APPENDIX B

GEOTECHNICAL INVESTIGATION VOIGT PARKING STRUCTURE (SCST 2016)

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GEOTECHNICAL INVESTIGATION
VOIGT PARKING STRUCTURE
LA JOLLA, CALIFORNIA
UCSD JOB NO. 5146

PREPARED FOR:

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November 29, 2016

SCST No. 160479P4
Report No. 1

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Subject: GEOTECHNICAL INVESTIGATION
VOIGT PARKING STRUCTURE
LA JOLLA, CALIFORNIA
UCSD JOB NO. 5146

Dear Roland:

SCST, Inc. (SCST) is pleased to present our report describing the geotechnical investigation performed for the subject project. We conducted the geotechnical investigation in general conformance with the scope of work presented in our proposal dated October 12, 2016. Based on the results of our investigation, we consider the planned development feasible from a geotechnical standpoint provided the recommendations of this report are followed. If you have any questions, please call us at (619) 280-4321.

Respectfully submitted,
SCST, INC.

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EXECUTIVE SUMMARY

This report presents the results of the geotechnical investigation SCST, Inc. (SCST) performed for the subject project. We understand the project will consist of the design and construction of a parking structure on the east side of the canyon located north of Geisel Library. The number of parking levels and the finished floor elevation of the lowest level were not available at the time of this report. However, preliminary studies indicate that the parking structure can daylight on the west side, corresponding to a finished floor elevation of roughly 310 feet. Excavations up to about 45 feet deep would be required to achieve this elevation. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project.

We explored the subsurface conditions by drilling nine borings to depths between about 18 and 51 feet below the existing ground surface using truck-mounted and limited-access drill rigs equipped with a hollow stem auger. Auger refusal on strongly cemented material/concretions occurred in six of the nine borings. An SCST engineer logged the borings and collected samples of the materials encountered for laboratory testing. SCST tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations.

The materials encountered in the borings consist of fill and Scripps Formation. Although not encountered in the borings, alluvium likely exists in the canyon bottom. The fill consists of medium dense to very dense silty to clayey sand with varying amounts of gravel. The Scripps Formation consists of dense to very dense, weakly to strongly cemented sandstone and siltstone and hard, strongly cemented claystone. Groundwater was not encountered in the borings.

The main geotechnical considerations affecting the project are the presence of potentially compressible soils (fill and possibly alluvium), a possible cut/fill transition, expansive soils, and difficult excavations in the Scripps Formation. To reduce the potential for settlement, compressible soils should be excavated below the parking structure and settlement-sensitive improvements. We anticipate that the bottom level of the parking structure will generally extend through the existing fill and into competent Scripps Formation. However, the west side may be underlain by fill. To mitigate such a transition and reduce the potential for differential settlement, the structure should be supported entirely on formational materials. In the formation area, the structure can be supported on shallow spread footings with bottom levels on Scripps Formation. In the fill area, to accommodate bearing on formation, the structure can be supported on deepened spread footings, soil-cement structural fill or sand/cement slurry placed between formation and bottom of footings, aggregate piers, or deep foundations. To reduce the potential for expansive heave, the top 2 feet of expansive soils beneath concrete slabs should be removed and replaced with material having an expansion index of 20 or less. Strongly cemented zones should be expected within the Scripps Formation. Gravel and cobbles should also be anticipated. The recommendations presented herein may need to be updated once final plans are developed.

1 INTRODUCTION

This report presents the results of the geotechnical investigation SCST, Inc. (SCST) performed for the subject project. We understand the project will consist of the design and construction of a parking structure on the east side of the canyon located north of Geisel Library. Design-level information was not available at the time of this report. However, preliminary studies indicate that excavations up to about 45 feet deep may be required to reach the lowest partial subterranean level. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project. Figure 1 presents a site vicinity map. Figure 2 presents the site location on the United States Geologic Survey 7.5 Minute Quadrangle Map.

2 SCOPE OF WORK

2.1 FIELD INVESTIGATION

We explored the subsurface conditions by drilling nine borings to depths between about 18 and 51 feet below the existing ground surface using truck-mounted and limited-access drill rigs equipped with a hollow stem auger. Auger refusal on strongly cemented material/ concretions occurred in six of the nine borings. Figure 3 shows the approximate locations of the borings. An SCST engineer logged the borings and collected samples of the materials encountered for laboratory testing. Logs of the borings are presented in Appendix I. Soils are classified according to the Unified Soil Classification System illustrated on Figure I-1.

2.2 LABORATORY TESTING

Selected samples were tested to evaluate pertinent soil classification and engineering properties and enable development of geotechnical conclusions and recommendations. The laboratory tests consisted of in situ moisture and density, grain size distribution, Atterberg Limits, R-value, expansion index, corrosivity and direct shear. The results of the laboratory tests and brief explanations of the test procedures are presented in Appendix II.

2.3 ANALYSIS AND REPORT

The results of the field and laboratory tests were evaluated to develop conclusions and recommendations regarding:

- Subsurface conditions beneath the site
- Potential geologic hazards
- Criteria for seismic design in accordance with the 2013 California Building Code (CBC)
- Site preparation and grading
- Temporary shoring
- Foundation alternatives and geotechnical engineering criteria for design of the foundations
- Estimated foundation settlements
- Support for concrete slabs-on-grade
- Lateral pressures for the design of retaining walls
- Pavement sections
- Soil corrosivity

2.4 ENVIRONMENTAL SOILS TESTING

SCST subcontracted with a State of California certified laboratory to perform environmental testing of the onsite soils as an indication of the presence of hazardous materials at the site. The analytical test results are presented in a separate report.

3 SITE DESCRIPTION

The site is located south of Voigt Drive, west of Engineer Lane and Jacobs School of Engineering, north of Geisel Library and east of Hopkins Lane in the Warren College area of UCSD's main campus in La Jolla, California. The site consists of paved Parking Lot P503 and the eastern flank of a southwest-northeast trending tributary canyon to Soledad Valley. The canyon side slope descends about 40 feet to the west at an inclination as steep as about 2½:1 (horizontal:vertical). Vegetation consists of eucalyptus trees in the central portion of the site and dense brush in the western portion of the site on the canyon side slope. The dense brush consists of Diegan Coastal Sage Scrub; therefore, this environmentally sensitive land was not accessible at the time of our investigation. Site elevations range from about 355 feet at the southeastern portion of the site to about 310 feet at the northwestern portion of the site near the canyon bottom.

4 PROPOSED DEVELOPMENT

We understand the project will consist of the design and construction of a parking structure. The number of parking levels and the finished floor elevation of the lowest level were not available at the time of this report. However, preliminary studies indicate that the parking structure can daylight on the west side, corresponding to a finished floor elevation of roughly 310 feet. Excavations up to about 45 feet deep would be required to achieve this elevation.

5 GEOLOGY AND SUBSURFACE CONDITIONS

The materials encountered in our borings consist of fill and Scripps Formation. Although not encountered in the borings, alluvium likely exists in the bottom of the canyon. Descriptions of the materials encountered are presented below. Figure 3 presents the site-specific geology. Figure 4 presents the regional geology in the vicinity of the site.

Fill: Fill was encountered in seven of the nine borings. The fill consists of medium dense to very dense silty to clayey sand with varying amounts of gravel. The fill extends to depths varying from about 2½ to 15 feet below the existing ground surface.

Alluvium: Alluvium is mapped in the bottom of the canyon along the western edge of the site. The area was not explored due to current access restrictions. The alluvium is anticipated to be unconsolidated.

Scripps Formation: The fill is underlain by Scripps Formation. The Scripps Formation consists of dense to very dense, weakly to strongly cemented sandstone and siltstone and

hard, strongly cemented claystone consist of medium dense to very dense, weakly to strongly cemented silty to clayey sandstone. Auger refusal on strongly cemented material/concretions occurred in borings B-1, B-3, B-4, B-6, B-8 and B-9.

Groundwater: Groundwater was not encountered in the borings. The permanent groundwater table is expected to be below a depth that will influence the planned construction. However, groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage. Because groundwater rise or seepage is difficult to predict, such conditions are typically mitigated if and when they occur.

6 GEOLOGIC HAZARDS

6.1 FAULTING AND SURFACE RUPTURE

The closest known active fault is the Rose Canyon fault zone (Del Mar section) located about 2.3 miles (3.7 kilometers) west-southwest of the site. The closest mapped fault is an unnamed fault located about 100 feet south of the site (City of San Diego, 2008). This fault is not known to have offset Holocene sediments indicating it is not an active fault. The State of California does not consider this fault to be active, and an Alquist-Priolo Earthquake Fault Zone has not been established for the fault. It is our opinion that, according to the guidelines of the State of California, the unnamed fault is not a potential source of seismic shaking or ground rupture. The site is not located in an Alquist-Priolo Earthquake Fault Zone. No active faults are known to underlie or project toward the site. Therefore, the probability of fault rupture is low.

6.2 CBC SEISMIC DESIGN PARAMETERS

A geologic hazard likely to affect the project is groundshaking as a result of movement along an active fault zone in the vicinity of the subject site. The site coefficients and maximum considered earthquake (MCE_R) spectral response acceleration parameters in accordance with the 2013 CBC are presented below:

Site Coordinates: Latitude 32.88225°
Longitude -117.23596°
Site Class: C
Site Coefficients, F_a = 1.000
F_v = 1.336
S_s = 1.198g
S_1 = 0.464g
S_{DS} = 0.799g
S_{D1} = 0.413g
PGA_M = 0.524g

6.3 LANDSLIDES AND SLOPE STABILITY

Claystones within the Scripps Formation may contribute to slope instability where the structure is unfavorable (dipping out of slope). Locally, however, the Scripps Formation dips to the

south-southwest, or generally into slope, which will contribute to the slope at the site being stable. Evidence of landslides or slope instabilities was not observed during our investigation. The potential for landslides or slope instabilities to occur at the site is considered low.

6.4 CITY OF SAN DIEGO SEISMIC SAFETY STUDY

Figure 5 shows the approximate site location on the City of San Diego Seismic Safety Study map. The site is located in Geologic Hazard Category 53, which is defined as level to sloping terrain with unfavorable geologic structure and low to moderate risk. In our opinion, the geologic risk is low.

6.5 LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction occurs when loose, saturated, generally fine sands and silts are subjected to strong ground shaking. The soils lose shear strength and become liquid; resulting in large total and differential ground surface settlements as well as possible lateral spreading during an earthquake. Due to the lack of shallow groundwater, and given the relatively dense nature of the materials beneath the site, the potential for liquefaction and dynamic settlement to occur is considered negligible.

6.6 FLOODING, TSUNAMIS AND SEICHES

The site is not located within a mapped area on the State of California Tsunami Inundation Maps (Cal EMA, 2009); therefore, damage due to tsunamis is considered low. Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The site is not located adjacent to any lakes or confined bodies of water; therefore, the potential for a seiche to affect the site is considered negligible. The site is not located within a flood zone or dam inundation area (County of San Diego, 2012).

6.7 SUBSIDENCE

The site is not located in an area of known subsidence associated with fluid withdrawal (groundwater or petroleum); therefore, the potential for subsidence due to the extraction of fluids is considered negligible.

6.8 HYDRO-CONSOLIDATION

Hydro-consolidation can occur in recently deposited sediments (less than 10,000 years old) that were deposited in a semi-arid environment. Examples of such sediments are aolian sands, alluvial fan deposits, and mudflow sediments deposited during flash floods. The pore spaces between the particle grains can re-adjust when inundated by groundwater causing the material to consolidate. The relatively dense materials underlying the site are not considered susceptible to hydro-consolidation.

7 CONCLUSIONS

The main geotechnical considerations anticipated to affect the project are the presence of potentially compressible soils (fill and possibly alluvium), a possible cut/fill transition, expansive soils, and difficult excavations in the Scripps Formation. We anticipate that the planned parking structure will generally extend through the compressible soils and be underlain by Scripps Formation. However, the western portion of the structure may be underlain by fill, and special site preparation or foundation design may need to be performed to reduce the potential for distress. Alternatives are presented in this report. The recommendations presented herein may need to be updated once final plans are developed.

8 RECOMMENDATIONS

8.1 SITE PREPARATION AND GRADING

8.1.1 Site Preparation

Site preparation should begin with the removal of existing improvements, vegetation and debris. Subsurface improvements that are to be abandoned should be removed, and the resulting excavations should be backfilled and compacted in accordance with the recommendations of this report. Pipeline abandonment can consist of capping or rerouting at the project perimeter and removal within the project perimeter. If appropriate, abandoned pipelines can be filled with grout or slurry as recommended by and observed by the geotechnical consultant.

8.1.2 Compressible Soils

The existing fill and alluvium, if encountered, should be excavated in their entirety beneath the parking structure and settlement sensitive improvements. Horizontally, excavations should extend at least 5 feet outside the planned perimeter foundations, at least 2 feet outside the planned hardscape or pavements, or up to existing improvements or the limits of grading, whichever is less. An SCST representative should observe conditions exposed in the bottom of excavation to determine if additional excavation is required.

8.1.3 Cut/Fill Transition

Depending on the design location of the parking structure and the extent of remedial excavations, the parking structure may straddle materials with different settlement potentials. This would occur at a transition from formation to fill. To mitigate such a transition and reduce the potential for differential settlement, the structure should be supported entirely on formation. In the formation area, the structure can be supported on shallow spread footings with bottom levels on Scripps Formation. In the fill area, to accommodate bearing on Scripps Formation, the structure can be supported on deepened

spread footings, soil-cement structural fill or sand/cement slurry placed between the formation and design bottom of footing, aggregate piers, or deep foundations. A structural slab may be needed in the fill area depending on fill depths. Specific recommendations should be made based on the final design. Additional exploration may be warranted.

8.1.4 Expansive Soil

To reduce the potential for expansive heave, soils with an expansion index greater than 20 should be excavated 2 feet below the planned parking structure or exterior slab subgrade elevations. Horizontally, excavations should extend at least 2 feet outside the perimeter of the slab or up to temporary shoring or existing improvements, whichever is less. Granular material with an expansion index of 20 or less should be used as replacement fill.

8.1.5 Compacted Fill

Excavated material, except for soil containing roots, debris and rock greater than 6 inches, can be used as compacted fill. Exterior concrete slabs-on-grade should be underlain by at least 2 feet of material with an expansion index of 20 or less determined in accordance with ASTM D4829. We expect that most of the onsite materials will meet the expansion index criteria. Fill should be placed in 6- to 8-inch thick loose lifts, moisture conditioned to near optimum moisture content, and compacted to at least 90% relative compaction. The maximum density and optimum moisture content for the evaluation of relative compaction should be determined in accordance with ASTM D1557. Utility trench backfill beneath structures, pavements and hardscape should be compacted to at least 90% relative compaction. The top 12 inches of subgrade beneath pavements should be compacted to at least 95% relative compaction.

8.1.6 Soil-Cement Structural Fill

We anticipate that the excavated soils will generally be suitable for use as soil-cement structural fill, if used. The soils should be mixed with Type II cement, moisture conditioned to not less than 1% below or not more than 2% above optimum content, and compacted to at least 95% relative compaction. The maximum dry density and optimum moisture content for evaluating relative compaction should be determined in accordance with ASTM D558, except the test method should be modified such that compaction is performed using a 10-lb rammer dropped from a height of 18 inches. The unconfined compressive strength (UCS) of the soil-cement should be at least 250 pounds per square inch (psi) at 28 days. We anticipate that a cement application rate of 5% cement by dry weight can be used. A soil-cement mix design should be performed to determine the actual cement application rate to achieve a UCS of at least 250 psi. A soil-cement dry unit weight of 120 pounds per cubic foot (pcf) can be assumed for estimating purposes.

8.1.7 Imported Soil

Imported soil should consist of predominately granular soil free of organic matter and rocks greater than 6 inches. Imported soil should have an expansion index of 20 or less and should be inspected and, if appropriate, tested by SCST prior to transport to the site.

8.1.8 Excavation Characteristics

It is anticipated that excavations can be achieved with conventional earthwork equipment in good working order. Difficult excavation should be anticipated in cemented zones within the formational materials. Localized concretions up to several feet in diameter may be encountered. Gravel and cobbles should also be anticipated. Contract documents should specify that the contractor mobilize equipment capable of excavating and compacting strongly cemented materials with gravel, cobbles and large concretions.

8.1.9 Oversized Material

Excavations may generate oversized material. Oversized material is defined as rocks or cemented clasts greater than 6 inches in largest dimension. Oversized material should be broken down to no greater than 6 inches in largest dimension for use in fill, used as landscape material, or disposed offsite.

8.1.10 Temporary Excavations

Temporary excavations 3 feet deep or less can be made vertically. Deeper temporary excavations in fill or alluvium should be laid back no steeper than 1:1 (horizontal:vertical). Deeper temporary excavations in Scripps Formation should be laid back no steeper than ¾:1 (horizontal:vertical) up to 30 feet deep. The faces of temporary slopes should be inspected daily by the contractor's Competent Person before personnel are allowed to enter the excavation. Any zones of potential instability, sloughing or raveling should be brought to the attention of the Engineer and corrective action implemented before personnel begin working in the excavation. Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. SCST should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces. Slopes steeper than those described above will require shoring. Additionally, temporary excavations that extend below a plane inclined at 1½:1 (horizontal:vertical) downward from the outside bottom edge of existing structures or improvements will require shoring.

8.1.11 Temporary Shoring

For design of cantilevered shoring with level backfill, an active earth pressure equal to a fluid weighing 35 pounds per cubic foot (pcf) can be used. For design of tied-back shoring with level backfill, a trapezoidal earth pressure distribution with a maximum pressure of 25H pounds per square foot (psf) at 0.2H down from the top of shoring and 0.2H up from the base of shoring, where H is the height of shoring in feet, can be used. The surcharge loads from traffic and construction equipment adjacent to the shored excavation can be modeled by assuming an additional 2 feet of soil behind the shoring.

For design of soldier piles embedded in Scripps Formation, an allowable passive pressure of 350 psf per foot of embedment over three times the pile diameter or the spacing of the piles, whichever is less, up to a maximum of 7,500 psf can be used. Soldier piles should be spaced at least three pile diameters, center to center.

For design of tie-backs, a friction angle of 35 degrees, a cohesion of 200 psf and an average frictional resistance of 600 psf can be used for the portion of anchor embedded in Scripps Formation. Only the frictional resistance developed beyond the active wedge will be effective in resisting lateral loads. It can be assumed that the active wedge adjacent to the shoring wall is defined by a plane drawn at 35 degrees from vertical through the bottom of the excavation. Anchor capacities should be proof-tested during construction. Where satisfactory tests are not achieved, the anchor diameter and/or length should be increased until satisfactory test results are obtained.

Continuous lagging will be required throughout. The soldier piles and tie-back anchors should be designed for the full-anticipated lateral pressure; however, the pressure on the lagging will be less due to arching in the soils. For design of lagging, the earth pressure but can be limited to a maximum value of 400 psf.

We recommend that the performance of the shoring system be monitored. The monitoring should consist of periodic surveying of the lateral and vertical locations of the tops of all soldier piles and the lateral movement along the lengths of selected soldier piles. We recommend that structures and improvements adjacent to the shoring be surveyed by the contractor prior to excavation and monitored weekly during construction.

8.1.12 Temporary Dewatering

Groundwater seepage may occur locally and should be anticipated in excavations. Temporary dewatering can be accomplished by sloping the excavation bottom to a sump and pumping from the sump. A layer of gravel about 6 inches thick placed in the bottom of the excavation will facilitate groundwater flow and can be used as a working platform.

8.1.13 Slopes

All permanent slopes should be constructed no steeper than 2:1 (horizontal:vertical). Faces of fill slopes should be compacted either by rolling with a sheep-foot roller or other suitable equipment, or by overfilling and cutting back to design grade. Fills should be benched into sloping ground inclined steeper than 5:1 (horizontal:vertical). It is our opinion that cut slopes constructed no steeper than 2:1 (horizontal:vertical) will generally possess an adequate factor of safety. An engineering geologist should observe all cut slopes, including temporary slopes, during grading to ascertain that no adverse geologic conditions are encountered that require revised recommendations. All slopes are susceptible to surficial slope failure and erosion. Water should not be allowed to flow over the top of slope. Additionally, slopes should be planted with vegetation that will reduce the potential for erosion.

8.1.14 Surface Drainage

Final surface grades around structures should be designed to collect and direct surface water away from the structure and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2%. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5% within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures. Drainage patterns established at the time of fine grading should be maintained throughout the life of the proposed structures. Site irrigation should be limited to the minimum necessary to sustain landscape growth. Should excessive irrigation, impaired drainage, or unusually high rainfall occur, saturated zones of perched groundwater can develop.

8.1.15 Grading Plan Review

SCST should review the grading plans and earthwork specifications to ascertain whether the intent of the recommendations contained in this report have been implemented, and that no revised recommendations are needed due to changes in the development scheme.

8.2 FOUNDATIONS

8.2.1 Shallow Spread Footings

Shallow spread footings with bottoms levels on Scripps Formation can be used to support the planned parking structure. Footings should extend at least 24 inches below lowest adjacent finished grade. Continuous footings should be at least 12 inches wide. Isolated or retaining wall footings should be at least 24 inches wide. To accommodate bearing on

Scripps Formation, soil-cement structural fill or 2-sack sand/cement slurry can be placed between the formation and design bottom of footing. An allowable bearing capacity of 5,000 psf can be used. The bearing capacity can be increased by 500 psf for each foot of depth below the minimum and 250 psf for each foot of width beyond the minimum up to a maximum of 8,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. Footings located adjacent to or within slopes should be extended to a depth such that a minimum horizontal distance of 7 feet exists between the lower outside footing edge and the face of the slope.

Lateral loads will be resisted by friction between the bottoms of footings and passive pressure on the faces of footings and other structural elements below grade. An allowable coefficient of friction of 0.35 can be used. Passive pressure can be computed using an allowable lateral pressure of 350 psf per foot of depth below the ground surface for level ground conditions. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper 1 foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

8.2.2 Aggregate Piers

Rammed Aggregate Piers® installed with an Impact® displacement process or equivalent can be used to support the structure in fill areas. The aggregate pier system can be used to support the building foundations. The aggregate piers should extend down to formational materials. A contractor specializing in the design and installation of aggregate piers should be contacted regarding recommendations for this type of construction, including the need to use a structural slab.

8.2.3 Deep Foundations

Deep foundations consisting of drilled, cast-in-place concrete piles can be used to support the planned parking structure in fill areas. The net allowable axial downward capacities of 24-inch, 30-inch and 36-inch diameter piles were determined using the computer program All-Pile. We assumed 10 feet of fill and that support would be obtained from both friction and end bearing in the Scripps Formation, using a factor of safety of 2.5. The frictional capacity of the fill is not included. Downdrag forces on the piles have also been neglected based on the assumption that the majority of fill settlement has already occurred. The pile capacities are based on the strength of the soils; the strength of the pile section itself should be checked to verify the structural capacity of the pile. Piles should be spaced at least three pile diameters, center to center, and embedded at least 5 feet into competent formational material. Recommended capacities are presented in the following table.

Allowable Axial Downward Capacities of Piles, kips

Depth of Embedment into Formation, Feet*	Pile Diameter (inches)		
	24	30	36
5	80	80	85
10	115	125	130
15	150	170	180
20	200	215	235

*Piles should extend a minimum of 5 feet into formation and 10 feet below the bottom of pile cap.

The uplift resistance will be obtained by friction and the weight of the pile. An allowable frictional uplift of 500 psf can be used. Lateral loads will be resisted by passive pressure on the drilled piles. An allowable passive pressure of 350 psf per foot of embedment acting on twice the pile diameter can be used based on a lateral deflection up to ½ inch.

Depending on the extent of remedial excavations, the portion of the structure supported on deep foundations may need to incorporate a structural slab designed to span between the foundations without relying on support from the underlying soil.

Groundwater seepage should be anticipated. Cemented zones should be anticipated within the formational materials. Contract documents should specify that the contractor mobilize equipment capable of penetrating hard, cemented material to reduce the potential that claims for delays or extra work will arise.

8.2.4 Settlement Characteristics

Total foundation settlements are estimated to be less than 1 inch. Differential settlements between adjacent columns and across continuous footings are estimated to be less than ¾ inch over a distance of 40 feet. Settlements should be completed shortly after structural loads are applied.

8.2.5 Foundation Plan Review

SCST should review the foundation plans to ascertain that the intent of the recommendations in this report has been implemented and that revised recommendations are not necessary as a result of changes after this report was completed.

8.2.6 Foundation Excavation Observations

A representative from SCST should observe the foundation excavations prior to forming or placing reinforcing steel.

8.3 SLABS-ON-GRADE

8.3.1 Parking Structure Slabs-on-Grade

The project structural engineer should design the parking structure slab. Where supported on grade, we recommend a minimum 6-inch thick slab underlain by at least 2 feet of granular material and reinforced with at least No. 4 reinforcing bars placed at 18 inches on center each way. Reinforcement should be placed approximately at mid-height of the slab. Concrete should have a minimum compressive strength of 3,250 psi.

A vapor barrier should be placed beneath slabs-on-grade where moisture sensitive floor coverings or equipment are planned. If plastic is used, a minimum 10 mil is recommended. The plastic should conform to ASTM E1745. Installation should conform to ASTM E1643. Current construction practice typically includes placement of a 2-inch thick sand cushion between the bottom of the concrete slab and the moisture vapor retarder/barrier. This cushion can provide some protection to the vapor retarder/barrier during construction, and may assist in reducing the potential for edge curling in the slab during curing. However, the sand layer also provides a source of moisture to the underside of the slab that can increase the time required to reduce vapor emissions to limits acceptable for the type of floor covering placed on top of the slab. The slab can be placed directly on the vapor retarder/barrier. The floor covering manufacturer should be contacted to determine the volume of moisture vapor allowable and any treatment needed to reduce moisture vapor emissions to acceptable limits for the particular type of floor covering installed.

8.3.2 Exterior Slabs-on-Grade

Exterior slabs should be at least 4 inches thick and reinforced with at least No. 3 bars at 18 inches on center each way. Slabs should be provided with weakened plane joints. Joints should be placed in accordance with the American Concrete Institute (ACI) guidelines. The project architect should select the final joint patterns. A 1-inch maximum size aggregate mix is recommended for concrete for exterior slabs. The corrosion potential of on-site soils with respect to reinforced concrete will need to be taken into account in concrete mix design. Coarse and fine aggregate in concrete should conform to the “Greenbook” Standard Specifications for Public Works Construction.

8.4 CONVENTIONAL RETAINING WALLS

8.4.1 Foundations

Shallow spread footings with bottom levels on compacted fill or Scripps Formation can be used to support site retaining walls. The recommendations provided in the foundation section of this report are also applicable to conventional retaining walls. However, an allowable bearing capacity of 2,500 psf should be used for footings supported on

compacted fill, with increases of 500 psf for each foot of depth below the minimum and 250 psf for each foot of width beyond the minimum up to a maximum of 5,000 psf.

8.4.2 Lateral Earth Pressures

The at-rest earth pressure for the design of restrained retaining wall with level backfills can be taken as equivalent to the pressure of a fluid weighing 55 pcf. The active earth pressure for the design of unrestrained retaining walls with level backfills can be taken as equivalent to the pressure of a fluid weighing 35 pcf. These values assume a granular and drained backfill condition. Higher lateral earth pressures would apply if walls retain expansive clay soils. An additional 20 pcf should be added to these values for walls with 2:1 (horizontal:vertical) sloping backfill. An increase in earth pressure equivalent to an additional 2 feet of retained soil can be used to account for surcharge loads from light traffic. The above values do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. If any other surcharge loads are anticipated, SCST should be contacted for the necessary increase in soil pressure.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a backdrain to reduce the accumulation of hydrostatic pressures. Backdrains may consist of a 2-foot wide zone of ¾-inch crushed rock. The backdrain should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. Weep holes should be provided or a perforated pipe should be installed at the base of the backdrain and sloped to discharge to a suitable storm drain facility. As an alternative, a geocomposite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide waterproofing specifications and details. Figure 6 presents typical conventional retaining wall backdrain details.

8.4.3 Seismic Earth Pressure

If required, the seismic earth pressure can be taken as equivalent to the pressure of a fluid weighing 20 pcf. This value is for level backfill and does not include a factor of safety. Appropriate factors of safety should be incorporated into the design. This pressure is in addition to the un-factored, static active earth pressure. The passive pressure and bearing capacity can be increased by ⅓ in determining the seismic stability of the wall.

8.4.4 Backfill

Wall backfill should consist of granular, free-draining material. Expansive or clayey soil should not be used. Additionally, fill within 3 feet from the back of the wall should not contain rocks greater than 3 inches in dimension. We anticipate that a portion of the onsite soils will be suitable for wall backfill. Backfill should be compacted to at least 90%

relative compaction. Backfill should not be placed until walls have achieved adequate structural strength. Compaction of wall backfill will be necessary to minimize settlement of the backfill and overlying settlement sensitive improvements. However, some settlement should still be anticipated. Provisions should be made for some settlement of concrete slabs and pavements supported on backfill. Additionally, any utilities supported on backfill should be designed to tolerate differential settlement.

8.5 MECHANICALLY STABILIZED EARTH RETAINING WALLS

The following soil parameters can be used for design of mechanically stabilized earth (MSE) retaining walls.

MSE Wall Design Parameters

Soil Parameter	Reinforced Soil	Retained Soil	Foundation Soil
Internal Friction Angle (degrees)	32°	32°	32°
Cohesion (psf)	0	0	0
Moist Unit Weight (pcf)	130	130	130

The reinforced soil should consist of granular, free-draining material with an expansion index of 20 or less. The bottom of MSE walls should extend to such a depth that a total of 5 feet exists between the bottom of the wall and the face of the slope. Figure 7 presents a typical MSE retaining wall backdrain detail. MSE retaining walls may experience lateral movement over time. The wall engineer should review the configuration of proposed improvements adjacent to the wall and provide measures to help reduce the potential for distress to these improvements from lateral movement.

8.6 SOIL NAIL WALLS

It is anticipated that the soil nails will generally encounter Scripps Formation. The following soil parameters can be used for the design of the soil nails.

- **Soil Unit Weight:** 130 pcf
- **Internal Friction Angle:** 35 degrees
- **Ultimate Bond Stress:** 1,500 psf

Bond stress capacity is influenced by soil and rock condition, method of construction and grouting techniques. The contractor should verify the bond stress capacity in the field prior to production nail installation.

8.7 PIPELINES

8.7.1 Thrust Blocks

For level ground conditions, a passive earth pressure of 350 psf per foot of depth below the lowest adjacent final grade can be used to compute allowable thrust block resistance. A value of 150 psf per foot should be used below groundwater level, if encountered.

8.7.2 Modulus of Soil Reaction

A modulus of soil reaction (E') of 2,000 psi can be used to evaluate the deflection of buried flexible pipelines. This value assumes that granular bedding material is placed adjacent to the pipe and is compacted to at least 90% relative compaction.

8.7.3 Pipe Bedding

Pipe bedding as specified in the "Greenbook" Standard Specifications for Public Works Construction can be used. Bedding material should consist of clean sand having a sand equivalent not less than 30 and should extend to at least 12 inches above the top of pipe. Alternative materials meeting the intent of the bedding specifications are also acceptable. Samples of materials proposed for use as bedding should be provided to the engineer for inspection and testing before the material is imported for use on the project. The onsite materials are not expected to meet "Greenbook" bedding specifications. The pipe bedding material should be placed over the full width of the trench. After placement of the pipe, the bedding should be brought up uniformly on both sides of the pipe to reduce the potential for unbalanced loads. No voids or uncompacted areas should be left beneath the pipe haunches. Ponding or jetting the pipe bedding should not be allowed.

8.7.4 Cutoff Walls

Where pipeline inclinations exceed 15 percent, cutoff walls may be necessary in trench excavations. Additionally, we do not recommend that open graded rock be used for pipe bedding or backfill due to the potential for piping erosion. The recommended bedding is clean sand having a sand equivalent not less than 30. Alternatively, 2-sack sand/cement slurry can be used for the pipe bedding. If sand/cement slurry is used for pipe bedding to at least 1 foot over the top of the pipe, cutoff walls are not considered necessary. The need for cutoff walls should be further evaluated by the project civil engineer designing the pipeline.

8.8 PAVEMENT SECTION RECOMMENDATIONS

The pavement support characteristics of the soils encountered during our investigation are considered low to medium. An R-value of 21 was assumed for design of preliminary

pavement sections. The actual R-value of the subgrade soils should be determined after grading and final pavement sections be provided. Based on an R-value of 21, the following pavement structural sections are recommended for the assumed Traffic Indexes.

Flexible Pavement Sections

Traffic Type	Traffic Index	Asphalt Concrete (inches)	Aggregate Base* (inches)
Parking Stalls	4.5	3	6
Drive Lanes	6.0	4	8
Heavy Traffic Areas	7.0	4	12

Portland Cement Concrete Pavement Sections

Traffic Type	Traffic Index	JPCP* (inches)	Aggregate Base* (inches)
Parking Stalls	4.5	6	6
Drive Lanes	6.0	7	6
Heavy Traffic Areas	7.0	7	6

***Jointed Plain Concrete Pavement.**

The top 12 inches of subgrade should be scarified, moisture conditioned to near optimum moisture content and compacted to at least 95% relative compaction. All soft or yielding areas should be removed and replaced with compacted fill or aggregate base. Aggregate base and asphalt concrete should conform to the Caltrans Standard Specifications or the "Greenbook" and should be compacted to at least 95% relative compaction. Aggregate base should have an R-value of not less than 78. All materials and methods of construction should conform to good engineering practices and the minimum standards of UCSD.

8.9 PERVIOUS PAVEMENT SECTION RECOMMENDATIONS

Pervious pavement section recommendations are based on Caltrans (2014) pavement structural design guidelines. The pavement sections below are based on the strength of the materials. However, the actual thickness of the sections may be controlled by the reservoir layer design, which the project civil engineer should determine.

Pervious Asphalt Pavement

Traffic Type	Category	*Asphalt Treated Permeable Base (ATPB) (inches)	Class 4 Aggregate Base (inches)
Parking Stalls	B	4½	8½

***1¼ inches of an open graded friction course (OGFC) should be placed on top of the ATPB.**

Pervious Concrete Pavement

Traffic Type	Category	Pervious Concrete (inches)	Class 4 Aggregate Base (inches)
Parking Stalls	B	5½	8½

Permeable Interlocking Concrete Pavers (PICP)

Traffic Type	Category	PICP (inches)	Class 3 Permeable (inches)	Class 4 Aggregate Base (inches)
Parking Stalls	B	3⅛	4½	8½

The top 12 inches of subgrade should be scarified, moisture conditioned to near optimum moisture content and compacted to at least 95% relative compaction. All soft or yielding subgrade areas should be removed and replaced with compacted fill or permeable base. All materials and methods of construction should conform to good engineering practices and the minimum local standards.

Deepened curbs or vertical cutoff membranes consisting of 30 mil HDPE or PVC should be installed at the edges of pervious pavements to reduce the potential for water-related distress to adjacent structures or improvements. The membrane should extend below the reservoir section. If infiltration is not used, the membrane should also extend horizontally between the subgrade and pervious base, and a suitable subdrain system should be installed.

8.10 SOIL CORROSIVITY

Representative samples of the onsite soils were tested to evaluate corrosion potential. The test results are presented in Appendix II. The project design engineer can use the sulfate results in conjunction with ACI 318 to specify the water/cement ratio, compressive strength and cementitious material types for concrete exposed to soil. A corrosion engineer should be contacted to provide specific corrosion control recommendations.

9 GEOTECHNICAL ENGINEERING DURING CONSTRUCTION

The geotechnical engineer should review project plans and specifications prior to bidding and construction to check that the intent of the recommendations in this report has been incorporated. Observations and tests should be performed during construction. If the conditions encountered during construction differ from those anticipated based on the subsurface exploration program, the presence of the geotechnical engineer during construction will enable an evaluation of the exposed conditions and modifications of the recommendations in this report or development of additional recommendations in a timely manner.

10 CLOSURE

SCST should be advised of any changes in the project scope so that the recommendations contained in this report can be evaluated with respect to the revised plans. Changes in recommendations will be verified in writing. The findings in this report are valid as of the date of this report. Changes in the condition of the site can, however, occur with the passage of time, whether they are due to natural processes or work on this or adjacent areas. In addition, changes in the standards of practice and government regulations can occur. Thus, the findings in this report may be invalidated wholly or in part by changes beyond our control. This report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations to site conditions at that time.

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the boring locations, and that our data, interpretations, and recommendations are based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty of any kind whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

11 REFERENCES

American Concrete Institute (ACI) (2012), Building Code Requirements for Structural Concrete (ACI 318-11) and Commentary, August.

California Emergency Management Agency, California Geological Survey, University of Southern California (Cal EMA) (2009), Tsunami Inundation Map for Emergency Planning, Del Mar Quadrangle, June 1.

California Geological Survey (2002), Simplified Fault Activity Map of California", compiled by Jennings, C.W. and Saucedo, G. J., 1999, revised Toppozada, T. and Branum, D., 1999.

Caltrans (2010), Standard Specifications.

City of San Diego (2008), Seismic Safety Study, Geologic Hazards and Faults, Grid Tile: 34, Development Services Department, April 3.

County of San Diego (2012), SanGIS Interactive Map.

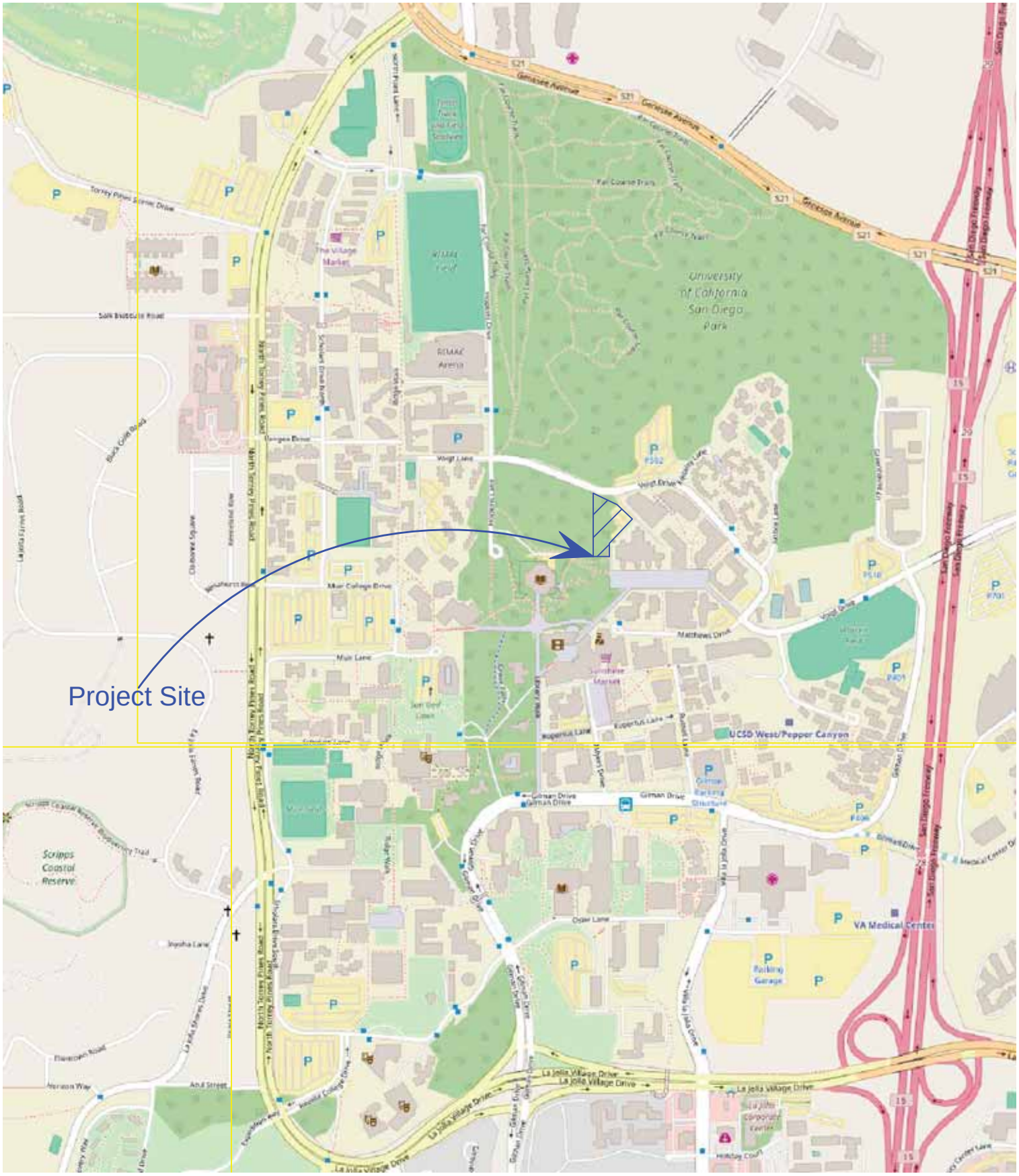
International Code Council (2012), 2013 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Based on the 2012 International Existing Building Code, Effective Date: January 1, 2014.

Jennings, C.W. and Bryant, W.A. (2010), Fault Activity Map of California, California Geologic Survey, Geologic Data Map No. 6.

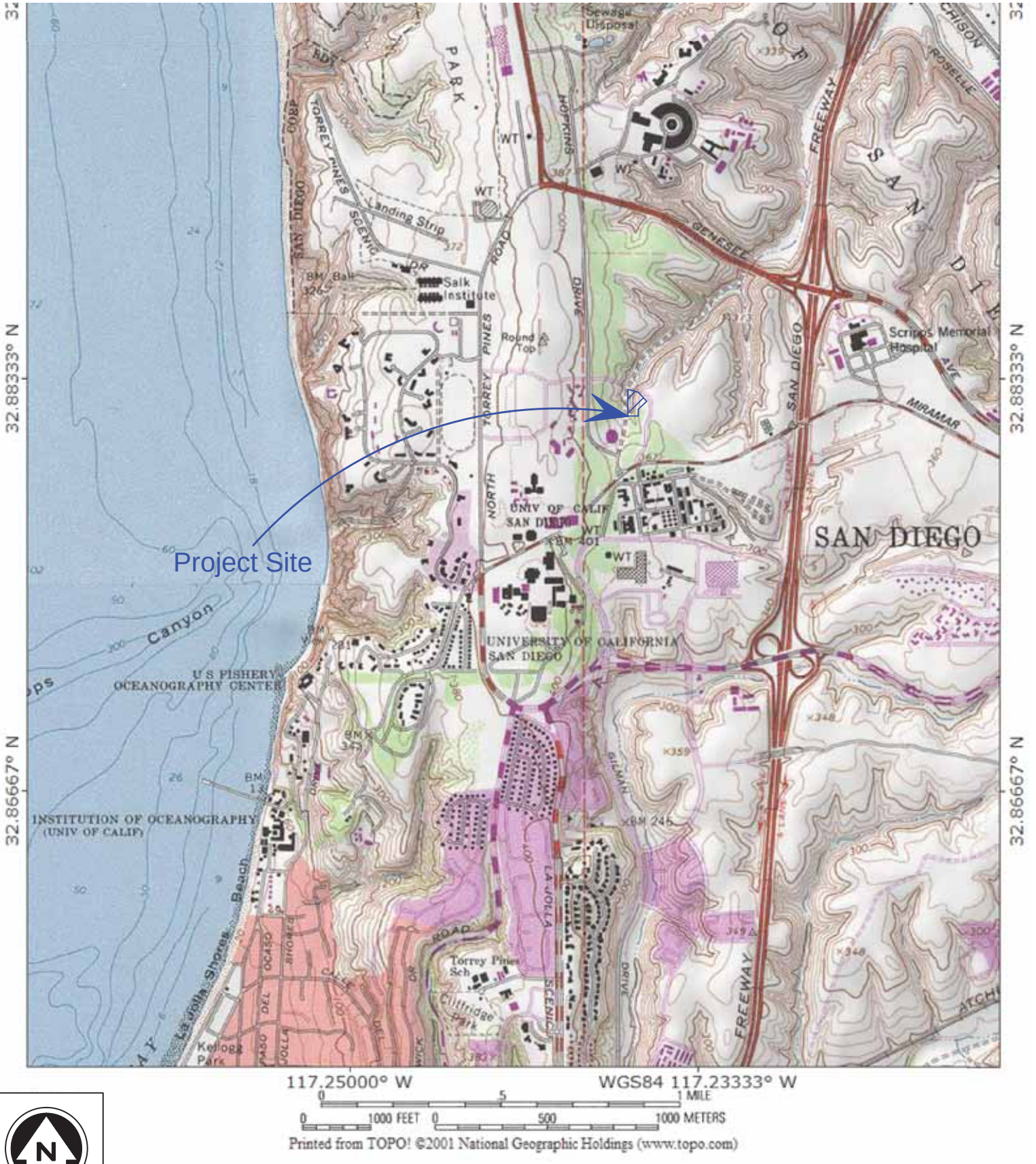
Kennedy, M.P. (1975), Geology of the San Diego Metropolitan Area, California, Del Mar 7½ Minute Quadrangle, California Division of Mines and Geology, California, Bulletin 200.

Kennedy, M.P. and Tan, S.S. (2008), Geologic Map of the San Diego 30' x 60' Quadrangle, California, California Geological Survey.

Public Works Standards, Inc. (2015), "Greenbook" Standard Specifications for Public Works Construction, 2015 Edition.

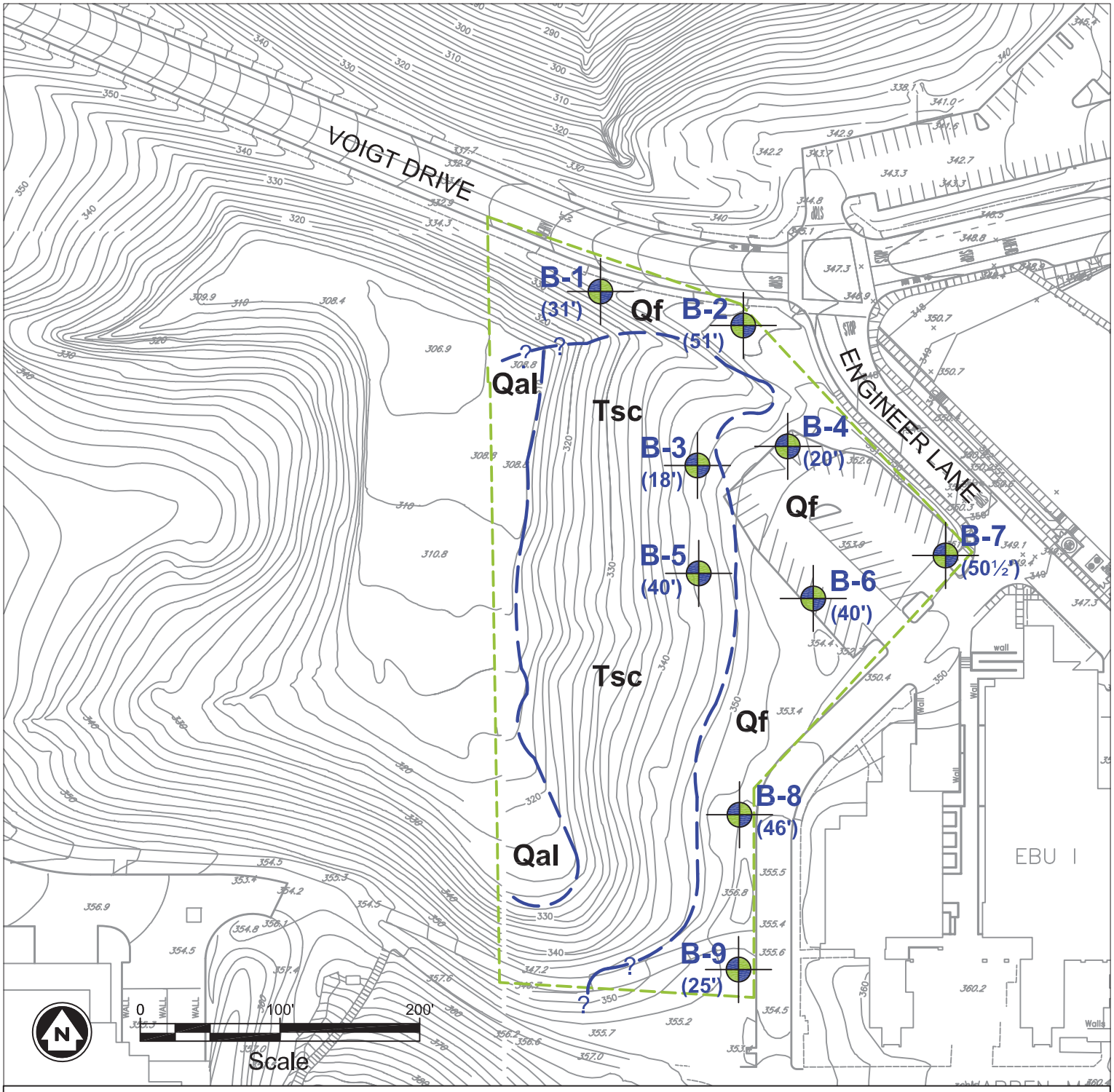


SCST, Inc.	SITE VICINITY MAP 5146 Voigt Parking Structure La Jolla, California	Date: November, 2016 By: MAW Job No.: 160479P4-1	Figure: 1



Scale as Shown

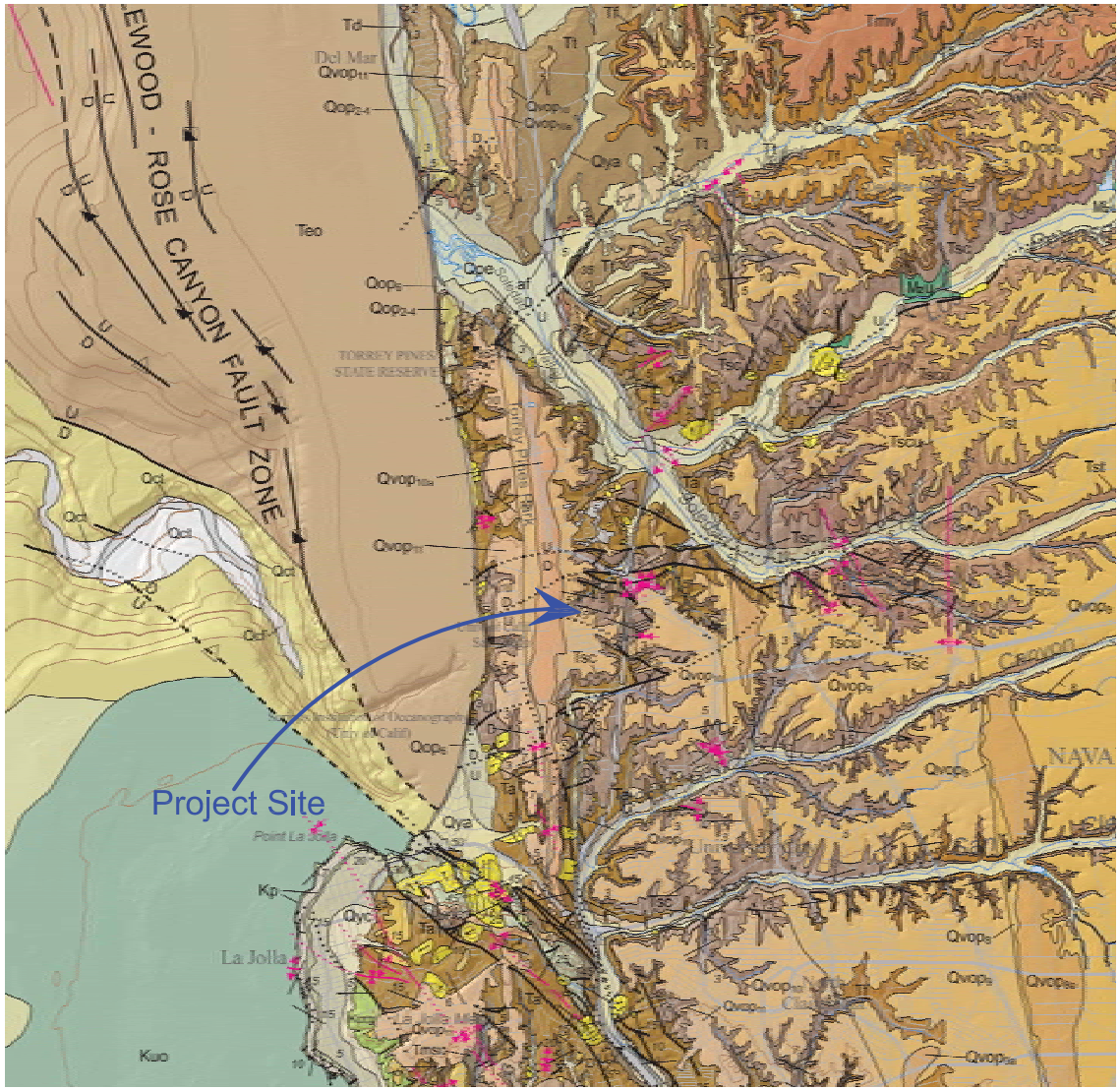
SCST, Inc.	USGS QUADRANGLE MAP 5146 Voigt Parking Structure La Jolla, California	Date: November, 2016 By: MAW Job No.: 160479P4-1	Figure: 2

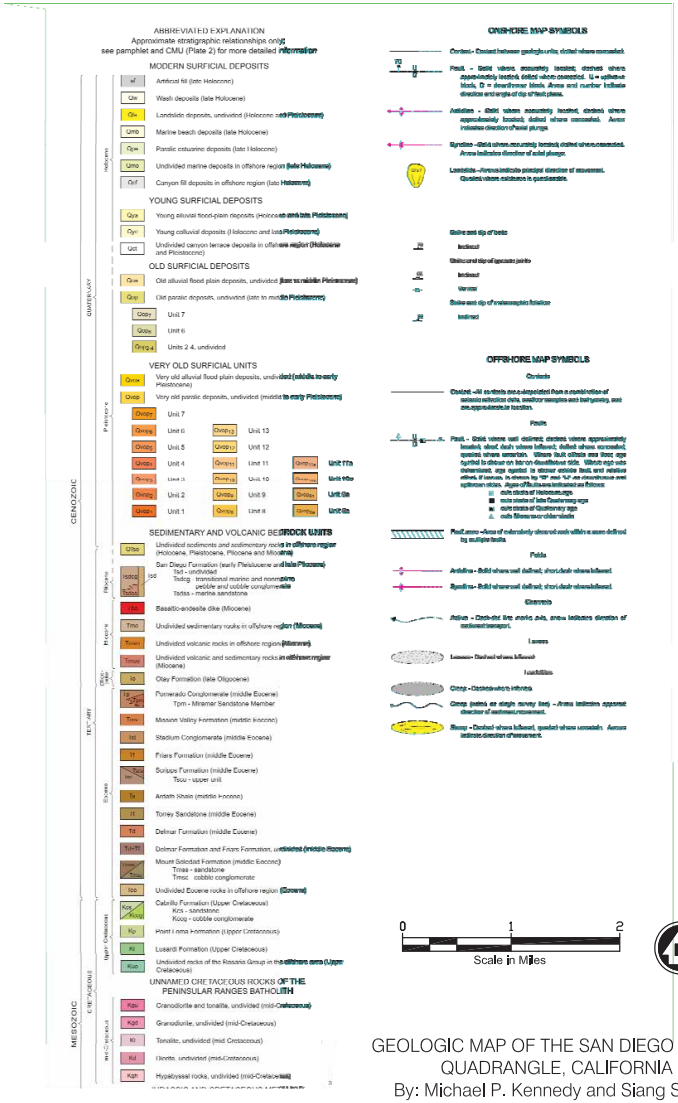


SCST LEGEND:

Qf	Fill
Qal	Alluvium
Tsc	Scripps Formation
?	Approximate Location of Geologic Contact, Queried Where Uncertain
B-9 (25')	Approximate Location of Boring (with Depth in Feet)
	Approximate Location of Site Boundary

SCST, Inc.	SUBSURFACE EXPLORATION MAP 5146 Voigt Parking Structure La Jolla, California	Date: November, 2016 By: MAW Job No.: 160479P4-1	Figure: 3

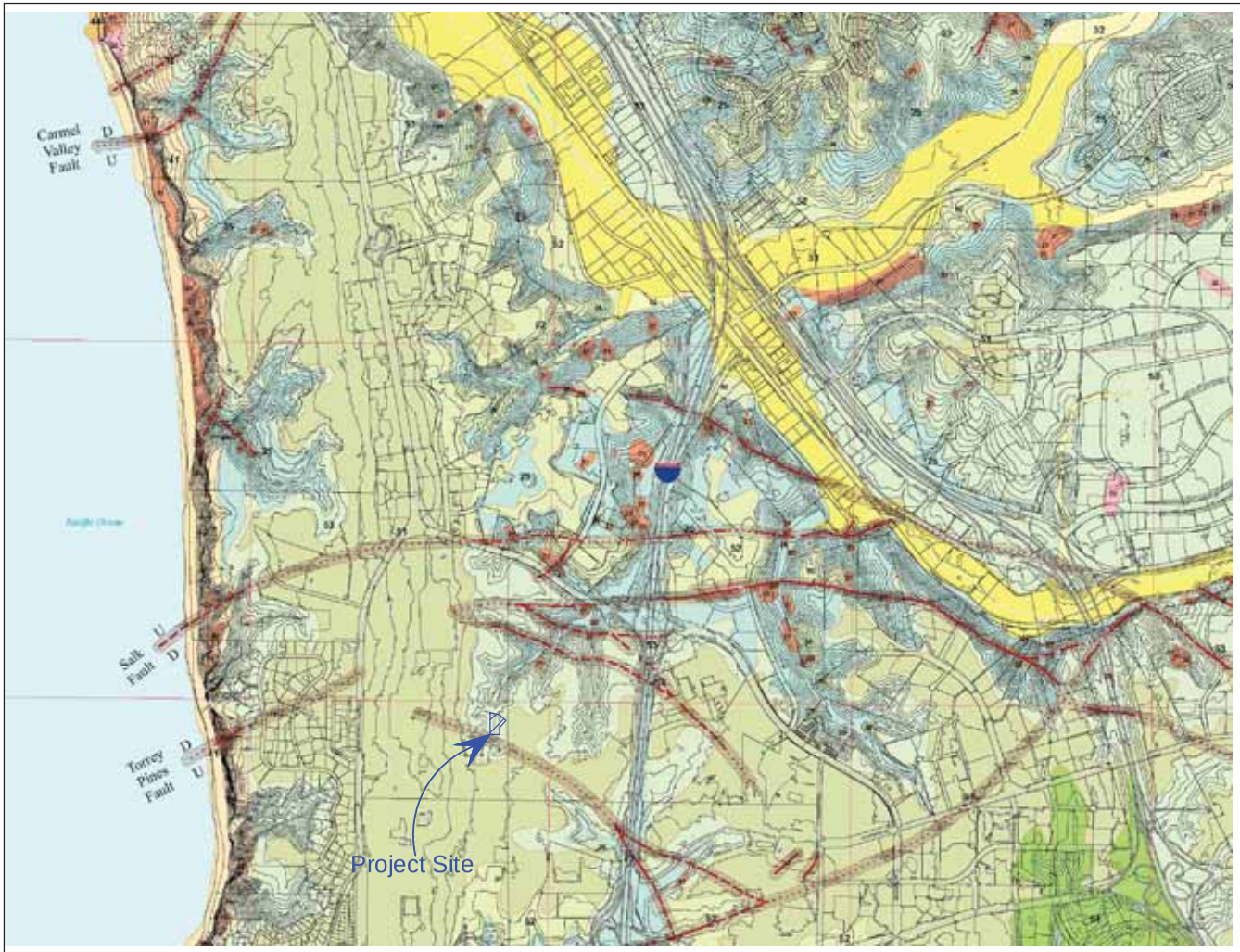




GEOLOGIC MAP OF THE SAN DIEGO 30' X 60' QUADRANGLE, CALIFORNIA
By: Michael P. Kennedy and Siang S. Tan
2008

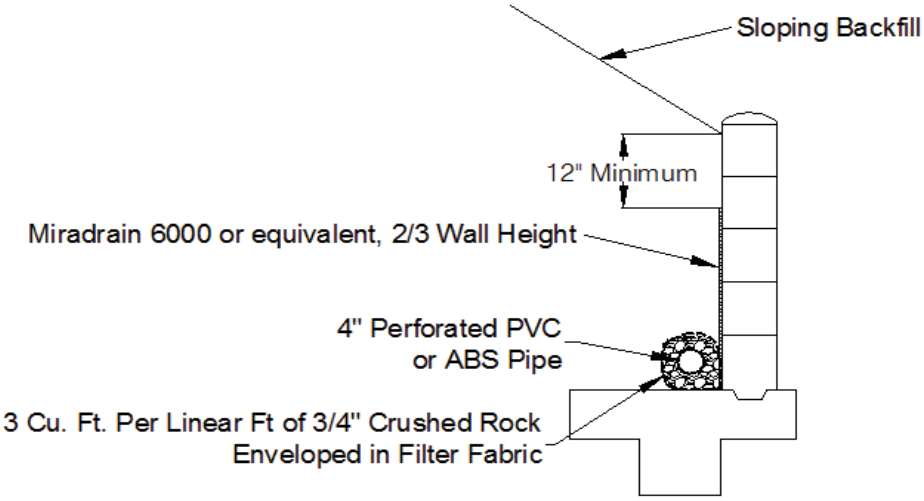
SCST, Inc.	REGIONAL GEOLOGY AND FAULT MAP 5146 Voigt Parking Structure La Jolla, California	Date: November, 2016 By: MAW Job No.: 160479P4-1

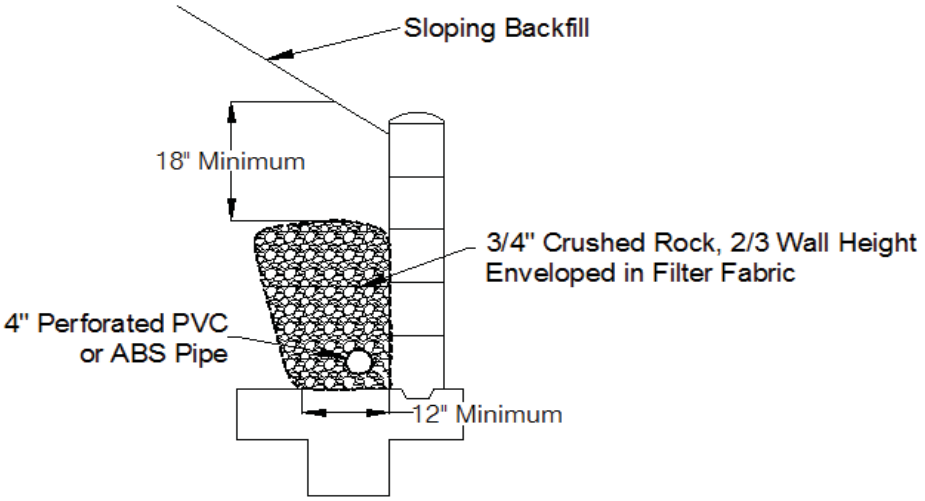
Figure: 4



City of San Diego
SEISMIC SAFETY STUDY
Geologic Hazards and Faults

SCST, Inc.	CITY OF SAN DIEGO SEISMIC SAFETY STUDY MAP 5146 Voigt Parking Structure La Jolla, California	Date: November, 2016 By: MAW Job No.: 160479P4-1	Figure: 5





Not to Scale

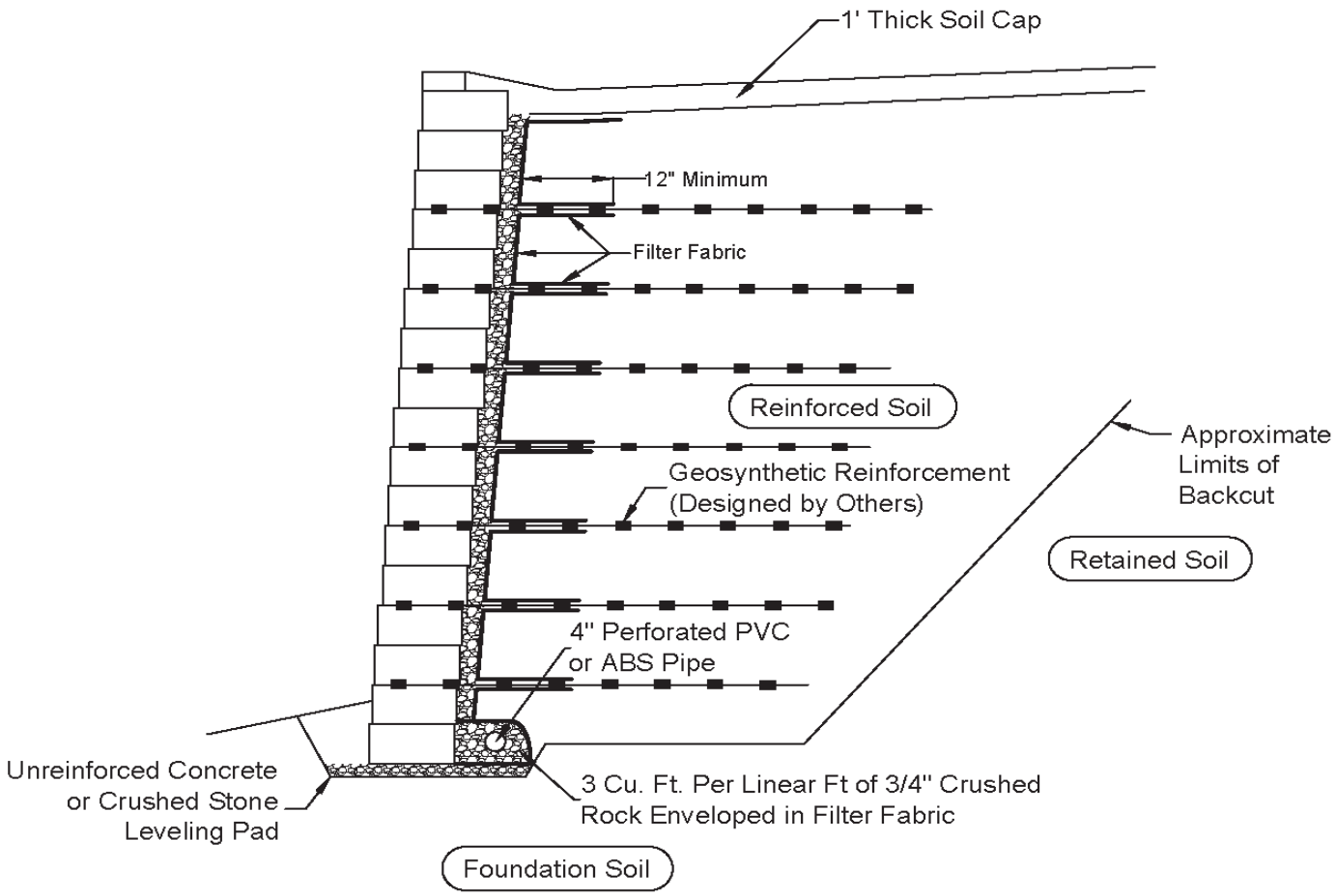
NOTES

1) Waterproof back of wall following architect's specifications.

2) 4" minimum perforated pipe, SDR35 or equivalent, holes down, 1% fall to outlet. Provide solid outlet pipe at suitable locations.

3) Drain instalation and outlet connection should be observed by the geotechnical consultant.

SCST, Inc.	TYPICAL RETAINING WALL BACKDRAIN DETAILS 5146 Voigt Parking Structure La Jolla, California	
	By: TBC	Date: November, 2016
	Job Number: 160479P4-1	Figure: 6



Not to Scale

NOTES

1) Backcut as recommended by the geotechnical report or field evaluation.
2) Additional drain at excavation backcut may be recommended based on conditions observed during construction.
3) Filter fabric should be installed between crushed rock and soil. Filter fabric should consist of Mirafi 140N or equivalent. Filter fabric should be overlapped approximately 6 inches.
4) Perforated pipe should outlet through a solid pipe to an appropriate gravity outfall. Perforated pipe and outlet pipe should have a fall of at least 1%.
5) Drain installation and outlet connection should be observed by the geotechnical consultant.

SCST, Inc.	TYPICAL MSE RETAINING WALL DETAIL 5146 Voigt Parking Structure La Jolla, California		
	By: TBC	Date:	November, 2016
	Job No: 160479P4-1	Figure:	7

APPENDIX I
FIELD INVESTIGATION

Our field investigation consisted of a visual reconnaissance of the site and drilling nine borings on October 26 and 31, 2016 and November 1 and 2, 2016 to depths between about 18 and 51 feet below the existing ground surface using truck-mounted and limited-access drill rigs equipped with a hollow stem auger. Auger refusal on strongly cemented material/concretions occurred in six of the nine borings. Figure 3 presents the approximate locations of the borings. Our field investigation was performed under the observation of an SCST engineer who also logged the borings and obtained samples of the materials encountered.

Relatively undisturbed samples were obtained using a modified California (CAL) sampler, which is a ring-lined split tube sampler with a 3-inch outer diameter and 2½-inch inner diameter. Standard Penetration Tests (SPT) were performed using a 2-inch outer diameter and 1⅜-inch inner diameter split tube sampler. The CAL and SPT samplers were driven with a 140-pound weight dropping 30 inches. The number of blows needed to drive the samplers the final 12 inches of an 18-inch drive is noted on the boring logs as "Driving Resistance (blows/ft of drive)." SPT and CAL sampler refusal was encountered when 50 blows were applied during any one of the three 6-inch intervals, a total of 100 blows was applied, or there was no discernible sampler advancement during the application of 10 successive blows. The SPT penetration resistance was normalized to a safety hammer (cathead and rope) with a 60% energy transfer ratio in accordance with ASTM D6066. The normalized SPT penetration resistance is noted on the boring logs as "N_{60}." Disturbed bulk samples were obtained from the SPT sampler and the drill cuttings.

The soils are classified in accordance with the Unified Soil Classification System as illustrated on Figure I-1. Logs of the borings are presented in the following Figures I-2 through I-20.

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION CHART

SOIL DESCRIPTION		GROUP SYMBOL	TYPICAL NAMES
I. COARSE GRAINED, more than 50% of material is larger than No. 200 sieve size.			
GRAVELS More than half of coarse fraction is larger than No. 4 sieve size but smaller than 3".	CLEAN GRAVELS	GW	Well graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels, gravel sand mixtures, little or no fines.
	GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
		GC	Clayey gravels, poorly graded gravel-sand, clay mixtures.
SANDS More than half of coarse fraction is smaller than No. 4 sieve size.	CLEAN SANDS	SW	Well graded sand, gravelly sands, little or no fines.
		SP	Poorly graded sands, gravelly sands, little or no fines.
		SM	Silty sands, poorly graded sand and silty mixtures.
		SC	Clayey sands, poorly graded sand and clay mixtures.
II. FINE GRAINED, more than 50% of material is smaller than No. 200 sieve size.			
	SILTS AND CLAYS (Liquid Limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, sandy silt or clayey-silt-sand mixtures with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silty clays or low plasticity.
	SILTS AND CLAYS (Liquid Limit 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.
III. HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.

SAMPLE SYMBOLS

- ☒ - Bulk Sample
- CAL - Modified California sampler
- CK - Undisturbed Chunk sample
- MS - Maximum Size of Particle
- ST - Shelby Tube
- SPT - Standard Penetration Test sampler

GROUNDWATER SYMBOLS

- ▽ - Water level at time of excavation or as indicated
- ≈ - Water seepage at time of excavation or as indicated

LABORATORY TEST SYMBOLS

- AL - Atterberg Limits
- CON - Consolidation
- COR - Corrosivity Tests (Resistivity, pH, Chloride, Sulfate)
- DS - Direct Shear
- EI - Expansion Index
- MAX - Maximum Density
- RV - R-Value
- SA - Sieve Analysis
- UC - Unconfined Compression

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-1

LOG OF BORING B-1

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 338 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		2-3 inches of mulch.							
1	SC	**Fill (Qf):** CLAYEY SAND, light brown, fine to medium grained, some gravel, moist, medium dense to dense.		X					RV
2		No gravel, dense.							
3			SPT		24	31			
4									
5									
6			SPT		37	48			
7									
8									
9									
10		Very dense.							
11			SPT		48	62			
12									
13									
14									
15									
16		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, mottled orangish brown and light gray, fine to medium grained, moist, very dense, weakly cemented.	SPT		50/4"	65/4"			
17									
18									
19									
20									

BORING CONTINUED ON I-3.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-2

LOG OF BORING B-1 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 338 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, moderately cemented.	SPT		50/3"	65/3"			
25			SPT		50/6"	65/6"			
28		SANDY CLAYSTONE, mottled light gray and orangish brown, moist, hard, strongly cemented.							
30			SPT		50/5"	65/5"			
31		**AUGER REFUSAL AT 31 FEET ON CONCRETION.**							
40									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-3

LOG OF BORING B-2

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		4-6 inches of mulch.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, some gravel, moist, medium dense to dense.		X					
2		Moderate brown.							
3			SPT		56	72			
4		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, light brown, fine to medium grained, moist, very dense, moderately cemented.							
5									
6			SPT		43	56			
7									
8		SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, weakly cemented.							
9									
10			SPT		50/5"	65/5"			
11									
12									
13									
14									
15									
16			SPT		45	58			
17									
18									
19									
20									

BORING CONTINUED ON I-5.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-4

LOG OF BORING B-2 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, mottled grayish brown and orangish, fine to medium grained, moist, dense, weakly cemented.	SPT		37	48			
22									
23		CLAYEY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, strongly cemented.							
24									
25			SPT		50/3"	65/3"			
26									
27									
28		SANDY CLAYSTONE, mottled light gray and orangish brown, moist, hard, strongly cemented.							
29									
30			SPT		50/5"	65/5"			EI
31									
32									
33									
34									
35			SPT		50/6"	50/6"			
36									
37									
38		SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, strongly cemented.							
39									
40									

BORING CONTINUED ON I-6

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-5

LOG OF BORING B-2 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
41		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, strongly cemented.	CAL		50/2"		15.8	99.9	
42		SANDY CLAYSTONE, light gray and orangish brown, moist, hard, strongly cemented.							
43									
44		SILTSTONE, orangish brown, moist, very dense, moderately to strongly cemented.							
45									
46			SPT		50/3"	65/3"			
47									
48		CLAYEY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, moderately to strongly cemented.							
49									
50			SPT		50/4"	65/4"			
51		**BORING TERMINATED AT 51 FEET.**							
52									
53									
54									
55									
56									
57									
58									
59									
60									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-6

LOG OF BORING B-3

Date Drilled: 10/26/2016 | Logged by: EM

Equipment: Limited-Access CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 345 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, pale yellowish brown, fine to medium grained, moist, weakly cemented.		X					
2									
3		SILTY SANDSTONE, light grayish brown and orangish brown, fine to medium grained, moist, very dense, strongly cemented.	SPT		44	57			
4									
5		Pale orangish brown.							
6			SPT		55	71			
7									
8									
9									
10									
11		CLAYEY SANDSTONE, light grayish brown, fine to medium grained, moist, very dense, strongly cemented.	SPT		50/6"	65/6"			
12									
13									
14									
15			SPT		50/6"	65/6"			
16									
17									
18									
19		**AUGER REFUSAL AT 7 FEET ON CONCRETION. DRILL RIG MOVED 10 FEET NORTHWEST AND BORING CONTINUED. AUGER REFUSAL AGAIN AT 18 FEET ON CONCRETION.**							
20									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-7

LOG OF BORING B-4

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 350½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		3 inches of asphalt concrete.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, trace gravel, moist, medium dense to dense.		X					COR
2		Moderate brown.							
3			SPT		26	34			
4									
5		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled light gray and orangish brown, fine grained, moist, very dense, moderately cemented.	SPT		67	87			
6									
7									
8									
9									
10		Light brown, fine to medium grained, weakly cemented.	SPT		50/3"	65/3"			
11									
12									
13		SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, strongly cemented.							
14									
15			SPT		50/6"	65/6"			
16									
17									
18									
19									
20									

AUGER REFUSAL AT 20 FEET ON CONCRETION.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-8

LOG OF BORING B-5

Date Drilled: 10/26/2016 | Logged by: EM

Equipment: Limited-Access CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1		**SCRIPPS FORMATION (Tsc):** SANDY SILTSTONE, mottled yellowish brown, fine to medium grained, moist, very dense, strongly cemented.		X					
2		Pale orangish brown.		X					
3			SPT		89	115			
4									
5		Pale yellowish brown.							SA
6			SPT		85/11"	110/11"			AL
7									
8									
9									
10		Light gray and orangish brown.	SPT		50/6"	65/6"			
11									
12									
13									
14									
15			SPT		50/5"	65/5"			
16									
17									
18		Gravel/cobbles at 18 feet.							
19									
20									

BORING CONTINUED ON I-10.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-9

LOG OF BORING B-5 (Continued)

Date Drilled: 10/26/2016 | Logged by: EM

Equipment: Limited-Access CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** SANDY SILTSTONE, orangish brown, fine to coarse grained, trace gravel, moist, very dense, weakly cemented.	SPT		50/5"	65/5"			
22									
23		SILTY SANDSTONE, light gray and orangish brown, fine to coarse grained, moist, very dense, weakly cemented.							
24									
25			SPT		50/5"	65/5"			
26									
27									
28									
29									
30		Pale orangish brown.	CAL		50/5"		6.9	100.6	DS
31									
32									
33									
34									
35		Light brown, fine to medium grained.	SPT		50/4"	65/4"			
36									
37									
38									
39									
40			SPT		50/5"	65/5"			

BORING TERMINATED AT 40 FEET.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-10

LOG OF BORING B-6

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 353½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		3 inches of asphalt concrete.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, some gravel, moist, medium dense.		X					EI
2									COR
3	SM	SILTY SAND, pale brown, fine to coarse grained, moist, medium dense.	SPT		23	30			
4									
5		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled orangish brown and light gray, fine grained, moist, very dense, weakly cemented.							
6			SPT		50/5"	65/5"			
7									
8									
9									
10		Pale orangish brown, fine to medium grained, moderately cemented.							SA
11			SPT		54	70			AL
12									
13									
14									
15		Orangish brown, fine grained, weakly cemented.	SPT		50/5"	65/5"			
16									
17									
18									
19									
20									

BORING CONTINUED ON I-12.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-11

LOG OF BORING B-6 (Continued)

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 353½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled light gray and orangish brown, fine grained, moist, very dense, weakly cemented.	SPT		50/5"	65/5"			
22									
23		SILTY SANDSTONE, pale orangish brown, fine to medium grained, moist, very dense, weakly cemented.							
24									
25			SPT		50/6"	65/6"			
26									
27									
28		CLAYEY SANDSTONE, mottled orangish brown and light gray, fine grained, moist, very dense, strongly cemented.							
29									
30			SPT		50/5"	65/5"			
31									
32									
33									
34									
35			SPT		50/6"	65/6"			
36									
37									
38									
39									
40									

AUGER REFUSAL AT 40 FEET ON CONCRETION.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-12

LOG OF BORING B-7

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 352 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		3 inches of asphalt concrete.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, trace gravel, moist.		X					
2									
3		**SCRIPPS FORMATION (Tsc):** CLAYSTONE, yellowish brown and light gray, moist, hard, moderately cemented.	SPT		50/4"	65/4"			
4									
5		Mottled light gray and orangish brown.							
6			SPT		55	71			
7									
8									
9									
10									
11			SPT		43	56			
12									
13		SILTY SANDSTONE, grayish brown, fine to coarse grained, moist, dense, weakly cemented.							
14									
15									
16			SPT		25	32			
17									
18		CLAYEY SANDSTONE, mottled orangish brown, yellowish brown, and light gray, fine to medium grained, moist, very dense, moderately cemented.							
19									
20									

BORING CONTINUED ON I-14.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-13

LOG OF BORING B-7 (Continued)

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 352 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled orangish brown, yellowish brown, and light gray, fine to medium grained, moist, very dense, moderately cemented.	SPT		40	52			SA AL
22									
23									
24									
25		Orangish brown, fine grained, weakly cemented.	SPT		50/5"	65/5"			
26									
27									
28									
29									
30		Light brown, fine to medium grained.	SPT		50/5"	65/5"			
31									
32									
33									
34									
35		Mottled orangish brown and light gray, fine grained, moderately cemented.	SPT		50/6"	65/6"			
36									
37									
38		SANDY CLAYSTONE, mottled orangish brown and light gray, moist, hard, strongly cemented.							
39									
40									

BORING CONTINUED ON I-15.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-14

LOG OF BORING B-7 (Continued)

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 352 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
41		**SCRIPPS FORMATION (Tsc):** SANDY CLAYSTONE, mottled orangish brown and light gray, moist, hard, strongly cemented.	CAL		50/5"		22.0	102.5	DS
42									
43		CLAYEY SANDSTONE, pale orangish brown, fine grained, moist, very dense, weakly cemented.							
44									
45			SPT		50/4"	65/4"			
46									
47									
48									
49									
50		Orangish brown.	SPT		50/6"	65/6"			
51		**BORING TERMINATED AT 50½ FEET.**							
52									
53									
54									
55									
56									
57									
58									
59									
60									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-15

LOG OF BORING B-8

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 354 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SC	**FILL (Qf):** CLAYEY SAND, moderate brown, fine to medium grained, some gravel, moist, dense.		X					
2									
3		Sampler bouncing on rock.	SPT		67/11"	87/11"			
4									
5		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, weakly cemented.	SPT		50/4"	65/4"			
6									
7									
8									
9									
10		Orangish brown.	SPT		50/4"	65/4"			
11									
12									
13		CLAYEY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, weakly cemented.							
14									
15			SPT		50/6"	65/6"			
16									
17									
18									
19									
20									

BORING CONTINUED ON I-17

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-16

LOG OF BORING B-8 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 354 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, weakly cemented.	SPT		50/4"	65/4"			
22									
23									
24									
25		Orangish brown.							
26			SPT		55	71			
27									
28									
29									
30		Mottled light gray and orangish brown, fine to medium grained.	SPT		50/5"	65/5"			
31									
32									
33		SANDY CLAYSTONE, mottled light gray and orangish brown, moist, hard, strongly cemented.							
34									
35			CAL		50/5"		13.0	116.8	
36									
37									
38									
39									
40									

BORING CONTINUED ON I-18

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-17

LOG OF BORING B-8 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 354 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
41		**SCRIPPS FORMATION (Tsc):** SANDY CLAYSTONE, mottled orangish brown and light gray, moist, hard, strongly cemented.	SPT		50/3"	65/3"			
42									
43		SILTY SANDSTONE, white, fine grained, moist, very dense, strongly cemented.							
44									
45			SPT		50/3"	65/3"			
46		**AUGER REFUSAL AT 46 FEET ON CONCRETION.**							
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-18

LOG OF BORING B-9

Date Drilled: 11/2/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 355½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		2-3 inches of mulch.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, some gravel, moist.		X					
2		Pale brown, dense.							
3			SPT		36	47			
4									
5									
6			SPT		30	39			
7									
8									
9		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, pale orangish brown, fine grained, moist, dense, moderately cemented.							
10									
11			SPT		31	40			
12									
13									
14									
15		Light grayish brown, fine to medium grained, very dense, weakly cemented.	SPT		50/4"	65/4"			
16									
17									
18									
19									
20									

BORING CONTINUED ON I-20.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	November, 2016
Job Number:	160479P4-1	Figure:	I-19

LOG OF BORING B-9 (Continued)

Date Drilled: 11/2/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 355½ | Depth to Groundwater (ft): Not Encountered

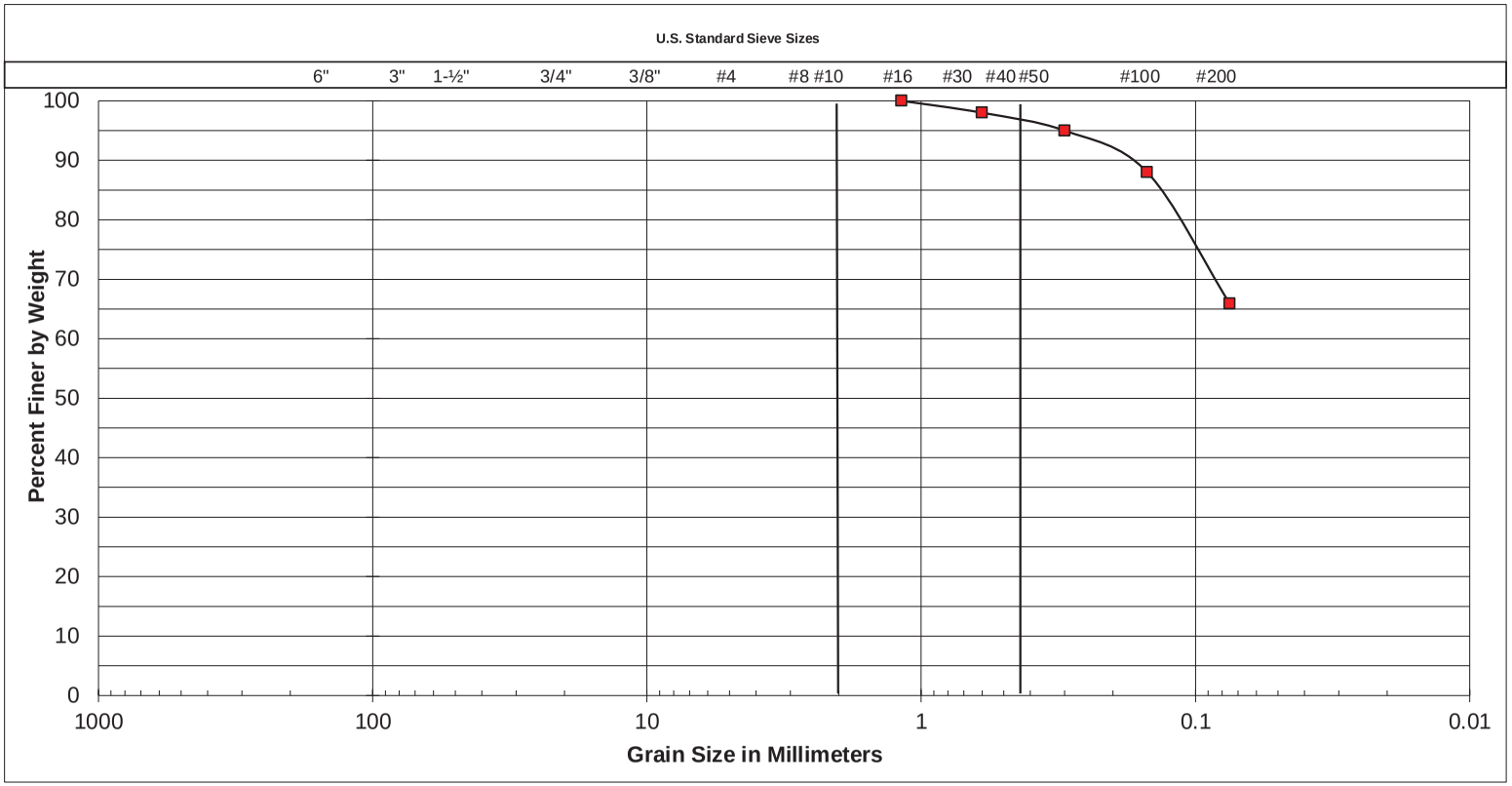
DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, light grayish brown, fine to medium grained, moist, very dense, strongly cemented.	SPT		50/6"	65/6"			
22									
23									
24									
25		**AUGER REFUSAL AT 25 FEET ON CONCRETION.**							
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

APPENDIX II
LABORATORY TESTING

Laboratory tests were performed to provide geotechnical parameters for engineering analyses. The following tests were performed:

- **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System.
- **IN SITU MOISTURE AND DENSITY:** The in situ moisture content and dry unit weight were determined on samples collected from the borings. The test results are presented on the boring logs in Appendix I.
- **GRAIN SIZE DISTRIBUTION:** The grain size distribution was determined on three soil samples in accordance with ASTM D422. Figures II-1 through II-3 present the test results.
- **ATTERBERG LIMITS:** The Atterberg limits were determined on three soil samples in accordance with ASTM D4318. Figures II-1 through II-3 present the test results.
- **R-VALUE:** An R-value test was performed on one soil sample in accordance with California Test Method 301. Figure II-4 presents the test result.
- **EXPANSION INDEX:** The expansion index was determined on two soil samples in accordance with ASTM D4829. Figure II-4 presents the test results.
- **CORROSIVITY**: Corrosivity tests were performed on two soil samples. The pH and minimum resistivity were determined in general accordance with California Test 643. The soluble sulfate content was determined in accordance with California Test 417. The total chloride ion content was determined in accordance with California Test 422. Figure II-4 presents the test results.
- **DIRECT SHEAR:** Direct shear tests were performed on two soil samples in accordance with ASTM D3080. The shear stress was applied at a constant rate of strain of 0.003 inch per minute. Figures II-5 and II-6 present the test results.

Soil samples not tested are now stored in our laboratory for future reference and analysis, if needed. Unless notified to the contrary, all samples will be disposed of 30 days from the date of this report.



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-5 at 5 to 6½ feet

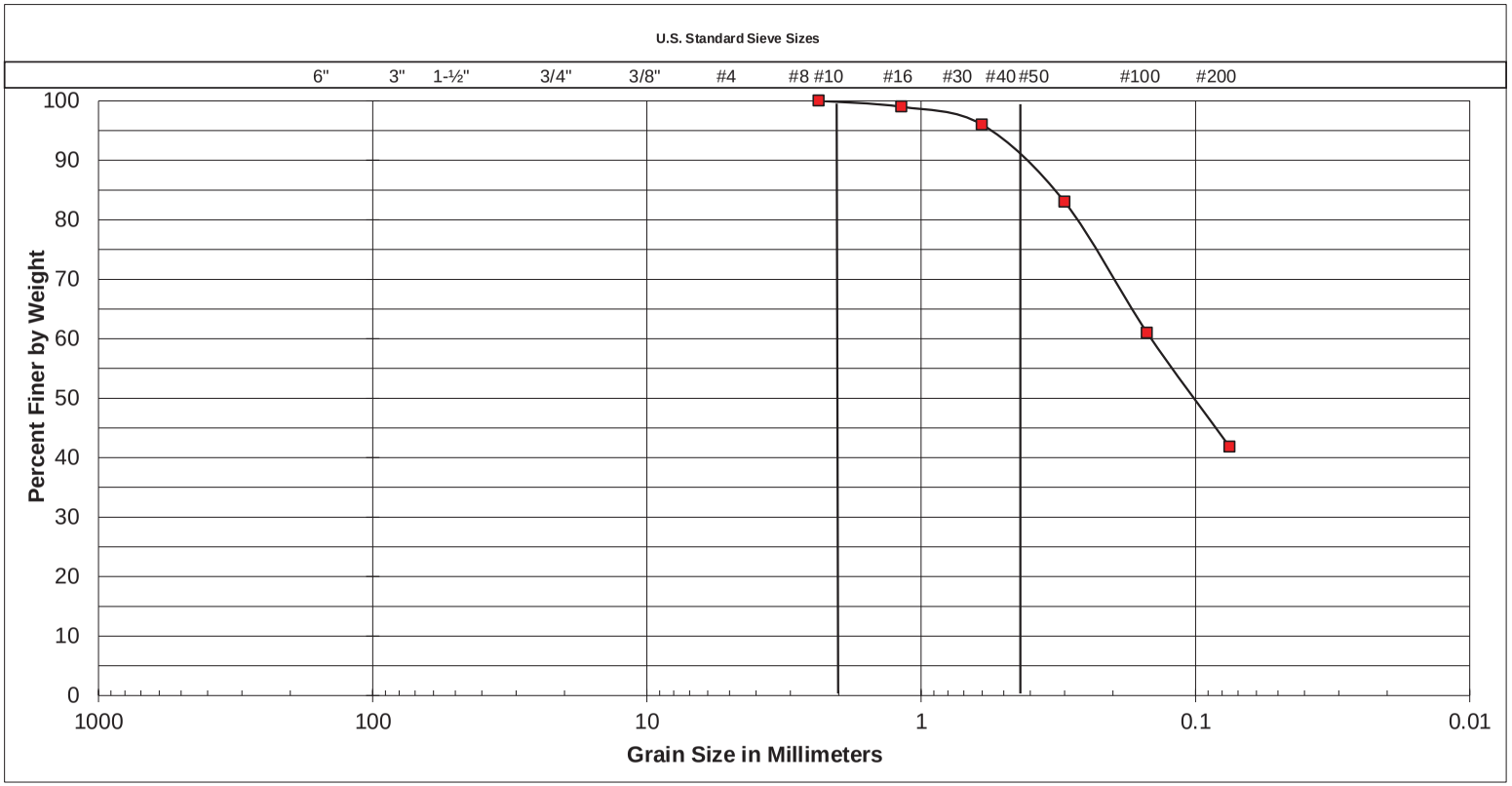
UNIFIED SOIL CLASSIFICATION:	ML
DESCRIPTION	SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT	49
PLASTIC LIMIT	30
PLASTICITY INDEX	19

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	DRB	Date:	November, 2016
Job Number:	160479P4-1	Figure:	II-1



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-6 at 10 to 11½ feet

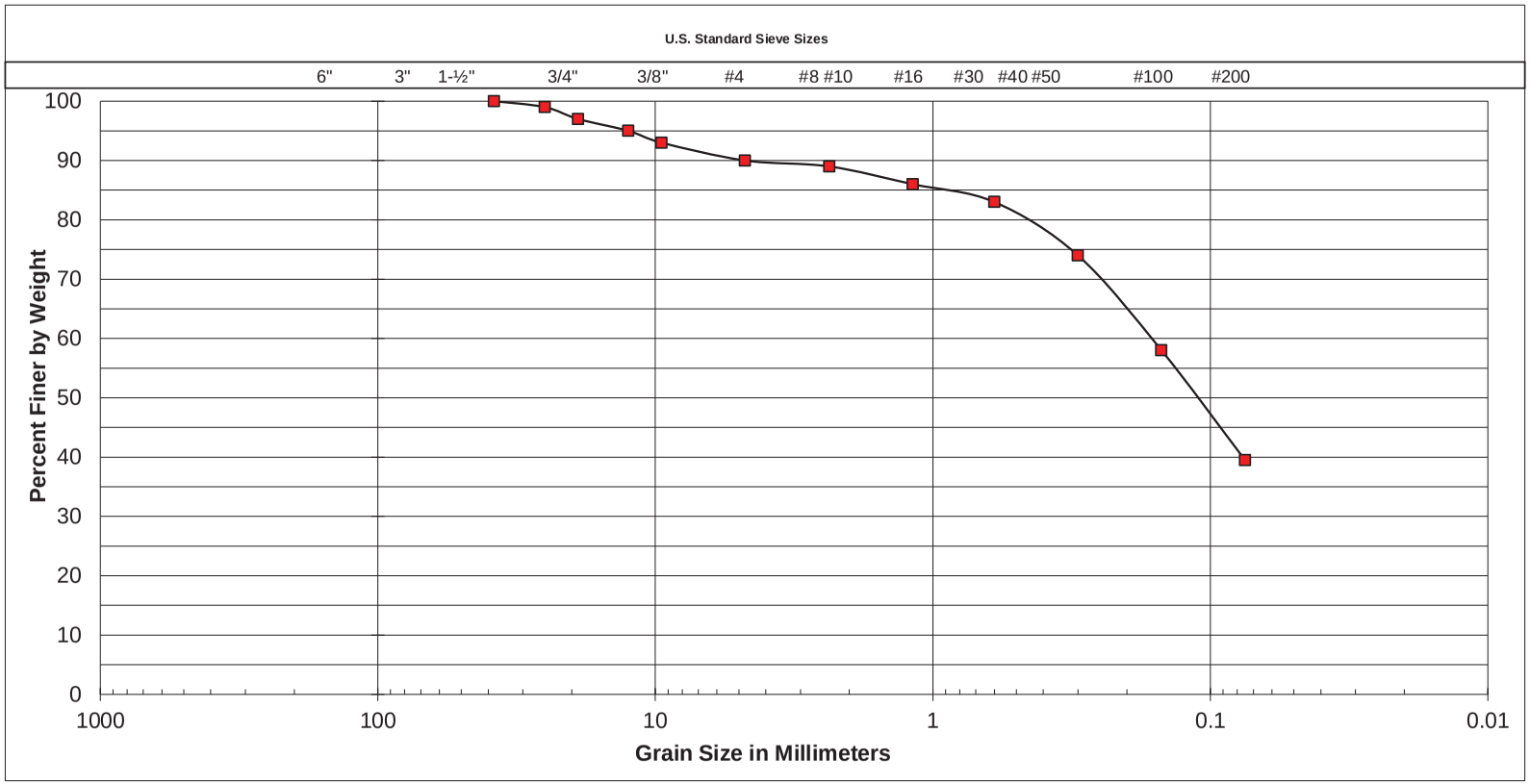
UNIFIED SOIL CLASSIFICATION:	SC
DESCRIPTION	CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	31
PLASTIC LIMIT	20
PLASTICITY INDEX	11

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	DRB	Date:	November, 2016
Job Number:	160479P4-1	Figure:	II-2



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-7 at 20 to 21½ feet

UNIFIED SOIL CLASSIFICATION:	SC
DESCRIPTION	CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	32
PLASTIC LIMIT	17
PLASTICITY INDEX	15

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	DRB	Date:	November, 2016
Job Number:	160479P4-1	Figure:	II-3

R-VALUE

CALIFORNIA TEST 301

SAMPLE	DESCRIPTION	R- VALUE
B-1 at ½ to 2 Feet	CLAYEY SAND, light brown	21

EXPANSION INDEX

ASTM D2489

SAMPLE	DESCRIPTION	EXPANSION INDEX
B-2 at 30 to 31 Feet and 35 to 36 Feet	SANDY CLAY, mottled light gray and orangish brown	85
B-6 at ½ to 2 Feet	CLAYEY SAND, yellowish brown	38

CLASSIFICATION OF EXPANSIVE SOIL [1]

EXPANSION INDEX	POTENTIAL EXPANSION
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
Above 130	Very High

1. ASTM D4829

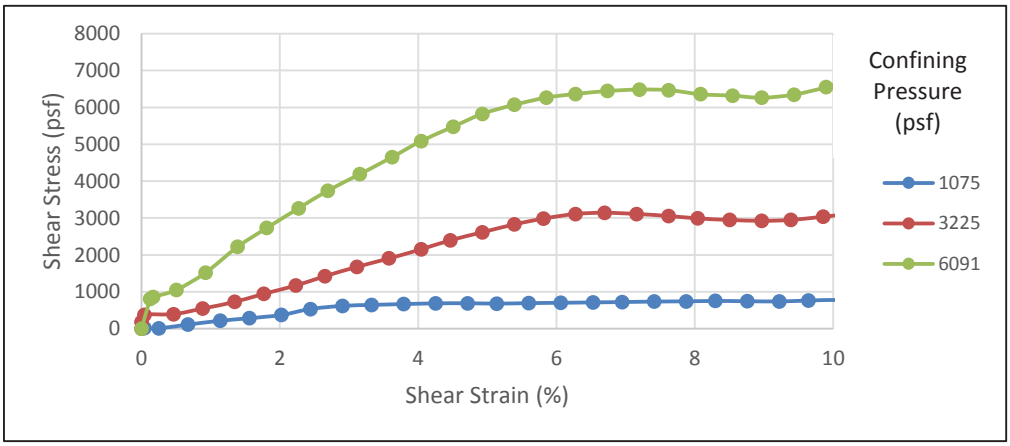
RESISTIVITY, pH, SOLUBLE CHLORIDE and SOLUBLE SULFATE

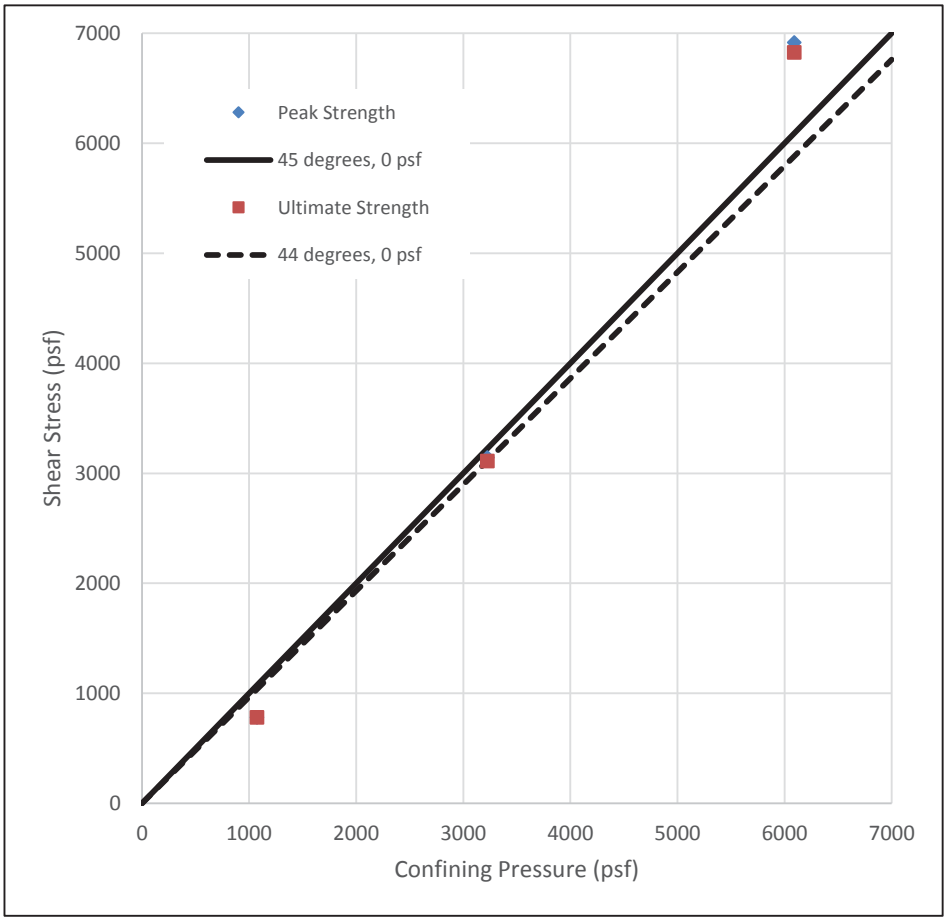
SAMPLE	RESISTIVITY (Ω-cm)	pH	CHLORIDE (%)	SULFATE (%)
B-4 at ½ to 2 Feet	340	7.3	0.077	0.049
B-6 at ½ to 2 Feet	395	6.8	0.108	0.063

SULFATE EXPOSURE CLASSES [2]

Class	Severity	Water-Soluble Sulfate (SO_4) in Soil, Percent by Mass
S0	Not applicable	$SO_4 < 0.10$
S1	Moderate	$0.10 \le SO_4 < 0.20$
S2	Severe	$0.20 \le SO_4 \le 2.00$
S3	Very Severe	$SO_4 > 2.00$

2. ACI 318, Table 4.2.1





SAMPLE ID: B-5 at 30 feet

SCRIPPS FORMATION (Tsc): SILTY SANDSTONE, pale orangish brown

NOTES: In Situ

Strain Rate: 0.003 in/min

Sample was consolidated and drained

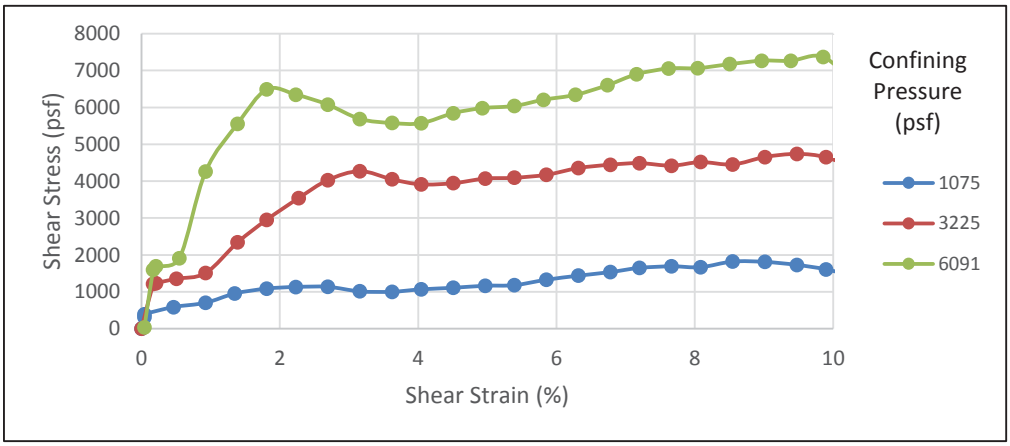
	Peak	Ultimate
Φ	45 °	44 °
c	0 psf	0 psf

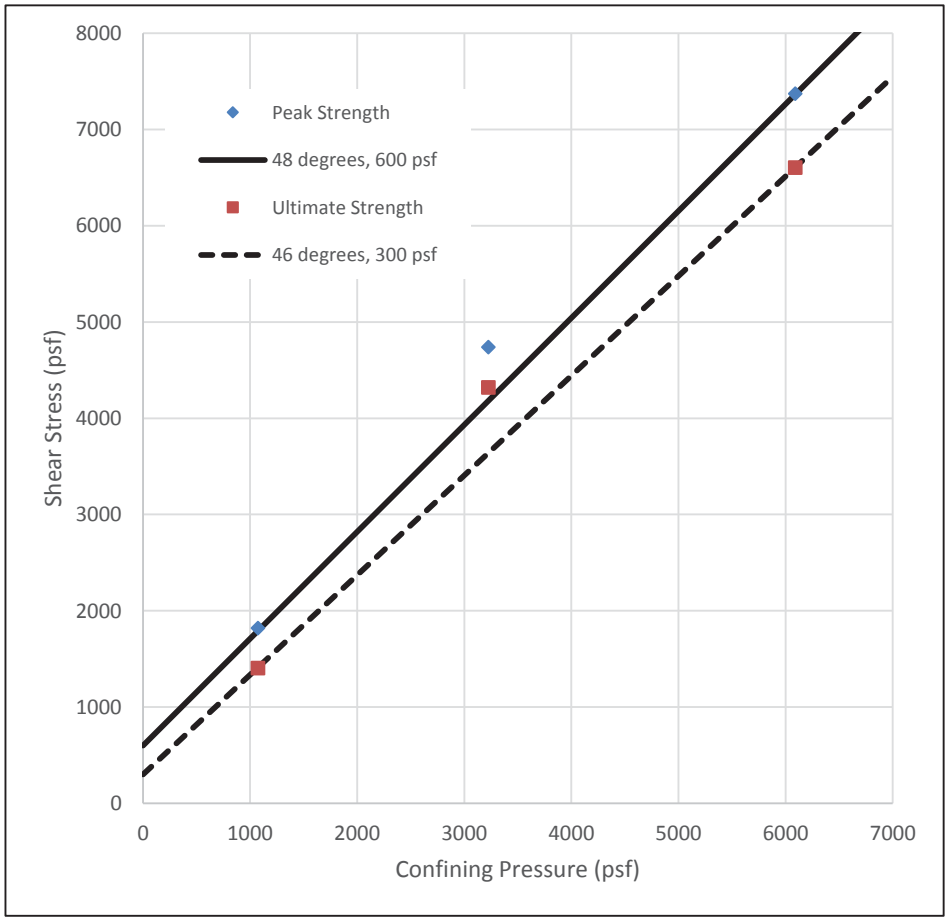
	Initial	Final
γ_d	100.6 pcf	100.6 pcf
w_c	6.9 %	21.3 %
Saturation	28 %	86 %

SCST Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	TBC	Date:	November, 2016
Job Number:	160479P4-1	Figure:	II-5





SAMPLE ID: B-7 at 40 feet

SCRIPPS FORMATION (Tsc): SANDY CLAYSTONE, mottled orangish brown and light gray

NOTES: In Situ

Strain Rate: 0.003 in/min

Sample was consolidated and drained

	Peak	Ultimate
Φ	48 °	46 °
c	600 psf	300 psf

	Initial	Final
γ_d	102.5 pcf	102.5 pcf
w_c	22.0 %	24.8 %
Saturation	93 %	100 %

SCST Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	TBC	Date:	November, 2016
Job Number:	160479P4-1	Figure:	II-6

SCST, Inc.
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SDVOSB . DVBE

December 30, 2016

SCST No. 160479P4
Report No. 3

Roland Bartsch P.E., LEED AP, QSD
Principal Civil Engineer
University of California, San Diego
Facilities Design & Construction
10280 North Torrey Pines Road, Suite 470
La Jolla, California 92037

Subject: BORING COMPLETION REPORT
VOIGT PARKING STRUCTURE
LA JOLLA, CALIFORNIA
UCSD JOB NO. 5146
PERMIT # LMWP-002541

Dear Roland:

In accordance with County of San Diego requirements, we prepared this boring completion report for the nine geotechnical borings that were drilled at the subject site. A boring location map, the boring logs, and the laboratory test results are attached. Baja Exploration (C57 License # 804318) drilled the borings. The borings were sealed in accordance with California Well Standards Bulletins and the County of San Diego Code of Regulatory Ordinances.

If you have any questions, please call me at (619) 280-4321.

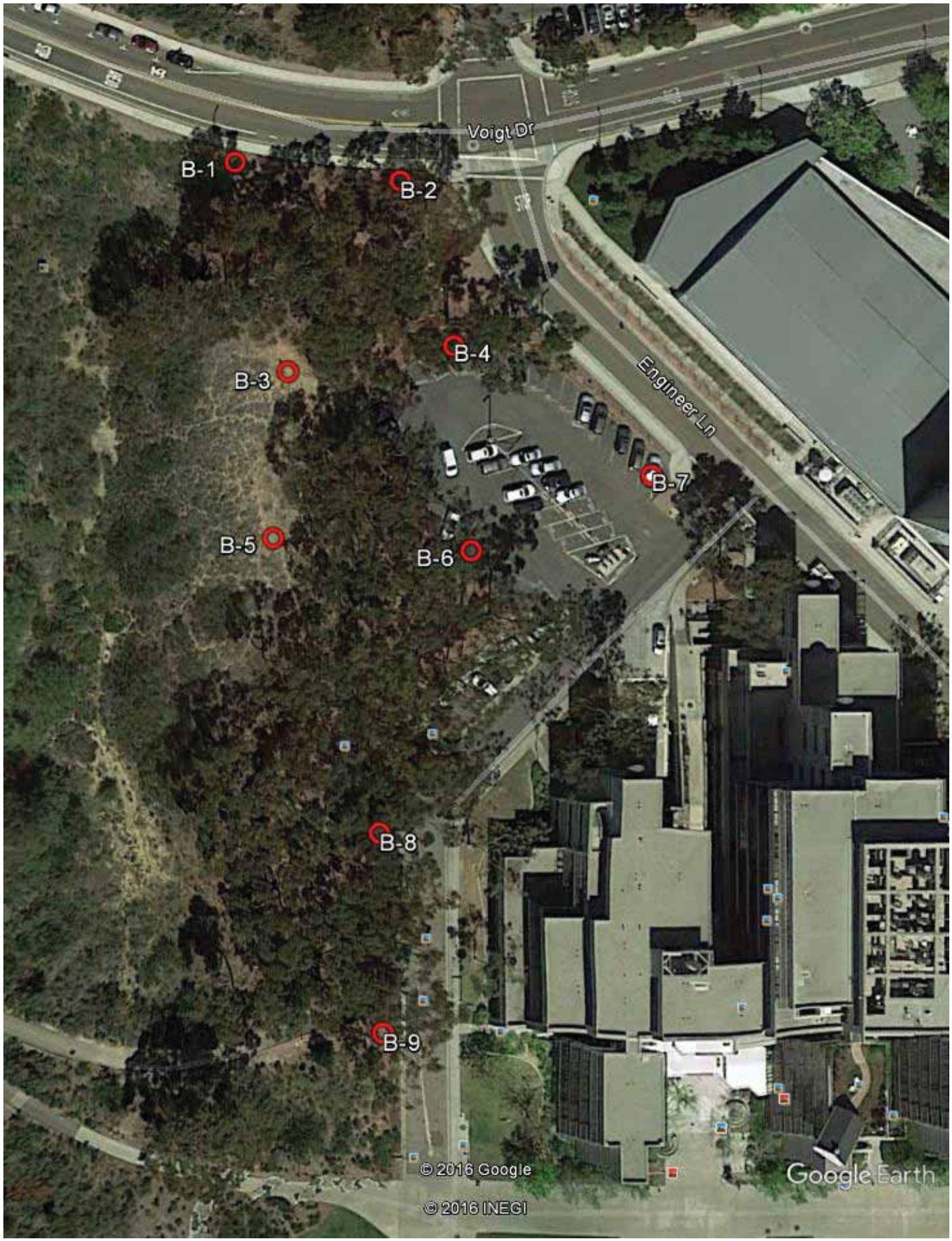
Respectfully submitted,
SCST, INC.

REGISTERED PROFESSIONAL ENGINEER
THOMAS B. CANADY
No. 50057
Exp. 6/30/17
CIVIL
STATE OF CALIFORNIA

Thomas B. Canady, PE 50057
Principal Engineer

Attachments:
Figure 1 - Boring Location Map
Figures 2 through 20 - Logs of Borings
Figures 21 through 26 - Laboratory Test Results

(1) Addressee via e-mail at rbartsch@ucsd.edu
(1) Well Permit Desk via e-mail at deh.monitoringwells@sdcounty.ca.gov



Google Earth

feet 200
meters 70

FIGURE 1

LOG OF BORING B-1

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 338 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		2-3 inches of mulch.							
1	SC	**Fill (Qf):** CLAYEY SAND, light brown, fine to medium grained, some gravel, moist, medium dense to dense.		X					RV
2		No gravel, dense.							
3			SPT		24	31			
4									
5									
6			SPT		37	48			
7									
8									
9									
10		Very dense.							
11			SPT		48	62			
12									
13									
14									
15									
16		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, mottled orangish brown and light gray, fine to medium grained, moist, very dense, weakly cemented.	SPT		50/4"	65/4"			
17									
18									
19									
20									

BORING CONTINUED ON FIGURE 3.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	2

LOG OF BORING B-1 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 338 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, moderately cemented.	SPT		50/3"	65/3"			
22									
23									
24									
25			SPT		50/6"	65/6"			
26									
27									
28		SANDY CLAYSTONE, mottled light gray and orangish brown, moist, hard, strongly cemented.							
29									
30			SPT		50/5"	65/5"			
31		**AUGER REFUSAL AT 31 FEET ON CONCRETION.**							
32									
33									
34									
35									
36									
37									
38									
39									
40									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	3

LOG OF BORING B-2

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		4-6 inches of mulch.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, some gravel, moist, medium dense to dense.		X					
2		Moderate brown.							
3			SPT		56	72			
4		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, light brown, fine to medium grained, moist, very dense, moderately cemented.							
5									
6			SPT		43	56			
7									
8		SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, weakly cemented.							
9									
10			SPT		50/5"	65/5"			
11									
12									
13									
14									
15									
16			SPT		45	58			
17									
18									
19									
20									

BORING CONTINUED ON FIGURE 5.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	4

LOG OF BORING B-2 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, mottled grayish brown and orangish, fine to medium grained, moist, dense, weakly cemented.	SPT		37	48			
22									
23		CLAYEY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, strongly cemented.							
24									
25			SPT		50/3"	65/3"			
26									
27									
28		SANDY CLAYSTONE, mottled light gray and orangish brown, moist, hard, strongly cemented.							
29									
30			SPT		50/5"	65/5"			EI
31									
32									
33									
34									
35			SPT		50/6"	50/6"			
36									
37									
38		SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, strongly cemented.							
39									
40									

BORING CONTINUED ON FIGURE 6.

LOG OF BORING B-2 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
41		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, strongly cemented.	CAL		50/2"		15.8	99.9	
42		SANDY CLAYSTONE, light gray and orangish brown, moist, hard, strongly cemented.							
43									
44		SILTSTONE, orangish brown, moist, very dense, moderately to strongly cemented.							
45									
46			SPT		50/3"	65/3"			
47									
48		CLAYEY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, moderately to strongly cemented.							
49									
50			SPT		50/4"	65/4"			
51		**BORING TERMINATED AT 51 FEET.**							
52									
53									
54									
55									
56									
57									
58									
59									
60									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	6

LOG OF BORING B-3

Date Drilled: 10/26/2016 | Logged by: EM

Equipment: Limited-Access CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 345 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, pale yellowish brown, fine to medium grained, moist, weakly cemented.		X					
2									
3		SILTY SANDSTONE, light grayish brown and orangish brown, fine to medium grained, moist, very dense, strongly cemented.	SPT		44	57			
4									
5		Pale orangish brown.							
6			SPT		55	71			
7									
8									
9									
10									
11		CLAYEY SANDSTONE, light grayish brown, fine to medium grained, moist, very dense, strongly cemented.	SPT		50/6"	65/6"			
12									
13									
14									
15			SPT		50/6"	65/6"			
16									
17									
18									
19		**AUGER REFUSAL AT 7 FEET ON CONCRETION. DRILL RIG MOVED 10 FEET NORTHWEST AND BORING CONTINUED. AUGER REFUSAL AGAIN AT 18 FEET ON CONCRETION.**							
20									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	7

LOG OF BORING B-4

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 350½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		3 inches of asphalt concrete.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, trace gravel, moist, medium dense to dense.		X					COR
2		Moderate brown.							
3			SPT		26	34			
4									
5		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled light gray and orangish brown, fine grained, moist, very dense, moderately cemented.	SPT		67	87			
6									
7									
8									
9									
10		Light brown, fine to medium grained, weakly cemented.	SPT		50/3"	65/3"			
11									
12									
13		SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, strongly cemented.							
14									
15			SPT		50/6"	65/6"			
16									
17									
18									
19									
20									

AUGER REFUSAL AT 20 FEET ON CONCRETION.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	8

LOG OF BORING B-5

Date Drilled: 10/26/2016 | Logged by: EM

Equipment: Limited-Access CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1		**SCRIPPS FORMATION (Tsc):** SANDY SILTSTONE, mottled yellowish brown, fine to medium grained, moist, very dense, strongly cemented.		X					
2		Pale orangish brown.							
3			SPT		89	115			
4									
5		Pale yellowish brown.							
6			SPT		85/11"	110/11"			SA AL
7									
8									
9									
10		Light gray and orangish brown.							
11			SPT		50/6"	65/6"			
12									
13									
14									
15									
16			SPT		50/5"	65/5"			
17									
18		Gravel/cobbles at 18 feet.							
19									
20									

BORING CONTINUED ON FIGURE 10.

LOG OF BORING B-5 (Continued)

Date Drilled: 10/26/2016 | Logged by: EM

Equipment: Limited-Access CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 344 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** SANDY SILTSTONE, orangish brown, fine to coarse grained, trace gravel, moist, very dense, weakly cemented.	SPT		50/5"	65/5"			
22									
23		SILTY SANDSTONE, light gray and orangish brown, fine to coarse grained, moist, very dense, weakly cemented.							
24									
25			SPT		50/5"	65/5"			
26									
27									
28									
29									
30		Pale orangish brown.	CAL		50/5"		6.9	100.6	DS
31									
32									
33									
34									
35		Light brown, fine to medium grained.	SPT		50/4"	65/4"			
36									
37									
38									
39									
40			SPT		50/5"	65/5"			

BORING TERMINATED AT 40 FEET.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	10

LOG OF BORING B-6

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 353½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		3 inches of asphalt concrete.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, some gravel, moist, medium dense.		X					EI
2									COR
3	SM	SILTY SAND, pale brown, fine to coarse grained, moist, medium dense.	SPT		23	30			
4									
5		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled orangish brown and light gray, fine grained, moist, very dense, weakly cemented.							
6			SPT		50/5"	65/5"			
7									
8									
9									
10		Pale orangish brown, fine to medium grained, moderately cemented.							SA
11			SPT		54	70			AL
12									
13									
14									
15		Orangish brown, fine grained, weakly cemented.	SPT		50/5"	65/5"			
16									
17									
18									
19									
20									

BORING CONTINUED ON FIGURE 12.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	11

LOG OF BORING B-6 (Continued)

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 353½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled light gray and orangish brown, fine grained, moist, very dense, weakly cemented.	SPT		50/5"	65/5"			
22									
23		SILTY SANDSTONE, pale orangish brown, fine to medium grained, moist, very dense, weakly cemented.							
24									
25			SPT		50/6"	65/6"			
26									
27									
28		CLAYEY SANDSTONE, mottled orangish brown and light gray, fine grained, moist, very dense, strongly cemented.							
29									
30			SPT		50/5"	65/5"			
31									
32									
33									
34									
35			SPT		50/6"	65/6"			
36									
37									
38									
39									
40									

AUGER REFUSAL AT 40 FEET ON CONCRETION.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	12

LOG OF BORING B-7

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 352 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		3 inches of asphalt concrete.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, trace gravel, moist.		X					
2									
3		**SCRIPPS FORMATION (Tsc):** CLAYSTONE, yellowish brown and light gray, moist, hard, moderately cemented.	SPT		50/4"	65/4"			
4									
5		Mottled light gray and orangish brown.							
6			SPT		55	71			
7									
8									
9									
10									
11			SPT		43	56			
12									
13		SILTY SANDSTONE, grayish brown, fine to coarse grained, moist, dense, weakly cemented.							
14									
15									
16			SPT		25	32			
17									
18		CLAYEY SANDSTONE, mottled orangish brown, yellowish brown, and light gray, fine to medium grained, moist, very dense, moderately cemented.							
19									
20									

BORING CONTINUED ON FIGURE 14.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	13

LOG OF BORING B-7 (Continued)

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 352 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled orangish brown, yellowish brown, and light gray, fine to medium grained, moist, very dense, moderately cemented.	SPT		40	52			SA AL
22									
23									
24									
25		Orangish brown, fine grained, weakly cemented.	SPT		50/5"	65/5"			
26									
27									
28									
29									
30		Light brown, fine to medium grained.	SPT		50/5"	65/5"			
31									
32									
33									
34									
35		Mottled orangish brown and light gray, fine grained, moderately cemented.	SPT		50/6"	65/6"			
36									
37									
38		SANDY CLAYSTONE, mottled orangish brown and light gray, moist, hard, strongly cemented.							
39									
40									

BORING CONTINUED ON FIGURE 15.

LOG OF BORING B-7 (Continued)

Date Drilled: 11/1/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 352 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
41		**SCRIPPS FORMATION (Tsc):** SANDY CLAYSTONE, mottled orangish brown and light gray, moist, hard, strongly cemented.	CAL		50/5"		22.0	102.5	DS
42									
43		CLAYEY SANDSTONE, pale orangish brown, fine grained, moist, very dense, weakly cemented.							
44									
45			SPT		50/4"	65/4"			
46									
47									
48									
49									
50		Orangish brown.	SPT		50/6"	65/6"			
51		**BORING TERMINATED AT 50½ FEET.**							
52									
53									
54									
55									
56									
57									
58									
59									
60									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	15

LOG OF BORING B-8

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 354 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SC	**FILL (Qf):** CLAYEY SAND, moderate brown, fine to medium grained, some gravel, moist, dense.		X					
2									
3		Sampler bouncing on rock.	SPT		67/11"	87/11"			
4									
5		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, light brown, fine to medium grained, moist, very dense, weakly cemented.	SPT		50/4"	65/4"			
6									
7									
8									
9									
10		Orangish brown.	SPT		50/4"	65/4"			
11									
12									
13		CLAYEY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, weakly cemented.							
14									
15			SPT		50/6"	65/6"			
16									
17									
18									
19									
20									

BORING CONTINUED ON FIGURE 17.

LOG OF BORING B-8 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 354 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** CLAYEY SANDSTONE, mottled light gray and orangish brown, fine to medium grained, moist, very dense, weakly cemented.	SPT		50/4"	65/4"			
22									
23									
24									
25		Orangish brown.							
26			SPT		55	71			
27									
28									
29									
30		Mottled light gray and orangish brown, fine to medium grained.	SPT		50/5"	65/5"			
31									
32									
33		SANDY CLAYSTONE, mottled light gray and orangish brown, moist, hard, strongly cemented.							
34									
35			CAL		50/5"		13.0	116.8	
36									
37									
38									
39									
40									

BORING CONTINUED ON FIGURE 18.

LOG OF BORING B-8 (Continued)

Date Drilled: 10/31/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 354 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
41		**SCRIPPS FORMATION (Tsc):** SANDY CLAYSTONE, mottled orangish brown and light gray, moist, hard, strongly cemented.	SPT		50/3"	65/3"			
42									
43		SILTY SANDSTONE, white, fine grained, moist, very dense, strongly cemented.							
44									
45			SPT		50/3"	65/3"			
46		**AUGER REFUSAL AT 46 FEET ON CONCRETION.**							
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	18

LOG OF BORING B-9

Date Drilled: 11/2/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 355½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		2-3 inches of mulch.							
1	SC	**Fill (Qf):** CLAYEY SAND, yellowish brown, fine to medium grained, some gravel, moist.		X					
2		Pale brown, dense.							
3			SPT		36	47			
4									
5									
6			SPT		30	39			
7									
8									
9		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, pale orangish brown, fine grained, moist, dense, moderately cemented.							
10									
11			SPT		31	40			
12									
13									
14									
15		Light grayish brown, fine to medium grained, very dense, weakly cemented.	SPT		50/4"	65/4"			
16									
17									
18									
19									
20									

BORING CONTINUED ON FIGURE 20.

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	CLF	Date:	December, 2016
Job Number:	160479P4-3	Figure:	19

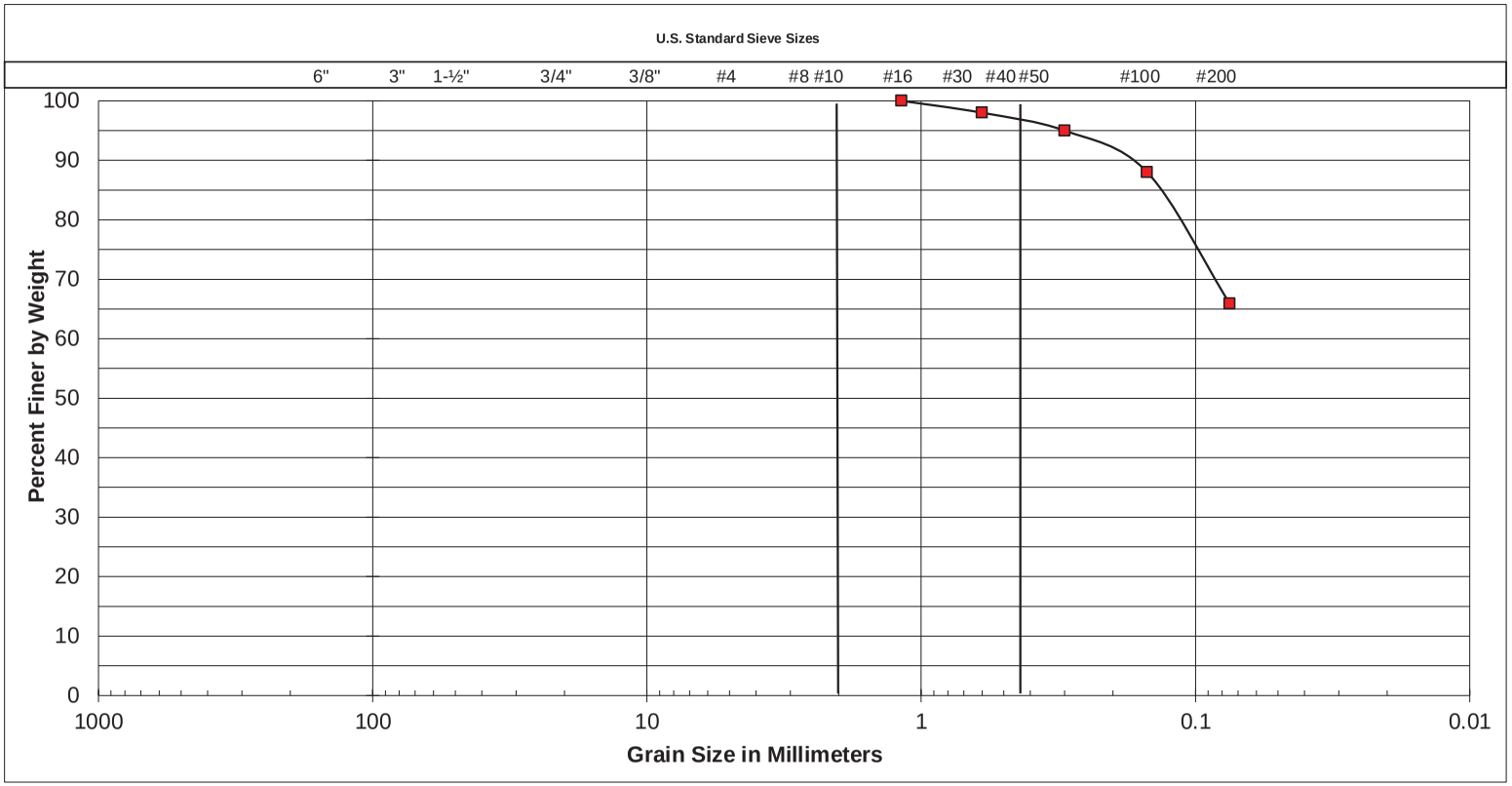
LOG OF BORING B-9 (Continued)

Date Drilled: 11/2/2016 | Logged by: EM

Equipment: Truck-Mounted CME-75, 8-inch Hollow-Stem Auger | Project Manager: TBC

Elevation (ft): 355½ | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21		**SCRIPPS FORMATION (Tsc):** SILTY SANDSTONE, light grayish brown, fine to medium grained, moist, very dense, strongly cemented.	SPT		50/6"	65/6"			
22									
23									
24									
25		**AUGER REFUSAL AT 25 FEET ON CONCRETION.**							
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-5 at 5 to 6½ feet

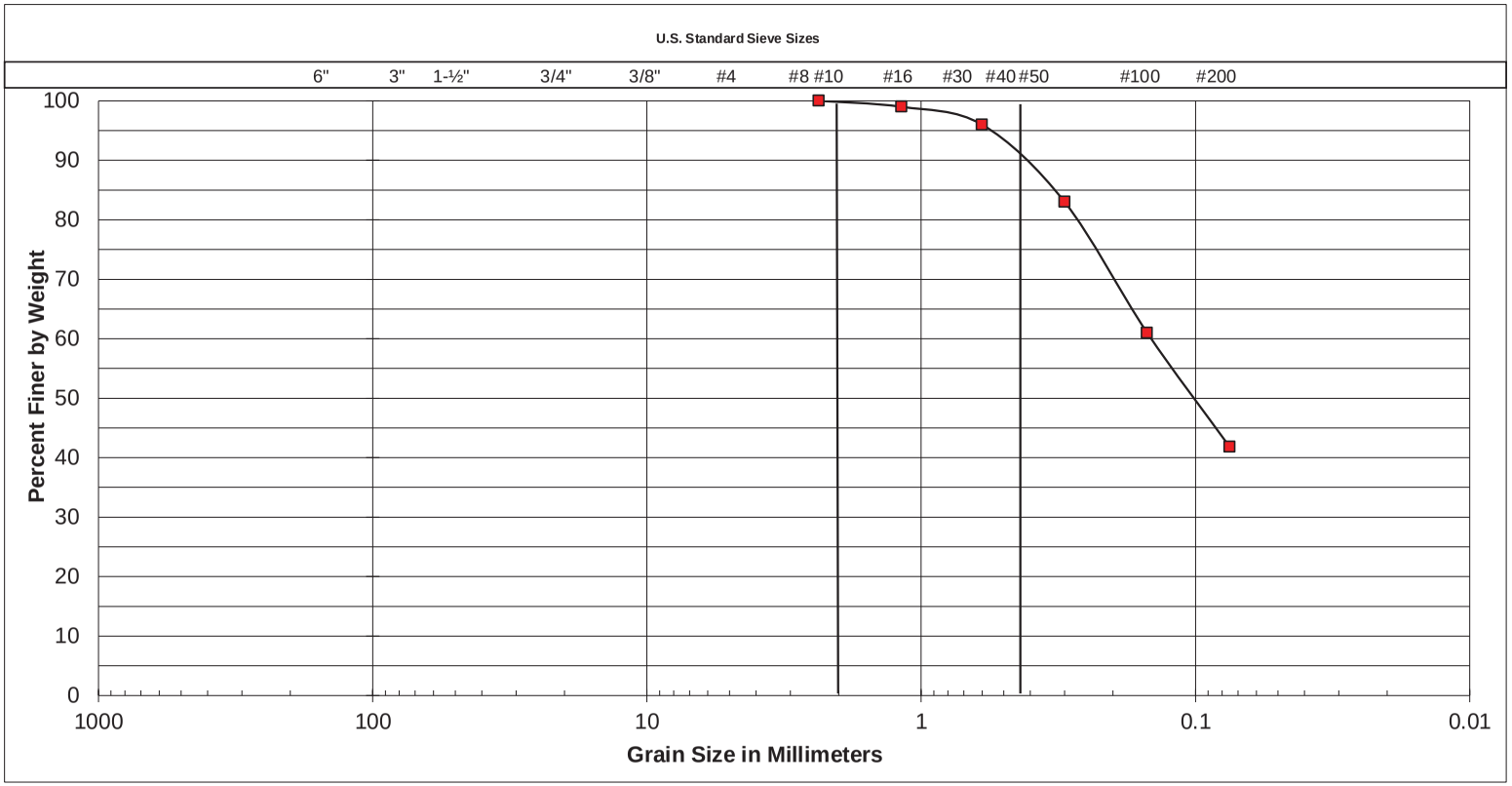
UNIFIED SOIL CLASSIFICATION:	ML
DESCRIPTION	SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT	49
PLASTIC LIMIT	30
PLASTICITY INDEX	19

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	DRB	Date:	December, 2016
Job Number:	160479P4-3	Figure:	21



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-6 at 10 to 11½ feet

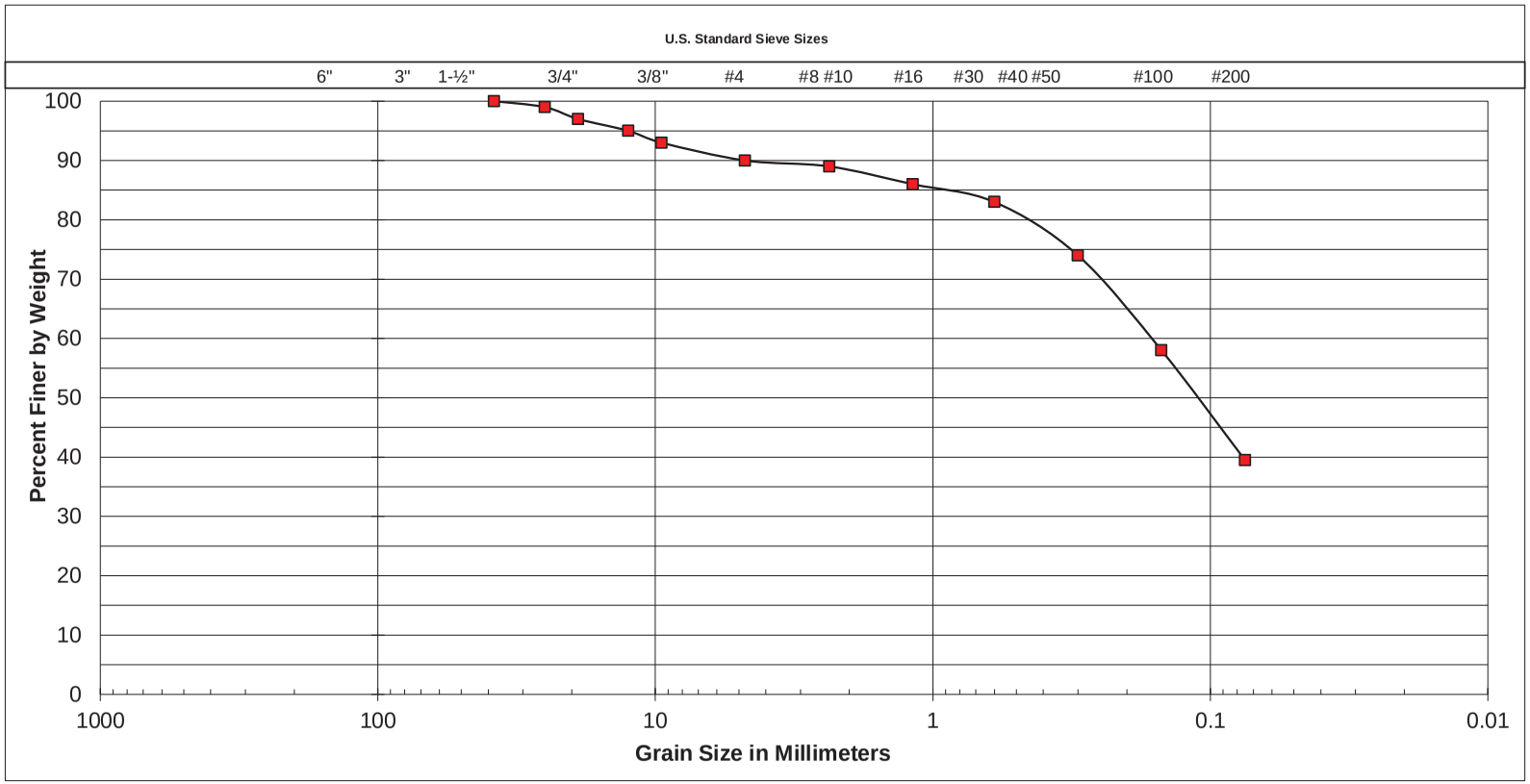
UNIFIED SOIL CLASSIFICATION:	SC
DESCRIPTION	CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	31
PLASTIC LIMIT	20
PLASTICITY INDEX	11

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	DRB	Date:	December, 2016
Job Number:	160479P4-3	Figure:	22



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-7 at 20 to 21½ feet

UNIFIED SOIL CLASSIFICATION:	SC
DESCRIPTION	CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	32
PLASTIC LIMIT	17
PLASTICITY INDEX	15

SCST, Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	DRB	Date:	December, 2016
Job Number:	160479P4-3	Figure:	23

R-VALUE

CALIFORNIA TEST 301

SAMPLE	DESCRIPTION	R- VALUE
B-1 at ½ to 2 Feet	CLAYEY SAND, light brown	21

EXPANSION INDEX

ASTM D2489

SAMPLE	DESCRIPTION	EXPANSION INDEX
B-2 at 30 to 31 Feet and 35 to 36 Feet	SANDY CLAY, mottled light gray and orangish brown	85
B-6 at ½ to 2 Feet	CLAYEY SAND, yellowish brown	38

CLASSIFICATION OF EXPANSIVE SOIL [1]

EXPANSION INDEX	POTENTIAL EXPANSION
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
Above 130	Very High

1. ASTM D4829

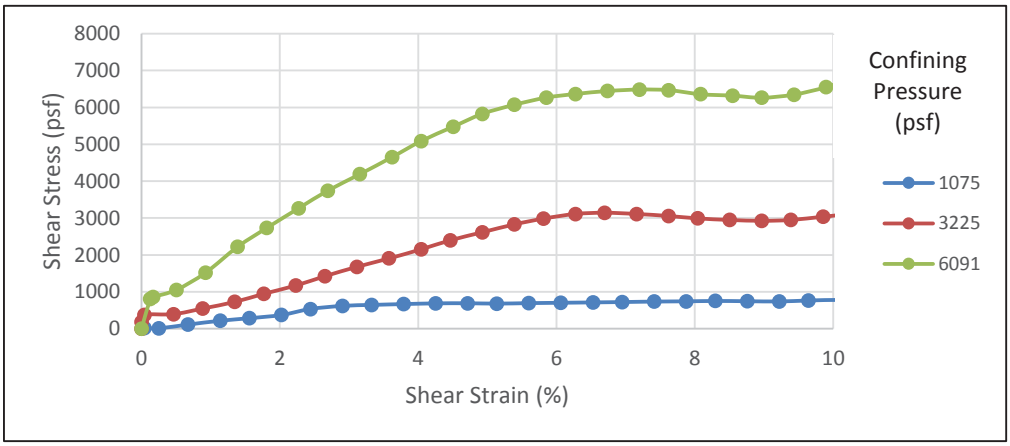
RESISTIVITY, pH, SOLUBLE CHLORIDE and SOLUBLE SULFATE

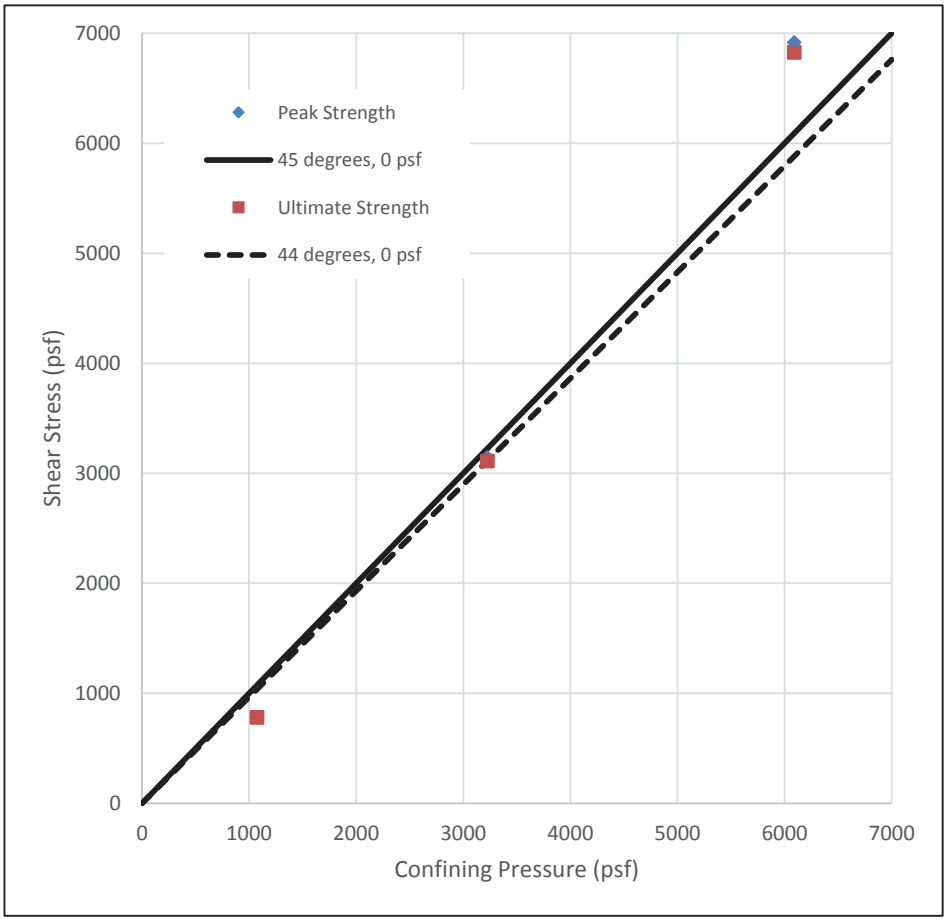
SAMPLE	RESISTIVITY (Ω-cm)	pH	CHLORIDE (%)	SULFATE (%)
B-4 at ½ to 2 Feet	340	7.3	0.077	0.049
B-6 at ½ to 2 Feet	395	6.8	0.108	0.063

SULFATE EXPOSURE CLASSES [2]

Class	Severity	Water-Soluble Sulfate (SO_4) in Soil, Percent by Mass
S0	Not applicable	$SO_4 < 0.10$
S1	Moderate	$0.10 \le SO_4 < 0.20$
S2	Severe	$0.20 \le SO_4 \le 2.00$
S3	Very Severe	$SO_4 > 2.00$

2. ACI 318, Table 4.2.1





SAMPLE ID: B-5 at 30 feet

SCRIPPS FORMATION (Tsc): SILTY SANDSTONE, pale orangish brown

NOTES: In Situ

Strain Rate: 0.003 in/min

Sample was consolidated and drained

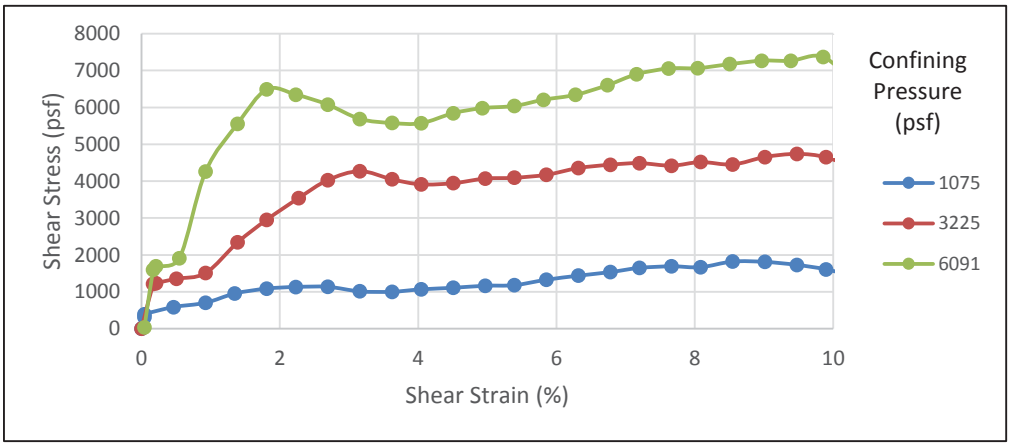
	Peak	Ultimate
Φ	45 °	44 °
c	0 psf	0 psf

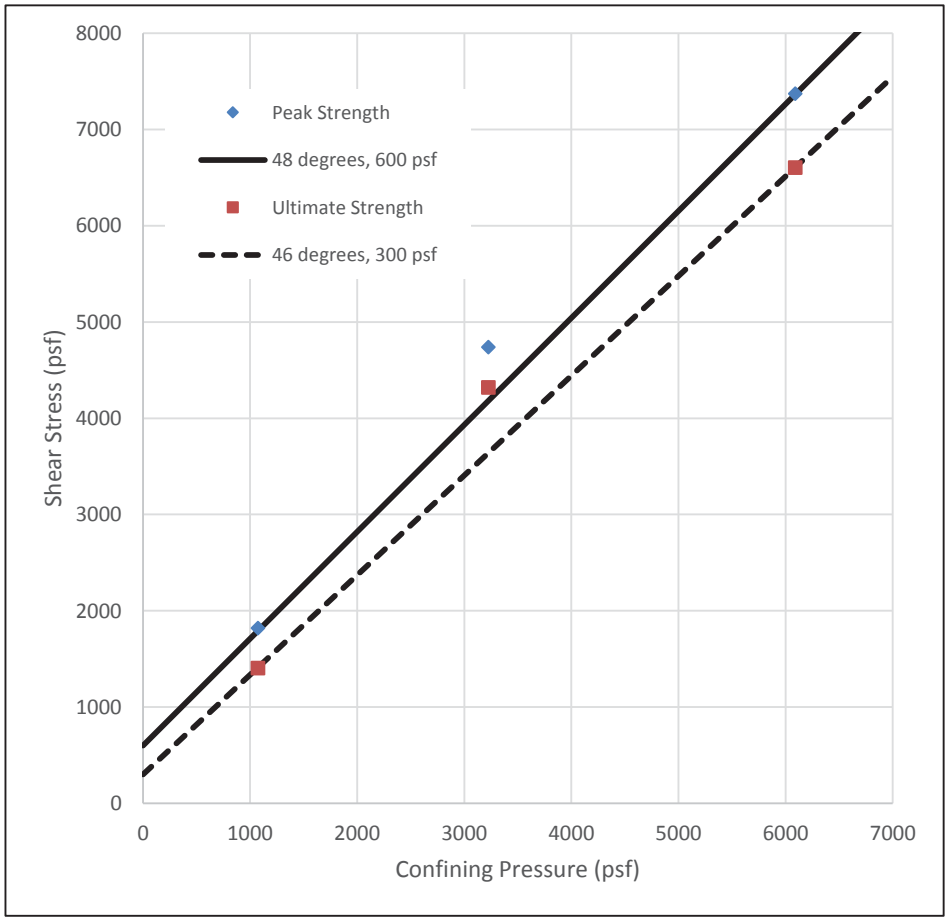
	Initial	Final
γ_d	100.6 pcf	100.6 pcf
w_c	6.9 %	21.3 %
Saturation	28 %	86 %

SCST Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	TBC	Date:	December, 2016
Job Number:	160479P4-3	Figure:	25





SAMPLE ID: B-7 at 40 feet

SCRIPPS FORMATION (Tsc): SANDY CLAYSTONE, mottled orangish brown and light gray

NOTES: In Situ

Strain Rate: 0.003 in/min

Sample was consolidated and drained

	Peak	Ultimate
Φ	48 °	46 °
c	600 psf	300 psf

	Initial	Final
γ_d	102.5 pcf	102.5 pcf
w_c	22.0 %	24.8 %
Saturation	93 %	100 %

SCST Inc.

5146 Voigt Parking Structure
La Jolla, California

By:	TBC	Date:	December, 2016
Job Number:	160479P4-3	Figure:	26

SITE DEVELOPMENT GUIDELINES AND PROCEDURES FOR UC, SAN DIEGO

Prepared by:
Environment, Health and Safety
University of California, San Diego
Revised: March 2016

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

UC San Diego Site Development Guidelines and Procedures outlines the basic steps for consideration during construction and development to address potential site contamination. The procedures in this guide are used to determine conditions for carrying out soil disturbances, disposition of soil exports, and screening criteria for reuse and importing of soil for UC San Diego Campus, Scripps Institution of Oceanography, Elliot Field, Mount Soledad, Hillcrest and Nimitz Marine Station. Departments that disturb and import soil are responsible for implementing these procedures. Each section should be reviewed to determine the appropriate level of action for any given site activity.

This guide reflects the requirements as defined in California Health and Safety Code, Division 20, Chapter 6.8, Section 25319.5, to determine if known or potential hazardous substances exist at a proposed project site which could pose a threat to public health or the environment and San Diego Regional Water Quality Control Board (RWQCB) Order No. R9-2014-0041 for discharge, disposal, stockpiles, and reuse of soil.

Background

The expansion, redevelopment, or reuse of UC San Diego properties may be complicated by the presence or potential presence of petroleum hydrocarbon fuels, heavy metals, munitions and other hazardous contaminants or wastes. Potential sources of contaminants include; historical use by U.S. Department of Defense (DOD), historical use as municipal landfills, installation of underground storage tanks, discharge of undocumented fill materials, historical spills of hazardous materials and agricultural use. Discovery of petroleum contamination, munitions debris, and unexploded ordnance have occurred throughout UC San Diego properties. Predominately the discovery of hazardous contamination on UC San Diego properties has been

attributed to DOD activities associated with Formerly Used Defense Sites (FUDS) Camp Matthews, Camp Callen, and Camp Elliott as well as Nimitz Marine Facility and the Mount Soledad location.

To address the possibility of hazardous materials and ordnance contamination and to continue with planned University expansion, performance standards have been put in place to ensure proper site assessment, analysis, and remediation in accordance with applicable federal, state, and local laws and regulations. These standards are included in the form of the *UC San Diego Soils Management Policy* PPM516-27 (Attachment A), and the *Formerly Used Defense Site Awareness Program*, PPM516.27.1 (Attachment B).

The *UC San Diego Soils Management Policy* establishes the minimum requirements to assess soil for the presence of hazardous materials. UC San Diego acknowledges the history of the U.S. DOD sites, and has implemented a University-wide education program to increase awareness of munitions-related materials. The *Formerly Used Defense Site* brochure, published by Environment, Health and Safety (EH&S), presents a brief site history of University properties, general safety precautions, and other information concerning the US Army Corps of Engineers (ACOE) Final Site Inspection Report, Former Camp Calvin B. Matthews Site.

CHAPTER TWO

SITE EVALUATION

The following actions are considered for each proposed project site. Based on the location, historical data search, proposed development, actual site conditions and analytical results, any combination of the following may be implemented.

1. Magnetometer Study – to identify any subsurface, metal anomalies.
2. Construction Support – using a certified unexploded ordnance (UXO) technician to observe soil disturbance and grading operations for the depths at which UXO may be found.
3. Soils Management Policy – to collect soil samples at an industry standard frequency for known historical constituents. (The use of hand augers to collect soil samples on flat terrain is not permitted.)
4. FUDS Awareness Program – to raise awareness within the Department of Defense site boundaries.
5. Restrictions on soil export, import, and reuse.

Field and analytical results produced during the site evaluation stage will be compared to the *Soil Export / Import / Relocation Guidelines*, found in Chapter 3. Based on investigation and analytical findings a determination will be made concerning the handling of soils. If UXOs or other contaminants are found, all activity must be stopped and a reevaluation must be made. Exceedances of screening criteria will be addressed by EH&S and Responsible Parties on a case-by-case basis to assess risk to human health and the environment.

Definition:
Project - Soil disturbance at any UC San Diego owned property.
Project Manager – UC San Diego staff responsible for project oversight.
Document Tracking – Responsibility remains with Project Manager's Department.

CHAPTER THREE

SOIL EXPORT / IMPORT / RELOCATION GUIDELINES

SOIL EXPORT GUIDELINES

Soils may only be exported to a location endorsed by the EH&S Department in collaboration with the project's responsible party. For applicable projects, it is the project manager's responsibility to file a notice of intent (NOI) with the RWQCB and/or a Special Waste Profile with a receiving facility prior to exporting/relocating soil from the project site. Sampling, analytical, NOI, Special Waste Profile and tracking documents must be retained with project documents for a minimum of five years. UC San Diego prefers to export soil to permitted Landfills with published acceptance criteria. Soil may not be exported to residential projects, community gardens or K-12 school sites, including indirect routes such as concrete mixing, nurseries, and sod farms. Clean, recyclable material such as soil, rock, and blacktop may be exported to a certified recycling facility. Export of uncontaminated soil to commercial, industrial, and business park projects or roadwork sites is acceptable. Transportation of soils to or from any location not previously endorsed by EH&S must be reviewed and supported by EH&S (Environmental Affairs) prior to use.

The following requirements must be met:

1. Sampling results must be compared to the UC San Diego Screening Criteria for Importing and Exporting of Soil (Please refer to **Table 1**).
2. Each load of soil exported from UC San Diego must be documented.
3. Completed documents are to be returned to the project manager and retained with project documents for a minimum of five years.

Site workers and UC San Diego personnel must be on the alert for any odors, discolorations, physical changes, or other clues and abnormalities that may indicate soil contamination. With any indication of soil contamination, grading and excavating in the suspect area must be stopped, and the Environmental Affairs division of EH&S must be contacted immediately. Until the issue is addressed, soils are not to be moved off-site, and excavation must cease in the vicinity of the suspect soil.

Site Conditions

1. **If data indicates contamination is not likely present in the soil samples analyzed:**

Grading and excavating should proceed according to the contractor's methods.

2. **If data indicates there is potential contamination present:**

UC San Diego The project must develop a soils management plan to address the contaminations of concern.

a. Contaminated soil may need to be removed to a hazardous waste disposal site. Environmental Affairs will assist with this determination and provide recommendations for export and disposal.
b. Fuel-contaminated soils (gasoline, aviation gas, diesel fuel, jet fuels, kerosene, and fuel oils) that meet San Diego RWQCB General WDR Order No. R9-2014-0041 criteria may be placed in temporary waste piles or engineered fill. This applies to on-site and off-site locations where contaminated soil is deposited.
c. Fuel and heavy metal contaminated soils that meet the criteria for Special Waste landfill disposal may be removed to a solid waste landfill after filing an appropriate application and receiving approval from the landfill operator.

3. If contaminated soil is discovered at export location:

The project manager must be notified immediately by the contractor of any claim that contaminated soil was received from UC San Diego or the site's refusal of acceptance. The project manager should immediately contact the Environmental Affairs division of EH&S.

a) Further grading, excavating, or loading of trucks must be stopped at the UC San Diego project site until a determination regarding contamination can be performed.
b) A representative from UC San Diego must visit the export site immediately and identify the soil in question. It is important that the soil in question not be combined with other soils at the export site. Any soil in question must not be deposited on the export site.
c) All suspected contaminated soil from UC San Diego must be removed from the export location to an appropriate disposal site, or brought back to the UC San Diego site of origin as soon as possible.
d) The soil should be returned to the UC San Diego site, stockpiled and separated from the working area, on plastic sheeting, and cordoned off with traffic tape until it can be analyzed and properly handled.
e) All trucks in route must be returned to the project site for a determination regarding contamination.

SOIL IMPORT / RELOCATION GUIDELINES

The following general requirements apply to fill materials brought from off-campus locations or from locations on campus generated from ongoing or previous excavations.

1. Environmental Affairs or other acceptable party should conduct a preliminary assessment of the source of the fill prior to any material being imported or relocated on campus. The primary purpose shall be to identify the potential for soil contamination and the potential extent of that contamination of concern.
2. The fill must not be from an area undergoing environmental clean-up or remediation, an area with expected contamination, or similar locations with high potential for soil contamination.
3. Acceptable soils shall be obtained from residential locations, undeveloped locations, previously evaluated and approved areas, or areas of "virgin" soils, such as deep excavations. Soils from agricultural areas should be used with caution due to potential pesticide contamination or presence of manure or decomposed organic material.
4. Imported soils from locations other than UC San Diego property must be compliant with the San Diego RWQCB Order # R9-2014-0014 and the California Human Health Screening Levels (CHHSL) for Soil for Commercial/Industrial use.
5. Soil analysis requirements:
    (a) Samples are to be "representative grab samples" from the source of the fill soil.
        (i) Up to 1000 yd^3 — 4 samples
        (ii) 1000 to 5000 yd^3 — 4 samples +1 per each added 500 yd^3
        (iii) >5000 yd^3 — 12 samples +1 per each added 1000 yd^3
    (b) Average of all sample results should be $\leq$ 50% of safe screening levels and each sample should not be $\geq$ 75% of the safe screening level identified in CHHSL.

TABLE 1

UC San Diego screening Criteria for Importing and Exporting of Soil

(San Diego Regional Water Quality Board Resolution R9-2007-104- General Conditional Waiver 8)

Petroleum Hydrocarbon contamination limits by EPA method 8015 Modified			
	Suitable for import	Suitable for export to industrial/commercial site 5 feet below finish grade	Requires further evaluation by EH&S prior to export
Gasoline and lighter chain hydrocarbons (C_4-C_{12})	ND & No contamination-based odor	ND & No contamination-based odor	Detectable Concentrations or contamination-based odor
Diesel fuel and medium chain hydrocarbons (C_8-C_{22})	ND & No contamination-based odor	ND & No contamination-based odor	Detectable Concentrations or contamination-based odor
Waste oil and heavier chain hydrocarbons (C_8-C_{40})	ND & No contamination-based odor	ND & No contamination-based odor	Detectable Concentrations or contamination-based odor
California Title 22 Metals			
	Suitable for import	Suitable for export to industrial/commercial site 5 feet below finish grade	Requires further evaluation by EH&S prior to export
Antimony	<5 mg/kg	<5 mg/kg	≥5 mg/kg
Arsenic	<50 mg/kg	<50 mg/kg	≥50 mg/kg
Barium	<1000 mg/kg	<1000 mg/kg	≥509 mg/kg
Beryllium	<4 mg/kg	<4 mg/kg	≥4 mg/kg
Cadmium	<1.7 mg/kg	<1.7 mg/kg	≥1.7 mg/kg
Chromium (total)	<50 mg/kg	<50 mg/kg	≥50 mg/kg
Cobalt	<20 mg/kg	<20 mg/kg	≥20 mg/kg
Copper	<60 mg/kg	<60 mg/kg	≥60mg/kg
Lead	<15 mg/kg	<15 mg/kg	≥15 mg/kg
Mercury	<0.26 mg/kg	<0.26 mg/kg	≥0.26 mg/kg
Molybdenum	<2 mg/kg	<2 mg/kg	≥2 mg/kg
Nickel	<100 mg/kg	<100 mg/kg	≥100 mg/kg
Selenium	<0.21 mg/kg	<0.21 mg/kg	≥0.21 mg/kg
Silver	<2 mg/kg	<2 mg/kg	≥2 mg/kg
Thallium	<1 mg/kg	<1 mg/kg	≥1 mg/kg
Vanadium	<50 mg/kg	<50 mg/kg	≥50 mg/kg
Zinc	<149 mg/kg	<149 mg/kg	≥149 mg/kg
Explosives by EPA Method 8330			
	Suitable for import	Suitable for export to industrial/commercial site 5 feet below finish grade	Requires further evaluation by EH&S prior to export
2,4-Dinitrotoluene	ND	ND	Detectable Concentration
Nitroglyderin	ND	ND	Detectable Concentration

ND - None detectable

REFERENCES

1) FINAL Site Inspection Report, Former Camp Calvin B. Matthews Site, September 2007

2) Review of a History of U.S. Army Camp Robert E. Callan and U. S. Marine Corps Camp Calvin B. Matthews, September 1998

3) USC, Title 42, Chapter 103 – Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

4) CCR, Title 22, Chapter 6.8 (Section 25300) – Hazardous Substance Account Act

5) California Regional Water Quality Control Board San Diego Region Order No. R9-2014-0014 Conditional Waiver No. Discharge/Disposal of Solid Wastes to Land. June 2014.

6) California Regional Water Quality Control Board San Diego Region Order No. R9-2002-0342 Waste Discharge Requirements for the Disposal of Fuel Contaminated Soil in the San Diego Region. December 2002.

ATTACHMENT A

UC SAN DIEGO SOILS MANAGEMENT POLICY

Section: 516-27
Effective: 09/01/2007
Supersedes: N/A
Issuing Office: Environment, Health & Safety

I. POLICY

The purpose of this policy is to protect human health and the environment from petroleum, heavy metals, and other hazardous materials or wastes that may be contained in UC San Diego soils. This policy applies to soil disturbance and soil placement associated with new and redevelopment within the UC San Diego Campus, Scripps Institution of Oceanography, Elliot Field, Mount Soledad, Hillcrest and Nimitz Marine Station. Requirements of this policy shall be included in any geotechnical field investigations.

Soil disturbance associated with landscaping, utility installation, or subsurface repair and maintenance should follow the UC San Diego Awareness Program as outlined in the brochure located at http://blink.UC San Diego.edu/safety/environment/outdoor/FUDS.

The department implementing the project will be the primary responsible department with coordination support provided by EH&S and Physical Planning.

II. PROCEDURES

Implementation of this policy assists in determining the presence of hazardous materials or wastes within a proposed project site. This will be done by collecting samples in accordance with industry-standard ASTM guidelines, analyzing samples using USEPA-

approved methods, and reporting results as part of the geotechnical investigation. The process includes:

1. The department implementing the project will consult with EH&S to determine application of this policy.
2. The department implementing the project will hire the environmental service, typically as part of geotechnical activities.
3. The environmental service provider will conduct sample collection according to ASTM guidelines and the procedure described below.
    a. All samples will be collected according to industry standards.
    b. All chemical analyses must be performed by State of California certified laboratories.
    c. At a minimum, perform the following soil sampling and analyses:
        i. In cooperation with EH&S, grid the site into an approximate 100 foot by 100 foot grid (approximately ¼ acre blocks). Historical use, such as an underground storage tank, may require additional, biased sample locations.
        ii. Collect soil samples from each of the locations using appropriate methods at approximately 2 feet below surface, 5 feet below surface and at 5 foot intervals thereafter to the bottom elevation of the proposed excavation.
        iii. Analyze all samples for the following constituents:
            (a) Total Petroleum Hydrocarbons (TPH) Extended Range (C8-C40) by EPA Method 8015 Modified.
            (b) California Toxic Metals Total Concentration for Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc.
            (c) Explosives by EPA Method 8330. (Unless exempted by EH&S)

4. Environmental service provider will include a limited environmental section (sample collection locations, collection specifics, and analytical results) as part of the geotechnical report. The environmental information will be signed by a State of California registered geologist or professional engineer. The report will be provided in hardcopy and in a readable electronic format.
5. Forward environmental section results to EH&S.
6. Any detection of explosives or California Toxic Metals will be addressed. Detections may be submitted to the United States Army Corps of Engineers and the Department of Toxic Substance and Control as the agencies involved with these constituents. Detections of TPH may be submitted to the Regional Water Quality Control Board depending on the final disposition of the soils.
7. Placement of excavated soils will be a joint decision between the Responsible Parties and EH&S.

III. RESPONSIBILITY

Departments that disturb soil as defined in this policy statement are responsible for implementing these procedures. At a minimum, the department implementing the project as the primary responsible parties will coordinate with Environment, Health & Safety, and Physical and Community Planning to determine the application of the policy and level of implementation.

ATTACHMENT B

UC SAN DIEGOCAMPUS-WIDE EDUCATION PROGRAM

Camp Matthews: Formerly Used Defense Site at UC SAN DIEGO

UC San Diego contains about 400 acres designated as a Formerly Used Defense Site (FUDS). This land, formerly Camp Calvin B. Matthews, is in the southeastern part of the campus (see maps).

Inspection and findings

The U.S. Army Corps of Engineers inspected the old Camp Matthews property, including a search for unexploded ordnance and discarded military munitions constituents.

In a September 2007 report, inspectors' findings indicated instances of soil contamination and debris remains from military munitions (see image at right).

Precautions

If you encounter or suspect the presence of unexploded military ordnance, debris, or contamination:

- Do not touch it! Consider all munitions to contain a live charge.
- Report the find immediately to UC San Diego Police, (858) 534-4357.
- Step away from the area, and keep others away until responders arrive.
- Provide a general description, including length, width, color, and location of the item(s).
- Be prepared to direct responders to the location.

For more information on Camp Matthews and the Army Corps of Engineers Final Report, visit the local library or contact EH&S Risk Management through a Freedom of Information Act request.

University Community Branch Library
4155 Governor Drive
San Diego, CA 92122-2501
Phone: (858) 552-1655

SOILS MANAGEMENT POLICY

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A. The department implementing the project will consult with EH&S to determine application of this policy.

B. The department implementing the project will hire the environmental service, typically as part of geotechnical activities.

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3) Explosives by EPA Method 8330 (unless exempted by EH&S).

4. Environmental service provider will include a limited environmental section (sample

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IV. REFERENCES
A. FINAL Site Inspection Report, Former Camp Calvin B. Matthews Site, September 2007.

B. Review of a History of U.S. Army Camp Robert E. Callan and U. S. Marine Corps Camp Calvin B. Matthews, September 1998.

C. USC, Title 42, Chapter 103 – Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

D. CCR, Title 22, Chapter 6.8 (Section 25300) – Hazardous Substance Account Act.

E. Order No. R9-2002-0342 - Waste Discharge Requirements for the Disposal and/or reuse of Petroleum Fuel Contaminated Soils (FCS) in the San Diego Region.