Appendix IS-5

Geotechnical Engineering Report

Geotechnical Engineering Report

The Getty Center Oak Parking Lots

1200 Getty Center Drive, Los Angeles, California

June 7, 2017

Revised on August 20, 2019

Terracon Project No. 60165174

Prepared for:

The J. Paul Getty Trust

Los Angeles, California

Prepared by:

Terracon Consultants, Inc.

Tustin, California

June 7, 2017
Revised on August 20, 2019

Terracon

The J. Paul Getty Trust
1200 Getty Center Drive, Suite 100-Office T214
Los Angeles, CA 90049-1678

Attn: Mr. Johan Uyttewaal
P: 310.440.7677
E: JUyttewaal@getty.edu

Re: Geotechnical Engineering Report
The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles, California
Terracon Project No. 60165174

Dear Mr. Uyttewaal,

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. These services were performed in general accordance with our proposal for engineering services, P60165174 dated January 27, 2017.

This geotechnical engineering report presents the results of the subsurface exploration and provides geotechnical engineering recommendations concerning earthwork and the design and construction of foundations, floor slabs, and pavements for the proposed project.

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

Sincerely,
Terracon Consultants, Inc.

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EXECUTIVE SUMMARY

A geotechnical exploration has been performed for the proposed project to be located on the north side of the Getty Center in Los Angeles, California. Terracon's geotechnical scope of work included the advancement of eleven (11) test borings to approximate depths ranging between 50.3 and 121.5 feet below the ground surface (bgs).

Based on the information obtained from our subsurface exploration, the site is considered suitable for development of the proposed project provided our geotechnical engineering recommendations are implemented in the design and construction phases of the project. The following geotechnical considerations were identified:

- The subsurface materials encountered in the borings generally consisted of predominantly undocumented fill soils overlying alluvium and bedrock of Santa Monica Slate.
- Two borings N-1 and N-3 at Lot B and four borings S-1 through S-4 at Lot A encountered auger refusal between the depths of 58 and 100.3 feet bgs.
- Groundwater was encountered at a depth of about 55 feet bgs in three of the test borings.
- Liquefaction analyses was performed based on the subsurface conditions encountered in all the borings. Based on the calculation results, seismically-induced total and differential settlement for the 2475 years return period is estimated to be less than 1 inch. The seismically-induced total and differential settlement for the 475 years return period is estimated to be less than ½ inch.
- Due to the presence of these undocumented fill materials at both Lot B and Lot A, the proposed restroom buildings should be supported on mat foundations bearing on engineered fill extending to a minimum of 5 feet below the bottom of the foundation. The objective of the mat foundation is to reduce differential settlement that may occur due to the presence of the undocumented fill materials.
- Support of pavements and mat foundations on or above existing fill materials is discussed in this report. However, even with the recommended construction testing services, there is an inherent risk for the owner that compressible fill or unsuitable material within or buried by the fill will not be discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill, but can be reduced by following the recommendations in this report.
- Recommended minimum pavement sections for the project are: Automobile parking areas – 3" AC over 4" Class II AB or 5" PCC over 4" Class II AB; On-site driveways and lanes – 3" AC over 11" Class II AB or 6" PCC over 4" Class II AB. All pavements should be supported on a minimum of 10 inches of scarified, moisture conditioned, and compacted materials.
- The 2016 California Building Code (CBC) seismic site classification for this site is D.
- Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during construction.

This geotechnical executive summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled General Comments should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT
THE GETTY CENTER OAK PARKING LOTS
1200 GETTY CENTER DRIVE
LOS ANGELES, CALIFORNIA

Terracon Project No. 60165174
June 7, 2017, Revised on August 20, 2019

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the two proposed Parking Areas to be located within the north side of the existing Getty Center in Los Angeles, California. The Site Location Plan (see Exhibit A-1) is included in Appendix A of this report. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- earthwork
- seismic considerations
- pavement design and construction
- groundwater conditions
- foundation design and construction
- floor slab design and construction

Our geotechnical engineering scope of work for this project included the advancement of eleven (11) test borings to approximate depths ranging between 50.3 and 121.5 feet bgs. Two borings N-1 and N-3 at Lot B and four borings S-1 through S-4 at Lot A encountered auger refusal between the depths of 58 and 100.3 feet bgs. Boring N-1 was advanced with hollow-stem auger to a depth of about 64 feet until auger refusal where the drilling technique was switched to rock coring. Rock coring was terminated in this boring at a depth of about 79 feet bgs. Core samples were not recovered in the core barrels.

Logs of the borings along with a Boring Location Diagram (see Exhibits A-2A and A-2B) are included in Appendix A of this report. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included in Appendix B of this report. Descriptions of the field exploration and laboratory testing are included in their respective appendices.

2.0 PROJECT INFORMATION

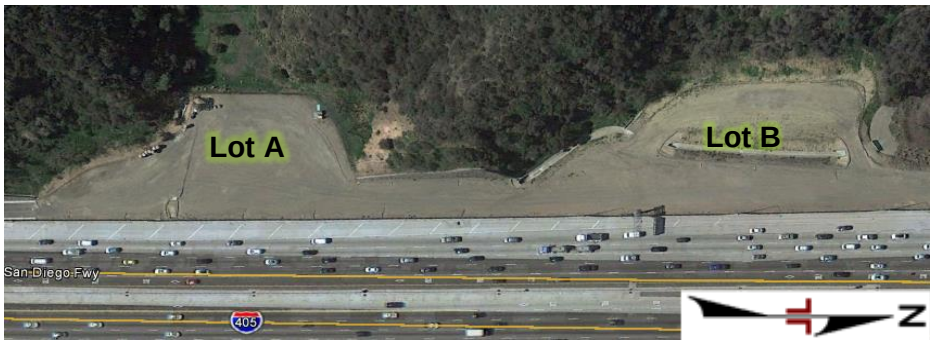
2.1 Project Description

ITEM	DESCRIPTION
Site layout	Refer to the Boring Location Plan (see Exhibits A-2A and A-2B in Appendix A).

ITEM	DESCRIPTION
Structures	The proposed project will include two restroom buildings with approximate dimensions of 14-ft by 17-ft each.
Construction	We assume that the restroom building will consist of wood frame constriction to be supported on mat foundations.
Maximum loads (assumed)	Column load – 40 to 80 kips Continuous Wall Load – 1 klf Maximum Uniform Floor Slab Load – 150 psf
Grading	Grading will include over-excavation and backfill to site grades beneath bathrooms. Grading for parking areas is expected to include cut and fill on the order of 2 feet or less.
Paving	The project will include asphalt concrete and Portland Cement Concrete pavements. Assumed Traffic Index (TI): Automobile Parking Areas……..4.5 Bus Lanes…….....7.0

2.2 Site Location and Description

The project site is divided into two areas located north of the existing parking structure which is located downhill and north of the Getty center residing at 1200 Getty Center Drive, Los Angeles, California. The two areas will be referred to as Lot B and Lot A. Lot B is approximately 1.8 acres and is located about 600 feet north of Lot A which is about 1.5 acres in size. Both areas are bounded by the I-405 freeway on the east and the Santa Monica Mountains on the west.



ITEM	DESCRIPTION
Existing improvements	None, except for a drainage ditch bisecting Lot B.
Current ground cover	Unpaved parking area with gravel surface
Existing topography	The area of the project sites lies within an eastward draining tributary canyon to Sepulveda Canyon. Lot A is a relatively flat area while Lot B is divided by a drainage structure. The site is bounded by the San Diego 405 Freeway on the east side, a graded pad on the north side, a graded unpaved driveway on the south side, and natural generally east-facing slopes on the west side. Elevations on the subject parcel range from approximately 685 feet above mean sea level (MSL) near the southeast corner to about 800 feet in two areas along about the western boundary of the parcel (maximum of 1,490 feet on the highest peak of Santa Monica Mountains on the west), according to the topography shown on Topographic Map (See Exhibit A-3) and the two site geologic maps (See Exhibits A-8 and A-9). Slope gradients range from as gentle as approximately 3H:1V (horizontal to vertical ratio) to as steep as 1H:1V, but predominantly range from about 1½H:1V to 1¼H:1V.

2.3 Background

Based on the review of the published geologic literature, aerial photographs and maps, the project site and the surrounding area consist of significant amount of undocumented fill materials. Majority of the fill materials were placed during the construction of Interstate 405. Additional fill materials were also placed in 1960.

Based on a compaction report, dated March 31, 1998, prepared by Woodward-Clyde, fill materials were placed within Lot B in 1998. The fill materials placed within the project site was classified as non-structural fill. These non-structural fill materials were compacted to a relative density of greater than 90% during the fill placement.

Our explorations indicate the site has approximately 35 to 60 feet of fill materials on Lot B and 5 to 50 feet of fill materials on Lot A. Based on the measured dry densities in our samples and the standard penetration test blow counts, it appears that the fill materials received some compaction during placement. Except for the Woodward-Clyde report mentioned above, which does not document all the fill materials encountered in both sites, Terracon does not have any other documentation to show if the fill placement or grading operations were inspected and if fill compaction was tested. Terracon should be notified if such documentation exists, as the recommendations included in this report may change.

3.0 SUBSURFACE CONDITIONS

3.1 General Geology and Geologic Setting

The site is located along the western edge of a southerly trending alluvial valley in Sepulveda Canyon, along the southern flank of the (as part of the Hollywood Hills) Santa Monica Mountains in the Transverse Ranges Geomorphic Province of California. Geologic structures including mountain ranges and valleys within this province trend mostly east-west, in contrast to the prevailing northwest trend in the neighboring Peninsular Ranges Geomorphic Province to the south. As described by the California Geological Survey (CGS)[1], the Transverse Ranges are an east-west trending series of steep mountain ranges and valleys. The east-west structure of the Transverse Ranges is oblique to the normal northwest trend of coastal California, hence the name "Transverse." The province extends offshore to include San Miguel, Santa Rosa, and Santa Cruz islands. Its eastern extension, the San Bernardino Mountains, has been displaced to the south along the San Andreas Fault. Intense north-south compression is squeezing the Transverse Ranges.

Sepulveda Canyon, which includes the project site, is a south-southeasterly trending canyon in the Santa Monica Mountains. The Santa Monica Mountain Range is one of several ranges within the Transverse Ranges Geomorphic Province and is a broad anticline that has been severely ruptured by faulting and intruded by volcanic sills and dikes.

The major faults that form the southern boundary of the Santa Monica Mountains in the Transverse Ranges include, from west to east, the Malibu Coast fault, the Santa Monica fault, the Hollywood fault, and the Raymond fault (see Exhibits A-5 and A-6 in Appendix A). The nearest major fault southerly of these faults in the adjacent Peninsular Ranges Province is the Newport-Inglewood fault.

Near-surface natural materials exposed on and adjacent to the subject parcel, consist of young alluvial valley deposits of Holocene and late Pleistocene age (map unit Qya[2]; see Exhibit A-5) overlying Santa Monica Slate of Jurassic age (map unit sms[3]; see Exhibit A-4).

Bedrock materials exposed on the slopes adjacent to the subject parcel, consist of the Jurassic (?) age Santa Monica Slate. Dibblee[3] described this formation as “dark bluish gray slate-phyllite, weathers brown; cleavage parallel to bedding; metamorphosed from shale, possibly in part from greywacke; fine grained, composed of mica, quartz, and feldspar.”

[1] California Geological Survey, 2002, California Geomorphic Provinces – California Geological Survey Note 36
[2] Bedrossian, T.L., and Rofers, P.D., 2012, Geologic Compilation of Quaternary Surficial Deposits in Southern California, Los Angeles 30’ x 60’ Quadrangle: California Geological Survey (CGS) Special Report 217, Plate 9, scale 1:100,000
[3] Dibblee, T.W., Jr., 1991, Geologic Map of the Beverly Hills Quadrangle, Los Angeles County, California: Dibblee Geological Foundation Map #DF-31, scale 1:24,000.

3.2 Stratigraphy

Geologic units described in the soil test borings and on the slopes adjacent to the subject parcel include, from youngest to oldest, artificial fill, alluvium, colluvium, landslide debris, and the Santa Monica Slate. The regional surficial geologic map is shown in Exhibit A-5. Site Geologic Maps 1 and 2 (see Exhibits A-8 and A-9) were prepared using topographic base maps from the City of Los Angeles[4,5]. The near-level ground on the subject parcel is underlain by fill. Holocene to late Pleistocene age young alluvial valley deposits underlie the fill.

The slopes adjacent to the subject parcel are underlain by Holocene age colluvium (slope wash deposits) described as grayish brown and reddish brown, slightly moist to very moist, loose to medium dense, fine- to medium-grained clayey sand with common roots and rootlets and abundant angular slate fragments.

The alluvium in the valley and colluvium on the adjacent slopes are underlain by the Jurassic age Santa Monica Slate, which consists of dark gray to reddish brown weathered intensely jointed and fractured slate and phyllite with well-developed slaty cleavage and a thick weathered zone containing angular chips and thin slabs of slate surrounded by sandy clay.

3.3 Geologic Structures

Foliation within the Santa Monica Slate in the site vicinity west of the 405 Freeway has dips that generally range from horizontal to 50 degrees southwest to northwest, with a localized 16-degree dip to the southeast. Jointing within the slate along the hillside within and adjacent to the subject parcel contains at least three apparent joint sets: set one has dips ranging from 54 degrees toward the south to southeast to vertical, set two has dips ranging from 34 to 85 degrees toward the northwest to north, and set three has dips ranging from 35 to 76 degrees toward the east to southeast. These dips are generally steeper than the predominantly approximately 1¼H:1V to 1½H:1V gradient of the generally east-facing slopes along the western side of the subject parcel. Therefore, the foliation and jointing are considered generally favorable to neutral with respect to these slopes. Six geologic cross sections are presented in Exhibits A-10 through A-15.

3.4 Typical Subsurface Profile

Specific conditions encountered at the boring locations are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details for the borings can be found on the boring logs included in Appendix A. The on-site subsurface materials consisted of predominantly undocumented fill soils overlying alluvium and highly weathered bedrock of Santa Monica Slate. Geologic cross sections are presented in Exhibits A-10 through A-15.

[4] City of Los Angeles, 1960a, Santa Monica Mountains, Topographic Maps, Map Series M-664, Sheet 213, scale 1 inch = 100 feet.
[5] City of Los Angeles, 1960b, Santa Monica Mountains, Topographic Maps, Map Series M-664, Sheet 233, scale 1 inch = 100 feet.

A compaction report, dated March 31, 1998, was prepared by Woodward-Clyde for the fill materials placed within the Lot B. Based on this report, the fill materials placed within the project site was classified as non-structural fill. These non-structural fill materials were compacted to a relative density of greater than 90% during the fill placement. The following table summarizes the subsurface soil and bedrock conditions encountered in the test borings at each site.

Site	Soil Unit	Depth feet, bgs	Soil Description
Lot B	Non-Structural Fill	20 to 35	Sand with variable amounts of clay and silt and Sandy Lean Clay with Gravel
	Undocumented Fill	40 to 60	Sand with variable amounts of clay and silt and Sandy Lean Clay with Gravel
	Alluvium	50 to 115	Gravel with variable amount of clay and silt, and Sand with variable amount of clay and silt
	Bedrock of Santa Monica Slate	70 to 121	Gravel with variable amount of clay and silt, Sand with variable amount of clay and silt and Sandy Lean Clay
Lot A	Undocumented Fill	5 to 50	Sand with variable amounts of clay and silt and Sandy Lean Clay with Gravel
	Alluvium	40 to 75	Sand with variable amounts of clay and silt
	Bedrock of Santa Monica Slate	50 to 100	Gravel with variable amount of clay and silt, and Sand with variable amount of clay and silt

Alluvium was not encountered in all the borings. At Lot B, alluvium was encountered in three of the six borings to depths of about 50 to 115 feet bgs (which corresponds to thickness of 10 to 55 feet below the existing fill materials). At Lot A, alluvium was encountered in four of the five borings to depths of about 40 to 75 feet bgs (which corresponds to thickness of 25 to 50 feet below the existing fill materials).

Auger refusal was encountered in Borings N-1 and N-3 at Lot B. In Boring N-1, auger refusal was encountered at a depth of about 64 feet bgs. Below this depth, rock coring was performed. However, core samples were not recovered in the core barrels and the coring was terminated at a depth of about 79 feet bgs. At Lot A, auger refusal was encountered in Borings S-1 though S-4 between the depths of 58 and 100 feet bgs.

Laboratory tests were conducted on selected soil samples and the test results are presented in Appendix B and are summarized in part on the boring logs. Atterberg limits test results indicated that fill materials have low plasticity. Three direct shear tests were performed on clayey sand and silty sand with gravel materials encountered between the depths of about 7½ and 40 feet bgs, and resulted in ultimate friction angle ranging between 31º and 42º and corresponding cohesion values ranging between 222 and 726 pounds per square foot (psf). Expansion index (EI) testing on near surface fill materials consisting of clayey sand soils indicates an expansion index of 30. Consolidation/collapse tests indicate that the fill materials consist of clayey sand materials

encountered at approximate depth of 5, 10 and 35 feet have a slight collapse potential when saturated under normal footing loads of 2,000 psf.

3.5 Groundwater

Groundwater was encountered at a depth of about 55 feet bgs in Borings N-3, S-1 and S-4. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations.

In clayey soils with low permeability, the accurate determination of groundwater levels may not be possible without long-term observation. Long-term observation after drilling could not be performed, as borings were backfilled immediately upon completion due to safety concerns. Groundwater levels can best be determined by implementation of a groundwater monitoring plan. Such a plan would include installation of groundwater monitoring wells, and periodic measurement of groundwater levels over a sufficient period of time.

No wells with groundwater data were reported on or near the subject parcel from the California Department of Water Resources Water Data Library and County of Los Angeles Department of Public Works Groundwater Well Data. Furthermore, CGS Seismic Hazard Zone Report does not show any groundwater contour within about 2-mile radius from the project site.

3.6 Seismic Considerations

3.6.1 Local Faulting

A State of California Earthquake Fault Zone of the Hollywood fault zone[6,7] crosses about 6 miles southeast of the subject site; the un-zoned fault strand of this fault zone passes within about 3½ miles southeast of the site (see Exhibits A-4, A-5 and A-6). This fault has predominantly left-lateral strike-slip relative movement with prominent reverse-slip movement characterizing the many faults in Transverse Ranges Province of southern California.

The nearest fault to the site is the Benedict Canyon fault located about 0.6 mile southeast of the site. The Benedict Canyon fault zone, considered a pre-Quaternary age fault[8], is left-lateral strike-slip with reverse-slip relative movement. This fault trends diagonally northeasterly through the Santa Monica Mountains and along the northern edge of the eastern-most part of the mountains, at the south edge of the easternmost part of the San Fernando Valley, and extends eastward toward the Eagle Rock fault zone. This fault is part of the Hollywood-Santa Monica-Raymond system. The only evidence for relatively recent movement along the Benedict Canyon fault zone

[6] California Geological Survey (CGS) 2014, Earthquake Zones of Required Investigation, Hollywood Quadrangle, Earthquake Fault Zones and Seismic Hazards Zones, scale 1:24,000.
[7] Hernandez, J.L, 2016, The Hollywood and Raymond Faults in the Los Angeles 7.5-minute quadrangle, Los Angeles County, California: California Geological Survey (CGS) Fault Evaluation Report FER 260, dated December 15, 2016.
[8]Jennings, C.W., and Bryant, W.A., 2010, Fault Activity Map of California: California Geological Survey, Geologic Data Map No. 6, scale 1:750,000.

occurs in the subsurface slightly east of the Santa Monica Mountains where the very gently north-sloping base of apparently youthful ground water-bearing sediments is offset downward relative to the north about 125 meters, based on differences in total depth of alluvial deposits in two nearby water wells. The fault in this vicinity coincides with a steep north-dipping gravity gradient[9].

3.6.2 Regional Faulting and Seismicity

The site will be affected by seismic shaking due to earthquakes on major local and regional active faults throughout the southern California region. The nearest significant active faults to the site, the Newport-Inglewood, Hollywood, and Santa Monica faults are discussed in detail below:

Newport-Inglewood Fault Zone: The Newport-Inglewood fault zone is the nearest active fault system to the site (see Exhibits A-5 and A-6). The Newport-Inglewood fault zone displays right-lateral strike-slip relative movement, a maximum credible earthquake magnitude of 7.1, a slip rate of 1.0 mm/yr, and the nearest strand lies approximately 1.5 miles southeast of the subject site.

Hollywood Fault Zone: The Hollywood fault zone displays predominantly left-lateral strike slip with reverse-slip relative movement, a maximum credible earthquake magnitude of 6.4, a slip rate of 1.0 mm/yr, and the nearest fault strand lies approximately 1.8 miles southeast of the subject site. The Hollywood fault lies within the central portion of the west-trending system of oblique, reverse and left-lateral faults that separate the Transverse Ranges Geomorphic Province of California on the north, from the Peninsular Ranges province on the south[10].

Santa Monica Fault Zone: The Santa Monica fault zone displays predominantly left-lateral strike slip with reverse-slip relative movement, a maximum credible earthquake magnitude of 6.6, a slip rate of 1.0 mm/yr, and the nearest fault strand lies about 3 miles south of the subject site. The Santa Monica fault is part of the Transverse Ranges Southern Boundary fault system, a west-trending system of reverse, oblique-slip, and strike-slip faults that extends for more than 200 km along the southern edge of the Transverse Ranges [10,11].

Other active and potentially active faults, including the relatively close Malibu Coast and Raymond faults, are listed in table below.

Fault	Geometry[1]	Distance (miles)[2]	Maximum Moment Magnitude[4]	Slip Rate (mm/year)[5]
Newport-Inglewood	rl-ss	1.5	7.1	1.0
Hollywood	ll-r-o	1.8	6.4	1.0
Santa Monica	ll-r-o	3	6.6	1.0
Malibu Coast	ll-r-o	4	6.7	0.3

[9] Weber, F.H., Bennett, J.H., Chapman, R.H., Chase, G.W., and Saul, R.B., 1980, Earthquake Hazards Associated with the Verdugo-Eagle Rock and Benedict Canyon Fault Zones, Los Angeles County, California: California Division of Mines and Geology (CDMG) Open File Report 80-10 LA, Final Technical Report – Fiscal Year 1979-1980, 173 p.
[10] Dolan, J.F., Sieh, K., Rockwell, T.K., Guptill, P., and Miller, G., 1997, Active Tectonics, Paleoseismology, and Seismic Hazards of the Hollywood Fault, northern Los Angeles Basin, California: Geological Society of America Bulletin, v. 109, p. 1595-1616.
[11] Dolan, J.F., Sieh, K., and Rockwell, T.K., 2000a, Late Quaternary activity and seismic potential of the Santa Monica fault system, Los Angeles, California: Geol. Soc. America Bull. 112, p. 1559-1581.

Fault	Geometry[1]	Distance (miles)[2]	Maximum Moment Magnitude[4]	Slip Rate (mm/year)[5]
Northridge	r	10	7.0	1.5
Palos Verdes	rl-ss	11	7.3	3.0
Verdugo	r	12	6.9	0.5
Compton	r	12[3]	6.8	1.5
San Fernando	r	14	6.7	2.0
Santa Susana	r	16	6.7	5.0
Sierra Madre	r	16	7.2	2.0
Raymond	ll-r-o	16	6.5	1.5
Upper Elysian Park	r	18[3]	6.4	1.3
San Gabriel	rl-ss	19	7.2	1.0
Elysian Park	r	20[3]	6.7	1.5
Simi-Santa Rosa	ll-r-o	20	7.0	1.0
Puente Hills	r	24[3]	7.1	0.7
Whittier	rl-r-o	25	6.8	2.5
San Cayetano	r	30	7.0	6.0
Oak Ridge	r	31	7.1	3.0
San Andreas (Movave)	rl-ss	38	7.4	30.0
Chino-Central Avenue	rl-r-o	43	6.7	1.0
Cucamonga	r	43	6.9	5.0
Ventura-Pitas Point	r-ll-o	43	6.9	1.0
Elsinore (Glen Ivy)	rl-ss	54	6.8	5.0
Garlock (West)	ll-ss	56	7.3	6.0
San Jacinto (San Bernardino)	rl-ss	58	6.7	12.0
Big Pine	ll-ss	60	6.9	0.8
North Frontal (Western)	r	73	7.2	1.0
White Wolf	r-ll-o	74	7.3	2.0
Pinto Mountain	ll-ss	100	7.2	2.5

Notes:
[1] (ss) strike slip, (r) reverse, (n) normal, (rl) right lateral, (ll), left lateral, (o) oblique
[2] Fault distances measured from Jennings and Bryant (2010) and is epicnetral distance
[3] Fault distance estimated from Shaw and others (2002)
[4] Maximum moment magnitude calculated from relationships (rupture area) derived from Wells and Coppersmith (1994; values listed in Appendix A of Cao and others, 2003)
[5] Slip rate values listed in Appendix A of Cao and others (2003)

No known historic earthquakes have occurred on the nearby Hollywood and Santa Monica faults. However, the most significant and recent historic earthquake on the Newport-Inglewood fault zone with no apparent surface rupture occurred during the March 10, 1933 Moment Magnitude 6.4 earthquake; the epicenter of this earthquake is located about 38 miles southeast of the site.

Earthquakes on one of the major active faults or blind thrust faults in southern California will probably cause moderate to severe ground shaking at the subject site during the life of the

structures[12,13]. The Modified Mercalli intensity in the area of the subject parcel due to the January 19, 1994, Mw 6.7 Northridge earthquake [14,15] (epicenter about 10 miles north-northwest of site) was mapped as intensity VII. The intensity in the area of the parcel due to the October 1, 1987, Mw 5.9 Whittier Narrows earthquake (epicenter about 18 miles west of site) was mapped as intensity VI.

The ANSS (Advanced National Seismic System), SCEC (Southern California Earthquake Center), and USGS (U.S. Geological Survey) earthquake catalogs were searched for earthquakes of local magnitudes equal to or greater than 5.0 occurring since 1895 for a radius of 100 kilometers surrounding the site with the coordinates 34.09121 degrees latitude and -118.47631 degrees longitude. The following table presents a tabular listing of earthquake epicenters close to the site. The earthquake epicenters are sorted by date of event.

Date	Latitude (° N)	Longitude (° W)	Focal Depth (km)	Mw (Moment Magnitude)
3/10/1922	34.243	119.097	10.0	6.5
3/11/1933	33.624	118.001	6.0	5.3
3/11/1933	33.767	117.985	6.0	5.0
3/11/1933	33.631	117.999	6.0	6.4
5/31/1938	33.699	117.511	10.2	5.2
9/21/1941	34.838	118.933	6.0	5.1
11/14/1941	33.791	118.264	6.0	5.1
7/21/1952	34.958	118.998	6.0	7.5
7/21/1952	34.973	119.066	6.0	5.8
7/23/1952	34.988	118.803	6.0	5.6
7/23/1952	34.996	118.930	15.2	5.1
1/12/1954	34.982	119.061	0.0	5.4
5/23/1954	34.968	119.002	14.5	5.0
9/12/1970	34.255	117.534	10.8	5.2
2/9/1971	34.416	118.370	6.0	5.3
2/9/1971	34.416	118.370	6.0	5.8
2/9/1971	34.416	118.370	6.0	5.8
2/9/1971	34.416	118.370	8.9	6.6
2/21/1973	33.979	119.050	10.0	5.3
8/6/1973	33.957	119.475	16.9	5.1
1/1/1979	33.916	118.687	13.3	5.2
9/4/1981	33.660	119.110	5.0	5.8

[12] Dolan, J.F., Sieh, K., Rockwell, T.K., Yeats, R.S., Shaw, J., Suppe, J., Huftile, G.J., and Gath, E.M., 1995, Prospects for Larger or More Frequent Earthquakes in the Los Angeles Metropolitan Region: Science, vol. 267, p. 199-205.
[13] Dolan, J.F., S.A. Christofferson and J.H. Shaw, 2003, Recognition of Paleoearthquakes on the Puente Hills Blind Thrust Fault, California: Science, April 4, 2003: p. 115-118.
[14] Greenwood, R.B., 1995a, Regional Geologic Overview of the Los Angeles Basin ***in*** Woods, M.C. and Seiple, W.R. (editors), The Northridge, California, Earthquake of 17 January 1994: Calif. Div. Mines and Geology Special Publication 116, p. 1-8.
[15] Greenwood, R.B., 1995b, Characterizing Blind Thrust Fault Sources—an Overview ***in*** Woods, M.C. and Seiple, W.R. (editors), The Northridge, California, Earthquake of 17 January 1994: Calif. Div. Mines and Geology Special Publication 116, p. 279-287.

Date	Latitude (° N)	Longitude (° W)	Focal Depth (km)	Mw (Moment Magnitude)
9/4/1981	33.557	119.120	5.5	5.5
10/1/1987	34.061	118.079	8.9	5.9
10/4/1987	34.074	118.098	7.7	5.3
6/10/1988	34.943	118.743	5.9	5.4
12/3/1988	34.151	118.130	13.7	5.0
2/28/1990	34.134	117.697	3.3	5.5
2/28/1990	34.140	117.690	10.0	5.7
6/28/1991	34.270	117.993	8.0	5.8
6/28/1991	34.260	118.000	11.0	5.6
1/17/1994	34.326	118.698	9.1	5.6
1/17/1994	34.320	118.700	0.0	5.8
1/17/1994	34.340	118.614	5.4	5.2
1/17/1994	34.275	118.493	5.3	5.9
1/17/1994	34.213	118.537	18.2	6.7
1/18/1994	34.377	118.698	10.7	5.2
1/19/1994	34.378	118.619	10.8	5.1
1/19/1994	34.379	118.712	13.8	5.1
1/29/1994	34.306	118.579	0.6	5.1
3/20/1994	34.231	118.475	12.4	5.2
6/26/1995	34.394	118.669	12.8	5.0
4/26/1997	34.369	118.670	15.9	5.1
7/29/2008	33.949	117.766	15.5	5.4
3/29/2014	33.932	117.916	5.1	5.1

3.6.3 Seismic Site Class and Parameters

DESCRIPTION	VALUE
2016 California Building Code Site Classification (CBC)	D
Site Latitude	34.09121° N
Site Longitude	118.47631° W
S_s Spectral Acceleration for a Short Period	2.229g
S_1 Spectral Acceleration for a 1-Second Period	0.790g
F_a Site Coefficient for a Short Period	1.0
F_v Site Coefficient for a 1-Second Period	1.5

3.6.4 Estimated Ground Motions

Based on the ASCE 7-10 Standard, the peak ground acceleration at the subject site is approximately 0.838g. Based on the USGS Unified Hazard Tool, the project site has a mode magnitude of 6.52 for 2% in 50 years return period and 6.51 for 10% in 50 years return period.

The site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.[16]

3.6.5 Liquefaction Potential

Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils exist below groundwater. The CGS has designated certain areas within the state as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table.

The project site is located within a liquefaction potential zone as indicated by the CGS (see Exhibit A-7). Based on the materials encountered at the project site, subsurface conditions encountered on the project site is predominantly fill soils overlying alluvium and bedrock of Santa Monica Slate. Groundwater was encountered at a depth of about 55 feet bgs.

Liquefaction analysis for the site was performed in general accordance with the DMG Special Publication 117. The liquefaction study utilized the software "LiquefyPro" by CivilTech Software. This analysis was based on the soils data from all the borings. The liquefaction analysis was performed in accordance with the City of Los Angles requirements. A total of two analyses were performed. The first analysis, a Peak Ground Acceleration (PGA_m) of 0.838g and modal magnitude of 6.52 for 2475 years return period were used. In the second analysis, 2/3 of (PGA_m) and modal magnitude of 6.51 for 475 years return period were used. Calculations utilized the groundwater depth of 55 feet bgs. Settlement analysis used the Tokimatsu, M-correction method. Fines were corrected for liquefaction using modified Stark and Olson. Liquefaction potential analysis was performed to the depth of 50 feet bgs. Liquefaction potential analysis is attached in Appendix D of this report.

Based on the subsurface conditions encountered, laboratory test results and depth to groundwater, liquefiable saturated sands are not anticipated to the maximum depth analyzed. Based on the calculation results, seismically-induced total and differential settlement for the 2475 years return period is estimated to be less than 1 inch. The seismically-induced total and differential settlement for the 475 years return period is estimated to be less than ½ inch.

3.7 Flood Hazard

The site is not located within the 100-Year and 500-Year Flood Zones according to the City of Los Angeles Safety Element [17]. However, localized flooding is possible along the Sepulveda Canyon drainage.

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[16] California Department of Conservation Division of Mines and Geology (CDMG), *"Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region"*, CDMG Compact Disc 2000-003, 2000.

[17] City of Los Angeles, 1996, Safety Element of the Los Angeles City General Plan, City Plan Case No. 95-0371, Council File No. 86-0662, 60 p.

3.8 Landslides

Review of topographic maps [4,5,18,19,20] and geologic maps [2,3,21,22] indicates there are several geomorphic (or mapped) expressions suggestive of evidence of ancient deep-seated landslides on the generally east-facing slopes adjacent to the subject parcel (see Exhibits A-8 and A-9). The slope areas within, and adjacent to, the subject parcel are mapped within a zone designated as having a potential for earthquake-induced landslides according to the California Division of Mines and Geology [23]. In addition, Morton and others [24] mapped the slopes on or adjacent to the parcel within areas having a low to moderate susceptibility to surficial soil slip.

3.9 Corrosion Potential

Results of soluble sulfate testing indicate that ASTM Type I/II portland cement may be used for all concrete on and below grade. Foundation concrete may be designed for negligible sulfate exposure in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

Laboratory test results performed at various depths indicate the on-site soils have pH values range between 7.55 and 7.81, minimum resistivity values range between 970 and 2,280 ohm-cm, chloride contents range between 60 and 78 mg/kg, water soluble sulfate contents range between 0.01 and 0.02%, Red-Ox potential values range between +669 and +674 mV, and negligible sulfides, as shown on the attached Results of Corrosivity Analysis sheet in Appendix B.

The corrosion results indicate a corrosive environment and should be used to evaluate the corrosive potential of the on-site soils to underground ferrous metals and design adequate corrosion protection systems. A corrosion consultant should be retained if a more detailed evaluation or a protection system is desired.

Refer to the Results of Corrosivity Analysis in Appendix B for the complete results of the corrosivity testing conducted in conjunction with this geotechnical exploration.

[18] U.S. Geological Survey, 1931, Topographic Map of the Sawtelle 6-Minute Quadrangle, California, scale 1:24,000.
[19] U.S. Geological Survey, 1950, Topographic Map of the Beverly Hills 7.5-Minute Quadrangle, California, scale 1:24,000.
[20] U.S. Geological Survey, 1995, Topographic Map of the Beverly Hills 7.5-Minute Quadrangle, California, scale 1:24,000.
[21] Association of Engineering Geologists (AEG), 1982, Geologic Maps, Santa Monica Mountains, Los Angeles, California, compiled by City of Los Angeles, map sheet 213, scale: 1 inch = 100 feet.
[22] Yerkes, R.F., and Campbell, R.H., compilers, 2005, Preliminary Geologic Map of the Los Angeles 30' x 60' Quadrangle, Southern California: U.S. Geological Survey, Open-File Report 2005-1019, scale 1:100,000, website: http://pubs.usgs.gov/of/2005/1019.
[23] California Division of Mines and Geology (CDMG), 1999, Seismic Hazard Zones map of the Beverly Hills Quadrangle: CDMG, scale 1:24,000.
[24] Morton, D.M, Alvarez, R.M., and Campbell, R.H., 2003, Soil-Slip Susceptibility Map for part of the Los Angeles 30' x 60' Quadrangle, Southern California: Preliminary Soil-Slip Susceptibility Maps, Southwestern California: U.S. Geological Survey, Open-File Report 03-17, Plate 2, scale 1:100,000.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

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

Our explorations indicate the site has 35 to 60 feet of fill materials on Lot B and 5 to 50 feet of fill materials on Lot A. Due to the presence of these undocumented fill materials at both Lot B and Lot A, the proposed restroom buildings should be supported on mat foundations bearing on engineered fill extending to a minimum depth of 5 feet below the bottom of the foundation. The objective of the mat foundation is to reduce differential settlement that may occur due to the presence of the undocumented fill materials.

Based on the findings summarized in this report, it is our professional opinion that the proposed construction will not be subject to a hazard to human life from settlement, slippage, or landslide, provided the recommendations of our report are incorporated into the proposed construction. It is also our opinion that the proposed construction will not adversely affect the geologic stability of the site or adjacent properties provided the recommendations contained in our report are incorporated into the proposed construction.

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

4.2 Earthwork

The following presents recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for the design and construction of earth supported elements including, foundations, slabs, and pavements, are contingent upon following the recommendations outlined in this section. All grading for the proposed bathroom buildings should incorporate the limits of the proposed construction plus a lateral distance of 5 feet beyond the perimeter of the proposed buildings.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

4.2.1 Site Preparation

Strip and remove existing demolition debris, pavements, vegetation, and other deleterious materials from the outline of the proposed Parking Areas and pavement areas. This should include the removal of all existing asphalt concrete, buried concrete slabs, and buried footings that may exist within the area of the proposed construction. Exposed surfaces should be free of mounds and depressions, which could prevent uniform compaction.

A drainage ditch is observed within the Lot B area. Based on the information provided by client, the ditch will remain in place and will be protected during construction.

Our explorations indicate the site has 35 to 60 feet of fill materials on Lot B and 5 to 50 feet of fill materials on Lot A. Support of pavements and mat foundations on or above existing fill materials is discussed in this report. However, even with the recommended construction testing services, there is an inherent risk for the owner that compressible fill or unsuitable material within or buried by the fill will not be discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill but can be reduced by following the recommendations in this report.

Although evidence of utilities or underground facilities was not observed during the site reconnaissance, such features could be encountered during construction. If encountered, abandoned underground utilities and facilities should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

4.2.2 Subgrade Preparation

Due to the presence of these undocumented fill materials at both Lot B and Lot A, the proposed restroom buildings should be supported on mat foundations bearing on engineered fill extending to a minimum depth of 5 feet below the bottom of the foundation. The objective of the mat foundation is to reduce differential settlement that may occur due to the presence of the undocumented fill materials.

The upper 5 feet of existing fill materials below the bottom of the mat foundations supporting the proposed restroom buildings should be over-excavated and recompacted. The excavation bottom, once properly cleared, should be scarified, moisture conditioned, and compacted per the compaction requirements in Section 4.2.5.

Subgrade materials beneath pavement and flatwork should be scarified, moisture conditioned, and compacted to a minimum depth of 10 inches. The moisture content and compaction of subgrade soils should be maintained until flatwork construction.

4.2.3 Fill Materials and Placement

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.
On-site sandy materials may be considered suitable for use as engineered fill provided on-site materials are processed to have particles less than 3-inch in diameter.

Imported soils or on-site sandy soils may be used as engineered fill materials in the following areas provided all oversized particles greater than 3-inch in diameter are screened and removed:

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

Imported soils (if required) should conform to low volume change materials as indicated in the following specifications:

Gradation	**Percent Finer by Weight (ASTM C 136)**
3”	100
No. 4 Sieve	50 to 100
No. 200 Sieve	10 to 40

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

*ASTM D 4829

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

4.2.4 Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	**Per the Modified Proctor Test (ASTM D 1557)**		
	Minimum Compaction Requirement	**Range of Moisture Contents for Compaction Above Optimum**	
		Minimum	**Maximum**
Imported low volume change materials or on-site sandy soils having particles less than 3 inch in diameter:			
Beneath slabs:	90%	-1%	+4%

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
Utility trenches*:	90%	-1%	+4%
Beneath pavements:	95%	-1%	+4%
Bottom of excavation to receive fill:	90%	-1%	+4%
Miscellaneous backfill:	90%	-1%	+4%
Aggregate base (beneath pavements):	95%	-2%	+2%

* Upper 12 inches should be compacted to 95% within pavement areas.

4.2.5 Grading and Drainage

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

Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration. We recommend a minimum horizontal setback distance of 10 feet from the perimeter of any building and the high-water elevation of the nearest storm-water retention basin.

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

4.2.6 Exterior Slab Design and Construction

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

- exterior slabs should be supported directly on subgrade fill with no, or very low expansion potential;
- strict moisture-density control during placement of subgrade fills;
- maintain proper subgrade moisture until placement of slabs;
- placement of effective control joints on relatively close centers and isolation joints between slabs and other structural elements;
- provision for adequate drainage in areas adjoining the slabs;

- using of designs which allow vertical movement between the exterior slabs and adjoining structural elements

4.2.7 Utility Trenches

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

On-site materials are considered suitable for backfill of utility and pipe trenches in non-structural areas from one foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances. Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

4.2.8 Construction Considerations

It is anticipated that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. On-site soils may pump or become unworkable at high water contents. The workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. Workability may be improved by scarifying and drying. Lightweight excavation equipment may be required to reduce subgrade pumping. Should unstable subgrade conditions develop stabilization measures will need to be employed.

At the time of our study, within the proposed excavation depth, moisture contents of the subsurface soils ranged from about 4 to 15 percent. Based on these moisture contents, some moisture conditioning may be needed for the project. The soils may need to be dried by aeration during dry weather conditions, or an additive, such as lime, cement, or kiln dust, may be needed to stabilize the soil. If the construction schedule does not allow for drying by aeration, clay soils may be stabilized using multiaxial geogrid and coarse aggregate materials.

