

**GEOTECHNICAL AND INFILTRATION EVALUATION  
PROPOSED SINGLE-FAMILY RESIDENTIAL DEVELOPMENT  
NORTH OF CLEVELAND AVENUE AND EAST OF CONWAY DRIVE  
ESCONDIDO, SAN DIEGO COUNTY, CALIFORNIA**

**PREPARED FOR**

**THE TRUE LIFE COMPANIES  
4350 VON KARMAN AVENUE, SUITE 200  
NEWPORT BEACH, CALIFORNIA 92660**

**PREPARED BY**

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

**PROJECT No. 3997-CR**

**AUGUST 2, 2024**

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**GeoTek, Inc.**  
1548 North Maple Street, Corona, California 92880  
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

August 2, 2024  
Project No. 3997-CR

**The True Life Companies**  
2350 Von Karman Avenue, Suite 200  
Newport Beach, California 92660

Attention: Mr. David Stearn

Subject: Geotechnical and Infiltration Evaluation  
Proposed Single-Family Residential Development  
North of Cleveland Avenue and East of Conway Drive  
Escondido, San Diego County, California

Dear Mr. Stearn:

GeoTek is pleased to provide a Geotechnical and Infiltration report for proposed development at the subject property located in the city of Escondido, San Diego County, California. This report presents a discussion of GeoTek's evaluation and provides updated geotechnical recommendations for earthwork, foundation design, and construction.

The 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 GeoTek's office.

Respectfully submitted,  
**GeoTek, Inc.**

Edward H. LaMont  
CEG 1892, Exp. 07/31/26  
Principal Geologist



Gaby M. Bogdanoff  
GE 3133, Exp. 06/30/26  
Project Engineer



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Figure 1 – Site Location Map

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Appendix A – Boring Logs

Appendix B – Laboratory Test Results

Appendix C – Percolation/Infiltration Test Data

Appendix D – General Grading Guidelines

## **I. 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 pertinent to the site,
- A site reconnaissance,
- Site exploration via four geotechnical borings drilled to depths between 8.3 and 15.5 feet across the site,
- Testing of two percolation borings to estimate infiltration rates of the subsoils at each of the three planned stormwater site basins (total of six tests),
- Collection of relatively undisturbed and bulk samples of the subsurface materials for geotechnical assessment,
- Review and evaluation of site seismicity,
- Engineering analyses, and;
- Compilation of this geotechnical and infiltration evaluation which presents GeoTek's findings, conclusions, and recommendations for site development.

The intent of this report is to aid in the evaluation of the site for future 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 10.4-acre project site is identified by San Diego County Assessor's Parcel Number (APN) 224-151-51-00. The site is located along the north side of Cleveland Avenue and east side of Conway Drive. Site topography is gently sloping to the southwest and ranges from a high of



approximately 792 feet above mean sea level (amsl) to a low of 762 feet amsl. At the time of GeoTek's site visit, the property had a light cover of vegetation consisting of dry weeds and grasses. The site appears to be vacant of structures and above-ground improvements. However, the property was an agricultural field prior to the 1990s.

The site is bounded by vacant land and residential properties to the north, single-family homes to the east, Conway Drive with single-family dwellings to the west, and Cleveland Avenue with single-family residences to the south. The general location of the site is shown in Figure 1.

## **2.2 PROPOSED DEVELOPMENT**

Based upon review of the Base Map for the project by Excel Engineering, Inc. and dated February 16, 2024, the property will be developed with 28 single-family residential lots, interior streets, underground utilities and hardscape as well as landscape improvements. The residential structures are planned to be one to two stories in height supported by conventional shallow footings and concrete floors.

The referenced Base Map indicates that relatively minor grading involving cuts up to 10 feet and fills up to 6 feet will be required to achieve design grades. Cut and fill slopes to maximum heights of 12 feet at maximum gradients of 2:1 (h:v) may be constructed. In addition, both screen and retaining walls are expected.

Also, the project will include the construction of three stormwater BMP basins. Two of the basins (known as Basins "B" and "C") are proposed to be built near the west property line and an additional basin (known as Basin "D") near the southeast corner of the property. Basins "B" and "C" will require cuts on the order of 2 to 6 feet, respectively, to attain the proposed basin bottom elevations (764 feet amsl for Basin "B" and 762 feet amsl for Basin "C"). Basin "D" will require cuts of about 2 feet and fills of approximately 6 feet to achieve the planned bottom elevation of 779 feet amsl.

If the 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 and grading plans should be reviewed by GeoTek when they become available.

### **3. FIELD EXPLORATION, LABORATORY TESTING, AND PERCOLATION TESTING**

#### **3.1 FIELD EXPLORATION**

GeoTek conducted a field exploration at the site on July 12, 2024 which consisted of drilling four geotechnical borings across the property. The explorations were performed to depths between 8.3 and 15.5 feet below existing ground surface using a track-mounted hollow stem auger drill rig. The approximate locations of the borings are shown on Figure 2, Exploration Location Map. Logs of the site borings are included in Appendix A.

#### **3.2 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, remolded direct shear, expansion index, among other tests. Test results are presented in Appendix B.

#### **3.3 PERCOLATION TESTING**

GeoTek utilized the percolation test procedure (City of Escondido, 2022) to estimate the infiltration rates of the subsurface materials in the three proposed stormwater basin areas.

The percolation test borings (Borings I-1 through I-6) were drilled within the cited areas with a hollow-stem auger drill rig. The test borings were drilled to the approximate basin bottom levels (i.e., 2 to 6 feet below existing grades) and were approximately eight inches in diameter. A three-inch diameter perforated PVC pipe encapsulated in filter sock was inserted into each of the test holes. The annular space between the test hole sidewalls and PVC pipe was filled with gravel.

Both native older alluvium and granitic bedrock materials were encountered in the test holes. The locations of the test borings are shown on Figure 2.

After pre-soaking the test holes, percolation testing was performed in the lower 24 inches of each test hole by a representative from GeoTek. The percolation rates were converted to infiltration rates via the Porchet Method. The infiltration rates, which do not include a factor of

safety and were determined after the water levels had stabilized, are presented in the following table.

<b>SUMMARY OF “RAW” INFILTRATION RATES</b>			
Area	Boring No.	Test Depth (feet)	“Raw” Infiltration Rate (inches per hour)
Basin “B” (southwest portion of the site)	I-3	2	0.3
	I-4	2	0.4
Basin “C” (west-central portion of the site)	I-5	6	0.0
	I-6	6	0.2
Basin “D” (southeastern portion of the site)	I-1	2	0.3
	I-2	2	0.3

The results show “raw” infiltration rates at the test locations ranging from negligible to about 0.4 inch per hour, indicating relatively poor infiltration rates. Copies of the percolation data sheets and the Porchet infiltration rate conversion calculations are presented in Appendix C. No factors of safety were applied to the rates provided. Over the lifetime of the infiltration areas, the infiltration rates may be affected by sediment 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 “raw” rates in designing stormwater BMP systems. In addition, BMP systems should be setback from improvements and structures as required by regulatory agencies.

It should be noted that the infiltration rates provided above were performed in relatively undisturbed subsurface materials. Infiltration rates will vary and are mostly dependent on the underlying consistency of the site soils and relative density. Infiltration rates may 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 stormwater facility.

## 4. GEOLOGIC AND SOILS CONDITIONS

### 4.1 REGIONAL SETTING

The subject property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends approximately 975 miles south of the Transverse Ranges geomorphic province to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California, and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province.

The site is located in an area geologically mapped by others to be underlain by older alluvium and monzogranite of Merriam Mountain (Kennedy, M.P., 1999). The site is not situated within a State of California "Alquist-Priolo Special Studies" Earthquake Fault Zone. The site is not situated within a County of San Diego fault zone, earthquake induced landslide or liquefaction zone. The nearest known active fault is the Elsinore Fault Zone (Julian Section) located approximately 13.3 miles to the northeast of the site.

### 4.2 SUBSURFACE CONDITIONS

A brief description of the earth materials encountered during the field investigation is presented in the following sections.

#### 4.2.1 Undocumented Fill

Undocumented fills were encountered in the majority of GeoTek's exploratory borings. The fills were found to extend from the ground surface to approximately 1 to 2 feet below existing grades. These materials are likely the result of the previous agricultural use of the site and generally consist of sandy silts and silty sands.

#### **4.2.2 Older Alluvium**

Older alluvial soils were encountered in various GeoTek's borings excavated, from below the undocumented fill to depths of about 3 to 5 feet below existing grades. These materials are mostly composed of stiff to very stiff sandy clays.

#### **4.2.3 Granitic Bedrock**

Granitic bedrock of diorite composition was encountered in all explorations from below the alluvial soils or undocumented fill to the maximum depth explored of 15.5 feet. The granitic bedrock materials encountered generally excavated as fine to coarse sands and silty sands. The onsite bedrock was observed to be severely to moderately weathered in the upper few feet, becoming less weathered and indurated with depth. The bedrock materials were found to be generally consistent with regionally mapped descriptions by others for "Monzogranite of Miriam Mountain" (Kennedy, M.P., 1999).

Expansion index test results obtained by GeoTek indicate that the site surficial soils have "very low" to "low" potential for expansion ( $EI < 50$ ).

Detailed logs of the site explorations are included in Appendix A. The locations of the site explorations are shown on the Exploration Location Map presented as Figure 2.

### **4.3 SURFACE WATER AND GROUNDWATER**

#### **4.3.1 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 southwest.

#### **4.3.2 Groundwater**

Groundwater was not encountered in any of the site explorations. The California Water Data Library database shows an onsite groundwater well near the western area of the north property line, with a depth to groundwater of approximately 28 feet. However, the cited database shows this record is "questionable."

Because the site is underlain by a relatively shallow layer of soil atop granitic rock, perched or seasonal groundwater maybe developed near the soil-bedrock contact. Groundwater is not anticipated to adversely affect the proposed development.

#### 4.4 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. The subject property is not located within a State of California Seismic Hazard Zone for earthquake induced landsliding. The nearest known active fault is the Elsinore Fault Zone (Julian section) located approximately 13.3 miles to the northeast of the site.

##### 4.4.1 Seismic Design Parameters

The site is located at approximately 33.1719° Latitude and -117.0836° Longitude. Based on the data from site explorations and geologic mapping, GeoTek considers that Site Class “C” is appropriate for the property. Site spectral accelerations ( $S_a$  and  $S_1$ ), for 0.2 and 1.0 second periods for a Class “C” site, was 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. The results, based on the ASCE 7-16 and 2022 CBC, are presented in the following table:

<b>SITE SEISMIC PARAMETERS</b>	
Mapped 0.2 sec Period Spectral Acceleration, $S_s$	0.952g
Mapped 1.0 sec Period Spectral Acceleration, $S_1$	0.346g
Site Coefficient for Site Class “C”, $F_a$	1.2
Site Coefficient for Site Class “C”, $F_v$	1.5
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, $S_{MS}$	1.142g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, $S_{M1}$	0.519g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, $S_{Ds}$	0.762g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, $S_{D1}$	0.346g
Peak Ground Acceleration Adjusted for Site Class Effects, $PGA_M$	0.495g
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.



