Appendix D

Biological Resources Assessment

Species Potential to Occur Table – Updated April 2021

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Plants and Lichens				
Abronia maritima red sand-verbena	None/None G4/S3? 4.2	Perennial herb. Blooms Feb-Nov. Occurs in coastal dunes of central and southern California, as well as the Channel Islands. Formerly fairly widespread, but available habitat has decreased, especially in Southern California. Under 100m (330ft).	None	Suitable habitat not present on site.
Amsinckia douglasiana Douglas' fiddleneck	None/None G4/S4 4.2 SBBG	Cismontane woodland, Valley and foothill grassland. Monterey shale, dry. 0 - 1950 m. annual herb. Blooms Mar-May	None	Suitable habitat and soils not present on site. No CNDDB records within 5 miles.
Anomobryum julaceum slender silver moss	None/None G5?/S2 4.2	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest. damp rock and soil on outcrops, usually on roadcuts. 100 - 1000 m. moss. Blooms	None	Suitable habitat not present on site.
Arctostaphylos refugioensis Refugio manzanita	None/None G3/S3 1B.2 SBBG	Chaparral (sandstone). 274 - 820 m. perennial evergreen shrub. Blooms Dec-Mar (May)	None	Suitable habitat not present on site.
Atriplex coulteri Coulter's saltbush	None/None G3/S1S2 1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub, Valley and foothill grassland. alkaline or clay. 3 - 460 m. perennial herb. Blooms Mar-Oct	Low	Marginal habitat present on site. Known CNDDB occurrence 2-miles east of site. Known from the Goleta Slough. Not detected during surveys.
Atriplex serenana var. *davidsonii* Davidson's saltscale	None/None G5T1/S1 1B.2	Annual herb. Blooms April to October. Coastal bluff scrub, coastal scrub. Alkaline soil. 3-250m (10-820ft).	Low	Marginal habitat present on site. Not detected during surveys.
Baccharis plummerae ssp. *plummerae* Plummer's baccharis	None/None G3T3/S3 4.3	Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub. rocky. 5 - 425 m. perennial deciduous shrub. Blooms May, Aug, Sep, Oct	None	Suitable habitat not present onsite.
Calandrinia breweri Brewer's calandrinia	None/None G4/S4 4.2 SBBG	Chaparral, Coastal scrub. sandy or loamy, disturbed sites and burns. 10 - 1220 m. annual herb. Blooms (Jan) Mar-Jun	None	Suitable habitat not present on site.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Calochortus catalinae Catalina mariposa lily	None/None G3G4/S3S4 4.2 SBBG	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. 15 - 700 m. perennial bulbiferous herb. Blooms (Feb) Mar-Jun	None	Suitable habitat not present on site.
Calochortus fimbriatus late-flowered mariposa lily	None/None G3/S3 1B.3 SBBG	Chaparral, Cismontane woodland, Riparian woodland. often serpentinite. 275 - 1905 m. perennial bulbiferous herb. Blooms Jun-Aug	None	Suitable habitat and serpentine soils not present on site.
Centromadia parryi ssp. *australis* southern tarplant	None/None G3T2/S2 1B.1 SBBG	Marshes and swamps (margins), Valley and foothill grassland (vernally mesic), Vernal pools. 0 - 480 m. annual herb. Blooms May-Nov	Low	No vernal pool habitat present on site, marginal habitat off-site in Los Camaros Wetland. Multiple CNDDB occurrences greater than 1 mile east, west and south of the site near water. Known from the Goleta Slough 0.5 mile south. Not detected during surveys.
Chorizanthe palmeri Palmer's spineflower	None/None G4/S4 4.2	Chaparral, Cismontane woodland, Valley and foothill grassland. rocky, serpentinite. 55 - 945 m. annual herb. Blooms Apr-Aug	None	Suitable habitat not present on site. Outside of elevation requirements.
Deinandra paniculata paniculate tarplant	None/None G4/S4 4.2	Coastal scrub, Valley and foothill grassland, Vernal pools. usually vernally mesic, sometimes sandy. 25 - 940 m. annual herb. Blooms (Mar) Apr-Nov (Dec)	None	Suitable habitat not present on site. Outside of elevation requirements.
Delphinium umbraculorum umbrella larkspur	None/None G3/S3 1B.3	Chaparral, Cismontane woodland. 400 - 1600 m. perennial herb. Blooms Apr-Jun	None	Suitable habitat not present on site. Outside of elevation requirements.
Erigeron sanctarum saints' daisy	None/None G3/S3 4.2	Chaparral, Cismontane woodland, Coastal scrub. 75 - 350 m. perennial rhizomatous herb. Blooms Mar-Jul	None	Suitable habitat not present on site. Outside of elevation requirements.
Eriogonum elegans elegant wild buckwheat	None/None G4G5/S4S5 4.3	Cismontane woodland, Valley and foothill grassland. Usually sandy or gravelly, often washes, sometimes roadsides. 200 - 1525 m. annual herb. Blooms May-Nov	None	Suitable habitat not present on site. Outside of elevation requirements.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Fritillaria ojaiensis Ojai fritillary	None/None G3/S3 1B.2 SBBG	Broadleafed upland forest (mesic), Chaparral, Cismontane woodland, Lower montane coniferous forest. rocky. 225 - 998 m. perennial bulbiferous herb. Blooms Feb-May	None	Suitable habitat not present on site. Outside of elevation requirements.
Galium cliftonsmithii Santa Barbara bedstraw	None/None G4/S4 4.3	Cismontane woodland. 200 - 1220 m. perennial herb. Blooms May-Jul	None	Suitable habitat not present on site. Outside of elevation requirements.
Horkelia cuneata var. *puberula* mesa horkelia	None/None G4T1/S1 1B.1	Perennial herb. Blooms February to September. Chaparral, cismontane woodland, coastal scrub. Sandy or gravelly sites. 70-810m (230-2655ft).	None	Suitable habitat not present on site. Outside of elevation requirements.
Juglans californica Southern California black walnut	None/None G4/S4 4.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland. alluvial. 50 - 900 m. perennial deciduous tree. Blooms Mar-Aug	None	Suitable habitat not present on site. Outside of elevation requirements.
Juncus acutus ssp. *leopoldii* southwestern spiny rush	None/None G5T5/S4 4.2	Coastal dunes (mesic), Meadows and seeps (alkaline seeps), Marshes and swamps (coastal salt). 3 - 900 m. perennial rhizomatous herb. Blooms (Mar) May-Jun	None	Suitable habitat not present on site.
Juncus luciensis Santa Lucia dwarf rush	None/None G3/S3 1B.2	Chaparral, Great Basin scrub, Lower montane coniferous forest, Meadows and seeps, Vernal pools. 300 - 2040 m. annual herb. Blooms Apr-Jul	None	Suitable habitat not present on site.
Lasthenia conjugens Contra Costa goldfields	FE/None G1/S1 1B.1	Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools. mesic. 0 - 470 m. annual herb. Blooms Mar-Jun	Low	Historical (1972) extirpated Project vicinity CNDDB record in on the Isla Vista bluffs. Marginal habitat present on site. Low potential to occur due to long history of disturbance. Not detected during surveys.
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	None/None G4T2/S2 1B.1 SBBG	Annual herb. Blooms February to June. Coastal salt marshes, playas, valley and foothill grassland, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands. 1-1400m (3-4595ft).	Low	Marginal grassland habitat present on site. Low potential to occur due to long history of disturbance. CNDDB (1982) occurrence 0.5 mile south of Project on opposite side of Hollister Avenue in the Goleta Slough.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Layia heterotricha pale-yellow layia	None/None G2/S2 1B.1 SBBG	Cismontane woodland, Coastal scrub, Pinyon and juniper woodland, Valley and foothill grassland. alkaline or clay. 300 - 1705 m. annual herb. Blooms Mar-Jun	Low	Marginal habitat present on site. Low potential to occur due to long history of disturbance. Not detected during surveys.
Lepechinia fragrans fragrant pitcher sage	None/None G3/S3 4.2	Chaparral. 20 - 1310 m. perennial shrub. Blooms Mar-Oct	None	Suitable habitat not present on site. Outside of elevation requirements.
Lonicera subspicata var. *subspicata* Santa Barbara honeysuckle	None/None G5T2?/S2? 1B.2	Chaparral, Cismontane woodland, Coastal scrub. 10 - 1000 m. perennial evergreen shrub. Blooms May-Aug (Dec-Feb)	Low	Marginal habitat present on site. Low potential to occur due to long history of disturbance. Not detected during surveys.
Malacothrix saxatilis var. *saxatilis* cliff malacothrix	None/None G5T4/S4 4.2	Coastal bluff scrub, Coastal scrub. 3 - 200 m. perennial rhizomatous herb. Blooms Mar-Sep	None	Suitable habitat not present on site.
Monardella hypoleuca ssp. *hypoleuca* white-veined monardella	None/None G4T3/S3 1B.3	Perennial herb. Blooms April to December. Chaparral, cismontane woodland. Dry slopes. 50-1525m (165-5005ft)	None	Suitable habitat not present on site. Outside of elevation requirements.
Pleuridium mexicanum Mexican earthmoss	None/None G5/S1 2B.1	Chaparral. Sandstone. 440 - 440 m. moss. Blooms	None	Suitable habitat not present on site. Outside of elevation requirements.
Scrophularia atrata black-flowered figwort	None/None G2?/S2? 1B.2	Closed-cone coniferous forest, Chaparral, Coastal dunes, Coastal scrub, Riparian scrub. 10 - 500 m. perennial herb. Blooms Mar-Jul	Low	Marginal habitat present on site. Low potential to occur due to long history of disturbance. Not detected during surveys.
Senecio astephanus San Gabriel ragwort	None/None G3/S3 4.3	Coastal bluff scrub, Chaparral. rocky slopes. 400 - 1500 m. perennial herb. Blooms May-Jul	None	Suitable habitat not present on site. Outside of elevation requirements.
Suaeda esteroa estuary seablite	None/None G3/S2 1B.2	Marshes and swamps (coastal salt). 0 - 5 m. perennial herb. Blooms (May) Jul-Oct (Jan)	None	Suitable habitat not present on site.
Thelypteris puberula var. *sonorensis* Sonoran maiden fern	None/None G5T3/S2 2B.2	Meadows and seeps (seeps and streams). 50 - 610 m. perennial rhizomatous herb. Blooms Jan-Sep	None	Suitable habitat not present on site. Outside of elevation requirements.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Thermopsis macrophylla Santa Ynez false lupine	None/SR G1/S1 1B.3 SBBG	Chaparral (sandy, granitic, disturbed areas). 425 - 1400 m. perennial rhizomatous herb. Blooms Apr-Jun	None	Suitable habitat not present on site. Outside of elevation requirements.
Invertebrates				
Bombus crotchii Crotch bumble bee	None/SCE G3G4/S1S2	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	Low	No CNDDB occurrences within five miles.
Danaus plexippus pop. 1 monarch - California overwintering population	None/None G4T2T3/S2S3	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	Low	No suitable habitat present. Eucalyptus trees are approximately 100 feet north of the Project site, but the monarch butterfly host and food plants are absent from the Project site. There are no historical reports of monarch butterflies using these trees for roosting aggregations. Plants that would serve as food sources for monarch butterflies are absent from within the Project site.
Tryonia imitator mimic tryonia (=California brackishwater snail)	None/None G2/S2	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinities.	None	Suitable habitat not present on site.
Fish				
Eucyclogobius newberryi tidewater goby	FE/None G3/S3	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.		No habitat present on site, or anticipated or in channelized Los Carneros Creek. Critical habitat off-site downstream in Creek, south of Hollister Avenue.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Oncorhynchus mykiss irideus pop. 10 steelhead - southern California DPS	FE/None G5T1Q/S1	Federal listing refers to populations from Santa Maria River south to southern extent of range (San Mateo Creek in San Diego County). Southern steelhead likely have greater physiological tolerances to warmer water and more variable conditions.		
Amphibians				
Rana boylii foothill yellow-legged frog	None/SE G3/S3 SSC	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	None	Suitable habitat not present on site.
Rana draytonii California red-legged frog	FT/None G2G3/S2S3 SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	None	Detected in the watershed as part of the CWMP surveys. Suitable breeding or upland habitat not present on site or within the study area. ~~T~~the project is separated by upstream suitable upland and breeding habitat (0.5 miles north) by the UPPR tracks and US 101. Within the study area Los Carneros creek is intermittent and does not provide a permanent water source. ~~No watershed CNDDB records~~.
Taricha torosa Coast Range newt	None/None G4/S4 SSC	Coastal drainages from Mendocino County to San Diego County. Lives in terrestrial habitats & will migrate over 1 km to breed in ponds, reservoirs & slow-moving streams.	None	Suitable habitat not present on site.
Reptiles				
Anniella pulchra Northern California legless lizard	None/None G3/S3 SSC	Sandy or loose loamy soils under sparse vegetation. Soil moisture is essential. They prefer soils with a high moisture content.	None	No suitable habitat on site.
Emys marmorata western pond turtle	None/None G3G4/S3 SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Needs basking	None	No suitable habitat on site. Suitable ponding and basking sites off-site in Los Carneros Creek.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
		sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.		
Phrynosoma blainvillii coast horned lizard	None/None G3G4/S3S4 SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	None	No suitable habitat on site.
Salvadora hexalepis virgultea coast patch-nosed snake	None/None G5T4/S2S3 SSC	Brushy or shrubby vegetation in coastal Southern California. Require small mammal burrows for refuge and overwintering sites.	None	No suitable habitat on site.
Thamnophis hammondii two-striped gartersnake	None/None G4/S3S4 SSC	Coastal California from vicinity of Salinas to northwest Baja California. From sea to about 7,000 ft elevation. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	None	Suitable habitat not present on site, potential to occur off-site in Los Carneros Creek riparian area. No CNDDB records within 5 miles
Birds				
Agelaius tricolor tricolored blackbird	None/ST G2G3/S1S2 SSC	Freshwater wetlands or open water with dense cattails, bulrush, and willows for nesting. Nest in large groups.	None	No CNDDB records within 5 miles. Project site lacks suitable habitat.
Ammodramus savannarum grasshopper sparrow	None/None G5/S3 SSC	Dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes. Favors native grasslands with a mix of grasses, forbs and scattered shrubs. Loosely colonial when nesting.	Low	Breeding localities include west of Goleta. Potential visitant, transient, foraging only. 2007 airport eBird records; 2015 and 2014 eBird sightings concentrated at the Elwood Open Space, four miles west.
Aquila chrysaetos golden eagle	None/None G5/S3 FP WL	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	None	No suitable nesting habitat and Project site is likely too small and proximal to urban development to provide foraging habitat. No CNDDB records within 5 miles.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Athene cunicularia burrowing owl	None/None G4/S3 SSC	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Low (winter foraging)	Formerly a common breeder from coastal bluffs to foothills in Goleta area, now only an occasional winter visitor. No suitable habitat onsite due to the ongoing disturbance, lack ground squirrel burrows, and the site is fragmented and isolated from other foraging areas by development and infrastructure. Recent CNDDB (2004, 2006) Goleta overwintering records. Possible sighting by City staff west of Los Carneros Road in 2008. No CNDDB records within 5 miles.
Contopus cooperi olive-sided flycatcher	None/None G4/S4 SSC	Nesting habitats are mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir & lodgepole pine. Most numerous in montane conifer forests where tall trees overlook canyons, meadows, lakes or other open terrain.	None	Suitable habitat not present on site.
Elanus leucurus white-tailed kite	None/None G5/S3S4 FP	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Low (foraging)	Observed foraging on-site in 2010 (City of Goleta, 2011) and to the west of Los Carneros Road (City of Goleta 2014). White-tailed kites are commonly observed at the Santa Barbara Airport, and are documented as nesting at Lake Los Carneros. Not documented by CNDDB in the Project vicinity. Known roosts at Lake Los Carneros. Breed in oak woodlands and trees, which are not present on the project site. Eucalyptus windrow trees adjacent to the project site not suitable for roosting since subject to ongoing disturbance by US 101 and UPRR. Cyclically fluctuating depending on prey population

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Gavia immer common loon	None/None G5/S1 SSC	Nesting locations at certain large lakes and reservoirs in interior of state, primarily in northeastern plateau region. Bodies of water regularly frequented are extensive, fairly deep, and produce quantities of large fish.	None	Suitable habitat not present on site.
Haliaeetus leucocephalus bald eagle	FD/SE G5/S3 FP	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	None	Suitable habitat not present on site.
Passerculus sandwichensis beldingi Belding's savannah sparrow	None/SE G5T3/S3	Inhabits coastal salt marshes, from Santa Barbara south through San Diego County. Nests in Salicornia on and about margins of tidal flats.	None	Suitable habitat not present on site.
Pelecanus occidentalis californicus California brown pelican	FD/SD G4T3T4/S3 FP	Colonial nester on coastal islands just outside the surf line. Nests on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators. Roosts communally.	None	Suitable habitat not present on site.
Rallus obsoletus levipes light-footed Ridgway's rail	FE/SE G5T1T2/S1 FP	Found in salt marshes traversed by tidal sloughs, where cordgrass and pickleweed are the dominant vegetation. Requires dense growth of either pickleweed or cordgrass for nesting or escape cover; feeds on molluscs and crustaceans.	None	Suitable habitat not present on site.
Riparia riparia bank swallow	None/ST G5/S2	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	None	Project vicinity CNDDB records are historical (1913, 1927). Suitable nesting habitat not present on site.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Sternula antillarum browni California least tern	FE/SE G4T2T3Q/S2 FP	Nests along the coast from San Francisco Bay south to northern Baja California. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.	None	Suitable habitat not present on site.
Strix occidentalis occidentalis California spotted owl	None/None G3G4T2T3/ S3 SSC	Mixed conifer forest, often with an understory of black oaks and other deciduous hardwoods. Canopy closure >40%. Most often found in deep-shaded canyons, on north-facing slopes, and within 300 meters of water.	None	Suitable habitat not present on site.
Vireo bellii pusillus least Bell's vireo	FE/SE G5T2/S2	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	None	Suitable habitat not present on site, off-site willow thickets are isolated. No CNDDB records within 5 miles. No eBird records in the Goleta Valley or the South Coast. There are only two breeding season records for the south coast in recent decades. One of these, from the Santa Barbara MunicipalAirport, involved a bird that was singing in willows along Los Carneros Creek in Goleta Slough, May 18–June 10, 2005 (City of Santa Barbara, 2015). No additional birds were detected that year, and the bird was not detected later in the season, despite additional visits. Mammal.
Mammals				
Antrozous pallidus pallid bat	None/None G5/S3 SSC	Found in a variety of habitats including deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts in crevices of rock outcrops, caves, mine tunnels, buildings, bridges, and hollows of live and dead trees which must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low (foraging)	No CNDDB records within 5 miles. Marginally suitable foraging habitat on-site. Off-site woodland adjacent to railroad and US 101 is not suitable.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Corynorhinus townsendii Townsend's big-eared bat	None/None G3G4/S2 SSC	Occurs throughout California in a wide variety of habitats. Most common in mesic sites, typically coniferous or deciduous forests. Roosts in the open, hanging from walls & ceilings in caves, lava tubes, bridges, and buildings. This species is extremely sensitive to human disturbance.	Low (foraging)	CNDDB Record (1985) suitable habitat not present on site. Marginally suitable foraging habitat on site.
Eumops perotis californicus western mastiff bat	None/None G5T4/S3S4 SSC	Occurs in open, semi-arid to arid habitats, including coniferiferous and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces and caves, and buildings. Roosts typically occur high above ground.	Low (foraging)	No CNDDB records within 5 miles. Roosting habitat not present. Marginally suitable foraging habitat on site.
Lasiurus blossevillii western red bat	None/None G5/S3 SSC	Roosts in trees in forests and woodlands of varying elevations. Forages in grasslands, shrublands, open woodlands and forests, and agriculture. Typically found in riparian habitats, does not occur in deserts.	Low (foraging)	No CNDDB records within 5 miles. Suitable roosting and not present on site. May forage on-site.
Neotoma lepida intermedia San Diego desert woodrat	None/None G5T3T4/ S3S4 SSC	Occurs in scrub habitats of southern California from San Luis Obispo County to San Diego County.	Low (foraging)	No CNDDB records within 5 miles. Not observed during surveys. Project site lacks suitable habitat such as rock outcrops preferred by this species for nest structures, and medium to dense foliage in the xeric grassland/scrub areas. Prefers xeric sites, not likely present in the adjacent Los Carneros Creek or Wetland.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Sensitive Natural Communities				
Southern California Steelhead Stream	None/None GNR/SNR		None	Habitat not on site.
Southern Coastal Salt Marsh	None/None G2/S2.1		None	Habitat not on site.
Southern Vernal Pool	None/None GNR/SNR		None	Habitat not on site.

Status (Federal/State)

FE =	Federal Endangered
FT =	Federal Threatened
SSC =	CDFW Species of Special Concern
FP =	CDFW Fully Protected
SR =	State Rare
SCE =	State Candidate Endangered
SE =	State Endangered
ST =	State Threatened

CRPR (CNPS California Rare Plant Rank)

1B =	Rare, Threatened, or Endangered in California and elsewhere
2B=	Rare, Threatened, or Endangered in California, but more common elsewhere
4 =	Limited Distribution (Watch List)

CRPR Threat Code Extension

.1 =	Seriously endangered in California (>80% of occurrences threatened/ high degree and immediacy of threat)
.2 =	Moderately threatened in California (20-80% of occurrences threatened/ moderate degree and immediacy of threat)
.3 =	Not very endangered in California (<20% of occurrences threatened/ low degree and immediacy of threat)

Watershed Environmental, Inc.
3324 State Street, Suite B, Santa Barbara, CA 93105
Phone (805) 729-1070 | Fax (805) 456-3987
www.WatershedEnvironmental.com

City of Goleta
Ms. Mary Chang
130 Cremona Drive, Suite B
Goleta, CA 93117

October 13, 2021

RE: Analysis of ESHA Boundary and SPA Buffer Zone - Heritage Ridge Residential Project, Goleta, California

Dear Mary,

As you know, Watershed Environmental Inc. is providing biological consulting services to the Heritage Ridge Residential Project applicant. Attached you will find an analysis of the ESHA boundary and SPA buffer zone based on the May 1, 2015 Google Earth satellite imagery that was used by the EIR consultant (Rincon Consultants Inc.) to map the existing habitat types in Figure 4.3-1 page 4.3-4 of the May 2021 *Revised Draft Heritage Ridge Residential Project Draft Environmental Impact Report*. To do the analysis, we downloaded the exact same Google Earth satellite image used in the revised draft EIR and imported the image into our ArcGIS software so that we could digitize the outer edge of the ESHA riparian tree canopy and generate a 100 ft. wide Stream Protection Area (SPA) buffer zone using the ESRI "buffer analysis tool". Figure 1 attached to this letter uses the 2015 satellite image used in the EIR as the background and depicts the parcel boundary, ESHA boundary, and SPA buffer zone that existed on May 1, 2015.

Over the past several months, the project applicant and design team have diligently worked to modify the project to keep structures out of the 100 ft. wide SPA and ensure project consistency with City of Goleta Conservation Element Policy CE 2.2. The applicant has achieved that goal, as depicted in the modified site plan provided as an attachment to this letter. As such, the project with these modifications is consistent with Policy CE 2.2 and does not require a modification to the 100 ft. SPA buffer.

Finally, it is important that the decision makers for this project and the public understand that the railroad is required by the Federal Railroad Administration to manage the vegetation within the railroad ROW for public safety and to: reduce fire hazards, maintain visibility of railroad signs and signals, conduct inspections, and maintain communication lines. The ESHA riparian tree canopy north of the project site is dominated by fast growing arroyo willow trees which the railroad is required to periodically manage (i.e., prune). The extent of the tree canopy varies over time and is dependent upon the amount of rainfall, weather conditions, and when the railroad last managed the vegetation within their ROW.

If the City and Rincon Consultants would like to undergo further analysis of this issue, we are glad to provide GIS shapefiles for your consideration.

If you have any questions, please give me a call at (805) 729-1070 or send me an email at mdelagarza@WatershedEnvioronmental.com.

Sincerely,

Mark de la Garza

Mark de la Garza
President Watershed Environmental Inc.

cc: Jaren Nuzman
Tim Kihm
Beth Collins

Attachments:

Figure 1. 2015 ESHA Boundary and SPA Buffer Zone

Figure 2. Modified Site Plan Showing Compliance with 100 Foot SPA Buffer from 2015 ESHA

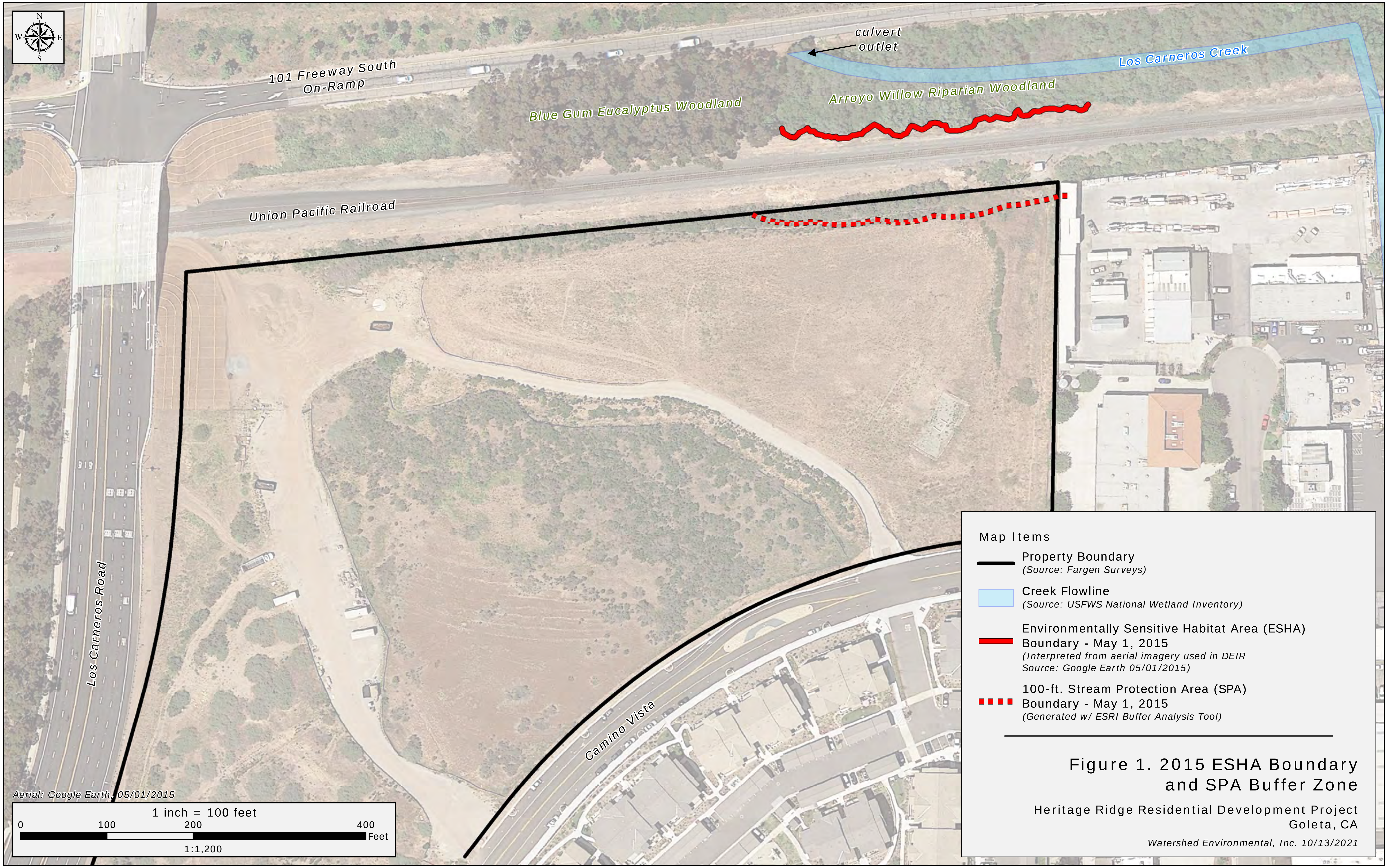
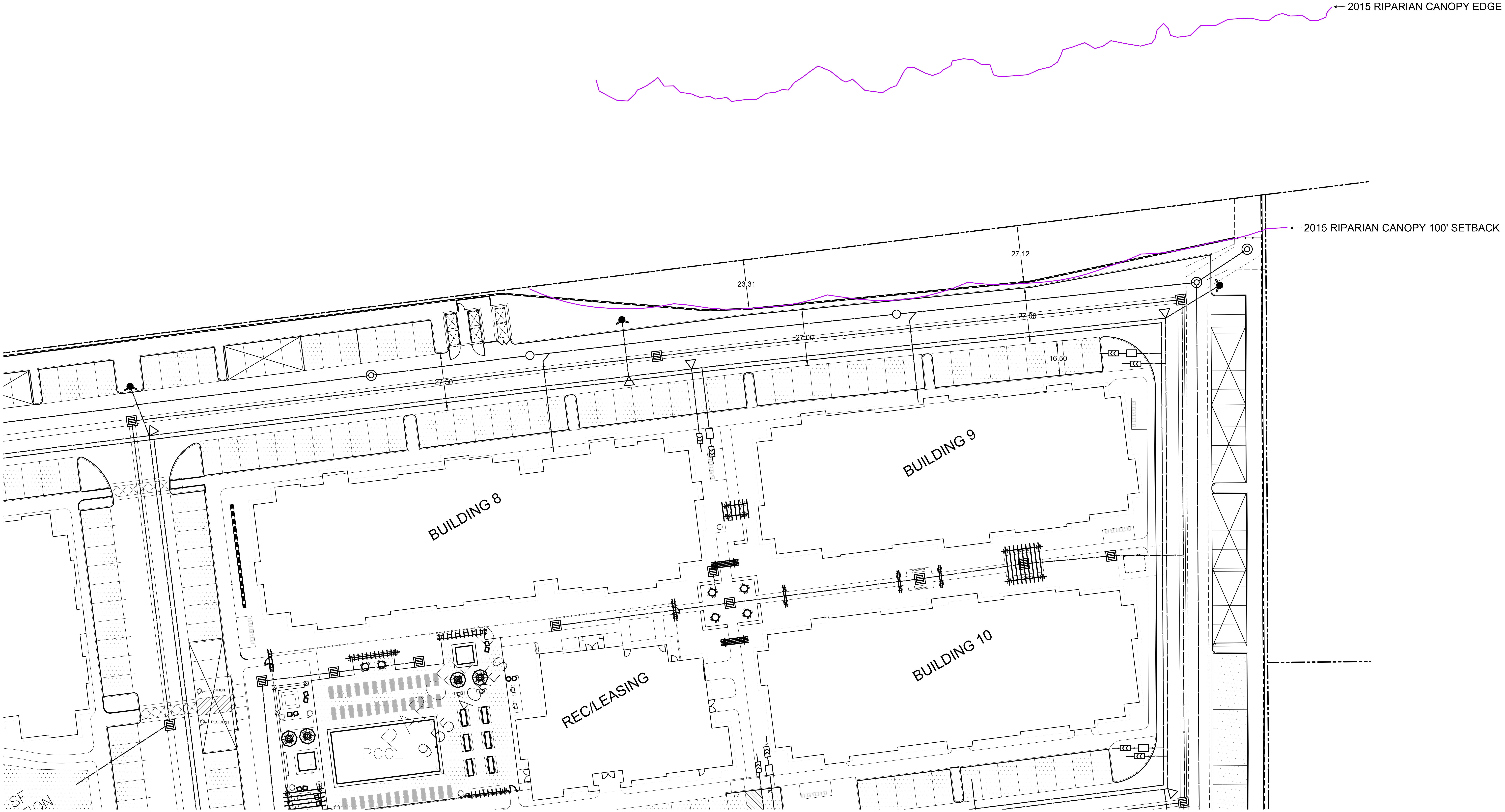


Figure 1. 2015 ESHA Boundary and SPA Buffer Zone

Heritage Ridge Residential Development Project
Goleta, CA

Watershed Environmental, Inc. 10/13/2021


2015 RIPARIAN CANOPY EDGE
2015 RIPARIAN CANOPY 100' SETBACK
27.12
23.31
27.00
27.00
16.50
27.50
BUILDING 8
BUILDING 9
BUILDING 10
REC/LEASING
POOL
PARCEL 9
5.5 ACRES
RESIDENT
RESIDENT
EV
SF

Biological Resource Assessment
Heritage Ridge Residential Project
APNs: 073-060-031 through 073-060-043
Goleta, Santa Barbara County, California

Prepared for:
City of Goleta
130 Cremona Drive, Suite B
Goleta, CA 93117

Prepared by:
Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, CA 93003

May 2016

TABLE OF CONTENTS

Figures

Appendix

EXECUTIVE SUMMARY

This report documents the biological resources on the Heritage Ridge Project site. Section 4.3 of the Envirometnal imapct Report (EIR) evaluates potential impacts to sensitive resources based on current project plans. The proposed project involves the development of 360 residential units in eight buildings, as well as two additional recreational buildings within the City of Goleta. No change to the underlying land use and zoning designation is proposed, but amendments to General Plan Figures 3-5 and 4-1 (Open Space and Conservation Elements) are required to remove an Environmentally Sensitive Habitat Area (ESHA) designation of Coastal Sage Scrub that does not occur on the property. The vacant site has undergone grading a disturbance since at least 1986, and is surrounded by residential land uses, with Willow Springs I & II to the east, the Village at Los Carneros to the west, and The Union Pacific Railroad (UPRR) and U.S. Highway 101 to the north. Pursuant to CEQA Guidelines § 15150, this report incorporates by reference the Willow Springs II EIR (City of Goleta, 2012; State Clearinghouse No. 2010031059).

Construction and grading is proposed entirely within the existing disturbed areas, and would not require displacement of any intact native habitat. Coastal sage scrub ESHA is mapped onsite, but does not occur and the designation is proposed for removal. No special status species have a moderate or high potential to occur on-site. The Project site hosts low-quality foraging habitat for birds and bats. A local wildlife linkage has been observed on the site between habitat to the north of U.S. Highway 101 and the Los Carneros Wetland.

1.0 INTRODUCTION

Rincon Consultants, Inc. has prepared this biological resources assessment to document the existing conditions and special status resources present at Heritage Ridge Residential Project in the City of Goleta (City), Santa Barbara County, California. The proposed project involves the development of 360 residential units in eight buildings, as well as two additional recreational buildings within the City of Goleta. No change to the underlying land use and zoning designation is proposed, but amendments to General Plan Figures 3-5 and 4-1 (Open Space and Conservation Elements) are required to remove an Environmentally Sensitive Habitat Area (ESHA) designation of Coastal Sage Scrub that does not occur on the property. For a detailed project description, refer to the Environmental Impact Report (EIR) Section 2.0, *Project Description*. It should be noted that during the development of the Willow Springs I and II projects located adjacent to the south, the project site was previously referred to as "North Willow Springs."

1.1 PROJECT LOCATION

The Project is located at a currently vacant site (APNs 073-060-031 through 073-060-043), comprised of lots 1 through 13 of Tract No. 13646 in the City of Goleta, County of Santa Barbara, California, as shown in Figure 1. The project site is northeast of Calle Koral, north of Camino Vista, and east of S. Los Carneros Road. The project site is bounded on the north by the Southern Pacific Railroad. The U.S. Highway 101 southbound on-ramp from S. Los Carneros Road is immediately north of the railroad, approximately 300 feet north of the project site boundary. The project site is bounded by S. Los Carneros Road to the west; industrial business to the east; and Camino Vista and residential uses (Willow Springs I &II) to the south. The project is located at latitude 34.435834 and longitude -119.851159 (NAD83), and is depicted on the

Goleta, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle, within Township 4 North and Range 28 West.

1.2 SITE BACKGROUND

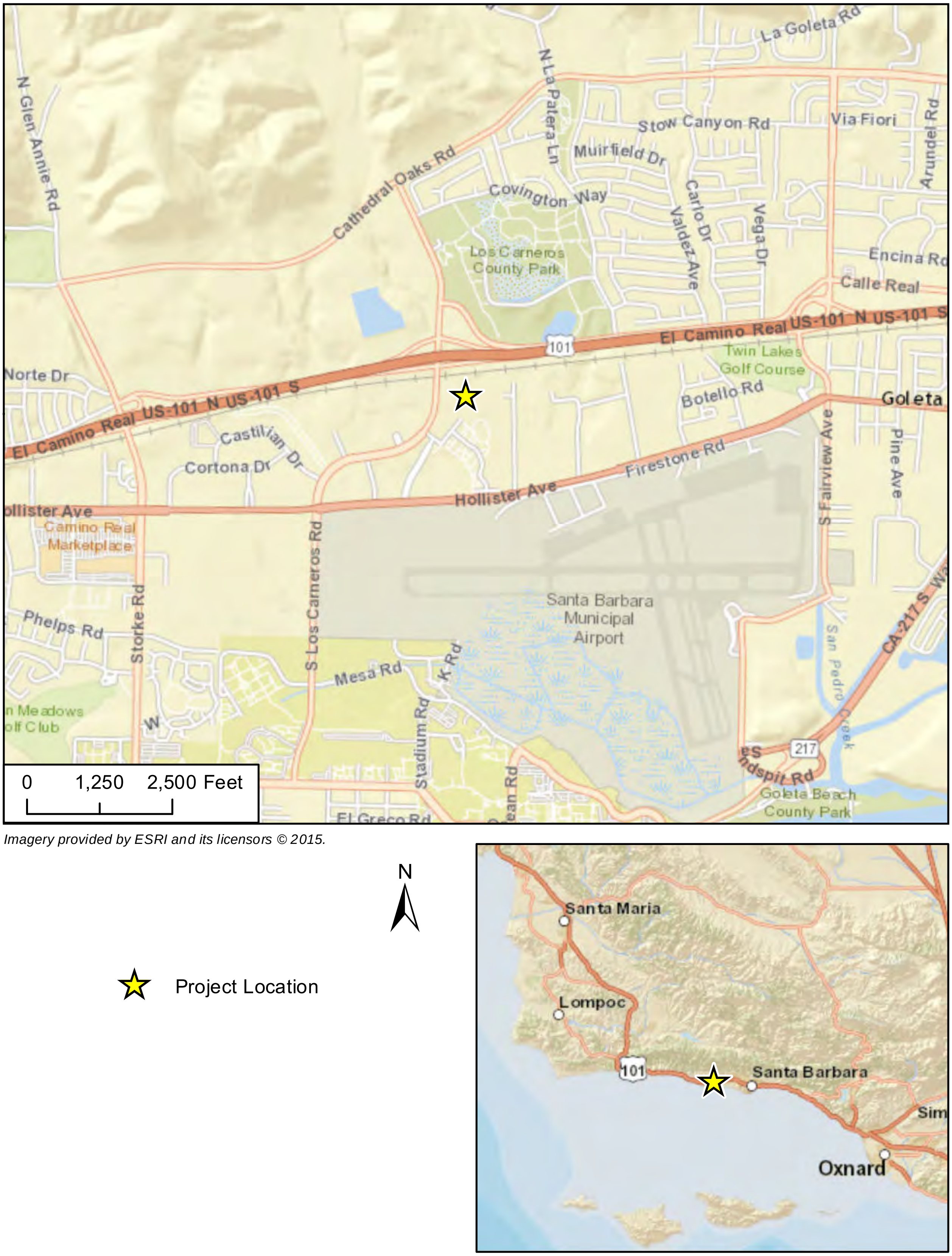
Historically, the project site and vicinity were in agricultural production. Before 1928, the project area was used for agriculture and grazing. An archaeologically sensitive site has been documented directly south of the project site. This prehistoric archaeological site was originally recorded by David Banks Rogers (1929). Based on the excavation of 46 trenches, Rogers characterized the very dense archaeological deposits associated with a village site resulted in a determination that the on-site archaeological deposits were eligible for listing on the National Register of Historic Places. The boundary of the archaeological area, generally in the center of the project site, and a 50-foot buffer have been fenced to ensure that no disturbance to the resource occurred during placement of stockpile soils outside of this area.

In 1986, a mass grading plan for the entire site was submitted, approved, and initiated (Mac Design Associates, 1997). Initial grading on-site consisted of clearing and grubbing of orchard trees and root structures. Surface material was scraped and placed in windrows. Investigations of prehistoric cultural resources were undertaken and grading resumed outside of fenced sensitive archaeological areas (Mac Design Associates, 1997). The Project site was used as a staging area for fill during the Los Carneros Road/Highway 101 interchange construction (Mac Design Associates, 1997). Ongoing activity associated with two stockpile permits first issued in 2002 avoided the fenced archaeological area and 50-foot buffer.

Today, the Project site consists of 13 undeveloped lots located between developed commercial and industrial development to the east and undeveloped vacant land to the west. There is no structural development; however, there are pieces of construction equipment and containers stored on site.

The Project site is relatively flat to gently sloping with the exception of the moderately steep slopes that define the boundary of the stockpile soils along the perimeter of the archaeological area and the eastern, western, northern, and southwestern property lines. Topography within the archaeological area is characterized by a modest ridge that trends generally northwest to southeast between 25 and 36 feet above mean sea level (AMSL). Low-lying level soils drain generally to the south. Soil stockpiling has resulted in elevating surrounding topography to over 43 feet AMSL. As a result, the central portion of the site has the highest elevations on the property and forms a ridge that divides the site drainage, with approximately half of the site draining in a westerly direction and half of the site draining in an easterly direction from the higher, center portion of the site. Ultimately, all runoff from the site drains through existing storm drains and into a 7.25-acre treatment wetland located on the Willow Springs property to the south. Runoff entering the treatment wetland drains across 500 feet (storm drain “A”) and 950 feet (storm drain “C”) of wetland vegetation before leaving the Willow Springs property at Hollister Avenue.

Pursuant to CEQA Guidelines § 15150, this report incorporates by reference the Willow Springs II EIR (City of Goleta, 2012; State Clearinghouse No. 2010031059).



Imagery provided by ESRI and its licensors © 2015.

Regional Location

Figure 1

City of Goleta

2.0 METHODOLOGY

2.1 REGULATORY OVERVIEW

Regulated or sensitive resources studied and analyzed herein include special status plant and wildlife species, nesting birds and raptors, sensitive plant communities, jurisdictional waters and wetlands, wildlife movement, and locally protected resources, such as protected trees.

2.1.1 Environmental Statutes

Biological resources are generally regulated by the following statutes:

- California Environmental Quality Act (CEQA)
- Federal Endangered Species Act (ESA)
- California Endangered Species Act (CESA)
- Federal Clean Water Act (CWA)
- California Fish and Game Code (CFGC)
- Migratory Bird Treaty Act (MBTA)
- The Bald and Golden Eagle Protection Act
- Porter-Cologne Water Quality Control Act
- City of Goleta General Plan/Coastal Land Use Plan (updated November, 2009) (General Plan)

2.1.2 Guidelines for Determining CEQA Significance

Determination of impacts is done on a project-by-project basis. Because of the complexity of biological resource issues, substantial variation can occur between projects. Impact assessment must account for both short-term and long-term impacts. Impacts are classified as significant or less than significant, depending on the size, type, and timing of the impact and the biological resources involved. Disturbance to habitats and/or species are considered significant if they substantially affect significant biological resources using the CEQA Checklist and City thresholds discussed below.

CEQA Checklist. The following threshold criteria, as defined by the CEQA Guidelines Appendix G Initial Study Checklist are used to evaluate potential environmental effects. Refer to Section 4.3 of the EIR for an analysis of Project impacts to biological resources. Based on these criteria, the Project would have a significant effect on biological resources if it would:

a) Have substantial adverse effects, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc…) through direct removal, filling, hydrological interruption, or other means.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan.

City of Goleta Environmental Thresholds Manual. The City's adopted Environmental Thresholds and Guidelines Manual provides environmental thresholds specific to biological resources. This manual primarily uses Appendix G of the State CEQA Guidelines for its criteria.[1]

a) substantially reduces or eliminates species diversity or abundance;
b) substantially reduces or eliminates quantity or quality of nesting areas;
c) substantially limits reproductive capacity through loss of individuals or habitat;
d) substantially fragments, eliminates, or otherwise disrupts foraging areas and/or access to food sources;
e) substantially limits or fragments the geographic range or dispersal routes of species; or
f) substantially interferes with natural processes, such as fire or flooding, upon which the habitat depends.

Impacts to biological resources may be considered less than significant where there is little or no importance to a given habitat and where disturbance would not create a significant impact. For example, disturbance to cultivated agricultural fields, or small acreages of nonnative, ruderal habitat, would be considered less than significant.

2.2 LITERATURE REVIEW

Rincon staff reviewed literature for baseline information on biological resources potentially occurring at the Project site and in the surrounding area. The literature review included information available in peer reviewed journals, standard reference materials (e.g., Bowers et al. 2004; Burt and Grossenheider, 1980; Holland, 1986; Baldwin et al. 2012, Sawyer et al. 2009; Stebbins, 2003; Oberhauser, 2004; American Ornithologists Union, 2014; United States Army Corps of Engineers, 2008 and 2014). Site-specific reports were reviewed, including the *Technical Review of Coastal Sage Scrub (CSS) Environmentally Sensitive Habitat Area (ESHA) for the North Willow Springs Project* (Dudek, 2014a), *Wildlife Corridor Analysis for the Heritage Ridge Project* (Dudek, 2014b), and the *Preliminary Landscape Plan, Heritage Ridge* (True Nature, 2014). Rincon also conducted a review of relevant databases of sensitive resource occurrences from the California Department of Fish and Wildlife (CDFW) California Natural Diversity Data Base

---

[1] The City's CEQA thresholds reference the Appendix G thresholds published in 1992, when the City's Threshold were adopted by the County Board of Supervisors. This BRA includes the Appendix G thresholds published in 2014.

(CNDDB) (CDFW, 2015a) and Biogeographic Information and Observation System (CDFW, 2015b); the U.S. Fish and Wildlife Service (USFWS) Critical Habitat Portal (USFWS, 2015a), National Wetlands Inventory Wetlands Mapper (USFWS, 2015b), and Information, Planning and Conservation System (USFWS, 2015a); the United States Department of Agriculture, Natural Resource Conservation Service Web Soil Survey (United States Department of Agricultural, Natural Resources Conservation Service, 2015); and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS, 2015). The General Plan, and City of Goleta CEQA Guidelines (2014) were also reviewed. Other sources of information about the site included aerial photographs, topographic maps, geologic maps, climatic data, and project plans. The Rare Plants of Santa Barbara County list was also reviewed (Central Coast Center for Plant Conservation, 2005). Previous biological studies for projects occurring in the region, including the *Hollister/Kellogg Park and the Armitos to Hollister Avenue Creek Path Biological Resource Assessment* (Rincon, 2013), *Cavaletto Tree Farm Housing Project Final Environmental Impact Report* (County of Santa Barbara, 2011), *Willow Springs II Final Environmental Impact Report* (City of Goleta, 2012), *Village at Los Carneros Project Final Environmental Impact Report* (City of Goleta, 2014a), *Cortona Apartments Final Environmental Impact Report* (City of Goleta, 2014b), the *Biological Resources Report for the Ekwill Street and Fowler Road Extension Project* (URS, 2014), and the *Goleta Slough Mouth Management Biological Technical Report* (Rincon, 2015) were reviewed for pertinent information of special status biological resources occurring in the region.

2.3 FIELD RECONNAISSANCE SURVEY

Rincon biologists conducted a vascular plant survey; wildlife observations; vegetation mapping; and a search for rare, threatened, and endangered species, sensitive natural communities, and potential jurisdictional resources on three separate occasions from March through June 2015. Surveys were conducted on foot and covered the Project site and a 100-foot buffer surrounding the Project site. Wildlife species were identified by direct observation, vocalization, or by sign (e.g. tracks, scat, burrows).

Dudek biologists visited the site on January 22, 2014 and conducted an ESHA analysis of the Project site and vicinity. Dudek biologists also visited the site on five separate occasions in January and February 2013; and on four occasions from February through April 2014 to assess of the condition and quality confirm existing biological conditions; search for wildlife species, sign and tracks, and travel routes; and perform nocturnal spotlighting surveys. The site was also surveyed by Envicom in 2010 and Dudek 2008 as part of the Willow Springs II permitting process (City of Goleta, 2011).

An inventory of native plant and animal species observed during the site visit was compiled, and an evaluation of potential jurisdictional features was performed. Where applicable, native vegetation communities were classified according to Sawyer et al. (2009), and cross-referenced with Holland (1986).

3.0 EXISTING CONDITIONS

This section provides a brief discussion of the existing conditions observed on-site and in the Project vicinity. For further details refer to Section 3.0 of the EIR, *Environmental impact Analysis*. Site photographs are located in Appendix C and a compendium of and animal species and native plant observed is located in Appendix D.

3.1 PHYSICAL CHARACTERISTICS

Within Goleta, much of the coastal plain between the Santa Ynez Mountains and Pacific Ocean is developed or has been historically disturbed by agriculture or ranching uses. Native vegetation within Goleta is fragmented, but includes riparian and upland woodlands, coastal scrub, native and non-native grasslands, wetlands and vernal pools. Relatively undisturbed habitats are present along narrow riparian corridors, in scattered undeveloped lands of varying sizes, and in protected open space areas.

The site is within the Santa Ynez – Sulphur Mountains subsection of the Southern California Coast of the U.S. Department of Agriculture Forest Service ecoregion system (USDA Forest Service 2014). This ecological subunit extends from the Santa Ynez River mouth in northern Santa Barbara County, south and east into the Sulphur Mountains just west of the Ventura River in northern Ventura County (USDA Forest Service 2014). This ecological unit is generally defined by its mountainous topography inland, with coastal plains at the immediate coast. Locally, the Santa Ynez Mountains to the north of the site form relatively steep hillsides vegetated by native chaparral and drained by incised streams along which grow bands of riparian shrubs and woodlands. The Project site is located within the South Coast region of Santa Barbara County on a coastal plain, along the south edge of the western Transverse Range Mountains. The site is within the South Coast subregion of the Jepson ecoregion system, which extends from Point Conception to the west southward to Mexico, along the immediate coast in Santa Barbara County, but also extending inland to the San Gabriel and San Bernardino mountains farther east and south (Baldwin et al. 2012). The Pacific Ocean is approximately 1.5 miles to the south and the Santa Ynez Mountains begin approximately 1.2 miles to the north.

The ocean is directly adjacent to the Santa Ynez Mountains (with elevations surpassing 4,000 feet), which forces air masses upward. When moist air is pushed up by the mountains, the orographic effect causes increased precipitation along the South Coastal plain. Annual precipitation in Goleta is typically about 16.3 inches, with the majority of rainfall received between November and April in typical years (Western Region Climate Center 2015). Mean annual temperatures range from 48 to 69 degrees Fahrenheit (°F). Summer daytime temperatures are often modified by morning fog and sea breezes. The growing season lasts 340 to 360 days per year (USDA NRCS, 2015).

3.1.1 Watershed and Drainages

The Project is within the 47.4-square mile Goleta Slough Watershed, which is fed by five major streams: Atascadero, San Pedro, and San Jose Creeks (meet “upstream” and north of the slough mouth) and Los Carneros and Tecolotito Creeks (meet further downstream west of the slough). Not all the tributary creeks are equally important to the functioning of the slough. Atascadero (Maria Ygnacio is part of the Atascadero system), San Jose and San Pedro enter the slough on its extreme eastern edge, within a few hundred meters of the mouth, and have little influence on slough conditions during most of the year. In contrast, Tecolotito and Los Carneros, although smaller streams, enter on the northwest corner and waters, along with tidal inflows, that determine water quality for much of the wetland (Leydecker, 2006).

Lake Los Carneros is a historic man-made duck pond built in 1936, located north of U.S. Highway 101, approximately 1,300 feet north of the project site. The lake is part of a 136-acre County park.

The Goleta Slough begins 1,200 feet south of the Project between Hollister Avenue and the Pacific Ocean. The Goleta Slough is a large expanse of open water and estuarine/wetland habitats that supports a rich and diverse coastal ecosystem of biological and cultural importance, and provides important ecosystem services such as floodwater storage capacity and the filtering of pollutants contained within stormwater runoff. The Goleta Slough is the northernmost example of a large southern California estuary and represents the northern limit of distribution for several plant and animal species. The Slough contains breeding populations of listed species such as the State listed as endangered Belding's savannah sparrow *(Passerculus sandwichensis beldingi*) and the federally listed as endangered tidewater goby (*Eucyclogobius newberryi*) as well as other species of federal, state, and local concern.

Intermittent Los Carneros Creek flows approximately 90 feet to the north of the Project parallel to the U.S. Highway 101, and then into an open, concrete-lined channel 450 feet to the east of the Project (beyond Aero Camino). It then flows from Lake Los Carneros Park, to a culvert under U. S. Highway 101, and is diverted in a concrete channel for 0.41 mile until it confluences with Tecolotito Creek and flows into the Goleta Slough, from whence its waters flow to the Pacific Ocean. The San Pedro Creek watershed (HUC 180600130202) includes San Pedro, San Jose, Los Carneros, and Tecolotito Creeks and their tributaries, and drains approximately 27.6 square miles. Tecolotito and Los Carneros Creeks had channel realignment projects implemented in 2006 as part of the airport expansion (County of Santa Barbara 2010). Compared with Tecolotito Creek, Los Carneros Creek is less developed and has fewer commercial or residential areas within its watershed (Leydecker, 2006).

The seven acre Los Carneros Wetland is located to the south between the Willow Springs I development and Hollister Avenue, beginning approximately 80 feet from the southern corner of the Project. Between Willow Springs I and II is an oval-shaped private open space preserve area, which is landscaped with a combination of ornamental and native species.

3.1.2 Soils

The Project site has undergone disturbance and import of fill, as discussed under Section 1.2*, Project Background*. Soils in the Project site are mapped as Goleta fine sandy loam, 0% to 2% slopes, Milpitas-Positas fine sandy loam, 2% to 9% slopes, and Xerorthents cut and fill areas (NRCS, 2015).

3.2 VEGETATION

Where applicable, classification on natural comminutes (Alliances and Associations) is based on the Manual of California Vegetation (Sawyer et. al., 2009). Numbers in brackets following natural communities correspond with the codes in the Manual of California Vegetation. This classification system is used by CNPS and CDFW to map, classify and establish the significance and rarity of vegetation types in California. Alliances and associations are defined by plant species composition and abundance, as well as the underlying abiotic characteristics of the stand (e.g., slope, aspect or soil type).

The following communities are present on site, as shown in Figure 2.

***Baccharis pilularis* (Coyote brush scrub) Alliance [32.060.00]**
The Manual of California Vegetation (2009) describes this community as occurring in river mouths, stream sides, terraces, stabilized dunes of coastal bars, spits along the coastline, coastal bluffs, open slopes, and ridges, although the species is upland. Elevations range from sea level to approximately

4,900 feet AMSL. Stands in southern California tend to be largely seral to other scrub and woodland types. *B. pilularis* mixes with shrubs with southern affinities (*Artemisia californica, Encelia californica, Eriogonum fasciculatum, Salvia leucophylla, S. mellifera*). On the south coast, *Baccharis pilularis* alliance appears as more disturbance related.

Coyote brush scrub at the site is a relatively open stand dominated by coyote brush with an understory of non-native grasses and forbs. The shrub layer consists almost exclusively of coyote brush, and biological diversity is low. California sagebrush is present, but at less than one percent of the total shrub cover. There are no other sage species present (i.e., species of the genus *Salvia* or *Artemisia*). Commonly-occurring species in the understory herbaceous layer include sweet fennel (*Foeniculum vulgare*), pampas grass (*Cortaderia jubata*), short-podded mustard (*Hirschfeldia incana*), scarlet pimpernel (*Anagallis arvensis*), Harding grass (*Phalaris aquatica*), filarees (*Erodium* spp.), ripgut brome (*Bromus diandrus*), rattail fescue (*Vulpia myuros*), and soft chess (*Bromus hordeaceous*).

Coyote brush is an early colonizer of disturbed areas. The coyote brush scrub on-site has become established in a slight depression, since this area was last mass graded. Due to the Project site's long history of agricultural use and grading, the coyote brush scrub contains low native species diversity, is infested by invasive species, and has lower overall biological value as compared to coyote brush scrub in a less-disturbed condition. Based on these characteristics, this community is not an example of intact coastal sage scrub that would qualify as ESHA. For further discussion refer to Section 4.3 of the Environmental Impact Report and Appendix D, *Technical Review of Coastal Sage Scrub (CSS) Environmentally Sensitive Habitat Area (ESHA) for the North Willow Springs Project*.

***Atriplex lentiformis* Shrubland (Quailbush Scrub) Alliance [36.370.00]**

The Manual of California Vegetation (2009) describes this community as occurring on gentle to steep southeast- and southwest-facing slopes. Elevations range from sea level to approximately 557 feet asml. The alliance especially occurs in disturbed areas, including roadsides and fluvial areas with alkaline soils. Atriplex lentiformis is dominant in the shrub canopy with *Artemisia californica, Atriplex canescens, Baccharis pilularis, Baccharis salicifolia ssp. salicifolia, Encelia californica, Kochia americana, Malosma laurina, Pluchea sericea, Rhus integrifolia, Sporobolus airoides, Suaeda taxifolia* and *Tamarix* spp. Emergent trees may be present at low cover, including *Myoporum laetum* or *Prosopis glandulosa*.

The community on-site is comprised almost exclusively of common disturbance following native species and non-native invasive species. As is typical with most vegetation maintained in a ruderal condition by frequent disturbance, this vegetation type within Project site does not directly fit into the CDFW plant community classification system. The shrub layer of community on-site is dominated by quailbush, with codominant coyote brush. The understory is dominated by mustard and other non-native annuals. An emergent red willow trees is present in the southeast corner. The on-site community is characterized as ruderal scrub rather than a natural community, but is described as quailbush scrub for the purposes of classification. Quailbush and coyote brush are known initial colonizers after disturbances (i.e., grading), and native plant diversity and structure within the community is low. The Quailbush scrub is established on fill material, presumably since this area of the site was last mass graded. Quailbush scrub is not considered sensitive by CDFW, and is not classified as coastal sage scrub.

***Bromus* (*diandrus*, *hordeaceus*)-*Brachypodium distachyon* Herbaceous Semi-Natural Alliance [42.026.00]** This semi-natural stand is found in all topographic settings in foothills, waste places, rangelands, openings in woodlands. Elevations range from sea level to approximately 7,200 feet asml.

On-site areas mapped as non-native grasses and forbs consist overwhelmingly of introduced nonnative species, with native species poorly represented. Ripgut brome, summer and black mustard, smilo grass (*Stipa miliacea*),), soft chess, and foxtail barley (*Hordeum murinum*) are prevalent. Other selected non-native species occurring in notable quantities are long-beaked filaree (*Erodium botrys*), bristly ox-tongue (*Helminthotheca* [<= *Picris*] *echioides*), tocalote (*Centaurea melitensis*), and Italian thistle (*Carduus pycnocephalus*). These species may be well distributed or concentrated in certain areas.

Native annual species represent much less than five percent of the vegetative cover. Among these species are Canada horseweed (*Conyza canadensis*), common tarweed (*Deinandra fasciculata*), and western ragweed (*Ambrosia psilostachya*). Emergent native shrubs include California sagebrush and coyote brush. Because they are comprised almost exclusively of non-native invasive species, areas mapped as *Bromus* grassland are not sensitive.

Brassica nigra **and other mustards (Upland Mustards) Herbaceous Semi-Natural Alliance [42.011.00]**
Typically occurs in fallow fields, grasslands, roadsides, levee slopes, disturbed coastal scrub, riparian areas, waste places. Elevations range from sea level to approximately 4,900 feet asml. *Brassica nigra*, *Brassica rapa*, *Brassica tournefortii*, *Hirschfeldia incana*, *Isatis tinctoria* or *Raphanus sativus* are dominant in the herbaceous layer. Emergent trees and shrubs may be present at low cover.

Under the Willow Springs II EIR, this area was classified as “non-native grasses and forbs” (City of Goleta, 2012). On-site black mustard (*brassica nigra*) is dominant, and many other non-native annual species are also present. This area was required to be hydro-seeded with native seed for erosion control following grading in 2013 as part of Willow Springs II. Seeded species include purple needle grass (*Stipa pulchra*), nodding needle grass (*Stipa cernua*), California brome (*Bromus carinatus*), blue wildrye (*Elymus glaucus*), California brittlebrush (*Encelia californica*), western blue eyed grass (*Sisyrinchium bellum*), small fescue (*Festuca microstachys*), and California poppy (*Eschscholzia californica*). Emergent trees include tree tobacco (*Nicotiana glauca)* and shrubs include castor bean *(Ricinus communis*) and coyote brush.

Per the General Plan CE Policy 5.2 and the City’s CEQA Thresholds, existing native grasslands must be comprised of 10% or more cover of total relative native grasses and that removal of or disturbance to a patch of native grasses less than 0.25 acre that is clearly isolated and not part of a significant native grassland or an integral component of a larger ecosystem is allowed. The purple needle grass observed within the upland mustard area does not constitute sensitive native grassland pursuant to the General Plan and City CEQA Guidelines, since it was required to be planted for erosion control following 2013 grading.

Disturbed
Disturbed areas include the Camino Vista roadway constructed in 2013, dirt roads, and areas cleared as part of the recent Los Carneros Bridge improvements. These areas have been recently graded or are subject to routine disturbance, leaving them barren or sparsely vegetated. Plant species consist overwhelmingly of non-native species, as well as occasional native species common to highly disturbed areas.

Note: Where applicable, classification on natural communities (Alliances and Associations) is based on the Manual of California Vegetation (2009). Numbers in brackets following natural communities correspond with the codes in the Manual of California Vegetation, where applicable.

Imagery provided by Google and its licensors © 2015.

Habitat Map

Figure 2

Off-site natural communities, between the railroad and U.S. Highway 101 to the north of the site, include Eucalyptus groves (*Eucalyptus* (*globulus, camaldulensis*) Semi-Natural Woodland Stands [79.100.00]) and Arroyo willow thickets (*Salix lasiolepis* Alliance [61.205.00]).[2]

3.3 GENERAL WILDLIFE

Vertebrate wildlife species observed during the Rincon and Dudek biological surveys included one lizard, 16 species of birds, and seven species of mammals. Many of these species are typical of undeveloped weedy lots within urban areas or patches of native habitat within urban areas or at the urban-wildland interface. A list of these species is provided in Appendix B. This list represents a sample of the non-sensitive wildlife species that can be expected to utilize habitats at the site for cover, foraging, and reproduction. Furthermore, in general, this list includes species that are relatively common and more easily detected during daytime surveys. Several smaller species (e.g. some reptiles, birds, and rodents) undoubtedly reproduce within the Project site, and some larger or more mobile species utilize the site's resources occasionally or on an infrequent basis, such as foraging raptors, migrating songbirds, and medium to large sized mammals such as coyotes, opossums, raccoons, and skunks.

As described earlier under the Section 3.2, *Vegetation*, the Project site has a long history of disturbance. The type and number of species that are expected at the site reflects disturbed habitat conditions. Habitats supporting wildlife at the site are limited to non-native herbaceous vegetation and coyote brush scrub. The relatively low native plant, plant community and habitat diversity, as well as the small size of the patch of coyote brush scrub, limits available niche space and the type of wildlife species and number of individuals the site can support. Also, the Project's proximity to urban areas and roads and associated night lighting, human activity and higher noise levels compared to more pristine native habitats is expected to dissuade many species from utilizing the area. Species using the site are those adapted to urban areas or at least somewhat tolerant of human activities.

The Goleta area is highly developed and the extent of native habitats been reduced considerably, historically through agriculture and through urban and suburban development since the 1940s. Consequently, habitat to support wildlife populations in the Goleta area is limited. The disturbed coyote brush scrub and the non-native vegetation at the Project site and vicinity provide habitat value, albeit low, for a variety of wildlife species. The area supports rodent fauna, and several rodent burrows were observed at the site. This prey base is expected to attract mammalian and avian predators, including potentially several species of raptors. The Project site may be a foraging resource for bats as well. Some migratory songbirds are expected to forage occasionally within the disturbed coyote brush scrub, especially because of the site's proximity to the Goleta Slough, the Los Carneros Wetland, and Lake Los Carneros Open Space. The proximity of the Project to these important wetlands/open spaces increases the potential for wildlife to use the Project site and vicinity.

While the Project site itself lacks a stream or other water body, Los Carneros Creek is approximately 90 feet to the north and provides an intermittent source of water for wildlife, as well as a potential movement corridor to larger areas of core habitat to the north. The site is also connected to the Goleta Slough via Los Carneros Creek, or via disturbed habitats, the Los Carneros Wetland, and a culvert beneath Hollister Avenue.

---

[2] Also considered Southern Arroyo Willow Riparian Forest [CTT61320CA] under Holland, which is considered sensitive by CDFW.

The Project site contains habitat that can support nesting birds, including raptors, protected under the California Fish and Game (CDFG) Code Section 3503 and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703–712). Native trees, ornamental trees, woody palms, and woody shrubs are present within and adjacent to the Project that could provide suitable nesting habitat. However, no active or previously occupied nests were observed in the vegetation during the 2015 (or previous) surveys.

4.0 SENSITIVE BIOLOGICAL RESOURCES

Local, state, and federal agencies regulate special status species and require an assessment of their presence or potential presence to be conducted on-site prior to the approval of any proposed development on a property. For the purposes of this analysis, the term "sensitive" is used to denote those species that meet the criteria of CEQA Guidelines Section 15380 as an Endangered, Rare or Threatened Species, whether or not officially listed, as provided in Section 15380(d).

This section discusses sensitive biological resources observed on the Project site, and evaluates the potential for the Project site to support other sensitive biological resources.

4.1 SPECIAL STATUS SPECIES

Assessments for the potential occurrence of special status species are based upon known ranges, habitat preferences for the species, species occurrence records from the CNDDB, species occurrence records from other sites in the vicinity of the survey area, and previous reports for the Project. Refer to Figure D.1 in Appendix D for map of CNDDB records and critical habitat in the Project vicinity (within 5 miles). The potential for each special status species to occur in the survey area was evaluated according to the following criteria:

- **None.** Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
- **Low.** Suitable or marginal habitat may occur in the Project site; however: no CNDDB records of the species have been recorded within twenty five years; records of the species within 5 miles of the Project are suspected to be now extirpated or potentially misidentified with other species; or individuals were not observed during field surveys and are not anticipated to be present. For bird and bat species, this category may be used for species that are documented, but likely to be only transient through the area during foraging or migratory movements, and for which no suitable nesting or roosting habitat is present.
- **Moderate.** CNDDB or other documented occurrences have been recorded within 5 miles of the Project site (project vicinity) and suitable habitat is present (suitable nesting or roosting habitat or high quality foraging areas for bird and bat species). Individuals were not observed during field surveys; however, the species could be present or otherwise impacted by the Project.
- **High.** CNDDB or other documented occurrences have been recorded within 1 mile of the Project site and suitable habitat is present (suitable nesting or roosting habitat for bird and bat species). Individuals were not observed during field surveys; however, the species could be present or otherwise impacted by the project.
- **Present**. The species was observed in the Project site during field surveys, or documented from the site during recent previous surveys.

4.1.1 Special Status Plant Species

For the purposes of this report, special status plant species are those plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered by the United States Fish and Wildlife Service (USFWS) under the federal Endangered Species Act (FESA) (7 U.S.C. § 136, 16 U.S.C. § 1531 *et seq*.); those listed or proposed for listing, or candidates for listing as rare, threatened, or endangered by the CDFW under the California Endangered Species Act (CESA); and/or species on the *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW, 2015c). This latter document includes the *California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California, Seventh Edition* (CNPS, 2015) as updated online. Those plants contained on the CNPS Rare Plant Rank (CRPR) Lists 1, 2, 3, and 4 are considered special-status species in this BRA, per the CNPS code definitions:

- *List 1A = Plants presumed extinct in California;*
- *List 1B.1 = Rare or endangered in California and elsewhere; seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat);*
- *List 1B.2 = Rare or endangered in California and elsewhere; fairly endangered in California (20-80% occurrences threatened);*
- *List 1B.3 = Rare or endangered in California and elsewhere, not very endangered in California (<20% of occurrences threatened or no current threats known);*
- *List 2 = Rare, threatened or endangered in California, but more common elsewhere;*
- *List 3 = Plants needing more information (most are species that are taxonomically unresolved; some species on this list meet the definitions of rarity under CNPS and CESA);*
- *List 4.2 = Plants of limited distribution (watch list), fairly endangered in California (20-80% occurrences threatened); and*
- *List 4.4= Plants of limited distribution (watch list), not very endangered in California (<20% occurrences threatened or no current threats known).*

CEQA Guidelines, Section 15125(a), also directs that special emphasis should be placed on resources that are rare or unique to the region. For example, plants listed by the Santa Barbara Botanic Garden (SBBG) or the Goleta Slough Ecosystem Management Plan (GSEMP) may be considered locally sensitive.

Based on the database and literature review, 17 special status plant species are known or have the potential to occur within a 5-mile vicinity of the Project (Appendix D). Of these, seven special status plant species have a low potential to occur based on the presence of potentially suitable habitat and recorded occurrences:

- Coulter's saltbush (*Atriplex coulteri*) – CRPR 1B.2
- Davidson's saltscale (*Atriplex serenana* var. *davidsonii*) – CRPR 1B.2
- Mesa horkelia (*Horkelia cuneata* var. *puberula*) – CRPR 1B.1
- Pale-yellow layia (*Layia heterotricha*) – CRPR 1B.1
- Black-flowered figwort (*Scrophularia atrata*) – CRPR 1B.2
- Southern tarplant (*Centromadia parryi* ssp. *australis*) – CRPR 1B.1
- Contra Costa goldfields (*Lasthenia conjugens*) – federally endangered and CRPR 1B.1
- Santa Barbara honeysuckle (*Lonicera subspicata* var. *subspicata*) – CRPR 1B.2

No special status plant species were observed during the spring 2015 surveys, or previous surveys in 2014, 2013, 2010, or 2008. Based on the long history of agricultural use and soil disturbance at the Project site, and because the Project site was mass graded on at least two occasions since 1986, the potential for occurrence of special status plant species is considered to be very low. Furthermore, competition from invasive species further reduces the potential for occurrence of listed species. Therefore, no special status plant species are expected to be impacted by the project and no further analysis of special status plants is required.

4.1.2 Special Status Wildlife Species

Special status wildlife species are animals listed, proposed for listing, or candidates for listing as threatened or endangered by the USFWS or National Marine Fisheries Service under the FESA; those listed or proposed for listing as rare, threatened, or endangered by the CDFW under the California CESA; animals designated as “Fully Protected,” “Species of Special Concern,” or “Rare,” by the CDFW; and species on the *Special Animals List* (CDFW, 2015d). CEQA Guidelines, Section 15125(a), also directs that special emphasis should be placed on resources that are rare or unique to the region.

Based on the database and literature review, 47 special status wildlife species are known or have the potential to occur within the vicinity, known occurrences within 5 miles of the Project were considered in this analysis (Appendix D). Of these, 26 species have a low potential to occur, based on the criteria above. While species such as white-tailed kite and Coopers hawk have been recorded foraging on the site, they have a low potential to occur based on the category above. For bird and bat species, the low category may be used for species that are documented but likely to be only transient through the area during foraging or migratory movements, and for which no suitable nesting or roosting habitat is present. The species that can be reasonably anticipated to occur were determined based on the reported ranges of the species, and the type, extent, and condition of habitat available at the site.

The use of the site by sensitive vertebrate wildlife species is limited to foraging by some species of birds and mammals listed as Fully Protected (FP), Species of Special Concern (SSC), Watch List (WL), or other Special Animals (SA) by the State of California. No species listed as threatened or endangered under the ESA or the CESA are expected to have the potential to occur at the site; for details refer to Appendix D, *Special Status Species Evaluation Tables*. No sensitive species are expected to reproduce at the site.

Special-status species present or with a low potential to occur within or adjacent to the Project but could be potentially affected, are discussed below, and, if applicable evaluated under Section 4.3 of the EIR.

Low:

- Monarch butterfly (*Danaus plexippus*) – SA, foraging
- Silvery legless lizard (*Anniella pulchra pulchra*) – SSC
- Coast horned lizard (*Phrynosoma blainvillii*) – SSC
- Two-striped garter snake (*Thamnophis hammondii*) – SSC, foraging
- Cooper’s hawk (*Accipiter cooperi*) – WL, foraging
- Grasshopper Sparrow (*Ammodramus savannarum*) – SSC, foraging
- sharp-shinned hawk (*Accipiter striatus*) – WL, foraging
- Short-eared owl (*Asio flammeus)* –SSC, foraging
- Long-eared owl (*Asio otus*) – SSC, foraging

- Oak titmouse (*Baeolophus inornatus*) – SA, foraging
- Burrowing owl (*Athene cunicularia)* – SSC, overwintering and foraging
- Vaux's swift (*Chaetura vauxi*) – SSC, foraging
- Northern harrier (*Circus cyaneus*) – SSC, foraging
- Black swift (*Cypseloides niger*) – SSC, foraging
- White-tailed kite (*Elanus leucurus*) – CFP, foraging
- Merlin (*Falco columbarius*) – WL, foraging
- Loggerhead shrike (*Lanius ludovicianus)* – SSC, foraging
- Yellow warbler (*Setophaga petechia*) – SSC, foraging
- Hoary bat (*Lasiurus cinereus*) – SA, foraging
- Pallid bat (*Antrozous pallidus*) – SSC, foraging
- Silver-haired bat (*Lasionycteris noctivagans*) – SA, foraging
- Western mastiff bat (*Eumops perotis californicus*) – SSC, foraging
- Western red bat (*Lasiurus blossevillii*) – SSC, foraging
- Townsend's big-eared bat (*Corynorhinus townsendii*) – SSC, foraging
- Yuma myotis (*Myotis yumanensis*) – SA, foraging
- American badger (*Taxidea taxus*) – SSC, foraging

Sensitive Terrestrial and Species

No special status wildlife species have the potential to occur based on the absence of suitable habitat and ongoing disturbance (Appendix D). In the unlikely event a special status terrestrial species was present on-site, it would be capable of escaping harm during vegetation removal and grading/construction activities. Impacts to individuals would not have an impacts to population in the area, given the fragmented nature of the Project site and presence of suitable habitat at north of U.S. Highway 101. Therefore, no special status terrestrial species are expected to be significantly impacted by the project and no further analysis of special status terrestrial species is required.

Nesting Bird Habitat

The Project site contains habitat that can support nesting birds, including raptors, protected under the California Fish and Game (CFG) Code Section 3503 and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703–712). Woody shrubs, eucalyptus and willow woodlands, and ornamental trees are present within and adjacent to the Project that could provide suitable nesting habitat. However, no active or previously occupied nests were observed in the vegetation during the 2015 or previous surveys.

Many other sensitive bird species potentially use the Project site for foraging (see Appendix D), but are not expected to nest thereon. The yellow-breasted chat and the yellow warbler may temporarily forage in the disturbed coyote brush scrub during migration, as each is known to utilize scrub habitats and is known to occur within the Goleta Slough Ecosystem and nearby Tecolotito Creek. The northern harrier is a fairly common visitant to the Goleta Slough and has been observed roosting at the Los Carneros Wetland, which is a few hundred feet to the south of the Project. This species as well as migrants such as the Vaux's swift and black swift may potentially forage over the Project site when present in the area. The burrowing owl and loggerhead shrike are also known from the Goleta Slough and have been observed in the vicinity of the Project to the west of Los Carneros Road.

Bat Habitat

As many as five species of bats and three other species of mammals listed as SSC may occur at the Project site. The bat species would only be expected to aerially forage occasionally over the site, and would not be expected to roost, hibernate, or reproduce on the site. The badger could potentially reach the Project site from natural areas to the north by way of the Los Carneros Creek riparian corridor; although, given the disturbed condition of the Project site and vicinity, as well as its small size, any occurrence of badgers would likely be transient.

Raptor Habitat
The City and surrounding area are inhabited by several species of migratory and resident raptors. Sensitive sensitive raptors species are known to occur or have potential to occur at the project site, including the white-tailed kite, burrowing owl, northern harrier, Cooper's hawk, sharp-shinned hawk, and short-eared owl, and merlin may forage on or near the Project site.

White-tailed kite. The white-tailed kite is a regular breeder and year-round resident in the Goleta area. Numbers declined in the area beginning in the 1970s through the early 1990s, but subsequently rebounded, based on annual Santa Barbara Audubon Society Christmas Bird Count data and annual monitoring of kite populations by local biologists (National Audubon Society 2015; Holmgren 2011). Although roost sites may shift suddenly within and between seasons, nearly all roosts on the South Coast since 1965 have been on or within one mile of More Mesa (Lehman, 2015). At the Goleta Slough, white-tailed kites forage regularly and have been recorded roosting in small numbers. Kites have been observed foraging over the Project site. The white-tailed kite inhabits low elevation, open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands (Dunk, 1995). They nest in trees, usually with a dense canopy, but nest trees can vary from single, isolated trees to trees within large woodlands. Along the South Coast, preferred nest trees include (in order of frequency used): oaks, pines, Monterey cypress, eucalyptus, and willows (Holmgren, 2000). In the Goleta area, nest sites are always adjacent to open space areas with a stable prey base, and kites show long-term fidelity to sites with good foraging opportunities (Holmgren, 2000). A variety of foraging habitat types are used, but those that support larger and more accessible prey populations are more suitable. Diurnally active rodents, primarily meadow vole (*Microtus californicus*), but also house mouse (*Mus musculus*) and western harvest mouse *(Reithrodontomys megalotis*) are the kite's principal dietary components. White-tailed kite territory size is a function of prey and competitor abundance. Reported average territory sizes include 4 to 53 acres, 47 to 130 acres, and 42 to 297 acres (City of Goleta, 2011). They are also found less commonly over agricultural areas and along highway rights-of-way (Lehman, 2015).

Burrowing owl. The burrowing owl formerly bred along the South Coast and in western Santa Barbara County, but its presence along the South Coast and western portions of Santa Barbara County is now restricted to late fall and winter transients from more interior portions of California (Lehman, 2015). Favored overwintering sites over the past two decades have been More Mesa and San Marcos Foothills (Lehman, 2015). Burrowing owls frequent extensive dry or sparse grassland and agricultural areas. The burrowing owl nests in burrows typically dug by fossorial mammals such as badgers and ground squirrels. Man-made structures, such as cement culverts and debris piles, may also be used. Recent sightings of wintering burrowing owls along the South Coast include Atascadero Creek near More Mesa in 2008, rocky grassland northeast of Foothill Road and Highway 154, the University of California Santa Barbara (UCSB) West Campus in 1998 and other University lands north of the Coal Oil Point Reserve in 2001. The latter record was of a single individual observed within a burrow in heavily disturbed area in the southern portion of the University-owned South Parcel, several hundred feet northwest of Devereux Slough in winter, 2001. A burrowing owl may have been observed on November 7, 2006 by Goleta staff along the railroad berm to the north of the Village at Los Carneros development site west of Los Carneros Road (City of Goleta, 2014a). Given the lack of recent records in the project vicinity, fragmented ruderal habitat subject to ongoing disturbance, and the adjacency on-site ruderal habitat to U.S. Highway 101 and the Union Pacific Railroad (UPRR) tracks, the burrowing owl has low potential to overwinter on at or adjacent to the Project site.

As discussed above, the low potential to occur determination is applied to species that are documented, but likely to be only transient through the area during foraging or migratory movements. Several other raptors that do not meet the aforementioned definition as “sensitive” (but are protected when nesting pursuant to CFGC § 3503.5) were observed or have the potential to forage at the site, including the American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*). The following discussion of raptor habitat focuses considerably on the sensitive white-tailed kite, as the local population of white-tailed kites has been well studied, it is the only FP raptor documented as foraging (only) at the Project site, and it also nests in the Goleta area (outside the Project site).

The General Plan extends protection to raptor nesting and roosting sites, by designating nesting and roosting sites as ESHA. The City requires that new development be set back at least 100 feet from active and historical raptor nests that qualify as ESHA, under CE Policy 8.4 (when feasible). Nesting raptors are also protected by Fish and Game Code Sections 3503 and 3503.5, as well as the Migratory Bird Treaty Act.

Raptor nests were not observed during the biological surveys conducted in 2015, 2014, 2013, 2010, and 2008, and the General Plan does not have a record of a historical raptor nest at or adjacent to the Project, as shown in the General Plan CE Figure 4.1 (Figure 4). Special Status and other sensitive raptors do not have potential to nest at the Project site due to lack of suitable nesting habitat and the proximity of the site to existing development, noise, and human activities, or because the Goleta area is outside of the species current breeding range. The Project site also lacks habitat for communal roosts of turkey vultures or white-tailed kites. The stand of eucalyptus located to the north of the northern stockpile area and the UPRR could be used by nesting raptors, although this is considered unlikely due to the proximity of the trees to Los Carneros Road and U.S. Highway 101 and, therefore, considerable traffic and noise. Additionally, the off-site trees were surveyed for nests in the spring 2015, and raptor nests (active or inactive) were not detected.

White-tailed kites gather in communal roosts during the non-breeding season. Roost aggregations of several to 45 individuals were recorded during regular monitoring of several roost sites in Goleta from November 1986 to May 2000 (Holmgren, 2000). Historically, More Mesa has been the most important communal roosting site in the Santa Barbara area, which is approximately three miles from the Project. Turkey vulture communal roosts at Ellwood North and Ellwood West on Ellwood Mesa are documented in the Ellwood-Devereux Coast Open Space and Habitat Management Plan (March 2004). The northern harrier has also roosted at the Los Carneros Wetland (GSEMP, 1997).

At the Los Carneros Wetland, white-tailed kites nested in 1990 (City of Goleta, 2012), and winter roosts were observed 1985–1990 (Lehman, 2015). However, presence/absence data for nesting kites is lacking for the wetland for most years since 1990. This historical nest site is several hundred feet to the south of the Project and, therefore, well outside of the 100-foot buffer required between new development and historical nest sites of sensitive (special-status) raptors by the General Plan (City of Goleta, 2012).

White-tailed kite nest sites can be vacated for a period of years and returned to later for nesting (Holmgren, 2000). The possibility of kites returning to roost or nest at the Los Carneros Wetland cannot be discounted, although it is less likely now that the wetlands are nearly surrounded by residential development and roads. In the Goleta area, kite nest sites have always been adjacent to open space areas with a stable prey base (Holmgren, 2000). Historical nest sites in the Goleta area have been abandoned when adjacent foraging areas have been compromised (Holmgren, 2000). Selected important nesting areas for the white-tailed kite in the Goleta area include Ellwood Mesa, Lake Los Carneros County Park, Coal Oil Point Reserve and nearby undeveloped areas, More Mesa, the East Storke Campus Wetland, and the Goleta Slough.

General Plan Policy CE 8.2 requires that all development be located, designed, constructed, and managed to avoid disturbance or adverse impacts to sensitive (special-status) species and their habitats, including nesting, rearing, roosting, *foraging*, and other elements of required habitats. The City's Environmental Thresholds and Guidelines Manual instructs that a project may result in a significant impact if it substantially fragments, eliminates, or otherwise disrupts foraging areas and/or access to food resources.

Project site habitat includes 4.74 acres of *Bromus* grassland, 4.17 acres of quailbush scrub, 3.29 acres of coyote brush scrub, and 4.06 acres of upland mustards that likely provide limited low-quality foraging habitat for raptors. The raptor foraging habitat at the Project site is separated from Bishop Ranch and Lake Los Carneros foraging habitat by U.S. Highway 101 and UPRR train tracks. Two important factors influencing habitat quality for foraging are prey density, as well as habitat features affecting prey accessibility, such as suitable perches (Dunk 1995). A number of prey species including Botta's pocket gophers, California ground squirrels, brush rabbits, various passerines, and western fence lizards, as well as several rodent burrows were observed during the biological surveys of the site in 2010, 2013, 2014, and 2015. Based on previous environmental analysis, the site has prey availability and foraging value (City of Goleta, 2011). The Project site does not contain notable perching habitat for foraging raptors. There are a few medium-sized trees, fences, and tall posts adjacent to the Project site, as well as tall eucalyptus trees to the north, which could serve as perches for foraging raptors. However, these potential perches are generally close to existing development or the traffic and noise of the U.S. Highway 101.

The Project is in local wildlife linkage between natural habitats to the north of U.S. Highway 101, the project site, and Los Carneros Wetland (see Section 4.5, *Wildlife Movement*). These habitat connections are expected to have positive effects on the foraging value of the site, as they allow for dispersal of small mammals and other prey species to repopulate the site following population declines. Prey density is in part dependent upon the ability of prey populations to rebound following cyclical declines caused by over-exploitation by predators or catastrophes, such as drought or disease. Habitat connectivity is an important factor affecting the ability of prey populations to rebound. Corridors and connections among habitat areas indirectly support kites as well as other birds-of-prey by maintaining their prey base.

White-tailed kites are known to forage up to tens of kilometers from communal roost sites, so when prey reductions occur at the local level, kites have a sufficiently large daily range that they can find other areas to hunt (Dunk, 1995). When collapse of prey populations occurs at the regional scale, kites can vacate an area until prey populations rebuild at which time kites gradually reoccupy suitable foraging areas, nest sites, and roost locations (Dunk, 1995). The local population of white-tailed kites has fluctuated dramatically presumably in response to prey abundance. Kites are a nomadic species able to adopt new home bases and vacate long-used areas quite abruptly (Dunk, 1995). The presence and abundance of white-tailed kites is strongly correlated with the presence of meadow voles (Stendell, 1972). California voles (*Microtus californicus)* were not observed, but can be expected to occur at the Project site.

As discussed previously, white-tailed kites formerly nested at the Los Carneros Wetland. If kites were to return to nest at the Los Carneros Wetland, the foraging habitat at the Project site would become of greater importance, as kites seldom forage more than 0.5 mile from the nest when breeding (Hawbecker, 1942). Henry (1983) found the mean breeding home range to be as low as 0.2 mile. The Project is within a 0.2-mile radius of the wetland, and much of the area within a 0.5-mile radius of the wetland is currently developed and would be almost completely developed under the Project. With development of the Project, kites nesting at the Los Carneros Wetland would be able to forage within a 0.5-mile radius of the wetland at the areas within the Goleta Slough Ecosystem south of Hollister Road, and undeveloped fields and native habitats north of U.S. Highway 101.

The Project also within a 0.5-mile radius of the natural habitats at Lake Los Carneros County Park, where nesting kites or kites displaying persistent territoriality have been observed in most years since year 1999 (City of Goleta, 2012). Kites have been recorded nesting have been recorded in the pine trees south of the dam in recent years (Millikan, 2011). Although the Project is within a 0.5-mile radius of this area, the foraging habitats at the County Park and adjacent undeveloped fields to the north of U.S. Highway 101 are probably of sufficient size and quality to support successful kite breeding. The Project is outside of the anticipated foraging range of nesting white-tailed kites at other known key nesting areas in the Goleta area (City of Goleta, 2012).

Although the Project site is estimated to be of moderate value to foraging raptors, it is of lesser regional importance given its small size, fragmented condition, proximity to urban development and road right-of-ways, and low native habitat diversity. The Project site is part of a fragmented area of disturbed habitat that is surrounded by development and roads. The Goleta area contains a number of other natural areas that provide comparatively larger expanses and higher value raptor habitat, as evidenced by the documented use and repeated nesting of various species of raptors in these areas (City of Goleta, 2012). For example, quality raptor habitat exists at Ellwood Mesa, Los Carneros Lake County Park, the Goleta Slough, Coal Oil Point Reserve and vicinity, and the Santa Ynez foothills.

Raptors generally require large home ranges, and individual foraging territories are often measured in terms of tens of acres to square miles. During breeding, demand for prey increases and additional habitat must be available for young birds to disperse from nesting locations and establish new territories. Urban development and other land-use conversion have resulted in the removal of substantial amounts of raptor foraging habitat in the Goleta area. Loss of foraging habitat reduces prey abundance and availability, which reduces and limits the number of raptors a given area can support. In general, smaller populations are less resilient to environmental stress (e.g. drought, disease, and fluctuations in prey availability).

Semi-aquatic Animals and Off-site Aquatic Critical Habitat

Semi-aquatic species (e.g., California red-legged frog, two-striped garter snake) are not likely to occur in and upstream from the channelized section of Los Carneros Creek adjacent to the Project, because only a limited band of riparian habitat is present that is adjacent to and subject to noise and vibration disturbances from U.S. Highway 101 and UPRR. The upland areas within 100 feet of the creek include the off-site filled and compacted UPPR tracks, and areas on the Project site that have recently been graded and reseeded. Areas within 500 feet of the creek are not suitable upland transitional habitat because of ongoing disturbance.

Off-site Los Carneros Creek provides intermittent aquatic habitat; during the dry season flow is low and consists of agricultural run-off (Leydecker, 2006). The creek is designated critical habitat for the southern steelhead, and south of Hollister Avenue for the tidewater goby (*Eucyclogobious newberryi*). However, neither species is anticipated to be present adjacent to the Project since the riparian area is separated from the Goleta Slough by 0.41 mile of channelization. Refer to Figure D.1 in Appendix D for map of designated critical habitat in the Project vicinity.

No direct impacts would result from construction and operation since no aquatic habitat occurs (or is expected to occur) on-site, Indirect impacts off-site aquatic habitat for downstream aquatic species (e.g., tidewater goby, and steelhead) would be reduced with adherence to existing regulations requiring a Stormwater Pollution Prevention Plan (SWPPP) to address stormwater run-off and sedimentation. Therefore, no special status aquatic or semi-aquatic species are expected to be impacted by the project and no further analysis of special status aquatic or semi-aquatic species is required.

4.2 SENSITIVE PLANT COMMUNITIES

One sensitive plant community that is tracked by the CNDDB occurs within the Project vicinity: Southern Coastal Salt Marsh. This nearshore marine tidal habitat is not present on-site. During the 2015 surveys no sensitive plant communities were present, nor were any of the individual indicator species associated with the communities observed. As discussed above, the purple needlegrass hydro-seeded within the upland mustard area is not considered a sensitive community, including under the General Plan and City's CEQA Thresholds. ESHA on-site and adjacent to the Project is discussed in Section 4.5, *Resources Protected by Local Policies and Ordinances*, below.

4.3 JURISDICTIONAL WATERS AND WETLANDS

No areas defined as wetlands by Federal, State or local policy are located on the Project site. Two previously identified jurisdictional features exist off-site adjacent to Project: 1) Los Carneros Creek, approximately 90 feet (measured from the edge of riparian vegetation) north of the northeast corner and channelized east of the Project; and 2) the Los Carneros Wetland, approximately 80 feet south of the southeastern corner of the Project site. No jurisdictional features are present within the Project site.

Los Carneros Creek riparian habitat, measured to edge of the willow thickets, extends approximately 100 feet wide beyond the limits of the banks where the creek crosses U.S. Highway 101. The potential off-site jurisdictional edge of riparian vegetation begins approximately 90 feet from the northern Project boundary. During 2015 surveys the ordinary high water mark (OHWM) was not apparent as the creek was obscured by vegetation. The off-site drainage is intermittent and does not regularly contain flowing water (Leydecker, 2006). Los Carneros Creek is channelized approximately 400 feet to the east of the Project, separated by Aero Camino. Water in Los Carneros Creek flows approximately 1.18 river miles south to its confluence with Tecolotito Creek, then approximately 2.24 river miles through the Goleta Slough to the Pacific Ocean.

As authorized by the U.S. Army Corps of Engineers (USACE) 404 Permit (No. 95-50087-DJC) the Los Carneros Wetland is permitted to receive stormwater flows from the Willow Springs I & II development, and the Project. The northern portion of the Los Carneros Wetland was required to be created to both as mitigation for filling a portion of a wetland on Willow Springs I, and to manage stormwater run-off from Willow Springs I & II and the Project.

4.4 WILDLIFE MOVEMENT

Wildlife need to access essential habitat for water, foraging, breeding, and cover. Examples of barriers or impediments to movement include housing and other urban development, roads, fencing, unsuitable habitat, or open areas with little vegetative cover. “Wildlife corridor” is a term commonly used to describe linkages between discrete areas of natural habitat that allow movement of wildlife for foraging, dispersal, and seasonal migration.

The Project is in a highly urbanized area. At the regional/landscape level scale, the City is not within any mapped landscape models, such as an Essential Connectivity Area or Natural Landscape block in the *California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California* (Spencer, et al. 2010). Recent Environmental Impact Reports (EIRs) analyzed potential impacts to wildlife corridors for proposed residential projects adjacent to Los Carneros Road and south of U.S. 101: Willow Springs II, to the east of Los Carneros Road (City of Goleta, 2011), and the Village at Los Carneros (City of Goleta 2014), to the west of Los Carneros Road. Tecolotito Creek is recognized as ESHA under the General Plan and considered a wildlife corridor for mammal species that travel between the Santa Ynez Mountain foothills and the Santa Barbara Airport and greater Goleta Slough (Dudek, 2014b). Los Carneros Creek that connects areas north of U.S. 101 to the Goleta Slough is a poor wildlife linkage providing minimal wildlife habitat. The “stormwater culvert” consists of an approximate 2,000 foot concrete-lined flood control channel with steep walls and 6-foot high chain-link fences at the top-of-slope (west and east) bordering the channel. The Project site was evaluated as an alternative wildlife movement corridor, from the Los Carneros Creek culvert under U.S. Highway 101, through the Project site and Los Carneros Wetland, below Hollister Avenue, and to the Goleta Slough (City of Goleta, 2011; Figure 4.3-3).[3]

The General Plan does not specifically define “wildlife corridors” or “habitat networks” which as discussed below, are protected under the General Plan. A wildlife movement corridor was defined by the City in the Willow Springs EIR as:

> “*…physical connections that allow wildlife to move between patches of suitable habitat in both undisturbed landscapes, as well as environments fragmented by urban development. Large areas of suitable habitat and corridors between these areas are necessary to maintain healthy ecological and evolutionary processes. For example, wildlife movement corridors are necessary for dispersal and migration, to ensure the mixing of genes between populations, and so wildlife can respond and adapt to environmental stress.*”

The *Wildlife Corridor Analysis for the Heritage Ridge Project* (Appendix E) further defines wildlife movement between core areas and/or habitat patches as wildlife corridors and linkages:

> Habitat Linkage: *An area which possesses sufficient cover, food, water and/or other essential elements to serve as a movement pathway between two or more large areas of habitat. An example of a linkage would be a belt of coastal sage scrub traversing a development, and connecting suitable habitat areas on either side of the developed area.*

---

[3] The wildlife analysis shown in Figure 4.3-3 of the Willow Springs II EIR does not account for the existing cultural resource fencing present in the project site.

> Wildlife Corridor: *Areas of open space of sufficient width to permit larger, more mobile species to pass between larger areas of open space (core habitats), or to disperse from one major core habitat to another. Such areas can be several hundred feet wide, unobstructed, and usually possess cover, food and water.*

The Willow Springs II EIR identified two biologically significant ecological habitat “patches” in the area, the Santa Ynez Mountains and the Goleta Slough. The latter, the Goleta Slough, has become isolated from the “core habitats” of the Santa Ynez Mountains due to urban expansion in the City. Several creeks connect these two ecological areas, including Tecolotito (Glen Annie), Los Carneros, San Pedro, Las Vegas, San Jose, and Marie Ignacio. Tecolotito Creek has been determined to be one of four primary corridors in the Goleta Valley with sufficient culvert sizes to allow for movement of larger mammals (i.e., deer and black bears) (Hoagland et al., 2011; City of Goleta, 2012). However, in the Village of Los Carneros FEIR, the City (2014) noted that the largest species to move through the Tecolotito Creek and culverts are foxes (*Vulpes* spp.) and the American badger and found the 110-foot total minimum width (60-feet for the Tecolotito Creek ESHA and 50 feet for adjacent upland habitat) proposed for the Los Carneros Village project was sufficient for wildlife species utilizing corridor (City of Goleta, 2014a). Based on literature, existing regional data, and site-specific studies, Tecolotito Creek and its culverts provide the best option for wildlife movement between the Santa Ynez Mountain foothills and the Goleta Slough on Santa Barbara Airport property.

In 2014 and 2013, wildlife camera studies were conducted, as summarized in the *Wildlife Corridor Analysis for the Heritage Ridge Project* (Appendix E). The study found evidence of a wildlife linkage between the Santa Ynez Mountain foothills and the Los Carneros Wetlands through the Heritage Ridge Project site and no linkage between the Los Carneros Creek or Wetlands and the greater Goleta Slough on the Santa Barbara Airport. This on-site wildlife linkage is important for many small- (raccoon, striped skunk, etc.) and medium- (coyote and bobcat) sized mammal species that use these areas (wetlands and foothills) to hunt, seek shelter, breed, and conduct other normal behaviors important for their survival, especially within the wilderness-urban interface. The study confirmed that the Hollister Avenue culvert at Tecolotito Creek offers the most ideal wildlife access point to the Goleta Slough on Santa Barbara Airport property. Another possible wildlife linkage exists to the east connecting to Las Vegas Creek at the Twin Creeks Golf Course, which also connects to the Goleta Slough, although with impediments. The expected end point of the linkage for most wildlife species traveling to the east may be the golf course for hunting opportunities.

4.5 RESOURCES PROTECTED BY LOCAL POLICIES AND ORDINANCES

Natural resources are regulated and protected through the Conservation Element (CE) of the General Plan, which contains policies aimed at protecting ESHAs that are generally mapped in Figure 4.1 of the General Plan (Figure 4). The General Plan provisions are also included in the City’s Zoning Ordinance through the ESHA Goleta Overlay (Section 35-250B).[4] Policies in the CE reinforce State and Federal regulations that protect special-status habitats and species and apply additional local restrictions to identify, preserve, and protect the City’s biological resources. Below is a summary of each ESHA type mapped on or near the Project (See Figures 3 and 4), and the text of the policies that regulate these resources.

---

[4] The City’s Zoning Ordinance also includes a Riparian Corridor Goleta overlay (Section 35-250C), but it only applies to rural agriculturally designated parcels the existing and Project site land use designation is urban.

Sage Scrub ESHA

A portion of the Project site that contains coyote brush scrub is currently designated an ESHA pursuant to the City's General Plan. It is mapped on Figure 4-1 of the Conservation Element as "sage scrub" on the Project site in the approximate areas fenced for cultural resources, as shown in Figure 3. Pursuant to CE Policy 1.5, the ESHA designation may be removed if a site-specific biological study contains substantial evidence that an area previously shown as an ESHA on Figure 4-1 does not contain habitat that meets the definition of an ESHA (excluding illegal removal). If the final decision-making body determines that the area is not an ESHA, a map modification shall be included in the next General Plan/Coastal Land Use Plan amendment. Please refer to Appendix F, *Technical Review of Coastal Sage Scrub (CSS) Environmentally Sensitive Habitat Area (ESHA) for the North Willow Springs Project*, for a site-specific biological study and substantial evidence regarding the ESHA designation. The area originally designated ESHA also extended onto Willow Springs II; refer to Figure 4-1 City's General Plan Conservation Element (Figure 4). A General Plan Amendment removing the sage scrub ESHA designation from Willow Springs II was approved by the Goleta City Council on June 17, 2014.

The Project was not mapped as ESHA under the 1993 Goleta Community Plan (County of Santa Barbara, 1993). The on-site ESHA is mapped as "Various Annual Grasslands" a habitat type under the March 2004 Detailed Habitat Inventory conducted by the City (City of Goleta, 2004). The 2006 General Plan EIR maps the on-site ESHA as "scrub." However, "coyote brush scrub" in not considered ESHA under the Programmatic General Plan EIR (City of Goleta, 2006, Page 3.4-10). A description of the coyote brush scrub is provided under Section 3.2, *Vegetation and Sensitive Plant Communities*.

The General Plan CE Policy 5.3 defines coastal sage scrub habitat as a drought-tolerant, Mediterranean habitat characterized by soft-leaved, shallow-rooted subshrubs such as California sagebrush, coyote brush, California encelia, goldenbush (*Ericameria ericoides*), giant wild rye (*Elymus condensatus*), and annual non-native grasses. Of these species only coyote brush was observed as dominant or codominant within the mapped on-site ESHA. The National Vegetation Classification Hierarchy as Applied to California Vegetation identifies coastal sage scrub as a macrogroup of multiple alliances, none of which includes coyote brush as the dominant alliance species. Under General Plan CE Policy 5.3 coastal sage scrub habitat must have both the compositional and structural characteristics of coastal sage scrub as described in a classification system recognized by the CDFW. However, no other characteristic coastal sage scrub species was observed as occurring even infrequently or sparsely (< 8% cover) by Rincon or Dudek Biologists.

The coyote brush scrub does not meet City's General Plan Policy CE 1.1a or CE 1.1b definitions of ESHA, and is not "rare or especially valuable because of its special nature or role in an ecosystem," when considering of the following conditions:

- Coyote brush scrub is a common plant community. Coyote brush scrub receives the lowest rarity ranking (G5S5) and is not considered sensitive by the State of California (CDFW, 2010);
- The coyote brush scrub at the site is disturbed, contains high cover of invasive species, low native plant species diversity, and has become established at the site relatively recently since the area was last graded. The site has been subject to agricultural activity related earth disturbance for much of the last 100 years;
- Threatened, endangered, or other special status wildlife species are not expected to reproduce at the site, and the site is not essential to the life-cycle of any listed wildlife species;
- Threatened, endangered, or other special status plant species have not been found at the site, and are not expected due to prior grading and agricultural use, as well as the site's existing disturbed condition; and,

- The coyote brush scrub is within an urban area, adjacent to existing industrial and residential development, and is not contiguous with native habitats.

Therefore, although according to Figure 4-1 in the Conservation Element of the Goleta General Plan the Project site contains coastal sage scrub ESHA, habitat that meets ESHA criteria was not observed within the Project boundary or nearby areas.

The coyote brush scrub does not meet the criteria in relevant City's General Plan policies to be considered an ESHA or coastal sage scrub; and therefore, should not be subject to the ESHA protection policies of the General Plan. Conservation Element policy CE 1.5: *Corrections to Map of ESHAs* allows ESHAs to be removed from Figure 4-1 of the General Plan if a site-specific biological study demonstrates substantial evidence that the area does not in fact contain habitat that meets the definition of an ESHA. The Project includes a General Plan Amendment to remove the Coastal Sage Scrub ESHA designation that is being concurrently processed. For further details, refer to Appendix F, *Technical Review of Coastal Sage Scrub (CSS) Environmentally Sensitive Habitat Area (ESHA) for the North Willow Springs Project.*

Stream Protection Area ESHA

The riparian habitat associated with the Los Carneros Creek adjacent the northeast property line is mapped as a Stream Protection Area (SPA) ESHA, thereby warranting a 100-foot buffer under Policy CE 2.2.

Wetland ESHA

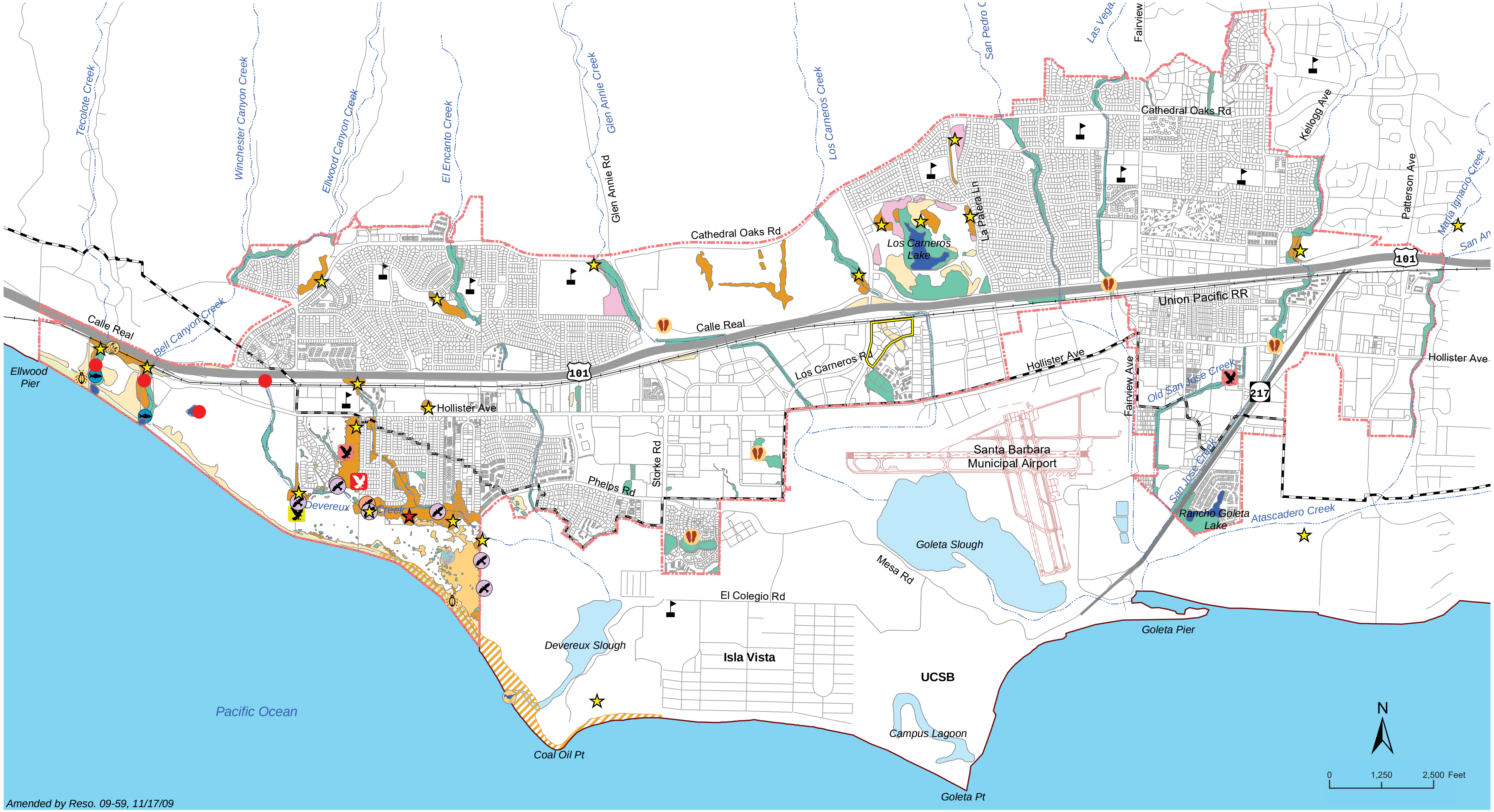
The Los Carneros Wetland begins approximately 80 feet from the southeast portion of the Project site, and is designated ESHA pursuant to General Plan CE Policy the 3.5, *Protection of Wetlands Outside the Coastal Zone*. A buffer evaluation is required under Policy CE 3.5; the policy requires a minimum buffer of 50 feet.

The Los Carneros Wetland is an approximate 7.25-acre open space area located north of Hollister Avenue, east of Los Carneros Way, and southwest of the residential units at Willow Springs I. It is approximately 600 feet southwest of the Willow Springs II project. The GSEMP considered the Los Carneros Wetland a major subarea of the Goleta Slough Ecosystem. The Los Carneros Wetland is a rare, surviving remnant freshwater-to-estuarine transitional habitat at the northern edge of the Goleta Slough. It contains areas of brackish and freshwater marsh, as well as willow-dominated, palustrine scrub-shrub/forested wetlands that were once part of a continuous corridor connecting Lake Los Carneros and the Goleta Slough. The site has historically supported nesting and roosting white-tailed kites. The wetland is also known as a roosting and foraging habitat for the northern harrier, short-eared owl, sharp-shinned hawk, and Cooper's hawk, and supports the only Goleta Valley location for yerba

Imagery provided by Google and its licensors © 2015.
Additional data provided by City of Goleta, March 2015.

Surrounding ESHA Map

Figure 3



Amended by Reso. 09-59, 11/17/09

Legend

Environmentally Sensitive Habitats
- 🟨 Beach and Shoreline
- ▭ Unvegetated Open Creek Channel
- 🟦 Open Water
- 🟩 Riparian/Marsh/Vernal Pool
- 🟧 Native Grassland
- 🟨 Sage Scrub/Dune/ Bluff Scrub
- 🟪 Native Upland Woodlands /Savannahs
- 🟧 Monarch Butterfly and/or Raptor Roosting Habitat
- ▨ Critical Habitat for the Western Snowy Plover

Special-Status Species
- Cooper's Hawk Nest
- Kite Nest
- Red-Shouldered Hawk Nest
- Red-Tailed Hawk Nest
- Vulture Roost
- Western Snowy Plover
- Tidewater Goby
- ● Red-Legged Frog
- Globose Dune Beetle
- ● Santa Barbara Honeysuckle
- Black-Flowered Figwort
- Southern Tarplant
- ☆ Monarch Butterfly Aggregation
- ★ Ellwood Main Monarch Grove

Other Features
- Goleta City Boundary
- Coastal Zone
- Schools
- Creeks
- ▭ Project Site

Sources: Habitat mapping conducted by Jones & Stokes in April-May 2006 based on aerial imagery (1-foot resolution) and field observation, merged with 1) information on the occurrence of special status habitats and species collected by City from recent information from local environmental review ; 2) mapping of creeks, ponds, lakes and reservoir location based on USGS topographic map review and habitat management plan documents, air photo interpretation, and field survey; and 3) review of California Natural Diversity Database (CNDDB) records by Jones & Stokes for occurrence of special status species in the Goleta and Dos Pueblos quadrangles and vicinities (2006 databases). Habitats reflect those comprising an ESHA.

Note: ESHA locations are approximate. Any area not designated on the ESHA map that meets the ESHA criteria shall be accorded the same protections as if the area was shown on the map. ESHA buffers are not shown on this map. Refer to the applicable policy in the General Plan for the specific buffer widths.

Special-Status Species and Environmentally Sensitive Habitat Areas

Source: Goleta General Plan/Local Coastal Program, 2009

Figure 4

mansa (*Anemopsis californica*), a locally important species according to the GSEMP. The Los Carneros Wetland is upstream from and connected to the Goleta Slough through a small culvert traversing north-south beneath Hollister Road. The Los Carneros Wetland serves as an approved detention area and bio-filter for stormwater flows from the existing Willow Springs I and II developments, and the Project. Refer to the Preliminary Hydraulic Report and Preliminary Stormwater Control Plan (MAC Design, 2014) and Environmental Impact Report Section 4.8, *Hydrology and Water Quality,* for additional information regarding Project drainage.

General Plan Policies

Below is a summary of the biological resource policies in the CE that apply to the Project; full text of the biological resource policies are included in Appendix A, *Regulatory Guidance.*

Policy CE 1: Environmental Sensitive Habitats Area Designation and Policy. The key protections and guidelines are stated in Policy CE 1, which include the following provisions applicable to ESHA:

- No development, except as otherwise allowed by Policy CE 1 is allowed within ESHAs.
- A setback or buffer separating all permitted development from an adjacent ESHA is required and must meet the minimum width requirements identified in the Conservation Element.
- Where there are no feasible, less environmentally damaging alternatives, the following uses may be located in ESHAs and ESHA buffers provided that measures are implemented to avoid or lessen impacts to the maximum extent feasible: public road crossings, utility lines, resource restoration and enhancement, nature education, and biological research.
- Any land use, construction, grading, or removal of vegetation that is not specified in Policy CE 1 is prohibited.
- New development must be sited and designed to avoid impacts to ESHAs. If there are no feasible alternatives that can eliminate all impacts, the alternative with the fewest or least significant impacts will be selected. Any impacts that cannot be avoided must be fully mitigated. On-site mitigation will be given priority; off-site mitigation will be approved only when is it not feasible to mitigate fully on-site.
- Development adjacent to an ESHA must minimize impacts to habitat values or sensitive species in the ESHA area to the maximum extent feasible.
- ESHA buffers shall have native habitat to serve as transitional habitat and must be of sufficient size to ensure the biological integrity and preservation of the ESHA they are intended to protect.
- Development in or adjacent to ESHA is subject to the following standards:
  - Site designs shall preserve wildlife corridors or habitat networks (CE 1.9).
  - Land divisions for parcels (except for open space lots) shall be allowed only if the new lot(s) can be developed without building in an ESHA or ESHA buffer and without impacts to ESHAs related to fuel modification for fire safety purposes.
  - Site plans and landscaping shall be designed to protect ESHAs, with priority given to protecting, supporting, and enhancing wildlife habitat values. Planting of nonnative invasive species is prohibited in ESHAs and ESHA buffers.
  - All new development shall be sited and designed to minimize grading, alteration of natural landforms and physical features, and vegetation clearance in order to reduce or avoid soil erosion, creek siltation, increased runoff, and reduced infiltration of stormwater and to prevent net increases in baseline follows for any receiving water body.
  - Light and glare will be controlled and directed away from wildlife habitat. Exterior night lighting shall be minimized, restricted to low intensity fixtures, shielded, and directed away from ESHAs.

- Noise levels from new development should not exceed an exterior noise level of 60 Ldn at the habitat site. During construction, this level may be exceeded if it can be demonstrated that significant adverse impacts on wildlife will be avoided or will be temporary.
- All new development shall be sited and designed to minimize the need for fuel modification or weed abatement for fire safety in order to preserve natural vegetation in and adjacent to ESHAs.
- The timing of grading and construction activities shall be controlled to minimize potential disruption of wildlife during critical time periods such as nesting or breeding seasons.
- Grading, earthmoving, and vegetation clearance adjacent to an ESHA shall be prohibited during the rainy season, generally from November 1 to March 31, except where necessary to protect or enhance the ESHA or to remediate hazardous flooding hazardous geologic conditions.
- In areas not adjacent to ESHAs where grading may be allowed, erosion control measures shall be implemented prior to and concurrent with all grading operations.

Additionally, the ESHA Goleta Overlay (Inland Zoning Ordinance Section 35-250.B) and General Plan Policy 8.3 requires a biological report for applications application with ESHA on-site, and includes specific conditions that may be placed on a project (e.g., deed restrictions, vegetation replacement). While not mapped under General Plan Figure 4.1, wildlife corridors are protected under CE policy 1.9. Wildlife corridors have been identified on the Project site, as discussed under Section 4.4 (above).

Policy CE 2: Protection of Creek and Riparian Areas. Policy CE 2.2, designated Streamside Protection Areas (SPA), requires a 100-foot buffer from Los Carneros Creek, as it is identified as creeks as shown in Figure 4.1 (Figure 4). SPA buffers may be adjusted based on a site-specific recommendation to the City. Section 4.3 of the EIR includes a buffer recommendation from off-site Los Carneros Creek.

Policy CE 3: Protection of Wetland. The off-site Los Carneros Wetland, which was previously in identified as an USACE wetland (i.e., hydrophytic vegetation, hydrology, and soils) is protected under Policy CE 3.2, as analyzed under EIR Section 4.3.

Policy CE 8: Protection of Special-Status Species. Nesting and roosting habitat for raptors are protected as ESHA in the under Policy CE 8. Policy CE 8.4 requires protection of protected raptors through the establishment of buffers around historic and active nests when feasible. No historical raptor nests are mapped nor were raptor nests observed in suitable eucalyptus tree habitat; therefore raptor nest ESHA is not present. Policy CE 8.3 requires a site-specific biological study, with specific ESHA mapping requirements.

Policy CE 9: Protection of Native Woodlands. Within the City there is currently no specific Tree Protection Plan or Ordinance adopted. Protection of trees within the City is regulated by Section 4.0, CE 9 of the General Plan, the Goleta Municipal Code Appendix A Grading Ordinance Guidelines for Native Oak Tree Removal (GMC), and the Draft *State of the Goleta Urban Forest Report: An Urban Resource Assessment for the City of Goleta* (dated November 17, 2009; herein referred to as the Goleta Urban Forest Report). The General Plan contains policies for the preservation of native trees including oaks (*Quercus* spp.), walnut (*Juglans californica*), California sycamore, cottonwood (*Populus* spp.), willows (*Salix* spp.) and other native trees found in ESHAs (General Plan Policy CE 9: Protection of Native Woodlands). However, per the GMC Part III – Program Basics trees voluntarily planted (e.g., landscape trees), regardless of species, are not protected. Landscape trees may be replaced. No trees are present on-site or are proposed for removal. Willows and eucalyptus tree present off-site in, but would not be directly affected by the Project.

Policy CE 10: Watershed Management and Water Quality. Provisions of Policy CE 10 that apply to the Project include Policy 10.3, Incorporation of Best Management Practices for Stormwater Management, CE 10.6, Stormwater Management Requirements, and Policy CE 10.7, Drainage and Stormwater Management Plans. Additionally, Policy CE 10, Landscaping to Control Erosion, specify erosion control landscaping specifics.

Other policies in the CE that do not apply to the Project provide additional detail project-level standards for terrestrial habitat areas (native grasslands, chaparral), and marine habitat areas beach and shoreline habitats.

4.6 CONSERVATION PLANS

No Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan has been adopted in this urbanized area.

5.0 IMPACT ANALYSIS AND MITIGATION MEASURES

Refer to Section 4.3, *Biological Resources*, of the Environmental Impact Report for a discussion of impact analysis and mitigation measures.

6.0 LIMITATIONS, ASSUMPTIONS, AND USE RELIANCE

This Biological Resources Assessment has been performed in accordance with professionally accepted biological investigation practices conducted at this time and in this geographic area. The biological investigation is limited by the scope of work performed. Biological surveys for the presence or absence of certain taxa have been conducted as part of this assessment but were not performed during a particular blooming period, nesting period, or particular portion of the season when positive identification would be expected if present, and therefore, cannot be considered definitive. The biological surveys are limited also by the environmental conditions present at the time of the surveys. In addition, general biological (or protocol) surveys do not guarantee that the organisms are not present and will not be discovered in the future within the site. In particular, mobile wildlife species could occupy the site on a transient basis, or re-establish populations in the future. Our field studies were based on current industry practices, which change over time and may not be applicable in the future. No other guarantees or warranties, expressed or implied, are provided. The findings and opinions conveyed in this report are based on findings derived from site reconnaissance, jurisdictional areas, review of CNDDB RareFind 5, and specified historical and literature sources. Standard data sources relied upon during the completion of this report, such as the CNDDB, may vary with regard to accuracy and completeness. In particular, the CNDDB is compiled from research and observations reported to CDFW that may or may not have been the result of comprehensive or site-specific field surveys. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

7.0 REFERENCES

American Ornithologists' Union (AOU). 2015. Check-list of North American Birds. Retrieved from: http://www.aou.org/checklist/north/

Associated Transportation Engineers. 2015. Heritage Ridge Project, City of Goleta California Updated Traffic Circulation, and Parking Study

Baldwin, B.G. (Ed.) et al., 2012. The Jepson Manual: Vascular Plants of California, Second Edition. University of California Press. Berkeley, California.

Bowers, N., R. Bowers, & K. Kaufman. 2004. Mammals of North America.

Burt, W.H., and R.P. Grossenheider. 1980. A Field Guide to the Mammals of North American North of Mexico. The Peterson Field Guide Series.

Calflora. 2015. Information on wild California plants for conservation, education, and appreciation. Berkeley, CA. Retrieved from: http://www.calflora.org/

[CDFW] California Department of Fish and Wildlife. 2015a. California Natural Diversity Database, Rarefind V. 5.

CDFW. 2015b. Special Animals List. Biogeographic Data Branch, California Natural Diversity Database. October 2015.

CDFW. 2015c. Biogeographic Information and Observation System (BIOS). Retrieved from http://bios.dfg.ca.gov

CDFW. 2015d. Special Vascular Plants, Bryophytes, and Lichens List. Biogeographic Data Branch, California Natural Diversity Database. October 2015.

California Department of Transportation and City of Goleta. July 2010. Ekwill Street and Fowler Road Extensions Project NES.

[CAL-IPC] California Invasive Plant Council. October, 2015. California Invasive Plant Inventory Database.

[CNPS] California Native Plant Society. 2015. Inventory of Rare and Endangered Plants (online edition, v8-02). CNPS, Sacramento, CA. Retrieved from http://www.rareplants.cnps.org.

Dudek. 2014a. Technical Review of Coastal Sage Scrub (CSS) Environmentally Sensitive Habitat Area (ESHA) for the North Willow Springs Project.

Dudek. 2014b. Wildlife Corridor Analysis for the Heritage Ridge Project.

Dunk, J.R. 1995. White-tailed Kite (Elanus leucurus). In Birds of North American Online, A. Poole, ed. Ithaca, NY: Cornell Laboratory of Ornithology. Accessed at bna.birds.cornell.edu/bna/species/178 in October, 2015.

Goleta, City of. 2004. Background Report #18: Biological Resources.

Goleta, City of. 2006. Final Goleta General Plan / Coastal Land Use Plan Environmental Impact Report (SCH # 2005031151)

Goleta, City of. November, 2009. City of Goleta General Plan / Coastal Land Use Plan.

Goleta, City of. 2012. Willow Springs II Final Environmental Impact Report (SCH# 2010031059) City of May, 2012.

Goleta, City of. 2014. Village at Los Carneros Project Final Environmental Impact Report SCH# 2011111001. June, 2014

[GSEMP] Goleta Slough Ecosystem Management Plan, December 1997.

Hawbecker, A. C. 1942. A life history study of the white-tailed kite. Condor 44: 267-276.

Hoagland, S. 2011. Habitat Linkage Project.

Holland, Robert F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Wildlife, Nongame Heritage Program. 156 pgs.

Holmgren, M. A. 2000. White-tailed Kites Near Orcutt in September 1999 and The Protection Environment for Kites in Santa Barbara County, California.

Holmgren, M.A. 2011. White-tailed Kite Mid-season Summary. Post to SB Co Birding email list.

Lehman, P. E. "The Birds of Santa Barbara County, California", Revised edition, April 2015, available at https://sites.google.com/site/lehmanbosbc/. Original edition: The Vertebrate Museum, University of California, Santa Barbara, 1994.

Leydecker, A. 2006. The Goleta Slough Watershed, A review of data collected from October 2005 through September 2006 by Santa Barbara Channelkeeper's Goleta Stream Team.

Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

MAC Design Associates. 2014. Preliminary Hydraulic Report for North Willow Springs.

MAC Design Associates. 2014. Preliminary Stormwater Control Plan.

Meade, D.E. 1999. Monarch Butterfly Overwintering Sites in Santa Barbara County California.

Millikan and Lewis. 2011. The Birds of Lake Carneros

National Audubon Society. 2015. Christmas Bird Count Historical Results. Accessed at http://birds.audubon.org/historical-results in October 2015.

[NOAA] National Oceanic and Atmospheric Administration. 2015. Retrieved from http://www.weather.gov/

Oberhauser, K., Solensky, M. 2004. The Monarch Butterfly Biology and Conservation.

Santa Barbara, City of. 2015. Draft PROGRAM ENVIRONMENTAL IMPACT REPORT On the Proposed Airport Master Plan. August 2015.

Santa Barbara, County of. 1993. Goleta Community Plan.

Santa Barbara, County of. 2010. Staff Report, Western Goleta Slough Restoration – CDFG East.

Sawyer, J. O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento, California.

Spencer, et al. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California.

Stebbins, R. C. 2003. A Field Guide to Western Reptiles and Amphibians. 2nd ed. Houghton-Mifflin Company. Boston, Massachusetts.

Stendell, R. C. 1972. The occurrence, food habits, and nesting strategy of White-tailed Kites in relation to a fluctuating vole population. Phd Thesis. Univ. of California, Berkeley.

True Nature. 2014. Preliminary Landscape Plan, Heritage Ridge

University of California, Santa Barbara; Santa Barbara, County of; Goleta, City of 2004. Draft Ellwood-Devereux Coast Open Space and Habitat Management Plan March 2004.

[USACE] U.S Army Corps of Engineers. 1995. 404 Permit No. 95-50087-DJC.

United States Department of Agricultural, Natural Resources Conservation Service. 2015a. Web Soil Survey. Retrieved from http://websoilsurvey.nrcs.usda.gov/app/.

United States Department of Agriculture, Natural Resources Conservation Service. 2015b. Lists of Hydric Soils. National Cooperative Soil Survey, U.S. Department of Agriculture. Accessed via: http://soils.usda.gov/use/hydric/.

[USFWS] United States Fish and Wildlife Service. 1973. The Endangered Species Act of 1973, as amended (16 U.S.C 1531 et seq.).

USFWS. 2000. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants. January 2000.

USFWS. 2015a. Critical Habitat Portal. Available at: http://criticalhabitat.fws.gov

USFWS. 2015b. Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested. Retrieved from: http://www.fws.gov/sacramento/es/spp_lists/auto_list.cfm

URS. March, 2014. Biological Resources Report for the Ekwill Street and Fowler Road Extension Project.

Western Regional Climate Center. 2015. Climate of California. Retrieved from http://www.wrcc.dri.edu/narratives/CALIFORNIA.htm

Zeiner, D., W.F. Laudenslayer, Jr., and K.E. Mayer (May 1988). California's Wildlife. California Statewide Wildlife Habitat Relationship System, Volumes I, II, & III. California Department of Fish and Wildlife.

8.0 LIST OF PREPARERS

RINCON CONSULTANTS, INC.

- **Primary Author:**
  - Holly Harris, Biologist / Project Manager
- **Technical Review:**
  - Steven J. Hongola, Senior Ecologist / Biological Program Manager
  - Colby J. Boggs, Principal
- **Graphics:**
  - Katherine Warner, Graphics Specialist
  - Doug Carrillo, Graphics Specialist
- **Field Reconnaissance Surveys:**
  - Amber Bruno, Senior Biologist / Program Manager
  - Holly Harris, Biologist
  - Jennifer Alvarado, Biologist

Appendix A

Regulatory Guidance

APPENDIX A: REGULATORY SETTING

Special-status habitats are vegetation types, associations, or sub-associations that support concentrations of special-status plant or wildlife species, are of relatively limited distribution, or are of particular value to wildlife.

Listed species are those taxa that are formally listed as endangered or threatened by the federal government (e.g. U.S. Fish and Wildlife Service [USFWS]), pursuant to the Federal Endangered Species Act (FESA) or as endangered, threatened, or rare (for plants only) by the State of California (i.e. California Fish and Game Commission), pursuant to the California Endangered Species Act or the California Native Plant Protection Act. Some species are considered rare (but not formally listed) by resource agencies, organizations with biological interests/expertise (e.g. Audubon Society, CNPS, The Wildlife Society), and the scientific community.

The following is a brief summary of the regulatory context under which biological resources are managed at the federal, state, and local levels. A number of federal and state statutes provide a regulatory structure that guides the protection of biological resources. Agencies with the responsibility for protection of biological resources within the Project site include:

- U.S. Army Corps of Engineers (wetlands and other waters of the United States);
- Regional Water Quality Control Board (waters of the State);
- U.S. Fish and Wildlife Service (federally listed species and migratory birds);
- California Department Fish and Wildlife (riparian areas and other waters of the State, state-listed species);
- City of Goleta

U.S. Army Corps of Engineers. Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) has authority to regulate activities that could discharge fill of material or otherwise adversely modify wetlands or other “waters of the United States.” Perennial and intermittent creeks are considered waters of the United States if they are hydrologically connected to other jurisdictional waters. The USACE also implements the federal policy embodied in Executive Order 11990, which is intended to result in no net loss of wetland value or acres. In achieving the goals of the Clean Water Act, the USACE seeks to avoid adverse impacts and offset unavoidable adverse impacts on existing aquatic resources. Any fill or adverse modification of wetlands that are hydrologically connected to jurisdictional waters would require a permit from the USACE prior to the start of work. Typically, when a project involves impacts to waters of the United States, the goal of no net loss of wetland acres or values is met through compensatory mitigation involving creation or enhancement of similar habitats.

Regional Water Quality Control Board. The State Water Resources Control Board (SWRCB) and the local Central Coast Regional Water Quality Control Board (RWQCB) have jurisdiction over “waters of the State,” pursuant to the Porter-Cologne Water Quality Control Act, which are defined as any surface water or groundwater, including saline waters, within the boundaries of the State. The SWRCB has issued general Waste Discharge Requirements (WDRs) regarding discharges to “isolated” waters of the State (Water Quality Order No. 2004-0004-DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the U.S. Army Corps of Engineers to be Outside of Federal Jurisdiction). The Central Coast RWQCB enforces actions under this general order for isolated waters not subject to federal jurisdiction, and is also responsible for the issuance of water quality certifications pursuant to Section 401 of the Clean Water Act for waters subject to federal jurisdiction.

United States Fish and Wildlife Service (USFWS). The USFWS implements the Migratory Bird Treaty Act (16 United States Code [USC] Section 703-711) and the Bald and Golden Eagle Protection Act (16 USC Section 668). The USFWS and National Marine Fisheries Service (NMFS) share responsibility for implementing the Federal Endangered Species Act (FESA) (16 USC § 153 et seq.). The USFWS generally implements the FESA for terrestrial and freshwater species, while the NMFS implements the FESA for marine and anadramous species. Projects that would result in “take” of any federally listed threatened or endangered species are required to obtain permits from the USFWS or NMFS through either Section 7 (interagency consultation with a federal nexus) or Section 10 (Habitat Conservation Plan) of FESA, depending on the involvement by the federal government in permitting and/or funding of the project. The permitting process is used to determine if a project would jeopardize the continued existence of a listed species and what measures would be required to avoid jeopardizing the species. “Take” under federal definition means to harass, harm (which includes habitat modification), pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Proposed or candidate species do not have the full protection of FESA; however, the USFWS and NMFS advise project applicants that they could be elevated to listed status at any time.

California Department of Fish and Wildlife (CDFW). The CDFW derives its authority from the Fish and Game Code of California. The California Endangered Species Act (CESA) (Fish and Game Code Section 2050 et. seq.) prohibits take of state listed threatened, endangered or fully protected species. Take under CESA is restricted to direct mortality of a listed species and does not prohibit indirect harm by way of habitat modification. The CDFW also prohibits take for species designated as Fully Protected under the Code.

California Fish and Game Code sections 3503, 3503.5, and 3511 describe unlawful take, possession, or destruction of birds, nests, and eggs. Fully protected birds (Section 3511) may not be taken or possessed except under specific permit. Section 3503.5 of the Code protects all birds-of-prey and their eggs and nests against take, possession, or destruction of nests or eggs.

Species of Special Concern (SSC) is a category used by the CDFW for those species which are considered to be indicators of regional habitat changes or are considered to be potential future protected species. Species of Special Concern do not have any special legal status except that which may be afforded by the Fish and Game Code as noted above. The SSC category is intended by the CDFW for use as a management tool to include these species into special consideration when decisions are made concerning the development of natural lands. The CDFW also has authority to administer the Native Plant Protection Act (NPPA) (Fish and Game Code Section 1900 et seq.). The NPPA requires the CDFW to establish criteria for determining if a species, subspecies, or variety of native plant is endangered or rare. Under Section 1913(c) of the NPPA, the owner of land where a rare or endangered native plant is growing is required to notify the department at least 10 days in advance of changing the land use to allow for salvage of plant.

The CDFW also has authority to administer the Native Plant Protection Act (NPPA) (Fish and Game Code Section 1900 *et seq.*). The NPPA requires the CDFW to establish criteria for determining if a species, subspecies, or variety of native plant is endangered or rare. Under Section 1913(c) of the NPPA, the owner of land where a rare or endangered native plant is growing is required to notify the department at least 10 days in advance of changing the land use to allow for salvage of plant. Special status plant species are given a California Rare Plant Rank (RPR) code. The code definitions are:

- List 1A = Plants presumed extinct in California;
- List 1B.1 = Rare or endangered in California and elsewhere; seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat);
- List 1B.2 = Rare or endangered in California and elsewhere; fairly endangered in California (20-80% occurrences threatened);
- List 1B.3 = Rare or endangered in California and elsewhere, not very endangered in California (<20% of occurrences threatened or no current threats known);
- List 2 = Rare, threatened or endangered in California, but more common elsewhere;
- List 3 = Plants needing more information (most are species that are taxonomically unresolved; some species on this list meet the definitions of rarity under CNPS and CESA);
- List 4.2 = Plants of limited distribution (watch list), fairly endangered in California (20-80% occurrences threatened); and
- List 4.4= Plants of limited distribution (watch list), not very endangered in California (<20% occurrences threatened or no current threats known).

Perennial and intermittent streams and associated riparian vegetation, when present, also fall under the jurisdiction of the CDFW. Section 1600 et seq. of the Fish and Game Code (Lake and Streambed Alteration Agreements) gives the CDFW regulatory authority over work within the stream zone (which could extend to the 100-year flood plain) consisting of, but not limited to, the diversion or obstruction of the natural flow or changes in the channel, bed, or bank of any river, stream or lake.

Goleta Slough Ecosystem Management Plan (GSEMP). The Goleta Slough Ecosystem Management Plan provides a comprehensive framework for ecosystem management and impact mitigation within the Goleta Slough Ecosystem. The policies of the Management Plan are advisory and are no more restrictive than the policies of the regulatory agencies that retain control over the Ecosystem. The Plan strives to balance protecting and enhancing wetland habitats while accommodating existing land uses. It also recognizes the need to balance the existing diversity of land uses with protection and enhancement of natural and human values that are provided within the Ecosystem. The Goleta Slough Ecosystem Management Area is comprised of all areas currently or historically within the tidally influenced basin of the Goleta Slough, as well as contiguous freshwater wetland habitats and upland habitats. While the project site apparently lies outside of the GSEMP boundary, the GSEMP is included herein because of the project’s potential to result in indirect impacts on the Goleta Slough Ecosystem.

City of Goleta. Natural resources within the Goleta city limits are regulated according to the General Plan as summarized above under Section 4.3 of the EIR. The General Plan includes policies that protect and preserve biological resources within the City by designating specific resources and areas as protected, including Environmentally Sensitive Habitat Areas (ESHA), restricting activities and uses in protected areas, providing for the management of the resources on City lands, specifying impact avoidance and mitigation requirements for types of activities and by type of biological resource, and providing guidance for development and conservation decisions over the long-term. The policies anticipate the potential impacts to biological resources from the land uses and activities that will occur under the General Plan and serve to avoid, reduce, and/or mitigate those impacts. The key policies regarding biological resources are in the Conservation, Open Space, and Land Use Elements.

The CE contains the following policies applicable to project:

CE 1.1 Definition of Environmentally Sensitive Habitat Areas. [GP/CP] ESHAs shall include, but are not limited to, any areas that through professional biological evaluation are determined to meet the following criteria:

a. Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and that could be easily disturbed or degraded by human activities and developments.
b. Any area that includes habitat for species and plant communities recognized as threatened or endangered by the state or federal governments; plant communities recognized by the State of California (in the Terrestrial Natural Communities Inventory) as restricted in distribution and very threatened; and those habitat types of limited distribution recognized to be of particular habitat value, including wetlands, riparian vegetation, eucalyptus groves associated with monarch butterfly roosts, oak woodlands, and savannas.
c. Any area that has been previously designated as an ESHA by the California Coastal Commission, the California Department of Fish and Game, City of Goleta, or other agency with jurisdiction over the designated area.

CE 1.2 Designation of Environmentally Sensitive Habitat Areas. [GP/CP] ESHAs in Goleta are generally shown in Figure 4-1, and Table 4-2 provides examples of the ESHAs and some locations of each. The provisions of this policy shall apply to all designated ESHAs. ESHAs generally include but are not limited to the following:

a. Creek and riparian areas.
b. Wetlands, such as vernal pools.
c. Coastal dunes, lagoons or estuaries, and coastal bluffs/coastal bluff scrub.
d. Beach and shoreline habitats.
e. Marine habitats.
f. Coastal sage scrub and chaparral.
g. Native woodlands and savannahs, including oak woodlands.
h. Native grassland.
i. Monarch butterfly aggregation sites, including autumnal and winter roost sites, and related habitat areas.

CE 1.6 Protection of ESHAs. [GP/CP] ESHAs shall be protected against significant disruption of habitat values, and only uses or development dependent on and compatible with maintaining such resources shall be allowed within ESHAs or their buffers. The following shall apply:

a. No development, except as otherwise allowed by this element, shall be allowed within ESHAs and/or ESHA buffers.
b. A setback or buffer separating all permitted development from an adjacent ESHA shall be required and shall have a minimum width as set forth in subsequent policies of this element. The purpose of such setbacks shall be to prevent any degradation of the ecological functions provided by the habitat area.
c. Public accessways and trails are considered resource-dependent uses and may be located within or adjacent to ESHAs. These uses shall be sited to avoid or minimize impacts on the resource to the maximum extent feasible. Measures—such as signage, placement of boardwalks, and limited fencing or other barriers—shall be implemented as necessary to protect ESHAs.
d. The following uses and development may be allowed in ESHAs or ESHA buffers only where there are no feasible, less environmentally damaging alternatives and will be subject to requirements

for mitigation measures to avoid or lessen impacts to the maximum extent feasible: 1) public road crossings, 2) utility lines, 3) resource restoration and enhancement projects, 4) nature education, 5) biological research, and 6) Public Works projects as identified in the Capital Improvement Plan, only where there are no feasible, less environmentally damaging alternatives.

e. If the provisions herein would result in any legal parcel created prior to the date of this plan being made unusable in its entirety for any purpose allowed by the land use plan, exceptions to the foregoing may be made to allow a reasonable economic use of the parcel. Alternatively, the City may establish a program to allow transfer of development rights for such parcels to receiving parcels that have areas suitable for and are designated on the Land Use Plan map for the appropriate type of use and development.

CE 1.7 Mitigation of Impacts to EHSAs. [GP/CP] New development shall be sited and designed to avoid impacts to ESHAs. If there is no feasible alternative that can eliminate all impacts, then the alternative that would result in the fewest or least significant impacts shall be selected. Any impacts that cannot be avoided shall be fully mitigated, with priority given to on-site mitigation. Off-site mitigation measures shall only be approved when it is not feasible to fully mitigate impacts on site. If impacts to on-site ESHAs occur in the Coastal Zone, any off-site mitigation area shall also be located within the Coastal Zone. All mitigation sites shall be monitored for a minimum period of 5 years following completion, with changes made as necessary based on annual monitoring reports. Where appropriate, mitigation sites shall be subject to deed restrictions. Mitigation sites shall be subject to the protections set forth in this plan for the habitat type unless the City has made a specific determination that the mitigation is unsuccessful and is to be discontinued.

CE 1.8 ESHA Buffers. [GP/CP] Development adjacent to an ESHA shall minimize impacts to habitat values or sensitive species to the maximum extent feasible. Native vegetation shall be provided in buffer areas to serve as transitional habitat. All buffers shall be of a sufficient size to ensure the biological integrity and preservation of the ESHA they are designed to protect.

CE 1.9 Standards Applicable to Development Projects. [GP/CP] The following standards shall apply to consideration of developments within or adjacent to ESHAs:

a. Site designs shall preserve wildlife corridors or habitat networks. Corridors shall be of sufficient width to protect habitat and dispersal zones for small mammals, amphibians, reptiles, and birds.
b. Land divisions for parcels within or adjacent to an ESHA shall only be allowed if each new lot being created, except for open space lots, is capable of being developed without building in any ESHA or ESHA buffer and without any need for impacts to ESHAs related to fuel modification for fire safety purposes.
c. Site plans and landscaping shall be designed to protect ESHAs. Landscaping, screening, or vegetated buffers shall retain, salvage, and/or reestablish vegetation that supports wildlife habitat whenever feasible. Development within or adjacent to wildlife habitat networks shall incorporate design techniques that protect, support, and enhance wildlife habitat values. Planting of nonnative, invasive species shall not be allowed in ESHAs and buffer areas adjacent to ESHAs.
d. All new development shall be sited and designed so as to minimize grading, alteration of natural landforms and physical features, and vegetation clearance in order to reduce or avoid soil erosion, creek siltation, increased runoff, and reduced infiltration of stormwater and to prevent net increases in baseline flows for any receiving water body. Light and glare from new

development shall be controlled and directed away from wildlife habitats. Exterior night lighting shall be minimized, restricted to low intensity fixtures, shielded, and directed away from ESHAs.

e. All new development should minimize potentially significant noise impacts on special-status species in adjacent ESHAs.
f. All new development shall be sited and designed to minimize the need for fuel modification, or weed abatement, for fire safety in order to preserve native and/or nonnative supporting habitats. Development shall use fire resistant materials and incorporate alternative measures, such as firewalls and landscaping techniques, that will reduce or avoid fuel modification activities.
g. The timing of grading and construction activities shall be controlled to minimize potential disruption of wildlife during critical time periods such as nesting or breeding seasons.
h. Grading, earthmoving, and vegetation clearance adjacent to an ESHA shall be prohibited during the rainy season, generally from November 1 to March 31, except as follows: 1) where erosion control measures such as sediment basins, silt fencing, sandbagging, or installation of geofabrics have been incorporated into the project and approved in advance by the City; 2) where necessary to protect or enhance the ESHA itself; or 3) where necessary to remediate hazardous flooding or geologic conditions that endanger public health and safety.
i. In areas that are not adjacent to ESHAs, where grading may be allowed during the rainy season, erosion control measures such as sediment basins, silt fencing, sandbagging, and installation of geofabrics shall be implemented prior to and concurrent with all grading operations.

CE 1.10 Management of ESHAs. [GP/CP] The following standards shall apply to the ongoing management of ESHAs:

a. The use of insecticides, herbicides, artificial fertilizers, or other toxic chemical substances that have the potential to degrade ESHAs shall be prohibited within and adjacent to such areas, except where necessary to protect or enhance the ESHA itself.
b. The use of insecticides, herbicides, or other toxic substances by City employees and contractors in construction and maintenance of City facilities and open space lands shall be minimized.
c. Mosquito abatement within or adjacent to ESHAs shall be limited to the implementation of the minimum measures necessary to protect human health and shall be undertaken in a manner that minimizes adverse impacts to the ESHAs.
d. Weed abatement and brush-clearing activities for fire safety purposes shall be the minimum that is necessary to accomplish the intended purpose. Techniques shall be limited to mowing and other low-impact methods such as hand crews for brushing, tarping, and hot water/foam for weed control. Disking shall be prohibited.
e. Where there are feasible alternatives, existing sewer lines and other utilities that are located within an ESHA shall be taken out of service, abandoned in place, and replaced by facilities located outside the ESHA to avoid degradation of the ESHA resources, which could be caused by pipeline rupture or leakage and by routine maintenance practices such as clearing of vegetation.
f. Removal of nonnative invasive plant species within ESHAs may be allowed and encouraged, unless the nonnatives contribute to habitat values.
g. The following flood management activities may be allowed in creek and creek protection areas: desilting, obstruction clearance, minor vegetation removal, and similar flood management methods.

CE 2.1 Designation of Protected Creeks. [GP/CP] The provisions of this policy shall apply to creeks shown in Figure 4-1. These watercourses and their associated riparian areas are defined as ESHAs. They serve as habitat for fish and wildlife, provide wildlife movement corridors, provide for the flow of stormwater runoff and floodwaters, and furnish open space and passive recreational areas for city residents.

CE 2.2 Streamside Protection Areas. [GP/CP] A streamside protection area (SPA) is hereby established along both sides of the creeks identified in Figure 4-1. The purpose of the designation shall be to preserve the SPA in a natural state in order to protect the associated riparian habitats and ecosystems. The SPA shall include the creek channel, wetlands and/or riparian vegetation related to the creek hydrology, and an adjacent upland buffer area. The width of the SPA upland buffer shall be as follows:

h. The SPA upland buffer shall be 100 feet outward on both sides of the creek, measured from the top of the bank or the outer limit of wetlands and/or riparian vegetation, whichever is greater. The City may consider increasing or decreasing the width of the SPA upland buffer on a case-by-case basis at the time of environmental review. The City may allow portions of a SPA upland buffer to be less than 100 feet wide, but not less than 25 feet wide, based on a site-specific assessment if (1) there is no feasible alternative siting for development that will avoid the SPA upland buffer; and (2) the project's impacts will not have significant adverse effects on streamside vegetation or the biotic quality of the stream.
i. If the provisions above would result in any legal parcel created prior to the date of this plan being made unusable in its entirety for any purpose allowed by the land use plan, exceptions to the foregoing may be made to allow a reasonable economic use of the parcel, subject to approval of a conditional use permit.

CE 3.1 Definition of Wetlands. [GP/CP] Wetlands are defined as any area that meets the definition of a wetland as defined by the California Coastal Commission, California Department of Fish and Game, and U.S. Fish and Wildlife Service. The most protective of definitions shall be applied and used to determine the boundary of a wetland. The City of Goleta uses the identification of a single indicator (soil, hydrology, or plants) to determine the boundary of a wetland.

CE 3.2 Designation of Wetland ESHAs. [GP/CP] Wetland ESHAs are included on Figure 4-1. In the Coastal Zone, wetlands are lands that may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens. Goleta's wetlands are associated with small lagoons at the mouths of Bell Canyon and Tecolote Creeks, vernal pools, and freshwater marshes and ponds or impoundments, such as Lake Los Carneros. All wetlands are defined as ESHAs. Any unmapped areas that meet the criteria identified in CE 3.1 are wetlands and shall be granted all of the protections for wetlands set forth in this plan.

CE 3.4 Protection of Wetlands in the Coastal Zone. [CP] The biological productivity and the quality of wetlands shall be protected and, where feasible, restored in accordance with the federal and state regulations and policies that apply to wetlands within the Coastal Zone. Only uses permitted by the regulating agencies shall be allowed within wetlands. The filling, diking, or dredging of open coastal waters, wetlands, estuaries, and lakes is prohibited unless it can be demonstrated that:

a. There is no feasible, environmentally less damaging alternative to wetland fill.
b. The extent of the fill is the least amount necessary to allow development of the permitted use.
c. Mitigation measures have been provided to minimize adverse environmental effects.
d. The purposes of the fill are limited to: incidental public services, such as burying cables or pipes; restoration of wetlands; and nature study, education, or similar resource-dependent activities.

A wetland buffer of a sufficient size to ensure the biological integrity and preservation of the wetland shall be required. Generally the required buffer shall be 100 feet, but in no case shall wetland buffers be less than 50 feet. The buffer size should take into

CE 3.5 Protection of Wetlands Outside the Coastal Zone. [GP] The biological productivity and the quality of inland wetlands shall be protected and, where feasible, restored. The filling of wetlands outside the Coastal Zone is prohibited unless it can be demonstrated that:

a. The wetland area is small, isolated, not part of a larger hydrologic system, and generally lacks productive or functional habitat value.
b. The extent of the fill is the least amount necessary to allow reasonable development of a use allowed by the Land Use Element.
c. Mitigation measures will be provided to minimize adverse environmental effects, including restoration or enhancement of habitat values of wetlands at another location on the site or at another appropriate offsite location within the City.

A wetland buffer of a sufficient size to ensure the biological integrity and preservation of the wetland shall be required. A wetland buffer shall be no less than 50 feet. The buffer size should take into consideration the type and size of the development, the sensitivity of the wetland resources to detrimental edge effects of the development to the resources, natural features such as topography, the functions and values of the wetland and the need for upland transitional habitat. The buffer area shall serve as transitional habitat with native vegetation and shall provide physical barriers to human intrusion.

CE 4.1 Definition of Habitat Area. [GP/CP] The monarch butterfly is recognized as a California and Goleta special resource. Although the species is not threatened with extinction, its autumnal and winter aggregation sites, or roosts, are especially vulnerable to disturbance. Sites that provide the key elements essential for successful monarch butterfly aggregation areas and are locations where monarchs have been historically present shall be considered ESHAs. These elements include stands of eucalyptus or other suitable trees that offer shelter from strong winds and storms, provide a microclimate with adequate sunlight, are situated near a source of water or moisture, and that provide a source of nectar to nourish the butterflies.

CE 4.2 Designation of Monarch Butterfly ESHAs. [GP/CP] Existing and known historical monarch roost sites, as shown on Figure 4-1, are hereby designated as ESHAs. These include about 20 known roosts, eight of which comprise the Ellwood Complex, a series of sites within a network consisting of eucalyptus groves and windrows interspersed by open fields and crossed by small creeks. This network includes several separate but interconnected autumnal and winter roost sites. The Ellwood Main site, the largest roost in Santa Barbara County and one of the largest in the state, occupies a site along Devereux Creek in the Sperling Preserve, a City-owned tract situated near the coastal bluffs in western Goleta.

CE 4.3 Site-Specific Studies and Unmapped Monarch ESHAs. [GP/CP] Any area not designated on Figure 4-1 that is determined by a site-specific study to contain monarch habitats, including autumnal and winter roost sites, shall be granted the same protections as if the area was shown on the figure. Proposals for development on sites shown on this figure or where there is probable cause to believe that monarch habitats may exist shall be required to provide a site-specific study.

CE 4.4 Protection of Monarch Butterfly ESHAs. [GP/CP] Monarch butterfly ESHAs shall be protected against significant disruption of habitat values, and only uses or development dependent on and compatible with maintaining such resources shall be allowed within these ESHAs or their buffer areas. The following standards shall apply:

a. No development, except as otherwise allowed by this policy, shall be allowed within monarch butterfly ESHAs or ESHA buffers.
b. Since the specific locations of aggregation sites may vary from one year to the next, the focus of protection shall be the entire grove of trees rather than individual trees that are the location of the roost.
c. Removal of vegetation within monarch ESHAs shall be prohibited, except for minor pruning of trees or removal of dead trees and debris that are a threat to public safety.
d. Public accessways are considered resource-dependent uses and may be located within a monarch ESHA or its buffer; however, such accessways shall be sited to avoid or minimize impacts to aggregation sites.
e. Interpretative signage is allowed within a monarch ESHA or its buffer, but shall be designed to be visually unobtrusive.
f. Butterfly research, including tree disturbance or other invasive methods, may be allowed subject to City approval of a permit.

CE 4.5 Buffers Adjacent to Monarch Butterfly ESHAs. [GP/CP] A buffer of a sufficient size to ensure the biological integrity and preservation of the monarch butterfly habitat, including aggregation sites and the surrounding grove of trees, shall be required. Buffers shall not be less than 100 feet around existing and historic roost sites as measured from the outer extent of the tree canopy. The buffer area shall serve as transitional habitat with native vegetation and shall provide physical barriers to human intrusion. The buffer may be reduced to 50 feet in circumstances where the trees contribute to the habitat but are not considered likely to function as an aggregation site, such as along narrow windrows. Grading and other activities that could alter the surface hydrology that sustains the groves of trees are prohibited within or adjacent to the buffer area.

CE 4.6 Standards Applicable to New Development Adjacent to Monarch ESHAs. [GP/CP] The following standards shall apply to consideration of proposals for new development adjacent to monarch ESHAs or ESHA buffers:

a. A site-specific biological study, prepared by an expert approved by the City who is qualified by virtue of education and experience in the study of monarch butterflies, shall be required to be submitted by the project proponent.
b. The study shall include preparation of a Monarch Butterfly Habitat Protection Plan, which at a minimum shall include: 1) the mapped location of the cluster of trees where monarchs are known, or have been known, to roost in both autumnal and over-wintering aggregations; 2) an estimate of the size of the population within the colony; 3) the mapped extent of the entire habitat area; and 4) the boundaries of the buffer zone around the habitat area.
c. A temporary fence shall be installed along the outer boundary of the buffer zone prior to and during any grading and construction activities on the site.
d. If an active roost or aggregation is present on the project site, any construction grading, or other development within 200 feet of the active roost, shall be prohibited between October 1 and March 1.

CE 8.3 Site-Specific Biological Resources Study. Any areas not designated on Figure 4-1 that meet the ESHA criteria for the resources specified in CE 8.1 shall be accorded the same protections as if the area were shown on the figure. Proposals for development on sites where ESHAs are shown on the figure, or where there is probable cause to believe that an ESHA may exist, shall be required to provide the City with a site-specific biological study that includes the following information:

a. A base map that delineates topographic lines, parcel boundaries, and adjacent roads.
b. A vegetation map that 1) identifies trees or other sites that are existing or historical nests for the species of concern and 2) delineates other elements of the habitat such as roosting sites and foraging areas.
c. A detailed map that shows the conclusions regarding the boundary, precise location and extent, or current status of the ESHA based on substantial evidence provided in the biological studies.
d. A written report that summarizes the survey methods, data, observations, findings, and recommendations.

CE 8.4 Buffer Areas for Raptor Species. [GP/CP] Development shall be designed to provide a 100-foot buffer around active and historical nest sites for protected species of raptors when feasible. In existing developed areas, the width of the buffer may be reduced to correspond to the actual width of the buffer for adjacent development. If the biological study described in CE 8.3 determines that an active raptor nest site exists on the subject property, whenever feasible no vegetation clearing, grading, construction, or other development activity shall be allowed within a 300-foot radius of the nest site during the nesting and fledging season.

CE 9.1 Definition of Protected Trees. [GP/CP] New development shall be sited and designed to preserve the following species of native trees: oaks (*Quercus* spp.), walnut (*Juglans californica*), sycamore (*Platanus racemosa*), cottonwood (*Populus* spp.), willows (*Salix* spp.), or other native trees that are not otherwise protected in ESHAs, unless as otherwise allowed in CE 9.

CE 10.1 New Development and Water Quality. [GP/CP] New development shall not result in the degradation of the water quality of groundwater basins or surface waters; surface waters include the ocean, lagoons, creeks, ponds, and wetlands. Urban runoff pollutants shall not be discharged or deposited such that they adversely affect these resources.

CE 10.2 Siting and Design of New Development. [GP/CP] New development shall be sited and designed to protect water quality and minimize impacts to coastal waters by incorporating measures designed to ensure the following:

a. Protection of areas that provide important water quality benefits, areas necessary to maintain riparian and aquatic biota, and areas susceptible to erosion and sediment loss.
b. Limiting increases in areas covered by impervious surfaces.
c. Limiting the area where land disturbances occur, such as clearing of vegetation, cut-and-fill, and grading, to reduce erosion and sediment loss.
d. Limiting disturbance of natural drainage features and vegetation.

