus	uncommon
	Stipa coronata	needle and thread	scarce
	Stipa lepida	foothill needlegrass	common
PTERIDOPHYTES			
Pteridaceae	*Pellaea andromedifolia*	coffee fern	scarce
	Pellaea mucronata	bird's foot fern	scarce
	Pityrogramma triangularis	goldenback fern	scarce

*Non-native species
†Sensitive species as shown on the Special Vascular Plants, Bryophytes, and Lichens list (CDFW 2016)

California Department of Fish and Wildlife (CDFW), Natural Diversity Database. April 2016. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. 126 pp.

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Appendix B

Animal Species Observed or Detected

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Appendix B
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME
INVERTEBRATES		
Anthophoridae	*Xylocopa* spp.	carpenter bee
Apiidae	*Apis mellifera mellifera*	honey bee
Formicidae	*Messor* spp.	harvester ant
	Pogonomyrex spp.	harvester ant
Hesperiidae	*Erynnis tristis*	mournful duskywing
Hesperiidae subfamily Pyrginae	*Erynnis funeralis*	funereal duskywing butterfly
Nymphalinae	*Vanessa cardui*	painted lady butterfly
Papilioninae	*Papilio eurymedon*	pale swallowtail butterfly
Pieridae	*Colias sp.*	sulfur butterfly
	Pieris protodice	common white butterfly
	Pieris rapae	cabbage white butterfly
Polyommatinae	*Icaricia acmon*	Acmon blue butterfly
	Leptotes marina	Marine blue butterfly
Riodinidae	*Apodemia mormo virgulti*	Behr's metalmark butterfly
Tenebrionidae	*Eleodes* spp.	darkling beetle
VERTEBRATES		
Reptiles		
Phrynosomatidae	*Sceloporus occidentalis*	western fence lizard
	Uta stansburiana	common side-blotched lizard
Viperidae	*Crotalus ruber*†	red-diamond rattlesnake
Birds		
Accipitridae	*Accipiter cooperii*†	Cooper's hawk
	Buteo jamaicensis	red-tailed hawk
	Circus cyaneus†	northern harrier
	Elanus leucurus†	white-tailed kite
Aegithalidae	*Psaltriparus minimus*	bushtit
Alaudidae	*Eremophia alpestris*†	horned lark
	Eremophila alpestris actia†	California horned lark
Cardinalidae	*Guiraca caerulea*	blue grosbeak
	Pheucticus melanocephalus	black-headed grosbeak
Cathartidae	*Cathartes aura*	turkey vulture
Charadriidae	*Charadrius vociferous*	killdeer

Appendix B (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

FAMILY	SCIENTIFIC NAME	COMMON NAME
VERTEBRATES		
Birds (cont.)		
Columbidae	*Columba livia*	rock dove
	Zenaida macroura	mourning dove
Corvidae	*Aphelocoma californica*	western scrub jay
	Corvus brachyrhynchos	American crow
	Corvus corax	common raven
Cuculidae	*Geococcyx californianus*	greater road runner
Emberizadae	*Junco hyernalis*	dark-eyed junco
	Aimophila ruficeps canescens†	southern California rufous-crowned sparrow
	Chondestes grammacus	lark sparrow
	Melospiza melodia	song sparrow
	Pipilo crissalis	California towhee
	Pipilo maculatus	spotted towhee
	Spizella atrogularis	black-chinned sparrow
Falconidae	*Falco sparverius*	American kestrel
Fringillidae	*Carduelis lawrencei*	Lawrence's goldfinch
	Carduelis psaltria	lesser goldfinch
	Carduelis tristis	American goldfinch
	Carpodacus mexicanus	house finch
Icteridae	*Icterus bullockii*	Bullock's oriole
	Molothrus ater	brown-headed cowbird
	Sturnella neglecta	western meadowlark
Mimidae	*Mimus polyglottos*	northern mockingbird
	Toxostoma redivivum	California thrasher
Odontophoridae	*Callipepla californica*	California quail
Paridae	*Baelophus inornatus*	oak titmouse
Parulidae	*Geothlypis trichas*	common yellowthroat
	Vermivora celata	orange-crowned warbler
	Wilsonia canadensis	Wilson's warbler
Picidae	*Caloptes auratus*	northern flicker
	Picoides nuttallii	Nuttall's woodpecker
Ptilogonatidae	*Phainopepla nitens*	phainopepla
Sylviidae	*Polioptila californica californica*†	coastal California gnatcather
Timaliidae	*Chamaea fasciata*	wrentit
Trochilidae	*Calypte anna*	Anna's hummingbird
	Calypte costae†	Costa's hummingbird
	Selasphorus sasin	Allen's hummingbird

Appendix B (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED – MURRIETA HILLS

FAMILY	**SCIENTIFIC NAME**	**COMMON NAME**
VERTEBRATES		
Birds (cont.)		
Troglodytidae	*Thryomanes bewickii*	Bewick's wren
	Troglodytes aedon	house wren
Tyrannidae	*Contopus sordidulus*	western wood-pewee
	Empidonax difficilis	Pacific slope flycatcher
	Myiarchus cinerascens	ash-throat flycatcher
	Sayornis nigricans	black phoebe
	Sayornis saya	Say's phoebe
	Tyrannus verticalis	western kingbird
Vireonidae	*Vireo huttoni*	Hutton's vireo
Mammals		
Canidae	*Canis familiaris*	domestic dog
	Canis latrans	coyote
Cervidae	*Odocoileus hemionus*	mule deer
Equidae	*Equus caballus*	horse
Felidae	*Puma concolor*	mountain lion
Heteromyidae	*Dipodomys* spp.	kangaroo rat
Leporidae	*Lepus californicus bennettii*†	San Diego black-tailed jack rabbit
	Sylvilagus audubonii	desert cottontail
Mephitidae	*Mephitis mephitis*	striped skunk
Muridae	*Neotoma* sp.	desert woodrat
Sciuridae	*Spermophilus beecheyi*	California ground squirrel

†Sensitive species, including animals shown on the Special Animals List (CDFW 2016). Animals identified only to Genus are potentially sensitive if at least one member of the Genus has potential to occur on the site.

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Appendix C

Explanation of Status Codes for Plant and Animal Species

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Appendix C
EXPLANATION OF STATUS CODES FOR PLANT AND ANIMAL SPECIES

U.S. Fish and Wildlife Service (USFWS)

BCC Birds of Conservation Concern
FE Federally listed endangered
FT Federally listed threatened

California Department of Fish and Wildlife (CDFW)

SE State listed endangered
ST State listed threatened
SSC State species of special concern

Multiple Species Habitat Conservation Plan (MSHCP) Covered

MSHCP Covered indicates that the species is part of a proposed list of species (146 total) considered at this time to be adequately conserved by the Western Riverside MSHCP, provided that participants meet all conditions listed in the Final MSHCP.

California Native Plant Society (CNPS) Codes

Lists

1A = Presumed extinct.

1B = Rare, threatened, or endangered in California and elsewhere. Eligible for state listing.

2 = Rare, threatened, or endangered in California but more common elsewhere. Eligible for state listing.

3 = Distribution, endangerment, ecology, and/or taxonomic information needed. Some eligible for state listing.

4 = A watch list for species of limited distribution. Needs monitoring for changes in population status. Few (if any) eligible for state listing.

List/Threat Code Extensions

.1 = Seriously endangered in California (over 80 percent of occurrences threatened/high degree and immediacy of threat)

.2 = Fairly endangered in California (20 to 80 percent occurrences threatened)

.3 = Not very endangered in California (less than 20 percent of occurrences threatened, or no current threats known)

A "CA Endemic" entry corresponds to those taxa that only occur in California.

All List 1A (presumed extinct in California) and some List 3 (need more information; a review list) plants lacking threat information receive no threat code extension. Threat Code guidelines represent only a starting point in threat level assessment. Other factors, such as habitat vulnerability and specificity, distribution, and condition of occurrences are considered in setting the Threat Code.

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Appendix D

Murrieta Hills Fuel Modification Clearing Within and Adjacent to Riverine Resources

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Memorandum

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942
619.462.1515 **tel**
619.462.0552 **fax**
www.**helixepi**.com

Date: July 24, 2019

To: Ron Goldman, City of Murrieta

cc: Rick Robotta, Benchmark Pacific

From: Barry Jones

Subject: Murrieta Hills Fuel Modification Clearing Within and Adjacent to Riverine Resources

HELIX Project: PHC-19

Message:

This memo addresses proposed fuel modification planned in proximity of the Riverine Resources for Murrieta Hills Project and provides an assessment of potential impacts to certain Riverine resources. As more fully described herein, impacts resulting from fuel modification adjacent to Riverine resources are not expected to result in complete loss of functions and services associated with Riverine resources.

Fuel modification or thinning completed in accordance with the project's Fire Protection Technical Report[1] includes the following three general classifications: Fuel Modification Zone (FMZ) 1, FMZ 2, and Internal Oak-dominated Open Space (also known as FMZ 3).

FMZs 1 and 2 occur primarily at the outer edges of development, or the area between development and the preserved habitat. The specifications for treatment of these areas include measures for trees, shrubs, and groundcovers and are spelled out in Table 1, *Fuel Modification Zones 1, 2, and 3: Fire Management Requirements and Specifications*. Approximately 0.0188 acre of Riverine drainages occur in FMZ 1 and approximately 0.1387 acre of Riverine drainages occur in FMZ 2 (Attachment A).

FMZ 3 applies only to the undeveloped corridor along the largest on-site drainage, known as the "Internal Oak-Dominated Open Space" in the project's Fire Protection Technical Report. This corridor is flanked by development along its entire length and treatment is spelled out in Table 1.

[1] Dudek. 2019. Approval Draft. Murrieta Hills FIRE PROTECTION TECHNICAL REPORT, Plan No. SP 012-3164, TTM 35853. July. 112 pp., plus appendices.

Table 1
FUEL MODIFICATION ZONES 1, 2, AND 3: FIRE MANAGEMENT REQUIREMENTS AND SPECIFICATIONS[1]

Fire Management Plan Page/ Section References	FMZ 1 – Section 5.1, Subsection 5.1.1, Pages 42-43	FMZ 2 – Section 5.1, Subsection 5.1.1, Pages 43-44	Internal Oak-Dominated Open Space / FMZ 3 – Section 5.1, Subsection 5.1.2, Pages 44-45
General	All highly flammable native vegetation, especially plant species found on the Prohibited List (Appendix F of the Fire Protection Technical Report) shall be removed. Species targeted for removal include chamise, California sagebrush, coyote bush, yerba santa, buckwheat, telegraph plant, sticky monkeyflower, laurel sumac, and sage (*Salvia*) species. This zone will be planted with drought-tolerant, less flammable plants from the Murrieta Hills Project Plant Palette (Appendix E of the Fire Protection Technical Report), which was prepared by VDLA Landscape architects and reviewed/revised by the authors of the Fire Protection Technical Report.	Represents a 50% thinning zone – 50% less fuel than on adjacent unmaintained preserve areas. Zone 2 areas will include removal of dead/dying vegetation, exotics, and plant species listed on the prohibited plant list. Species targeted for removal include chamise, California sagebrush, coyote bush, yerba santa, buckwheat, telegraph plant, sticky monkeyflower, laurel sumac, and sage (*Salvia*) species. Removal of these components will result in 50% thinning of the existing fuels. As necessary to meet the 50% thinning objective, other plants will be removed to create a mosaic of vegetation with adequate spacing and discontinuity. Large shrubs shall not be cut back hard or hedge them into unnatural shapes (sic).	The area will be maintained as an FMZ through annual maintenance of non-jurisdictional areas so that vegetation does not exceed a height of four inches. All plant species found on the Prohibited List (Appendix F of the Fire Protection Technical Report) shall be removed. There are limited areas within this open space that are jurisdictionally protected by California Department of Fish and Wildlife and will be left unmaintained. All of these areas are beyond 150 feet from adjacent structures. Additionally, should mortality of oaks and or willow trees occur in these jurisdictional areas, from drought, insect, disease or other factors, they will be removed or chipped on site to avoid the accumulation of dead fuels.
Vegetation Layer	**Zone 1**	**Zone 2**	**Zone 3**
Tree	Raise canopy 8 feet or 1/3 the height of mature tree.	Only certain tree species are allowed.[3]	See general requirement above
Shrub	Less than 2 feet tall and at a minimum of 5 feet on center.	Single specimen native shrubs, exclusive of chamise and sage, may be retained, on 20-foot centers.	See general requirement above
Ground Cover	75% of this layer shall be limited to a maximum of height of 18 inches. 25% of this layer may reach a height of 24 inches.	75% of this layer shall be limited to a maximum height of 36 inches. 25% of this layer may reach a maximum height of 48 inches.	See general requirement above

Table 1 (cont.)
FUEL MODIFICATION ZONES 1, 2 AND 3: FIRE MANAGEMENT REQUIREMENTS AND SPECIFICATIONS[1]

Vegetation Layer	Zone 1	Zone 2	Zone 3
Irrigation Requirement	This irrigated high plant moisture zone shall be serviced by a permanent automatic irrigation system that keeps plants hydrated via efficient drip irrigation, as defined by the Project's Landscape Architect.	No irrigation.	No irrigation.
Impact[4]	0.0188 acre	0.1389 acre	0.4435 acre

[1] All work being performed in these fuel management zones is being conducted within the development footprint established through the Murrieta Hills HANS process. Work will be done within and/or adjacent to Riverine resources in Zones 1 and 2 and areas outside of / adjacent to designated riparian/riverine areas of Zone 3, and 20 separate and small areas considered jurisdictional in nature. The total impact to areas considered jurisdictional is approximately 0.6 acre.

[2] Appendix F of Approval Draft. Murrieta Hills Fire Protection Technical Report, Plan No. SP 012-3164, TTM 35853 (Dudek 2018).

[3] All native tree species occurring at Murrieta Hills are included on the list of allowable species.

[4] The function and services of the impacted non-wetland jurisdictional features include groundwater recharge, flood conveyance, sediment transport, and some water quality benefits.
Thinning and pruning of vegetation is not expected to have any effects on the groundwater recharge portion of the function and services because groundwater recharge is a function of surface water, slope and soil permeability and all of these would remain unaffected by the proposed vegetation management.
Flood conveyance is the capacity of a drainage feature to convey storm flows. The proposed vegetation management will not constrict or otherwise inhibit the capacity of these drainages to covey storm flows as and when necessary.
Sediment transport is the fluvial movement of sediments in a stream. The vegetation thinning will reduce vegetative cover adjacent to the streambed and there is the potential for minor increases in sediment entering the avoided streambed.

Fuel Modification. Fuel modification is planned in 19 separate and small areas, all of which are considered jurisdictional (Figures 1 and 2a-g; Table 2, *Fuel Modification Acreages*). The total impact area is approximately 0.6010 acre.

Table 2
FUEL MODIFICATION ACREAGES

Drainage	Fuel Modification Zone			Total
	Zone 1[1]	Zone 2[1]	Zone 3[1]	
1		0.0385[3]	0.3287[2,3,4,5,6]	**0.3672**
1.1			0.0023[6]	**0.0023**
1.2	0.0025[3]	0.0089[3]		**0.0114**
1.3	0.0007[3]	0.0062[3]	0.0514[3]	**0.0583**
1.4			0.0248[3]	**0.0248**
1.5		0.0135[4]		**0.0135**
1.7			0.0061[3]	**0.0061**
1.7.1		0.0003[3]		**0.0003**
1.7.2		0.0023[3]		**0.0023**
1.8			0.0067[3]	**0.0067**
1.9		0.0034[3]	0.0096[3]	**0.0130**

Table 2 (cont.)
FUEL MODIFICATION ACREAGES

Drainage	Fuel Modification Zone			Total
	Zone 1[1]	Zone 2[1]	Zone 3[1]	
1.10	0.0035[3]	0.0453[2,3,7]	0.0038[3]	**0.0526**
1.10.1	0.0015[3]	0.0046[3]		**0.0061**
1.10.2		0.0026[3]		**0.0026**
1.10.3		0.0004[7]		**0.0004**
1.11		0.0001[3]		**0.0001**
3	0.0106[3]	0.0114[3]	0.0101[3]	**0.0321**
4		0.0011[3]		**0.0011**
7		0.0001[3]		**0.0001**
TOTAL	**0.0188**	**0.1387**	**0.4435**	**0.6010**

[1] Vegetation communities noted as follows: [2] coastal sage scrub; [3] chaparral; [4] coastal sage scrub/chaparral; [5] eucalyptus woodland; [6] field cropland; [7] disturbed

Effects of Fuel Modification on Riverine Resources. HELIX Environmental Planning, Inc. (HELIX) staff (i.e., Larry Sward) recently took photos of the areas mapped as Riverine/streambed by HELIX as part of the Habitat Evaluation and Acquisition Negotiation Strategy[2] (HANS) and Determination of Biologically Equivalent or Superior Preservation[3] (DBESP) reports (Attachment A). The locations of the photos were GPS'd with submeter accuracy (Figure 1).

The streambeds mostly support low-growing herbaceous vegetation (Streambeds 1 [lower FMZ], [upper FMZ], 1.3, 1.7.1, 1.7.2, 1.10.1, 3, and 4, 4), or no vegetation whatsoever (Streambeds 1 [upper FMZ], 1.10 [lower FMZ], and 1.10 [upper][4]). There is one streambed that has a few isolated shrubs that may be subject to thinning or vegetation removal (Streambed 1.2.1 [lower FMZ]).

The functions and services of these non-wetland jurisdictional features include: (1) groundwater recharge; (2) flood conveyance; (3) sediment transport; and (4) some potential water quality benefits.

1. **Groundwater Recharge –** Thinning, removal, and pruning of vegetation is not expected to have few, if any effects on groundwater recharge. Ground water recharge is a function of surface water, slope, and soil permeability.

   Ground water recharge is expected to either be unchanged or only minimally impacted by FMZ 2 and 3. Because Zone 1 is irrigated, groundwater recharge would likely increase in Zone 1 which could result in establishment of non-native exotic species in these locations.

[2] Murrieta Hills Project Habitat Evaluation and Acquisition Negotiation Strategy Biological Analysis. Prep for Pulte/BP Murrieta Hills, LLC. May.

[3] Murrieta Hills Project Determination of Biologically Equivalent or Superior Preservation Report. Prep for Pulte/BP Murrieta Hills, LLC. May.

[4] Upper and lower are used in places where a drainage crosses in and out of the FMZ, with the upper location being higher in the watershed.

2. **Flood Conveyance –** Flood conveyance is the capacity of a drainage feature to convey storm flows. The proposed vegetation management will not constrict or inhibit the capacity of these drainages to convey storm flows compared to their current capacity.

   Because vegetation is being thinned or completely removed in portions of Zones 2 and 3, flood conveyance may increase slightly because of potential for increases in runoff from these areas.

3. **Sediment Transport –** Sediment transport is the fluvial movement of sediment in a stream. The proposed vegetation management will not inhibit or restrict the drainages' capacity for sediment transport. The vegetation thinning or removal will reduce vegetative cover adjacent to the streambed and there is the potential for minor increases in sediment entering the avoided streambed.

   Potential minor increases in sediment transport are not expected to significantly increase from its current volumes. There is also the potential for very minor impacts to the streambeds during thinning and removal of the adjacent vegetation in the form of trampling or loosening the soil should workers walk through or drag vegetation across the drainage. Any minor increases in sediment transport from the actual thinning/removal process are also not considered to be significant.

4. **Water Quality Benefits –** Water quality benefits are typically derived from vegetation absorbing pesticides and other pollutants. This is not an important service of these drainages because the limited amount of vegetation in them restricts their capacity to absorb compounds from the runoff.

   Changes in these streams' capacity to provide water quality benefits is expected to be negligible. Based on site specific surveys there are no species identified in Section 6.1.2 of the MSHCP that occur onsite. Section V.B of the DBESP Report for Murrieta Hills provides a full discussion of species covered under Section 6.1.2.

Based on the effect of the FMZs specified vegetation modifications on the functions and services of the areas subject to fuel modification, the applicant is proposing mitigation based on ratios agreed to with the Western Riverside Resource Conservation Authority (RCA) as spelled out in Table 3, *Mitigation Criteria and Mitigation Ratios*.

