UPDATED GEOTECHNICAL AND INFILTRATION EVALUATION
FOR
PROPOSED SINGLE-AND MULTI-FAMILY HOUSING DEVELOPMENT
APNS 0459-014-11 AND -35
ADELANTO, SAN BERNARDINO COUNTY, CALIFORNIA

PREPARED FOR

VINTAGE 145 LLC
20683 SUNSET CIRCLE
WALNUT, CALIFORNIA 91789

PREPARED BY

GEOTEK, INC.
1548 NORTH MAPLE STREET
CORONA, CALIFORNIA 92878

PROJECT NO. 3057-CR **MARCH 23, 2022**

GEOTEK

GeoTek, Inc.
1548 North Maple Street, Corona, California 92878
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

March 23, 2022
Project No. 3057-CR

Vintage 145 LLC
20683 Sunset Circle
Walnut, California 91789

Attention: Mr. Richard Wu

Subject: Updated Geotechnical and Infiltration Evaluation
Proposed Single- and Multi-Family Housing Development
APNs 0459-014-11 and -35
Adelanto, San Bernardino County, California

Dear Mr. Wu:

We are pleased to provide our updated geotechnical and infiltration report for proposed development at the subject property located in the city of Adelanto, San Bernardino County, California. This report presents a discussion of our evaluation and provides geotechnical recommendations for earthwork, foundation design, and construction.

In our opinion, site development appears feasible from a geotechnical viewpoint provided that the recommendations presented in this report are incorporated into the design and construction phases of the project.

The opportunity to be of service is sincerely appreciated. If you have any questions, please do not hesitate to call our office.

Respectfully submitted,
GeoTek, Inc.

REGISTERED GEOLOGIST
EDWARD H. LaMONT
No. 1892
Exp.
Certified Engineering Geologist
STATE OF CALIFORNIA

LICENSED PROFESSIONAL ENGINEER
GABY M. BOGDANOFF
NO. 3133
GEOTECHNICAL
STATE OF CALIFORNIA

Edward H. LaMont
CEG 1892, Exp. 07/31/22
Principal Geologist

Gaby M. Bogdanoff
GE 3133, Exp. 06/30/22
Project Engineer

G:\Projects\3051 to 4000\3057CR Vintage 145 LLC SWC Auburn Ave & Panther Ave Adelanto\Geotechnical and Infiltration Investigation\3057-CR Geotechnical and Infiltration Evaluation 29-Acre Adelanto.doc

TABLE OF CONTENTS

TABLE OF CONTENTS

1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the existing geotechnical conditions for the currently proposed development. Services provided for this study included the following:

- Research and review of readily available geologic data and past reports pertinent to the site,
- A site reconnaissance,
- Site exploration via twelve exploratory trenches excavated to depths ranging from 6 to 9 feet and four exploratory borings to depths between 20 and 21 feet across the site,
- Excavation of four percolation test borings to a depth of approximately 5 feet within the future site basins,
- Collection of relatively undisturbed and bulk samples of the site soils for geotechnical assessment and corrosion evaluation,
- Review and evaluation of site seismicity,
- Engineering analyses, and;
- Compilation of this updated geotechnical evaluation which presents our findings, conclusions, and recommendations for site development.

The intent of this report is to aid in the evaluation of the site for future proposed development from a geotechnical perspective. The professional opinions and geotechnical information contained in this report may need to be updated based upon our review of the final site development plans. Final site development plans should be provided to GeoTek for review when available.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 SITE DESCRIPTION

The site consists of a roughly rectangular-shaped property located southwest of Auburn Avenue and Panther Avenue in the city of Adelanto, San Bernardino County, California. The site is identified by San Bernardino County Assessor's Parcel Numbers (APNs) 0459-014-11 and -35. The 29-acre site encompasses approximately 140 graded single-family lots and unimproved streets. Based on the review of historical images, the site was graded in the 1980s-1990s. The site is currently void of structures. However, as indicated by Digalert and field observations, underground utilities exist within Colonial Avenue which is the main interior road that trends north-south and crosses the center of the property. Also, underground utilities were noted within various, unimproved cul-de-sac areas.

Site topography slopes gently down toward the north-northeast with a total relief of approximately 10 to 12 feet. Surface drainage is directed to the north-northeast. At the time of our investigation, the lots and streets were relatively void of vegetation with only occasional bushes. Visible trash was noted near the perimeter streets.

The site is bounded by Auburn Avenue (unimproved road) and vacant land beyond to the north; single-family homes and vacant land to the west; Panther Avenue (mostly unimproved) and vacant land to the east; and single-family dwellings to the south. The general location of the site is shown in Figure 1.

2.2 PROPOSED DEVELOPMENT

According to the Site Plan prepared by Blue Engineering & Consulting, undated, the property will be developed with 19 single-family homes and 60 multi-family buildings (348 units), two basins, a pool/clubhouse, parks, interior drive/parking areas, underground utilities, and other improvements. The residential structures are anticipated to be one to two stories of wood-framed construction and will utilize concrete slab-on-grade and shallow foundations. A copy of the site plan is shown in Figure 2, Exploration location Map,

Since much of the property will be a multi-family housing development, we anticipate that the site will need to be regraded to provide uniform support to the proposed buildings. This may involve cuts and fills of less than 5 feet and minor slopes. Within the southern region of the

property, 19 currently existing single-family lots will remain. Minor grade changes are anticipated within this area.

If site development differs from the information presented in this report, the recommendations should be subject to further review and evaluation by GeoTek. Final site development plans should be reviewed by GeoTek when they become available.

3. REPORT REVIEW

Zeiser Kling Consultants, Inc., (Zeiser) issued a *Geotechnical Feasibility Investigation* for the property on October 6, 2005. The Zeiser study included excavation of five exploratory borings to depths ranging from about 28.5 to 60 feet below grade across the site. The soils encountered within the Zeiser's borings consisted of undocumented fill atop alluvial deposits. The undocumented fill ranged from 2 to 5 feet in thickness and was composed of silty sand in a medium dense to dense state. Zeiser also noted that the fill was highly weathered, burrowed, and vegetated. The underlying alluvial soils were composed of silty to clayey sand, poorly graded sand, and sandy silt which were medium dense/stiff to very dense/hard. Groundwater was not encountered within any of Zeiser excavations and groundwater in the site region was anticipated to be 80 feet or deeper. The potential for soil liquefaction was considered low due to the dense/hard consistency of the site soils and great depth to groundwater.

Zeiser concluded that all existing undocumented fill and the upper 1 to 2 feet of the underlying alluvium were unsuitable for support of structures, structural fill, and improvements. These materials were recommended to be removed and replaced with engineered compacted fill. Cut lots or thin fill portions of cut/fill transition lots were recommended to be over-excavated such as a minimum depth of 2 feet of fill exists beneath the base of footings. A shrinkage factor of about 0 to 5 percent was estimated for the upper 5 feet of soils. Subsidence was anticipated to be about 0.05 feet.

Following grading, Zeiser indicated that the residential structures could be supported by conventional shallow foundations resting on "very low" to "low" expansive soils. Based on laboratory test results, Zeiser stated that the site soils have negligible sulfate content and high R-value.

Copies of the exploration logs and laboratory test results prepared by Zeiser are presented in Appendix A.

As previously noted, the site was graded in the 1980s-1990s. However, a report of geotechnical observation and compaction testing during the grading operation was not available at the time of this evaluation.

4. FIELD EXPLORATION, LABORATORY TESTING, AND PERCOLATION TESTING

4.1 FIELD EXPLORATION

GeoTek conducted a field exploration at the site on February 7, and February 17, 2022 which consisted of excavating twelve exploratory trenches and four exploratory borings to depths ranging from 6 to 21.5 feet below existing grades. In addition, four percolation test borings about 5 feet deep each were drilled within the two future basins (northeastern and east-central regions). The trenches were performed with a backhoe and the borings with a truck-mounted hollow-stem auger drill rig. The approximate locations of these excavations are shown on Figure 2, Exploration Location Map. Logs of the excavations performed by GeoTek are included in Appendix B.

4.2 LABORATORY TESTING

Laboratory testing was performed on selected soil samples collected during our field exploration. The purpose of the laboratory testing was to confirm the field classification of the soil materials encountered and to evaluate the physical properties of the soils for use in the engineering design and analysis. Laboratory testing included in-situ dry density-moisture content, proctor, collapse, expansion index, and corrosion. Test results are presented in Appendix C.

4.3 PERCOLATION TESTING

GeoTek utilized the industry standard percolation test procedure (Riverside County, 2011) to estimate the infiltration rate of the subsurface materials encountered in the two basin areas. The depths to the bottom of these basins were currently unknown. Thus, for the purpose of this evaluation, testing was performed at about 5 feet below existing grade.

The test boring diameter was approximately eight inches. Percolation testing was performed within the lower approximately 20 inches in the borings by a representative of our firm. As

required, the percolation rates were corrected to account for discharge of water from both the sides and bottom of the borings. This correction was done using the Porchet Method, obtaining the infiltration rates tabulated below:

SUMMARY OF RAW INFILTRATION RATES		
Area	Boring No.	Raw Infiltration Rate (inches per hour)
Northeast Basin	I-1	0.91
	I-2	0.86
East-central Basin	I-3	0.38
	I-4	0.59

Detailed infiltration/percolation test data and Porchet conversion calculations are presented in Appendix D.

Over the lifetime of the basin systems, the infiltration rates may be affected by silt build up and biological activities, as well as local variations in near surface soil conditions. A suitable factor of safety should be applied to the observed rates to design the infiltration system.

It should be noted that the infiltration rates provided above were obtained in relatively undisturbed native materials (encountered below 3 feet of fill approximately). Infiltration rates will vary and are mostly dependent on the underlying consistency of the site soils and relative density. Infiltration rates will be impacted by weight of equipment travelling over the soils, placement of engineered fill and other various factors. GeoTek assumes no responsibility or liability for the ultimate design or performance of the storm water management system.

5. GEOLOGIC AND SOILS CONDITIONS

5.1 REGIONAL SETTING

The property is situated in the Mojave Desert geomorphic province. The Mojave Desert province is a wedge-shaped area that is enclosed on the southwest by the San Andreas fault zone, the Transverse Ranges province and the Colorado Desert province, on the north and northeast by the Garlock fault zone, the Tehachapi Mountains and the Basin and Range province, and on the east by the Nevada and Arizona state lines, and the Colorado River. The

area is dominated by broad alluviated basins that are mostly aggrading surfaces that are receiving non-marine continental deposits from the adjacent upland areas.

The primary fault zones of the area are found in the western half of the province and have a general northwest-southeast trend. These zones are the San Andreas, Helendale, Lenwood and Lockhart in the subject site vicinity. In addition to these major zones, there are numerous secondary fault zones in the area and many smaller fault zones in the eastern half of the province. Many of the secondary fault zones in the province have a general east-west trend.

More specific to the subject property, the site is located in an area geologically mapped to be underlain by alluvium (Dibblee, T.W., 1960). No active faults are shown presently in the immediate site vicinity on the maps reviewed for the area.

5.2 SUBSURFACE CONDITIONS

A brief description of the earth materials encountered during our field investigation and evaluation by Zeiser (2005) is presented in the following sections.

5.2.1 Fill

Our explorations found that site is underlain by fill consisting of silty sand with occasional layers of poorly graded sand and sandy silt. The fill was dry to slightly moist, brown to gray in color, and had thicknesses ranging from 1 to 5 feet. The average fill thickness was about 2 to 3 feet. Our test results showed that the fill has a "very low" expansion potential (EI ≈ 0). Zeiser generally reported similar findings.

In addition, our in-situ testing and field observations indicate that the majority of the fill appear to be in a relatively dense condition. However, since the property was graded more than 30 years ago, the upper portions of the fill have become relatively loose and dry. Based on the above, reprocessing of the upper 18 inches of soils within the proposed single-family development area will be required prior to the construction of improvements and dwellings. The multi-family development portion of the site will require complete fill removal since some of the future buildings may span between existing building pads and non-structural (street/utility) areas.

5.2.2 Alluvium

As observed in all site excavations, alluvial deposits exist below the fill. The alluvium noted was composed of varying units of silty sand, sandy silt, clayey sand, and poorly graded sand which were gray to brown in color, medium dense to very dense, and slightly moist. Various amounts of caliche/calcrete were observed in the alluvium. Tests performed on the most unfavorable

samples of the alluvium (selected based on blow counts) suggested a negligible to slight potential for collapse upon the application of water. Zeiser also reported that the collapse potential at the site was minor to negligible.

Detailed logs of the site explorations are included in Appendices A and B. The locations of the site explorations are shown on the Exploration Location Map, Figure 2.

5.3 SURFACE WATER AND GROUNDWATER

5.3.1 Surface Water

Surface water on this site is the result of precipitation or surface run-off from surrounding areas. Overall surface drainage is generally to the north-northeast.

5.3.2 Groundwater

No groundwater was encountered in any of the site excavations performed by GeoTek to a maximum depth of 21.5 feet or by Zeiser (2005) to a maximum depth of 60 feet.

The California Water Data Library (http://wdl.water.ca.gov/waterdatalibrary/) displays various groundwater wells located at a distance of approximately 0.5-mile from the site. Records of these wells indicate that groundwater in the region is deeper than 80 feet. Thus, groundwater is not anticipated to be a factor during the site construction.

5.4 FAULTING AND SEISMICITY

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. No active or potentially active fault is known to exist at this site nor is the site situated within an *"Alquist-Priolo"* Earthquake Fault Zone (Bryant and Hart, 2007; CGS, 1986). The nearest known active fault zone is the San Andreas Fault Zone located approximately 19 miles southwest of the site.

The subject property is not located within a State of California Seismic Hazard Zone for earthquake induced landslides and liquefaction.

5.4.1 Seismic Design Parameters

The site is located at approximately 34.5913° Latitude and -117.4481° Longitude. Site spectral accelerations (S_a and S_1), for 0.2 and 1.0 second periods for a Class "D" site, were determined

from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format. Using the ASCE 7-16 option on the SEAOC/OSHPD website results in the values for S_{M1} and S_{D1} reported as "null-See Section 11.4.8" (of ASCE 7-16). As noted in ASCE 7-16, Section 11.4.8, a site-specific ground motion procedure is recommended for Site Class D when the value S_1 exceeds 0.2. The value S_1 for the subject site exceeds 0.2.

For a Site Class "D", an exception to performing a site-specific ground motion analysis is allowed in ASCE 7-16 where S_1 exceeds 0.2 provided the value of the seismic response coefficient, Cs, is conservatively calculated by Eq 12.8-2 of ASCE 7-16 for values of $T \leq 1.5Ts$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5Ts$ or Eq. 12.8-4 for $T > T_L$.

The results, based on the 2015 NEHRP and the 2019 CBC, are presented in the following table and we have assumed that the exception as allowed in ASCE 7-16 is applicable. If the exception is deemed not appropriate, a site-specific ground motion analysis will be required.

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, S_S	1.089g
Mapped 1.0 sec Period Spectral Acceleration, S_1	0.427g
Site Coefficient for Site Class "D", F_a	1.065
Site Coefficient for Site Class "D", F_v	1.873
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, S_{MS}	1.159g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, S_{M1}	0.8g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, S_{DS}	0.773g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, S_{D1}	0.533g
Peak Ground Acceleration Adjusted for Site Class Effects, PGA_M	0.53g
Seismic Design Category	D

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

5.5 LIQUEFACTION AND SEISMICALLY INDUCED SETTLEMENT

The project site is not located within an area mapped by the State of California for liquefaction potential. Due to the presence of dense alluvium and the lack of shallow groundwater, the risk of soil liquefaction at the site is nil.

Loose to medium dense sand tend to densify during strong ground shaking. Seismically induced settlement of the alluvial sandy units at the site is estimated to be less than 0.5-inch total and less than 0.25 inches differential over a 30-foot span.

5.6 OTHER SEISMIC HAZARDS

Evidence of ancient landslides or slope instabilities at this site was not observed during our site reconnaissance. Thus, the potential for landslides is considered negligible for design purposes.

The potential for secondary seismic hazards such as a seiche and tsunami is negligible due to site elevation and distance from an open body of water.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 GENERAL

The proposed development appears feasible from a geotechnical viewpoint provided that the following recommendations are incorporated into design and construction.

6.2 EARTHWORK CONSIDERATIONS

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of Adelanto/San Bernardino County, the 2019 California Building Code (CBC), and recommendations contained in this report. The Grading Guidelines included in Appendix E outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix E.

6.2.1 Site Clearing

The site should be cleared of existing vegetation, roots, and debris. These materials should be properly disposed of off-site.

6.2.2 Remedial Grading

Our explorations performed within the single-family development area (19 existing single-family lots within the southern-most portion of the site) indicate that fills in this area ranged from 2.5 to 3 feet below existing pad grade. This will result in at least one foot of engineered compacted fill below footing base grade (assuming 18-inch-deep footings) which is considered adequate for a homogeneous/competent foundation support. However, prior to placement of additional fill or constructing foundations/improvements, the lots should be scarified to a minimum depth of approximately 18 inches and allowed to soak so that optimum moisture content is achieved down to 18 to 24 inches prior to soil recompaction. The scarified soil should then be recompacted to at least 90 percent (ASTM D 1557). A representative of GeoTek should observe and verify that adequate moisture conditioning and proper compaction is attained on the lots. Also, periodic testing of the fill below the 18-inch recompaction zone should be conducted to confirm a minimum compaction of 90 percent (ASTM D 1157). If the lots require cuts to reach design grades, additional remedial work will be needed to provide an adequate thickness of engineered fill below foundations.

The remainder of the site to be developed with multi-family homes will require regrading. All existing fill, utility backfill (where applicable), and the upper one foot of the alluvium should be removed to expose competent native materials within the structural grading limits. Competent native materials are defined are alluvial soils relatively homogeneous, not relatively porous, and with a relative compaction of at least 85 percent (ASTM D 1557). Removal depths in this area are anticipated to be of about 2 to 5 feet, or deeper. As a minimum, removals should extend down and away from foundation elements at a 1:1 (h:v) projection to the recommended removal depth, or a minimum of 5 feet laterally. The bottom of all removals should be scarified to a minimum depth of 12 inches, brought to slightly above the optimum moisture content, and then recompacted to at least 90 percent (ASTM D 1557).

The upper 1.5 feet of existing soil or one foot below pavement subgrade, whichever is deeper, should be recompacted below asphaltic concrete pavement and Portland cement concrete hardscape areas. The horizontal extent of removals should extend at least two feet beyond the edge of the improvements.

Development plans should be reviewed by this firm when available. Depending on actual field conditions encountered during grading, locally deeper areas of removal may be recommended.

The exploratory trenches conducted during this evaluation were backfilled with relatively uncompacted soils. The backfill should be entirely removed and replaced as engineered compacted fill. The locations of these excavations are shown on Figure 2.

6.2.3 Engineered Fill

The onsite soils are considered suitable for reuse as engineered fill provided they are free from vegetation, debris, deleterious material and hard lumps greater than six to eight inches in maximum dimension.

Fill should be placed upon the completion of the site remedial grading described in Section 6.2.2. Fill materials should then be placed in horizontal lifts not exceeding eight inches in loose thickness, moisture conditioned to at least the optimum moisture content, and compacted to a minimum relative compaction of 90 percent (ASTM D 1557).

Detailed recommendations pertaining to the placement of engineered fill are presented in Appendix E.

6.2.4 Slopes

Fill and cut slopes constructed at gradients of 2:1 (h:v) or flatter, in accordance with industry standards, are anticipated to be both grossly and surficially stable. Fill placed on slopes should be properly benched into competent soils per the geotechnical engineer. Cut slopes should be observed by a geotechnical engineer/engineering geologist to approve the exposed conditions upon excavation.

6.2.5 Excavation Characteristics

Excavation in the on-site soils is expected to be feasible utilizing heavy-duty grading equipment in good operating condition. All temporary excavations for grading purposes should be constructed in accordance with local and Cal-OSHA guidelines.

6.2.6 Trench Excavation and Backfill

Temporary trench excavations within the on-site materials should be stable at a 1:1 (h:v) inclination for short durations during construction and where cuts do not exceed ten feet in height. Temporary cuts to a maximum height of four feet can be excavated vertically, but local sloughing and/or failure could occur due to the granular nature of the majority of the soils at this site. Increased caution should be applied when working near or within any excavations at this site.

Trench excavations should conform to Cal-OSHA regulations. The contractor should have a competent person, per OSHA requirements, on site during construction to observe conditions and to make the appropriate recommendations.

Utility trench backfill should be compacted to at least 90 percent relative compaction (as determined by ASTM D-1557 test procedures). Under-slab trenches should also be compacted to project specifications. Where applicable, based on jurisdictional requirements, the top 12 inches of backfill below subgrade for road pavements should be compacted to at least 95 percent relative compaction. On-site materials should be suitable as backfill provided particles larger than six inches are removed.

Compaction should be achieved with a mechanical compaction device. Ponding or jetting of trench backfill is not recommended. If backfill soils have dried out, they should be properly moisture conditioned prior to placement in trenches.

6.2.7 Shrinkage and Subsidence

Several factors will impact earthwork balancing on the site, including shrinkage, subsidence, trench spoil from utilities and footing excavations, as well as the accuracy of topography.

Shrinkage is primarily dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of approximately 5 to 10 percent may be considered for the materials requiring recompaction. Subsidence of up to 0.1 feet may occur.

6.3 DESIGN RECOMMENDATIONS

6.3.1 Foundation Design Criteria

As noted by our laboratory test results, the onsite soils are expected to have a "very low" ($0 \leq EI \leq 20$) expansion potential in accordance with ASTM D 4829. Foundation design criteria, in general conformance with the 2019 CBC, are presented below. These are minimal recommendations and are not intended to supersede the design by the project structural engineer. Final foundation recommendations should be based on the expansion characteristics of the as-grade soils.

The foundation elements for the proposed structures should bear entirely in engineered fill soils. Foundations should be designed in accordance with the 2019 CBC. A summary of our foundation design recommendations is presented in the following table:

DESIGN PARAMETERS FOR CONVENTIONALLY REINFORCED FOUNDATIONS	
Design Parameter	"Very Low" Expansion Potential
Foundation Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent grade)	One- and two-story – 12
Minimum Foundation Width (Inches)*	One- and two-story – 12
Minimum Slab Thickness (Inches)	4 – Actual
Minimum Slab Reinforcing	6" x 6" – W1.4/W1.4 welded wire fabric in middle of slab
Minimum Reinforcement for Continuous Footings, Grade Beams, and Retailing Wall Footings	Two No. 4 reinforcing bars, one placed near the top and one near the bottom
Effective Plasticity Index	NA**
Presaturation of Subgrade Soil (Percent of Optimum/Depth in Inches)	Minimum 100% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete

*Code minimums per Table 1809.7 of the 2019 CBC should be complied with
**Effective Plasticity Index should be verified at the completion of the site remedial grading.

In general, an allowable bearing capacity of 2,000 psf may be used for design of continuous and perimeter footings 12 inches deep and 12 inches wide, and pad footings 24 inches square and 12 inches deep. This value may be increased by 400 psf for each additional 12 inches in depth and 200 psf for each additional 12 inches in width to a maximum value of 3,000 psf. Additionally, an increase of one-third may be applied when considering short-term live loads (e.g. seismic and wind loads).

For foundations designed in accordance with the above parameters and foundation areas prepared in accordance with Section 6.2.2 of this report, we would anticipate a maximum static settlement of less than 1-inch and a maximum differential static settlement of less than 0.5-inch in a 30-foot span. As noted previously, seismically induced settlement is also estimated to be less than 0.5 inch total settlement and less than 0.25-inch differential settlement over a 30-foot span.

The passive earth pressure may be computed as an equivalent fluid having a density of 230 psf per foot of depth, to a maximum earth pressure of 2,500 psf for footings founded in engineered fill. A coefficient of friction between engineered fill and concrete of 0.35 may be used with dead load forces. The upper one foot of soil below the adjacent grade should not be used in

calculating passive pressure, unless the ground is confined by concrete or pavement. The passive pressure and frictional resistance should be combined without reduction.

A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the *2019 California Green Building Standards Code* (CALGreen) Section 4.505.2, the 2019 CBC Section 1907.1, ACI 360R-10 and ACI 203.2R-06. It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g. stake penetrations, tears, punctures from walking on the aggregate layer, etc.). These occurrences should be limited as much as possible during construction.

Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a 6-mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limit migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e., thickness, composition, strength, and permeability) to achieve the desired performance level. Consideration should be given to consulting with an individual possessing specific expertise in this area for additional evaluation.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarders should be designed and constructed in accordance with applicable CALGreen, American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek does not practice in the field of moisture vapor transmission evaluation/mitigation, since this does not fall under the geotechnical disciplines. Therefore, we recommend that a qualified person, such as the flooring contractor, structural engineer, and/or architect be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. That person (or persons) should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structures as deemed appropriate. In addition, the recommendations in this report and

our services in general are not intended to address mold prevention, since we along with geotechnical consultants in general, do no practice in areas of mold prevention. If specific recommendations are desired, a professional mold prevention consultant should be contacted.

6.3.2 Miscellaneous Foundation Recommendations

- To reduce moisture penetration beneath the slab on grade areas, utility trenches should be backfilled with engineered fill, lean concrete, or concrete slurry where they intercept the perimeter footing or thickened slab edge.
- Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.
- Under-slab utility trenches should be compacted to project specifications. Compaction should be achieved with a mechanical compaction device. If soils to be used as backfill have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

6.3.3 Foundation Setbacks

Minimum setbacks for all foundations should comply with the 2019 CBC or City of Adelanto/San Bernardino County requirements, whichever is more stringent. Improvements not conforming to these setbacks are subject to the increased likelihood of excessive lateral movements and/or differential settlements. If large enough, these movements can compromise the integrity of the improvements. The following recommendations are presented:

- The outside bottom edge of all footings should be set back a minimum of H/2 (where H is the slope height) from the face of any ascending slope. The setback should be at least 5 feet and need not to exceed 15 feet. Where a retaining wall is constructed at the toe of the slope, the height of the slope should be measured from top of the wall to the top of the slope.
- The outside bottom edge of all footings should be set back a minimum of H/3 from the face of any descending slope. The setback should be at least 7 feet and need not to exceed 40 feet.
- The bottom of any foundations for structures should be deepened so as to extend below a 1:1 projection upward from the bottom of the nearest excavation.

- The bottom of all footings for new structures near retaining walls should be deepened so as to extend below a 1:1 projection upward from the bottom inside edge of the wall foundation.

6.3.4 Retaining Wall Design and Construction

6.3.4.1 General Design Criteria

Recommendations presented in this report apply to typical masonry or concrete vertical retaining walls. These are typical design criteria and are not intended to supersede the design by the structural engineer.

Retaining wall foundations should be designed in accordance with Section 6.3.1 of this report. A minimum footing width of 12 inches and footing embedment of 12 inches into engineered compacted fill are recommended. Wall footings should rest upon a minimum of 24 inches of engineered compacted fill and should be designed using an allowable soil bearing pressure of 2,000 psf. In addition, a passive pressure of 230 psf per foot of depth and a coefficient of friction between engineered fill and concrete of 0.35 may be utilized.

All earth retention structure plans, as applicable, should be reviewed by this office prior to finalization.

The backfill material placement for all earth retention structures should meet the requirement of Section 6.3.4.4 in this report.

In general, cantilever earth retention structures, which are designed to yield at least 0.001H, where H is equal to the height of the wall to the base of the footing, may be designed using the active condition. Rigid earth retention structures (including but not limited to rigid walls, and walls braced at top, such as typical basement walls) should be designed using the at-rest condition.

In addition to the design lateral forces due to retained earth, surcharges due to improvements, such as an adjacent building or traffic loading, should be considered in the design of the earth retention structures. Loads applied within a 1:1 (h:v) projection from the surcharge on the stem of the earth retention structure should be considered in the design.

Final selection of the appropriate design parameters should be made by the designer of the earth retention structures.

6.3.4.2 Cantilevered Walls

The recommendations presented below are for cantilevered walls retaining less than six feet of compacted soil. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions such as traffic, structures, seismic events, or adverse geologic conditions.

ACTIVE EARTH PRESSURES		
Surface Slope of Retained Materials (h:v)	Equivalent Fluid Pressure (pcf) Native Backfill*	Equivalent Fluid Pressure (pcf) Import Granular Backfill**
Level	42	36
2:1	70	53

*The design pressures assume the native backfill material has an expansion index less than or equal to 20 and a friction angle of about 29 degrees. Backfill zone includes area between the back of the wall and footing to a plane (1:1 h:v) up from the bottom of the wall foundation to the ground surface.
**The design pressures assume that import granular backfill material has an expansion index less than or equal to 20 and a friction angle of at least 34 degrees. Backfill zone includes area between the back of the wall and footing to a plane (1:1 h:v) up from the bottom of the wall foundation to the ground surface.

6.3.4.3 Restrained Retaining Walls

Retaining walls that will be restrained prior to placing and compacting backfill material, or that have reentrant or male corners, should be designed for an at-rest equivalent fluid pressure of 62 pcf, plus any applicable surcharge loading, for native backfill and level back slope condition. For imported granular backfill, an at-rest equivalent fluid pressure of 57 pcf should be utilized. For areas of male or reentrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall laterally from the corner, or a distance otherwise determined by the project structural engineer.

6.3.4.4 Retaining Wall Backfill and Drainage

Retaining wall backfill should consist of materials with expansion index (EI) ≤ 20 and free of deleterious and/or oversized materials. The wall backfill should also include a minimum one-foot wide section of ¾- to 1-inch clean crushed rock (or approved equivalent). The rock should be placed immediately adjacent to the back of wall and extend up from the back drain to within approximately 12 inches of finish grade. The upper 12 inches should consist of

compacted onsite materials. Presence of other materials might necessitate revision to the parameters provided and modification of wall designs. The backfill materials should be placed in lifts no greater than 8-inches in thickness and compacted to a minimum of 90 percent relative compaction in accordance with ASTM Test Method D 1557. Proper surface drainage needs to be provided and maintained. Bracing of the walls during backfilling and compaction may also be necessary.

All earth retention structures should be provided with an adequate pipe and gravel back drain system to reduce the potential for hydrostatic pressure build up. As a minimum, backdrains should consist of a four-inch diameter perforated collector pipe (Schedule 40, SDR 35, or approved equivalent) embedded in a minimum of one cubic foot per lineal foot of ¾- to 1-inch clean crushed rock or equivalent, wrapped in filter fabric (Mirafi 140N or approved equivalent). The drain system should be connected to a suitable outlet, as determined by the civil engineer. Drain outlets should be maintained over the life of the project and should not be obstructed or plugged by adjacent improvements. Waterproofing of site walls should be performed where moisture migration through the wall is undesirable.

Proper surface drainage needs to be provided and maintained. Water should not be allowed to pond behind retaining walls. Waterproofing of site walls should be performed where moisture migration through the wall is undesirable.

6.3.4.5 Other Design Considerations

- Retaining and garden wall foundation elements should be designed in accordance with building code setback requirements.
- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts, and backfill materials should be approved by the project geotechnical engineer or their authorized representative.

6.3.5 Pool Construction

The proposed swimming pool should derive support entirely from engineered fill. A minimum 12 inches of engineered fill should be provided below the pool shell.

The pool walls should be designed for at-rest soil conditions using an equivalent fluid density of 62 pcf provided that native, non-expansive soils are used as wall backfill. Pool walls surcharged

by adjacent structures should be designed for additional pressures. Alternatively, the pool walls may be designed as freestanding walls using the active soil state conditions provided that some lateral movement of the pool walls would be acceptable. If the active state is to be used, an equivalent fluid density of 42 pcf is considered suitable. These recommended pressures are based on drained conditions. If a drain system adjacent/beneath the pool is not provided, the pool walls should then be designed for an equivalent fluid pressure of 100 pcf for the at-rest condition and 88 pcf for the active condition.

As noted above, the use of the lower (drained condition) at-rest or active soil pressures will require a subdrain system beneath/adjacent to the pool. A typical subdrain system includes a series of 4-inch diameter perforated drain pipes encapsulated with at least one cubic foot of free-draining material per linear foot of pipe. The free-draining material should be encapsulated within a geotextile to prevent migration of fines into the drainage medium. The drain pipes should be routed to an acceptable discharge location, as determined by the civil engineer/pool designed. If desired, GeoTek can review the subdrain system once designed to determine if additional measures are warranted.

Pool decking supported on grade should be separated from the pool bond beam by a full-depth, mastic construction joint. If it is desired to extend the pool deck over the bond beam, consideration should be given to designing the deck as a structural slab supported by the pool shell. This will reduce the possibility of deck cracking occurring along the outer edge of the bond beam. We also recommend that the area of the pool decking be pre-saturated prior to concrete placement. The subgrade soils should be moisture conditioned to at least 100 percent of the soil's optimum moisture content to a depth of 12 inches, prior to concrete placement. Testing by the geotechnical engineer is recommended to confirm that the soils have been adequately moisture treated.

Pool decking may consist of five-inch-thick concrete and the use of reinforcement is suggested. Control joints should be placed in two directions and located a distance apart approximately equal to 24 to 36 times the slab thickness. The pool designer should provide final design recommendations.

6.3.6 Soil Corrosivity

Corrosivity test results (6,097 Ohm-cm) obtained on a representative soil sample collected from the property indicate that the on-site materials are "moderately corrosive" to buried ferrous metals in accordance with current standards used by corrosion engineers (Roberge, P.R., 2005). However, this should be verified with a corrosion engineer. Corrosion test results are included in Appendix C.

6.3.7 Soil Sulfate Content

Based on data included in Appendix C, the sulfate content (0.0085 percent) determined on a representative soil sample collected from the site indicated a value of less than 0.1 percent by weight. The soluble sulfate contents of this level are considered "negligible" per Table 4.2.1 of ACI 318. Based on the test results and Table 4.3.1 of ACI 318, special concrete mix design is not considered necessary. However, additional soluble sulfate testing should be performed during site grading to assess the sulfate levels within the as-graded soils.

6.3.8 Import Soils

Import soils should have expansion characteristics similar to the on-site soils. GeoTek recommends that the proposed import soils be tested for expansion and corrosivity potential. GeoTek should be notified a minimum of 72 hours prior to importing so that appropriate sampling and laboratory testing can be performed.

6.3.9 Pavement Design

Pavement design for the site was conducted per *Caltrans Highway Design Manual* guidelines for flexible pavements. Based on a design R-value test of 50 (Zeiser, 2005) and for Traffic Indices (TIs) of 4.5 and 5.5 generally associated with these types of projects, the following preliminary section was estimated:

PRELIMINARY MINIMUM PAVEMENT SECTIONS		
Area	TI	Flexible Pavement*
Parking Area	4.5	3" AC/4" AB
Local Street/Drive Area	5.5	3" AC/4" AB

*AC = Asphalt Concrete, AB = Aggregate Base.

Traffic Indices used in our pavement design are considered a reasonable value for the proposed pavement areas and should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from the paving may result in premature pavement failure. Traffic parameters used for design were selected based upon engineering judgment and not upon information furnished to us such as an equivalent wheel load analysis or a traffic study.

The recommended pavement section is intended as a minimum guideline and final selection of pavement cross section parameters should be made by the project civil engineer, based upon the local laws and ordinates, expected subgrade and pavement response, and desired level of conservatism. If thinner or highly variable pavement sections are constructed, increased

maintenance and repair could be expected. Final pavement design should be checked by testing of soils exposed at subgrade (the upper foot) after final grading has been completed.

Asphalt concrete and aggregate base should conform to current Caltrans Standard Specifications Section 39 and 26-1.02, respectively. As an alternative, asphalt concrete can conform to Section 203-6 of the current Standard Specifications for Public Work (Green Book). Crushed aggregate base or crushed miscellaneous base can conform to Section 200-2.2 and 200-2.4 of the Green Book, respectively. Pavement base should be compacted to at least 95 percent of the ASTM D1557 laboratory maximum dry density (modified proctor).

All pavement installation, including preparation and compaction of subgrade, compaction of base material, placement and rolling of asphaltic concrete, should be done in accordance with the City of Adelanto/San Bernardino County specifications, and under the observation and testing of GeoTek and a City/County Inspector where required. Jurisdictional minimum compaction requirements in excess of the aforementioned minimums may govern.

Deleterious material, excessive wet or dry pockets, oversized rock fragments, and other unsuitable yielding materials encountered during grading should be removed. Once existing compacted fill are brought to the proposed pavement subgrade elevations, the subgrade should be proof-rolled in order to check for a uniform and unyielding surface. The upper 12 inches of pavement subgrade soils should be scarified, moisture conditioned at or near optimum moisture content, and recompacted to at least 95 percent of the laboratory maximum dry density (ASTM D1557). If loose or yielding materials are encountered during construction, additional evaluation of these areas should be carried out by GeoTek. All pavement section changes should be properly transitioned.

6.3.10 Concrete Construction

6.3.10.1 Exterior Concrete Flatwork

Exterior concrete flatwork (sidewalks, driveways, patios, etc.) should have a minimum thickness of four inches. No specific reinforcement is required due to the non-structural nature. However, the use of some reinforcement should be considered. Some shrinkage and cracking of the concrete should be anticipated as a result of typical mix designs and curing practices commonly utilized in residential construction.

"Very low" expansive subgrade soils below exterior concrete flatwork should be pre-saturated to at least 100 percent of optimum moisture content. Minimum depth of pre-saturation should be 12 inches.

Sidewalks and driveways may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria would apply, if more restrictive than the recommendations presented in this report.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with the City of Adelanto/San Bernardino County specifications, and under the observation and testing of GeoTek and a City/County inspector, if necessary.

6.3.10.2 Concrete performance

Concrete cracks should be expected. These cracks can vary from sizes that are essentially unnoticeable to more than 0.125-inch in width. Most cracks in concrete, while unsightly, do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete can also undergo chemical processes that are dependent upon a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two orthogonal directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

6.4 POST CONSTRUCTION CONSIDERATIONS

6.4.1 Landscape Maintenance and Planting

Water has been shown to weaken the inherent strength of soil, and slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from graded slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Controlling surface drainage and runoff and maintaining a suitable vegetation cover can minimize erosion. Plants selected for landscaping should be lightweight, deep-rooted types that require little water and are capable of surviving the prevailing climate.

Overwatering should be avoided. Care should be taken when adding soil amendments to avoid excessive watering. An abatement program to control ground-burrowing rodents should be implemented and maintained. This is critical as burrowing rodents can decrease the long-term performance of slopes.

It is common for planting to be placed adjacent to structures in planter or lawn areas. This will result in the introduction of water into the ground adjacent to the foundation. This type of landscaping should be avoided.

6.4.2 Drainage

The need to maintain proper surface drainage and subsurface systems cannot be overly emphasized. Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond or seep into the ground adjacent to the footings. Roof leaders and downspouts should discharge onto paved surfaces sloping away from the structure or into a closed pipe system which outfalls to the street gutter pan or directly to the storm drain system. Pad drainage should be directed toward approved areas and not be blocked by other improvements.

It is the owner's responsibility to maintain and clean drainage devices on or contiguous to their lot. In order to be effective, maintenance should be conducted on a regular and routine schedule and necessary corrections made prior to each rainy season.

6.5 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

We recommend that foundation plans for the site be reviewed by this office prior to construction to check for conformance with the recommendations of this report. We also recommend that GeoTek representatives be present during construction of foundation and other improvements to observe and document proper implementation of the geotechnical recommendations. The owner/developer should verify that GeoTek representatives perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of unsuitable materials.
- Observe and test remedial grading operations.
- Observe the fill for uniformity during placement, including utility trench backfill. Also, perform field density testing of the fill materials.

- Observe and probe foundation excavations to confirm suitability of bearing materials with respect to density.
- Observe retaining wall backfill and backdrain.

If requested, a construction observation and compaction report can be provided by GeoTek, which can comply with the requirements of the governmental agencies having jurisdiction over the project.

7 INTENT

It is the intent of this report to aid in the design and construction of the proposed development. Implementation of the advice presented in this report is intended to reduce risk associated with construction projects. The professional opinions and geotechnical advice contained in this report are not intended to imply total performance of the project or guarantee that unusual or variable conditions will not be discovered during or after construction.

The scope of our report is limited to the boundaries of the subject property. This update does not and should in no way be construed to encompass any areas beyond the specific area of the proposed construction as indicated to us by our client. Further, no evaluation of any existing site improvements is included. The scope is based on our understanding of the project and the client's needs, our fee estimate (Proposal No. P-0102522-CR) date January 10, 2022 and geotechnical engineering standards normally used on similar projects in this locality at the present.

8 LIMITATIONS

Our findings are based on site conditions observed and the stated sources. Thus, our comments are professional opinions that are limited to the extent of the available data.

GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Since our recommendations are based on the site conditions observed and encountered, and laboratory testing, our conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty of any kind is expressed or implied. Standards of care/practice are subject to change with time.

9 SELECTED REFERENCES

American Concrete Institute (ACI), 2006, Publication 302.2R-06, Guide for Concrete Slabs That Receive Moisture Sensitive Flooring Materials.

_____, 2010, Publications 360R-10, Guide to Design of Slabs-On-Ground.

American Society of Civil Engineers (ASCE), 2017, "Minimum Design Loads for Buildings and Other Structures," ASCE/SEI 7-16.

Blue Engineering & Consulting, Inc., Undated, "348 Unit Multi-Family Residential, Adelanto".

California Code of Regulations, Title 24, 2019, "California Building Code," 2 volumes.

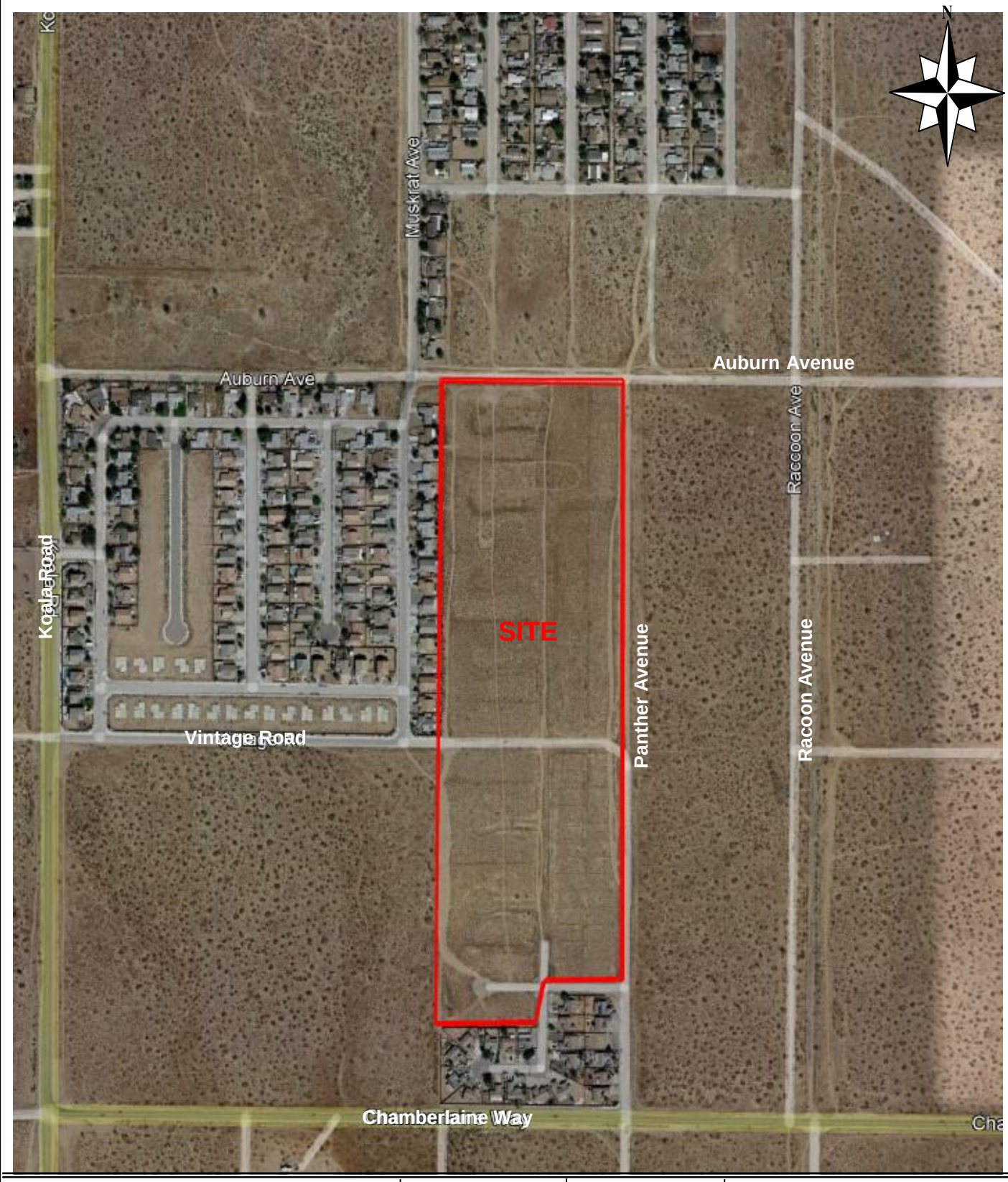
California Department of Water Resources, Water Data Library.

California Division of Mines and Geology (CDMG), 2008, "Guidelines for Evaluating and Mitigating Seismic Hazards in California," Special Publication 117A.

Dibblee, T.W., 1960, "Preliminary Geologic Map of the Victorville Quadrangle, California," US Geological Survey, Mineral Investigations Field Studies Map MF-229, 1:62,500.

Roberge, P.R., 2005, "From Corrosion Basics: An Introduction", 2nd Edition.

Zeiser Kling Consultants, Inc., 2005, "Geotechnical Feasibility Investigation, Proposed Residential Development, Panther Avenue and Crippen Avenue, City of Adelanto, San Bernardino County, California," PN 05116-00, dated October 6.



Vintage 145 LLC
29-Acre Residential Site
APNs 0459-014-11 and -35
Adelanto, San Bernardino County, California

Project No. 3057-CR

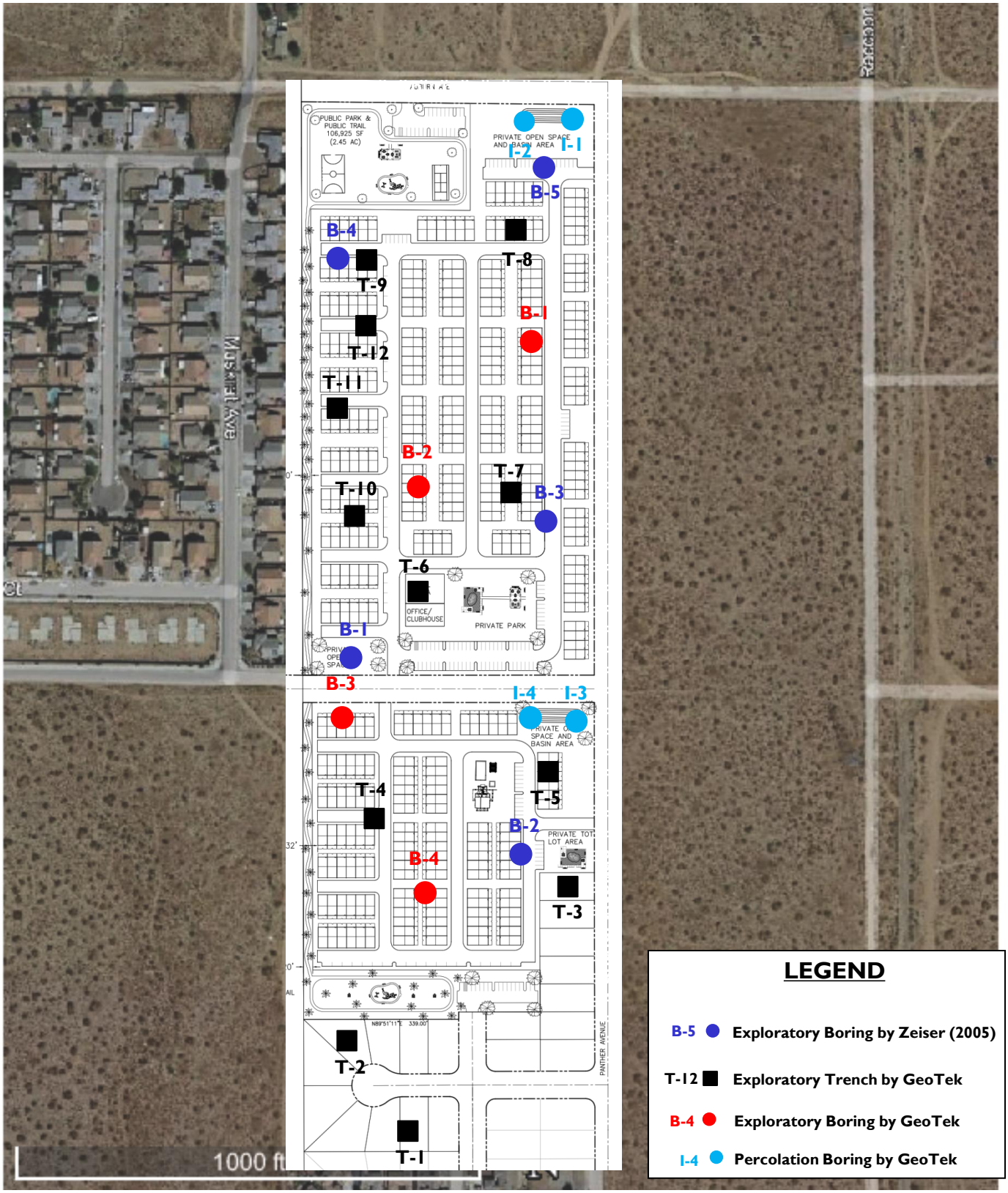
Scale:
As Shown

0 400 ft

Figure 1

Site Location Map

GEOTEK



LEGEND

- B-5 ● Exploratory Boring by Zeiser (2005)
- T-12 ■ Exploratory Trench by GeoTek
- B-4 ● Exploratory Boring by GeoTek
- I-4 ● Percolation Boring by GeoTek

Vintage 145 LLC
29-Acre Residential Site
APNs 0459-014-11 and -35
Adelanto, San Bernardino County, California

Project No. 3057-CR

Scale: As Shown

Figure 2

Exploration Location Map

GEOTEK

APPENDIX A

LOGS OF EXCAVATIONS AND LABORATORY TEST RESULTS BY ZEISER KLING CONSULTANTS, INC (2005)

Updated Geotechnical and Infiltration Evaluation

Adelanto, San Bernardino County, California

Project No. 3057-CR

GEOTEK

LOG OF EXPLORATORY BORING

Project:	**Crippen and Panther**	Boring No.:	**B-1**
Project Number:	**05116-00**	Driller:	**2R Drilling**
		Drill Type:	**HSA**
Date Drilled:	**9/6/05**	Hammer Wt. / Drop:	**140lb / 30in**
Logged By:	**JNR**	Ground Elev. [ft]:	**---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
						Total Depth: 30 feet below ground surface. No groundwater encountered. Backfilled with cuttings on 9/6/2005.			

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project: **Crippen and Panther**
Project Number: **05116-00**
Date Drilled: **9/6/05**
Logged By: **JNR**

Boring No.: **B-1**
Driller: **2R Drilling**
Drill Type: **HSA**
Hammer Wt. / Drop: **140lb / 30in**
Ground Elev. [ft]: **---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
			8 18 35	3.7	118	**Artificial Fill (Af):** @0 feet: Silty Fine SAND (SM): Brown, very fine to fine grained, slightly micaceous, damp to moist, dense.			
			17 35 36	4.8	118	**Alluvium (Qal):** @2 feet: Silty Fine SAND (SM): Reddish brown, very fine to fine grained, less silty than above, slightly micaceous, damp to moist, very dense.		RV	
5			6 8 10	3.0	112	@5 feet: Silty Fine SAND (SM): Reddish brown, very fine to fine grained, more than above, slightly micaceous, damp to moist, medium dense.		GS	
10			10 27 36	6.1	118	@10 feet: Silty SAND (SM): Reddish brown, fine grained sand, slightly micaceouse, few caliche in upper portion of sample, moist, very dense.			
15			10 23 27	5.4	121	@15 feet: Silty Fine SAND (SM): Grayish brown, very fine to fine grained, slightly micaceous, dense.			
20			10 20 23			@20 feet: Poorly graded SAND (SP): Light brown, very fine to medium grained with some coarse, moist, dense.			
25			15 40 50/5"	1.4	113	@25 feet: Poorly graded SAND (SP): Light reddish brown, fine to medium grained with some coarse, moist, very dense.			
			7 18 19			@28.5 feet: Poorly graded SAND (SP): Light reddish brown, fine to medium grained, moist, dense.			

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project: **Crippen and Panther**
Project Number: **05116-00**
Date Drilled: **9/6/05**
Logged By: **JNR**

Boring No.: **B-2**
Driller: **2R Drilling**
Drill Type: **HSA**
Hammer Wt. / Drop: **140lb / 30in**
Ground Elev. [ft]: **---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
			16 18 15	1.2	116	**Artificial Fill (Af):** @0 feet: Silty Fine SAND (SM): Brown, very fine to fine grained, dry to damp, medium dense.			
			5 12 15	2.0	115	**Alluvium (Qal):** @2 feet: Silty Fine SAND (SM): Brown, very fine to fine grained, dry to damp, medium dense.			
5			18 32 40	7.9	127	@5 feet: Silty Clayey Fine SAND (SC): Brown, very fine to fine grained, more fines than above, damp, very dense.	>4.50	AL,CO,SU	
10			22 50	3.6	119	@12 feet: Poorly graded SAND (SP): Brown, fine to medium grained with few coarse, damp to moist, very dense.			
15			30 50/4"	6.3	108	@17 feet: Silty SAND to Poorly graded SAND (SM/SP): Brown, very fine to fine grained with some medium, damp, very dense.	>4.50		
20			15 27 27			@22 feet: Poorly graded SAND (SP): Very light brown, very fine to medium grained, damp to moist, very dense.			
25			18 30 40	0.8	106	@27 feet: Poorly graded SAND (SP): Very light reddish brown, very fine to medium grained with some coarse, dry to damp, dense.			

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project: **Crippen and Panther**
Project Number: **05116-00**
Date Drilled: **9/6/05**
Logged By: **JNR**

Boring No.: **B-2**
Driller: **2R Drilling**
Drill Type: **HSA**
Hammer Wt. / Drop: **140lb / 30in**
Ground Elev. [ft]: **---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
						@12 feet: Poorly graded SAND (SP): Brown, fine to medium grained with few coarse, damp to moist, very dense. *(continued)*			
			7 13 18			@32 feet: Poorly graded SAND (SP): Very light reddish brown, fine to medium grained with some coarse, moist, dense.			
35									
			18 28 40	0.9	106	@37 feet: Poorly graded SAND (SP): Very light reddish brown, fine to medium grained with some coarse, moist, very dense.			
40									
			15 23 30			@42 feet: Poorly graded SAND (SP): Light brown, very fien to medium grained with few coarse, moist, very dense.			
45									
			29 23 45	13.7	117	@47 feet: Silty SAND to Poorly graded SAND (SM/SP): Brown, very fine to fine grained, moist, very dense.	>4.50		
50									
			10 25 32			@52 feet: Poorly graded SAND (SP): Brown, very fine to fine grained with few medium and coarse, moist, very dense.			
55									
			32 50/4"	9.0	107	@57 feet: Silty Fine SAND (SM): Light reddish brown, very fine to fine grained, moist, very dense.			
			10 4 8			@58.5 feet: SILT (ML): Reddish brown, clayey, few caliche stringers, moist, firm.			

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project:	**Crippen and Panther**	Boring No.:	**B-2**
Project Number:	**05116-00**	Driller:	**2R Drilling**
		Drill Type:	**HSA**
Date Drilled:	**9/6/05**	Hammer Wt. / Drop:	**140lb / 30in**
Logged By:	**JNR**	Ground Elev. [ft]:	**---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
						Total Depth: 60 feet below ground surface. No groundwater encountered. Backfilled with cuttings on 9/6/2005.			

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project: **Crippen and Panther**
Project Number: **05116-00**
Date Drilled: **9/7/05**
Logged By: **MZ**

Boring No.: **B-3**
Driller: **2R Drilling**
Drill Type: **HSA**
Hammer Wt. / Drop: **140lb / 30in**
Ground Elev. [ft]: **---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
			14 20 20	3.8	120	**Artficial Fill (Af):** @0 feet: Silty Fine SAND (SM): Brown, damp, dense.		DS,MAX	
5			5 13 24	6.4	117	@1 foot: Silty SAND (SM): Yellow brown, fine grained sand with trace of medium and coarse, damp, dense. **Alluvium (Qal):** @5 feet: Silty SAND (SM): Yellow brown, fine grained, caliche straining on roots, damp, dense.			
10			22 45 50/5"	6.5	132	@10 feet: (top) Silty SAND (SM): Brown, caliche filled pores, damp, very dense. (bottom) Silty SAND (SM): Light gray, trace of clay, caliche straining, roots, pinhole porosity, damp, very dense.	>4.50		
15			23 44 50/5"	1.9	120	@15 feet: Silty SAND (SM): Light brown, fine grained, dry to damp, very dense.			
20			50/6"	3.0	106	@20 feet: Well graded SAND (SW): Yellowish brown to brown, trace of fine gravel, damp, very dense.			
25			16 50/6"	1.9	106	@25 feet: Well graded SAND (SW): Yellowish brown to brown, trace of fine gravel, damp, very dense.			

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project: **Crippen and Panther**
Project Number: **05116-00**
Date Drilled: **9/7/05**
Logged By: **MZ**

Boring No.: **B-3**
Driller: **2R Drilling**
Drill Type: **HSA**
Hammer Wt. / Drop: **140lb / 30in**
Ground Elev. [ft]: **---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
			13 25 35	0.9		@30 feet: Well graded SAND (SW): Yellowish brown to brown, trace of fine gravel, damp, dense.			
						Total Depth: 31.5 feet below ground surface. No groundwater encountered. Backfilled with cuttings on 9/7/2005			

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project: **Crippen and Panther**
Project Number: **05116-00**
Date Drilled: **9/7/05**
Logged By: **MZ**

Boring No.: **B-4**
Driller: **2R Drilling**
Drill Type: **HSA**
Hammer Wt. / Drop: **140lb / 30in**
Ground Elev. [ft]: **---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
			13 23 25	7.1	120	**Artificial Fill (Af):** Silty Fine SAND (SM): Brown, dry to damp. @1 foot: (top) Silty SAND (SM): Light brown, damp, dense. (bottom) Silty SAND (SM): Brown, mottled with caliche, damp, dense.	>4.50		
5			9 20 42	4.2	118	**Alluvium (Qal):** @5 feet: Silty SAND (SM): Brown, fine grained with trace of medium and coarse, damp, dense.			
10			17 28 36	7.7	118	@10 feet: Silty SAND (SM): Light brown to yellowish brown, fine grained, slight porosity, damp, dense.			
15			13 26 50/5"	2.7	118	@15 feet: Sandy SILT (ML): Light grayish brown, fine to medium grained sand, damp, hard.			
20			12 28 20			@20 feet: Silty SAND and Sandy SILT (SM & ML): Light yellow brown, interbedded, damp, dense/hard.			
25			25 50/5"	5.9	100	@25 feet: Sandy SILT (ML): Light yellowish brown, fine grained sand, slight oxidation, damp, hard.	>4.50	CP	

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project: **Crippen and Panther**
Project Number: **05116-00**
Date Drilled: **9/7/05**
Logged By: **MZ**

Boring No.: **B-4**
Driller: **2R Drilling**
Drill Type: **HSA**
Hammer Wt. / Drop: **140lb / 30in**
Ground Elev. [ft]: **---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
			16 27 45	1.8	109	@30 feet: Silty SAND (SM): Light yellowish brown, fine grained sand, slight oxidation, very damp.			
						Total Depth: 31.5 feet below ground surface. No groundwater encountered. Backfilled with cuttings 9/7/2005.			

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project:	**Crippen and Panther**	Boring No.:	**B-5**
Project Number:	**05116-00**	Driller:	**2R Drilling**
		Drill Type:	**HSA**
Date Drilled:	**9/7/05**	Hammer Wt. / Drop:	**140lb / 30in**
Logged By:	**MZ**	Ground Elev. [ft]:	**---**

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
			8 16 33	4.5	122	**Artificial Fill (Af):** @ Surface: Moderate weeds, ant hills and burrows. @2 feet: Silty SAND (SM): Light brown, fine grained with trace of coarse, damp, medium dense.			
5						**Alluvium (Qal):** @7 feet: Silty SAND (SM): Light brown to grayish brown, slight porosity, caliche straining, slight oxidations, damp, very dense.			
			50/6"	5.0	108			DS	
10									
			20 31 50	4.5	118	@12 feet: (top) Sandy SILT (ML): Grayish brown, trace of caliche stringers, damp, hard. (bottom) Silty SAND (SM): Grayish brown, damp, very dense.	>4.50		
15									
			11 21 32			@17 feet: Silty to Clayey SAND (SM/SC): Grayish brown, fine to medium grained, damp, very dense.			
20									
			50/6"	2.1	106	@22 feet: Silty SAND (SM): Brown, trace of clay, trace of gravel, damp, very dense.			
25									
			13 14 15			@27 feet: Well graded SAND (SW): Light yellowish brown, fine to coarse grained, dry to damp, medium dense.			
						Total Depth: 28.5 feet below ground surface.			

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

LOG OF EXPLORATORY BORING

Project: **Crippen and Panther**
Project Number: **05116-00**

Date Drilled: **9/7/05**
Logged By: **MZ**

Boring No.: **B-5**
Driller: **2R Drilling**
Drill Type: **HSA**
Hammer Wt. / Drop: **140lb / 30in**
Ground Elev. [ft]: **---**

Depth [ft]	Graphic Log	Sample Type	Blows/6"	Moisture Content [%]	Dry Density, [pcf]	SOIL DESCRIPTION and CLASSIFICATION (USCS)	Pocket Pen. [tsf]	Lab Tests	Remarks
						No groundwater encountered. Backfilled with cuttings on 9/7/2005.			

Standard Split Spoon | Shelby Tube | Water Level ATD
California | Bulk Sample | Static Water Table

HS BA TP 05116-00 HS.GPJ ZKCI.GDT 10/6/05

ZEISER KLING Consultants, Inc.

APPENDIX C

LABORATORY TEST PROCEDURES

VISUAL CLASSIFICATION OF SOILS

As a part of the routine laboratory soil testing, the soil samples are visually classified in accordance with the Unified Soil Classification System by experienced laboratory technicians. If necessary, in order to verify the visual classification, selected samples are classified utilizing the results of Standard Classification tests performed in accordance with ASTM D2487-00.

MOISTURE AND DENSITY TESTING

Moisture content and dry density determinations were performed on relatively undisturbed samples obtained from the exploratory excavations. The results of these tests are presented on the borings logs (Appendix B). Where applicable, only moisture content is determined from "undisturbed" or disturbed samples.

MAXIMUM DRY DENSITY TESTS

The maximum dry density and optimum moisture content of selected earth materials were determined in general accordance with ASTM D1557-02. The results of these tests are presented in the Laboratory Summary below.

ATTERBERG LIMITS

The Atterberg limits were performed in general accordance with (ASTM D4318-00 and are used frequently in soil classification and identification. The soil descriptions defined by the United Soil Classification System (USCS) are based on these limits. Fine-grained soils are classified in the laboratory by performing several tests that define the plastic and liquid limits. The results of these tests are presented graphically as an attachment in this Appendix.

DIRECT SHEAR TESTS

Direct shear tests were performed in general accordance with ASTM D3080-98 on selected remolded and relatively undisturbed samples that were pre-soaked for a minimum of 24 hours. The samples were then tested under various normal loads with a different specimen being used for each normal load. The samples were sheared in a motor driven, strain-controlled direct shear testing apparatus at a strain rate of 0.05 inches per minute. The results of this test are presented in the Laboratory Summary in the tables below as well as graphically.

CORROSION TEST (BY OTHERS)

The corrosion test, including sulfate content, was performed by M.J. Schiff, and the results are presented in the attached results in this Appendix.

APPENDIX C (CONT'D)

LABORATORY TEST PROCEDURES

PERCENT PASSING NO. 200 SIEVE

Representative samples were dried, weighed, and soaked in water until individual soil particles were separated, and then washed on the No. 200 sieve. That portion of the material retained on the No. 200 sieve was oven-dried and weighed in accordance with ASTM D1140-00 to determine the percentage of fines. The results of this test are presented in the Laboratory Summary.

LABORATORY TEST RESULTS

Maximum Dry Density

Sample Location	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (percent)
B-3 @ 0'-5'	Brown Fine Silty Sand (SM)	130.0	8.5

Direct Shear

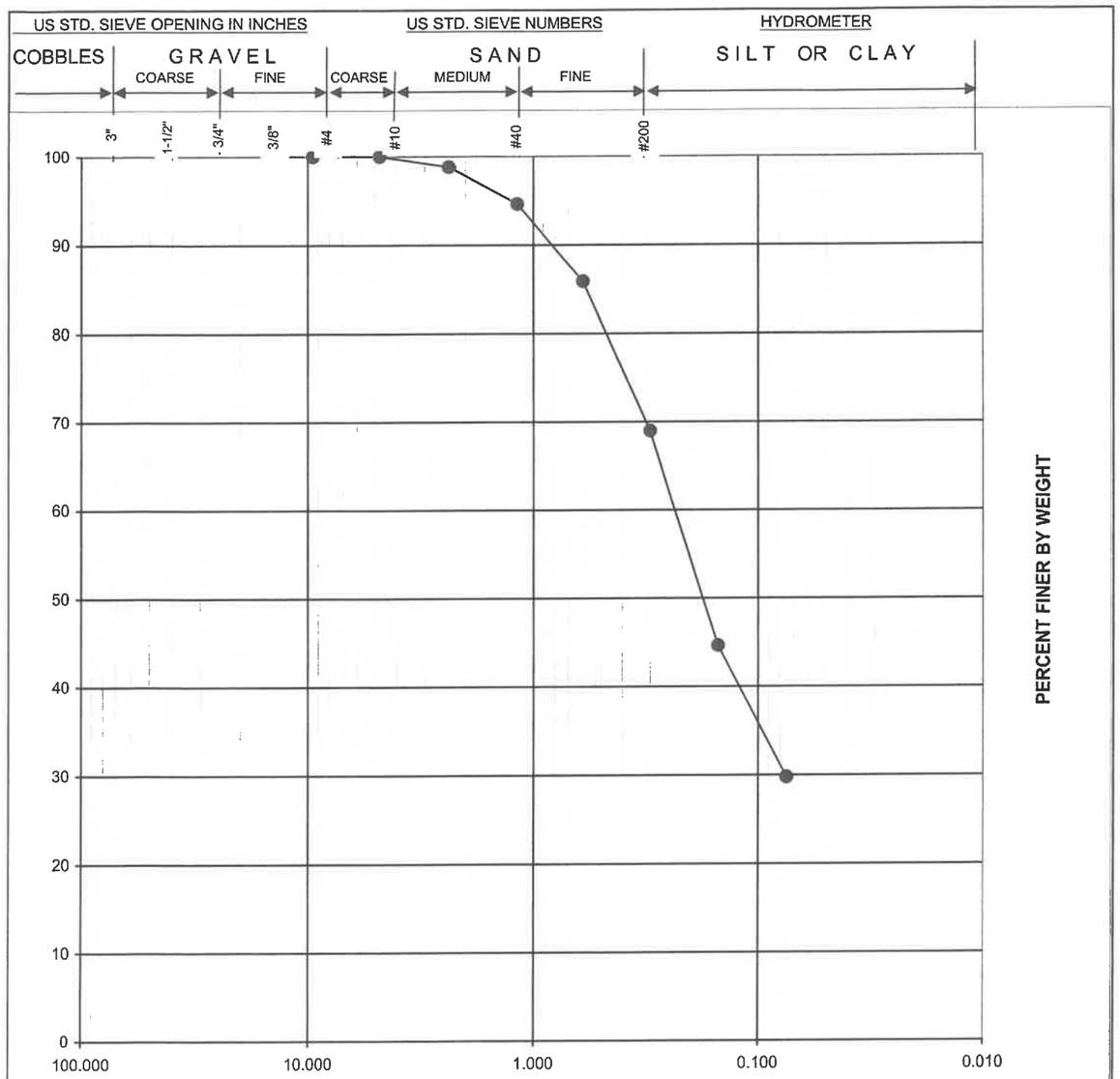
Sample Location	Soil Description	Cohesion (psf)	Friction Angle (degrees)
B-5 @ 7'	Light Brown Silty Sand (SM)	100	31

Percent Passing #200 Sieve

Sample Location	Soil Description	Percent Passing #200
B-1 @ 5'	Reddish Brown Silty Sand (SM)	29.8

R-Value

Sample Location	Soil Description	R-Value
B-1 @ 0-5'	Brown Silty Fine Sand (SM)	54



PROJECT NUMBER : 05116-00

PROJECT NAME : PANTHER & CRIPPEN

SAMPLE NO.	DEPTH	SYMBOL	CLASSIFICATION	NAT.W%	LL	PL	PI
B-1	5'	SM	REDDISH BROWN SILTY SAND		-	-	-

ZEISER KLING CONSULTANTS, INC.
1221 E. Dyer Road, Suite 105; Santa Ana, CA 92705
Tel: (714) 755-1355; Fax: (714) 755-1366

GRAIN - SIZE CURVE

PROJECT NAME : PANTHER & CRIPPEN PROJECT NO: 05116-00 DATE : 30-Sep-05

BORING NUMBER : B-2 SAMPLE NO./DEPTH : 5' TESTED BY : RMC

SAMPLE DESCRIPTIONS/CLASSIFICATION : BROWN SILTY CLAYEY SAND (SC)

PLASTIC LIMIT

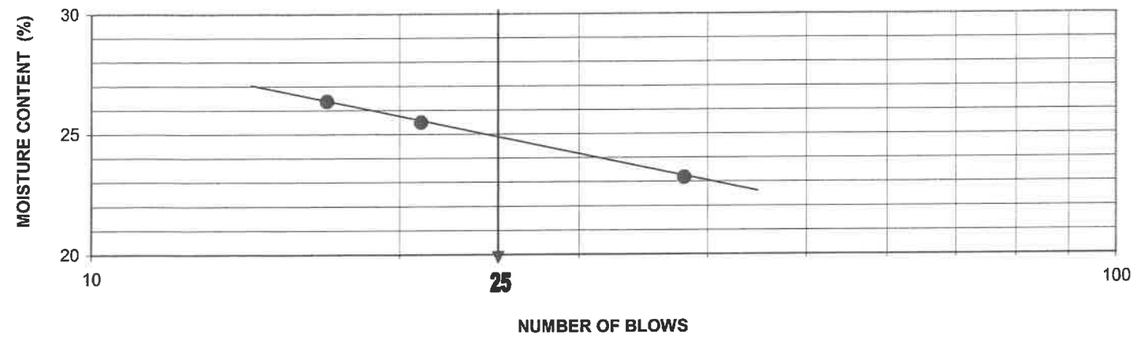
DETERMINATION NO	1	2
DISH NO.	30	
MASS OF DISH + WET SOIL,(Gms)	22.13	
MASS OF DISH + DRY SOIL,(Gms)	20.81	
MASS OF WATER,(Gms)	1.32	
MASS OF DISH,(Gms)	11.25	
MASS OF DRY SOIL,(Gms)	9.56	
MOISTURE CONTENT,(%)	13.81	

LIQUID LIMIT

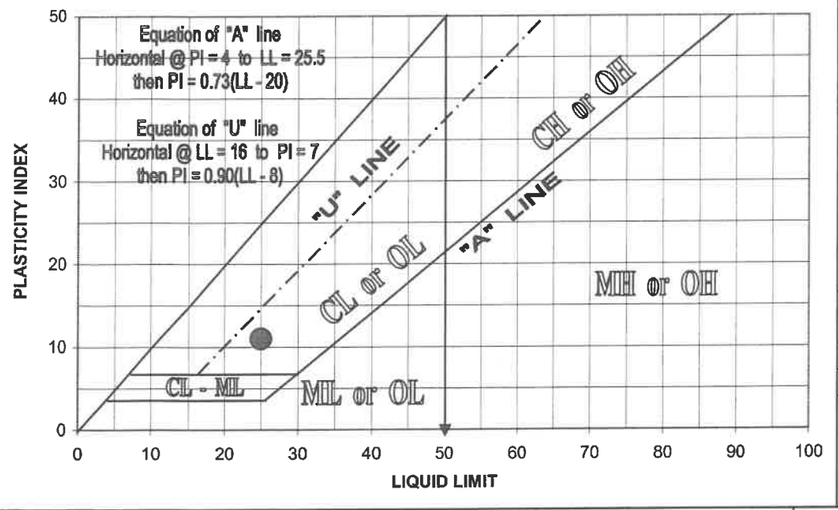
DETERMINATION NO.	1	2	3
DISH NUMBER	11	9	15C
MASS, DISH + WET SOIL,(Gms)	17.38	17.80	17.27
MASS, DISH + DRY SOIL,(Gms)	14.63	15.05	14.86
MASS OF WATER,(Gms)	2.75	2.75	2.41
MASS OF DISH,(Gms)	4.20	4.26	4.46
MOISTURE CONTENT,(%)	26.4	25.5	23.2
NUMBER OF BLOWS	17	21	38

NATURAL MOISTURE CONTENT,%

FLOW CURVE



PLASTICITY CHART



RESULT SUMMARY

NATURAL MOISTURE CONTENT, (%)	-
LIQUID LIMIT (LL)	25
PLASTIC LIMIT (PL)	14
PLASTICITY INDEX (PI)	11
SYMBOL FROM PLASTICITY CHART	CL

METHOD OF PREPARATION		METHOD OF LL DETERMINATION	
DRY	X	MULTIPOINT	X
WET		ONE-POINT	

REMARKS :

ZEISER KLING CONSULTANTS,INC.
1221 E. Dyer Road, Suite 105; Santa Ana, CA. 92705
Tel: (714) 755-1355; Fax: (714) 755-1366

ATTERBERG LIMITS

(ASTM D4318-00)

Project Name : PANTHER & CRIPPEN

Project No. : 05116-00

Sample Location : B-3 Depth : 0 - 5'

Sample Descriptions / Classification : BROWN SILTY FINE SAND (SM)

Date : 6-Oct-05

Tested By : RMC

Applied Normal Load (ksf)	1.0		2.0		4.0	
Shear Stress,(Peak) (ksf)	0.684		1.308		2.352	
Shear Stress,(Ultimate) (ksf)	0.660		1.248		2.316	
Density and Saturation	Initial	Final	Initial	Final	Initial	Final
Wet Weight of Soil + Ring (gms)	196.3	203.52	196.14	203.42	196.27	203.57
Dry Weight of Soil + Ring (gms)		184.39		184.23		184.36
Weight of Water (gms)	-	19.13	-	19.19	-	19.21
Weight of Ring (gms)	-	44.23	-	44.07	-	44.2
Weight of Dry Soil (gms)	-	140.16	-	140.16	-	140.16
Moisture Content (%)	8.5	13.7	8.5	13.7	8.5	13.7
Wet Density (pcf)	127.0	133.0	127.0	133.0	127.0	133.0
Dry Density (pcf)	-	117.0	-	117.0	-	117.0
Specific Gravity,G_s (Assumed)	2.68					
Thickness of Specimen, (in.)	1.00					
Degree of Saturation, (%)	53.0	85.2	53.0	85.4	53.0	85.5
Void Ratio	-	0.429	-	0.429	-	0.429

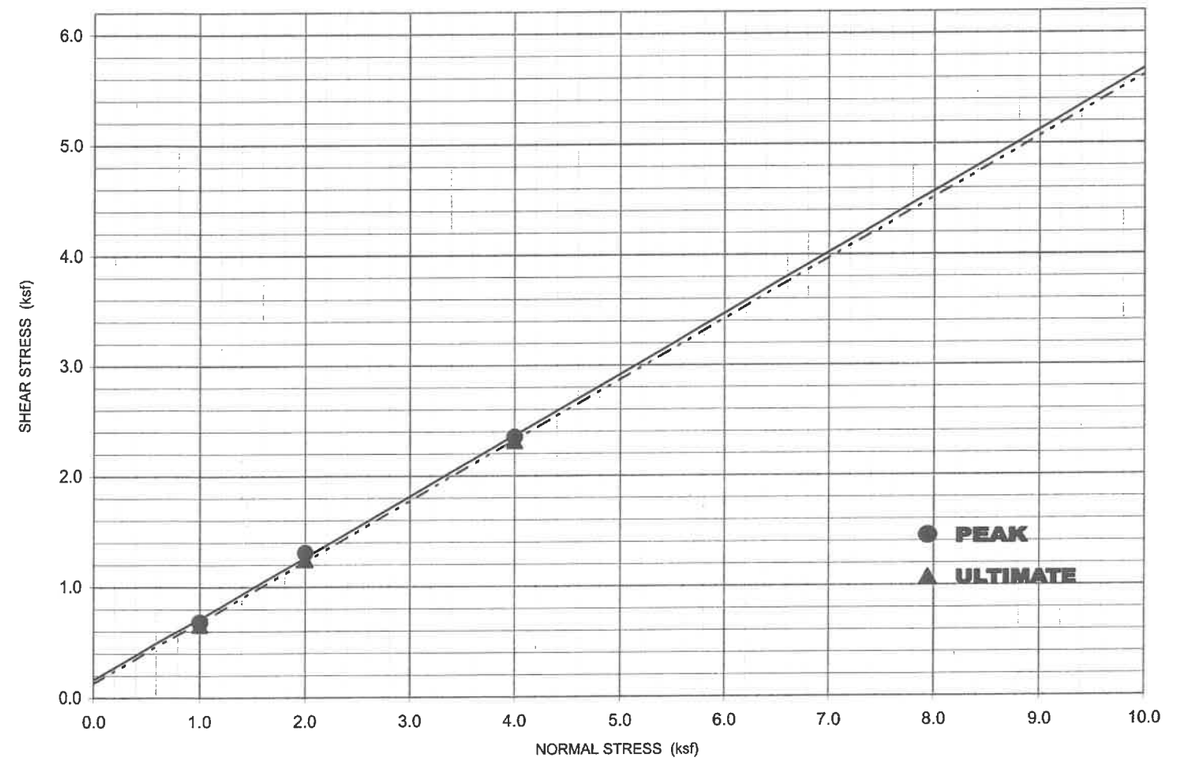
Lateral Displacement, d_h 0.3600 (in.)

Displacement Rate,d_r 0.05 (in./min.)

Elapsed Time of Test, t_e 7.20 (min.)

	PEAK	ULTIMATE
Cohesion,c (psf)	175	150
Friction Angle, ϕ	29	29

Remarks :



ZEISER KLING CONSULTANTS,INC.
1221 E. Dyer Road, Suite 105; Santa Ana, CA 92705
Tel: (714) 755-1355; Fax: (714) 755-1366

DIRECT SHEAR TEST
(ASTM D3080-03)

JOB NAME : PANTHER & CRIPPEN

JOB NUMBER: 05116-00

SAMPLE NUMBER :

TESTED BY : R.B

SAMPLE LOCATION : B - 3 @ 0 - 5'

DATE : 30-Sep-05

SAMPLE DESCRIPTIONS/CLASSIFICATION : DK. BROWN SILTY FINE SAND (SM)

TEST STANDARD	ASTM D-698 - 00			**ASTM D-1557- 02**		
METHOD	A	B	C	**A**	B	C
TRIAL NUMBER	1	2	3	4	5	
WATER ADDED (ML)	0	50	100	150		
WT. SOIL + MOLD (GMS)	3955	4066	4132	4110		
WT.OF MOLD (GMS)	2010	2010	2010	2010		
WT. OF WET SOIL (GMS)	1945	2056	2122	2100		
WET DENSITY (PCF)	128.6	136.0	140.3	138.9		
CAN NUMBER	R15	R1	R16	R10		
WET SOIL + TARE (GMS)	735.50	703.13	803.70	863.00		
DRY SOIL + TARE (GMS)	712.10	671.75	756.36	799.91		
TARE (GMS)	188.72	187.80	187.32	190.08		
DRY SOIL (GMS)	523.38	483.95	569.04	609.83		
WATER (GMS)	23.40	31.38	47.34	63.09		
MOISTURE CONTENT (%)	4.5	6.5	8.3	10.3		
DRY DENSITY (PCF)	123.1	127.7	129.6	125.9		

DIAMETER OF MOLD: 4 In.

VOLUME OF MOLD: 0.0333 Cu.Ft.

SCALPED ON SIEVE SIZE/NO.: #4

PERCENT RETAINED,(%) : -

MAXIMUM DRY DENSITY: 130.0 Pcf.

OPT. MOIST. CONTENT : 8.5 %

FOR OVERSIZE CORRECTION (ASTM D4718):

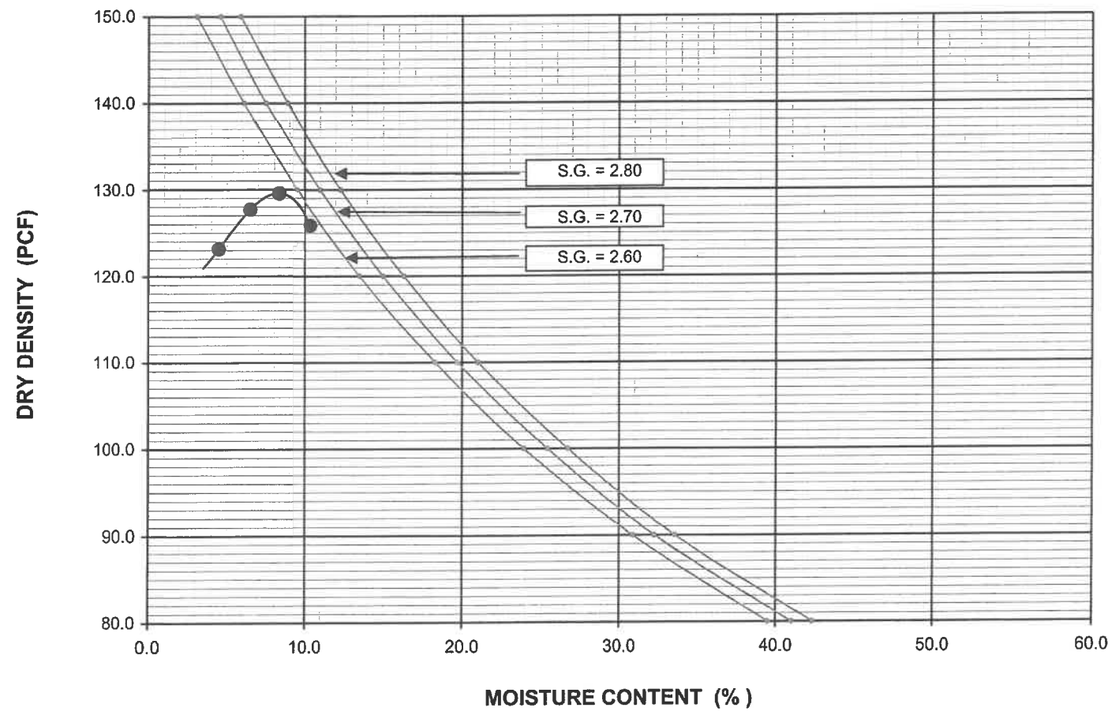
%,Finer Fraction = - % Moisture = -

%,Oversize Fraction = - Assumed Sp.Gr. 2.64

Corrected MDD of Total Materials,(PCF) = -

Corrected OMC of Total Materials, (%) = -

REMARKS :



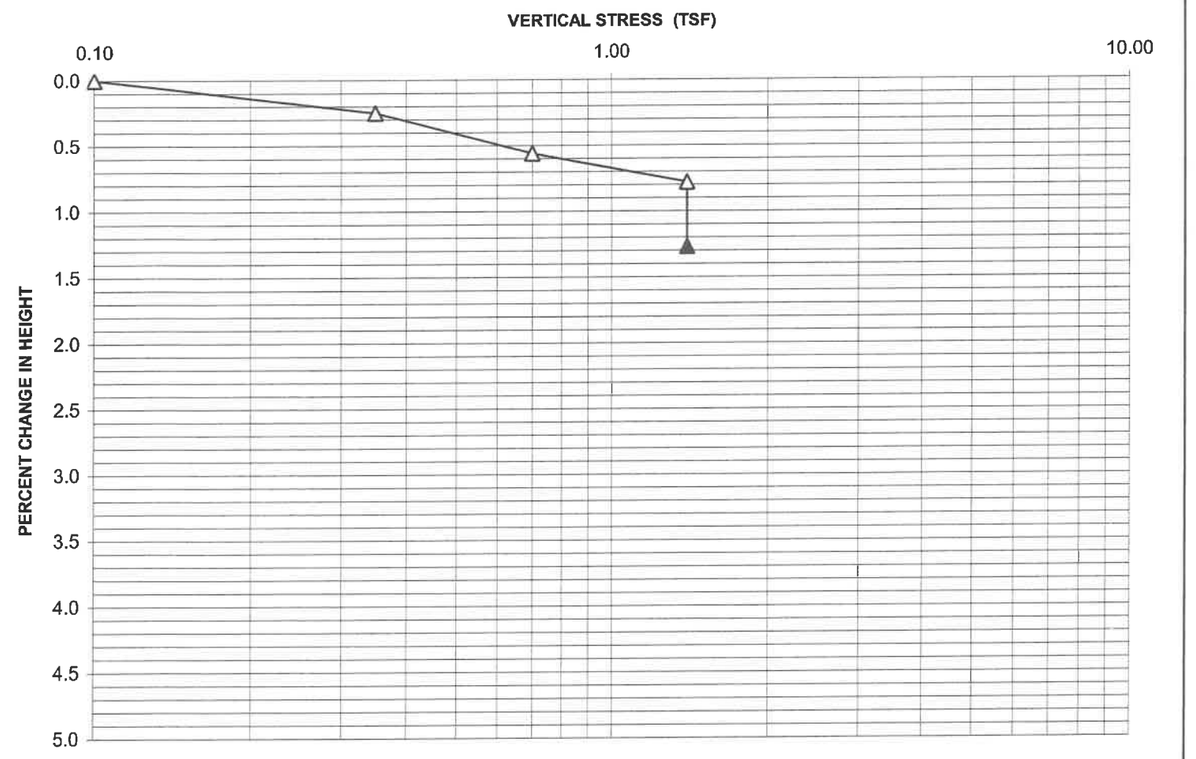
ZEISER KLING CONSULTANTS, INC.
1221 E. Dyer Road, Suite 105; Santa Ana, CA 92705
Tel: (714) 755-1355; Fax: (714) 755-1366

MAXIMUM DENSITY TEST

PROJECT:	PANTHER & CRIPPEN	NO. :	05116-00
BORING NO.:	B-4	SAMPLE NO. / DEPTH :	25'
APPROPRIATE VERTICAL STRESS	1.40	TSF	
FRAME NO. :	2	TECHNICIAN:	RMC
SOIL DESCRIPTIONS :	Lt. Br. Fine Sandt Silt to Silty Fine Sand (ML/SM)		
SPECIMEN TYPE :	Undisturbed sample	LIQUID LIMIT :	
REMARKS :	"Seat, load and inundate only - No time-rate"		
	Tap water was used		

MOISTURE & DENSITY DATA	BEFORE TEST	AFTER TEST
WET WEIGHT + RING,(g)	171.22	188.14
DRY WEIGHT + RING,(g)	165.32	165.32
WEIGHT OF WATER,(g)	5.9	22.82
WEIGHT OF RING,(g)		45.54
DRY WEIGHT OF SOIL,(g)	119.78	119.78
MOISTURE CONTENT,(%)	4.9	19.1
DRY DENSITY,(Pcf)	100.0	101.3

DATE OF READING	TIME	LOAD (KG)	STRESS (TSF)	DIAL READING (INCHES)	% CONSOL	DATE OF READING	TIME	LOAD (KG)	STRESS (TSF)	DIAL READING (INCHES)	% CONSOL
21-Sep-05	9:34	1.00	0.35	0.2000	0						
	10:36	2.00	0.70	0.2025	0.25						
	11:50	4.00	1.40	0.2056	0.56						
	12:58	(+) H_2O		0.2078	0.78						
9/22/2005	8:29			0.2117	1.17						
	10:34			0.2117	1.17						



COLLAPSE POTENTIAL, I_c (%)	COLLAPSE INDEX$_{(2\ TSF)}$, I_e (%)	DEGREE OF COLLAPSE
0.49		

ZEISER KLING CONSULTANTS, INC.
1221 E. Dyer Road, Suite 105; Santa Ana, CA. 92705
Tel: (714) 755-1355; Fax: (714) 755-1366

COLLAPSE POTENTIAL OF SOILS
(ASTM D5333-03)

Project Name : PANTHER & CRIPPEN

Project No. : 05116-00

Sample Location : B-5 Depth : 7'

Sample Descriptions / Classification : LT. BROWN SILTY SAND (SM)

Date : 22-Sep-05

Tested By : RMC

Applied Normal Load (ksf)	1.0		2.0		4.0	
Shear Stress,(Peak) (ksf)	0.732		1.296		2.892	
Shear Stress,(Ultimate) (ksf)	0.672		1.356		2.616	
Density and Saturation	Initial	Final	Initial	Final	Initial	Final
Wet Weight of Soil + Ring (gms)	183.37	199.44	184.39	200.42	184.14	200.08
Dry Weight of Soil + Ring (gms)		176.75		177.77		177.47
Weight of Water (gms)	-	22.69	-	22.65	-	22.61
Weight of Ring (gms)	-	44.26	-	45.4	-	44.08
Weight of Dry Soil (gms)	-	132.49	-	132.37	-	133.39
Moisture Content (%)	5.0	17.1	5.0	17.1	5.0	16.9
Wet Density (pcf)	116.2	129.5	116.1	129.4	117.0	130.2
Dry Density (pcf)	-	110.6	-	110.5	-	111.3
Specific Gravity,G_s (Assumed)	2.68					
Thickness of Specimen, (in.)	1.00					
Degree of Saturation, (%)	26.2	89.6	26.1	89.3	26.7	90.5
Void Ratio	-	0.512	-	0.514	-	0.502

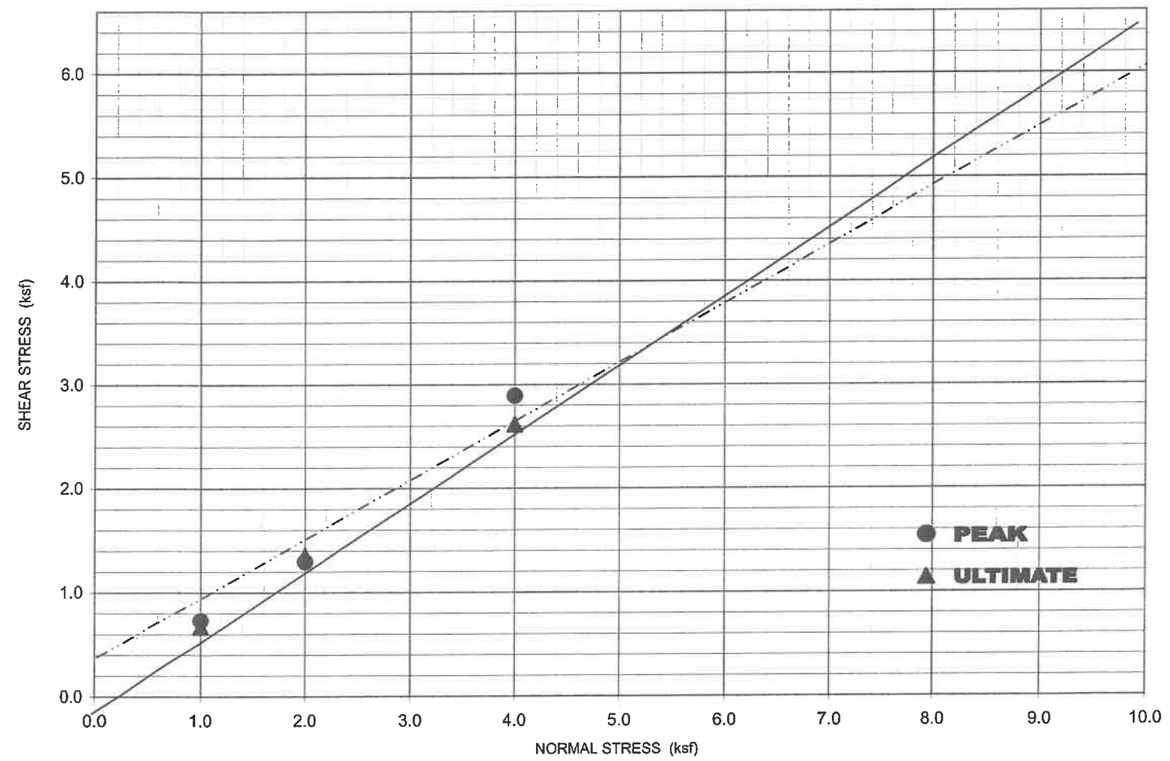
Lateral Displacement, d_h 0.3600 (in.)

Displacement Rate,d_r 0.05 (in./min.)

Elapsed Time of Test, t_e 7.20 (min.)

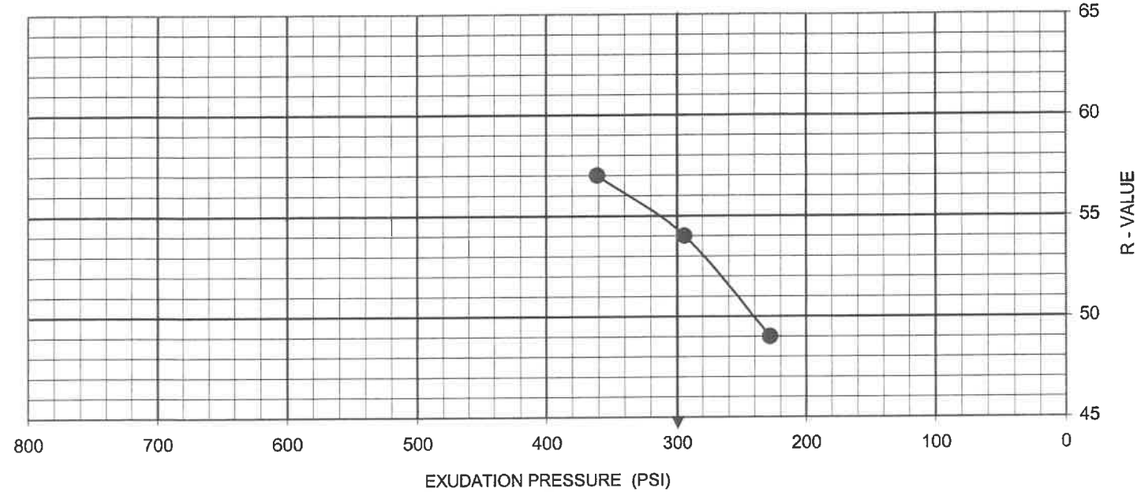
	PEAK	ULTIMATE
Cohesion,c (psf)	100	100
Friction Angle, ϕ	32	31

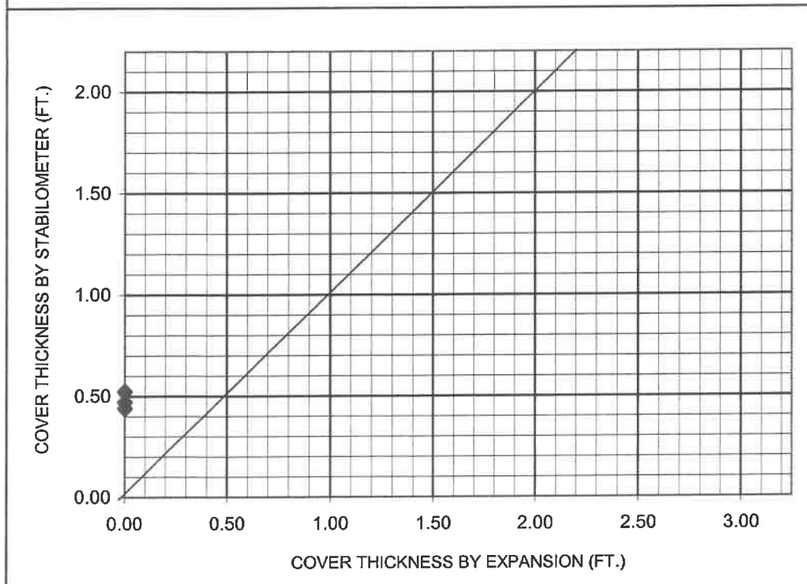
Remarks :



ZEISER KLING CONSULTANTS,INC.
1221 E. Dyer Road, Suite 105; Santa Ana, CA 92705
Tel: (714) 755-1355; Fax: (714) 755-1366

DIRECT SHEAR TEST
(ASTM D3080-03)





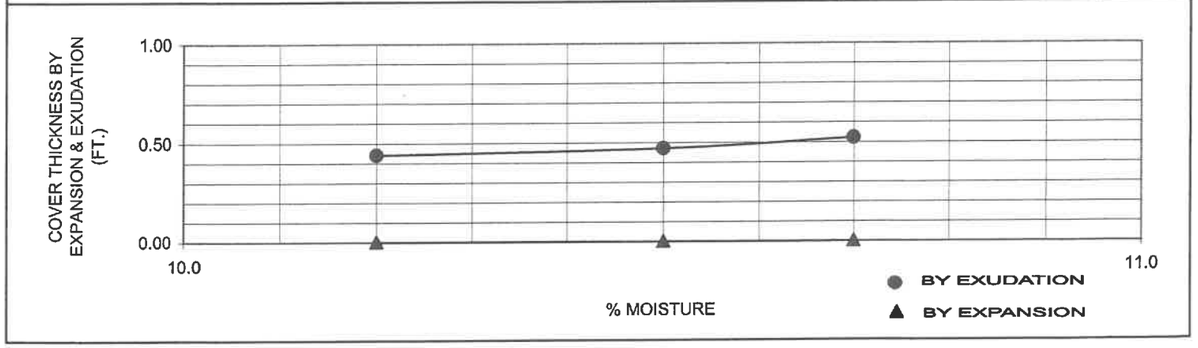
R - VALUE CURVES

05116-00
PROJECT NUMBER

PANTHER & CRIPPEN
PROJECT NAME

B-1 @ 0 - 5'
SAMPLE NO. / LOCATION

R - VALUES	
R-VALUE BY EXUDATION	54
R-VALUE BY EXPANSION	-
COVER THICKNESS (ft.)	-



M. J. Schiff & Associates, Inc.
Consulting Corrosion Engineers - Since 1959
431 W. Baseline Road
Claremont, CA 91711
Phone: (909) 626-0967 Fax: (909) 626-3316
E-mail lab@mjschiff.com
website: mjschiff.com

Table 1 - Laboratory Tests on Soil Samples

Zeiser Kling Consultants
Panther & Crippen
Your #05116-00, MJS&A #05-1395LAB
23-Sep-05

Sample ID			B-2 @ 5' SM / SC
Resistivity		**Units**	
as-received		ohm-cm	83,000
minimum		ohm-cm	2,400
pH			8.3
Electrical Conductivity		mS/cm	0.16
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	28
magnesium	Mg^{2+}	mg/kg	19
sodium	Na^{1+}	mg/kg	80
Anions			
carbonate	CO_3^{2-}	mg/kg	44
bicarbonate	HCO_3^{1-}	mg/kg	272
chloride	Cl^{1-}	mg/kg	20
sulfate	SO_4^{2-}	mg/kg	ND
Other Tests			
ammonium	NH_4^{1+}	mg/kg	na
nitrate	NO_3^{1-}	mg/kg	na
sulfide	S^{2-}	qual	na
Redox		mV	na

Minimum resistivity per CTM 643, sulfate per CTM 417, and chloride per CTM 422

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

APPENDIX B

LOGS OF TRENCHES AND BORINGS BY GEOTEK

Updated Geotechnical and Infiltration Evaluation
Adelanto, San Bernardino County, California
Project No. 3057-CR

GEOTEK

A - FIELD TESTING AND SAMPLING PROCEDURES

The Modified Split-Barrel Sampler (Ring)

The ring sampler is driven into the ground in accordance with ASTM Test Method D 3550. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler is typically driven into the ground 12 or 18 inches with a 140-pound hammer free falling from a height of 30 inches. Blow counts are recorded for every 6 inches of penetration as indicated on the logs of borings. The samples are removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

Bulk Samples (Large)

These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)

These are plastic bag samples which are normally airtight and contain less than five pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

B – BORING/TRENCH LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the logs of borings/trenches:

SOILS

USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium

GEOLOGIC

B: Attitudes	Bedding: strike/dip
J: Attitudes	Joint: strike/dip
C: Contact line	
……..	Dashed line denotes USCS material change
———	Solid Line denotes unit / formational change
———	Thick solid line denotes end of boring/trench

(Additional denotations and symbols are provided on the logs of borings/trenches).

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-1 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Fill:** Silty f-c SAND, light grayish brown, slightly moist, very dense, hard to excavate	2.4	108.9	
			SM/SP	**Alluvium**: Silty f-c SAND to f-c SAND, gray, slightly moist, dense	3.9	103.4	
5				Same as above	4.2	104.6	
			SM	Calcrete Zone, Silty f-c SAND, light gray, slightly moist, dense			
				TRENCH TERMINATED AT 8 FEET			
10				No groundwater encountered Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-2 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				Fill:			
			SM	Silty f-m SAND, light grayish brown, slightly moist, very dense	4.3	108.3	MD, SH, EI, SR
				Alluvium:			
			SM	Silty f-c SAND, light gray, slightly moist, dense	7.2	103.4	
5				becomes light grayish brown			
			ML/SM	Calcrete Zone, Sandy SILT to silty SAND, grayish brown, slightly moist, hard to very dense			
				TRENCH TERMINATED AT 8 FEET			
				No groundwater encountered			
10				Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring; ---Large Bulk; --Small Bulk; ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

TRENCH NO.: T-3

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Fill:** Silty f-c SAND, light brown, slightly moist, very dense	3.0	112.8	
			SM	**Alluvium**: Silty f-m SAND, light grayish brown, slightly moist, very dense	3.9	109.9	
5			SM/ML	Silty f SAND to sandy SILT, light brown, slightly moist, medium dense to stiff	6.0	98.1	
			SP	F-c SAND, brown, moist, medium dense to dense			
10				**TRENCH TERMINATED AT 9 FEET** No groundwater encountered Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-4 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Fill:** Silty f-c SAND, light brown, dry to slightly moist, medium dense			
			SM/ML	**Alluvium:** Silty f-m SAND to sandy SILT, light brown, slightly moist, dense	2.3	103.4	
5			SC-SM	Silty clayey f-c SAND, brown, slightly moist to moist, dense, some caliche/calcrete Becomes calcrete, hard to excavate	7.8	107.8	
			SM	Silty f-c SAND, light brown, slightly moist, dense			
10				**TRENCH TERMINATED AT 8 FEET** No groundwater encountered Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-5 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				Fill:			
			SM	Silty f-c SAND, light brown, slightly moist, very dense	1.8	109.2	
				Same as above	4.8	106.0	
			SM/ML	**Alluvium:** Silty f SAND to f sandy SILT, light brown, slightly moist, dense			
5			SM	Silty f-m SAND, light brown, slightly moist, medium dense	4.8	100.8	
				Silty f SAND, light grayish brown, slightly moist, some caliche			
				Calcrete Zone, silty f-c SAND, brown, moist			
				Same as above, no calcrete			
				TRENCH TERMINATED AT 8 FEET			
				No groundwater encountered			
10				Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-6 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				Fill:			
	X		SM	Silty f-c SAND, light brown, slightly moist, dense	3.1	108.2	
				Alluvium:			
			SM/ML	Silty f SAND to f sandy SILT, light brown, slightly moist, dense to very stiff	4.9	101.4	
5			SM	Silty f-c SAND, brown, slightly moist to moist, dense to very dense, some caliche becomes dense			
				TRENCH TERMINATED AT 8 FEET			
				No groundwater encountered			
10				Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring; ---Large Bulk; --Small Bulk; ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-7 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Fill:** Silty f-c SAND, light brown, slightly moist, very dense	2.0	115.0	
			SM-ML	**Alluvium:** Silty f SAND to f sandy SILT, light brown, slightly moist, medium dense to stiff	4.3	98.0	
5			SM	Silty f-c SAND, light brown to brown, moist, dense, trace caliche Same as above, some caliche/calcrete	8.5	101.6	
10				**TRENCH TERMINATED AT 8 FEET** No groundwater encountered Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-8 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				Fill:			
			SM	Silty f-c SAND, light brown, slightly moist, dense	3.3	109.1	
				Alluvium:			
5			SM	Silty f-c SAND, brown, moist, dense, some calcrete	10.2	105.0	
			SM/SC	Silty clayey f-c SAND, brown, moist, dense, few caliche concretions			
10				**TRENCH TERMINATED AT 9 FEET**			
				No groundwater encountered			
				Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-9 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Fill:** Silty f-m SAND, grayish brown, slightly moist, dense, some caliche	2.5	110.5	MD
			SM/ML	Silty f-m SAND to sandy SILT, light brown, slightly moist, dense to very stiff	4.8	107.3	
5			SM	**Alluvium:** Silty f-c SAND, brown, slightly moist, dense becomes moist	3.3	105.2	
			SM/SC	Silty clayey f-c SAND, brown, moist, dense, some caliche/ calcrete			
10				**TRENCH TERMINATED AT 9 FEET** No groundwater encountered Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring; ---Large Bulk; --Small Bulk; ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	**TRENCH NO.: T-10** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				Fill:			
			SM	Silty f-c SAND, light brown, slightly moist, dense	3.0	108.6	
				Alluvium:			
			SM/ML	Silty f-m SAND to sandy SILT, light grayish brown, slightly moist, medium dense to stiff	3.3	103.2	
5			SM	Silty f-c SAND, brown, slightly moist to moist, dense, trace caliche			
			SM/SC	Silty clayey f-c SAND, brown, moist, dense to very dense, some calcrete/ caliche			
			SM	Silty f-c SAND, brown, moist, dense, trace caliche			
10				**TRENCH TERMINATED AT 9 FEET** No groundwater encountered Trench backfilled with excavated soils			
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-11 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Fill:** Silty f-c SAND, light brown, slightly moist, medium dense to dense			
			SM/ML	**Alluvium:** Silty f SAND to sandy SILT, light grayish brown, slightly moist, medium dense to stiff	4.1	99.2	
			SM	Silty f-m SAND, light brown, slightly moist, dense	4.2	101.6	
5			SM/SC	Silty clayey f-c SAND, brown, slightly moist to moist, some caliche/calcrete	7.5	103.7	
				TRENCH TERMINATED AT 6 FEET			
				No groundwater encountered			
				Trench backfilled with excavated soils			
10							
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

CLIENT:	Vintage 145 LLC	**LOGGED BY:**	DRW
PROJECT NAME:	Auburn Avenue and Partner Avenue	**EQUIPMENT**	Backhoe
PROJECT NO.:	3057-CR	**DATE:**	2/7/2022
LOCATION:	See Exploration Location Map		

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blow Count	USCS Symbol	TRENCH NO.: T-12 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Fill:** Silty f-c SAND, light brown, slightly moist, medium dense to dense			
				Alluvium:			
			SM	Silty f SAND, light brown, slightly moist, medium dense	3.1	98.6	
				becomes brown, trace caliche	5.1	102.6	
5			SM/SC	Silty clayey f-c SAND, brown, slightly moist to moist, some caliche/calcrete			
				TRENCH TERMINATED AT 7 FEET			
				No groundwater encountered			
				Trench backfilled with excavated soils			
10							
15							

LEGEND

Sample type: ---Ring ---Large Bulk --Small Bulk ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Vintage 145 LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Auburn Ave and Panther Ave	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Cody
PROJECT NO.:	3057-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Adelanto, CA			**DATE:**	2/17/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	Boring No.: B-1 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		20 20 20	R1	SM	**Fill:** Silty f SAND, light grey-brown, slightly moist, medium dense, minor pinhole porosity	1.8	110.9	
		17 35 44	R2	SP	F SAND, trace silt, light brown, slightly moist, very dense, trace caliche	3.4	108.7	
5		50/6	R3	SM	**Alluvium:** Silty f-m SAND, light brown, slightly moist, very dense, trace caliche	2.9	101.4	
		50/6	R4		Same as above			
10		29 50/6	R5	SM/SC	Silty clayey f-c SAND, reddish-brown, moist, very dense	6.0	124.3	
15		15 21 30	R6	SM	Silty Vf-f Sand, light greyish-brown, dense, slightly moist			
20		40 50/5	R7	SP	F-c SAND, trace silt, yellowish-brown, slightly moist, very dense			
25					**BORING TERMINATED AT 21 FEET** Boring backfilled with excavated soils. No groundwater encountered.			
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Vintage 145 LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Auburn Ave and Panther Ave	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Cody
PROJECT NO.:	3057-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Adelanto, CA			**DATE:**	2/17/2022

Boring No.: B-2

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
					Fill:			
		12 21 31	R1	SM	Silty f SAND, yellowish-brown, slightly moist, dense	1.6	114.7	
5		16 17 15	R2	SM	**Alluvium:** Silty f-m SAND, yellowish brown, slightly moist, medium dense	1.4	110.8	
		10 21 35	R3	SM/SC	Silty f-m SAND, reddish-brown, slightly moist, dense to Silty clayey f-c SAND, reddish-brown, slightly moist, dense	1.9	115.3	HC
		50/6	R4	SW/SP	F-c SAND, reddish-brown, moist, very dense to f-m SAND, trace silt, yellowish-brown, slightly moist, very dense, trace caliche	2.2	106.2	
10		28 30 46	R5	SC/SM	Silty clayey f-m SAND, yellowish-brown, slightly moist, very dense, some caliche			
15		17 27 40	R6	SP	F SAND, trace silt, light grey-brown, slightly moist, very dense, some caliche			
20		50/6	R7		becomes reddish-brown, trace caliche			
					BORING TERMINATED AT 20.5 FEET Boring backfilled with excavated soils. No groundwater encountered.			
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Vintage 145 LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Auburn Ave and Panther Ave	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Cody
PROJECT NO.:	3057-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Adelanto, CA			**DATE:**	2/17/2022

Boring No.: B-3

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		40 50/5	R1	SM	**Fill:** Silty f-m SAND, brown, slightly moist, very dense	1.3	110.8	
		18 34 50/5	R2	SM/ML	Silty f SAND, yellow-brown, slightly moist, very dense to F sandy SILT, white, slightly moist, some caliche	4.3	115.4	HC
5		50/4	R3	SM/ML	**Alluvium:** Silty f SAND, light brown, slightly moist, very dense to Sandy SILT, white, slightly moist, very dense, some caliche	5.2		
		34 50/6	R4	SM	Silty f SAND, light brown, slightly moist, very dense, trace caliche	3.8	111.7	HC
10		22 32 40	R5	SM/SC	Silty f SAND, light brown, slightly moist, very dense to Silty clayey f-c SAND, reddish-brown, slightly moist, trace caliche			
15		18 34 37	R6					
20		19 34 50/5	R7					
25					**BORING TERMINATED AT 21.5 FEET** Boring backfilled with excavated soils. No groundwater encountered.			
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Vintage 145 LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Auburn Ave and Panther Ave	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Cody
PROJECT NO.:	3057-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Adelanto, CA			**DATE:**	2/17/2022

Boring No.: B-4

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
					Fill:			
	■	14 27 38	R1	SM	Silty f SAND, light brown, slightly moist, very dense	2.1	116.7	
5	■	40 50/4	R2	SM	**Alluvium:** Silty f-m SAND, reddish-brown, slightly moist, very dense, trace caliche	3.8	111.3	
	■	40 50/5	R3		becomes yellow-brown	5.2	99.6	
	■	37 50/5	R4		becomes reddish-brown, very dense	6.4	121.1	
10	■	33 50/5	R5	SP/SC	f SAND, brown, slightly moist, very dense to silty clayey f-c SAND, reddish-brown, moist, very dense			
15	■	16 18 48	R6	SM	Silty F SAND light greyish-brown, slightly moist, very dense, trace caliche			
20	■	30 50/3	R7		becomes brown			
					BORING TERMINATED AT 21 FEET Boring backfilled with excavated soils. No groundwater encountered.			
25								
30								

LEGEND

Sample type: ■ ---Ring ■ ---SPT ▨ ---Small Bulk ▩ ---Large Bulk □ ---No Recovery ▽ ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Vintage 145 LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Auburn Ave and Panther Ave	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Cody
PROJECT NO.:	3057-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Adelanto, CA			**DATE:**	2/17/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	Boring No.: I-1 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
	Ring	8 13 30	S1	SM	**Fill:** Silty f-m SAND, yellowish-brown, slightly moist, dense, little caliche			
	Ring	26 30 35	S2	SM	**Alluvium:** Silty f-c SAND, white, slightly moist, dense, some caliche Silty f-c SAND, light brown, slightly moist			
5					**BORING TERMINATED AT 5 FEET** No groundwater encountered. Boring prepped with pipe, filter sock and gravel for infiltration testing			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring; ---SPT; ---Small Bulk; ---Large Bulk; ---No Recovery; ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Vintage 145 LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Auburn Ave and Panther Ave	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Cody
PROJECT NO.:	3057-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Adelanto, CA			**DATE:**	2/17/2022

Boring No.: I-2

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		8 16 18	S1	SM	**Fill:** Silty f-m SAND, yellowish-brown, slightly moist, medium dense to dense			
		16 19 38	S2	SM	**Alluvium:** Silty f-m SAND, light yellowish-brown, slightly moist, dense, trace caliche Silty f-m SAND, light brown, slightly moist			
5					**BORING TERMINATED AT 5 FEET** No groundwater encountered. Boring prepped with pipe, filter sock and gravel for infiltration testing			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Vintage 145 LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Auburn Ave and Panther Ave	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Cody
PROJECT NO.:	3057-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Adelanto, CA			**DATE:**	2/17/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: I-3** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		11 29 27	S1	SM	**Fill:** Silty f SAND, light yellowish-brown, slightly moist, dense			
		17 24 20	S2	SM	**Alluvium:** Silty f-c SAND, light yellowish-brown, slightly moist, dense			
5					**BORING TERMINATED AT 5 FEET** No groundwater encountered. Boring prepped with pipe, filter sock and gravel for infiltration testing			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Vintage 145 LLC	**DRILLER:**	2R Drilling	**LOGGED BY:**	C. Diaz
PROJECT NAME:	Auburn Ave and Panther Ave	**DRILL METHOD:**	Hollow Stem	**OPERATOR:**	Cody
PROJECT NO.:	3057-CR	**HAMMER:**	140#/30"	**RIG TYPE:**	CME 75
LOCATION:	Adelanto, CA			**DATE:**	2/17/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**Boring No.: I-4** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		7 17 32	S1	SM	**Fill:** Silty f SAND, light yellowish-brown, slightly moist, dense			
		24 22 18	S2	SM	**Alluvium:** Silty f-m SAND, light yellowish-brown, slightly moist, dense			
5					**BORING TERMINATED AT 5 FEET** No groundwater encountered. Boring prepped with pipe, filter sock and gravel for infiltration testing			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

APPENDIX C

LABORATORY TEST RESULTS BY GEOTEK

Updated Geotechnical and Infiltration Evaluation
Adelanto, San Bernardino County, California
Project No. 3057-CR

GEOTEK

SUMMARY OF LABORATORY TESTING

Collapse

Collapse tests were conducted in accordance with ASTM D4546. The results of these tests are presented herein.

Direct Shear

Direct shear testing was performed on remolded samples of the surficial soils according to ASTM Test Method D 3080. The results of these tests are presented herein.

Expansion Index

Expansion Index testing was performed a representative soil sample collected from the site. Testing was performed in general accordance with ASTM Test Method D 4829. The test results are presented herein.

In Situ Moisture Content and Unit Weight

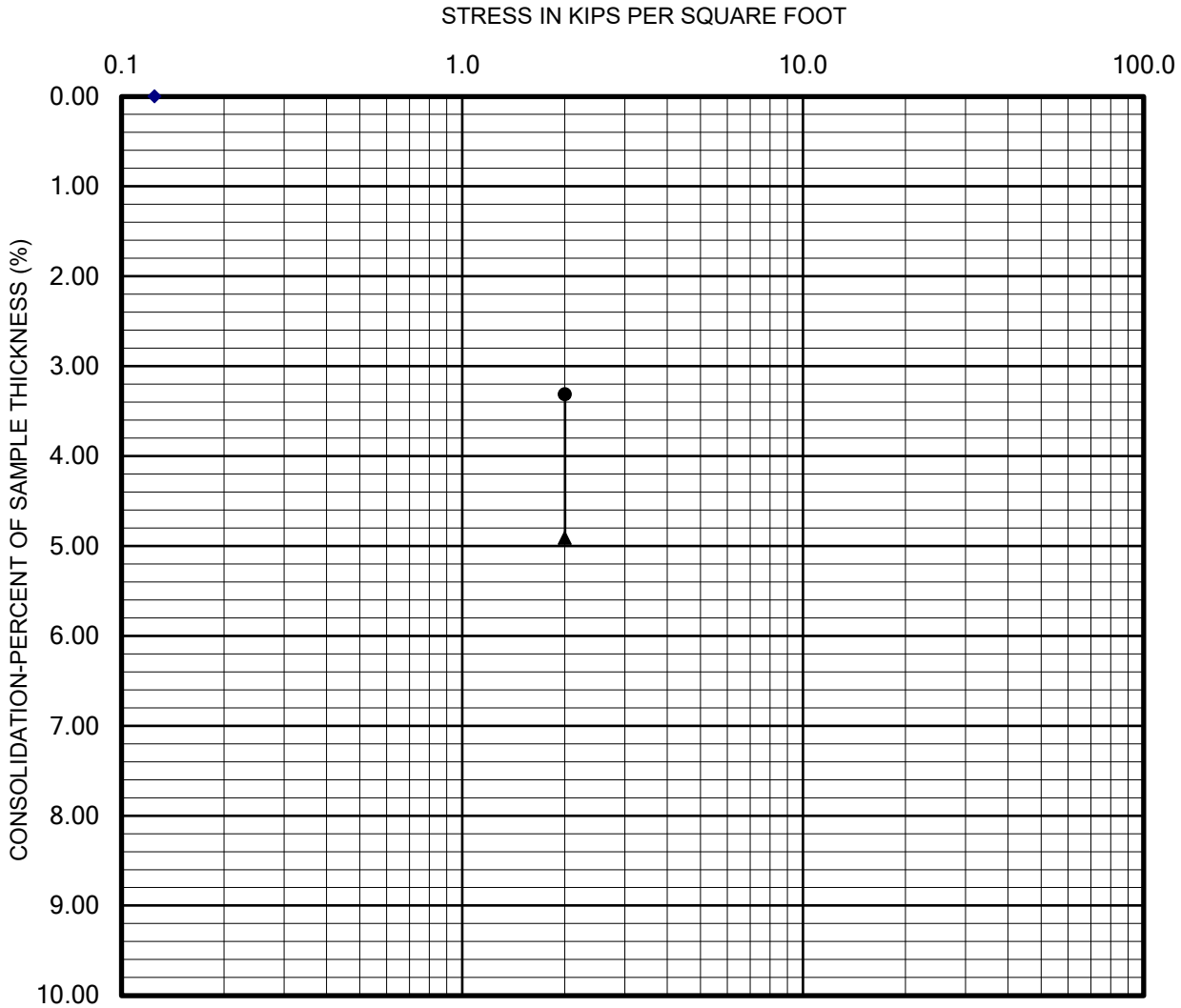
The field moisture content was measured in the laboratory on selected samples collected during the field investigation. The field moisture content is determined as a percentage of the dry unit weight. The dry density was measured in the laboratory on selected ring samples. The results are shown on the logs of exploratory borings in Appendix B.

Moisture-Density Relationship

Laboratory testing was performed on two samples collected during the subsurface exploration. The laboratory maximum dry density and optimum moisture content for the soil types were determined in general accordance with test method ASTM Test Procedure D 1557. The results are included herein.

Sulfate Content, Resistivity and Chloride Content

Testing to determine the water-soluble sulfate content was performed by others in general accordance with ASTM D4327 test procedures. Resistivity testing was completed by others in general accordance with ASTM G187 test procedures. Testing to determine the chloride content was performed by others in general accordance with ASTM D4327 test procedures. The results of the testing are provided herein.



Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

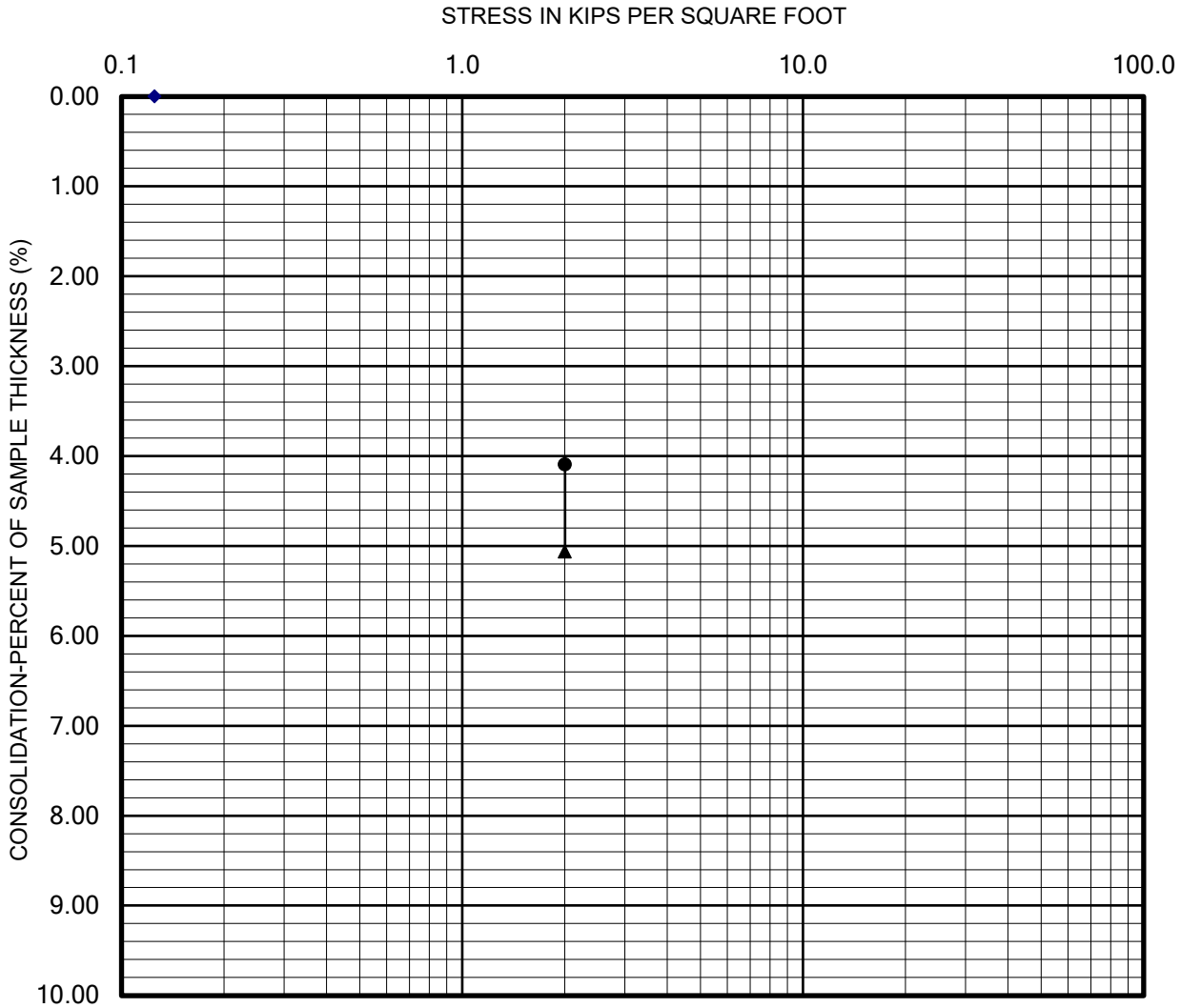
PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

GEOTEK

COLLAPSE REPORT

Sample: B-2 @ 6 feet

CHECKED BY: DA	Lab: Corona
PROJECT NO.: 3057-CR	Date: 2/21/2022



Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

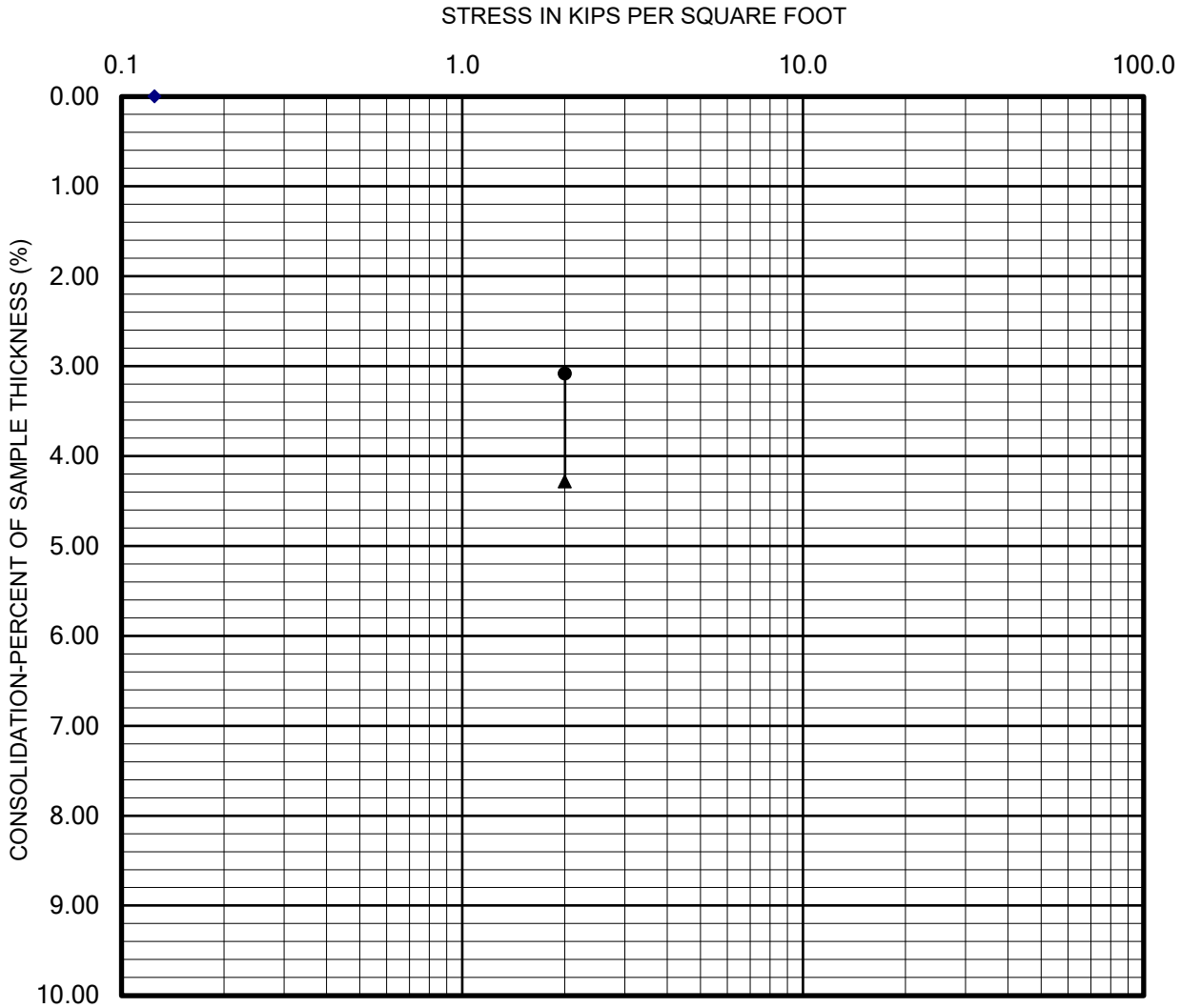
PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

GEOTEK

COLLAPSE REPORT

Sample: B-3 @ 3 feet

CHECKED BY: DA	Lab: Corona
PROJECT NO.: 3057-CR	Date: 2/21/2022



Seating Cycle
Loading Prior to Inundation
Loading After Inundation
Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

GEOTEK

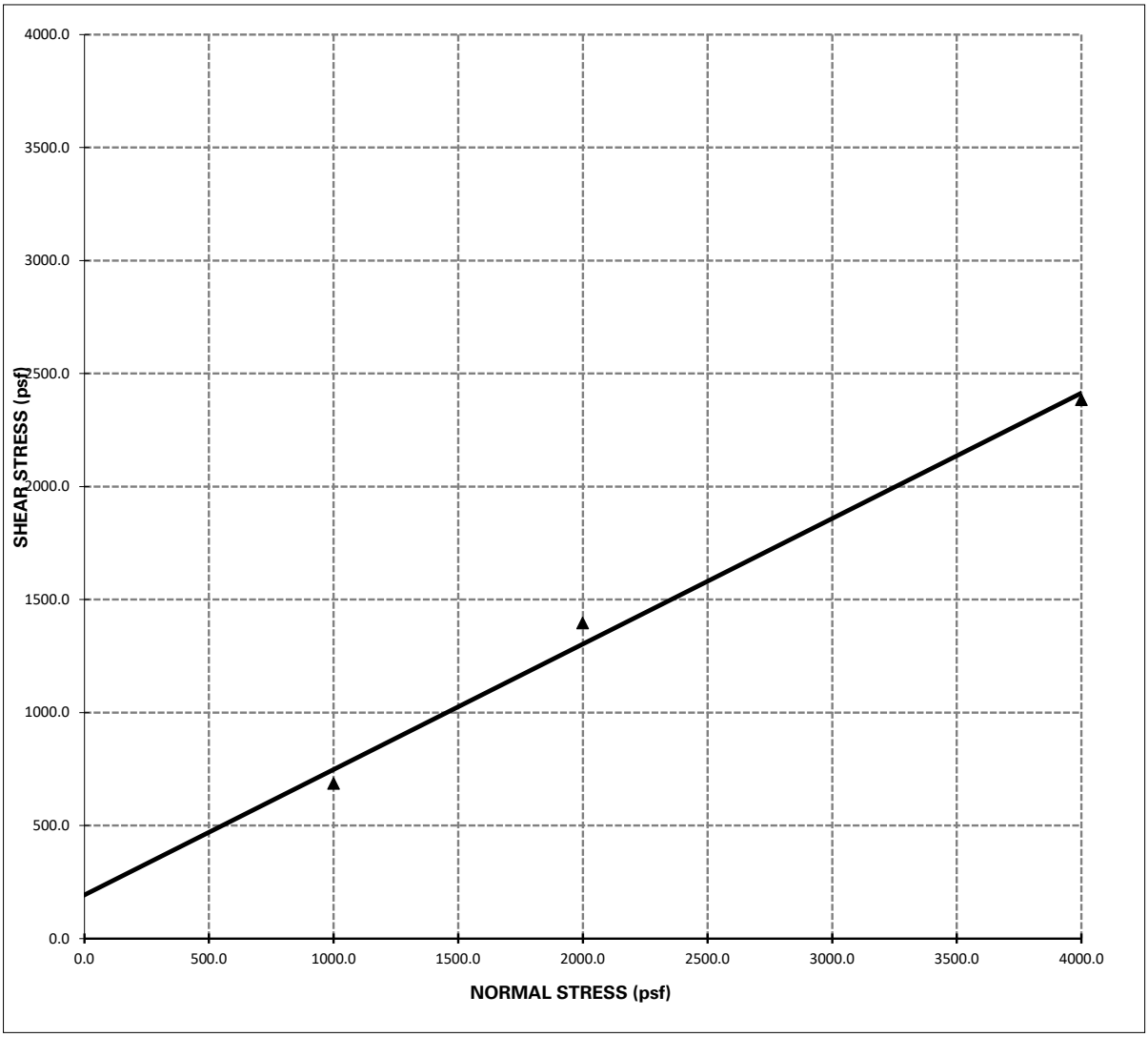
COLLAPSE REPORT

Sample: B-3 @ 10 feet

CHECKED BY: DA	Lab: Corona
PROJECT NO.: 3057-CR	Date: 2/21/2022

DIRECT SHEAR TEST

Project Name:	W Square Group LLC	***Sample Location:***	T-2 @ 1-3 feet
Project Number:	3057-CR	***Date Tested:***	2/28/2022



Shear Strength: **Φ = 29 °, C = 192 psf**

Notes: 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.35 in/min.

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client:	W. Square Group LLC	***Tested/ Checked By:***	DA Lab No Corona
Project Number:	3057-CR	***Date Tested:***	2/22/2022
Project Location:	SWC Auburn Avenue and Panther Avenue, Adelanto	***Sample Source:***	T-2 @ 1-3 feet
		Sample Description:	

Ring #: _____ Ring Dia. : 4.01" Ring Ht. 1"

DENSITY DETERMINATION

A	Weight of compacted sample & ring (gm)	785.5
B	Weight of ring (gm)	366.5
C	Net weight of sample (gm)	**419.0**
D	Wet Density, lb / ft3 (C*0.3016)	**126.4**
E	Dry Density, lb / ft3 (D/1.F)	**116.5**

SATURATION DETERMINATION

F	Moisture Content, %	8.5
G	Specific Gravity, assumed	**2.70**
H	Unit Wt. of Water @ 20 °C, (pcf)	**62.4**
I	% Saturation	**51.4**

READINGS

DATE	TIME	READING	
2/22/2022		0.2490	Initial
2/22/2022		0.2490	10 min/Dry
2/23/2022		0.2490	Final

FINAL MOISTURE

Final Weight of wet sample & tare	% Moisture
781.8	**7.6**

EXPANSION INDEX = 0

GEOTEK

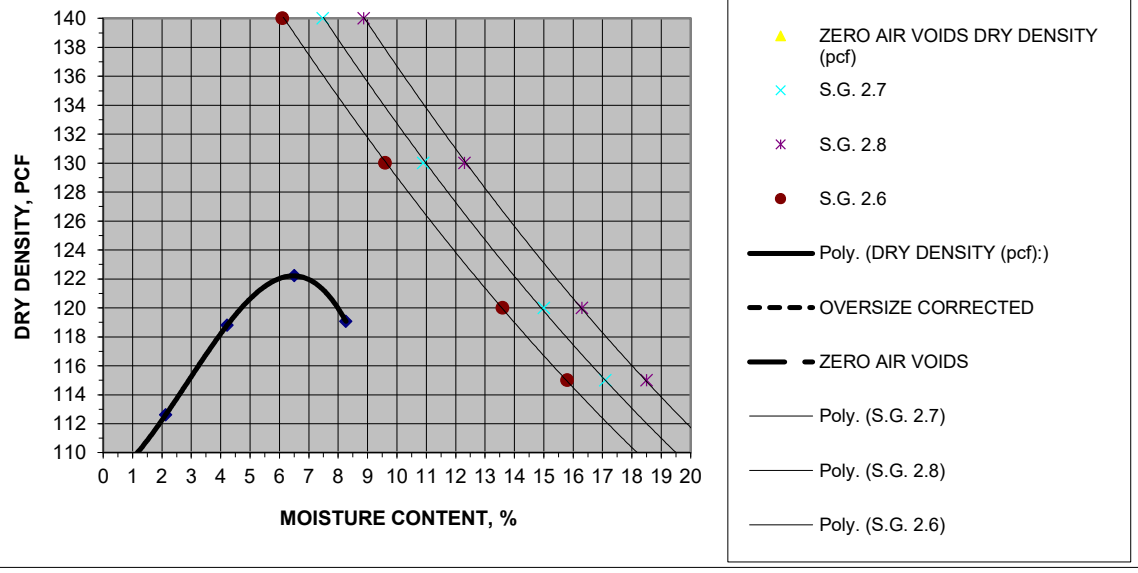
MOISTURE/DENSITY RELATIONSHIP

Client:	W Square Group LLC	**Job No.:**	3057-CR
Project:	SWC Auburn Avenue and Panther Avenue	**Lab No.:**	Corona
Location:	Adelanto		
Material Type:	-		
Material Supplier:	-		
Material Source:	-		
Sample Location:	T-2 @ 1-3 feet		
	-		
Sampled By:	DW	**Date Sampled:**	-
Received By:	CB	**Date Received:**	2/8/2022
Tested By:	KG	**Date Tested:**	2/24/2022
Reviewed By:	DA	**Date Reviewed:**	3/1/2022

Test Procedure: ASTM D1557 **Method:** A

Oversized Material (%): 0.0 **Correction Required:** ☐ yes ☐ no

MOISTURE/DENSITY RELATIONSHIP CURVE



MOISTURE DENSITY RELATIONSHIP VALUES

Maximum Dry Density, pcf	122.5	**@ Optimum Moisture, %**	6.5
Corrected Maximum Dry Density, pcf		**@ Optimum Moisture, %**	

MATERIAL DESCRIPTION

Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

Atterberg Limits:

	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %

Classification:

Unified Soils Classification:

AASHTO Soils Classification:

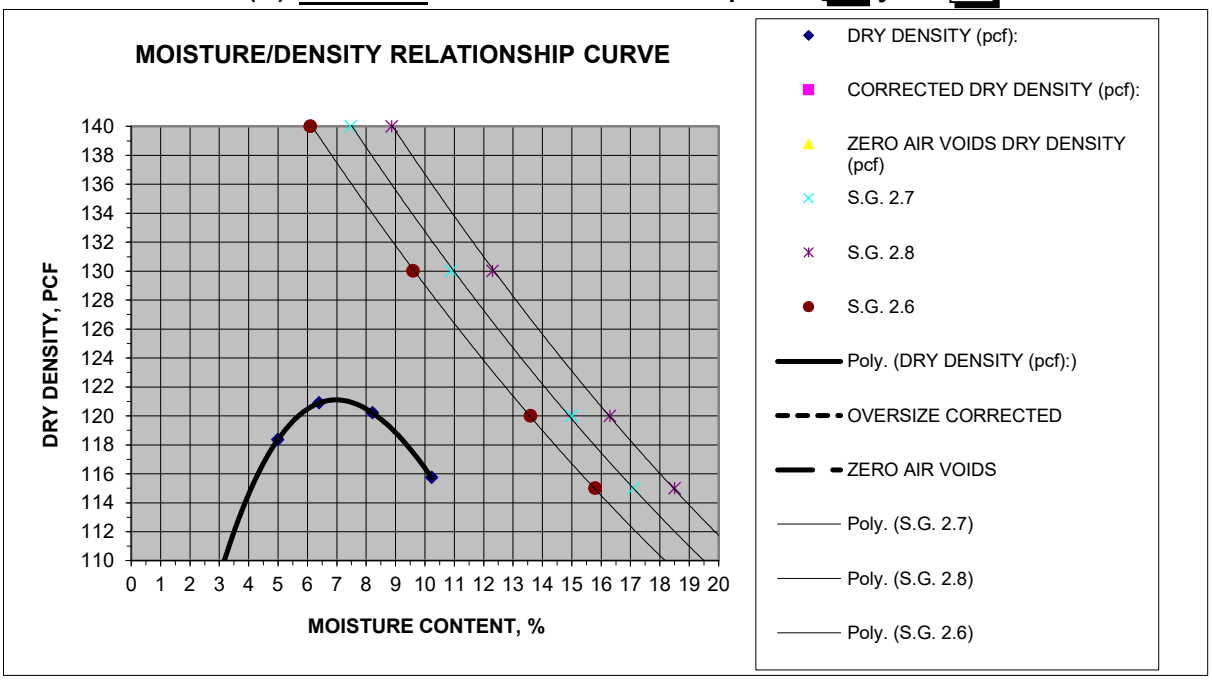
GEOTEK

MOISTURE/DENSITY RELATIONSHIP

Client:	W Square Group LLC	**Job No.:**	3057-CR
Project:	SWC Auburn Avenue and Panther Avenue	**Lab No.:**	Corona
Location:	Adelanto		
Material Type:	-		
Material Supplier:	-		
Material Source:	-		
Sample Location:	T-9 @ 2-4 feet		
	-		
Sampled By:	DW	**Date Sampled:**	-
Received By:	CB	**Date Received:**	2/8/2022
Tested By:	KG	**Date Tested:**	2/24/2022
Reviewed By:	DA	**Date Reviewed:**	3/1/2022

Test Procedure: ASTM D1557 **Method:** A

Oversized Material (%): 0.0 **Correction Required:** ☐ yes ☐ no



MOISTURE DENSITY RELATIONSHIP VALUES

Maximum Dry Density, pcf	121.5	**@ Optimum Moisture, %**	7.5
Corrected Maximum Dry Density, pcf		**@ Optimum Moisture, %**	

MATERIAL DESCRIPTION

Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

Atterberg Limits:

	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %

Classification:

Unified Soils Classification:

AASHTO Soils Classification:

Soil Analysis Lab Results

Client: GeoTek, Inc.
Job Name: SWC Auburn Are & Painter Ave 29-Acre, Adelanto
Client Job Number: 3057-CR W. Square Group LLC
Project X Job Number: S220223H
February 27, 2022

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51	ASTM G200	SM 4500-D	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd | Minimum		**pH**	**Redox**	**Sulfide** S^{2-}	**Nitrate** NO_3^-	**Ammonium** NH_4^+	**Lithium** Li^+	**Sodium** Na^+	**Potassium** K^+	**Magnesium** Mg^{2+}	**Calcium** Ca^{2+}	**Fluoride** F_2^{--}	**Phosphate** PO_4^{3-}
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
T-2 @ 1-3'	1-3	85.4	0.0085	22.3	0.0022	93,800	6,097	8.8	254	0.39	21.1	0.3	ND	36.9	7.2	83.2	473.5	2.8	0.2

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

APPENDIX D

PERCOLATION AND INFILTRATION DATA

Updated Geotechnical and Infiltration Evaluation
Adelanto, San Bernardino County, California
Project No. 3057-CR

GEOTEK

Client:	**Vintage 145 LLC**
Project:	**SWC Auburn and Panther Avenues**
Project No:	**3057-CR**
Date:	**3/2/2022**

Boring No. **I-1**

Infiltration Rate (Porchet Method)

Time Interval, Δt =	30	min
Final Depth to Water, D_F =	44.5	in
Test Hole Radius, r =	4	in
Initial Depth to Water, D_O =	40	in
Total Test Hole Depth, D_T =	60	in

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	20	in
$H_F = D_T - D_F$ =	15.5	in
$\Delta H = \Delta D = H_O - H_F$ =	4.5	in
$H_{avg} = (H_O+H_F)/2$ =	17.75	in

I_t = 0.91 **Inches per Hour**

GEOTEK

Client:	**Vintage 145 LLC**
Project:	**SWC Auburn and Panther Avenues**
Project No:	**3057-CR**
Date:	**3/2/2022**

Boring No. **I-2**

Infiltration Rate (Porchet Method)

Time Interval, Δt =	30	min
Final Depth to Water, D_F =	44.25	in
Test Hole Radius, r =	4	in
Initial Depth to Water, D_O =	40	in
Total Test Hole Depth, D_T =	60	in

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	20	in
$H_F = D_T - D_F$ =	15.75	in
$\Delta H = \Delta D = H_O - H_F$ =	4.25	in
$Havg = (H_O+H_F)/2$ =	17.875	in

I_t = 0.86 **Inches per Hour**

GEOTEK

Client:	**Vintage 145 LLC**
Project:	**SWC Auburn and Panther Avenues**
Project No:	**3057-CR**
Date:	**3/2/2022**

Boring No. **I-3**

Infiltration Rate (Porchet Method)

Time Interval, Δt =	30	min
Final Depth to Water, D_F =	42	in
Test Hole Radius, r =	4	in
Initial Depth to Water, D_O =	40	in
Total Test Hole Depth, D_T =	60	in

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	20	in
$H_F = D_T - D_F$ =	18	in
$\Delta H = \Delta D = H_O - H_F$ =	2	in
$H_{avg} = (H_O+H_F)/2$ =	19	in

I_t = 0.38 **Inches per Hour**

GEOTEK

Client:	**Vintage 145 LLC**
Project:	**SWC Auburn and Panther Avenues**
Project No:	**3057-CR**
Date:	**3/2/2022**

Boring No. **I-4**

Infiltration Rate (Porchet Method)

Time Interval, Δt =	30	min
Final Depth to Water, D_F =	43	in
Test Hole Radius, r =	4	in
Initial Depth to Water, D_O =	40	in
Total Test Hole Depth, D_T =	60	in

Equation - $I_t = \dfrac{\Delta H\ (60r)}{\Delta t\ (r+2H_{avg})}$

$H_O = D_T - D_O$ =	20	in
$H_F = D_T - D_F$ =	17	in
$\Delta H = \Delta D = H_O - H_F$ =	3	in
$H_{avg} = (H_O+H_F)/2$ =	18.5	in

I_t = 0.59 **Inches per Hour**

GEOTEK

Percolation Test Data Sheet

Project:	SWC AUBURN AVE & PANTHER AVE	Project No:	3057-CR	Date:	2/18/2022
Test Hole No:	I-1	Tested By:	C. Diaz		
Depth of Test Hole, D_T:	60"	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	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	7:30AM	7:55AM	25	40	44.5	4.5	N
2	7:56AM	8:21AM	25	40	42.75	3.75	N

*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. Other wise, pre-soak (fill) 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".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:22AM	8:52AM	30	40	44.5	4.5	
2	8:53AM	9:23AM	30	40	44.5	4.5	
3	9:24AM	9:54AM	30	40	44.5	4.5	
4	9:55AM	10:25AM	30	40	44.5	4.5	
5	10:26AM	10:56AM	30	40	44.25	4.25	
6	10:57AM	11:27AM	30	40	44.5	4.5	
7	11:28AM	11:58AM	30	40	44.5	4.5	
8	11:59AM	12:29PM	30	40	44.5	4.5	
9	12:30PM	1:00PM	30	40	44.5	4.5	
10	1:01PM	1:31PM	30	40	44.5	4.5	
11	1:32PM	2:02PM	30	40	44.5	4.5	
12	2:03PM	2:33PM	30	40	44.5	4.5	
13							
14							
15							

COMMENTS: PRESOAK 5 GAL, PARTLY CLOUDY (34 F), WIND (6 MPH), GROUND DRY

Percolation Test Data Sheet

Project:	SWC AUBURN AVE & PANTHER AVE	Project No:	3057-CR	Date:	2/18/2022
Test Hole No:	I-2	Tested By:	C. Diaz		
Depth of Test Hole, D_T:	60"	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	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	7:35AM	8:00AM	25	40	45	5	N
2	8:01AM	8:26AM	25	40	44.25	4.25	N

*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. Other wise, pre-soak (fill) 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".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:27AM	8:57AM	30	40	44.75	4.75	
2	8:58AM	9:28AM	30	40	44.75	4.75	
3	9:29AM	9:59AM	30	40	44.5	4.5	
4	10:00AM	10:30AM	30	40	44.5	4.5	
5	10:31AM	11:01AM	30	40	44.25	4.25	
6	11:02AM	11:32AM	30	40	44.25	4.25	
7	11:33AM	12:03PM	30	40	44.25	4.25	
8	12:04PM	12:34PM	30	40	44.25	4.25	
9	12:35PM	1:05PM	30	40	44.25	4.25	
10	1:06PM	1:36PM	30	40	44.25	4.25	
11	1:37PM	2:07PM	30	40	44.25	4.25	
12	2:08PM	2:38PM	30	40	44.25	4.25	
13							
14							
15							

COMMENTS: PRESOAK 5 GAL, PARTLY CLOUDY (34 F), WIND (6 MPH), GROUND DRY

Percolation Test Data Sheet

Project:	SWC AUBURN AVE & PANTHER AVE	Project No:	3057-CR	Date:	2/18/2022
Test Hole No:	I-3	Tested By:	C. Diaz		
Depth of Test Hole, D_T:	60"	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	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	7:16AM	7:41AM	25	40	42.25	2.25	N
2	7:42AM	8:07AM	25	40	42.25	2.25	N

*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. Other wise, pre-soak (fill) 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".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:08AM	8:38AM	30	40	42	2	
2	8:39AM	9:09AM	30	40	42	2	
3	9:10AM	9:40AM	30	40	42.25	2.25	
4	9:41AM	10:11AM	30	40	42	2	
5	10:12AM	10:42AM	30	40	42	2	
6	10:43AM	11:13AM	30	40	42	2	
7	11:14AM	11:44AM	30	40	42.25	2.25	
8	11:45AM	12:15PM	30	40	42	2	
9	12:16PM	12:46PM	30	40	42	2	
10	12:47PM	1:17PM	30	40	42	2	
11	1:18PM	1:48PM	30	40	42	2	
12	1:49PM	2:19PM	30	40	42	2	
13							
14							
15							

COMMENTS: PRESOAK 5 GAL, PARTLY CLOUDY (34 F), WIND (6 MPH), GROUND DRY

Percolation Test Data Sheet

Project:	SWC AUBURN AVE & PANTHER AVE	Project No:	3057-CR	Date:	2/18/2022
Test Hole No:	I-4	Tested By:	C. Diaz		
Depth of Test Hole, D_T:	60"	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	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	7:19AM	7:44AM	25	40	43.75	3.75	
2	7:45AM	8:10AM	25	40	42.5	2.5	

*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. Other wise, pre-soak (fill) 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".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:11AM	8:41AM	30	40	43	3	
2	8:42AM	9:12AM	30	40	43	3	
3	9:19AM	9:51AM	30	40	43	3	
4	9:52AM	10:22AM	30	40	43.25	3.25	
5	10:23AM	10:53AM	30	40	43	3	
6	10:54AM	11:24AM	30	40	43	3	
7	11:25AM	11:55AM	30	40	43	3	
8	11:56AM	12:26PM	30	40	43.5	3.5	
9	12:27PM	12:57PM	30	40	43	3	
10	12:58PM	1:28PM	30	40	43	3	
11	1:29PM	1:59PM	30	40	43	3	
12	2:00PM	2:30PM	30	40	43	3	
13							
14							
15							

COMMENTS: PRESOAK 5 GAL, PARTLY CLOUDY (34 F), WIND (6 MPH), GROUND DRY

APPENDIX E

GENERAL GRADING GUIDELINES

Updated Geotechnical and Infiltration Evaluation
Adelanto, San Bernardino County, California
Project No. 3057-CR

GEOTEK

GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the California Building Code, CBC (2019) and the guidelines presented below.

Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.
5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.

6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
   a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
   b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed unless otherwise specifically indicated in the text of this report.
2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).

2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
    a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
    b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
    a) They are not placed in concentrated pockets;
    b) There is a sufficient percentage of fine-grained material to surround the rocks;
    c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
   a) shallow (12 + inches) under slab interior trenches and,
   b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

JOB SAFETY

General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

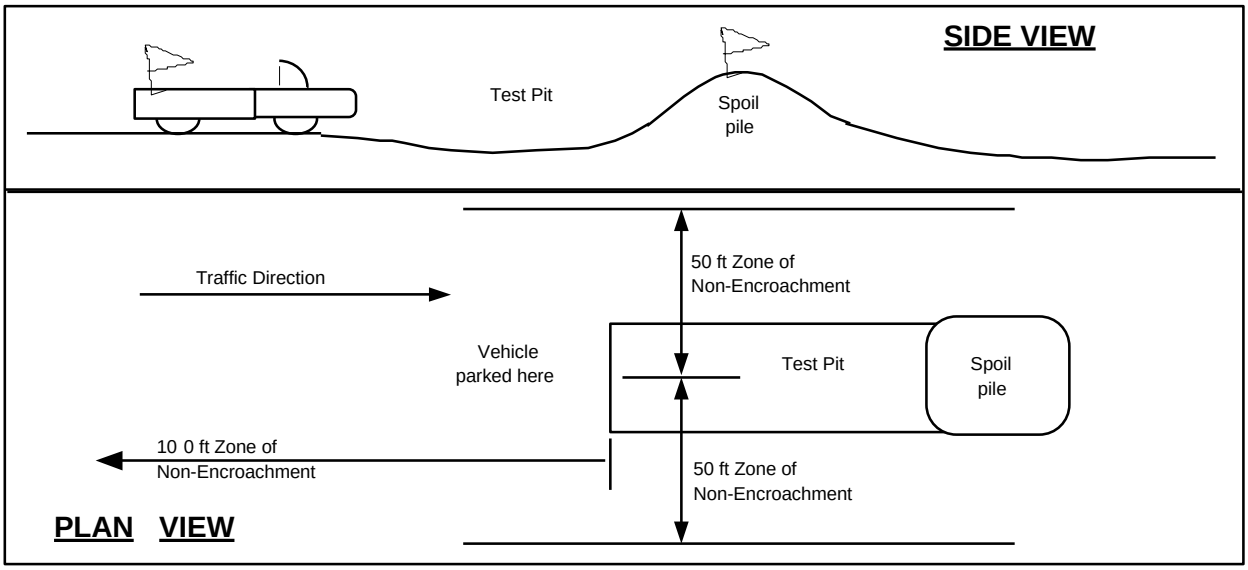
Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

TEST PIT SAFETY PLAN



Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

Procedures

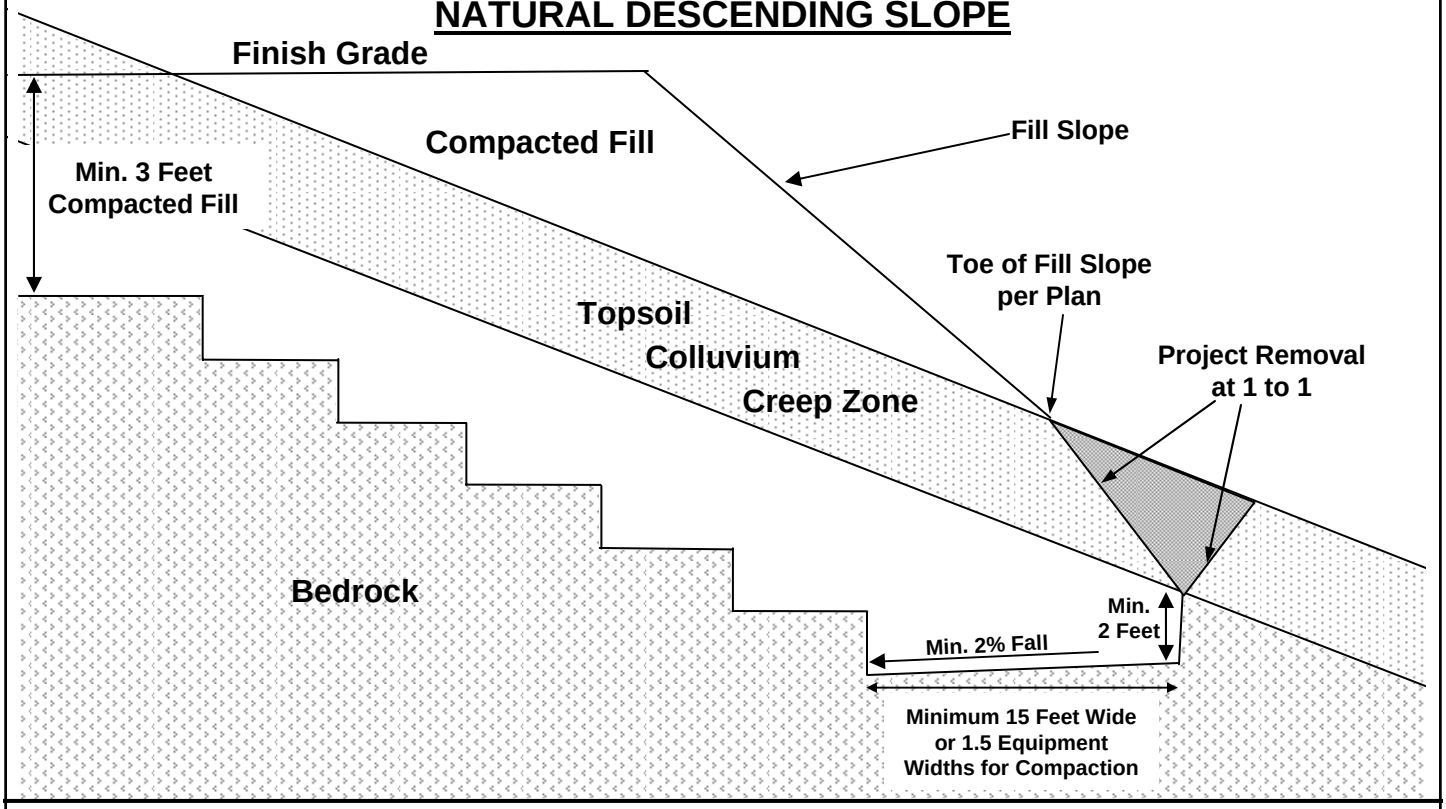
In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor's representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

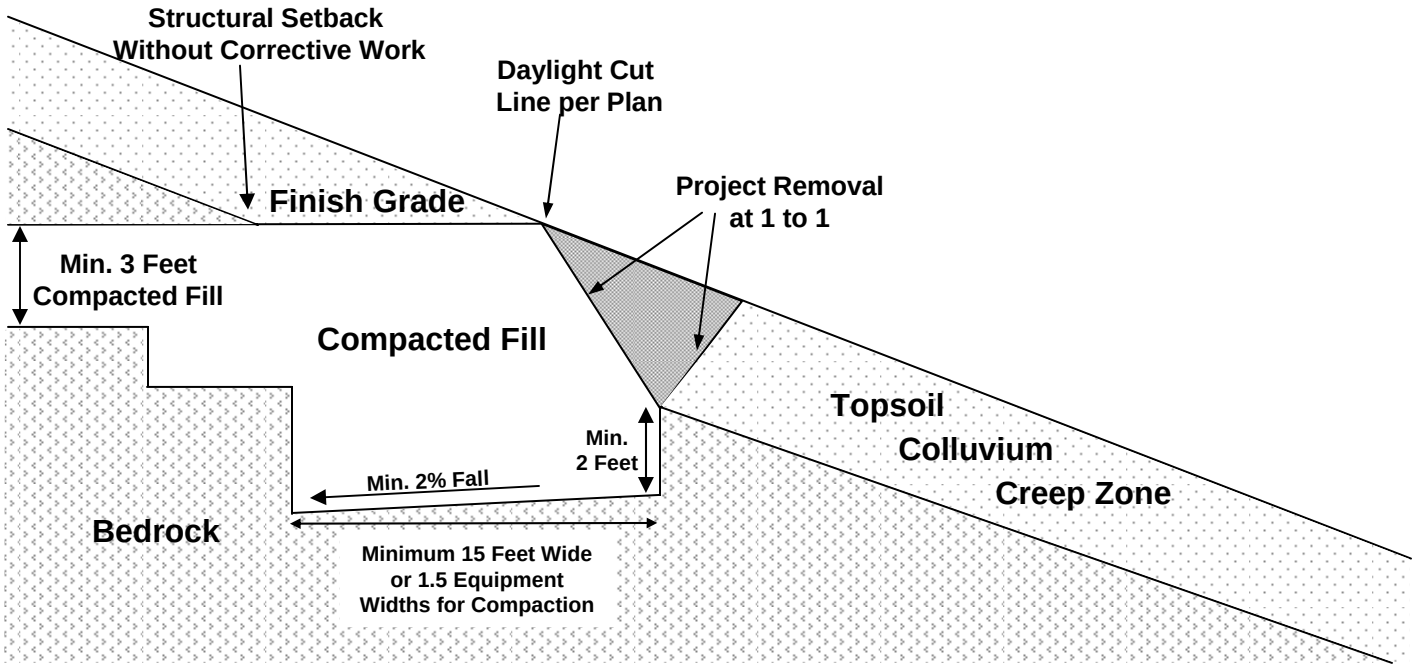
The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

TYPICAL FILL SLOPE OVER NATURAL DESCENDING SLOPE



DAYLIGHT CUT AREA OVER NATURAL DESCENDING SLOPE



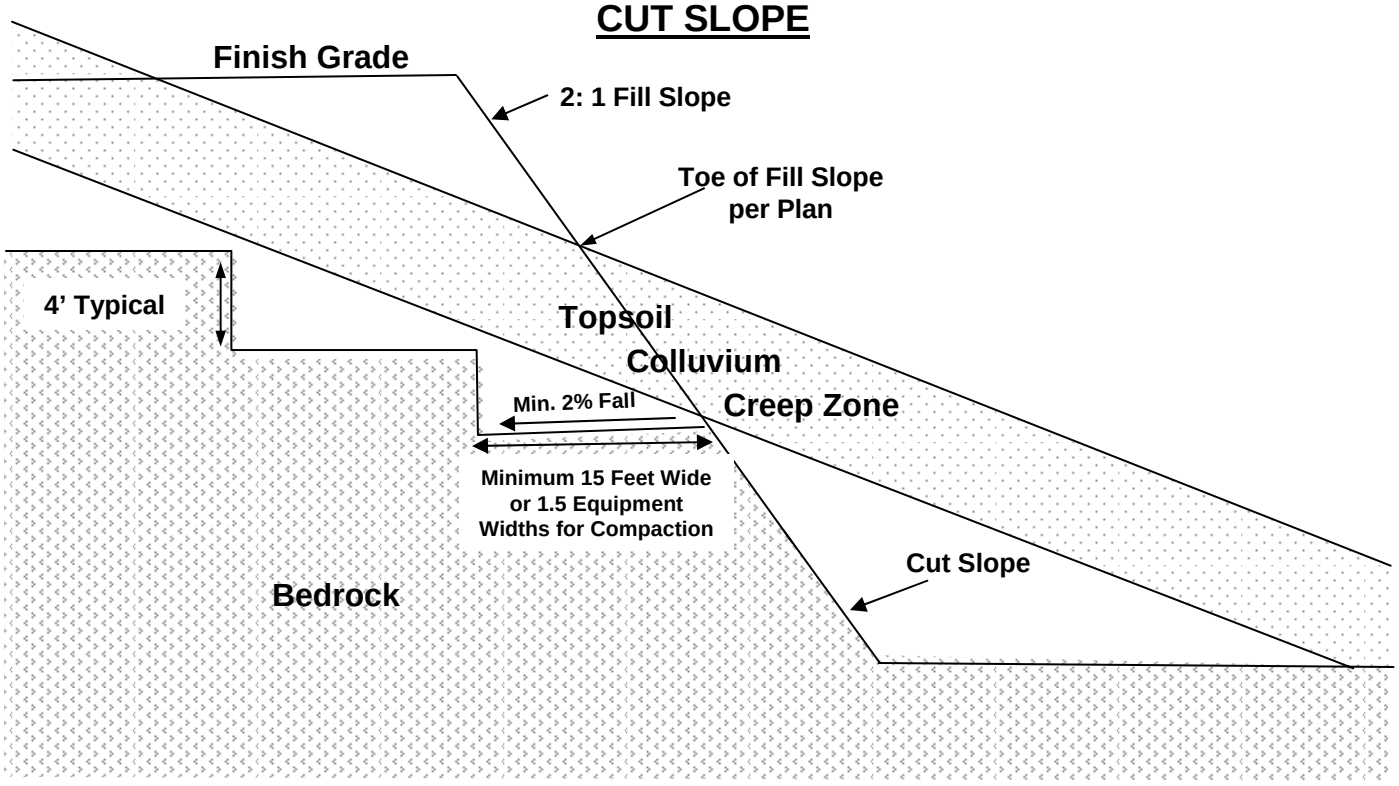
GEOTEK
1548 North Maple Street
Corona, California 92878

TREATMENT ABOVE NATURAL SLOPES

STANDARD GRADING GUIDELINES

PLATE E-1

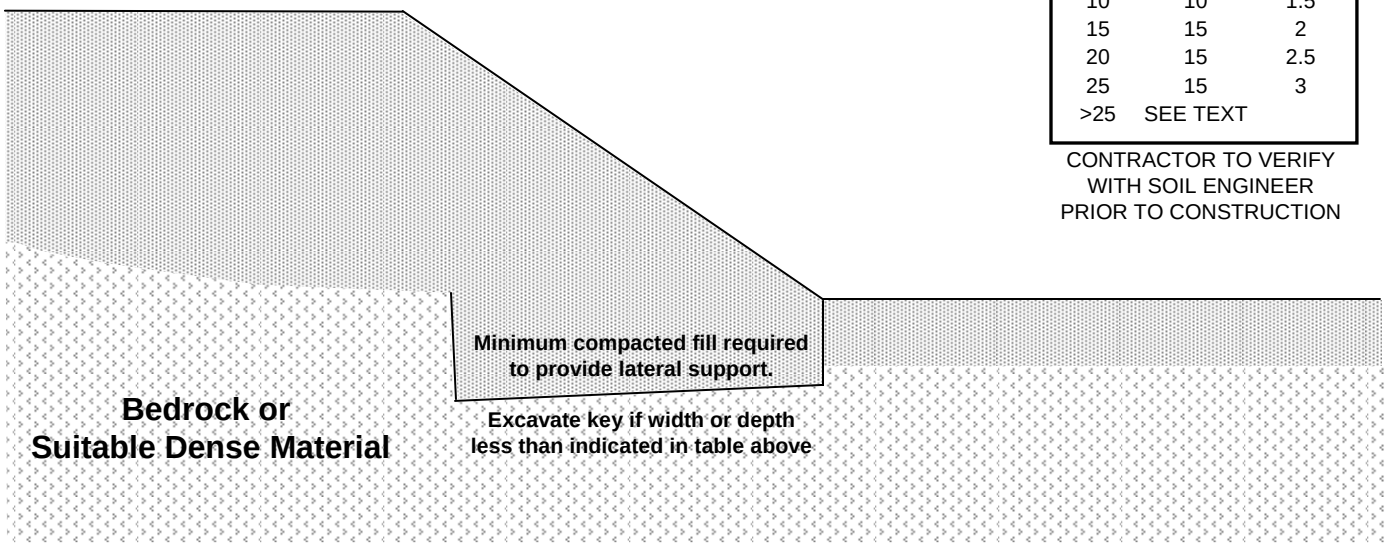
TYPICAL FILL SLOPE OVER CUT SLOPE



TYPICAL FILL SLOPE

SLOPE HEIGHT	MIN. KEY WIDTH	MIN. KEY DEPTH
5	7	1
10	10	1.5
15	15	2
20	15	2.5
25	15	3
>25	SEE TEXT	

CONTRACTOR TO VERIFY WITH SOIL ENGINEER PRIOR TO CONSTRUCTION



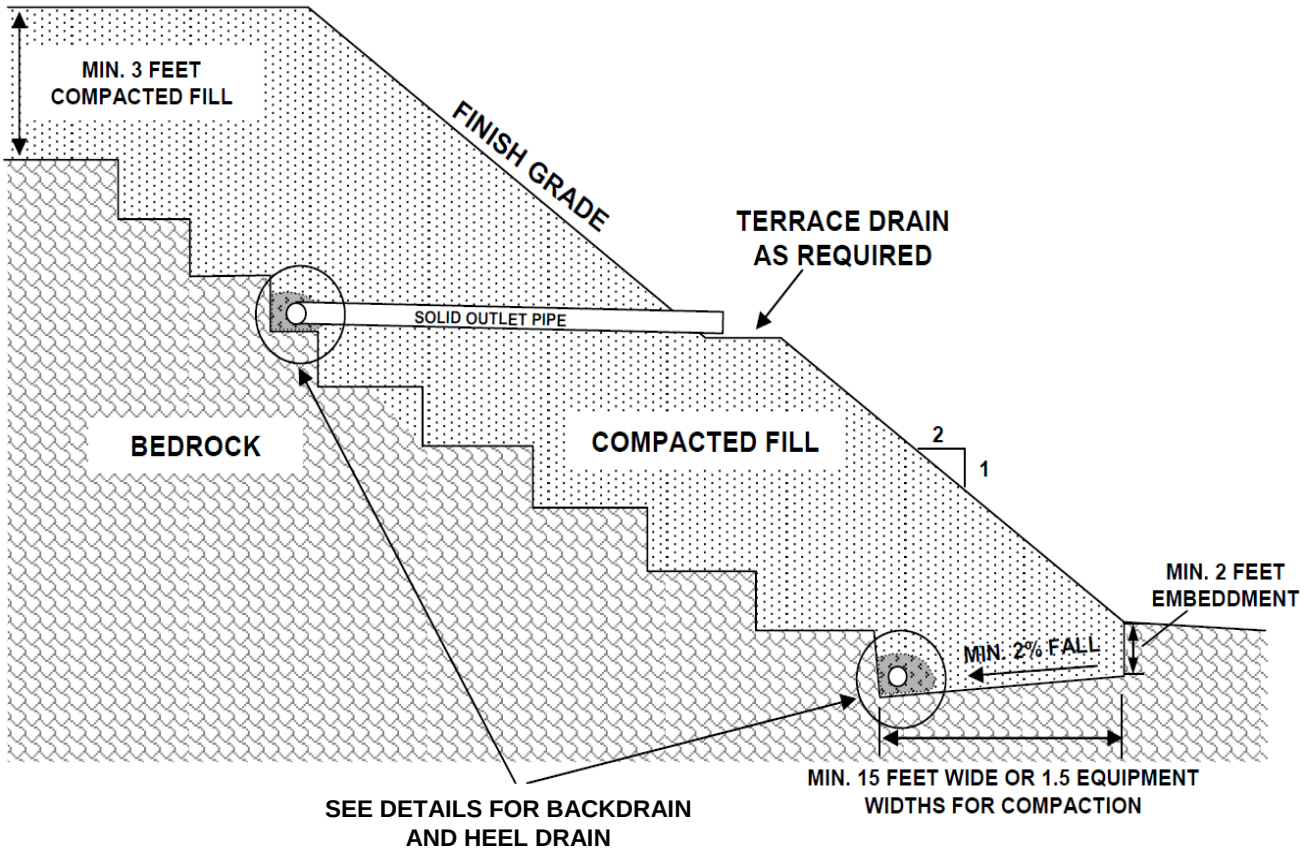
GEOTEK

1548 North Maple Street
Corona, California 92878

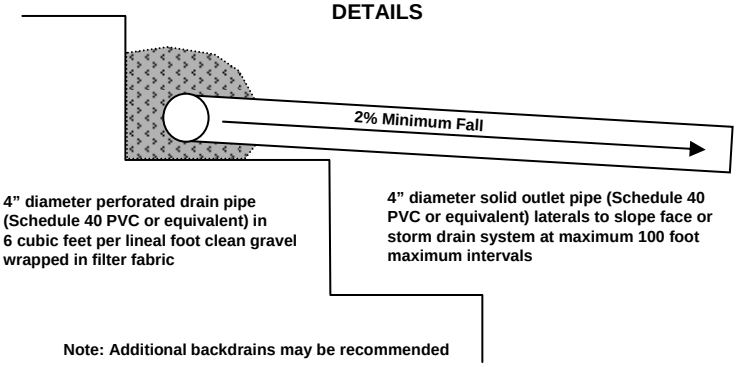
COMMON FILL
SLOPE KEYS

STANDARD GRADING GUIDELINES

PLATE E-2



BACKDRAIN DETAILS



4" diameter perforated drain pipe (Schedule 40 PVC or equivalent) in 6 cubic feet per lineal foot clean gravel wrapped in filter fabric

4" diameter solid outlet pipe (Schedule 40 PVC or equivalent) laterals to slope face or storm drain system at maximum 100 foot maximum intervals

Note: Additional backdrains may be recommended

HEEL DRAIN DETAILS

6" diameter perforated drain pipe in 6 cubic feet per lineal foot clean gravel wrapped in filter fabric, outlet pipe to gravity flow with 2% minimum fall

GEOTEK	1548 North Maple Street Corona, California 92878	TYPICAL BUTTRESS AND STABILIZATION FILL	STANDARD GRADING GUIDELINES PLATE E-3