CE 10.3 Incorporation of Best Management Practices for Stormwater Management. [GP/CP] New development shall be designed to minimize impacts to water quality from increased runoff volumes and discharges of pollutants from nonpoint sources to the maximum extent feasible, consistent with the City's Storm Water Management Plan or a subsequent Storm Water Management Plan approved by the City and the Central Coast Regional Water Quality Control Board. Post construction structural BMPs shall be designed to treat, infiltrate, or filter stormwater runoff in accordance with applicable standards as required by law. Examples of BMPs include, but are not limited to, the following:

a. Retention and detention basins.

b. Vegetated swales.
c. Infiltration galleries or injection wells.
d. Use of permeable paving materials.
e. Mechanical devices such as oil-water separators and filters.
f. Revegetation of graded or disturbed areas.
g. Other measures as identified in the City’s adopted Storm Water Management Plan and other City-approved regulations.

Appendix B

Site Photographs

Photograph 1. View north of the on-site native hydroseed area in the foreground, and the off-site eucalyptus trees and willow thickets past the UPPR tracks in the background.

Photograph 2. View south of coyote brush scrub, also designated by the City as ESHA and proposed to be removed through a General Plan Amendment, and the cultural resources fencing.

Photograph 3. View northeast in the fenced cultural resources area of non-native grasses and forbs in the foreground, and the coyote brush scrub in the background. The existing Willow Springs apartments are visible to the south.

Photograph 4. View from the existing Via Luisa entrance, looking southwest of the saltbush / coyote bush scrub. Yellow-blooming mustard is codominant. Camino Vista Road is visible.

Photograph 5. View of coyote brush scrub along the northern property line and the UPPR tracks, with off-site willow thickets in the background.

Appendix C

Floral and Faunal Compendium

Appendix C. Plant and Wildlife Species Observed Within the Project Site

Scientific Name	Common Name	Status	Native or Introduced
PLANTS			
Trees			
Nicotiana glauca	tree tobacco	-	Non-native
Myoporum laetum	false sandalwood		Non-native
Platanus racemosa	California Sycamore		Native (planted)
Salix lasiolepis	arroyo willow	-	Native
Shrubs			
Atriplex lentiformis	quailbush (saltbush)	-	Native
Artemisia californica	California sagebrush	-	Native
Baccharis pilularis	coyote brush	-	Native
Encelia californica	California brittlebush	-	Native
Ricinus communis	castor bean	-	Non-native
Herbs			
Ambrosia psilostachya	western ragweed	-	Native
Amaranthus albus	pigweed amaranth	-	Non-native
Brassica nigra	black mustard	-	Non-native
Brassica rapa	field mustard	-	Non-native
Bromus carinatus	California bromegrass	-	Native
Bromus diandrus	ripgut brome	-	Non-native
Bromus hordeaceus	soft chess	-	Non-native
Carduus pycnocephalus	Italian thistle	-	Non-native
Centaurea melitensis	tocalote	-	Non-native
Chenopodium sp.	goosefoot	-	Non-native
Conyza canadensis	Canada horseweed	-	Non-native
Cortaderia sp.	pampas grass species	-	Non-native
Calystegia macrostegia	morning glory	-	Native
Datura wrightii	jimson weed	-	Native
Deinandra fasciculata	common tarweed	-	Native
Elymus glaucus	Buckley blue wildrye	-	Native
Erodium botrys	long-beaked filaree	-	Non-native
Erodium cicutarium	red-stemmed filaree	-	Non-native
Eschscholzia californica	California poppy	-	Native
Festuca microstachys	small fescue	-	Native
Helminthotheca echioides	bristly ox-tongue	-	Non-native
Heterotheca grandiflora	telegraph weed	-	Native
Hordeum murinum	foxtail barley	-	Non-native
Lupinus sp.	Lupine species	-	Native
Malva parviflora	cheeseweed	-	Non-native
Malva nicaeensis	bull mallow	-	Non-native
Madia gracilis	gumweed	-	Native
Malacothrix saxatilis	cliff aster	-	Native
Marrubium vulgare	horehound	-	Non-native
Oxalis sp.	Sorrel species	-	Non-native
Plantago lanceolata	English plantain	-	Non-native
Polygonum aviculare ssp. *depressum*	common knotweed	-	Non-native
Pennisetum setaceum	fountaingrass	-	Non-native
Stipa miliacea	smilo grass	-	Non-native
Raphanus sativus	wild radish	-	Non-native

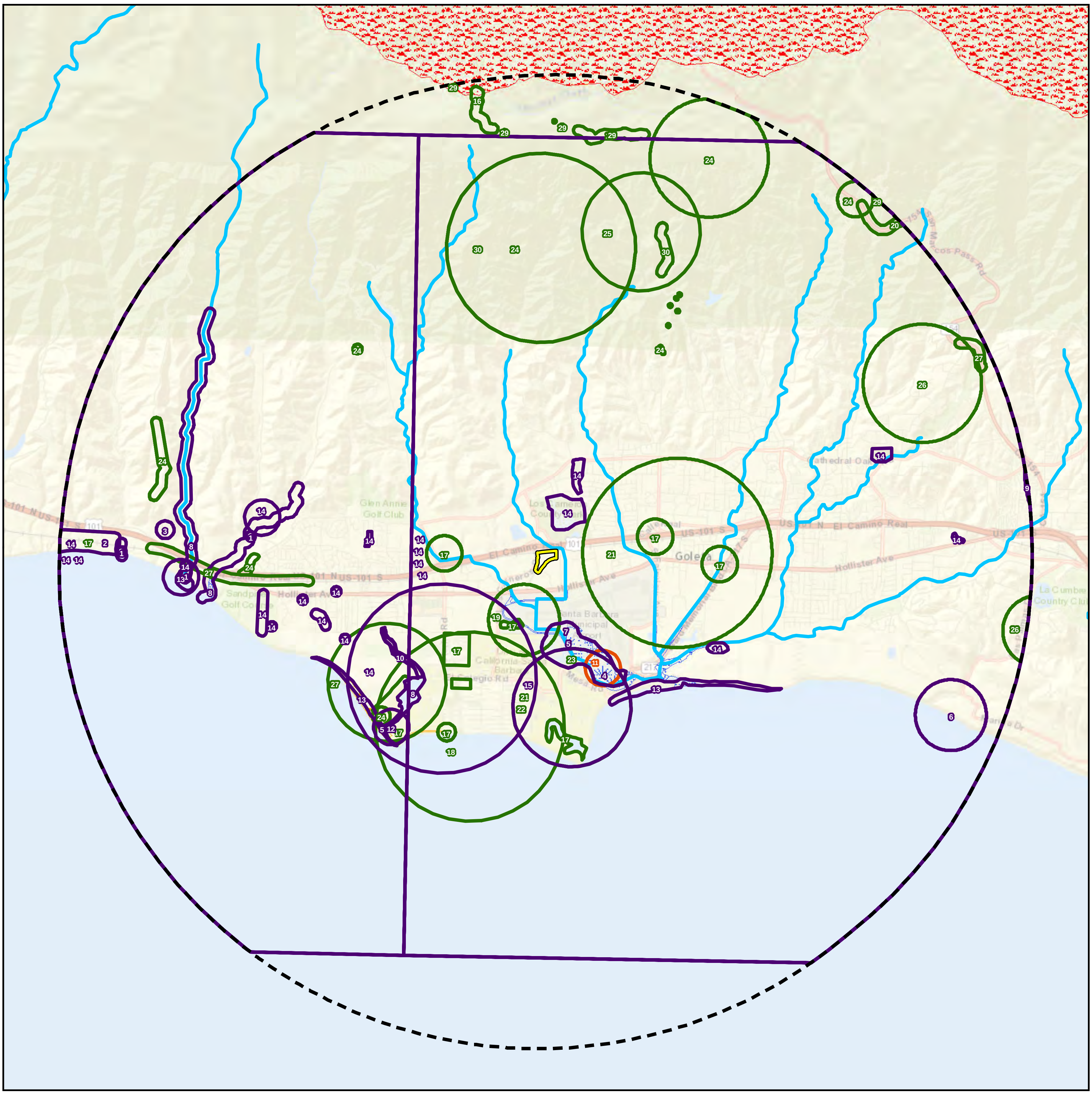
Appendix C. Plant and Wildlife Species Observed Within the Project Site

Scientific Name	Common Name	Status	Native or Introduced
Rumex crispus	curly dock	-	Non-native
Salsola tragus	Russian thistle	-	Non-native
Sisyrinchium bellum	western blue-eyed grass	-	Native
Stipa pulchra	purple needle grass	-	Native (hydroseed)
Stipa cernua	nodding needlegrass	-	Native (hydroseed)
Sonchus asper	prickly sow-thistle	-	Non-native
Solanum douglasii	Douglas' nightshade	-	Native
Xanthium strumarium	cocklebur	-	Native
Verbena lasiostachys	common vervain	-	Non-native
Vulpia myuros	rattail fescue	-	Non-native
WILDLIFE			
Birds			
Accipiter cooperii	Copper's hawk	SA	Native
Cathartes aura	turkey vulture	-	Native
Larus sp.	gull species	-	Native
Columba livia	rock pigeon	-	Non-native
Calypte anna	Anna's hummingbird	-	Native
Tyrannus vociferans	Cassin's kingbird	-	Native
Corvus brachyrhynchos	American crow	-	Native
Psaltriparus minimus	bushtit	-	Native
Baeolophus inornatus	oak titmouse	SA	Native
Mimus polyglottos	Northern mockingbird	-	Native
Geothlypis trichas	common yellowthroat	-	Native
Pipilo maculatus	spotted towhee	-	Native
Melozone crissalis	California towhee	-	Native
Melospiza melodia	song sparrow	-	Native
Haemorhous mexicanus	house finch	-	Native
Spinus psaltria	lesser goldfinch	-	Native
Reptiles			
Sceloporus occidentalis	coastal western fence lizard	-	Native
Mammals			
*Canis latrans**	coyote	-	Native
*Didelphis virginiana**	opossum	-	Native
*Lynx rufus**	bobcat	-	Native
*Mephitis mephitis**	striped skunk	-	Native
Otospermophilus beecheyi	California ground squirrel		Native
*Procyon lotor**	raccoon	-	Native
Sylvilagus bachmani	brush rabbit		Native

Source: Rincon, 2015.
*Observed Dudek, 2014. Refer to Appendix F

Appendix D

Special Status Species Evaluation Tables



Imagery provided by ESRI and its licensors © 2015.
Additional data provided by the:
California Natural Diversity Database, May 2015.
Critical Habitat, September 2015

- 🟨 Project Boundary
- ⬚ 5 Mile Buffer

CNDDB

- 🟪 Animals
- 🟩 Plants
- 🟧 Natural Communities

Critical Habitat

- 🟥 California red-legged frog
- ▨ Tidewater goby
- ▨ Western snowy plover
- — Steelhead

1 - California red-legged frog
2 - white-tailed kite
3 - ferruginous hawk
4 - light-footed clapper rail
5 - western snowy plover
6 - bank swallow
7 - Belding's savannah sparrow
8 - tidewater goby
9 - Townsend's big-eared bat
10 - western pond turtle
11 - Southern Coastal Salt Marsh
12 - sandy beach tiger beetle
13 - globose dune beetle
14 - monarch butterfly
15 - mimic tryonia (=California brackishwater snail)
16 - slender silver moss
17 - southern tarplant
18 - Contra Costa goldfields
19 - Coulter's goldfields
20 - pale-yellow layia
21 - Coulter's saltbush
22 - Davidson's saltscale
23 - estuary seablite
24 - Santa Barbara honeysuckle
25 - Refugio manzanita
26 - mesa horkelia
27 - black-flowered figwort
28 - Santa Lucia dwarf rush
29 - late-flowered mariposa-lily
30 - Sonoran maiden fern

Project Vicinity CNDDB and Critical Habitat

Figure D

Table 1. Special Status Plant Species in Project Vicinity

Scientific Name	Fed/State ESA CRPR G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Rationale
Amsinckia douglasiana Douglas' fiddleneck	--/-- G3/S3.2 4.2	Annual herb; blooms March to May; cismontane woodland and valley and foothill grassland; usually on Monterey shale in dry areas.	None	Suitable habitat and soils not present on site. No CNDDB records within 5 miles.
Anemopsis californica yerba mansa	Locally Rare (GSEMP)	Marsh and creekside plant that is alkaline tolerant. Blooms in Spring. Tolerates alkaline soil, sand, clay, no drainage and seasonal flooding.	None	Suitable wetland habitat not present on site. Present at the Los Carneros Wetland.
Anomobryum julaceum slender silver moss	-- / -- 4.2 G4G5 / S2	Moss. Broadleafed upland forest, lower montane coniferous forest, north coast coniferous forest. Moss which grows on damp rocks and soil; acidic substrates. Usually seen on roadcuts. 100-1000m (330-3280ft).	None	Suitable habitat not present on site.
Arctostaphylos refugioensis Refugio manzanita	-- / -- 1B.2 G2 / S2	Perennial evergreen shrub. Blooms Dec-May. Chaparral. On sandstone. 300-820m (985-2690ft).	None	Suitable habitat not present on site.
Atriplex coulteri Coulter's saltbush	--/ -- 1B.2 G2/S2	Perennial herb. Blooms Mar-Oct. Coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland. Ocean bluffs, ridgetops, as well as alkaline low places. 10-440m (30-1445ft).	Low	Marginal habitat present on site. Known CNDDB occurrence 2-miles east of site. Known from the Goleta Slough. Not detected during surveys.
Atriplex serenana var. *davidsonii* Davidson's saltscale	--/ -- 1B.2 G5T1/S1	Annual herb. Blooms Apr-Oct. Coastal bluff scrub, coastal scrub. Alkaline soil. 3-250m (10-820ft).	Low	Marginal habitat present on site. Not detected during surveys. Not detected during surveys.
Calochortus fimbriatus late-flowered mariposa-lily	-- / -- 1B.2 G3 / S3	Perennial bulbiferous herb. Blooms June-Aug. Chaparral, cismontane woodland, riparian woodland. Dry, open coastal woodland, chaparral; on serpentine. 275-1905 m (900-6250ft).	None	Suitable habitat and serpentine soils not present on site.

Table 1. Special Status Plant Species in Project Vicinity

Scientific Name	Fed/State ESA CRPR G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Rationale
Centromadia parryi ssp. *australis* southern tarplant	--/ -- 1B.1 G3T2/S2	Annual herb. Blooms May-Nov. Marshes and swamps (margins), valley and foothill grassland. Often in disturbed sites near the coast at marsh edges; also in alkaline soils sometimes with saltgrass. Sometimes on vernal pool margins. 0-425m (0-1395ft).	Low	No vernal pool habitat present on-site, marginal habitat off-site in Los Camaros Wetland. Multiple CNDDB occurrences greater than 1 mile east, west and south of the site near water. Known from the Goleta Slough 0.5 mile south. Not detected during surveys.
Horkelia cuneata var. *puberula* mesa horkelia	-- / -- 1B.1 G4T1 / S1	Perennial herb. Blooms Feb-Sept. Chaparral, cismontane woodland, coastal scrub. Sandy or gravelly sites. 70-810m (230-2655ft).	Low	Marginal habitat present on site. Not detected during surveys. Low potential to occur due to long history of disturbance. No CNDDB records within 5 miles.
Juncus luciensis Santa Lucia dwarf rush	-- / -- 1B.2 G2G3/ S2S3	Annual herb. Blooms Apr-Jul. Vernal pools, meadows, lower montane coniferous forest, chaparral, Great Basin scrub. Vernal pools, ephemeral drainages, wet meadow habitats and streamsides. 300-2040m (985-6690ft).	None	Suitable habitat not present on site.
Lasthenia conjugens Contra Costa goldfields	FE/ -- 1B.1 G1/S1	Annual herb. Blooms Mar-Jun. Valley and foothill grassland, vernal pools, alkaline playas, cismontane woodland. Vernal pools, swales, low depressions, in open grassy areas. 1-470m (3-1540ft).	Low	Historical (1972) extirpated Project vicinity CNDDB record in on the Isla Vista bluffs. Marginal habitat present on site. Low potential to occur due to long history of disturbance. Not detected during surveys.
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	--/ -- 1B.1 G4T2/S2	Annual herb. Blooms Feb-Jun. Coastal salt marshes, playas, valley and foothill grassland, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands. 1-1400m (3-4595ft).	Low	Marginal grassland habitat present on site. Low potential to occur due to long history of disturbance. CNDDB (1982) occurrence 0.5 mile south of Project on opposite side of Hollister Avenue in the Goleta Slough.
Layia heterotricha pale-yellow layia	--/ -- 1B.1 G2/S2	Annual herb. Blooms Mar-Jun. Cismontane woodland, pinyon-juniper woodland, valley and foothill grassland. Alkaline or clay soils; open areas. 270-1365m (885-4480ft).	Low	Marginal habitat present on site. Low potential to occurdue to long history of disturbance. Not detected during surveys.

Table 1. Special Status Plant Species in Project Vicinity

Scientific Name	Fed/State ESA CRPR G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Rationale
Lonicera subspicata var. *subspicata* Santa Barbara honeysuckle	-- / -- 1B.2 G5T2/ S2	Perennial evergreen shrub. Blooms May-Feb. Chaparral, cismontane woodland, coastal scrub. 35-1000m (115-3280ft).	Low	Marginal habitat present on site. Low potential to occur due to long history of disturbance. Not detected during surveys.
Scrophularia atrata black-flowered figwort	-- / -- 1B.2 G2G3 / S2S3	Perennial herb. Blooms Mar-Jul. Closed-cone coniferous forest, chaparral, coastal dunes, coastal scrub, riparian scrub. Sand, diatomaceous shales, and soils derived from other parent material; around swales and in sand dunes. 10-250m (30-820ft).	Low	Marginal habitat present on site. Low potential to occur due to long history of disturbance. Not detected during surveys.
Suaeda esteroa estuary seablite	-- / -- 1B.2 G3 / S2	Perennial herb. Blooms May-Jan. Marshes and swamps. Coastal salt marshes in clay, silt, and sand substrates. 0-5m (0-15ft).	None	Suitable habitat not present on site.
Thelypteris puberula var. *sonorensis* Sonoran Maiden fern	-- / -- 2B.2 G5T3 / S2.2?	Perennial rhizomatous herb. Blooms Jan-Sep. Meadows and seeps. Along streams, seepage areas. 50-550m (165-1805ft).	None	Suitable habitat not present on site.

Project Vicinity refers to within a 5 mile radius of site.
FE = Federally Endangered FT = Federally Threatened
SE = State Endangered ST = State Threatened SR = State Rare
G-Rank/S-Rank = Global Rank and State Rank as per NatureServe and CDFW's CNDDB RareFind3.
CRPR (CNPS California Rare Plant Rank):
1A=Presumed Extinct in California
1B=Rare, Threatened, or Endangered in California and elsewhere
2A=Plants presumed extirpated in California, but more common elsewhere
2B=Plants Rare, Threatened, or Endangered in California, but more common elsewhere
3=Need more information (a Review List)
4=Plants of Limited Distribution (a Watch List)
CRPR Threat Code Extension:
.1=Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2=Fairly endangered in California (20-80% occurrences threatened)
.3=Not very endangered in California (<20% of occurrences threatened)

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
Invertebrates				
Danaus plexippus Monarch butterfly	-- / -- -- G5 / S3	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	Low	No suitable habitat present. Eucalyptus trees are approximately 100 feet north of the Project site, but the monarch butterfly host and food plants are absent from the Project site. There are no historical reports of monarch butterflies using these trees for roosting aggregations. Plants that would serve as food sources for monarch butterflies are absent from within the Project site.
Cicindela hirticollis gravida Sandy beach tiger beetle	-- / -- -- G5T2 / S1	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico. Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sands not affected by wave action.	None	Suitable habitat not present on site.
Coelus globosus Globose dune beetle	-- / -- -- G1 / S1	Inhabitant of coastal sand dune habitat; erratically distributed from Ten Mile Creek in Mendocino County south to Ensenada, Mexico. Inhabits foredunes and sand hummocks; it burrows beneath the sand surface and is most common beneath dune vegetation.	None	Suitable habitat not present on site.
Tryonia imitator Mimic tryonia (=California brackishwater snail)	-- / -- -- G2G3 / S2S3	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinities.	None	Suitable habitat not present on site.
Fish				
Eucyclogobious newberryi	FE / -- SSC G3 / S2S3	Brackish water habitats along the Calif coast from Agua Hedionda Lagoon, San Diego Co. to mouth of Smith River. Found in shallow lagoons and lower stream reaches,	None	No habitat present on site, or anticipated or in channelized Los Carneros Creek. Critical habitat off-site downstream in Creek,

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
Tidewater goby		they need fairly still but not stagnant water and high oxygen levels.		south of holster Avenue.
Oncorhynchus mykiss irideus southern California DPS	FE/-- G5T2A/S2 SSC	Cold, clear waters in complex streams with riffles, pools, and sources of cover such as undercut banks, aquatic vegetation, submerged wood, etc.; connectivity to Pacific Ocean key to life cycle.	None	No habitat present on site or within channelized Los Carneros Creek. Los Carneros Creek is designated as critical habitat (South Coast Hydrologic Unit 3315). No CNDDB records within 5 miles.
Amphibians				
Rana draytonii California red-legged frog	FT / -- -- G2G3 / S2S3	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	None	Suitable habitat not present on site, Los Carneros creek does not provide a permanent water source. No watershed CNDDB records.
Reptiles				
Emys marmorata western pond turtle	-- / -- SSC G3G4 / S3	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	None	No suitable habitat on-site. Suitable ponding and basking sites off-site in Los Carneros Creek.
Thamnophis hammondii Two-striped garter snake	--/-- G3/S2 SSC	Streams or ponds having riparian or wetland vegetation; small mammal burrows are used for overwintering.	None	Suitable habitat not present on site, potential to occur off-site in Los Carneros Creek riparian area. No CNDDB records within 5 miles.
Birds				

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
Accipter cooperii Cooper's hawk	-- / -- WL G5 / S4	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also live oaks.	Low (foraging)	Observed foraging on-site during 2015 surveys. No suitable nesting habitat is present.
Accipiter striatus sharp-shinned hawk	-- / -- WL G5 / S4	Ponderosa pine, black oak, riparian deciduous, mixed conifer and Jeffrey pine habitats. Prefers riparian areas. North-facing slopes, with plucking perches are critical requirements. Nests usually within 275 ft. of water.	Low (foraging)	No CNDDB records within 5 miles. EBird observations in 2012 and 2013 in Los Carneros Wetland near airport 0.25 mile south of site. Site is within winter migratory range.
Asio flammeus short-eared owl	-- / -- SSC G5 / S3	Uncommon and local winter visitant along the coast, where it formerly nested. Usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands	Low (foraging)	No CNDDB records within 5 miles. Observed roosting at the Los Carneros Wetlands, but as a rare vagrant (GSEMP). Potential visitant, transient, foraging only.
Asio otus Long-eared owl	-- / -- SSC G5 / S3	Riparian bottomlands grown to tall willows and cottonwoods; also, belts of live oak paralleling stream courses. Require adjacent open land productive of mice and the presence of old nests of crows, hawks, or magpies for breeding. Riparian habitat required; also uses live oak thickets and other dense stands of trees.	Low (foraging)	No CNDDB records within 5 miles. Rare transient and winter visitant along the coast.
Agelaius tricolorr tri-colored blackbird	-- / SE SSC G2G3 / S1S2	Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony. Formerly more common, now an uncommon and very local breeder in Santa Barbara County in dense stands of bulrushes and cattails.	None	No CNDDB records within 5 miles. Project site lacks suitable habitat.
Ammodramus savannarum grasshopper sparrow	-- / -- SSC G5 / S2	Uncommon and very local summer resident on grassy slopes and mesas west of the deserts.	Low (foraging)	Breeding localities include west of Goleta. Potential visitant, transient, foraging only. 2007 airport eBird records; 2015 and 2014 eBird

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name **Common Name**	**Fed/State ESA** **CDFW** **G-Rank/S-Rank**	**Habitat Requirements**	**Potential for Occurrence**	**Potential for Occurrence**
				sightings concentrated at the Elwood Open Space, four miles west.
Athene cunicularia burrowing owl	--/-- G4/S3 SSC	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Low (winter foraging)	Formerly a common breeder from coastal bluffs to foothills in Goleta area, now only an occasional winter visitor. No suitable habitat onsite due to the ongoing disturbance, lack ground squirrel burrows, and the site is fragmented and isolated from other foraging areas by development and infrastructure. Recent CNDDB (2004, 2006) Goleta overwintering records. Possible sighting by City staff west of Los Carneros Road in 2008. No CNDDB records within 5 miles.
Aquila chrysaetos golden eagle	--/-- G5/S3 FP,WL	Uncommon resident of mountainous and valley-foothill areas. Nesting occurs on cliff ledges and overhangs or in large trees. Foraging typically occurs in open terrain where small rodent prey is seen while soaring high above ground.	None	No suitable nesting habitat and Project site is likely too small and proximal to urban development to provide foraging habitat. No CNDDB records within 5 miles.
Baeolophus inornatus oak titmouse	--/-- G5/S3? SA	Resident from southern Oregon south to Baja California. Preferred habitats include live oaks and deciduous growth, including oak woodlands, streamside cottonwoods, forest edges, and oak-juniper woodlands.	Low (foraging)	No oak woodland on-site or in the Project vicinity. No CNDDB records within 5 miles. Detected on-site, expected to forage only.
Circus cyaneus northern harrier	-- / -- SSC G5 / S3	Fairly common winter visitant to open grasslands, agricultural fields, freshwater and coastal salt marshes,estuaries, open desert and brushlands.	Low (foraging)	Potentially a winter visitor at Goleta Slough, and may forage occasionally at the site, when present. No CNDDB records within 5 miles. EBird sightings throughout Goleta concentrated near the estuaries and golf course.
Chaetura vauxi	-- / --	Fairly common spring and fall transient in	Low (foraging)	No CNDDB records within 5 miles.

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
Vaux's swift	SSC G5 / S2S3	southern California, and rare and irregular winter visitant, primarily along the coast. Prefers redwood and Douglas-fir habitats with nest-sites in large hollow trees and snags, especially tall, burned out stubs.		Potential visitant, transient, foraging only.
Cypseloides niger black swift	-- / -- SSC G4 / S2	Breeds very locally in the Sierra Nevada and Cascade Range, the San Gabriel, San Bernardino, and San Jacinto Mts., and in coastal bluffs and mountains from San Mateo Co. south probably to San Luis Obispo Co. Nests in moist crevice or cave on sea cliffs above the surf, or on cliffs behind, or adjacent to, waterfalls in deep canyons. Forages widely over many habitats.	Low (foraging)	No CNDDB records within 5 miles. EBird sightings on the outskirts of Goleta and in the Santa Ynez foothills.
Buteo regalis Ferruginous hawk	-- / -- WL G4 / S3S4	Open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon-juniper habitats. Eats mostly lagomorphs, ground squirrels, and mice. Population trends may follow lagomorph population cycles.	Low (foraging)	Marginally suitable foraging habitat on site. Suitable nesting habitat not present.
Charadrius alexandrinus nivosus Western snowy plover	FT / -- SSC G3T3 / S2	Sandy beaches, salt pond levees and shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	None	Suitable habitat not present on site.
Empidonax traillii extimus southwestern willow flycatcher	FE/SE -- G5T1T2/S1	Riparian woodlands in southern California, generally with dense shrubs and trees.	None	Suitable habitat not present on site, and off-site willow thickets are limited in acreage and isolated. No CNDDB records within 5 miles. No eBird records in the Goleta Valley or the South Coast.
Falco columbarius Merlin	-- / -- WL G5 / S3S4	Seacoast, tidal estuaries, open woodlands, savannahs, edges of grasslands and deserts, farms and ranches. Clumps of trees or windbreaks are required for roosting in open country.	Low (foraging)	No CNDDB records within 5 miles. Reported at Lake Los Carneros. Not observed during site visit.

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
Icteria virens yellow-breasted chat	-- / -- SSC G5 / S3	Migratory birds that occasionally winter in coastal areas. Habitat consists of thick, shrubby areas such as abandoned farmlands where vegetative growth is abundant.	None	No CNDDB records within 5 miles. Reported from Tecolotito Creek in previous years. Riparian habitats not present on site, and off-site willow thickets are limited in acreage and isolated. .
Lanius ludovicianus loggerhead shrike	--/-- SSC G4/S4	Found in open grasslands with scattered perches of posts, wires, trees and scrub.	Low (foraging)	The relatively small size of the Project site and proximity to transportation infrastructure and urban development likely discourage this species from occurring. No CNDDB records within 5 miles. Ebird records at Lake Los Carneros and the Santa Barbara Airport.
Elanus coeruleus white-tailed kite	--/-- FP G5/S3	Grassland, sparse scrub, marshes or open woodland habitats often near agricultural areas. Nests are in isolated trees or forests.	Low (foraging)	Observed foraging on-site in 2010 (City of Goleta, 2011) and to the west of Los Carneros Road (City of Goleta 2014). White-tailed kites are commonly observed at the Santa Barbara Airport, and are documented as nesting at Lake Los Carneros. Not documented by CNDDB in the Project vicinity. Known roosts at Lake Los Carneros. Breed in oak woodlands and trees, which are not present on the project site. Eucalyptus windrow trees adjacent to the project site not suitable for roosting since subject to ongoing disturbance by US 101 and UPRR. Cyclically fluctuating depending on prey population.

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
Passerculus sandwichensis beldingi Belding's savannah sparrow	-- / SE -- G5T3 / S2	Inhabits coastal salt marshes, from Santa Barbara south through San Diego County. Nests in Salicornia on and about margins of tidal flats.	None	Suitable habitat not present on site.
Picoides nuttallii Nuttall's woodpecker	--/-- SA G5/SNR	Typically associated with oak trees and found in wooded canyons and foothills, groves and orchards.	None	No CNDDB records within 5 miles. No oak woodland habitat on-site or in the Project vicinity.
Rallus obsoletus levipes (=Rallus longirostris levipes) light-footed Ridgway's [clapper] rail	FE / SE FP G5T1T2 / S1	Found in salt marshes traversed by tidal sloughs, where cordgrass and pickleweed are the dominant vegetation. Requires dense growth of either pickleweed or cordgrass for nesting or escape cover; feeds on mollusks and crustaceans.	None	Suitable habitat not present on site.
Riparia riparia bank swallow	-- / ST SSC G5 / S2S3	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	None	Project vicinity CNDDB records are historical (1913, 1927). Suitable nesting habitat not present on site.
Setophaga petechia *(=Dendroica petechia brewsteri)* yellow warbler	-- / -- SSC G5 / S3S4	Inhabits riparian areas and nests in trees and shrubs of overgrown fields, pastures, shorelines, cultivated fields, orchards, roadsides, and suburban parks.	Low (foraging)	Marginally suitable habitat off- site in Los Carneros Creek riparian vegetation. No CNDDB records within 5 miles, recent (2013) observation one mile west of the Project site. Ebird records at Tecolotito Creek, Lake Los Carneros, and the Santa Barbara Airport.
Vireo bellii pusillus least Bell's vireo	FE/SE -- G5T2/S2	Summer resident of southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, baccharis, mesquite.	None	Suitable habitat not present on site, off-site willow thickets are isolated. No CNDDB records within 5 miles. No eBird records in the Goleta Valley or the South Coast. There are only two breeding season records for the south coast in recent decades. One of these, from the Santa Barbara Municipal

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
				Airport, involved a bird that was singing in willows along Los Carneros Creek in Goleta Slough, May 18–June 10, 2005 (City of Santa Barbara, 2015). No additional birds were detected that year, and the bird was not detected later in the season, despite additional visits.
Mammals				
Antrozous pallidus pallid bat	--/-- G5/S3 SSC	Deserts, grasslands, shrublands, woodlands, and forest. Most common in open, dry, habitats with rocky area for roosting. Roost must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low (foraging)	No CNDDB records within 5 miles. Marginally suitable foraging habitat on-site. Off-site woodland adjacent to railroad and US 101 is not suitable.
Corynorhinus townsendii Townsend's big-eared bat	-- / -- SSC G3G4 / S2S3	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	Low (foraging)	CNDDB Record (1985) suitable habitat not present on site. Marginally suitable foraging habitat on site.
Eumops perotis californicus western mastiff bat	-- / -- SSC G5T4 / S3S4	Open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban. Crevices in cliff faces, high buildings, trees, and tunnels are required for roosting.	Low (foraging)	No CNDDB records within 5 miles. Roosting habitat not present. Marginally suitable foraging habitat on site.
Lasionycteris noctivagans silver-haired bat	--/-- SA G5/S3S4	Primarily a coastal and montane forest dweller feeding over streams, ponds, and open brushy areas; roosts in hollow trees beneath exfoliating bark, abandoned woodpecker holes and rarely under tocks. Needs drinking water.	Low (foraging)	No CNDDB records within 5 miles. Suitable roosting habitat not present on site. May forage on-site.
Lasiurus blossevillii western red bat	-- / -- SSC G5 / S3	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests; prefers habitat edges and mosaics with trees that are protected from	Low (foraging)	No CNDDB records within 5 miles. Suitable roosting and not present on site. May forage on-site.

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
		above and open below with open areas for foraging.		
Lasiurus cinereus hoary bat	--/-- SA G5/S3	The most widespread North American bat. Prefers open habitats or habitat mosaics with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Low (foraging)	No CNDDB records within 5 miles. Suitable roosting habitat not present on-site, may forage on-site.
Lepus californicus bennettii San Diego black-tailed jackrabbit	-- / -- SSC G5T3T4 / S3	Inhabits desert scrub, coastal scrub and early stages of forest and chaparral habitats	None	Commonly occurred in grassland and disturbed habitat along runways within the Goleta Slough Ecosystem, but not present in the Ecosystem since late 1980s.
Myotis yumanensis Yuma myotis	-- / -- -- G5 / S4	Widespread in California, except the Mojave and Colorado Desert regions. Optimal habitats are open forests and woodlands with sources of water over which to feed. Distribution closely tied to bodies of water. Maternity roosts typically occur in caves and buildings.	Low (foraging)	No CNDDB records within 5 miles. Suitable roosting and open water foraging habitat not present on site.
Neotoma bryanti (*N. lepida intermedia*) Bryant's [San Diego desert] woodrat	-- / -- SSC G5T3T4 / S3S4	Coastal scrub of Southern California from San Diego County to San Luis Obispo County. Moderate to dense canopies preferred, xeric sties. They are particularly abundant in rock outcrops and rocky cliffs and slopes.	None	No CNDDB records within 5 miles. Not observed during surveys. Project site lacks suitable habitat such as rock outcrops preferred by this species for nest structures, and medium to dense foliage in the xeric grassland/scrub areas. Prefers xeric sites, not likely present in the adjacent Los Carneros Creek or Wetland.
Taxidea taxus American badger	--/-- SSC G5/S3	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	Low (foraging)	No CNDDB records within 5 miles. Recorded in the Goleta Slough as late as 1986. Not detected during wildlife camera studies. This species could potentially reach the site from undeveloped areas to the north byway of Los Carneros

Table 2. Special Status Animal Species in the Project Vicinity

Scientific Name Common Name	Fed/State ESA CDFW G-Rank/S-Rank	Habitat Requirements	Potential for Occurrence	Potential for Occurrence
				Creek, although given the fragmented and disturbed condition of the Project site and vicinity, as well as its small size, this is unlikely. Any occurrence would likely be transient.

Regional Vicinity refers to within a 5 mile radius of site.

FT = Federally Threatened	SE = State Endangered
FC = Federal Candidate Species	ST = State Threatened
FE = Federally Endangered	SR = State Rare

FS=Federally Sensitive SS=State Sensitive
G-Rank/S-Rank = Global Rank and State Rank as per NatureServe and CDFW’s CNDDB RareFind3.
SC = CDFW Species of Special Concern
FP = Fully Protected

Appendix E: Wildlife Corridor Analysis for the Heritage Ridge Project

DUDEK

621 CHAPALA STREET
SANTA BARBARA, CALIFORNIA 93101
T 805.963.0651 F 805.963.2074

September 2, 2014 8176-1

Via mail and E-mail

Mr. Craig Minus
The Towbes Group
21 East Victoria Street, Suite 200
Santa Barbara, California 93101

Subject: Wildlife Corridor Analysis for the Heritage Ridge Project

Dear Mr. Minus:

This wildlife corridor analysis examines the possible movement of mammal species onto and through the Heritage Ridge Project (Project) site between the Santa Ynez Mountain foothills and the Goleta Slough. The focused analysis was designed to collect information relating to a proposed alternative wildlife corridor to a segment of Los Carneros Creek identified by the City in the *Draft Willow Springs II Environmental Impact Report* (DEIR; City 2011). The Project site is located east of Los Carneros Road, south of U.S. Highway 101 (U.S. 101), and immediately north of the existing Willow Springs I and II residential communities in the City of Goleta (City), California (*Figure 1*). The biological study area encompasses the Project site, the Los Carneros Creek and Wetland, and additional open space between Willow Springs I and II, and U.S. 101.

BACKGROUND

Recent Environmental Impact Reports (EIRs) analyzed potential impacts to wildlife corridors for proposed residential projects adjacent to Los Carneros Road and south of U.S. 101: Willow Springs II, to the east of Los Carneros Road (City 2011), and the Village at Los Carneros (City 2014a), to the west of Los Carneros Road. Tecolotito Creek is recognized as an Environmentally Sensitive Habitat Area (ESHA) under the City's Coastal Land Use Plan (Coastal LUP) and considered a wildlife corridor for mammal species that travel between the Santa Ynez Mountain foothills and the Santa Barbara Airport and greater Goleta Slough (Hoagland 2011). The City (2011) considered the Willow Springs II Project site a potential alternative wildlife corridor to Los Carneros Creek for wildlife movement.

A wildlife movement corridor was defined by the City (2011) as,

> "*…physical connections that allow wildlife to move between patches of suitable habitat in both disturbed and undisturbed landscapes, as well as environments fragmented by urban development. Large areas of suitable habitat and corridors between these areas are necessary to maintain healthy ecological and evolutionary processes. For example, wildlife movement corridors are necessary for dispersal and migration, to ensure the mixing of genes between populations, and so wildlife can respond and adapt to environmental stress.*"

In the DEIR (2011), Envicom identified two biologically significant ecological habitat "patches" in the area, the Santa Ynez Mountains and the Goleta Slough. The latter, the Goleta Slough, has become isolated from the "core habitats" of the Santa Ynez Mountains due to urban expansion in the City. Several creeks connect these two ecological areas, including Tecolotito (Glen Annie), Los Carneros, San Pedro, Las Vegas, San Jose, and Marie Ignacio. Although the City's consultant, Envicom Corporation (Envicom), was not able to investigate each creek or route for the possibility of successful wildlife movement as part of EIR preparation, they nonetheless were able to draw conclusions based on field visits in the area and available materials. Generally, they found that, due to the City's urban environment south of U.S. 101, the creeks offered the best potential wildlife corridors between the foothills of the Santa Ynez Mountains and Goleta Slough, although the quality of these corridors varied.

Specific to Los Carneros Creek and the Project site, the City continues:

> *"Los Carneros Creek flows beneath the 101 Freeway in a culvert large enough to support the movement of large mammals. After passing beneath the 101 Freeway, realigned Los Carneros Creek turns and flows east just north of the Union Pacific Railroad tracks before turning and flowing to the south for approximately 0.40 miles to Hollister Avenue in an exposed concrete-lined channel through the industrial area to the east of the project site. Los Carneros Creek then passes under Hollister Avenue in a culvert also capable of supporting the movement of large mammals, including deer, bear, and mountain lion, to the open space of the Goleta Slough Ecosystem. North of the 101 Freeway, Los Carneros Creek passes from the foothills of the Santa Ynez Mountains through naturally vegetated, agricultural or undeveloped lands. Based on land uses surrounding the creeks and associated riparian areas, it appears that Los Carneros Creek, as well as Glen Annie (Tecolotito) Creek, offer better opportunities for movement compared to other creeks draining to the Slough, since each passes through relatively little urban development."*

> *"The project site and the Willow Springs North property represent an alternative to movement along the approximately 0.40-mile exposed concrete-lined reach of Los Carneros*

> *Creek to the east of the site. Wildlife utilizing the Willow Springs North property could pass from the Los Carneros Creek culvert beneath the 101 Freeway to the Goleta Slough, via disturbed undeveloped habitats and the Los Carneros Wetland….This option is not without impediments, as portions of the area are graded or contain sparse vegetative cover, and wildlife must cross Camino Vista, a two-lane residential road. However, these are not substantial barriers for some species. Furthermore, the culvert beneath Hollister Avenue between the Los Carneros Wetland and the Goleta Slough is too small to allow passage of large and perhaps some medium-sized mammals. It would be necessary for larger species to cross Hollister Avenue. Nevertheless, this corridor is the more suitable option for smaller species, as compared to the exposed concrete-lined reach of Los Carneros Creek to the east. The concrete-lined reach lacks any cover or foraging habitat for a long distance, leaving many animals vulnerable to predation by raptors, owls, or coyotes, for example. Many animals would not pass through this area due to these habitat conditions."*

Of wildlife corridors in general, the DEIR states that, "*where movement has been substantially restrained by encroaching development, it is necessary to maintain corridors, despite existing impediments within them, in order to preserve what remains as opportunities for movement.*" The DEIR nonetheless concluded that impacts from the proposed Willow Springs II development would have a *less than significant* affects to the potential alternative corridor (City 2011). Alternatively, the City arrived at the *potentially significant without mitigation* conclusion in their DEIR for the Village at Los Carneros (City 2014a), which contains a primary wildlife corridor along and including Tecolotito Creek, an Environmentally Significant Habitat Area (ESHA) with a City Streamside Protection Area (SPA) designation. The City allowed for a reduction in ESHA buffer from 100-feet to 35 to 40 feet ESHA/SPA from Tecolotito Creek ESHA and, as mentioned, a primary wildlife corridor in their EIR; however, the final conditions of approval for the Village at Los Carneros project required that "*the applicant must submit plans demonstrating a minimum 100-foot setback buffer between the project development and the top of the Tecolotito Creek bank*" (City 2014b). No ESHA, SPA, or riparian or creek habitats occur on the Heritage Ridge Project site.

For this study, Dudek further defines wildlife movement between core areas and/or habitat patches as wildlife corridors and linkage. Please note that the City's definition of "wildlife corridor" is used when describing or paraphrasing EIR statements.

<u>Habitat Linkage</u>: *An area which possess sufficient cover, food, water and/or other essential elements to serve as a movement pathway or between two or more large areas of habitat. An example of a linkage would be a belt of coastal sage scrub traversing a development, and connecting suitable habitat areas on either side of the developed area.*

Wildlife Corridor: *Areas of open space of sufficient width to permit larger, more mobile species to pass between larger areas of open space (core habitats), or to disperse from one major core habitat to another. Such areas can be several hundred feet wide, unobstructed, and usually possess cover, food and water.*

METHODOLOGY

Dudek investigated wildlife movement within the biological study area in 2013 and 2014. A pilot study was conducted in 2013 between January 3 and February 4, 2013 (32 days). In 2014, Dudek increased the number of camera stations and duration of the focused study, which lasted from January 18 to June 3, 2014 (160 days). The methodology of the two studies, which comprises our wildlife corridor analysis (i.e., analysis), is described in detail below.

During the 2013 pilot study, under the direction of senior ecologist John Davis IV, wildlife biologists Traci Caddy and Dave Compton conducted an initial daytime field survey on January 3, 2013, to confirm existing biological conditions; search for wildlife species, sign and tracks, and travel routes; and select appropriate camera station locations to record animal movements through the Project site and vicinity. Based on this survey, Dudek strategically placed four cameras to capture wildlife species movement through selected locations in the biological study area (*Table 1, Figure 2*). In addition, Dudek biologists Traci Caddy and Dave Compton conducted one additional daytime tracking survey on January 9, 2013, and two nocturnal spotlighting surveys on January 3, 2013, and January, 9, 2013, to survey for nocturnal wildlife activity. An additional daytime visit to review collected data, camera station, and site conditions as they related to wildlife movement was conducted by Dave Compton and senior ecologist John Davis IV on February 4, 2013.

In 2014, Dudek expanded the biological survey area, increased the number of camera stations, and lengthened the survey duration. In addition to camera locations used in 2013, five cameras were placed in strategic locations to provide more coverage of the potential routes of travel. Dudek strategically placed a total of nine cameras to capture species movement through these selected areas of the Project site and to assess entrance and/or exit points to the Project site. In addition, Dudek biologists conducted three daytime tracking surveys, on February 4, April 3, and May 2014. Detailed methods for camera stations and daytime surveys are discussed below.

Camera Stations

Nine motion-triggered camera stations (un-baited and unscented) were set up using Cuddeback Capture® digital cameras with a 50-foot flash range and seven Bushnell HD® Trophy Cams with an 80-foot flash range. The cameras were placed throughout the Project site, and each operated to a maximum period of 160 days (*Table 1*). Camera direction and location were selected according to the most likely route of wildlife travel through the potential wildlife corridor and at access points to the potential corridor, including the culverts on the north and south ends of the study area (*Figure 2*).

Four camera stations were redeployed in the same locations as in the Dudek 2013 study. For the purpose of this study, Camera Station 1 is in the same location as in the 2013 study at the Hollister Avenue culvert. Camera Station 2 is in the same location as in the 2013 study and now has two cameras (2a and 2b) to ensure coverage that is more complete over possible routes of travel through the Los Carneros Wetland. Camera Station 3 has been re-named Camera station 11 and has been moved slightly south of the original 2013 location due to added fencing and gates. Camera Station 4 is in the same location as in 2013, at the Los Carneros Creek site at the Highway 101 culvert. Five additional cameras have been added to this 2014 study to more thoroughly cover all of the possible routes of travel or entry points into the corridor. These are at the locations described in *Table 1* and displayed on *Figure 1*.

The camera stations were visited on January 22, February 4, February 13, March 3, March 13, April 15, May 15, and June 11, 2014 to download photographs, adjust the position of the camera, and replace batteries (as needed). In 2013, the camera stations were visited on January 9, 13, 15, and 31.

Tracking Surveys

Dudek biologists Traci Caddy and Dave Compton surveyed the study area for tracks and signs during daytime hours on January 3, 2013, and January 9, 2013 (*Table 2*). The entire Project site and access areas to the suggested wildlife movement corridor were surveyed on foot, and all mammal tracks and sign were inventoried. Surveys focused on potential accessed points to the site and areas where mammal tracks could easily be observed, including roads and muddy/wet areas. During the February 4, 2013, site visit, senior ecologist John Davis IV revisited many of the tracks to further verify identification and search for additional tracks. In 2014, Mr. Davis IV, Mr. Compton, and Ms. Caddy conducted four additional tracking surveys.

Spotlighting Surveys

Dudek biologists Traci Caddy and Dave Compton conducted nocturnal spotlighting surveys in the study area for mammal species on January 3, 2013, and January 15, 2013 (*Table 2*). Each survey lasted approximately two hours. The biologists walked the Project site and other open space between Willow Springs I and U.S. 101, watching for wildlife and occasionally stopping to shine flashlights over open areas where wildlife might be passing. On the latter date, the biologists also walked the perimeter of the Los Carneros Wetland, occasionally shining lights over the wetland to scan for wildlife.

Table 1
Camera Station Locations and Dates of Operations

Camera Station	Location and Orientation	Coordinates	Start Date(s)	End Date(s)
1	North end of culvert beneath Hollister Avenue	34° 25' 52.38" N 119° 51' 02.74" W	January 7, 2014	June 11, 2014
2(a)	Los Carneros Wetland; Camera faces east	34° 35' 55.22" N 119° 51' 07.96" W	January 16, 2014	June 11, 2014
2(b)	Los Carneros Wetland; same location as Camera 2 facing south	34° 35' 10.47" N 119° 51' 07.74" W	March 3,2014	June 11, 2014
3[1]	Middle of potential wildlife corridor on fence at west edge of project site	34° 26' 55.22" N 119° 51' 07.96" W	January 9, 2013	January 31, 2013
4	South end of culvert beneath U.S. 101	34° 26' 14.67" N 119° 51' 00.52" W	January 7, 2014	June 11, 2014
5	South end of culvert beneath U.S. 101; east of camera 4 and just north of camera 6	34° 26' 15.42" N 119° 50' 53.13" W	January 16, 2014	June 11, 2014
6	Concrete channel north end	34° 26' 13.51" N 119° 50' 52" W	January 16, 2014	June 11, 2014
7	Concrete channel south end	34° 25' 53.94" N 119° 50' 51.30" W	January 7, 2014	June 11, 2014
8	Corner of Los Carneros Way	34° 26' 01.79" N 119° 51' 09.98" W	January 22, 2014	June 11, 2014
9	Middle of corridor and behind construction trailer	34° 26' 06.61" N 119° 51' 06.31" W	January 22, 2014	June 11, 2014
10[2]	North-central portion of project site along coyote brush scrub.	34° 26' 11.44" N 119° 51' 05.46" W	Not applicable[2]	Not applicable2
11	Middle of project site through chain-link fence	34° 26' 10.44" N 119° 51' 08.06" W	January 16, 2014	June 11, 2014

[1] Installed, but not operating on January 11-14, 2013.

[2] Location of camera station selected, however, camera was not installed. Instead selected stations 3 (2013) and 11 (2014)

Table 2
Tracking and Spotlighting Survey Dates, Times, and Conditions

Survey Date/ Times	Conditions	Surveyors	Type of Survey
January 3, 2013 2:21pm-4:30pm	Clear with light winds (0-2 mph). Temperatures ranged from 63°F to 64°F.	Dave Compton, Traci Caddy	Daytime tracking survey
January 3, 2013 6:43pm-8:30pm	Clear with light winds (0-2 mph). Temperatures ranged from 43°F to 51°F.	Dave Compton, Traci Caddy	Nighttime spotlighting survey
January 9,2013 6:50am- 8:45am	Clear with light winds (0-2 mph). Temperatures ranged from 42°F to 50°F.	Dave Compton, Traci Caddy	Daytime tracking survey
January 15, 2013 6:50pm-8:20pm	Clear with light winds (0-2 mph). Temperatures ranged from 41°F 42°F.	Dave Compton, Traci Caddy	Nighttime spotlighting survey
February 4, 2013 11:00am – 12:30pm	Clear with light winds (0-2 mph). Temperatures ranged from 70°F 72°F.	John Davis IV Dave Compton	Daytime site review
February 4, 2014 8:11am- 10:34am	25% Cloud Cover with light winds (0-1 mph). Temperatures ranged from 49°F to 52°F.	Traci Caddy, Dave Compton	Daytime tracking survey
March 3, 2014 8:11am – 9:35	25%CC with light winds (0-1mph). Temperatures ranged from 52°F-57°F.	Traci Caddy, Dave Compton	Daytime tracking survey
April 8, 2014 3:30 – 5:00 pm	50%CC with light winds (0-5.5mph). Temperatures ranged from 75°F-84°F.	John Davis IV	Daytime tracking survey
April 15, 2014 11:00 – 12:35 pm	Clear with light winds (0-1mph). Temperatures ranged from 73°F-78°F.	John Davis IV	Daytime tracking survey

LIMITATIONS

The 2013 survey was conducted during winter, when most mammals occurring in the area would be expected to be active in this season. Conditions were suitable for detection of active wildlife species and any recent sign of their presence in the Project area during the surveys (*Table 2*). However, the short duration of the wildlife movement assessment during mid-winter limited the amount and intensity of wildlife movement we could reasonably document. Further, the winter season is not ideal to capture wildlife dispersing from “core habitats” such as the Santa Ynez Mountains foothill to “patches” like the Goleta Slough. Instead, wildlife movement captured by the cameras and evidenced by sign was likely a function of daily activities in search of prey items and shelter. Wildlife activities, especially of mammals, increase in spring and summer;

therefore, there is chance that wildlife species that may occur at other times of year were not captured as a result. Additionally, some of the fences that were present during the study were likely installed since field surveys were performed by Envicom (July 16, 2010) and/or the FEIR (City 2011) was prepared (2010/2011). Some fencing in the direct pathway of the potential wildlife corridor may have obstructed wildlife movement during the study.

The 2014 study was conducted concurrently with the construction of the Willow Springs II development. The combination of on-going construction, traffic, fencing, material storage, etc. likely affected wildlife travel routes, however, these limitations were recognized and discussed early in the study (before camera's were positioned). In fact, The Towbes Group understood the limitations and worked proactively with Dudek to make adjustments to reduce the limitations and strengthen the study. The major changes were to fencing. The Towbes Group – Construction Division cut several openings in the chain link fencing in areas where Dudek observed or determined that wildlife traveled or could through the site on the way to and back from the Los Carneros Wetlands.

Also during the study, a second construction project started to the west of the Project site, reinforcement of the Los Carneros Road overpass, a Caltrans project. The steep slope of the south overpass abutment was highly disturbed throughout much of the study and access to the lower portions of the abutment occurred in the northern portion of the biological study area. It is unlikely that the daytime construction directly affected wildlife movement to the Los Carneros Wetlands or west to Tecolotito Creek (no nighttime work was conducted); however, Dudek was unable to safely place camera stations in the area to capture wildlife movement to the west of the Project site. The construction activities also affected prime wildlife tracking conditions following rain events as ideal tracking areas were quickly driven over by construction equipment and vehicles quickly eliminating any new tracks.

RESULTS

Camera Stations

<u>Coyote</u>

The coyote (*Canis latrans*) is a medium-size mammal (8 to 20 kg / 1300 to 1700 mm total length) that can move over a large area and between habitats in search of prey. During this study, coyotes were detected by an independent camera station observation (observation) at Camera Station 2b, Camera Station 4, Camera Station 5, Camera Station 6, and Camera Station 9 (*Table 3* and *Camera Data*). Camera Station 4 (at the culvert at U.S 101 just north of the Project site) had the greatest number of observations of coyote (total number (n) equals 17). There were only two on-site observations of coyote recorded at Camera Station 9 (*Table 3*) and a total of 29 coyote observations for all camera stations.

Bobcat

The bobcat (*Lynx rufus*) is a medium-size mammal (7 to 13 kg / 635 to 1400 mm total length) that can move over a large area (territory size ranges from 5 to 30 square miles) and their habitat includes forests, deserts, urban edges, and scrub. Bobcats were detected at Camera Station 2a, Camera Station 4, Camera Station 5, Camera Station 8, Camera Station 9, and Camera Station 11. Camera Station 5 (at the culvert at U.S 101 northeast of the Project site) had the greatest number of observations of bobcat, with 146 moving in either direction along the Los Carneros Creek culvert. There were several observations (n=27) of bobcat recorded on all three of the cameras located on the Project site. There were also several observations of bobcat at the entrance/exit points to the Project site including Camera Stations 4 and 2a (17 observations) (*Table 3*). There were a total of 190 observations of bobcat.

Raccoon

The raccoon (*Procyon lotor*) is a medium-size mammal (4 to 8 kg / 780 to 930 mm total length that persists near creeks in the urban landscape and also natural forest woodlands and wetlands habitats. While this species covers relatively long distances for a mammal of its size, its home range is much smaller than that of the coyote and larger mammals (Zeiner et al. 1990). Raccoons were detected at Camera Station 2a, Camera Station 4, Camera Station 5, Camera Station 6, Camera Station 8, and Camera Station 9 (*Table 3*). The culverts north of the Project site at Camera Station 4, Camera Station 5, and Camera Station 6 at the north end of the concrete channel had the highest number of raccoon observations, with 48-61 per location. There were several observations (n=30) of raccoon at two of the cameras (Camera Station 8 and Camera Station 9) on the Project site. There were a total of 204 observations of raccoon.

Other mammal species recorded at camera stations were smaller mammals that do not range over large areas and, therefore, are not indicator species for wildlife corridors. They included striped skunk (*Mephitis mephitis*) and opossum (*Didelphis virginiana*). Neither rabbit nor rodent (i.e., small mammal) species were included in the analysis.

Table 3
Camera Station Results

Camera Station No.	Season Year	Mammal Species Observed	Number of Independent Observation	Notes
1	Winter 2013	Coyote (*Canis latrans)*	2	Heading in west direction in both photographs.
1	Winter 2013	Raccoon (*Procyon lotor)*	3	Crossing through stream and heading south in all photographs.
2a	Winter 2013	Coyote (*Canis latrans)*	5	The same individual identified in three of the photographs based on distinct tail markings
2a	Winter 2014	Bobcat (*Lynx rufus)*	9	Observed equally going in both directions
2a	Winter 2014	Raccoon (*Procyon lotor)*	4	
2a	Winter 2014	Opossum (*Didelphis virginiana)*	1	
2b	Spring 2014 Summer 2014	Coyote(*Canis latrans)*	4	Heading west in all occasions
4	Winter 2014 Spring 2014 Summer 2014	Coyote(*Canis latrans)*	17	Most occurrences are heading in south direction
4	Winter 2014 Spring 2014 Summer 2014	Bobcat (*Lynx rufus)*	8	Occurrences are going in both directions along creek.
4	Winter 2014 Spring 2014 Summer 2014	Raccoon (*Procyon lotor)*	48	
4	Winter 2014 Spring 2014 Summer 2014	Striped Skunk (*Mephitis mephitis)*	26	
4	Spring 2014	Opossum (*Didelphis virginiana)*	13	
5	Winter 2014 Spring 2014	Coyote(*Canis latrans)*	5	All occurrences were heading in north direction
5	Winter 2014 Spring 2014	Bobcat (*Lynx rufus)*	146	Occurrences are going in both directions.
5	Winter 2014 Spring 2014	Raccoon (*Procyon lotor)*	51	Many of the occurrences have multiple individuals.
5	Winter 2014 Spring 2014	Striped Skunk (*Mephitis mephitis)*	15	Most occurrences are heading in north direction.
5	Winter 2014 Spring 2014	Opossum (*Didelphis virginiana)*	146	
6	Winter 2014	Coyote(*Canis latrans)*	1	
6	Winter 2014 Spring 2014	Raccoon (*Procyon lotor)*	61	Occurrences heading in both directions
6	Spring 2014	Striped Skunk (*Mephitis*	14	

Table 3
Camera Station Results

Camera Station No.	Season Year	Mammal Species Observed	Number of Independent Observation	Notes
	Summer 2014	*mephitis)*		
8	Winter 2014 Spring 2014 Summer 2014	Bobcat (*Lynx rufus)*	14	Occurrences heading in both directions
8	Winter 2014 Spring 2014 Summer 2014	Raccoon (*Procyon lotor)*	26	Many of the occurrences have multiple individuals.
8	Winter 2014 Spring 2014 Summer 2014	Striped Skunk (*Mephitis mephitis)*	19	
8	Winter 2014 Spring 2014 Summer 2014	Opossum (*Didelphis virginiana)*	20	
9	Spring 2014 Summer 2014	Coyote(*Canis latrans)*	2	Both occurrences heading in southern direction
9	Spring 2014 Summer 2014	Bobcat (*Lynx rufus)*	11	Most occurrences heading in north direction.
9	Winter 2014 Spring 2014	Raccoon (*Procyon lotor)*	4	
9	Winter 2014 Spring 2014	Striped Skunk (*Mephitis mephitis)*	11	Most occurrences are heading in north direction
9	Winter 2014 Spring 2014	Opossum (*Didelphis virginiana)*	24	
11	Spring 2014	Bobcat (*Lynx rufus)*	2	Both occurrences heading in northern direction
11	Winter 2013	Raccoon (*Procyon lotor)*	1	Two individuals in photograph
11	Winter 2013 Winter 2014 Spring 2014	Striped Skunk (*Mephitis mephitis)*	12	Most occurrences heading in north direction
11	Spring 2014 Summer 2014	Opossum (*Didelphis virginiana)*	14	All occurrences are heading in north direction

Tracking Surveys

In 2013, most tracks were recorded around the middle of the Project site near Camera Station 3 (*Figure 3*). This area included a graded, temporary road and large unvegetated areas, including muddy ground and standing water. In this area, raccoon, coyote, striped skunk, bobcat, and opossum (*Didelphis virginiana*) tracks were observed. Additionally, raccoon tracks were observed near Camera Station 4. Much of the remainder of the Project site consisted of vegetated areas where tracks could not easily be discerned. *Figure 3* displays the location and year of the tracks and sign observed.

In 2014, tracks were primarily recorded around the northern end of the Project site, just north of Camera Station 11 near the railroad tracks (*Figure 3*). This area had unvegetated areas along the railroad tracks and along the construction road areas and includes muddy ground and standing water. In this area, raccoon, coyote, and bobcat tracks or scat were observed. Additionally, coyote scat was observed near Camera Station 11. Much of the remainder of the Project site consisted of vegetated areas and/or substrate where tracks could not easily be discerned, and as discussed, construction activities on-site and near the Los Carneros Road Bridge reduced the area and timing for track identification.

Spotlighting Surveys

In 2013, no mammal species were detected during walking nocturnal spotlighting surveys, however, several owls were observed. Spotlighting was not performed in 2014.

SUMMARY

During the study, three target medium-sized mammal species (coyote, bobcat, and raccoon) and two non-target mammal species (striped skunk and opossum) moved between the north and western portions of the Heritage Ridge Project site and south to the Los Carneros Wetlands. No observations of deer, bear, or mountain lion were within the biological study area during the study. The most interesting data is that of the bobcat. The study’s highly documented the bobcat, a typically timid species, within the biological study area demonstrating that the habitat at the U.S. 101 culverts outlets provided enough plant coverage and shelter to allow safe movement south of the highway for this elusive cat. Bobcats are primarily nocturnal animals, especially near urban areas where they try to avoid human encounters. In fact, bobcats that live in areas highly fragmented by urbanization are even more nocturnal than bobcats that live in remote areas (Urban Carnivores 2014). Nearly all bobcat observations were at night.

Bobcats moved through Project site to reach the Los Carneros Wetlands and are also thought to travel west or east of the site. The data suggest that the latter is preferred, but without camera stations positioned at the Los Carneros Road overpass due to on-going construction activities during the study, no direct evidence is available for the west travel route (alternative wildlife linkage); however, the west route connects with Tecolotito Creek, a documented primary wildlife corridor to the Goleta Slough (City 2014a, Hoagland 2011), approximately 0.44 to 0.50 mile to the south and west. To the east of the Project site and south of U.S. 101, the urban environment is dense and expansive, with the exception of Twin Lakes Golf Course and Las Vegas Creek (on the golf course) approximately 0.64 mile east of Camera Station 5. Las Vegas Creek extends south across Hollister Avenue and along the eastern boundary of the Santa Barbara Airport with access to highly fragmented habitat patches, including the Goleta Slough another 0.75 mile south of the golf course. Of the 190 bobcat camera station observation only 25 (7.6 percent) were from on-site camera stations (8 and 11) and the Los Carneros Wetlands (camera station 2A). Los Carneros Creek represented the eastern boundary of the biological survey area (Camera Station 5, 6, and 7). Bobcats were most often observed at Camera Station 5, but not in Los Carneros Creek at station 6 or 7 as the creek becomes a concrete stormwater culvert south of the Union Pacific railroad track easement. This indicates that bobcats were also using, perhaps preferring, other routes of travel. Data for the coyote and raccoon supported the use of all potential wildlife movement routes (i.e., linkages). Both species are more tolerant of the urban environment and were found throughout the biological study area with the exception of the south end of the stormwater culvert (Camera Station 7), and, therefore, bobcats remain the focus of analysis especially as it relates to Project Design (below).

DISCUSSION

The hypothesis of an alternative wildlife movement route (wildlife linkage) south through the Project site to the Los Carneros Wetlands and onto the Santa Barbara Airport and greater Goleta Slough was analyzed in this study. As alluded to by the City (2011) and consultant (Envicom), it is unlikely due to physical barriers and impediments that wildlife movement would occur in the concrete portion of Los Carneros Creek south of Union Pacific railroad tracks. Instead, it was proposed that the Project site and Tecolotito Creek would provide a more ideal wildlife corridor to the slough.

"…it appears that Los Carneros Creek, as well as Glen Annie (Tecolotito) Creek, offer better opportunities for movement compared to other creeks draining to the Slough, since each passes through relatively little urban development" (City 2011).

It is agreed that the segment of Los Carneros Creek that connects areas north of U.S. 101 to the Goleta Slough is a poor wildlife linkage providing no wildlife habitat. The "stormwater culvert" consists of an approximately 2,000 foot concrete-lined flood control channel with steep walls and 6-foot high chain-link fences at the top-of-slope (west and east) bordering the channel. Dudek's data suggests that wildlife species were generally absent from the channel, especially the southern end near Hollister Road, where the camera captured regular human foot traffic but no wildlife activity. Striped skunk and opossum were, however, infrequently captured by the wildlife cameras on the north end. Based on the camera data, Los Carneros Creek/Channel does not provide a wildlife linkage between the Santa Ynez Mountains and the Goleta Slough on airport property.

Additionally, the City (2011) stated:

"Wildlife utilizing the Willow Springs North property could pass from the Los Carneros Creek culvert beneath the 101 Freeway to the Goleta Slough, via disturbed undeveloped habitats and the Los Carneros Wetland…"

"It would be necessary for larger species to cross Hollister Avenue. Nevertheless, this corridor is the more suitable option for smaller species, as compared to the exposed concrete-lined reach of Los Carneros Creek to the east."

Light traffic on Hollister Avenue is expected late in the evening, which theoretically, would allow nocturnally active wildlife species to transverse the asphalt to the airport and slough from the Los Carneros Wetlands. However, most mammal species will then find limited habitat, coverage, and an 8-foot tall, well-maintained chain-link security fence approximately 300 feet south of the road, forming a physical barrier to the slough. The area north of the slough and south of Hollister Avenue is considered a "habitat patch" considering the surrounding urban environment, although the quality is questionable due to the existing hazards, frequent maintenance, and limited coverage. Predatory interactions and road causalities may result from these forays for the species of interest. One raccoon was observed dead on Hollister Avenue during the study. If wildlife species were able to access the airport property, just south of Los Carneros Creek is the airport runway and a very well maintain safety area providing no coverage and limited hunting or foraging opportunities. Habitat conditions improve further west and south near the confluence of Los Carneros and Tecolotito Creek and south along and adjacent to Tecolotito Creek deeper into the slough.

As indicated, the Hollister Avenue culvert at Tecolotito Creek offers the most ideal wildlife access point to the Goleta Slough on Santa Barbara Airport property (*Figure 4*). In fact, Hoagland et. al. (2011) determined Tecolotito Creek to be one of four primary corridors in the Goleta Valley with sufficient culvert sizes to allow for movement of larger mammals (i.e., deer and black bears) (Hoagland 2011, City 2012); however, in the Village of Los Carneros Draft EIR, the City (2014a) noted that the largest species to move through the Tecolotito Creek and culverts is foxes (*Vulpes* spp.) and the American badger (*Taxidea taxus*) and found the 110 foot total minimum width (60 foot for the Tecolotito Creek ESHA and 50 feet for adjacent upland habitat) proposed for the Village project was sufficient for wildlife species utilizing corridor, which was later expanded to 100 feet from the creek bank per the final conditions of approval for the project (City 2014b). Based on literature, existing data, and personal observations, Tecolotito Creek and its culverts provide the best option for wildlife movement between the Santa Ynez Mountain foothills and the Goleta Slough on Santa Barbara Airport property.

In conclusion, the study found evidence of a wildlife linkage between the Santa Ynez Mountain foothills and the Los Carneros Wetlands through the Heritage Ridge Project site and no linkage between the Los Carneros Creek or Wetlands and the greater Goleta Slough on the Santa Barbara Airport. The alternative wildlife corridor proposed by the City (2011) linking the foothills (and Project site) to the slough was, therefore, not substantiated. Instead, the data suggest that an alternative wildlife linkage occurs to the west connecting to Tecolotito Creek, a primary wildlife corridor to the Goleta Slough (*Figure 4*). Another possible wildlife linkage exists to the east connecting to Las Vegas Creek at the Twin Creeks Golf Course, which also connects to the Goleta Slough, although with impediments. The expected end point of the linkage for most wildlife species traveling to the east may just be the golf course for hunting opportunities.

PROJECT DESIGN

Heritage Ridge has allotted for a wildlife linkage along the north and west perimeter of the Project site to allow for movement of mammals and other wildlife species between the Santa Ynez Mountain foothills and Los Carneros wetlands to the south of the site. True Nature Landscape Architecture, working with Dudek, has included in a wildlife trail in their preliminary landscape plan (*see attached C-1, C-2, and C-3*) along a 6 to 8-foot sound wall that will separate parking lots (north and west side of project) and condominiums (south side of Project) from the designated wildlife linkage. To ensure conditions along the linkage will continue its purpose of wildlife movement, the plant palette is low maintenance in design. Even so, the corridor will be regularly maintained. The wildlife linkage will also be in compliance with City of Goleta Fire Department Codes and resistant to vagrant establishments. The Towbes Group is in the process of finalizing the project design; therefore, recommendations are presented below to reduce indirect effects to the wildlife corridor that could inhibit movement and/or full use of the trail to the Los Carneros Wetlands.

RECOMMENDATIONS

The Heritage Ridge Project will affect the width and topography of the wildlife linkage that extends between the Santa Ynez Mountain foothills and the Los Carneros Wetlands. To successfully allow for development of the Project while providing a functional wildlife linkage between the foothill and wetlands, the following recommendations are requested of the Project:

- Direct all neighborhood night lighting downward and away from the wildlife linkage
- No artificial lighting should be placed on the noise barrier or in the wildlife linkage
- Restrict the use of pesticides, insecticides, and rodenticides, and educate the future homeowners about the effects to mammals and other wildlife species

- Bobcats are susceptible to the same diseases as domestic cats, and disease can be transmitted between domestic cats and bobcats (or vice versa). Educating future house owners and the public about feline diseases and promoting indoor cats will protect bobcat use of the corridor and throughout the coastal zone and foothills
- Educate future homeowners and the public about the importance of the wildlife linkage

Implementation of the above recommendations will reduce potential indirect affects to wildlife utilizing the linkage, especially at night, when most mammals were observed moving through the area.

CONCLUSION

The Heritage Ridge Project will expand the boundaries of the existing Willow Springs residential neighborhoods to the west near Los Carneros Road. Two narrow urban wildlife corridors/linkages are situated near the Project site; one potentially links with Tecolotito Creek further west of the site and Los Carneros Road, while the second extends along the northern and western portions of the Project site to the east and along Los Carneros Road and eventually south (off-site) to the Los Carneros Wetlands. Maintaining this wildlife linkage is important for many small- (raccoon, stripped skunk, etc.) and medium- (coyote and bobcat) sized mammal species that use these areas (wetlands and foothills) to hunt, seek shelter, breed, and conduct other normal behaviors important for their survival, especially within the wildness-urban interface. If the recommendations presented are implemented and successfully maintained, I expect that wildlife travel will persist along the perimeter of the Project site connecting the San Ynez Mountain foothills and the Los Carneros Wetlands.

If you have any questions regarding the contents of this letter report, please do not hesitate to contact me at (805) 308-8524 office or (805) 252-7996 cell or by email at jdavis@dudek.com.

Sincerely,

John H. Davis IV
Project Manager / Senior Ecologist

Att.: *References*
Camera Data
Figure 1: Project Site Location
Figure 2: Camera Stations
Figure 3: Camera Station and Tracking Results

Att. (continued):

Figure 4: Wildlife Corridors
Photo Documentation'
Landscape Plans (C-1, C-2, and C-3)

cc: Linda Blackbern, The Towbes Group, via email

REFERENCES

City of Goleta. 2014a. Village at Los Carneros Final Environmental Impact Report (June 2, 2014).

City of Goleta. 2014b. Village at Los Carneros Final Conditions of Approval.

City of Goleta. 2011. Willow Springs II Draft Environmental Impact Report. City of Goleta. October 2011.

Elbroch, M., M. Kresky, and J. Evans. 2012. Field Guide to Animal Tracks and Scat of California. California Natural History Guide Series.

Elbroch, M. 2003 Mammal Tracks and Sign: a guide to North American Species

Elbroch, M. 2006. Animal Skulls: a guide to North American Species

Hoagland, S. 2011. Habitat Linkage Project.

Jameson, E.W. and H. J. Peeters. 2004. California Mammals. University of California Press. Berkeley, California.

Reid, F.A. 2006. A field guide to mammals of North America, 4th Edition. The Peterson field guide series.

Zeiner, D.C., W.F. Laudenslayer Jr., K.E. Mayer, and M. White, eds. 1990. California's Wildlife. Volume III: Mammals. California Statewide Habitat Relationship System. Sacramento, Calif.: California Department of Fish and Game.

