GEOTECHNICAL INVESTIGATION
PROPOSED PALOMAR COLLEGE NORTH EDUCATION CENTER
WEST OF HORSE RANCH CREEK ROAD
FALLBROOK, CALIFORNIA

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1.0 INTRODUCTION AND SCOPE OF SERVICES

1.1 Introduction

This report presents the results of the geotechnical investigation, performed by Construction Testing and Engineering, Inc. (CTE), and provides preliminary conclusions and recommendations for the proposed Palomar College North Education Center in Fallbrook, California. This investigation was performed in general accordance with the terms of CTE proposal G-3962, dated December 19, 2016.

CTE understands the proposed improvements include numerous one- to two-story structures, parking lots, drive areas, utilities, and ancillary improvements, within the four planned phases of development. Preliminary recommendations for excavations, site preparation, fill placement, and foundation design for the proposed improvements are presented herein.

CTE's understanding of the proposed improvements is based upon conceptual plans and discussions with the design team. The exploration locations were provided by the project architect and civil engineer, based on projected project layout. As such, CTE should review additional project plans as they are developed in order to verify that geotechnical recommendations remain applicable. References reviewed for this report are provided in Appendix A.

1.2 Scope of Services

The scope of services provided included:

- Review of referenced geologic and soils reports.
- Coordination of utility mark-out and location for Underground Services Alert (USA) and a private utility locating company.

- Obtaining appropriate San Diego County Department of Environmental Health (DEH) Boring Permits.
- Exploration of subsurface conditions utilizing truck mounted CME-45, CME-75, and CME-95 drill rigs, as well as track-mounted and limited-access drilling equipment, and a 30-ton Cone Penetration Test (CPT) rig.
- Analytical testing of groundwater.
- Percolation testing in accordance with County of San Diego Department of Environmental Health (DEH) procedures.
- Geotechnical laboratory testing of selected soil samples.
- Description of site/regional geology and evaluation of potential geologic hazards.
- Engineering and geologic analysis.
- Preparation of this summary report.

2.0 SITE DESCRIPTION

The proposed improvement area (identified as APN: 1081205500) is located east of Interstate Highway 15 and south of the Pala Mesa Heights Drive-Horse Ranch Creek Road intersection in Fallbrook, California (Figure 1). The irregularly shaped site is bounded to the north and east by Horse Ranch Creek Road, to the west by Interstate 15, and to the south by currently undeveloped land. The subject site is generally unimproved although existing utilities are present near the eastern and western limits of the site, and minor grading previously occurred during the construction of the adjacent Horse Ranch Creek Road. The general layout of the subject site and proposed improvements is shown on Figures 2 and 2A.

Based on reconnaissance and review of area topography, the improvement area is located within a north-south trending drainage that descends to the south. Low relief hills are located to the north and east of the site. Improvement area elevations range from approximately 350 feet above mean sea level (msl) in the northern portion of the site to approximately 280 feet above msl in the southern portion.

3.0 FIELD INVESTIGATION AND LABORATORY TESTING

3.1 Field Investigation

CTE conducted the field investigation on January 18, 24, 25, 30, 31, February 1, 16, and March 1, 2017. The investigation consisted of visual reconnaissance and excavation of 97 exploratory borings, in accessible and limited access areas, in addition to seven percolation test holes and nine cone penetration test (CPT) advancements. Borings B-13, B-44, and B-99 were also utilized as percolation test holes resulting in a total of 10 percolation test locations. The accessible borings were excavated with CME-45, CME-75 and CME-95 truck-mounted drill rigs equipped with eight-inch-diameter, hollow-stem augers that extended to a maximum depth of approximately 76.3 feet below the ground surface (bgs). Due to accessibility restrictions and the presence of soft saturated near-surface soil, a track-mounted limited-access drill rig equipped with eight-inch-diameter, hollow-stem augers was utilized where feasible. Explorations in other limited access locations (unreachable with the track-mounted rig) were advanced with a manually operated three-inch diameter auger. Bulk and relatively undisturbed samples were collected from the cuttings, and by driving Standard Penetration Test and Modified California samplers.

The CPT advancements were performed with a 30-ton Cone Penetration Test (CPT) rig to further evaluate the subsurface conditions. The CPT explorations were advanced to a maximum depth of approximately 82.6 feet bgs.

The percolation test holes were advanced with a manually operated six-inch diameter hand auger to the depth of estimated discharge elevations.

The soils were logged in the field by CTE Certified Engineering Geologists and were visually classified in general accordance with the Unified Soil Classification System. The field descriptions have been modified, where appropriate, to reflect laboratory test results. Boring logs, including descriptions of the soils encountered, are included in Appendix B. The approximate locations of the borings are presented on Figure 2 and Figure 2A.

Approximate exploration locations were provided or requested by the project design team based on the proposed site layout at the time that the field work commenced in January, 2017. However, following initial fieldwork, laboratory testing, and engineering analyses, the project design and construction team collectively relocated the proposed buildings and occupied structures farther to the north, in order to reduce the site area that would require deep overexcavation and recompaction of Young Alluvial Flood Deposits. As a result of the building relocation, many of the exploration locations are located outside of proposed structure limits, while other potential relocated building footprints are located beyond the explorations. Rather than performing additional explorations within the currently proposed building footprints for future phase structures (which we also understand may be further modified prior to their construction), we elected to complete this report based on the explorations already performed. While it is our professional opinion that an adequate number of explorations have been performed throughout the proposed future phase building areas, the rough grading for the future building areas will be completed well before construction of those

buildings, and update recommendations and/or reports for those buildings should be completed in the future using appropriate as-graded information obtained during mass grading of the entire site.

3.2 Laboratory Testing

Laboratory tests were conducted on selected soil samples for classification purposes, and to evaluate physical properties and engineering characteristics. Laboratory tests included: In-Place Moisture and Density, Expansion Index (EI), Grain Size Distribution, Atterberg Limits, Consolidation, Resistance "R"-Value, and Chemical Characteristics. Test descriptions and laboratory test results for the selected soils are included in Appendix C.

Analytical testing was conducted on groundwater samples from three representative locations, as requested. It is our understanding that site groundwater may be used for agricultural irrigation. As such, analytical results (Appendix G) should be evaluated in accordance with applicable regulatory requirements based on the anticipated use.

3.3 Percolation Testing

As requested, 10 percolation tests were performed within the proposed basin areas for the purpose of storm water infiltration design and/or evaluation. These tests were performed in general accordance with the County of San Diego Department of Environmental Health (SD DEH) procedures. The tests were specifically performed in accordance with SD DEH Case III method, which is performed when all of the presoak water infiltrates through the test hole overnight. The presoak duration for all the tests ranged from approximately 21 to 28 hours, which is within the 15 to 30 hour presoak range. The approximate percolation test locations are presented on Figure 2. The percolation test results

are presented in the table below. Infiltration rates have been calculated utilizing the noted factor of safety based on the completed worksheet D.5-1 (Appendix E). The project storm water or basin designer may modify the factor of safety based on an independent evaluation of Worksheet D.5-1 attached in Appendix E. The infiltration feasibility information is also presented on the completed I-8 Worksheet attached in Appendix E.

TABLE 1.4

Test Location	Soil Type	San Diego County Percolation Procedure	Depth (in)	Percolation Rate (minutes/inch)	Infiltration Rate (inches per hour)
P-1	Qya	Case III	64.5	24	0.42
P-2	Qya	Case III	20.0	30	0.16
P-3	Qya	Case III	66.0	16	0.66
P-4	Qya	Case III	39.8	12	0.91
P-5	Qya	Case III	66.0	15	0.68
P-6	Qya	Case III	40.0	15	0.68
P-7	Qya	Case III	41.0	24	0.42
P-8	Qya	Case III	61.5	17	0.61
P-9	Qya	Case III	61.5	20	0.51
P-10	Qya	Case III	40.8	27	0.38

Qya = Quaternary Young Alluvial Flood Plain Deposits

The percolation test results were obtained in accordance with City and County standards. However, it should be noted that percolation test results can significantly vary laterally and vertically due to slight changes in soil type, degree of weathering, secondary mineralization, and other physical and chemical variabilities. As such, the test results are considered to be an estimate of percolation and converted infiltration rates for design purposes. No guarantee is made based on the percolation testing related to the actual functionality or longevity of associated infiltration basins or other BMP devices designed from the presented infiltration rates.

4.0 GEOLOGY

4.1 General Setting

Fallbrook is located within the Peninsular Ranges physiographic province that is characterized by northwest-trending mountain ranges, intervening valleys, and predominantly northwest trending regional faults. The San Diego Region of the Peninsular Ranges can generally be subdivided into the coastal plain area, central mountain–valley area and eastern mountain valley area. The project site is located within the central mountain-valley area that is characterized by a locally eroded basement surface consisting of Jurassic and Cretaceous crystalline rocks.

4.2 Geologic Conditions

Regional geologic mapping prepared by Kennedy and Tan (2007) indicates that the near surface geologic units underlying the site consist of Quaternary Young Alluvial Flood Plain Deposits and Old Alluvial Flood Plain Deposits (Figure 3). Igneous rocks mapped along the limits of the valley consist of Cretaceous Gabbro to the east and Granodiorite of Indian Mountain to the west.

Based on recent site explorations near surface geologic units at the site were found to consist of Quaternary Previously Placed Fill, Quaternary Young Alluvial Flood Plain Deposits, Residual Soil, and Quaternary Old Alluvial Flood Plain Deposits. Cretaceous Gabbro was encountered at depth. Cretaceous Granodiorite of Indian Mountain may also exist at depth beneath the site but was not identified during the recent investigation. Descriptions of the geologic units observed during the subsurface investigation are presented below. Surficial geologic materials are depicted on Figure 2 and Figure 2A. Generalized geologic cross-sections are presented on Figures 4 and 4A.

4.2.1 Quaternary Previously Placed Fill

Quaternary Previously Placed Fill was encountered in the east-central portion of the site as well as within an infilled drainage in the northeastern site area. Where encountered, this unit was observed to consist of loose to medium dense, dark reddish brown, silty to clayey fine to medium grained sand with minor gravel. The fill is associated with previous grading for the construction of the adjacent Horse Ranch Creek Road, which was performed during 2012 and 2013. Localized areas of the subject site containing deeper fill may be encountered during proposed grading and construction. Specific as-graded documentation has not been obtained for this fill unit. Therefore, for the purposes of this report, this fill is considered to be undocumented. As such, the existing fills are to be overexcavated and properly processed and compacted beneath proposed improvement areas as recommended herein.

4.2.2 Quaternary Young Alluvial Flood Plain Deposits

Young Alluvial Flood Plain Deposits, as mapped by Kennedy and Tan (2007), were encountered throughout the western portion of the site. The distribution of the Young Alluvial Deposits is shown on Figures 2 and 2A. Where observed, this unit was found to consist of loose to medium dense, moist to very moist, dark brown to dark reddish brown, silty fine to medium grained sand and sandy silt. Based on subsurface and regional observations, this unit is anticipated to thicken toward the southwest.

4.2.3 Residual Soil

Residual Soil was encountered in borings throughout the elevated portions of the site noted to be underlain by Quaternary Old Alluvial Flood Plain Deposits. Where encountered, the Residual Soil unit generally consisted of loose to medium dense, reddish brown, silty to clayey fine grained sand. This unit is relatively thin and was observed blanketing the underlying Old Alluvial Flood Plain Deposits.

4.2.4 Quaternary Old Alluvial Flood Plain Deposits

The Old Alluvial Flood Plain Deposits, as mapped by Kennedy and Tan (2007), were encountered beneath the Young Alluvial Flood Plain Deposits in the southern and western site areas, and throughout the elevated portions of the site to the north and east. Where observed, this unit was found to consist of medium dense to very dense, moist to very moist, reddish brown, silty to clayey fine to medium grained sand and sandy clay. Based on the investigation findings, this material is generally considered suitable for support of the intended improvements, subject to confirmation by CTE geotechnical personnel during grading and/or site preparations.

4.2.5 Cretaceous Gabbro

Cretaceous Gabbro comprises the bedrock unit underlying the site. Where encountered, this unit was found to consist of highly weathered, very dense, reddish gray gabbro that excavates to silty to fine to medium grained sand. This unit was encountered at depths ranging from approximately 62 to 82 feet bgs.

4.3 Groundwater Conditions

During the recent investigation, perched groundwater was encountered at depths ranging from approximately seven (7) to 31 feet below existing grades. Substantial precipitation in the Fallbrook area occurred prior to, and during, the field investigation. As a result, significant variability within observed groundwater depths and the temporary shallow perched water zones was noted during the subsurface explorations. As indicated, analytical testing was conducted on groundwater samples from three representative locations. However, the ephemeral perched water condition precluded establishment of a more representative static groundwater elevation.

Based on site topography and the recent field observations, the potential for relatively shallow seasonal ground water and zones of perched groundwater does exist at the site. This could potentially impact excavations and earthwork during project construction. Proper site drainage is to be designed, installed, and maintained as per the recommendations of the project civil engineer and architect of record.

4.4 Geologic Hazards

Geologic hazards that were considered to have potential impacts to site development were evaluated based on field observations, literature review, and laboratory test results. It appears that geologic hazards at the site are primarily limited to those caused by shaking from earthquake-generated ground motions. The following paragraphs discuss the geologic hazards considered and their potential risk to the site.

4.4.1 Surface Fault Rupture

Based on the site reconnaissance and review of referenced literature, the site is not within a State of California-designated Alquist-Priolo Earthquake Fault Studies Zone or Local Special Studies Zone and no known active fault traces underlie, or project toward, the site. According to the California Division of Mines and Geology, a fault is active if it displays evidence of activity in the last 11,000 years (Hart and Bryant, revised 2007). Therefore, the potential for surface rupture from displacement or fault movement beneath the proposed improvements is considered to be low.

4.4.2 Local and Regional Faulting

The California Geological Survey (CGS) and the United States Geological Survey (USGS) broadly group faults as “Class A” or “Class B” (Cao, 2003; Frankel et al., 2002). Class A faults are generally identified based upon relatively well-defined paleoseismic activity, and a fault-slip rate of more than 5 millimeters per year (mm/yr). In contrast, Class B faults have comparatively less defined paleoseismic activity and are considered to have a fault-slip rate less than 5 mm/yr. The nearest known Class B fault is the offshore Newport-Inglewood Fault, which is approximately 33.6 kilometers southwest of the site (Blake, T.F., 2000). The nearest known Class A fault is the Temecula segment of the Elsinore Fault, which is located approximately 11.6 kilometers northeast of the site.

It is noted that northwest-trending faults are mapped by Kennedy and Tan (2007) approximately two miles to the east of the site. These faults are not recognized to be

"active". As such, these northwest-trending faults are not considered to represent a seismic concern to the subject site.

The following Table 4.4.2 presents the known faults nearest to the site, including estimated magnitude and fault classification. The regional faults listed generally exhibit dextral strike-slip movement. The attached Figure 5 shows regional faults and seismicity with respect to the site.

TABLE 4.4.2
NEAR-SITE FAULT PARAMETERS

FAULT NAME	APPROXIMATE DISTANCE FROM SITE (KM)	MAXIMUM ESTIMATED EARTHQUAKE MAGNITUDE	CLASSIFICATION
Elsinore-Temecula	11.6	6.8	A
Elsinore-Julian	13.9	7.1	A
Newport-Inglewood	33.6	7.1	B
Rose Canyon	35.2	7.2	B
Elsinore-Glen Ivy	37.0	6.8	A
San Jacinto-Anza	47.5	7.2	A

The site could be subjected to significant shaking in the event of a major earthquake on any of the faults listed above or other faults in the southern California or northern Baja California region.

4.4.3 Historic Seismicity

The level of seismicity within recent history (last 50 years) of the San Diego County area is relatively low compared to other areas of southern California and northwestern Baja California. Only a few small to moderate earthquakes have been reported in the San Diego area during the period of instrumental recordings, which began in the early 1900s. Most of the high seismic activity in the region is associated with the Elsinore Fault Zone and the San Jacinto Fault Zone, located approximately 12 and 50 kilometers northeast of the site respectively. In the western portion of San Diego County a series of small-to-moderate earthquakes in July 1985 were reportedly associated with the Rose Canyon Fault Zone (Reichle, 1985). The largest event in that series was M4.7, which was centered within San Diego Bay. A similar series of earthquakes in coastal San Diego occurred in 1964 (Simons, 1979).

Regional earthquake history is provided in Table 4.4.3 based on review of the USGS Earthquake Archives (http://earthquake.usgs.gov/earthquakes/search/) for significant earthquakes within 100 kilometers of the site with magnitudes greater than M5.5.

TABLE 4.4.3
Regional Earthquake History

EARTHQUAKE DATE (yr-mo-day)	EARTHQUAKE TIME (UTC)	MAGNITUDE	ESTIMATED DEPTH (km)	GENERAL LOCATION
1918-04-21	22:32:29	6.7	10.0	Southern California
1933-03-11	01:54:09	6.4	6.0	Southern California
1937-03-25	16:49:02	6.0	6.0	Southern California
1968-04-09	02:28:58	6.6	10.0	Southern California
1986-07-13	13:47:08	5.8	10.0	Southern California
1992-06-28	14:43:21	5.5	9.6	Southern California
1992-06-28	15:05:30	6.3	3.6	Southern California
1999-10-16	09:59:38	5.6	6.0	Southern California

4.4.4 Liquefaction and Seismic Settlement Evaluation

Liquefaction occurs when saturated fine-grained sands or silts lose their physical strengths during earthquake-induced shaking and behave like a liquid. This is due to loss of point-to-point grain contact and transfer of normal stress to the pore water. Liquefaction potential varies with water level, soil type, material gradation, relative density, and probable intensity and duration of ground shaking. Seismic settlement can occur with or without liquefaction; it results from densification of loose soils.

Based on the localized presence of loose granular soils and shallow groundwater within the Young Alluvial Flood Plain Deposits, a quantitative evaluation of liquefaction and seismic settlement was performed as summarized herein.

Input parameters for the liquefaction evaluation were based on the Maximum Considered Earthquake (MCE, 2% probability of exceedance with a 50-year period). A code-based acceleration value was obtained in accordance with ASCE 7-10 Equation 11.8-1 (PGA_M). In order to quantify site liquefaction susceptibility, the computer program LiquefyPro was utilized. The following data were also utilized used for the analysis:

- Based on observations and information obtained during the recent site investigations, highest groundwater levels at the site appear to be on the order of ten feet bgs. Based on the available information, a reasonable but conservative groundwater depth of five feet bgs was modeled for the liquefaction analysis.

- As indicated, the PGA_M value (0.495g) obtained using ASCE 7-10 Section 11.8.3 was used for the liquefaction evaluation.

- Based on the area tectonic framework and probable seismic hazard deaggregation for PGA, a modal contributing magnitude of 7.57, associated with the Elsinore Fault System, was used for the analysis.

Each of the evaluated CPT and boring exploration locations was individually analyzed using the PGA and magnitude values obtained. Results indicate that the calculated dynamic settlement is proportional to the depths of the Young Alluvial Deposits. Maximum calculated liquefaction settlements ranging from approximately 2.0 to 8.0 inches were obtained for explorations within the deep Young Alluvial Deposits in the southern portion of the site and outside of the currently proposed structural improvement limits. Dynamic settlement values for explorations within the currently proposed building areas were found to range from 0 to approximately 3.5 inches depending on depth of young alluvial deposits. The underlying older alluvium was generally found to be non-liquefiable.

A summary of the estimated liquefaction settlement potential is provided in table 4.4.4 below. Copies of the liquefaction program output are attached as Appendix E.

TABLE 4.4.4

Exploration Location	Data Type	Estimated Liquefaction Settlement (inches)	Approximate Depth of Young Alluvial Deposits Qya (feet)
B-21	CPT	0.05	0
B-27	SPT	0.33	7
B-30	CPT	0.09	9
B-31	CPT	0.05	0
B-49	CPT	0.00	0
B-51	CPT	0.08	0
B-64	CPT	0.01	0
B-66	CPT	0.01	0
B-69	SPT	1.47	26
B-76	CPT	3.38	28
B-84	SPT	6.42*	31
B-91	CPT	1.91*	24
B-92	SPT	8.35*	32

*Exploration located well outside of currently proposed building limits

As indicated, total liquefaction-induced settlement or ground deformation beneath structural improvement areas is estimated to range from approximately 0 to 3.5 inches. Therefore, in order to mitigate detrimental effects associated with the noted liquefaction potential,

recommendations have been provided for the excavation and recompaction of Young Alluvial Deposits, where they occur beneath proposed structure areas. Following the recommended remedial grading it is anticipated that structures can be founded on standard shallow foundations as detailed herein and that liquefaction and associated detrimental phenomena potential will be negligible within the proposed improved structural building areas.

Surface effects associated with liquefaction-related settlement can consist of sand boils, soil strength loss and associated phenomena. In general, the potential for surface manifestations is related to thickness of remaining liquefiable layers compared to depth of overlying non-liquefiable material (Ishihara, 1985). However, since the liquefiable and seismic settlement prone materials are to be removed and recompacted beneath the proposed structural building areas, surface effects are not anticipated as indicated herein.

Liquefaction, seismic settlement, and associated effects cannot be precluded beneath parking lots and other non-structure improvement areas to be situated outside of the designated grading limits where deep removals will not be performed. While recommendations have been provided herein for placement of a limited thickness of engineered fill beneath these minor or shallow improvement areas for static support and to help reduce the effects of minor differential settlement and surface effects, solar arrays and other improvements in these areas will be subject to significant movement and possible damage should the design seismic event occur. However, due to the minor nature of these improvements, mitigation of

liquefaction and/or seismic settlement is not anticipated to be warranted or required. Therefore, minor structures or improvements located in the currently proposed parking lot areas (assuming such areas are only overexcavated and recompacted to shallower depths as indicated herein) are anticipated to experience site differential seismic settlement on the order of two inches over a distance of approximately 50 feet.

The potential hazard associated with lateral spreading is generally anticipated to be low, based on the lack of significant slopes or free faces on, and adjacent to, the subject site.

4.4.5 Tsunamis and Seiche Evaluation

According to State of California Emergency Management Agency mapping, the site is not located within a tsunami inundation zone based on distance from the coastline and elevation above sea level. Damage resulting from oscillatory waves (seiches) is considered unlikely due to the absence of nearby confined bodies of water.

4.4.6 Flooding

Based on Federal Emergency Management Agency mapping (FEMA 2012), site improvement areas are located within Zone X, which is defined as: “Areas determined to be outside of the 0.2% annual chance floodplain”. However, during recent rains, a substantial amount of surface water was observed along the southwestern portion of the site. This surface flow should be factored into the design of proposed improvements, by others, in this portion of the site, as required.

4.4.7 Landsliding

Based on geologic mapping by Kennedy and Tan (2007), landslides are not mapped in the site area and no evidence of landsliding was encountered during the recent field exploration. Based on the site conditions and investigation findings, landsliding is not anticipated to be a significant geologic hazard within the subject site.

The site is relatively flat at a surface ratio generally less than 5:1 (horizontal to vertical ratio). Proposed grading will further reduce the minor slopes that exist at the site and steep permanent cuts were not observed in the area. The proposed structures will be underlain by medium dense to dense engineered fill and Old Alluvial Flood Plain Deposits with minor cuts and fills. Therefore, the potential for existing or seismically induced landslides is considered to be low.

4.4.8 Compressible and Expansive Soils

Based on observations and testing, the disturbed near surface, Previously Placed Fill, Residual Soil, and Young Alluvial Flood Plain Deposits are considered to be potentially compressible in their current condition. Therefore, it is recommended that these soils be overexcavated where feasible to the depth of competent underlying natural materials, and properly compacted as recommended herein. In areas where minor structures are proposed over deep Young Alluvial Flood Plain Deposits, other mitigation methods may be required and are included in the recommendations section of this report. Based on the site observations and testing, the underlying dense Old Alluvial Flood Plain Deposits and

Cretaceous bedrock units are not anticipated to be subject to significant compressibility under the proposed loads, and will only require overexcavation and recompaction in areas where differential fill thicknesses need to be reduced.

Based on observation and laboratory testing, soils at the site are generally anticipated to exhibit a Very Low to Low expansion potential (Expansion Index of 50 or less). Laboratory testing yielded Expansion Index values ranging from 0 to 36. Therefore, expansive soils are generally not anticipated to present adverse impacts to site development and do not require special foundation and/or slab-on-grade design considerations at this time. Additional evaluation of expansion potential of the near-surface soils should be evaluated during, or following, rough grading activities.

4.4.9 Corrosive Soils

Chemical testing was performed to evaluate the potential effects that site soils may have on concrete foundations and various types of buried metallic utilities. Soil environments detrimental to concrete generally have elevated levels of soluble sulfates and/or pH levels less than 5.5. According to American Concrete Institute (ACI) Table 318 4.3.1, specific guidelines have been provided for concrete where concentrations of soluble sulfate (SO_4) in soil exceed 0.1 percent by weight. These guidelines include low water: cement ratios, increased compressive strength, and specific cement type requirements.

Based on the results of the Sulfate and pH testing performed, onsite soils are anticipated to generally have a negligible corrosion potential to Portland cement concrete improvements. As such, Type II Portland cement is generally anticipated to be appropriate for proposed site improvements, subject to the review and determination of the project Structural Engineer(s).

A minimum resistivity value less than approximately 5,000 ohm-cm, and/or soluble chloride levels in excess of 200 ppm generally indicate a corrosive environment to buried metallic utilities and untreated conduits. Based on the obtained resistivity values of 2,620 and 5,190 ohm-cm and soluble chloride levels of 55.1 and 69.3 ppm, onsite soils are locally anticipated to have at least a moderate corrosion potential for buried uncoated/unprotected metallic conduits. Based on these results, at a minimum, the use of buried plastic piping or conduits would appear applicable, where feasible.

The results of the chemical tests performed are presented in the attached Appendix C. However, CTE does not practice corrosion engineering. Therefore, a corrosion engineer or other qualified consultant could be contacted if site specific corrosivity issues are of concern.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 General

The proposed improvements at the site are feasible from CTE's geotechnical standpoint, provided the preliminary recommendations in this report are incorporated into design and construction of the project. Recommendations for the proposed earthwork and improvements are included in the

following sections and Appendix D. However, recommendations in the text of this report supersede those presented in Appendix D, should variations exist. These recommendations should be further evaluated as project plans are developed.

5.2 Site Preparation

Prior to grading, the site should be cleared of any existing vegetation or debris, not suitable for structural backfill and be properly disposed of offsite. In areas to receive structures, overexcavation should extend to a minimum depth of two feet below proposed foundations or to the depth of competent Old Alluvial Flood Plain Deposits, whichever is deeper. In order to provide relatively uniform conditions under proposed structures, the depth of fill should also be a minimum of 1/3 the maximum depth of fill beneath the structure footprint. Overexcavation should extend laterally at least five feet beyond the limits of the proposed improvements, or a distance equal to the depth of the overexcavation, whichever is greater.

Overexcavation in proposed pavement or flatwork areas should be conducted to a minimum depth of five feet below proposed grade, or to the depth of competent underlying materials (for static support purposes). Young Alluvial Flood Deposits are generally anticipated to be suitable for static support purposes at a depth of five feet below existing or proposed grades, whichever is deeper. However, it is generally recommended that all Young Alluvial Flood Deposits are overexcavated and recompacted within an imaginary 1:1 plane extended down from the southernmost edge of the south driveway access and sidewalk improvements, should the overexcavations for the proposed building improvement areas not already remove and recompact this zone. This additional overexcavation is

considered optional from a Building Code standpoint, but is recommended due the anticipated relative importance of the southern campus access.

A CTE representative should observe the exposed ground surface prior to placement of compacted fill to document and verify the competency of the encountered subgrade materials. If unsuitable material is exposed at the base of excavations additional removals may be recommended. After approval by this office, the exposed subgrades to receive fill should be scarified a minimum of nine inches, moisture conditioned, and properly compacted prior to additional compacted fill placement.

If encountered, existing below-ground utilities should be redirected around proposed structures. Existing utilities at an elevation to extend through the proposed footings should generally be sleeved and caulked to minimize the potential for moisture migration below the building slabs. Abandoned pipes exposed by grading should be securely capped or filled with minimum two-sack cement/sand slurry to help prevent moisture from migrating beneath foundation and slab soils.

An engineer or geologist from CTE should observe the exposed bottom of overexcavations prior to placement of compacted fill or improvements. Overexcavation should extend to a depth of suitable competent soil as observed by a CTE representative. As indicated, deeper excavations or overexcavations may be necessary depending upon encountered conditions.

5.2.1 Shrinkage and Bulking

Based on our observation and testing performed for this report, the following ranges are generally anticipated with respect to shrinkage and bulking of site materials:

- Young Alluvial Deposits: 10 to 15 percent shrinkage
- Existing Fill Materials: 5 to 10 percent shrinkage
- Old Alluvial Deposits: 0 to 5 percent bulking

5.3 Site Excavation

Generally, excavation of site materials may be accomplished with heavy-duty construction equipment under normal conditions. However, excavations within the Alluvial Flood Plain Deposits could be sensitive to caving and/or erosion, and may not effectively remain standing vertical or near-vertical, even at shallow or minor heights and for short periods of time. As indicated in Section 4.3, seasonal groundwater also may locally be encountered in construction excavations.

5.4 Fill Placement and Compaction

Following recommended overexcavation of loose or disturbed soils, areas to receive fills or improvements should be scarified a minimum of nine inches, moisture conditioned, and properly compacted. Granular fill and backfill should be compacted to a minimum relative compaction of 90 percent at a moisture content of at least two percent above optimum, as evaluated by ASTM D 1557. The optimum lift thickness for fill soil will depend on the type of compaction equipment used. Generally, backfill should be placed in uniform, horizontal lifts not exceeding eight inches in loose thickness. Fill placement and compaction should be conducted in conformance with local ordinances.

5.5 Fill Materials

Properly moisture-conditioned very low to low expansion potential soils derived from the on-site excavations are considered suitable for reuse as compacted fill on the site if prepared and placed as recommended herein. Soils should be screened of organics and materials generally greater than three inches in maximum dimension, as recommended. If encountered, irreducible materials greater than three inches in maximum dimension generally should not be used in shallow fills (within three feet of proposed grades). In utility trenches, adequate bedding should surround pipes.

Imported fill beneath structures and flatwork should have an Expansion Index of 20 or less (ASTM D 4829) with less than 30 percent passing the No. 200 sieve. Proposed fill soils for use in structural or slope areas should be evaluated by CTE before being imported to the site.

Although this report is not intended to address environmental conditions at the subject site, we anticipate that imported soils will be screened, sampled, and tested in accordance with the State of California Department of Toxic Substances Control (2001) Clean Fill Information Advisory for Imported Fill soils to Public School Sites, or Conditional Waiver 10 of RWQCB Region 9 Order No. R9-2014-0041, dated June 26, 2014, as applicable.

Retaining wall backfill located within a 45-degree wedge extending up from the bottom of the heel of the wall foundation should consist of soil having an Expansion Index of 20 or less (ASTM D 4829) with less than 30 percent passing the No. 200 sieve. On site soil gradation and Atterberg Limit laboratory tests indicate that localized site soils may not meet these recommendations. As

such selective grading and/or import of select soil could be necessary. The upper 12 to 18 inches of wall backfill could consist of lower permeability soils, in order to reduce surface water infiltration behind walls. The project structural engineer and/or architect should detail proper wall backdrains, including gravel drain zones, fills, filter fabric and perforated drain pipes. A conceptual wall backdrain detail is provided in Figure 6.

5.6 Temporary Construction Slopes

The following recommended temporary slopes should be relatively stable against deep-seated failure, but may experience localized sloughing. On-site soils are considered Type B and Type C soils with recommended slope ratios as set forth in Table 5.6.

TABLE 5.6
RECOMMENDED TEMPORARY SLOPE RATIOS

SOIL TYPE	SLOPE RATIO (Horizontal: vertical)	MAXIMUM HEIGHT
B (Old Alluvial Flood Plain Deposits)	1:1 (OR FLATTER)	30 Feet
C (Previously Placed Fill, Young Alluvial Flood Plain Deposits and Residual Soil)	1.5:1 (OR FLATTER)	20 Feet

Actual field conditions and soil type designations must be verified by a "competent person" while excavations exist, according to Cal-OSHA regulations. In addition, the above sloping recommendations do not allow for surcharge loading at the top of slopes by vehicular traffic, equipment or materials. Joints and fractures in all temporary and cut slopes should be evaluated for stability by CTE, and could modify temporary slope ratios shown on Table 5.6. Appropriate surcharge setbacks must be maintained from the top of all unshored slopes.

5.7 Foundations and Slab Recommendations

The following recommendations are for preliminary design purposes only. These foundation recommendations should be reevaluated after review of the project grading and foundation plans, and after completion of rough grading of the building pad areas. Upon completion of rough pad grading, Expansion Index of near surface soils should be evaluated, and recommendations updated, as necessary. Lightly loaded upright structures such as flagpoles and other supports may be designed in accordance with the current California Building Code, or applicable standards assuming code minimum design values, or as per the recommendations provided herein.

5.7.1 Shallow Spread Foundations

Foundation recommendations presented herein are based on the anticipated very low to low expansion potential of site soils (Expansion Index of 50 or less).

Following the recommended preparatory grading, continuous and isolated spread footings are anticipated to be suitable for use at this site. It is anticipated that all proposed footings will be founded entirely in properly engineered fill placed and compacted as recommended herein. Footings should not straddle cut-fill interfaces in which case cut grade areas would be overexcavated and replaced with properly compacted fill.

Foundation dimensions and reinforcement should be based on an allowable bearing value of 2,500 pounds per square foot for footings founded in suitable compacted fill materials and embedded a minimum of 18 inches below the lowest adjacent rough subgrade elevation. If

utilized, continuous footings should be at least 18 inches wide. Isolated footings should be at least 24 inches in least dimension.

The above bearing values may be increased by 250 psf for each additional six inches of width or embedment beyond the minimums recommended, for an additional increase of up to 1,000 psf. The above bearing values may also be increased by one third for short duration loading which includes the effects of wind or seismic forces. If elastic foundation design is utilized, an uncorrected modulus of subgrade reaction (k) of 150 psi per inch is considered appropriate. Footing uplift or other calculations should be based on an apparent cohesion of 200 psf and angle of internal friction (phi) of 28 degrees.

Minimum footing reinforcement for continuous footings should consist of four No. 5 reinforcing bars; two placed near the top and two placed near the bottom, or as per the project structural engineer. The structural engineer should design isolated footing reinforcement. Footing excavations in fill areas should be maintained at, or be brought to, a minimum moisture content of two percent above optimum prior to concrete placement.

Lightly loaded upright structures such as flagpoles, solar shade structures and other supports may be designed in accordance with current California Building Code or applicable standards assuming Class 4 soils (CBC Table 1806A.2) and code minimum design values or as per the recommendations provided herein. Additional design information for these

ancillary structures should be provided by CTE based on the as-graded site condition and the specific location of the proposed improvements.

5.7.2 Foundation Settlement

The maximum total static settlement is expected to be on the order of 1.25-inches and the maximum differential static settlement is expected to be on the order of ¾ inch over a distance of approximately 40 feet. Following proper site preparations as recommended herein, dynamic settlement for building areas is generally not expected to be significant and is not anticipated to adversely affect the proposed improvements.

5.7.3 Foundation Setback

Footings for structures should be designed such that the horizontal distance from the face of adjacent slopes to the outer edge of footings is at least 10 feet. In addition, footings should be founded beneath a 1:1 plane extended up from the nearest bottom edge of adjacent trenches and/or excavations. Deepening of affected footings may be a suitable means of attaining the prescribed setbacks, provided adequate compacted fill thicknesses will still remain beneath deepened spread footings.

5.7.4 Interior Concrete Slabs-On-Grade

Concrete slabs should be designed based on the anticipated loading, but measure at least five inches thick. Slab reinforcement should at least consist of No. 3 reinforcing bars, placed on maximum 18-inch centers, each way, at or above mid-slab height, but with proper concrete cover.

Slabs subjected to heavier loads may require thicker slab sections and/or increased reinforcement. A 135-pci subgrade modulus is considered suitable for elastic design of minimally embedded improvements such as slabs-on-grade. Slab on grade areas should be maintained at a minimum two percent above optimum moisture content or be brought to two percent above optimum moisture content just prior to placement of underlayments or concrete.

In moisture-sensitive floor areas, a suitable vapor retarder of at least 15-mil thickness (with all laps or penetrations sealed or taped) overlying a four-inch layer of consolidated crushed aggregate or gravel (with SE of 30 or more) should be installed, as per the 2013 CBC/Green Building Code. An optional maximum two-inch layer of similar material may be placed above the vapor retarder to help protect the membrane during steel and concrete placement. This recommended protection is generally considered typical in the industry. If proposed floor areas or coverings are considered especially sensitive to moisture emissions, additional recommendations from a specialty consultant could be obtained. CTE is not an expert at preventing moisture penetration through slabs, but understands that ACI recommends concrete be placed directly upon the vapor retarder for best protection against moisture intrusion for most building conditions. A qualified architect or other experienced professional/specialist should be contacted if moisture penetration is a more significant concern.

5.8 Seismic Design Criteria

The seismic ground motion values listed in the table below were derived in accordance with the ASCE 7-10 Standard and 2016 CBC. This was accomplished by establishing the Site Class based on the soil anticipated post-graded properties at the site, and then calculating the site coefficients and parameters using the United States Geological Survey Seismic Design Maps application using the site coordinates of 33.3529 degrees latitude and -117.1564 degrees longitude. These values are intended for the design of structures to resist the effects of earthquake ground motions.

TABLE 5.8
SEISMIC GROUND MOTION VALUES

PARAMETER	VALUE	CBC REFERENCE (2016)
Site Class	D	ASCE 7, Chapter 20
Mapped Spectral Response Acceleration Parameter, S_S	1.288	Figure 1613.3.1 (1)
Mapped Spectral Response Acceleration Parameter, S_1	0.497	Figure 1613.3.1 (2)
Seismic Coefficient, F_a	1.000	Table 1613.3.3 (1)
Seismic Coefficient, F_v	1.503	Table 1613.3.3 (2)
MCE Spectral Response Acceleration Parameter, S_{MS}	1.288	Section 1613.3.3
MCE Spectral Response Acceleration Parameter, S_{M1}	0.747	Section 1613.3.3
Design Spectral Response Acceleration, Parameter S_{DS}	0.859	Section 1613.3.4
Design Spectral Response Acceleration, Parameter S_{D1}	0.498	Section 1613.3.4
PGA_M	0.495	ASCE 7, Equation 11.8-1

5.9 Lateral Resistance and Earth Pressures

Lateral loads acting against structures may be resisted by friction between the footings and the supporting compacted fill soil or passive pressure acting against structures. If frictional resistance is used, an allowable coefficient of friction of 0.30 (total frictional resistance equals the coefficient of friction multiplied by the dead load) is recommended for concrete cast directly against compacted fill. A design passive resistance value of 300 pounds per square foot per foot of depth (with a maximum value of 1,800 pounds per square foot) may be used. These values may not be increased for short term loading. Soil Class 4 as per CBC table 1806A.2 may also be used for bearing and sliding resistance. The allowable lateral resistance can be taken as the sum of the frictional resistance and the passive resistance, provided the passive resistance does not exceed two-thirds of the total allowable resistance. Frictional resistance should be ignored if the passive resistance exceeds two-thirds the allowable resistance.

Retaining walls up to approximately 10 feet high and backfilled using granular soils may be designed using the equivalent fluid weights given below.

TABLE 5.9
EQUIVALENT FLUID UNIT WEIGHTS
(pounds per cubic foot)

WALL TYPE	LEVEL BACKFILL	SLOPE BACKFILL 2:1 (HORIZONTAL: VERTICAL)
CANTILEVER WALL (YIELDING)	30	48
RESTRAINED WALL	60	75

Lateral pressures on cantilever retaining walls (yielding walls) due to earthquake motions may be calculated based on work by Seed and Whitman (1970). The total lateral thrust against a properly drained and backfilled cantilever retaining wall above the groundwater level can be expressed as:

$$P_{AE} = P_A + \Delta P_{AE}$$

For non-yielding (or "restrained") walls, the total lateral thrust may be similarly calculated based on work by Wood (1973):

$$P_{KE} = P_K + \Delta P_{KE}$$

Where P_A = Static Active Thrust (determined via Table 5.9)
P_K = Static Restrained Wall Thrust (determined via Table 5.9)
ΔP_{AE} = Dynamic Active Thrust Increment = $(3/8)\ k_h\ \gamma H^2$
ΔP_{KE} = Dynamic Restrained Thrust Increment = $k_h\ \gamma H^2$
k_h = *½ Peak Ground Acceleration = ½ (PGA_M)
H = Total Height of the Wall
γ = Total Unit Weight of Soil ≈ 130 pounds per cubic foot

*It is anticipated that the 1/2 reduction factor will be appropriate for proposed walls that are not substantially sensitive to movement during the design seismic event. Proposed walls that are more sensitive to such movement could utilize a 2/3 reduction factor. If any proposed walls require minimal to no movement during the design seismic event, no reduction factor to the peak ground acceleration should be used. The project structural engineer of record should determine the appropriate reduction factor to use (if any) based on the specific proposed wall characteristics.

The increment of dynamic thrust may be distributed triangularly with a line of action located at H/3 above the bottom of the wall (SEAOC, 2013).

These values assume non-expansive backfill and free-draining conditions. Some onsite soils may not be suitable for use as wall backfill. Measures should be taken to prevent moisture buildup behind all retaining walls. Figure 6, attached herewith, shows a conceptual wall backdrain that may be suitable for use at the subject site. Waterproofing should be as specified by the project architect.

In addition to the recommended earth pressure, subterranean structure walls (if proposed) adjacent to the streets or other traffic loads should be designed to resist a uniform lateral pressure of 100 psf. This is the result of an assumed 300-psf surcharge behind the walls due to normal street traffic. If the traffic is kept back at least 10 feet or a distance equal to the retained soil height from the subject walls, whichever is less, the traffic surcharge may be neglected. The project architect or structural engineer should determine the necessity of waterproofing the subterranean structure walls to reduce moisture infiltration.

Temporary shoring is not anticipated to be necessary based on current plans. However, temporary shoring recommendations may be provided should conditions arise to necessitate such.

5.10 Exterior Flatwork

To reduce the potential for cracking in exterior flatwork caused by minor movement of subgrade soils and typical concrete shrinkage, it is recommended that such flatwork be installed with crack-control joints at appropriate spacing as designed by the project architect, and measure a minimum 4.5 inches in thickness. Additionally, it is recommended that flatwork be installed with at least number 3 reinforcing bars on maximum 18-inch centers, each way, at above mid-height of slab but with proper concrete cover. Flatwork, which should be installed with crack control joints, includes driveways, sidewalks, and architectural features. Doweling of flatwork joints at critical pathways or similar could also be beneficial in resisting minor subgrade movements.

Before concrete placement, all subgrade preparation and soil moisture conditioning should be conducted according to the earthwork recommendations previously provided. Positive drainage should be established and maintained next to all flatwork. Subgrade materials shall be maintained at, or be elevated to, above optimum moisture content prior to concrete placement.

5.11 Vehicular Pavements

The proposed improvements include paved vehicle drive and parking areas. Presented in Table 5.11 are preliminary minimum pavement sections utilizing laboratory determined "R"-Value and estimated Traffic Index Values.

TABLE 5.11
RECOMMENDED PAVEMENT THICKNESS

Traffic Area	Assumed Traffic Index	Preliminary Subgrade "R"-Value	Asphalt Pavements		Portland Cement Concrete Pavements On Subgrade Soils (inches)
			AC Thickness (inches)	Aggregate Base Thickness (inches)	
Moderate to Heavy Drive Areas & Frequently Used Fire Lanes	6.0	30+	4.0	7.0	7.0
Parking, Light Drive, & Infrequently Used Fire Lane Areas	5.0	30+	3.0	6.0	6.5

* Caltrans class 2 aggregate base or "Greenbook" Processed Miscellaneous Base
** Concrete should have a modulus of rupture of at least 600 psi
***Alternative asphalt concrete sections can generally be proposed by substituting 0.5 inches of asphalt for 1.0 inch of aggregate base, if desired.

Following rough site grading, CTE recommends laboratory testing of representative at-grade soils for as-graded "R"-Value determination as laboratory testing of collected samples can indicate a variation of "R"-Values. The local public agency, as applicable, should be involved in the design and construction of any improvements within their respective rights-of-way, and for onsite pavements, as required.

The upper one foot of subgrade and all aggregate base materials beneath pavement areas should be compacted to 95% relative compaction in accordance with ASTM D1557, at a minimum of two percent above optimum moisture content.

Asphalt paved areas should be designed, constructed, and maintained in accordance with the recommendations of the Asphalt Institute or other widely recognized authority. Concrete paved areas should be designed and constructed in accordance with the recommendations of the American Concrete Institute or other widely recognized authority, particularly with regard to thickened edges, joints, and drainage. The Standard Specifications for Public Works construction ("Greenbook") or Caltrans Standard Specifications may be referenced for pavement materials specifications.

5.12 Drainage

Surface runoff should be collected and directed away from improvements by means of appropriate erosion-reducing devices and positive drainage should be established around the proposed improvements. Positive drainage should be directed away from improvements and slope areas at a gradient of at least two percent for a distance of at least five feet. However, the project civil

engineers should evaluate the on-site drainage and make necessary provisions to keep surface water from affecting the site.

Generally, CTE recommends against allowing water to infiltrate building pads or adjacent to slopes and improvements. Therefore, CTE recommends storm water cleansing devices be underlain by an impervious barrier and that the infiltrate be collected via subsurface piping and discharged off site.

Installation of subdrains or drainage devices may be recommended by CTE depending on the conditions encountered. Variations in groundwater level should be anticipated due to seasonal variations and irrigation as the site is developed.

5.13 Slopes

Based on anticipated soil strength characteristics, fill and cut slopes should be constructed at slope ratios of 2:1 (horizontal: vertical) or flatter. These fill slope inclinations should exhibit factors of safety greater than 1.5.

Although properly constructed slopes on this site should be grossly stable, the soils will be somewhat erodible. Therefore, runoff water should not be permitted to drain over the edges of slopes unless that water is confined to properly designed and constructed drainage facilities. Erosion-resistant vegetation should be maintained on the face of all slopes. Typically, soils along the top portion of a fill slope face will creep laterally. CTE recommends against building distress-sensitive hardscape improvements within five feet of slope crests.

As indicated, site slopes are generally considered to be stable provided site drainage is implemented as described herein and is constructed and maintained in accordance with the recommendations of the project Civil Engineer

5.14 Controlled Low Strength Materials (CLSM)

Controlled Low Strength Materials (CLSM) may be used in lieu of compacted soils below foundations, within building pads, and/or adjacent to retaining walls or other structures, provided the appropriate geotechnical recommendations are also incorporated. Minimum overexcavation depths recommended herein beneath bottom of footings, slabs, flatwork, and other areas may be applicable beneath CLSM if/where CLSM is to be used, and excavation bottoms should be observed by CTE prior to placement of CLSM. Prior to CLSM placement, the excavation should be free of debris, loose soil materials, and water. Once specific areas to utilize CLSM have been determined, CTE should review the locations to determine if additional recommendations are appropriate.

CLSM should consist of a minimum three-sack cement/sand slurry with a minimum 28-day compressive strength of 100 psi (or equal to or greater than the maximum allowable short term soil bearing pressure provided herein, whichever is higher) as determined by ASTM D4832. If re-excavation is anticipated, the compressive strength of CLSM should generally be limited to a maximum of 150 psi per ACI 229R-99. Where re-excavation is required, two-sack cement/sand slurry may generally be used to help limit the compressive strength. The allowable soils bearing pressure and coefficient of friction provided herein should still govern foundation design. CLSM may not be used in lieu of structural concrete where required by the structural engineer.

5.15 Plan Review

CTE should be authorized to review the project grading and foundation plans, and the grading or earthwork specifications (as applicable), prior to commencement of earthwork. Recommendations contained herein may be modified depending upon more specific development plans.

5.16 Construction Observation

The recommendations provided in this report are based on preliminary design information for the proposed construction and the subsurface conditions observed in the explorations performed. The interpolated subsurface conditions should be checked in the field during construction as necessary. Foundation and pavement recommendations may be revised upon review of development plans and completion of grading and as-built laboratory test results.

Recommendations provided in this report are based on the understanding and assumption that CTE will provide the observation and testing services for the project. All earthwork should be observed and tested to verify that grading activities have been performed according to the recommendations contained within this report. CTE's representatives should evaluate all footing trenches before reinforcing steel placement.

6.0 LIMITATIONS OF INVESTIGATION

The field evaluation, laboratory testing, and geotechnical analysis presented in this report have been conducted according to current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during construction.

The recommendations presented herein have been developed in order to reduce the potential adverse impacts of differential bearing and deep fill conditions, as well as variable groundwater conditions. However, even with the design and construction precautions herein, some differential movement and associated distress can occur and should be anticipated. In addition, observation, evaluation, and update recommendations provided during grading and construction are absolutely essential and CTE cannot accept responsibility for conditions not observed during grading or construction if such services are provided by others.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

CTE's preliminary conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described in this report are encountered, this office should be notified and additional recommendations, if required, will be provided.

This report is prepared for the project client as described. It is not applicable to any other site. No other party can rely on this report without the express permission of CTE.

The opportunity to be of service on this project is appreciated. If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

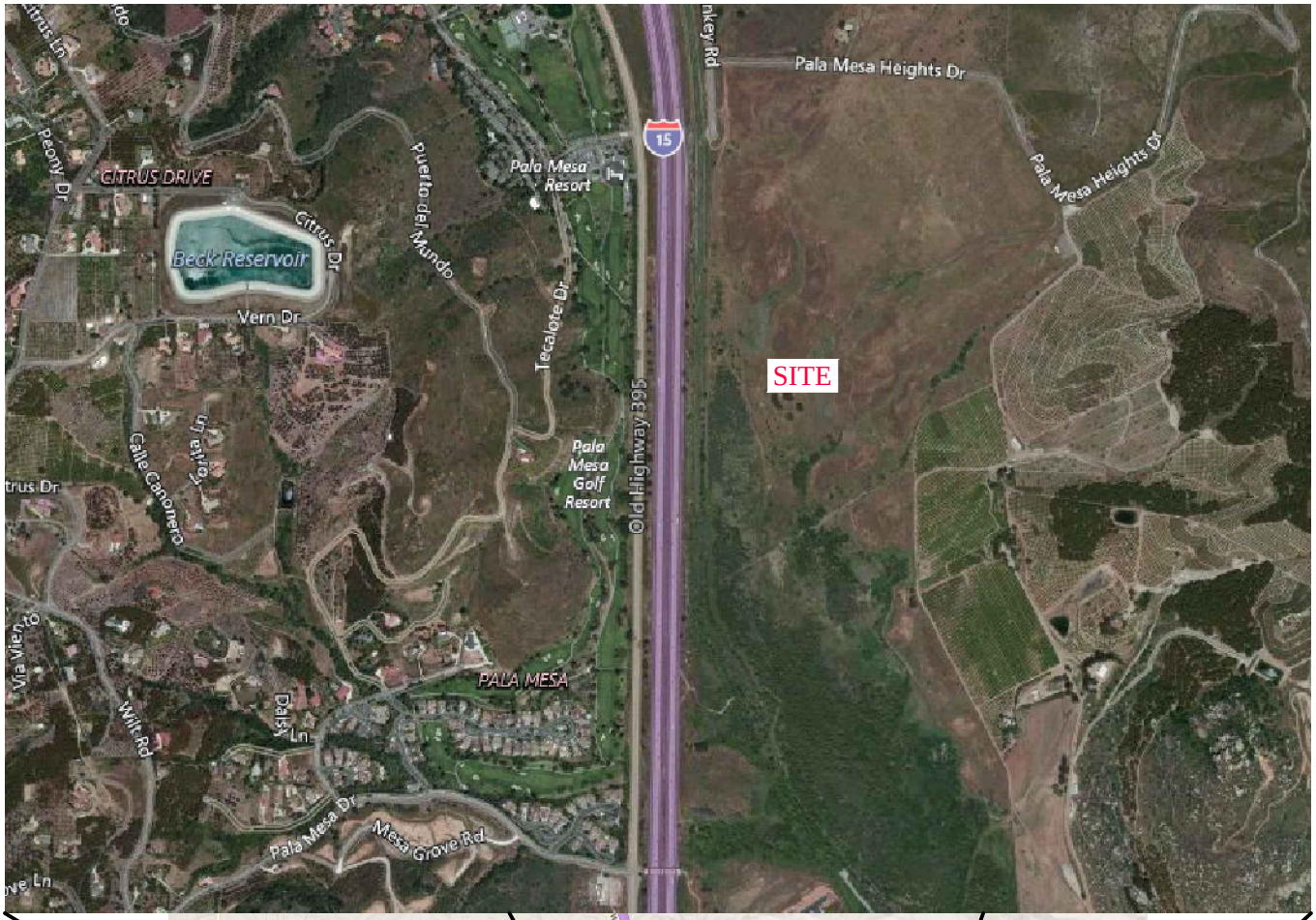
CONSTRUCTION TESTING & ENGINEERING, INC.

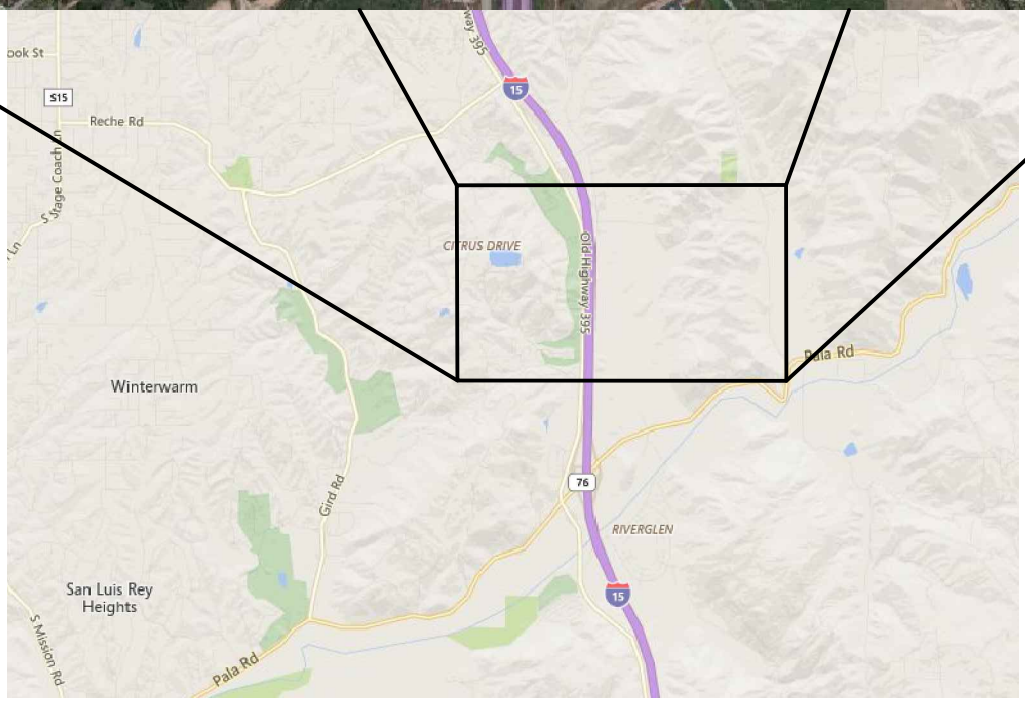
Dan T. Math, GE #2665
Vice President, Principal

Jay F. Lynch, CEG# 1890
Principal Engineering Geologist

Aaron J. Beeby, CEG #2603
Project Geologist

AJB/DTM/JFL:nri





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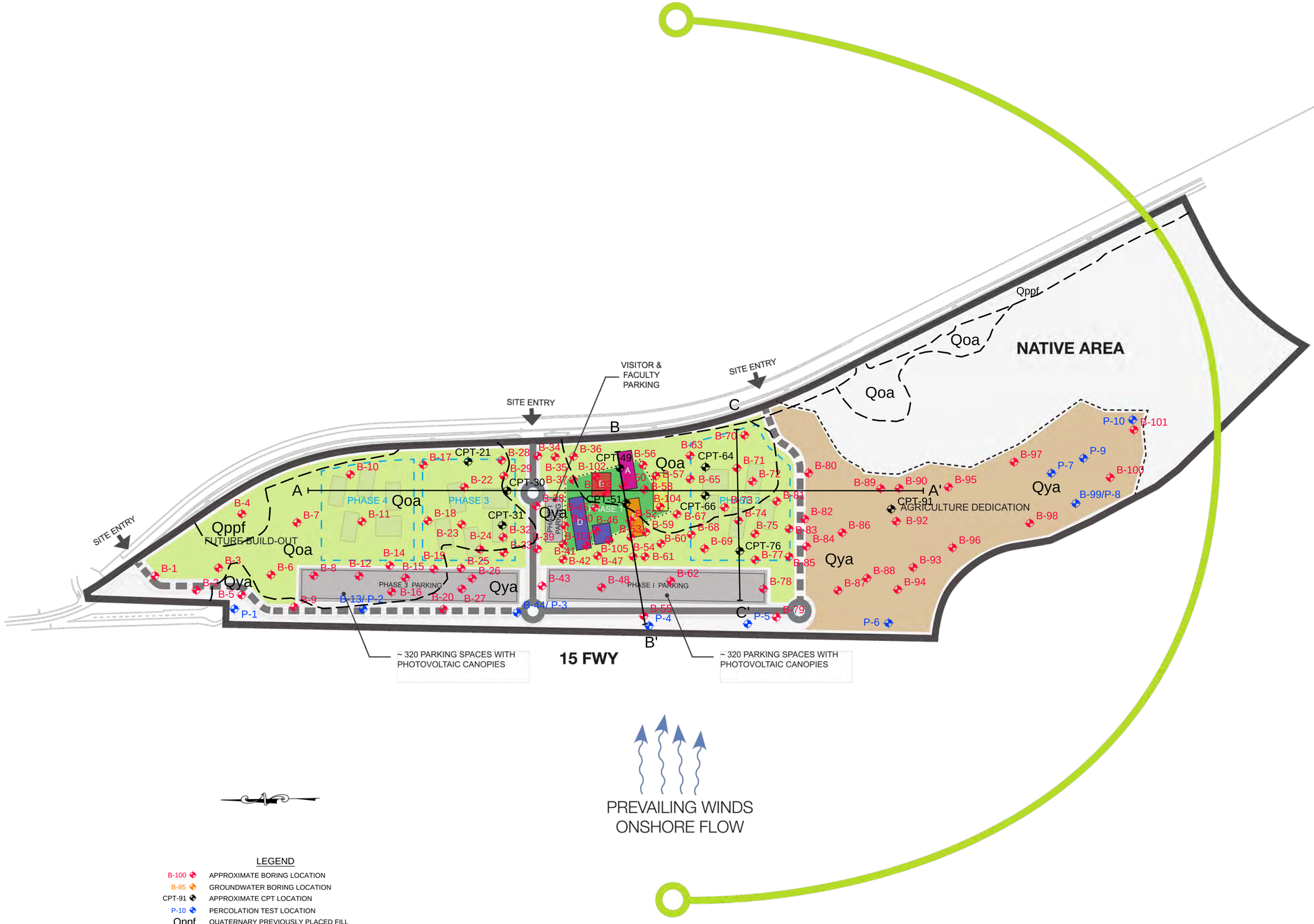
SITE INDEX MAP

PROPOSED PALOMAR COLLEGE NORTH EDUCATION CENTER, PHASE I
WEST ON HORSE RABCH CREEK ROAD
FALLBROOK, CALIFORNIA

SCALE:	DATE:
AS SHOWN	2/17
CTE JOB NO.: 10-13509G	FIGURE: 1



LEGEND

B-100	APPROXIMATE BORING LOCATION
B-85	GROUNDWATER BORING LOCATION
CPT-91	APPROXIMATE CPT LOCATION
P-10	PERCOLATION TEST LOCATION
Qppf	QUATERNARY PREVIOUSLY PLACED FILL
Qya	QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSITS
Qoa	QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS
	APPROXIMATE GEOLOGIC CONTACT
A A'	CROSS SECTION

\\Esc_server\projects\10-13509G\Figure 2 (Proposed).dwg

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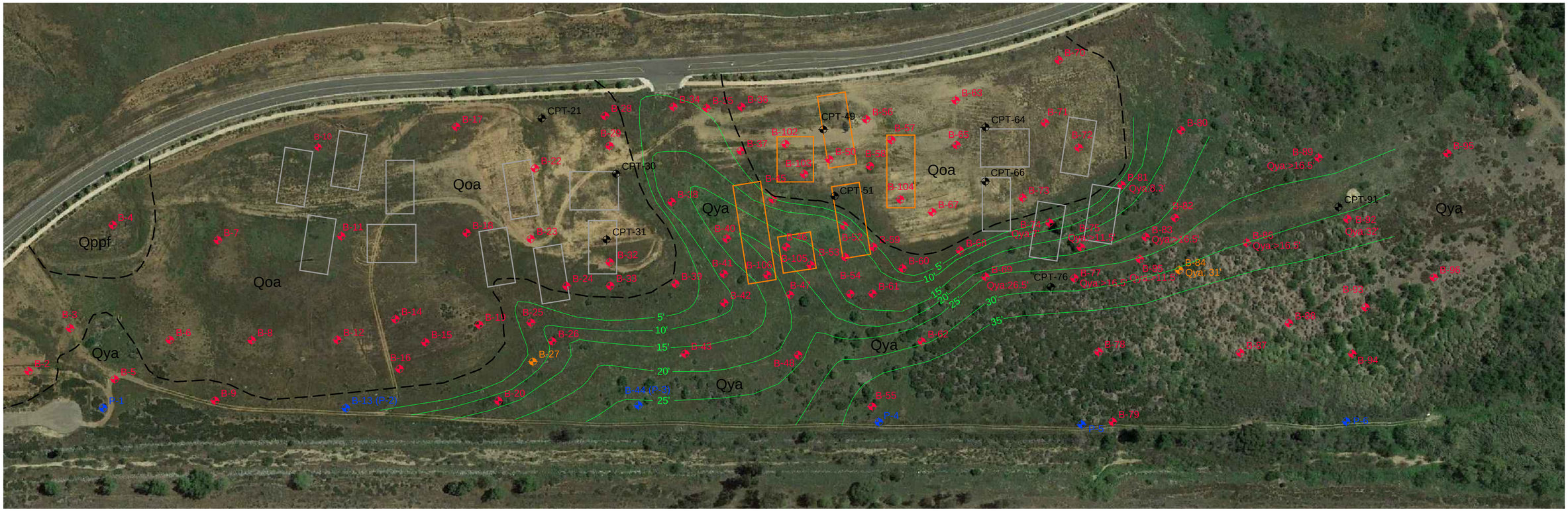
GEOLOGIC/EXPLORATION LOCATION MAP (PROPOSED)
PALOMAR COLLEGE NORTH EDUCATION CENTER
WEST OF HORSE RANCH CREEK ROAD
FALLBROOK, CALIFORNIA

SCALE:	DATE:
1"=200'	2/17
CTE Job No.:	FIGURE:
10-13509G	2



LEGEND

B-100	APPROXIMATE BORING LOCATION
B-85	GROUNDWATER BORING LOCATION
P-10	PERCOLATION TEST LOCATION
Qppf	QUATERNARY PREVIOUSLY PLACED FILL
Qya	QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSITS
Qoa	QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS
15	APPROXIMATE Qya DEPTH
	PROPOSED PHASE I STRUCTURE
	PROPOSED STRUCTURE FOR FUTURE PHASE

100' 0 50' 100'

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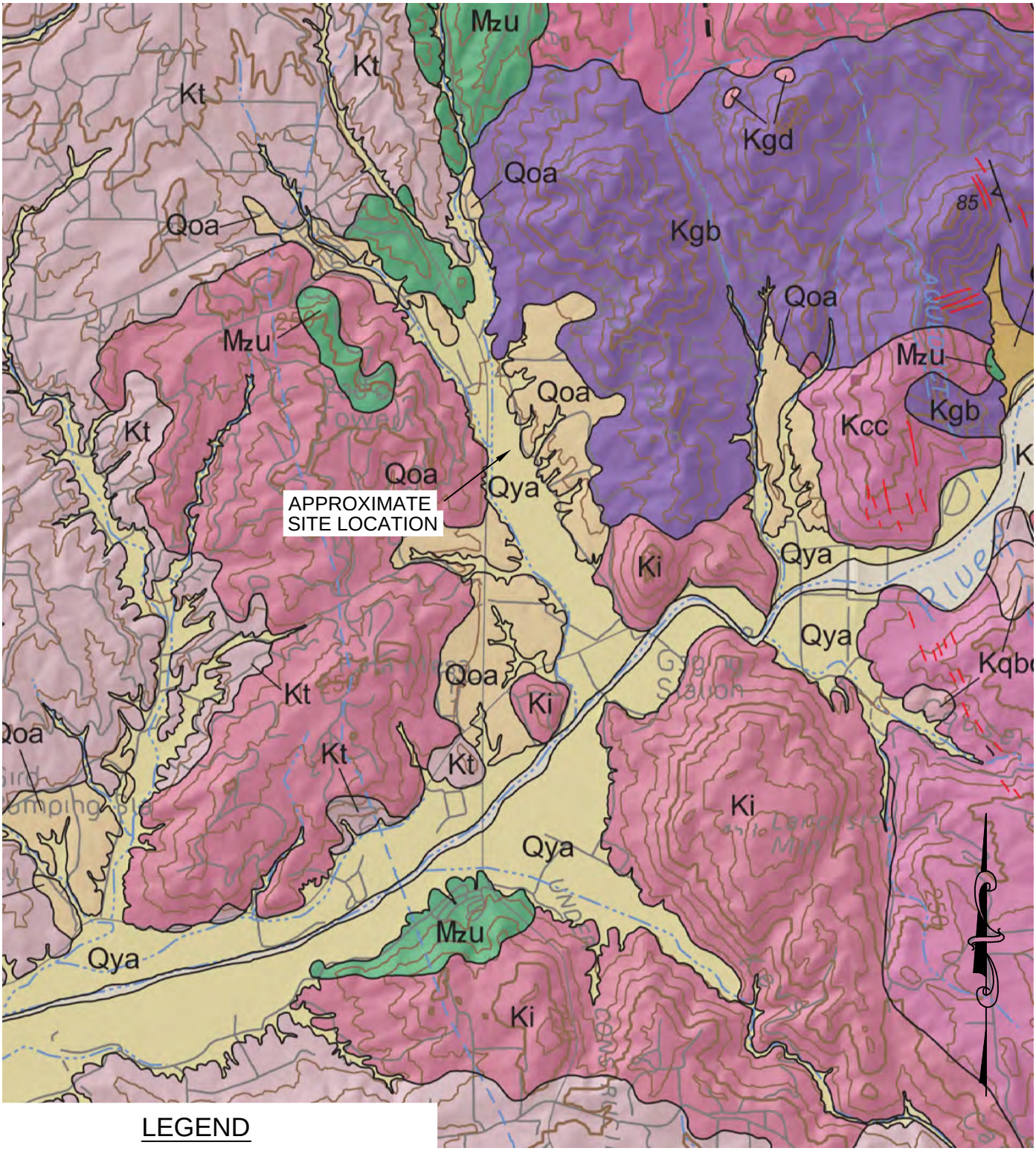
GEOLOGIC/EXPLORATION LOCATION MAP (AERIAL IMAGE)

PROPOSED PALOMAR COLLEGE NORTH EDUCATION CENTER
HORSE RANCH CREEK ROAD
FALLBROOK, CALIFORNIA

SCALE: 1"=100'	DATE: 2/17
CTE Job No.: 10-13509G	FIGURE: 2A

\\Esc_server\projects\10-13509G\Figure 2A (Aerial Image).dwg



LEGEND

Qya	Young Alluvial Flood Plain Deposits
Qoa	Old Alluvial Flood Plain Deposits
Kt	Cretaceous Tonalite
Kgb	Cretaceous Gabbro
Ki	Cretaceous Granodiorite of Indian Mountain
Mzu	Metasedimentary and Metavolcanic Rocks Undivided

NOTE: Base Map by Kennedy and Tan, 2007, Geologic Map of the Oceanside 30' x 60' Quadrangle, California.

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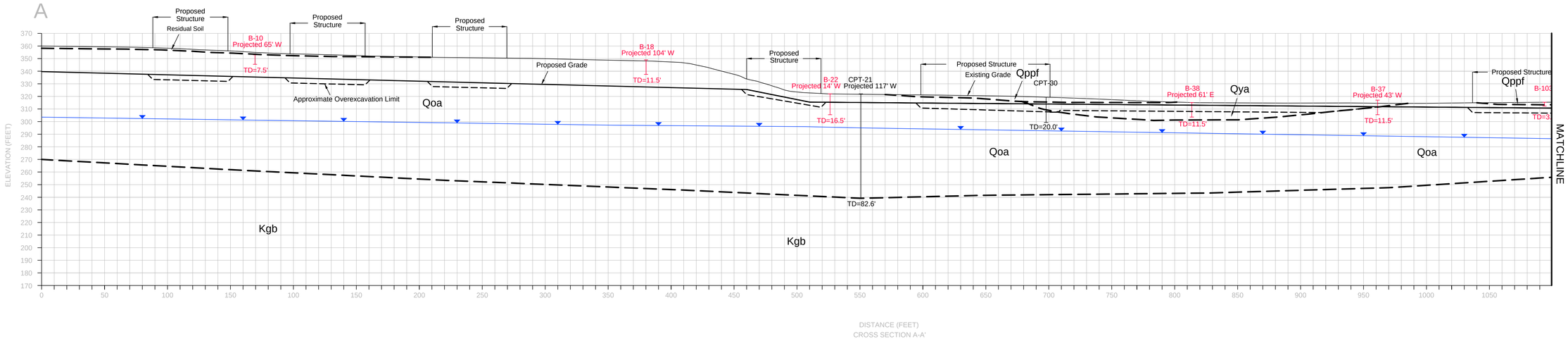
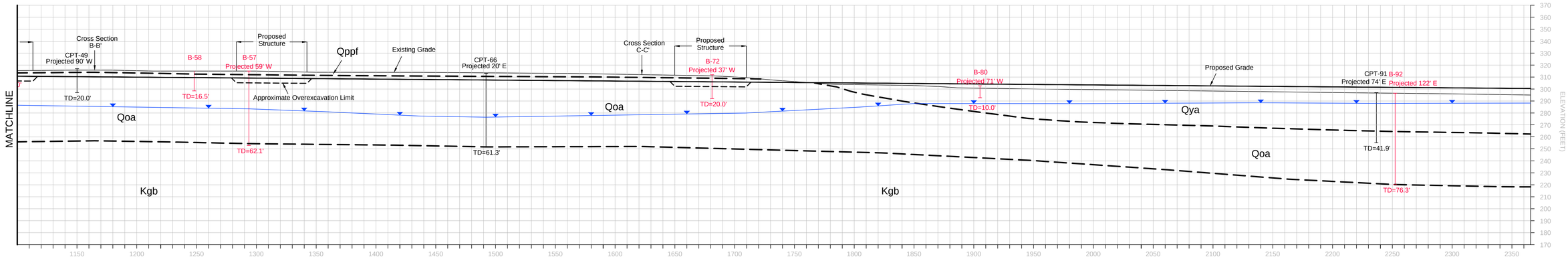
REGIONAL GEOLOGIC MAP
PROPOSED PALOMAR COLLEGE NORTH EDU. CTR. PHASE I
WEST OF HORSE RANCH CREEK ROAD
FALLBROOK, CALIFORNIA

SCALE:	DATE:
1"~4,000'	1/17
CTE JOB NO.: 10-13509G	FIGURE: 3

\\Esc_server\projects\10-13509G\Figure 3 (Geo Map).dwg





LEGEND

Qppf	QUATERNARY PREVIOUSLY PLACED FILL
Qya	QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSITS
Qoa	QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS
Kgb	CRETACEOUS GABBRO
	APPROXIMATE GEOLOGIC CONTACT
	APPROXIMATE GROUNDWATER ELEVATION

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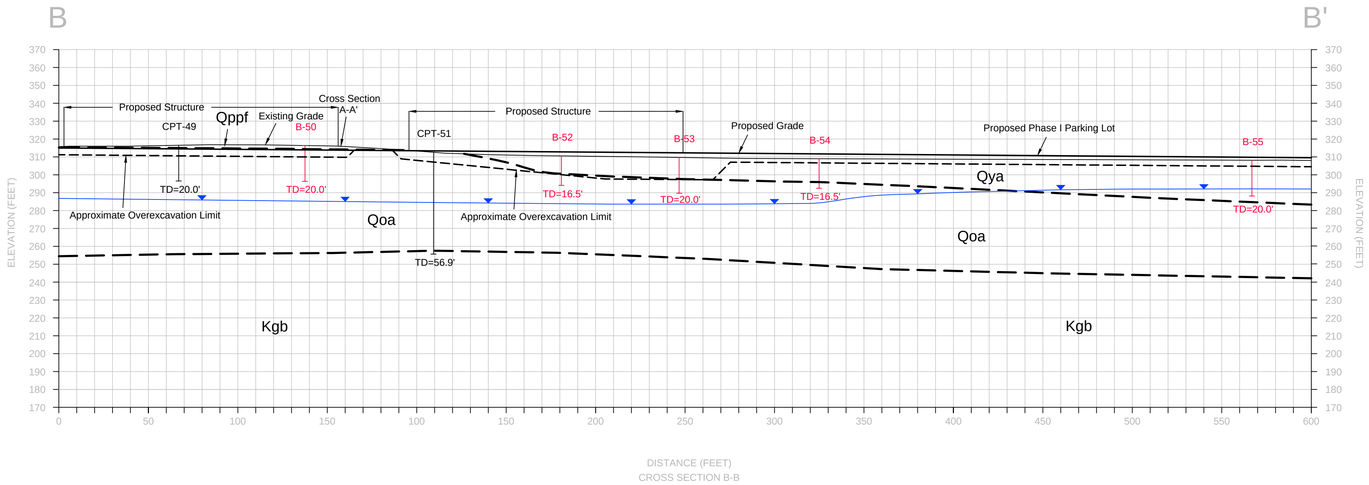
CROSS SECTION A–A'

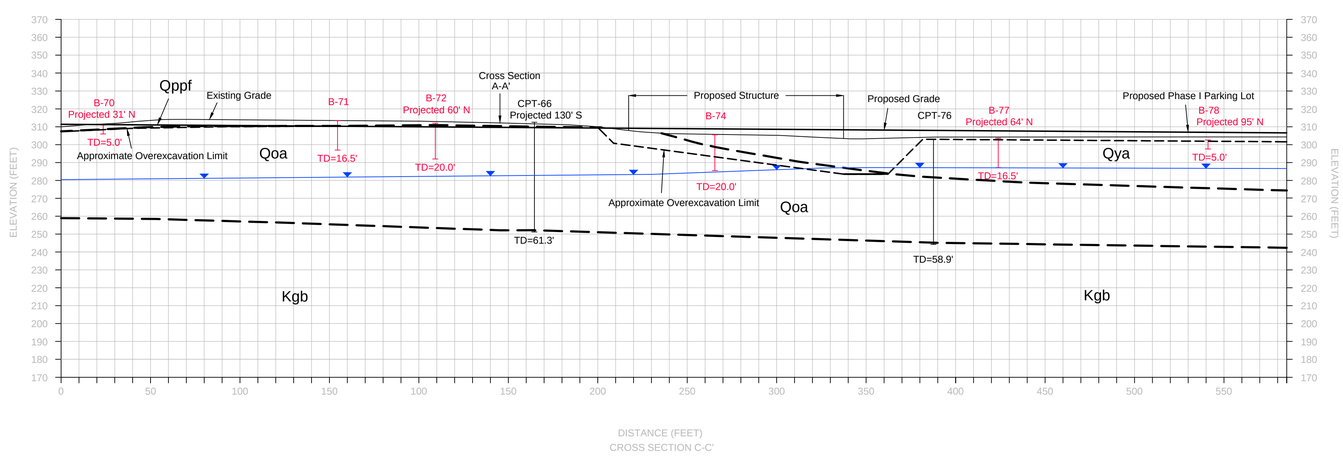
PROPOSED PALOMAR COLLEGE NORTH EDUCATION CENTER
WEST OF HORSE RANCH CREEK ROAD
FALLBROOK, CALIFORNIA

SCALE: 1"=40'	DATE: 2/17
CTE Job No.: 10-13509G	FIGURE: 4

\\Esc_server\projects\10-13509G\Figures 4 and 4A (Cross Sections).dwg



CROSS SECTION B-B



CROSS SECTION C-C'

LEGEND

Qppf	QUATERNARY PREVIOUSLY PLACED FILL
Qya	QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSITS
Qoa	QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS
Kgb	CRETACEOUS GABBRO
	APPROXIMATE GEOLOGIC CONTACT
	APPROXIMATE GROUNDWATER ELEVATION

CTE INC Construction Testing & Engineering, Inc.
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CROSS SECTIONS B–B' and C–C'

PROPOSED PALOMAR COLLEGE NORTH EDUCATION CENTER
WEST OF HORSE RANCH CREEK ROAD
FALLBROOK, CALIFORNIA

SCALE: 1"=40'	DATE: 2/17
CTE Job No.: 10-13509G	FIGURE: 4A

\\Esc_server\projects\10-13509c\Figures 4 and 4A (Cross Sections).dwg

LEGEND

12 0 6 12

1 inch = 12 mi.

HISTORIC FAULT DISPLACEMENT (LAST 200 YEARS)

HOLOCENE FAULT DISPLACEMENT (DURING PAST 11,700 YEARS)

LATE QUATERNARY FAULT DISPLACMENT (DURING PAST 700,000 YEARS)

QUATERNARY FAULT DISPLACEMENT (AGE UNDIFFERENTIATED)

PREQUATERNARY FAULT DISPLACEMENT (OLDER THAN 1.6 MILLION YEARS)

PERIOD	1800-1868	1869-1931	1932-2010
MAGNITUDE ≥ 7.0			
6.5-6.9			
5.5-5.9			
5.0-5.4			

40 LAST TWO DIGITS OF M ≥ 6.5 EARTHQUAKE YEAR

APPROXIMATE SITE LOCATION

NOTES: FAULT ACTIVITY MAP OF CALIFORNIA, 2010, CALIFORNIA GEOLOGIC DATA MAP SERIES MAP NO. 6;
EPICENTERS OF AND AREAS DAMAGED BY M≥5 CALIFORNIA EARTHQUAKES, 1800–1999 ADAPTED AFTER TOPPOZADA, BRANUM, PETERSEN, HALLSTORM, CRAMER, AND REICHLE, 2000, CDMG MAP SHEET 49
REFERENCE FOR ADDITIONAL EXPLANATION; MODIFIED WITH CISN AND USGS SEISMIC MAPS

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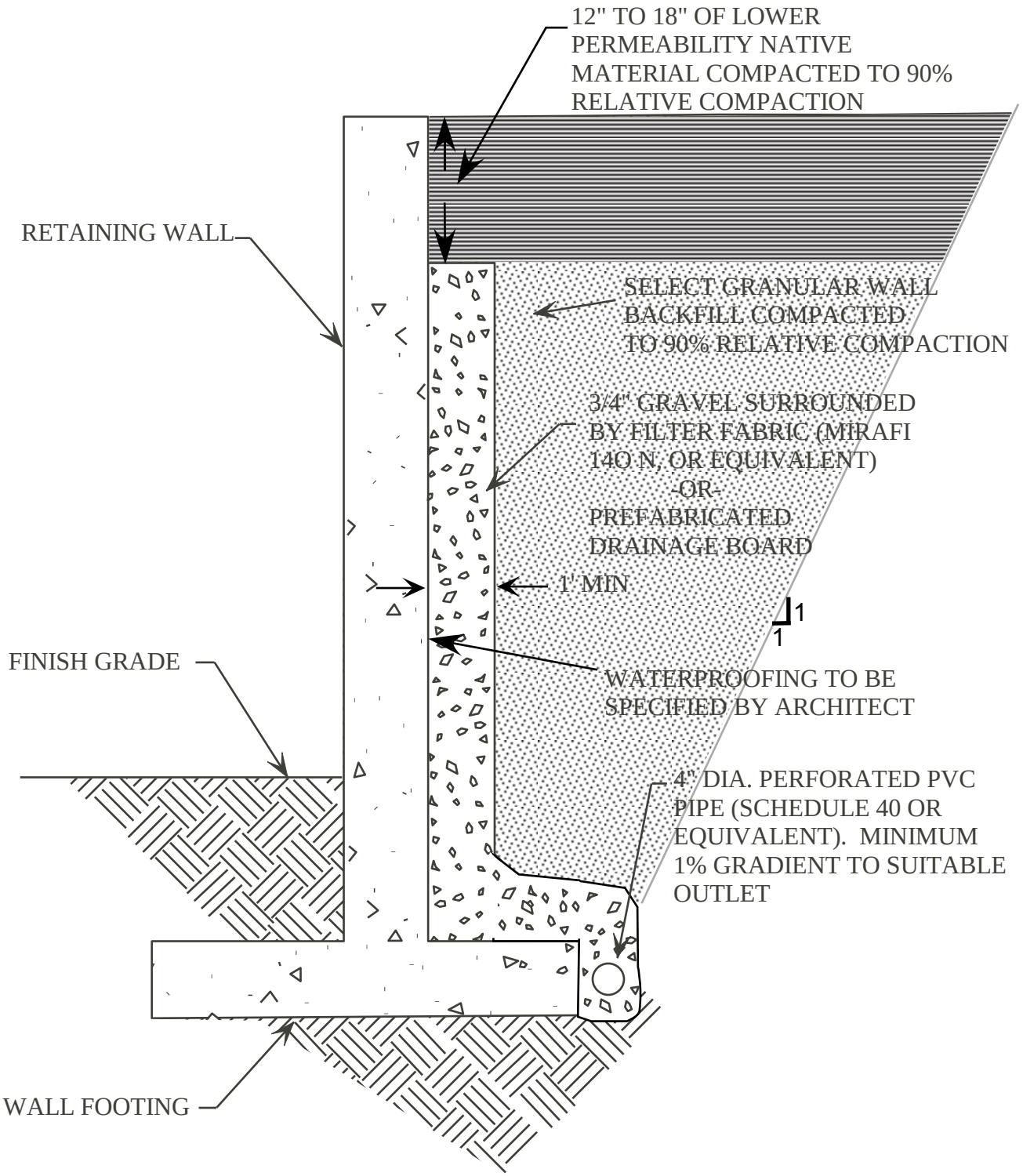
REGIONAL FAULT AND SEISMICITY MAP

PROPOSED PALOMAR COLLEGE NORTH EDU. CTR.
WEST OF HORSE RANCH CREEK ROAD
FALLBROOK, CALIFORNIA

CTE JOB NO: 10-13509G
SCALE: 1 inch = 12 miles
DATE: 2/17
FIGURE: 5



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RETAINING WALL DRAINAGE DETAIL

CTE JOB NO:	10-13509G
SCALE:	NO SCALE
DATE: 02/17	FIGURE: 6

APPENDIX A

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REFERENCES

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APPENDIX B

EXPLORATION LOGS

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DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES
		GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" 4 10 40 200

CLEAR SQUARE SIEVE OPENING U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed
PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded
PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

FIGURE: BL1

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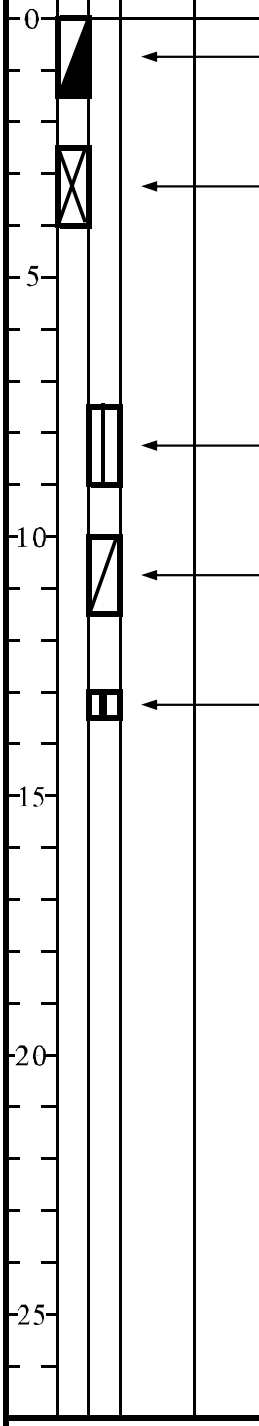
PROJECT: | DRILLER: | SHEET: of
CTE JOB NO: | DRILL METHOD: | DRILLING DATE:
LOGGED BY: | SAMPLE METHOD: | ELEVATION:

BORING LEGEND

Depth (Feet) | Sample: Bulk / Driven | Blows/Foot | Dry Density (pcf) | Moisture (%) | U.S.C.S. Symbol | Graphic Log | DESCRIPTION | Laboratory Tests



Block or Chunk Sample

Bulk Sample

Standard Penetration Test

Modified Split-Barrel Drive Sampler (Cal Sampler)

Thin Walled Army Corp. of Engineers Sample

Groundwater Table

Soil Type or Classification Change

? — ? — ? — ? — ? — ? — ?

Formation Change [(Approximate boundaries queried (?)]

"SM"

Quotes are placed around classifications where the soils exist in situ as bedrock

FIGURE: BL2

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 2
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-45)	DRILLING DATE:	1/18/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~360 FEET

BORING: B-1

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**RESIDUAL SOIL:** Loose, moist, brown to dark brown, silty fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, slightly moist, reddish brown, silty fine grained SAND with trace medium and coarse grains.	
5			17 23 30						
								Increased clay content	
10								Becomes brown to dark brown	
15			19 42 50/3"						
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	2	of	2
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-45)	DRILLING DATE:			1/18/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:			~360 FEET

BORING: B-1

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25			16 22 22			SM		Dense, dry to slightly moist, light brown, silty fine grained SAND with some medium grains, friable.	
30									
35			18 24 26						
								Total Depth: 36.5' No Groundwater	
40									
45									
50									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-45)	DRILLING DATE:	1/18/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~337 FEET

BORING: B-2

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC/CL		**RESIDUAL SOIL:** Medium dense or very stiff, slightly moist, dark reddish brown, clayey fine to medium grained SAND/ sandy CLAY, oxidized.	
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, dry to slightly moist, light reddish brown, clayey fine grained SAND with trace gravels.	
						SM		Dense, slightly moist, light reddish brown, silty fine to medium grained SAND with trace gravel, oxidized.	
5			17 22 23						
10			27 50/3"					Becomes very dense with gravel	
								Total Depth: 10.8' No Groundwater	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-45)	DRILLING DATE:	1/18/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~337 FEET

BORING: B-3

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, dark brown, clayey fine grained SAND with silt. Gravels-related to nearby storm drain backfill	
		▯	12 18 18						
5						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, slightly moist, brown to reddish brown, silty fine grained SAND with trace clay.	
						SC		Very dense, slightly moist, reddish brown, clayey fine grained SAND.	
10		▯	22 28 40						
								Total Depth: 11.5' No Groundwater	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/25/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~352 FEET

BORING: B-4

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC/SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, clayey to silty fine to medium grained SAND.	
5						SC		Loose to medium dense, moist, reddish brown, clayey fine to medium grained SAND.	
								Asphalt and gravel observed	
10								Total Depth: 8.4' (Refusal on asphalt) No Groundwater	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-45)	DRILLING DATE:	1/18/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~328 FEET

BORING: B-5

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**RESIDUAL SOIL:** Loose to medium dense, slightly moist, brown to dark brown, silty fine grained SAND with trace clay.	
							SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, slightly moist, brown, silty fine grained SAND with trace clay and medium to coarse grained sand.	
5		✓		12 21 38						
							CL/SC		Hard or dense, moist, dark reddish brown, fine grained sandy CLAY/ clayey SAND.	
10				8 13 15						
							SC/SM		Dense, slightly moist, brown to reddish brown, silty to clayey fine grained SAND with some gravel.	
15		✓		15 27 32						
							SM		Medium dense, slightly moist, reddish brown, silty fine grained SAND with trace clay.	
				6 10 17						
20									Total Depth: 20' No Groundwater	
25										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~334 FEET

BORING: B-6

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM/SC		**RESIDUAL SOIL:** Loose to medium dense, slightly moist, brown to dark brown, silty to clayey fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, brown to reddish brown, silty fine grained SAND with trace clay, oxidized.	
5									
						SC/SM		Very dense, slightly moist, reddish brown, silty to clayey fine to medium grained SAND, oxidized.	
10		■	22 50/6"						
15						SM		Very dense, slightly moist, reddish brown, silty fine grained SAND with trace clay.	
		■	14 27 39						
20								Total Depth: 20' No Groundwater	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/30/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~347 FEET

BORING: B-7

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**RESIDUAL SOIL:** Loose to medium dense, slightly moist, brown to dark brown, silty fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, reddish brown, silty fine to medium grained SAND, oxidized.	
5									
10			18 20 25					Becomes dense with trace coarse grained sand	
15			14 18 20						
20								Total Depth: 19.5' No Groundwater	
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/30/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~333 FEET

BORING: B-8

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**RESIDUAL SOIL:** Loose, moist, brown to grayish brown, silty fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, reddish brown, silty fine to medium grained SAND with trace clay, oxidized.	
5									
						SC		Medium dense, slightly moist, reddish brown, clayey fine grained SAND with trace clay, oxidized.	
10		▯	6 6 13						
15		▯	6 8 10						
								Total Depth: 16.5' No Groundwater	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH		DRILLER:	BAJA EXPLORATION	SHEET:	1 of	1
CTE JOB NO:	10-13509G		DRILL METHOD:	HOLLOW-STEM (CME-45)	DRILLING DATE:		1/18/2017
LOGGED BY:	DAK		SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:		~324 FEET

BORING: B-9

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose to medium dense, slightly moist, brown to grayish brown, silty fine grained SAND with clay.	
						CL/SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Hard or dense, slightly moist, reddish brown, fine grained sandy CLAY/ clayey SAND.	
5			12 14 18						
			15 37 50			SM		Very dense, slightly moist, reddish brown, silty fine grained SAND.	
10								Total Depth: 10' No Groundwater	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/25/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~353 FEET

BORING: B-10

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X						SC		**RESIDUAL SOIL:** Medium dense, moist, dark reddish brown, clayey fine grained SAND, oxidized.	
							SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, moist, reddish brown, clayey fine grained SAND, oxidized.	
5										
									Total Depth: 7.5' (Refusal in dense flood plain deposits) No Groundwater	
10										
15										
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~339 FEET

BORING: B-11

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM/SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, brown to reddish broan, silty to clayey fine grained SAND, oxidized.	
							SC		Medium dense, slightly moist, reddish brown, clayey fine to medium grained SAND, oxidized.	
5		■		5 6 9						
10										
15		■		16 13 25						
									Total Depth: 16.5' No Groundwater Encountered	
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~333 FEET

BORING: B-12

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**RESIDUAL SOIL:** Medium dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, moist, reddish brown, silty fine to medium grained SAND, oxidized, massive.	
						CL-ML		Dense, moist, reddish brown, silty CLAY with fine to medium grained SAND, oxidized.	
5		▮	10 12 30						
10		▮	5 12 27		5.6				M, AL
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/25/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~320 FEET

BORING: B-13

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, very moist, dark reddish brown, silty fine grained SAND, oxidized.	
							SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, very moist, reddish brown, clayey fine to medium grained SAND, oxidized.	
5									Total Depth: 3' No Groundwater	
10										
15										
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH		DRILLER:	BAJA EXPLORATION	SHEET:	1 of	1
CTE JOB NO:	10-13509G		DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:		1/18/2017
LOGGED BY:	AJB		SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:		~337 FEET

BORING: B-14

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**RESIDUAL SOIL:** Loose to medium dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized.	
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense to very dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized.	
5		▮	26 50/3"						CHM
						SM		Very dense, slightly moist, reddish brown, silty fine grained SAND, oxidized, massive.	
10									
15		▮	5 15 19						
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~330 FEET

BORING: B-15

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM/SC		**RESIDUAL SOIL:** Loose, moist, brown, silty to clayey fine grained SAND.	EI, RV
5						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, slightly moist, brown to reddish brown, silty fine grained SAND, oxidized.	
10			17 25 39	113.3	2.6				MD, CN
15						SM/SP		Dense, slightly moist, reddish brown, silty to poorly graded fine to medium grained SAND with silt, oxidized.	
20			8 16 17					Total Depth: 20' No Groundwater	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~325 FEET

BORING: B-16

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**RESIDUAL SOIL:** Loose to medium dense, moist, brown to dark brown, clayey fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, brown to reddish brown, silty fine grained SAND with trace clay, oxidized.	
5									
						SC		Dense, slightly moist, brown to reddish brown, clayey fine grained SAND with trace medium to coarse grained sand.	
10			11 15 17						M, AL
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/25/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~337 FEET

BORING: B-17

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC/CL		**QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense or very stiff, moist, dark reddish brown, clayey fine to medium grained SAND, oxidized.	
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, very moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
5								Total Depth: 3' (Refusal in dense flood plain deposits) No Groundwater	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/30/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~339 FEET

BORING: B-18

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**RESIDUAL SOIL:** Loose to medium dense, moist, brown, silty fine grained SAND with trace clay, oxidized.	
						SM/SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, reddish brown, silty to clayey fine to medium grained SAND, oxidized.	
5									
10		▯	8 13 18					Becomes dense	
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~327 FEET

BORING: B-19

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC/CL		**RESIDUAL SOIL:** Medium dense or very stiff, moist, reddish brown, fine to medium grained SAND, oxidized.	
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
5			12 15 23			SM		Dense to very dense, moist, reddish brown, silty fine to medium grained SAND, oxidized, massive.	
10			15 21 38						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~316 FEET

BORING: B-20

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, friable.	
								Becomes brownish gray fine to medium grained SAND.	
5			8 5 4					Friable sand interbed	
						SP-SM		Medium dense, moist, gray, poorly graded fine to medium grained SAND with silt, friable.	
10						CL		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Hard, moist, reddish brown, fine to medium grained sandy CLAY, oxidized.	EI
15			12 20 30						
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~322 FEET

BORING: B-22

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist to moist, brown to reddish brown, silty fine to medium grained SAND, oxidized.	
						SM/SC		Medium dense, moist, reddish brown, silty to clayey fine to medium grained SAND, oxidized.	
5			7 9 9						
10									
						SP-SM		Dense, dry to slightly moist, pale grayish brown, poorly graded fine to medium grained SAND with silt, oxidized, massive.	
15			14 14 16						GS
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~329 FEET

BORING: B-23

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**RESIDUAL SOIL:** Loose, moist, dark reddish brown, clayey fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, slightly moist, light brown to reddish brown, silty fine grained SAND, oxidized.	
5			15 25 39					Becomes very dense	
10									
15			9 10 12					Becomes medium dense	
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~319 FEET

BORING: B-24

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**RESIDUAL SOIL:** Loose to medium dense, moist, reddish brown, silty fine grained SAND, oxidized.	
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense to very dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
5			17 23 29						
10			7 14 19					Silty fine grained sand interbeds	
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~319 FEET

BORING: B-25

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, grayish brown, silty fine grained SAND, massive, friable, micaceous.	
5									
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, reddish brown, clayey fine to medium grained SAND, oxidized.	
10			3 8 13						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~317 FEET

BORING: B-26

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, friable, pinhole porosity.	
5			6 7 9						
10			10 22 17			SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
15			5 11 19						
20								Total Depth: 20' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/30/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~317 FEET

BORING: B-27

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, very moist, dark brown, silty fine grained SAND, friable, micaceous.	
						SM/SC		Loose, moist, dark reddish brown, silty to clayey fine grained SAND.	
5			3 3 5						
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense to very dense, slightly moist, reddish brown, clayey fine grained SAND with silt and trace medium to coarse grained sand.	
10			12 36 40						
15									
						SM/SC		Dense to very dense, slightly moist, mottled red and grayish brown, silty to clayey fine to medium grained SAND with trace coarse grained sand.	
20			21 38 38						MD, AL, CN
25					▼			Groundwater encountered at approximately 25 feet	

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	2 of 3
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/30/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~317 FEET

BORING: B-27

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						SM/SC		Dense to very dense, slightly moist, mottled red and grayish brown, silty to clayey fine to medium grained SAND with trace coarse grained sand.	
30			13 16 21					Becomes dense	
35									
						SM		Very dense, moist, reddish brown, silty fine to coarse grained SAND with gravel, oxidized mottling.	
40			36 36 38						
45			7 8 14					Becomes medium dense	
50									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	3 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/30/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~317 FEET

BORING: B-27

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
50			16 13 50/4"			SM		Medium dense, moist, reddish brown, silty fine to coarse grained SAND with gravel, oxidized mottling.	
55									
60			13 21 30					Becomes dense with interbedded fine and coarse grained sands and gravel.	
						SM/SC		**RESIDUAL SOIL:** Dense, moist, reddish brown, silty to clayey fine to coarse grained SAND, oxidized mottling.	
65			22 24 38						
						"SM"		**CRETACEOUS GABBRO:** Very dense, moist, grayish brown gabbro that excavates to silty fine grained SAND, oxidized, severely weathered.	
70			50/4"						
								Total Depth: 70.3' No Groundwater Encountered Backfilled with Bentonite Grout Capped with Chips	
75									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~319 FEET

BORING: B-28

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, grayish brown, silty fine grained SAND, massive, friable, micaceous.	
10			2 3 2			SC		**RESIDUAL SOIL:** Medium dense, slightly moist, reddish brown, clayey fine to medium grained SAND with silt, oxidized.	
15			5 6 6			SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized.	
20								Total Depth: 16.5' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~319 FEET

BORING: B-29

Depth (Feet)	Sample Bulk	Sample Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM/SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose, moist, brown, silty to clayey fine grained SAND.	
							SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, reddish brown, silty fine to medium grained SAND with trace clay, oxidized.	
5										
10				12 19 26						
15							SM		Dense, slightly moist, reddish brown, clayey fine grained SAND, oxidized.	
				9 13 20						
20									Total Depth: 20' No Groundwater Encountered	
25										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~324 FEET

BORING: B-32

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**RESIDUAL SOIL:** Loose, moist, dark brown, silty fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, brown to reddish brown, silty fine to medium grained SAND, oxidized.	
5									
10			9 12 14						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~318 FEET

BORING: B-33

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, brown, silty to clayey fine grained SAND.	
5									
						SM		**RESIDUAL SOIL:** Loose to medium dense, slightly moist, reddish brown, silty fine to medium grained SAND with trace medium to coarse grains, oxidized.	
10		▨	5 6 8						
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, slightly moist, reddish brown, silty fine grained SAND, oxidized.	
15									
		▨	9 14 18						
20								Total Depth: 20' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~318 FEET

BORING: B-34

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine to medium grained SAND.	
5						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, brown to reddish brown, silty fine to medium grained SAND, oxidized, massive.	
10			12 11 11						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~318 FEET

BORING: B-35

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose to medium dense, dark reddish brown, clayey fine to medium grained SAND, massive.	
5						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, reddish brown, silty fine to medium grained SAND, oxidized, massive. Becomes fine grained sand	
10		☒	39 38 50					Becomes very dense	
15		☐	16 25 25					Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~318 FEET

BORING: B-36

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, clayey fine to medium grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, moist, reddish brown, silty fine to medium grained SAND, oxidized.	
5			11 20 25					Becomes fine grained sand	
10			10 12 14						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~317 FEET

BORING: B-37

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, clayey fine to medium grained SAND.	
						SC/SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, reddish brown, clayey to silty fine to medium grained SAND, oxidized.	
5			31 33 46			SM		Dense, slightly moist, reddish brown, silty fine to medium grained SAND, oxidized, massive.	
10			12 14 19						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~315 FEET

BORING: B-38

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM/ML		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, very moist, brown, silty fine grained SAND/ sandy SILT.	
							ML		Medium stiff, very moist, dark reddish brown SILT with silty SAND interbeds.	
5				3 2 3						GS
10				1 1 1						GS
									Total Depth: 11.5' No Groundwater Encountered	
15										
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~314 FEET

BORING: B-39

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, very moist, dark brown, silty fine grained SAND, friable.	
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Very dense, slightly moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
5			16 50/6"						
10			8 14 18					Becomes dense	
15			9 22 22						
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/24/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~312 FEET

BORING: B-40

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist to very moist, brown to dark brown, silty fine grained SAND with clay.	
10			1 1 1					Becomes very moist to wet, medium to coarse grained sand	
								Total Depth: 11.5' No Groundwater Encountered	

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PROJECT:	PALOMAR COLLEGE NORTH		DRILLER:	BAJA EXPLORATION	SHEET:	1 of 3	
CTE JOB NO:	10-13509G		DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017	
LOGGED BY:	AJB		SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~311 FEET	

BORING: B-41

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, very moist, dark brown, silty fine grained SAND, friable, micaceous.	
5		▯	3 3 3						CHM
10		◪	8 16 20	115.4	6.2				MD, CN
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Very dense, slightly moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
15		▯	7 16 14						
20		◪	17 50/6"	110.4	9.4				MD, CN
						SM		Dense, moist, reddish brown, silty fine to medium grained SAND, oxidized, massive.	
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	2 of 3
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~311 FEET

BORING: B-41

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						SM		Dense, moist, reddish brown, silty fine to medium grained SAND, oxidized, massive.	
						SC		Dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
					▼			Groundwater encountered at approximately 28 feet	
30		▮	7 19 35						
						CL		Very stiff, wet, reddish brown, fine grained sandy CLAY, oxidized.	
35									
40		▮	11 12 20	17.6					M, AL
45		▮	12 25 20	18.7					M, AL
						SC/SM		Dense, very moist, reddish brown, silty to clayey fine to medium grained SAND, oxidized.	
						CL		Hard, very moist, reddish brown, fine to medium grained sandy CLAY, oxidized.	
50									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	3 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~311 FEET

BORING: B-41

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
50				7 16 19	13.1		CL		Hard, very moist, reddish brown, fine to medium grained sandy CLAY, oxidized.	M, AL
									Total Depth: 51.5' Groundwater encountered at approximately 28 feet Backfilled with Bentonite Grout Capped with Chips	
55										
60										
65										
70										
75										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~311 FEET

BORING: B-42

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, very moist, dark brown, silty fine grained SAND, friable.	
5		✓	5 6 7						
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Very dense, moist, reddish brown, silty fine to medium grained SAND, oxidized, massive.	
10		✓	13 30 28						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~312 FEET

BORING: B-43

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SP-SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose to medium dense, moist, yellowish brown, poorly graded fine to medium grained SAND with silt, friable.	RV
5			2 3 3						GS
								Becomes medium dense	
10			3 5 8						GS
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/25/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~313 FEET

BORING: B-44

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Loose, moist, dark brown, silty fine grained SAND, friable, massive.	
5								Total Depth: 5' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~312 FEET

BORING: B-45

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, clayey fine grained SAND.	EI
						SC/CL		Loose or stiff, moist, dark reddish brown, clayey fine grained SAND/ sandy CLAY, oxidized.	
5									
						CL		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Hard, moist, reddish brown, fine to medium grained sandy CLAY, oxidized.	
10			7 12 19		5.6				M, AL
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/24/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~311 FEET

BORING: B-46

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist to very moist, dark brown to grayish brown, silty fine grained SAND, friable, massive.	
5			2 3 3						
10									
15			2 3 5			SC		Medium dense, moist, reddish brown, clayey fine grained SAND.	
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:	1/18/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~310 FEET

BORING: B-47

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Loose to medium dense, moist, dark brown, silty fine grained SAND, massive.	
5				2 3 4						
									Becomes reddish brown	
10				2 3 4						
									Total Depth: 11.5' No Groundwater Encountered	
15										
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH		DRILLER:	BAJA EXPLORATION	SHEET:	1 of	1
CTE JOB NO:	10-13509G		DRILL METHOD:	HOLLOW-STEM (CME-75)	DRILLING DATE:		1/18/2017
LOGGED BY:	AJB		SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:		~310 FEET

BORING: B-48

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine to medium grained SAND, massive.	
5		■	2 1 3						
10						SP		Loose, moist, light brown, poorly graded fine to medium grained SAND, friable.	
						SM		Loose, moist, brown, silty fine grained SAND, massive, friable.	
15		■	2 2 3						
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1	of	1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:			1/30/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:			~316 FEET

BORING: B-50

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, clayey fine to medium grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, reddish brown, silty fine to medium grained SAND, oxidized.	
5								Becomes moist	
10		▯	10 13 15						
						SC		Medium dense to dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized.	
15		▯	17 29 43						MD, AL
20								Total Depth: 20' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/24/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~311 FEET

BORING: B-52

Depth (Feet)	Sample Bulk	Sample Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist to wet, dark brown, silty fine grained SAND, friable.	
							CL		Soft, wet, grayish brown, fine grained sandy CLAY with silt.	
5				2 3 4			SM		Loose, moist to wet, grayish brown to brown, silty fine grained SAND, friable.	
10							SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
15				12 15 18						
									Total Depth: 16.5' No Groundwater Encountered	
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/24/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~310 FEET

BORING: B-53

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, grayish brown, silty fine grained SAND with trace clay, friable.	
5									
10									
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
15		▯	5 11 22						
		▯	18 23 25			SM		Dense, slightly moist, brown to reddish brown, silty fine grained SAND with trace medium to coarse grains, laminated to thinly bedded.	
20								Total Depth: 20' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/24/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~309 FEET

BORING: B-54

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, grayish brown, silty fine grained SAND with trace clay, friable.	
5									
10									
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, dark grayish brown, silty fine grained SAND with trace medium to coarse grained sand.	
15			9 13 23					Becomes dense	
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~308 FEET

BORING: B-55

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM/SC		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, grayish brown to dark brown, silty to clayey fine grained SAND, massive.	
5						SM		Loose, moist, brown to grayish brown, silty fine grained SAND.	
10		▯	4 4 5						
15					▼			Groundwater encountered at approximately 16 feet	
20		▯	4 4 4						MD, AL
								Total Depth: 20' Groundwater encountered at approximately 16 feet Backfilled with bentonite grout capped with chips	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/30/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~316 FEET

BORING: B-56

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose, slightly moist, dark reddish brown, silty fine grained SAND, massive.	
	X					SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to very dense, moist, reddish brown, silty fine to medium grained SAND with trace gravel, oxidized mottling.	
5	X	■	17 20 26						
10		■	11 14 18						
15								Total Depth: 11.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH		DRILLER:	BAJA EXPLORATION	SHEET:	1 of 3	
CTE JOB NO:	10-13509G		DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/30/2017	
LOGGED BY:	AJB		SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~315 FEET	

BORING: B-57

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, brown, silty fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, brown to reddish brown, silty fine to medium grained SAND, oxidized.	
5			14 15 19	106.3	3.3				MD, CN
10			8 10 11						
15			15 18 26					Gravel	
						SC		Medium dense, moist, brown to reddish brown, clayey fine to medium grained SAND, massive.	
						SM		Medium dense, moist, reddish brown, silty fine to medium grained SAND, oxidized, few clayey sand interbeds.	
20			9 12 14						
						CL-ML		Interbedded silty fine to medium grained SAND and silty CLAY.	
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	2 of 3
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/30/2017
LOGGED BY:	AJB			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~315 FEET

BORING: B-57

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						CL-ML		Interbedded silty fine to medium grained SAND and silty CLAY.	
30			11 9 11	19.7	▼			Becomes very moist Groundwater encountered at approximately 31.5 feet	M, AL
35									
40			9 10 10					Manganeze nodules present Becomes dense	
45						CL		Hard, moist, dark reddish brown, sandy fine to medium grained CLAY, oxidized.	
50									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	3 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/30/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~315 FEET

BORING: B-57

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
50			12 14 21	17.0		CL		Hard, moist, dark reddish brown, sandy fine to medium grained CLAY, oxidized.	M, AL
55			14 27 39 50/5"			SC		Very dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized.	M, AL
60			50/6"						M, AL
			50/1"					**CRETACEOUS GABBRO:** Very dense, slightly moist, dark reddish gray gabbro that excavates to silty fine to medium grained SAND, oxidized, severely weathered.	
65								Total Depth: 62.1' Groundwater encountered at approximately 31.5 feet Backfilled with bentonite grout capped with chips	
70									
75									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/30/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~315 FEET

BORING: B-58

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, dark brown, silty fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, moist, dark reddish brown, silty fine grained SAND with trace gravel.	
5			19 26 23						
						SC		Dense, moist, reddish brown, clayey fine to medium grained SAND with trace gravel, oxidized.	
						SM		Dense, moist, dark reddish brown, silty ifne to medium grained SAND, oxidized, massive.	
10			20 22 28	112.5	7.1				MD, CN
						SC		Medium dense, moist, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
15			10 11 14						
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/14/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~310 FEET

BORING: B-59

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist to wet, gray to dark brown, silty fine grained SAND.	
5									
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense to very dense, slightly moist, reddish brown, silty fine grained SAND with trace coarse grains interbedded with laminated silt.	
10		☑	32 50/3"						
								Total Depth: 10.8' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/30/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~308 FEET

BORING: B-60

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, grayish brown, silty fine grained SAND, friable.	
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, silghtly moist, reddish brown, clayey fine grained SAND, oxidized.	
5									
						SM		Dense, slightly moist, reddish brown, silty fine grained SAND, oxidized mottling.	
10			9 15 20						
15						SM/SC		Very dense, moist, reddish brown, silty to clayey fine grained SAND, oxidized.	
			17 50/6"						MD, AL, CN
20								Total Depth: 19.5' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH		DRILLER:	BAJA EXPLORATION	SHEET:	1 of	1
CTE JOB NO:	10-13509G		DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:		1/24/2017
LOGGED BY:	DAK		SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:		~308 FEET

BORING: B-61

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, grayish brown, silty fine grained SAND, with trace clay.	
5										
10										
							SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense to very dense, slightly moist, reddish brown, silty fine grained SAND with trace gravel.	
15		✓		30 35 50/4"						
									Total Depth: 16.3' No Groundwater Encountered	
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/31/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~308 FEET

BORING: B-62

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist to wet, gray to dark brown, silty fine grained SAND.	
5								Becomes slightly moist, reddish brown	
10								Total Depth: 10' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/31/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~315 FEET

BORING: B-63

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, silty fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, silghtly moist, reddish brown, silty fine to medium grained SAND, oxidized, massive.	
5									
10			10 13 15					Carbonate nodules	
15									
20			8 14 20					Total Depth: 20' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/31/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~315 FEET

BORING: B-65

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, clayey fine grained SAND.	
							SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, silghtly moist, reddish brown, silty fine to medium grained SAND, oxidized, massive.	
5										
10		■		9 12 18					Becomes light reddish brown, mottled	
15		■		14 15 19						
									Total Depth: 16.5' No Groundwater Encountered	
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/24/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~313 FEET

BORING: B-67

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, brown to grayish brown, silty fine grained SAND.	
5						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, silghtly moist, brown to yellowish brown, silty fine grained SAND, oxidized, massive.	
10			16 22 38					Becomes very dense with trace gravel	
15								Total Depth: 11.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/24/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~307 FEET

BORING: B-68

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND with trace clay.	
5						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Dense, silghtly moist to moist, brown, silty fine grained SAND, oxidized, massive.	
10			18 19 22					Becomes reddish brown, mottled, medium to coarse grains, with gravel.	
15			20 33 50						
20								Total Depth: 16.5' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/31/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~305 FEET

BORING: B-69

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, massive, friable, micaceous.	
5						SM		Medium dense, moist, reddish brown, silty fine to medium grained SAND, massive, friable.	
10		▯	6 7 9						GS
					▼			Seepage encountered at approximately 13 feet	
15						SM		Medium dense, moist, reddish brown, silty fine grained SAND, oxidized.	
20		▯	5 8 12						
						SP-SM		Medium dense, wet, gray, poorly graded fine to medium grained SAND with silt, massive, friable.	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	2 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/31/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~305 FEET

BORING: B-69

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25			8 9 12			SP-SM		Medium dense, wet, gray, poorly graded fine to medium grained SAND with silt, massive, friable.	GS
						CL-ML		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Hard, moist, reddish brown, silty CLAY with fine to medium grained sand, oxidized, silty sand interbeds.	
30			19 22 27		17.0				M, AL
35			7 13 20						
								Total Depth: 36.5' Seepage encountered at approximately 13 feet Backfilled with bentonite grout capped with chips	
40									
45									
50									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~311 FEET

BORING: B-70

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, clayey fine to medium grained SAND.	
	X					SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, dark reddish brown, silty fine to medium grained SAND, oxidized, massive.	
5								Total Depth: 5' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~314 FEET

BORING: B-71

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, silty fine to medium grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, moist, reddish brown, silty fine to medium grained SAND, oxidized.	
5			7			CL		Very stiff, moist, reddish brown, fine grained sandy CLAY, oxidized.	
			15			SP-SM		Medium dense to dense, moist, reddish brown, poorly graded fine to medium grained SAND with silt, oxidized, friable.	
			22						
10									
15			12						
			19						
			18						
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~312 FEET

BORING: B-72

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, reddish brown, clayey fine to medium grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, dark grayish brown, silty fine to medium grained SAND with trace clay, oxidized.	
5			13 12 13					Becomes reddish brown	
								Fine gravel interbed	
						SP-SM		Medium dense, moist, reddish brown, poorly graded fine to medium grained SAND with silt and trace coarse grains.	
10			20 39 50						
						SM		Medium dense, moist, dark reddish brown, silty fine grained SAND, oxidized.	
15			8 12 12						MD, AL
20								Total Depth: 20' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1	of	1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:			1/24/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:			~310 FEET

BORING: B-73

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose, slightly moist, brown, silty fine grained SAND.	
5						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, brown to reddish brown, silty fine grained SAND, locally friable.	
10			6 10 14					Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~305 FEET

BORING: B-74

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, brown to grayish brown, silty fine grained SAND with trace clay.	
5									
						SC		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, slightly moist, reddish brown, clayey fine grained SAND, oxidized.	
10		▨	16 22 32						
						SM		Dense, slightly moist to moist, grayish brown, silty fine grained SAND with medium and coarse grains.	
15		▥	10 12 18						
		▥	13 14 15					Becomes medium dense	
20								Total Depth: 20' No Groundwater Encountered	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~302 FEET

BORING: B-75

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, friable, massive.	
5						SP		Medium dense, moist, brown to grayish brown, poorly graded fine to coarse grained SAND with trace silt.	
10			5 7 8						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~303 FEET

BORING: B-77

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, friable, massive.	
5							SP-SM		Medium dense, moist, brown to grayish brown, poorly graded fine to coarse grained SAND with silt.	
10		▯		6 4 5						
15		▯		7 6 6			SM		Loose, moist, grayish brown, silty fine grained SAND with trace gravel.	
									Total Depth: 16.5' No Groundwater Encountered	
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~303 FEET

BORING: B-78

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, very moist, dark brown, clayey fine grained SAND.	
						SM		Loose, moist, dark reddish brown, silty fine grained SAND, oxidized, massive, friable.	
								Clay interbed	
5								Total Depth: 5' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~302 FEET

BORING: B-79

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, friable, massive.	
5			2 2 2						
10					▼			Groundwater encountered at approximately 11 feet	
						SP		Loose, wet, brown, poorly graded fine grained SAND with trace coarse grains.	
15			2 2 3			SM		Loose, wet, brown, silty fine grained SAND, friable.	
								Total Depth: 16.5' Groundwater encountered at approximately 11 feet Backfilled with bentonite grout capped with chips	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~302 FEET

BORING: B-80

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC/SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, clayey to silty fine grained SAND.	
5						SC		Loose to medium dense, moist, dark brown, clayey fine to medium grained SAND.	
						SM		Loose to medium dense, moist, dark reddish brown, silty fine to medium grained SAND, oxidized, friable.	
10								Total Depth: 10' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~303 FEET

BORING: B-81

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist to very moist, dark brown, silty fine grained SAND, friable, micaceous.	
5										
							SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense to dense, moist, reddish brown, silty fine to medium grained SAND with trace gravel, oxidized, massive.	
10									Total Depth: 8.6' (Refusal on gravel) No Groundwater	
15										
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~301 FEET

BORING: B-82

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, friable, massive.	
5						SM/SP		Loose, moist, brown to reddish brown, silty to poorly graded fine to medium grained SAND.	
10		▮	6 5 4						
15		▯	1 2 1		▼			Groundwater encountered at approximately 18 feet	
20								Total Depth: 19.5' Groundwater encountered at approximately 18 feet Backfilled with bentonite grout capped with chips	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~301 FEET

BORING: B-83

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, friable, massive.	
						SP/SM		Loose, moist, brown, poorly graded to silty fine to coarse grained SAND, friable.	
10			6 6 4						
						SM		Loose to medium dense, moist to wet, grayish brown, silty fine grained SAND.	
15			10 12 10						
								Total Depth: 16.5' Groundwater encountered at approximately 11 feet Backfilled with bentonite grout capped with chips	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/30/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~301 FEET

BORING: B-84

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, friable, massive.	
5								Becomes fine to medium grained	
10			5 5 6						
					▼			Groundwater encountered at approximately 14.1 feet	
15									
20			3 3 5						
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	2 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/30/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~301 FEET

BORING: B-84

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						SM		Loose, moist, dark grayish brown, silty fine to medium grained SAND, friable, massive.	
30			3 4 6			CL		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Very stiff, moist, reddish brown, clayey fine to medium grained sandy CLAY, oxidized, massive.	
						SC		Dense, wet, reddish brown, clayey fine to medium grained SAND, oxidized, massive.	
35									
40			14 13 18						
45						CL		Very stiff, very moist, reddish brown, fine grained sandy CLAY, oxidized.	
50									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	3 of 3
CTE JOB NO:	10-13509G			DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/30/2017
LOGGED BY:	AJB			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~301 FEET

BORING: B-84

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
50			8 8 11			CL		Very stiff, very moist, reddish brown, fine grained sandy CLAY, oxidized.	
55									
60			4 8 36						
						"SM"		**CRETACEOUS GABBRO:** Very dense, slightly moist, dark reddish gray gabbro that excavates to silty fine to medium grained SAND, oxidized, severely weathered.	
65			50/6"						
								Total Depth: 65.5' Groundwater encountered at approximately 14.1 feet Backfilled with bentonite grout capped with chips	
70									
75									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~302 FEET

BORING: B-85

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, massive, friable.	
5									
10			3 5 8					Medium to coarse grained sand	
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~299 FEET

BORING: B-86

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, massive, friable.	
10			4 6 5					Fine to coarse grained sand	
15			3 4 5					Becomes very moist	
								Total Depth: 16.5' No Groundwater Encountered	

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~300 FEET

BORING: B-87

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, massive, friable.	
						CL/SC		Medium stiff or loose, moist, dark brown, fine grained sandy CLAY/ clayey SAND.	
5								Total Depth: 5' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~298 FEET

BORING: B-88

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, massive, friable.	
5									Total Depth: 5' No Groundwater Encountered	
10										
15										
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~297 FEET

BORING: B-89

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM/SP		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty to poorly graded fine grained SAND, massive, friable.	
5		■	1 1 1					Gravel	
10								Groundwater encountered at approximately 13 feet	
15		■	3 2 2					Total Depth: 16.5' Groundwater encountered at approximately 13 feet Backfilled with bentonite chips	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~296 FEET

BORING: B-90

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM/SP		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty to poorly graded fine grained SAND, massive, friable.	
5						SM/ML		Loose or soft, moist, dark grayish brown, silty fine grained SAND, sandy SILT.	
								Becomes reddish brown	
10			6 6 5		11.0				M, AL
								Groundwater encountered at approximately 12 feet	
						CL-ML		Medium stiff, moist, dark grayish brown, silty CLAY with trace fine to medium grained sand.	
15			2 2 4		19.0				M, AL
								Total Depth: 16.5' Groundwater encountered at approximately 12 feet Backfilled with bentonite chips	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 3
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/31/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~296 FEET

BORING: B-92

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, friable, massive, micaceous.	
5						SP-SM		Loose, moist, reddish brown, poorly graded fine to medium grained SAND with silt, friable.	
10			2 3 5		▼			Groundwater encountered at approximately 12 feet	
						SM		Loose, wet, brown, silty fine to medium grained SAND.	
15			2 1 2						
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH		DRILLER:	BAJA EXPLORATION	SHEET:	2 of 4	
CTE JOB NO:	10-13509G		DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/31/2017	
LOGGED BY:	AJB		SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~296 FEET	

BORING: B-92

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25			1 1 2	108.4	21.9	SM		Loose, wet, brown, silty fine to medium grained SAND.	MD, AL
30						CL		**<u>QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS</u>:** Hard, moist, reddish broan, fine to medium grained SAND, oxidized, massive.	
35			9 14 18						
40									
45			9 14 28					Carbonate nodules	M, AL
50									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	3 of 4
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/31/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~296 FEET

BORING: B-92

Depth (Feet)	Sample Bulk	Sample Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
50							CL		Hard, moist, reddish brown, fine to medium grained SAND, oxidized, massive.	
55										
60										
65										
70										
75										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	4 of 4
CTE JOB NO:	10-13509G	DRILL METHOD:	HOLLOW-STEM (CME-95)	DRILLING DATE:	1/31/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~296 FEET

BORING: B-92

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
75			10 17 50/5"			CL		Hard, moist, reddish brown, fine to medium grained SAND, oxidized, massive.	
						"SM"		**CRETACEOUS GABBRO:** Very dense, slightly moist, dark reddish gray gabbro that excavates to silty fine to medium grained SAND, oxidized, severely weathered.	
								Total Depth: 76.3' Groundwater encountered at approximately 12 feet Backfilled with bentonite grout capped with chips	
80									
85									
90									
95									
100									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~295 FEET

BORING: B-93

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, very moist, dark brown, clayey fine to medium grained SAND.	
						SM		Loose, moist, dark reddish brown, silty fine grained SAND, oxidized.	
						CL		Medium stiff, moist, dark reddish brown, fine grained sandy CLAY, oxidized.	
						SC		Loose, moist, dark brown, clayey fine grained SAND.	
5						SW		Loose, wet, reddish brown, well graded SAND, friable, massive. Becomes very moist to wet at approximately 7.5 feet	
10								Total Depth: 9.3' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~296 FEET

BORING: B-94

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, friable.	
5								Becomes very moist to wet Fine gravel interbed	
10								Total Depth: 10.0' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	1/25/2017
LOGGED BY:	DAK			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~293 FEET

BORING: B-95

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine grained SAND, friable, massive.	
5									
						SP/SM		Loose, wet, grayish brown, poorly graded to silty fine to medium grained SAND.	
10		■	2 3 4						
15						SM		Loose, wet, brown, silty fine grained SAND with medium to coarse grains.	
		■	1 1 1						
20								Total Depth: 19.5' No Groundwater Encountered Backfilled with bentonite grout capped with chips	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~293 FEET

BORING: B-96

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, friable.	
5									Becomes very moist to wet	
10									Total Depth: 8.1' No Groundwater Encountered	
15										
20										
25										

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~292 FEET

BORING: B-97

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, very moist, dark brown, silty fine to medium grained SAND.	
						SM/ML		Loose or medium stiff, very moist, dark brown, silty fine to medium grained SAND/ sandy SILT.	
						SM		Loose, moist, dark brown, silty fine to medium grained SAND, friable.	
5						SP-SM		Loose, moist, reddish gray, poorly graded fine to medium grained SAND with silt, friable.	
						SM		Loose, moist, dark reddish brown, silty fine to medium grained SAND, oxidized, micaceous.	
10								Total Depth: 10' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~290 FEET

BORING: B-98

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, friable.	
5								Total Depth: 5.0' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	RJ	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	1/24/2017
LOGGED BY:	RJ	SAMPLE METHOD:	BULK	ELEVATION:	~288 FEET

BORING: B-99

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark brown, silty fine grained SAND, friable.	
5								Total Depth: 5.0' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~286 FEET

BORING: B-100

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine to medium grained SAND, massive, friable.	
								Becomes dark grayish brown	
5			2 3 3						GS
					▼			Groundwater encountered at approximately 8 feet	
10								Becomes medium dense and reddish gray	
15			2 5 6						GS
								Total Depth: 16.5' Groundwater encountered at approximately 8 feet Backfilled with bentonite chips	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH			DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13509G			DRILL METHOD:	TRACK-MOUNTED (LAR)	DRILLING DATE:	2/1/2017
LOGGED BY:	AJB			SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~285 FEET

BORING: B-101

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark grayish brown, silty fine to medium grained SAND, massive, friable.	
						SM/ML		Loose or medium stiff, moist, dark grayish brown, silty fine to medium grained SAND/ sandy SILT, massive, friable.	
5								Becomes light reddish brown	
10		▯	4 2 4		▼			Groundwater encountered at approximately 11 feet	
						SP		Medium dense, wet, reddish gray, poorly graded fine to medium grained SAND with trace silt, friable, massive.	
15		▯	16 15 13						GS
20								Total Depth: 20' Groundwater encountered at approximately 11 feet Backfilled with bentonite chips	
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	3/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~317 FEET

BORING: B-102

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, brown, clayey fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, light reddish brown, silty fine grained SAND, oxidized, friable.	
								Medium to coarse grained sand Trace gravel	
5								Total Depth: 5' (Refusal in dense Old Alluvial Flood Plain Deposits) No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	3/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~315 FEET

BORING: B-103

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, brown, clayey fine grained SAND.	
						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, light reddish brown, silty fine grained SAND, oxidized, friable.	
5								Total Depth: 3' (Refusal in dense Old Alluvial Flood Plain Deposits) No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	3/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~313 FEET

BORING: B-104

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY OLD ALLUVIAL FLOOD PLAIN DEPOSITS:** Medium dense, moist, reddish brown, silty fine to medium grained SAND, oxidized, friable.	
5								Total Depth: 3' (Refusal in dense Old Alluvial Flood Plain Deposits) No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	3/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~310 FEET

BORING: B-105

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark reddish brown, silty fine grained SAND, friable, micaceous.	
5									
								Becomes very moist	
10									
								Seepage encountered at approximately 13.3 feet	
						ML		Soft, wet, dark reddish brown, fine grained sandy SILT.	
15									
								Total Depth: 17.2' Seepage encountered at approximately 13.3 feet	
20									
25									

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PROJECT:	PALOMAR COLLEGE NORTH	DRILLER:	AJB	SHEET:	1 of 1
CTE JOB NO:	10-13509G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	3/1/2017
LOGGED BY:	AJB	SAMPLE METHOD:	BULK	ELEVATION:	~312 FEET

BORING: B-106

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		**QUATERNARY YOUNG ALLUVIAL FLOOD PLAIN DEPOSIT** Loose, moist, dark reddish brown, silty fine grained SAND, friable, micaceous.	
5								Becomes very moist	
10								Seepage encountered at approximately 11 feet	
15						ML		Soft, wet, dark reddish brown, fine grained sandy SILT.	
20								Total Depth: 17.2' Seepage encountered at approximately 13.3 feet	
25									

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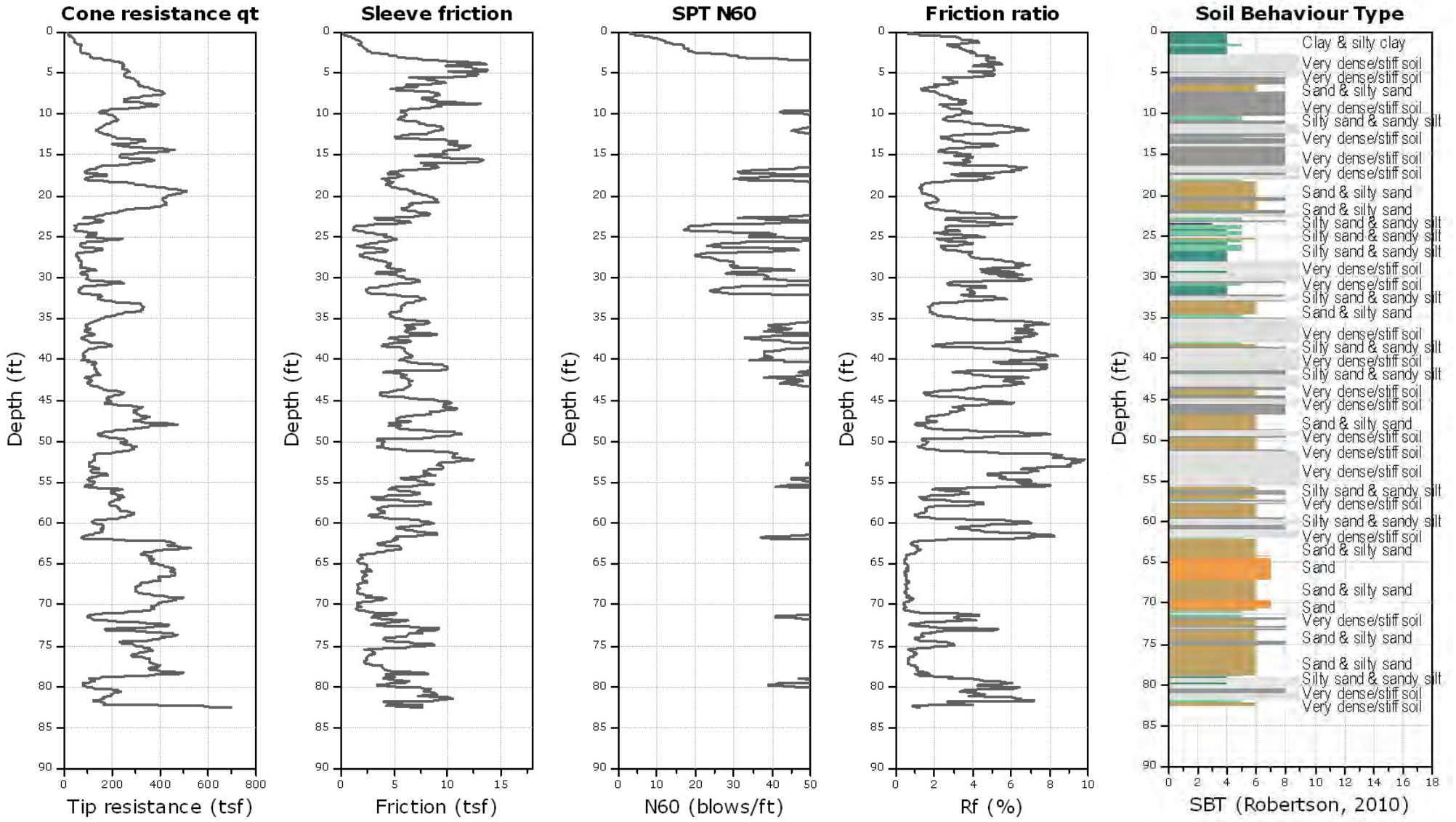
CPT-21

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 82.61 ft, Date: 2/16/2017
Cone Type: Vertek



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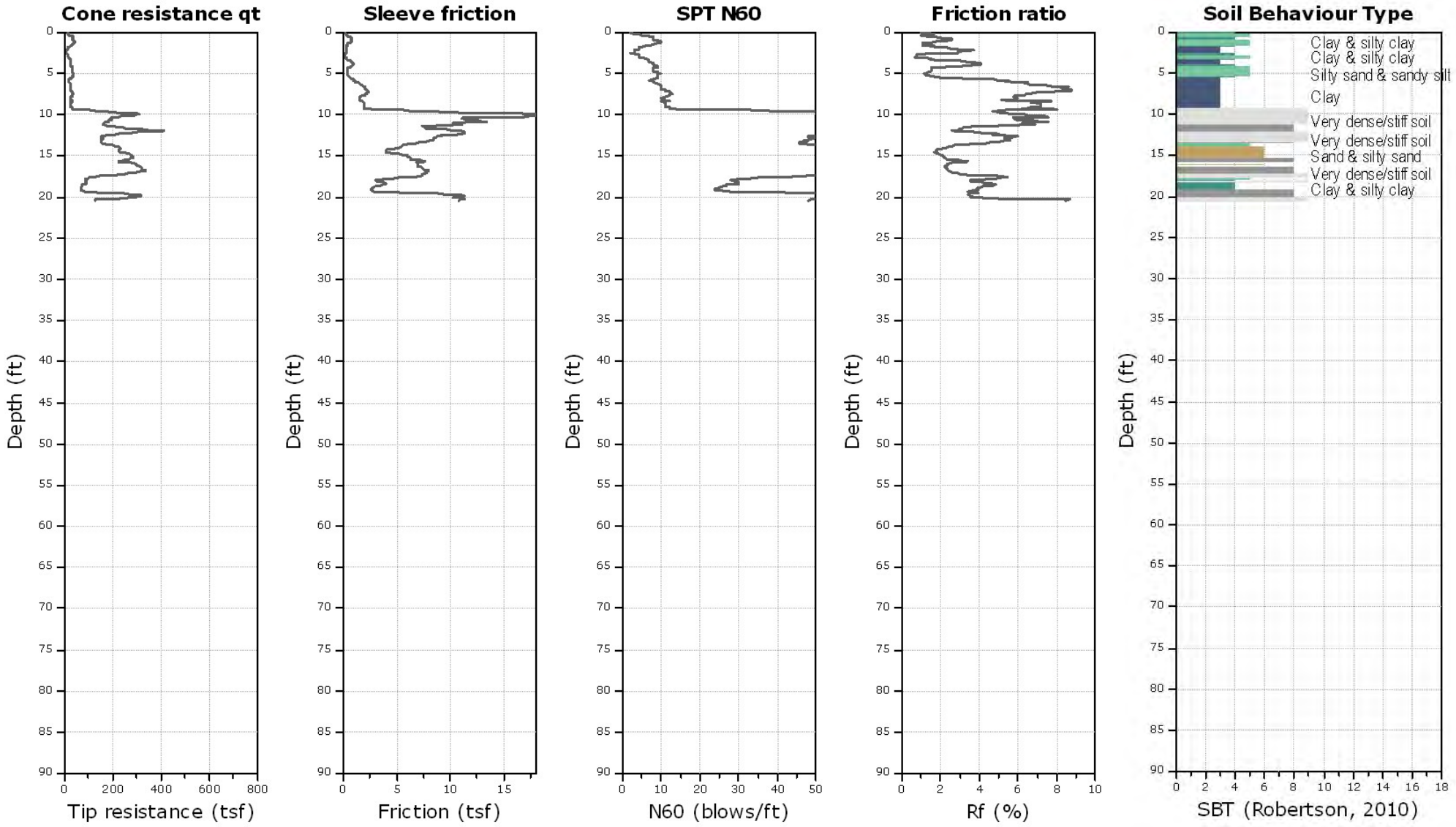
CPT-30

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 20.35 ft, Date: 2/16/2017
Cone Type: Vertek



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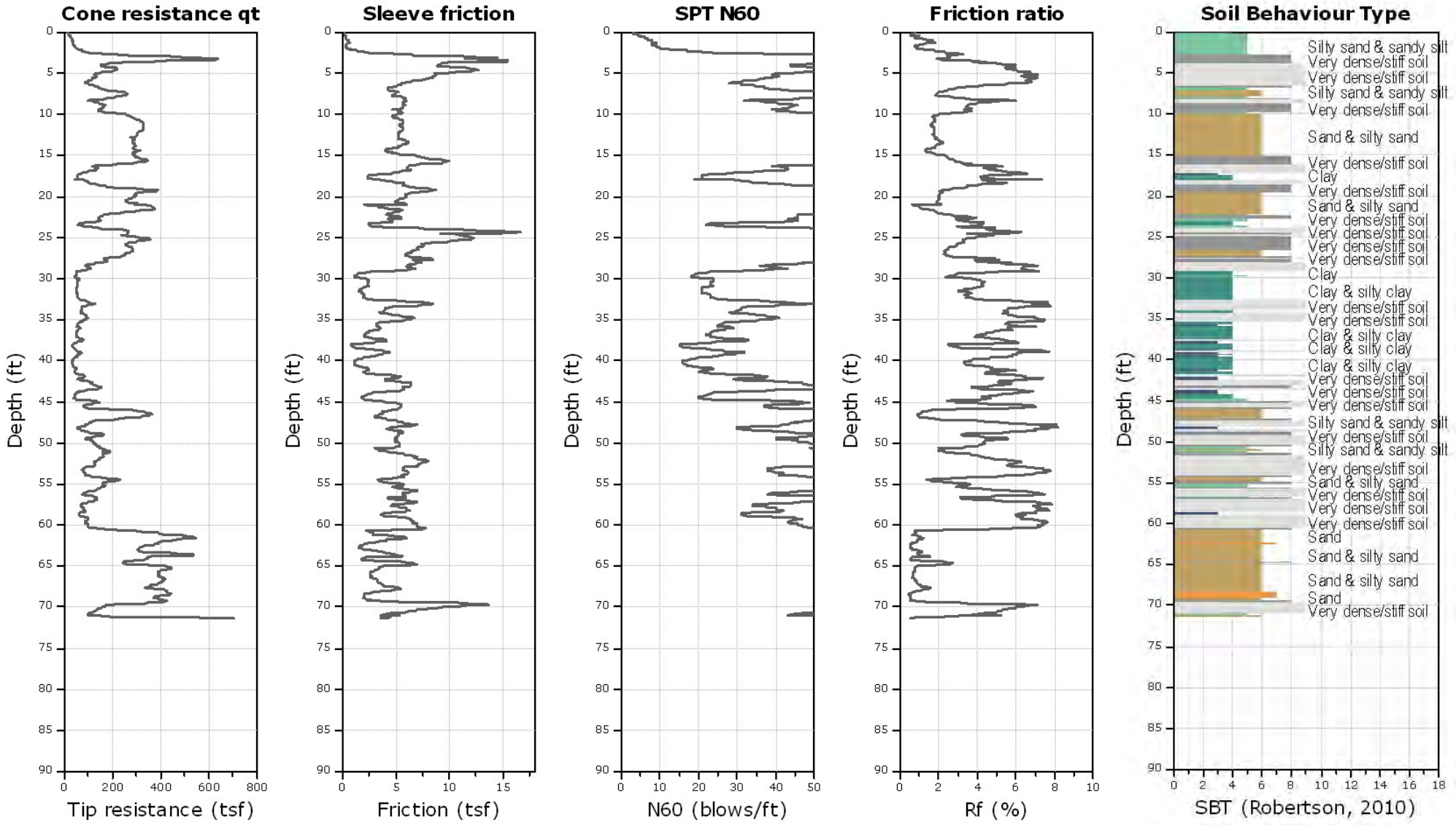
CPT-31

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 71.35 ft, Date: 2/16/2017
Cone Type: Vertek



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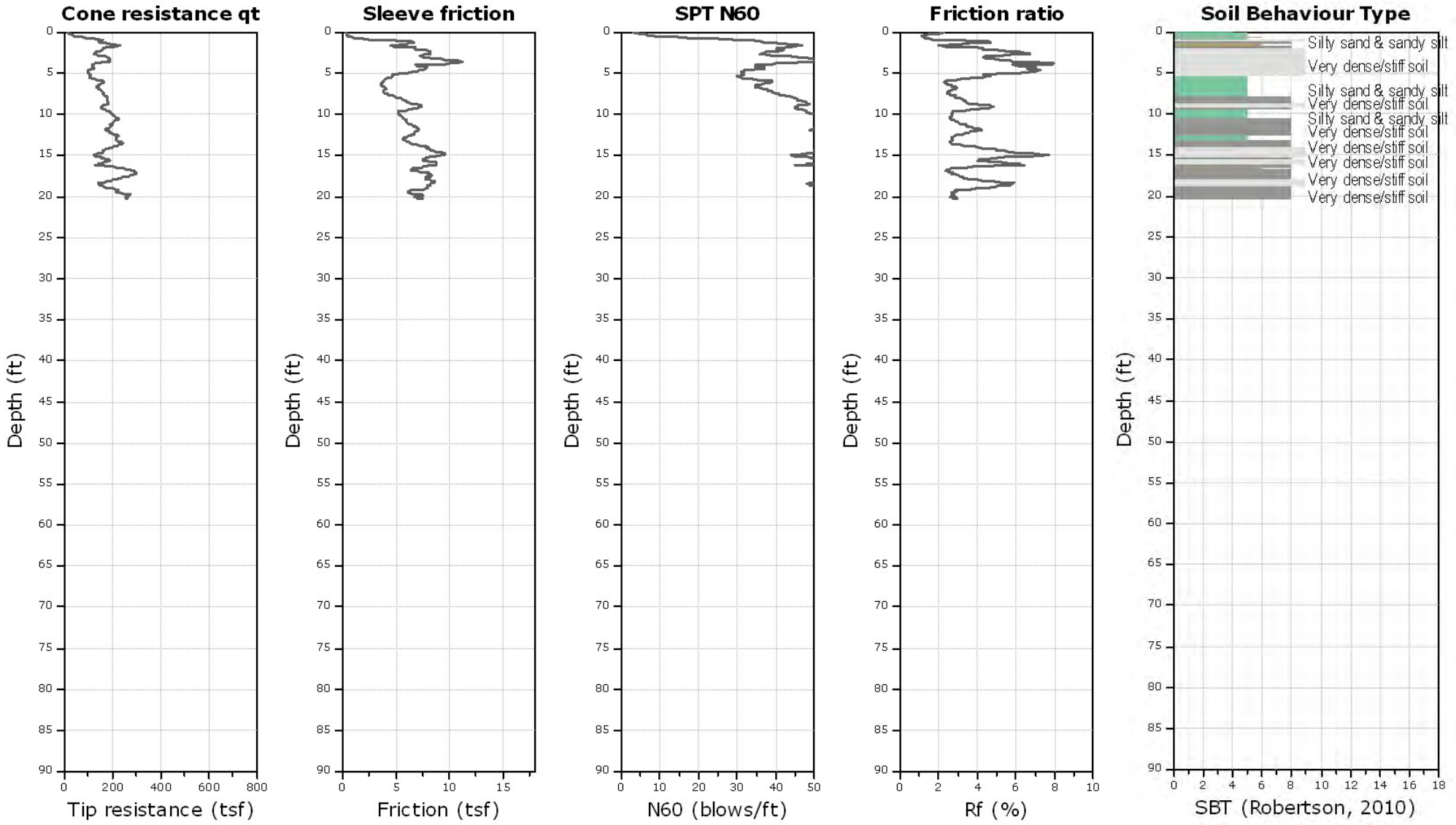
CPT-49

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 20.25 ft, Date: 2/16/2017
Cone Type: Vertek



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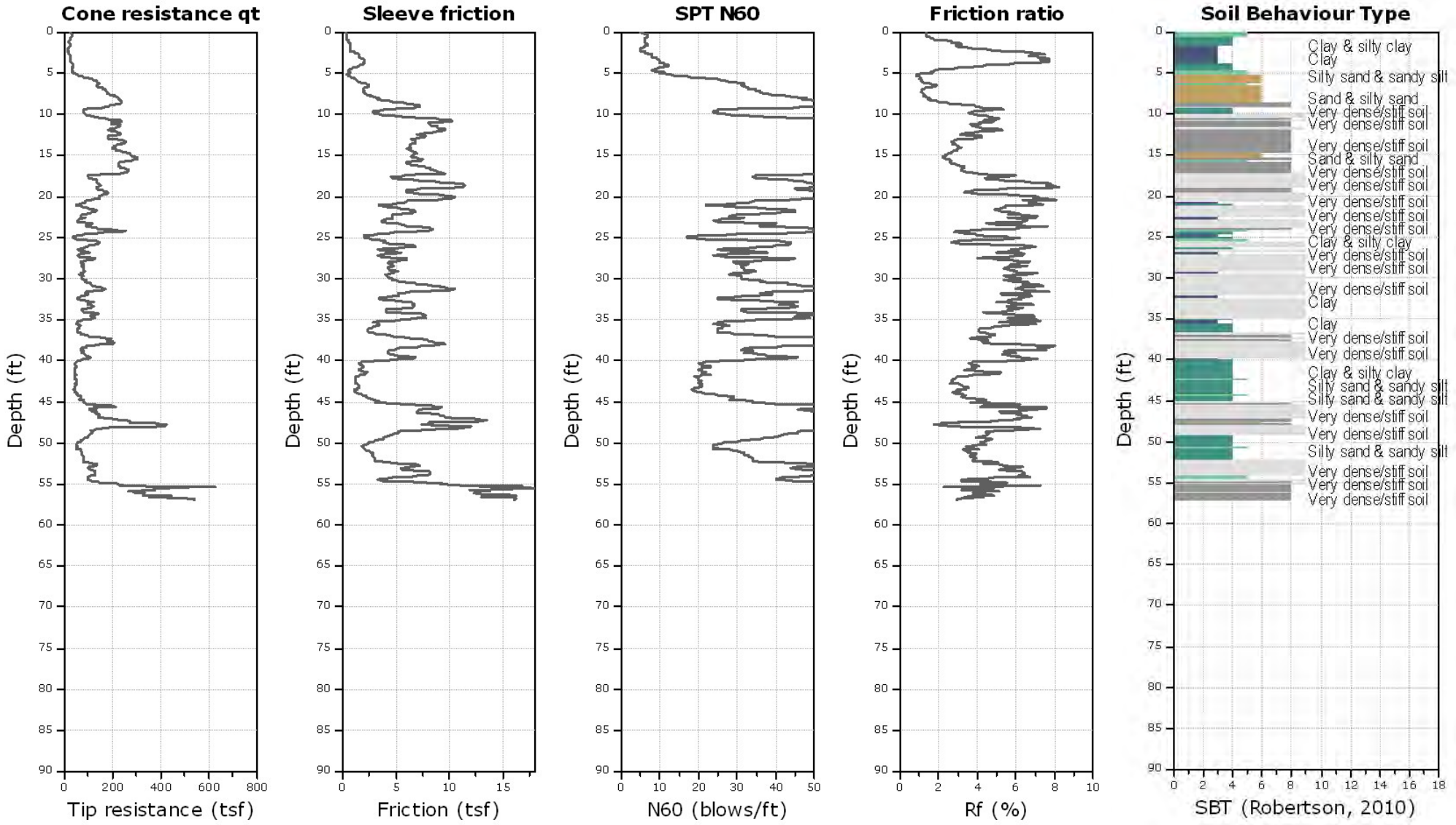
CPT-51

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 56.90 ft, Date: 2/16/2017
Cone Type: Vertek



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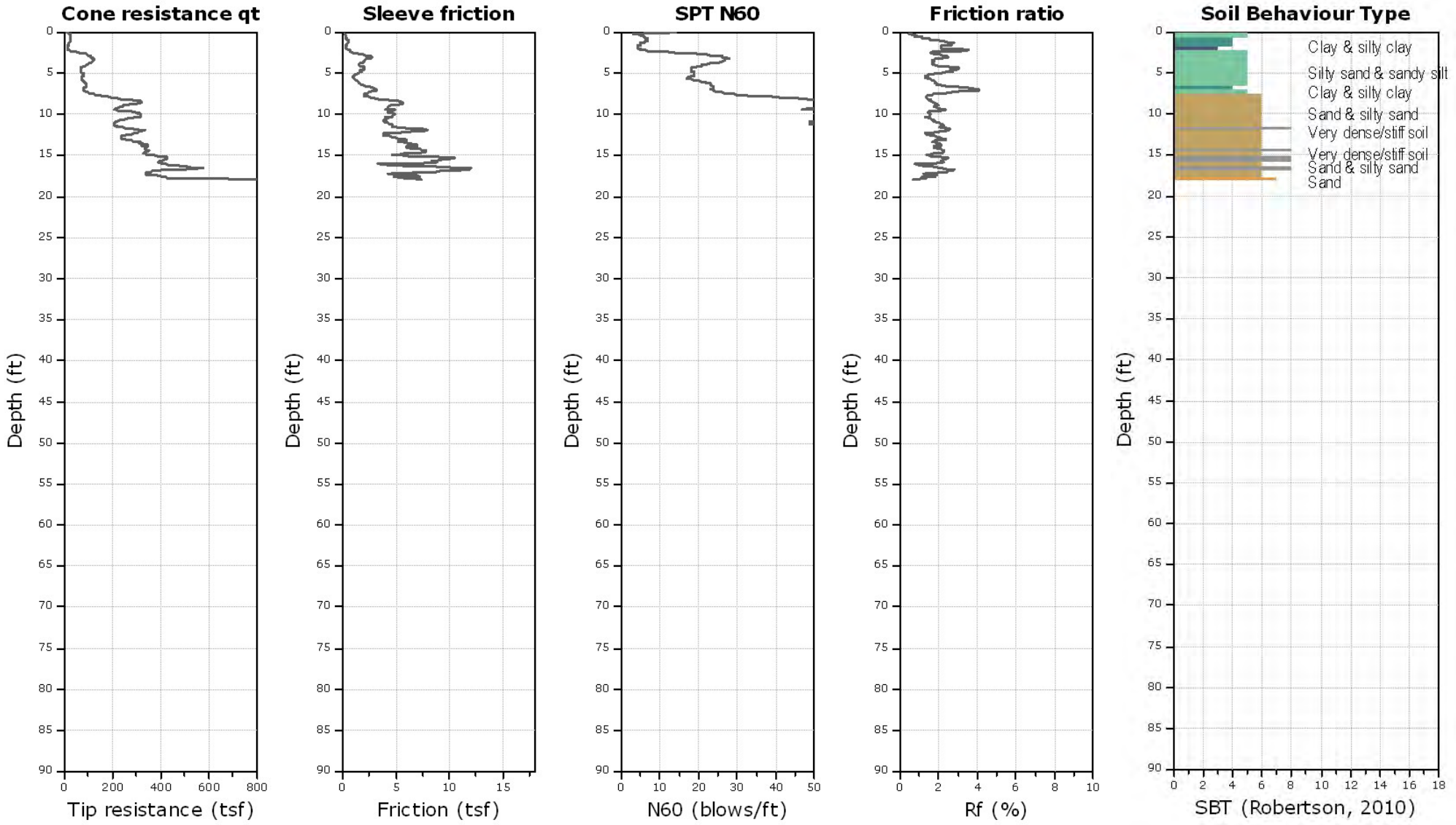
CPT-64

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 17.91 ft, Date: 2/16/2017
Cone Type: Vertek



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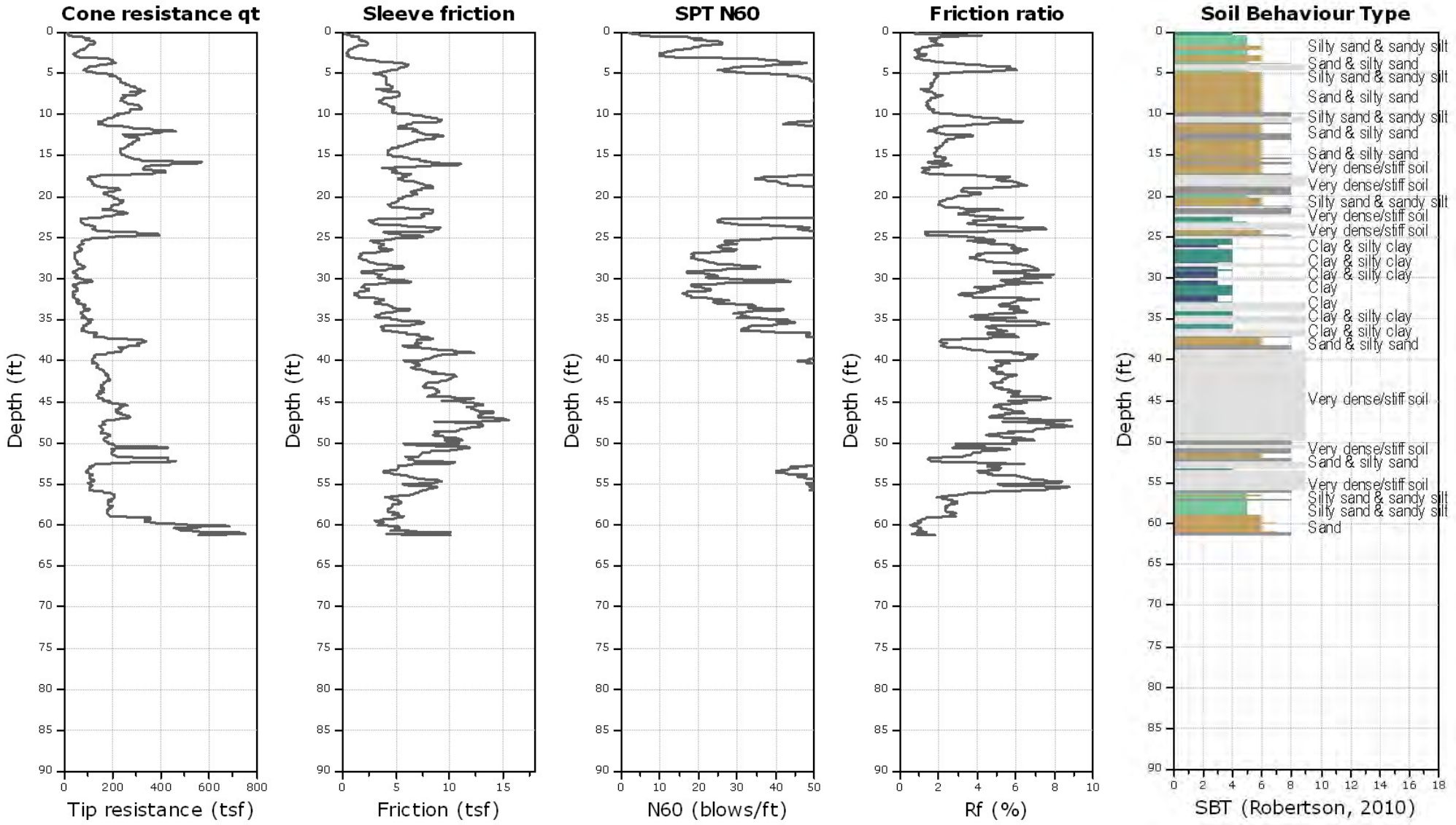
CPT-66

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 61.32 ft, Date: 2/16/2017
Cone Type: Vertek



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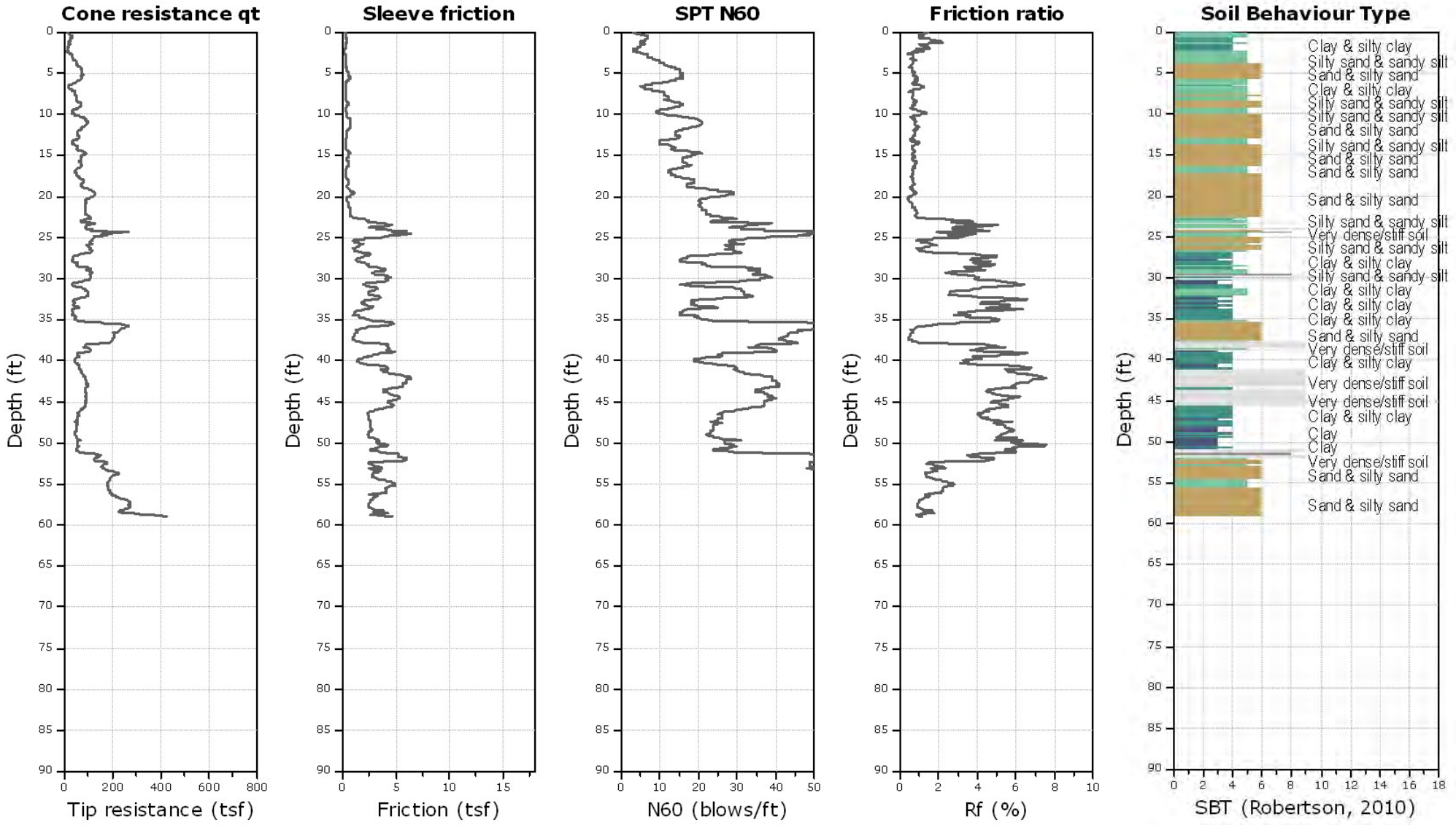
CPT-76

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 58.93 ft, Date: 2/16/2017
Cone Type: Vertek



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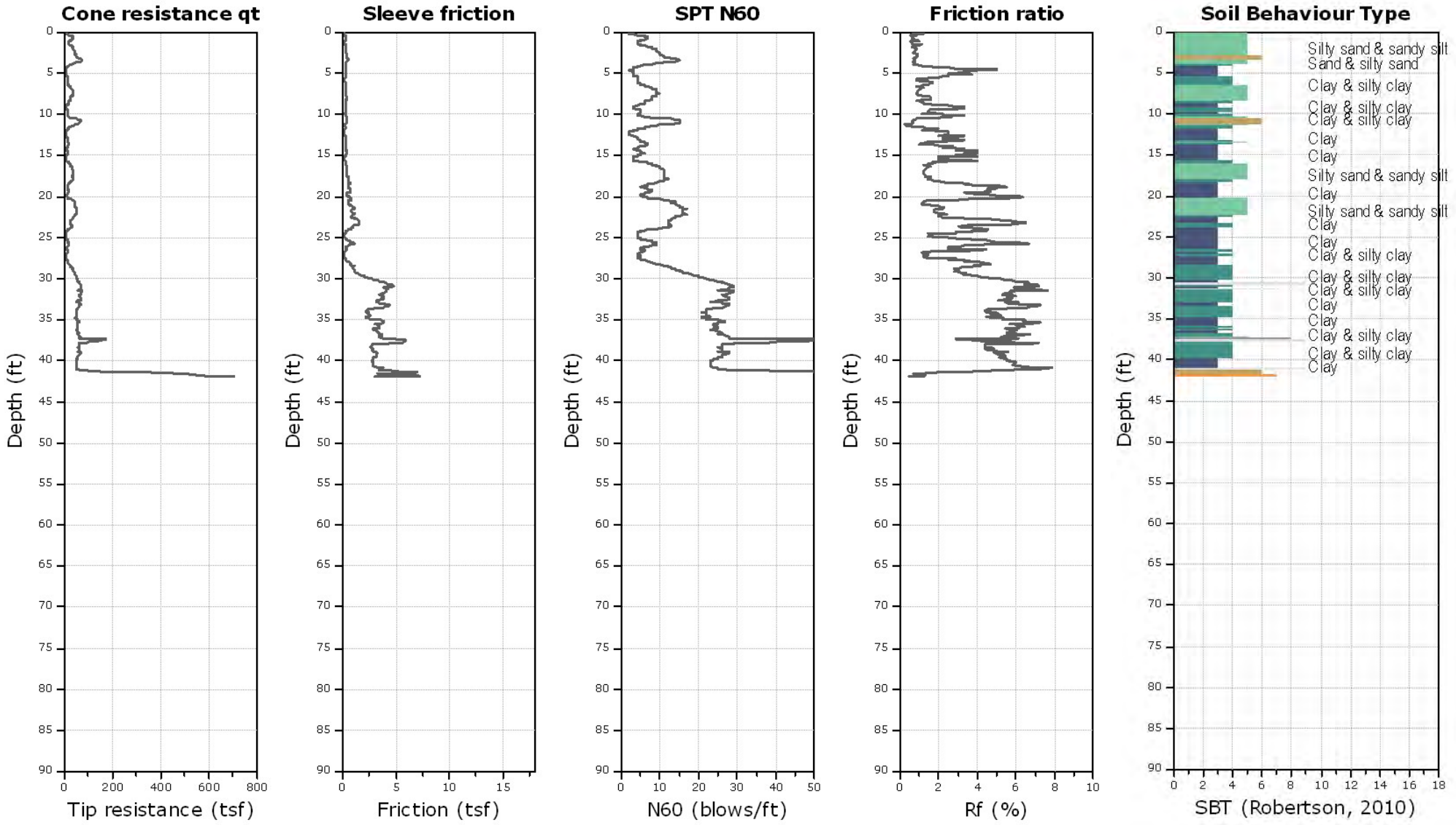
CPT-91

Project: **CTE (Construction Testing and Eng.)**
Location: **Horse Ranch Creek Rd Fallbrook, CA**

Total depth: 41.94 ft, Date: 2/16/2017
Cone Type: Vertek



APPENDIX C

LABORATORY METHODS AND RESULTS

APPENDIX C
LABORATORY METHODS AND RESULTS

Laboratory Testing Program

Laboratory tests were performed on representative soil samples to detect their relative engineering properties. Tests were performed following test methods of the American Society for Testing Materials or other accepted standards. The following presents a brief description of the various test methods used.

Classification

Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D2487. The soil classifications are shown on the Exploration Logs in Appendix B.

In-Place Moisture and Density

To determine the moisture and density of in-place site soils, a representative sample was tested for the moisture and density at time of sampling.

Expansion Index

Expansion testing was performed on selected samples of the matrix of the on-site soils according to ASTM D 4829.

Particle-Size Analysis

Particle-size analyses were performed on selected representative samples according to ASTM D 422.

Atterberg Limits

The procedure of ASTM D4518-84 was used to measure the liquid limit, plastic limit and plasticity index of representative samples.

Consolidation

To assess their compressibility and volume change behavior when loaded and wetted, relatively undisturbed samples of representative samples from the investigation were subject to consolidation tests in accordance with ASTM D 2435.

Resistance “R” Value

The resistance “R”-value was measured by the California Test. 301. The graphically determined “R” value at an exudation pressure of 300 pounds per square inch is the value used for pavement section calculation.

Chemical Analysis

Soil materials were collected with sterile sampling equipment and tested for Sulfate and Chloride content, pH, Corrosivity, and Resistivity.

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EXPANSION INDEX TEST

ASTM D 4829

LOCATION	DEPTH (feet)	EXPANSION INDEX	EXPANSION POTENTIAL
B-15	0-5	36	LOW
B-20	15	16	VERY LOW
B-45	0-5	0	VERY LOW
B-72	0-5	0	VERY LOW

IN-PLACE MOISTURE AND DENSITY

LOCATION	DEPTH (feet)	% MOISTURE	DRY DENSITY
B-12	10	5.6	N/A
B-15	10	2.6	113.3
B-16	10	9.1	N/A
B-27	20	10.8	118.7
B-41	10	6.2	115.4
B-41	20	9.4	110.4
B-41	40	17.6	N/A
B-41	45	18.7	N/A
B-41	50	13.1	N/A
B-45	10	5.6	N/A
B-50	18.5	7.2	100.7
B-57	5	3.3	106.3
B-57	30	19.7	N/A
B-57	50	17.0	N/A
B-57	55	18.0	N/A
B-57	56.5	15.0	N/A
B-57	60	19.4	N/A
B-58	10	7.1	112.5
B-60	18.5	9.8	121.4
B-69	30	17.0	N/A
B-72	18.5	9.7	N/A
B-90	10	11.0	N/A
B-90	15	19.0	N/A
B-92	25	21.9	108.4
B-92	45	15.8	N/A

RESISTANCE "R"-VALUE

CALTEST 301

LOCATION	DEPTH (feet)	R-VALUE
B-15	0-5	9
B-43	0-5	51
B-92	0-5	62

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SULFATE

LOCATION	DEPTH (feet)	RESULTS ppm
B-14	5	158.1
B-41	5	117.8

CHLORIDE

LOCATION	DEPTH (feet)	RESULTS ppm
B-14	5	69.3
B-41	5	55.1

p.H.

LOCATION	DEPTH (feet)	RESULTS
B-14	5	7.46
B-41	5	7.39

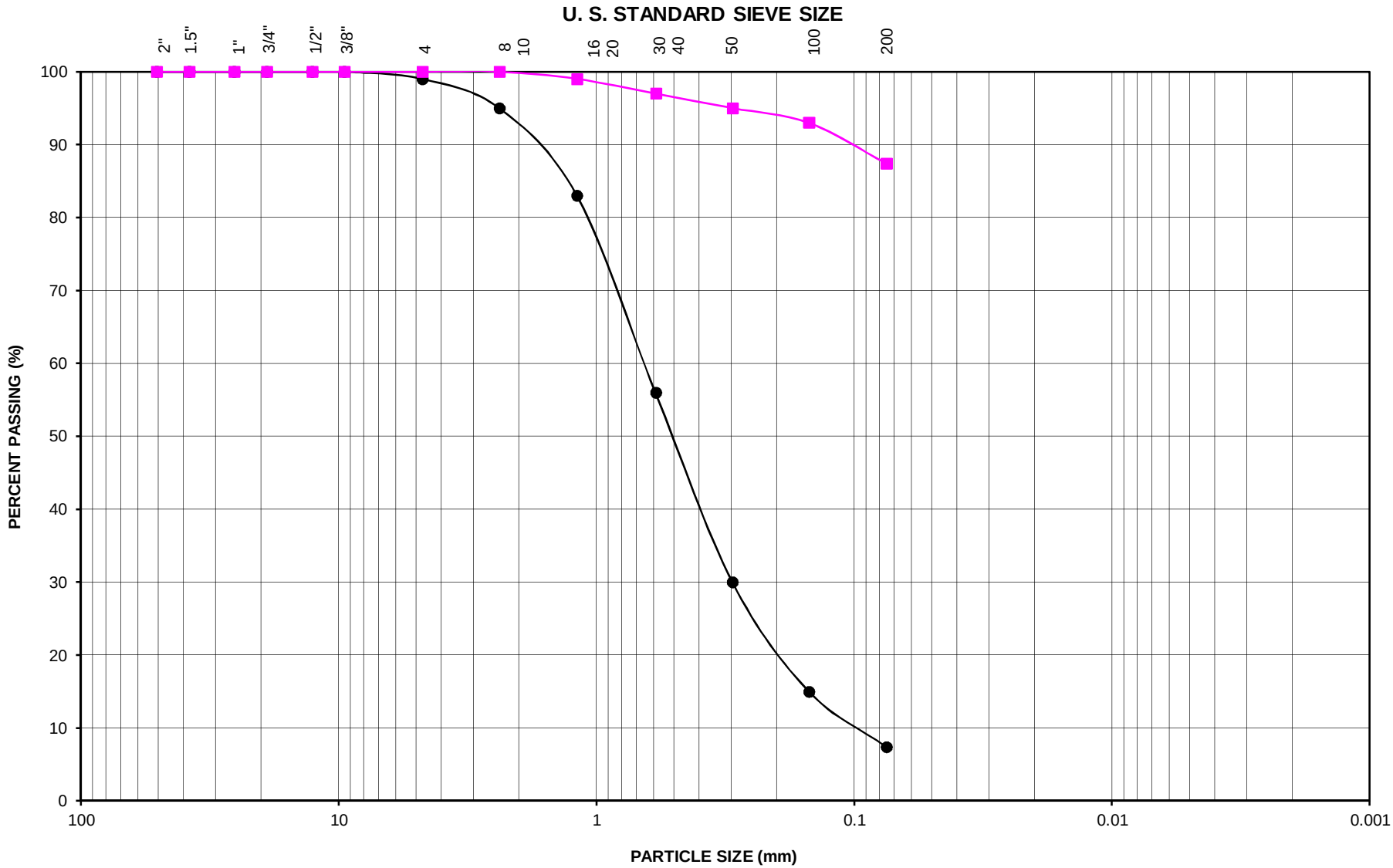
RESISTIVITY

CALIFORNIA TEST 424

LOCATION	DEPTH (feet)	RESULTS ohms-cm
B-14	5	2,620
B-41	5	5,190

ATTERBERG LIMITS

LOCATION	DEPTH (feet)	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
B-12	10	22	5	CL-ML
B-16	10	26	10	CL
B-27	20	24	12	CL
B-41	40	30	15	CL
B-41	45	44	28	CL
B-41	50	27	11	CL
B-45	10	29	15	CL
B-50	18.5	-	-	Non Plastic
B-57	30	24	7	CL-ML
B-57	50	33	14	CL
B-57	55	29	15	CL
B-57	56.5	26	12	CL
B-57	60	32	17	CL
B-60	18.5	-	-	Non Plastic
B-69	30	22	6	CL-ML
B-72	18.5	-	-	Non Plastic
B-90	10	-	-	Non Plastic
B-90	15	23	5	CL-ML
B-92	45	26	12	CL



PARTICLE SIZE ANALYSIS

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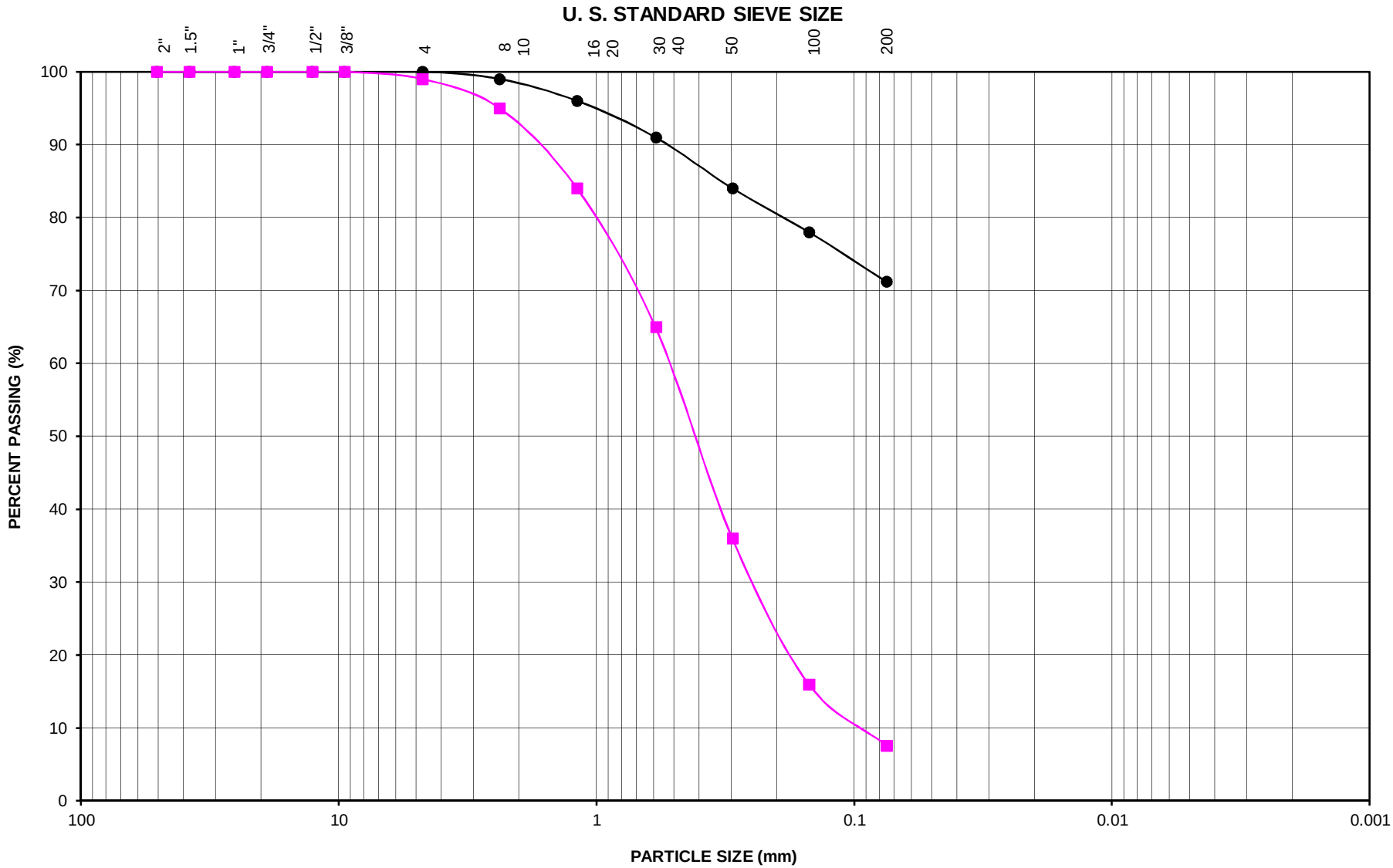
1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955

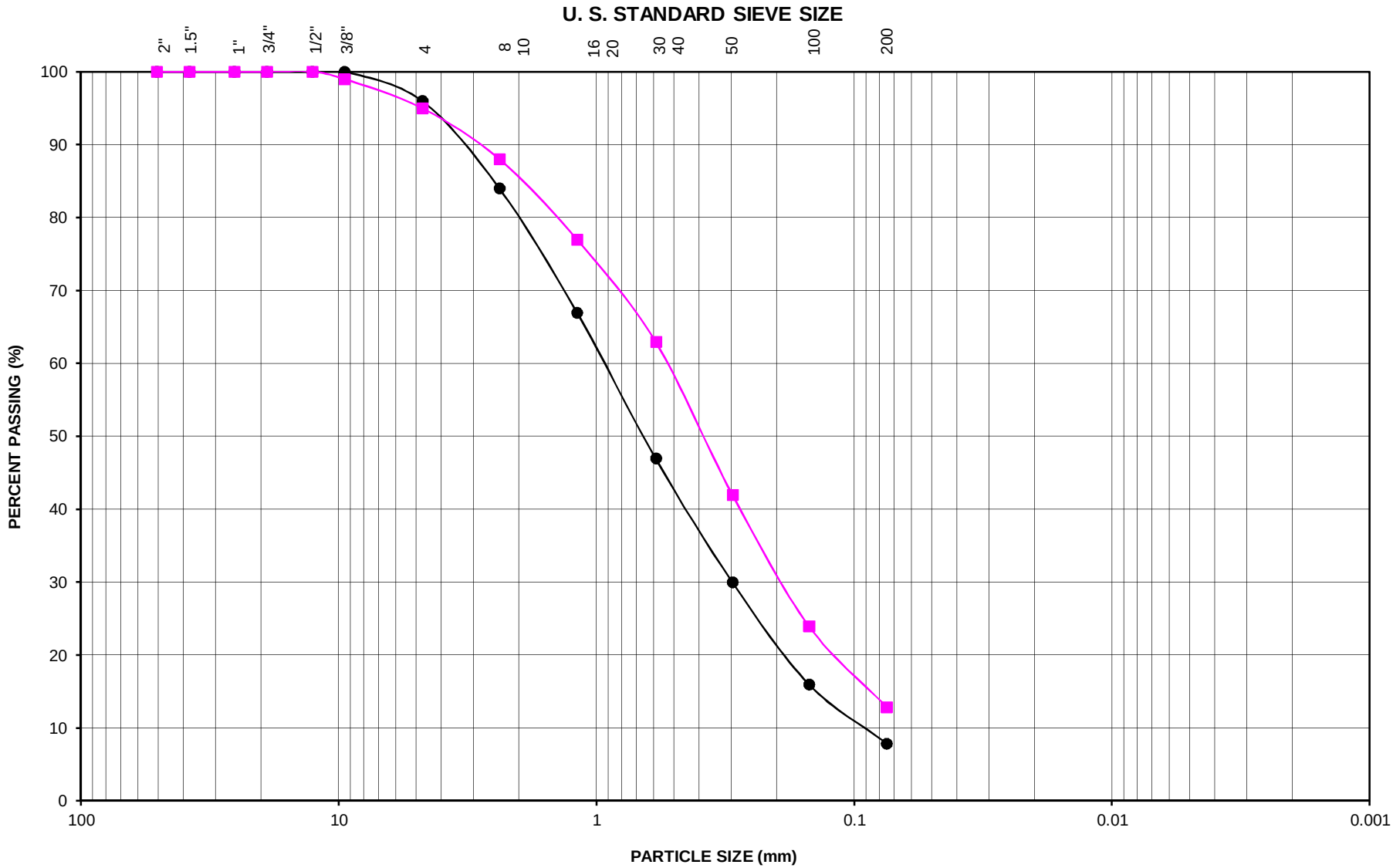
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-22	15	●	0	0	SP-SM
B-38	0-5	■	0	0	ML
CTE JOB NUMBER:		10-13509G		FIGURE:	C-1



PARTICLE SIZE ANALYSIS

CTE INC.
Construction Testing & Engineering, Inc.
1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955

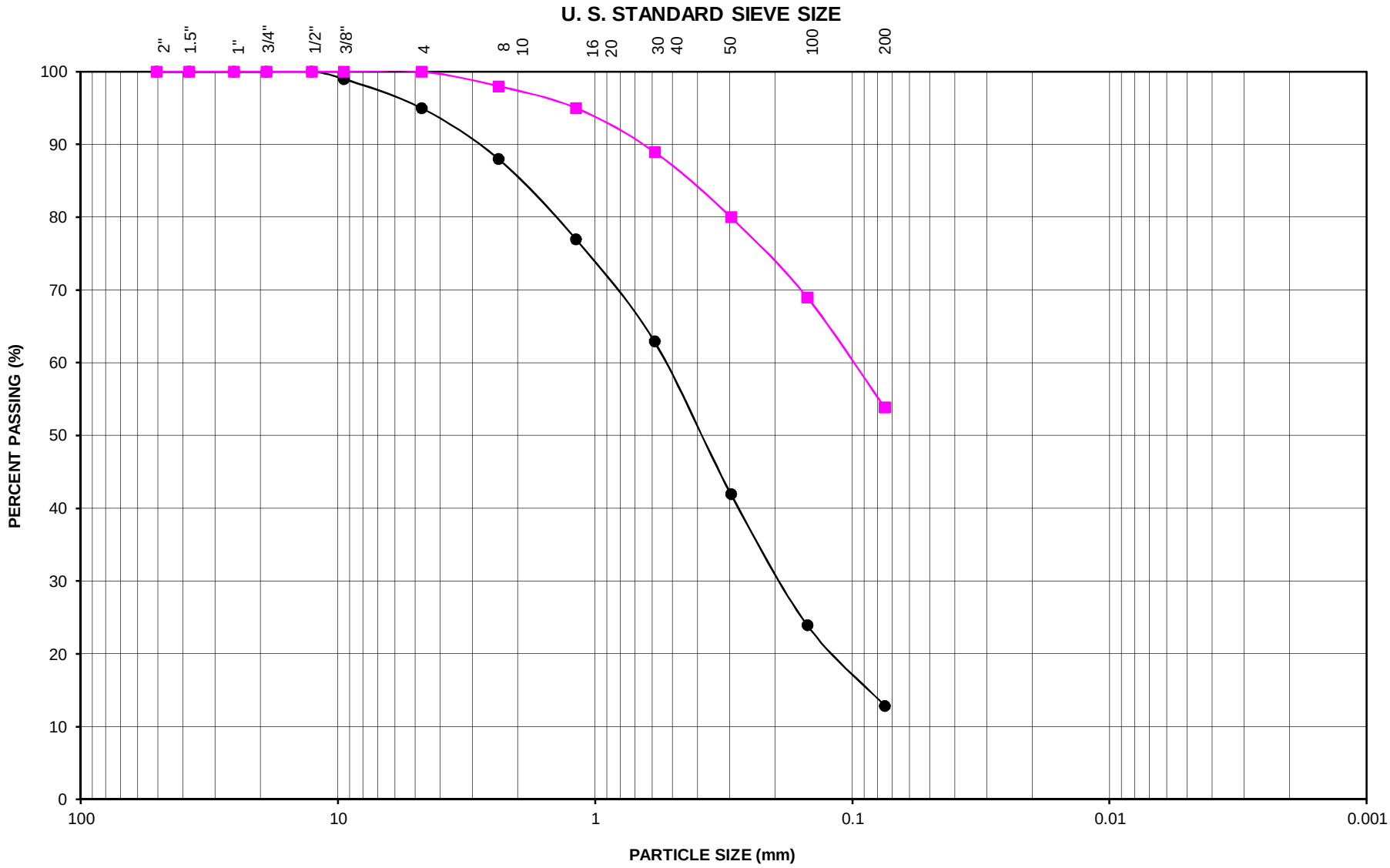
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-38	10	●	0	0	ML
B-43	5	■	0	0	SP-SM
CTE JOB NUMBER:		10-13509G		FIGURE:	C-2



PARTICLE SIZE ANALYSIS

CTE INC.
Construction Testing & Engineering, Inc.
1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955

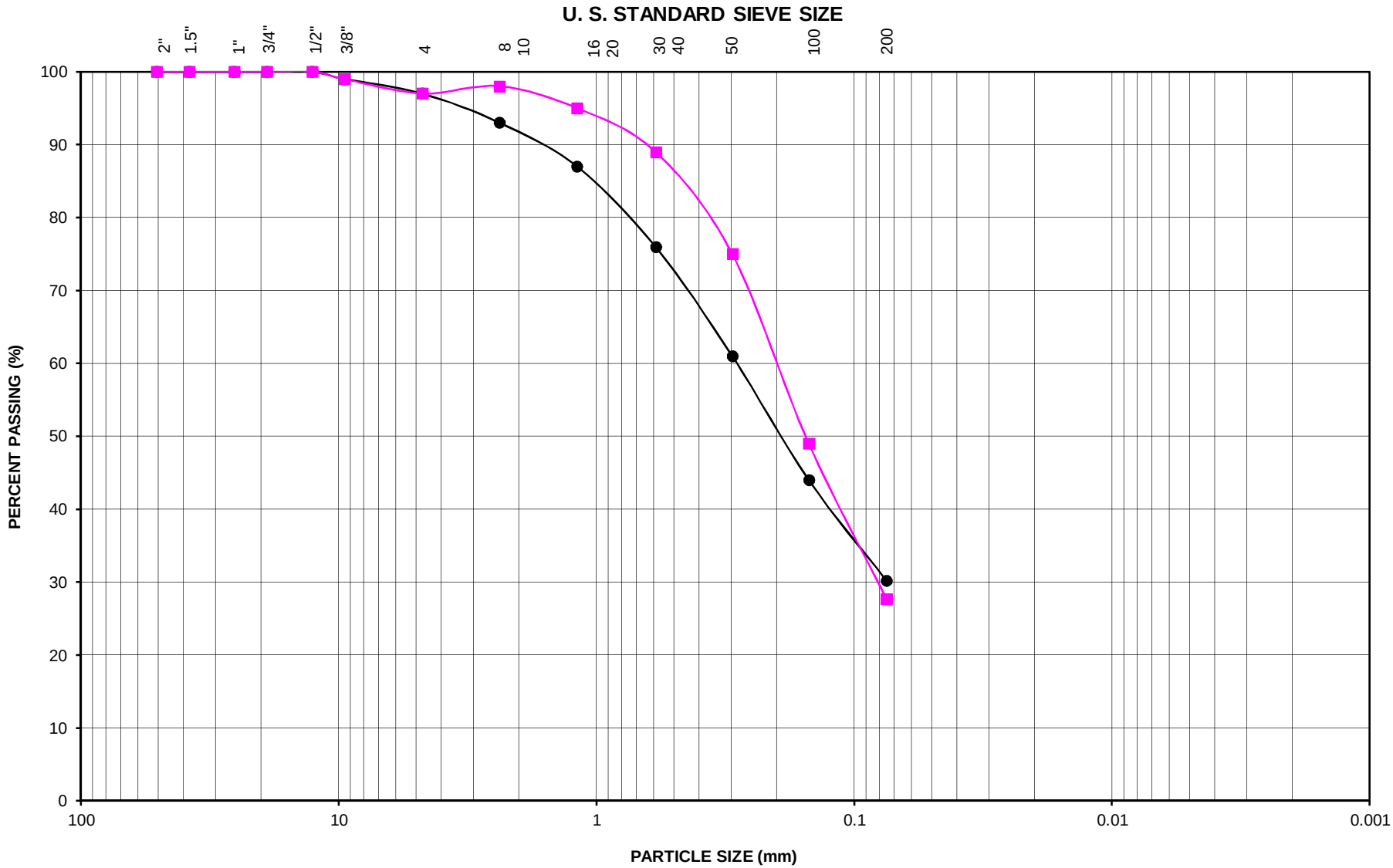
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-43	10	●	0	0	SP-SM
B-69	10	■	0	0	SM
CTE JOB NUMBER:		10-13509G		FIGURE:	C-3



PARTICLE SIZE ANALYSIS

CTE INC.
Construction Testing & Engineering, Inc.
1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955

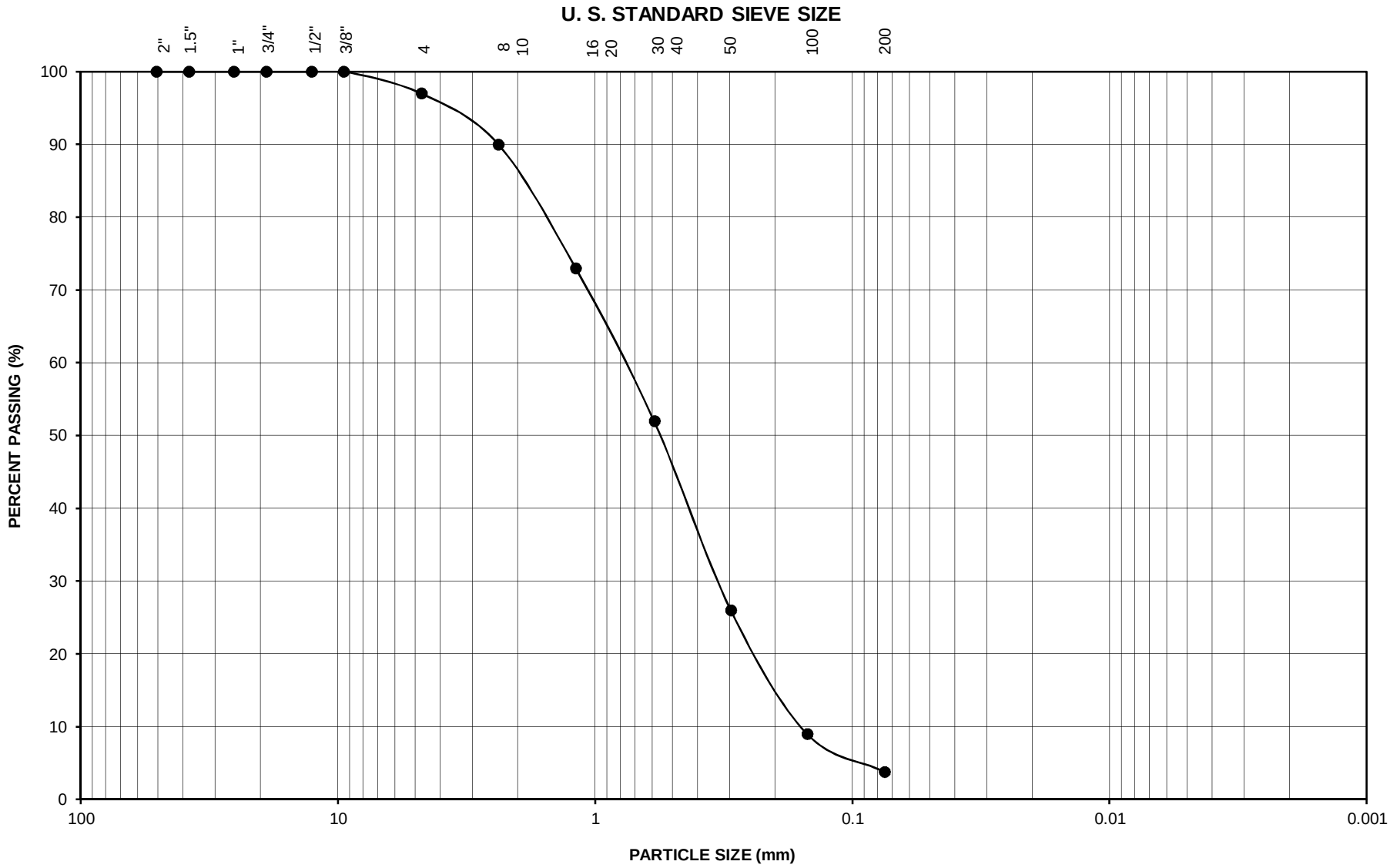
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-69	25	●	0	0	SP-SM
B-84	30	■	0	0	CL
CTE JOB NUMBER:		10-13509G		FIGURE:	C-4



PARTICLE SIZE ANALYSIS

CTE INC.
Construction Testing & Engineering, Inc.
1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955

Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-100	5	●	0	0	SM
B-100	15	■	0	0	SM
CTE JOB NUMBER:		10-13509G		FIGURE:	C-5



PARTICLE SIZE ANALYSIS

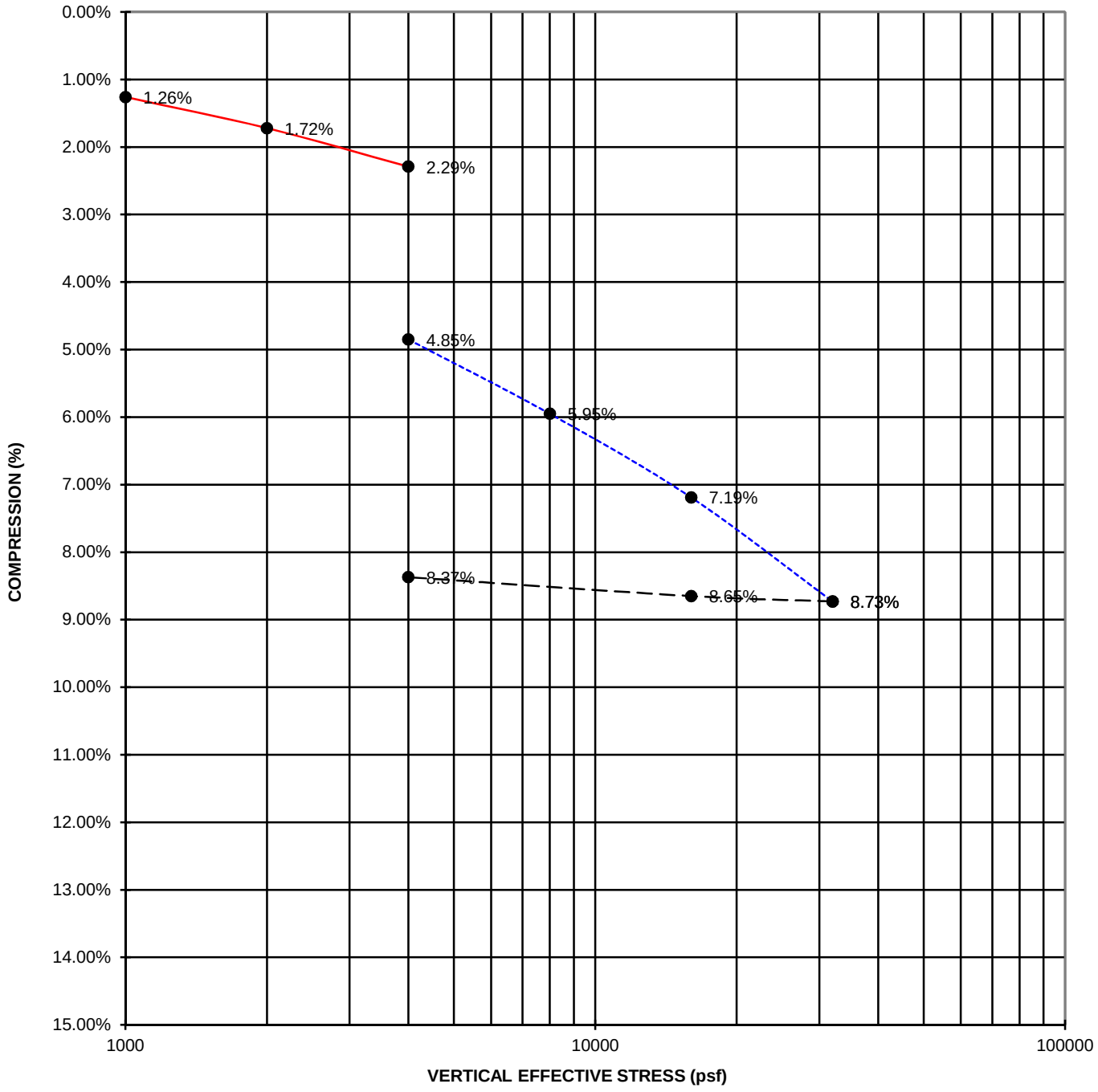
CTE INC.
Construction Testing & Engineering, Inc.
1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955

Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-101	18.5	●	0	0	SP

CTE JOB NUMBER: 10-13509G FIGURE: C-6

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

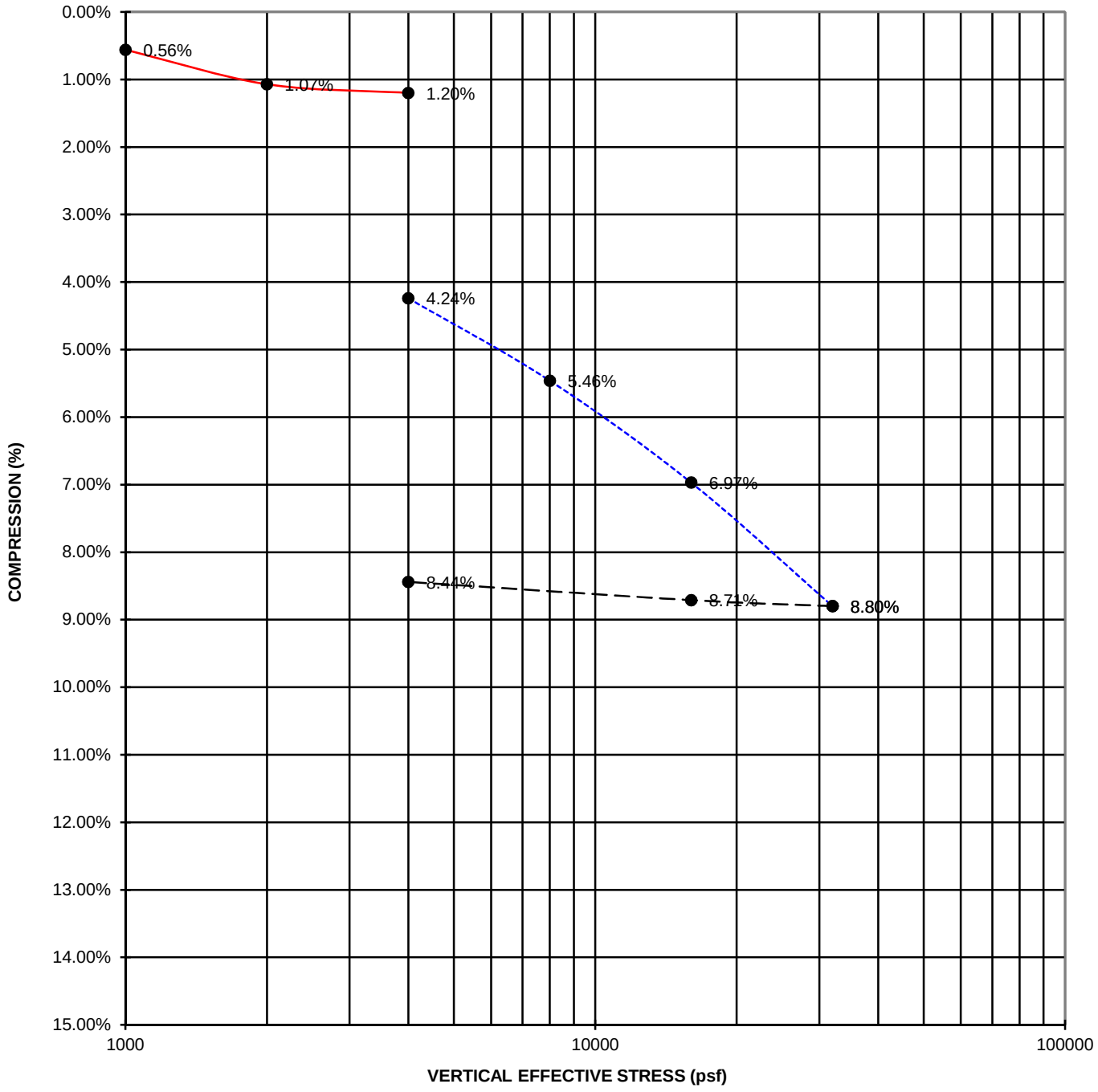


Consolidation Test ASTM D2435

Project Name:	Palomar College North Endeucation Center				
Project Number:	10-13509G	Sample Date:	2/1/2017	Initial Moisture (%):	2.6
Lab Number:	26970	Test Date:	2/6/2017	Final Moisture (%):	13.8
Sample Location:	B-15 @ 10'	Tested By:	RCV	Initial Dry Density (PCF):	113.3
Sample Description:	Moderate brown SM			Final Dry Density (PCF):	123.7

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

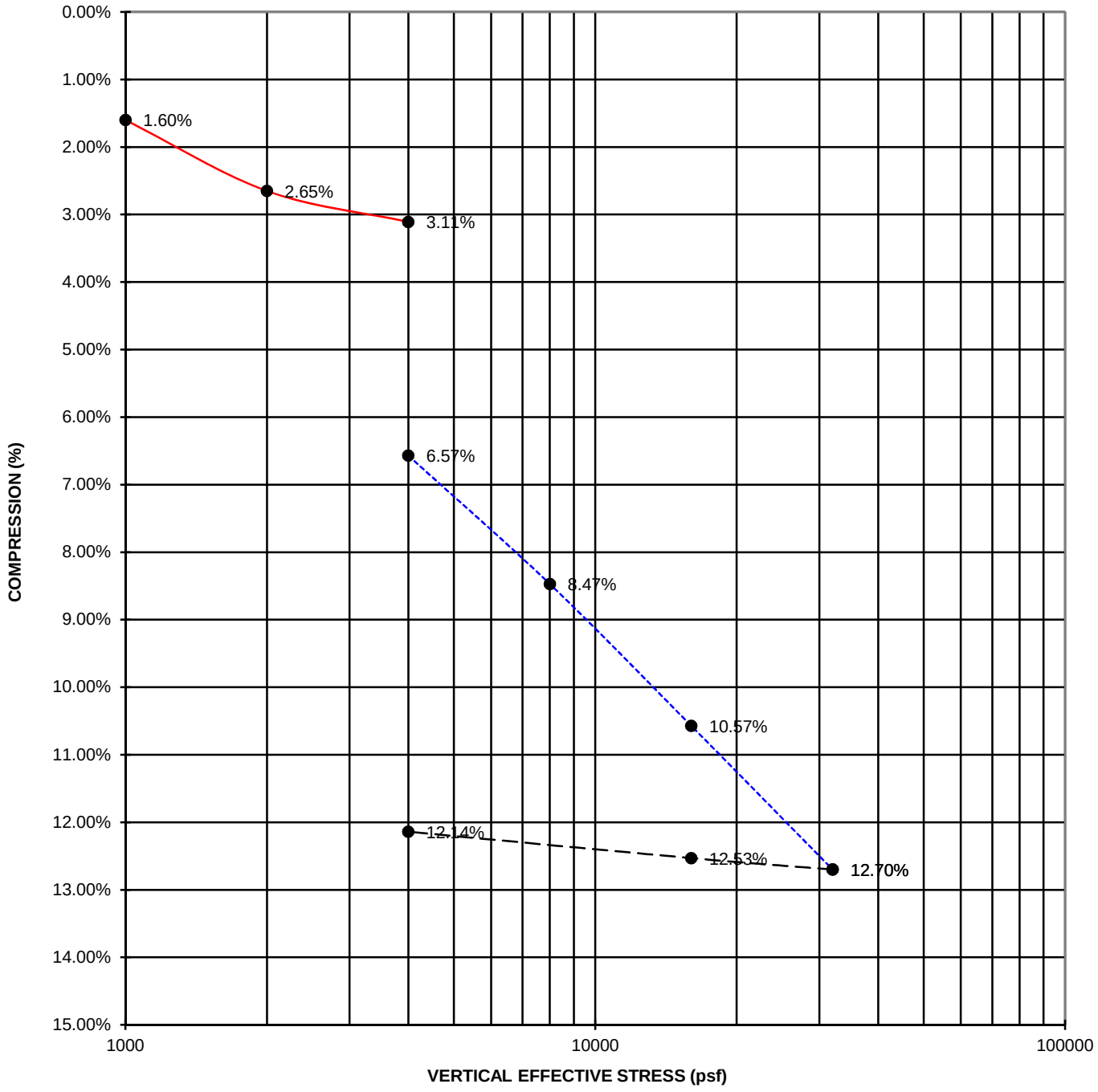


Consolidation Test ASTM D2435

Project Name:	Palomar College North Edu Center				
Project Number:	10-13509	Sample Date:	1/18/2017	Initial Moisture (%):	6.2
Lab Number:	26946	Test Date:	1/20/2017	Final Moisture (%):	12.4
Sample Location:	B-41 @ 10'	Tested By:	JNC	Initial Dry Density (PCF):	115.4
Sample Description:	Reddish Brown SM			Final Dry Density (PCF):	126.1

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

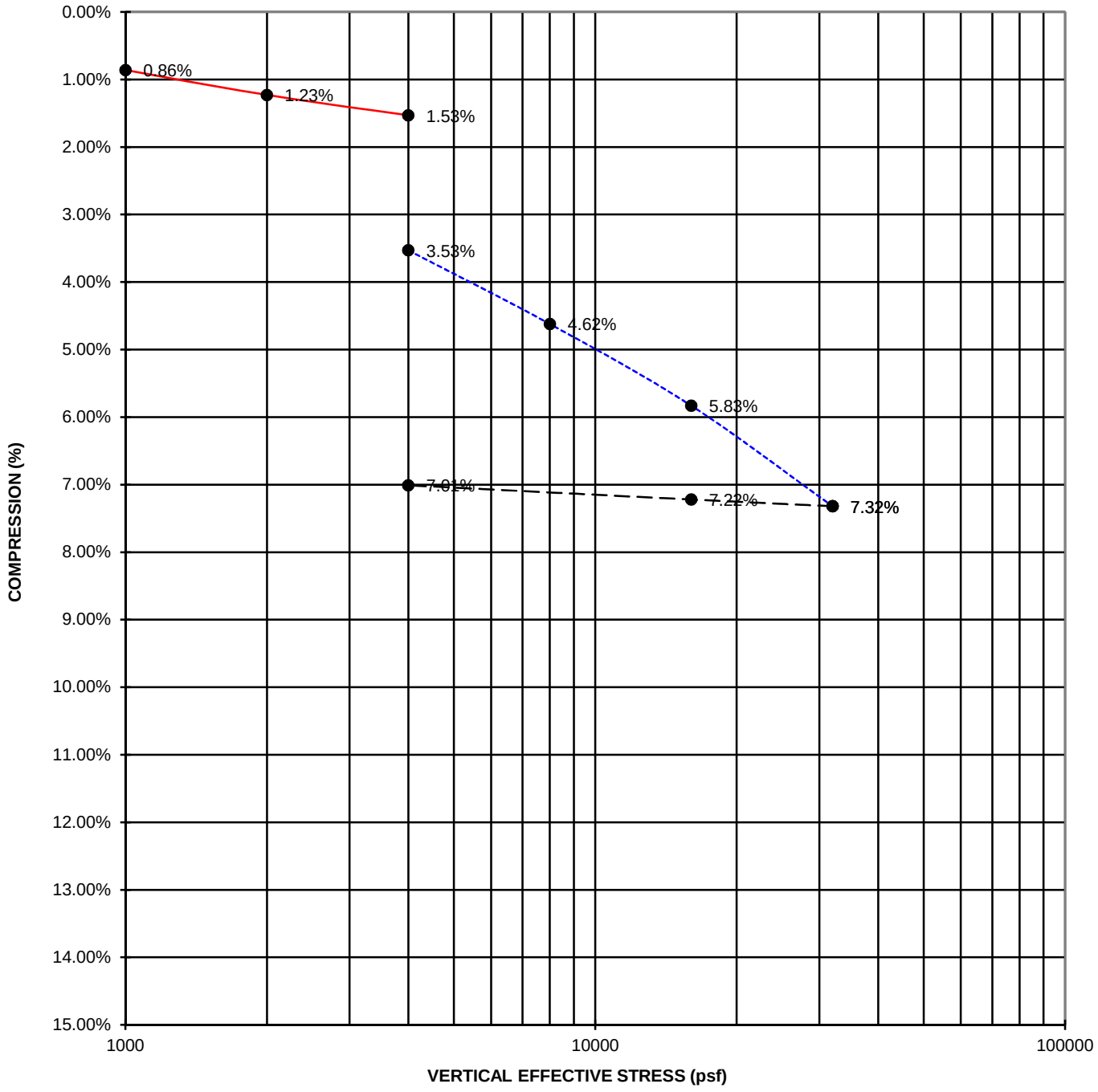


Consolidation Test ASTM D2435

Project Name:	Palomar College North Edu Center				
Project Number:	10-13509	Sample Date:	1/18/2017	Initial Moisture (%):	9.4
Lab Number:	26946	Test Date:	1/20/2017	Final Moisture (%):	13.5
Sample Location:	B-41 @ 20'	Tested By:	JNC	Initial Dry Density (PCF):	110.4
Sample Description:	Moderate brown SM			Final Dry Density (PCF):	127.5

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

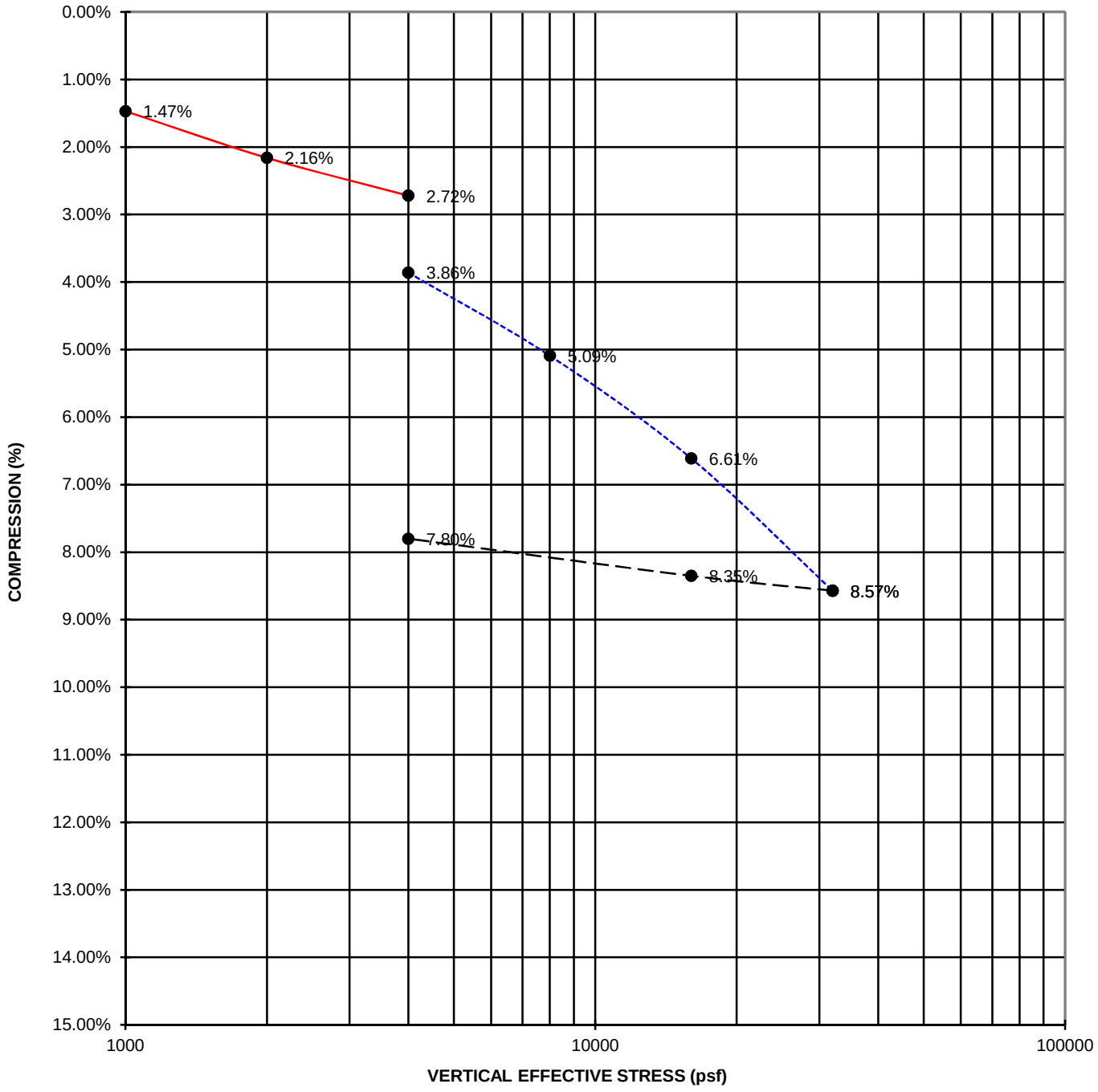


Consolidation Test ASTM D2435

Project Name:	Palomar College North Endcation Center				
Project Number:	10-13509G	Sample Date:	2/1/2017	Initial Moisture (%):	3.3
Lab Number:	26970	Test Date:	2/6/2017	Final Moisture (%):	16.1
Sample Location:	B-57 @ 5'	Tested By:	RCV	Initial Dry Density (PCF):	106.3
Sample Description:	Moderate brown SW-SM			Final Dry Density (PCF):	114.3

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

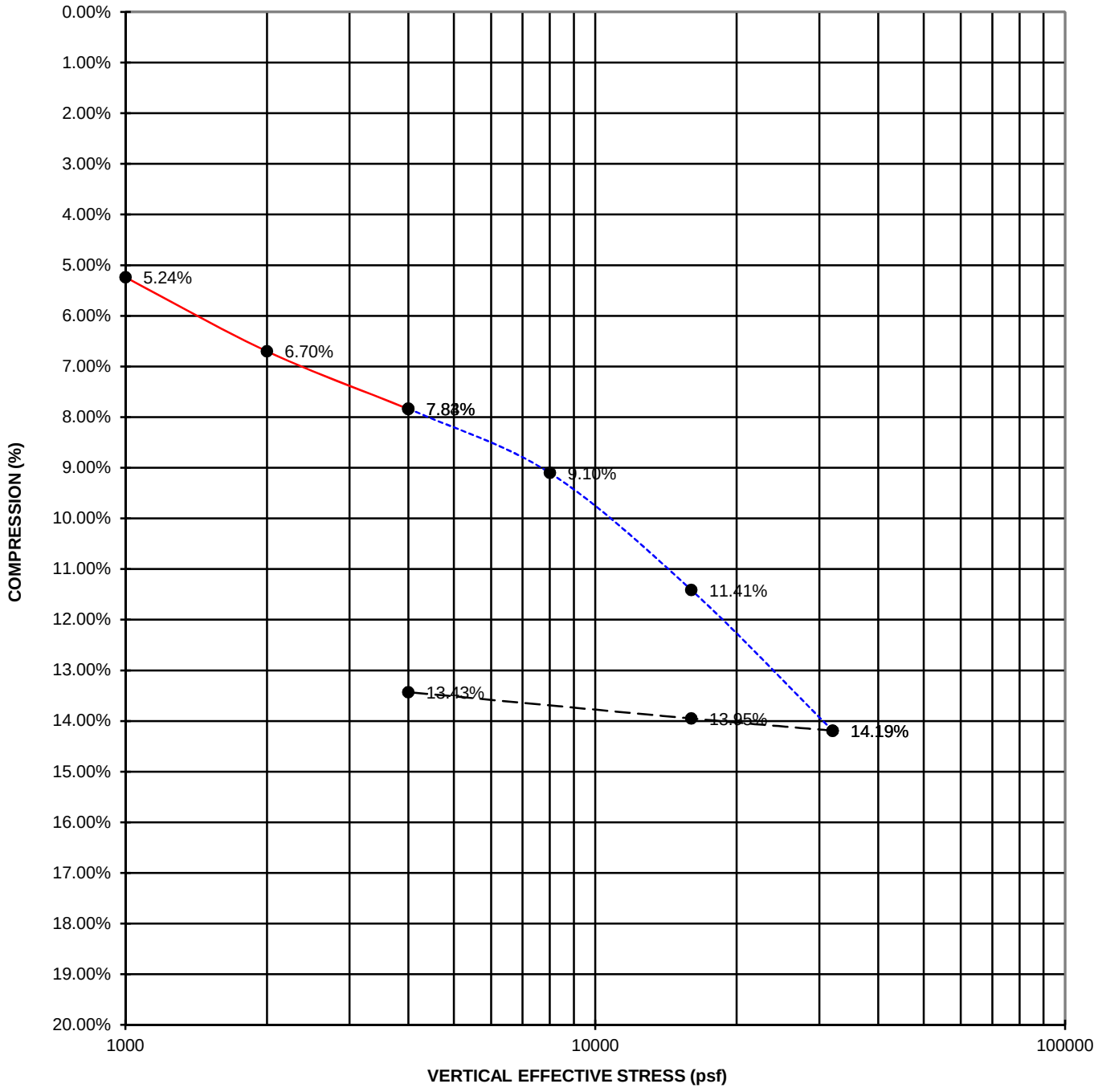


Consolidation Test ASTM D2435

Project Name:	Palomar College North Endcation Center				
Project Number:	10-13509G	Sample Date:	2/1/2017	Initial Moisture (%):	7.1
Lab Number:	26970	Test Date:	2/6/2017	Final Moisture (%):	13.3
Sample Location:	B-58 @ 10'	Tested By:	RCV	Initial Dry Density (PCF):	112.5
Sample Description:	Moderate brown SM			Final Dry Density (PCF):	121.9

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying



Consolidation Test ASTM D2435

Project Name:	Palomar College North Endcation Center				
Project Number:	10-13509G	Sample Date:	2/1/2017	Initial Moisture (%):	21.9
Lab Number:	26970	Test Date:	2/6/2017	Final Moisture (%):	11.6
Sample Location:	B-92 @ 25'	Tested By:	RCV	Initial Dry Density (PCF):	108.4
Sample Description:	Dark brown SC			Final Dry Density (PCF):	125.2

APPENDIX D

STANDARD SPECIFICATIONS FOR GRADING

Section 1 - General

Construction Testing & Engineering, Inc. presents the following standard recommendations for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications. Recommendations contained in the body of the previously presented soils report shall supersede the recommendations and or requirements as specified herein. The project geotechnical consultant shall interpret disputes arising out of interpretation of the recommendations contained in the soils report or specifications contained herein.

Section 2 - Responsibilities of Project Personnel

The geotechnical consultant should provide observation and testing services sufficient to general conformance with project specifications and standard grading practices. The geotechnical consultant should report any deviations to the client or his authorized representative.

The Client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the geotechnical consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services. During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.

The Contractor is responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including, but not limited to, earth work in accordance with the project plans, specifications and controlling agency requirements.

Section 3 - Preconstruction Meeting

A preconstruction site meeting should be arranged by the owner and/or client and should include the grading contractor, design engineer, geotechnical consultant, owner’s representative and representatives of the appropriate governing authorities.

Section 4 - Site Preparation

The client or contractor should obtain the required approvals from the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, root of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.

Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and other man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or rerouting pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the geotechnical consultant at the time of demolition.

Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the contractor from damage or injury.

Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the geotechnical consultant.

Section 5 - Site Protection

Protection of the site during the period of grading should be the responsibility of the contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the geotechnical consultant, the client and the regulating agencies.

Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas cannot be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.

Rain related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions as determined by the geotechnical consultant. Soil adversely affected should be classified as unsuitable materials and should be subject to overexcavation and replacement with compacted fill or other remedial grading as recommended by the geotechnical consultant.

The contractor should be responsible for the stability of all temporary excavations. Recommendations by the geotechnical consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and, therefore, should not be considered to preclude the responsibilities of the contractor. Recommendations by the geotechnical consultant should not be considered to preclude requirements that are more restrictive by the regulating agencies. The contractor should provide during periods of extensive rainfall plastic sheeting to prevent unprotected slopes from becoming saturated and unstable. When deemed appropriate by the geotechnical consultant or governing agencies the contractor shall install checkdams, desilting basins, sand bags or other drainage control measures.

In relatively level areas and/or slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1.0 foot; they should be overexcavated and replaced as compacted fill in accordance with the applicable specifications. Where affected materials exist to depths of 1.0 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be overexcavated and replaced as compacted fill in accordance with the slope repair recommendations herein. If field conditions dictate, the geotechnical consultant may recommend other slope repair procedures.

Section 6 - Excavations

6.1 Unsuitable Materials

Materials that are unsuitable should be excavated under observation and recommendations of the geotechnical consultant. Unsuitable materials include, but may not be limited to, dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft bedrock and nonengineered or otherwise deleterious fill materials.

Material identified by the geotechnical consultant as unsatisfactory due to its moisture conditions should be overexcavated; moisture conditioned as needed, to a uniform at or above optimum moisture condition before placement as compacted fill.

If during the course of grading adverse geotechnical conditions are exposed which were not anticipated in the preliminary soil report as determined by the geotechnical consultant additional exploration, analysis, and treatment of these problems may be recommended.

6.2 Cut Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal: vertical).

The geotechnical consultant should observe cut slope excavation and if these excavations expose loose cohesionless, significantly fractured or otherwise unsuitable material, the materials should be overexcavated and replaced with a compacted stabilization fill. If encountered specific cross section details should be obtained from the Geotechnical Consultant.

When extensive cut slopes are excavated or these cut slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top of the slope.

6.3 Pad Areas

All lot pad areas, including side yard terrace containing both cut and fill materials, transitions, located less than 3 feet deep should be overexcavated to a depth of 3 feet and replaced with a uniform compacted fill blanket of 3 feet. Actual depth of overexcavation may vary and should be delineated by the geotechnical consultant during grading, especially where deep or drastic transitions are present.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm drainage swale and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slopes of 2 percent or greater is recommended.

Section 7 - Compacted Fill

All fill materials should have fill quality, placement, conditioning and compaction as specified below or as approved by the geotechnical consultant.

7.1 Fill Material Quality

Excavated on-site or import materials which are acceptable to the geotechnical consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement. All import materials anticipated for use on-site should be sampled tested and approved prior to and placement is in conformance with the requirements outlined.

Rocks 12 inches in maximum and smaller may be utilized within compacted fill provided sufficient fill material is placed and thoroughly compacted over and around all rock to effectively fill rock voids. The amount of rock should not exceed 40 percent by dry weight passing the 3/4-inch sieve. The geotechnical consultant may vary those requirements as field conditions dictate.

Where rocks greater than 12 inches but less than four feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the recommendations below. Rocks greater than four feet should be broken down or disposed off-site.

7.2 Placement of Fill

Prior to placement of fill material, the geotechnical consultant should observe and approve the area to receive fill. After observation and approval, the exposed ground surface should be scarified to a depth of 6 to 8 inches. The scarified material should be conditioned (i.e. moisture added or air dried by continued discing) to achieve a moisture content at or slightly above optimum moisture conditions and compacted to a minimum of 90 percent of the maximum density or as otherwise recommended in the soils report or by appropriate government agencies.

Compacted fill should then be placed in thin horizontal lifts not exceeding eight inches in loose thickness prior to compaction. Each lift should be moisture conditioned as needed, thoroughly blended to achieve a consistent moisture content at or slightly above optimum and thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials and weather conditions.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal: vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least six-foot wide benches and a minimum of four feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area after keying and benching until the geotechnical consultant has reviewed the area. Material generated by the benching operation should be moved sufficiently away from

the bench area to allow for the recommended review of the horizontal bench prior to placement of fill.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benching should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface or previously compacted fill should be processed by scarification, moisture conditioning as needed to at or slightly above optimum moisture content, thoroughly blended and recompacted to a minimum of 90 percent of laboratory maximum dry density. Where unsuitable materials exist to depths of greater than one foot, the unsuitable materials should be over-excavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

Rocks 12 inch in maximum dimension and smaller may be utilized in the compacted fill provided the fill is placed and thoroughly compacted over and around all rock. No oversize material should be used within 3 feet of finished pad grade and within 1 foot of other compacted fill areas. Rocks 12 inches up to four feet maximum dimension should be placed below the upper 10 feet of any fill and should not be closer than 15 feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures or deep utilities are proposed. Oversized material should be placed in windrows on a clean, overexcavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so those successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the geotechnical consultant at the time of placement.

The contractor should assist the geotechnical consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill. The contractor should provide this work at no additional cost to the owner or contractor's client.

Fill should be tested by the geotechnical consultant for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Test D 1556-00, D 2922-04. Tests should be conducted at a minimum of approximately two vertical feet or approximately 1,000 to 2,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the geotechnical consultant.

7.3 Fill Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal: vertical).

Except as specifically recommended in these grading guidelines compacted fill slopes should be over-built two to five feet and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be overexcavated and reconstructed under the guidelines of the geotechnical consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

At the discretion of the geotechnical consultant, slope face compaction may be attempted by conventional construction procedures including backrolling. The procedure must create a firmly compacted material throughout the entire depth of the slope face to the surface of the previously compacted firm fill intercore.

During grading operations, care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately established desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope. Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not

exceeding four feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly dozer trackrolled.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished using a berm and pad gradient of at least two percent.

Section 8 - Trench Backfill

Utility and/or other excavation of trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 90 percent of the laboratory maximum density.

Within slab areas, but outside the influence of foundations, trenches up to one foot wide and two feet deep may be backfilled with sand and consolidated by jetting, flooding or by mechanical means. If on-site materials are utilized, they should be wheel-rolled, tamped or otherwise compacted to a firm condition. For minor interior trenches, density testing may be deleted or spot testing may be elected if deemed necessary, based on review of backfill operations during construction.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, the contractor may elect the utilization of light weight mechanical compaction equipment and/or shading of the conduit with clean, granular material, which should be thoroughly jetted in-place above the conduit, prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review of the geotechnical consultant at the time of construction.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the geotechnical consultant. Clean granular backfill and/or bedding are not recommended in slope areas.

Section 9 - Drainage

Where deemed appropriate by the geotechnical consultant, canyon subdrain systems should be installed in accordance with CTE's recommendations during grading.

Typical subdrains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications.

Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, and concrete swales).

For drainage in extensively landscaped areas near structures, (i.e., within four feet) a minimum of 5 percent gradient away from the structure should be maintained. Pad drainage of at least 2 percent should be maintained over the remainder of the site.

Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns could be detrimental to slope stability and foundation performance.

Section 10 - Slope Maintenance

10.1 - Landscape Plants

To enhance surficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the southern California area and plants relative to native plants are generally desirable. Plants native to other semi-arid and arid areas may also be appropriate. A Landscape Architect should be the best party to consult regarding actual types of plants and planting configuration.

10.2 - Irrigation

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.

Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.

10.3 - Repair

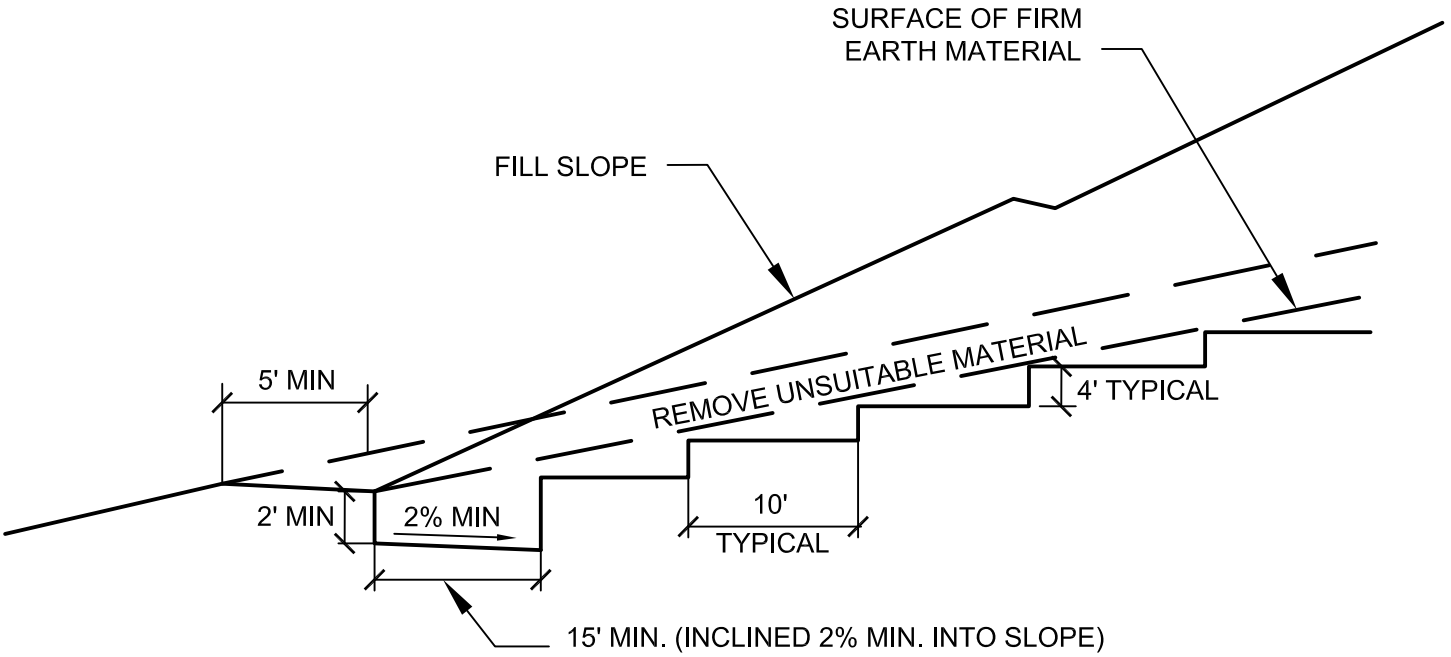
As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period prior to landscape planting.

If slope failures occur, the geotechnical consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

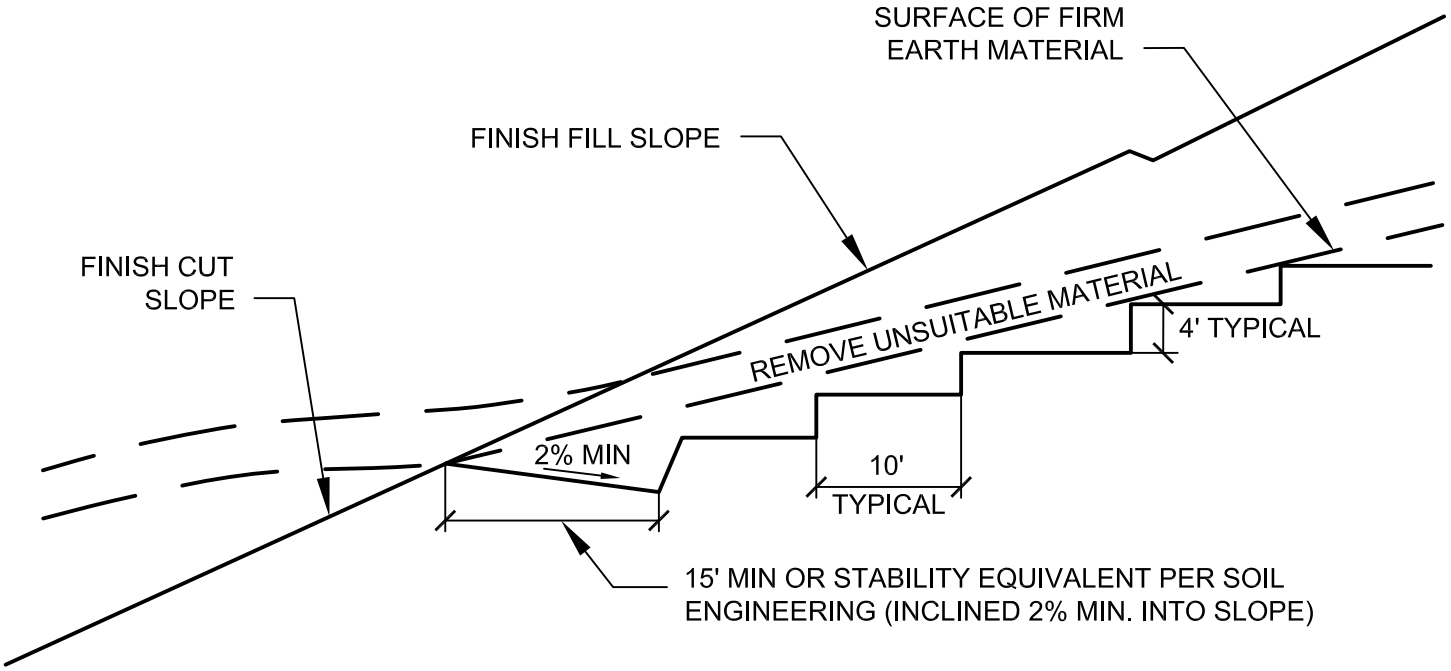
If slope failures occur as a result of exposure to period of heavy rainfall, the failure areas and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer one foot to three feet of a slope face).

BENCHING FILL OVER NATURAL

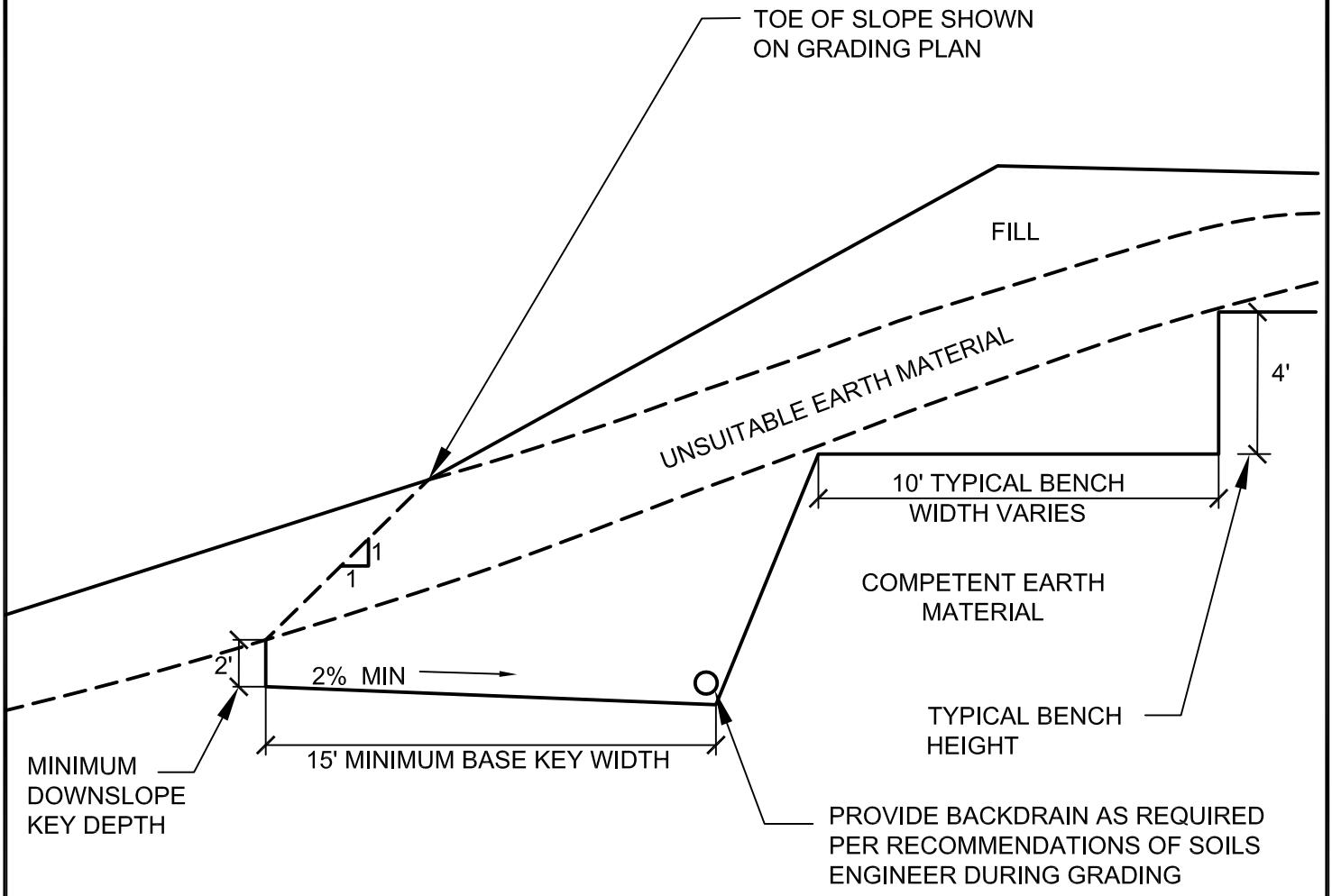


BENCHING FILL OVER CUT



NOT TO SCALE

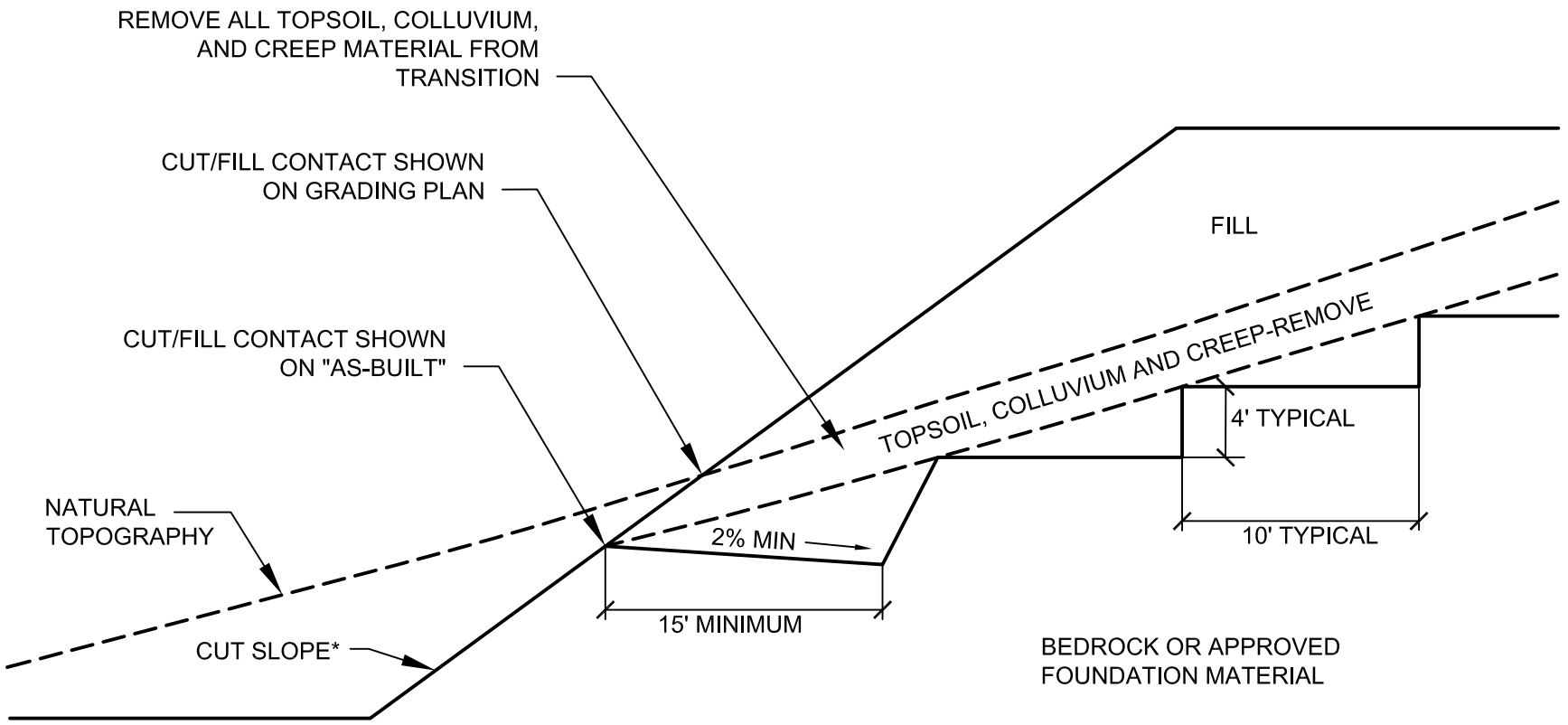
BENCHING FOR COMPACTED FILL DETAIL



WHERE NATURAL SLOPE GRADIENT IS 5:1 OR LESS, BENCHING IS NOT NECESSARY. FILL IS NOT TO BE PLACED ON COMPRESSIBLE OR UNSUITABLE MATERIAL.

NOT TO SCALE

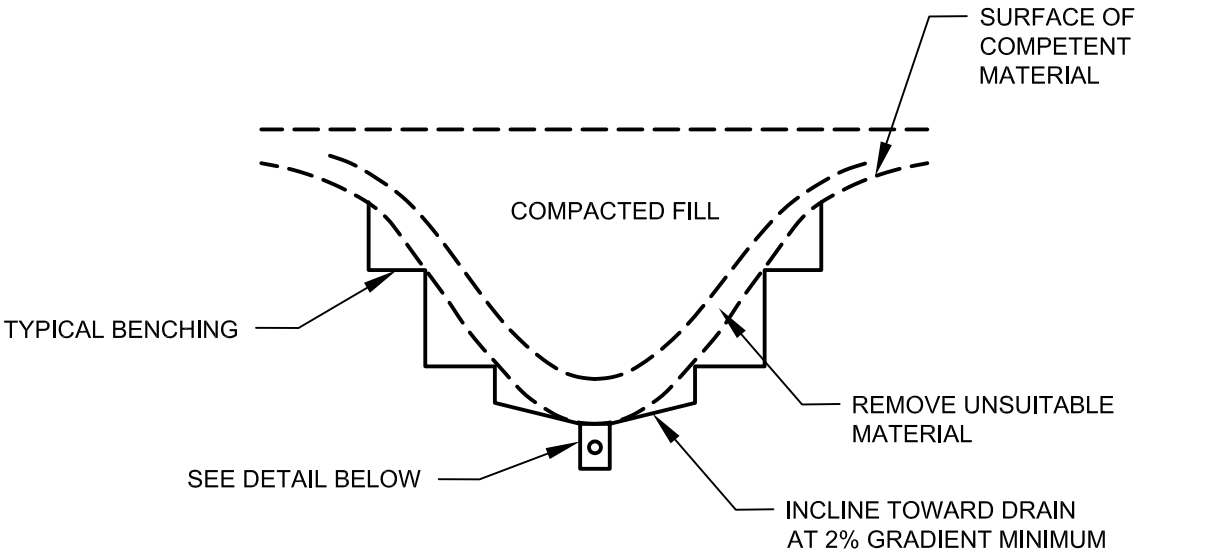
FILL SLOPE ABOVE NATURAL GROUND DETAIL



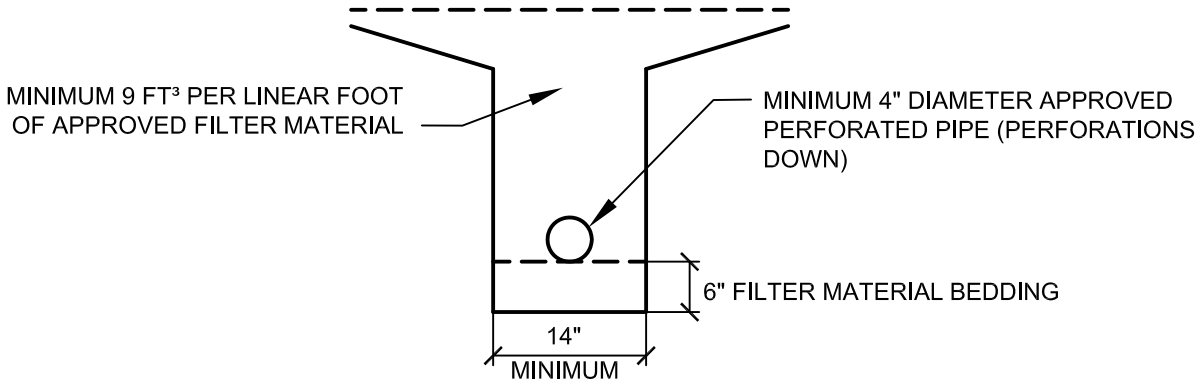
*NOTE: CUT SLOPE PORTION SHOULD BE MADE PRIOR TO PLACEMENT OF FILL

NOT TO SCALE

FILL SLOPE ABOVE CUT SLOPE DETAIL



DETAIL



CALTRANS CLASS 2 PERMEABLE MATERIAL
FILTER MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1"	100
¾"	90-100
⅜"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi

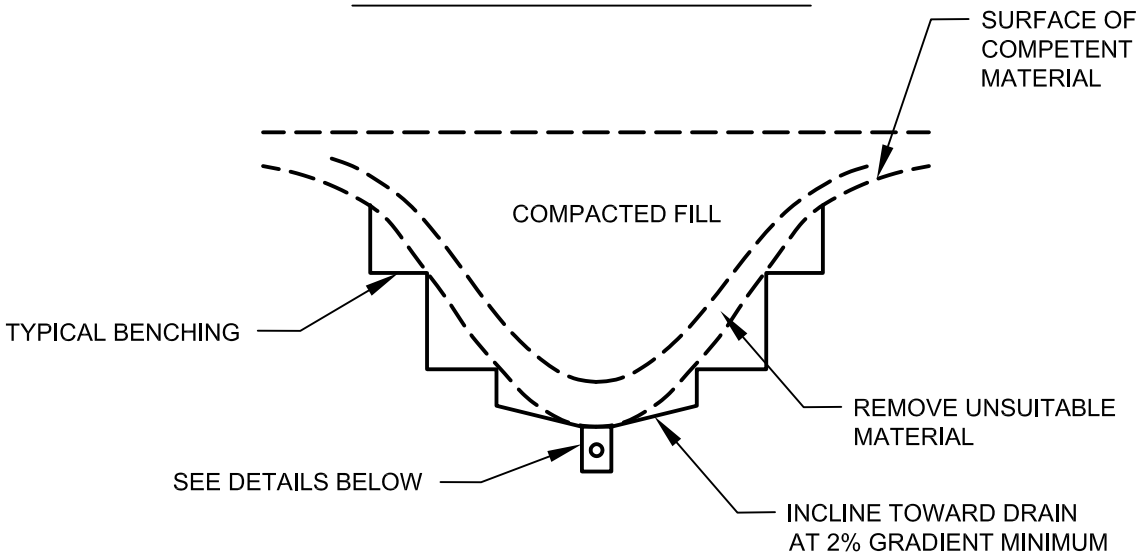
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

LENGTH OF RUN	PIPE DIAMETER
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

NOT TO SCALE

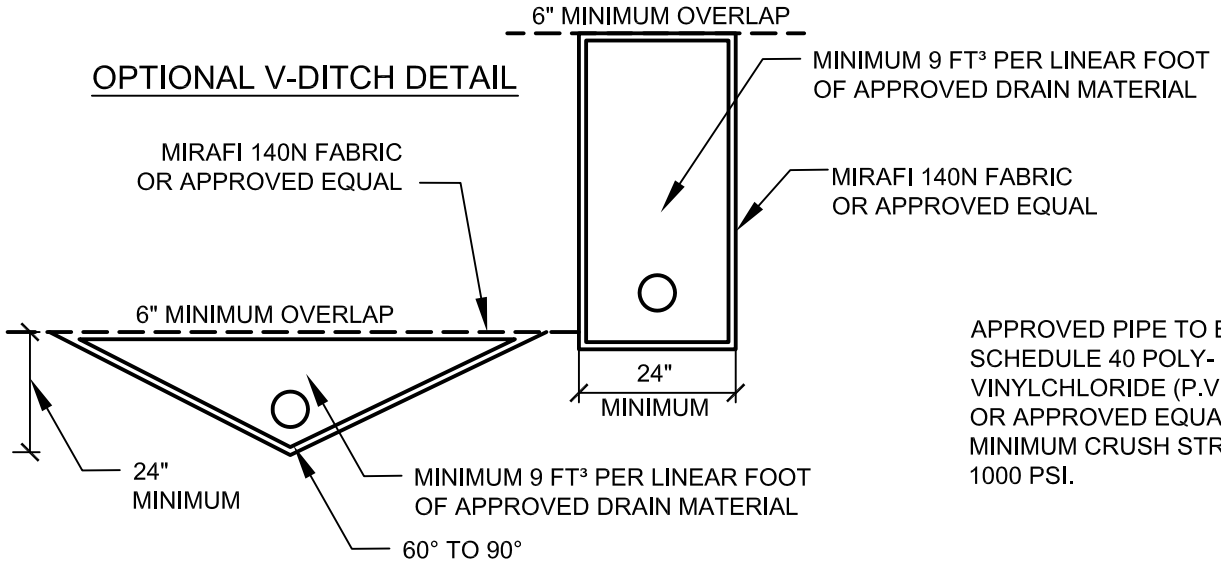
TYPICAL CANYON SUBDRAIN DETAIL

CANYON SUBDRAIN DETAILS



TRENCH DETAILS

OPTIONAL V-DITCH DETAIL



APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYLCHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 PSI.

DRAIN MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 ½"	88-100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

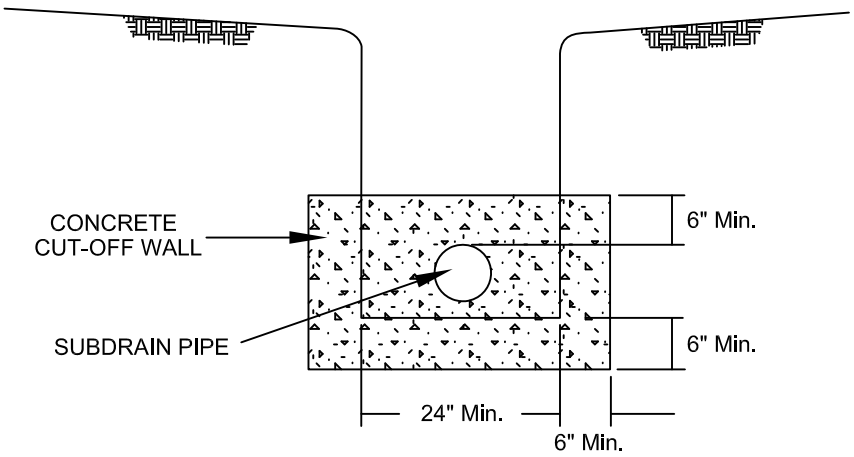
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

LENGTH OF RUN	PIPE DIAMETER
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

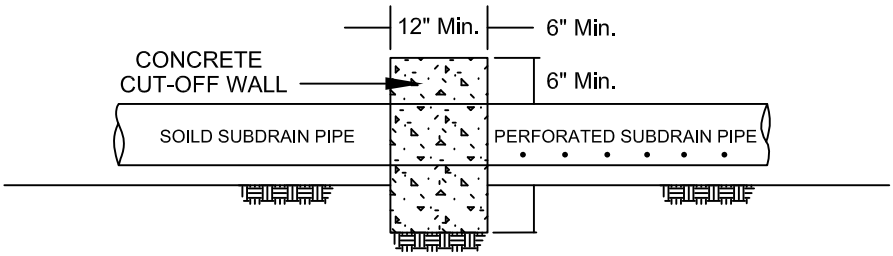
NOT TO SCALE

GEOFABRIC SUBDRAIN

FRONT VIEW



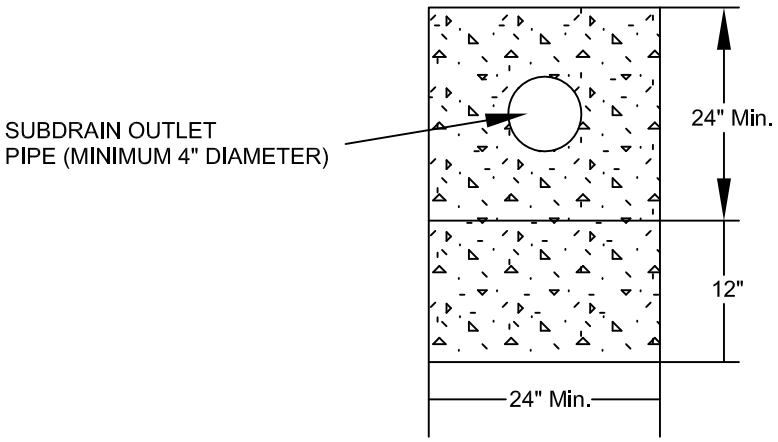
SIDE VIEW



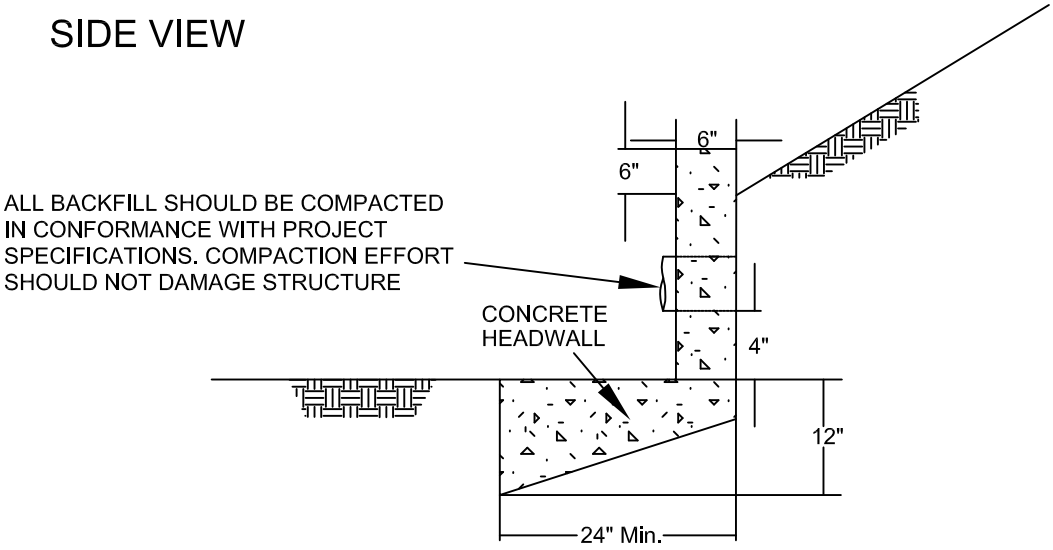
NOT TO SCALE

RECOMMENDED SUBDRAIN CUT-OFF WALL

FRONT VIEW



SIDE VIEW



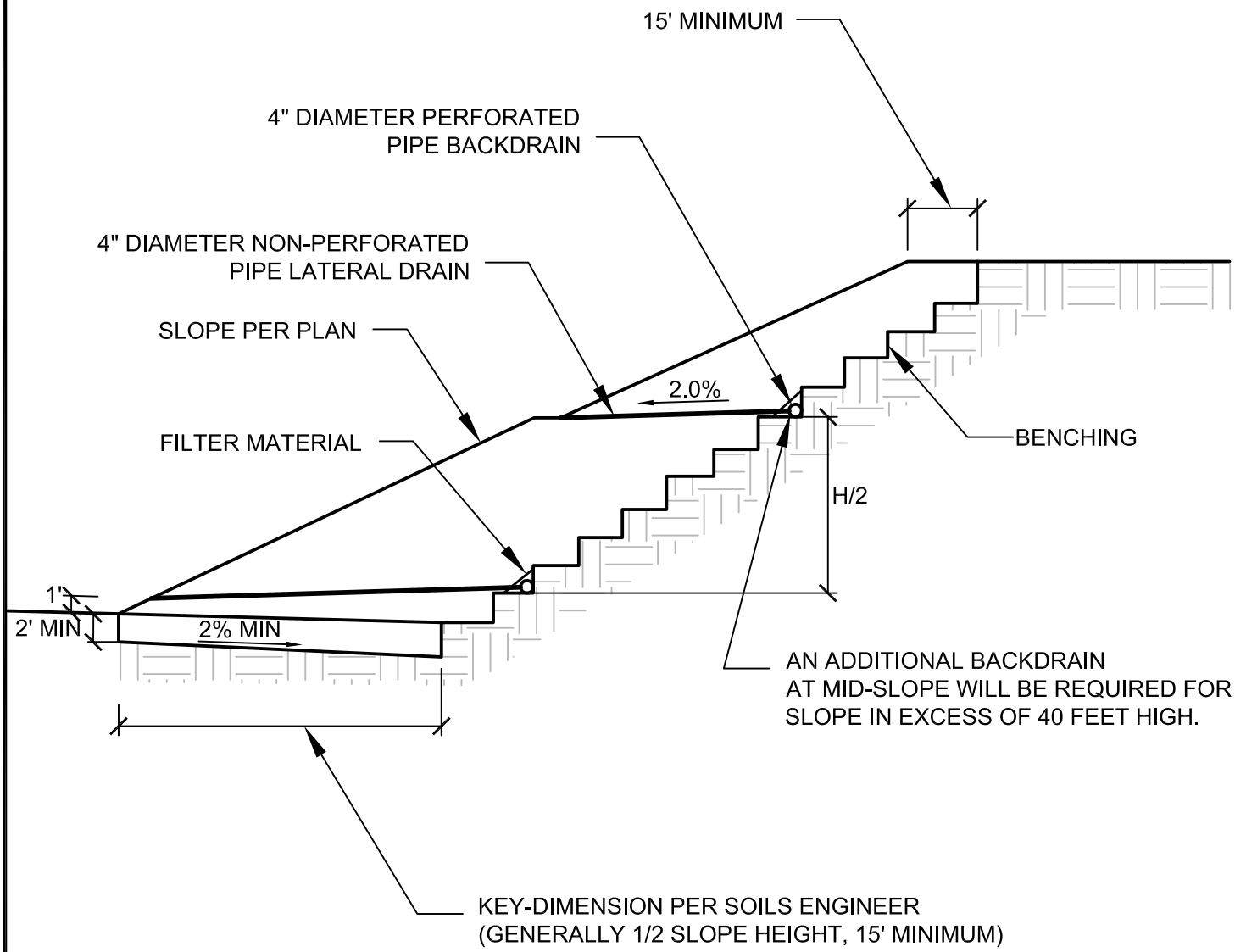
NOTE: HEADWALL SHOULD OUTLET AT TOE OF SLOPE
OR INTO CONTROLLED SURFACE DRAINAGE DEVICE

ALL DISCHARGE SHOULD BE CONTROLLED

THIS DETAIL IS A MINIMUM DESIGN AND MAY BE
MODIFIED DEPENDING UPON ENCOUNTERED
CONDITIONS AND LOCAL REQUIREMENTS

NOT TO SCALE

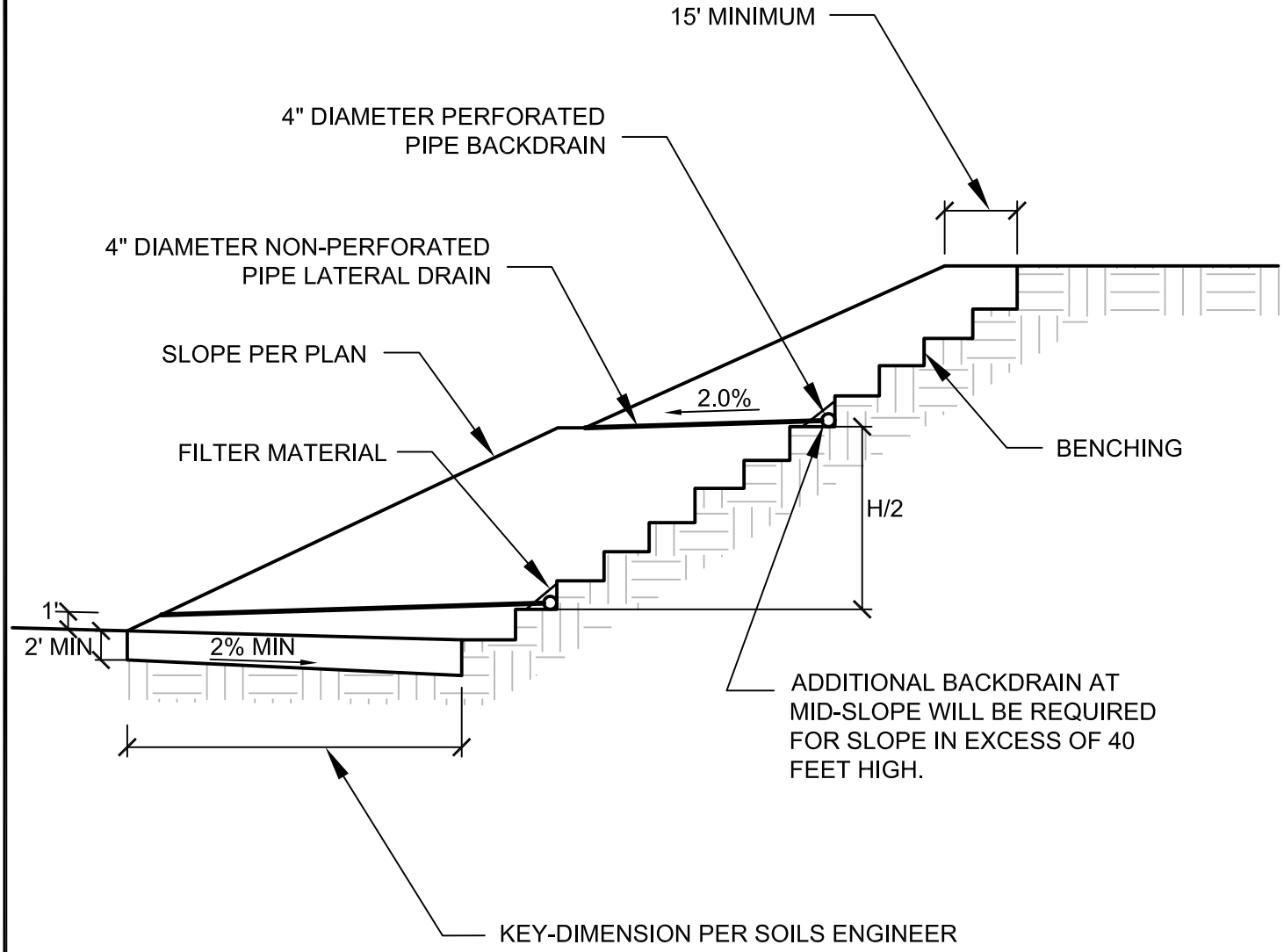
TYPICAL SUBDRAIN OUTLET HEADWALL DETAIL



DIMENSIONS ARE MINIMUM RECOMMENDED

NOT TO SCALE

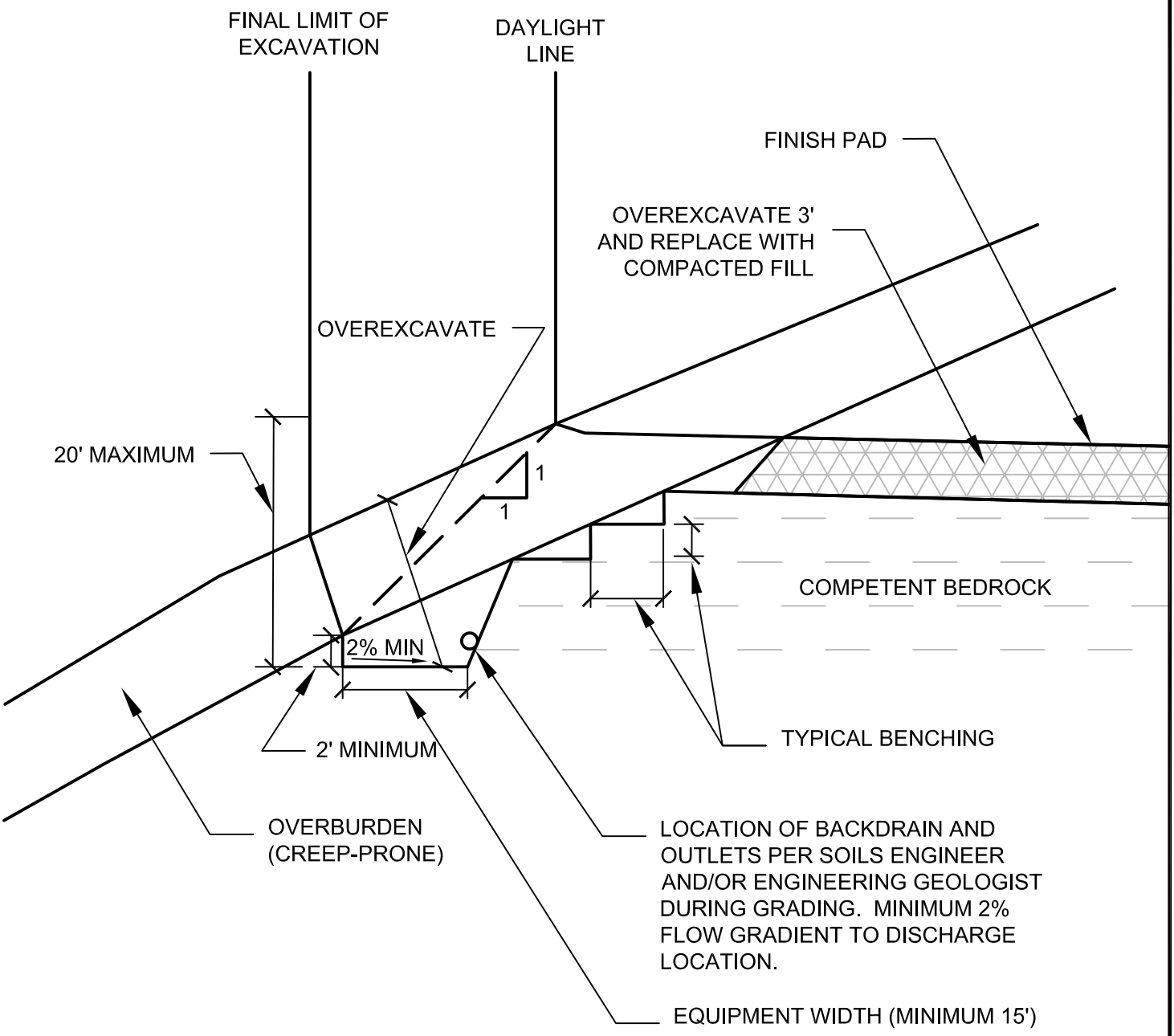
TYPICAL SLOPE STABILIZATION FILL DETAIL



DIMENSIONS ARE MINIMUM RECOMMENDED

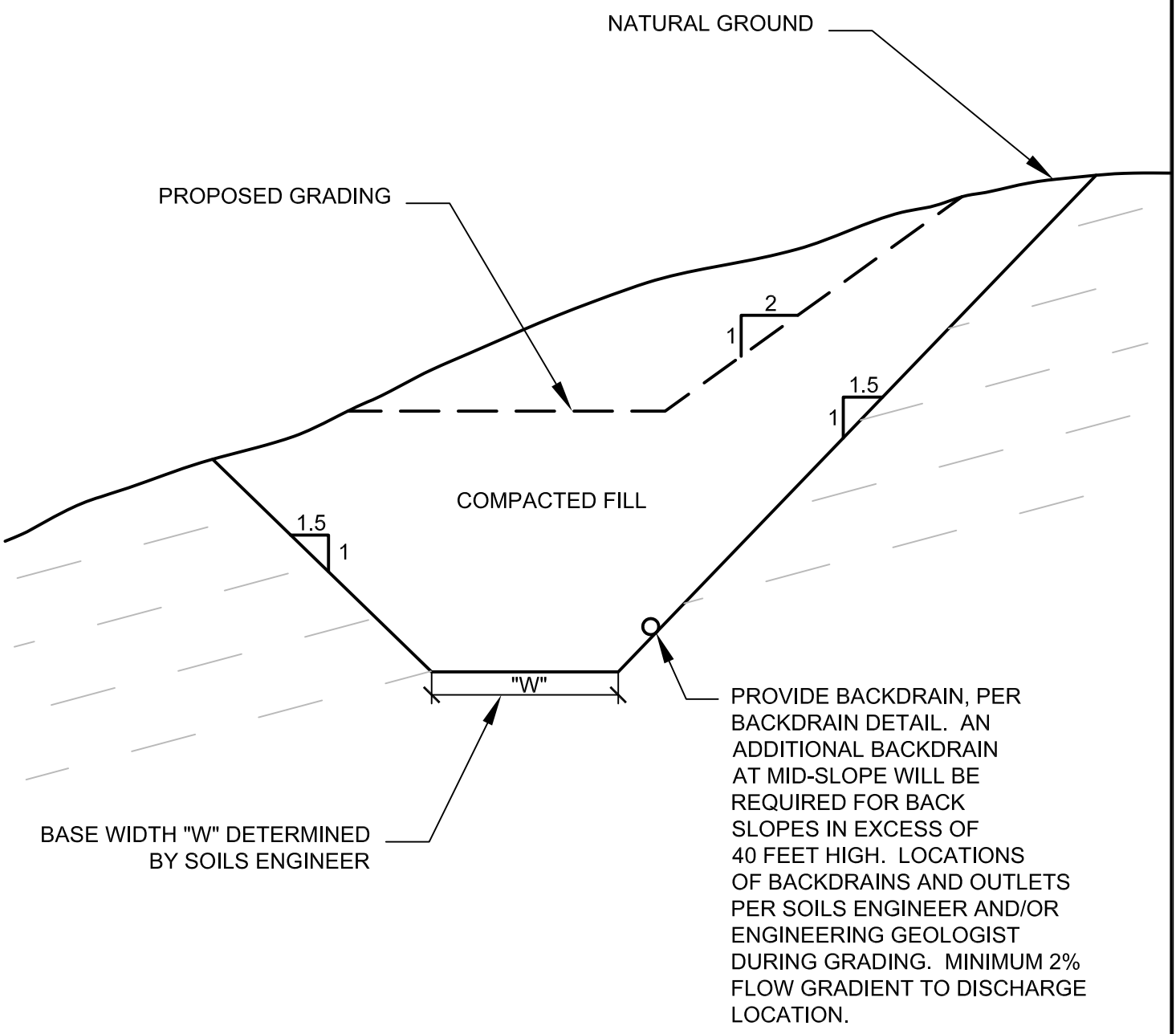
NOT TO SCALE

TYPICAL BUTTRESS FILL DETAIL



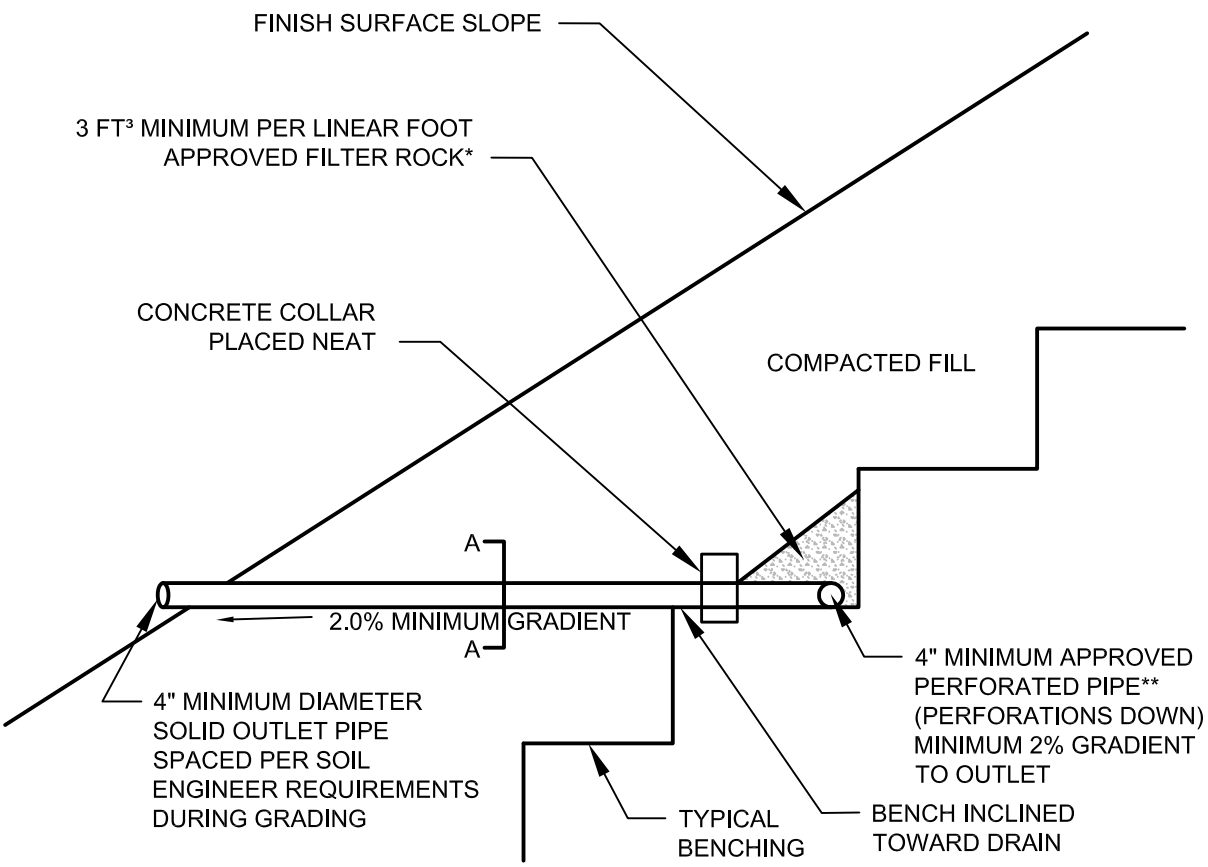
NOT TO SCALE

DAYLIGHT SHEAR KEY DETAIL

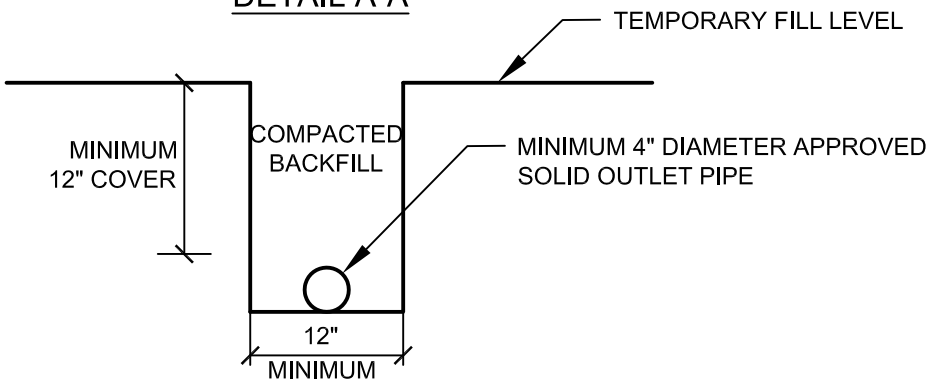


NOT TO SCALE

TYPICAL SHEAR KEY DETAIL



DETAIL A-A



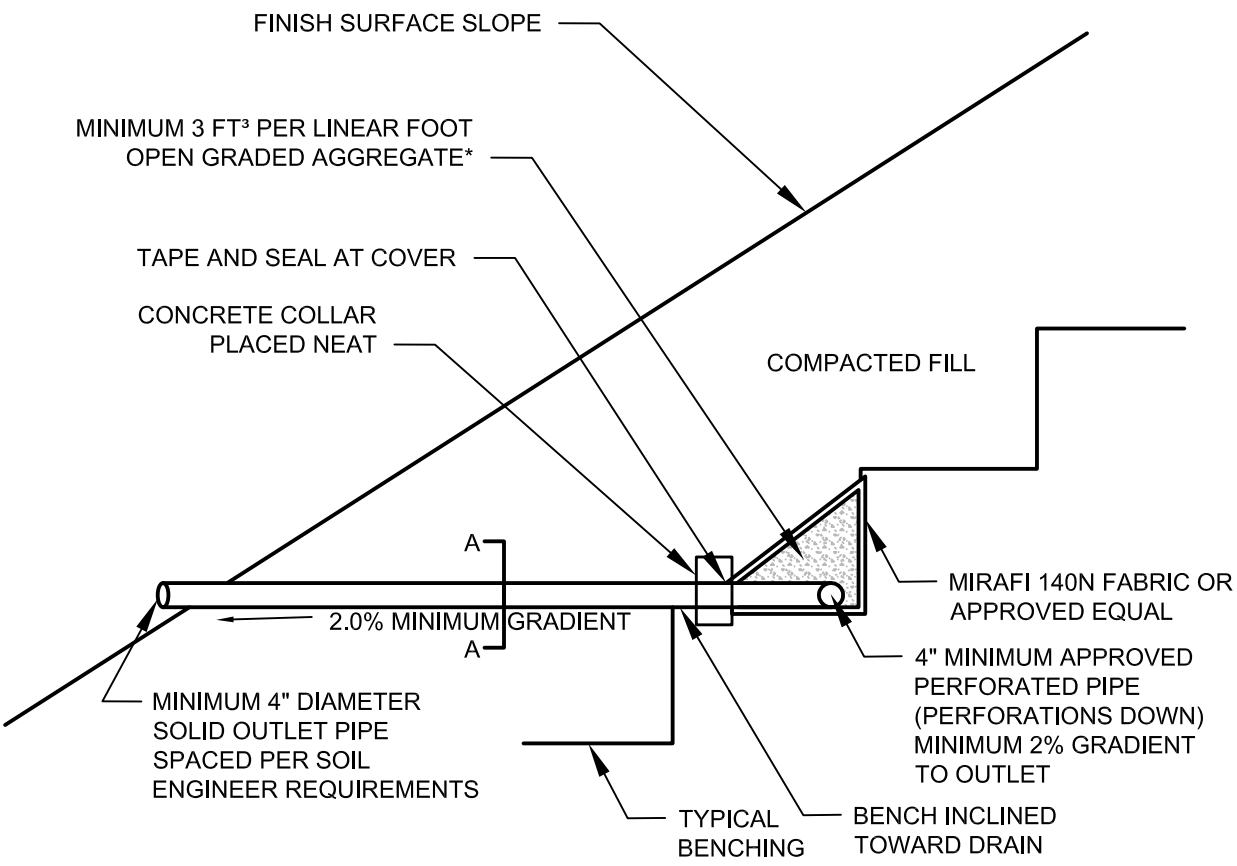
**APPROVED PIPE TYPE:
SCHEDULE 40 POLYVINYL CHLORIDE
(P.V.C.) OR APPROVED EQUAL.
MINIMUM CRUSH STRENGTH 1000 PSI

*FILTER ROCK TO MEET FOLLOWING
SPECIFICATIONS OR APPROVED EQUAL:

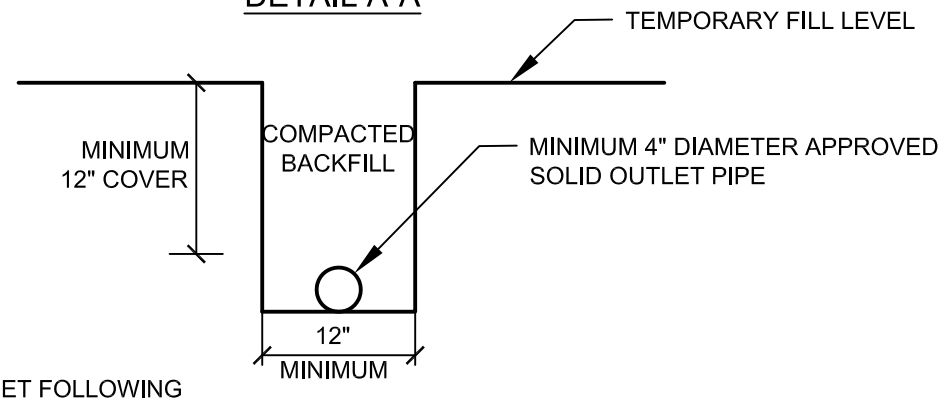
SIEVE SIZE	PERCENTAGE PASSING
1"	100
¾"	90-100
⅜"	40-100
NO. 4	25-40
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

NOT TO SCALE

TYPICAL BACKDRAIN DETAIL



DETAIL A-A

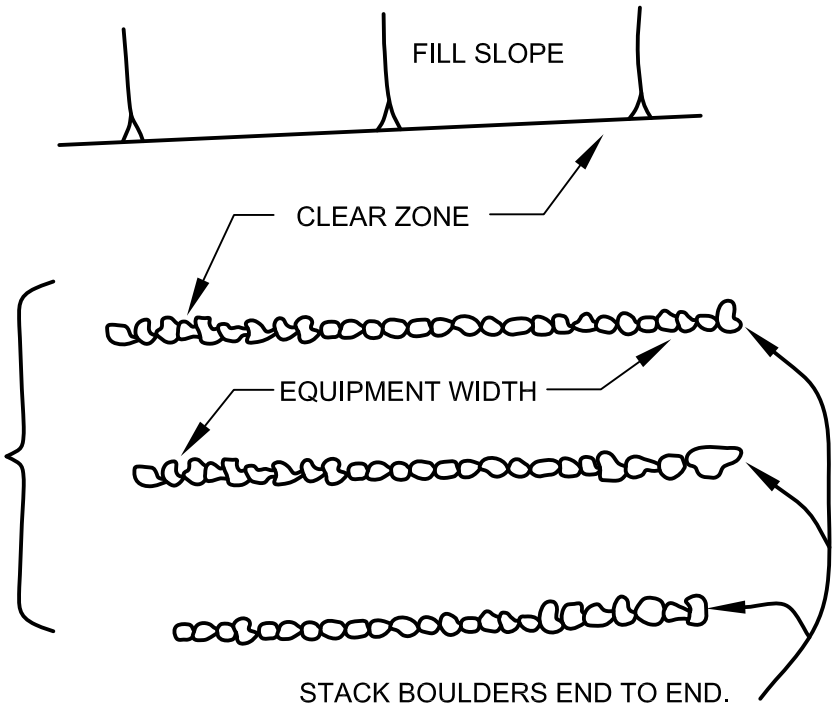


*NOTE: AGGREGATE TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

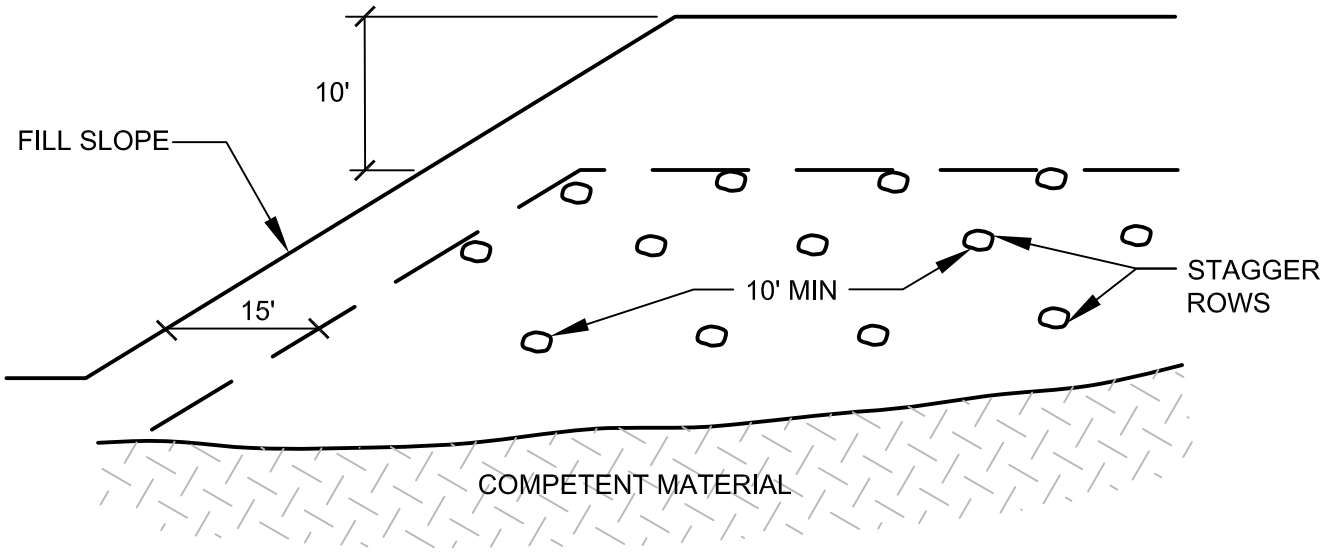
SIEVE SIZE	PERCENTAGE PASSING
1 ½"	100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

NOT TO SCALE

BACKDRAIN DETAIL (GEOFRABIC)

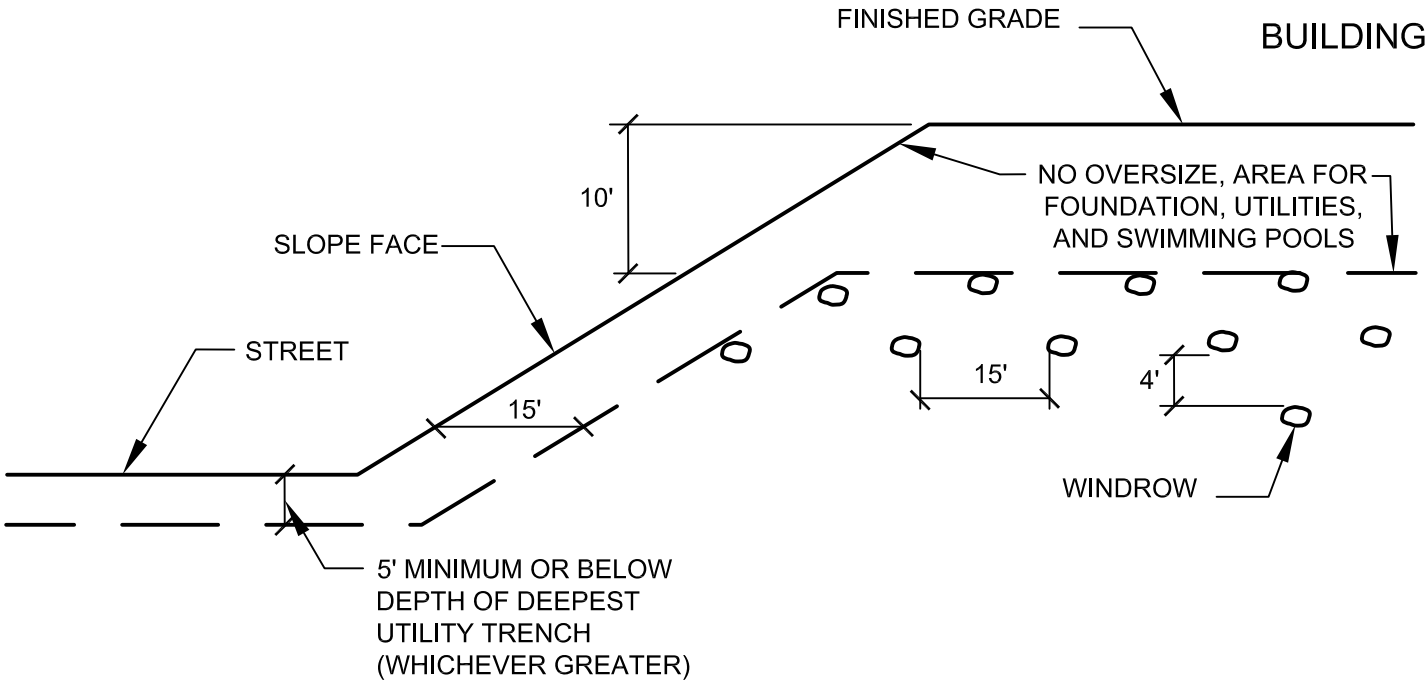


SOIL SHALL BE PUSHED OVER ROCKS AND FLOODED INTO VOIDS. COMPACT AROUND AND OVER EACH WINDROW.

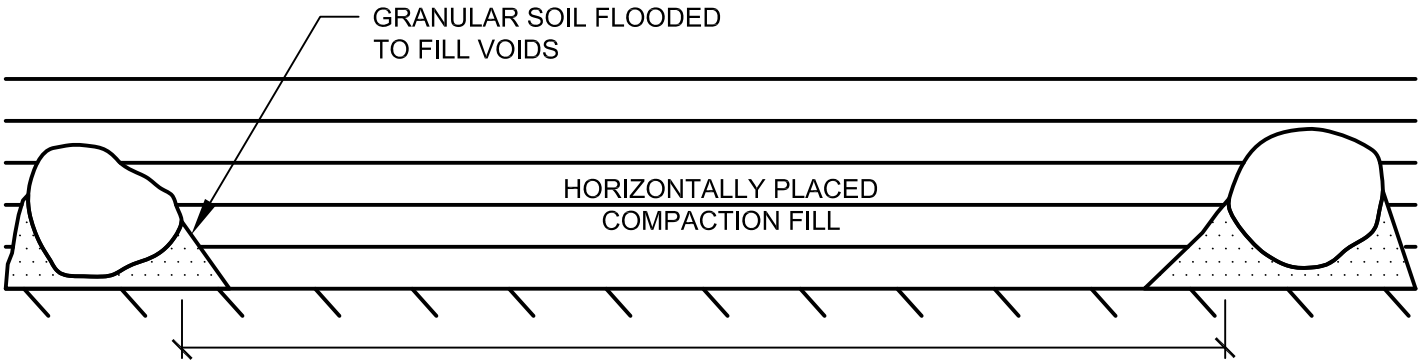


NOT TO SCALE

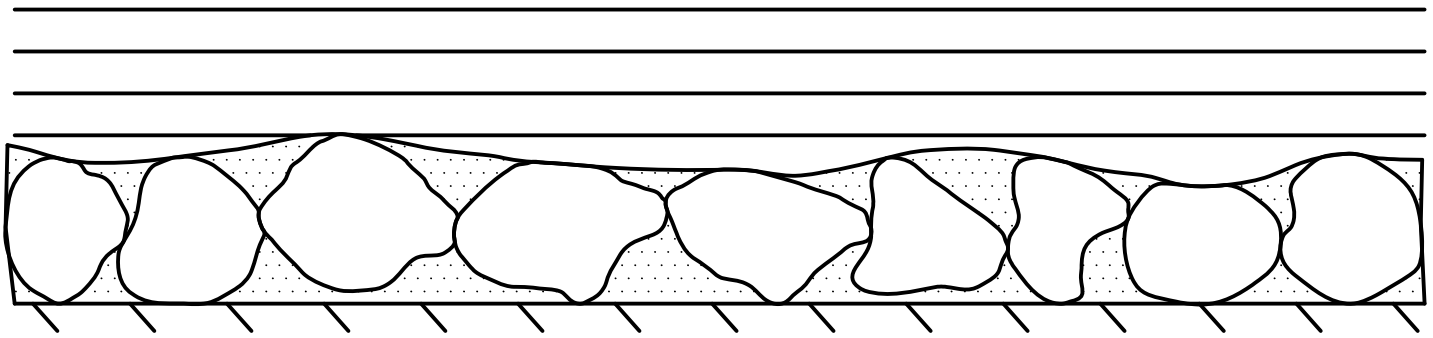
ROCK DISPOSAL DETAIL



TYPICAL WINDROW DETAIL (EDGE VIEW)



PROFILE VIEW

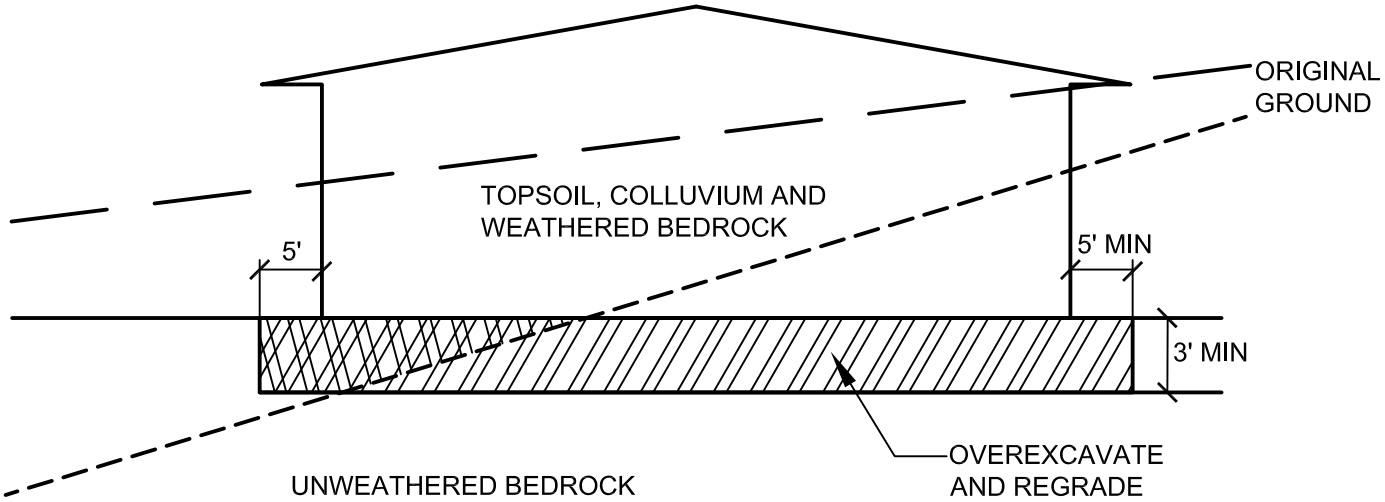


NOT TO SCALE

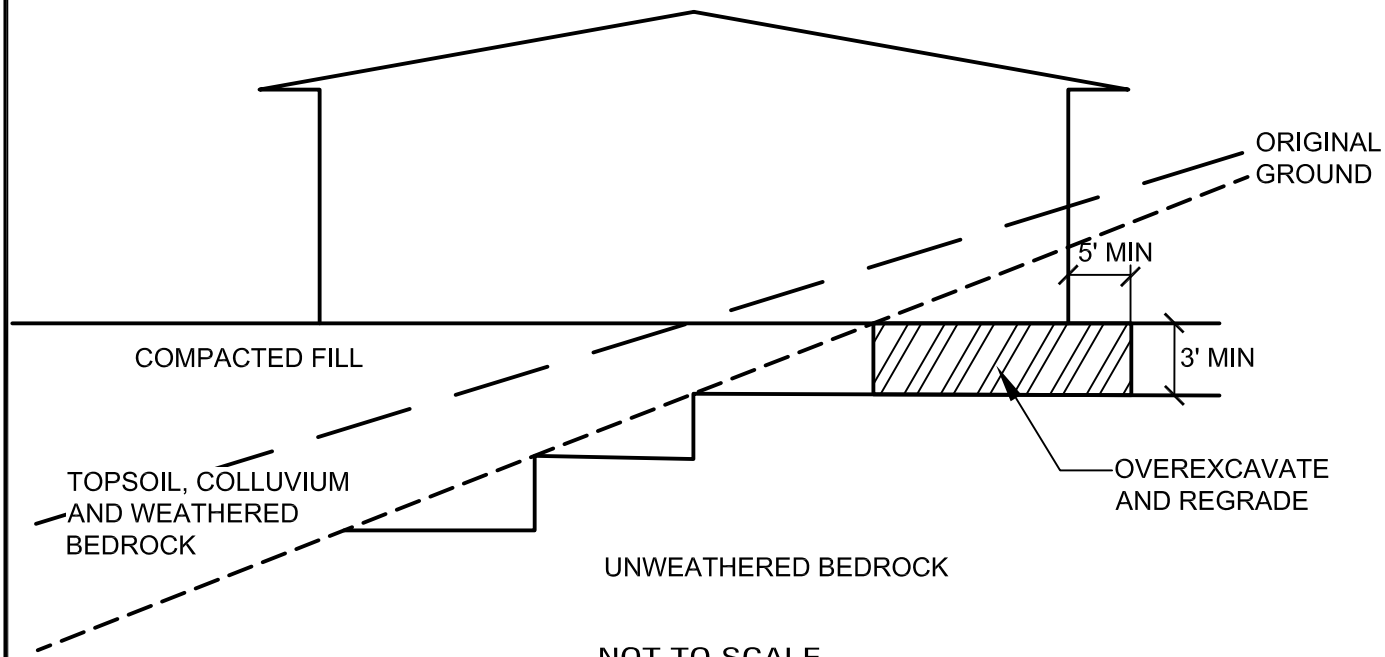
ROCK DISPOSAL DETAIL

GENERAL GRADING RECOMMENDATIONS

CUT LOT



CUT/FILL LOT (TRANSITION)



NOT TO SCALE

TRANSITION LOT DETAIL

APPENDIX E

I-8 and D.5-1 WORKSHEETS

Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	1	0.25
		Predominant soil texture	0.25	2	0.50
		Site soil variability	0.25	2	0.50
		Depth to groundwater / impervious layer	0.25	2	0.50
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
B	Design	Level of pretreatment/ expected sediment loads	0.5	2	1.0
		Redundancy/resiliency	0.25	2	0.50
		Compaction during construction	0.25	2	0.50
		Design Safety Factor, $S_B = \Sigma p$			2.0
Combined Safety Factor, $S_{total} = S_A \times S_B$					3.75
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)					0.16 - 0.91
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$					0.043 - 0.24
Supporting Data					
Briefly describe infiltration test and provide reference to test forms: Infiltration rates were determined by performing percolation tests in accordance with the DEH method. All 10 of the percolation tests were performed in Young Alluvial Flood Plain Deposits.					

Worksheet I-8 : Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet I-8	
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The NRCS soils within the basin areas of the site consist of Type A and B soils with very low surface runoff. The northern and eastern portions of the site consist of Type C soils with high surface runoff. The site soils are generally consistent with the NRCS mapped soil types based on site explorations and percolation testing. However, the measured infiltration rates are slower than those presented in the NRCS report. Two general soil units were present in the area of the proposed development, Quaternary Young Alluvial Flood Plain Deposits and Old Alluvial Flood Plain Deposits. Ten percolation tests were completed, with all ten tests performed within the native soils. The calculated infiltration rates (with an applied factor of safety of 3.75) ranged from approximately 0.043 to 0.24 inches per hour. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		
Provide basis: Not Applicable. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Worksheet I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: Not Applicable. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: Not Applicable. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration If any answer from row 1-4 is "No", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Worksheet I-8 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	
Provide basis: Due to the significant amount of Young Alluvial Flood Plain sands beneath the areas of the proposed basins, it is likely that an appreciable volume of water will infiltrate. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: Due to moderate permeability of the geologic units encountered at the site, surface water would likely migrate laterally or mound locally. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			

Worksheet I-8 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: According to Geotracker, the nearest known "Open" LUST cleanup site is over 3.8 miles from the proposed basin locations. In addition, the proposed development is not industrial and capture of surface waters is not anticipated to increase the risk of groundwater contamination. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: The site is located within a drainage that surface waters flow through during significant precipitation events. Therefore, the basin water could increase the risk of changing the seasonality of ephemeral streams or increase the risk of contaminating surface waters that currently exist. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration. If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.		

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings

APPENDIX F

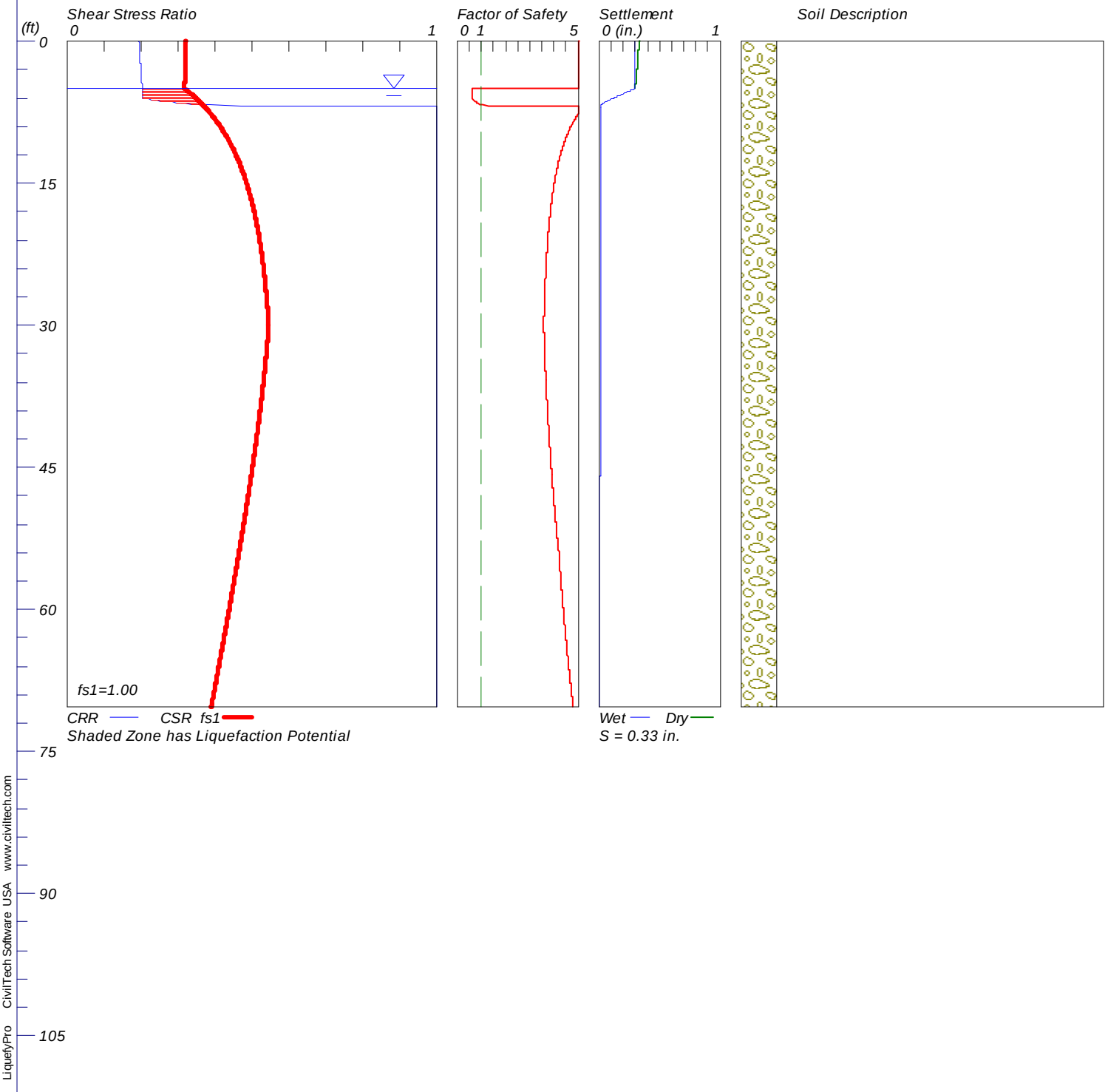
LIQUEFACTION ANALYSIS WORKSHEETS

LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=B-27 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

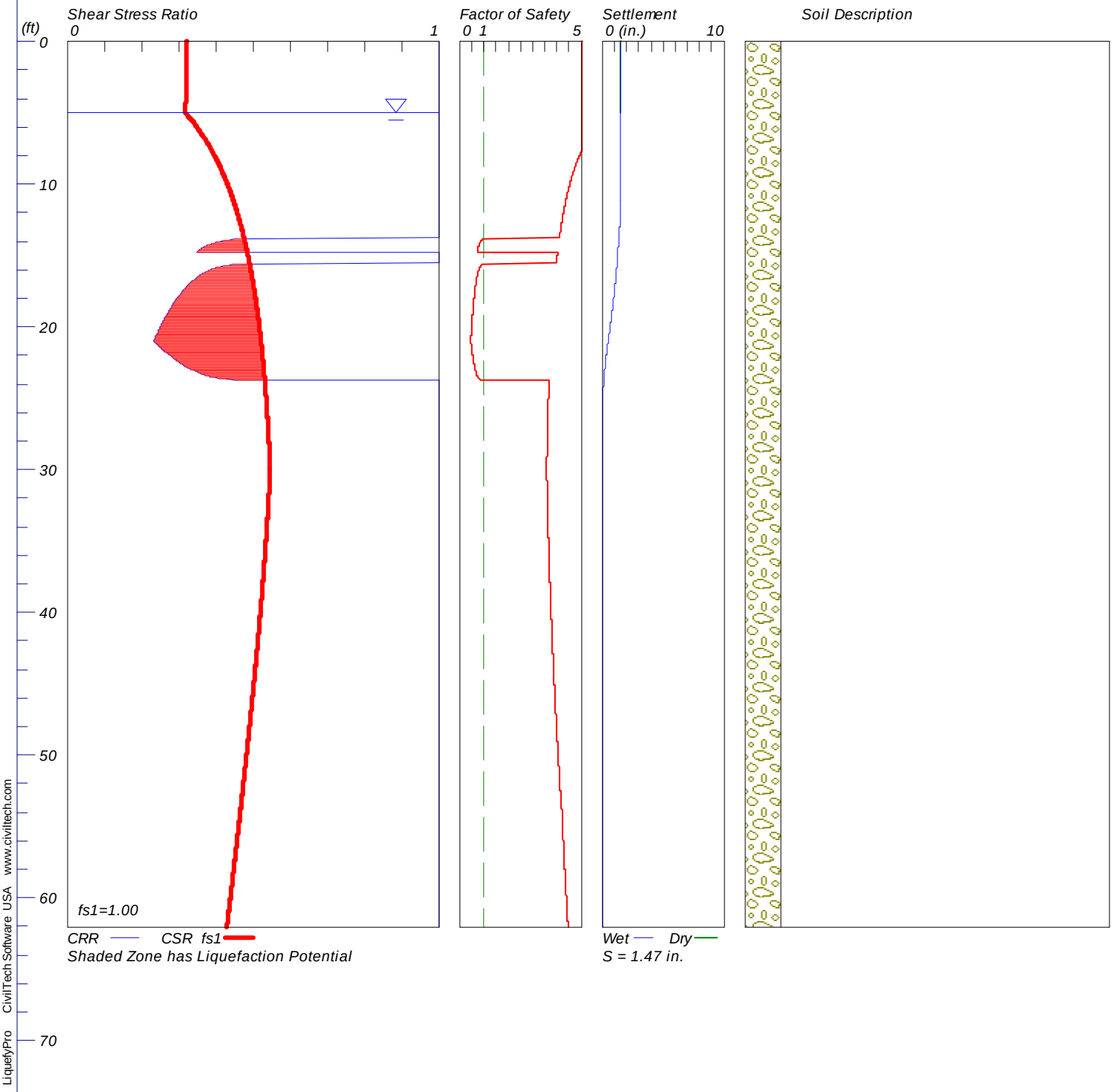


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=B-69 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

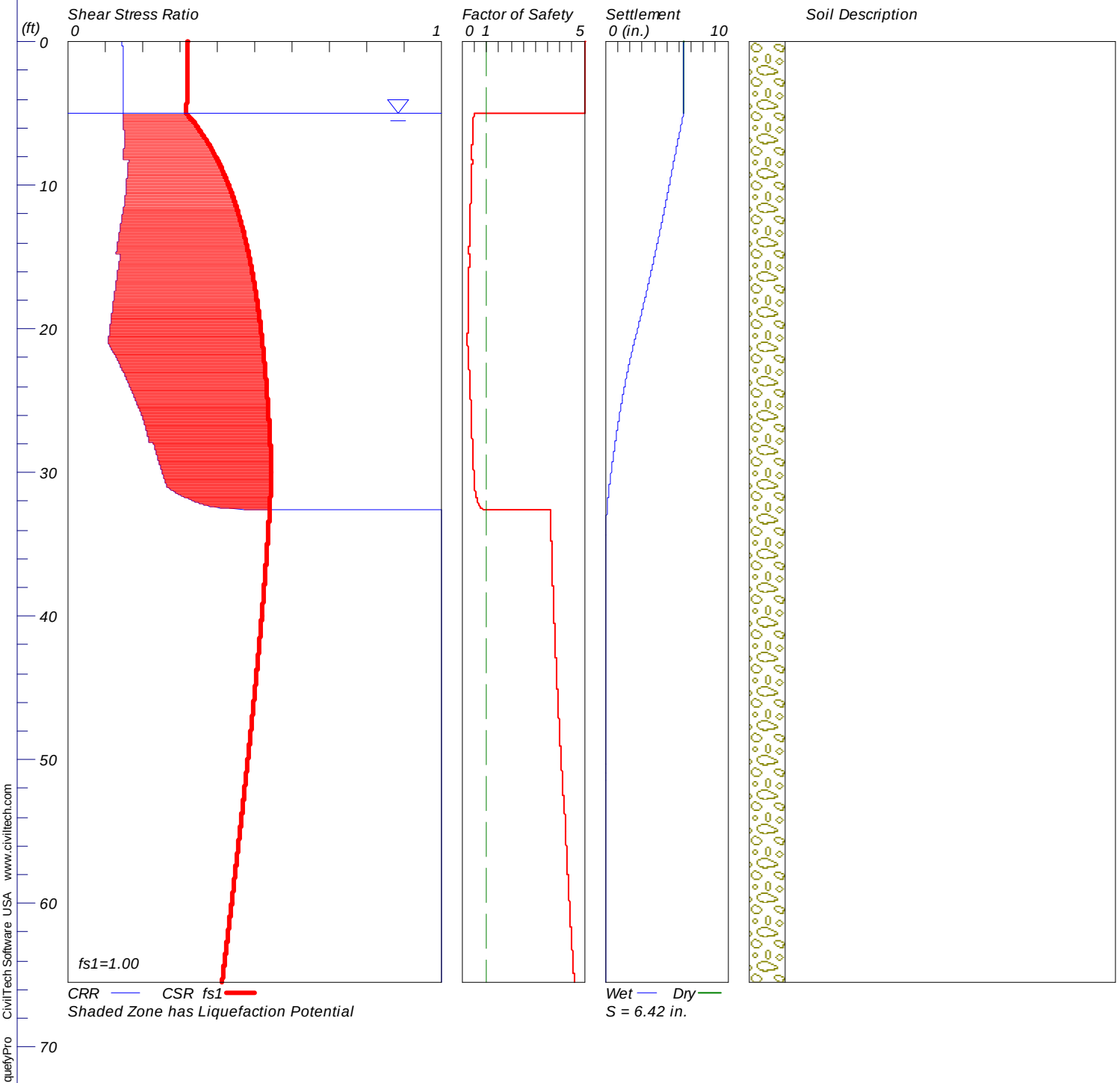


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=B-84 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

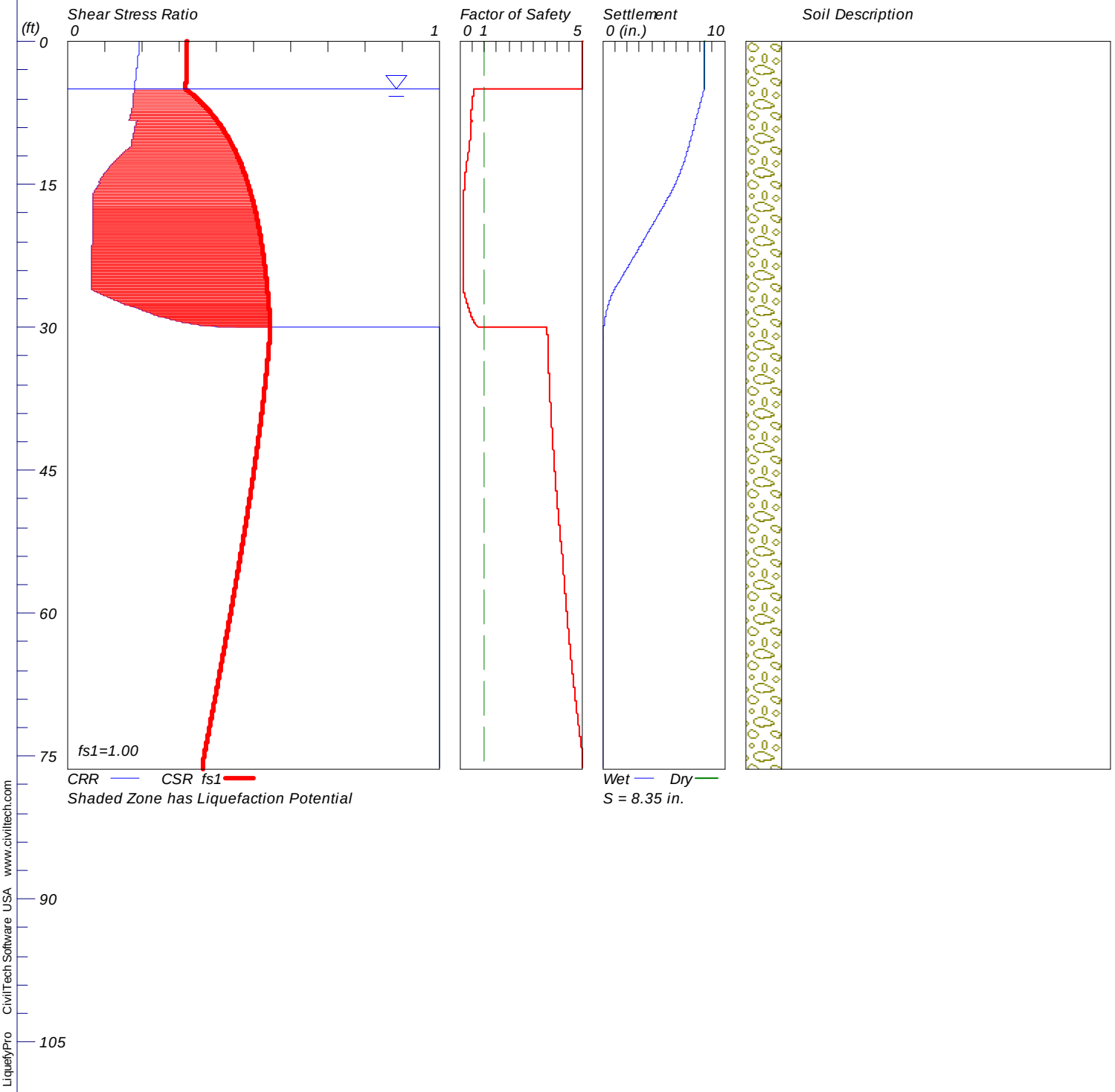


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=B-92 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

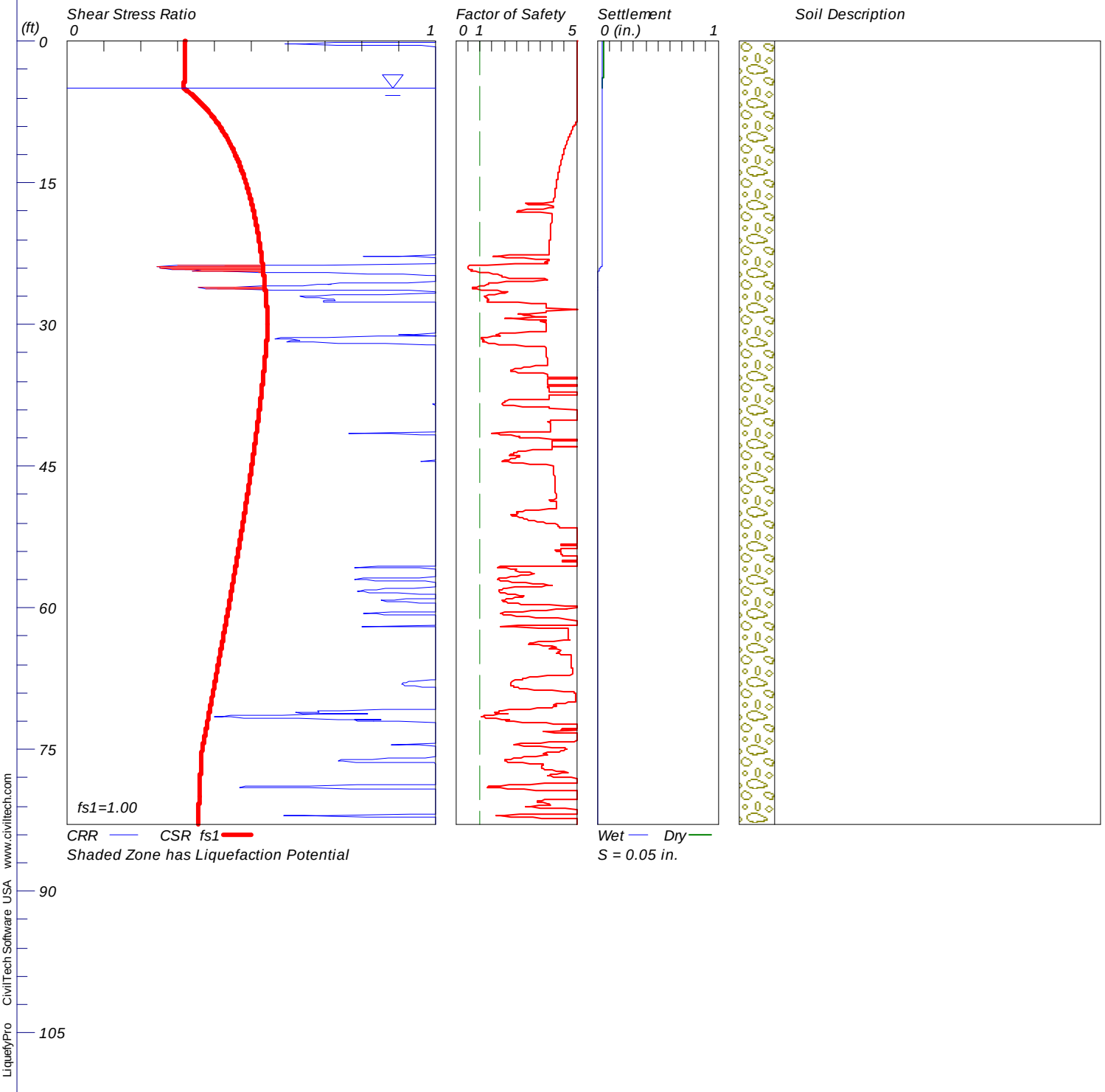


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-21 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

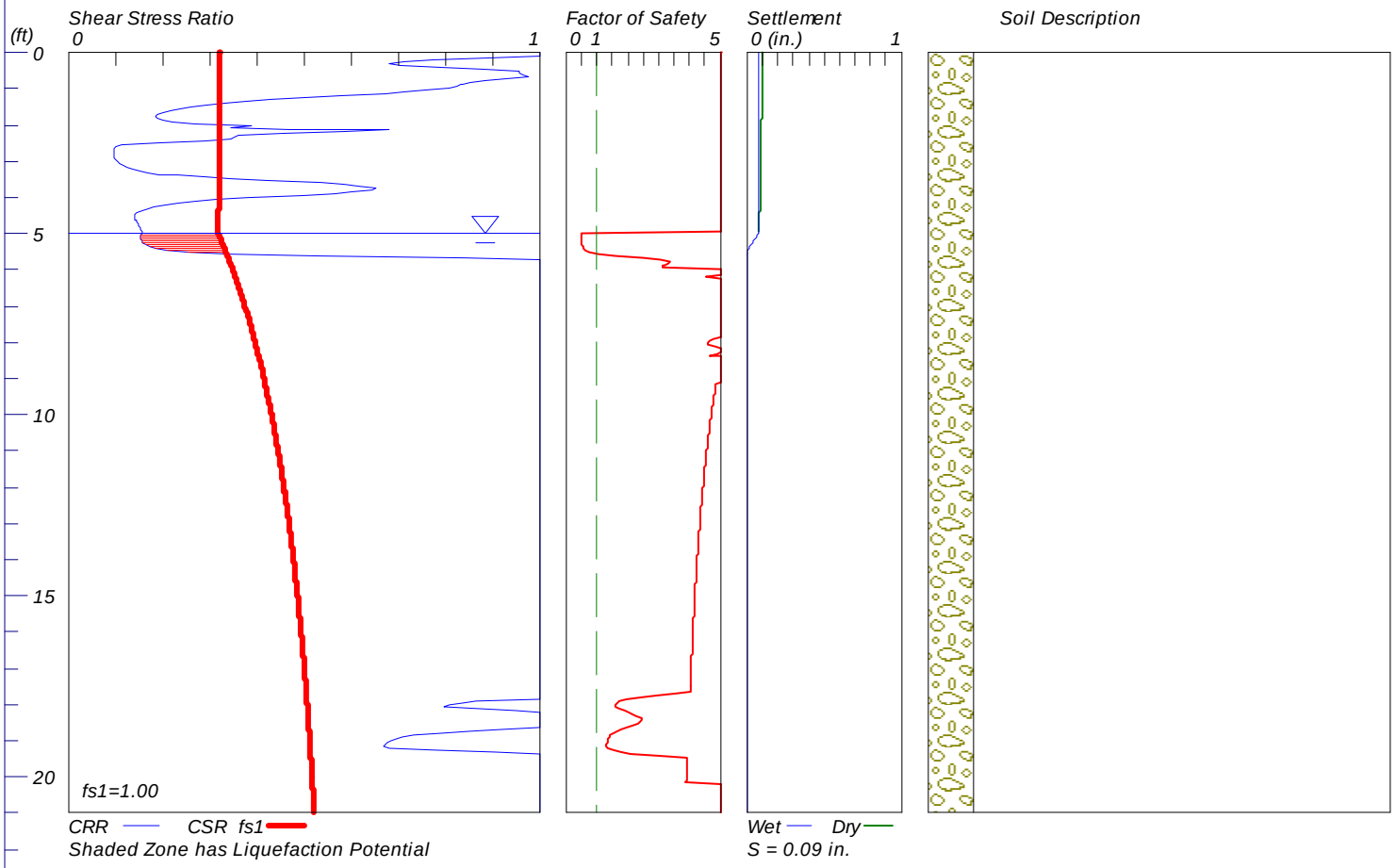


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-30 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

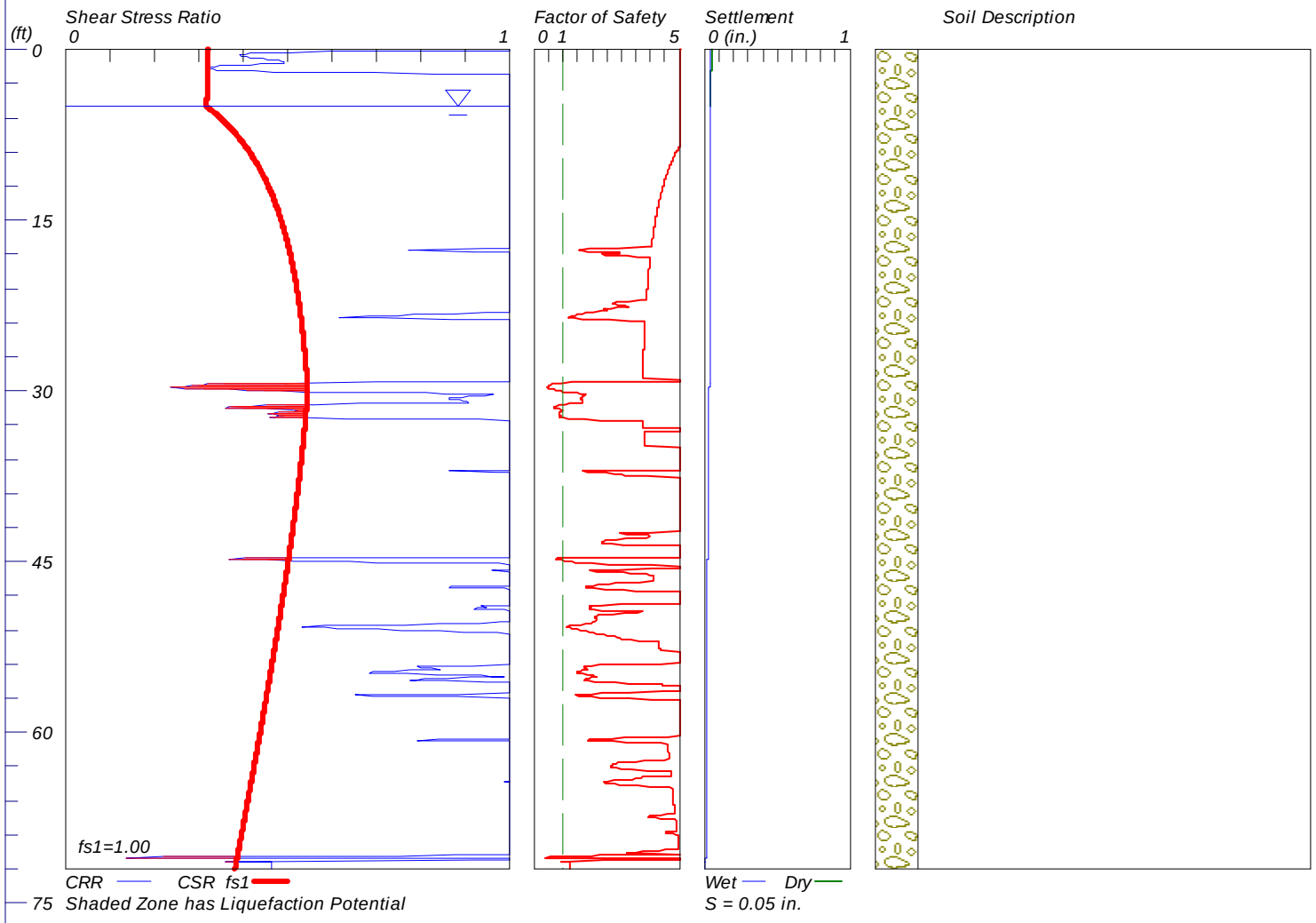


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-31 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

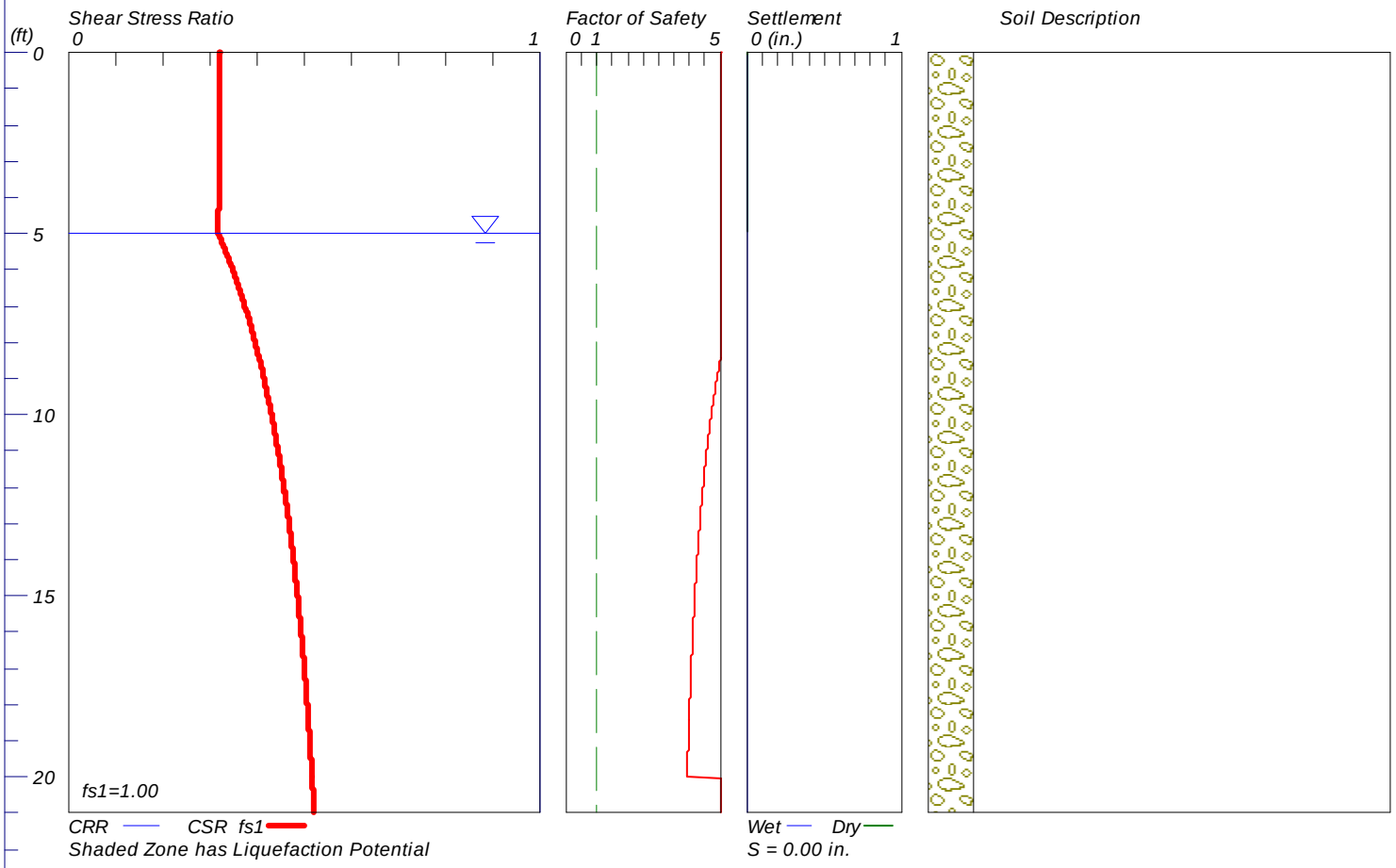


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-49 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

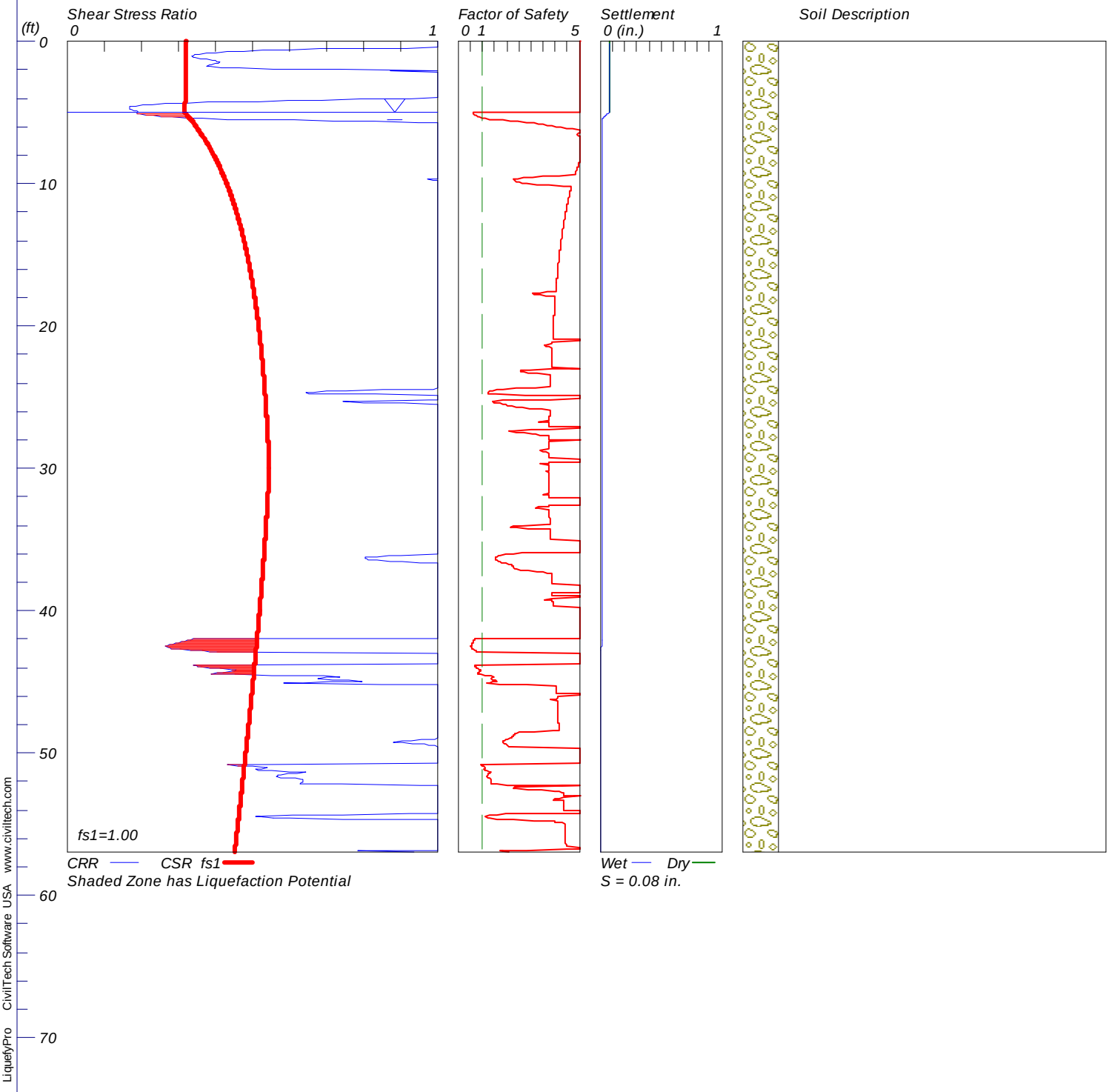


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-51 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

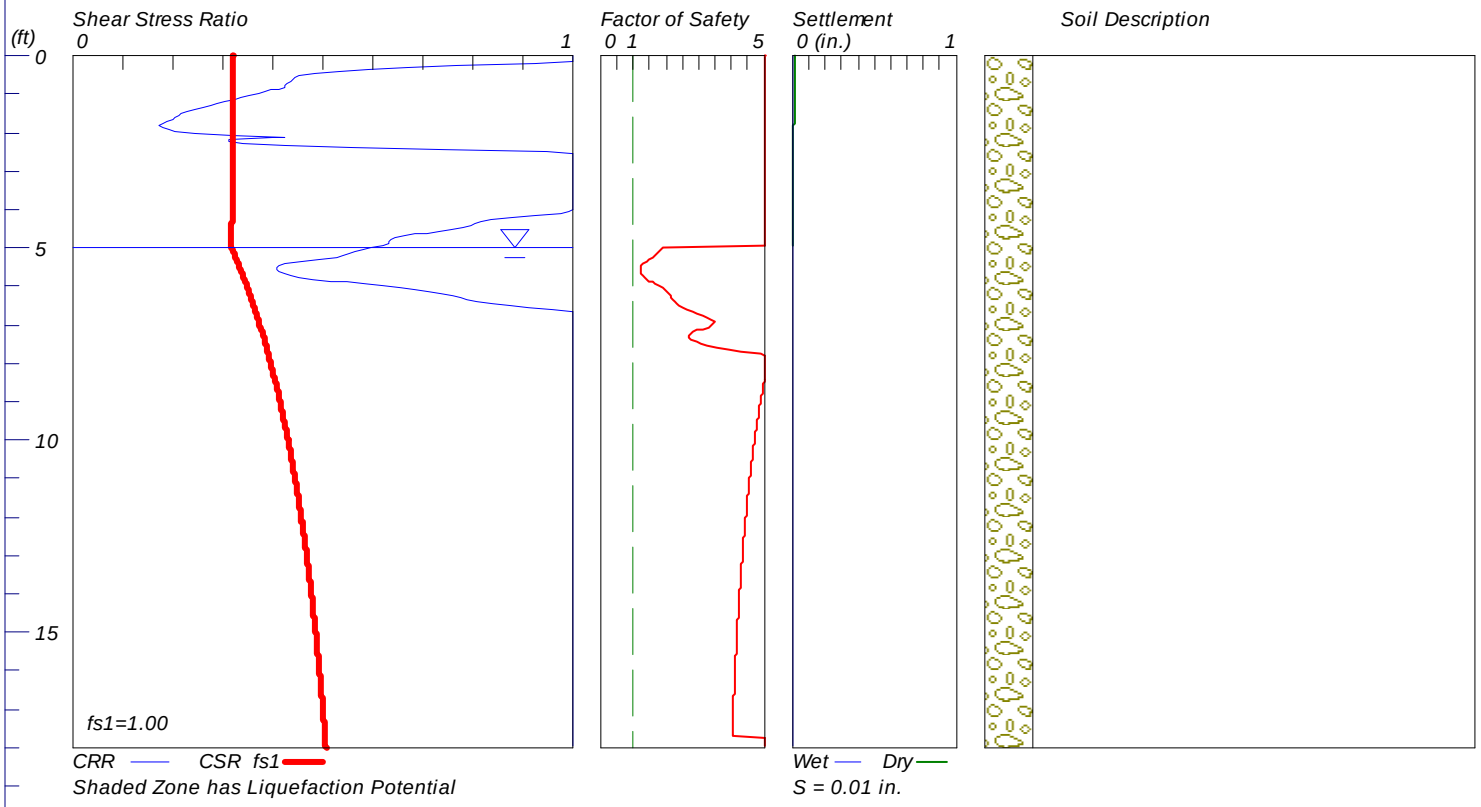


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-64 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

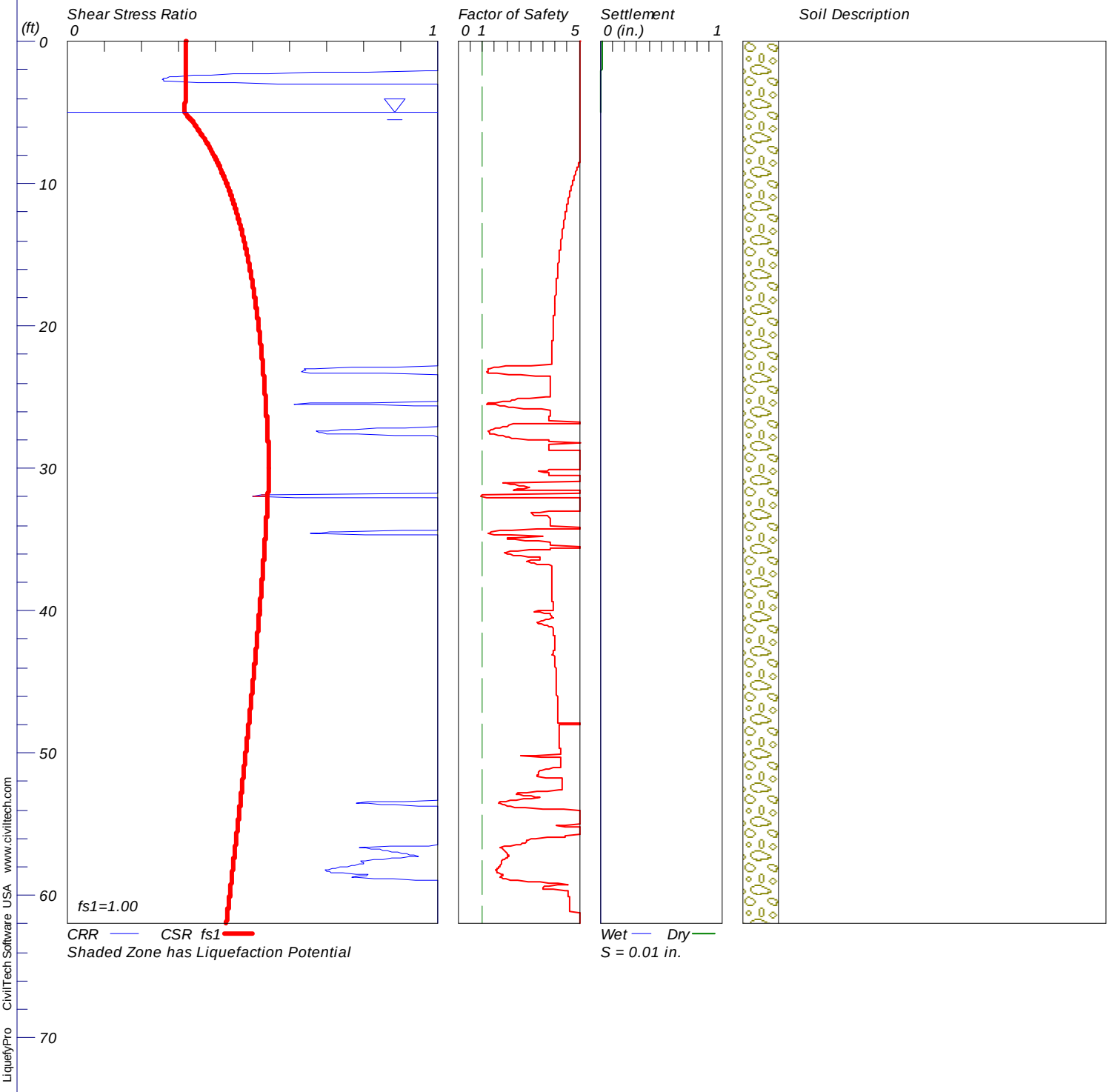


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-66 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

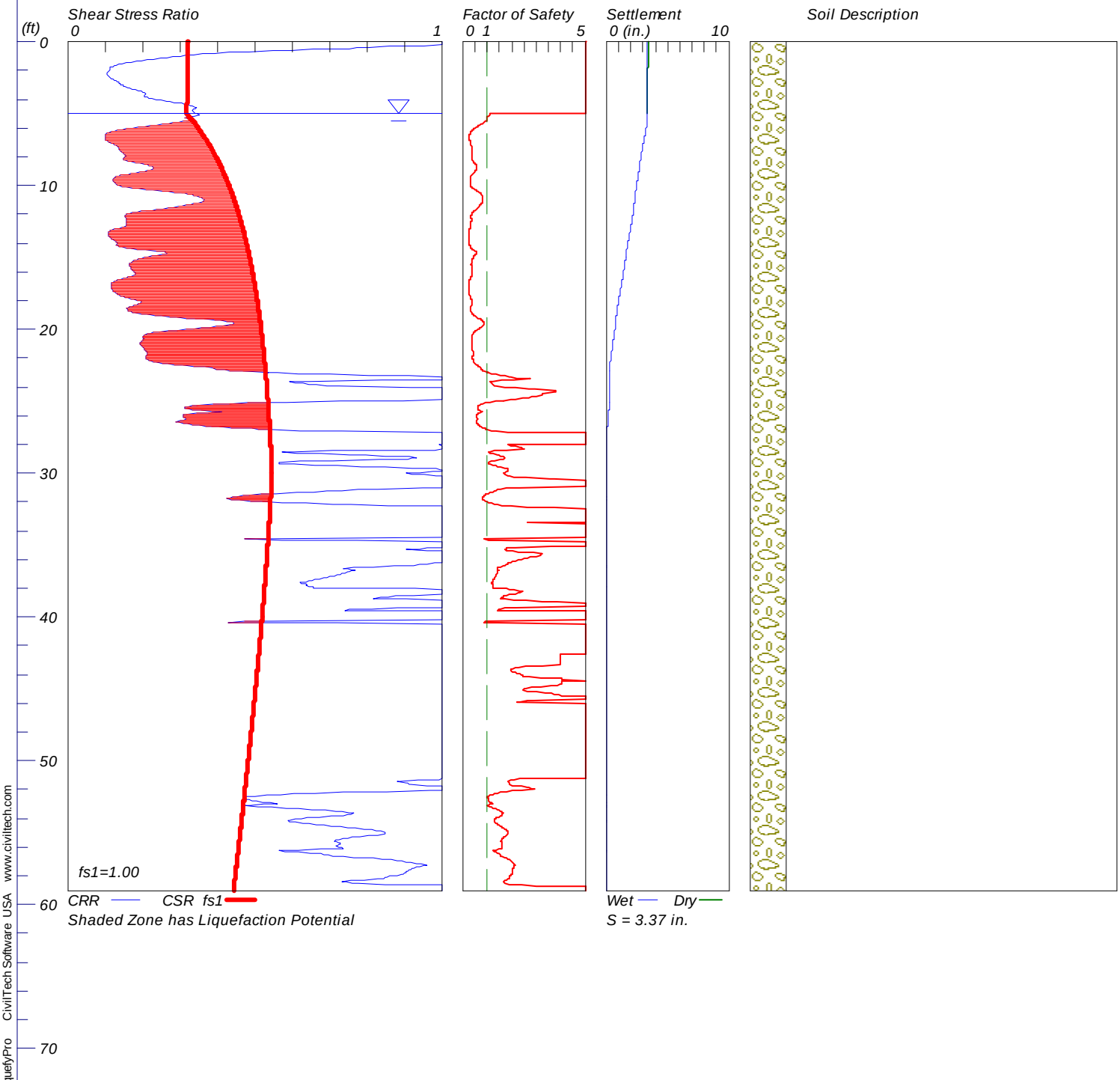


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-76 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g

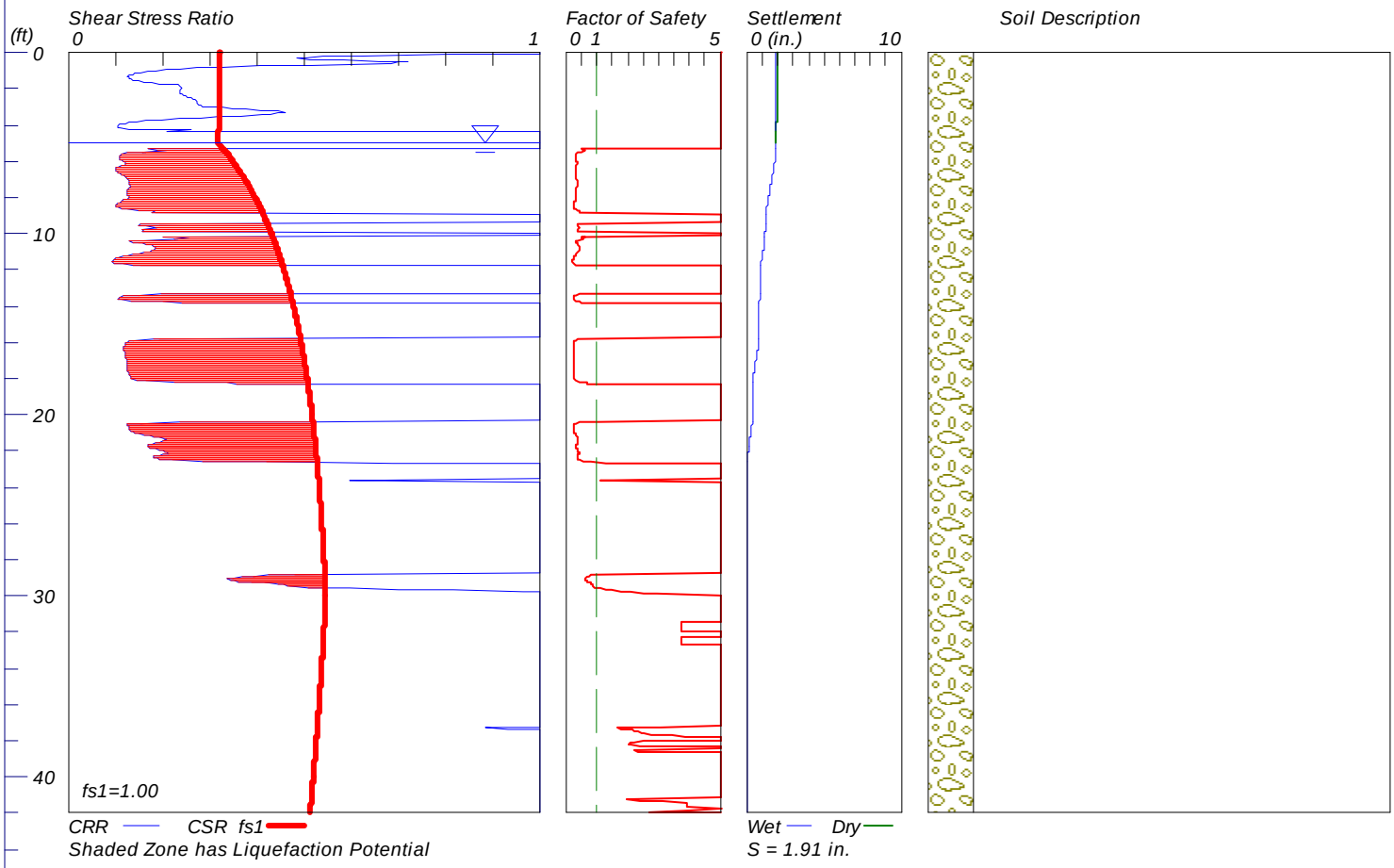


LIQUEFACTION ANALYSIS

Palomar College North

Hole No.=CPT-91 Water Depth=5 ft

Magnitude=7.57
Acceleration=0.495g



APPENDIX G

GROUNDWATER ANALYSIS RESULTS

Enthalpy Analytical, Inc.
Formerly Associated Labs
806 N. Batavia - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.associatedlabs.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client:	Construction Testing & Engineering Inc.
Address:	1441 Montiel Road Suite 115 Escondido, CA 92026
Attn:	Scott Sokolowski

Lab Request:	387127
Report Date:	02/08/2017
Date Received:	01/30/2017
Client ID:	14407

Comments: Palomar North
PO #10-13509G
Horse Ranch Creek, Fallbrook, CA

See attached report for TKN results (necessary for Total Nitrogen calculations).

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
387127-001	B-57
387127-002	B-26
387127-003	B-84

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Report Review performed by: Ranjit Clarke, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

Matrix:	Water	**Client:**	Construction Testing & Engineering Inc.	**Collector:**	client
Sampled:	01/30/2017 10:30	**Site:**			
Sample #:	**387127-001**	**Client Sample #:**	B-57	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**6.16**	1	0.5	mg/L		02/08/17	CB	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1175017
Nitrate, as Nitrogen	**5.06**	1	0.1	mg/L	02/03/17	01/31/17 16:50	JP	
Nitrite, as Nitrogen	**0.12**	1	0.1	mg/L	02/03/17	01/31/17 16:50	JP	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3010A					QCBatchID:		QC1174931
Antimony	ND	2	0.04	mg/L	02/01/17	02/02/17	JN	D2
Arsenic	**0.168**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Barium	**25.4**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Beryllium	**0.043**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Cadmium	**0.134**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Chromium	**6.84**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Cobalt	**3.47**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Copper	**6.06**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Lead	**0.772**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Molybdenum	ND	2	0.02	mg/L	02/01/17	02/02/17	JN	D2
Nickel	**3.11**	2	0.04	mg/L	02/01/17	02/02/17	JN	
Selenium	ND	2	0.02	mg/L	02/01/17	02/02/17	JN	D2
Silver	**0.025**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Thallium	ND	2	0.01	mg/L	02/01/17	02/02/17	JN	D2
Vanadium	**12.1**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Zinc	**7.59**	2	0.04	mg/L	02/01/17	02/02/17	JN	
Method: EPA 7470A *NELAC*	Prep Method: Method					QCBatchID:		QC1174963
Mercury	**0.65**	1	0.4	ug/L	02/02/17	02/02/17	JP	
Method: SM 2320-B	Prep Method: Method					QCBatchID:		QC1174959
Bicarbonate (HCO3)	**200**	1	5	mg/L		02/02/17	TP	
Carbonate (CO3)	ND	1	5	mg/L		02/02/17	TP	
Hydroxide (OH)	ND	1	5	mg/L		02/02/17	TP	
Total Alkalinity (as CaCO3)	**160**	1	5	mg/L		02/02/17	TP	
Method: SM 2540-C	Prep Method: Method					QCBatchID:		QC1174893
Total Dissolved Solids	**835**	5	50	mg/L	01/31/17	02/01/17	TP	
Method: SM 4500-H+B	Prep Method: Method					QCBatchID:		QC1174884
pH	**7.39**	1		pH Units	01/30/17 00:00	01/30/17 19:10	NP	T2
Method: SM 4500-Norg B	Prep Method: Method					QCBatchID:		
See Attached		1						

Matrix:	Water	**Client:**	Construction Testing & Engineering Inc.	**Collector:**	client
Sampled:	01/30/2017 11:30	**Site:**			
Sample #:	**387127-002**	**Client Sample #:**	B-26	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**5.05**	1	0.5	mg/L		02/08/17	CB	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1175017
Nitrate, as Nitrogen	**5.05**	1	0.1	mg/L	02/03/17	01/31/17 19:22	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	02/03/17	01/31/17 19:22	JP	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3010A					QCBatchID:		QC1174931
Antimony	ND	2	0.04	mg/L	02/01/17	02/02/17	JN	D2
Arsenic	**0.332**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Barium	**19.2**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Beryllium	ND	2	0.01	mg/L	02/01/17	02/02/17	JN	D2
Cadmium	**0.112**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Chromium	**4.53**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Cobalt	**1.97**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Copper	**3.96**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Lead	**0.596**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Molybdenum	ND	2	0.02	mg/L	02/01/17	02/02/17	JN	D2
Nickel	**1.83**	2	0.04	mg/L	02/01/17	02/02/17	JN	
Selenium	ND	2	0.02	mg/L	02/01/17	02/02/17	JN	D2
Silver	**0.025**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Thallium	ND	2	0.01	mg/L	02/01/17	02/02/17	JN	D2
Vanadium	**10.1**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Zinc	**8.40**	2	0.04	mg/L	02/01/17	02/02/17	JN	
Method: EPA 7470A *NELAC*	Prep Method: Method					QCBatchID:		QC1174963
Mercury	**0.58**	1	0.4	ug/L	02/02/17	02/02/17	JP	
Method: SM 2320-B	Prep Method: Method					QCBatchID:		QC1174959
Bicarbonate (HCO3)	**240**	1	5	mg/L		02/02/17	TP	
Carbonate (CO3)	ND	1	5	mg/L		02/02/17	TP	
Hydroxide (OH)	ND	1	5	mg/L		02/02/17	TP	
Total Alkalinity (as CaCO3)	**200**	1	5	mg/L		02/02/17	TP	
Method: SM 2540-C	Prep Method: Method					QCBatchID:		QC1174893
Total Dissolved Solids	**938**	2	20	mg/L	01/31/17	02/01/17	TP	
Method: SM 4500-H+B	Prep Method: Method					QCBatchID:		QC1174884
pH	**7.34**	1		pH Units	01/30/17 00:00	01/30/17 19:10	NP	T2
Method: SM 4500-Norg B	Prep Method: Method					QCBatchID:		
See Attached		1						

Matrix:	Water	**Client:**	Construction Testing & Engineering Inc.	**Collector:**	client
Sampled:	01/30/2017 14:00	**Site:**			
Sample #:	**387127-003**	**Client Sample #:**	B-84	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**7.65**	1	0.5	mg/L		02/08/17	CB	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1175017
Nitrate, as Nitrogen	**5.31**	1	0.1	mg/L	02/03/17	01/31/17 17:39	JP	
Nitrite, as Nitrogen	**0.14**	1	0.1	mg/L	02/03/17	01/31/17 17:39	JP	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3010A					QCBatchID:		QC1174931
Antimony	ND	2	0.04	mg/L	02/01/17	02/02/17	JN	D2
Arsenic	**0.386**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Barium	**9.99**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Beryllium	ND	2	0.01	mg/L	02/01/17	02/02/17	JN	D2
Cadmium	**0.057**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Chromium	**2.45**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Cobalt	**1.00**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Copper	**2.45**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Lead	**0.516**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Molybdenum	**0.022**	2	0.02	mg/L	02/01/17	02/02/17	JN	
Nickel	**0.844**	2	0.04	mg/L	02/01/17	02/02/17	JN	
Selenium	ND	2	0.02	mg/L	02/01/17	02/02/17	JN	D2
Silver	ND	2	0.01	mg/L	02/01/17	02/02/17	JN	D2
Thallium	ND	2	0.01	mg/L	02/01/17	02/02/17	JN	D2
Vanadium	**5.95**	2	0.01	mg/L	02/01/17	02/02/17	JN	
Zinc	**5.28**	2	0.04	mg/L	02/01/17	02/02/17	JN	
Method: EPA 7470A *NELAC*	Prep Method: Method					QCBatchID:		QC1174963
Mercury	**0.63**	1	0.4	ug/L	02/02/17	02/02/17	JP	
Method: SM 2320-B	Prep Method: Method					QCBatchID:		QC1174959
Bicarbonate (HCO3)	**260**	2.5	12.5	mg/L		02/02/17	TP	
Carbonate (CO3)	ND	2.5	12.5	mg/L		02/02/17	TP	
Hydroxide (OH)	ND	2.5	12.5	mg/L		02/02/17	TP	
Total Alkalinity (as CaCO3)	**210**	2.5	12.5	mg/L		02/02/17	TP	
Method: SM 2540-C	Prep Method: Method					QCBatchID:		QC1174893
Total Dissolved Solids	**1170**	2	20	mg/L	01/31/17	02/01/17	TP	
Method: SM 4500-H+B	Prep Method: Method					QCBatchID:		QC1174884
pH	**7.22**	1		pH Units	01/30/17 00:00	01/30/17 19:10	NP	T2
Method: SM 4500-Norg B	Prep Method: Method					QCBatchID:		
See Attached		1						

QCBatchID:	**QC1174884**	**Analyst:**	npham	**Method:**	SM 4500-H+B
Matrix:	Water	**Analyzed:**	01/30/2017	**Instrument:**	CHEM (group)

Duplicate Summary

Analyte	Sample Amount	Duplicate Amount	Units	RPD	Limits RPD	Notes
QC1174884DUP1						**Source: 387113-001**
pH	8.39	8.40	pH Units	0.1	20	

QCBatchID:	**QC1174893**	**Analyst:**	npham	**Method:**	SM 2540-C
Matrix:	Water	**Analyzed:**	02/01/2017	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1174893MB1						
Total Dissolved Solids	ND	mg/L		10		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1174893LCS1											
Total Dissolved Solids	1000		1030		mg/L	103			90-110		

Duplicate Summary

Analyte	Sample Amount	Duplicate Amount	Units	RPD	Limits RPD	Notes
QC1174893DUP1						**Source: 387127-003**
Total Dissolved Solids	1170	1170	mg/L	0.0	5	

QCBatchID: QC1174931	**Analyst:** kedy		**Method:** EPA 6010B		
Matrix: Water	**Analyzed:** 02/01/2017		**Instrument:** AAICP (group)		

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1174931MB1					
Antimony	ND	mg/L		0.02	
Arsenic	ND	mg/L		0.01	
Barium	ND	mg/L		0.01	
Beryllium	ND	mg/L		0.005	
Cadmium	ND	mg/L		0.005	
Chromium	ND	mg/L		0.01	
Cobalt	ND	mg/L		0.005	
Copper	ND	mg/L		0.01	
Lead	ND	mg/L		0.005	
Molybdenum	ND	mg/L		0.01	
Nickel	ND	mg/L		0.02	
Selenium	ND	mg/L		0.01	
Silver	ND	mg/L		0.005	
Thallium	ND	mg/L		0.005	
Vanadium	ND	mg/L		0.005	
Zinc	ND	mg/L		0.02	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1174931LCS1											
Antimony	2		1.90		mg/L	95			80-120		
Arsenic	2		1.89		mg/L	95			80-120		
Barium	2		2.17		mg/L	109			80-120		
Beryllium	2		2.03		mg/L	102			80-120		
Cadmium	2		2.13		mg/L	107			80-120		
Chromium	2		2.03		mg/L	102			80-120		
Cobalt	2		2.11		mg/L	106			80-120		
Copper	2		2.01		mg/L	101			80-120		
Lead	2		2.06		mg/L	103			80-120		
Molybdenum	2		2.03		mg/L	102			80-120		
Nickel	2		2.10		mg/L	105			80-120		
Selenium	2		1.89		mg/L	95			80-120		
Silver	2		1.86		mg/L	93			80-120		
Thallium	2		2.01		mg/L	101			80-120		
Vanadium	2		2.10		mg/L	105			80-120		
Zinc	2		2.08		mg/L	104			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1174931MS1, QC1174931MSD1												**Source: 387127-003**
Antimony	ND	1	1	-0.052	-0.192	mg/L	0	0	114.8	75-125	20	M,M,D
Arsenic	0.386	1	1	1.32	1.28	mg/L	93	89	3.1	75-125	20	
Barium	9.99	1	1	12.3	12.8	mg/L	231	281	4.0	75-125	20	NC
Beryllium	ND	1	1	0.876	0.891	mg/L	88	89	1.7	75-125	20	
Cadmium	0.057	1	1	1.20	1.16	mg/L	114	110	3.4	75-125	20	
Chromium	2.45	1	1	3.81	3.94	mg/L	136	149	3.4	75-125	20	M
Cobalt	1.00	1	1	2.41	2.31	mg/L	141	131	4.2	75-125	20	M
Copper	2.45	1	1	3.66	3.81	mg/L	121	136	4.0	75-125	20	M
Lead	0.516	1	1	1.73	1.63	mg/L	121	111	6.0	75-125	20	

QCBatchID: QC1174931	**Analyst:** kedy	**Method:** EPA 6010B	
Matrix: Water	**Analyzed:** 02/01/2017	**Instrument:** AAICP (group)	

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1174931MS1, QC1174931MSD1											**Source:**	**387127-003**
Molybdenum	0.022	1	1	0.428	0.393	mg/L	41	37	8.5	75-125	20	M
Nickel	0.844	1	1	2.23	2.13	mg/L	139	129	4.6	75-125	20	M
Selenium	ND	1	1	-2.588	-2.288	mg/L	0	0	12.3	75-125	20	M
Silver	0.009	1	1	0.896	0.907	mg/L	89	90	1.2	75-125	20	
Thallium	ND	1	1	0.722	0.730	mg/L	72	73	1.1	75-125	20	M
Vanadium	5.95	1	1	7.44	7.78	mg/L	149	183	4.5	75-125	20	NC
Zinc	5.28	1	1	7.02	7.45	mg/L	174	217	5.9	75-125	20	NC

QCBatchID:	**QC1174959**	**Analyst:**	trinh	**Method:**	SM 2320-B
Matrix:	Water	**Analyzed:**	02/02/2017	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1174959MB1						
Bicarbonate (HCO3)	ND	mg/L		5		
Carbonate (CO3)	ND	mg/L		5		
Hydroxide (OH)	ND	mg/L		5		
Total Alkalinity (as CaCO3)	ND	mg/L		5		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1174959LCS1											
Total Alkalinity (as CaCO3)	200		190		mg/L	95			90-110		

Duplicate Summary

Analyte	Sample Amount	Duplicate Amount	Units	RPD	Limits RPD	Notes
QC1174959DUP1						**Source: 386968-001**
Bicarbonate (HCO3)	300	300	mg/L	0.0	20	
Carbonate (CO3)	ND	ND	mg/L	0.0	20	
Hydroxide (OH)	ND	ND	mg/L	0.0	20	
Total Alkalinity (as CaCO3)	240	240	mg/L	0.0	20	

QCBatchID:	**QC1174963**	**Analyst:**	dswafford	**Method:**	EPA 7470A
Matrix:	Water	**Analyzed:**	02/02/2017	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1174963MB1						
Mercury	ND	ug/L		0.4		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1174963LCS1											
Mercury	5		4.87		ug/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1174963MS1, QC1174963MSD1												**Source: 387174-001**
Mercury	ND	5	5	4.68	4.66	ug/L	94	93	0.4	75-125	20	

QCBatchID: QC1175017	**Analyst:** JParedes	**Method:** EPA 300.0			
Matrix: Water	**Analyzed:** 02/03/2017	**Instrument:** AAICP (group)			

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1175017MB1						
Nitrate + Nitrite, as Nitrogen	ND	mg/L		0.1		
Nitrate, as Nitrogen	ND	mg/L		0.1		
Nitrite, as Nitrogen	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1175017LCS1											
Nitrate, as Nitrogen	9.04		8.68		mg/L	96			90-110		
Nitrite, as Nitrogen	9.13		8.72		mg/L	96			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1175017MS1, QC1175017MSD1												**Source: 387142-001**
Nitrate, as Nitrogen	2.50	9.04	9.04	11.5	11.5	mg/L	100	100	0.0	80-120	20	
Nitrite, as Nitrogen	ND	9.13	9.13	8.21	8.26	mg/L	90	90	0.6	80-120	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
931 W. Barkley Ave, Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933	Lab No: 387127 Page: 1 of 1	Standard: 7 · 4 Day: · 3 Day: · 2 Day: · 1 Day: · Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	CTE INC	Name:	PALOMAR NORTH
Report To:	SCOTT SOKOLOWSKI	Number:	10-135096
Email:	SCOTT@CTE-INC.NET	P.O. #:	10-135096
Address:	1441 MONTIEL RD. STE 115	Address:	HORSE RANCH CREEK RD FALLBROOK, CA
~~Phone:~~	ESCONDIDO CA 92026	Global ID:	
~~Fax:~~ PHONE	760-672-3514	Sampled By:	S SOKOLOWSKI

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: METALS	Test Instructions / Comments
1	B-57	1/30/17	10:30	W	4	Y/2	X	
2	B-26	1/30/17	11:30	W	4	Y/2	X	
3	B-54	1/30/17	2:00 PM	W	4	Y/2	X	
4								
5								
6								
7								
8								
9								
10								

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		SCOTT SOKOLOWSKI	CTE INC / GEOLOGIST	1/30/17 2:40 PM
1 Received By:		E. Marriott		1/30/17 1440
2 Relinquished By:		E. Marriott		1/30/17 1617
2 Received By:		Gerry Kuo		1/30/17 1617
3 Relinquished By:				
3 Received By:				

Ranjit Clarke

From: Scott Sokolowski <scott@cte-inc.net>
Sent: Thursday, January 12, 2017 10:44 AM
To: Ranjit Clarke
Subject: RE: Sample bottle delivery?

Ranjit,
Thank you, run for Total Nitrogen. I'll find out the sample days and arrange for p/u the day before. Would you be able to pickup at the jobsite? It's off of Horse Ranch Creek Road in Fallbrook.

Scott Sokolowski, PG
Project Geologist
1441 Montiel Rd Ste 115, Escondido, CA 92026 | Ph (760) 746-4955 | Fax (760) 746-9806
Construction Testing & Engineering, Inc.
Inspection • Testing • Geotechnical • Environmental & Construction Engineering • Civil Engineering • Surveying
cte-inc.net

From: Ranjit Clarke [mailto:Ranjit.Clarke@enthalpy.com]
Sent: Thursday, January 12, 2017 10:38 AM
To: Scott Sokolowski
Subject: RE: Sample bottle delivery?

Scott,

We will get the bottles to you tomorrow. The holding times are as follows:

Nitrogen/Nitrates = 48hrs*
Total Dissolved Salts/TDS = 7 Days
Heavy metals = 6 months
pH = 15 min
Alkalinity = 14 Days

***For the Nitrogen, do you just need Nitrates or do you need Total Nitrogen (which includes Nitrate, Nitrite and TKN)?**

For pH, it is best to use a field meter. The lab can always run a pH as well.

There shouldn't be an issue picking these up next week to meet holding times as long as the p/u is arranged the day before.

Thanks,

Ranjit

Ranjit Clarke
Senior Project Manager
O: 714-771-9906 / M: 657-274-9864 / F: 714-538-1209
Ranjit.Clarke@enthalpy.com

From: Scott Sokolowski [mailto:scott@cte-inc.net]
Sent: Thursday, January 12, 2017 10:31 AM
To: Ranjit Clarke <Ranjit.Clarke@enthalpy.com>
Subject: Sample bottle delivery?

Ranjit,

Good morning, I need 4 sets of sample containers delivered to the office tomorrow for the following analytics:

Nitrogen/Nitrates
Total Dissolved Salts/TDS
Heavy metals
pH
Alkalinity

I also need to know the hold times for these analyses and if there would be any issues with getting these picked up next week to meet the hold times. Does it make more sense to take pH with a field meter?

Thank you,

Scott Sokolowski, PG
Project Geologist
1441 Montiel Rd Ste 115, Escondido, CA 92026 | Ph (760) 746-4955 | Fax (760) 746-9806
Construction Testing & Engineering, Inc.
Inspection • Testing • Geotechnical • Environmental & Construction Engineering • Civil Engineering • Surveying
cte-inc.net

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client:_____ Project:_____

Date Received:_____ Sampler's Name Present: Yes No

Sample(s) received in a cooler? (Yes) How many? 1 No (skip section 2) Sample Temp (°C):_____

Sample Temp (°C) from each cooler: #1: 1.4 #2: _____ #3:_____ #4:_____

(Acceptance range is 0 to 6°C or, for samples collected the same day as sample receipt, arrival on ice; For Microbiology sample 0 to 10°C ar, for samples collected the same day as sample receipt, arrival on ice)

Shipping Information:_____

Section 2

Was the cooler packed with: ✓ Ice ____ Ice Packs ____ Bubble Wrap ___ Styrofoam

____ Paper ____None ____ Other_____

Cooler Temp (°C): #1: 0.7 #2: _____ #3:_____ #4:_____

Section 3	YES	NO	N/A
Was a COC received?	✓		
Were sample IDs present?	✓		
Were sampling dates & times present?	✓		
Was a relinquished signature present?	✓		
Were the tests required clearly indicated?	✓		
Were custody seals present?	✓	—	
If Yes – were they intact?	✓		—
Were all samples sealed in plastic bags?			✓
Did all samples arrive intact? If no, indicate below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were correct containers used for the tests required?	✓		
Was a sufficient amount of sample sent for tests indicated?	✓		
Was there headspace in VOA vials?			✓
Were the containers labeled with correct preservatives?	✓		

21/30/17

21/30/17

Section 4

Explanations/Comments:_____

Section 5

For discrepancies, how was the Project Manager notified? Verbal PM Initials:_____ Date/Time_____

Email (email sent to/on):_____ /_____

Project Manager's response:

Completed By: _____ Date: 1-30-17

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WORK ORDER NUMBER: 17-01-2629

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Enthalpy Analytical, Inc.

Client Project Name: 387127

Attention: Ranjit Clarke
931 W. Barkley Avenue
Orange, CA 92868-1208

Approved for release on 02/07/2017 by:
Xuan Dang
Project Manager

ResultLink

Email your PM

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Contents

Client Project Name: 387127
Work Order Number: 17-01-2629

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Work Order Narrative

Work Order: 17-01-2629 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 01/31/17. They were assigned to Work Order 17-01-2629.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Enthalpy Analytical, Inc. 931 W. Barkley Avenue Orange, CA 92868-1208	Work Order:	17-01-2629
		Project Name:	387127
		PO Number:	387127
		Date/Time Received:	01/31/17 14:57
		Number of Containers:	3
Attn:	Ranjit Clarke		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
B-57 (387127-001)	17-01-2629-1	01/30/17 10:30	1	Aqueous
B-26 (387127-002)	17-01-2629-2	01/30/17 11:30	1	Aqueous
B-84 (387127-003)	17-01-2629-3	01/30/17 14:00	1	Aqueous

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Detections Summary

Client:	Enthalpy Analytical, Inc.	Work Order:	17-01-2629
	931 W. Barkley Avenue	Project Name:	387127
	Orange, CA 92868-1208	Received:	01/31/17
Attn:	Ranjit Clarke		

Client SampleID

Analyte	Result	Qualifiers	RL	Units	Method	Extraction
B-57 (387127-001) (17-01-2629-1)						
Total Kjeldahl Nitrogen	0.98		0.50	mg/L	SM 4500 N Org B	N/A
B-84 (387127-003) (17-01-2629-3)						
Total Kjeldahl Nitrogen	2.2		0.50	mg/L	SM 4500 N Org B	N/A

Subcontracted analyses, if any, are not included in this summary.

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* MDL is shown

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Analytical Report

Enthalpy Analytical, Inc.
931 W. Barkley Avenue
Orange, CA 92868-1208

Project: 387127

Date Received: 01/31/17
Work Order: 17-01-2629
Preparation: N/A
Method: SM 4500 N Org B
Units: mg/L

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
B-57 (387127-001)	**17-01-2629-1-A**	**01/30/17 10:30**	**Aqueous**	**BUR05**	**02/06/17**	**02/06/17 17:00**	**H0206TKNL1**

Parameter	Result	RL	DF	Qualifiers
Total Kjeldahl Nitrogen	0.98	0.50	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
B-26 (387127-002)	**17-01-2629-2-A**	**01/30/17 11:30**	**Aqueous**	**BUR05**	**02/06/17**	**02/06/17 17:00**	**H0206TKNL1**

Parameter	Result	RL	DF	Qualifiers
Total Kjeldahl Nitrogen	ND	0.50	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
B-84 (387127-003)	**17-01-2629-3-A**	**01/30/17 14:00**	**Aqueous**	**BUR05**	**02/06/17**	**02/06/17 17:00**	**H0206TKNL1**

Parameter	Result	RL	DF	Qualifiers
Total Kjeldahl Nitrogen	2.2	0.50	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-05-076-3730**	**N/A**	**Aqueous**	**BUR05**	**02/06/17**	**02/06/17 17:00**	**H0206TKNL1**

Parameter	Result	RL	DF	Qualifiers
Total Kjeldahl Nitrogen	ND	0.50	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Sample Duplicate

Enthalpy Analytical, Inc.		Date Received:	01/31/17
931 W. Barkley Avenue		Work Order:	17-01-2629
Orange, CA 92868-1208		Preparation:	N/A
		Method:	SM 4500 N Org B
Project: 387127			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
17-01-2585-2	**Sample**	**Aqueous**	**BUR05**	**02/06/17 00:00**	**02/06/17 17:00**	**H0206TKND1**
17-01-2585-2	**Sample Duplicate**	**Aqueous**	**BUR05**	**02/06/17 00:00**	**02/06/17 17:00**	**H0206TKND1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Total Kjeldahl Nitrogen	781.2	778.4	0	0-25	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Enthalpy Analytical, Inc.
931 W. Barkley Avenue
Orange, CA 92868-1208

Project: 387127

Date Received: 01/31/17
Work Order: 17-01-2629
Preparation: N/A
Method: SM 4500 N Org B
Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-05-076-3730	**LCS**	**Aqueous**	**BUR05**	**02/06/17**	**02/06/17 17:00**	**H0206TKNL1**
099-05-076-3730	**LCSD**	**Aqueous**	**BUR05**	**02/06/17**	**02/06/17 17:00**	**H0206TKNL1**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Total Kjeldahl Nitrogen	5.000	4.480	90	4.760	95	80-120	6	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 17-01-2629 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Enthalpy Analytical
Formerly Associated Labs
1 Park Plaza, Suite 1000
Irvine, CA 92614
Tel: 714.771.6900 Fax: 714.538.1209
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Subcontract Laboratory:

Eurofins CalScience - Sub
7440 Lincoln Way
Garden Grove, CA 92841

ATTN: Xuan Dang
PO# 387127

Project: 387127 **Due:**
PM: Ranjit Clarke
Email: ranjit.clarke@enthalpy.com
CC: incomingreports@enthalpy.com

Require: ☑ EDD ☐ EDF ☐ EDT

Report To: ☐ MDL

17-01-2629

Note:

	Matrix	Sampled	Sample ID	Analysis	Comment
1	Water	01/30/17 10:30	B-57 (387127-001)	4500-N Org B_OUT	TKN
2	Water	01/30/17 11:30	B-26 (387127-002)	4500-N Org B_OUT	TKN
3	Water	01/30/17 14:00	B-84 (387127-003)	4500-N Org B_OUT	TKN

Note:
Standard TAT

Relinquished By	Received By:
Date/Time 1/31/17 14:10	Date/Time 1/31/17 1405
Date/Time 1/31/17 1457	Date/Time 1/31/17 14:57

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WORK ORDER NUMBER: 17-01- 2629

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Enthalpy Analytical

DATE: 01 / 31 / 2017

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC3B (CF: 0.0°C); Temperature (w/o CF): 3.3 °C (w/ CF): 3.3 °C; ☐ Blank ☑ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: 659

CUSTODY SEAL:

Cooler ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: 659

Sample(s) ☑ Present and Intact ☐ Present but Not Intact ☐ Not Present ☐ N/A Checked by: 659

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☐	☐	☑
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☑	☐	☐
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOA**h** ☐ VOA**na$_2$** ☐ 100PJ ☐ 100PJ**na$_2$** ☐ 125AGB ☐ 125AGB**h** ☐ 125AGB**p** ☐ 125PB

☐ 125PB**znna** ☐ 250AGB ☐ 250CGB ☐ 250CGB**s** ☐ 250PB ☐ 250PB**n** ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s**

☑ 500PB**s** ☐ 1AGB ☐ 1AGB**na$_2$** ☐ 1AGB**s** ☐ 1PB ☐ 1PB**na** ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (_____) ☐ EnCores® (_____) ☐ TerraCores® (_____) ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, Labeled/Checked by: 659

s = H_2SO_4, **u** = ultra-pure, **x** = Na_2SO_3+$NaHSO_4.H_2O$, **znna** = Zn $(CH_3CO_2)_2$ + NaOH Reviewed by: 656

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