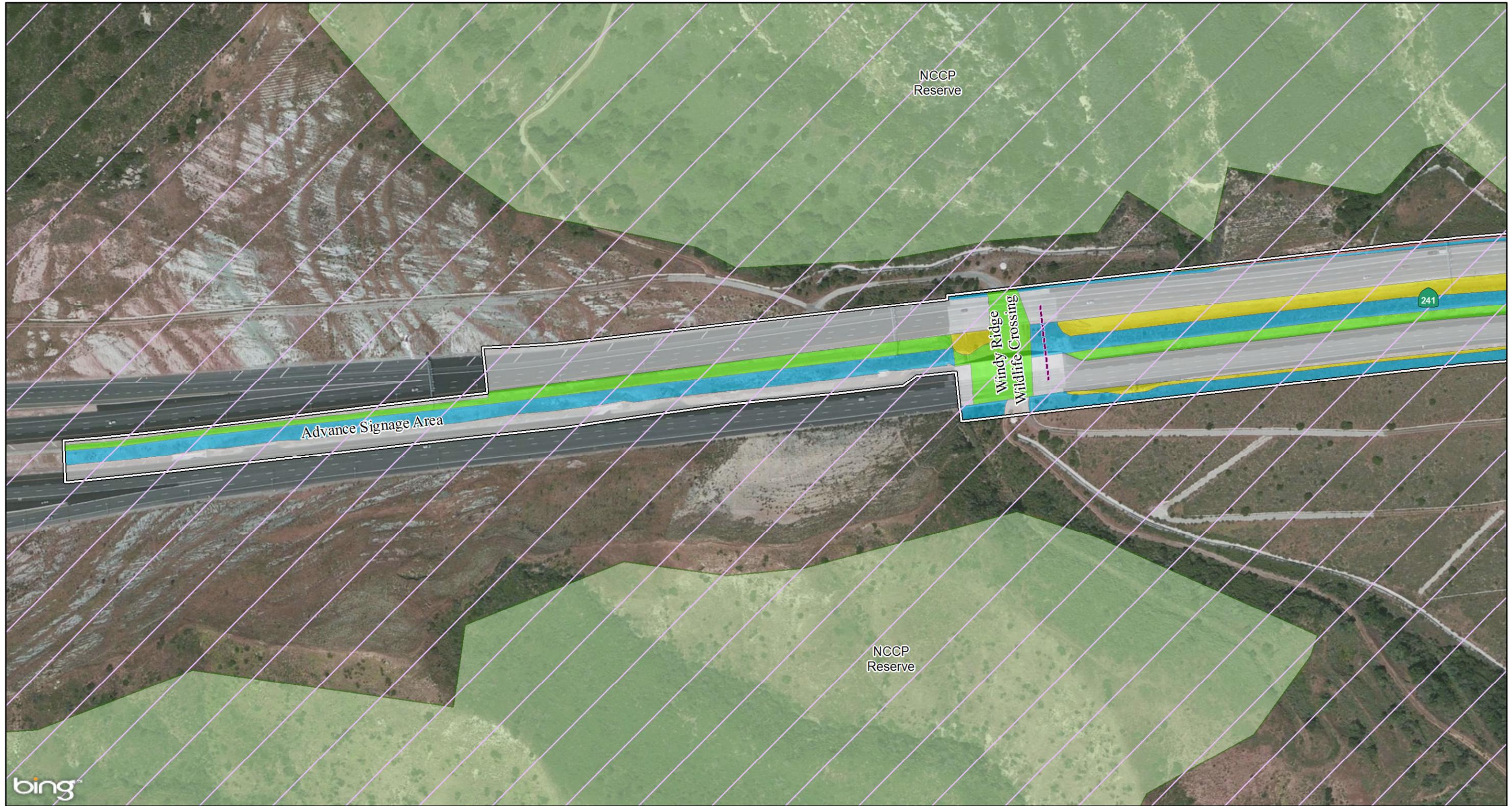


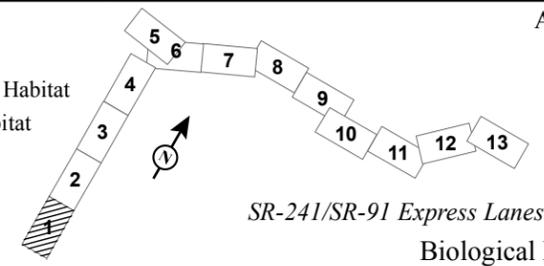
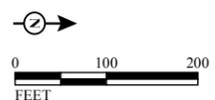
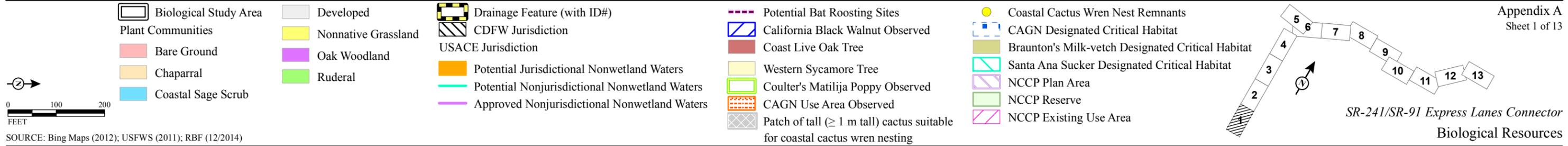
# Appendix A. Biological Resources Map

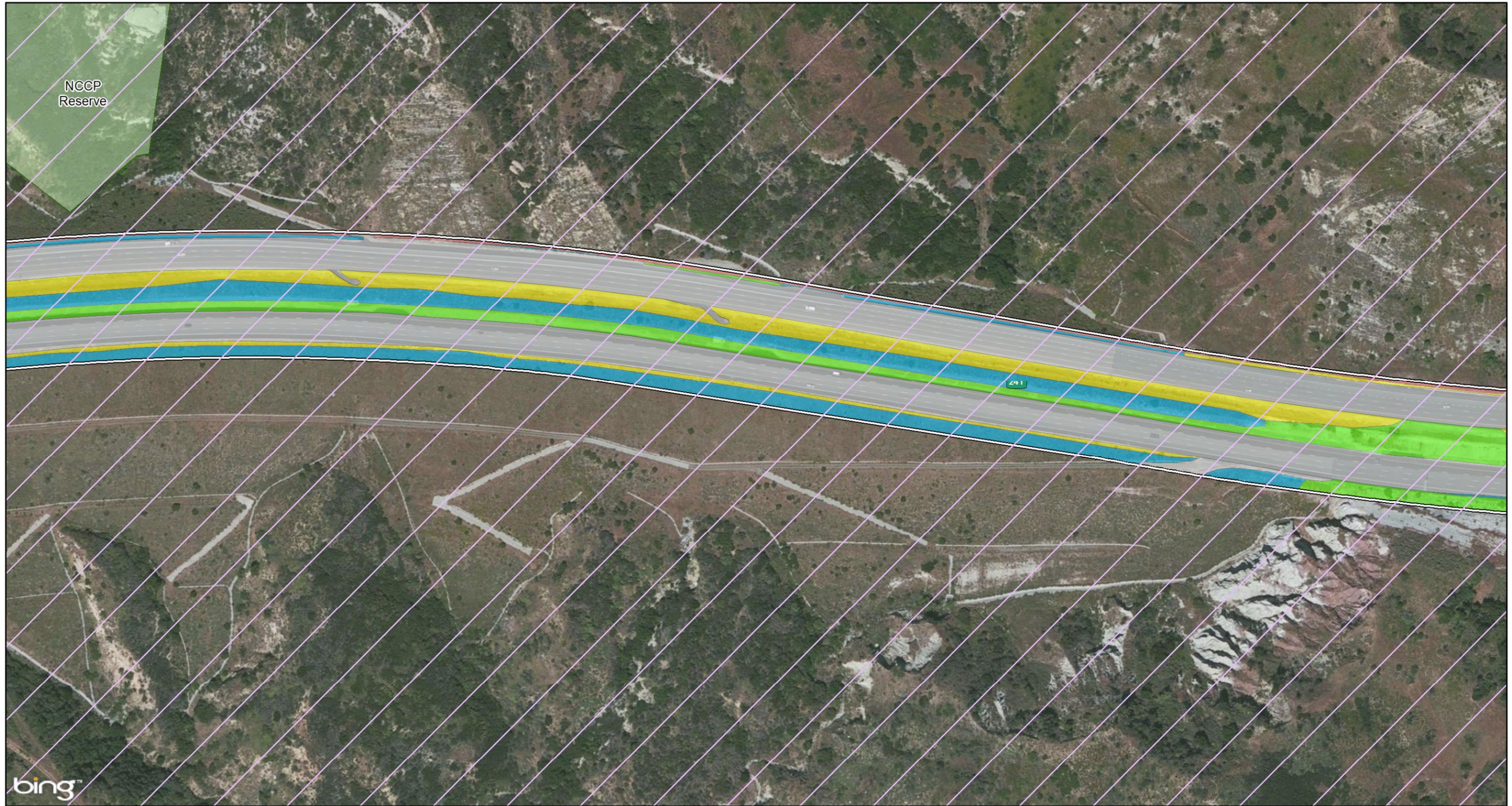
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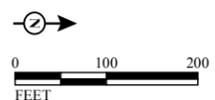
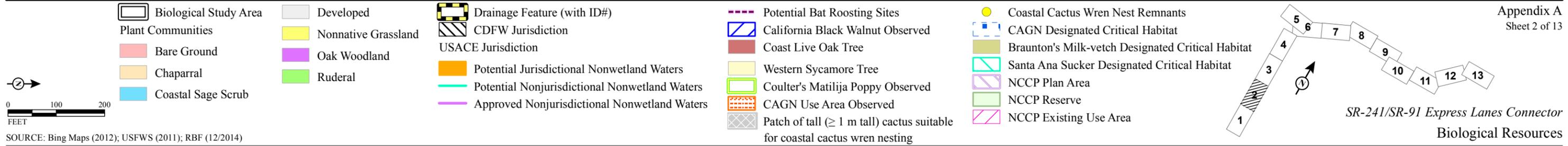


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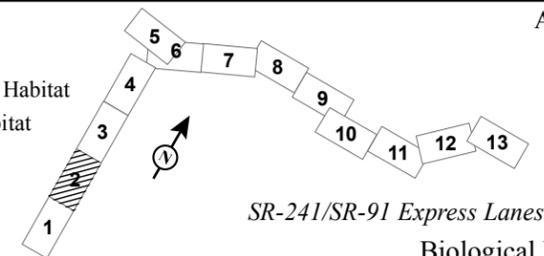


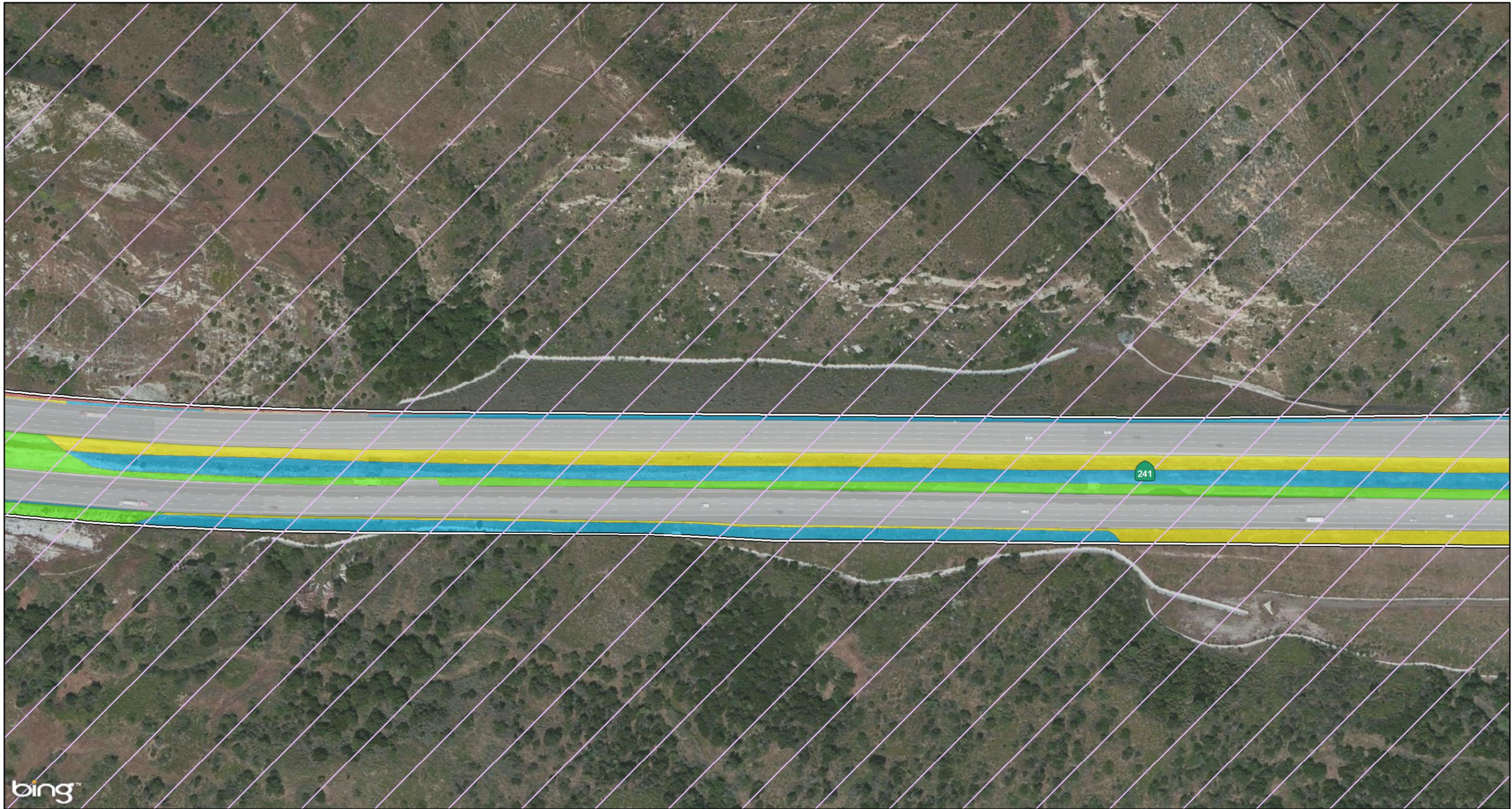


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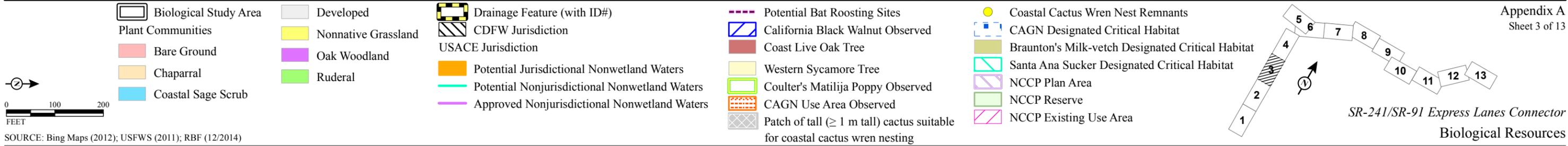


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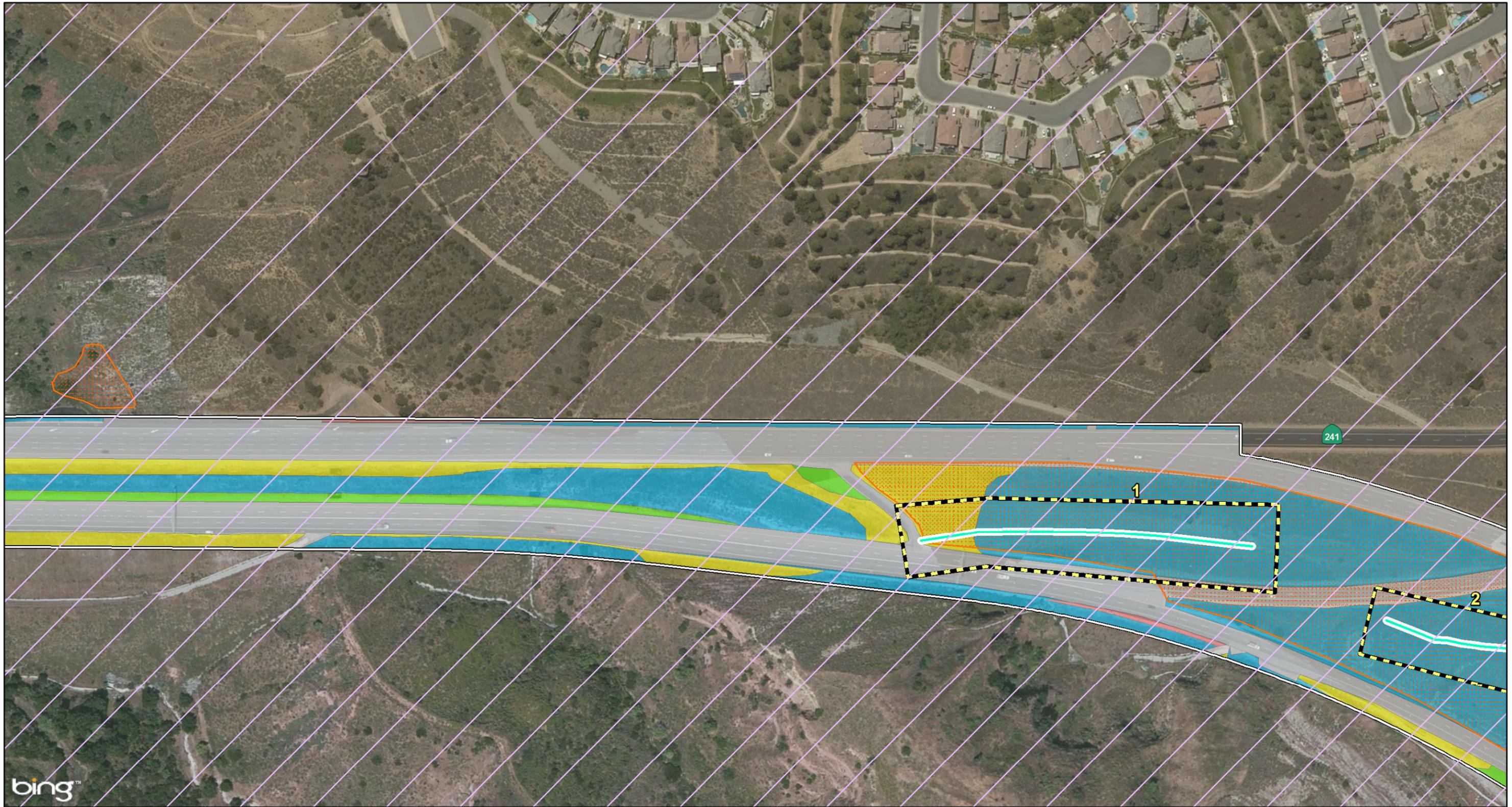




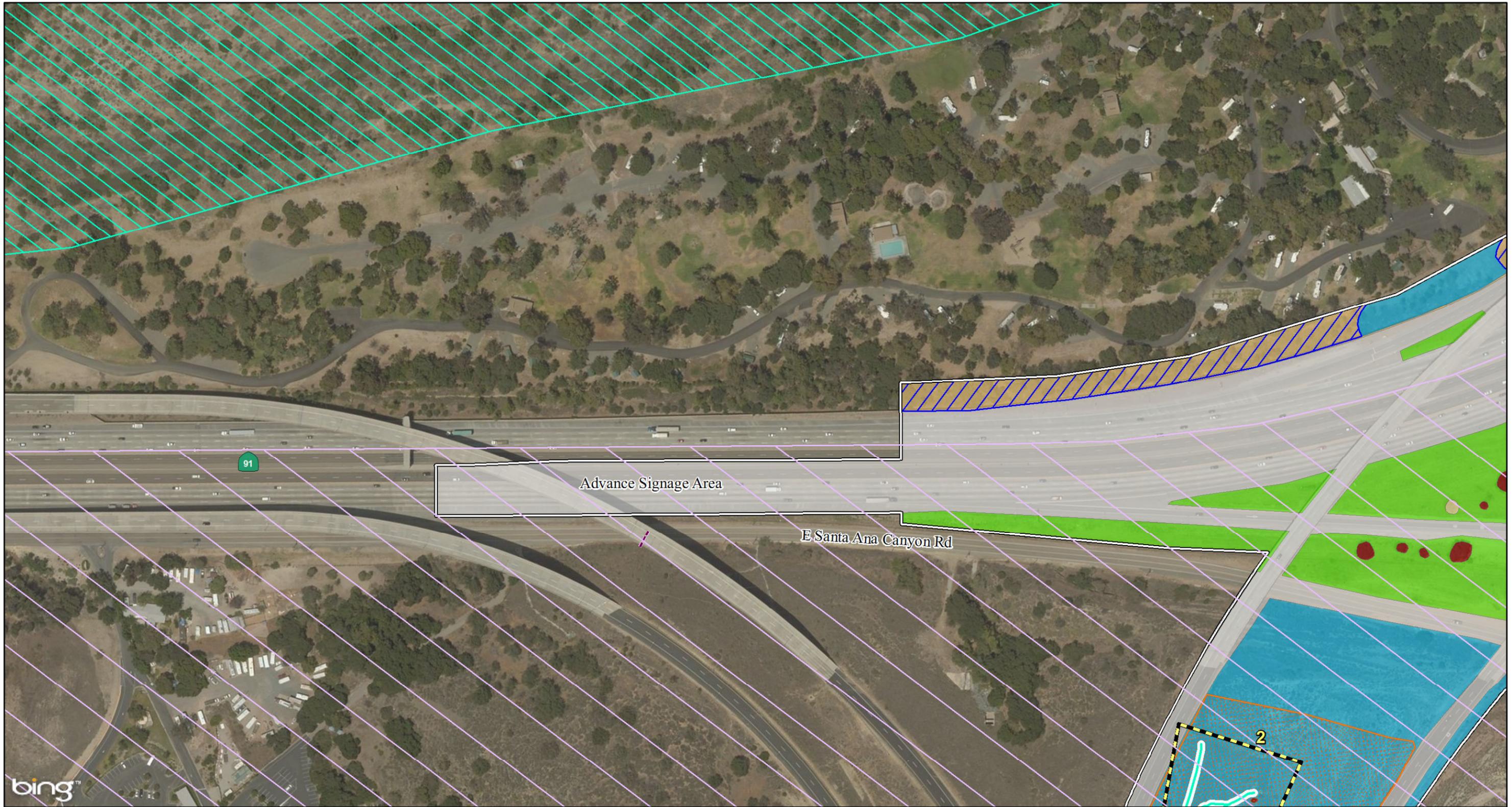
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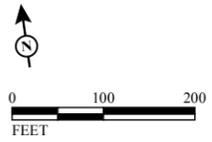
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  SOURCE: Bing Maps (2012); USFWS (2011); RBF (12/2014) I:\RBF1101\GIS\Biological_Resources.mxd (10/22/2015)	<b>Biological Study Area</b> Plant Communities Bare Ground Chaparral Coastal Sage Scrub Developed Nonnative Grassland Oak Woodland Ruderal	Drainage Feature (with ID#) CDFW Jurisdiction USACE Jurisdiction Potential Jurisdictional Nonwetland Waters Potential Nonjurisdictional Nonwetland Waters Approved Nonjurisdictional Nonwetland Waters	Potential Bat Roosting Sites California Black Walnut Observed Coast Live Oak Tree Western Sycamore Tree Coulter's Matilija Poppy Observed CAGN Use Area Observed Patch of tall (≥ 1 m tall) cactus suitable for coastal cactus wren nesting	Coastal Cactus Wren Nest Remnants CAGN Designated Critical Habitat Braunton's Milk-vetch Designated Critical Habitat Santa Ana Sucker Designated Critical Habitat NCCP Plan Area NCCP Reserve NCCP Existing Use Area	Appendix A Sheet 4 of 13  SR-241/SR-91 Express Lanes Connector Biological Resources
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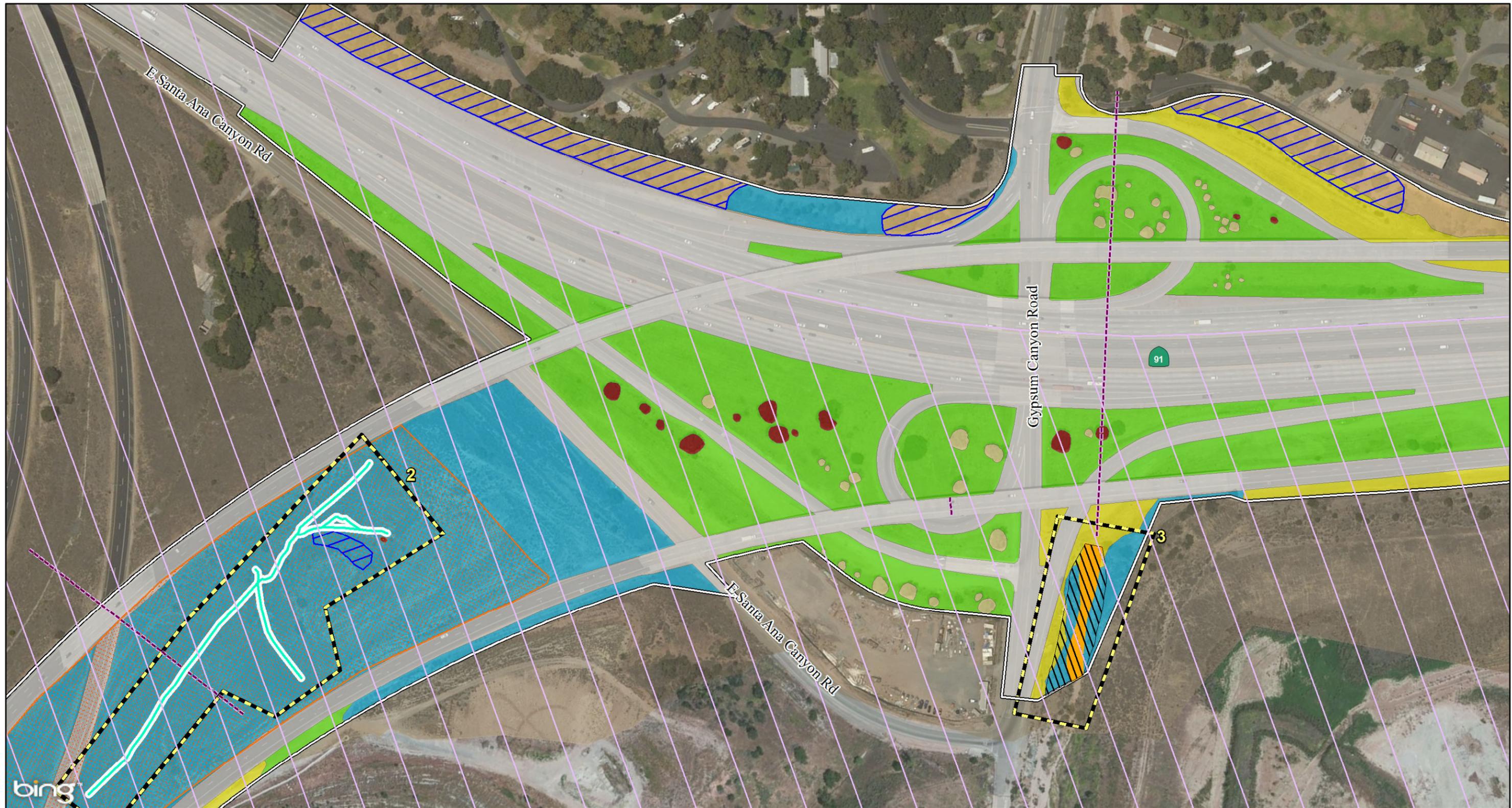
Biological Study Area	Developed	Drainage Feature (with ID#)	Potential Bat Roosting Sites	Coastal Cactus Wren Nest Remnants
Plant Communities	Nonnative Grassland	CDFW Jurisdiction	California Black Walnut Observed	CAGN Designated Critical Habitat
Bare Ground	Oak Woodland	USACE Jurisdiction	Coast Live Oak Tree	Braunton's Milk-vetch Designated Critical Habitat
Chaparral	Ruderal	Potential Jurisdictional Nonwetland Waters	Western Sycamore Tree	Santa Ana Sucker Designated Critical Habitat
Coastal Sage Scrub		Potential Nonjurisdictional Nonwetland Waters	Coulter's Matilija Poppy Observed	NCCP Plan Area
		Approved Nonjurisdictional Nonwetland Waters	CAGN Use Area Observed	NCCP Reserve
			Patch of tall ( $\geq 1$ m tall) cactus suitable for coastal cactus wren nesting	NCCP Existing Use Area



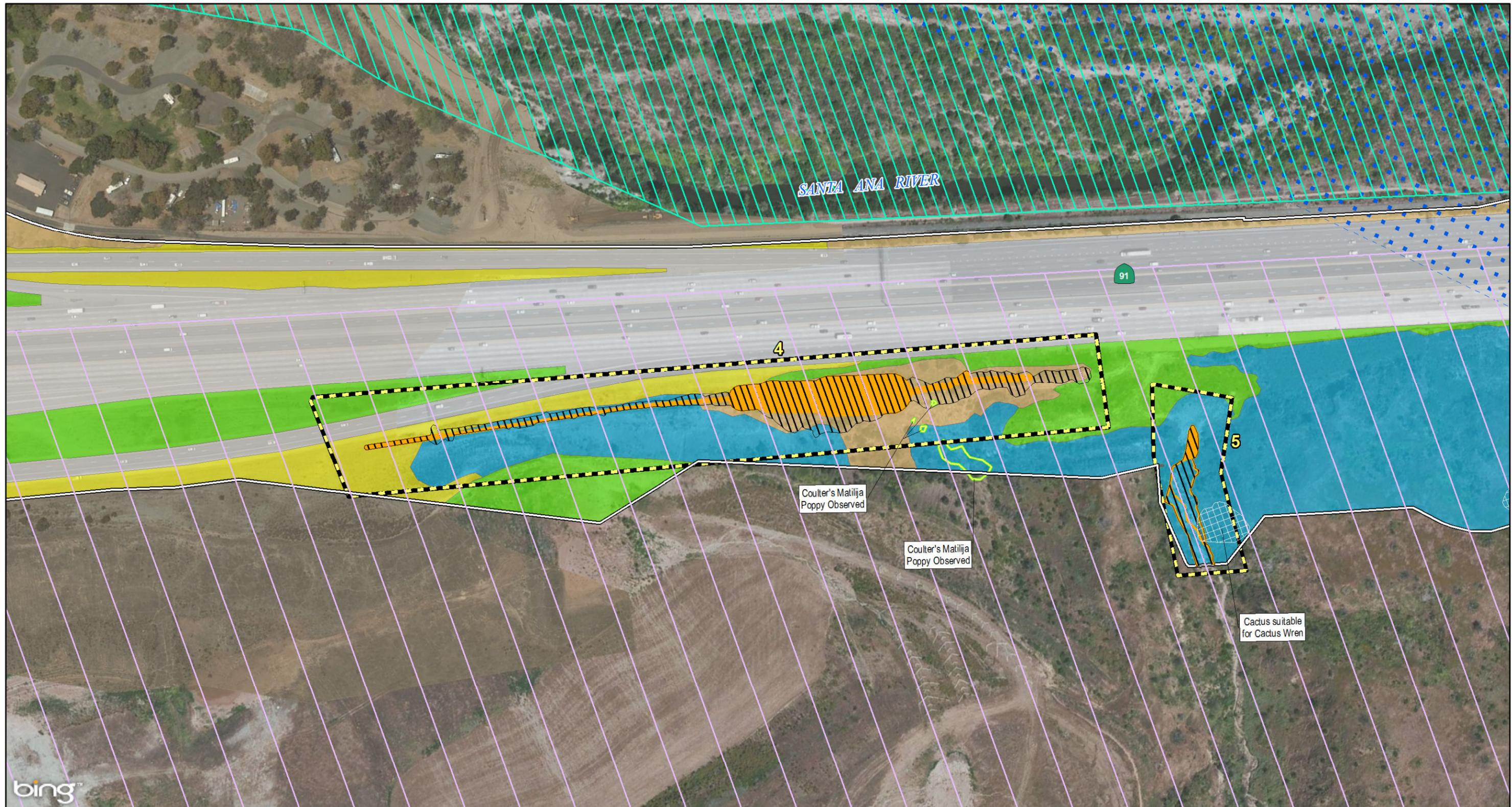
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Appendix A  
 Sheet 5 of 13

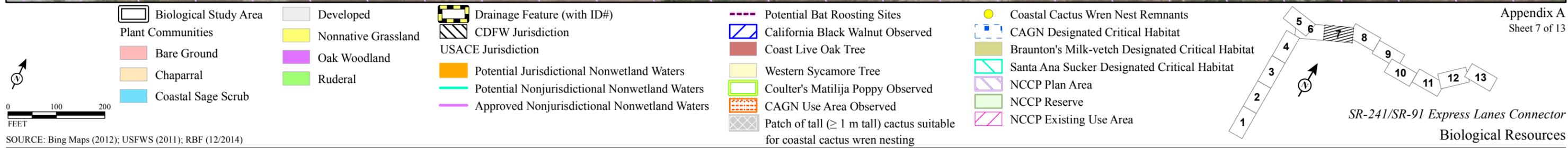
SR-241/SR-91 Express Lanes Connector  
 Biological Resources

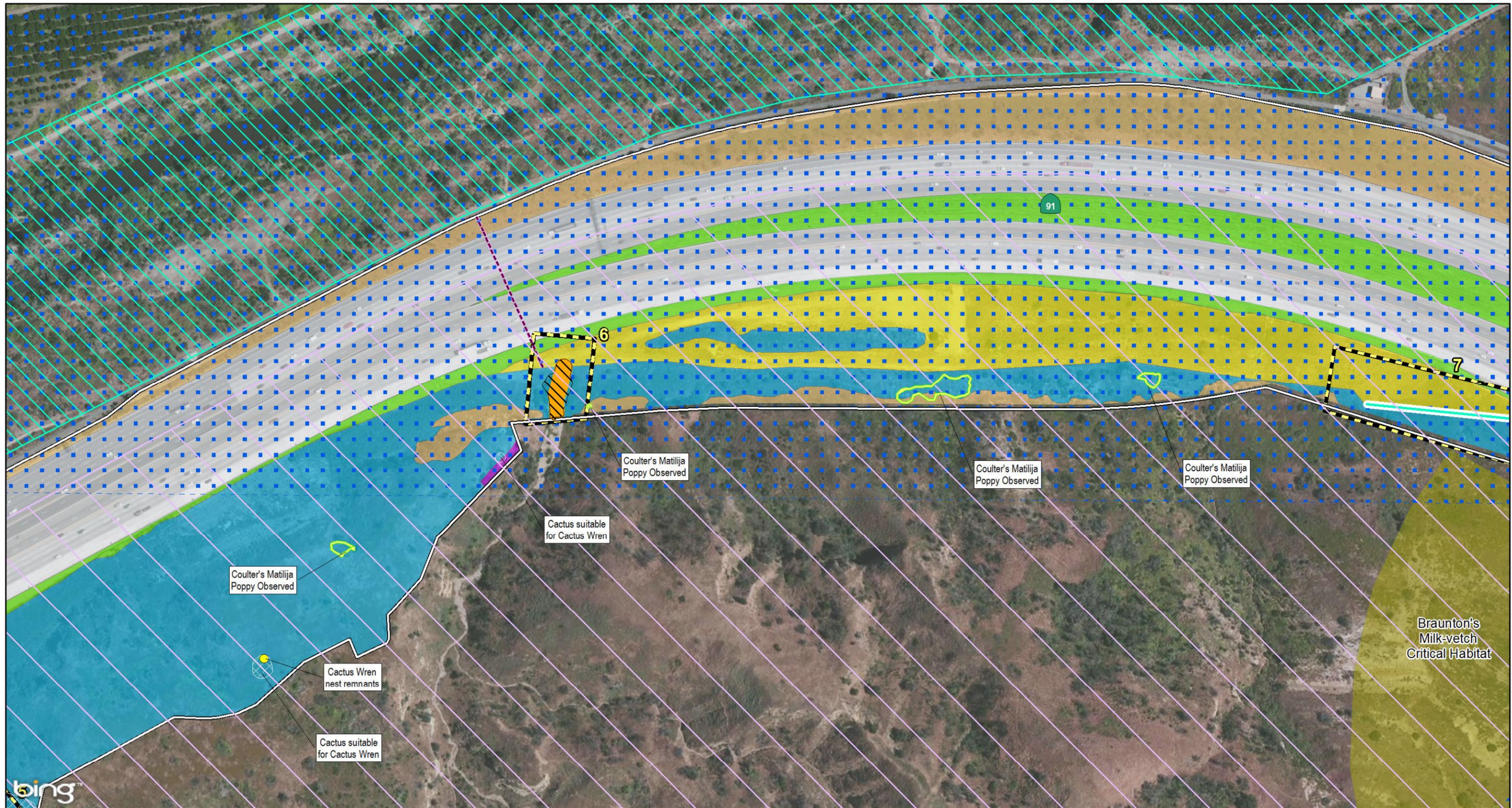


	Biological Study Area Developed Plant Communities Bare Ground Chaparral Coastal Sage Scrub	Nonnative Grassland Oak Woodland Ruderal	Drainage Feature (with ID#) CDFW Jurisdiction USACE Jurisdiction Potential Jurisdictional Nonwetland Waters Potential Nonjurisdictional Nonwetland Waters Approved Nonjurisdictional Nonwetland Waters	Potential Bat Roosting Sites California Black Walnut Observed Coast Live Oak Tree Western Sycamore Tree Coulter's Matilija Poppy Observed CAGN Use Area Observed Patch of tall ( $\geq 1$ m tall) cactus suitable for coastal cactus wren nesting	Coastal Cactus Wren Nest Remnants CAGN Designated Critical Habitat Braunton's Milk-vetch Designated Critical Habitat Santa Ana Sucker Designated Critical Habitat NCCP Plan Area NCCP Reserve NCCP Existing Use Area	
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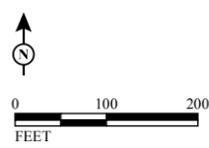
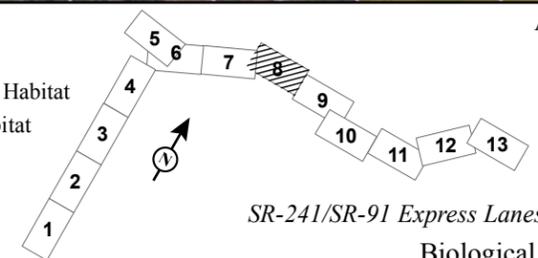


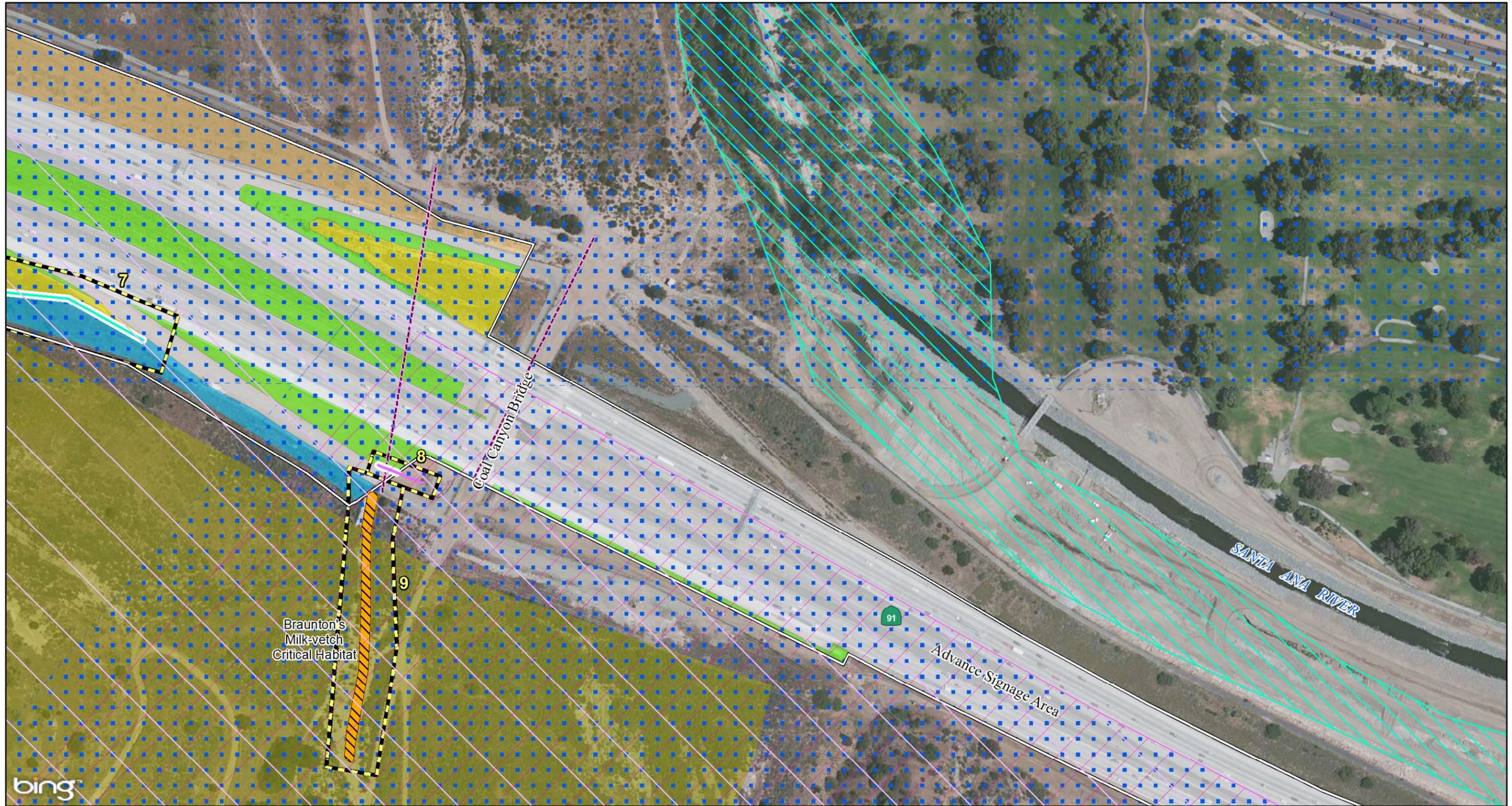
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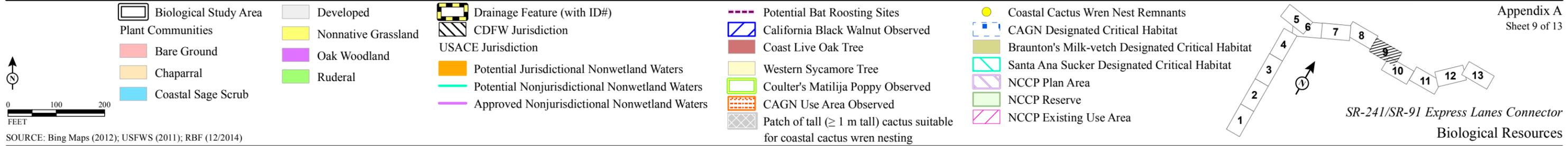


- |                          |                     |   |  |   |
|--------------------------|---------------------|---|--|---|
| Biological Study Area    | Developed           | Drainage Feature (with ID#)                   | Potential Bat Roosting Sites   | Coastal Cactus Wren Nest Remnants                 |
| <b>Plant Communities</b> | Nonnative Grassland | CDFW Jurisdiction                             | California Black Walnut Observed   | CAGN Designated Critical Habitat                  |
| Bare Ground              | Oak Woodland        | USACE Jurisdiction                            | Coast Live Oak Tree  | Braunton's Milk-vetch Designated Critical Habitat |
| Chaparral                | Ruderal             | Potential Jurisdictional Nonwetland Waters    | Western Sycamore Tree  | Santa Ana Sucker Designated Critical Habitat      |
| Coastal Sage Scrub       |                     | Potential Nonjurisdictional Nonwetland Waters | Coulter's Matilija Poppy Observed  | NCCP Plan Area                                    |
|                          |                     | Approved Nonjurisdictional Nonwetland Waters  | CAGN Use Area Observed   | NCCP Reserve                                      |
|                          |                     |   | Patch of tall ( $\geq 1$ m tall) cactus suitable for coastal cactus wren nesting | NCCP Existing Use Area                            |

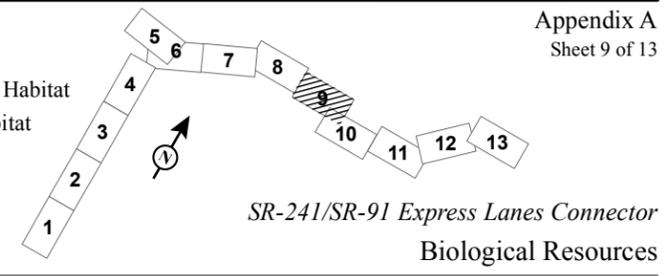


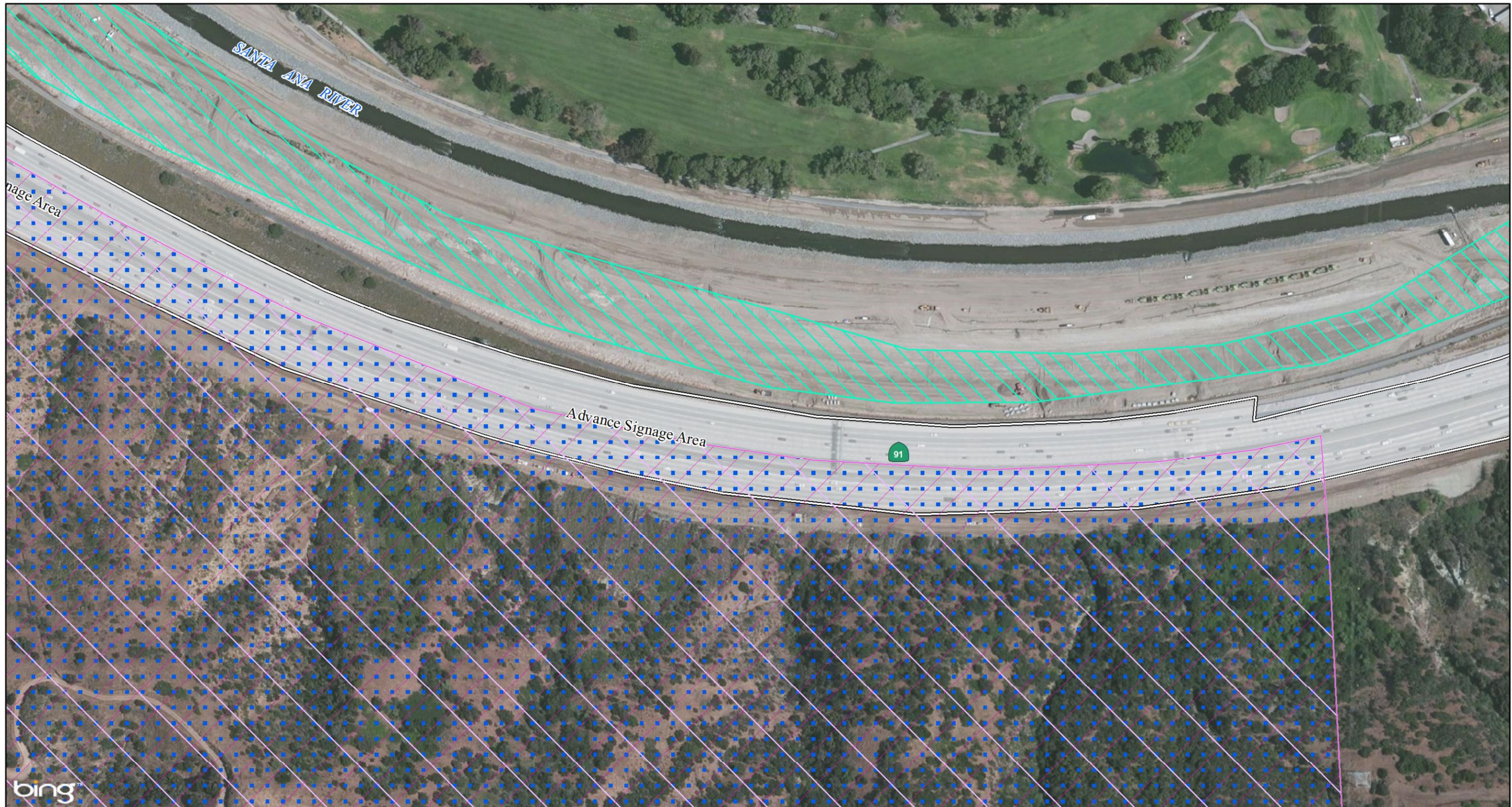


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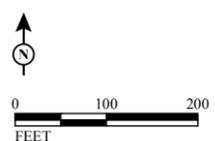
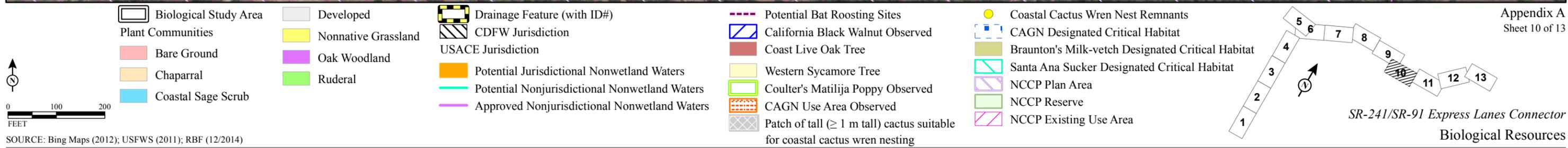


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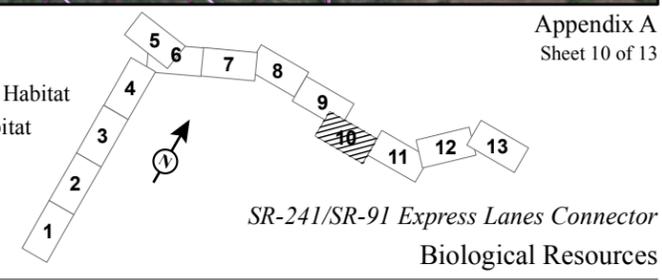


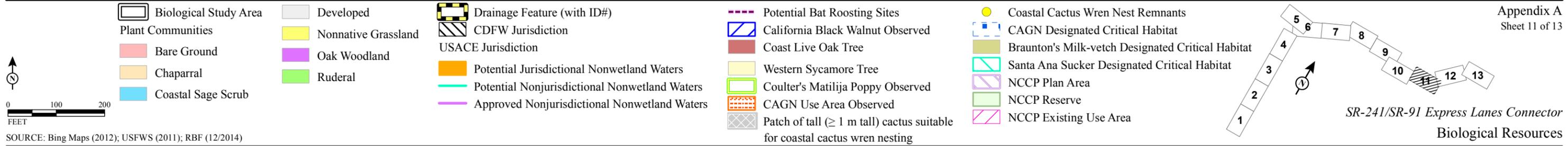


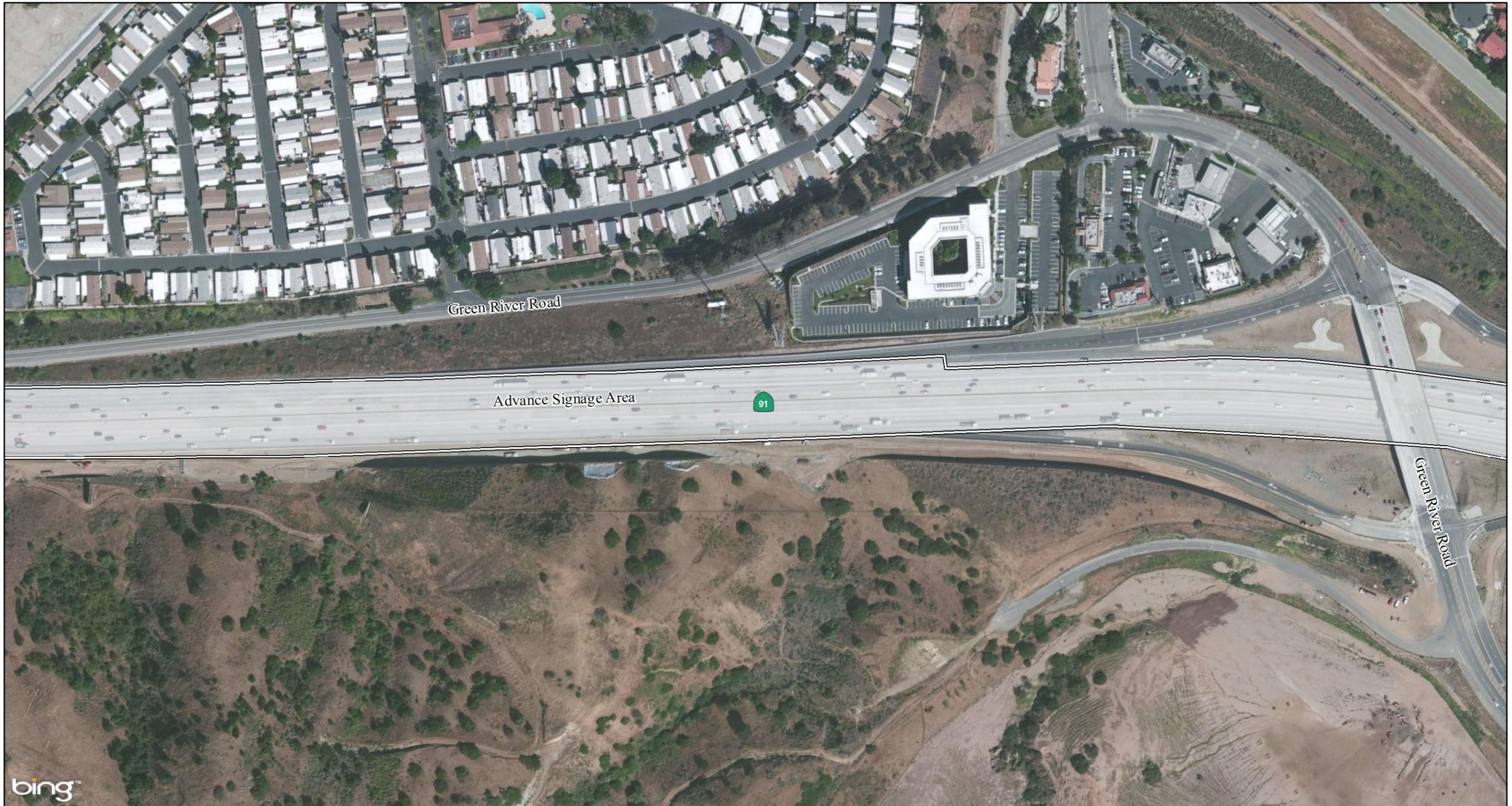
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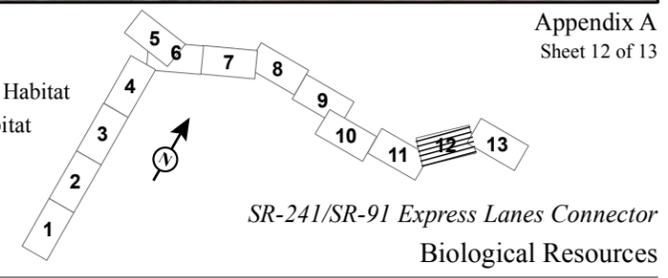
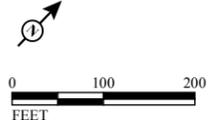
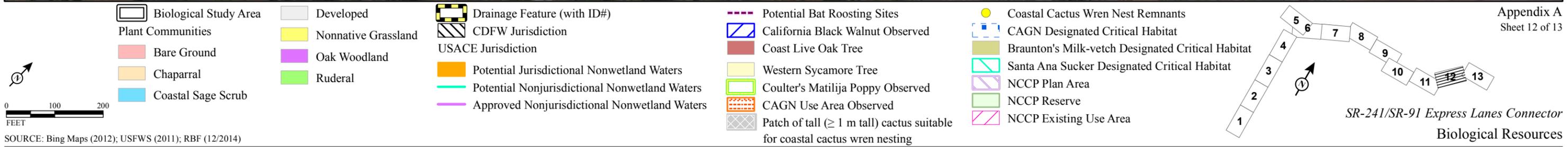
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# Appendix B. Vascular Plant Species Observed

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## APPENDIX B

### VASCULAR PLANT SPECIES OBSERVED

The following vascular plant species were observed in the BSA by LSA biologist Stan Spencer, Ph.D. during site surveys conducted on May 10 and June 28, 2011; August 2013; May 2014; and March 2015.

\* Introduced, nonnative species

#### ANGIOSPERMAE: DICOTYLEDONAE

#### DICOT FLOWERING PLANTS

##### Amaranthaceae

\* *Amaranthus albus*

##### Amaranth Family

Prostrate pigweed

##### Anacardiaceae

*Malosma laurina*

*Rhus integrifolia*

\* *Schinus molle*

*Toxicodendron diversilobum*

##### Sumac Family

Laurel sumac

Lemonade berry

Peruvian pepper tree

Pacific poison oak

##### Apiaceae

\* *Foeniculum vulgare*

##### Carrot Family

Sweet fennel

##### Asteraceae

*Acourtia microcephala*

*Ambrosia acanthicarpa*

*Ambrosia psilostachya*

*Artemisia californica*

*Artemisia douglasiana*

*Baccharis pilularis*

*Baccharis salicifolia*

*Baccharis sarothroides*

*Bebbia juncea*

\* *Bidens pilosa*

*Brickellia californica*

\* *Carduus pycnocephalus*

\* *Centaurea melitensis*

\* *Conyza bonariensis*

*Conyza canadensis*

*Corethrogyne filaginifolia* var. *californica*

\* *Chrysanthemum coronarium*

*Deinandra fasciculata*

*Encelia californica*

##### Sunflower Family

Sacapellote

Annual bur-sage

Western ragweed

California sagebrush

Mugwort

Coyote bush

Mulefat

Broom baccharis

Sweetbush

Common beggar-ticks

California brickellbush

Italian thistle

Tocalote

Flax-leaved horseweed

Common horseweed

California aster

Garland chrysanthemum

Fascicled tarweed

California encelia

<i>Encelia farinosa</i>	Brittlebush
<i>Eriophyllum confertiflorum</i> var. <i>confertiflorum</i>	Golden yarrow
* <i>Gazania linearis</i>	Gazania
<i>Hazardia squarrosa</i>	Saw-toothed goldenbush
<i>Helianthus annuus</i>	Western sunflower
<i>Heterotheca grandiflora</i>	Telegraph weed
* <i>Hypochaeris glabra</i>	Smooth cat's-ear
<i>Isocoma menziesii</i>	Goldenbush
<i>Iva axillaris</i>	Poverty weed
* <i>Lactuca serriola</i>	Prickly lettuce
<i>Layia platyglossa</i>	Common tidy-tips
<i>Logfia filaginoides</i>	California cottonrose
* <i>Logfia gallica</i>	Narrowleaf cottonrose
<i>Malacothrix saxatilis</i> var. <i>tenuifolia</i>	Cliff malacothrix
<i>Pseudognaphalium californicum</i>	California everlasting
* <i>Pseudognaphalium luteoalbum</i>	Jersey cudweed
<i>Pseudognaphalium microcephalum</i>	San Diego rabbit-tobacco
* <i>Senecio vulgaris</i>	Common groundsel
* <i>Silybum marianum</i>	Milk thistle
* <i>Sonchus oleraceus</i>	Common sow-thistle
<i>Stephanomeria exigua</i>	Small wreath-plant
<i>Uropappus lindleyi</i>	Silver puffs
<i>Xanthium strumarium</i>	Common cocklebur
<i>Ericameria palmeri</i> var. <i>pachylepis</i>	Box Springs goldenbush

### **Boraginaceae**

*Amsinckia menziesii*  
*Cryptantha intermedia*  
*Heliotropium curassavicum*  
*Echium candicans*\*  
*Eriodictyon crassifolium*  
*Nemophila menziesii*  
*Phacelia cicutaria* var. *hispida*  
*Phacelia distans*  
*Phacelia parryi*  
*Phacelia ramosissima*

### **Brassicaceae**

\* *Brassica nigra*  
 \* *Brassica tournefortii*  
 \* *Hirschfeldia incana*  
*Lepidium lasiocarpum*  
 \* *Lepidium latifolium*  
*Lepidium oblongum*  
 \* *Raphanus sativus*  
 \* *Sisymbrium orientale*

### **Borage Family**

Common fiddleneck  
 Common cryptantha  
 Salt heliotrope  
 Pride of Madeira  
 Thick-leaved yerba santa  
 Bably blue eyes  
 Caterpillar phacelia  
 Common phacelia  
 Parry's phacelia  
 Branching phacelia

### **Mustard Family**

Black mustard  
 Sahara mustard  
 Shortpod mustard  
 Shaggyfruit pepperweed  
 Broad-leaved peppergrass  
 Peppergrass  
 Wild radish  
 Indian hedgemustard

**Cactaceae**

*Opuntia littoralis*

**Caprifoliaceae**

*Sambucus nigra* ssp. *cerulea*

**Chenopodiaceae**

*Atriplex canescens*

*Atriplex lentiformis* ssp. *lentiformis*

\* *Atriplex semibaccata*

*Chenopodium berlandieri*

\* *Chenopodium murale*

\* *Kochia scoparia*

\* *Salsola tragus*

**Convolvulaceae**

*Calystegia macrostegia*

**Crassulaceae**

*Crassula connata*

*Dudleya lanceolata*

*Dudleya pulverulenta*

**Cucurbitaceae**

*Cucurbita foetidissima*

*Marah macrocarpus*

**Euphorbiaceae**

\* *Chamaesyce maculata*

*Croton californicus*

*Croton setigerus*

\* *Ricinis communis*

**Fabaceae**

*Acmispon humistratus*

*Acmispon americanus*

*Acmispon maritimus*

*Acmispon glaber*

*Lupinus bicolor*

*Lupinus succulentus*

\* *Medicago polymorpha*

\* *Melilotus albus*

\* *Melilotus indicus*

\* *Trifolium hirtum*

*Trifolium willdenovii*

**Cactus Family**

Coastal prickly pear

**Honeysuckle Family**

Mexican elderberry

**Goosefoot Family**

Fourwing saltbush

Big saltbush

Australian saltbush

Nettleleaf goosefoot

Nettle-leaved goosefoot

Kochia

Russian-thistle

**Morning-Glory Family**

Morning-glory

**Stonecrop Family**

Sand pygmy-stonecrop

Lanceleaf dudleya

Chalky live-forever

**Gourd Family**

Calabazilla

Wild cucumber

**Spurge Family**

Spotted spurge

California croton

Doveweed

Castor bean

**Legume Family**

Hill lotus

Spanish lotus

Alkali lotus

Coastal deerweed

Miniature lupine

Arroyo lupine

California burclover

White sweetclover

Yellow sweetclover

Bristled clover

Tomcat clover

**Fagaceae**

*Quercus agrifolia* var. *agrifolia*

**Geraniaceae**

- \* *Erodium botrys*
- \* *Erodium cicutarium*

**Grossulariaceae**

*Ribes* sp.

**Juglandaceae**

*Juglans californica* var. *californica*

**Lamiaceae**

- \* *Marrubium vulgare*
- Salvia apiana*
- Salvia mellifera*

**Malvaceae**

*Malacothamnus fasciculatus*

**Myrtaceae**

- \* *Eucalyptus* sp.

**Nyctaginaceae**

*Mirabilis laevis*

**Oleaceae**

- Fraxinus* sp.
- \* *Olea europaea*

**Onagraceae**

*Epilobium brachycarpum*

**Oxalidaceae**

- \* *Oxalis pes-caprae*

**Papaveraceae**

*Eschscholzia californica*  
*Romneya coulteri*

**Phrymaceae**

*Mimulus aurantiacus*

**Plantaginaceae**

*Plantago ovata*

**Beech Family**

Coast live oak

**Geranium Family**

Long-beaked filaree  
Red-stemmed filaree

**Gooseberry Family**

Currant

**Walnut Family**

Southern Calif. black walnut

**Mint Family**

Horehound  
White sage  
Black sage

**Mallow Family**

Chaparral bush mallow

**Myrtle Family**

Eucalyptus

**Four O'Clock Family**

Wishbone bush

**Olive Family**

Ash  
European olive

**Evening Primrose Family**

Panicled willow-herb

**Oxalis Family**

Bermuda buttercup

**Poppy Family**

California poppy  
Coulter's Matilija poppy

**Monkey-flower Family**

Bush monkey flower

**Plantain Family**

Woolly plantain

**Platanaceae**

*Keckiella antirrhinoides*  
*Platanus racemosa*

**Polemoniaceae**

*Eriastrum saphirinum*  
*Gilia angelensis*  
*Leptodactylon californicus*

**Polygonaceae**

*Eriogonum fasciculatum*  
\* *Polygonum aviculare*  
\* *Rumex crispus*

**Portulacaceae**

\* *Portulaca oleracea*

**Rosaceae**

*Heteromeles arbutifolia*

**Rubiaceae**

*Galium angustifolium* ssp. *angustifolium*

**Salicaceae**

*Populus fremontii* ssp. *fremontii*  
*Salix gooddingii*  
*Salix laevigata*  
*Salix lasiolepis*

**Simaroubaceae**

\* *Ailanthus altissima*

**Scrophulariaceae**

*Scrophularia californica*

**Solanaceae**

*Datura wrightii*  
\* *Nicotiana glauca*  
*Solanum douglasii*  
*Solanum xanti*

**Tamaricaceae**

\* *Tamarix ramosissima*

**Sycamore Family**

Yellow bush penstemon  
Western sycamore

**Phlox Family**

Sapphire woolly-star  
Los Angeles gilia  
Prickly-phlox

**Buckwheat Family**

California buckwheat  
Common knotweed  
Curly dock

**Purslane Family**

Common purslane

**Rose Family**

Toyon

**Madder Family**

Narrow-leaved bedstraw

**Willow Family**

Western cottonwood  
Goodding's willow  
Red willow  
Arroyo willow

**Quassia Family**

Tree of heaven

**Figwort Family**

California figwort

**Nightshade Family**

Jimsonweed  
Tree tobacco  
Douglas' nightshade  
Chaparral nightshade

**Tamarisk Family**

Mediterranean tamarisk

**Urticaceae**

- \* *Urtica urens*

**Verbenaceae**

- Verbena lasiostachys*

**Vitaceae**

- Vitis girdiana*

**Zygophyllaceae**

- \* *Tribulus terrestris*

**ANGIOSPERMAE:**

**MONOCOTYLEDONAE**

**Agavaceae**

- Hesperoyucca whipplei*

**Arecaceae**

- \* *Washingtonia robusta*

**Liliaceae**

- Calochortus splendens*

**Poaceae**

- \* *Avena barbata*
- \* *Avena fatua*
- \* *Bromus catharticus*
- \* *Bromus diandrus*
- \* *Bromus hordeaceus*
- \* *Bromus madritensis* ssp. *rubens*
- \* *Cynodon dactylon*
- Hordeum depressum*
- Leptochloa uninervia*
- Leymus condensatus*
- \* *Lolium multiflorum*
- Stipa cernua*
- Stipa lepida*
- Stipa pulchra*
- \* *Pennisetum setaceum*
- \* *Phalaris minor*
- \* *Piptatherum miliaceum*
- \* *Polypogon monspeliensis*
- \* *Schismus barbatus*
- \* *Vulpia myuros* var. *myuros*

**Nettle Family**

- Dwarf nettle

**Vervain Family**

- Western verbena

**Grape Family**

- Desert wild grape

**Caltrop Family**

- Puncture vine

**MONOCOT FLOWERING PLANTS**

**Agave Family**

- Chaparral yucca

**Palm Family**

- Mexican fan palm

**Lily Family**

- Splendid mariposa lily

**Grass Family**

- Slender wild oat
- Common wild oat
- Rescue grass
- Ripgut grass
- Soft chess
- Foxtail chess
- Bermuda grass
- Low barley
- Mexican sprangletop
- Giant wild-rye
- Italian ryegrass
- Nodding needlegrass
- Foothill needlegrass
- Purple needlegrass
- African fountain grass
- Littleseed canary grass
- Smilo grass
- Rabbitfoot grass
- Mediterranean grass
- Rattail fescue

<i>Eragrostis</i> sp.	Lovegrass
* <i>Poa annua</i>	Annual bluegrass
* <i>Stipa miliacea</i>	Smilo grass
<b>Themidaceae</b>	<b>Brodiaea Family</b>
<i>Bloomeria crocea</i>	Golden stars
<i>Dichelostemma capitatum</i>	Blue dicks

Taxonomy and scientific nomenclature generally conform to Baldwin, B.G., D.H. Goldman et al., eds. (2012; *The Jepson Manual: Vascular Plants of California*, 2<sup>nd</sup> edition; University of California Press, Berkeley and Los Angeles, California).

Common names for each taxon generally conform to Roberts, F.M., Jr. (2008; *The Vascular Plants of Orange County, California: An Annotated Checklist*; F.M. Roberts Publications, San Luis Rey, California) except where Abrams, L. (1923, 1944, and 1951; *Illustrated Flora of the Pacific States: Washington, Oregon, and California*, Vols. I-III; Stanford University Press, Stanford, California) and Abrams, L., and Ferris, R.S. (1960; *Illustrated Flora of the Pacific States: Washington, Oregon, and California*, Vol. IV; Stanford University Press, Stanford, California) were used, particularly when species-specific common names were not identified in Roberts, F.M., Jr. (2008).

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# Appendix C. Animal Species Detected

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## APPENDIX C

### ANIMAL SPECIES DETECTED

This is a list of the conspicuous reptiles, birds, and mammals noted in or flying over the BSA by LSA Associates, Inc., biologists during surveys conducted from April through June 2011 and bat surveys conducted for adjacent projects in 2006, 2008, and 2013. Presence may be noted if a species is seen or heard, or identified by the presence of tracks, scat, or other signs.

\* Species not native to the BSA

#### REPTILIA

##### Phrynosomatidae

*Sceloporus occidentalis*

*Uta stansburiana*

##### Viperidae

*Crotalus oreganus*

#### AVES

##### Odontophoridae

*Callipepla californica*

##### Phalacrocoracidae

*Phalacrocorax auritus*

##### Ardeidae

*Ardea herodias*

*Ardea alba*

##### Cathartidae

*Cathartes aura*

##### Accipitridae

*Accipiter cooperii*

*Buteo jamaicensis*

##### Falconidae

*Falco sparverius*

#### REPTILES

##### Phrynosomatid Lizards

Western fence lizard

Common side-blotched lizard

##### Vipers

Western rattlesnake

#### BIRDS

##### New World Quail

California quail

##### Cormorants

Double-crested cormorant

##### Hérons, Bitterns, and Allies

Great blue heron

Great egret

##### New World Vultures

Turkey vulture

##### Hawks, Kites, Eagles, and Allies

Cooper's hawk

Red-tailed hawk

##### Caracaras and Falcons

American kestrel

**Laridae**

*Larus delawarensis*  
*Larus californicus*

**Columbidae**

\* *Columba livia*  
*Zenaida macroura*

**Apodidae**

*Aeronautes saxatilis*

**Trochilidae**

*Calypte anna*  
*Selasphorus rufus* or *sasin*

**Tyrannidae**

*Sayornis nigricans*  
*Sayornis saya*  
*Myiarchus cinerascens*  
*Tyrannus vociferans*  
*Tyrannus verticalis*

**Corvidae**

*Aphelocoma californica*  
*Corvus corax*

**Hirundinidae**

*Tachycineta bicolor*  
*Stelgidopteryx serripennis*  
  
*Petrochelidon pyrrhonota*

**Aegithalidae**

*Psaltriparus minimus*

**Troglodytidae**

*Thryomanes bewickii*  
*Troglodytes aedon*

**Poliophtilidae**

*Poliophtila californica californica*

**Sylviidae**

*Chamaea fasciata*

**Gulls, Terns, and Skimmers**

Ring-billed gull  
California gull

**Pigeons and Doves**

Rock pigeon  
Mourning dove

**Swifts**

White-throated swift

**Hummingbirds**

Anna's hummingbird  
Rufous or Allen's  
hummingbird

**Tyrant Flycatchers**

Black phoebe  
Say's phoebe  
Ash-throated flycatcher  
Cassin's kingbird  
Western kingbird

**Crows and Jays**

Western scrub-jay  
Common raven

**Swallows**

Tree swallow  
Northern rough-winged  
swallow  
Cliff swallow

**Long-Tailed Tits and Bushtits**

Bushtit

**Wrens**

Bewick's wren  
House wren

**Gnatcatchers and Gnatwrens**

Coastal California  
gnatcatcher

**Sylviid Warblers**

Wrentit

**Turdidae**

*Sialia mexicana*

**Mimidae**

*Mimus polyglottos*

**Motacillidae**

*Anthus rubescens*

**Ptilonotidae**

*Phainopepla nitens*

**Parulidae**

*Geothlypis trichas*

*Setophaga coronata*

**Emberizidae**

*Pipilo maculatus*

*Aimophila ruficeps*

*Melospiza crissalis*

*Melospiza melodia*

*Zonotrichia leucophrys*

**Icteridae**

*Agelaius phoeniceus*

*Sturnella neglecta*

*Quiscalus mexicanus*

*Icterus bullockii*

**Fringillidae**

*Haemorhous mexicanus*

*Spinus psaltria*

*Spinus tristis*

**MAMMALIA**

**Sciuridae**

*Spermophilus beecheyi*

**Geomyidae**

*Thomomys bottae*

**Thrushes**

Western bluebird

**Mockingbirds and Thrashers**

Northern mockingbird

**Wagtails and Pipits**

American pipit

**Silky-flycatchers**

Phainopepla

**Wood Warblers**

Common yellowthroat

Yellow-rumped warbler

**Emberizids**

Spotted towhee

Rufous-crowned sparrow

California towhee

Song sparrow

White-crowned sparrow

**Blackbirds**

Red-winged blackbird

Western meadowlark

Great-tailed grackle

Bullock's oriole

**Fringilline and Cardueline**

**Finches and Allies**

House finch

Lesser goldfinch

American goldfinch

**MAMMALS**

**Squirrels, Chipmunks, and  
Marmots**

California ground squirrel

**Pocket Gophers**

Botta's pocket gopher

**Cricetidae**

*Microtus californicus*  
*Neotoma macrotis*

**Leporidae**

*Sylvilagus audubonii*

**Molossidae**

*Tadarida brasiliensis*

**Vespertilionidae**

*Eptesicus fuscus*  
*Antrozous pallidus*  
*Myotis californicus*  
*Myotis ciliolabrum*  
*Myotis evotis*  
*Myotis yumanensis*

**Felidae**

*Lynx rufus*

**Canidae**

*Canis latrans*

**Cervidae**

*Odocoileus hemionus*

**Hamsters, Voles, Lemmings,  
and New World Rats and Mice**

California vole  
Big-eared woodrat

**Rabbits and Hares**

Audubon's cottontail

**Free-Tailed Bats**

Brazilian (Mexican) free-tailed bat

**Evening Bats**

Big brown bat  
Pallid bat  
California myotis  
Western small-footed myotis  
Long-eared myotis  
Yuma myotis

**Cats**

Bobcat

**Foxes, Wolves, and Allies**

Coyote

**Deer, Elk, and Allies**

Mule deer

**Taxonomy and nomenclature are based on the following:**

Amphibians and reptiles: Crother, B.I. ed. (2012, Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico. *Herpetological Circular* 39) for species taxonomy and nomenclature; Stebbins, R.C., and S.M. McGinnis (2012, Field Guide to Amphibians and Reptiles of California, Revised Edition, University of California Press, Berkeley) for sequence and higher order taxonomy.

Birds: American Ornithologists' Union (1998, The A.O.U. Checklist of North American Birds, Seventh Edition, American Ornithologists' Union, Washington, D.C.; and annual supplements; see <http://www.aou.org/checklist/north/index.php>).

Mammals: Wilson, D.E., and D.M. Reeder, eds. (2005, Mammal Species of the World, 3rd ed., Johns Hopkins University Press, Baltimore, Maryland; see <http://www.vertebrates.si.edu/msw/mswcfapp/msw/index.cfm>).

# Appendix D. Coastal California Gnatcatcher Survey Report

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July 14, 2011

Erin McCarthy  
United States Fish and Wildlife Service  
Carlsbad Field Office  
6010 Hidden Valley Road, Suite 101  
Carlsbad, CA 92011

Lyann Comrack  
Nongame Wildlife Program  
California Department of Fish and Game  
1812 Ninth Street  
Sacramento, CA 95811

Subject: Coastal California Gnatcatcher Survey Results: SR-241/SR-91 Express Lanes  
Connector Project, Orange County, California (April–June 2011)

Dear Ms. McCarthy and Ms. Comrack:

This letter report documents the results of protocol surveys for the coastal California gnatcatcher (*Polioptila californica californica*; CAGN), a federally listed threatened species, conducted by LSA Associates, Inc. (LSA). Six CAGN surveys were conducted in suitable habitat within the Biological Study Area (BSA), which is from the Windy Ridge area on State Route 241 (SR-241) to State Route 91 (SR-91), and from the SR-91 interchange with SR-241 along SR-91 to Coal Canyon. Portions south of SR-91 are undeveloped areas within the Central and Coastal Subregion Natural Communities Conservation Planning (NCCP) area. All survey areas are in Orange County, California (see Appendix A, Figure 1; all figures provided in Appendix A).

Surveys were positive, with one successfully breeding pair of CAGN (first clutch: 3 fledged young; second clutch: 3 nestlings at survey's end) and one incidentally observed male CAGN found within or immediately adjacent to the BSA (Figure 2).

## **BIOLOGICAL STUDY AREA**

The BSA is from the Windy Ridge area on SR-241 to SR-91, and from the SR-91 interchange with SR-241 along SR-91 to Coal Canyon. The BSA is located on the United States Geological Survey (USGS) *Black Star Canyon, California* 7.5-minute series topographical quadrangle. The project area lies within the northeastern portion of the City of Anaheim and the southeastern portion of the City of Yorba Linda. The north side of SR-91 is bordered by Featherly Regional Park, the Santa Ana River, and the Santa Ana River Trail. South of SR-91, the area is predominantly surrounded by residential and commercial properties and portions of undeveloped areas within the NCCP planning area, but the proposed project is not within the NCCP Reserve. Most of the lands on the south side of SR-91 and the east and west sides of SR-241 are undeveloped open space.

Elevation ranges from approximately 370 feet (ft) above mean sea level (amsl) to 1,570 ft amsl. The surrounding topography adjacent to SR-91 is moderately rolling, with steep canyons and hillsides associated with the Santa Ana Mountains bordering the southernmost portion of the BSA adjacent to SR-241.

Some of the vegetation types in the BSA are considered suitable for CAGN and include patches of coastal sage scrub (CSS) and black sage-bush mallow dominated chaparral. Some of the vegetation appears to be recovering from the Santiago Fire of October 2007. Dominant plant species include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), shortpod mustard (*Hirschfeldia incana*), chaparral bush mallow (*Malacothamnus fasciculatus*), laurel sumac (*Malosma laurina*), coastal deerweed (*Lotus scoparius* var. *scoparius*), white sage (*Salvia apiana*), black sage (*Salvia mellifera*), bush monkey flower (*Mimulus aurantiacus*), and Whipple's yucca (*Yucca whipplei*).

## METHODS

LSA biologists Eric Krieg, Ingri Quon, and Richard Erickson conducted six protocol surveys from April 14 to June 9, 2011, in accordance with survey guidelines issued in 1997 by the United States Fish and Wildlife Service (USFWS). During each survey, the biologist walked slowly through the scrub and adjacent habitats, listening for CAGN. A taped CAGN recording was played periodically along the survey route.

Surveys were conducted pursuant to Federal Fish and Wildlife Permit TE-777965-9 (April 8, 2008–April 7, 2012) and a letter permit from the California Department of Fish and Game (CDFG) attached to Scientific Collecting Permit SC-000777 covering conditions for research on listed birds (July 23, 2009–April 12, 2012). On March 30, 2011, per permit requirements, a 10-day survey notification was emailed to Erin McCarthy (USFWS) and Lyann Comrack (CDFG). The survey schedule and conditions are shown in Table A.

**Table A: Survey Schedule and Conditions**

Date (2011)	Time	Weather	Surveyor
April 14	0735–1100	Clear, cool, calm	RE
May 2	0700–0930	Clear, cool, light breeze	IQ
May 10	0730–1200	Clear, cool–mild, light air	IQ
May 26	0735–0845	Clear, cool–mild, calm–light air	EK
June 2	0715–0830	Clear, cool–mild, light breeze	EK
June 9	0630–0740	Clear, mild, calm–light air	EK

Surveyor: EK = Eric Krieg; IQ = Ingri Quon; RE = Richard Erickson  
Wind description using seaman's terms from Beaufort scale.

## RESULTS

A total of nine adult and young CAGN were detected or observed within or immediately adjacent to the BSA during the protocol surveys. All CAGN were within the vicinity of SR-241.

- A pair of CAGN hatched six young from two nests. The first nest was found on April 14 with three nestlings, which later fledged. A second nest with three eggs was found on June 2 and, on the last survey on June 9, this nest had three nestlings.

- A single male CAGN was heard and then observed on May 10 just outside of the BSA along the west side of SR-241, approximately 2,000 ft south of the connector on-ramps to SR-91.

No brown-headed cowbirds (*Molothrus ater*), a brood parasite of CAGN and other passerines, were detected during the surveys. A list of animal species detected during the surveys is shown in Appendix B. The California Native Species Field Survey Form for the CAGN observations is in Appendix C.

If you have any questions or comments, please call (949) 553-0666 or email Eric Krieg at eric.krieg@lsa-assoc.com, Ingri Quon at ingri.quon@lsa-assoc.com, or Richard Erickson at richard.erickson@lsa-assoc.com.

