



**Sladden
Engineering**

GEOTECHNICAL INVESTIGATION
PROPOSED GYMNASIUM
JOSHUA SPRINGS CALVARY CHAPEL
57353 JOSHUA LANE
APN 0585-062-65
YUCCA VALLEY, CALIFORNIA

-Prepared By-

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Project No. 544-25019

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Joshua Springs Calvary Chapel
57353 Joshua Lane
Yucca Valley, California 92284

Subject: Geotechnical Investigation

Project: Proposed Gymnasium
Joshua Springs Calvary Chapel
57353 Joshua Lane
APN 0585-062-65
Yucca Valley, California

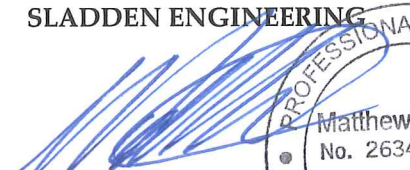
Sladden Engineering is pleased to present the results of the geotechnical investigation performed for the proposed gymnasium to be constructed within the Joshua Springs Calvary Chapel property located at 57353 Joshua Lane in the Town of Yucca Valley, California (APN 0585-062-65). Our services were completed in accordance with our proposal for geotechnical engineering services revised December 26, 2024 and your authorization to proceed with the work. The purpose of our investigation was to explore the subsurface conditions at the site to provide recommendations for foundation design and the design of the various site improvements. Evaluation of environmental issues and hazardous waste was not included within the scope of services provided.

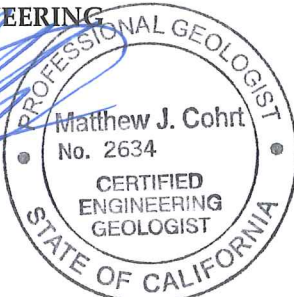
The opinions, recommendations and design criteria presented in this report are based on our field exploration program, laboratory testing and engineering analyses. Based on the results of our investigation, it is our professional opinion that the proposed project should be feasible from a geotechnical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

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INTRODUCTION	1
PROJECT DESCRIPTION	1
SCOPE OF SERVICES	2
SITE CONDITIONS.....	3
GEOLOGIC SETTING.....	3
SUBSURFACE CONDITIONS	4
GROUNDWATER CONDITIONS	5
TECTONIC SETTING	6
BACKGROUND INFORMATION RELATIVE TO THE ALQUIST-PRIOLO ACT	7
SITE-SPECIFIC GROUND MOTION PARAMETERS.....	8
GEOLOGIC HAZARDS.....	8
CONCLUSIONS	10
EARTHWORK AND GRADING.....	10
Site Clearing	10
Preparation of Building Areas	11
Compaction	11
Shrinkage and Subsidence.....	11
CONVENTIONAL SHALLOW SPREAD FOOTINGS.....	12
SLABS-ON-GRADE.....	12
RETAINING WALLS	13
ON-SITE PAVEMENT DESIGN	13
CORROSION SERIES.....	14
UTILITY TRENCH BACKFILL.....	14
DRAINAGE	14
EXTERIOR CONCRETE FLATWORK.....	14
LIMITATIONS	15
ADDITIONAL SERVICES.....	15
REFERENCES.....	16

PLATES	<ul style="list-style-type: none"> Site Location Map Regional Geologic Map Exploration Location Plan Fault Zone Map Fault Zone Overlay
APPENDIX A	Field Exploration
APPENDIX B	Laboratory Testing
APPENDIX C	Ground Motion Parameters
APPENDIX D	Site Plan

INTRODUCTION

This report presents the results of the geotechnical investigation performed by Sladden Engineering (Sladden) for the proposed gymnasium to be constructed within the Joshua Springs Calvary Chapel property located at 57353 Joshua Lane in the Town of Yucca Valley, California. The site is located at approximately 33.0946 degrees north latitude and 116.4128 degrees west longitude. The approximate location of the site is indicated on the Site Location Map (Figure 1).



Figure 1 (USGS, 2021)

Our investigation was conducted 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 (NV5, 2024), it is our understanding that the project will consist of constructing a new gymnasium on the property. Underground utilities, concrete flatwork, landscape areas and various associated improvements are also anticipated. For our analyses, we expect that the new gymnasium will consist of a relatively lightweight wood-frame or steel-frame structure supported on conventional shallow spread footings and concrete slabs on grade.

Based on the relatively level nature of the site, Sladden expects that grading will be limited to minor cuts and fills to accomplish the desired elevations and provide adequate gradients for site drainage. This does not include the removal and re-compaction of the loose surface soil and primary foundation-bearing soil within the proposed building and foundation areas. Upon completion of precise grading plans, Sladden should be retained to verify that the recommendations presented within this report are properly 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 structures, we expect that isolated column loads will be less than 100 kips and continuous wall loads will be less than 5.0 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 to develop foundation design criteria and recommendations for site preparation. Specifically, our site characterization consisted of the following tasks:

- Site reconnaissance to assess the existing surface conditions on and adjacent to the site.
- Drilling two (2) exploratory boreholes and two (2) percolation test holes to depths between approximately 20 and 51 feet bgs to characterize the subsurface soil conditions. Representative samples of the soil were classified in the field and retained for laboratory testing and engineering analyses.
- Performing laboratory testing on selected samples to evaluate their engineering characteristics.
- Reviewing geologic literature and discussing geologic hazards.
- Performing site-specific ground motion procedures for the subject property.
- Performing 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 subject property is located at 57353 Joshua Lane in the Town of Yucca Valley, California. The property is formally identified by the County of San Bernardino as APN 0585-062-65 and occupies a total area of approximately 22.87 acres. At the time of our investigation, the site was occupied by various facility buildings, parking areas, a baseball diamond and landscape areas. The proposed gymnasium will be constructed in the southwest quarter of the property, just west of the existing baseball diamond. The site is near the elevation of the adjacent properties and roadways and is generally bounded by Joshua Lane to the north, Joshua View Drive/Kingston Avenue to the east, Neaglesa Street to the south and Hardesty Drive to the west.

Based on our review of the Yucca Valley South 7.5-Minute Quadrangle Map (USGS, 2021), the site is situated at an approximate elevation of 3,645 feet above mean sea level (MSL).

No natural ponding of water or surface seeps were observed at or near the sites during our investigation conducted on February 12, 2025. Site drainage appears to be controlled via sheet flow and surface infiltration. A mapped "blue line" drainage course is located just to the west of the proposed gymnasium location.

GEOLOGIC SETTING

The site is located within the Transverse Ranges Geomorphic province. The Transverse Ranges are characterized by roughly east-west trending, convergent (north-south compressional) deformational structural features. The convergent deformational features of the Transverse Ranges are a result of north-south crustal shorting due to plate tectonics, locally folding and uplifting of the mountains and lowering of the intervening valleys, along with propagation of thrust faults (including blind thrusts) and in filling of the valley basins with sediments. The Transverse Ranges are considered to be one of the most rapidly rising orogenic regions on earth.

The site has been mapped by Dibblee (1967) to be immediately underlain by older alluvium (Qoa). The site is located on the distal portions on an alluvial fan complex with sediment transport being derived upgradient from the Little San Bernardino Mountains. The regional geologic setting for the site vicinity is presented on the Regional Geologic Map (Figure 2).

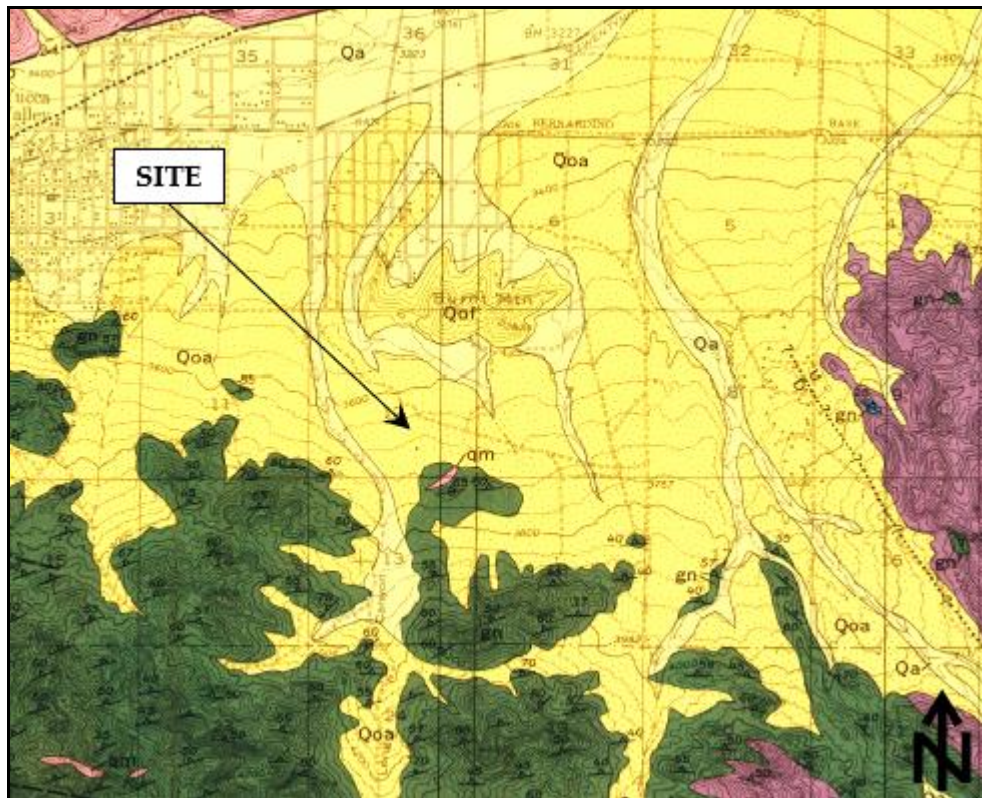


Figure 2 (Dibble, 1967)

SUBSURFACE CONDITIONS

The subsurface conditions at the site were investigated by drilling two (2) exploratory boreholes and two (2) percolation test holes on the property to depths between approximately 20 and 51 feet bgs. The approximate locations of the boreholes are illustrated on the Exploration 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 analysis.

During our field investigation, a mantle of fill soil was encountered to a depth of approximately six (6) feet below existing grade. Underlying the fill soil interbedded alluvium consisting of silty sand (SM), and sand (SP/SW) was encountered. Generally, the soil was found to be dry to moist, medium dense to dense, and dark yellowish brown in in-situ color.

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 variable across the site.

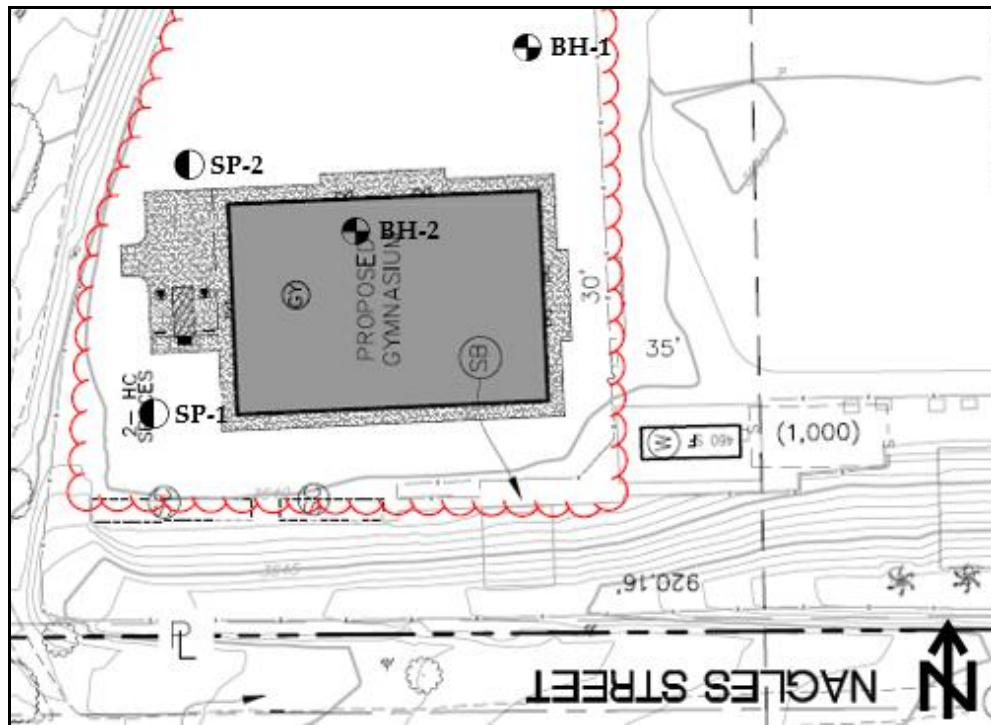


Figure 3

GROUNDWATER CONDITIONS

Groundwater was not encountered at the maximum explored depth of 51 feet bgs during our field investigation. Based on the depth to groundwater in the project vicinity (CDWR, 2025), it is our opinion that groundwater should not be a factor in the design or construction of the proposed project. The following table provides a summary of the recorded high groundwater depths in the project vicinity.

TABLE 1 GROUNDWATER DEPTHS					
STATE WELL	LAT/LONG	DISTANCE (KM)	DIRECTION	DATE	DEPTH (FT)
01N05E36N001S	34.1217/-116.4225	3.10	NNW	06/01/1971	190.1
01N05E36J001S	34.1239/-116.4089	3.25	N	07/01/1969	Dry Well
01N05E36M004S	34.1253/-116.4214	3.50	NNW	03/29/2006	112.33
01N06E31P001S	34.1236/-116.3983	3.50	NNE	12/04/1968	307.2
01N05E36L001S	34.1266/-116.4161	3.60	N	12/01/1998	216
01N05E36M001S	34.1269/-116.4203	3.65	NNW	02/14/2006	177.54
01N05E36K003S	34.1273/-116.4130	3.65	N	03/20/2002	157
01N06E31E001S	34.1289/-116.4033	3.90	NNE	04/17/1996	309.25

TECTONIC SETTING

Regional faulting within the site vicinity includes the Burnt Mountain Fault Zone, Eureka Peak Fault Zone, Pinto Mountain Fault Zone, Johnson Valley Fault Zone (northern and southern sections), Kickapoo Fault Zone (or Landers fault), Homestead Valley Fault Zone, and the Camp Rock – Emerson-Copper Mountain Fault Zone.

Table 2 lists the closest known faults that was generated in part using the Quaternary Fault and Fold Database of the United States (USGS, 2025) as modified using the fault parameters from Southern Earthquake Data Center (SCEDC, 2025) and USGS 2008 Seismic Hazard Maps – Source Parameters (USGS, 2008). 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 2 CLOSEST KNOWN ACTIVE FAULTS		
Fault Name	Distance (Km)	Maximum Event (Mw)
Burnt Mountain	<1.0*	6.8
Eureka Peak	2.7	6.7
Pinto Mountain	4.0	7.3
Landers	8.2	7.40
South Emerson-Copper Mountain	20.3	7.10
Johnson Valley Northern	24.6	6.90
San Andreas	25.2	7.5

* Subject Parcel is located within the Burnt Mountain Fault Zone

The subject parcel is partially located within the Burnt Mountain fault zone. However, the currently proposed gymnasium building is located outside of the fault zone (Figure 4).



Figure 4

BURNT MOUNTAIN FAULT

The Burnt Mountain Fault is a right-lateral strike-slip fault with an average strike of 173 degrees. It extends approximately 26 kilometers in total length and ruptured during the 1992 Landers earthquake (USGS, 2025). According to Hough (1994), the mapped surface rupture exhibited a maximum right-lateral displacement of 6 to 7 centimeters over a distance of about 2 kilometers. Treiman (1992) reported up to 3 cm of right-lateral displacement and 2.5 cm of vertical displacement. Due to the absence of paleo-seismic studies along the Burnt Mountain fault zone, the recurrence interval for faulting remains undetermined. The fault's slip rate is estimated to range from 0.2 to 1.0 mm per year (USGS, 2025).

BACKGROUND INFORMATION RELATIVE TO THE ALQUIST-PRIOLO ACT

The objective of the Alquist-Priolo Act (Act) is to regulate development near active faults so as to mitigate the hazard of surface fault rupture (Hart and Bryant, 1997). Current law prohibits construction of habitable structures across active fault traces. Therefore, the evaluation of the potential ground rupture hazard to establish building setbacks is required by reviewing agencies. In addition, the Act mandates that structures intended for human occupancy of over 2,000 person hours per year are not built over known active faults. A Holocene-active fault is defined by the California Geological Survey as a sufficiently active and well-defined fault that exhibits surface displacement within the Holocene Epoch (approximately the last 11,000 years). In areas of known or suspected Holocene-active or pre-Holocene faults, and prior to site development, the actual location of an active fault(s) needs to be ascertained, such that appropriate setbacks from the fault(s) can be determined and Restricted Use Zones (RUZs) or no building areas established. Not only is it important to identify the fault location, but it is also equally important to verify areas where no faults exist.

To evaluate on-site fault hazards, subsurface exploration by the excavation of trenches are performed to expose the soil and rock profiles and to allow for the direct observation of existing shallow/near-surface faults. Trenches are oriented generally perpendicular to the regional fault trends and are logged in detail by Geologists experienced in fault rupture hazard studies. Trench depths are controlled by the age of the surficial sediments or rocks exposed within the trench. In general, it is desirable to have exposed soil profiles spanning at least the last 11,700 years, or Holocene Epoch. Soil profiles with Holocene and older profiles can then allow for the determination of the relative age of the encountered fault. If the fault disrupts Holocene sediments, then the fault is determined to be a Holocene-active fault and building setbacks are established accordingly. Conversely, if the fault is buried by pre-Holocene sediments or rock, then the fault can be deemed a pre-Holocene fault, with construction of non-critical structures allowed over or immediately adjacent to the fault. In many cases, the sediments exposed may only cover a portion of the Holocene, such that judgment and risk assessments are professed relative to the age of the faults and suitability of the site for development. The success of the risk assessments is dependent upon the quality of the data collected, local agency requirements, and the experience of the Professional Geologists performing the work.

Building setback distances from the fault, generally mandated by the Act to be approximately 50 feet, are dependent upon the confidence or degree of accuracy of the fault location across the site: the higher the degree of confidence, the lesser the setback requirements. The size of the property, number of faults, number of exploration trenches defining the fault location(s), survey quality, and local regulatory agency requirements, affect the setback distance requirements. The Act also allows for jurisdictions to establish policies and criteria that are more restrictive than the Act.

SITE-SPECIFIC GROUND MOTION PARAMETERS

Sladden has reviewed the 2022 California Building Code (CBC) and ASCE7-16 and developed site-specific ground motion parameters for the subject site. The project Seismic Design Maps and site-specific ground motion parameters are summarized in the following table and included within Appendix C. The project Structural Engineer should verify that all design parameters provided are applicable for the subject project.

TABLE 3 GROUND MOTION PARAMETERS	
Latitude / Longitude	34.0946/-116.4128
Risk Category	II
Site Class	D
Code Reference Documents	ASCE 7-16; Chapter 11 & 21

Description	Type	Map Based	Site-Specific
MCE _R Ground Motion (0.2 second period)	S _S	2.205	---
MCE _R Ground Motion (1.0 second period)	S _I	0.729	---
Site-Modified Spectral Acceleration Value	S _{MS}	2.205	2.477
Site-Modified Spectral Acceleration Value	S _{MI}	Null	1.922
Numeric Seismic Design Value at 0.2 second SA	S _{DS}	1.0	1.651
Numeric Seismic Design Value at 1.0 second SA	S _{DI}	Null	1.282
Site Amplification Factor at 0.2 second	F _a	1.0	1.0
Site Amplification Factor at 1.0 second	F _v	Null	2.5
Site Peak Ground Acceleration	PG _{AM}	0.996	0.989

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 our review of CDMG (1993), the subject parcel is located within a State of California designed fault zone (Plate 4). However, the proposed new gymnasium building will be constructed outside of the fault zone (Plate 5). Based on our review of pertinent geologic literature, maps and aerial photographs, 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. Based on site-specific ground motion parameters developed for the property (Appendix C), the site-modified peak ground acceleration (PGAm) is estimated to be 0.989g.
- III. Liquefaction. 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.
- Based on the relatively dense nature of the underlying earth materials and the depth to groundwater in the project vicinity, risks associated with liquefaction are considered "low".
- IV. Tsunamis and Seiches. Because the site is situated at an inland location and is not immediately adjacent to any impounded bodies of water, risks associated with tsunamis and seiches are considered "negligible".
- V. Slope Failure, Landsliding, Rock Falls. Slope instability in the form of landslides and rock falls were not observed at or near the subject site. The site is situated on relatively flat ground and is not located immediately adjacent to any slopes. As such, risks associated with slope instability (landslides, mass wasting, and rock falls) are considered "negligible".
- VI. Expansive Soil. Generally, the near-surface soil consists of silty sand (SM) and sand (SW/SP). Based on the results of our laboratory testing (EI=0), the materials underlying the site are considered to have a "negligible" expansion potential. The recommended remedial grading will result in substantial mixing and blending of the surface soil. The expansion potential of the subsurface soil should be reevaluated after grading.
- VII. Static Settlement. Static 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 ultimate static settlement is expected to be less than 1 inch when using the recommended allowable bearing pressures. As a practical matter, differential static settlement between footings can be assumed as one-half of the total static settlement.
- VIII. Subsidence. Land subsidence can occur in valleys 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.

- IX. 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) (Boggs, 2001). Based on the flat nature of the site and the composition of the surface soil, we judge that risks associated with debris flows should be considered “negligible”.
- X. Flooding and Erosion. No signs of flooding or erosion were observed during our field investigation. Risks associated with flooding and erosion should be evaluated and mitigated by the project design Civil Engineer.

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 included in this report are incorporated into design and carried out through construction. The main geotechnical concern is the presence of loose and potentially compressible near-surface native soil throughout the project site.

We recommend that remedial work within the proposed new building areas include over-excavation and re-compaction of the primary foundation-bearing soil to provide uniform foundation support and to help mitigate potential differential settlements. Specific recommendations for foundation area 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. Based on our observations of the materials encountered, we anticipate that the subsoil will conform to that described by CalOSHA as Type 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 based on our field and laboratory investigation.

EARTHWORK AND GRADING

All earthwork including excavation, backfill, and preparation of the primary foundation and/or slab bearing soil should be performed in accordance with the geotechnical recommendations presented in this report and portions of the local regulatory requirements, as applicable. All earthwork 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. Site Clearing: Areas to be graded should be cleared of vegetation, associated root systems, underground utilities, and debris. All areas scheduled to receive fill should be cleared of old fills and any irreducible matter. The strippings should be removed off-site, or stockpiled for later use in landscape areas. Voids left by obstructions should be properly backfilled in accordance with the compaction recommendations of this report.

- b. Preparation of the Building Areas. To provide firm and uniform foundation-bearing conditions, we recommend over-excavation and re-compaction throughout the proposed building and foundation areas. All artificial fill soil and native low density near surface native soil should be removed to a depth of at least 4 feet below existing grade or 3 feet below the bottom of the footings, whichever is deeper. Remedial grading should extend laterally, a minimum of five feet beyond the building limits where possible. The native soil exposed by over-excavation should be scarified, moisture conditioned to near optimum moisture content, and compacted to at least 90 percent relative compaction prior to fill placement. The previously removed soil may then be replaced as compacted engineered soil in accordance with the recommendations below.

- c. Compaction: Soil to be used as engineered fill should be free of organic material, debris, and other deleterious substances. All fill material should be placed in thin lifts, not exceeding six inches in a loose condition. 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 fill 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 to ensure proper placement of the fill materials. Table 4 provides a summary of the excavation and compaction recommendations.

TABLE 4 SUMMARY OF RECOMMENDATIONS	
*Remedial Grading	Over-excavation and re-compaction within the building envelope and extending laterally for 5 feet beyond the building limits where possible and to a minimum of 4 feet below existing grade or 3 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, at near optimum moisture content and compact to a minimum of 90 percent relative compaction.
Asphalt Concrete Sections	Compact the top 12 inches to at least 95 percent compaction at near 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 should be between 10 and 20 percent. Subsidence of the surfaces that are scarified and compacted should be between 1 tenth and 3 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.

CONVENTIONAL SHALLOW SPREAD FOOTINGS

Conventional shallow spread footings are expected to provide adequate support for the proposed structure. All footings should be founded upon properly compacted engineered fill soil and should have a minimum embedment depth of 12 inches measured from the lowest adjacent finished grade. Continuous footings and isolated pad footings should have minimum widths of 12 inches and 24 inches, respectively. Continuous footings and isolated pad footings supported upon properly compacted engineered fill soil may be designed using allowable (net) bearing pressures of 2000 and 2500 pounds per square foot (psf), respectively. Allowable increases of 200 psf for each additional 1 foot of width and 250 psf for each additional 6 inches of depth may be used if desired. The maximum allowable bearing pressure should be 3000 psf. The allowable bearing pressures are intended for 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 foundation preparations conform 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 40 feet apart.

Lateral load resistance for the conventional shallow 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 0.45 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. All footings should be reinforced in accordance with the project Structural Engineer's recommendations.

SLABS-ON-GRADE

To provide uniform and adequate support, concrete slabs-on-grade must be placed on properly compacted engineered fill soil as outlined in the previous sections of this report. The slab subgrade should remain near optimum moisture content and should not be permitted to dry prior to concrete placement. Slab subgrade should be firm and unyielding. Disturbed soil should be removed and replaced with engineered fill soil compacted to a minimum of 90 percent relative compaction.

Slab thickness and reinforcement should be determined by the Structural Engineer. We recommend a minimum slab thickness of 4.0 inches and minimum reinforcement of #3 bars at 18 inches on center in both directions. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed at slab mid-height. Final floor slab design and reinforcement should be determined by the Structural Engineer.

Slabs with moisture-sensitive surfaces should be underlain with a moisture vapor retarder consisting of a polyvinyl chloride membrane such as 10-mil visqueen, or equivalent. 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. 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 thin leveling course of sand across the pad surface prior to placement of the membrane.

RETAINING WALLS

Minor retaining walls may be necessary to complete the proposed construction. Cantilever retaining walls may be designed using "active" pressures. Active pressures may be estimated using an equivalent fluid weight of 35 pcf for level native backfill soil acting in a triangular pressure distribution with drained backfill conditions. "At Rest" pressures should be utilized for restrained walls. At rest pressures may be estimated using an equivalent fluid weight of 55 pcf for native backfill soil with level drained backfill conditions.

We recommend that a back drain system be provided behind all retaining walls or that the walls be designed for full hydrostatic pressures. The back drains should consist of a heavy walled, four-inch diameter, perforated pipe sloped to drain to outlets by gravity, and of clean, free-draining, three-quarter to one-and-a-half-inch crushed rock or gravel. The crushed rock or gravel should extend to within one foot of the surface. The upper one foot should be backfilled with compacted, fine-grained soil to exclude surface water. A Mirafi 140N (or equivalent) filter cloth should be placed between the on-site native material and the drain rock.

We recommend that the ground surface behind retaining walls be sloped to drain. Under no circumstances should the surface water be diverted into back drains. Where migration of moisture through walls would be detrimental, the walls should be waterproofed.

ON-SITE PAVEMENT DESIGN

Asphalt concrete pavements should be designed in accordance with the Caltrans Highway Design Manual based on the R-Value and Traffic Index. The R-value of the near-surface soil was estimated to be in excess of 60. Because site grading will consist of significant blending of the near surface soil, the pavement section layer thickness should be based on post grading R-value test results. 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:

TABLE 5		
RECOMMENDED ASPHALT PAVEMENT SECTION LAYER THICKNESS		
Pavement Material	Recommended Thickness	
	TI = 5.0	TI = 6.5
Asphalt Concrete Surface Course	3.0 inches	3.0 inches
Class II Aggregate Base Course	4.0 inches	6.0 inches
Compacted Subgrade Soil	12.0 inches	12.0 inches

Asphalt concrete and Class II aggregate base should conform to the latest edition of the Standard Specifications for Public Works Construction (“Greenbook”) or CalTrans Standard Specifications. 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 falls within the “negligible-S0” sulfate exposure category. The use of Type V cement and special sulfate-resistant concrete mixes may not be necessary. The 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 7.9. Based on soluble chloride concentration testing (80 ppm) the falls within the “normal-C1” chloride exposure category. The minimum resistivity of the surface soil was found to be 5,900 that suggests the site soil is considered to have “low” corrosion potential with respect to ferrous metal installations. A corrosion expert should be consulted regarding appropriate corrosion protection measures for corrosion sensitive installations.

UTILITY TRENCH BACKFILL

All utility trench backfill should be compacted to a minimum of 90 percent relative compaction. Trench backfill materials should be placed in lifts no greater than six inches in a loose condition, moisture conditioned (or air-dried) as necessary to achieve near optimum moisture content, and mechanically compacted to a minimum of 90 percent relative compaction. A representative of the project soil engineer should test the backfill to verify adequate compaction.

EXTERIOR CONCRETE FLATWORK

To provide uniform support and minimize settlement related cracking of concrete flatwork, the subgrade soil within concrete flatwork areas should be compacted to a minimum of 90 percent relative compaction. A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soil prior to concrete placement.

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. 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 locations and extrapolation of these conditions throughout the proposed building areas. 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 extend into the properly compacted 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 soil 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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PLATES

SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
EXPLORATION LOCATION PLAN
FAULT ZONE MAP
FAULT ZONE OVERLAY



USGS (2021)

SITE LOCATION MAP

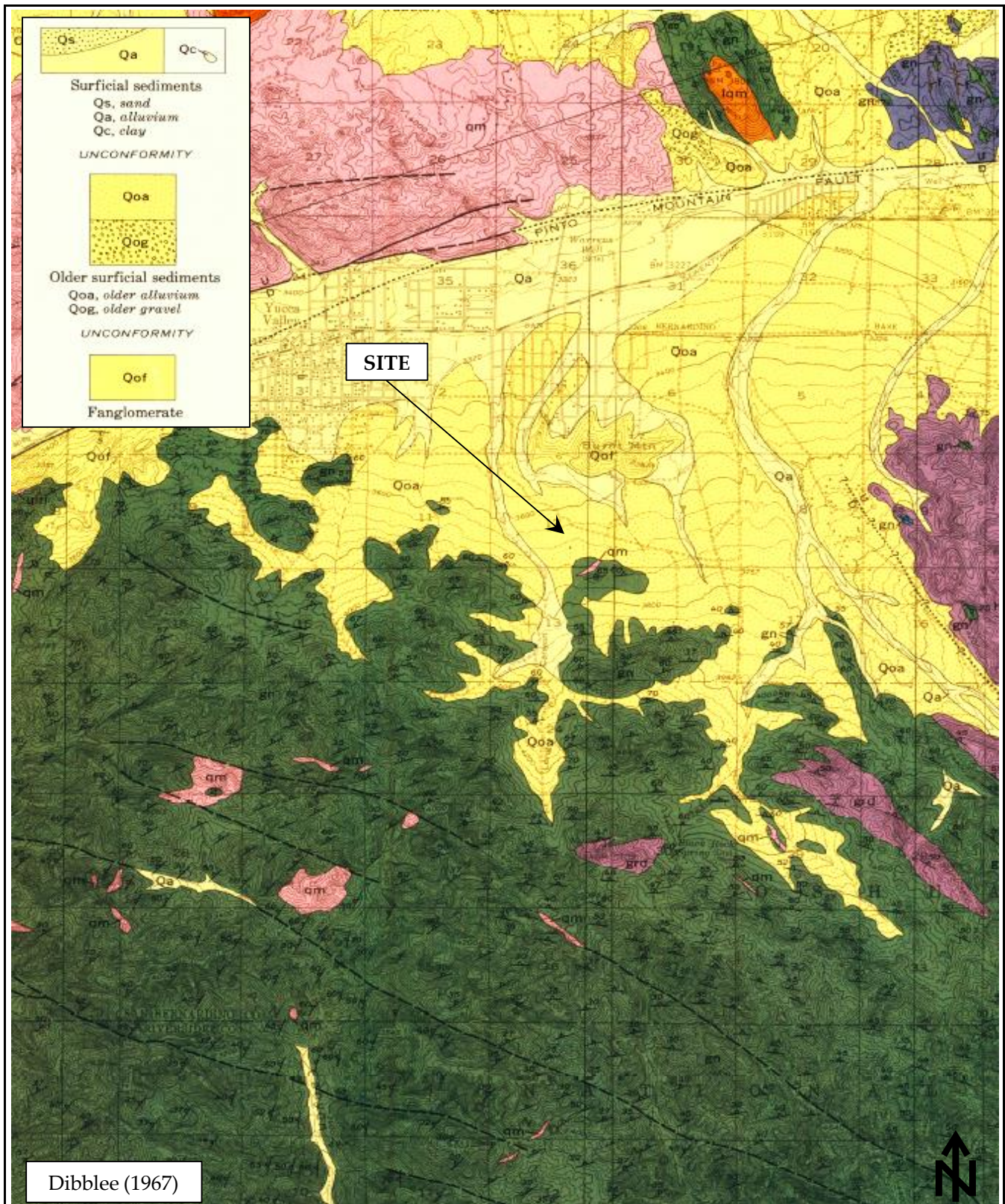
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Sladden Engineering



Project Number:	544-25019
Report Number:	25-04-180
Date:	April 8, 2025

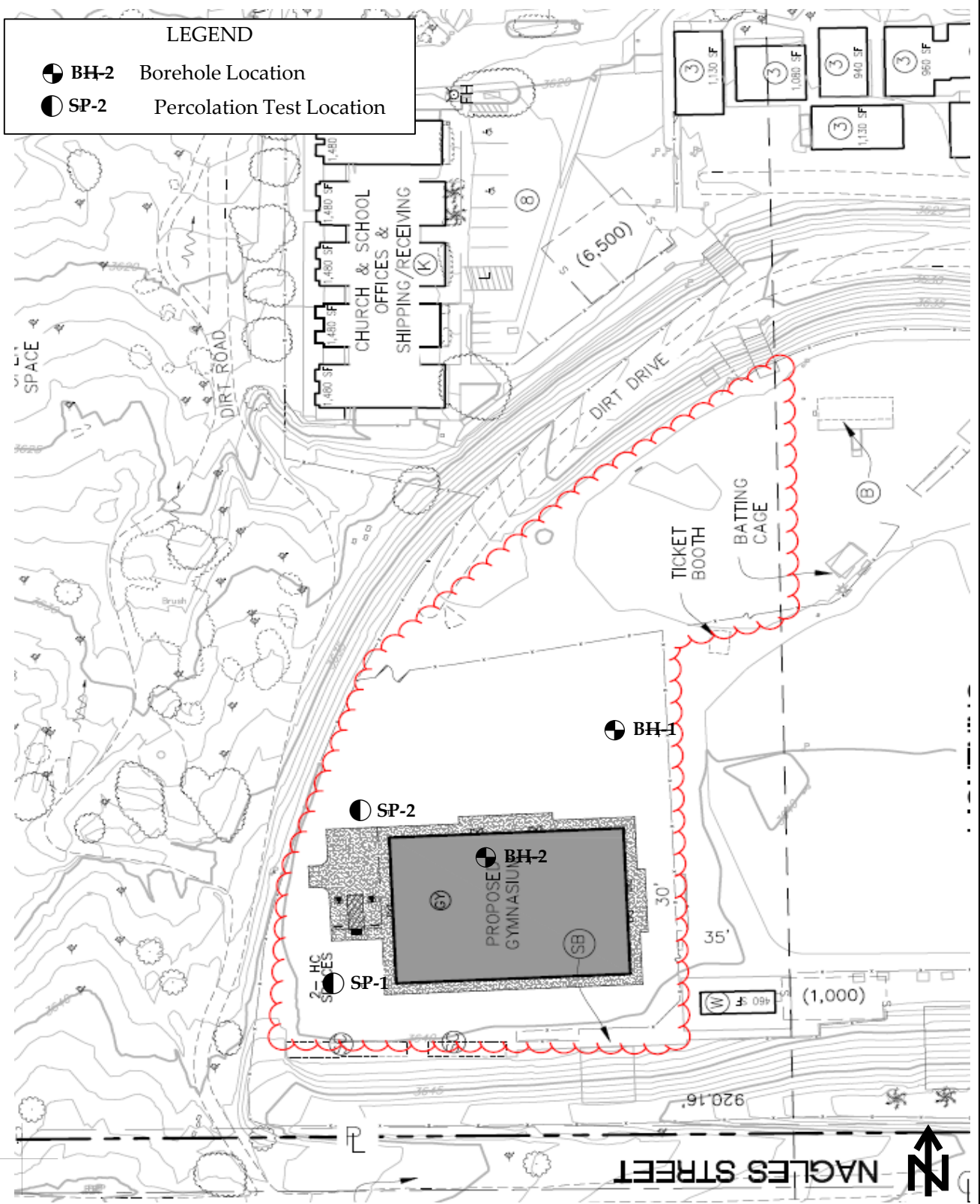
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 Sladden Engineering	REGIONAL GEOLOGIC MAP		PLATE 2
	Project Number:	544-25019	
	Report Number:	25-04-180	
	Date:	April 8, 2025	

LEGEND

-  **BH-2** Borehole Location
-  **SP-2** Percolation Test Location



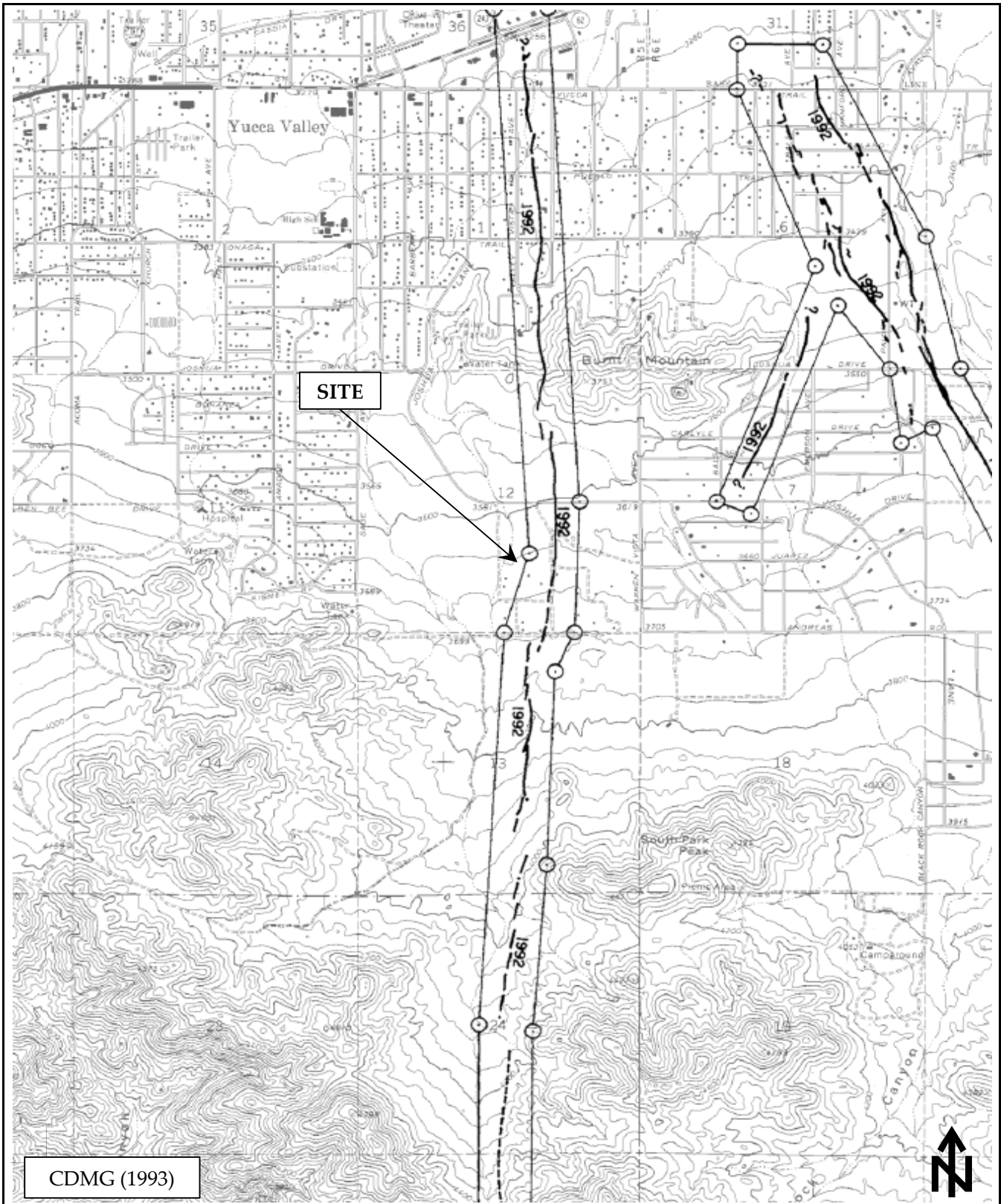
Sladden Engineering

EXPLORATION LOCATION PLAN

Project Number:	544-25019
Report Number:	25-04-180
Date:	April 8, 2025

PLATE

3



CDMG (1993)



FAULT ZONE MAP

PLATE



Sladden Engineering

Project Number:

544-25019

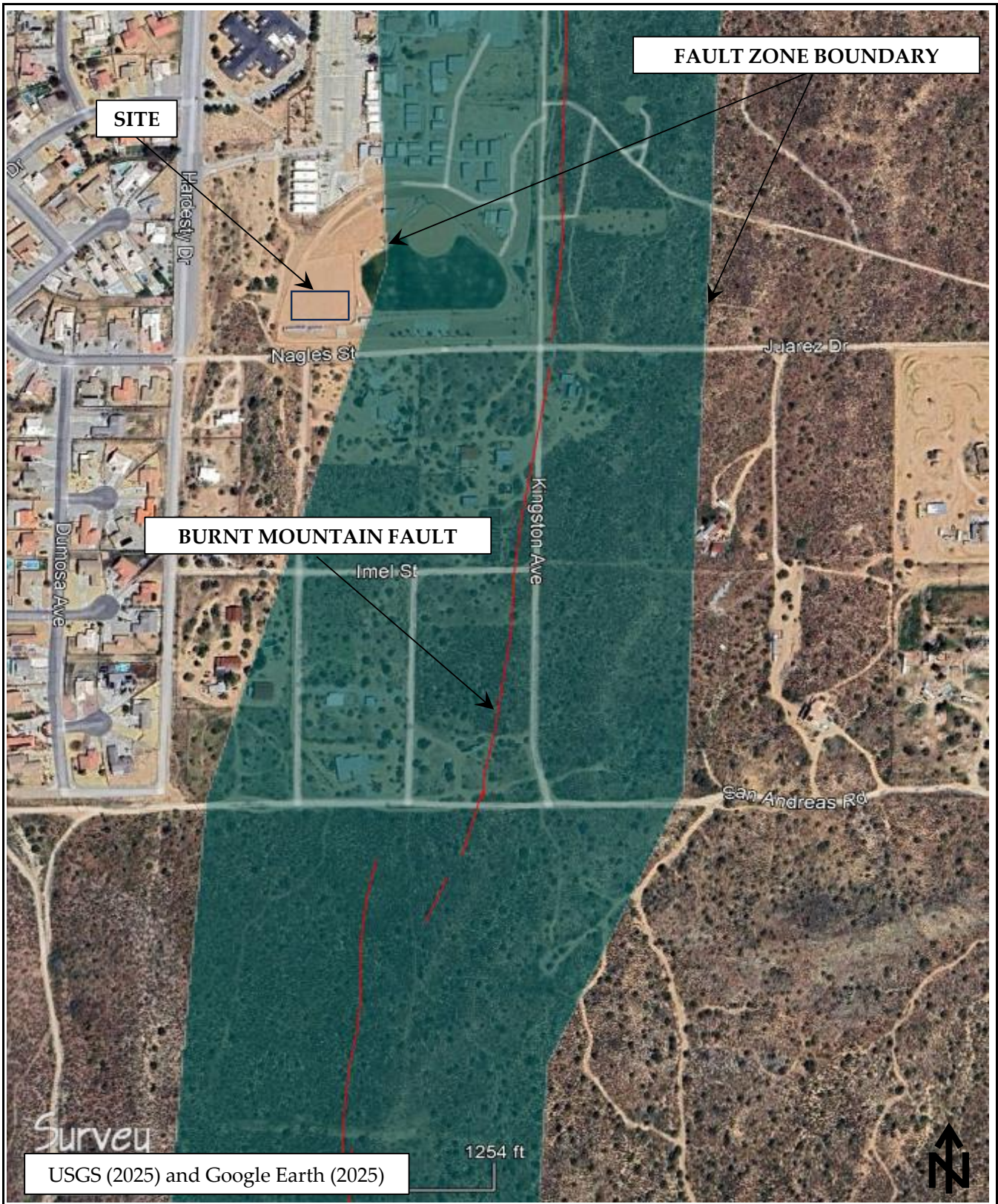
Report Number:


25-04-180

Date:

April 8, 2025

4



 Sladden Engineering	FAULT ZONE OVERLAY		PLATE 5
	Project Number:	544-25019	
	Report Number:	25-04-180	
	Date:	April 8, 2025	

APPENDIX A
FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

For our field investigation two (2) exploratory bores and two (2) percolation test holes were excavated on the subject site. Continuous logs of the materials encountered were made by a representative of Sladden Engineering. Materials encountered in the bores were classified in accordance with the Unified Soil Classification System.

Representative undisturbed samples were obtained within our borings 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.



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BORE LOG

Equipment:	Mobile B-61	Date Drilled:	2/12/2025
Elevation:	3,645 Ft. MSL	Boring No:	BH-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
	31 50	1	0	21.3	5.2	136.3	2		Silty Sand (SM); dark yellowish brown, slightly moist, dense, fine- to coarse-grained with clay (Fill/Disturbed).
	7 8 8			20.3	4.7	127.2	4		Silty Sand (SM); dark yellowish brown, slightly moist, fine- to coarse-grained (Qoa)
							6		
	12 13 16			4.5	2.5		10		Sand (SP); dark yellowish brown, dry, medium dense, fine- to coarse-grained (Qoa).
	11 15 19			20.1	7.1	106.5	16		Silty Sand (SM); dark yellowish brown, moist, medium dense, fine- to coarse-grained with trace clay (Qoa).
	13 15 16			6.5	3.4		20		Sand (SW-SM); dark yellowish brown, dry, fine- to coarse-grained with gravel (Qoa).
							22		
	15 21 25			5.6	2.6		26		Sand (SW-SM); dark yellowish brown, dry, medium dense, fine- to coarse-grained (Qoa).
	12 13 15			5.6	2.6		30		Sand (SW-SM); dark yellowish brown, dry, medium dense, fine- to coarse-grained (Qoa).
							32		
	18 36 37			3.8	1.5	106.2	36		Sand (SW); dark yellowish brown, dry, dense, fine- to coarse-grained (Qoa).
	12 17 18			4.4	2.1		40		Sand (SW); dark yellowish brown, dry, dense, fine- to coarse-grained (Qoa).
							42		
	15 24 50			4.8	1.7	112.2	46		Sand (SW); dark yellowish brown, dry, dense, fine- to coarse-grained (Qoa).
	15 16 16			6.6	2.8		50		Sand (SW); dark yellowish brown, dry, dense, fine- to coarse-grained (Qoa).

Completion Notes:
 Terminated at ~51.5 Feet bgs.
 No Bedrock Encountered.
 No Groundwater or Seepage Encountered.

PROPOSED GYMNASIUM 57353 JOSHUA LANE, YUCCA VALLEY	
Project No:	544-25019
Report No:	25-04-180
Page	1



Sladden Engineering

BORE LOG

Equipment:	Mobile B-61	Date Drilled:	2/12/2025
Elevation:	3,645 Ft. MSL	Boring No:	BH-2



Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); dark yellowish brown, slightly moist, fine- to coarse-grained with clay (Fill).
	3 3 2				13.3		4		Silty Sand (SM); very dark brown, moist, loose, fine to coarse-grained (Fill).
							6		
							8		
	8 9 11				5.2	116.7	10		Silty Sand (SM); dark yellowish brown, moist, medium dense, fine- to coarse-grained (Qoa).
							12		
							14		
	6 10 12				5.0		16		Sand (SW-SM); dark yellowish brown, moist, medium dense, fine- to coarse-grained (Qoa).
							18		
							20		
	19 23 27				3.7	126.8	22		Sand (SW); dark yellowish brown, dry to slightly moist, dense, fine- to coarse-grained with gravel (Qoa).
							24		
							26		
	11 14 19				3.4		28		Sand (SW-SM); dark yellowish brown, dry, dense, fine- to coarse-grained (Qoa).
							30		
							32		
	14 17 21				3.1	115.2	34		Sand (SW-SM); dark yellowish brown, dry, slightly moist, medium dense, fine- to coarse-grained (Qoa).
							36		Terminated at 31.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							38		
							40		
							42		
							44		
							46		
							48		
							50		



Sladden Engineering

BORE LOG

Equipment:	Mobile B-61	Date Drilled:	2/12/2025
Elevation:	3,645 Ft. MSL	Boring No:	SP-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
				19.3	4.9		2		Silty Sand (SM); dark brown, moist, fine- to coarse-grained with roots (Fill).
							6		Sand (SW-SM); dark yellowish brown, dry to slightly moist, fine- to coarse-grained (Qoa).
							22		Silty Sand (SM); dark brown, moist, fine to coarse-grained (Qoa).
							30		Terminated at 30.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.



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BORE LOG

Equipment:	Mobile B-61	Date Drilled:	2/12/2025
Elevation:	3,645 Ft. MSL	Boring No:	SP-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); dark brown, moist, fine- to coarse-grained with roots (Fill).
						4			
						6			
							8		Sand (SW-SM); dark yellowish brown, dry to slightly moist, fine- to coarse-grained (Qoa).
						10			
						12			
						14			
						16			
						18			
						20			
						22			
						24			
						26			
						28			
						30			
						32			
						34			
						36			
						38			
						40			
						42			
						44			
						46			
						48			
						50			
Completion Notes:								Terminated at 20.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.	

PROPOSED GYMNASIUM
57353 JOSHUA LANE, YUCCA VALLEY

APPENDIX B

LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Representative bulk 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

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, Test Method A. Graphic representations of the results of this testing are presented 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 soil 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.

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.

Corrosion Series Testing: The soluble sulfate concentrations of the surface soil were 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: 544-25019
Project Name: 57353 Joshua Lane
Lab ID Number: LN6-25054
Sample Location: BH-1 Bulk 1 @ 0-5'
Description: Dark Brown Silty Sand (SM)

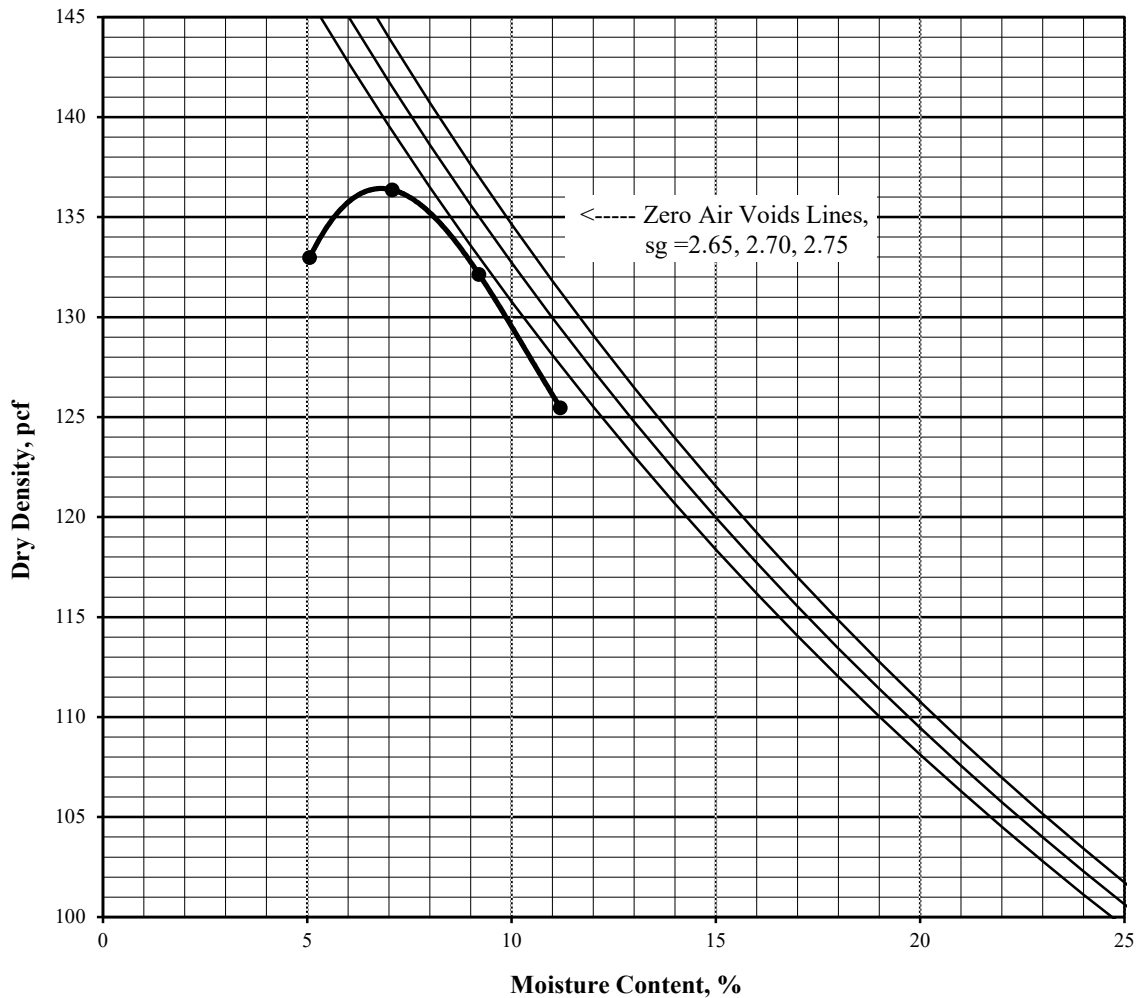
March 28, 2025

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 138.5 pcf
Optimum Moisture: 7.5%

Corrected for Oversize (ASTM D4718)

Sieve Size	% Retained
3/4"	
3/8"	
#4	5.9





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Expansion Index

ASTM D 4829

Job Number: 544-25019
 Job Name: 57353 Joshua Lane
 Lab ID Number: LN6-25054
 Sample ID: BH-1 Bulk 1 @ 0-5'
 Soil Description: Dark Brown Silty Sand (SM)

March 28, 2025

Wt of Soil + Ring:	617.8
Weight of Ring:	194.6
Wt of Wet Soil:	423.2
Percent Moisture:	5.9%
Sample Height, in	0.95
Wet Density, pcf:	135.4
Dry Denstiy, pcf:	127.9

% Saturation:	50.1
---------------	------

Expansion

Rack # 1

Date/Time	3/27/2025	2:00 PM
Initial Reading	0.0000	
Final Reading	0.0000	

Expansion Index

0

(Final - Initial) x 1000



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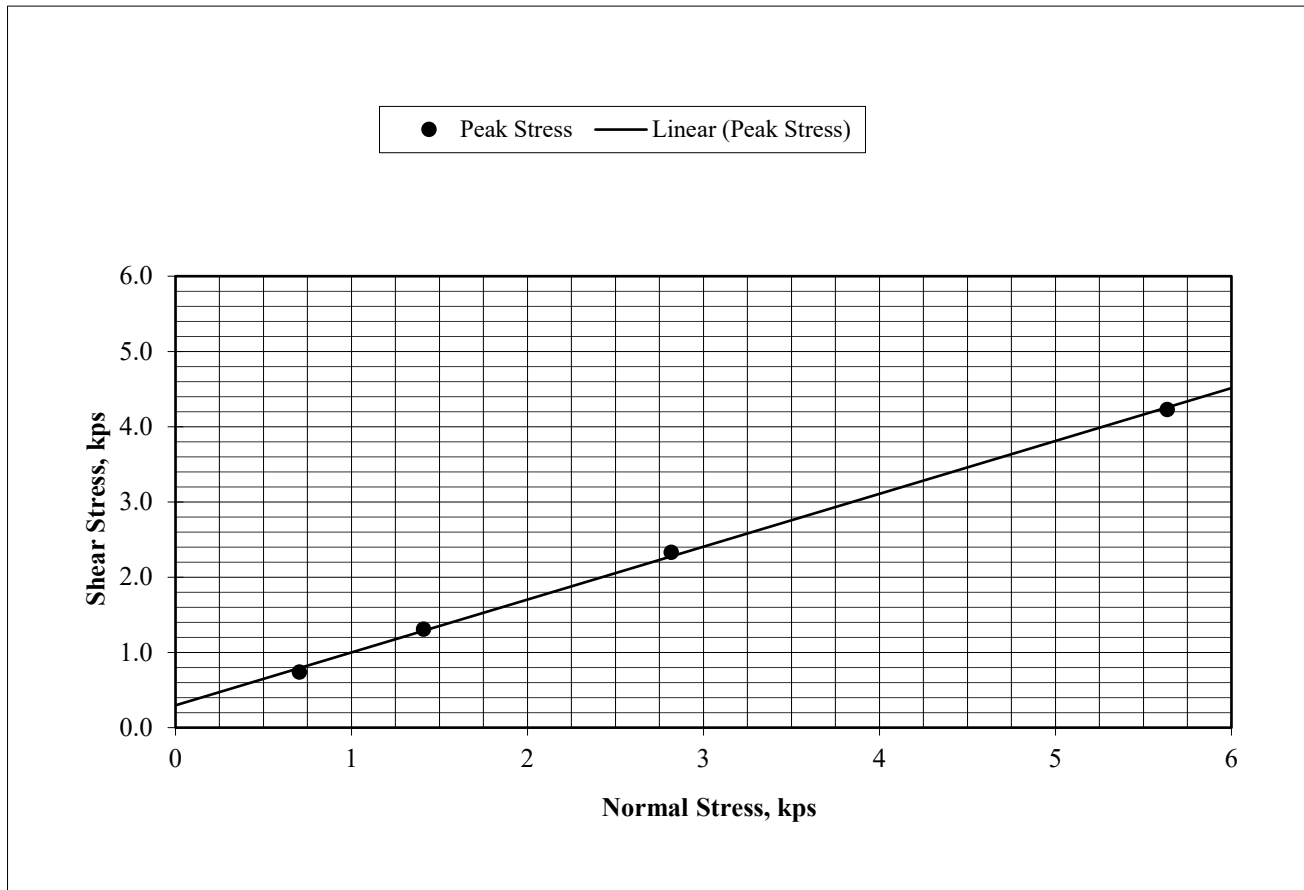
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Direct Shear ASTM D 3080-04 (modified for unconsolidated condition)

Job Number: 544-25019
Job Name 57353 Joshua Lane
Lab ID No. LN6-25054
Sample ID BH-1 Bulk 1 @ 0-5'
Classification Dark Brown Silty Sand (SM)
Sample Type Remolded @ 90% of Maximum Density

March 28, 2025
Initial Dry Density: 124.1 pcf
Initial Moisture Content: 7.9 %
Peak Friction Angle (ϕ): 35°
Cohesion (c): 300 psf

Test Results	1	2	3	4	Average
Moisture Content, %	11.1	11.1	11.1	11.1	11.1
Saturation, %	83.9	83.9	83.9	83.9	83.9
Normal Stress, kps	0.704	1.409	2.817	5.635	
Peak Stress, kps	0.741	1.308	2.333	4.229	





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Gradation

ASTM C117 & C136

Project Number: 544-25019

March 28, 2025

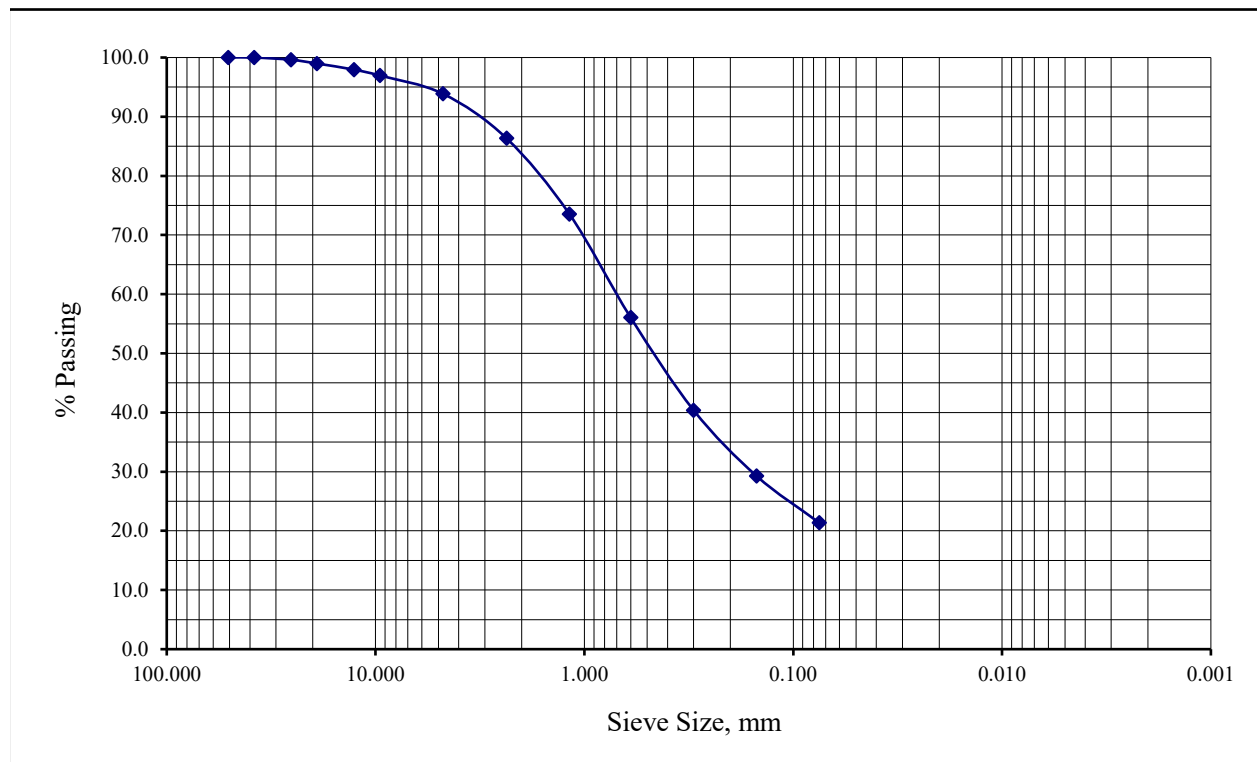
Project Name: 57353 Joshua Lane

Lab ID Number: LN6-25054

Sample ID: BH-1 Bulk 1 @ 0-5'

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	99.6
3/4"	19.1	99.0
1/2"	12.7	98.0
3/8"	9.53	97.0
#4	4.75	93.9
#8	2.36	86.3
#16	1.18	73.6
#30	0.60	56.0
#50	0.30	40.4
#100	0.15	29.3
#200	0.075	21.4





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Gradation

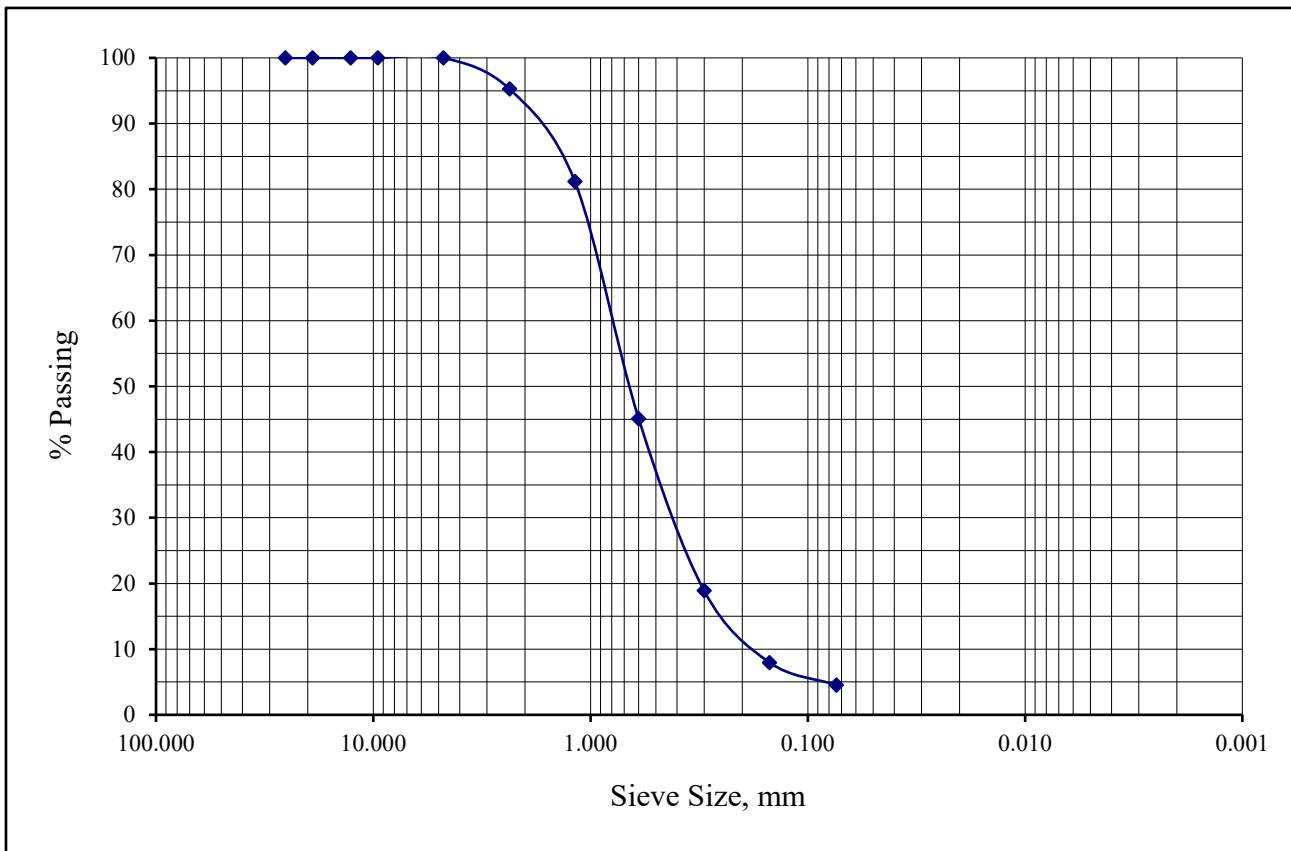
ASTM C117 & C136

Project Number: 544-25019
Project Name: 57353 Joshua Lane
Lab ID Number: LN6-25054
Sample ID: BH-1 S-3 @ 10'

March 28, 2025

Soil Classification: SP

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	100.0
#8	2.36	95.3
#16	1.18	81.2
#30	0.60	45.1
#50	0.30	18.9
#100	0.15	8.0
#200	0.074	4.5





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Gradation

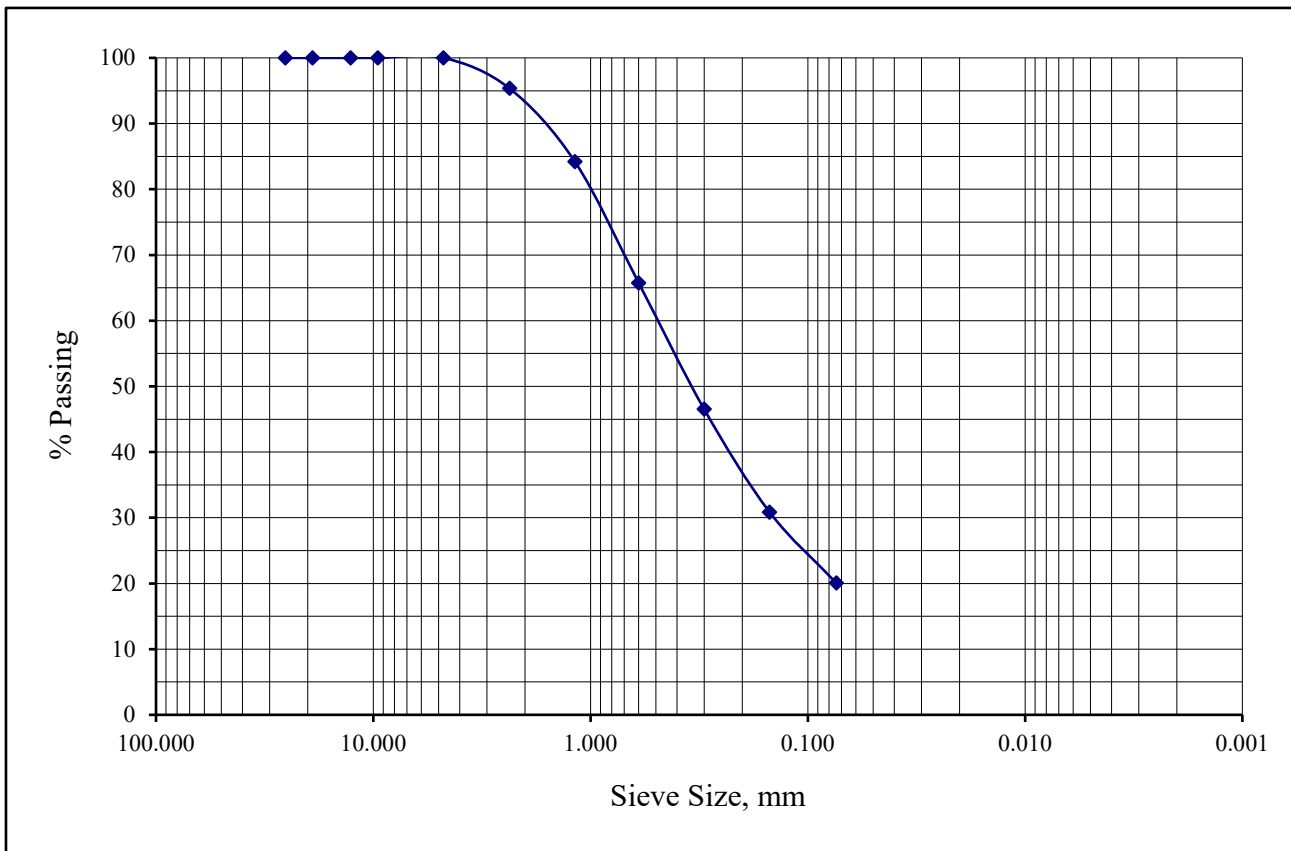
ASTM C117 & C136

Project Number: 544-25019
Project Name: 57353 Joshua Lane
Lab ID Number: LN6-25054
Sample ID: BH-1 R-4 @ 15'

March 28, 2025

Soil Classification: 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	100.0
#8	2.36	95.3
#16	1.18	84.2
#30	0.60	65.7
#50	0.30	46.5
#100	0.15	30.9
#200	0.074	20.1





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Gradation

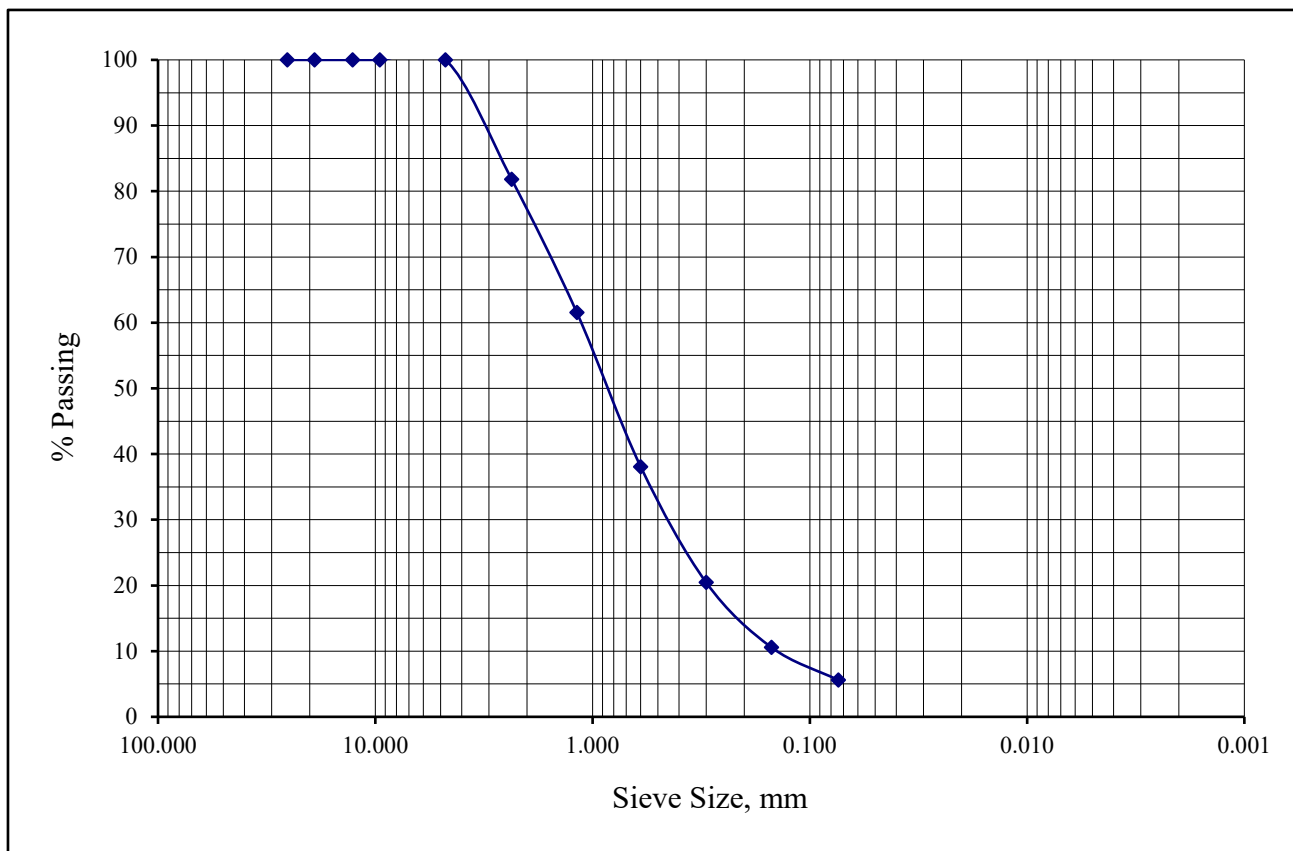
ASTM C117 & C136

Project Number: 544-25019
Project Name: 57353 Joshua Lane
Lab ID Number: LN6-25054
Sample ID: BH-1 R-6' @ 25'

March 28, 2025

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	100.0
#8	2.36	81.8
#16	1.18	61.5
#30	0.60	38.1
#50	0.30	20.5
#100	0.15	10.6
#200	0.074	5.6





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Gradation

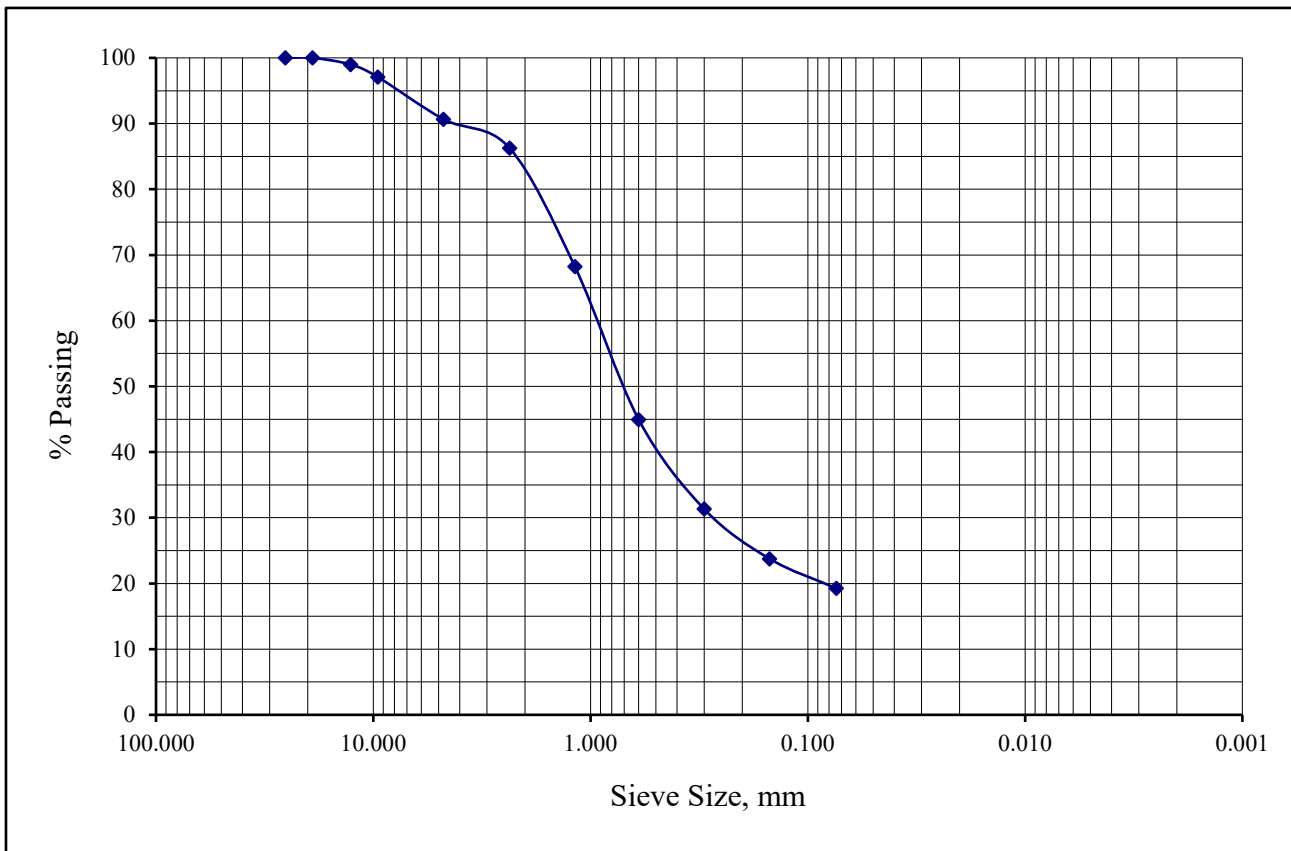
ASTM C117 & C136

Project Number: 544-25019
Project Name: 57353 Joshua Lane
Lab ID Number: LN6-25054
Sample ID: SP-1 @ 30'

March 28, 2025

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	99.0
3/8"	9.53	97.1
#4	4.75	90.7
#8	2.36	86.3
#16	1.18	68.2
#30	0.60	44.9
#50	0.30	31.3
#100	0.15	23.8
#200	0.074	19.3





Sladden Engineering

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

One Dimensional Consolidation

ASTM D2435 & D5333

Job Number: 544-25019
Job Name: 57353 Joshua Lane

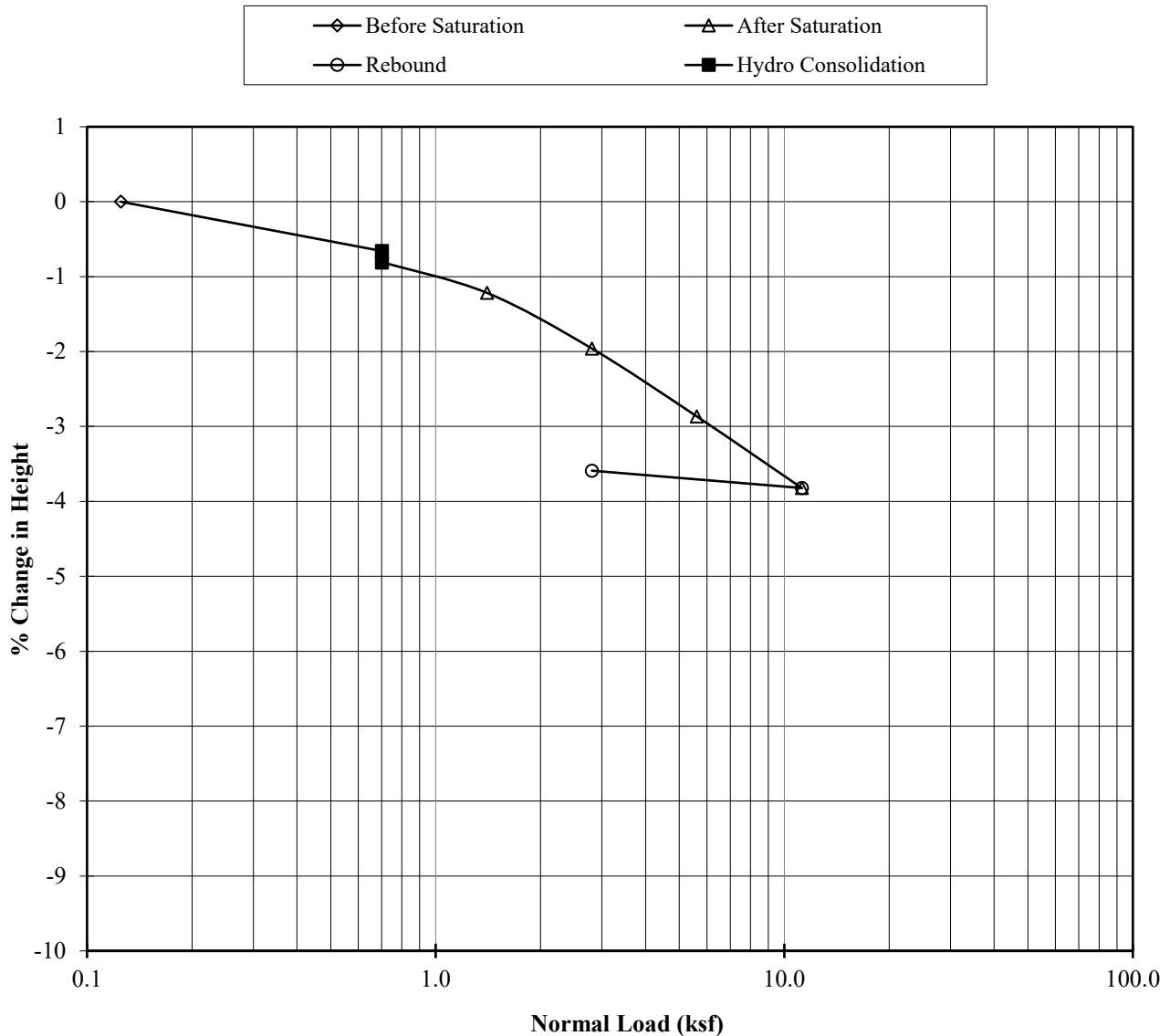
March 28, 2025

Lab ID Number: LN6-25054
Sample ID: BH-1 R-4 @ 15'
Soil Description: Dark Brown Silty Sand (SM)

Initial Dry Density, pcf: 121.8
Initial Moisture, %: 7.1
Initial Void Ratio: 0.369
Specific Gravity: 2.67

Hydrocollapse: 0.2% @ 0.702 ksf

% Change in Height vs Normal Pressure Diagram





Sladden Engineering

6782 Stanton Ave., Suite C, 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: March 28, 2025

Account No.: 544-25019

Customer: Joshua Springs Calvary Chapel

Location: Proposed Gymnasium APN 0585-062-65 57353 Joshua Lane, Yucca Valley

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
BH-1 @ 0-5'	7.9	20	80	5,900

APPENDIX C

**SEISMIC DESIGN MAP AND REPORT
SITE-SPECIFIC GROUND MOTION PARAMETERS**

SITE-SPECIFIC GROUND MOTION ANALYSIS (ASCE 7-16)

Project: 57353 Joshua Lane, Yucca Valley
Project Number: 544-25019
Client: Joshua Springs Calvary Chapel
Site Lat/Long: 34.0946/-116.4128
Controlling Seismic Source: Burnt Mountain / Pinto Mountain

REFERENCE	NOTATION	VALUE	REFERENCE	NOTATION	VALUE	REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured	F _v (Table 11.4-2)[Used for General Spectrum]	F _v	1.7			
Site Class D - Table 11.4-1	F _a	1.0	Design Maps	S _s	2.205	0.2*(S _{D1} /S _{D5})	T ₀	0.112*
Site Class D - 21.3(ii)	F _v	2.5	Design Maps	S ₁	0.729	S _{D1} /S _{D5}	T ₅	0.562*
0.2*(S _{D1} /S _{D5})	T ₀	0.165	Equation 11.4-1 - F _a *S _s	S _{MS}	2.205*	Equation 11.4-4 - 2/3*S _{M1}	S _{D1}	0.8262*
S _{D1} /S _{D5}	T ₅	0.827	Equation 11.4-3 - 2/3*S _{MS}	S _{D5}	1.47*	Equation 11.4-2 - F _v *S ₁	S _{M1}	1.2393*
Fundamental Period (12.8.2)	T	Period	Design Maps	PGA	0.905			
Seismic Design Maps or Fig 22-14	T _L	8	Table 11.8-1	F _{PGA}	1.1			
Equation 11.4-4 - 2/3*S _{M1}	S _{D1}	1.2150	Equation 11.8-1 - F _{PGA} *PGA	PGA _M	0.996*			
Equation 11.4-2 - F _v *S ₁ ¹	S _{M1}	1.8225	Section 21.5.3	80% of PGA _M	0.796			
¹ - F _v as determined by Section 21.3			Design Maps	C _{RS}	0.905			
			Design Maps	C _{R1}	0.891			
<u>RISK COEFFICIENT</u>								
Cr - At Periods <=0.2, Cr=C _{RS}	C _{RS}	0.905				Cr - At Periods between 0.2 and 1.0 use trendline formula to complete	Period	Cr
Cr - At Periods >=1.0, Cr=C _{R1}	C _{R1}	0.891					0.200	0.905
							0.300	0.903
							0.400	0.902
							0.500	0.900
							0.600	0.898
							0.680	0.897
							1.000	0.891

* Code based design value. See accompanying data for Site Specific Design values.

Mapped values from <https://hazards.atcouncil.org/>
<https://www.seismicmaps.org/>



PROBABILISTIC SPECTRA¹
2% in 50 year Exceedence

Project No: 544-25019

Period	UGHM	RTGM	Max Directional Scale Factor ²	Probabilistic MCE
0.010	0.989	0.950	1.19	1.131
0.100	1.639	1.609	1.19	1.915
0.200	2.124	2.092	1.20	2.510
0.300	2.400	2.318	1.22	2.828
0.500	2.374	2.218	1.23	2.728
0.750	1.979	1.814	1.24	2.249
1.000	1.666	1.514	1.24	1.877
2.000	0.898	0.804	1.24	0.997
3.000	0.577	0.516	1.25	0.645
4.000	0.398	0.356	1.25	0.445
5.000	0.296	0.263	1.26	0.331

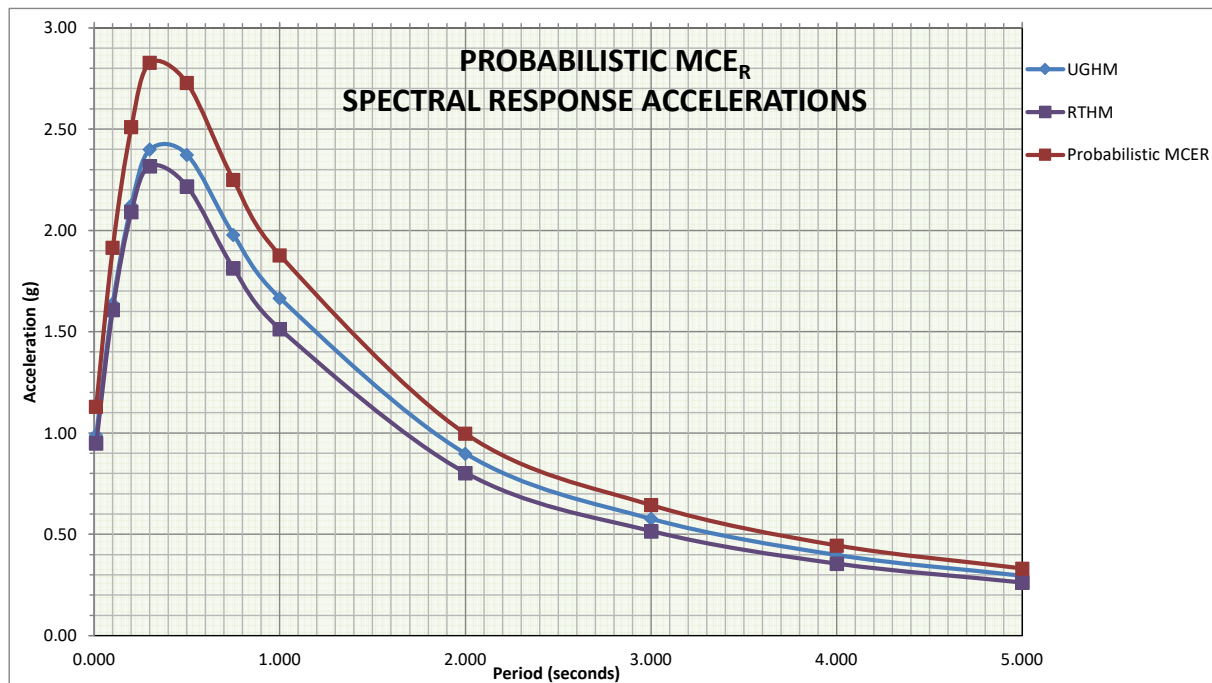
¹ Data Sources:

<https://earthquake.usgs.gov/hazards/interactive/>

<https://earthquake.usgs.gov/designmaps/rtgm/>

² Shahi-Baker RotD100/RotD50 Factors (2014)

Probabilistic PGA: 0.989
 Is Probabilistic $S_{a(max)} < 1.2F_a$? **NO**



DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations¹
 Controlling Source: Burnt Mountain / Pinto Mountain

Is Probabilistic $S_{a(max)} < 1.2F_a$? **NO**

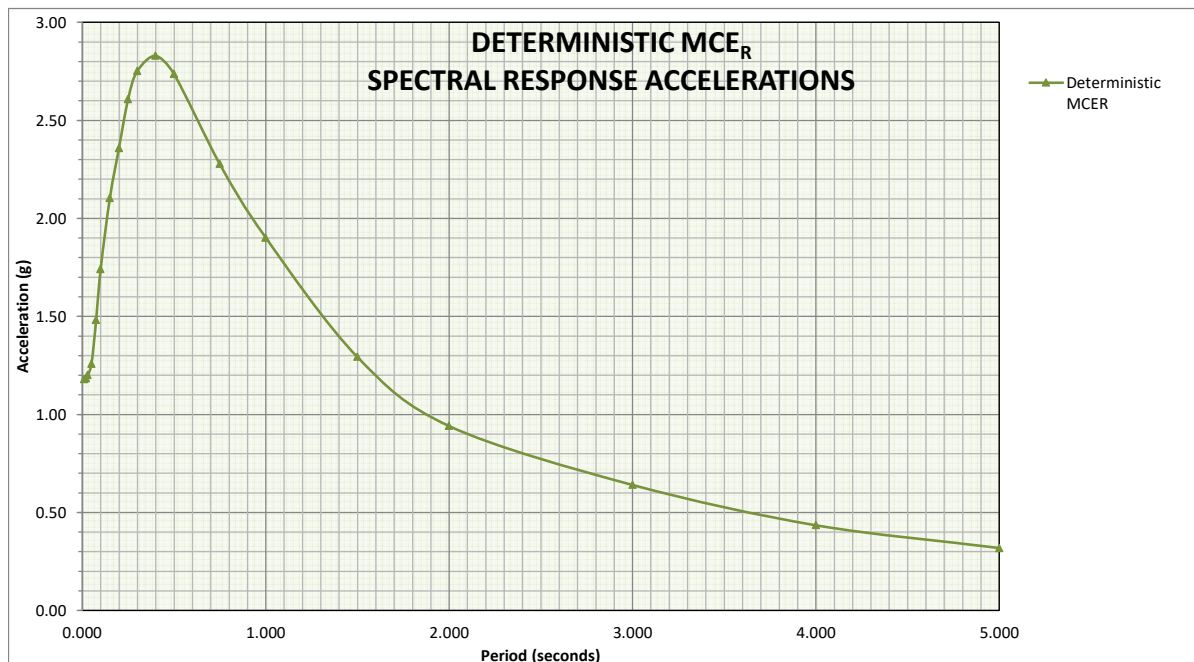
Period	Deterministic $P S_a$ Median + 1.σ for 5% Damping	Max Directional Scale Factor ²	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	0.991	1.19	1.179	1.179
0.020	0.996	1.19	1.185	1.185
0.030	1.009	1.19	1.200	1.200
0.050	1.057	1.19	1.258	1.258
0.075	1.246	1.19	1.482	1.482
0.100	1.463	1.19	1.741	1.741
0.150	1.753	1.20	2.104	2.104
0.200	1.966	1.20	2.359	2.359
0.250	2.156	1.21	2.609	2.609
0.300	2.256	1.22	2.752	2.752
0.400	2.300	1.23	2.829	2.829
0.500	2.225	1.23	2.737	2.737
0.750	1.837	1.24	2.278	2.278
1.000	1.533	1.24	1.901	1.901
1.500	1.043	1.24	1.294	1.294
2.000	0.759	1.24	0.941	0.941
3.000	0.513	1.25	0.641	0.641
4.000	0.348	1.25	0.435	0.435
5.000	0.253	1.26	0.318	0.318

Project No: 544-25019

Is Deterministic $S_{a(max)} < 1.5 * F_a$? **NO**
 Section 21.2.2 Scaling Factor: **N/A**
 Deterministic PGA: **0.991**
 Is Deterministic PGA $\geq F_{PGA} * 0.5$? **YES**

¹ NGAWest 2 GMPE worksheet and Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) - Time Dependent Model

² Shahi-Baker RotD100/RotD50 Factors (2014)



SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	1.131	1.179	1.131	0.754
0.100	1.915	1.741	1.741	1.161
0.200	2.510	2.359	2.359	1.573
0.300	2.828	2.752	2.752	1.835
0.500	2.728	2.737	2.728	1.819
0.750	2.249	2.278	2.249	1.500
1.000	1.877	1.901	1.877	1.252
2.000	0.997	0.941	0.941	0.627
3.000	0.645	0.641	0.641	0.427
4.000	0.445	0.435	0.435	0.290
5.000	0.331	0.318	0.318	0.212

Period	ASCE 7 SECTION 21.3 General Spectrum	80% General Response Spectrum
0.005	0.615	0.492
0.010	0.641	0.513
0.020	0.695	0.556
0.030	0.748	0.598
0.050	0.855	0.684
0.060	0.908	0.727
0.075	0.988	0.791
0.090	1.068	0.855
0.100	1.122	0.897
0.110	1.175	0.940
0.120	1.228	0.983
0.136	1.314	1.051
0.150	1.388	1.111
0.160	1.442	1.153
0.170	1.470	1.176
0.180	1.470	1.176
0.200	1.470	1.176
0.250	1.470	1.176
0.300	1.470	1.176
0.400	1.470	1.176
0.500	1.470	1.176
0.600	1.470	1.176
0.640	1.470	1.176
0.750	1.470	1.176
0.820	1.470	1.176
0.900	1.350	1.080
0.930	1.306	1.045
1.000	1.215	0.972
1.500	0.810	0.648
2.000	0.608	0.486
3.000	0.405	0.324
4.000	0.304	0.243
5.000	0.243	0.194

**ASCE 7-16: Section 21.4
Site Specific**

	Calculated Value	Design Value
SDS:	1.651	1.651
SD1:	1.282	1.282
SMS:	2.477	2.477
SM1:	1.922	1.922
Site Specific PGAm:	0.989	0.989
Site Class:	D measured	

Seismic Design Category - Short* D

Seismic Design Category - 1s* D

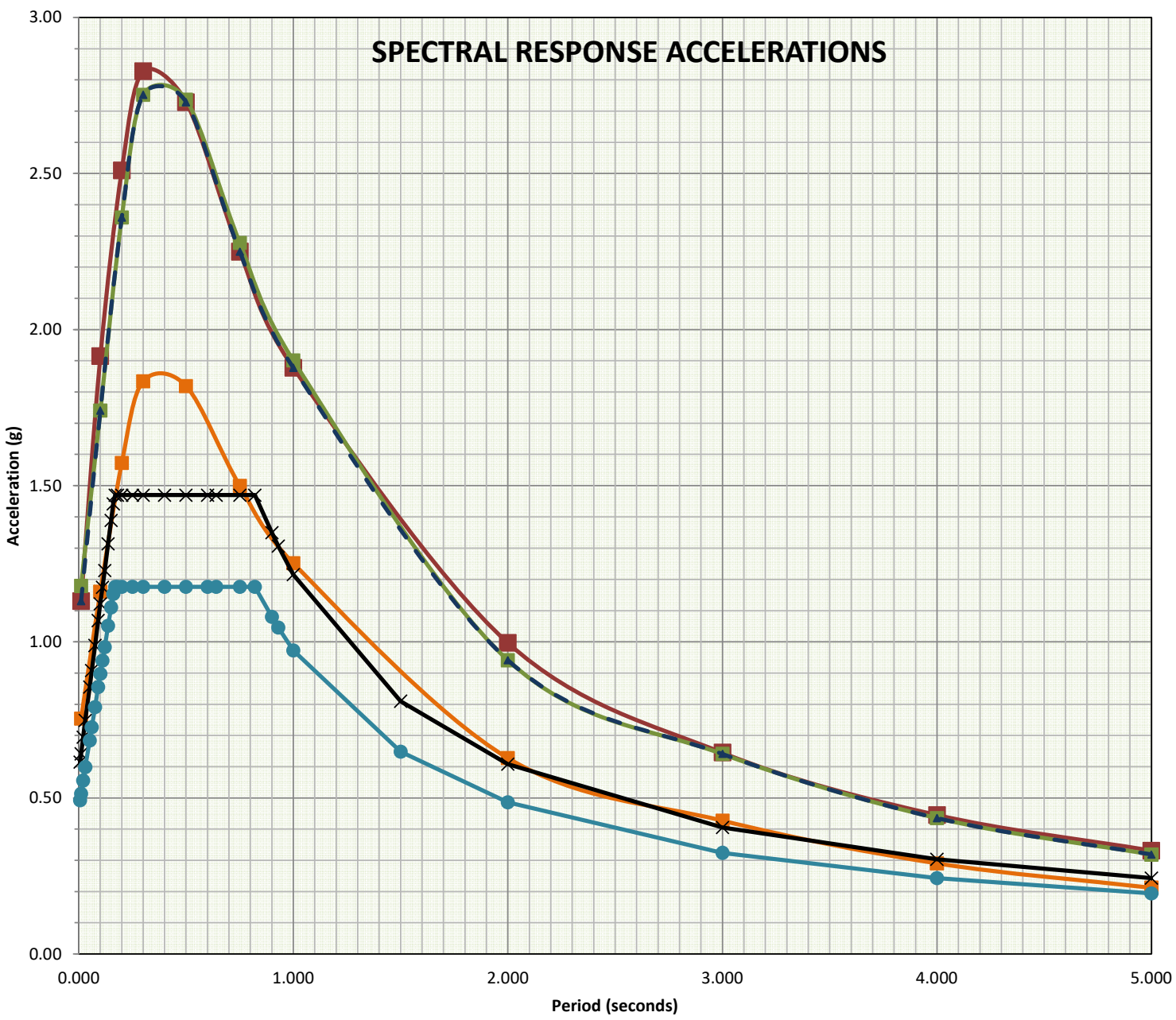
* Risk Categories I, II, or III

Project No: 544-25019



SPECTRAL RESPONSE ACCELERATIONS

- Probabilistic MCE
- Deterministic MCE
- Site-Specific MCE
- Design Response Spectrum
- ASCE 7 Section 21.3 General Spectrum
- 80% General Response Spectrum

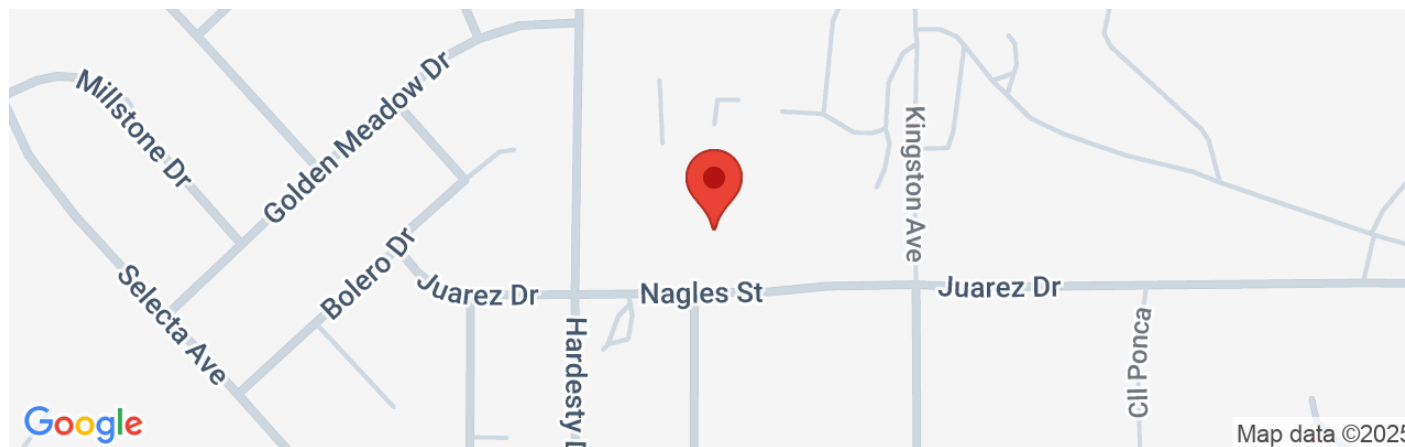


USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
 USGS web services are now operational so this tool should work as expected.



57353 Joshua Lane, Yucca Valley

Latitude, Longitude: 34.0946, -116.4128



Date	2/26/2025, 9:15:09 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S _S	2.205	MCE _R ground motion. (for 0.2 second period)
S ₁	0.729	MCE _R ground motion. (for 1.0s period)
S _{MS}	2.205	Site-modified spectral acceleration value
S _{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S _{DS}	1.47	Numeric seismic design value at 0.2 second SA
S _{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F _a	1	Site amplification factor at 0.2 second
F _v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.905	MCE _G peak ground acceleration
F _{PGA}	1.1	Site amplification factor at PGA
PGA _M	0.996	Site modified peak ground acceleration
T _L	8	Long-period transition period in seconds
S _{sRT}	2.291	Probabilistic risk-targeted ground motion. (0.2 second)
S _{sUH}	2.531	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S _{sD}	2.205	Factored deterministic acceleration value. (0.2 second)
S _{1RT}	0.815	Probabilistic risk-targeted ground motion. (1.0 second)
S _{1UH}	0.914	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.

Type	Value	Description
S1D	0.729	Factored deterministic acceleration value. (1.0 second)
PGAd	0.905	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA _{UH}	0.981	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C _{RS}	0.905	Mapped value of the risk coefficient at short periods
C _{R1}	0.891	Mapped value of the risk coefficient at a period of 1 s
C _v	1.5	Vertical coefficient

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APPENDIX D
SITE PLAN

IN THE TOWN OF YUCCA VALLEY

JOSHUA SPRINGS CALVARY CHAPEL

CONDITIONAL USE PERMIT SITE PLAN

REVISED SEPTEMBER 11, 2024

PREPARED FOR (APPLICANT, OWNER):
 JOSHUA SPRINGS CALVARY CHAPEL
 57353 JOSHUA LANE
 YUCCA VALLEY, CA 92284
 (760) 365-0769
 EMAIL: jere@joshuasprings.org

PROJECT DESCRIPTION

JOSHUA SPRINGS CALVARY CHAPEL (JSCC) CURRENTLY OCCUPIES A PORTION OF THE 23+ ACRE SITE AND OPERATES A CHURCH, CAFE (FOR PRIVATE USE), ADMINISTRATIVE OFFICES, A K-12 SCHOOL, RELATED PARKING AND OTHER FACILITIES. JSCC PROPOSES TO CONSTRUCT AN AMPHITHEATRE, A CLASSROOM AND FOR A CONCESSION STAND AND ADDITIONAL PARKING SPACES.

THE TURFED PLAYFIELD LOCATED NEAR THE SOUTHERLY END OF THE SITE ACCOMMODATES VARIOUS ACTIVATES AND IS LIGHTED WITH LIGHTS ON EXISTING POLES.

KINDERGARTEN THROUGH 12TH GRADE STUDENTS UTILIZE THE EXISTING CLASSROOMS.

THE VARIOUS ACTIVATES ARE EXPECTED TO CONTINUE TO OCCUR NON-CURRENTLY. PARKING IS PROVIDED ON THE SITE FOR EACH USE, AND TOTAL NUMBER OF PARKING SPACES HAVE BEEN FOUND TO ACCOMMODATE ALL ACTIVITIES OR USES WHEN IF OCCURRING NON-CONCURRENTLY.

TABLES ON THE CLIP SITE PLAN SHOW THE EXISTING AND PROPOSED LAND USES ALONG WITH REQUIRED AND PROPOSED PARKING TO ACCOMMODATE THOSE USES.

ASSESSOR'S PARCEL NO.'S

585-062-65

LEGAL DESCRIPTION

ALL THAT CERTAIN REAL PROPERTY SITUATED IN THE INCORPORATED TOWN OF YUCCA VALLEY, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

THE EAST HALF OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER AND THE SOUTH HALF OF THE WEST HALF OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 1 SOUTH, RANGE 5 EAST, SAN BERNARDINO MERIDIAN, AS SHOWN IN GRANT DEED RECORDED AUGUST 26, 1999 AS DOCUMENT NO. 19990362597;

TOGETHER WITH PARCELS 1 AND 3 OF PARCEL MAP 5375 BOOK 55 OF PARCEL MAPS AT PAGES 95 THROUGH 96, INCLUSIVE, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, PURSUANT TO NOTICE OF MERGER RECORDED AUGUST 11, 1999 AS INSTRUMENT NO. 99-340403, OFFICIAL RECORDS OF SAID COUNTY;

ALSO TOGETHER WITH A PORTION OF THE WEST HALF OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 12, AS SHOWN IN GRANT DEED RECORDED APRIL 12, 1991 AS DOCUMENT NO. 91-123180, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SAID WEST HALF OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER;

THENCE SOUTH 89°43'38" WEST ALONG THE SOUTH LINE OF SAID WEST HALF OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER, A DISTANCE OF 60.00 FEET;

THENCE NORTH 0°16'24" WEST A DISTANCE OF 124.37 FEET;

THENCE NORTH 50°05'49" EAST A DISTANCE OF 79.37 FEET TO THE EAST LINE OF SAID WEST HALF OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER;

THENCE SOUTH 0°05'49" WEST ALONG SAID EAST LINE OF THE WEST HALF OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER, A DISTANCE OF 175.00 FEET TO THE POINT OF BEGINNING.

UTILITY COMPANIES

- WATER** HI-DESERT WATER DISTRICT
55439 29 PALMS HWY
YUCCA VALLEY, CALIFORNIA 92284
ATTENTION: MARK BAN
PHONE: (760)365-8333
- TELEPHONE** VERIZON
295 N. SUNRISE WAY
PALM SPRINGS, CALIFORNIA 92262
ATTENTION: LARRY MOORE
PHONE: (760)778-3603
- POWER** SOUTHERN CALIFORNIA EDISON
6999 OLD WOMAN SPRINGS ROAD
YUCCA VALLEY, CALIFORNIA 92284
ATTENTION: JOHN COBELL
PHONE: (760)369-5449
- GAS** THE GAS COMPANY
7320 PIONEERTOWN ROAD
YUCCA VALLEY, CALIFORNIA 92284
ATTENTION: DARRYL WHITLEY
PHONE: (760)228-0908
- CABLE** TIME WARNER CABLE
83-473 AVENUE 45
INDIO, CALIFORNIA 92201
ATTENTION: LEE HOBSON
PHONE: (760)674-0007
- SEWAGE DISPOSAL** SEPTIC TANKS AND SEEPAGE PITS

NOTES:

1. EXISTING AND PROPOSED LAND USE: CHURCH, SCHOOL AND VACANT.
2. EXISTING AND PROPOSED GENERAL PLAN LAND USE DESIGNATION: RURAL RESIDENTIAL 1 ACRE MIN. (RR-1) AND RURAL RESIDENTIAL 2.5 ACRE MINIMUM (RR-2.5)
3. LANDSCAPING CONSISTS OF DROUGHT TOLERANT LANDSCAPING PER LOCAL WATER DISTRICT ORDINANCE AND INCLUDES A DRIP IRRIGATION SYSTEM.
4. NO HILLY TERRAIN EXISTS ON-SITE.
5. DRAINAGE COURSES WILL BE MAINTAINED AS OPEN SPACE ONSITE STORMWATER DETENTION OR RETENTION BASINS EXIST.
6. DATE OF AERIAL TOPOGRAPHIC SURVEY: SEPTEMBER 4, 2015
7. EXISTING AND PROPOSED ZONING DESIGNATIONS: RURAL LIVING 1 ACRE MINIMUM (RL-1) AND RURAL LIVING 2.5 ACRE MINIMUM (RL 2.5).
8. THIS SITE DOES NOT LIE WITHIN A FEMA FLOOD ZONE.

AREA TABULATION

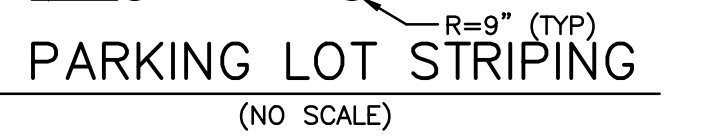
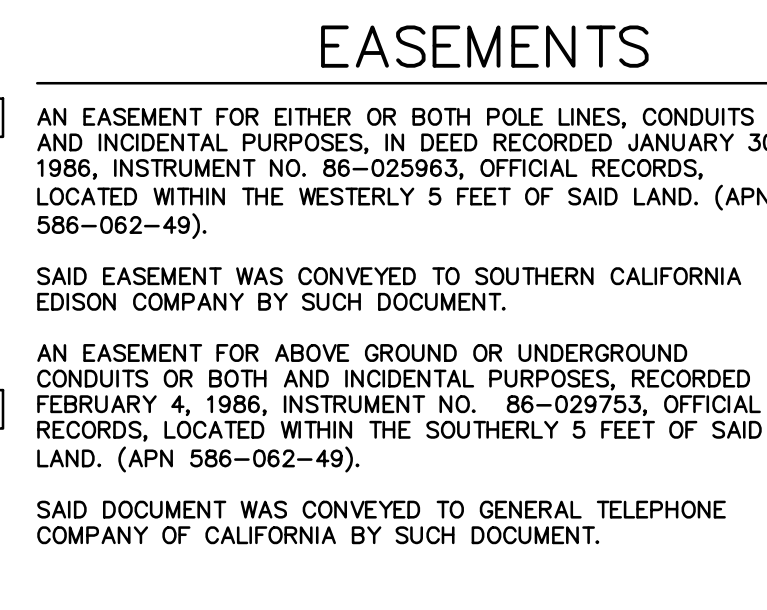
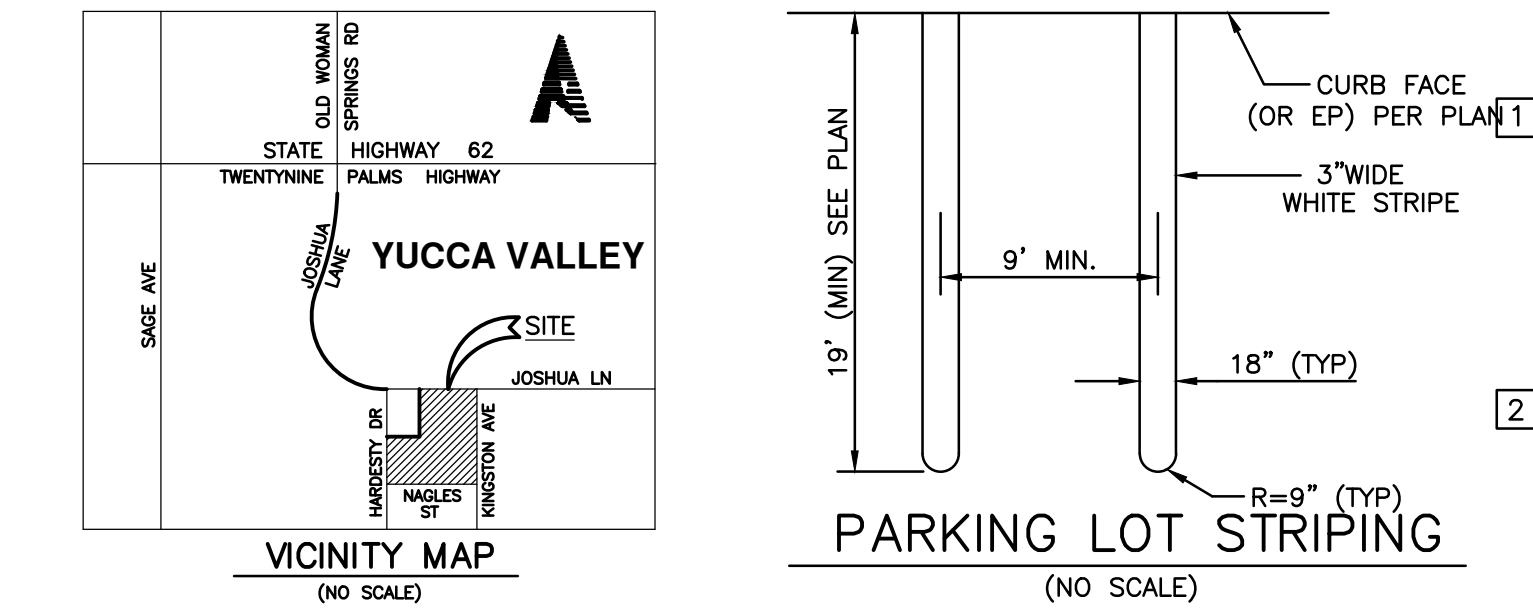
TOTAL NET C.U.P. SITE AREA = 1,013,786± S.F. (23± ACRES)
 TOTAL BUILDING AREA = 87,640 ± S.F.
 TOTAL IMPERVIOUS AREA = 256,800 ± S.F.
 TOTAL PERVIOUS AREA = 885,200 ± S.F.

LEGEND

- INDICATES EXISTING BUILDING
- INDICATES PROPOSED BUILDING ADDITION OR OTHER FACILITY
- INDICATES EXISTING & PROPOSED PAVING & PARKING
- OR HC INDICATES HANDICAP PARKING
- L INDICATES EXISTING LOADING ZONE
- INDICATES LOADING ZONE
- FH 1/2" INDICATES FIRE HYDRANT (6 EXISTING)
- INDICATES DRAINAGE FLOW
- L.S. INDICATES LANDSCAPED AREAS
- FS INDICATES FINISHED SURFACE ELEVATION
- EASEMENT LEGEND
- EXISTING PARCEL LINE
- EXISTING FENCE OR WALL
- EXISTING TREE OR BUSH
- BUILDING OR AREA DESIGNATION
- APPROX. EXISTING SEPTIC SYSTEM AREA (SEPTIC TANK VOLUME, GAL.)
- WESTERN LIMITS OF AQUIST PROLO GEOLOGIC HAZARD STUDY ZONE
- VEGETATION
- E-E EXISTING OVERHEAD ELECTRIC
- G-G EXISTING GAS LINE
- W-W EXISTING WATER MAIN

LAND USES

SYMBOL	DESCRIPTION	PARKING FORMULA	SIZE	PARKING RECD.
1	SANCTUARY INCLUDING WELCOME CENTER & CAFE	1 SPACE/30 SF	3750 SF 9,520 SF	125 0
2	CHAPEL	1 SPACE/30 SF	2,180 SF	91
3	CLASSROOMS (K-12 & SUNDAY SCHOOL)	1 SPACE/STAFF/CLASSROOM	1 SPACE/2 STUDENTS	108
4	GAZEBO	36 @ 10 STUDENTS/CLASSROOM	N/A	-
5	BASKETBALL COURT	N/A	30x55	-
6	RESERVED	N/A	-	-
7	CANOPY	N/A	20x30	-
8	PAVED PARKING LOT	N/A	-	-
9	MONUMENT SIGN	N/A	-	-
10	PLAYGROUND	N/A	-	-
11	RESERVED	N/A	-	-
A	GYMNASIUM/THUNDERDOME	1 SPACE/30 SF	90' X 120' (10,800 SF)	360
B	RESTROOMS	N/A	11.67' X 60.17'	0
C	STORMWATER RETENTION BASIN	N/A	15,700 SF	0
D	PRAYER GARDEN	-	60' X 155'	-
E	RESERVED	-	-	-
F	CHURCH AND SCHOOL OFFICES, SHIPPING AND RECEIVING	1 SP/250SF	7,400 SF	31
G	RESERVED	-	-	-
M	SPORT FIELDS (BASEBALL, FOOTBALL, OTHER)	-	REGULATION	-
N	SPORT FIELD LIGHT TOWERS (12)	N/A	(35 FT. MAX)	0
V	STORAGE CONTAINERS	1 SP/1000 SF	1000 SF	1
W	CONCESSION STAND/EQUIPMENT BUILDING	1 SP/1000 SF	12' X 38'	1
SB	SPORTS BLEACHERS	1 SP/24" SEATING	1800 LF SEATING	225
SC	STORAGE CONTAINER	1 SP/1000 SF	2000 SF	2
TE	TRASH BINS (3)	3 @ 5'X8'	-	0
AT	AMPHITHEATRE (OUTDOOR) 400 SEATS	1 SP/24" SEATING	1250 LF SEATING	156
CR	INDICATES PROPOSED CLASSROOM BUILDING (REPLACES FORMER BUILDING DESTROYED IN 2007 FIRE.)	-	-	-
GY	GYMNASIUM	-	-	-
TOTAL:				1,100



(GENERAL PLAN DESIGNATION: RURAL RESIDENTIAL 0.5 ACRE MIN.)
 (ZONING DESIGNATION: RESIDENTIAL SINGLE FAMILY 2 D.U. PER ACRE)

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