The mitigation criteria used in Table 3 fall into the following general criteria classifications:

1. **Criteria A**: Upslope of Zone 1. These areas are not expected to be impacted by irrigation from Zone 1 because they are upslope.

2. **Criteria B**: Within 50 feet downslope of Zone 1. These areas may be impacted by irrigation from Zone 1 because they are immediately downslope of Zone 1 where elevation gradient plays a role.

3. **Criteria C**: More than 50 feet downslope of Zone 1. These areas are not expected to be impacted by irrigation from Zone 1 because they are more than 50 feet downslope of Zone 1.

4. **Criteria D**: Vegetation is either chaparral, sage scrub, or grassland.

   These areas could be impacted by higher removal of native species, including chamise (*Adenostoma fasciculatum*), California sagebrush (*Artemisia californica*), coyote bush (*Baccharis pillularis*), yerba santa (*Eriodictyon californicum*), buckwheat (*Eriogonum* sp.), telegraph plant (*Heterotheca grandiflora*), sticky monkeyflower (*Diplacus aurantiacus*), laurel sumac (*Malosma laurina*), and sage (*Salvia*) species.

5. **Criteria E**: Steep slopes. Steeper slope areas increase the potential for erosion.

   These criteria were then combined, and a mitigation ratio attached to each combination based on the potential combined impact on a given drainage. All drainages within Zone 1 will be mitigated at 2:1 and drainages within Zones 2 and 3 will be mitigated at between 0.5:1 and 1:1 with offsite re-establishment (Table 3).

TABLE 3
MITIGATION CRITERIA AND MITIGATION RATIOS

Zone 1 Shall be mitigated at 2:1

MITIGATION CRITERIA					
Mitigation Criteria	**Criteria A: Upslope of Zone 1 [1]**	**Criteria B: Within 50 feet downslope of Zone 1 [2]**	**Criteria C: Greater than 50 feet downslope of Zone 1 [3]**	**Criteria D: Vegetation Type: Chaparral, sage scrub or grassland [4]**	**Criteria E: Steep Slope [5]**

MITIGATION CRITERIA COMBINATIONS								
Mitigation Criteria Combination	**Criteria 1 (A+D+E)**	**Criteria 2 (A+D)**	**Criteria 3 (B+D+E)**	**Criteria 4 (B+D)**	**Criteria 5 (B+E)**	**Criteria 6 (C+D+E)**	**Criteria 7 (C+D)**	**Criteria 8 (C+E)**
Zone 2 Mitigation Ratio	0.75:1	0.5:1	1:1	0.75:1	0.75:1	0.75:1	0.5:1	0.5:1
Internal Oak-dominated Open Space (Zone 3) Mitigation Ratio	0.75:1	0.5:1	1:1	0.75:1	0.75:1	0.75:1	0.5:1	0.5:1

[1] Because it is upslope of Zone 1 no irrigation water flows would be added to the streambed
[2] Because it is within 50 feet and downslope of Zone 1 there is the potential for irrigation water flow to be added to the streambed
[3] Because it is more than 50 feet downslope of Zone 1 no irrigation water flows would be expected to be added to the streambed
[4] Chaparral and sage scrub vegetation are expected to have a majority of the native shrub species removed and there is potential for increased erosion
[5] Steep slopes adjacent to the drainages will increase potential for erosion

Each drainage was reviewed and broken into segments by mitigation criteria combination. A single drainage could consist of multiple segments. The area of each segment was calculated, and the appropriate mitigation ratio applied to the impacts within that given segment.

All Zone 1 areas are automatically mitigated at a ratio of 2:1.

Table 4, *Fuel Modification Mitigation Requirements for Fuel Modification Zones 2 and 3* shows the results of that assessment for Zones 2 and 3.

TABLE 4
FUEL MODIFICATION MITIGATION REQUIREMENTS FOR FUEL MODIFICATION ZONES 2 AND 3

Drainage Number (Mitigation Criteria Combination)[1]	MITIGATION CRITERIA					Mitigation Ratio	Impact (Acres)	Impact (Linear Feet)	Mitigation Requirement
	Criteria A: Upslope of Zone 1	Criteria B: Within 50 feet downslope of Zone 1	Criteria C: Greater than 50 feet downslope of Zone 1	Criteria D: Vegetation Type: Chaparral or sage scrub	Criteria E: Steep Slope				
Drainage 1(1)	x			x	x	0.75:1	0.0051	44	0.0038
Drainage 1(2)	x			x		0.5:1	0.0162	141	0.0081
Drainage 1(3)		x		x	x	1:1	0.1510	1,009	0.1510
Drainage 1(4)		x		x		0.75:1	0.0084	73	0.0063
Drainage 1(6)			x	x	x	0.75:1	0.0598	520	0.0449
Drainage 1(7)			x	x		0.5:1	0.1270	792	0.0635
Drainage 1.1(7)			x	x		0.5:1	0.0023	50	0.0012
Drainage 1.2(1)	x			x	x	0.75:1	0.0089	130	0.0068
Drainage 1.3(1)	x			x	x	0.75:1	0.0062	90	0.0049
Drainage 1.3(3)		x		x	x	1:1	0.0082	50	0.0082
Drainage 1.3(6)			x	x	x	0.75:1	0.0431	255	0.0323
Drainage 1.4(3)		x		x	x	1:1	0.0045	33	0.0045
Drainage 1.4(6)			x	x	x	0.75:1	0.0203	168	0.0152
Drainage 1.5(1)	x			x	x	0.75:1	0.0135	186	0.0101
Drainage 1.7(3)		x		x	x	1:1	0.0046	50	0.0046
Drainage 1.7(6)			x	x	x	0.75:1	0.0015	16	0.0011
Drainage 1.7.1 (2)	x			x		0.5:1	0.0003	6	0.0002
Drainage 1.7.2(1)	x			x	x	0.75:1	0.0023	50	0.0017
Drainage 1.8(3)		x		x	x	1:1	0.0061	66	0.0061
Drainage 1.8(7)			x	x		0.5:1	0.0006	7	0.0003
Drainage 1.9(1)	x			x	x	0.75:1	0.0034	50	0.0026
Drainage 1.9(3)		x		x	x	1:1	0.0042	61	0.0042
Drainage 1.9(6)			x	x	x	0.75:1	0.0054	78	0.0041
Drainage 1.10(1)	x			x	x	0.75:1	0.0227	226	0.0170
Drainage 1.10(3)		x		x	x	1:1	0.0040	120	0.0040
Drainage 1.10(5)		x		x		0.75:1	0.0030	44	0.0023

TABLE 4 (cont.)
FUEL MODIFICATION MITIGATION REQUIREMENTS FOR FUEL MODIFICATION ZONES 2 AND 3

Drainage Number (Mitigation Criteria Combination)[1]	MITIGATION CRITERIA					Mitigation Ratio	Impact (Acres)	Impact (Linear Feet)	Mitigation Requirement
	Criteria A: Upslope of Zone 1	Criteria B: Within 50 feet downslope of Zone 1	Criteria C: Greater than 50 feet downslope of Zone 1	Criteria D: Vegetation Type: Chaparral or sage scrub	Criteria E: Steep Slope				
Drainage 1.10(6)			x	x	x	0.75:1	0.0112	188	0.0084
Drainage 1.10(8)			x		x	0.5:1	0.0080	58	0.0040
Drainage 1.10.1(1)	x			x	x	0.75:1	0.0046	100	0.0035
Drainage 1.10.2(1)	x			x	x	0.75:1	0.0026	38	0.0020
Drainage 1.10.3(7)			x	x		0.5:1	0.0004	17	0.0002
Drainage 1.11	x			x		0.5:1	0.0001	5	0.0001
Drainage 3(1)	x			x	x	0.75:1	0.0114	124	0.0086
Drainage 3(3)		x		x	x	1:1	0.0101	137	0.0101
Drainage 4(2)	x			x		0.5:1	0.0011	15	0.0006
Drainage 7 (2)	x			x		0.5:1	0.0001	3	0.0001
TOTAL							**0.5822**	**5,000**	**0.4458**

Based on the assessment above, impacts to 0.5822 acre of Riverine/streambed within Zones 2 and 3 require 0.4458 acre of mitigation. Zone 1 mitigation totals 0.0376 acre, and when combined with Zones 2 and 3, the total mitigation obligation is 0.4834 acre.

Mitigation will be accomplished through the purchase of 0.4834 re-establishment credits from the Riverpark Mitigation Bank.

Attachments:

Figure 1: Photo Locations
Figures 2a-d: Riparian/Riverine and FMZ
Attachment A: Waters of the U.S. in the Fuel Modification Zone

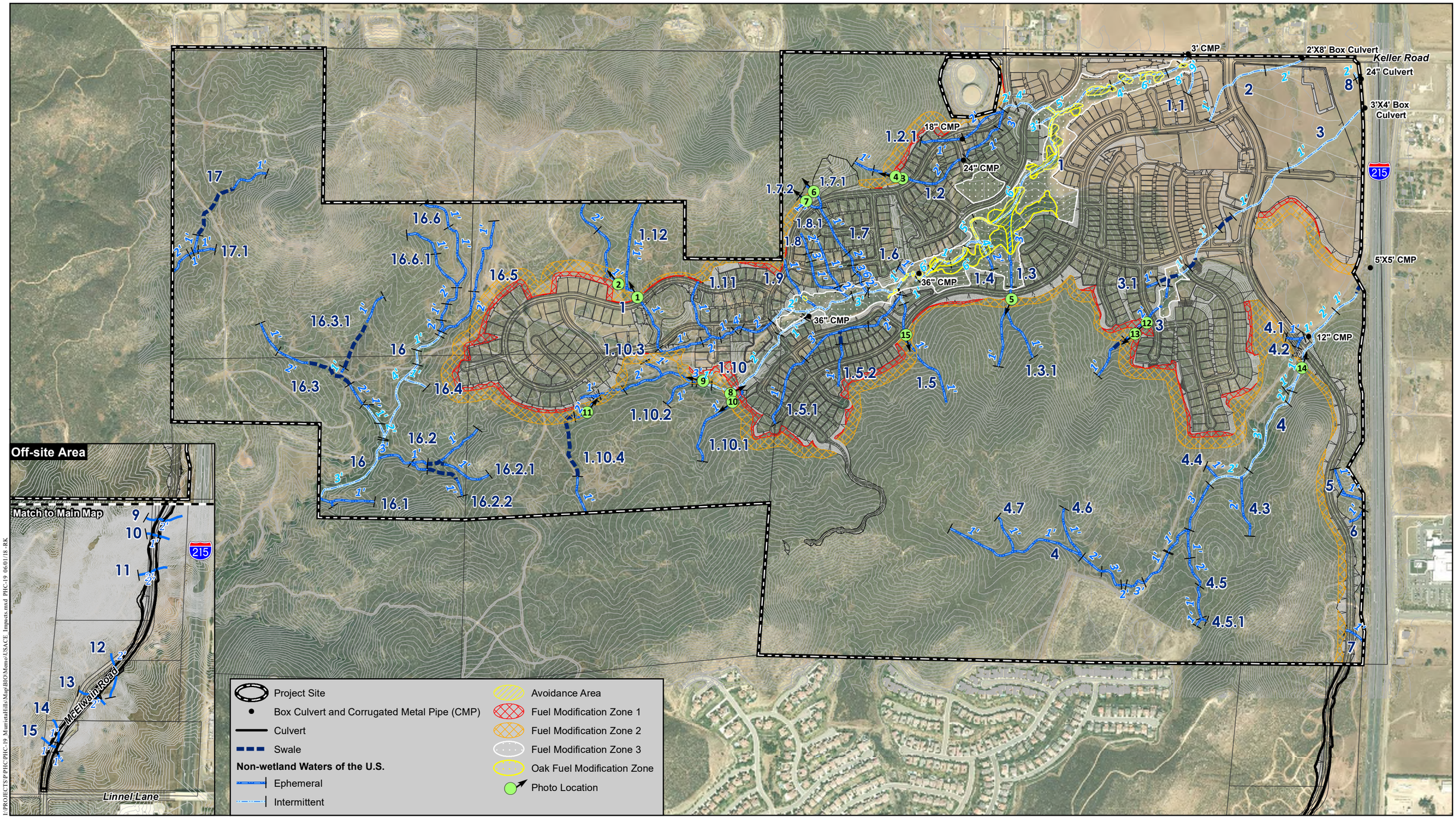

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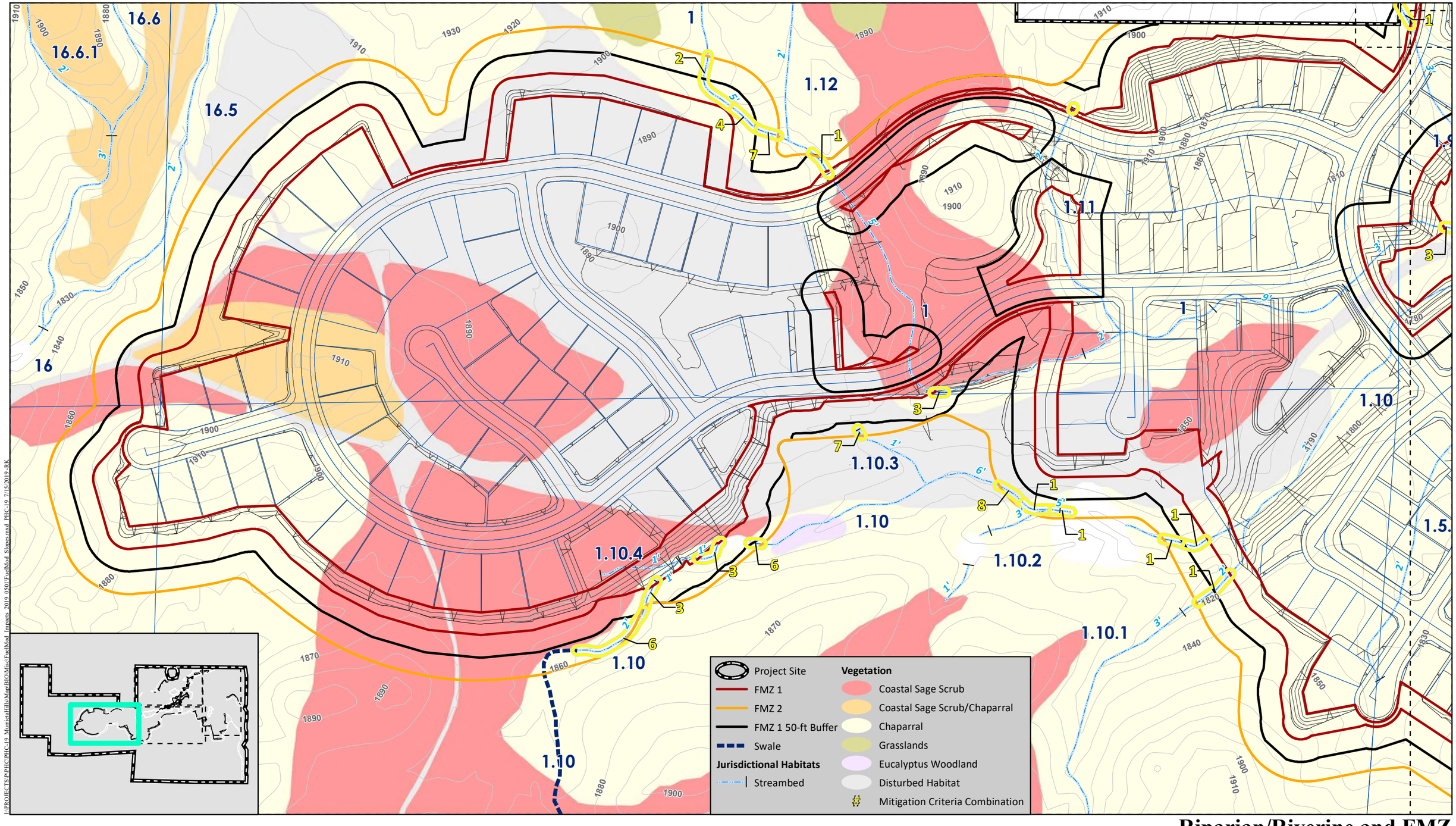
Photo Locations

MURRIETA HILLS

HELIX Environmental Planning



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HELIX Environmental Planning

Riparian/Riverine and FMZ

MURRIETA HILLS

Figure 2a

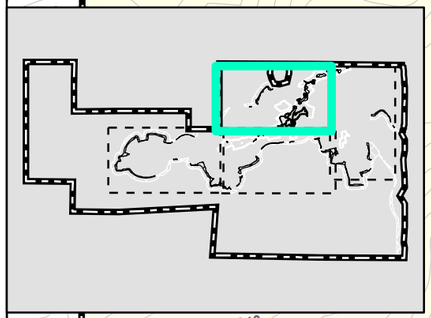
Project Site
FMZ 1
FMZ 2
FMZ 1 50-ft Buffer
Box Culvert and Corrugated Metal Pipe (CMP)

Jurisdictional Habitats

Streambed

Vegetation

Coastal Sage Scrub
Coastal Sage Scrub/Chaparral
Chaparral
Grasslands
Eucalyptus Woodland
Field Cropland
Disturbed Habitat
Mitigation Criteria Combination



1.2.1
1.2
1.7.1
1.7.2
1.7
1.4
1
18" CMP
24" CMP
SP 1
SP 6
SP 7
SP 8
SP 9

Riparian/Riverine and FMZ

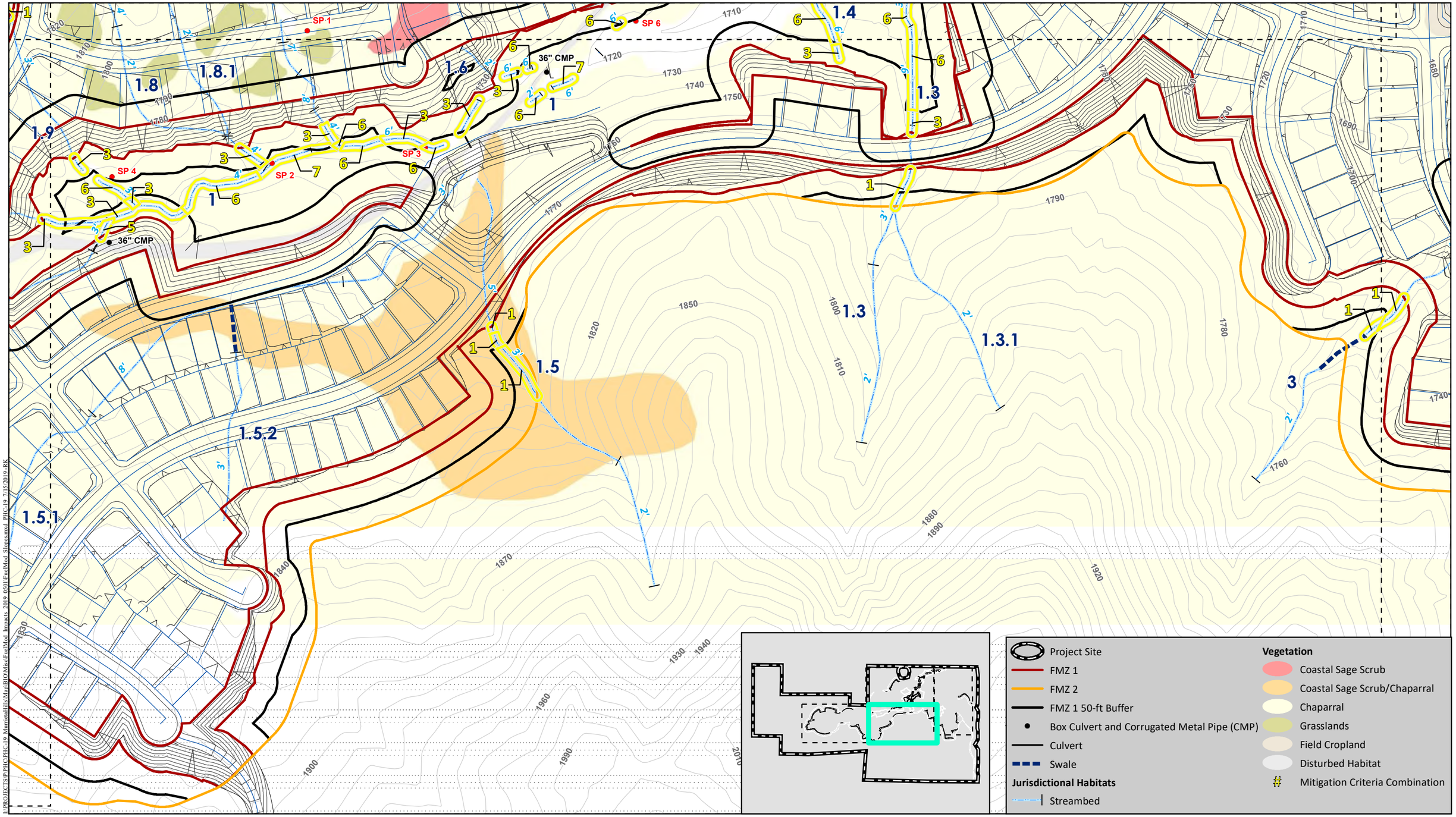
MURRIETA HILLS

HELIX Environmental Planning

N

0 200 Feet

Figure 2b



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Riparian/Riverine and FMZ

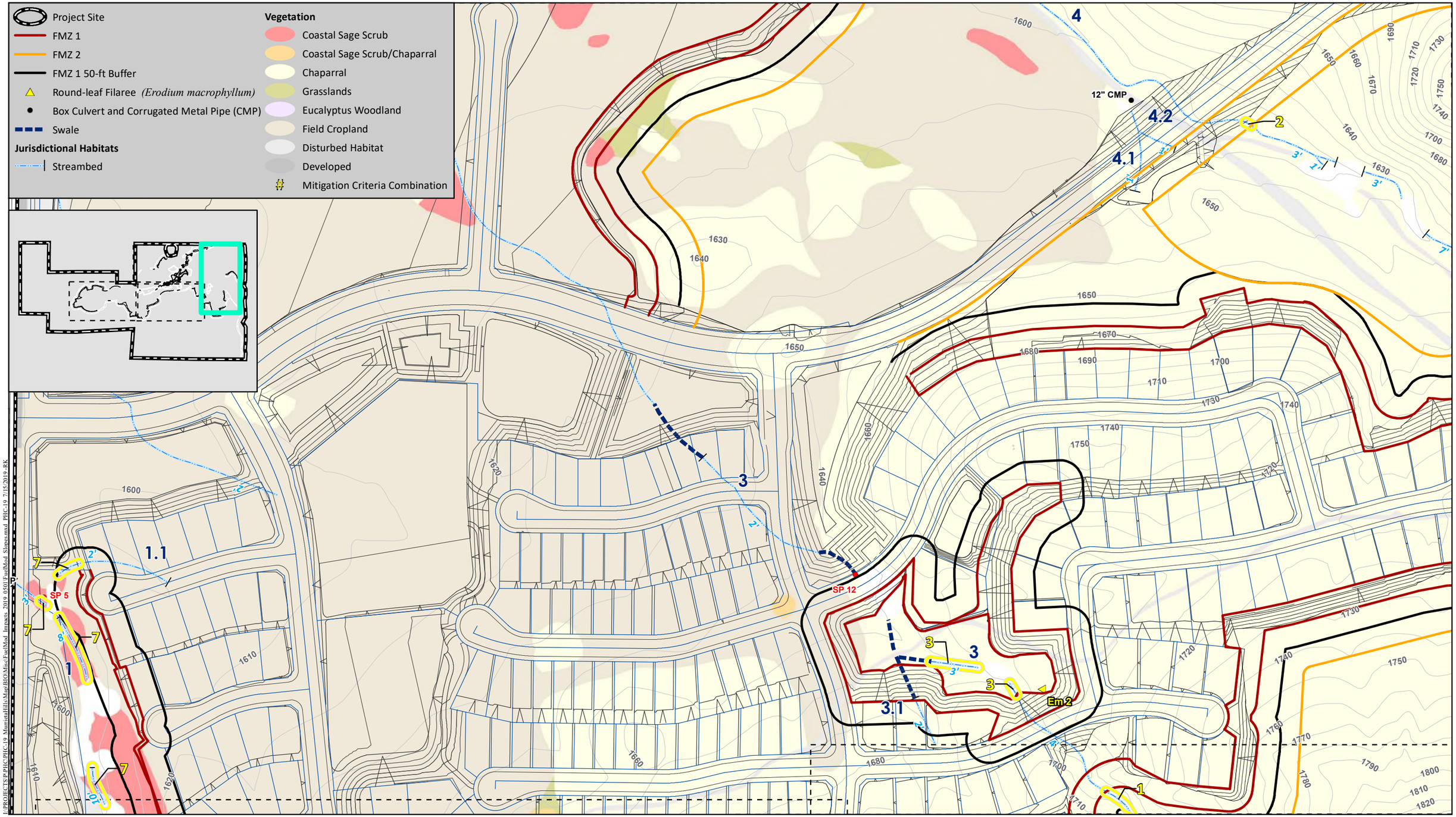
MURRIETA HILLS

HELIX Environmental Planning

N

0 200 Feet

Figure 2c



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Riparian/Riverine and FMZ

MURRIETA HILLS

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Figure 2d

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Photo 1. Streambed 1. Looking upstream (lower fuel mod area).

Photo 2. Streambed 1. Looking upstream (upper fuel mod area).

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Photo 3. Streambed 1.2.1. Looking upstream from bottom edge of fuel modification zone 1.

Photo 4. Streambed 1.2.1. Looking upstream from bottom edge of fuel modification zone 2.

Photo 5. Streambed 1.3. Looking upstream.

Photo 6. Streambed 1.7.1. Looking upstream.

Photo 7. Streambed 1.7.2. Looking upstream.

Photo 8. Streambed 1.10. Looking downstream (lower fuel mod area).

Photo 9. Streambed 1.10. Looking downstream (upper fuel mod area).

Photo 10. Streambed 1.10.1. Looking upstream.

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Photo 11. Streambed 1.10.4. Looking downstream.

Photo 12. Streambed 3. Looking upstream from bottom edge of fuel modidfication zone 1.

Photo 13. Streambed 3. Looking upstream from bottom edge of fuel modification zone 2.

Photo 14. Streambed 4. Looking downstream.

Photo 15. Streambed 1.5. Looking upstream.

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September 25, 2017 PHC-19

Ms. Laurie Correa
Western Riverside Regional Conservation Authority
3403 10th Street, Suite 320
Riverside, CA 92501

Subject: Minor Amendment Request for Inclusion of Warm Springs Parkway and McElwain Road as Covered Activities Under the Multiple Species Habitat Conservation Plan

Dear Ms. Correa:

Roadway alignments shown on Figure 7-1 of the Multiple Species Habitat Conservation Plan (MSHCP) are considered Covered Activities under the MSHCP. Permittees, including the City of Murrieta (City), need to comply with MSHCP requirements identified in Sections 6.1.2, 6.1.3, 6.1.4, and 6.3.2 and with siting, design, and construction requirements identified in Sections 7.5.1, 7.5.2, and 7.5.3 for these Covered Roads when the improvements add capacity (through lanes). The City is proposing to construct Warm Springs Parkway east of Interstate (I-) 215, and the Murrieta Hills project proposes improvements to McElwain Road west of I-215, neither of which are identified on Figure 7-1 as a covered activity under the MSHCP.

Section 7.3.1 of the MSHCP states, "As discussed in Section 3.0 of this document, public and private Development within the Criteria Area that is determined to be consistent with the Criteria is considered a Covered Activity." The MSHCP member agencies and the Western Riverside Regional Conservation Authority (RCA) are currently considering a minor amendment process to cover roadways that are not considered Covered Activities but that can otherwise show consistency with the MSHCP requirements. Consistency would be determined during the Joint Project Review by the RCA and the Wildlife Agencies. This letter provides the basis for determining that the proposed Warm Springs Parkway and McElwain Road are consistent with MSHCP Criteria, and can meet the findings required under the proposed Minor Amendment process.

Minor Amendment Guidelines

Under the draft guidelines, the Permittee would need to assess the following for the new or realigned road:

1. The new or realigned road must replace a road or road alignment currently on Figure 7-1 that will not be built because of the new roadway. No net increase in impact acreage can occur.

2. The vegetation community acreage impacts cannot negatively affect Rough Step status of the Rough Step Unit(s) the road is in.

3. Whether the new road or realigned road impacts existing Reserve lands or future Reserve assembly.

4. Whether the new or realigned road affects Reserve connectivity.

5. Consistency with Sections 6.1.2, 6.1.3, 6.1.4, and 6.3.2 and with the siting, design, and construction requirements identified in Sections 7.5.1, 7.5.2, and 7.5.3.

Roadway Description

Warm Springs Parkway and McElwain Road

Warm Springs Parkway has an assumed right-of-way (ROW) of 100 feet and a total length of approximately 1,320 linear feet, assuming the additional area required is limited to the area targeted for conservation (Attachment A). An additional 3.02 acres of ROW is needed for Warm Springs Parkway. With an assumed ROW width of 70 feet for McElwain Road, and a linear distance of 3,008 feet (Attachment A), approximately 4.80 acres of existing MSHCP-approved ROW will need to be identified that can be removed in order for McElwain Road to show consistency with the MSHCP. Combined, the total ROW needed is 7.82 acres.

Existing vegetation within the Warm Springs Parkway ROW includes 0.23 acre of Riversidean sage scrub/streambed and 2.79 acres of agriculture. Vegetation within McElwain Road is entirely southern mixed chaparral. Approximately 0.03 acre of streambed bisects McElwain Road (Table 1). Warm Springs Parkway traverses Proposed Constrained Linkage 16 and is located in Criteria Cell 5256 of Cell Group Y, while McElwain Road occurs at the very western end of Proposed Constrained Linkage 16 and is located within Criteria Cells 5255 and 5358 of Cell Group C. Both roadways are within Area 4 of Narrow Endemic Plant Species Survey Area (NEPSSA) and Criteria Area Species Survey Area (CASSA). An unnamed tributary to Warm Springs Creek bisects both the McElwain Road and Warm Springs Parkway alignments and is considered Riverine under Section 6.1.2 of the MSHCP.

Table 1
VEGETATION COMMUNITIES
FOR MCELWAIN ROAD AND WARM SPRINGS PARKWAY

Vegetation Type	McElwain Road	Warm Springs Parkway	Total
Chaparral	4.77	--	4.77
Riversidean Sage Scrub/Streambed	--	0.23	0.23
Streambed	0.03	--	0.03
Disturbed	--	2.79	2.79
TOTAL	**4.80**	**3.02**	**7.82**

Proposed Roadway Vacations

The City is proposed to vacate or reduce in width the ROW of four circulation element roadways that are covered activities under Section 7.5.1, to account for the addition of Warm Springs Parkway and McElwain Road. These are Hunter Road, Washington Street, Whitewood Road, and Antelope Road. Hunter Road has a ROW of 74 feet and supports 1.85 acres of sage scrub, 0.75 acre of chaparral, 0.49 acre of oak riparian woodland, and 0.18 acre of disturbed areas and the total vacation area is 1,932 linear feet (Attachment B). Washington Street has a ROW width of 75 feet and consists of streambed and the total vacation area is 265 linear feet (Attachment C). Whitewood Road ROW is being reduced by 52 feet over approximately 2,671 linear feet and results in an acreage reduction of 3.19 acres, including 0.26 acre of sage scrub/streambed and 2.93 acres of agriculture, while Antelope Road ROW is being reduced by 32 feet over approximately 1,320 linear feet, with a resulting acreage reduction of 0.97 acre including 0.65 acre of disturbed sage scrub and 0.32 acre of disturbed area (Table 2; Attachment A).

Table 2
VEGETATION COMMUNITIES FOR WHITEWOOD ROAD,
ANTELOPE ROAD, HUNTER ROAD, AND WASHINGTON STREET

Vegetation Type	Whitewood Road	Antelope Road	Hunter Road	Washington Street	Total
Oak/Riparian Woodland	--	--	0.49	--	0.49
Riversidean Sage Scrub/Streambed	0.26	--	--	--	0.26
Riversidean Sage Scrub	--	0.65	1.85	--	2.50
Chaparral	--	--	0.75	--	0.75
Streambed	--	--	--	0.45	0.45
Agriculture	2.93	--	--	--	2.93
Disturbed	--	0.32	0.18	--	0.50
TOTAL	**3.19**	**0.97**	**3.27**	**0.45**	**7.88**

Hunter Road is located within Cells 5974 and 5977 at the southern end of Core 2. Washington Street is located in Criteria Cell 6422. Whitewood Road is located in Criteria Cells 5256, 5259, 5361, and 5366, and Antelope Road is located in Criteria Cell 5256 of Cell Group Y.

Minor Amendment Consistency Analysis

The Murrieta Hills project occurs in Subunit 2, Lower Sedco Hills, in the Sun City/Menifee Area Plan of the MSHCP, and is located within Cell Group C which targets conservation of between 60 and 70 percent of the Cell Group. The project, including impacts from McElwain Road, is conserving in excess of 60 percent of the site and meets MSHCP Biological Issues and Considerations and acreage targets; McElwain Road is also consistent with the Minor Amendment criteria outlined above as more fully described below. Similarly, an analysis of Warm Springs Parkway is also provided to show consistency with the Minor Amendment criteria noted above. Each criterion is noted in italics with the response shown without italics.

Criteria: *The new or realigned road must replace a road or road alignment currently on Figure 7-1 that will not be built because of the new roadway. No net increase in impact acreage can occur.*

Response: JPR No. 06090801 identified areas targeted for conservation immediately east of I-215, including the area for the proposed construction of Warm Springs Parkway. Areas outside the areas targeted for conservation are excluded from roadway requirements (Attachment A). Warm Springs Parkway has a ROW width of 100 feet. Based on this, approximately 3.02 acres (1,320 linear feet) of Warm Springs Parkway ROW will need to be accounted for.

For this analysis, the portions of McElwain Road within the proposed development footprint are excluded from roadway requirements (Attachment A). Based on this, approximately 4.80 acres (3,008 linear feet) of McElwain Road ROW will need to be accounted for.

In total, 7.82 acres of road ROW that were part of an approved road alignment on Figure 7-1 will need to be removed in order to be consistent with this criterion.

The City has identified two circulation element roadways where portions of the roadways could be removed from the circulation element: Hunter Road and Washington Street. The portion of Hunter Road that could be removed that would have biological value would currently traverse Warm Springs Creek (Attachment B). The total area of this segment is 3.27 acres. The portion of Washington Street that could be eliminated that would have biological value crosses Murrieta Creek and totals 0.45 acre (Attachment C).

Two roadways in the immediate vicinity of both Warm Springs Parkway and Murrieta Hills are proposed to be downsized from their MSHCP-approved widths: Whitewood Road is being reduced by 52 feet and results in an acreage reduction of 3.19 acres, while Antelope Road ROW is being reduced by 32 feet, with a resulting acreage reduction of 0.97 acre (Attachment A).

The resulting math is as follows:

ROW Increases:	
- Warm Springs Parkway	3.02 acres
- McElwain Road	4.80 acres
Total ROW Increase	7.82 acres

ROW Decreases	
- Hunter Road	3.27 acres
- Washington Street	0.45 acre
- Whitewood Road	3.19 acres
- Antelope Road	0.97 acre
Total ROW Decrease	7.88 acres

Based on the above, there is adequate ROW "credit" available to meet both the City's needs for Warm Springs Parkway and the Murrieta Hills project's need for McElwain Road.

Criteria: *The vegetation community acreage impacts cannot negatively affect Rough Step status of the Rough Step Unit(s) the road is in.*

Response: The Murrieta Hills project site, including McElwain Road, and Warm Springs Parkway are in Rough Step Unit 6 of the MSHCP. According to the 2014 Western Riverside County MSHCP Annual Report[1] (most recent report available), all vegetation communities in Rough Step Unit 6 are "in step", though Permittees and participating agencies continue to prioritize preservation of riparian scrub, forest, and woodland habitats. The Murrieta Hills project would preserve 9.51 acres of riparian habitat through avoidance. McElwain Road will impact chaparral, and the larger project as a whole would impact 30.6 acres of sage scrub habitats. Chaparral does not have Rough Step goals and the impacts to 0.028 acre of streambed are being mitigated.

Warm Springs Parkway will impact 0.23 acre of Riversidean sage scrub/streambed and 2.79 acres of agriculture. Agriculture does not have Rough Step goals. Impacts to streambed will be mitigated at the time of project impacts.

According to Table 9 of the 2014 Annual Report, approximately 260 acres of coastal sage scrub impacts are still allowed and this number does not include any conservation proposed on the Murrieta Hills project. When combining the Murrieta Hills (30.6 acres) and Warm Springs Parkway (0.23 acre) impacts to sage scrub vegetation, both projects are still within Rough Step for Rough Step Unit 6 even without the Murrieta Hills conservation being factored into the assessment.

[1] Western Riverside County Regional Conservation Authority Multiple Species Habitat Conservation Plan Annual Report for the Period January 1, 2014 through December 31, 2014. November 2016.

Table 3 provides a comparison of habitat types removed and added as a result of the proposed amendment.

Table 3
VEGETATION ACREAGE CHANGES

Vegetation Type	Acres Added	Acres Removed	Net Change
Oak/Riparian Woodland	0.49	--	0.49
Riversidean Sage Scrub/Streambed	0.26	0.23	0.03
Riversidean Sage Scrub	2.50	--	2.50
Chaparral	0.75	4.77	(4.02)
Streambed	0.45	0.03	0.42
Agriculture	2.93	--	2.93
Disturbed	0.50	2.79	(2.29)
TOTAL	**7.88**	**7.82**	**0.06**

Criteria: *Whether the new road or realigned road impacts existing Reserve lands or future Reserve assembly.*

Response: The Murrieta Hills project occurs at the very western end of Proposed Constrained Linkage 16 (PCL-16) and Proposed Linkage 8 (PL-8) traverses the site, while Warm Springs Parkway traverses PCL-16. Neither roadway impacts existing Reserve lands. As noted above, the Murrieta Hills project, including the construction of McElwain Road results in conservation in excess of 60 percent of the project site, which is consistent with the 60 to 70 percent conservation target for Cell Group C. McElwain Road would not preclude future Reserve Assembly goals. PL-8 is a major component of one of the two east-west connections between Core Areas in the Lake Mathew/Estelle Mountain, Alberhill, and Cleveland National Forest in the west and Core Areas in French Valley and Johnson Ranch to the east. Planning Species potentially occurring onsite include the Quino checkerspot butterfly (*Euphydryas editha quino*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), Bell's sage sparrow (*Amphispiza belli belli*), loggerhead shrike (*Lanius ludoviciannus*), coastal California gnatcatcher (*Polioptila californica californica*), Stephens' kangaroo rat (*Dipodomys stephensi*) and bobcat (*Lynx rufous*). While the adding of any new roadway through PL-8 will have at least some impact on connectivity, the Murrieta Hills project, including McElwain, was specifically designed to facilitate conservation of the portion of PL-8 that occurs on the project site, and to provide connectivity with the existing culvert that crosses under I-215. The Murrieta Hills project, including McElwain Road, will conserve in excess of 60% of the site, which meets conservation acreage goals for PL-8 and will contribute to overall reserve assembly in this area. Conservation will also facilitate use by PL-8 Planning Species and McElwain is not expected to significantly impact planning species. The development was also pulled back to maximize wildlife movement along this drainage course, including the bobcat and Stephens' kangaroo rat. A culvert undercrossing is being provided under McElwain Road to facilitate wildlife movement through PL-8.

