Appendix E:
Geology and Soils Supporting Information

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E.1 - Geotechnical Engineering Report

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Geotechnical Engineering Report

Proposed Retail Center
Victorville, San Bernardino County, California
February 28, 2020
Terracon Project No. CB205003

Prepared for:
3K1 Consulting Services, LLC
Phoenix, Arizona

Prepared by:
Terracon Consultants, Inc.
Colton, California

February 28, 2020

3K1 Consulting Services, LLC
11811 N. Tatum Boulevard, Suite 1051
Phoenix, Arizona 85028 -1654

Attn: Mr. Michael Scarbrough
P: (602) 850 8101
E: mike@3k1consulting.com

Re: Geotechnical Engineering Report
Proposed Retail Center
SWC of Seneca Road and Highway 395 Intersection
Victorville, San Bernardino County, California
Terracon Project No. CB205003

Dear Mr. Scarbrough:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PCB205003 dated January 16, 2020. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

2/28/2020

Ali Tabatabaei, Ph.D., P.E., G.E
Geotechnical Project Engineer

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REPORT TOPICS

Note: This report was originally delivered in a web-based format. Orange Bold text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the *GeoReport* logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report

Proposed Retail Center
SWC of Seneca Road and Highway 395 Intersection
Victorville, San Bernardino County, California

Terracon Project No. CB205003
February 28, 2020

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed retail center to be located SWC of Seneca Road and Highway 395 Intersection in Victorville, San Bernardino County, California. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions and historic high groundwater
- 2019 California Building Code (CBC) seismic design parameters
- Liquefaction potential
- Seismic induced settlement
- Recommendations for foundation design and concrete slabs-on-grade
- Subgrade preparation/earthwork recommendations
- Corrosion suite test results
- Recommendations for preliminary pavement section design

The geotechnical engineering Scope of Services for this project included the advancement of 17 test borings to depths ranging from approximately 6½ to 51½ feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and/or as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project site is an approximate 8.3-acre tract of land located at SWC of Seneca Road and Highway 395 Intersection in Victorville, San Bernardino County, California. The approximate coordinates of the site are: 34.5136°N/117.4000°W (approximate) See **Site Location**
Existing Improvements	The project site is an undeveloped vacant tract of land surrounded by the following improvements: West side: Vacant tract of land North side: Seneca Road East side: Highway 395 South side: Vacant tract of land
Current Ground Cover	The site is covered with native soils and bushes.
Existing Topography	The project site is relatively flat.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Proposed Development	Project site includes the following buildings and pads: PAD A (2,700 SF), D.T. END CAP (2,800 SF), SHOPS 1 (6,000 SF), END CAP (3,200 SF), PAD B (2,700 SF), MAJOR B (15,000 SF), SHOPS 2 (9,600 SF) and MAJOR A (35,000 SF). Approximate footprint areas are summarized inside parenthesis. The development will also include car parking spaces and associated driveways. Infiltration systems to accommodate storm water runoff (Low Impact Development) were not identified on the preliminary plans.
Proposed Structures	We anticipate the proposed buildings will consist of wood/steel frames to be supported on shallow foundations along with slab-on-grade floors.
Finished Floor Elevation	Assumed within two feet of existing grade.
Structural Loads (assumed)	Structural loads were not provided at the time of this report. We assume that the proposed structures will have the following loads: ■ Columns: up to 100 kips ■ Walls: 1 to 4 kips per linear foot (klf) ■ Slabs: 100 to 150 pounds per square foot (psf)
Grading Requirements	Minimal cut/fill – assumed to be less than two feet
Below Grade Structures	Not anticipated

Item	Description
Free-Standing Retaining Wall	Not anticipated
Pavements	Paved driveway and parking will be constructed on site. We assume both rigid (concrete) and flexible (asphalt) pavement sections should be considered. Please confirm this assumption. Anticipated traffic indices (TIs) are as follows for asphalt pavement: ■ Auto Parking Areas: TI=4.5 ■ Drive Lanes TI=5.5 ■ Truck Delivery Areas: TI=6.0 ■ The pavement design period is 20 years. Anticipated average daily truck traffic (ADTT) is as follows for concrete pavement: ■ Light Duty: ADTT=1 (Category A) ■ Medium Duty: ADTT=25 (Category B) ■ Dumpster Pad: ADTT=700 (Category C)

GEOTECHNICAL CHARACTERIZATION

Subsurface Profile

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. The following table provides our geotechnical characterization.

The geotechnical characterization forms the basis of our geotechnical calculations and evaluation of site preparation, foundation options and pavement options. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely.

Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description [1]	Consistency/Density
Stratum I	51 ½ (maximum depth of exploration)	Silty sand, brown	Loose to very dense

1. The soil materials encountered are not expected to experience substantial volumetric changes (shrink/swell) with fluctuations in moisture content.

Groundwater Conditions

The borings were advanced in the dry using continuous flight auger drilling techniques that allow short-term groundwater observations to be made while drilling. Groundwater seepage was not observed within the maximum depths of exploration during or at the completion of drilling. **We do not anticipate groundwater will affect construction at this project site.**

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed.

Historic Groundwater Conditions

shallow groundwater is not expected at the project site. Depth-to-groundwater data in the vicinity of the site indicate groundwater deeper than 100 feet beneath the site. Based on the groundwater condition, liquefaction is not considered a potential hazard.

Hydroconsolidation

To evaluate the potential deformation that may be caused by the addition of water to subsurface soils, hydroconsolidation testing was performed on a selected, representative relatively undisturbed sample. The result is shown in Exploration Results section. The test result indicates collapse potentials of 1.4% (B-2 at 2.5 fee), 3.3% (B-4 at 2.5 feet), 2.5% (B-4 at 7.5 feet), 3.6% (B-12 at 2.5 feet); 2.2% (B-12 at 5 feet) and 2.8% (B-12 at 10 feet), boring number and sample depths summarized in parenthesizes. all samples were saturated under a confining pressure of 2,000 psf. The risk of hydro collapse can be mitigated by removal and replacement of the top 5 feet of on- site soil with engineered fill.

Soil sample with collapse potential of 2.5% and 2.8% were encountered at depths of 7.5 to 10 feet bgs. Based on the measured densities and field blow counts, it is our opinion that sample disturbance may have contributed to the measured hydro-collapse laboratory results. Furthermore, effective stresses at such depths will be lower than 2,000 psf, which is the confining pressure the samples were tested for at.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the California Building Code (CBC). Based on the soil properties encountered at the site and as described on the exploration logs and

results, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum depth of 51½ feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

Seismic Design Parameters

The 2019 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. The general procedure seismic parameters per the 2019 CBC were determined from the web-based on-line seismic design maps and tools recommended by the USGS (https://hazards.atcouncil.org/) as of February 4, 2020 and are summarized in the following table for reference only. It is the responsibility of structural engineers to verify and confirm these parameters for themselves during their design.

The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_S value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that "while values of site coefficient F_a tend to decrease with intensity for softer sites, values of spectrum shape adjustment factor C_a tend to increase such that the net effect is approximately the same intensity of MCE_R ground motions for Site Classes C, D, and E when MCE_R ground motion intensity is strong (i.e., S_{MS} ≥1.0)." Therefore, ASCE 7-16 permits the use of the value of the site coefficient Fa of Site Class C (F_a = 1.2) for Site Class D sites (for values of S_S greater than or equal to 1.0 g) in lieu of site-specific hazard analysis.

Based on this exception, the spectral response accelerations presented below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 1613 of the 2019 CBC.

Description	Value
2019 California Building Code Site Classification (CBC) [1]	D
Site Latitude	34.5136
Site Longitude	-117.4000
Mapped Spectral Acceleration Parameters [2]	S_S = 1.239 and S_1 = 0.482
Site Coefficients	F_A = 1.004 and F_V = 1.818[3]

Description	Value
Adjusted Maximum Considered Earthquake Spectral Response Parameters Design Spectral Acceleration Parameters [2]	SM_S = 1.245 and SM_1 = 0.876[3]
Design Spectral Acceleration Parameters [2]	SD_S = 0.83 and SD_1 = 0.584[3]
Geometric Mean Peak Ground Acceleration [3]	0.55g
De-aggregated Modal Magnitue[4]	7.91

1. Seismic site classification in general accordance with the 2019 California Building Code, which refers to ASCE 7-16.
2. These values were obtained using on-line seismic design maps and tools recommended by the USGS (https://hazards.atcouncil.org/).
3. Section 11.4.8 of ASCE 7-16, Tables 1613.2.3(1) and 1613.2.3(2) within Section 1613 of the 2019 CBC
4. These values were obtained using on-line Unified Hazard Tool by the USGS (https://earthquake.usgs.gov/hazards/interactive/) for return period of 2% in 50 years accessed at 1/29/2020.

A site-specific ground motion study could reduce design values and consequently construction costs. We recommend consulting with a structural engineer to evaluate the need for such study and its potential impact on construction costs. Terracon should be contacted if a site-specific ground motion study is desired.

LIQUEFACTION AND SEISMIC SETTLEMENT

Liquefaction Potential

According to the County of San Bernardino General Plan (2006), the site is not located within an area identified as having potential for liquefaction. Moreover, historic groundwater levels are deeper than 100 feet, therefore, liquefaction is not anticipated.

Seismic Settlement

The underlying native soils are comprised predominantly of silty sand (SM). SPT blow counts indicate that the relative density of the soils encountered generally are loose to very dense up to the maximum depth of approximately 51½ feet bgs attained in borings.

Seismic settlement was estimated using soil profile from exploratory boring B-3. Our analysis indicates that seismic settlement (dry sand settlement) would be at the order of ½ inch. We expect that the maximum seismic differential settlement could be at the order of ¼ inch over 50 feet. Therefore, **in our opinion, seismic settlement is not considered a significant geologic hazard** at this site.

GEOTECHNICAL OVERVIEW

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and our current understanding of the proposed project.

On-site soils generally consisted of silty sand from ground surface to the maximum boring termination depth of about 51½ feet below ground surface (bgs). On-site subsurface soils are not expected to experience substantial volumetric changes (shrink/swell) with fluctuations in moisture content.

Based on the conditions encountered, we believe the proposed buildings can be supported on shallow foundations, such as spread footings.

No groundwater was encountered in any of the borings within the drilling depths at the time of drilling. Groundwater is not expected to affect shallow foundation construction on this site.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

The following recommendations include site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs, and pavements are contingent upon following the recommendations outlined in this section.
Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

Site Preparation

Strip and remove existing vegetation, debris, and other deleterious materials from proposed buildings and pavement areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively

level surface to receive fill and provide for a relatively uniform thickness of fill beneath proposed building structures.

We recommend stripping topsoil to depths that expose soils with less than 3 percent organics and no roots having a diameter greater than 1/8 inch. While the depth of the unsuitable soils should be expected to vary, the thickness of the top soil layer may be estimated to range between 6 and 12 inches for construction budgeting purposes. The thickness of the top soil layer was not determined during our field exploration. Therefore, the actual depth of stripping should be verified by engineering observations made during the grading operations at the project. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

Stripped materials consisting of vegetation and organic materials should be wasted from the site, or used to revegetate landscaped areas or exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

Although no evidence of fills or underground facilities such as septic tanks, cesspools, basements, and utilities was not observed during the site reconnaissance, such features could be encountered during construction. If unexpected fills or underground facilities are encountered, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

Due to the presence of low bearing soils and moderate collapse potential in the upper on-site soils we recommend that the proposed structures be supported on engineered fill extending to a minimum depth of 2 feet below the bottom of foundations, or 5 feet below existing grades, whichever is greater. Engineered fill placed beneath the entire footprint of the structures should extend horizontally a minimum distance of 3 feet beyond the outside edge of perimeter footings.

Subgrade soils beneath exterior slabs and pavements should be scarified, moisture conditioned, and compacted to a minimum depth of 10 inches. The moisture content and compaction of subgrade soils should be maintained until slab or pavement construction.

Exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned, and compacted per the compaction requirements in this report.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable. However, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Excavation

The bottom of excavations should be thoroughly cleaned of loose soils and disturbed materials prior to backfill placement and/or construction.

Individual contractors are responsible for designing and constructing stable, temporary excavations. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

Fill Material Types

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Clean on-site soils or approved imported materials may be used as fill material for the following:

■ general site grading	■ foundation backfill
■ foundation areas	■ pavement areas
■ interior floor slab areas	■ exterior slab areas

If imported soils are used as fill materials to raise grades, these soils should conform to low volume change materials and should conform to the following requirements:

Gradation	**Percent Finer by Weight (ASTM C 136)**
3”	100
No. 4 Sieve	50 - 100
No. 200 Sieve	20 - 50

- Liquid Limit ..... 30 (max)
- Plasticity Index ..... 15 (max)
- Maximum Expansive Index* ..... 20 (max)

*ASTM D 4829

The contractor shall notify the Geotechnical Engineer of import sources sufficiently ahead of their use so that the sources can be observed and approved as to the physical characteristic of the import material. For all import material, the contractor shall also submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" (Class S0) potential for sulfate attack based upon current ACI criteria and is "mildly corrosive" to ferrous metal and copper. The reports shall be accompanied by a written statement from the contractor

that the laboratory test results are representative of all import material that will be brought to the job.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed 10 inches loose thickness.

