Exhibit D

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Soil Investigation Report
(Design Phase)
Based on CBC 2016

PROJECT LOCATED AT

0 Hillcrest Rd, Watsonville, CA 9507
APN 117-081-013-0006

FOR

Ahmed Saba- Single Family Dwelling
(831)-818-4077

11 WEST LAUREL DRIVE SUITE 225
SALINAS CA 93906
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FOUNDATION & SOIL ENGINEERING
11 WEST LAUREL DRIVE SUITE 225
SALINAS CA 93906 (831) 840-4284

September 17, 2017

Ahmed Saba
0 Hillcrest Rd, Watsonville, CA 9507
APN 117-081-013-0006

SUBJECT: SOIL INVESTIGATION REPORT

Dear Mr. Ahmed Saba,

In accordance with your authorization, Geri Martin Daliva Engineers has completed the soil investigation for your project located at 0 Hillcrest Rd, Watsonville, CA 95076, APN 117-081-013-000.

This report includes the results of field and laboratory testing and recommendations for foundation design; as well as site development. It is our opinion that this site is suitable for the proposed development from soil engineering standpoint. The recommendations are based upon applicable standards at the time this report was done.

It has been a pleasure to be of service to you on this project. If you have any questions regarding the attached report, please don't hesitate to contact us at (831) 840-4284.

Respectfully Submitted,

Geri Martin Daliva Engineers

GERONIMO MARTIN DALIVA, CA PE #65185, Expires on September 30, 2017
Registered California Professional Civil Engineer

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This report has been prepared for the exclusive use of a SINGLE FAMILY DWELLING located at 0 Hillcrest Rd, Watsonville, CA 95076 with specific application to the proposed project.

1. PURPOSE AND SCOPE OF WORK

1.0.1 Preparation of this summary report of our findings which includes geotechnical recommendations for the proposed construction such as foundation design including bearing capacity of the soil; and the preparation of a site plan showing the locations of all subsurface exploratory borings and overall recommendations for utility trenches, slab-on-grade and drainage on surface.

1.0.2 Laboratory testing of the soil and bedrock samples obtained from the exploratory borings including determining Moisture-Density and near- surface "Atterberg limits" for soil samples. Test results are included in Appendix B.

1.0.3 Subsurface exploration consisting of drilling two exploratory borings; 5, 10, & 15 feet deep for laboratory analysis and evaluation. Determining ground water level if it is within the depth of our borings. The boring logs are included in Appendix A.

1.1 PROJECT DESCRIPTION OF PROPOSED DEVELOPMENT

We understand that the proposed project will include a second dwelling to be built at the southern portion of the property.

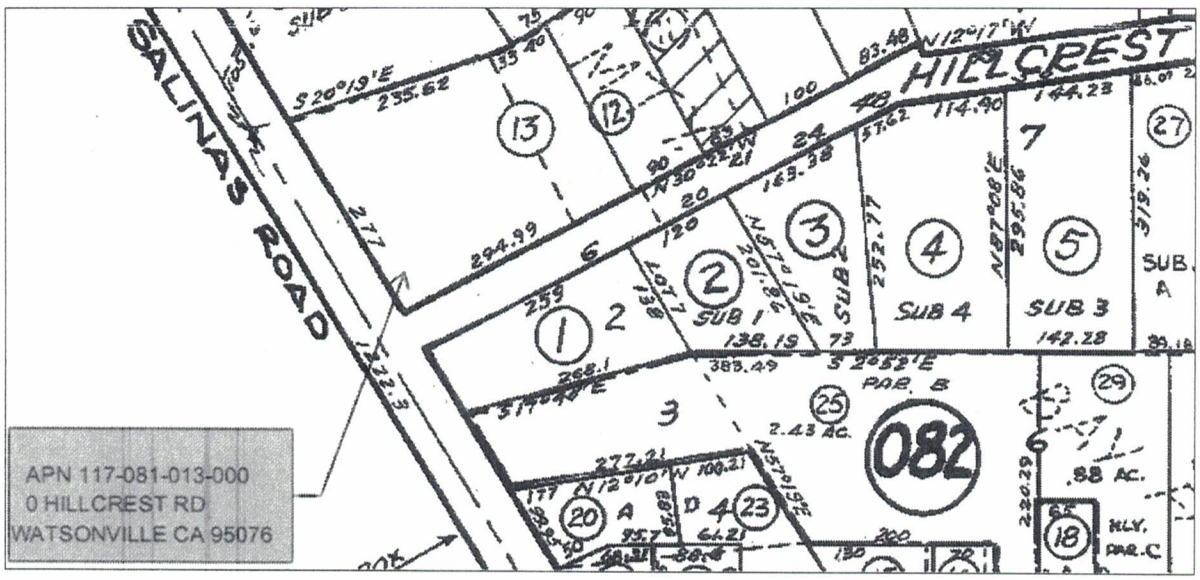
This report was prepared for the exclusive use of our client and their designer, Gabriel Martinez of Hacienda Designs for design of this project. In the event of project change such as the locations and scope of work of the proposed structures, or any other site features change from what is shown on the site plan included in this report, GMD Engineers should be notified so that the changes can be reviewed to determine if the recommendations presented in this report are still applicable or whether modifications are necessary.

1.2 SITE DESCRIPTION

The site is located at 0 Hillcrest Rd, Watsonville, CA 95076 (LAT: 36.87277, LONG:-121.76047) APN 117-081-013-0006. Watsonville located just outside the southern portion of the greater Bay Area and 18 miles (29 km) north-east of the. The average annual rainfall for the city is approximately 13.26 inches (336.8 mm). The site is located in a residential

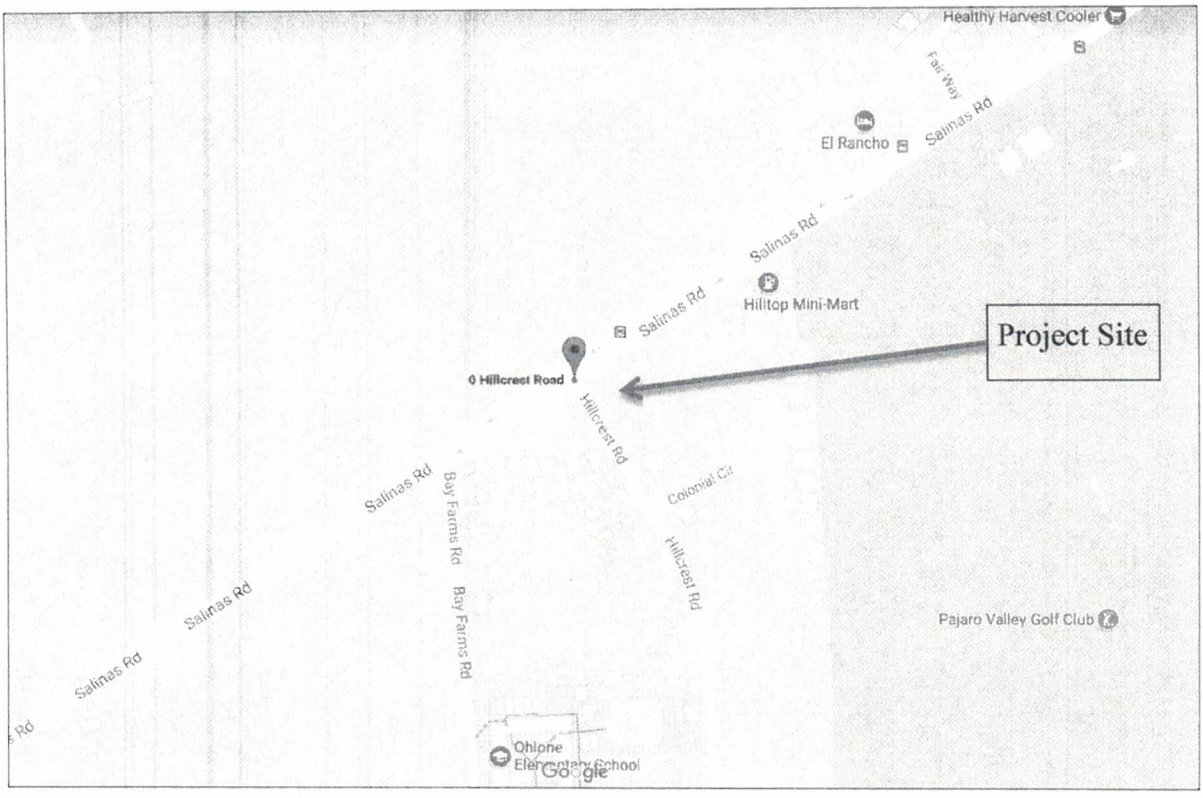
area of Watsonville City, Monterey County. The city rests about 18 meters (59 feet) above sea level, and it is located roughly eight miles from the Pacific Ocean. The Santa Cruz Mountains are mostly underlain by a large, elongated prism of granite and metamorphic basement rock types to the northeast and southwest by the San Andreas and San Gregorio-Nacimiento strike-slip fault systems, respectively. Overlying the granitic basement rocks is a sequence of dominantly marine sedimentary rocks of Paleocene to Pliocene age and non-marine sediments of Pliocene to Pleistocene age.

The subject property with an area of 1.41acre (approx. 61,420 Sq. Ft) is of a 4-sided, parallelogram-shaped parcel situated in the Watsonville City is vacant at this time of soil investigation. A site plan is enclosed in Appendix B. The property is bounded by 277 ft along Salinas Rd, on the north; on the east by lot 14, 268.62 ft; on the south by lot 12 on the west by Hillcrest Rd.

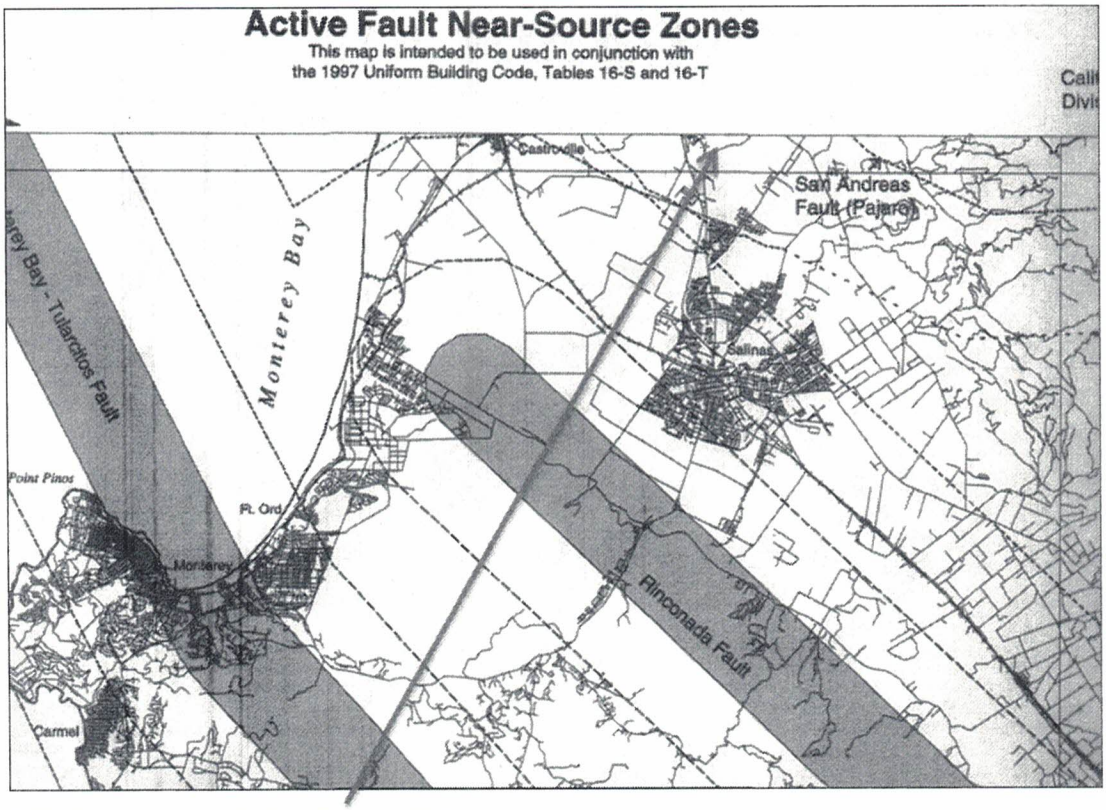


0 Hillcrest Rd, Watsonville, CA 95076 (LAT: 36.87277, LONG:-121.76047)

At the time of the investigation, the property of mostly level at the northern-south portion and slightly sloping to the east. Surface soils comprised of alluvial deposits of silty clay with sand and some gravel. Drainage at the property is directed to the east at a slight to moderate fall as sheet flow.



Project Location: 0 Hillcrest Rd, Watsonville, CA 95076 APN 117-081-013-0006



REGIONAL FAULT NEAR SITE

Monterey County is located in one of the most seismically active regions in the world. The San Andreas Fault traverses the eastern portion of the County, and many areas therein are susceptible to seismic hazards such as strong ground shaking, liquefaction, and earthquake-induced landslides.

The site, however, is not located within a currently designated Alquist-Priolo Earthquake Fault Zone and per the fault map below, no known surface expression of active faults is believed to exist within the site.

Monterey County is traversed by a number of both 'active" and 'potentially active" faults most of which are relatively minor hazards for the purposes of the site development. In Monterey County, the entire mapped onshore active fault traces lie along the main San Andreas Fault. As such, this site will experience seismic activity of various magnitudes emanating from one or more of the numerous faults in the region. Although, fault rupture through the site, is not anticipated.

Upon review of the Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, the site is situated approximately 16 miles south-west of the Rinconada Fault , a Type B Fault which is a part of the San Andreas Fault System. Monterey Bay-Tularcitos Fault Zone is approximately 30 miles to the southwest of the site is not as liable to rupture as the San Andreas Fault (Pajaro) which is 18 miles north-east. The Palo Colorado-San Gregorio Fault Zone is located approximately 45 miles to the southwest.

The San Andreas Fault (Type A) situated north-east of the subject is named after San Andreas Lake, a small body of water that was formed in a valley between the two plates, is a continental transform fault that extends roughly 1300 km (810 miles) through California. It forms the tectonic boundary between the Pacific Plate and the North American Plate, and its motion is right-lateral strike-slip (horizontal). The fault divides into three segments, each with different characteristics and a different degree of earthquake risk, the most significant being the southern segment, which passes within about 35 miles of Los Angeles. A 2015 study in partnership with the U.S. Geological Survey predicted a 7% chance of a magnitude 8.0 earthquake along San Andreas Fault in the next 30 years. Some scientist calls such magnitude of earthquake, the next "Big One".

Other onshore faults in Monterey County include the Monterey Bay-Tularcitos Fault , San Gregorio Fault and Monte Vista-Shannon Fault. Since these faults are offshore, they are not a risk for causing a land rupture but could cause seismic shaking and possibly trigger a tsunami. A tsunami may be triggered by an underwater landslide in response to seafloor deformation or may occur from the actual fault rupture motion. This component of risk is separate from the risk of a tsunami generated elsewhere around the Pacific Rim from a large earthquake, such as the earthquake that caused the devastating 2004 tsunami in Sumatra, but the impact could be similar.

An active fault is defined by the California Geologic Survey as one that has had surface displacement within Holocene time (about the last 11,000 years).

The site is likely to be shaken by earthquakes of approximately 8.0 (similar to the "San Francisco earthquake of 1906, with an average recurrence between 138 to 188 years along

North coast segment of San Andreas Fault. Also, earthquakes of magnitude 6 to 7 are likely along the faults within the Monterey Bay area.

MAJOR HISTORICAL EARTHQUAKES IN THE REGION

Year	Epicenter	Richter Magnitude at Epi-
1901	Parkfield	6.4
1906	San Francisco	8.3
1922	Parkfield	6.3
1934	Parkfield	6.0
1966	Parkfield	6.6
1983	Coalinga	6.5
1984	Morgan Hill	6.1
1989	Loma Prieta	7.1
2003	San Simeon	6.5
2004	Parkfield	6.0

Sour U.S. Geological Survey

While Richter magnitude provides a useful measure of comparison between earthquakes, the Moment magnitude is more widely used for scientific comparison since it accounts for the actual slip that generated the earthquake.

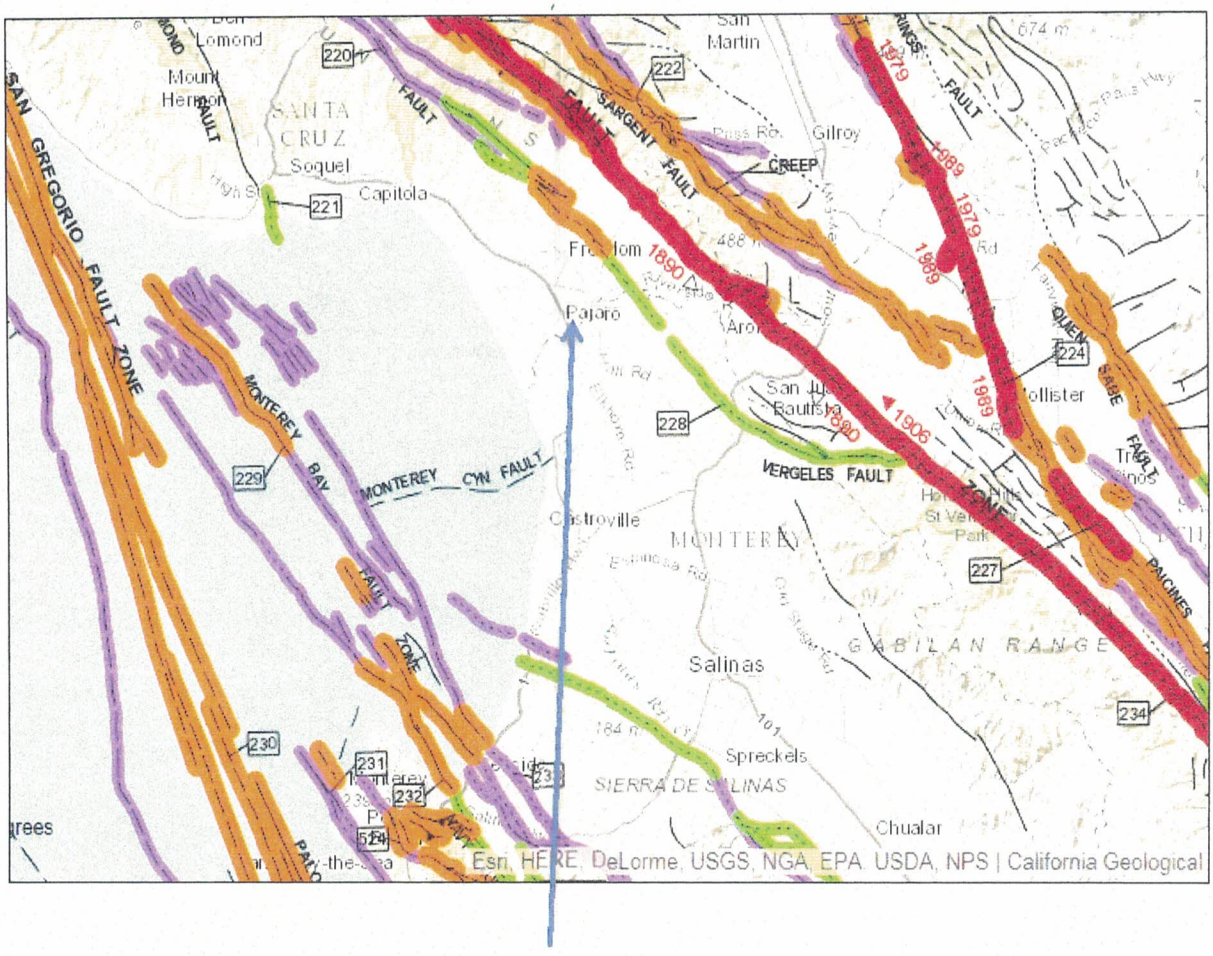
Actual damage is due to the propagation of seismic or ground waves from initial failure and the intensity of shaking are as much related to earthquake magnitude as the condition of underlying materials. Loose materials tend to amplify ground waves, while hard rock can quickly attenuate them, causing little damage to overlying structures. For this reason, the Modified Mercalli Intensity (MMI) Scale provides a useful qualitative assessment of earthquake intensity.

The MMI Scale is shown in the table below.

Modified Mercalli Intensity Scale

Mercalli Intensity	Equivalent Richter Magnitude	Witness Observations
I	1.0 to 2.0	Felt by very few people; barely noticeable.
II	2.0 to 3.0	Felt by a few people, especially on upper floors.
III	3.0 to 4.0	Noticeable indoors, especially on upperfloors, but may not be recognized as an earthquake.
IV	4.0	Felt by many indoors, few outdoors. May feel like heavy truck passing by.
V	4.0 to 5.0	Felt by almost everyone, some people awakened. Small objects moved. trees and poles may shake.
VI	5.0 to 6.0	Felt by everyone. Difficult to stand. Some heavy furniture moved, some plaster falls. Chimneys may be slightly damaged.
VII	6.0	Slight to moderate damage in well built, ordinary structures. Considerable damage to poorly built structures. Some walls may fall.
VIII	6.0 to 7.0	Little damage in specially built structures. Considerable damage to ordinary buildings, severe damage to poorly built structures. Some walls collapse.
IX	7.0	Considerable damage to specially built structures, buildings shifted off foundations. Ground cracked noticeably. Wholesale destruction. Landslides.
X	7.0 to 8.0	Most masonry and frame structures and their foundations destroyed. Ground badly cracked. Landslides. Wholesale destruction.
XI	8.0	Total damage. Few, if any, structures standing. Bridges destroyed. Wide cracks in ground. Waves seen on ground.
XII	8.0 or greater	Total damage. Waves seen on ground. Objects thrown up into air.

1.3.1 GEOTECHNICAL HAZARDS



Regional Seismic Map near 0 Hillcrest Rd., Watsonville, Ca. 95076 (Lat:36.87277, Long:-121.76047)

a. The San Andreas Fault is one of the most famous and because of its proximity to large population centers in California, it one of the most dangerous earthquake-generating faults on Earth. Potential seismic hazards resulting from a nearby moderate to major earthquake may include primary lurching, ground shaking, ground rupture, liquefaction, lateral spreading, and earthquake-induced densification and landsliding. These potential hazards are discussed below. Risks from seiches, tsunamis, and inundation due to embankment failure are considered low at the site based on the elevated topographic setting and the absence of large reservoirs in the vicinity.

b. Lurching. Ground lurching is a result of the rolling motion imparted to the ground surface during energy released by an earthquake. Such rolling motion can cause ground cracks to form. The potential for the formation of these cracks is considered greater in poorly consolidated colluvial and alluvial deposits.

Due to the relatively consistent older dune deposits, lurching is expected to be low to negligible. Within the loose residual, colluvial, and undocumented fill areas, overexcavation of these materials and construction of engineered fills underlying all developed portions of the project is intended to mitigate this hazard.

c. Ground Shaking. An earthquake of moderate to high magnitude generated within the Monterey County could cause considerable ground shaking at the site, similar to that which has occurred in the past. This hazard is not unique to this project and affects all properties in the region. To mitigate the shaking effects, all structures should be designed using sound engineering judgment and the latest California Building Code (CBC) requirements as a minimum. Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead-and-live loads. The prescribed lateral forces are generally considered to be substantially smaller than the actual peak forces that would be associated with a major earthquake. Consequently, structures should be able to (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996).

d. Ground Rupture. The site is not within a State of California Earthquake Fault Hazard Zone and no active faults cross the site. Therefore, the potential for fault rupture at the site is considered low. The project site is located at approximately 6 miles to the northeast of the Rinconada Fault. The site inspection did not reveal any surface features indicating a fault rupture has occurred at the site. The existing structure, driveways and roads do not reveal any strains which would be attributable to subsurface lateral or vertical displacements resulting from fault slip. Therefore surface rupture from fault activity across the site is considered improbable.

e. Liquefaction. Soil liquefaction is a phenomenon under which saturated, cohesionless, loose soils experience a temporary loss of shear strength when subjected to the cyclic shear stresses caused by earthquake ground shaking. Maps showing liquefaction potential by Dupre and Tinsley (1980) indicate that the site has a not susceptibility for liquefaction. Based on our exploration, near-surface zones of light brown lean clay were encountered. Groundwater was not encountered in any exploratory locations, which extended up to 15

feet below existing grade. Based on these findings, in conjunction with general earthwork activities to create a stable foundation soil, it is our opinion that the soils encountered on site are not susceptible to liquefaction.

f. Lateral Spreading. Lateral spreading is a failure within weaker soil material that causes the soil mass to move towards a free face or down a gentle slope. The site is not susceptible to lateral spreading.

g. Seismically Induced Densification. Densification of loose to medium dense sand above and below the groundwater level during earthquake shaking could cause settlement. As previously stated, the liquefaction potential of the on-site soil is considered not existent.

h. Seismically Induced Landsliding. As for all of the County of Monterey area, the risk of instability is greater during major earthquakes than during other time periods. The relatively flat terrain at the site does not appear to be subject to seismically induced landsliding. However, although seismically induced landsliding can be a significant hazard, it can generally be mitigated through proper grading procedures of existing and proposed conditions.

i. Soil Flows

Soil flows/slips are generic terms for shallow disrupted slides composed of loose combinations of soil, surficial deposits, rock fragments, weathered rock and vegetation. The principal failure mechanism in this type of flow is fluidization of the soil mass, caused by a reduction in shear strength due to increased pore water pressure during rain. This type of failure can be triggered by additional forces acting on hill slope materials during strong earthquake shaking, which can also induce dynamic compaction and increase pore water pressure, further weakening the slide mass.

There is no history of soil flows in the project location.

1.4 2016 CBC SEISMIC DESIGN PARAMETERS CALCULATION PER LATEST USGS JAVA PROGRAM GROUND MOTION PARAMETER CALCULATOR AND ASCE/SEI 7-10:

Note: USGS Java Program Version 5.1.0 (Java Ground Motion Parameter Calculator) was used to determine the seismic design parameters. The structure is placed in Seismic Design Category D.

References: Chapter 16, Structural Design, 2015 IBC (International Building Code) or the 2016 California Building Code; Chapter 11, Seismic Design Criteria & Chapter 12, Seismic Design Requirements for Building Structures, Section 12.8 Equivalent Lateral Force Procedure of the ASCE/SEI 7-10 (American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures).

NOTE: Please refer to Appendix "C" for Seismic Parameters.

1.5 EXPECTED TOTAL AND DIFFERENTIAL SETTLEMENT.

The recommendations given in this report are such that settlements are negligible and as such are of little concern. The expected total settlement is expected to be ¼ inch and the expected differential settlement is less than ½ of that value.

2.0 INVESTIGATION AND TESTING

2.1 SUBSURFACE GEOTECHNICAL EXPLORATION

Based on our site and boring log investigation and exploration, the site soil properties indicate that the sub-surface on the site are relatively consistent , however, there are variations in color, moisture content, and density across the site.

The subsurface exploration portion of the investigation consisted of two (2) drill rig borings that were conducted under our observation from August 31, 2017 by California Geotech, Hollister CA.

We observed drilling of 2 borings and logged the subsurface conditions at each location. Boring locations are shown on Site Plan, Appendix. We retained a Mobile B24 drill rig and crew to advance the borings using 4-inch diameter solid flight auger methods. The boring drilled for this investigation encountered very stiff lean clay to sandy lean clay and sandy silt to a depth of approximately 8½ feet. Below a depth of 8½ feet, the boring encountered medium dense, silty sand with lean clay to 15 depth. Borings were advanced to depths ranging from 15 to 18 feet below existing grade. Borings were backfilled with drill cuttings. We obtained soil samples at various intervals using standard penetration tests and a California Modified Sampler (3-inch O.D. split spoon with 2.5-inch I.D. liners). The blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The sampler was driven 18 inches and the number of blows were recorded for each 6 inches of penetration. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last one foot of penetration; the blow counts have not been converted using any correction factors. When sampler driving was difficult, penetration was recorded only as inches penetrated for 50 hammer blows.

The borehole is performed in an approximate corner of the proposed building and samples were taken at depth of 5 ft, 10 ft and 15 ft, respectively.

Soil samples were obtained at selected intervals in the soil test borings. All samples were identified according to project number, boring number and depth, encased in polyethylene plastic wrapping to protect against moisture loss, and transported to HSI Engineering laboratory in special containers.

The soil samples were labeled, photographed, wrapped up in transparent membrane and stored in 5-gal plastic containers according to their depth.

The following tests had been performed: moisture test (ASTM D2937-04) and D2216-05; a grain size distribution test (ASTM D 422-63 (2002); plasticity index test (ASTM D 4318-05) and an expansion index test (ASTM D4829-07).
We used the field logs to develop the report logs in Appendix A. The logs depict subsurface conditions at the exploration locations for the date of exploration; however, subsurface conditions may vary with time.

2.2 EXPANSIVE NATURE OF THE SOIL

The surface soils are moderate expansive lean clay material. A deepened, 12" wide 18" thick footing shall be adopted.

2.3 LIQUEFACTION POTENTIAL

Based on the results of our field investigation, it is our opinion that the potential for liquefaction at the site is low. Our opinion is based on the fact that liquefaction most often occurs is loose saturated silts.

3.0 SUBSURFACE CONDITIONS

3.1 STRATIGRAPHY

The following soil types were encountered in the soil test borings performed at the site:

On soil test borings B-1 & B-2 and encountered a non- developed zone (approximately 6 to 12 inches), which consisted of varying amounts of organics and roots.

Detailed description of the type of soil layers encountered during drilling is given in the borehole logs *(Appendix B)*. The lines designating the interface between soil strata on the boring logs represent approximate boundaries; transition between materials may be gradual.

3.2 GROUNDWATER

No groundwater encountered, however; groundwater levels may fluctuate with seasonal climatic variations and changes in the land use. Low permeability soils will require several days or longer for groundwater to enter and stabilize in the test borings.

4.0 RECOMMENDATIONS

The recommendations presented in the following sections of this report are based on the information available regarding the proposed construction, the results obtained from our soil test borings and laboratory tests, and our experience with similar projects. Because the test borings represent a very small statistical sampling of subsurface conditions, it is possible that conditions may be encountered during construction that are substantially different from those indicated by the soil test borings. In these instances adjustments to design and construction may be necessary.

4.1 SITE PREPARATION

Concrete pavement, building rubble, concrete foundations and any other debris noted at or below the existing ground surface should be removed as part of the site preparation for the proposed construction area. In all new fill and excavation areas, vegetation, topsoil, roots and other deleterious materials (typically 4 to 6 inches), deemed unsuitable shall be removed from the proposed construction areas, and replaced with controlled fill. Site clearing, grubbing and stripping will need to be performed only during dry weather conditions. Operation of heavy equipment on the site during wet conditions could result in excessive rutting and mixing of organic debris with the underlying soils.

4.2 EXCAVATIONS

Temporary construction slopes should be designed and excavated in strict compliance with the rules and regulations of the Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA), 29 CFR, Part 1926. This document was prepared to better insure the safety of workers entering trenches or excavations, and requires that all excavations conform to the new OSHA guidelines.

Excavating is recognized as one of the most hazardous construction operations. OSHA recently revised Subpart P, Excavations, of 29 CFR 1926.650, 29 CFR 1926.651, and 29 CFR 1926.652 to make the standard easier to understand, permit the use of performance criteria where possible, and provide construction employers with options when classifying soil and selecting employee protection methods.

This chapter is intended to assist OSHA Technical Manual users, safety and health consultants, OSHA field staff, and others in the recognition of trenching and shoring hazards and their prevention.

The side walk of trenches constructed in these materials will be prone to sudden collapse (for trenches deeper than 2 feet) unless they are properly shored and braced or laid back at an appropriate angle. Project designers should make a clear note of this fact in the project specifications and on the project plans and should draw attention to contractor and particularly the underground contractor, to the property shore and brace or lay back the sides walls of trenches.

All work should comply with the State of California Construction Safety Orders for "Excavations, Trenches, and Earthworks".

For the purpose of this section of the report, utility pipes, free draining sand should be used as bedding. Sand bedding should be compacted to at least 90% relative compaction based on ASTM Test Procedure D 1557-00, or to the degree of compaction specified by the utility designer.
The contractor is solely responsible for protecting excavations by shoring, sloping, benching or other means as required to maintain stability of both the excavation sides and bottom. GMD Engineers does not assume any responsibility for construction site safety or the activities of the contractor.

For this site, the overburden soil encountered in our exploratory borings consisted of mostly silty sand with clay. We anticipate that OSHA will classify these materials as type B. OSHA recommends a maximum slope inclination of 1H: 1V for type B soils. Excavation requirements will vary depending on the actual soil conditions in some areas. Temporary construction slopes should be closely observed for signs of mass movement, such as tension cracks near the crest, bulging at the toe of the slope, etc.

4.2.1 Sloping and Benching

A. Sloping

Maximum allowable slopes for excavations less than 20 ft (6.09 m) based on soil type and angle to the horizontal are as follows:

Table 4.2.1:2-1. Allowable Slopes

Soil type	**Height/Depth ratio**	**Slope angle**
Stable Rock	Vertical	90°
Type A	¾:1	53°
Type B	1:1	45°
Type C	1½:1	34°
Type A(short-term)	½:1	63°

(For a maximum excavation depth of 12 ft)

4.3 STRUCTURAL FILL

Whenever structural fill is needed, it is recommended that structural fills be constructed as controlled, well-compacted engineered fills. Or approved import sand should be used as a utility trench backfill. The average bulk density bulk density material placed on the backfill sides of walls will be about 140 pounds per cubic foot (pcf). Backfill in trenches located under and adjacent structural fill, foundations, concrete slabs and pavements should be placed in horizontal layers no more than 8 inches. Each layer of imported trench backfill should be water conditioned and compacted of at least 95% relative compaction, if it is underneath the pavement area.

We recommend that within three feet of the structure foundation, a clayey material or control density fill be used for the trench of the backfill and bedding, to seal the trench and prevent conduit for water to enter beneath the structure foundation.

Structural engineered fill should be non-corrosive, inorganic, low plastic clay, sand, or gravel (granular material). Any existing soils with a high organic content (browns) are suitable for reuse as fill in landscaping areas only. It is recommended that only granular fill be used within 5 feet of the retaining wall footprint. The intent of these recommendations is to reduce the potential for consolidation and settlement of new fills. The site native soils may be used for trench backfill above the select material.

Laboratory testing should be performed on the fill materials to determine the appropriate moisture-density relationship of the fill being placed. Adjustments to the soil moisture by wetting or drying should be made as

needed during fill placement.

During grading operations, representative samples of the proposed imported structural fill materials should be periodically checked via laboratory testing. A full-time representative from the testing agency should be on site to monitor excavation and grading operation as well as the suitability of fill materials.

Suitable fill material should be placed in thin lifts (lift thickness depends on type of compaction equipment, but in general, lifts of 8 inches loose measurement is recommended). The soil should be compacted by the appropriate compaction equipment to meet the specified compaction recommendations.

Self-propelled compactors similar to Caterpillar Model 815 with tamping feet or sheep foot rollers may be required to adequately compact fine-grained fill material (silts and clay). If the fill material is granular (sands and gravels) with less than 10% clays and silts, smooth-drum vibratory compactors should be used. In addition, a smooth-drum roller should be provided to "seal" the fill at the end of each workday to reduce the impact of precipitation. In areas undergoing removal of seepage water, the engineered fill should be limited to well-graded sand and gravel or crushed stone.
Within small excavations, such as in utility trenches (less than 24 inches in width), around manholes or behind retaining walls, we recommend the use of "wacker packers", "Rammax" compactors or vibrating plate compactors to achieve the specified compaction. Loose lift thickness of 4 inches are recommended in small area fills.

We recommend that structural fill, if needed and backfill be compacted in accordance with the criteria stated in Table 1. A qualified field representative should periodically observe fill placement operations and perform field density tests at various locations throughout each lift, including trench backfill, to indicate if the specified compaction is being achieved.

TABLE 1

STANDARD STRUCTURAL FILL PLACEMENT GUIDELINES

Areas of Fill Placement	Compaction Recommendation (ASTM D698-Standard Proctor)	Moisture Content (Percent of Optimum)

Granular cushion beneath Floor Slab and over Footings	98%	As necessary to obtain density
Structural fill supporting Footings	98%	-1 to +3 percent
Structural fill placed within 5 feet beyond the perimeter of the building pad	98%	-1 to +3 percent
Grade-raise fill placed within 1 foot of the base of the pavement	98%	-1 to +3 percent
Structural fill placed below the base of the Pavement Soil Sub grade	95%	-1 to +3 percent
Utility Trenches - Within building and pavement areas	98%	-1 to +3 percent
Beneath Landscaped/Grass Areas	92%	As necessary to obtain density

During construction, we recommend that fill materials placed in the building area have a liquid limit of less than 45, and a plasticity index of less than 25. Whenever possible, highly plastic silt (MH) or clay (CH) fill soils should not be placed within the upper 4 feet of the final ground elevation. Soils which have a liquid limit greater than 45 and a plasticity index greater than 25 will typically require removal or blending with less plastic materials to result in lower Atterberg limits.

The soil horizons were categorized as per the Unified Soils Classification System (USCS) with additional notes regarding any soft, moist, or unsuitable soils. The presence and depth of subsurface water was estimated during excavation and measured after completion of each boring. The soil descriptions and classifications contained within the boring logs (Appendix B) were determined by visual observation of a Soils Engineer unless a laboratory number denotes the soil.

Graded Slopes

Cut slopes should be observed by our office during grading to determine whether any adverse geologic conditions are encountered on the exposed slope. If adverse conditions are noted, additional mitigation measures, possibly including slope reconstruction, may be recommended. Additional recommendations to reduce the need for cut slope reconstruction can be provided our office during grading plan development.

All fill slopes should be adequately keyed into firm natural materials unaffected by shrinkage cracks. We recommend that fill slopes be overbuilt and cut back to finished grades; trackwalking of slopes is not sufficient. As described previously, finished slopes should receive approximately 4 inches (no more than 6 inches) of topsoil to improve erosion protection and promote the growth of vegetation. Final slope construction may require erosion control protection by means of jute matting or other synthetic products until mature vegetation occurs.

Fill Placement

After a firm, undisturbed, non-yielding surface is exposed, general fill areas (those areas receiving at least 2 feet of fill) should be scarified to a minimum depth of 12 inches, moisture conditioned, and recompacted to provide adequate bonding with the initial lift of fill. Cut and shallow fill areas (those areas receiving less than 2 feet of fill) should be scarified to a minimum depth of 12 inches. All fills should be placed in thin lifts, with the lift thickness not to exceed the depth of penetration of the compaction equipment used.