Warm Springs Parkway does not impact existing Reserve lands, is being constructed in a north-south alignment to minimize the length of the roadway through the Reserve, which would minimize acreage and fragmentation impacts. Warm Springs Parkway, Wildwood Road, and Antelope Road occur within Subunit 5, Cell Group Y of the Southwest Area Plan of the MSHCP, which targets conservation of 55 to 65 percent of the 640-acre Cell Group. While the 55 percent conservation target may not be achievable within Cell Group Y based on existing development within the Cell Group with or without this proposed Minor Amendment, the adding of Warm Springs Parkway and the reduction in ROW on Wildwood Road and Antelope Road results in a net increase of 1.14 acres of conservation and would not preclude future Reserve assembly.

Similarly, Warm Springs Parkway, Wildwood Road, and Antelope Road all occur within PCL-16, and the proposed adding of Warm Springs Parkway while reducing the size of Wildwood Road and Antelope Road will result in a net increase of 1.14 acres to PCL-16. Planning Species potentially occurring within these roadways include Quino checkerspot butterfly, coastal California gnatcatcher, and bobcat. The Quino checkerspot butterfly does not likely currently occur within this section of PCL-16, and the proposed revisions result in a very small increase in habitat conservation (sage scrub) for the coastal California gnatcatcher. While the adding of any new roadway through PCL-16 will have at least some impact on connectivity, a culvert undercrossing is being provided under Warm Springs Parkway to facilitate wildlife movement, especially bobcat, and the reduction in roadway width on Wildwood Road will further facilitate wildlife movement under this roadway.

Criteria: *Whether the new or realigned road affects Reserve connectivity.*

Response: As noted above, the Murrieta Hills project, including McElwain Road occur within PL-8 which is one of two major east-west linkages in this portion of the MSHCP Plan Area. Adding a roadway through PL-8 will have some impact on connectivity on PL-8. The Murrieta Hills project, including McElwain, was specifically designed to provide connectivity with the existing culvert that crosses under I-215, and the development was pulled back to maximize wildlife movement along the drainage course. A six- by six-foot box culvert undercrossing is being provided under McElwain Road to facilitate wildlife movement, especially bobcat and Stephens' kangaroo rat. Other planning species (Quino checkerspot butterfly, southern California rufous-crowned sparrow, Bell's sage sparrow, loggerhead shrike, and coastal California gnatcatcher) would need to traverse an additional roadway through PL-8 by flying over the two-lane roadway.

Adding Warm Springs Parkway as an additional road crossing through PCL-16 could impact wildlife movement through PCL-16. These potential impacts are being offset by including a wildlife undercrossing and reducing roadway widths for Whitewood Road and Antelope Road. Specifically, an undercrossing is being provided under Warm Springs Parkway to facilitate wildlife movement. The final design has not been determined, but the City has committed that the undercrossing will be soft bottomed, and will be wide enough to convey a 100-year storm without the need for hardened surfaces such as concrete or riprap in the channel bottom similar to the design at the existing Whitewood Road crossing immediately downstream. As noted above, Whitewood Road ROW will be narrowed by 52 feet and Antelope Road ROW is being

reduced by 32 feet. Narrowing of these roadways will reduce undercrossing lengths, which will facilitate wildlife movement through PCL-16, especially for bobcat. Other planning species, (Quino checkerspot butterfly and coastal California gnatcatcher) would need to fly over these roadways.

Criteria: *Consistency with Sections 6.1.2, 6.1.3, 6.1.4, and 6.3.2 and with the siting, design, and construction requirements identified in Sections 7.5.1, 7.5.2, and 7.5.3.*

Responses – The following below addresses each MSHCP Section as required.

Section 6.1.2: Focused surveys for plant and animal species covered under Section 6.1.2 were completed for the Murrieta Hills project, including McElwain Road, and McElwain Road does not impact any species covered under Section 6.1.2.

Surveys have not been conducted for Warm Springs Parkway, but because a large majority of the ROW is being actively farmed, impacts to species covered under Section 6.1.2 are not anticipated.
McElwain Road impacts to Riverine resources have been minimized by crossing at a narrow point in the drainage, and by crossing at a 90-degree angle to the drainage. Mitigation will be provided through purchase of mitigation or in lieu fee credits, or through a mitigation plan implemented by the project proponent. The alignment of McElwain Road minimizes and mitigates impacts to Riparian/Riverine resources consistent with Section 6.1.2 of the MSHCP. When the additions and deletions are combined for all of the roadways, there is a net reduction of 0.96 acre of riparian/riverine resource impacts, including high quality oak/riparian habitat along Warm Springs Creek as a result of the elimination of Hunter Road. Elimination of Hunter Road will eliminate impacts to potential least Bell's vireo (*Vireo bellii pusillus*) habitat.

The proposed Warm Springs Parkway alignment minimizes impacts to Riparian/Riverine resources by crossing the drainage at a 90-degree angle and mitigation will be provided for any impacts to Riparian/Riverine consistent with Section 6.1.2 of the MSHCP. When the additions and deletions are combined for all of the roadways, there is a net reduction of 0.96 acre of riparian/riverine resource impacts, including high quality oak/riparian habitat along Warm Springs Creek as a result of the elimination of Hunter Road. Additionally, there is a net reduction of 0.03 acre of impacts to Riversidean sage scrub/streambed when the addition of Warm Springs Parkway is combined with the reduction of Wildwood Road and Antelope Road.

Section 6.1.3: Focused surveys for NEPPSA plant species for the Murrieta Hills project, including McElwain Road, and McElwain Road does not impact any species covered under Section 6.1.3.

There is almost no potential for NEPSSA species within the Warm Springs Parkway ROW although surveys have not yet been conducted. Whitewood Road and Antelope Road are in close proximity to Warm Springs Parkway and the potential for NEPSSA species in these locations is similarly remote. The NEPSSA 4 species are almost entirely vernal pool, clay, and alkali soil endemics. All of Warm Springs Parkway is Cajalco fine sandy loam that would not support

NEPSSA 4 species. Whitewood Road is Cajalco fine sandy loam, Cieneba sandy loam, and a small area of Porterville Clay, with only the Porterville Clay having the potential to support NEPSSA 4 species. Antelope Road is Vista course sandy loam, Cajalco fine sandy loam, and Cieneba rocky sandy loam, none of which would be expected to support NEPSSA 4 species (Attachment D). However, there is always the potential for small clay and alkali soil inclusions that would only be observable through a site assessment. Based on aerial photograph review, nothing that appeared to be a clay or alkali inclusion was observed.

Section 6.3.2: Focused surveys for plant and animal species covered under Section 6.3.2 were completed for the Murrieta Hills project, including McElwain Road, and McElwain Road does not impact any species covered under Section 6.3.2.

There is almost no potential for CASSA species within the Warm Springs Parkway ROW although surveys have not been conducted. Whitewood Road and Antelope Road are in close proximity to Warm Springs Parkway and the potential for CASSA species in these locations is similarly remote. The CASSA 4 species are almost entirely vernal pool, clay, and alkali soil endemics. All of Warm Springs Parkway is Cajalco fine sandy loam that would not support CASSA 4 species. Whitewood Road is Cajalco fine sandy loam, Cieneba sandy loam, and a small area of Porterville Clay, with only the Porterville Clay having the potential to support CASSA 4 species. Antelope Road is Vista course sandy loam, Cajalco fine sandy loam, and Cieneba rocky sandy loam, none of which would be expected to support CASSA 4 species (Attachment D). However, there is always the potential for small clay and alkali soil inclusions that would only be observable through a site assessment. Based on aerial photograph review, nothing that appeared to be a clay or alkali inclusion was observed. There is the potential that least Bell's vireo surveys could be required when the Warm Springs Parkway project moves forward, and burrowing owl surveys would definitely be required.

Elimination of Hunter Road will eliminate impacts to potential Los Angeles pocket mouse habitat. Reducing the ROW widths for Wildwood Road and Antelope Road would also reduce impacts to potential burrowing owl (*Athene cunicularia*) habitat.

Section 6.1.4: Measures to address Section 6.1.4 of the MSHCP include treating runoff prior to exiting the site to insure the quantity and quality of water leaving the roadway does not impact the MSHCP Conservation Area, limiting and directing night lighting away from the MSHCP Conservation Area, and precluding the use of non-natives in Table 6-2 of the MSHCP in roadway landscape plans.

Measures to address Section 6.1.4 of the MSHCP include treating runoff prior to exiting the site to insure the quantity and quality of water leaving the roadway does not impact the MSHCP Conservation Area, limiting and directing night lighting away from the MSHCP Conservation Area, and precluding the use of non-natives in Table 6-2 of the MSHCP in roadway landscape plans. Reducing the total roadway footprint by the reduction of Whitewood Road and Antelope Road will also reduce these impacts.

Section 7.5: Section 7.5.1 of the MSHCP states that the ultimate alignment and design of planned roadways, bridges, and interchanges will be subject to the following design, siting, and construction guidelines (responses to each bullet for both roadways are included below):

- Planned roads will be located in the least environmentally sensitive location feasible, including disturbed and developed areas or areas that have been previously altered. Alignments will follow existing roads, easements, ROWs, and disturbed areas, as appropriate, to minimize habitat fragmentation.

  Response: Warm Springs Parkway bisects an existing agricultural field and runs due north-south to minimize fragmentation.

  McElwain Road has been designed to run as close to I-215 as possible to place the roadway in the least environmentally sensitive area while still providing access to the project from the south. This has minimized fragmentation.

- Planned roads will avoid, to the greatest extent feasible, impacts to Covered Species and wetlands. If wetlands avoidance is not possible, then any impacts to wetlands will require issuance of and mitigation in accordance with a federal 404 and/or state 1600 permits.

  Response: As noted above, Warm Springs Parkway is not anticipated to impact covered species and does not impact wetlands. The roadway does impact non-wetland Riparian/Riverine resources and these impacts are being mitigated in accordance with state and federal permitting requirements.

  As noted above, McElwain Road does not impact covered species and wetlands. The roadway does impact non-wetland Riparian/Riverine resources and these impacts are being mitigated in accordance with state and federal permitting requirements.

- Design of planned roads will consider wildlife movement requirements, as further outlined below under Guidelines for Construction of Wildlife Corridors.

  Response: Both roadways will incorporate requirements consistent with Section 7.5.2 of the MSHCP. Section 7.5.2 of the MSHCP addresses construction of wildlife crossings. Because I-215 is a major impediment to large wildlife (e.g., mountain lion and mule deer), neither roadway is being designed to facilitate movement of these species. It is anticipated that the undercrossing for Warm Springs Parkway will be at least the same size as the existing Whitewood Road undercrossing, which will adequately convey small- and medium-sized wildlife under Warm Springs Parkway.

  McElwain Road will include a six- by six-foot box culvert that would provide a wildlife crossing under the roadway. Section 7.5.2 of the MSHCP recommends that culverts be a minimum of 1 to 1.5 meters for medium-sized wildlife that are anticipated to use this linkage and the six- by six-foot culvert proposed exceeds this requirement. The box

culvert under McElwain Road would be approximately 150 feet long and would provide direct line of sight from end to end. The undercrossing is being placed within the drainage that traverses this portion of the site which is the area most likely to be utilized for wildlife movement. A second three- by three-foot box culvert will be placed above the six- by six-foot culvert to allow for wildlife movement during high flow events.

Section 7.5.2 of the MSHCP in part states:

- Small- and medium-sized mammal crossings should be placed at least every 300 meters and small- and medium-sized mammal crossings should be varied in size to accommodate a variety of mammal species.
- 1.0- to 1.5-meter culverts should be installed to support medium sized (e.g., coyote, raccoon).
- Smaller, 0.5- to 1.0-meter culverts should be installed for small mammals, reptiles, and amphibians. These smaller structures are preferred by mice, weasels, and other small wildlife.
- Dirt, rock, or concrete benches should be installed on at least one side of the large mammal crossing facility in order to allow wildlife to cross during most storm event circumstances.

The MSHCP also states that "All undercrossings and culverts which are intended to get wildlife usage, will be designed in a manner which allows a dry crossing under nearly all circumstances. This will include designing an elevated bench above the normal high water line or providing a textured gentle slope up the side of the culvert/undercrossing." Warm Springs Parkway will address this as noted above through construction of an undercrossing for Warm Springs Parkway that will be at least the same size as the existing Whitewood Road undercrossing. McElwain Road will include a six- by six-foot box culvert in the channel bottom, along with a three- by three-foot box culvert above the 100-year flood level for an all-weather undercrossing.

- Narrow Endemic Plant Species will be avoided; if avoidance is not feasible, then mitigation as described in the Narrow Endemics Plant Policy will be implemented.

  Response: No Narrow Endemic Plant Species occur within the McElwain Road ROW and none are anticipated in the Warm Springs Parkway ROW.

  There is almost no potential for NEPSSA species within the Warm Springs Parkway ROW although surveys have not been conducted. Whitewood Road and Antelope Road are in close proximity to Warm Springs Parkway and the potential for NEPSSA species in these locations is similarly remote. NEPSSA 4 species are almost entirely vernal pool, clay and alkali soil endemics. All of Warm Springs Parkway is Cajalco fine sandy loam, which would not support NEPSSA 4 species. Whitewood Road is Cajalco fine sandy loam, Cieneba sandy loam, and a small area of Porterville Clay, with only the Porterville Clay having the potential to support NEPSSA 4 species. Antelope Road is Vista course sandy loam, Cajalco fine sandy loam, and Cieneba rocky sandy loam, none of which

would be expected to support NEPSSA 4 species (Attachment D). There is always the potential for small clay and alkali soil inclusions that would only be observable through a site assessment. Based on aerial photograph review, nothing that appeared to be a clay or alkali inclusion was observed.

- Any construction, maintenance, and operation activities that involve clearing of natural vegetation will be conducted outside the active breeding season (March 1 through June 30).

  Response: Both projects will be conditioned to avoid clearing of vegetation during the breeding season.

- Prior to design and construction of transportation facilities, biological surveys will be conducted within the study area for the facility including vegetation mapping and species surveys and/or wetland delineations. The appropriate biological surveys to be conducted will be based on field conditions and recommendations of the project manager in consultation with a qualified biologist. The results of the biological resources investigations will be mapped and documented. The documentation will include preliminary conclusions and recommendations regarding potential effects of facility construction on MSHCP Conservation Area resources and methods to avoid and minimize impacts to MSHCP Conservation Area resources in conjunction with project siting, design, construction, and operation. The project biologist will work with facility designers during the design and construction phase to ensure implementation of feasible recommendations.

  Response: Surveys have been conducted for McElwain Road and are included in the MSHCP Consistency Report prepared for the project. The project biologist has worked with the project design team in developing the alignment and design criteria.

  Surveys will be conducted for Warm Springs Parkway as part of the MSHCP processing for the project. The project biologist will work with the project design team in developing the alignment and design criteria.

Section 7.5.3 discusses construction guidelines for projects. These guidelines include erosion control, breeding bird restrictions, water quality measures, requirements to delineate disturbance limits in the field, exotic species control, monitoring requirements, fire protection, and dust control measures. These are all addressed as either project conditions through the City or through state and federal wetland permit processes.

Based on the above, both McElwain Road and Warm Springs Parkway would meet the criteria for a minor amendment to the MSHCP by having designed both roadways to avoid or minimize impacts to MSHCP covered species, confirming the projects would not cause Rough Step Unit 6 to be out of step, minimizing impacts to Riparian/Riverine resources, and maintaining wildlife movement through project design and proposed wildlife undercrossings, and through implementation of construction minimization measures.

Sincerely,

Barry Jones
Senior Consulting Biologist

Enclosures:
Attachment A Right-of-Way Revisions
Attachment B Hunter Road Right-of-Way Reduction
Attachment C Washington Street Right-of-Way Reduction
Attachment D Right-of-Way Revisions/Soils Map

MSHCP Cell
66' Wide Road ROW
MSHCP Open Space
Proposed Project Impacts
Area Targeted for Conservation
RCA MSHCP Conserved Lands
Chaparral
Disturbed Habitat
Southern Willow Scrub
Agriculture
Disturbed Habitat
Riversidean Sage Scrub
Riversidean Sage Scrub/Streambed

KELLER
SCENIC VIEW
WARM SPRINGS PARKWAY
ALBA
CARLISLE
WHITEWOOD ROAD
BRIANS
WALT
ANTELOPE
DAMSEL
JOAN DUNN
TRIPLE C RANCH
BAXTER
I-215
McElwain Road
5255
5256
5259
5358
5361
5366
32'
0.28
0.31
0.37
ROW Reduction 0.97 Acre
100'
ROW Addition 3.02 Acres
1.67
0.23
0.95
Area Targeted for Conservation
JPR No. 06090801
52'
2.1
ROW Reduction 3.19 Acres
0.26
0.88
ROW: 4.80 acres, 3008 linear ft

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Right-of-Way Revisions

MURRIETA HILLS

Attachement A

HELIX Environmental Planning

N 0 400 Feet

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Hunter Road Right-of-Way Reduction

MURRIETA HILLS

HELIX Environmental Planning

0 200 Feet

Attachment B

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Washington Street Right-of-Way Reduction

MURRIETA HILLS

HELIX Environmental Planning

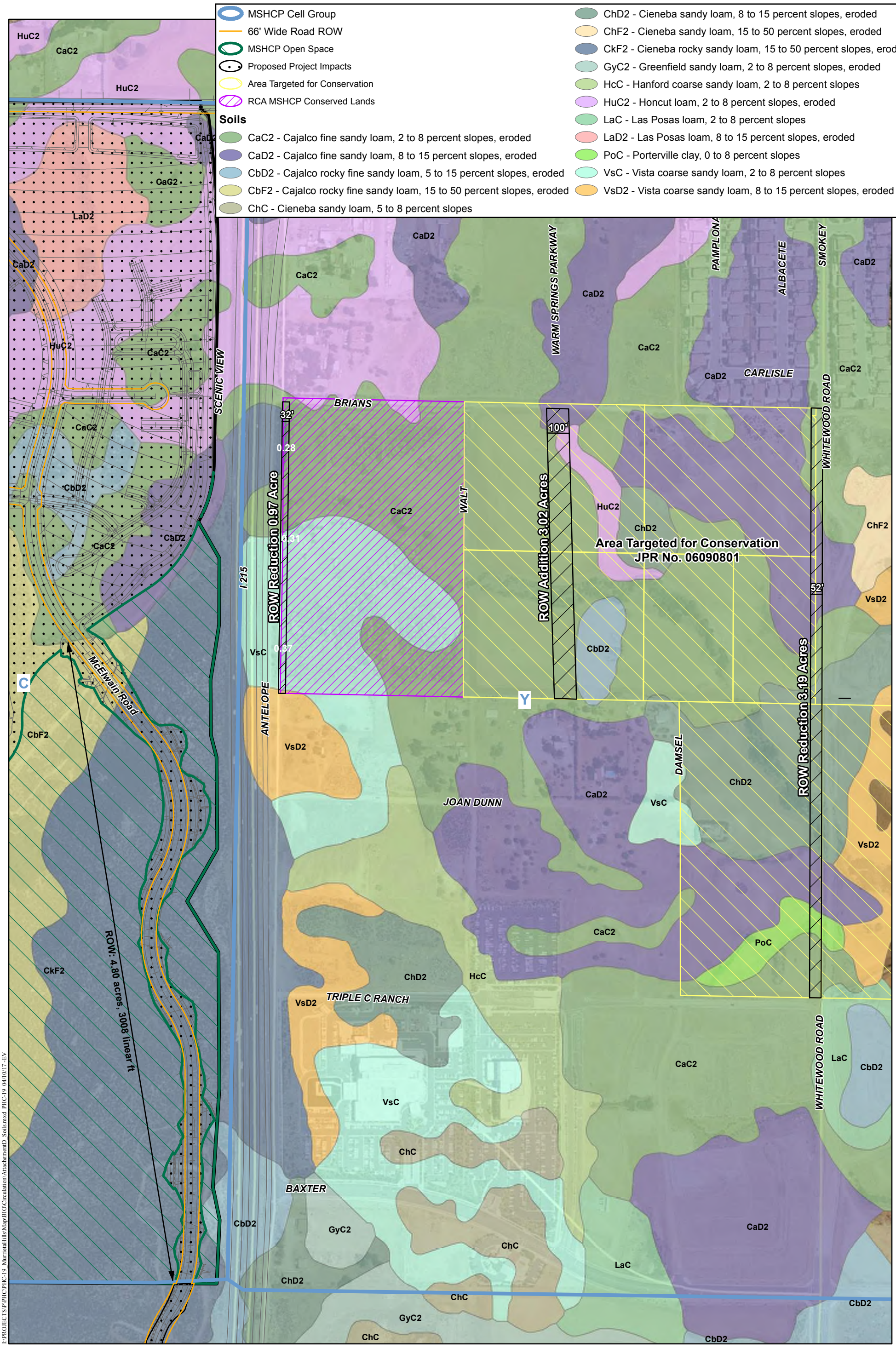
0 300 Feet

Attachment C

MSHCP Cell Group
66' Wide Road ROW
MSHCP Open Space
Proposed Project Impacts
Area Targeted for Conservation
RCA MSHCP Conserved Lands

Soils

CaC2 - Cajalco fine sandy loam, 2 to 8 percent slopes, eroded
CaD2 - Cajalco fine sandy loam, 8 to 15 percent slopes, eroded
CbD2 - Cajalco rocky fine sandy loam, 5 to 15 percent slopes, eroded
CbF2 - Cajalco rocky fine sandy loam, 15 to 50 percent slopes, eroded
ChC - Cieneba sandy loam, 5 to 8 percent slopes
ChD2 - Cieneba sandy loam, 8 to 15 percent slopes, eroded
ChF2 - Cieneba sandy loam, 15 to 50 percent slopes, eroded
CkF2 - Cieneba rocky sandy loam, 15 to 50 percent slopes, erod ed
GyC2 - Greenfield sandy loam, 2 to 8 percent slopes, eroded
HcC - Hanford coarse sandy loam, 2 to 8 percent slopes
HuC2 - Honcut loam, 2 to 8 percent slopes, eroded
LaC - Las Posas loam, 2 to 8 percent slopes
LaD2 - Las Posas loam, 8 to 15 percent slopes, eroded
PoC - Porterville clay, 0 to 8 percent slopes
VsC - Vista coarse sandy loam, 2 to 8 percent slopes
VsD2 - Vista coarse sandy loam, 8 to 15 percent slopes, eroded



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Right-of-Way Revisions/Soils

MURRIETA HILLS

HELIX Environmental Planning

0 400 Feet

Attachement D

Memorandum

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619.462.0552 **fax**
www.**helixepi**.com

Date: March 22, 2019

To: Ron Goldman, City of Murrieta

Cc: Rick Robotta, Benchmark Pacific

From: Barry Jones

Subject: Murrieta Hills Fuel Modification Clearing Adjacent to Riverine Resources

HELIX Proj. No.: PHC-19

Message:

Earlier this week HELIX staff (i.e., Larry Sward) took photos of the areas mapped as streambed by HELIX as part of the HANS and DBESP reports and characterized as “unvegetated drainages” that occur in the fuel modification zones (FMZ) at Murrieta Hills (Attachment A). The locations of the photos were GPS’d with submeter accuracy (Figure 1).