CAMERA STATION DATA

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
2a	January 18, 2014/6:41am January 24, 2014/4:48am January 25, 2014/6:08 am January 30, 2014/6:03am February 1, 2014/7:13am February 5, 2014/8:26pm February 12, 2014/10:17pm February 18, 2014/12:13am February 21, 2014/10:15pm	Bobcat	Going in both directions Heading southeast Heading northwest
2a	January 25, 2014/3:31am	Opossum	
2a	January 18, 2014/5:41am February 18, 2014/5:20am February 28, 2014/4:54am March 3, 2014/3:41am	Raccoon	
2b	April 23, 2014/2:48am May 18, 2014/4:15am May 23, 2014/12:20am June 8, 2014/11:38pm	Coyote	Heading west Heading west Heading west Heading west
4	March 26, 2014/10:48pm March 29, 2014/8:11pm April 4, 2014/8:39pm April 8, 2014/10:02pm April 10, 2014/2:29am April 28, 2014/12:53am May 4, 2014/4:42am May 8, 2014/2:02am May 9, 2014/5:09am May 22, 2014/3:09am May 24, 2014/11:36pm May 25, 2014/10:17pm May 31, 2014/10:32pm	Opossum	
4	February 15, 2014/5:09am February 18, 2014/1:20am February 24, 2014/5:55am March 4, 2014/3:21am March 7, 2014/10:08pm March 9, 2014/11:45pm March 11, 2014/2:49am March 13, 2014/3:34am March 15, 2014/10:54pm March 17, 2014/9:31pm March 24, 2014/7:27pm March 25, 2014/7:36pm	Raccoon	

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	March 26, 2014/5:44am		
	April 2, 2014/6:15am		
	April 2, 2014/8:18pm		
	April 5, 2014/8:20pm		
	April 7, 2014/6:23am		
	April 7, 2014/10:27pm		
	April 7, 2014/10:53pm		
	April 9, 2014/10:29pm		
	April 12, 2014/11:12pm		
	April 16, 2014/11:47pm		
	April 17, 2014/4:38am		
	April 19, 2014/8:13pm		
	April 24, 2014/10:29pm		
	April 26, 2014/9:01pm		
	April 29, 2014/8:56pm		
	May 1, 2014/6:22am		
	May 3, 2014/1:13am		
	May 3, 2014/1:14am		
	May 3, 2014/1:26am		
	May 3, 2014/4:52am		
	May 4, 2014/9:28pm		
	May 8, 2014/12:19am		
	May 8, 2014/4:04am		
	May 8, 2014/5:10am		
	May 9, 2014/11:11pm		
	May 13, 2014/4:36am		
	May 13, 2014/11:10pm		
	May 13, 2014/11:24pm		
	May 18, 2014/1:27am		
	May 25, 2014/11:07pm		
	May 27, 2014/3:10am		2 Raccoons
	May 29, 2014/4:35am		
	May 31, 2014/1:08am		
	June 2, 2014/5:20am		
	June 3, 2014/4:47am		
	June 3, 2014/11:41pm		
Camera Station 4	February 14, 2014/1:05am	Striped Skunk	
	February 14, 2014/3:33am		
	February 16,2014/2:08am		
	February 16,2014/10:29pm		
	February 23, 2014/1:57am		
	February 23, 2014/6:50pm		
	March 12, 2014/12:34pm		
	March 16, 2014/4:06am		
	March 19, 2014/2:57am		

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	March 28, 2014/12:09am		
	March 28, 2014/3:24am		
	April 3, 2014/9:40pm		
	April 10, 2014/5:12am		
	April 13, 2014/3:42am		
	April 17, 2014/1:43am		
	April 24, 2014/1:05am		
	April 24, 2014/9:04pm		
	April 29, 2014/4:51pm		
	April 30, 2014/11:49pm		
	May 6, 2014/2:28am		
	May 12, 2014/9:43pm		
	May 14, 2014/3:26am		
	May 15, 2014/1:52am		
	May 15, 2014/11:34pm		
	May 17, 2014/3:57am		
	June 6, 2014/3:41am		
Camera Station 4	January 8, 2014/9:58pm	Bobcat	Heading south
	January 13, 2014/4:55pm		
	February 8 , 2014/1:18am		Heading north
	April 12, 2014/4:06am		Heading north
	May 8, 2014/4:33am		Heading north
	May 17, 2014/11:07pm		Heading south
	June 4, 2014/3:14am		Heading north
	June 6, 2014/9:28pm		Heading south
Camera Station 4	January 17, 2014/10:52am	Coyote	All heading south
	January 20, 2014/11:05pm		
	January 21, 2014/12:00am		
	April 2, 2014/5:29pm		
	April 25, 2014/6:08pm		
	May 7, 2014/7:51pm		Heading north
	May 9, 2014/5:16am		Heading south
	May 11, 2014/4:36am		Heading south
	May 18, 2014/4:00pm		Heading south
	May 22, 2014/5:00am		Heading south
	May 24, 2014/5:12am		Heading south
	May 28, 2014/5:23pm		Heading south
	May 31, 2014/4:30pm		Heading south
	May 31, 2014/4:36pm		Heading south
	June 4, 2014/2:03am		Heading north
	June 8, 2014/6:57am		Heading south
	June 9, 2014/5:23pm		Heading south
Camera Station 5	January 20, 2014/3:38am	Opossum	
	January 22, 2014/4:57am		
	January 23, 2014/12:15am		
	January 24, 2014/3:54am		

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	January 25, 2014/1:20am January 25, 2014/1:52am January 26, 2014/6:57pm January 27, 2014/7:39pm January 28, 2014/10:12pm February 1, 2014/9:23pm February 5, 2014/12:25am February 5, 2014/8:55pm February 8, 2014/1:36am February 8, 2014/1:51am February 8, 2014/6:35pm February 9, 2014/6:24pm February 10, 2014/6:12pm February 11, 2014/12:08am February 14, 2014/8:26pm February 17, 2014/7:31pm February 20, 2014/1:01am February 20, 2014/11:28pm February 27, 2014/7:37pm March 6, 2014/8:14pm March 7, 2014/8:38pm March 8, 2014/8:11pm March 9, 2014/1:53am March 9, 2014/8:54pm March 10, 2014/7:32pm March 10, 2014/8:03pm March 11, 2014/3:02am March 11, 2014/3:16am March 12, 2014/4:09am March 12, 2014/8:12pm March 14, 2014/9:03pm March 16, 2014/9:09pm March 16, 2014/10:47pm March 17, 2014/8:28pm March 18, 2014/4:03am March 18, 2014/6:08am March 18, 2014/8:56pm March 18, 2014/11:01pm March 19, 2014/11:43pm March 20, 2014/4:35am March 20, 2014/9:53pm March 20, 2014/11:07pm March 21, 2014/10:16pm March 23, 2014/2:06am March 23, 2014/11:09am March 25, 2014/5:13am		

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	March 25, 2014/8:46pm March 25, 2014/9:18pm March 27, 2014/2:13am March 27, 2014/2:45am March 27, 2014/8:28pm March 28, 2014/1:39am March 28, 2014/4:11am March 28, 2014/8:36pm April 2, 2014/11:24pm April 3, 2014/3:38am April 4, 2014/12:13am April 4, 2014/3:21am April 4, 2014/4:27am April 4, 2014/9:28pm April 4, 2014/10:25pm April 5, 2014/12:02am April 5, 2014/1:52am April 5, 2014/2:15am April 6, 2014/9:44pm April 7, 2014/10:35pm April 8, 2014/1:00am April 9, 2014/5:29am April 9, 2014/5:59am April 10, 2014/4:43am April 10, 2014/6:22am April 10, 2014/9:04pm April 11, 2014/5:31am April 11, 2014/6:09am April 11, 2014/6:54am April 12, 2014/5:34am April 12, 2014/10:06pm April 12, 2014/11:11pm April 12, 2014/11:54pm April 13, 2014/2:11am April 13, 2014/2:50am April 13, 2014/5:21am April 14, 2014/12:11am April 14, 2014/3:47am April 14, 2014/4:21am April 14, 2014/9:23pm April 15, 2014/12:22am April 15, 2014/4:09am April 16, 2014/2:39am April 16, 2014/2:51am April 16, 2014/3:40am April 17, 2014/5:29am		

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	April 18, 2014/1:13am April 22, 2014/8:36pm April 23, 2014/9:29pm April 24, 2014/2:18am April 24, 2014/4:57am April 25, 2014/2:06am April 25, 2014/11:40pm April 26, 2014/12:39am April 26, 2014/3:15am April 26, 2014/10:50pm April 27, 2014/1:55am April 29, 2014/2:54am April 30, 2014/4:52am April 30, 2014/9:26pm April 30, 2014/9:42 May 2, 2014/2:23am May 3, 2014/1:31am May 3, 2014/10:21pm May 4, 2014/10:53pm May 5, 2014/2:43am May 6, 2014/1:03am May 6, 2014/1:39am May 6, 2014/10:22pm May 7, 2014/12:14am May 7, 2014/12:40am May 7, 2014/1:32am May 7, 2014/1:34am May 7, 2014/4:21am May 7, 2014/8:47pm May 8, 2014/12:47am May 8, 2014/2:30am May 8, 2014/3:03am May 8, 2014/3:04am May 8, 2014/3:31am May 8, 2014/3:40am May 8, 2014/5:12am May 8, 2014/9:07pm May 9, 2014/12:04am May 9, 2014/3:58am May 12, 2014/10:15pm May 15, 2014/12:41am May 16, 2014/9:33pm May 18, 2014/3:07am May 18, 2014/9:42pm May 20, 2014/3:37am May 20, 2014/3:43am		

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	May 20, 2014/3:59am		
	May 20, 2014/4:05am		
	May 20, 2014/4:28am		
	May 20, 2014/9:06pm		
Camera Station 5	January 25, 2014/4:14am	Raccoon	
	January 26, 2014/2:26am		
	January 26, 2014/6:22am		Two raccoons heading north
	January 27, 2014/5:09am		
	January 27, 2014/6:17am		
	January 27, 2014/10:59pm		
	January 28, 2014/3:29am		
	February 2, 2014/5:28am		
	February 2, 2014/11:28pm		
	February 3, 2014/1:35am		
	February 3, 2014/5:17am		
	February 3, 2014/8:28pm		
	February 4, 2014/4:53am		Two raccoons heading north
	February 4, 2014/6:59pm		
	February 8, 2014/4:00am		Two raccoons heading south
	February 13, 2014/2:11am		
	February 18, 2014/2:11am		
	February 19, 2014/9:39pm		
	February 20, 2014/7:26pm		
	February 23, 2014/9:27pm		
	March 5, 2014/7:35pm		
	March 5, 2014/10:34pm		
	March 8, 2014/7:52pm		
	March 9, 2014/3:15am		
	March 11, 2014/3:02am		
	March 11, 2014/8:40pm		
	March 13, 2014/1:42am		
	March 15, 2014/11:34pm		
	March 16, 2014/6:18am		
	March 17, 2014/10:17pm		
	March 17, 2014/10:56pm		
	March 23, 2014/1:07am		
	March 24, 2014/12:50am		
	March 28, 2014/2:23am		
	March 29, 2014/3:49am		Two raccoons
	March 29, 2014/4:47am		Two raccoons
	April 1, 2014/2:34am		
	April 2, 2014/6:00am		
	April 2, 2014/6:21am		
	April 6, 2014/9:16pm		
	April 7, 2014/9:07pm		
	April 9, 2014/10:39pm		

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	April 14, 2014/1:51am		
	April 14, 2014/2:32am		
	April 18, 2014/4:16am		
	April 19, 2014/8:26pm		
	April 23, 2014/5:02am		Two raccoons
	April 23, 2014/5:03		Two raccoons
	April 23, 2014/8:40pm		
	April 25, 2014/5:46am		Two raccoons
	April 26, 2014/10:35pm		
	April 27, 2014/5:15am		Two raccoons
	May 4, 2014/4:02am		
	May 4, 2014/10:59pm		
	May 5, 2014/5:17am		
	May 7, 2014/5:18am		
	May 9, 2014/3:05am		
	May 9, 2014/9:26pm		
	May 9, 2014/11:53pm		
	May 15, 2014/12:53am		
	May 18, 2014/2:31am		
Camera Station 5	January 18, 2014/3:25am	Striped skunk	Heading north
	January 20, 2014/12:14pm		Heading south
	January 21, 2014/5:33am		Heading north
	January 22, 2014/3:41am		
	January 25, 2014/4:27am		Heading north
	January 27, 2014/1:42am		Heading north
	January 28, 2014/3:29am		Heading north
	February 6, 2014/1:11am		Heading south
	February 6, 2014/4:20am		Heading north
	February 23, 2014/8:50pm		Heading north
	March 5, 2014/8:24pm		Heading west
	March 11, 2014/5:33am		Heading south
	March 21, 2014/12:00am		
	April 3, 2014/10:04pm		Heading north
	April 7, 2014/11:09pm		Heading north
Camera Station 5	January 18, 2014/1:00am	Coyote	Heading north
	January 27, 2014/2:25am		Heading north
	January 30, 2014/2:18am		Heading north
	February 1, 2014/1:31am		Heading north
	May 8, 2014/2:15am		Heading north
Camera Station 5	January 16, 2014/9:51pm	Bobcat	Heading south
	January 16. 2014/10:18pm		Heading north
	January 17, 2014/11:29pm		Heading south
	January 18, 2014/12:12am		Heading north
	January 18, 2014/4:10am		Heading north
	January 19, 2014/2:42am		Heading south
	January 19, 2014/2:49am		Heading south

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	January 19, 2014/8:57pm		Heading south
	January 19, 2014/10:26pm		Heading north
	January 20, 2014/5:43am		Heading south
	January 20, 2014/6:08am		Heading north
	January 24, 2014/12:14am		Heading south
	January 24, 2014/12:46am		Heading north
	January 26, 2014/1:24am		Heading south
	January 26, 2014/1:24am		Heading west
	January 26, 2014/4:10am		Heading north
	January 27, 2014/12:46pm		Heading south
	January 27, 2014/1:12am		Heading north
	January 29, 2014/1:54am		Heading south
	January 29, 2014/4:13am		Heading north
	January 30, 2014/2:17am		Heading south
	January 30, 2014/3:59am		Heading north
	January 31, 2014/11:45am		Heading south
	February 1, 2014/3:01am		Heading north
	February 2, 2014/7:44pm		Heading south
	February 2, 2014/8:52pm		Heading north
	February 4, 2014/12:12am		Heading south
	February 4, 2014/2:24am		Heading south
	February 4, 2014/2:27am		Heading north
	February 4, 2014/2:57am		Heading north
	February 5, 2014/2:41am		Heading south
	February 5, 2014/3:44am		Heading north holding kill
	February 6, 2014/2:14am		Heading south
	February 8, 2014/3:34am		Heading south
	February 8, 2014/5:06am		Heading north
	February 10, 2014/2:33am		Heading north
	February 10, 2014/3:36am		Heading south
	February 10, 2014/4:15am		Heading north
	February 12, 2014/1:46am		Heading south
	February 12, 2014/3:43am		Heading north
	February 18, 2014/12:44am		Heading south
	February 18, 2014/2:00am		Heading north
	February 19, 2014/11:58pm		Heading south
	February 19, 2014/11:59pm		Heading north
	February 20, 2014/12:00am		Heading south
	February 20, 2014/2:07am		Heading north
	February 22, 2014/8:18pm		Heading south
	February 22, 2014/9:49pm		Heading north
	February 23, 2014/3:31am		Heading south
	February 23, 2014/5:07am		Heading north
	March 2, 2014/3:13am		Heading south
	March 3, 2014/4:48am		Heading north
	March 4, 2014/12:10am		Heading south

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	March 4, 2014/4:48am		Heading north
	March 6, 2014/9:02pm		Heading south
	March 6, 2014/9:46pm		Heading north
	March 7, 2014/11:38pm		Heading south
	March 8, 2014/4:31am		Heading north
	March 9, 2014/1:59am		Heading south
	March 9, 2014/3:51am		Heading north
	March 9, 2014/10:59pm		Heading south
	March 10, 2014/3:26am		Heading north
	March 11, 2014/11:51pm		Heading south
	March 12, 2014/2:16am		Heading north
	March 12, 2014/5:17am		Heading north
	March 12, 2014/10:52pm		Heading south
	March 13, 2014/2:41am		Heading north
	March 16, 2014/2:20am		Heading north
	March 17, 2014/1:04am		Heading south
	March 17, 2014/5:17am		Heading north
	March 17, 2014/9:33pm		Heading south
	March 17, 2014/11:02pm		Heading north
	March 19, 2014/11:51		Heading south
	March 19, 2014/2:29am		Heading north
	March 22, 2014/10:46pm		Heading south
	March 23, 2014/11:57pm		Heading north
	March 24, 2014/12:10am		Heading north
	March 27, 2014/8:34pm		Heading south
	March 27, 2014/10:32pm		Heading north
	March 28, 2014/11:34pm		Heading south
	March 29, 2014/12:19am		Heading south
	March 29, 2014/2:18am		Heading north
	March 29, 2014/4:27am		Heading north
	March 30, 2014/11:19pm		Heading south
	March 31, 2014/1:22am		Heading north
	April 2, 2014/10:53pm		Heading south
	April 2, 2014/11:07pm		Heading south
	April 3, 2014/12:29am		Heading north
	April 6, 2014/12:31am		Heading south
	April 6, 2014/12:46am		Heading north
	April 6, 2014/3:55am		Heading north
	April 7, 2014/1:51am		Heading south
	April 7, 2014/3:29am		Heading south
	April 7, 2014/5:54am		Heading north
	April 10, 2014/7:56pm		Heading south
	April 10, 2014/9:46pm		Heading south
	April 10, 2014/9:56pm		Heading north
	April 11, 2014/3:44am		Heading north
	April 12, 2014/1:11am		Heading south

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	April 12, 2014/3:22am April 12, 2014/4:13am April 14, 2014/9:05am April 15, 2014/3:41am April 16, 2014/1:35am April 17, 2014/5:03am April 18, 2014/11:52pm April 19, 2014/3:23am April 19, 2014/5:21am April 20, 2014/8:57pm April 21, 2014/4:12am April 23, 2014/12:16am April 23, 2014/3:03am April 25, 2014/12:49am April 25, 2014/12:51am April 25, 2014/12:53am April 25, 2014/5:03am April 25, 2014/6:20am April 25, 2014/11:02pm April 26, 2014/1:25am April 30, 2014/3:11am April 30, 2014/4:51am May 1, 2014/9:39pm May 3, 2014/11:51pm May 4, 2014/3:59am May 7, 2014/2:53am May 7, 2014/4:31am May 7, 2014/9:48pm May 8, 2014/1:44am May 8, 2014/4:13am May 11, 2014/12:20am May 11, 2014/1:06am May 11, 2014/2:37am May 12, 2014/4:16am May 15, 2014/3:32am May 18, 2014/5:45am May 18, 2014/11:43pm		Heading north Heading north Heading south Heading north Heading south Heading north Heading north Heading south Heading north Heading south Heading north Heading south Heading north Heading south Heading north Heading south Heading north Heading north Heading south Heading north Heading south Heading north Heading north Heading south Heading north Heading south Heading north Heading south Heading south Heading north Heading north Heading south Heading north Heading south Heading north Heading north Heading south
Camera Station 6	January 20, 2014/4:39am	Coyote	
Camera Station 6	February 17, 2014/ 2:00am February 18, 2014/2:00am February 20, 2014/1:06am February 20, 2014/1:09am February 20, 2014/1:10am February 23, 2014/4:59am February 27, 2014/7:22am February 27, 2014/9:15pm	Raccoon	Heading south Two individuals going south Heading north Heading south Heading north Heading south Heading south Heading south

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	March 4, 2014/4:09am		Heading south
	March 5, 2014/4:18am		Heading north
	March 7, 2014/7:26pm		Two individuals going south
	March 7, 2014/9:05pm		Heading south
	March 8, 2014/12:43pm		Heading north
	March 8, 2014/3:43am		Heading west
	March 8, 2014/7:13pm		Heading south
	March 11, 2014/8:40pm		Heading north
	March 11, 2014/11:25pm		Heading south
	March 12, 2014/1:42am		Heading north
	March 12, 2014/6:33pm		Heading south
	March 12, 2014/7:32pm		Two individuals going south
	March 12, 2014/7:56pm		Heading north
	March 13, 2014/1:49am		Heading south
	March 13, 2014/8:35pm		Heading south
	March 21, 2014/8:52pm		Heading north
	March 21, 2014/9:14pm		Heading south
	March 21, 2014/12:52am		Heading south
	March 21, 2014/3:43am		Heading south
	March 22, 2014/3:45am		Heading north
	March 23, 2014/4:48am		Heading north
	March 24, 2014/3:50am		Heading north
	March 24, 2014/11:39pm		Heading south
	March 25, 2014/8:01pm		Heading south
	March 25, 2014/11:32pm		Heading south
	March 26, 2014/4:54am		Heading south
	March 26, 2014/5:28am		Heading north
	March 27, 2014/4:38am		Heading south
	March 27, 2014/6:09am		Two individuals going south
	March 28, 2014/2:19am		Heading north
	March 28, 2014/8:38pm		Heading south
	March 28, 2014/9:03pm		Heading north
	March 29, 2014/4:58am		Heading south
	March 29, 2014/8:48pm		Two individuals going south
	April 1, 2014/2:33am		Heading north
	March 2, 2014/8:03pm		Heading south
	March 2, 2014/8:47pm		Heading south
	March 3, 2014/3:48am		Heading north
	March 4, 2014/12:42am		Heading north
	March 4, 2014/1:00am		Heading north
	March 4, 2014/4:43am		Heading south
	March 6, 2014/3:04am		Heading south
	March 11, 2014/2:07am		Heading south
	March 12, 2014/1:25am		Heading north
	March 13, 2014/12:02am		Heading south
	March 17, 2014/12:33am		Heading south

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	March 18, 2014/9:24pm		Heading south
	May 1, 2014/9:32pm		Heading south
	May 6, 2014/3:01am		Heading south
	May 8, 2014/12:25am		Heading south
	May 13, 2014/4:21am		Heading north
	May 22, 2014/3:58am		Heading south
	May 30, 2014/2:53am		Heading north
Camera Station 6	March 21, 2014/11:45pm	Striped skunk	
	April 2, 2014/1:10am		
	April 18, 2014/2:49am		
	April 22, 2014/2:30am		
	April 27, 2014/5:20am		
	April 27, 2014/11:49pm		
	April 30, 2014/11:21pm		
	May 4, 2014/11:51pm		
	May 7, 2014/9:23pm		
	May 23, 2014/10:53pm		2individuals heading south
	May 23, 2014/11:45pm		three individuals
	May 30, 2014/1:07am		
	May 31, 2014/11:19pm		
	June 6, 2014/11:38pm		
Camera Station 8	January 24, 2014/5:36am January 28, 2014/10:56pm January 29, 2014/3:54am January 29, 2014/10:31pm January 31, 2014/2:14am February 2, 2014/12:15am February 3, 2014/4:27am February 6, 2014/9:55pm February 6, 2014/10:42pm February 8, 2014/6:28am February 10, 2014/4:00am February 12, 2014/1:11am March 9, 2014/12:40am March 17, 2014/10:11pm April 4, 2014/4:33am April 7, 2014/12:37am May 4, 2014/9:36pm May 13, 2014/9:11pm June 6, 2014/1:26am	Striped skunk	
Camera Station 8	January 28, 2014/11:29pm January 28, 2014/12:18am January 31, 2014/9:12pm February 3, 2014/1:31am February 6, 2014/2:39am	Opossum	

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	February 10, 2014/1:43am		
	February 10, 2014/10:10pm		
	February 27, 2014/10:18pm		
	March 13, 2014/3:13pm		
	April 14, 2014/1:25am		
	April 18, 2014/2:23am		
	April 20, 2014/4:34am		
	April 21, 2014/4:57am		
	April 28, 2014/8:51pm		
	April 30, 2014/2:02am		
	May 2, 2014/10:58pm		
	May 3, 2014/9:16pm		
	June 3, 2014/10:35pm		
	June 3, 2014/10:42pm		
	June 10, 2014/1:40am		
Camera Station 8	January 22, 2014/8:18pm	Raccoon	
	January 23, 2014/4:50am		
	January 23, 2014/8:26am		
	January 24, 2014/3:24am		
	January 25, 2014/1:40am		2 Raccoons
	January 25, 2014/7:03pm		
	January 27, 2014/5:07am		
	January 28, 2014/7:50pm		
	January 30, 2014/4:07am		
	February 3, 2014/2:58am		2 Raccoons
	February 12, 2014/5:00am		
	February 17, 2014/10:33pm		
	February 19, 2014/10:05pm		
	February 24, 2014/3:11am		
	February 24, 2014/3:40am		
	March 3, 2014/12:53am		
	March 8, 2014/12:09am		
	March 11, 2014/10:10pm		
	April 7, 2014/4:42am		
	April 7, 2014/6:16am		
	April 25, 2014/4:39am		
	May 7, 2014/8:34pm		
	May 19, 2014/8:43pm		
	May 29, 2014/12:38am		
	May 29, 2014/1:35am		
	June 2, 2014/8:26pm		
Camera Station 8	January 25, 2014/1:23am	Bobcat	Heading north
	January 25, 2014/4:42am		Heading south
	January 28, 2014/4:44am		Heading south
	February 6,2014/12:45am		Heading north
	February 13, 2014/11:01pm		Heading north

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	February 14, 2014/1:39am		Heading south
	March 18, 2014/10:41pm		Heading south
	April 15, 2014/11:13pm		Heading south
	April 17, 2014/2:47am		Heading south
	April 17, 2014/2:50am		Heading north
	April 27, 2014/10:48pm		Heading south
	May 22, 2014/2:08am		Heading south
	June 2, 2014/12:23am		Heading north
	June 6, 2014/12:43am		Heading north
Camera Station 9	January 22, 2014/6:56pm	Opossum	
	January 22, 2014/9:39pm		
	January 22, 2014/9:50pm		
	January 22, 2014/9:59pm		
	January 24, 2014/1:45am		
	January 25, 2014/3:11am		
	January 25, 2014/7:41pm		
	February 4, 2014/10:27pm		
	February 5, 2014/7:16pm		
	February 6, 2014/2:29am		
	February 17, 2014/12:20am		2 opossums
	March 3, 2014/4:55am		
	March 4, 2014/1:19am		
	March 5, 2014/12:51am		
	March 6, 2014/4:45am		
	March 7, 2014/2:55am		
	March 8, 2014/2:49am		
	March 9, 2014/2:53am		
	March 10, 2014/5:42am		
	March 11, 2014/2:34am		
	March 12, 2014/7:59pm		
	April 24, 2014/1:34am		
	May 11, 2014/4:09am		
	May 20, 2014/2:16pm		
Camera Station 9	January 23, 2014/2:31am	Striped skunk	
	January 24, 2014/12:36am		
	January 24, 2014/7:17pm		
	January 24, 2014/9:47pm		
	January 24, 2014/9:51pm		
	January 25, 2014/3:52am		
	January 26, 2014/7:05pm		
	January 26, 2014/9:49pm		
	February 5, 2014/6:53pm		
	February 7, 2014/10:26pm		
	March 21, 2014/8:58pm		
Camera Station 9	January 25, 2014/3:06pm	Raccoon	Heading north
	March 7, 2014/6:38am		2 raccoons

Camera Station No.	Date / Time Stamp	Mammal Species Observed	Notes
	March 19, 2014/4:36am		
	March 19, 2014/4:48am		
Camera Station 9	March 11, 2014/10:25pm	Bobcat	Heading south
	March 23, 2014/12:19am		Heading south
	March 23, 2014/10:36pm		Heading south
	March 27, 2014/9:02pm		Heading south
	March 28, 2014/11:59pm		Heading south
	April 5, 2014/10:55pm		Heading south
	April 14, 2014/9:37pm		Heading south
	April 23, 2014/1:40am		Heading north
	May 11, 2014/1:59am		Heading north
	May 18, 2014/2:39am		Heading north
	June 1, 2014/10:22pm		Heading south
Camera Station 9	May 23, 2014/2:38am	Coyote	Heading south
	June 6, 2014/1:45am		Heading south
Camera Station 11	January 24, 2014/5:55pm	Striped skunk	Heading north
	March 18, 2014/11:05pm		Heading north
	March 21, 2014/8:23pm		Heading south
	March 27, 2014/9:10pm		Heading north
	April 3, 2014/8:19pm		Heading north
	April 3, 2014/8:48pm		Heading north
	May 3, 2014/3:33am		Heading north
	May 6, 2014/11:56pm		Heading north
	May 9, 2014/8:34pm		Heading north
	May 17, 2014/10:19pm		Heading north
	May 19, 2014/3:04am		Heading north
Camera Station 11	March 29, 2014/12:58am	Bobcat	Heading north
	March 21, 2014/12:27am		Heading north
Camera Station 11	April 23, 2014/9:02pm	Opossum	Heading north
	April 28, 2014/9:22pm		Heading north
	April 30, 2014/2:28am		Heading north
	March 19, 2014/11:36pm		Heading north
	March 20, 2014/8:12pm		Heading north
	April 23, 2014/9:02pm		Heading north
	April 28, 2014/9:22pm		Heading north
	May 2, 2014/11:54pm		Heading north
	May 2, 2014/11:54pm		Heading north
	May 5, 2014/11:54pm		Heading north
	May 6, 2014/8:40pm		Heading north
	May 26, 2014/2:45am		Heading north
	June 3, 2014/10:56pm		Heading north
	June 4, 2014/9:32pm		Heading north

SOURCE: USGS Topo 7.5 Minute Series - GOLETA Quadrangle
Township 4N / Range 28W / Sections 07, 18

FIGURE 1

Project Site Location

Wildlife Corridor Analysis for the Heritage Ridge Project

SOURCE: Bing Maps

DUDEK

FIGURE 2
Camera Stations

Wildlife Corridor Analysis for the Heritage Ridge Project

Date: 8/15/2014 - Created by: - Last saved by: kzecher - Path: \\Dudek-files\gisdata\Projects\j817601\MAPDOC\MAPS\Figure 2 Camera stations.mxd

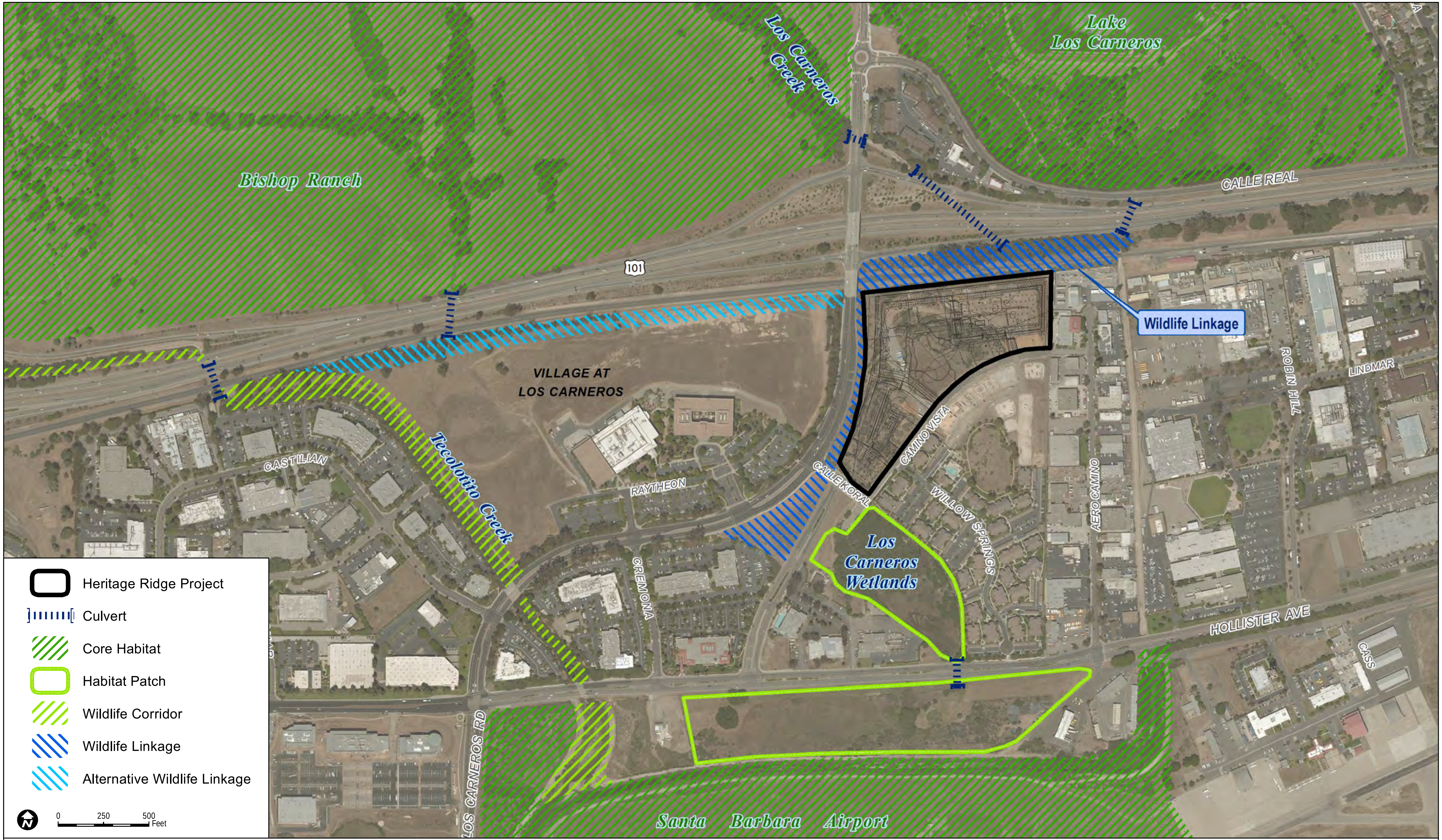
SOURCE: Bing Maps

DUDEK

FIGURE 3
Tracking Results

Wildlife Corridor Analysis for the Heritage Ridge Project

Date: 8/15/2014 - Created by: - Last saved by: kzecher - Path: \\Dudek-files\gis\gisdata\Projects\j817601\MAPDOC\MAPS\Figure 3 Tracking Results2.mxd



SOURCE: SOURCE: MAC Design Associates, Bing Maps

DUDEK

Figure 4
Wildlife Corridors

Wildlife Corridor Analysis for the Heritage Ridge Project

Date: 8/14/2014 - Created by: - Last saved by: kzecher - Path: \\Dudek-files\gisdata\Projects\j817601\MAPDOC\MAPS\Figure 4 Wildlife Corridors.mxd

Camera Station 1: Human traveling southeast to Hollister Avenue near culvert that extends under the street and enters onto Santa Babara Airport.

Camera Station 1: Another human traveling southeast to Hollister Avenue.

Camera Station 2a. Bobcat (*Lynx rufus*) in a grassy opening along the western portion of the Los Carnerous wetlands area. The houses in the background are along Willow Springs Lane.

Camera Station 2a. Racoon (*Procyon lotor*) along the fringe of the Los Carnerous wetlands just north of office buidlings situated along Hollister Avenue

Camera Station 2b. Coyote (*Canas latrans*) entering low willow lined channel, west Los Carnerous wetlands.

Traci, I would like another photo here from 2b

Camera Station 4. Coyote (*Canas latrans*) heading south from the western culvert. The culvert extends under SR-101 from near the Union Pacific Railroad tracks to open grassland areas to the north.

Camera Station 4. Bobcat (*Lynx rufus*) traveling north toward the culvert. Arroyo willows are located along the undefined channel. Eucalyptus trees are abundance between SR-101 and UPRR tracks.

Camera Station 4. Coyote (*Canis latrans*)

Camera Station 4. Raccoon (*Procyon lotor*).

Camera Station 5. Bobcat

Camera Station 5. Coyote (*Canis latrans*) traveling southwest from the eastern culvert that also extends north from near the Union Pacific Railroad tracks under SR-101 to open grasslands and Lake Carnerous to the north.

Camera Station 5. Raccoon (*Procyon lotor*)

Camera Station 5. Bobcat (*Lynx rufos*)

Camera Station 6. North American [Virginia] Opossum (*Didelphis virginiana*) walking south along the Los Carnerous culvert just south of UPRR tracts. The flood control structure is located in an industrial portion of Goleta.

Camera Station 6. Raccoon (*Procyon lotor*) in the culvert.

Camera Station 6. Raccoons (*Procyon lotor*).

Camera Station 6. Striped skunk (*Mephitis mephitis*).

Camera Station 7. Human walking north into the Los Carnerous culvert from Hollister Avenue.

Camera Station 7. Human walking south towards Hollister Avenue.

Camera Station 8. Bobcat (*Lynx rufus*) near the corner of Calle Koral and Camino Vista.

Camera Station 8. North American [Virginia] Opossum (*Didelphis virginiana*) walking southwest towards an opening in the chain-linked fencing that leads to the roads.

Camera Station 8. Striped skunk (*Mephitis mephitis*).

Camera Station 8. Raccoons (*Procyon lotor*).

Camera Station 11. Bobcat (*Lynx rufus*) at the opening in the fence line, northwest portion of the site near Los Carnerous Road.

Camera Station 11. North American [Virginia] Opossum (*Didelphis virginiana*).

Camera Station 11. Striped skunk (*Mephitis mephitis*).

Camera Station 11. Striped skunk (*Mephitis mephitis*).

LANDSCAPE DESIGN INTENT

GENERAL DESIGN:
THE LANDSCAPE DESIGN GRACEFULLY BLENDS THE EXISTING WILLOW SPRINGS NEIGHBORHOOD WITH THE PROPOSED NORTH WILLOW SPRINGS PROJECT BY USING A SIMILAR PLANT PALETTE AND CARRYING THE TWO RAIL FENCE ALONG CAMINO VISTA. GRASSY MEADOWS OF NATIVE AND CLIMATE ADAPTED PLANTS PLANTED WITH LARGE TREES CREATE AN INVITING STREETSCAPE WHILE FILTERING AND RETAINING STORM WATER.

WATER USE:
THE PROPOSED PLANT PALETTE FEATURES TOUGH, LOW-MAINTENANCE WATER-WISE PLANTS. THE LANDSCAPE IRRIGATION SYSTEMS WILL BE COMPRISED OF EFFICIENT DRIP IRRIGATION AND STREAM ROTATOR HEADS OPERATED BY A CLIMATE-BASED SMART CONTROLLER WITH AN ON-SITE WEATHER MONITORING STATION.

NEIGHBORHOOD PARK:
THE PARK IS SITED ATOP THE KNOLL AND FEATURES A LEVEL GRASSY PLAY LAWN AND PICNIC AREA SURROUNDED BY BEAUTIFUL NATIVE FLOWING PLANTS. THE LOW, DROUGHT TOLERANT COASTAL SAGE SCRUB PLANTS PROVIDE NECTAR FOR BUTTERFLIES AND FOOD AND FORAGE FOR BIRDS. LOVELY FLOWERING NATIVE SHRUBS AND MAJESTIC TREES SUCH AS COAST LIVE OAKS, ISLAND OAK, AND SYCAMORE PLACED UPON MOUNDS FRAME THE PARK.

SENIOR HOUSING:
TALL, NARROW OPEN-CANOPY TREES HIGHLIGHT AND FRAME THE ART DECO ARCHITECTURE OF THE SENIOR HOUSING BUILDINGS. AMPLE LANDSCAPED GARDENS PROVIDE PLACES TO REST, GARDEN, AND PLAY SPORTS SUCH AS BOCCE BALL OR LAWN BOWLING. A CENTRAL PICNIC AREA AND OUTDOOR GAME TABLES NEXT TO THE POOL, SPA, AND RECREATION BUILDING COMPLETE THE AMPLE SITE AMENITIES.

WORKFORCE HOUSING:
BEAUTIFUL WATER-WISE PLANTINGS ENHANCE THE CONTEMPORARY ARCHITECTURE. THE MORE FORMAL CENTRAL COURTYARDS OPEN UP TO INFORMAL, NATURAL LANDSCAPE AREAS WHICH BLEND INTO THE PARK AND STORM WATER BASINS WHICH ARE DESIGNED TO FEEL LIKE GRASSY MEADOWS WITH LARGE CANOPY TREES.

SENIOR HOUSING

BIO-RETENTION SWALE

COMMUNITY VEGETABLE GARDEN

BOCCE/LAWN BOWLING COURTS (ARTIFICIAL TURF WITH INFILTRATION CAPACITY BELOW)

PICNIC AREA AND OUTDOOR CARD/CHESS TABLES UNDER ARBOR

POOL AND SPA AREA WITH PERMEABLE PAVING AT POOL DECK

WALL PER CIVIL ENGINEER'S PLAN

TRASH ENCLOSURE PLANTED WITH VINES (TYP.)

ROSE AND HERB GARDEN WITH FOUNTAIN

CARPORTS (TYP.)

TALL DECIDUOUS TREES SUCH AS CALIFORNIA SYCAMORE

WORKFORCE HOUSING

CARPORTS (TYP.)

RETAINING WALL PER CIVIL ENGINEER'S PLAN

PERMEABLE PAVING IN OPEN PARKING STALLS PER CIVIL ENGINEER'S PLANS

2 STORY BUILDINGS PER ARCHITECT'S PLANS (TYP.)

SLOPE PLANTING

INFORMAL PLANTINGS OF WATER-WISE, 3'-4' HT. NATIVE SHRUBS ON SLOPE ALONG LOS CARNEROS ROAD SUCH AS:
- JOYCE COULTER CEANOTHUS
- JOHN DOURLEY MANZANITA
- DARK STAR CEANOTHUS
- COFFEEBERRY
- MOUND 'SAN BRUNO'
- BUCKWHEAT
- ISLAND SNAPDRAGON
- DEER GRASS

LOW GROUNDCOVERS ON SLOPE SUCH AS:
- DWARF COYOTE BRUSH
- CARMEL CREEPER
- DWARF ACACIA
- PINK CREEPING MYOPORUM

WILDLIFE CONNECTION:
- A BREAK IN PLANTING TO CREATE A MEANDERING TRAIL FOR SMALL MAMMALS SUCH AS BOBCATS

CANOPY TREES SUCH AS:
- COAST LIVE OAK
- ISLAND IRONWOOD
- REDBUD

WATER-WISE BIO-RETENTION BASIN AND SWALE PLANTINGS SUCH AS:
- REED GRASS
- CAREX SP.
- TUFTED HAIR GRASS
- MUHLENBERGIA SP.
- AUTUMN MOOR GRASS

MAIL BOXES (TYP.)

FLOWERING TREES SUCH AS:
- JACARANDA
- MARINA ARBUTUS

NARROW TREES SUCH AS:
- SHOESTRING ACACIA

UPRIGHT ACCENT PLANT SUCH AS:
- BLUE JUNIPER
- VARIEGATED TAWHIWHI

WORKFORCE HOUSING

AMENITIES:

BIO-RETENTION BASIN BASIN PLANTED WITH TURF FOR ACTIVE PLAY

ENCLOSED PICNIC AREA WITH TABLES, BARBEQUES, AND TOT LOT

RECREATION AREA WITH POOL, 2 SPAS, PICNIC TABLES, BARBEQUES, AND SMALL PLAY LAWN

EXISTING EUCALYPTUS TREES (OFF-SITE) TO REMAIN

3-STORY BUILDINGS (TYP.)

PERMEABLE PAVING OR BRICK ON SAND AT COURTYARDS AND RECREATION AREAS

VINES ON TRASH ENCLOSURES

WALLS PER CIVIL ENGINEER'S PLANS

TALL NARROW TREES TO ENHANCE 3 STORY BUILDING SUCH AS:
- LEMON-SCENTED GUM
- SHOESTRING ACACIA
- AUSTRALIAN WILLOW
- JACARANDA

BIKE PARKING (TYP.)

WALL PER CIVIL ENGINEER'S PLANS

EVERGREEN CANOPY TREES ALONG EAST PROPERTY BOUNDARY SUCH AS:
- SHOESTRING ACACIA
- AUSTRALIAN WILLOW
- BRISBANE BOX

PERMEABLE PAVING AT PARKING STALLS PER CIVIL ENGINEER'S PLAN

GOLETA WEST SANITARY DISTRICT EASEMENT - NO TREES, LOW GROUNDCOVER SUCH AS GREEN CARPET NATAL PLUM

INFILTRATION GARDEN PLANTED WITH GRASSES AND CAREX SPECIES

ENTRY MONUMENT

CORKSCREW WILLOWS FRAMING ENTRY

EXISTING WILLOW SPRINGS NEIGHBORHOOD

NEIGHBORHOOD PARK (SEE CL-3)

D.G. PATH MEANDERING THROUGH THE PARK FOR ACTIVE RECREATION

NATIVE SHRUBS

NATIVE PLANT LANDSCAPE - LOW GROWING HUMMINGBIRD AND BUTTERFLY PLANTS

D.G. PICNIC AREA

OAK TREES WITH NATIVE MEADOW GRASSES ON GENTLE MOUNDS TO FRAME PARK

LODGEPOLE TWO RAIL FENCE TO MATCH EXISTING WILLOW SPRINGS FENCING TO CREATE A UNIFIED STREETSCAPE

PERMEABLE PAVING AT PARKING STALLS PER CIVIL ENGINEER'S PLAN

EVERGREEN CANOPY TREE SUCH AS PEPPERMINT TREE

COLORFUL ACCENT TREE SUCH AS FOREST PANSY REDBUD OR CHINESE FRINGE TREE

TALL NARROW ACCENT PLANT SUCH AS BLUE SKYROCKET JUNIPER OR ICEE BLUE PODOCARPUS

CORK OAKS FRAMING ENTRY

ENTRY MONUMENT

LODGEPOLE TWO RAIL FENCE TO MATCH EXISTING WILLOW SPRINGS FENCING TO CREATE A UNIFIED STREETSCAPE

TALL, NARROW EVERGREEN TREE SUCH AS LEMON-SCENTED GUM

TRUE NATURE
LANDSCAPE ARCHITECTURE
5266 Hollister Ave. Suite 230
Goleta, CA 93111
TrueNatureDesign.com
805-770-2100

HERITAGE RIDGE

Goleta, California
The Towbes Group, Inc

KIMBERLY J. TRUE
NO. 5596
PRELIMINARY
NOT FOR BIDDING
NOT FOR CONSTRUCTION
SIGNATURE
EXP. DATE

SCALE: 1" =40'-0"
0 20' 40' 80'

8/28/14
JOB NO. 1313

CL-1

PRELIMINARY LANDSCAPE PLAN

PLANT PALETTE IMAGES

TREES


Shoestring Acacia


Peppermint Tree


Marina Arbutus


Lemon-Scented Gum


Australian Willow


Jacaranda


Brisbane Box


Willow Pittosporum


Corkscrew Willow


Forest Pansy Redbud


California Sycamore


Coast Live Oak


Swan Hill Fruitless Olive


Santa Cruz Island Ironwood

PARK


John Dourley Manzanita


Shoestring Acacia


Island Bush Poppy


Native Blue Rye


California Coffeeberry


Low-growing native hummingbird & butterfly plants


White Sage


Purple Sage


Deer Grass


Carmel Creeper

RESIDENTIAL SHRUBS, ACCENT PLANTS, & GROUNDCOVER


Dwarf Bottle Brush


Variegated Agave


Purple New Zealand Flax


New Zealand Flax


Giant Velvet Rose


Ground Morning Glory


Variegated Flax Lily


Rosemary


Blue Podocarpus


Variegated Pittosporum


Plum Delight Fringe-Flower


Dwarf Strawberry Tree


Bougainvillea


Starburst Yellow Daylily


Dark Blue Lily of the Nile


Putah Creek Myoporum


Toyon


Island Snapdragon


Evergreen Eulalia & Mendocino Reed Grass


Cape Rush


Autumn Moor Grass


Blue Sedge


Slender Sedge

PLANT PALETTE

SENIOR HOUSING

Botanical	Common	Water Use*
TREES:		
Acacia stenophylla	Shoestring Acacia	Low
Agonis flexuosa	Peppermint Tree	Low
Arbutus x `Marina`	Marina Arbutus	Low
Cercis canadensis `Forest Pansy` TM	Forest Pansy Redbud	Moderate
Chionanthus retusus	Chinese Fringe Tree	Moderate
Corymbia (Eucalyptus) citriodora	Lemon-Scented Gum	Low
Geijera parviflora	Australian Willow	Low
Howea forsteriana	Kentia Palm	Moderate
Jacaranda mimosifolia	Jacaranda	Moderate
Juniperus scopulorum `Skyrocket`	Skyrocket Juniper	Moderate
Lophostemon confertus	Brisbane Box	Moderate
Olea europaea `Swan Hill` TM	Swan Hill Fruitless Olive	Low
Pittosporum phyllyraeoides	Willow Pittosporum	Low
Platanus racemosa	California Sycamore	Moderate
Quercus suber	Cork Oak	Low
ACCENT PLANTS		
Agave attenuata `Variegata`	Variegated Agave	Low
Chondropetalum tectorum	Cape Rush	Low
Miscanthus transmorrisonensis	Evergreen Eulalia	Moderate
Phormium tenax `Dusky Chief`	Purple New Zealand Flax	Low
Phormium x `Duet`	New Zealand Flax	Low
VINES		
Bougainvillea x `San Diego Red`	Bougainvillea	Low
Ficus pumila minima	Creeping Fig	Moderate
Pandorea jasminoides	Bower Vine	Moderate
SHRUBS		
Arbutus unedo `Elfin King`	Dwarf Strawberry Tree	Low
Arctostaphylos x `John Dourley`	John Dourley Manzanita	Low
Arctostaphylos x `Sunset`	Sunset Manzanita	Low
Bougainvillea x `La Jolla`	Bougainvillea	Low
Callistemon citrinus `Little John`	Dwarf Bottle Brush	Low
Ceanothus x `Dark Star`	California Lilac	Low
Galvezia speciosa `Boca Rosa`	Island Snapdragon	Very Low
Heteromeles arbutifolia	Toyon	Very Low
Loropetalum chinense `Plum Delight`	Plum Delight Fringe-Flower	Moderate
Metrosideros collina `Springfire`	Leuha	Moderate
Olea europaea `Little Ollie` TM	Little Ollie Olive	Low
Pittosporum tenuifolium `Marjorie Channon'	Variegated Tawhiwhi	Moderate
Pittosporum tobira `Variegata`	Variegated Mock Orange	Moderate
Pittosporum tobira `Wheelers Dwarf`	Wheeler`s Dwarf Mock Orange	Moderate
Podocarpus 'Icee Blue'	Blue Podocarpus	Moderate
Prunus ilicifolia lyonii	Catalina Cherry	Low
Rhaphiolepis umbellata `Minor`	Yedda Hawthorn	Low
GROUNDCOVER		
Baccharis pilularis `Pigeon Point`	Dwarf Coyote Brush	Low
Carex glauca	Blue Sedge	Low
Carissa macrocarpa `Green Carpet`	Green Carpet Natal Plum	Low
Ceanothus griseus horizontalis	Carmel Creeper	Low
Convolvulus sabatius	Ground Morning Glory	Low
Cotoneaster dammeri `Lowfast`	Lowfast Bearberry Cotoneaster	Low
Fragaria chiloensis	Beach Strawberry	Moderate
Myoporum parvifolium `Putah Creek`	Putah Creek Myoporum	Low
Rosmarinus o. `Huntington Carpet`	Huntington Carpet Rosemary	Very Low
COLORFUL GROUNDCOVER		
Agapanthus x `Storm Cloud`	Dark Blue Lily of the Nile	Moderate
Dianella caerulea `Cassablue`	Cassablue Flax Lily	Moderate
Dianella tasmanica `Variegata`	Flax Lily	Moderate
Hemerocallis x `Starburst Yellow` TM	Starburst Yellow Daylily	Modertae

PLANT PALETTE

NEIGHBORHOOD PARK

Botanical	Common	Water Use*
TREES:		
Cercis occidentalis	Western Redbud	Moderate
Cupressus macrocarpa	Monterey Cypress	Low
Lyonothamnus floribundus asplenifolius	Santa Cruz Island Ironwood	Low
Platanus racemosa	California Sycamore	Moderate
Quercus agrifolia	Coast Live Oak	Very Low
Quercus tomentella	Island Live Oak	Low
PARK NATIVE SHRUBS		
Arctostaphylos densiflora `Howard McMinn`	Howard McMinn Manzanita	Low
Arctostaphylos x `John Dourley`	John Dourley Manzanita	Low
Artemisia californica	California Sagebrush	Low
Ceanothus x `Dark Star`	California Lilac	Low
Dendromecon harfordii	Island Bush Poppy	Low
Heteromeles arbutifolia	Toyon	Very Low
Leymus condensatus `Canyon Prince`	Native Blue Rye	Low
Rhamnus californica `Mound San Bruno`	California Coffeeberry	Low
Rhus integrifolia	Lemonade Berry	Low
Ribes viburnifolium	Catalina Perfume	Low
Salvia leucophylla	Purple Sage	Low
LOW GROWING NATIVE HUMMINGBIRD & BUTTERFLY PLANTS		
Baccharis pilularis `Pigeon Point`	Dwarf Coyote Brush	Low
Ceanothus griseus horizontalis	Carmel Creeper	Low
Encelia californica	California Encelia	Very Low
Epilobium canum	Hummingbird Trumpet	Very Low
Erigeron glaucus `Wayne Roderick`	Seaside Daisy	Low
Eriogonum fasciculatum	Common Buckwheat	Very Low
Eriophyllum confertiflorum	Golden Yarrow	Very Low
Eschscholzia californica	California Poppy	Very Low
Galvezia (Gambelia) speciosa 'Boca Rosa'	Island Bush Snapdragon	Very Low
Isocoma menziesii decumbens	Decumbent Goldenbush	Very Low
Lessingia filaginifolia `Silver Carpet`	Branching Sea Aster	Low
Lupinus succulentus	Arroyo Lupine	Low
Mimulus aurantiacus	Sticky Monkey Flower	Very Low
Muhlenbergia rigens	Deer Grass	Low
Salvia apiana	White Sage	Very Low
Sisyrinchium bellum	Blue Eyed Grass	Low
Stipa pulchra	Purple Needle Grass	Very Low
MEADOW WITH NATIVE PLANTINGS		
Achillea millefolium	Common Yarrow	Low
Agrostis pallens	Thingrass	Low
Calamagrostis foliosa	Reed Grass	Moderate
Carex pansa	Sanddune Sedge	Moderate
Carex praegracilis	Slender Sedge	Moderate
Carex tumulicola	Berkeley Sedge	Low
Deschampsia cespitosa	Tufted Hair Grass	Moderate
Eschscholzia californica	California Poppy	Very Low
Festuca rubra `Molate`	Molate Fescue	High
Layia platyglossa	Tidy Tips	Low
Lupinus succulentus	Arroyo Lupine	Low
Muhlenbergia capillaris	Pink Muhly	Moderate
Muhlenbergia dubia	Pine Muhly	Low
Muhlenbergia lindheimeri	Lindheimer`s Muhly	Low
Muhlenbergia rigens	Deer Grass	Low
Sesleria autumnalis	Autumn Moor Grass	Moderate
Stipa pulchra	Purple Needle Grass	Very Low
LAWN		
Festuca arundinacea `Marathon II`	Marathon II Sod	High
Agrostis pallens	Thingrass sod or seed	Low

PLANT PALETTE

WORKFORCE HOUSING

Botanical	Common	Water Use*
TREES:		
Acacia stenophylla	Shoestring Acacia	Low
Agonis flexuosa	Peppermint Tree	Low
Arbutus x `Marina`	Marina Arbutus	Low
Corymbia (Eucalyptus) citriodora	Lemon-Scented Gum	Low
Geijera parviflora	Australian Willow	Low
Howea forsteriana	Kentia Palm	Moderate
Jacaranda mimosifolia	Jacaranda	Moderate
Juniperus scopulorum `Skyrocket`	Skyrocket Juniper	Moderate
Lophostemon confertus	Brisbane Box	Moderate
Phoenix roebelenii	Pygmy Date Palm	Moderate
Pittosporum angustifolium (phylliraeoides)	Willow Pittosporum	Low
Platanus racemosa	California Sycamore	Moderate
Quercus agrifolia	Coast Live Oak	Very Low
Salix matsudana `Tortuosa`	Corkscrew Willow	High
Syagrus romanzoffiana	Queen Palm	Moderate
ACCENT PLANTS		
Agave attenuata `Variegata`	Variegated Agave	Low
Chondropetalum tectorum	Cape Rush	Low
Miscanthus transmorrisonensis	Evergreen Eulalia	Moderate
Phormium tenax `Dark Delight`	Purple New Zealand Flax	Low
Phormium x `Duet`	New Zealand Flax	Low
VINES		
Bougainvillea x `San Diego Red`	Bougainvillea	Low
Distictis buccinatoria	Trumpet Vine	Moderate
Ficus pumila minima	Creeping Fig	Moderate
SHRUBS		
Arbutus unedo `Elfin King`	Dwarf Strawberry Tree	Low
Arctostaphylos x `John Dourley`	John Dourley Manzanita	Low
Arctostaphylos x `Sunset`	Sunset Manzanita	Low
Bougainvillea x `La Jolla`	Bougainvillea	Low
Callistemon citrinus `Little John`	Dwarf Bottle Brush	Low
Ceanothus x `Dark Star`	California Lilac	Low
Galvezia speciosa `Boca Rosa`	Island Snapdragon	Very Low
Heteromeles arbutifolia	Toyon	Very Low
Loropetalum chinense `Plum Delight`	Plum Delight Fringe-Flower	Moderate
Metrosideros collina `Springfire`	Leuha	Moderate
Olea europaea `Little Ollie` TM	Little Ollie Olive	Low
Pittosporum tenuifolium `Marjorie Channon'	Variegated Tawhiwhi	Moderate
Pittosporum tobira `Variegata`	Variegated Mock Orange	Moderate
Pittosporum tobira `Wheelers Dwarf`	Wheeler`s Dwarf Mock Orange	Moderate
Podocarpus 'Icee Blue'	Blue Podocarpus	Moderate
Prunus ilicifolia lyonii	Catalina Cherry	Low
Rhamnus californica `Mound San Bruno`	California Coffeeberry	Low
Rhaphiolepis umbellata `Minor`	Yedda Hawthorn	Low

Botanical	Common	Water Use*
GROUNDCOVER		
Aeonium canariense	Giant Velvet Rose	Low
Aeonium 'Sunburst'	Sunburst Aeonium	Low
Agapanthus x `Storm Cloud`	Dark Blue Lily of the Nile	Moderate
Baccharis pilularis `Pigeon Point`	Dwarf Coyote Brush	Low
Carex glauca	Blue Sedge	Low
Carissa macrocarpa `Green Carpet`	Green Carpet Natal Plum	Low
Ceanothus griseus horizontalis	Carmel Creeper	Low
Convolvulus sabatius	Ground Morning Glory	Low
Cotoneaster dammeri `Lowfast`	Lowfast Bearberry Cotoneaster	Low
Dianella caerulea `Cassablue`	Cassablue Flax Lily	Moderate
Dianella tasmanica `Variegata`	Variegated Flax Lily	Moderate
Fragaria chiloensis	Beach Strawberry	Moderate
Hemerocallis x `August Orange`	Orange Daylily	Moderate
Hemerocallis x `Starburst Yellow` TM	Starburst Yellow Daylily	Moderate
Myoporum parvifolium `Putah Creek`	Putah Creek Myoporum	Low
Philodendron x `Xanadu`	Philodendron	Moderate
Rosmarinus officinalis `Huntington Carpet`	Huntington Carpet Rosemary	Very Low
Senecio mandraliscae	Blue Chalk Sticks	Low
SLOPE PLANTINGS		
Acacia redolens `Lowboy`	Prostrate Acacia	Low
Baccharis pilularis `Pigeon Point`	Coyote Brush	Low
Ceanothus griseus horizontalis	Carmel Creeper	Low
Myoporum parvifolium `Pink`	Pink Myoporum	Low
BIO-RETENTION BASIN / SWALE PLANTS		
Agrostis pallens	Thingrass	Low
Calamagrostis foliosa	Reed Grass	Low
Carex pansa	Sanddune Sedge	Moderate
Carex praegracilis	Slender Sedge	Moderate
Carex tumulicola	Berkeley Sedge	Low
Chondropetalum tectorum	Cape Rush	Low
Deschampsia cespitosa	Tufted Hair Grass	Moderate
Festuca rubra `Molate`	Molate Fescue	High
Muhlenbergia capillaris	Pink Muhly	Moderate
Muhlenbergia rigens	Deer Grass	Low
Sesleria autumnalis	Autumn Moor Grass	Moderate
Stipa pulchra	Purple Needle Grass	Very Low
LAWN		
Festuca arundinacea `Marathon II`	Marathon II Sod	High
Agrostis pallens	Thingrass sod or seed	Low

TRUE NATURE
LANDSCAPE ARCHITECTURE
5266 Hollister Ave. Suite 230
Goleta, CA 93111
TrueNatureDesign.com
805-770-2100

HERITAGE RIDGE

Goleta, California
The Towbes Group, Inc

KIMBERLY J. TRUE
NO. 5596
PRELIMINARY
NOT FOR BIDDING
NOT FOR CONSTRUCTION
SIGNATURE
EXP. DATE

8/28/14
JOB NO. 1313

CL-2

PRELIMINARY PLANT PALETTE

PLANT PALETTE IMAGES

PARK


COAST LIVE OAK


CALIFORNIA SYCAMORE


WESTERN REDBUD


CATALINA IRONWOOD


ISLAND BUSH SNAPDRAGON


COMMON YARROW


SLENDER SEDGE


PURPLE SAGE

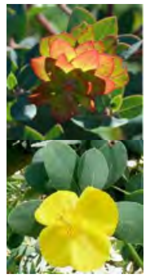

CALIFORNIA LILAC


WHITE SAGE


NATIVE BLUE RYE


DEER GRASS


COFFEEBERRY


MANZANITA, BUSH POPPY


LOW GROWING NATIVE HUMMINGBIRD AND BUTTERFLY PLANTS


TURF PLAY AREA AND MEADOW WITH NATIVE PLANTINGS (BACKGROUND)

PLANT PALETTE

NEIGHBORHOOD PARK

Botanical	Common
Cercis occidentalis	Western Redbud
Cupressus macrocarpa	Monterey Cypress
Lyonothamnus floribundus asplenifolius	Fernleaf Catalina Ironwood
Platanus racemosa	California Sycamore
Quercus agrifolia	Coast Live Oak
Quercus tomentella	Island Live Oak

PARK NATIVE SHRUBS

Arctostaphylos densiflora `Howard McMinn`	Howard McMinn Manzanita
Arctostaphylos x `John Dourley`	John Dourley Manzanita
Artemisia californica	California Sagebrush
Ceanothus x `Dark Star`	California Lilac
Dendromecon harfordii	Island Bush Poppy
Leymus condensatus `Canyon Prince`	Native Blue Rye
Rhamnus californica `Mound San Bruno`	California Coffeeberry
Rhus integrifolia	Lemonade Berry
Ribes viburnifolium	Catalina Perfume
Salvia leucophylla	Purple Sage

LOW GROWING NATIVE HUMMINGBIRD & BUTTERFLY PLANTS

Baccharis pilularis `Pigeon Point`	Coyote Brush
Ceanothus griseus horizontalis	Carmel Creeper
Encelia californica	California Encelia
Epilobium canum	Hummingbird Trumpet
Erigeron glaucus `Wayne Roderick`	Seaside Daisy
Eriogonum fasciculatum	Common Buckwheat
Eriophyllum confertiflorum	Golden Yarrow
Eschscholzia californica	California Poppy
Galvezia speciosa	Island Bush Snapdragon
Isocoma menziesii decumbens	Decumbent Goldenbush
Lessingia filaginifolia `Silver Carpet`	Branching Sea Aster
Lupinus succulentus	Arroyo Lupine
Mimulus aurantiacus	Sticky Monkey Flower
Muhlenbergia rigens	Deer Grass
Salvia apiana	White Sage
Sisyrinchium bellum	Blue Eyed Grass
Stipa pulchra	Purple Needle Grass

MEADOW WITH NATIVE PLANTINGS

Achillea millefolium	Common Yarrow
Agrostis pallens	Thingrass
Calamagrostis foliosa	Reed Grass
Carex pansa	Sanddune Sedge
Carex praegracilis	Slender Sedge
Carex tumulicola	Berkeley Sedge
Deschampsia cespitosa	Tufted Hair Grass
Eschscholzia californica	California Poppy
Festuca rubra `Molate`	Molate Fescue
Layia platyglossa	Tidy Tips
Lupinus succulentus	Arroyo Lupine
Muhlenbergia capillaris	Pink Muhly
Muhlenbergia dubia	Pine Muhly
Muhlenbergia lindheimeri	Lindheimer`s Muhly
Muhlenbergia rigens	Deer Grass
Stipa pulchra	Purple Needle Grass

LAWN

Festuca arundinacea `Marathon II`	Marathon II Sod
Agrostis pallens	Thingrass sod or seed

LANDSCAPE DESIGN INTENT

GENERAL DESIGN:
THE LANDSCAPE DESIGN GRACEFULLY BLENDS THE EXISTING WILLOW SPRINGS NEIGHBORHOOD WITH THE PROPOSED NORTH WILLOW SPRINGS PROJECT BY USING A SIMILAR PLANT PALETTE AND CARRYING THE TWO RAIL FENCE ALONG CAMINO VISTA. GRASSY MEADOWS OF NATIVE AND CLIMATE ADAPTED PLANTS PLANTED WITH LARGE TREES CREATE AN INVITING STREETSCAPE WHILE FILTERING AND RETAINING STORM WATER.

WATER USE:
THE PROPOSED PLANT PALETTE FEATURES TOUGH, LOW-MAINTENANCE WATER-WISE PLANTS. THE LANDSCAPE IRRIGATION SYSTEMS WILL BE COMPRISED OF EFFICIENT DRIP IRRIGATION AND STREAM ROTATOR HEADS OPERATED BY A CLIMATE-BASED SMART CONTROLLER WITH AN ON-SITE WEATHER MONITORING STATION.

NEIGHBORHOOD PARK:
THE PARK IS SITED ATOP THE KNOLL AND FEATURES A LEVEL GRASSY PLAY LAWN AND PICNIC AREA SURROUNDED BY BEAUTIFUL NATIVE FLOWING PLANTS. THE LOW, DROUGHT TOLERANT COASTAL SAGE SCRUB PLANTS PROVIDE NECTAR FOR BUTTERFLIES AND FOOD AND FORAGE FOR BIRDS. LOVELY FLOWERING NATIVE SHRUBS AND MAJESTIC TREES SUCH AS COAST LIVE OAKS, ISLAND OAK, AND SYCAMORE PLACED UPON MOUNDS FRAME THE PARK.

SITE AMENITY	UNITS	QUANTITY
Active Trail	LF	1,216
Park Bench	EA	6
BBQ	EA	2
Picnic Table	EA	7
Trash Can	EA	3
Recycle Can	EA	3
Ash Can for Charcoal	EA	2
Drinking Fountain	EA	1
Bike Parking	EA	1
Turf Level Play Area	SF	3,905
Meadow with Native Plantings	SF	22,703
Native Landscape	SF	43,517

TRUE NATURE
LANDSCAPE ARCHITECTURE
5266 Hollister Ave. Suite 230
Goleta, CA 93111
TrueNatureDesign.com
805-770-2100

HERITAGE RIDGE
Goleta, California
The Towbes Group, Inc

KIMBERLY J. TRUE
NO. 5596
PRELIMINARY
NOT FOR BIDDING
NOT FOR CONSTRUCTION
SIGNATURE
EXP. DATE

SCALE: 1" =30'-0"
0 15' 30' 60'
8/28/14
JOB NO. 1313
CL-3

PRELIMINARY PARK LANDSCAPE PLAN

Appendix F: Technical Review of Coastal Sage Scrub (CSS) Environmentally Sensitive Habitat Area (ESHA) for the North Willow Springs Project

DUDEK

621 CHAPALA STREET
SANTA BARBARA, CALIFORNIA 93101
T 805.963.0651 F 805.963.2074

MEMORANDUM

To:	The Towbes Group Mr. Craig Minus
From:	Dudek John H. Davis IV, MS, CE, Senior Ecologist Heather Moine, Biologist
Subject:	Technical Review of Coastal Sage Scrub (CSS) Environmentally Sensitive Habitat Area (ESHA) for the North Willow Springs Project
Date:	April 10, 2014
Attachment(s):	Figure – Project Parcels

This memo provides a technical review of the City of Goleta (City) designated Coastal Sage Scrub (CSS) Environmentally Sensitive Habitat Area (ESHA) within the North Willow Springs project site in the City of Goleta (City), California. Per Resolution No. 12-46 (Resolution; City of Goleta 2012), the City updated their General Plan to remove the ESHA designation from the Willow Springs II project site, adjacent to and south of the North Willow Springs project site. To determine if removal of an ESHA designation is appropriate for the coyote brush scrub on the North Willow Springs project site, Dudek evaluated current site conditions and compared the results to the biological resources evaluation of the sites that was used as the basis for the Resolution.

On February 4, 2009, Dudek prepared a *Focused Biological Resource Evaluation of Mapped Environmentally Sensitive Habitat Areas, Willow Springs II Project* (hereafter referred to as Evaluation; Dudek 2009a) which reviewed the biological resources on the Willow Springs II project site and vicinity, specifically the coastal sage scrub designated ESHA. The Evaluation defined “Willow Springs II project site and vicinity” as the area “bound by Hollister Avenue to the south, Los Carneros Road to the west, the Union Pacific Railroad and U.S. 101 to the north, and mixed-use development to the east”. The Evaluation, therefore, included both sites: Willow Springs II and North Willow Springs.

A component of the Evaluation was a field investigation of the sites to determine if the previously mapped CSS ESHA met the current definitions as defined in the City’s General Plan/Coastal Land Use Plan (GP/CLUP) and Coastal Zoning Ordinance. According to the Goleta Coastal Zoning Ordinance 35:11 (1997), an ESHA is any area “*which contains unique natural* *resources and/or endangered species of animal or plant life, and existing and potential development may have the impact of despoiling or eliminating these resources*".

The Evaluation of the designated CSS ESHA found that the "[existing] habitat composition and structure likely does not support, nor does it have the ability to support, an especially rich and diverse plant and/or wildlife population associated with an ESHA." Instead a disturbed coyote brush shrub with low biological diversity existed on the sites. Therefore, it was concluded that the disturbed coyote brush scrub is not a sensitive plant community and does not meet the City's definition of ESHA for the sites.

The Towbes Group, owner of the Willow Springs sites, requested a GP/CLUP amendment to remove the CSS ESHA designation from the within the Willow Springs sites. The City's Resolution (City of Goleta 2012), identified the area to be removed from ESHA as Willow Springs II, approximately 6.0 acres comprised of six parcels (*see attached Figure*).

The parcels included:

- Assessor Parcel Numbers ("APNs") 073-060-044 to 073-060-048
- The adjacent parcel underlying the Via Luisa public right of way easement; as well as
- The land underlying the extension of the Camino Vista Road

As a result, the City's Resolution (City of Goleta 2012) interpreted the scrub to be removed from CSS ESHA as the Willow Springs II project site. The lifting of the ESHA designation did not extend to the Willow Spring North project site as presented in the Evaluation. A total of 2.19 acres of CSS ESHA designation currently remains on a portion of North Willow Springs project site (*again please refer to the attached Figure*).

On January 22, 2014, Dudek biologists visited designated CSS ESHA on the North Willow Springs project site to re-evaluate the coyote brush scrub. As previously documented in the Evaluation, the area consists of disturbed scrub habitat with approximately 50% coyote brush (*Baccharis pilularis*) and approximately 50% cover of non-native grasses and forbs, including, but not limited to wild sweet fennel (*Foeniculum vulgare*), pampas grass (*Cortaderia jubata*), short-podded mustard (*Hirschfeldia incana*), Harding grass (*Phalaris aquatica*), and ripgut brome (*Bromus diandrus*).

As stated in the Evaluation:

Although coyote brush scrub, in a disturbed state, is present on site, this community does not meet the City's definition of ESHA and would not be considered a special-status community as it relates to the subject property for the following reasons:

> *1. Because coyote brush is an efficient post-disturbance colonizer, this species likely has been colonizing the site since the mid-1990s when mass grading operations ended, and the Willow Springs II project site and vicinity were left undeveloped as a flat, fallow, infill site. Once the grading operations ceased, this community likely began to develop due to the presence of an offsite seed source to the northwest. The coyote brush scrub on site lacks the species diversity and vegetative structure typically seen in higher quality coastal sage scrub habitats. Because the habitat onsite does not support characteristic coastal sage scrub species, it does not meet the definition of coastal sage scrub as it is defined by Holland (1986) and thus does not meet the criteria for ESHA in CE 1.3.*
>
> *2. Coyote brush scrub is not recognized by the State of California as a special community that is known or believed to be of high priority for inventory in the CNDDB (CDFG 2003) and thus is not considered a rare or especially valuable resource.*
>
> *3. The coyote brush scrub habitat on site is disturbed, highly fragmented, and bound by intensive land uses including major roadways (Los Carneros Road and Highway 101) and industrial and residential development, and thus would not provide suitable habitat for rare, threatened, and/or endangered plant or wildlife species.*
>
> *4. In terms of providing habitat or facilitating wildlife movement for special-status wildlife species, the habitat on site is isolated from contiguous blocks of high quality native habitat and has limited connectivity to areas of high biological value due to the presence of chain link fences, existing major arterial roadways, and building infrastructure, which interrupts wildlife movement, results in habitat fragmentation, reduces the biological productivity of remaining isolated habitats, and thus discourages use.*

Based on the Evaluation, Resolution No. 12-46, and the January 22, 2014 site visit, Dudek concludes that the 2.19 acres of disturbed coyote brush scrub within North Willow Springs project site, currently designated as CSS ESHA, is not a sensitive plant community, and as such does not meet the City's definition of ESHA. Dudek recommends that the CSS ESHA designation be removed from the North Willow Springs project site.

References

CDFG (California Department of Fish and Game, Natural Diversity Data Base). 2003. The Vegetation Classification and Mapping Program List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database. September.

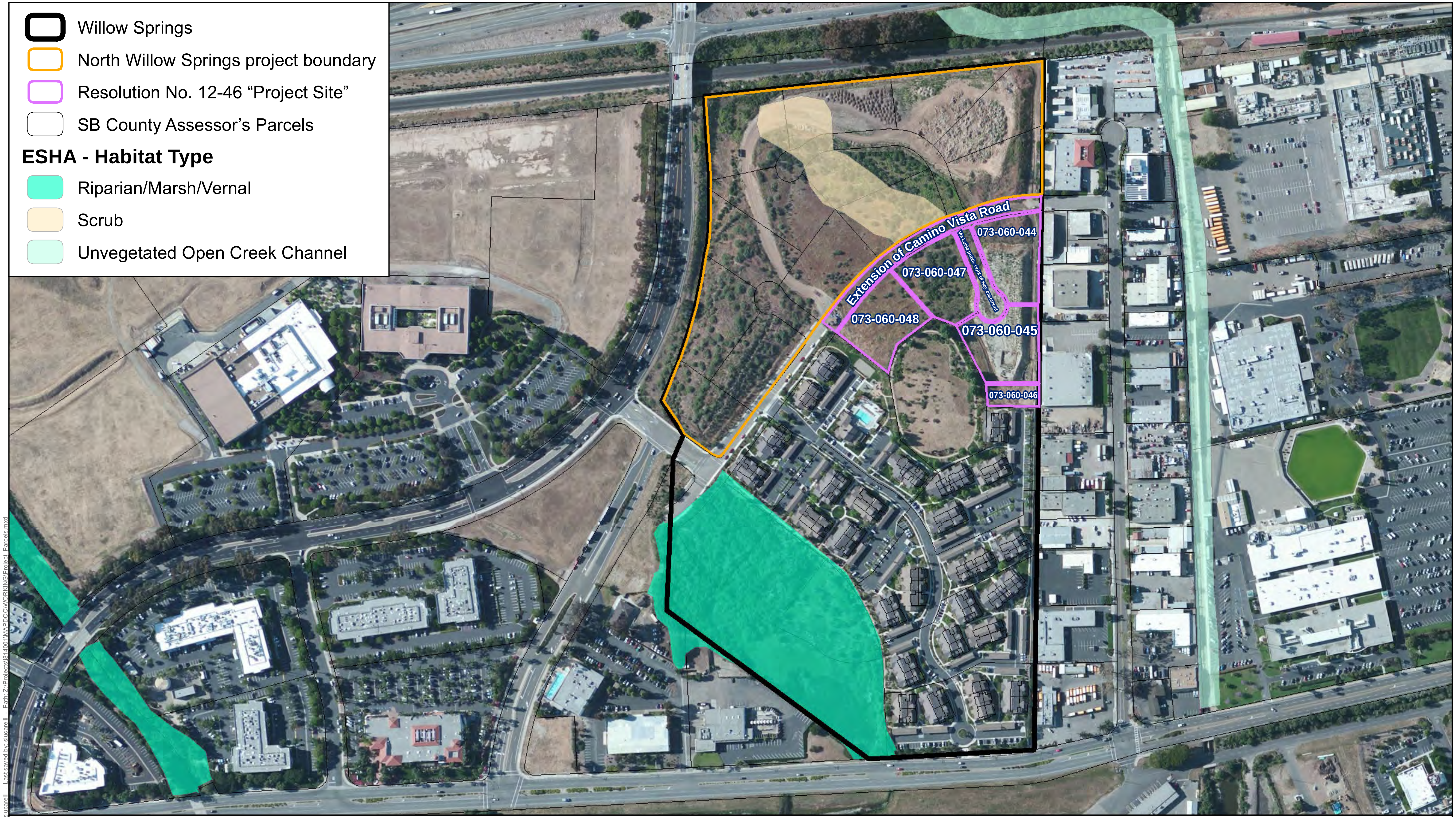
City of Goleta 2012. Resolution No. 12-46, A Resolution of the City Council of the City of Goleta, California, Adopting Amendments to the General Plan/Coastal Land Use Plan Open Space Element, Conservation Element, and Safety Element; Case Nos. 11-080-GPA and 11-081-GPA. July 17, 2012.

Dudek 2009a. *Focused Biological Resource Evaluation of Mapped Environmentally Sensitive Habitat Areas, Willow Springs II Project, City of Goleta, California*. February 4, 2009.

Dudek 2009b. *Coastal Sage Scrub Mitigation Plan, Willow Springs II Project, City of Goleta, California*. August 17, 2009.

Dudek 2012. *Focused Biological Resource Evaluation of Mapped Environmentally Sensitive Habitat Areas and Coastal Sage Scrub Mitigation Plan Willow Springs II Project, City of Goleta, CA*. November 19, 2012.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Game. Sacramento, CA.



SOURCE: ESHA from City of Goleta (5/2012)

ROW Parcels are estimated as ROW data intentionally left out of Santa Barbara County Assessor's Parcels

Project Parcels

North Willow Springs

DUDEK

Date: 1/15/2014 - Created by: slucarelli - Last saved by: slucarelli - Path: Z:\Projects\j814001\MAPDOC\WORKING\Project Parcels.mxd

Appendix G: U.S. Army Corps of Engineers 404 Permit No. 95-50087-DJC

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
300 NORTH LOS ANGELES STREET
LOS ANGELES, CALIFORNIA 90012

May 16, 1995

REPLY TO
ATTENTION OF:

Office of the Chief
Regulatory Branch

Albert Galen, Executor
Estate of Albert Levinson - Gen. Partner
Los Carneros Community Associates
2300 East Imperial Highway, 7th Floor
El Segundo, California 90245

Dear Mr. Galen:

Reference is made to your application (No. 95-50087-DJC) dated February 3, 1995, for a Department of the Army Permit. Enclosed are two copies of a draft permit authorizing you to fill 2.58 acres of wetlands located at your property on the north east corner of Los Carneros Boulevard and Hollister Avenue near Goleat, Santa Barbara County, California.

THIS PERMIT WILL NOT BECOME VALID UNTIL YOU HAVE TAKEN ALL OF THE FOLLOWING STEPS:

1. The owner or authorized responsible official must sign and date the two copies of the permit indicating that he/she agrees to the work as described and agrees to comply with any and all conditions stated in the permit.

2. The signer's name and title, if any, must be typed or printed below the signature.

3. Both signed copies of the permit must be returned to the Corps of Engineers at the above address (Attention: CESPL-CO-R) A pre-addressed envelope is enclosed for your convenience. Upon receipt of the signed copies, the Corps of Engineers will sign and forward one of the copies back to you.

4. When returning the signed copies of the permit, include a check for the processing fee of $100, payable to the Finance and Accounting Officer USAED LA.

If we do not receive the signed copies of the permit within 30 days from the date of this letter, your request for the proposed work will be withdrawn.

Also enclosed are pre-addressed postcards for you to notify this office regarding the dates for beginning and completing the authorized activity.

Sincerely,

Carl F. Enson, P.E.
Chief, Construction-
Operations Division

Enclosure(s)

LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS

DEPARTMENT OF THE ARMY PERMIT

Permittee:
Albert Galen, Executor
Estate of Albert Levinson - General Partner
Los Carneros Community Associates
2300 East Imperial Highway, 7th Floor
El Segundo, California 90245

Permit Number: 95-50087-DJC

Issuing Office: Los Angeles District

Note: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: To fill 2.58 acres of wetlands to facilitate construction of a road (Calle Koral) and a residential development and to create 2.16 acres of jurisdictional wetlands on the project site as shown on the attached drawings.

Project Location: Wetlands at the north east corner of Los Carneros Blvd. and Hollister Ave. adjacent to Carneros Creek and Goleta Slough near Goleta, Santa Barbara County, California

Permit Conditions

General Conditions:

1. The time limit for completing the authorized activity ends on May 16, 1998. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith

transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification from this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished with the terms and conditions of your permit.

Special Conditions: See attached sheet.

Further Information:

1. Congressional Authorities. You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measure ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt

completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give you favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

LOS CARNEROS COMMUNITY ASSOCIATES
BY ESTATE OF ALBERT LEVINSON, GENERAL PARTNER

PERMITTEE
LEONARD JAFFE

MAY 17, 1995
DATE

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

Carl F. Enson, P.E.
Chief, Construction-
Operations Division

17 May 95
DATE

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

TRANSFEREE

DATE

SPECIAL CONDITIONS FOR 95-50087-DJC

1. The permittee shall use best management practices during construction, such as placement of hay bales or silt curtains, where site runoff would flow into on-site wetlands or the drainage culvert beneath Hollister Blvd. to reduce the potential for sedimentation into Los Carneros Creek and Goleta Slough. The permittee shall seed all newly filled and disturbed areas with native grass species.

2. Concurrent with the filling of 2.58 acres of wetlands authorized by this permit, the applicant will create a minimum of 2.13 acres of wetlands on-site, as described in the February 3, 1995 Los Carneros Wetlands Restoration and On-Site Mitigation Plan.

3. The applicant shall submit, for Corps review and approval, a $50,000 mitigation performance bond to assure successful implementation of the on-site mitigation (wetland creation) efforts. Prior to filling the 2.58 acres of wetlands authorized by this project, the bond shall be executed with a Corps approved surety. A determination of whether the on-site mitigation efforts were successful will be made by the Corps following a 5-year monitoring period in accordance with the February 3, 1995 Los Carneros Wetlands Restoration and On-Site Mitigation Plan.

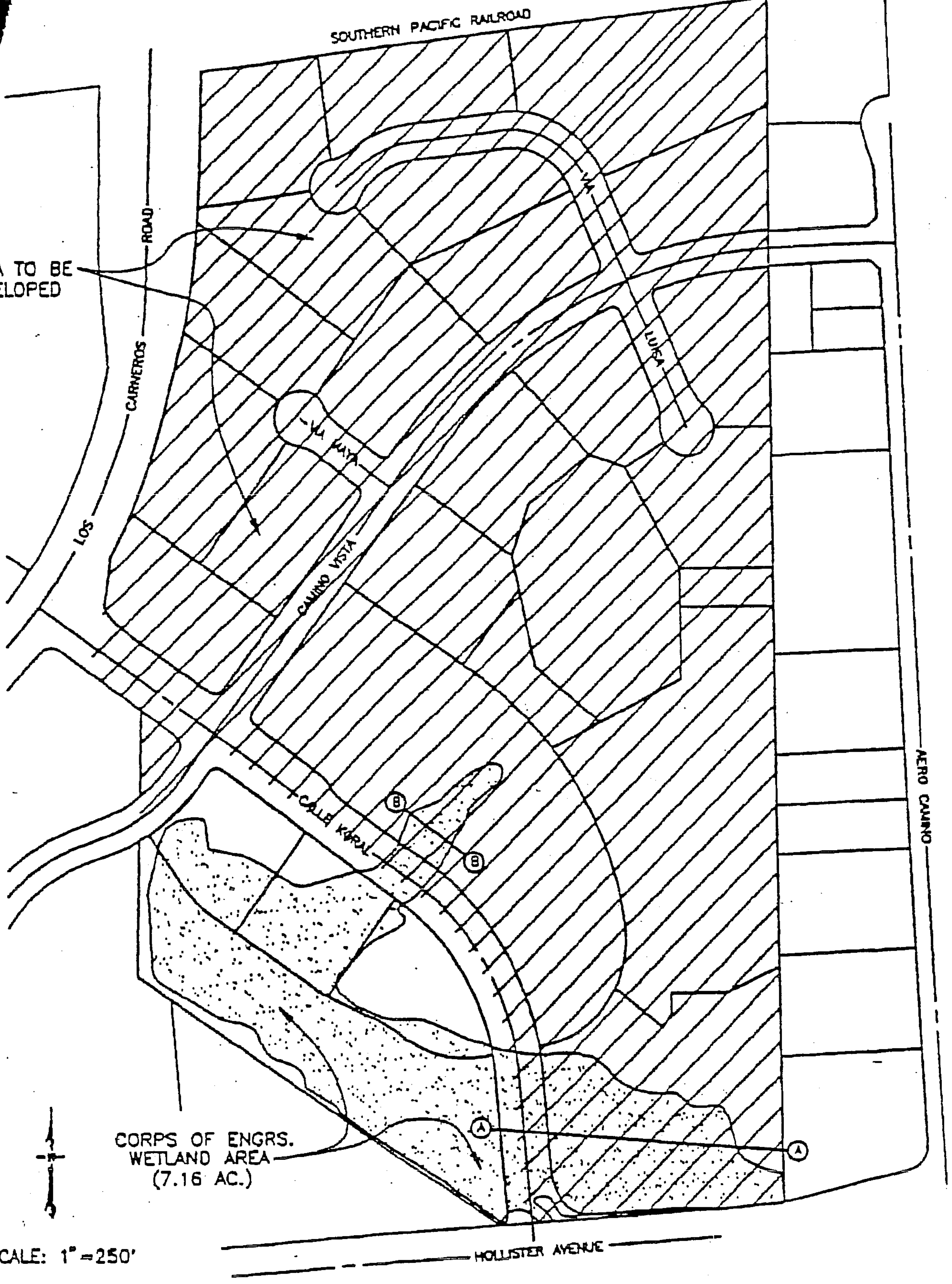
4. The Applicant shall preserve the unfilled and created wetlands on the development site through recordation of a deed restriction precluding all development activities from occuring except for those activities necessary for the creation, maintenance, monitoring, and management for wetland habitat purposes. The language of this deed restriction shall be approved by the Corps' Office of Counsel prior to recordation. Recordation shall occur prior to opening of Calle Koral to public use.

5. Prior to filling the 2.58 acres of wetlands authorized by this permit, $50,000 will be provided to the University of California, Santa Barbara. Use of these funds shall be restricted to wetland habitat enhancement, creation, and/or restoration.

6. Prior to filling the 2.58 acres of wetlands authorized by this permit, $75,000 will be granted to the County of Santa Barbara for the purpose of wetlands restoration in accordance with the Condition of Approval C.13 placed on approval of the Tentative Map. [Note: the applicant had previously provided these funds to the County. As such, the applicant is currently in compliance with this condition.]

7. Prior to filling the 2.58 acres of wetlands authorized by this permit, $650,000 shall be placed into an escrow account in accordance with the Agreement between Los Carneros Community Associates and the California Fish and Game Commission dated May 15, 1995. Use of these funds by the Commission shall be coordinated with the Corps on a project by project basis and restricted to wetland habitat enhancement, creation, and/or restoration as stipulated in the Agreement. Not more than 10% of the funds shall be used for administrative or planning purposes. No less than 90% of the funds shall be used for implementation or construction of enhancement, creation, and/or restoration projects in the Goleta Slough area or its watershed.

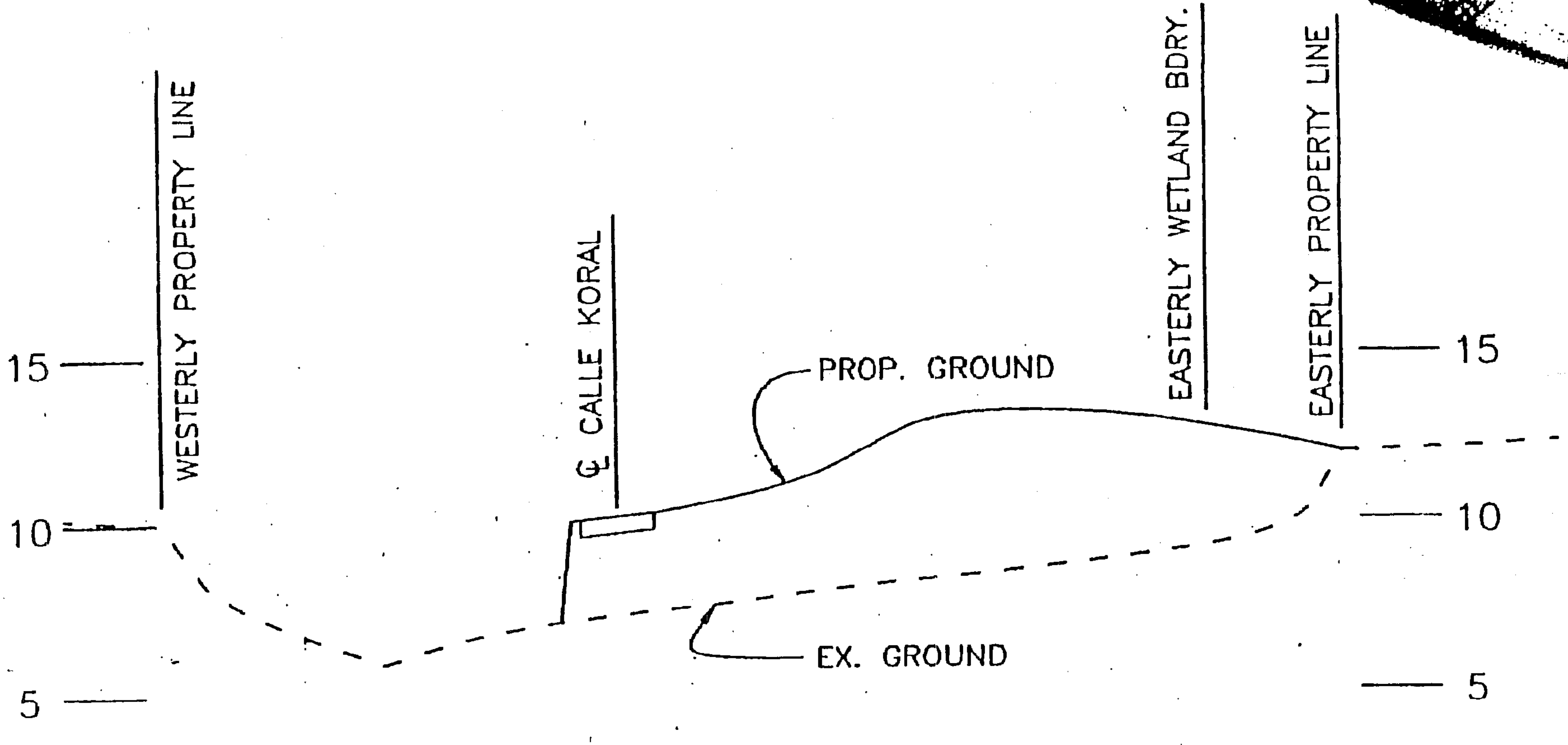
8. The applicant must comply with all 21 special conditions submitted by Corps letter of March 19, 1995 to (and later approved by) the State Historic Prervation Office which were developed to avoid all impacts to site CA-SBa-56. Of these 21 conditions, five (#'s 13, 14, 15, 16, and 17) related only to CA-SBa-52, which is a cultural resource site located near a previously planned wetland mitigation area. This mitigation area is not longer part of the applicant's proposal. Therefore, the applicant would not be required to comply with those 5 conditions. Approval of these conditions by SHPO and ACHP constitutes compliance with Section 106 of the National Historic Preservation Act.



SCALE: 1" = 250'

Penfield & Smith
ENGINEERS • SURVEYORS
FILE: COCAPP3

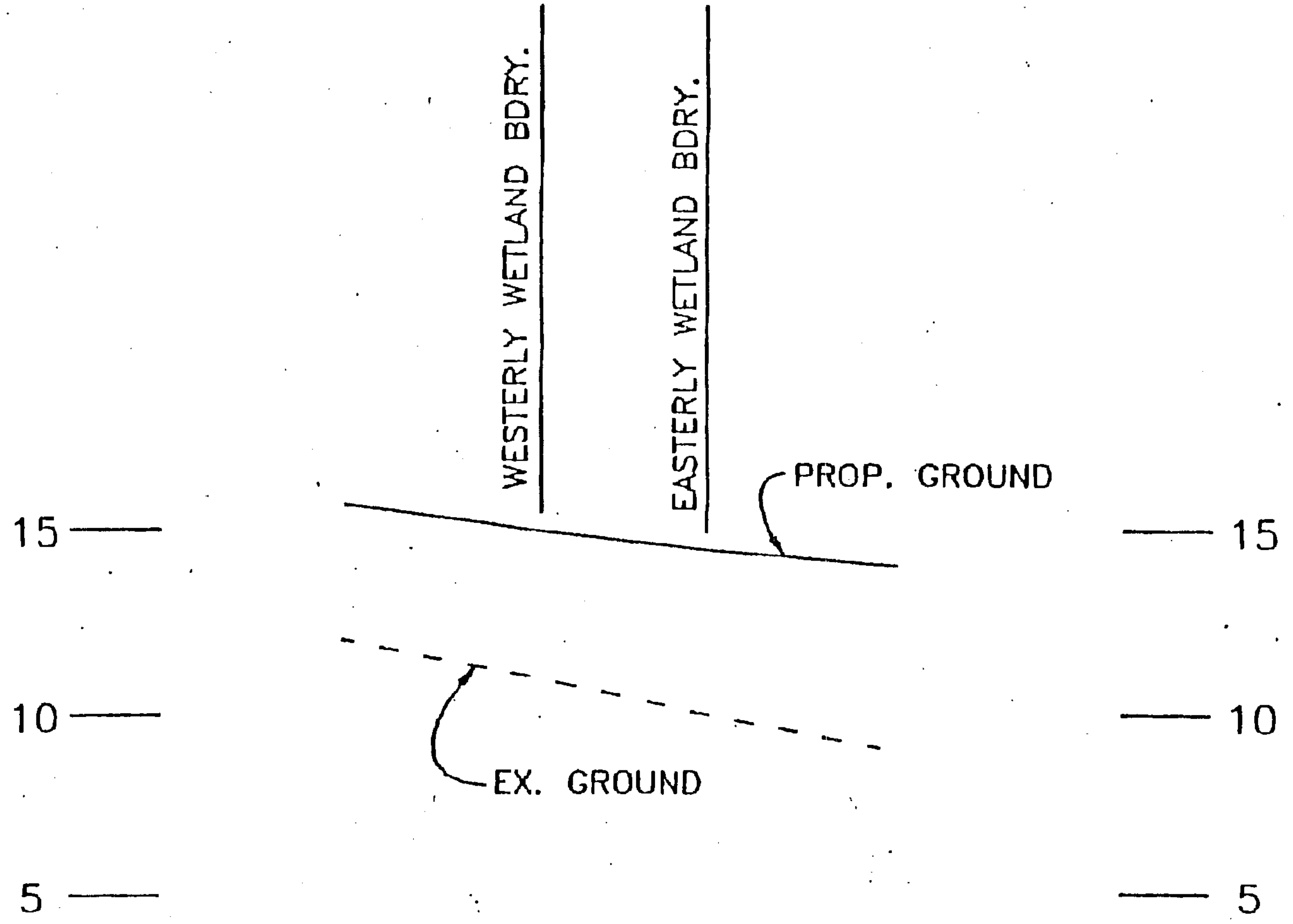
SITE PLAN



CROSS SECTION A–A

SCALE: HORIZ. 1" = 100'
VERT. 1" = 5'

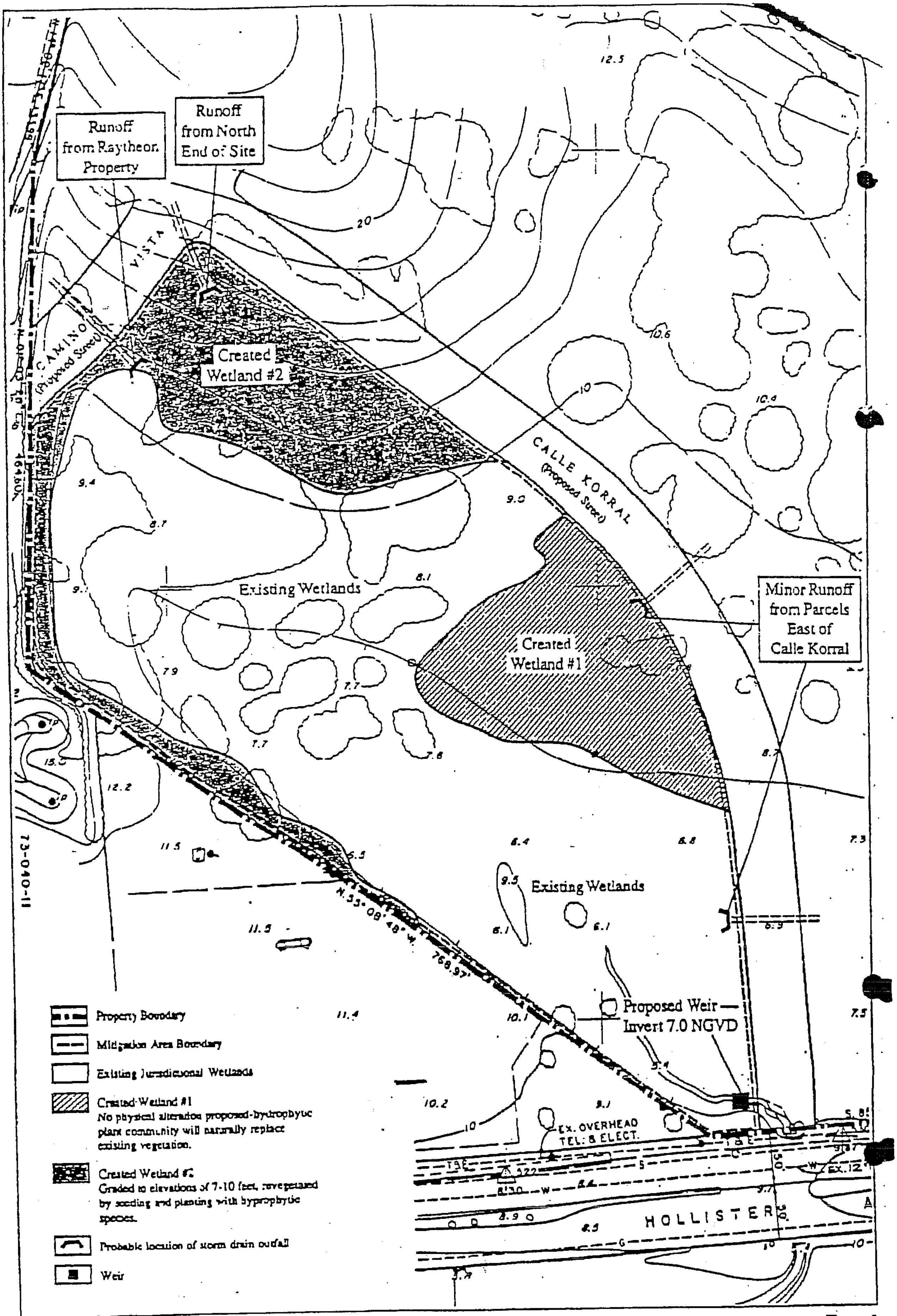
Penfield & Smith
ENGINEERS + SURVEYORS
FILE: COEAPP4



CROSS SECTION B–B

SCALE: HORIZ. 1" = 100'
VERT. 1" = 5'

Penfield & Smith
ENGINEERS • SURVEYORS
FILE: COEAPPS



01-23-95(LCC201)

Figure 3

N

LSA

Scale in Feet
0 90

Los Careros On-site Mitigation

Appendix E

Geotechnical Engineering Report

GEOTECHNICAL ENGINEERING REPORT
HERITAGE RIDGE APARTMENTS
(FORMERLY WILLOW SPRINGS NORTH)
NORTH OF CALLE KORAL AND CAMINO VISTA
GOLETA, CALIFORNIA

July 8, 2014

Prepared for

The Towbes Group, Inc.

Prepared by

Earth Systems Pacific
2049 North Preisker Lane, Suite E
Santa Maria, California 93454

Earth Systems Pacific

2049 Preisker Lane, Suite E
Santa Maria, CA 93454

(805) 928-2991 • FAX (805) 928-9253
E-mail: esp@earthsys.com

July 8, 2014

FILE NO.: SL-15702-SF

Mr. Craig Minus
The Towbes Group, Inc.
21 East Victoria Street, Suite 200
Santa Barbara, California 93101

PROJECT: HERITAGE RIDGE APARTMENTS (FORMERLY WILLOW SPRINGS NORTH)
NORTH OF CALLE KORAL AND CAMINO VISTA
GOLETA, CALIFORNIA

SUBJECT: Geotechnical Engineering Report

REF: 1) Proposal for a Geotechnical Engineering Report and Percolation Testing, Willow Springs Phase 3 Apartments, North of Calle Koral and Camino Vista, Goleta, California, by Earth Systems Pacific, dated February 4, 2014, Doc. No. 1402-005.PRP

2) Change Order for the Willow Springs North Apartments, North of Calle Koral and Camino Vista, Goleta, California, by Earth Systems Pacific, dated April 24, 2014, Doc. No. 1404-080.CO

Dear Mr. Minus:

In accordance with your authorization of the above-referenced proposal and change order, this geotechnical engineering report has been prepared for use in the development of plans and specifications for the Heritage Ridge Apartments project planned north of Calle Koral and Camino Vista in the City of Goleta, California. Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, retaining walls, slabs-on-grade and exterior flatwork, pavement sections, the swimming pools, drainage and maintenance, and construction observation and testing are presented herein. Also included are the results of the infiltration testing. Two bound copies and an electronic copy of this report are being furnished for your use.

We appreciate the opportunity to have provided services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact me.

Sincerely,

Earth Systems Pacific

Doug Dunham

Doug Dunham, GE
Associate Engineer

Doc. No. 1407-006.SER/ln

REGISTERED PROFESSIONAL ENGINEER
DOUGLAS A. DUNHAM
No. 2586
Exp. 12-31-15
GEOTECHNICAL
STATE OF CALIFORNIA

TABLE OF CONTENTS

Appendices

APPENDIX A	Boring, CPT, and Infiltration Test Location Map Boring Log Legend Boring Logs Graphical CPT Data
APPENDIX B	Laboratory Test Results
APPENDIX C	Corrosion Evaluation Report Prepared by Cerco Analytical
APPENDIX D	Infiltration Test Results
APPENDIX E	Typical Bench and Keyway Detail
APPENDIX F	Typical Detail A: Pipe Placed Parallel to Foundations

1.0 INTRODUCTION

The Heritage Ridge Apartments project (formerly named the Willow Springs North Apartments) will generally consist of constructing nine multi-family residential buildings, two clubhouse buildings and recreation areas with swimming pools, and other associated surface and subsurface improvements. The project is planned for construction on the remaining parcel of land (referred to herein as "the site") associated with the overall Willow Springs project located north of Calle Koral and Camino Vista in the City of Goleta, California. The site is shown on the Boring, CPT, and Infiltration Test Location Map presented in Appendix A.

The clubhouse and apartment buildings will be one to three stories, will be of wood and steel frame construction, and will utilize Portland cement concrete (PCC) slabs-on-grade. Two swimming pools are planned near the clubhouse buildings, and we have assumed they will be of gunite construction and will have a maximum depth of 5 feet. PCC or masonry retaining walls that we have assumed will not exceed 8 feet in height will also be constructed. For the purposes of this report, maximum line loads of 3 kips per linear foot, and maximum point loads of 50 kips were assumed.

We have assumed surface improvements will consist of hot mix asphalt (HMA) and/or PCC pavement over aggregate base (AB) for vehicles, and PCC flatwork for pedestrians. Low Impact Development (LID) drainage disposal improvements are anticipated; however, LID drainage improvements are not within our scope of work and are not addressed in this report. Subsurface improvements will be the underground municipal utilities that will provide the sewer, water, power, and communication services.

Based on the grading design and the need to remove and recompact the existing stockpile soils, cuts and fills associated with developing the building and surface improvement areas, improving access, and improving drainage are anticipated to be on the order of 10 feet or more. Additionally, an archaeological area with a buffer zone exists in the central portion of the site where special grading techniques will be required.

2.0 SCOPE OF SERVICES

The scope of work for the geotechnical engineering report included a general site reconnaissance, subsurface investigation, infiltration testing, laboratory testing of selected soil samples, geotechnical analysis of data, and preparation of this report. The analysis and subsequent recommendations were based, in part, upon information provided by the client.

This report and preliminary geotechnical recommendations are intended to comply with the considerations of 1803.1 through 1803.6, J104.3 and J104.4 of the California Building Code (CBSC, 2013) and common geotechnical engineering practice in this area under similar conditions at this time. The test procedures were accomplished in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, retaining walls, slabs-on-grade and exterior flatwork, pavement sections, the swimming pools, drainage and maintenance, and construction observation and testing are presented to guide the development of project plans and specifications. It is our intent that this report be used exclusively by the client to form the geotechnical basis of the design of the project and in the preparation of plans and specifications. Application beyond this intent is strictly at the user's risk. If future property owners wish to use this report, such use will be allowed to the extent the report is applicable, only if the user agrees to be bound by the same contractual conditions as the original client, or contractual conditions that may be applicable at the time of the report use.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, dewatering, shoring, temporary slope angles, construction means and methods, etc. Analyses of the areal or site geology, and of the soil for asbestos (either man-made or naturally occurring), radioisotopes, mold or other microbial content, hydrocarbons, lead, or other chemical properties (except for geotechnical corrosivity) are beyond the scope of this report. Ancillary features such as temporary access roads; fences and site work walls; flag and light poles; signage; LID drainage improvements; and nonstructural fills are not within our scope and are also not addressed.

As there may be unresolved geotechnical issues with respect to this project, the geotechnical engineer should be retained to provide consultation as the design progresses, and to review project plans as they near completion to assist in verifying that pertinent geotechnical issues have been addressed and to aid in conformance with the intent of this report. In the event that there are any changes in the nature, design, or location of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified by the geotechnical engineer in writing. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions are observed by the geotechnical engineer in the field during construction, and the recommendations have been verified as appropriate or are modified by the geotechnical engineer in writing.

3.0 SITE SETTING

The site is located northeast of Calle Koral and Camino Vista in the northern sector of the City of Goleta, California. Camino Vista provides access to the site. The approximate central site coordinates and elevation from the Google Earth website (Europa Technologies, 2013) are latitude 34.436 degrees north, longitude 119.852 degrees west, and 28 feet.

Los Carneros Road forms the westerly boundary, the Union Pacific Railroad (UPRR) easement is the northerly boundary, a commercial development is the easterly boundary, and Camino Vista and Calle Koral form the southerly boundary. The general surrounding areas are as follows. The area to the south is the previously developed Willow Springs Phases 1 and 2 Apartment projects, the area to the east is commercially developed, the area to the west is a combination of a commercial development and an undeveloped parcel of land, and the area to the north is the UPRR and Highway 101 easements.

A very sparse to moderate growth of weeds and brush covers the site. The site is relatively flat to gently sloping with the exception of the moderately steep slopes that surround the stockpile soils that were previously placed along the perimeter of the archeological area and the property lines. Drainage is by sheet flow.

4.0 FIELD INVESTIGATION AND LABORATORY ANALYSIS

On February 25, 26, and April 30, 2014, twenty borings were drilled at the site to depths ranging from approximately 3 to 51.5 feet below the existing ground surface. Eleven of the borings (Borings 1 through 11) were drilled for exploration and sample acquisition purposes, and the other nine (Infiltration Test Nos. A through I) were drilled for infiltration testing. The borings were drilled with a Mobile Model B-53 drill rig equipped with a six inch (for the exploratory borings), or an eight inch (for infiltration test borings) outside diameter hollow stem auger. The drill rig also has an automatic trip hammer for sampling. On May 21, 2014, six cone penetrometer test (CPT) soundings were also performed at the site. The CPT soundings were advanced to depths ranging from approximately 18.5 to 60 feet below the existing ground surface. The approximate locations of all of the borings and CPT soundings are shown on the Boring, CPT, and Infiltration Test Location Map presented in Appendix A.

Soils encountered in the exploratory borings were logged and categorized in general accordance with the Unified Soil Classification System and ASTM D 2488-09a. Copies of the exploratory boring logs can be found in Appendix A. The CPT soundings were conducted in general accordance with ASTM D 5778-95 and D 3441-94 using an electric cone penetrometer. Copies of the graphical CPT data can also be found in Appendix A.

Soil samples were taken using a ring-lined barrel sampler (ASTM D 3550-01/07, with shoe similar to D 2937-04) and Standard Penetration Tests (SPT) were conducted at selected depths in the exploratory borings per ASTM D 1586-11. Bulk soil samples were also obtained from the exploratory boring auger cuttings.

Ring samples were tested for unit weight and moisture (ASTM D 2937-10, as modified for ring liners). Two bulk samples were tested for maximum density and optimum moisture (ASTM D 1557-12), and direct shear tests (ASTM D 3080/D 3080M-11) were conducted on the same bulk samples after they were remolded to approximately 90 percent of maximum dry density. Two one dimensional consolidation tests (ASTM D 2435/D 2435M-11) were performed on ring samples. Two bulk samples were also sent to Cerco Analytical of

Concord, California for use in preparing a corrosion evaluation report. The evaluation and associated chemical test results are for use by the architect/engineer in determining appropriate corrosion mitigation measures. The laboratory test results and the corrosion evaluation report prepared by Cerco Analytical are presented in Appendices B and C, respectively.

5.0 GENERAL SUBSURFACE PROFILE

The general subsurface profile observed in the exploratory borings and CPT soundings consisted of fill soils overlying alluvial soils. The fill soils were sands in a slightly moist to moist condition with a loose to medium dense consistency. The underlying alluvium was generally moist to wet layered sand, silt, and clay soils. The sands were loose to very dense, and the clays were very soft to hard. Fine to coarse gravel was also observed within the fill and alluvial soils. Three of the six CPT soundings were terminated short of their respective target depths due to practical penetration refusal in very dense layers of alluvial sands. Subsurface water was encountered at approximate depths ranging from 22.5 to 38 feet below the existing ground surface in exploratory Borings 6 through 11. Please refer to the exploratory boring logs and the graphical CPT data for a more complete description of the subsurface conditions.

6.0 INFILTRATION TEST RESULTS

Infiltration testing was performed to assist the architect/engineer in determining the potential for utilizing LID drainage improvements at the site. The infiltration testing was performed in the three areas designated by the architect/engineer. It consisted of drilling three 8-inch diameter borings to approximate depths of 3, 6, and 9 feet below the existing ground surface in each area. A 2-inch diameter perforated polyvinyl chloride (PVC) pipe was installed in the center of each of the three borings. The bottom 2 inches of the borings and the annular spaces around the outside of the PVC pipes were filled with gravel to reduce caving of the areas to be tested. The constructed infiltration test borings were then completely filled with clear water and allowed to presaturate overnight.

The next day, the 3, 6, and 9 foot deep infiltration test borings were again refilled with clear water to approximate heights of 1-foot. The falling head rate of infiltration was then measured and recorded over a period of 4 hours. In the case where the infiltration rate was relatively fast, clear water was added to continue the infiltration measurements over the 4 hour period of time. The infiltration test results are presented in Appendix D.

The tests only indicate the infiltration rate at the specific location and under specific conditions. Sound engineering judgment should be exercised in extrapolating the tests results for other conditions or locations. Technical design references vary in the methods they present when using these types of test results. However, most references include reduction and/or correction factors for several parameters including, but not limited to, size of infiltration system relative to the test volume, number of tests conducted, variability in the soil profile, anticipated silt loading, anticipated biological buildup, anticipated long term maintenance, and other factors. Typically, in aggregate these factors range from about 2.5 to 50 depending on the method used. The final determination of the means by which these data are used is left to the architect/engineer.

In many cases, native soils will infiltrate water much faster than the same soil placed as compacted fill. It would be prudent to consider performing additional infiltration testing in the LID drainage improvement areas after they have been constructed.

7.0 CONCLUSIONS

In our opinion, the site is suitable, from a geotechnical engineering standpoint, for the planned development as described in the "Introduction" section of this report, provided the recommendations contained herein are implemented in the design and construction. This opinion does not extend to the suitability of the site for LID drainage improvements as this is the responsibility of other engineers. Assuming the site is prepared in accordance with the "Preliminary Geotechnical Recommendations" section of this report, shallow foundation systems may be used to support the planned structures.

The primary geotechnical engineering issues at this site are the existing stockpile soils, grading in the archeological area, the potential for the potential for settlement, the expansive soils, the excavation characteristics of the soils, the suitability of the soils for use as fill and backfill, the stability of the soils during grading, the corrosive nature of the soils, the erodible nature of the soils, the potential for liquefaction and seismically induced settlement, and the type shallow foundation systems that should be used.

Stockpile Soils

Fairly well defined areas of stockpiled soils were previously placed over most of the site for use on this project. The stockpile soils, or any other previously placed fill soils that may exist at the site, should be completely removed and placed during grading operations as moisture conditioned compacted fill soils.

Grading in the Archaeological Area

An archaeological area with a 50-foot buffer zone exists in the central portion of the site as shown on the Boring, CPT, and Infiltration Test Location Map. Special grading techniques will need to be implemented to minimize the impact of site development there. In lieu of the normal soil disturbance that would occur during mass grading of the native soils under the building and the surface improvement areas, the placement of a triaxial geogrid on the surface of the native soils after removing the vegetation and the stockpile soils is planned prior to placing the compacted fills to develop final grades. This geogrid is intended to reduce the potential for settlement in the archaeological area and buffer zone area only; normal mass grading techniques will need to be used in all other building and surface improvements areas of the site. Recommendations for the archaeological area and buffer zone are presented in the "Site Preparation" and "Grading" sections of this report.

Settlement

Settlement (total and differential) can occur when foundations and surface improvements span materials having variable consolidation characteristics, such as the soils on this site with variable in situ moisture and density. Such a situation could stress and possibly damage foundations and surface improvements, often resulting in severe cracks and displacement. To reduce this potential, it is necessary for all foundations and surface improvements to bear in material that is as uniform as practicable. Outside of the archaeological area and 50-foot buffer zone, a program of overexcavation, scarification, moisture conditioning, and compaction of the upper soils in the building and surface improvement areas is recommended to provide more uniform soil moisture and density, and to provide appropriate support. To reduce this potential for settlement within the archaeological area, see the previous paragraph.

Expansive Soils

Previous expansion index testing of the clay soils produced values that place these soils in the *"medium"* expansion category per ASTM D 4829-11. Expansive soils tend to swell with seasonal increases in soil moisture and shrink during the dry season as soil moisture decreases. The volume changes that the soils undergo in this cyclical pattern can stress and damage slabs and foundations if precautionary measures are not incorporated in design and in the construction procedure.

Methods commonly used for slab protection include placement of nonexpansive material beneath slabs, premoistening of subslab soils, or a combination of the two. While premoistening alone can be helpful in *reducing* the effects of expansive soil, this method generally does not (and should not be expected to) provide protection from expansive soil damage to the extent that can be achieved by use of nonexpansive material in conjunction with premoistening. Due to the expansive nature of the clay soils and subsequent likelihood that differential expansion and subsequent cracking of slabs would occur if premoistening were used by itself, it is not recommended as the only means of expansive soil mitigation. Use of nonexpansive imported soil materials beneath slabs, in combination with premoistening, will result in more uniform slab support conditions with less tendency for heave and random cracking. Expansive soil concerns with respect to foundations will be mitigated by increased depth and reinforcement of conventional foundation elements, or by using rigid mat foundation systems.

Expansive soils can also be damaging to the HMA and curbs that separate it from LID drainage improvements such as bioswales, infiltration basins, etc. This is due to the large variations in soil moisture contents that occur in the LID infiltration areas from season to season. Deepening curbs in these areas is recommended in the "Pavement Sections" part of this report.

Excavation Characteristics

The soils are anticipated to be excavatable with conventional earthmoving equipment; however, the stability of excavations is a concern. Additionally, gravel was noted within the fill and alluvial soils. Based on our preliminary testing, the soils are considered to be "Type C" per the 2007 Cal/OSHA classification system. This classification should be verified by the contractor's "Competent Person" at the time of construction. Excavation sloping and shoring will be needed to safely work in, and to restrict the size of, the excavations, and reduce the potential for falling rock hazards. As with all construction safety issues, the methods of excavation stabilization, sloping, and/or shoring are ultimately the responsibility of the contractor.

Suitability of the Soils for Use as Fill and Backfill

We anticipate that the majority, if not all, of the soils excavated at the site will be acceptable from a geotechnical viewpoint for reuse as compacted fill and backfill. However, special requirements for utility trench bedding and shading per the specifications of the City of Goleta, the conduit manufacturer, and the utility companies should be anticipated. Also in localized areas within the stockpile soils, we encountered a relatively small amount of soils that may have possible hydrocarbon odors (noted during a previous stockpile evaluation), or that contained debris and organic material. If soils that are contaminated with any of these conditions are encountered during construction, they are not considered suitable for use as fill and backfill in their current condition. These soils will require evaluation for possible mitigation measures that may render them usable for use as fill and backfill; however, they may alternatively require removal from the site per applicable local, state, and federal regulations.

Stability of Soil During Grading

The soils may be susceptible to temporary high soil moisture contents, especially during or soon after the rainy season. Attempting to compact the soils in an overly moist condition may create unstable conditions in the form of pumping, yielding, shearing, and/or rutting. These conditions will not allow proper compaction and are inappropriate for continued fill placement. Therefore, the construction schedule should allow adequate time during grading for aerating and drying the soils to near optimum moisture content prior to compaction. If unstable conditions occur, the geotechnical engineer should be consulted to provide recommendations for correction of the conditions.

Corrosive Soils

Based on the testing performed by Cerco Analytical, the upper site soils were classified as "moderately corrosive to corrosive" to certain construction materials that will be in contact with the soils. The architect/engineer should refer to the Cerco Analytical report presented in Appendix C for use in determining appropriate mitigation measures for soil corrosivity.

Soil Erosion

The site soils are considered to be highly erodible. Stabilization of surface soils, particularly those disturbed during construction, by vegetation or other means *during* and *following* construction is essential to reduce the potential of erosion damage. Care should be taken to establish and maintain proper drainage around the structures and improvements.

Liquefaction and Seismically Induced Settlement

Liquefaction is the loss of soil strength caused by a significant seismic event. It occurs primarily in loose, fine to medium-grained sands, and in very soft to medium stiff silts that are saturated by groundwater. During a major earthquake, the saturated sands and silts tend to compress and decrease in volume. If drainage does not occur rapidly, the pore water pressure builds up in the soils causing them to lose their strength and transition to a liquefied state.

In order to estimate the potential for liquefaction and its effects on the site, we analyzed the boring and CPT data and utilized methods suggested by the Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117a (CDMG, 2008). Using the peak ground acceleration (PGA_M) of 1.15g (USGS, 2013) and groundwater depths that considered final grade elevations, the analysis confirmed there is a potential for liquefaction to occur at the site. It appears that liquefaction would occur in some layers of the saturated alluvial soils. If liquefaction were to occur at the site, the repercussions would likely be in the form of dynamic settlement; loss of soil bearing and lateral spreading are not anticipated. This is due to the relative thickness or depth of the overlying non-liquefiable soils and the site's relatively flat topography.

As part of our liquefaction analysis, we also found there is a potential for seismically induced settlement of dry soil to occur at the site. The highest magnitude of seismically induced settlement appears to occur in localized areas in the upper portion of some of the alluvial soils. Provided the site is graded per the recommendations presented in the "Grading' section of this report, the alluvial soils most prone to seismically induced settlement will be removed and replaced as compacted fill.

Based on our analyses, we have estimated that the combined magnitude of both liquefaction and seismically induced settlement would be less than 4 inches; the magnitude of differential settlement is estimated to be less than 2 inches. It is therefore our opinion that no special measures with respect to liquefaction and seismically induced settlement are considered necessary for this project provided the site can be graded to the recommendations in the "Grading" section of this report. If the portions of the site cannot be graded to those recommendations, rigid mat foundations should be used in lieu of conventional foundation systems as described in the next paragraph.

Shallow Foundation Types

Where remedial grading operations within any building area are terminated short of the recommended removal widths and depths to avoid soil disturbance within the archaeological area and buffer zone, there is a potential for an increase in the magnitude of the static and seismic settlement (total and differential) to occur. To accommodate this increase in settlement, the shallow foundation systems within these building areas should consist of rigid mat foundations, not conventional foundations. In addition, the entire building area should also be underlain with the same triaxial geogrid planned for use in the archeological area and buffer zone.

8.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following recommendations are applicable to the structures and improvements as described in the "Introduction" section of this report. If subterranean rooms, basements, cellars, stacked retaining walls, or other such features are incorporated into site development, the geotechnical engineer should be contacted for individual assessment.

Definitions

Unless otherwise noted, the following definitions are used in the following recommendations. Where specific terms are not defined, common definitions used in the construction industry are intended.

- **Grading Area:** The entire site area to be graded including all the building and surface improvement areas, and the areas where LID drainage improvements are planned.

- **Archeological Area:** The area within the archeological area and including the 50 foot archeological area buffer zone.

- **Building Area:** The area within and extending a minimum of 5 feet beyond the perimeter of the foundations for a structure. The building area also includes the foundation areas (plus 5 feet to each side) of any ancillary structure that will be rigidly attached to the main structure and is expected to perform in the same manner as the main structure. Such structures could include covered walkways, covered work areas, patio covers, arbors, etc.

- **Surface Improvement Area:** The area within and extending a minimum of 2 feet beyond the perimeter of the surface improvement.

- **Scarified**: Ripping the exposed soil surface in two orthogonal directions to a minimum depth of 12 inches.

- **Moisture Conditioning:** Adjusting the soil moisture to optimum moisture content or slightly above, prior to the application of compaction effort.

- **Compacted or Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness, and compacted to a minimum of 90 percent of maximum dry density. The standard tests used to define maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-10, respectively, or other methods acceptable to the geotechnical engineer and the governing jurisdiction.

Site Preparation

The Areas Outside of the Archaeological Area

1. The existing ground surface in the grading area outside of the archaeological area should be prepared for construction by removing existing structures, improvements, vegetation, tree stumps, large roots, debris, and other deleterious material. *All existing fill soils should be completely removed and replaced as compacted fill.* Any existing utilities that will not be serving the site should be removed or properly abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

2. Voids created by the removal of materials or utilities, and extending below the recommended overexcavation depth, should be immediately called to the attention of the geotechnical engineer. No fill should be placed unless the geotechnical engineer has observed the underlying soil.

The Areas Inside of the Archaeological Area

3. The existing ground surface in the grading area inside of the archaeological area should be prepared for construction by removing the stockpile soils and all other existing fill soils down to the native soil surface. Then all vegetation, debris, and other deleterious material should be removed from the native soil surface. Per the City of Goleta, all vegetation should be removed by hand (which can include brushing, raking, or the use of a power blower) from the native soil surface. All

vegetation shall be removed to the degree practicable at the ground surface such that no soil disturbance occurs. The remnants of the vegetation should then be sprayed with topical herbicide per manufacturer's specifications approximately 60 days prior to implementing grading operations. The root ball masses shall be left in place to die. Any existing utilities that will not be serving the site should be removed or properly abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

Grading

The Areas Outside of the Archaeological Area

1. Following site preparation, the soils in the building area should be removed to a level plane at a minimum depth of 3 to 8 feet below the bottom of the deepest footing or 3 to 8 feet below existing grade, *whichever is deeper,* as recommended by the geotechnical engineer in the field. During construction, locally deeper removals may also be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

2. Following site preparation, the soils in the surface improvement area should be removed to a level plane at a minimum depth of 1-foot below the proposed subgrade elevation or 2 feet below the existing ground surface, whichever is deeper. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

3. Following site preparation, the soils in the fill areas beyond the building and surface improvement areas should be removed to a depth of 2 feet below the existing ground surface. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

4. Voids created by dislodging cobbles and/or debris during scarification should be backfilled and compacted, and the dislodged materials should be removed from the area of work.

The Areas Inside of the Archaeological Area

5. Surface vegetation removal and herbicide application must be accomplished 60 days prior to the geogrid placement. No remedial grading or scarification shall occur prior to placement of the geogrid; however, it is acceptable to place import sand on the native soil surface where uneven areas or undulations exist to create as level a surface as practicable to place the geogrid on. Creating level areas to place the geogrid on improves both the constructability and the performance of the geogrid system.

6. Following site preparation and placement of the leveling import sand, the native soil surface in the grading area inside the archaeological area should be covered with a tri-axial geogrid such as Tensar TX 7, or an approved equivalent. The geogrid should be anchored and/or overlapped as recommended by the manufacturer prior to placing any fill soil.

7. The first 6 inches of fill placed on top of the geogrid shall be an imported sand material reviewed and approved by the City of Goleta to provide a visual indication to avoid impeding into the native soils.

8. Fill soils shall be placed and spread from the outside to the inside of the archeological area with track earthmoving equipment such that the equipment shall only be working on the top of the fill soils. The fill soils shall be placed such that the earthmoving equipment does not come into contact with the archeological area native soils or the geogrid.

Grading, General

9. On-site material and approved import materials may be used as general fill and up to 18 inches below the bottom of the slab-on-grade elevation within the building area where conventional foundations will be used. On-site material and approved import materials may be used as general fill up to pad grade where rigid mat foundations will be used. All fill soils should be moisture conditioned and compacted.

10. A minimum of 18 inches of nonexpansive material when measured from the bottom of the conventional foundation slabs-on-grade should be placed in the building area. The non-expansive material is not required where rigid mat foundations are used. Nonexpansive material is defined as being coarse grained (ASTM D 2487-11), and having an expansion index of 10 or less (ASTM D 4829-11). The 4-inch sand cushion (discussed later in the "Slabs-on-Grade and Exterior Flatwork" section of this report) is part of this 18-inch thickness of nonexpansive material, not in addition to it. Prior to placement of the nonexpansive material, the underlying soil should be moistened

to a minimum of optimum moisture content and no desiccation cracks should be present.

11. Proposed imported soils should be evaluated by the geotechnical engineer before being used, and on an intermittent basis during placement on the site.

12. All materials used as fill should be cleaned of any debris and rocks larger than 6 inches in diameter. No rocks larger than 3 inches in diameter should be used within the upper 3 feet of finish grade. When fill material includes rocks, the rocks should be placed in a sufficient soil matrix to ensure that voids caused by nesting of the rocks will not occur and that the fill can be properly compacted.

13. Fill slopes should be keyed and benched into competent soil as generally shown on the Typical Bench and Keyway Detail presented in Appendix E. The geotechnical engineer should approve all keyways and benches. The keyway should be a minimum of 10 feet wide.

14. Slopes under normal conditions should be constructed at 2:1 (horizontal to vertical) or flatter inclinations. Slopes subject to inundation should be constructed at 3:1 or flatter inclinations.

15. Cut slopes and fill over cut slopes be overexcavated and constructed as compacted fill slopes.

16. Fill slopes should be overfilled to an extent determined by the contractor, but not less than 3 feet when measured perpendicular to the slope face, so that when

trimmed back to the compacted core, the recommended compaction is achieved. Compaction of each fill lift should extend out to the temporary slope face. As an alternative to overfilling, fill slopes may be built to the finish slope surface. In such cases, compaction of each fill lift should extend to the face of the slope, and the slope face should be backrolled with a sheepsfoot compactor at intervals not exceeding 4 vertical feet.

17. Care shall be taken to avoid spillage of loose materials down the faces of the slopes during grading. At the completion of mass filling, the slope surfaces should be moisture conditioned, shaped, and compacted. To obtain the recommended compaction of the slope face, soil moisture should be maintained at optimum moisture, or slightly above, from the time of mass filling to final compaction of the slope faces.

Utility Trenches

1. Unless otherwise recommended, utility trenches adjacent to foundations should not be excavated within the zone of foundation influence, as shown on Typical Detail A presented in Appendix F.

2. Utilities that will pass beneath a foundation should be placed with properly compacted utility trench backfill, and the foundation should be designed to span the trench.

3. A select, noncorrosive, granular, easily compacted material should be used as bedding and shading immediately around utilities. Generally, the soils at the site may be used for trench backfill above the select material. Site soils with moisture

levels above optimum moisture content may be difficult to compact to project standards. If obtaining compaction is difficult with the site soils, use of imported well-graded sand may be desirable.

4. Utility trench backfill should be moisture conditioned and compacted; however, the Engineering Design Standards (SBC, 2011) requires a minimum compaction of 95 percent of maximum dry density in trench backfill in existing or future public roadway areas. A minimum of 95 percent of maximum dry density should also be obtained where trench backfill comprises the upper 1 foot of subgrade beneath HMA or PCC pavement, and in all AB. A minimum of 85 percent of maximum dry density will generally be sufficient where trench backfill is located in landscaped or other unimproved areas, where settlement of trench backfill would not be detrimental.

5. Jetting of trench backfill should generally not be allowed as a means of backfill densification. However, to aid in encasing utility conduits, particularly corrugated conduits and multiple closely spaced conduits in a single trench, jetting or flooding may be useful. Jetting or flooding should only be attempted with extreme caution, and any jetting or flooding operation should be subject to review by the geotechnical engineer.

6. The recommendations of this section are minimums only, and may be superseded by the architect/engineer based upon the soil corrosivity, or the requirements of the pipe manufacturer, the utility companies, or the governing jurisdiction.

Foundations

In preparing the following foundation recommendations, we have assumed that foundations will not be constructed within 10 feet of LID drainage improvements. If this is not the case, the geotechnical engineer should review the type of LID drainage improvement planned within 10 feet of a foundation to ascertain if revised and/or supplemental foundation recommendations are needed.

Conventional Foundation Systems – Conventional foundation systems or continuous and spread (pad) footings may be used to support the buildings where the remedial grading recommended in the "Grading" section of this report is completely accomplished. Recommendations for conventional foundations are as follows:

1. Conventional continuous footings and spread footings connected on at least two sides by grade beams bearing entirely on soil compacted per the "Grading" section of this report may be used to support the structures. Grade beams should also be placed across all vehicle entrances or other large entrances into the buildings. Footings and grade beams should have a minimum depth of 21 inches below lowest adjacent grade; however, footing and grade beam dimensions and geometery should also conform to the requirements of CBC Section 1809 (CBSC, 2013). All spread footings should be a minimum of 2 feet square. Footing reinforcement should be in accordance with the requirements of the architect/engineer; minimum continuous footing and grade beam reinforcement should consist of four No. 4 rebar, two near the top and two near the bottom, or two No. 5 rebar, one near the top and one near the bottom.

2. Conventional foundations should be designed using maximum allowable bearing capacities of 1,500 psf dead load and 2,000 psf dead plus live load. Using these criteria, maximum total and differential settlement are expected to be on the order of 3/4-inch and 1/4-inch in 25 feet, respectively.

Rigid Mat Foundations – Rigid mat foundations should be used to support the buildings where the remedial grading recommended in the "Grading" section of this report cannot be accomplished to avoid encroaching into the archeological area. Geogrid as specified in paragraph 6 of the "Grading" section of this report should be extended such that it covers the entire building area under the rigid mat foundations. Recommendations for the rigid mat foundations are as follows:

3. Rigid mat foundations bearing entirely on soil compacted per the "Grading" section of this report may be used to support the buildings. The rigid mat foundations should consist of a structural, moment, and shear resisting slab, or an integrated system of structural slab sections spanning between a grid of moment/shear resisting grade beams.

4. The rigid mat foundations should be designed using a maximum allowable bearing capacity of 2,000 psf or a modulus of subgrade reaction of 200 psi/inch. Using these criteria, maximum total static settlement from normal foundation loading is estimated to be on the order of 3/4-inch and differential static settlement is estimated 1/8-inch in 30 feet.

5. The rigid mat foundation system should significantly reduce the magnitude of differential settlement due to liquefaction and seismically induced settlement of dry

soil; however, the total settlement will not necessarily be reduced. Total and differential seismic settlement should be reassessed after the actual level remedial grading is accomplished to provide a more accurate estimation of those values.

6. Due to the specialized design required for the rigid mat foundations, dimensioning and reinforcement is left to the discretion of the architect/engineer.

Foundations, General

7. The allowable bearing capacities may be increased by one-third when transient loads such as wind or seismicity are included. The foundations should be designed using the following seismic parameters. Based on the borings and CPT soundings, the Site Class per CBC Section 1613.3.2 (CBSC, 2013) is "D", a Stiff Soil Profile. Using the Earthquake Hazards Program website (USGS, 2013), the ASCE Standard 7-10 setting, Risk Category III per CBC Table 1604.5, and the site coordinates from the "Site Setting" section of this report, the following seismic parameters were determined.

2013 CBC Mapped Values		**Site Class "D" Adjusted Values**				**Design Values**	
Seismic Parameters	**Values (g)**	**Site Coefficients**	**Values**	**Seismic Parameters**	**Values (g)**	**Seismic Parameters**	**Values (g)**
S_S	2.853	**F_a**	1.000	**S_{MS}**	2.853	**S_{DS}**	1.902
S_1	1.003	**F_v**	1.500	**S_{M1}**	1.505	**S_{D1}**	1.003
Peak Mean Ground Acceleration (PGA_M) = 1.15g							

8. Lateral loads may be resisted by soil friction and by passive resistance of the soil acting on foundations. Lateral capacity is based on the assumption that backfill

adjacent to foundations is properly compacted. Please refer to the "Retaining Walls" section of this report for values.

9. Foundation excavations should be observed by the geotechnical engineer prior to rebar and PCC placement. Footing excavations should be thoroughly moistened prior to PCC placement and no desiccation cracks should be present.

Retaining Walls

1. All retaining wall foundations should be founded in soil compacted as recommended in the "Grading" section of this report. Conventional foundations may be used for the retaining walls, and should have a minimum depth of 21 inches below lowest adjacent grade not including the keyway. It is assumed that retaining walls will not exceed 8 feet in height.

2. Wall design should be based on the following parameters:

Active equivalent fluid pressure (imported sand or gravel backfill)	35 pcf
Active equivalent fluid pressure (native soil backfill)	45 pcf
At-rest equivalent fluid pressure (imported sand or gravel backfill)	50 pcf
At-rest equivalent fluid pressure (native soil backfill)	65 pcf
Passive equivalent fluid pressure (compacted fill)	350 pcf
Maximum toe pressure (compacted fill)	2,000 psf
Coefficient of sliding friction (compacted fill)	0.35

3. No surcharges are taken into consideration in the above values. The maximum toe pressure is an *allowable* value to which a factor of safety has been applied. No

factors of safety, load factors, and/or other factors have been applied to any of the remaining values.

4. If the values for imported sand or gravel are used in the design, the sand or gravel should be utilized exclusively as backfill above a 1:1 (horizontal to vertical) plane extended from the base of the wall to daylight.

5. The above pressures are applicable to a horizontal retained surface behind the wall. Walls having a retained surface that slopes upward from the wall should be designed for an additional equivalent fluid pressure of 1 pcf for the active case and 1.5 pcf for the at-rest case, for every degree of slope inclination.

6. Under the CBC, the Risk-Targeted Maximum Considered Earthquake (MCE_R) must be used for determining seismic pressures on walls. Further, CBC Section 1803.5.12.1 requires that dynamic seismic lateral earth pressures be provided by the geotechnical engineer for walls retaining more than 6 feet of backfill. The Earthquake Hazards Program website (USGS, 2013) was used to determine the MCE_R-based Geometric Mean Peak Ground Acceleration (PGA_M) for a Seismic Design Category "D" project. The resulting PGA_M was 1.15g. Then, using the methods presented by Lew et al. (SEAOC, 2010) and this PGA_M, the appropriate incremental increase in lateral soil pressure, above the static active equivalent fluid pressure for flexible (cantilevered) walls, was determined to be 30 pcf for native soil and 40 pcf for imported sand/gravel backfill. Flexible (cantilevered) walls retaining over 6 feet of backfill should be designed using these incremental seismic pressures. Walls retaining 6 feet or less of backfill need not be designed for seismic pressures.

7. Recent research by Al Atik and Sitar (2010) confirmed that for flexible (cantilevered) walls, particularly those over 12 feet tall, an increase in soil pressure does occur under significant seismic accelerations. Further, they found that the increase is due to the out-of-phase interaction between the soil and the flexible wall. When considering rigid walls (i.e. those designed using at-rest criteria); however, they found that the incremental increase due to seismicity was typically less than 50 percent of the static wall pressure. Consequently, no incremental increase in lateral soil pressure is recommended for the design of walls where the static design utilizes the at-rest equivalent fluid pressure and they are designed with factors of safety and earth load factors of at least 1.5.

8. In typical structural design methods for retaining walls such as those found in CBC Section 1605, lateral soil pressure is multiplied by a load factor of 1.6. According to Lew et al. (2010), a load factor of 1.6 is too conservative for seismic loads; this paper suggests that the seismic increase in lateral pressure be separated from the static active pressure and that a load factor of 1.0 be used for the seismic increase. Further, Al Atik and Sitar (2010) found that pressure increases due to seismic earth loads were minimal for walls retaining less than 12 feet of backfill. While the Al Atik and Sitar's research is generally accepted among geotechnical and structural engineers in California, it is not entirely acknowledged by the CBSC, as the CBC sets the height below which seismic loads may be ignored at 6 feet. Given this disparity, it is suggested that caution be used not to over-engineer walls retaining between 6 and 12 feet of backfill.

9. The active and at-rest values presented above are for drained conditions. Consequently, retaining walls should be drained with rigid perforated pipe encased

in a free draining gravel blanket. The pipe should be placed perforations downward and should discharge in a nonerosive manner away from foundations and other improvements. The gravel blanket should have a width of approximately 1-foot and should extend upward to approximately 1-foot from the top of the wall. The upper foot should be backfilled with on-site soil, except in areas where a PCC slab or HMA pavement will abut the top of the wall. In such cases, the gravel backfill should extend up to the material that supports the PCC or the HMA. To reduce infiltration of the soil into the gravel, a permeable synthetic fabric conforming to the Standard Specifications (Caltrans, 2010) Section 88-1.02B – Class "C," should be placed between the two. Manufactured synthetic drains such as Miradrain or Enkadrain are acceptable alternatives to the use of gravel, provided that they are installed in accordance with the recommendations of the manufacturer. Where drainage can be properly controlled, weep holes on maximum 4 foot centers may be used in lieu of perforated pipe. A fabric as described above should be placed between the weep holes and the drain gravel.

10. Retaining walls where moisture transmission through the wall would be undesirable should be *thoroughly* waterproofed in accordance with the specifications of the architect/engineer.

11. The architect/engineer should bear in mind that retaining walls by their nature are flexible structures, and that surface treatments on walls often crack. Where walls are to be plastered or otherwise have a finish applied, the flexibility should be considered in determining the suitability of the surfacing material, spacing of horizontal and vertical control joints, etc. The flexibility should also be considered

where a retaining wall will abut or be connected to a rigid structure, and where the geometry of the wall is such that its flexibility will vary along its length.

Slabs-on-Grade and Exterior Flatwork

1. Conventional interior lightly loaded PCC slabs-on-grade and exterior flatwork should have a minimum thickness of 4 full inches; the thickness of heavily loaded slabs and exterior flatwork should be specified by the architect/engineer. Conventional foundation slabs-on-grade should be doweled to footings and grade beams with dowels.

2. Reinforcement size, placement, and dowels should be as directed by the architect/engineer. Lightly loaded exterior flatwork should be reinforced, at a minimum, with No. 3 rebar at 24 inches on-center each way. Heavily loaded exterior flatwork should have minimum rebar sizing and spacing that meets the criteria of ACI 318, Section 7.12.2. A modulus of subgrade reaction (K_{30}) of 100 psi/inch may be used in the design of heavily loaded slabs-on-grade founded on compacted native soil. The modulus of subgrade reaction (K_{30}) may be increased to 200 psi/inch if the slab is underlain with a minimum of 6 inches of compacted Class 2 AB (Caltrans, 2010), and to 300 psi/inch if the slab is underlain with a minimum of 12 inches of compacted Class 2 AB.

3. Due to the current use of impermeable floor coverings, water-soluble flooring adhesives, and the speed at which buildings are now constructed, moisture vapor transmission through slabs is a much more common problem than in past years. Where moisture vapor transmitted from the underlying soil would be undesirable, the slabs should be protected from subsurface moisture vapor. A number of options

for vapor protection are discussed below; however, the means of vapor protection, including the type and thickness of the vapor retarder, if specified, are left to the discretion of the architect/engineer.

4. Several recent studies, including those of American Concrete Institute (ACI) Committee 302, have concluded that excess water above the vapor retarder increases the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. The studies also concluded that it is preferable to eliminate the typical sand layer beneath the slab and place the slab PCC in direct contact with a Class "A" vapor retarder, particularly during wet weather construction. However, placing the PCC directly on the vapor retarder requires special attention to using the proper vapor retarder, a very low water-cement ratio in the PCC mix, and special finishing and curing techniques.

5. Probably the next most effective option would be the use of vapor-inhibiting admixtures in the slab PCC mix and/or application of a sealer to the surface of the slab. This would also require special PCC mixes and placement procedures, depending upon the recommendations of the admixture or sealer manufacturer.

6. Another option that may be a reasonable compromise between effectiveness and cost considerations is the use of a subslab vapor retarder protected by a sand layer. If a Class "A" vapor retarder is specified, the retarder can be placed directly on the compacted soil material. The retarder should be covered with a minimum 2 inches of *clean* sand. If a less durable vapor retarder is specified (Class "B" or "C"), a minimum of 4 inches of clean sand should be provided, and the retarder should be placed in the center of the clean sand layer. Clean sand is defined as a well or poorly

graded sand (ASTM D 2487-11) of which less than 3 percent passes the No. 200 sieve.

7. Where specified, vapor retarders should conform to ASTM Standard E 1745-11. This standard specifies properties for three performance classes, Class "A", "B" and "C". The appropriate class should be selected based on the sensitivity of floor coverings to moisture intrusion and the potential for damage to the vapor retarder during placement of slab reinforcement and concrete.

8. Regardless of the underslab vapor retarder selected, proper installation of the retarder is critical for optimum performance. All seams must be properly lapped, and all seams and utility penetrations properly sealed in accordance with the vapor retarder manufacturer's recommendations.

9. If sand is used between the vapor retarder and the slab, it should be moistened only as necessary to promote concrete curing; saturation of the sand should be avoided, as the excess moisture would be on top of the vapor retarder, potentially resulting in vapor transmission through the slab for months or years.

10. In conventional construction, it is common to use 4 to 6 inches of sand beneath exterior flatwork. Due to the soil's expansion potential, there will be a risk of movement and damage to such flatwork if conventional measures are used. Heaving and cracking are likely to occur. This movement could be reduced by the placement of a 12 to 18-inch thick layer of compacted, nonexpansive soil beneath the flatwork. Under all flatwork; however, the thicker the nonexpansive soil layer, the better the expansive soil protection. Nonexpansive soils are defined in

paragraph 10 in the "Grading" section of this report.

11. Another measure that can be taken to reduce the risk of movement of flatwork is to provide thickened edges or grade beams around the perimeters of the flatwork. The thickened edges or grade beams could be up to 18 inches deep, with the deeper edges or grade beams providing better protection. At a minimum, the thickened edge or grade beam should be reinforced by two No. 4 rebar, one near the top and one near the bottom.

12. It is recognized that the measures discussed above for protecting exterior flatwork from expansive soils are expensive; possibly more expensive than simply replacing the flatwork that has heaved and/or cracked. Accordingly, the above measures for protecting exterior flatwork should be implemented unless the client's preference is to replace exterior flatwork that is damaged over time. Therefore, the degree to which the exterior flatwork is protected from expansive soil damage is left to the discretion of the client.

13. Flatwork should be constructed with frequent joints to allow articulation as flatwork moves in response to seasonal moisture and/or temperature variations causing minor expansion and contraction of the soil, or variable bearing conditions. The soil in the subgrade should be moistened to at least optimum moisture content and no desiccation cracks should be present prior to casting the flatwork.

14. Where maintaining the elevation of the flatwork is desired, the flatwork should be doweled to the perimeter foundation as specified by the architect/engineer. In other areas, the flatwork may be doweled to the foundation or the flatwork may be

allowed to "float free," at the discretion of the architect/engineer. Flatwork that is intended to float free should be separated from foundations by a felt joint or other means.

15. To reduce shrinkage cracks in PCC, the PCC aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the PCC should be properly placed and finished, contraction joints should be installed, and the PCC should be properly cured. PCC materials, placement, and curing specifications should be at the direction of the architect/engineer. The Guide for Concrete Floor and Slab Construction (ACI, 2004) is suggested as a resource for the architect/engineer in preparing such specifications.

Pavement Sections

The following preliminary pavement sections are based on an assumed R-value of 25. The soil exposed at the access road/driveway subgrade should be tested during construction for R-value to verify that these preliminary pavement sections are appropriate, otherwise revised pavement sections should be prepared. Pavement design sections are provided for assumed Traffic Indices (TI) of 4.5, 5.0, 5.5, 6.0, 6.5, and 7.0. Determination of the appropriate TI for specific areas is left to others. The pavement sections were calculated in accordance with the Highway Design Manual (Caltrans, 2012). The calculated AB and HMA thickness are for compacted material. Normal Caltrans construction tolerances should apply.

R-value	TI	HMA (inches)	Class 2 AB (inches)
25	4.5	2.50	6.00
25	5.0	2.75	7.00
25	5.5	3.00	8.00
25	6.0	3.25	9.00
25	6.5	3.75	10.00
25	7.0	4.00	11.00

1. The upper 12 inches of subgrade and all AB (Caltrans, 2010) should be compacted to a minimum of 95 percent of maximum dry density.

2. Subgrade and AB should be firm and unyielding when proof-rolled by heavy rubber-tired equipment prior to paving.

3. To provide stability for curbs, they should be set back a minimum of 3 feet from the tops of slopes, or the curbs should be deepened to provide stability. The geotechnical engineer should review all conditions where curbs are deepened to provide stability.

4. Where HMA will lie within 5 feet of LID drainage improvements such as bioswales, infiltration basins, etc., the HMA should be separated from the LID drainage improvements by deepened curbs or other means that will reduce the potential for moisture fluctuations in the soils beneath the HMA. Curbs or other water cut off measures use to separate the HMA from the LID drainage improvement should penetrate a minimum of 12 inches below the invert of the LID drainage improvement.

5. Finished HMA surfaces should slope toward drainage facilities such that rapid runoff will occur and no ponding is allowed on or adjacent to the HMA.

Swimming Pools

We have assumed that the pools will be of reinforced gunite construction, will be no deeper than 5 feet below surrounding grades, and will bear in medium expansive soils.

1. Pool design should be based on the "medium" expansion category per ASTM D 4829-11. If specific lateral pressures are needed for the design, please refer to the "Retaining Walls" section of this report for values.

2. The soil should be overexcavated as needed to allow for the placement of a minimum of a 12-inch thick gravel bed beneath the pool shell. Clean, free-draining, crushed gravel should then be placed in the excavation, up to the bottom-of-shell elevation. As the gravel will act as a cushion as well as a drain, a collection point and drain pipe should be installed to discharge the water from under the pool. A hydrostatic relief valve should also be provided to protect the pool shell from floating in the event of a failure in the drain system.

3. As a minimum, the upper 12 inches of soil placed beneath the pool decks should be nonexpansive (as defined in paragraph 10 of the "Grading" section of this report) or 12 inches of gravel can be used. Flexible joints should be used between the deck and the coping. All joints in the pool deck should be sealed.

Drainage and Maintenance

1. Per CBC Section 1804.3 (CBSC, 2013), unpaved ground surfaces should be *finish graded* to direct surface runoff away from foundations and other improvements at a minimum 5 percent grade for a minimum distance of 10 feet. The site should be similarly sloped to drain away from foundations, slopes, and other improvements during construction. Where this is not practicable due to property lines, other improvements, etc., swales with improved surfaces, area drains, or other drainage facilities, should be used to collect and discharge runoff.

2. To reduce the potential for planter drainage from gaining access to subslab areas, any raised planter boxes adjacent to foundations should be installed with drains and sealed sides and bottoms. Drains should also be provided for areas adjacent to the foundations that would not otherwise freely drain.

3. The eaves of the buildings should be fitted with roof gutters. Runoff from flatwork, roof gutters, downspouts, planter drains, area drains, etc. should discharge in a nonerosive manner away from foundations and other improvements in accordance with the requirements of the governing agencies.

4. The on-site soils are highly erodible; stabilization of soils disturbed during construction by vegetation or other means *during* and *following* construction, is essential to reduce erosion damage. Care should be taken to establish and maintain vegetation. The landscaping should be planned and installed to maintain the surface drainage recommended above. Surface drainage should also be maintained during construction.

5. To reduce migration of surface drainage into the subgrade, maintenance of pavement areas is critical. Any cracks that develop in the pavement should be promptly sealed.

6. The owner or site maintenance personnel should periodically observe the areas within and around the site for indications of rodent activity and soil instability. The owner or site maintenance personnel should also implement an aggressive program for controlling the rodent activity in the general area.

Construction Observation and Testing

1. It must be recognized that the recommendations contained in this report are based on a limited number of borings and CPT soundings, and rely on continuity of the subsurface conditions encountered. It is assumed that the geotechnical engineer will be retained to provide consultation during the design phase, to review final plans once they are available, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

2. At a minimum, the geotechnical engineer should be retained to provide:
    - Review of final grading, utility, and foundation plans
    - Professional observation during grading, foundation excavations, and trench backfill
    - Oversight of compaction testing during grading
    - Oversight of special inspection during grading

3. Special inspection of grading and backfill should be provided as per CBC Section 1705.6 and CBC Table 1705.6 (CBSC, 2013). In our opinion, none of the grading

construction is of a nature that should require continuous special inspection; subject to approval by the Building Official, periodic special inspection should suffice. The special inspector should be under the direction of the geotechnical engineer. At a minimum, the following items should be inspected and/or tested by the special inspector:

- Stripping and clearing of vegetation
- Overexcavation to the recommended depths
- Scarification, moisture conditioning, and compaction of the soil
- Geogrid placement
- Fill quality, placement, and compaction
- Utility trench backfill
- Retaining wall drains and backfill
- Foundation excavations
- Subgrade and AB compaction and proof-rolling

4. A program of quality control should be developed prior to beginning grading. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

5. Locations and frequency of compaction tests should be as per the recommendation of the geotechnical engineer at the time of construction. The recommended test location and frequency may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

6. A preconstruction conference among the owner, the geotechnical engineer, the City of Goleta, the special inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements.

7. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

9.0 CLOSURE

Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section of this report. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge.

If changes with respect to development type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. Any items not specifically addressed in this report shall comply with the CBC (CBSC, 2013) and the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon the geotechnical conditions encountered at the site, and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by the geotechnical engineer based on conditions exposed at the time of construction.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. This report shall be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text

REFERENCES

ASCE (American Society of Civil Engineers). 2013. *Minimum Design Loads for Buildings and other Structures (7-10, third printing)*. Standards ASCE/SEI 7-10, ASCE.

ASTM (American Society for Testing Materials). 2013. *Annual Book of Standards*. ASTM.

CBSC (California Building Standards Commission). 2013. *California Building Code (CBC)*. CBSC.

California Division of Mines and Geology. [1997] 2008. *Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication* 117. California Division of Mines and Geology.

Cal/OSHA *"Pocket Guide for the Construction Industry - Excavation, Trenches, and Earthwork."* 2007. Cal/OSHA

Caltrans (California Department of Transportation). 2010. "Standard Specifications." Caltrans.

Caltrans (California Department of Transportation). 2012 "Highway Design Manual." Caltrans.

Europa Technologies. 2013. U.S. Department of State Geographer. *Google Earth Website*. Retrieved from: http://www.google.com/earth/index.html

SBC (Santa Barbara County Department of Public Works Transportation Division). 2011 *"Engineering Design Standards."* SBC.

USGS (United States Geological Survey). 2013. "Earthquake Hazards Program." United States Geological Survey. Retrieved from: http://www.earthquake.usgs.gov/hazards/designmaps/

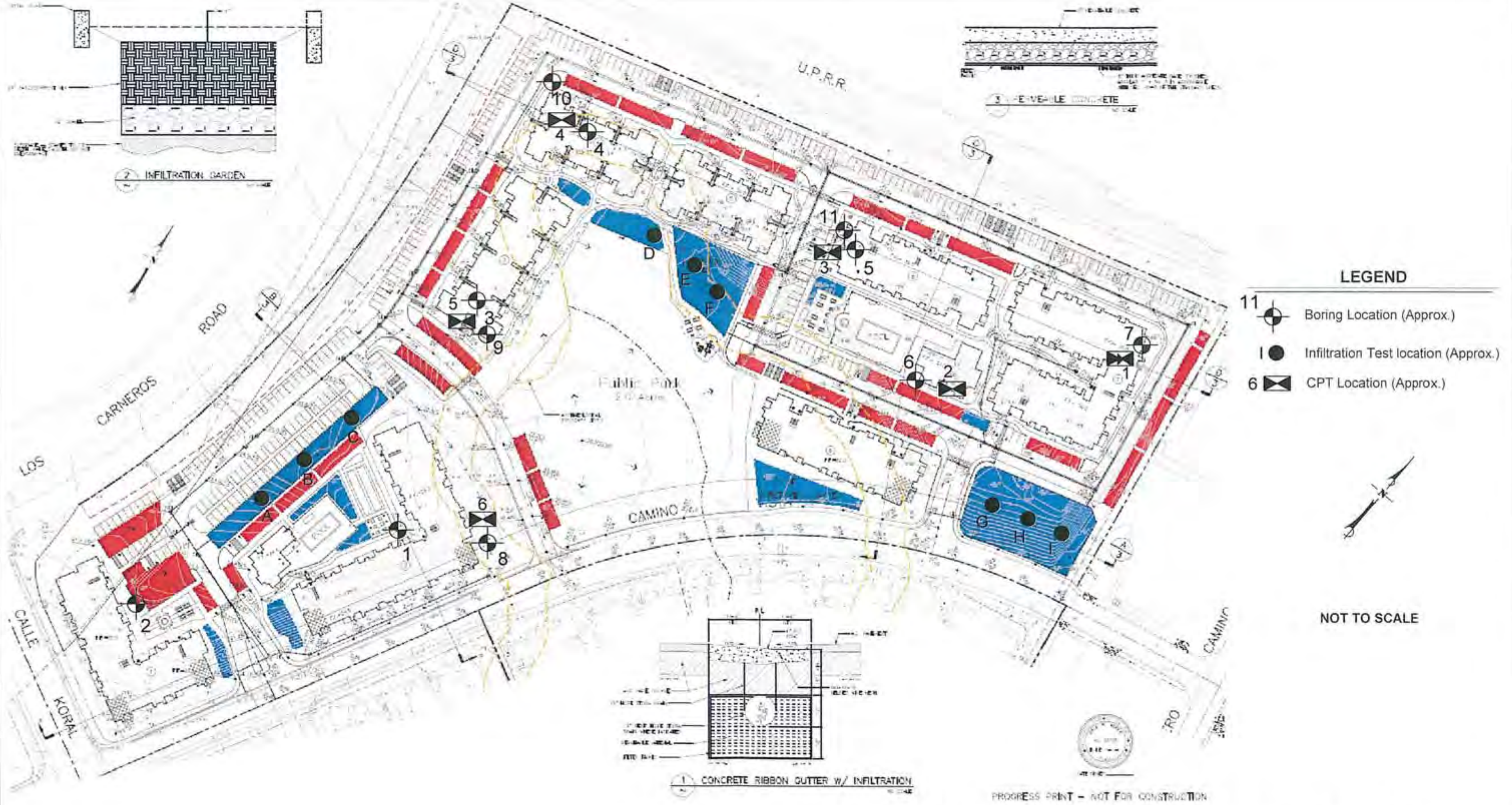
APPENDIX A

Boring, CPT, and Infiltration Test Location Map

Boring Log Legend

Boring Logs

Graphical CPT Data



BORING, CPT, AND INFILTRATION TEST LOCATION MAP

HERITAGE RIDGE APARTMENTS

North of Calle Koral and Camino Vista
Goleta, California

Base Map Provided by: MAC Design Associates

Earth Systems Pacific

2049 North Preisker Lane, Suite E
Santa Maria, California 93454
(805) 928-2991 • FAX (805) 928-9253
E-mail: esc@earthsys.com

April 30, 2014

SMK

SL-15702-SF

WILLOW SPRINGS NORTH APTS BLM 4-30-2014.dwg

Earth Systems Pacific

BORING LOG LEGEND

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	▦
STANDARD PENETRATION TEST (SPT)	●
SHELBY TUBE	▭
BULK	○
SUBSURFACE WATER DURING DRILLING	▼
SUBSURFACE WATER AFTER DRILLING	▽

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS	MORE THAN HALF OF MATERIAL IS TESTED OR JUDGED TO BE LARGER THAN #200 SIEVE SIZE	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	○
		GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	⬡
		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	▥
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	⬡
		SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	▓
		SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	░
		SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	▥
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	▩
FINE GRAINED SOILS	HALF OR MORE OF MATERIAL IS TESTED OR JUDGED TO BE SMALLER THAN #200 SIEVE SIZE	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY, CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY	▥
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	▧
		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	┅
		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY, SILTY SOILS, ELASTIC SILTS	▥
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	▧
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	▦
		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	▽

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET
LITTLE/NO MOISTURE	JUDGED BELOW OPTIMUM	JUDGED ABOUT OPTIMUM	JUDGED OVER OPTIMUM	SATURATED

TYPICAL CONSISTENCY

COARSE GRAINED SOILS

BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER	
0-10	0-16	LOOSE
11-30	17-50	MEDIUM DENSE
31-50	51-83	DENSE
OVER 50	OVER 83	VERY DENSE

FINE GRAINED SOILS

BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER	
0-2	0-3	VERY SOFT
3-4	4-7	SOFT
5-8	8-13	MEDIUM STIFF
9-15	14-25	STIFF
16-30	26-50	VERY STIFF
OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL ROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL ROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
FRESH	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM; SOME FRACTURES PRESENT; FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY"; FELDSPAR CRYSTALS ARE "CLOUDY"
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

drafting/masters/Boring Log Legend091608.dwg

Earth Systems Pacific

Boring No. 1

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: orange brown, moist, loose, some fine to coarse gravel (Fill)					
5				5.0-6.5	●			2 2 4
10	SP		POORLY GRADED SAND: gray, moist, loose, trace clay (Alluvium)	10.0-11.5	●			3 4 4
15			medium dense	15.0-16.5	■	109.6	10.6	3 11 17
17			increasing clay content					
20	CL		SANDY LEAN CLAY: orange brown, moist, very stiff	20.0-21.5	■	114.1	13.8	2 12 11
25			hard	25.0-26.5	■	116.9	7.9	5 31 49
26.5			End of Boring @ 26.5' No subsurface water encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: brown, slightly moist, medium dense, trace fine gravel (Fill)					
5			moist	5.0-6.5	●			7 8 10
10	SP		POORLY GRADED SAND: gray, moist, medium dense (Alluvium)	10.0-11.5	●			9 12 11
15	CL		SANDY LEAN CLAY: brown, moist, very stiff	15.0-16.5	■	122.9	11.8	4 12 25
20				20.0-21.5	■	114.8	16.4	4 16 27
21.5			interlayered with thin lenses of poorly graded sand					
25				25.0-26.5	■	117.0	14.3	4 14 23
26.5			End of Boring @ 26.5' No subsurface water encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 3

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0 1 2 3	SC	▨	CLAYEY SAND: yellow brown, moist, medium dense, trace fine gravel, trace organics (Fill)					
4 5 6		▨	increasing clay content	5.0-6.5	▬	117.5	9.9	6 15 16
				6-10	○			
7 8 9 10 11 12 13 14	SC	▨	CLAYEY SAND: brown, moist, medium dense (Alluvium)	10.0-11.5	▬	109.7	18.7	7 15 31
15 16		▨		15.0-16.5	●			8 8 14
17 18 19 20 21 22 23 24 25 26			End of Boring @ 16.5' No subsurface water encountered					

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 4

PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 2/25/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: orange brown, slightly moist, loose, trace fine gravel (Fill)	1-5	○			
3		▨	moist, medium dense	5.0-6.5	▬	103.4	7.5	10 11 12
7	SC	▨	CLAYEY SAND: brown, moist, medium dense (Alluvium)	10.0-11.5	●			11 11 10
11		▨	red brown, increasing clay content	15.0-16.5	●			8 8 7
17			End of Boring @ 16.5' No subsurface water encountered					

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 5

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: brown, moist, loose, trace fine to coarse gravel (Fill)					
1		▨						
2		▨						
3		▨						
4		▨						
5		▨		5.0-6.5	●			3 2 2
6		▨						
7		▨						
8		▨						
9		▨	dense, some fine gravel					
10		▨		10.0-11.5	■	126.4	9.5	9 30 50
11		▨						
12		▨						
13		▨	some concrete and organic debris					
14		▨						
15	SC	▨	CLAYEY SAND: dark brown, moist, medium dense (Alluvium)	15.0-16.5	■	126.9	8.4	11 19 22
16		▨						
17			End of Boring @ 16.5' No subsurface water encountered					
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 6

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: orange brown, moist, medium dense, trace coarse gravel (Fill)					
5				5.0-6.5	●			15 8 9
10			dark brown, loose	10.0-11.5	●			5 4 2
13	SC		CLAYEY SAND: dark brown, moist, medium dense (Alluvium)					
15				15.0-16.5	▬	114.5	11.3	4 9 9
18	SP		POORLY GRADED SAND: gray, moist, medium dense					
20				20.0-21.5	▬	99.2	10.3	4 8 9
20.5	CL		SANDY LEAN CLAY: brown, moist, stiff					
25			▽ gray, wet, very soft, interlayered with thin lenses of well graded sand	25.0-26.5	●			0 1 1
26.5			End of Boring @ 26.5' Subsurface water encountered at 25.0'					

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 7

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 2
JOB NO.: SL-15702-SF
DATE: 2/26/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: orange brown, loose, moist, some fine to coarse gravel (Fill)					
5				5.0-6.5	●			4 3 3
10				10.0-11.5	●			4 3 4
12			light brown, increasing clay content					
14	SC		CLAYEY SAND: dark brown, medium dense, moist (Alluvium)	14-17	○			
15				15.0-16.5	▬	115.2	12.7	10 15 23
20	CL		SANDY LEAN CLAY: brown, stiff, moist	20.0-21.5	▬	111.5	13.4	5 7 14
22.5			wet ▽					
25				25.0-26.5	▬	108.9	24.7	4 5 9

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 7

PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 2/26/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	CL	▨	SANDY LEAN CLAY: as above					
30		▨	interlayered with thin lenses of poorly graded sand	30.0-31.5	●			4 6 8
35		▨	gray/brown mottled, trace organics	35.0-36.5	●			0 4 7
40		▨		40.0-41.5	●			1 4 7
45		▨	very stiff	45.0-46.5	●			5 8 8
50		▨	stiff	50.0-51.5	●			3 5 7
51.5			End of Boring @ 51.5' Subsurface water encountered @ 22.5'					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 8

PAGE 1 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: dark brown, medium dense, moist, trace coarse gravel (Fill)					
4.5	SC		CLAYEY SAND: dark gray brown, medium dense, moist, trace fine gravel (Alluvium)					
7	CL		SANDY LEAN CLAY: brown, stiff, moist, trace fine roots					
12			increasing sand content					
14			decreasing sand content					
19	SP		POORLY GRADED SAND: brown, medium dense, moist					
20.5			light yellow brown					
24.5			loose, wet, trace fine to coarse gravel ▽	25.0-26.5	●			1 2 3

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 8

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 2 OF 2
JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: as above					
30			dense	30.0-31.5	●			8 18 23
35	ML		SANDY SILT: green gray, hard, moist, trace clay, trace fine shells	35.0-36.5	●			8 16 20
40				40.0-41.5	●			7 15 26
45			very stiff	45.0-46.5	●			7 12 16
50				50.0-51.5	●			6 12 18
52			End of Boring @ 51.5' Subsurface water encountered between 24.5' & 34.5'					

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 9

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 2
JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: dark brown, medium dense, moist, trace fine gravel, trace brick fragments and debris (Fill)					
5	CL	▨	SANDY LEAN CLAY: brown, stiff, moist (Alluvium)					
12	SC	▨	CLAYEY SAND: orange brown, medium dense, moist					
18.5	SP	░	POORLY GRADED SAND: yellow brown, dense, moist					

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 9

PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: as above					
29			loose, wet ▽					
30				30.0-31.5	●			2 3 6
35	SM		SILTY SAND: light gray/light orange brown mottled, medium dense, wet	35.0-36.5	●			5 9 11
37	ML		SANDY SILT: dark gray, very stiff, moist, trace fine shells					
40				40.0-41.5	●			5 10 14
45				45.0-46.5	●			4 8 13
50				50.0-51.5	●			5 11 15
51.5			End of Boring @ 51.5' Subsurface water encountered between 29.0' & 37.0'					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

Earth Systems Pacific

Boring No. 10

PAGE 1 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: orange brown, medium dense, moist (Fill)					
6	ML	▨	SILTY SAND: brown, medium dense, moist, trace clay (Alluvium)					
14	SC	▨	CLAYEY SAND: brown, medium dense, moist					

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 10

PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SC		CLAYEY SAND: as above					
30	SP		POORLY GRADED SAND: light brown, medium dense, moist					
36	SM		SILTY SAND: light brown, dense, wet ▽					
40				40.0-41.5	●			5 13 19
41.5			End of Boring @ 41.5' Subsurface water encountered at 36.0'					

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 11

PAGE 1 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: brown, loose, slightly moist, trace fine to coarse gravel (Fill)					
1								
2								
3								
4								
5								
6								
7			moist					
8								
9								
10								
11								
12								
13								
14								
15	SM		SILTY SAND WITH CLAY: dark gray brown, medium dense, moist, trace clay (Alluvium)					
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 11

PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: gray brown, medium dense, very moist					
30	CL		SANDY LEAN CLAY: dark brown, stiff, moist					
38	SC		▼ CLAYEY SAND: brown to dark brown, loose, wet, trace silt					
40				40.0-41.5	●			1 4 3
45	CL		SANDY LEAN CLAY: dark gray/olive brown mottled, very stiff, very moist, trace organics, some silt	45.0-46.5	●			2 7 9
49	SC		CLAYEY SAND: dark gray/olive brown mottled, loose, wet					
50				50.0-51.5	●			1 6 6
51.5			End of Boring @ 51.5' Subsurface water encountered between 38.0' to 45.0' and 49.0'					

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

APPENDIX B

Laboratory Test Results

Heritage Ridge Apartments SL-15702-SF

BULK DENSITY TEST RESULTS

ASTM D 2937-10 (modified for ring liners)

March 17, 2014

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1	16.0 - 16.5	10.6	121.2	109.6
1	21.0 - 21.5	13.8	129.9	114.1
1	26.0 - 26.5	7.9	126.2	116.9
2	16.0 - 16.5	11.8	137.4	122.9
2	21.0 - 21.5	16.4	133.6	114.8
2	26.0 - 26.5	14.3	133.7	117.0
3	6.0 - 6.5	9.9	129.1	117.5
3	11.0 - 11.5	18.7	130.3	109.7
4	6.0 - 6.5	7.5	111.2	103.4
5	11.0 - 11.5	9.5	138.4	126.4
5	16.0 - 16.5	8.4	137.6	126.9
6	16.0 - 16.5	11.3	127.5	114.5
6	21.0 - 21.5	10.3	109.5	99.2
7	16.0 - 16.5	12.7	129.7	115.2
7	21.0 - 21.5	13.4	126.5	111.5
7	26.0 - 26.5	24.7	135.8	108.9

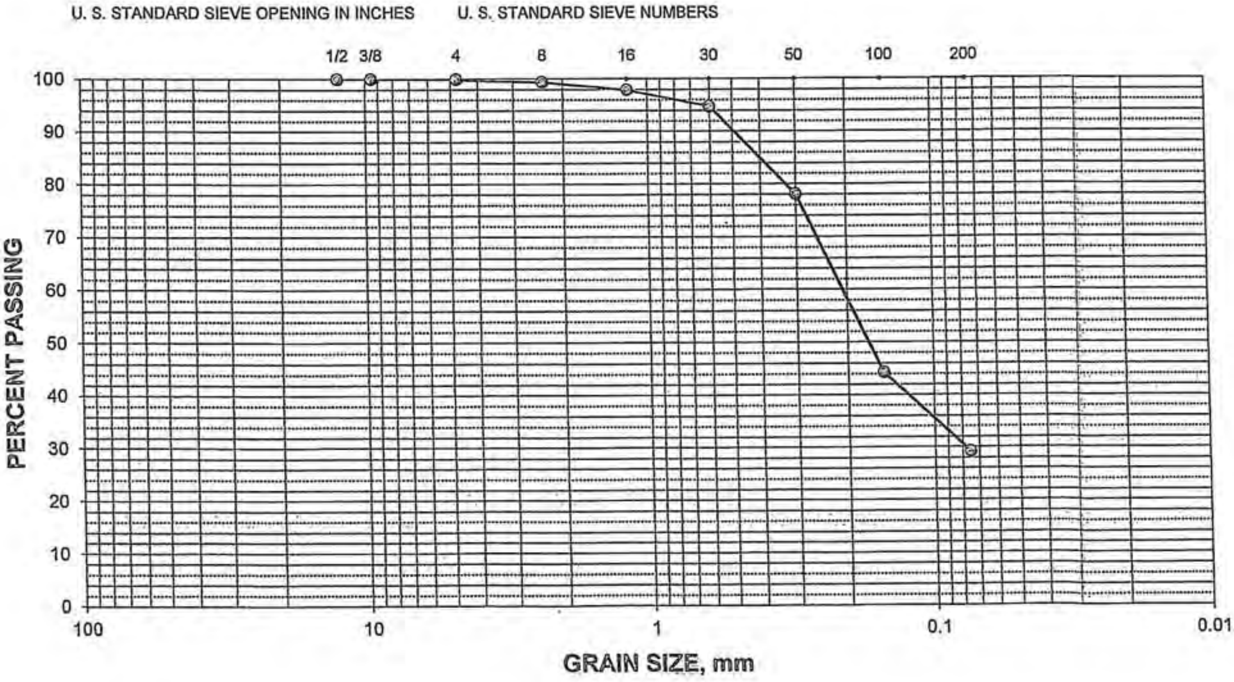
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-00/06

Boring #3 @ 6.0 - 10.0'
Clayey Sand (SC)

March 17, 2014

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	2	98
#30 (600-µm)	5	95
#50 (300-µm)	22	78
#100 (150-µm)	56	44
#200 (75-µm)	71	29



MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12

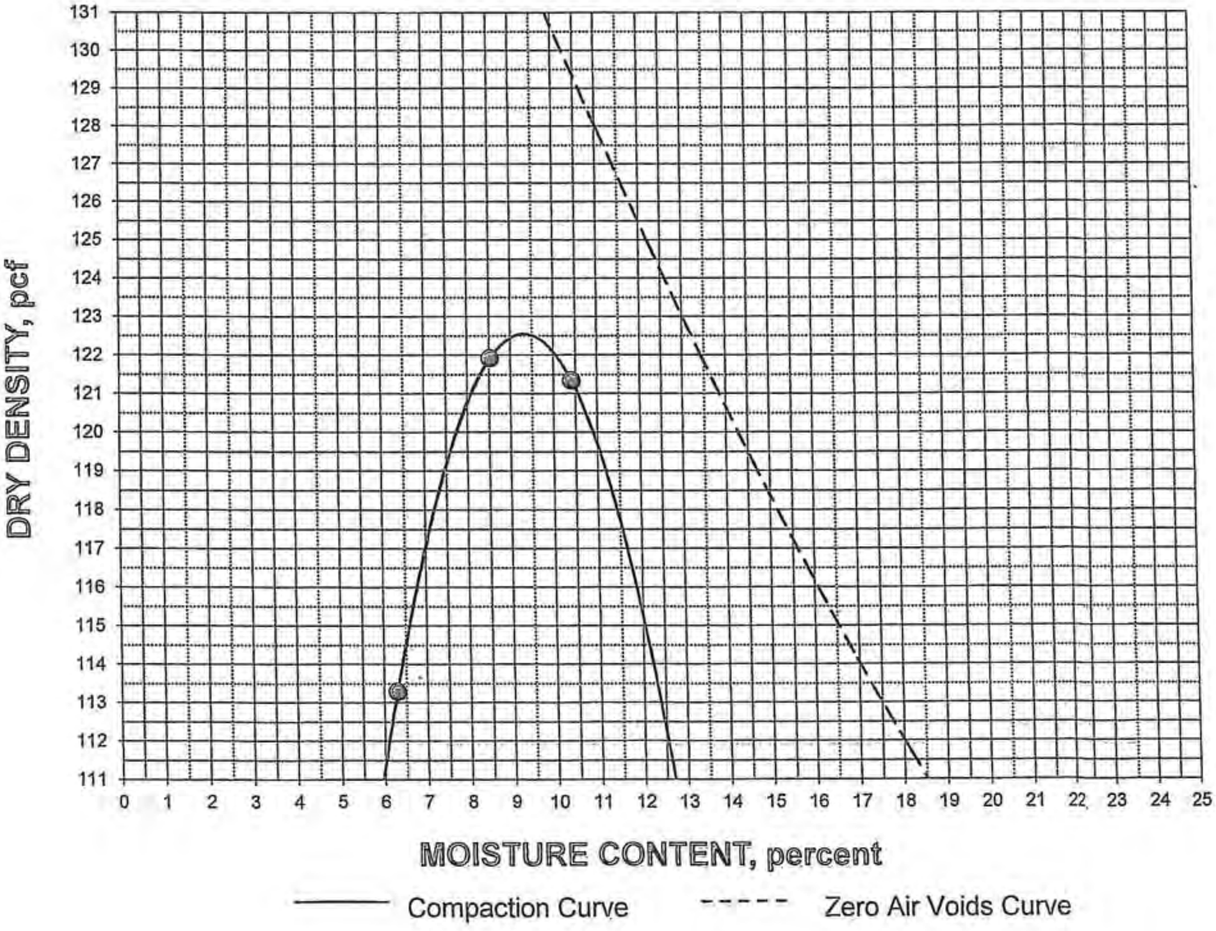
PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.65 (assumed)

March 17, 2014
Boring #3 @ 6.0 - 10.0'
Clayey Sand (SC)

MAXIMUM DRY DENSITY: 122.5 pcf
OPTIMUM MOISTURE: 9.3%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0



DIRECT SHEAR

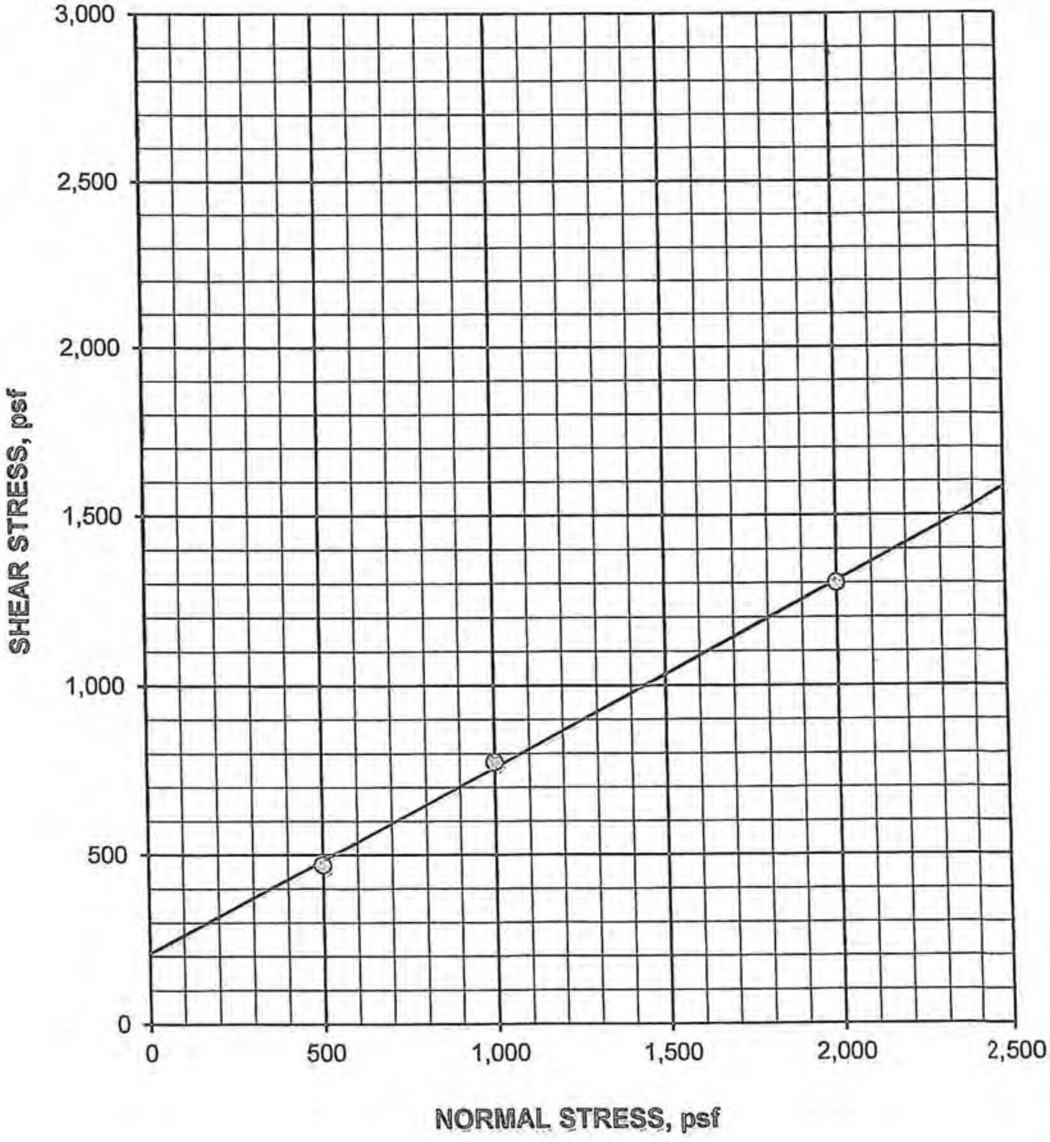
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

March 17, 2014

Boring #3 @ 6.0 - 10.0'
Clayey Sand (SC)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 110.3 pcf
INITIAL MOISTURE CONTENT: 9.3 %
PEAK SHEAR ANGLE (Ø): 29°
COHESION (C): 208 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #3 @ 6.0 - 10.0'

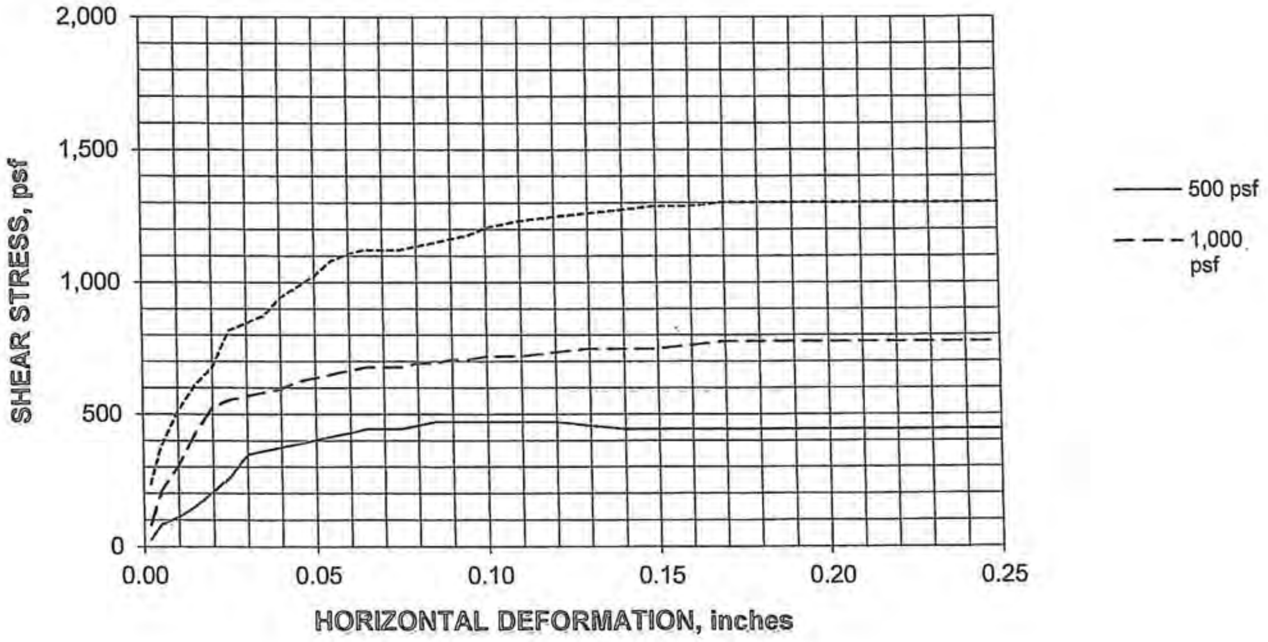
March 17, 2014

Clayey Sand (SC)

Compacted to 90% RC, saturated

SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	9.3	9.3	9.3	9.3
DRY DENSITY, pcf	110.3	110.3	110.3	110.3
SATURATION, %	49.4	49.4	49.4	49.4
VOID RATIO	0.499	0.499	0.499	0.499
DIAMETER, inches	2.375	2.375	2.375	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	19.4	19.8	19.9	
DRY DENSITY, pcf	111.4	112.8	117.6	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.484	0.466	0.406	
HEIGHT, inches	0.99	0.98	0.94	



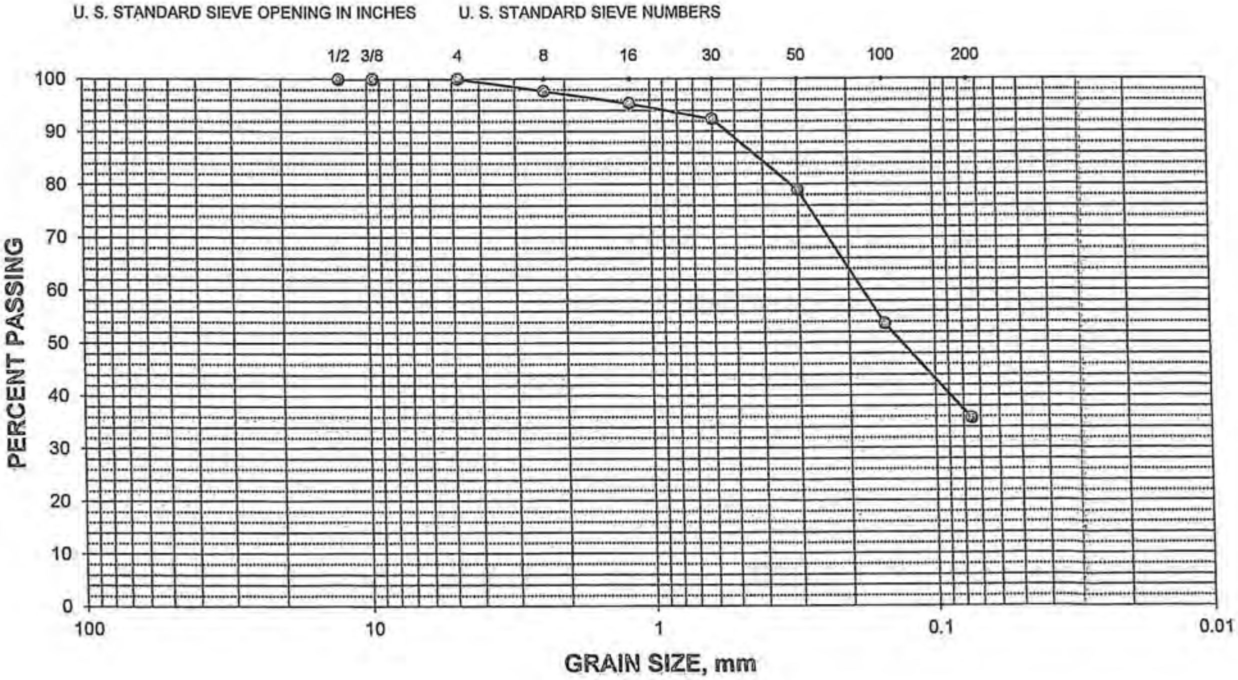
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-00/06

Boring #4 @ 1.0 - 5.0'
Clayey Sand (SC)

March 17, 2014

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	2	98
#16 (1.18-mm)	5	95
#30 (600-µm)	8	92
#50 (300-µm)	21	79
#100 (150-µm)	46	54
#200 (75-µm)	64	36



MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

March 17, 2014

Boring #4 @ 1.0 - 5.0'

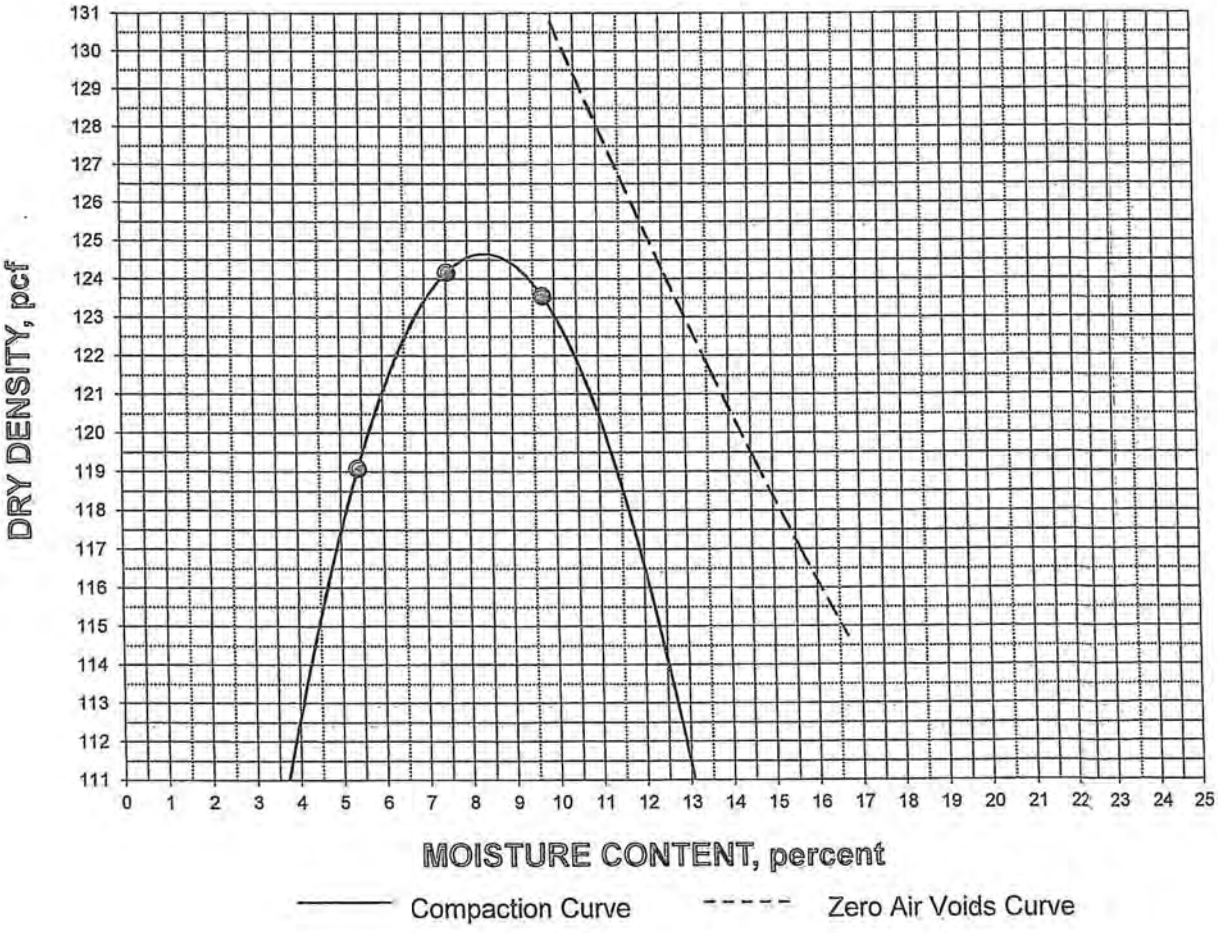
Clayey Sand (SC)

MAXIMUM DRY DENSITY: 124.6 pcf

OPTIMUM MOISTURE: 8.4%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0



DIRECT SHEAR

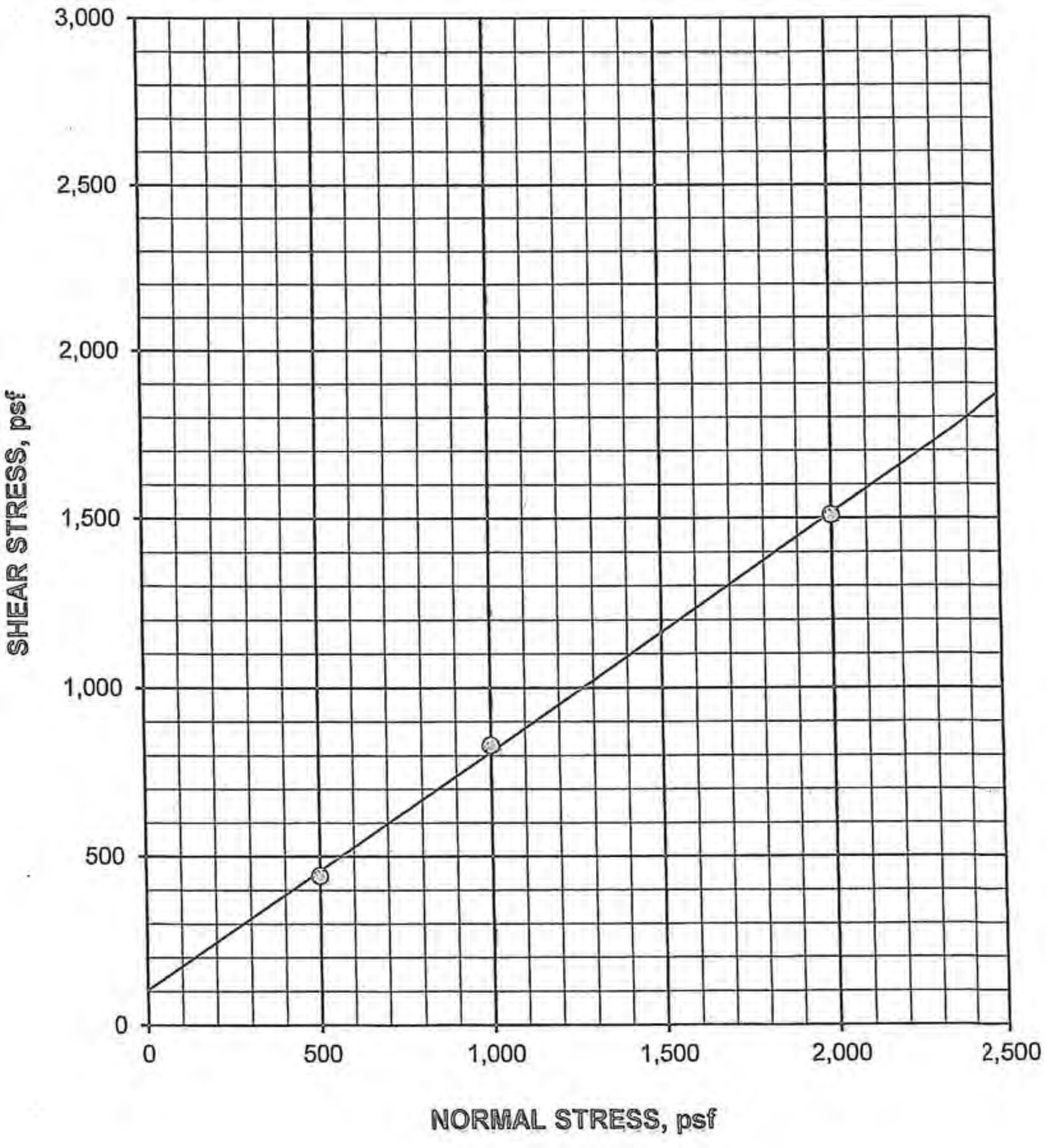
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

March 17, 2014

Boring #4 @ 1.0 - 5.0'
Clayey Sand (SC)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 112.2 pcf
INITIAL MOISTURE CONTENT: 8.4 %
PEAK SHEAR ANGLE (Ø): 35°
COHESION (C): 104 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #4 @ 1.0 - 5.0'

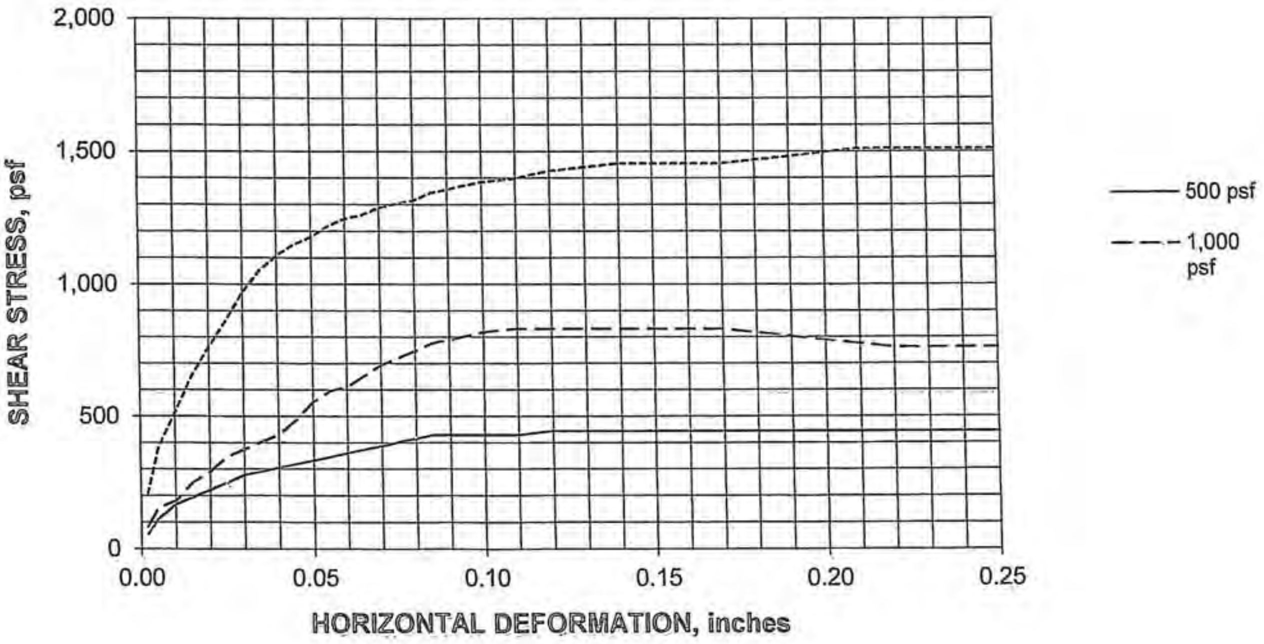
March 17, 2014

Clayey Sand (SC)

Compacted to 90% RC, saturated

SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	8.4	8.4	8.4	8.4
DRY DENSITY, pcf	112.2	112.2	112.2	112.2
SATURATION, %	47.0	47.0	47.0	47.0
VOID RATIO	0.474	0.474	0.474	0.474
DIAMETER, inches	2.375	2.375	2.375	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	18.0	17.6	17.0	
DRY DENSITY, pcf	113.0	113.9	119.0	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.464	0.452	0.390	
HEIGHT, inches	0.99	0.99	0.94	



CONSOLIDATION TEST

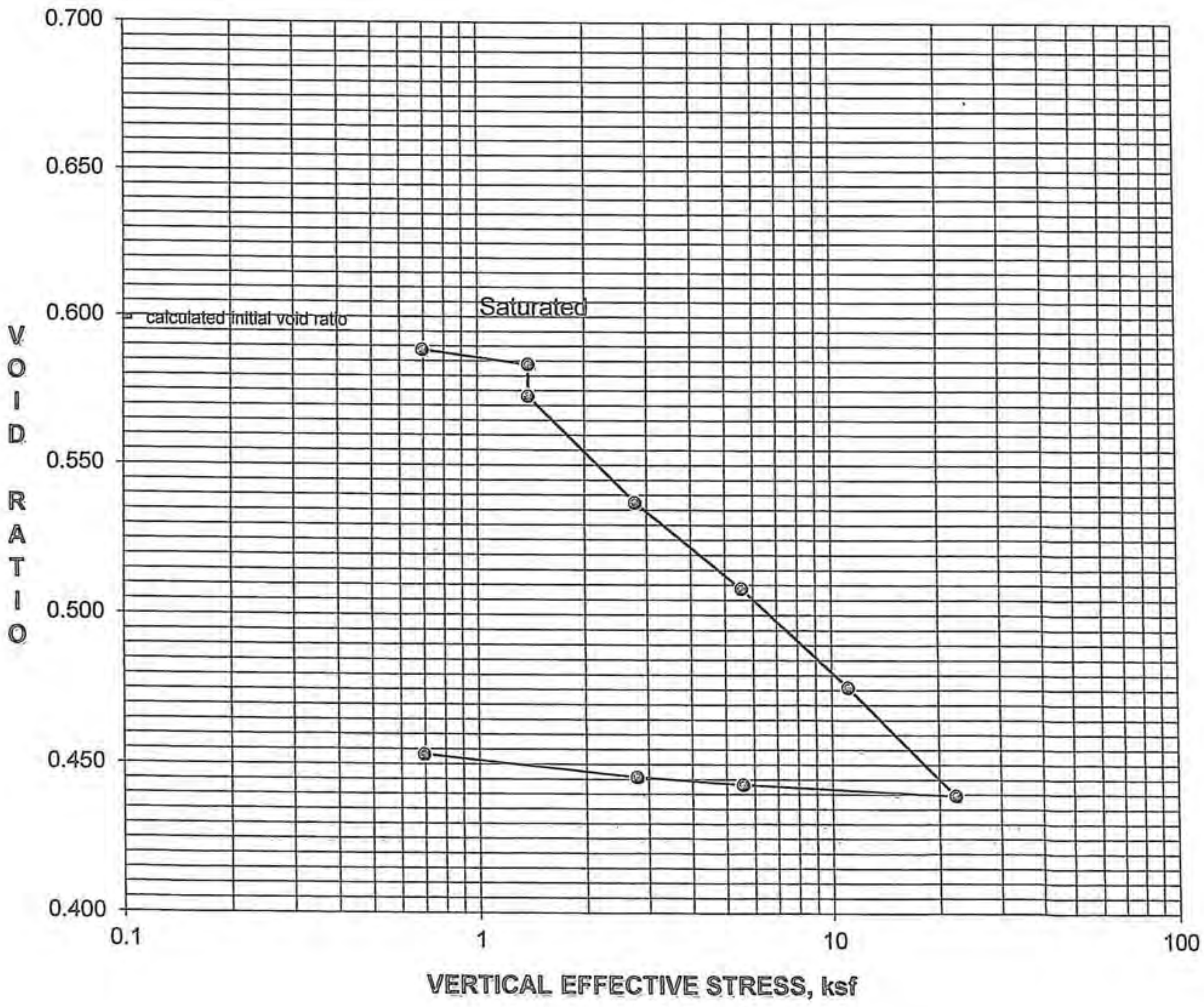
ASTM D 2435/D2435M-11

March 17, 2014

Boring #4 @ 6.0 - 6.5'
Clayey Sand (SC)
Ring Sample

DRY DENSITY: 103.5 pcf
MOISTURE CONTENT: 7.5%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.599

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



CONSOLIDATION TEST

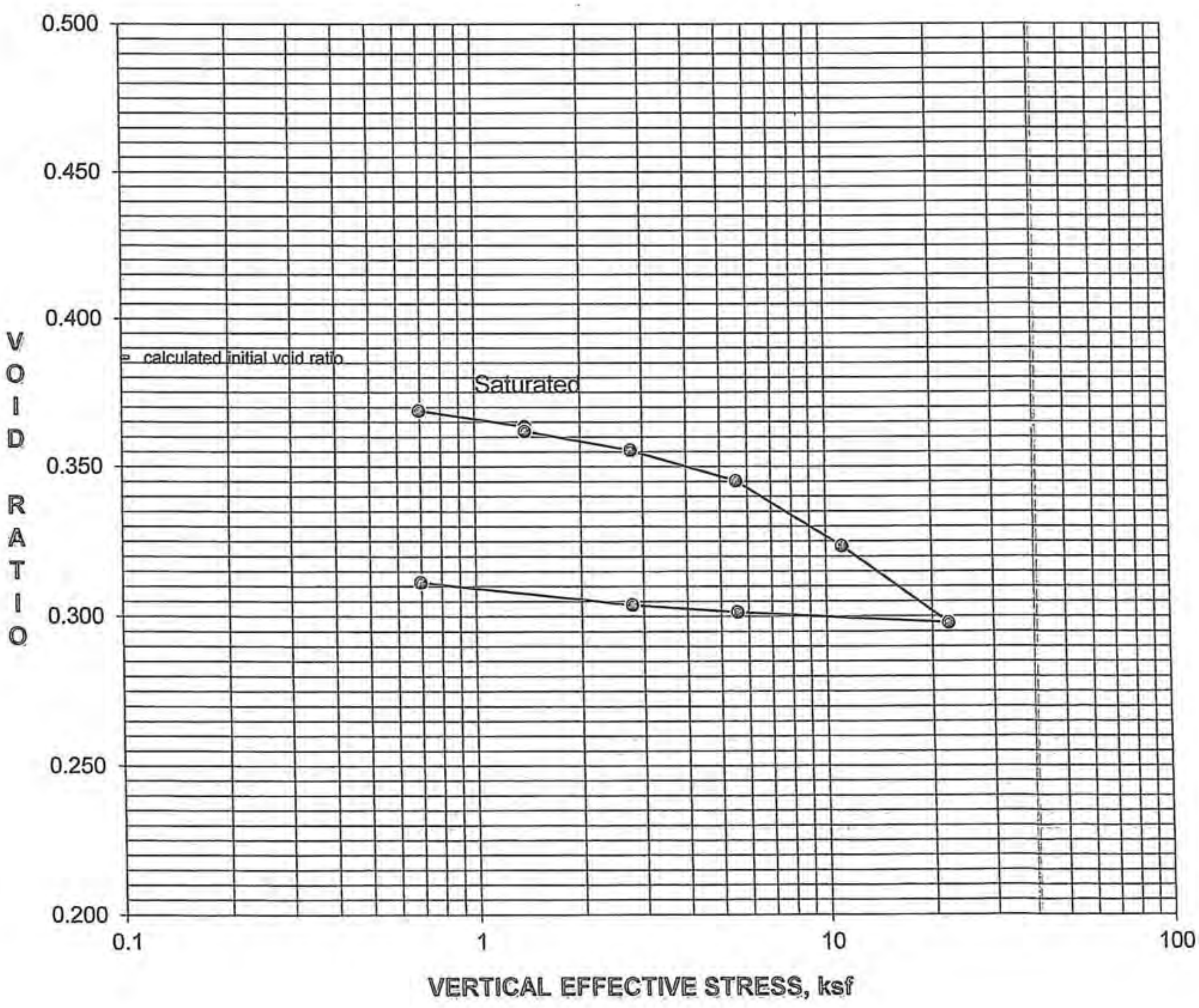
ASTM D 2435/D2435M-11

March 17, 2014

Boring #6 @ 16.0 - 16.5'
Clayey Sand (SC)
Ring Sample

DRY DENSITY: 119.3 pcf
MOISTURE CONTENT: 11.3%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.387

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



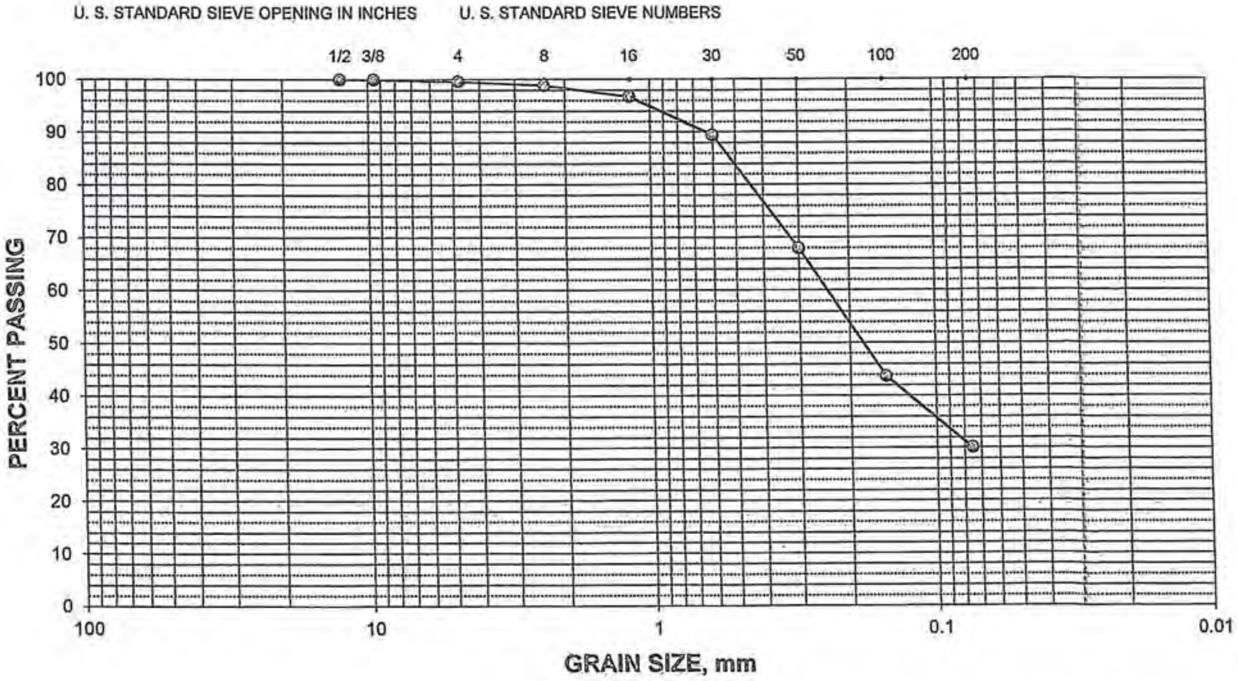
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-00/06

Boring #7 @ 30.0 - 31.5'
Clayey Sand (SC)

March 17, 2014

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	3	97
#30 (600-µm)	11	89
#50 (300-µm)	32	68
#100 (150-µm)	56	44
#200 (75-µm)	70	30



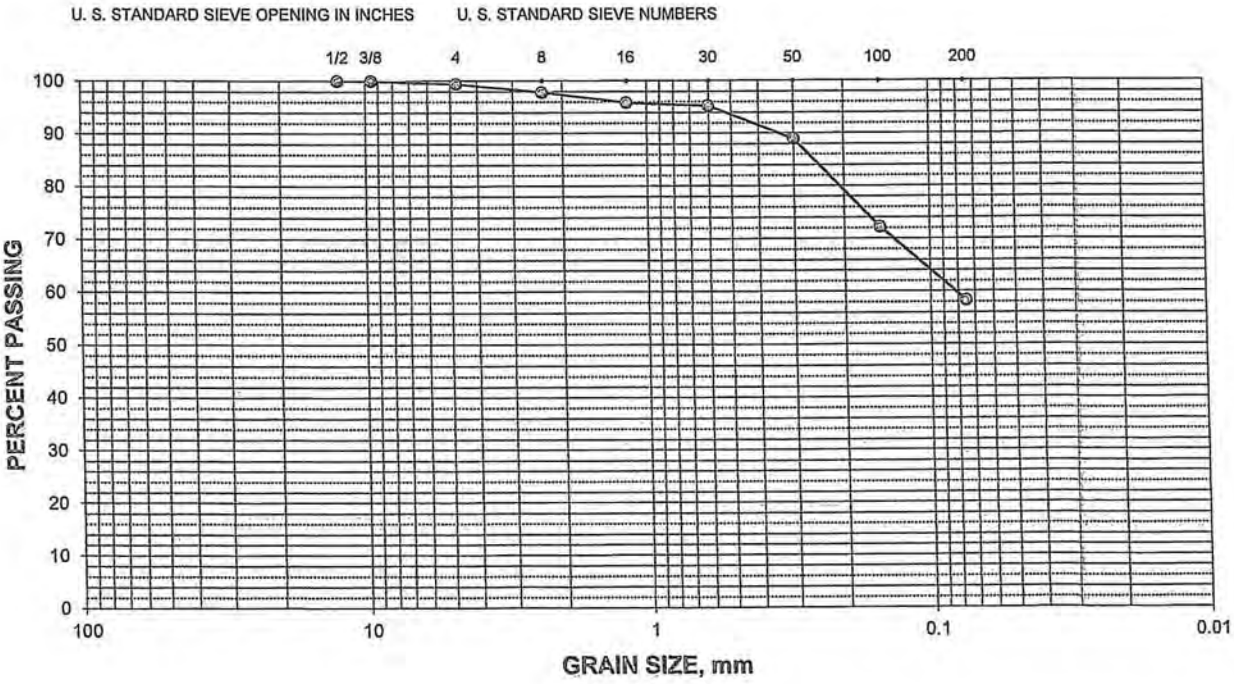
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-00/06

Boring #7 @ 40.0 - 41.5'
Sandy Lean Clay (CL)

March 17, 2014

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	2	98
#16 (1.18-mm)	4	96
#30 (600-µm)	5	95
#50 (300-µm)	11	89
#100 (150-µm)	28	72
#200 (75-µm)	42	58



APPENDIX C

Corrosion Evaluation Report
Prepared by Cerco Analytical

California State Certified Laboratory No. 2153

1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 [illegible] Fax. 925 [illegible]
www.cercoanalytical.com

13 March, 2014

Job No.1403033
Cust. No.12651

Mr. Doug Dunham, P.E., G.E.
Earth Systems Pacific
2049 Preisker Lane, Suite E
Santa Maria, CA 93454

Subject: Project No.: SL-15702-SF
Project Name: Willow Springs North, Goleta, CA
Corrosivity Analysis – CalTrans Test Methods

Dear Mr. Dunham:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on March 03, 2014. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.001 is classified as "corrosive" and Sample No.002 is classified as "moderately corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations ranged from 28 to 73 mg/kg and are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations ranged from 150 to 160 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils ranged from 8.25 to 8.26, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

Cheryl McMillen for

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

rnia State Certified Laboratory No. 2153

CERCO
analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

ient: Earth Systems Pacific
ient's Project No.: SL-15702-SF
ient's Project Name: Willow Springs North, Goleta, CA
ate Sampled: 25-Feb-14
ate Received: 6-Mar-14
atrix: Soil
ithorization: Letter Dated March 03, 2014

Date of Report: 13-Mar-2014

Job/Sample No.	Sample I.D.	Moisture (%)	pH	Min.Resistivity (ohms-cm)**	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1403033-001	Boring 3 (B-3) @ 6-10'	-	8.26	1,400	-	28	150
1403033-002	Boring 4 (B-4) @ 1-5'	-	8.25	2,300	-	73	160

ethod:	226	CT 532/643	CT 532/643	-	CT 422/ASTM D4327	CT 417/ASTM D4327
etection Limit:	-	-	-	50	15	15
ate Analyzed:	-	12-Mar-2014	10-Mar-2014	-	12-Mar-2014	12-Mar-2014

* Results Reported on an "As Received" Basis

Cheryl McMillen

ieryl McMillen
iboratory Director

iality Control Summary - All laboratory quality control parameters were found to be within established limits

APPENDIX D

Infiltration Test Results

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: A
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 3 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	2.02	---	---
10	2.04	0.02	42
10	2.06	0.02	42
10	2.08	0.02	42
10	2.10	0.02	42
10	2.13	0.03	28
10	2.15	0.02	42
20	2.19	0.04	42
20	2.29	0.10	17
20	2.33	0.04	42
20	2.38	0.05	33
20	2.44	0.06	28
20	2.50	0.06	28
20	2.56	0.06	28
20	2.63	0.07	24
20	2.67	0.04	42

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: B
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 6 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	5.21	---	---
10	5.67	0.46	2
10	5.88	0.21	4
10	6.17	0.29	3
Refill	3.33	---	---
10	4.60	1.27	1
10	5.79	1.19	1
10	6.21	0.42	2
Refill	3.33	---	---
10	4.35	1.02	1
10	5.33	0.98	1
10	6.13	0.80	1
10	6.44	0.31	3
Refill	3.25	---	---
10	4.38	1.13	1
10	5.50	1.12	1
10	5.67	0.17	5
10	5.88	0.21	4
Refill	3.35	---	---
10	4.42	1.07	1
10	5.71	1.29	1
10	5.92	0.21	4
10	6.19	0.27	3
Refill	3.77	---	---
10	4.67	0.90	1
10	5.60	0.93	1
10	5.79	0.19	4
10	6.00	0.21	4
Refill	3.33	---	---
10.0	4.33	1.00	1
10.0	5.44	1.11	1

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: C
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 9 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	4.50	---	---
10	5.13	0.63	1
10	5.75	0.62	1
10	6.25	0.50	2
10	6.67	0.42	2
10	7.04	0.37	2
10	7.38	0.34	2
Refill	2.92	---	---
10	3.88	0.96	1
10	4.75	0.87	1
10	5.75	1.00	1
10	6.00	0.25	3
10	6.29	0.29	3
10	6.46	0.17	5
10	6.77	0.31	3
10	6.92	0.15	6
10	7.04	0.12	7
Refill	3.46	---	---
10	4.08	0.62	1
10	4.79	0.71	1
10	5.42	0.63	1
10	6.02	0.60	1
10	6.17	0.15	6
10	6.35	0.18	5
10	6.50	0.15	6
10	6.75	0.25	3
10	6.94	0.19	4

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: D
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 3 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	3.79	---	---
15	4.08	0.29	4
15	4.19	0.11	11
15	4.29	0.10	13
15	4.42	0.13	10
15	4.50	0.08	16
15	4.60	0.10	13
15	4.69	0.09	14
15	4.75	0.06	21
Refill	3.54	---	---
15	3.67	0.13	10
15	3.77	0.10	13
15	3.88	0.11	11
15	4.00	0.12	10
15	4.13	0.13	10
15	4.19	0.06	21
15	4.25	0.06	21
15	4.31	0.06	21

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: E
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 6 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	4.98	---	---
15	5.08	0.10	13
15	5.21	0.13	10
15	5.29	0.08	16
15	5.35	0.06	21
15	5.46	0.11	11
15	5.54	0.08	16
15	5.60	0.06	21
15	5.69	0.09	14
15	5.77	0.08	16
15	5.83	0.06	21
15	5.92	0.09	14
15	5.98	0.06	21
15	6.08	0.10	13
Refill	4.67	---	---
15	4.77	0.10	13
15	4.85	0.08	16
15	4.93	0.08	16

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: F		**Test Hole Diameter:**	**8 inches**
Date Drilled: 2-25-14		**Test Hole Depth:**	**9 feet**
Date Tested: 2-26-14		**Test Duration:**	**4 hours**
Technician: Rochelle Wagner			

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	6.33	---	---
15	6.46	0.13	10
15	6.54	0.08	16
15	6.65	0.11	11
15	6.73	0.08	16
15	6.79	0.06	21
15	6.88	0.09	14
15	6.94	0.06	21
15	7.00	0.06	21
15	7.06	0.06	21
15	7.13	0.07	18
15	7.19	0.06	21
15	7.25	0.06	21
15	7.31	0.06	21
15	7.38	0.07	18
15	7.44	0.06	21
15	7.50	0.06	21

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: G		**Test Hole Diameter:**	8 inches
Date Drilled: 2-25-14		**Test Hole Depth:**	3 feet
Date Tested: 2-26-14		**Test Duration:**	4 hours
Technician: Rochelle Wagner			

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	2.75	---	---
30	2.85	0.10	25
30	2.96	0.11	23
30	3.04	0.08	31
30	3.10	0.06	42
30	3.15	0.05	50
30	3.19	0.04	62
30	3.23	0.04	62
30	3.29	0.06	42

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: H
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 6 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	5.10	---	---
30	5.25	0.15	17
30	5.38	0.13	19
30	5.50	0.12	21
30	5.60	0.10	25
30	5.71	0.11	23
30	5.81	0.10	25
30	5.92	0.11	23
30	5.98	0.06	42

Project: Heritage Ridge Apartments SL-15702-SF

INFILTRATION TEST RESULTS

Infiltration Test: I
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 9 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	7.75	---	---
30	7.96	0.21	12
30	8.17	0.21	12
30	8.42	0.25	10
Refill	7.50	---	---
30	7.71	0.21	12
30	7.94	0.23	11
30	8.13	0.19	13
30	8.27	0.14	18
30	8.42	0.15	17

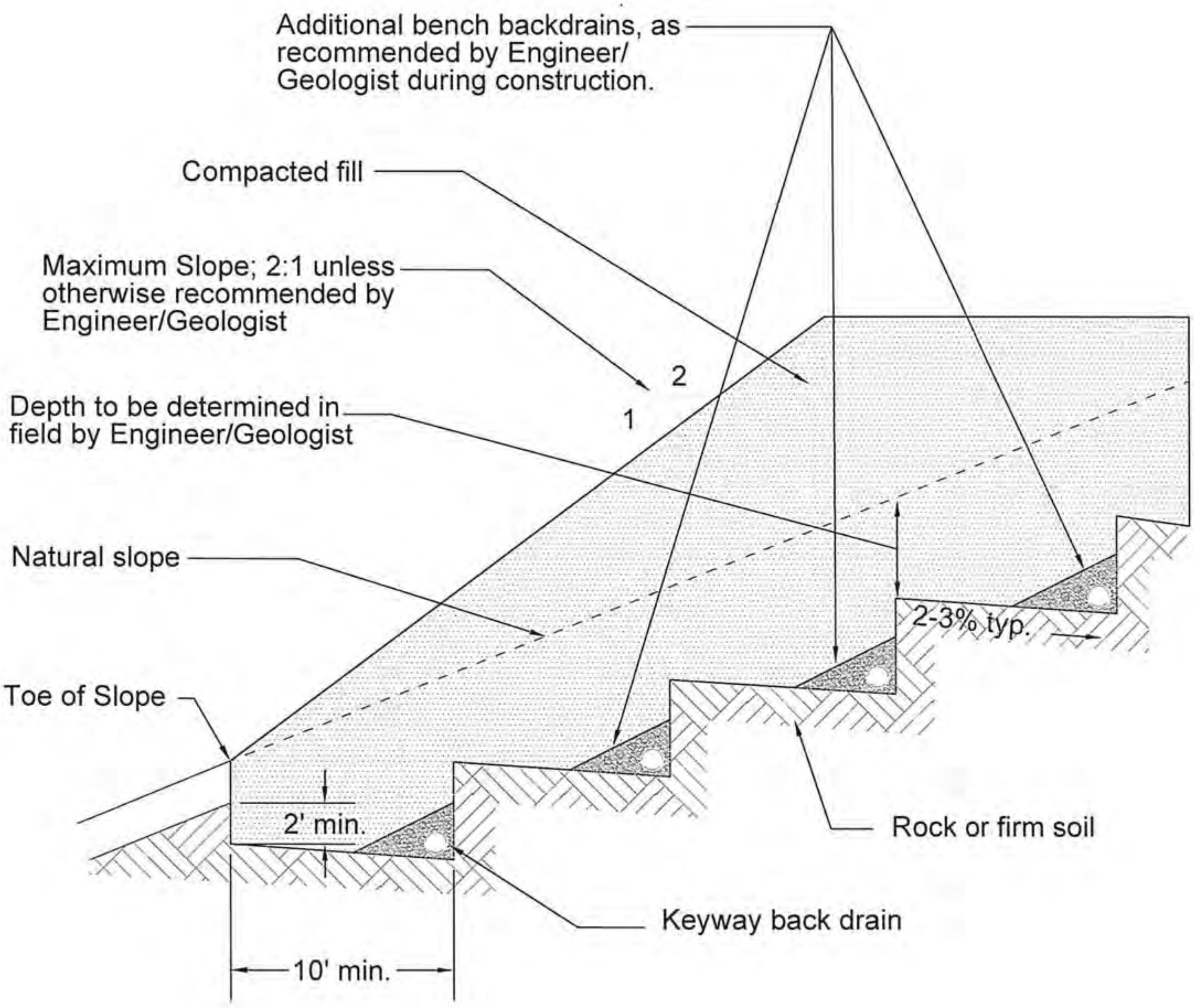
APPENDIX E

Typical Bench and Keyway Detail

BENCH and KEYWAY DETAIL (Typical)

HERITAGE RIDGE APARTMENTS

North of Calle Koral and Camino Vista
Goleta, California



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems Pacific

2049 North Preisker Lane, Suite E
Santa Maria, California, 93454

(805) 928-2991 • FAX (805) 928-9253
E-mail: esc@earthsys.com

April 11, 2014 SMK **SL-15702-SF**

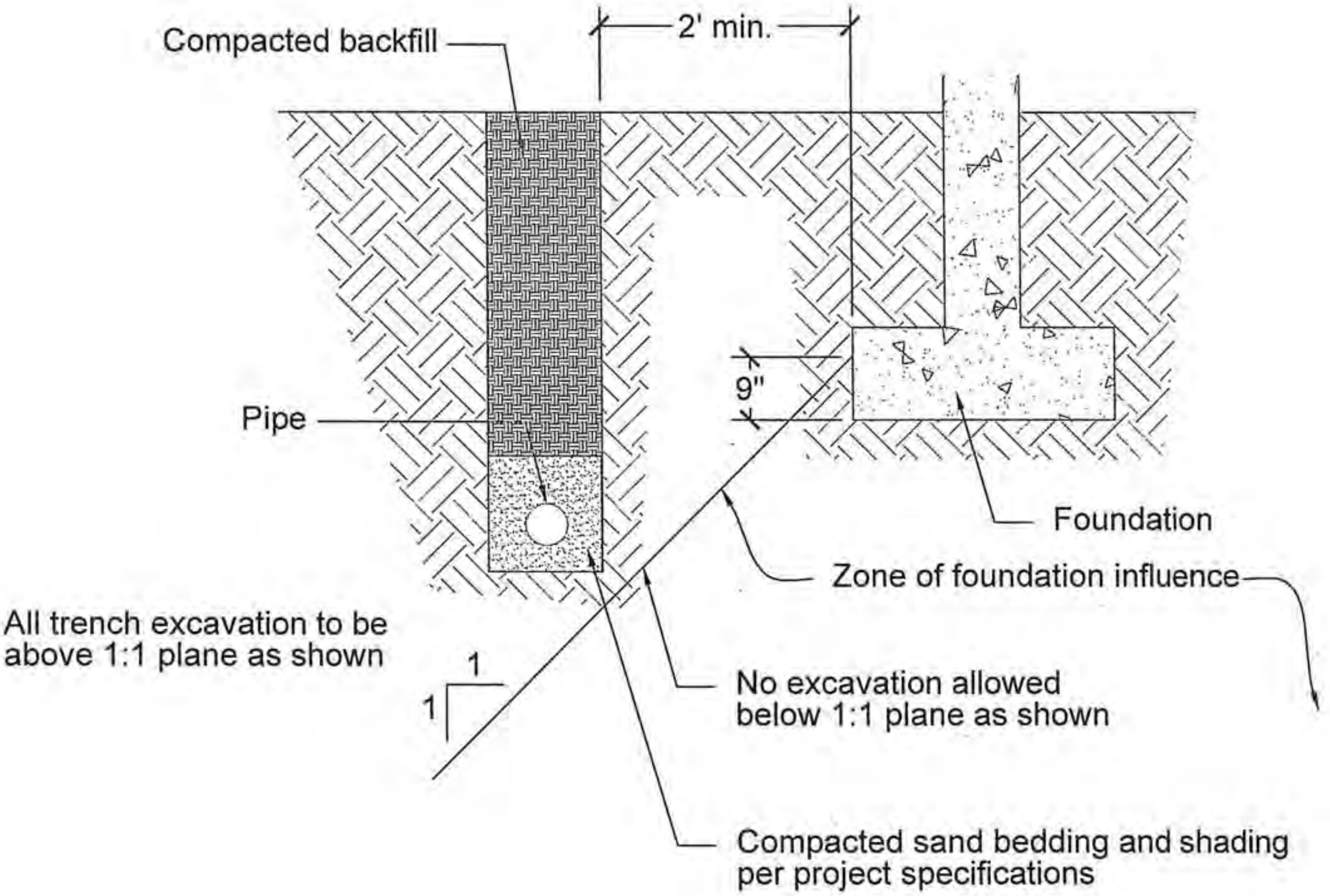
APPENDIX F

Typical Detail A: Pipe Placed Parallel to Foundations

TYPICAL DETAIL A:
PIPE PLACED PARALLEL TO FOUNDATIONS

HERITAGE RIDGE APARTMENTS

North of Calle Koral and Camino Vista
Goleta, California



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems Pacific

2049 North Preisker Lane, Suite E
Santa Maria, California 93454
(805) 928-2991 • FAX (805) 928-9253
E-mail: esc@earthsys.com

SL 15702 SE

GEOTECHNICAL ENGINEERING REPORT UPDATE
HERITAGE RIDGE APARTMENTS
NORTH OF CALLE KORAL AND CAMINO VISTA
GOLETA, CALIFORNIA

May 12, 2020

Prepared for:

Mr. Todd Stark
FPA Multifamily, LLC

Prepared by:

Earth Systems Pacific
2049 Preisker Lane, Suite E
Santa Maria, California 93454

Earth Systems
2049 Preisker Lane, Suite E | Santa Maria, CA 93454 | Ph: 805.928.2991 | www.earthsystems.com

May 12, 2020

File No.: 301378-004

Mr. Todd Stark, President
FPA Multifamily, LLC
2082 Michelson Drive
Irvine, California 92807

PROJECT: HERTITAGE RIDGE APARTMENTS
NORTH OF CALLE KORAL AND CAMINO VISTA
GOLETA, CALIFORNIA

SUBJECT: Geotechnical Engineering Report Update

REF: 1) Proposal for a Geotechnical Engineering Report Update and Estimate for Construction Observation, Materials Testing and Special Inspection Services, Heritage Ridge Apartments, North of Calle Koral and Camino Vista, Goleta California, by Earth Systems Pacific, dated March 10, 2020, Doc. No. 2003-015.PRP

2) Geotechnical Engineering Report, Heritage Ridge Apartments (formerly Willow Springs North, North of Calle Koral and Camino Vista, Goleta, California, by Earth Systems Pacific, dated June 9, 2014, Doc. No. 1404-011.SER

Dear Mr. Stark:

In accordance with your authorization of Reference 1, this geotechnical engineering report update has been prepared for use in the development of plans and specifications for the planned Heritage Ridge Apartments project. The project is located north of Calle Koral and Camino Vista in the City of Goleta, California.

Reference 2 was originally written to address the design and development of the Heritage Ridge Apartments project and the recommendations were intended to generally comply with the considerations of the 2013 Edition of the California Building Code (CBC). Since the 2019 Edition of the CBC will now apply to this project, the information presented in Reference 2 requires updating.

This report update is intended to replace Reference 2; however, all the field and laboratory test data from Reference 2 has been included within this report. Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, retaining walls, slabs-on-grade and exterior flatwork, swimming pools, drainage and maintenance, and construction observation and testing are presented herein. Two bound copies and an electronic copy of this report are being furnished for your use.

We appreciate the opportunity to have provided services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact me.

Sincerely,

Earth Systems Pacific

Doug Dunham

Doug Dunham, GE
Associate Engineer

REGISTERED PROFESSIONAL ENGINEER
DOUGLAS A. DUNHAM
No. 2586
Exp. 12-31-21
GEOTECHNICAL
STATE OF CALIFORNIA

Doc. No.: 2005-036.SER/ln

Table of Contents

Appendices

APPENDIX A	Boring, CPT, and Infiltration Test Location Map (from Reference 2) Boring Log Legend and Boring Logs (from Reference 2) Graphical CPT Data (from Reference 2)
APPENDIX B	Laboratory Test Results (from Reference 2)
APPENDIX C	Corrosion Evaluation Report Prepared by Cerco Analytical, Inc. (from Reference 2)
APPENDIX D	Infiltration Test Results (from Reference 2)
APPENDIX E	Typical Bench and Keyway Detail
APPENDIX F	Typical Detail A: Pipe Placed Parallel to Foundations

1.0 INTRODUCTION

The Heritage Ridge Apartments project will generally consist of constructing eight multi-family residential buildings; two clubhouse buildings and recreation areas with swimming pools; and associated surface and subsurface improvements. The project is planned for construction on the remaining parcel of land (referred to herein as "the site") associated with the overall Willow Springs development. The site is located north of Calle Koral and Camino Vista in the City of Goleta, California. The site is shown on the Boring, CPT, and Infiltration Test Location Map presented in Appendix A.

The clubhouse and apartment buildings will be one to three stories, will be of wood and steel frame construction, and will utilize Portland cement concrete (PCC) slabs-on-grade. Two swimming pools are planned near the clubhouse buildings, and we have assumed they will be of gunite construction and will have a maximum depth of 5 feet. PCC or masonry retaining walls up to 8 feet in height will also be constructed. For the purposes of this report, maximum line loads of 3 kips per linear foot, and maximum point loads of 50 kips were assumed.

We have assumed surface improvements will consist of hot mix asphalt (HMA) and/or PCC pavement placed over aggregate base (AB) for vehicle use, and PCC flatwork for pedestrian use. Subsurface improvements will be the underground municipal utilities that will provide the sewer, water, power, and communication services. Low Impact Development (LID) drainage disposal improvements will be constructed, and the preliminary infiltration test results are presented later in this report for the architect/engineer's use. No on-site effluent disposal systems are planned; therefore, this item is not within our scope of work and is not addressed within this report.

Based on the grading design and the need to remove and recompact the existing stockpile fill soils, cuts and fills associated with developing the building and surface improvement areas, improving access, and improving drainage are anticipated to be on the order of 10 feet or more. Additionally, an archaeological area with a buffer zone exists in the central portion of the site where special grading techniques will be required.

2.0 SCOPE OF SERVICES

The scope of work for the geotechnical engineering report update included a general site reconnaissance, review of Reference 2, geotechnical analysis of data from Reference 2, and preparation of this report. The report and subsequent preliminary geotechnical recommendations were based, in part, on information provided by the client.

This report and preliminary geotechnical recommendations are intended to comply with the considerations of CBC Sections 1803.1 through 1803.6, J104.3 and J104.4 (CBSC, 2019), and common geotechnical engineering practice in this area under similar conditions at this time. The test procedures were accomplished in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, retaining walls, slabs-on-grade and exterior flatwork, pavement sections, swimming pools, drainage and maintenance, and construction observation and testing are presented to guide the development of project plans and specifications. It is our intent that this report be used exclusively by the client to form the geotechnical basis of the design of the project and in the preparation of plans and specifications. Application beyond this intent is strictly at the user's risk. If future property owners wish to use this report, such use will be allowed to the extent the report is applicable, only if the user agrees to be bound by the same contractual conditions as the original client, or contractual conditions that may be applicable at the time of the report use.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, dewatering, shoring, temporary slope angles, construction means and methods, etc. Analyses of the areal or site geology, and of the soil for asbestos (either man-made or naturally occurring), radioisotopes, mold or other microbial content, hydrocarbons, lead, or other chemical properties are beyond the scope of this report. Ancillary features such as temporary access roads; fences and site work walls; flag and light poles; signage; effluent disposal systems; drainage basins; and nonstructural fills are not within our scope and are also not addressed.

As there may be unresolved geotechnical issues with respect to this project, the geotechnical engineer should be retained to provide consultation as the design progresses, and to review project plans as they near completion to assist in verifying that pertinent geotechnical issues have been addressed and to aid in conformance with the intent of this report. In the event that there are any changes in the nature, design, or location of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified by the geotechnical engineer in writing. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions are observed by the geotechnical engineer in the field during construction, and the recommendations have been verified as appropriate or are modified by the geotechnical engineer in writing.

3.0 SITE SETTING

The site is located northeast of Calle Koral and Camino Vista in the northern sector of the City of Goleta, California. Camino Vista provides access to the site. The approximate central site coordinates and elevation from the Google Earth website (Google, 2020) are latitude 34.436 degrees north, longitude 119.852 degrees west, and 28 feet.

Los Carneros Road forms the westerly boundary, the Union Pacific Railroad (UPRR) easement is the northerly boundary, a commercial development is the easterly boundary, and Camino Vista and Calle Koral form the southerly boundary. The general surrounding areas are as follows. The area to the south is the previously developed Willow Springs Phases 1 and 2 Apartment projects, the area to the east is commercially developed, the area to the west is a combination of a commercial development and an undeveloped parcel of land, and the area to the north is the UPRR and Highway 101 easements.

A very sparse to heavy growth of weeds and brush covers the site. The site is relatively flat to gently sloping with the exception of the moderately steep slopes that surround the stockpile soils that were previously placed along the perimeter of the archeological area and the property lines. Drainage is by sheet flow.

4.0 PREVIOUS FIELD AND LABORATORY INVESTIGATION

On February 25, 26, and April 30, 2014, twenty borings were drilled at the site to depths ranging from approximately 3 to 51.5 feet below the existing ground surface. Eleven of the borings (Borings 1 through 11) were drilled for exploration and sample acquisition purposes, and the other nine (Infiltration Test Nos. A through I) were drilled for the preliminary infiltration testing.

The borings were drilled with a Mobile Model B-53 drill rig equipped with a 6-inch (for the exploratory borings), or an 8-inch (for the infiltration test borings) outside diameter hollow stem auger. The drill rig also has an automatic trip hammer for sampling. On May 21, 2014, six cone penetrometer test (CPT) soundings were also performed at the site. The CPT soundings were advanced to depths ranging from approximately 18.5 to 60 feet below the existing ground surface. The approximate locations of all of the borings and CPT soundings are shown on the Boring, CPT, and Infiltration Test Location Map presented in Appendix A.

Soils encountered in the exploratory borings were logged and categorized in general accordance with the Unified Soil Classification System and ASTM D2488-09a. Copies of the exploratory boring logs can be found in Appendix A. The CPT soundings were conducted in general accordance with ASTM D5778-95 and D3441-94 using an electric cone penetrometer. Copies of the graphical CPT data can also be found in Appendix A.

Soil samples were taken using a ring-lined barrel sampler (ASTM D3550-01/07, with shoe similar to D2937-04) and Standard Penetration Tests (SPT) were conducted at selected depths in the exploratory borings per ASTM D1586-11. Bulk soil samples were also obtained from the exploratory boring auger cuttings.

Ring samples were tested for unit weight and moisture (ASTM D2937-10, as modified for ring liners). Two bulk samples were tested for maximum density and optimum moisture (ASTM D1557-12), and direct shear tests (ASTM D3080/D3080M-11) were conducted on the same bulk samples after they were remolded to approximately 90 percent of maximum dry density. Two one dimensional consolidation tests (ASTM D2435/D2435M-11) were performed on ring samples. Two bulk samples were also sent to Cerco Analytical, Inc. (Cerco) of Concord, California for use in preparing a corrosion evaluation report. The evaluation and associated chemical test results are for use by the architect/engineer in determining appropriate corrosion mitigation measures. The laboratory test results and the corrosion evaluation report prepared by Cerco are presented in Appendices B and C, respectively.

5.0 GENERAL SUBSURFACE PROFILE

The general subsurface profile observed in the exploratory borings and CPT soundings consisted of fill soils overlying alluvial soils. The fill soils were sands in a slightly moist to moist condition with a loose to medium dense consistency. The underlying alluvium was generally moist to wet layered sand, silt, and clay soils. The sands were loose to very dense, and the silts and clays were very soft to hard. Fine to coarse gravel was also observed within the fill and alluvial soils. Three of the six CPT soundings were terminated short of their respective target depths due to practical penetration refusal in very dense layers of alluvial sands. Subsurface water was encountered at approximate depths ranging from 22.5 to 38 feet below the existing ground surface in exploratory Borings 6 through 11. Please refer to the exploratory boring logs and the graphical CPT data for a more complete description of the subsurface conditions.

Based on the subsurface profile described above, the Site Class per Chapter 20 Table 20.3-1 (ASCE, 2017) is "D, a Stiff Soil Profile."

6.0 INFILTRATION TEST RESULTS

Infiltration testing was performed to assist the architect/engineer in determining the potential for utilizing LID drainage improvements at the site. The infiltration testing was performed in the three areas designated by the architect/engineer. Testing consisted of drilling three 8-inch diameter borings to approximate depths of 3, 6, and 9 feet below the existing ground surface in each area. A 2-inch diameter perforated polyvinyl chloride (PVC) pipe was installed in the center of each of the borings. The bottom 2 inches of the borings and the annular spaces around the outside of the PVC pipes were filled with gravel to reduce caving of the areas to be tested. The constructed infiltration test borings were then completely filled with clear water and allowed to presaturate overnight.

The next day, the infiltration test borings were again refilled with clear water to an approximate height of 1-foot. The falling head rate of infiltration was then measured and recorded over a period of 4 hours. In the case where the infiltration rate was relatively fast, clear water was added to continue the infiltration measurements over the 4-hour period of time. The infiltration test results are presented in Appendix D.

The tests only indicate the infiltration rate at the specific location and under specific conditions. Sound engineering judgment should be exercised in extrapolating the tests results for other conditions or locations. Technical design references vary in the methods they present when using these types of test results. However, most references include reduction and/or correction factors for several parameters including, but not limited to, size of infiltration system relative to the test volume, number of tests conducted, variability in the soil profile, anticipated silt loading, anticipated biological buildup, anticipated long term maintenance, and other factors. Typically, in aggregate these factors range from about 2.5 to 50 depending on the method used. The final determination of the means by which these data are used is left to the architect/engineer.

In many cases, native soils will infiltrate water much faster than the same soil placed as compacted fill. It would be prudent to consider performing additional infiltration testing in the LID drainage improvement areas after they have been constructed.

7.0 GROUND MOTION ANALYSES

In accordance with the CBC (CBSC, 2019) and ASCE 7-16 (2017), an assessment was made to determine the need for employing "Site-Specific Ground Motion Procedures" to calculate the ground motion parameters for the project. The S_1 ground motion value obtained from the Structural Engineers Association of California website (SEAOC, 2020) using the ASCE 7-16, for Site Class "D, a Stiff Soil Profile" was 0.362g which is greater than 0.2; therefore, per Section 11.4.8 of ASCE 7-16, the project requires site-specific ground motion analyses unless certain exceptions that relate to the building's period are met. Because we have no information on the building's fundamental period we performed a site-specific ground motion analysis to develop the seismic design parameters in accordance with ASCE 7-16 Sections 11.4.8 and 21.2.

A risk-targeted maximum considered earthquake (MCE_R) modeling procedure was performed in accordance with ASCE 7-16, including a Probabilistic Seismic Hazard Analysis (PSHA) and a Deterministic Seismic Hazard Analysis (DSHA). These analyses are based on knowledge of the regional tectonic setting, geology, and seismicity. A PSHA using the United States Geologic Survey (USGS, 2020) Unified Hazard Tool was used to access the Third California Earthquake Rupture Forecast (UCERF3) database (USGS, 2013) and NGA-West2 ground motion prediction equations (PEER, 2013) as described in ASCE 7-16 Section 21.2.1.1 (Method 1) were applied to estimate the peak ground motion corresponding to the uniform hazards earthquake and MCE_R which has a 2% probability of being exceeded in 50 years.

For analysis purposes, we assumed the Mission Ridge-Arroyo Parida-Santa Ana fault as the causative fault located 0.6 miles from the site. The Mission Ridge-Arroyo Parida-Santa Ana fault is a reverse fault, and we specified a 70-degree dip and footwall conditions for the attenuation relationships. A magnitude of 6.8 was used as a basis to model fault rupture. The primary seismic risks are from earthquakes generated by the local Mission Ridge-Arroyo Parida-Santa Ana and Red Mountain faults. Although listed faults are thought to potentially generate the most severe seismic shaking any local fault could produce seismic shaking at the site.

The 2019 CBC seismic design criteria are based on a Design Earthquake that produces ground motion 2/3 of the lesser of an earthquake with 2 percent probability of occurrence in 50 years, or maximum 84th percentile of the mean deterministic MCE.

Seismic Design Category

Section 1613.2.5 (CBSC, 2019) states that structures classified as Risk Category I, II or III that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to Seismic Design Category E, others shall be assigned to Design Category D. The S_1 calculated for the site is 0.811 which is greater than 0.75; therefore, the site should be assigned to the Seismic Design Category E.

Seismic Design Parameters

This site may be subject to strong ground shaking due to potential fault movements along regional faults including the Mission Ridge-Arroyo Parida-Santa Ana fault, whose proximity and magnitude potential were considered during our site-specific analysis. Engineered design and earthquake-resistant construction increase safety and allow development of seismically active areas. The minimum seismic design should comply with the CBC (CBSC, 2019) and ASCE 7-16. The resulting seismic coefficients considering Site Class D are given in the table below.

Seismic Design Category	E
Site Class	D
Mapped and Code Based Ground Motion	
Short Period Spectral Response, S_s	2.300 g
1 second mapped Spectral Response, S_1	0.811 g
Design Earthquake Ground Motion	
Short Period Spectral Response, S_{DS}	1.435 g
1 second Spectral Response, S_{D1}	1.255 g
Peak Ground Acceleration (PGA_M)	0.966 g
MCE Spectral Response Acceleration	
Short Period Spectral Response, S_{MS}	2.152 g
1 Second Period Spectral Response, S_{M1}	1.882 g
Site Amplification Factors	
Short Period Site Coefficient, F_a	1.00
1 Second Period Site Coefficient, F_v	2.50
Vertical Site Coefficient, C_v	1.50
Risk Coefficient (Short Period), C_{RS}	0.874
Risk Coefficient (1 Second Period), C_{R1}	0.875

The estimated peak horizontal site acceleration based upon a probabilistic analysis (2 percent probability of occurrence in 50 years) is approximately 2.39 g for this site. Acceleration values provided are estimates only. Vertical accelerations are typically 1/3 to 2/3 of the horizontal accelerations but can equal or exceed the horizontal accelerations depending upon the fault type, local site effects and amplification.

8.0 CONCLUSIONS

In our opinion, the site is suitable from a geotechnical standpoint for the planned development as described in the "Introduction" section of this report, provided the recommendations contained herein are implemented in the design and construction. This opinion does not extend to the suitability of the site for LID drainage improvements as this is the responsibility of other engineers. Assuming the site is prepared in accordance with the "Preliminary Geotechnical Recommendations" section of this report, shallow conventional continuous and spread (pad) footings may be used to support the planned structures.

The primary geotechnical concerns are the potential for strong ground shaking, the existing stockpile soils, grading in the archeological area, the potential for settlement, the expansive soils, the excavation characteristics of the soils, the suitability of the soils for use as fill and backfill, the stability of the soils during grading, the corrosive nature of the soils, the erodible nature of the soils, and the potential for liquefaction and seismically induced settlement of dry sand.

Strong Ground Shaking

The site is in a region of high seismic activity, with the potential for large seismic events that could generate strong ground shaking. The CBC requires that seismic loads are considered in structural design. A seismic analysis was undertaken to provide seismic acceleration design parameters; the results are presented in the "Ground Motion Analyses" section of this report for use by others in the structural design process

Stockpile Soils

Fairly well defined areas of stockpiled soils were previously placed over most of the site for use on this project. The stockpile soils, or any other previously placed fill soils that may exist at the site, should be completely removed and placed during grading operations as moisture conditioned compacted fill soils.

Grading in the Archaeological Area

An archaeological area with a 50-foot buffer zone exists in the central portion of the site as shown on the Boring, CPT, and Infiltration Test Location Map. Special grading techniques will need to be implemented to minimize the impact of site development there. In lieu of the normal soil disturbance that would occur during mass grading of the native soils under the building and the surface improvement areas, the placement of a triaxial geogrid on the surface of the native soils after removing the vegetation and the stockpile soils is planned prior to placing the compacted fills to develop final grades. This geogrid is intended to reduce the potential for settlement in the archaeological area and buffer zone area only; normal mass grading techniques will need to be used in all other building and surface improvements areas of the site. Recommendations for the archaeological area and buffer zone are presented in the "Site Preparation" and "Grading" sections of this report.

Settlement Potential

Settlement (total and differential) can occur when foundations and surface improvements span materials having variable consolidation characteristics, such as the soils on this site with variable in situ moisture and density. Such a situation could stress and possibly damage foundations and surface improvements, often resulting in severe cracks and displacement. To reduce this potential, it is necessary for all foundations and surface improvements to bear in material that is as uniform as practicable. Outside of the archaeological area and 50-foot buffer zone, a program of overexcavation, scarification, moisture conditioning, and compaction of the upper soils in the building and surface improvement areas is recommended to provide more uniform soil moisture and density, and to provide appropriate support. To reduce this potential for settlement within the archaeological area, see the previous paragraph. If any portion of a building area crosses into the archaeological area or buffer zone, the entire building area should be prepared as if it were in the archaeological area.

Expansive Soils

Previous expansion index testing of the clay soils produced values that place these soils in the "*medium*" expansion category per ASTM D4829-11. Expansive soils tend to swell with seasonal increases in soil moisture and shrink during the dry season as soil moisture decreases. The volume changes that the soils undergo in this cyclical pattern can stress and damage PCC slabs and foundations if precautionary measures are not incorporated in design and in the construction procedure.

Methods commonly used for slab protection include placement of nonexpansive material beneath slabs, premoistening of subslab soils, or a combination of the two. While premoistening alone can be helpful in *reducing* the effects of expansive soil, this method generally does not (and should not be expected to) provide protection from expansive soil damage to the extent that can be achieved by use of nonexpansive material in conjunction with premoistening. Due to the expansive nature of the clay soils and subsequent likelihood that differential expansion and subsequent cracking of slabs would occur if premoistening were used by itself, it is not recommended as the only means of expansive soil mitigation. Use of nonexpansive imported soil materials beneath slabs, in combination with premoistening, will result in more uniform slab support conditions with less tendency for heave and random cracking. Expansive soil concerns with respect to foundations will be mitigated by increased depth and reinforcement of conventional foundation elements.

Expansive soils can also be damaging to the HMA and curbs that separate it from LID drainage improvements such as bioswales, infiltration basins, etc. This is due to the large variations in soil moisture contents that occur in the LID infiltration areas from season to season. Deepening curbs in these areas is recommended in the "Pavement Sections" part of this report.

Excavation Characteristics

The soils are anticipated to be excavatable with conventional earthmoving equipment; however, the stability of excavations is a concern. Additionally, gravel was noted within the fill and alluvial soils. Based on our preliminary testing, the soils are considered to be "Type C" per the 2019 Cal/OSHA classification system. This classification should be verified by the contractor's "Competent Person" at the time of construction. Excavation sloping and shoring will be needed to safely work in, and to restrict the size of, the excavations, and reduce the potential for falling rock hazards. As with all construction safety issues, the methods of excavation stabilization, sloping, and/or shoring are ultimately the responsibility of the contractor.

Suitability of the Soils for Use as Fill and Backfill

We anticipate that the majority, if not all, of the soils excavated at the site will be acceptable from a geotechnical viewpoint for reuse as compacted fill and backfill. However, special requirements for utility trench bedding and shading per the specifications of the City of Goleta, the conduit manufacturer, and the utility companies should be anticipated. Also in localized areas within the stockpile soils, we encountered a relatively small amount of soils that may have possible hydrocarbon odors (noted during a previous stockpile evaluation), or that contained debris and organic material. If soils that are contaminated with any of these conditions are encountered during construction, they are not considered suitable for use as fill and backfill in their current condition. These soils will require evaluation for possible mitigation measures that may render them usable for use as fill and backfill; however, they may alternatively require removal from the site per applicable local, state, and federal regulations.

Stability of Soil During Grading

The soils may be susceptible to temporary high soil moisture contents, especially during or soon after the rainy season. Attempting to compact the soils in an overly moist condition may create unstable conditions in the form of pumping, yielding, shearing, and/or rutting. These conditions will not allow proper compaction and are inappropriate for continued fill placement. Therefore, the construction schedule should allow adequate time during grading for aerating and drying the soils to near optimum moisture content prior to compaction. If unstable conditions occur, the geotechnical engineer should be consulted to provide recommendations for correction of the conditions.

Corrosive Soils

Based on the testing performed by Cerco Analytical, Inc., the upper site soils were classified as "moderately corrosive to corrosive" to certain construction materials that will be in contact with the soils. The architect/engineer should refer to the Cerco Analytical, Inc. report presented in Appendix C for use in determining appropriate mitigation measures for soil corrosivity.

Soil Erosion

The site soils are considered to be highly erodible. Stabilization of surface soils, particularly those disturbed during construction, by vegetation or other means *during* and *following* construction is essential to reduce the potential of erosion damage. Care should be taken to establish and maintain proper drainage around the structures and improvements.

Liquefaction and Seismically Induced Settlement

Liquefaction is the loss of soil strength caused by a significant seismic event. It occurs primarily in loose, fine to medium-grained sands, and in very soft to medium stiff silts that are saturated by groundwater. During a major earthquake, the saturated sands and silts tend to compress and the void spaces between the soil particles that are filled with water decrease in volume. This causes the pore water pressure to build up in the soils. Then if the water does drain away rapidly, the soils may lose their strength and transition into a liquefied state.

Seismically induced settlement of dry sand is also caused by a significant seismic event, and may occur in lower density and sand and silt soils that are not saturated by groundwater. During a major earthquake, the void spaces between the unsaturated soil particles that are filled with air tend to compress which translates to a decrease in volume or settlement.

In order to estimate the potential for liquefaction and its effects on the site, we analyzed the boring and CPT data and utilized methods suggested by the Guidelines for Evaluating and

Mitigating Seismic Hazards in California, Special Publication 117a (CDMG, 2008). Using the peak ground acceleration (PGA_M) of 0.966g (from the "Ground Motion Analyses" section of this report), a mean earthquake modal magnitude (from all sources) of 6.9 (USGS, 2020), and groundwater depths that considered final grade elevations, the analysis confirmed there is a potential for liquefaction to occur at the site. It appears that liquefaction would occur in some layers of the saturated alluvial soils. If liquefaction were to occur at the site, the repercussions would likely be in the form of dynamic settlement; loss of soil bearing and lateral spreading are not anticipated. This is due to the relative thickness or depth of the overlying non-liquefiable soils with respect to the thickness of the underlying potentially liquefiable soils and the site's relatively flat topography, respectively.

As part of our liquefaction analysis, we also found there is a potential for seismically induced settlement of dry sand to occur at the site. The highest magnitude of seismically induced settlement appears to occur in localized areas in the upper portion of some of the alluvial soils. Provided the site is graded per the recommendations presented in the "Grading' section of this report, the alluvial soils most prone to seismically induced settlement will be removed and replaced as compacted fill.

Based on our analyses, we have estimated that the combined magnitude of both liquefaction and seismically induced settlement would be less than 4 inches; the magnitude of differential settlement is estimated to be less than 2 inches. It is therefore our opinion that no special measures with respect to liquefaction and seismically induced settlement are considered necessary for this project.

9.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following recommendations are applicable to the project as described in the "Introduction" section of this report. If additional stories, retaining walls taller than 8 feet, stacked retaining walls, basements, or other such features are incorporated into site development, the geotechnical engineer should be contacted for individual assessment.

Definitions

Unless otherwise noted, the following definitions are used in these recommendations. Where specific terms are not defined, common definitions used in the construction industry are intended.

- **Grading Area:** The entire site area to be graded including all the building and surface improvement areas, and the areas where LID drainage improvements are planned.
- **Archeological Area:** The area within the archeological area and including the 50 foot archeological area buffer zone.
- **Building Area:** The area within and extending a minimum of 5 feet beyond the perimeter of the foundations for a structure. The building area also includes the foundation areas (plus 5 feet to each side) of any ancillary structure that will be rigidly attached to the main structure and is expected to perform in the same manner as the main structure. Such structures could include covered walkways, covered work areas, patio covers, arbors, etc.
- **Surface Improvement Area:** The area within and extending a minimum of 2 feet beyond the perimeter of the surface improvement.
- **Scarified**: Ripping the exposed soil surface in two orthogonal directions to a minimum depth of 12 inches.
- **Moisture Conditioning:** Adjusting the soil moisture to optimum moisture content or slightly above, prior to the application of compaction effort.
- **Compacted or Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness, and compacted to a minimum of 90 percent of maximum dry density. A minimum of 95 percent will be required in the upper 1-foot of subgrade below vehicle pavement and in all AB. The standard tests used to define maximum dry density and field

density should be ASTM D1557-12 and ASTM D6938-17, respectively, or by other methods acceptable to the geotechnical engineer and the governing jurisdiction.

- **Nonexpansive Material:** Nonexpansive material is defined as being a coarse grained soil (ASTM D2487-17) and having an expansion index of 10 or less (ASTM D4829-11).

Site Preparation

The Areas Outside of the Archaeological Area

1. The existing ground surface in the grading area outside of the archaeological area should be prepared for construction by removing existing structures, improvements, vegetation, tree stumps, large roots, debris, and other deleterious material. *All existing fill soils should be completely removed and replaced as compacted fill.* Any existing utilities that will not be serving the site should be removed or properly abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

2. Voids created by the removal of materials or utilities, and extending below the recommended overexcavation depth, should be immediately called to the attention of the geotechnical engineer. No fill should be placed unless the geotechnical engineer has observed the underlying soil.

The Areas Inside of the Archaeological Area

3. The existing ground surface in the grading area inside of the archaeological area should be prepared for construction by removing the stockpile soils and all other existing fill soils down to the native soil surface. Then all vegetation, debris, and other deleterious material should be removed from the native soil surface. Per the City of Goleta, all vegetation should be removed by hand (which can include brushing, raking, or the use of a power blower) from the native soil surface. All vegetation shall be removed to the degree practicable at the ground surface such that no soil disturbance occurs. The remnants of the vegetation should then be sprayed with topical herbicide per

manufacturer's specifications approximately 60 days prior to implementing grading operations. The root ball masses shall be left in place to die. Any existing utilities that will not be serving the site should be removed or properly abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

Grading

The Areas Outside of the Archaeological Area

1. Following site preparation, the soils in the building area should be removed to a level plane at a minimum depth of 3 to 8 feet below the bottom of the deepest footing or 3 to 8 feet below existing grade, *whichever is deeper,* as recommended by the geotechnical engineer in the field. During construction, locally deeper removals may also be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

2. Following site preparation, the soils in the surface improvement area should be removed to a level plane at a minimum depth of 1-foot below the proposed subgrade elevation or 2 feet below the existing ground surface, whichever is deeper. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

3. Following site preparation, the soils in the fill areas beyond the building and surface improvement areas should be removed to a depth of 2 feet below the existing ground surface. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

4. Voids created by dislodging cobbles and/or debris during scarification should be backfilled and compacted, and the dislodged materials should be removed from the area of work.

The Areas Inside of the Archaeological Area

5. Surface vegetation removal and herbicide application must be accomplished 60 days prior to the geogrid placement. No remedial grading or scarification shall occur prior to placement of the geogrid; however, it is acceptable to place import sand on the native soil surface where uneven areas or undulations exist to create as level a surface as practicable to place the geogrid on. Creating level areas to place the geogrid on improves both the constructability and the performance of the geogrid system.

6. Following site preparation and placement of the leveling import sand, the native soil surface in the grading area inside the archaeological area should be covered with a tri-axial geogrid such as Tensar TX 7, or an approved equivalent. The geogrid should be anchored and/or overlapped as recommended by the manufacturer prior to placing any fill soil.

7. The first 6 inches of fill placed on top of the geogrid shall be an imported sand material reviewed and approved by the City of Goleta to provide a visual indication to avoid impeding into the native soils.

8. Fill soils shall be placed and spread from the outside to the inside of the archeological area with track earthmoving equipment such that the equipment shall only be working on the top of the fill soils. The fill soils shall be placed such that the earthmoving equipment does not come into contact with the archeological area native soils or the geogrid.

Grading, General

9. If any portion of a building area crosses into the archaeological area or buffer zone, the entire building area should be prepared as if it were in the archaeological area.

10. On-site material and approved import materials may be used as general fill and up to 18 inches below the bottom of the slab-on-grade elevation within the building area where

conventional foundations will be used. All fill soils should be moisture conditioned and compacted.

11. A minimum of 18 inches of nonexpansive material when measured from the bottom of the conventional foundation slabs-on-grade should be placed in the building area. The 4-inch sand cushion (discussed later in the "Slabs-on-Grade and Exterior Flatwork" section of this report) is part of this 18-inch thickness of nonexpansive material, not in addition to it. Prior to placement of the nonexpansive material, the underlying soil should be moistened to a minimum of optimum moisture content and no desiccation cracks should be present.

12. Proposed imported soils should be evaluated by the geotechnical engineer before being used, and on an intermittent basis during placement on the site.

13. All materials used as fill should be cleaned of any debris and rocks larger than 6 inches in diameter. No rocks larger than 3 inches in diameter should be used within the upper 3 feet of finish grade. When fill material includes rocks, the rocks should be placed in a sufficient soil matrix to ensure that voids caused by nesting of the rocks will not occur and that the fill can be properly compacted.

14. Fill slopes should be keyed and benched into competent soil as generally shown on the Typical Bench and Keyway Detail presented in Appendix E. The geotechnical engineer should approve all keyways and benches. The keyway should be a minimum of 10 feet wide.

15. Slopes under normal conditions should be constructed at 2:1 (horizontal to vertical) or flatter inclinations. Slopes subject to inundation should be constructed at 3:1 or flatter inclinations.

16. Cut slopes and fill over cut slopes be overexcavated and constructed as compacted fill slopes.

17. Fill slopes should be overfilled to an extent determined by the contractor, but not less than 3 feet when measured perpendicular to the slope face, so that when trimmed back to the compacted core, the recommended compaction is achieved. Compaction of each fill lift should extend out to the temporary slope face. As an alternative to overfilling, fill slopes may be built to the finish slope surface. In such cases, compaction of each fill lift should extend to the face of the slope, and the slope face should be backrolled with a sheepsfoot compactor at intervals not exceeding 4 vertical feet.

18. Care shall be taken to avoid spillage of loose materials down the faces of the slopes during grading. At the completion of mass filling, the slope surfaces should be moisture conditioned, shaped, and compacted. To obtain the recommended compaction of the slope face, soil moisture should be maintained at optimum moisture, or slightly above, from the time of mass filling to final compaction of the slope faces.

Utility Trenches

1. Unless otherwise recommended, utility trenches adjacent to foundations should not be excavated within the zone of foundation influence, as shown on Typical Detail A presented in Appendix F.

2. Utilities that will pass beneath a foundation should be placed with properly compacted utility trench backfill, and the foundation should be designed to span the trench.

3. Utility connections to the buildings should be flexible enough to handle the combination of total dynamic settlement and seismically induced settlement of dry sand of 4 inches.

4. A select, noncorrosive, granular, easily compacted material should be used as bedding and shading immediately around utilities. Generally, the soil found at the site may be used for trench backfill above the select material.

5. Utility trench backfill should be moisture conditioned and compacted; however, the Engineering Design Standards (SBC, 2011) requires a minimum compaction of 95 percent

of maximum dry density in trench backfill in existing or future public roadway areas. A minimum of 95 percent of maximum dry density should also be obtained where trench backfill comprises the upper 1-foot of subgrade beneath HMA or PCC pavement, and in all AB. A minimum of 85 percent of maximum dry density will generally be sufficient where trench backfill is located in landscaped or other unimproved areas, where settlement of trench backfill would not be detrimental.

6. Jetting of trench backfill should generally not be allowed as a means of backfill densification. However, to aid in encasing utility conduits, particularly corrugated conduits and multiple closely spaced conduits in a single trench, jetting or flooding may be useful. Jetting or flooding should only be attempted with extreme caution, and any jetting or flooding operation should be subject to review by the geotechnical engineer.

7. The recommendations of this section are minimums only, and may be superseded by the architect/engineer based upon the soil corrosivity, or the requirements of the pipe manufacturer, the utility companies, or the governing jurisdiction.

Foundations

In preparing the following foundation recommendations, we have assumed that foundations will not be constructed within 10 feet of LID drainage improvements. If this is not the case, the geotechnical engineer should review the type of LID drainage improvement planned within 10 feet of a foundation to ascertain if revised and/or supplemental foundation recommendations are needed.

1. Conventional continuous and spread footings bearing entirely on soil compacted per the "Grading" section of this report may be used to support the structures. All spread footings should be connected by grade beams on at least two sides. Grade beams should also be placed across all large entrances into the buildings. Footings and grade beams should have a minimum depth of 21 inches below lowest adjacent grade; however, footing and

grade beam dimensions should also conform to the requirements of Section 1809 (CBSC, 2019). All spread footings should be a minimum of 2 feet square.

2. Footing reinforcement should be in accordance with the requirements of the architect/engineer; minimum continuous footing and grade beam reinforcement should consist of four No. 4 rebars, two near the top and two near the bottom of the footing or grade beam, or two No. 5 rebar, one near the top and one near the bottom of the footing or grade beam.

3. Continuous and spread footings supported by compacted fill should be designed using maximum allowable bearing capacities of 1,500 psf dead load and 2,000 psf dead plus live load. Using this criterion, maximum total and differential settlement are expected to be on the order of 3/4-inch and 1/4-inch in 25 feet, respectively. Footings should also be designed to withstand total and differential dynamic settlement of 4 inches and 2 inches across the largest building dimension, respectively.

4. The allowable bearing capacities may be increased by one-third when transient loads such as wind or seismicity are included if the structural engineer determines they are allowed per Sections 1605.3.1 and 1605.3.2 (CBSC, 2019). The foundations should be designed using the "Seismic Design Parameters" listed in the "Ground Motion Analyses" section of this report.

5. Lateral loads may be resisted by soil friction and by passive resistance of the soil acting on foundations. Lateral capacity is based on the assumption that backfill adjacent to foundations is properly compacted. A passive equivalent fluid pressure of 350 pcf and a coefficient of friction of 0.35 may be used in design. No factors of safety, load factors, and/or other factors have been applied to any of the values.

6. Foundation excavations should be observed by the geotechnical engineer prior to rebar and PCC placement. Footing excavations should be thoroughly moistened prior to PCC placement and no desiccation cracks should be present.

Retaining Walls

1. Retaining wall foundations should be founded on fill soil compacted as recommended in the "Grading" section of this report. Conventional foundations for retaining walls should have a minimum depth of 21 inches below lowest adjacent grade not including the keyway. It is assumed that retaining walls will not exceed a height of 8 feet.

2. Wall design should be based on the following parameters:

Active equivalent fluid pressure (imported sand or gravel backfill)	35 pcf
Active equivalent fluid pressure (native soil backfill)	45 pcf
At-rest equivalent fluid pressure (imported sand or gravel backfill)	50 pcf
At-rest equivalent fluid pressure (native soil backfill)	65 pcf
Passive equivalent fluid pressure (compacted fill)	350 pcf
Maximum toe pressure (compacted fill)	2,000 pcf
Coefficient of sliding friction (compacted fill)	0.35

3. No surcharges are taken into consideration in the above values. No factors of safety, load factors, and/or other factors have been applied to any of the equivalent fluid pressure values.

4. The above pressures are applicable to a horizontal retained surface behind the wall. Walls having a retained surface that slopes upward from the wall should be designed for an additional equivalent fluid pressure of 1 pcf for the active case and 1.5 pcf for the at-rest case, for every degree of slope inclination.

5. Under the CBC, the Risk-Targeted Maximum Considered Earthquake (MCER) must be used for determining seismic pressures on walls. Further, Section 1803.5.12.1 (CBSC, 2019) requires that dynamic seismic lateral earth pressures be provided by the geotechnical engineer for walls retaining more than 6 feet of backfill. The PGA_M for the site is 0.966g. Then, using the methods presented by Lew et al. (SEAOC, 2010) and this PGA_M, the

appropriate incremental increase in lateral soil pressure, above the static active equivalent fluid pressure for flexible (cantilevered) walls, was determined to be 40 pcf for imported sand or gravel backfill and 30 pcf for the native soil backfill. Flexible (cantilevered) walls retaining over 6 feet of backfill should be designed using these incremental seismic pressures. Walls retaining 6 feet or less of backfill need not be designed for seismic pressures.

6. Recent research by Al Atik and Sitar (2010) confirmed that for flexible (cantilevered) walls, particularly those over 12 feet tall, an increase in soil pressure does occur under significant seismic accelerations. Further, they found that the increase is due to the out-of-phase interaction between the soil and the flexible wall. When considering rigid walls (i.e. those designed using at-rest criteria); however, they found that the incremental increase due to seismicity was typically less than 50 percent of the static wall pressure. Consequently, no incremental increase in lateral soil pressure is recommended for the design of walls where the static design utilizes the at-rest equivalent fluid pressure and they are designed with factors of safety and earth load factors of at least 1.5.

7. In typical structural design methods for retaining walls such as those found in Section 1605 (CBSC, 2019), lateral soil pressure is multiplied by a load factor of 1.6. According to Lew et al. (2010), a load factor of 1.6 is too conservative for seismic loads; this paper suggests that the seismic increase in lateral pressure be separated from the static active pressure and that a load factor of 1.0 be used for the seismic increase. Further, Al Atik and Sitar (2010) found that pressure increases due to seismic earth loads were minimal for walls retaining less than 12 feet of backfill. While the Al Atik and Sitar's research is generally accepted among geotechnical and structural engineers in California, it is not entirely acknowledged by the CBSC, as the CBC (CBSC, 2019) sets the height below which seismic loads may be ignored at 6 feet. Given this disparity, it is suggested that caution be used not to over-engineer walls retaining between 6 and 12 feet of backfill.

8. The active and at-rest values presented above are for drained conditions. Consequently, retaining walls should be drained with rigid perforated pipe encased in a free draining gravel blanket. The pipe should be placed perforations downward and should discharge in a nonerosive manner away from foundations and other improvements. The gravel blanket should have a width of approximately 1-foot and should extend upward to approximately 1-foot from the top of the wall. The upper foot should be backfilled with on-site soil, except in areas where a slab or pavement will abut the top of the wall. In such cases, the gravel backfill should extend up to the material that supports the slab or pavement. To reduce infiltration of the soil into the gravel, a permeable synthetic fabric conforming to the Standard Specifications (Caltrans, 2018) Section 96-1.02B – Class "C," should be placed between the two. Manufactured geocomposite wall drains conforming to the Standard Specifications (Caltrans, 2018) Section 96-1.02C are acceptable alternatives to the use of gravel, provided that they are installed in accordance with the recommendations of the manufacturer. Where drainage can be properly controlled, weep holes on maximum 4-foot centers may be used in lieu of perforated pipe. A filter fabric as described above should be placed between the weep holes and the drain gravel.

9. Retaining walls where moisture transmission through the wall would be undesirable should be thoroughly waterproofed in accordance with the specifications of the architect/engineer.

10. The architect/engineer should bear in mind that retaining walls by their nature are flexible structures, and that surface treatments on walls often crack. Where walls are to be plastered or otherwise have a finish applied, the flexibility should be considered in determining the suitability of the surfacing material, spacing of horizontal and vertical control joints, etc. The flexibility should also be considered where a retaining wall will abut or be connected to a rigid structure, where retaining walls cross into the archaeological buffer limits, and where the geometry of the wall is such that its flexibility will vary along its length.

Slabs-on-Grade and Exterior Flatwork

Design Considerations

1. Conventional interior light duty PCC slabs-on-grade and exterior flatwork should have a minimum thickness of 4 full inches; however, the thickness of heavy duty slabs and flatwork should be specified by the architect/engineer. Conventional foundation slabs-on-grade should be doweled to the footings and grade beams with rebar.

2. Rebar size, placement, and dowels should be as directed by the architect/engineer. Conventional interior light-duty PCC slabs-on-grade and exterior flatwork should be reinforced, at a minimum, with No. 3 rebar placed 18 inches on-center each way. Heavy-duty exterior flatwork should have minimum rebar sizing and spacing that meets the criteria of American Concrete Institute (ACI) 318 (ACI, 2014).

3. A modulus of subgrade reaction (K_{30}) of 100 psi/inch may be used in the design of heavy-duty PCC slabs-on-grade founded on compacted native soil. The modulus of subgrade reaction (K_{30}) may be increased to 200 psi/inch if the slab is underlain with a minimum of 6 inches of compacted Class 2 AB (Caltrans, 2018), and to 300 psi/inch if the slab is underlain with a minimum of 12 inches of compacted Class 2 AB.

Moisture Vapor Transmission Considerations

4. Due to the use of moisture sensitive floor coverings, water-soluble flooring adhesives, or where moisture sensitive equipment, products, or environments (humidity controlled or refrigerator rooms) exist and the speed at which buildings are now constructed, moisture vapor transmission through PCC slabs-on-grade is a common problem. Where moisture vapor transmission from the underlying soil would be undesirable, the slabs can be protected from the subsurface moisture vapor. A number of options for subsurface moisture vapor transmission protection are discussed below; however, the means of protection, including the type and thickness of the vapor retarder/barrier, if specified, are left to the discretion of the architect/engineer.

5. Where specified, vapor retarder/barrier material should conform to ASTM E1745-17. This standard specifies properties for three performance classes, Class "A", "B" and "C". The appropriate class should be selected based on the sensitivity of floor coverings or the environments to moisture vapor intrusion and the potential for damage to the vapor retarder/barrier material during placement of the slab-on-grade rebar and PCC.

6. Several recent studies including those of ACI Committee 302 (ACI, 2015) have concluded that excess water above the vapor retarder/barrier increases the potential for moisture damage to floor coverings, and increased humidity levels amplifies the potential for mold growth or other microbial contamination to both the floor coverings and other building components. The studies also concluded that it is preferable to eliminate the typical sand layer beneath the slab-on-grade and place the slab PCC in direct contact with a vapor retarder/barrier particularly during wet weather construction. However, placing the PCC directly on the vapor retarder/barrier requires special attention to specifying the proper vapor retarder/barrier material, a very low water-cement ratio in the design PCC mix, and special finishing and curing techniques.

7. Another option for vapor transmission protection would be the use of vapor-inhibiting admixtures in the PCC slab-on-grade design mix and/or the application of a penetrant or sealer to the surface of the slab-on-grade. This would also require a special PCC design mix and placement procedures depending upon the recommendations of the admixture, the penetrant, or the sealer manufacturer. Using vapor-inhibiting admixtures and/or the penetrant or sealer along with a subslab moisture vapor transmission retarder/barrier can provide substantial protection against moisture vapor transmission through PCC slabs-on-grade. A manufacturer of these vapor-inhibiting materials does provide limited guarantees or warranties with respect to the effectiveness of their products. Recommendations for can be provided if requested.

8. A third option that may be a reasonable compromise between effectiveness and cost considerations would be the use of a subslab moisture vapor transmission

retarder/barrier protected by a clean sand layer. If a Class "A" vapor retarder/barrier is specified, the retarder/barrier can be placed directly on the compacted soil material. The vapor retarder/barrier should be covered with a minimum 2 inches of *clean* sand. If a less durable vapor retarder is specified (Class "B" or "C"), a minimum of 4 inches of clean sand should be provided, and the retarder should be placed in the center of the clean sand layer. Clean sand is defined as a well or poorly graded sand (ASTM D2487-17) of which less than 3 percent passes the No. 200 sieve. The site soils do not fulfill the criteria to be considered "clean sand."

9. Regardless of the underslab vapor retarder selected, proper installation of the retarder is critical for optimum performance. All seams must be properly lapped, and all seams and utility penetrations properly sealed in accordance with the vapor retarder manufacturer's recommendations. Installation should conform to ASTM E1643-18a.

Construction Considerations

10. If clean sand is used between the vapor retarder/barrier and the PCC slab-on-grade, the sand should be moistened only as necessary to promote PCC curing; saturation of the sand should be avoided, as the excess moisture would be on top of the Vapor retarder/barrier, potentially resulting in vapor transmission through the slab for months or years.

11. Regardless of the underslab vapor retarder/barrier selected, proper installation of the vapor retarder/barrier is critical for optimal performance. Where utilized, the vapor retarder/barrier should be placed a minimum of 1-inch above the flow line of the drainage path surrounding the structures, or 1-inch above the area drain grates if area drains are used to collect runoff around the structures. All seams must be properly lapped, and all seams and utility penetrations should be properly sealed in accordance with the vapor retarder/barrier manufacturer's recommendations and ASTM E1643-18a. At the terminating edges of the vapor retarder/barrier, the vapor retarder/barrier should be effectively sealed with accessories specifically designed to seal the material to new or

existing PCC; details for edge sealing of the vapor retarder/barrier should be provided by the architect/engineer.

12. In conventional construction, it is common to use 4 to 6 inches of nonexpansive soil beneath exterior flatwork. Due to the soil's expansion potential, there will be a risk of movement and damage to the flatwork if only conventional measures are used. Heaving and cracking are likely to occur. This movement could be reduced by the placement of a 12 to 18-inch thick layer of compacted, nonexpansive soil beneath the flatwork. Under all flatwork; however, the thicker the nonexpansive soil layer, the better the expansive soil protection. Nonexpansive soils are described within the "Definitions" section of this report.

13. Another measure that can be taken to reduce the risk of movement of flatwork is to provide thickened edges or grade beams around the perimeters of the flatwork. The thickened edges or grade beams could be up to 12 to 21 inches deep, with the deeper edges or grade beams providing better protection. At a minimum, the thickened edge or grade beam should be reinforced by two No. 4 rebar, one near the top and one near the bottom of the thickened edge or grade beam.

14. It is recognized that the measures discussed above for protecting exterior flatwork from expansive soils are expensive, possibly more expensive than simply replacing flatwork that has heaved and/or cracked. Consequently, the above measures for protecting exterior flatwork are only suggestions for consideration by the owner and/or the architect/engineer. The degree to which exterior flatwork is protected from expansive soil damage is left to the discretion of the owner and/or the architect/engineer.

15. Exterior flatwork should be constructed with frequent joints to allow articulation as flatwork moves in response to seasonal moisture and/or temperature variations causing minor expansion and contraction of the soil, or variable bearing conditions. The soil in

the subgrade should be moistened to at least optimum moisture content and no desiccation cracks should be present prior to casting the flatwork.

16. Where maintaining the elevation of the flatwork is desired, the flatwork should be doweled to the perimeter foundation as specified by the architect/engineer. In other areas, the flatwork may be doweled to the foundation or the flatwork may be allowed to "float free," at the discretion of the architect/engineer. Flatwork that is intended to float free should be separated from foundations by a felt joint or other means.

17. To reduce shrinkage cracks in PCC, the PCC aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the PCC should be properly placed and finished, contraction joints should be installed, and the PCC should be properly cured. PCC materials, placement, and curing specifications should be at the direction of the architect/engineer. The Guide for Concrete Floor and Slab Construction (ACI, 2015) is suggested as a resource for the architect/engineer in preparing such specifications.

Pavement Sections

The following preliminary pavement sections are based on an assumed R-value of 25 and should be used for cost estimating purposes only. The soil exposed at the access road/driveway subgrade should be tested during construction for R-value to verify that these preliminary pavement sections are appropriate, otherwise revised pavement sections should be prepared. Pavement design sections are provided for assumed Traffic Indices (TI) of 4.5, 5.0, 5.5, 6.0, 6.5, and 7.0. Determination of the appropriate TI for specific areas is left to others. The pavement sections were calculated in accordance with the Highway Design Manual (Caltrans, 2020). The calculated AB and HMA thickness are for compacted material. Normal Caltrans construction tolerances should apply.

R-value	TI	HMA (inches)	Class 2 AB (inches)
25	4.5	2.50	6.00
25	5.0	2.75	7.00
25	5.5	3.00	8.00
25	6.0	3.25	9.00
25	6.5	3.75	10.00
25	7.0	4.00	11.00

1. The upper 12 inches of subgrade and all AB (Caltrans, 2018) should be compacted to a minimum of 95 percent of maximum dry density.

2. Subgrade and AB should be firm and unyielding when proof-rolled by heavy rubber-tired equipment prior to paving.

3. To provide stability for curbs, they should be set back a minimum of 3 feet from the tops of slopes, or the curbs should be deepened to provide stability. The geotechnical engineer should review all conditions where curbs are deepened to provide stability.

4. Where HMA will lie within 5 feet of LID drainage improvements such as bioswales, infiltration basins, etc., the HMA should be separated from the LID drainage improvements by deepened curbs or other means that will reduce the potential for moisture fluctuations in the soils beneath the HMA. Curbs or other water cut off measures use to separate the HMA from the LID drainage improvement should penetrate a minimum of 12 inches below the invert of the LID drainage improvement.

5. Finished HMA surfaces should slope toward drainage facilities such that rapid runoff will occur and no ponding is allowed on or adjacent to the HMA.

Swimming Pools

We have assumed that the pools will be of reinforced gunite construction, will be no deeper than 5 feet below surrounding grades, and will bear in medium expansive soils.

1. Pool design should be based on the "medium" expansion category per ASTM D 4829-11. If specific lateral pressures are needed for the design, please refer to the "Retaining Walls" section of this report for values.

2. The soil should be overexcavated as needed to allow for the placement of a minimum of a 12-inch thick gravel bed beneath the pool shell. Clean, free-draining, crushed gravel should then be placed in the excavation, up to the bottom-of-shell elevation. As the gravel will act as a cushion as well as a drain, a collection point and drain pipe should be installed to discharge the water from under the pool. A hydrostatic relief valve should also be provided to protect the pool shell from floating in the event of a failure in the drain system.

3. As a minimum, the upper 12 inches of soil placed beneath the pool decks should be nonexpansive (as described in the "Definitions" section of this report) or 12 inches of gravel can be used. Flexible joints should be used between the deck and the coping. All joints in the pool deck should be sealed.

Drainage and Maintenance

1. Per Section 1804.4 (CBSC, 2019), unpaved ground surfaces should be *finish graded* to direct surface runoff away from foundations and other improvements at a minimum 5 percent grade for a minimum distance of 10 feet. The site should be similarly sloped to drain away from foundation, slopes, and other improvements during construction. Where this is not practicable due to property lines, other improvements, etc., swales with improved surfaces, area drains, or other drainage facilities, should be used to collect and discharge runoff.

2. To reduce the potential for planter drainage from gaining access to subslab areas, any raised planter boxes adjacent to foundations should be installed with drains and sealed sides and bottoms. Drains should also be provided for areas adjacent to the foundations that would not otherwise freely drain.

3. The eaves of the buildings should be fitted with roof gutters. Runoff from flatwork, roof gutters, downspouts, planter drains, area drains, etc. should discharge in a nonerosive manner away from foundations and other improvements in accordance with the requirements of the governing agencies.

4. The on-site soils are highly erodible; stabilization of soils disturbed during construction by vegetation or other means *during* and *following* construction, is essential to reduce erosion damage. Care should be taken to establish and maintain vegetation. The landscaping should be planned and installed to maintain the surface drainage recommended above. Surface drainage should also be maintained during construction.

5. To reduce migration of surface drainage into the subgrade, maintenance of pavement areas is critical. Any cracks that develop in the pavement should be promptly sealed.

6. The owner or site maintenance personnel should periodically observe the areas within and around the site to look for indications of rodent activity and surficial soil instability. The owner or site maintenance personnel should implement a program for controlling the abundant rodent activity in the general area.

Construction Observation and Testing

1. It must be recognized that the recommendations contained in this report are a review of Reference 2 and rely on the continuity of the subsurface conditions encountered. It is assumed that the geotechnical engineer will be retained to provide consultation during the design phase, to review final plans once they are available, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

2. At a minimum, the geotechnical engineer should be retained to provide:

   - Review of final grading, utility, and foundation plans

- Professional observation during grading, foundation excavations, and trench backfill
- Oversight of compaction testing during grading
- Oversight of special inspection during grading

3. Special inspection of grading and backfill should be provided as per Section 1705.6 and Table 1705.6 (CBSC, 2019). In our opinion, none of the grading construction is of a nature that should warrant continuous special inspection; periodic special inspection should suffice. Subject to approval by the Building Official, the exception to continuous special inspection is described in Section 1704.2 (CBSC, 2019) and should be specified by the architect/engineer and periodic special inspection of the following items should be provided by the special inspector.

    - Stripping and clearing of vegetation
    - Overexcavation to the recommended depths
    - Geogrid placement
    - Moisture conditioning and compaction of the soil
    - Fill quality, placement, and compaction
    - Utility trench backfill
    - Foundation excavations
    - Retaining wall drains and backfill
    - Subslab blanket drain system

4. A program of quality control should be developed prior to beginning grading. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

5. Locations and frequency of compaction tests should be as per the recommendation of the geotechnical engineer at the time of construction. The recommended test location

and frequency may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

6. A preconstruction conference among the owner, the geotechnical engineer, the City of Goleta, the special inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements.

7. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

10.0 CLOSURE

Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section of this report. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge.

If changes with respect to development type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. Any items not specifically addressed in this report shall comply with the CBC (CBSC, 2016) and the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon the geotechnical conditions encountered at the site and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by this firm based on conditions exposed at the time of construction.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. This report shall be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text.

TECHNICAL REFERENCES

ACI (American Concrete Institute). 2015. "Guide for Concrete Floor and Slab Construction." Documents 302.1R15, ACI.

ACI (American Concrete Institute). 2014. "Building Code Requirements for Structural Concrete." Document 318, ACI.

ASCE (American Society of Civil Engineers). 2017. Minimum Design Loads for Buildings and other Structures (7-16). Standards ASCE/SEI 7-16, ASCE.

ASTM (American Society for Testing Materials). 2020. Annual Book of Standards. ASTM.

Atik, L. A. and Sitar, N. 2010 October. "Seismic Earth Pressures on Cantilever Retaining Structures." *Journal of Geotechnical and Geoenvironmental Engineering* 136 (10). American Society of Civil Engineers.

CBSC (California Building Standards Commission). 2019. California Building Code (CBC). CBSC.

California Division of Mines and Geology [1997] 2008. *Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117a.*

Cal/OSHA. 2019 "Pocket Guide for the Construction Industry - Excavation, Trenches, and Earthwork."

Caltrans (California Department of Transportation). 2018. "Standard Specifications." Caltrans.

Caltrans (California Department of Transportation). 2020. "Flexible Pavement, Chapter 630." Highway Design Manual.

Google. 2020. U.S. Department of State Geographer. Google Earth Website. Retrieved from: http://www.google.com/earth/index.html

Lew, M., et al. 2010. "Seismic Earth Pressures on Deep Building Basements." *Structural Engineers Association of California (SEAOC) Convention Proceedings.*

PEER (Pacific Earthquake Engineering Research Center), 2013, Next Generation Attenuation (NGA)-West ground motion attenuation models and database, accessed at https://ngawest2.berkeley.edu/

SBC (Santa Barbara County Department of Public Works Transportation Division). 2011 *"Engineering Design Standards."* SBC.

SEAOC (Structural Engineers Association of California). 2020. "Seismic Design Map Tool." Retrieved from: https://seismicmaps.org/

USGS (United States Geological Survey). 2013. The Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) – The Time Dependent Model, USGS Open File Report 2013-1165.

USGS (United States Geological Survey), 2020. "Unified Hazard Tool." United States Geological Survey. Retrieved from: http://earthquake.usgs.gov/hazards/interactive/

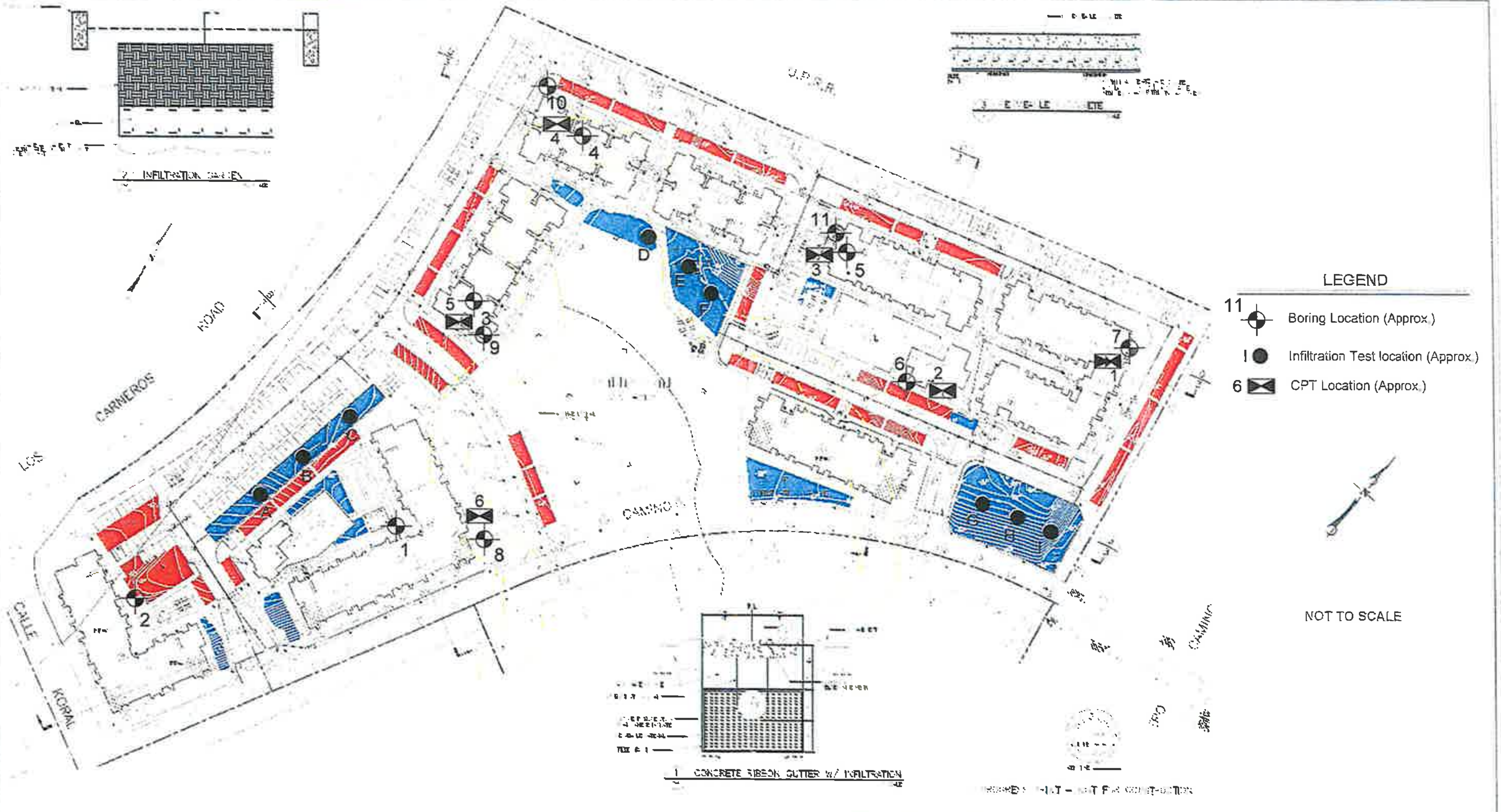
APPENDIX A

Boring, CPT, and Infiltration Test Location Map (from Reference 2)

Boring Log Legend (from Reference 2)

Boring Logs (from Reference 2)

Graphical CPT Data (from Reference 2)



BORING, CPT, AND INFILTRATION TEST LOCATION MAP

HERITAGE RIDGE APARTMENTS

North of Calle Koral and Camino Vista
Goleta, California

Base Map Provided by: MAC Design Associates

Earth Systems Pacific

2049 North Preisker Lane, Suite E
Santa Maria, California 93454
(805) 928-2991• FAX (805) 928-9253
E-mail: esc@earthsys.com

April 30, 2014

SMK

SL-15702-SF

WILLOW SPRINGS NORTH APTS BLM 4-30-2014.dwg

Earth Systems Pacific

BORING LOG LEGEND

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS	GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS TESTED OR JUDGED TO BE LARGER THAN #200 SIEVE SIZE	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	⁘
	GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	○
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	▦
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	▩
	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	▓
	SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	░
	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	▥
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	▩
FINE GRAINED SOILS HALF OR MORE OF MATERIAL IS TESTED OR JUDGED TO BE SMALLER THAN #200 SIEVE SIZE	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY, CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY	▥
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	▧
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	⁙
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY, SILTY SOILS, ELASTIC SILTS	▥
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	▧
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	▦
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	▽ ▽ ▽

SAMPLE / SUBSURFACE WATER SYMBOLS

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	▦
STANDARD PENETRATION TEST (SPT)	●
SHELBY TUBE	▭
BULK	○
SUBSURFACE WATER DURING DRILLING	▼
SUBSURFACE WATER AFTER DRILLING	▽

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET
LITTLE/NO MOISTURE	JUDGED BELOW OPTIMUM	JUDGED ABOUT OPTIMUM	JUDGED OVER OPTIMUM	SATURATED

TYPICAL CONSISTENCY

COARSE GRAINED SOILS

BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER	
0-10	0-16	LOOSE
11-30	17-50	MEDIUM DENSE
31-50	51-83	DENSE
OVER 50	OVER 83	VERY DENSE

FINE GRAINED SOILS

BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER	
0-2	0-3	VERY SOFT
3-4	4-7	SOFT
5-8	8-13	MEDIUM STIFF
9-15	14-25	STIFF
16-30	26-50	VERY STIFF
OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING			
	# 200	# 40	# 10	# 4	3/4"	3"	12"
SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL ROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL ROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
FRESH	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM; SOME FRACTURES PRESENT; FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY"; FELDSPAR CRYSTALS ARE "CLOUDY"
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

rafting/masters/Boring Log Legend091608.dwg

Earth Systems Pacific

Boring No. 1

PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 2/25/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: orange brown, moist, loose, some fine to coarse gravel (Fill)					
5				5.0-6.5	●			2 2 4
10	SP		POORLY GRADED SAND: gray, moist, loose, trace clay (Alluvium)	10.0-11.5	●			3 4 4
15			medium dense	15.0-16.5	■	109.6	10.6	3 11 17
17			increasing clay content					
20	CL		SANDY LEAN CLAY: orange brown, moist, very stiff	20.0-21.5	■	114.1	13.8	2 12 11
25			hard	25.0-26.5	■	116.9	7.9	5 31 49
26.5			End of Boring @ 26.5' No subsurface water encountered					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: brown, slightly moist, medium dense, trace fine gravel (Fill)					
5			moist	5.0-6.5	●			7 8 10
10	SP		POORLY GRADED SAND: gray, moist, medium dense (Alluvium)	10.0-11.5	●			9 12 11
15	CL		SANDY LEAN CLAY: brown, moist, very stiff	15.0-16.5	▬	122.9	11.8	4 12 25
20				20.0-21.5	▬	114.8	16.4	4 16 27
21.5			interlayered with thin lenses of poorly graded sand					
25				25.0-26.5	▬	117.0	14.3	4 14 23
26.5			End of Boring @ 26.5' No subsurface water encountered					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 3

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: yellow brown, moist, medium dense, trace fine gravel, trace organics (Fill)					
1		▨						
2		▨						
3		▨						
4		▨	increasing clay content					
5		▨		5.0-6.5	■	117.5	9.9	6 15 16
6		▨		6-10	○			
7	SC	▨	CLAYEY SAND: brown, moist, medium dense (Alluvium)					
8		▨						
9		▨						
10		▨		10.0-11.5	■	109.7	18.7	7 15 31
11		▨						
12		▨						
13		▨						
14		▨						
15		▨		15.0-16.5	●			8 8 14
16		▨						
17			End of Boring @ 16.5' No subsurface water encountered					
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling
Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 4

PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 2/25/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE DATA: SAMPLE TYPE	SAMPLE DATA: DRY DENSITY (pcf)	SAMPLE DATA: MOISTURE (%)	SAMPLE DATA: BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: orange brown, slightly moist, loose, trace fine gravel (Fill)	1-5	○			
3		▨	moist, medium dense					
5		▨		5.0-6.5	▬	103.4	7.5	10 11 12
7	SC	▨	CLAYEY SAND: brown, moist, medium dense (Alluvium)					
10		▨		10.0-11.5	●			11 11 10
11		▨	red brown, increasing clay content					
15		▨		15.0-16.5	●			8 8 7
17			End of Boring @ 16.5' No subsurface water encountered					

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 5

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: brown, moist, loose, trace fine to coarse gravel (Fill)					
5		▨		5.0-6.5	●			3 2 2
9		▨	dense, some fine gravel					
10		▨		10.0-11.5	▬	126.4	9.5	9 30 50
13		▨	some concrete and organic debris					
15	SC	▨	CLAYEY SAND: dark brown, moist, medium dense (Alluvium)	15.0-16.5	▬	126.9	8.4	11 19 22
17			End of Boring @ 16.5' No subsurface water encountered					

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 6

PAGE 1 OF 1
JOB NO.: SL-15702-SF
DATE: 2/25/2014

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: orange brown, moist, medium dense, trace coarse gravel (Fill)					
5				5.0-6.5	●			15 8 9
10			dark brown, loose	10.0-11.5	●			5 4 2
13	SC		CLAYEY SAND: dark brown, moist, medium dense (Alluvium)					
15				15.0-16.5	▬	114.5	11.3	4 9 9
18	SP		POORLY GRADED SAND: gray, moist, medium dense					
20				20.0-21.5	▬	99.2	10.3	4 8 9
21	CL		SANDY LEAN CLAY: brown, moist, stiff					
25			▼ gray, wet, very soft, interlayered with thin lenses of well graded sand	25.0-26.5	●			0 1 1
26			End of Boring @ 26.5' Subsurface water encountered at 25.0'					

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 7

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 2
JOB NO.: SL-15702-SF
DATE: 2/26/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: orange brown, loose, moist, some fine to coarse gravel (Fill)					
1								
2								
3								
4								
5				5.0-6.5	●			4 3 3
6								
7								
8								
9								
10				10.0-11.5	●			4 3 4
11								
12			light brown, increasing clay content					
13								
14				14-17	○			
14	SC		CLAYEY SAND: dark brown, medium dense, moist (Alluvium)					
15				15.0-16.5	▬	115.2	12.7	10 15 23
16								
17								
18								
19								
20	CL		SANDY LEAN CLAY: brown, stiff, moist	20.0-21.5	▬	111.5	13.4	5 7 14
21								
22			wet ▽					
23								
24								
25				25.0-26.5	▬	108.9	24.7	4 5 9
26								

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 7

PAGE 2 OF 2
JOB NO.: SL-15702-SF
DATE: 2/26/2014

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	CL	▨	SANDY LEAN CLAY: as above					
30		▨	interlayered with thin lenses of poorly graded sand	30.0-31.5	●			4 6 8
35		▨	gray/brown mottled, trace organics	35.0-36.5	●			0 4 7
40		▨		40.0-41.5	●			1 4 7
45		▨	very stiff	45.0-46.5	●			5 8 8
50		▨	stiff	50.0-51.5	●			3 5 7
52			End of Boring @ 51.5' Subsurface water encountered @ 22.5'					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 8

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

PAGE 1 OF 2
JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC		CLAYEY SAND: dark brown, medium dense, moist, trace coarse gravel (Fill)					
1								
2								
3								
4								
5	SC		CLAYEY SAND: dark gray brown, medium dense, moist, trace fine gravel (Alluvium)					
6								
7	CL		SANDY LEAN CLAY: brown, stiff, moist, trace fine roots					
8								
9								
10								
11								
12			increasing sand content					
13								
14			decreasing sand content					
15								
16								
17								
18								
19	SP		POORLY GRADED SAND: brown, medium dense, moist					
20								
21			light yellow brown					
22								
23								
24			▽					1
25			loose, wet, trace fine to coarse gravel	25.0-26.5	●			2 3
26								

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 8

PAGE 2 OF 2
JOB NO.: SL-15702-SF
DATE: 4/30/2014

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: as above					
30			dense	30.0-31.5	●			8 18 23
35	ML		SANDY SILT: green gray, hard, moist, trace clay, trace fine shells	35.0-36.5	●			8 16 20
40				40.0-41.5	●			7 15 26
45			very stiff	45.0-46.5	●			7 12 16
50				50.0-51.5	●			6 12 18
52			End of Boring @ 51.5' Subsurface water encountered between 24.5' & 34.5'					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

Boring No. 9

PAGE 1 OF 2
JOB NO.: SL-15702-SF
DATE: 4/30/2014

DEPTH (feet)	USCS CLASS	SYMBOL	HERITAGE RIDGE APARTMENTS North of Calle Koral and Camino Vista Goleta, California SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0 1 2 3 4	SC	▩	CLAYEY SAND: dark brown, medium dense, moist, trace fine gravel, trace brick fragments and debris (Fill)					
5 6 7 8 9 10 11	CL	▧	SANDY LEAN CLAY: brown, stiff, moist (Alluvium)					
12 13 14 15 16 17 18	SC	▩	CLAYEY SAND: orange brown, medium dense, moist					
19 20 21 22 23 24 25 26	SP	░	POORLY GRADED SAND: yellow brown, dense, moist					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

Boring No. 9
PAGE 2 OF 2
JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: as above					
29			loose, wet ▼					
30				30.0-31.5	●			2 3 6
35	SM		SILTY SAND: light gray/light orange brown mottled, medium dense, wet	35.0-36.5	●			5 9 11
37	ML		SANDY SILT: dark gray, very stiff, moist, trace fine shells					
40				40.0-41.5	●			5 10 14
45				45.0-46.5	●			4 8 13
50				50.0-51.5	●			5 11 15
51.5			End of Boring @ 51.5' Subsurface water encountered between 29.0' & 37.0'					

LEGEND: ▬ Ring Sample ○ Grab Sample ☐ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 10

PAGE 1 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: orange brown, medium dense, moist (Fill)					
6	ML	▧	SILTY SAND: brown, medium dense, moist, trace clay (Alluvium)					
14	SC	▨	CLAYEY SAND: brown, medium dense, moist					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

Boring No. 10

PAGE 2 OF 2
JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SC		CLAYEY SAND: as above					
30	SP		POORLY GRADED SAND: light brown, medium dense, moist					
36	SM		▼ SILTY SAND: light brown, dense, wet					
40				40.0-41.5	●			5 13 19
41.5			End of Boring @ 41.5' Subsurface water encountered at 36.0'					

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Boring No. 11

PAGE 1 OF 2
JOB NO.: SL-15702-SF
DATE: 4/30/2014

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SC	▨	CLAYEY SAND: brown, loose, slightly moist, trace fine to coarse gravel (Fill)					
1		▨						
2		▨						
3		▨						
4		▨						
5		▨						
6		▨						
7		▨	moist					
8		▨						
9		▨						
10		▨						
11		▨						
12		▨						
13		▨						
14		▨						
15	SM	▥	SILTY SAND WITH CLAY: dark gray brown, medium dense, moist, trace clay (Alluvium)					
16		▥						
17		▥						
18		▥						
19		▥						
20		▥						
21		▥						
22		▥						
23		▥						
24		▥						
25		▥						
26		▥						

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 11

PAGE 2 OF 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-15702-SF
DATE: 4/30/2014

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: gray brown, medium dense, very moist					
30	CL		SANDY LEAN CLAY: dark brown, stiff, moist					
38	SC		▽ CLAYEY SAND: brown to dark brown, loose, wet, trace silt					
40				40.0-41.5	●			1 4 3
45	CL		SANDY LEAN CLAY: dark gray/olive brown mottled, very stiff, very moist, trace organics, some silt	45.0-46.5	●			2 7 9
49	SC		CLAYEY SAND: dark gray/olive brown mottled, loose, wet	50.0-51.5	●			1 6 6
52			End of Boring @ 51.5' Subsurface water encountered between 38.0' to 45.0' and 49.0'					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

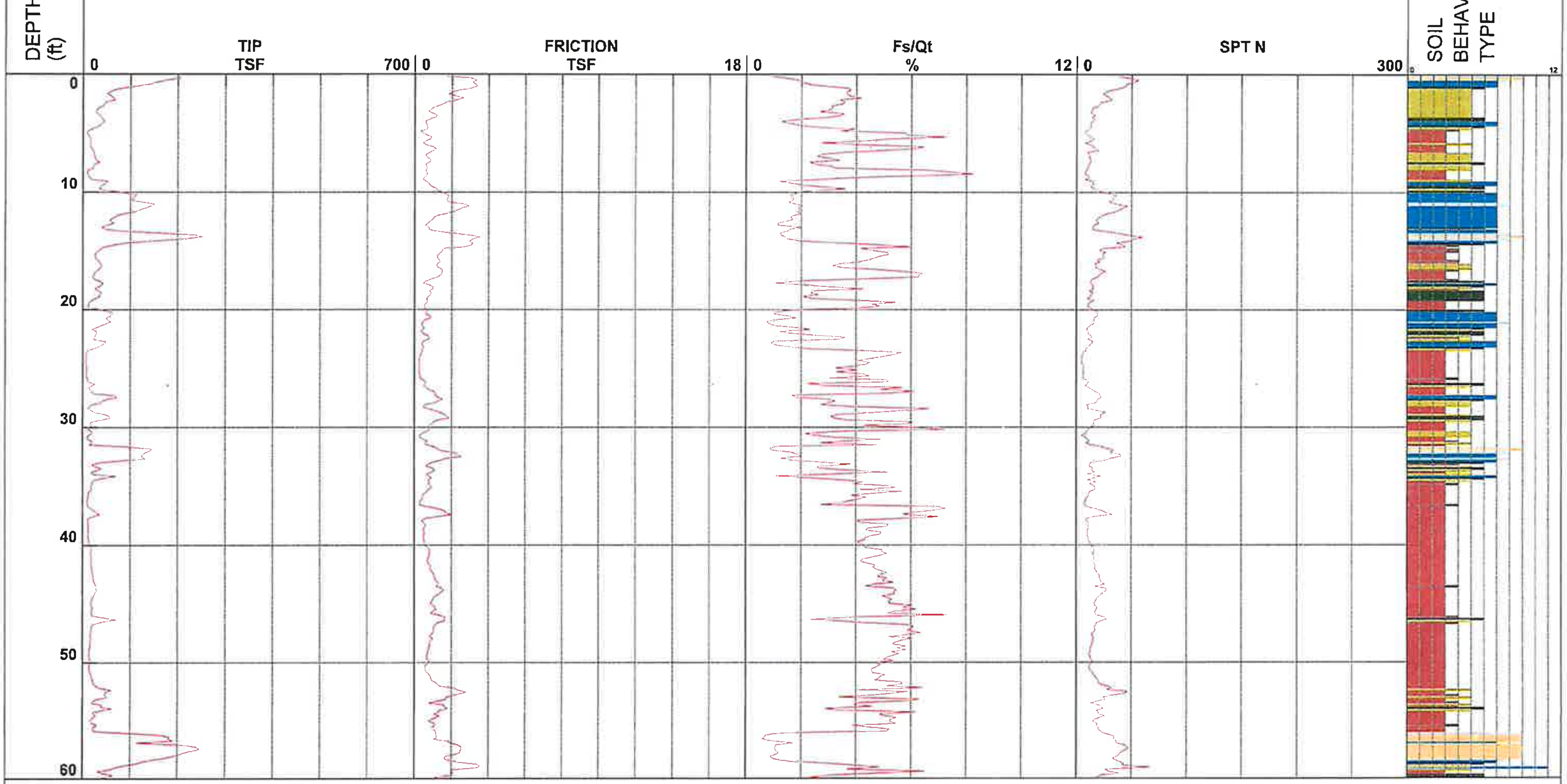
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Project	Willow Springs Apt	Operator	BH-MM	Filename	SDF(821).cpt
Job Number	SL-15702-SF	Cone Number	DDG1281	GPS	
Hole Number	CPT-01	Date and Time	5/21/2014 10:56:58 AM	Maximum Depth	60.53 ft
EST GW Depth During Test	30.00 ft				

Net Area Ratio .8

CPT DATA



- ▨ 1 - sensitive fine grained
- ▨ 2 - organic material
- 🟥 3 - clay
- ▨ 4 - silty clay to clay
- ▨ 5 - clayey silt to silty clay
- ■ 6 - sandy silt to clayey silt
- 🟦 7 - silty sand to sandy silt
- ▨ 8 - sand to silty sand
- ▨ 9 - sand
- ▨ 10 - gravelly sand to sand
- ▨ 11 - very stiff fine grained (*)
- 🟦 12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems Pacific

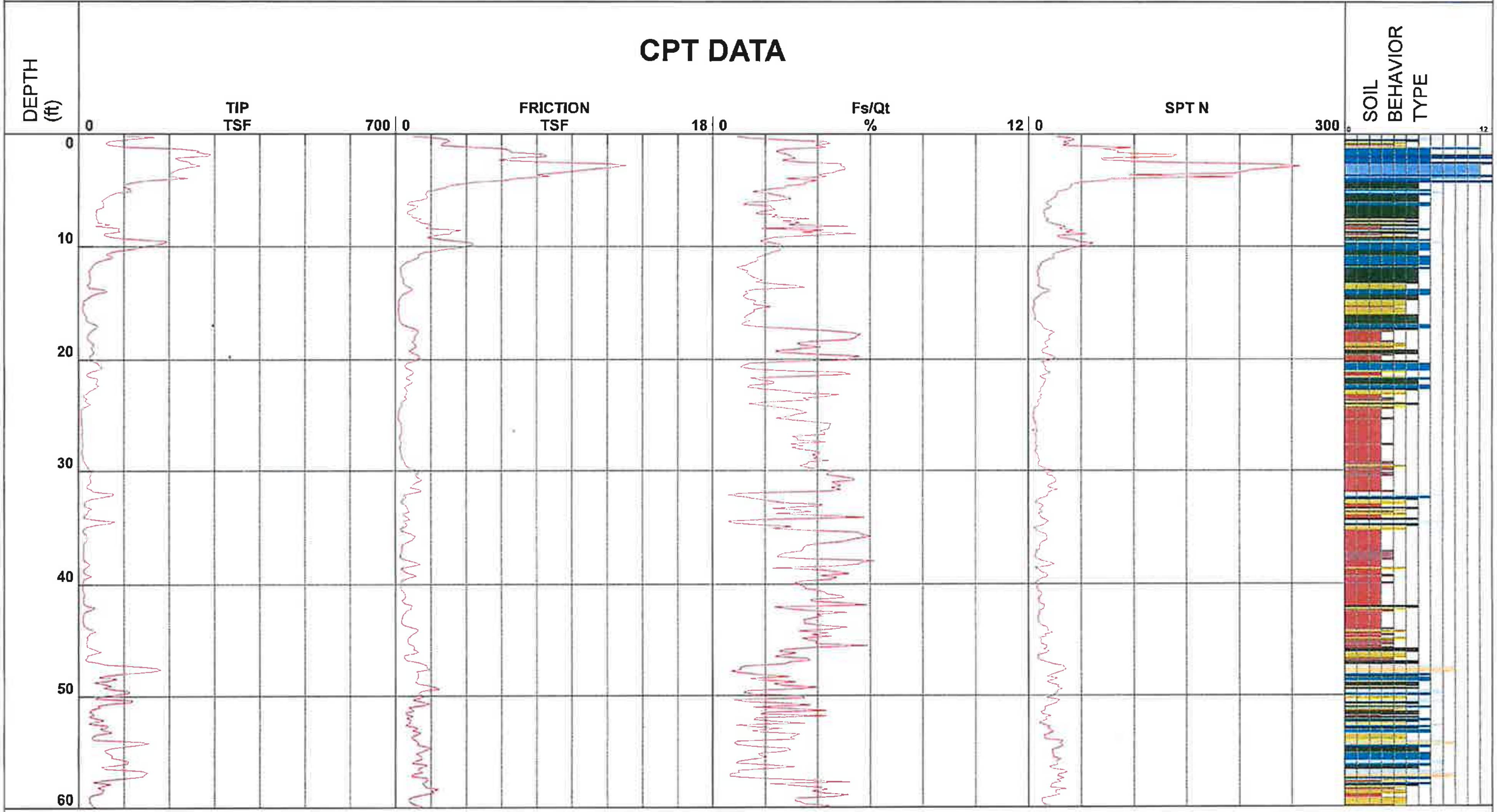
Project: Willow Springs Apt
Job Number: SL-15702-SF
Hole Number: CPT-02
EST GW Depth During Test: 30.00 ft

Operator: BH-MM
Cone Number: DDG1281
Date and Time: 5/21/2014 11:55:25 AM

Filename: SDF(822).cpt
GPS:
Maximum Depth: 60.53 ft

Net Area Ratio .8

CPT DATA



- 1 - sensitive fine grained
- ▨ 2 - organic material
- 🟥 3 - clay
- ▨ 4 - silty clay to clay
- ▨ 5 - clayey silt to silty clay
- ■ 6 - sandy silt to clayey silt
- 🟦 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 🟥 10 - gravelly sand to sand
- ▨ 11 - very stiff fine grained (*)
- 🟦 12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems Pacific

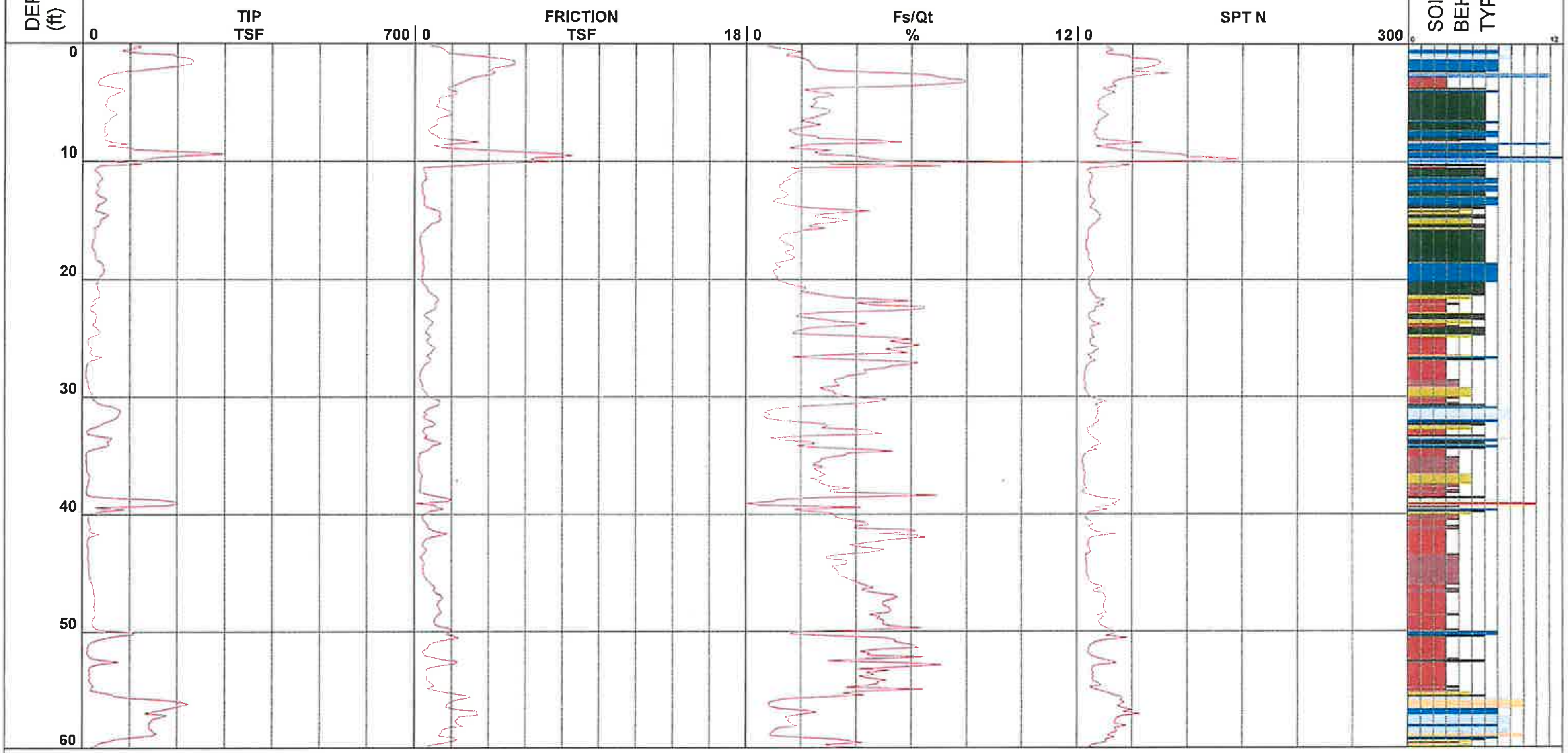
Project Willow Springs Apt
Job Number SL-15702-SF
Hole Number CPT-03
EST GW Depth During Test 30.00 ft

Operator BH-MM
Cone Number DDG1281
Date and Time 5/21/2014 10:13:33 AM

Filename SDF(820).cpt
GPS
Maximum Depth 60.53 ft

Net Area Ratio .8

CPT DATA



- ▨ 1 - sensitive fine grained
- ▨ 2 - organic material
- 🟥 3 - clay
- ▨ 4 - silty clay to clay
- ▨ 5 - clayey silt to silty clay
- ■ 6 - sandy silt to clayey silt
- 🟦 7 - silty sand to sandy silt
- 8 - sand to silty sand
- ▨ 9 - sand
- 🟥 10 - gravelly sand to sand
- ▨ 11 - very stiff fine grained (*)
- 🟦 12 - sand to clayey sand (*)

Cone Size 10cm squared

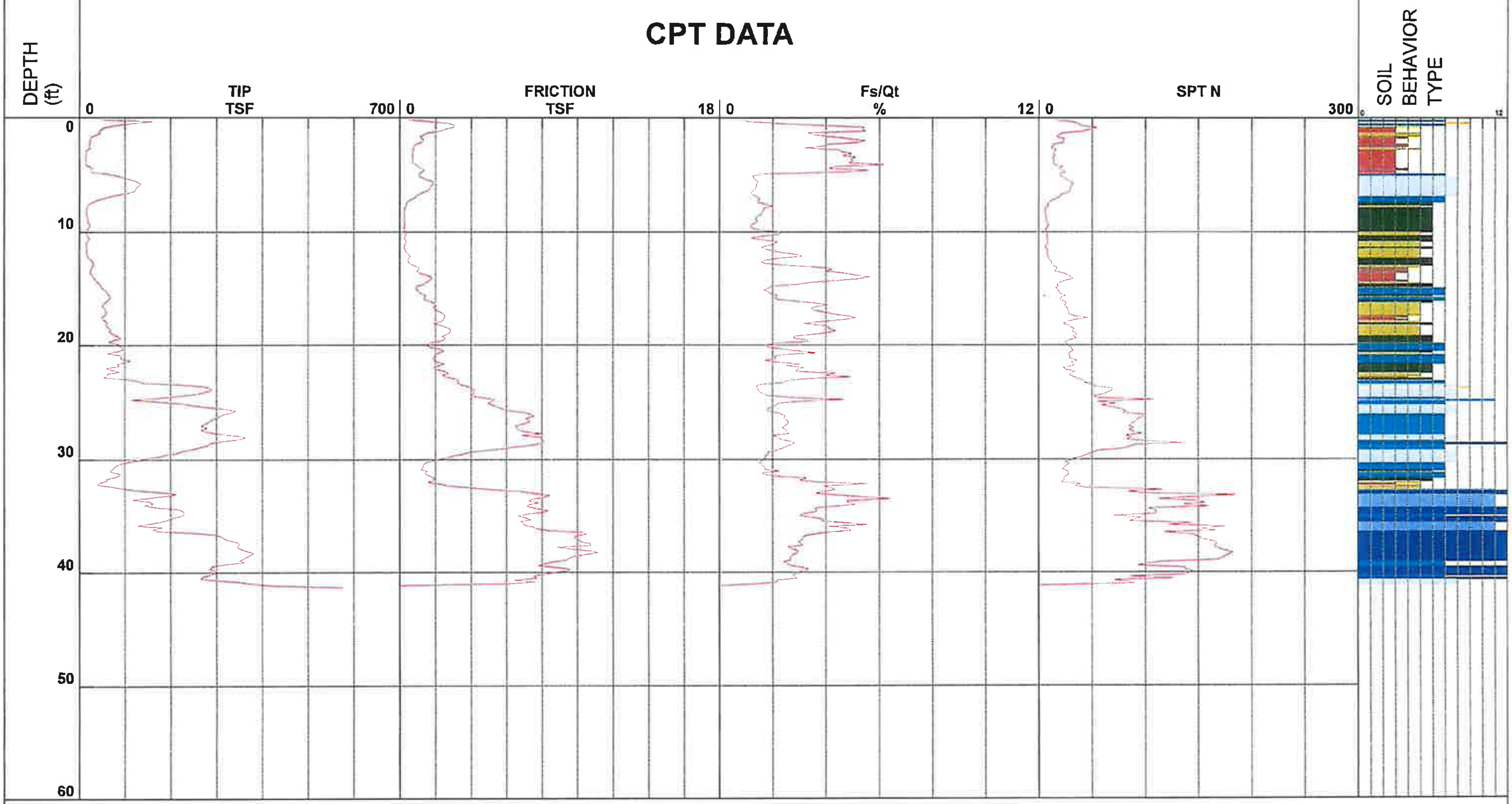
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems Pacific

Project	Willow Springs Apt	Operator	BH-MM	Filename	SDF(819).cpt
Job Number	SL-15702-SF	Cone Number	DDG1281	GPS	
Hole Number	CPT-04	Date and Time	5/21/2014 9:29:51 AM	Maximum Depth	41.34 ft
EST GW Depth During Test		27.00 ft			

Net Area Ratio .8

CPT DATA



- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

Cone Size 10cm squared

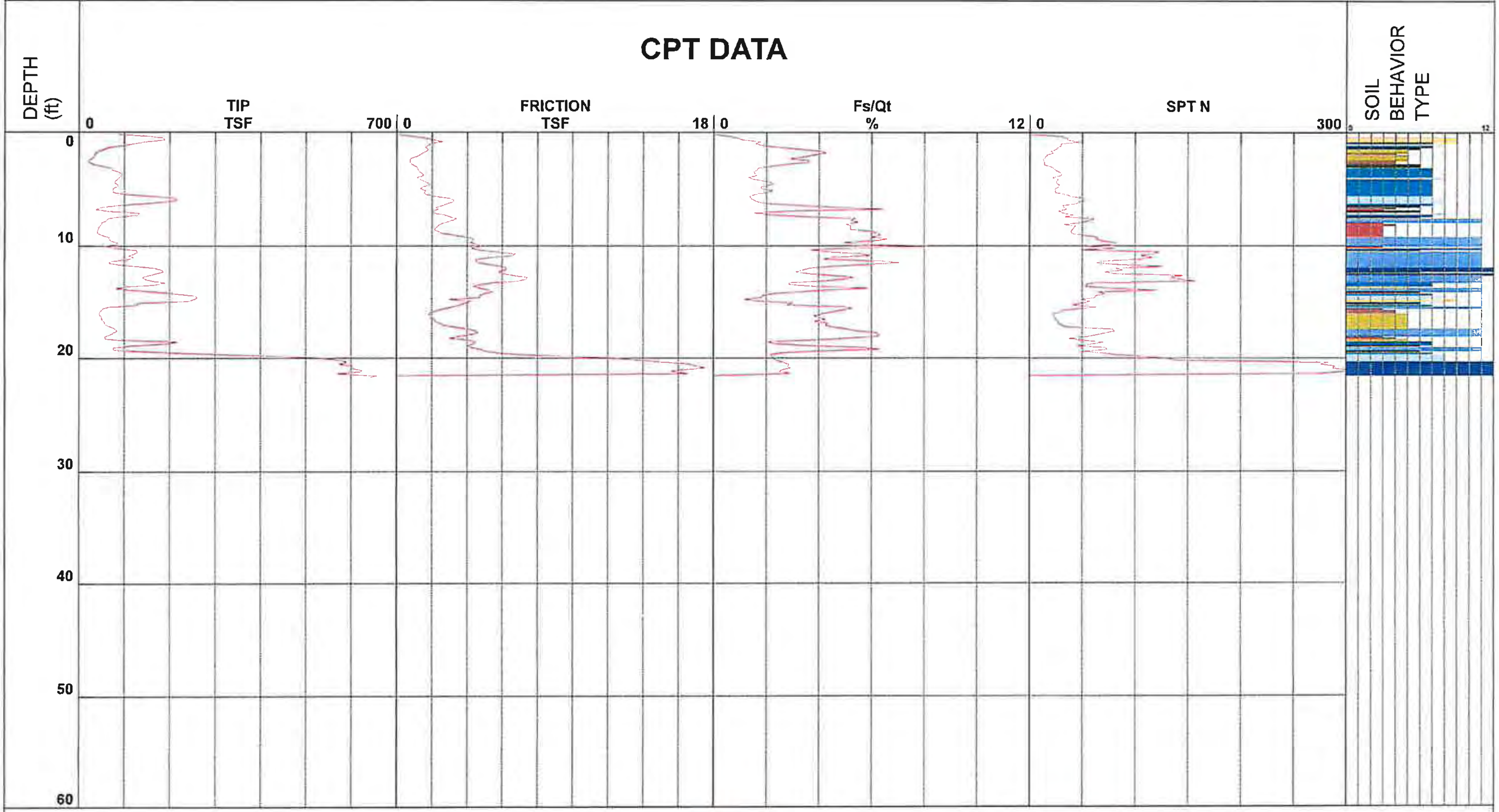
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems Pacific

Project	Willow Springs Apt	Operator	BH-MM	Filename	SDF(818).cpt
Job Number	SL-15702-SF	Cone Number	DDG1281	GPS	
Hole Number	CPT-05	Date and Time	5/21/2014 9:01:32 AM	Maximum Depth	21.65 ft
EST GW Depth During Test		21.65 ft			

Net Area Ratio .8

CPT DATA



- ▨ 1 - sensitive fine grained
- ■ 2 - organic material
- 🟥 3 - clay
- ▨ 4 - silty clay to clay
- ▨ 5 - clayey silt to silty clay
- ■ 6 - sandy silt to clayey silt
- 🟦 7 - silty sand to sandy silt
- ▨ 8 - sand to silty sand
- ▨ 9 - sand
- 🟥 10 - gravelly sand to sand
- ▨ 11 - very stiff fine grained (*)
- 🟦 12 - sand to clayey sand (*)

Cone Size 10cm squared

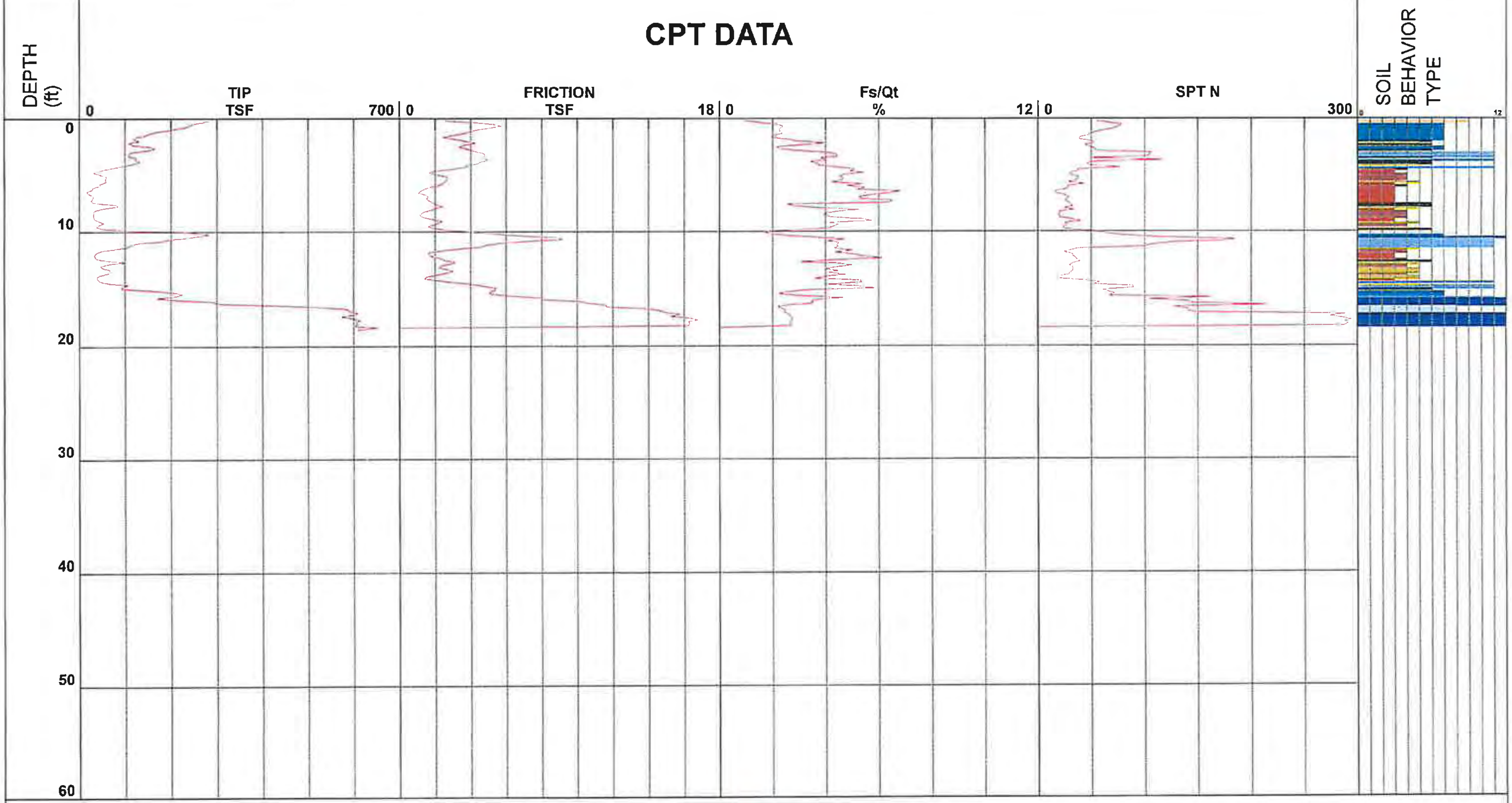
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems Pacific

Project	Willow Springs Apt	Operator	BH-MM	Filename	SDF(817).cpt
Job Number	SL-15702-SF	Cone Number	DDG1281	GPS	
Hole Number	CPT-06	Date and Time	5/21/2014 8:29:47 AM	Maximum Depth	18.54 ft
EST GW Depth During Test	18.54 ft				

Net Area Ratio .8

CPT DATA



- ▒ 1 - sensitive fine grained
- ▨ 2 - organic material
- 🟥 3 - clay
- ■ 4 - silty clay to clay
- ▨ 5 - clayey silt to silty clay
- ■ 6 - sandy silt to clayey silt
- 🟦 7 - silty sand to sandy silt
- ▒ 8 - sand to silty sand
- ▒ 9 - sand
- 🟥 10 - gravelly sand to sand
- ▨ 11 - very stiff fine grained (*)
- 🟦 12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

APPENDIX B

Laboratory Test Results (from Reference 2)

BULK DENSITY TEST RESULTS

ASTM D 2937-10 (modified for ring liners)

March 17, 2014

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1	16.0 - 16.5	10.6	121.2	109.6
1	21.0 - 21.5	13.8	129.9	114.1
1	26.0 - 26.5	7.9	126.2	116.9
2	16.0 - 16.5	11.8	137.4	122.9
2	21.0 - 21.5	16.4	133.6	114.8
2	26.0 - 26.5	14.3	133.7	117.0
3	6.0 - 6.5	9.9	129.1	117.5
3	11.0 - 11.5	18.7	130.3	109.7
4	6.0 - 6.5	7.5	111.2	103.4
5	11.0 - 11.5	9.5	138.4	126.4
5	16.0 - 16.5	8.4	137.6	126.9
6	16.0 - 16.5	11.3	127.5	114.5
6	21.0 - 21.5	10.3	109.5	99.2
7	16.0 - 16.5	12.7	129.7	115.2
7	21.0 - 21.5	13.4	126.5	111.5
7	26.0 - 26.5	24.7	135.8	108.9

Heritage Ridge Apartments SL-15702-SF

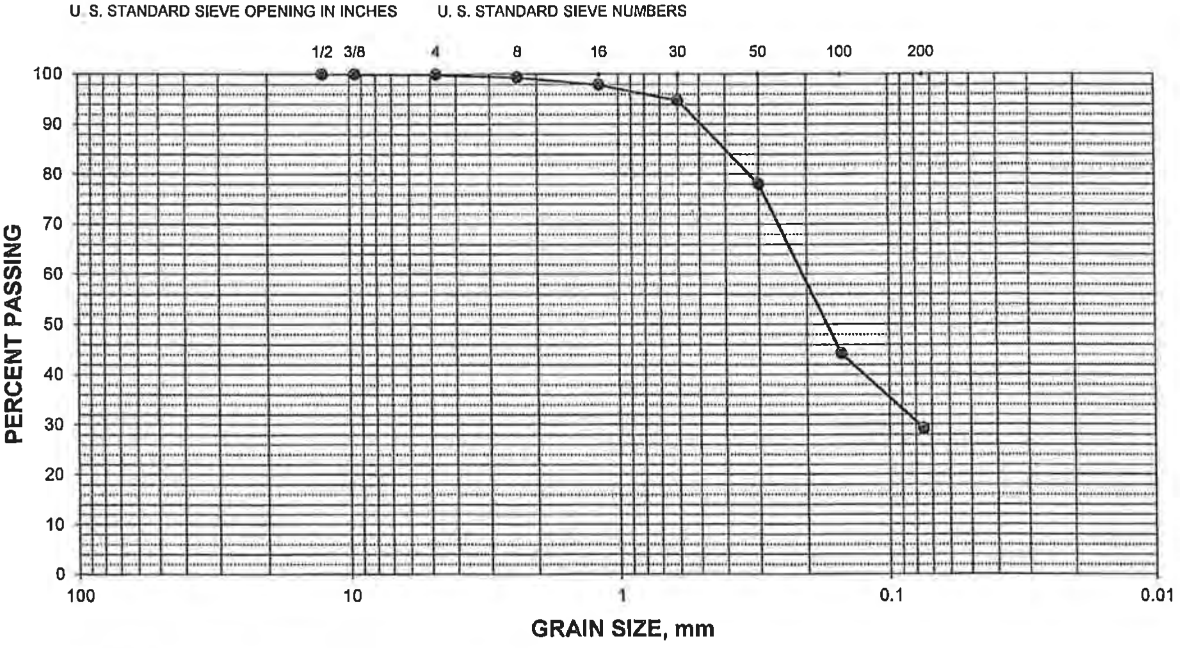
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-00/06

Boring #3 @ 6.0 - 10.0'
Clayey Sand (SC)

March 17, 2014

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	2	98
#30 (600-µm)	5	95
#50 (300-µm)	22	78
#100 (150-µm)	56	44
#200 (75-µm)	71	29



MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12

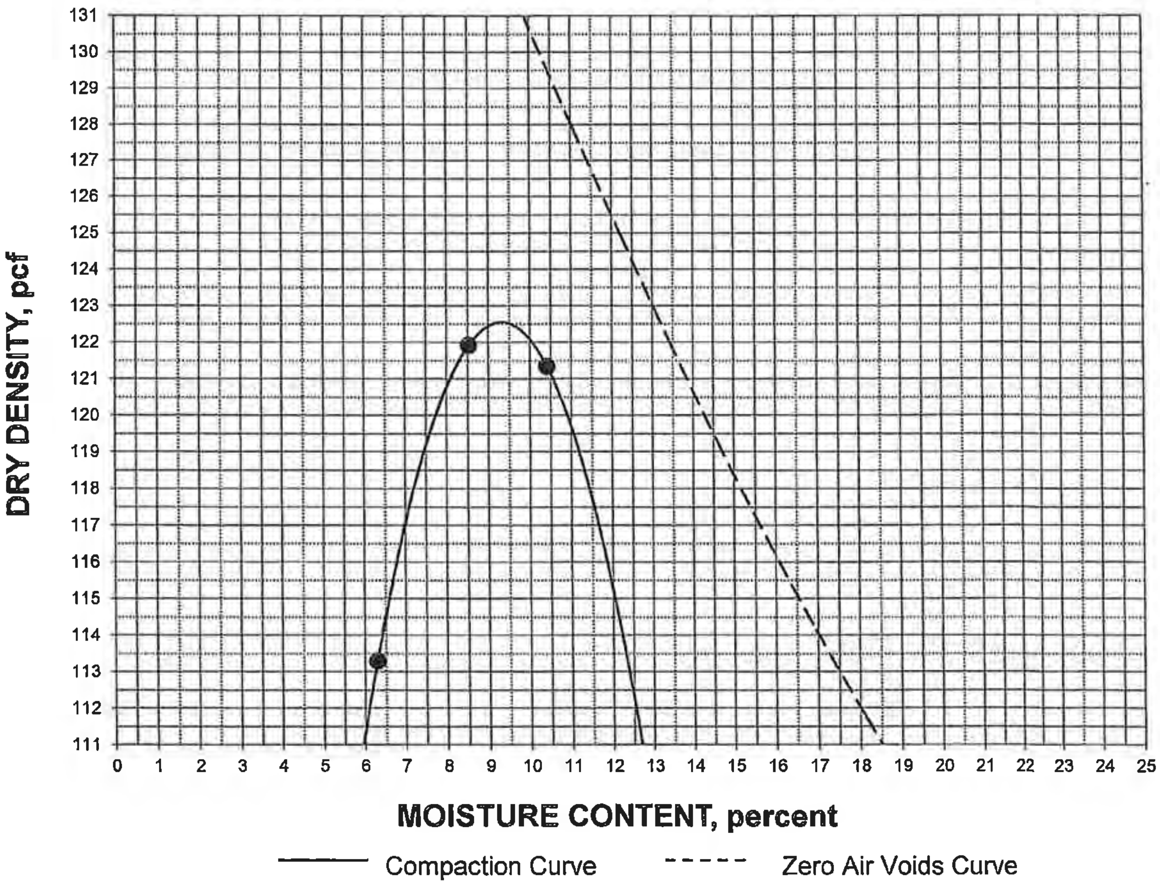
PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.65 (assumed)

March 17, 2014
Boring #3 @ 6.0 - 10.0'
Clayey Sand (SC)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 122.5 pcf
OPTIMUM MOISTURE: 9.3%



DIRECT SHEAR

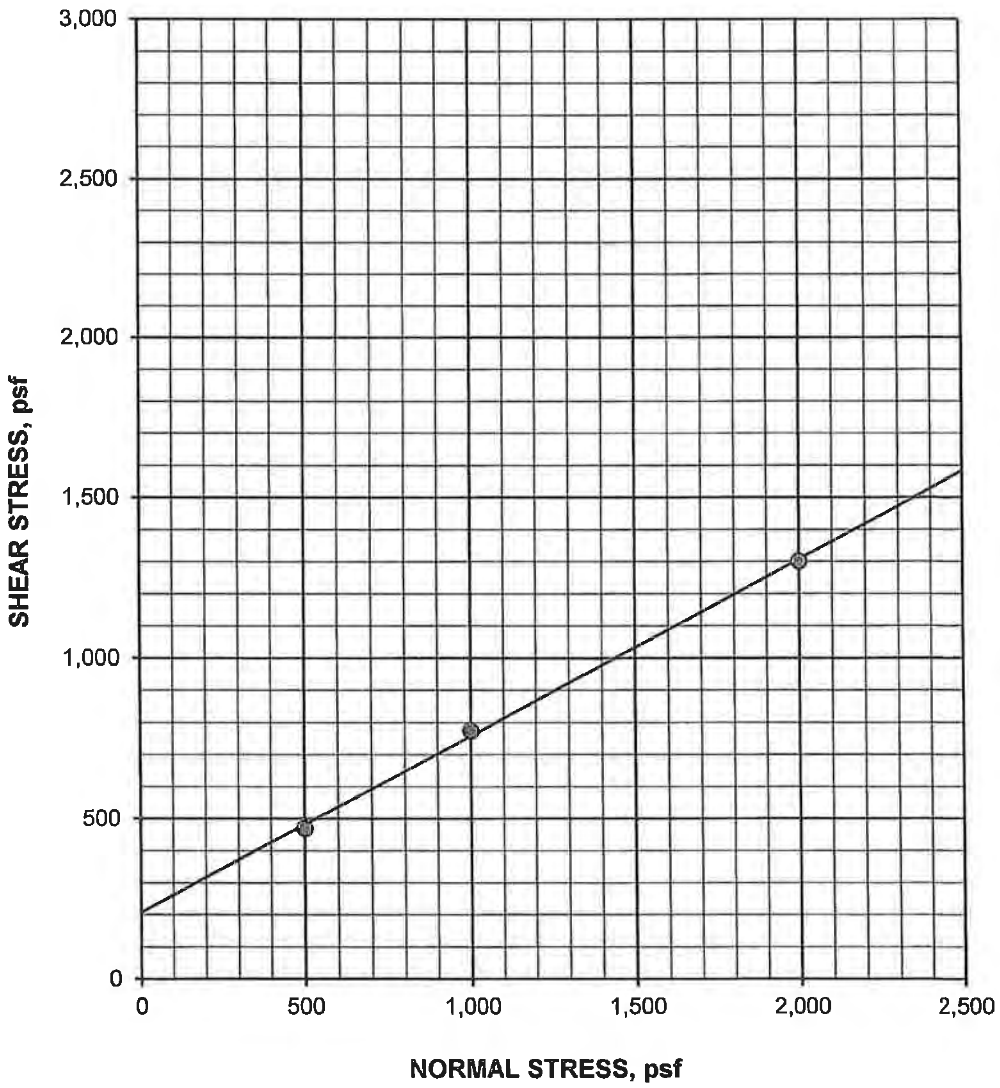
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

March 17, 2014

Boring #3 @ 6.0 - 10.0'
Clayey Sand (SC)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 110.3 pcf
INITIAL MOISTURE CONTENT: 9.3 %
PEAK SHEAR ANGLE (Ø): 29°
COHESION (C): 208 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

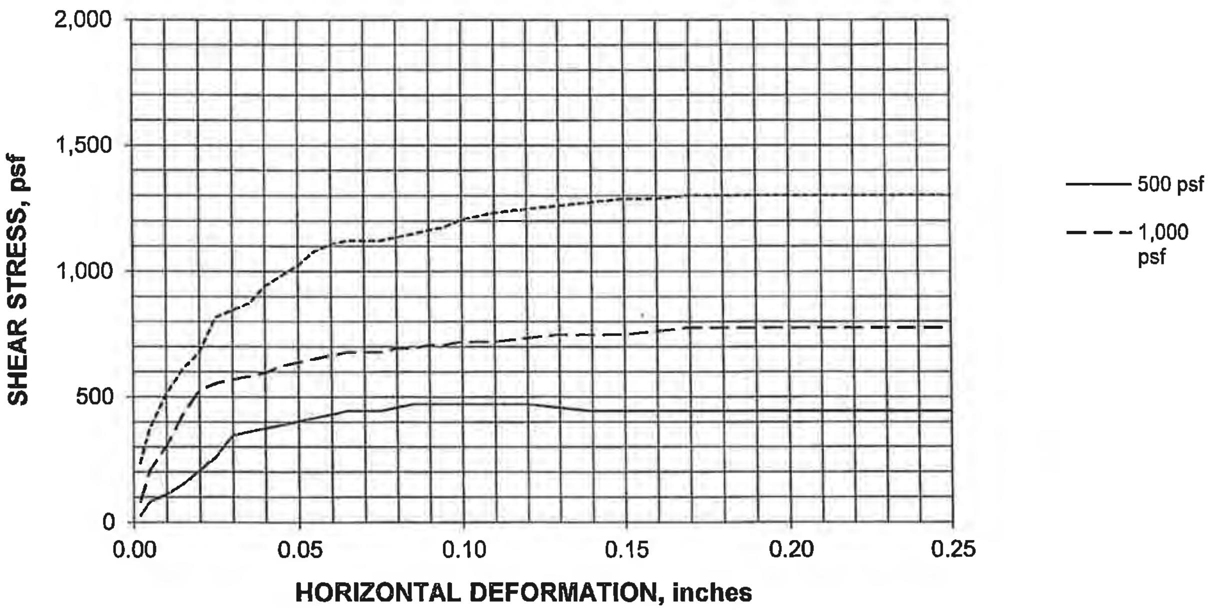
Boring #3 @ 6.0 - 10.0'
March 17, 2014

Clayey Sand (SC)

Compacted to 90% RC, saturated

SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	**1**	**2**	**3**	**AVERAGE**
INITIAL				
WATER CONTENT, %	9.3	9.3	9.3	9.3
DRY DENSITY, pcf	110.3	110.3	110.3	110.3
SATURATION, %	49.4	49.4	49.4	49.4
VOID RATIO	0.499	0.499	0.499	0.499
DIAMETER, inches	2.375	2.375	2.375	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	19.4	19.8	19.9	
DRY DENSITY, pcf	111.4	112.8	117.6	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.484	0.466	0.406	
HEIGHT, inches	0.99	0.98	0.94	



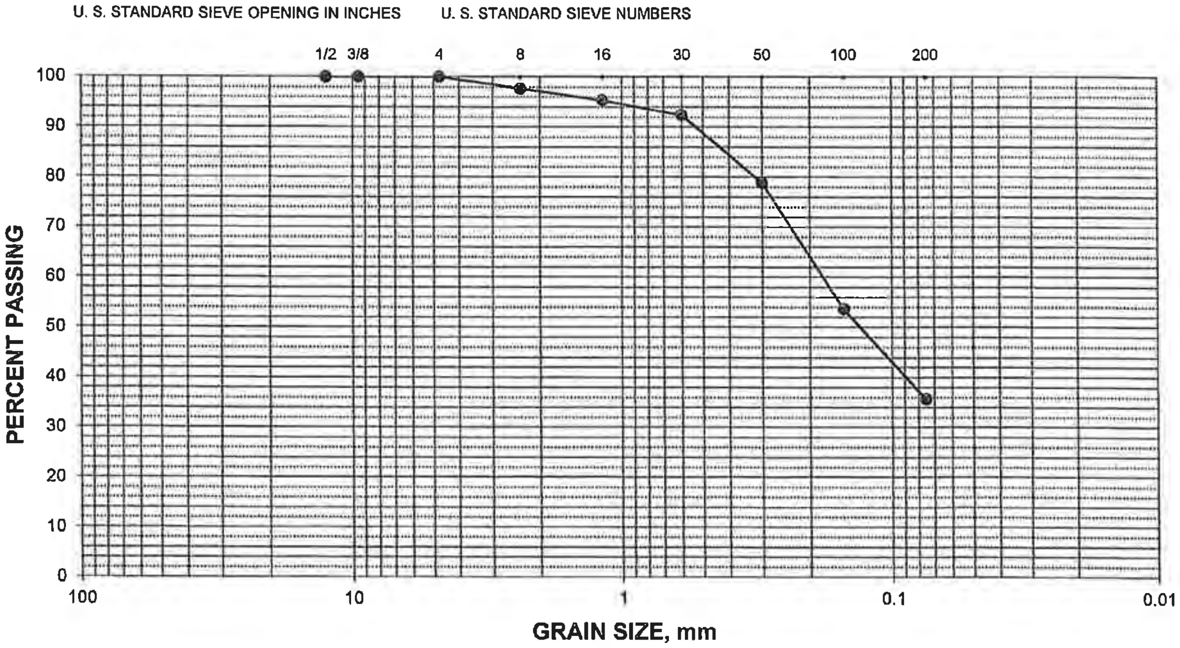
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-00/06

Boring #4 @ 1.0 - 5.0'
Clayey Sand (SC)

March 17, 2014

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	2	98
#16 (1.18-mm)	5	95
#30 (600-µm)	8	92
#50 (300-µm)	21	79
#100 (150-µm)	46	54
#200 (75-µm)	64	36



MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

March 17, 2014

Boring #4 @ 1.0 - 5.0'

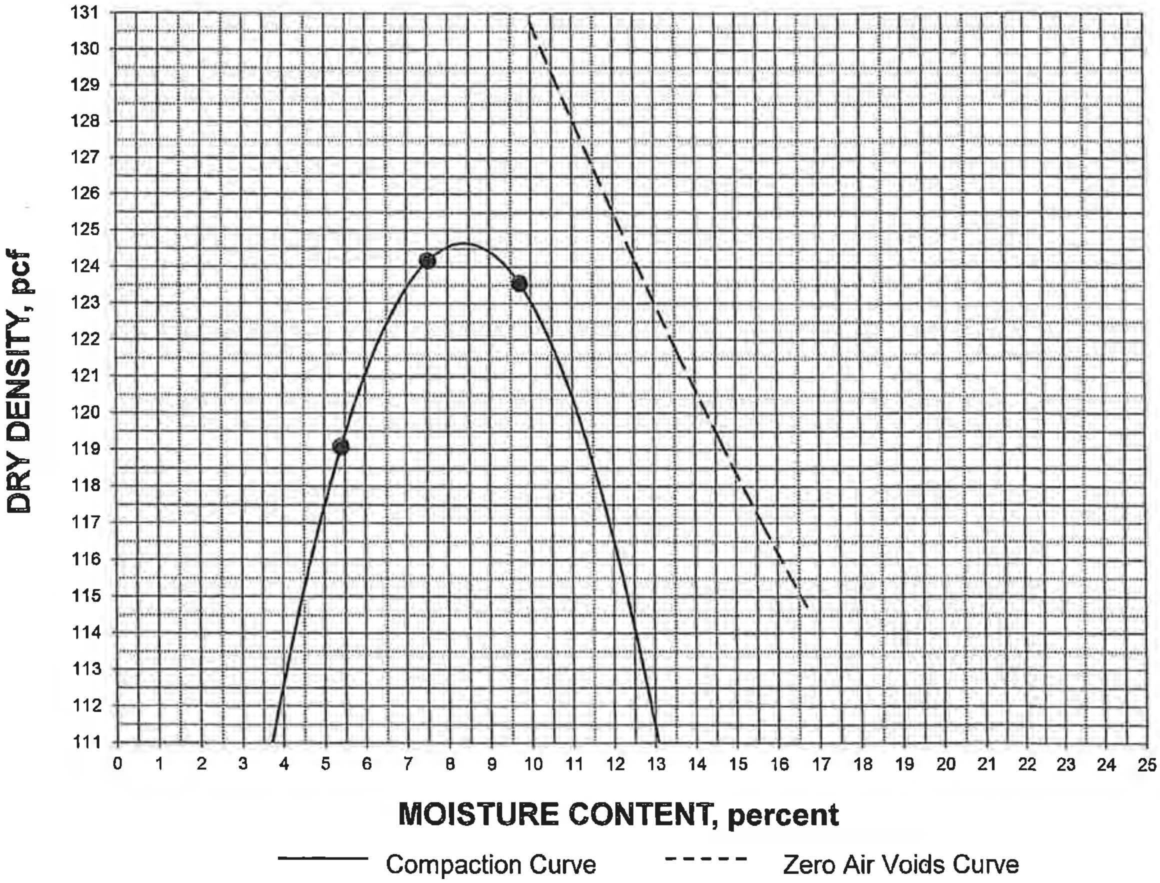
Clayey Sand (SC)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 124.6 pcf

OPTIMUM MOISTURE: 8.4%



DIRECT SHEAR

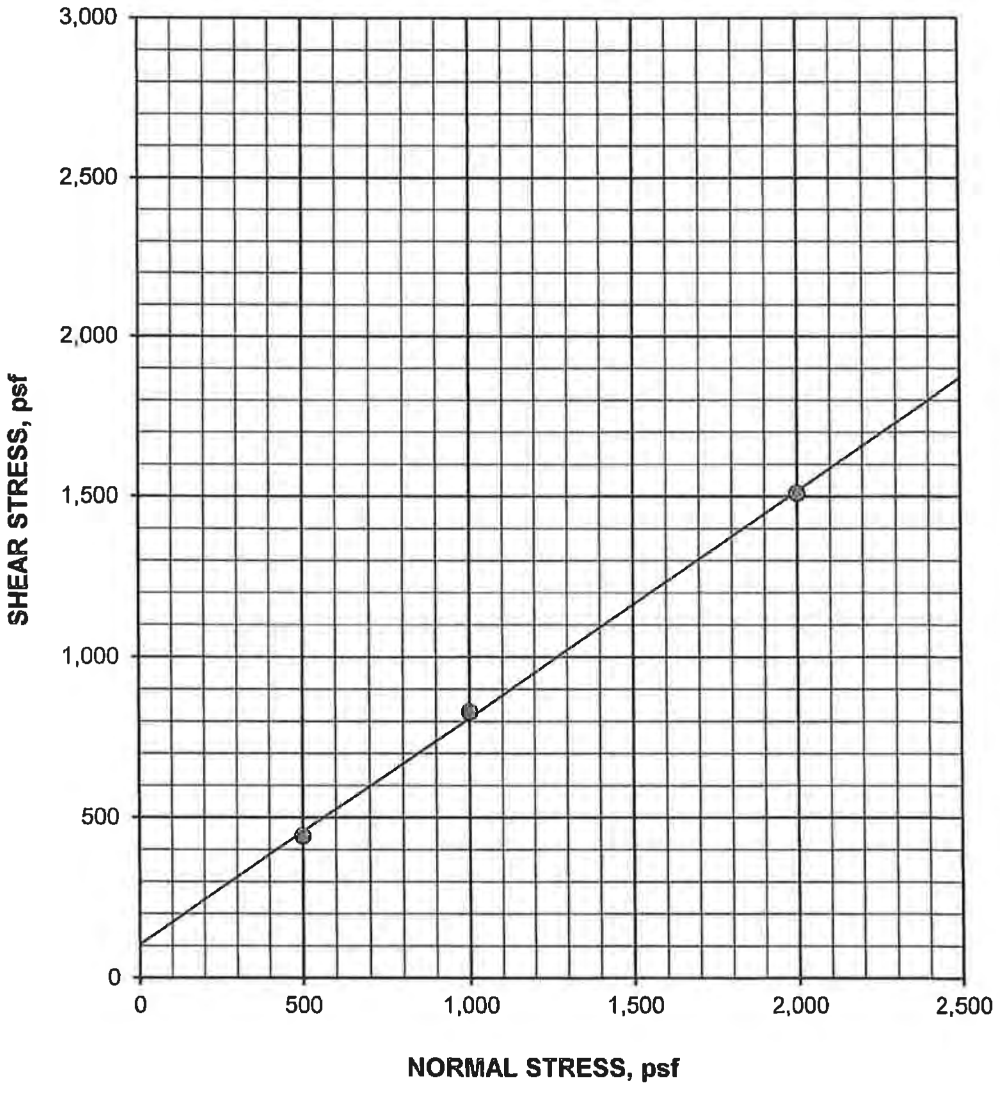
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

March 17, 2014

Boring #4 @ 1.0 - 5.0'
Clayey Sand (SC)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 112.2 pcf
INITIAL MOISTURE CONTENT: 8.4 %
PEAK SHEAR ANGLE (Ø): 35°
COHESION (C): 104 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #4 @ 1.0 - 5.0'

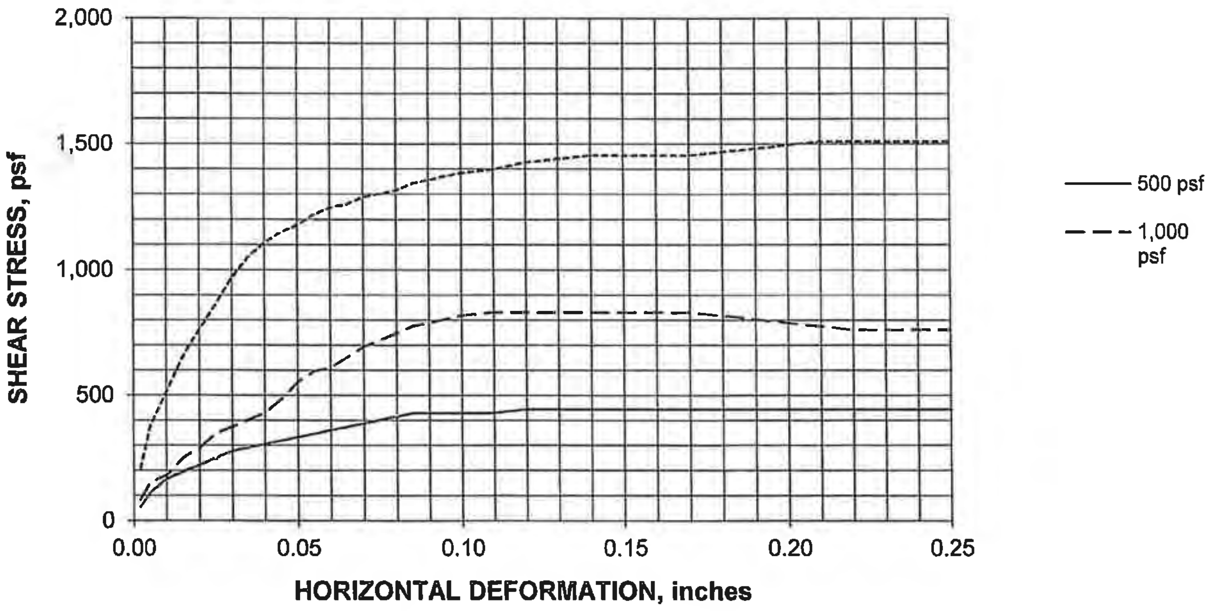
March 17, 2014

Clayey Sand (SC)

Compacted to 90% RC, saturated

SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	**1**	**2**	**3**	**AVERAGE**
INITIAL				
WATER CONTENT, %	8.4	8.4	8.4	8.4
DRY DENSITY, pcf	112.2	112.2	112.2	112.2
SATURATION, %	47.0	47.0	47.0	47.0
VOID RATIO	0.474	0.474	0.474	0.474
DIAMETER, inches	2.375	2.375	2.375	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	18.0	17.6	17.0	
DRY DENSITY, pcf	113.0	113.9	119.0	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.464	0.452	0.390	
HEIGHT, inches	0.99	0.99	0.94	



CONSOLIDATION TEST

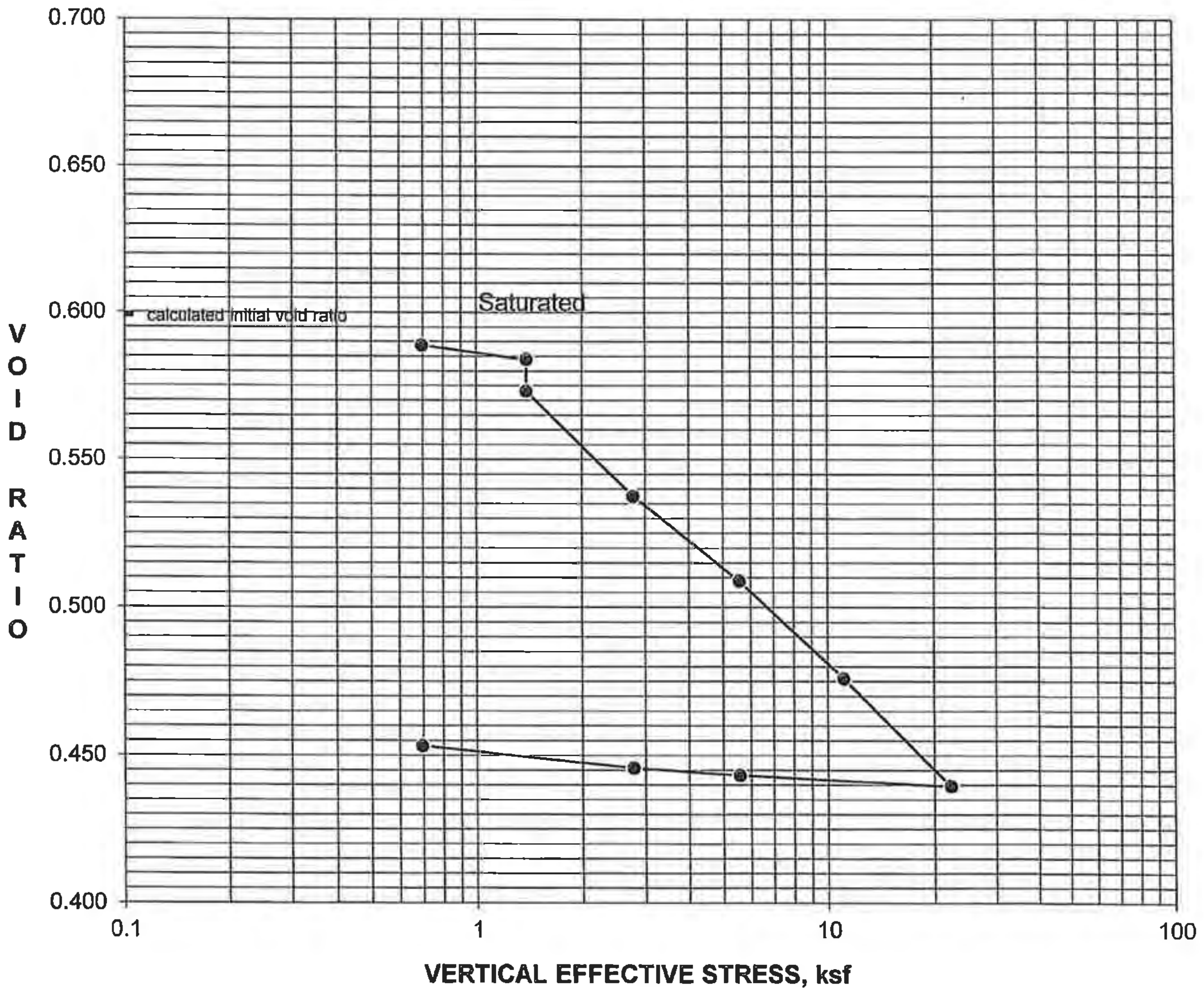
ASTM D 2435/D2435M-11

March 17, 2014

Boring #4 @ 6.0 - 6.5'
Clayey Sand (SC)
Ring Sample

DRY DENSITY: 103.5 pcf
MOISTURE CONTENT: 7.5%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.599

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



CONSOLIDATION TEST

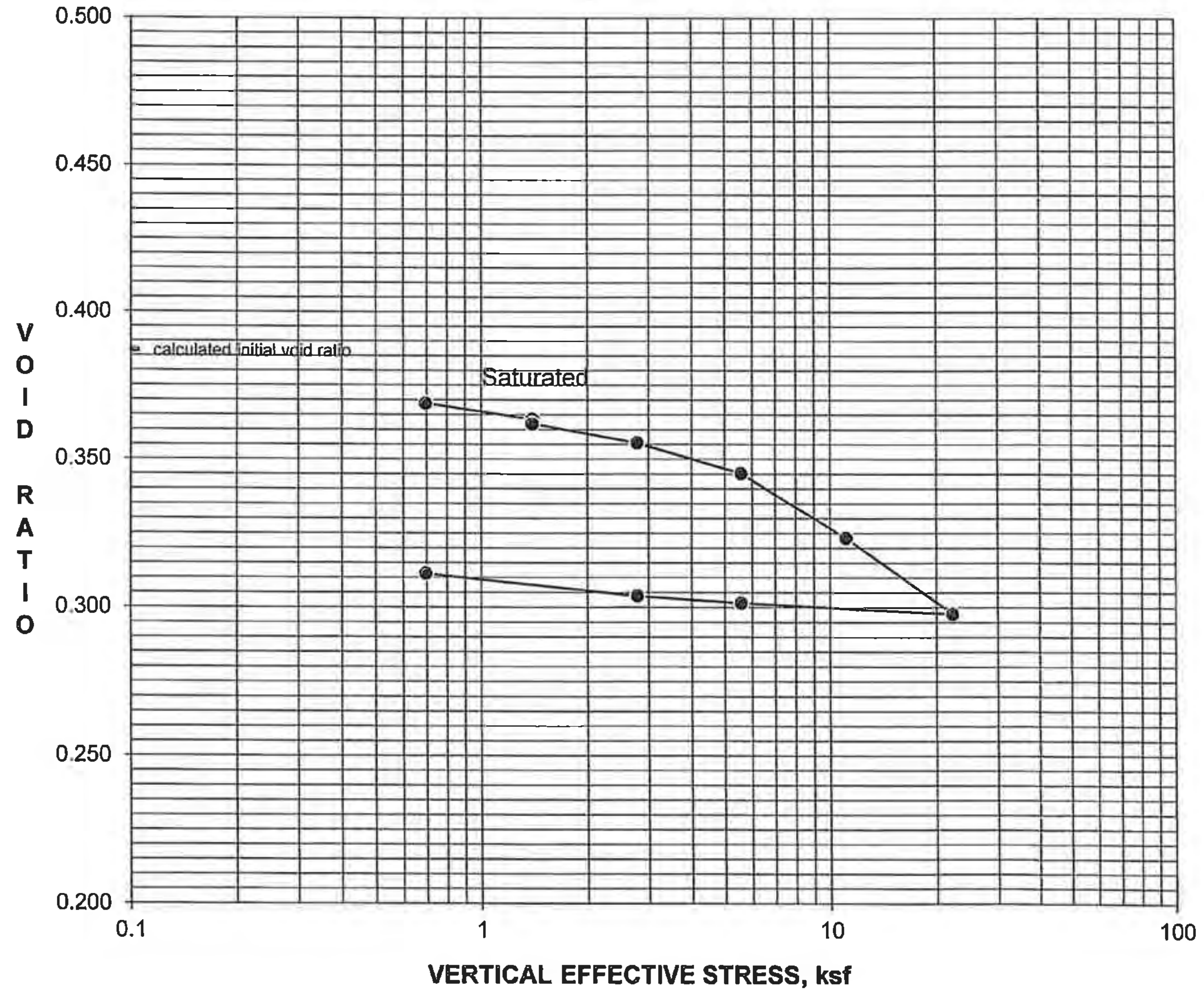
ASTM D 2435/D2435M-11

March 17, 2014

Boring #6 @ 16.0 - 16.5'
Clayey Sand (SC)
Ring Sample

DRY DENSITY: 119.3 pcf
MOISTURE CONTENT: 11.3%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.387

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



Heritage Ridge Apartments SL-15702-SF

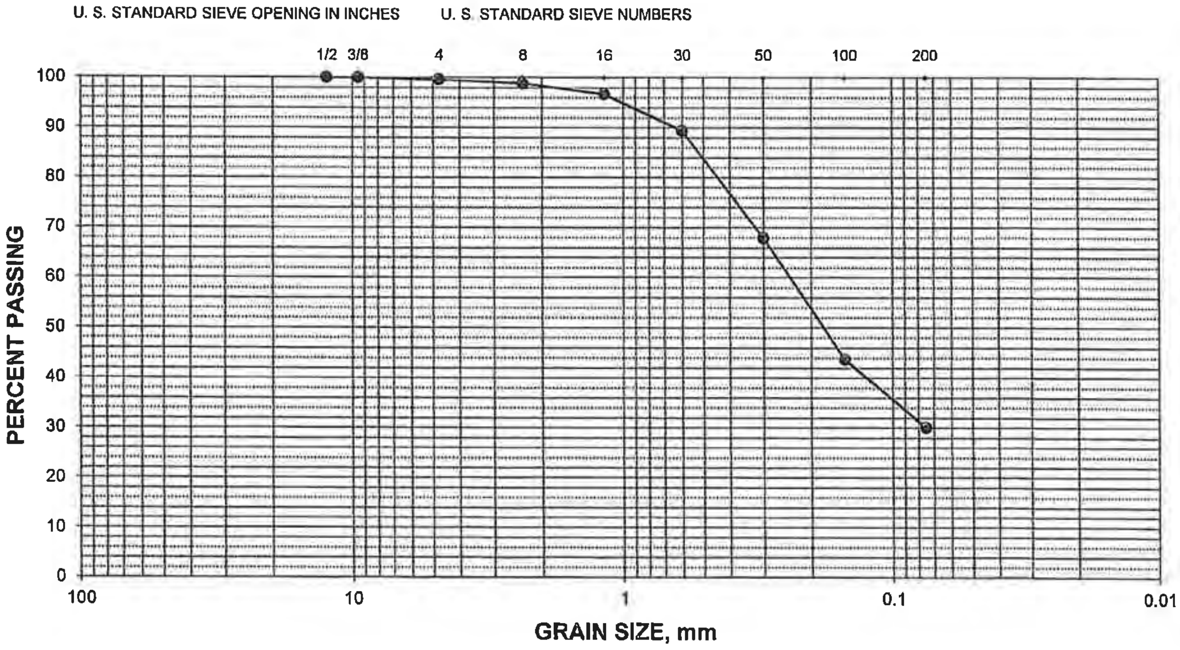
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-00/06

Boring #7 @ 30.0 - 31.5'
Clayey Sand (SC)

March 17, 2014

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	3	97
#30 (600-μm)	11	89
#50 (300-μm)	32	68
#100 (150-μm)	56	44
#200 (75-μm)	70	30



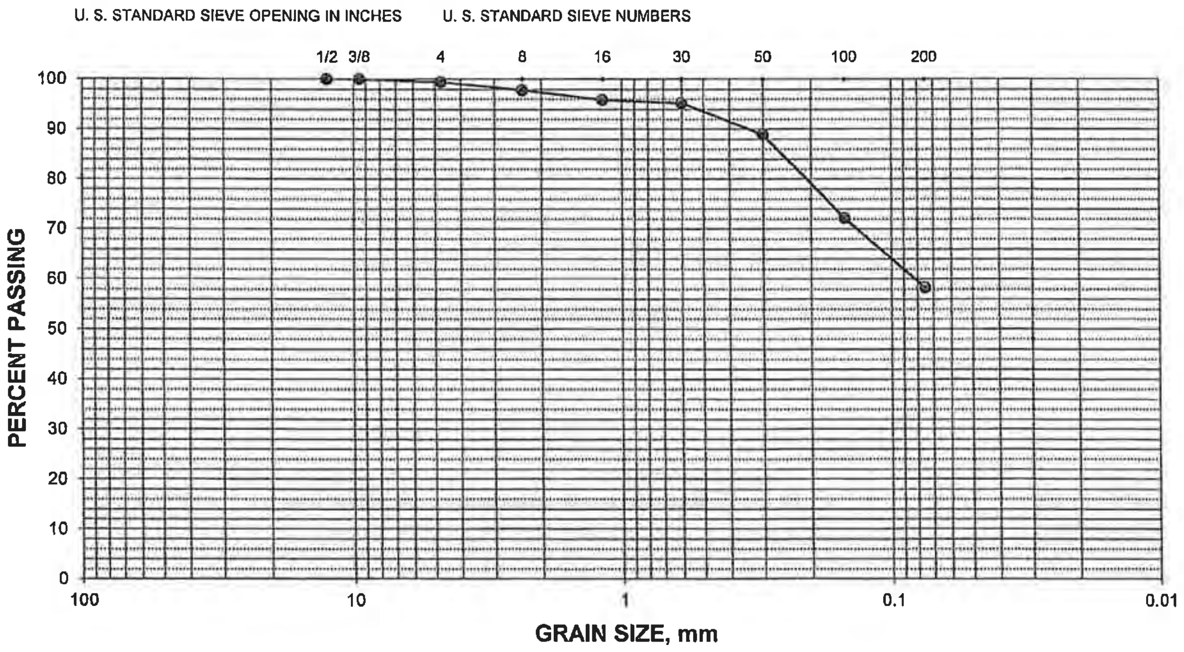
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-00/06

Boring #7 @ 40.0 - 41.5'
Sandy Lean Clay (CL)

March 17, 2014

Sieve size	% Retained	% Passing
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	2	98
#16 (1.18-mm)	4	96
#30 (600-µm)	5	95
#50 (300-µm)	11	89
#100 (150-µm)	28	72
#200 (75-µm)	42	58



APPENDIX C

Corrosion Evaluation Report
Prepared by Cerco Analytical, Inc.

(from Reference 2)

California State Certified Laboratory No. 2153

CERCO
analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

13 March, 2014

Job No.1403033
Cust. No.12651

Mr. Doug Dunham, P.E., G.E.
Earth Systems Pacific
2049 Preisker Lane, Suite E
Santa Maria, CA 93454

Subject: Project No.: SL-15702-SF
Project Name: Willow Springs North, Goleta, CA
Corrosivity Analysis – CalTrans Test Methods

Dear Mr. Dunham:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on March 03, 2014. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.001 is classified as "corrosive" and Sample No.002 is classified as "moderately corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations ranged from 28 to 73 mg/kg and are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations ranged from 150 to 160 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils ranged from 8.25 to 8.26, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Earth Systems Pacific
Client's Project No.: SL-15702-SF
Client's Project Name: Willow Springs North, Goleta, CA
Date Sampled: 25-Feb-14
Date Received: 6-Mar-14
Matrix: Soil
Authorization: Letter Dated March 03, 2014

Date of Report: 13-Mar-2014

Job/Sample No.	Sample I.D.	Moisture (%)	pH	Min.Resistivity (ohms-cm)**	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1403033-001	Boring 3 (B-3) @ 6-10'	-	8.26	1,400	-	28	150
1403033-002	Boring 4 (B-4) @ 1-5'	-	8.25	2,300	-	73	160

	Moisture	pH	Min.Resistivity	Sulfide	Chloride	Sulfate
Method:	226	CT 532/643	CT 532/643	-	CT 422/ASTM D4327	CT 417/ASTM D4327
Detection Limit:	-	-	-	50	15	15
Date Analyzed:	-	12-Mar-2014	10-Mar-2014	-	12-Mar-2014	12-Mar-2014

* Results Reported on an "As Received" Basis

Cheryl McMillen

Cheryl McMillen
Laboratory Director

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits**

APPENDIX D

Infiltration Test Results (from Reference 2)

Project: Heritage Ridge Apartments SL-15702-SF

INFILTRATION TEST RESULTS

Infiltration Test: A
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 3 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	2.02	---	---
10	2.04	0.02	42
10	2.06	0.02	42
10	2.08	0.02	42
10	2.10	0.02	42
10	2.13	0.03	28
10	2.15	0.02	42
20	2.19	0.04	42
20	2.29	0.10	17
20	2.33	0.04	42
20	2.38	0.05	33
20	2.44	0.06	28
20	2.50	0.06	28
20	2.56	0.06	28
20	2.63	0.07	24
20	2.67	0.04	42

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: B
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 6 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	5.21	---	---
10	5.67	0.46	2
10	5.88	0.21	4
10	6.17	0.29	3
Refill	3.33	---	---
10	4.60	1.27	1
10	5.79	1.19	1
10	6.21	0.42	2
Refill	3.33	---	---
10	4.35	1.02	1
10	5.33	0.98	1
10	6.13	0.80	1
10	6.44	0.31	3
Refill	3.25	---	---
10	4.38	1.13	1
10	5.50	1.12	1
10	5.67	0.17	5
10	5.88	0.21	4
Refill	3.35	---	---
10	4.42	1.07	1
10	5.71	1.29	1
10	5.92	0.21	4
10	6.19	0.27	3
Refill	3.77	---	---
10	4.67	0.90	1
10	5.60	0.93	1
10	5.79	0.19	4
10	6.00	0.21	4
Refill	3.33	---	---
10.0	4.33	1.00	1
10.0	5.44	1.11	1

Project: Heritage Ridge Apartments SL-15702-SF

INFILTRATION TEST RESULTS

Infiltration Test: C
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 9 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	4.50	---	---
10	5.13	0.63	1
10	5.75	0.62	1
10	6.25	0.50	2
10	6.67	0.42	2
10	7.04	0.37	2
10	7.38	0.34	2
Refill	2.92	---	---
10	3.88	0.96	1
10	4.75	0.87	1
10	5.75	1.00	1
10	6.00	0.25	3
10	6.29	0.29	3
10	6.46	0.17	5
10	6.77	0.31	3
10	6.92	0.15	6
10	7.04	0.12	7
Refill	3.46	---	---
10	4.08	0.62	1
10	4.79	0.71	1
10	5.42	0.63	1
10	6.02	0.60	1
10	6.17	0.15	6
10	6.35	0.18	5
10	6.50	0.15	6
10	6.75	0.25	3
10	6.94	0.19	4

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: D
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 3 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	3.79	---	---
15	4.08	0.29	4
15	4.19	0.11	11
15	4.29	0.10	13
15	4.42	0.13	10
15	4.50	0.08	16
15	4.60	0.10	13
15	4.69	0.09	14
15	4.75	0.06	21
Refill	3.54	---	---
15	3.67	0.13	10
15	3.77	0.10	13
15	3.88	0.11	11
15	4.00	0.12	10
15	4.13	0.13	10
15	4.19	0.06	21
15	4.25	0.06	21
15	4.31	0.06	21

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: E
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 6 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	4.98	---	---
15	5.08	0.10	13
15	5.21	0.13	10
15	5.29	0.08	16
15	5.35	0.06	21
15	5.46	0.11	11
15	5.54	0.08	16
15	5.60	0.06	21
15	5.69	0.09	14
15	5.77	0.08	16
15	5.83	0.06	21
15	5.92	0.09	14
15	5.98	0.06	21
15	6.08	0.10	13
Refill	4.67	---	---
15	4.77	0.10	13
15	4.85	0.08	16
15	4.93	0.08	16

Project: Heritage Ridge Apartments SL-15702-SF

INFILTRATION TEST RESULTS

Infiltration Test: F
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner
Test Hole Diameter: 8 inches
Test Hole Depth: 9 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	6.33	---	---
15	6.46	0.13	10
15	6.54	0.08	16
15	6.65	0.11	11
15	6.73	0.08	16
15	6.79	0.06	21
15	6.88	0.09	14
15	6.94	0.06	21
15	7.00	0.06	21
15	7.06	0.06	21
15	7.13	0.07	18
15	7.19	0.06	21
15	7.25	0.06	21
15	7.31	0.06	21
15	7.38	0.07	18
15	7.44	0.06	21
15	7.50	0.06	21

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: G
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: **8 inches**
Test Hole Depth: **3 feet**
Test Duration: **4 hours**

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	2.75	---	---
30	2.85	0.10	25
30	2.96	0.11	23
30	3.04	0.08	31
30	3.10	0.06	42
30	3.15	0.05	50
30	3.19	0.04	62
30	3.23	0.04	62
30	3.29	0.06	42

Project: Heritage Ridge Apartments **SL-15702-SF**

INFILTRATION TEST RESULTS

Infiltration Test: H
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner
Test Hole Diameter: 8 inches
Test Hole Depth: 6 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	5.10	---	---
30	5.25	0.15	17
30	5.38	0.13	19
30	5.50	0.12	21
30	5.60	0.10	25
30	5.71	0.11	23
30	5.81	0.10	25
30	5.92	0.11	23
30	5.98	0.06	42

Project: Heritage Ridge Apartments SL-15702-SF

INFILTRATION TEST RESULTS

Infiltration Test: I
Date Drilled: 2-25-14
Date Tested: 2-26-14
Technician: Rochelle Wagner

Test Hole Diameter: 8 inches
Test Hole Depth: 9 feet
Test Duration: 4 hours

INTERVAL (minutes)	READING (feet)	INCREMENTAL FALL (feet)	INFILTRATION RATE (minutes/inch)
---	7.75	---	---
30	7.96	0.21	12
30	8.17	0.21	12
30	8.42	0.25	10
Refill	7.50	---	---
30	7.71	0.21	12
30	7.94	0.23	11
30	8.13	0.19	13
30	8.27	0.14	18
30	8.42	0.15	17

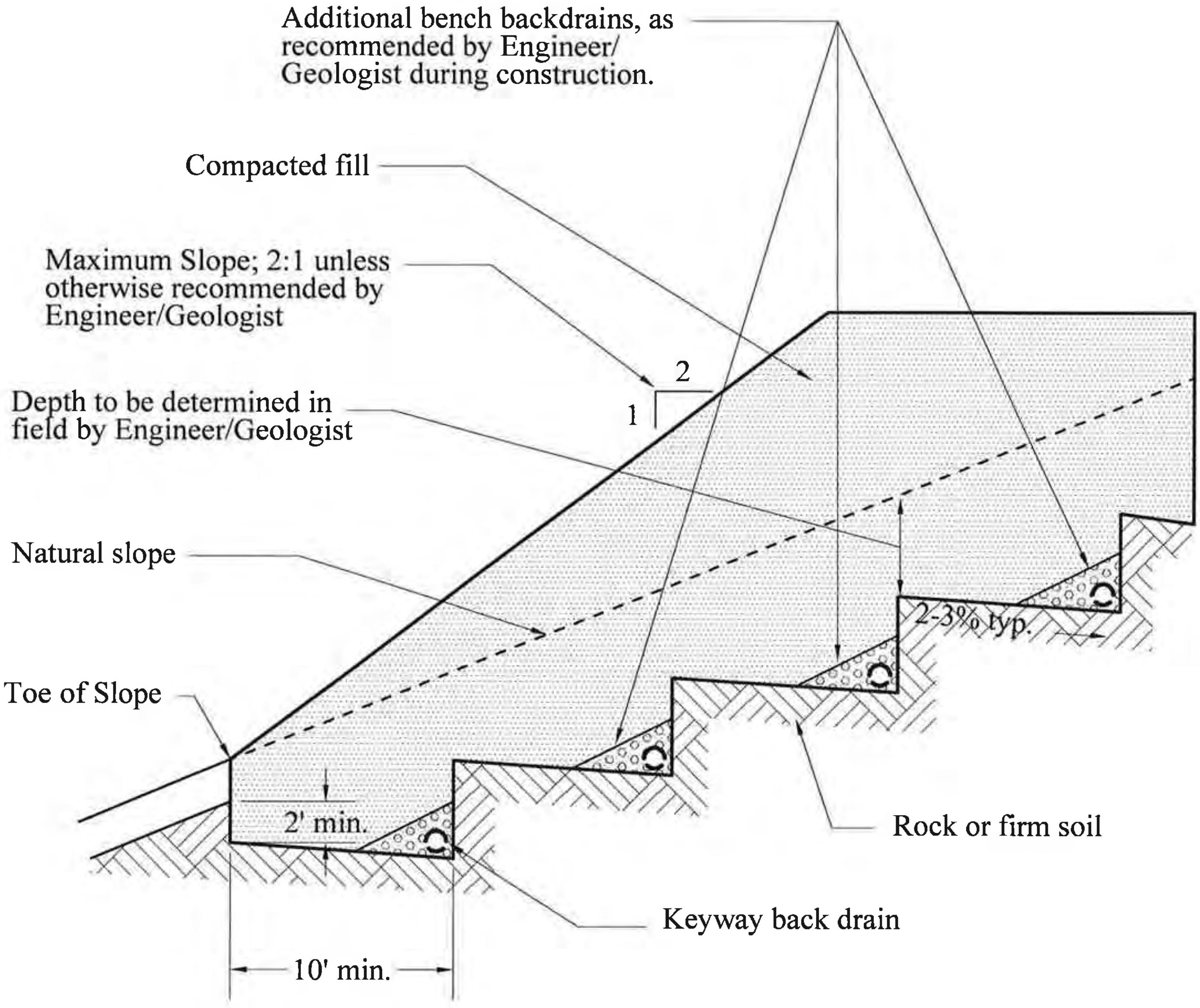
APPENDIX E

Typical Bench and Keyway Detail

BENCH and KEYWAY DETAIL (Typical)

HERITAGE RIDGE APARTMENTS

North of Calle Koral and Camino Vista
Goleta, California



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems

2049 Preisker Lane, Suite E
Santa Maria, California 93454

ES File No : 301378-004

(805) 928-2991 • FAX (805) 928-9253
E-mail: esc@earthsystems.com

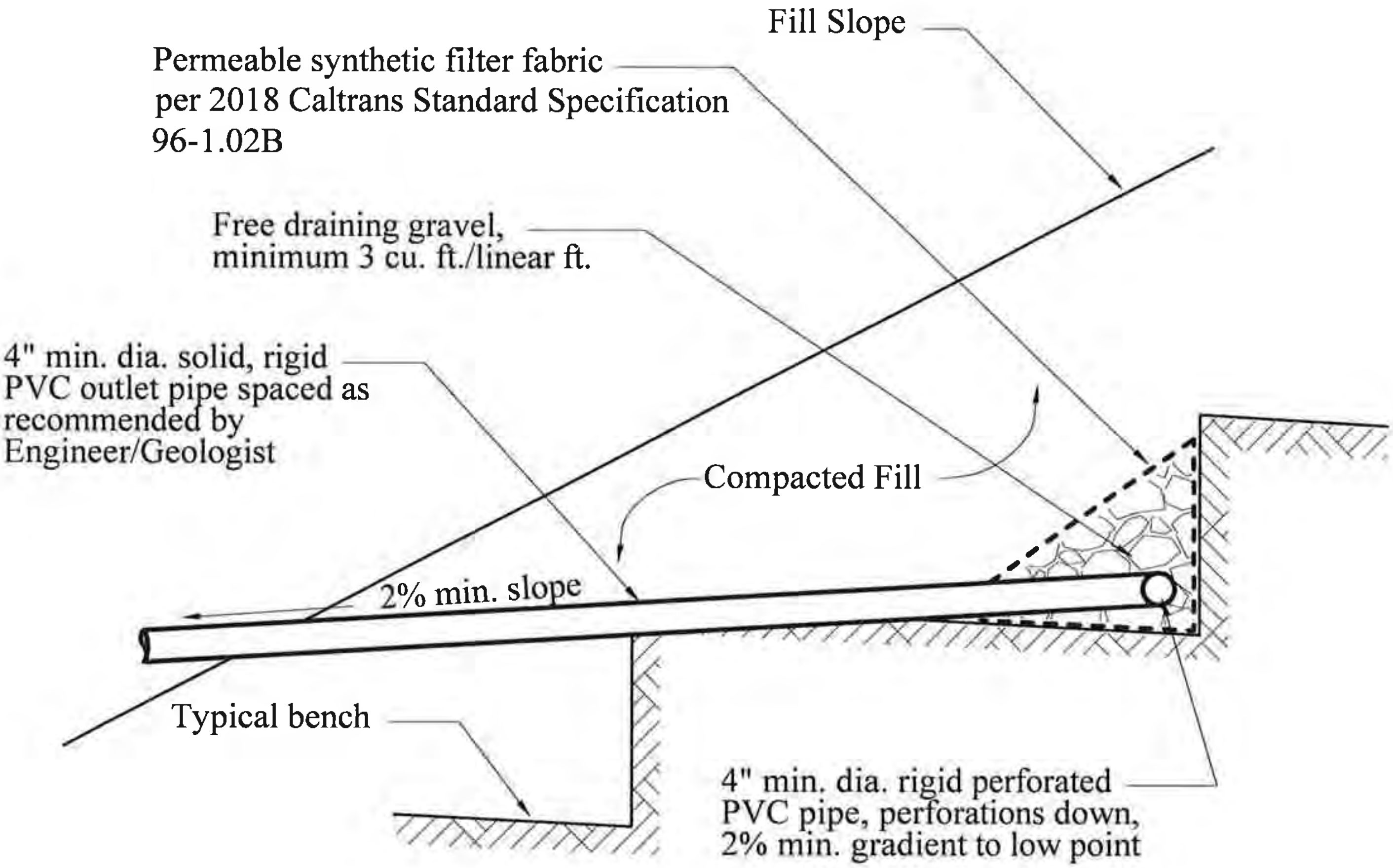
SMK

May 14, 2020
BENCH-D01-V03.dwg

BACK DRAIN DETAIL (Typical)

HERITAGE RIDGE APARTMENTS

North of Calle Koral and Camino Vista
Goleta, California



Note: A prefabricated panel drainage system (Advanedge, Miradrain, etc.) may be substituted for the gravel / pipe system, provided it is installed in accordance with the manufacturer's recommendations

SCHEMATIC ONLY
NOT TO SCALE

Earth Systems

2049 Preisker Lane, Suite E
Santa Maria, California 93454

(805) 928-2991 • FAX (805) 928-9253
E-mail: esc@earthsystems.com

ES File No.: 301378-004

SMK

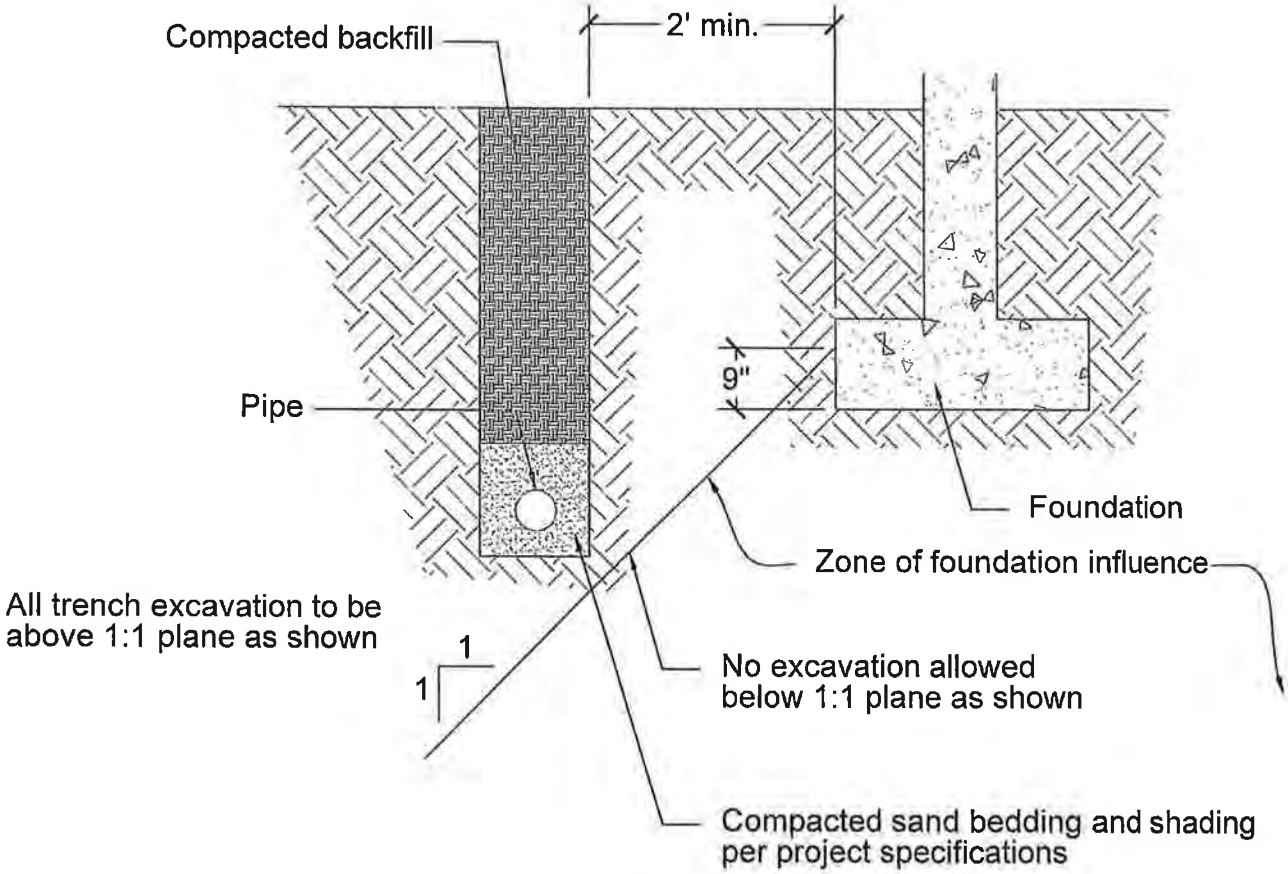
May 14, 2020
DRAIN-D01-V06.dwg

APPENDIX F

Typical Detail A: Pipe Placed Parallel to Foundations

TYPICAL DETAIL A:
PIPE PLACED PARALLEL TO FOUNDATIONS

HERITAGE RIDGE APARTMENTS
North of Calle Koral and Camino Vista
Goleta, California



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems Pacific

2049 North Preisker Lane, Suite E
Santa Maria, California 93454
(805) 928-2991 • FAX (805) 928-9253
E-mail: esc@earthsys.com

SL-15702-SF