Test Procedures:

ASTM D-1557.

Required Moisture Content: Not less than 2 percent above optimum moisture content.

Minimum Relative Compaction: Not less than 95 percent.

For general fill areas, the following compaction control requirements should be used:

Test Procedures: ASTM D-1557.

Required Moisture Content: Not less than 2 percent above optimum moisture content.

Minimum Relative Compaction: Not less than 92 percent.

4.4 FOUNDATION DESIGN

Based on the current laboratory data, and subject to change after the additional excavations are completed, the proposed structure may be supported by conventional shallow spread or continuous footings supported on approved undisturbed native soil or properly engineered fill. The following recommendations are based on the assumption that the recommendations in earthwork, have been implemented.

Preliminary recommendations regarding the geotechnical aspects of building design are presented below and are subject to change after additional explorations have been completed. All footings should satisfy any reinforcement required by structural consideration.

The following recommendations are considered preliminary for feasibility level planning and design.

4.4.1 Allowable Vertical Bearing Pressures and Settlements

Generally two geotechnical issues determine the design bearing pressure for conventional spread footing or mat foundations: (1) available soil bearing capacity based on the strength of the soil and/or (2) tolerable settlement.

The bearing capacity, based only on the shear strength of the soil, will be dependent upon the footing geometry.

4.4.2 Resistance To Lateral Loads

Lateral loads applied to foundations can be resisted by a combination of lateral bearing and base adhesion. If the deflection resulting from the strain necessary to develop the passive pressure is within structural tolerance, the passive pressure and frictional resistance can be used in combination. Otherwise, additional passive pressure values could be provided based on tolerable deflection. The allowable values already incorporate a factor of safety and, as such, would be compared directly to the driving loads. If analytical approaches require the input of a ratio of available resisting forces and driving loads greater than unity, the ultimate values would be used.

4.4.3 CONCRETE SLABS-ON-GRADE

4.4.3.1 Subgrade Preparation

Slabs-on-grade should be supported on compacted subgrade as described in this report. The slab subgrade, to a depth of 12 inches, should have moisture content above optimum immediately prior to pouring the slab or placing a vapor retarding membrane.

4.4.3.2 Capillary and Moisture/Vapor Break

Considering the depth to ground water and the soil types, a capillary break (i.e. clean sand or gravel layer) is not necessary but may be considered if moisture sensitive flooring is planned. It is recommended that the slab subgrade be covered by vapor retarding membrane, such as 6-mil polyolefin. If design should incorporate a gravel subgrade layer, the membrane should have a minimum thickness of 10 mil. As an added precaution, consideration could be given to extending the vapor retarding membrane around the footings to provide a more complete vapor barrier. The subgrade surface should be smooth and care should be exercised to avoid tearing, ripping, or otherwise puncturing the vapor retarding membrane. If the vapor retarding membrane becomes torn or disturbed, it should be removed and replaced or properly patched. It is recommended consideration be given to placing concrete directly on the vapor retarding membrane. If desired by designers, the vapor retarding membrane could be covered with approximately 1 to 2 inches of saturated surface dry (SSD), relatively clean sand to protect it during construction. Concrete should not be placed if sand overlying the vapor barrier has been allowed to attain a moisture content greater than about 5% (due to precipitation or excessive moistening). Excessive water beneath interior floor slabs could result in future significant vapor transmission through the slab, adversely affecting moisture-sensitive floor coverings and the indoor environment.

It should be noted that, although the slab support discussed above is currently the industry standard, this system might not be completely effective in preventing floor slab moisture vapor transmission problems. This system will not necessarily assure that floor slab moisture transmission rates will meet floor-covering manufacturer standards and that indoor humidity levels will not inhibit mold growth. A qualified specialist(s) with knowledge of slab moisture protection systems, flooring design and other potential components that may be influenced by moisture, should address these post- construction conditions separately. The purpose of a geotechnical study is to address subgrade conditions only, and consequently, it does not evaluate future potential conditions.

CONCRETE: Concrete shall be normal weight with minimum compressive strength of $f'c$ = 2,500 psi at 28 days.

Slab concrete should have good density, a low water/cement ratio, and proper curing to promote a low porosity. It is recommended the water/cement ratio not exceed 0.45 to minimize vapor transfer.

It should be noted that at the time of the field exploration, the surface and near surface soils were classified as lean Clay (CL).

Based on the results of the soil test borings, laboratory testing and our engineering evaluation, it is our opinion that the subsurface conditions are suitable for supporting the proposed structure using continuous wall footings and pad footings using a soil bearing capacity of 2.0 ksf.

All perimeter and interior footings should be embedded at least 18 inches below the lowest adjacent grade.

Pad footing, combined footings and grade beams, if needed shall be designed based on a 2,000 psf.

All footings shall have a minimum of 12" wide and 18" below undisturbed natural grade, unless deeper footings are required to satisfy structural requirements.

All exterior walls shall be supported on continuous solid or fully grouted masonry or concrete footings.

Footings shall have installed a minimum of 2 No. 5 bar at the top and 2 No. 5 bar located 3 inches to 4 inches from the bottom of the footing. Use fy=60 ksi for steel rebar.

Concrete shall have a minimum specified compressive strength as shown in Table R402.2 but not less than 2,500 psi (R402.2).

Use a soil bearing capacity of 2,000 psf for dead plus live loads. This allowable bearing pressure may be increased by one-third for short term, wind and seismic.

In order to mitigate the potential for expansive soils, footings shall be designed in accordance with the following requirements:

1. Depth of footings below the natural and finish grades shall not be less than 24 inches for exterior and 18 inches for interior footings.
2. Exterior walls and interior bearing walls shall be supported on continuous footings.

3. Footings shall be reinforced with four 5/8-inch-diameter deformed reinforcing bars. Two bars shall be placed within 4 inches of the bottom of the footings and two bars within 4 inches of the top of the footing with a minimum concrete cover per ACI 318, Section 7.7.1.

4. On-grade concrete floor slabs shall be placed on a 4-inch fill of coarse aggregate or on a 2-inch sand bed over a moisture barrier membrane. A 6 mil minimum vapor barrier in direct contact with the concrete and a concrete mix design which will address bleeding, shrinkage and curing shall be used. (American Concrete Institute, ACI 302.2R). The slabs shall be at least 4 inches thick and shall be reinforced with ½-inch-diameter deformed reinforcing bars. Reinforcing bars shall be spaced at intervals not exceeding 16 inches each way, or as specified by the project Structural Engineer.

5. The soil below an interior concrete slab shall be pre-saturated to a depth of 18 inches prior to placing the concrete.

6. All drainage adjacent to footings shall be conducted away from the structure by a 3-foot-wide sloped apron or equivalent draining into an approved non-erosive device.

7. Allowable foundation and lateral pressures for footing design shall not exceed the values shown in Table 1806.2.

4.5 DRAINAGE AND GROUNDWATER CONSIDERATIONS

The site should be graded to provide positive drainage to reduce storm water infiltration. Surface drainage should be planned to prevent ponding and to promote drainage of surface water away from the structure foundations, edges of pavements and sidewalks, toward suitable collection and discharge facilities. A minimum gradient of one percent for asphalt areas should be maintained. A minimum of three percent gradient should be maintained for landscaped areas immediately adjacent (within 10 feet) to the structure. In general, water should not be allowed to collect near the surface of the footing of the structures during or after construction. If water were allowed to accumulate next to the foundation, it would provide an available source of free water to the expansive soil underlying the foundation. Similarly, surface water drainage patterns or swales must not be altered so that runoff is allowed to collect next to the foundation.

4.6 LIMITATIONS

Changed in the project design will render our recommendation invalid unless our staff reviews such changes and our specific recommendations are modified accordingly.

Our recommendations have been in accordance with the principles and practices generally employed by the soils engineering profession and engineering geology; and as such, this acknowledgement is in lieu of all other warranties, express or implied.

This report is being issued with the understanding that it is the responsibility of the Owner, or his representative, to ensure that the information and recommendations contained within our report are called to the attention of the Project Architect/ Engineers and incorporated into the plans, and that the necessary steps are being taken to ensure that the Contractors and Sub Contractors carry out such recommendations in the field.

Unanticipated soil and bedrock conditions are commonly encountered and cannot be fully evaluated by surface geologic investigations or exploratory borings, and frequently require that additional expenditures be made to attain proper development. Some contingency fund should be allotted to accommodate these possible extra costs.

Respectfully submitted,

Geri Martin Daliva Engineers

GERONIMO M DALIVA, California P.E. # 65185 (Expires September 30, 2017)
California Registered Professional Civil Engineer

APPENDIX "A"

Unified Soil Classification System

Log of Test Boring

UNIFIED SOIL CLASSIFICATION SYSTEM – ASTM D2488 (Modified)

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel–sand mixtures, little or no fines
			GP	Poorly graded gravels or gravels–sand mixtures, little or no fines
		GRAVELS (MORE THAN 12% FINES)	GM	Silty gravels, gravel–sand–silt mixtures, non–plastic fines
			GC	Clayey gravels, gravel–sand–clay mixtures, plastic fines
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS (MORE THAN 12% FINES)	SM	Silty sands, sand–silt mixtures, non–plastic fines
			SC	Clayey sands, sand–clay mixtures, plastic fines
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 35%		ML	Inorganic silts and very fine clayey sand silt sands, with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly, sand, silty or lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS LIQUID LIMIT IS BETWEEN 35% AND 50%		MI	Inorganic silts, clayey silts and silty fine sands of intermediate plasticity
			CI	Inorganic clays, gravelly/sandy clays and silty clays of intermediate plasticity.
			OI	Organic clays and silty clays of intermediate plasticity.
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Organic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic clays
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

BORING LOG EXPLANATION

LOGGED BY _____ DATE DRILLED _____ BORING DIAMETER _____ BORING NO. _____

Depth, ft.	Sample No. and Type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1			▼ ← Ground water elevation						
2	1–		← Soil Sample Number						NOTE: All blows/foot are normalized to 2" outside diameter sampler size.
3	L		← Soil Sample Size/Type L = 3" Outside Diameter M = 2.5" Outside Diameter T = 2" Outside Diameter ST= Shelby Tube BAG = Bag Sample						
4									
5									

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT
VERY LOOSE	0–4
LOOSE	4–10
MEDIUM DENSE	10–30
DENSE	30–50
VERY DENSE	OVER 50

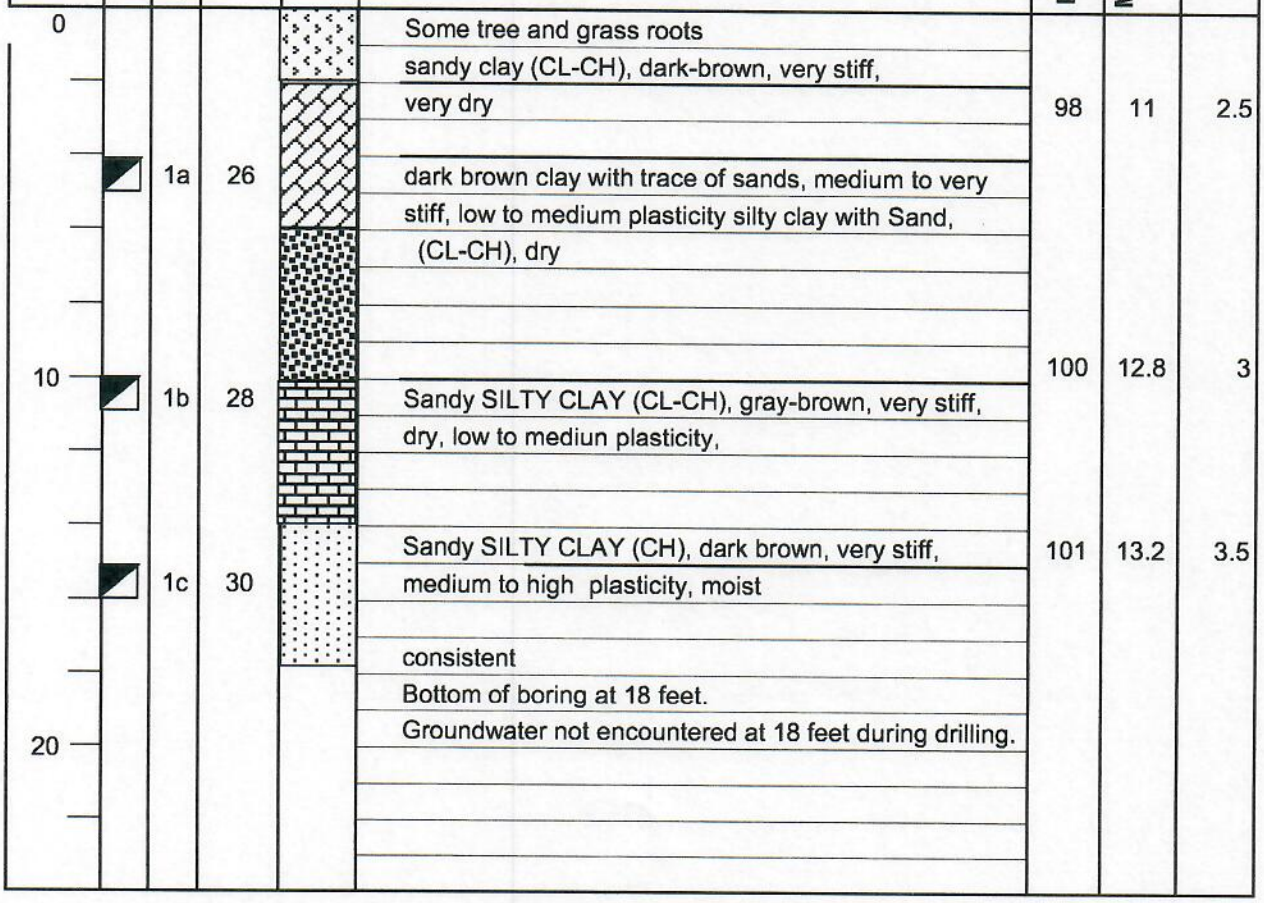
CONSISTENCY

SILTS AND CLAYS	BLOWS/FOOT
VERY SOFT	0–2
SOFT	2–4
FIRM	4–8
STIFF	8–16
VERY STIFF	16–32
HARD	OVER 32

Geri Martin Daliva Engineers
11 West Laurel Drive, Suite 225
Salinas, CA 93906

Boring Log Explanation

Project: Single Family Dwelling	Project Number: 2017-114	Client: Ahmed Saba	Boring No. B-1
Address, City, State: 0 Hillcrest Rd, Watsonville, CA 9507		Drilling Contractor: CALIFORNIA GEOTECH	Drill Rig Type: B-24
Logged By: PRC	Date — Started: 8/31/2017	Bit Type: 4-wing (solid head)	Diameter: head)carbide-tipped 4 inches
Drill Crew: CALIFORNIA GEOTECH	Date — Completed: 8/31/2017	Hammer Type:	
USA Ticket Number:	Date — Backfilled: Yes	Hammer Weight: 130 LBS	Hammer Drop: 0.762 m
	Groundwater Depth: NOT ENCOUNTERED	Elevation:	Total Depth of Boring: 18 ft



Standard Penetration Split Spoon Sampler (SPT)
California Sampler
Shelby Tube
CPP Sampler
Stabillized Ground water
Groundwater At time of Drilling
Bulk/ Bag Sample

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(831) 840-4284
gmdalivaengineers@gmail.com

GMD NO: 2017114
DATE: 8/31/2017
Plate No.1

Project: Single Family Dwelling	Project Number: 2017-114	Client: Ahmed Saba	Boring No. B-2
Address, City, State: 0 Hillcrest Rd, Watsonville, CA 9507		Drilling Contractor: CALIFORNIA GEOTECH	Drill Rig Type: B-24
Logged By: PRC	Date — Started: 8/31/2017	Bit Type: 4-wing (solid head) head)carbide-tipped	Diameter: 4 inches
Drill Crew: CALIFORNIA GEOTECH	Date — Completed: 8/31/2017	Hammer Type:	
USA Ticket Number:	Date — Backfilled: Yes	Hammer Weight: 130 LBS	Hammer Drop: 0.762 m
	Groundwater Depth: NOT ENCOUNTERED	Elevation:	Total Depth of Boring: 18 ft

Depth (feet)	Sample Type	Sample Number	Blow Counts (blows/foot)	Graphic Log	Lithology **Soil Group Name:** modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifier color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.	Dry Density (pcf)	Moisture Content (%)	Field Penetrometer (tsf)
0					Some tree roots			
					sandy silty clay (CL-CH), dark-brown, stiff,			
					dry	101	10.2	2.2
		1a	24		dark brown clay with trace of sands, medium to very stiff, low to medium plasticity SILTY CLAY (CL-CH), dry			
10		1b	30		Sandy SILTY CLAY (CL-CH), gray-brown, very stiff, slightly moist, mediun plasticity,	98	12.3	2.8
		1c	32		Sandy SILTY CLAY (CH), dark brown, very stiff, medium plasticity, moist	96	12.5	3
					consistent			
					Bottom of boring at 18 feet.			
20					Groundwater not encountered at 18 feet during drilling.			

Standard Penetration Split Spoon Sampler (SPT)
California Sampler
Shelby Tube
CPP Sampler
Stabillized Ground water
Groundwater At time of Drilling
Bulk/ Bag Sample

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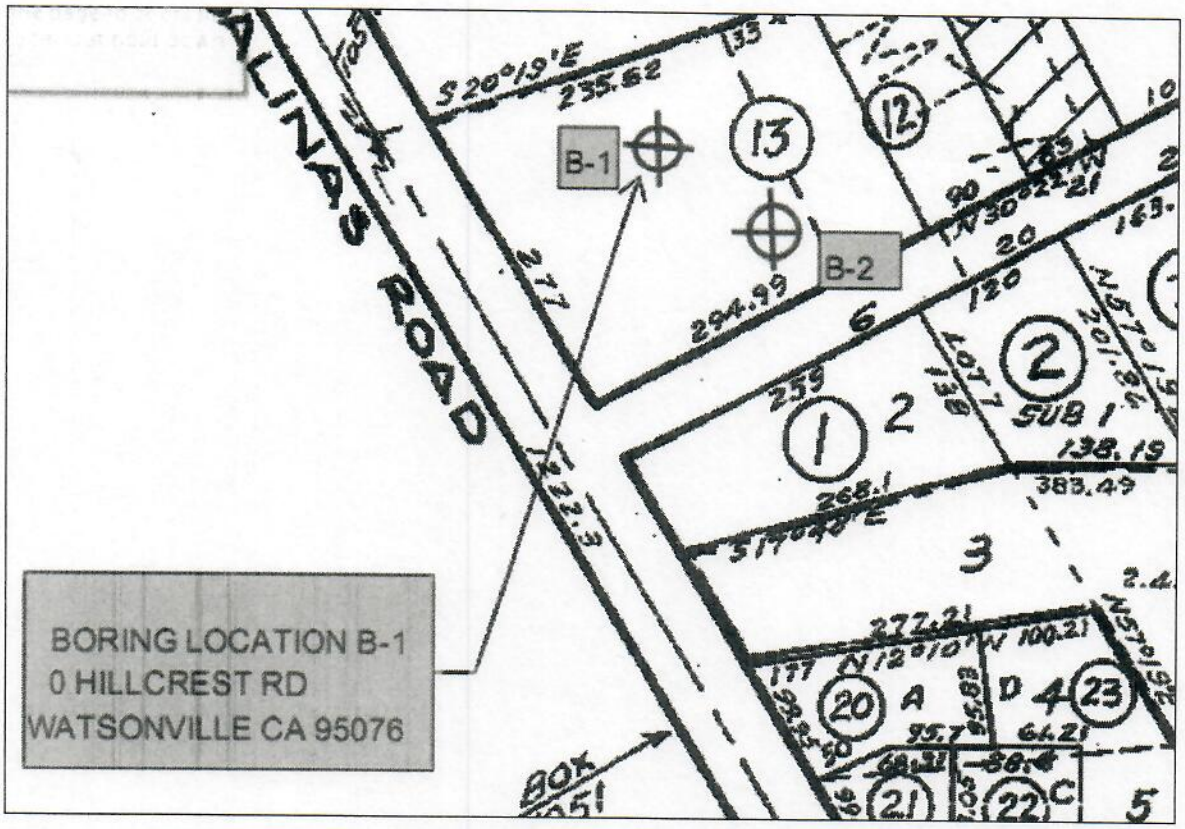
GMD NO: 2017114
DATE: 8/31/2017
Plate No. 2

APPENDIX "B"

Location of Boring

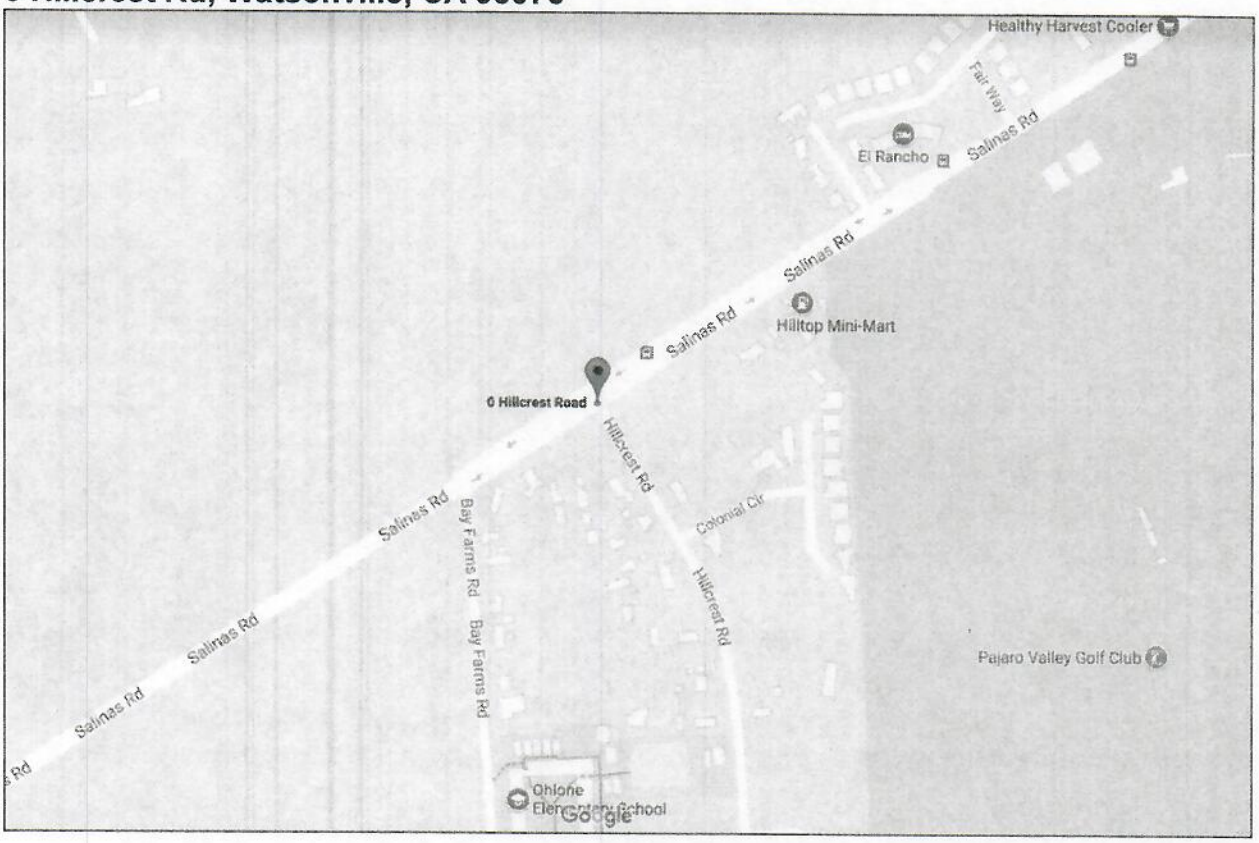
Location Plan

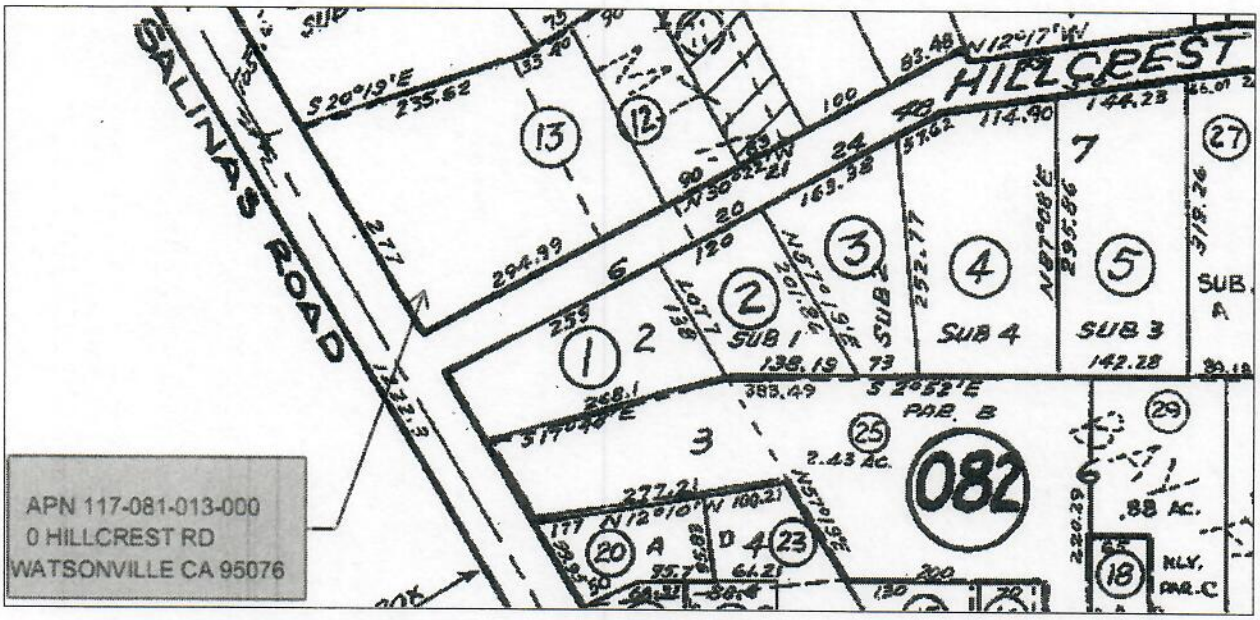


APPROXIMATE BORING LOCATION

APN 117-081-013-000

0 Hillcrest Rd, Watsonville, CA 95076





ASSESSORS MAP

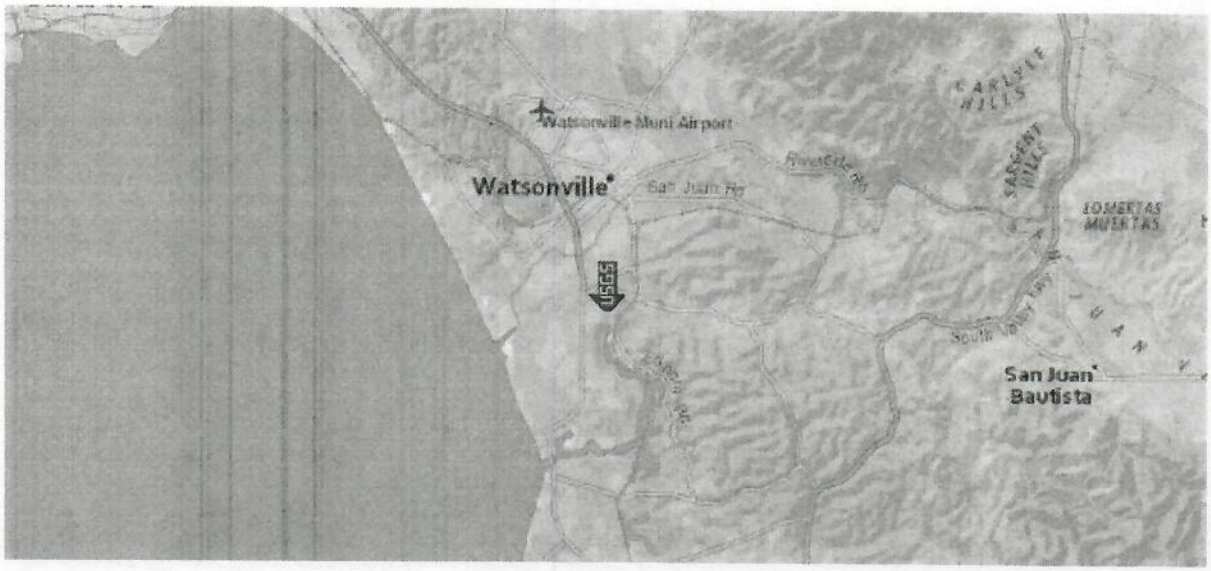
APPENDIX "C"

SEISMIC PARAMETERS

USGS Design Maps Summary Report

User–Specified Input

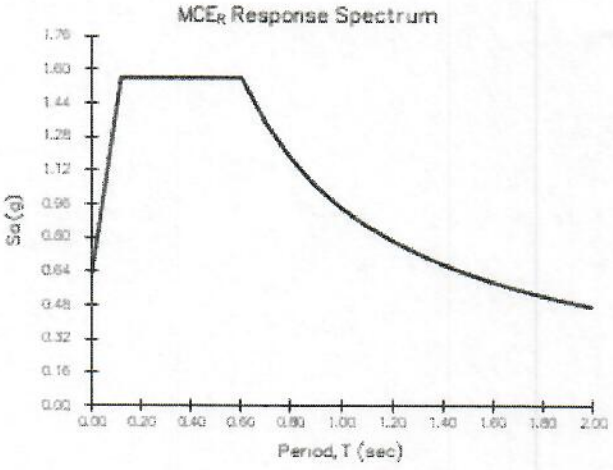
Report Title	0 HILLCREST RD WATSONVILLE CA 95076 Thu September 28, 2017 14:08:39 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	36.87277°N, 121.76047°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

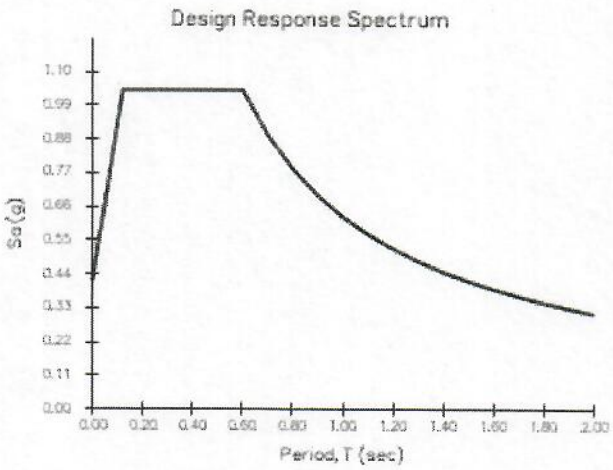


USGS–Provided Output

S_S =	1.564 g	S_{MS} =	1.564 g	S_{DS} =	1.043 g
S_1 =	0.629 g	S_{M1} =	0.943 g	S_{D1} =	0.629 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





USGS Design Maps Detailed Report

2012/2015 International Building Code (36.87277°N, 121.76047°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 1613.3.1 — Mapped acceleration parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2012/2015 International Building Code are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 1613.3.3.

From Figure 1613.3.1(1) [1]	S_S = 1.564 g
From Figure 1613.3.1(2) [2]	S_1 = 0.629 g

Section 1613.3.2 — Site class definitions

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Section 1613.

2010 ASCE-7 Standard – Table 20.3-1
SITE CLASS DEFINITIONS

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 1613.3.3 — Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters

TABLE 1613.3.3(1)
VALUES OF SITE COEFFICIENT F_a

Site Class	Mapped Spectral Response Acceleration at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.564 g, F_a = 1.000

TABLE 1613.3.3(2)
VALUES OF SITE COEFFICIENT F_v

Site Class	Mapped Spectral Response Acceleration at 1-s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.629 g, F_v = 1.500

Equation (16-37): $S_{MS} = F_a S_S = 1.000 \times 1.564 = 1.564$ g

Equation (16-38): $S_{M1} = F_v S_1 = 1.500 \times 0.629 = 0.943$ g

Section 1613.3.4 — Design spectral response acceleration parameters

Equation (16-39): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.564 = 1.043$ g

Equation (16-40): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.943 = 0.629$ g

Section 1613.3.5 — Determination of seismic design category

TABLE 1613.3.5(1)
SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATION

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.043 g, Seismic Design Category = D

TABLE 1613.3.5(2)
SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.629 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 1613.3.5(1) or 1613.3.5(2)" = D

Note: See Section 1613.3.5.1 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 1613.3.1(1)*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1(1).pdf
2. *Figure 1613.3.1(2)*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1(2).pdf

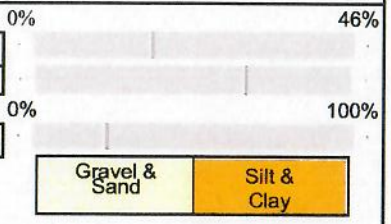
APPENDIX "D"

Results of Laboratory Soil Testing

SOIL CLASSIFICATION ACCORDING ASTM

I. GRAIN SIZE PROPERTIES

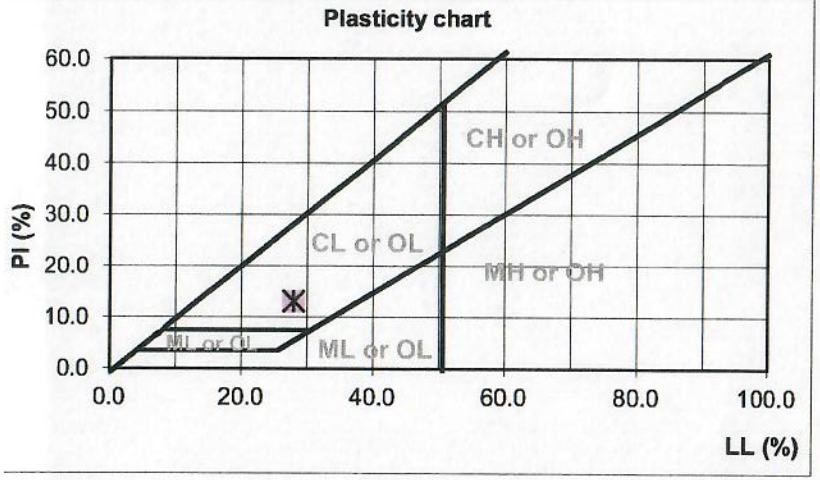
Percent, gravel:	
Percent, sand:	46%
Percent, passing No 200:	54%
Coefficient of uniformity Cu:	
Coefficient of curvature Cc:	



II. PLASTICITY OF FINES (PASSING SIEVE No.40)

Liquidity Limit LL (%)	28.0
Plasticity Index PI(%)	13.0

☐ Organic with LLdry/LL<0.75



CLASSIFICATION RESULTS

Group symbol:

CL

English designation as:

Sandy Lean Clay

(It may be necessary to click on a random cell after changing input data in order to refresh the results)

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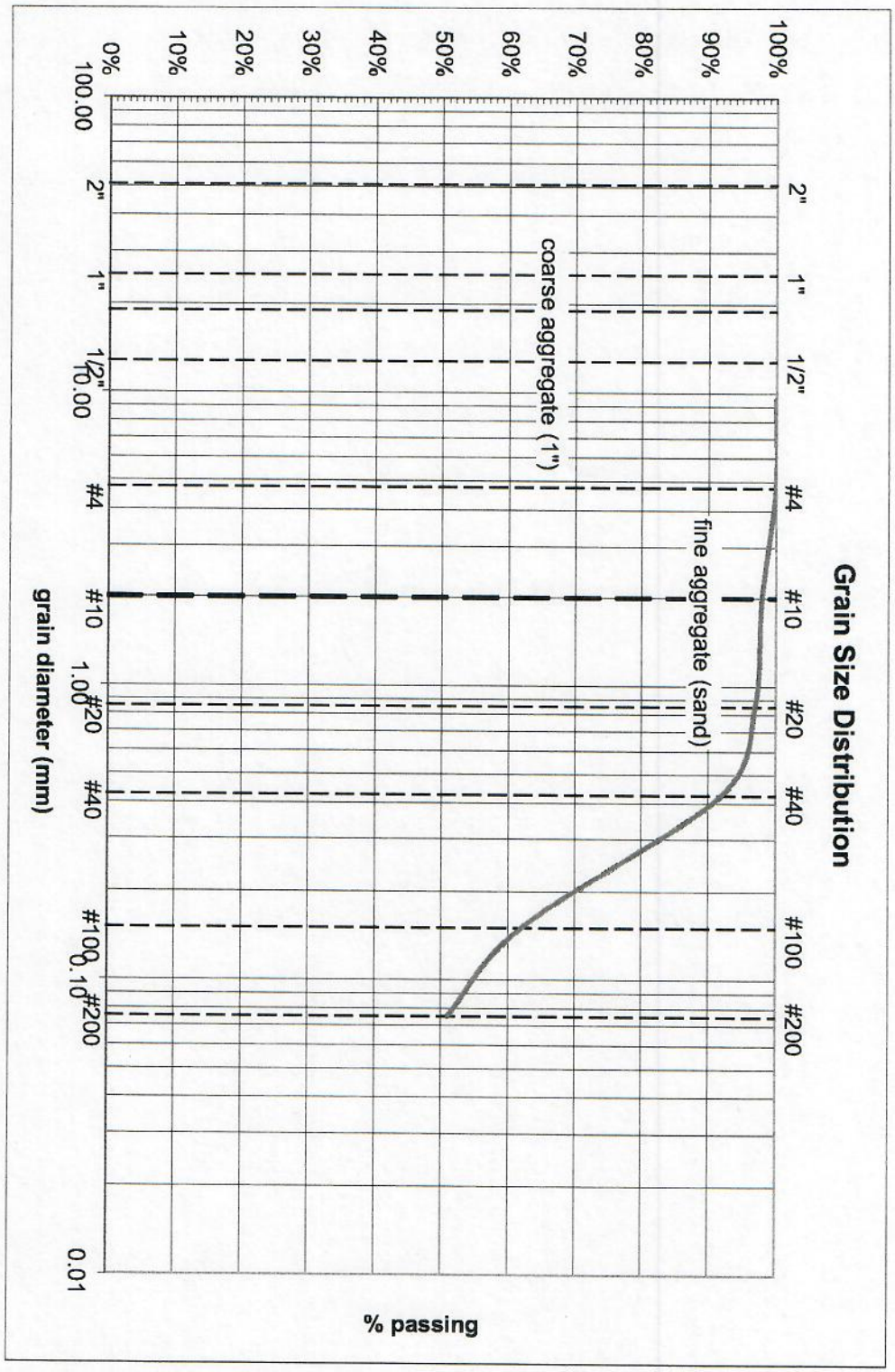
B-2 AT 5-6 FT
0 HILLCREST RD
ROYAL OAKS

GMD NO: 2017114
DATE:8-31-2017
PLATE NO: B-4



GMD ENGINEERS SOIL & FOUNDATION ENGINEERING 11 WEST LAUREL DRIVE SUITE 225 SALINAS CA 93906 **(831) 840-4284** gmdalivaengineers@gmail.com	**B-1 @ 5-6 FT** 00 Hillcrest Rd Rd ROYAL OAKS CA 95076	GMD NO: 2017-1145 DATE: 8-31-2017 PLATE NO: 3

APPENDIX "E"

SOIL DRILLING PICTURES

Boring #1 Drilling Operation on 8-31-2017 at 0 Hillcrest Rd Watsonville Ca 95076

Boring #2 Drilling Operation on 8-31-2017 at 0 Hillcrest Rd Watsonville Ca 95076

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WETLANDS AND BIOLOGICAL ASSESSMENT

5 HILLCREST ROAD
ROYAL OAKS, MONTEREY COUNTY, CALIFORNIA
(APN 117-081-013-000)

MARCH 2018

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COAST RANGE
BIOLOGICAL LLC

EXECUTIVE SUMMARY

At the request of landowner Ahmed Saba, Coast Range Biological LLC and Biosearch Environmental Consulting conducted a Wetlands and Biological Assessment for the ~1.4-acre property located at 5 Hillcrest Road in Royal Oaks, northern Monterey County, California (APN 117-081-013-000). The proposed project consists of the construction of a new 3,632 ft^2 single-family residence, with a 864 ft^2 garage and attached 64 ft^2 breezeway, a 216 ft^2 covered porch, 432 ft^2 deck and stairs, 50 ft^2 landing and stairs, and a 420 ft^2 detached guest house, as shown on site plans, dated September 27, 2017, prepared by M.L. Couper Design. The area evaluated for this Wetlands and Biological Assessment includes: (1) a ~1.4-acre "project site" encompassing the 5 Hillcrest Road property (a ~0.18-acre portion of which will be developed as part of the project), where biological resource impact determinations are made; and (2) a ~4.6-acre "study area," which includes the project site and adjacent areas extending outward 100-feet, where habitats are mapped and evaluated for the potential presence of special-status biological resources, including special-status plant and wildlife species and sensitive habitats (e.g., riparian corridors, streams, wetlands, and sensitive vegetation communities). Potential significant impacts that may occur to these resources as a result of the proposed project are identified and mitigation measures suggested to reduce impacts to less-than-significant levels.

No special-status plant species were observed on the project site or study area during the field visits, but the visits occurred outside the typical blooming period of most plant species. All 40 special-status plant species identified for the region are unlikely to inhabit the project site or surrounding study area because: (1) the project site and study area lack suitable habitat components (e.g., soil type, micro-habitat, plant community) for special-status plant species known from the region; (2) the project site and study area have a history of extensive past disturbance, including commercial agricultural production; and/or (3) a species (e.g., trees, shrubs, or other woody species, or herbaceous species which bloom or are otherwise identifiable in March) should have been identifiable during the field visits and was not observed. Therefore, no special-status plant species are anticipated to occur on project site or study area, and no mitigation measures for special-status plant species are recommended.

Thirty-eight special-status wildlife species were analyzed for their potential occurrence on the study area. Three special-status wildlife species were considered to have a moderate potential to occur on the study area: white-tailed kite (*Elanus leucurus*), Allen's hummingbird (*Selasphorus sasin*), and western red bat (*Lasiurus blossevilli*). The California red-legged frog (*Rana draytonii*) is unlikely to occur on the project site, but low numbers of California red-legged frog individuals could be dispersing in the vicinity at night during the rainy season, and could incidentally occur on the project site. In addition, trees, shrubs, and herbaceous vegetation on the study area could provide nesting habitat for non-listed bird species protected under the Migratory Bird Treaty Act and state Fish and Game Code. Mitigation measures are included in this report to address any potential significant impacts to special-status wildlife species.

Riparian Woodland is present along the intermittent/ephemeral drainage swale in the eastern portion of the study area. According to the North County Land Use Plan/Local Coastal Program, a 50-foot setback from the Riparian Woodland dripline would apply. Seasonal Wetland is present in the lower reach of the drainage swale. According to the North County Land Use Plan/Local Coastal Program, a 100-foot setback from the wetland edge would apply. Based on current project plans, the proposed house will not impact the Riparian Woodland or Seasonal Wetland, and will fall outside the 50-foot Riparian Woodland setback and the 100-foot wetland setback. Assuming all project ground disturbance occurs outside of the wetland and riparian setbacks, and with the utilization of standard Best Management Practices during construction (such as erosion control and other measures), no

direct or indirect impacts to Seasonal Wetland and Riparian Woodland habitats are anticipated from the project. Due to the Seasonal Wetland and Riparian Woodland setbacks, the project will not result in any significant adverse impacts to wildlife corridors.

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APPENDICES

1.0 INTRODUCTION

At the request of landowner Ahmed Saba, Coast Range Biological LLC and Biosearch Environmental Consulting conducted a Wetlands and Biological Assessment for the ~1.4-acre property located at 5 Hillcrest Road in Royal Oaks, northern Monterey County, California (Figure 1) (APN 117-081-013-000). The proposed project consists of the construction of a new 3,632 ft^2 single-family residence, with a 864 ft^2 garage and attached 64 ft^2 breezeway, a 216 ft^2 covered porch, 432 ft^2 deck and stairs, 50 ft^2 landing and stairs, and a 420 ft^2 detached guest house, as shown on site plans, dated September 27, 2017, prepared by M.L. Couper Design.

The area evaluated for this Wetlands and Biological Assessment includes: (1) a ~1.4-acre "project site" encompassing the 5 Hillcrest Road property (a ~0.18-acre portion of which will be developed as part of the project), where biological resource impact determinations are made; and (2) a ~4.6-acre "study area," which includes the project site and adjacent areas extending outward 100-feet (Figure 2), where habitats are mapped and evaluated for the potential presence of special-status biological resources, including special-status[1] plant and wildlife species and sensitive habitats (e.g., riparian corridors, streams, wetlands, and sensitive vegetation communities). Potential significant impacts that may occur to these resources as a result of the proposed project are identified and mitigation measures suggested to reduce impacts to less-than-significant levels.

2.0 METHODS

2.1 Literature Review

Prior to conducting field studies, a background literature search was conducted to determine which special-status species and other sensitive biological resources have potential to inhabit the study area region based on documented occurrences and range distribution (Appendix A). The primary sources for this search included the California Natural Diversity Data Base (CNDDB) (CDFW 2018), California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2018), and the U.S. Fish and Wildlife Service (USFWS) list of threatened or endangered species (USFWS 2018a) records for the Moss Landing and surrounding USGS 7.5' quadrangles[2]. In addition, other lists and publications were consulted, including the California Department of Fish and Wildlife (CDFW) Special Animals list (CDFW 2017), Zeiner et al. (1988; 1990a; 1990b), eBird (2018), the National Wetlands Inventory (USFWS 2018b), Web Soil Survey (NRCS 2018a), topographic maps (USGS 1954), and Baldwin et al. (2012).

2.2 Field Studies

Reconnaissance-level field studies were conducted on February 28 and March 5, 2018. The project site and accessible portions of the study area were traversed on foot to document habitat conditions to determine the potential for occurrence of special-status biotic resources. The potential for occurrence of special-status plant and wildlife species was assessed based on the presence of necessary habitat

[1] Special-status species are defined here to include: (1) all plants and animals that are listed under the Federal or State Endangered Species Acts as rare, threatened or endangered; (2) all federal and state candidates for listing; (3) California Department of Fish and Wildlife Species of Special Concern; (4) plants that qualify under the definition of "rare" in the California Environmental Quality Act (CEQA), section 15380; and (5) all plants included in Lists 1 and 2 (and Lists 3 and 4 when they meet the definition of "rare") in CNPS (2018).

[2] The initial raw species list was refined to remove species that are documented in the general region but are not expected to occur near the study area due to range limitation or extirpation, or occur in habitats obviously lacking from the study area, such as marine habitats. The remaining species were analyzed for their potential to occur on the study area (Appendix A).

Figure 1. Project site locality map.

Figure 2. Habitats on the study area.
Orthophoto date: 7/23/16

Coast Range Biological

Mapscale: 1:800
0 25 50 100 150 200 Feet

N

Map Prepared by: T. Mahony
Map Date: 3/6/18

characteristics, confirmed records from the region, and the biologist's knowledge of the target species. No focused field surveys were conducted. Potential sensitive resources were mapped in the field with a Trimble GPS unit (sub-meter accuracy). Other habitats were mapped onto a digital orthophoto (dated July 23, 2016) using ArcGIS mapping software based on variations in texture, color, and structure. The project site and project disturbance envelope were estimated onto the orthophoto based on available site plans prepared by M.L. Couper Design, and are only approximate.

2.2.1 Special-status Species

Potential for occurrence of special-status species was classified as follows: None, Low, Moderate, High, or Present. For species with a potential for occurrence of None or Low, habitat for the species is lacking or is otherwise degraded or unsuitable, and no further recommendations are made since the species is unlikely to inhabit the study area. For species that are present on the study area (based on field observations and/or documentation during the background literature search), or for species with a Moderate or High potential for occurrence (based on the presence of suitable habitat), mitigation measures are recommended to reduce any potential significant impacts to less-than-significant levels (CEQA Guidelines, Appendix G).

2.2.2 Other Sensitive Biotic Resources

Other sensitive biotic resources searched for during the reconnaissance include wetlands, streams, riparian corridors, and rare or sensitive vegetation communities known from the region and/or identified in the CNDDB (e.g., those listed with a State rank of S1-S3 [CDFG 2010]). In addition, since the project is located in the Coastal Zone, habitats considered sensitive by the California Coastal Commission under the California Coastal Act (CCA) and the County of Monterey under the North County Land Use Plan/Local Coastal Program (LCP) were addressed. Impacts to sensitive habitats could be considered significant under CEQA and other federal, state, and local regulations.

Wetlands, streams, and riparian corridors could also fall under the jurisdiction of state and federal agencies, including the CDFW, U.S. Army Corps of Engineers, and Regional Water Quality Control Board. In addition, the potential presence of wetlands jurisdictional by the California Coastal Commission under the CCA/LCP (e.g., the "one-parameter approach", where the presence of any one wetland parameter—hydrophytic vegetation, wetland hydrology, or hydric soils—is generally sufficient to delineate an area as wetland under the CCA) were evaluated. Four sample points were taken on the study area and recorded on Corps data forms provided in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* ("Arid West Manual") (USACE 2008).

3.0 PROJECT SITE AND STUDY AREA DESCRIPTION

The project site covers ~1.4-acres and is located at 5 Hillcrest Road in Royal Oaks, northern Monterey County, California (Figures 1 and 2). A ~0.18-acre subset of the project site constitutes the approximate location of the proposed residence, guest house, and driveway, which was estimated from available site plans. The study area covers ~4.6-acres and includes the project site and a 100-foot buffer. The project site consists of undeveloped land that was historically used for agriculture (based on a review of historic aerial photographs). Currently, there are no active land uses on the project site, though the western portion of the project site is occasionally used as a gravel parking/staging area. Some vegetation clearing has occurred in the eastern portion of the project site, including the Riparian Corridor, and piles of cut vegetation were observed during the field visits. No vegetation has been cleared on the project site since the purchase of the property in June 2017

(Ahmed Saba, landowner, pers. comm.). Based on a review of aerial photographs, the vegetation clearing occurred sometime in late 2016 or early 2017.

Adjacent areas on the study area, outside the project site, consist of Salinas Road and agricultural land to the north, and ruderal areas and residential development to the east, south, and west. Land uses surrounding the study area consist of agricultural land to the north and west, Pajaro Valley Golf Club to the east, and residential development to the south. Photographs of the project site and study area are included in Appendix B.

3.1 Vegetation

Four habitats are present on the study area: Non-Native Grassland, Riparian Woodland, Seasonal Wetland, and Developed/Landscaped (Figure 2). A ruderal phase of Non-Native Grassland[3], composed of the *Avena* and other non-native herbaceous Alliances[4], covers most of the project site and is dominated by non-native grasses and forbs adapted to disturbance, including ripgut brome (*Bromus diandrus*[5]), wild oats (*Avena* sp.), barley (*Hordeum murinum* subsp. *leporinum*), black mustard (*Brassica nigra*), vetch (*Vicia sativa*), redstem filaree (*Erodium cicutarium*), cheese weed (*Malva* sp.), rescue grass (*Bromus catharticus*), rattail fescue (*Festuca myuros*), wild radish (*Raphanus sativus*), English plantain (*Plantago lanceolata*), and rough cat's-ear (*Hypochaeris radicata*), with occasional native species including coyote brush (*Baccharis pilularis*), California poppy (*Eschscholzia californica*), and California aster (*Symphyotrichum chilense*). Riparian Woodland is present along the drainage swale and is dominated by a canopy of willow (*Salix* sp.), with occasional coast live oak (*Quercus agrifolia*). The understory consists of sparsely vegetated areas due to past vegetation clearing, along with dense thickets of native and non-native shrubs and herbaceous species including California blackberry (*Rubus ursinus*), cape ivy (*Delairea odorata*), English ivy (*Hedera helix*), poison hemlock (*Conium maculatum*), and curly dock (*Rumex crispus*). Seasonal Wetland occurs in the swale downstream of Riparian Woodland, and is dominated by wetland-classified herbaceous plant species, including iris-leaved rush (*Juncus xiphioides*), curly dock, and poison hemlock. Developed/Ruderal habitat consists of roads and residential development, as well as disturbed, ruderal areas dominated by bare ground or non-native herbaceous species adapted to disturbance described above for Non-Native Grassland. In addition, small stands of non-native acacia trees—blackwood acacia (*Acacia melanoxylon*) and silver wattle (*Acacia dealbata*)—are present on the study area.

A list of plant species observed on the study area is included in Appendix C.

3.2 Wildlife

Wildlife expected on the study area include a variety of native species common in the Monterey Bay region, including some that may become tolerant to human disturbance. Mule deer (*Odocoileus hemionus*) may use or pass through the project site, particularly at night and despite the nearby residential housing. Striped skunk (*Mephitis mephitis*) and raccoon (*Procyon lotor*) are expected. Pacific chorus frog (*Pseudacris regilla*) may disperse through the Riparian Woodland corridor but no breeding habitat is present. Western fence lizard (*Sceloporus occidentalis*) is expected. Gopher snake (*Pituophis catenifer*) may use open areas, although nearby Salinas Road reduces habitat quality due to the risk of road-kill. Several common resident and wintering birds were observed in or near the Riparian Woodland, including Anna's hummingbird (*Calypte anna*), black phoebe (*Sayornis nigricans*), northern mockingbird (*Mimus polyglottos*), ruby-crowned kinglet (*Regulus calendula*),

[3] Vegetation nomenclature follows Holland (1986).

[4] Alliance nomenclature follows Sawyer et al. (2009).

[5] Botanical nomenclature follows Baldwin et al. (2012) and The Jepson Flora Project (2018).

and yellow-rumped warbler (*Dendroica coronata*). A list of wildlife species observed or detected by sign on the study area is included in Appendix D.

3.3 Geology, Climate, and Soils

The study area occurs between ~155 and ~170-feet elevation (USGS 1954) and occurs on a broad terrace that slopes toward the southeast. Average annual precipitation for the region is 21.52 inches, occurring primarily between October and May (Western Regional Climate Center 2018). The study area is underlain by marine and non-marine (continental) sedimentary rocks of Pleistocene age (older alluvium, lake, playa, and terrace deposits) (California Geological Survey 2010).

Three soil types have been mapped on the study area (NRCS 2018a):

EdB—Elkhorn fine sandy loam, 2 to 5 percent slopes
EdC—Elkhorn fine sandy loam, 5 to 9 percent slopes
EeD—Elkhorn fine sandy loam, thin surface variant, 5 to 15 percent slopes

Elkhorn fine sandy loam, 2 to 5 percent slopes, is a well-drained soil derived from mixed fine-loamy alluvium from sandstone, and is found on terraces. A typical profile consists of fine sandy loam from 0 to 26 inches, sandy clay loam from 26 to 46 inches, and fine sandy loam from 46 to 63 inches. The depth to water table and a restrictive feature is >80 inches below the surface. Elkhorn fine sandy loam, 5 to 9 percent slopes, is a well-drained soil derived from mixed fine-loamy alluvium from sandstone, and is found on terraces. A typical profile consists of fine sandy loam from 0 to 26 inches, sandy clay loam from 26 to 46 inches, and fine sandy loam from 46 to 63 inches. The depth to water table and a restrictive feature is >80 inches below the surface. Elkhorn fine sandy loam, thin surface variant, 5 to 15 percent slopes, is a well-drained soil derived from mixed fine-loamy alluvium from sandstone, and is found on terraces. A typical profile consists of fine sandy loam from 0 to 17 inches, clay loam from 17 to 25 inches, and unweathered bedrock from 25 to 29 inches. The depth to water table is >80 inches below the surface, and the depth to a restrictive feature (lithic bedrock) is ~25 inches below the surface.

Elkhorn fine sandy loam, 2 to 5 percent slopes is listed as hydric for Monterey County when containing unnamed inclusions in depressions (NRCS 2018b). Elkhorn fine sandy loam, 5 to 9 percent slopes and Elkhorn fine sandy loam, thin surface variant, 5 to 15 percent slopes are not listed as hydric soils for Monterey County (NRCS 2018b).

3.4 Hydrology

The principal hydrologic sources for the study area are direct precipitation, surface sheet flow from surrounding uplands, and drainage through a remnant channel/swale in the eastern portion of the study area. In the Moss Landing USGS 7.5' topographic quadrangle (USGS 1954), the swale is mapped as an unnamed intermittent drainage originating downstream (south) of Salinas Road, draining southbound across the eastern portion of the study area, and eventually discharging into Elkhorn Slough, ~1-mile south of the study area. The drainage is not mapped in the National Hydrography Dataset (NHD) (USGS 2018). The swale and associated vegetation were mapped as Freshwater Emergent Wetland and Freshwater Forested/Shrub Wetland in the National Wetlands Inventory (NWI) (USFWS 2018b).

The drainage originates south of Salinas Road via discharge from a culvert and surface runoff from the road, and flows southbound along the eastern study area boundary via a narrow, weakly incised channel in the upper reach that broadens to a swale in the lower reach. The swale discharges into a

culvert under residential development in the southeastern corner of the study area. The swale/channel was dry during the February-March 2018 field visits, and likely only contains surface flow after significant rain events. Since the drainage is mapped as intermittent in the USGS 7.5' Moss Landing topographic quadrangle and is absent in the NHD, and since it lacked surface flow during the February-March 2018 field visits, the drainage is considered here to be ephemeral/intermittent.

4.0 RESULTS

4.1 Special-status Plants

Forty special-status plant species are documented to occur in the study area region based on the background literature search discussed in Section 2.1. A list of these species, their status, and their typical habitats is presented in Appendix A. A search of the CNDDB GIS database found no documented occurrences[6] of special-status plant species on the study area, but numerous occurrences have been documented within three miles of the study area (Figure 3). The study area is not located within designated Critical Habitat for any federally-listed plant species (USFWS 2018c).

No special-status plant species were observed on the project site or surrounding study area during the field visits (Appendix C), but the visits occurred outside the typical blooming period of most plant species. All 40 special-status plant species identified for the region are unlikely to inhabit the project site or surrounding study area because: (1) the project site and study area lack suitable habitat components (e.g., soil type, micro-habitat, plant community) for special-status plant species known from the region; (2) the project site and study area have a history of extensive past disturbance, including a long history of agricultural production; and/or (3) a species (e.g., trees, shrubs, or other woody species, or herbaceous species which bloom or are otherwise identifiable in March) should've been identifiable during the field visits and was not observed.

Therefore, no special-status plant species are anticipated to occur on project site or study area, and no mitigation measures for special-status plant species are recommended.

4.2 Special-status Wildlife

Thirty-eight special-status wildlife species were analyzed for their potential occurrence on the project site and surrounding study area because they: (1) occur in habitats present in the general vicinity of the study area, and (2) have ranges that include the study area (Appendix A). A search of the CNDDB GIS database found no documented occurrences of special-status wildlife species on the study area, but numerous occurrences have been documented within three miles of the study area (Figure 3). The study area is not located within designated Critical Habitat for any federally-listed wildlife species (USFWS 2018c).

No special-status wildlife species were observed on the project site or study area during the reconnaissance-level site visit. Three special-status wildlife species have a moderate potential to occur on or near the study area: Allen's hummingbird (*Selasphorus sasin*), white-tailed kite (*Elanus leucurus*), and western red bat (*Lasiurus blossevillii*). These species are discussed further below. The California red-legged frog (*Rana draytonii*), though expected to have a low potential to inhabit the Riparian Woodland on the study area, is analyzed below due to its federally-threatened status and the presence of documented occurrences in the vicinity. In addition, trees, shrubs, and herbaceous vegetation on the study area could provide nesting habitat for non-listed bird species protected under

[6] The lack of documented occurrences does not necessarily mean that a species does not occur in an area, only that no occurrences have been reported.

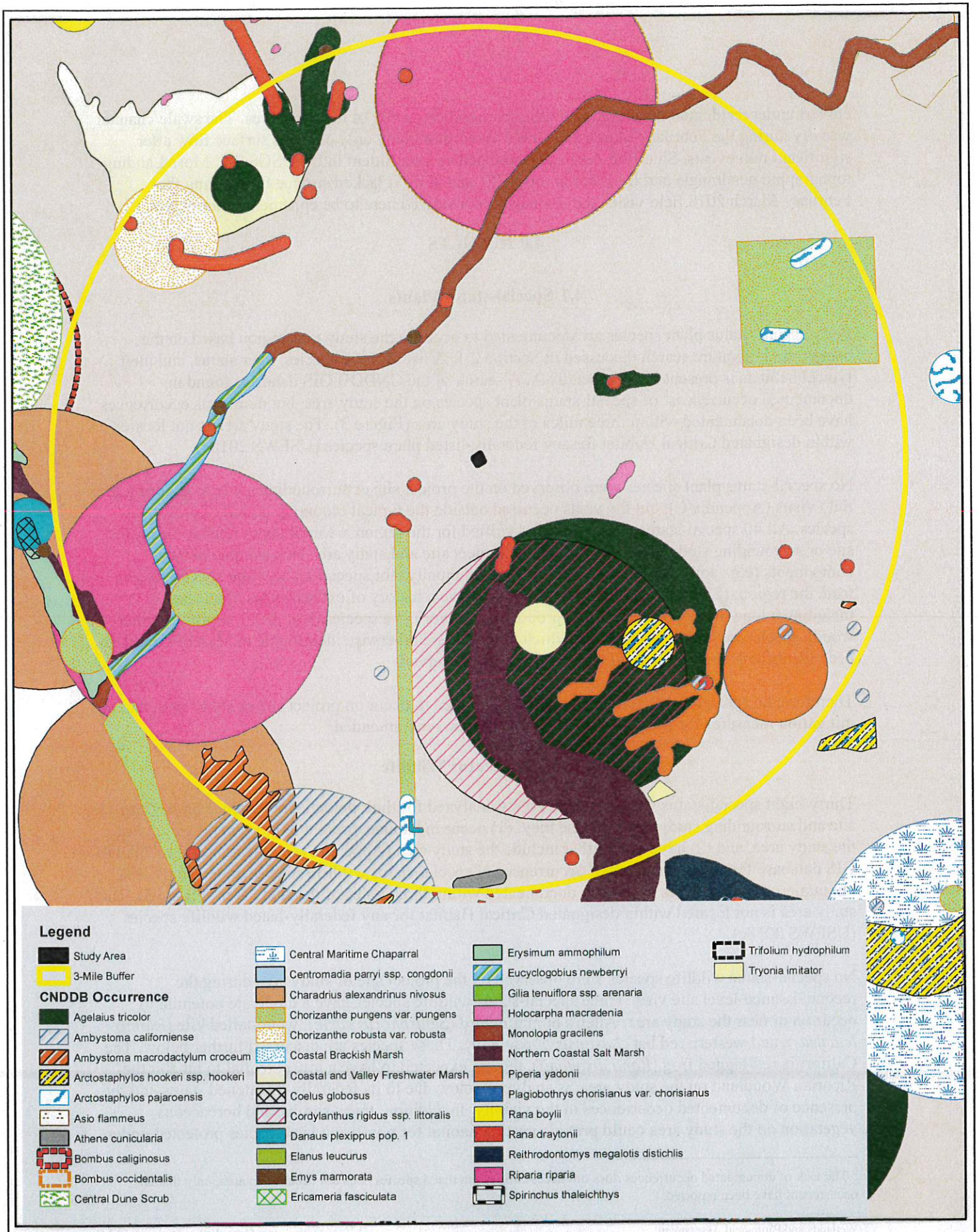

Figure 3. CNDDB map of the study area.

Data Source: CNDDB (CDFW 2018).

the Migratory Bird Treaty Act (MBTA) and state Fish and Game Code.

The remaining special-status wildlife species analyzed are considered absent or to have a low potential to inhabit the project site or study area, and it is therefore unlikely they would be adversely impacted by the proposed project (Appendix A). These species are not discussed further. Some special-status wildlife species documented from the region in the CNDDB and/or USFWS species list were not included in Appendix A because suitable habitat is clearly absent from the project site and study area or whose range does not include the study area (e.g., southern sea otter [*Enhydra lutris nereis*], marbled murrelet [*Brachyramphus marmoratus*], and western snowy plover [*Charadrius alexandrinus nivosus*]).

California Red-legged Frog (*Rana draytonii*), Federal Status: Threatened; State Status: Species of Special Concern

The California red-legged frog (CRLF) is a large (85-138 mm), nocturnal species that historically occupied much of central and southern California. The species requires still or slow-moving water during the breeding season, where it deposits large egg masses, usually attached to submerged or emergent vegetation. Breeding typically occurs between December and April, depending on annual environmental conditions and locality. Eggs require 6 to 12 days before hatching and metamorphosis occurs 3.5 to 7 months after hatching (Stebbins 2003). Following metamorphosis between July and September, juveniles generally do not travel far from aquatic habitats. Movements of individuals generally begin with the first rains of the weather-year, in response to receding water or following the breeding season (Fellers and Kleeman 2007). Radio-telemetry data indicates that individuals generally engage in straight-line movements irrespective of riparian corridors and can move up to two miles (Bulger et al. 2003; Fellers and Kleeman 2007). California red-legged frogs utilize a variety of water sources during the non-breeding season, and females are more likely than males to depart from perennial ponds shortly after depositing eggs (Fellers and Kleeman 2007). They may take refuge in small mammal burrows, leaf litter or other moist areas during periods of inactivity or whenever it is necessary to avoid desiccation (Rathbun et al. 1993; Jennings and Hayes 1994). Occurrence of this frog has shown to be negatively correlated with presence of introduced bullfrogs (Moyle 1973; Hayes and Jennings 1986, 1988), but both species coexist at some locations, particularly along the coast. Genetic studies indicate that the nominal subspecies *draytonii* and *aurora* represent separate lineages and are therefore distinct species (Shaffer et al. 2004).

The nearest documented CRLF occurrence is ~0.4-miles southwest of the study area, with numerous other occurrences present within three miles of the study area (Figure 3). Several individuals of all size classes were found over-summering along an unnamed tributary to Elkhorn Slough in 2016 and 2017 (Allaback, personal observation). A productive CRLF breeding pond is located immediately west of Salinas Road and State Highway 1, 0.75-miles to the southwest. Other potential breeding ponds are present in the region, including on Pajaro Valley Golf Club to the east. The study area lacks aquatic habitat for CRLF, and surrounding disturbances including residential housing, Salinas Road, and commercial agriculture reduce habitat quality and connectivity with the project site. However, the Riparian Woodland and Seasonal Wetland could provide foraging and sheltering habitat during the rainy season, if standing water is present, or may facilitate low numbers of individuals passing through during dispersal. These habitats will not be impacted by the project, but individuals may pass through the area at night during the rainy season, and could incidentally occur on the project site. Mitigation measures are included in Section 5.0 to ensure any CRLF in the vicinity are not impacted by project construction.

White-tailed Kite (*Elanus leucurus*), Federal Status: None; State Status: Fully Protected

The white-tailed kite is a medium-sized raptor that occupies low-elevation grassland, agricultural, wetland, oak woodland and oak savanna habitats (Dunk 1995). The species is distributed throughout the coastal foothills and valleys along the entire length of the state, throughout the Central Valley, and into the foothills of the Sierra Nevada (Dunk 1995). It nests in a wide variety of trees and shrubs, either isolated or part of larger stands. Typically, four eggs are laid in February and March and chicks hatch after 30-32 days. Juveniles often share their parents' home range for at least one season. During the non-breeding season, the species roosts communally. Nearby open areas are required for foraging, and the species will use certain types of agricultural fields. Food habit studies have demonstrated that voles make up a large proportion of its diet, although other small mammals, birds and insects are also eaten (Dunk 1995). The species hunts during the day primarily by hovering and searching for prey. White-tailed kites in California are generally resident, although they may occupy different areas during the non-breeding and breeding seasons. The species underwent a dramatic reduction in numbers due to habitat loss and hunting, and was extirpated throughout much of its range in the early 1900s. Between the 1940s and early 1980s, the population recovered and its range expanded. More recently, population declines have again been noted, possibly as a result of the conversion of agricultural lands to urban uses (Dunk 1995). In California, the white-tailed kite is listed as "Fully Protected" in the California Fish and Game Code and as a Bird of Conservation Concern by the USFWS.

Observations of white-tailed kites in the Pajaro Valley-Elkhorn Slough region are regularly reported (eBird 2018). The species was a confirmed breeder in the area during surveys conducted from 1988-92 (Monterey Peninsula Audubon Society 1993). Foraging habitat is present on the project site for white-tailed kites, which may become tolerant to human activity in some areas. Nesting is possible in the Riparian Woodland or at numerous trees outside the study area in all directions. Potential measures to protect white-tailed kites related to future ground disturbance would include pre-construction breeding bird surveys to locate any nests, avoiding nest disturbance with buffers to ground disturbance, and/or conducting work outside the nesting season. Mitigation measures are included in Section 5.0 to ensure that white-tailed kites are not impacted by project construction.

Allen's Hummingbird (*Selasphorus sasin*), Federal Status: Bird of Conservation Concern; State Status: None.

Allen's hummingbird breeds in a narrow band along the coast of California and southern Oregon and winters from Central California south through Baja and Central Mexico. Nesting habitat in the San Francisco Bay region includes mixed evergreen forest, redwood forests, riparian woodland, nonnative eucalyptus and cypress groves, and occasionally live oak woodlands and coastal scrub with scattered trees (Mitchell 2000). In addition to nectar, insects are taken, especially spiders. Allen's hummingbird is an extremely early migrant, and arrives on nesting grounds in January and February (Mitchell 2000). Males engage in a distinct J-shaped flight pattern when courting females. Nests are often clustered and semi-colonial. Females typically produce two broods.

Observations of Allen's hummingbirds are regularly reported in the region (eBird 2018). The species was a confirmed breeder in the area during surveys conducted from 1988-92 (Monterey Peninsula Audubon Society 1993). Suitable nesting habitat for Allen's hummingbird is present on the study area in the Riparian Woodland. Potential measures to protect Allen's hummingbirds related to future ground disturbance would include pre-construction breeding bird surveys to locate any nests, avoiding nest disturbance with buffers to ground disturbance, and/or conducting work outside the nesting season. Mitigation measures to reduce impacts to Allen's hummingbird to less-than-significant levels are included in Section 5.0.

Other Nesting Bird Species

Suitable nesting habitat for other, non-listed bird species protected under the MBTA and Fish and Game Code occurs in trees, shrubs, and herbaceous vegetation on the study area. The MBTA regulates or prohibits taking, killing, and possession of migratory bird species and their nests as listed in Title 50 Code of Federal Regulation (CFR) Section 10.13. Bird species and their nests are also protected under Sections 3515 and 3503 of the state Fish and Game Code. Vegetation removal during the nesting season, or noise and other disturbance during project implementation, could adversely impact nesting bird species on the study area, should they be present, potentially resulting in nest destruction, abandonment, or failure. Mitigation measures to address potential significant impacts to nesting bird species are included in Section 5.0.

Red Bat (*Lasiurus blossevillii*), Federal Status: None, State Status: Species of Special Concern, Western Bat Working Group.

The western red bat is widely distributed in the western United States, Central America and South America. *Lasiurus blossevillii* formerly was included in *Lasiurus borealis*, but recent genetic work has demonstrated that the two represent distinct species (Morales and Bikham 1995; Baker, et al. 2003). The species roosts primarily in the foliage of trees and shrubs and is closely associated with riparian habitats (Shump and Shump 1982). It feeds primarily on insects, which are taken in flight or while foraging on the ground. Breeding occurs in late summer, while fertilization is delayed until the spring (Shump and Shump 1982). It appears that red bats in California do not migrate out of the state, although there may be seasonal movements (Cryan 2003). Loss of riparian habitat has been implicated in the decline of this species.

There are no nearby records for red bats but this may be due to a lack of survey effort, since the species is known from elsewhere in Monterey and Santa Cruz Counties (CDFW 2018). Potential roosting habitat during the winter for red bats is present on the study area in the Riparian Woodland. However, since Riparian Woodland will not be impacted by the project, and there will be a >50-foot setback between suitable roosting habitat and project disturbance, no direct or indirect impacts to western red bat are anticipated from the project and no mitigation measures for the species are recommended.

4.3 Sensitive Habitats

According to Section 2.3 of the LCP, "*Environmentally sensitive habitats are areas in which plant or animal life or their habitats are rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments. These include Areas of Special Biological Significance as identified by the State Water Resources Control Board; rare and endangered species habitat, all coastal wetlands and lagoons, all marine wildlife, and kelp beds; and indigenous dune plant habitats.*"

4.3.1 Riparian Corridors

Riparian Habitat/Community/Woodland is defined in Appendix B of the LCP as: "*An area of vegetation and associated animal species which typically occurs along freshwater course. Riparian woodland is generally restricted to a linear strip along streams although where river valleys are broad, the extent of riparian woodland is often correspondingly broad. Characteristic woody species are Black Cottonwood, Sycamore, Red Alder, White Alder, Box Elder and Willow species.*"

Riparian Corridor is defined as: "*An area consisting of the stream channel and an area on each side of the stream to be measured from the mean rainy season (bankfull) flow-line as follows: (a) 150-foot zone from each side of perennial streams, or the extent of riparian vegetation, whichever is greater; (b) 50-foot zone from each side of intermittent streams, or the extent of riparian vegetation, whichever is greater.*"

According to Section 2.3.3 of the LCP: "*Riparian plant communities shall be protected by establishing setback requirements consisting of 150 feet on each side of the bank of perennial streams, and 50 feet on each side of the bank of intermittent streams, or the extent of riparian vegetation, whichever is greater. In all cases, the setback must be sufficient to prevent significant degradation of the habitat area. The setback requirement may be modified if it can be conclusively demonstrated by a qualified biologist that a narrower corridor is sufficient or a wider corridor is necessary to protect existing riparian vegetation from the impacts of adjacent use.*"

During the field visit, Riparian Woodland was delineated along the drainage swale in the eastern portion of the study area (Figure 2). The Riparian Woodland was mapped to the dripline of existing riparian vegetation and, for cleared areas, the pre-disturbance riparian dripline was estimated from vegetation piles observed in the field and a review of pre-disturbance aerial photographs. The drainage was mapped as an intermittent stream in the USGS 7.5' Moss Landing topographic quadrangle (USGS 1954), and was dry during the field visits. Therefore, according to the LCP, a 50' setback from the Riparian Woodland dripline would apply (Figure 2).

4.3.2 Wetlands

Wetlands are defined in Appendix B of the LCP as: "*Lands within the Coastal Zone which may be covered periodically or permanently with shallow water and include saltwater marshes, fresh water marshes, open or closed brackish water marshes, swamps, mudflats, and fens.*"

According to Section 2.3.3 of the LCP: "*A setback of 100 feet from the landward edge of vegetation of all coastal wetlands shall be provided and maintained in open space use. No permanent structures except for those necessary for resource-dependent use which cannot be located elsewhere shall be constructed in the setback area. Prior to approval of all proposed structures in the setback area, it must be demonstrated that the development does not significantly disrupt the habitat resource.*"

Four wetland delineation sample points were taken on the project site (Figure 2). Data forms are included in Appendix E. In the lower reach of the drainage swale, Riparian Woodland is replaced with Seasonal Wetland vegetation dominated by wetland-classified herbaceous species including iris-leaved rush, curly dock, and poison hemlock. The wetland extends down the swale before entering a culvert under residential development in the southeastern portion of the study area. According to the LCP, a 100-foot setback from the wetland edge would apply (Figure 2).

In addition to LCP setbacks for Riparian Woodland and Seasonal Wetland discussed above, both of these areas could fall under the regulatory jurisdiction of state and federal agencies. At the federal level, these habitats could fall under the regulatory jurisdiction of the U.S. Army Corps of Engineers (ACOE) under Section 404 of the federal Clean Water Act (CWA). Work, such as placement of fill material, occurring within ACOE jurisdiction normally requires a permit under Section 404 of the CWA. The ACOE, under Section 401 of the federal CWA, is required to meet state water quality regulations prior to granting a Section 404 permit. This is accomplished by application to the local Regional Water Quality Control Board (RWQCB) for Section 401 certification that requirements have been met. In addition, the RWQCB could have jurisdiction over "waters of the State" and over "isolated" or other wetlands exempt from ACOE jurisdiction under the Porter-Cologne Water Quality

Control Act. At the state level, the CDFW has jurisdiction over streams to the top-of-bank or riparian dripline, whichever is greater. Work within CDFW jurisdiction normally requires a Streambed Alteration Agreement.

Based on current project plans, the proposed house will not impact the Riparian Woodland or Seasonal Wetland, and will fall outside the 50-foot Riparian Woodland setback and the 100-foot wetland setback described in the LCP. Assuming all project ground disturbance occurs outside of the wetland and riparian setbacks, and with the utilization of standard Best Management Practices during construction (such as erosion control and other measures to ensure no sediment, pollutants, or debris enters the Riparian Woodland or Seasonal Wetland), no direct or indirect impacts to Seasonal Wetland and Riparian Woodland habitats are anticipated from the project and no mitigation measures are recommended.

4.3.3 Wildlife Corridors

Projects that "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" could result in significant impacts under CEQA. The Riparian Woodland, Seasonal Wetland, and Non-Native Grassland habitats could provide a movement corridor for some native wildlife, as discussed in Section 3.2. However, the presence of residential development immediately to the east and south of the project site, and agricultural development to the north and west reduces habitat quality, and limits the value of the project site as a movement corridor for native wildlife. In addition, since the proposed development only covers ~0.18-acre of the ~1.4-acre project site, and the Riparian Woodland and Seasonal Wetland will be protected with 50 and 100-foot setbacks, respectively, no significant adverse impacts to wildlife corridors are anticipated from the project, and no mitigation measures are recommended.

5.0 IMPACT ASSESSMENT AND MITIGATION

The proposed project consists of the construction of a new 3,632 ft^2 single-family residence, with a 864 ft^2 garage and attached 64 ft^2 breezeway, a 216 ft^2 covered porch, 432 ft^2 deck and stairs, 50 ft^2 landing and stairs, and a 420 ft^2 detached guest house, as shown on site plans, dated September 27, 2017 prepared by M.L. Couper Design. Mitigation measures to address potential significant impacts to special-status biological resources are discussed below.

Potential Significant Impact 1: The study area lacks aquatic or upland habitat for CRLF. However, the Riparian Woodland and Seasonal Wetland could provide marginal foraging and sheltering habitat during the rainy season, if standing water is present, and the vegetative cover may facilitate dispersal from offsite breeding locations. These habitats will not be impacted by the project, but low numbers of CRLF individuals could be dispersing in the vicinity at night during the rainy season, and could incidentally occur on the project site. Measures are recommended to ensure any CRLF in the vicinity are not impacted by project construction.

Mitigation Measure 1a: Prior to project construction, the project work area (encompassing all areas of project ground disturbance) shall be identified, located outside the Riparian Woodland and Seasonal Wetland setbacks, and clearly delineated with high-visibility construction fencing. No ground disturbance, construction equipment, or personnel shall enter beyond the fenced boundary during the duration of construction. Standard erosion control measures and other Best Management Practices shall be used as necessary throughout the duration of construction so that no sediment, pollutants, debris, or other material enters into the Riparian Woodland or Seasonal Wetland.

Mitigation Measure 1b: Since any CRLF dispersing across the study area would do so at night during the rainy season, grading and other ground disturbance associated with project construction shall take place during the dry season (generally May 1 to October 15). If any ground disturbance is anticipated during the rainy season, a qualified biologist shall view the site conditions and determine if any additional avoidance and minimization measures for CRLF are warranted. If a CRLF is observed at any time during construction, work shall cease and CDFW and USFWS contacted for guidance.

Potential Significant Impact 2: Suitable habitat for white-tailed kite and Allen's hummingbird, and other native nesting bird species protected under the MBTA and CDFW Code, is present in trees, shrubs, and herbaceous vegetation on the study area, primarily in the Riparian Woodland. Vegetation removal, or noise and disturbance during construction, could result in direct or indirect disturbance to nesting bird species, if present, potentially resulting in nest destruction or abandonment.

Mitigation Measure 2: If any phase of the project is conducted during the February 1 to August 31 breeding bird season, a qualified biologist shall conduct a preconstruction breeding bird survey throughout areas of suitable habitat up to 300-feet from the project site within 15 days prior to the onset of any construction activity. If bird nests are observed, buffer zones shall be established around all active nests to protect nesting adults and their young from construction disturbance. Buffer zone distances, which depend to some degree on the species and shall be established in consultation with CDFW, are typically at least 50-feet around native passerines, 100-feet around special-status passerines, and 300-1,000 feet or more around raptors, depending on the species. Work within the buffer zone shall be postponed until all the young are fledged, as determined by a qualified biologist.

The conclusions of this biotic assessment reflect conditions observed at the time of the field visits and the biologist's interpretation of those conditions. Government regulatory agencies make the final determination regarding biological resource issues on the project site, and this report should be submitted to the appropriate agencies for review and concurrence.

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Appendix A. Special-status species with potential to inhabit the study area region.

List compiled from searches of the CNDDB (CDFW 2018a), CNPS Inventory of Rare and Endangered Plants (CNPS 2018), and USFWS (2018a) records for the Moss Landing, Soquel, Watsonville East, Watsonville West, Prunedale, Salinas, and Marina 7.5' USGS quadrangles, CDFW Special Animals List (2017), and other publications (Zeiner et al. 1988, 1990a). This list has not been reviewed by the regulatory agencies.

Species	Status	Typical Habitat	Habitat Assessment of Study Area
PLANTS			
Agrostis lacuna-vernalis vernal pool bent grass	1B.1	Vernal pools (mima mounds), 115-145 m. Blooms April-May.	**None.** No vernal pools present on the study area.
Allium hickmanii Hickman's onion	1B.2	Closed-cone coniferous forest, chaparral (maritime), coastal prairie, coastal scrub, valley and foothill grassland, 5-200 m. Blooms March-May.	**Low.** Some marginal habitat components present but suitable micro-habitat lacking. Not observed during field visit.
Arctostaphylos andersonii Santa Cruz manzanita	1B.2	Broadleafed upland forest, chaparral, North Coast coniferous forest (openings, edges), 60-730 m. Blooms November-April.	**None.** No *Arctostaphylos* observed on the study area.
Arctostaphylos hookeri ssp. *hookeri* Hooker's manzanita	1B.2	Closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub (sandy), 85-536 m. Blooms January-June.	**None.** No *Arctostaphylos* observed on the study area.
Arctostaphylos montereyensis Toro manzanita	1B.2	Chaparral (maritime), cismontane woodland, coastal scrub (sandy), 30-730 m. Blooms February-March.	**None.** No *Arctostaphylos* observed on the study area.
Arctostaphylos pajaroensis Pajaro manzanita	1B.1	Chaparral (sandy), 30-760 m. Blooms December-March.	**None.** No *Arctostaphylos* observed on the study area.
Arctostaphylos pumila sandmat manzanita	1B.2	Closed-cone coniferous forest, chaparral (maritime), cismontane woodland, coastal dunes, coastal scrub (sandy, openings), 3-205 m. Blooms February-May.	**None.** No *Arctostaphylos* observed on the study area.
Arenaria paludicola marsh sandwort	FE, SE, 1B.1	Marshes and swamps (freshwater or brackish, sandy openings), 3-170 m. Blooms May-August.	**None.** No suitable habitat on the study area.
Astragalus tener var. *tener* alkali milk-vetch	1B.2	Playas, valley and foothill grassland (adobe clay), vernal pools (alkaline), 1-60 m. Blooms March-June.	**None.** No suitable alkaline habitat or clay soils on the study area.
Castilleja ambigua var. *insalutata* pink Johnny-nip	1B.1	Coastal prairie, coastal scrub, 0-100 m. Blooms May-August.	**None.** No suitable habitat on the study area.
Castilleja latifolia Monterey Coast paintbrush	4.3	Closed-cone coniferous forest, cismontane woodland (openings), coastal dunes, coastal scrub (sandy), 0 - 185 m. Blooms February-September.	**None.** No suitable habitat present on the study area.
Centromadia parryi subsp. *congdonii* Congdon't tarplant	1B.1	Valley and foothill grassland (alkaline), 1-230 m. Blooms May-October.	**None.** No suitable alkaline habitat on the study area.
Chorizanthe minutiflora Fort Ord spineflower	1B.2	Chaparral (maritime), coastal scrub (sandy openings), 55-150 m. Blooms April-July.	**None.** No suitable habitat present on the study area.

Species	Status	Typical Habitat	Habitat Assessment of Study Area
Chorizanthe pungens var. *pungens* Monterey spineflower	FT, 1B.2	Chaparral (maritime), cismontane woodland, coastal dunes, coastal scrub, valley and foothill grassland (sandy), 3-450 m. Sandy soils in coastal dunes or more inland within chaparral or other habitats. Blooms April-August.	**Low.** Suitable sandy habitat lacking.
Chorizanthe robusta var. *robusta* robust spineflower	FE, 1B.1	Maritime chaparral, cismontane woodland, coastal dunes, coastal scrub (sandy or gravelly), 3-330 m. Blooms April-September.	**Low.** Suitable sandy habitat lacking.
Cordylanthus rigidus ssp. *littoralis* seaside bird's-beak	SE,1B.1	Closed-cone coniferous forest, chaparral (maritime), cismontane woodland, coastal dunes, coastal scrub (sandy, often disturbed sites), 0-515 m. Blooms April-October.	**None.** No suitable habitat on the study area.
Ericameria fasciculata Eastwood's goldenbush	1B.1	Closed-cone coniferous forest, chaparral, coastal dunes, coastal scrub (sandy openings), 30-275 m. Blooms July-Oct.	**None.** No suitable habitat present on the study area. Not observed.
Erysimum ammophilum sand-loving wallflower	1B.2	Chaparral (maritime), coastal dunes, coastal scrub (sandy, openings), 0-60 m. Blooms February-June.	**None.** No suitable habitat on the study area.
Erysimum menziesii Menzies' wallflower	FE, SE, 1B.1	Coastal dunes, 0-35 m. Blooms March-September.	**None.** No suitable habitat present on the study area.
Fritillaria liliacea fragrant fritillary	1B.2	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland (often serpentinite), 3-410 m. Blooms February-April.	**None.** No suitable habitat present on the study area. Not observed during field visit.
Gilia tenuiflora ssp. *arenaria* Monterey gilia	FE, ST, 1B.2	Chaparral (maritime), cismontane woodland, coastal dunes, coastal scrub (sandy, openings), 0-45 m. Blooms April-June.	**None.** No suitable habitat present on the study area.
Grindelia hirsutula var. *maritima* San Francisco gumplant	3.2	Coastal bluff scrub, coastal scrub, valley and foothill grassland (sandy or serpentinite), 15-400 m. Blooms June-September.	**Low.** Suitable sandy/serpentinite habitat lacking.
Holocarpha macradenia Santa Cruz tarplant	FT, SE, 1B.1	Coastal prairie, coastal scrub, valley and foothill grassland (often clay), 10-220 m. Blooms June-October.	**Low.** Some marginal habitat components present but suitable micro-habitat lacking.
Horkelia cuneata var. *sericea* Kellogg's horkelia	1B.1	Closed-cone coniferous forest, chaparral, coastal dunes, old sand hills, coastal scrub (sandy or gravelly openings), 10-200 m. Blooms April-September.	**Low.** Suitable sandy habitat lacking.
Horkelia marinensis Point Reyes horkelia	1B.2	Coastal dunes, coastal prairie, coastal scrub (sandy), 5-350 m. Blooms May-September.	**None.** No suitable habitat on the study area.
Lasthenia californica ssp. *macrantha* perennial goldfields	1B.2	Coastal bluff scrub, coastal dunes, coastal scrub, 5-520 m. Blooms January-November.	**None.** No suitable habitat on the study area.
Lasthenia conjugens Contra Costa goldfields	FE, 1B.1	Cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools (mesic), 0-470 m.	**Low.** Suitable alkaline habitat lacking.

Species	Status	Typical Habitat	Habitat Assessment of Study Area
		Blooms March-June.	
Legenere limosa legenere	1B.1	Vernal pools, 1 - 880 m. Blooms April-June.	**None.** No vernal pools present on the study area.
Microseris paludosa marsh microseris	1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland (mesic), 5-300 m. Blooms April-June.	**Low.** Some marginal habitat components present but suitable micro-habitat lacking.
Monardella sinuata ssp. *nigrescens* northern curly-leaved monardella	1B.2	Chaparral (SCR Co.), coastal dunes, coastal scrub, lower montane coniferous forest (SCR Co., ponderosa pine sandhills), 0-300 m. Blooms May-July (sometimes Aug-Sept).	**None.** No suitable habitat on the study area.
Monolopia gracilens woodland woollythreads	1B.2	Broadleafed upland forest openings, chaparral openings, cismontane woodland, North Coast coniferous forest openings, valley and foothill grassland (serpentine), sandy to rocky soils, 100-1,200 m. Blooms March-July.	**None.** No suitable habitat present on the study area.
Pedicularis dudleyi Dudley's lousewort	1B.2, SR	Chaparral (maritime), cismontane woodland, North Coast coniferous forest, valley and foothill grassland, 60 to 900 m. Blooms April-June.	**None.** No suitable habitat present on the study area.
Penstemon rattanii var. *kleei* Santa Cruz Mountains beardtongue	1B.2	Chaparral, lower montane coniferous forest, North Coast coniferous forest, 400-1,100 m. Blooms May-June.	**None.** No suitable habitat present on the study area. Out of elevational range.
Pentachaeta bellidiflora white-rayed pentachaeta	FE, SE, 1B.1	Cismontane woodland, coastal scrub, valley and foothill grassland (often serpentinite), 35-620 m. Blooms March-May.	**None.** No suitable habitat present on the study area.
Piperia yadonii Yadon's rein orchid	FE, 1B.1	Closed-cone coniferous forest, coastal bluff scrub, chaparral (maritime)/sandy, 10-510 m. Blooms May-August.	**None.** No suitable habitat present on the study area.
Plagiobothrys chorisianus var. *chorisianus* Choris' popcorn-flower	1B.2	Chaparral, coastal prairie, coastal scrub (mesic), 15-100 m. Blooms March-June.	**Low.** Some marginal habitat components present but suitable micro-habitat lacking. Not observed during field visit.
Plagiobothrys diffusus San Francisco popcorn-flower	SE, 1B.1	Coastal prairie, valley and foothill grassland, 60-360 m. Blooms March-June.	**Low.** Some marginal habitat components present but suitable micro-habitat lacking. Not observed during field visit.
Rosa pinetorum pine rose	1B.2	Closed-cone coniferous forest, 2-300 m. Blooms May-July.	**None.** No suitable habitat present on the study area.
Trifolium buckwestiorum Santa Cruz clover	1B.1	Broadleafed upland forest, cismontane woodland, coastal prairie (gravelly, margins), 105-610 m. Blooms April-October.	**Low.** Some marginal habitat components present but suitable micro-habitat lacking.
Trifolium hydrophilum saline clover	1B.2	Marshes and swamps, valley and foothill grassland (mesic/alkaline), vernal pools, 0-300 m. Blooms April-June.	**Low.** Suitable alkaline habitat lacking.

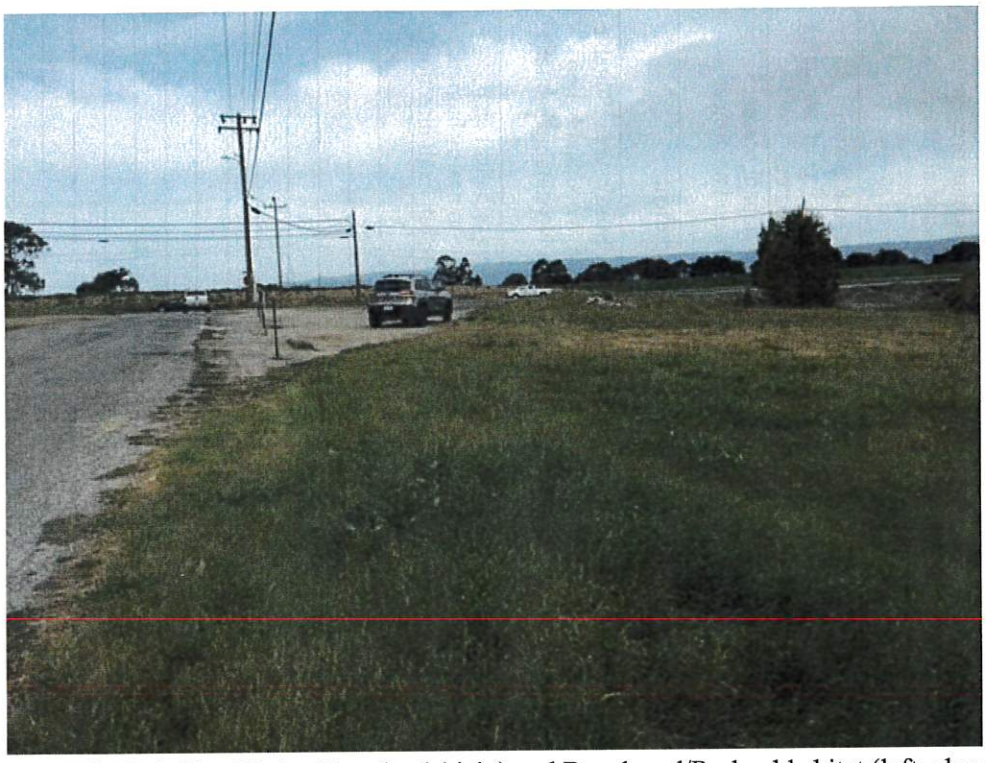
Species	Status	Typical Habitat	Habitat Assessment of Study Area
WILDLIFE			
Invertebrates			
Cicindela ohlone Ohlone tiger beetle	FE	Remnant native grasslands with California oatgrass and purple needlegrass in Santa Cruz County. Substrate is poorly drained clay or sandy clay soil over bedrock of Santa Cruz mudstone.	**None.** No suitable habitat on the study area. Out of range.
Danaus plexippus monarch butterfly	Winter roosts sensitive (CDFW)	Winter roost sites extend along the coast from northern Mendocino to Baja. Roosts in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	**Low.** Typical species used for roosting absent from the study area. No documented roost sites on or adjacent to the study area; may forage on the study area.
Euphilotes enoptes smithi Smith's blue butterfly	FE	Most commonly associated with coastal dunes and coastal sage scrub plant communities in Monterey and Santa Cruz Counties. Host plants *Eriogonum latifolium* and *Eriogonum parvifolium* are utilized as both larval and adult food plants.	**None.** No suitable habitat on the study area. No host plants observed.
Linderiella occidentalis California linderiella	CDFW Special Animals List	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in pools has very low alkalinity, conductivity, and total dissolved solids.	**None.** No suitable habitat on the study area.
Trimerotropis infantilis Zayante band-winged grasshopper	FE	Isolated sandstone deposits in the Santa Cruz Mountains (the Zayante Sand Hills ecosystem). Mostly on sand parkland habitat, but also in areas with well-developed ground cover and in sparse chaparral with grass.	**None.** No suitable habitat on the study area; outside of range.
Tryonia imitator California brackishwater snail	CDFW Special Animals List	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.** Known from Elkhorn Slough, but no brackish habitat on the study area.
Fishes			
Eucyclogobius newberryi tidewater goby	FE, SSC	Inhabits brackish water habitats along the California coast from San Diego to the Smith River. Found in shallow lagoons and lower stream reaches with fairly still, but not stagnant, water and high oxygen levels.	**None.** No suitable aquatic habitat on the study area.
Oncorhynchus mykiss irideus steelhead – central California coast DPS	FT	From Russian River south to Soquel Creek and to, but not including, the Pajaro River. Also includes San Francisco and San Pablo Bay Basins.	**None.** No suitable aquatic habitat on the study area.
Amphibians			
Ambystoma californiense California tiger salamander	FT, ST	Need underground refugia, especially ground squirrel and gopher burrows to over-summer; prefers vernal	**Low.** Marginal upland habitat on the project site and study area, no breeding habitat present;

Species	Status	Typical Habitat	Habitat Assessment of Study Area
		pools or other seasonal water sources for breeding but will use perennial ponds without fish.	outside extant range.
Ambystoma macrodactylum croceum Santa Cruz long-toed salamander	FE, SE, FP	Inhabits mammal burrows in oak woodland, dense coastal scrub and willow riparian habitat in south Santa Cruz and north Monterey Counties near the coast. Migrates during rain events at night to reach seasonal and perennial breeding ponds that are typically fishless.	**None.** Marginal upland habitat on the study area; outside extant range.
Rana boylii foothill yellow-legged frog	SSC, SCT	Breeds in perennial streams with cobble-sized substrate; highly aquatic species.	**None.** No suitable habitat present on the study area; outside extant range.
Rana draytonii California red-legged frog	FT, SSC	Breeds in semi-permanent and perennial water sources often with dense, shrubby or emergent riparian vegetation including stock ponds and marshes; uses a variety of wetland habitats including streams during the summer months.	**Low.** The study area lacks aquatic or upland habitat for CRLF. However, Riparian Woodland and Seasonal Wetland could provide marginal foraging and sheltering habitat during the rainy season, if standing water is present. These habitats will not be impacted by the project, but low numbers of CRLF individuals could be dispersing in the vicinity at night during the rainy season, and could incidentally occur on the project site.
Reptiles			
Anniella pulchra nigra Black legless lizard	SSC	Inhabits coastal sand dunes and sandy soils with bush lupine and mock heather as dominant plants. Moist soil is essential.	**None: Project Site; Low: Study Area.** No appropriate vegetation associations present on the study area.
Emys marmorata western pond turtle	SSC	Inhabits permanent or nearly permanent bodies of water in many habitat types below 6000 ft. elevation. Typically nests in grassy, open habitat.	**Low.** No suitable aquatic habitat on the study area and unlikely to nest on project site due to the distance to nearest potential aquatic habitat (~0.25 mi), barriers to overland movement from residential housing, and upland disturbance from commercial agriculture.
Phrynosoma blainvilii Coast (Blainville's) horned lizard	SSC	Sandy soils in chaparral, grasslands and open woodlands; feeds primarily on native ants.	**None.** No suitable habitat present on the study area.
Birds			
Aquila chrysaetos Golden eagle	BCC, FP	Open and semi-open habitats including grasslands, scrub, coniferous forests and tundra; nests in large trees and cliffs.	**Low.** Not expected to nest or forage on study area due to human activity.
Buteo regalis (wintering) Ferruginous hawk	BCC	Winters in expansive open grasslands; forages primarily on ground squirrels.	**Low.** Not expected to forage on study area due to human activity and marginal prey-base.
Circus cyaneus (nesting)	SSC	Nests on ground in grassy vegetation, usually in	**None.** No nesting habitat present; may be seen

Species	Status	Typical Habitat	Habitat Assessment of Study Area
northern harrier		proximity to a marsh or other water body.	passing through during migration.
Elanus leucurus (nesting) white-tailed kite	FP	Open grassland, meadows, or marshes, for foraging, close to isolated, dense-topped trees for nesting and perching.	**Moderate.** Marginal nesting habitat on study area but appropriate nesting habitat nearby in all directions; may forage onsite.
Falco peregrinus anatum American peregrine falcon	FP, BCC	Near wetlands, lakes, rivers, or other water. On cliff banks, dunes, mounds, and human-made structures. Nest consists of a scrape, depression, or ledge in an open site.	**Low.** No nesting habitat present; may pass through during migration.
Asio flammeus (nesting) short-eared owl	SSC	Nests in emergent wetland vegetation, tall grass, alfalfa fields.	**None.** No nesting habitat present; marginal wintering habitat available if project site is not mowed.
Athene cunicularia (nesting and wintering) burrowing owl	SSC BCC	Nests and winters in grasslands and open scrub with suitable burrows.	**Low.** No nesting habitat present; marginal wintering habitat due to nearby trees, no potential cover-sites currently present.
Selasphorus sasin Allen's hummingbird	BCC	Nests in narrow coastal belt in woodland and scrub habitats.	**Moderate.** Potential nesting habitat in Riparian Woodland.
Picoides nuttallii Nuttall's woodpecker	BCC	Nests in oak woodland and along riparian corridors.	**Low.** Marginal nesting habitat in Riparian Woodland.
Contopus cooperi olive-sided flycatcher	SSC	Nests primarily in coniferous forests with open canopy; nests in Eucalyptus forest along coast.	**Low.** No suitable nesting habitat on the study area.
Lanius ludovicianus (nesting) loggerhead shrike	BCC, SSC	Nests in isolated trees and shrubs; forages in open habitats.	**Low.** Marginal nesting habitat present: rare breeder in area but may winter onsite.
Riparia riparia bank swallow	ST	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, or ocean to dig nesting hole.	**None.** No suitable habitat on the study area.
Baeolophus inornatus oak titmouse	BCC	Nests in oak, oak-pine and pinyon-juniper woodland.	**Low.** Marginal nesting habitat in Riparian Woodland.
Ammodramus savannarum grasshopper sparrow	SSC	Nests in short- to mid-height open grasslands.	**Low.** Marginal nesting habitat due to nearby Riparian Woodland.
Passerculus sandwichensis alaudinus Bryant's savannah sparrow	SSC	Nests in tidally influenced habitats and moist grasslands.	**Low.** Marginal nesting habitat on the study area.
Agelaius tricolor tricolored blackbird	BCC, SCE	Nests in freshwater marsh; forages in grasslands and croplands.	**Low.** No suitable habitat on the study area.
Mammals			
Antrozous pallidus pallid bat	SSC, WBWG	Roosts in caves, trees and buildings; forages in variety of habitats.	**Low.** No suitable roosting habitat present within 50-feet of work area and no project

Species	Status	Typical Habitat	Habitat Assessment of Study Area
			impacts anticipated.
Corynorhinus townsendii Townsend's big-eared bat	SSC, WBWG	Located 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.** No suitable roosting habitat present within 50-feet of work area and no project impacts anticipated.
Lasiurus blossevilli Western red bat	SSC, WBWG	Roosts in foliage of trees and shrubs in riparian habitats during winter months.	**Moderate.** Suitable habitat in Riparian Woodland but none within 50-feet of work area and no project impacts anticipated.
Myotis thysanodes Fringed myotis	WBWG	Maternity roosts in bridge crevices, tree cavities and under exfoliating bark.	**Low.** No suitable roosting habitat present within 50-feet of work area and no project impacts anticipated.
Myotis volans Long-legged myotis	WBWG	Roosts in trees, rock crevices, mines and buildings; primarily in montane forests.	**Low.** No suitable habitat present.
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	SSC	Riparian, coastal scrub and forest habitats of moderate canopy and moderate to dense understory. Constructs houses of sticks and other material.	**None: Project Site; Low Study Area.** Suitable habitat present in Riparian Woodland but no woodrat houses observed. No suitable habitat adjacent to study area.
Taxidea taxus American badger	SSC	Most abundant in grassland, scrub and drier, open forest. Preys on burrowing rodents; digs burrows for dens and during foraging bouts.	**None.** No suitable burrows or badger sign observed; not expected due to nearby human activity and habitat conversion in all directions.

Key to Status:	
FE	Federal Endangered
FT	Federal Threatened
SE	State Endangered
ST	State Threatened
SCT	State Candidate Threatened
SCE	State Candidate Endangered
SR	State Rare
WBWG	Western Bat Working Group: High Priority Species
SSC	California Department of Fish and Wildlife Species of Special Concern
FP	California Department of Fish and Wildlife Fully Protected Species
BCC	Federal Bird of Conservation Concern
1B	CNPS Rare Plant Rank of plants rare, threatened, or endangered in California and elsewhere
2	CNPS Rare Plant Rank of plants rare, threatened, or endangered in California but more common elsewhere
3	CNPS Rare Plant Rank of plants for which more information is needed; a review list
4	CNPS Rare Plant Rank of plants of limited distribution: a watch list
.1/.2/.3	Seriously endangered in California/Fairly endangered in California/ Not very endangered in California



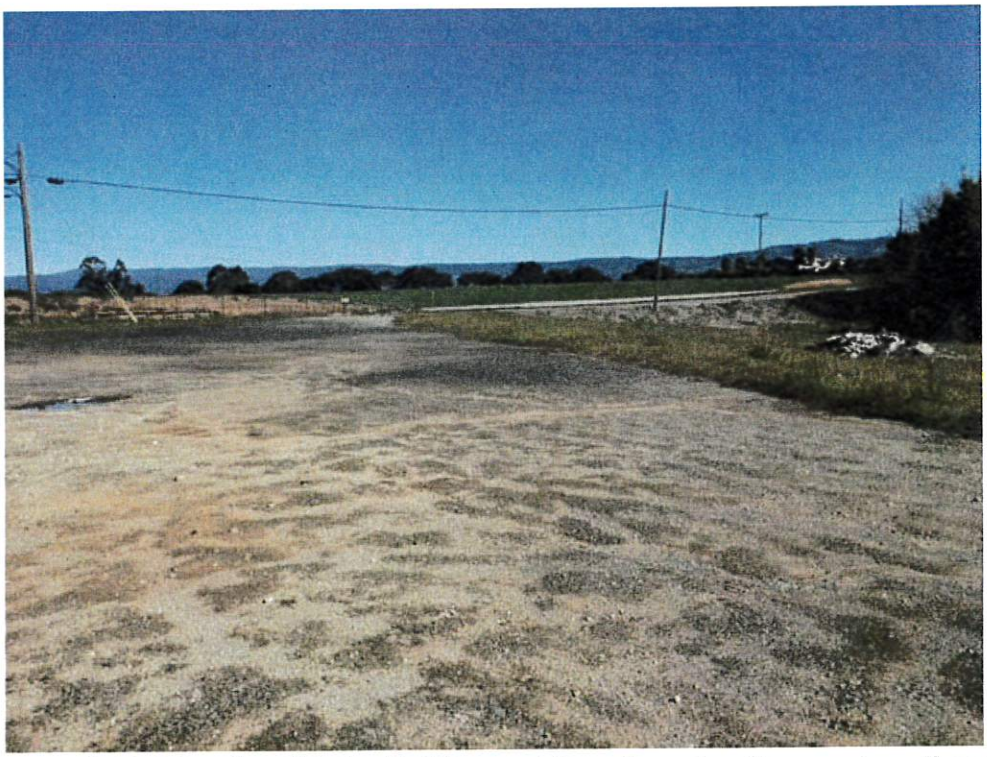
Appendix B-1. Non-Native Grassland (right) and Developed/Ruderal habitat (left, along Hillcrest Rd) near proposed house, with non-native acacia in the distance, looking north.

Appendix B-2. Non-Native Grassland at location of proposed house, with Riparian Woodland and Seasonal Wetland in the distance (looking east).

Appendix B-3. Riparian Woodland in northeastern portion of study area, looking downstream (south).

Appendix B-4. Seasonal Wetland in foreground, with remnant Riparian Woodland disturbed by vegetation removal (left), looking upstream (north).

Appendix B-5. Developed/Ruderal habitat along Salinas Road (left), Non-Native Grassland (right), and Riparian Woodland in distance where drainage emerges south of Salinas Road.



Appendix B-6. Developed/Ruderal habitat consisting of gravel parking area in northwestern portion of the project site, looking north.

Appendix C. Plant species observed on the study area, February 28 and March 5, 2018.

Scientific Name	Common Name
*Acacia dealbata**	silver wattle
*Acacia melanoxylon**	blackwood acacia
Agapanthus sp.*	lily of the Nile
Avena sp.*	wild oats
Baccharis glutinosa	marsh baccharis
Baccharis pilularis	coyote brush
*Brassica nigra**	black mustard
*Bromus catharticus**	rescue grass
*Bromus diandrus**	ripgut brome
*Bromus hordeaceus**	soft chess
Carex sp.	sedge
*Carpobrotus edulis**	ice plant
*Conium maculatum**	poison hemlock
*Cortaderia jubata**	pampas grass
*Cynodon dactylon**	Bermuda grass
*Delairea odorata**	cape ivy
*Erodium botrys**	filaree
*Erodium cicutarium**	redstem filaree
*Erodium moschatum**	whitestem filaree
Eschscholzia californica	California poppy
*Festuca myuros**	rattail fescue
*Festuca perennis**	Italian ryegrass
*Geranium dissectum**	cutleaf geranium
*Hedera helix**	English ivy
*Helminthotheca echioides**	bristly ox-tongue
*Holcus lanatus**	velvet grass
Hordeum murinum subsp. *leporinum**	barley
*Hypochaeris radicata**	rough cat's-ear
Juncus patens	spreading rush
Juncus xiphioides	iris-leaved rush
Malva sp.*	mallow
*Medicago polymorpha**	bur clover
*Oxalis pes-caprae**	Bermuda buttercup
*Phalaris aquatica**	Harding grass
Pinus sp.*	pine
*Plantago coronopus**	cutleaf plantain
*Plantago lanceolata**	English plantain
*Poa annua**	annual bluegrass
Quercus agrifolia	coast live oak
*Raphanus sativus**	wild radish
Rubus ursinus	California blackberry
*Rumex acetosella**	sheep sorrel
*Rumex crispus**	curly dock
*Rumex pulcher**	fiddle dock
Salix sp.	willow
*Senecio vulgaris**	common groundsel
Symphyotrichum chilense	California aster

Scientific Name	Common Name
*Vicia sativa**	vetch
* = non-native species	

Appendix D. Wildlife species observed or detected by sign on the study area, March 5, 2018.

Scientific Name	Common Name
Cathartes aura	Turkey vulture
Buteo jamaicensis	Red-tailed hawk
Streptopelia decaocto	Eurasian collared-dove
Calypte anna	Anna's hummingbird
Sayornis nigricans	Black phoebe
Sayornis saya	Say's phoebe
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Regulus calendula	Ruby-crowned kinglet
Mimus polyglottos	Northern mockingbird
Sturnus vulgaris	European starling
Dendroica coronata	Yellow-rumped warbler
Zonotrichia atricapilla	Golden-crowned sparrow
Carduelis psaltria	Lesser goldfinch
Carpodacus mexicanus	House finch
Thomomys bottae	Botta's pocket gopher

APPENDIX E

CORPS DELINEATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 5 Hillcrest Road City/County: Royal Oaks/Monterey County Sampling Date: 2/28/18

Applicant/Owner: Ahmed Saba State: CA Sampling Point: 1a

Investigator(s): T. Mahony, Coast Range Biological LLC Section, Township, Range: Mt. Diablo Meridian T12S,R2E,sec21

Landform (hillslope, terrace, etc.): swale/drainage Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): LRR C Lat: 36.873210 Long: -121.760408 Datum: NAD 83

Soil Map Unit Name: Elkhorn fine sandy loam, thin surface variant, 5 to 15 percent slopes NWI classification: PSSA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

Seasonal wetland hydrology naturally problematic. Located in swale/drainage. Meets three wetland parameters, but due to minimal ground vegetation and dense cover of willow canopy and historic drainage channel, meets LCP Riparian definition and was mapped as Riparian Woodland rather than wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix sp.	80	Y	FACW
2.			
3.			
4.			
	80 = Total Cover		
Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Conium maculatum	2	N	FACW
2. Raphanus sativus	5	N	UPL
3. Rumex crispus	2	N	FAC
4. Helminthotheca echioides	2	N	FAC
5.			
6.			
7.			
8.			
	11 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

% Bare Ground In Herb Stratum 90 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

Sample point dominated by wetland classified species (Salix), but species is phreatophytic and could be tapping into deeper groundwater.

SOIL

Sampling Point: 1a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/2	90	10YR 5/6	10	c	m	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

Hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): None

Water Table Present? Yes ___ No ✓ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): None

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:

Located in a swale with a braided network of small weakly incised scour channels, but no deeply incised main channel w/ bed/bank/OHWM. Drains into swale downstream and into culvert under residential development. Historic drainage channel present on Moss Landing USGS 7.5' topo quad.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 5 Hillcrest Road City/County: Royal Oaks/Monterey County Sampling Date: 2/28/18

Applicant/Owner: Ahmed Saba State: CA Sampling Point: 1b

Investigator(s): T. Mahony, Coast Range Biological LLC Section, Township, Range: Mt. Diablo Meridian T12S,R2E,sec21

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): convex Slope (%): 15

Subregion (LRR): LRR C Lat: 36.873149 Long: -121.760549 Datum: NAD 83

Soil Map Unit Name: Elkhorn fine sandy loam, thin surface variant, 5 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____ No ✓	
Wetland Hydrology Present?	Yes _____ No ✓	

Remarks:

Seasonal wetland hydrology naturally problematic. Located on well-drained slope above swale. No wetland indicators observed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus diandrus	70	Y	UPL
2. Raphanus sativus	5	N	UPL
3. Vicia sativa	5	N	FACU
4. Phalaris aquatica	5	N	FACU
5. Avena sp.	5	N	UPL
6. Symphyotrichum chilense	2	N	FAC
7.			
8.			
	92 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Sample point dominated by upland vegetation.

SOIL

Sampling Point: 1b

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/3	100	none				loam	
6-20	10YR 3/2	100	none					silty clay loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): None

Water Table Present? Yes ___ No ✓ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): None

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:

On well-drained slope above swale. No wetland hydrology indicators observed.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 5 Hillcrest Road City/County: Royal Oaks/Monterey County Sampling Date: 3/5/18

Applicant/Owner: Ahmed Saba State: CA Sampling Point: 1c

Investigator(s): T. Mahony, Coast Range Biological LLC Section, Township, Range: Mt. Diablo Meridian T12S,R2E,sec21

Landform (hillslope, terrace, etc.): swale/drainage Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): LRR C Lat: 36.873115 Long: -121.760293 Datum: NAD 83

Soil Map Unit Name: Elkhorn fine sandy loam, thin surface variant, 5 to 15 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

Seasonal wetland hydrology naturally problematic. Located in swale/drainage downstream of Riparian Woodland. All three wetland parameters met.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Conium maculatum	10	N	FACW
2. Raphanus sativus	5	N	UPL
3. Rumex crispus	5	N	FAC
4. Juncus xiphioides	60	Y	OBL
5. Phalaris aquatica	5	N	FACU
6.			
7.			
8.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Sample point dominated by hydrophytic vegetation.

SOIL

Sampling Point: 1c

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/1	95	10YR 5/6	10	c	m	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

Hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): None

Water Table Present? Yes ___ No ✓ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 2"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:

Located in swale that drains into culvert under residential development. Historic drainage channel present on Moss Landing USGS 7.5' topo quad.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 5 Hillcrest Road City/County: Royal Oaks/Monterey County Sampling Date: 3/5/18

Applicant/Owner: Ahmed Saba State: CA Sampling Point: 2

Investigator(s): T. Mahony, Coast Range Biological LLC Section, Township, Range: Mt. Diablo Meridian T12S,R2E,sec21

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): convex Slope (%): 15

Subregion (LRR): LRR C Lat: 36.873004 Long: -121.761000 Datum: NAD 83

Soil Map Unit Name: Elkhorn fine sandy loam, thin surface variant, 5 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____ No ✓	
Wetland Hydrology Present?	Yes _____ No ✓	

Remarks:

Seasonal wetland hydrology naturally problematic. Located on well-drained terrace. No wetland indicators observed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca myuros	40	Y	FACU
2. Erodium botrys	20	Y	FACU
3. Plantago lanceolata	20	Y	FAC
4. Plantago coronopus	5	N	FAC
5. Avena sp.	5	N	UPL
6. Hordeum murinum	5	N	FACU
7.			
8.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Sample point dominated by upland vegetation.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100	none				sndy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: fill hardpan

Depth (inches): 4"

Hydric Soil Present? Yes ____ No ✓

Remarks:

No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): None

Water Table Present? Yes ____ No ✓ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): None

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:

On well-drained terrace. No wetland hydrology indicators observed.