

Exhibit D

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**GEOTECHNICAL INVESTIGATION
For
Proposed Residential Construction
180 Walker Valley Road
APN 131-101-033
Monterey County, California**

**Prepared For
Danny Kelly**

**Prepared By
HARO, KASUNICH AND ASSOCIATES, INC.
Geotechnical & Coastal Engineers
Project No. M11108
November 2017**

Project No. M11108
10 November 2017

MR. DANNY KELLY
41-K Bayview Road
Castroville, California 95012

Subject: Geotechnical Investigation

Reference: Proposed Residential Construction
APN 131-101-033
180 Walker Valley Road
Monterey County, California

Dear Mr. Kelly:

In accordance with your authorization, Haro Kasunich and Associates, Inc. (HKA) have performed a Geotechnical Investigation for the residential construction at 180 Walker Valley Road, Monterey County, California.

Primary geotechnical concerns at the site include strong seismic shaking, adequate foundation support, and appropriate control of surface runoff around the site. The proposed structure may be founded upon conventional spread footings bearing on compacted, fill.

The accompanying report presents our conclusions and recommendations, as well as the results of the geotechnical investigation on which they are based.

If you have any questions concerning the data or conclusions presented in this report, please call our office.

Respectfully Submitted,

HARO, KASUNICH & ASSOCIATES, INC.



Andrew Kasunich
Staff Engineer



John E. Kasunich
G.E. 455

AK/JEK/sr
Copies: 3 to Addressee
1 to Susan Bushman (designer)



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GEOTECHNICAL INVESTIGATION

Introduction

This report presents the results of our Geotechnical Investigation for the proposed residential construction located at 180 Walker Valley Road in Monterey County; see the Site Location Map, Figure 1, in the Appendix of this report. HKA understands the project scope to consist of construction of a new wood frame, story single family residential structure with slab on grade floors. The new house will be founded on conventional spread footings embedded into a mat of engineered fill.

Purpose and Scope

The purpose of our investigation was to explore and evaluate surface and subsurface soil conditions at the site, and provide geotechnical criteria and recommendations for general site grading, foundations, slab-on-grade, and site drainage.

The specific scope of our services was as follows:

1. Site reconnaissance to determine the overall site conditions and to outline the geotechnical requirements. Review of available data in our files regarding the site and vicinity.
2. Explore the subsurface conditions at the site with eight (8) exploratory borings drilled to a depth of 4 feet using hand auger equipment.
3. Test selected soil samples to determine their pertinent engineering properties.

4. Evaluate the geologic setting of the site, and review published geologic maps of the area surrounding the site and compare the information garnered from our geologic review with the subsurface data from our exploratory borings and laboratory test results.
5. Analyze the field and laboratory data to develop recommendations for site grading and drainage, building foundations, slabs-on-grade, and general site improvements.
6. Present the results of our investigation in a report.

Project Description

HKA understands the project scope to consist of construction of a new 2,212 sq. ft, two story single family residence, with attached 948 sq. ft. garage. The new home will be founded on conventional spread footings embedded into a mat of engineered fill. The mat of engineered fill will be constructed to an elevation of 5 feet above existing grade. This will allow positive surface drainage to be implemented around the house and establish an engineered building pad to support the residential structure.

Site Description

The project parcel is trapezoidal in shape, and roughly 2.5 acre in size. The parcel is moderately sloped with slopes ranging from 5% to over 20%. The average slope in the proposed building foot print is roughly 10%. The site is moderately wooded with native Oak, and understory plants such as poison oak, blackberry and coffee berry.

Field Exploration

Subsurface conditions were investigated in November 2016. The approximate location of the test borings are indicated on the Boring Site Plan, Figure 4 in the Appendix of this report. All borings were advanced using hand auger equipment. The relative density of the onsite soils was estimated by probing various depths of the hand augured borings.

The soils encountered in the borings were continuously logged in the field and described in accordance with the Unified Soil Classification System (ASTM D2486). The Logs of Test Borings, Figures 6 to 13 are included in the Appendix of this report. The Boring Logs denote subsurface conditions at the locations and time observed, and it is not warranted that they are representative of subsurface conditions at other locations or times.

Laboratory Testing

The laboratory testing program was directed toward determining pertinent engineering and index soil properties. The natural moisture contents were determined on selected samples and are recorded on the boring logs at the appropriate depths. In addition, select samples were run through the #200 sieve to determine the amount of fines present in onsite soils and further aid in the classification of soils.

The strength parameters of the underlying earth materials were estimated by probing various elevations of the hand augured borings. The results of the field and laboratory testing appear on the "Logs of Test Boring" opposite the sample tested.

Subsurface Conditions

Based on the subsurface exploration, the near surface soils consisted of a loose to medium dense silty sand with varying amounts of binder. Based on our lab results the percentage of fines present in onsite soils ranged 20% to 32% indicating silty sand with low expansion potential.

Groundwater

Groundwater was not encountered in any of the exploratory borings completed in November 2016. Contrasts in permeability between granular soil and clayey soil strata allow perched groundwater conditions to develop. Subsurface conditions and water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time may also result in changes to the conditions observed or inferred from our investigation. We noted during the winter months of January, February 2017 that shallow perched ground water occurred in the low, flat area of the existing driveway southeast and adjacent to the building site.

Site Geology

A review of the Geological Map of Monterey County (Wagner, et al, 2002) indicates the surficial soils at the site are mapped as Q: Alluvium, Qe: Eolian Sand, and Qar: Aromas Sand. The soils encountered in our borings are consistent with these descriptions. A geologic site map is included in Appendix A, Figure 2. The site is located at a geologic boundary between Eolian sand dunes and the upper reaches of the alluvium deposit that overlies Walker Valley.

Seismicity

The following is a general discussion of seismicity in the project area.

The project site lies about 16 kilometers southwest of the San Andreas Fault zone. The San Andreas Fault is a major fault zone of active displacement which extends from the Gulf of California to the vicinity of Point Arena, where the fault leaves the California coastline. Between these points, the fault is about 700 miles long. The fault zone is a break or series of breaks along the earth's crust, where shearing movement has taken place. This fault movement is primarily horizontal.

Historically, the San Andreas Fault has been the site of large earthquakes, and consequently large earthquakes can be expected in the future. The largest of the historic quakes in Northern California occurred on 18 April 1906 (mag. 8.3+). The recent 17 October 1989 earthquake was also associated with the San Andreas Fault system. This event was the second largest earthquake in Northern California this past century.

An extension of the Zayante-Vergeles Fault is located 8 kilometers northwest of the site. This fault is potentially active with a reoccurrence interval of about 3000 years and is capable of generating a 7.4 magnitude earthquake.

The above information is provided to illustrate that the property lies within a complex geologic area and may be influenced by intense ground shaking in the future.

Geotechnical Related Seismicity

The improvements should be designed in conformance with the most current California Building Code (2016 CBC). For seismic design, the soil properties at the site are classified as **Site Class “D”** based on definitions presented in Table 1613.3.2 in the 2016 CBC. The longitude and latitude were determined using a satellite image generated by Google Earth. These coordinates were taken from the approximate middle of the area of the proposed improvements:

Longitude = -121.7105, Latitude = 36.8078

The coordinates listed above were used as inputs in the Java Ground Motion Parameter Calculator created by the USGS to determine the ground motion associated with the maximum considered earthquake (MCE) SM and the reduced ground motion for design SD. The results are as follows:

Site Class D

SM_s= 1.500 g

SM₁= 0.900 g

SD_s= 1.000 g

SD₁= 0.600 g

A maximum considered earthquake geometric mean (MCE_G) peak ground acceleration (PGA) was estimated using the Figure 22-7 of the ASCE Standard 7-10. The mapped PGA was 0.702 g and the site coefficient F_{PGA} for Site Class D is 1.1. The MCE_G peak ground acceleration adjusted for Site Class effects is $PGA_M = F_{PGA} * PGA$

$$PGA_M = 1.1 * 0.702g = 0.772 g$$

Geological Hazards

Liquefaction

During an earthquake, seismic waves travel through the earth and vibrate the ground. In cohesionless, granular material having low relative density (loose to medium dense sands for example), this vibration can disturb the particle framework leading to increased compaction of the material and reduction of pore space between the framework grains. If the sediment is saturated, water occupying the pore spaces resists this compaction and exerts pore pressure that reduces the contact stress between the sediment grains. With continued shaking, transfer of intergranular stress to pore water can generate pore pressures great enough to cause the sediment to lose its strength and change from a solid state to a liquefied state. This mechanical transformation termed liquefaction can cause various kinds of ground failure at or near the ground surface.

The liquefaction process typically occurs at depths less than 50 feet below the ground surface. Liquefaction can occur at deeper intervals, given the right conditions, however ground manifestations have been found to be relatively minor.

The Monterey County Liquefaction Map (See Appendix, Figure 3) shows the site located near areas mapped as having high liquefaction susceptibility. During HKA's site reconnaissance perched shallow groundwater was observed at the site. To mitigate the potential for liquefaction, the top two feet of loose soil within the building pad should be sub excavated and recompacted. Additionally, a 5 foot (\pm) thick mat of engineered fill should be constructed atop the two feet of recompacted soil.

Slope Instability

The project site slopes gently. Slope instability is not a project site geological hazard.

Differential Settlement

Based upon our recommended allowable bearing capacities, total and differential settlements for the project are anticipated to be 1 inch or less.

Building Codes and Site Class

Project design and construction should conform to the following current building codes:

-2016 California Building Code (CBC); and

-2013 Green Building Standards Code (CAL Green)

In accordance with section 1613.3.2 of the 2016 CBC, the project site should be assigned the Site Class D.

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our investigation, the proposed residential construction is compatible with site conditions, from a geotechnical engineering standpoint, provided our recommendations are carefully followed during the design and construction phases of the project. Based on results of our analysis we recommend the new two story home be supported by conventional spread footings embedded into an earthen mat of engineered fill that extends a minimum 24 inches below the bottom of foundations and 5 horizontal feet beyond the outer most edges. The top 1.0 feet of soil, when measured from existing ground surface, should be subexcavated, and the exposed subgrade scarified 12 inches and compacted to 90% relative compaction. A mat of engineered fill should be placed 5 feet above existing grade on top of the 2.0 feet of recompacted soil. The finished surface of the engineered fill should be graded so that surface flow is conveyed away from building foundations.

Primary geotechnical concerns at the site include strong seismic shaking, adequate foundation support, proper control of surface runoff, and subsurface seepage. The project site is located within a seismically active area and strong seismic shaking is expected to occur over the lifetime of the project. Structures should be designed and constructed in accordance with the most current CBC (2016) and the recommendations of this report to minimize reaction to seismic shaking.

The following recommendations should be used to design and prepare plans for the proposed new residential construction.

Site Grading

1. The geotechnical engineer should be notified at least four (4) working days prior to any site clearing or grading so that the work in the field can be coordinated with the grading contractor and arrangements for testing and observation can be made. The recommendations of this report are based on the assumption that HKA will perform the required testing and observation during grading and construction. It is the owner's responsibility to make the necessary arrangements for these required services.
2. Where referenced in this report, Percent Relative Compaction and Optimum Moisture Content shall be based on ASTM Test Designation D1557-current.
3. Areas to be graded should be cleared of all obstructions including loose fill, trees not designated to remain, or other unsuitable material. Existing depressions or voids created during site clearing should be backfilled with engineered fill.
4. Cleared areas should then be stripped of organic-laden topsoil. Stripping depth should be from 2 to 6 inches. Actual depth of stripping should be determined in the field by the HKA. Strippings should be wasted off-site or stockpiled for use in landscaped areas if desired.

5. Areas to receive engineered fill should be scarified to a depth of 12 inches, moisture conditioned, and compacted to 90% percent relative compaction.

6. Engineered fill should be placed in thin lifts not exceeding 8 inches in loose thickness; moisture conditioned, and compacted to at least 90 percent relative compaction. The upper 6 inches of pavement section subgrades should be compacted to at least 95 percent relative compaction. The aggregate base below pavements should likewise be compacted to at least 95 percent relative compaction.

7. If grading is performed during or shortly after the rainy season, the grading contractor may encounter compaction difficulty, such as pumping or bringing free water to the surface, in the upper surface soils. If compaction cannot be achieved after adjusting the soil moisture content, it may be necessary to over-excavate the subgrade soil and replace it with angular crushed rock to stabilize the subgrade. We estimate that the depth of over-excavation would be approximately 24 inches under these adverse conditions.

8. If properly moisture conditioned the on-site soils generally appear suitable for use as engineered fill. Import soils utilized as engineered fill at the project site should:

- 1) Be free of wood, organic debris and other deleterious materials;
- 2) Not contain rocks or clods greater than 2.5 inches in any dimension;
- 3) Not contain more than 30 percent of fines passing the #200 sieve;

- 4) Have a Plasticity Index less than 18;
 - 5) Be approved by HKA. Contractor should submit to the geotechnical engineer samples of import material or utility trench backfill for compliance testing a minimum of 4 days before it is delivered.
9. We estimate shrinkage factors of about 15 percent for the on-site materials when used in engineered fills.
10. After the earthwork operations have been completed and the geotechnical engineer has finished his observation of the work, no further earthwork operations shall be performed except with the approval of and under the observation of the geotechnical engineer.

Foundation - Conventional Spread Footings

11. Based on the site and soil characteristics, the proposed two story home may be supported by conventional spread foundations embedded into an earthen mat of engineered fill. Conventional spread foundations should be at least 15 inches wide by 15 inches deep.
12. Compacted, engineered fill should extend a minimum 24 inches below bottom of foundations and 5 horizontal feet beyond outer most edges. Spread footings constructed to the given criteria may be designed for the following allowable bearing capacities:

- a) 1,800 psf for dead plus live loads
- b) A one-third increase for seismic and/or wind loading

13. Passive resisting earth pressure equivalent to a fluid weighing 250 pcf may be used in design of foundations embedded in engineered fill.

14. Lateral load resistance for structures supported on spread footings may be developed in friction between the foundation bottom and the supporting soil. A friction coefficient of 0.35 is considered applicable.

15. The foundation trenches should be kept moist and be thoroughly cleaned of all slough or loose materials prior to pouring concrete. In addition, all footings located adjacent to other footings or utility trenches should have their bearing surfaces founded below an imaginary 1.5:1 plane projected upward from the bottom edge of the adjacent footings or utility trenches.

16. The exposed foundation trench soil should be kept moist at the time of concrete pour.

17. All footing excavations should be thoroughly cleaned, moisture content verified and observed by the geotechnical engineer prior to placing forms and steel.

Observation of foundation excavations allows anticipated soil conditions to be correlated to those inferred from our investigation and to verify that the footings are in accordance with our recommendation.

18. Provided our recommendations are incorporated into the design and construction of the project, post-construction total and differential settlement of foundations is expected to be 1 inch or less.

Utility Trenches

19. Trenches must be properly shored and braced during construction or laid back at an appropriate angle to prevent sloughing and caving at sidewalls. The project plans and specifications should direct the attention of the contractor to comply with CAL OSHA and local safety requirements and codes dealing with excavations and trenches.

20. Trenches should be backfilled with engineered fill and uniformly compacted by mechanical means to the relative compaction as required by County specifications, but not less than 95 percent under paved areas and 90 percent elsewhere. The relative compaction will be based on the maximum dry density obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1551.

21. We recommend placing a 3 foot concrete plug in each trench where it passes under the exterior foundations. Care should be taken not to damage utility lines.

22. Trenches should be capped with 1.5 feet of relatively impermeable soil.

Concrete Slabs-on-Grade

23. Concrete slab floors should be supported by engineered fill extending a minimum 24 inches below the bottom of the slab. The engineered fill should be prepared in accordance with the section of this report titled "Site Grading".

24. To reduce the potential for cracking and curling as well as other undesirable defects the concrete slab-on-grade design, placement, and curing should be done in accordance with the most recent version of ACI 302.1R-04.

25. To minimize potential for floor wetness interior concrete slab floors should be underlain with a vapor barrier. Vapor barriers should be overlapped a minimum of 6 inches at the joints and carefully fitted around service openings. Whether to locate the vapor barrier in direct contact with the slab or beneath a blotter layer of granular fill should be made with careful considerations to many factors directly and indirectly related to concrete construction. Such factors include but are not limited to; whether a water tight roof membrane is in place prior to slab construction, sequence of slab construction in relation to other construction activities requiring water, and the floor covering manufacturer's recommendations. Proposed installation should be independently evaluated as to the moisture-related sensitivity of subsequent floor finishes, project conditions, schedule, and the potential effects of slab curling and

cracking. We also recommend that a qualified experienced waterproofing specialist be included on the design team and these recommendations and any revised or supplemental recommendations they make be included in the final design construction documents and implemented during construction.

26. Although shallow groundwater was not encountered at the time of our field drilling operation, it was noticed during the winter months following our investigation. A free draining granular material to act as capillary break is recommended below the slab. The granular material should be comprised of a minimum 4 inch thick layer of a permeable material that meets the requirements of a Caltrans Class I Type A gradation (Section 68.202F(2) Std. Spec.). A thin layer approximately 1 inch thick of fine graded material should be proof rolled over the permeable material using a drum roller before installation of the vapor barrier to reduce the possibility of puncture.

27. We recommend the specifications for slab-on-grade floors require moisture emission tests be performed on the slab prior to the installation of flooring. No flooring should be installed until safe moisture emission levels are recorded for the type of flooring to be used.

Flexible Pavements

28. A pavement section design was beyond our designated scope of work. In general, asphaltic concrete, aggregate base and subbase, and preparation of the subgrade

should conform to and be placed in accordance with the Caltrans Standard Specifications, latest edition, except that the test method for compaction should be determined by ASTM D1557-current.

29. To have the selected sections perform to their greatest efficiency, it is important that the following items be considered:

- A. Moisture condition the top 12 inches subgrade and compact to a minimum relative compaction of at least 90 percent with the top 6 inches of subgrade compacted to at least 95 percent relative compaction, at about 2 percent over optimum moisture content.
- B. Provide sufficient gradient to prevent ponding of water.
- C. Use only quality materials of the type and thickness (minimum) specified. Base rock should meet Caltrans Standard Specifications for Class II Aggregate Base, and be angular in shape.
- D. Compact the base rock to a relative dry density of 95 percent.
- E. Place the asphaltic concrete during periods of fair weather when the free air temperature is within prescribed limits per Caltrans specifications.
- F. Provide a routine maintenance program.

Site Drainage

30. Surface drainage should include provisions for positive gradients so that surface runoff is not permitted to pond adjacent to foundations and pavements. Surface drainage should be directed away from the building foundations.

31. Full roof gutters should be placed around all eaves. Discharge from the roof gutters should be conveyed away from the downspouts by closed conduit or impervious swales to the project storm water runoff disposal system. Based upon the seasonal shallow perched groundwater at in the neighborhood of the site we recommend storm water runoff be conveyed beyond the building pad to the nearest acceptable storm drain discharge system.

32. The migration of water or spread of extensive root systems below foundations, slabs, or pavements may cause undesirable differential movements and subsequent damage to these structures. Landscaping should be planned accordingly.

Curtain Drain

33. If a curtain drain is selected to mitigate localized perched groundwater conditions, the curtain drain may be placed around the upslope perimeter of the proposed engineered fill pad to intercept potential seepage before it migrates below the building foundation.

34. The curtain drain should extend a minimum of 12 inches below the loose surface sands and be embedded into the underlying denser silty sand. The curtain drain should be a minimum 12 inches wide.

35. The trench for the curtain drain should be lined with a vapor/water barrier on the house side of the trench wall and along the base of the trench.

36. A thin layer of gravel should be placed over the membrane for the length of the trench. A 4-inch perforated pipe placed holes down should be connected to a solid drain line that conveys collected seepage to an appropriate discharge location away from side of the house. If daylight cannot be achieved due to flatness of site it can be discharged into either a dry well with sump pump that discharges into a suitable location or into a buried drain field infilled with drain rock.

37. Gravel for the curtain drain should meet the qualifications of State of California Standard Specifications, Section 68-1.025, Class I, Type A or an approved equivalent.

38. The curtain drain should be capped with 12 inches of compacted soil.

Plan Review, Construction Observation, and Testing

39. Our firm should be provided the opportunity for a general review of the final project plans prior to construction so that our geotechnical recommendations may be properly interpreted and implemented. If our firm is not accorded the opportunity of making the recommended review, we can assume no responsibility for misinterpretation of our recommendations. We recommend that our office review the project plans prior to submittal to public agencies, to expedite project review. The recommendations

presented in this report require our review of final plans and specifications prior to construction and upon our observation and, where necessary, testing of the earthwork and foundation excavations. Observation of grading and foundation excavations allows anticipated soil conditions to be correlated to those actually encountered in the field during construction.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time, our firm should be notified so that supplemental recommendations can be given.
2. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to ensure that the Contractors and Subcontractors carry out such recommendations in the field. The conclusions and recommendations contained herein are professional opinions derived in accordance with current standards of professional practice. No other warranty expressed or implied is made.
3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside our control. Therefore, this report should not be relied upon after a period of three years without being reviewed by a geotechnical engineer.

APPENDIX A

Vicinity Map – Figure 1

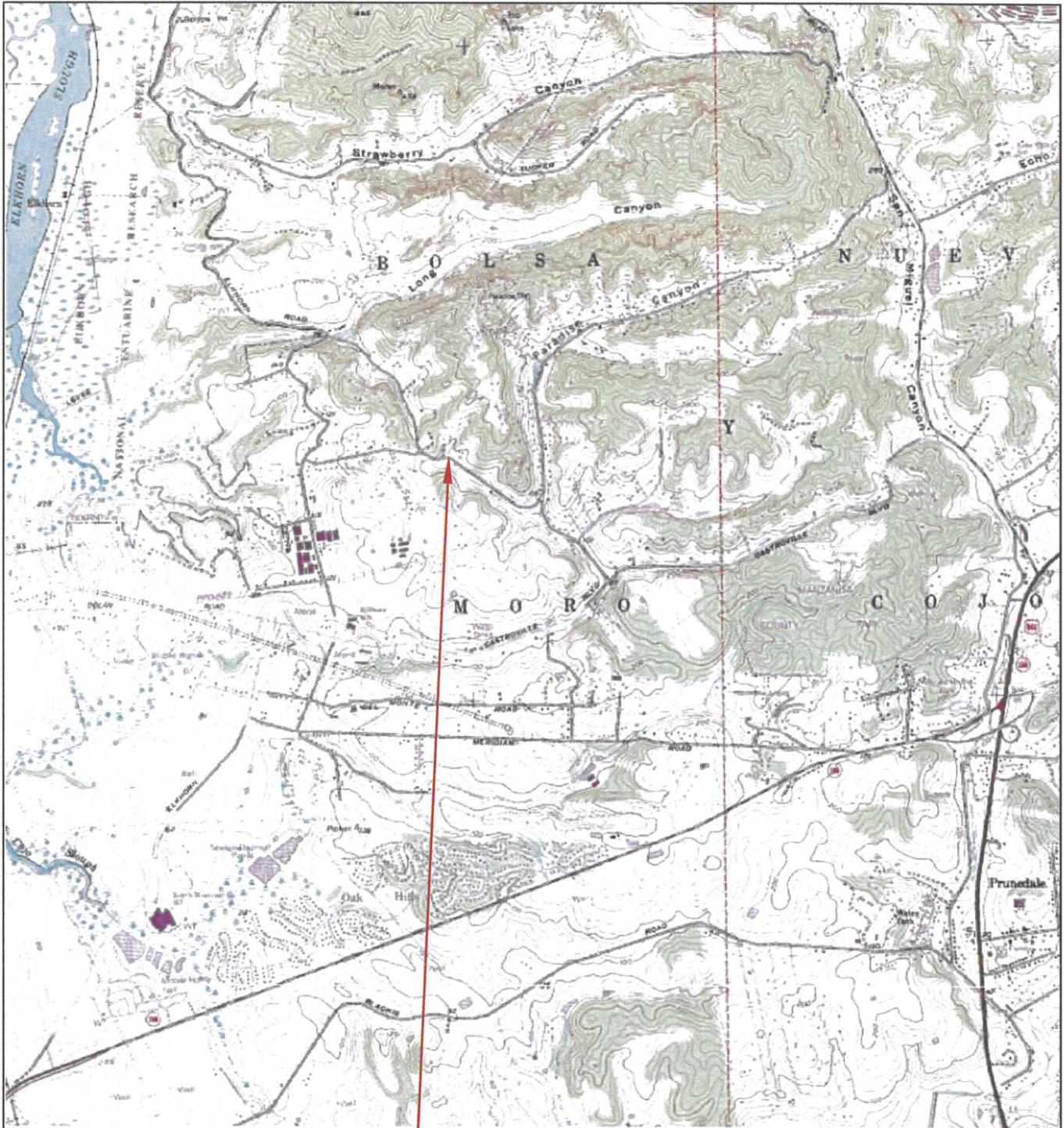
Regional Geologic Map – Figure 2

Regional Liquefaction Map – Figure 3

Boring Site Map – Figure 4

Key to Logs – Figure 5

Logs of Test Borings – Figure 6 to 13



NOTES:



SITE LOCATION

SITE VICINITY MAP
180 Walker Valley Road
Monterey County, California

SCALE: NO SCALE

DRAWN BY: AK

DATE: NOV 2017

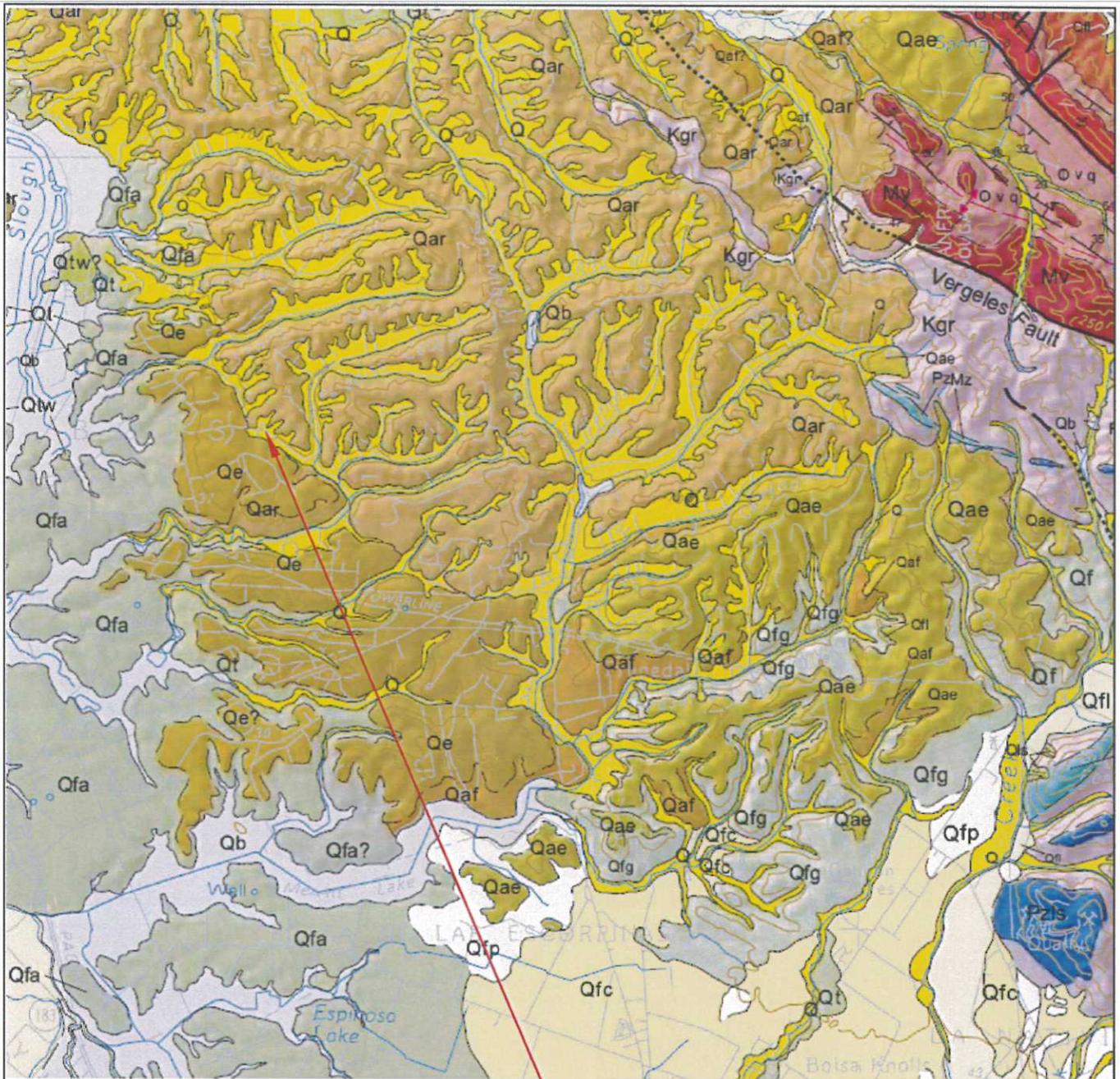
REVISED:

JOB NO. M11108

HARO, KASUNICH & ASSOCIATES, INC.
GEOTECHNICAL AND COASTAL ENGINEERS
116 E. LAKE AVENUE, WATSONVILLE, CA 95076
(831) 722-4175

FIGURE NO. 1

SHEET NO.



— SITE LOCATION

KEY:



Alluvium



Eolian sand



Aromas Sand (undivided)

TAKEN FROM:

GEOLOGIC MAP OF THE MONTEREY 30'x60' QUADRANGLE AND ADJACENT AREAS, CALIFORNIA

Compiled by

David L. Wagner¹, H. Gary Greene², George J. Saucedo¹ and Cynthia L. Pridmore¹

2002

Digitized by

Sarah E. Watkins¹, Jason D. Little¹, and Joseph J. Bizzarro²

REGIONAL GEOLOGIC MAP

180 Walker Valley Road
Monterey County, California

SCALE: NO SCALE

DRAWN BY: AK

DATE: NOV 2017

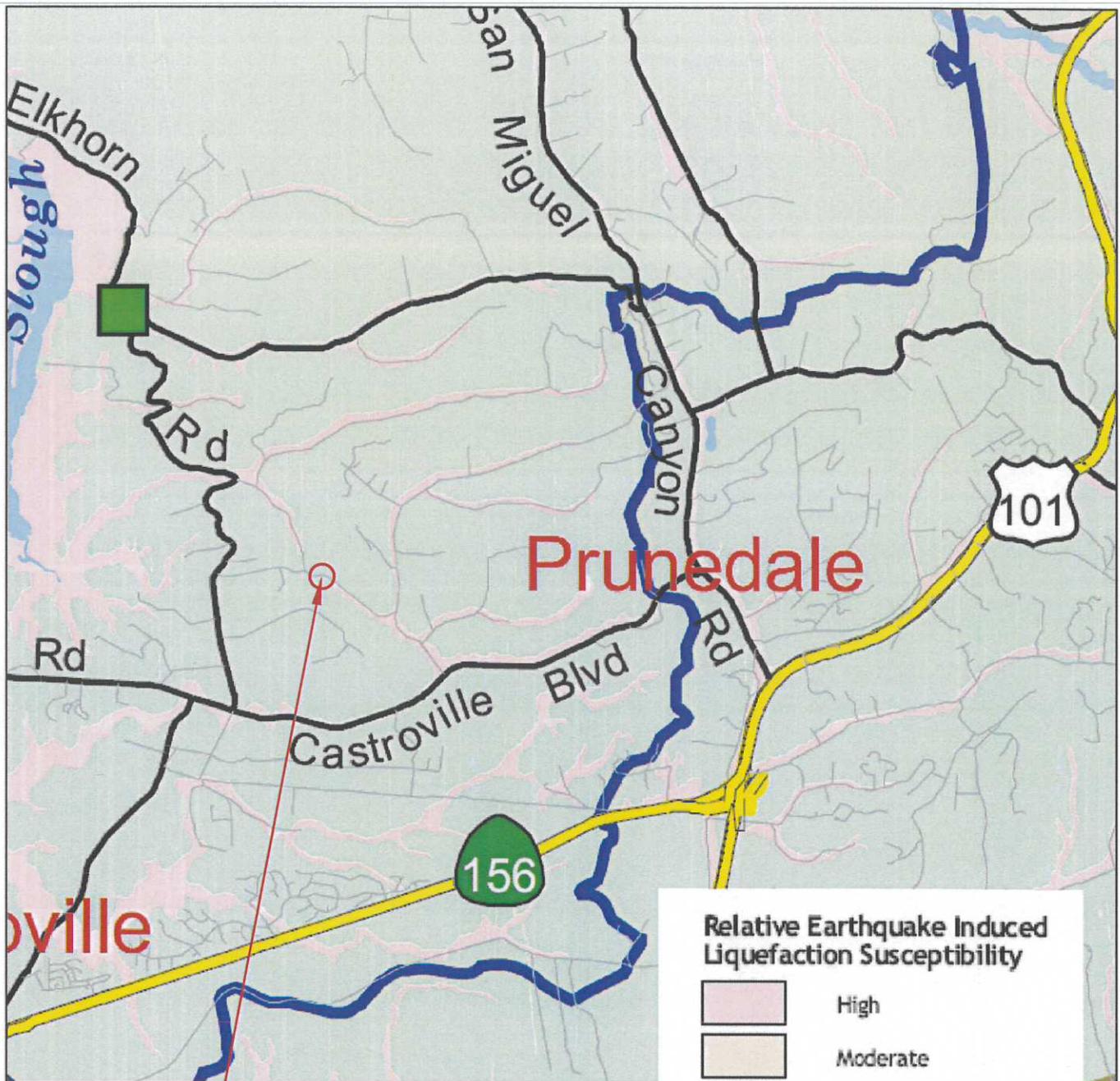
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SHEET NO.

FIGURE NO. 2



SITE LOCATION

TAKEN FROM:

Monterey County

Relative Earthquake Induced Liquefaction Susceptibility

Regional Liquefaction Map
180 Walker Valley Road
Monterey County, California

SCALE: NO SCALE

DRAWN BY: AK

DATE: NOV 2017

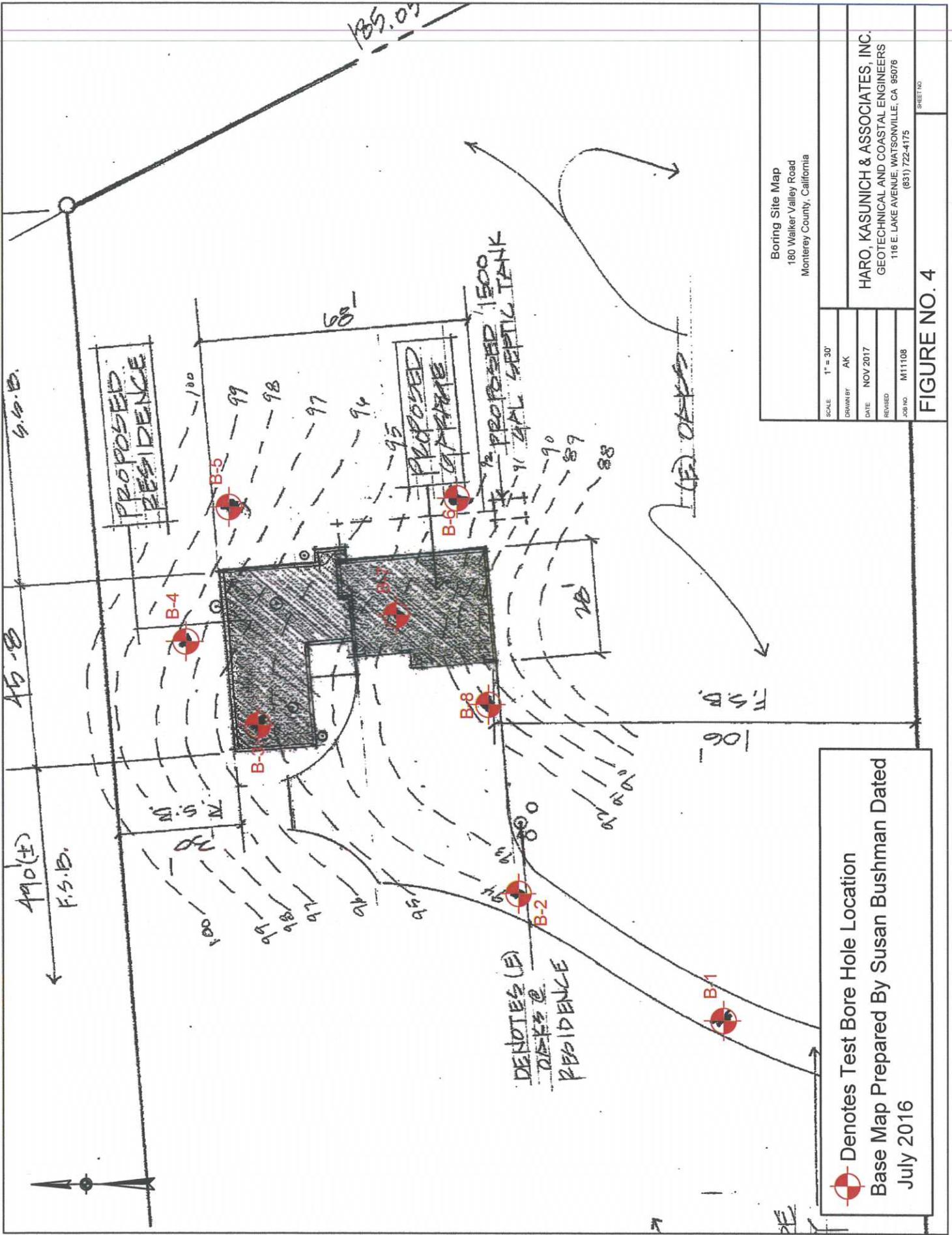
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SHEET NO.

FIGURE NO. 3



Boring Site Map 180 Walker Valley Road Monterey County, California	
SCALE	1" = 30'
DRAWN BY	AK
DATE	NOV 2017
REVISED	
JOB NO.	M11108
HARO, KASUNICH & ASSOCIATES, INC. GEOTECHNICAL AND COASTAL ENGINEERS 116 E LAKE AVENUE, WATSONVILLE, CA 95076 (831) 722-4175	
SHEET NO.	

Denotes Test Bore Hole Location
Base Map Prepared By Susan Bushman Dated
July 2016

FIGURE NO. 4

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVEL WITH 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 NO. 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 WITH 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 NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS		
200	40	10	4	3/4"	3"	12"
SAND		GRAVEL		COBBLES	BOULDERS	
FINE	MEDIUM	COARSE	FINE			

RELATIVE DENSITY		CONSISTENCY			SAMPLING METHOD			H.O	
SANDS AND GRAVELS	BLOWS PER FOOT*	SILTS AND CLAYS	STRENGTH (TSF)**	BLOWS PER FOOT*	STANDARD PENETRATION TEST	T	Initial	Final	Water level designation
VERY LOOSE	0 - 4	VERY SOFT	0 - 1/4	0 - 2	MODIFIED CALIFORNIA	L or M			
LOOSE	4 - 10	SOFT	1/4 - 1/2	2 - 4	PITCHER BARREL	P			
MEDIUM DENSE	10 - 30	FIRM	1/2 - 1	4 - 8	SHELBY TUBE	S			
DENSE	30 - 50	STIFF	1 - 2	8 - 16	BULK	B			
VERY DENSE	OVER 50	VERY STIFF	2 - 4	16 - 32					
		HARD	OVER 4	OVER 32					

*Number of blows of 140 lb hammer falling 30 inches to drive a 2" O.D. (1 3/4" I.D.) split spoon sampler (ASTM D-1586)

**Unconfined compressive strength in tons/ft² as determined by laboratory testing or approximated by the Standard Penetration Test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

Haro Kasunich & Associates

KEY TO LOGS
180 Walker Valley Road
Monterey County, CALIFORNIA

Project No.
M11108
November 2017

Figure No. 5

LOGGED BY AK DATE DRILLED October 2016 BORING DIAMETER 4" BORING NO. B-1

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\HKALOGSUM11108 180 Walker Valley Rd.log Date: 11/10/2017

Depth, ft.	Sample No. and type Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t.s.f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
0								
1.1	1-1 (B) ▲	Medium to dark brown Silty SAND w/binder	SM				7.2	
1.2	1-2 (B) ▲	Medium to dark brown Silty SAND w/binder, dense	SM				8.2	%Passing#200 =31.5
1.3	1-3 (B) ▲	Brown Silty SAND	SM				7.3	
1.4	1-4 (B) ▲	Brown Silty SAND					7.5	
4.0		Boring terminated at 4.0 feet						

HARO, KASUNICH AND ASSOCIATES, INC.

BY: dk

FIGURE NO. 6

LOGGED BY AK DATE DRILLED October 2016 BORING DIAMETER 4" BORING NO. B-2

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\HKALOGS\M11108-180 Walker Valley Rd.log Date: 11/10/2017

Depth, ft.	Sample No. and type Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t.s.f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
0								
1.5	2-1 (B) ▲	Dark brown Silty SAND w/binder	SM				9.0	
2.0	2-2 (B) ▲	Dark brown Silty SAND w/increase in binder	SM				7.8	
3.0	2-3 (B) ▲	Brown Silty SAND w/decrease in binder, dense	SM				6.6	
3.5	2-4 (B) ▲	Brown Silty SAND	SM				6.8	
4.0		Boring terminated at 4.0 feet						
6								
8								
10								
12								
14								

HARO, KASUNICH AND ASSOCIATES, INC.

BY: dk

FIGURE NO. 7

LOGGED BY AK DATE DRILLED October 2016 BORING DIAMETER 4" BORING NO. B-3

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\HAKALOGS\M11108 180 Walker Valley Rd.log Date: 11/10/2017

Depth, ft.	Sample No. and type Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t.s.f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
0								
1	3-1 (B)	Dark brown Silty SAND w/binder	SM				6.6	
2	3-2 (B)	Medium to dark brown Silty SAND (slight increase in binder), dense	SM				7.7	
3	3-3 (B)	Medium to dark brown Silty SAND (slight increase in binder)	SM				6.0	
4	3-4 (B)	Medium to dark brown Silty SAND w/binder (slight decrease in binder)	SM				6.4	
4.0		Boring terminated at 4.0 feet						
6								
8								
10								
12								
14								

HARO, KASUNICH AND ASSOCIATES, INC.

BY: dk

FIGURE NO. 8

LOGGED BY AK DATE DRILLED October 2016 BORING DIAMETER 4" BORING NO. B-4

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\H\KALOGS\M11108 180 Walker Valley Rd.log Date: 11/10/2017

Depth, ft.	Sample No. and type Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t.s.f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
0								
4-1	(B)	Dark brown Silty SAND w/binder	SM				3.8	
4-2	(B)	Dark brown Silty SAND (slight increase in binder)	SM				6.1	
4-3	(B)	Dark orange brown Clayey SAND, dense	SC				7.1	
4-4	(B)	Dark orange brown Clayey SAND (slight decrease in Clay) Boring terminated at 4.0 feet	SM				7.4	
6								
8								
10								
12								
14								

HARO, KASUNICH AND ASSOCIATES, INC.

BY: dk

FIGURE NO. 9

LOGGED BY AK DATE DRILLED October 2016 BORING DIAMETER 4" BORING NO. B-5

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\HKALOGSUM1108-180 Walker Valley Rd.log Date: 11/10/2017

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft. - lbs.	Qu - t.s.f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
0									
1.5	5-1 (B)		Medium to dark brown Silty SAND, dense	SM				6.3	
2.5	5-2 (B)		Medium to dark brown Silty SAND w/slight binder	SM				8.6	
3.5	5-3 (B)		Medium orange brown Silty SAND (Increase in binder)	SM				8.1	
4.0	5-4 (B)		Orange brown Clayey SAND Boring terminated at 4.0 feet	SC				8.4	
6									
8									
10									
12									
14									

HARO, KASUNICH AND ASSOCIATES, INC.

BY: dk

FIGURE NO. 10

LOGGED BY AK DATE DRILLED October 2016 BORING DIAMETER 4" BORING NO. B-6

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\H\KALOGS\M11108-180 Walker Valley Rd.log Date: 11/10/2017

Depth, ft.	Sample No. and type Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t.s.f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
0								
1.5	6-1 (B) ▲	Medium to dark brown Silty SAND, dense	SM				4.8	
2.5	6-2 (B) ▲	Medium brown Silty SAND	SM				7.3	
3.5	6-3 (B) ▲	Orange brown Clayey SAND	SM				9.5	
4.0	6-4 (B) ▲	Orange brown Clayey SAND	SC				8.8	Passing No. 200 = 25.8
4.0		Boring terminated at 4.0 feet						
6								
8								
10								
12								
14								

HARO, KASUNICH AND ASSOCIATES, INC.

BY: dk

FIGURE NO. 11

LOGGED BY AK DATE DRILLED October 2016 BORING DIAMETER 4" BORING NO. B-7

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\HKALOGSUM1108-180 Walker Valley Rd.log Date: 11/10/2017

Depth, ft.	Sample No. and type Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t.s.f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
0								
1.5	7-1 (B) ▲	Dark brown Silty SAND, dense	SM				5.9	
2.5	7-2 (B) ▲	Brown Silty SAND w/binder	SM				7.0	
3.5	7-3 (B) ▲	Dark orange brown Clayey SAND	SC				9.5	% Passing No. 200 =22.0
4.0	7-4 (B) ▲	Dark orange brown Silty Clayey SAND (decrease in Clay) Boring terminated at 4.0 feet	SC/SM				7.8	
6								
8								
10								
12								
14								

HARO, KASUNICH AND ASSOCIATES, INC.

BY: dk

FIGURE NO. 12

LOGGED BY AK DATE DRILLED November 2016 BORING DIAMETER 4" BORING NO. B-8

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\HKALOGS\M11108 180 Walker Valley Rd.log Date: 11/10/2017

Depth, ft.	Sample No. and type Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t.s.f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
0								
1.5	8-1 (B)	Dark brown Silty SAND	SM				4.6	% Passing No. 200 =20.2
2.0	8-2 (B)	Dark brown Silty SAND w/Clay binder	SM			6.4		
3.5	8-3 (B)	Dark brown Silty SAND w/binder (slight decrease in binder)	SM			6.2		
4.0	8-4 (B)	Medium to dark brown Silty SAND w/trace of binder (slight decrease in binder)	SM			5.3		
4.0		Boring terminated at 4.0						
6								
8								
10								
12								
14								

HARO, KASUNICH AND ASSOCIATES, INC.

BY: dk

FIGURE NO. 13



Biotic Report

Proposed Development of a Single-Family Residence
180 Walker Valley Road
Castroville, CA

Prepared for:

Daniel and Sarah Hicks

Prepared by:

Robert K. Burton, PhD

Kristy L. Uschyk

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1 Introduction

This biotic report provides a complete description of vegetation, habitat types, and common and rare wildlife and plants occurring within the vicinity of a proposed single-family residence to be located at 180 Walker Valley Road, Castroville. We report results of on-the-ground surveys of plants and wildlife conducted October 2017. In addition we reviewed records of special-status species occurrences documented in the California Natural Diversity Database (CNDDDB) in order to evaluate the potential for special-status species occurrences within the vicinity of the proposed project.

2 Project Location and Description

The proposed project is located on a 2.51-acre parcel located at 180 Walker Valley Road (APN 131-101-033-000, Appendix A), within rural unincorporated Castroville, California. The rectangular shaped parcel is adjacent to Bayview Road on the narrow southern edge and adjacent to Walker Valley Road along the long eastern edge of the property. The remaining perimeter of the property is adjacent to similar sized parcels containing single-family residences (Figure 1). The Universal Transverse Mercator Grid (UTM) coordinates for the approximate southeast corner of the parcel are 10S 614763 m E and 4074297 m N.

The proposed project consists of an approximately 2,300-ft² single-family residence, an attached 900-ft² garage, and a driveway providing access from Walker Valley Road. Surrounding land use includes rural single-family residential developments and small-scale agriculture. The nearest extent of Elkhorn Slough is approximately 0.75 miles (1.2 km) west of the project site. Vegetation on the property is comprised primarily of Cismontane Woodland - Coast Live Oak (*Quercus agrifolia*) Series (Holland 1986).

3 Wildlife / Botanical Survey & Habitat Evaluation

3.1 Survey Methods

The entire site was surveyed during the morning of 2 October 2017 to identify common and special-status wildlife species through direct observations or from proxy evidence such as foot tracks, scat, and identifiable burrows or dens. We also evaluated suitability of wildlife habitats to support special-status and common wildlife species known to occur within the central coast region. In addition, on 2 October and 11 October 2017, we conducted a botanical survey in order to identify the primary plant communities present on the site, to identify and inventory special-status plant species, identify all native and non-native plant species present, and to evaluate suitability of plant communities to support special-status plant species known to occur within the region. In addition, traveling along public roads, we evaluated habitat suitability for special-status plants and wildlife within the vicinity of the project site.

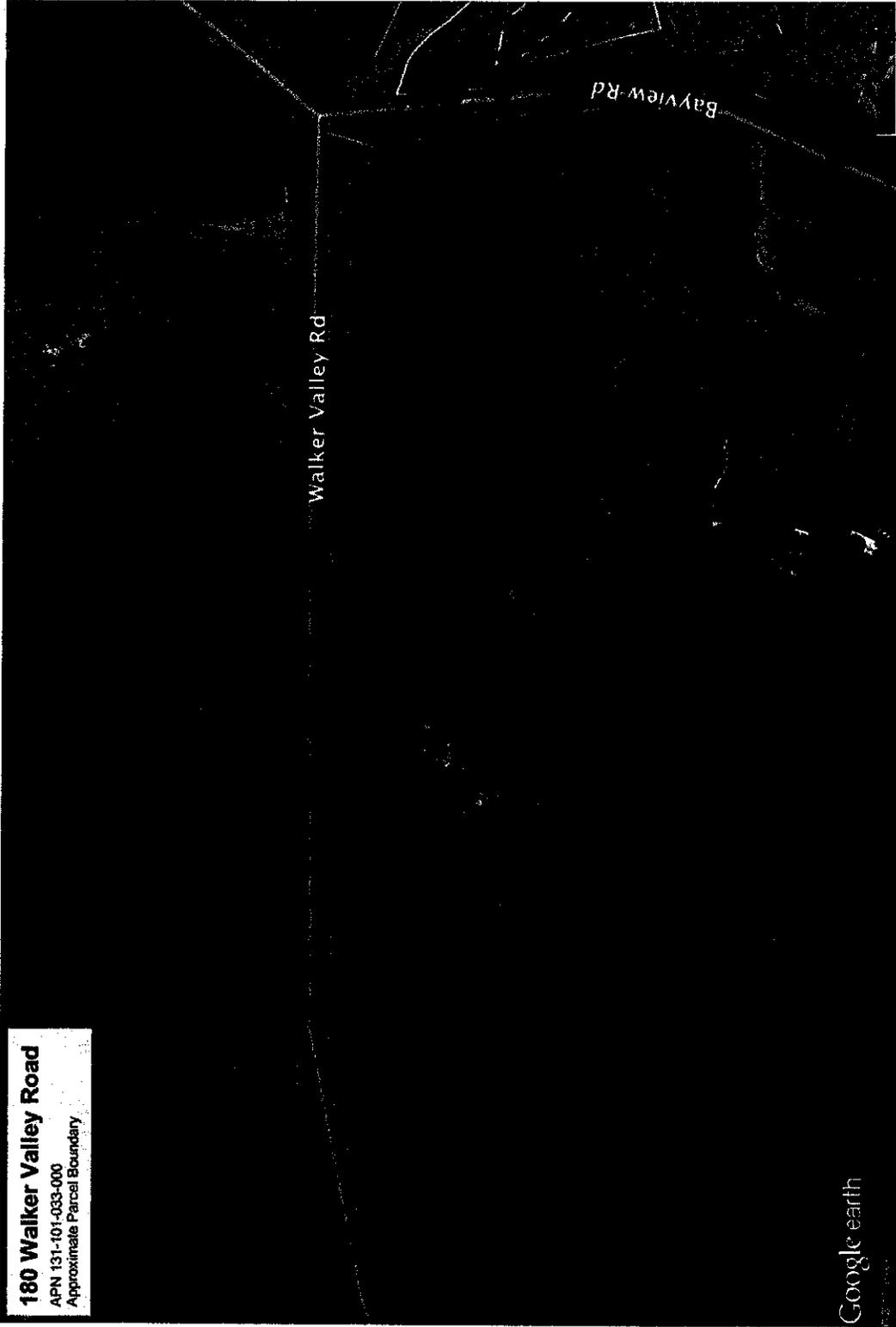


Figure 1. Project site, 180 Walker Valley Road, Castroville, California.

3.2 Wildlife and Wildlife Habitats

While surveying the site, several common birds were identified and mammals were either observed directly or were evident by presence of tracks and scat. No reptiles or amphibians were observed during the survey. We also did not find evidence of special-status wildlife on the project site or within the immediate proximity of the project site (see Section 4 below). The most abundant wildlife observed were birds, comprised predominantly of native species typically associated with coast live oak woodlands (Table 1).

Table 1. Avian species observed at the project site, 180 Walker Valley Road, Castroville, California.

Common Name	Scientific Name	Habitat Association
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	Coast live oak woodland
American Crow	<i>Corvus brachyrhynchos</i>	Coast live oak woodland
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	In flight over the site
Black Phoebe	<i>Sayornis nigricans</i>	Coast live oak woodland
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	Coast live oak woodland
Dark-eyed Junco	<i>Junco hyemalis</i>	Coast live oak woodland
Downy Woodpecker	<i>Picoides pubescens</i>	Coast live oak woodland
Oak Titmouse	<i>Baeolophus inornatus</i>	Coast live oak woodland
Spotted Towhee	<i>Pipilo maculatus</i>	Coast live oak woodland
Townsend's Warbler	<i>Setophaga townsendi</i>	Coast live oak woodland
Western Scrub Jay	<i>Aphelocoma californica</i>	Coast live oak woodland

In addition to avian species we observed scat and tracks of California mule deer (*Odocoileus hemionus*) and we observed brush rabbits (*Sylvilagus bachmani*) along the edge of the property and crossing Walker Valley Road. Although we found no direct evidence of their presence the site contains suitable habitat for grey fox (*Urocyon cinereoargenteus*), Virginia opossum (*Didelphis marsupialis*), and raccoons (*Procyon lotor*), all species that are occasionally observed in the immediate vicinity of the project site. We also found no evidence of California ground squirrels (*Ottospermophilus beecheyi*), which is a relatively common species, however we were particularly interested in their presence/absence due to the fact that their burrows are frequently utilized by California tiger salamanders (*Ambystoma californiense*), a species listed as threatened under the Federal and California Endangered Species Acts (ESA).

There are likely a number of common reptiles that may occur on the project site including the western fence lizard (*Sceloporus occidentalis*), Skilton's skink (*Plestiodon skiltonianus*), Pacific gopher snake (*Pituophis catenifer*), and ring-necked snake (*Diadophis punctatus*), as well as some of the more common amphibian species such as the Pacific tree frog (*Pseudacris regilla*) or occasionally the western toad (*Anaxyrus boreas*), Arboreal salamander (*Aneides lugubris*), or the Monterey salamander (*Ensatina eschscholtzii eschscholtzii*). Although these relatively common species may occur within the types of habitats present on the project site (Stebbins 2003) no individuals of these species were observed during our surveys.

3.3 Plants and Plant Communities

The project site is comprised of Cismontane Woodland, Coast Live Oak series plant community (Holland 1986) infrequently interspersed with Monterey pine (*Pinus radiata*). The understory is comprised of a mix of native shrubs, native and non-native perennial and annual herbaceous plants, and native and non-native grasses.

Native shrubs occurring on the site include California coffeeberry (*Frangula californica*) and Coyote Brush (*Baccharis pilularis ssp. consanguinea*), the latter of which occurs at fairly low densities. The most abundant native herbaceous plants are poison oak (*Toxicodendron diversilobum*) and California blackberry (*Rubus ursinus*).

Table 2. Native plant species observed at the project site, 180 Walker Valley Road, Castroville, California.

Common name	Scientific Name
Coast live oak	<i>Quercus agrifolia var. agrifolia</i>
Monterey pine	<i>Pinus radiata</i>
California coffeeberry	<i>Frangula californica</i>
Coyote brush	<i>Baccharis pilularis ssp. consanguinea</i>
California blackberry	<i>Rubus ursinus</i>
Cotton batting plant	<i>Pseudognaphalium stramineum</i>
Horseweed	<i>Erigeron canadensis</i>
Poison oak	<i>Toxicodendron diversilobum</i>
Sticky monkey flower	<i>Mimulus guttatus</i>
Tall cyperus (Nut sedge)	<i>Cyperus eragrostis</i>
Western bracken fern	<i>Pteridium aquilinum var. pubescens</i>
Wood mint	<i>Stachys bullata</i>
Nodding needle grass	<i>Stipa cernua</i>

There are a number of non-native plant species occurring within the project site. These include the tree of heaven (*Ailanthus altissima*), which occur in a relatively small patch near the proposed building site. The remaining non-native plants are herbaceous perennial and annual species, which along with non-native grasses, are either intermixed among native species or tend to dominate the more open and disturbed areas (Table 3).

We found no evidence of special-status plants during our surveys. Although October is not optimal for identifying species with spring or summer bloom periods, a review of special-status plant CNDDDB records from the vicinity of the project site strongly indicate those special-status species would not be expected, due to unsuitability of habitats present on the project site.

Table 3. Non-native plant species observed at the proposed project site, 180 Walker Valley Road, Castroville, California.

Common name	Scientific Name
Tree of heaven	<i>Ailanthus altissima</i>
Oleander	<i>Nerium oleander</i>
Bull thistle	<i>Cirsium vulgare</i>
Cape ivy	<i>Delairia odorata</i>
Compass plant	<i>Euphorbia lathyris</i>
Cut leaf plantago	<i>Plantago coronopus</i>
English plantain	<i>Plantago lanceolata</i>
Hairy cat's ear	<i>Hypochaeris radicata</i>
Italian thistle	<i>Carduus pycnocephalus</i>
Milk thistle	<i>Silybum marianum</i>
Mustard	<i>Brassica sp.</i>
Oleander	<i>Nerium oleander</i>
Poison hemlock	<i>Conium maculatum</i>
Wild radish	<i>Raphanus sativus</i>
Pampas grass	<i>Cortaderia jubata</i>
Rabbitfoot grass	<i>Polypogon monspeliensis</i>
Rattlesnake grass	<i>Briza minor</i>
Ripgut grass	<i>Bromus diandrus</i>

4 Special Status Wildlife and Plant Species Regional Occurrences - Prunedale Quad

The California Natural Diversity Database was queried on 10 October 2017. Within the Prunedale quad there are 46 occurrences of special-status wildlife representing 10 species and 47 occurrences representing 11 species of special-status plants (Appendix A & B). Narrowing the search to include only those species occurring within Cismontane Woodlands, which include coast live oak woodlands, we found records of 13 occurrences of 2 special-status wildlife species, and 18 occurrences of plants representing 5 species associated with the primary habitat type found within the project site boundary.

4.1 Special Status Wildlife Occurrences - Prunedale Quad

Wildlife species associated with permanent fresh and brackish water habitats were excluded from further analysis due to the complete lack of suitable habitat within the project site boundary or within the immediately vicinity of the project site. Wildlife species excluded from

further evaluation due to a lack of suitable wetland/aquatic habitats include the Salinas harvest mouse (*Reithrodontomys megalotis distichlis*), tricolored blackbird (*Agelaius tricolor*), western pond turtle (*Emys marmorata*), California Ridgway's rail (*Rallus obsoletus obsoletus*), and California brackishwater snail (*Tryonia imitator*). Likewise, habitats within the project site are unsuitable for burrowing owl (*Athene cunicularia*), which occur in open grasslands that do not occur on the project site or within the immediate vicinity.

Special status wildlife species that could occur among terrestrial habitats within the vicinity of the project site include the White-tailed Kite (*Elanus leucurus*), the Federally and State Threatened California tiger salamander (*Ambystoma californiense*), the Federally and State endangered Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*), and the Federally threatened California red-legged frog (*Rana draytonii*). Known occurrences of these species within the vicinity of the project site are based on historical and current CNDDDB records.

4.1.1 White-tailed Kite

White-tailed kites are relatively common within suitable habitats along the central coast of California where they forage among open habitats including grasslands, wetlands and agricultural fields. Their prey preferences are fairly broad but are focused on species occupying open habitats such as small diurnal mammals, birds, reptiles, and amphibians. They forage by hovering and dropping vertically onto prey. Although white-tailed kites forage in open habitats they nest at or near the tops of oak trees, such as those found on the project site (Zeiner et al 1990).

Although white-tailed kites are frequently observed in the region there is only a single CNDDDB record of white-tailed kites occurring within the Prunedale quad. The record documents a female kite on a nest with male kites roosted nearby. The location of the nest is approximately 1.5 (2.4 km) northeast of the project site (Figure 2).

No white-tailed kites were observed during surveys of the project site, and the species does occur within the region year-round. The site provides little foraging habitat as the area is dominated by relatively dense coast live oak woodlands interspersed with Monterey pines. The project site does contain a substantial number of oaks that may be suitable for nesting, and there are large areas of open grasslands and agricultural fields nearby, which are suitable as foraging habitats. During our surveys we found no evidence of nesting or indication of the presence of an adult pair or fledglings, and given that the breeding season extends through October along the central coast, they would likely have been apparent if present on the project site.

4.1.2 California Tiger Salamander

California tiger salamanders, within the central coast region, typically occupy California annual grasslands and open woodlands. California tiger salamanders breed in vernal pools or other natural ephemeral ponds as well as modified catchments and stock ponds with sufficient water to support adults and juvenile development through dispersal age. Breeding ponds optimally dry during the summer, which limits the potential for colonization by bullfrogs (*Lithobates catesbeianus*) or exotic fish that prey on larvae. The species also requires access to burrows of small mammals, such as California ground squirrels or Botta's pocket gophers (*Thomomys bottae*), where they typically spend the dry non-breeding periods of the year (USFWS 2017).

Small ephemeral freshwater pools occur within approximately 0.44 miles (0.7 km) west of the site, adjacent to the northern edge of Walker Valley Road immediately east of the intersection with Elkhorn Road, which appear to be maintained into late summer by agricultural runoff from an adjacent strawberry farm. There is also seasonal ponding approximately 0.3 miles (0.48 km) east of the project site on Bayview Road. Although both of these wetlands may be suitable breeding habitat for California tiger salamanders, the closest CNDDDB record of California tiger salamander occurrence within the Prunedale quad is from the vicinity of Strawberry Canyon approximately 1.1 miles (1.8 km) north of the project site (Figure 2).

The project site itself lacks habitats suitable for supporting populations of either breeding or estivating California tiger salamanders. The site is dominated by relatively dense woodland canopy of coast live oak, widely interspersed with Monterey pines. The relatively dense understory is comprised of a mix of native and non-native grasses, annuals, perennials, and native shrubs. The site lacks wetland features suitable for breeding and lacks open grasslands and any indication of the presence of California ground squirrels or other suitable small mammal burrows.

California tiger salamanders were not observed on the site or within the vicinity of the site. Given the proximity of known occurrences of the species and limited suitability of habitats on or adjacent to the site, the potential for California tiger salamanders to occur on the project site is considered to be very low.

4.1.3 Santa Cruz long-toed salamander

There are two subspecies of long-toed salamanders known to occur in California. One of these subspecies, the Santa Cruz long-toed salamander, has an extremely limited distribution in coastal central California. The species requires shallow, typically ephemeral, freshwater pools for breeding. The remainder of the year they remain protected from desiccation in burrows of small mammals such as deer mice (*Peromyscus spp.*), California voles (*Microtus californicus*), California moles (*Scapanus latimanus*), and Botta's pocket gophers. Upland habitats utilized by Santa Cruz long-toed salamanders include coast live oak and Monterey pine woodlands, where they may find refuge among tree roots, as well as among riparian vegetation such as arroyo

willow (*Salix lasiolepis*). Santa Cruz long-toed salamanders may travel several hundred meters between breeding and upland sites (USFWS 2004).

There are 4 CNDDDB records of Santa Cruz long-toed salamanders for the Prunedale Quad (Figure 2). Two records are from Moro Cojo Slough to the south and southwest of the project site, a third is from a location near the north end of Elkhorn Slough, and the fourth documents a sighting at the Elkhorn Slough Estuarine Research Reserve, which is approximately 1 mile (1.6 km) northwest of the project site. There is potentially suitable breeding habitat 0.44 miles west of the site, adjacent to the northern edge of Walker Valley Road immediately east of the intersection with Elkhorn Road, which appears to be maintained into late summer by agricultural runoff from an adjacent strawberry farm. There is also seasonal ponding approximately 0.3 miles (0.48 km) east of the project site on Bayview Road.

The project site itself lacks habitats suitable for supporting populations of either breeding or estivating Santa Cruz long-toed salamanders. As described the site is dominated by relatively dense woodland canopy of coast live oak, widely interspersed with Monterey pines. The relatively dense understory is comprised of a mix of native and non-native grasses, annuals, perennials, and native shrubs. The site lacks wetland features suitable for breeding and lacks substantial numbers of suitable small mammal burrows that might provide cover during the non-breeding periods of the year.

Santa Cruz long-toed salamanders were not observed on the site and there is a limited number of potentially suitable small mammal burrows. Given the proximity of known occurrences of the species and limited suitability of habitats on or adjacent to the site, there is very low potential for Santa Cruz long-toed salamanders to occur on the project site.

4.1.4 California red-legged frog

Breeding sites of California red-legged frogs include a relatively wide variety of aquatic habitats that includes pools and ponds as well as streams and creeks, marshes, coastal dune ponds, lagoons, and stock ponds. During the dry season red-legged frogs tend to remain in close proximity of water, however they may find refuge in moist riparian woodlands, small mammal burrows, and other locations where moisture persists. Red-legged frogs are capable of dispersing long distances across terrain and habitats that would normally be unsuitable (USFWS 2002).

Although there are no records of California red-legged frog occurrences from the project site and immediately vicinity, there are 19 CNDDDB records of red-legged frog occurrences within the Prunedale quad. This includes a record from a location adjacent to Elkhorn Road, which is approximately 0.84 miles (1.35 km) northwest of the project site (Figure 2).

There is potentially suitable breeding habitat 0.44 miles (0.7 km) west of the site, adjacent to the northern edge of Walker Valley Road immediately east of the intersection with Elkhorn Road. This habitat is comprised of a small patch of willow riparian habitat with small pools of shallow open water. Standing water appears to be maintained into late summer by agricultural runoff from an adjacent strawberry farm. There is also seasonal ponding approximately 0.3 miles (0.48 km) east of the project site on Bayview Road. Given that California red-legged frogs will utilize a wide range of aquatic habitats for breeding, it is likely that they are breeding at one or both of these locations. The project site itself does have marginally suitable upland habitat, although there are no wetland or riparian habitats either onsite or immediately adjacent to the site.

California red-legged frogs are capable of dispersing considerable distances overland and could extend out from potential breeding sites in the area to upland habitats. In the event of seasonal absence of water, California red-legged frogs may utilize spaces under fallen logs or rocks where some moisture persists and these types of microhabitats may occur on the project site. However, given that there is no suitable wetland habitats on or immediately adjacent to the project site, and given that there appear to be persistent wet habitats to the west and east of the sites (apparently due to anthropogenic inputs of water), the potential for California red-legged frogs to occur on the project site is considered to be very low.

4.2 Special Status Plant Occurrences - Prunedale Quad

There are CNDDDB records documenting populations of 11 species of plants, within the Prunedale quad (Table 4). Of those 11 species, four are listed under the Federal or California Endangered Species Acts (ESA), or both. Yadon's rein orchid (*Piperia yadonii*) is listed as Endangered under the Federal ESA. The Santa Cruz tarplant (*Holocarpa macradenia*) is listed as Threatened under the Federal ESA, and Endangered under the California ESA. The Monterey spineflower (*Chorizanthe pungens* var. *pungens*) is listed Threatened under the Federal ESA, and seaside bird's-beak (*Cordylanthus rigidus* ssp. *littoralis*) is listed as Endangered under the California ESA.

4.2.1 Yadon's rein orchid

Occurrences of Yadon's rein orchid are documented in the CNDDDB from several locations within the Prunedale Quad (Figure 3). The nearest documented population is from a location approximately 1 mile (1.5 km) east of the project site. Plant communities at that location are comprised of maritime chaparral intermixed with oak woodland. Plant communities that the Yadon's rein orchid is typically associated with are Maritime Chaparral, Northern Coastal Scrub, and Closed-cone Pine Forests (Calflora 2017). These plant communities are absent from the project site and from the adjacent properties. The bloom period for Yadon's rein orchid is May through August, so it may not have been recognizable during our survey times and we did not find any evidence of the species present on the site. Given that plant communities this species

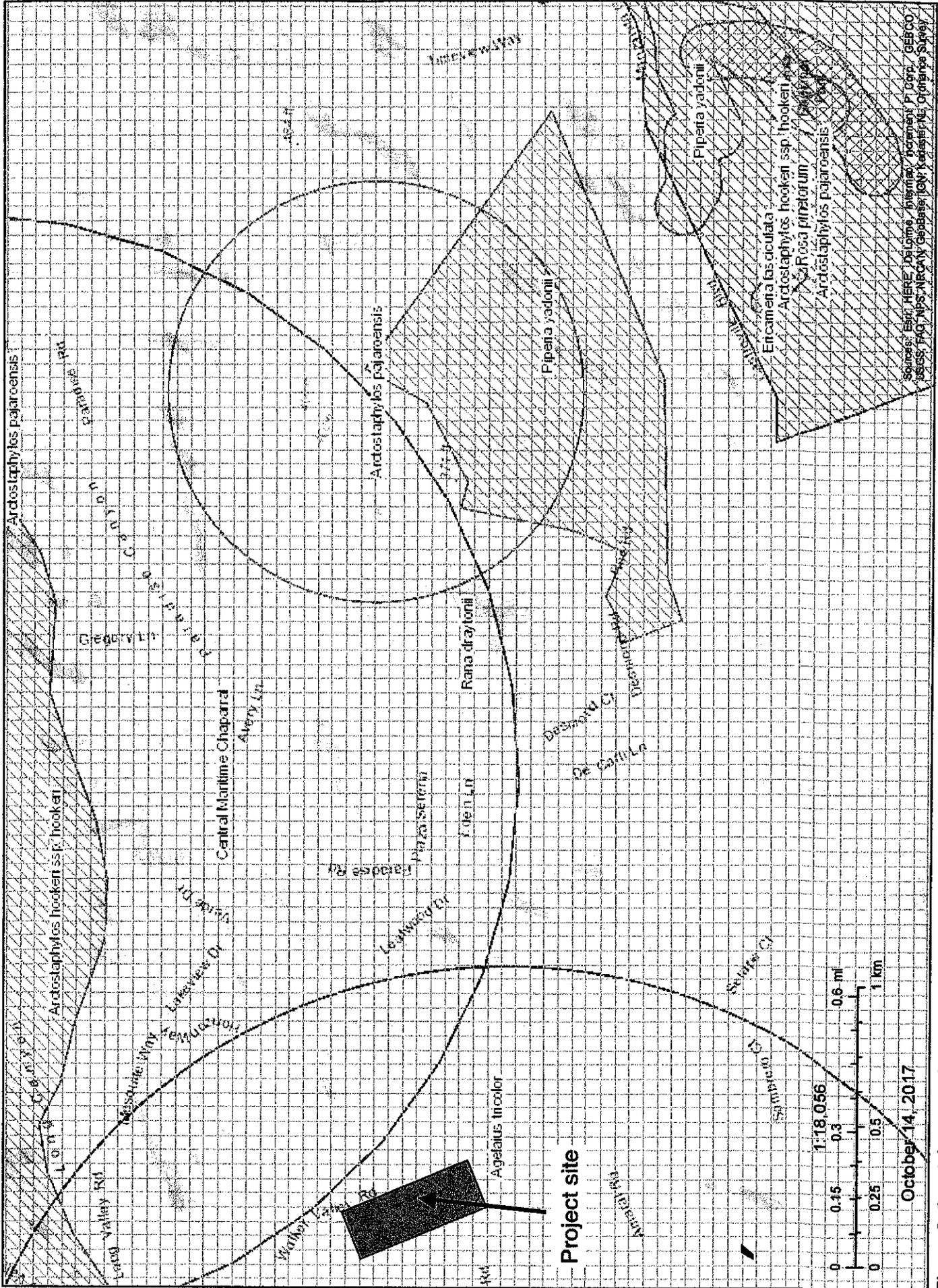
is associated with are absent from the project site and adjacent properties, the potential for this species to occur on the project site is considered to be low.

Table 4. CNDDDB Special status plant species occurrence - Prunedale quad.

Common Name	Scientific Name	ESA Listing Status	Potential for Occurrence
Santa Cruz tarplant	<i>Holocarpha macradenia</i>	Threatened (FESA) Endangered (CESA)	Very low
Yadon's rein orchid	<i>Piperia yadonii</i>	Endangered (FESA)	Low
Monterey spineflower	<i>Chorizanthe pungens</i> var. <i>pungens</i>	Threatened (FESA)	Very low
Seaside bird's-beak	<i>Cordylanthus rigidus</i> ssp. <i>littoralis</i>	Endangered (CESA)	Very low
Hooker's manzanita	<i>Arctostaphylos hookeri</i> ssp. <i>hookeri</i>	N/A	Very low
Pajaro manzanita	<i>Arctostaphylos pajaroensis</i>	N/A	Very low
Congdon's tarplant	<i>Centromadia parryi</i> ssp. <i>congdonii</i>	N/A	Very low
Eastwood's goldenbush	<i>Ericameria fasciculata</i>	N/A	Very low
Fragrant fritillary	<i>Fritillaria liliacea</i>	N/A	Very low
Choris' popcornflower	<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	N/A	Very low
Pine rose	<i>Rosa pinetorum</i>	N/A	Very low

4.2.2 Santa Cruz Tarplant

There is 1 CNDDDB record of Santa Cruz tarplant (*Holocarpha macradenia*) occurrence within the Prunedale quad. The occurrence is approximately 4.8 miles (7.74 km) north of the project site. A relatively large population was documented occurring among actively grazed grasslands comprised of a mosaic of non-native annuals and native coastal prairie species. The species is typically associated with Coastal Prairie plant community (Calflora 2017), which is absent from the project site and adjacent properties. The bloom period for Santa Cruz tarplant does extend into October and it would have been recognizable during our surveys. We found no evidence the species is present on the project site and given the unsuitability of habitats on the site, for this species, the potential for its occurrence on the site is considered to be very low.



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeBCO, IGN, Canada, Swisstopo

Figure 3. Special-status plant occurrences within the vicinity of the project site (CNDDb 2017).

4.2.3 Monterey Spineflower

Monterey spineflower (*Chorizanthe pungens var. pungens*) populations are documented in the CNDDDB from several locations within the Prunedale quad (Figure 3). The nearest known populations occur approximately 1.2 miles (1.9 km) north of the project site and approximately 2 miles (3.2 km) east of the project site occurring in areas dominated by maritime chaparral. Habitats that the Monterey spineflower is associated with are absent from the project site and adjacent properties. The species bloom period is April through June, however dried plants can be readily identified. We did not find any evidence of the species present on the site. Given that the plant communities this species is associated with are absent from the project site and adjacent properties, and the proximity of known occurrences, the potential for this species to occur on the project site is considered to be very low.

4.2.4 Seaside birds-beak

There are locales where Seaside bird's-beak (*Cordylanthus rigidus ssp. littoralis*) was documented in the early 1900's, which are recorded in the CNDDDB however the location data is fairly generalized. There are two locales from the Prunedale quad; one is over 3.3 miles (5.3 km) northwest of the project site while the second generalized location is approximately 2.8 miles (4.4 km) southwest of the project site. This species is typically associated with young marine sand deposits or marine terraces and may occur along the edge of oak woodlands. The edge of the oak woodland is open along the borders adjacent to Bayview Road and Walker Valley Road, however the woodland is continuous with dense woodlands on neighboring properties to the south and west. This species is identifiable into October, although the bloom period typically ends by August (Calflora 2017). We did not observe the species on or adjacent to the site, and given the plant communities present on the site and within the immediate vicinity the potential for this species to occur on the project site is considered to be very low.

4.2.5 Hooker's manzanita and Pajaro manzanita

Hooker's manzanita (*Arctostaphylos hookeri hookeri*) and Pajaro Manzanita (*Arctostaphylos pajaroensis*) are relatively abundant within maritime chaparral, which occurs at several locations throughout the Prunedale quad. Both species are identifiable at all times of the year (Calflora 2017). Maritime chaparral is absent from the project site and adjacent properties and no Manzanita species (*Arctostaphylos spp.*) were found during our surveys. Given the lack of suitable habitat for these species and their absence from the project site, there potential to occur on the site is considered to be very low.

4.2.6 Congdon's tarplant

There are 3 CNDDDB records of Congdon's tarplant occurrences within the Prunedale quad however this species is typically associated with Valley Grasslands and wetlands, and was not

observed or expected to occur within Cismontane Woodland – Coast Live Oak Woodland Series. The closest known occurrence is approximately 1.4 miles (2.3 km) northeast of the project and appears to be associated with maritime chaparral. The species does potentially bloom through October (Calflora 2017) and would likely have been detectable at the time of our survey. We did not observe the species on the project site. Given the extent of closed canopy oak woodland on the project site and surrounding areas, along with disturbed roadside conditions of the oak woodland edge, potential for the species to occur on the project site is considered to be very low.

4.2.7 Eastwood's goldenbush

There are CNDDDB records of populations of Eastwood's goldenbush (*Ericameria fasciculata*) from a location within Manzanita Regional Park, approximately 1 mile (1.6 km) east of the project site. Specific habitat characteristics include sandy soil among maritime chaparral. The species is typically associated with Chaparral, Closed-cone Pine Forest, and Northern Coastal Scrub plant communities, which are absent from the project site and adjacent properties. The species' bloom period is July through October (Calflora 2017) and it would likely have been identifiable during our surveys. We did not observe the species on or adjacent to the site, and given the plant communities present on the site and within the immediate vicinity, the potential for this species to occur on the project site is considered to be very low.

4.2.8 Fragrant fritillary

There are 2 CNDDDB records of populations of fragrant fritillary (*Fritillaria liliacea*) from the Prunedale quad. One population is located approximately 4.2 miles (6.8 km) east of the project site with the second located approximately 5.5 miles (8.9 km) northeast of the site. The species is typically associated with Coastal scrub, Valley and Foothill Grassland, Coastal Prairie, and Wetland-Riparian plant communities (Calflora 2017). The species is also often associated with serpentine soils. This species' bloom period is relatively short occurring from February through April and would not likely have been identifiable during our survey period. Nonetheless, given the lack of suitable habitat for this species with the project site and adjacent properties and the distance between known populations and the project site, the potential for this species to occur on the site is considered to be very low.

4.2.9 Choris' popcornflower

There is a single CNDDDB record of Choris' popcornflower (*Plagiobothrys chorisianus* var. *chorisianus*) occurrence within the Prunedale quad. The location is approximately 2.5 miles (4 km) west of the Project site within the seasonally inundated marsh in Moro Cojo Slough. The species is associated with Coastal Prairie, Chaparral, Northern Coastal Scrub, Wetland-Riparian plant communities and more specifically the primary habitat association is wetlands. There is no suitable habitat for this species on the project site or with the adjacent lands. The nearest

wet habitats we observed are 0.4 miles (0.7 km) west of the site and 0.3 miles (0.48 km) east of the project site. Given the lack of suitable habitat for these species from the project site and adjacent properties and the distance between known populations and the project sites, the potential for this species to occur on the site is considered to be very low.

4.2.10 Pine rose

There are CNDDDB records of populations of pine rose (*Rosa pinetorum*) from a location within Manzanita Regional Park, approximately 1 mile (1.6 km) east of the project site. The species is typically associated with Chaparral, Closed-cone Pine Forest, and Northern Coastal Scrub plant communities all of which are absent from the project site and surrounding properties (Calflora 2017). The species' bloom period is May through July however this perennial would have been identifiable during our surveys. Given the plant communities present on the site and within the immediate vicinity the potential for this species to occur on the project site is considered to be very low.

5 Summary

We found no evidence of special-status wildlife or plants either within the project site or within the immediately surrounding areas. In addition, we found no CNDDDB records that indicate special-status wildlife or plants have been documented occurring within the project site or within the immediate vicinity. Our analysis of habitat suitability for special-status species known to occur within the region strongly indicates the habitat on the site is unsuitable for these species, and we conclude the potential for special-status species addressed in this report to occur on the site to be very limited.

The proposed building site for the single-family residence and driveway are located within a portion of the property that has been previously disturbed, which would be expected to reduce biological impacts associated with construction. Furthermore, while the potential for special-status species to be impacted by construction of the proposed residence and driveway is considered to be very limited, implementation of standard avoidance and mitigation measures would ensure potential impacts to special-status and common species would be reduced to well below significant thresholds.

6 Literature Cited

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7 Appendices



101

14 11.63 AC.

10 5.7 AC.

12

47 12.38 AC.

24 7.492 AC.

15 10 AC.

16 11.0 AC.

115

13 7.28 AC.

27

23 4.8 AC. APPT. X.

29

48

23 8.77 AC.

18 2.5 AC. PAR. A

22 PAR. B

33 PAR. C

31

32

33

40 3.357 AC.

41

46

45 1 AC.

44 1 AC.

51 PAR. 1

51 PAR. 2

52

54

55

50

51

52

17



Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad (Prunedale (3612176)) AND Taxonomic Group (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
burrowing owl <i>Athene cunicularia</i>	ABNSB10010	None	None	G4	S3	SSC
California red-legged frog <i>Rana draytonii</i>	AAABH01022	Threatened	None	G2G3	S2S3	SSC
California Ridgway's rail <i>Rallus obsoletus obsoletus</i>	ABNME05016	Endangered	Endangered	G5T1	S1	FP
California tiger salamander <i>Ambystoma californiense</i>	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
mimic tryonla (=California brackishwater snail) <i>Tryonia imitator</i>	IMGASJ7040	None	None	G2	S2	
Salinas harvest mouse <i>Reithrodontomys megalotis distichlis</i>	AMAFF02032	None	None	G5T1	S1	
Santa Cruz long-toed salamander <i>Ambystoma macrodactylum croceum</i>	AAAAA01082	Endangered	Endangered	G5T1T2	S1S2	FP
tricolored blackbird <i>Agelaius tricolor</i>	ABPBXB0020	None	Candidate Endangered	G2G3	S1S2	SSC
western pond turtle <i>Emys marmorata</i>	ARAAD02030	None	None	G3G4	S3	SSC
white-tailed kite <i>Elanus leucurus</i>	ABNKC06010	None	None	G5	S3S4	FP

Record Count: 10



Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad (Prunedale (3612176)) AND Taxonomic Group (Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Choris' popcornflower <i>Plagiobothrys chorisianus var. chorisianus</i>	PDBOR0V061	None	None	G3T2Q	S2	1B.2
Congdon's tarplant <i>Centromadia parryi ssp. congdonii</i>	PDAST4R0P1	None	None	G3T2	S2	1B.1
Eastwood's goldenbush <i>Ericameria fasciculata</i>	PDAST3L080	None	None	G2	S2	1B.1
fragrant fritillary <i>Fritillaria liliacea</i>	PMLILOV0C0	None	None	G2	S2	1B.2
Hooker's manzanita <i>Arctostaphylos hookeri ssp. hookeri</i>	PDERI040J1	None	None	G3T2	S2	1B.2
Monterey spineflower <i>Chorizanthe pungens var. pungens</i>	PDPGN040M2	Threatened	None	G2T2	S2	1B.2
Pajaro manzanita <i>Arctostaphylos pajaroensis</i>	PDERI04100	None	None	G1	S1	1B.1
pine rose <i>Rosa pinetorum</i>	PDROS1J0W0	None	None	G2	S2	1B.2
Santa Cruz tarplant <i>Holocarpha macradenia</i>	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
seaside bird's-beak <i>Cordylanthus rigidus ssp. littoralis</i>	PDSCR0J0P2	None	Endangered	G5T2	S2	1B.1
Yadon's rein orchid <i>Piperia yadonii</i>	PMORC1X070	Endangered	None	G1	S1	1B.1

Record Count: 11

Tree Resource Assessment 180 Walker Valley Road

Prepared for:

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41 K Bayview
Castroville, CA 95012

Prepared by:

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Urban Forester
Member Society of American Foresters #48004
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1213 Miles Avenue
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8/3/16

Owner:

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Designer:

Susan Bushman
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Forester and Arborist:

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SUMMARY

Development is proposed for this site known requiring excavation near oak trees on site. The project proposes approximately 2,212 square foot two story single-family dwelling with a 948 square foot attached garage. There are a few planted trees on the property as well as existing native trees; the trees are considered to be in fair to poor or better condition both structurally and in health. Several trees within the building footprint will need to be removed and some excavation will be performed near a number of Oak trees along the proposed driveway. A tree assessment/arborist report has been prepared that identifies and addresses the affects that the project will have to the existing tree resources on site as well as a list of recommendations regarding trees on the project.

INTRODUCTION

This tree assessment/arborist report is prepared for Daniel Kelly & Sarah Hicks, the owners of the property located at 180 Walker Valley Road in Castroville, CA by Frank Ono, Urban Forester and Certified Arborist (member Society of American Foresters #48004 and International Society of Arboriculture Certified Arborist #536) due to the proposed construction. The North Monterey County Land Use Plan and Monterey County Zoning Ordinance Title 20 identify native Coast live oak trees as a species requiring protection and special consideration for management.

ASSIGNMENT/SCOPE OF PROJECT

To ensure protection of the tree resources on site, the property owners Daniel Kelly & Sarah Hicks, have requested an assessment of the trees in proximity to proposed development areas. The findings of the report are to be documented in an arborist report to work in conjunction with other conditions for approval of the building permit application. To accomplish this assignment, the following tasks have been completed;

- Evaluate health, structure and preservation suitability for each tree within or adjacent (15 feet or less) to proposed development of trees greater than or equal to six diameter inches at 24 inches above grade.
- Review proposed building site plans as provided by designer Susan Bushman.
- Make recommendations for alternative methods and preconstruction treatments to facilitate tree retention.
- Create preservation specifications, as it relates to a Tree Location/Preservation Map.
- Determine the quantity of trees affected by construction that meet "Landmark" criteria as defined by the County of Monterey, Title 20 Monterey County Zoning Ordinance; as well as mitigation requirements for those to be affected.
- Document findings in the form of a report as required by the County of Monterey Planning Department.

LIMITATIONS

This assignment is limited to the review of footprint location plans submitted to me dated July 2016 by Mr. Daniel Kelly (prepared by Susan Bushman) to assess affects from potential construction to trees within or adjacent to construction activities. The assessment has been made of these plans specifically. Only minor grading and erosion details are discussed in this report as it relates to tree health. It is not the intent of this report to be a monetary valuation of the trees or provide risk assessment for any tree on this parcel, as any tree can fail at any time. No clinical diagnosis was performed on any pest or pathogen that may or may not be present. F.O. Consulting shall not be responsible for another's means, methods, techniques, schedules, sequence or procedures, or for contractor safety or any other related programs; or for another's failure to complete the work in accordance with the plans and specifications. A tree hazard assessment may be necessary to evaluate trees outside the immediate building areas, as this was not part of the development assessment. In addition to an inspection of the property, F.O. Consulting relied on information provided in the preparation of this report (such as, surveys, property boundaries, and property ownership) and must reasonably rely on the accuracy of the information provided. F.O. Consulting shall not be responsible for another's means, methods, techniques, schedules, sequence or' procedures, or for contractor safety or any other related programs; or for another's failure to complete the work in accordance with the plans and specifications.

PURPOSE AND GOAL

This Tree Assessment/Arborist report is prepared for this parcel due to proposed construction activities located at 180 Walker Valley Road in Castroville, CA. The purpose of the assessment is to determine what trees will be affected by the proposed construction project. Oak trees are considered protected trees as defined by the County of Monterey, Title 20 Monterey County Zoning Ordinance.

The goal of this report is to protect and maintain the North Monterey County Area forested resources through the adherence of development standards, which allow the protection, and maintenance of its forest resources. Furthermore it is the intended goal of this report to aid in planning to offset any potential effects of proposed development on the property while encouraging forest stability and sustainability, perpetuating the forested character of the property and the immediate vicinity.

SITE DESCRIPTION

- 1) Assessor's Parcel Number: 131-101-033-000.
- 2) Location: 180 Walker Valley Road Castroville, CA 95012.
- 3) Parcel size: 2.5 acres.
- 4) Existing Land Use: The parcel is zoned for residential use (LDR/2.5 CZ).
- 5) Slope: The parcel ranges from mild to steep sloped. Slopes range from 5% to over 20% with the average slope in the proposed construction around 10%.
- 6) Soils: The parcel is located on soils classified by the Monterey County Soils report as Arnold Loamy Sand soils. The Arnold series consists of somewhat excessively drained soils that formed on hills and uplands in old marine sand dunes or in materials weathered from soft sandstone. The vegetation consists of grasses, forbs, oaks, chamise, manzanita, and eucalyptus. Permeability is rapid, and the available water capacity is 3 to 5 inches. Roots penetrate to a depth of more than 60 inches. Arnold soils are used for range, wildlife habitat, and watershed.
- 7) Vegetation: The vegetation on site is composed primarily of a native Oak and related understory plants such as poison oak, blackberry and coffee berry.
- 8) Forest Condition and Health: The stand of trees and health are evaluated with the use of the residual trees combined with surrounding adjacent trees as a complete stand. The site is undeveloped and surrounding forest canopy is fragmented. It is an Oak woodland with an 80 % to 90% canopy closure. The stand is predominantly Coast Live Oaks (many of which range from fair to poor health). Major pests observed were Western Oak Bark Beetle (*Pseudopityophthorus pubipennis*) and Phytophthora Root and Crown rot (*Phytophthora cinnamomi*)

BACKGROUND

A preliminary meeting was conducted with Mr. Kelly on May 19th, 2016 to assess the suitability of his design to build a single family home. Mr. Kelly, who originally started with a design that involved the removal of over 15 native existing Coast Live Oak trees, worked to change the design after our initial meeting with the county planner. Mr. Kelly redesigned the layout of his proposed structure presently which now requires the removal of only 5 Oak trees. I was then retained to conduct a Tree Resource Assessment focusing on the incorporation of the preliminary location of his site improvements coupled with consideration for the general goals of site improvement desired of the landowner. Proposed improvements assessed included preserving trees to the greatest extent feasible, maintaining the view shed and general aesthetic quality of the area while complying with Monterey County Codes. The study of individual trees determined treatments necessary to complete the project and meet the goals of the landowner. Trees within and immediately adjacent proposed development area were located, measured, inspected, flagged and recorded. The assessment of each tree concluded with an opinion of whether the tree should be removed, or preserved, based on the extent and effect of construction activity to the short and long-term health of the tree. All meetings and field review were focused on the area immediately surrounding the proposed development.

OBSERVATIONS/DISCUSSION

The following list includes observations made while on site, and summarizes details discussed during this stage of the planning process:

- The site is undeveloped and heavily forested with tree spacing ranging between 5 and 15 feet apart. There is a graded landing in the middle of the property where proposed building will be built. Tree density of the site is approximated to be 320 trees at 150 trees per acre minus the buildable area. Percentage of trees to be removed compared to total population is less than 2%.
- Existing driveway is located adjacent to trees #557 and #558. Minor cut and fill grading may be necessary but should not have severe side effects as long as soil is not stock piled with grades changed to where the soils are kept in place directly against the base of the trees. The soil cut should not significantly affect Tree #557 as the area was already disturbed to install the existing roadway access.
- Several oaks are located scattered on the property which are to be removed.
 - #477 is a mature multi stemmed Oak that is in poor condition with a heavy lean towards the proposed garage and is uprooting on the side opposite the lean and needs removal.
 - Tree #574 is in fair condition and is within building footprint and must be removed.
 - Tree #575 is in fair condition, at the edge of the building footprint, will need to be removed because of required building footings.
 - Tree #571 is in good condition, but is within the building footprint and must be removed.
 - Tree #570 in fair condition is located outside of the building envelope, however it has a severe lean into the proposed second story and will need to be removed.
- Trees #567, 568, and 569 are leaning into the second story and will need pruning of selective limbs to attain necessary building clearance.
- Tree #573 will require minor crown pruning to for necessary clearance.
- Tree #572 will require major crown pruning for necessary clearance.

CONCLUSION/PROJECT ASSESSMENT

This proposal to build an addition to a single-family residence and expand the driveway and garage is planned to maintain the existing Oak forested environment, allowing the forest to continue to exist and regenerate over time. Five trees are planned for removal for this site due to expected construction with three of the five trees being directly impacted by building footprint and the two others posing risk to proposed structures or frequently occupied areas. All remaining trees are expected to survive if properly protected and monitored. The remainder of the property outside the building footprint contains tree cover, which will remain undisturbed. No watercourses are near the planned construction.

Short Term Affects

Minor site disturbance will occur during building construction. Short term site affects are confined to the construction envelope and immediate surroundings, the five trees being removed will have minor effects on the overall forest canopy and comprise less than 2% of total tree population. The pruning of the majority of the tree crowns should be well under 30% of total individual tree crown densities and should have very negligible effects on the trees growth. Tree #572 will require one of its multi stems to be removed that is growing into the building footprint and may have some short term effects including a reduction of growth and potential limb dieback. This was considered the best option to save the tree and minimize total tree removal.

Long Term Affects

No significant long term affects to the forest ecosystem are anticipated, the construction and tree impacts are constrained to the building envelope and proposed road prism. The proposed development takes up 2% of the total acreage and has been previously disturbed, this further minimizes effects to the native landscape and forest. The project as proposed is not likely to significantly reduce the availability of wildlife habitat over the long term. Whenever construction activities take place near trees, there is the potential for those trees to experience decline in the long term as well. The greatest attempt has been made to identify for removal those trees likely to experience decline.

RECOMMENDATIONS

Pre-Construction Meeting

Prior to the start of construction a meeting and training session must be conducted in order to be communicate and instruct personnel about tree retention and protection. The pre-construction meeting will include required tree protection and exclusionary fencing installed prior to grading, excavation and construction procedures. Meeting attendees will be all involved parties including site clearance personnel, construction managers, heavy equipment operators, subcontractors, and tree service operators; a certified professional such as a Monterey County qualified forester or County qualified arborist will conduct training. A list of pre-construction attendees and the materials discussed will be maintained to be provided to the county. Meeting attendees must agree to abide to tree protection and instructions as indicated during the meeting.

Tree Protection will be implemented as follows:

- Trees located adjacent to construction areas shall be protected from damage by construction equipment by the use of temporary fencing and through wrapping of trunks with protective materials to protect the trees Critical Root Zones (CRZ).
- Fencing shall consist of chain link, snowdrift, plastic mesh, hay bales, or field fence.
- Fencing must not be attached to the tree. It shall be free standing or self-supporting so as not to damage trees, shall be rigidly supported and shall stand a minimum of height of four feet above grade extending to the trees dripline or CRZ (determined in the field as eight (8') or more feet from the base of the tree unless a lesser distance is approved in the field).
- Soil compaction, parking of vehicles or heavy equipment, stockpiling of construction materials, and/or dumping of materials should not be allowed adjacent to trees on the property especially within fenced areas.
- Fenced areas and the trunk protection materials must remain in place during the entire construction period.

During grading and excavation activities:

- All trenching, grading or any other digging or soil removal that is expected to encounter tree roots will be monitored by a qualified arborist or forester to ensure against drilling or cutting into or through major roots.
- The project arborist should be on site during excavation activities to direct any minor field adjustments that may be needed.
- Trenching for the retaining wall and driveway located adjacent to any tree should be done by hand where practical and any roots greater than 3-inches in diameter should be bridged or pruned appropriately.
- Any roots that must be cut should be cut by manually digging a trench and cutting exposed roots with a saw, vibrating knife, rock saw, narrow trencher with sharp blades, or other approved root pruning equipment.
- Any roots damaged during grading or excavation should be exposed to sound tissue and cut cleanly with a saw.

If at any time potentially significant roots are encountered:

- The arborist/forester will be authorized to halt excavation until appropriate mitigation measures are formulated and implemented.
- If significant roots are identified that must be removed, a determination will be made if it will destabilize or negatively affects the target trees negatively. The property owner will be notified immediately and a determination made by the project arborist as required by law for treatment of the area that will not risk death decline or instability of the tree consistent with the implementation of appropriate construction design approaches to minimize affects, such as hand digging, bridging or tunneling under roots, etc..

Tree Pruning

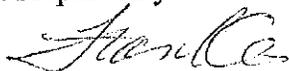
It is to be understood that the pruning of retained trees is expected for this site, especially along and near building construction areas. Pruning will include trees with deadwood, minor structural defects or disease that must be compensated, and to improve vehicle or potential pedestrian clearance. Following construction, a qualified arborist should monitor trees adjacent to the improvements area and if any decline in health that is attributable to the construction is noted, it will be treated as appropriately recommended by a certified arborist or qualified forester and if necessary replacement tree will be re-planted on the site.

Best Management Practices to Observe (BMP)

The following best management practices must be adhered to:

- A) Tree service Contractors will verify animal or bird nesting prior to tree work. If nesting activity of migratory birds are found, work must stop and a wildlife biologist consulted before commencing work (the typical bird nesting season ranges from February 22 to August 1).
- B) Do not deposit any fill around trees, which may compact soils and alter water and air relationships. Avoid depositing fill, parking equipment, or staging construction materials near existing trees. Covering and compacting soil around trees can alter water and air relationships with the roots. Fill placed within the drip line may encourage the development of oak rot fungus (*Armillaria mellea*). As necessary, trees may be protected by boards, fencing or other materials to delineate protection zones.
- C) Pruning shall be conducted so as not to unnecessarily injure the tree. General-Principals of pruning include placing cuts immediately beyond the branch collar, making clean cuts by scoring the underside of the branch first, and for live oak, avoiding the period from February through May.
- D) Native live trees are not adapted to summer watering and may develop crown or root rot as a result. Do not regularly irrigate within the drip line of oaks. Native, locally adapted, drought resistant species are the most compatible with this goal.
- E) Root cutting should occur outside of the springtime. Late June and July would likely be the best. Pruning of the live crown should not occur February through May.
- F) Tree material greater than 3 inches in diameter remaining on site more than one month that is not cut and split into firewood must be covered with thick clear plastic that is dug in securely around the pile to discourage infestation and dispersion of bark beetles.
- G) A mulch layer up to approximately 4 inches deep should be applied to the ground under selected trees following construction. Only 1 to 2 inches of mulch should be applied within 1 to 2 feet of the trunk, and under no circumstances should any soil or mulch be placed against the root crown (base) of trees. The best source of mulch would be from chipped material generated on site.
- H) If trees along near the development are visibly declining in vigor, a Professional Forester or Certified Arborist should be contacted to inspect the site to recommend a course of action.

Report Prepared By:



Frank Ono, SAF Forester #48004 and ISA Certified Arborist #536

August 3, 2016

Date

TREE CHART

The following trees were assessed surrounding the project and are indicated on an attached site map. Tree removal is indicated for trees near or within the proposed building area. Tree condition/vigor correlates with canopy position within the stand and is measured by leaf and crown area. Tree rated Dominant and co-dominant are trees that generally have larger crowns capable of supporting more leaves, and have a generally healthy and appealing growth form. Dominant trees are trees with wide crowns above the level of the forest canopy that receive sunlight from above as well as the sides. Co-dominant trees are large crowned trees at the general level of the forest canopy that receive sunlight from above and partly from the sides. Crowns are somewhat smaller than dominant but healthy and vigorous. Trees rated intermediate and particularly suppressed trees have smaller crowns and are therefore less vigorous. Intermediate trees have much of the canopy below the general level of the forest or are pinched at the sides. They will receive sunlight from above but very little to none from the sides. Suppressed trees are trees that are overtopped by large trees and receive no direct sun from above or from the sides.

ID	Diameter	Species	Condition/Vigor	Position	Comments	Removal
554	16+20	Oak	Good	Co-Dominant		
555	22+9	Oak	Fair	Co-Dominant		
556	9	Oak	Fair	Intermediate		
557	14	Oak	Fair	Intermediate		
558	10	Oak	Fair	Suppressed		
559	13	Oak	Fair	Co-Dominant		
560	10	Oak	Fair	Suppressed		
561	8	Oak	Fair	Intermediate		
562	12	Oak	Fair	Co-Dominant		
563	16+12+10	Oak	Good	Co-Dominant		
564	22+14	Oak	Fair	Co-Dominant		
565	12+11	Oak	Fair	Co-Dominant		
477	18+15	Oak	Poor	Co-Dominant	Heavy lean, uprooting	x
478	12	Oak	Poor	Co-Dominant	Decay at base	
566	11	Oak	Fair	Co-Dominant		
567	13	Oak	Poor	Co-Dominant	Leaning	
568	16	Oak	Fair	Co-Dominant		
569	14	Oak	Fair	Co-Dominant		
570	15	Oak	Fair	Co-Dominant	Leaning	x
571	16	Oak	Good	Dominant		x
572	15+11	Oak	Poor	Dominant	decay, leaning	
573	14	Oak	Fair	Co-Dominant		
574	14	Oak	Fair	Co-Dominant		x
575	14	Oak	Fair	Co-Dominant		x
576	16	Oak	Fair	Dominant	Leaning	

PHOTOGRAPHS



View looking into property; tree #557 is on the left and #558 on the right



Tree #477 is uprooting and will need removal or significant pruning for fire access

Tree #477 will need removal

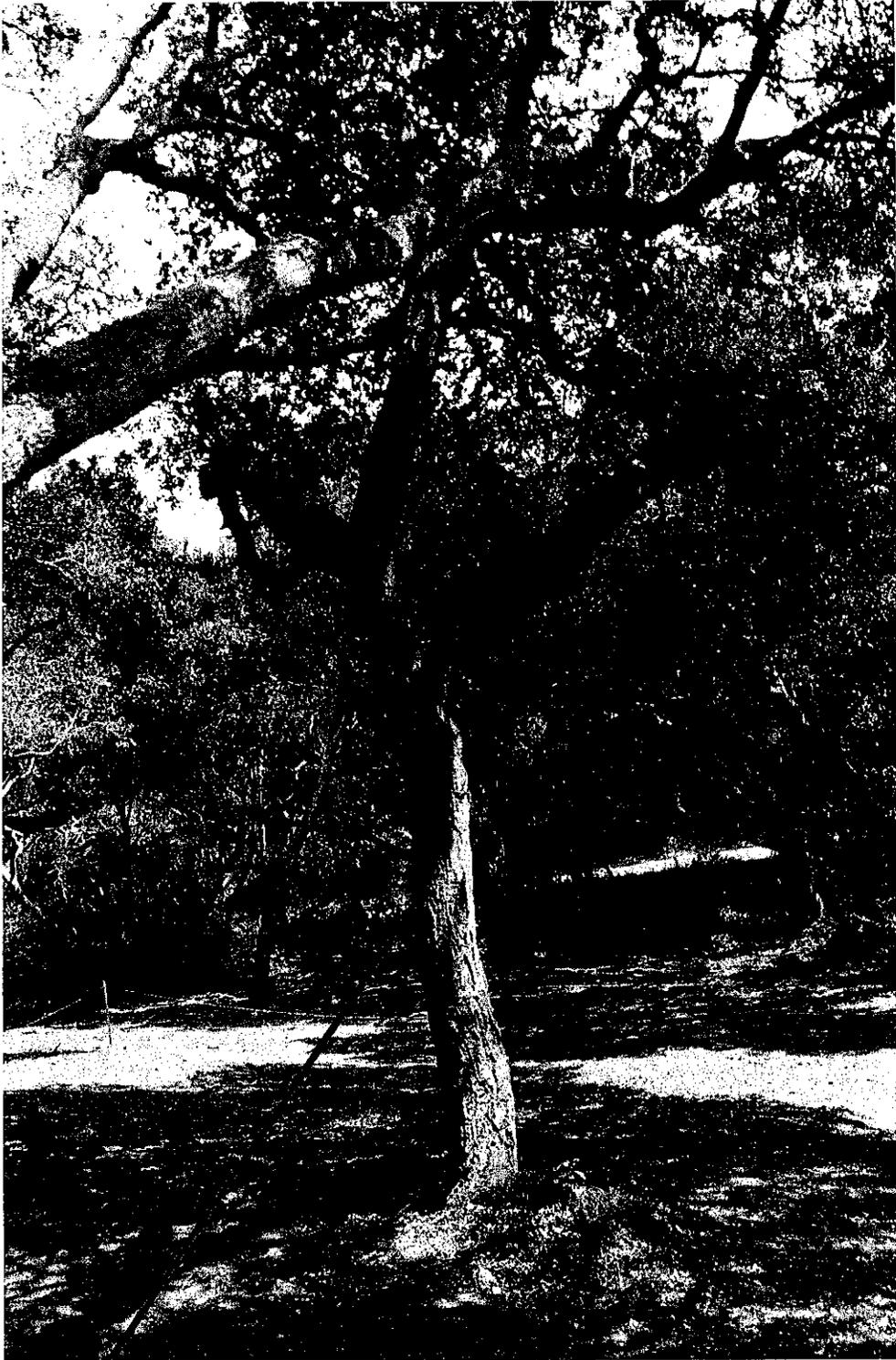




#569, #568, #567 will need pruning of upper limbs



Tree #569 will need pruning #570 will need removal



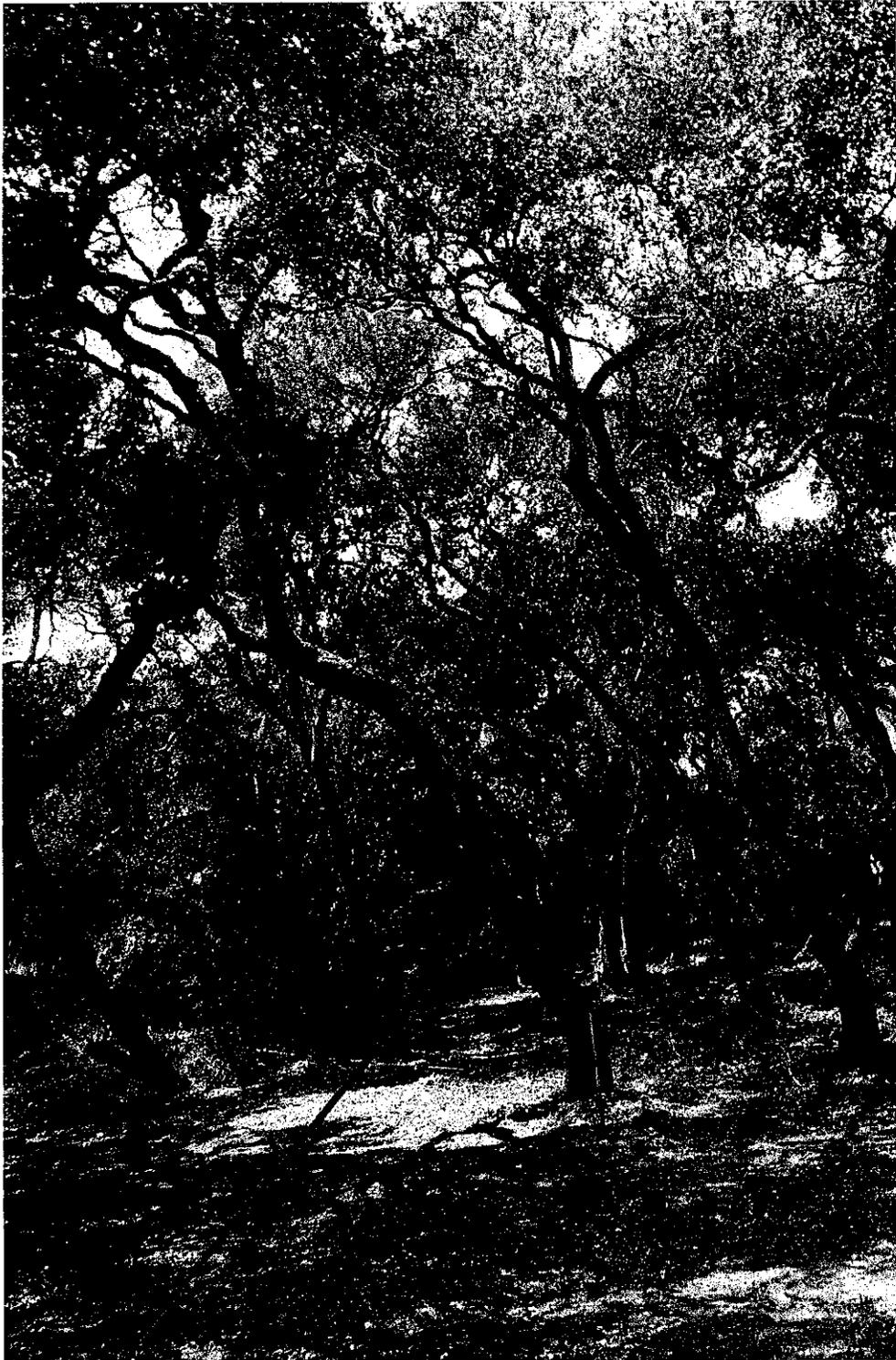
Tree #571 is inside building footprint and need removal



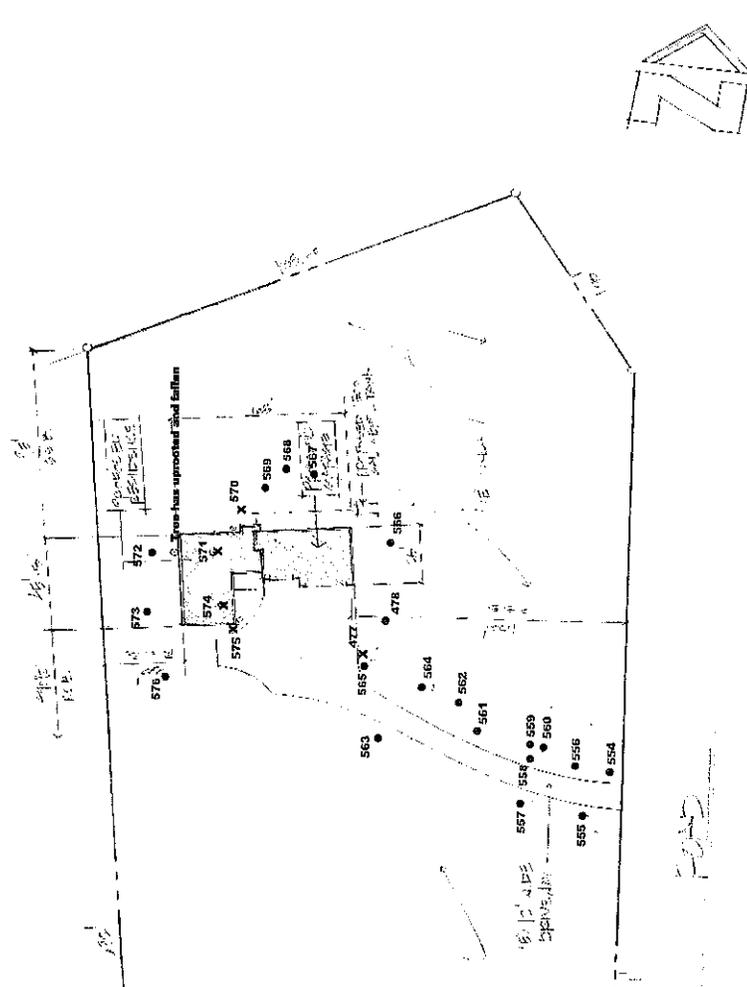
Trees #575 and #574 will need removal



Tree #573 will need pruning



Tree #570 will need removal



ID	Diameter	Species	Condition	Position	Comments	Removal
554	16-20	Oak	Good	CoDominant		
555	22-9	Oak	Fair	CoDominant		
556	9	Oak	Fair	Intermediate		
557	14	Oak	Fair	Intermediate		
558	10	Oak	Fair	Suppressed		
559	13	Oak	Fair	CoDominant		
560	10	Oak	Fair	Intermediate		
561	8	Oak	Fair	CoDominant		
562	16-22-10	Oak	Good	CoDominant		
563	22-14	Oak	Fair	CoDominant		
564	12-11	Oak	Poor	CoDominant	Heavy lean, sprouting	x
565	18-15	Oak	Poor	CoDominant	Decay at base	
566	11	Oak	Fair	CoDominant		
567	13	Oak	Poor	CoDominant	Leaning	
568	15	Oak	Fair	CoDominant		
569	14	Oak	Fair	CoDominant		
570	12	Oak	Good	CoDominant	Leaning	x
571	12	Oak	Good	CoDominant		
572	15-11	Oak	Poor	Dominant	decaying leaning	x
573	14	Oak	Fair	CoDominant		
574	14	Oak	Fair	CoDominant		
575	14	Oak	Fair	CoDominant		
576	15	Oak	Fair	Dominant	Leaning	x

Drawn by:
Frank Ono
F.O. Consulting
 1213 Miles Avenue
 Pacific Grove, CA
 foconsulting@redshift.com

APN: 131-101-033-000

Address: 180 Walker Valley Road, Castroville

Scale: No Scale

Date: August 3, 2013

Sheet

Frank Ono
International Society of Arboriculture
Certified Arborist # 536
Society of American Foresters Professional Member 48004
1213 Miles Avenue
Pacific Grove CA, 93950
Telephone (831) 373-7086
Cellular (831) 594-2291

December 29, 2017

Daniel Kelly & Sarah Hicks
41 K Bayview
Castroville, CA 95012

RE: 180 Walker Valley Road – Amendment to Arborist Report

Mr. Daniel Kelly & Ms. Sarah Hicks;

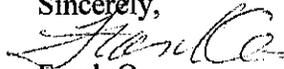
This document is written as an amendment to the report prepared for the property at 180 Walker Valley Road, Prunedale CA specifically regarding the trees surrounding the proposed residence. The project proposes approximately 2,212 square foot two story single-family dwelling with a 948-square foot attached garage. The existing trees surrounding the proposed development were determined in fair to poor or better condition both structurally and in health. Several trees within the building footprint are to be removed and excavation performed near trees along the proposed driveway, however site conditions have changed due to results of storm activity over the last winter. The previous storms have de-stabilized many of the trees with a few trees now experiencing failure.

The following has occurred to five trees:

- #477 has uprooted this tree was to be removed because it was within the building footprint.
- #557 has fallen across the proposed driveway and removed, its uprooted stump remains
- #564 and #565 have uprooted and removed because they blocked access to the property
- #569 also fell, its stump remains.

Thank you very much and please feel free to call if there are any questions or if I can be of further assistance.

Sincerely,



Frank Ono

Certified Arborist # 536

Society of American Foresters # 048004

FO

Project No. M11108
14 February 2018

MR. DANNY KELLY
41-K Bayview Road
Castroville, California 95012

Subject: Percolation Testing Results

Reference: Proposed Residential Construction
APN 131-101-033
180 Walker Valley Road
Monterey County, California

Dear Mr. Kelly:

This letter presents the results of the percolation rate testing for the proposed single family residence at 180 Walker Valley Road, Monterey County, California.

The results of the project site percolation testing will be utilized by the Septic Designer to design the proposed leach line trenches located downslope and north of the new residence. The leach lines are proposed to be 90 feet and 60 feet long and not exceed a depth of 5 feet below existing grade.

Our previous work at the project site includes a Geotechnical Investigation Report, dated 10 November 2017. The purpose of the report was to present geotechnical design criteria for the proposed new residence development.

Site Description

The project parcel is trapezoidal in shape, and roughly 2.5 acres in size. The parcel is moderately sloped with slopes ranging from 5% to over 20%. The average slope in the proposed building foot print is roughly 10%. The site is moderately wooded with native Oak, and understory plants such as poison oak, blackberry and coffee berry.

Percolation Test Locations

A Preliminary Site Grading & Drainage Plan for the project dated 14 February 2018 has been prepared by Haro, Kasunich & Associates. Sheet C2 shows the approximate location of the proposed leach lines. The lines are 90 feet and 60 feet in length and do not exceed 5 feet in depth.

On 6 January 2017, Danny Kelly machine drilled a total of seven (7) test borings in the approximate location of the leach field trenches; see Percolation Test Location Map, Figure 1 attached to this report. The borings were drilled from 3 to 10 feet below existing grade. The deepest 10 foot boring was installed as a ground water monitoring boring, No groundwater was encountered in this boring during the monitoring period, 7 January 2017 to 12 February 2018.

The percolation test holes were drilled with 9-inch diameter, solid flight auger with soils encountered at the bottoms of the test holes identified in the field. The following table outlines the depths of the percolation test boreholes and the soils encountered at the bottom of the boreholes within the percolation test zone. Boring logs with lab results are attached with this report.

Percolation Testing Borehole Data

Test Borehole Identification	Depth Drilled	Soils at Bottom of Borehole
P-1	5'0"	Silty Sand
P-2	5'0"	Silty Sand
P-3	3'0"	Silty Sand
P-4	3'0"	Silty Sand
P-5	5'0"	Silty Sand
P-6	8'0"	Silty Sand

Test Boreholes Setup

A layer of 3/8" angular gravel approximately 2 inches thick was placed at the bottom of each borehole. A 3-inch diameter perforated PVC pipe was placed in each test hole with additional gravel placed between the pipe and the borehole sidewall to secure the pipe in place.

Each test borehole was then filled with water on 25 January 2018 to pre-saturate the test zones.

Percolation Testing

On 26 January 2018, within 24 hours of pre-saturating the test boreholes, percolation testing was conducted utilizing the falling head percolation test procedure.

First all the test borehole locations were inspected and the post-saturation water level was noted. The boreholes were then filled with clean water to test the proposed leach field trench elevations. Falling head percolation tests were conducted at depths ranging from 0.00 to 8.00 feet below the ground surface.

The 26 January 2018, falling head percolation tests were performed as follows:

- a. Clear water was placed within the percolation zone of each test.
- b. Water level readings were taken from a fixed reference point to the nearest 1/4th of an inch every 30 minutes using a steel tape and high powered flash light; if the first two readings showed that 6 inches of water seeped away in less than 30 minutes measurements were taken every 10 minutes (this was the case for every test location)
- c. The process was repeated every 10 minutes within a 60 minute period. If the test holes drained before the end of the 60 minute period the hole was refilled and test continued to the end of the 60 minute period. The test was ended after 1 hour of readings. If successive water level drops varied by more than 1/4th of an inch, the last 10 minute reading or the 10 minute reading before refill (which ever was lower), was used to calculate the percolation rate in inches per hour (in/hr).

The percolation rate for each test hole was determined by using the last 10 minute reading or the 10 minute reading before refill (which ever was lower). The following table summarizes our percolation testing results:

Percolation Rate Testing Results

Test Borehole Identification	Percolation Zone Tested (feet below grade)	Measured Water Level Drop (nearest 1/4 inch)	Percolation or Infiltration Rate (inches/hour)
P-1	0.00' to 5.00'	9.00"	54.03 in/hr
P-2	0.00 to 5.00'	8.00"	48.00 in/hr
P-3	0.00' to 3.00'	12.00"	72.00 in/hr
P-4	0.00' to 3.00'	14.00"	84.00 in/hr
P-5	0.00' to 5.00'	13.00	78.00 in/hr
P-6	0.00' to 8.00'	15.00	90.00 in/hr

Mr. Danny Kelly
Project No. M11108
180 Walker Valley Road
14 February 2018
Page 4

If you have any questions concerning the data or conclusions presented in this report, please call our office.

Respectively submitted,

HARO, KASUNICH & ASSOCIATES, INC



Andrew Kasunich, E.I.T.
Staff Engineer



John E. Kasunich
G.E. 455



AK/JEK/sr

Attachments: Site Plan, Perc Data

Copies: 1 to Addressee
1 to Susan Bushamn

Percolation Test Results For 180 Walker Valley Road

Project No: M11108
 Date: 12 February 2018
 By: AK

HOLE NO.:	P-1	TEST DATE:	1/26/2018	DRILL DATE:	1/6/2018	
WATER LEVEL AFTER PRE-SOAK:	Bottom	DEPTH OF BORING (feet):	5 Feet			
TESTED BY:	SH	PERCOLATION ZONE (feet):	5 Feet			
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	1.333	NA	-		
1	30	3.500	NA	26.004	1.15	52.01
2	60	4.917	NA	16.999	1.76	34.00

Did the previous measurement exceed 6 inches? If no continue measurements at 30 minute intervals. If yes, start over, taking measurements every 10 minutes for 1 hour, go to table titled "Sandy Soils".

3	90					
4	120					
5	150					
6	180					
7	210					
8	240					

*Water depth taken from top of pipe, not ground surface

SANDY SOILS						
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	1.500	NA	-		
1	10	3.250	NA	21.000	0.48	126.00
2	20	4.417	NA	13.999	0.71	84.00
3	30	5.167	1.500	9.005	1.11	54.03
4	40	3.167	NA	19.999	0.50	120.00
5	50	4.167	NA	12.001	0.83	72.01
6	60	5.333	NA	13.996	0.71	83.97

*Water depth taken from top of pipe, not ground surface

Pipe Height Above Ground (ft)
1.500

Average Of Reading's (in/hr)= 90.00

Reported Percolation Rate (in/hr) = 54.03

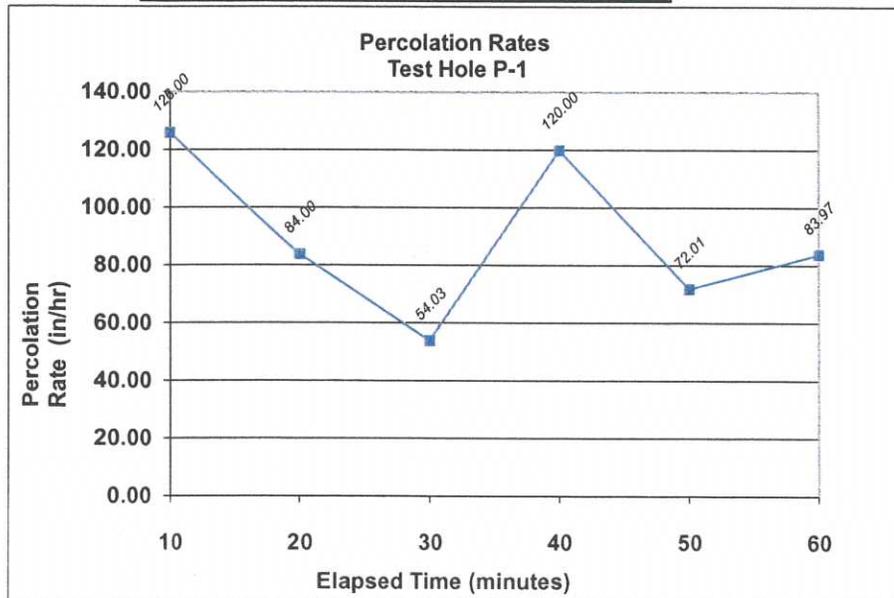


Figure No. _____

Page No. _____

Percolation Test Results For 180 Walker Valley Road

Project No: M11108
 Date: 12 February 2018
 By: AK

HOLE NO.:	P-2	TEST DATE:	1/26/2018	DRILL DATE:	1/6/2018	
WATER LEVEL AFTER PRE-SOAK:	Bottom	DEPTH OF BORING (feet):	5 Feet			
TESTED BY:	SH	PERCOLATION ZONE (feet):	5 Feet			
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	1.333	NA	-		
1	30	5.333	NA	48.004	0.62	96.01
2	60	6.000	1.083	8.000	3.75	16.00

Did the previous measurement exceed 6 inches? If no continue measurements at 30 minute intervals. If yes, start over, taking measurements every 10 minutes for 1 hour, go to table titled "Sandy Soils".

3	90					
4	120					
5	150					
6	180					
7	210					
8	240					

*Water depth taken from top of pipe, not ground surface

SANDY SOILS						
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	1.083	NA	-		
1	10	3.083	NA	24.000	0.42	144.00
2	20	4.500	NA	17.000	0.59	102.00
3	30	5.333	NA	10.000	1.00	60.00
4	40	6.000	1.167	8.000	1.25	48.00
5	50	2.917	NA	21.001	0.48	126.00
6	60	3.750	NA	10.000	1.00	60.00

*Water depth taken from top of pipe, not ground surface

Pipe Height Above Ground (ft)
1.167

Average Of Reading's (in/hr)= 90.00

Reported Percolation Rate (in/hr) = 48.00

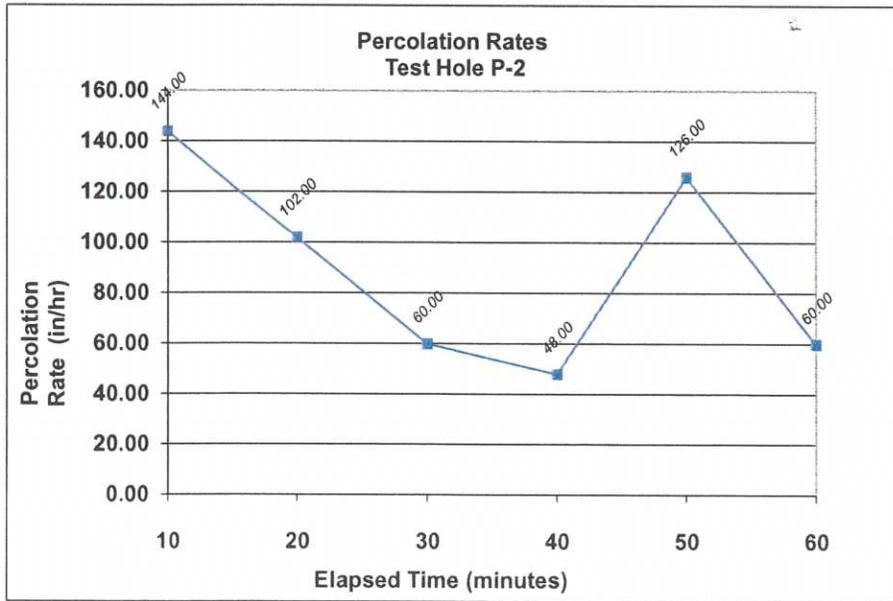


Figure No. _____

Page No. _____

Percolation Test Results For 180 Walker Valley Road

Project No: M11108
 Date: 12 February 2018
 By: AK

HOLE NO.:	P-3	TEST DATE:	1/26/2018	DRILL DATE:	1/6/2018	
WATER LEVEL AFTER PRE-SOAK:	Bottom	DEPTH OF BORING (feet):	3 Feet			
TESTED BY:	SH	PERCOLATION ZONE (feet):	3 Feet			
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	0.750	NA	-		
1	30	1.833	NA	13.000	2.31	26.00
2	60	2.500	0.833	8.000	3.75	16.00

Did the previous measurement exceed 6 inches? If no continue measurements at 30 minute intervals. If yes, start over, taking measurements every 10 minutes for 1 hour, go to table titled "Sandy Soils".

3	90					
4	120					
5	150					
6	180					
7	210					
8	240					

*Water depth taken from top of pipe, not ground surface

SANDY SOILS						
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	0.833	NA	-		
1	10	1.583	NA	9.000	1.11	54.00
2	20	2.667	NA	13.000	0.77	78.00
3	30	3.917	0.583	0.583	17.14	3.50
4	40	1.583	NA	12.000	0.83	72.00
5	50	2.750	NA	14.000	0.71	84.00
6	60	3.917	NA	14.000	0.71	84.00

*Water depth taken from top of pipe, not ground surface

Pipe Height Above Ground (ft)
1.083

Average Of Reading's (in/hr)= 62.58

Reported Percolation Rate (in/hr) = 72.00

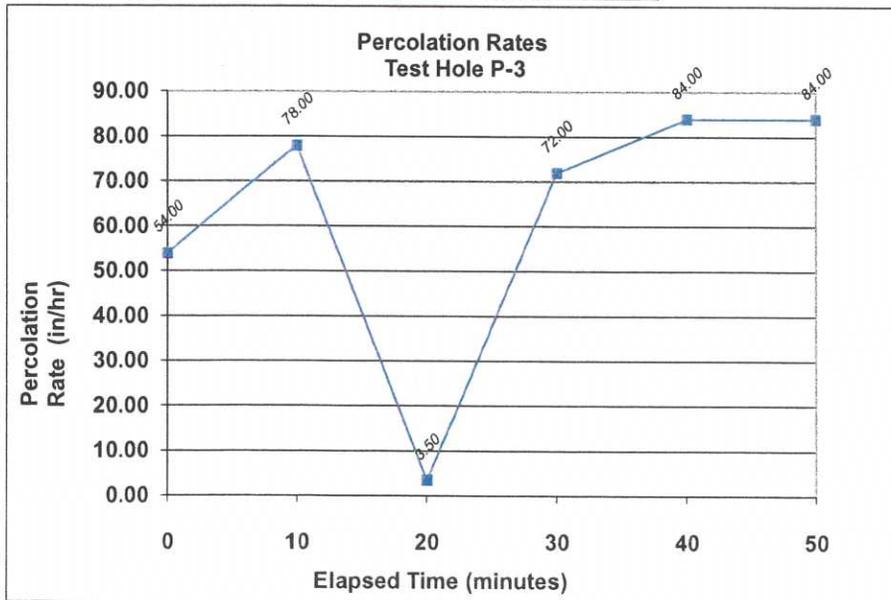


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Percolation Test Results For 180 Walker Valley Road

Project No: M11108
 Date: 12 February 2018
 By: AK

HOLE NO.:	P-4		TEST DATE: 1/26/2018	DRILL DATE: 1/6/2018		
WATER LEVEL AFTER PRE-SOAK:	Bottom		DEPTH OF BORING (feet): 3 Feet			
TESTED BY:	SH		PERCOLATION ZONE (feet): 3 Feet			
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	1.500	NA	-		
1	30	2.583	NA	13.000	2.31	26.00
2	60	3.750	0.917	14.000	2.14	28.00

Did the previous measurement exceed 6 inches? If no continue measurements at 30 minute intervals. If yes, start over, taking measurements every 10 minutes for 1 hour, go to table titled "Sandy Soils".

3	90					
4	120					
5	150					
6	180					
7	210					
8	240					

*Water depth taken from top of pipe, not ground surface

SANDY SOILS						
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	0.917	NA	-		
1	10	1.750	NA	10.000	1.00	60.00
2	20	2.917	NA	13.999	0.71	84.00
3	30	4.083	1.083	14.000	0.71	84.00
4	40	2.500	NA	17.000	0.59	102.00
5	50	3.333	NA	9.996	1.00	59.98
6	60	4.917	NA	19.004	0.53	114.02

*Water depth taken from top of pipe, not ground surface

Pipe Height Above Ground (ft)
1.083

Average Of Reading's (in/hr)= 84.00

Reported Percolation Rate (in/hr) = 59.98

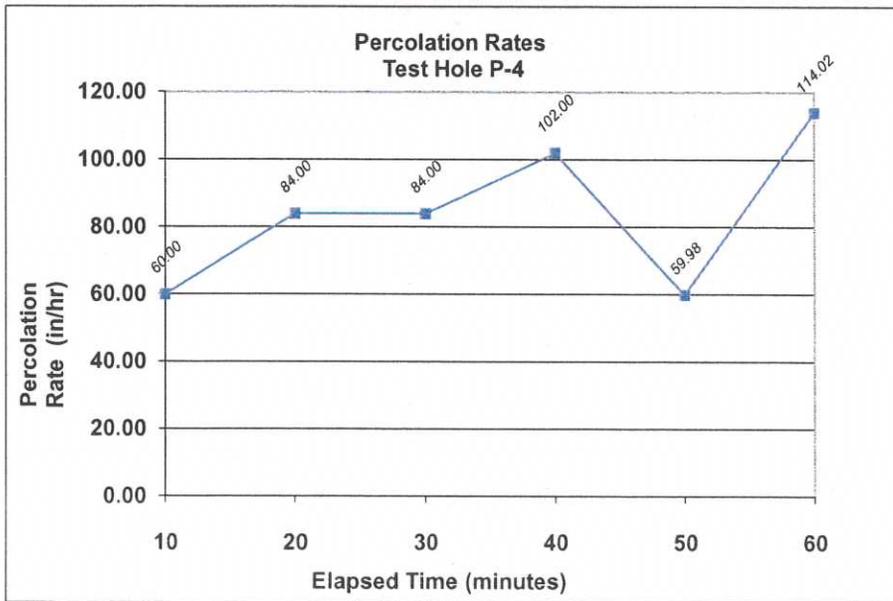


Figure No. _____

Page No. _____

Percolation Test Results For 180 Walker Valley Road

Project No: M11108
 Date: 12 February 2018
 By: AK

HOLE NO.:	P-5		TEST DATE:	1/26/2018		DRILL DATE:	1/6/2018	
WATER LEVEL AFTER PRE-SOAK:	Bottom		DEPTH OF BORING (feet):	5 Feet				
TESTED BY:	SH		PERCOLATION ZONE (feet):	5 Feet				
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)		
Start	0	1.167	NA	-				
1	30	3.417	NA	27.001	1.11	54.00		
2	60	4.500	NA	13.000	2.31	26.00		

Did the previous measurement exceed 6 inches? If no continue measurements at 30 minute intervals. If yes, start over, taking measurements every 10 minutes for 1 hour, go to table titled "Sandy Soils".

3	90							
4	120							
5	150							
6	180							
7	210							
8	240							

*Water depth taken from top of pipe, not ground surface

SANDY SOILS							
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)	
Start	0	1.083	NA	-			
1	10	2.167	NA	13.000	0.77	78.00	
2	20	4.083	NA	23.001	0.43	138.00	
3	30	5.917	1.000	22.000	0.45	132.00	
4	40	2.500	NA	18.000	0.56	108.00	
5	50	4.167	NA	19.999	0.50	120.00	
6	60	5.250	NA	13.001	0.77	78.00	

*Water depth taken from top of pipe, not ground surface

Pipe Height Above Ground (ft)
1.167

Average Of Reading's (in/hr) = 109.00

Reported Percolation Rate (in/hr) = 78.00

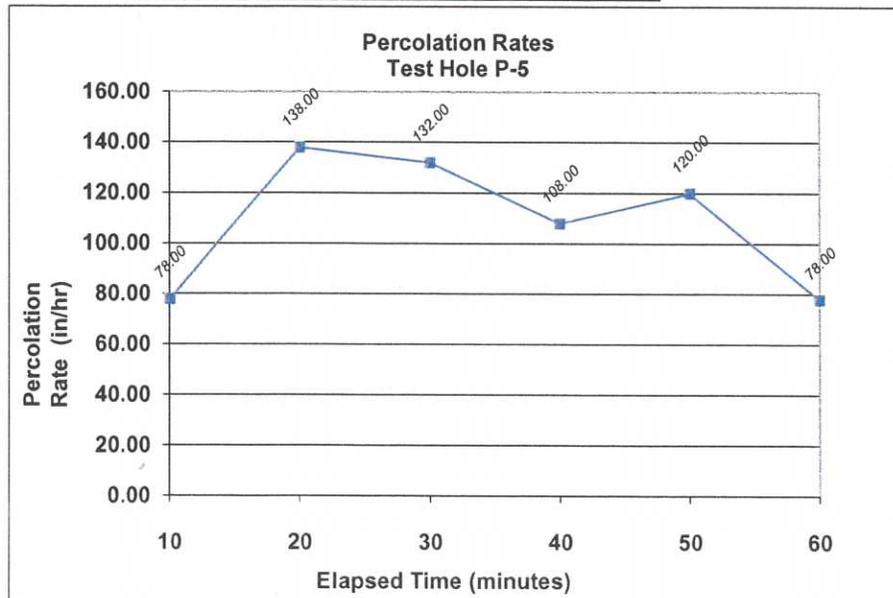


Figure No. _____

Page No. _____

Percolation Test Results For 180 Walker Valley Road

Project No: M11108
 Date: 12 February 2018
 By: AK

HOLE NO.:	P-6	TEST DATE:	1/7/2018	DRILL DATE:	1/6/2018	
WATER LEVEL AFTER PRE-SOAK:	Bottom	DEPTH OF BORING (feet):	8 Feet			
TESTED BY:	JSH	PERCOLATION ZONE (feet):	8 Feet			
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	1.417	NA	-		
1	30	5.500	NA	49.000	0.61	98.00
2	60	6.750	NA	15.000	2.00	30.00

Did the previous measurement exceed 6 inches? If no continue measurements at 30 minute intervals. If yes, start over, taking measurements every 10 minutes for 1 hour, go to table titled "Sandy Soils".

3	90					
4	120					
5	150					
6	180					
7	210					
8	240					

*Water depth taken from top of pipe, not ground surface

SANDY SOILS						
READING	ELAPSED TIME (min)	WATER DEPTH* (feet)	REFILL TO* (feet)	Incremental Change (in.)	PERCOLATION RATE (min/inch)	PERC (in/hr)
Start	0	1.333	NA	-		
1	10	4.333	NA	36.000	0.28	216.00
2	20	5.500	NA	14.004	0.71	84.02
3	30	6.750	NA	15.000	0.67	90.00
4	40	8.667	1.417	23.000	0.43	138.00
5	50	3.750	NA	28.000	0.36	168.00
6	60	5.667	NA	23.000	0.43	138.00

*Water depth taken from top of pipe, not ground surface

Pipe Height Above Ground (ft)
1.500

Average Of Reading's (in/hr)= 139.00

Reported Percolation Rate (in/hr) = 90.00

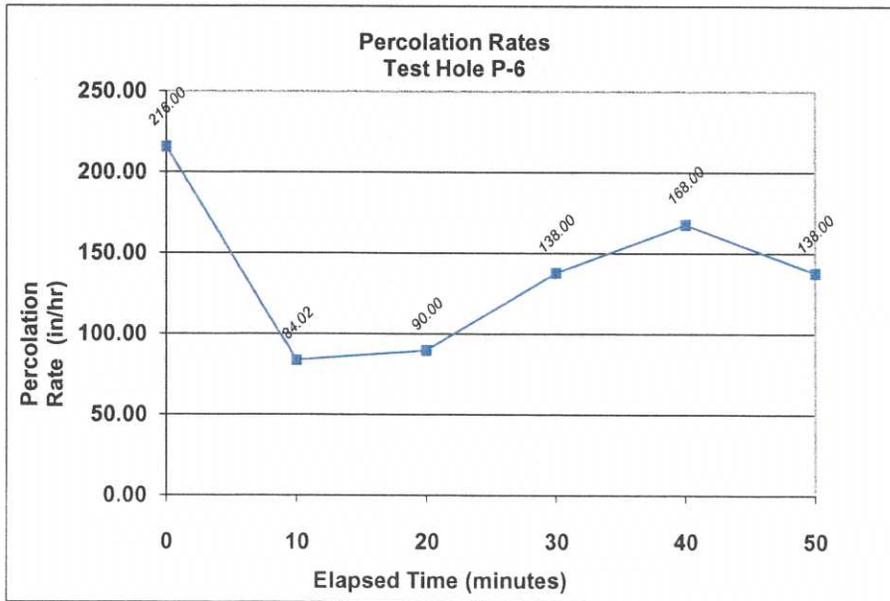
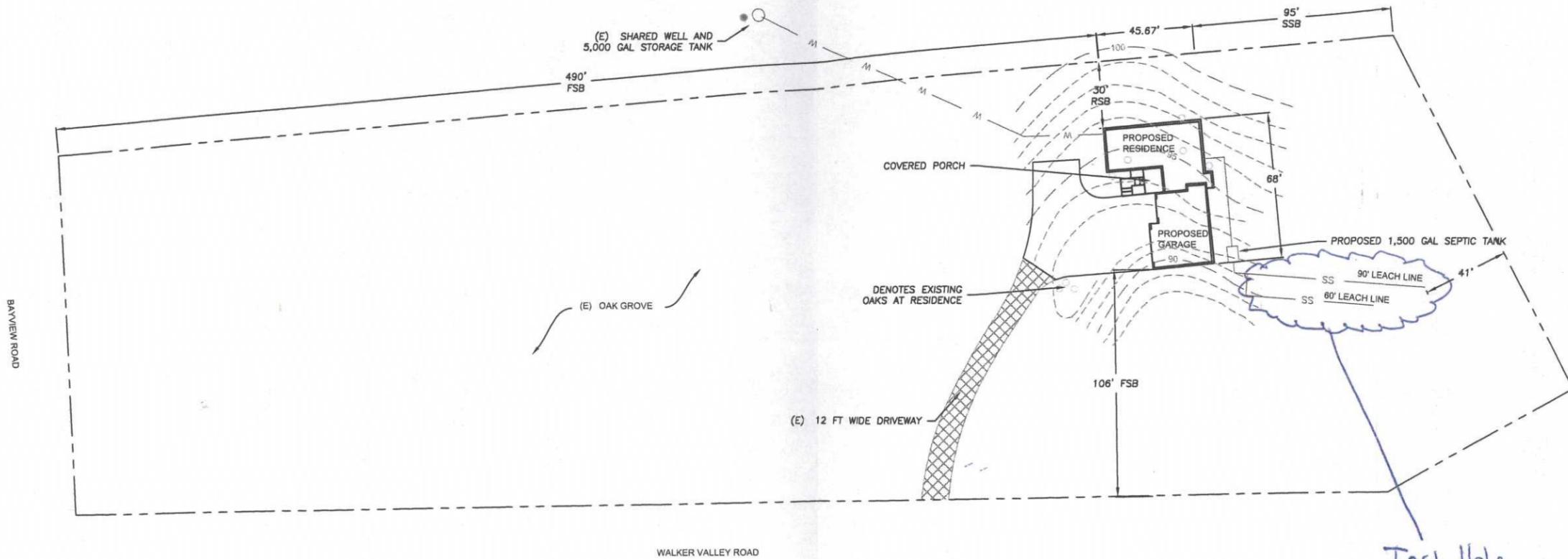


Figure No. _____

Page No. _____

LEGEND

	EXISTING CONTOURS
	PROPOSED CONTOURS
	EXISTING FENCE LINE
	PROJECT BENCHMARK
	EXISTING DIRT ROAD AND PAD
	LIMITS OF GRADING



SITE PLAN
SCALE: 1" = 30'



0 15 30 60
SCALE: 1" = 30'



DATE	REVISION	BY

HARO, KASUNICH & ASSOCIATES
 GEOTECHNICAL AND COASTAL ENGINEERS
 116 EAST LAKE AVENUE, WATSONVILLE, CALIFORNIA 95076
 (831) 722-4775 PHONE AND (831) 722-3202 FAX

SITE PLAN
 DANNY KELLY
 180 WALKER VALLEY
 CASTROVILLE, CA 95012
 APN 131-101-033

PROJECT:	MM08
DATE:	2/5/18
DESIGN:	AK
DRAWN:	AJB
SCALE:	1" = 30'

C2