The photos show that shrubby vegetation that would be subject to fuel modification removal and thinning was almost entirely lacking in the subject drainages. The streambeds mostly support low-growing herbaceous vegetation (Streambeds 1 [lower FMZ], 1.2.1 [upper FMZ], 1.3, 1.7.1, 1.7.2, 1.10.1, 1.10.4, 3, 4, 4, and 5), or no vegetation whatsoever (Streambeds 1 [upper FMZ],1.10 [lower FMZ], and 1.10 [upper]). There is one streambed that has a few isolated shrubs that may be subject to thinning (Streambed 1.2.1 [lower FMZ]).

The effect of fuel modification on the vegetation within the streambeds onsite is expected to be negligible and does not warrant mitigation.

Enclosures:

Attachment A. Waters of the U.S. in the Fuel Modification Zone
Figure 1. Photo Locations

Photo 1. Streambed 1. Looking upstream (lower fuel mod area).

Photo 2. Streambed 1. Looking upstream (upper fuel mod area).

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Photo 3. Streambed 1.2.1. Looking upstream from bottom edge of fuel modification zone 1.

Photo 4. Streambed 1.2.1. Looking upstream from bottom edge of fuel modification zone 2.

Photo 5. Streambed 1.3. Looking upstream.

Photo 6. Streambed 1.7.1. Looking upstream.

Photo 7. Streambed 1.7.2. Looking upstream.

Photo 8. Streambed 1.10. Looking downstream (lower fuel mod area).

Photo 9. Streambed 1.10. Looking downstream (upper fuel mod area).

Photo 10. Streambed 1.10.1. Looking upstream.

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Photo 11. Streambed 1.10.4. Looking downstream.

Photo 12. Streambed 3. Looking upstream from bottom edge of fuel modidfication zone 1.

Photo 13. Streambed 3. Looking upstream from bottom edge of fuel modification zone 2.

Photo 14. Streambed 4. Looking downstream.

Photo 15. Streambed 1.5. Looking upstream.

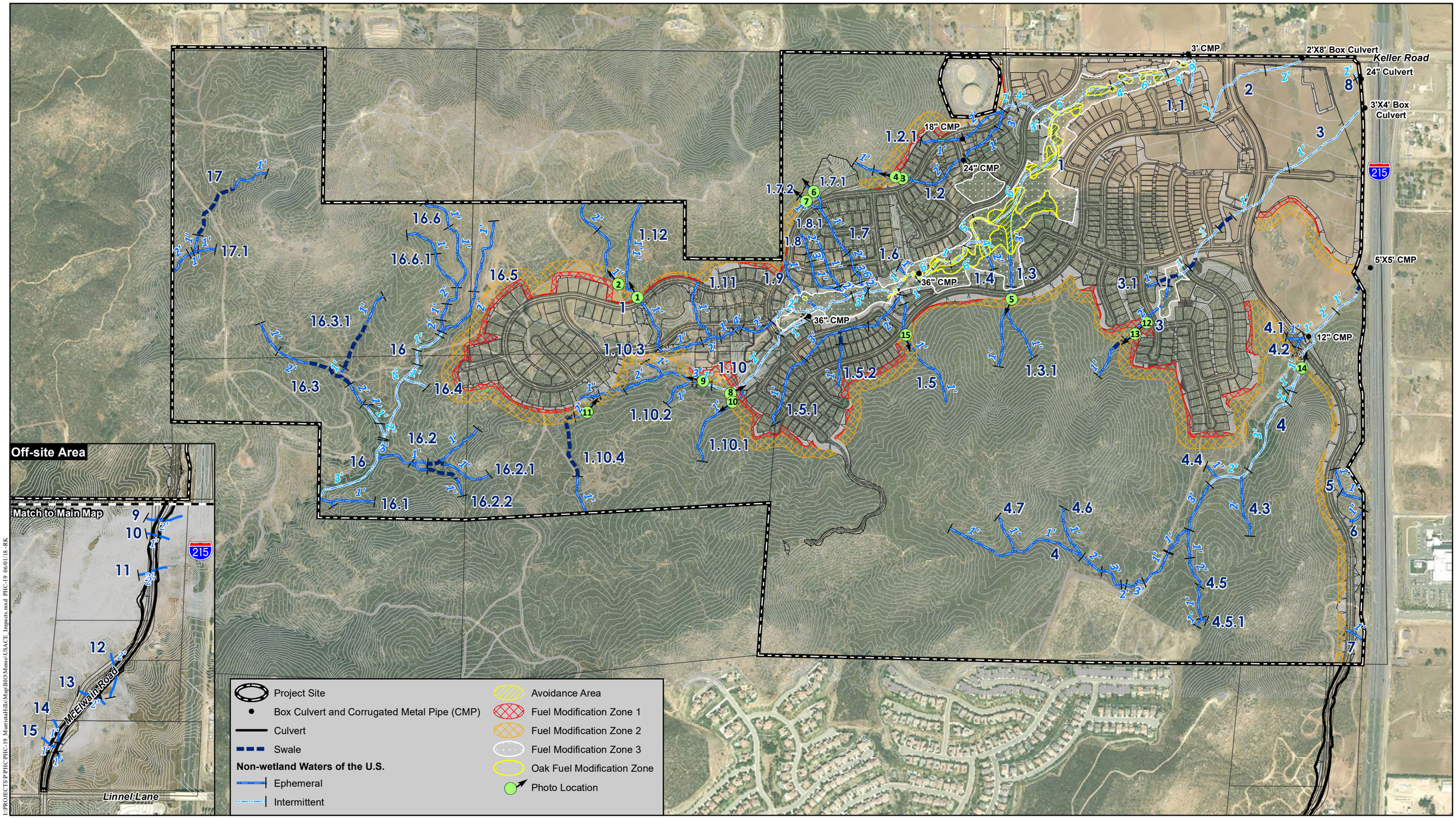

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Photo Locations

MURRIETA HILLS

HELIX Environmental Planning

Memorandum

HELIX Environmental Planning, Inc.
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La Mesa, CA 91942
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619.462.0552 **fax**
www.**helixepi**.com

Date: July 17, 2019

To: Ron Goldman, City of Murrieta

cc: Rick Robotta, Benchmark Pacific

From: Barry Jones

Subject: Murrieta Hills Fuel Modification Clearing Within and Adjacent to Riverine Resources

HELIX Project: PHC-19

Message:

This memo addresses proposed fuel modification planned in proximity of the Riverine Resources for Murrieta Hills Project and provides an assessment of potential impacts to certain Riverine resources. As more fully described herein, impacts resulting from fuel modification adjacent to Riverine resources are not expected to result in complete loss of functions and services associated with Riverine resources.

Fuel modification or thinning completed in accordance with the project's Fire Protection Technical Report[1] includes the following three (3) general classifications: Fuel Modification Zone (FMZ) 1, FMZ 2 and Internal Oak-dominated Open Space (also known as FMZ 3).

FMZs 1 and 2 occur primarily at the outer edges of development, or the area between development and the preserved habitat. The specifications for treatment of these areas include measures for trees, shrubs, and groundcovers and are spelled out in Table 1. Approximately 0.0188 acre of Riverine drainages occur in FMZ 1 and approximately 0.1387 acre of Riverine drainages occur in FMZ 2 (Attachment A).

FMZ 3 applies only to the undeveloped corridor along the largest onsite drainage, known as the "Internal Oak-Dominated Open Space" in the project's Fire Protection Technical Report. This corridor is flanked by development along its entire length and treatment is spelled out in Table 1.

[1] Dudek. 2019. Approval Draft. Murrieta Hills FIRE PROTECTION TECHNICAL REPORT, Plan No. SP 012-3164, TTM 35853. July. 112 pp., plus appendices.

Table 1
FUEL MODIFICATION ZONES 1, 2 AND 3: FIRE MANAGEMENT REQUIREMENTS AND SPECIFICATIONS[1]

Fire Management Plan Page/ Section References	FMZ 1 – Section 5.1, Subsection 5.1.1, Pages 42-43	FMZ 2 – Section 5.1, Subsection 5.1.1, Pages 43-44	Internal Oak-Dominated Open Space / FMZ 3 – Section 5.1, Subsection 5.1.2, Pages 44-45
General	All highly flammable native vegetation, especially plant species found on the Prohibited List (Appendix E of the Fire Protection Technical Report) shall be removed. Species targeted for removal include chamise, California sagebrush, coyote bush, yerba santa, buckwheat, telegraph plant, sticky monkeyflower, laurel sumac, and sage (*Salvia*) species. This zone will be planted with drought-tolerant, less flammable plants from the Murrieta Hills Project Plant Palette (Appendix D of the Fire Protection Technical Report), which was prepared by VDLA Landscape architects and reviewed/revised by the authors of the Fire Protection Technical Report.	Represents a 50% thinning zone – 50% less fuel than on adjacent unmaintained preserve areas. Zone 2 areas will include removal of dead/dying vegetation, exotics, and plant species listed on the prohibited plant list. Species targeted for removal include chamise, California sagebrush, coyote bush, yerba santa, buckwheat, telegraph plant, sticky monkeyflower, laurel sumac, and sage (*Salvia*) species. Removal of these components will result in 50% thinning of the existing fuels. As necessary to meet the 50% thinning objective, other plants will be removed to create a mosaic of vegetation with adequate spacing and discontinuity. Large shrubs shall not be cut back hard or hedge them into unnatural shapes (sic).	The area will be maintained as an FMZ through annual maintenance of non-jurisdictional areas so that vegetation does not exceed a height of four inches. All plant species found on the Prohibited List (Appendix E of the Fire Protection Technical Report) shall be removed. There are limited areas within this open space that are jurisdictionally protected by California Department of Fish and Wildlife and will be left unmaintained. All of these areas are beyond 150 feet from adjacent structures. Additionally, should mortality of oaks and or willow trees occur in these jurisdictional areas, from drought, insect, disease or other factors, they will be removed or chipped on site to avoid the accumulation of dead fuels.
Vegetation Layer	**Zone 1**	**Zone 2**	**Zone 3**
Tree	Raise canopy 8 feet or 1/3 the height of mature tree.	Only certain tree species are allowed.[3]	See general requirement above
Shrub	Less than 2 feet tall and at a minimum of 5 feet on center.	Single specimen native shrubs, exclusive of chamise and sage, may be retained, on 20-foot centers.	See general requirement above
Ground Cover	75% of this layer shall be limited to a maximum of height of 18 inches. 25% of this layer may reach a height of 24 inches.	75% of this layer shall be limited to a maximum height of 36 inches. 25% of this layer may reach a maximum height of 48 inches.	See general requirement above

Table 1 (cont.)
FUEL MODIFICATION ZONES 1, 2 AND 3: FIRE MANAGEMENT REQUIREMENTS AND SPECIFICATIONS[1]

Vegetation Layer	Zone 1	Zone 2	Zone 3
Irrigation Requirement	This irrigated high plant moisture zone shall be serviced by a permanent automatic irrigation system that keeps plants hydrated via efficient drip irrigation, as defined by the Project's Landscape Architect.	No irrigation.	No irrigation.
Impact[4]	0.0188 acre	0.1389 acre	0.4435 acre

[1] All work being performed in these fuel management zones is being conducted within the development footprint established through the Murrieta Hills HANS process. Work will be done within and/or adjacent to Riverine resources in Zones 1 and 2 and areas outside of / adjacent to designated riparian/riverine areas of Zone 3, and 20 separate and small areas considered jurisdictional in nature. The total impact to areas considered jurisdictional is approximately 0.6 acre.

[2] Appendix E of Approval Draft. Murrieta Hills Fire Protection Technical Report, Plan No. SP 012-3164, TTM 35853 (Dudek 2018).

[3] All native tree species occurring at Murrieta Hills are included on the list of allowable species.

[4] The function and services of the impacted non-wetland jurisdictional features include groundwater recharge, flood conveyance, sediment transport, and some water quality benefits.
Thinning and pruning of vegetation is not expected to have any effects on the groundwater recharge portion of the function and services because groundwater recharge is a function of surface water, slope and soil permeability and all of these would remain unaffected by the proposed vegetation management.
Flood conveyance is the capacity of a drainage feature to convey storm flows. The proposed vegetation management will not constrict or otherwise inhibit the capacity of these drainages to covey storm flows as and when necessary.
Sediment transport is the fluvial movement of sediments in a stream. The vegetation thinning will reduce vegetative cover adjacent to the streambed and there is the potential for minor increases in sediment entering the avoided streambed.

Fuel Modification. Fuel modification is planned in 19 separate and small areas, all of which are considered jurisdictional (Figures 1 and 2a-g; Table 2). The total impact area is approximately 0.6033 acre.

Table 2
FUEL MODIFICATION ACREAGES

Drainage	Fuel Modification Zone			Total
	Zone 1[1]	Zone 2[1]	Zone 3[1]	
1		0.0385[3]	0.3287[2,3,4,5,6]	**0.3672**
1.1			0.0023[6]	**0.0023**
1.2	0.0025[3]	0.0089[3]		**0.0114**
1.3	0.0007[3]	0.0062[3]	0.0514[3]	**0.0583**
1.4			0.0248[3]	**0.0248**
1.5		0.0135[4]		**0.0135**
1.7			0.0061[3]	**0.0061**
1.7.1		0.0003[3]		**0.0003**
1.7.2		0.0023[3]		**0.0023**
1.8			0.0067[3]	**0.0067**
1.9		0.0034[3]	0.0096[3]	**0.0130**

Table 2
FUEL MODIFICATION ACREAGES

Drainage	Fuel Modification Zone			Total
	Zone 1[1]	Zone 2[1]	Zone 3[1]	
1.10	0.0035[3]	0.0453[2,3,7]	0.0038[3]	**0.0526**
1.10.1	0.0015[3]	0.0046[3]		**0.0061**
1.10.2		0.0026[3]		**0.0026**
1.10.3		0.0004[7]		**0.0004**
1.11		0.0001[3]		**0.0001**
3	0.0106[3]	0.0114[3]	0.0101[3]	**0.0321**
4		0.0011[3]		**0.0011**
7		0.0001[3]		**0.0001**
TOTAL	**0.0188**	**0.1387**	**0.4435**	**0.6033**

[1] Vegetation communities noted as follows: [2] coastal sage scrub; [3] chaparral; [4] coastal sage scrub/chaparral; [5] eucalyptus woodland; [6] field cropland; [7] disturbed

Effects of Fuel Modification on Riverine Resources. HELIX staff (i.e., Larry Sward) recently took photos of the areas mapped as Riverine/streambed by HELIX as part of the Habitat Evaluation and Acquisition Negotiation Strategy[2] (HANS) and Determination of Biologically Equivalent or Superior Preservation[3] (DBESP) reports (Attachment A). The locations of the photos were GPS'd with submeter accuracy (Figure 1).

The streambeds mostly support low-growing herbaceous vegetation (Streambeds 1 [lower FMZ], [upper FMZ], 1.3, 1.7.1, 1.7.2, 1.10.1, 3, and 4, 4), or no vegetation whatsoever (Streambeds 1 [upper FMZ], 1.10 [lower FMZ], and 1.10 [upper][4]). There is one streambed that has a few isolated shrubs that may be subject to thinning or vegetation removal (Streambed 1.2.1 [lower FMZ]).

The functions and services of these non-wetland jurisdictional features include: (1) groundwater recharge; (2) flood conveyance; (3) sediment transport; and (4) some potential water quality benefits.

1. **Groundwater Recharge –** Thinning, removal and pruning of vegetation is not expected to have few, if any effects on groundwater recharge. Ground water recharge is a function of surface water, slope, and soil permeability.

   Ground water recharge is expected to either be unchanged or only minimally impacted by FMZ 2 and 3. Because Zone 1 is irrigated, groundwater recharge would likely increase in Zone 1 which could result in establishment of non-native exotic species in these locations.

[2] Murrieta Hills Project Habitat Evaluation and Acquisition Negotiation Strategy Biological Analysis. Prep for Pulte/BP Murrieta Hills, LLC. May.

[3] Murrieta Hills Project Determination of Biologically Equivalent or Superior Preservation Report. Prep for Pulte/BP Murrieta Hills, LLC. May.

[4] Upper and lower are used in places where a drainage crosses in and out of the FMZ, with the upper location being higher in the watershed.

2. **Flood Conveyance –** Flood conveyance is the capacity of a drainage feature to convey storm flows. The proposed vegetation management will not constrict or inhibit the capacity of these drainages to convey storm flows compared to their current capacity.

   Because vegetation is being thinned or completely removed in portions of Zones 2 and 3, flood conveyance may increase slightly because of potential for increases in runoff from these areas.

3. **Sediment Transport –** Sediment transport is the fluvial movement of sediment in a stream. The proposed vegetation management will not inhibit or restrict the drainages' capacity for sediment transport. The vegetation thinning or removal will reduce vegetative cover adjacent to the streambed and there is the potential for minor increases in sediment entering the avoided streambed.

   Potential minor increases in sediment transport are not expected to significantly increase from its current volumes. There is also the potential for very minor impacts to the streambeds during thinning and removal of the adjacent vegetation in the form of trampling or loosening the soil should workers walk through or drag vegetation across the drainage. Any minor increases in sediment transport from the actual thinning/removal process are also not considered to be significant.

