

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
TRACT MAP NO. 31831
APN 360-350-004 & 005
SWC SHERMAN AND GARBANI ROAD
MENIFEE, CALIFORNIA

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Project No. 644-17079
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Garbani 10, LLC
32823 Temecula Parkway
Temecula, California 92592

Subject: Geotechnical Investigation

Project: Proposed Residential Development
Tract Map No. 31831
APN: 360-350-004 & 005
SWC Sherman Road and Garbani Road
Menifee, California

Sladden Engineering is pleased to present the results of our geotechnical investigation performed for the residential development (Tract Map No. 31831) proposed for the subject site located on the southwest corner of Sherman Road and Garbani Road in the City of Menifee, California. Our services were completed in accordance with our proposal for geotechnical engineering services dated September 20, 2017 and your authorization to proceed with the work. The purpose of our investigation was to explore the subsurface conditions at the site in order to provide recommendations for foundation design and site preparation. Evaluation of environmental issues and hazardous wastes was not included within the scope of services provided.

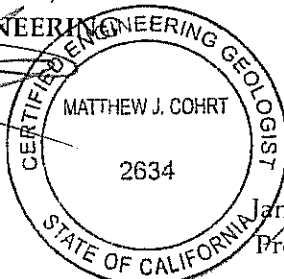
The opinions, recommendations and design criteria presented in this report are based on our field exploration program, laboratory testing and engineering analyses. Based on the results of our investigation, it is our professional opinion that the proposed project should be feasible from a geotechnical perspective provided that the recommendations presented in this report are implemented into design and carried out through construction.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this report, please contact the undersigned.

Respectfully submitted,

SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

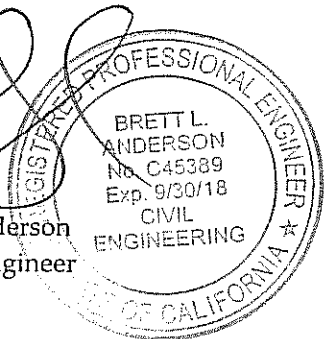


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INTRODUCTION

This report presents the results of the geotechnical investigation performed by Sladden Engineering (Sladden) for the residential development (Tract Map No. 31831) proposed for the subject site located on the southwest corner of Sherman Road and Garbani Road in the City of Menifee, California. The site is located at approximately 34.6553 degrees North latitude and 117.1812 degrees West longitude. The approximate location of the site is indicated on the Site Location Map (Figure 1).

Our investigation was conducted in order to evaluate the engineering properties of the subsurface materials, to evaluate their *in-situ* characteristics, and to provide engineering recommendations and design criteria for site preparation, foundation design and the design of various site improvements. This study also includes a review of published and unpublished geotechnical and geological literature regarding seismicity at and near the subject site.

PROJECT DESCRIPTION

Based on the provided site plan (Kolibrien 2017), it is our understanding that the proposed project will consist of constructing a total of thirty (30) residential structures on the subject site. The project will also include paved roadways, retention basins, drainage easements, underground utilities, landscaping and various other site improvements. For our analyses, we expect that the proposed residential buildings will consist of relatively lightweight one or two-story wood-frame structures supported on conventional shallow spread footings and concrete slabs-on-grade or post-tensioned slabs.

Based on the relatively minor surface gradients throughout the subject site, it is apparent that grading will consist of generally minor cuts and fills in order to achieve the final pad elevations and to provide adequate gradients for site drainage. This does not include remedial grading consisting of the over-excavation and re-compaction of primary foundation bearing soil and/or bedrock within the building areas. Upon completion of the precise grading plans, Sladden should be retained to review the plans in order to confirm that the recommendations presented within in this report are incorporated into the design of the proposed project.

Structural foundation loads were not available at the time of this report. Based on our experience with relatively lightweight wood-frame structures, we expect that isolated column loads will be less than 20 kips and continuous wall loads will be less than 2.0 kips per linear foot. If these assumed loads vary significantly from the actual loads, we should be consulted to verify the applicability of the recommendations provided.

SCOPE OF SERVICES

The purpose of our investigation was to determine specific engineering characteristics of the surface and near surface soil in order to develop foundation design criteria and recommendations for site preparation. Exploration of the site was achieved, by drilling six (6) exploratory boreholes to depths between approximately 11 and 16 feet below the existing ground surface (bgs). Specifically, our site characterization consisted of the following tasks:

- Site reconnaissance to assess the existing surface conditions on and adjacent to the site.
- The excavation of six (6) exploratory boreholes to depths varying from approximately 11 to 16 feet bgs in order to characterize the subsurface soil conditions. Representative samples of the soil were classified in the field and retained for laboratory testing and engineering analyses.
- The performance of laboratory testing on selected samples to evaluate their engineering characteristics.
- The review of geologic literature with respect to potential geologic hazards.
- The performance of engineering analyses to develop recommendations for foundation design and site preparation.
- The preparation of this report summarizing our work at the site.

SITE CONDITIONS

The site is located on the southwest corner of Sherman Road and Garbani Road in the City of Menifee, California. At the time of our investigation, the site was undeveloped and appeared to have been previously disked. Wire perimeter fencing bounds the property. An existing gravel pad exists on the site along with an access road to the pad. The site is bounded by Garbani Road to the north, Sherman Road to the east, an existing residence to the south and a natural ascending hill to the east.

According to the Romoland 7.5-Minute Quadrangle map (USGS, 2015), the site varies in elevation between approximately 1,515 and 1,485 feet above mean sea level (MSL).

No ponding water or surface seeps were observed at or near the site during our investigation conducted on October 31, 2017. Site drainage is controlled by sheet flow, surface infiltration and within City and/or County maintained storm drain systems located along nearby streets.

GEOLOGIC SETTING

The project site is located in the northern portion of the Peninsular Ranges Physiographic Province of California. The Peninsular Ranges are mountainous areas that extend from the western edge of the continental borderland to the Salton Trough and from the Transverse Ranges Physiographic Province in the north to the tip of Baja California in the south. The province is characterized by elongated, northwest-southeast trending mountain ranges and valleys and is truncated at its northern margin by the east-west grain of the Transverse Ranges.

The site has been mapped by Morton (2003) to be immediately underlain by old alluvial fan deposits (Qof) and monzogranite to granodiorite (Kpvg) bedrock. The geologic setting for the site and site vicinity is presented on the Regional Geologic Map (Figure 2).

SUBSURFACE CONDITIONS

The subsurface conditions at the site were investigated by drilling six (6) exploratory boreholes on the site. The approximate locations of the boreholes are illustrated on the Borehole Location Plan (Figure 3). The boreholes were advanced using a truck-mounted Mobile B-61 drill-rig equipped with 8-inch outside diameter hollow stem augers. A representative of Sladden was on-site to log the materials encountered and retrieve samples for laboratory testing and engineering analyses.

During our field investigation, artificial fill/disturbed soil was encountered to a depth of generally less than four (4) feet bgs within the majority of our bores. However, deeper fill was encountered to a depth of seven (7) feet bgs in the vicinity of BH-4. A previously demolished residence in the vicinity of BH-4 resulted in deeper fill depths. Underlying the artificial fill/disturbed soil and extending to the maximum explored depth, native alluvium and shallow seated bedrock was encountered. The native soil consisted primarily of clayey sand (SC) and sand (SP) that appeared dark yellowish brown in *in-situ* color, slightly moist, medium dense to very dense and fine-to-coarse grained. Hard intrusive bedrock was encountered underlying alluvial fan deposits at a depth of approximately 2.5 to 10.5 feet bgs within our bores. The presence of bedrock resulted in practical auger refusal within each of our bores.

The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and tests of the field samples. The final logs are included in Appendix A of this report. The stratification lines represent the approximate boundaries between soil types although the transitions may be gradual and/or variable across the site.

Groundwater was not encountered to our maximum explored depth of 16 feet bgs. Due to the presence of shallow seated bedrock, it is our opinion that groundwater will not be a factor in the construction of the proposed project.

SEISMICITY AND FAULTING

The southwestern United States is a tectonically active and structurally complex region, dominated by northwest trending dextral faults. The faults of the region are often part of complex fault systems, composed of numerous subparallel faults that splay or step from the main fault traces. Strong seismic shaking could be produced by any of these faults during the design life of the proposed project.

We consider the most significant geologic hazard to the project to be the potential for moderate to strong seismic shaking that is likely to occur during the design life of the project. The proposed project is located in the highly seismic Southern California region within the influence of several fault systems that are considered to be active or potentially active. An active fault is defined by the State of California as a "sufficiently active and well defined fault" that has exhibited surface displacement within the Holocene epoch (about the last 11,000 years). A potentially active fault is defined by the State as a fault with a history of movement within Pleistocene time (between 11,000 and 1.6 million years ago).

Table 1 lists the closest known active faults that were generated in part using the EQFAULT computer programs (Blake, 2000), as modified using the fault parameters from The Revised 2002 California Probabilistic Seismic Hazard Maps (Cao et al, 2003). This table does not identify the probability of reactivation or the on-site effects from earthquakes occurring on any of the other faults in the region.

TABLE 1
CLOSEST KNOWN ACTIVE FAULTS

Fault Name	Distance (Km)	Maximum Event
Elsinore – Temecula	11.8	6.8
Elsinore – Glen Ivy	16.1	6.8
San Jacinto – San Jacinto Valley	24.0	6.9
San Jacinto – Anza	25.8	7.2
Elsinore – Julian	33.9	7.1
San Jacinto – San Bernardino	41.1	7.5
Chino – Central Ave (Elsinore)	41.4	6.7
Whittier	48.4	6.8
San Andreas – San Bernardino	48.5	6.7
San Andreas – Southern	48.5	7.2

2016 CBC SEISMIC DESIGN PARAMETERS

Sladden has reviewed the 2016 California Building Code (CBC) and summarized the current seismic design parameters for the proposed structures. The seismic design category for a structure may be determined in accordance with Section 1613 of the 2016 CBC or ASCE7. According to the 2016 CBC, Site Class C may be used to estimate design seismic loading for the proposed structures. The 2016 CBC Seismic Design Parameters are summarized below (USGS, 2017a). The project Design Map Reports are included within Appendix C.

Risk Category (Table 1.5-1): I/II/III

Site Class (Table 1613.3.2): C

Ss (Figure 1613.3.1): 1.501g

S1 (Figure 1613.3.1): 0.611g

Fa (Table 1613.3.3(1)): 1.0

Fv (Table 1613.5.3(2)): 1.3

Sms (Equation 16-37 {Fa X Ss}): 1.501g

Sm1 (Equation 16-38 {Fv X S1}): 0.795g

SDs (Equation 16-39 {2/3 X Sms}): 1.000g

SD1 (Equation 16-40 {2/3 X Sm1}): 0.530g

Seismic Design Category: D

GEOLOGIC HAZARDS

The subject site is located in an active seismic zone and will likely experience strong seismic shaking during the design life of the proposed project. In general, the intensity of ground shaking will depend on several factors including: the distance to the earthquake focus, the earthquake magnitude, the response characteristics of the underlying materials, and the quality and type of construction. Geologic hazards and their relationship to the site are discussed below.

- I. Surface Rupture. Surface rupture is expected to occur along preexisting, known active fault traces. However, surface rupture could potentially splay or step from known active faults or rupture along unidentified traces. Based on review of Jennings (1994), Morton (2003), RCPR (2017) and CDOC (2017), faults are not mapped on the site. In addition, no signs of active surface faulting were observed during our review of non-stereo digitized photographs of the site and site vicinity (Google, 2017). Finally, no signs of active surface rupture or secondary seismic effects (lateral spreading, lurching etc.) were identified on-site during our field investigation. Therefore, it is our opinion that risks associated with primary surface ground rupture should be considered "low".
- II. Ground Shaking. The site has been subjected to past ground shaking by faults that traverse through the region. Strong seismic shaking from nearby active faults is expected to produce strong seismic shaking during the design life of the proposed project. A probabilistic approach was employed to estimate the peak ground acceleration (a_{max}) that could be experienced at the site. Based on the USGS Unified Hazard Tool (USGS, 2017b) and shear wave velocity (V_{s30}) of 537 m/s, the site could be subjected to ground motions on the order of 0.40g. The peak ground acceleration at the site is judged to have a 475 year return period and a 10 percent chance of exceedance in 50 years.

- III. Liquefaction/Seismic Settlement. Liquefaction is the process in which loose, saturated granular soil loses strength as a result of cyclic loading. The strength loss is a result of a decrease in granular sand volume and a positive increase in pore pressures. Generally, liquefaction can occur if all of the following conditions apply: liquefaction-susceptible soil, groundwater within a depth of 50 feet or less, and strong seismic shaking.
- The State of California has not evaluated the Romoland Quadrangle for liquefaction hazards. However, the project site is underlain by shallow seated bedrock and risks associated with liquefaction are considered negligible.
- IV. Tsunamis and Seiches. Because the site is situated at an elevated inland location, and is not immediately adjacent to any impounded bodies of water, risk associated with tsunamis and seiches is considered negligible.
- V. Slope Failure, Landsliding, Rock Falls. The site is situated on relatively flat ground, however is located adjacent to an ascending sloped hillside to the west of the site. Signs of slope instability in the form of landslides, rock falls, earthflows and slumps were not observed at or near the subject site during our investigation. As such, risks associated with slope instability should be considered "low".
- VI. Expansive Soil. Expansion Index testing of select samples was performed in order to evaluate the expansive potential of the materials underlying the site. Based the results of our laboratory testing (EI=46), the materials present near the ground surface are considered to have a "low" expansion potential. Accordingly, risk of structural damage caused by volumetric changes in the surface soil should be considered "in design and construction".
- VII. Settlement. Settlement resulting from the anticipated foundation loads should be tolerable provided that the recommendations included in this report are considered in foundation design and construction. The estimated ultimate settlement is calculated to be approximately one inch when using the recommended bearing values. As a practical matter, differential settlement between footings can be assumed as one-half of the total settlement.
- VIII. Flooding and Erosion. No signs of flooding or erosion were observed during our field investigation. Risks associated with flooding and erosion should be considered evaluated and mitigated by the project design Civil Engineer.
- IX. Subsidence. Land subsidence can occur in areas where aquifer systems have been subjected to extensive groundwater pumping, such that groundwater pumping exceeds groundwater recharge. Generally, pore water reduction can result in a rearrangement of skeletal grains and could result in elastic (recoverable) or inelastic (unrecoverable) deformation of an aquifer system.

Locally, no fissures or other surficial evidence of subsidence were observed at or near the subject site. Based upon the presence of shallow seated bedrock throughout the site, the potential for subsidence related settlement is considered "negligible".

- X. Ground Fissures. No surface features indicative of ground fissuring were identified on the site during our field investigation. Accordingly, risks associated with ground fissuring are considered low.
- XI. Debris Flows. Debris flows are viscous flows consisting of poorly sorted mixtures of sediment and water and are generally initiated on slopes steeper than approximately six horizontal to one vertical (6H:1V). Based on the relatively flat nature of the site, the relatively shallow sloped hillside to the south of the site and the composition of the surface soil, we judge that risks associated with debris flows should be considered "low".

CONCLUSIONS

Based on the results of our investigation, it is our professional opinion that the project should be feasible from a geotechnical perspective provided that the recommendations provided in this report are incorporated into design and carried out through construction. The main geotechnical concerns in the design and construction of the proposed project are the presence of loose and potentially expansive near surface soil and the potential hard bedrock conditions that will likely be encountered throughout the site. Specialized grading equipment will likely be necessary to accomplish significant excavations.

Because of the presence of relatively loose and potentially expansive near surface soil and shallow bedrock, we recommend that remedial grading within the proposed building areas include over-excavation and/or re-compaction of the artificial fill soil and the primary foundation bearing soil and/or bedrock. Specific recommendations for site preparation are presented in the Earthwork and Grading section of this report.

Caving did occur to varying degrees within each of our exploratory bores and the surface soil may be susceptible to caving within deeper excavations. All excavations should be constructed in accordance with the normal CalOSHA excavation criteria. On the basis of our observations of the materials encountered, we anticipate that the subsoil will conform to that described by CalOSHA as Type B or C. Soil conditions should be verified in the field by a "Competent person" employed by the Contractor.

The following recommendations present more detailed design criteria that have been developed on the basis of our field and laboratory investigation.

EARTHWORK AND GRADING

All earthwork including excavation, backfill and preparation of the surface soil, should be performed in accordance with the geotechnical recommendations presented in this report and portions of the local regulatory requirements, as applicable. All earth work should be performed under the observation and testing of a qualified soil engineer. The following geotechnical engineering recommendations for the proposed project are based on observations from the field investigation program, laboratory testing and geotechnical engineering analyses.

- a. Stripping. Areas to be graded should be cleared of the scattered weeds and surface vegetation. All areas scheduled to receive fill should be cleared of surface improvements, artificial fill and any unsuitable matter. The unsuitable materials should be removed from the site. Existing artificial fill soil should be removed in its entirety and replaced as engineered fill. Voids left by obstructions should be properly backfilled in accordance with the compaction recommendations of this report.
- b. Preparation of Building Areas. In order to provide uniform foundation bearing conditions and to mitigate potential differential settlements related to likely soil/bedrock transition conditions, we recommend over-excavation and re-compaction throughout the new building areas. The artificial fill soil, native low density near surface soil and bedrock should be removed to at least 3 feet below existing grade or 3 feet below the bottom of the footings, whichever is deeper. If deeper removals are deemed necessary during site grading, the removals should be equivalent to approximately one-half of the maximum removal depth to minimize the potential for differential settlements related to variable fill depths. Remedial grading should extend laterally beyond the building perimeters a minimum distance equivalent to the fill depth where possible. The exposed surface soil should then be scarified, moisture conditioned to within two percent of optimum moisture content, and compacted to at least 90 percent relative compaction.
- c. Compaction. Soil to be used as engineered fill should be free of organic material, debris, and other deleterious substances, and should not contain irreducible matter greater than three inches in maximum dimension. All fill materials should be placed in thin lifts, not exceeding six inches in their loose state. If import fill is required, the material should be of a low to non-expansive nature and should meet the following criteria:

Plastic Index	Less than 12
Liquid Limit	Less than 35
Percent Soil Passing #200 Sieve	Between 15% and 35%
Maximum Aggregate Size	3 inches

The subgrade and all fills material should be compacted with acceptable compaction equipment, to at least 90 percent relative compaction. The bottom of the exposed subgrade should be observed by a representative of Sladden Engineering prior to fill placement. Compaction testing should be performed on all lifts in order to ensure proper placement of the fill materials. Table 2 provides a summary of the excavation and compaction recommendation.

TABLE 2
SUMMARY OF RECOMMENDATIONS

*Remedial Grading	Excavation and recompaction within the building envelope and extending laterally for 5 feet beyond the building limits and to a minimum of 3 feet below existing grade or 2 feet below the bottom of the footings, whichever is deeper
Native / Import Engineered Fill	Place in thin lifts not exceeding 6 inches in a loose condition, compact to a minimum of 90 percent relative compaction.
Asphalt Concrete Sections	Compact the top 12 inches to at least 95 percent compaction within 2 percent of optimum moisture content.

*Actual depth may vary and should be determined by a representative of Sladden Engineering in the field during construction.

- d. Shrinkage and Subsidence. Volumetric shrinkage of the material that is excavated and replaced as controlled compacted fill should be anticipated. We estimate that this shrinkage could vary from 10 to 15 percent. Subsidence of the surfaces that are scarified and compacted should be between 1 and 2 tenths of a foot. This will vary depending upon the type of equipment used, the moisture content of the soil at the time of grading and the actual degree of compaction attained. Bulking of excavated bedrock is likely to occur, however the actual bulking rate cannot be determined until grading commences.

POST-TENSIONED SLABS

Post-tensioned slabs may be considered for the proposed residential structures in order to mitigate potential expansive soil conditions. We have evaluated the on-site soil for construction of post-tensioned foundation systems in general accordance with design specifications of the Post Tensioning Institute. Final design should be based upon the results of Expansion Index testing performed after rough grading. Post-tensioned slabs should be designed to be rigid and capable of spanning areas of non-uniform support and meet the following criteria:

Design Criteria		Category I Very Low to Low Expansion Potential (EI 0-50)
Center Lift	ϵ_m center	9.0
	γ_m center	0.46
Edge Lift	ϵ_m edge	4.8
	γ_m edge	1.03
Perimeter Footing Depth (inches)		18
Allowable Bearing Capacity (psf)		2,500

Resistance to lateral loads may be provided by a combination of friction acting at the base of the slabs or foundations and passive earth pressure along the sides of the foundations. A coefficient of friction of 0.40 between soil and concrete may be used with consideration to dead load forces only. A passive earth pressure of 250 pounds per square foot, per foot of depth, may be used for the sides of footings that are placed against properly compacted native or approved import soil. Passive earth pressure should be ignored within the upper 1 foot except where confined (such as beneath a floor slab).

FOUNDATIONS: CONVENTIONAL SHALLOW SPREAD FOOTINGS

Conventional spread footings may be expected to provide adequate support for the proposed residential structures provided that the expansive soil conditions are considered in design. All footings should be founded upon properly compacted engineered fill and should have a minimum embedment depth of 18 inches measured from the lowest adjacent finished grade. Continuous and isolated footings should have minimum widths of 12 inches and 24 inches, respectively. Continuous and isolated footings supported upon properly compacted soil may be designed using allowable (net) bearing pressures of 1800 and 2000 pounds per square foot (psf), respectively. Allowable increases of 250 psf for each additional 1 foot in width and 250 psf for each additional 6 inches in depth may be utilized, if desired. The maximum allowable bearing pressure should be 2500 psf. The allowable bearing pressure applies to combined dead and sustained live loads. The allowable bearing pressures may be increased by one-third when considering transient live loads, including seismic and wind forces.

Based on the recommended allowable bearing pressures, the total static settlement of the shallow footings is anticipated to be less than one-inch provided that foundation preparation conforms to the recommendations described in this report. Static differential settlement is anticipated to be approximately one-half of the total settlement for similarly loaded footings spaced up to approximately 50 feet apart.

Lateral load resistance for the spread footings will be developed by passive pressure against the sides of the footings below grade and by friction acting at the base of the footings. An allowable passive pressure of 250 psf per foot of depth may be used for design purposes. An allowable coefficient of friction 0.40 may be used for dead and sustained live loads to compute the frictional resistance of the footing placed directly on compacted fill. Under seismic and wind loading conditions, the passive pressure and frictional resistance may be increased by one-third.

All footing excavations should be observed by a representative of the project geotechnical consultant to verify adequate embedment depths prior to placement of forms, steel reinforcement or concrete. The excavations should be trimmed neat, level and square. All loose, disturbed, sloughed or moisture-softened soils and/or any construction debris should be removed prior to concrete placement. Excavated soil generated from footing and/or utility trenches should not be stockpiled within the building envelopes or in areas of exterior concrete flatwork. All footings should be reinforced in accordance with the project Structural Engineer's recommendations.

SLABS-ON-GRADE

In order to reduce the risk of heave, cracking and settlement, concrete slabs-on-grade must be placed on properly compacted fill as outlined in the previous sections. The slab subgrades should remain near optimum moisture content and should not be permitted to dry prior to concrete placement. All slab subgrades should be firm and unyielding. Disturbed soils should be removed and then replaced and compacted to a minimum of 90 percent relative compaction.

Slab thickness and reinforcement should be determined by the Structural Engineer based upon the post-grading expansion test results. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed at slab mid-height.

Slabs with moisture sensitive surfaces should be underlain with a moisture vapor barrier consisting of a polyvinyl chloride membrane such as 10-mil Visqueen. All laps within the membrane should be sealed and at least 2 inches of clean sand should be placed over the membrane to promote uniform curing of the concrete and to limit damage. To reduce the potential for punctures, the membrane should be placed on a pad surface that has been graded smooth without any sharp protrusions. If a smooth surface can not be achieved by grading, consideration should be given to placing a 1-inch thick leveling course of sand across the pad surface prior to placement of the membrane.

PRELIMINARY PAVEMENT DESIGN

Asphalt concrete pavements should be designed in accordance with Topic 610 of the Caltrans Highway Design Manual based on R-Value and Traffic Index. The R-Value of the near surface soil is expected to exceed 40. On-site soil and any imported soil should be tested for R-Value prior to establishing final pavement design sections. For preliminary pavement design, Traffic Indices (TI) of 5.0 and 6.5 were used for the light duty and heavy duty pavements, respectively. We assumed Asphalt Concrete (AC) over Class II Aggregate Base (AB). The preliminary flexible pavement layer thickness is as follows:

RECOMMENDED ASPHALT PAVEMENT SECTION LAYER THICKNESS		
Pavement Material	Recommended Thickness	
	TI=5.0	TI=6.5
Asphalt Concrete Surface Course	3.0 inches	4.0 inches
Class II Aggregate Base Course	6.0 inches	6.0 inches
Compacted Subgrade Soil	12 inches	12 inches

Asphalt concrete should conform to Sections 203 and 302 of the latest edition of the Standard Specifications for Public Works Construction (Caltrans or Greenbook). Class II aggregate base should conform to Section 26 of the Caltrans Standard Specifications or Greenbook, latest edition. The aggregate base course should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Method D 1557.

CORROSION SERIES

The soluble sulfate concentrations of the surface soil were determined to be 20 parts per million (ppm). The soil is considered to have a "negligible" corrosion potential with respect to concrete. The use of Type V cement and special sulfate resistant concrete mixes should not be necessary. Soluble sulfate content of the surface soil should be reevaluated after grading and appropriate concrete mix designs should be established based upon post-grading test results.

The pH level of the surface soil was determined to be 8.0. Based on soluble chloride concentration testing (30 ppm), the soil is considered to have a "low" corrosive potential with respect to normal grade steel. The minimum resistivity of the surface soil was found to be 3500 ohm-cm, which suggests the site soil is considered to have a "moderate" corrosion potential with respect to ferrous metal installations. A corrosion expert should be consulted regarding appropriate corrosion protection measures.

UTILITY TRENCH BACKFILL

All utility trench backfill should be compacted to a minimum relative compaction of 90 percent. Trench backfill materials should be placed in lifts no greater than six inches in a loose condition, moisture conditioned as necessary to achieve near optimum moisture conditions, and then mechanically compacted in place to a minimum relative compaction of 90 percent. A representative of the project geotechnical consultant should test the backfills to verify adequate compaction.

EXTERIOR CONCRETE FLATWORK

To minimize cracking of concrete flatwork, the subgrade soil below concrete flatwork areas should first be compacted to a minimum relative compaction of 90 percent. A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soil.

DRAINAGE

All final grades should be provided with positive gradients away from foundations to provide rapid removal of surface water runoff to an adequate discharge point. No water should be allowed to be pond on or immediately adjacent to foundation elements. In order to reduce water infiltration into the subgrade soil, surface water should be directed away from building foundations to an adequate discharge point. Subgrade drainage should be evaluated upon completion of the precise grading plans and in the field during grading.

LIMITATIONS

The findings and recommendations presented in this report are based upon an interpolation of the soil conditions between the exploratory boring locations and extrapolation of these conditions throughout the proposed building area. Should conditions encountered during grading appear different than those indicated in this report, this office should be notified.

The use of this report by other parties or for other projects is not authorized. The recommendations of this report are contingent upon monitoring of the grading operation by a representative of Sladden Engineering. All recommendations are considered to be tentative pending our review of the grading operation and additional testing, if indicated. If others are employed to perform any soil testing, this office should be notified prior to such testing in order to coordinate any required site visits by our representative and to assure indemnification of Sladden Engineering.

We recommend that a pre-job conference be held on the site prior to the initiation of site grading. The purpose of this meeting will be to assure a complete understanding of the recommendations presented in this report as they apply to the actual grading performed.

ADDITIONAL SERVICES

Once completed, final project plans and specifications should be reviewed by use prior to construction to confirm that the full intent of the recommendations presented herein have been applied to design and construction. Following review of plans and specifications, observation should be performed by the Soil Engineer during construction to document that foundation elements are founded on/or penetrate into the recommended soil, and that suitable backfill soil is placed upon competent materials and properly compacted at the recommended moisture content.

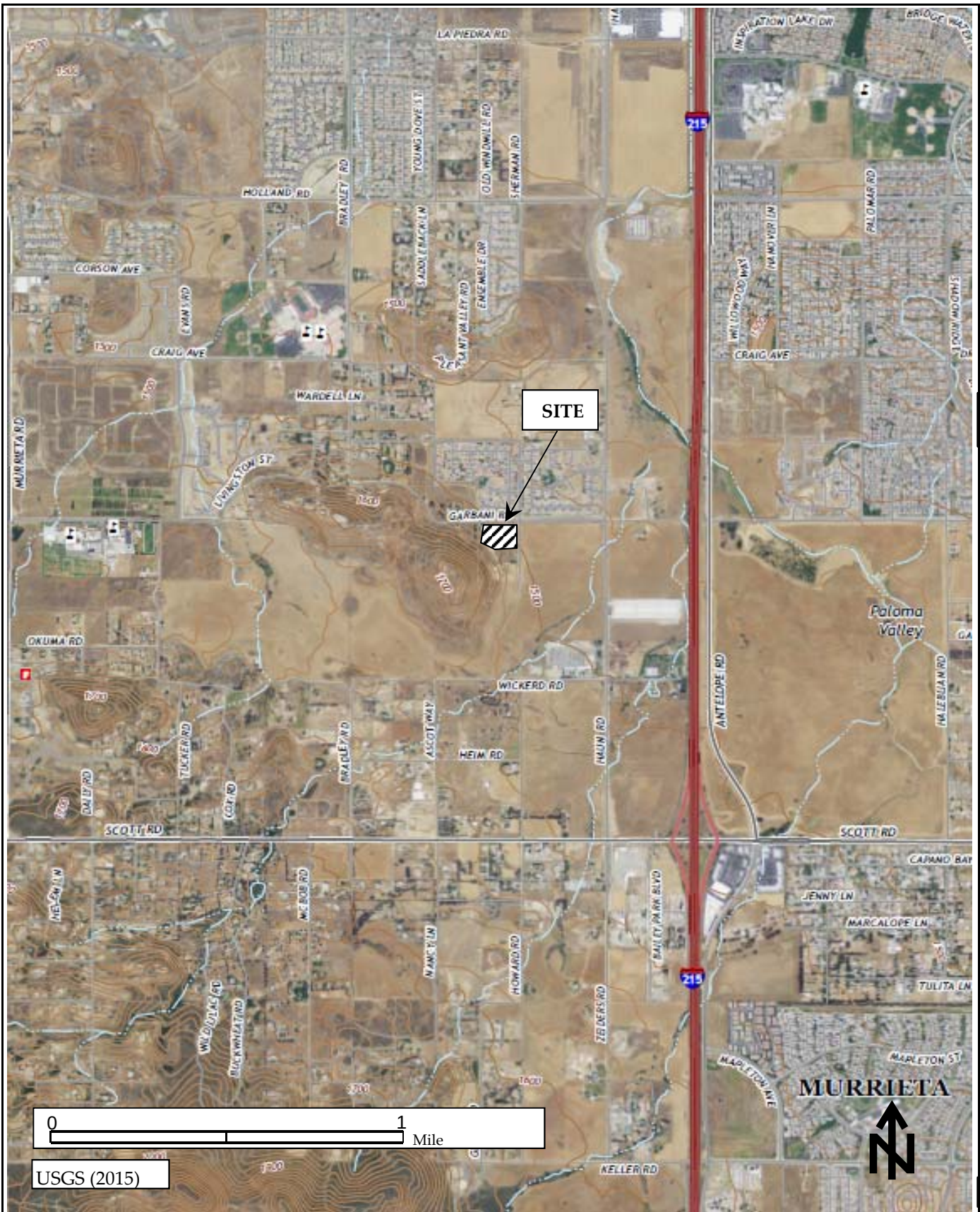
Tests and observations should be performed during grading by the Soil Engineer or his representative in order to verify that the grading is being performed in accordance with the project specifications. Field density testing shall be performed in accordance with acceptable ASTM test methods. The minimum acceptable degree of compaction should be 90 percent for engineered fill and subgrade soils and 95 percent for Class II aggregate base as obtained by ASTM Test Method D1557. Where testing indicates insufficient density, additional compactive effort shall be applied until retesting indicates satisfactory compaction.

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- United States Geological Survey (USGS), 2017b, Unified Hazard Tool; available at: <https://geohazards.usgs.gov/hazards/interactive>

FIGURES

SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
BOREHOLE LOCATION PLAN



Sladden Engineering

SITE LOCATION MAP

Project Number:

644-17079

Report Number:

17-12-115

Date:

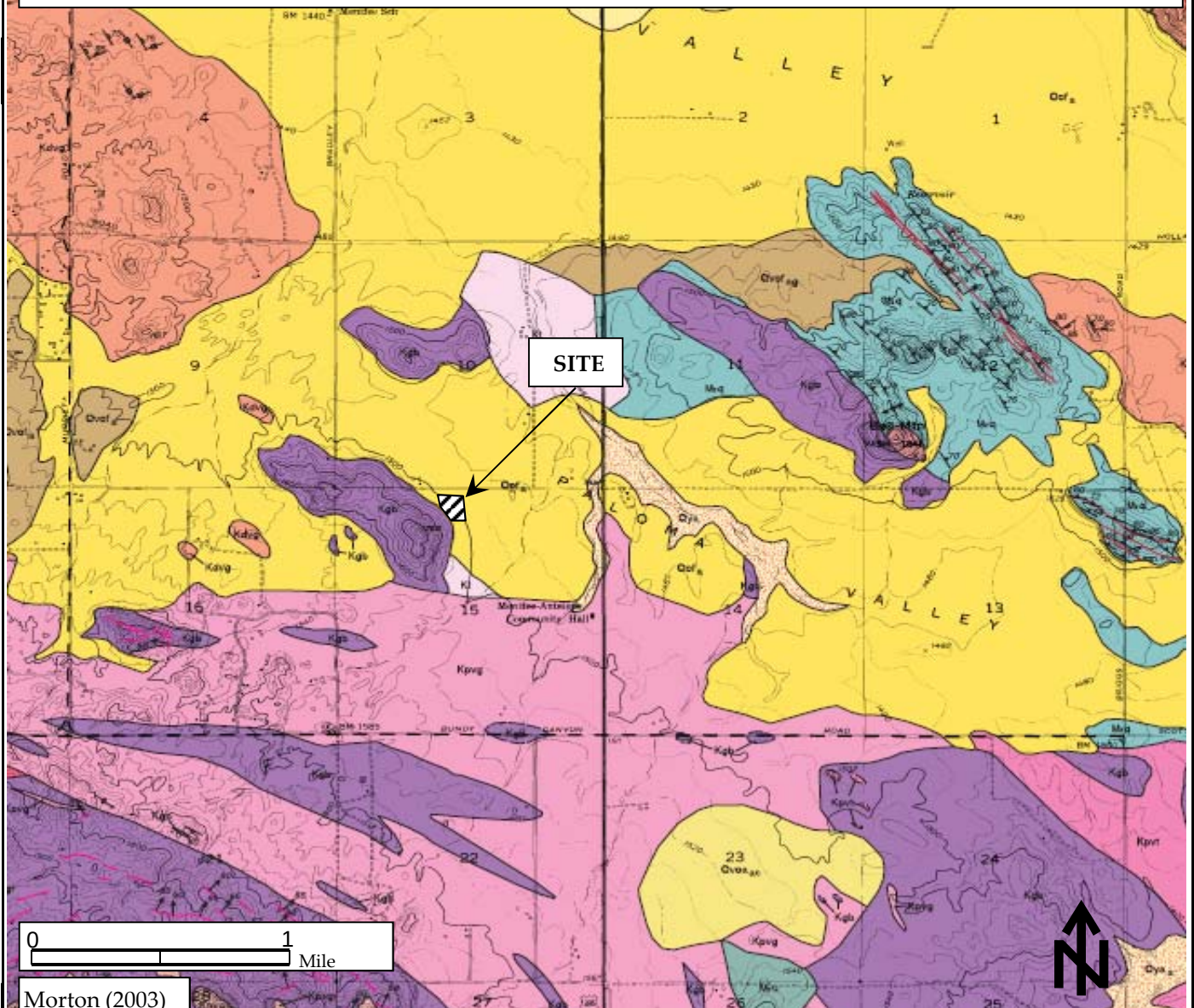
December 12, 2017

FIGURE

1

EXPLANATION OF SITE UNITS

- Qof** **Old alluvial fan deposits (late to middle Pleistocene)**—Reddish brown, gravel and sand alluvial fan deposits; indurated, commonly slightly dissected. In places includes thin alluvial fan deposits of Holocene age
- Kgbd** **Gabbroic dikes (Cretaceous)**—Relatively fine-grained, massive, black hornblende gabbro occurs as thin (few meters thick) dike on hill west of Menifee Road. Dike cuts granodiorite to tonalite (Kdvg) of Domenigoni Valley and adjacent metamorphic rock units
- Kpvg** **Monzogranite to granodiorite**—Pale gray, massive, medium-grained hypidiomorphic-granular biotite monzogranite, and less abundant hornblende-biotite granodiorite forming older ring dike. Plagioclase is An₂₀ to An₃₅, subhedral, tabular crystals. Contains inclusions of small to large staped blocks of gabbro



Morton (2003)

REGIONAL GEOLOGIC MAP

FIGURE

2



Sladden Engineering

Project Number:

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Report Number:

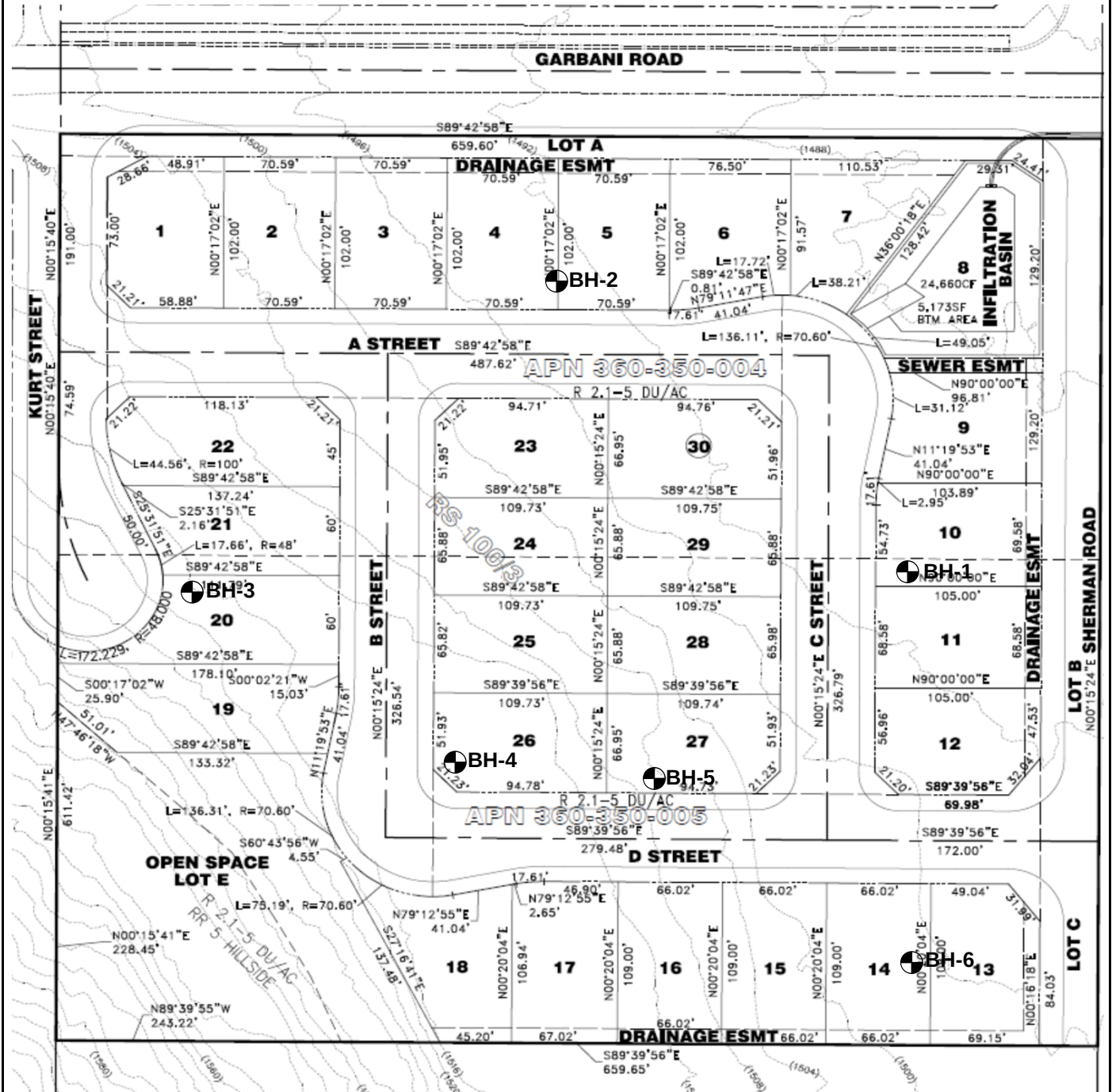
17-12-115

Date:

December 12, 2017

LEGEND

 BH-6 Approximate Borehole Location



Kolibrien (2017)



BOREHOLE LOCATION PLAN

FIGURE

3



Sladden Engineering

Project Number:

644-17079

Report Number:

17-12-115

Date:

December 12, 2017

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

For our field investigation, six (6) exploratory bores were excavated on October 31, 2017 utilizing a truck mounted hollow stem auger rig (Mobile B-61). Continuous logs of the materials encountered were made by a representative of Sladden Engineering. Materials encountered in the boreholes were classified in accordance with the Unified Soil Classification System which is presented in this appendix.

Representative undisturbed samples were obtained within our bores by driving a thin-walled steel penetration sampler (California split spoon sampler) or a Standard Penetration Test (SPT) sampler with a 140 pound automatic-trip hammer dropping approximately 30 inches (ASTM D1586). The number of blows required to drive the samplers 18 inches was recorded in 6-inch increments and blowcounts are indicated on the boring logs.

The California samplers are 3.0 inches in diameter, carrying brass sample rings having inner diameters of 2.5 inches. The standard penetration samplers are 2.0 inches in diameter with an inner diameter of 1.5 inches. Undisturbed samples were removed from the sampler and placed in moisture sealed containers in order to preserve the natural soil moisture content. Bulk samples were obtained from the excavation spoils and samples were then transported to our laboratory for further observations and testing.

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			TYPICAL NAMES		
COARSE GRAINED SOILS MORE THAN HALF IS LARGER THAN No.200 SIEVE	GRAVELS	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVEL-SAND MIXTURES	
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES	
	MORE THAN HALF COARSE FRACTION IS LARGER THAN No.4 SIEVE SIZE	GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY-GRADED GRAVEL-SAND-SILT MIXTURES	
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES	
	SANDS	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS	
			SP	POORLY GRADED SANDS, GRAVELLY SANDS	
		MORE THAN HALF COARSE FRACTION IS SMALLER THAN No.4 SIEVE SIZE	SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
				SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN HALF IS SMALLER THAN No.200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, CLEAN CLAYS	
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS: LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	

EXPLANATION OF BORE LOG SYMBOLS

-  California Split-spoon Sample
-  Unrecovered Sample
-  Standard Penetration Test Sample
-  Groundwater depth

Note: The stratification lines on the borelogs represent the approximate boundaries between the soil types; the transitions may be gradual.

**SLADDEN ENGINEERING****BORE LOG**

Drill Rig: Mobil B-61 Date Drilled: 10/31/2017

Elevation: 1495 Ft (MSL) Boring No: BH-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
	13/13/28	1	46	35.2	11.2	123.2	2		Clayey Sand (SC); dark yellowish brown, slightly moist, medium dense, fine-grained (Fill/Disturbed).
	35/50-2"			22.1	13.0	115.3	4		
							6		
							8		
	18/30/30			14.9	5.4		10		Bedrock (Granitoid); moderately hard, moderately strong, highly weathered; breaks down to clayey sand (SC/SP) soil type.
							12		
							14		
	38/50-6"			8.5	3.2	135.6	16		
							18		Practical Auger Refusal at ~16.5 Feet bgs.
							20		Bedrock Encountered at ~2.5 Feet bgs.
							22		No Groundwater or Seepage Encountered.
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		
Completion Notes:								PROPOSED RESIDENTIAL DEVELOPMENT SWC SHERMAN ROAD & GARBANI ROAD, MENIFEE	
								Project No: 644-17079	Page 1
								Report No: 17-12-115	

**SLADDEN ENGINEERING****BORE LOG**

Drill Rig:	Mobil B-61	Date Drilled:	10/31/2017
Elevation:	1495 Ft (MSL)	Boring No:	BH-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Clayey Sand (SC); dark yellowish brown, slightly moist, fine-grained (Fill/Disturbed).
	26/30/25			11.4	4.1		4		
							6		
							8		Bedrock (Granitoid); moderately hard, moderately strong, highly weathered; breaks down to clayey sand (SC/SP) soil type.
	19/31/50-4"			17.9	7.9	130.1	10		
							12		
							14		Practical Auger Refusal at ~11.5 Feet bgs.
							16		Bedrock Encountered at ~3.5 Feet bgs.
							18		No Groundwater or Seepage Encountered.
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

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SWC SHERMAN ROAD & GARBANI ROAD, MENIFEE

Project No: 644-17079

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**SLADDEN ENGINEERING****BORE LOG**

Drill Rig: Mobil B-61 Date Drilled: 10/31/2017

Elevation: 1510 Ft (MSL) Boring No: BH-3

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Clayey Sand (SC); dark yellowish brown, slightly moist, fine to coarse grained with gravel (Fill/Disturbed).
	7/14/16			25.1	2.7	123.5	4		Clayey Sand (SC); dark yellowish brown, slightly moist, medium dense, fine to coarse grained with gravel (Qof).
							6		
							8		
	36/50-6"			17.6	5.0		10		
							12		Bedrock (Granitoid); moderately hard, moderately strong, highly weathered; breaks down to clayey sand (SC/SP) soil type.
							14		
	50-3"			18.9	3.4	117.7	16		
							18		
							20		Practical Auger Refusal at ~16.5 Feet bgs.
							22		Bedrock Encountered at ~6.5 Feet bgs.
							24		No Groundwater or Seepage Encountered.
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		
Completion Notes:								PROPOSED RESIDENTIAL DEVELOPMENT	
								SWC SHERMAN ROAD & GARBANI ROAD, MENIFEE	
								Project No: 644-17079	
								Report No: 17-12-115	Page 3

**SLADDEN ENGINEERING****BORE LOG**

Drill Rig:	Mobil B-61	Date Drilled:	10/31/2017
Elevation:	1515 Ft (MSL)	Boring No:	BH-4

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); dark yellowish brown, slightly moist, fine to coarse grained with gravel, wire and concrete debris (Fill).
	5/9/8			35.3	4.7		4		Silty Sand (SM); dark yellowish brown, slightly moist, medium dense, fine to coarse grained with gravel, wire and concrete debris (Fill).
							6		
							8		Clayey Sand (SC); dark yellowish brown, slightly moist, very dense, fine-grained (Qof).
	13/31/23			19.2	3.1	123.7	10		
							12		
							14		Bedrock (Granitoid); moderately hard, moderately strong, highly weathered; breaks down to clayey sand (SC/SP) soil type.
	50-6"			13.2	3.6		16		
							18		
							20		Practical Auger Refusal at ~16.5 Feet bgs.
							22		Bedrock Encountered at ~10.5 Feet bgs.
							24		No Groundwater or Seepage Encountered.
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED RESIDENTIAL DEVELOPMENT
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Project No: 644-17079

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**SLADDEN ENGINEERING****BORE LOG**

Drill Rig: Mobil B-61

Date Drilled: 10/31/2017

Elevation: 1510 Ft (MSL)

Boring No: BH-5

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Clayey Sand (SC); dark yellowish brown, slightly moist, fine to coarse grained with gravel (Fill/Disturbed).
	5/6/7			41.2	7.8	117.8	4		Clayey Sand (SC); dark yellowish brown, slightly moist, loose, fine-grained (Qof).
							6		
							8		
	22/50-6"			15.5	6.7		10		
							12		Bedrock (Granitoid); moderately hard, moderately strong, highly weathered; breaks down to clayey sand (SC/SP) soil type.
							14		
	50-1"			16.1	3.2		16		
							18		
							20		Practical Auger Refusal at ~16.5 Feet bgs.
							22		Bedrock Encountered at ~7.5 Feet bgs.
							24		No Groundwater or Seepage Encountered.
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

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SWC SHERMAN ROAD & GARBANI ROAD, MENIFEE

Project No: 644-17079

Report No: 17-12-115

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**SLADDEN ENGINEERING****BORE LOG**

Drill Rig: Mobil B-61 Date Drilled: 10/31/2017

Elevation: 1502 Ft (MSL) Boring No: BH-6

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Clayey Sand (SC); dark yellowish brown, slightly moist, fine to coarse grained with gravel (Fill/disturbed).
	6/13/45			43.3	11.7		4		
							6		Clayey Sand (SC); dark yellowish brown, slightly moist, very dense, fine to coarse grained Qof).
							8		
	28/50-6"			10.2	4.1	132.8	10		Bedrock (Granitoid); moderately hard, moderately strong, highly weathered; breaks down to clayey sand (SC/SP) soil type.
							12		
							14		Practical Auger Refusal at ~11.5 Feet bgs.
							16		Bedrock Encountered at ~5.5 Feet bgs.
							18		No Groundwater or Seepage Encountered.
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED RESIDENTIAL DEVELOPMENT
SWC SHERMAN ROAD & GARBANI ROAD, MENIFEE

Project No: 644-17079

Report No: 17-12-115

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APPENDIX B

LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Representative bulk and relatively undisturbed soil samples were obtained in the field and returned to our laboratory for additional observations and testing. Laboratory testing was generally performed in two phases. The first phase consisted of testing in order to determine the compaction of the existing natural soil and the general engineering classifications of the soils underlying the site. This testing was performed in order to estimate the engineering characteristics of the soil and to serve as a basis for selecting samples for the second phase of testing. The second phase consisted of soil mechanics testing. This testing including consolidation, shear strength and expansion testing was performed in order to provide a means of developing specific design recommendations based on the mechanical properties of the soil.

CLASSIFICATION AND COMPACTION TESTING

Unit Weight and Moisture Content Determinations: Each undisturbed sample was weighed and measured in order to determine its unit weight. A small portion of each sample was then subjected to testing in order to determine its moisture content. This was used in order to determine the dry density of the soil in its natural condition. The results of this testing are shown on the Bore Logs.

Maximum Density-Optimum Moisture Determinations: Representative soil types were selected for maximum density determinations. This testing was performed in accordance with the ASTM Standard D1557-91, Test Method A. The results of testing are presented graphically in this appendix. The maximum densities are compared to the field densities of the soil in order to determine the existing relative compaction to the soil.

Classification Testing: Soil samples were selected for classification testing. This testing consists of mechanical grain size analyses. This provides information for developing classifications for the soil in accordance with the Unified Soil Classification System which is presented in the preceding appendix. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing is very useful in detecting variations in the soils and in selecting samples for further testing.

SOIL MECHANIC'S TESTING

Expansion Testing: One (1) bulk sample was selected for Expansion testing. Expansion testing was performed in accordance with the UBC Standard 18-2. This testing consists of remolding 4-inch diameter by 1-inch thick test specimens to a moisture content and dry density corresponding to approximately 50 percent saturation. The samples are subjected to a surcharge of 144 pounds per square foot and allowed to reach equilibrium. At that point the specimens are inundated with distilled water. The linear expansion is then measured until complete (ASTM D4829).

Direct Shear Testing: One (1) bulk sample was selected for Direct Shear testing. This test measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation design and lateral design. Tests were performed using a recompacted test specimen that was saturated prior to tests. Tests were performed using a strain controlled test apparatus with normal pressures ranging from 800 to 2300 pounds per square foot (ASTM D3080-04).

Consolidation Testing: Two (2) relatively undisturbed samples were selected for consolidation testing. For this test, a one-inch thick test specimen was subjected to vertical loads varying from 575 psf to 11520 psf applied progressively. The consolidation at each load increment was recorded prior to placement of each subsequent load. The specimens were saturated at 575 psf or 720 psf load increment (ASTM D2435 & D5333).

Corrosion Series Testing: The soluble sulfate concentrations of the surface soil was determined in accordance with California Test Method Number (CA) 417. The pH and Minimum Resistivity were determined in accordance with CA 643. The soluble chloride concentrations were determined in accordance with CA 422.



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Maximum Density/Optimum Moisture

ASTM D698/D1557

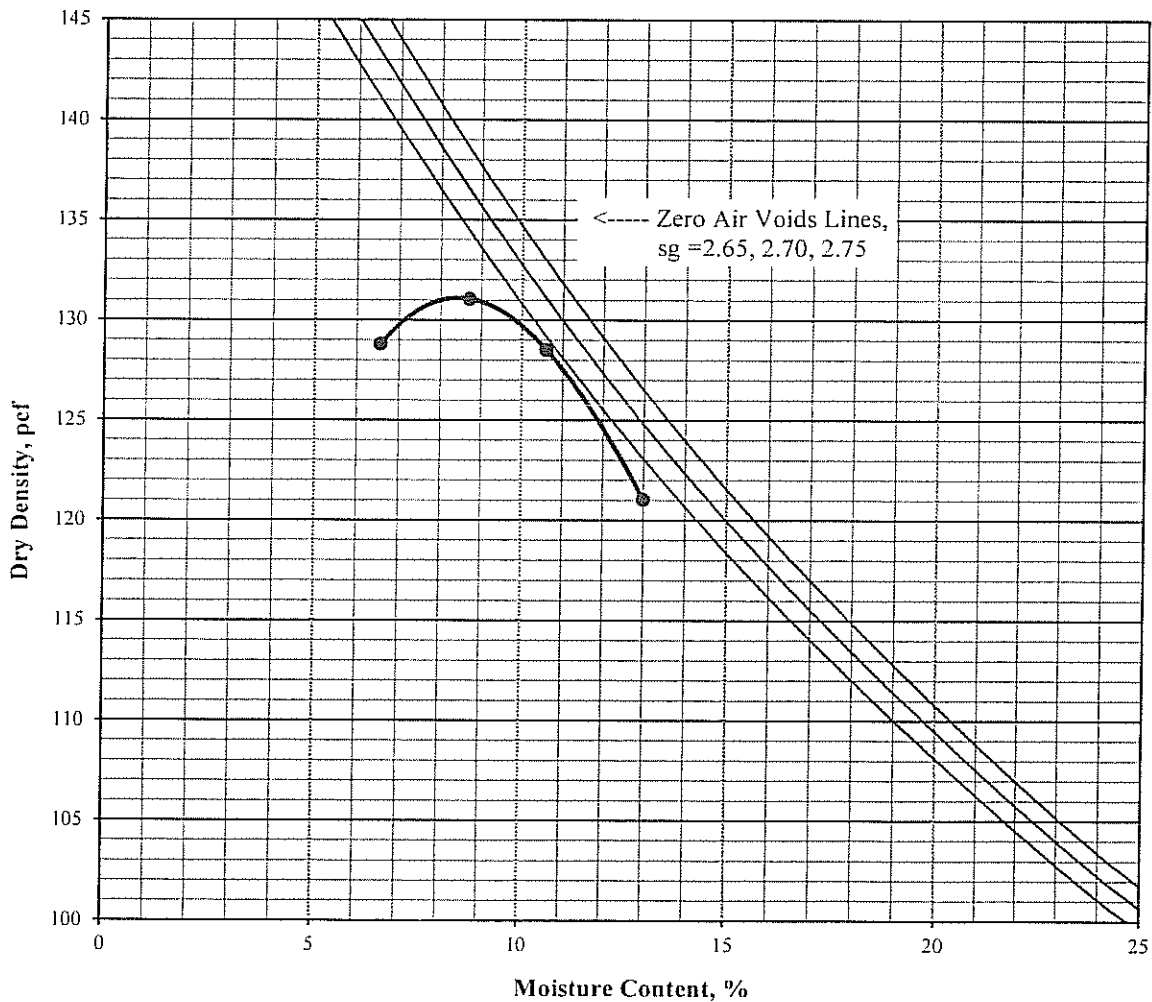
Project Number: 644-17079
Project Name: SWC Sherman Road & Garbani Road
Lab ID Number: LN6-17527
Sample Location: Bulk @ 0-5'
Description: Brown Clayey Sand (SC)

December 7, 2017

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 131.5 pcf
Optimum Moisture: 9%

Sieve Size	% Retained
3/4"	
3/8"	
#4	0.9





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Expansion Index

ASTM D 4829

Job Number: 644-17079
Job Name: SWC Sherman Road & Garbani Road
Lab ID Number: LN6-17527
Sample ID: Bulk @ 0-5'
Soil Description: Brown Clayey Sand (SC)

December 7, 2017

Wt of Soil + Ring:	581.0
Weight of Ring:	190.5
Wt of Wet Soil:	390.5
Percent Moisture:	8.8%
Sample Height, in	0.95
Wet Density, pcf:	124.6
Dry Density, pcf:	114.5

% Saturation:	50.4
---------------	------

Expansion

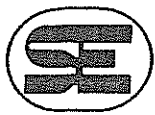
Rack # 1

Date/Time	12/5/2017	2:30 PM
Initial Reading	0.0000	
Final Reading	0.0457	

Expansion Index

46

(Final - Initial) x 1000



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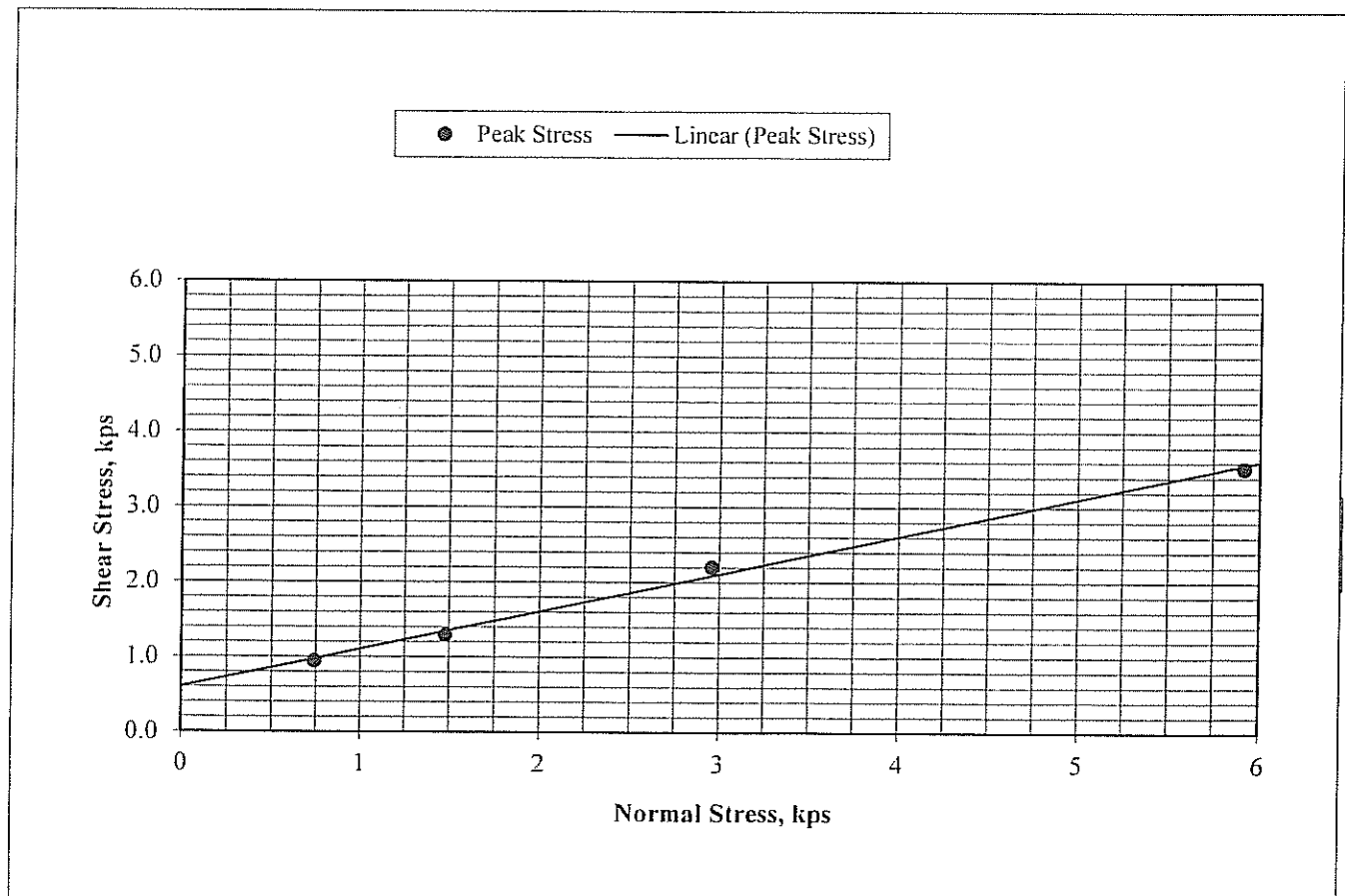
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Direct Shear ASTM D 3080-04 (modified for unconsolidated condition)

Job Number: 644-17079
Job Name SWC Sherman Road & Garbani Road
Lab ID No. LN6-17527
Sample ID Bulk @ 0-5'
Classification Brown Clayey Sand (SC)
Sample Type Remolded @ 90% of Maximum Density

December 7, 2017
Initial Dry Density: 118.1 pcf
Initial Moisture Content: 9.2 %
Peak Friction Angle (ϕ): 27°
Cohesion (c): 600 psf

Test Results	1	2	3	4	Average
Moisture Content, %	15.5	15.5	15.5	15.5	15.5
Saturation, %	98.4	98.4	98.4	98.4	98.4
Normal Stress, kps	0.739	1.479	2.958	5.916	
Peak Stress, kps	0.944	1.293	2.204	3.526	



Job Number: 644-17079
Job Name: SWC Sherman Road & Garbani Road
Date: 12/7/2017

Moisture Adjustment		Remolded Shear Weight	
Wt of Soil:	<u>1,000</u>	Max Dry Density:	131.5
Moist As Is:	<u>6.7</u>	Optimum Moisture:	9.0
Moist Wanted:	<u>9.0</u>		
ml of Water to Add:	21.6	Wt Soil per Ring, g:	155.1

UBC



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Gradation

ASTM C117 & C136

Project Number: 644-17079

December 7, 2017

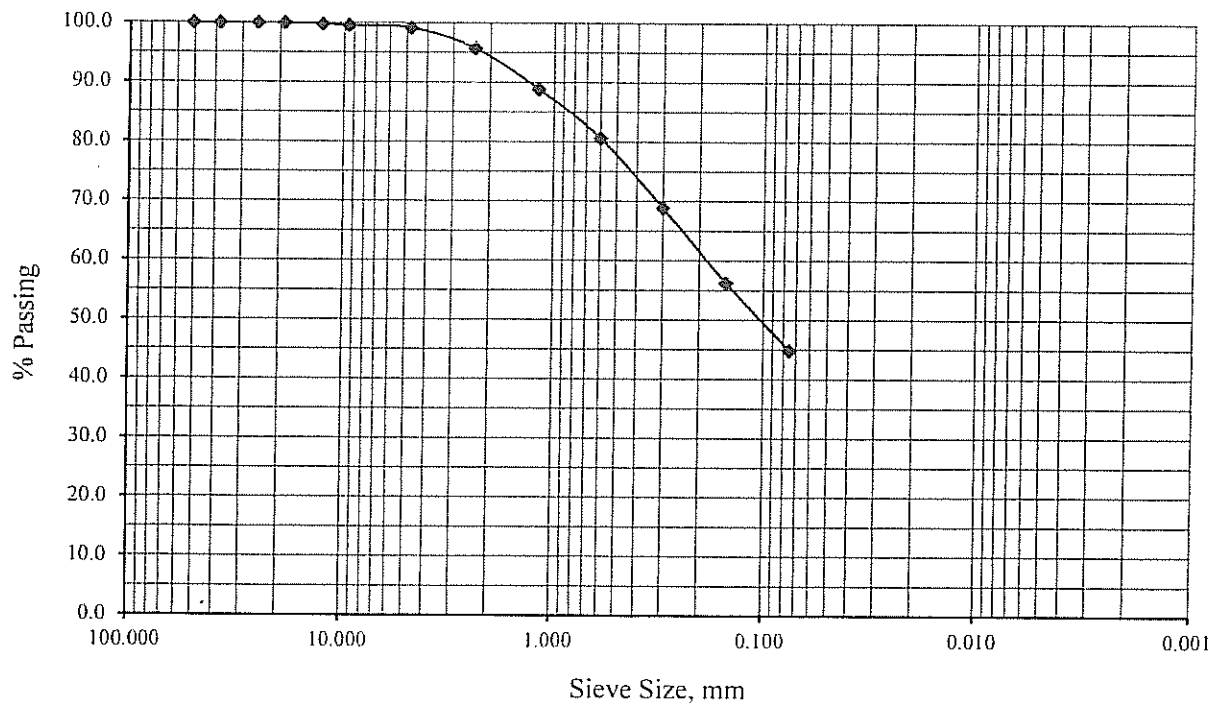
Project Name: SWC Sherman Road & Garbani Road

Lab ID Number: LN6-17527

Sample ID: Bulk @ 0-5'

Soil Classification: SC

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	99.8
3/8"	9.53	99.6
#4	4.75	99.1
#8	2.36	95.7
#16	1.18	88.8
#30	0.60	80.6
#50	0.30	68.9
#100	0.15	56.3
#200	0.075	44.9





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Gradation

ASTM C117 & C136

Project Number: 644-17079

December 7, 2017

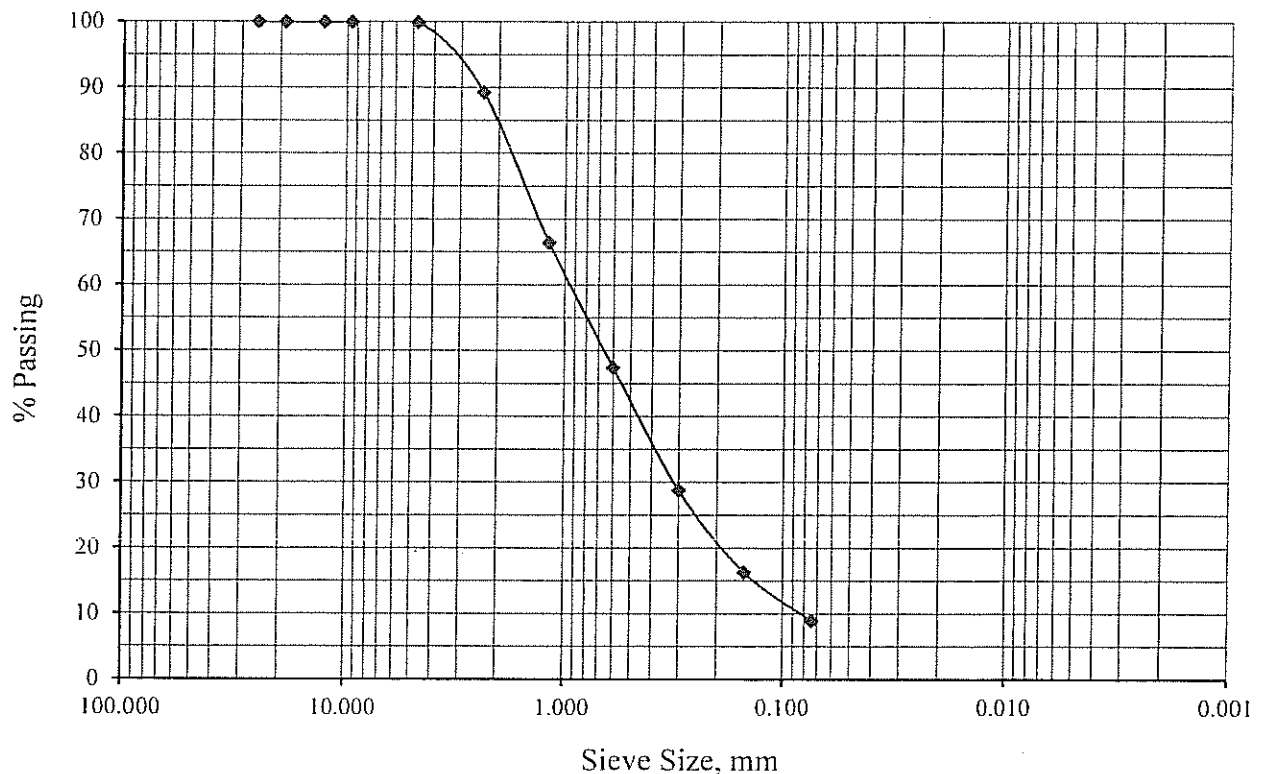
Project Name: SWC Sherman Road & Garbani Road

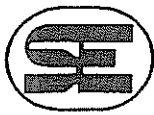
Lab ID Number: LN6-17527

Sample ID: BH-1 R-4 @ 15'

Soil Classification: SW-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	99.9
#8	2.36	89.3
#16	1.18	66.4
#30	0.60	47.4
#50	0.30	28.8
#100	0.15	16.3
#200	0.074	8.9





Sladden Engineering

450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

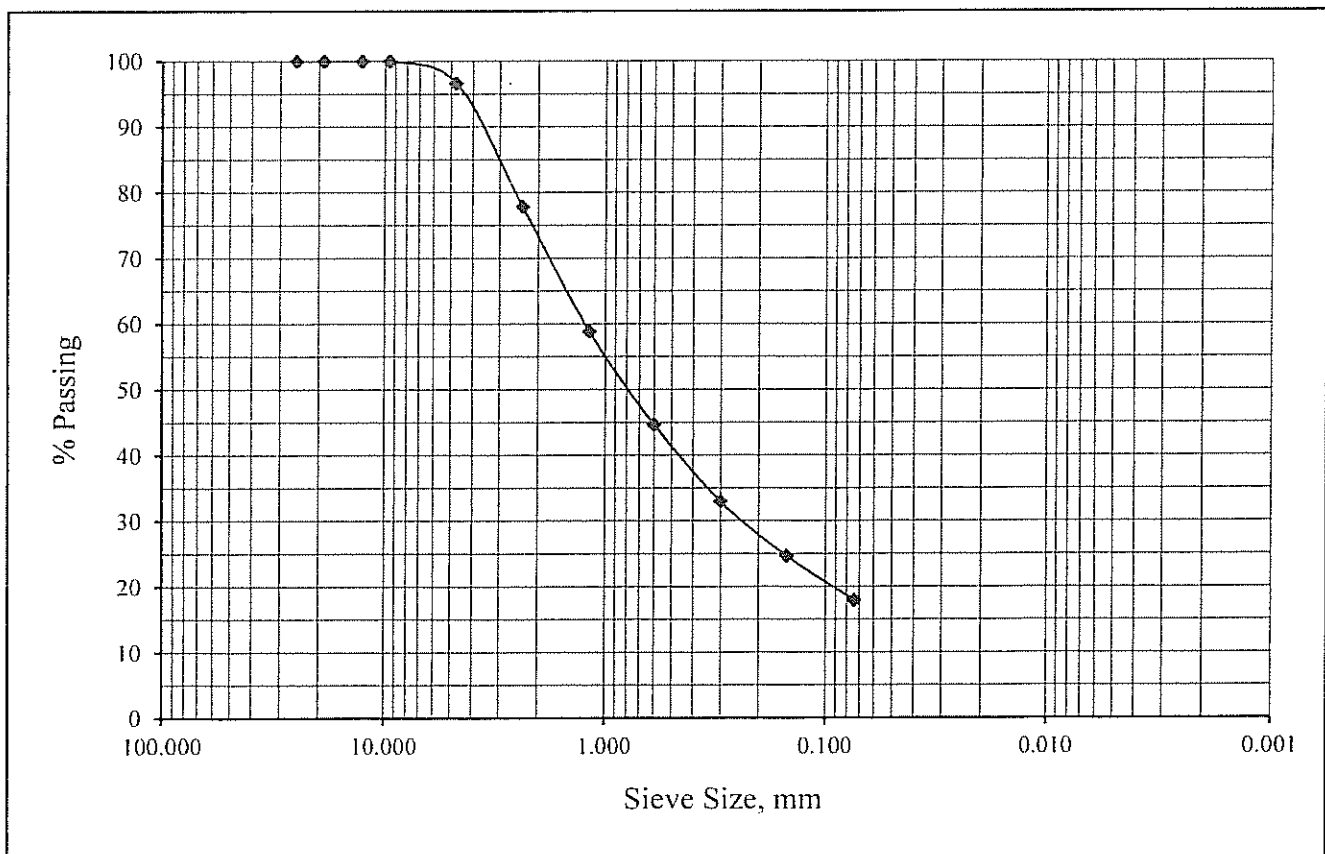
ASTM C117 & C136

Project Number: 644-17079
Project Name: SWC Sherman Road & Garbani Road
Lab ID Number: LN6-17527
Sample ID: BH-3 S-2 @ 10'

December 7, 2017

Soil Classification: SC

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	96.7
#8	2.36	77.9
#16	1.18	58.9
#30	0.60	44.7
#50	0.30	33.0
#100	0.15	24.7
#200	0.074	17.9





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Gradation

ASTM C117 & C136

Project Number: 644-17079

December 7, 2017

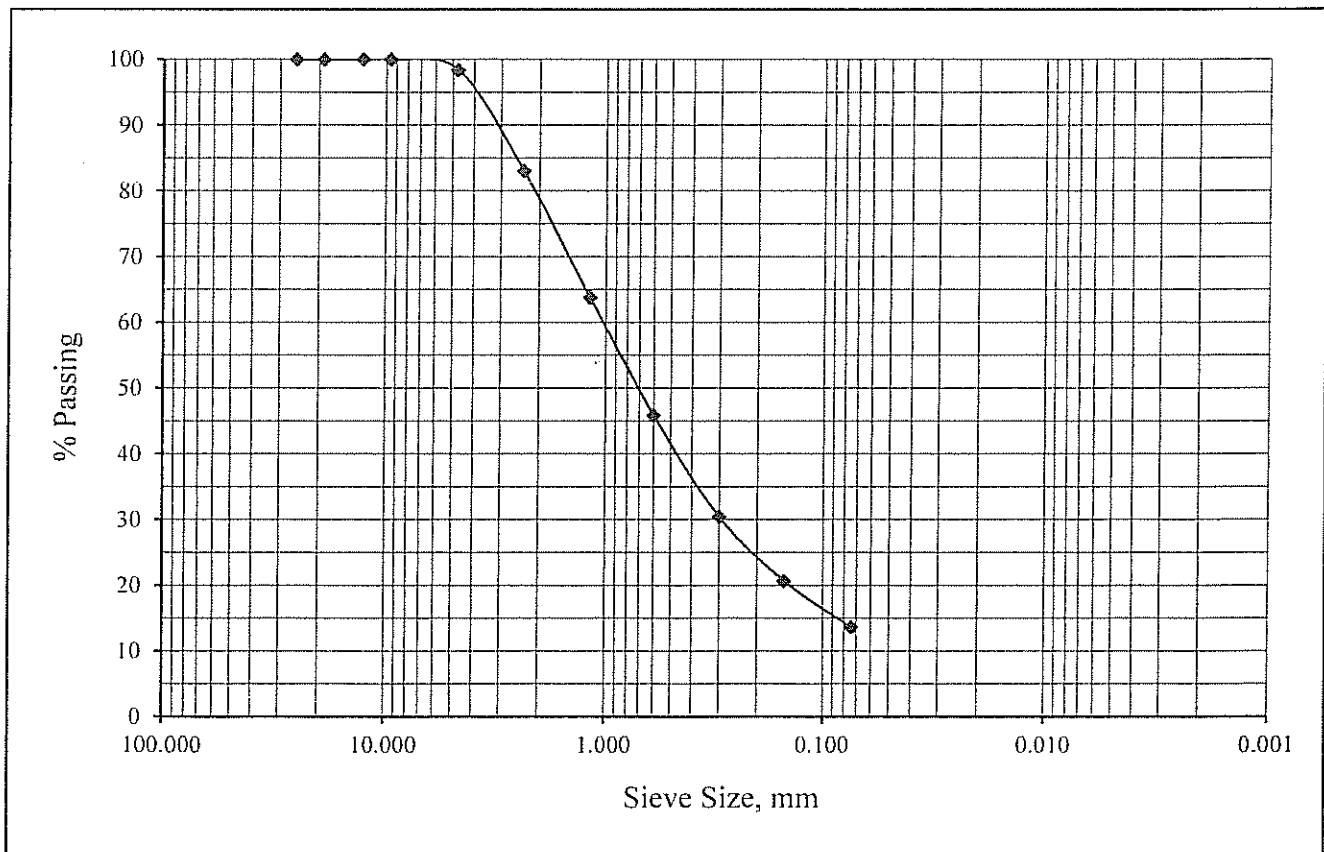
Project Name: SWC Sherman Road & Garbani Road

Lab ID Number: LN6-17527

Sample ID: BH-4 S-3 @ 15'

Soil Classification: SC

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	98.4
#8	2.36	83.0
#16	1.18	63.8
#30	0.60	45.9
#50	0.30	30.5
#100	0.15	20.7
#200	0.074	13.6





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Gradation

ASTM C117 & C136

Project Number: 644-17079

December 7, 2017

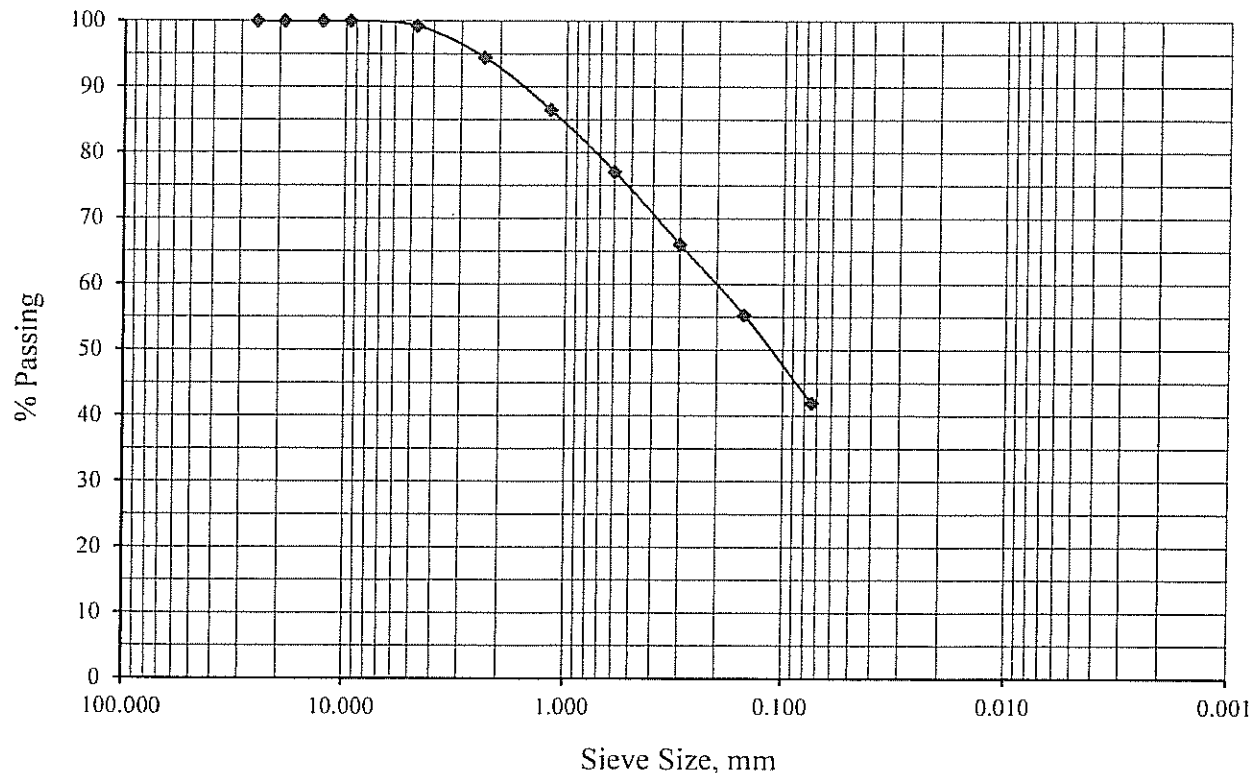
Project Name: SWC Sherman Road & Garbani Road

Lab ID Number: LN6-17527

Sample ID: BH-5 R-1 @ 5'

Soil Classification: SC

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	99.2
#8	2.36	94.5
#16	1.18	86.5
#30	0.60	77.1
#50	0.30	66.1
#100	0.15	55.3
#200	0.074	41.9





Sladden Engineering

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One Dimensional Consolidation

ASTM D2435 & D5333

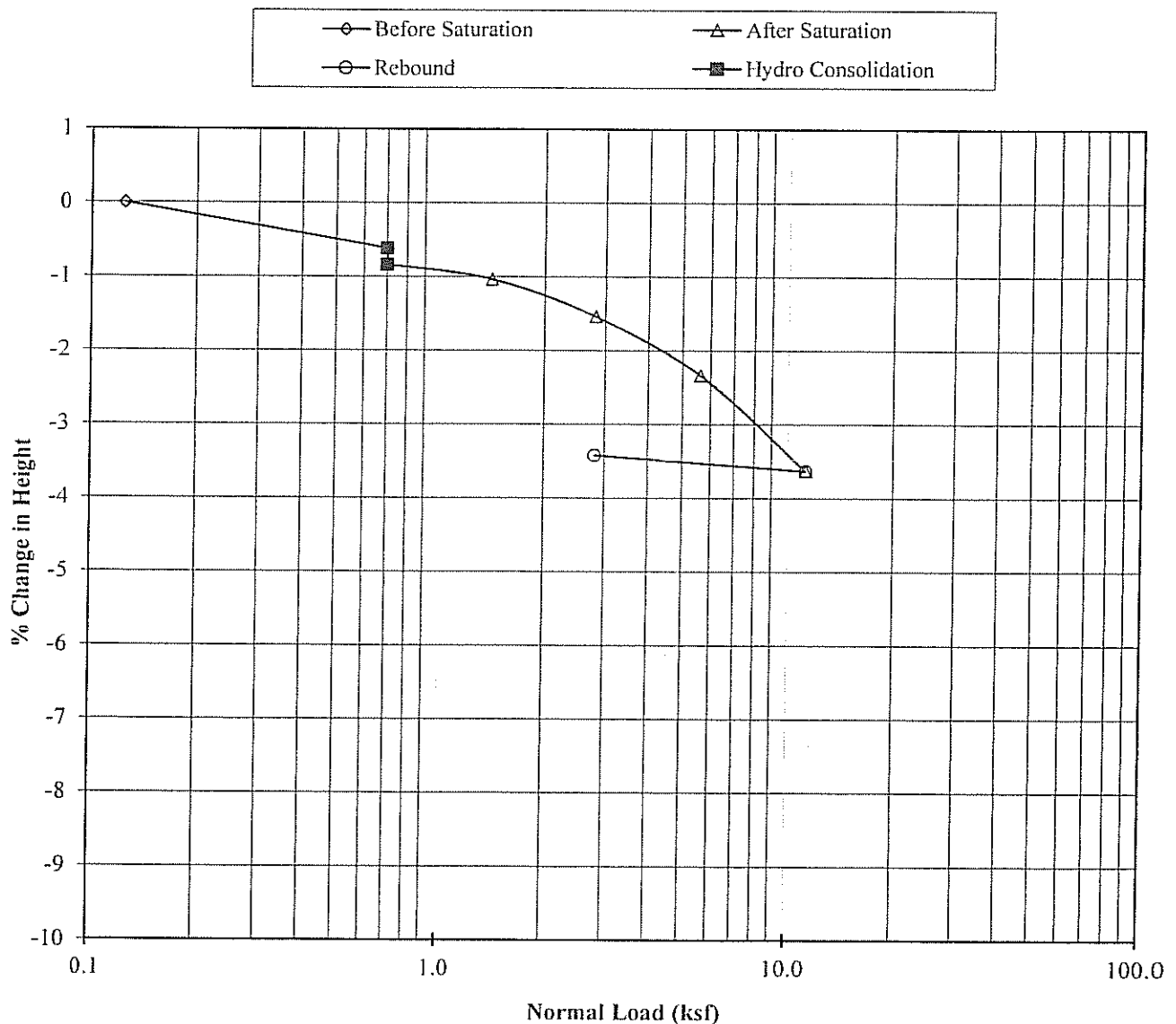
Job Number: 644-17079
Job Name: SWC Sherman Road & Garbani Road
Lab ID Number: LN6-17527
Sample ID: BH-5 R-1 @ 5'
Soil Description: Red Brown Clayey Sand (SC)

December 7, 2017

Initial Dry Density, pcf: 115.8
Initial Moisture, %: 7.8
Initial Void Ratio: 0.440
Specific Gravity: 2.67

Hydrocollapse: 0.2% @ 0.702 ksf

% Change in Height vs Normal Pressure Diagram





Sladden Engineering

6782 Stanton Ave., Suite A, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
45090 Golf Center Pkwy., Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Date: December 7, 2017

Account No.: 644-17079

Customer: Garbani 10, LLC

Location: SWC Sherman Road & Garbani Road

Analytical Report

Corrosion Series

	pH per CA 643	Soluble Sulfates per CA 417 ppm	Soluble Chloride per CA 422 ppm	Min. Resistivity per CA 643 ohm-cm
Bulk @ 0-5'	7.9	120	80	1400

APPENDIX C

SEISMIC DESIGN MAP AND REPORT DEAGGREGATION OUTPUT

USGS Design Maps Summary Report

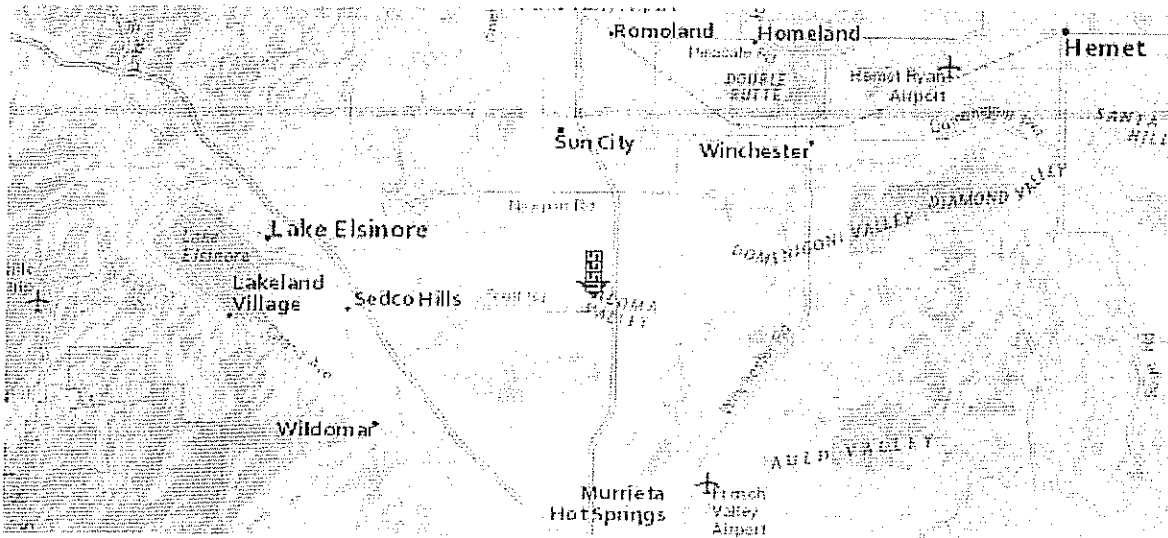
User-Specified Input

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 33.65534°N, 117.18117°W

Site Soil Classification Site Class C – "Very Dense Soil and Soft Rock"

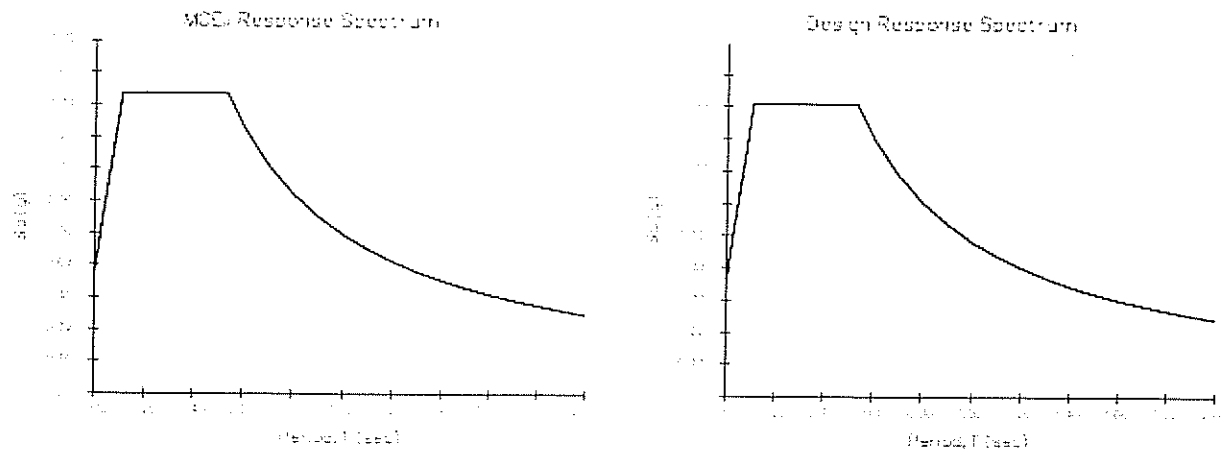
Risk Category I/II/III



USGS-Provided Output

$S_s = 1.501 \text{ g}$	$S_{MS} = 1.501 \text{ g}$	$S_{DS} = 1.000 \text{ g}$
$S_1 = 0.611 \text{ g}$	$S_{M1} = 0.795 \text{ g}$	$S_{D1} = 0.530 \text{ g}$

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.



For PGA_M , T_L , C_{RS} , and C_{R1} values, please [view the detailed report](#).

Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

Design Maps Detailed Report

ASCE 7-10 Standard (33.65534°N, 117.18117°W)

Site Class C – “Very Dense Soil and Soft Rock”, Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 ^[1]

$$S_s = 1.501 \text{ g}$$

From Figure 22-2 ^[2]

$$S_1 = 0.611 \text{ g}$$

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class C, based on the site soil properties in accordance with Chapter 20.

Table 20.3-1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf

Any profile with more than 10 ft of soil having the characteristics:

- Plasticity index $PI > 20$,
- Moisture content $w \geq 40\%$, and
- Undrained shear strength $\bar{s}_u < 500 \text{ psf}$

F. Soils requiring site response analysis in accordance with Section 21.1

See Section 20.3.1

$$\text{For SI: } 1\text{ft/s} = 0.3048 \text{ m/s } 1\text{lb/ft}^2 = 0.0479 \text{ kN/m}^2$$

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

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

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

For Site Class = C and $S_s = 1.501$ g, $F_a = 1.000$

Table 11.4-2: Site Coefficient F_v

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

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

For Site Class = C and $S_1 = 0.611$ g, $F_v = 1.300$

Equation (11.4-1):

$$S_{MS} = F_a S_s = 1.000 \times 1.501 = 1.501 \text{ g}$$

Equation (11.4-2):

$$S_{M1} = F_v S_1 = 1.300 \times 0.611 = 0.795 \text{ g}$$

Section 11.4.4 — Design Spectral Acceleration Parameters

Equation (11.4-3):

$$S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.501 = 1.000 \text{ g}$$

Equation (11.4-4):

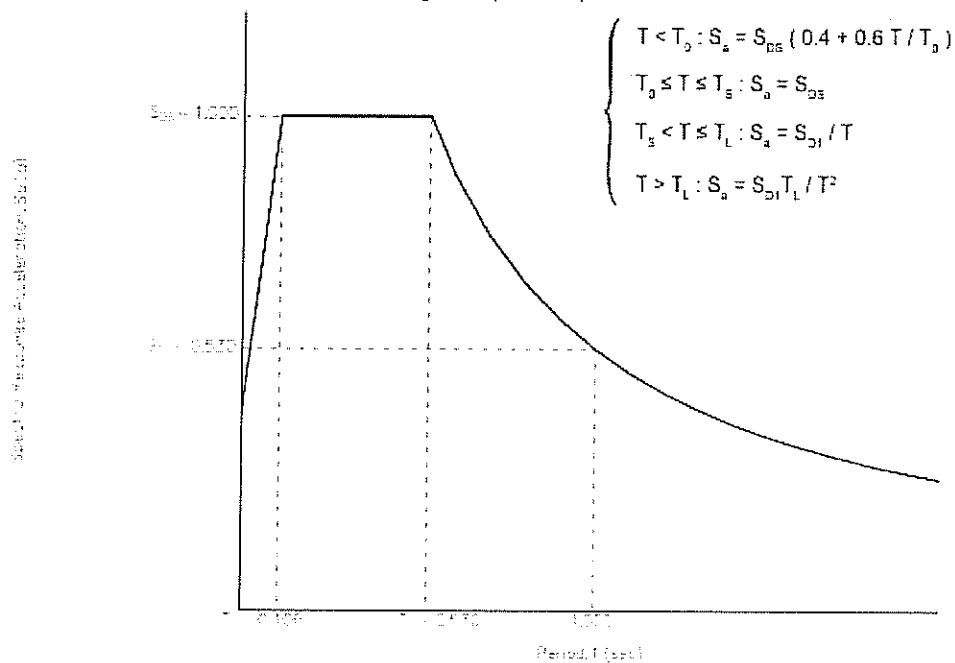
$$S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.795 = 0.530 \text{ g}$$

Section 11.4.5 — Design Response Spectrum

From Figure 22-12 ^[3]

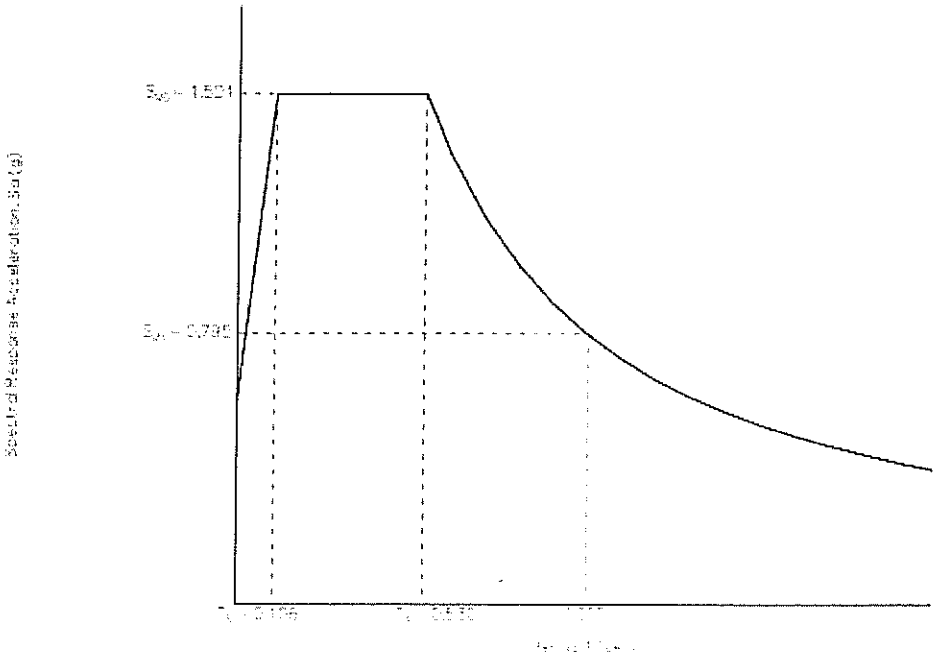
$$T_L = 8 \text{ seconds}$$

Figure 11.4-1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From **Figure 22-7** ^[4]

$$PGA = 0.565$$

Equation (11.8-1):

$$PGA_M = F_{PGA} PGA = 1.000 \times 0.565 = 0.565 \text{ g}$$

Table 11.8-1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

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

For Site Class = C and PGA = 0.565 g, $F_{PGA} = 1.000$

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From **Figure 22-17** ^[5]

$$C_{RS} = 1.015$$

From **Figure 22-18** ^[6]

$$C_{R1} = 1.006$$

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

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

For Risk Category = I and $S_{DS} = 1.000g$, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

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

For Risk Category = I and $S_{D1} = 0.530g$, Seismic Design Category = D

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

Seismic Design Category $\equiv$ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. Figure 22-1: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. Figure 22-2: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. Figure 22-12: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. Figure 22-7: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. Figure 22-17: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. Figure 22-18: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

Unified Hazard Tool



Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

^ Input

Edition

Dynamic: Continuous U.S. 2014 (v4.1.

Spectral Period

Peak ground acceleration

Latitude

Decimal degrees

33.655338

Time Horizon

Return period in years

475

Longitude

Decimal degrees, negative values for western longitudes

-117.181171

Site Class

537 m/s (Site class C)

^ Hazard Curve



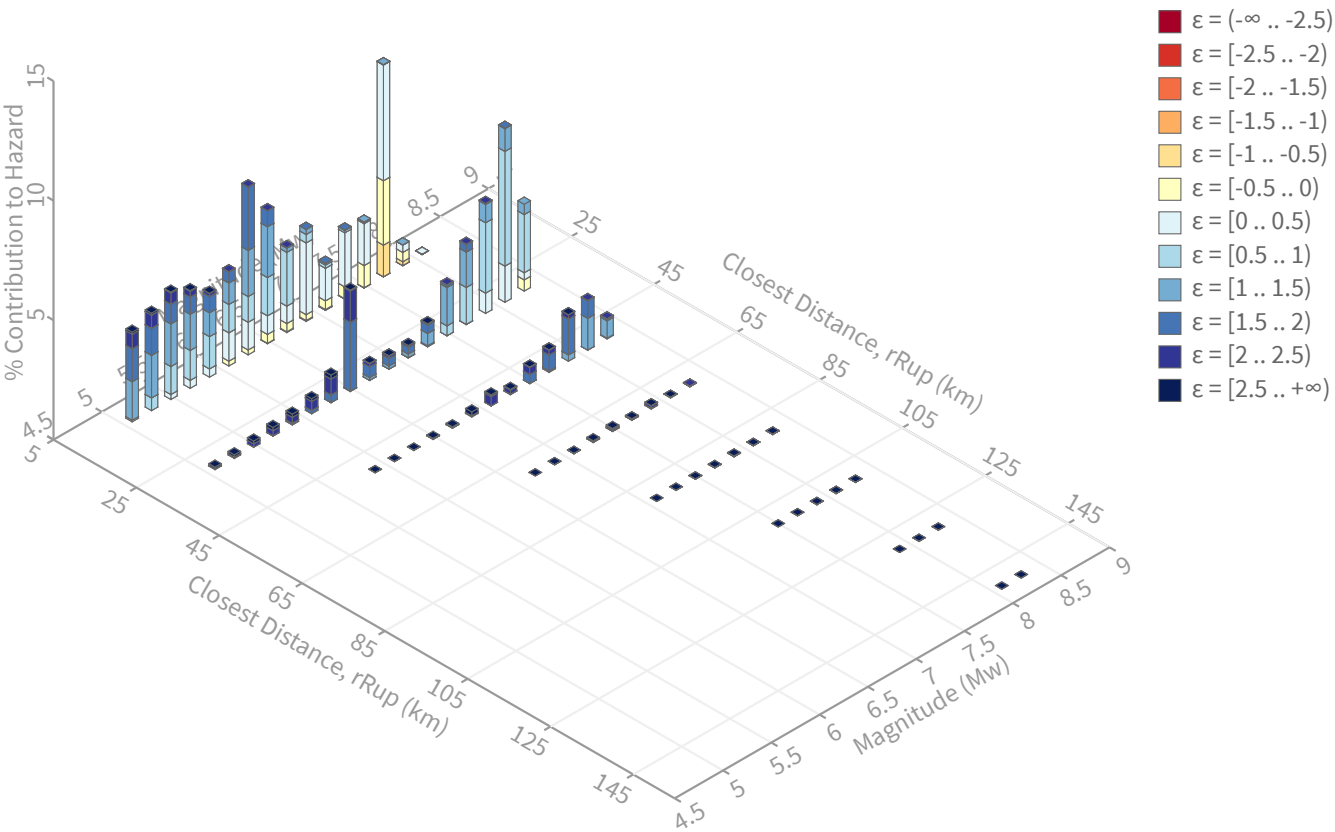
Please select “Edition”, “Location” & “Site Class” above to compute a hazard curve.

Compute Hazard Curve

^ Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 475 yrs
Exceedance rate: 0.0021052632 yr⁻¹
PGA ground motion: 0.37936899 g

Recovered targets

Return period: 506.33526 yrs
Exceedance rate: 0.001974976 yr⁻¹

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.15 %

Mean (for all sources)

r: 18.63 km
m: 6.88
ε₀: 0.96 σ

Mode (largest r-m bin)

r: 9.75 km
m: 7.71
ε₀: -0.07 σ
Contribution: 8.86 %

Mode (largest ε₀ bin)

r: 9.75 km
m: 7.71
ε₀: 0.1 σ
Contribution: 4.84 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set  Source	Type	r	m	ϵ_0	lon	lat	az	%
UC33brAvg_FM31	System							32.86
Elsinore (Temecula) rev [0]		9.74	7.38	0.11	117.249°W	33.590°N	220.88	10.26
San Jacinto (Stepovers Combined) [2]		24.57	7.98	0.74	116.983°W	33.802°N	48.17	9.81
Elsinore (Glen Ivy) rev [3]		18.08	6.42	1.51	117.373°W	33.685°N	280.67	2.77
Elsinore (Glen Ivy) rev [2]		24.00	6.49	1.88	117.428°W	33.721°N	287.76	2.33
San Andreas (San Bernardino S) [6]		47.51	7.91	1.64	116.820°W	33.959°N	44.57	2.09
Elsinore (Stepovers Combined) [1]		10.53	6.65	0.60	117.281°W	33.612°N	242.27	1.32
UC33brAvg_FM32	System							32.77
Elsinore (Temecula) rev [0]		9.74	7.42	0.08	117.249°W	33.590°N	220.88	10.13
San Jacinto (Stepovers Combined) [2]		24.57	7.98	0.74	116.983°W	33.802°N	48.17	9.76
Elsinore (Glen Ivy) rev [3]		18.08	6.42	1.52	117.373°W	33.685°N	280.67	2.83
Elsinore (Glen Ivy) rev [2]		24.00	6.51	1.86	117.428°W	33.721°N	287.76	2.40
San Andreas (San Bernardino S) [6]		47.51	7.91	1.63	116.820°W	33.959°N	44.57	2.10
Elsinore (Stepovers Combined) [1]		10.53	6.69	0.57	117.281°W	33.612°N	242.27	1.38
UC33brAvg_FM31 (opt)	Grid							17.19
PointSourceFinite: -117.181, 33.741		9.96	5.84	0.97	117.181°W	33.741°N	0.00	2.23
PointSourceFinite: -117.181, 33.741		9.96	5.84	0.97	117.181°W	33.741°N	0.00	2.23
PointSourceFinite: -117.181, 33.705		7.31	5.71	0.67	117.181°W	33.705°N	0.00	1.80
PointSourceFinite: -117.181, 33.705		7.31	5.71	0.67	117.181°W	33.705°N	0.00	1.80
PointSourceFinite: -117.181, 33.714		8.26	5.57	0.92	117.181°W	33.714°N	0.00	1.14
PointSourceFinite: -117.181, 33.714		8.26	5.57	0.92	117.181°W	33.714°N	0.00	1.14
PointSourceFinite: -117.181, 33.813		16.32	5.99	1.57	117.181°W	33.813°N	0.00	1.05
PointSourceFinite: -117.181, 33.813		16.32	5.99	1.57	117.181°W	33.813°N	0.00	1.05
UC33brAvg_FM32 (opt)	Grid							17.17
PointSourceFinite: -117.181, 33.741		9.97	5.84	0.97	117.181°W	33.741°N	0.00	2.23
PointSourceFinite: -117.181, 33.741		9.97	5.84	0.97	117.181°W	33.741°N	0.00	2.23
PointSourceFinite: -117.181, 33.705		7.31	5.71	0.67	117.181°W	33.705°N	0.00	1.80
PointSourceFinite: -117.181, 33.705		7.31	5.71	0.67	117.181°W	33.705°N	0.00	1.80
PointSourceFinite: -117.181, 33.714		8.26	5.57	0.92	117.181°W	33.714°N	0.00	1.14
PointSourceFinite: -117.181, 33.714		8.26	5.57	0.92	117.181°W	33.714°N	0.00	1.14
PointSourceFinite: -117.181, 33.813		16.32	5.99	1.57	117.181°W	33.813°N	0.00	1.05
PointSourceFinite: -117.181, 33.813		16.32	5.99	1.57	117.181°W	33.813°N	0.00	1.05

*** Deaggregation of Seismic Hazard at One Period of Spectral Acceleration ***

*** Data from Dynamic: Conterminous U.S. 2014 (v4.1.1) ****

PSHA Deaggregation. %contributions.

site: Test

longitude: 117.181°W

latitude: 33.655°E

imt: Peak ground acceleration

vs30 = 537 m/s (Site class C)

return period: 475 yrs.

#This deaggregation corresponds to: Total

Summary statistics for PSHA PGA deaggregation, r =distance, ϵ =epsilon:

Deaggregation targets:

Return period: 475 yrs

Exceedance rate: 0.0021052632 yr^{-1}

PGA ground motion: 0.37936899 g

Recovered targets:

Return period: 506.33526 yrs

Exceedance rate: 0.001974976 yr^{-1}

Totals:

Binned: 100 %

Residual: 0 %

Trace: 0.15 %

Mean (for all sources):

r : 18.63 km

m : 6.88

ϵ_0 : 0.96 σ

Mode (largest r - m bin):

r : 9.75 km

m : 7.71

ϵ_0 : -0.07 σ

Contribution: 8.86 %

Mode (largest ϵ_0 bin):

r : 9.75 km

m : 7.71

ϵ_0 : 0.1 σ

Contribution: 4.84 %

Discretization:

r : min = 0.0, max = 1000.0, Δ = 20.0 km

m : min = 4.4, max = 9.4, Δ = 0.2

ϵ : min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys:

ϵ_0 : $[-\infty \dots -2.5)$

ϵ_1 : $[-2.5 \dots -2.0)$

ϵ_2 : $[-2.0 \dots -1.5)$

ϵ_3 : $[-1.5 \dots -1.0)$

ϵ_4 : $[-1.0 \dots -0.5)$

ϵ_5 : $[-0.5 \dots 0.0)$

ϵ_6 : $[0.0 \dots 0.5)$

ϵ_7 : [0.5 .. 1.0)

ϵ_8 : [1.0 .. 1.5)

ϵ_9 : [1.5 .. 2.0)

ϵ_{10} : [2.0 .. 2.5)

ϵ_{11} : [2.5 .. $+\infty$]

Closest Distance, rRup (km)		Magnitude (Mw)		ALL_	$\epsilon=[2.5, \infty)$	$\epsilon=[2, 2.5)$	$\epsilon=[1.5, 2)$	$\epsilon=$
[1, 1.5)	$\epsilon=[0.5, 1)$	$\epsilon=(-\infty, 0.5)$	$\epsilon=[-0.5, \infty)$	$\epsilon=[-1, -0.5)$	$\epsilon=[-1.5, -1)$	$\epsilon=[-2, -1.5)$		
$\epsilon=[-2.5, -2)$	$\epsilon=(-\infty, -2.5)$							
150 8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
150 8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
130 7.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
130 8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
130 8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
110 7.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
110 7.7	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
110 7.9	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
110 8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
110 8.3	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
90 7.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
90 7.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
90 7.5	0.004	0.000	0.004	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
90 7.7	0.018	0.004	0.014	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
90 7.9	0.034	0.012	0.022	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
90 8.1	0.004	0.000	0.004	0.001	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
90 8.3	0.013	0.003	0.010	0.001	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
70 6.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
70 6.9	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
70 7.1	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000					
70 7.3	0.069	0.015	0.054	0.000	0.000	0.000	0.000	0.000

0.000	0.000	0.000	0.000							
70	7.5	0.114	0.000	0.061	0.053	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.7	0.054	0.004	0.038	0.012	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.9	0.133	0.028	0.100	0.005	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	8.1	0.019	0.013	0.006	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	8.3	0.024	0.001	0.021	0.002	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	5.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.1	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.3	0.011	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.5	0.034	0.001	0.033	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.7	0.052	0.008	0.044	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.9	0.207	0.053	0.154	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.1	0.452	0.002	0.388	0.062	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.3	0.214	0.018	0.174	0.022	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.5	0.682	0.001	0.372	0.299	0.010	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.7	0.932	0.065	0.659	0.207	0.001	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.9	1.941	0.264	1.497	0.180	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	8.1	2.068	0.000	1.329	0.729	0.009	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	8.3	0.832	0.029	0.728	0.075	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.1	0.098	0.031	0.067	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.3	0.145	0.060	0.085	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.5	0.254	0.143	0.111	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.7	0.356	0.013	0.218	0.125	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.9	0.446	0.069	0.251	0.126	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.1	0.626	0.135	0.385	0.105	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

30	6.3	1.143	0.005	0.318	0.665	0.155	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.5	4.234	0.020	2.870	1.314	0.030	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.7	0.701	0.000	0.116	0.448	0.127	0.011	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.9	0.548	0.005	0.127	0.320	0.092	0.004	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.1	0.518	0.016	0.147	0.285	0.070	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.3	0.960	0.046	0.515	0.349	0.050	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.5	2.121	0.001	0.412	1.604	0.099	0.006	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.7	3.348	0.009	1.544	1.478	0.315	0.002	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.9	4.592	0.848	2.944	0.766	0.034	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.1	7.270	1.512	4.797	0.953	0.008	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.3	3.631	0.470	0.298	2.434	0.430	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.1	3.742	0.067	1.609	1.375	0.610	0.080	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.3	4.069	0.532	1.780	1.132	0.550	0.075	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.5	4.483	0.208	1.171	1.782	0.817	0.480	0.024	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.7	4.078	0.334	1.251	1.514	0.711	0.249	0.019	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.9	3.498	0.346	1.351	0.997	0.678	0.127	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.1	3.935	0.203	1.185	1.187	0.896	0.461	0.004	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.3	7.020	0.205	1.160	1.075	1.928	2.652	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.5	5.559	0.018	0.373	0.777	1.600	2.123	0.668	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.7	3.545	0.031	0.346	0.728	2.249	0.172	0.019	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.9	3.844	0.037	0.244	3.002	0.352	0.210	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.1	1.955	0.002	0.029	0.361	1.360	0.133	0.069	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.3	2.885	0.003	0.014	0.495	2.262	0.092	0.019	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.5	2.748	0.001	0.008	0.926	1.751	0.058	0.004	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.7	8.860	0.000	0.000	1.322	2.693	4.841	0.004	0.000	0.000

0.000	0.000	0.000	0.000							
10	7.9	0.860	0.000	0.000	0.161	0.391	0.307	0.001	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	8.1	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

Principal Sources (faults, subduction, random seismicity having > 3% contribution

UC33brAvg_FM31:

Percent Contributed: 32.86

Distance (km): null

Magnitude: null

Epsilon (mean values): null

Elsinore (Temecula) rev [0]:

Percent Contributed: 10.26

Distance (km): 9.7411202

Magnitude: 7.3778576

Epsilon (mean values): 0.10600919

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 9.81

Distance (km): 24.568702

Magnitude: 7.9789132

Epsilon (mean values): 0.73585997

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

Elsinore (Glen Ivy) rev [3]:

Percent Contributed: 2.77

Distance (km): 18.081327

Magnitude: 6.4239123

Epsilon (mean values): 1.5147146

Azimuth: 280.67093

Latitude: 33.68522

Longitude: -117.3727

Elsinore (Glen Ivy) rev [2]:

Percent Contributed: 2.33

Distance (km): 23.997644

Magnitude: 6.4862353

Epsilon (mean values): 1.8830013

Azimuth: 287.76176

Latitude: 33.72083

Longitude: -117.4279

San Andreas (San Bernardino S) [6]:

Percent Contributed: 2.09

Distance (km): 47.511788

Magnitude: 7.908257

Epsilon (mean values): 1.6359348

Azimuth: 44.567261

Latitude: 33.95911
Longitude: -116.8198
Elsinore (Stepovers Combined) [1]:
Percent Contributed: 1.32
Distance (km): 10.532427
Magnitude: 6.6505304
Epsilon (mean values): 0.60452375
Azimuth: 242.27106
Latitude: 33.6116
Longitude: -117.28099
UC33brAvg_FM32:
Percent Contributed: 32.77
Distance (km): null
Magnitude: null
Epsilon (mean values): null
Elsinore (Temecula) rev [0]:
Percent Contributed: 10.13
Distance (km): 9.7411202
Magnitude: 7.4223076
Epsilon (mean values): 0.080182155
Azimuth: 220.88047
Latitude: 33.589792
Longitude: -117.24926
San Jacinto (Stepovers Combined) [2]:
Percent Contributed: 9.76
Distance (km): 24.568702
Magnitude: 7.9758141
Epsilon (mean values): 0.73819
Azimuth: 48.17305
Latitude: 33.802499
Longitude: -116.98307
Elsinore (Glen Ivy) rev [3]:
Percent Contributed: 2.83
Distance (km): 18.081327
Magnitude: 6.4194796
Epsilon (mean values): 1.5171134
Azimuth: 280.67093
Latitude: 33.68522
Longitude: -117.3727
Elsinore (Glen Ivy) rev [2]:
Percent Contributed: 2.4
Distance (km): 23.997644
Magnitude: 6.5132589
Epsilon (mean values): 1.8595695
Azimuth: 287.76176
Latitude: 33.72083
Longitude: -117.4279
San Andreas (San Bernardino S) [6]:
Percent Contributed: 2.1

Distance (km): 47.511788
Magnitude: 7.9109207
Epsilon (mean values): 1.6339778
Azimuth: 44.567261
Latitude: 33.95911
Longitude: -116.8198
Elsinore (Stepovers Combined) [1]:
Percent Contributed: 1.38
Distance (km): 10.532427
Magnitude: 6.6875457
Epsilon (mean values): 0.57465367
Azimuth: 242.27106
Latitude: 33.6116
Longitude: -117.28099
UC33brAvg_FM31 (opt):
Percent Contributed: 17.19
Distance (km): null
Magnitude: null
Epsilon (mean values): null
PointSourceFinite: -117.181, 33.741:
Percent Contributed: 2.23
Distance (km): 9.9638883
Magnitude: 5.8386712
Epsilon (mean values): 0.97401884
Azimuth: 0
Latitude: 33.740773
Longitude: -117.18117
PointSourceFinite: -117.181, 33.741:
Percent Contributed: 2.23
Distance (km): 9.9638851
Magnitude: 5.8386723
Epsilon (mean values): 0.97401754
Azimuth: 0
Latitude: 33.740773
Longitude: -117.18117
PointSourceFinite: -117.181, 33.705:
Percent Contributed: 1.8
Distance (km): 7.3071047
Magnitude: 5.7075514
Epsilon (mean values): 0.66882479
Azimuth: 0
Latitude: 33.704801
Longitude: -117.18117
PointSourceFinite: -117.181, 33.705:
Percent Contributed: 1.8
Distance (km): 7.3071047
Magnitude: 5.7075514
Epsilon (mean values): 0.66882479
Azimuth: 0

Latitude: 33.704801
Longitude: -117.18117
PointSourceFinite: -117.181, 33.714:
Percent Contributed: 1.14
Distance (km): 8.2648514
Magnitude: 5.5712992
Epsilon (mean values): 0.92323308
Azimuth: 0
Latitude: 33.713794
Longitude: -117.18117
PointSourceFinite: -117.181, 33.714:
Percent Contributed: 1.14
Distance (km): 8.2648514
Magnitude: 5.5712992
Epsilon (mean values): 0.92323308
Azimuth: 0
Latitude: 33.713794
Longitude: -117.18117
PointSourceFinite: -117.181, 33.813:
Percent Contributed: 1.05
Distance (km): 16.317243
Magnitude: 5.9929076
Epsilon (mean values): 1.5672703
Azimuth: 0
Latitude: 33.812719
Longitude: -117.18117
PointSourceFinite: -117.181, 33.813:
Percent Contributed: 1.05
Distance (km): 16.317272
Magnitude: 5.9929014
Epsilon (mean values): 1.5672776
Azimuth: 0
Latitude: 33.812719
Longitude: -117.18117
UC33brAvg_FM32 (opt):
Percent Contributed: 17.17
Distance (km): null
Magnitude: null
Epsilon (mean values): null
PointSourceFinite: -117.181, 33.741:
Percent Contributed: 2.23
Distance (km): 9.9651473
Magnitude: 5.83814
Epsilon (mean values): 0.97461225
Azimuth: 0
Latitude: 33.740773
Longitude: -117.18117
PointSourceFinite: -117.181, 33.741:
Percent Contributed: 2.23

Distance (km): 9.9651441
Magnitude: 5.8381411
Epsilon (mean values): 0.97461095
Azimuth: 0
Latitude: 33.740773
Longitude: -117.18117
PointSourceFinite: -117.181, 33.705:
Percent Contributed: 1.8
Distance (km): 7.3076388
Magnitude: 5.7070967
Epsilon (mean values): 0.66926547
Azimuth: 0
Latitude: 33.704801
Longitude: -117.18117
PointSourceFinite: -117.181, 33.705:
Percent Contributed: 1.8
Distance (km): 7.3076388
Magnitude: 5.7070967
Epsilon (mean values): 0.66926547
Azimuth: 0
Latitude: 33.704801
Longitude: -117.18117
PointSourceFinite: -117.181, 33.714:
Percent Contributed: 1.14
Distance (km): 8.2648749
Magnitude: 5.5712844
Epsilon (mean values): 0.92324818
Azimuth: 0
Latitude: 33.713794
Longitude: -117.18117
PointSourceFinite: -117.181, 33.714:
Percent Contributed: 1.14
Distance (km): 8.2648749
Magnitude: 5.5712844
Epsilon (mean values): 0.92324818
Azimuth: 0
Latitude: 33.713794
Longitude: -117.18117
PointSourceFinite: -117.181, 33.813:
Percent Contributed: 1.05
Distance (km): 16.319249
Magnitude: 5.9924082
Epsilon (mean values): 1.5678376
Azimuth: 0
Latitude: 33.812719
Longitude: -117.18117
PointSourceFinite: -117.181, 33.813:
Percent Contributed: 1.05
Distance (km): 16.319277

Magnitude: 5.992402
Epsilon (mean values): 1.5678449
Azimuth: 0
Latitude: 33.812719
Longitude: -117.18117
PSHA Deaggregation. %contributions.
site: Test
longitude: 117.181°W
latitude: 33.655°E
imt: Peak ground acceleration
vs30 = 537 m/s (Site class C)
return period: 475 yrs.
#This deaggregation corresponds to: Abrahamson, Silva & Kamai (2014)
Summary statistics for PSHA PGA deaggregation, r =distance, ϵ =epsilon:
Deaggregation targets:
Return period: 475 yrs
Exceedance rate: 0.0021052632 yr^{-1}
PGA ground motion: 0.37936899 g
Recovered targets:
Return period: 506.33526 yrs
Exceedance rate: 0.001974976 yr^{-1}
Totals:
Binned: 23.12 %
Residual: 0 %
Trace: 0.09 %
Mean (for all sources):
 r : 19.49 km
 m : 6.84
 ϵ_0 : 1.06 σ
Mode (largest r - m bin):
 r : 9.75 km
 m : 7.71
 ϵ_0 : 0.03 σ
Contribution: 1.85 %
Mode (largest ϵ_0 bin):
 r : 24.59 km
 m : 8.1
 ϵ_0 : 0.7 σ
Contribution: 1.59 %
Discretization:
 r : min = 0.0, max = 1000.0, Δ = 20.0 km
 m : min = 4.4, max = 9.4, Δ = 0.2
 ϵ : min = -3.0, max = 3.0, Δ = 0.5 σ
Epsilon keys:
 ϵ_0 : [$-\infty$.. -2.5)
 ϵ_1 : [-2.5 .. -2.0)
 ϵ_2 : [-2.0 .. -1.5)
 ϵ_3 : [-1.5 .. -1.0)
 ϵ_4 : [-1.0 .. -0.5)

ϵ_5 : [-0.5 .. 0.0)

ϵ_6 : [0.0 .. 0.5)

ϵ_7 : [0.5 .. 1.0)

ϵ_8 : [1.0 .. 1.5)

ϵ_9 : [1.5 .. 2.0)

ϵ_{10} : [2.0 .. 2.5)

ϵ_{11} : [2.5 .. $+\infty$)

Closest Distance, rRup (km)				Magnitude (Mw)		ALL_ε	ε=[2.5,∞)	ε=[2,2.5)	ε=[1.5,2)	ε=
[1,1.5)	ε=[0.5,1)	ε=(-∞,0.5)	ε=[-0.5,∞)			ε=[-1,-0.5)	ε=[-1.5,-1)		ε=[-2,-1.5)	
ε=[-2.5,-2)	ε=(-∞,-2.5)									
150 8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
150 8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
130 7.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
130 8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
130 8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
110 7.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
110 7.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
110 7.9	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
110 8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
110 8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
90 7.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
90 7.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
90 7.5	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
90 7.7	0.007	0.002	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
90 7.9	0.014	0.009	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
90 8.1	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
90 8.3	0.005	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
70 6.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
70 6.9	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
70 7.1	0.005	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000

0.000	0.000	0.000	0.000							
70	7.3	0.035	0.012	0.023	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.5	0.046	0.000	0.032	0.015	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.7	0.018	0.001	0.014	0.003	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.9	0.043	0.018	0.025	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	8.1	0.006	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	8.3	0.008	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.3	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.5	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.7	0.014	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.9	0.069	0.023	0.046	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.1	0.139	0.000	0.130	0.009	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.3	0.064	0.007	0.056	0.001	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.5	0.213	0.000	0.161	0.052	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.7	0.284	0.018	0.260	0.006	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.9	0.546	0.048	0.497	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	8.1	0.580	0.562	0.018	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	8.3	0.230	0.000	0.230	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.1	0.035	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.3	0.050	0.018	0.032	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.5	0.069	0.038	0.031	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.7	0.094	0.058	0.036	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.9	0.118	0.007	0.072	0.039	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.1	0.172	0.029	0.115	0.028	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

12/11/2017

Unified Hazard Tool

30	6.3	0.262	0.076	0.119	0.066	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.5	0.876	0.001	0.823	0.047	0.004	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.7	0.161	0.002	0.122	0.035	0.002	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.9	0.126	0.017	0.091	0.018	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.1	0.123	0.028	0.080	0.015	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.3	0.230	0.003	0.134	0.093	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.5	0.486	0.012	0.452	0.022	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.7	0.779	0.361	0.343	0.075	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.9	1.021	0.958	0.063	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.1	1.614	1.593	0.020	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.3	0.811	0.811	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.1	1.349	0.656	0.509	0.177	0.007	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.3	1.184	0.118	0.552	0.342	0.172	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.5	1.039	0.279	0.460	0.124	0.174	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.7	0.908	0.318	0.347	0.149	0.093	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.9	0.771	0.273	0.314	0.184	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.1	0.853	0.233	0.320	0.208	0.093	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.3	1.367	0.282	0.152	0.336	0.597	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.5	1.130	0.057	0.131	0.368	0.461	0.113	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.7	0.730	0.037	0.101	0.536	0.050	0.005	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.9	0.802	0.062	0.601	0.081	0.058	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.1	0.406	0.030	0.333	0.028	0.015	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.3	0.599	0.012	0.557	0.027	0.002	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.5	0.575	0.006	0.558	0.011	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.7	1.851	0.000	0.421	1.430	0.001	0.000	0.000	0.000	0.000

0.000	0.000	0.000	0.000							
10	7.9	0.181	0.000	0.180	0.001	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							

Principal Sources (faults, subduction, random seismicity having > 3% contribution

UC33brAvg_FM31:

Percent Contributed: 7.3

Distance (km): null

Magnitude: null

Epsilon (mean values): null

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 2.18

Distance (km): 24.568702

Magnitude: 7.9783476

Epsilon (mean values): 0.7830177

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

Elsinore (Temecula) rev [0]:

Percent Contributed: 2.13

Distance (km): 9.7411202

Magnitude: 7.3844399

Epsilon (mean values): 0.19251362

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

UC33brAvg_FM32:

Percent Contributed: 7.28

Distance (km): null

Magnitude: null

Epsilon (mean values): null

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 2.17

Distance (km): 24.568702

Magnitude: 7.9752155

Epsilon (mean values): 0.78541017

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

Elsinore (Temecula) rev [0]:

Percent Contributed: 2.1

Distance (km): 9.7411202

Magnitude: 7.4269742

Epsilon (mean values): 0.17330131

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

UC33brAvg_FM31 (opt):

Percent Contributed: 4.27
Distance (km): null
Magnitude: null
Epsilon (mean values): null
UC33brAvg_FM32 (opt):
Percent Contributed: 4.26
Distance (km): null
Magnitude: null
Epsilon (mean values): null
PSHA Deaggregation. %contributions.
site: Test
longitude: 117.181°W
latitude: 33.655°E
imt: Peak ground acceleration
vs30 = 537 m/s (Site class C)
return period: 475 yrs.
#This deaggregation corresponds to: Boore, Stewart, Seyhan & Atkinson (2014)
Summary statistics for PSHA PGA deaggregation, r=distance, ϵ =epsilon:
Deaggregation targets:
Return period: 475 yrs
Exceedance rate: 0.0021052632 yr⁻¹
PGA ground motion: 0.37936899 g
Recovered targets:
Return period: 506.33526 yrs
Exceedance rate: 0.001974976 yr⁻¹
Totals:
Binned: 23.33 %
Residual: 0 %
Trace: 0.1 %
Mean (for all sources):
r: 18.68 km
m: 6.81
 ϵ_0 : 1.01 σ
Mode (largest r-m bin):
r: 14.57 km
m: 6.27
 ϵ_0 : 1.13 σ
Contribution: 1.77 %
Mode (largest ϵ_0 bin):
r: 9.74 km
m: 7.71
 ϵ_0 : 0.09 σ
Contribution: 1.75 %
Discretization:
r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
 ϵ : min = -3.0, max = 3.0, Δ = 0.5 σ
Epsilon keys:
 ϵ_0 : [- ∞ .. -2.5)

ϵ_1 : [-2.5 .. -2.0)

ϵ_2 : [-2.0 .. -1.5)

ϵ_3 : [-1.5 .. -1.0)

ϵ_4 : [-1.0 .. -0.5)

ϵ_5 : [-0.5 .. 0.0)

ϵ_6 : [0.0 .. 0.5)

ϵ_7 : [0.5 .. 1.0)

ϵ_8 : [1.0 .. 1.5)

ϵ_9 : [1.5 .. 2.0)

ϵ_{10} : [2.0 .. 2.5)

ϵ_{11} : [2.5 .. + ∞]

Closest Distance, rRup (km)		Magnitude (Mw)		ALL_ ϵ	$\epsilon=[2.5, \infty)$	$\epsilon=[2, 2.5)$	$\epsilon=[1.5, 2)$	$\epsilon=[1, 1.5)$	$\epsilon=[0.5, 1)$	$\epsilon=[-\infty, 0.5)$	$\epsilon=[-0.5, \infty)$
[1, 1.5)		$\epsilon=[-2.5, -2)$		$\epsilon=[-1, -0.5)$	$\epsilon=[-1.5, -1)$	$\epsilon=[-2, -1.5)$					
130	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	7.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	7.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	7.7	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	7.9	0.007	0.001	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	8.1	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	8.3	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	6.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	7.1	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	7.3	0.014	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	7.5	0.026	0.010	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	7.7	0.009	0.006	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	7.9	0.031	0.001	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	8.1	0.004	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	8.3	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

0.000	0.000	0.000	0.000							
50	6.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	6.3	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	6.5	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	6.7	0.016	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	6.9	0.061	0.010	0.051	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	7.1	0.116	0.102	0.014	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	7.3	0.055	0.000	0.052	0.003	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	7.5	0.164	0.097	0.066	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	7.7	0.211	0.177	0.034	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	7.9	0.473	0.013	0.457	0.003	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	8.1	0.482	0.255	0.226	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
50	8.3	0.189	0.187	0.002	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	5.3	0.013	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	5.5	0.076	0.047	0.029	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	5.7	0.116	0.076	0.040	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	5.9	0.138	0.024	0.078	0.036	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.1	0.169	0.036	0.108	0.025	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.3	0.329	0.001	0.054	0.258	0.017	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.5	1.127	0.001	1.070	0.048	0.008	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.7	0.170	0.004	0.132	0.032	0.001	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.9	0.127	0.019	0.092	0.016	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	7.1	0.120	0.001	0.040	0.063	0.016	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	7.3	0.213	0.001	0.118	0.093	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	7.5	0.463	0.001	0.443	0.019	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							

30	7.7	0.733	0.297	0.335	0.102	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.9	0.994	0.000	0.935	0.059	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.1	1.587	1.568	0.019	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.3	0.792	0.792	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.1	0.532	0.160	0.270	0.077	0.024	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.3	0.970	0.178	0.446	0.231	0.086	0.030	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.5	1.493	0.208	0.508	0.455	0.183	0.139	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.7	1.311	0.334	0.334	0.425	0.205	0.013	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.9	1.021	0.333	0.365	0.129	0.194	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.1	1.039	0.203	0.343	0.179	0.259	0.056	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.3	1.770	0.153	0.216	0.223	0.274	0.904	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.5	1.226	0.078	0.138	0.355	0.582	0.073	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.7	0.726	0.048	0.087	0.541	0.049	0.002	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.9	0.771	0.036	0.585	0.096	0.055	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.1	0.391	0.028	0.310	0.034	0.019	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.3	0.572	0.014	0.534	0.020	0.004	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.5	0.537	0.003	0.512	0.022	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.7	1.754	0.000	0.000	1.752	0.002	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.9	0.168	0.000	0.006	0.162	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

Principal Sources (faults, subduction, random seismicity having > 3% contribution

UC33brAvg_FM31:

Percent Contributed: 7.28

Distance (km): null

Magnitude: null

Epsilon (mean values): null

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 2.14

Distance (km): 24.568702

Magnitude: 7.9786717
Epsilon (mean values): 0.79905319
Azimuth: 48.17305
Latitude: 33.802499
Longitude: -116.98307
Elsinore (Temecula) rev [0]:
Percent Contributed: 2.04
Distance (km): 9.7411202
Magnitude: 7.3723809
Epsilon (mean values): 0.24916237
Azimuth: 220.88047
Latitude: 33.589792
Longitude: -117.24926
UC33brAvg_FM32:
Percent Contributed: 7.25
Distance (km): null
Magnitude: null
Epsilon (mean values): null
San Jacinto (Stepovers Combined) [2]:
Percent Contributed: 2.12
Distance (km): 24.568702
Magnitude: 7.9756494
Epsilon (mean values): 0.80131809
Azimuth: 48.17305
Latitude: 33.802499
Longitude: -116.98307
Elsinore (Temecula) rev [0]:
Percent Contributed: 2.01
Distance (km): 9.7411202
Magnitude: 7.4177102
Epsilon (mean values): 0.22887896
Azimuth: 220.88047
Latitude: 33.589792
Longitude: -117.24926
UC33brAvg_FM31 (opt):
Percent Contributed: 4.4
Distance (km): null
Magnitude: null
Epsilon (mean values): null
UC33brAvg_FM32 (opt):
Percent Contributed: 4.4
Distance (km): null
Magnitude: null
Epsilon (mean values): null
PSHA Deaggregation. %contributions.
site: Test
longitude: 117.181°W
latitude: 33.655°E
imt: Peak ground acceleration

vs30 = 537 m/s (Site class C)

return period: 475 yrs.

#This deaggregation corresponds to: Campbell & Bozorgnia (2014)

Summary statistics for PSHA PGA deaggregation, r =distance, ϵ =epsilon:

Deaggregation targets:

Return period: 475 yrs

Exceedance rate: $0.0021052632 \text{ yr}^{-1}$

PGA ground motion: 0.37936899 g

Recovered targets:

Return period: 506.33526 yrs

Exceedance rate: $0.001974976 \text{ yr}^{-1}$

Totals:

Binned: 15.06 %

Residual: 0 %

Trace: 0.06 %

Mean (for all sources):

r : 16.82 km

m : 6.93

ϵ_0 : 1.04σ

Mode (largest r - m bin):

r : 9.75 km

m : 7.71

ϵ_0 : 0.16σ

Contribution: 1.66 %

Mode (largest ϵ_0 bin):

r : 9.74 km

m : 7.71

ϵ_0 : 0.16σ

Contribution: 1.65 %

Discretization:

r : min = 0.0, max = 1000.0, Δ = 20.0 km

m : min = 4.4, max = 9.4, Δ = 0.2

ϵ : min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys:

ϵ_0 : $[-\infty \dots -2.5)$

ϵ_1 : $[-2.5 \dots -2.0)$

ϵ_2 : $[-2.0 \dots -1.5)$

ϵ_3 : $[-1.5 \dots -1.0)$

ϵ_4 : $[-1.0 \dots -0.5)$

ϵ_5 : $[-0.5 \dots 0.0)$

ϵ_6 : $[0.0 \dots 0.5)$

ϵ_7 : $[0.5 \dots 1.0)$

ϵ_8 : $[1.0 \dots 1.5)$

ϵ_9 : $[1.5 \dots 2.0)$

ϵ_{10} : $[2.0 \dots 2.5)$

ϵ_{11} : $[2.5 \dots +\infty]$

Closest Distance, r_{Rup} (km) Magnitude (Mw)

$[1, 1.5)$ $\epsilon=[0.5, 1)$ $\epsilon=(-\infty, 0.5)$ $\epsilon=[-0.5, \infty)$

$\epsilon=[-2.5, -2)$ $\epsilon=(-\infty, -2.5)$

ALL_ ϵ $\epsilon=[2.5, \infty)$ $\epsilon=[2, 2.5)$ $\epsilon=[1.5, 2)$ $\epsilon=[1, 1.5)$

$\epsilon=[-1, -0.5)$ $\epsilon=[-1.5, -1)$ $\epsilon=[-2, -1.5)$

110	7.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
110	7.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
110	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
110	8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	7.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	7.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	7.7	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	7.9	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	8.3	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	6.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.3	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.5	0.007	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.7	0.005	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.9	0.011	0.006	0.005	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	8.1	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	8.3	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.5	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.7	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.9	0.016	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.1	0.061	0.045	0.016	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.3	0.023	0.012	0.011	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.5	0.065	0.002	0.056	0.006	0.000	0.000	0.000	0.000	0.000

0.000	0.000	0.000	0.000							
50	7.7	0.089	0.013	0.076	0.001	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.9	0.176	0.014	0.162	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	8.1	0.182	0.173	0.009	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	8.3	0.071	0.071	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.5	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.7	0.006	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.9	0.019	0.009	0.010	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.1	0.059	0.003	0.037	0.018	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.3	0.169	0.023	0.100	0.046	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.5	0.837	0.001	0.039	0.788	0.010	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.7	0.119	0.001	0.086	0.028	0.004	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.9	0.088	0.007	0.053	0.028	0.001	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.1	0.078	0.009	0.049	0.021	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.3	0.144	0.000	0.030	0.089	0.024	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.5	0.309	0.000	0.287	0.015	0.006	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.7	0.447	0.000	0.399	0.046	0.002	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.9	0.591	0.000	0.569	0.022	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.1	0.895	0.000	0.887	0.008	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.3	0.430	0.000	0.430	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.1	0.194	0.093	0.084	0.017	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.3	0.292	0.034	0.177	0.074	0.006	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.5	0.431	0.236	0.133	0.039	0.023	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.7	0.472	0.057	0.242	0.120	0.034	0.019	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.9	0.495	0.187	0.157	0.087	0.063	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

10	6.1	0.698	0.190	0.248	0.120	0.136	0.004	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.3	1.445	0.024	0.255	0.272	0.221	0.672	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.5	1.260	0.120	0.093	0.440	0.477	0.130	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.7	0.777	0.121	0.041	0.587	0.024	0.005	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.9	0.792	0.064	0.606	0.073	0.049	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.1	0.386	0.030	0.310	0.028	0.019	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.3	0.557	0.011	0.522	0.013	0.011	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.5	0.524	0.003	0.500	0.017	0.004	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.7	1.661	0.005	1.654	0.001	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.9	0.160	0.000	0.016	0.144	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

Principal Sources (faults, subduction, random seismicity having > 3% contribution

UC33brAvg_FM31:

Percent Contributed: 5.35

Distance (km): null

Magnitude: null

Epsilon (mean values): null

Elsinore (Temecula) rev [0]:

Percent Contributed: 2.02

Distance (km): 9.7411202

Magnitude: 7.3467666

Epsilon (mean values): 0.27658013

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 1.26

Distance (km): 24.568702

Magnitude: 7.9601794

Epsilon (mean values): 1.1602125

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

UC33brAvg_FM32:

Percent Contributed: 5.33

Distance (km): null

Magnitude: null

Epsilon (mean values): null

Elsinore (Temecula) rev [0]:

Percent Contributed: 1.99

Distance (km): 9.7411202

Magnitude: 7.3949539

Epsilon (mean values): 0.2532041

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 1.25

Distance (km): 24.568702

Magnitude: 7.958108

Epsilon (mean values): 1.1616037

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

UC33brAvg_FM31 (opt):

Percent Contributed: 2.19

Distance (km): null

Magnitude: null

Epsilon (mean values): null

UC33brAvg_FM32 (opt):

Percent Contributed: 2.19

Distance (km): null

Magnitude: null

Epsilon (mean values): null

PSHA Deaggregation. %contributions.

site: Test

longitude: 117.181°W

latitude: 33.655°E

imt: Peak ground acceleration

vs30 = 537 m/s (Site class C)

return period: 475 yrs.

#This deaggregation corresponds to: Chiou & Youngs (2014)

Summary statistics for PSHA PGA deaggregation, r=distance, ε=epsilon:

Deaggregation targets:

Return period: 475 yrs

Exceedance rate: 0.0021052632 yr⁻¹

PGA ground motion: 0.37936899 g

Recovered targets:

Return period: 506.33526 yrs

Exceedance rate: 0.001974976 yr⁻¹

Totals:

Binned: 19.78 %

Residual: 0 %

Trace: 0.11 %

Mean (for all sources):

r: 18.1 km

m: 6.99

ϵ_0 : 0.89 σ

Mode (largest r-m bin):

r: 9.75 km

m: 7.71

ϵ_0 : -0.15 σ

Contribution: 2.13 %

Mode (largest ϵ_0 bin):

r: 9.74 km

m: 7.71

ϵ_0 : -0.15 σ

Contribution: 2.11 %

Discretization:

r: min = 0.0, max = 1000.0, Δ = 20.0 km

m: min = 4.4, max = 9.4, Δ = 0.2

ϵ : min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys:

ϵ_0 : [- ∞ .. -2.5)

ϵ_1 : [-2.5 .. -2.0)

ϵ_2 : [-2.0 .. -1.5)

ϵ_3 : [-1.5 .. -1.0)

ϵ_4 : [-1.0 .. -0.5)

ϵ_5 : [-0.5 .. 0.0)

ϵ_6 : [0.0 .. 0.5)

ϵ_7 : [0.5 .. 1.0)

ϵ_8 : [1.0 .. 1.5)

ϵ_9 : [1.5 .. 2.0)

ϵ_{10} : [2.0 .. 2.5)

ϵ_{11} : [2.5 .. + ∞)

Closest Distance, rRup (km)	Magnitude (Mw)	ALL_ ϵ	ϵ =[2.5, ∞)	ϵ =[2,2.5)	ϵ =[1.5,2)	ϵ =
[1,1.5)	ϵ =[0.5,1)	ϵ =[- ∞ ,0.5)	ϵ =[-0.5, ∞)	ϵ =[-1,-0.5)	ϵ =[-1.5,-1)	ϵ =[-2,-1.5)
ϵ =[-2.5,-2)	ϵ =[- ∞ , -2.5)					
130 7.9 0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			
130 8.1 0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			
130 8.3 0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			
110 7.5 0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			
110 7.7 0.001	0.001	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			
110 7.9 0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			
110 8.1 0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			
110 8.3 0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			
90 7.3 0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000			

90	7.5	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	7.7	0.006	0.002	0.004	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	7.9	0.007	0.002	0.005	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	8.1	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
90	8.3	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	6.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.1	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.3	0.010	0.003	0.007	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.5	0.021	0.000	0.013	0.008	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.7	0.016	0.002	0.012	0.001	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	7.9	0.028	0.003	0.024	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	8.1	0.004	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
70	8.3	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	6.9	0.006	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.1	0.052	0.000	0.032	0.020	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.3	0.033	0.004	0.023	0.006	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.5	0.131	0.000	0.027	0.099	0.004	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.7	0.198	0.031	0.093	0.074	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	7.9	0.386	0.008	0.363	0.015	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	8.1	0.430	0.122	0.308	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
50	8.3	0.177	0.175	0.002	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.1	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	5.3	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000

0.000	0.000	0.000	0.000							
30	5.5	0.018	0.002	0.016	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	5.7	0.032	0.018	0.014	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	5.9	0.049	0.031	0.019	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.1	0.079	0.006	0.056	0.017	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.3	0.111	0.022	0.069	0.019	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.5	0.426	0.001	0.019	0.398	0.007	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.7	0.086	0.001	0.061	0.021	0.004	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	6.9	0.085	0.014	0.045	0.023	0.003	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	7.1	0.092	0.004	0.021	0.048	0.019	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	7.3	0.188	0.014	0.108	0.041	0.025	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	7.5	0.451	0.000	0.019	0.403	0.029	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	7.7	0.730	0.003	0.314	0.325	0.088	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	7.9	1.046	0.052	0.932	0.050	0.012	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	8.1	1.652	0.009	1.626	0.017	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
30	8.3	0.831	0.831	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	5.1	0.662	0.223	0.310	0.097	0.032	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	5.3	0.766	0.403	0.242	0.083	0.039	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	5.5	0.786	0.121	0.385	0.187	0.091	0.002	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	5.7	0.755	0.292	0.266	0.089	0.108	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	5.9	0.684	0.288	0.252	0.080	0.064	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	6.1	0.808	0.230	0.308	0.112	0.159	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	6.3	1.216	0.012	0.268	0.146	0.311	0.478	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	6.5	0.990	0.067	0.145	0.317	0.110	0.352	0.000	0.000	0.000
0.000	0.000	0.000	0.000							
10	6.7	0.733	0.006	0.091	0.059	0.532	0.038	0.007	0.000	0.000
0.000	0.000	0.000	0.000							

12/11/2017

Unified Hazard Tool

10	6.9	0.850	0.014	0.061	0.686	0.041	0.048	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.1	0.452	0.012	0.029	0.377	0.019	0.016	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.3	0.681	0.008	0.015	0.634	0.022	0.001	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.5	0.660	0.002	0.490	0.161	0.006	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.7	2.126	0.000	0.010	2.113	0.003	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.9	0.209	0.000	0.020	0.189	0.001	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

Principal Sources (faults, subduction, random seismicity having > 3% contribution

UC33brAvg_FM31:

Percent Contributed: 6.7

Distance (km): null

Magnitude: null

Epsilon (mean values): null

Elsinore (Temecula) rev [0]:

Percent Contributed: 2.38

Distance (km): 9.7411202

Magnitude: 7.3991692

Epsilon (mean values): 0.048420072

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 2.21

Distance (km): 24.568702

Magnitude: 7.9850983

Epsilon (mean values): 0.76495312

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

UC33brAvg_FM32:

Percent Contributed: 6.69

Distance (km): null

Magnitude: null

Epsilon (mean values): null

Elsinore (Temecula) rev [0]:

Percent Contributed: 2.36

Distance (km): 9.7411202

Magnitude: 7.4416077

Epsilon (mean values): 0.018510271

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 2.2

Distance (km): 24.568702

Magnitude: 7.9815833

Epsilon (mean values): 0.76682779

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

UC33brAvg_FM31 (opt):

Percent Contributed: 3.2

Distance (km): null

Magnitude: null

Epsilon (mean values): null

UC33brAvg_FM32 (opt):

Percent Contributed: 3.19

Distance (km): null

Magnitude: null

Epsilon (mean values): null

PSHA Deaggregation. %contributions.

site: Test

longitude: 117.181°W

latitude: 33.655°E

imt: Peak ground acceleration

vs30 = 537 m/s (Site class C)

return period: 475 yrs.

#This deaggregation corresponds to: Idriss (2014)

Summary statistics for PSHA PGA deaggregation, r=distance, ϵ =epsilon:

Deaggregation targets:

Return period: 475 yrs

Exceedance rate: 0.0021052632 yr⁻¹

PGA ground motion: 0.37936899 g

Recovered targets:

Return period: 506.33526 yrs

Exceedance rate: 0.001974976 yr⁻¹

Totals:

Binned: 18.71 %

Residual: 0 %

Trace: 0.1 %

Mean (for all sources):

r: 19.51 km

m: 6.87

 ϵ_0 : 0.79 σ

Mode (largest r-m bin):

r: 24.74 km

m: 8.1

 ϵ_0 : 0.21 σ

Contribution: 1.52 %

Mode (largest ϵ_0 bin):

r: 24.58 km

m: 8.1

 ϵ_0 : 0.2 σ

Contribution: 1.5 %

Discretization:

r: min = 0.0, max = 1000.0, Δ = 20.0 kmm: min = 4.4, max = 9.4, Δ = 0.2 ϵ : min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys:

 ϵ_0 : $[-\infty \dots -2.5)$ ϵ_1 : $[-2.5 \dots -2.0)$ ϵ_2 : $[-2.0 \dots -1.5)$ ϵ_3 : $[-1.5 \dots -1.0)$ ϵ_4 : $[-1.0 \dots -0.5)$ ϵ_5 : $[-0.5 \dots 0.0)$ ϵ_6 : $[0.0 \dots 0.5)$ ϵ_7 : $[0.5 \dots 1.0)$ ϵ_8 : $[1.0 \dots 1.5)$ ϵ_9 : $[1.5 \dots 2.0)$ ϵ_{10} : $[2.0 \dots 2.5)$ ϵ_{11} : $[2.5 \dots +\infty]$

Closest Distance, rRup (km)		Magnitude (Mw)		ALL_ ϵ	$\epsilon=[2.5, \infty)$	$\epsilon=[2, 2.5)$	$\epsilon=[1.5, 2)$	$\epsilon=[1, 1.5)$	$\epsilon=[0.5, 1)$	$\epsilon=[-\infty, 0.5)$	$\epsilon=[-0.5, \infty)$
[1, 1.5)	$\epsilon=[0.5, 1)$	$\epsilon=[-\infty, 0.5)$	$\epsilon=[-0.5, \infty)$	$\epsilon=[-1, -0.5)$	$\epsilon=[-1.5, -1)$	$\epsilon=[-2, -1.5)$					
$\epsilon=[-2.5, -2)$	$\epsilon=[-\infty, -2.5)$										
130 8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
130 8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
110 7.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
110 7.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
110 8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
110 8.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
90 7.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
90 7.7	0.002	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
90 7.9	0.004	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
90 8.1	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
90 8.3	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
70 6.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								
70 6.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000								

70	7.1	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
70	7.3	0.007	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
70	7.5	0.014	0.006	0.007	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
70	7.7	0.007	0.000	0.005	0.001	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
70	7.9	0.020	0.006	0.014	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
70	8.1	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
70	8.3	0.004	0.001	0.004	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	5.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	6.1	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	6.3	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	6.5	0.013	0.001	0.011	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	6.7	0.019	0.007	0.011	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	6.9	0.055	0.020	0.035	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	7.1	0.084	0.001	0.080	0.003	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	7.3	0.039	0.006	0.032	0.001	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	7.5	0.110	0.000	0.085	0.026	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	7.7	0.150	0.015	0.117	0.018	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	7.9	0.359	0.194	0.166	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	8.1	0.394	0.000	0.390	0.003	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
50	8.3	0.164	0.028	0.136	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
30	5.1	0.062	0.031	0.031	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
30	5.3	0.075	0.042	0.033	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
30	5.5	0.090	0.056	0.033	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
30	5.7	0.106	0.013	0.065	0.028	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000					
30	5.9	0.121	0.039	0.061	0.022	0.000	0.000	0.000	0.000	0.000

0.000	0.000	0.000	0.000							
30	6.1	0.147	0.061	0.069	0.017	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.3	0.273	0.004	0.143	0.119	0.007	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.5	0.969	0.016	0.919	0.033	0.001	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.7	0.166	0.000	0.108	0.047	0.010	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	6.9	0.122	0.005	0.072	0.038	0.008	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.1	0.105	0.011	0.049	0.046	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.3	0.186	0.028	0.125	0.033	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.5	0.412	0.000	0.380	0.018	0.013	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.7	0.659	0.007	0.572	0.076	0.004	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	7.9	0.941	0.796	0.119	0.025	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.1	1.522	1.503	0.010	0.009	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
30	8.3	0.767	0.470	0.298	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.1	1.005	0.067	0.570	0.193	0.175	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.3	0.857	0.236	0.345	0.140	0.135	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.5	0.735	0.263	0.245	0.190	0.036	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.7	0.631	0.250	0.233	0.148	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	5.9	0.528	0.013	0.239	0.145	0.131	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.1	0.537	0.189	0.133	0.197	0.018	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.3	1.221	0.015	0.139	0.281	0.785	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.5	0.952	0.018	0.051	0.271	0.121	0.492	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.7	0.579	0.025	0.049	0.440	0.054	0.011	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	6.9	0.630	0.023	0.020	0.524	0.062	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.1	0.320	0.002	0.017	0.245	0.031	0.025	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.3	0.476	0.003	0.005	0.443	0.015	0.010	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

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Unified Hazard Tool

10	7.5	0.452	0.001	0.006	0.425	0.020	0.001	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.7	1.468	0.000	0.000	1.312	0.154	0.001	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	7.9	0.142	0.000	0.000	0.141	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						
10	8.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000						

Principal Sources (faults, subduction, random seismicity having > 3% contribution

UC33brAvg_FM31:

Percent Contributed: 6.23

Distance (km): null

Magnitude: null

Epsilon (mean values): null

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 2.02

Distance (km): 24.568702

Magnitude: 7.984709

Epsilon (mean values): 0.32168773

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

Elsinore (Temecula) rev [0]:

Percent Contributed: 1.68

Distance (km): 9.7411202

Magnitude: 7.3833462

Epsilon (mean values): -0.30070363

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

UC33brAvg_FM32:

Percent Contributed: 6.22

Distance (km): null

Magnitude: null

Epsilon (mean values): null

San Jacinto (Stepovers Combined) [2]:

Percent Contributed: 2.01

Distance (km): 24.568702

Magnitude: 7.9813663

Epsilon (mean values): 0.32523728

Azimuth: 48.17305

Latitude: 33.802499

Longitude: -116.98307

Elsinore (Temecula) rev [0]:

Percent Contributed: 1.66

Distance (km): 9.7411202

Magnitude: 7.4273405

Epsilon (mean values): -0.33699308

Azimuth: 220.88047

Latitude: 33.589792

Longitude: -117.24926

UC33brAvg_FM31 (opt):

Percent Contributed: 3.13

Distance (km): null

Magnitude: null

Epsilon (mean values): null

UC33brAvg_FM32 (opt):

Percent Contributed: 3.13

Distance (km): null

Magnitude: null

Epsilon (mean values): null