#### **4.5 LIQUEFACTION AND SEISMICALLY INDUCED SETTLEMENT**

The project site is not located within an area mapped by the California Geological Survey or the County of San Diego as being subject to liquefaction. Due to the lack of groundwater and presence of shallow bedrock, it is GeoTek's opinion that the liquefaction potential at the site is nil.

Also, the potential for seismically induced settlement of unsaturated sands is considered negligible.

#### **4.6 OTHER HAZARDS**

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

The potential for secondary seismic hazard such as a tsunami is considered negligible due to site elevation and great distance to the ocean.

### **5. CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 GENERAL**

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

#### **5.2 EARTHWORK CONSIDERATIONS**

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of Escondido, the County of San Diego, the 2022 California Building Code (CBC), and recommendations contained in this report. Site grading plans should be reviewed by this office when they become available. Additional recommendations will likely be offered after reviewing these plans. The General Earthwork Grading Guidelines included in Appendix D 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 D.



### 5.2.1 Site Clearing

The site should be cleared of existing vegetation, roots, and debris within the limits of the planned improvements. These materials should be properly disposed of off-site. Voids resulting from removing any materials should be replaced with engineered fill materials with expansion characteristics similar to the onsite materials. Utilities (if present) should be relocated, removed, or rerouted, as necessary. Water wells (if present) should be abandoned per California Department of Water Resources requirements.

### 5.2.2 Remedial Grading

All undocumented fill, soft/loose older alluvium, and highly weathered bedrock should be removed to expose competent native materials. Competent native materials are defined as either older alluvium which is not visibly porous having an in-place compaction of at least 85 percent of the soil's maximum dry density (per ASTM D 1557) or firm, unyielding bedrock. A representative of this firm should observe and approve the bottom of all excavations.

Based on the data available, removals generally on the order of three to four feet from existing grade or to a minimum of two feet below proposed grades, whichever is greater, should be performed below structural areas in fill. Actual depths of removals should be determined in the field based on observation and in-place density testing. 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 five feet laterally, whichever is greater. The bottom of the removals should be graded to drain toward the front of the lot at a gradient of at least two percent.

In order to facilitate footing excavation and installation of house services, consideration should be given to overexcavate cut lots to a minimum depth of five feet below proposed grades. GeoTek recommends that the entire lot be over-excavated. GeoTek recommends that utility alignments be overexcavated to at least one foot below the depth of the lowest underground utility.

To prevent potential differential settlement, the cut portions of transition (i.e. cut/fill) lots should be overexcavated a minimum of five feet below proposed grades or to a depth of one-half of the maximum fill thickness on the lot, whichever is greater. The horizontal extent of over-excavation could comprise the entire lot or extend at least five feet outside the structural area, or a distance equal to the depth of overexcavation below the bottom of the structural elements, whichever is greater. Overexcavation bottoms should be graded to drain toward the front of the lot (two percent minimum).

Screen and/or retaining walls may be proposed along the boundaries of the site. Efforts should be made to obtain permission from adjacent landowners and applicable regulatory agencies to perform remedial grading to at least five feet beyond property lines. If this is not feasible, then slot-cut excavations, shoring, or deepened foundations may be recommended to support the proposed walls.

The bottom of all removals should be scarified to a minimum depth of 12 inches, brought to slightly above optimum moisture content, and then recompacted to at least 90 percent of the soil's maximum dry density per ASTM D 1557. The bottoms of remedial excavations should be observed by a GeoTek representative prior to scarification.

### **5.2.3 Excavation Characteristics**

Excavation in the on-site materials is expected to be feasible utilizing heavy-duty earthmoving or excavating equipment in good operating condition. Field observations indicate that the onsite granitic bedrock is moderately to severely weathered and becomes indurated at depth. Based on GeoTek's experience in the project area, these bedrock materials should be rippable with a D-8 dozer in good working condition. Some localized very hard bedrock areas, not detected during the field investigation, and corestones may be encountered that will be more resistant to ripping. The use of specialized excavation techniques, possibly including blasting, may be necessary in localized areas of the site.

Overexcavation of street areas and cut/transition lots underlain by granitic bedrock during rough grading should be considered to prevent significant trenching difficulties associated with utility and foundation installations.

### **5.2.4 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 inches in maximum dimension. If oversized materials (greater than six inches) are generated from cuts into bedrock, the oversized rock should be disposed of offsite or stockpiled on site and crushed for future use. However, our field observations indicate that the onsite bedrock breaks down into sands and silty sands when excavated.

Fill materials should be placed in horizontal lifts not exceeding six inches in loose thickness, moisture conditioned to slightly above optimum moisture content, and compacted to a minimum relative compaction of 90 percent (ASTM D 1557).

### **5.2.5 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.

### **5.2.6 Trench Excavation and Backfill**

Temporary trench excavations within the on-site surficial materials should be stable at 1:1 (h:v) inclinations for short durations during construction and where cuts do not exceed ten feet in height. We anticipate that temporary cuts to a maximum height of four feet can be excavated vertically into undocumented fill and older alluvium. Temporary excavations into granitic bedrock are also anticipated to be stable vertically but should be monitored for adverse conditions.

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

Utility trench backfill should be compacted to at least 90 percent relative compaction (ASTM D 1557). Compaction should be achieved with a mechanical compaction device. Jetting of trench backfill is not recommended. If soils to be used as backfill have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

### **5.2.7 Shrinkage, Bulking, and Subsidence**

For planning purposes, a shrinkage loss of about 10 to 20 percent is anticipated for excavations within the undocumented fill and 5 to 10 percent within the older alluvium at the site. Bedrock materials may bulk up to 10 percent. Several factors will impact earthwork balancing on the site, including shrinkage, bulking, 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, depth of fill and underlying site conditions.

Subsidence is not considered to be a factor with the underlying site materials.

Site balance areas should be available in order to adjust project grades, depending on actual field conditions at the conclusion of earthwork construction.

### 5.3 DESIGN RECOMMENDATIONS

#### 5.3.1 Foundation and Structural Slab Design Criteria

Foundation design criteria for a conventional foundation system, in general conformance with the 2022 CBC, are presented below. Based on test results by GeoTek, the on-site surficial soils have “very low” to “low” expansion potential. However, additional expansion index and soluble sulfate testing of the soils should be performed during construction to evaluate the as-graded conditions. Final recommendations should be based upon the as-graded soils conditions.

A summary of our preliminary foundation design recommendations is presented in the following table:

<b>GEOTECHNICAL RECOMMENDATIONS FOR CONVENTIONALLY REINFORCED SHALLOW FOUNDATIONS</b>		
Design Parameter	“Very Low” Expansion Potential ( $0 \leq EI \leq 20$ )	“Low” Expansion Potential ( $21 \leq EI \leq 50$ )
Foundation Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent grade)	One- and two-story - 12	One- and two-story - 12
Minimum Foundation Width (Inches)*	One- and two-story - 12	One- and two-story - 12
Minimum Slab Thickness (actual)**	4 – Actual	4 – Actual
Minimum Slab Reinforcing**	6” x 6” – W1.4/W1.4 welded wire fabric placed in middle of slab	6” x 6” – W2.9/W2.9 welded wire fabric or No.3 reinforcing bars at 24” on center placed in middle of slab
Minimum Footing Reinforcement	Two No. 4 reinforcing bars, one placed near the top and one near the bottom	Two No. 4 reinforcing bars, one placed near the top and one near the bottom
Effective Plasticity Index***	NA	15
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum of 100% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete	Minimum of 110% 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 2022 CBC.

\*\*Slab thickness and reinforcement should be determined by the structural engineer.

\*\*\*Effective plasticity index should be verified at the completion of rough grading.

It should be noted that the criteria provided are based on soil support characteristics only. The structural engineer should design the slab and beam reinforcement based on actual loading conditions.

An allowable bearing capacity of 1,800 pounds per square foot (psf) may be used for the design of continuous footings about 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 and 50 psf for each additional 12 inches in depth or width, respectively, to a maximum value of 3,000 psf. An increase of one-third may be applied when considering short-term live loads (e.g. seismic and wind loads).

For footings designed in accordance with the recommendations presented in this report, GeoTek anticipates a maximum static settlement of less than one inch and a maximum differential static settlement of less than 0.5 inch in a 30-foot span. Seismic settlement is anticipated to be minimal.

The passive earth pressure may be computed as an equivalent fluid having a density of 200 psf per foot of depth, to a maximum earth pressure of 2,000 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.30 may be used with dead load forces. The passive pressure and frictional resistance may be combined without reduction. The upper foot of soil should be neglected when computing passive earth pressure unless the ground is covered by asphalt or concrete.

A grade beam, a minimum of 12 inches wide and 12 inches deep, should be utilized across large entrances. The base of the grade beam should be at the same elevation as the bottom of the adjoining footings.

It is recommended that control joints be placed in two directions spaced approximately 24 to 36 times the thickness of the structural slab in inches. These joints are a widely accepted means to control cracks and should be reviewed by the project structural engineer.

### **5.3.2 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.

### **5.3.3 Foundation Setbacks**

Minimum setbacks for all foundations should comply with the 2022 CBC or City of Escondido/San Diego 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 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 5 feet and need not exceed 40 feet.
- If pools are planned, pool setback should be one-half of the building footing setback.
- 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.

### **5.3.4 Structural Slab Moisture and Vapor Retarder System**

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 2022 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2022 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 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 GeoTek along with geotechnical consultants in general, do not practice in areas of mold prevention. If specific recommendations are desired, a professional mold prevention consultant should be contacted.

### **5.3.5 Wall Design and Construction**

#### *5.3.5.1 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.



Walls supported by conventional shallow foundations should be embedded a minimum of 12 inches into engineered fill. Wall foundations should be designed in accordance with Section 5.3.1 of this report. Wall foundations should be placed on a minimum of 24 inches of engineered compacted fill placed over approved native materials. Structural needs may govern and should be evaluated by the project structural engineer.

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 5.3.5.4 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 footing of the earth retention structure should be considered in the design.

Proposed retaining walls along property lines will require a case-by-case evaluation. If remedial grading cannot be performed within the wall foundation area (per section 5.2.2), drilled piers embedded into competent native soil may be utilized. Alternatively, conventional shallow wall foundations may be designed utilizing reduced soil values. GeoTek should be contacted to provide final wall design recommendations near property lines when project plans are available.

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

#### *5.3.5.2 Cantilevered Walls*

The recommendations presented below are for cantilevered retaining walls. 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.

<b>ACTIVE EARTH PRESSURES</b>	
Surface Slope of Retained Materials (h:v)	Equivalent Fluid Pressure (pcf) Selected Native Backfill or Imported Backfill*
Level	47
2:1	84

\* The design pressures assume the backfill material will consist of either selected native soil or imported soil with an expansion index less than or equal to 50 and a friction angle of at least 28 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.

### 5.3.5.3 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 70 pcf, plus any applicable surcharge loading, for selected native or imported backfill and level back slope condition. 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.

### 5.3.5.4 Retaining Wall Backfill and Drainage

The wall backfill should also include a minimum one (1) foot wide section of ¾- to 1-inch clean crushed rock (or an approved equivalent). The rock should be placed immediately adjacent to the back of the wall and extend up from a back drain to within approximately 24 inches of the finish grade. The upper 24 inches should consist of compacted on-site materials. The rock should be separated from the earth with filter fabric. The presence of other materials might necessitate revision of the parameters provided and modification of the wall designs. The backfill materials should have properties as detailed in Section 5.3.5.2 and should be placed in lifts no greater than eight inches in thickness and compacted to a minimum of 90 percent relative compaction as determined by ASTM D 1557 test procedures. Proper surface drainage needs to be provided and maintained.

As an alternative to the drain, rock and fabric, a pre-manufactured wall drainage product (example: Mira Drain 6000 or approved equivalent) may be used behind the retaining wall. The

wall drainage product should extend from the base of the wall to within two feet of the ground surface. The subdrain should be placed in direct contact with the wall drainage product.

Retaining walls should be provided with an adequate pipe and gravel back drain system to help prevent buildup of hydrostatic pressures. 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 linear foot of ¾- to 1-inch clean crushed rock or an approved equivalent, wrapped in filter fabric (Mirafi 140N or an approved equivalent). The drain system should be connected to a suitable outlet. Waterproofing of site walls should be performed where moisture migration through the walls is undesirable.

**5.3.5.5 Other Design Considerations**

- Retaining and screen 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.

**5.3.6 Pavement Design Considerations**

Pavement design for proposed on-site parking and drive areas was conducted per Caltrans Highway Design Manual guidelines for flexible pavements. Based on an assumed design R-value of 20 and for Traffic Indexes (TIs) of 4.5 for residential streets and 6.0 for local collector streets, the following preliminary sections were estimated:

<b>PRELIMINARY PAVEMENT SECTIONS</b>			
Street Classification	TI	Assumed Design R-Value	Preliminary Pavement Sections*
Residential	4.5	20	3" AC**/6" AB**
Local Collector	6.0	20	3" AC**/10.5" AB or 4" AC/8.5" AB

\*AC = Asphalt Concrete, AB = Aggregate Base,

\*\* Minimum thickness per City of Escondido Design Standards and Standards Drawings (2014)



The TIs used in our pavement design are considered reasonable values for the proposed street 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 sections provided are 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 ordinances, 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 one 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 Escondido/San Diego 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 is 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.

### **5.3.7 Soil Corrosivity**

The soil resistivity at this site was tested in the laboratory on two (2) samples collected during the field investigation. The results of the testing indicate that the on-site materials are “corrosive” to “moderately corrosive” (4,087 and 9,380 ohm-cm) to buried ferrous metals in accordance with current standards used by corrosion engineers (Roberge, P.R., 2005). Recommendations for protection of buried ferrous metal should be provided by a corrosion engineer. Additional corrosion testing should be performed at the time of site grading to assess the corrosion potential of the as-graded soils.

### **5.3.8 Soil Sulfate Content**

The sulfate content was determined in the laboratory on two (2) samples collected during the field investigation. The results indicate that the water-soluble sulfate is less than 0.1 percent by weight, which is considered “negligible” as per Table 19.3.1.1 of ACI 318. Based on the above, no special recommendations for concrete are required for this project due to soil sulfate exposure.

### **5.3.9 Import Soils**

Import soils should have a “very low” to “low” expansion potential ( $EI \leq 50$ ), be cleared of organics, and have a maximum size up to six inches. GeoTek, Inc. also recommends that the proposed import soils be tested for expansion and corrosivity potential. GeoTek, Inc. should be notified for a minimum of 72 hours prior to importing so that appropriate sampling and laboratory testing can be performed.

### **5.3.10 Concrete Construction**

#### *5.3.10.1 General*

Concrete construction should follow the 2022 CBC and ACI guidelines regarding design, mix placement, and curing of the concrete. If desired, we could provide quality control testing of the concrete during construction.

#### *5.3.10.2 Concrete Mix Design*

As indicated in Section 5.3.8, the site will not require a particular concrete mix design to resist sulfate attack.

#### *5.3.10.3 Concrete Flatwork*

Exterior concrete flatwork (sidewalks, driveways, patios, etc.) should have a minimum thickness of four inches. No concrete reinforcement is required from a geotechnical

standpoint. However, 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. “Low” expansive subgrade soils should be pre-saturated to at least 110 percent of optimum moisture content. The 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 Escondido/San Diego County specifications, and under the observation and testing of GeoTek and a City/County inspector, if necessary.

#### *5.3.10.4 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.

## **5.4 POST CONSTRUCTION CONSIDERATIONS**

### **5.4.1 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.

### **5.4.2 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.

## **5.5 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS**

GeoTek recommends that foundation plans for the site be reviewed by this office prior to construction to check for conformance with the recommendations of this report. GeoTek also recommends 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 bottom of removals prior to fill placement.
- Evaluate the suitability of onsite and import materials for fill placement and collect soil samples for laboratory testing where necessary.
- Observe the fill for uniformity during placement, including utility trenches.
- Perform field density testing of the fill materials.
- Observe and probe foundation excavations to confirm suitability of bearing materials.

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.

## **6 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 report 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-0609524r-CR) date July 2, 2024 and geotechnical engineering standards normally used on similar projects in this locality at present.

## 7 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.

## 8 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.

California Code of Regulations, Title 24, 2022, "California Building Code," 2 volumes.

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

City of Escondido, 2014, "Design Standards and Standard Drawings," effective date April 2.

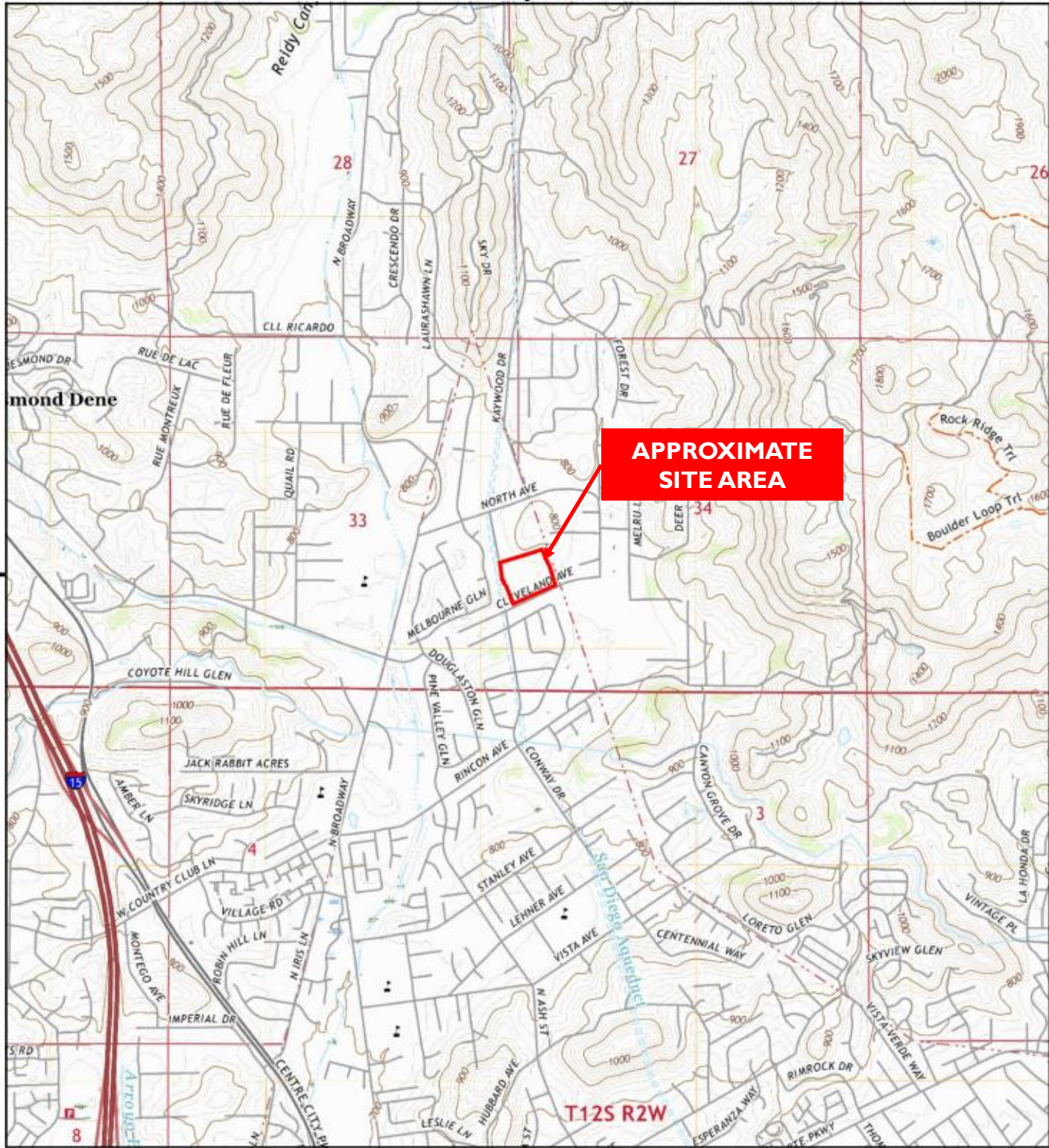
\_\_\_\_\_, 2022, "Stormwater Design Manual," updated October 2022.

Excel Engineering, Inc., 2024, "Base Map, Conway Drive & Cleveland Avenue, City of Escondido, California," dated February 16.



Kennedy, M.P., 1999, "Geologic Map of the Valley Center 7.5-minute quadrangle, San Diego County, California," Preliminary Geologic Maps, PGM-99-06, 1:24,000.

Roberge, Pierre. R., 2005, "From Corrosion Basics: An Introduction," 2<sup>nd</sup> Edition.



Modified from the Valley Center 2022  
7.5-Minute Topographic Map Sheets



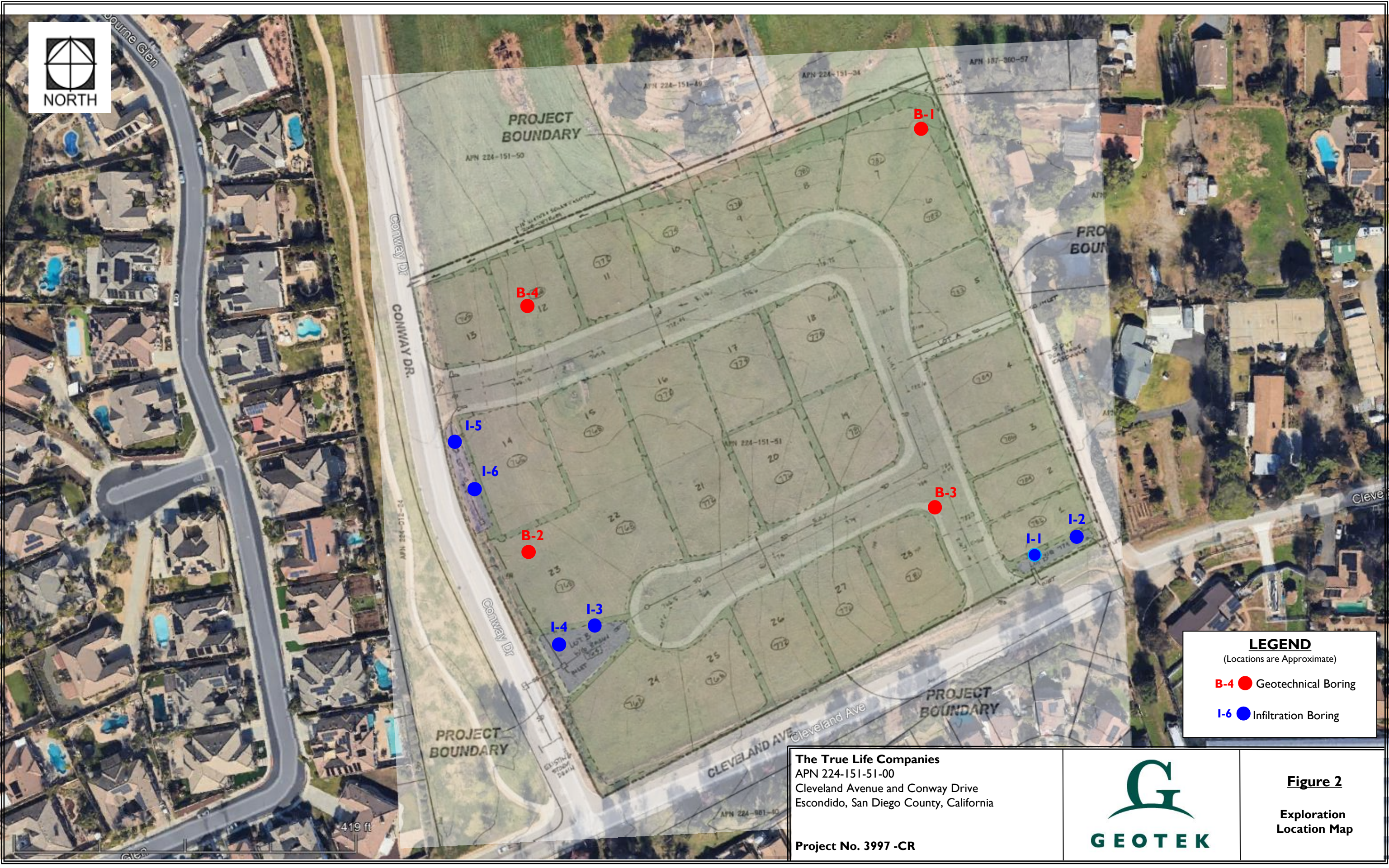
**The True Life Companies**  
Assessor's Parcel Number (APN) 224-151-51-00  
North of Cleveland Avenue and East of Conway Drive  
Escondido, San Diego County, California



**Figure I**  
**Site Location Map**



**Project No. 3997-CR**



**LEGEND**  
(Locations are Approximate)

**B-4** ● Geotechnical Boring

**I-6** ● Infiltration Boring

**The True Life Companies**  
APN 224-151-51-00  
Cleveland Avenue and Conway Drive  
Escondido, San Diego County, California

**Project No. 3997 -CR**



**Figure 2**  
**Exploration  
Location Map**

419 ft

# **APPENDIX A**

## **BORING LOGS**

**Geotechnical and Infiltration Evaluation  
Escondido, San Diego County, California  
Project No. 3997-CR**



## 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

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

### 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

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

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.172887, -117.082793

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow-Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 789

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: B-1  MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5				ML	<b>Undocumented Fill:</b> F-m sandy SILT, brown, moist			
		9	R1	CL	<b>Older Alluvium:</b> F-m sandy CLAY, reddish brown, moist, very stiff, trace silt	14.7	100.1	AL, MD, SH, EI, SA, SR
		12						
		17						
		9	R2		Hard, orange oxidation staining	17.7	118.5	
		20						
10		28						
		14	R3		<b>Dioritic Bedrock:</b> Excavates as f-m sandy SILT, greyish orange, moist, moderately weathered	15.1	123.6	
		25						
	36							
	16	R4		Orangish white to dark grey				
	35							
	50-5"							
	59	R5		Excavates as Sand becomes f-c, trace gravel up to 1.0" maximum dimension, slightly weathered				
	50-4"							
15		50-3"	R6		Excavates as f-c SAND, white to dark grey, moist, trace silt, indurated			
20	<b>BORING TERMINATED AT 13.8 FEET</b>							
	No groundwater encountered Boring backfilled with soil cuttings							
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.171447, -117.084297

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 760

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: B-2	Laboratory Testing			
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others	
<b>MATERIAL DESCRIPTION AND COMMENTS</b>									
				SM	<b>Undocumented Fill:</b> Silty f-m SAND, brown, moist				
		7 12 13	R1	CL	<b>Older Alluvium:</b> F-c sandy CLAY, reddish brown, slightly moist, very stiff	4.0	117.8		
		9 15 21	R2		<b>Dioritic Bedrock:</b> Excavates as f sandy SILT, greyish orange, moist, severely weathered	22.1	107.3		
5		6 12 19	R3		Excavates as f-m Sand	19.9	108.7		
		7 15 16	R4		Excavates as f Sand, grey, orange oxidation staining				
10		7 10 16	R5		Orangish white to grey				
		26 50-5"	R6		Excavates as f-c Sand, white to grey, trace orange oxidation staining, moderately weathered				
15	<b>BORING TERMINATED AT 14.4 FEET</b>								
	No groundwater encountered Borining backfilled with soil cuttings								
20									
25									
30									

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.171591, -117.082690

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 784

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: B-3  MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5				ML	<b>Undocumented Fill:</b> F-c sandy SILT, brown, moist			
5		12 5 9			<b>Dioritic Bedrock:</b> Excavates as Silty f-c SAND, light orangish grey, slightly moist, severely weathered.  becomes indurated	3.1	124.2	
		50-5"			Orangish grey, micaceous			
		50-4"						
		50-4"						
10					<b>BORING TERMINATED AT 8.3 FEET</b>			
					No groundwater encountered Boring backfilled with soil cuttings			
15								
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>		---Ring		---SPT		---Small Bulk		---Large Bulk		---No Recovery		---Water Table
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation	MD = Maximum Density				

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.172256, -117.084349

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 766

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: B-4	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
				SM	<b>Undocumented Fill:</b> Silty f-c SAND, brown, moist			EI, MD, SR
					<b>Dioritic Bedrock:</b> Excavates as silty f-c SAND, light brown, trace gravel up to 0.5" maximum dimension, orange oxidation, staining, slightly weathered.	2.7		
5					Excavates as SAND with silt, orangish brown, few gravel up to 1.0" maximum dimension, trace clay, slightly micaceous, slightly weathered	2.2		
					Light orangish brown, becomes indurated	2.5		
					Orangish brown			
10								
15					Brownish grey, trace orange oxidation staining			
					<b>BORING TERMINATED AT 15.5 FEET</b>			
					No groundwater encountered Boring backfilled with soil cuttings			
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.171361, -117.082344

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 779

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: I-1  MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5		5 7 9	SI	CL	<b>Older Alluvium:</b> F sandy CLAY, reddish brown, moist, very stiff, rootlets			
10					<b>BORING TERMINATED AT 2.0 FEET</b>  No groundwater encountered Boring backfilled with soil cuttings			
15								
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.171419, -117.082166

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 774

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: I-2  <b>MATERIAL DESCRIPTION AND COMMENTS</b>	Laboratory Testing			
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others	
0		7		SI	CL				
1		10							
2		11							
<b>BORING TERMINATED AT 2.0 FEET</b>									
No groundwater encountered Boring backfilled with soil cuttings									
5									
10									
15									
20									
25									
30									

<b>LEGEND</b>	<b>Sample type:</b> <span style="display: inline-block; width: 15px; height: 15px; background-color: #cccccc; border: 1px solid black; margin-right: 5px;"></span> ---Ring <span style="display: inline-block; width: 15px; height: 15px; background-color: #999999; border: 1px solid black; margin-right: 5px;"></span> ---SPT <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; border-style: dashed; margin-right: 5px;"></span> ---Small Bulk <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; border-style: dotted; margin-right: 5px;"></span> ---Large Bulk <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></span> ---No Recovery <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; border-style: dashed; margin-right: 5px;"></span> ---Water Table							
	<b>Lab testing:</b> AL = Atterberg Limits SR = Sulfate/Resistivity Test		EI = Expansion Index SH = Shear Test		SA = Sieve Analysis HC = Consolidation		RV = R-Value Test MD = Maximum Density	

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.171089, -117.084062

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 760

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: I-3	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
8		8	SI	CL	<b>Older Alluvium:</b> F sandy CLAY, dark brown, moist, very stiff, rootlets			
12					<b>BORING TERMINATED AT 2.0 FEET</b>  No groundwater encountered Boring backfilled with soil cuttings			
15								
5								
10								
15								
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.171031, -117.084217

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 759

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: I-4	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
<b>MATERIAL DESCRIPTION AND COMMENTS</b>								
		5	SI	ML	<b>Undocumented Fill:</b> F-m sandy SILT, brown, moist			
		7		CL	<b>Older Alluvium:</b> F sandy CLAY, reddish brown, moist, stiff, rootlets			
		7						
<b>BORING TERMINATED AT 2.0 FEET</b>								
No groundwater encountered Boring backfilled with soil cuttings								
5								
10								
15								
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.171868, -117.084551

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 765

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: I-5  <b>MATERIAL DESCRIPTION AND COMMENTS</b>	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
			SI	ML	<b>Undocumented Fill:</b> F-m sandy SILT, brown, moist			
				CL	<b>Older Alluvium:</b> F sandy CLAY, reddish brown, moist			
5		44 50-4"	SI		<b>Dioritic Bedrock:</b> Excavates as silty f-c SAND, light orangish grey, moist, moderately weathered			
					<b>BORING TERMINATED AT 6.0 FEET</b>			
					No groundwater encountered Boring backfilled with soil cuttings			
10								
15								
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

**GeoTek, Inc.**  
**LOG OF EXPLORATORY BORING**

**CLIENT:** The True Life Companies  
**PROJECT NAME:** APN 224-151-51-00  
**PROJECT NO.:** 3997-CR  
**COORDINATES:** 33.171702, -117.084474

**DRILLER:** 2R Drilling  
**DRILL METHOD:** Hollow Stem  
**HAMMER:** 140#/30"  
**ELEVATION:** 765

**LOGGED BY:** JC  
**OPERATOR:** Jerry  
**RIG TYPE:** CME-55 Track  
**DATE:** 7/12/2024

Depth (ft)	SAMPLES			USCS Symbol	Boring No.: I-6  MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/ 6 in	Sample Number			Water Content (%)	Dry Density (pcf)	Others
				ML	<b>Undocumented Fill:</b> F-m sandy SILT, brown, moist			
				CL	<b>Older Alluvium:</b> F sandy CLAY, reddish brown, moist			
5		20 49 50-6"	SI		<b>Dioritic Bedrock:</b> Excavates as F-m sandy SILT, grey, moist, trace orange oxidation staining, moderately weathered			
					<b>BORING TERMINATED AT 6.0 FEET</b>			
					No groundwater encountered Boring backfilled with soil cuttings			
10								
15								
20								
25								
30								

<b>LEGEND</b>	<b>Sample type:</b>	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	<b>Lab testing:</b>	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation

# **APPENDIX B**

## **LABORATORY TEST RESULTS**

**Geotechnical and Infiltration Evaluation  
Escondido, San Diego County, California  
Project No. 3997-CR**



## SUMMARY OF LABORATORY TESTING

### Atterberg Limits

Selected fine-grained soil samples were tested for their Atterberg limits in general accordance with ASTM D 4318. The results of these tests are presented herein.

### Direct Shear

Shear testing was performed in a direct shear machine of the strain-control type in general accordance with ASTM D 3080 test procedures. The rate of deformation was approximately 0.01 inch per minute. The sample was sheared under varying confining loads in order to determine the coulomb shear strength parameters, angle of internal friction and cohesion. The tests were performed on soil samples remolded to approximately 90 percent of maximum dry density as determined by ASTM D 1557 test procedures. The shear test results are presented herein.

### Expansion Index

Expansion Index testing was performed on two soil samples 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.

### Percent Passing No. 200 Sieve

The amount of soil particles passing No. 200 Sieve was estimated in accordance with ASTM D 1140. The test results are presented herein.

### Sulfate Content, Resistivity and Chloride Content

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

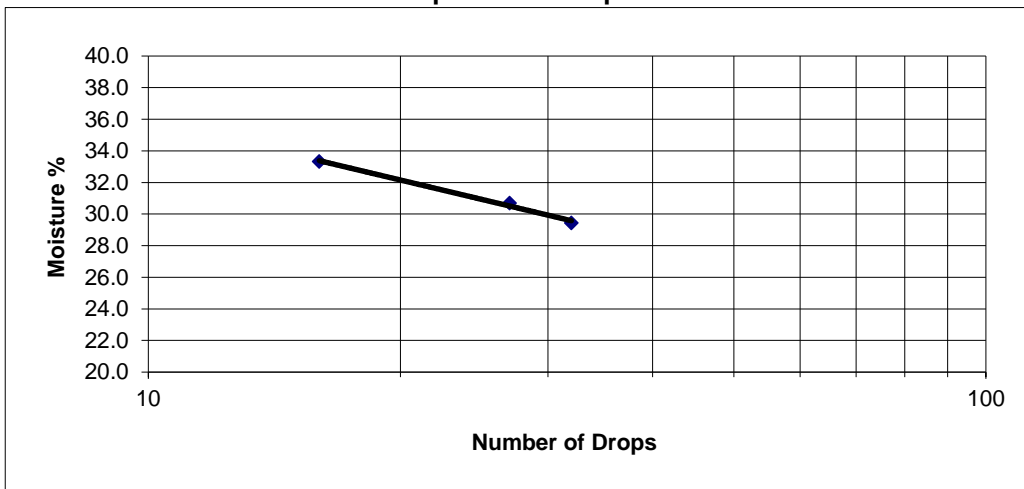


### ATTERBERG LIMITS DATA

Field Classification	_____	Job No.	3997-CR
Sample Number	_____	Client	The True Life Companies
Sample Type	_____	Project	APN 224-151-51 - Phase I
Location	B-1 @ 0-5 Feet		
Tested by:	AH		

Number of Blows	Plastic Limit		Liquid Limit		
	16	27	16	27	32
Wt. of Dish + Wet Soil	37.14	36.90	19.25	17.09	17.92
Wt. of Dish + Dry Soil	36.25	36.04	16.01	14.54	15.27
Wt. of Moisture	0.89	0.86	3.24	2.55	2.65
Wt. of Dish	30.91	30.62	6.29	6.23	6.27
Wt. of Dry Soil	5.34	5.42	9.72	8.31	9.00
Moisture Content %	16.7	15.9	33.3	30.7	29.4

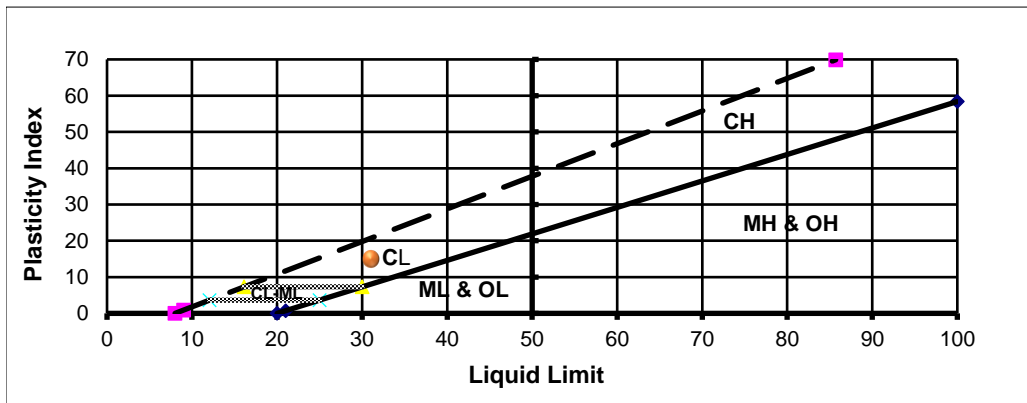
Liquid Limit Graph

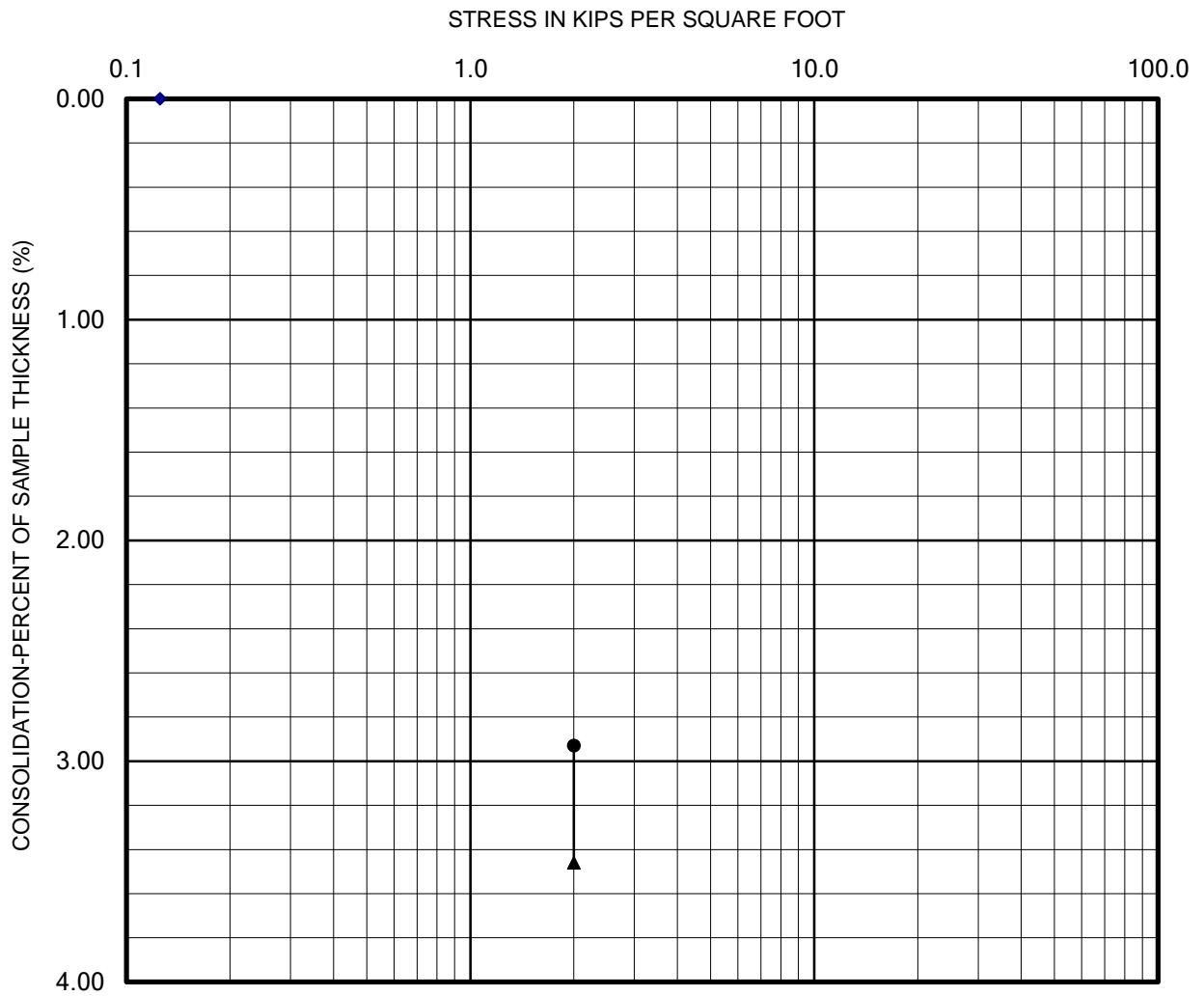


Liquid Limit  
\_\_\_\_\_ 31

Plastic Limit  
\_\_\_\_\_ 16

Plasticity Index  
\_\_\_\_\_ 15





- Seating Cycle
- Loading Prior to Inundation
- ▲— Loading After Inundation
- ▲--- Rebound Cycle

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546



## COLLAPSE REPORT

**Sample: B-1 @ 3 Feet**

CHECKED BY: EC

Lab: Corona

PROJECT NO.: 3997-CR

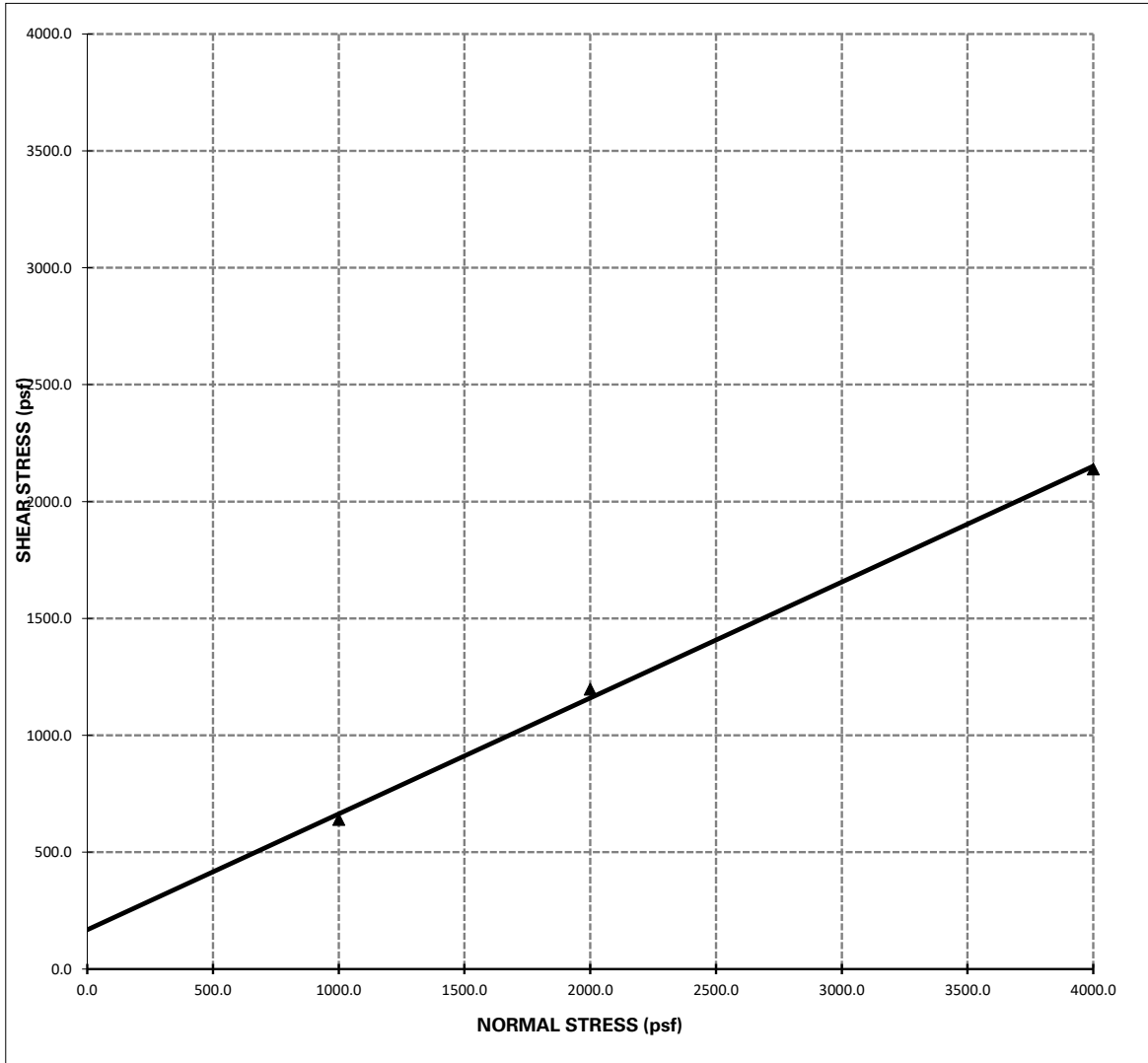
Date: 7/22/2024



## DIRECT SHEAR TEST

**Project Name:** APN 224-151-51 - Phase I  
**Project Number:** 3997-CR

**Sample Location:** B-1 @ 0-5 Feet  
**Date Tested:** 7/22/2024



**Shear Strength:**  $\Phi = 26^\circ$  ; **C = 168 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 0.01 in/min.



## EXPANSION INDEX TEST

(ASTM D4829)

**Client:** The True Life Companies  
**Project Number:** 3997-CR  
**Project Location:** Assessor Parcel Number 224-151-51 - Phase I

**Tested/ Checked By:** EC Lab No Corona  
**Date Tested:** 7/22/2024  
**Sample Source:** B-1 @ 0-5 Feet  
**Sample Description:** \_\_\_\_\_

Ring #: \_\_\_\_\_ Ring Dia. : 4.01" Ring Ht.: 1"

### DENSITY DETERMINATION

Weight of compacted sample & ring (gm)	741.5
Weight of ring (gm)	363.6
Net weight of sample (gm)	<b>377.9</b>
Wet Density, lb / ft3 (C*0.3016)	<b>114.0</b>
Dry Density, lb / ft3 (D/1.F)	<b>101.0</b>

### SATURATION DETERMINATION

Moisture Content, %	12.8
Specific Gravity, assumed	<b>2.70</b>
Unit Wt. of Water @ 20°C, (pcf)	<b>62.4</b>
% Saturation	<b>51.8</b>

READINGS		
DATE	TIME	READING
7/22/2024		0.6790
7/22/2024		0.6780
7/23/2024		0.7240

Initial  
10 min/Dry  
  
  
  
Final

FINAL MOISTURE	
Final Weight of wet sample & tare	% Moisture
791.2	<b>26.0</b>

**EXPANSION INDEX = 46**



## EXPANSION INDEX TEST

(ASTM D4829)

**Client:** The True Life Companies  
**Project Number:** 3997-CR  
**Project Location:** Assessor Parcel Number 224-151-51 - Phase I

**Tested/ Checked By:** EC Lab No Corona  
**Date Tested:** 7/22/2024  
**Sample Source:** B-4 @ 0-5 Feet  
**Sample Description:** \_\_\_\_\_

Ring #: \_\_\_\_\_ Ring Dia. : 4.01" Ring Ht.: 1"

### DENSITY DETERMINATION

Weight of compacted sample & ring (gm)	772.4
Weight of ring (gm)	362.9
Net weight of sample (gm)	<b>409.5</b>
Wet Density, lb / ft3 (C*0.3016)	<b>123.5</b>
Dry Density, lb / ft3 (D/1.F)	<b>113.4</b>

### SATURATION DETERMINATION

Moisture Content, %	8.9
Specific Gravity, assumed	<b>2.70</b>
Unit Wt. of Water @ 20°C, (pcf)	<b>62.4</b>
% Saturation	<b>49.5</b>

READINGS		
DATE	TIME	READING
7/22/2024		0.9090
7/22/2024		0.9080
7/23/2024		0.9080

Initial  
10 min/Dry  
  
  
  
  
Final

FINAL MOISTURE	
Final Weight of wet sample & tare	% Moisture
785.5	<b>12.1</b>

**EXPANSION INDEX = 0**



**Report No: PTR:24-00145-S01**

# Proctor Report

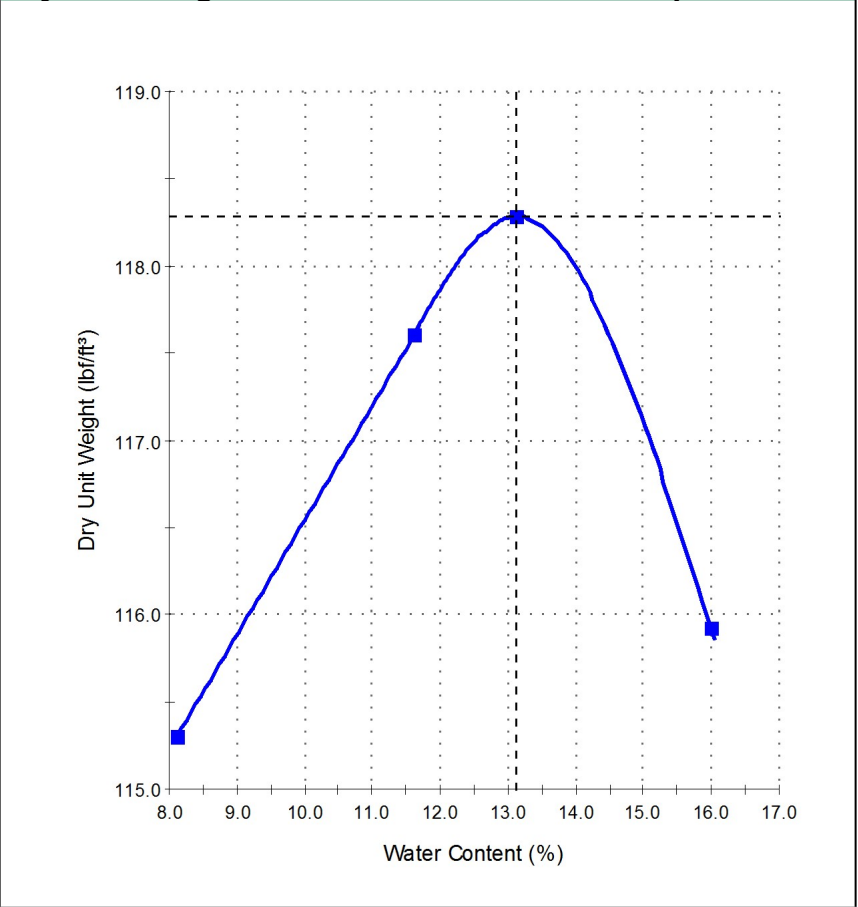
**Client:** The True Life Companies  
 ATTN: Michael Torres  
 Newport Beach CA 92660  
**CC:**  
  
**Project:** 3997-CR  
 Assessor Parcel Number 224-151-51 -  
 Phase I ESA

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

## Sample Details

**Sample ID:** 24-00145-S01  
**Date Sampled:** 7/19/2024  
**Sampled By:**  
**Material:** Fine to Medium Sandy CLAY  
**Location:** B-1 @ 0-5 Feet

## Dry Unit Weight - Water Content Relationship



## Test Results

ASTM D 1557  
**Maximum Dry Unit Weight (lb/ft³):** 118.3  
**Optimum Water Content (%):** 13.1  
 Method: A  
 Preparation Method: Moist  
 Retained Sieve No 4 (4.75mm) (%): 1  
 Passing Sieve No 4 (4.75mm) (%): 99  
 Tested By: Eduardo Cuevas  
 Date Tested: 7/18/2024

## Comments



Report No: PTR:24-00145-S02

# Proctor Report

**Client:** The True Life Companies  
 ATTN: Michael Torres  
 Newport Beach CA 92660

**CC:**

**Project:** 3997-CR  
 Assessor Parcel Number 224-151-51 -  
 Phase I ESA

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

## Sample Details

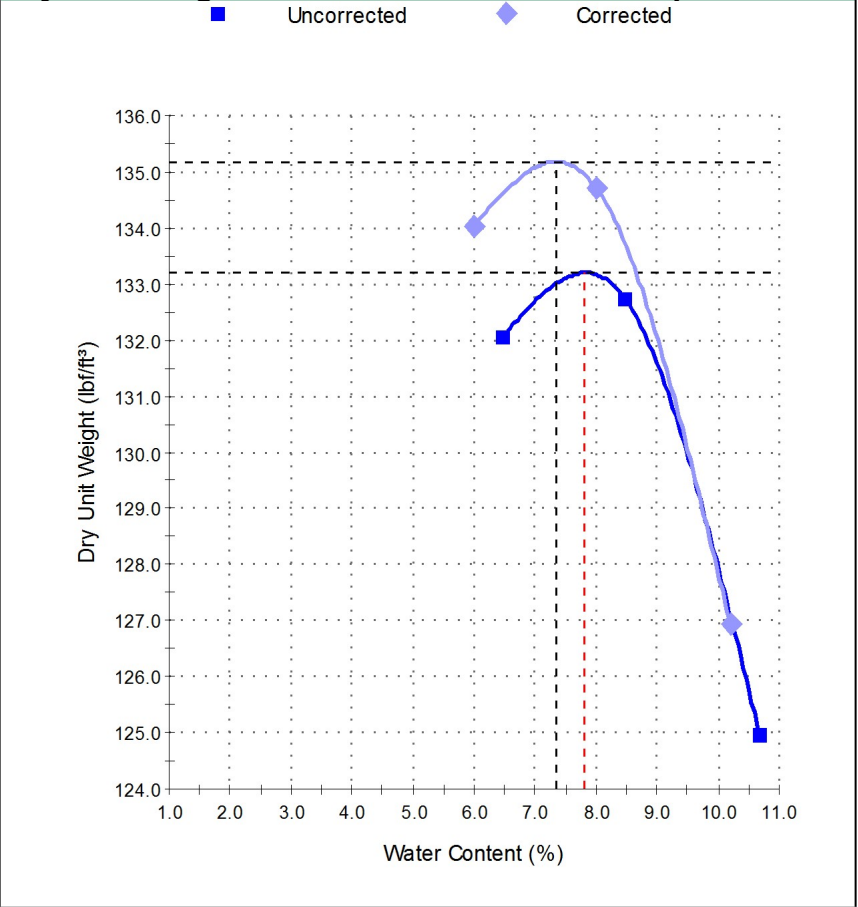
**Sample ID:** 24-00145-S02 **Date Sampled:** 7/19/2024

**Sampled By:**

**Material:** Silty Fine to Coarse SAND

**Location:** B-4 @ 0-5 Feet

## Dry Unit Weight - Water Content Relationship



## Test Results

ASTM D 1557	
<b>Maximum Dry Unit Weight (lb/ft³):</b>	<b>133.2</b>
<b>Optimum Water Content (%):</b>	<b>7.8</b>
Method:	A
Preparation Method:	Moist
Retained Sieve No 4 (4.75mm) (%):	7
Passing Sieve No 4 (4.75mm) (%):	93
Tested By:	Eduardo Cuevas
Date Tested:	7/18/2024
ASTM D 4718	
<b>Corrected Maximum Dry Unit Weight (lb/ft³):</b>	<b>135.2</b>
<b>Corrected Optimum Water Content (%):</b>	<b>7.3</b>
Specific Gravity (Oversize):	2.70
Sieve Size (Oversize):	No 4
Oversize Particles (%):	7

## Comments



## -200 WASH

Date: 7/25/2024  
W.O.: 3997-CR sample ID B-1  
Client: The True Life Companies depth 0-5 Feet  
Project: Assessor Parcel Number 224-151-51 - Phase I

Sieve Size	Particle Diameter		Wt. Retained	Wt. Passing	% Passing	Specs
	in.	mm.				
#200	0.0029	0.074	109.7	205.7	65.2%	
Dry Weight	<u>315.4</u>					
Soak Time	<u>1440</u>	<u>Minutes</u>				



## Soil Analysis Lab Results

Client: GeoTek USA

Job Name: Assessor Parcel Number 224-151-51 - Phase 1

Client Job Number: 3997-CR

Project X Job Number: S240716H

July 18, 2024

Bore# / Description	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	
		Sulfates	SO <sub>4</sub> <sup>2-</sup>	Chlorides	Cl <sup>-</sup>	Resistivity													pH
	Depth	(mg/kg)	(wt%)	(mg/kg)	(wt%)	As Rec'd	Minimum												
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ω-cm)	(Ω-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
B-1	0-5	170.4	0.0170	75.1	0.0075	66,330	4,087	6.4	153	6.5	6.6	1.8	0.1	111.1	5.7	51.1	187.2	5.7	1.3
B-4	0-5	15.0	0.0015	7.0	0.0007	214,400	9,380	6.4	157	5.1	0.1	3.3	ND	18.8	2.5	23.7	87.0	4.7	0.9

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)

**Note:** Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops. This is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

If one sample pops up much more corrosive than all others, we would recommend collecting more samples surrounding the problem sample location to determine if the peak is isolated to it. This allows us to conclude it was a contaminated sample and able to declare it an outlier.

Try out our new online forms: [SOIL CORROSIVITY & THERMAL RESISTIVITY LAB REQUEST FORM](#) & [IN-SITU WENNER 4 PIN QUOTE REQUEST FORM](#)

# **APPENDIX C**

## **PERCOLATION/INFILTRATION TEST DATA**

**Geotechnical and Infiltration Evaluation  
Escondido, San Diego County, California  
Project No. 3997-CR**



**Client:** The True Life Companies  
**Project:** APN 224-151-51-00  
**Project No:** 3997-CR  
**Date:** 7/15/2024

**Boring No.** I-1

**Percolation to Infiltration Rate (Porchet Method)**

Time Interval,  $\Delta t =$  30  
 Final Depth to Water,  $D_F =$  1.875  
 Test Hole Radius,  $r =$  4  
 Initial Depth to Water,  $D_O =$  0  
 Total Test Hole Depth,  $D_T =$  24

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

$H_O = D_T - D_O =$  24  
 $H_F = D_T - D_F =$  22.125  
 $\Delta H = \Delta D = H_O - H_F =$  1.875  
 $H_{avg} = (H_O + H_F) / 2 =$  23.0625

$I_t =$  0.30 Inches per Hour



**Client:** The True Life Companies  
**Project:** APN 224-151-51-00  
**Project No:** 3997-CR  
**Date:** 7/15/2024

**Boring No.** I-2

**Percolation to Infiltration Rate (Porchet Method)**

Time Interval,  $\Delta t =$  30  
 Final Depth to Water,  $D_F =$  2.125  
 Test Hole Radius,  $r =$  4  
 Initial Depth to Water,  $D_O =$  0  
 Total Test Hole Depth,  $D_T =$  24

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

$H_O = D_T - D_O =$  24  
 $H_F = D_T - D_F =$  21.875  
 $\Delta H = \Delta D = H_O - H_F =$  2.125  
 $H_{avg} = (H_O + H_F) / 2 =$  22.9375

$I_t =$  0.34 Inches per Hour



**Client:** The True Life Companies  
**Project:** APN 224-151-51-00  
**Project No:** 3997-CR  
**Date:** 7/15/2024

**Boring No.** I-3

**Percolation to Infiltration Rate (Porchet Method)**

Time Interval,  $\Delta t =$  30  
 Final Depth to Water,  $D_F =$  2  
 Test Hole Radius,  $r =$  4  
 Initial Depth to Water,  $D_O =$  0  
 Total Test Hole Depth,  $D_T =$  24

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

$H_O = D_T - D_O =$  24  
 $H_F = D_T - D_F =$  22  
 $\Delta H = \Delta D = H_O - H_F =$  2  
 $H_{avg} = (H_O + H_F) / 2 =$  23

$I_t =$  0.32 Inches per Hour



**Client:** The True Life Companies  
**Project:** APN 224-151-51-00  
**Project No:** 3997-CR  
**Date:** 7/15/2024

**Boring No.** I-4

**Percolation to Infiltration Rate (Porchet Method)**

Time Interval,  $\Delta t =$  30  
 Final Depth to Water,  $D_F =$  2.625  
 Test Hole Radius,  $r =$  4  
 Initial Depth to Water,  $D_O =$  0  
 Total Test Hole Depth,  $D_T =$  24

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

$H_O = D_T - D_O =$  24  
 $H_F = D_T - D_F =$  21.375  
 $\Delta H = \Delta D = H_O - H_F =$  2.625  
 $H_{avg} = (H_O + H_F) / 2 =$  22.6875

$I_t =$  0.43 Inches per Hour



**Client:** The True Life Companies  
**Project:** APN 224-151-51-00  
**Project No:** 3997-CR  
**Date:** 7/15/2024

**Boring No.** I-5

**Percolation to Infiltration Rate (Porchet Method)**

Time Interval,  $\Delta t =$  30  
 Final Depth to Water,  $D_F =$  48.24  
 Test Hole Radius,  $r =$  4  
 Initial Depth to Water,  $D_O =$  48  
 Total Test Hole Depth,  $D_T =$  72

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

$H_O = D_T - D_O =$  24  
 $H_F = D_T - D_F =$  23.76  
 $\Delta H = \Delta D = H_O - H_F =$  0.24  
 $H_{avg} = (H_O + H_F) / 2 =$  23.88

$I_t =$  0.04 Inches per Hour



**Client:** The True Life Companies  
**Project:** APN 224-151-51-00  
**Project No:** 3997-CR  
**Date:** 7/15/2024

**Boring No.** I-6

**Percolation to Infiltration Rate (Porchet Method)**

Time Interval,  $\Delta t =$  30  
 Final Depth to Water,  $D_F =$  49.44  
 Test Hole Radius,  $r =$  4  
 Initial Depth to Water,  $D_O =$  48  
 Total Test Hole Depth,  $D_T =$  72

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

$H_O = D_T - D_O =$  24  
 $H_F = D_T - D_F =$  22.56  
 $\Delta H = \Delta D = H_O - H_F =$  1.44  
 $H_{avg} = (H_O + H_F) / 2 =$  23.28

$I_t =$  0.23 Inches per Hour



**PERCOLATION DATA SHEET**

**Project:** APN 224-151-51-00

**Job No.:** 3997-CR

**Test Hole No.:** I-1 **Tested By:** JC

**Date:** 7/15/2024

**Depth of Hole As Drilled:** 24" **Before Test:** 24"

**After Test:** 24"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
Trial	7:13 AM		24"	24				Pre-soaked with 5+ gallons of clear water prior to Trials
	7:38 AM	25			21.375	2.625		
Trial	7:39 AM		24"	24				
	8:04 AM	25			21.5	2.5		
1	8:05 AM		24"	24				
	8:35 AM	30			21.25	2.75		
2	8:36 AM		24"	24				
	9:06 AM	30			21.75	2.25		
3	9:07 AM		24"	24				
	9:37 AM	30			21.875	2.125		
4	9:38 AM		24"	24				
	10:08 AM	30			22	2		
5	10:09 AM		24"	24				
	10:39 AM	30			22	2		
6	10:40 AM		24"	24				
	11:10 AM	30			22	2		
7	11:11 AM		24"	24				
	11:41 AM	30			22.125	1.875		
8	11:42 AM		24"	24				
	12:12 PM	30			22.125	1.875		
9	12:13 PM		24"	24				
	12:43 PM	30			22.125	1.875		
10	12:44 PM		24"	24				
	1:14 PM	30			22.125	1.875		
11	1:15 PM		24"	24				
	1:45 PM	30			22.125	1.875		
12	1:46 PM		24"	24				
	2:16 PM	30			22.125	1.875		



**PERCOLATION DATA SHEET**

**Project:** APN 224-151-51-00

**Job No.:** 3997-CR

**Test Hole No.:** I-2 **Tested By:** JC

**Date:** 7/15/2024

**Depth of Hole As Drilled:** 24" **Before Test:** 24"

**After Test:** 24"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
Trial	7:16 AM		24"	24				Pre-soaked with 5+ gallons of clear water prior to Trials
	7:41 AM	25			21.75	2.25		
Trial	7:42 AM		24"	24				
	8:07 AM	25			21.625	2.375		
1	8:08 AM		24"	24				
	8:38 AM	30			21.625	2.375		
2	8:39 AM		24"	24				
	9:09 AM	30			21.625	2.375		
3	9:10 AM		24"	24				
	9:40 AM	30			21.625	2.375		
4	9:41 AM		24"	24				
	10:11 AM	30			21.75	2.25		
5	10:12 AM		24"	24				
	10:42 AM	30			21.75	2.25		
6	10:43 AM		24"	24				
	11:13 AM	30			21.875	2.125		
7	11:14 AM		24"	24				
	11:44 AM	30			21.875	2.125		
8	11:45 AM		24"	24				
	12:15 PM	30			21.875	2.125		
9	12:16 PM		24"	24				
	12:46 PM	30			21.875	2.125		
10	12:47 PM		24"	24				
	1:17 PM	30			21.875	2.125		
11	1:18 PM		24"	24				
	1:48 PM	30			21.875	2.125		
12	1:49 PM		24"	24				
	2:19 PM	30			21.875	2.125		



**PERCOLATION DATA SHEET**

**Project:** APN 224-151-51-00

**Job No.:** 3997-CR

**Test Hole No.:** I-3 **Tested By:** JC

**Date:** 7/15/2024

**Depth of Hole As Drilled:** 24" **Before Test:** 24"

**After Test:** 24"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
Trial	7:08 AM		24"	24				Pre-soaked with 5+ gallons of clear water prior to Trials
	7:33 AM	25			21.875	2.125		
Trial	7:34 AM		24"	24				
	7:59 AM	25			22.125	1.875		
1	8:00 AM		24"	24				
	8:30 AM	30			21.875	2.125		
2	8:31 AM		24"	24				
	9:01 AM	30			21.875	2.125		
3	9:02 AM		24"	24				
	9:32 AM	30			21.875	2.125		
4	9:33 AM		24"	24				
	10:03 AM	30			21.875	2.125		
5	10:04 AM		24"	24				
	10:34 AM	30			22	2		
6	10:35 AM		24"	24				
	11:05 AM	30			22	2		
7	11:06 AM		24"	24				
	11:36 AM	30			22	2		
8	11:37 AM		24"	24				
	12:07 PM	30			22	2		
9	12:08 PM		24"	24				
	12:38 PM	30			22	2		
10	12:39 PM		24"	24				
	1:09 PM	30			22	2		
11	1:10 PM		24"	24				
	1:40 PM	30			22	2		
12	1:41 PM		24"	24				
	2:11 PM	30			22	2		



**PERCOLATION DATA SHEET**

**Project:** APN 224-151-51-00

**Job No.:** 3997-CR

**Test Hole No.:** I-4 **Tested By:** JC

**Date:** 7/15/2024

**Depth of Hole As Drilled:** 24" **Before Test:** 24"

**After Test:** 24"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
Trial	7:05 AM		24"	24				Pre-soaked with 5+ gallons of clear water prior to Trials
	7:30 AM	25			20.5	3.5		
Trial	7:31 AM		24"	24				
	7:56 AM	25			21	3		
1	7:57 AM		24"	24				
	8:27 AM	30			20.875	3.125		
2	8:28 AM		24"	24				
	8:58 AM	30			20.875	3.125		
3	8:59 AM		24"	24				
	9:29 AM	30			20.875	3.125		
4	9:30 AM		24"	24				
	10:00 AM	30			21	3		
5	10:01 AM		24"	24				
	10:31 AM	30			21	3		
6	10:32 AM		24"	24				
	11:02 AM	30			21.125	2.875		
7	11:03 AM		24"	24				
	11:33 AM	30			21.375	2.625		
8	11:34 AM		24"	24				
	12:04 PM	30			21.375	2.625		
9	12:05 PM		24"	24				
	12:35 PM	30			21.375	2.625		
10	12:36 PM		24"	24				
	1:06 PM	30			21.375	2.625		
11	1:07 PM		24"	24				
	1:37 PM	30			21.375	2.625		
12	1:38 PM		24"	24				
	2:08 PM	30			21.375	2.625		



**PERCOLATION DATA SHEET**

**Project:** APN 224-151-51-00

**Job No.:** 3997-CR

**Test Hole No.:** I-5 **Tested By:** JC

**Date:** 7/15/2024

**Depth of Hole As Drilled:** 72" **Before Test:** 72"

**After Test:** 72"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
Trial	6:55 AM		72"	24				Pre-soaked with 5+ gallons of clear water prior to Trials
	7:20 AM	25			23.4	0.6		
Trial	7:23 AM		72"	24				
	7:48 AM	25			23.4	0.6		
1	7:49 AM		72"	24				
	8:19 AM	30			23.52	0.48		
2	8:20 AM		72"	24				
	8:50 AM	30			23.52	0.48		
3	8:51 AM		72"	24				
	9:21 AM	30			23.64	0.36		
4	9:22 AM		72"	24				
	9:52 AM	30			23.64	0.36		
5	9:53 AM		72"	24				
	10:23 AM	30			23.64	0.36		
6	10:24 AM		72"	24				
	10:54 AM	30			23.76	0.24		
7	10:55 AM		72"	24				
	11:25 AM	30			23.76	0.24		
8	11:26 AM		72"	24				
	11:56 AM	30			23.76	0.24		
9	11:57 AM		72"	24				
	12:27 PM	30			23.76	0.24		
10	12:28 PM		72"	24				
	12:58 PM	30			23.76	0.24		
11	12:59 PM		72"	24				
	1:29 PM	30			23.76	0.24		
12	1:30 PM		72"	24				
	2:00 PM	30			23.76	0.24		



**PERCOLATION DATA SHEET**

**Project:** APN 224-151-51-00

**Job No.:** 3997-CR

**Test Hole No.:** I-6 **Tested By:** JC

**Date:** 7/15/2024

**Depth of Hole As Drilled:** 72" **Before Test:** 72"

**After Test:** 72"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Rate (Minutes per Inch)	Comments
Trial	7:02 AM		72"	24				Pre-soaked with 5+ gallons of clear water prior to Trials
	7:27 AM	25			22.44	1.56		
Trial	7:28 AM		72"	24				
	7:53 AM	25			22.44	1.56		
1	7:54 AM		72"	24				
	8:24 AM	30			22.2	1.8		
2	8:25 AM		72"	24				
	8:55 AM	30			22.32	1.68		
3	8:56 AM		72"	24				
	9:26 AM	30			22.32	1.68		
4	9:27 AM		72"	24				
	9:57 AM	30			22.44	1.56		
5	9:58 AM		72"	24				
	10:28 AM	30			22.32	1.68		
6	10:29 AM		72"	24				
	10:59 AM	30			22.44	1.56		
7	11:00 AM		72"	24				
	11:30 AM	30			22.56	1.44		
8	11:31 AM		72"	24				
	12:01 PM	30			22.56	1.44		
9	12:02 PM		72"	24				
	12:32 PM	30			22.56	1.44		
10	12:33 PM		72"	24				
	1:03 PM	30			22.56	1.44		
11	1:04 PM		72"	24				
	1:34 PM	30			22.56	1.44		
12	1:35 PM		72"	24				
	2:05 PM	30			22.56	1.44		



# **APPENDIX D**

## **GENERAL GRADING GUIDELINES**

**Geotechnical and Infiltration Evaluation  
Escondido, San Diego County, California  
Project No. 3997-CR**



## **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 (2022) 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.

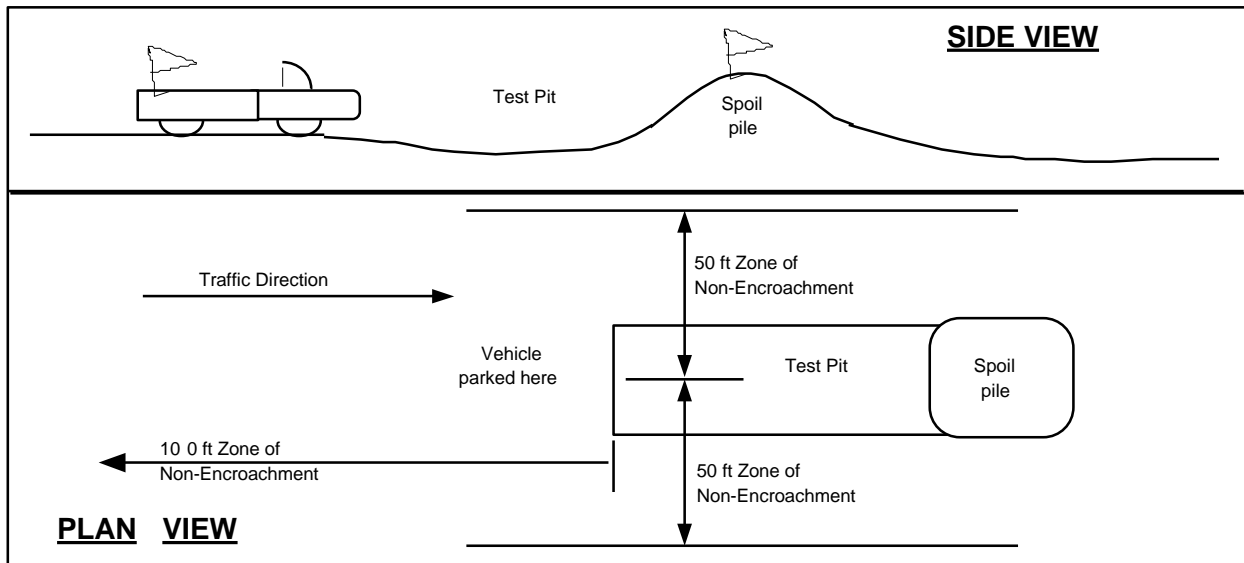
### **Test Pits Location, Orientation and Clearance**

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 contractor's 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.

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