Sladden Engineering

GEOTECHNICAL INVESTIGATION
PROPOSED SELF-STORAGE FACILITY
APN 0597-111-67
SEC SUN MESA DRIVE & NEWTON LANE
TOWN OF YUCCA VALLEY, CALIFORNIA

-Prepared By-

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Project No. 544-24365
25-01-003

Mr. Rob Billings
5024 Wallaby Street
Yucca Valley, California 92284

Subject: Geotechnical Investigation

Project: Proposed Self-Storage Facility
APN 0597-111-67
SEC Sun Mesa Drive & Newton Lane
Yucca Valley, California

Sladden Engineering is pleased to present the results of the geotechnical investigation performed for the storage facility proposed for the property located at the southeast corner of Sun Mesa Drive and Newton Lane in the Town of Yucca Valley, California. Our services were completed in accordance with our proposal for geotechnical engineering services dated November 15, 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 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 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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TOWN OF YUCCA VALLEY, CALIFORNIA

INTRODUCTION

This report presents the results of the geotechnical investigation performed by Sladden Engineering (Sladden) for the storage facility proposed for the property located at the southeast corner of Sun Mesa Drive and Newton Lane in the Town of Yucca Valley, California. The site is located at approximately 34.1669 degrees north latitude and 116.4207 degrees west longitude. The approximate location of the site is indicated on the Site Location Map (Figure 1).

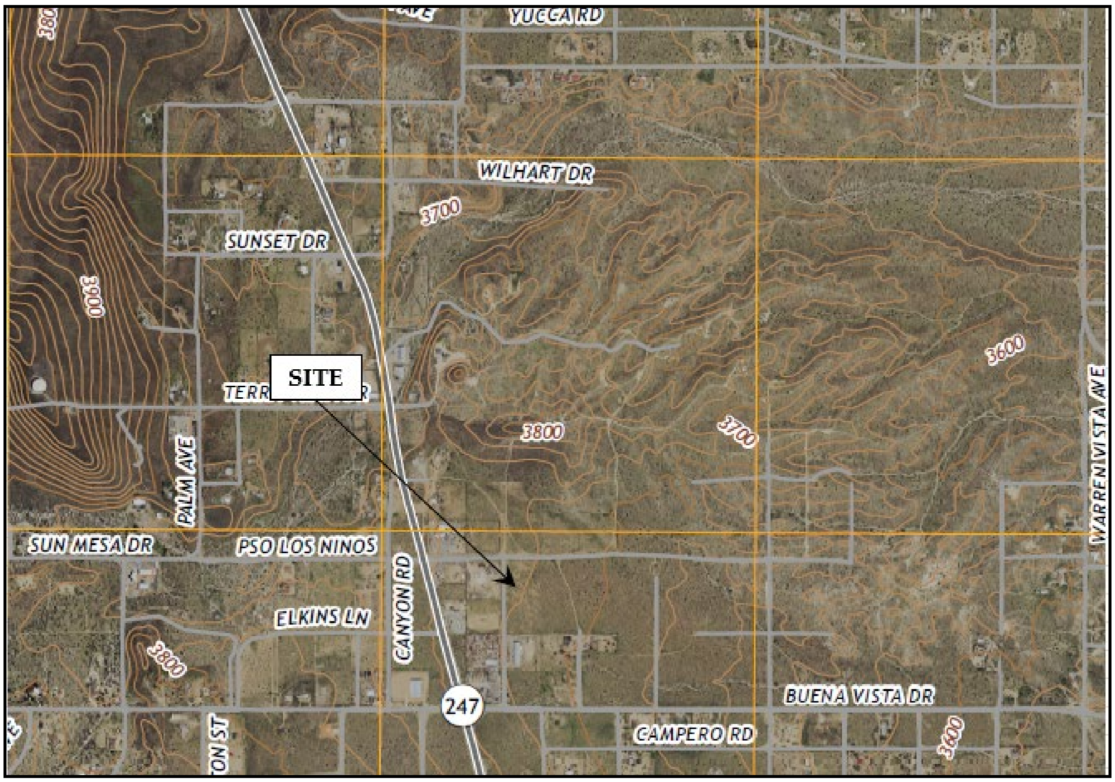

Figure 1 (USGS, 2021)

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 (DRP Enterprises, 2022), it is our understanding that the proposed project will consist of constructing a mini/self-storage facility and a 400-square-foot office on the subject property. Concrete flat work, landscape areas and various other associated site improvements. For our analyses, we expect that the proposed buildings will consist of reinforced masonry, concrete tilt-up, lightweight wood-frame or steel-frame structures supported on conventional shallow spread footings and concrete slabs-on-grade.

Based on the provided preliminary grading plans (DRP Enterprises, undated) grading will be limited to minor cuts of 4,970 cubic yards and 4,485 cubic yards of fill to accomplish the desired elevations and to 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 foundation areas. Upon completion of precise grading plans, Sladden should be retained to verify that the recommendations presented within in 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 50 kips and continuous wall loads will be less than 3.0 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 four (4) percolation test holes to depths between approximately 5 and 21.5 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 the Southeast corner of Sun Mesa Drive and Newton Lane in the Town of Yucca Valley, California. The property is formally identified by the County of San Bernardino as APN 0597-111-67 and occupies a total area of approximately 4.34 acres. At the time of our investigation, the site was undeveloped and covered in scattered native low-growth desert vegetation. The site is near the elevation of the adjacent properties and roadways and is bounded by Sun Mesa Drive to the north, undeveloped property to the east, commercial property to the south, and Newton Lane to the west.

Based on our review of the Yucca Valley North 7.5-Minute Quadrangle Map (USGS, 2021), the site is situated at an approximate elevation of 3,719 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 December 3, 2024 Site drainage appears to be controlled via sheet flow and surface infiltration. A blue line stream is located approximately 0.40 km northwest of the project site.

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 (CGS, 2002). The site has been mapped by Dibblee (1967) to be immediately underlain by Quaternary-age older alluvium (Qoa) and Quaternary-age older gravel. The regional geologic setting for the site vicinity is presented on the Regional Geologic Map (Figure 2).

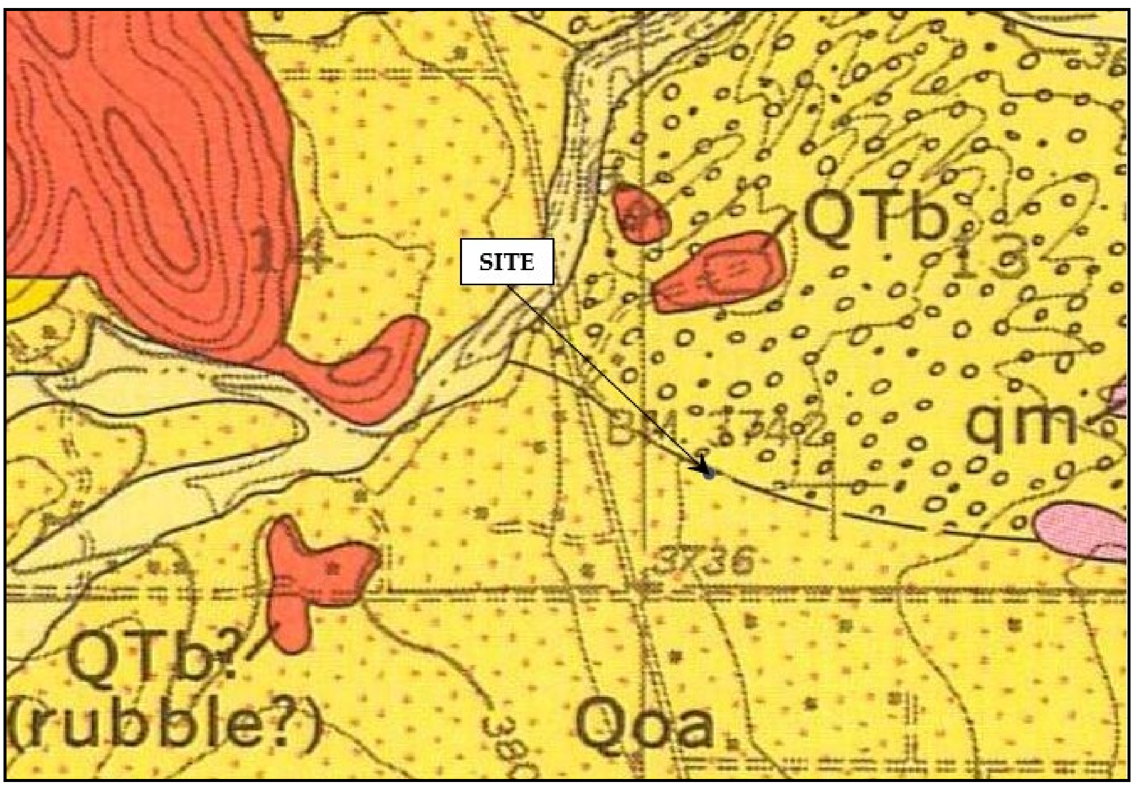

Figure 2 (Dibblee, 1997)

SUBSURFACE CONDITIONS

The subsurface conditions at the site were investigated by drilling two (2) exploratory boreholes and four (4) percolation test holes on the property depths between approximately 5 and 21.5 feet bgs. The approximate locations of the boreholes are illustrated on the Exploration Location Photograph (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, native alluvium was encountered to the maximum explored depth of 21.5 feet bgs. Generally, the native earth materials consist of granular soil was found to be dry, medium dense, and grayish 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 to the maximum deplored depth of approximately 21.5 feet bgs during our field investigation. Based on the depth to groundwater in the immediate project vicinity (CDWR, 2024), 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 historic high groundwater depths in the project vicinity.

TABLE 1 GROUNDWATER DEPTHS				
STATE WELL	LAT/LONG	DISTANCE (KM)	DATE	DEPTH (FT)
01N05E14J001S	34.1697/-116.4255	0.52	01/23/1958	167
01N05E14Q001S	34.1661/-116.43	0.86	02/12/1958	100
01N05E14P001S	34.1661/-116.4344	1.26	01/01/1958	82
01N05E24B001S	34.1625/-116.4122	0.95	02/12/1958	131.54

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 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. A Holocene-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 pre-Holocene 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).

As previously stated, the site has been subjected to strong seismic shaking related to active faults that traverse through the region. Some of the more significant seismic events near the subject site within recent times include: M6.0 North Palm Springs (1986), M6.1 Joshua Tree (1992), M7.3 Landers (1992), M6.2 Big Bear (1992), M7.1 Hector Mine (1999), and M7.1 Ridgecrest (2019).

Table 2 lists the closest known potentially active faults that was generated in part using fault parameters from The Revised 2002 California Probabilistic Seismic Hazard Maps (Cao et al, 2003), 2008 National Seismic Hazard Maps – Source Parameters (USGS, 2008) and the Fault and Fold Database of the United States (USGS, 2024a). This table does not identify the probability of reactivation or the on-site effects from earthquakes occurring on any faults in the region.

TABLE 2 CLOSEST KNOWN ACTIVE FAULTS		
Fault Name	Distance (Km)	Maximum Event
Landers*	0	7.3
Pinto Mountain	4.0	7.2
Burnt Mountain	5.0	7.3
Eureka Peak	5.4	6.5
So Emerson-Copper Mnt	15.7	7.0
Johnson Valley No	16.6	6.7
North Frontal (East)	18.6	6.4
Calico-Hidlago	22.2	7.3
Lenwood-Lockhart-Old Woman Springs	28.8	7.0
Pisgah-Bullion Mtn-Mesquite Lk	30.6	7.3

* On-Site

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 the 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 not be built over known active faults. A Holocene-active fault is defined by the California Geological Survey as a fault that has experienced surface displacement within the Holocene Epoch (approximately the last 11,700 years). A pre-Holocene fault is defined by the State of California whose recency of past movement is older than 11,700 years. In areas of known or suspected Holocene-active or potentially active 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 excavation of trenches is 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 11,000 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 active and building setbacks are established accordingly. Conversely, if the fault is buried by pre-Holocene sediments or rock, then the fault can be deemed inactive or potentially active, 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 epoch, 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	34.1669/-116.4207
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	2.162	---
MCE_R Ground Motion (1.0 second period)	S_1	0.766	---
Site-Modified Spectral Acceleration Value	S_{MS}	2.162	**2.466**
Site-Modified Spectral Acceleration Value	S_{M1}	Null	**1.902**
Numeric Seismic Design Value at 0.2 second SA	S_{DS}	1.441	**1.644**
Numeric Seismic Design Value at 1.0 second SA	S_{D1}	Null	**1.268**
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	PGA_M	1.013	**0.938**

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 CGS (2024) and CDMG (1993), the site is located within the Landers fault zone (Figure 4). ***In accordance with current State of California guidelines, subsurface fault studies should be performed to identify the active surface rupture potential. Habitable structures are not permitted to be constructed across active fault splays. Local planning agencies are responsible for regulating and enforcing the applicable laws and ordinances regarding building and construction in accordance with state and local requirements. This includes oversight regarding the construction of structures not intended for human occupancy on parcels delineated to be within the fault zone. Based on the nature of the project, it is our understanding the proposed self-storage units and office are not intended for human occupancy or to exceed 2,000 person-hours per year.***

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 0.938g.

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 depth of groundwater greater than 50 feet, risks associated with liquefaction should be 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 site soil consists of silty sand (SM)). Based on the results of our laboratory testing (EI=1), the materials underlying the site are considered non-expansive.

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 concerns are the presence of loose and potentially compressible near-surface native soil throughout the project site, and the potentially active fault splay located on the property.

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.

As previously stated, the subject parcel is located within a State of California delineated fault zone (Figure 4). In accordance with current State of California guidelines, habitable structures are not permitted to be constructed within the fault zone unless the absence of active faulting can be demonstrated. Based on the nature of the proposed project, it is our understanding the proposed self-storage units and office are not intended for human occupancy or to exceed 2,000 person-hours per year. If the proposed project is expected to exceed 2,000 persons-hours or vary significantly, Sladden should be contacted to re-evaluate the necessity for a subsurface fault study.

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 Foundation 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 2 feet below existing grade or 2 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 2 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, 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 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.

CONVENTIONAL SHALLOW SPREAD FOOTINGS

Conventional shallow spread footings are expected to provide adequate support for the proposed structures. 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 1800 and 2000 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 2500 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 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.

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 7.7. Based on soluble chloride concentration testing (80 ppm) the falls within the "C1" chloride exposure category. The minimum resistivity of the surface soil was found to be 6,700 that suggests the site soil is considered to have a "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 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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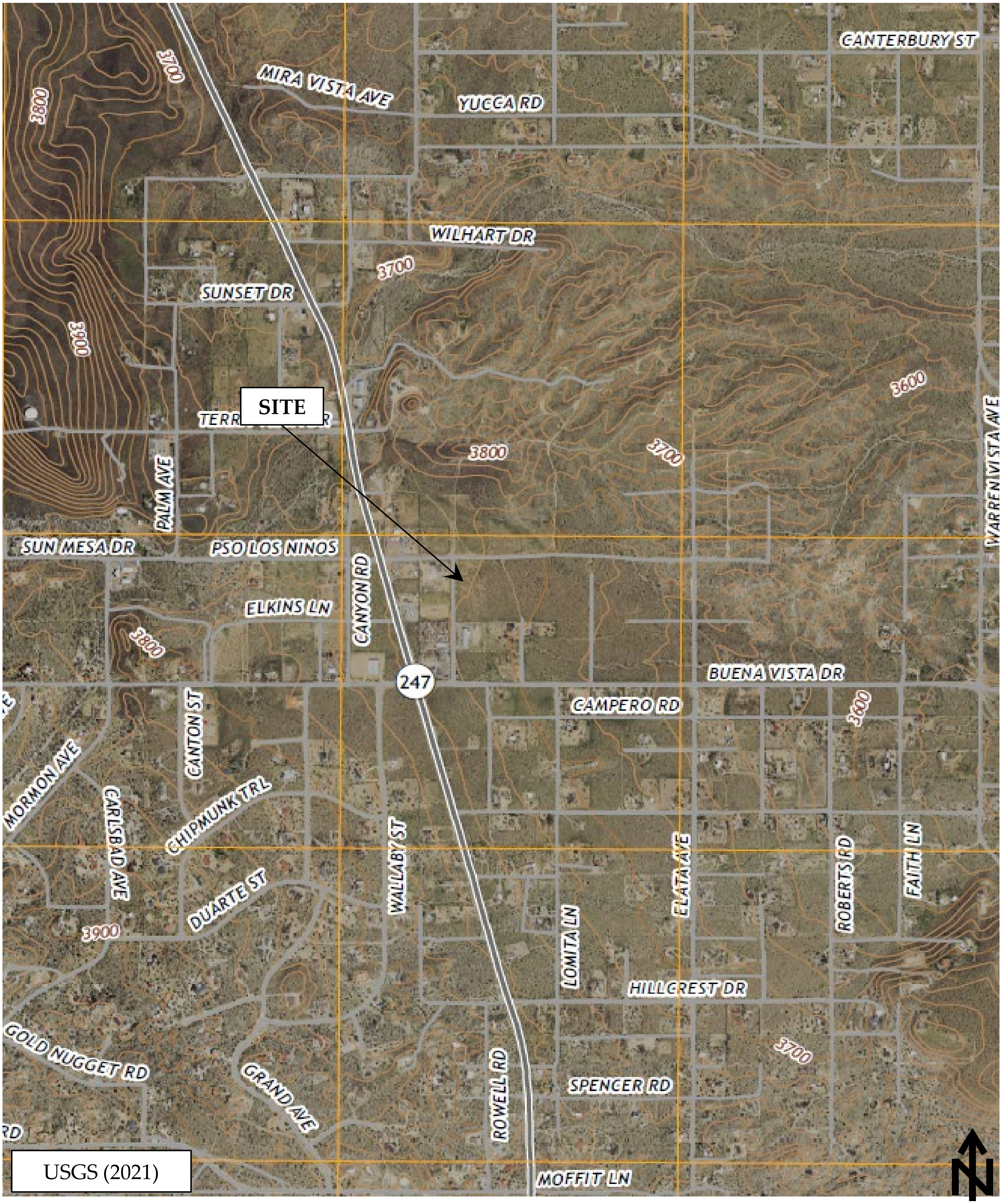
https://earthquake.usgs.gov/hazards/interactive/

PLATES

SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
EXPLORATION LOCATION PHOTOGRAPH
AP FAULT ZONE MAP



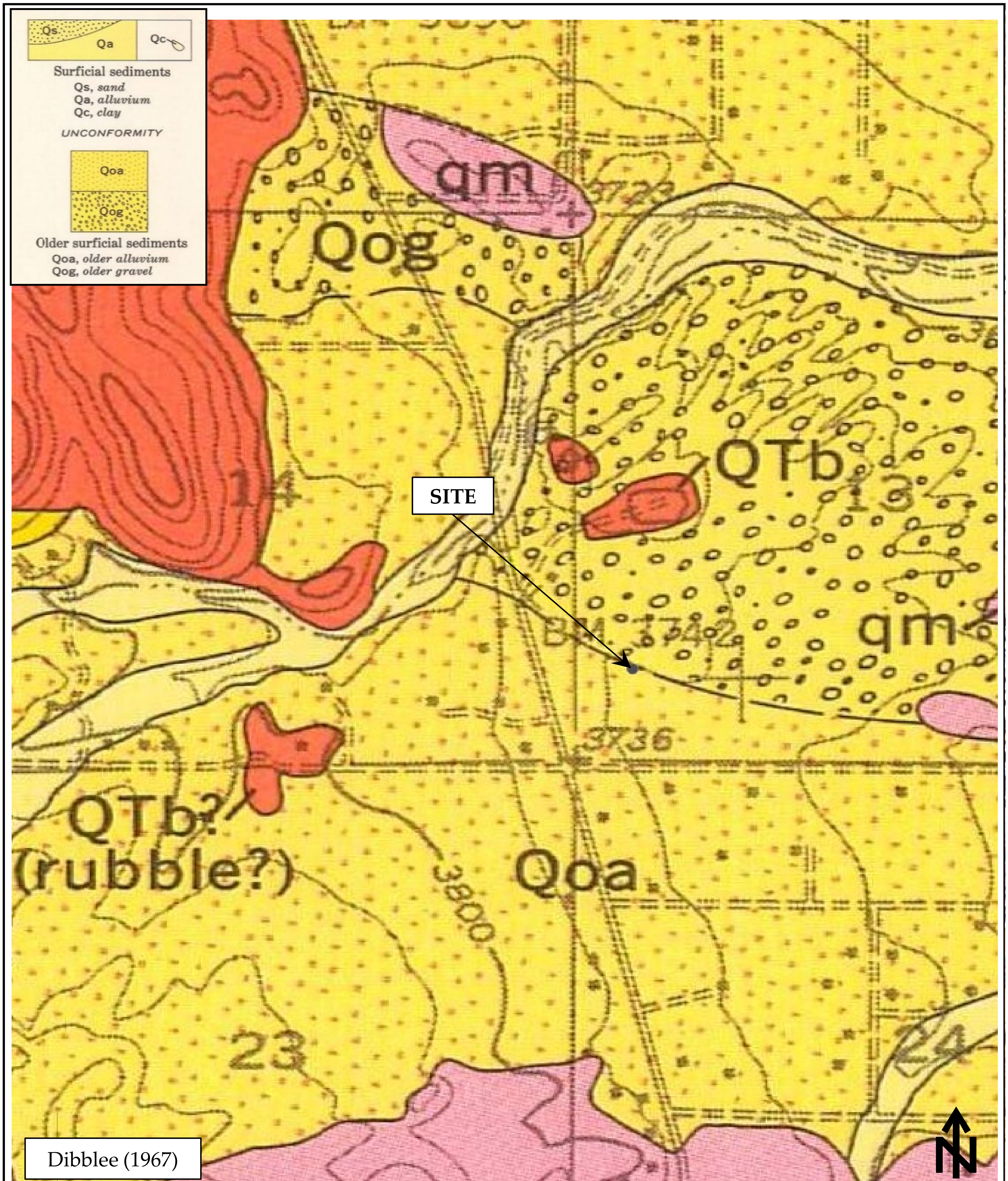
SITE LOCATION MAP

PLATE

1

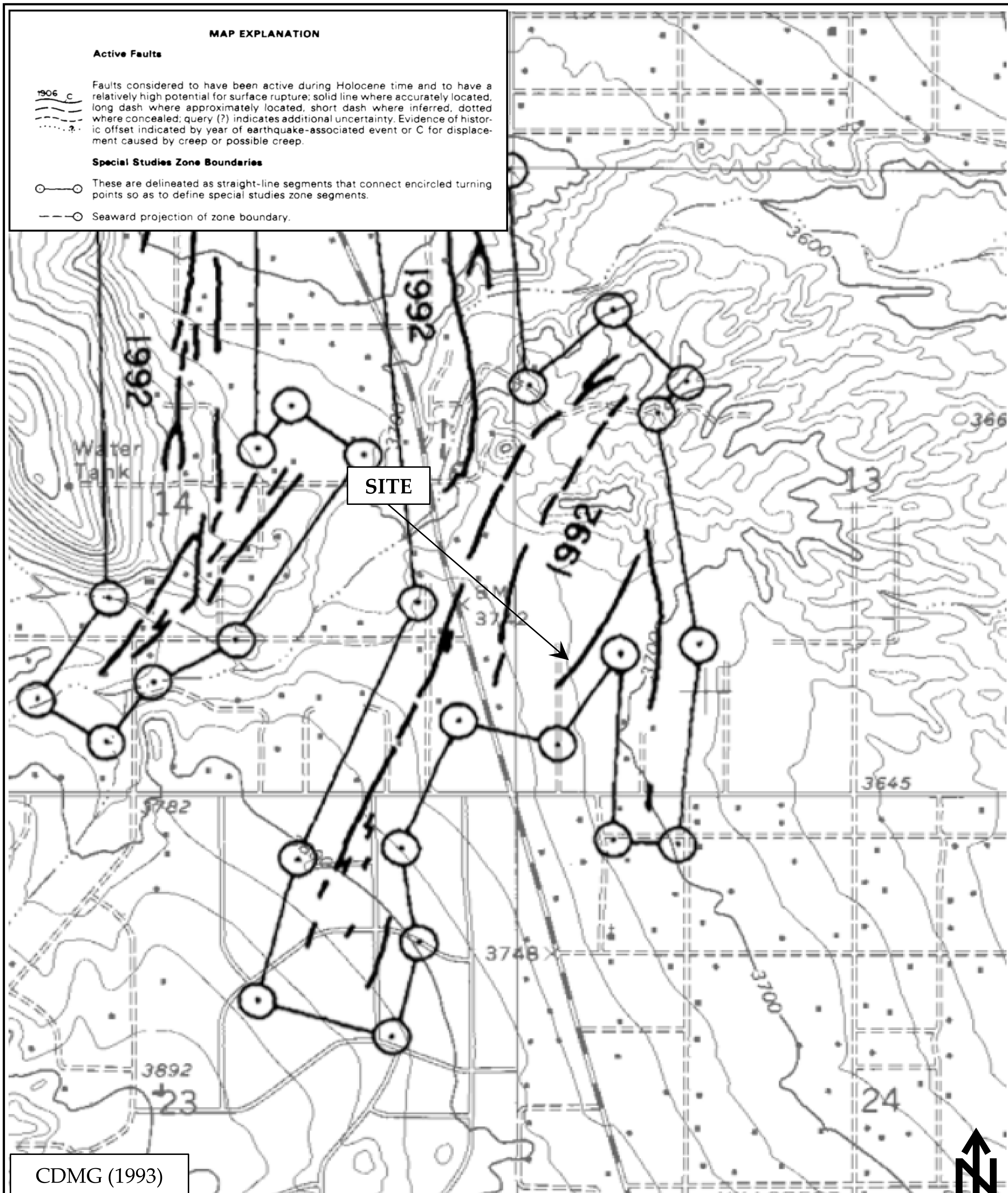
Project Number:	544-24365
Report Number:	25-01-003
Date:	January 2, 2024

Sladden Engineering



Sladden Engineering	REGIONAL GEOLOGIC MAP		PLATE 2
	Project Number:	544-24365	
	Report Number:	25-01-003	
	Date:	January 2, 2024	

Sladden Engineering	EXPLORATION LOCATION PHOTOGRPAH		PLATE 3
	Project Number:	544-24365	
	Report Number:	25-01-003	
	Date:	January 2, 2024	



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AP FAULT ZONE MAP

Project Number:	544-24365
Report Number:	25-01-003
Date:	January 2, 2024

PLATE

4

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

For our field investigation two (2) exploratory bores and four (4) 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:	12/3/2024
Elevation:	3,719 FT MSL	Boring No:	BH-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
	14 14 17	1	1		2.7	117.8			Silty Sand (SM); stong brown, dry, medium dense, fine to coarse-grained, with calcium carbonate (Qoa).
	13 16 11				2.7	111.4			Silty Sand (SM); stong brown, dry, medium dense, fine to coarse-grained, with calcium carbonate and rootlets (Qoa).
	5 7 8				2.8				Sand (SW)-Silty Sand (SM); strong brown, dry, medium dense, fine to coarse-grained, with gravel (Qoa).
	12 14 16				1.6	104.4			Silty Sand (SM); light brown, dry, medium dense, fine to coarse-grained, with calcium carbonate (Qoa).
	10 13 13				2.2				Silty Sand (SM); light brown, dry, medium dense, fine to coarse-grained, with calcium carbonate (Qoa).
									Terminated at ~ 21.5 ft bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Depth (Feet): 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50

Completion Notes:

PROPOSED SELF-STORAGE FACILITY
SEC SUN MESA DRIVE & NEWTON LANE, YUCCA VALLEY

Project No:	544-24365	Page	1
Report No:	25-01-003		

Sladden Engineering

BORE LOG

Equipment:	MOBILE B-61	Date Drilled:	12/3/2024
Elevation:	3,719 FT MSL	Boring No:	BH-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
	15 16 13				3.3		5		Silty Sand (SM); stong brown, dry, medium dense, fine to coarse-grained, with calcium carbonate (Qoa).
	11 16 20				1.7	113.6	10		Sand (SW)-Silty Sand (SM); strong brown, dry, medium dense, fine to coarse-grained, with gravel (Qoa).
	7 9 11				1.4		15		Silty Sand (SM); light brown, dry, medium dense, fine to coarse-grained, with calcium carbonate (Qoa).

Terminated at ~ 15 ft bgs.
No Bedrock Encountered.
No Groundwater or Seepage Encountered.
Cased to Facilitate Percolation Testing.

Completion Notes:

PROPOSED SELF-STORAGE FACILITY
SEC SUN MESA DRIVE & NEWTON LANE, YUCCA VALLEY

Project No: 544-24365
Report No: 25-01-003

Sladden Engineering

BORE LOG

Equipment:	MOBILE B-61	Date Drilled:	12/3/2024
Elevation:	3,719 FT MSL	Boring No:	P-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							0–5		Silty Sand (SM); streong brown, dry, fine to coarse-grained, with calcium carbonate (Qoa).
							5		Terminated at ~ 5 ft bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.

Depth scale (feet): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50

Completion Notes:

PROPOSED SELF-STORAGE FACILITY
SEC SUN MESA DRIVE & NEWTON LANE, YUCCA VALLEY

Project No: 544-24365
Report No: 25-01-003

Sladden Engineering

BORE LOG

Equipment:	MOBILE B-61	Date Drilled:	12/3/2024
Elevation:	3,719 FT MSL	Boring No:	P-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4		Silty Sand (SM); streong brown, dry, fine to coarse-grained, with calcium carbonate (Qoa).
							6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~ 5 ft bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.

Completion Notes:

PROPOSED SELF-STORAGE FACILITY
SEC SUN MESA DRIVE & NEWTON LANE, YUCCA VALLEY

Project No:	544-24365	Page	4
Report No:	25-01-003		

Sladden Engineering

BORE LOG

Equipment:	MOBILE B-61	Date Drilled:	12/3/2024
Elevation:	3,719 FT MSL	Boring No:	P-3

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4		Silty Sand (SM); streong brown, dry, fine to coarse-grained, with calcium carbonate (Qoa).
							6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~ 5 ft bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.

Completion Notes:

PROPOSED SELF-STORAGE FACILITY
SEC SUN MESA DRIVE & NEWTON LANE, YUCCA VALLEY

Project No: 544-24365
Report No: 25-01-003

Sladden Engineering

BORE LOG

Equipment:	MOBILE B-61	Date Drilled:	12/3/2024
Elevation:	3,719 FT MSL	Boring No:	P-4

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); streong brown, dry, fine to coarse-grained, with calcium carbonate (Qoa).
							4		
							6		Terminated at ~ 5 ft bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED SELF-STORAGE FACILITY
SEC SUN MESA DRIVE & NEWTON LANE, YUCCA VALLEY

Project No:	544-24365	Page	6
Report No:	25-01-003		

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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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: January 17, 2025

Account No.: 544-24365

Customer: Rob Billings

Location: APN 0597-111-67, Self-Storage Facility, Sun Mesa Drive, Yucca Valley

Analytical Report

Corrosion Series

BH-1 @ 0-5'	pH per CA 643	Soluble Sulfates per CA 417 ppm	Soluble Chloride per CA 422 ppm	Min. Resistivity per CA 643 ohm-cm
	7.7	20	80	6,700

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Maximum Density/Optimum Moisture

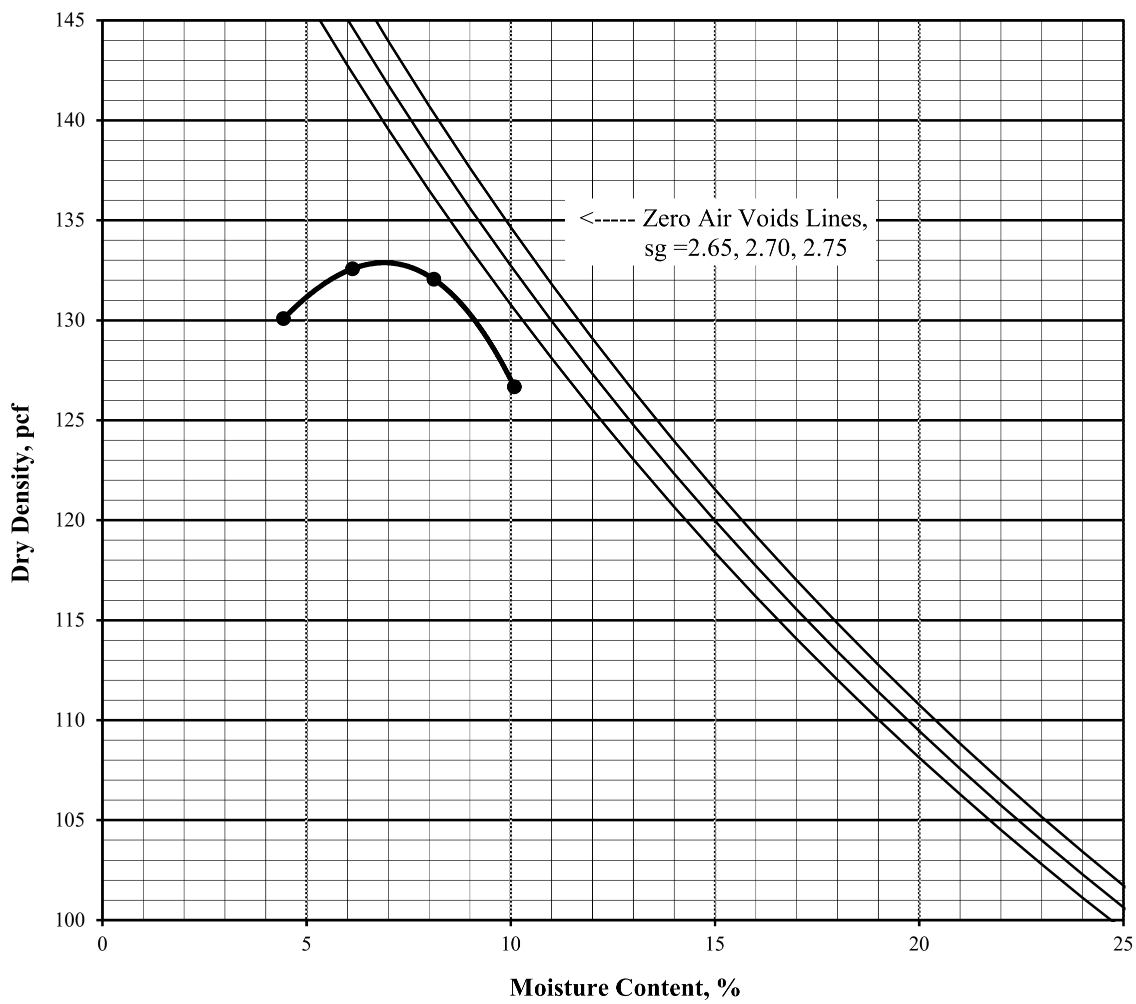
ASTM D698/D1557

Project Number: 544-24365
Project Name: Sun Mesa Drive
Lab ID Number: LN6-24549
Sample Location: BH-1 Bulk 1 @ 0-5'
Description: Brown Silty Sand (SM)

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 134 pcf
Optimum Moisture: 7%

Sieve Size	% Retained
3/4"	
3/8"	
#4	1.4



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Expansion Index

ASTM D 4829

Job Number: 544-24365 — January 17, 2025

Job Name: Sun Mesa Drive

Lab ID Number: LN6-24549

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

Soil Description: Brown Silty Sand (SM)

Wt of Soil + Ring:	610.4
Weight of Ring:	194.6
Wt of Wet Soil:	415.8
Percent Moisture:	6.5%
Sample Height, in	0.95
Wet Density, pcf:	133.1
Dry Denstiy, pcf:	124.9

% Saturation:	50.3

Expansion **Rack # 2**

Date/Time	1/14/2025	2:30pm
Initial Reading	0.0000	
Final Reading	0.0008	

Expansion Index **1**

(Final - Initial) x 1000

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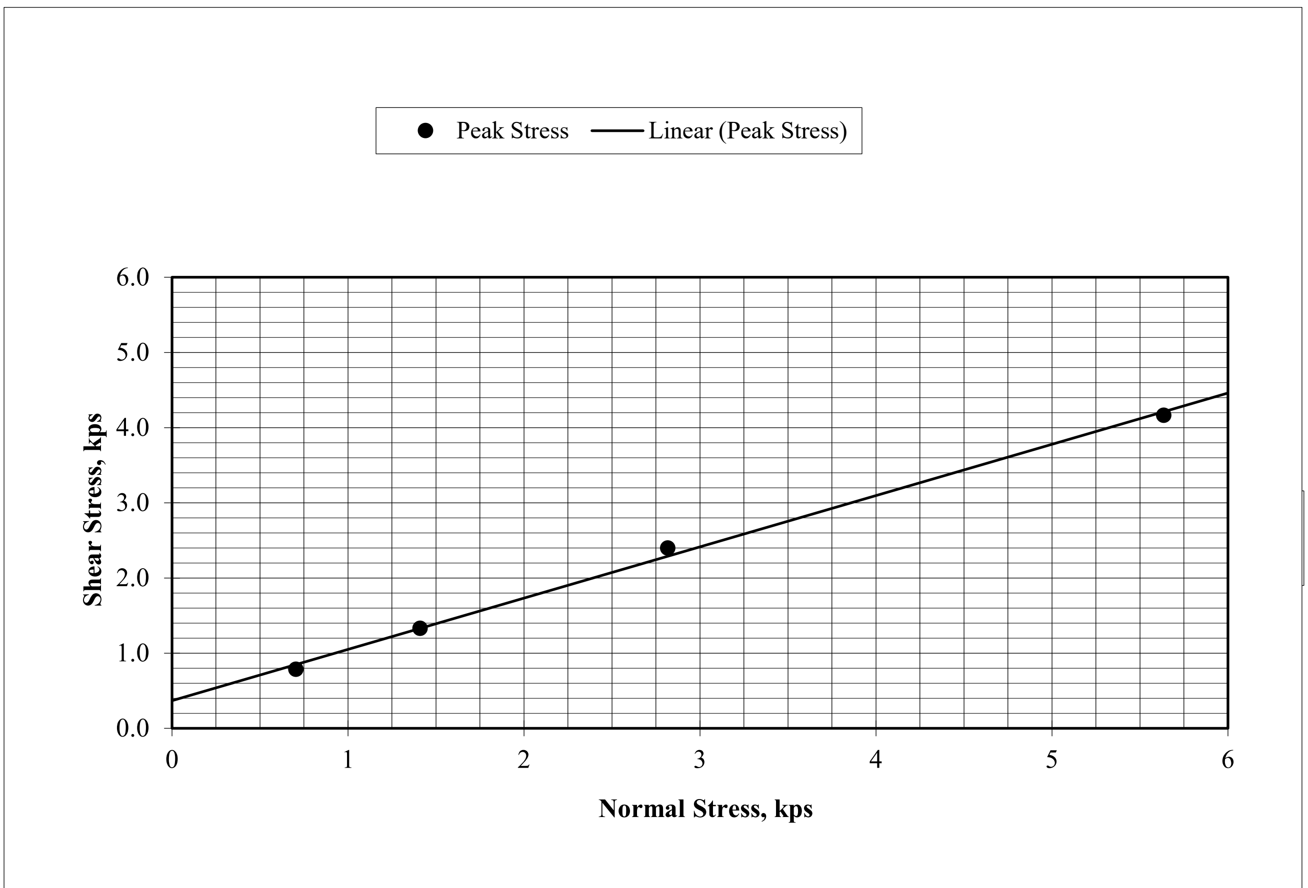
Direct Shear ASTM D 3080-04
(modified for unconsolidated condition)

Job Number: 544-24365
Job Name: Sun Mesa Drive
Lab ID No.: LN6-24549
Sample ID: BH-1 Bulk @ 0-5'
Classification: Brown Silty Sand (SM)
Sample Type: Remolded @ 90% of Maximum Density

January 17, 2025
Initial Dry Density: 121.1 pcf
Initial Mosture Content: 6.9 %
Peak Friction Angle (Ø): 34°
Cohesion (c): 370 psf

Test Results	1	2	3	4	Average
Moisture Content, %	11.1	11.1	11.1	11.1	11.1
Saturation, %	76.6	76.6	76.6	76.6	76.6
Normal Stress, kps	0.704	1.409	2.817	5.635	
Peak Stress, kps	0.785	1.330	2.398	4.164	



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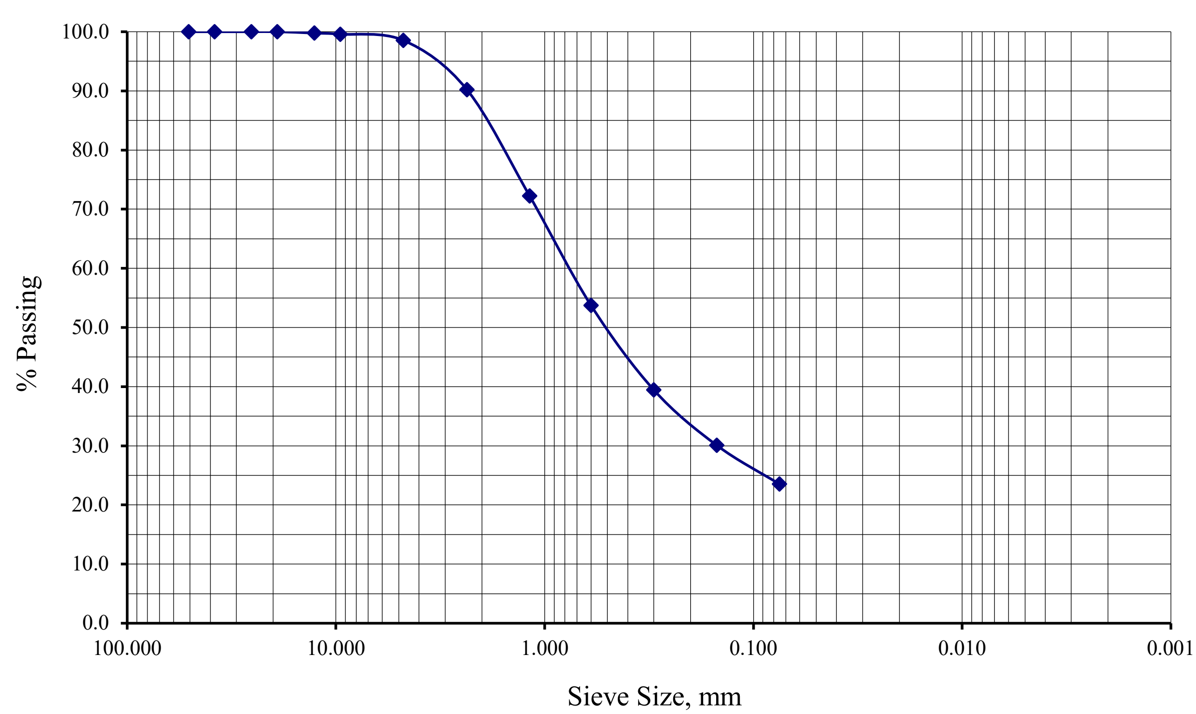
Gradation

ASTM C117 & C136

Project Number: 544-24365 January 17, 2025
Project Name: Sun Mesa Drive
Lab ID Number: LN6-24549
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	100.0
3/4"	19.1	100.0
1/2"	12.7	99.8
3/8"	9.53	99.6
#4	4.75	98.5
#8	2.36	90.2
#16	1.18	72.2
#30	0.60	53.7
#50	0.30	39.4
#100	0.15	30.1
#200	0.075	23.5



APPENDIX C

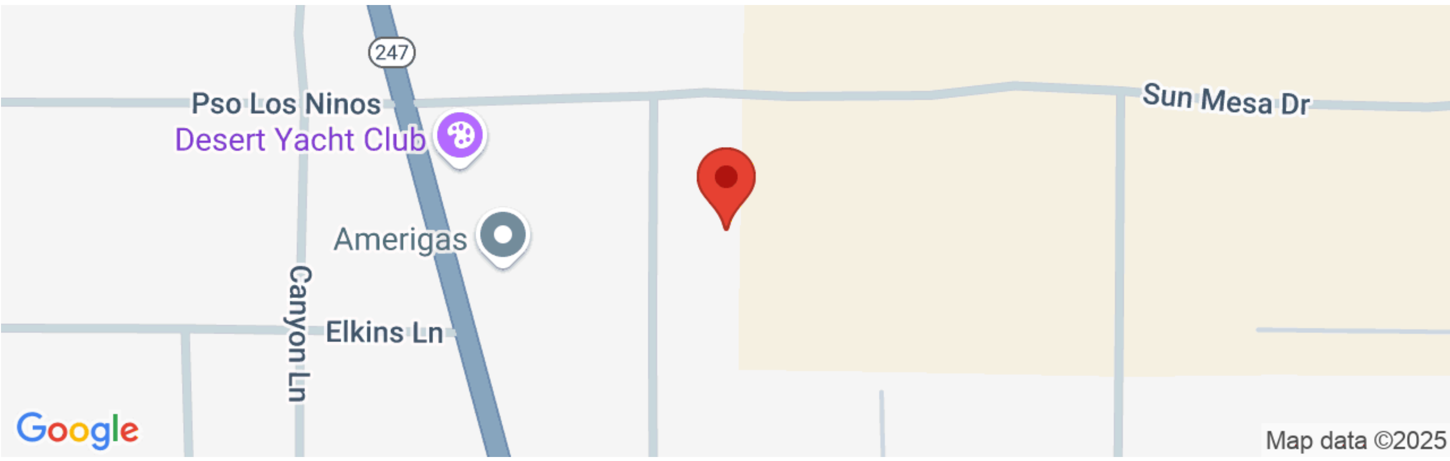
SEISMIC DESIGN MAP AND REPORT
SITE-SPECIFIC GROUND MOTION PARAMETERS

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.

OSHPD

544-24365

Latitude, Longitude: 34.1669, -116.4207



Date	1/7/2025, 10:49:39 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	2.162	MCE_R ground motion. (for 0.2 second period)
S_1	0.766	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.162	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.441	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	0.921	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	1.013	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	2.162	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.377	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.269	Factored deterministic acceleration value. (0.2 second)
S1RT	0.766	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.854	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.805	Factored deterministic acceleration value. (1.0 second)
PGAd	0.938	Factored deterministic acceleration value. (Peak Ground Acceleration)

Type	Value	Description
PGA_{UH}	0.921	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.91	Mapped value of the risk coefficient at short periods
C_{R1}	0.897	Mapped value of the risk coefficient at a period of 1 s
C_V	1.5	Vertical coefficient

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

Project: PROPOSED SELF-STORAGE FACILITY
Project Number: 544-24365
Client: MR. ROB BILLINGS
Site Lat/Long: 34.1669/-116.4207
Controlling Seismic Source: Landers

REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured
Site Class D - Table 11.4-1	F_a	1.0
Site Class D - 21.3(ii)	F_v	2.5
$0.2*(S_{D1}/S_{DS})$	T_0	0.177
S_{D1}/S_{DS}	T_S	0.886
Fundamental Period (12.8.2)	T	Period
Seismic Design Maps or Fig 22-14	T_L	8
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	1.2767
Equation 11.4-2 - F_V*S_1 [1]	S_{M1}	1.9150

[1] - F_V as determined by Section 21.3

REFERENCE	NOTATION	VALUE
Fv (Table 11.4-2)[Used for General Spectrum]	F_v	1.7
Design Maps	S_s	2.162
Design Maps	S_1	0.766
Equation 11.4-1 - F_A*S_S	S_{MS}	2.162*
Equation 11.4-3 - $2/3*S_{MS}$	S_{DS}	1.441*
Design Maps	PGA	0.92
Table 11.8-1	F_{PGA}	1.1
Equation 11.8-1 - F_{PGA}*PGA	PGA_M	1.012*
Section 21.5.3	80% of PGA_M	0.810
Design Maps	C_{RS}	0.910
Design Maps	C_{R1}	0.897

REFERENCE	NOTATION	VALUE
$0.2*(S_{D1}/S_{DS})$	T_0	0.12*
S_{D1}/S_{DS}	T_S	0.602*
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	0.8681*
Equation 11.4-2 - F_V*S_1	S_{M1}	1.3022*

RISK COEFFICIENT

Cr - At Perods <=0.2, Cr=C_{RS}	C_{RS}	0.910
Cr - At Periods >=1.0, Cr=C_{R1}	C_{R1}	0.897

Cr - At Periods between 0.2 and 1.0 use trendline formula to complete

Period	Cr
0.200	0.910
0.300	0.908
0.400	0.907
0.500	0.905
0.600	0.904
0.680	0.902
1.000	0.897

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

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

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PROBABILISTIC SPECTRA[1]
2% in 50 year Exceedence

Project No: 544-24365

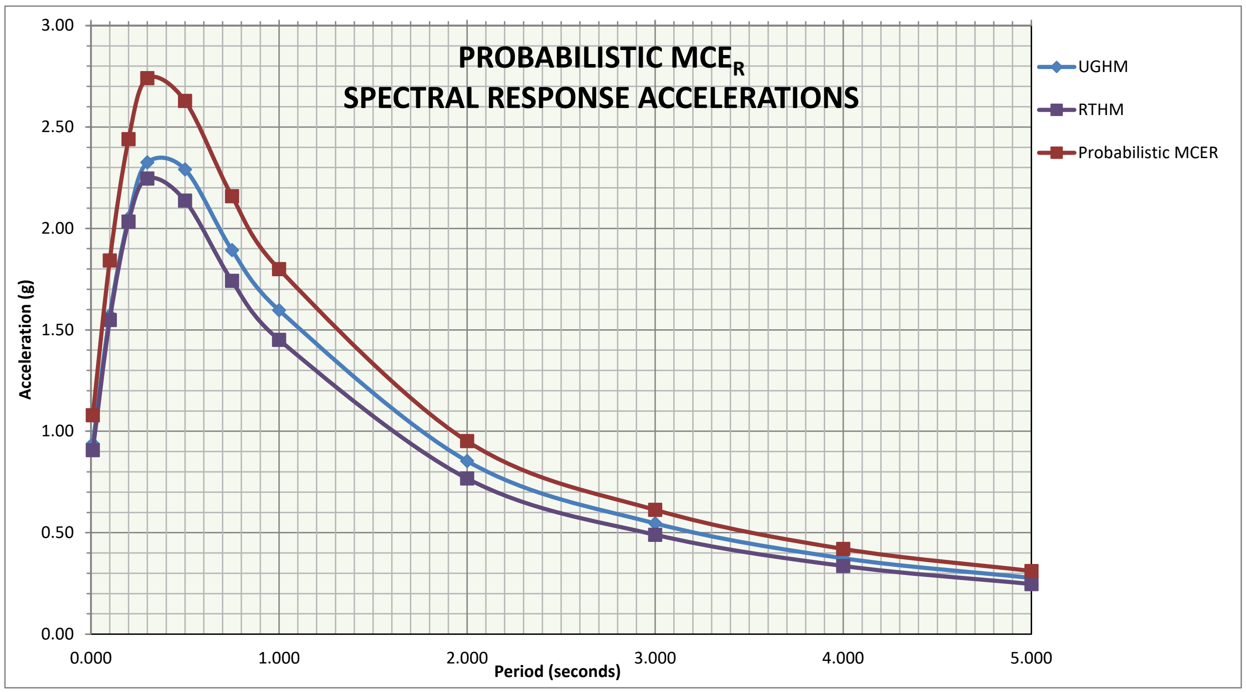
Period	UGHM	RTGM	Max Directional Scale Factor[2]	Probabilistic MCE
0.010	0.938	0.907	1.19	1.079
0.100	1.571	1.548	1.19	1.842
0.200	2.051	2.033	1.20	2.440
0.300	2.325	2.246	1.22	2.740
0.500	2.291	2.137	1.23	2.629
0.750	1.893	1.741	1.24	2.159
1.000	1.597	1.451	1.24	1.799
2.000	0.853	0.767	1.24	0.951
3.000	0.546	0.490	1.25	0.613
4.000	0.374	0.336	1.25	0.420
5.000	0.277	0.247	1.26	0.311

Probabilistic PGA: 0.938

Is Probabilistic $Sa_{(max)} < 1.2F_a$? NO

[1] Data Sources:
https://earthquake.usgs.gov/hazards/interactive/
https://earthquake.usgs.gov/designmaps/rtgm/

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



Sladden Engineering

DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations[1]

Controlling Source: Landers

Is Probabilistic $Sa_{(max)}$<1.2Fa? NO

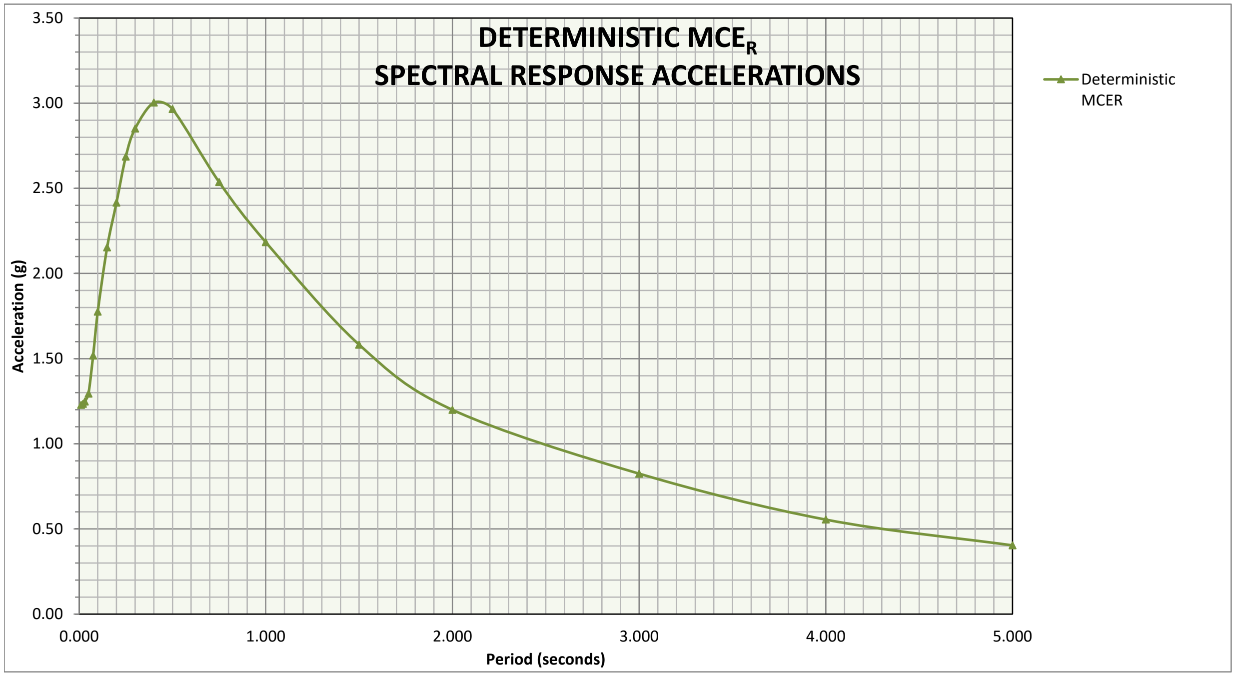
Project No: 544-24365

Period	Deterministic PSa Median + 1.σ for 5% Damping	Max Directional Scale Factor[2]	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	1.032	1.19	1.228	1.228
0.020	1.037	1.19	1.234	1.234
0.030	1.049	1.19	1.248	1.248
0.050	1.088	1.19	1.295	1.295
0.075	1.276	1.19	1.518	1.518
0.100	1.493	1.19	1.776	1.776
0.150	1.795	1.20	2.154	2.154
0.200	2.013	1.20	2.416	2.416
0.250	2.220	1.21	2.686	2.686
0.300	2.337	1.22	2.851	2.851
0.400	2.442	1.23	3.003	3.003
0.500	2.411	1.23	2.965	2.965
0.750	2.046	1.24	2.537	2.537
1.000	1.761	1.24	2.184	2.184
1.500	1.276	1.24	1.582	1.582
2.000	0.967	1.24	1.199	1.199
3.000	0.660	1.25	0.825	0.825
4.000	0.444	1.25	0.555	0.555
5.000	0.320	1.26	0.403	0.403

Is Determinstic $Sa_{(max)}$<1.5*Fa?	NO
Section 21.2.2 Scaling Factor:	N/A
Deterministic PGA:	1.032
Is Deterministic PGA >=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)



Sladden Engineering

SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	1.079	1.228	1.079	0.720
0.100	1.842	1.776	1.776	1.184
0.200	2.440	2.416	2.416	1.610
0.300	2.740	2.851	2.740	1.827
0.500	2.629	2.965	2.629	1.752
0.750	2.159	2.537	2.159	1.439
1.000	1.799	2.184	1.799	1.199
2.000	0.951	1.199	0.951	0.634
3.000	0.613	0.825	0.613	0.408
4.000	0.420	0.555	0.420	0.280
5.000	0.311	0.403	0.311	0.207

ASCE 7-16: Section 21.4
Site Specific

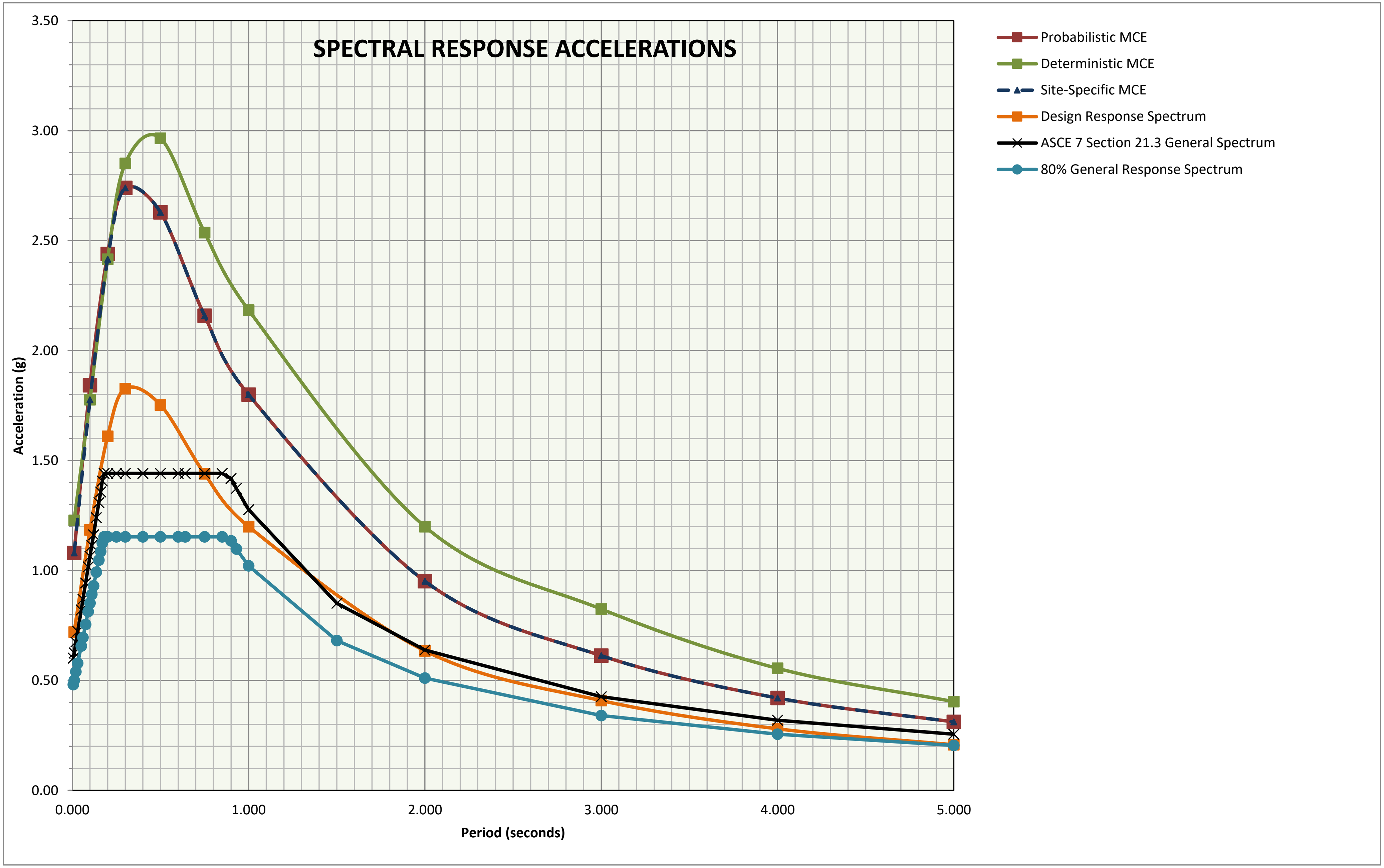
	Calculated Value	Design Value
SDS:	1.644	1.644
SD1:	1.268	1.268
SMS:	2.466	2.466
SM1:	1.902	1.902
Site Specific PGAm:	0.938	0.938
Site Class:	D measured	

Seismic Design Category - Short*	E
Seismic Design Category - 1s*	E

* Risk Categories I, II, or III

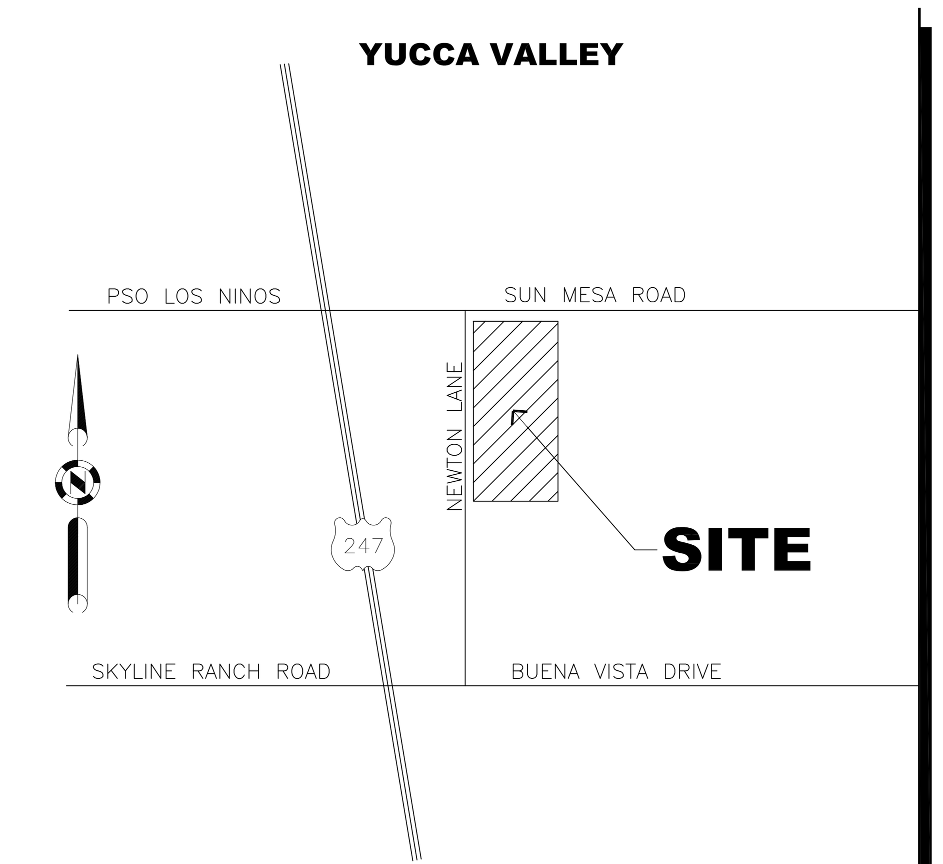
Period	ASCE 7 SECTION 21.3 General Spectrum	80% General Response Spectrum
0.005	0.601	0.481
0.010	0.625	0.500
0.020	0.674	0.539
0.030	0.723	0.578
0.050	0.821	0.656
0.060	0.869	0.696
0.075	0.943	0.754
0.090	1.016	0.813
0.100	1.065	0.852
0.110	1.114	0.891
0.120	1.162	0.930
0.136	1.240	0.992
0.150	1.309	1.047
0.160	1.358	1.086
0.170	1.406	1.125
0.180	1.441	1.153
0.200	1.441	1.153
0.250	1.441	1.153
0.300	1.441	1.153
0.400	1.441	1.153
0.500	1.441	1.153
0.600	1.441	1.153
0.640	1.441	1.153
0.750	1.441	1.153
0.850	1.441	1.153
0.900	1.419	1.135
0.930	1.373	1.098
1.000	1.277	1.021
1.500	0.851	0.681
2.000	0.638	0.511
3.000	0.426	0.340
4.000	0.319	0.255
5.000	0.255	0.204

Project No: 544-24365


SPECTRAL RESPONSE ACCELERATIONS
Acceleration (g)
Period (seconds)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.000
1.000
2.000
3.000
4.000
5.000
Probabilistic MCE
Deterministic MCE
Site-Specific MCE
Design Response Spectrum
ASCE 7 Section 21.3 General Spectrum
80% General Response Spectrum

APPENDIX D

SITE PLAN



VICINITY MAP

NOT TO SCALE

LEGEND:

1. STANDARD 9 FT X 19 FT. PARKING STALL W/ 6" WIDE x 48" LONG WHEEL STOP
2. ACCESSIBLE PARKING STALL 2% MAX. SLOPE
3. ACCESS AISLE, 2% SLOPE AND CROSS SLOPE
4. DECOMPOSED GRANITE
5. 400 S.F. MANAGERS UNIT/LIVING QUARTERS
6. ROLLING SECURITY GATES
7. ACCESSIBLE ROUTE, MIN 4' WIDE NOT TO EXCEED 5% SLOPE, 2% CROSS SLOPE
8. TRASH ENCLOSURE PER CITY STANDARDS
9. LIGHT STANDARD, TYP. AS SHOWN - PER CITY STANDARDS
10. WALL PACK, TYP. AS SHOWN
11. 8 FT MAX. HT. CMU WALL
12. CONC. CURB AND GUTTER - PER CITY STANDARDS
13. 6" DIA. CONC. FILLED BOLLARDS AS SHOWN, EMBEDDED MIN. 36" INTO GROUND
14. CONC. PAD AT NEW ELECTRICAL SERVICE LOCATION TBD
15. CONC. CURB
16. W.I. FENCE (TBD), 8 FT. MAX. HT.
17. W.I. FENCE (TBD), 10 FT. MAX. HT.
18. DECORATIVE ROCK LANDSCAPING: LARGE RIVERROCK W/ RANDOM BOULDERS
19. RETENTION BASIN
20. 20 FT WIDE FIRE LANE
21. 10FT X 20 FT LOADING ZONE, TYP. AS SHOWN
22. LEACH FIELD, SEE CIVIL DRAWINGS

9.14.060: MINI-/SELF-STORAGE FACILITIES:

A. General: The only commercial activities permitted on the site of a self-service storage facility shall be rental of storage bays and pick up and deposit of goods and/or property in dead storage. Storage bays shall not be used to: manufacture, fabricate or process goods; service or repair vehicles, boats, small engines or electrical equipment, or to conduct similar repair activities; conduct garage sales or retail sales of any kind; or conduct any other commercial or industrial activity on the site.

B. Security Quarters Permitted: Residential quarters for security purposes may be established on the site.

C. Bays Have No Legal Address: Individual storage bays or private postal boxes within a self-service storage facility shall not be considered a premises for the purpose of assigning a legal address in order to obtain an occupational license or other governmental permit or license to do business.

D. Outside Storage:

1. Except as provided in this section, all property stored on site shall be entirely within enclosed buildings.

2. Open storage of private recreational vehicles and dry storage of recreational boats for personal use shall be permitted within a self-service storage facility provided that the following is met:

a. Such storage shall take place only within a designated area. The area so designated shall be clearly delineated upon the site plan accompanying the application;

b. The open storage area shall not exceed twenty five percent (25%) of the buildable area of the site;

c. The open storage area shall be entirely screened from view from adjacent residential areas and all street rights of way by a solid building wall or a masonry wall with a minimum height of eight feet (8');

d. Vehicles shall not be stored within the area set aside for minimum building setbacks; and

e. No vehicle maintenance, washing or repair shall be permitted on site. Recreational boats stored on the site shall be placed and maintained upon wheeled trailers. No dry stacking of boats shall be permitted on site.

E. Minimum Lot Size: Notwithstanding any other provision of this code the minimum lot size for a self-storage facility shall be one acre.

F. Separation Between Storage Buildings: If separate buildings are constructed, there shall be a minimum ten foot (10') setback between individual buildings within the facility.

G. Maximum Bay Size: The maximum size of a storage bay shall be five hundred (500) square feet.

H. Maximum Building Height: With the exception of a structure used as a security quarters, the maximum height of a self-service storage facility shall be one story. The height of the building shall not exceed twenty feet (20'), except for any architectural features located along the street entrance to the facility. In addition, a parapet wall shall be constructed to screen roof mounted air conditioning and other equipment, if any. The combined height of the building and the parapet wall shall not exceed twenty five feet (25').

I. Parking Requirements: See , "Parking And Loading Regulations", of this title for ministorage parking requirements.

J. Miscellaneous Requirements:

1. Outdoor Lighting: All outdoor lighting shall meet the requirements of title 8,, "Outdoor Lighting", of this code.

2. Loudspeakers: Exterior loudspeakers or paging equipment shall not be permitted on the site.

3. Bay Doors: Storage bay doors shall not face any abutting property which is residentially zoned, nor shall they be visible from any adjacent residential property or any street right of way.

4. Barbed Wire: Barbed or similar wire may be used for security purposes, but it shall not be visible from any adjacent residential property or any street right of way.

5. Architectural Treatment: The exterior facades of all structures shall receive uniform architectural treatment, including stucco and painting of surfaces. All structures adjacent to properties designated with a residential land use shall have a pitched roof or other treatment comparable to the adjacent residential development. (Ord. 253, 12-16-2014)

DEVELOPMENT STATISTICS
FOR:
BILLINGS MINI STORAGE
S.E.C. NEWTON LANE AND SUN MESA
YUCCA VALLEY, CA

LEGAL DESCRIPTION:	TR 8749, MB 120/50-64 SEC. 13 T1N, R5E., S,B,B,&M.
APN	0597-111-67-0000
TOTAL SITE AREA:	189,050 SQ. FT. 4,34 ACRES
ADDRESS:	S.E.C. NEWTON AND SUN MESA YUCCA VALLEY CA
ZONING: GPLU	INDUSTRIAL INDUSTRIAL
PROPOSED LAND USE	MINISTORAGE

SCOPE OF WORK: PROPOSED MINISTORAGE FACILITY WITH ONE CARETAKERS UNIT. ALL STORAGE TO BE ENCLOSED. NO OPEN STORAGE IS PROPOSED.

PER MUNICODE SEC. 9.10 INDUSTRIAL DISTRICTS

SETBACKS:		MAX. FENCE HT
FRONT:	15'-0"	8'-0" MAX.
REAR:	0'	10'-0" MAX.
SIDE:	0'	10'-0" MAX.
STREET SIDE:	15'-0"	10'-0" MAX.

PER MUNICODE SEC. 9.14.060 MINI/SELF-STORAGE FACILITIES

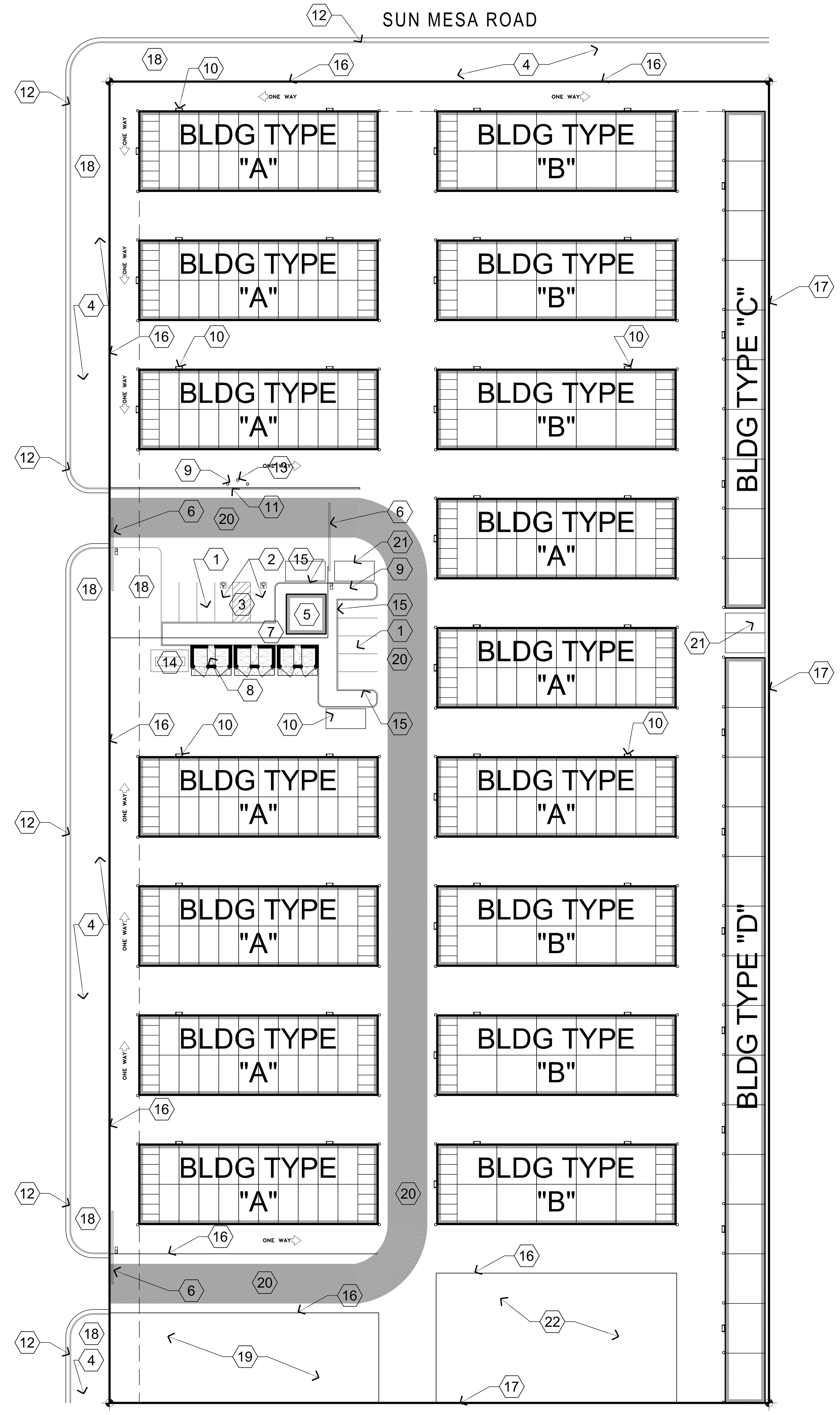
ALLOWABLE BUILDING HEIGHT:	20'-0" ONE STORY
AREAS:	400 S.F ONE STORY OFFICE/MANAGER UNIT 89,700 S.F STORAGE UNIT TOTAL
FAR: 70% MAX.	89,700 s.f. /220,786 s.f. = 0.406 40.6 % < 70% .: FAR o.k.

TYPES:	**UNIT COUNT:**						
	5X10 50 S.F.	10x20 200 S.F.	20x20 400 S.F.	25x20 500 S.F.	TOTAL S.F. PER BLDG.	NO. BLDG. TYPES	TOTAL S.F. PER BLDG. TYPE
TYPE "A"	16	20	-	-	4,800 S.F.	10	48,000 S.F.
TYPE "B"	16	-	10	-	4,800 S.F.	6	28,800 S.F.
TYPE "C"	-	-	-	10	5,000 S.F.	1	5,000 S.F.
TYPE "D"	-	-	-	15	7,500 S.F.	1	7,500 S.F.
TYPE "E"	-	-	1	-	400 S.F.	1	400 S.F.
TOTAL UNITS	256	200	60 MGR. UNIT NOT INCL.	25		TOTAL S.F.	89,700 S.F.

PARKING REQUIREMENTS:

	REQUIRED:	PROVIDED:
PER MUNICODE SEC. 9.33.040-C, TABLE 3-7 MINI/SELF-STORAGE FACILITIES:: STANDARD 9X19 PARKING STALLS:		
6 SPACES + 2 CARETAKERS	8	8
ACCESSIBLE STALLS:	1 reqd	
STANDARD:	1	1
VAN:	1	1
		10
LOADING SPACES: ONE PER PER 20,000 S.F. 10 FT X 20 FT:	5	5
TOTAL PARKING ON SITE:	8 REQUIRED	10 PROVIDED

NOTE: ALL PARKING STALLS SHALL BE 9'-0" x 19'-0" MIN. BACKUP-1 WAY ISLES SHALL BE MIN. 12'-0" WIDE, PER CITY STANDARDS. BACKUP-2 WAY ISLES SHALL BE MIN. 25'-0" WIDE, PER CITY STANDARDS.



REV. 2.0

NORTH

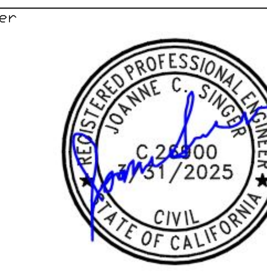
OVERALL SITE PLAN

SCALE: 1" = 40'-0"

No.	Revision / Issue	Drawn by	Checked by	Date
	PRELIMS		DRP/JS	08-03-22

DRP Enterprises

Engineer



Project Owner

ROB BILLINGS
SUN MESA ROAD
YUCCA VALLEY, CA

Project

PROPOSED MINI STORAGE
S.E. CORNER NEWTON LANE AND SUN MESA ROAD

SCALE

1" = 40'-0"

Project Number & Sheet Number

T-1.0