Compaction Requirements

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
On-site soils and/or low volume change imported fill:			
Beneath foundations:	90	0%	+3%
Beneath interior slabs:	90	0%	+3%
Fill greater than 5 feet in depth	95	0%	+3%
Miscellaneous backfill and behind retain walls:	90	0%	+3%
Beneath pavements:	95	0%	+3%
Utility Trenches*:	90	0%	+3%
Bottom of excavation receiving fill:	90	0%	+3%
Aggregate base (beneath pavements):	95	0%	+3%

* Upper 12 inches should be compacted to 95% within pavement and structural areas. Low-volume change imported soils should be used in structural areas.

Utility Trenches

It is anticipated that the on-site soils will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unsuitable material encountered at the bottom of excavations should be removed and be replaced with an adequate bedding material. A non-expansive granular material with a sand equivalent greater than 30 is recommended for bedding and shading of utilities, unless otherwise allowed by the utility manufacturer.

On-site materials are considered suitable for backfill of utility and pipe trenches from one foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

Shrinkage

For balancing grading on-site, estimated shrink factor of granular soils when used as compacted fill following recommendations in this report ranges between 0.90 and 0.95. Shrinkage factors are based on converting materials in its natural state before disturbance to materials after compaction.

Grading and Drainage

Positive drainage should be provided during construction and maintained throughout the life of the development. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Planters and other surface features which could retain water in areas adjacent to the building or pavements should be sealed or eliminated. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

We recommend a minimum horizontal setback distance of 10 feet from the perimeter of any building and the high-water elevation of the nearest storm-water retention basin.

Roof drainage should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems and landscaped irrigation should not be installed within 5 feet of foundation walls.

Exterior Slab Design and Construction

Exterior slabs-on-grade, exterior architectural features, and utilities founded on, or in backfill may experience some movement due to the volume change of the backfill. To reduce the potential for damage caused by movement, we recommend:

- minimizing moisture increases in the backfill;
- controlling moisture-density during placement of backfill;
- using designs which allow vertical movement between the exterior features and adjoining structural elements;
- placing effective control joints on relatively close centers.

Construction Considerations

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to floor slab and pavement construction.

Onsite soils consist of cohesionless sandy soils. Such soils have the tendency to cave and slough during excavations. Therefore, formwork may be needed for foundation excavations.

We recommend that the earthwork portion of this project be completed during extended periods of dry weather if possible. If earthwork is completed during the wet season (typically November through April) it may be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork operations may require additional mitigative measures beyond that which would be expected during the drier summer and fall months. This could include diversion of surface runoff around exposed soils and draining of ponded water on the site. Once subgrades are established, it may be necessary to protect the exposed subgrade soils from construction traffic.

Construction Observation and Testing

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proof-rolling, placement and compaction of controlled compacted fills, backfilling of excavations to the completed subgrade.

The exposed subgrade and each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. In the event that unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the

continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Item	Description
Foundation Support	2 feet below the bottom of foundations, or 5 feet below existing grades, whichever is greater.
Net Allowable Bearing pressure [1, 2] **(On-site soils or structural fill)**	2,000 psf
Minimum Foundation Dimensions	Columns: 24 inches Continuous: 18 inches
Minimum Footing Depth	18" below finish grade
Ultimate Passive Resistance [4]	350 pcf
Ultimate Coefficient of Sliding Friction [5]	0.32
Estimated Total Static Settlement from Structural Loads [2]	about 1 inch
Estimated Differential Settlement [2, 6]	About 1/2 of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied.
2. Values provided are for maximum loads noted in **Project Description**. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations. The above settlement estimates have assumed that the maximum footing size is 6 feet for column footings and 3 feet for continuous footings.
3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the **Earthwork**.
4. Use of passive earth pressures requires the footing forms be removed and compacted structural fill be placed against the vertical footing face. A factor of safety of 2.0 is recommended.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions. A factor of safety of 1.5 is recommended.
6. Differential settlements are as measured over a span of 40 feet.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

To ensure foundations have adequate support, special care should be taken when footings are located adjacent to trenches. The bottom of such footings should be at least 1 foot below an imaginary plane with an inclination of 1.5 horizontal to 1.0 vertical extending upward from the nearest edge of adjacent trenches.

FLOOR SLABS

DESCRIPTION	RECOMMENDATION
Interior floor system	Slab-on-grade concrete
Floor slab support	2 feet below the bottom of foundations, or 5 feet below existing grades, whichever is greater.
Subbase	Minimum 4-inches of Aggregate Base
Modulus of subgrade reaction	200 pounds per square inch per inch (psi/in) (The modulus was obtained based on estimates obtained from NAVFAC 7.1 design charts). This value is for a small loaded area (1 Sq. ft or less) such as for forklift wheel loads or point loads and should be adjusted for larger loaded areas.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement

performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Pavement Design Parameters

Design of asphalt concrete (AC) pavements is based on the procedures outlined in the Caltrans "Highway Design Manual for Safety Roadside Rest Areas" (Caltrans, 2016). Design of Portland cement concrete (PCC) pavements are based upon American Concrete Institute (ACI) 330R-08; "Guide for Design and Construction of Concrete Parking Lots."

A design R-value of 35 was used for the AC pavement. A modulus of rupture of 600 psi was used for pavement concrete. The structural sections are predicated upon proper compaction of the utility trench backfills and the subgrade soils as prescribed by in **Earthwork**, with the upper 12 inches of subgrade soils and all aggregate base material brought to a minimum relative compaction of 95 percent in accordance with ASTM D 1557 prior to paving. The aggregate base should meet Caltrans requirements for Class 2 base.

It should be noted that the pavement designs were based upon the results of preliminary sampling and testing and should be verified by additional sampling and testing during construction when the actual subgrade soils are exposed.

Pavement Section Thicknesses

The following table provides options for AC and PCC Sections:

Asphalt Concrete Design		
Usage	**Assumed Traffic Index**	**Recommended Structural Section**
Auto Parking Areas	4.5	3” HMA[1]/4” Class 2 AB[2]
Drive lanes	5.5	3” HMA[1]/6” Class 2 AB[2]
Truck Delivery Areas	6.0	3.5” HMA[1]/7” Class 2 AB[2]

1. HMA = hot mix asphalt
2. AB = aggregate base

Portland Cement Concrete Design			
Layer	Thickness (inches)		
	Light Duty[1]	Medium Duty[2]	Dumpster Pad[3]
PCC	5.0	6.0	7.5
Aggregate Base [4]	--	--	--

1. Car Parking and Access Lanes, Average Daily Truck Traffic (ADTT) = 1 (Category A).
2. Truck Parking Areas, Multiple Units, ADTT = 25 (Category B)
3. In areas of anticipated heavy traffic, fire trucks, delivery trucks, or concentrated loads (e.g., dumpster pads), and areas with repeated turning or maneuvering of heavy vehicles, ADTT = 700 (Category C).
4. Aggregate base is not required. Compacted on-site material is considered competent.

Recommended structural sections were calculated based on assumed TIs and our preliminary sampling and testing.

Terracon does not practice traffic engineering. We recommend that the project civil engineer or traffic engineer verify that the TIs and ADTT traffic indices used are appropriate for this project.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2 percent.
- Subgrade and pavement surfaces should have a minimum 2 percent slope to promote proper surface drainage.
- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

CORROSIVITY

The following table lists the laboratory electrical resistivity (standard and as-received), chlorides, soluble sulfates, and pH testing results. These values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Boring	Depth (feet)	Soluble Sulfate (Percent)	Soluble Chloride (Percent)	Total Salts (Percent)	pH	Resistivity (as-received) (Ohm-cm)	Resistivity (saturated) (Ohm-cm)
B-8	0 to 5	0.0149	0.0035	0.0347	8.00	42,680	4,656

Results of soluble sulfate testing indicate samples of the on-site soils tested possess negligible sulfate concentrations when classified in accordance with Table 4.3.1 of the ACI Design Manual. Concrete should be designed in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

The resistivity measured on soil samples from the borings tested in the laboratory are 42,680 and 4,656 ohm-centimeter for as-received and saturated samples, respectively. Resistivity results indicate the soil sample tested has mild corrosive potential to buried ferrous metal pipes**.** Evaluation of the resistivity test results follows the guidelines of J.F. Palmer, “Soil Resistivity Measurements and Analysis”, Materials Performance, Volume 13, January 1974. The table that follows outlines the guidelines for soil resistivity versus corrosion potential.

For protection against corrosion to buried metals, Terracon recommends that an experienced corrosion engineer be retained to design a suitable corrosion protection system for underground metal structures or components.

Corrosion Potential of Soil on Steel

Soil Resistivity (ohm-cm)	Corrosion Potential
0 to 1,000	Very High
1,000 to 2,000	High
2,000 to 5,000	Moderate
> 5,000	Mild

If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact

excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Terracon conducted seventeen (17) soil-testing borings. These borings were planned to the following extended depths below existing grades.

Number of Borings	Boring Depth (feet) [1]	Location
1 (B-1)	31 ½	Pad A
2 (B-2 and B-4)	21 ½	D.T. End Cap and End Cap
1 (B-3)	51 ½	Shops 1
1 (B-5)	31 ½	Pad B
4 (B-6 through B-9)	6 ½	Parking lots
1 (B-10)	31 ½	Major B
1 (B-11)	21 ½	Major B
1 (B-12)	26 ½	Shops 2
1 (B-13)	26 ½	Major A
1 (B-14)	31	Major A
1 (B-15)	51 ½	Major A
1 (B-16)	31 ½	Major A
1 (B-17)	6 ½	Parking Lots

1. Below ground surface.

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained by interpolation from the Google Earth. If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advance the borings with a truck-mounted drill rig using hollow-stem augers. Both a standard penetration test (SPT) sampler (2-inch outer diameter and 1-3/8-inch inner diameter) and a modified California ring-lined sampler (3-inch outer diameter and 2-3/8-inch inner diameter) are utilized in our investigation. The penetration resistance is recorded on the boring logs as the number of hammer blows used to advance the sampler in 6-inch increments (or less if noted). The samplers are driven with an automatic hammer that drops a 140-pound weight 30 inches for each blow. After the required seating, samplers are advanced up to 18 inches, providing up to three sets of blowcounts at each sampling interval. The sampling depths, penetration

distances, and other sampling information are recorded on the field boring logs. The recorded blows are raw numbers without any corrections for hammer type (automatic vs. manual cathead) or sampler size (ring sampler vs. SPT sampler). Relatively undisturbed and bulk samples of the soils encountered are placed in sealed containers and returned to the laboratory for testing and evaluation.

We observe and record groundwater levels during drilling and sampling. For safety purposes, all borings are backfilled with auger cuttings after their completion.

Our exploration team prepares field boring logs as part of the drilling operations. These field logs include visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs are prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- Water (Moisture) Content of Soil by Mass
- Laboratory Determination of Density (Unit Weight) of Soil Specimens
- Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
- R-value test
- Direct shear test
- Consolidation test
- Modified Proctor test
- Corrosion suite

The laboratory testing program often included examination of soil samples by an engineer. Based on the material’s texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION

Proposed Retail Center ■ Victorville, San Bernardino County, California
February 28, 2020 ■ Terracon Project No. CB205003

