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GEOTECHNICAL INVESTIGATION REPORT
PROPOSED RETAIL STORE,
CAR WASH AND GAS STATION (PHASE 1)
AND 4-STORY HOTEL (PHASE 2)
APN 3096-381-01 & 3096-381-09
SOUTHEAST CORNER OF U.S. HIGHWAY 395 & DOS PALMAS ROAD
VICTORVILLE, CALIFORNIA

June 21, 2021
LKGE Project No. 21-0423

FOR

DOS3SRK Investment, LLC
1102 S. Main Street
Corona, CA 92882

June 21, 2021
LKGE Project No. 21-0423

DOS3SRK Investment LLC
1102 S. Main Street
Corona, CA 92882

Attn: Mr. Kaushik Patel

Subject: **GEOTECHNICAL INVESTIGATION REPORT**
Proposed Retail Store, Car Wash and Gas Station (Phase 1) and
4-Story Hotel (Phase 2)
APN's 3096-381-01 & PN 3096-381-09
Southeast Corner of U.S. Highway 395 and Dos Palmas Road
Victorville, California

Dear DOS3SRK Investment LLC,

Pursuant to your request, LK Geotechnical Engineering, Inc. has completed a geotechnical investigation and prepared this report for the proposed development at the subject site. The primary objective of this investigation was to provide our best estimate of the geotechnical factors that pertain to the gross stability of the proposed improvement and to evaluate alternatives for a foundation system for the proposed structures.

The report includes a description and an evaluation of the soil materials and provides soils engineering recommendations for construction of the proposed improvement. This report is intended for submittal to the appropriate governmental authorities that control the issuance of necessary permits.

Based on our findings, the proposed project is geotechnically feasible, provided that the recommendations in this report are incorporated into the design and are implemented during construction of the project.

If you have any questions regarding the information contained in this report, please feel free to call this office.

Sincerely,
LK GEOTECHNICAL ENGINEERING, INC.

Sean Lin, G.E. 2921
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
CHI HSIN LIN
No. 2921
GEOTECHNICAL
STATE OF CALIFORNIA

TABLE OF CONTENTS

Page

List of Plates

List of Appendices

1. SCOPE OF WORK

To prepare this report, we have performed the tasks described in the following subsections:

1.1. Literature Review

We reviewed geological literature including geologic maps, topographic maps and aerial photographs relevant to the subject site in preparation of this report. A list of literature reviewed is presented in the "References" section of this report.

1.2. Field Exploration

We performed a field exploration consisting of logging of eight (8) exploratory soil borings on May 17, 2021. The exploration was performed using an 8-inch diameter hollow-stem auger drill rig. The borings were advanced to a maximum depth of approximately 31-feet below existing grade. The approximate locations of the geotechnical exploration are shown on Plate 1. Detailed descriptions of the soils encountered during drilling are presented in Appendix A – Field Exploration.

1.3. Field Percolation Testing

We performed a percolation testing by using two of the exploratory borings to determine the infiltration rate of on-site soil. Detailed testing data is presented in Appendix A – Field Exploration.

1.4. Geotechnical Laboratory Testing

Representative soil samples collected from our field exploration were delivered to the EGLab, Inc. (EGL) of Arcadia, California for testing, and to evaluate relevant engineering properties. The detailed laboratory test results are presented in Appendix B – Laboratory Testing. Based on our review of the laboratory data, LKGE concurs with and accept the laboratory testing results performed by EGLab, Inc.

1.5. Engineering Analysis and Report Preparation

We compiled all geological and geotechnical data obtained from literature review, field exploration and laboratory test results, and then prepared this report to present our findings and the geotechnical recommendations, including seismic considerations, grading, foundations, foundation setback, retaining walls, floor slabs, temporary excavations, and drainage.

2. PROPOSED DEVELOPMENT AND SITE DESCRIPTION

2.1. Proposed Development

It is our understanding that the proposed project consists of the construction of a retail store, car wash and gas station (Phase 1), and a 4-story hotel (Phase 2) at the subject site. The proposed structures are shown on Plate 1 – Site Plan and Geotechnical Exploration Map.

2.2. Site Description

The project site is located at the southeast corner of U.S. Highway 395 and Dos Palmas Road in Victorville, California. The site is bounded by U.S. Highway 395 on the west, Cantina Drive on the east, Dos Palmas Road on the north and vacant lots on the south.

The site is currently vacant with short bushes and shrubs.

The site exhibits low relief, with a regional gradient of approximately 0.5 percent toward the north. Drainage across the site is by uncontrolled sheet flow to the adjacent street and drainage course, as well as by infiltration within unpaved areas.

3. SITE GEOLOGY AND SUBSURFACE CONDITIONS

3.1. Regional Geology

According to the regional geologic map (Morton & Miller, 2003), the project the site is underlain by alluvium. This material composes primarily silty sand, sand and gravel. A portion of the geologic map is reproduced as Plate 2 – Regional Geologic Map.

3.2. Subsurface Earth Materials

Based on our review of the available regional geologic data and our field exploration, the earth materials observed at the site consist of alluvium.

3.2.1. Alluvium (Qa)

Alluvium consisting of brown silty sand and sand with silt were encountered at the site. In general, the alluvium at the site was observed to be to medium dense in general, except upper 1- to 2-feet that is disturbed by vegetation/animals. The firm alluvium is considered suitable for receiving compacted fill, or for foundation or slab support, provided that our recommendations are followed and integrated into the plans.

3.3. Groundwater

No groundwater was observed on the site or in our exploratory borings to a maximum depth of 31-feet below existing grade. The groundwater level appears to be well below the level of the proposed structures. It should be noted that local fluctuations in groundwater levels may occur due to seasonal variations in rainfall.

4. GEOLOGIC AND SEISMIC HAZARDS EVALUATION

4.1. Seismic Hazard Zones Evaluation

The southern California region is seismically active and commonly experiences strong ground shaking resulting from earthquakes along active faults. Ground shaking resulting from a moderate to major earthquake (Magnitude 6.0 or greater) can be expected during the lifespan of the existing and/or proposed structures. Property owners and the general public should be aware that any structure or slope in the southern California region could be subject to significant damage as a result of a moderate or major earthquake. The hazards associated with seismic activity in the vicinity of the site are discussed and evaluated in the following sections.

4.1.1. Earthquake Fault Zone

The State of California established the Alquist-Priolo Earthquake Fault Zoning Act in 1972 which went into effect in 1973. The purpose of this Act is to prohibit the construction of most structures for human occupancy across the traces of active faults and to mitigate the hazard of fault rupture. An "active fault" is defined by the State Mining and Geology Board as one which had surface displacement within the Holocene era (+/- 11,000 years) and is well defined at the surface. The term “sufficiently active” has been used if there is evidence of Holocene surface displacement along one or more of its segments or branches.

The Act was renamed the Alquist-Priolo Special Studies Zones Act in 1975 and then Alquist-Priolo Earthquake Fault Zoning Act in 1994. The original designation “Special Studies Zones” has been renamed “Earthquake Fault Zones”. Under the Act, the State Geologist is required to delineate Earthquake Fault Zones (EFZ) along active faults in California. Development within these zones must include geologic investigations demonstrating that the sites are not threatened by surface displacement from future faulting. The California Geologic Survey (CGS) is required to delineate active faults, compile maps of EFZs and submit such Official Maps to the public and continually review and revise EFZs based on new geologic and seismic data. EFZ boundaries on early maps were positioned about 660 feet (200 meters) away from the fault traces to accommodate imprecise locations of the faults and possible existence of active branches. The policy since 1997 is to position the EFZ boundaries about 500 feet (150 meters) away from major active faults and about 200 to 300 feet (60 to 90 meters) away from well defined, minor faults.

Based on our review of geologic map, the closest known fault is the North Frontal Fault which is mapped about 12.9-miles southeast of the site.

4.1.2. Soil Liquefaction Potential

Soil liquefaction occurs when the pore pressures generated within a soil mass approach the effective overburden pressure. Liquefaction of soils may be caused by cyclic loading such as that imposed by ground shaking during earthquakes. The increase in pore pressure results in a loss of strength, and the soil then can undergo both horizontal and vertical movements, depending on the site conditions. Other phenomena associated with soil liquefaction include sand boils, ground oscillation, and loss of foundation bearing capacity. Liquefaction is generally known to occur in loose, saturated, relatively clean, fine-grained cohesionless soils at depths shallower than approximately 50 feet. Factors to consider in the evaluation of soil liquefaction potential include groundwater conditions, soil type, grain size distribution, relative density, degree of saturation, and both the intensity and duration of ground motion.

Based on lack of shallow groundwater at the site, it is our professional opinion that the liquefaction potential at the site is very low. Consequently seismically-induced settlement is negligible.

4.2. CBC Seismic Design Parameters

The future structures should be designed by the structural engineer in accordance with the applicable seismic building code. Based on our geotechnical investigation, the subject site is classified as Site Class D in accordance with the 2019 California Building Code that refers to the ASCE 7-16.

Per Section 11.4.8 of ASCE 7-16, structures shall be designed for the seismic response coefficient C_s determined by Eq. (12.8-2) for values of $T \leq 1.5\ T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. (12.8-3) for $T_L \geq T > 1.5\ T_s$ or Eq. (12.8-4) for $T > T_L$, where

T = the fundamental period of the building
$T_s = S_{D1}/S_{DS}$
T_L = long-period transition period

The design spectral response acceleration parameters presented on the following table generated by the Applied Technology Council (ATC) website, may be utilized for seismic design:

Site location (latitude, longitude): (34.4988, -117.3985)				
Spectral Period, T (second)	MCE_R ground motion (g)	Site-Modified Spectral Acceleration (g)		**Seismic Design Acceleration (g)**
0.2	S_s = 1.278	F_a = 1.0	S_{MS} = 1.278	**S_{DS} = 0.852**
1.0	S_1 = 0.496	F_v = 1.7	S_{M1} = 0.843	**S_{D1} = 0.562**
Site modified peak ground acceleration PGA_M = 0.55 g				
Long-period transition period T_L = 8 second				
Seismic Design Category = D				

If seismic response coefficient C_s recommended above is not applicable for structural design, the site-specific ground motion hazard analysis presented in this report should be used.

5. GEOTECHNICAL ENGINEERING RECOMMENDATIONS

5.1. Geotechnical Overview

Based on the findings of our investigation, the site is considered to be suitable from a soils engineering standpoint for construction of the proposed structures, provided the recommendations included herein are followed and integrated into the building and/or grading plans.

The following is a list of geotechnical considerations for this project:

- Based on our review of the proposed site plan, massive site grading is needed to achieve the proposed grades and site drainage. Our grading recommendations are presented in “Site Preparation and Earthwork” section.

- Surficial disturbed/loose soils were encountered at various locations within the property. We recommend that the proposed buildings be supported on a uniform compacted fill blanket per our recommendations presented in “Site Preparation and Earthwork” section.

- The on-site upper 5-feet of soil is considered as “moderate” collapsible soil based on our laboratory test results. We recommend that the proposed buildings be supported on a uniform compacted fill blanket per our recommendations presented in “Site Preparation and Earthwork” section.

- The on-site near surface soil is not considered as “expansive soil” based on our field soil classification.

- On-site near surface soil is not considered as “corrosive soil” based on the laboratory testing results.

Our geotechnical engineering analyses performed for this report were based on the preliminary information provided to us. If the design substantially changes, then our geotechnical engineering recommendations would be subject to revision based on our evaluation of the changes.

5.2. Expansive Soil Evaluation

Expansive soils are characterized by their ability to undergo significant volume changes (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from rainfall, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors, and may cause unacceptable settlement or heave of structures, concrete slabs supported on-grade, or pavements supported over these materials. Depending on the extent and location below finished subgrade, these soils could have a detrimental effect on the proposed construction.

Based on our field soil classification, the near surface sandy soil is considered to have a “Very Low” expansion potential. Mitigation measure for expansive soil is not needed.

5.3. Collapsible Soil Evaluation

Based on the laboratory testing results, the upper 5-feet of near surface soil is considered to have a “slight” to “moderate” collapsible potential. We have incorporated the mitigation for collapsible soil into our grading/compaction recommendations.

5.4. Corrosive Soil Evaluation

The potential for the near-surface on-site materials to corrode buried steel and concrete improvements was evaluated preliminarily. In accordance with the Caltrans Corrosive Guidelines, corrosive soil is defined as the soil has a pH less than 5.5, or chloride concentration greater than 500 ppm, or sulfate concentration in soils greater than 2,000 ppm, or minimum resistivity less than 1,000 ohm-centimeters. Laboratory testing was performed to evaluate pH and electrical resistivity, as well as chloride and sulfate contents. These laboratory test results are presented in Appendix B.

Based on our review of laboratory test results, the followings are our findings:

- Based on chloride conetent test results, the on-site soils is not considered corrosive to reinforcing steel in concrete structures and pipes.
- Based on sulfate conetent test results, the on-site soils is not considered corrosive to concrete in accordance with ACI 318, Table 4.3.1. As a minimum, we recommend that Type I or II cement and a water-cement ratio of no greater than 0.5 be used on the project.
- Based on soil resistivity results, the on-site soil is not considerred corrosive to buried ferrous metals.

In general, conventional corrosion protection measures for metal in contact with soil may include the following:

- Underground steel utilities should be given a high-quality protective coating such as 40 mil extruded polyethylene, 20 mil plastic tape over primer per AWWA Standard C209, or hot applied coal tar enamel or tape per AWWA Standard C203.
- All underground steel should be electrically insulated from above ground steel, dissimilar metals, and cement-mortar or concrete coated steel.
- Underground steel pipe should be bonded for electrical continuity if rubber-gasketed, mechanical, grooved-end, or other non-conductive type joints are used. In addition, cathode protection is recommended for underground steel utilities.

If special corrosion protection is required for certain performance criteria determined by the project designer, a corrosion specialist should be consulted regarding suitable types of piping and appropriate protection for underground metal conduits.

5.5. Stormwater Infiltration Evaluation

Percolation testing was performed using the falling head boring test method in accordance with the County of San Bernardino Technical Guidelines. The water level was measured to the nearest tenth of a foot and converted to inches in the calculation. The results of the percolation test are tabulated below, and the raw data is attached in Appendix A.

Recommended Design Infiltration Rate

Boring No.	Total Depth of Boring (ft)	Depth of Testing Zone (ft)	Soil Description of Testing Zone	Infiltration Rate (inch/hour)
B-4	11	5 – 10	Silty SAND	3.3
B-8	11	5 – 10	Silty SAND	1.9

The project Civil Engineer should review the raw data of percolation test to determine infiltration rate for design of the proposed infiltration system. The proposed infiltration system should comply with the following setbacks.

Stormwater Infiltration Facility Setback Requirements

Setback from	Distance
Property lines and public right of way	5 feet
Adjacent private property lines	10 feet
Any foundation	10 feet or within 1:1 plane drawn up from the bottom of foundation, whichever is greater
Water well used for drinking water	100 feet

5.6. Site Preparation and Earthwork

Prior to construction/grading, the area of the proposed development should be clear of any loose surficial soils, vegetation and/or man-made debris. Demolition debris and other unsuitable materials should be stripped and removed from the site. Water lines or other old utility lines or installations to be abandoned should be removed or crushed in place. Holes resulting from removal of buried obstructions which extend below finished site grades should be backfilled with compacted soils.

5.6.1. Over-Excavation and Subgrade Preparation

For building foundation support, we recommend over-excavate at least 3 feet below the proposed footing bottom, or 5 feet below the existing grade, whichever is deeper. The lateral extent of the over-excavation should be at least 5 feet beyond the building line (where space permits) or equidistant to the thickness of fill below footing, whichever is greater.

For any ancillary structures (i.e. property line fence walls, canopies, trash enclosure, etc.), we recommend over-excavate at least 1 foot below the proposed footing bottom, or 2 feet below the existing grade, whichever is deeper. The lateral extent of the over-excavation should be equidistant to the thickness of fill below footing (where space permits).

For pavement and hardscape (patios, steps, walkways, etc.), we recommend over-excavate at least 1 foot below the proposed subgrade or 2 feet below the existing grade, whichever is deeper, and then recompact to 90% relative compaction. The lateral extent of the over-excavation should be equidistant to the thickness of fill below subgrade (where space permits).

Any excavated bottom to receive new compacted fill should be inspected and approved by a representative from LKGE. prior to compaction work. Deeper excavations may be required in areas where soft, saturated, or unsuitable materials, for example, tree root balls or undocumented fill are encountered.

5.6.2. Compaction

On-site materials are considered to be suitable for compaction, provided that all deleterious materials and oversized rocks are removed from the site prior to compaction.

All new compacted fill should be supported on firm native soil and compacted to at least 90 percent of the maximum dry density, as determined by the current ASTM D1557 and at about 2 percent above optimum moisture content. Fill should be placed in horizontal lifts of approximately 8 inches in loose thickness, and then compacted by mechanical methods, using sheepsfoot rollers, multiple wheel pneumatic tired rollers, or other appropriate compacting rollers.

It may be necessary to import soils to the site to be used as compacted fill. Imported materials should be a sandy type of material and approved by the geotechnical engineer prior to transporting to the job site. The sandy material should not have an Expansion Index exceeding 20 and should not contain rocks larger than 8-inches in size.

5.6.3. Shrinkage/Bulking Due to Compaction

Based on our review of the in-situ soil density data, preliminary volumetric shrinkage on the order of 10 to 15 percent as a result of compaction of onsite soil may be assumed.

5.6.4. Excavation Characteristics

The earth materials underlying the site should be generally excavatable with heavy-duty earthwork equipment in good working condition. Some gravels, cobbles and man-made debris should be anticipated within the soils. Some local caved-in conditions should be anticipated in the sandy soil during temporary excavation.

5.7. Temporary Excavation

The maximum recommended height of unsurcharged, temporary vertical excavations in the earth materials at the site is 4 feet. Excavations above this height should be trimmed to a 1:1

(H:V) ratio where the space is available. Surcharge loads, including construction vehicles and materials, should not be placed within five (5) feet of the unsupported excavation edge. Some sloughing of cohesionless sandy materials encountered at the site should be expected.

Excavations shall not remove the lateral support from a public way, from an adjacent property or from an existing structure.

Where space for sloped excavations is not available, slot-cut or temporary shoring (trench box) may be utilized. Temporary shoring consisting of “trench box” system may be used for surcharged footing or trench excavations (if applicable). It is the contractor’s responsibility to provide sufficient shoring during construction.

Surfaces exposed in slope excavations should be kept moist but not saturated to minimize raveling and sloughing during construction. Adequate provisions should be made to protect the slopes from erosion during periods of rainfall. Water should not be allowed to pond on the top of the excavation or to flow towards it. All excavations should be stabilized within 30 days of initial excavation.

All excavations shall be made in accordance with the regulations of the State of California, Division of Occupational Safety and Health, (Cal/OSHA). These recommended temporary excavation slopes do not preclude local raveling and sloughing. Provided our recommendations are followed, the resulting temporary excavations are anticipated to be safe from a geotechnical standpoint for the proposed construction operations, and should not expose workers to hazards due to cave-ins, provided that geologic conditions exposed by the excavations are as anticipated.

Confined or trench excavations (i.e. retaining walls or utility trench excavations) should be made in accordance with the regulations of the State of California, Division of Occupational Safety and Health (Cal/OSHA). We recommend that confined excavations should be shored using hydraulic shoring, screw jacks or timber shoring, as determined by the project engineer.

All temporary excavations at the site should be observed and monitored by our representative to verify soil conditions so that any necessary modifications can be made based on variations of soil encountered at the site. Surcharged temporary excavations and shoring should be continuously observed by our representative. If adverse conditions are encountered during excavations, additional recommendations will be provided.

It is recommended that a pre-excavation site meeting be attended by the grading contractor, the soils engineer and an agency representative to discuss methods and sequence of excavation.

5.8. Temporary Shoring

Temporary excavation will be required to install the underground fuel tank. Where the sloped excavation is not feasible due to space constraint or surcharge conditions, a temporary shoring system consisting of soldier piles and wood lagging or other shoring system should be utilized for portions of the proposed underground tank excavations.

Shoring shall be designed by a California licensed engineer experienced in the design and construction of shoring under similar conditions. Once the final excavation and shoring plans are complete, the plans and the design should be reviewed by LKGE for conformance with the design intent and recommendations.

- **Lateral Earth Pressures**

The cantilevered shoring walls should be designed using the lateral earth pressure presented in the attached Plate SW-1 and the following table:

Shoring Type	Lateral Earth Pressure*	Pressure Distribution
Cantilevered Shoring	28H psf	Triangular Distribution

* H = wall height

- **Surcharge Loads**

Any surcharge (live, including traffic, or dead load) located within a 1:1 plane projected upward from the base of the shored excavation, including adjacent structures, should be added to the lateral earth pressures. The lateral contribution of a uniform surcharge load located immediately behind the temporary shoring may be calculated by multiplying the vertical surcharge pressure by 0.30. Lateral load contributions of surcharges located at a distance behind the shored wall may be provided once the load configurations and layouts are known. As a minimum, a 240 psf vertical uniform surcharge is recommended to account for nominal construction and/or traffic loads. More detailed lateral pressure and loading information can be provided, if needed, for specific loading scenarios as recognized through the design process.

- **Soldier Piles**

Soldier piles should be at least 18-inch in diameter and should be designed for an allowable passive resistance of 350 pcf (equivalent fluid weight). The passive resistance value can be doubled if pile spacing is greater than 2.5D on center where D is the diameter of the drilled shaft for the soldier piles. The downward axial capacity of soldier pile can be designed for an allowable skin friction of 400 psf. The upper 1.5D should be neglected when calculating the axial capacity below the excavated level. Structural concrete should be used for the soldier piles below the excavation, sand-cement slurry may be used above the excavation where lagging will be installed.

Drilling of the soldier pile shafts can be accomplished using conventional drilling equipment. In the event of soil caving, it may be necessary to use casing and/or drilling mud to permit the installation of the soldier piles. Drilled holes for soldier piles should not be left open overnight. Concrete for piles should be placed immediately after the drilling of the hole is complete.

The concrete should be pumped to the bottom of the drilled shaft using a tremie. Once concrete pumping is initiated, the bottom of the tremie should remain below the surface of the concrete to prevent contamination of the concrete by soil inclusions. If steel casing is used, the casing should be removed as the concrete is placed.

Due to the proximity of the excavation to existing improvements, some means of monitoring the performance of the shoring system is recommended. Monitoring should consist of periodic surveying of lateral and vertical locations at the tops of all soldier piles. We will be pleased to discuss this further with the design consultants and the contractor when the design of the shoring system has been finalized. Also, we should review the shoring plans and calculations to evaluate whether our recommendations have been incorporated into the design.

- **Lagging**

Continuous treated timber lagging should be used between the soldier piles. The lagging can be designed for the recommended lateral earth pressure but limited to a maximum of 400 psf with consideration of soil arching. If treated timber is used, the lagging may remain in place. To develop the full lateral resistance, provisions should be taken to assure firm contact between the soldier piles and the soils; for this, we recommend that at least 1.5-sack sand-cement slurry fill be used behind the lagging.

- **Deflections**

Certain amount of deflection of a shored embankment will occur. For design of shoring, the maximum deflection shall not exceed ½ inch at the top of the shored embankment where a structure is within 1:1 (H:V) plane projected up from the base of the temporary excavation and for a maximum lateral deflection of 1 inch provided there are no structures within a 1:1 (H:V) plane projected up from the base of temporary excavation.

If greater deflection occurs during construction, additional bracing/anchoring may be necessary to minimize settlement and loss of support of adjacent buildings, streets and/or utilities in adjacent streets and alleys. If desired to reduce the deflection, a greater active pressure could be used in the shoring design.

5.9. Conventional Footings for Buildings

Conventional footings can be used for support of the proposed buildings, provided footings are founded on the compacted fill. The reinforcement of footings shall be designed by the project structural engineer.

Continuous footings should be at least 18 inches in width and at least 24 inches deep founded on compacted fill, and may be designed using an allowable bearing pressure of 2,500 psf.

Square footings should be at least 24 inches in width and at least 24 inches deep founded on compacted fill, and may be designed using an allowable bearing pressure of 2,500 psf.

The allowable bearing capacity can increase 350 psf for each additional foot of width, and 500 psf for each additional foot of depth to a maximum allowable capacity of 6,000 psf.

The bearing pressure given is for the total of dead and frequently applied live loads and may be increased by one-third for short duration loading which includes the effects of wind or seismic forces.

The estimated static settlement is expected to be less than ¾ inch with differential settlement estimated to be less than ½ inch within a span of 30 feet. Settlement of the proposed foundation system is expected to occur on initial load application.

Resistance to lateral loading may be provided by friction acting at the base of foundations and by passive earth pressure within the native dense sand. An allowable coefficient of friction of 0.35 may be used with the dead load forces. Passive earth pressure may be computed as an equivalent fluid having a density of 350 pcf with a maximum earth pressure of 5,000 psf. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third.

5.10. Conventional Footings for Ancillary Structures

For light-weight ancillary structures (e.g. trash enclosures, planter walls, etc.), conventional shallow footings can be used, provided that footings are placed on compacted fill per our "Site Preparation and Earthwork" recommendations.

For the design of spread footings for other light-weight structures, we recommend the bottom of square or continuous footings be founded at least 12 inches below the proposed ground surface. A minimum footing width of 18 inches is recommended for square footings and 12 inches for continuous footings. The allowable bearing value for footings with above minimum sizes is 1,500 psf for dead plus live load. Based on the allowable net bearing pressures presented above, static settlement is anticipated to be less than 0.5 inch. Differential settlement is expected to be up to one-half of the total settlement over a 30-foot span. Most of the static settlement at the project site is expected to occur immediately after the application of the load.

Resistance to lateral loading may be provided by friction acting at the base of foundations and by passive earth pressure. An allowable coefficient of friction of 0.35 may be used with the dead load forces. Passive earth pressure may be computed as an equivalent fluid having a density of 350 pcf with a maximum earth pressure of 5,000 psf. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third.

5.11. Floor Slab-on-Grade

Concrete slab-on-grade may be used for the proposed building and should be supported on compacted fill, per the "Site Preparation and Earthwork" recommendations. A vertical unit modulus of subgrade reaction (k_1) of 150 pci based on a 1'x1' load plate can be assumed for structural design.

Concrete slabs should be at least 4 inches thick and should be reinforced with a minimum of #4 rebar spaced not exceeding 16 inches on center, each way. The project structural engineer should design the reinforcement of slab based on the design performance criteria.

5.12. Moisture Retarder

Slabs to be covered with flooring should be protected by an acceptable plastic vapor retarder/barrier (minimum 10 mil thickness) placed on the firm subgrade.

If moisture vapor transmission is a concern to the facility owner, an expert should be consulted to provide additional recommendations for the design and construction of slabs in moisture sensitive flooring areas.

5.13. Hardscape

Patios, steps, walkways, etc. are not normally subject to building code requirements for structural support. In order to reduce the potential for distress due to potential settlement, the hardscape should be supported by compacted fill per our "Site Preparation and Earthwork" recommendations. Hardscape slabs reinforcement and control joints should be designed by the structural engineer or architect based on the design performance criteria.

5.14. Pavement

Prior to placing pavement structural section, the subgrade shall be prepared in accordance with the recommendations in "Site Preparation and Earthwork" section.

Based on the laboratory test results, we assumed the R-value of 50 for the on-site soils. The base material should be Caltrans Class 2 aggregate base. Recommendations for the flexible pavement structural design is provided in the following table.

Traffic Area	Light Vehicle Parking Lot (TI=5)	Truck Load Service Lane (TI=7)
Asphalt Concrete (AC) Thickness	3 inches	4 inches
Aggregate Base* (AB) Thickness	4 inches	6 inches

*The aggregate base should be compacted to at least 95% relative compaction.

As an alternative, a rigid pavement section consisting of Portland Cement Concrete (PCC) can be used. Recommendations for the rigid concrete pavement design is provided in the following table.

Traffic Area	Light Vehicle Parking Lot (TI=5)	Truck Load Service Lane (TI=7)
Concrete Thickness	5 inches	6 inches
Compacted Aggregate Base	2 inches	4 inches
Contraction Joint Spacing	10 ft.	10 ft.
Depth of Joint	1 inch	
Compressive Strength of Concrete @ 28 days	3500 psi	
Modulus of Rupture of Concrete @ 28 days	550 psi	

Concrete slabs should be separated from other structures or fixed objects within or abutting the paved area by isolation joints. This serves to offset the effects of the differential horizontal and vertical movements of the structures which may fracture the concrete slab. When isolation joints are located where wheel and other loads are applied, the pavement edge at the joint should be thickened by 20 percent or two inches, whichever is greater.

A joint filler should be applied to any new isolated joints within the concrete slab. The joint filler should extend through the slab thickness and should be recessed below the pavement surface so that the joint can be sealed with joint sealant material. The types of joint filler materials recommended include bituminous mastic, bituminous impregnated cellulose or cork, sponge rubber, or resin-bound cork. Joint filler materials should be installed in accordance with the recommendations of the manufacturer.

5.15. Drainage Protection

All pad and roof drainage should be collected and transferred to the street or an approved area in non-erosive drainage devices. Drainage should not be allowed to pond on the pad or against any foundation or retaining wall.

We recommend a minimum 5 percent slope away from the building foundations for a horizontal distance of 3 feet be established for any landscape areas immediately adjacent to the building foundations. In addition, we recommend a minimum 2 percent slope away from the building foundations be established for any impervious surfaces immediately adjacent to the building foundations for a minimum horizontal distance of 10 feet. Lastly, we recommend the installation of roof gutters and downspouts which deposit water into a buried drain system be installed instead of discharging surface water into planter areas adjacent to structures.

It is the responsibility of the contractor and ultimately the developer and/or property owner to insure that all drainage devices are installed and maintained in accordance with the approved plans, our recommendations, and the requirements of all applicable municipal agencies. This includes installation and maintenance of all subdrain outlets and surface drainage devices.

It is recommended that watering be limited or stop altogether during the rainy season when little irrigation is required. Over-saturation of the ground can cause major subsurface damage. Maintaining a proper drainage system will minimize the shrink/swell potential of sub-soils.

5.16. Pre-Construction Survey

We recommend that the client's representative prepare a pre-construction survey prior to site development. The pre-construction survey should document existing site conditions and performance of offsite structures (i.e. property line block walls and fences) prior to construction (where applicable). If adverse conditions are encountered during excavations, additional recommendations may be necessary.

6. GENERAL INFORMATION

Accuracy of Provided Drawings

LK Geotechnical Engineering, Inc. (LKGE) investigation, analysis, findings and/or recommendations of a site, with respect to the proposed improvements, are often dependent on several factors or information provided to LKGE by the client and/or the client's representative(s). Provided information or Drawings may include topographic surveys, architectural drawings, engineering plans and/or grading plans. It is LKGE's assumption that the provided Drawings, to be utilized as part of our investigation, accurately depict topographic conditions, existing and/or proposed structures and grades, property lines, easements, etc. It should be understood that LKGE's use of the provided Drawings does not mean or confirm that the provided Drawings are accurate. If revisions are made to the site Drawings, these documents should be submitted to LKGE as soon as possible. Additional exploration, analysis and/or revised recommendations may be necessary depending upon our review of the revised Drawings, etc.

Environmentally Hazardous or Non-Hazardous Materials

It should be clearly understood that environmental geologic services are not within the scope of this study. Environmental geologic services may include the detection of hazardous or non-hazardous materials, wastes or substances existing on the site from research of available records, exploratory methods, sampling, laboratory analysis, etc. or the recommended treatment and/or disposal of these materials, wastes or substances. If hazardous or non-hazardous materials, wastes or substances are revealed by supplementary investigations or studies or are encountered during construction or grading operations, appropriate environmental investigation(s) and analysis may be required. In this case, mitigation and/or treatment of hazardous or non-hazardous materials, wastes or substances may be necessary. It should be understood that the property owner and potential future property owner(s) shall acknowledge and/or indemnify that LKGE has neither created or contributed to the creation or existence of any hazardous or non-hazardous materials, wastes or substances or otherwise dangerous conditions at the site. All site generated hazardous or non-hazardous materials, wastes or substances are the possession and responsibility of the property owner and potential future property owner(s).

Plan Review

This report is based on the development plans provided to our office. We recommend that the client's representative(s) provide a complete set of the construction, building and/or grading plans to our office for review and/or approval, prior to initiation of construction. Any change in the scope of the project, from that addressed herein, may require additional geotechnical services by LKGE. Formal plans should be reviewed and approved by LKGE, prior to initiation of construction. The appropriate government reviewing agency may require that the building and/or grading plans be signed by a licensed geotechnical engineer and/or a licensed engineering geologist, prior to initiation of construction. The plan review fees will be billed in accordance with our current fee schedule.

Government Reviewing Agency and Additional Geotechnical Services

This report is intended for submittal to the appropriate governmental authorities that control the issuance of necessary permits. The client or client's representative should submit the geotechnical reports to the appropriate government reviewing agency, unless specific arrangements are made with this office. It should be noted that the government reviewing agency has various fees for reviewing geotechnical reports, the fees for which are not included within our scope of work. If applicable, the report submittal fees will be billed in accordance with our current fee schedule. All geotechnical and/or engineering geologic aspects of the proposed development are subject to review and approval by the government reviewing agency. It should be understood that the government reviewing agency may approve or deny any portion of the proposed development, which may require additional geotechnical services by this office. Additional geotechnical services may include review responses, supplemental letters, plan review and signature, construction observations, meetings, etc. The fees for generating additional reports, letters, exploration, analysis, etc. will be billed on a time and material basis, per our previously approved work acknowledgment or a pre-determined, agreed fee.

Site Observations during Construction

The appropriate government reviewing agency or building department requires that the geotechnical consultant of record provide site observations during grading and construction. The purpose of the site inspections is to verify site geotechnical and/or engineering geologic conditions and conformance with the intensions of the recommendations addressed herein. Although certain geotechnical and/or engineering geologic observations may not be required by the building department, the more site inspections typically reduce the risk for future problems. It is the client's or the client's representative(s) responsibility to contact the appropriate building department or building official regarding approval for all required inspections. Following is a general list of inspections required by this firm.

a) Pre-grade meetings
b) Foundation excavations for all structures (residence, retaining walls, pools, etc.)
c) Temporary excavations/shoring
d) Bottom excavations for primary and/or secondary structural fills
e) Keyway excavations
f) Compaction testing for primary and secondary structural fills
g) Compaction testing for retaining wall backfill and utility trenches

h) Subdrains for retaining walls, swimming pools or ponds

It is recommended that all foundation excavations be approved by this firm prior to placing forms, steel reinforcement and/or concrete. Any fill which is placed at the site should be tested for compaction, especially if used for engineering purposes. All cut-slopes and temporary excavations should be observed by a representative of this firm. Should the observation reveal any unforeseen hazard, appropriate action will be recommended.

Representatives of LKGE will observe work in progress, perform tests on soil, and observe excavations and trenches. Excavation bottom observations should be requested before the placement of subdrains or compacted fill. The approved plans and permits should be on the job site and available for review by this office. The site inspections during construction will be billed on a time and material basis in accordance with our current fee schedule.

It is advised that the client contact LKGE at least 1 week in advance of commencing constructing and/or grading to allow for contractual agreements for geotechnical services during the construction phases of your project. Please advise this office at least 48 hours prior to any required verification or approval.

Construction Site Maintenance

It is the responsibility of the contractor to maintain a safe construction site and for the safe operation of all equipment. When excavations exist on the site, the areas should be secured by placing appropriate coverings, fencing, warning signs, etc. All excavations should be properly covered and secured. Excavation stock piles or spoil piles should either be removed from the site or be property compacted, in accordance with recommendations presented herein. Fill temporarily stock-piled on the site should be placed in stable or approved areas and away from slopes, excavations or improvements. Earth materials generated from grading should not be disposed of along slopes or other unapproved locations. Workers should not be allowed to enter any un-shored excavations over 5-feet in depth, or depth specified herein. Water should not be allowed to saturate open footing trenches. Temporary erosion control measures and proper drainage control should be followed, especially during the rainy season.

It should be understood that the project contractor or others shall supervise and direct the work and they shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during the performance of the work.

Periodic or continuous observation by LKGE is not intended to include verification of dimensions or review of the adequacy of the contractor's safety measures in, on, or near the construction site.

Final As-built Reports

During or upon completion of the project or grading, the appropriate government reviewing agency or building department often requires interim or final as-built geotechnical reports prepared by this firm to document that foundations and/or fill placement were conducted per the recommendations addressed herein and/or the approved building and/or grading plans. Interim or final geotechnical reports are often required for placement of primary or secondary structural fill, retaining wall backfill, slope repairs, pile observations, etc. The interim or final geotechnical reports will be billed on a time and material basis, in accordance with our current fee schedule.

7. LIMITATIONS

This report has been compiled for the exclusive use of the addressee(s) of the report, and their authorized representatives. It shall not be transferred to, or used by, a third party, to another project or applied to any other project on this site, other than as described herein, without the written consent and/or thorough review by this firm.

This report and the exploration are subject to the following conditions. Please read this section carefully, it limits our liability.

This report is based on the development plans provided to our office. In the event that any significant changes (from those discussed herein) in the design and/or location of the proposed structure(s) are planned, the conclusions and recommendations contained in this report may not be considered valid unless the changes are reviewed by LKGE and the conclusions and recommendations are modified and/or approved by this firm after such review.

The conclusions and recommendations contained herein are based on the findings and observations made at the test pit, trench and/or boring locations. While no great variations in fill, soil and/or bedrock conditions are anticipated, if conditions are encountered during construction which appears to differ from those disclosed herein, this firm should be notified immediately, so as to consider the need for modifications or revised geotechnical recommendations. Compliance with the design concepts, specifications or recommendations during construction requires our review during construction which pertains to the specific recommendations contained herein.

The subsurface conditions, excavations, characteristics and geologic structure described herein and shown on the enclosed cross-section(s) have been projected from individual test pits, trenches and/or borings placed on the subject property. The subsurface conditions and excavation characteristics, and geologic structure shown should in no way be construed to reflect any variations which may occur between or away from these exploratory excavations. The projection of geologic data is based on available information and experience and should not be considered exact.

It should be noted that fluctuations in the level of the groundwater may occur at the site due to variations in rainfall, temperature, irrigation, water line leaks, sewage disposal and/or other factors not evident at the time of measurements reported herein. LKGE assumes no responsibility for groundwater variations which may occur across the site. High groundwater levels can be extremely hazardous and saturation of earth materials can cause subsidence, settlement and/or slippage at the site.

The intent of this report is to advise our client and/or client's representative(s) on soils and engineering geologic conditions at the site with respect to the proposed improvements. Implementation of the advice presented in the Recommendations Section of this report is intended to reduce the risk associated with the proposed project and should not be construed to imply total performance of the project. It should be understood that geotechnical consulting and the contents of this report are not perfect. Any errors or omissions noted by any party reviewing this report, and/or any other geotechnical aspect of this project, should be reported to this firm as soon as possible.

Geotechnical engineering is characterized by uncertainty or is described as an inexact science or art. The conclusions and recommendations presented herein are partly based on; 1) the evaluation of technical data gathered by this firm, 2) standard of practice, 3) experience, and, 4) professional judgment. The conclusions and recommendations presented herein should be considered advice. Other geotechnical consultants could arrive at different conclusions and recommendations. This report has been prepared in accordance with generally accepted practice. No warranties, either expressed or implied, are made as to the professional advice provided under the terms of the agreement and included in this report.

It should be understood that LKGE's services are limited to the disciplines of soils engineering and/or engineering geology. While LKGE may refer various professionals or outside services, working in associated disciplines, to their client's or client's representatives, LKGE is not responsible for the performance of work by third parties, which may include, but are not limited to, surveyors, civil or structural engineers, architects, contractors, etc. It should be clearly understood that LKGE is not a licensed surveyor, architect, civil or structural engineer or contractor. LKGE's periodic or continuous inspection(s) of geotechnical work on an LKGE project shall not relieve third party professionals of their responsibility to perform their work in accordance with the applicable and/or approved geotechnical reports, plans, specifications, safety requirements, etc. It should be understood that LKGE's periodic or continuous inspection(s) of geotechnical work on an LKGE project does not imply that LKGE is observing, verifying and/or approving all site work. LKGE will only make site inspections, per our approved work authorization agreement(s) and/or related to the appropriate geotechnical field services provided by LKGE and will not relieve others of their professional responsibilities.

Should the project be delayed beyond the period of one year after the date of this report, the site should be observed and the report reviewed to consider possible changed conditions.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to assure that the information and recommendations contained herein are called to the attention of the designers and builders for the project.

8. REFERENCES

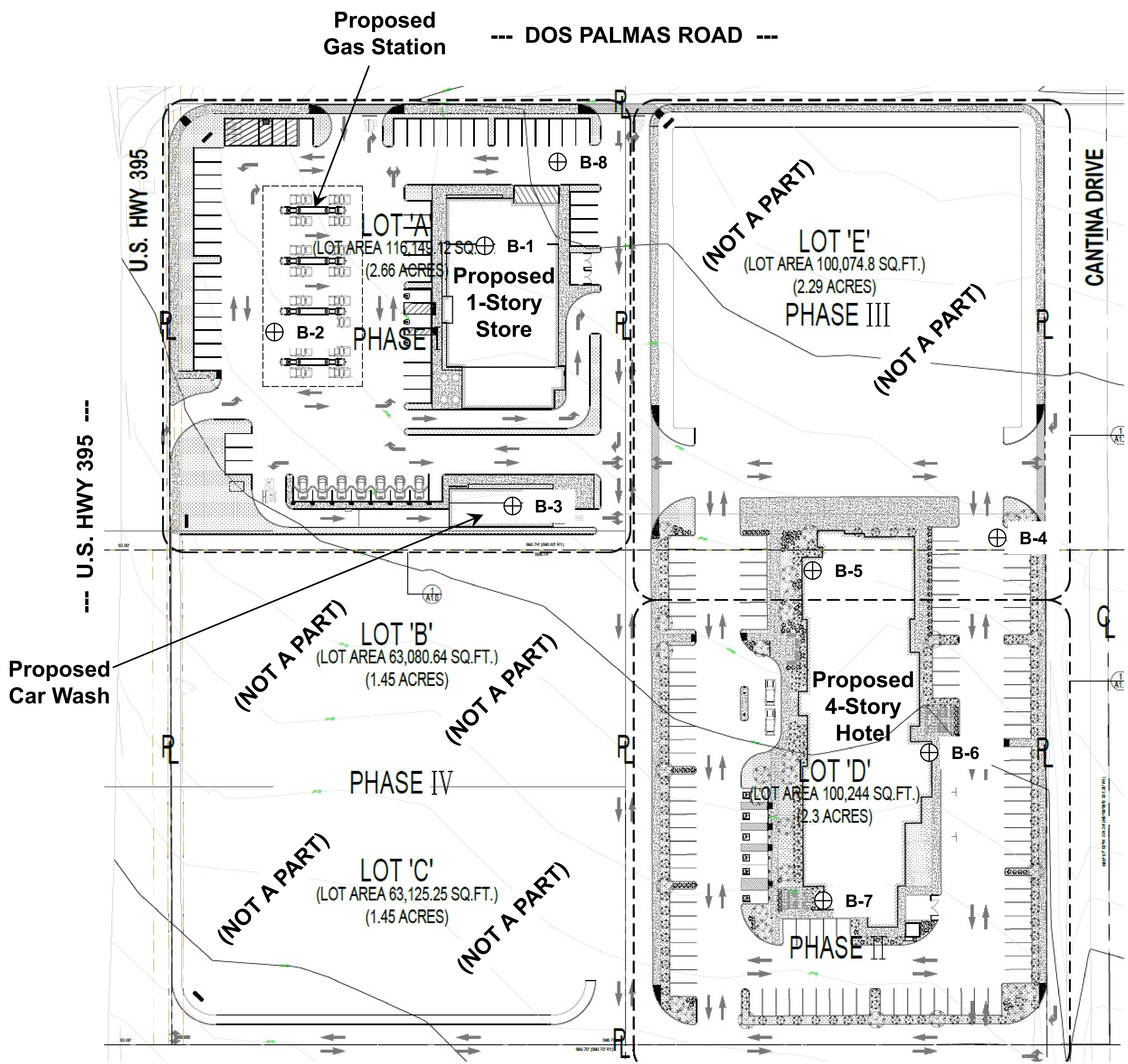
California Geological Survey, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117A, 108 pp.

Dibblee, T.W., 1960, Preliminary Geologic Map of the Victorville Quadrangle, USGS, Scale 1”=2,000’.

Morton, D.M. and Miller, F.K., 2003, Preliminary Geologic Map of the San Bernardino 30’x60’ Quadrangle, California, Scale: 1:100,000.

San Bernardino County, 2007, General Plan

PLATES



EXPLANATION

⊕ B-1 Boring Location

LK Geotechnical

LK Geotechnical Engineering, Inc.
10120 National Blvd., Los Angeles, CA 90034
Tel: 310.866.8977; Fax: 310.204.2459

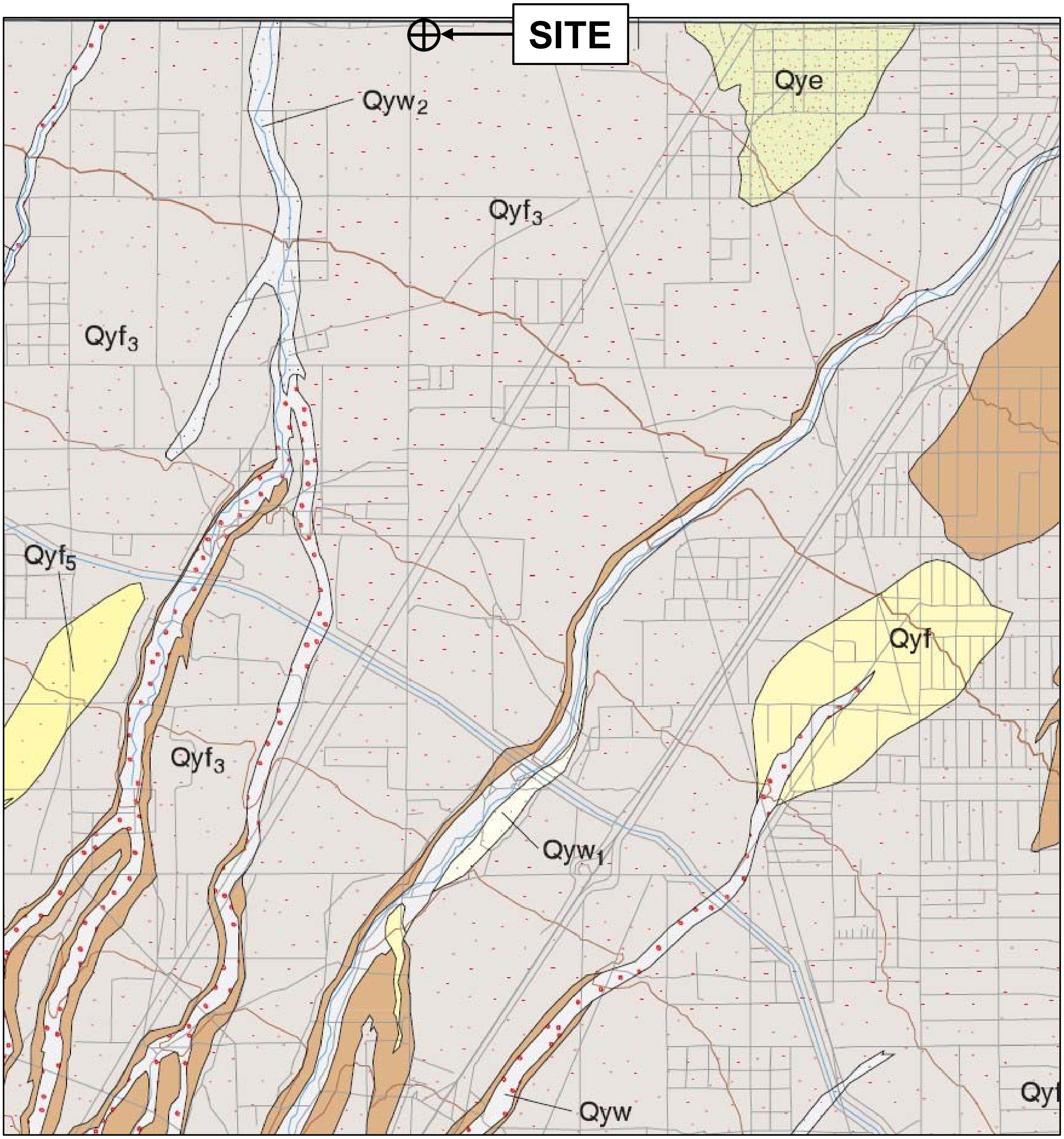
Scale: 1" = 80'

0 80 160

Site Plan
& Geotechnical Exploration Map

Southeast Corner of U.S. Hwy 395 & Dos Palmas Road
Victorville, California

June 2021	Project 21-0423	Plate 1



Reference: Morton D.M. & Miller, 2003, Preliminary Geologic Map of the San Bernardino 30'x60' Quadrangle.

LK Geotechnical

LK Geotechnical Engineering, Inc.
10120 National Blvd., Los Angeles, CA 90034
Tel: 310.866.8977; Fax: 310.204.2459

Regional Geologic Map

SE Corner of Highway 395 & Dos Palmas Road
Victorville, California

June 2021	Project 21-0423	Plate 2

Appendix A
Field Exploration

We performed a field exploration consisting of logging of eight (8) exploratory soil borings on May 17, 2021. The exploration was performed using an 8-inch diameter hollow-stem auger drill rig. The borings were advanced to a maximum depth of approximately 31 feet below the existing grade. The approximate locations of geotechnical exploration are shown on Plate 1.

The Boring Log is presented on Plates A-1 through A-8. The Boring Logs describe the earth materials encountered, samples obtained, and show the field and laboratory tests performed. The borings were logged by an engineer or geologist using the Unified Soil Classification System. Drive and bulk samples of representative earth materials were obtained from the borings and delivered to the geotechnical laboratory for testing.

A California modified sampler was used to obtain drive samples of the soil encountered. This sampler consists of a 3-inch outside diameter (O.D.), 2.4-inch inside diameter (I.D.) split barrel shaft that was driven a total of 6-inches into the soil at the bottom of the boring. The soil was retained in brass rings for laboratory testing. Additional soil from each drive remaining in the cutting shoe was usually discarded after visually classifying the soil.

In addition, a Standard Penetration Test (SPT) sampler was used to obtain drive samples of soil encountered. SPT sampler consists of a 2-inch O.D., 1.4-inch I.D. split barrel shaft that is advanced into the soil at the bottom of the drilled hole a total of 18 inches. Soil samples obtained by the SPT were retained in plastic bags.

Upon completion of the geologic and geotechnical logging, the borings were backfilled with soil from the cuttings.

Percolation Testing

Percolation testing was performed using the falling head boring test method in accordance with the San Bernardino County Technical Guidelines. The water level was measured to the nearest tenth of a foot and converted to inches in the calculation. The results of the percolation tests are tabulated below and the raw data is attached.

Recommended Design Infiltration Rate

Boring No.	Total Depth of Boring (ft)	Depth of Testing Zone (ft)	Soil Description of Testing Zone	Infiltration Rate (inch/hour)
B-4	11	5 – 10	Silty SAND	3.3
B-8	11	5 – 10	Silty SAND	1.9

LK Geotechnical

BORING LOG

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-1
	DRILLING METHOD Hollow Stem Auger	**DATE DRILLED** 5/17/2021
SURFACE ELEVATIOIN (ft) N/A	**BOREHOLE DIAMETER** 8 inches	**DRILLER** Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft) Not encountered	**HAMMER TYPE & EFFICIENCY** Automatic Trip/Eri = 81%	**LOGGED BY** SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
0						**Alluvium (Qa)**	
						Sandy SILT; gray; medium dense; dry	
5	Cal. Mod. Sample	7, 7	1.1	114.0	SM	Silty SAND; medium dense, dry, brown, well-graded	C
10	SPT Sample	6, 7, 9			SM	Silty SAND; medium dense, brown, poorly graded, dry	
15	Cal. Mod. Sample	15, 17	2.2	115.5	SM	Silty SAND, dense, brown, dry, poorly graded	
						Total Depth= 16 ft	
20							
25							

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

LK Geotechnical

BORING LOG

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-2
	DRILLING METHOD Hollow Stem Auger	**DATE DRILLED** 5/17/2021
SURFACE ELEVATIOIN (ft) N/A	**BOREHOLE DIAMETER** 8 inches	**DRILLER** Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft) Not encountered	**HAMMER TYPE & EFFICIENCY** Automatic Trip/Eri = 81%	**LOGGED BY** SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
0	Bulk					**Alluvium (Qa)**	
					ML/SM	Sandy SILT to Silty SAND; gray; loose to medium dense; dry	CR
5	SPT	4 6 6			SM	Silty SAND; light brown; medium dense; dry; poorly graded	
10	Cal. Mod.	15 15	3.3	106.8	SM	Silty SAND; light brown; medium dense; dry; well graded	
15	SPT	5 9 13			SM	Silty SAND; light brown; medium dense; dry; poorly graded	
20	Cal. Mod.	50 9"	5.1	99.8	SM	Silty SAND; white/brown; dense; dry; poorly graded	
						Total Depth= 21 ft	
25							

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

BORING LOG

LK Geotechnical

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-3
	DRILLING METHOD Hollow Stem Auger	**DATE DRILLED** 5/17/2021
SURFACE ELEVATIOIN (ft) N/A	**BOREHOLE DIAMETER** 8 inches	**DRILLER** Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft) Not encountered	**HAMMER TYPE & EFFICIENCY** Automatic Trip/Eri = 81%	**LOGGED BY** SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
0						**Alluvium (Qa)**	
					ML	Sandy SILT; gray; medium dense; dry	
5	Cal. Mod. Sample	10 10	1.1	114.3	SM	Silty SAND; brown; medium dense; moist; poorly graded	DS
10	SPT Sample	7 8 9			SM	Silty SAND; light brown/brown; medium dense; dry	
15	Cal. Mod. Sample	19 19	1.5	115.9	SM	Silty SAND; light brown/brown; medium dense; dry	
						Total Depth= 16 ft	
20							
25							

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

PLATE NO. A-3

BORING LOG

LK Geotechnical

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-4
	DRILLING METHOD	**DATE DRILLED**
	Hollow Stem Auger	5/17/2021
SURFACE ELEVATIOIN (ft)	**BOREHOLE DIAMETER**	**DRILLER**
N/A	8 inches	Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft)	**HAMMER TYPE & EFFICIENCY**	**LOGGED BY**
Not encountered	Automatic Trip/Eri = 81%	SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
0						**Alluvium (Qa)**	
						Sandy SILT; gray; medium dense; dry	
5	Cal. Mod.	12 12	2.4	115.7	SM	Silty SAND; medium dense; poor/well graded	FC 20.3%
10	Cal. Mod.	13 13	1.7	116.2	SM	Silty SAND; medium dense; poor graded with few 1/4" gravel	DS
						Total Depth= 11 ft	
15							
20							
25							

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

BORING LOG

LK Geotechnical

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-5
	DRILLING METHOD Hollow Stem Auger	**DATE DRILLED** 5/17/2021
SURFACE ELEVATIOIN (ft) N/A	**BOREHOLE DIAMETER** 8 inches	**DRILLER** Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft) Not encountered	**HAMMER TYPE & EFFICIENCY** Automatic Trip/Eri = 81%	**LOGGED BY** SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
0						**Alluvium (Qa)** Sandy SILT; gray; medium dense; dry	
5	Cal. Mod. Sample	12 12	1.4	111.9	SM	Silty SAND; medium dense; dry; medium/poor grade	C
10	SPT Sample	13 13			SM	Silty SAND; medium dense; dry; mid/poor grade	
15	Cal. Mod. Sample	15 16	1.7	111.6	SM	Silty SAND, medium dense; dry; mid-poor grade	
20	SPT Sample	16 28 31			SM	Silty SAND; dense; moist; well graded	
						Total Depth= 21.5 ft	
25							

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

LK Geotechnical

BORING LOG

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-6
	DRILLING METHOD	**DATE DRILLED**
	Hollow Stem Auger	5/17/2021
SURFACE ELEVATIOIN (ft)	**BOREHOLE DIAMETER**	**DRILLER**
N/A	8 inches	Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft)	**HAMMER TYPE & EFFICIENCY**	**LOGGED BY**
Not encountered	Automatic Trip/Eri = 81%	SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
0	Bulk					**Alluvium (Qa)**	
						Sandy SILT; gray; medium dense; dry	CR
5	SPT	7 8 8			SM	Silty SAND; medium dense; dry; well graded	
10	Cal. Mod.	18 26	2.7	117.7	SM	Silty SAND; medium dense; dry; poorly graded	C
15	SPT	12 16 13			SM	Silty SAND; medium dense; moist; poorly graded	
20	Cal. Mod.	50 9"	2.6	115.8	SP-SM	SAND; dense; moist; well graded	
25	SPT	13 17 21			SM	Silty SAND; medium dense; moist; poorly graded	

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

BORING LOG

LK Geotechnical

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-6
	DRILLING METHOD	**DATE DRILLED**
	Hollow Stem Auger	5/17/2021
SURFACE ELEVATIOIN (ft)	**BOREHOLE DIAMETER**	**DRILLER**
N/A	8 inches	Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft)	**HAMMER TYPE & EFFICIENCY**	**LOGGED BY**
Not encountered	Automatic Trip/Eri = 81%	SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
						Continued…	
25							
30	Cal. Mod. Sample	50 8"	7.4	109.2	SM	Silty sand; dense; moist;	C
						Total Depth= 31 ft	
35							
40							
45							
50							

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

Geotechnical

BORING LOG

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-7
	DRILLING METHOD Hollow Stem Auger	**DATE DRILLED** 5/17/2021
SURFACE ELEVATIOIN (ft) N/A	**BOREHOLE DIAMETER** 8 inches	**DRILLER** Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft) Not encountered	**HAMMER TYPE & EFFICIENCY** Automatic Trip/Eri = 81%	**LOGGED BY** SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
0						**Alluvium (Qa)**	
					SM	Silty SAND; gray; medium dense; dry	
5	Cal. Mod. Sample	5 12	1.0	110.4	SM	Silty SAND; medium dense; dry; well graded	C
10	SPT Sample	8 11 11			SM	Silty SAND; medium dense; dry; well graded	
15	Cal. Mod. Sample	20 25	1.9	117.1	ML	Sandy SILT; medium dense; moist; well graded	
						Total Depth= 16 ft	
20							
25							

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

LK Geotechnical

BORING LOG

PROJECT ADDRESS	PROJECT NO.	HOLE ID
SE Corner of Dos Palmas Road and Highway 395 Victorville, CA	21-0423	B-8
	DRILLING METHOD: Hollow Stem Auger	DATE DRILLED: 5/17/2021
SURFACE ELEVATIOIN (ft): N/A	BOREHOLE DIAMETER: 8 inches	DRILLER: Charlies Soil Sampling Drilling
GROUNDWATER DEPTH (ft): Not encountered	HAMMER TYPE & EFFICIENCY: Automatic Trip/Eri = 81%	LOGGED BY: SC & SL

DEPTH (ft)	SAMPLE	BLOWS PER 6"	MOISTURE (%)	DRY UNIT WT (pcf)	USCS	DESCRIPTION	LAB TEST
0						**Alluvium (Qa)**	
						Silty SAND; gray; medium dense; dry	R
5	Cal. Mod. Sample	10 11	1.3	111.9	SM	Silty sand; brown; medium dense; no cementation	FC
10	Cal. Mod. Sample	25 36	5.6	108.3	SM/ML	Silty SAND to sandy SILT; light brown; dense; dry; medium cementation	
						Total Depth= 11 ft	
15							
20							
25							

LEGEND
- Bulk Sample
- Cal. Mod. Sample
- SPT Sample
- Groundwater Level

ACRONYM : FC: fine content; PA: particle size analysis; DS: direct shear; C: consolidation; PI: Atterberg limits; EI: expansive index; CR: corrosivity; CP: compaction curve; R: R-value

NOTES :

* Borehole was backfilled with soil cuttings.

Infiltration Rate Calculation Sheet

Project :	SE HWY 395 & Dos Palmas		Project No. :	21-0406		Date :	5/17/2021
	Test Hole No.:	B-4	Tested by :	SL		Temp. (°F):	68
	Depth of Test Hole, D_T (in):	120	USCS Soil Classification :		SM		
		Test Hole Dimension (inches)			Length	Width	
	Diameter (if round) (inches) =	8	Sides (if rectangular) =				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	7:35 AM	8:00 AM	25	78.0	115.2	37.2	Y
2	8:05 AM	8:30 AM	25	101.0	115.2	14.2	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	8:35 AM	8:45 AM	10	62.40	32.04	30.36	7.4
2	8:45 AM	8:55 AM	10	32.04	16.20	15.84	7.3
3	8:55 AM	9:05 AM	10	16.20	8.16	8.04	6.8
4	9:12 AM	9:22 AM	10	51.60	27.60	24.00	6.9
5	9:22 AM	9:32 AM	10	27.60	14.40	13.20	6.9
6	9:33 AM	9:43 AM	10	52.32	28.92	23.40	6.6
7	9:43 AM	9:53 AM	10	28.92	16.08	12.84	6.3

Recommended Infiltration Rate = Min. Tested Rate/2 = 3.3 inch /hr

Infiltration Rate Calculation Sheet

Project :	SE HWY 395 & Dos Palmas		Project No. :	21-0406		Date :	5/17/2021
	Test Hole No.:	B-8	Tested by :	SL		Temp. (°F):	68
	Depth of Test Hole, D_T (in):	120	USCS Soil Classification :		SM		
Test Hole Dimension (inches)					Length	Width	
Diameter (if round) (inches) =		8	Sides (if rectangular) =				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	7:50 AM	8:15 AM	25	50.4	106.3	55.9	Y
2	8:20 AM	8:45 AM	25	63.8	110.4	46.6	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	9:00 AM	9:10 AM	10	56.40	25.80	30.60	8.5
2	9:10 AM	9:20 AM	10	25.80	17.04	8.76	4.5
3	9:20 AM	9:30 AM	10	17.04	11.40	5.64	4.2
4	10:00 AM	10:10 AM	10	57.60	25.92	31.68	8.7
5	10:10 AM	10:20 AM	10	25.92	18.36	7.56	3.8
6	10:21 AM	10:31 AM	10	52.32	27.60	24.72	7.1
7	10:31 AM	10:41 AM	10	27.60	19.32	8.28	3.9
8	10:41 AM	10:51 AM	10	19.32	13.44	5.88	3.8

Recommended Infiltration Rate = Min. Tested Rate/2 = 1.9 inch /hr

Appendix B
Laboratory Testing

Representative soil samples collected from our field exploration were delivered to the EGLab, Inc. of Arcadia, California for testing, and to evaluate relevant engineering properties. Based on our review of the laboratory data, LKGE concurs with and accept the laboratory testing results performed by EGLab, Inc.

Laboratory Moisture Content and Density Tests

The moisture content and dry densities of selected driven samples obtained from the exploratory borings were evaluated in general accordance with the latest version of ASTM D 2937. The results are shown on the attached EGL report.

Direct Shear Test

Direct shear testing was conducted on representative soil samples to determine their shear strength in accordance with the ASTM D3080. The sample was saturated under normal load before testing. For each test, three samples were placed, one at a time, into the test apparatus and subjected to a range of normal loads appropriate for the anticipated conditions. The samples were then sheared at a constant shear rate of 0.01-inches per minute. Shear deformation was recorded until a maximum of about 0.3 inches of horizontal displacement was achieved. Ultimate shear strengths for each sample were selected from the shear stress-displacement data. Based on the test data, the stress generally becomes constant beyond 0.2 inch of displacement and it is our opinion that the samples were sheared to its ultimate strength status. The shear strength parameters are presented in the following table and on the attached EGL report.

Sample Location	Depth (ft.)	Soil Type	Soil Description	Ultimate Strength Parameters	
				Cohesion (psf)	Friction Angle (degrees)
B-3	5	Qa	Silty SAND	106	34
B-4	10	Qa	Silty SAND	112	35

Consolidation Test

Consolidation testing was performed on representative soil samples under consolidated drained conditions per the ASTM D2435 Method. Axial loads were carried to a maximum of 8,000 psf. To hasten consolidation, investigate the collapsibility potential and similar possible adverse field conditions, water was added to an axial load of 2,000 psf. Compressibility of the soils within the zone of significant stress was investigated and the results are provided on the attached EGL report. The collapse/swell potential is tabulated below:

Sample Location	Depth (ft.)	Soil Type	Soil Description	Percent of Collapse (-)/ Swell (+)	Collapse Index
B-1	5	Qa	Silty SAND	-0.8	slightly
B-5	5	SM	Silty SAND	-2.4	moderate
B-6	10	SW-SM	Silty SAND	-0.4	slightly
B-7	5	SM	Silty SAND	-1.8	slightly

Corrosivity Tests

Soil pH and resistivity tests were performed on a representative soil sample in general accordance with the latest version of California Test Method 643. The chloride content of the selected sample was evaluated in general accordance with the latest version of California Test Method 422. The sulfate content of the selected samples was evaluated in general accordance with the latest version of California Test Method 417. The test results are presented in the attached EGL report.

R-value Test

R-value testing was performed on representative soil samples under exudation pressures per the Caltrans Test 301 Method. The testing data is presented in the attached EGL report and the results are tabulated below:

Sample Location	Depth (ft)	Soil Description	R-value
B-1 to B-8	0 – 5	Silty SAND	61

EGLAB, INC.,
11819 Goldring Road, Unit D, Arcadia, CA 91006
Ph: 626-263-3588; Fax: 626-263-3599; Email: ryan@eglab.com

May 26, 2021

LK Geotechnical Engineering, Inc.
10120 National Boulevard
Los Angeles, California 90034

Attn: Mr. Sean Lin

Project Name: SE Dos Palmas Road and HWY 395, Victorville
Project No: 21-0423
EGL Job No. 21-122-042

Dear Mr. Lin:

We have completed the testing program conducted on samples from the above project. The tests were performed in accordance with testing procedures as follows:

TEST	METHOD
Moisture & Dry Density	ASTM D2937
Consolidation	ASTM D2435
Direct Shear	ASTM D3080
% Passing #200 Sieve	ASTM D1140
R-Value	CT-301
Corrosion	CT-417,422,643

Enclosed is the Summary of Test Results.

We appreciate the opportunity to provide testing services to LK Geotechnical Engineering, Inc. Should you have any questions, please call the undersigned.

Sincerely yours,
EGLAB, Inc.

Ryan Jones, GE
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
RYAN KEITH JONES
No. 2852
Exp.
GEOTECHNICAL
STATE OF CALIFORNIA

SUMMARY OF LABORATORY TEST RESULTS

PROJECT NAME: SE Dos Palmas Road and HWY 395, Victorville

EGLAB JOB NO.: 21-122-042

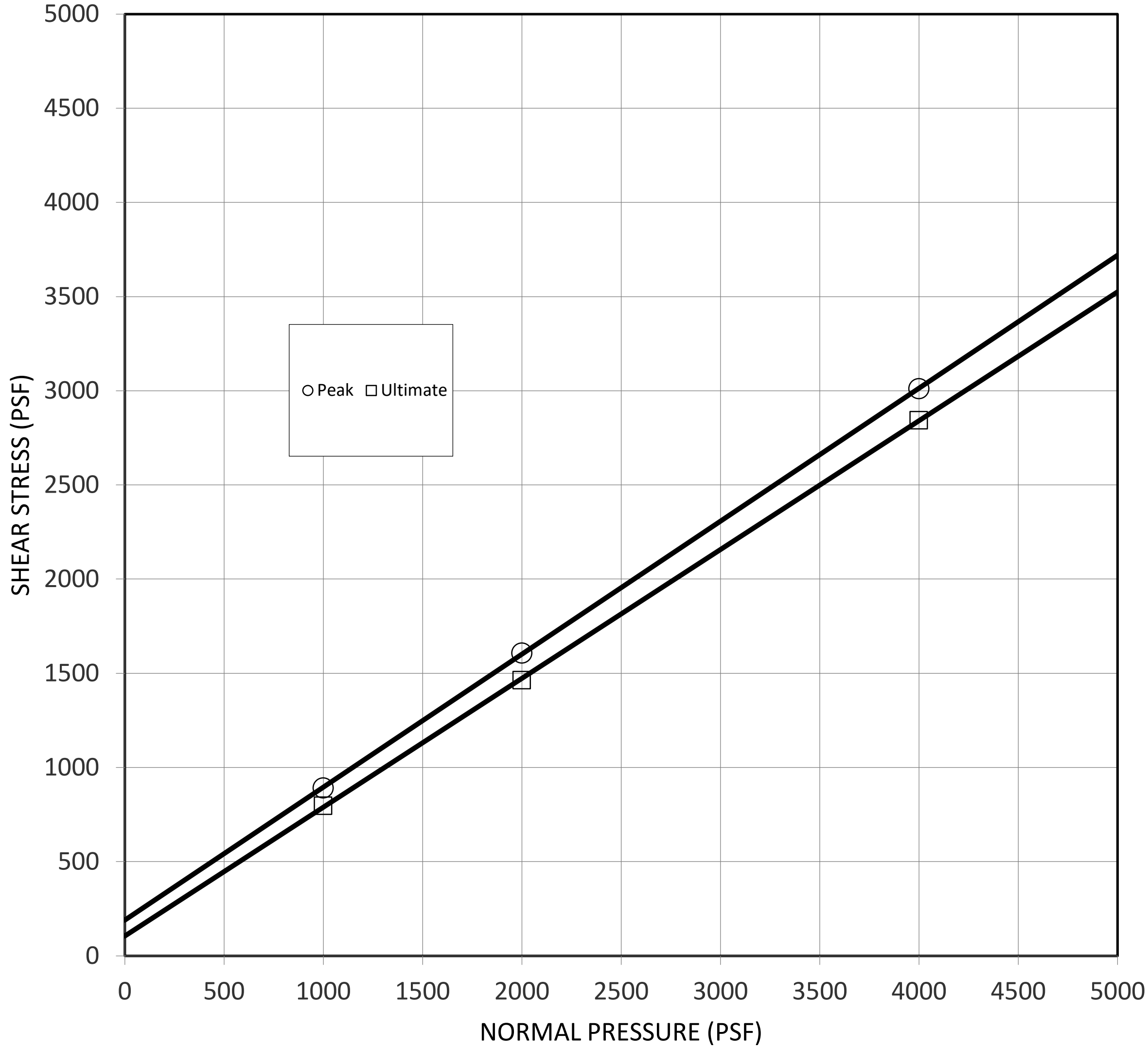
PROJECT NO.: 21-0423

CLIENT: LK Geotechnical

DATE: 5/25/2021

SUMMARIZED BY: JT

BORING NO.	SAMPLE NO.	DEPTH (ft)	MOISTURE CONTENT ASTM D2216 (%)	DRY DENSITY ASTM D2937 (PCF)	%PASSING #200 ASTM D1140 (%)
B-1	N/A	5.0	1.1	114.0	
B-1	N/A	15.0	2.2	115.5	
B-2	N/A	10.0	3.3	106.8	
B-2	N/A	20.0	5.1	99.8	
B-3	N/A	5.0	1.1	114.3	
B-3	N/A	15.0	1.5	115.9	
B-4	N/A	5.0	2.4	115.7	20.3
B-4	N/A	10.0	1.7	116.2	
B-5	N/A	5.0	1.4	111.9	
B-5	N/A	15.0	1.7	111.6	
B-6	N/A	10.0	2.7	117.7	
B-6	N/A	20.0	2.6	115.8	
B-6	N/A	30.0	7.4	109.2	
B-7	N/A	5.0	1.0	110.4	
B-7	N/A	15.0	1.9	117.1	
B-8	N/A	5.0	1.3	111.9	6.3
B-8	N/A	10.0	5.6	108.3	



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
B-3	N/A	5.0	Ring	SW-SM	○	190	35
					□	106	34

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)	γ_d (pcf)	S (%)
1000	1.1	17.3	113.0	95
2000	1.1	17.1	113.8	96
4000	1.1	15.7	114.9	91

EGLAB, INC.

Project Name:
SE Dos Palmas Road and HWY 395, Victorville

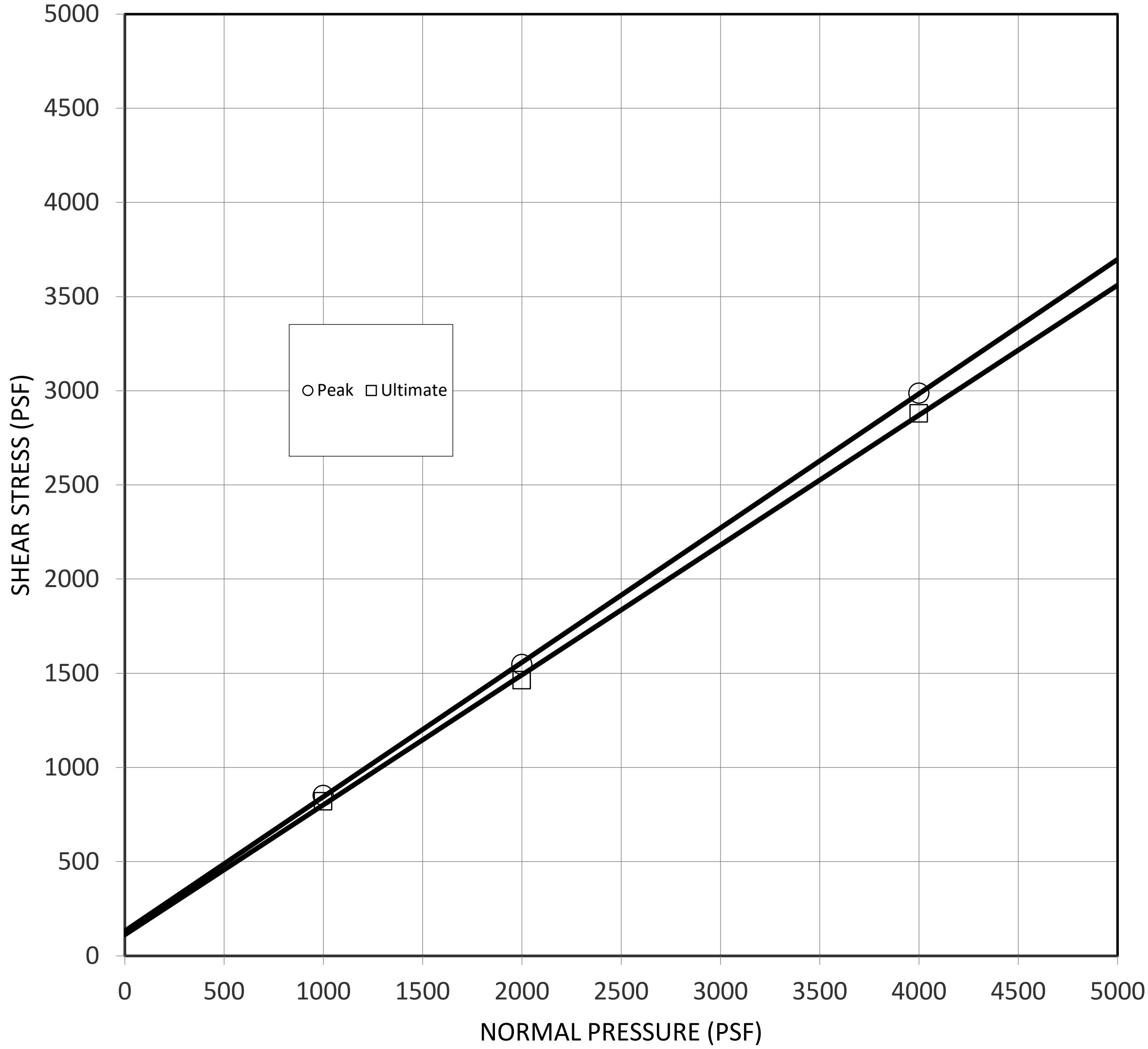
Client: LK Geotechnical

Project No.: 21-0423

EGLAB Project No.: 21-122-042

DIRECT SHEAR

05/21 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
B-4	N/A	10.0	Ring	SM	○	132	35
					□	112	35

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)	γ_d (pcf)	S (%)
1000	1.7	16.6	116.2	100
2000	1.7	15.8	116.4	95
4000	1.7	14.9	117.3	92

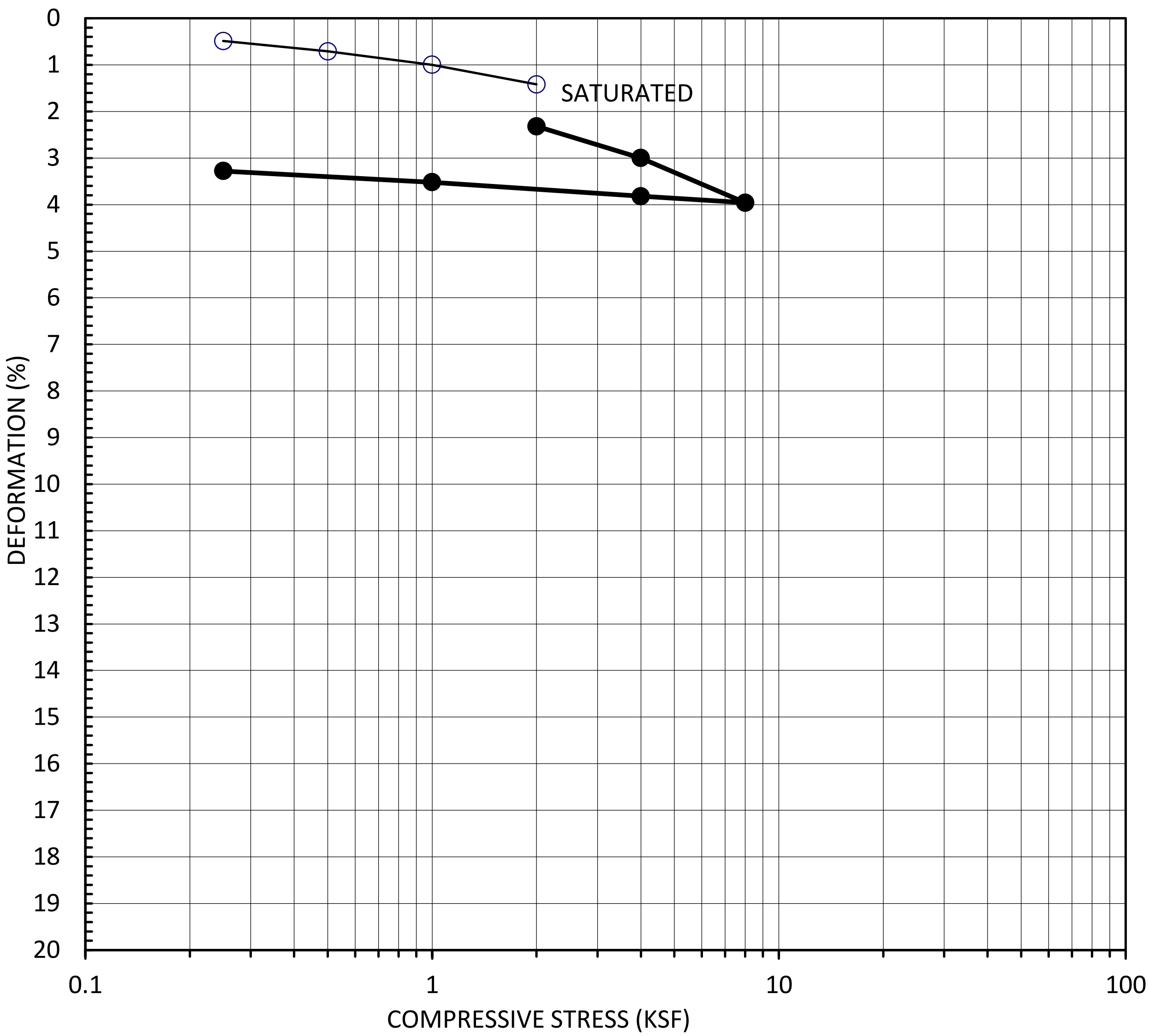
EGLAB, INC.

Project Name:
SE Dos Palmas Road and HWY 395, Victorville

Client: LK Geotechnical
Project No.: 21-0423
EGLAB Project No.: 21-122-042

DIRECT SHEAR

05/21 (ASTM D3080) Figure



Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density (PCF)	Init. Void Ratio
○	B-1	N/A	5.0	SW-SM	1.1	115.2	0.463

Project Name:
SE Dos Palmas Road and HWY 395, Victorville

Client:	LK Geotechnical
Project No.:	21-0423
EGLAB Project No.:	21-122-042

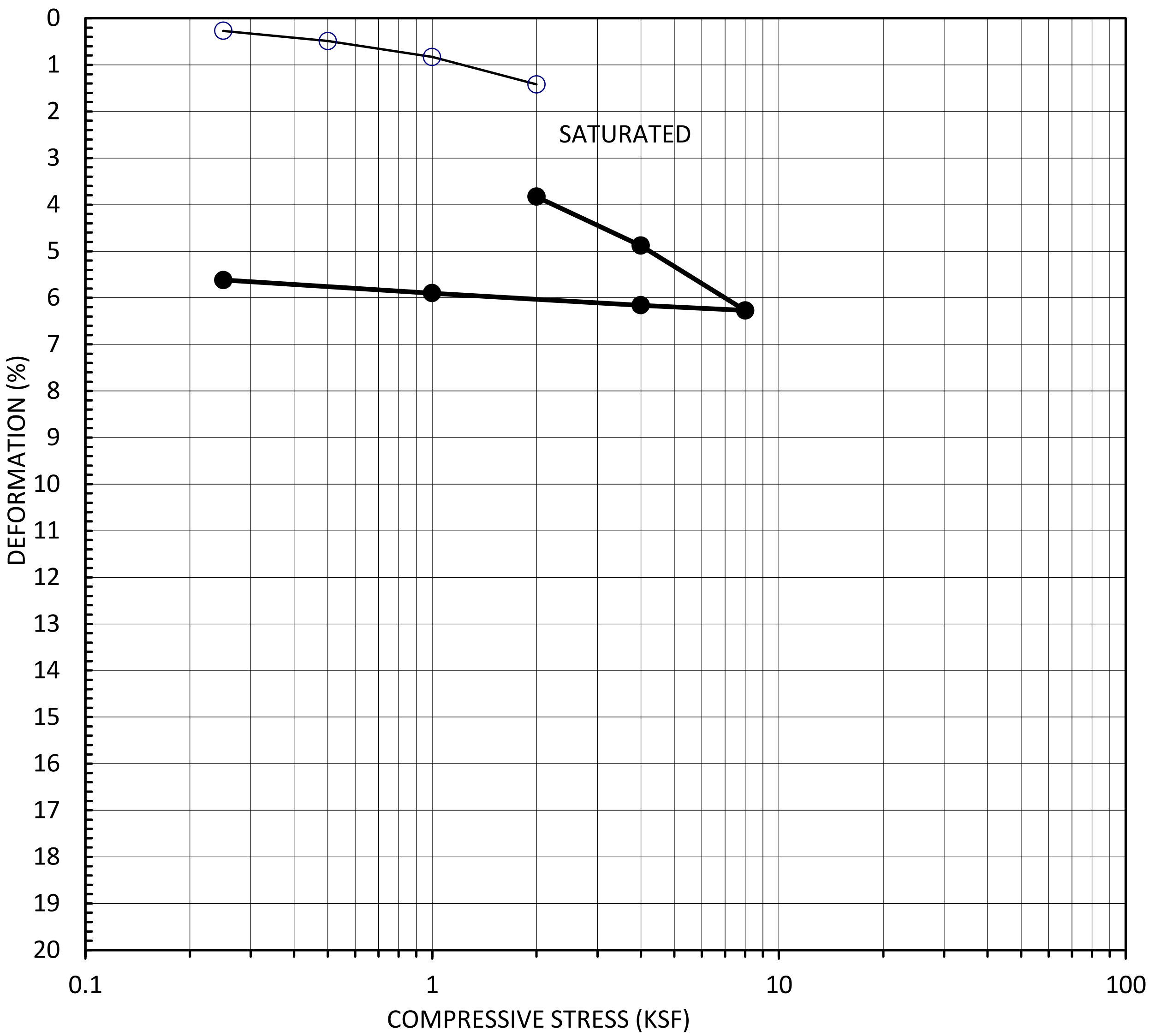
EGLAB, INC.

CONSOLIDATION

(ASTM D2435)

05/21

Figure



Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density (PCF)	Init. Void Ratio
○	B-5	N/A	5.0	SM	1.4	113.6	0.484

Project Name:

SE Dos Palmas Road and HWY 395, Victorville

Client:	LK Geotechnical
Project No.:	21-0423
EGLAB Project No.:	21-122-042

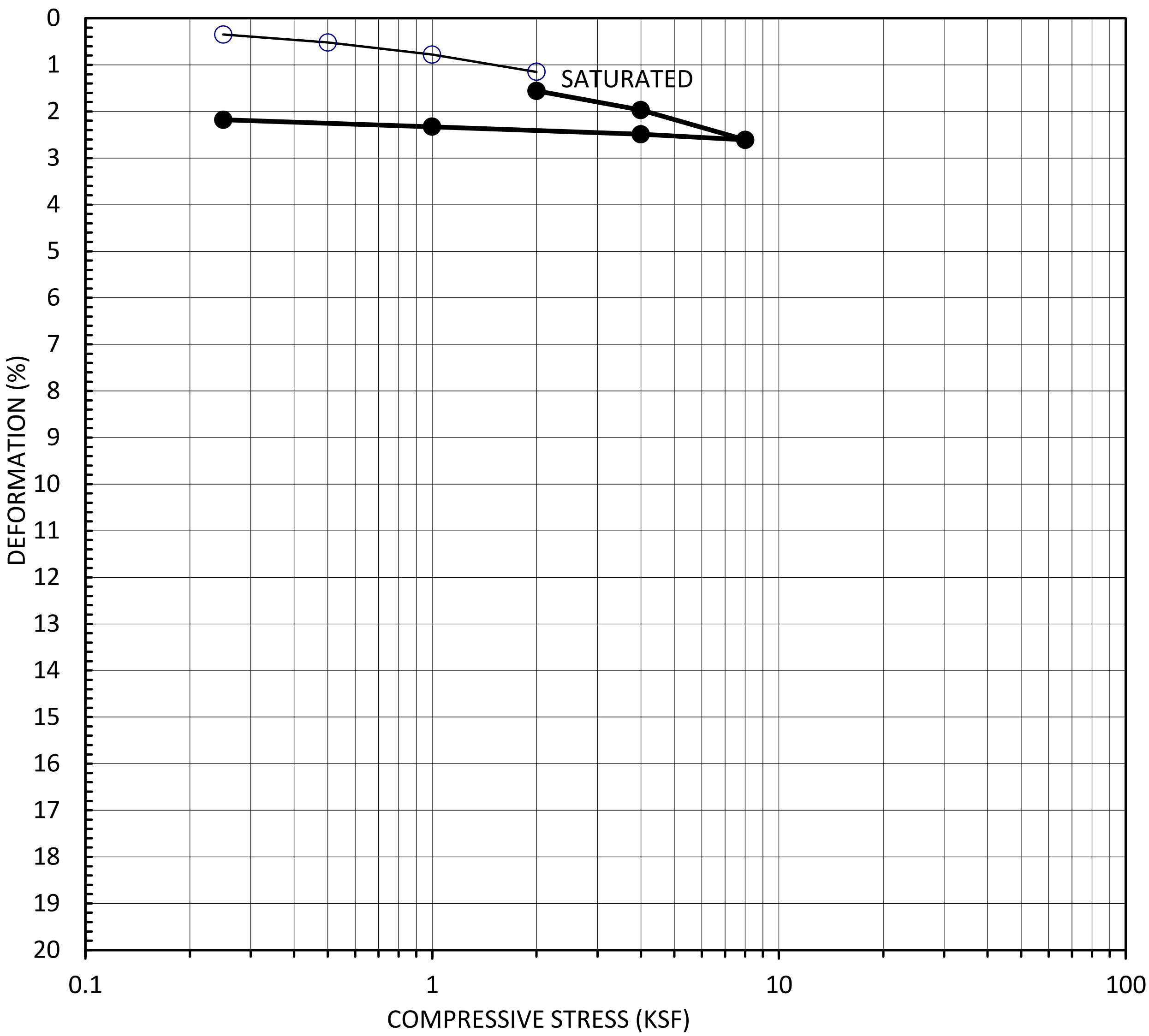
EGLAB, INC.

CONSOLIDATION

(ASTM D2435)

05/21

Figure



Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density (PCF)	Init. Void Ratio
○	B-6	N/A	10.0	SW-SM	1.0	111.5	0.510

EGLAB, INC.

Project Name:
SE Dos Palmas Road and HWY 395, Victorville

Client: LK Geotechnical

Project No.: 21-0423

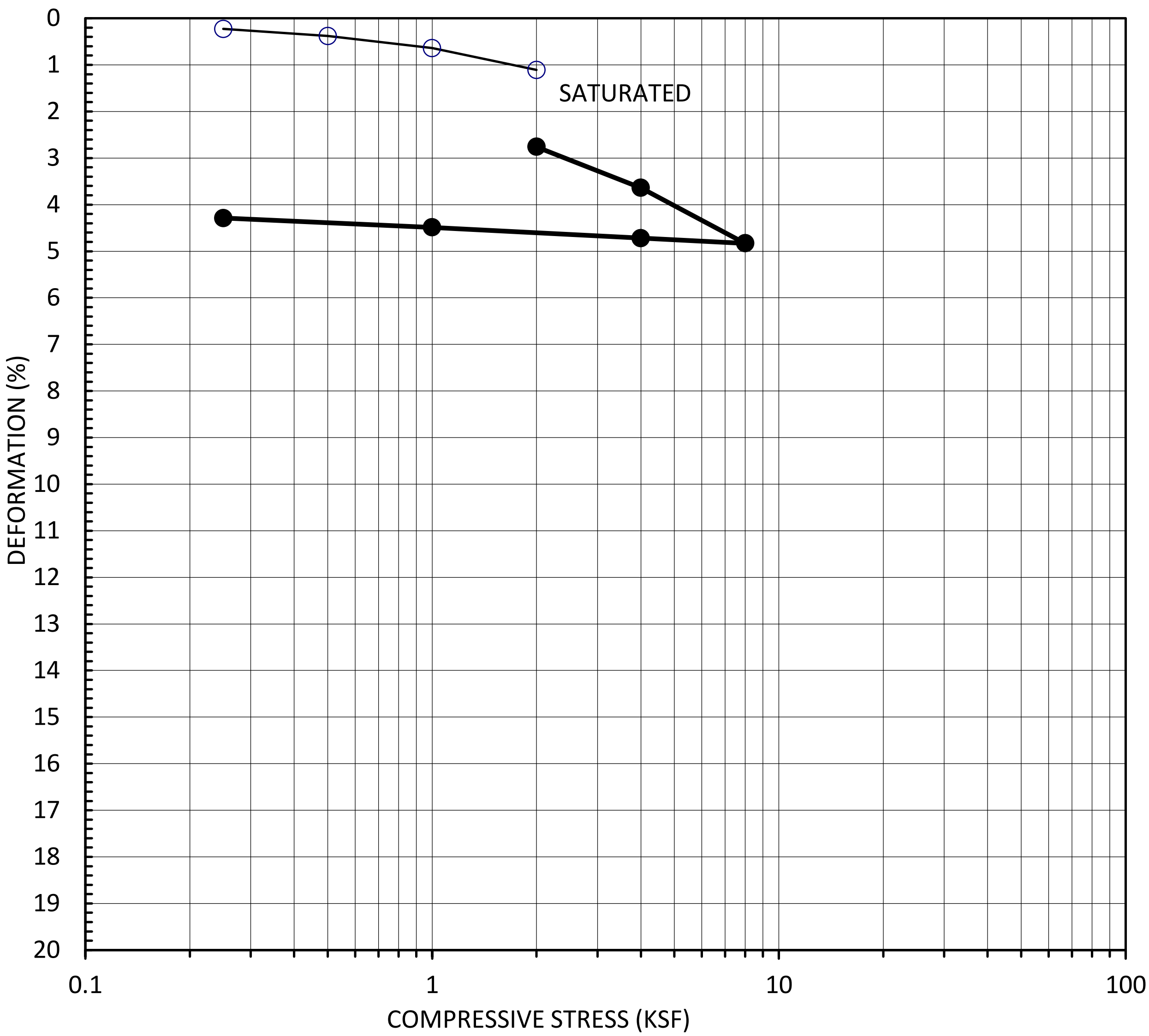
EGLAB Project No.: 21-122-042

CONSOLIDATION

(ASTM D2435)

05/21

Figure



Symbol	Boring No.	Sample No.	Depth (Ft.)	Soil Type	Init. Moisture Content (%)	Init. Dry Density (PCF)	Init. Void Ratio
○	B-7	N/A	5.0	SM	2.7	117.5	0.434

EGLAB, INC.	Project Name: SE Dos Palmas Road and HWY 395, Victorville Client: LK Geotechnical Project No.: 21-0423 EGLAB Project No.: 21-122-042

CONSOLIDATION

(ASTM D2435)

05/21

Figure

SUMMARY OF CORROSION TEST RESULTS

PROJECT NAME: SE Dos Palmas Road and HWY 395, Victorville

EGLAB JOB NO.: 21-122-042

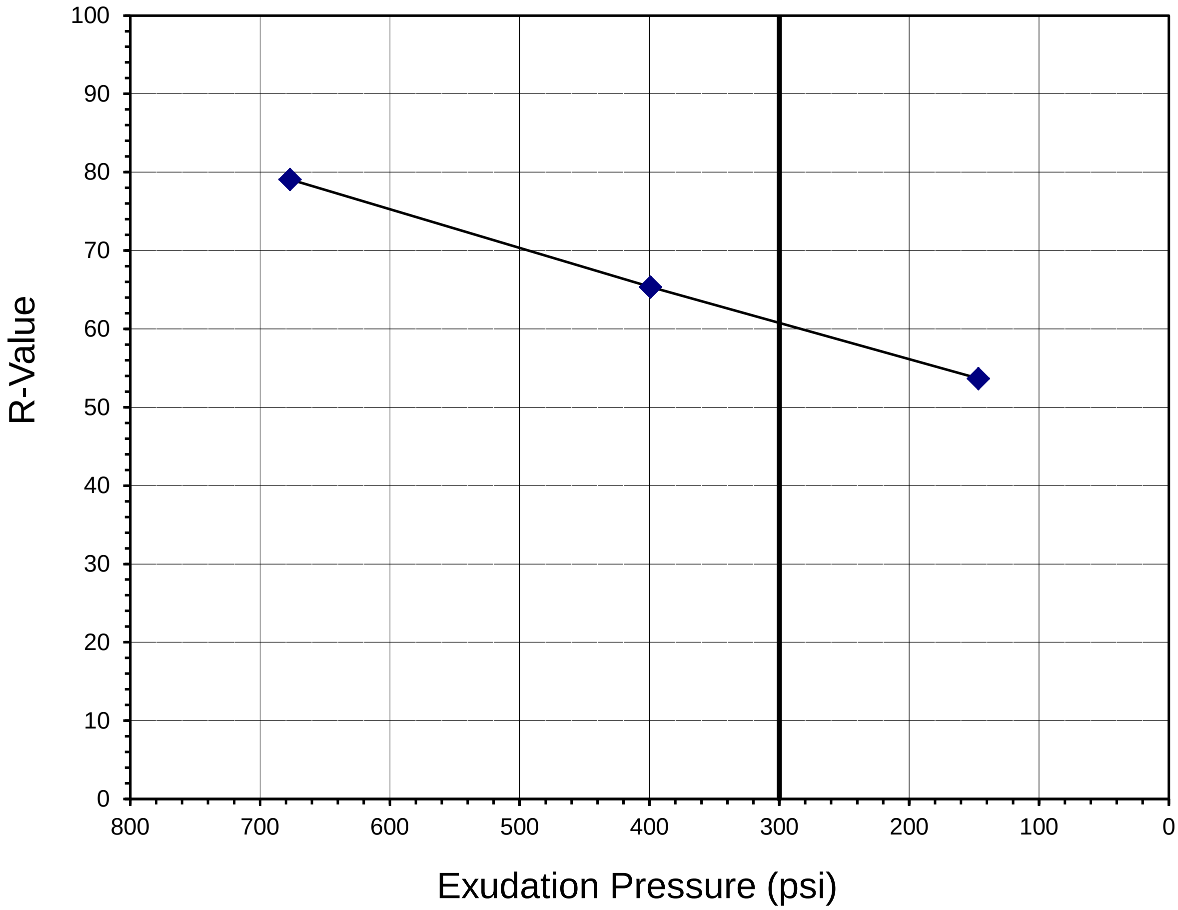
PROJECT NO.: 21-0423

CLIENT: LK Geotechnical

DATE: 5/21/2021

Summarized By: JT

BORING NO.	SAMPLE NO.	DEPTH (ft)	pH CalTrans 643	Chloride Content CalTrans 422 (ppm)	Sulfate Content CalTrans 417 (% by weight)	Minimum Resistivity CalTrans 643 (ohm-cm)
B-2	N/A	5.0	8.15	145	0.004	8,400
B-6	N/A	5.0	8.16	165	0.005	9,200



Test No.	Compaction Pressure (psi)	Density (pcf)	Moisture (%)	Expansion Pressure (psi)	Horizontal Pressure (psi) @ 160 psi	Sample Height (in)	Exudation Pressure (psi)	R-Value	R-Value Correction
1	350	127.5	9.8	0.00	60	2.47	146	54	54
2	350	128.0	8.9	0.00	45	2.50	399	65	65
3	350	129.0	8.1	0.06	28	2.50	677	79	79

Test Name and Method:
Resistance R-Value and Expansion Pressure - Cal Test 301

Boring No.:	B-1 to B-8
Sample No.:	N/A
Depth: (ft)	0-5
Sample Type:	Bulk
Sample Description:	Silty sand (SM)
Test Date:	5/25/21

EGLAB, INC.

Project Name:
SE Dos Palmas Road and HWY 395, Victorville
Client: LK Geotechnical, Inc.
Project No.: 21-0423
EGLAB Job No.: 21-122-042

Test Results: R-Value at 300 psi
Exudation Pressure: **61**

R-VALUE TEST REPORT

05/26/21

FIGURE 1

Earth Pressure Analyses: General Limit Equilibrium (GLE) - Trial Wedge Method

Shoring Wall Parameters

Height of wall, H = 15.0 feet

Angle of back slope, β = 0.0 degrees

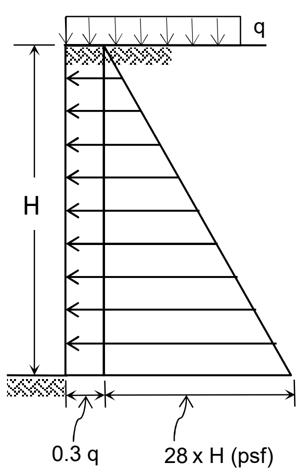
Soil Parameters

Unit weight, γ = 120.0 pcf

Condition	Shear Strength Used	Cohesion C (psf)	Friction angle ϕ (deg)	Factor of Safety, F.S.	Design Cohesion C_d (psf)	Design Friction angle ϕ_d (deg)
Static	Ultimate	106.0	34.0	1.20	*88.3*	*29.3*

Failure plane angle (deg)	Assumed tension crack (ft)	Failure plane length (ft)	Weight of soil wedge (lb/ft)	Active Force ,P_A (lb/ft)	Active EFW_A (pcf)
42	*3.9*	*16.5*	*13958.9*	*1831.1*	*16.3*
44	*3.5*	*16.5*	*13207.8*	*2140.3*	*19.0*
46	*3.2*	*16.4*	*12435.3*	*2405.3*	*21.4*
48	*3.0*	*16.2*	*11670.1*	*2628.4*	*23.4*
50	*2.8*	*15.9*	*10924.8*	*2812.0*	*25.0*
52	*2.7*	*15.6*	*10204.3*	*2958.3*	*26.3*
54	*2.6*	*15.3*	*9509.9*	*3069.1*	*27.3*
56	*2.6*	*15.0*	*8841.2*	*3145.8*	*28.0*
58	*2.5*	*14.7*	*8196.7*	*3189.3*	*28.3*
60	*2.5*	*14.4*	*7574.8*	*3200.1*	***28.4***
62	*2.5*	*14.1*	*6973.4*	*3178.5*	*28.3*
64	*2.6*	*13.8*	*6390.5*	*3124.2*	*27.8*
66	*2.6*	*13.5*	*5824.1*	*3036.3*	*27.0*
68	*2.7*	*13.2*	*5272.1*	*2914.0*	*25.9*
70	*2.9*	*12.9*	*4732.5*	*2755.6*	*24.5*
72	*3.1*	*12.5*	*4203.4*	*2559.2*	*22.7*

Cantilevered Shoring



LK Geotechnical

LK Geotechnical Engineering, Inc.
10120 National Blvd., Los Angeles, CA 90034
Tel: 310.866.8977; Fax: 310.204.2459

EARTH PRESSURES FOR SHORING WALL

SE of HWY 395 & Dos Palmas Road

Victorville, California

DATE:	June 2021	PROJECT#	21-0423	PLATE	SW-1