4. **Water Quality Benefits –** Water quality benefits are typically derived from vegetation absorbing pesticides and other pollutants. This is not an important service of these drainages because the limited amount of vegetation in them restricts their capacity to absorb compounds from the runoff.

   Changes in these streams' capacity to provide water quality benefits is expected to be negligible. Based on site specific surveys there are no species identified in Section 6.1.2 of the MSHCP that occur onsite. Section V.B of the DBESP Report for Murrieta Hills provides a full discussion of species covered under Section 6.1.2.

Based on the effect of the FMZs specified vegetation modifications on the functions and services of the areas subject to fuel modification, the applicant is proposing mitigation based on ratios agreed to with the Western Riverside Resource Conservation Authority (RCA) as spelled out in Table 3.

The mitigation criteria used in Table 3 fall into the following general criteria classifications:

1. **Criteria A**: Upslope of Zone 1. These areas are not expected to be impacted by irrigation from Zone 1 because they are upslope.

2. **Criteria B**: Within 50 feet downslope of Zone 1. These areas may be impacted by irrigation from Zone 1 because they are immediately downslope of Zone 1 where elevation gradient plays a role.

3. **Criteria C**: More than 50 feet downslope of Zone 1. These areas are not expected to be impacted by irrigation from Zone 1 because they are more than 50 feet downslope of Zone 1.

4. **Criteria D**: Vegetation is either chaparral, sage scrub or grassland.

   These areas could be impacted by higher removal of native species, including chamise (*Adenostoma fasciculatum*), California sagebrush (*Artemisia californica*), coyote bush (*Baccharis pillularis*), yerba santa (*Eriodictyon californicum*), buckwheat (*Eriogonum* sp.), telegraph plant (*Heterotheca grandiflora*), sticky monkeyflower (*Diplacus aurantiacus*), laurel sumac (*Malosma laurina*), and sage (*Salvia*) species.

5. **Criteria E**: Steep slopes. Steeper slope areas increase the potential for erosion.

   These criteria were then combined, and a mitigation ratio attached to each combination based on the potential combined impact on a given drainage. All drainages within Zone 1 will be mitigated at 2:1 and drainages within Zones 2 and 3 will be mitigated at between 0.5:1 and 1:1 with offsite re-establishment (Table 3).

TABLE 3
MITIGATION CRITERIA AND MITIGATION RATIOS

Zone 1 Shall be mitigated at 2:1								
MITIGATION CRITERIA								
Mitigation Criteria	**Criteria A: Upslope of Zone 1 [1]**	**Criteria B: Within 50 feet downslope of Zone 1 [2]**	**Criteria C: Greater than 50 feet downslope of Zone 1 [3]**	**Criteria D: Vegetation Type: Chaparral, sage scrub or grassland [4]**	**Criteria E: Steep Slope [5]**			
MITIGATION CRITERIA COMBINATIONS								
Mitigation Criteria Combination	**Criteria 1 (A+D+E)**	**Criteria 2 (A+D)**	**Criteria 3 (B+D+E)**	**Criteria 4 (B+D)**	**Criteria 5 (B+E)**	**Criteria 6 (C+D+E)**	**Criteria 7 (C+D)**	**Criteria 8 (C+E)**
Zone 2 Mitigation Ratio	0.75:1	0.5:1	1:1	0.75:1	0.75:1	0.75:1	0.5:1	0.5:1
Internal Oak-dominated Open Space (Zone 3) Mitigation Ratio	0.75:1	0.5:1	1:1	0.75:1	0.75:1	0.75:1	0.5:1	0.5:1

[1] Because it is upslope of Zone 1 no irrigation water flows would be added to the streambed
[2] Because it is within 50 feet and downslope of Zone 1 there is the potential for irrigation water flow to be added to the streambed
[3] Because it is more than 50 feet downslope of Zone 1 no irrigation water flows would be expected to be added to the streambed
[4] Chaparral and sage scrub vegetation are expected to have a majority of the native shrub species removed and there is potential for increased erosion
[5] Steep slopes adjacent to the drainages will increase potential for erosion

Each drainage was reviewed and broken into segments by mitigation criteria combination. A single drainage could consist of multiple segments. The area of each segment was calculated, and the appropriate mitigation ratio applied to the impacts within that given segment.

All Zone 1 areas are automatically mitigated at a ratio of 2:1.

Table 4 shows the results of that assessment for Zones 2 and 3.

TABLE 4
FUEL MODIFICATION MITIGATION REQUIREMENTS FOR FUEL MODIFICATION ZONES 2 AND 3

Drainage Number (Mitigation Criteria Combination)[1]	MITIGATION CRITERIA					Mitigation Ratio	Impact (Acres)	Impact (Linear Feet)	Mitigation Requirement
	Criteria A: Upslope of Zone 1	Criteria B: Within 50 feet downslope of Zone 1	Criteria C: Greater than 50 feet downslope of Zone 1	Criteria D: Vegetation Type: Chaparral or sage scrub	Criteria E: Steep Slope				
Drainage 1(1)	x			x	x	0.75:1	0.0051	44	0.0038
Drainage 1(2)	x			x		0.5:1	0.0162	141	0.0081
Drainage 1(3)		x		x	x	1:1	0.1510	1,009	0.1510
Drainage 1(4)		x		x		0.75:1	0.0084	73	0.0063
Drainage 1(6)			x	x	x	0.75:1	0.0598	520	0.0449
Drainage 1(7)			x	x		0.5:1	0.1270	792	0.0635
Drainage 1.1(7)			x	x		0.5:1	0.0023	50	0.0012
Drainage 1.2(1)	x			x	x	0.75:1	0.0089	130	0.0068
Drainage 1.3(1)	x			x	x	0.75:1	0.0062	90	0.0049
Drainage 1.3(3)		x		x	x	1:1	0.0082	50	0.0082
Drainage 1.3(6)			x	x	x	0.75:1	0.0431	255	0.0323
Drainage 1.4(3)		x		x	x	1:1	0.0045	33	0.0045
Drainage 1.4(6)			x	x	x	0.75:1	0.0203	168	0.0152
Drainage 1.5(1)	x			x	x	0.75:1	0.0135	186	0.0101
Drainage 1.7(3)		x		x	x	1:1	0.0046	50	0.0046
Drainage 1.7(6)			x	x	x	0.75:1	0.0015	16	0.0011
Drainage 1.7.1 (2)	x			x		0.5:1	0.0003	6	0.0002
Drainage 1.7.2(1)	x			x	x	0.75:1	0.0023	50	0.0017
Drainage 1.8(3)		x		x	x	1:1	0.0061	66	0.0061
Drainage 1.8(7)			x	x		0.5:1	0.0006	7	0.0003
Drainage 1.9(1)	x			x	x	0.75:1	0.0034	50	0.0026
Drainage 1.9(3)		x		x	x	1:1	0.0042	61	0.0042
Drainage 1.9(6)			x	x	x	0.75:1	0.0054	78	0.0041
Drainage 1.10(1)	x			x	x	0.75:1	0.0227	226	0.0170
Drainage 1.10(3)		x		x	x	1:1	0.0040	120	0.0040
Drainage 1.10(5)		x		x		0.75:1	0.0030	44	0.0023

TABLE 4 (cont.)
FUEL MODIFICATION MITIGATION REQUIREMENTS FOR FUEL MODIFICATION ZONES 2 AND 3

Drainage Number (Mitigation Criteria Combination)[1]	MITIGATION CRITERIA					Mitigation Ratio	Impact (Acres)	Impact (Linear Feet)	Mitigation Requirement
	Criteria A: Upslope of Zone 1	Criteria B: Within 50 feet downslope of Zone 1	Criteria C: Greater than 50 feet downslope of Zone 1	Criteria D: Vegetation Type: Chaparral or sage scrub	Criteria E: Steep Slope				
Drainage 1.10(6)			x	x	x	0.75:1	0.0112	188	0.0084
Drainage 1.10(8)			x		x	0.5:1	0.0080	58	0.0040
Drainage 1.10.1(1)	x			x	x	0.75:1	0.0046	100	0.0035
Drainage 1.10.2(1)	x			x	x	0.75:1	0.0026	38	0.0020
Drainage 1.10.3(7)			x	x		0.5:1	0.0004	17	0.0002
Drainage 1.11	x			x		0.5:1	0.0001	5	0.0001
Drainage 3(1)	x			x	x	0.75:1	0.0114	124	0.0086
Drainage 3(3)		x		x	x	1:1	0.0101	137	0.0101
Drainage 4(2)	x			x		0.5:1	0.0011	15	0.0006
Drainage 7 (2)	x			x		0.5:1	0.0001	3	0.0001
TOTAL							**0.5845**	**4,980**	**0.4466**
							0.5822	5000	0.4458

Cursory check of numbers equalled these. May want to double check.

Based on the assessment above, impacts to 0.5845 acre of Riverine/streambed within Zones 2 and 3 require 0.4466 acre of mitigation. Zone 1 mitigation totals 0.0376 acre, and when combined with Zones 2 and 3, the total mitigation obligation is 0.4842 acre.

Mitigation will be accomplished through the purchase of 0.4842 re-establishment credits from the Riverpark Mitigation Bank.

Enclosures:

Figure 1 Photo Locations
Figure 2a-d Riparian/Riverine Resources within Fuel Modification Zones
Attachment A. Waters of the U.S. in the Fuel Modification Zone

The RCA recommends you include the current Fire Protection Plan as a Enclosure so that the appendices you reference in this memo that occur in the Fire Protection document can be reviewed by the reader. At the very least, the most current version of the Fire Protection Plan needs to be included in the DBESP so that the Wildlife Agencies can review it. Otherwise you will be delayed with an additional submittal for it.

Regional Conservation Authority
Western Riverside County

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August 27, 2019

Ron Goldman, Consultant
City of Murrieta
1 Town Square
Murrieta, California 92562

Dear Mr. Goldman:

Please find the following JPR attached:

JPR 09-02-17-01. The Local Identifier is Murrieta Hills (SPO-012-3164). The JPR file attached includes the following:

- RCA JPR Findings (Amended)
- Exhibit A, Vicinity Map with MSHCP Schematic Cores and Linkages
- Exhibit B, Criteria Area Cells with Riverside County Vegetation and Project Location
- Exhibit C, Criteria Area Cells with MSHCP Soils and Project Location
- Exhibit D, Conservation and Avoidance Areas
- Regional Map

Thank you,

Wendy Worthey
Western Riverside County Regional Conservation Authority

cc: Karin Cleary-Rose
U.S. Fish and Wildlife Service
777 East Tahquitz Canyon Way,
Suite 208
Palm Springs, California 92262

Joanna Gibson
California Dept. of Fish and Wildlife
3602 Inland Empire Blvd. #C220
Ontario, California 91764

RCA Joint Project Review (JPR)

JPR #: 09-02-17-01
Date: AMENDED 08/27/19

Project Information

Permittee:	**City of Murrieta**
Case Information:	**Murrieta Hills Specific Plan Amendment**
Site Acreage:	**973.7 acres (361.76 acres developed on-site; 4.15 acres off-site McElwain Road extension; 0.08 acre off-site Keller Road outfall structure)**
Portion of Site Proposed for MSHCP Conservation Area:	**607.7 acres**

Criteria Consistency Review

Consistency Conclusion: The project is consistent with both the Criteria and Other Plan requirements

Applicable Core/Linkage: Proposed Linkage 8 and Proposed Constrained Linkage 16
Area Plan: Sun City/Menifee

APN	Sub-Unit	Cell Group	Cell
384-190-001	SU 2 – Lower Sedco Hills	C	5252
384-190-003			5253
384-190-005 through 384-190-014			5254
384-200-006 through 384-200-017			5255
384-210-001 through 384-210-003			5355
			5356
			5357
			5358

a. As stated in Section 3.2.3 of the MSHCP, "Proposed Linkage 8 (Sedco Hills/Wildomar) is composed largely of upland Habitat in the Sedco Hills and Wildomar area. This Linkage is a major component of one of the two main east-west connections between Core Areas in the Lake Mathews/Estelle Mountain, Alberhill and the Cleveland National Forest in the western portion of the MSHCP Plan Area and Core Areas in French Valley, Johnson Ranch, Diamond Valley Lake and San Jacinto Mountains in the eastern portion of the MSHCP Plan Area. This Linkage provides Live-In Habitat for over 50 pairs of coastal California gnatcatcher, as well as a connection to other key populations of gnatcatcher known to occur in Alberhill, North Peak and the Ramsgate area. Other Planning Species for which Habitat is provided include Quino checkerspot butterfly, Stephens' kangaroo rat, and bobcat. The grasslands occurring within this proposed Linkage also provide foraging Habitat for a number of raptors. Maintenance of large intact interconnected habitat blocks is important for these species. The northern portion of this

Linkage includes a portion of the lower San Jacinto River extending under I-15 to connect with Proposed Extension of Existing Core 3."

In addition, as stated in Section 3.2.3 of the MSHCP, "Proposed Constrained Linkage 16 is located approximately in the south-central region of the Plan Area. This Constrained Linkage consists of an unnamed blueline drainage connecting Proposed Linkage 8 in the west with Proposed Core 2 (Antelope Valley) in the east. The Linkage provides Habitat for species and also provides for movement of species. The Linkage likely provides for movement of common mammals such as bobcat. Existing urban Development and agricultural use constrain the Linkage along its entire length, and the Linkage is completely surrounded by a city-designated planned land use. Species movement through the Linkage may also be affected by the intersection of the Linkage with I-215. Therefore, treatment and management of edge conditions along this Linkage will be necessary to ensure that it provides Habitat and movement functions for species using the Linkage. Guidelines Pertaining to Urban/Wildlands Interface for the management of edge factors such as lighting, urban runoff, toxics, and domestic predators are presented in Section 6.1 of this document [MSHCP]."

b. The project site is located within Cell Group C. According to Section 3.3.14 of the MSHCP, "Conservation within this Cell Group will contribute to assembly of Proposed Linkage 8 and Proposed Constrained Linkage 16. Conservation within this Cell Group will focus on chaparral, woodlands and forest, a small area of coastal sage scrub, and grassland. Areas conserved within this Cell Group will be connected to coastal sage scrub and chaparral habitat proposed for conservation to the south in Cell Groups H′ and I′, and Cell 5460, all in the Southwest Area Plan. Conservation within this Cell Group will range from 60% to 70%, focusing on the southern, central, and eastern portions of the Cell Group."

c. Rough Step: The proposed project is within Rough Step Unit 6. Rough Step 6 encompasses 101,542 acres within the south-central region of western Riverside County and includes Antelope Valley, Warm Springs Creek, Paloma Creek, Lake Skinner, Johnson Ranch, and Diamond Valley Lake. This Rough Step area is bounded by Interstate 15 to the northwest, Bundy Canyon Road and Olive Avenue to the north, and Palm Avenue to the west. Within Rough Step 6, 24,836 acres are located within the Criteria Area. Key vegetation communities within Rough Step 6 include coastal sage scrub; grasslands, riparian scrub, woodland, forest; and woodland and forests. Based on the 2017 MSHCP Annual Report, all vegetation categories are "in" rough step. Based on the MSHCP baseline vegetation mapping, vegetation on the proposed project site is primarily comprised of chaparral, grassland, agricultural land, woodland and forest, coastal sage scrub, and developed/disturbed. Development on the project site will not conflict with or interfere with the Rough Step Status of Unit 6.

d. Project History: A JPR for the proposed project was originally submitted for review as JPR 07-05-23-01. This JPR was indefinitely suspended due to the project missing a Determination of Biological Equivalent or Superior Report (DBESP) and missing a substantial discussion regarding the round-leaved filaree located on the project site. A JPR for the revised project was later resubmitted as a new JPR 09-02-17-01 that was approved by RCA on December 2, 2009, but was found inconsistent by the Wildlife Agencies (CDFW and USFWS) for numerous reasons. First, inconsistency was due to the proposed

conservation area being configured such that it did not conserve the areas described for conservation within Cell Group C (the southern, central, and eastern portions of the Cell Group), nor was it biologically functional, and nor did it encompass a suitably sized area near the existing I-215 wildlife undercrossing. Second, the proposed McElwain Road southern entrance to the project did not adequately address wildlife movement and was expected to bisect areas described for conservation. In addition, Rough Step Unit 6 was "out of step" at the time of the 2009 JPR, and the proposed project intended to impact riparian vegetation that would further exacerbate Rough Step Unit 6. Finally, the proposed mitigation (1:1 on-site creation/restoration and 1:1 out-of-kind credits) for impacts to 3.01 acres of riparian/riverine vegetation was considered by the Wildlife Agencies inadequate in demonstrating a biologically equivalent or superior option as compared to the habitat lost. The original 2009 JPR Findings and the original Wildlife Agency comment letters are attached for reference.

The proposed project has been modified to reduce its overall development footprint from 504.46 acres in the 2009 JPR to 361.76 acres in this current JPR submittal. Proposed conservation for the proposed project has also been reduced from 793.12 acres to 607.7 acres; the northwestern and southwestern parcels are no longer a part of the overall project. The southwestern parcels have since been acquired as conservation land (approximately 189 acres per Evandel-Wilson and Evandel-Bergstein in 2015). The northwestern parcel is currently undeveloped. The proposed conservation for this JPR has been reconfigured such that the southern portion of the Cell Group is prioritized and a larger area will be conserved adjacent to the I-215 undercrossing. The revised project description also includes a 69 percent reduction in impacts to riparian vegetation and has increased the mitigation ratio. McElwain Road was added as a MSHCP Covered Activity through Minor Amendment No. 2017-01 (RCA 2018), and the proposed project has committed to a crossing structure beneath this road that will facilitate wildlife movement through the conservation area. Furthermore, per the 2017 Annual Report, Rough Step Unit 6 is no longer out of step.

e. Project Information: Updated project information provided by the Permittee includes the following: RCA Joint Project Review Application received 2/8/18, a *Murrieta Hills Project Habitat Evaluation and Acquisition Negotiation Strategy Biological Analysis* (*Analysis*) prepared by HELIX Environmental (8/13/19), a *Murrieta Hills Project General Biological Resources Assessment* (*Bio Report*) prepared by HELIX Environmental (8/13/19), and a *Murrieta Hills Project* DBESP prepared by HELIX Environmental (8/13/19).

The proposed project is a master planned community that intends to be annexed into the City of Murrieta, and would include an amendment to the existing Murrieta Hills Specific Plan SPM-4 that was originally approved by the City in 1995, as well as appropriate rezoning from the Rural Mountainous zone to that of the City of Murrieta Specific Plan zoning. The proposed project includes single and multi-family homes, commercial development, active and passive parks, and open space for MSHCP Conservation. The proposed project also includes a northerly extension of McElwain Road that will connect it with Keller Road. The inclusion of McElwain Road was added to the MSHCP as a Covered Road through Minor Amendment No. 2017-01 (RCA 2018). Finally, the proposed project includes an

off-site outfall structure that funnels water from the drainage bisecting the project site beneath Keller Road to the north.

The development is proposed on 361.76 acres of the site, and the remaining 607.7 acres is proposed as MSHCP Conservation Land. The extension of McElwain Road will impact 4.15 acres off site and the off-site outfall structure on Keller Road will impact 0.08 acre; both off-site features are located outside of MSHCP Criteria Cells. Additionally, the project includes 4.1 acres of riparian/riverine avoidance that will be protected by deed restriction.

The project site is dominated by chaparral dominated by chamise (*Adenostoma fasciculatum*), hoary-leaved ceanothus (*Ceanothus crassifolius*), red shank (*Adenostoma sparsifolium*), and black sage (*Salvia mellifera*). The project site also contains southern willow scrub, mulefat scrub, southern cottonwood-willow riparian woodland, coast live oak woodland, Riversidean sage scrub, Coastal sage scrub/chaparral, non-native grassland, field cropland, Eucalyptus woodland, disturbed, and developed areas. The off-site area is dominated by chaparral, but also contains Riversidean sage scrub, non-native grassland, disturbed, and developed land. The project site straddles the highest points of three watersheds: Cole Canyon-Murrieta Creek, Menifee Creek, and Warm Springs Creek. Soils on the project site include Cajalco rocky fine sandy loam, Los Posas loam, Cajalco fine sandy loam, Honcut loam, Auld clay, and Los Posas rocky loam. The off-site area is primarily mapped as Cajalco rocky fine sandy loam.

f. As mentioned previously, the project site is located within Cell Group C. Conservation within this Cell Group will contribute to assembly of Proposed Linkage 8 and Proposed Constrained Linkage 16, and will range from 60% to 70% of the Cell Group focusing in the southern, central, and eastern portions of the Cell Group.

Using the mid-range of the area described for conservation (65%) within Cell Group C, which is comprised of 8 individual cells, approximately 863 acres are described for conservation within this 1,328-acre Cell Group. To date, 12.8 acres have been developed in this Cell, Covered Road acreage is 6.5 acres, and 189 acres have been conserved to date in the southwestern corner. With implementation of the proposed project, 361.76 acres will be developed and 607.7 acres will be contributed to conservation, bringing the total proposed conservation within Cell Group C to 797 acres. Finally, there are approximately 149 additional acres within Cell Group C that are available for conservation, giving potential for approximately 946 total acres of conservation within Cell Group C, allowing the Cell Group to meet its mid-range goal (863 acres) and even its high-end goal (930 acres).

The project site is located within the northern portion of the area described for conservation within Proposed Linkage 8 and directly adjacent to the western edge of Proposed Constrained Linkage 16. According to the *Analysis*, the configuration of the proposed project site and the conservation of 607.7 acres by the proposed project is intended to preserve the functionality of Proposed Linkage 8 for its intended planning species, such as coastal California gnatcatcher and southern California rufous-crowned sparrow, by minimizing impacts to suitable habitat (chaparral, sage scrub, grassland, and riparian) for the these species to the greatest extent possible. According to the *Analysis*, the proposed project will maximize the amount of sage scrub habitat conserved and avoided by the development footprint while

concentrating approximately 35 percent of its impacts to less optimal habitat for the planning species, such as field croplands and disturbed habitat. Finally, the proposed project has configured their site plan so as to preserve other MSHCP-covered species within its study area. The proposed project will conserve approximately 3,036 individuals of Parry's spineflower (66% of the total on the project site). This population was intended to serve as one of the 10 necessary populations for Parry's spineflower to be considered adequately conserved. However, per the 2017 Annual Report, 10 populations of Parry's spineflower have already been conserved. Conservation of this population of Parry's spineflower will still contribute to the recovery of this species, but is not necessary for this species to be adequately conserved. Additionally, the project's conservation land would preserve populations of long-spined spineflower (*Chorizanthe polygonoides var. longispina*) and Palmer's grapplinghook (*Harpagonella palmeri*).

The Permittee is requiring the proposed project to have an access road connecting the project from the south. This access road is located adjacent to I-215 and is referred to as McElwain Road. Completion of a Minor Amendment 2017-01 (approved January 10, 2018) authorized the exchange of Hunter Road, Washington Street, Whitewood Road, and Antelope Road to accommodate the extension of McElwain Road to Keller Road and the construction of Warm Springs Parkway. While the Minor Amendment allowed for the extension of McElwain Road for this JPR, construction of Warm Springs Parkway will require one or more JPRs as part of the future approval process and will not be discussed further in this document. McElwain Road will be designed to incorporate a 6-foot by 6-foot box culvert in the floodplain and a 4-foot by 4-foot box culvert outside of the 100-year floodplain to facilitate wildlife movement through both Proposed Constrained Linkage 16 and Proposed Linkage 8. The culvert beneath McElwain Road will be approximately 137 feet long and provide direct line of sight from end to end. McElwain Road has been sited close to I-215 in order to avoid additional fragmentation within the portion of the project that will be turned over to the RCA as MSHCP Conservation Lands. In addition, McElwain Road will comply with Section 7.5.2 of the MSHCP, including that ingress and egress of the culvert under McElwain Road will be revegetated appropriately to encourage wildlife movement. The project will also provide directional fencing, shading or any other means of buffering wildlife from the proposed development as well as McElwain Road. **As a condition of these Findings, the Applicant shall provide both a Fencing Plan and an Access Plan for the proposed MSHCP Conservation Lands to the RCA and the Wildlife Agencies prior to site grading or land conveyance**.

Implementation of the proposed project will allow Cell Group C to reach its conservation goals. Development of the proposed project would not further impede the conservation goals for these linkages. Based on this discussion, development of the proposed project site is consistent with the Reserve Assembly goals of the MSHCP.

Other Plan Requirements

Section 6.1.2 – Was Riparian/Riverine/Vernal Pool Mapping or Information Provided?

Yes. There are riverine/riparian resources on site. There are no reported vernal pools or other fairy shrimp habitat on the site. A Determination of Biologically Equivalent or Superior Preservation (DBESP) report was prepared to address impacts to the riparian and riverine resources on site.

Section 6.1.3 – Was Narrow Endemic Plant Species Survey Information Provided?

Yes. The project site is located within a Narrow Endemic Plant Species Survey Area (NEPSSA) for Munz's onion, San Diego ambrosia, many-stemmed dudleya, spreading navarretia, California Orcutt grass, and Wright's trichocoronis.

Section 6.3.2 – Was Additional Survey Information Provided?

Yes. The project site is located in a Criteria Area Species Survey Area (CASSA) for Davidson's saltscale, Parish's brittlescale, thread-leaved brodiaea, smooth tarplant, round-leaved filaree, Coulter's goldfields, and little mousetail. The project site is also located in an Additional Survey Area for burrowing owl.

Section 6.1.4 – Was Information Pertaining to Urban/Wildland Interface Guidelines Provided?

Yes. The proposed project includes areas proposed for Conservation; therefore, the guidelines contained in Section 6.1.4 are applicable.

Comments:

a. Section 6.1.2: According to the *Analysis* and DBESP, both prepared by HELIX, the project site supports a total of 9.1 acres of riparian habitat and 3.21 acres of riverine resources. The off-site area consists of 0.03 acre of riverine resources. The riparian areas on site consist of four vegetative communities: southern willow scrub, mulefat scrub, southern cottonwood-willow riparian woodland, and coast live oak woodland. Riverine areas are comprised of unvegetated streambed with a defined bed and bank, and follows the boundaries of streambeds regulated by CDFW.

   The project development would directly impact 0.97 acre of riparian habitat and 1.13 acres of riverine resource, comprised of 0.42 acre of coast live oak woodland, 0.04 acre of riparian woodland, 0.36 acre of southern willow scrub, 0.15 acre of mulefat scrub, and 1.13 acres of streambed. The present functions and values of these resources include water conveyance, sediment transport, energy dissipation, cover for wildlife movement, and habitat for nesting birds. The riparian impacts will be mitigated at a 3:1 ratio, for a total of 2.91 acres, and the riverine resource will be mitigated at a 2:1 ratio for a total of 2.26 acres. Additional impacts to riverine features as a result of fuel modification total 0.60 acre. Due to the preservation of a subset of function and values such as sediment transport, energy dissipation, and water conveyance, impacts to riverine features within the fuel modification zone will be mitigated at varying ratios depending on the level of impact per fuel modification zone and the effected function and value (described in Appendix 7 of the *Analysis*). The total mitigation from fuel modification impacts adds an additional 0.48 acre of mitigation to the overall mitigation total. The final total of 5.65 acres of mitigation will be provided via a combination of off-site purchase of credits at an approved Mitigation Bank or In Lieu Fee Program, off-site habitat restoration, or another mitigation method approved by the City, Wildlife Agencies, and RCA. Prior to project initiation activities (including, but not limited to, ground disturbance, vegetation clearing and/or equipment staging), the final mitigation option must be submitted to the RCA and the Wildlife Agencies for review and concurrence.

According to the *Analysis* and DBESP, should an off-site restoration site be chosen, a Habitat Mitigation and Monitoring Program will be prepared and submitted to the City, Wildlife Agencies, and RCA for review and approval prior to project initiation (including, but not limited to, ground disturbance, vegetation clearing and/or equipment staging). If the Mitigation Bank or In Lieu Fee options are chosen instead, options would include the Riverpark Mitigation Bank, which supports re-establishment of alkali playa and vernal pool habitat. According to the DBESP, the mitigation will be biologically equivalent to resources being impacted by the proposed project because it will be contiguous with other higher quality habitat, while the proposed project's impacts to riparian/riverine are non-contiguous patches. Finally, there will be a minimum of 6.11 acres of on-site riparian/riverine conservation (a component of the 607.7 total acres that are set aside for conservation) and 4.1 acres of avoidance in the Linear Nature Park (LNP) that is located within the middle of the project site. The 4.1 acres of riparian/riverine within the LNP will be covered by a deed restriction that will protect this resource in perpetuity.

Vernal Pools/Fairy Shrimp: The site was assessed for potential fairy shrimp habitat, such as vernal pools or ephemeral ponds, and for potential habitat indicators such as basins, roads ruts, and cracked mud. According to the *Analysis,* the Project site and off-site areas do not contain vernal pool habitat or other habitat suitable for fairy shrimp. The project site does include a 4.4-acre patch of clay soils located on the southeastern edge of an agricultural field. According to the *Analysis*, this patch area has been degraded by discing and dry farming. Furthermore, the patch area was evaluated and depressional features suitable for fairy shrimp were determined absent.

Riparian Birds: HELIX identified suitable habitat for least Bell's vireo (*Vireo bellii pusillus*; LBVI), low potential habitat for southwestern willow flycatcher (*Empidonax traillii extimus*; SWFL), and no potential habitat for yellow-billed cuckoo (*Coccyzus americanus*; YBCU) on the project site. According to the *Analysis*, the YBCU requires dense, wide riparian woodlands with well-developed and mesic understories for breeding. The project site does not have this habitat and therefore there is not potential for this species to occur. SWFL requires dense riparian woodlands along streams and rivers with mature, dense stands of willows and cottonwoods. According to the *Analysis*, the project site contains riparian woodland that has low potential to support this species. The most suitable habitat is characterized as southern cottonwood-willow riparian forest. LBVI is typically associated with riparian scrub, forest, and woodland habitat with dense cover. According to the *Analysis,* the project site contains habitat suitable for this species.

Focused surveys for least Bell's vireo and southwestern willow flycatcher were conducted on site between May and July 2006, with the least Bell's vireo surveys repeated in June and July 2008, and April and July 2012. Neither of these bird species were identified on site during these three survey efforts. The *Analysis* notes that suitable habitat for southwestern willow flycatcher has been eliminated by the removal of an on-site nursery that was contributing nuisance flows to the riparian vegetation at the time of the 2006 surveys.

The proposed project has not yet acquired property access to the off-site area of the proposed project associated with the McElwain Road extension. As such, all MSHCP consistency analysis was conducted

via public road access and desktop review. **As a condition of these Findings, immediately upon obtaining access, the Applicant shall conduct a full biological assessment for Section 6.1.2 resources at the McElwain Road off-site project site prior to ground-disturbing activities. The results of this assessment will be provided to the RCA and the Wildlife Agencies for review and concurrence prior to ground-disturbing activities**.

Based on the mitigation proposed in the DBESP, and the requirements for the final riparian/riverine mitigation option and the biological assessment at McElwain Road to be provided to RCA and the Wildlife Agencies prior to initiation of the project, the project demonstrates compliance with Section 6.1.2 of the MSHCP.

b. Section 6.1.3: The project site is located within a NEPSSA Area 4 for Munz's onion, San Diego ambrosia, many-stemmed dudleya, spreading navarretia, California Orcutt grass, and Wright's trichocoronis. According to the *Analysis*, suitable habitat for Munz's onion and many-stemmed dudleya exists on the project site in the form of clay soils. According to HELIX, surveys for these plants were conducted on May 19, 22, 24, 26, 28, June 2, 6, 7, and 9, 2006. Surveys were then completed again on April 16 and June 11, 2008, as well as May 11, 2012. Focused surveys were conducted within suitable habitat and no NEPSSA species were identified on the project site.

   The proposed project has not yet acquired property access to the off-site area of the proposed project associated with the McElwain Road extension. As such, all MSHCP consistency analysis was conducted via public road access and desktop review. **As a condition of these Findings, immediately upon obtaining access, the Applicant shall conduct a full biological assessment for Section 6.1.3 resources at the McElwain Road off-site project site prior to ground-disturbing activities. The results of this assessment will be provided to the RCA and the Wildlife Agencies for review and concurrence prior to ground-disturbing activities**. Based on the information provided by HELIX, and the requirement for the biological assessment at McElwain Road to be provided to RCA and the Wildlife Agencies prior to initiating project activities, the project demonstrates consistency with Section 6.1.3 of the MSHCP.

c. Section 6.3.2: The project site is located in a CASSA for Davidson's saltscale, Parish's brittlescale, thread-leaved brodiaea, smooth tarplant, round-leaved filaree, Coulter's goldfields, and little mousetail. According to the *Analysis*, suitable habitat for thread-leaved Brodiaea and round-leaved filaree exists on the project site in the form of clay soils. HELIX conducted surveys for these plants on May 19, 22, 24, 26, 28, June 2, 6, 7, and 9, 2006. Surveys were then completed again on April 16 and June 11, 2008 and May 11, 2012. In 2006, HELIX reported finding two individuals of round-leaved filaree in the northeastern corner of the project site near the agricultural land. The species was observed in a disc of clay soils near the mapped Auld clay soils. However, in 2008 and 2012, HELIX did not observe this species on the project site. HELIX suggests that high rainfall in 2005 (242% of average) preceding the 2006 surveys resulted in the detection of the two individuals, while lower than average rainfall in 2008 and 2012 (88% and 63%) may contribute to their absence during the succeeding surveys. The *Analysis* states that there are 10 occurrences of round-leaved filaree within the MSHCP Plan area, eight of which are located on MSHCP conserved land. Based on HELIX's determination, the two individuals identified

in 2006 do not constitute a population with long-term conservation value and therefore avoidance is not warranted. The 2009 JPR included 15 acres of habitat restoration in the southwestern corner of the project site that would include the salvage of topsoil from the location of the round-leaved filaree to use in the restoration area. This restoration is no longer proposed in the updated project; however, the 15 acre region is included in the proposed conservation for the project.

The project site is also located in an Additional Survey Area for burrowing owl. Suitable habitat for the burrowing owl was identified on site and HELIX biologists conducted focused surveys for burrowing owl in May, July, and August 2006, April 24, May 5, 6, and 20, 2008, June and July 2012, and April and May 2018. All surveys were conducted in accordance with the *Burrowing Owl Survey Instructions for the Western Riverside MSHCP* (RCA 2006). The results of the habitat assessment, Step I, indicated that the majority of the project site contained steep terrain and dense vegetation not suitable for burrowing owl. However, suitable habitat was present in the form of non-native grassland, field croplands, disturbed habitat, and some areas of sage scrub with less than 30% ground cover. The results of the focused burrow survey, Step II-A, indicated that nearly all potential burrows were located in the northeastern portion of the project site in the field croplands. As such, four focused burrowing owl surveys (Step II-B) were conducted during each survey year. All suitable burrows detected during all four focused surveys were mapped and depicted on a corresponding figure. No direct BUOW observations or BUOW sign (feathers, pellets, fecal material, prey remains, etc.) were recorded during the focused burrowing owl surveys. The site does encompass suitable burrows that could be utilized by burrowing owl.

Due to the potential suitable burrowing owl habitat on site a 30-day preconstruction survey for burrowing owls is required prior to initial ground-disturbing activities. If burrowing owl have colonized the property site prior to the initiation of construction, the Permittee should immediately inform RCA and the Wildlife Agencies, and coordinate on the potential need for a Burrowing Owl Protection and Relocation Plan, prior to initiating ground disturbance.

The proposed project has not yet acquired property access to the off-site area of the proposed project associated with the McElwain Road extension. As such, all MSHCP consistency analysis was conducted via public road access and desktop review. **As a condition of these Findings, and immediately upon obtaining access, the Applicant shall conduct a full biological assessment for Section 6.3.2 resources at the McElwain Road off-site project site prior to ground-disturbing activities. The results of this assessment will be provided to the RCA and the Wildlife Agencies for review and concurrence prior to ground-disturbing activities**.

Based on the documentation provided by HELIX, and the requirement for the biological assessment at McElwain Road to be provided to RCA and the Wildlife Agencies prior to initiating project activities, the project demonstrates consistency with Section 6.3.2 of the MSHCP related to CASSA and burrowing owl survey requirements.

d. Section 6.1.4: To preserve the integrity of areas surrounding the Project site which are proposed Conservation Areas, the guidelines contained in Section 6.1.4 related to controlling edge effects from development adjacent to the MSHCP Conservation Area should be considered by the Permittee in their

actions relative to the Project. Conservation Area includes existing conserved lands and lands described for conservation per MSHCP Cell criteria. Specifically, the Permittee should include as Project conditions of approval the following measures:

i. Incorporate measures to control the quantity and quality of runoff from the site entering the MSHCP Conservation Area. In particular, measures shall be required to avoid discharge of untreated surface runoff from developed and paved areas into MSHCP Conservation Areas. This measure applies to any discharges upstream of and connecting to existing or future conservation areas including discharges to tributaries to all larger streams\rivers (Santa Ana River, San Jacinto River, Santa Margarita River, Murrieta Creek, Temecula Creek) in western Riverside County. The proposed project will implement appropriate BMPs to ensure that the quality and quantity of runoff discharged is not altered in an adverse way when compared to existing conditions.

ii. Land uses proposed in proximity to the MSHCP Conservation Area that use chemicals or generate bioproducts such as manure, which are potentially toxic or may adversely affect wildlife species, habitat or water quality shall incorporate measures to ensure that application of such chemicals does not result in discharge to the MSHCP Conservation Area. The greatest risk is from landscaping fertilization overspray and run-off.

iii. Night lighting shall be directed away from the MSHCP Conservation Area to protect species within the MSHCP Conservation Area from direct night lighting. Shielding shall be incorporated in project designs to ensure ambient lighting in the MSHCP Conservation Area is not increased. The *Analysis* states that lighting will be placed such that it is not directed towards conserved habitat. Spotlight-type backyard lighting directed towards the Conservation Area will be prohibited.

iv. Proposed noise generating land uses affecting the MSHCP Conservation Area shall incorporate setbacks, berms or walls to minimize the effects of noise on MSHCP Conservation Area resources pursuant to applicable rules, regulations and guidelines related to land use noise standards.

v. Consider the invasive, non-native plant species listed in Table 6-2 of the MSHCP in approving landscape plans to avoid the use of invasive species for the portions of the project that are adjacent to the MSHCP Conservation Area. Considerations in reviewing the applicability of this list shall include proximity of planting areas to the MSHCP Conservation Areas, species considered in the planting plans, resources being protected within the MSHCP Conservation Area and their relative sensitivity to invasion, and barriers to plant and seed dispersal, such as walls, topography and other features.

vi. Proposed land uses adjacent to the MSHCP Conservation Area shall incorporate barriers, where appropriate in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping into the MSHCP Conservation Areas. Such barriers may include native landscaping, rocks/boulders, fencing, walls, signage, and/or appropriate mechanisms. **As mentioned above, a condition of these Findings, the Applicant shall provide both a Fencing Plan and an Access Plan for the proposed MSHCP Conservation Lands to the RCA and the Wildlife Agencies prior to site grading or land conveyance**.

vii. Manufactured slopes associated with the proposed site development shall not extend into the MSHCP Conservation Area.

e. MSHCP Volume I, Appendix C: The following best management practices (BMPs), as applicable, shall be implemented for the duration of construction:

i. A condition shall be placed on grading permits requiring a qualified biologist to conduct a training session for project personnel prior to grading. The training shall include a description of the species of concern and its habitats, the general provisions of the Endangered Species Act (Act) and the MSHCP, the need to adhere to the provisions of the Act and the MSHCP, the penalties associated with violating the provisions of the Act, the general measures that are being implemented to conserve the species of concern as they relate to the project, and the access routes to and project site boundaries within which the project activities must be accomplished.

ii. Water pollution and erosion control plans shall be developed and implemented in accordance with RWQCB requirements.

iii. The footprint of disturbance shall be minimized to the maximum extent feasible. Access to sites shall be via pre-existing access routes to the greatest extent possible.

iv. The upstream and downstream limits of projects disturbance plus lateral limits of disturbance on either side of the stream shall be clearly defined and marked in the field and reviewed by the biologist prior to initiation of work.

v. Projects should be designed to avoid the placement of equipment and personnel within the stream channel or on sand and gravel bars, banks, and adjacent upland habitats used by target species of concern.

vi. Projects that cannot be conducted without placing equipment or personnel in sensitive habitats should be timed to avoid the breeding season of riparian species identified in MSHCP Global Species Objective No. 7.

vii. When stream flows must be diverted, the diversions shall be conducted using sandbags or other methods requiring minimal instream impacts. Silt fencing of other sediment trapping materials shall be installed at the downstream end of construction activity to minimize the transport of sediments off site. Settling ponds where sediment is collected shall be cleaned out in a manner that prevents the sediment from reentering the stream. Care shall be exercised when removing silt fences, as feasible, to prevent debris or sediment from returning to the stream.

viii. Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage into riparian areas or other sensitive habitats. These designated areas shall be located in such a manner as to prevent any runoff from entering sensitive habitat. Necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. Project related spills of hazardous materials shall be reported to appropriate entities including but not limited to

applicable jurisdictional city, FWS, and CDFG, RWQCB and shall be cleaned up immediately and contaminated soils removed to approved disposal areas.

ix. Erodible fill material shall not be deposited into water courses. Brush, loose soils, or other similar debris material shall not be stockpiled within the stream channel or on its banks.

x. The qualified project biologist shall monitor construction activities for the duration of the project to ensure that practicable measures are being employed to avoid incidental disturbance of habitat and species of concern outside the project footprint.

xi. The removal of native vegetation shall be avoided and minimized to the maximum extent practicable. Temporary impacts shall be returned to pre-existing contours and revegetated with appropriate native species.

xii. Exotic species that prey upon or displace target species of concern should be permanently removed from the site to the extent feasible.

xiii. To avoid attracting predators of the species of concern, the project site shall be kept as clean of debris as possible. All food related trash items shall be enclosed in sealed containers and regularly removed from the site(s).

xiv. Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed project footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans. Construction limits will be fenced with orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas.

The Permittee shall have the right to access and inspect any sites of approved projects including any restoration/enhancement area for compliance with project approval conditions, including these BMPs.

AC

JPR Log No. 09-02-17-01

Proposed Linkages:
- Constrained Linkage
- Linkage
- Existing Channel

Existing Cores & Linkages:
- Constrained Linkage
- Core
- Linkage
- Noncontiguous Habitat Block

Proposed Cores & Habitat Blocks:
- Core
- Proposed Extension of Existing Cores
- Noncontiguous Habitat Block

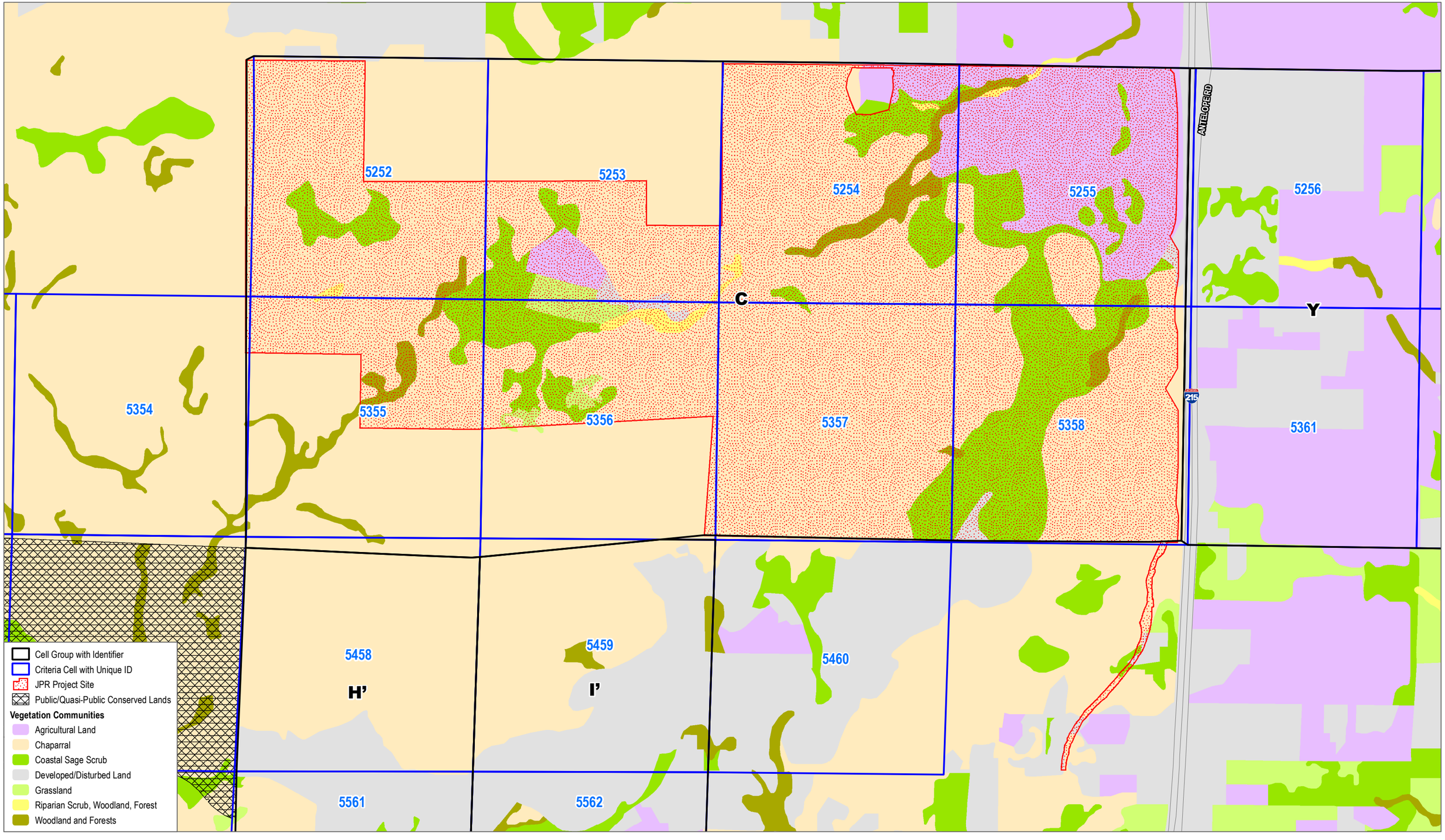
SOURCE: Western Riverside County Regional Conservation Authority 2019; County of Riverside 2019

DUDEK

0 2.5 5 Miles

EXHIBIT A

JPR Log No. 09-02-17-01 - Vicinity Map with MSHCP Schematic Cores and Linkages



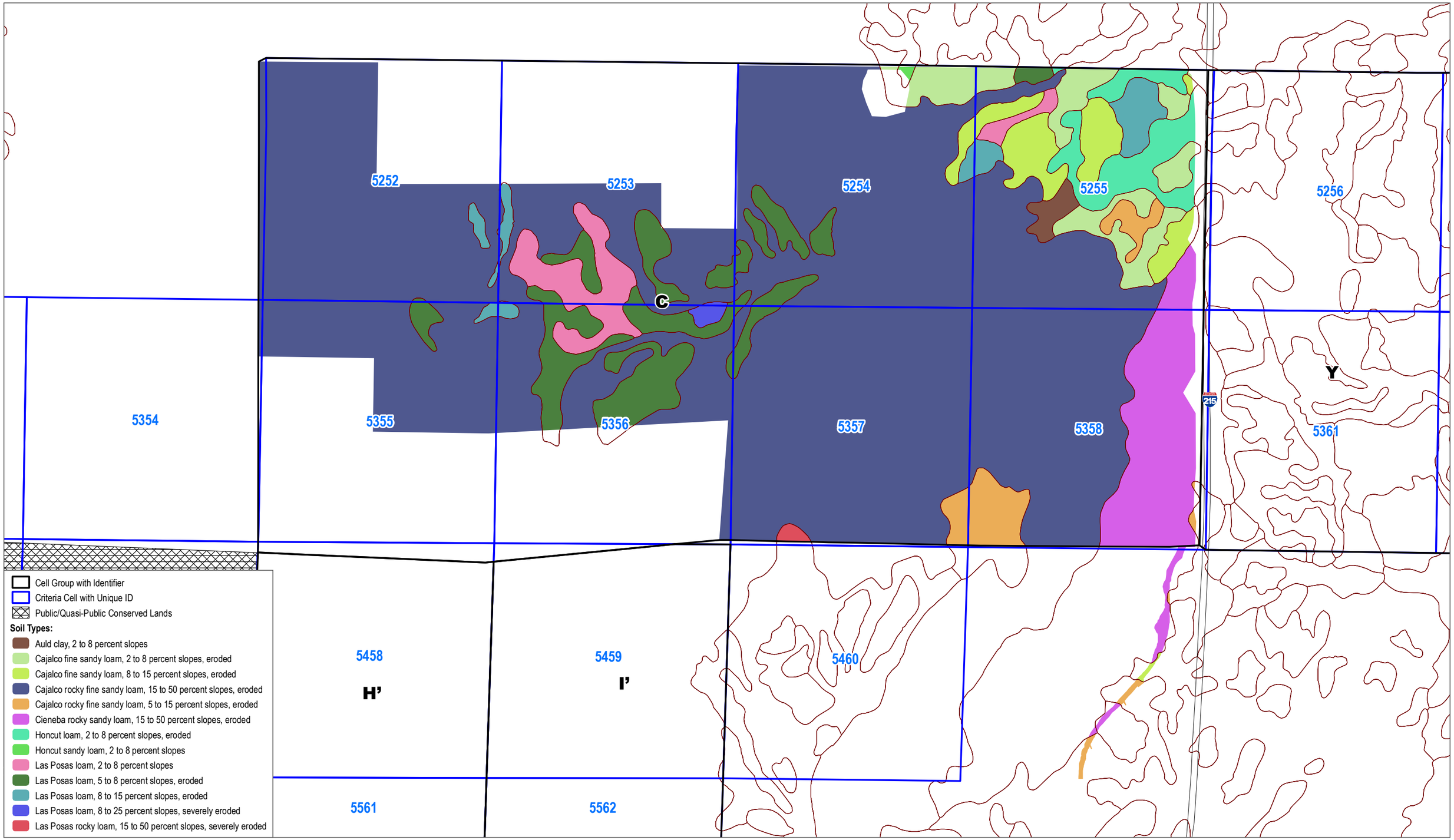
SOURCE: County of Riverside 2019

DUDEK

0 500 1,000 Feet

EXHIBIT B

JPR Log No. 09-02-17-01 - Criteria Area Cells with Riverside County Vegetation and Project Location



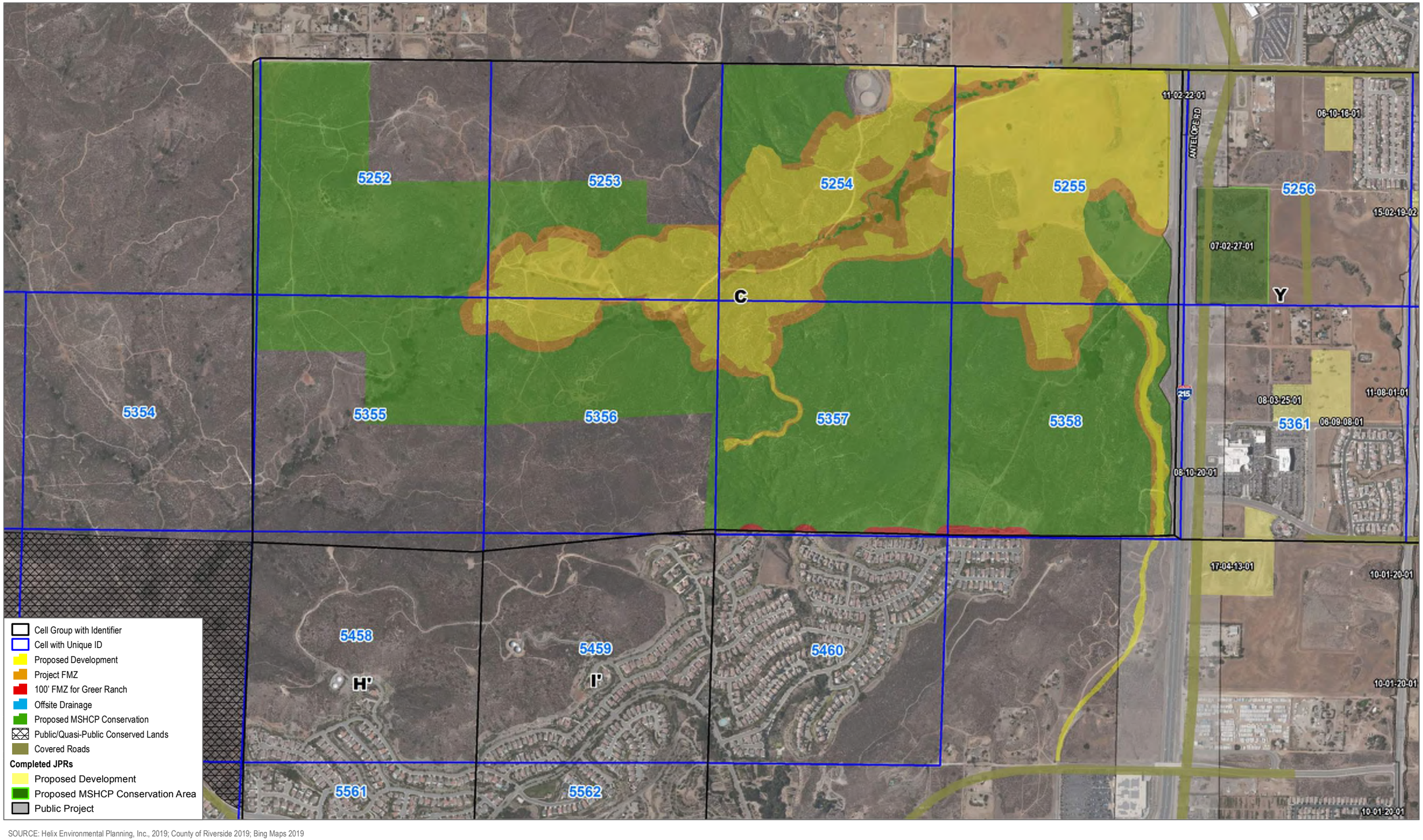
SOURCE: USDA/NRCS Soils 2017; County of Riverside 2019

DUDEK

0 500 1,000 Feet

EXHIBIT C

JPR Log No. 09-02-17-01 - Criteria Area Cells with MSHCP Soils and Project Location

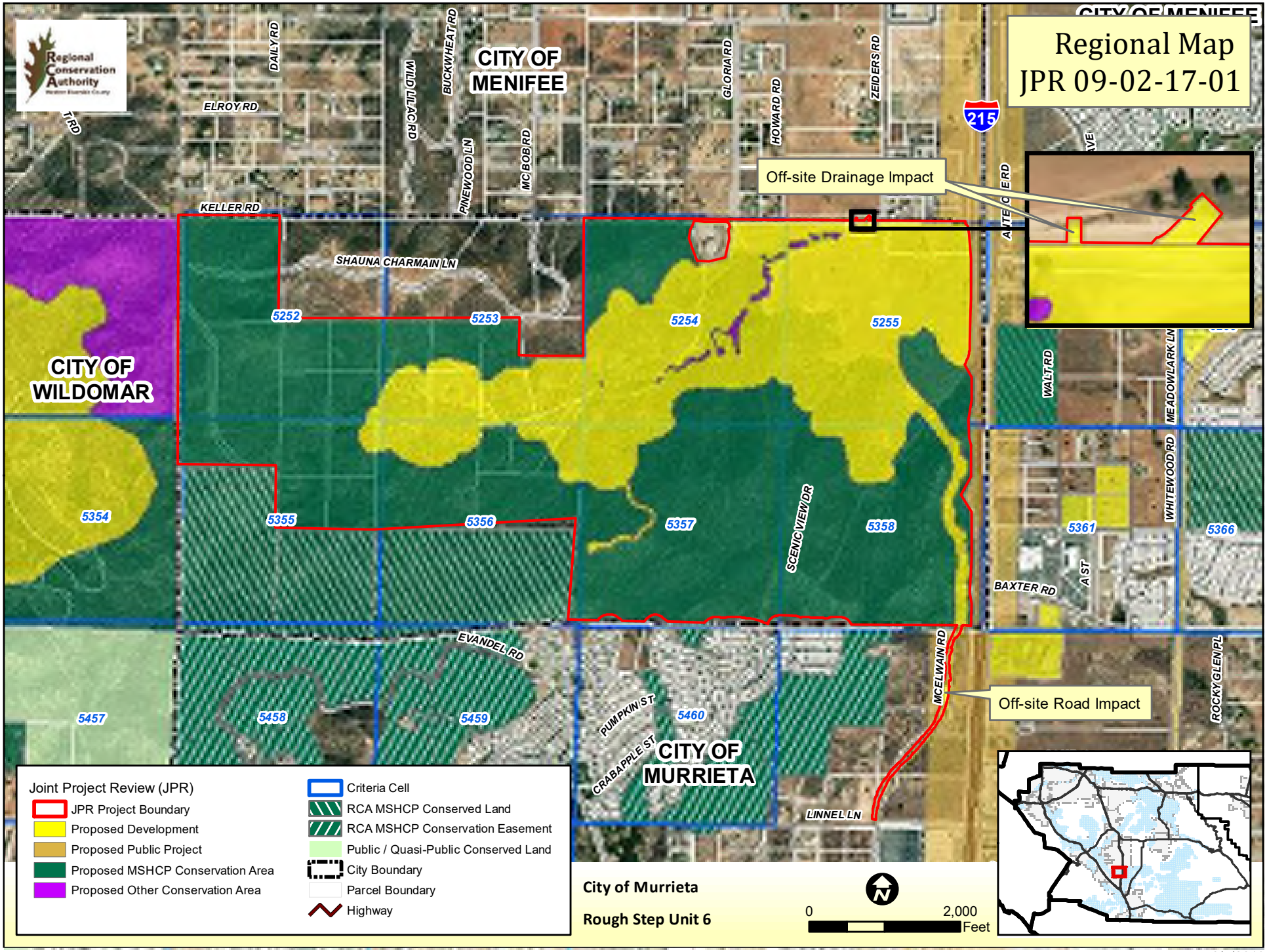


SOURCE: Helix Environmental Planning, Inc., 2019; County of Riverside 2019; Bing Maps 2019

DUDEK 0 500 1,000 Feet

EXHIBIT D

JPR Log No. 09-02-17-01 - Conservation and Avoidance Areas


Regional Map
JPR 09-02-17-01
Regional Conservation Authority
CITY OF MENIFEE
CITY OF WILDOMAR
CITY OF MURRIETA
Off-site Drainage Impact
Off-site Road Impact
ELROY RD
KELLER RD
SHAUNA CHARMAIN LN
DAILY RD
WILD LILAC RD
BUCKWHEAT RD
PINEWOOD LN
MC BOB RD
GLORIA RD
HOWARD RD
ZEIDERS RD
215
WALT RD
MEADOWLARK LN
WHITEWOOD RD
ROCKY GLEN PL
SCENIC VIEW DR
BAXTER RD
A ST
EVANDEL RD
PUMPKIN ST
CRABAPPLE ST
MCELWAIN RD
LINNEL LN
5252
5253
5254
5255
5354
5355
5356
5357
5358
5361
5366
5457
5458
5459
5460
Joint Project Review (JPR)
JPR Project Boundary
Proposed Development
Proposed Public Project
Proposed MSHCP Conservation Area
Proposed Other Conservation Area
Criteria Cell
RCA MSHCP Conserved Land
RCA MSHCP Conservation Easement
Public / Quasi-Public Conserved Land
City Boundary
Parcel Boundary
Highway
City of Murrieta
Rough Step Unit 6
0
2,000
Feet

8/7/2019