Depending upon depth of excavation and seasonal conditions, groundwater or perched groundwater may be encountered in excavations. Pumping from sumps may be utilized to control water within excavations. Well points may be required for significant groundwater flow, or where excavations penetrate groundwater to a significant depth.

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of footings and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should

become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to footings and pavement construction.

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

The exposed subgrade and each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the geotechnical engineer's representative prior to placement of additional lifts. We recommend that each lift of fill be tested for density and moisture content at a frequency of one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. We recommend one density and moisture content test for every 50 linear feet of compacted utility trench backfill.

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

The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottoms. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

4.3 Foundation Design Recommendations

DESCRIPTION	RECOMENDATION
Structures	Proposed Restroom Buildings
Foundation Type	Mat foundations
Bearing Material	A minimum of 5 feet of engineered fill comprised of on-site soils
Allowable Bearing Pressure	1,000 psf
Minimum Dimensions	The mat foundations should cover the footprint of the proposed structure
Minimum Embedment Depth Below Finished Grade	12 inches

DESCRIPTION	RECOMENDATION
Total Estimated Settlement	1 inch
Estimated Differential Settlement	½ inch across 40 feet

A modulus of subgrade reaction (Kv_1) of 150 pounds per cubic inch (pci) should be used. Other details including treatment of loose foundation soils, superstructure reinforcement and observation of foundation excavations as outlined in this report are applicable for the design and construction of a mat foundation at the site.

The subgrade modulus (K_b) for the mat is affected by the size of the mat foundation and would vary according the following equation:

$$K_b = Kv_1 \times (B+1)^2 / 4B^2$$

Where: Kv_1 is the modulus of vertical subgrade reaction
B is the width of the mat foundation.

Thus for a footing width of B = 14 ft bearing on the onsite soils, the subgrade modulus would be:

$$K_b = 150 \times (14+1)^2 / (4 \times 14^2) = 43 \text{ pci}$$

Finished grade is defined as the lowest adjacent grade within five feet of the foundation for perimeter (or exterior) footings, or finish floor elevation for interior footings. The allowable foundation bearing pressures apply to dead loads plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. The weight of the foundation concrete below grade may be neglected in dead load computations.

Foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of joints at openings or other discontinuities in masonry walls is recommended.

The geotechnical engineer should observe foundation excavations. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

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

4.4 Lateral Earth Pressures

The lateral earth pressure recommendations herein are applicable to the design of rigid retaining walls subject to slight rotation, such as cantilever or gravity type concrete walls.

These recommendations are not applicable to the design of any retaining wall systems for the temporary excavation. Design of such retaining wall systems is contractor's responsibility. For engineered fill comprised of on-site materials above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are presented in the following table for a level backfill:

ITEM	VALUE
Active Case	37 psf/ft
Passive Case	390 psf/ft[1]
At-Rest Case	56 psf/ft
Surcharge Loads	0.3*(Surcharge)
Coefficient of Friction	0.40

The lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if such conditions are to be included in the design.

Fill against foundation should be compacted to densities specified in the Earthwork section of this report.

4.5 Pavements

4.5.1 Design Recommendations

Based on soil lithology and conditions, an estimated design R-Value was used to calculate the Asphalt Concrete (AC) pavement thickness sections and Portland Cement Concrete (PCC) pavement sections. R-value testing should be completed prior to pavement construction to verify the design R-value.

Assuming the pavement subgrades will be prepared as recommended within this report, the following pavement sections should be considered minimums for this project for the traffic indices assumed in the table below. As more specific traffic information becomes available, we should be contacted to reevaluate the pavement calculations.

	Recommended Pavement Section Thickness (inches) [1]	
	Automobile Parking Areas Assumed Traffic Index (TI) = 4.5	**On-Site Driveways and Bus Lanes Assumed TI = 7.0 [2]**
Section I Portland Cement Concrete (600 psi Flexural Strength)	5.0-inches PCC over 4-inches Class II Aggregate Base	6.0-inches PCC over 4-inches Class II Aggregate Base
Section II Asphaltic Concrete	3-inches AC over 4-inches Class II Aggregate Base	4-inches AC over 9-inches Class II Aggregate Base

[1] All materials should meet the CALTRANS Standard Specifications for Highway Construction.
[2] Traffic Index for bus lanes is assumed and should be verified based on daily trips.

All pavements should be supported on a minimum of 10 inches of scarified, moisture conditioned, and compacted materials. These pavement sections are considered minimal sections based upon the expected traffic and the existing subgrade conditions. However, they are expected to function with periodic maintenance and overlays if good drainage is provided and maintained.

Subsequent to clearing, grubbing, and removal of topsoil, subgrade soils beneath all pavements should be scarified, moisture conditioned, and compacted to a minimum depth of 10 inches. All materials should meet the CALTRANS Standard Specifications for Highway Construction. Aggregate base materials should meet the gradation and quality requirement of Class 2 Aggregate Base (¾ inch maximum) in Caltrans Standard Specifications, latest edition, Sections 25 through 29.

All concrete for rigid pavements should have a minimum flexural strength of 600 psi (4,250 psi Compressive Strength) and be placed with a maximum slump of four inches. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

Preventative maintenance should be planned and provided for through an on-going pavement management program in order to enhance future pavement performance. Preventative maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment.

Preventative maintenance consists of both localized maintenance (e.g. crack sealing and patching) and global maintenance (e.g. surface sealing). Preventative maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements.

4.5.2 Construction Considerations

Materials and construction of pavements for the project should be in accordance with the requirements and specifications of the State of California Department of Transportation, or other approved local governing specifications.

Base course or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade.

5.0 GENERAL COMMENTS

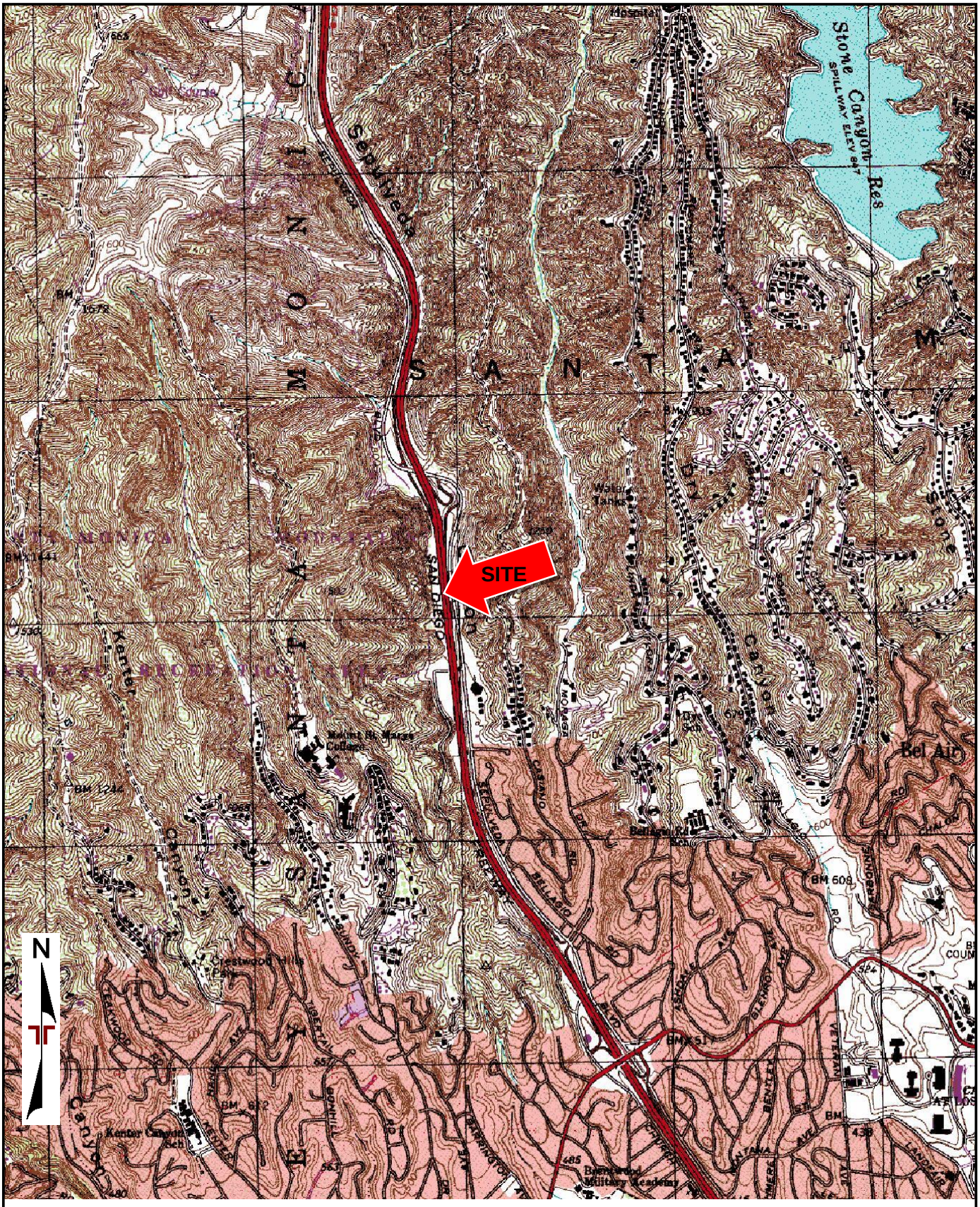
Terracon should be retained to review the final design plans and specifications, so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

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

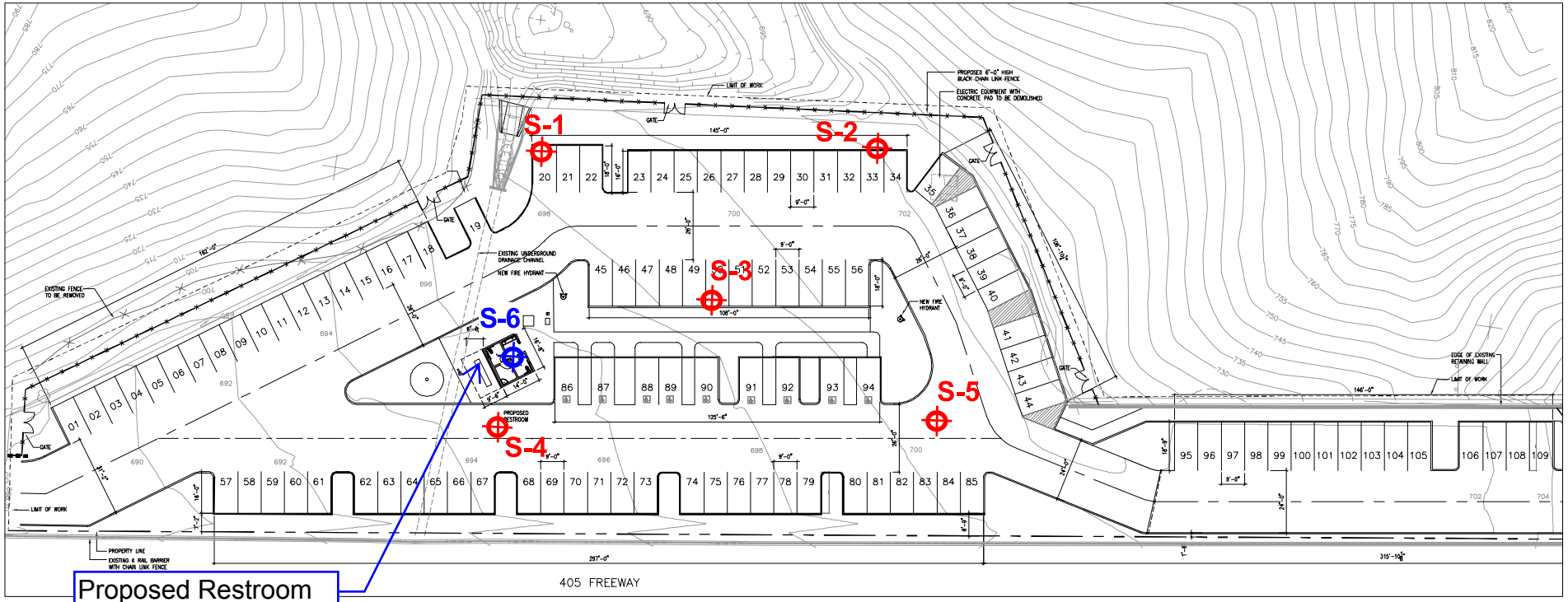
This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A
FIELD EXPLORATION



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
QUADRANGLES INCLUDE: BEVERLY HILLS, CA (1/1/1995).

Project Manager: SP	Project No. 60165174	Terracon 1421 Edinger Ave Ste C Tustin, CA 92780-6287	SITE LOCATION The Getty Center Oak Parking Lots 1200 Getty Center Drive Los Angeles, CA	Exhibit A-1
Drawn by: SP	Scale: 1"=2,000'			
Checked by: FH	File Name: A-1			
Approved by: DRC	Date: 03/22/2019			



Proposed Restroom

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

2019 Terracon Approximate Boring Location

2017 Terracon Approximate Boring Location

1 ENLARGED PARKING LOT-A

SCALE: 1/16"=1'-0"

0 4 8

PORTION LOT 12
OFFICIAL MAP OF THE COUNTY OF LOS ANGELES
REGION 36 DIVISION
OM-1-76/92
APN 4493-014-027

PARKING LOT SQUARE FOOTAGE		
NORTH AND SOUTH LOT	SQUARE FOOTAGE	
PAVING	90,260	71%
LANDSCAPE	36,595	29%
TOTAL	126,855	100%
NET TOTAL SQUARE FOOTAGE	2.91 ACRES	

PARKING COUNT			
	LOT A	LOT B	TOTAL
ADA CAR SPACES	7	0	7
VAN ACCESSIBLE ADA SPACES	2	0	2
CAR SPACES	100	111	211
NEW CAR SPACES-COMBINED			220

OAK PARKING
18006.00
1200 GETTY CENTER DRIVE LOS ANGELES, CA 90049

2019.02.28

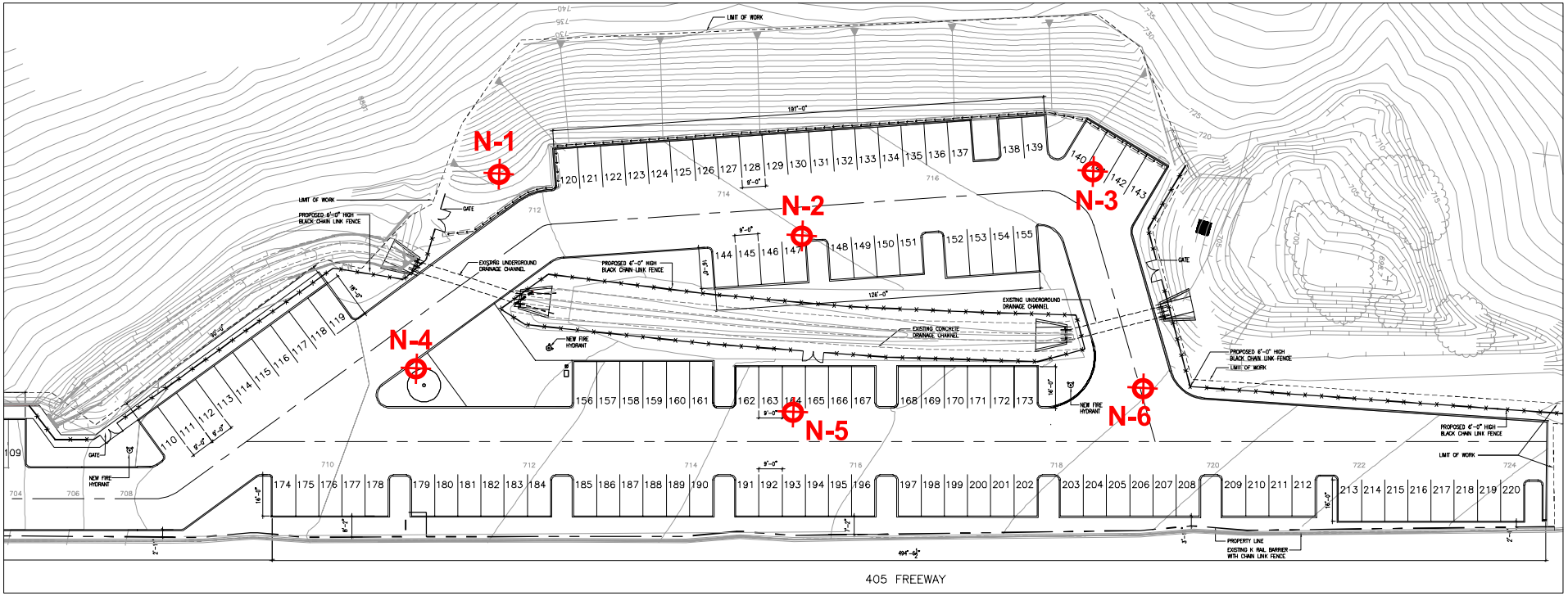
Frederick Fisher and Partners
12240 Santa Monica Blvd, Los Angeles, CA 90025 | (310) 820-6060 | fisherpartners.net

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

BORING LOCATION MAP (GETTY CENTER SOUTH)

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit
A-2A



1 ENLARGED PARKING LOT-B
SCALE: 1/16"=1'-0"

0 4 8

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

2017 Terracon Approximate Boring Location

PORTION LOT 12
OFFICIAL MAP OF THE COUNTY OF LOS ANGELES
REGION 36 DIVISION
OM-1-78/92
APN 4493-014-027

PARKING LOT SQUARE FOOTAGE		
NORTH AND SOUTH LOT	SQUARE FOOTAGE	
PAVING	90,260	71%
LANDSCAPE	36,595	29%
TOTAL	126,855	100%
NET TOTAL SQUARE FOOTAGE	2.91 ACRES	

PARKING COUNT			
	LOT A	LOT B	TOTAL
ADA CAR SPACES	7	0	7
VAN ACCESSIBLE ADA SPACES	2	0	2
CAR SPACES	100	111	211
NEW CAR SPACES-COMBINED			220

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Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

BORING LOCATION MAP (GETTY CENTER NORTH)

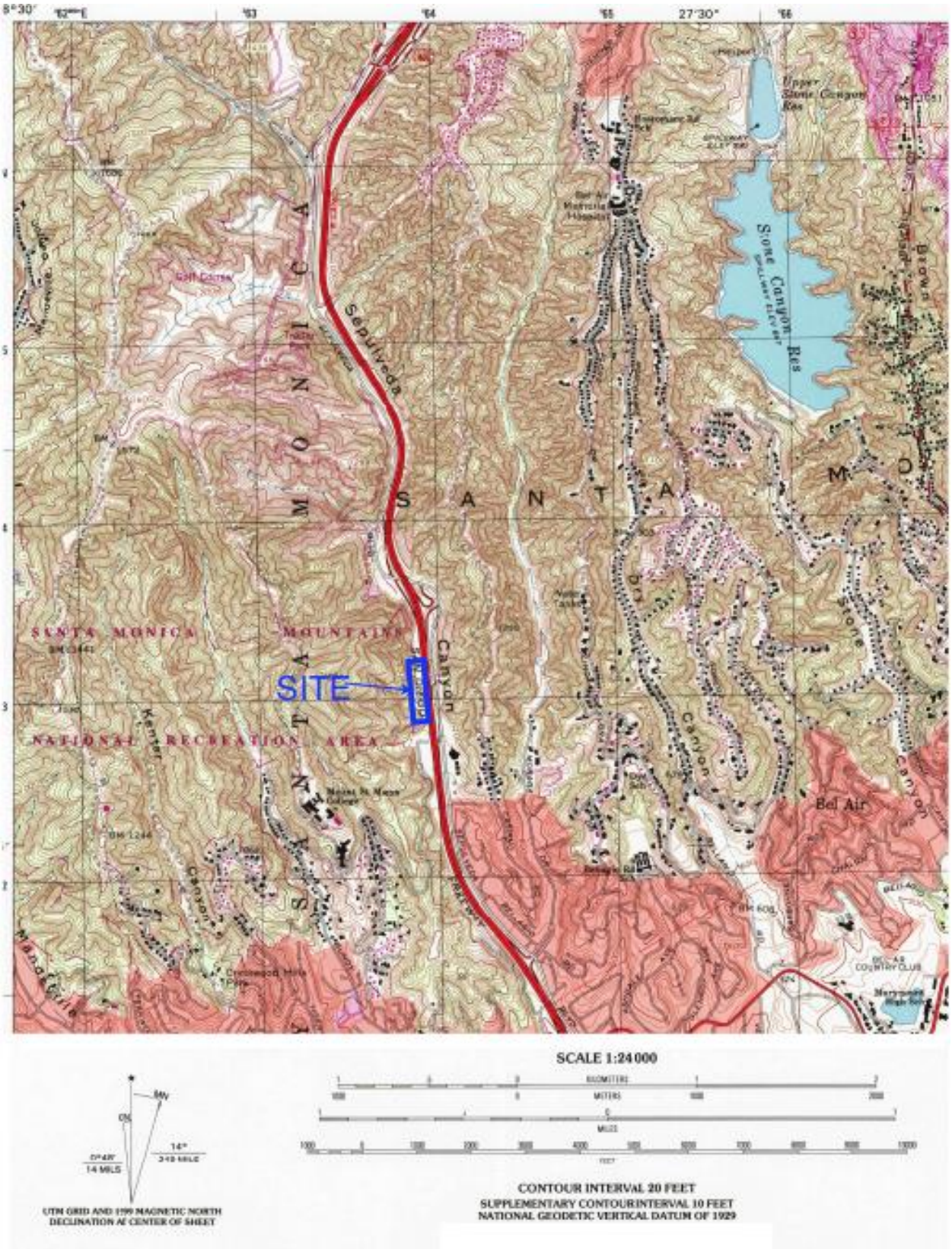
The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit
A-2B

OAK PARKING
18006.00
1200 GETTY CENTER DRIVE, LOS ANGELES, CA 90049

2019.02.28

Frederick Fisher and Partners
1246 Santa Monica Blvd, Los Angeles, CA 90025 | (310) 820-0080 | fisherpartners.net



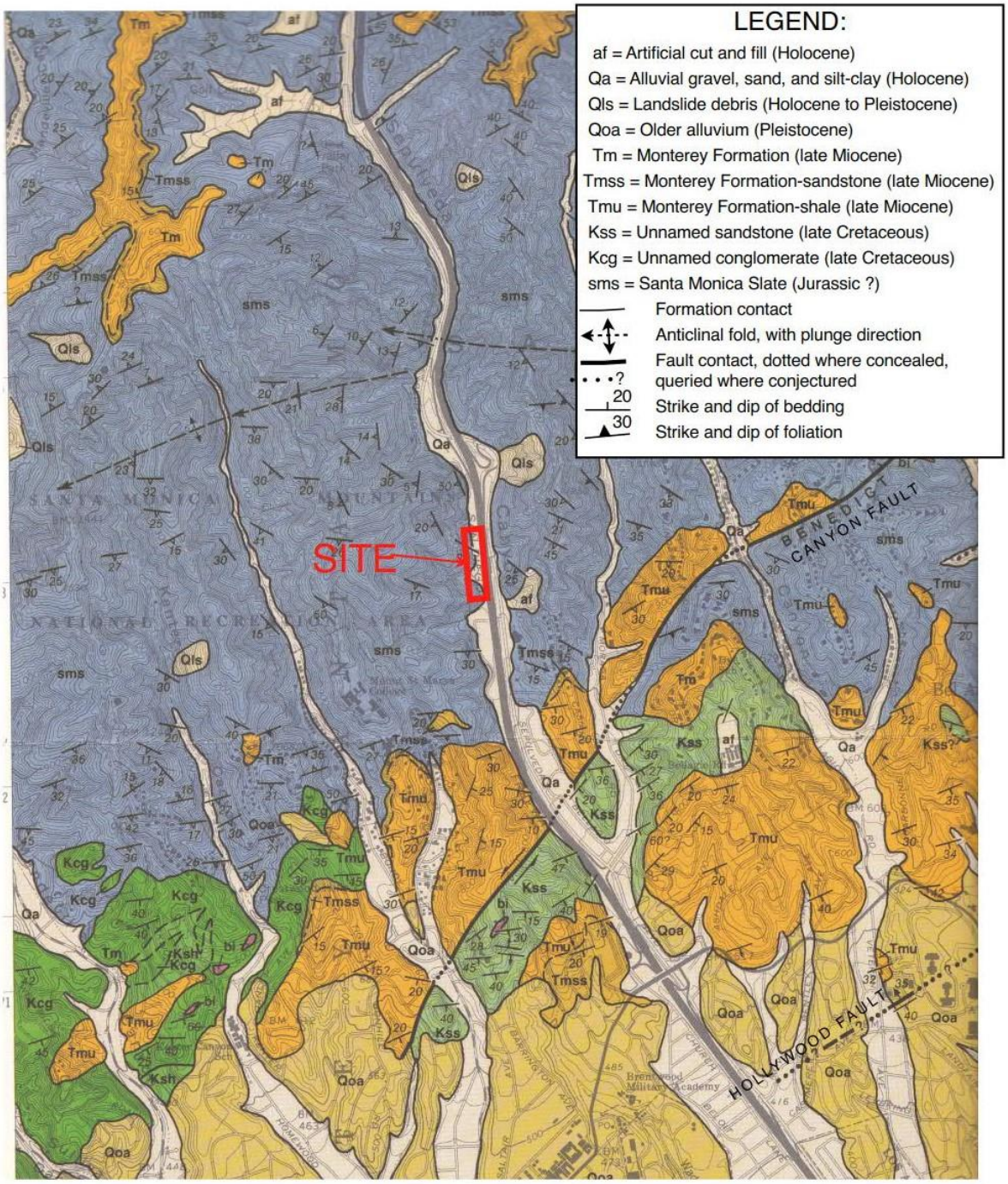
Excerpt of Topographic Map of Beverly Hills 7.5' Quadrangle (U.S.G.S., 1995)

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

Project Manager: SP	Project No. 60165174	Terracon Consulting Engineers & Scientists	TOPOGRAPHIC MAP
Drawn by: SP	Scale: As shown	1421 Edinger Avenue Ste C Tustin, California 92614	**The Getty Center Oak Parking Lots**
Checked by: FH	File Name: A-3	PH. (949) 261-0051 FAX. (949) 261-6110	**1200 Getty Center Drive**
Approved by: DRC	Date: 3/22/2019		**Los Angeles CA**

Exhibit

A-3



Excerpt of Geologic Map of the Beverly Hills 7.5' Quadrangle (Dibble, 1991)

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

Project Manager:	SP
Drawn by:	SP
Checked by:	FH
Approved by:	DRC
Project No.	60165174
Scale:	As shown
File Name:	A-4
Date:	3/22/2019

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue Ste C Tustin, California 92614
PH. (949) 261-0051 FAX. (949) 261-6110

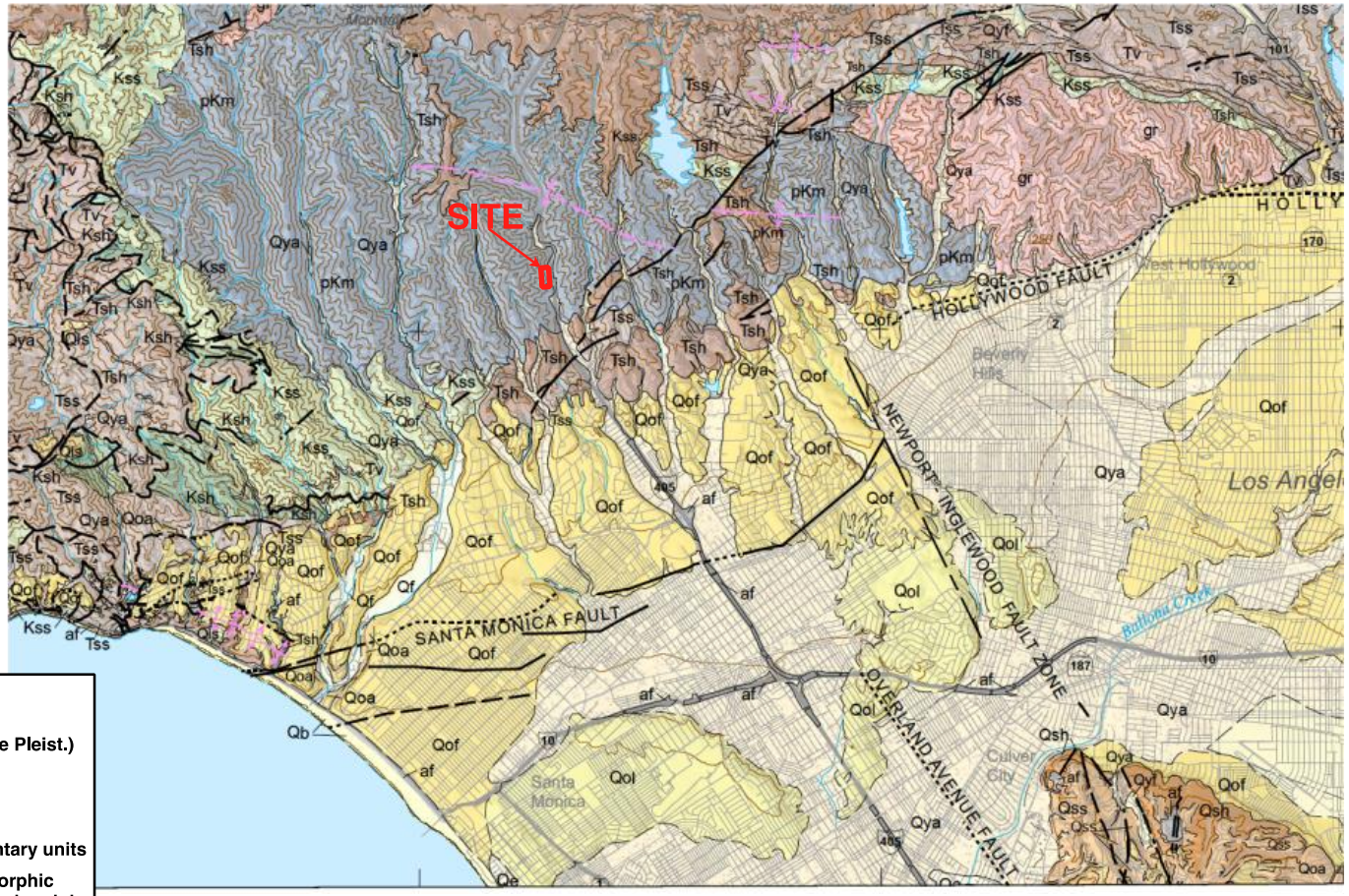
REGIONAL GEOLOGIC MAP

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit

A-4

Excerpt of *Geologic Compilation of Quaternary Surficial Deposits in Southern California, Los Angeles 30' x 60' Quadrangle (Revised) by Bedrossian, T.L., and Rofers, P.D. (2012)*



Explanation of Local Units:

- **af - Artificial Fill (Late Holocene)**
- **Qya = Young Alluvial Valley Deposits (Holo.-late Pleist.)**
- **Qof = Old Alluvial Fan Deposits (Pleistocene)**
- **Tss = Coarse-grained Tertiary age formations**
- **Tsh = Fine-grained Tertiary age formations**
- **Kss = Coarse-grained Cretaceous age sedimentary units**
- **pKm = Cretaceous and pre-Cretaceous metamorphic formations of sedimentary and volcanic origin**

SCALE 1:100 000

5 2.5 0 5 MILES

5000 0 5000 10000 15000 20000 25000 30000 35000 40000 45000 50000 FEET

5 2.5 0 5 10 KILOMETERS

5000 0 5000 10000 METERS

CONTOUR INTERVAL 50 METERS

NATIONAL GEODETIC VERTICAL DATUM OF 1929

APPROXIMATE MEAN DECLINATION, 2012

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

Project Manager:	SP
Drawn by:	SP
Checked by:	FH
Approved by:	DRC

Project No.	60165174
Scale:	As shown
File Name:	A-5
Date:	03/22/2019

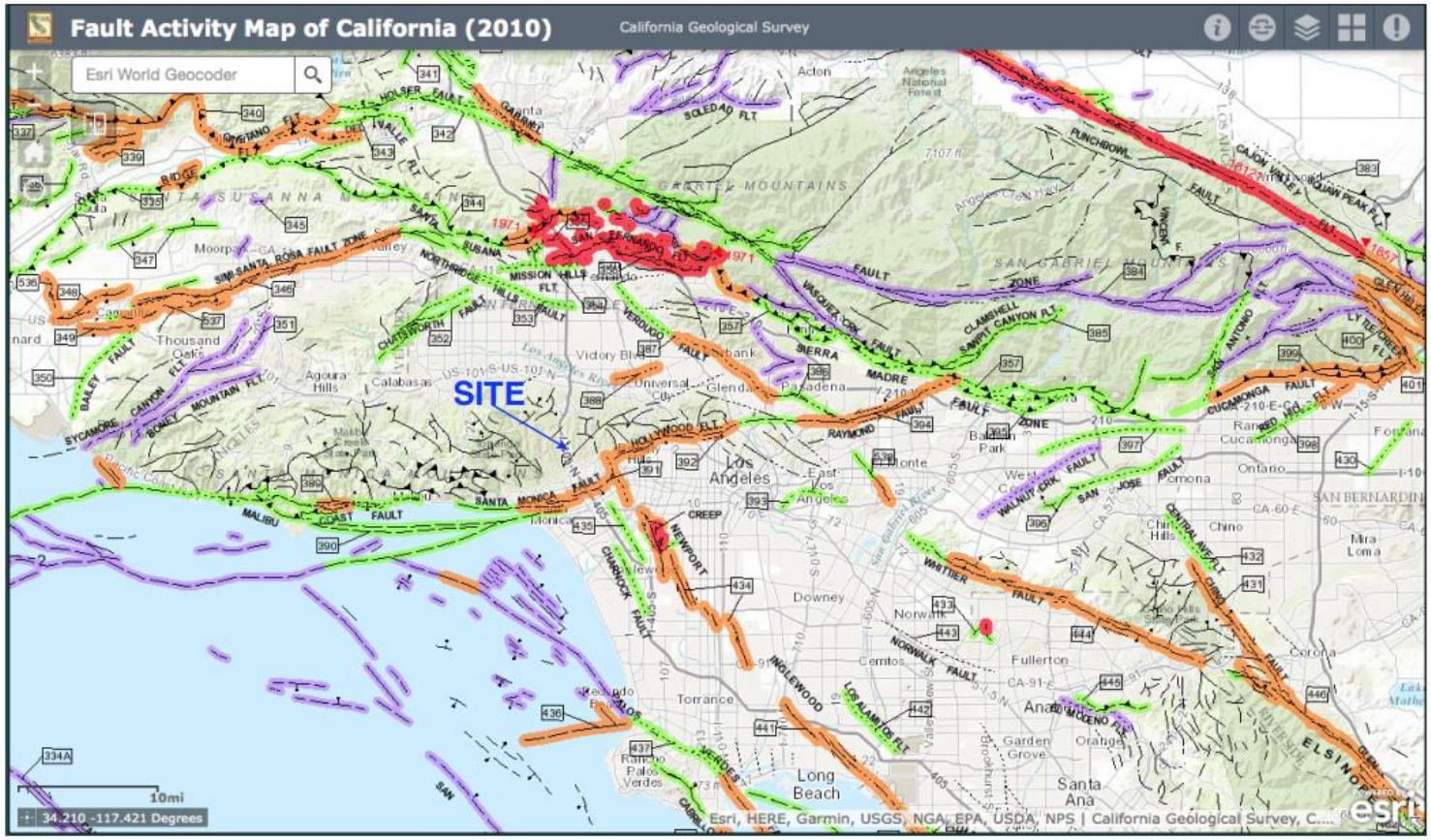
Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

REGIONAL SURFICIAL GEOLOGIC MAP

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit

A-5



N

Excerpt of Fault Activity Map of California by Jennings, C.W., and Bryant, W.A., 2010: California Geological Survey Geologic Data Map No. 6, Scale 1:750,000

EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain.

FAULT CLASSIFICATION COLOR CODE
(Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred.

Holocene fault displacement (during past 11,700 years) without historic record.

Late Quaternary fault displacement (during past 700,000 years).

Quaternary fault (age undifferentiated).

Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement.

ADDITIONAL FAULT SYMBOLS

Bar and ball on downthrown side (relative or apparent).

Arrows along fault indicate relative or apparent direction of lateral movement.

Arrow on fault indicates direction of dip.

Low angle fault (barbs on upper plate).

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

Project Manager:	SP
Drawn by:	SP
Checked by:	FH
Approved by:	DRC

Project No.	60165174
Scale:	As shown
File Name:	A-6
Date:	03/22/2019

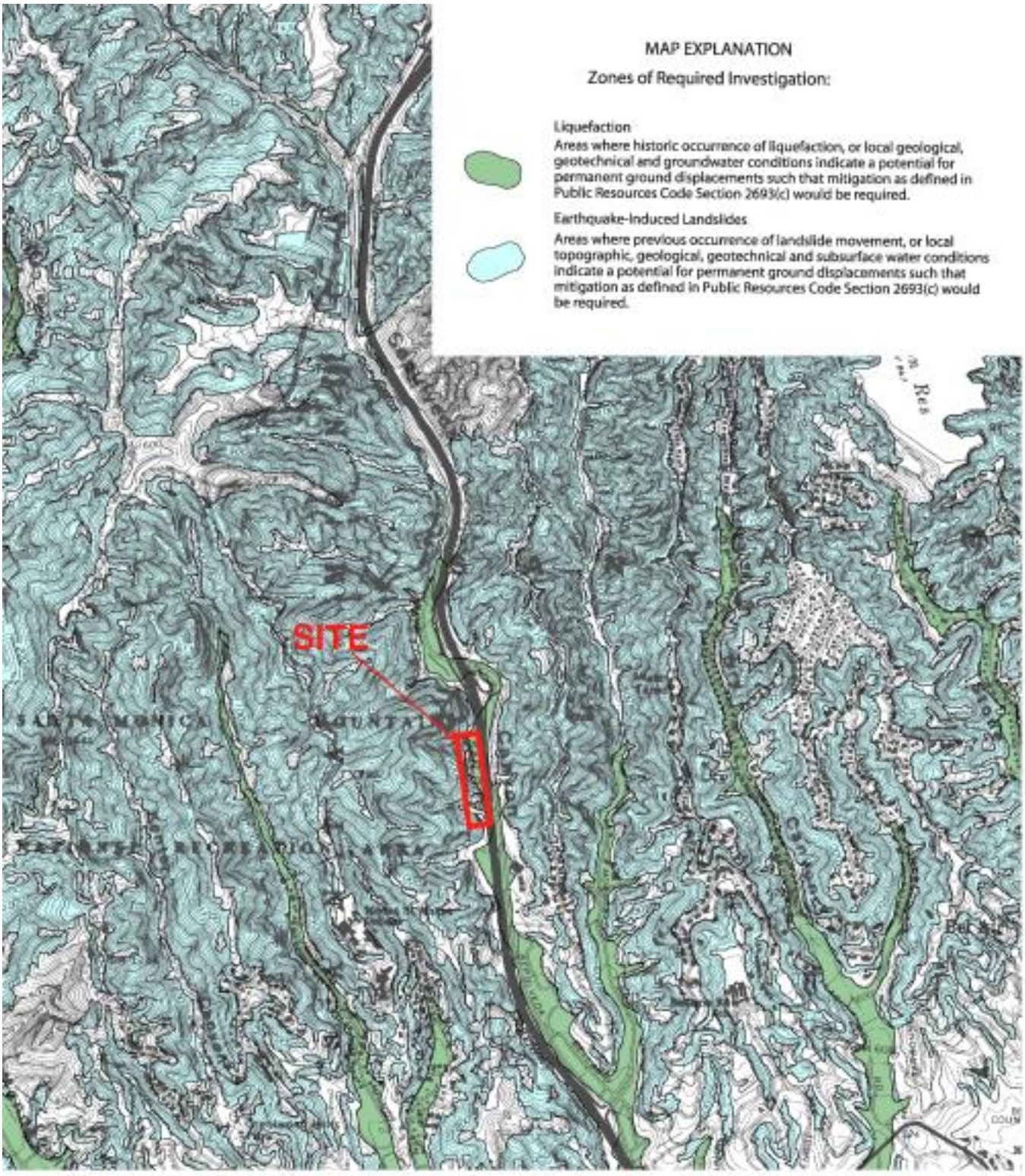
Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

REGIONAL FAULT MAP

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit

A-6



Excerpt from Seismic Hazard Zones Map of Beverly Hills Quadrangle (CDMG, 1999)

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

Project Manager:	SP
Drawn by:	SP
Checked by:	FH
Approved by:	DRC

Project No.	60165174
Scale:	As shown
File Name:	A-7
Date:	3/22/2019

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue Ste C Tustin, California 92614
PH. (949) 261-0051 FAX. (949) 261-6110

SEISMIC HAZARD ZONE MAP

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit

A-7

Terracon
Consulting Engineers & Scientists
2421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

SANTA MONICA MOUNTAINS
TOPOGRAPHIC MAPS

CITY OF LOS ANGELES
LYALL A. PARDEE CITY ENGINEER
JANUARY 1960

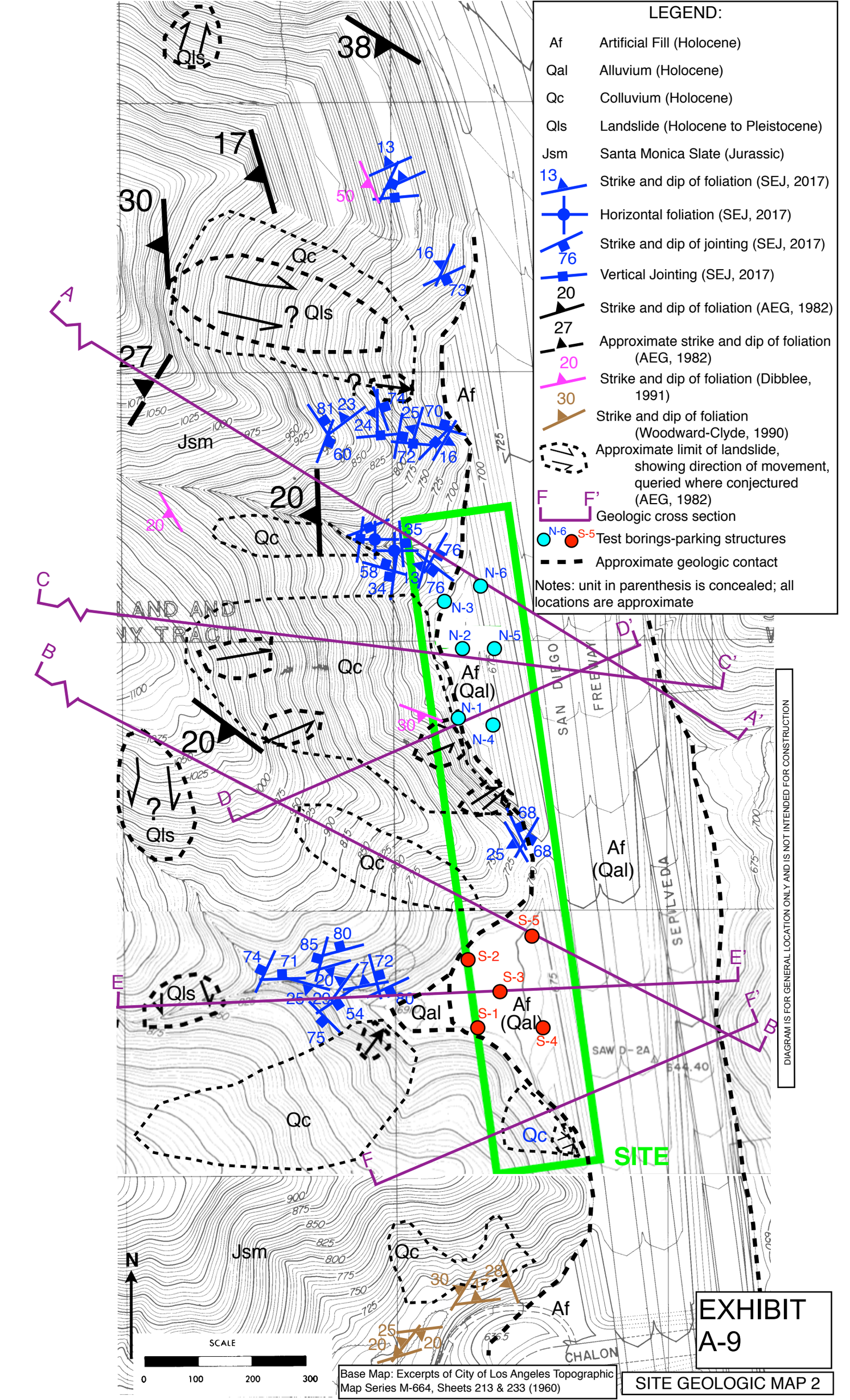
SCALE
0 100 200 300

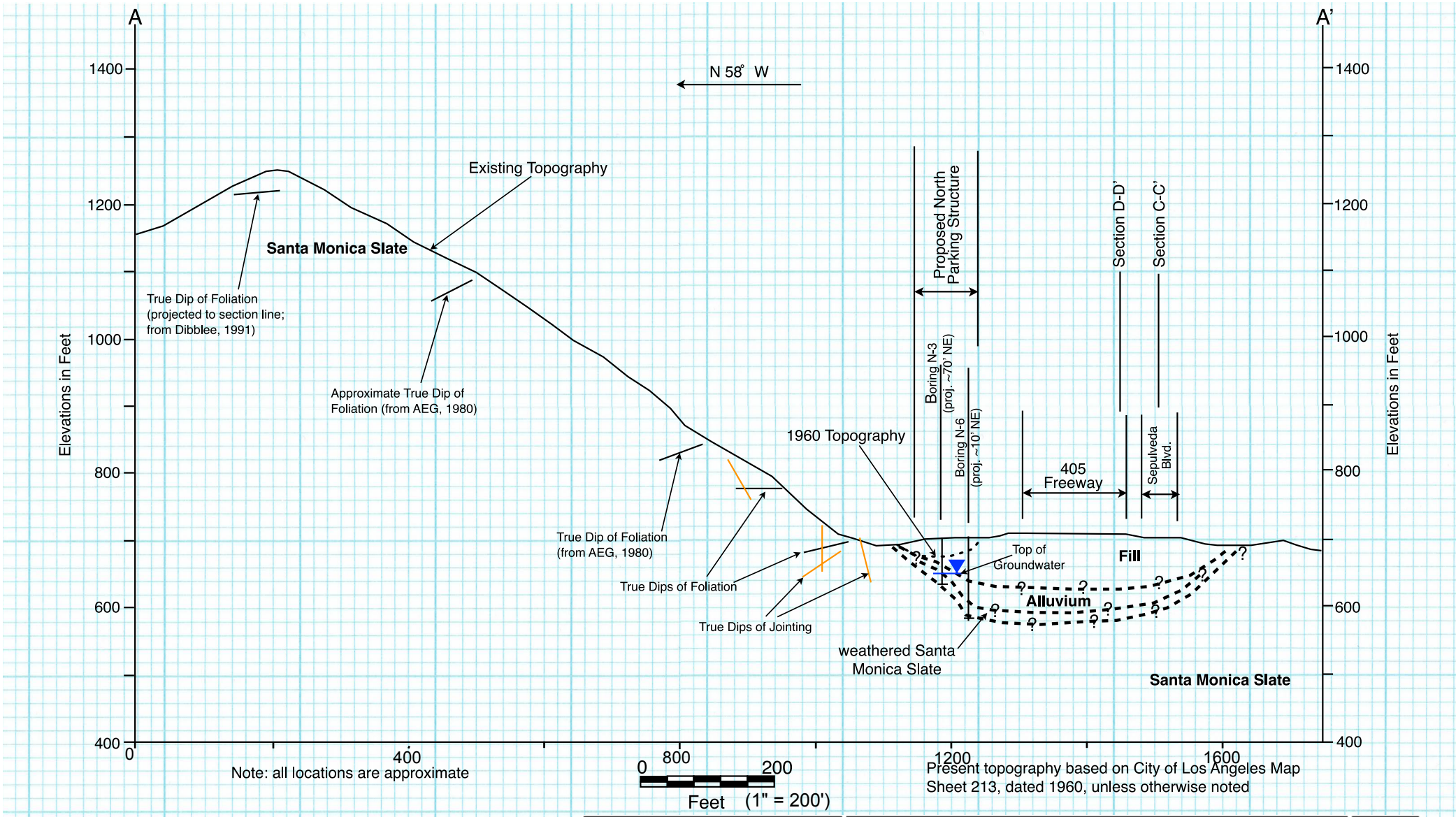
DIAGRAM IS FOR GENERAL LOCATION ONLY AND IS NOT INTENDED FOR CONSTRUCTION

SITE GEOLOGIC MAP 1

213

EXHIBIT
A-8


LEGEND:
Af Artificial Fill (Holocene)
Qal Alluvium (Holocene)
Qc Colluvium (Holocene)
Qls Landslide (Holocene to Pleistocene)
Jsm Santa Monica Slate (Jurassic)
Strike and dip of foliation (SEJ, 2017)
Horizontal foliation (SEJ, 2017)
Strike and dip of jointing (SEJ, 2017)
Vertical Jointing (SEJ, 2017)
Strike and dip of foliation (AEG, 1982)
Approximate strike and dip of foliation (AEG, 1982)
Strike and dip of foliation (Dibblee, 1991)
Strike and dip of foliation (Woodward-Clyde, 1990)
Approximate limit of landslide, showing direction of movement, queried where conjectured (AEG, 1982)
Geologic cross section
Test borings-parking structures
Approximate geologic contact
Notes: unit in parenthesis is concealed; all locations are approximate
A
A'
B
B'
C
C'
D
D'
E
E'
F
F'
N-1
N-2
N-3
N-4
N-5
N-6
S-1
S-2
S-3
S-4
S-5
Qls
Qc
Jsm
Af
Af (Qal)
Qal
SITE
SAN DIEGO FREEWAY
SEPULVEDA
SAW D-2A
544.40
CHALON
DIAGRAM IS FOR GENERAL LOCATION ONLY AND IS NOT INTENDED FOR CONSTRUCTION
N
SCALE
0
100
200
300
EXHIBIT A-9
Base Map: Excerpts of City of Los Angeles Topographic Map Series M-664, Sheets 213 & 233 (1960)
SITE GEOLOGIC MAP 2



Note: all locations are approximate

Present topography based on City of Los Angeles Map Sheet 213, dated 1960, unless otherwise noted

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

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

GEOLOGIC CROSS SECTION A-A'

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit

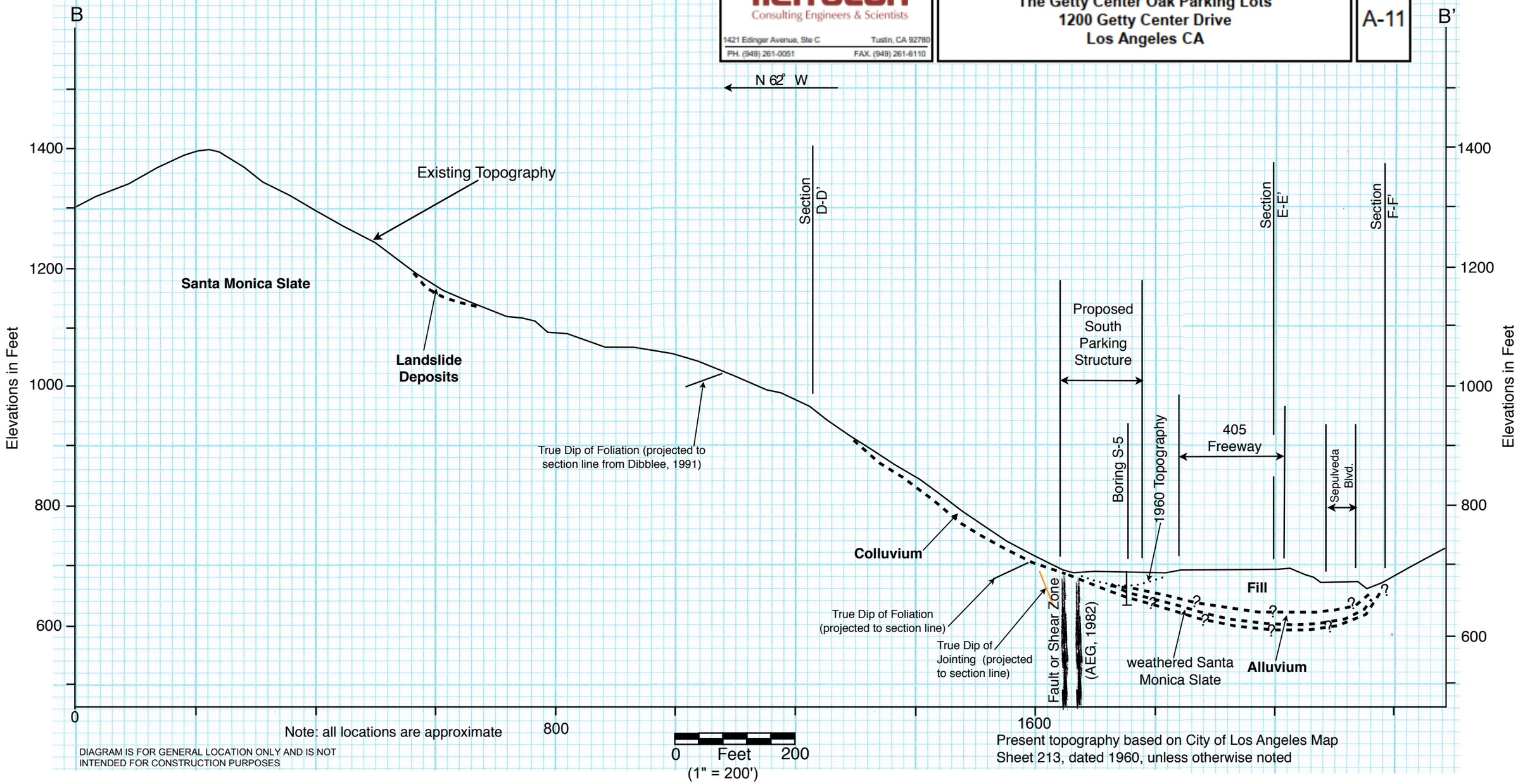
A-10

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

GEOLOGIC CROSS SECTION B-B'

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit A-11

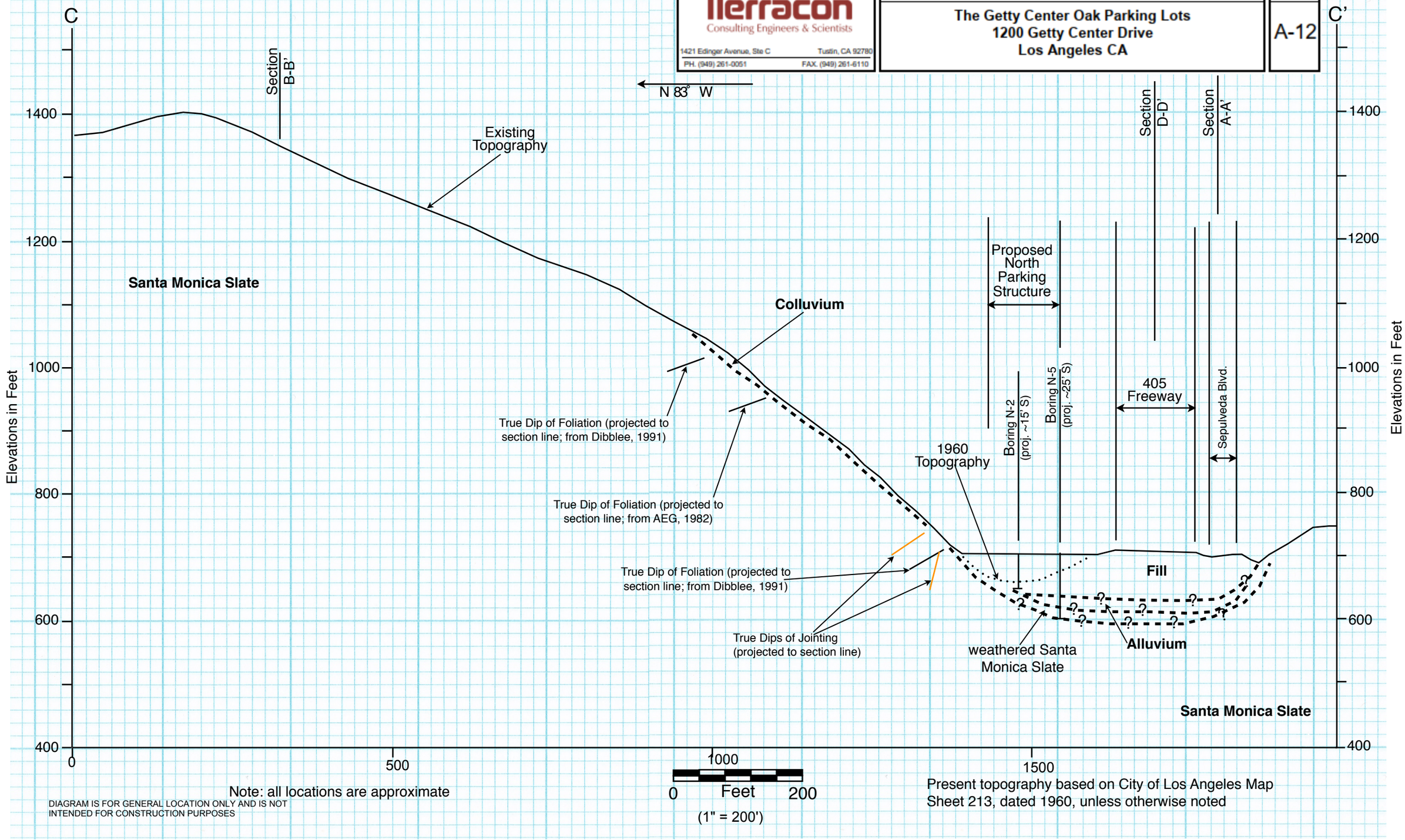


Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

GEOLOGIC CROSS SECTION C-C'

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

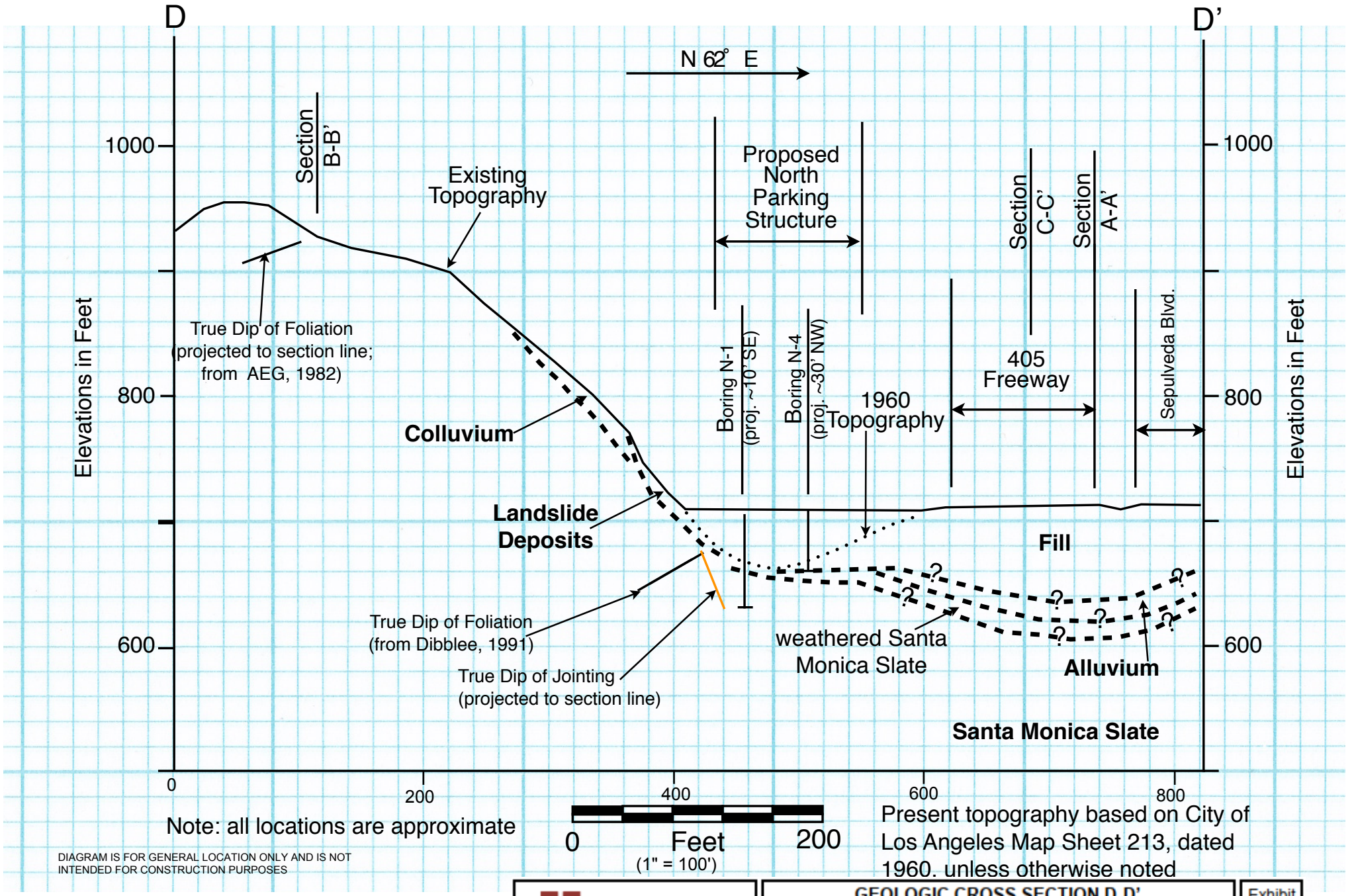
Exhibit A-12



Note: all locations are approximate

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

Present topography based on City of Los Angeles Map Sheet 213, dated 1960, unless otherwise noted



Note: all locations are approximate

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

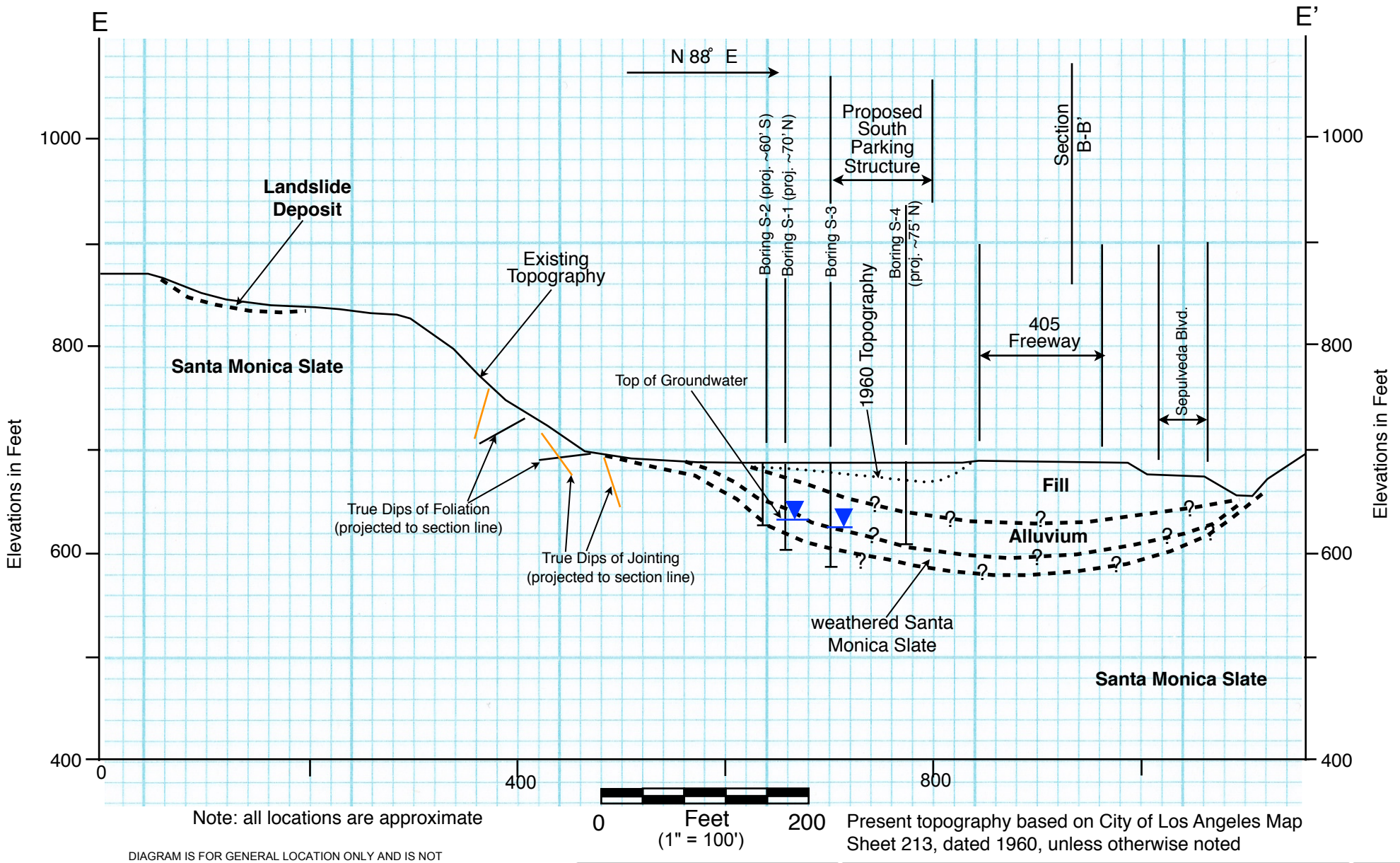
Present topography based on City of Los Angeles Map Sheet 213, dated 1960. unless otherwise noted

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

GEOLOGIC CROSS SECTION D-D'

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit
A-13



Note: all locations are approximate

Present topography based on City of Los Angeles Map Sheet 213, dated 1960, unless otherwise noted

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

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

GEOLOGIC CROSS SECTION E-E'

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

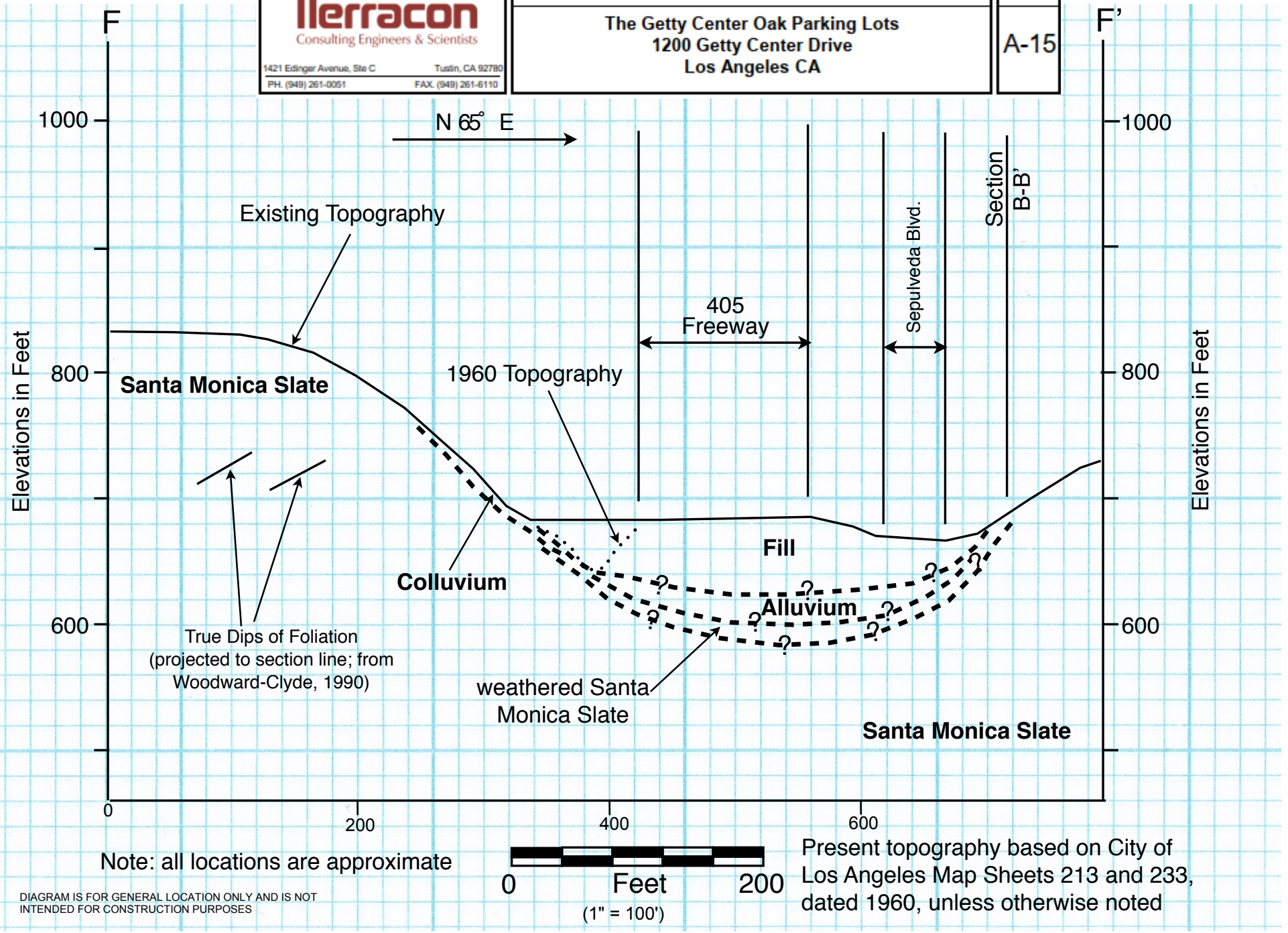
Exhibit
A-14

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue, Ste C Tustin, CA 92780
PH. (949) 261-0051 FAX. (949) 261-6110

GEOLOGIC CROSS SECTION F-F'

The Getty Center Oak Parking Lots
1200 Getty Center Drive
Los Angeles CA

Exhibit A-15



Note: all locations are approximate

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

Present topography based on City of Los Angeles Map Sheets 213 and 233, dated 1960, unless otherwise noted

Field Exploration Description

A total of eleven (11) test borings were drilled at the site from March 20 to 23 and March 30, 2017. The borings were drilled to approximate depths ranging between 50.5 and 121.5 feet bgs at the approximate locations shown on the attached Boring Location Diagram, Exhibits A-2A and A-2B. Test borings were advanced with truck-mounted B-61 drill rig utilizing 6-inch diameter hollow-stem augers and CME-75 drill rig utilizing 8-inch diameter hollow-stem augers.

Two borings N-1 and N-3 at Lot B and four borings S-1 through S-4 at Lot A encountered auger refusal between the depths of 58 and 100.3 feet bgs. Boring N-1 was advanced with hollow-stem auger to a depth of about 64 feet until auger refusal where drilling technique was switched to rock coring. Rock coring was terminated in this boring at a depth of about 79 feet bgs. Core samples were not recovered in the core barrels.

The borings were located in the field by using the proposed site plan, an aerial photograph of the site, and a handheld GPS unit. The accuracy of boring locations should only be assumed to the level implied by the method used.

Continuous lithologic logs of the borings were recorded by the field engineer during the drilling operations. At selected intervals, samples of the subsurface materials were taken by driving split-spoon or ring-barrel samplers. Bulk samples of subsurface materials were also obtained. Groundwater conditions were evaluated in the borings at the time of site exploration.

Penetration resistance measurements were obtained by driving the split-spoon and ring-barrel samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the consistency or relative density of materials encountered.

An automatic hammer was used to advance the split-barrel sampler in the borings performed on this site. A significantly greater efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the SPT-N value. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

BORING LOG NO. N-1

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.091863° Longitude: -118.47664°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
0.0													
	FILL - SANDY LEAN CLAY (CL), trace gravel, yellowish-brown												
	very stiff	5			3-6-10 N=16								
7.5													
	FILL - CLAYEY SAND (SC), trace gravel, yellowish-brown, medium dense				6-14-19					13	103		
		10			5-11-15 N=26								
		15			4-50/6"					11	96		
	trace cobbles, very dense												
20.0													
	FILL - CLAYEY SAND (SC), trace gravel, yellowish-brown, medium dense	20			15-8-6 N=14								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017
Drill Rig: CME-75 | Driller: BC2 ENV
Project No.: 60165174 | Exhibit: A-17

BORING LOG NO. N-1

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.091863° Longitude: -118.47664°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
		25			3-5-11					9	96		14
		30			24-29-31 N=60								
35.0		35			37-50/2"								
		40			22-50/2"								

FILL - CLAYEY SAND (SC), trace gravel, yellowish-brown, medium dense *(continued)*

WEATHERED SANTA MONICA SLATE, completely weathered
CLAYEY SAND (SC), yellowish-brown, medium dense

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017
Drill Rig: CME-75 | Driller: BC2 ENV
Project No.: 60165174 | Exhibit: A-17

BORING LOG NO. N-1

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.091863° Longitude: -118.47664°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	WEATHERED SANTA MONICA SLATE, completely weathered *(continued)*	45											
	SILTY SAND (SM), dark gray, very dense	50			50/6"								
		55											
		60			50/3"								
					50/4"								
	64.0												
	Auger Refusal at 64 Feet **WEATHERED SANTA MONICA SLATE**, completely weathered, core samples were not recovered												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.
Encountered auger refusal in bedrock and switched to rock coring

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017	Boring Completed: 03-30-2017
Drill Rig: CME-75	Driller: BC2 ENV
Project No.: 60165174	Exhibit: A-17

BORING LOG NO. N-1

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.091863° Longitude: -118.47664° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	79.0 ***Rock coring terminated at 79 feet***												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017
Drill Rig: CME-75 | Driller: BC2 ENV
Project No.: 60165174 | Exhibit: A-17

BORING LOG NO. N-2

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092185° Longitude: -118.476632°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
FILL - CLAYEY SAND (SC), with gravel, brown						30						31-17-14	
medium dense		5			18-28-30					9	118		42
					6-10-15 N=25								
yellowish-brown		10			6-21-34					10	123		
dense		15			5-11-21 N=32								
20.0													
FILL - SILTY CLAYEY SAND (SC-SM), trace gravel, yellowish-brown, medium dense		20			2-3-18					15	105		

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017
Drill Rig: CME-75 | Driller: BC2 ENV
Project No.: 60165174 | Exhibit: A-18

BORING LOG NO. N-2

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

GRAPHIC LOG	LOCATION / DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	LOCATION See Exhibit A-2 Latitude: 34.092185° Longitude: -118.476632°												
	FILL - SILTY CLAYEY SAND (SC-SM), trace gravel, yellowish-brown, medium dense *(continued)*												
	25.0	25											
	FILL - CLAYEY SAND (SC), with gravel, brown, dense, fragments of weathered Santa Monica slate				15-17-14 N=31								34
	yellowish-brown, medium dense	30			6-12-14 N=26								
	35.0	35											
	FILL - SILTY CLAYEY SAND (SC-SM), gray to dark brown, medium dense, fragments of weathered Santa Monica slate				8-8-10 N=18								
		40			6-10-9 N=19								

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017
Drill Rig: CME-75 | Driller: BC2 ENV
Project No.: 60165174 | Exhibit: A-18

BORING LOG NO. N-2

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

GRAPHIC LOG	LOCATION / DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	See Exhibit A-2 Latitude: 34.092185° Longitude: -118.476632°												
	FILL - SILTY CLAYEY SAND (SC-SM), gray to dark brown, medium dense, fragments of weathered Santa Monica slate *(continued)*	45			7-6-9 N=15								
		50			10-10-10 N=20								
	51.5												
	Boring Terminated at 51.5 Feet												

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017
Drill Rig: CME-75 | Driller: BC2 ENV
Project No.: 60165174 | Exhibit: A-18

BORING LOG NO. N-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092482° Longitude: -118.476755°

DEPTH	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
5				8-15-28					10	123		
10				12-12-12 N=24								
				7-13-15 N=28					10	117		
15				8-12-16 N=28								
20				5-5-16					8	109		

FILL - SANDY LEAN CLAY (CL), trace gravel, brown

hard

very stiff

20.0

SANDY LEAN CLAY (CL), brown, very stiff

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-19

BORING LOG NO. N-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092482° Longitude: -118.476755°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	SANDY LEAN CLAY (CL), brown, very stiff *(continued)*												
		25			8-9-11 N=20								
	with gravel, dark brown, stiff	30			6-6-6 N=12							32-17-15	
	very stiff	35			5-8-8 N=16								
	40.0												
	ALLUVIUM - CLAYEY GRAVEL (GC), dark brown, very dense	40			50/6"								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-19

BORING LOG NO. N-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092482° Longitude: -118.476755°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
45.0		**ALLUVIUM - CLAYEY GRAVEL (GC)**, dark brown, very dense *(continued)*	45			50/5"
		ALLUVIUM - SILTY GRAVEL (GM), dark brown, very dense				
50.0		**WEATHERED SANTA MONICA SLATE**, completely weathered **SILTY GRAVEL (GM)**, dark brown, very dense	50			50/4"
			55	▽		50/3"
			60			50/5"
			65			50/5"

EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-19

BORING LOG NO. N-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092482° Longitude: -118.476755°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	WEATHERED SANTA MONICA SLATE, completely weathered *(continued)*												
	70.2	70			50/2"								
	Auger Refusal at 70.2 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-19

BORING LOG NO. N-4

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.091804° Longitude: -118.47639°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
0					**FILL - SILTY SAND (SM)**, with gravel, brown								
5.0		5			15-22-22					5	128		
					very stiff								
		10			9-10-10 N=20								
15.0		15			10-12-13 N=25								
		20			14-14-20					8	124		

FILL - SANDY LEAN CLAY (CL), with gravel, brown, hard

FILL - CLAYEY SAND (SC), with gravel and cobbles, brown, medium dense

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-20

BORING LOG NO. N-4

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.091804° Longitude: -118.47639°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	FILL - CLAYEY SAND (SC), with gravel and cobbles, brown, medium dense *(continued)*												
	dense	25			8-15-15 N=30								
30.0	**FILL - SILTY CLAYEY SAND (SC-SM)**, with gravel, dark brown, medium dense, trace of weathered Santa Monica slate	30			12-12-13 N=25								
		35			8-10-12					11	123	27-21-6	37
40.0	**FILL - CLAYEY SAND (SC)**, with gravel, dark brown, medium dense, trace of weathered Santa Monica slate	40			8-8-9 N=17								

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-20

BORING LOG NO. N-4

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.091804° Longitude: -118.47639°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	FILL - CLAYEY SAND (SC), with gravel, dark brown, medium dense, trace of weathered Santa Monica slate *(continued)*	45			12-21-21 N=42								
	dense	50			25-25-50					6	124		
	51.5												
	Boring Terminated at 51.5 Feet												

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-20

BORING LOG NO. N-5

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092199° Longitude: -118.476391°

DEPTH	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	FILL - SANDY LEAN CLAY (CL), with gravel, brown											
	very stiff											
5				12-15-18					8	114		
10				9-10-8 N=18								
15												
20				8-11-16 N=27								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-23-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-21

BORING LOG NO. N-5

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092199° Longitude: -118.476391°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	FILL - SANDY LEAN CLAY (CL), with gravel, brown *(continued)*												
	25.0 **SANDY LEAN CLAY (CL)**, brown, very stiff	25											
		30			11-14-21					6	130		
		35											
		40			9-10-11 N=21								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-23-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-21

BORING LOG NO. N-5

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092199° Longitude: -118.476391°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
		SANDY LEAN CLAY (CL), brown, very stiff *(continued)*	45											
50.0		**FILL - CLAYEY GRAVEL (GC)**, dark brown to black, very dense	50			50/6"								
55.0		**FILL - SANDY LEAN CLAY (CL)**, with gravel, brown, very stiff	55			9-7-17 N=24								
60.0		**ALLUVIUM - POORLY GRADED GRAVEL (GP)**, black to dark brown, medium dense	60			19-25-23					4	123		
65.0		**ALLUVIUM - SANDY SILTY CLAY (CL-ML)**, brown, very stiff	65			3-5-19								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-23-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-21

BORING LOG NO. N-5

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092199° Longitude: -118.476391°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
					N=24								
	70.0	70											
					15-18-25 N=43								
	80.0	75											
		80			30-40-45 N=85								
		85											

ALLUVIUM - SANDY SILTY CLAY (CL-ML), brown, very stiff *(continued)*

ALLUVIUM - SILTY SAND (SM), with gravel, brown, dense, trace of weathered Santa Monica slate

WEATHERED SANTA MONICA SLATE, completely weathered
SILTY SAND (SM), brown, very dense

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-23-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-21

BORING LOG NO. N-5

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092199° Longitude: -118.476391°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	WEATHERED SANTA MONICA SLATE, completely weathered *(continued)*												
	SANDY LEAN CLAY (CL), dark brown, hard	90			12-15-26 N=41								
		95											
		100			9-21-40					10	131		
	101.5												
	Boring Terminated at 101.5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-23-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-21

BORING LOG NO. N-6

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092568° Longitude: -118.476481°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	0.0 **FILL - SILTY SAND (SM)**, with gravel trace clay, brown												
	5.0 **FILL - SANDY LEAN CLAY (CL)**, with gravel, brown, very stiff	5			11-12-12 N=24								
	hard	10			10-19-30								
		15			12-18-20 N=38								
	20.0 **FILL - CLAYEY GRAVEL (GC)**, with gravel, dark gray, dense	20			19-20-17 N=37								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-22

BORING LOG NO. N-6

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092568° Longitude: -118.476481°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
		25											
					14-50/6"					7	119		
		30											
30.0					10-7-7 N=14								
		35											
					10-7-8 N=15								
		40											
					19-30-38					7	131		

FILL - CLAYEY GRAVEL (GC), with gravel, dark gray, dense *(continued)*

very dense

FILL - SANDY LEAN CLAY (CL), with gravel, brown to dark brown, stiff

stiff to very stiff

hard

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-22

BORING LOG NO. N-6

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092568° Longitude: -118.476481°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
		45											
					10-10-9 N=19								
		50											
					5-5-7 N=12								
55.0		55											
					7-7-5 N=12								
60.0		60											
					12-25-27					5	126		
65.0		65											
					15-20-23								

FILL - SANDY LEAN CLAY (CL), with gravel, brown to dark brown, stiff *(continued)*

very stiff

stiff

FILL - SANDY SILTY CLAY (CL-ML), brown, stiff

ALLUVIUM - SANDY LEAN CLAY (CL), with gravel, brown to dark brown, hard

ALLUVIUM - SILTY CLAYEY SAND (SC-SM), with gravel, brown, dense

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-22

BORING LOG NO. N-6

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092568° Longitude: -118.476481°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
					N=43								
	ALLUVIUM - SILTY CLAYEY SAND (SC-SM), with gravel, brown, dense *(continued)*	70			19-13-19 N=32								
	75.0	75			18-17-18 N=35								
	ALLUVIUM - CLAYEY SAND (SC), with gravel, brown, trace of weathered Santa Monica slate dense	80			15-26-33					9	125		
		85			6-14-18 N=32								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-22

BORING LOG NO. N-6

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092568° Longitude: -118.476481°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	ALLUVIUM - CLAYEY SAND (SC), with gravel, brown, trace of weathered Santa Monica slate *(continued)*												
		90			5-10-21 N=31								
	medium dense	95			6-8-8 N=16								
		100			6-10-10 N=20								
		105			10-10-10 N=20								
		110											

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-23-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-22

BORING LOG NO. N-6

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.092568° Longitude: -118.476481°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	ALLUVIUM - CLAYEY SAND (SC), with gravel, brown, trace of weathered Santa Monica slate *(continued)*				7-11-21					13	123		
	115.0	115											
	WEATHERED SANTA MONICA SLATE, completely weathered **POORLY GRADED GRAVEL (GP)**, dark brown, very dense				19-50/6"								
	121.5	120			50/2"								
	Boring Terminated at 121.5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-23-2017

Drill Rig: B-61 | Driller: Cal Pac

Project No.: 60165174 | Exhibit: A-22

BORING LOG NO. S-1

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090324° Longitude: -118.476417°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
FILL - SANDY LEAN CLAY (CL), with gravel, brown													
very stiff		5			13-21-17					7	114		
		10			7-9-12 N=21					6	121		
15.0													
ALLUVIUM - SANDY LEAN CLAY (CL), with gravel, brown, very stiff		15			13-15-18					6	112	31-20-11	
stiff		20			7-6-5 N=11								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-20-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-23

BORING LOG NO. S-1

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090324° Longitude: -118.476417°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	ALLUVIUM - SANDY LEAN CLAY (CL), with gravel, brown, very stiff *(continued)*												
	very stiff	25			10-12-12					4	105		
	tan to orange	30			9-11-11 N=22							29-16-13	
		35			8-5-11 N=16								
	40.0	40			50/6"								
	WEATHERED SANTA MONICA SLATE, completely weathered **SILTY SAND (SM)**, with gravel, brown to dark brown, very dense												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-20-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-23

BORING LOG NO. S-1

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090324° Longitude: -118.476417°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	WEATHERED SANTA MONICA SLATE, completely weathered *(continued)*	45			50/5"								
	POORLY GRADED GRAVEL (GP), dark brown to black, very dense	50			50/4"								
		55	▽		50/3"								
		60			50/5"								
		65			50/4"								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-20-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-23

BORING LOG NO. S-1

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090324° Longitude: -118.476417°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	WEATHERED SANTA MONICA SLATE, completely weathered *(continued)*	70			50/5"					6	125		
		75			50/6"								
		80			50/5"								
		85			50/3"								
	87.0 ***Auger Refusal at 87 Feet***												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-20-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-23

BORING LOG NO. S-2

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090674° Longitude: -118.476475°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	FILL - SILTY CLAYEY SAND (SC-SM), with gravel, brown												
	5.0												
	ALLUVIUM - CLAYEY SAND (SC), with gravel, brown, medium dense	5			8-7-10 N=17								
		10			18-20-20					6	121		20
		15			9-13-14 N=27								
		20			8-13-14					8	124		

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-20-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-24

BORING LOG NO. S-2

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090674° Longitude: -118.476475°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	ALLUVIUM - CLAYEY SAND (SC), with gravel, brown, medium dense *(continued)*	25			8-6-4 N=10								
		30			8-7-8 N=15								
		35			8-9-11 N=20							28-18-10	
	40.0	40			8-13-18 N=31								
	ALLUVIUM - CLAYEY GRAVEL (GC), dark brown, dense												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-20-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-24

BORING LOG NO. S-2

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090674° Longitude: -118.476475°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	ALLUVIUM - CLAYEY GRAVEL (GC), dark brown, dense *(continued)*	45			21-28-14 N=42								
	50.0	50			25-22-50/5"								
	WEATHERED SANTA MONICA SLATE, completely weathered **POORLY GRADED GRAVEL (GP)**, dark brown, very dense	55			50/3"								
	58.0												
	Auger Refusal at 58 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-20-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-24

BORING LOG NO. S-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090523° Longitude: -118.476258°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
FILL - CLAYEY SAND (SC), with gravel, dark brown													
medium dense		5			5-14-13 N=27								
dense		10			11-25-23 N=48								
medium dense		15			15-14-12 N=26	14							
		20			14-19-20					7	121		

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-21-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-25

BORING LOG NO. S-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090523° Longitude: -118.476258°

DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	FILL - CLAYEY SAND (SC), with gravel, dark brown *(continued)*												
25.0	**ALLUVIUM - CLAYEY SAND (SC)**, with gravel, dark brown	25			8-13-16 N=29							30-21-9	
		30			8-9-6 N=15								
	dense	35			11-15-21 N=36								
40.0	**ALLUVIUM - SILTY SAND (SM)**, with gravel, tan to orange brown, medium dense	40			11-16-20					9	117		

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017	Boring Completed: 03-21-2017
Drill Rig: B-61	Driller: Cal Pac
Project No.: 60165174	Exhibit: A-25

BORING LOG NO. S-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090523° Longitude: -118.476258°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
		ALLUVIUM - SILTY SAND (SM), with gravel, tan to orange brown, medium dense *(continued)*												
45.0		**ALLUVIUM - CLAYEY SAND (SC)**, with gravel, dark brown, medium dense	45			6-12-14 N=26								
		very dense	50			13-21-31 N=52								
		medium dense	55			13-15-14 N=29								
			60			10-11-11					12	120		
			65			14-8-13								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-21-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-25

BORING LOG NO. S-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090523° Longitude: -118.476258°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	ALLUVIUM - CLAYEY SAND (SC), with gravel, dark brown, medium dense *(continued)*				N=21								
		70			12-14-19					11	127		
	75.0												
	WEATHERED SANTA MONICA SLATE, completely weathered **POORLY GRADED GRAVEL (GP)**, dark brown, very dense	75			50/3"								
		80			50/4"								
		85			50/3"								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-21-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-25

BORING LOG NO. S-3

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090523° Longitude: -118.476258°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	WEATHERED SANTA MONICA SLATE, completely weathered *(continued)*	90			50/3"								
		95			50/4"								
	100.3	100			50/4"								
	Auger Refusal at 100.3 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-20-2017 | Boring Completed: 03-21-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-25

BORING LOG NO. S-4

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090323° Longitude: -118.476067°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	FILL - CLAYEY SAND (SC), with gravel, brown to gray												
	medium dense	5			10-19-25					7	121		
	dense				7-15-15 N=30								20
	medium dense	10			5-21-27					5	123		
		15			9-9-15 N=24								21
		20			8-21-33					6	121		

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017

Drill Rig: CME-75 | Driller: BC2 ENV

Project No.: 60165174 | Exhibit: A-26

BORING LOG NO. S-4

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090323° Longitude: -118.476067°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
		25											
	FILL - CLAYEY SAND (SC), with gravel, brown to gray *(continued)*												
	dense				15-15-18 N=33								
		30											
	medium dense				17-18-17					8	117		
		35											
					13-14-14 N=28								
40.0		40											
	FILL - SILTY CLAYEY SAND (SC-SM), with gravel, gray to brown, medium dense				14-15-12 N=27								

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017

Drill Rig: CME-75 | Driller: BC2 ENV

Project No.: 60165174 | Exhibit: A-26

BORING LOG NO. S-4

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090323° Longitude: -118.476067°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
		45			16-14-7 N=21								
	50.0	50			7-7-15 N=22								
		55	▽		4-8-4 N=12								
		60			4-14-8 N=22								
	65.0	65			50/6"								

FILL - SILTY CLAYEY SAND (SC-SM), with gravel, gray to brown, medium dense *(continued)*

ALLUVIUM - CLAYEY SAND (SC), with gravel, dark gray, medium dense, trace of weathered Santa Monica slate

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017	Boring Completed: 03-30-2017
Drill Rig: CME-75	Driller: BC2 ENV
Project No.: 60165174	Exhibit: A-26

BORING LOG NO. S-4

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090323° Longitude: -118.476067°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	ALLUVIUM - POORLY GRADED SAND WITH SILT (SP-SM), with gravel, gray to black, very dense, trace of weathered Santa Monica slate *(continued)*												
	70.0	70											
	ALLUVIUM - SILTY CLAYEY SAND (SC-SM), with gravel, gray to black, dense, trace of weathered Santa Monica slate				19-22-27 N=49								
	75.0	75											
	WEATHERED SANTA MONICA SLATE POORLY GRADED SAND WITH SILT (SP-SM), with gravel, gray to black, very dense				34-50/5"								
	79.0				50/6"								
	Auger Refusal at 79 Feet												

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

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered while drilling*

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-30-2017 | Boring Completed: 03-30-2017

Drill Rig: CME-75 | Driller: BC2 ENV

Project No.: 60165174 | Exhibit: A-26

BORING LOG NO. S-5

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090777° Longitude: -118.476135°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	FILL - SILTY SAND (SM), with gravel, brown												
	5.0												
	FILL - CLAYEY SAND (SC), with gravel, brown to dark brown, dense	5			14-20-20					6	115		
		10			18-24-18 N=42								19
	medium dense	15			10-16-21					9	114		
		20			9-11-11 N=22								27

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-27

BORING LOG NO. S-5

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

LOCATION See Exhibit A-2

Latitude: 34.090777° Longitude: -118.476135°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	FILL - CLAYEY SAND (SC), with gravel, brown to dark brown, dense *(continued)*	25			17-19-35					9	118		
	30.0 **FILL - CLAYEY GRAVEL (GC)**, with gravel, dark brown to gray, dense	30			12-15-15 N=30								
	35.0 **WEATHERED SANTA MONICA SLATE**, completely weathered **POORLY GRADED GRAVEL (GP)**, dark brown, very dense	35			24-30-50 N=80								
		40			50/6"								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
The estimated depth of the fill materials should not be considered exact due to the similarity of lithology, color, and/or densities of the graded materials and native soils.

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-27

BORING LOG NO. S-5

PROJECT: The Getty Center Oak Parking Lots

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

SITE: 1200 Getty Center Drive
Los Angeles, California

GRAPHIC LOG	LOCATION / DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	EXPANSION INDEX	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	See Exhibit A-2 Latitude: 34.090777° Longitude: -118.476135°												
	WEATHERED SANTA MONICA SLATE, completely weathered *(continued)*	45			50/5"								
	50.3	50			50/4"								
	Boring Terminated at 50.3 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 03-22-2017 | Boring Completed: 03-22-2017
Drill Rig: B-61 | Driller: Cal Pac
Project No.: 60165174 | Exhibit: A-27

APPENDIX B

LABORATORY TESTING

Laboratory Testing

Samples retrieved during the field exploration were taken to a DSA certified laboratory for further observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System (USCS) described in Appendix C. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples and the test results are presented in this appendix. The laboratory test results were used for the geotechnical engineering analyses, and the development of foundation and earthwork recommendations. Laboratory tests were performed in general accordance with the applicable ASTM, local or other accepted standards.

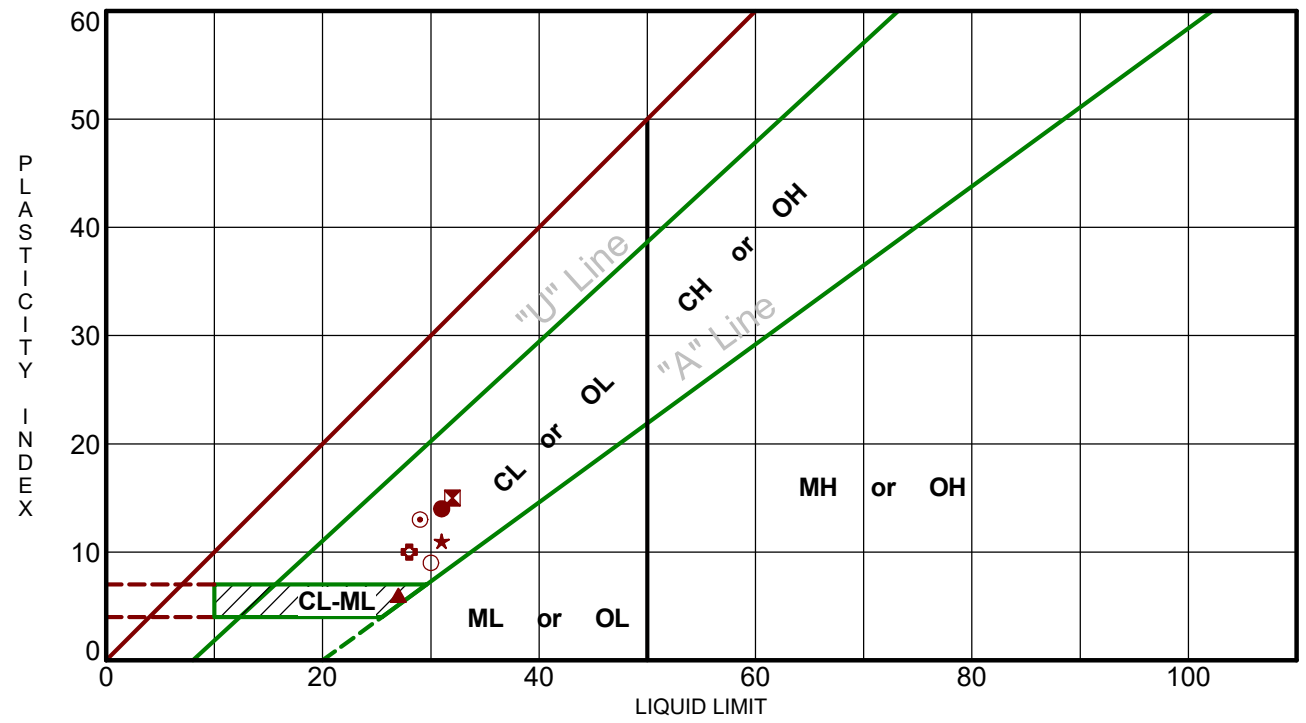
Selected soil samples obtained from the site were tested for the following engineering properties:

- ASTM D7263 Dry Density
- CT422 Chloride Content
- CT643 pH
- ASTM C136 Grain Size Distribution
- ASTM D4318 Atterberg Limits
- ASTM D4829 Expansion Index
- ASTM D2216 Moisture Content
- CT417 Soluble Sulfates
- CT643 Minimum Resistivity
- ASTM D4546 Collapse/Swell Potential
- ASTM D3080 Direct Shear

Procedural standards noted above are for reference to methodology in general. In some cases variations to methods are applied as a result of local practice or professional judgment.

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
● N-2	0 - 5	31	17	14		SC	CLAYEY SAND WITH GRAVEL
⊠ N-3	30 - 31.5	32	17	15		CL	SANDY LEAN CLAY WITH GRAVEL
▲ N-4	35 - 36.5	27	21	6	37	SC-SM	SILTY CLAYEY SAND WITH GRAVEL
★ S-1	15 - 16.5	31	20	11		CL	SANDY LEAN CLAY WITH GRAVEL
⊙ S-1	30 - 31.5	29	16	13		CL	SANDY LEAN CLAY WITH GRAVEL
✿ S-2	35 - 36.5	28	18	10		SC	CLAYEY SAND WITH GRAVEL
○ S-3	25 - 26.5	30	21	9		SC	CLAYEY SAND WITH GRAVEL

PROJECT: The Getty Center Oak Parking Lots

SITE: 1200 Getty Center Drive
Los Angeles, California

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

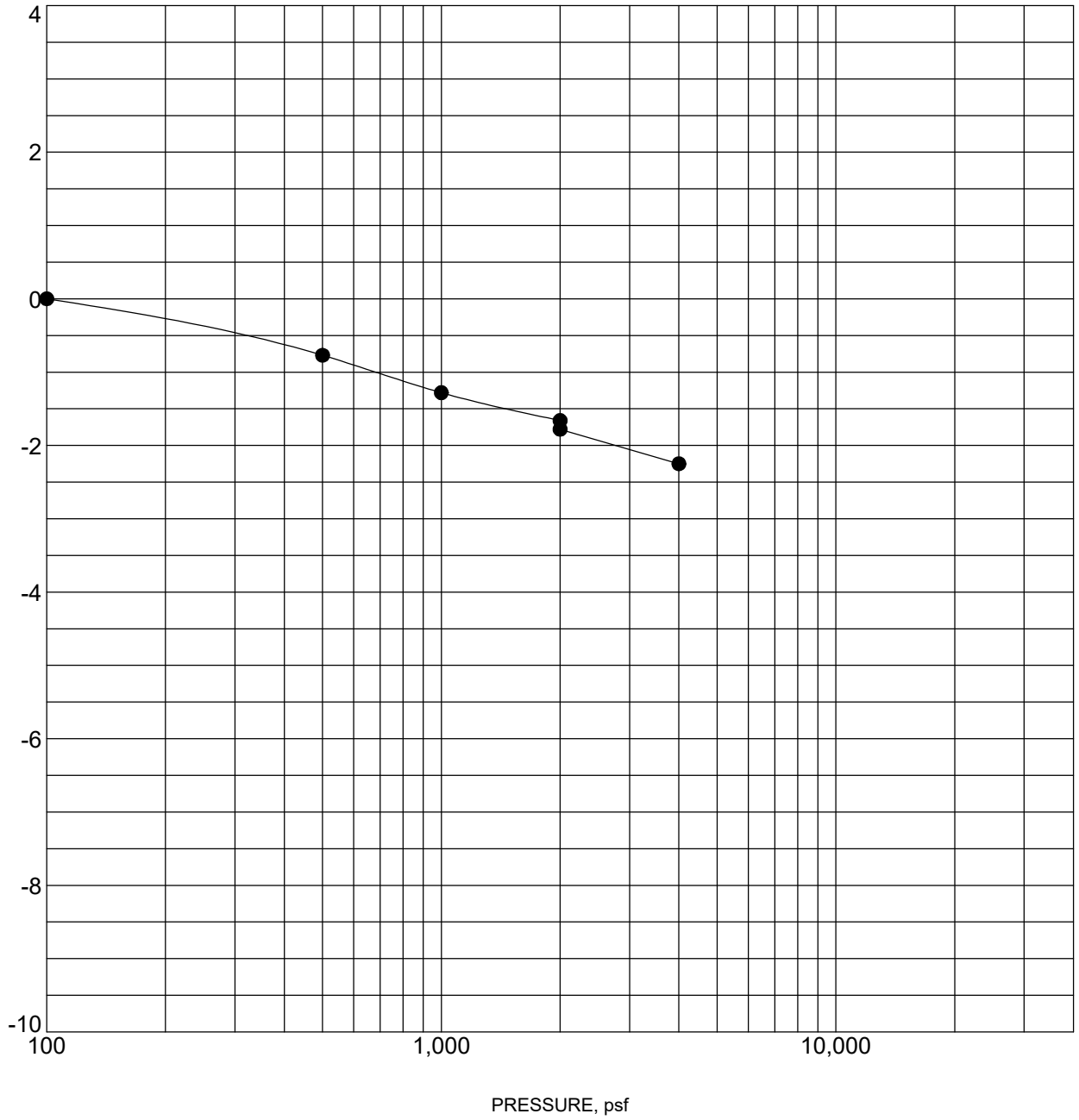
PROJECT NUMBER: 60165174

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

EXHIBIT: B-2

SWELL CONSOLIDATION TEST

ASTM D4546



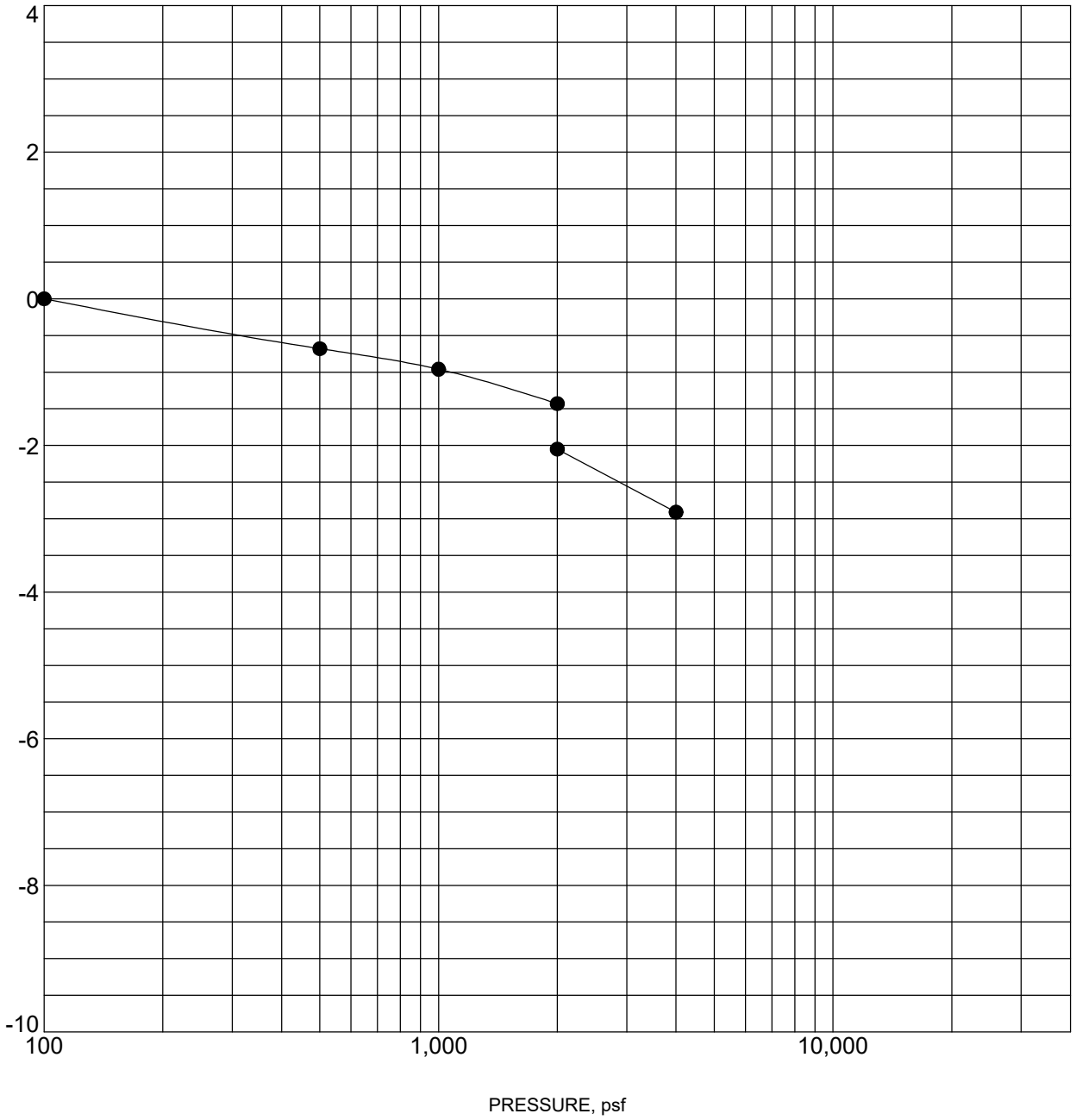
Specimen Identification			Classification	γ_d, pcf	WC, %
●	N-2	5 - 6.5 ft	CLAYEY SAND WITH GRAVEL	118	9

NOTES: Water added at 2000 psf

PROJECT: The Getty Center Oak Parking Lots	Terracon 1421 Edinger Ave, Ste C Tustin, CA	PROJECT NUMBER: 60165174
SITE: 1200 Getty Center Drive Los Angeles, California		CLIENT: The J. Paul Getty Trust Los Angeles, CA
		EXHIBIT: B-3

SWELL CONSOLIDATION TEST

ASTM D4546



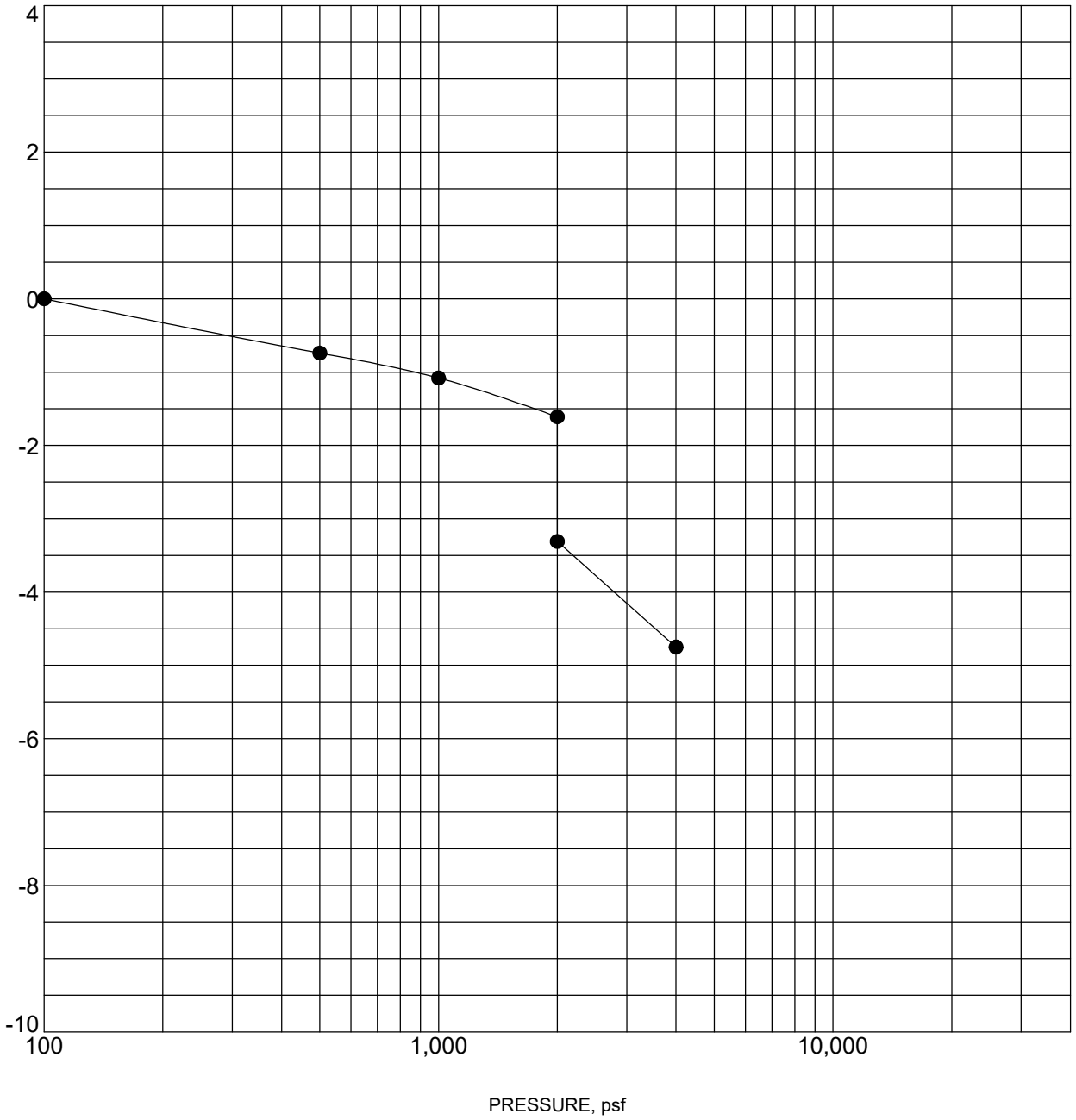
Specimen Identification			Classification	γ_d, pcf	WC, %
●	N-4	35 - 36.5 ft	SILTY CLAYEY SAND WITH GRAVEL	123	11

NOTES: Water added at 2000 psf

PROJECT: The Getty Center Oak Parking Lots	Terracon 1421 Edinger Ave, Ste C Tustin, CA	PROJECT NUMBER: 60165174
SITE: 1200 Getty Center Drive Los Angeles, California		CLIENT: The J. Paul Getty Trust Los Angeles, CA
		EXHIBIT: B-4

SWELL CONSOLIDATION TEST

ASTM D4546

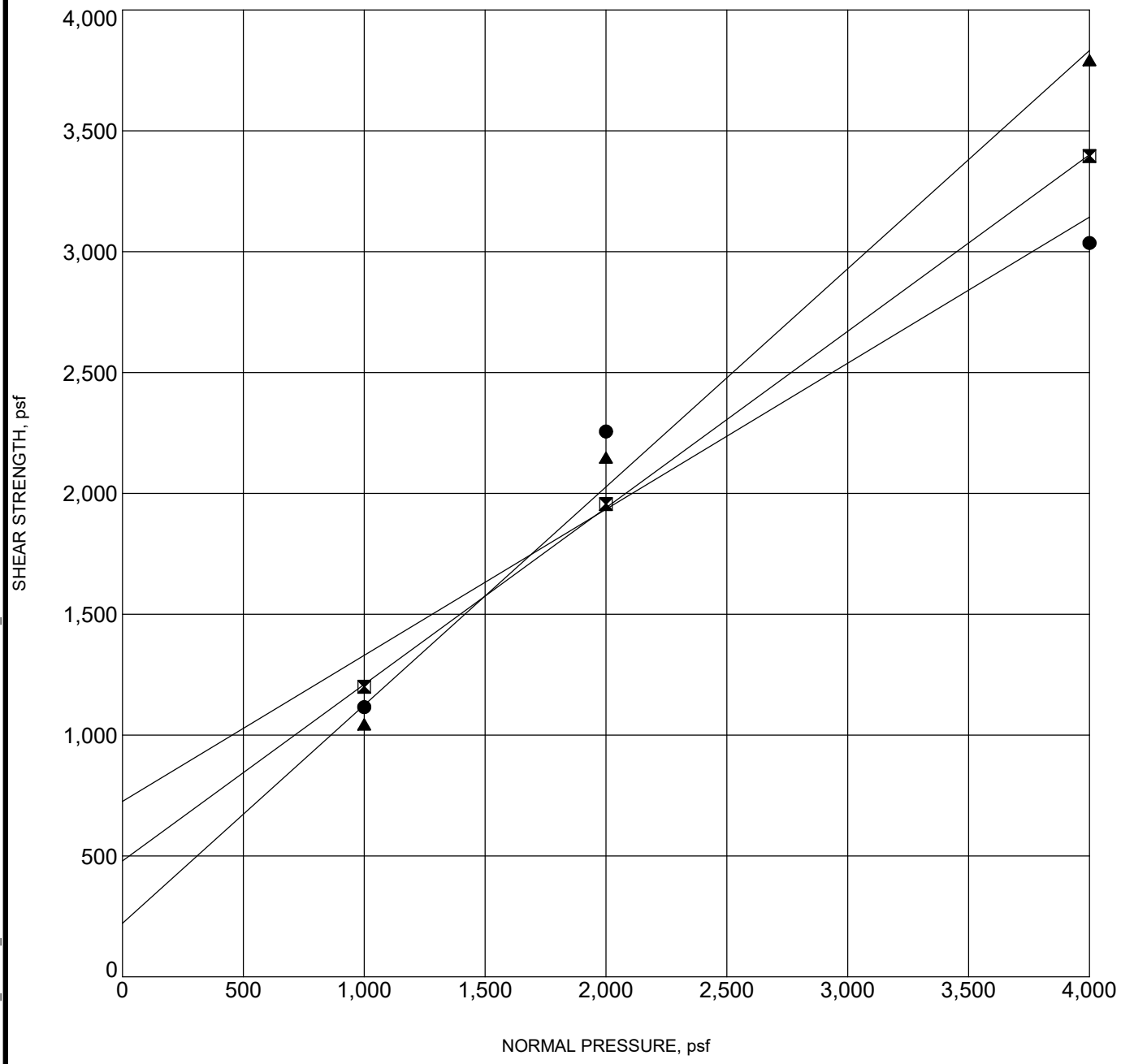


Specimen Identification			Classification	γ_d, pcf	WC, %
●	S-2	10 - 11.5 ft	CLAYEY SAND WITH GRAVEL	121	6

NOTES: Water added at 2000 psf

PROJECT: The Getty Center Oak Parking Lots	Terracon 1421 Edinger Ave, Ste C Tustin, CA	PROJECT NUMBER: 60165174
SITE: 1200 Getty Center Drive Los Angeles, California		CLIENT: The J. Paul Getty Trust Los Angeles, CA
		EXHIBIT: B-5

DIRECT SHEAR TEST ASTM D3080



Specimen Identification			Classification	γ_d, pcf	WC,%	c, psf	ϕ°
●	N-1	7.5 - 9	CLAYEY SAND SC	103	13	726	31
⊠	N-4	20 - 21.5	CLAYEY SAND WITH GRAVEL SC	124	8	480	36
▲	S-3	40 - 41.5	SILTY SAND WITH GRAVEL SM	117	9	222	42

PROJECT: The Getty Center Oak Parking Lots

SITE: 1200 Getty Center Drive
Los Angeles, California

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60165174

CLIENT: The J. Paul Getty Trust
Los Angeles, CA

EXHIBIT: B-6

CHEMICAL LABORATORY TEST REPORT

Project Number: 60165174
Service Date: 04/25/17
Report Date: 03/22/19
Task:

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

Client

Project

Getty Center: Oak Parking Lots

Sample Submitted By: Terracon (60) **Date Received:** 4/20/2017 **Lab No.: 17-0334**

Results of Corrosion Analysis

Sample Number			
Sample Location	N-1	N-5	S-2
Sample Depth (ft.)	10.0	20.0	15.0
pH Analysis, AWWA 4500 H	7.55	7.81	7.79
Water Soluble Sulfate (SO4), AWWA 4500 E (percent %)	0.02	0.02	0.01
Sulfides, AWWA 4500-S D, (mg/kg)	Nil	Nil	Nil
Red-Ox, AWWA 2580 (mV)	+671	+674	+669
Total Salts, AWWA 2510 (mg/kg)	1870	1602	706
Chlorides, AWWA 4500 Cl B (mg/kg)	78	60	60
Resistivity, ASTM G-57 (ohm-cm)	970	1261	2280

Analyzed By: Kurt D. Ergun

Kurt D. Ergun
Chemist

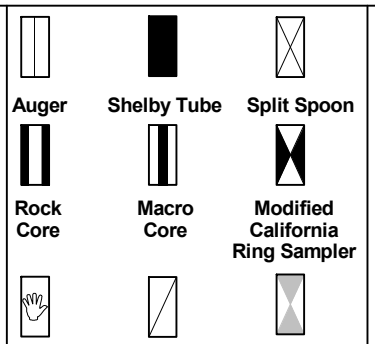
APPENDIX C

SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL

Water Initially Encountered

Water Level After a Specified Period of Time

Water Level After a Specified Period of Time

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

FIELD TESTS

(HP)	**Hand Penetrometer**
(T)	**Torvane**
(b/f)	**Standard Penetration Test (blows per foot)**
N	**N value**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**
(WOH)	Weight of Hammer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels and sands.			**CONSISTENCY OF FINE-GRAINED SOILS** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance Includes silts and clays.			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

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UNIFIED SOIL CLASSIFICATION SYSTEM

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

[Q] PI plots below "A" line.

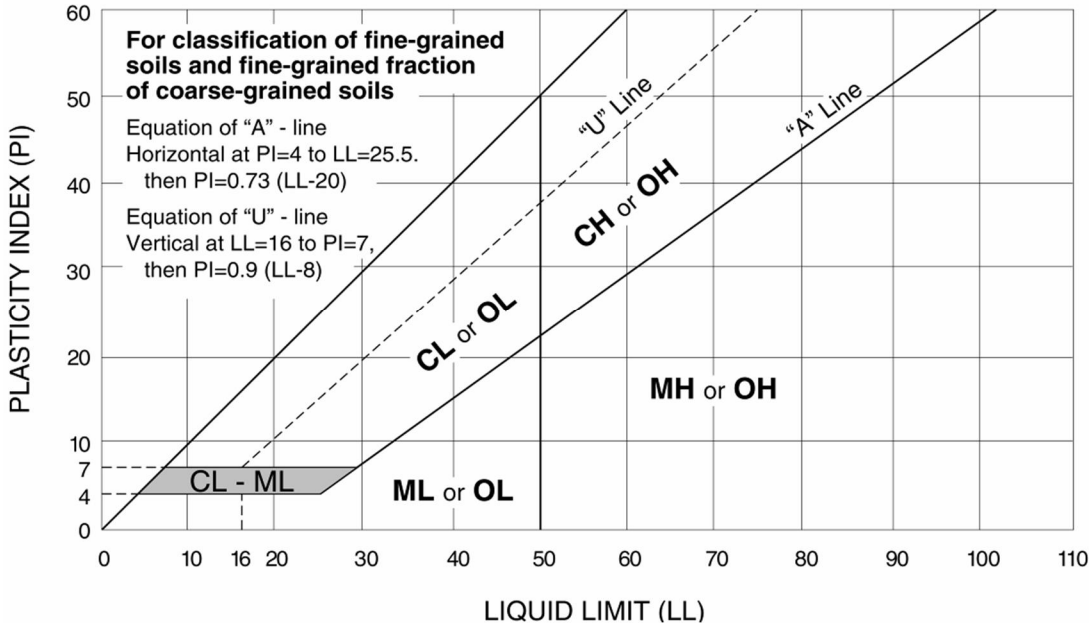

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Exhibit C-2

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.09121°N, 118.47631°W)

Site Class D – “Stiff Soil”, Risk Category IV (e.g. essential facilities)

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_s = 2.229 g
From Figure 22-2 [2]	S_1 = 0.790 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\overline{v}_s$	$\overline{N}$ or $\overline{N}_{ch}$	$\overline{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content w ≥ 40%, and • Undrained shear strength $\overline{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 2.229 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.790 g, F_v = 1.500

Equation (11.4–1):	$S_{MS} = F_a S_S = 1.000 \times 2.229 = 2.229$ g
Equation (11.4–2):	$S_{M1} = F_v S_1 = 1.500 \times 0.790 = 1.185$ g

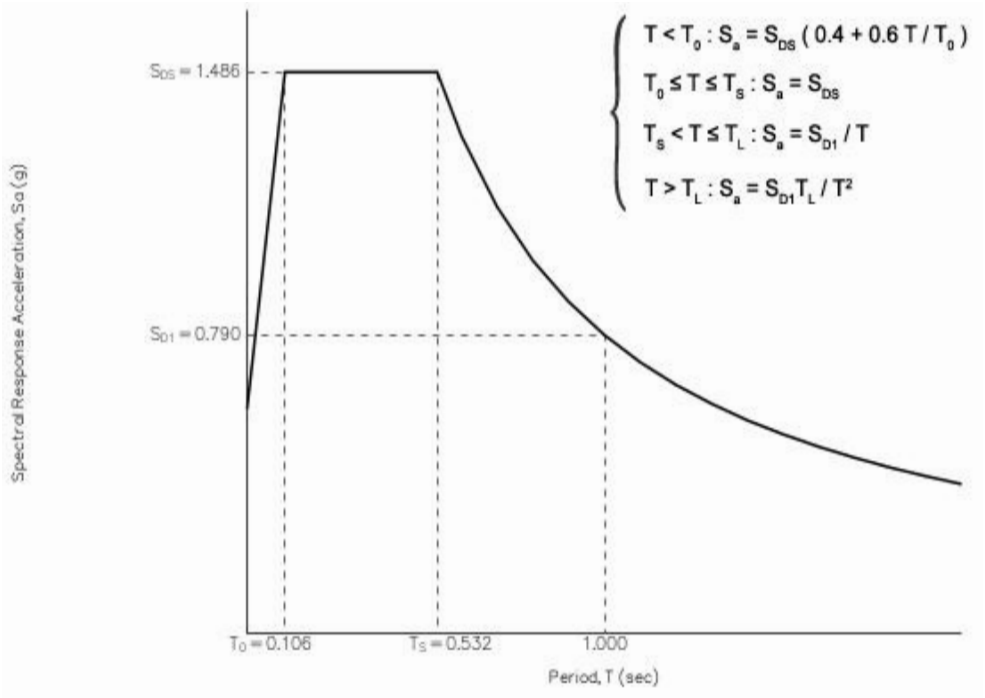
Section 11.4.4 — Design Spectral Acceleration Parameters

Equation (11.4–3):	$S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.229 = 1.486$ g
Equation (11.4–4):	$S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.185 = 0.790$ g

Section 11.4.5 — Design Response Spectrum

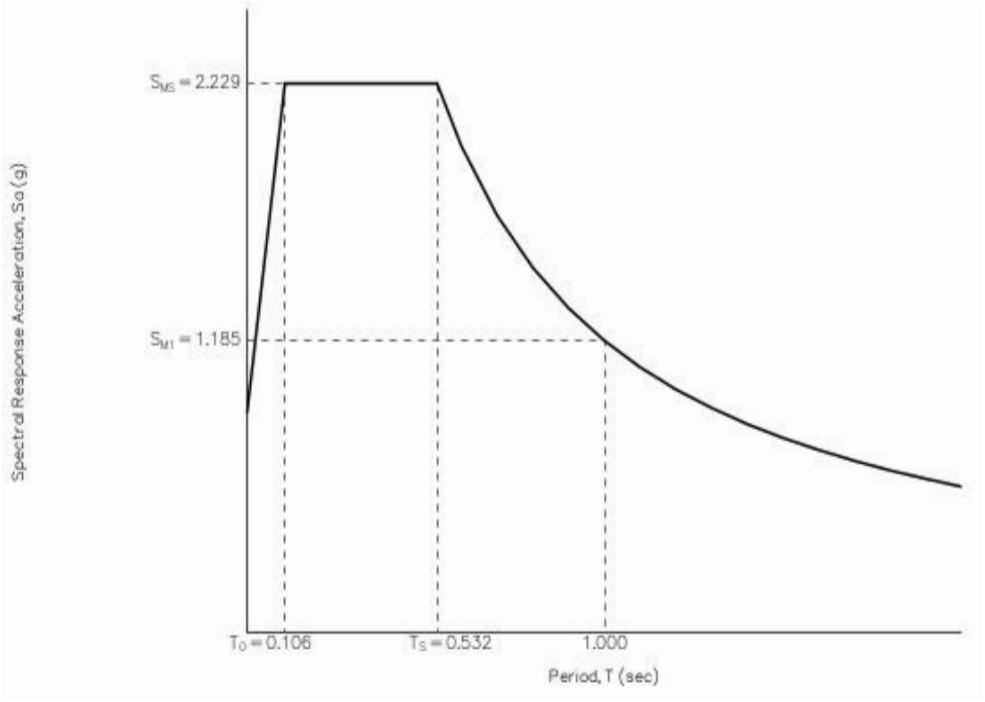
From Figure 22-12 [3]	$T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.838

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.838 = 0.838$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.838 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.955

From Figure 22-18 [6] C_{R1} = 0.972

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \leq S_{DS} < 0.33g$	B	B	C
$0.33g \leq S_{DS} < 0.50g$	C	C	D
$0.50g \leq S_{DS}$	D	D	D

For Risk Category = IV and S_{DS} = 1.486 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \leq S_{D1} < 0.133g$	B	B	C
$0.133g \leq S_{D1} < 0.20g$	C	C	D
$0.20g \leq S_{D1}$	D	D	D

For Risk Category = IV and S_{D1} = 0.790 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is E for buildings in Risk Categories I, II, and III, and F for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ “the more severe design category in accordance with Table 11.6-1 or 11.6-2” = F

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

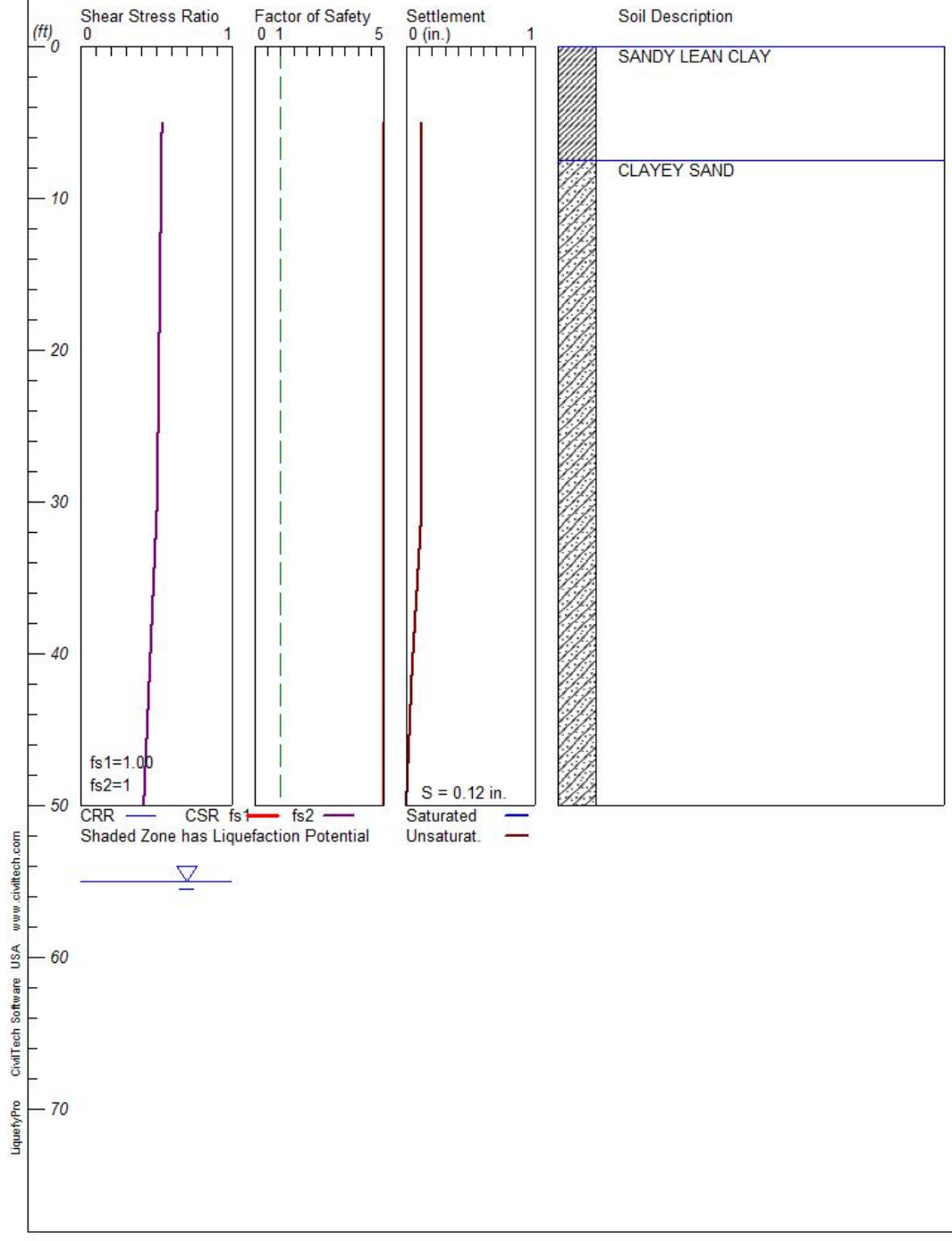
APPENDIX D

LIQUEFACTION ANALYSIS

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=N-1 ***Water Depth=55 ft*** ***Magnitude=6.52***
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-1**

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****

LIQUEFACTION ANALYSIS SUMMARY

****
****

Font: Courier New, Regular, Size 8 is recommended for this report.
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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N1 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-1
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=N-1
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	16.00	120.00	NoLiq
7.50	17.00	120.00	NoLiq
10.00	26.00	120.00	NoLiq
15.00	100.00	120.00	NoLiq
20.00	14.00	120.00	NoLiq
25.00	8.00	120.00	NoLiq
30.00	60.00	120.00	NoLiq
35.00	100.00	120.00	14.00
40.00	100.00	120.00	14.00
50.00	100.00	120.00	14.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.12 in.
Total Settlement of Saturated and Unsaturated Sands=0.12 in.
Differential Settlement=0.061 to 0.081 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.12	0.12
6.00	2.00	0.54	5.00	0.00	0.12	0.12
7.00	2.00	0.54	5.00	0.00	0.12	0.12
8.00	2.00	0.53	5.00	0.00	0.12	0.12
9.00	2.00	0.53	5.00	0.00	0.12	0.12
10.00	2.00	0.53	5.00	0.00	0.12	0.12
11.00	2.00	0.53	5.00	0.00	0.12	0.12
12.00	2.00	0.53	5.00	0.00	0.12	0.12
13.00	2.00	0.53	5.00	0.00	0.12	0.12
14.00	2.00	0.53	5.00	0.00	0.12	0.12
15.00	2.00	0.53	5.00	0.00	0.12	0.12
16.00	2.00	0.52	5.00	0.00	0.12	0.12
17.00	2.00	0.52	5.00	0.00	0.12	0.12
18.00	2.00	0.52	5.00	0.00	0.12	0.12
19.00	2.00	0.52	5.00	0.00	0.12	0.12
20.00	2.00	0.52	5.00	0.00	0.12	0.12
21.00	2.00	0.52	5.00	0.00	0.12	0.12
22.00	2.00	0.52	5.00	0.00	0.12	0.12
23.00	2.00	0.52	5.00	0.00	0.12	0.12
24.00	2.00	0.51	5.00	0.00	0.12	0.12
25.00	2.00	0.51	5.00	0.00	0.12	0.12
26.00	2.00	0.51	5.00	0.00	0.12	0.12
27.00	2.00	0.51	5.00	0.00	0.12	0.12

28.00	2.00	0.51	5.00	0.00	0.12	0.12
29.00	2.00	0.51	5.00	0.00	0.12	0.12
30.00	2.00	0.51	5.00	0.00	0.12	0.12
31.00	2.82	0.50	5.00	0.00	0.12	0.12
32.00	2.80	0.50	5.00	0.00	0.11	0.11
33.00	2.78	0.49	5.00	0.00	0.10	0.10
34.00	2.77	0.49	5.00	0.00	0.10	0.10
35.00	2.75	0.48	5.00	0.00	0.09	0.09
36.00	2.74	0.48	5.00	0.00	0.08	0.08
37.00	2.72	0.48	5.00	0.00	0.07	0.07
38.00	2.71	0.47	5.00	0.00	0.07	0.07
39.00	2.69	0.47	5.00	0.00	0.06	0.06
40.00	2.68	0.46	5.00	0.00	0.05	0.05
41.00	2.66	0.46	5.00	0.00	0.05	0.05
42.00	2.65	0.45	5.00	0.00	0.04	0.04
43.00	2.64	0.45	5.00	0.00	0.04	0.04
44.00	2.62	0.44	5.00	0.00	0.03	0.03
45.00	2.61	0.44	5.00	0.00	0.03	0.03
46.00	2.60	0.44	5.00	0.00	0.02	0.02
47.00	2.58	0.43	5.00	0.00	0.02	0.02
48.00	2.57	0.43	5.00	0.00	0.01	0.01
49.00	2.56	0.42	5.00	0.00	0.01	0.01
50.00	2.55	0.42	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

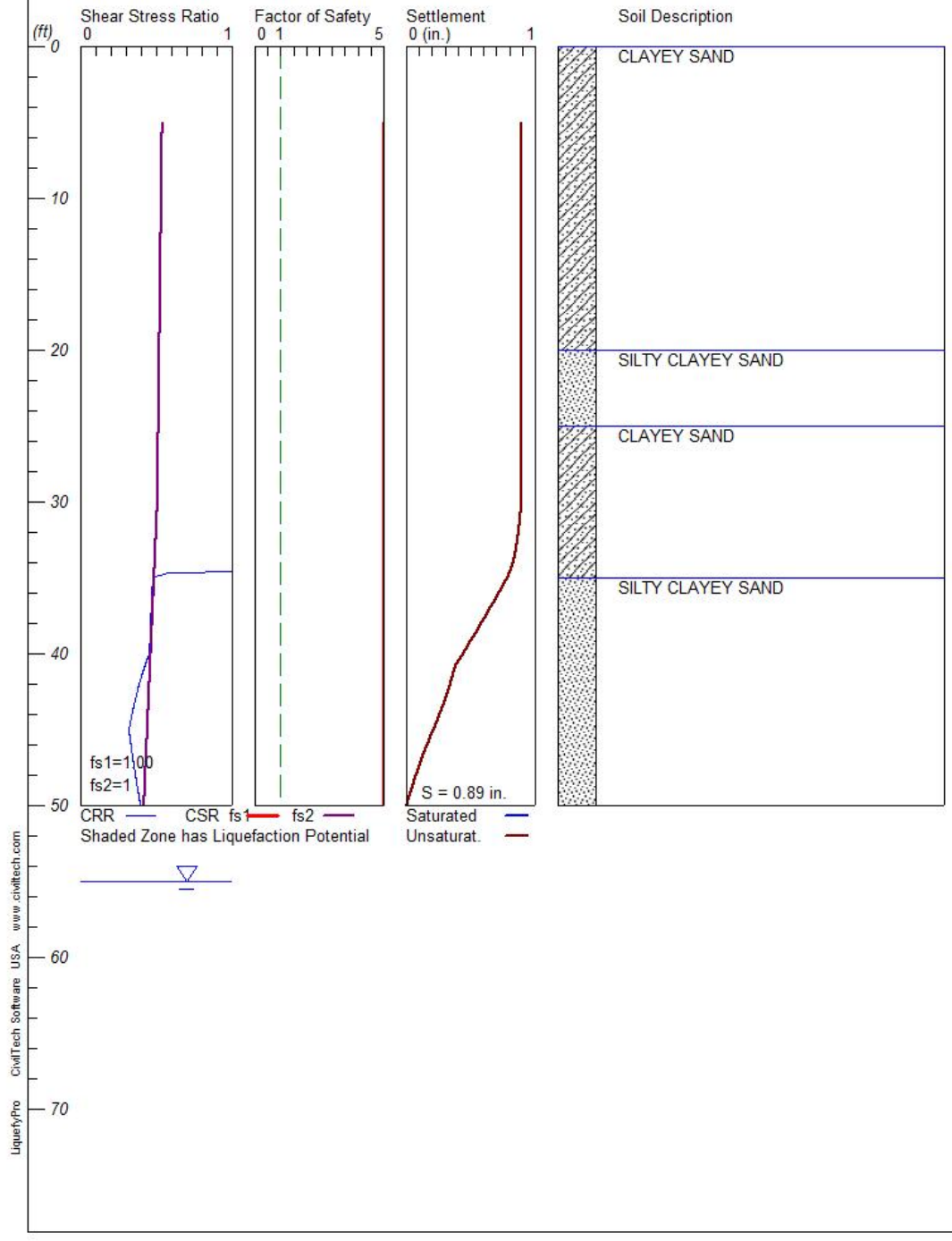
---

1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=N-2 ***Water Depth=55 ft*** ***Magnitude=6.52***
Acceleration=0.838g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N2 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-2
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=N-2
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	29.00	120.00	NoLiq
7.50	25.00	120.00	NoLiq
10.00	28.00	120.00	NoLiq
15.00	32.00	120.00	NoLiq
20.00	11.00	120.00	NoLiq
25.00	31.00	120.00	NoLiq
30.00	26.00	120.00	NoLiq
35.00	18.00	120.00	30.00
40.00	19.00	120.00	30.00
45.00	15.00	120.00	30.00
50.00	20.00	120.00	30.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.89 in.
Total Settlement of Saturated and Unsaturated Sands=0.89 in.
Differential Settlement=0.447 to 0.590 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.89	0.89
6.00	2.00	0.54	5.00	0.00	0.89	0.89
7.00	2.00	0.54	5.00	0.00	0.89	0.89
8.00	2.00	0.53	5.00	0.00	0.89	0.89
9.00	2.00	0.53	5.00	0.00	0.89	0.89
10.00	2.00	0.53	5.00	0.00	0.89	0.89
11.00	2.00	0.53	5.00	0.00	0.89	0.89
12.00	2.00	0.53	5.00	0.00	0.89	0.89
13.00	2.00	0.53	5.00	0.00	0.89	0.89
14.00	2.00	0.53	5.00	0.00	0.89	0.89
15.00	2.00	0.53	5.00	0.00	0.89	0.89
16.00	2.00	0.52	5.00	0.00	0.89	0.89
17.00	2.00	0.52	5.00	0.00	0.89	0.89
18.00	2.00	0.52	5.00	0.00	0.89	0.89
19.00	2.00	0.52	5.00	0.00	0.89	0.89
20.00	2.00	0.52	5.00	0.00	0.89	0.89
21.00	2.00	0.52	5.00	0.00	0.89	0.89
22.00	2.00	0.52	5.00	0.00	0.89	0.89
23.00	2.00	0.52	5.00	0.00	0.89	0.89
24.00	2.00	0.51	5.00	0.00	0.89	0.89
25.00	2.00	0.51	5.00	0.00	0.89	0.89
26.00	2.00	0.51	5.00	0.00	0.89	0.89

27.00	2.00	0.51	5.00	0.00	0.89	0.89
28.00	2.00	0.51	5.00	0.00	0.89	0.89
29.00	2.00	0.51	5.00	0.00	0.89	0.89
30.00	2.00	0.51	5.00	0.00	0.89	0.89
31.00	2.82	0.50	5.00	0.00	0.88	0.88
32.00	2.80	0.50	5.00	0.00	0.87	0.87
33.00	2.78	0.49	5.00	0.00	0.85	0.85
34.00	2.77	0.49	5.00	0.00	0.83	0.83
35.00	0.47	0.48	5.00	0.00	0.78	0.78
36.00	0.47	0.48	5.00	0.00	0.72	0.72
37.00	0.46	0.48	5.00	0.00	0.65	0.65
38.00	0.46	0.47	5.00	0.00	0.58	0.58
39.00	0.46	0.47	5.00	0.00	0.51	0.51
40.00	0.45	0.46	5.00	0.00	0.44	0.44
41.00	0.41	0.46	5.00	0.00	0.37	0.37
42.00	0.38	0.45	5.00	0.00	0.34	0.34
43.00	0.36	0.45	5.00	0.00	0.30	0.30
44.00	0.34	0.44	5.00	0.00	0.26	0.26
45.00	0.32	0.44	5.00	0.00	0.21	0.21
46.00	0.33	0.44	5.00	0.00	0.16	0.16
47.00	0.34	0.43	5.00	0.00	0.11	0.11
48.00	0.36	0.43	5.00	0.00	0.07	0.07
49.00	0.38	0.42	5.00	0.00	0.04	0.04
50.00	0.39	0.42	5.00	0.00	0.00	0.00

---

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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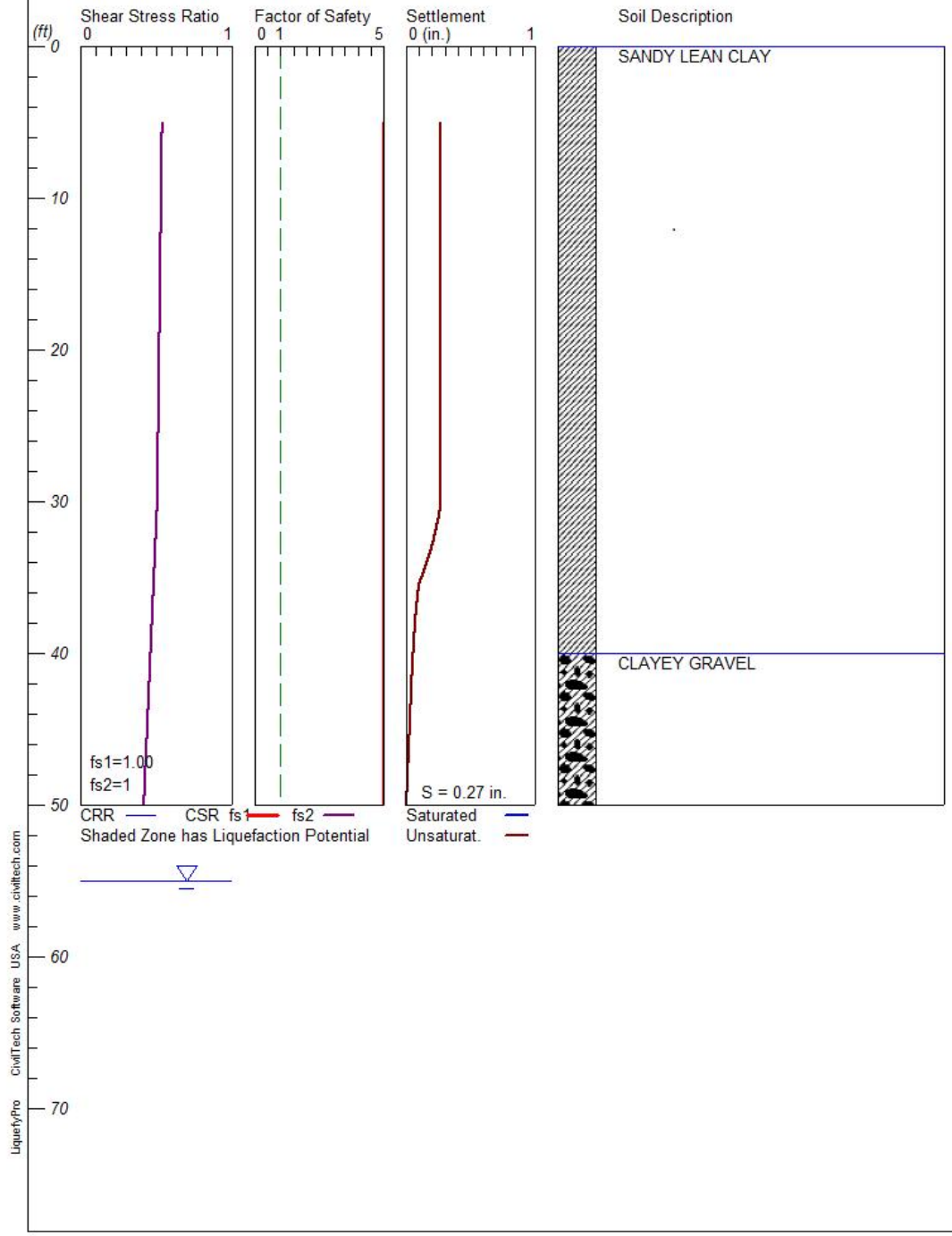
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=N-3 Water Depth=55 ft

Magnitude=6.52
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-5**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N3 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-3
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=N-3
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	36.00	120.00	NoLiq
7.50	24.00	120.00	NoLiq
10.00	28.00	120.00	NoLiq
15.00	28.00	120.00	NoLiq
20.00	18.00	120.00	NoLiq
25.00	20.00	120.00	NoLiq
30.00	12.00	120.00	NoLiq
35.00	16.00	120.00	51.00
40.00	100.00	120.00	20.00
45.00	100.00	120.00	20.00
50.00	100.00	120.00	20.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.27 in.
Total Settlement of Saturated and Unsaturated Sands=0.27 in.
Differential Settlement=0.134 to 0.177 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.27	0.27
6.00	2.00	0.54	5.00	0.00	0.27	0.27
7.00	2.00	0.54	5.00	0.00	0.27	0.27
8.00	2.00	0.53	5.00	0.00	0.27	0.27
9.00	2.00	0.53	5.00	0.00	0.27	0.27
10.00	2.00	0.53	5.00	0.00	0.27	0.27
11.00	2.00	0.53	5.00	0.00	0.27	0.27
12.00	2.00	0.53	5.00	0.00	0.27	0.27
13.00	2.00	0.53	5.00	0.00	0.27	0.27
14.00	2.00	0.53	5.00	0.00	0.27	0.27
15.00	2.00	0.53	5.00	0.00	0.27	0.27
16.00	2.00	0.52	5.00	0.00	0.27	0.27
17.00	2.00	0.52	5.00	0.00	0.27	0.27
18.00	2.00	0.52	5.00	0.00	0.27	0.27
19.00	2.00	0.52	5.00	0.00	0.27	0.27
20.00	2.00	0.52	5.00	0.00	0.27	0.27
21.00	2.00	0.52	5.00	0.00	0.27	0.27
22.00	2.00	0.52	5.00	0.00	0.27	0.27
23.00	2.00	0.52	5.00	0.00	0.27	0.27
24.00	2.00	0.51	5.00	0.00	0.27	0.27
25.00	2.00	0.51	5.00	0.00	0.27	0.27
26.00	2.00	0.51	5.00	0.00	0.27	0.27

27.00	2.00	0.51	5.00	0.00	0.27	0.27
28.00	2.00	0.51	5.00	0.00	0.27	0.27
29.00	2.00	0.51	5.00	0.00	0.27	0.27
30.00	2.00	0.51	5.00	0.00	0.27	0.27
31.00	2.82	0.50	5.00	0.00	0.25	0.25
32.00	2.80	0.50	5.00	0.00	0.23	0.23
33.00	2.78	0.49	5.00	0.00	0.20	0.20
34.00	2.77	0.49	5.00	0.00	0.16	0.16
35.00	2.75	0.48	5.00	0.00	0.12	0.12
36.00	2.74	0.48	5.00	0.00	0.09	0.09
37.00	2.72	0.48	5.00	0.00	0.08	0.08
38.00	2.71	0.47	5.00	0.00	0.07	0.07
39.00	2.69	0.47	5.00	0.00	0.06	0.06
40.00	2.68	0.46	5.00	0.00	0.05	0.05
41.00	2.66	0.46	5.00	0.00	0.05	0.05
42.00	2.65	0.45	5.00	0.00	0.04	0.04
43.00	2.64	0.45	5.00	0.00	0.04	0.04
44.00	2.62	0.44	5.00	0.00	0.03	0.03
45.00	2.61	0.44	5.00	0.00	0.03	0.03
46.00	2.60	0.44	5.00	0.00	0.02	0.02
47.00	2.58	0.43	5.00	0.00	0.02	0.02
48.00	2.57	0.43	5.00	0.00	0.01	0.01
49.00	2.56	0.42	5.00	0.00	0.01	0.01
50.00	2.55	0.42	5.00	0.00	0.00	0.00

---

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

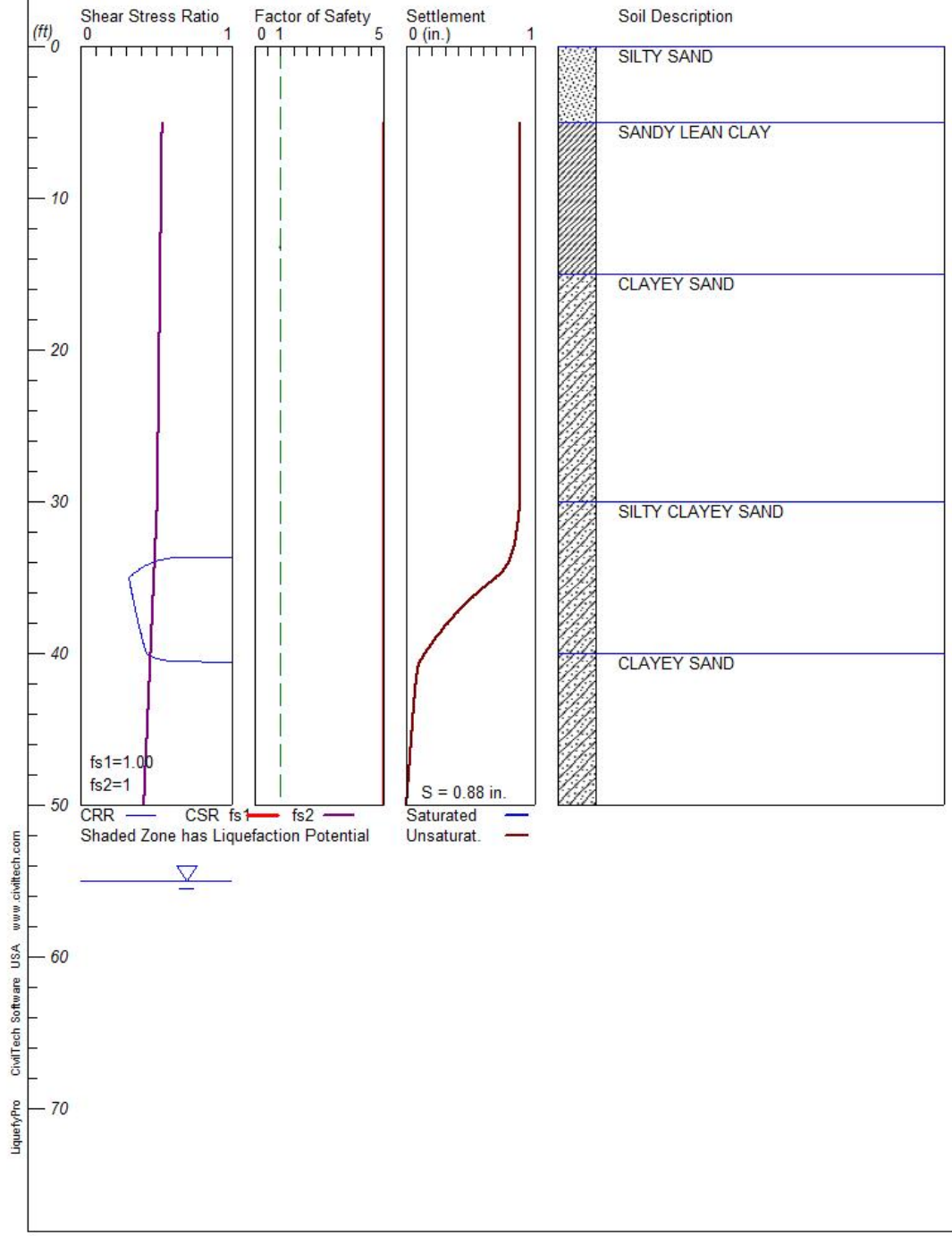
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=N-4 Water Depth=55 ft

Magnitude=6.52
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-7**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N4 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-4
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=N-4
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	36.00	120.00	NoLiq
10.00	20.00	120.00	NoLiq
15.00	25.00	120.00	NoLiq
20.00	17.00	120.00	NoLiq
25.00	30.00	120.00	NoLiq
30.00	25.00	120.00	NoLiq
35.00	11.00	120.00	37.00
40.00	17.00	120.00	37.00
45.00	42.00	120.00	37.00
50.00	38.00	120.00	37.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.88 in.
Total Settlement of Saturated and Unsaturated Sands=0.88 in.
Differential Settlement=0.441 to 0.582 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.88	0.88
6.00	2.00	0.54	5.00	0.00	0.88	0.88
7.00	2.00	0.54	5.00	0.00	0.88	0.88
8.00	2.00	0.53	5.00	0.00	0.88	0.88
9.00	2.00	0.53	5.00	0.00	0.88	0.88
10.00	2.00	0.53	5.00	0.00	0.88	0.88
11.00	2.00	0.53	5.00	0.00	0.88	0.88
12.00	2.00	0.53	5.00	0.00	0.88	0.88
13.00	2.00	0.53	5.00	0.00	0.88	0.88
14.00	2.00	0.53	5.00	0.00	0.88	0.88
15.00	2.00	0.53	5.00	0.00	0.88	0.88
16.00	2.00	0.52	5.00	0.00	0.88	0.88
17.00	2.00	0.52	5.00	0.00	0.88	0.88
18.00	2.00	0.52	5.00	0.00	0.88	0.88
19.00	2.00	0.52	5.00	0.00	0.88	0.88
20.00	2.00	0.52	5.00	0.00	0.88	0.88
21.00	2.00	0.52	5.00	0.00	0.88	0.88
22.00	2.00	0.52	5.00	0.00	0.88	0.88
23.00	2.00	0.52	5.00	0.00	0.88	0.88
24.00	2.00	0.51	5.00	0.00	0.88	0.88
25.00	2.00	0.51	5.00	0.00	0.88	0.88
26.00	2.00	0.51	5.00	0.00	0.88	0.88
27.00	2.00	0.51	5.00	0.00	0.88	0.88

28.00	2.00	0.51	5.00	0.00	0.88	0.88
29.00	2.00	0.51	5.00	0.00	0.88	0.88
30.00	2.00	0.51	5.00	0.00	0.88	0.88
31.00	2.82	0.50	5.00	0.00	0.87	0.87
32.00	2.80	0.50	5.00	0.00	0.86	0.86
33.00	2.78	0.49	5.00	0.00	0.83	0.83
34.00	0.47	0.49	5.00	0.00	0.79	0.79
35.00	0.32	0.48	5.00	0.00	0.69	0.69
36.00	0.34	0.48	5.00	0.00	0.55	0.55
37.00	0.36	0.48	5.00	0.00	0.43	0.43
38.00	0.38	0.47	5.00	0.00	0.32	0.32
39.00	0.40	0.47	5.00	0.00	0.22	0.22
40.00	0.43	0.46	5.00	0.00	0.14	0.14
41.00	2.66	0.46	5.00	0.00	0.09	0.09
42.00	2.65	0.45	5.00	0.00	0.07	0.07
43.00	2.64	0.45	5.00	0.00	0.06	0.06
44.00	2.62	0.44	5.00	0.00	0.05	0.05
45.00	2.61	0.44	5.00	0.00	0.04	0.04
46.00	2.60	0.44	5.00	0.00	0.04	0.04
47.00	2.58	0.43	5.00	0.00	0.03	0.03
48.00	2.57	0.43	5.00	0.00	0.02	0.02
49.00	2.56	0.42	5.00	0.00	0.01	0.01
50.00	2.55	0.42	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

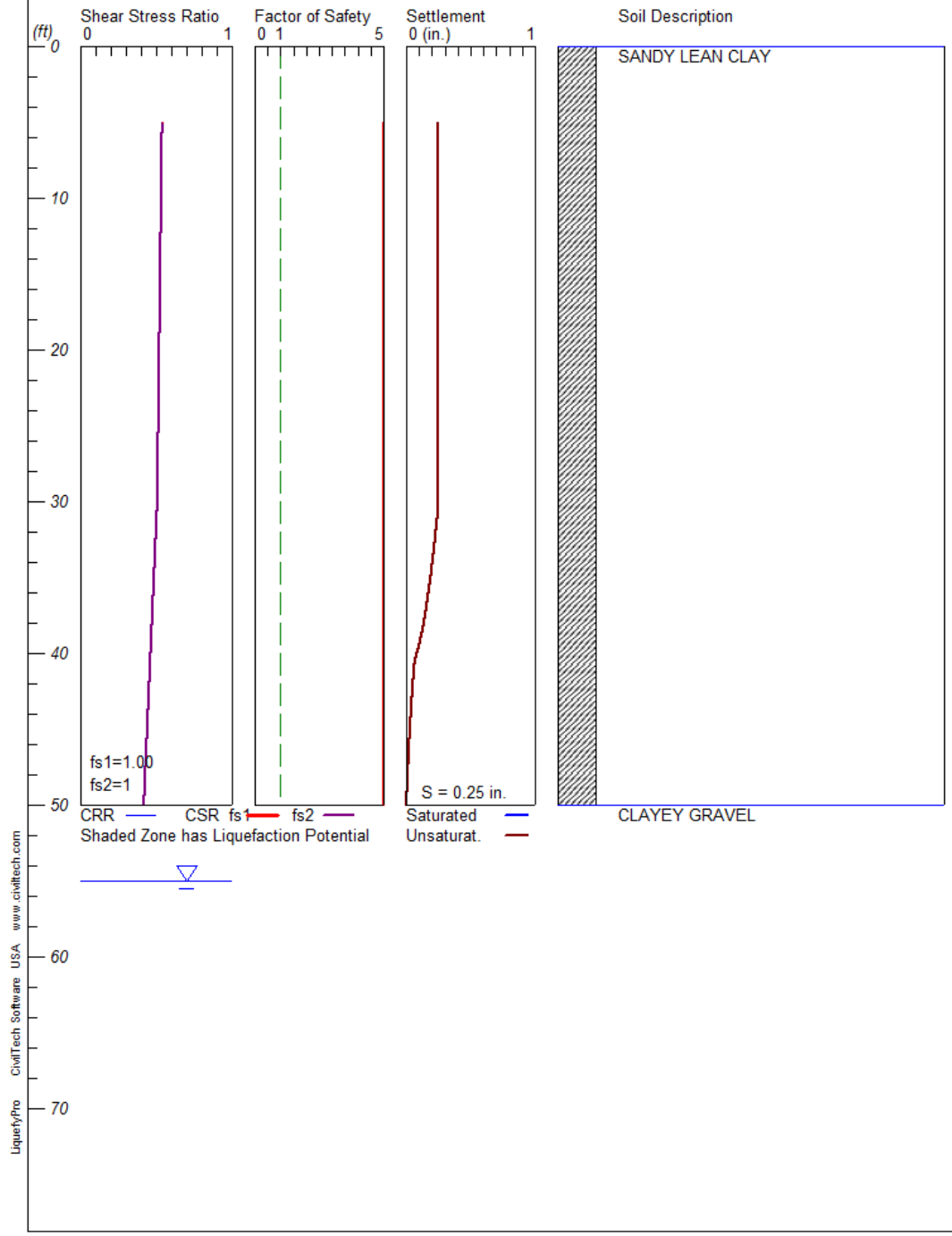
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=N-5 Water Depth=55 ft

Magnitude=6.52
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-9**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N5 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-5
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=N-5
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	25.00	120.00	NoLiq
10.00	18.00	120.00	NoLiq
20.00	27.00	120.00	NoLiq
30.00	28.00	120.00	NoLiq
40.00	21.00	120.00	51.00
50.00	100.00	120.00	20.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.25 in.
Total Settlement of Saturated and Unsaturated Sands=0.25 in.
Differential Settlement=0.124 to 0.164 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.25	0.25
6.00	2.00	0.54	5.00	0.00	0.25	0.25
7.00	2.00	0.54	5.00	0.00	0.25	0.25
8.00	2.00	0.53	5.00	0.00	0.25	0.25
9.00	2.00	0.53	5.00	0.00	0.25	0.25
10.00	2.00	0.53	5.00	0.00	0.25	0.25
11.00	2.00	0.53	5.00	0.00	0.25	0.25
12.00	2.00	0.53	5.00	0.00	0.25	0.25
13.00	2.00	0.53	5.00	0.00	0.25	0.25
14.00	2.00	0.53	5.00	0.00	0.25	0.25
15.00	2.00	0.53	5.00	0.00	0.25	0.25
16.00	2.00	0.52	5.00	0.00	0.25	0.25
17.00	2.00	0.52	5.00	0.00	0.25	0.25
18.00	2.00	0.52	5.00	0.00	0.25	0.25
19.00	2.00	0.52	5.00	0.00	0.25	0.25
20.00	2.00	0.52	5.00	0.00	0.25	0.25
21.00	2.00	0.52	5.00	0.00	0.25	0.25
22.00	2.00	0.52	5.00	0.00	0.25	0.25
23.00	2.00	0.52	5.00	0.00	0.25	0.25
24.00	2.00	0.51	5.00	0.00	0.25	0.25
25.00	2.00	0.51	5.00	0.00	0.25	0.25
26.00	2.00	0.51	5.00	0.00	0.25	0.25
27.00	2.00	0.51	5.00	0.00	0.25	0.25
28.00	2.00	0.51	5.00	0.00	0.25	0.25
29.00	2.00	0.51	5.00	0.00	0.25	0.25
30.00	2.00	0.51	5.00	0.00	0.25	0.25
31.00	2.82	0.50	5.00	0.00	0.24	0.24

32.00	2.80	0.50	5.00	0.00	0.23	0.23
33.00	2.78	0.49	5.00	0.00	0.22	0.22
34.00	2.77	0.49	5.00	0.00	0.20	0.20
35.00	2.75	0.48	5.00	0.00	0.19	0.19
36.00	2.74	0.48	5.00	0.00	0.17	0.17
37.00	2.72	0.48	5.00	0.00	0.15	0.15
38.00	2.71	0.47	5.00	0.00	0.13	0.13
39.00	2.69	0.47	5.00	0.00	0.11	0.11
40.00	2.68	0.46	5.00	0.00	0.08	0.08
41.00	2.66	0.46	5.00	0.00	0.06	0.06
42.00	2.65	0.45	5.00	0.00	0.05	0.05
43.00	2.64	0.45	5.00	0.00	0.04	0.04
44.00	2.62	0.44	5.00	0.00	0.04	0.04
45.00	2.61	0.44	5.00	0.00	0.03	0.03
46.00	2.60	0.44	5.00	0.00	0.02	0.02
47.00	2.58	0.43	5.00	0.00	0.02	0.02
48.00	2.57	0.43	5.00	0.00	0.01	0.01
49.00	2.56	0.42	5.00	0.00	0.01	0.01
50.00	2.55	0.42	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

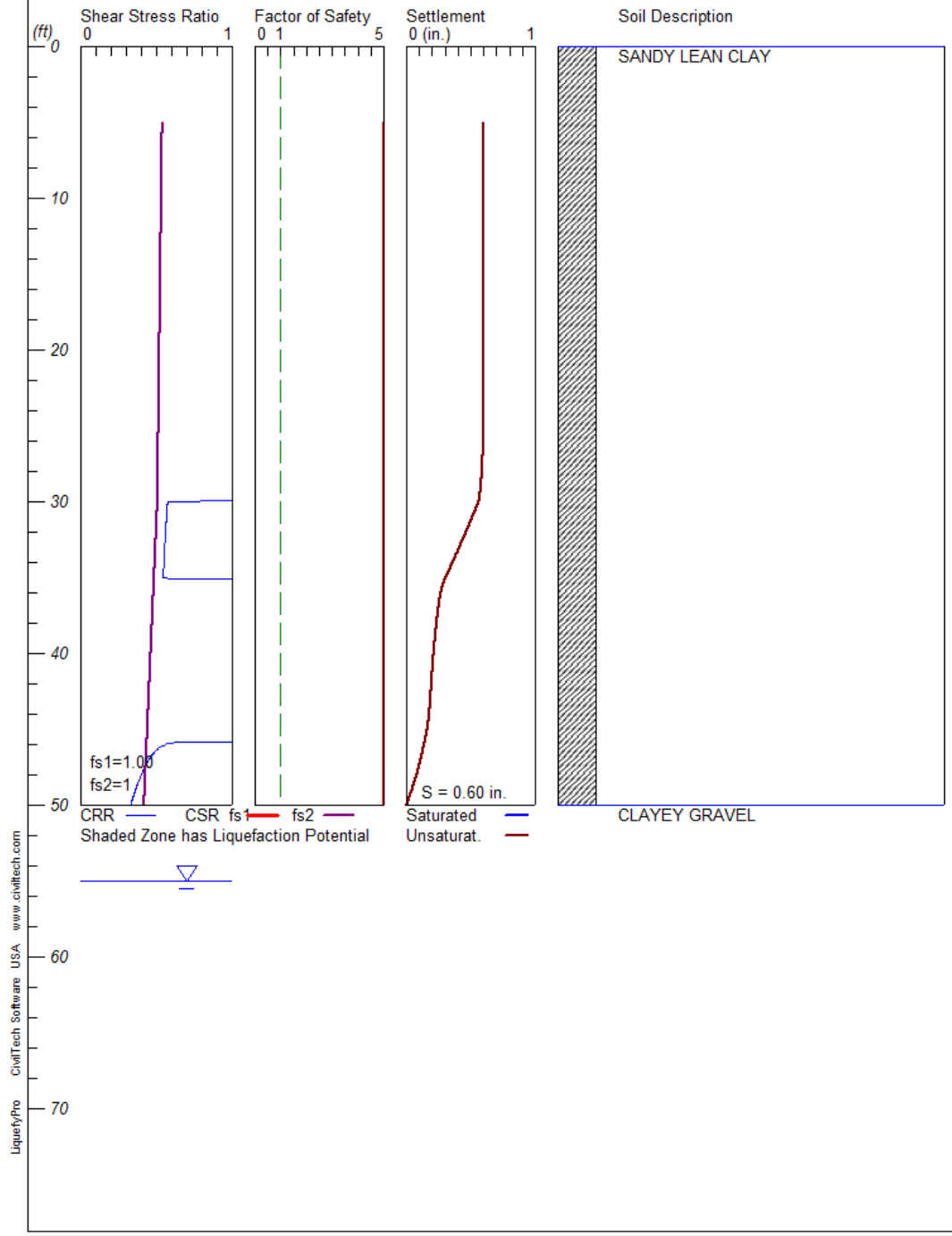
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=N-6 Water Depth=55 ft

Magnitude=6.52
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-11**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N6 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-6
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=N-6
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	24.00	120.00	NoLiq
10.00	40.00	120.00	NoLiq
15.00	38.00	120.00	NoLiq
20.00	37.00	120.00	NoLiq
25.00	100.00	120.00	NoLiq
30.00	14.00	120.00	51.00
35.00	15.00	120.00	51.00
40.00	55.00	120.00	51.00
45.00	19.00	120.00	51.00
50.00	12.00	120.00	51.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.60 in.
Total Settlement of Saturated and Unsaturated Sands=0.60 in.
Differential Settlement=0.301 to 0.398 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.60	0.60
6.00	2.00	0.54	5.00	0.00	0.60	0.60
7.00	2.00	0.54	5.00	0.00	0.60	0.60
8.00	2.00	0.53	5.00	0.00	0.60	0.60
9.00	2.00	0.53	5.00	0.00	0.60	0.60
10.00	2.00	0.53	5.00	0.00	0.60	0.60
11.00	2.00	0.53	5.00	0.00	0.60	0.60
12.00	2.00	0.53	5.00	0.00	0.60	0.60
13.00	2.00	0.53	5.00	0.00	0.60	0.60
14.00	2.00	0.53	5.00	0.00	0.60	0.60
15.00	2.00	0.53	5.00	0.00	0.60	0.60
16.00	2.00	0.52	5.00	0.00	0.60	0.60
17.00	2.00	0.52	5.00	0.00	0.60	0.60
18.00	2.00	0.52	5.00	0.00	0.60	0.60
19.00	2.00	0.52	5.00	0.00	0.60	0.60
20.00	2.00	0.52	5.00	0.00	0.60	0.60
21.00	2.00	0.52	5.00	0.00	0.60	0.60
22.00	2.00	0.52	5.00	0.00	0.60	0.60
23.00	2.00	0.52	5.00	0.00	0.60	0.60
24.00	2.00	0.51	5.00	0.00	0.60	0.60
25.00	2.00	0.51	5.00	0.00	0.60	0.60
26.00	2.86	0.51	5.00	0.00	0.60	0.60
27.00	2.86	0.51	5.00	0.00	0.59	0.59

28.00	2.86	0.51	5.00	0.00	0.59	0.59
29.00	2.85	0.51	5.00	0.00	0.58	0.58
30.00	0.57	0.51	5.00	0.00	0.56	0.56
31.00	0.56	0.50	5.00	0.00	0.51	0.51
32.00	0.56	0.50	5.00	0.00	0.46	0.46
33.00	0.55	0.49	5.00	0.00	0.41	0.41
34.00	0.55	0.49	5.00	0.00	0.36	0.36
35.00	0.54	0.48	5.00	0.00	0.30	0.30
36.00	2.74	0.48	5.00	0.00	0.27	0.27
37.00	2.72	0.48	5.00	0.00	0.25	0.25
38.00	2.71	0.47	5.00	0.00	0.23	0.23
39.00	2.69	0.47	5.00	0.00	0.22	0.22
40.00	2.68	0.46	5.00	0.00	0.21	0.21
41.00	2.66	0.46	5.00	0.00	0.20	0.20
42.00	2.65	0.45	5.00	0.00	0.19	0.19
43.00	2.64	0.45	5.00	0.00	0.19	0.19
44.00	2.62	0.44	5.00	0.00	0.18	0.18
45.00	2.61	0.44	5.00	0.00	0.16	0.16
46.00	0.56	0.44	5.00	0.00	0.14	0.14
47.00	0.45	0.43	5.00	0.00	0.11	0.11
48.00	0.40	0.43	5.00	0.00	0.08	0.08
49.00	0.36	0.42	5.00	0.00	0.04	0.04
50.00	0.33	0.42	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

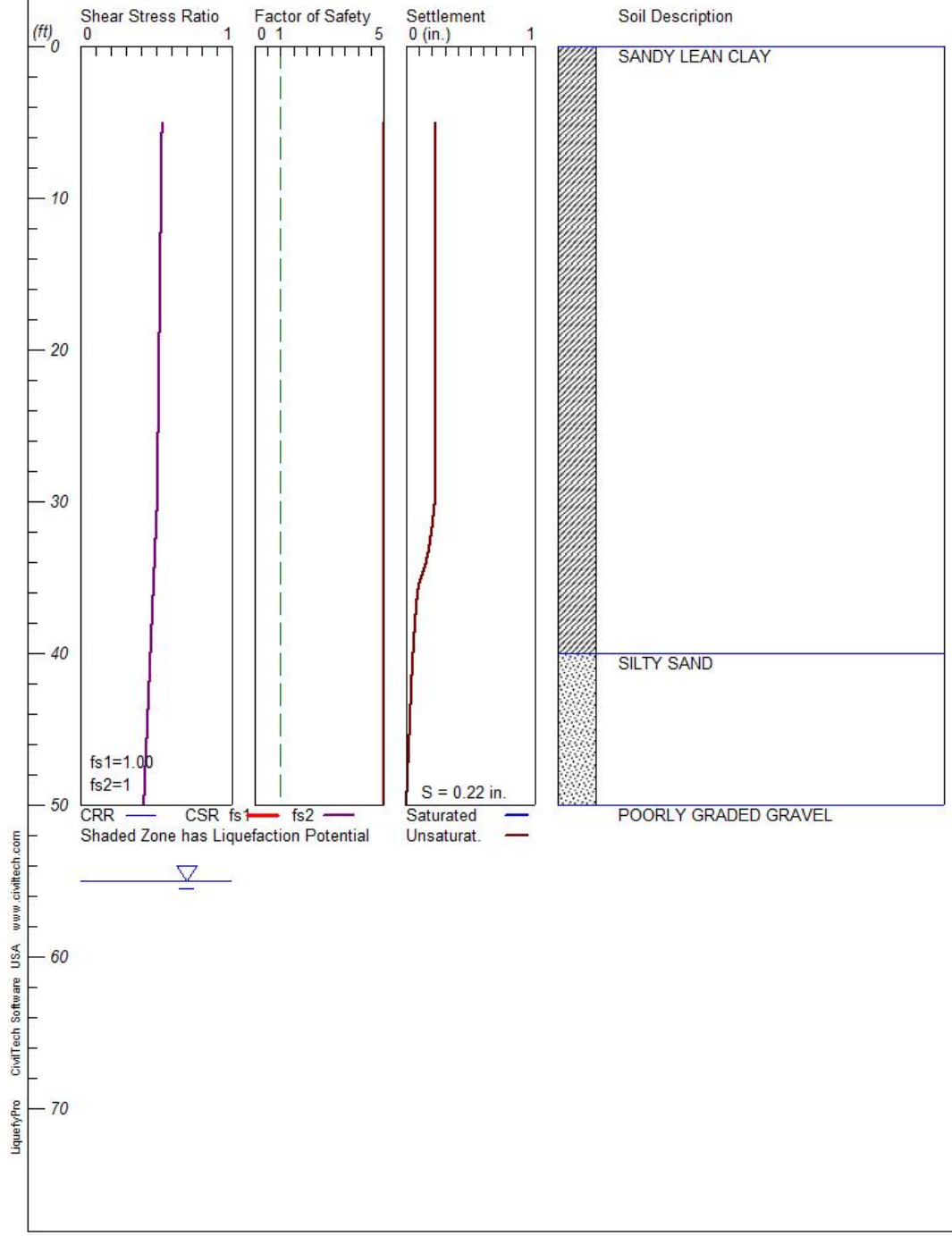
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=S-1 Water Depth=55 ft

Magnitude=6.52
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-13**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S1 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-1
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=S-1
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	32.00	120.00	NoLiq
10.00	21.00	120.00	NoLiq
15.00	28.00	120.00	NoLiq
20.00	11.00	120.00	NoLiq
25.00	20.00	120.00	NoLiq
30.00	22.00	120.00	NoLiq
35.00	16.00	120.00	51.00
40.00	100.00	120.00	51.00
45.00	100.00	120.00	20.00
50.00	100.00	120.00	20.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.22 in.
Total Settlement of Saturated and Unsaturated Sands=0.22 in.
Differential Settlement=0.110 to 0.146 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.22	0.22
6.00	2.00	0.54	5.00	0.00	0.22	0.22
7.00	2.00	0.54	5.00	0.00	0.22	0.22
8.00	2.00	0.53	5.00	0.00	0.22	0.22
9.00	2.00	0.53	5.00	0.00	0.22	0.22
10.00	2.00	0.53	5.00	0.00	0.22	0.22
11.00	2.00	0.53	5.00	0.00	0.22	0.22
12.00	2.00	0.53	5.00	0.00	0.22	0.22
13.00	2.00	0.53	5.00	0.00	0.22	0.22
14.00	2.00	0.53	5.00	0.00	0.22	0.22
15.00	2.00	0.53	5.00	0.00	0.22	0.22
16.00	2.00	0.52	5.00	0.00	0.22	0.22
17.00	2.00	0.52	5.00	0.00	0.22	0.22
18.00	2.00	0.52	5.00	0.00	0.22	0.22
19.00	2.00	0.52	5.00	0.00	0.22	0.22
20.00	2.00	0.52	5.00	0.00	0.22	0.22
21.00	2.00	0.52	5.00	0.00	0.22	0.22
22.00	2.00	0.52	5.00	0.00	0.22	0.22
23.00	2.00	0.52	5.00	0.00	0.22	0.22
24.00	2.00	0.51	5.00	0.00	0.22	0.22
25.00	2.00	0.51	5.00	0.00	0.22	0.22
26.00	2.00	0.51	5.00	0.00	0.22	0.22
27.00	2.00	0.51	5.00	0.00	0.22	0.22

28.00	2.00	0.51	5.00	0.00	0.22	0.22
29.00	2.00	0.51	5.00	0.00	0.22	0.22
30.00	2.00	0.51	5.00	0.00	0.22	0.22
31.00	2.82	0.50	5.00	0.00	0.21	0.21
32.00	2.80	0.50	5.00	0.00	0.19	0.19
33.00	2.78	0.49	5.00	0.00	0.18	0.18
34.00	2.77	0.49	5.00	0.00	0.15	0.15
35.00	2.75	0.48	5.00	0.00	0.11	0.11
36.00	2.74	0.48	5.00	0.00	0.09	0.09
37.00	2.72	0.48	5.00	0.00	0.08	0.08
38.00	2.71	0.47	5.00	0.00	0.07	0.07
39.00	2.69	0.47	5.00	0.00	0.06	0.06
40.00	2.68	0.46	5.00	0.00	0.05	0.05
41.00	2.66	0.46	5.00	0.00	0.05	0.05
42.00	2.65	0.45	5.00	0.00	0.04	0.04
43.00	2.64	0.45	5.00	0.00	0.04	0.04
44.00	2.62	0.44	5.00	0.00	0.03	0.03
45.00	2.61	0.44	5.00	0.00	0.03	0.03
46.00	2.60	0.44	5.00	0.00	0.02	0.02
47.00	2.58	0.43	5.00	0.00	0.02	0.02
48.00	2.57	0.43	5.00	0.00	0.01	0.01
49.00	2.56	0.42	5.00	0.00	0.01	0.01
50.00	2.55	0.42	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

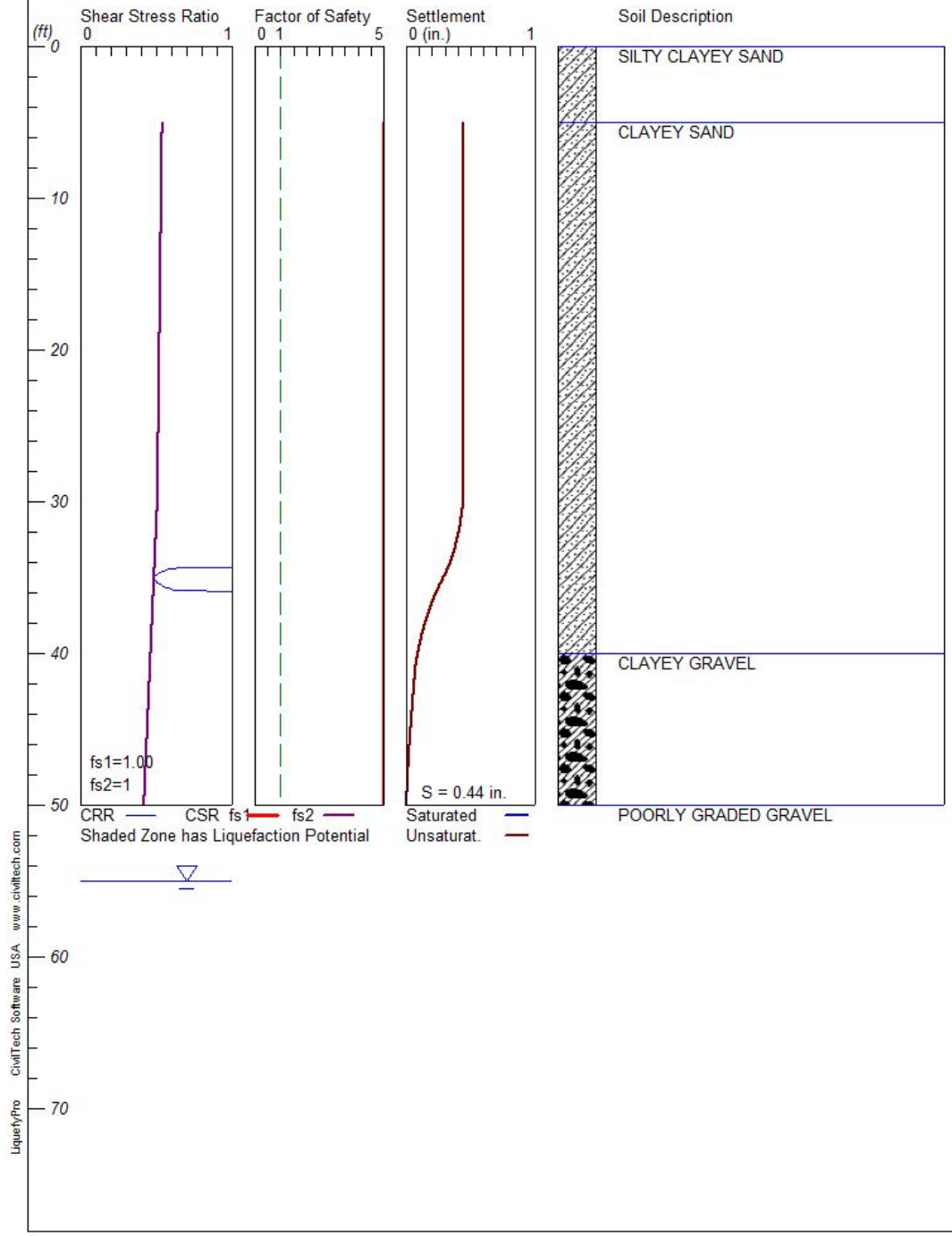
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=S-2 Water Depth=55 ft

Magnitude=6.52
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-15**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S2 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-2
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=S-2
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	17.00	120.00	NoLiq
10.00	20.00	120.00	NoLiq
15.00	27.00	120.00	NoLiq
20.00	14.00	120.00	NoLiq
25.00	10.00	120.00	NoLiq
30.00	15.00	120.00	NoLiq
35.00	20.00	120.00	20.00
40.00	31.00	120.00	20.00
45.00	42.00	120.00	20.00
50.00	100.00	120.00	5.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.44 in.
Total Settlement of Saturated and Unsaturated Sands=0.44 in.
Differential Settlement=0.220 to 0.291 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.44	0.44
6.00	2.00	0.54	5.00	0.00	0.44	0.44
7.00	2.00	0.54	5.00	0.00	0.44	0.44
8.00	2.00	0.53	5.00	0.00	0.44	0.44
9.00	2.00	0.53	5.00	0.00	0.44	0.44
10.00	2.00	0.53	5.00	0.00	0.44	0.44
11.00	2.00	0.53	5.00	0.00	0.44	0.44
12.00	2.00	0.53	5.00	0.00	0.44	0.44
13.00	2.00	0.53	5.00	0.00	0.44	0.44
14.00	2.00	0.53	5.00	0.00	0.44	0.44
15.00	2.00	0.53	5.00	0.00	0.44	0.44
16.00	2.00	0.52	5.00	0.00	0.44	0.44
17.00	2.00	0.52	5.00	0.00	0.44	0.44
18.00	2.00	0.52	5.00	0.00	0.44	0.44
19.00	2.00	0.52	5.00	0.00	0.44	0.44
20.00	2.00	0.52	5.00	0.00	0.44	0.44
21.00	2.00	0.52	5.00	0.00	0.44	0.44
22.00	2.00	0.52	5.00	0.00	0.44	0.44
23.00	2.00	0.52	5.00	0.00	0.44	0.44
24.00	2.00	0.51	5.00	0.00	0.44	0.44
25.00	2.00	0.51	5.00	0.00	0.44	0.44
26.00	2.00	0.51	5.00	0.00	0.44	0.44
27.00	2.00	0.51	5.00	0.00	0.44	0.44

28.00	2.00	0.51	5.00	0.00	0.44	0.44
29.00	2.00	0.51	5.00	0.00	0.44	0.44
30.00	2.00	0.51	5.00	0.00	0.44	0.44
31.00	2.82	0.50	5.00	0.00	0.43	0.43
32.00	2.80	0.50	5.00	0.00	0.41	0.41
33.00	2.78	0.49	5.00	0.00	0.38	0.38
34.00	2.77	0.49	5.00	0.00	0.34	0.34
35.00	0.48	0.48	5.00	0.00	0.29	0.29
36.00	2.74	0.48	5.00	0.00	0.23	0.23
37.00	2.72	0.48	5.00	0.00	0.18	0.18
38.00	2.71	0.47	5.00	0.00	0.14	0.14
39.00	2.69	0.47	5.00	0.00	0.11	0.11
40.00	2.68	0.46	5.00	0.00	0.09	0.09
41.00	2.66	0.46	5.00	0.00	0.07	0.07
42.00	2.65	0.45	5.00	0.00	0.06	0.06
43.00	2.64	0.45	5.00	0.00	0.05	0.05
44.00	2.62	0.44	5.00	0.00	0.04	0.04
45.00	2.61	0.44	5.00	0.00	0.03	0.03
46.00	2.60	0.44	5.00	0.00	0.02	0.02
47.00	2.58	0.43	5.00	0.00	0.02	0.02
48.00	2.57	0.43	5.00	0.00	0.01	0.01
49.00	2.56	0.42	5.00	0.00	0.01	0.01
50.00	2.55	0.42	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

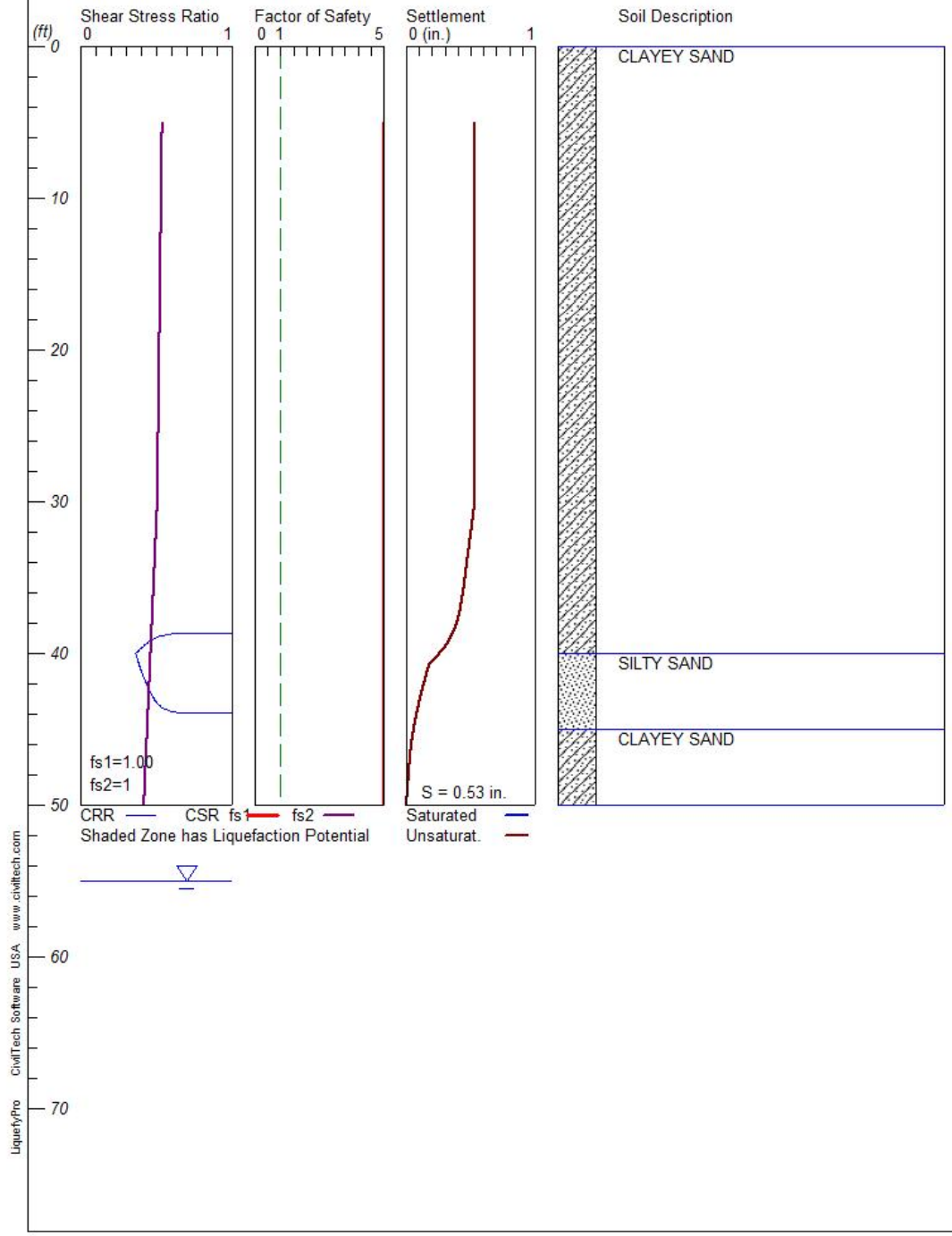
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=S-3 Water Depth=55 ft

Magnitude=6.52
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-17**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S3 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-3
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=S-3
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	27.00	120.00	NoLiq
10.00	48.00	120.00	NoLiq
15.00	26.00	120.00	NoLiq
20.00	20.00	120.00	NoLiq
25.00	29.00	120.00	NoLiq
30.00	15.00	120.00	NoLiq
35.00	36.00	120.00	20.00
40.00	18.00	120.00	20.00
45.00	26.00	120.00	20.00
50.00	52.00	120.00	20.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.53 in.
Total Settlement of Saturated and Unsaturated Sands=0.53 in.
Differential Settlement=0.265 to 0.350 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.53	0.53
6.00	2.00	0.54	5.00	0.00	0.53	0.53
7.00	2.00	0.54	5.00	0.00	0.53	0.53
8.00	2.00	0.53	5.00	0.00	0.53	0.53
9.00	2.00	0.53	5.00	0.00	0.53	0.53
10.00	2.00	0.53	5.00	0.00	0.53	0.53
11.00	2.00	0.53	5.00	0.00	0.53	0.53
12.00	2.00	0.53	5.00	0.00	0.53	0.53
13.00	2.00	0.53	5.00	0.00	0.53	0.53
14.00	2.00	0.53	5.00	0.00	0.53	0.53
15.00	2.00	0.53	5.00	0.00	0.53	0.53
16.00	2.00	0.52	5.00	0.00	0.53	0.53
17.00	2.00	0.52	5.00	0.00	0.53	0.53
18.00	2.00	0.52	5.00	0.00	0.53	0.53
19.00	2.00	0.52	5.00	0.00	0.53	0.53
20.00	2.00	0.52	5.00	0.00	0.53	0.53
21.00	2.00	0.52	5.00	0.00	0.53	0.53
22.00	2.00	0.52	5.00	0.00	0.53	0.53
23.00	2.00	0.52	5.00	0.00	0.53	0.53
24.00	2.00	0.51	5.00	0.00	0.53	0.53
25.00	2.00	0.51	5.00	0.00	0.53	0.53
26.00	2.00	0.51	5.00	0.00	0.53	0.53
27.00	2.00	0.51	5.00	0.00	0.53	0.53

28.00	2.00	0.51	5.00	0.00	0.53	0.53
29.00	2.00	0.51	5.00	0.00	0.53	0.53
30.00	2.00	0.51	5.00	0.00	0.53	0.53
31.00	2.82	0.50	5.00	0.00	0.52	0.52
32.00	2.80	0.50	5.00	0.00	0.50	0.50
33.00	2.78	0.49	5.00	0.00	0.49	0.49
34.00	2.77	0.49	5.00	0.00	0.47	0.47
35.00	2.75	0.48	5.00	0.00	0.46	0.46
36.00	2.74	0.48	5.00	0.00	0.44	0.44
37.00	2.72	0.48	5.00	0.00	0.42	0.42
38.00	2.71	0.47	5.00	0.00	0.39	0.39
39.00	0.49	0.47	5.00	0.00	0.34	0.34
40.00	0.36	0.46	5.00	0.00	0.25	0.25
41.00	0.39	0.46	5.00	0.00	0.17	0.17
42.00	0.43	0.45	5.00	0.00	0.13	0.13
43.00	0.48	0.45	5.00	0.00	0.11	0.11
44.00	2.62	0.44	5.00	0.00	0.08	0.08
45.00	2.61	0.44	5.00	0.00	0.06	0.06
46.00	2.60	0.44	5.00	0.00	0.04	0.04
47.00	2.58	0.43	5.00	0.00	0.03	0.03
48.00	2.57	0.43	5.00	0.00	0.02	0.02
49.00	2.56	0.42	5.00	0.00	0.01	0.01
50.00	2.55	0.42	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

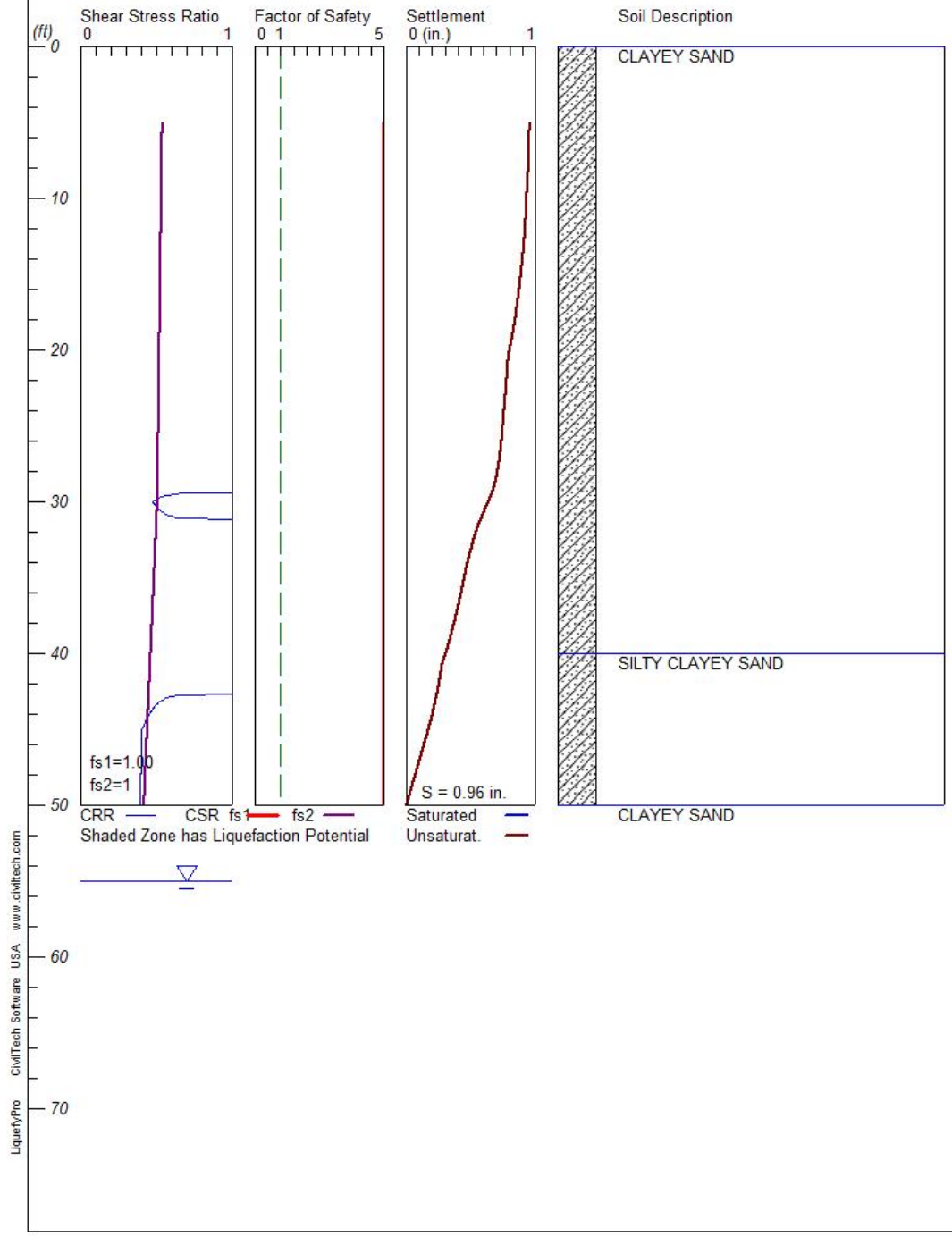
---

1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=S-4 ***Water Depth=55 ft*** ***Magnitude=6.52***
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-19**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S4 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-4
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=S-4
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	22.00	120.00	20.00
7.50	30.00	120.00	20.00
10.00	24.00	120.00	20.00
15.00	24.00	120.00	21.00
20.00	27.00	120.00	21.00
25.00	33.00	120.00	21.00
30.00	18.00	120.00	21.00
35.00	28.00	120.00	21.00
40.00	27.00	120.00	21.00
45.00	21.00	120.00	21.00
50.00	22.00	120.00	21.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.96 in.
Total Settlement of Saturated and Unsaturated Sands=0.96 in.
Differential Settlement=0.479 to 0.632 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.86	0.54	5.00	0.00	0.96	0.96
6.00	2.86	0.54	5.00	0.00	0.95	0.95
7.00	2.86	0.54	5.00	0.00	0.95	0.95
8.00	2.86	0.53	5.00	0.00	0.95	0.95
9.00	2.86	0.53	5.00	0.00	0.94	0.94
10.00	2.86	0.53	5.00	0.00	0.93	0.93
11.00	2.86	0.53	5.00	0.00	0.93	0.93
12.00	2.86	0.53	5.00	0.00	0.92	0.92
13.00	2.86	0.53	5.00	0.00	0.91	0.91
14.00	2.86	0.53	5.00	0.00	0.90	0.90
15.00	2.86	0.53	5.00	0.00	0.89	0.89
16.00	2.86	0.52	5.00	0.00	0.88	0.88
17.00	2.86	0.52	5.00	0.00	0.86	0.86
18.00	2.86	0.52	5.00	0.00	0.84	0.84
19.00	2.86	0.52	5.00	0.00	0.82	0.82
20.00	2.86	0.52	5.00	0.00	0.80	0.80
21.00	2.86	0.52	5.00	0.00	0.79	0.79
22.00	2.86	0.52	5.00	0.00	0.78	0.78
23.00	2.86	0.52	5.00	0.00	0.77	0.77
24.00	2.86	0.51	5.00	0.00	0.76	0.76
25.00	2.86	0.51	5.00	0.00	0.75	0.75
26.00	2.86	0.51	5.00	0.00	0.74	0.74

27.00	2.86	0.51	5.00	0.00	0.73	0.73
28.00	2.86	0.51	5.00	0.00	0.71	0.71
29.00	2.85	0.51	5.00	0.00	0.68	0.68
30.00	0.47	0.51	5.00	0.00	0.64	0.64
31.00	0.61	0.50	5.00	0.00	0.58	0.58
32.00	2.80	0.50	5.00	0.00	0.54	0.54
33.00	2.78	0.49	5.00	0.00	0.50	0.50
34.00	2.77	0.49	5.00	0.00	0.47	0.47
35.00	2.75	0.48	5.00	0.00	0.45	0.45
36.00	2.74	0.48	5.00	0.00	0.43	0.43
37.00	2.72	0.48	5.00	0.00	0.40	0.40
38.00	2.71	0.47	5.00	0.00	0.37	0.37
39.00	2.69	0.47	5.00	0.00	0.34	0.34
40.00	2.68	0.46	5.00	0.00	0.30	0.30
41.00	2.66	0.46	5.00	0.00	0.27	0.27
42.00	2.65	0.45	5.00	0.00	0.25	0.25
43.00	0.55	0.45	5.00	0.00	0.23	0.23
44.00	0.45	0.44	5.00	0.00	0.20	0.20
45.00	0.40	0.44	5.00	0.00	0.17	0.17
46.00	0.40	0.44	5.00	0.00	0.14	0.14
47.00	0.40	0.43	5.00	0.00	0.10	0.10
48.00	0.40	0.43	5.00	0.00	0.07	0.07
49.00	0.39	0.42	5.00	0.00	0.03	0.03
50.00	0.39	0.42	5.00	0.00	0.00	0.00

---

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

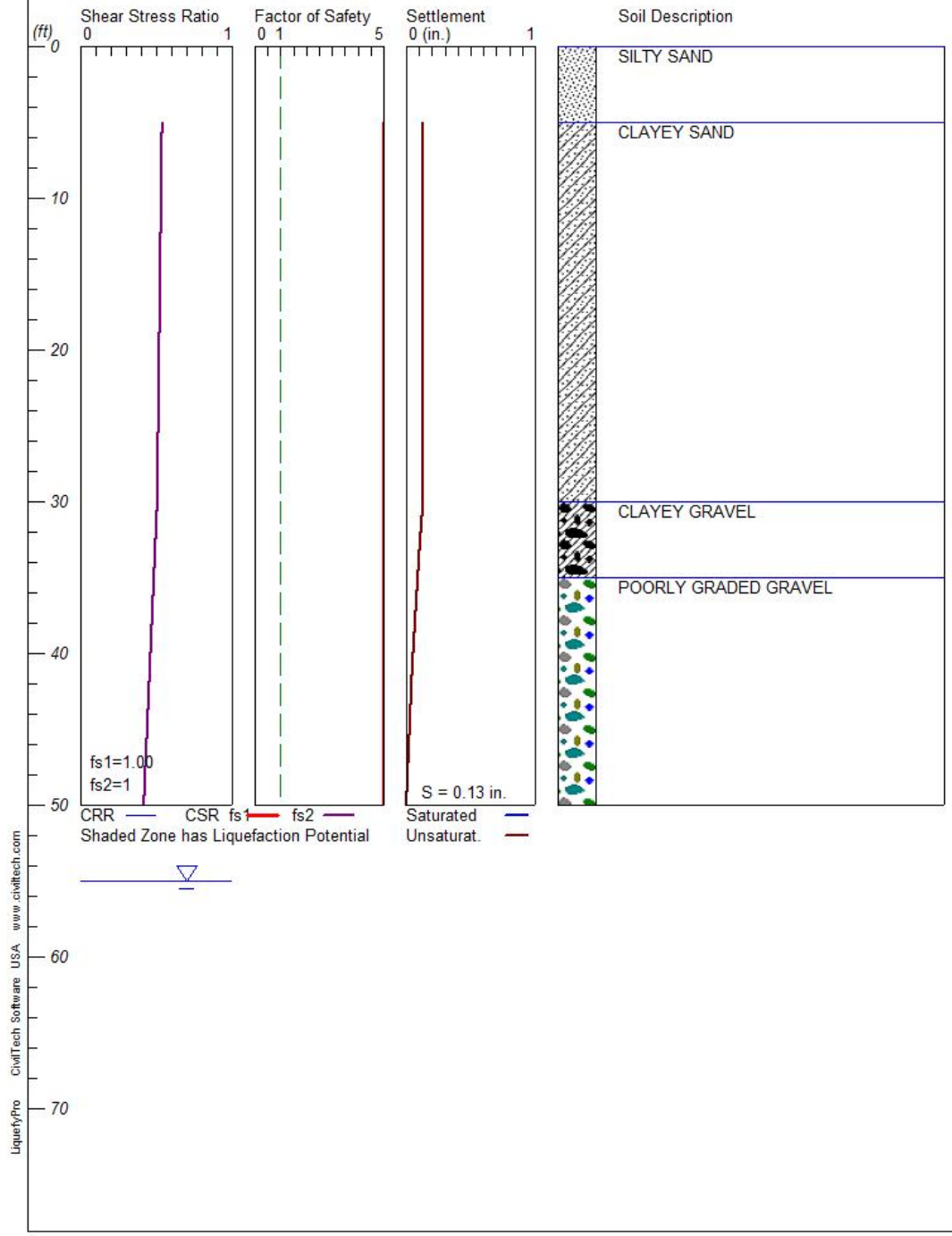
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (2475 years)

Hole No.=S-5 Water Depth=55 ft

Magnitude=6.52
Acceleration=0.838g



Terracon **60165174** **EXHIBIT D-21**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S5 (2475 years).liq
Title: Getty Center Parking (2475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-5
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.84 g
Earthquake Magnitude= 6.52

Input Data:
Surface Elev.=
Hole No.=S-5
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.84 g
Earthquake Magnitude=6.52
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.0
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	20.00	120.00	NoLiq
10.00	42.00	120.00	NoLiq
15.00	19.00	120.00	NoLiq
20.00	22.00	120.00	NoLiq
25.00	27.00	120.00	NoLiq
30.00	30.00	120.00	NoLiq
35.00	80.00	120.00	5.00
40.00	100.00	120.00	5.00
45.00	100.00	120.00	5.00
50.00	100.00	120.00	5.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.13 in.
Total Settlement of Saturated and Unsaturated Sands=0.13 in.
Differential Settlement=0.065 to 0.086 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.54	5.00	0.00	0.13	0.13
6.00	2.00	0.54	5.00	0.00	0.13	0.13
7.00	2.00	0.54	5.00	0.00	0.13	0.13
8.00	2.00	0.53	5.00	0.00	0.13	0.13
9.00	2.00	0.53	5.00	0.00	0.13	0.13
10.00	2.00	0.53	5.00	0.00	0.13	0.13
11.00	2.00	0.53	5.00	0.00	0.13	0.13
12.00	2.00	0.53	5.00	0.00	0.13	0.13
13.00	2.00	0.53	5.00	0.00	0.13	0.13
14.00	2.00	0.53	5.00	0.00	0.13	0.13
15.00	2.00	0.53	5.00	0.00	0.13	0.13
16.00	2.00	0.52	5.00	0.00	0.13	0.13
17.00	2.00	0.52	5.00	0.00	0.13	0.13
18.00	2.00	0.52	5.00	0.00	0.13	0.13
19.00	2.00	0.52	5.00	0.00	0.13	0.13
20.00	2.00	0.52	5.00	0.00	0.13	0.13
21.00	2.00	0.52	5.00	0.00	0.13	0.13
22.00	2.00	0.52	5.00	0.00	0.13	0.13
23.00	2.00	0.52	5.00	0.00	0.13	0.13
24.00	2.00	0.51	5.00	0.00	0.13	0.13
25.00	2.00	0.51	5.00	0.00	0.13	0.13
26.00	2.00	0.51	5.00	0.00	0.13	0.13
27.00	2.00	0.51	5.00	0.00	0.13	0.13

28.00	2.00	0.51	5.00	0.00	0.13	0.13
29.00	2.00	0.51	5.00	0.00	0.13	0.13
30.00	2.00	0.51	5.00	0.00	0.13	0.13
31.00	2.82	0.50	5.00	0.00	0.12	0.12
32.00	2.80	0.50	5.00	0.00	0.11	0.11
33.00	2.78	0.49	5.00	0.00	0.10	0.10
34.00	2.77	0.49	5.00	0.00	0.10	0.10
35.00	2.75	0.48	5.00	0.00	0.09	0.09
36.00	2.74	0.48	5.00	0.00	0.08	0.08
37.00	2.72	0.48	5.00	0.00	0.07	0.07
38.00	2.71	0.47	5.00	0.00	0.07	0.07
39.00	2.69	0.47	5.00	0.00	0.06	0.06
40.00	2.68	0.46	5.00	0.00	0.05	0.05
41.00	2.66	0.46	5.00	0.00	0.05	0.05
42.00	2.65	0.45	5.00	0.00	0.04	0.04
43.00	2.64	0.45	5.00	0.00	0.04	0.04
44.00	2.62	0.44	5.00	0.00	0.03	0.03
45.00	2.61	0.44	5.00	0.00	0.03	0.03
46.00	2.60	0.44	5.00	0.00	0.02	0.02
47.00	2.58	0.43	5.00	0.00	0.02	0.02
48.00	2.57	0.43	5.00	0.00	0.01	0.01
49.00	2.56	0.42	5.00	0.00	0.01	0.01
50.00	2.55	0.42	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

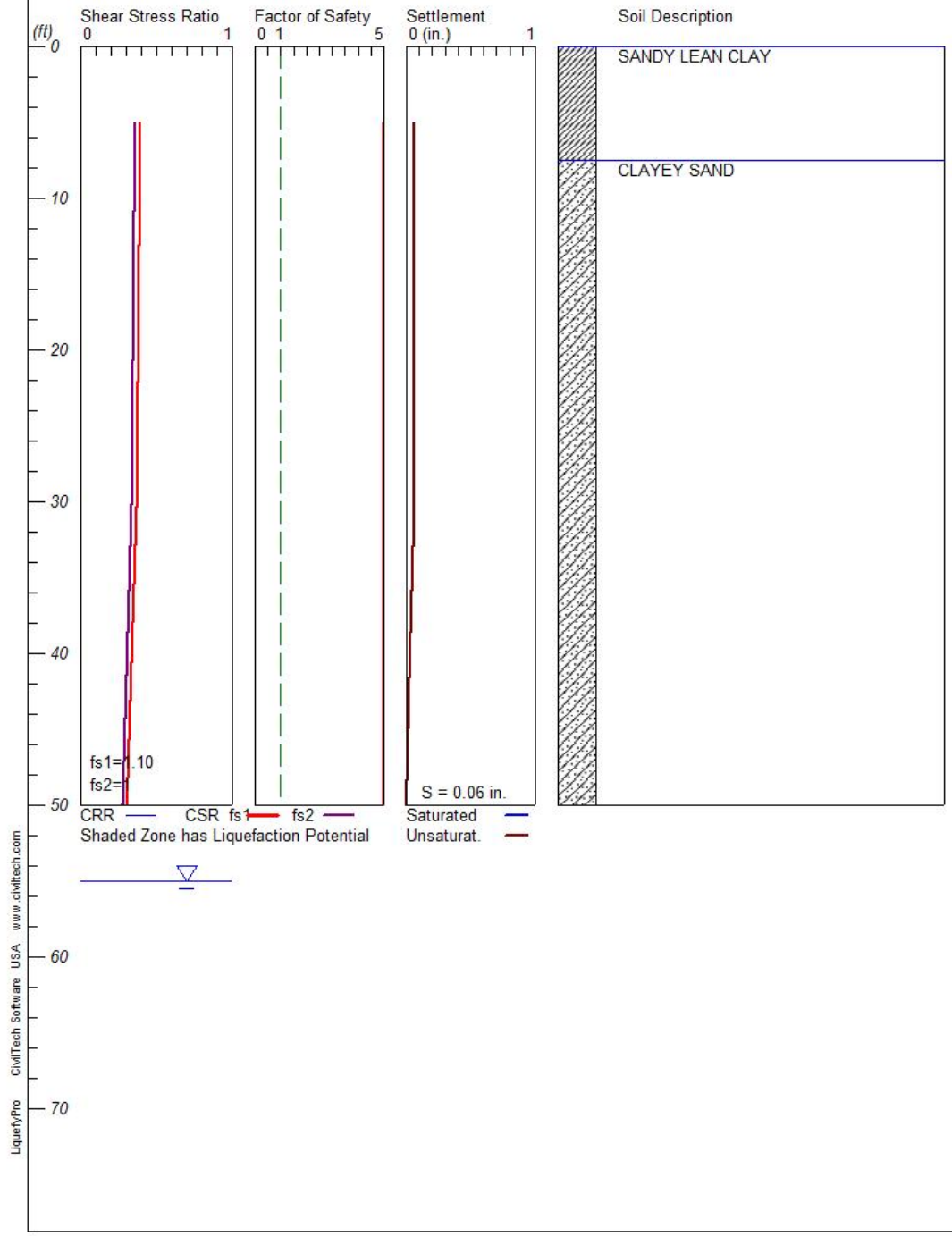
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=N-1 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



Terracon **60165174** **EXHIBIT D-23**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N1 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-1
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=N-1
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	16.00	120.00	NoLiq
7.50	17.00	120.00	NoLiq
10.00	26.00	120.00	NoLiq
15.00	100.00	120.00	NoLiq
20.00	14.00	120.00	NoLiq
25.00	8.00	120.00	NoLiq
30.00	60.00	120.00	NoLiq
35.00	100.00	120.00	14.00
40.00	100.00	120.00	14.00
50.00	100.00	120.00	14.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.06 in.
Total Settlement of Saturated and Unsaturated Sands=0.06 in.
Differential Settlement=0.031 to 0.042 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.06	0.06
6.00	2.00	0.39	5.00	0.00	0.06	0.06
7.00	2.00	0.39	5.00	0.00	0.06	0.06
8.00	2.00	0.39	5.00	0.00	0.06	0.06
9.00	2.00	0.39	5.00	0.00	0.06	0.06
10.00	2.00	0.39	5.00	0.00	0.06	0.06
11.00	2.00	0.39	5.00	0.00	0.06	0.06
12.00	2.00	0.39	5.00	0.00	0.06	0.06
13.00	2.00	0.39	5.00	0.00	0.06	0.06
14.00	2.00	0.39	5.00	0.00	0.06	0.06
15.00	2.00	0.39	5.00	0.00	0.06	0.06
16.00	2.00	0.38	5.00	0.00	0.06	0.06
17.00	2.00	0.38	5.00	0.00	0.06	0.06
18.00	2.00	0.38	5.00	0.00	0.06	0.06
19.00	2.00	0.38	5.00	0.00	0.06	0.06
20.00	2.00	0.38	5.00	0.00	0.06	0.06
21.00	2.00	0.38	5.00	0.00	0.06	0.06
22.00	2.00	0.38	5.00	0.00	0.06	0.06
23.00	2.00	0.38	5.00	0.00	0.06	0.06
24.00	2.00	0.38	5.00	0.00	0.06	0.06
25.00	2.00	0.38	5.00	0.00	0.06	0.06
26.00	2.00	0.38	5.00	0.00	0.06	0.06
27.00	2.00	0.37	5.00	0.00	0.06	0.06

28.00	2.00	0.37	5.00	0.00	0.06	0.06
29.00	2.00	0.37	5.00	0.00	0.06	0.06
30.00	2.00	0.37	5.00	0.00	0.06	0.06
31.00	2.83	0.37	5.00	0.00	0.06	0.06
32.00	2.81	0.37	5.00	0.00	0.06	0.06
33.00	2.79	0.36	5.00	0.00	0.05	0.05
34.00	2.78	0.36	5.00	0.00	0.05	0.05
35.00	2.76	0.36	5.00	0.00	0.05	0.05
36.00	2.75	0.35	5.00	0.00	0.04	0.04
37.00	2.73	0.35	5.00	0.00	0.04	0.04
38.00	2.72	0.35	5.00	0.00	0.04	0.04
39.00	2.70	0.34	5.00	0.00	0.03	0.03
40.00	2.69	0.34	5.00	0.00	0.03	0.03
41.00	2.68	0.34	5.00	0.00	0.03	0.03
42.00	2.66	0.33	5.00	0.00	0.02	0.02
43.00	2.65	0.33	5.00	0.00	0.02	0.02
44.00	2.63	0.33	5.00	0.00	0.02	0.02
45.00	2.62	0.32	5.00	0.00	0.01	0.01
46.00	2.61	0.32	5.00	0.00	0.01	0.01
47.00	2.59	0.32	5.00	0.00	0.01	0.01
48.00	2.58	0.31	5.00	0.00	0.01	0.01
49.00	2.57	0.31	5.00	0.00	0.00	0.00
50.00	2.56	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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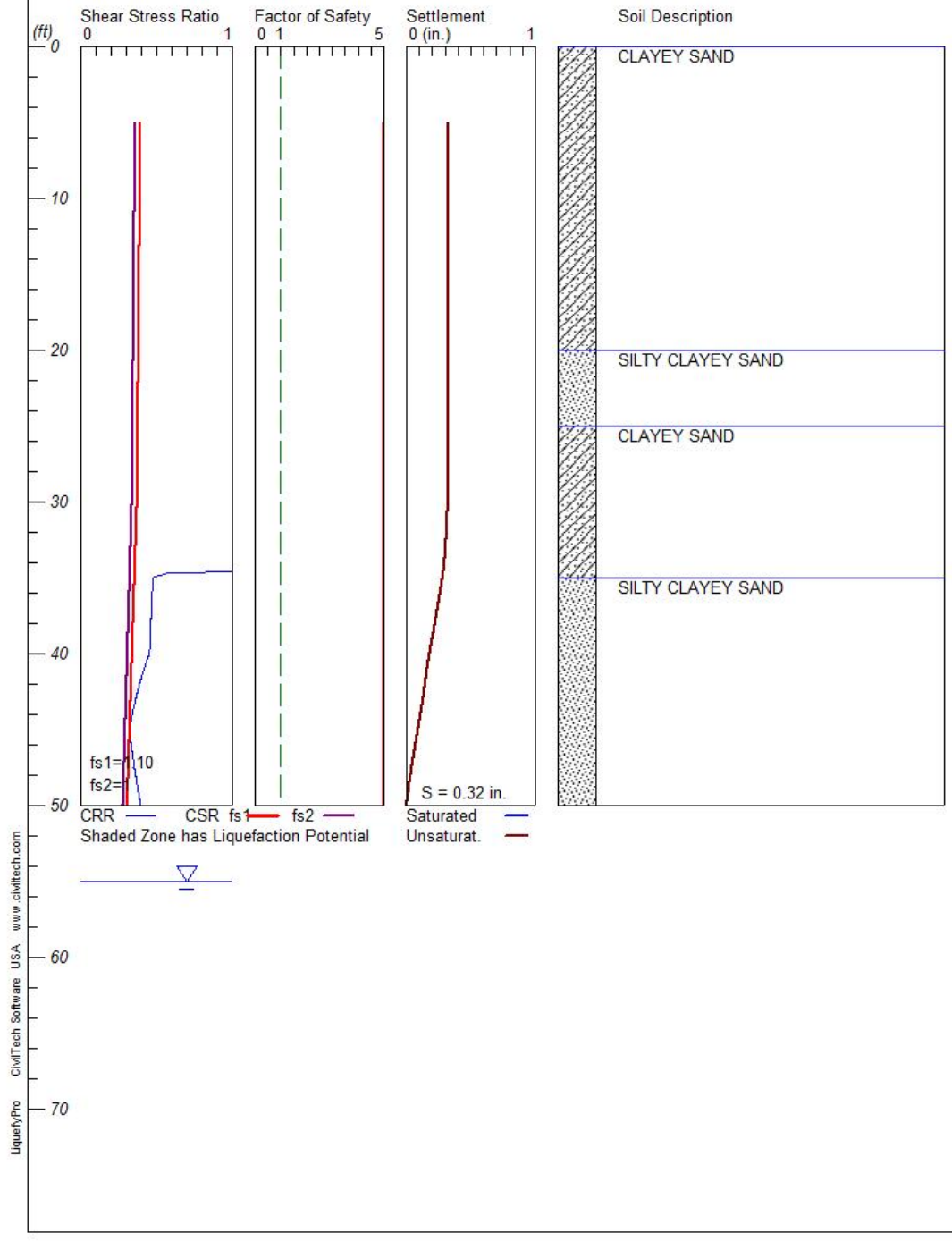
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=N-2 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N2 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-2
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=N-2
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	29.00	120.00	NoLiq
7.50	25.00	120.00	NoLiq
10.00	28.00	120.00	NoLiq
15.00	32.00	120.00	NoLiq
20.00	11.00	120.00	NoLiq
25.00	31.00	120.00	NoLiq
30.00	26.00	120.00	NoLiq
35.00	18.00	120.00	30.00
40.00	19.00	120.00	30.00
45.00	15.00	120.00	30.00
50.00	20.00	120.00	30.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.32 in.
Total Settlement of Saturated and Unsaturated Sands=0.32 in.
Differential Settlement=0.161 to 0.212 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.32	0.32
6.00	2.00	0.39	5.00	0.00	0.32	0.32
7.00	2.00	0.39	5.00	0.00	0.32	0.32
8.00	2.00	0.39	5.00	0.00	0.32	0.32
9.00	2.00	0.39	5.00	0.00	0.32	0.32
10.00	2.00	0.39	5.00	0.00	0.32	0.32
11.00	2.00	0.39	5.00	0.00	0.32	0.32
12.00	2.00	0.39	5.00	0.00	0.32	0.32
13.00	2.00	0.39	5.00	0.00	0.32	0.32
14.00	2.00	0.39	5.00	0.00	0.32	0.32
15.00	2.00	0.39	5.00	0.00	0.32	0.32
16.00	2.00	0.38	5.00	0.00	0.32	0.32
17.00	2.00	0.38	5.00	0.00	0.32	0.32
18.00	2.00	0.38	5.00	0.00	0.32	0.32
19.00	2.00	0.38	5.00	0.00	0.32	0.32
20.00	2.00	0.38	5.00	0.00	0.32	0.32
21.00	2.00	0.38	5.00	0.00	0.32	0.32
22.00	2.00	0.38	5.00	0.00	0.32	0.32
23.00	2.00	0.38	5.00	0.00	0.32	0.32
24.00	2.00	0.38	5.00	0.00	0.32	0.32
25.00	2.00	0.38	5.00	0.00	0.32	0.32
26.00	2.00	0.38	5.00	0.00	0.32	0.32

27.00	2.00	0.37	5.00	0.00	0.32	0.32
28.00	2.00	0.37	5.00	0.00	0.32	0.32
29.00	2.00	0.37	5.00	0.00	0.32	0.32
30.00	2.00	0.37	5.00	0.00	0.32	0.32
31.00	2.83	0.37	5.00	0.00	0.32	0.32
32.00	2.81	0.37	5.00	0.00	0.31	0.31
33.00	2.79	0.36	5.00	0.00	0.30	0.30
34.00	2.78	0.36	5.00	0.00	0.30	0.30
35.00	0.48	0.36	5.00	0.00	0.28	0.28
36.00	0.47	0.35	5.00	0.00	0.26	0.26
37.00	0.47	0.35	5.00	0.00	0.24	0.24
38.00	0.46	0.35	5.00	0.00	0.22	0.22
39.00	0.46	0.34	5.00	0.00	0.20	0.20
40.00	0.45	0.34	5.00	0.00	0.18	0.18
41.00	0.42	0.34	5.00	0.00	0.16	0.16
42.00	0.39	0.33	5.00	0.00	0.14	0.14
43.00	0.36	0.33	5.00	0.00	0.13	0.13
44.00	0.34	0.33	5.00	0.00	0.11	0.11
45.00	0.32	0.32	5.00	0.00	0.09	0.09
46.00	0.33	0.32	5.00	0.00	0.07	0.07
47.00	0.35	0.32	5.00	0.00	0.05	0.05
48.00	0.36	0.31	5.00	0.00	0.03	0.03
49.00	0.38	0.31	5.00	0.00	0.02	0.02
50.00	0.39	0.31	5.00	0.00	0.00	0.00

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* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

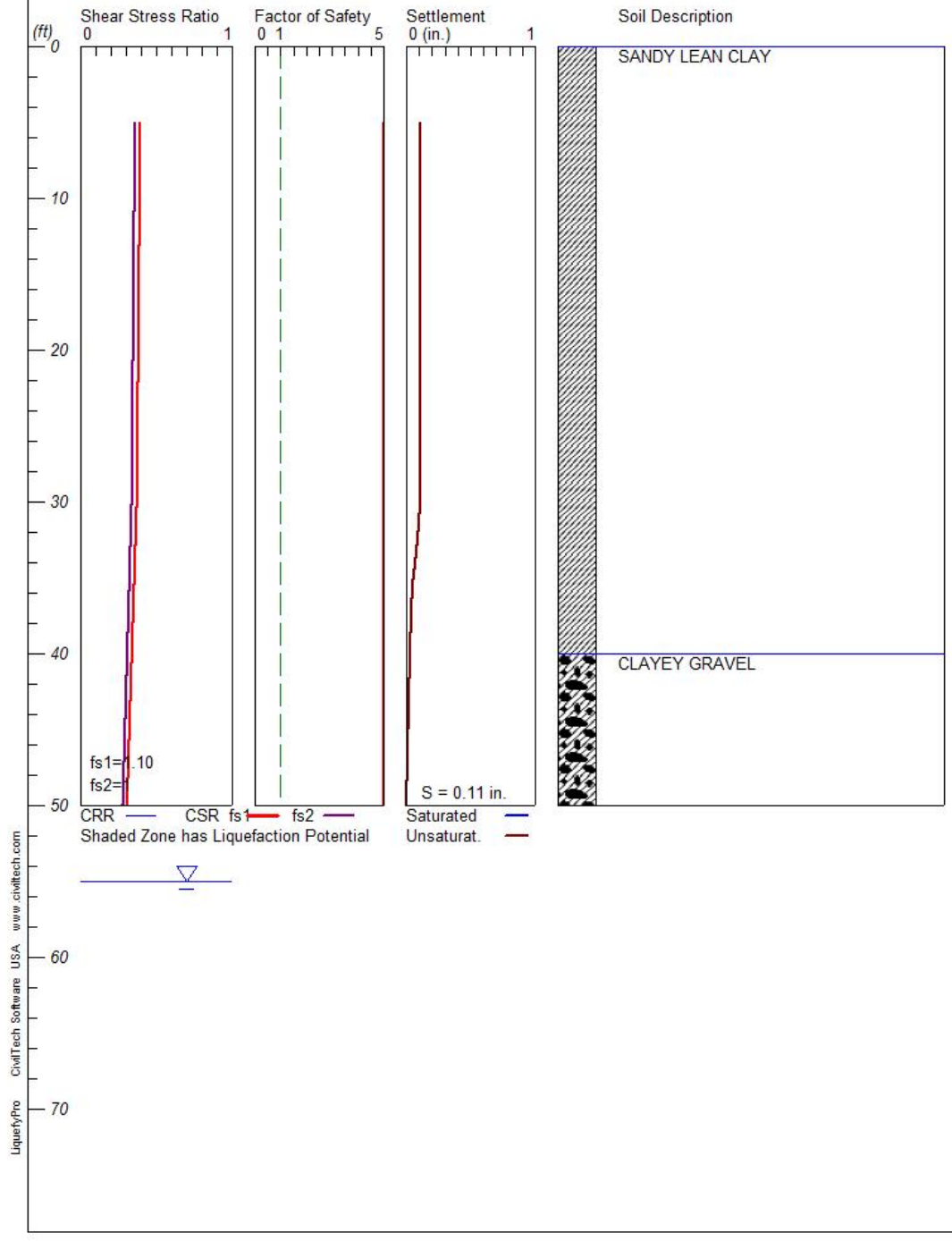
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=N-3 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



Terracon **60165174** **EXHIBIT D-27**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N3 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-3
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=N-3
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	36.00	120.00	NoLiq
7.50	24.00	120.00	NoLiq
10.00	28.00	120.00	NoLiq
15.00	28.00	120.00	NoLiq
20.00	18.00	120.00	NoLiq
25.00	20.00	120.00	NoLiq
30.00	12.00	120.00	NoLiq
35.00	16.00	120.00	51.00
40.00	100.00	120.00	20.00
45.00	100.00	120.00	20.00
50.00	100.00	120.00	20.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.11 in.
Total Settlement of Saturated and Unsaturated Sands=0.11 in.
Differential Settlement=0.054 to 0.071 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.11	0.11
6.00	2.00	0.39	5.00	0.00	0.11	0.11
7.00	2.00	0.39	5.00	0.00	0.11	0.11
8.00	2.00	0.39	5.00	0.00	0.11	0.11
9.00	2.00	0.39	5.00	0.00	0.11	0.11
10.00	2.00	0.39	5.00	0.00	0.11	0.11
11.00	2.00	0.39	5.00	0.00	0.11	0.11
12.00	2.00	0.39	5.00	0.00	0.11	0.11
13.00	2.00	0.39	5.00	0.00	0.11	0.11
14.00	2.00	0.39	5.00	0.00	0.11	0.11
15.00	2.00	0.39	5.00	0.00	0.11	0.11
16.00	2.00	0.38	5.00	0.00	0.11	0.11
17.00	2.00	0.38	5.00	0.00	0.11	0.11
18.00	2.00	0.38	5.00	0.00	0.11	0.11
19.00	2.00	0.38	5.00	0.00	0.11	0.11
20.00	2.00	0.38	5.00	0.00	0.11	0.11
21.00	2.00	0.38	5.00	0.00	0.11	0.11
22.00	2.00	0.38	5.00	0.00	0.11	0.11
23.00	2.00	0.38	5.00	0.00	0.11	0.11
24.00	2.00	0.38	5.00	0.00	0.11	0.11
25.00	2.00	0.38	5.00	0.00	0.11	0.11
26.00	2.00	0.38	5.00	0.00	0.11	0.11

27.00	2.00	0.37	5.00	0.00	0.11	0.11
28.00	2.00	0.37	5.00	0.00	0.11	0.11
29.00	2.00	0.37	5.00	0.00	0.11	0.11
30.00	2.00	0.37	5.00	0.00	0.11	0.11
31.00	2.83	0.37	5.00	0.00	0.10	0.10
32.00	2.81	0.37	5.00	0.00	0.09	0.09
33.00	2.79	0.36	5.00	0.00	0.08	0.08
34.00	2.78	0.36	5.00	0.00	0.07	0.07
35.00	2.76	0.36	5.00	0.00	0.05	0.05
36.00	2.75	0.35	5.00	0.00	0.05	0.05
37.00	2.73	0.35	5.00	0.00	0.04	0.04
38.00	2.72	0.35	5.00	0.00	0.04	0.04
39.00	2.70	0.34	5.00	0.00	0.03	0.03
40.00	2.69	0.34	5.00	0.00	0.03	0.03
41.00	2.68	0.34	5.00	0.00	0.03	0.03
42.00	2.66	0.33	5.00	0.00	0.02	0.02
43.00	2.65	0.33	5.00	0.00	0.02	0.02
44.00	2.63	0.33	5.00	0.00	0.02	0.02
45.00	2.62	0.32	5.00	0.00	0.01	0.01
46.00	2.61	0.32	5.00	0.00	0.01	0.01
47.00	2.59	0.32	5.00	0.00	0.01	0.01
48.00	2.58	0.31	5.00	0.00	0.01	0.01
49.00	2.57	0.31	5.00	0.00	0.00	0.00
50.00	2.56	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

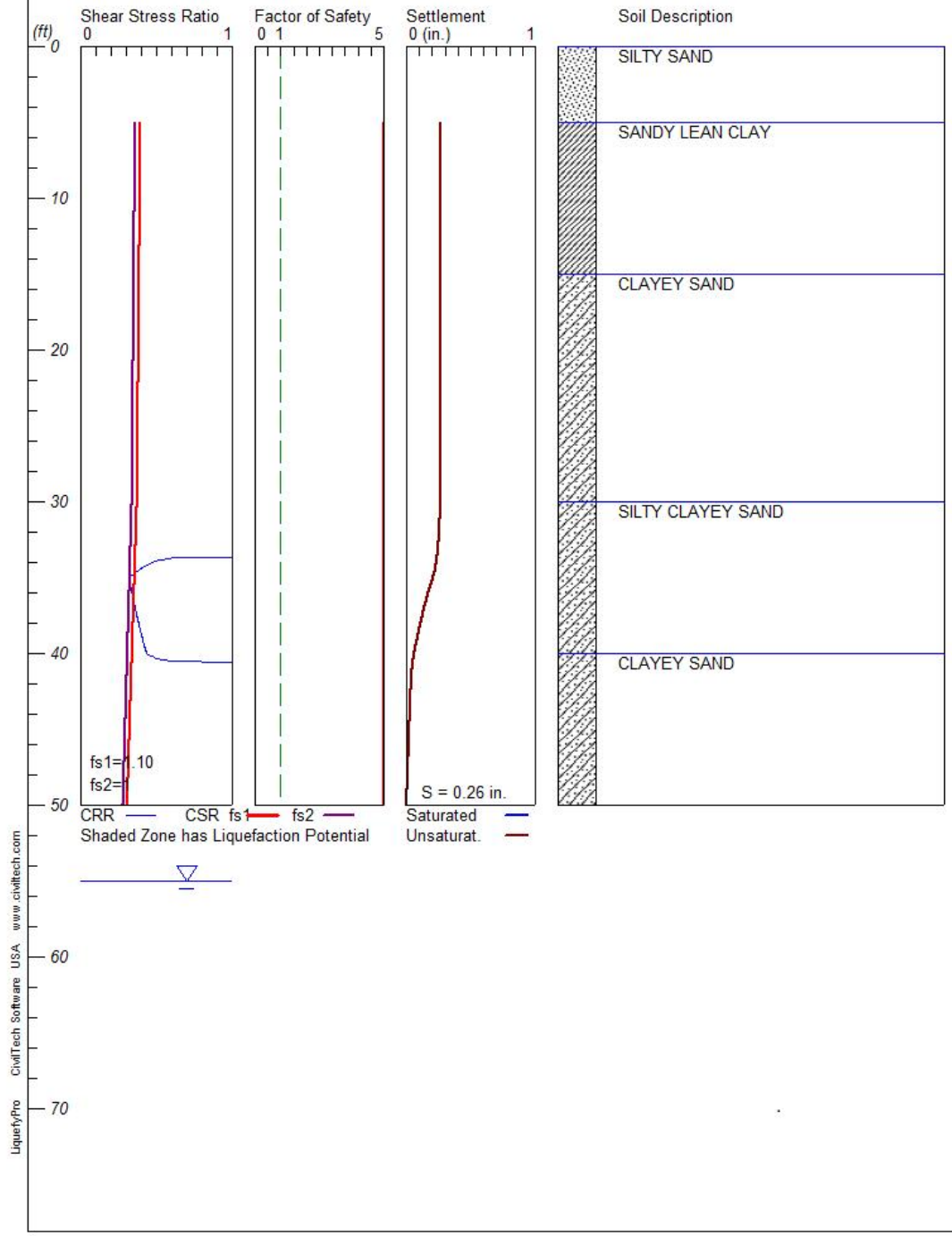
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=N-4 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



Terracon **60165174** **EXHIBIT D-29**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N4 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-4
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=N-4
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	36.00	120.00	NoLiq
10.00	20.00	120.00	NoLiq
15.00	25.00	120.00	NoLiq
20.00	17.00	120.00	NoLiq
25.00	30.00	120.00	NoLiq
30.00	25.00	120.00	NoLiq
35.00	11.00	120.00	37.00
40.00	17.00	120.00	37.00
45.00	42.00	120.00	37.00
50.00	38.00	120.00	37.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.26 in.
Total Settlement of Saturated and Unsaturated Sands=0.26 in.
Differential Settlement=0.132 to 0.175 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.26	0.26
6.00	2.00	0.39	5.00	0.00	0.26	0.26
7.00	2.00	0.39	5.00	0.00	0.26	0.26
8.00	2.00	0.39	5.00	0.00	0.26	0.26
9.00	2.00	0.39	5.00	0.00	0.26	0.26
10.00	2.00	0.39	5.00	0.00	0.26	0.26
11.00	2.00	0.39	5.00	0.00	0.26	0.26
12.00	2.00	0.39	5.00	0.00	0.26	0.26
13.00	2.00	0.39	5.00	0.00	0.26	0.26
14.00	2.00	0.39	5.00	0.00	0.26	0.26
15.00	2.00	0.39	5.00	0.00	0.26	0.26
16.00	2.00	0.38	5.00	0.00	0.26	0.26
17.00	2.00	0.38	5.00	0.00	0.26	0.26
18.00	2.00	0.38	5.00	0.00	0.26	0.26
19.00	2.00	0.38	5.00	0.00	0.26	0.26
20.00	2.00	0.38	5.00	0.00	0.26	0.26
21.00	2.00	0.38	5.00	0.00	0.26	0.26
22.00	2.00	0.38	5.00	0.00	0.26	0.26
23.00	2.00	0.38	5.00	0.00	0.26	0.26
24.00	2.00	0.38	5.00	0.00	0.26	0.26
25.00	2.00	0.38	5.00	0.00	0.26	0.26
26.00	2.00	0.38	5.00	0.00	0.26	0.26
27.00	2.00	0.37	5.00	0.00	0.26	0.26

28.00	2.00	0.37	5.00	0.00	0.26	0.26
29.00	2.00	0.37	5.00	0.00	0.26	0.26
30.00	2.00	0.37	5.00	0.00	0.26	0.26
31.00	2.83	0.37	5.00	0.00	0.26	0.26
32.00	2.81	0.37	5.00	0.00	0.25	0.25
33.00	2.79	0.36	5.00	0.00	0.25	0.25
34.00	0.47	0.36	5.00	0.00	0.23	0.23
35.00	0.32	0.36	5.00	0.00	0.21	0.21
36.00	0.34	0.35	5.00	0.00	0.17	0.17
37.00	0.36	0.35	5.00	0.00	0.14	0.14
38.00	0.38	0.35	5.00	0.00	0.11	0.11
39.00	0.41	0.34	5.00	0.00	0.08	0.08
40.00	0.43	0.34	5.00	0.00	0.06	0.06
41.00	2.68	0.34	5.00	0.00	0.04	0.04
42.00	2.66	0.33	5.00	0.00	0.04	0.04
43.00	2.65	0.33	5.00	0.00	0.03	0.03
44.00	2.63	0.33	5.00	0.00	0.03	0.03
45.00	2.62	0.32	5.00	0.00	0.02	0.02
46.00	2.61	0.32	5.00	0.00	0.02	0.02
47.00	2.59	0.32	5.00	0.00	0.01	0.01
48.00	2.58	0.31	5.00	0.00	0.01	0.01
49.00	2.57	0.31	5.00	0.00	0.00	0.00
50.00	2.56	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

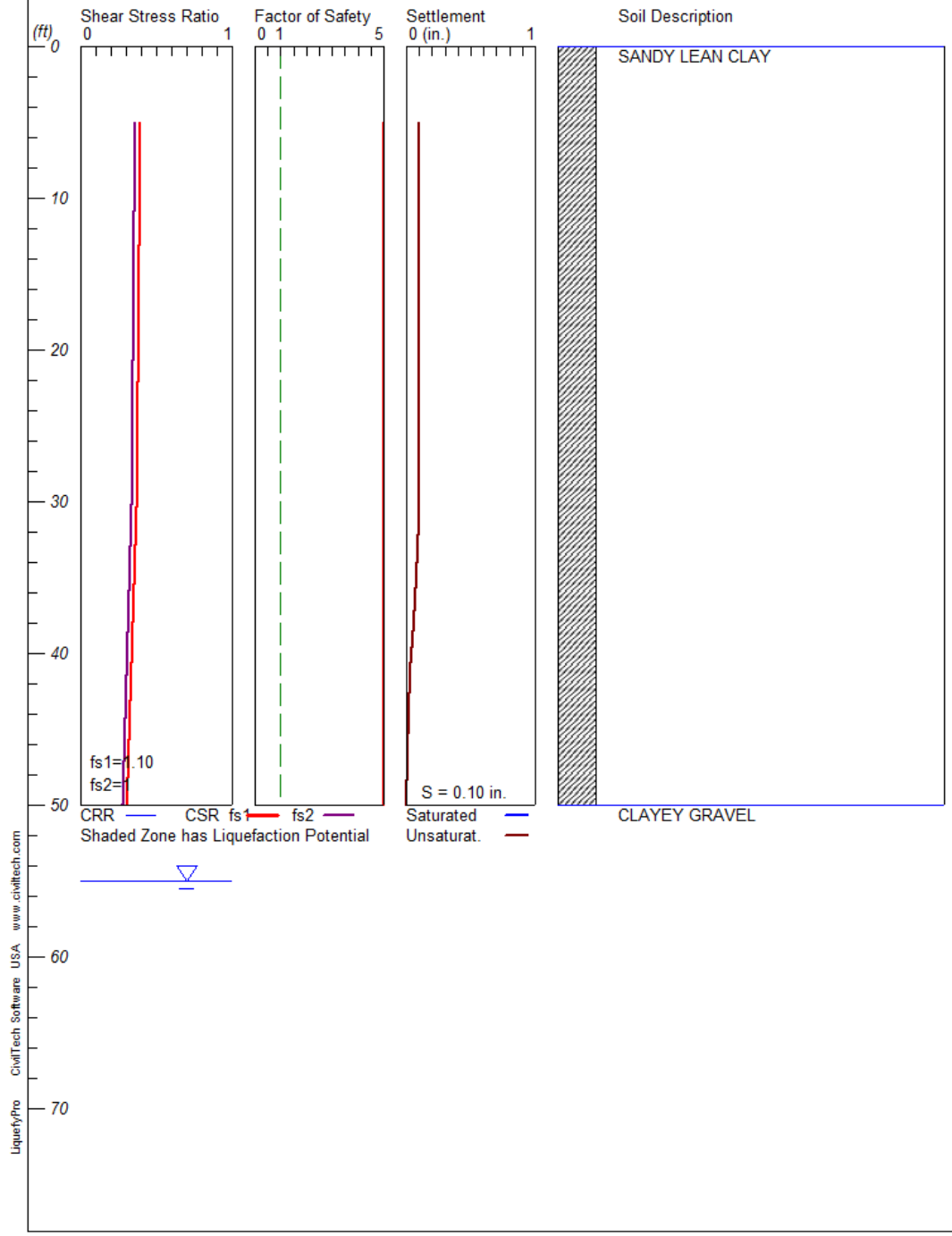
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=N-5 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



Terracon **60165174** **EXHIBIT D-31**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N5 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-5
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=N-5
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	25.00	120.00	NoLiq
10.00	18.00	120.00	NoLiq
20.00	27.00	120.00	NoLiq
30.00	28.00	120.00	NoLiq
40.00	21.00	120.00	51.00
50.00	100.00	120.00	20.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.10 in.
Total Settlement of Saturated and Unsaturated Sands=0.10 in.
Differential Settlement=0.051 to 0.068 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.10	0.10
6.00	2.00	0.39	5.00	0.00	0.10	0.10
7.00	2.00	0.39	5.00	0.00	0.10	0.10
8.00	2.00	0.39	5.00	0.00	0.10	0.10
9.00	2.00	0.39	5.00	0.00	0.10	0.10
10.00	2.00	0.39	5.00	0.00	0.10	0.10
11.00	2.00	0.39	5.00	0.00	0.10	0.10
12.00	2.00	0.39	5.00	0.00	0.10	0.10
13.00	2.00	0.39	5.00	0.00	0.10	0.10
14.00	2.00	0.39	5.00	0.00	0.10	0.10
15.00	2.00	0.39	5.00	0.00	0.10	0.10
16.00	2.00	0.38	5.00	0.00	0.10	0.10
17.00	2.00	0.38	5.00	0.00	0.10	0.10
18.00	2.00	0.38	5.00	0.00	0.10	0.10
19.00	2.00	0.38	5.00	0.00	0.10	0.10
20.00	2.00	0.38	5.00	0.00	0.10	0.10
21.00	2.00	0.38	5.00	0.00	0.10	0.10
22.00	2.00	0.38	5.00	0.00	0.10	0.10
23.00	2.00	0.38	5.00	0.00	0.10	0.10
24.00	2.00	0.38	5.00	0.00	0.10	0.10
25.00	2.00	0.38	5.00	0.00	0.10	0.10
26.00	2.00	0.38	5.00	0.00	0.10	0.10
27.00	2.00	0.37	5.00	0.00	0.10	0.10
28.00	2.00	0.37	5.00	0.00	0.10	0.10
29.00	2.00	0.37	5.00	0.00	0.10	0.10
30.00	2.00	0.37	5.00	0.00	0.10	0.10
31.00	2.83	0.37	5.00	0.00	0.10	0.10

32.00	2.81	0.37	5.00	0.00	0.09	0.09
33.00	2.79	0.36	5.00	0.00	0.09	0.09
34.00	2.78	0.36	5.00	0.00	0.08	0.08
35.00	2.76	0.36	5.00	0.00	0.08	0.08
36.00	2.75	0.35	5.00	0.00	0.07	0.07
37.00	2.73	0.35	5.00	0.00	0.06	0.06
38.00	2.72	0.35	5.00	0.00	0.06	0.06
39.00	2.70	0.34	5.00	0.00	0.05	0.05
40.00	2.69	0.34	5.00	0.00	0.04	0.04
41.00	2.68	0.34	5.00	0.00	0.03	0.03
42.00	2.66	0.33	5.00	0.00	0.03	0.03
43.00	2.65	0.33	5.00	0.00	0.02	0.02
44.00	2.63	0.33	5.00	0.00	0.02	0.02
45.00	2.62	0.32	5.00	0.00	0.02	0.02
46.00	2.61	0.32	5.00	0.00	0.01	0.01
47.00	2.59	0.32	5.00	0.00	0.01	0.01
48.00	2.58	0.31	5.00	0.00	0.01	0.01
49.00	2.57	0.31	5.00	0.00	0.00	0.00
50.00	2.56	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

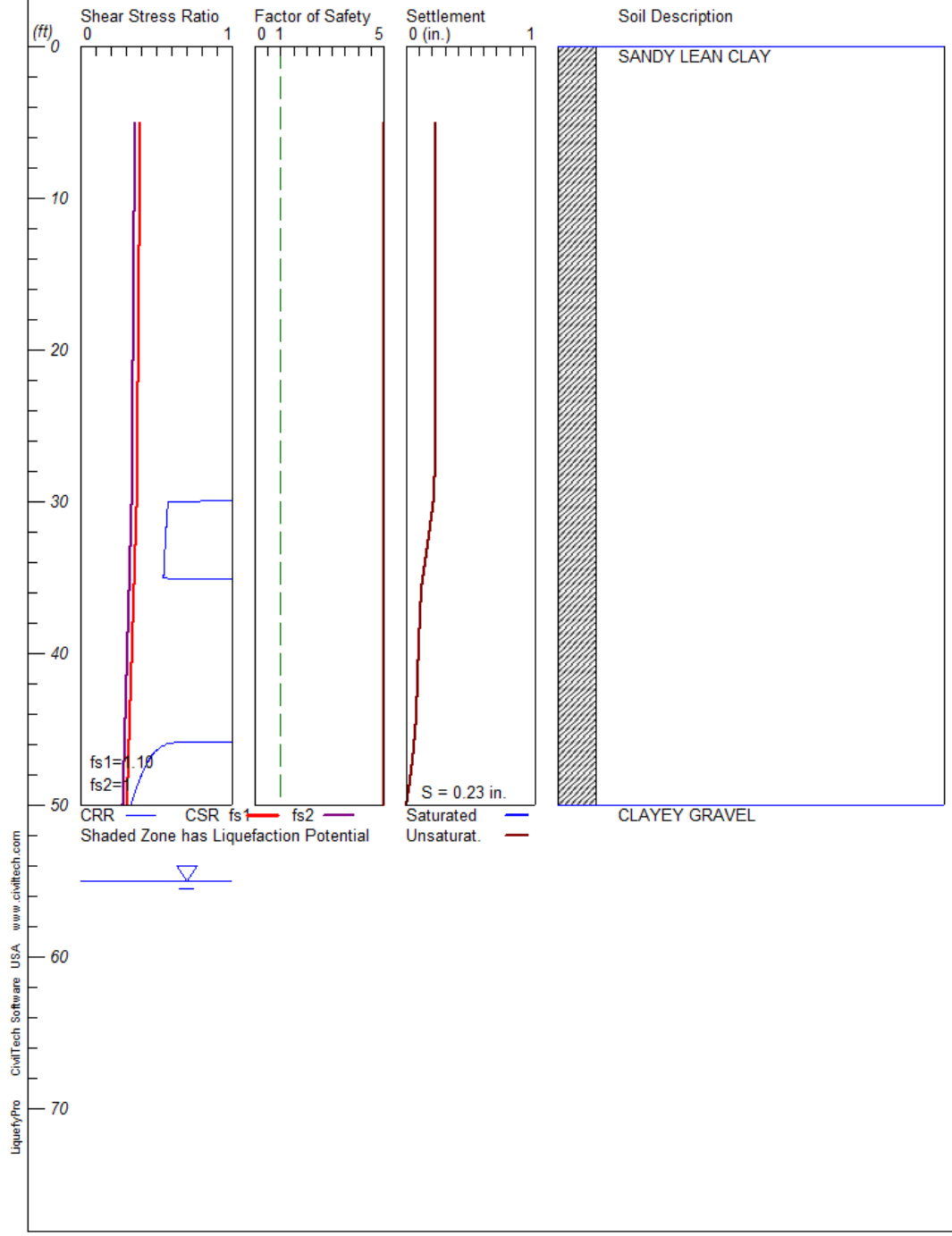
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (10% in 50 years)

Hole No.=N-6 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



Terracon **60165174** **EXHIBIT D-33**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\N6 (475 years).liq
Title: Getty Center Parking (10% in 50 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=N-6
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=N-6
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	24.00	120.00	NoLiq
10.00	40.00	120.00	NoLiq
15.00	38.00	120.00	NoLiq
20.00	37.00	120.00	NoLiq
25.00	100.00	120.00	NoLiq
30.00	14.00	120.00	51.00
35.00	15.00	120.00	51.00
40.00	55.00	120.00	51.00
45.00	19.00	120.00	51.00
50.00	12.00	120.00	51.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.23 in.
Total Settlement of Saturated and Unsaturated Sands=0.23 in.
Differential Settlement=0.115 to 0.152 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.23	0.23
6.00	2.00	0.39	5.00	0.00	0.23	0.23
7.00	2.00	0.39	5.00	0.00	0.23	0.23
8.00	2.00	0.39	5.00	0.00	0.23	0.23
9.00	2.00	0.39	5.00	0.00	0.23	0.23
10.00	2.00	0.39	5.00	0.00	0.23	0.23
11.00	2.00	0.39	5.00	0.00	0.23	0.23
12.00	2.00	0.39	5.00	0.00	0.23	0.23
13.00	2.00	0.39	5.00	0.00	0.23	0.23
14.00	2.00	0.39	5.00	0.00	0.23	0.23
15.00	2.00	0.39	5.00	0.00	0.23	0.23
16.00	2.00	0.38	5.00	0.00	0.23	0.23
17.00	2.00	0.38	5.00	0.00	0.23	0.23
18.00	2.00	0.38	5.00	0.00	0.23	0.23
19.00	2.00	0.38	5.00	0.00	0.23	0.23
20.00	2.00	0.38	5.00	0.00	0.23	0.23
21.00	2.00	0.38	5.00	0.00	0.23	0.23
22.00	2.00	0.38	5.00	0.00	0.23	0.23
23.00	2.00	0.38	5.00	0.00	0.23	0.23
24.00	2.00	0.38	5.00	0.00	0.23	0.23
25.00	2.00	0.38	5.00	0.00	0.23	0.23
26.00	2.87	0.38	5.00	0.00	0.23	0.23
27.00	2.87	0.37	5.00	0.00	0.22	0.22

28.00	2.88	0.37	5.00	0.00	0.22	0.22
29.00	2.86	0.37	5.00	0.00	0.22	0.22
30.00	0.57	0.37	5.00	0.00	0.21	0.21
31.00	0.57	0.37	5.00	0.00	0.19	0.19
32.00	0.56	0.37	5.00	0.00	0.18	0.18
33.00	0.55	0.36	5.00	0.00	0.16	0.16
34.00	0.55	0.36	5.00	0.00	0.15	0.15
35.00	0.55	0.36	5.00	0.00	0.13	0.13
36.00	2.75	0.35	5.00	0.00	0.12	0.12
37.00	2.73	0.35	5.00	0.00	0.11	0.11
38.00	2.72	0.35	5.00	0.00	0.10	0.10
39.00	2.70	0.34	5.00	0.00	0.10	0.10
40.00	2.69	0.34	5.00	0.00	0.09	0.09
41.00	2.68	0.34	5.00	0.00	0.09	0.09
42.00	2.66	0.33	5.00	0.00	0.09	0.09
43.00	2.65	0.33	5.00	0.00	0.08	0.08
44.00	2.63	0.33	5.00	0.00	0.08	0.08
45.00	2.62	0.32	5.00	0.00	0.07	0.07
46.00	0.56	0.32	5.00	0.00	0.06	0.06
47.00	0.45	0.32	5.00	0.00	0.05	0.05
48.00	0.40	0.31	5.00	0.00	0.03	0.03
49.00	0.36	0.31	5.00	0.00	0.02	0.02
50.00	0.33	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

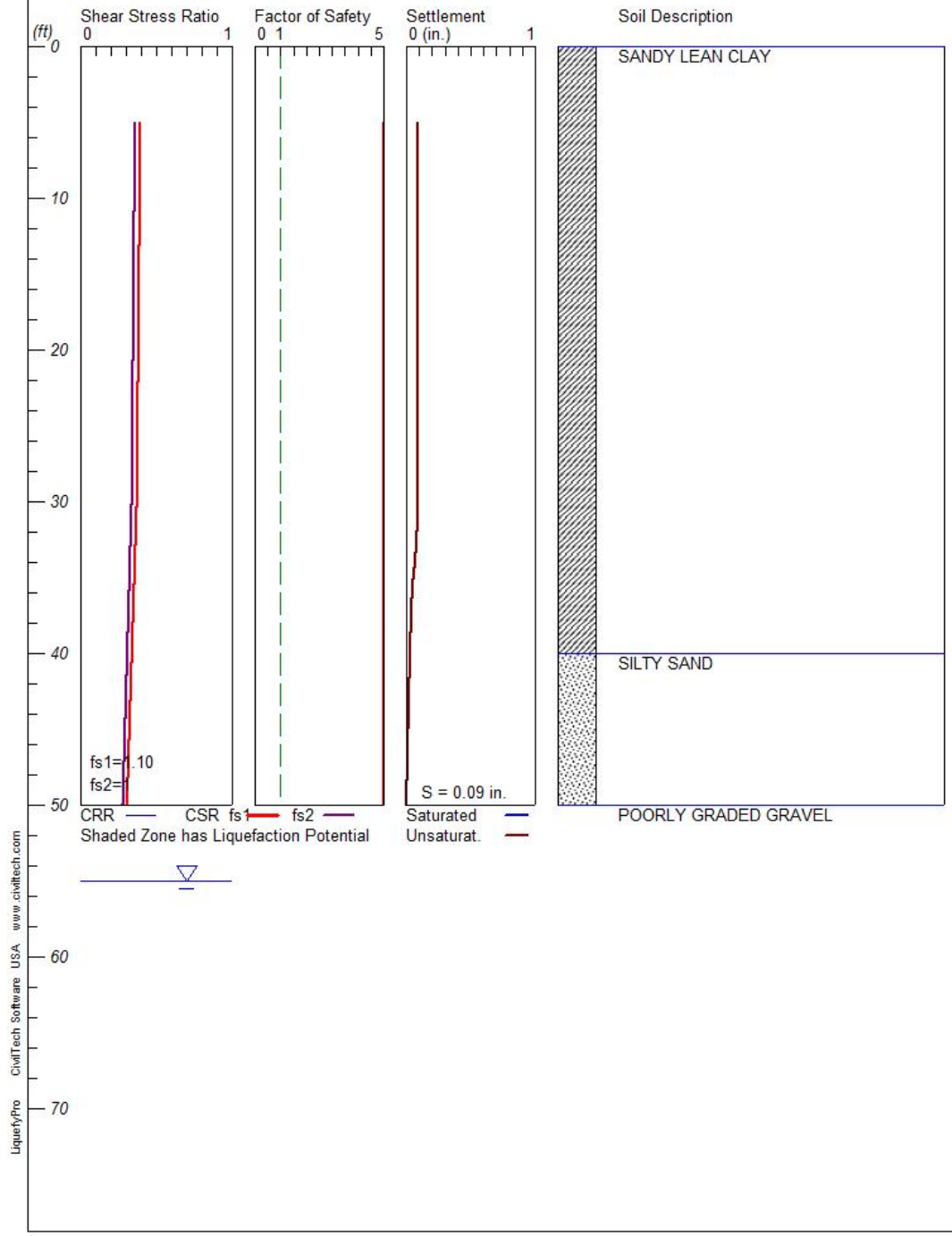
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=S-1 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



Terracon **60165174** **EXHIBIT D-35**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S1 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-1
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=S-1
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	32.00	120.00	NoLiq
10.00	21.00	120.00	NoLiq
15.00	28.00	120.00	NoLiq
20.00	11.00	120.00	NoLiq
25.00	20.00	120.00	NoLiq
30.00	22.00	120.00	NoLiq
35.00	16.00	120.00	51.00
40.00	100.00	120.00	51.00
45.00	100.00	120.00	20.00
50.00	100.00	120.00	20.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.09 in.
Total Settlement of Saturated and Unsaturated Sands=0.09 in.
Differential Settlement=0.046 to 0.061 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.09	0.09
6.00	2.00	0.39	5.00	0.00	0.09	0.09
7.00	2.00	0.39	5.00	0.00	0.09	0.09
8.00	2.00	0.39	5.00	0.00	0.09	0.09
9.00	2.00	0.39	5.00	0.00	0.09	0.09
10.00	2.00	0.39	5.00	0.00	0.09	0.09
11.00	2.00	0.39	5.00	0.00	0.09	0.09
12.00	2.00	0.39	5.00	0.00	0.09	0.09
13.00	2.00	0.39	5.00	0.00	0.09	0.09
14.00	2.00	0.39	5.00	0.00	0.09	0.09
15.00	2.00	0.39	5.00	0.00	0.09	0.09
16.00	2.00	0.38	5.00	0.00	0.09	0.09
17.00	2.00	0.38	5.00	0.00	0.09	0.09
18.00	2.00	0.38	5.00	0.00	0.09	0.09
19.00	2.00	0.38	5.00	0.00	0.09	0.09
20.00	2.00	0.38	5.00	0.00	0.09	0.09
21.00	2.00	0.38	5.00	0.00	0.09	0.09
22.00	2.00	0.38	5.00	0.00	0.09	0.09
23.00	2.00	0.38	5.00	0.00	0.09	0.09
24.00	2.00	0.38	5.00	0.00	0.09	0.09
25.00	2.00	0.38	5.00	0.00	0.09	0.09
26.00	2.00	0.38	5.00	0.00	0.09	0.09
27.00	2.00	0.37	5.00	0.00	0.09	0.09

28.00	2.00	0.37	5.00	0.00	0.09	0.09
29.00	2.00	0.37	5.00	0.00	0.09	0.09
30.00	2.00	0.37	5.00	0.00	0.09	0.09
31.00	2.83	0.37	5.00	0.00	0.09	0.09
32.00	2.81	0.37	5.00	0.00	0.08	0.08
33.00	2.79	0.36	5.00	0.00	0.08	0.08
34.00	2.78	0.36	5.00	0.00	0.07	0.07
35.00	2.76	0.36	5.00	0.00	0.05	0.05
36.00	2.75	0.35	5.00	0.00	0.05	0.05
37.00	2.73	0.35	5.00	0.00	0.04	0.04
38.00	2.72	0.35	5.00	0.00	0.04	0.04
39.00	2.70	0.34	5.00	0.00	0.03	0.03
40.00	2.69	0.34	5.00	0.00	0.03	0.03
41.00	2.68	0.34	5.00	0.00	0.03	0.03
42.00	2.66	0.33	5.00	0.00	0.02	0.02
43.00	2.65	0.33	5.00	0.00	0.02	0.02
44.00	2.63	0.33	5.00	0.00	0.02	0.02
45.00	2.62	0.32	5.00	0.00	0.01	0.01
46.00	2.61	0.32	5.00	0.00	0.01	0.01
47.00	2.59	0.32	5.00	0.00	0.01	0.01
48.00	2.58	0.31	5.00	0.00	0.01	0.01
49.00	2.57	0.31	5.00	0.00	0.00	0.00
50.00	2.56	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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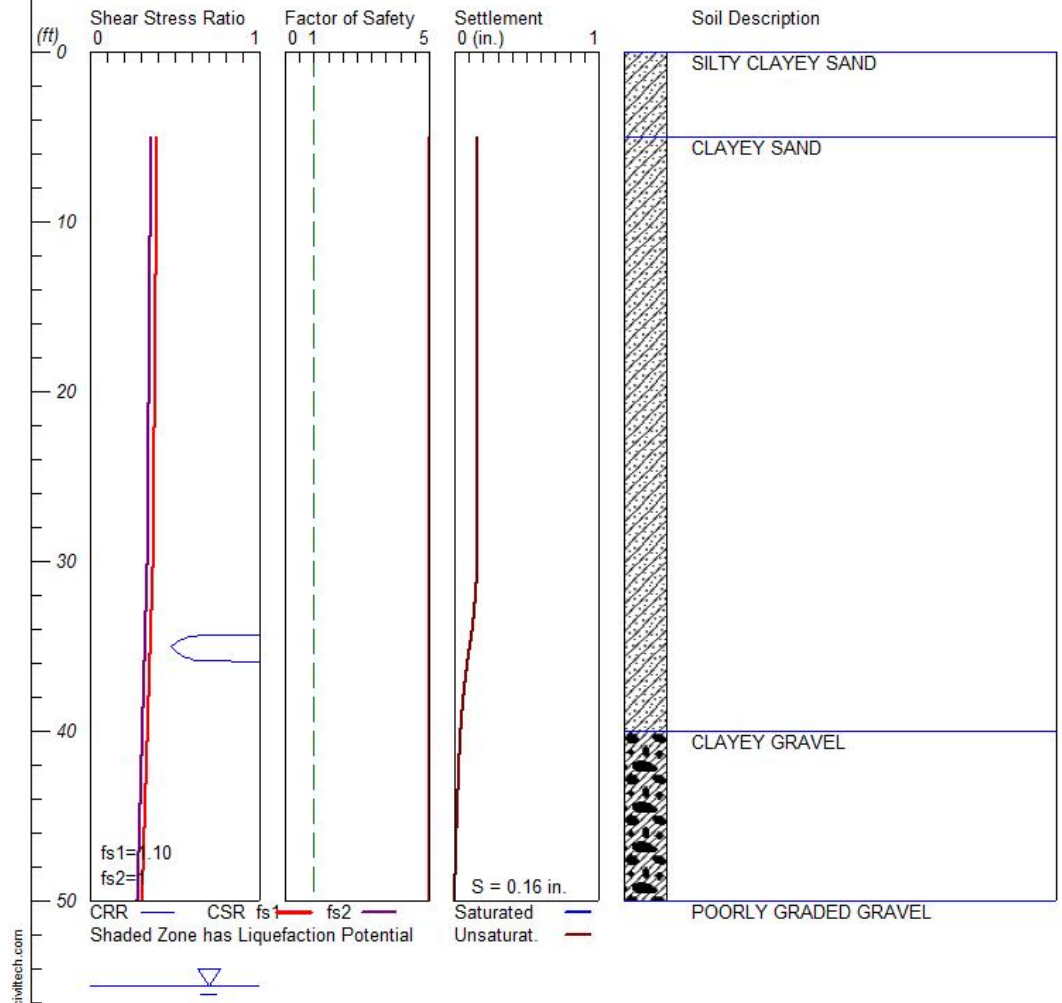
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=S-2 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S2 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-2
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=S-2
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	17.00	120.00	NoLiq
10.00	20.00	120.00	NoLiq
15.00	27.00	120.00	NoLiq
20.00	14.00	120.00	NoLiq
25.00	10.00	120.00	NoLiq
30.00	15.00	120.00	NoLiq
35.00	20.00	120.00	20.00
40.00	31.00	120.00	20.00
45.00	42.00	120.00	20.00
50.00	100.00	120.00	5.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.16 in.
Total Settlement of Saturated and Unsaturated Sands=0.16 in.
Differential Settlement=0.079 to 0.105 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.16	0.16
6.00	2.00	0.39	5.00	0.00	0.16	0.16
7.00	2.00	0.39	5.00	0.00	0.16	0.16
8.00	2.00	0.39	5.00	0.00	0.16	0.16
9.00	2.00	0.39	5.00	0.00	0.16	0.16
10.00	2.00	0.39	5.00	0.00	0.16	0.16
11.00	2.00	0.39	5.00	0.00	0.16	0.16
12.00	2.00	0.39	5.00	0.00	0.16	0.16
13.00	2.00	0.39	5.00	0.00	0.16	0.16
14.00	2.00	0.39	5.00	0.00	0.16	0.16
15.00	2.00	0.39	5.00	0.00	0.16	0.16
16.00	2.00	0.38	5.00	0.00	0.16	0.16
17.00	2.00	0.38	5.00	0.00	0.16	0.16
18.00	2.00	0.38	5.00	0.00	0.16	0.16
19.00	2.00	0.38	5.00	0.00	0.16	0.16
20.00	2.00	0.38	5.00	0.00	0.16	0.16
21.00	2.00	0.38	5.00	0.00	0.16	0.16
22.00	2.00	0.38	5.00	0.00	0.16	0.16
23.00	2.00	0.38	5.00	0.00	0.16	0.16
24.00	2.00	0.38	5.00	0.00	0.16	0.16
25.00	2.00	0.38	5.00	0.00	0.16	0.16
26.00	2.00	0.38	5.00	0.00	0.16	0.16
27.00	2.00	0.37	5.00	0.00	0.16	0.16

28.00	2.00	0.37	5.00	0.00	0.16	0.16
29.00	2.00	0.37	5.00	0.00	0.16	0.16
30.00	2.00	0.37	5.00	0.00	0.16	0.16
31.00	2.83	0.37	5.00	0.00	0.15	0.15
32.00	2.81	0.37	5.00	0.00	0.15	0.15
33.00	2.79	0.36	5.00	0.00	0.14	0.14
34.00	2.78	0.36	5.00	0.00	0.12	0.12
35.00	0.48	0.36	5.00	0.00	0.11	0.11
36.00	2.75	0.35	5.00	0.00	0.09	0.09
37.00	2.73	0.35	5.00	0.00	0.07	0.07
38.00	2.72	0.35	5.00	0.00	0.06	0.06
39.00	2.70	0.34	5.00	0.00	0.05	0.05
40.00	2.69	0.34	5.00	0.00	0.04	0.04
41.00	2.68	0.34	5.00	0.00	0.04	0.04
42.00	2.66	0.33	5.00	0.00	0.03	0.03
43.00	2.65	0.33	5.00	0.00	0.03	0.03
44.00	2.63	0.33	5.00	0.00	0.02	0.02
45.00	2.62	0.32	5.00	0.00	0.02	0.02
46.00	2.61	0.32	5.00	0.00	0.01	0.01
47.00	2.59	0.32	5.00	0.00	0.01	0.01
48.00	2.58	0.31	5.00	0.00	0.01	0.01
49.00	2.57	0.31	5.00	0.00	0.00	0.00
50.00	2.56	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

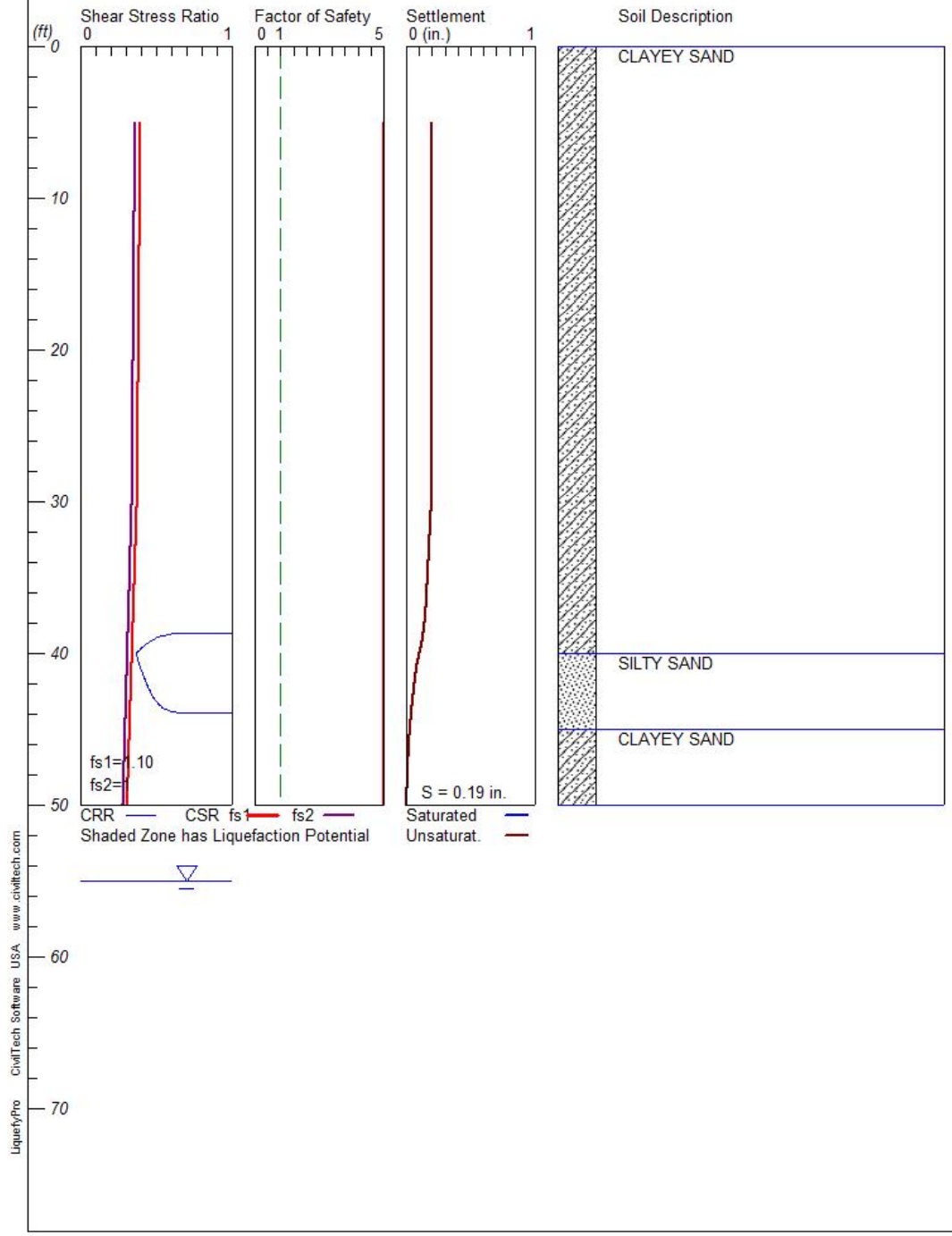
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=S-3 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S3 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-3
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=S-3
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	27.00	120.00	NoLiq
10.00	48.00	120.00	NoLiq
15.00	26.00	120.00	NoLiq
20.00	20.00	120.00	NoLiq
25.00	29.00	120.00	NoLiq
30.00	15.00	120.00	NoLiq
35.00	36.00	120.00	20.00
40.00	18.00	120.00	20.00
45.00	26.00	120.00	20.00
50.00	52.00	120.00	20.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.19 in.
Total Settlement of Saturated and Unsaturated Sands=0.19 in.
Differential Settlement=0.097 to 0.128 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.19	0.19
6.00	2.00	0.39	5.00	0.00	0.19	0.19
7.00	2.00	0.39	5.00	0.00	0.19	0.19
8.00	2.00	0.39	5.00	0.00	0.19	0.19
9.00	2.00	0.39	5.00	0.00	0.19	0.19
10.00	2.00	0.39	5.00	0.00	0.19	0.19
11.00	2.00	0.39	5.00	0.00	0.19	0.19
12.00	2.00	0.39	5.00	0.00	0.19	0.19
13.00	2.00	0.39	5.00	0.00	0.19	0.19
14.00	2.00	0.39	5.00	0.00	0.19	0.19
15.00	2.00	0.39	5.00	0.00	0.19	0.19
16.00	2.00	0.38	5.00	0.00	0.19	0.19
17.00	2.00	0.38	5.00	0.00	0.19	0.19
18.00	2.00	0.38	5.00	0.00	0.19	0.19
19.00	2.00	0.38	5.00	0.00	0.19	0.19
20.00	2.00	0.38	5.00	0.00	0.19	0.19
21.00	2.00	0.38	5.00	0.00	0.19	0.19
22.00	2.00	0.38	5.00	0.00	0.19	0.19
23.00	2.00	0.38	5.00	0.00	0.19	0.19
24.00	2.00	0.38	5.00	0.00	0.19	0.19
25.00	2.00	0.38	5.00	0.00	0.19	0.19
26.00	2.00	0.38	5.00	0.00	0.19	0.19
27.00	2.00	0.37	5.00	0.00	0.19	0.19

28.00	2.00	0.37	5.00	0.00	0.19	0.19
29.00	2.00	0.37	5.00	0.00	0.19	0.19
30.00	2.00	0.37	5.00	0.00	0.19	0.19
31.00	2.83	0.37	5.00	0.00	0.19	0.19
32.00	2.81	0.37	5.00	0.00	0.18	0.18
33.00	2.79	0.36	5.00	0.00	0.18	0.18
34.00	2.78	0.36	5.00	0.00	0.17	0.17
35.00	2.76	0.36	5.00	0.00	0.16	0.16
36.00	2.75	0.35	5.00	0.00	0.16	0.16
37.00	2.73	0.35	5.00	0.00	0.15	0.15
38.00	2.72	0.35	5.00	0.00	0.14	0.14
39.00	0.49	0.34	5.00	0.00	0.12	0.12
40.00	0.36	0.34	5.00	0.00	0.10	0.10
41.00	0.40	0.34	5.00	0.00	0.08	0.08
42.00	0.43	0.33	5.00	0.00	0.06	0.06
43.00	0.49	0.33	5.00	0.00	0.05	0.05
44.00	2.63	0.33	5.00	0.00	0.04	0.04
45.00	2.62	0.32	5.00	0.00	0.03	0.03
46.00	2.61	0.32	5.00	0.00	0.02	0.02
47.00	2.59	0.32	5.00	0.00	0.01	0.01
48.00	2.58	0.31	5.00	0.00	0.01	0.01
49.00	2.57	0.31	5.00	0.00	0.00	0.00
50.00	2.56	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

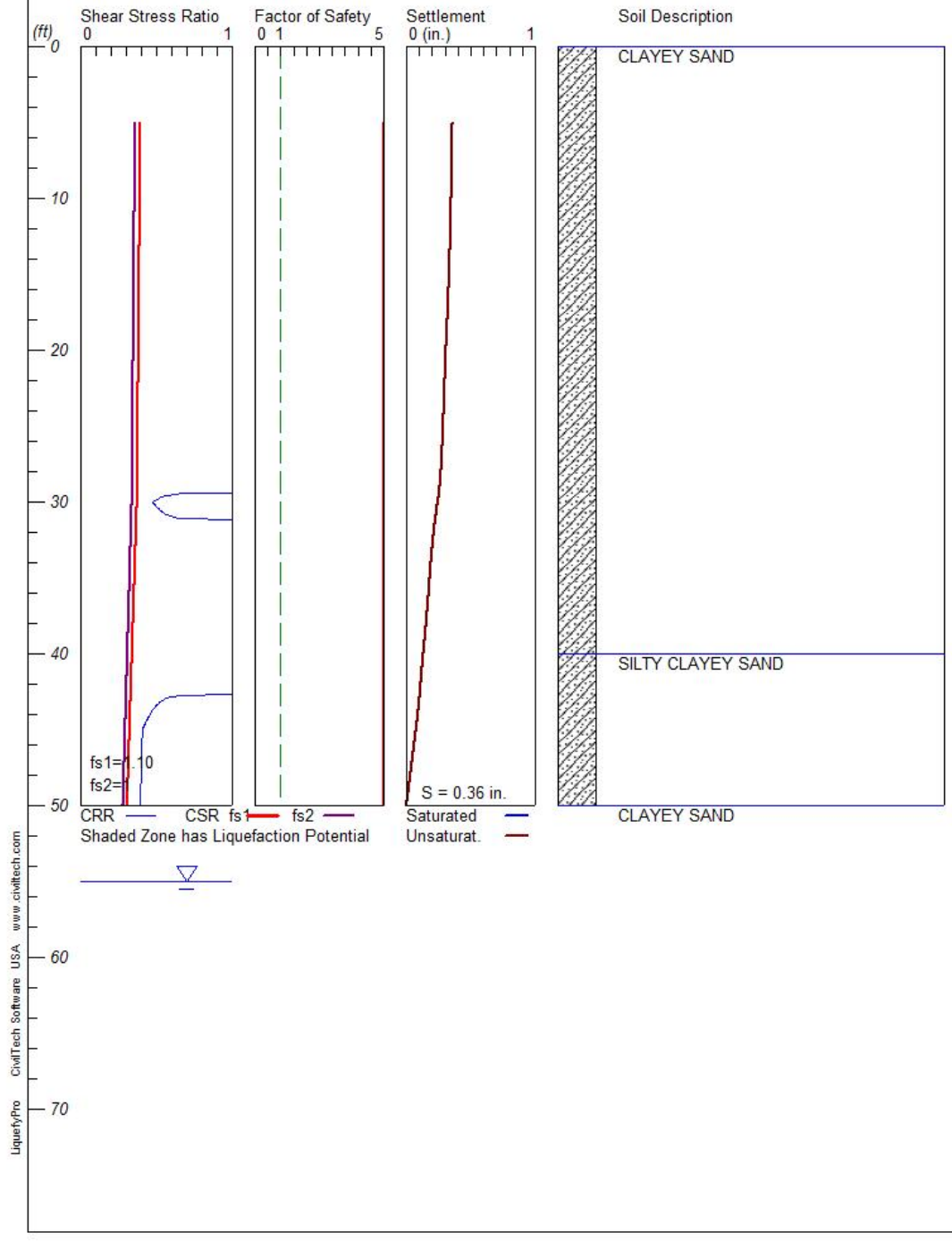
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=S-4 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



Terracon **60165174** **EXHIBIT D-41**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S4 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-4
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=S-4
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	22.00	120.00	20.00
7.50	30.00	120.00	20.00
10.00	24.00	120.00	20.00
15.00	24.00	120.00	21.00
20.00	27.00	120.00	21.00
25.00	33.00	120.00	21.00
30.00	18.00	120.00	21.00
35.00	28.00	120.00	21.00
40.00	27.00	120.00	21.00
45.00	21.00	120.00	21.00
50.00	22.00	120.00	21.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.36 in.
Total Settlement of Saturated and Unsaturated Sands=0.36 in.
Differential Settlement=0.179 to 0.236 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.87	0.40	5.00	0.00	0.36	0.36
6.00	2.87	0.39	5.00	0.00	0.36	0.36
7.00	2.87	0.39	5.00	0.00	0.35	0.35
8.00	2.87	0.39	5.00	0.00	0.35	0.35
9.00	2.87	0.39	5.00	0.00	0.35	0.35
10.00	2.87	0.39	5.00	0.00	0.35	0.35
11.00	2.87	0.39	5.00	0.00	0.35	0.35
12.00	2.87	0.39	5.00	0.00	0.34	0.34
13.00	2.87	0.39	5.00	0.00	0.34	0.34
14.00	2.87	0.39	5.00	0.00	0.34	0.34
15.00	2.87	0.39	5.00	0.00	0.33	0.33
16.00	2.87	0.38	5.00	0.00	0.33	0.33
17.00	2.87	0.38	5.00	0.00	0.32	0.32
18.00	2.87	0.38	5.00	0.00	0.32	0.32
19.00	2.87	0.38	5.00	0.00	0.31	0.31
20.00	2.87	0.38	5.00	0.00	0.31	0.31
21.00	2.87	0.38	5.00	0.00	0.30	0.30
22.00	2.87	0.38	5.00	0.00	0.30	0.30
23.00	2.87	0.38	5.00	0.00	0.29	0.29
24.00	2.87	0.38	5.00	0.00	0.29	0.29
25.00	2.87	0.38	5.00	0.00	0.29	0.29
26.00	2.87	0.38	5.00	0.00	0.28	0.28

27.00	2.87	0.37	5.00	0.00	0.28	0.28
28.00	2.88	0.37	5.00	0.00	0.27	0.27
29.00	2.86	0.37	5.00	0.00	0.26	0.26
30.00	0.47	0.37	5.00	0.00	0.24	0.24
31.00	0.61	0.37	5.00	0.00	0.23	0.23
32.00	2.81	0.37	5.00	0.00	0.21	0.21
33.00	2.79	0.36	5.00	0.00	0.20	0.20
34.00	2.78	0.36	5.00	0.00	0.19	0.19
35.00	2.76	0.36	5.00	0.00	0.18	0.18
36.00	2.75	0.35	5.00	0.00	0.17	0.17
37.00	2.73	0.35	5.00	0.00	0.16	0.16
38.00	2.72	0.35	5.00	0.00	0.15	0.15
39.00	2.70	0.34	5.00	0.00	0.14	0.14
40.00	2.69	0.34	5.00	0.00	0.13	0.13
41.00	2.68	0.34	5.00	0.00	0.12	0.12
42.00	2.66	0.33	5.00	0.00	0.11	0.11
43.00	0.55	0.33	5.00	0.00	0.10	0.10
44.00	0.45	0.33	5.00	0.00	0.09	0.09
45.00	0.41	0.32	5.00	0.00	0.07	0.07
46.00	0.40	0.32	5.00	0.00	0.06	0.06
47.00	0.40	0.32	5.00	0.00	0.04	0.04
48.00	0.40	0.31	5.00	0.00	0.03	0.03
49.00	0.39	0.31	5.00	0.00	0.01	0.01
50.00	0.39	0.31	5.00	0.00	0.00	0.00

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* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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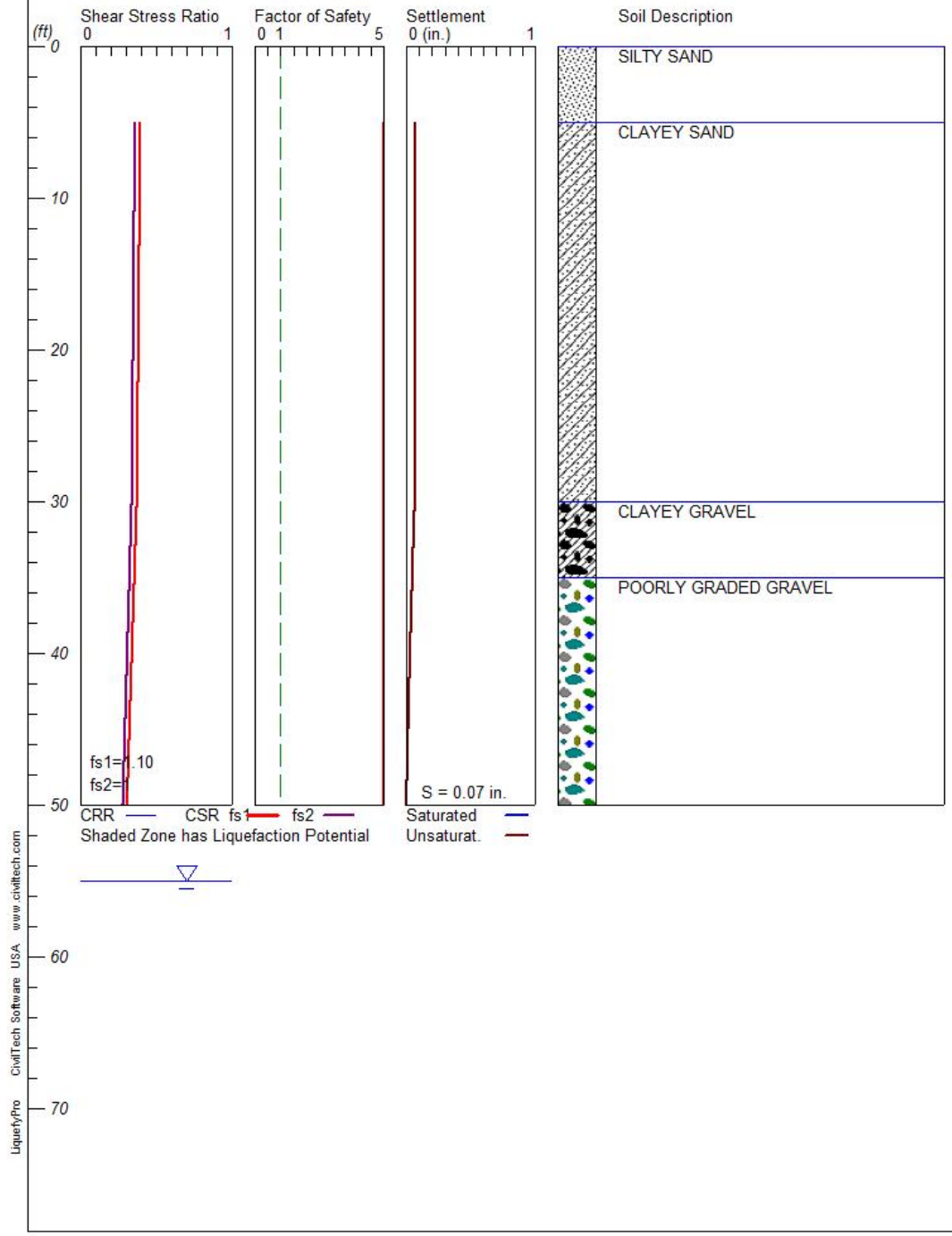
1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

LIQUEFACTION ANALYSIS

Getty Center Parking (475 years)

Hole No.=S-5 Water Depth=55 ft

Magnitude=6.51
Acceleration=0.559g



Terracon **60165174** **EXHIBIT D-43**

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: N:\Projects\2016\60165174\Working Files\Calculations-Analyses\S5 (475 years).liq
Title: Getty Center Parking (475 years)
Subtitle: 60165174

Surface Elev.=
Hole No.=S-5
Depth of Hole= 50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration= 0.56 g
Earthquake Magnitude= 6.51

Input Data:
Surface Elev.=
Hole No.=S-5
Depth of Hole=50.00 ft
Water Table during Earthquake= 55.00 ft
Water Table during In-Situ Testing= 55.00 ft
Max. Acceleration=0.56 g
Earthquake Magnitude=6.51
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
5.00	20.00	120.00	NoLiq
10.00	42.00	120.00	NoLiq
15.00	19.00	120.00	NoLiq
20.00	22.00	120.00	NoLiq
25.00	27.00	120.00	NoLiq
30.00	30.00	120.00	NoLiq
35.00	80.00	120.00	5.00
40.00	100.00	120.00	5.00
45.00	100.00	120.00	5.00
50.00	100.00	120.00	5.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.07 in.
Total Settlement of Saturated and Unsaturated Sands=0.07 in.
Differential Settlement=0.033 to 0.043 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
5.00	2.00	0.40	5.00	0.00	0.07	0.07
6.00	2.00	0.39	5.00	0.00	0.07	0.07
7.00	2.00	0.39	5.00	0.00	0.07	0.07
8.00	2.00	0.39	5.00	0.00	0.07	0.07
9.00	2.00	0.39	5.00	0.00	0.07	0.07
10.00	2.00	0.39	5.00	0.00	0.07	0.07
11.00	2.00	0.39	5.00	0.00	0.07	0.07
12.00	2.00	0.39	5.00	0.00	0.07	0.07
13.00	2.00	0.39	5.00	0.00	0.07	0.07
14.00	2.00	0.39	5.00	0.00	0.07	0.07
15.00	2.00	0.39	5.00	0.00	0.07	0.07
16.00	2.00	0.38	5.00	0.00	0.07	0.07
17.00	2.00	0.38	5.00	0.00	0.07	0.07
18.00	2.00	0.38	5.00	0.00	0.07	0.07
19.00	2.00	0.38	5.00	0.00	0.07	0.07
20.00	2.00	0.38	5.00	0.00	0.07	0.07
21.00	2.00	0.38	5.00	0.00	0.07	0.07
22.00	2.00	0.38	5.00	0.00	0.07	0.07
23.00	2.00	0.38	5.00	0.00	0.07	0.07
24.00	2.00	0.38	5.00	0.00	0.07	0.07
25.00	2.00	0.38	5.00	0.00	0.07	0.07
26.00	2.00	0.38	5.00	0.00	0.07	0.07
27.00	2.00	0.37	5.00	0.00	0.07	0.07

28.00	2.00	0.37	5.00	0.00	0.07	0.07
29.00	2.00	0.37	5.00	0.00	0.07	0.07
30.00	2.00	0.37	5.00	0.00	0.07	0.07
31.00	2.83	0.37	5.00	0.00	0.06	0.06
32.00	2.81	0.37	5.00	0.00	0.06	0.06
33.00	2.79	0.36	5.00	0.00	0.05	0.05
34.00	2.78	0.36	5.00	0.00	0.05	0.05
35.00	2.76	0.36	5.00	0.00	0.05	0.05
36.00	2.75	0.35	5.00	0.00	0.04	0.04
37.00	2.73	0.35	5.00	0.00	0.04	0.04
38.00	2.72	0.35	5.00	0.00	0.04	0.04
39.00	2.70	0.34	5.00	0.00	0.03	0.03
40.00	2.69	0.34	5.00	0.00	0.03	0.03
41.00	2.68	0.34	5.00	0.00	0.03	0.03
42.00	2.66	0.33	5.00	0.00	0.02	0.02
43.00	2.65	0.33	5.00	0.00	0.02	0.02
44.00	2.63	0.33	5.00	0.00	0.02	0.02
45.00	2.62	0.32	5.00	0.00	0.01	0.01
46.00	2.61	0.32	5.00	0.00	0.01	0.01
47.00	2.59	0.32	5.00	0.00	0.01	0.01
48.00	2.58	0.31	5.00	0.00	0.01	0.01
49.00	2.57	0.31	5.00	0.00	0.00	0.00
50.00	2.56	0.31	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils