Exhibit C

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REPORT
to
MR. & MRS. COOPER
291 LAURELES GRADE
CARMEL VALLEY, CALIFORNIA 93924

GEOTECHNICAL and GEOLOGICAL HAZARDS REPORT

for the proposed
RESIDENCE
LAURELES GRADE
CARMEL VALLEY, CALIFORNIA 93924
A. P. N. 416-051-016-000

by

GRICE ENGINEERING, INC.
561-A BRUNKEN AVENUE
SALINAS, CALIFORNIA 93901

SEPTEMBER 2023

GRICE ENGINEERING INC

ENGINEERING GEOTECHNICS SEPTIC HYDROLOGY
FOUNDATIONS SOILS EARTH STRUCTURES

561A Brunken Avenue
Salinas, California 93901
griceengineering@sbcglobal.net

Salinas: (831) 422-9619
Monterey: (831) 375-1198
FAX: (831) 422-1896

File No. 7491-21.11
September 05, 2023

Mr. & Mrs. Cooper
291 Laureles Grade
Carmel Valley, California 93924

Project: Residence
Laureles Grade
Carmel Valley, California 93924
A. P. N. 416-051-016-000

Subject: Geotechnical and Geological Hazards Report

Dear Mr. & Mrs. Cooper,

Pursuant to your request, we have completed our geotechnical and geological hazards investigation and evaluation of the above-named site. It is our opinion that this site is suitable for the proposed development, provided the recommendations made herein are followed.

In general, the near surface soils are loose and need to be taken into account during design and construction of a single family residence. Recommendations are given relative to this and other characteristics within the report and noted under Special Recommendations.

Review of the geologic hazards on and nearby the site indicates that no unusual or significant geologic features are located on or nearby which will likely affect the site, buildings or proposed construction. The greatest hazard to construction and occupants of such is seismic shaking during earthquakes which is addressed in conformance with the California Building Codes.

The report contained herein is made with our best efforts to evaluate the site, determine the site's geotechnical conditions and provide recommendations for these conditions. We submit this report with the understanding that it is the responsibility of the owner, or his representative, to ensure incorporation of these recommendations into the final plans, and their subsequent implementation in the field.

In addition, we recommend that GRICE ENGINEERING, INC., be retained to review the project plans and provide the construction supervision and testing required to document compliance with these recommendations. Should any site condition not mentioned in this report be observed, this office should be notified so that additional recommendations can be made, if necessary.

This report and the recommendations herein are made expressly for the above referenced project and may not be utilized for any other site without written permission of GRICE ENGINEERING, INC.

Please feel free to call this office should you have any questions regarding this report.

Very truly yours,
GRICE ENGINEERING, INC.

Lawrence E. Grice, P.E.
R. C. E. 66857

NOTICE TO OWNER

Any earthwork and grading performed without direct engineering supervision and material testing by Grice Engineering, Inc., will not be certified as complete and in accordance with the requirements set forth herein.

Foundations placed without observation of bearing conditions, in accordance with the requirements set forth herein, will not be certified.

Inspection of Work

It is recommended that all site work be inspected and tested during performance by this firm to establish compliance with these recommendations.

NOTIFY:	GRICE ENGINEERING, INC.	SALINAS	(831) 422-9619
	561-A Brunken Avenue	MONTEREY	(831) 375-1198
	Salinas, California 93901		

EMAIL ADDRESS: griceengineering@sbcglobal.net

A minimum of 48 hours (2 working days) notification is required prior to commencement of work so that scheduling for testing and inspections can be made.

Please be advised costs incurred during inspection and testing of all site work are separate and not considered part of the fees as charged by Grice Engineering, Inc., for the report contained herein.

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**GEOTECHNICAL and
GEOLOGICAL HAZARDS
REPORT
for the proposed
RESIDENCE
LAURELES GRADE
CARMEL VALLEY, CALIFORNIA 93924
A. P. N. 416-051-016-000**

Introduction, Method and Scope of Investigation

The purpose of this report is to evaluate the geotechnical and geological hazard properties of the site relative to the construction of a single family residence. From these findings recommendations are given for the design of the development and subsequent construction.

For this purpose, the site was investigated, and prior information concerning construction and subsurface exploration in this area was examined for soils and materials data. The investigation consisted of a detailed site evaluation, which included a site inspection, review of literature available to GRICE ENGINEERING, INC., including Site Plan from Draftect Building and Designs, Topographic Site Survey from Lucido Surveyors, geotechnical drilling and soil sampling, material evaluation, and analysis of the geotechnical and geological hazard properties of the site soils. This report concludes the results of the investigation and provides recommendations based on that work.

The findings and recommendations contained in this report are applicable only to the above-named site and its proposed development, and may not be utilized for any other site or purpose without written permission of GRICE ENGINEERING, INC.

Site Description

The project site is located to the east of Laureles Grade at the intersection with Hidden Hills Road, in an unincorporated area of Carmel Valley located in westernmost Monterey County, California. Please refer to the Vicinity and Location Maps and the Site Map in Appendix “A” for details.

The topography of the 1.023 acre site is located on a shallow bench on the east side of a ridge aligned generally northwest to southeast. The building area descends moderately to east spanning the elevation of approximately 1202 feet in the west to 1157 feet above mean sea level (msl) in the east. The majority of the site, is covered with grass, brush and scattered trees.

The proposed development is to include a single family residence with an attached garage. A shared driveway will provide access to the residence along the southern boundary from Laureles Grade.

The residence, approximately 2,945 square ft, is to be of conventional wood construction with support provided by deep pier or spread footings. The garage is to have a slab-on-grade floor with raised wood utilized in the residential portions.

Field Investigation

Our field investigation consisted of a site inspection, along with drilling and sampling 13 exploratory bores to establish the subsurface soil profile, and obtain sufficient soil specimens to determine the soil characteristics. Drilling was accomplished by hand and continuous flight auger, with the spoil constantly examined, classified, and logged by field method in accordance with the Unified Soil Classification Chart[1], which is the basis of ASTM D-2487-10. In the hand augured bores, Penetration Resistance values were obtained through use of a dynamic cone penetrometer (ASTM Special Technical Publication #399). The blow count, as measured in this method is Standard Penetration Resistance.

The site investigation incorporated all boring advanced on this parcel and that adjacent to the west. Both parcels are being developed in parallel by the client. All bores were utilized for the determination of the soil profile and structure. Bores, 1, 2, 3, 4A, 5A, 6, and 8 were utilized for percolation testing. These bores were provided with perforated casing.

For the location of each boring, please refer to the Site Map in Appendix "A."

* *In-situ* refers to the in place state of soil. *In-situ* native soils are those which are in-place as deposited by nature and have not been disturbed by man's actions in the historic past.

[1] Adopted 1952 by Corps of Engineers and Bureau of Reclamation. ASTM D-2487 was developed as based on the Uniform Soils Classification Chart and System. The methods are equivalent.

Site Soil Profile

As found in the exploratory drilling, the site soils are generally consistent between each of the bores.

The surficial soils were observed to be a very dark greyish brown silty clay containing few to some amount of shale gravels. These loose soils have a granular structure and were observed to be moist to damp.

Monterey Shale is located below the surficial soils at depths ranging from one to twelve feet. The shale bedrock is considered to be moderately deformed and compact.

Complete soil characteristics and comments are reported on the boring logs at the depths observed. The logs are located in Appendix "B."

Groundwater

No groundwater was encountered at this site to the maximum depth of exploration, approximately 39 feet below grade (elevation -6.5 feet).

GEOLOGIC AND GEOLOGICAL HAZARDS INVESTIGATION

Introduction

The purpose of this report section is to evaluate the site and surrounding areas to determine geologic characteristics and potential geologic hazards pertaining to site development and improvement.

In general this includes: the inspection and classification of local rock outcrops, a detailed site inspection for fault induced features or other potential hazards and a field evaluation of the local geology. A search of published and unpublished data was performed to collate geologic information as it pertains to this property. The literature review was extensive and consisted of comparing field observation with published data, analysis of site soil conditions, correlation of site observation with local hazard maps (ground failure, seismicity, dam failure and inundation, etc.) and an analysis of site seismicity.

The Vicinity and Location Map shows the location of interest, with the indication of the site.

Regional Geology

Geologically, the state of California can be separated into natural geomorphic provinces which reflect fundamental differences in both geography and geology. Monterey County is located in the Coast Range Province. This province consists of thick, folded, Cenozoic sedimentary rocks and a very distinctive triad of core rocks. The sediments are predominately sandstone, shale or mudstone and vary greatly depending on location. The core rocks of this province consist of three distinct late Mesozoic terrains: The Salinian Block, The Franciscan Series, and the Great Valley Sequence.

The Salinian Block is a complex of granite and high grade metamorphic rocks including: gneiss, schist, quartzite, marble and granulite. In this region the granite has been dated as early Cretaceous (C.O. Hutton, 1952). The Franciscan Complex is a heterogeneous assemblage of sandstone, siltstone, shale, volcanic greenstone and chert. It has undergone metamorphism, severe dislocation and pervasive shearing and is only exposed along the coast to the West of the Sur-Nacimiento Fault Zone and East of the San Andreas Fault Zone. The Great Valley Sequence extends along the East flank of the Coast Ranges near the margins of the Sacramento and San Joaquin Valleys and is a well ordered series of marine sandstone, shale, mudstone and conglomerate.

Site Geology

The site geology has been mapped by various researches and compiled on the Geologic Map of the Monterey Peninsula, MF-71, Dibblee Jr. (1999), as siliceous shale of the Monterey Formation. The local bedding is indicated at the site as dipping to northeast at 30 degrees.

Our observation with the local geology is consistent with the above. The surficial soils are weathering products of the underlaying shale and consist largely of blend of silty clays and shale clasts. The shale is near grade in the northern portion of the property and depressed approximately 10 feet through the center of the parcel in the east to west alignment. Outcrops were observed near to or just north to northeast of the northern property boundary.

The soils overlaying the bedrock were observed soft to medium stiff or dense and moist to very damp.

Seismic History

Although no fault traces are thought to directly cross the building site, Monterey County is traversed by a number of faults most of which are relatively minor hazards for the purposes of the site development. As such, this site will experience seismic activity of various magnitudes emanating from one or more of the numerous faults in the region.

Various maps presently exist, allowing observation on the site of distinctive geologic features. Some maps, such as that by Burkland and Associates (Reference No. 10) developed for Monterey County, are compilations from various sources detailing the locations of studied faults. Faults have inherent variances within their zones, and discoveries of new fault segments or entire faults ongoing. There is also some difference in exact fault line location from source map to map, making precise location of said faults difficult. Therefore, relative to the information contained within this report, the following is considered to be as accurate as is currently possible from information made available to Grice Engineering, Inc.

Active Fault Near-Source Zones

The Fault Maps as developed for the 1997 Uniform Building Code (California Department of Conservation, Division of Mines and Geology, February 1998) list faults and fault zones for the purpose of determining characteristics relative to seismic engineering. These maps indicate the position of active fault zones which are grouped in three categories, A, B & C, in decreasing influence. For this purpose an active fault is one which has tectonic movement in the last 11,000 years and as such is called a Holocene Fault. Other faults, which have been active during the Pleistocene period (11,000 to 3,000,000 years ago), but without recent movement, are considered "Potentially Active", while faults with no activity within these time frames are considered "Inactive". The following are the nearest listed zones. (Reference No. 14)

Of most concern are active faults which have tectonic movement in the last 11,000 years and as such are called Holocene Faults and potentially active faults. The following are those nearest listed (Reference No. 33).

The nearest B-type fault zone is that of the San Andreas Rift System (Creeping Segment), located approximately 23.7 miles to the northeast. It has the greatest potential for seismic activity with estimated intensities of VI-VII Mercalli in this location. This fault is listed as a B-type fault perpendicular to the site, however it is listed as an A-type to the north.

Other B-type fault zones are the Monterey Bay-Tularcitos Fault Zone, the center of which is located approximately 2.5 miles to the southwest, the Rinconada Fault Zone, approximately 6.94 miles to the northeast, the San Gregorio-Palo Colorado (Sur) Fault Zone, approximately 14.1 miles to the southwest, and the Zayante-Vergeles Fault Zone, approximately 20.8 miles to the northeast. These zones are not as liable to rupture as the San Andreas Fault and a seismic event at any of the above fault zones would likely produce earth movements of a lesser intensity at the site.

Local Faults

In addition to the fault zones as discussed above, the local faults are as listed below as shown on the following maps, “Preliminary Geologic Map of the Monterey and Seaside 7.5 minute Quadrangles, Monterey County, California, with emphasis on active faults” (Reference No. 16), “Geological Map of the Monterey and Seaside 7.5 minute Quadrangles, Monterey County, California: A Digital Database” (Reference No. 17), “Geologic Map of the Monterey Peninsula and Vicinity, Monterey, Salinas, Point Sur., and Jamesburg 15-Minute Quadrangles, Monterey County” (Reference No. 23), “Fault Activity Map of California: California Geological Survey Geologic Data Map” (Reference No. 33), and “Quaternary Fault and Fold Database for the United States” (Reference No. 47) including the USGS overlay on Google Earth.

TABLE OF LOCAL FAULTS			
FAULT, PERPENDICULAR TO SITE	**APPROXIMATE DISTANCE FROM SITE**	**DIRECTION**	**TIME OF LAST DISPLACEMENT ON FAULT (Ref. 32)**
Chupines, Laguna Seca Section	0.66 miles	Northeast	Quaternary
Laureles Fault	1.76 miles	Southwest	Late Quaternary
Berwick Fault	2.13 miles	Southwest	Late Quaternary

Major Earthquakes

Earthquakes with the highest intensities experienced in the area are the result of the 1906 San Francisco (Olema) and the 1989 Loma Prieta Earthquakes along the San Andreas Fault.

The epicenter of the 1906, 8.3 (Richter) earthquake was at Olema, approximately 23.7 miles north of the site. The intensity in the vicinity of this site was estimated to be between VI and VII, Modified Mercalli Scale.

The Loma Prieta Earthquake of October 17, 1989, was centered in the Santa Cruz Mountains, approximately 35 miles northeast of the site. This Magnitude 7.1 (Richter) earthquake also developed an intensity of VI within the vicinity of this site.

Seismic Hazards

A: Ground Rupture; Surface rupture occurs during an earthquake when fault displacement breaks the ground surface along the historic trace of a fault. Our site investigation confirms there are no visible signs of fault induced features or indications to suggest that a fault directly crosses the site. Therefore, the risk from ground rupture at the site are low.

B: Ground Failures; Ground failures are related to the intensity and duration of the shaking caused by an earthquake, as well as local conditions. A search of historic ground failure documentation indicates that no historic ground failures have occurred at or in the vicinity of the project site nor were visible evidence of such occurrences observed. Therefore, the risk from ground failures at the site are low.

The California Division of Mines and Geology considers four types of ground failures: (1.) Liquefaction, (2.) Lurch Cracking and Lateral Spreading, (3.) Landslides, (4.) Differential Compaction.

1. Liquefaction:

Liquefaction is the loss of strength in saturated granular soils produced by seismic shaking and is often accompanied by the surface occurrence of free water produced by sand boils. For this to occur, the soils must be saturated, at a relatively shallow depth, of a granular (non-cohesive) nature, and be relatively loose.

General liquefaction susceptibility based on depth to groundwater is as follows; if less than 10 feet, maximum possible susceptibility for liquefaction to occur is very high, depths from 9-30 feet have a moderate possible susceptibility and groundwater depths greater than 30 feet, liquefaction susceptibility is low.

The site soils are considered not susceptible to liquefaction as they are un-saturated and underlaid by Monterey Shale bedrock at a shallow depth.

Historic records of liquefaction indicates this area has not exhibited liquefaction or sand boils, an indication of partial liquefaction. and have a cohesive character. The occurrence of liquefaction is not reported in any reviewed document hence it is our opinion the site has a low potential for liquefaction.

2. Lurch Cracking and Lateral Spreading:

Soils shaken by an earthquake may settle, become compacted or slide which may produce cracks and fissures, such effects are called lurch cracking. Lateral spreading is the horizontal movement of soil masses caused by seismic waves, usually such movement is toward an open face or steep slope and occurs along a weakened strata of saturated soils.

As the soils at the proposed site are relatively shallow and underlaid by Monterey Shale bedrock they therefore have a low susceptibility to the effects and damage from lurch cracking.

3. Landslides:

Landslides are generally mass movements of loose rock and soil, either dry or water saturated and are usually gravity driven. Obviously, steep slopes enhance such movements.

As no steep slopes exist adjacent to the site and the site is underlaid by Monterey Shale bedrock at a shallow depth the site generally has minimal potential from the threat of landslides.

4. Differential Compaction:

Differential Compaction is a loss of volume resulting from seismic ground shaking. Generally, for this to happen the site soils must be of low relative density and dilatant. Differential Compaction is more likely in water saturated, low density alluvial material, such as paleo-swamps and/or marshes, or strata of low density and of fine grained silts and sands.

The shallow depth to Monterey Shale Bedrock and recommendations given in this report preclude any potential of differential compaction.

5. Differential-Total Settlement-Static and Dynamic

The recommendations given in the Geotechnical Report are such that concerns of settlement are negligible. The total settlement is expected to be less than 1/4 inch and the expected differential settlement less than one half that.

C: Ground Shaking; Ground shaking is the soil columns response to seismic energy transmission. Intensity of ground shaking and the potential for structural damage is greatly influenced by local soil conditions. Therefore, it is important that all structures be designed and built in accordance with the requirements of the Uniform Building Code's current edition, Seismic Zone IV. All buildings should be founded on undisturbed native soils and/or accepted engineered fill to prevent resonance amplification between soils and the structure.

D: Tsunamis and Seiches; Tsunamis and Seiches are inundations by oceanic or fresh water waves generated by seismic events. The highest recorded wave height in the Monterey Bay is 9 feet and no bodies of fresh water are near the site. Since the site is approximately 1200 feet above sea level there is little potential for inundations due to Tsunamis or Seiches. As such, the property is deemed safe from either hazard.

E: Inundation Due to Dam Failures; The site is not within the inundation plane of any dam.

F: Inundation Due to Storm Flooding; The Federal Emergency Management Agency Flood Limits Map does not show the parcel within the100 year event.

Hydro-Collapse and Subsidence

As observed the near surface soils up to an approximate depth of five feet are sufficiently soft to possess some capacity to settle under hydraulic loading. However, this effect is not common in the area. The recommendations given in this report were established to reduce the potential of this occurring.

The area is not within a known Subsidence Zone.

Slope Stability

Inspection of the site indicates that no landslides are located above or below the building area and the area is generally not susceptible to a slope failure due to the presence of Monterey Shale bedrock positioned at a shallow depth.

Slope Stability and Erosion

The parcel was evaluated for landslides located above or below the building area. The site evaluation included the method as delineated in "Special Publication 117A Guidelines for Evaluating and Mitigating Seismic Hazards in California" was reviewed as applicable to this site. The following summarizes the findings.

The following methods and publications were utilized to determine the presence of land movement or excessive erosion above and below the project site.

A. On site evaluation of land features.
B. Aerial photographs spanning the time frame from December 30, 1985 to July 09, 2023.
C. Open File Report 7-718, 1977, Green
D. Geologic Map of California - Santa Cruz Sheet, 1958, Jennings etc.
E. Ground Failures in the Monterey Bay Counties Region, Professional Paper 993, Dept. of the Interior.

1. "Are existing landslides, active or inactive, present on, or adjacent (either uphill or downhill) to the project site?"

There are no existing landslides, active or inactive, present on, or adjacent to the project site.

The general area is considered not susceptible to mass slope failure due to the shallow depth to Monterey Shale bedrock.

No features or conditions were visually observed during the site exploration which indicate or suggest landsliding has or will occur above or below the project site.

No recorded features were noted on any of the reviewed publications which, suggest, imply or note, landslides have or will occur above or below the project site.

2. "Are there geologic formations or other earth materials located on or adjacent to the site that are known to be susceptible to landslides?"

There are no geologic formations, or other earth materials located on or adjacent to the site that is known to be susceptible to landslides. The building site is located on an eastern slope varying in grades from 5% to 25%.

Due to the natural topsoil is compressible. This characteristic is addressed in the Geotechnical Report.

3. “Do slope areas show surface manifestations of the presence of subsurface water (springs and seeps), or can potential pathways or sources of concentrated water infiltration be identified on or up-slope of the site?”

No springs or seeps or the indication of such, were observed during the site exploration. Review of the aerial imagery did not indicate any locations of seepage as suggested by increased or more active vegetation or topography (erosion scarps, slump). Spring or seeps within the general area and lithology are not typical.

Drainage over the local terrain is unfocused with some managed drainage around adjacent structures and the street along the western boundary.

Inspection of aerial photographs indicates the terrain and presence of vegetation has been consistent during that period. The land use during this time span is undeveloped.

These characteristics indicate a low potential for rapid solifluction or debris flow.

4. “Are susceptible land forms and vulnerable locations preset?”

No excessively steep or erodible slopes are located above or below the site.

5. “Given the proposed development, could anticipate change in the surface and subsurface hydrology (due to watering of lawns, on-site sewage disposal, concentrated runoff from impervious surfaces, etc.) increase the potential for future landsliding in some areas?”

The area is generally fully developed. No lands of further development are located up-slope of the parcel. Future construction within the area will most likely be residential additions or replacement of existing structures. Further mass grading of land is unlikely. Future changes to land use (new septic’s; increase of landscapes; use of the land) is unlikely. Any changes to drainage conditions will be minor. Only minor changes to drainage and landscaping are proposed for this project.

Seismic Strength Loss

The site soils are considered resistant to seismic strength loss and the resulting momentary liquefaction as they are unsaturated and contain a significant cohesive clay-silt fraction. The relatively short duration of earthquake loading will not provide a significant number of high amplitude stress cycles to alter the strain characteristics. Additionally the clay-silt fraction is not considered quick nor sensitive, as such it will not have the associated loss of strength.

Chemical Reactivity

The area is well developed with structures, generally found on Portland Cement products. Additionally these structures date back to the 1950's or earlier. Much of the concrete used in these structures has remained as cast. The area soils are not known for sulfate reaction with Portland Cement products and as such chemical reactivity is not considered a problem in this area.

Expansive Soils

In general the site soils are or contain clays of low to medium plasticity. These soils are typical to the area. Expansivity has not been influential to the local existing structures or pavement as no deformations attributable to expansive soils were observed. Additionally there are no known problems with expansive soils in the area.

Surface Rupture and Lateral Spreading

The project site is located 0.66 miles to the southwest of the Chupines Fault. The site inspection did not reveal any surface features indicating a fault rupture has occurred at the site. The existing structure, driveways and roads do not reveal any strains which would be attributable to subsurface lateral or vertical displacements resulting from a fault slip. Therefore, surface rupture from fault activity across the site is considered improbable.

The project site is underlain by relatively strong soils and soft bedrock at a shallow depth. These materials are considered resistant to lateral spreading. As such surface rupture from lateral spreading is considered improbable.

Seismicity

It is recommended that all structures be designed and built in accordance with the requirements of the California Building Code's current edition. All buildings should be founded on undisturbed native soils and/or certified engineered fill to prevent resonance amplification between soils and the structures.

2022 California Building Code Geoseismic Classifications

The California Building Code, 2022 Edition (Reference No. 14), provides for seismic design values. These values are to be utilized when evaluating structural elements. The soils profile determination is based on the penetration resistance data developed from advancement of exploratory bores. Using averaged penetration values per depth of soil type gives an overall site value of 35 blows/foot penetration resistance as per Equation 20.4-3, ASCE 7-16 and Supplement 1 (02/01/19). The geoseismic character is as listed in the following table.

2021 I. B. C. - 2022 CBC EARTHQUAKE LOADS: SECTION 1613				
LATITUDE	36.545663	SOIL PROFILE:	Stiff Soils	
LONGITUDE	-121.752164	SITE CLASS	D	
PERIOD	S	F	Sm	Sd
0.2 sec	Ss = 1.302	Fa = 1.000	Sms = 1.302	Sds = 0.868
1.0 sec NOTE 1	S1 = 0.476	Fv = Note 1	Sm1 =	Sd1 =
Seismic Design Category to be assigned by structural engineer or designer				

Note 1: Refer to Section 11.4.8 ASCE 7-16 for other requirements.

CONCLUSIONS OF INVESTIGATION

In general, the suitable, *in-situ**, native Monterey Shale bedrock and certified engineered fill are acceptable for foundation purposes and display engineering properties adequate for the anticipated soil pressures, providing the recommendations in this report are followed. Review of documents and site evaluation indicates the parcel is not subject to Geologic Hazards other than seismic events.

Special Recommendations

It is recommended that all foundations be embedded into the Monterey Shale Bedrock.

Additionally it is recommended that all loose and disturbed soils be processed as engineered fill for support of on-grade engineered structures, e.g., interior floor slabs, pavements, etc. The minimum depth of processing is to include all soils above the Monterey Shale.

Relative to dispersal of septic effluent by standard leachfields, the only suitable soils and to a sufficient depth of such soils exists in the southern area of the parcel. Design of the proposed residence will need to proceed in such a manner to maintain these soils in a natural state.

This lot is adjacent to developed areas and miscellaneous debris is scattered across the surficial soils in the southern area of the parcel. A utility easement crosses through the southern area of the parcel. As such disturbed soils and buried objects may be located within the area of proposed construction. As such, all care and practice is to be exercised to observe for and locate any such conditions. Abandoned utilities are to be removed in their entirety and all disturbed soils are to be processed as engineered fill.

The base of all excavations and over-excavations are to be inspected by the Soils Engineer prior to further processing, steel or form placement.

Any further site activity, especially grading and foundation excavations, should be under the direction of a qualified Soils Engineer or their representative.

Should the spectrum of development change, this office should be notified so that additional recommendations can be made, if necessary.

* Suitable, *in-situ,* native soils are those soils which are in-place as deposited by nature and have characteristics adequate for support of the intended load or application.

Foundations and Footings

Geotechnical evaluation indicates that square, round, and continuous spread footings are satisfactory types of support. The minimum embedment for shallow, spread foundations is 12 inches for single stories, 18 inches for two stories and 36 inches for deep pier foundations into suitable, *in-situ*,* native Monterey Shale Bedrock. Embedment depths do not take into account the loose upper top soils, disturbed soils or any other unacceptable soils which exist at the site, e.g., any unengineered fill, landscaping soils, etc.

VERTICAL SOIL PRESSURES[1]	
FOOTING TYPE	DEAD + LIVE LOAD, $kips/ft^2$
Spread & Isolated NOTE 4	2.75
Caisson; End NOTE 3 & 4	3.5+0.37D+0.80B
Caisson; Skin NOTE 4	0.425
LATERAL SOIL PRESSURES[1]	
TYPE	VALUE, lbs/ft^2
Active Earth Pressure	28 lbs/ft^3 E.F.P.
Restrained Earth Pressure	50 lbs/ft^3 E.F.P.
Seismic	3 lbs/ft^3 x H^2 applied at 0.6H
Friction at Base	0.35 × Dead Load
Passive Earth Pressure	425 lbs/ft^3 E.F.P. NOTE2
Uplift Friction (rock)	210 lbs/ft^2 × H

Notes: LL = Live Load; DL = Dead Load; H = Vertical height of material retained.
One-third increase to be allowed for wind and seismic forces.
[1] For depths into acceptable native materials or engineered fill.
[2] Excludes near surface 0.5 feet of *in-situ* soils.
[3] B and D are zero for depths less than 2 feet into acceptable materials
Maximum value of 10 kips / sq. ft. without review.
[4] For depth into Monterey Shale bedrock

Pile foundation information is not provided as none are required or proposed. All foundation excavations are to be cleaned of debris and loose or otherwise unsuitable soils prior to placement of concrete.

* Suitable, *in-situ,* native soils are those soils which are in-place as deposited by nature and have characteristics acceptable for support of the intended load or application.

Slabs-on-Grade

All slabs should be constructed over a prepared subgrade placed on a suitable *in-situ** native material or certified engineered fill. The site exploration observed that the existing surficial soils are loose to depths of approximately 5 feet. These soils should not be relied upon for support of slabs-on-grade or other surficial structures.

As such, where any unsuitable soils remain after excavation to subgrade, they are to be processed as engineered fill, prior to further fill, placement or construction of the on-grade structure. At a minimum the upper 6 inches of sub-grade below all surficial structures should be processed as engineered fill in areas of on-grade structures.

The native topsoil is a silty clay of low-medium to medium plasticity. This soil may change volume from variation in water content. Where new slabs are to be supported by these soils special consideration should be given to providing a properly prepared subgrade and pavement section. Further recommendations can be given during completion of the construction plans and during construction.

The subgrade materials should be observed and accepted by a qualified Soils Engineer or their representative prior to placement of forms, reinforcing or concrete.

On-grade slabs should be placed over a moisture vapor barrier consisting of a waterproof membrane (Moist Stop, 10 mil Visqueen, or equal) with a 2 inch protective sand cover. The waterproof membrane should be placed over a capillarity break consisting of 4 inches of open graded rock; round and sub-round rock is recommended to prevent punctures of the membrane. Open graded crushed aggregate may be utilized, provided the vapor barrier is protected from punctures by a cushion of filter fabric (Mirafi 140N or equal) laid over the aggregate prior to placement of the membrane. Where such concerns are not warranted, alternative underlayment may be utilized at the owners discretion.

All care and practice required to prevent punctures of the membrane during placement and pouring of covering slabs should be utilized during construction. Unless otherwise required for structural purposes, all slabs should be reinforced with a minimum of No. 4, Grade 40, deformed steel reinforcing bars, 24 inches o.c., each way, to prevent separation and displacement in cases of cracking.

* Suitable, *in-situ,* native soils are those soils which are in-place as deposited by nature and have characteristics acceptable for support of the intended load or application.

Specifications for Rock Under Floor Slabs

Definition: Graded gravel of crushed rock for use under floor slabs shall consist of a minimum thickness of mineral aggregate placed in accordance with these specifications and in conformance with the dimensions shown on the project plans. The minimum thickness is specified under the section Slabs-on-Grade above.

Material: The mineral aggregate for use under floor slabs shall consist of broken stone, crushed or uncrushed gravel, quarry waste, or a combination thereof. The aggregate shall be free from adobe, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated dry condition does not exceed 3 percent of the oven dry weight of the sample.

Grading: The mineral aggregate shall be of such size, that the percentage composition by dry weight as determined by the use of laboratory sieves, U.S. Standard, in compliance with ASTM C-136-06, "Standard Method for Sieve Analysis of Fine and Coarse Aggregates", will conform to the following grading specification:

SIEVE SIZE	PERCENTAGE PASSING SIEVE
3/4 inch	100 %
No. 4	0 - 10 %
No. 200	0 - 2 %

Placing: Subgrade upon which gravel or crushed rock is to be placed shall be prepared as outlined in the Recommended Grading Specifications. In addition, the subgrade shall be kept moist so that no drying cracks appear prior to pouring slabs. If cracks appear, subgrade shall be moistened until cracks close.

Slope Ratio and Drainage

Analysis of site soils indicate that cut and fill slope ratios of 2 horizontal to 1 vertical will be satisfactory provided they are landscaped with soil retaining ground covers and are protected against concentrated over slope drainage.

Surface Drainage and Erosion Control

It is recommended that concentrated roof and area drainage be conveyed and released as separately and divided as possible to the lower portion of the parcel. The release of drainage should consider adjacent parcels and structures. Storm runoff should never be directed to septic system leachfields. A subsurface dispersal system **MAY NOT** be used.

Design and construction of the project should fit the topographic and hydrologic features of the site. It is important to minimize unnecessary grading of or near steep slopes. Disturbing native vegetation and natural soil structure allows runoff velocity and transport of sediments to increase.

General surface drainage should be retained at low velocity by slope, sod or other energy reducing features sufficient to prevent erosion, with concentrated over-slope drainage carried in lined channels, flumes, pipe or other erosion-preventing installations.

Runoff flows should be directed into pipes or lined ditches and then onto an energy dissipater before discharging into streams or drainage ways. De-silting should be provided as necessary and may take form of stilling basins, gravel berms, forested/vegetated screens, etc.

During construction, never store cut and fill material where it may wash into streams or drainage ways. Keep all culverts and drainage facility free of silt and debris. Keep emergency erosion control materials such as straw mulch, plastic sheeting, and sandbags on-site and install these at the end of each day as necessary.

Re-vegetate and protect exposed soils by October 15. Use appropriate grass/legume seed mixes and/or straw mulch for temporary cover. Plan permanent vegetation to include native and drought tolerant plants. Seeding and re-vegetation may require special soil preparation, fertilizing, irrigation, and mulching.

Subsurface Drains

Use of spun filter fabric is not recommended for use in construction subsurface drains as this type of fabric typically becomes clogged. Should filter fabric be necessary it is recommended that a woven fabric be used such as Mirafi Filterweave 300. Otherwise we would recommend omission of the fabric and placement of Caltrans Class 1, Type “A” or “B” drain rock, and that any fabric only be placed near the top of the trench between the gravel and earth backfill or where the gravel extends to grade 1 foot below finished grades.

CLASS 1		
SIEVE SIZES	**PERCENTAGE PASSING**	
	TYPE A	TYPE B
50.0-mm/2 inches	----	100
37.5-mm/1.5 inches	----	95-100
19.0-mm/0.75 inches	100	50-100
12.5-mm/0.5 inches	95-100	-----
9.5-mm/0.415 inches	70-100	15-55
4.75-mm/No. 4	0-55	0-25
2.36-mm/No. 8	0-10	0-5
75.0-µm/No. 200	0-3	0-3

General Grading Recommendations

For those items not directly addressed, it is recommended that all earthwork be performed in accordance with the following.

General: This item shall consist of all clearing and grubbing, preparation of land to be filled, excavation and fill of the land; spreading, compaction, and control of the fills, and the subsidiary work necessary to complete the graded area to conform with the lines, grades and slopes as shown on the approved plans.

The Contractor shall provide all equipment and labor necessary to complete the work as specified herein, as shown on the approved plans as stated in the project specifications.

Preparation: Site preparation will consist of clearing and grubbing any existing structures and deleterious materials from the site, and the earthwork required to shape the site to receive the intended improvements, in accordance with the recommended grading specifications and the recommendations as provided above.

All vegetable matter, irreducible material greater than 4 inches and other deleterious materials shall be removed from the areas in which grading is to be done. Such materials not suitable for reuse shall be disposed of as directed.

After the foundation for fill has been cleared, it shall be brought to the proper moisture content by adding water or aerating and compacting to a Relative Compaction of not less than 90% or as specified. The soils shall be tested to a depth sufficient to determine quality and shall be approved by the Soils Engineer for foundation purposes prior to placing the engineered fill.

General Fill: The general fill shall be placed only on approved surfaces, as engineered fill, and shall be compacted to 90% Relative Compaction. Native soils accepted for the fill or the existing aggregate fill may be used for fill purposes provided all aggregate larger than 6 inches are removed. The material for the engineered fill shall be approved by the Soils Engineer before commencement of grading operations.

Each layer shall be compacted to a Relative Compaction of not less than 90% or as specified in the soils report and on the accepted plans. Compaction shall be continuous over the entire area of each layer.

The selected fill material shall be placed in layers which, when compacted, shall not exceed 6 inches in thickness. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to ensure uniformity of material in each layer. The fill shall be placed such that cross fall does not exceed 1 foot in 20 unless otherwise directed.

When fill material includes rock or concrete rubble, no irreducible material larger than 4 inches greatest dimensions will be allowed except under the direction of the Soils Engineer.

Imported Materials: Materials imported for fill purposes shall be classified as: SAND, group symbol SW, SP, SC or SM, as given in ASTM 2487-10, "The Classification of Soils for Engineering Purposes”. In all cases the portion finer than the No. 200 sieve shall not contain any greatly expansive clays and shall be free from vegetable matter and other deleterious materials. The material for the engineered fill shall be approved by the Soils Engineer before commencement of grading operations.

Structural Backfill: Trench, wall and structural backfill shall be placed only on approved surfaces, as engineered fill, and shall be compacted to 95% Relative Compaction. Materials imported for backfill purposes shall have a Sand Equivalent of no-less than 30 and shall be classified as Clean Sands as designated in “The Classification of Soils for Engineering Purposes” (ASTM 2487-10).

Pavement Grades: All pavement grades shall be of uniform thickness, density and moisture prior to placement of the next grade. Flexure of each or all grades shall not exceed 0.25 inches in 5 feet under an axial load of 18.5 kips.

Aggregate Base Course: All aggregates used for specified base courses, shall be handled in a manner which prevents segregation and non-uniformity of gradations.

Compaction: All recompacted soil and/or the engineering fill, should be placed at a minimum 90% Relative Compaction or at the value required for that portion of the work. All pavement sections should be compacted to a minimum of 95% Relative Compaction.

Field density testing shall be completed by the Soils Engineer on each compacted layer or as determined by the Soils Engineer. At least one test shall be made for each 500 cubic yard or fraction thereof, placed with a minimum of two tests per layer in isolated areas. Where a sheeps'-foot roller is used, the soil may be disturbed to a depth of several inches. Density tests shall be taken in compacted materials below the disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof, is below the required density, that particular layer or portion shall be reworked until the required density has been obtained.

Moisture: During compaction moisture content of native soils should be that consistent with the moisture relative to 95% Relative Compaction and in no case should these materials placed at less than 3 percent above the specific optimum moisture content for the soil in question. The engineer may elect to accept high moisture compact soils provided the materials are at 95% Relative Wet Density at that moisture content.

The moisture content of the fill material shall be maintained in a suitable range to permit efficient compaction. The Soils Engineer may require adding moisture, aerating, or blending of wet and dry soils.

All earth moving and work operations shall be controlled to prevent water from running into and pooling in excavated areas. All such water shall be promptly removed and the site kept drained.

Tests: All materials placed should be tested in accordance with the Compaction Control Tests: “Density of Soil In-Place by Sand Cone Method” (ASTM D-1556-07), “Moisture-Density Relationship of Soils” (ASTM D-1557-09), and “Density of Soils In-Place by Nuclear Method” (ASTM D-6938-10).

The standard test used to define maximum densities of all compaction work shall be the “Moisture-Density Relationship of Soils” (ASTM D-1557-09), using a 10-pound ram and 18-inch drop. All densities shall be expressed as a relative density in terms of the maximum density obtained in the laboratory by the foregoing standard procedure.

Deleterious Materials: Materials containing an excess of 5% (by weight) of vegetative or other deleterious matter may be utilized in areas of landscaping or other non-structural fill. Deleterious material includes all vegetative and non-mineral material, and all non-reducible stone, rubble and/or mineral matter of greater than 6 inches.

Over-Excavations: Over-excavations, when required, should include the foundation and pavement envelopes. Such excavations should extend beyond the edge of development a minimum of 5 feet and to an imaginary line extending away and downward at a slope of 45 degrees from the edge of development. The process shall include the complete removal of the required soils and subsequent placement of the engineered fill. After removal of the soils to the required depth, the base of the excavation shall be inspected and approved by the Soils Engineer or his representative prior to further soils processing or placement. Based on this inspection other recommendations may be made.

Existing Conditions: In developed areas underground utilities may be located within the area of proposed construction. In addition, buried objects or deeply disturbed soils may also be encountered. As such, all care and practice is to be exercised to observe for and locate any such objects. Where these objects are to be removed or use discontinued, they are to be removed in their entirety and all disturbed soils are to be processed as engineered fill.

Key: All fill on slopes greater than 1 vertical to 6 horizontal shall be keyed into the adjacent soil. The toe of all slopes should be supported by a key cut a minimum of 3 feet into undisturbed soils to the in side of the fill toe. This key should be a minimum of 6 feet in width and slope at no-less than 10% into the slope. In addition, as the fill advances up slope benches 3 feet across it should be scarified into the fill/undisturbed soil interface.

Seasonal Limits: When the work is interrupted by rain, fill operations shall not be resumed until field tests by the Soils Engineer indicate that the moisture content and density of the fill are as previously specified and the soils to be placed are in suitable condition.

Unusual Conditions: In the event that any unusual conditions are encountered during grading operations which are not covered by the soil investigation or the specifications, the Soils Engineer shall be immediately notified such that additional recommendations may be made.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report are based on our understanding of the project as represented by the plans, and the assumption that the soil conditions do not deviate from those represented in this site soils investigation. Therefore, should any variations or undesirable conditions be encountered during construction, or if the actual project will differ from that planned at this time, GRICE ENGINEERING, INC., should be notified and provided the opportunity to make addendum recommendations if required.

NOTIFY: GRICE ENGINEERING, INC. SALINAS (831) 422-9619
561-A Brunken Avenue MONTEREY (831) 375-1198
Salinas, California 93901

EMAIL ADDRESS: griceengineering@sbcglobal.net

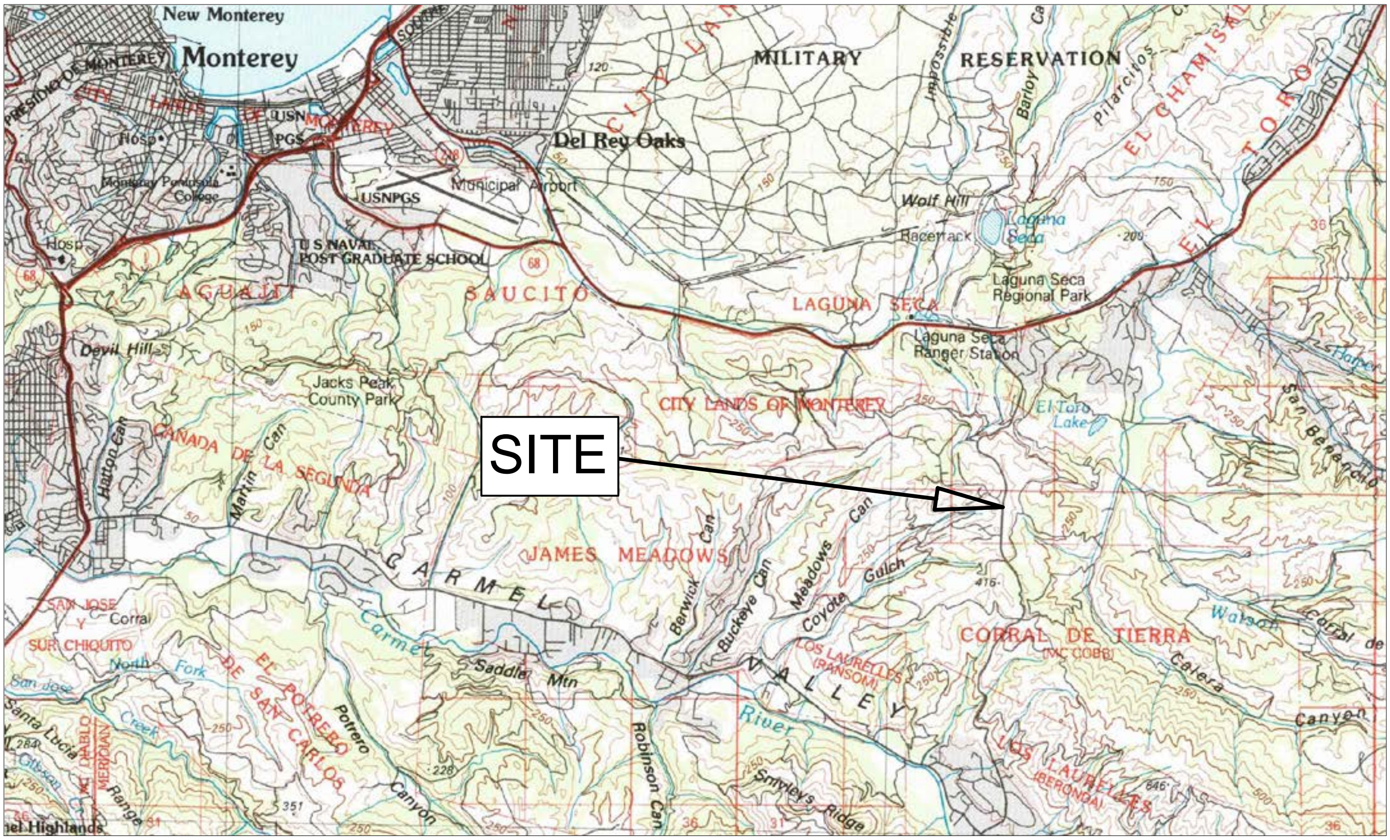
This report is issued with admonishment to the owner and to his representative(s), that the information contained herein should be made available to the responsible project personnel including the architects, engineers, and contractors for the project. The recommendations contained herein should be incorporated into the plans, the specifications, and the final work.

It is requested that GRICE ENGINEERING, INC., be retained to review the project grading and foundation plans to ensure compliance with these recommendations. Further, it is the position of GRICE ENGINEERING, INC., that work performed without our knowledge and supervision, or the direction and supervision of a project responsible professional Soils Engineer renders this report invalid.

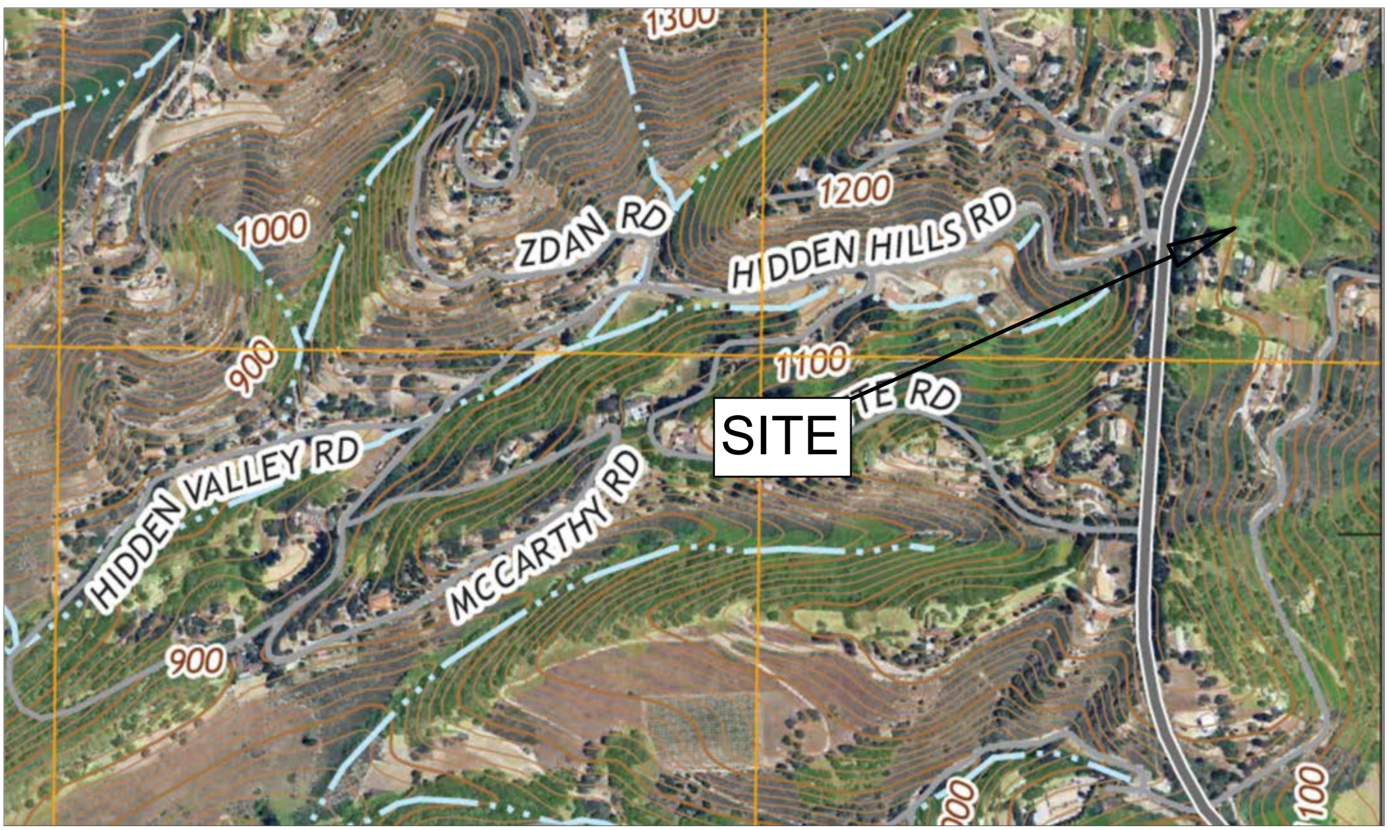
It is our opinion the findings of this report are **valid** as of the **present date**, **however**, changes in the **Codes and Requirements** can occur and change the recommendations given within this report concerning the property. In addition changes in the conditions of a property can occur with the passage of time, due either to natural processes or to the works of man and may affect this property. In addition, changes in **standards** may occur as a result of legislation, or the broadening of knowledge, and these changes may require reevaluation of the conditions stated herein. Accordingly, the findings of this report may be invalidated wholly, or partially, by changes beyond our control. Therefore, this report is subject to review and should not be relied upon after a period of **three years**.

REVISED 12-06-2021

APPENDIX A



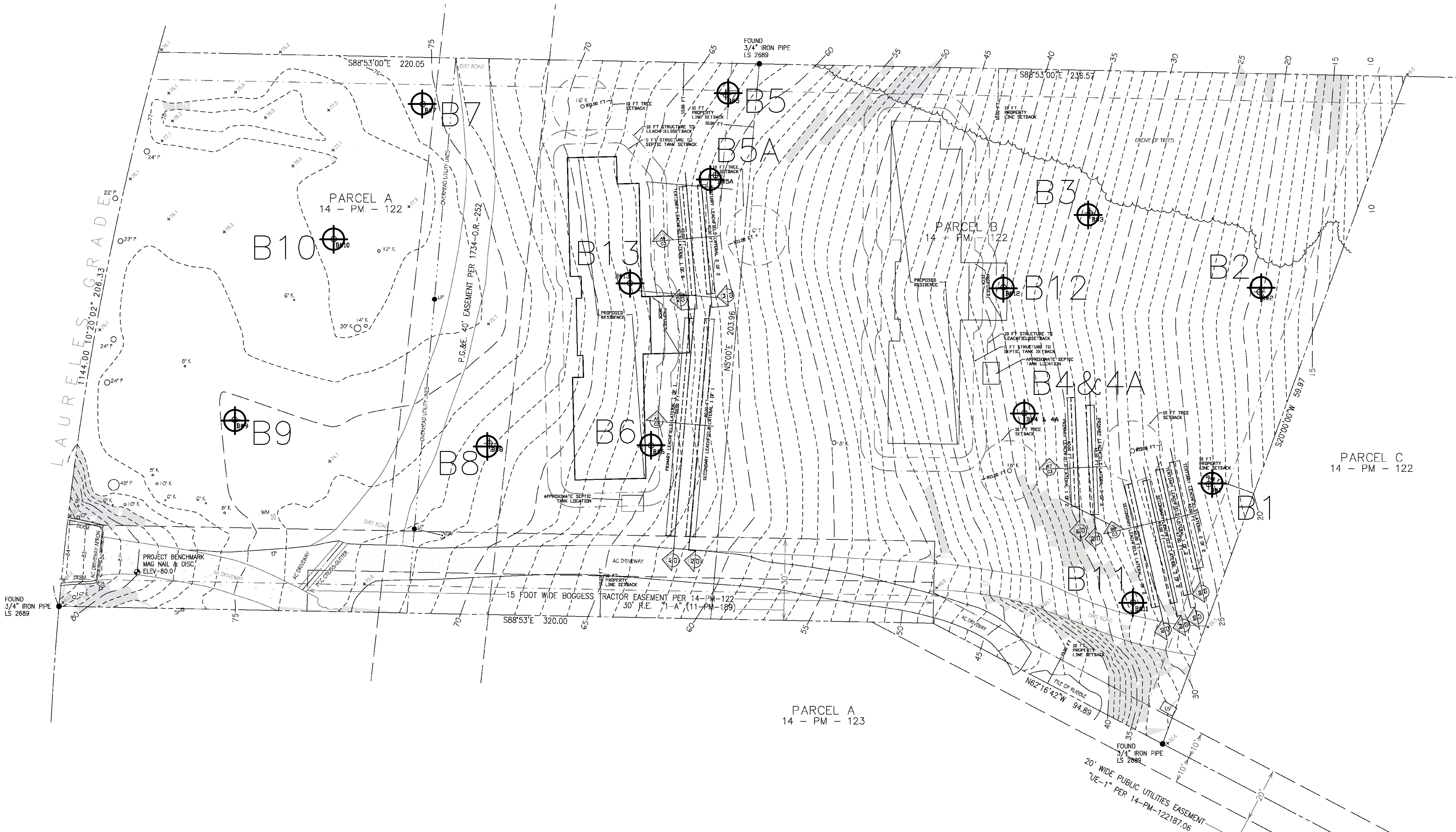
Vicinity Map



Location Map

GRICE ENGINEERING INC
561A Brunken Avenue Salinas, California 93901
Salinas: (831) 422-9619
Monterey: (831) 375-1198 FAX: (831) 422-1896

Vicinity and Location Map
Residence @ APN 416-051-016
Laureles Grade, Carmel Valley, California



SITE PLAN with BORE LOCATIONS DISPLAYS TWO ADJACENT PROJECTS PROPOSED BY THE CLIENT. SITE EVALUATION, INVESTIGATION AND TESTING WERE COMPLETED IN UNISON FOR BOTH PARCELS. THIS REPORT ADDRESSES PARCEL B NOT TO SCALE

APPENDIX B

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 1

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
23.50	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
23.00	0.50											
22.50	1.00											
22.00	1.50											
21.50	2.00	ML-CL				(CUTTINGS) Very dark greyish brown | silty CLAY; low-medium plasticity; friable | few: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
21.00	2.50											
20.50	3.00					Color paling some and clast content increasing some, very friable structure						
20.00	3.50											
19.50	4.00											
19.00	4.50											
18.50	5.00					Gravel content increasing, could be approaching Monterey Shale End of bore at 4.75 feet. No free water encountered. Bore lined for percolation testing						
18.00	5.50											
17.50	6.00											
17.00	6.50											
16.50	7.00											
16.00	7.50											
15.50	8.00											
15.00	8.50											
14.50	9.00											
14.00	9.50											
13.50	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 2

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
19.25	0.00					(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
		ML										
18.75	0.50											
18.25	1.00											
						(CUTTINGS) Very dark greyish brown | CLASTS; fine sand to 2" gravel; subangular; Monterey Shale | little to some: silty clay; low-medium plasticity; friable | very damp; loose.						
17.75	1.50	ML-CL										
17.25	2.00											
16.75	2.50											
16.25	3.00											
						Color paling some and clast content increasing some, very friable structure						
15.75	3.50											
		ROCK				Cuttings and Drilling texture indicate Monterey Shale End of bore at 3.75 feet. No free water encountered. Bore lined for percolation testing						
15.25	4.00											
14.75	4.50											
14.25	5.00											
13.75	5.50											
13.25	6.00											
12.75	6.50											
12.25	7.00											
11.75	7.50											
11.25	8.00											
10.75	8.50											
10.25	9.00											
9.75	9.50											
9.25	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 3

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
33.50	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | little-some: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
33.00	0.50											
32.50	1.00											
32.00	1.50											
31.50	2.00	ROCK				(CUTTINGS) MONTEREY SHALE; compact; medium hard; moist.						
31.00	2.50					Three adjacent bores ending on-in Monterey Shale End of deepest bore at 2.0 feet. No free water encountered. Deepest bore lined for percolation testing, remainder backfilled.						
30.50	3.00											
30.00	3.50											
29.50	4.00											
29.00	4.50											
28.50	5.00											
28.00	5.50											
27.50	6.00											
27.00	6.50											
26.50	7.00											
26.00	7.50											
25.50	8.00											
25.00	8.50											
24.50	9.00											
24.00	9.50											
23.50	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 4

January 25, 2023

<table>
<tr><th>Elev</th><th>Depth</th><th>Symbol</th><th>Sample</th><th>Field BlowCount per 6 inch</th><th>Standard Pen. Burmister</th><th>Description</th><th>Auger Pen.</th><th>Density</th><th>Moisture</th><th>Unconfined</th><th>Cohesion</th><th>Shear</th></tr>
<tr><td>38.50</td><td>0.00</td><td>ML</td><td></td><td></td><td></td><td>(CUTTINGS) Dark brown | SAND; fine to medium fine | trace-few: silt; low plasticity; friable | damp; loose.</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>38.00</td><td>0.50</td><td></td><td></td><td></td><td></td><td>BORE DAMAGED-COVERED BY BRUSH CLEARING OF SITE
DRILL NEW BORE FOR PERCOLATION TESTING - SEE LOG B4A</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>37.50</td><td>1.00</td><td></td><td></td><td></td><td></td><td>Slight increase in clay content with depth</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>37.00</td><td>1.50</td><td>ML-CL</td><td></td><td></td><td></td><td>(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>36.50</td><td>2.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>36.00</td><td>2.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>35.50</td><td>3.00</td><td></td><td></td><td></td><td></td><td>Color paling some and clast content increasing some, very friable structure
Some decrease in clast amount with depth</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>35.00</td><td>3.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>34.50</td><td>4.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>34.00</td><td>4.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>33.50</td><td>5.00</td><td></td><td></td><td></td><td></td><td>End of bore at 5.0 feet. No free water encountered.
Bore lined for percolation testing
Bore lost as area mowed during interval between drilling and perc testing</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>33.00</td><td>5.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>32.50</td><td>6.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>32.00</td><td>6.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>31.50</td><td>7.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>31.00</td><td>7.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>30.50</td><td>8.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>30.00</td><td>8.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>29.50</td><td>9.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>29.00</td><td>9.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>28.50</td><td>10.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 4A

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
38.50	0.00	ML				(CUTTINGS) Dark brown | SAND; fine to medium fine | trace-few: silt; low plasticity; friable | damp; loose.						
38.00	0.50					BORE DAMAGED-COVERED BY BRUSH CLEARING OF SITE DRILL NEW BORE FOR PERCOLATION TESTING - REPLACMENT OF BORE 4						
37.50	1.00					Slight increase in clay content with depth Same						
37.00	1.50	ML-CL				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
36.50	2.00											
36.00	2.50											
35.50	3.00					About the same as bore 4 Color paling some and clast content increasing some, very friable structure Some decrease in clast amount with depth						
35.00	3.50											
34.50	4.00											
34.00	4.50											
33.50	5.00					Increase in gravel - Possibly approaching Monterey Shale End of bore at 5.25 feet. No free water encountered.						
33.00	5.50					Bore lined for percolation testing Original Bore lost as area mowed during interval between drilling and perc testing						
32.50	6.00											
32.00	6.50											
31.50	7.00											
31.00	7.50											
30.50	8.00											
30.00	8.50											
29.50	9.00											
29.00	9.50											
28.50	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 5

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
62.50	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
62.00	0.50											
61.50	1.00					BORE DAMAGED-COVERED BY BRUSH CLEARING OF SITE DRILL NEW BORE FOR PERCOLATION TESTING - SEE LOG B5A						
61.00	1.50											
60.50	2.00					Amount of clasts increasing with depth						
60.00	2.50											
59.50	3.00					Encountering in-situ Monterey Shale						
59.00	3.50					End of bore at 3.25 feet. No free water encountered. Bore lined for percolation testing						
58.50	4.00											
58.00	4.50											
57.50	5.00											
57.00	5.50											
56.50	6.00											
56.00	6.50											
55.50	7.00											
55.00	7.50											
54.50	8.00											
54.00	8.50											
53.50	9.00											
53.00	9.50											
52.50	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 5A

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
60.50	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
60.00	0.50											
59.50	1.00					BORE DAMAGED-COVERED BY BRUSH CLEARING OF SITE DRILL NEW BORE FOR PERCOLATION TESTING - REPLACMENT OF BORE 5						
59.00	1.50											
58.50	2.00					Amount of clasts increasing with depth						
58.00	2.50											
57.50	3.00	SM-ML				More of a silty sand with gravel for the most part, loose-medium dense						
57.00	3.50											
56.50	4.00											
56.00	4.50					Appear to be on top of Monterey Shale End of bore at 4.25 feet. No free water encountered. Bore lined for percolation testing						
55.50	5.00											
55.00	5.50											
54.50	6.00											
54.00	6.50											
53.50	7.00											
53.00	7.50											
52.50	8.00											
52.00	8.50											
51.50	9.00											
51.00	9.50											
50.50	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 6 January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
65.50	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
65.00	0.50											
64.50	1.00											
64.00	1.50											
63.50	2.00											
63.00	2.50											
62.50	3.00	CL-SC-SW				(CUTTINGS) Very dark greyish brown | silty CLAY; low-medium plasticity; friable | few to some (varies in layers): clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
62.00	3.50											
61.50	4.00											
61.00	4.50											
60.50	5.00					Refusal to hand augur End of bore at 525 feet. No free water encountered. Bore lined for percolation testing						
60.00	5.50											
59.50	6.00											
59.00	6.50											
58.50	7.00											
58.00	7.50											
57.50	8.00											
57.00	8.50											
56.50	9.00											
56.00	9.50											
55.50	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 7

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
75.50	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | little-some: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
75.00	0.50											
74.50	1.00	ROCK										
74.00	1.50											
73.50	2.00	ROCK				(CUTTINGS) MONTEREY SHALE; compact; medium hard; moist.						
73.00	2.50					End of bore at 2.5 feet. No free water encountered. Bore backfilled.						
72.50	3.00											
72.00	3.50											
71.50	4.00											
71.00	4.50											
70.50	5.00											
70.00	5.50											
69.50	6.00											
69.00	6.50											
68.50	7.00											
68.00	7.50											
67.50	8.00											
67.00	8.50											
66.50	9.00											
66.00	9.50											
65.50	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 8

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
72.25	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | little-some: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
71.75	0.50											
71.25	1.00											
70.75	1.50											
70.25	2.00											
69.75	2.50	ROCK				(CUTTINGS) MONTEREY SHALE; compact; medium hard; moist.						
69.25	3.00					End of bore at 2.5 feet. No free water encountered. Bore lined for percolation testing.						
68.75	3.50											
68.25	4.00											
67.75	4.50											
67.25	5.00											
66.75	5.50											
66.25	6.00											
65.75	6.50											
65.25	7.00											
64.75	7.50											
64.25	8.00											
63.75	8.50											
63.25	9.00											
62.75	9.50											
62.25	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 9

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
74.90	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | little-some: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
74.40	0.50											
73.90	1.00	ROCK				(CUTTINGS) MONTEREY SHALE; compact; medium hard; moist.						
						End of bore at 1.25 feet. No free water encountered. Bore backfilled.						
73.40	1.50											
72.90	2.00											
72.40	2.50											
71.90	3.00											
71.40	3.50											
70.90	4.00											
70.40	4.50											
69.90	5.00											
69.40	5.50											
68.90	6.00											
68.40	6.50											
67.90	7.00											
67.40	7.50											
66.90	8.00											
66.40	8.50											
65.90	9.00											
65.40	9.50											
64.90	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 10

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
77.25	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | little-some: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
76.75	0.50											
76.25	1.00	ROCK				(CUTTINGS) MONTEREY SHALE; compact; medium hard; moist.						
						End of bore at 1.25 feet. No free water encountered. Bore backfilled.						
75.75	1.50											
75.25	2.00											
74.75	2.50											
74.25	3.00											
73.75	3.50											
73.25	4.00											
72.75	4.50											
72.25	5.00											
71.75	5.50											
71.25	6.00											
70.75	6.50											
70.25	7.00											
69.75	7.50											
69.25	8.00											
68.75	8.50											
68.25	9.00											
67.75	9.50											
67.25	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 11

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
32.50	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
31.50	1.00											
30.50	2.00											
29.50	3.00	CL-SC				(CUTTINGS) Very dark greyish brown | silty CLAY; low-medium plasticity; friable | few to some: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
28.50	4.00											
27.50	5.00					Stiffen slightly and color pales with increasing depth. Occasional horizons with most gravel						
26.50	6.00											
25.50	7.00											
24.50	8.00											
23.50	9.00											
22.50	10.00	ROCK				(CUTTINGS) MONTEREY SHALE; compact; medium hard; moist.						
21.50	11.00											
20.50	12.00											
19.50	13.00											
18.50	14.00											
17.50	15.00											
16.50	16.00											
15.50	17.00											
14.50	18.00											
13.50	19.00											
12.50	20.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 11

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
11.50	21.00											
10.50	22.00											
9.50	23.00											
8.50	24.00											
7.50	25.00											
6.50	26.00											
5.50	27.00											
4.50	28.00											
3.50	29.00											
2.50	30.00											
1.50	31.00											
0.50	32.00											
-0.50	33.00											
-1.50	34.00											
-2.50	35.00											
-3.50	36.00											
-4.50	37.00											
-5.50	38.00											
						All Monterey Shale to end of bore						
-6.50	39.00											
						End of bore at 39.0 feet. No free water encountered or observed. Bore left open for 1 week then backfilled						
-7.50	40.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 12 January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
38.50	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
38.00	0.50											
37.50	1.00											
37.00	1.50											
36.50	2.00											
36.00	2.50											
35.50	3.00	CL				(CUTTINGS) Very dark greyish brown | silty CLAY; low-medium plasticity; friable | few: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
35.00	3.50											
34.50	4.00		4.00	DCPT 7.00	7.00							
34.00	4.50											
33.50	5.00											
33.00	5.50											
32.50	6.00					Stiffen slightly and color pales with increasing depth.						
32.00	6.50											
31.50	7.00											
31.00	7.50											
30.50	8.00											
30.00	8.50	CL	8.50	DCPT 5.00	5.00	(CUTTINGS) Medium greyish brown | silty CLAY; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft-medium stiff						
29.50	9.00											
29.00	9.50											
28.50	10.00											

2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 13

January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
67.00	0.00	ML				(CUTTINGS) Very dark greyish brown | clayey SILT; low-medium plasticity; friable | few to little: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
66.50	0.50											
66.00	1.00											
65.50	1.50											
65.00	2.00											
64.50	2.50											
64.00	3.00	CL-SC				(CUTTINGS) Very dark greyish brown | silty CLAY; low-medium plasticity; friable | few to some: clasts; fine sand to 1"+ gravel; subangular; Monterey Shale | very damp; soft						
63.50	3.50											
63.00	4.00											
62.50	4.50											
62.00	5.00											
61.50	5.50											
61.00	6.00					Stiffen slightly and color pales with increasing depth. Occasional horizons with most.						
60.50	6.50											
60.00	7.00											
59.50	7.50			DCPT								
			7.50	6.00	6.00	Soft, loose drilling						
59.00	8.00											
58.50	8.50											
58.00	9.00											
57.50	9.50											
57.00	10.00											

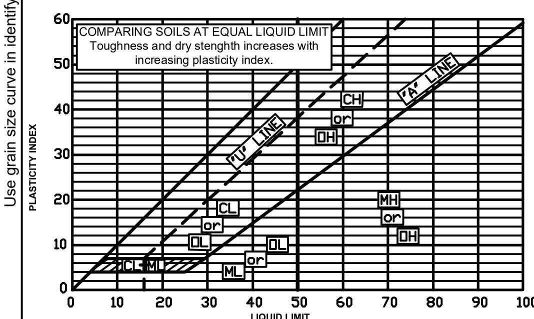
2 Residential Lots; Cooper; Laureles Grade, APN's 416-051-015 & 016

Boring No. 13 January 25, 2023

Elev	Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
56.50	10.50											
56.00	11.00		11.00	DCPT 50+	50+	(CUTTINGS) MONTEREY SHALE; compact; medium hard; moist.						
55.50	11.50											
55.00	12.00					Refusal to hand augur End of bore at 12.00 feet. No free water encountered. Bore backfilled with cuttings.						
54.50	12.50											
54.00	13.00											
53.50	13.50											
53.00	14.00											
52.50	14.50											
52.00	15.00											
51.50	15.50											
51.00	16.00											
50.50	16.50											
50.00	17.00											
49.50	17.50											
49.00	18.00											
48.50	18.50											
48.00	19.00											
47.50	19.50											
47.00	20.00											

UNIFIED SOIL CLASSIFICATION & ASTM D2487: INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 3 inches and basing fractions on estimated weights)				GROUP SYMBOLS N.	TYPICAL NAMES	INFORMATION REQUIRED FOR DESCRIBING SOILS	LABORATORY CLASSIFICATION CRITERIA	
COARSE GRAINED SOILS — More than half of material is **larger** than No. 200 sieve size is (The No. 200 sieve size is about the smallest particle visible to the naked eye)	GRAVELS — More than half of coarse fraction is larger than No. 4 sieve size (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.	GW	Well graded gravels, gravel-sand mixtures, little or no fines.	Give typical name, indicate approximate percentages of sand and gravel, max. size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information, and symbol in parentheses.	Use grain size curve in identifying the fractions as given under field identification. Determine percetages of gravel and sand from grain size curve. Depending on percentage of fines (fractin smaller than No. 200 sieve size) coarse grained soils are classified as follows: Less than 5% GW,GP, SW, SP; More than 12 % GM, GC, SW, SC; 5% to 12% **Borderline** cases requiring use of dual symbols.	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4; $C_c = \frac{(D_{30})^2}{(D_{10} \times D_{60})}$ Between one and 3
			Predominatly one size or a range of sizes with some intermediate sizes missing.	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.			Not meeting all gradation requirements for GW
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.			Atterberg limits below "A" line or PI less than 4 — Above "A" line with PI between 4 and 7 are **borderline** cases requiring use of dual symbols
			Plastic fines (for identification procedures see CL below).	GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics.		Atterberg limits above "A" line or PI greater than 7
	SANDS — More than half of coarse fraction is smaller than No. 4 sieve size	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.	SW	Well graded sands, gravelly sands, little or no fines.			$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6; $C_c = \frac{(D_{30})^2}{(D_{10} \times D_{60})}$ Between one and 3
			Predominatly one size or a range of sizes with some intermediate sizes missing.	SP	Poorly graded sands, gravelly sands, little or no fines.	EXAMPLE:		Not meeting all gradation requirements for SW
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for idendification procedures see ML below).	SM	Silty sands, poorly graded sand-silt mixtures.	**Silty Sand,** gravelly; about 20% hard, angular gravel particles ½ inch maximum size; rounded and subangular sand grains coarse to fine, about 15 % non-plastic fines with low dry strength, well compacted and moist in place, alluvial sand; (SM).		Atterberg limits below "A" line or PI less than 4 — Above "A" line with PI between 4 and 7 are **borderline** cases requiring use of dual symbols
			Plastic fines (for identification procedures see CL below).	SC	Clayey sands, poorly graded sand-clay mixtures.			Atterberg limits above "A" line or PI greater than 7
FINE GRAINED SOILS — More than half of material is **smaller** than No. 200 sieve size	IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE	DRY STRENGTH (CRUSHING CHARACTERISTICS)	DILATANCY (REACTION TO SHAKING) / TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT)					
	SILTS AND CLAYS — Liquid limit less than 50	None to slight	Quick to slow / None	ML	Inorganic silts and very vine sands, rock flour, silty or clayey fine sands withg slight plasticity.	Give typical name, indicate degree and character of plasticity, amount and maximum size of coarse grains, color in wet conditions, odor if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses.		
		Medium to high	None to very slow / Medium	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.			
		Slight to medium	Slow / Slight	OL	Organic silts and organic silt-clays of low plasticity.			
	SILTS AND CLAYS — Liquid limit greater than 50	Slight to medium	Slow to none / Slight to medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	For undisturbed soils add information or structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions.		
		High to very high	None / High	CH	Inorganic clays of high plasticity, fat clays.	EXAMPLE:		
		Medium to high	None to very slow / Slight to medium	OH	Organic clays of medium to high plasticity.	**Clayey silt**, brown, slightly plastic, small percentage of fine sand, numerous vertical root holes, firm and dry in place, loess; (ML).		
HIGHLY ORGANIC SOILS			Readily identified by color, odor, spongy feel and frequently by fibrous texture.	Pt	Peat and other highly organic soils.			



PLASTICITY CHART
FOR LABORATORY CLASSIFICATION OF FINE GRAINED SOILS

N. **Boundary** classifications: Soils possessing characteristics of two groups are designated by combinations of group symbols. For examle GW-GC, well graded gravel-sand mixture with clay binder.
N. All sieve sizes on this chart are U.S. Standard.

FIELD IDENTIFICATION PROCEDURES FOR FINE GRAINED SOILS OR FRACTIONS

These procedures are to be performed on the minus No. 40 sieve size particles, approximately $\frac{1}{64}$ inches. For field classification purposes, screening is not intended; simply remove by hands the coarse particles that interfere with the test.

DILATANCY (Reaction to shaking)

After removing portions larger than No. 40 sieve size, prepare a pot of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.

Place the pot in the open palm of one hand and shake horizontally, stricking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pot which changes to a livery consistancy and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pot stiffens and finnally it cracks or crumbles. The rapidity of appearance of water during shaking and of its diappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickes and most distinct reactoin whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

DRY STRENGTH (Crushing characteristics)

After removing particles larger than No. 40 sieve size, mold a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun, or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quality of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sand and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

TOUGHNESS (Consistency near plastic limit)

After removing particles larger that the No. 40 sieve size, a specimen of soil about one-half inch cube in size is molded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface of between the palms into a thread about one-eight inch in diameter . The thread is then folded and rerolled repeatedly. Durning this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticitiy, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occure below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic limit.

ADOPTED BY: CORPS OF ENGINEERS AND BUREAU OF RECLAMATION-JANUARY 1962

IO3-D-347

GRICE ENGINEERING INC
561A Brunken Avenue
Salinas, California 93901
Salinas: (831) 422-9619
Monterey: (831) 375-1198 FAX: (831) 422-1896

SOIL CLASSIFICATION CHART conforms to Unified Soils Classification and ASTM D2487

REFERENCES

1. American Society of Civil Engineers, **Minimum Design Loads for Buildings and Other Structures, ASCE Standard ASCE/SEI 7-05 Including Supplement No. 1**, 2006, pp 385.

2. Allen, C. R., 1975, **Geological Criteria for Evaluating Seismicity,** GSA Bull v 86 pp 1041-1057.

3. Bailey, E. H., Irwim, W. P., and Jones, D. L., 1964, **Franciscan and Related Rocks, and their significance in the Geology of Western California,** CDMG Bulletin 183, pp 177.

4. Bailey, E. H., Edition, 1966, **Geology of Northern California,** CDMG Bulletin 190, pp 507.

5. Blair, M.L. and Spangle, W. E., 1979, **Seismic Safety and Land-Use Planning - Selected Examples from California,** USGS Professional Paper 941-B.

6. Bolt, B. A., 1975; **Geological Hazards,** Springer-Verlag, pp 328.

7. Bryant, W. A., 1985, **Faults in The Southern Monterey Bay Area** CDMG Fault Evaluation Report FER-167 pp 13.

8. Bullis, K.C., 1980, **Environmental Constraints Analysis of Monterey County, Part I: Seismic and Geologic Hazards,** Monterey County Planning Department, General Update Program, Second printing June 1982, pp 54 and appendices.

9. Bullis, K. C., 1981, **Environmental Constraints Analysis of Monterey County Part I: Flood, Fire and Miscellaneous Hazards, Emergency Preparedness,** Monterey County Planning Department, General Update Program, pp 55-104 and appendices.

10. Burkland and Associates 1975, **Seismic Safety Element of the Monterey County General Plan,** pp 50 and appendices.

11. Burkland and Associates 1975, **Geotechnical Study for the Seismic Safety Element,** Monterey County California File No. K3-0113-M1, pp 125.

12. California Department of Conservation, 2010, **Fault Activity Map of California**, data date same as information on report, Interactive, URL: https://maps.conservation.ca.gov/cgs/fam.

13. California Department of Conservation, 1998, **Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada,** International Conference of Building Officials, Introduction & Maps.

14. **2022 California Building Code, California Code of Regulations, Title 24, Volumes 1 & 2, California Building Standards Commission**, based on the 2021 International Building Code.

15. Clark, J. C., and Reitman, J. D., 1973. **Oligocene Stratigraphy, Tectonics, and Paleogeography Southwest of the San Andreas Fault, Santa Cruz Mountains and Gabilan Range, California Coast Ranges**: USGS Professional Paper 783, pp 18.

16. Clark, J. C., Dibblee, T. W. Jr., Greene, H. G., and Bowen, O. E., Jr., 1974, **Preliminary Geologic Map of the Monterey and Seaside 7.5 minute Quadrangles, Monterey County, California, with Emphasis on Active Faults,** USGS Miscellaneous Field Studies Map MF-577.

17. Clark, Joseph C., Dupré, William R., & Rosenberg, Lewis I., **Geological Map of the Monterey and Seaside 7.5 minute Quadrangles, Monterey County, California: A Digital Database**, 1997, U. S. Department of the Interior, US Geological Survey, Open-File Report 97-30, Map and Pamphlet, pp 26.

18. Clark, Joseph C., Brabb, Earl E., & Rosenberg, Lewis I., 2000, **Geologic Map of the Spreckels 7.5-Minute Quadrangle, Monterey County, California,** USGS Department of the Interior, Map MF-2349 & Pamphlet, pp 22.

19. Clark, Joseph C. & Rosenberg, Lewis I., March 1999, **Southern San Gregorio Fault Displacement: Stepover Segmentation VS. Through-Going Tectonics,** USGS Department of the Interior-National Earthquake Hazards Reduction Program, Award Number 1434-HQ-98-GR-00007, pp 22 without appendices.

20. Cleveland, G. B., 1975, **Landsliding in Marine Terrace Terrain, California,** CDMG Special Report 119, pp 24.

21. Compton, R. R., 1966, **Granitic and Metamorphic Rocks of The Salinian Block California Coast Ranges** CDMG Bulletin 190, pp 277-287.

22. Dibblee, T. W. Jr., 1966, **Evidence for Cumulative Offset on The San Andreas Fault in Central and Northern California** CDMG Bulletin 190.

23. Dibblee, T. W., Jr., 1999, **Geologic Map of the Monterey Peninsula and Vicinity, Monterey, Salinas, Point Sur, and Jamesburg 15-Minute Quadrangles Monterey County, California,** Dibblee Geological Foundation Map #DF-71.

24. Dickinson, William R., Duccea, Mihai, Rosenberg, Lewis I, Greene, H. Gary, Graham, Stephan A., Clark, Joseph C., Weber, Gerald E., Kidder, Steven, Ernst, W. Gary, and Brabb, Earl E., 2005, **Net Dextral Slip Neogene San Gregorio-Hosgri Fault Zone, Coastal California: Geologic Evidence and Tectonic Implications**, Geological Society of America, Special Paper 391, pp 43.

25. Dittmer, E, and Stein, C, 1977, **Salinas Seismic Hazards Technical Report,** Department of Community Development, City of Salinas, pp 73.

26. Dupre, W. R., and Tinsley, J. C., III, 1980, **Geology and Liquefaction potential of Northern Monterey and Southern Santa Cruz, California**: USGS Miscellaneous Field Studies Map 1199, Scale 1:62,500, 2 sheets.

27. Dupre, W. R., 1990, **Maps Showing Geology and Liquefaction Susceptibility of Quaternary Deposits in the Monterey, Seaside, Spreckels and Carmel Valley Quadrangles, Monterey County, CA**, US Geological Survey and University of Houston, Map #MF-2096, 2 Sheets.

28. Durham, D.L., 1974, **Geology of the Southern Salinas Valley Area California** USGS Professional Paper 819 pp 111.

29. Greene, H. G., Lee, W. H. K., McCulloch, D. S., and Brabb, E. E., 1973, **Faults and Earthquakes in the Monterey Bay Region California**, USGS MF 518, maps and paper pp 14.

30. Greene, H. G., 1977, **Geology of the Monterey Bay Region,** USGS Open-File Report pp 77-718.

31. Hays, W. W., 1980, **Procedures for Estimating Earthquake Ground Motions,** USGS Professional Paper 1114, pp 77.

32. Jennings, C. W., and Strand, R. G., 1958, **Geologic Map of California Olaf P. Jenkins Edition Santa Cruz Sheet,** Scale 1:250,000, Third Printing 1971.

33. Jennings, C. W., and Bryant, W. A., 2010 **Fault Activity Map of California: California Geological Survey Geologic Data Map**, No. 6, Map Scale 1:750,000, Includes “An Explanatory Text to Accompany the Fault Activity Map of California”, pp 94.

34. Lee, L. Don, Gudson, Seldon and Kauffman, Marvin E., 1978, **Physical Geology,** 5th Edition, Prentice Hall, Inc., Englewood Cliffs, New Jersey 07632, pp. 490.

35. Lindh, A. G., 1983, **Preliminary Assessment of Long-term probabilities for large earthquakes along selected Fault Segments of the San Andreas Fault System in California,** USGS Open File Report 83-63, pp 15.

36. Nason, R. D., and Rogers, T. H., 1967, **Self-Guiding Map to Active Faulting in the San Juan Bautista Quadrangle Conference on Geologic Problems of The San Andreas Fault System,** Stanford University scale 1:24,000.

37. Nilsen, T. H., Dibblee, T. W. Jr., and Blake, M. C. Jr., 1990, **Geology of the Central Diablo Range, CA,** Field Trip June 2-3.

38. Oakeshott, G. B., 1966, **San Andreas Fault in The California Coast Range Province in Bailey, E. H., Edition, Geology of Northern California,** CDMG Bulletin 190, pp 357-373.

39. Plafker, G., and Galloway, J. P., Edition, 1989 (approved for publication), **Lessons Learned from the Loma Prieta, California, Earthquake of October 17, 1989,** USGS Circular 1045, pp 48.

40. Ray, R. G., 1960, **Aerial Photographs in Geologic Interpretation and Mapping,** USGS Professional Paper 373, Seventh Printing 1984, pp 230.

41. Real Estate Data, Inc., 1980, **Aerial Map Volume of Monterey County, California,** Photo 110, 2398 NW 119th St., Miami, FL 33167, Fifteenth Edition.

42. Robbins, S.L., 1982, **Complete Bouguer Gravity, Aeromagnetic, and Generalized Geologic map of the Hollister 15-minute Quadrangle, CA,** Geophysical Investigations Map GP 945, 2 sheets, Scale 1:62,500.

43. Sarna-Wojcicki, A. M., Pampeyan, E. H., and Hall, N.T., 1975, **Maps Showing Recently Active Breaks Along the San Andreas Fault Between the Central Santa Cruz Mountains and the Northern Gabilan Range, CA,** 2 maps, text is on map 2, Scale 1:24,000.

44. Spangle, Wm. and Associates, Burkland and Associates, and Thorup, Richard R., July 1974, **Faults, Seismicity and Tsunami Hazards: Monterey County, California**: **Part of Geological Report**, County Map 3, File No. K4-0113-M1.

45. Tinsley, J. C. III, 1975, **Quaternary Geology of Northern Salinas Valley, Monterey County, California**: Stanford University PhD. Thesis, pp 194 map scale 1:62,500.

46. **US Department of Agriculture, Soil Conservation Service 1978 Soil Survey, Monterey County, CA,** 226 pages and maps.

47. **US Geological Survey, California Geological Survey 2006 Quaternary Fault and Fold Database for the United States**, access date same as report, from URL: http://earthquakes.usgs.gov/regional/qfaults.

48. **US Geological Survey California Geological Survey 2006, The USGS Store, Map Locator,** access date same as report, from URL: http://store.usgs.gov/ click on ‘map locator’.

49. USGS Open File Report 88-398, 1988 **Probabilities of Large Earthquakes Occurring in California on the San Andreas Fault,** by the Working Group on California Earthquake Probabilities, pp 62.

50. Wallace, R. E., 1970 **Earthquake Recurrence Intervals on The San Andreas Fault,** GSA Bulletin v 81.

51. Wagner, David L., Greene, H. Gary, Saucedo, George J. and Pridmore, Cynthia L. Compiled by Watkins, Sarah E., Little, Jason D. and Bizzarro, Joseph J. digitalized by 2002, **California Department of Conservation, Geologic Map of the Monterey 30' x 60' Quadrangle and Adjacent Areas, CA**, 3 maps and CD-ROM.

52. Ward, P. L., and Page, R. A., 1989, **The Loma Prieta Earthquake of Oct 17, 1989, USGS Pamphlet**, Hodgen, L. D., and Troll, J. A., Edition Second Printing, revised January 1990.

53. Wyss, M., 1979, **Estimating Maximum Expectable Magnitude of Earthquakes from Fault Dimensions,** Geology v 7 n 7, pp 336-340.

54. Youd, T. L., and Hoose, S. N., 1978, **Historic Ground Failures in Northern California Triggered by Earthquakes,** USGS Professional Paper P-993, pp 177.