Sincerely,

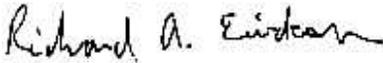
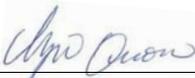
**LSA ASSOCIATES, INC.**



Ingri Quon  
Senior Biologist

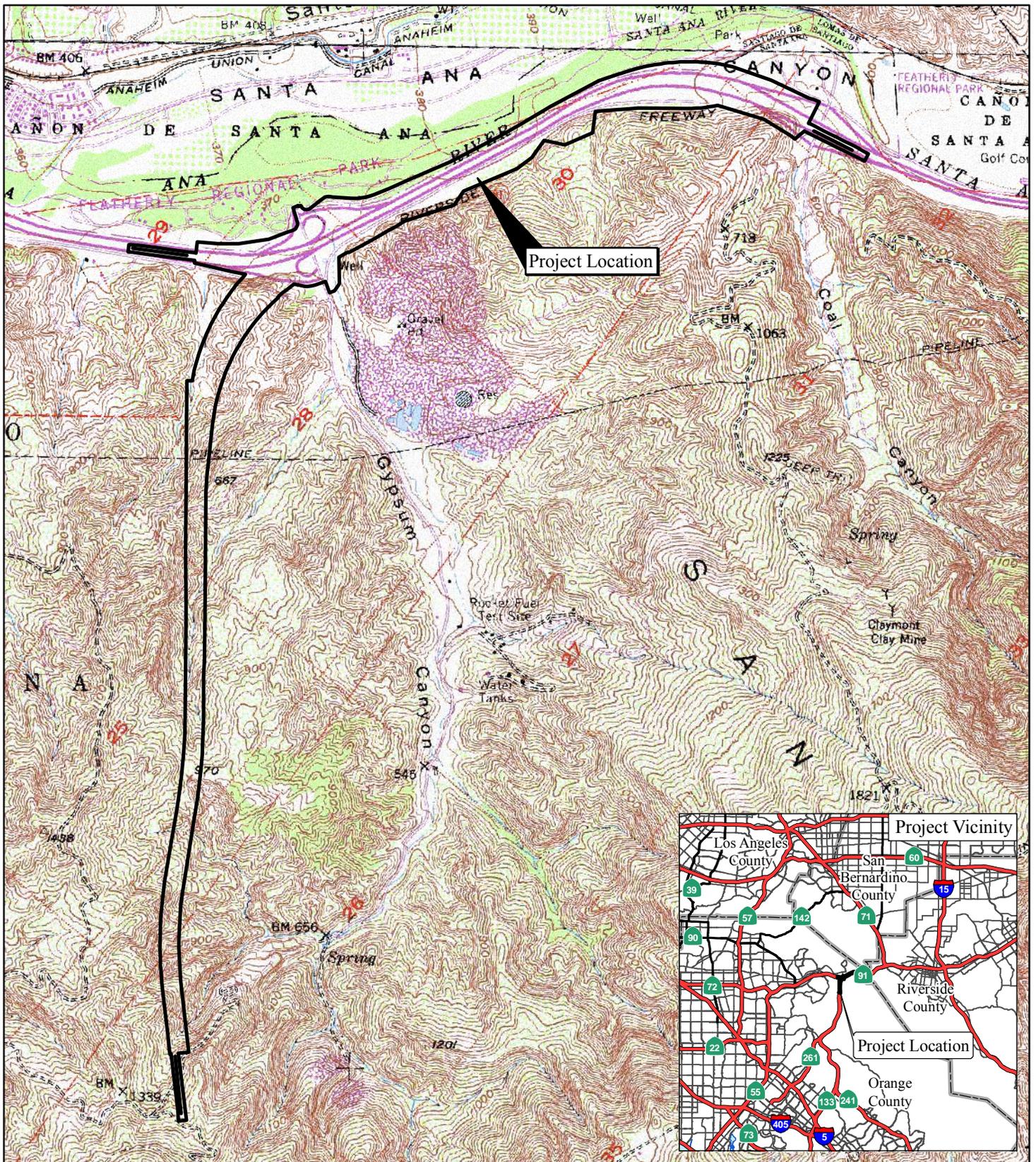
Attachments: Appendix A: Figures  
Appendix B: Animal Species Detected  
Appendix C: California Native Species Field Survey Form

**I CERTIFY THAT THE INFORMATION IN THIS SURVEY REPORT AND ATTACHED EXHIBITS FULLY AND ACCURATELY REPRESENT MY WORK:**

<b>SURVEYOR:</b>	<b>PERMIT NUMBER:</b>	<b>DATE:</b>
 Richard Erickson	TE-777965-9	July 14, 2011
 Eric Krieg	TE-777965-9	July 14, 2011
 Ingri Quon	TE-777965-9	July 14, 2011

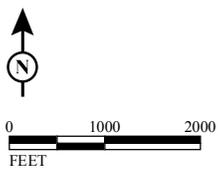
# APPENDIX A

## FIGURES



LEGEND  
 — Project Location

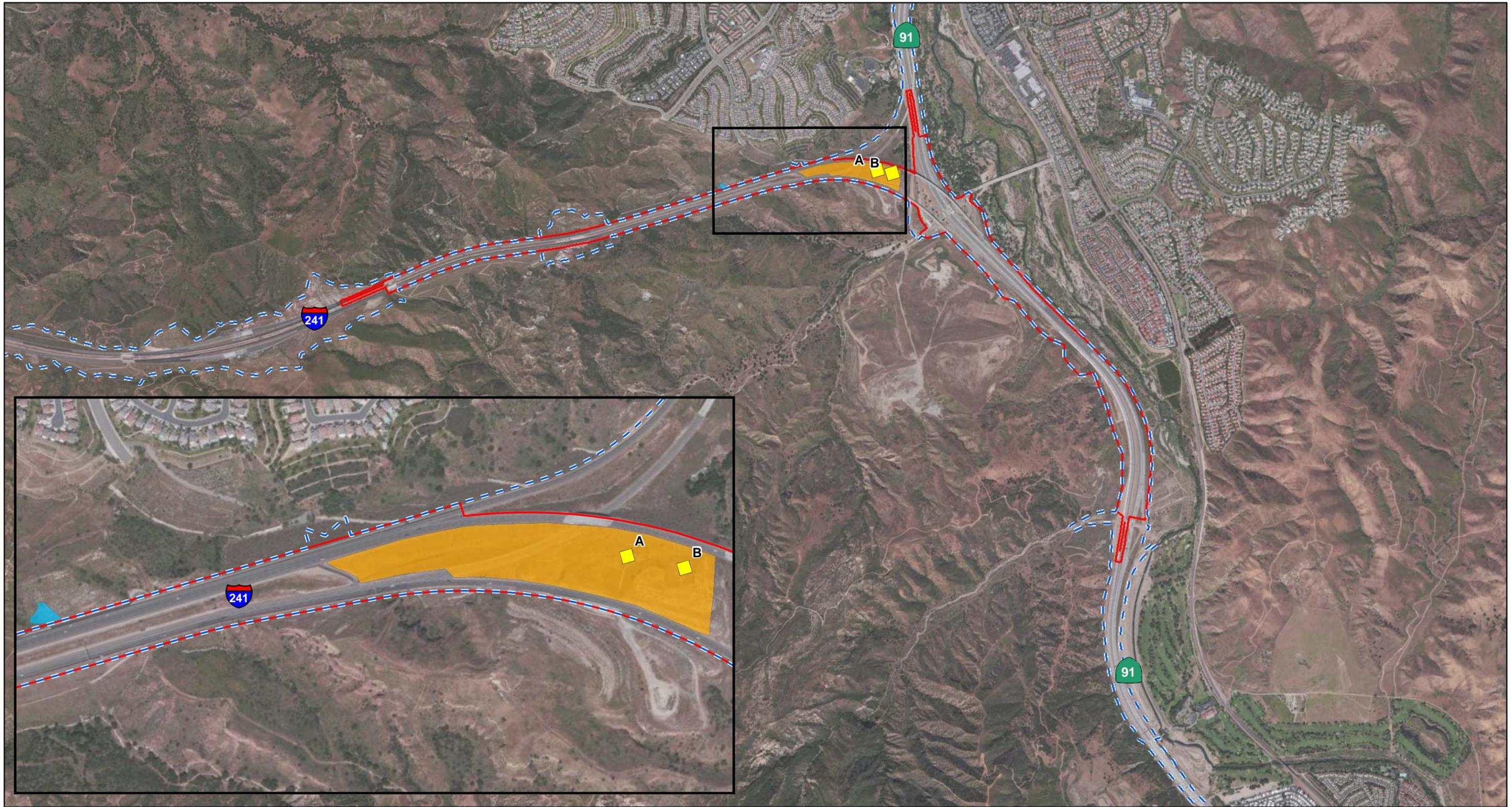
FIGURE 1



SOURCE: USGS 7.5' Quad, BLACK STAR CANYON ('88)  
 F:\RBF1101\GIS\Fig1\_ProjLoc.mxd (7/7/2011)

*SR-91 Express Lanes Extension  
 and SR-241 Connector*

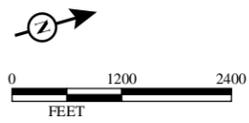
Project Location



L S A

LEGEND

- - - Existing Caltrans ROW
- Biological Study Area (BSA)
- California Gnatcatcher Male Observed (5/10/11)
- California Gnatcatcher Pair & Family
- California Gnatcatcher Nest Location



SOURCE: Bing (2009); USFWS (2011)  
 I:\RBF1101\GIS\CAGN.mxd (7/7/2011)

FIGURE 2

*SR-91 Express Lanes Extension  
 and SR-241 Connector*  
 Coastal California Gnatcatcher 2011 Survey Results

**APPENDIX B**  
**ANIMAL SPECIES DETECTED**

## APPENDIX B

### ANIMAL SPECIES DETECTED

This is a list of the conspicuous reptiles, birds, and mammals noted in or flying over the study area by LSA Associates, Inc. biologists during surveys conducted from April through June 2011. Presence may be noted if a species is seen or heard, or identified by the presence of tracks, scat, or other signs.

\* Species not native to the study area

#### REPTILIA

##### Phrynosomatidae

*Sceloporus occidentalis*  
*Uta stansburiana*

##### Viperidae

*Crotalus oreganus*

#### AVES

##### Odontophoridae

*Callipepla californica*

##### Phalacrocoracidae

*Phalacrocorax auritus*

##### Ardeidae

*Ardea herodias*  
*Ardea alba*

##### Cathartidae

*Cathartes aura*

##### Accipitridae

*Accipiter cooperii*  
*Buteo jamaicensis*

##### Falconidae

*Falco sparverius*

##### Laridae

*Larus delawarensis*  
*Larus californicus*

#### REPTILES

##### Phrynosomatid Lizards

Western fence lizard  
Common side-blotched lizard

##### Vipers

Western rattlesnake

#### BIRDS

##### New World Quail

California quail

##### Cormorants

Double-crested cormorant

##### Hérons, Bitterns, and Allies

Great blue heron  
Great egret

##### New World Vultures

Turkey vulture

##### Hawks, Kites, Eagles, and Allies

Cooper's hawk  
Red-tailed hawk

##### Caracaras and Falcons

American kestrel

##### Gulls, Terns, and Skimmers

Ring-billed gull  
California gull

**Columbidae**

- \* *Columba livia*
- Zenaida macroura*

**Apodidae**

- Aeronautes saxatilis*

**Trochilidae**

- Calypte anna*
- Selasphorus rufus* or *sasin*

**Tyrannidae**

- Sayornis nigricans*
- Sayornis saya*
- Myiarchus cinerascens*
- Tyrannus vociferans*
- Tyrannus verticalis*

**Corvidae**

- Aphelocoma californica*
- Corvus corax*

**Hirundinidae**

- Tachycineta bicolor*
- Stelgidopteryx serripennis*
- Petrochelidon pyrrhonota*

**Aegithalidae**

- Psaltriparus minimus*

**Troglodytidae**

- Thryomanes bewickii*
- Troglodytes aedon*

**Poliophtilidae**

- Poliophtila californica californica*

**Sylviidae**

- Chamaea fasciata*

**Turdidae**

- Sialia mexicana*

**Mimidae**

- Mimus polyglottos*

**Pigeons and Doves**

- Rock pigeon
- Mourning dove

**Swifts**

- White-throated swift

**Hummingbirds**

- Anna's hummingbird
- Rufous or Allen's hummingbird

**Tyrant Flycatchers**

- Black phoebe
- Say's phoebe
- Ash-throated flycatcher
- Cassin's kingbird
- Western kingbird

**Crows and Jays**

- Western scrub-jay
- Common raven

**Swallows**

- Tree swallow
- Northern rough-winged swallow
- Cliff swallow

**Long-Tailed Tits and Bushtits**

- Bushtit

**Wrens**

- Bewick's wren
- House wren

**Gnatcatchers and Gnatwrens**

- Coastal California gnatcatcher

**Sylviid Warblers**

- Wrentit

**Thrushes**

- Western bluebird

**Mockingbirds and Thrashers**

- Northern mockingbird

**Motacillidae**

*Anthus rubescens*

**Ptilonotidae**

*Phainopepla nitens*

**Parulidae**

*Dendroica coronata*

*Geothlypis trichas*

**Emberizidae**

*Pipilo maculatus*

*Aimophila ruficeps*

*Melospiza crissalis*

*Melospiza melodia*

*Zonotrichia leucophrys*

**Icteridae**

*Agelaius phoeniceus*

*Sturnella neglecta*

*Quiscalus mexicanus*

*Icterus bullockii*

**Fringillidae**

*Carpodacus mexicanus*

*Spinus psaltria*

*Spinus tristis*

**MAMMALIA**

**Sciuridae**

*Spermophilus beecheyi*

**Geomyidae**

*Thomomys bottae*

**Cricetidae**

*Microtus californicus*

*Neotoma macrotis*

**Leporidae**

*Sylvilagus audubonii*

**Wagtails and Pipits**

American pipit

**Silky-flycatchers**

Phainopepla

**Wood Warblers**

Yellow-rumped warbler

Common yellowthroat

**Emberizids**

Spotted towhee

Rufous-crowned sparrow

California towhee

Song sparrow

White-crowned sparrow

**Blackbirds**

Red-winged blackbird

Western meadowlark

Great-tailed grackle

Bullock's oriole

**Fringilline and Cardueline Finches and Allies**

House finch

Lesser goldfinch

American goldfinch

**MAMMALS**

**Squirrels, Chipmunks, and Marmots**

California ground squirrel

**Pocket Gophers**

Botta's pocket gopher

**Hamsters, Voles, Lemmings, and New World Rats and Mice**

California vole

Big-eared woodrat

**Rabbits and Hares**

Audubon's cottontail

**Felidae**

*Lynx rufus*

**Canidae**

*Canis latrans*

**Cervidae**

*Odocoileus hemionus*

**Cats**

Bobcat

**Foxes, Wolves, and Allies**

Coyote

**Deer, Elk, and Allies**

Mule deer

**Taxonomy and nomenclature are based on the following:**

Amphibians and reptiles: Crother, B.I. ed. (2008, Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico. *Herpetological Circular 37*) for species taxonomy and nomenclature; Stebbins, R.C. (2003, A Field Guide to Western Reptiles and Amphibians, third edition, Houghton Mifflin, Boston) for sequence and higher order taxonomy.

Birds: American Ornithologists' Union (1998, The A.O.U. Checklist of North American Birds, Seventh Edition, American Ornithologists' Union, Washington D.C.; and supplements; see <http://www.aou.org/checklist/north/index.php>).

Mammals: Wilson, D.E., and D.M. Reeder, eds. (2005, Mammal Species of the World, 3rd ed., Johns Hopkins University Press, Baltimore, Maryland; see <http://vertebrates.si.edu/mammals/msw/>).

**APPENDIX C**  
**CALIFORNIA NATIVE SPECIES FIELD SURVEY FORM**



# Appendix E. Bat Habitat Suitability Assessment Memorandum

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## MEMORANDUM

DATE: January 6, 2012

TO: Lisa Williams, Project Manager

FROM: Jill Carpenter, Bat Specialist

SUBJECT: Bat Habitat Suitability Assessment for the State Route 241/State Route 91 Express Lanes Connector Project in Orange County, California

The purpose of this memorandum is to discuss the results of the Bat Habitat Suitability Assessment conducted by LSA Associates, Inc. (LSA) biologists Jill Carpenter and Ingri Quon on November 30, 2011, at three bridge structures at the northern end of State Route 241 (SR-241) near State Route 91 (SR-91) within the Biological Study Area for the SR-241/SR-91 Express Lanes Connector Project. Two of the bridge structures surveyed comprise the separate northbound and southbound spans of the Windy Ridge Wildlife Crossing, while the third bridge structure is the southbound SR-241 connector from westbound SR-91 over the westbound SR-91 connector from northbound SR-241. Other structures that contain bat roosting habitat are present within the study area; however, these were not surveyed as part of this assessment since they were previously evaluated for the presence of bat roosting habitat by LSA in 2006, and nighttime surveys confirming bat roosting at these locations were performed by LSA in June 2008. Based upon those survey results, the presence of day-roosting bats is assumed at these structures, which include various expansion joints in the SR-241/SR-91 interchange flyovers, a double-box culvert adjacent to the Coal Canyon Wildlife Corridor, and a triple-box culvert beneath SR-91 at Gypsum Canyon Road.

This daytime assessment was conducted to locate potential bat roosting sites as well as to evaluate the potential for bat roosting activity within the study area. Potential day- and night-roosting sites were identified through the examination of bridge and culvert structures for suitable crevices and roosting habitat as well as any presence of bat sign (e.g., guano, urine staining, or vocalizations). Day roosts are used by bats during the day for shelter from the elements and from predators, while a night roost refers to a structure (natural or humanmade) located near or in the foraging area in which bats roost during the evening between foraging bouts as an energy-saving strategy. Species that commonly utilize anthropogenic structures such as bridges for day roosting include the Mexican free-tailed bat (*Tadarida brasiliensis*), big brown bat (*Eptesicus fuscus*), pallid bat (*Antrozous pallidus*), and Yuma myotis (*Myotis yumanensis*); other species that may use these types of roosts for day roosting include small-footed myotis (*Myotis ciliolabrum*), California myotis (*Myotis californicus*), western mastiff bat (*Eumops perotis*), and western canyon bat (*Parastrellus hesperus*).<sup>1</sup>

Although no suitable bat roosting habitat was observed at the SR-91/SR-241 connector bridge, crevices suitable for day-roosting bats were observed in gaps in the filler material within the expansion joints at the Windy Ridge Wildlife Crossing. No bat sign was observed at that location

<sup>1</sup> Formerly known as *Pipistrellus hesperus*.

except for scattered guano consistent with use by night-roosting bats found below the closure pour on the northbound bridge structure; however, these results should be interpreted with some degree of caution, since this assessment was conducted in early winter, and colonies that may be present during the spring and summer months may no longer have been utilizing any of the suitable crevices at the time of the assessment. Day-roosting bats present during the spring and summer months may be maternity colonies or groups consisting of mothers and flightless young; these groups are particularly vulnerable to disturbance and impacts related to construction activities. It is possible that a small maternity grouping could use these structures; however, given the short lengths of the crevice spaces and the absence of sign, it is very unlikely that a large maternity colony uses these bridges for roosting.

Per LSA's current understanding of the project, construction activities are not expected to occur at the majority of structures within the study area, with bridge widening limited to the three structures examined during this assessment. At any structure where construction activities that may cause direct or indirect impacts to bats, preconstruction nighttime emergence surveys that include exit counts and acoustic monitoring should be performed to determine the approximate number and species of bats utilizing the structure(s) for roosting. Any such survey should be conducted during the spring or summer months at least 1 year prior to construction in order to allow time to plan and implement any appropriate mitigation that may be needed to minimize impacts to roosting bats. If day-roosting bats are present or their presence is suspected in structures that will be directly impacted by construction activities, temporary and humane exclusionary devices may need to be placed in the fall (September or October) preceding construction at those structures to avoid potential direct impacts to bats; these devices would be removed at the completion of construction.

# Appendix F. Jurisdictional Delineation Report

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# SR-241 / SR-91 Express Lanes Connector Project

ORANGE COUNTY AND RIVERSIDE COUNTY, CALIFORNIA

City of Anaheim, City of Yorba Linda, and City of Corona

12-ORA-241 PM 36.1/39.1

12-ORA-91 PM 14.7/18.9

08-RIV-91 PM 0.0/1.5

OK9700 / 1200020097

## Jurisdictional Delineation Report



**Prepared for:**  
**Foothill/Eastern Transportation Corridor Agency, Project Sponsor**

**and for:**  
**State of California Department of Transportation, Lead Agency**



May 2015

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## INTRODUCTION

California Department of Transportation (Caltrans) District 12, in cooperation with the Foothill/Eastern Transportation Corridor Agency (F/ETCA), proposes to construct a median-to-median connector between State Route 241 (SR-241) and the State Route 91 (SR-91) Express Lanes. SR-241 is a tolled facility, starting at the Oso Parkway interchange in south Orange County and continuing to its terminus at SR-91. The SR-91 Express Lanes is a two-lane tolled facility located within the median of SR-91, from State Route 55 (SR-55) to the Orange/Riverside County line (east of the SR-241 interchange). Currently, there is no direct connection between SR-241 and the SR-91 Express Lanes.

The project, located at the junction of SR-241 and SR-91 and in the Cities of Anaheim, Yorba Linda, and Corona, and the counties of Orang and Riverside, would provide improved access between SR-241 and SR-91 and is proposed to be a tolled facility. Caltrans will be the lead agency for the project. The proposed median-to-median connector project encompasses 12-ORA-241 (Post Mile [PM] 36.1/39.1), 12-ORA-91 (PM 14.7/18.9), and 08 RIV-91 (PM 0.0/1.5), for a length of approximately 8.7 miles. Please refer to Figure 1 (all figures provided in Appendix A).

This report presents the results of a delineation of wetlands and waters subject to potential jurisdiction by the United States Army Corps of Engineers (USACE), the California Department of Fish and Wildlife (CDFW), and the Regional Water Quality Control Board (RWQCB) as part of the evaluation for potential permit requirements under Section 404 of the Federal Clean Water Act (CWA), for Streambed Alteration Agreement processing under Section 1600 et seq. of the California Fish and Game Code, and certification under Section 401 of the CWA, respectively. This jurisdictional delineation is also an important source of California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) information for the evaluation of potential impacts associated with the proposed project.

The findings and conclusions presented in this report, including the location and extent of wetlands and other waters subject to regulatory jurisdiction, represent the professional opinion of the consultant biologists. These findings and conclusions should be considered preliminary until verified by the USACE, the CDFW, and the RWQCB.

## SITE DESCRIPTION

The project area consists of developed roadway areas and a vegetated median surrounded by a variety of land uses, including commercial, some residential, recreational, and undeveloped/open space.

The Biological Study Area (BSA) is located on the United States Geological Survey (USGS) *Black Star Canyon, California* 7.5-minute series topographical quadrangle. The BSA is approximately 8.7 total linear miles (mi). Approximately 3 mi is along SR 241, from south of the Windy Ridge Wildlife Crossing north to the SR-241/SR-91 interchange. Approximately 5.7 mi is along SR-91 from west of the SR-241/SR-91 interchange to just east of Green River Road.

Elevations range from approximately 370 to 1,570 ft above mean sea level (amsl). The topography is moderately rolling adjacent to SR-91, with steep canyons and hillsides from the Santa Ana Mountains bordering the southernmost portion of the BSA. Canyons and tributary washes associated with the

Santa Ana River also occur throughout the BSA. There is a variety of plant communities located within the BSA, including coastal sage scrub (CSS), chaparral, nonnative grassland, ruderal vegetation, ornamental vegetation, and developed areas.

The Santa Ana River Watershed is the largest in Southern California. It is an important aquatic resource, covering over 388.5 square kilometers (sq km) (150 square miles [sq mi]). The river begins in the San Bernardino Mountains, crossing San Bernardino, Riverside, and Orange Counties before flowing into the Pacific Ocean.

The BSA supports a mosaic of native plant communities and developed areas. Within the BSA, SR-91 and SR-241 pass through a series of open spaces that extend from the Cleveland National Forest and Santa Ana Mountains in the south to the Puente-Chino Hills area to the north and west. Bridge and culvert crossings such as those at Gypsum and Coal Canyons also convey water via culverts to the Santa Ana River under SR-91. The climate is classified as Mediterranean (i.e., semi-arid climate with hot and dry summers and moderately mild and wet winters). The average annual precipitation varies according to elevation and distance from the ocean and ranges from approximately 12 to 14 inches. Although most of the precipitation occurs from November to May, thunderstorms occur at all times of the year and can cause extremely high precipitation rates. Temperatures typically range between 45 and 84 degrees Fahrenheit (°F).<sup>1</sup>

## REGULATORY BACKGROUND

### United States Army Corps of Engineers

The USACE regulates discharges of dredged or fill material into waters of the United States. These waters include wetland and nonwetland bodies of water that meet specific criteria. USACE regulatory jurisdiction pursuant to Section 404 of the CWA is founded on a connection, or nexus, between the water body in question and interstate commerce. This connection may be direct (through a tributary system linking a stream channel with traditional navigable waters (TNWs) used in interstate or foreign commerce) or may be indirect (through a nexus identified in USACE regulations). The following definition of waters of the U.S. is taken from the discussion provided at 33 Code of Federal Regulations (CFR) 328.3:

“The term waters of the United States means:

- (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce...;
- (2) All interstate waters including interstate wetlands;
- (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams) ... the use, degradation or destruction of which could affect interstate or foreign commerce...;
- (4) All impoundments of waters otherwise defined as waters of the United States under the definition; and
- (5) Tributaries of waters defined in paragraphs (a) (1)–(4) of this section.”

<sup>1</sup> [www.ocalmanac.com/Weather/we02.htm](http://www.ocalmanac.com/Weather/we02.htm).

The USACE typically considers any body of water displaying an ordinary high water mark (OHWM) for designation as waters of the U.S., subject to guidance from U.S. Supreme Court decisions. USACE jurisdiction over nontidal waters of the U.S. extends laterally to the OHWM or beyond the OHWM to the limit of any adjacent wetlands, if present (33 CFR 328.4). The OHWM is defined 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 soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.” (33 CFR 328.3) Jurisdiction typically extends upstream to the point where the OHWM is no longer perceptible.

As discussed above, USACE regulatory jurisdiction under Section 404 of the CWA is founded on a connection between the water body in question and interstate commerce. In the past, an indirect nexus could potentially be established if isolated waters provided habitat for migratory birds, even in the absence of a surface connection to a navigable water of the U.S. The 1984 rule that enabled the USACE to expand jurisdiction over isolated waters of this type became known as the Migratory Bird Rule. However, on January 9, 2001, the U.S. Supreme Court narrowly limited USACE jurisdiction of “nonnavigable, isolated, intrastate” waters based solely on the use of such waters by migratory birds and, particularly, the use of indirect indicators of interstate commerce (e.g., use by migratory birds that cross state lines) as a basis for jurisdiction. The Court’s ruling derives from the case *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers*, No. 99-1178 (SWANCC). The Supreme Court determined that the USACE had exceeded its statutory authority by asserting CWA jurisdiction over an abandoned sand and gravel pit in northern Illinois, which provides habitat for migratory birds.

In 2006, the U.S. Supreme Court further considered USACE jurisdiction of “waters of the United States” in the consolidated cases *Rapanos v. United States* and *Carabell v. United States* (126 S. Ct. 2208), collectively referred to as “Rapanos.” The Supreme Court concluded that wetlands are “waters of the United States” if they significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as navigable. On June 5, 2007, the USACE issued guidance regarding the Rapanos decision. After consideration of public comments and agencies’ experience, revised guidance was issued on December 2, 2008. This guidance states that the USACE will continue to assert jurisdiction over TNWs, wetlands adjacent to TNWs, relatively permanent nonnavigable tributaries that have a continuous flow at least seasonally (typically three months), and wetlands that directly abut relatively permanent tributaries. The USACE will determine jurisdiction over waters that are nonnavigable tributaries that are not relatively permanent and wetlands adjacent to nonnavigable tributaries that are not relatively permanent only after making a significant nexus finding. According to the guidance, the USACE generally will not assert jurisdiction over the following features: swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow); and ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

Furthermore, the preamble to USACE regulations (Preamble Section 328.3, Definitions) states that the USACE does not generally consider the following waters to be waters of the U.S. The USACE does, however, reserve the right to regulate these waters on a case-by-case basis.

- Nontidal drainage and irrigation ditches excavated on dry land;

- Artificially irrigated areas that would revert to upland if irrigation ceased;
- Artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
- Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons; and
- Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for purposes of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the U.S.

Waters found to be isolated and not subject to CWA regulation are often still regulated by the RWQCB under the State Porter-Cologne Water Quality Control Act (Porter-Cologne Act).

## **Wetlands**

Wetland delineations for Section 404 purposes must be conducted according to the Regional Supplement to the Corps Wetland Delineation Manual: Arid West Region (Regional Supplement) (USACE 2008) and the USACE 1987 Wetland Delineation Manual (1987 Manual) (Environmental Laboratory 1987). Where there are differences between the two documents, the Regional Supplement takes precedence over the 1987 Manual.

The USACE and United States Environmental Protection Agency (EPA) define wetlands as follows:

“Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions.”

In order to be considered a jurisdictional wetland under Section 404, an area must possess three wetland characteristics: hydrophytic vegetation, hydric soils, and wetland hydrology. Each characteristic has a specific set of mandatory wetland criteria that must be satisfied in order for that particular wetland characteristic to be met. Several indicators may be analyzed to determine whether the criteria are satisfied.

Hydrophytic vegetation and hydric soils indicators provide evidence that episodes of inundation have lasted more than a few days or have occurred repeatedly over a period of years, but do not confirm that an episode has occurred recently. Conversely, wetland hydrology indicators provide evidence that an episode of inundation or soil saturation occurred recently, but do not provide evidence that episodes have lasted more than a few days or have occurred repeatedly over a period of years. Because of this, if an area lacks one of the three characteristics under normal circumstances, the area is considered nonwetland under most circumstances.

Determination of wetland limits may be obfuscated by a variety of natural environmental factors or human activities, collectively called “difficult wetland situations,” including cyclic periods of drought and flooding or highly ephemeral stream systems. During periods of drought, for example, bank

return flows are reduced and water tables are lowered. This results in a corresponding lowering of ordinary high water and invasion of upland plant species into wetland areas. Conversely, extreme flooding may create physical evidence of high water well above what might be considered ordinary and may allow the temporary invasion of hydrophytic species into nonwetland areas. In the highly ephemeral systems typical of Southern California, these problems are encountered frequently. In these situations, professional judgment based on years of practical experience and extensive knowledge of local ecological conditions comes into play in delineating wetlands. The *Regional Supplement* provides additional guidance for difficult wetland situations.

**Hydrophytic Vegetation.** Hydrophytic vegetation is plant life that grows and is typically adapted for life in permanently or periodically saturated soils. The hydrophytic vegetation criterion is met if more than 50 percent of the dominant plant species from all strata (tree, shrub, herb, and woody vine layers) are considered hydrophytic. Hydrophytic species are those included on the *National List of Plant Species That Occur in Wetlands: California (Region 0)* (Reed 1988), published by the United States Fish and Wildlife Service (USFWS). Each species on the list is rated according to a wetland indicator category, as shown in Table A. To be considered hydrophytic, the species must have wetland indicator status (i.e., be rated as OBL, FACW, or FAC).

**Table A: Hydrophytic Vegetation**

Category		Probability
Obligate Wetland	OBL	Almost always occur in wetlands (estimated probability > 99 percent)
Facultative Wetland	FACW	Usually occur in wetlands (estimated probability 67–99 percent)
Facultative	FAC	Equally likely to occur in wetlands and nonwetlands (estimated probability 34–66 percent)
Facultative Upland	FACU	Usually occur in nonwetlands (estimated probability 67–99 percent)
Obligate Upland	UPL	Almost always occur in nonwetlands (estimated probability > 99 percent)

The delineation of hydrophytic vegetation is typically based on the most dominant species from each vegetative stratum (strata are considered separately); when more than 50 percent of these dominant species are hydrophytic (i.e., FAC, FACW, or OBL), the vegetation is considered hydrophytic. In particular, the USACE recommends the use of the “50/20” rule (also known as the dominance test) from the *Regional Supplement* for determining dominant species. Under this method, dominant species are the most abundant species that immediately exceed 50 percent of the total dominance measure for the stratum, plus any additional species composing 20 percent or more of the total dominance measure for the stratum. In cases where indicators of hydric soil and wetland hydrology are present but the vegetation initially fails the dominance test, the prevalence index must be used. The prevalence index is a weighted average of all plant species within a sampling plot. The prevalence index is particularly useful when communities only have one or two dominants, where species are present at roughly equal coverage, or when strata differ greatly in total plant cover. In addition, USACE guidance provides that morphological adaptations may be considered when determining hydrophytic vegetation when indicators of hydric soil and wetland hydrology are present (USACE 2006). If the plant community passes either the dominance test or prevalence index after reconsideration of the indicator status of any plant species that exhibit morphological adaptations for life in wetlands, then the vegetation is considered hydrophytic.

**Hydric Soils.**<sup>1</sup> Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.<sup>2</sup> Soils are considered likely to meet the definition of a hydric soil when one or more of the following criteria are met:

1. All Histels except Folistels and Histosols except Folists;
2. Soils that are frequently ponded for a long duration or very long duration<sup>3</sup> during the growing season; or
3. Soils that are frequently flooded for a long duration or very long duration during the growing season.

Hydric soils develop under conditions of saturation and inundation combined with microbial activity in the soil that causes a depletion of oxygen. While saturation may occur at any time of year, microbial activity is limited to the growing season, when soil temperature is above biologic zero (the soil temperature at a depth of 50 centimeters [cm], below which the growth and function of locally adapted plants are negligible). Biogeochemical processes that occur under anaerobic conditions during the growing season result in the distinctive morphologic characteristics of hydric soils. Based on these criteria, a National List of Hydric Soils was created from the National Soil Information System (NASIS) database and is updated annually.

The *Regional Supplement* has a number of field indicators that may be used to identify hydric soils. The Natural Resources Conservation Service (NRCS) (2003) has also developed a number of field indicators that may demonstrate the presence of hydric soils. These indicators include hydrogen sulfide generation, the accumulation of organic matter, and the reduction, translocation, and/or accumulation of iron and other reducible elements. These processes result in soil characteristics that persist during both wet and dry periods. Separate indicators have been developed for sandy soils and for loamy and clayey soils.

**Wetland Hydrology.** Under natural conditions, development of hydrophytic vegetation and hydric soils is dependent on a third characteristic: wetland hydrology. Areas with wetland hydrology are those where the presence of water has an overriding influence on vegetation and soil characteristics due to anaerobic and reducing conditions, respectively (Environmental Laboratory 1987). The wetland hydrology parameter is satisfied if the area is seasonally inundated or saturated to the surface for a minimum of 14 consecutive days during the growing season in most years (USACE 2006).

Hydrology is often the most difficult criterion to measure in the field due to seasonal and annual variations in water availability. Some of the indicators that are commonly used to identify wetland hydrology include visual observation of inundation or saturation, watermarks, recent sediment

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<sup>1</sup> The hydric soil definition and criteria included in the 1987 Manual are obsolete. Users of the Manual are directed to the United States Department of Agriculture (USDA) Natural Resources Conservation Service website for the most current information on hydric soils.

<sup>2</sup> Current definition as of 1994 (FR July 13, 1994).

<sup>3</sup> A long duration is defined as a single event ranging from 7 to 30 days; a very long duration is defined as a single event that lasts longer than 30 days.

deposits, surface scour, and oxidized root channels (rhizospheres) resulting from prolonged anaerobic conditions.

**Deepwater Aquatic Habitat.** Deepwater aquatic habitats are areas that are permanently inundated at mean annual water depths >6.6 ft or permanently inundated areas > 6.6 ft in depth that do not support rooted-emergent or woody plant species.<sup>1</sup> Deepwater aquatic waters do not qualify as wetland waters due to the lack of hydrophytic terrestrial vegetation. Deepwater aquatic waters are recognized as having a high habitat value due to their use as a fish and wildlife resource and limited distribution in the arid west.

### California Department of Fish and Wildlife

The CDFW, through provisions of the California Fish and Game Code (Sec. 1600 et seq.), is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be adversely affected. Streams (and rivers) are defined by the presence of a channel bed and banks and at least an intermittent flow of water. The CDFW regulates wetland areas only to the extent that those wetlands are part of a river, stream, or lake as defined by the CDFW.

In obtaining CDFW agreements, the limits of wetlands are not typically determined. The reason for this is that the CDFW generally includes, within the jurisdictional limits of streams and lakes, any riparian habitat present. Riparian habitat includes willows, mulefat, and other vegetation typically associated with the banks of a stream or lake shorelines and may not be consistent with USACE definitions. In most situations, wetlands associated with a stream or lake would fall within the limits of riparian habitat. Thus, defining the limits of CDFW jurisdiction based on riparian habitat will automatically include any wetland areas and may include additional areas that do not meet USACE criteria for soils and/or hydrology (e.g., where riparian woodland canopy extends beyond the banks of a stream, away from frequently saturated soils).

### Regional Water Quality Control Board

The RWQCBs are responsible for the administration of Section 401 of the CWA. Typically, the areas subject to RWQCB jurisdiction coincide with those of the USACE (i.e., waters of the U.S., including any wetlands). The RWQCB also asserts authority over waters of the State under waste discharge requirements pursuant to the Porter-Cologne Act.

## METHODOLOGY

On December 3, 2013, LSA biologists Ingri Quon and Lonnie Rodriguez conducted a field investigation of the drainage features along SR-241 and SR-91. On March 19, 2015, LSA biologist Stan Spencer, Ph.D., conducted a follow-up investigation along SR-91 for Drainage Feature 5 and the immediate surrounding area to investigate any additional drainage features. Features along SR-241 were delineated according to the USACE three-parameter (vegetation, soils, and hydrology) method

<sup>1</sup> Areas < 6.6 ft mean annual depth that support only submergent aquatic plants are vegetated shallows, not wetlands.

of wetlands delineation (1987 Corps of Engineers Wetland Delineation Manual; 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region), as well as California Department of Fish and Wildlife (CDFW) guidelines. At the same time, the features along SR-91 were checked for comparison with results for the portion of the project area that overlaps with the 2009 jurisdictional delineation that was part of the SR-91 CIP.

The study area was surveyed on foot for potential wetland and nonwetland USACE jurisdictional waters, as well as CDFW streambed and riparian resources. The boundaries of the potential jurisdictional areas were observed in the field and mapped on a series of aerial photographs (scale at 1 inch = 200 ft) attached as Figure 2, which shows the entire BSA. Measurements of Federal and State jurisdictional areas mapped during the course of the field investigation were determined by a combination of direct measurements taken in the field and measurements taken from aerial photographs. The OHWM was determined through direct observation of indicators such as water staining, scouring, and shelving.

During the 2013 and 2015 field investigations, the BSA was surveyed for areas supporting species of plant life potentially indicative of wetlands according to routine wetland delineation procedures described in the Regional Supplement. No areas of potential wetland jurisdiction were observed within the BSA; therefore, soil sample plots were not required. A formal delineation was conducted for work conducted for the jurisdictional delineation of SR-91 CIP (LSA 2009). At that time soil pits would also have been dug if needed to examine the soil profile and hydrological conditions; any surface inundation, saturated soils, groundwater levels, and/or other wetland hydrology indicators were noted. Hydrological conditions, including surface inundation, saturated soils, groundwater levels, and/or other wetland hydrology indicators were noted. General site characteristics were also noted.

## RESULTS

### USACE Jurisdiction

**Nexus to Navigable Waters.** All channelized storm water from the proposed project area eventually discharges into the Santa Ana River (Figure 1). The Santa Ana River is situated within the 1,840-square mile Santa Ana River Hydrologic Unit (SARHU). The SARHU lies within Orange, San Bernardino, and Riverside Counties. The Santa Ana River extends approximately 96 mi from its headwaters in the San Bernardino Mountains, to where it drains into the Pacific Ocean between the south end of Huntington Beach State Beach and the north end of Newport Beach. In the vicinity of the BSA, the Santa Ana River parallels SR-91 and then roughly State Route 55 (SR-55) through the cities of Yorba Linda, Anaheim, Orange, Fountain Valley, Costa Mesa, and Huntington Beach. The Santa Ana River, a traditional navigable water (TNW), meets the Pacific Ocean approximately 25 mi downstream from the study area.

**Potential and Approved Non-Jurisdictional Nonwetland Waters of the U.S.** Some of the drainage features within the study area are composed of a mixture of natural earthen bottoms and concrete or riprap-lined channels. All of these drainages have been altered in some form or are wholly human-made. According to USACE guidance, drainage features may be excluded from Federal Clean Water

Act (CWA) jurisdiction if they are excavated wholly in and drain only upland areas and do not carry Relatively Permanent Water (RPW), or they are low-volume swales.

Three drainage systems (Drainage Features 1, 2, and 7) within the project limits are likely non-jurisdictional under the USACE since the USACE typically does not assert jurisdiction over nontidal drainage and ditches that are excavated on dry land, drain adjacent upland areas, and do not convey relatively permanent flow. Drainage Features 1 (asphalt-lined swale), 2 (riprap-lined treatment pond/basin including two concrete v-ditches and two erosion rills), and 7 (concrete v-ditch) appear to have been created on dry land as part of the original permitted construction of SR-241 to drain the road surface and adjacent upland areas and do not convey relatively permanent flow. Therefore, it is expected that the USACE will not assert jurisdiction over these drainages. Furthermore, per 33 CFR Section 328.3, waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m), which also meet the criteria of this definition) are not waters of the United States. Additionally, none of these potentially non-jurisdictional waters within the project limits would satisfy USACE wetland criteria should the USACE assert jurisdiction.

One drainage system (Drainage Features 8) is part of an approved determination by the USACE, whereby, Drainage Features 8 has been determined to be a non-jurisdictional drainage feature.

**Potential Jurisdictional Nonwetland Waters of the U.S.** There are five drainages (Drainage Features 3, 4, 5, 6, and 9)<sup>1</sup> where potential USACE jurisdictional nonwetland waters occur because they fit the criteria of being waters of the U.S. but did not meet the three USACE criteria for wetland determination.

No wetland waters were observed within the project limits that met the USACE three-parameter hydrophytic vegetation, hydric soils, and wetland hydrology requirements. As shown below in Table B, a total of 1.20 acres (Drainages 3, 4, 5, and 6) meet the USACE requirements of jurisdictional waters of the U.S., while non-jurisdictional drainage features (Drainage Features 1, 2, and 7) total approximately 2,733 linear ft (0.52 mi), in addition to approved non-jurisdictional Drainage Feature 8 (44.6 linear ft).

Table B shows the total potential USACE jurisdictional and non-jurisdictional areas within the project area.

**Table B: Potential USACE Jurisdictional and Non-Jurisdictional Areas**

Total Potential Jurisdictional Areas (significant nexus determination required)	1.20 acres
Total Potential Non-Jurisdictional Length	2,733 linear feet*
Total Approved Non-Jurisdictional Length (Drainage Feature 8)	44.6 linear feet*

\* Linear feet are provided since a definable OHWM was not visible on the concrete-lined drainages (e.g., v-ditches); therefore, acreage could not be determined.

<sup>1</sup> Drainage Feature 9 is outside, but adjacent to the study area. The length and area are *not* included in the calculations.

## CDFW Jurisdiction

All the areas satisfying the USACE jurisdictional criteria for Waters of the U.S. (Drainage Features 3, 4, 5, 6, and 9)<sup>1</sup> are also subject to CDFW jurisdiction pursuant to Section 1602 of the California Fish and Game Code. Drainages believed not to be jurisdictional by the USACE but have an earthen bottom and some vegetation are believed to have some minimal value to wildlife and are likely subject to jurisdiction of the CDFW. In addition, streambed banks extending beyond the limits of USACE jurisdiction are considered subject to CDFW jurisdiction. There were no areas within the BSA where riparian vegetation, potentially considered subject to CDFW jurisdiction, extended beyond the streambed banks. Drainages believed to be not jurisdictional by the USACE and that lack riparian vegetation, are concrete-lined, show an absence of any aquatic or terrestrial wildlife, and do not function as a river, lake, or stream are also not likely to be considered jurisdictional by the CDFW.

As shown in Table C, the total acreage of potential CDFW jurisdiction within the BSA is 2.37 acres (Drainage Features 3, 4, 5, 6), which exceeds the total area delineated as USACE jurisdiction (i.e., 1.20 acres) by 1.17 acre. A total of 2.37 acres meet the CDFW requirements of jurisdictional waters, while non-jurisdictional drainage features (Drainage Features 1, 2, 7) total approximately 2,733 linear ft (0.52 mi); in addition to USACE-approved non-jurisdictional Drainage Feature 8 (44.6 linear ft). The extent of potential CDFW jurisdictional areas is shown in Appendix B.

**Table C: Potential CDFW Jurisdictional and Non-Jurisdictional Areas**

Total Potential Jurisdictional Areas	2.37 acres
Total Potential Non-Jurisdictional Length	2,733 linear feet*
Total Approved Non-Jurisdictional Length (Drainage Feature 8)	44.6 linear feet*

\* Linear feet are provided since a definable OHWM was not visible on the concrete-lined drainages (e.g., v-ditches); therefore, acreage could not be determined.

## RWQCB Jurisdiction

Since there is no public guidance on determining Regional Water Quality Control Board (RWQCB) jurisdictional areas, jurisdiction was determined based on the Federal definition of wetlands (three-parameter) and other waters of the U.S. (i.e., OHWM) as recommended by the September 2004 Workplan (SWRCB 2004). Since there are areas within the BSA subject to USACE jurisdiction, RWQCB jurisdiction in this case is coincident with USACE jurisdiction for purposes of Section 401 certification; therefore, the total area of potential RWQCB jurisdiction is also 1.20 acres.

## CONCLUSIONS

In conclusion, Drainage Features 3, 4, 5, 6, and 9 (Drainage Feature 9 is adjacent to/outside the BSA) may be subject to potential USACE, RWQCB, and/or CDFW jurisdiction, but all other drainage features are either non-jurisdictional as already determined by the USACE (Drainage Features 8) or are likely non-jurisdictional because they have been excavated on dry land during the construction of

<sup>1</sup> Drainage Feature 9 is outside, but adjacent to the study area. The length and area are *not* included in the calculations.

SR-241 or SR-91 for the sole purpose of collecting sheet flow from upland areas or, in most cases, roadway runoff (Drainage Features 1, 2, and 7).

Appendix A includes figures showing the project location and locations of the potential jurisdictional areas, as well as representative site photos. Appendix B includes a table of drainage-specific information. Appendix C includes an analysis of the functions and values of each of the drainages.

The findings and conclusions presented in this report, including the location and extent of wetlands and other waters subject to regulatory jurisdiction, represent the professional opinion of the consultant biologists. These findings and conclusions should be considered preliminary until verified by the USACE and CDFW.

## REFERENCES

- California Department of Fish and Game, Environmental Services Division. 1994. A Field Guide to Lake and Streambed Alteration Agreements Sections 1600–1607 California Fish and Game Code.
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. United States Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Federal Interagency Committee for Wetland Delineation. 1989. Federal manual for identifying and delineating jurisdictional wetlands. United States Army Corps of Engineers, United States Environmental Protection Agency, United States Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative Technical publication. 76 pp. plus appendices.
- Hickman, J.C., ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley and Los Angeles, CA. 1,400 pp.
- Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California in cooperation with the California Department of Fish and Game.
- Knecht, A.A. 1971. Soil Survey of Western Riverside Area, California. United States Department of Agriculture, Soil Conservation Service, and United States Department of the Interior, Bureau of Indian Affairs in Cooperation with University of California Agricultural Experiment Station.
- LSA Associates, Inc. (LSA) 2009. Jurisdictional Delineation Report, State Route 91 Corridor Improvement Project, Orange and Riverside Counties, California; ORA-91-R14.53/R18.91, RIV-91-R0.00/R13.04, RIV-15-R35.64/R45.14; EA 0F540. November. Prepared for Caltrans.
- Munsell Color. 2000 (rev. ed.). *Munsell Soil Color Charts*. Macbeth Division of Kollmorgen Instruments Corporation, New Windsor, NY.

- NETRonline. 1946. Historic Aerials. Accessed December 21, 2011. <http://www.historicaerials.com/aerials.php?scale=3&lon=-117.8634868986703&lat=33.696832161912&year=1946>.
- Reed, P.B., Jr. 1988. National List of Plant Species that Occur in Wetlands: California (Region 0). United States Fish and Wildlife Service Biological Report 88(26.10). 135 pp.
- Reed, P.B., Jr. 1997. Revision of the National List of Plant Species that Occur in Wetlands. United States Fish and Wildlife Service, Washington, D.C. viii + 462 pp.
- Soil Conservation Service. 1987. Hydric Soils of the United States. United States Department of Agriculture, Washington, D.C.
- Soil Survey Staff. 1975. Soil taxonomy. Agriculture Handbook No. 436. United States Government Printing Office, Washington, D.C. 754 pp.
- State Water Resources Control Board (SWRCB). 2004. Workplan: Filling the Gaps in Wetland Protection. September.
- Supreme Court of the United States. June 19, 2006. Opinion of Scalia, J.: John A. Rapanos, et al., Petitioners 04-1034 v. United States; June Carabell et al., Petitioners 04-1384 v. United States Army Corps of Engineers et al. On Writs of Certiorari to the United States Court of Appeals for the Sixth Circuit.
- United States Army Corps of Engineers. 1991. CECW-OR Memorandum: Questions and answers on the 1987 Manual.
- United States Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).
- United States Army Corps of Engineers. June 5, 2007. Memorandum: Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States & Carabell v. United States*.
- United States Army Corps of Engineers. December 2, 2008. Memorandum: Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States & Carabell v. United States*.
- United States Army Corps of Engineers. 1992. CECW-OR Memorandum: Clarification and interpretation of the 1987 Manual.
- United States Department of Agriculture Natural Resource Conservation Service. 2003. Field Indicators of Hydric Soils in the United States, Version 5.01. G.W. Hurt, P.M. Whited, and R.F. Pringle (eds.) USDA NRCS in cooperation with the National Technical Committee for Hydric Soils, Fort Worth, TX.
- United States Department of Agriculture Natural Resource Conservation Service. 2005. Soils, Soil Use, Hydric Soils. <http://soils.usda.gov/use/hydric>.

Western Regional Climate Center. 2014. Cooperative Climatological Data Summaries. Yorba Linda data collection location. Accessed February 20, 2014. <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9847>.

## APPENDIX A

### FIGURES

Figure 1: Project Location

Figure 2: Location of Jurisdictional Waters

Figure 3: Representative Site Photographs



LEGEND

- Project Location
- Advance Signage Areas Only (FasTrak)



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FEET

SOURCE: USGS 7.5' Quad - Black Star Canyon (1988), CA  
I:\ARBF1101\GIS\ProjectLocation.mxd (5/18/2015)

FIGURE 1

SR-241/SR-91 Express Lanes Connector  
Project Location



LEGEND

Biological Study Area

Proposed Roadway

Proposed Bridge Structure

Proposed Retaining Wall

Proposed Grading Limits (Slope and Access Road)

Advance Signage Areas

Proposed Right-of-Way

Existing Caltrans Right-of-Way

Drainage Feature (with ID#)

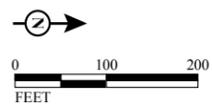
CDFW Jurisdiction

USACE Jurisdiction

Potential Jurisdictional Nonwetland Waters

Potential Nonjurisdictional Nonwetland Waters

Approved Nonjurisdictional Nonwetland Waters



SOURCE: Bing Maps (2012); RBF (12/2014)  
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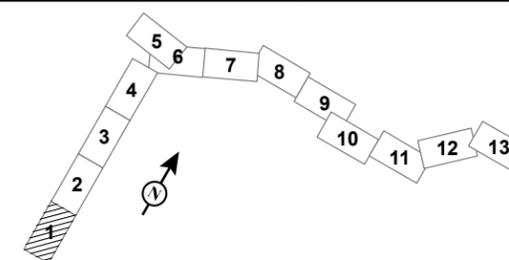


FIGURE 2  
Sheet 1 of 13

SR-241/SR-91 Express Lanes Connector  
Location of Jurisdictional Waters

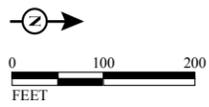


LEGEND

-  Biological Study Area
-  Proposed Roadway
-  Proposed Bridge Structure
-  Proposed Retaining Wall
-  Proposed Grading Limits (Slope and Access Road)

-  Advance Signage Areas
-  Proposed Right-of-Way
-  Existing Caltrans Right-of-Way
-  Drainage Feature (with ID#)
-  CDFW Jurisdiction

- USACE Jurisdiction
-  Potential Jurisdictional Nonwetland Waters
  -  Potential Nonjurisdictional Nonwetland Waters
  -  Approved Nonjurisdictional Nonwetland Waters



SOURCE: Bing Maps (2012); RBF (12/2014)  
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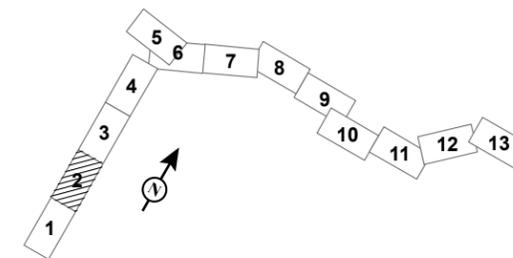


FIGURE 2  
 Sheet 2 of 13

SR-241/SR-91 Express Lanes Connector  
 Location of Jurisdictional Waters

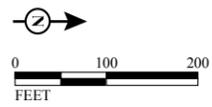


LEGEND

-  Biological Study Area
-  Proposed Roadway
-  Proposed Bridge Structure
-  Proposed Retaining Wall
-  Proposed Grading Limits (Slope and Access Road)

-  Advance Signage Areas
-  Proposed Right-of-Way
-  Existing Caltrans Right-of-Way
-  Drainage Feature (with ID#)
-  CDFW Jurisdiction

- USACE Jurisdiction
-  Potential Jurisdictional Nonwetland Waters
  -  Potential Nonjurisdictional Nonwetland Waters
  -  Approved Nonjurisdictional Nonwetland Waters



SOURCE: Bing Maps (2012); RBF (12/2014)  
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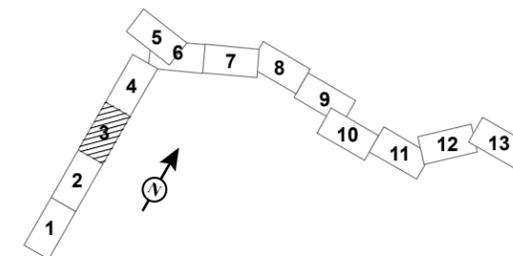
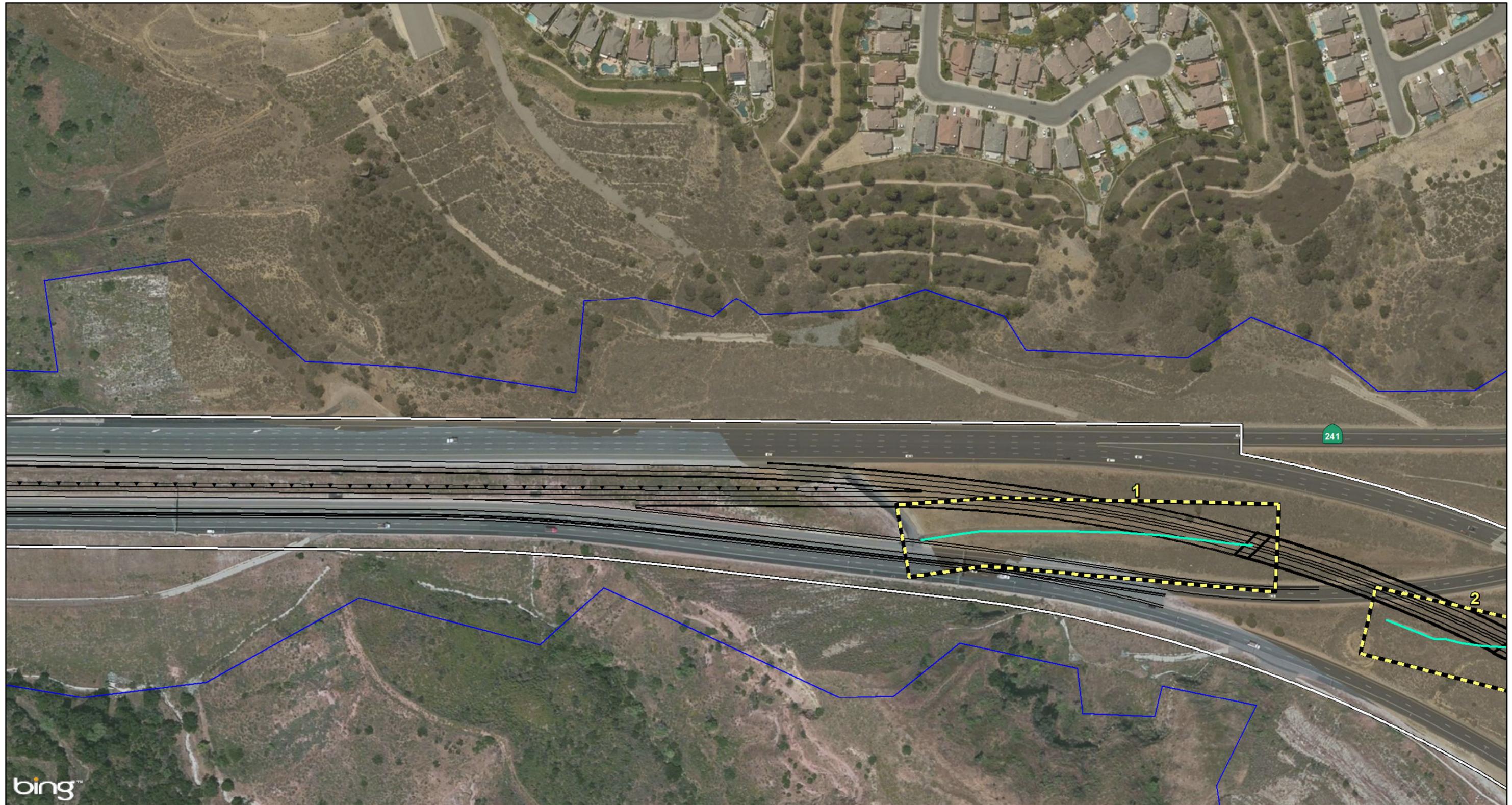


FIGURE 2  
 Sheet 3 of 13

SR-241/SR-91 Express Lanes Connector  
 Location of Jurisdictional Waters



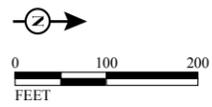
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LEGEND

-  Biological Study Area
-  Proposed Roadway
-  Proposed Bridge Structure
-  Proposed Retaining Wall
-  Proposed Grading Limits (Slope and Access Road)

-  Advance Signage Areas
-  Proposed Right-of-Way
-  Existing Caltrans Right-of-Way
-  Drainage Feature (with ID#)
-  CDFW Jurisdiction

- USACE Jurisdiction
-  Potential Jurisdictional Nonwetland Waters
  -  Potential Nonjurisdictional Nonwetland Waters
  -  Approved Nonjurisdictional Nonwetland Waters



SOURCE: Bing Maps (2012); RBF (12/2014)  
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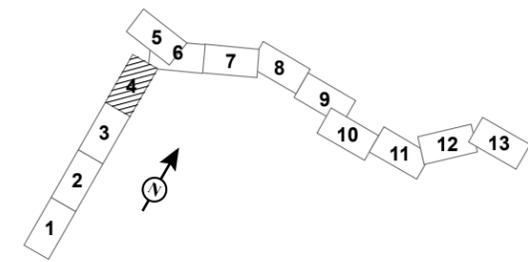


FIGURE 2  
 Sheet 4 of 13

SR-241/SR-91 Express Lanes Connector  
 Location of Jurisdictional Waters



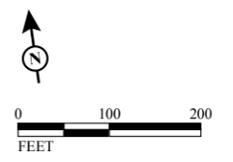
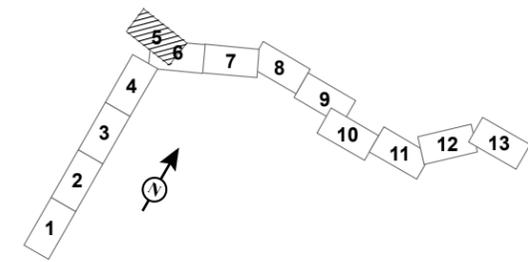
FIGURE 2  
Sheet 5 of 13

LEGEND

- Biological Study Area
- Proposed Roadway
- Proposed Bridge Structure
- Proposed Retaining Wall
- Proposed Grading Limits (Slope and Access Road)

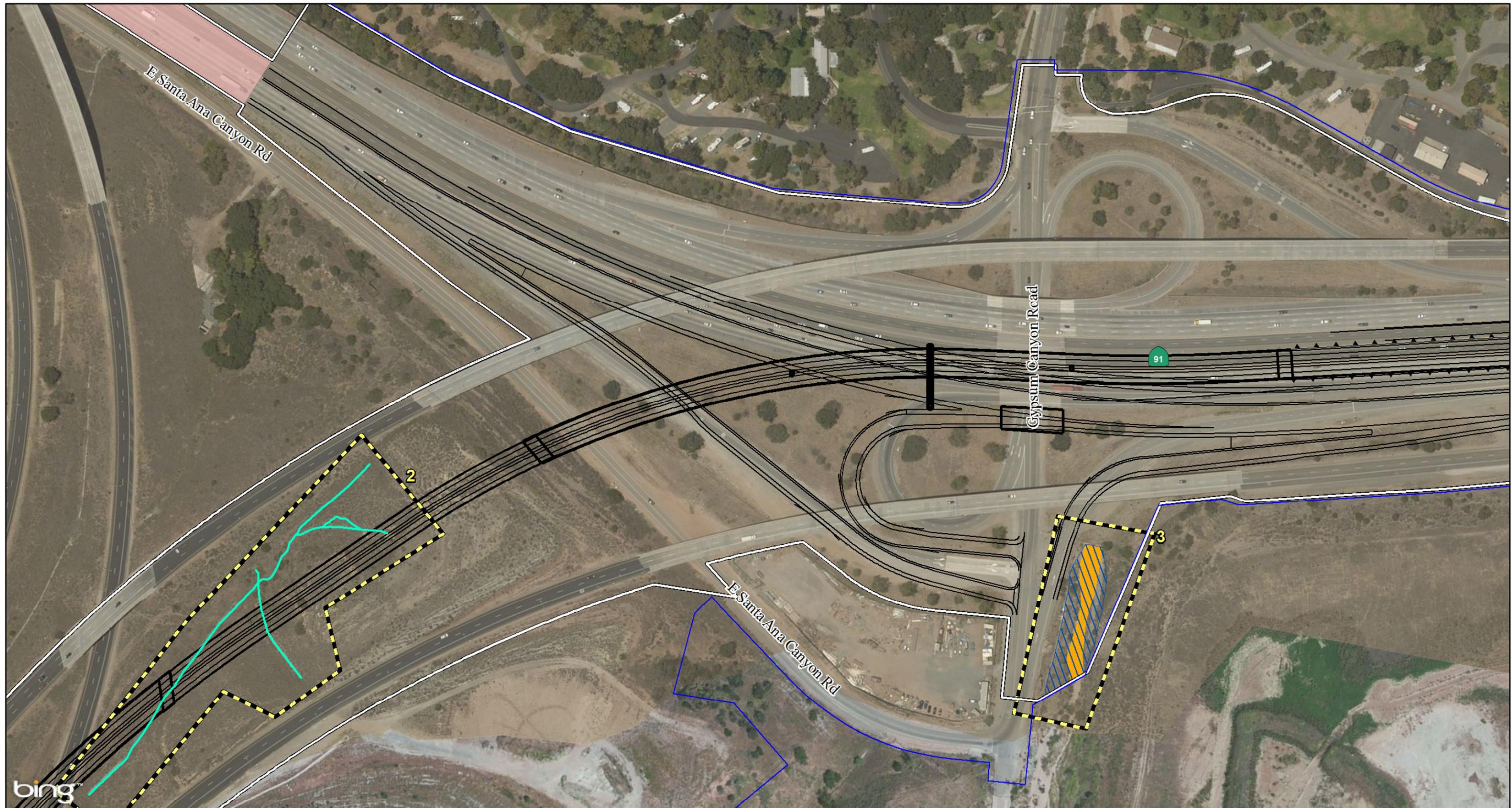
- Advance Signage Areas
- Proposed Right-of-Way
- Existing Caltrans Right-of-Way
- Drainage Feature (with ID#)
- CDFW Jurisdiction

- USACE Jurisdiction
- Potential Jurisdictional Nonwetland Waters
  - Potential Nonjurisdictional Nonwetland Waters
  - Approved Nonjurisdictional Nonwetland Waters



SOURCE: Bing Maps (2012); RBF (12/2014)  
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SR-241/SR-91 Express Lanes Connector  
Location of Jurisdictional Waters



LEGEND

- Biological Study Area
- Proposed Roadway
- Proposed Bridge Structure
- Proposed Retaining Wall
- Proposed Grading Limits (Slope and Access Road)

- Advance Signage Areas
- Proposed Right-of-Way
- Existing Caltrans Right-of-Way
- Drainage Feature (with ID#)
- CDFW Jurisdiction

- USACE Jurisdiction**
- Potential Jurisdictional Nonwetland Waters
- Potential Nonjurisdictional Nonwetland Waters
- Approved Nonjurisdictional Nonwetland Waters

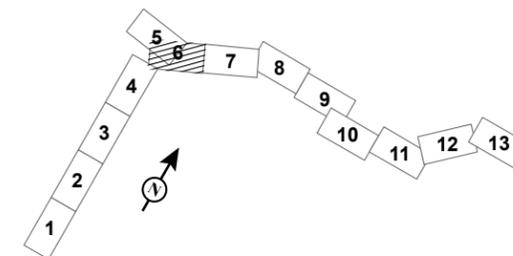
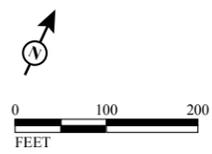


FIGURE 2  
Sheet 6 of 13



SOURCE: Bing Maps (2012); RBF (12/2014)  
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SR-241/SR-91 Express Lanes Connector  
Location of Jurisdictional Waters



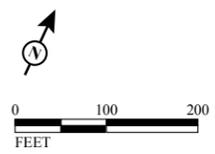
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LEGEND

- Biological Study Area
- Proposed Roadway
- Proposed Bridge Structure
- Proposed Retaining Wall
- Proposed Grading Limits (Slope and Access Road)

- Advance Signage Areas
- Proposed Right-of-Way
- Existing Caltrans Right-of-Way
- Drainage Feature (with ID#)
- CDFW Jurisdiction

- USACE Jurisdiction**
- Potential Jurisdictional Nonwetland Waters
- Potential Nonjurisdictional Nonwetland Waters
- Approved Nonjurisdictional Nonwetland Waters



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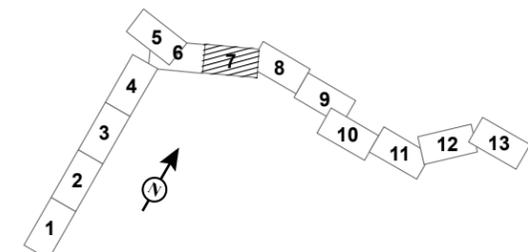


FIGURE 2  
Sheet 7 of 13

SR-241/SR-91 Express Lanes Connector  
Location of Jurisdictional Waters



LEGEND

- Biological Study Area
- Proposed Roadway
- Proposed Bridge Structure
- Proposed Retaining Wall
- Proposed Grading Limits (Slope and Access Road)

- Advance Signage Areas
- Proposed Right-of-Way
- Existing Caltrans Right-of-Way
- Drainage Feature (with ID#)
- CDFW Jurisdiction

- USACE Jurisdiction
- Potential Jurisdictional Nonwetland Waters
  - Potential Nonjurisdictional Nonwetland Waters
  - Approved Nonjurisdictional Nonwetland Waters

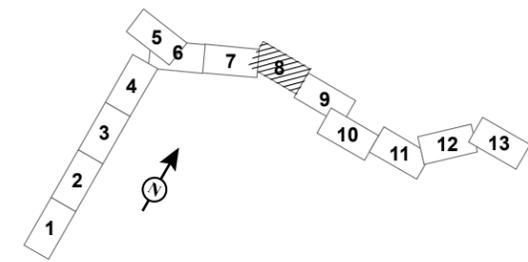


FIGURE 2  
Sheet 8 of 13

SOURCE: Bing Maps (2012); RBF (12/2014)  
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SR-241/SR-91 Express Lanes Connector  
Location of Jurisdictional Waters



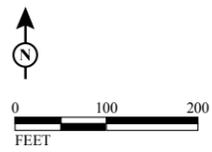
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LEGEND

- Biological Study Area
- Proposed Roadway
- Proposed Bridge Structure
- Proposed Retaining Wall
- Proposed Grading Limits (Slope and Access Road)

- Advance Signage Areas
- Proposed Right-of-Way
- Existing Caltrans Right-of-Way
- Drainage Feature (with ID#)
- CDFW Jurisdiction

- USACE Jurisdiction**
- Potential Jurisdictional Nonwetland Waters
- Potential Nonjurisdictional Nonwetland Waters
- Approved Nonjurisdictional Nonwetland Waters



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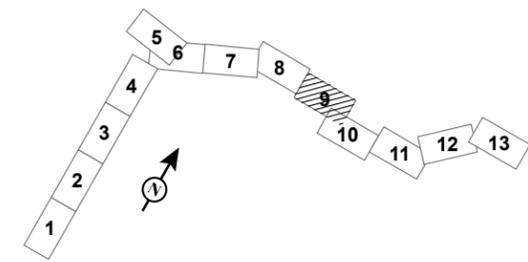


FIGURE 2  
 Sheet 9 of 13

SR-241/SR-91 Express Lanes Connector  
 Location of Jurisdictional Waters



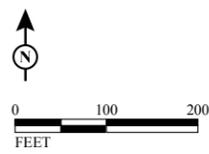
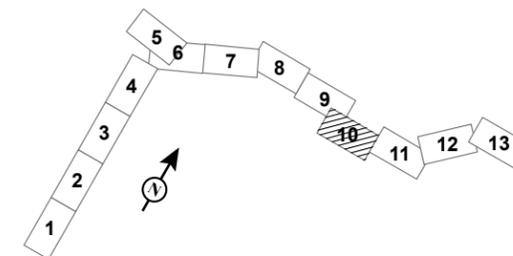
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LEGEND

-  Biological Study Area
-  Proposed Roadway
-  Proposed Bridge Structure
-  Proposed Retaining Wall
-  Proposed Grading Limits (Slope and Access Road)

-  Advance Signage Areas
-  Proposed Right-of-Way
-  Existing Caltrans Right-of-Way
-  Drainage Feature (with ID#)
-  CDFW Jurisdiction

- USACE Jurisdiction
-  Potential Jurisdictional Nonwetland Waters
-  Potential Nonjurisdictional Nonwetland Waters
-  Approved Nonjurisdictional Nonwetland Waters



SOURCE: Bing Maps (2012); RBF (12/2014)  
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FIGURE 2  
 Sheet 10 of 13

SR-241/SR-91 Express Lanes Connector  
 Location of Jurisdictional Waters



**LEGEND**

Biological Study Area	Advance Signage Areas	<b>USACE Jurisdiction</b>
Proposed Roadway	Proposed Right-of-Way	Potential Jurisdictional Nonwetland Waters
Proposed Bridge Structure	Existing Caltrans Right-of-Way	Potential Nonjurisdictional Nonwetland Waters
Proposed Retaining Wall	Drainage Feature (with ID#)	Approved Nonjurisdictional Nonwetland Waters
Proposed Grading Limits (Slope and Access Road)	CDFW Jurisdiction	

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SOURCE: Bing Maps (2012); RBF (12/2014)  
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**FIGURE 2**  
Sheet 11 of 13

*SR-241/SR-91 Express Lanes Connector*  
Location of Jurisdictional Waters

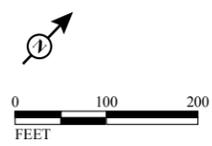


LEGEND

- Biological Study Area
- Proposed Roadway
- Proposed Bridge Structure
- Proposed Retaining Wall
- Proposed Grading Limits (Slope and Access Road)

- Advance Signage Areas
- Proposed Right-of-Way
- Existing Caltrans Right-of-Way
- Drainage Feature (with ID#)
- CDFW Jurisdiction

- USACE Jurisdiction
- Potential Jurisdictional Nonwetland Waters
  - Potential Nonjurisdictional Nonwetland Waters
  - Approved Nonjurisdictional Nonwetland Waters



SOURCE: Bing Maps (2012); RBF (12/2014)  
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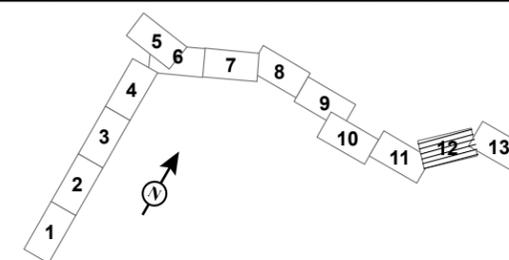


FIGURE 2  
 Sheet 12 of 13

SR-241/SR-91 Express Lanes Connector  
 Location of Jurisdictional Waters

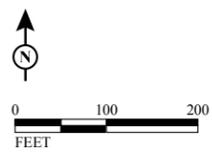


LEGEND

- Biological Study Area
- Proposed Roadway
- Proposed Bridge Structure
- Proposed Retaining Wall
- Proposed Grading Limits (Slope and Access Road)

- Advance Signage Areas
- Proposed Right-of-Way
- Existing Caltrans Right-of-Way
- Drainage Feature (with ID#)
- CDFW Jurisdiction

- USACE Jurisdiction
- Potential Jurisdictional Nonwetland Waters
  - Potential Nonjurisdictional Nonwetland Waters
  - Approved Nonjurisdictional Nonwetland Waters



SOURCE: Bing Maps (2012); RBF (12/2014)  
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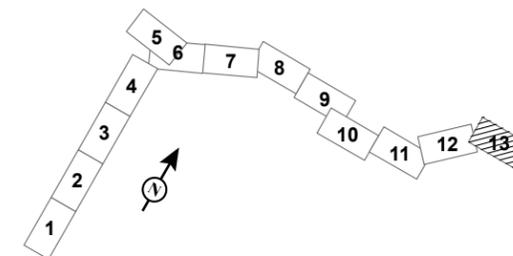


FIGURE 2  
 Sheet 13 of 13

SR-241/SR-91 Express Lanes Connector  
 Location of Jurisdictional Waters



**A.** Likely non-jurisdictional asphalt swale in uplands used to convey road runoff from northbound SR-241 (Location 1).



**B.** Likely non-jurisdictional v-ditch in uplands used to convey road runoff from northbound SR-241 (Location 2).



**C.** Likely non-jurisdictional v-ditches and riprap water treatment basin excavated in uplands collects runoff from SR-241. Outflows under SR-241 and then SR-91 (Location 2).



**D.** View looking downstream of Gypsum Canyon Creek (likely jurisdictional) before it passes under SR-91 (Location 3).

**FIGURE 3**  
(Page 1 of 2)



**E.** A 48-inch culvert used to convey road runoff from likely jurisdictional drainage feature (Location 4).



**F.** View looking south at likely jurisdictional nonwetland drainage area (Location 6).



**G.** Likely non-jurisdictional v-ditch excavated in uplands (toe-of-slope) used to convey road runoff from eastbound SR-91 (Location 7).



**H.** Approved non-jurisdictional nonwetland drainage feature (Location 8).

**FIGURE 3**  
(Page 2 of 2)

**APPENDIX B**

**TABLE OF POTENTIAL USACE AND CDFW JURISDICTIONAL  
AND NON-JURISDICTIONAL AREAS**

**Table B-1: Potential USACE and CDFW Jurisdictional and Non-Jurisdictional Areas**

Drainage Feature Number	Start Coordinates	End Coordinates	Linear Feet	Hydrologic Regime	USACE			CDFW		RWQCB		Nearest RPW <sup>2</sup>	Connection to RPW	Approximate Distance to RPW (miles)	Flow Route to RPW	Width (feet)	Depth Estimate (feet)	Side Slope Estimate	Primary Substrate	Hydrologic Indicators	Chemical Characteristics	Biological Characteristics	Comments	
					Likely Jurisdictional Status <sup>1</sup>	Potential Non-Wetland Waters (acres)	Potential Wetland Waters (acres)	Total Potential Area (acres)	Likely Jurisdictional Status	Total Potential Area (acres)	Likely Jurisdictional Status													Total Potential Area (acres)
1	33.859397, -117.716719	33.861334, -117.716692	712.1	Ephemeral	Non-Jurisdictional	0.000	0.000	0.000	Non-Jurisdictional	0.000	Non-Jurisdictional	0.000	Santa Ana River	Direct	Less than 1	Culvert under SR-91	12	Less than 1	5:1	Asphalt	Water staining	Unknown	Upland ruderal vegetation adjacent	
2	33.86215, -117.716184	33.864608, -117.71546	1436.8	Ephemeral	Non-Jurisdictional	0.000	0.000	0.000	Non-Jurisdictional	0.000	Non-Jurisdictional	0.000	Santa Ana River	Direct	Less than 1	Culvert under SR-91	4-46	Less than 1	1:1, 4:1	Concrete/riprap/sand/loam	Shelving, scouring	Unknown	Mule Fat Scrub	Carries/Collects roadway runoff from SR-241 into water treatment basin
3	33.865259, -117.710289	33.866032, -117.710587	288.2	Ephemeral	*Jurisdictional	0.200	0.000	0.200	Jurisdictional	0.520	Jurisdictional	0.200	Santa Ana River	Direct	Less than 1	Culvert under SR-91	19-40	2	2:1	Sand/cobbles	Shelving, scouring	Unknown	Mule Fat Scrub	
4	33.868452, -117.706383	33.870656, -117.70197	1435.9	Ephemeral	*Jurisdictional	0.838	0.000	0.838	Jurisdictional	1.455	Jurisdictional	0.838	Santa Ana River	Direct	Less than 1	Culvert under SR-91	5-86	3	3:1	Sand/cobbles/asphalt	Scouring, clear line on bank	Unknown	Mule Fat/Elderberry Scrub	
5	33.869379, -117.70011	33.870702, -117.701246	97.5	Ephemeral	*Jurisdictional	0.070	0.000	0.070	Jurisdictional	0.070	Jurisdictional	0.070	Santa Ana River	Direct	Less than 1	Culvert under SR-91	2	Less than 1	1:1	Sand/cobbles	Shelving, scouring	Unknown	Upland ruderal vegetation and Coastal Sage Scrub	
6	33.871932, -117.69727	33.872845, -117.696855	122.5	Ephemeral	*Jurisdictional	0.090	0.000	0.090	Jurisdictional	0.120	Jurisdictional	0.090	Santa Ana River	Direct	Less than 1	Culvert under SR-91	3-35	2	2:1	Sand/loam	Shelving, scouring	Unknown	Mule Fat/Elderberry Scrub	
7	33.872409, -117.689533	33.872726, -117.691172	526.0	Ephemeral	Non-Jurisdictional	0.000	0.000	0.000	Non-Jurisdictional	0.000	Non-Jurisdictional	0.000	Santa Ana River	Direct	Less than 1	Culvert under SR-91	4	2	3:1	Concrete	Water staining	Unknown	Upland ruderal vegetation adjacent	
8	33.87191, -117.688225	33.871591, -117.687599	44.6	Ephemeral	Approved Non-Jurisdictional	0.000	0.000	0.000	Non-Jurisdictional	0.000	Non-Jurisdictional	0.000	Santa Ana River	Direct	Less than 1	Culvert under SR-91	3	Less than 1	None	Riprap	Poorly defined OHWM	Unknown	Upland ruderal vegetation adjacent	Newly constructed for SR-91 CIP
9 (Coal Canyon) <sup>3</sup>	33.870007, -117.688049	33.87153, -117.687909	N/A	Ephemeral	*Jurisdictional	N/A	N/A	N/A	Jurisdictional	N/A	Jurisdictional	N/A	Santa Ana River	Direct	Less than 1	Culvert under SR-91	19-22	2	1:1	Sand/cobbles/concrete	Shelving, scouring, change in plant community	Unknown	Coastal Sage Scrub, Mule Fat Scrub	
<b>TOTAL</b>						<b>1.198</b>	<b>0.000</b>	<b>1.198</b>		<b>2.165</b>		<b>1.198</b>												

Note: All drainages are in Orange County.

Coordinates are provided in latitude/longitude.

\* Potential USACE waters that require a significant nexus determination.

<sup>1</sup> Drainages that are not likely to be jurisdictional include those that are poorly defined, are concrete ditches, or are small erosional features.

<sup>2</sup> The portion of the Santa Ana River adjacent to the project area is approximately 25 river miles from tidal waters. To the north and west of the project area, the river contains relatively permanent perennial flow and has a sandy bottom as far downstream as the I-5 freeway. The river is mostly contained within concrete-lined channels to the west of I-5, although sediment buildup downstream of I-405 has allowed for the growth of lush riparian vegetation between the freeway and the zone of tidal influence.

<sup>3</sup> Drainage Feature 9 (Coal Canyon) is immediately adjacent to the east end of the proposed project, but is outside of the study area and proposed project impacts.

CDFW = California Department of Fish and Wildlife

I-405 = Interstate 405

I-5 = Interstate 5

N/A = not applicable

OHWM = ordinary high water mark

RPW = Relatively Permanent Water

RWQCB = Regional Water Quality Control Board

SR-91 = State Route 91

USACE = United States Army Corps of Engineers

**APPENDIX C**

**ANALYSIS OF FUNCTIONS AND VALUES OF WETLANDS  
AND OTHER WATERS**

## ANALYSIS OF FUNCTIONS AND VALUES OF WETLANDS AND OTHER WATERS

The following is a qualitative assessment of the functions and values attributable to the identified wetlands and other potential jurisdictional waters in the BSA. All wetlands and other waters have some degree of functionality, and no single wetland can perform all of the functions considered below. The following functions are analyzed at low, moderate, or high value levels. Each individual drainage is analyzed in Table C-1 (following) based on the criteria outlined below.

**Hydrologic Regime.** This function is the ability of a wetland or stream to absorb and store water belowground. The degree of this saturation is dependent on the soil composition and is affected by prior flooding events. For example, clay soils possess more pore space than sandy soils. However, the smaller pore size slows the rate at which water is absorbed and released; therefore, clay soil has a lower capacity to store water than sandy soils. The storage of water belowground allows for the fluctuation between anaerobic and aerobic conditions that benefit environmental conditions necessary for microbial cycling.

**Flood Storage and Flood Flow Modification.** This function is determined based on the ability of a wetland or stream at which the peak flow in a watershed can be attenuated during major storm events and during peak domestic flows to take in surface water that may otherwise cause flooding. This is dependent on the size of the wetland or stream, the amount of water it can hold, and the location in the watershed. For instance, larger wetlands or streams that have a greater capacity to receive waters have a greater ability to reduce flooding. In addition, areas high in the watershed may have more ability to reduce flooding in downstream areas, but areas lower in the watershed may have greater benefits to a specific area. Vegetation, shape, and the configuration of the wetland or stream may also affect flood storage by dissipating the energy of flows during flood events.

**Sediment Retention.** Removal of sediment is the process that keeps sediments from migrating downstream. This is accomplished through the natural process of sediment retention and entrapment. This function is dependent on the sediment load being delivered by runoff into the watershed. Similar to above, the vegetation, shape, and configuration of a wetland will also affect sediment retention if water is detained for long durations, as would be the case with dense vegetation, a bowl-shaped watershed, or slow-moving water. This function would be demonstrated (i.e., high) if the turbidity of the incoming water is greater than that of the outgoing water.

**Nutrient Retention and Transformation.** Nutrient cycling consists of two variables: uptake of nutrients by plants and detritus turnover, in which nutrients are released for uptake by plants downstream. Wetland systems in general are much more productive with regard to nutrients than upland habitats. The regular availability of water associated with the wetland or stream may cause the

growth of plants (nutrient uptake) and associated detritivores and generate nutrients that may be utilized by a variety of aquatic and terrestrial wildlife downstream.

**Toxicant Trapping.** The major processes by which wetlands remove nutrients and toxicants are as follows: (1) by trapping sediments rich in nutrients and toxicants, (2) by absorption to soils high in clay content or organic matter, and (3) through nitrification and denitrification in alternating oxic and anoxic conditions. Removal of nutrients and toxicants is closely tied to the processes that provide for sediment removal.

**Social Significance.** This is a measure of the probability that a wetland or stream will be utilized by the public because of its natural features, economic value, official status, and/or location. This includes its being utilized by the public for recreational uses, such as boating, fishing, birding, walking, and other passive recreational activities. In addition, a wetland or stream that is utilized as an outdoor classroom, is a location for scientific study, or is near a nature center would have a higher social significance standing.

**Wildlife Habitat.** General habitat suitability is the ability of a wetland to provide habitat for a wide range of wildlife. Vegetation is a large component of wildlife habitat. As plant community diversity increases along with connectivity with other habitats, so does potential wildlife diversity. In addition, a variety of open water, intermittent ponding, and perennial ponding is also an important habitat element for wildlife.

**Aquatic Habitat.** The ability of a wetland or stream to support aquatic species requires that there be ample food supply, pool and riffle complexes, and sufficient soil substrate. Food supply is typically in the form of aquatic invertebrates and detrital matter from nearby vegetation. Pool and riffle complexes provide a variety of habitats for species diversity as well as habitat for breeding and rearing activities. Species diversity is directly related to the complexity of the habitat structure.

**Table C-1: Functions and Values of Drainages within the Biological Study Area**

<b>Drainage</b>	<b>Hydrologic Regime</b>	<b>Flood Storage and Flood Flow Modification</b>	<b>Sediment Retention</b>	<b>Nutrient Retention and Transformation</b>	<b>Toxicant Trapping</b>	<b>Social Significance</b>	<b>Wildlife Habitat</b>	<b>Aquatic Habitat</b>
<b>1</b>	Low	Low	Low	Low	Low	Low	Low	Low
<b>2</b>	Low	Moderate	Low	Low	Low	Low	Low	Low
<b>3</b>	Low	Low	Low	Low	Low	Low	Low	Low
<b>4</b>	Low	Low	Low	Low	Low	Low	Low	Low
<b>5</b>	Low	High	Low	Low	Low	Low	Low	Low
<b>6</b>	Low	Low	Low	Low	Low	Low	Low	Low
<b>7</b>	Low	Low	Low	Low	Low	Low	Low	Low
<b>8</b>	Low	High	Low	Low	Low	Low	Low	Low
<b>9</b>	Low	Low	Low	Low	Low	Low	Low	Low