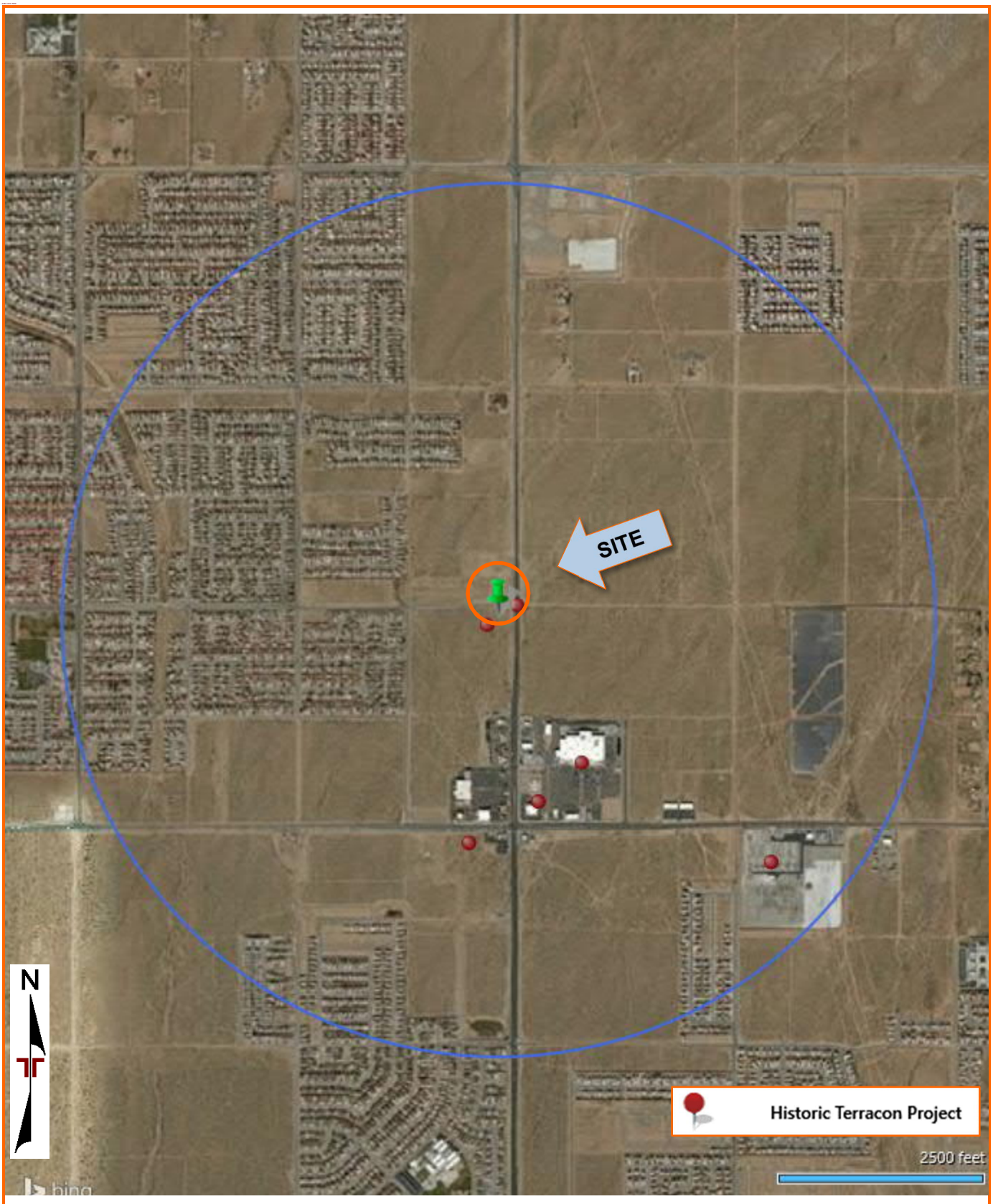


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

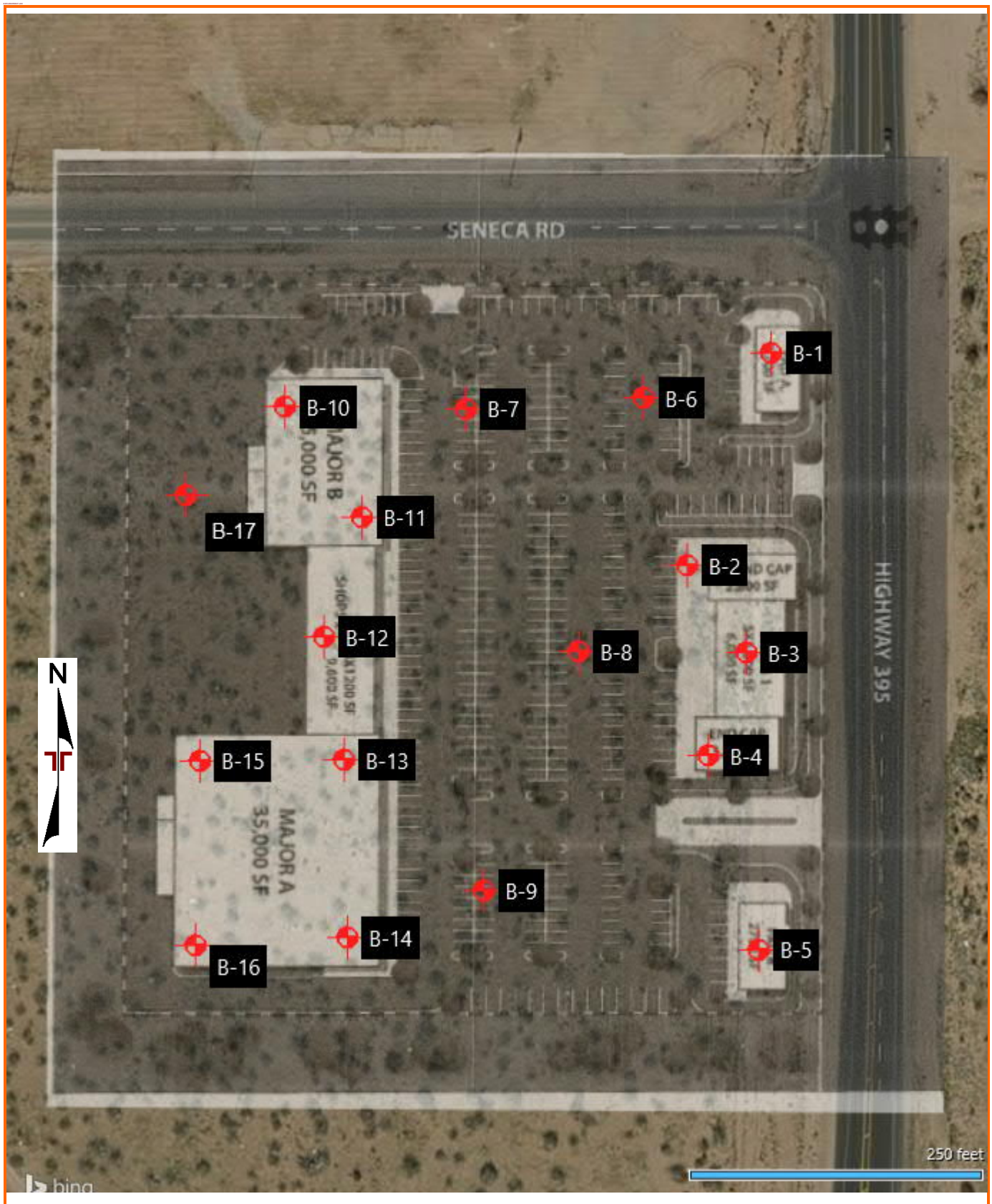


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. B-1

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5137° Longitude: -117.3997°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown								22
					2-2-5 N=7				
		5			2-4-7 N=11				
					20-50/6"				
		10			15-20-30 N=50				
		15			15-28-21 N=49				
		20			4-12-14 N=26				
		25			12-18-22 N=40				
		30			17-31-39 N=70				
	31.5								
	Boring Terminated at 31.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-29-2020 | Boring Completed: 01-29-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-2

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5131° Longitude: -117.3999°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					4-5-8		2	113	
		5			9-20-25		3	110	
					17-23-31		2	118	
		10			32-50/5"		4	112	
		15			16-27-34		6	119	
	21.0	20			26-50/6"		4	110	
	Boring Terminated at 21 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-29-2020 | Boring Completed: 01-29-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-3

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5128° Longitude: -117.3998°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					2-3-4 N=7				24
		5			5-9-14 N=23				28
					7-13-13 N=26				11
		10			8-12-14 N=26				18
		15			8-9-9 N=18				13
		20			9-13-11 N=24				25
		25			15-17-15 N=32				21
		30			7-11-11 N=22				26

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-29-2020 | Boring Completed: 01-29-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-3

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5128° Longitude: -117.3998°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2" *(continued)*	35							
					9-10-12 N=22				25
		40							
					9-11-10 N=21				32
		45							
					8-10-16 N=26				42
		50							
	51.5				6-17-22 N=39				38
	Boring Terminated at 51.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-29-2020 | Boring Completed: 01-29-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-4

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5126° Longitude: -117.3999°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								29
					4-5-10		4	112	
		5			8-15-31		3	112	
					8-26-43		3	117	
		10			33-50/4"		8	106	
		15			10-17-25		2	120	
		20			9-12-21		2	109	
	21.5								
	Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-29-2020 | Boring Completed: 01-29-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-5

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.512° Longitude: -117.3998°

DEPTH	GRAPHIC LOG	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
		SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
						6-8-13		2	120	
			5			13-17-17		4	113	
						9-14-17		3	113	
			10			18-28-41		6	127	
			15			50/6"		4	103	
			20			17-19-20		2	113	
			25			16-27-37		3	119	
			30			17-41-34		4	126	
31.5		***Boring Terminated at 31.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-29-2020 | Boring Completed: 01-29-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-6

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5135° Longitude: -117.4001°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					4-9-11		2	114	
		5							
					9-11-15		1		
	6.5								
	Boring Terminated at 6.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-29-2020 | Boring Completed: 01-29-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-7

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5133° Longitude: -117.4005°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					5-9-13		2	117	
		5							
					9-15-16		2	118	
	6.5								
	Boring Terminated at 6.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-8

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5127° Longitude: -117.4002°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"					20			30
					7-9-12		1	121	
		5							
					13-20-30		2	113	
	6.5								
	Boring Terminated at 6.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-9

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5122° Longitude: -117.4005°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					5-7-8		2		
		5							
	6.5				5-7-13		3		
	Boring Terminated at 6.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-29-2020 | Boring Completed: 01-29-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-10

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5135° Longitude: -117.4011°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					2-2-5 N=7				
		5			8-10-10 N=20				
					8-33-50/3"				
		10			10-8-8 N=16				
		15			16-30-29 N=59				
		20			5-9-11 N=20				
		25			10-13-14 N=27				
		30			12-20-27 N=47				
	31.5								
	Boring Terminated at 31.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-11

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5132° Longitude: -117.4009°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					3-4-7		4	114	
		5			5-13-15		3	117	
					8-8-9		2		
		10			4-5-9		1		
		15			25-50/6"		5	120	
	21.5	20			17-24-30		1		
	Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-12

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5129° Longitude: -117.4009°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					4-8-10		3	114	
		5			9-14-16		3	114	
					13-20-24		3	119	
		10			8-10-12		2	111	
		15			18-50/5"		5	122	
		20			16-35-40		1	124	
		25			15-28-43		2	123	
	26.5								
	Boring Terminated at 26.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-13

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5125° Longitude: -117.4009°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
					2-3-3 N=6				8
		5			3-4-5 N=9				4
					15-25-25 N=50				39
		10			14-16-13 N=29				37
		15			13-17-21 N=38				
		20			4-14-18 N=32				
		25			10-12-14 N=26				

SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"

26.5

Boring Terminated at 26.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-20-2020 | Boring Completed: 01-20-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-14

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.512° Longitude: -117.4009°

DEPTH	GRAPHIC LOG	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
		SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
						7-7-12		1		
			5			9-14-17		2	110	
						21-38-50/5"		3	116	
			10			20-50/5"		8	102	
			15			50/6"		5	108	
			20			21-36-50/5"		3	111	
			25			13-30-50/6"		3	121	
			30			28-50/6"		4	108	
31.0		***Boring Terminated at 31 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-15

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5125° Longitude: -117.4012°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					5-9-16 N=25				24
		5			20-20-15 N=35				23
					6-7-8 N=15				4
		10			6-7-9 N=16				6
		15			10-12-17 N=29				47
		20			7-13-17 N=30				9
		25			6-13-15 N=28				9
		30			13-21-23 N=44				51

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-15

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5125° Longitude: -117.4012°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2" *(continued)*	35							
					14-20-27 N=47				30
		40							
					7-21-22 N=43				19
		45							
					13-17-21 N=38				27
		50							
	51.5				14-20-30 N=50				60
	Boring Terminated at 51.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-16

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5121° Longitude: -117.4013°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"									
					2-3-3 N=6				
		5			3-5-6 N=11				
					14-26-49 N=75				
		10			23-50/6"				
		15			10-17-24 N=41				
		20			14-16-19 N=35				
		25			11-12-15 N=27				
		30			10-15-17 N=32				
31.5									
Boring Terminated at 31.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

BORING LOG NO. B-17

PROJECT: Proposed Retail Center

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

SITE: US 395 & Seneca Road
Victorville, CA

LOCATION See Exploration Plan

Latitude: 34.5131° Longitude: -117.4013°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Sand Equivalent	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, light brown, trace gravel to 1/2"								
					4-9-15		4	108	
		5							
	6.5				9-13-15		2	112	
	Boring Terminated at 6.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
8" Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

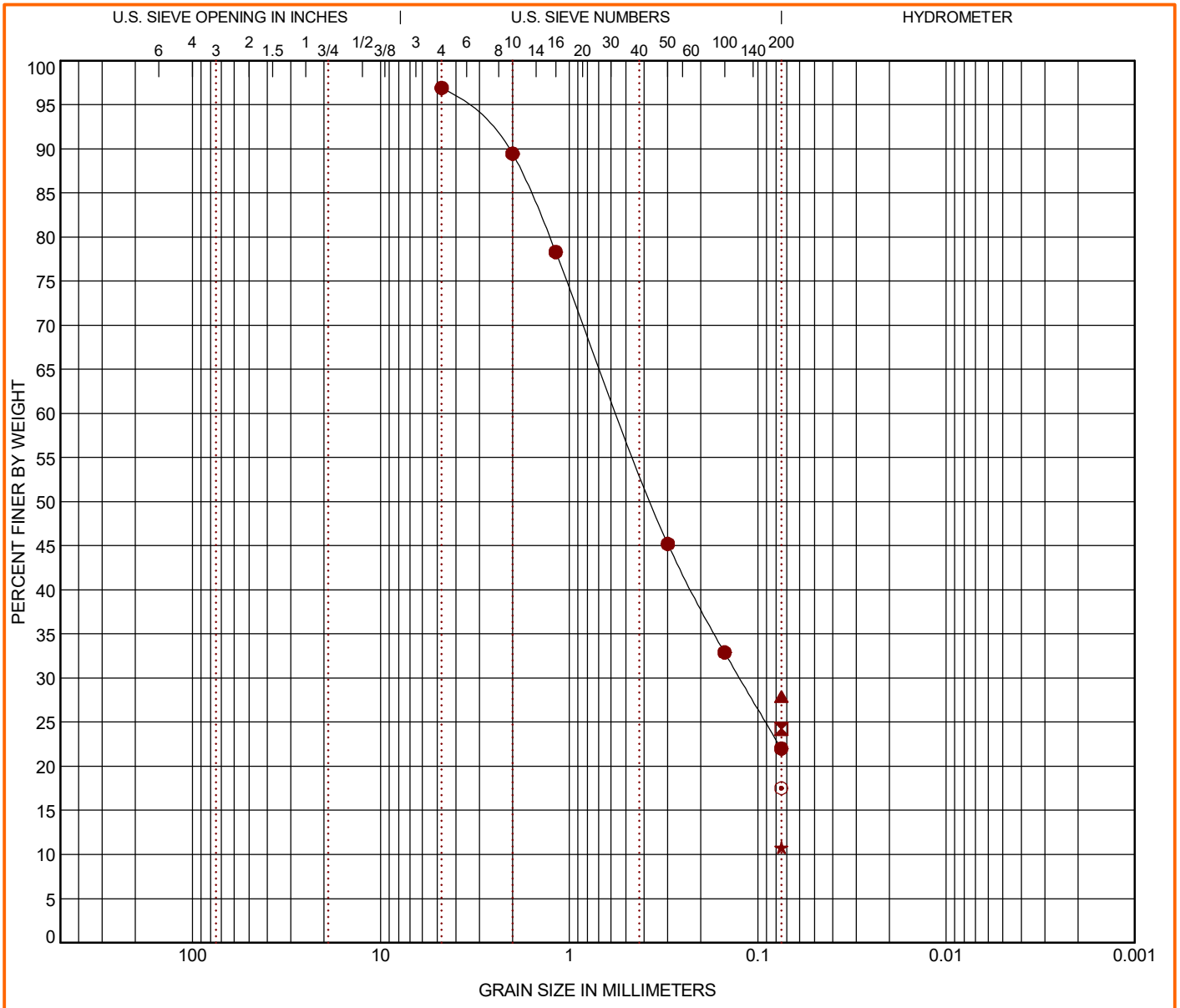
Boring Started: 01-30-2020 | Boring Completed: 01-30-2020

Drill Rig: Mobile B-61 | Driller: Cal Pac Drilling

Project No.: CB205003

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-1	0 - 5	SILTY SAND (SM)		NP	NP	NP		
⊠	B-3	2.5 - 4							
▲	B-3	5 - 6.5							
★	B-3	7.5 - 9							
⊙	B-3	10 - 11.5							

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-1	0 - 5	4.75	0.553	0.125				74.9		22.0	
⊠	B-3	2.5 - 4	0.075								24.2	
▲	B-3	5 - 6.5	0.075								27.9	
★	B-3	7.5 - 9	0.075								10.8	
⊙	B-3	10 - 11.5	0.075								17.5	

PROJECT: Proposed Retail Center

PROJECT NUMBER: CB205003

SITE: US 395 & Seneca Road
Victorville, CA

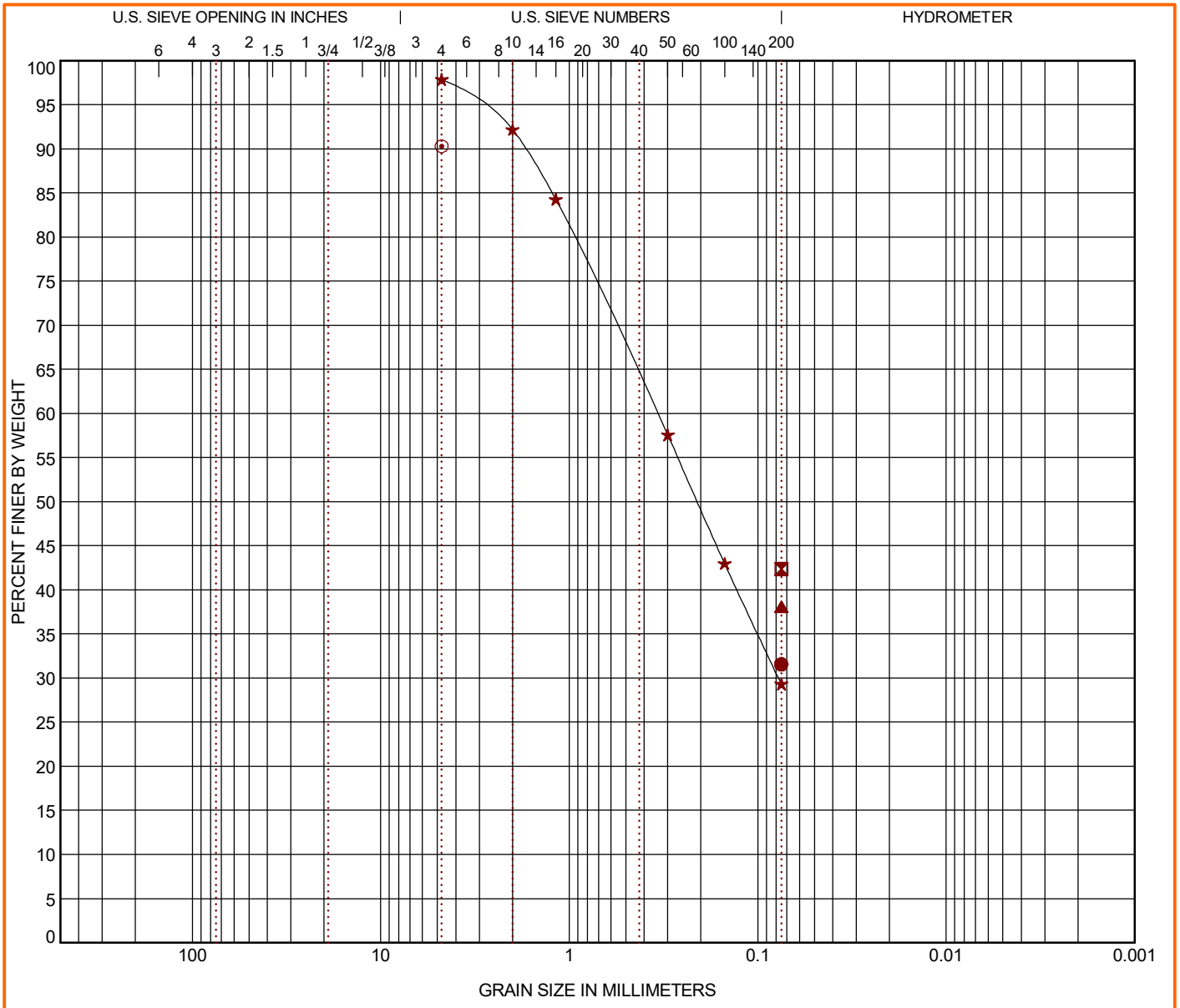
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 CB205003 PROPOSED QUICK N .GPJ TERRACON_DATATEMPLATE.GDT 2/19/20

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-3	40 - 41.5							
⊠	B-3	45 - 46.5							
▲	B-3	50 - 51.5							
★	B-4	0 - 5	SILTY SAND (SM)		NP	NP	NP		
⊙	B-5	0 - 5							

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-3	40 - 41.5	0.075								31.6	
⊠	B-3	45 - 46.5	0.075								42.4	
▲	B-3	50 - 51.5	0.075								38.1	
★	B-4	0 - 5	4.75	0.34	0.078				68.6		29.3	
⊙	B-5	0 - 5	4.75									

PROJECT: Proposed Retail Center

PROJECT NUMBER: CB205003

SITE: US 395 & Seneca Road
Victorville, CA

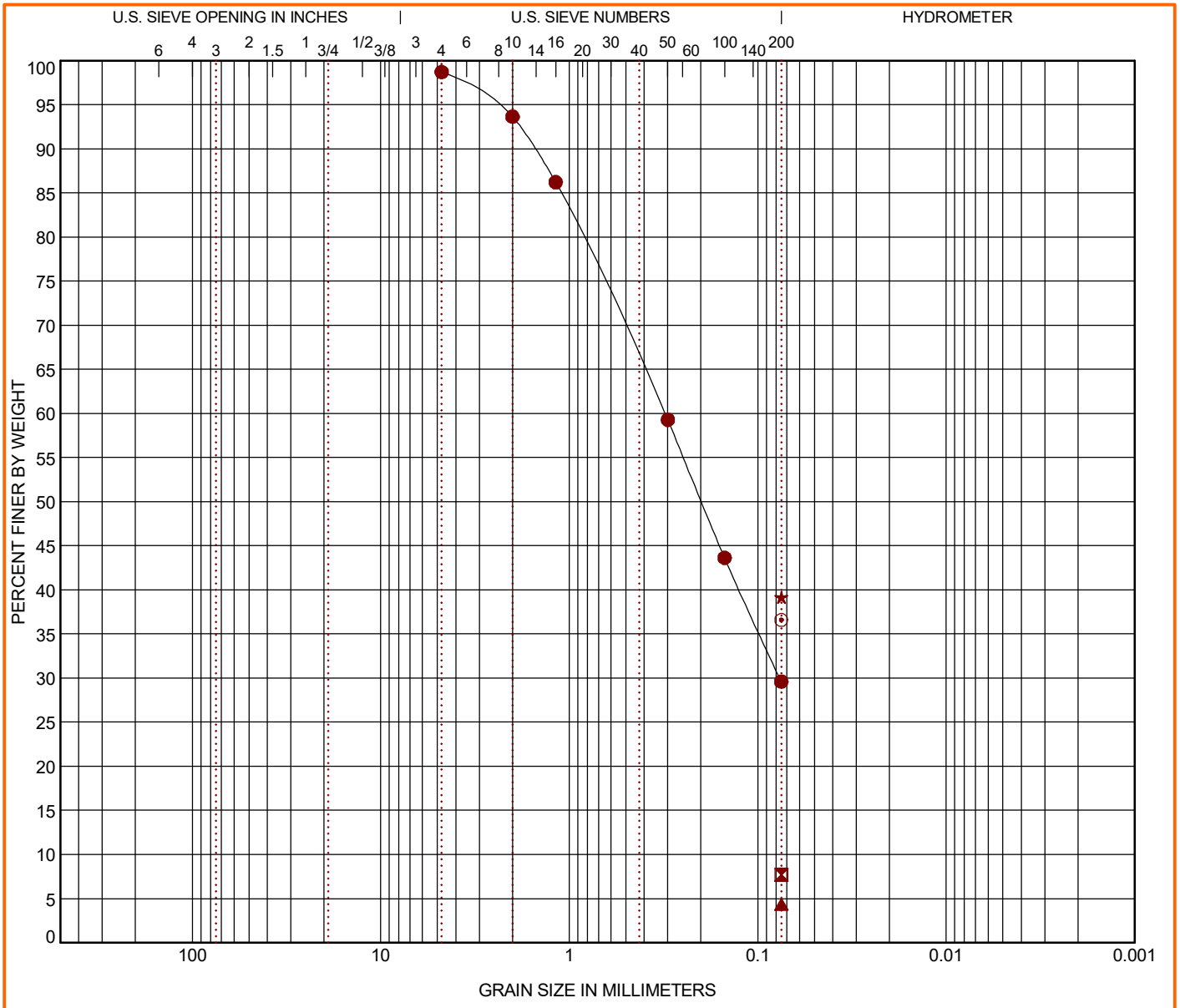
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 CB205003 PROPOSED QUICK N .GPJ TERRACON_DATATEMPLATE.GDT 2/19/20

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-8	0 - 5	SILTY SAND (SM)		NP	NP	NP		
⊠	B-13	2.5 - 4							
▲	B-13	5 - 6.5							
★	B-13	7.5 - 9							
⊙	B-13	10 - 11.5							

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-8	0 - 5	4.75	0.311	0.076				69.1		29.6	
⊠	B-13	2.5 - 4	0.075								7.7	
▲	B-13	5 - 6.5	0.075								4.3	
★	B-13	7.5 - 9	0.075								39.2	
⊙	B-13	10 - 11.5	0.075								36.6	

PROJECT: Proposed Retail Center

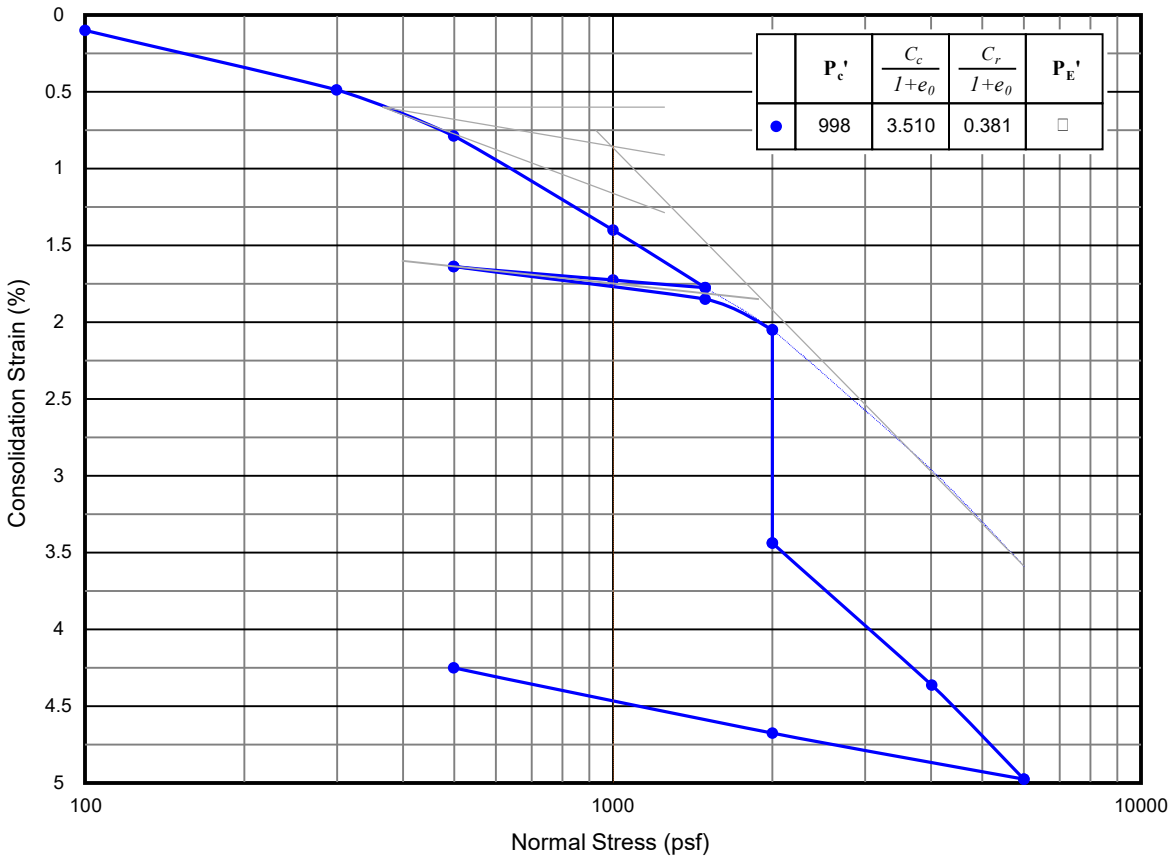
PROJECT NUMBER: CB205003

SITE: US 395 & Seneca Road
Victorville, CA

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 CB205003 PROPOSED QUICK N .GPJ TERRACON_DATATEMPLATE.GDT 2/19/20



	Boring No.	Depth (ft)	USCS Classification	γ_d (pcf)	w (%)	HCS (%)
●	2	2.5	(SM) Silty Sand	113	2	1.4

CONSOLIDATION TESTS (ASTM D2435/4546)

Project:	Proposed Retail Center				
Location:	Victorville, San Bernardino County				
Project No.:	CB205003	Engineer:		Enclosure:	

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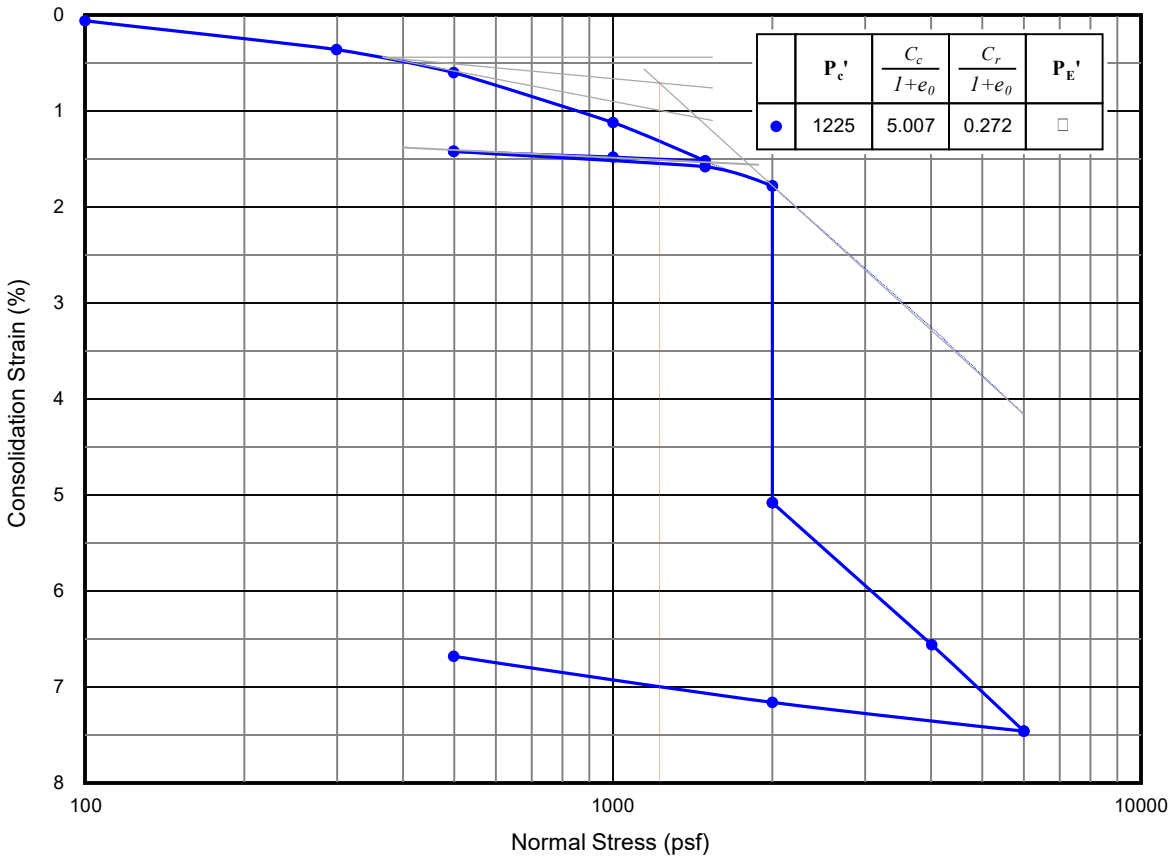

	Boring No.	Depth (ft)	USCS Classification	γ_d (pcf)	w (%)	HCS (%)
●	4	2.5	(SM) Silty Sand	112	3.9	3.3

CONSOLIDATION TESTS (ASTM D2435/4546)

Project:	Proposed Retail Center				
Location:	Victorville, San Bernardino County				
Project No.:	CB205003	Engineer:		Enclosure:	

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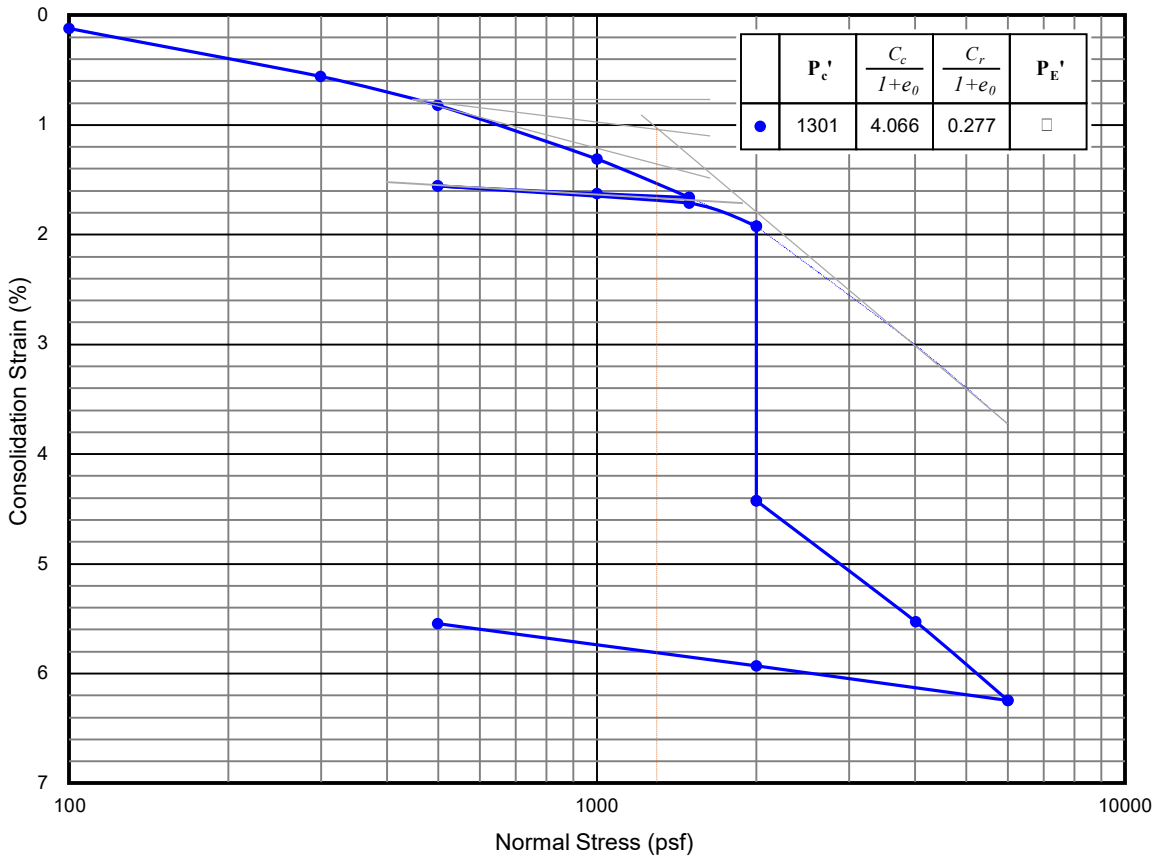

	Boring No.	Depth (ft)	USCS Classification	γ_d (pcf)	w (%)	HCS (%)
●	4	7.5		117	2.9	2.5

Terracon

CONSOLIDATION TESTS (ASTM D2435/4546)

Project:	Proposed Retail Center				
Location:	Victorville, San Bernardino County, California				
Project No.:	CB205003	Engineer:		Enclosure:	

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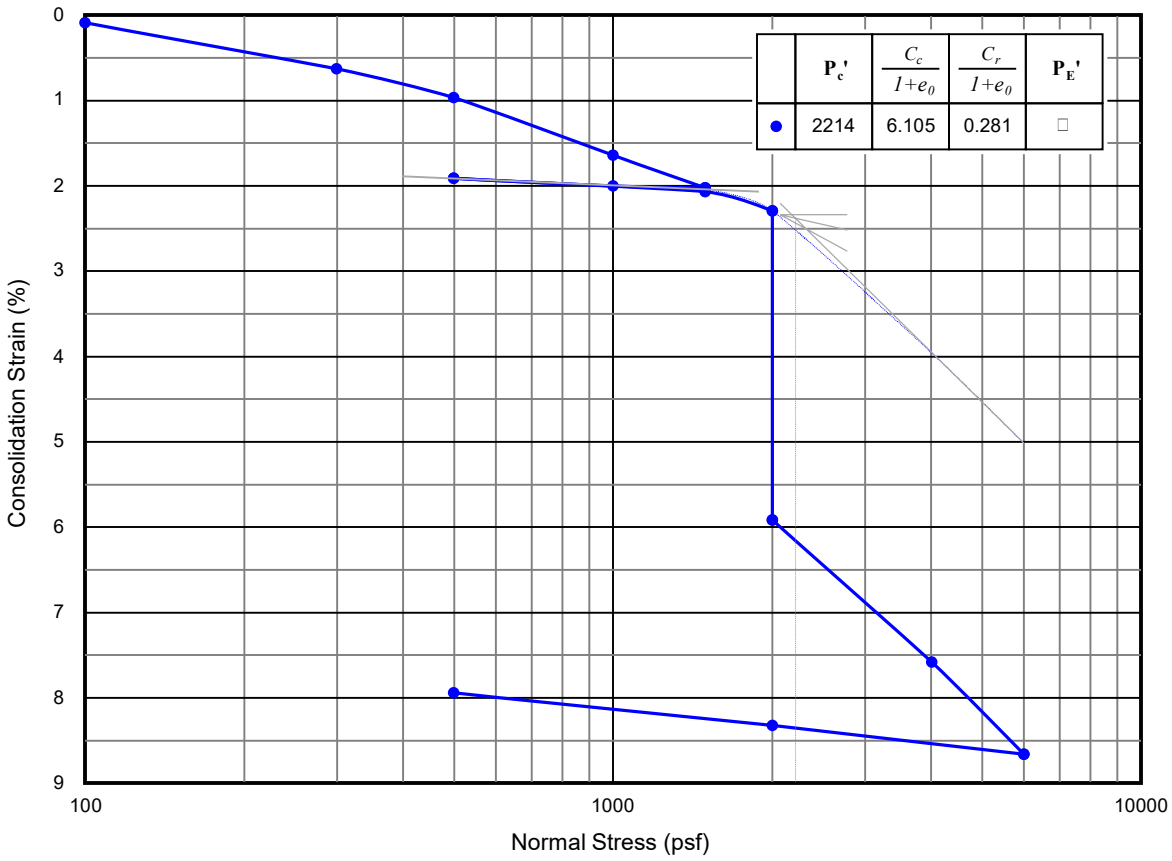

	Boring No.	Depth (ft)	USCS Classification	γ_d (pcf)	w (%)	HCS (%)
●	12	2.5	(SM) Silty Sand	114	3.0	3.6

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Terracon

CONSOLIDATION TESTS (ASTM D2435/4546)

Project:	Proposed Retail Center				
Location:	Victorville, San Bernardino County				
Project No.:	CB205003	Engineer:		Enclosure:	

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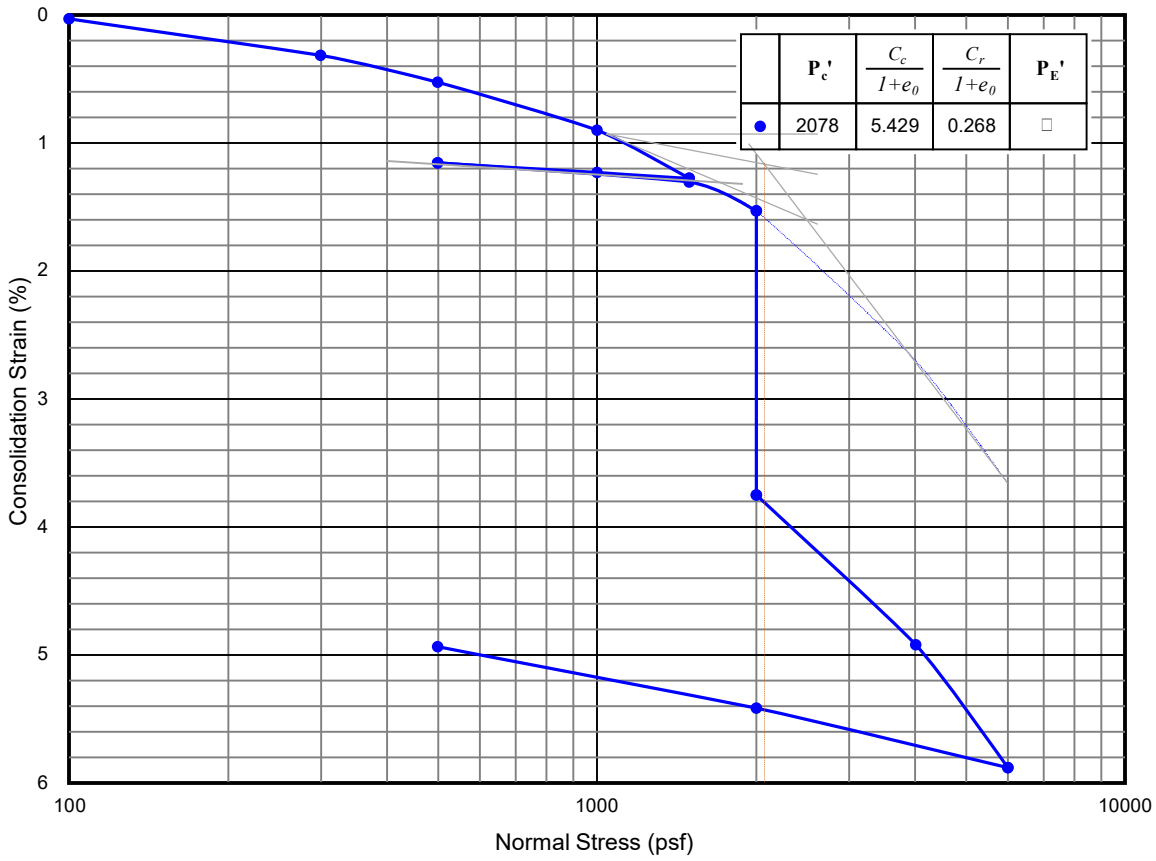
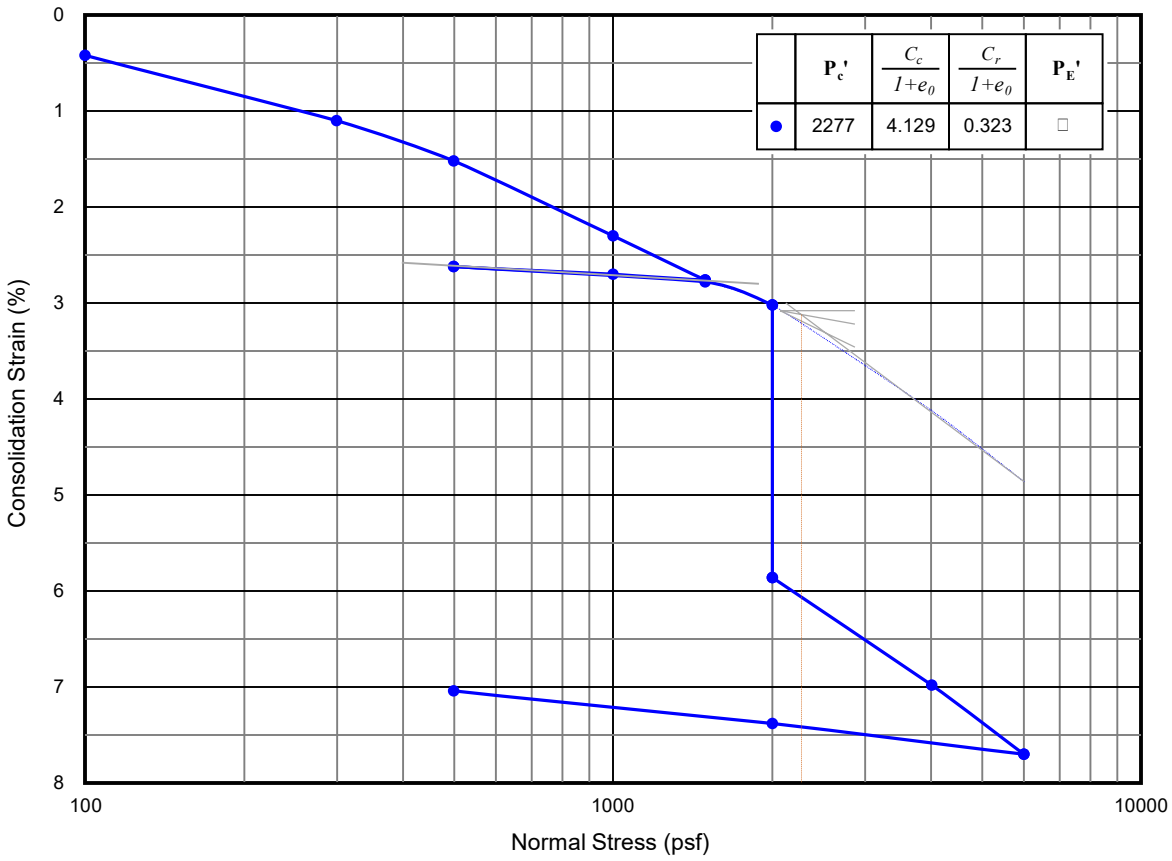


	Boring No.	Depth (ft)	USCS Classification	γ_d (pcf)	w (%)	HCS (%)
●	12	5	(SM) Silty Sand	114.0	3.0	2.2

Terracon	CONSOLIDATION TESTS (ASTM D2435/4546)					
	Project:	Proposed Retail Center				
	Location:	Victorville, San Bernardino County, California				
	Project No.:	CB205003	Engineer:		Enclosure:	



	Boring No.	Depth (ft)	USCS Classification	γ_d (pcf)	w (%)	HCS (%)
●	12	10	(SM) Silty Sand	111	2.0	2.8

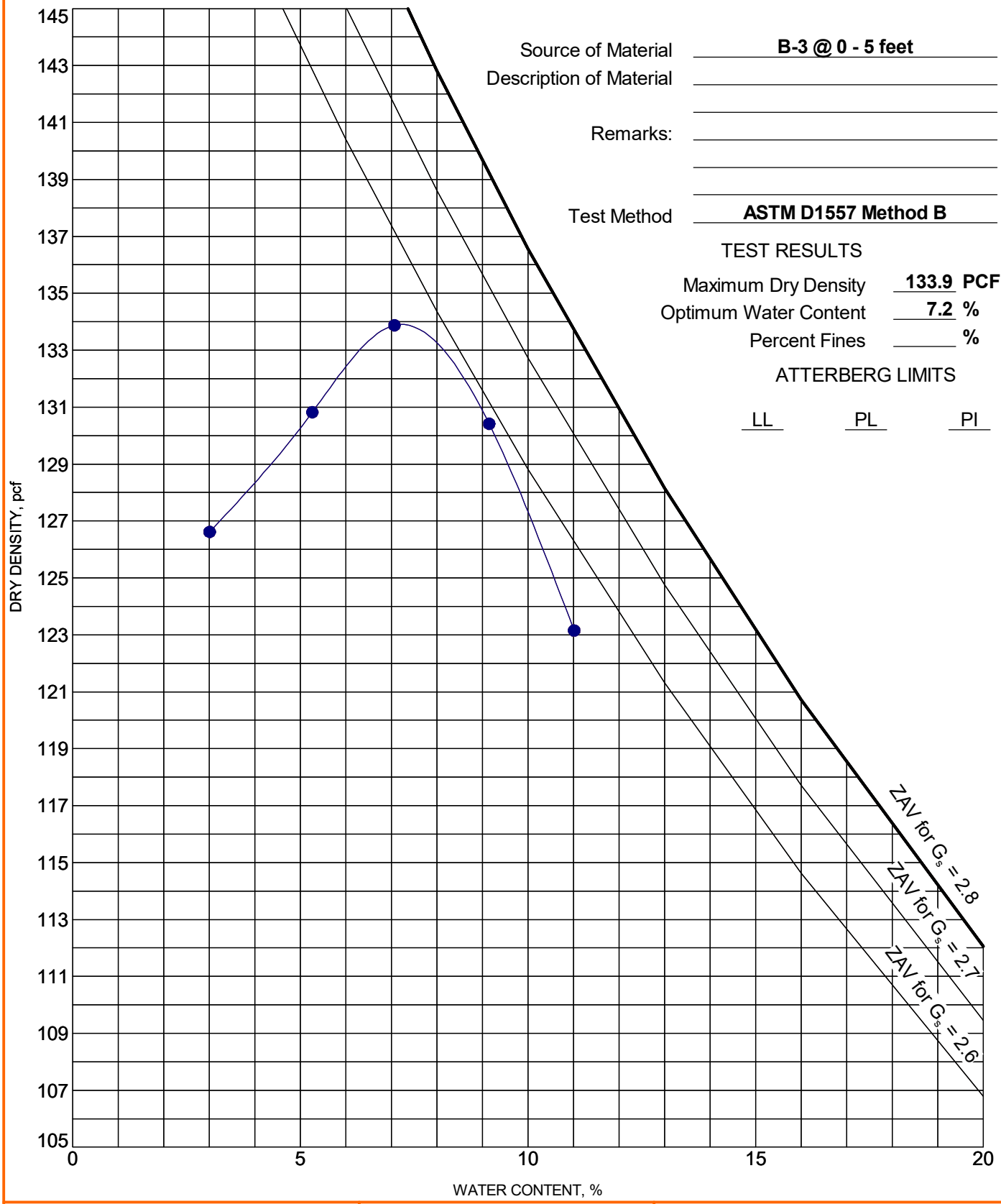
Terracon

CONSOLIDATION TESTS (ASTM D2435/4546)

Project:	Proposed Retail Center				
Location:	Victorville, San Bernardino County				
Project No.:	CB205003	Engineer:		Enclosure:	

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-3 @ 0 - 5 feet**

Description of Material:

Remarks:

Test Method: **ASTM D1557 Method B**

TEST RESULTS

Maximum Dry Density	**133.9**	**PCF**
Optimum Water Content	**7.2**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Proposed Retail Center

PROJECT NUMBER: CB205003

SITE: US 395 & Seneca Road
Victorville, CA

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

Source of Material: **B-5 @ 0 - 5 feet**

Description of Material:

Remarks:

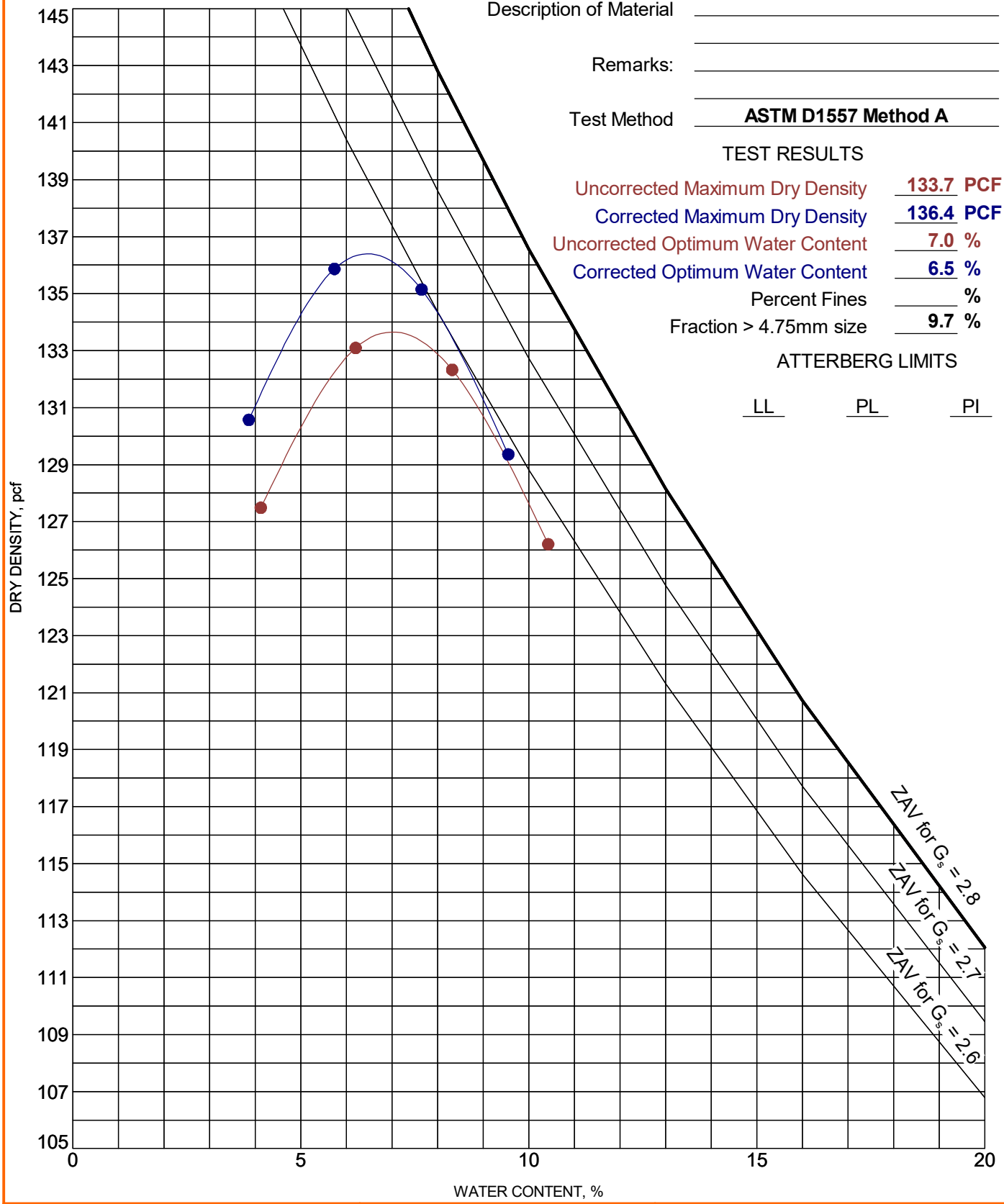
Test Method: **ASTM D1557 Method A**

TEST RESULTS

Uncorrected Maximum Dry Density	133.7	PCF
Corrected Maximum Dry Density	136.4	PCF
Uncorrected Optimum Water Content	7.0	%
Corrected Optimum Water Content	6.5	%
Percent Fines		%
Fraction > 4.75mm size	9.7	%

ATTERBERG LIMITS

LL	PL	PI



PROJECT: Proposed Retail Center

PROJECT NUMBER: CB205003

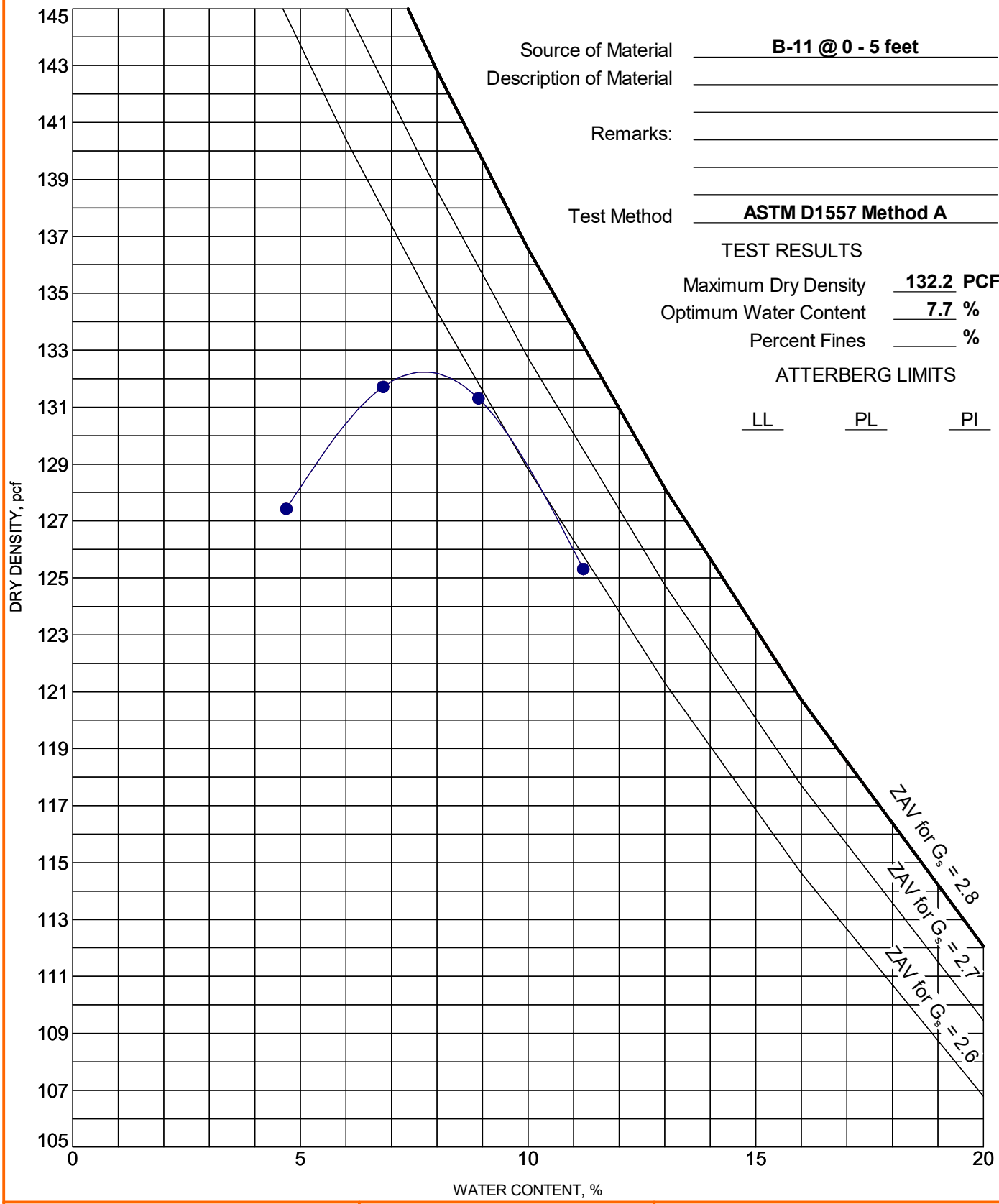
SITE: US 395 & Seneca Road
Victorville, CA

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-11 @ 0 - 5 feet**

Description of Material:

Remarks:

Test Method: **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density	**132.2**	**PCF**
Optimum Water Content	**7.7**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

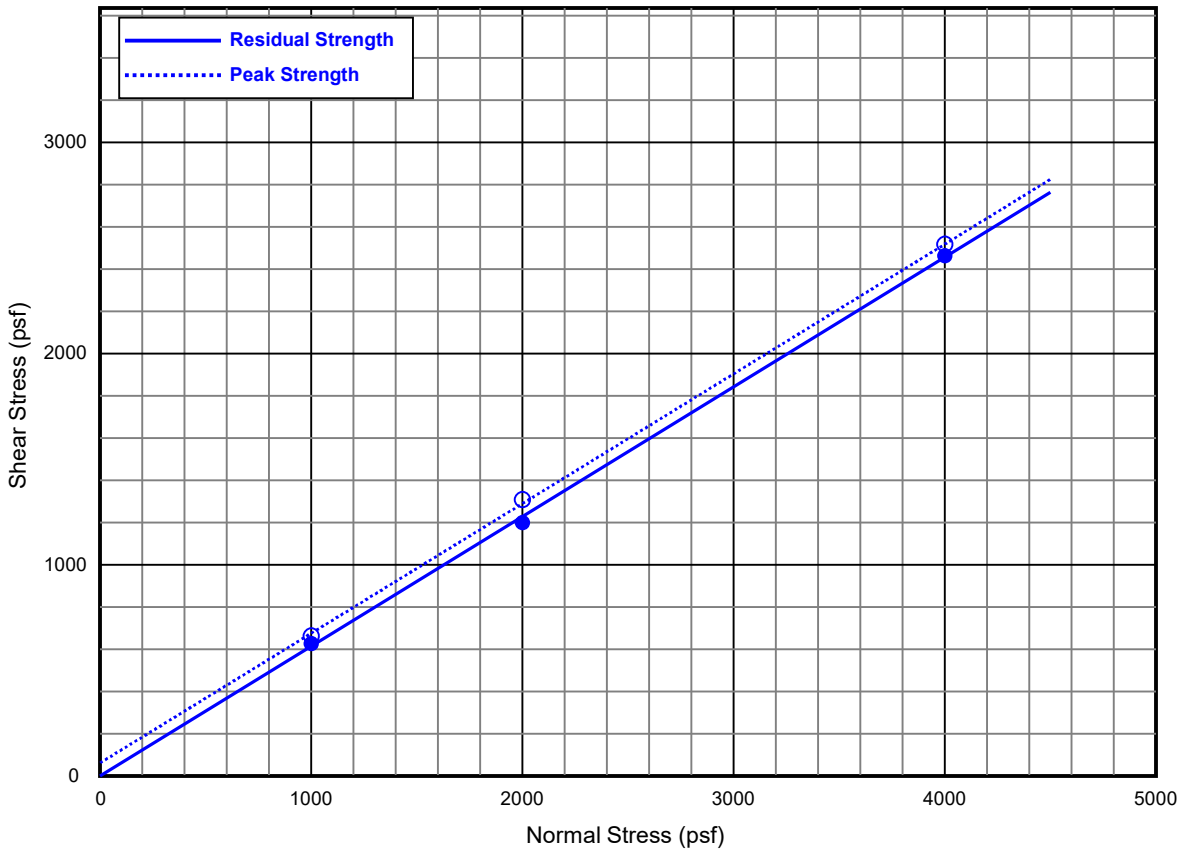
PROJECT: Proposed Retail Center

PROJECT NUMBER: CB205003

SITE: US 395 & Seneca Road
Victorville, CA

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

CLIENT: 3K1 Consulting Services, LLC
Phoenix, AZ



	Boring No.	Depth (ft)	γ_d (pcf)	w (%)	C_{pk} (psf)	ϕ_{pk} (°)	C_{rs} (psf)	ϕ_{rs} (°)
●	4	5	112	3	60.0	31.6	0.0	31.5
	(SM) Silty Sand / Undisturbed							

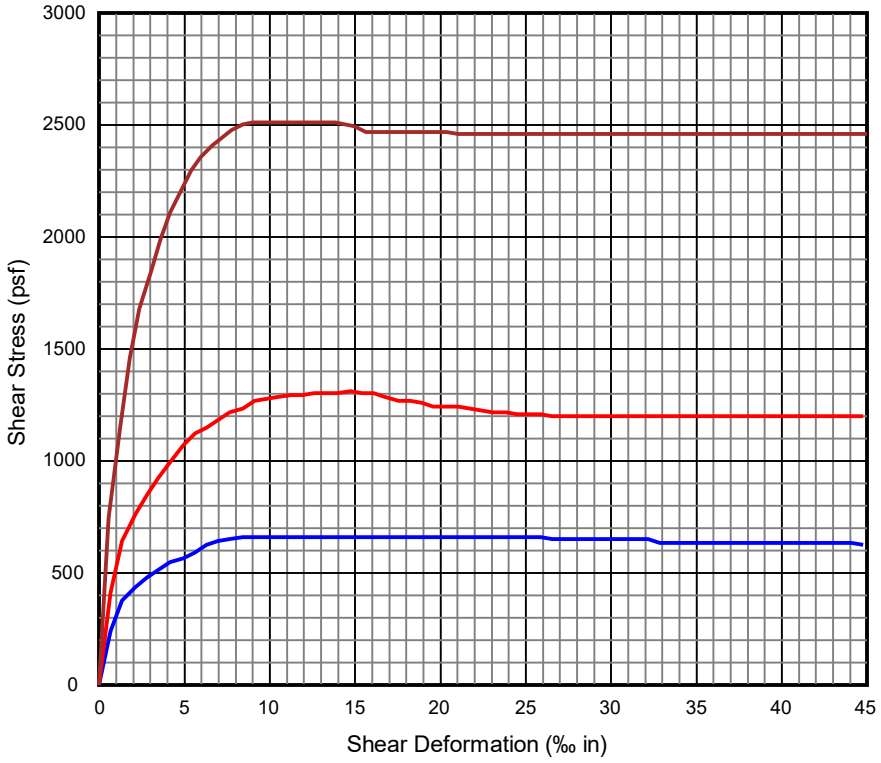
Terracon

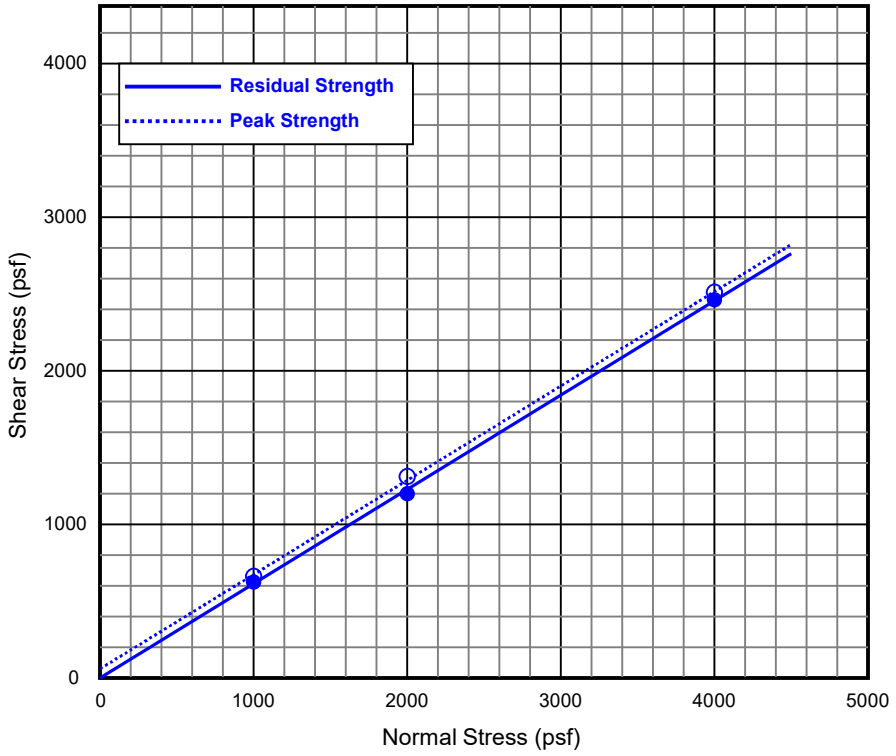
DIRECT SHEAR TESTS (ASTM D3080)

Project:	Proposed Retail Center				
Location:	Victorville, San Bernardino, California				
Project No.:	CB205003	Engineer:		Enclosure:	

Z:\Projects\2020\CB205003\Working Files\Laboratory-Field Data-Boring Logs\Direct Shear\LabSuite_CB205003.csv

Prepared at 2/20/2020 3:53:52 PM





	Boring No.	Depth (ft)	USCS	γ_d (pcf)	w (%)	C_{pk} (psf)	ϕ_{pk} (°)	C_{rs} (psf)	ϕ_{rs} (°)
●	4	5	(SM) Silty Sand / Undisturbed	112	3	60.0	31.6	0.0	31.5

Terracon

DIRECT SHEAR TESTS (ASTM D3080)

Project:	Proposed Retail Center				
Location:	Victorville, San Bernardino, California				
Project No.:	CB205003	Engineer:		Enclosure:	

Z:\Projects\2020\CB205003\Working Files\Laboratory-Field Data-Boring Logs\Direct Shear\LabSuite_CB205003.csv

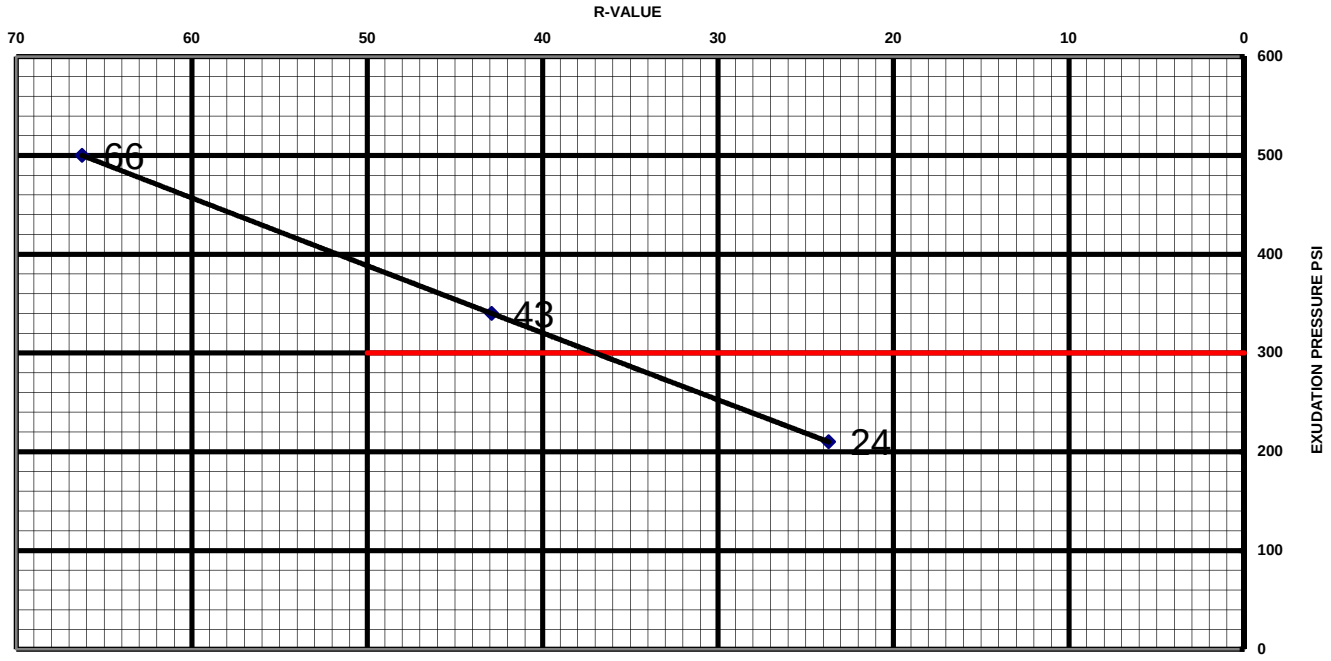
Job No. CB205003
Date. 2/11/2020

LAB0RATORY RECORD OF TESTS MADE ON BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: 3KI Consulting Service, LLC
PROJECT Proposed Quick N Clean
LOCATION: US 395 & Seneca Road, Victorville, CA
R-VALUE # : B-8 (0 to 5')
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	200	300	350	
INITIAL MOISTURE %	5.4	5.4	5.4	
WATER ADDED, ML	50	40	30	
WATER ADDED %	4.5	3.7	2.7	
MOISTURE AT COMPACTION %	9.9	9.1	8.1	
HEIGHT OF BRIQUETTE	2.53	2.45	2.50	
WET WEIGHT OF BRIQUETTE	1171	1148	1174	
DENSITY LB. PER CU.FT.	127.6	130.2	131.6	
STABILOMETER PH AT 1000 LBS.	46	34	20	
2000 LBS.	93	61	33	
DISPLACEMENT	5.80	5.40	4.90	
R-VALUE	24	43	66	
EXUDATION PRESSURE	210	340	500	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	3	5	11	
THICK. INDICATED BY E.P.	0.10	0.17	0.37	

EXUDATION CHART



R-Value: **37**

Terracon

SAND EQUIVALENT TEST DATA SHEET

Test Methods: ASTM D 2419-02, AASHTO T 176-02, California Test Method 217 (11/99)

Job No.:	CB205003	*Sample No.:*	8A	*Date Tested:*	2-7-2020
Project:	Quick n Clean	*SampleFrom:*		*Tested By:*	MN
Client:		*Sampled By:*		*Tester's Certs:*	
Lab No.:		*Date Sampled:*			

S.E. = (Sand reading/Clay reading) x 100

Calculate the sand equivalent to the nearest 0.1 and if is not a whole number, report it as the next **higher whole number.**

Sample No.:		Specimen 1	Specimen 2	Specimen 3	Average:
8A	*Sand Reading*	2.3	2.3	2.3	S.E.= 20
	Clay Reading	12.0	12.1	12.1	
	S.E. =	19.16	19.00	19.00	

Sample No.:		Specimen 1	Specimen 2	Specimen 3	Average:
	Sand Reading				S.E.=
	Clay Reading				
	S.E. =				

Sample No.:		Specimen 1	Specimen 2	Specimen 3	Average:
	Sand Reading				S.E.=
	Clay Reading				
	S.E. =				

Sample No.:		Specimen 1	Specimen 2	Specimen 3	Average:
	Sand Reading				S.E.=
	Clay Reading				
	S.E. =				

Sample No.:		Specimen 1	Specimen 2	Specimen 3	Average:
	Sand Reading				S.E.=
	Clay Reading				
	S.E. =				

Sample No.:		Specimen 1	Specimen 2	Specimen 3	Average:
	Sand Reading				S.E.=
	Clay Reading				
	S.E. =				

Sand Equivalent Shaker:	*Mechanical*	(Mechanical or Manually-Operated)
Sand Equivalent Shaker:	*ELE(Ploog Eng.) 24-4949-02*	(Manufacturer/Model)
Serial Number:	*SC1165-40203360*	(Serial Number)
Calibration Date:	*CHJ / Jorge Franco / 5/20/2007*	(Company/Technician/Date)
Next Calibration Due Date:	*CHJ / Jorge Franco / 5/20/2008*	(Company/Technician/Date)
Equipment I.D. Number	*CHJ282*	(CHJ I.D. Number)

Reviewed By:		Signature:	

CHEMICAL LABORATORY TEST REPORT

Project Number: CB205003
Service Date: 02/10/20
Report Date: 02/19/20
Task:

Terracon
750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

3K1 Consulting Services, LLC
Phoenix, AZ

Project

Proposed Quick N Clean

Sample Submitted By: Terracon (CB) **Date Received:** 2/7/2020 **Lab No.: 20-0157**

Results of Corrosion Analysis

Sample Number	8A
Sample Location	B-8
Sample Depth (ft.)	0.0-5.0
pH Analysis, ASTM G 51	8.00
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	149
Chlorides, ASTM D 512, (mg/kg)	35
Total Salts, AWWA 2540, (mg/kg)	347
Resistivity (As-Received), ASTM G 57, (ohm-cm)	42680
Resistivity (Saturated), ASTM G 57, (ohm-cm)	4656

Analyzed By: Trisha Campo
Chemist

UNIFIED SOIL CLASSIFICATION SYSTEM

Terracon GeoReport

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3 [E]		GW	Well-graded gravel [F]
			Cu < 4 and/or [Cc<1 or Cc>3.0] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ≥ 6 and 1 ≤ Cc ≤ 3 [E]		SW	Well-graded sand [I]
			Cu < 6 and/or [Cc<1 or Cc>3.0] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

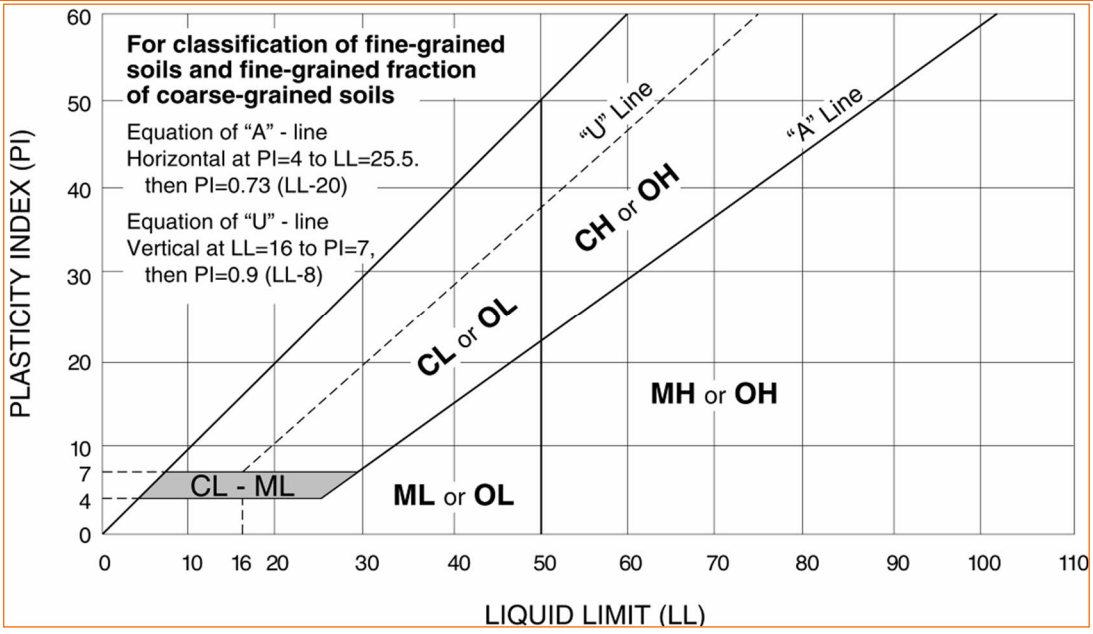
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS
Proposed Retail Center ■ Victorville, CA
Terracon Project No. CB205003

Terracon GeoReport

SAMPLING

- Auger Cuttings
- Modified California Ring Sampler
- Standard Penetration Test

WATER LEVEL

- **Water Initially Encountered**
- **Water Level After a Specified Period of Time**
- **Water Level After a Specified Period of Time**
- **Cave In Encountered**

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

N	**Standard Penetration Test Resistance (Blows/Ft.)**
(HP)	**Hand Penetrometer**
(T)	**Torvane**
(DCP)	**Dynamic Cone Penetrometer**
UC	**Unconfined Compressive Strength**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25		< 3
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4	3 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00		5 - 9
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15	10 - 18
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30	19 - 42
		Hard	> 4.00	> 30	> 42

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

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E.2 - Paleontological Records Search Results

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Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

14 July 2020

FirstCarbon Solutions
250 Commerce, Suite 250
Irvine, CA 92602

Attn: Stefanie Griffin, Archaeologist

re: Paleontological resources for the proposed Quick N Clean Carwash Project, FCS Project # 5019.0002, in the City of Adelanto, San Bernardino County, project area

Dear Stefanie:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed Quick N Clean Carwash Project, FCS Project # 5019.0002, in the City of Adelanto, San Bernardino County, project area as outlined on the portion of the Adelanto USGS topographic quadrangle map that you sent to me via e-mail on 30 June 2020. We have no vertebrate fossil localities that lie directly within the boundaries of the proposed project area, but we do have localities nearby from sedimentary deposits similar to those that may occur at depth in the proposed project area.

Surface deposits in the entire proposed project area consist of younger Quaternary Alluvium, derived as alluvial fan deposits from the San Gabriel Mountains to the south. These deposits typically do not contain significant vertebrate fossils in the uppermost layers, but they may be underlain by older Quaternary deposits that do contain significant vertebrate fossil remains. Our closest fossil vertebrate locality in these older Quaternary deposits is LACM 1224, east-southeast of the proposed project area west of Spring Valley Lake, that produced a specimen of fossil camel, *Camelops*. Additionally, east-southeast of the proposed project area, on the western side of the Mojave River below the bluffs, an otherwise unrecorded specimen of mammoth was collected in 1961 from older Quaternary Alluvium deposits. Just east of due north of the proposed project area, between Adelanto and the former George Air Force Base, our older Quaternary locality LACM 7786 produced a fossil specimen of meadow vole, *Microtus*.

Shallow excavations in the younger Quaternary Alluvium in the proposed project area are unlikely to produce significant vertebrate fossils. Deeper excavations in the proposed project area that extend down into older Quaternary deposits, however, may well encounter significant fossil vertebrate remains. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice