November 30, 2015 15-363-26

Sinanian Development
18980 Ventura Boulevard, Suite 200
Tarzana, CA 91356

Subject: Supplement No. 1
Geotechnical and Geologic Investigation
Lots 11, 19, and 20, Block 15, Tract No. 7803
1749 and 1751 Malcolm Avenue and 1772 Glendon Avenue
Los Angeles, California

Gentlemen:

INTRODUCTION

We are pleased to submit this Supplement No. 1 report responding to the City comments. The original report of geotechnical and geological investigation report for the subject project was issued by this office on July 21, 2015.

This submittal is in response to comments in a Geology and Soils Report Correction Letter dated August 19, 2015 by the Grading Section Of the Department of Building and Safety of the City of Los Angeles (Log # 89430). For convenience, we have enclosed a copy of the City Review Letter with this Supplement No. 1 report. Our responses also incorporate verbal discussion of the comments between the undersigned geologist and Mr. Schneidereit of LADBS as well as with Mr. Brian Olson of the California Geologic Survey.

Our responses follow the original order of comments.

RESPONSE TO THE COMMENTS

1. In order to respond to this comment, and as requested, additional exploration was advanced along Malcolm Avenue. Seven additional Cone Penetrometer soundings were advanced along the street, CPT-14 through CPT-20, on October

6, 2015. Prior to advancing the CPTs, necessary traffic control, encroachment and excavation permits were retrieved for drilling in the public right-of-way.

See the Drawing No. 1 for the locations of the new CPTs. The new CPTs were advanced in the street between old CPTs 8-10 on the north and CPTs 11-13 on the south along the same alignment. These additional CPTs have allowed for better resolution of the fault location and orientation.

We have revised the main geologic cross section A to include the new CPTs along the street, and have removed the projected geologic Borings 1 through 3. We have included a new geologic cross section B, through the geologic borings and previously advanced CPTs which were advanced through the east portion of the subject property. We have identified the fault location based on cross correlation of CPT logs and boring logs in each of these north-south sections, as well as numerous east-west sections between the two main transects, and this has given us a better resolution of the fault location and orientation.

Based on the additional exploration, by having two transects of geologic data, one along the street and one along the eastern property, we have been able to determine that the location of the faults are essentially the same as previously reported, as is the orientation of the fault.

In order to determine this, we have included new short geologic sections C, D, E, F and G which are extended subparallel to the fault trace, between CPTs and borings on private property and CPTs on the street. These additional sections serve to present positive cross-correlation (or lack thereof) of subsurface geology between the two main north-south transects. Subsurface profiles as depicted in sections C and D, which are south of the fault, appear to match up reasonably well at the same or similar elevations. Section E, which extends parallel and just north of the mapped fault, also matches subsurface layers reasonably well. However, in sections F (between CPT 19 and B-3) and G (between CPT-6 and

CPT-19), both of which cross the projected fault, subsurface layers appears to be disrupted or disturbed. Our interpretation of the subsurface structure essentially locks in the orientation of the fault from the street to the east portion of the property, and this orientation is essentially the same as what was previously reported. Please see attached Drawings for graphical depiction.

2. Since we have provided additional CPT data in the street, our transects A and B have more suitable orientations for cross comparison of subsurface data. CPT-11 through CPT-13 are reasonably similar to new CPTs 14 through 19. The entire upper 10-15 feet across the transect, until the fault, appears to be fine-grained soils.

   Regarding the comment about Qof-1 missing from CPT-2, it is possible that the area was previously excavated for one utility or another. As can be seen from Drawing 1, and is typically the case in urban environments, the upper ground surface in public streets can be significantly disturbed due to excavation and backfill associated with utilities. Below 30 feet, the layers appear to match up with CPT-1, Boring 1, and CPT-3.

   Other than possible man-made disturbance of subsurface layers, it should be noted that typically during alluvial deposition, some braiding is likely, resulting in lenticular layers that do not extend for long distances in any direction.

3. The purple marker bed served only to show the offset of layers in the northern part of the site in our original report, between CPT-10 and Boring 3. There are several such minor layers that can be traced with reasonable certainty across borings or CPTs, which appear to be offset at the same location by the fault. There is no other significance to this purple layer.

ADDITIONAL GEOLOGIC CONSIDERATIONS

The subsurface layers as shown in sections A and B appear to be folded due to the proximity to the fault zone. This is more pronounced in the southern portion of the study area. Folding of subsurface strata near faults is common and well documented in the literature.

As part of our supplemental investigation, and during a meeting with Mr. Schneidereit of LADBS prior to commencing additional field work, we were asked to utilize information from the gasoline station south of the site to augment our data and provide additional discussion of the stratigraphic correlation of the southern portion of the study area. For the Site Assessment Report of the south-adjacent gas station, we reached out to Mr. Brian Olson of the CGS, who provided us with a Site Assessment Report for 10801 Santa Monica Boulevard prepared by Wayne Perry in 2011.

As part of his effort, Wayne Perrry advanced three environmental borings and utilized boring log information from several other prior sources, logs of which were not all included in his report. However, we were able to interpret soil log information for Boring TDD-3, advanced in the northeast corner of the gas station to depth of approximately 30 feet, from cross section C-C' of Perry's report, and include our reinterpreted log of TDD-3 in our Geologic Cross Section B-B'. This log was advanced in support of an environmental assessment report presumably by an environmental specialist and therefore is of limited use to us in our current fault study. Nevertheless, we have extended our interpretation of subsurface structure in transect B to include the boring information from TDD-3. The geologic data from TDD-3 is sufficiently similar to our Boring Log 1, advanced in the southeast portion of the site, and hence, does not provide any supporting data that would indicate the presence of a fault in the southern portion of the study area.

REVISED ENGINEERED MITIGATION RECOMMENDATIONS

The city asked us to provide additional exploration to get better resolution of the fault orientation, or recommend a larger setback. We have provided additional exploration and felt have made a reasonably accurate geologic interpretation of the subsurface conditions. However, in light of the city's request, and due to the nature of the profession and variability of subsurface conditions, we are revising our setback recommendation to 20 feet (originally we recommended ten feet). The 20 feet setback will affect the northeast portion of the proposed new building as it was previously designed. Either the design needs to be revised to stay outside of the 20 feet setback zone, or the building structure be designed so that any portion extending into the No-Build Zone is structurally cantilevered so that its foundation stays outside of the no-build zone. Based on recent correspondence with the clients and project architect and engineer, they will be pursuing the latter option, i.e. the building footprint will stay the same, and the portion of the building within the No-Build-Zone will be structurally cantilevered.

In addition, for the same reasoning, we are revising our mat foundation recommendation to include the entire project area. Previously we had recommended only the eastern building to utilize a 24" mat foundation. At the current time, we are recommending the western building to also utilize a 24" mat foundation.

See our Drawings Nos. 9, 10 and 11, Geotechnical Site Plan and Cross Sections, for graphical depictions of the engineered mitigation.

-oOo-

Thank you for the opportunity to be of continued service on this project. Should you have any questions regarding this Supplement No. 1, or wish to discuss the project further, please do not hesitate to call us.

Respectfully Submitted,

APPLIED EARTH SCIENCES

Shant Minas
Engineering Geologist
EG 2607

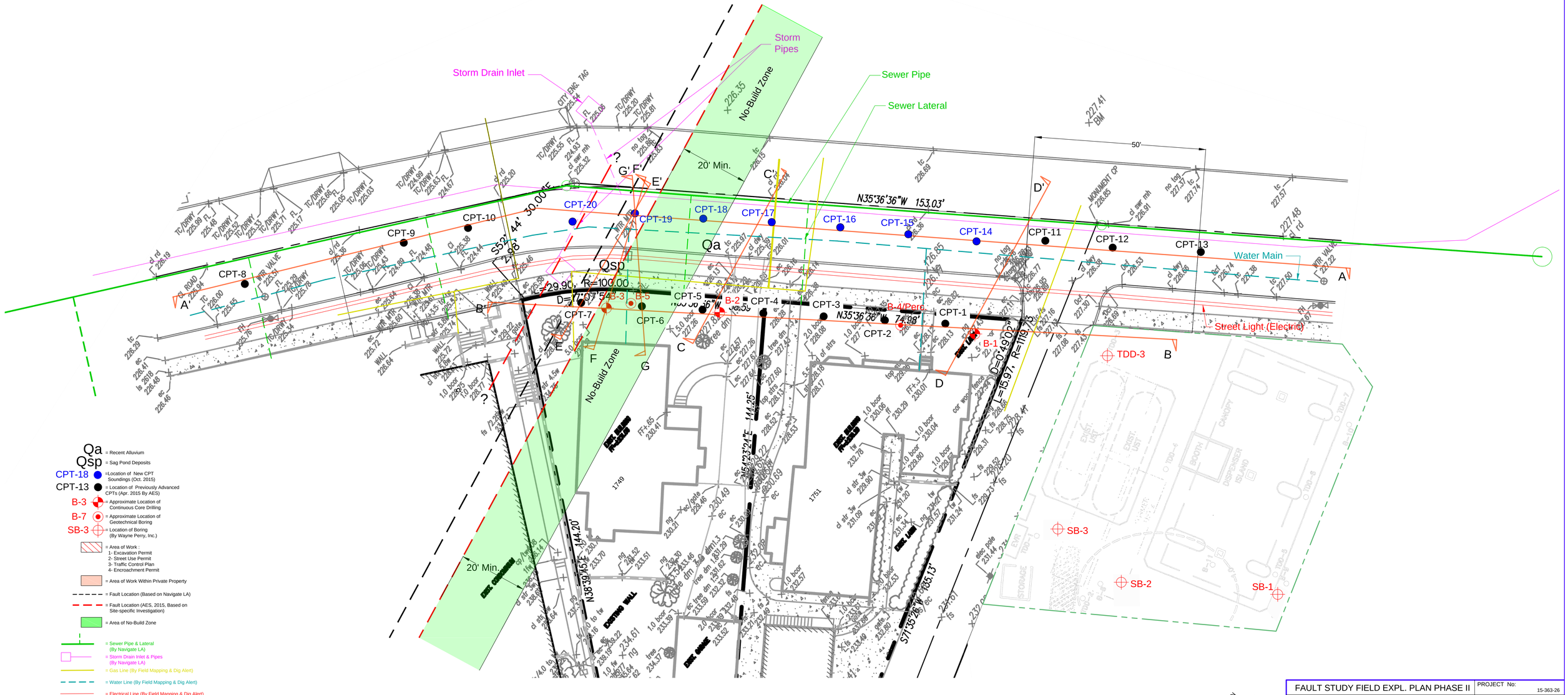
Caro J. Minas, President,
Geotechnical Engineer
GE 601

Steven Miller
Senior Engineering Geologist
EG 1303

SM/CJM/la

Enclosure: Drawing No. 1 - Fault Study Field Exploration Plan (Phase II)
Drawing No. 2 - Geologic Cross Section A
Drawing No. 3 - Geologic Cross Section B
Drawing Nos. 4 through 8 - Geologic Cross Sections C through G
Drawing No. 9 - Geotechnical Site Plan
Drawing No. 10 and 11 - Geotechnical Cross Sections H and I
Summary of Cone Penetration Data by Kehoe Engineering for new CPTs 14 through 20
Copy of City Correction Letter (Log No. 89430)
Site Assessment Report for 10801 Santa Monica Blvd., Wayne Perry, 2011

Distribution: (4)



Qa = Recent Alluvium

Qsp = Sag Pond Deposits

CPT-18 = Location of New CPT Soundings (Oct. 2015)

CPT-13 = Location of Previously Advanced CPTs (Apr. 2015 By AES)

B-3 = Approximate Location of Continuous Core Drilling

B-7 = Approximate Location of Geotechnical Boring

SB-3 = Location of Boring (By Wayne Perry, Inc.)

= Area of Work :
1- Excavation Permit
2- Street Use Permit
3- Traffic Control Plan
4- Encroachment Permit

= Area of Work Within Private Property

= Fault Location (Based on Navigate LA)

= Fault Location (AES, 2015, Based on Site-specific Investigation)

= Area of No-Build Zone

= Sewer Pipe & Lateral (By Navigate LA)

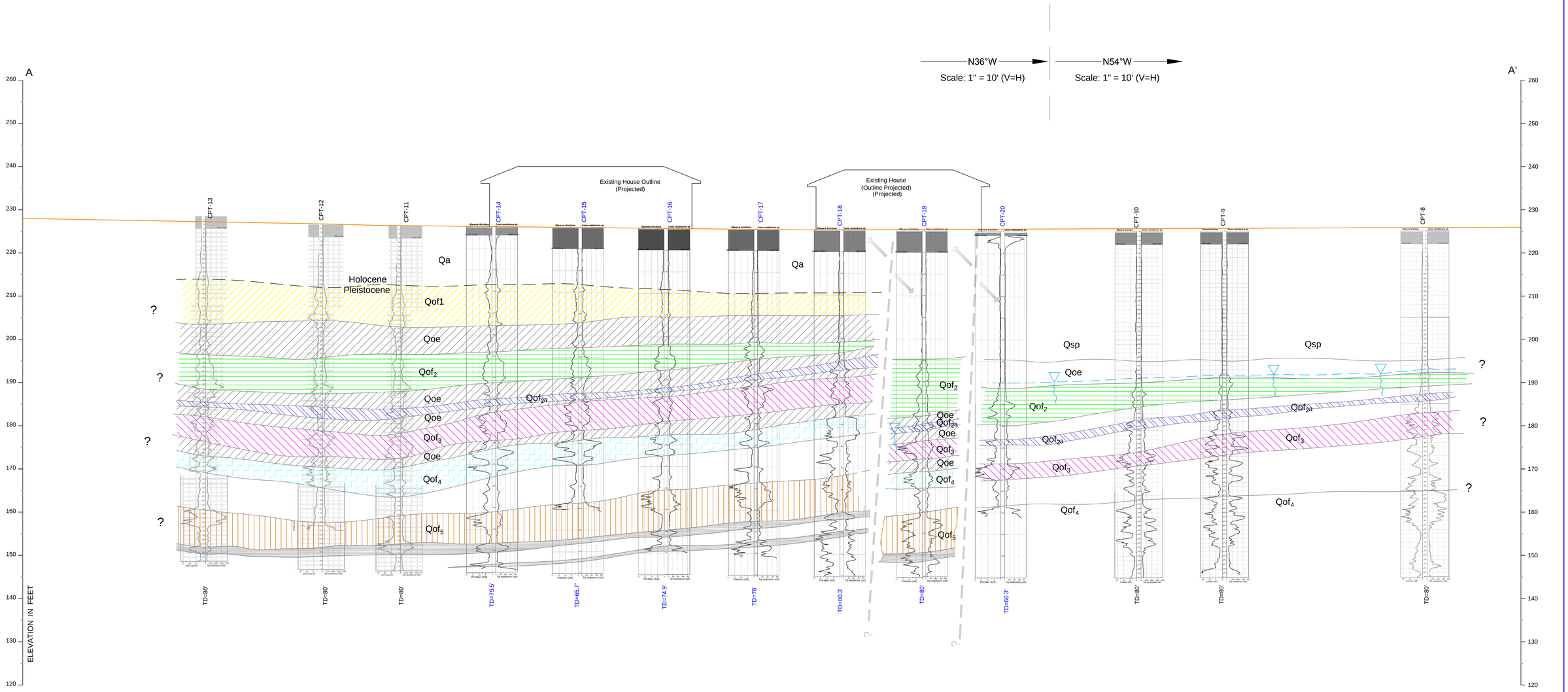
= Storm Drain Inlet & Pipes (By Navigate LA)

= Gas Line (By Field Mapping & Dig Alert)

= Water Line (By Field Mapping & Dig Alert)

= Electrical Line (By Field Mapping & Dig Alert)

FAULT STUDY FIELD EXPL. PLAN PHASE II		PROJECT No:	15-363-26
DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Avenue, Los Angeles, CA 90024	CHECKED BY:	SM
Applied Earth Sciences	GEOTECHNICAL, GEOLOGY, ENVIRONMENTAL ENGINEERING CONSULTANTS www.aesoil.com (818) 552-6000	DRAWING No: 1	SUPP. No: 1



CPT-13
TD=80'
= Location of Previously Advanced CPTs (Apr. 2015 By AES)

CPT-20
TD=80'
=Location of New CPT Soundings (Oct. 2015 By AES)

GEOLOGIC CROSS SECTION A-A'		PROJECT No: 15-363-26	
DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Ave. & 1772 Glendon Ave., Los Angeles, CA 90024	CHECKED BY:	SM
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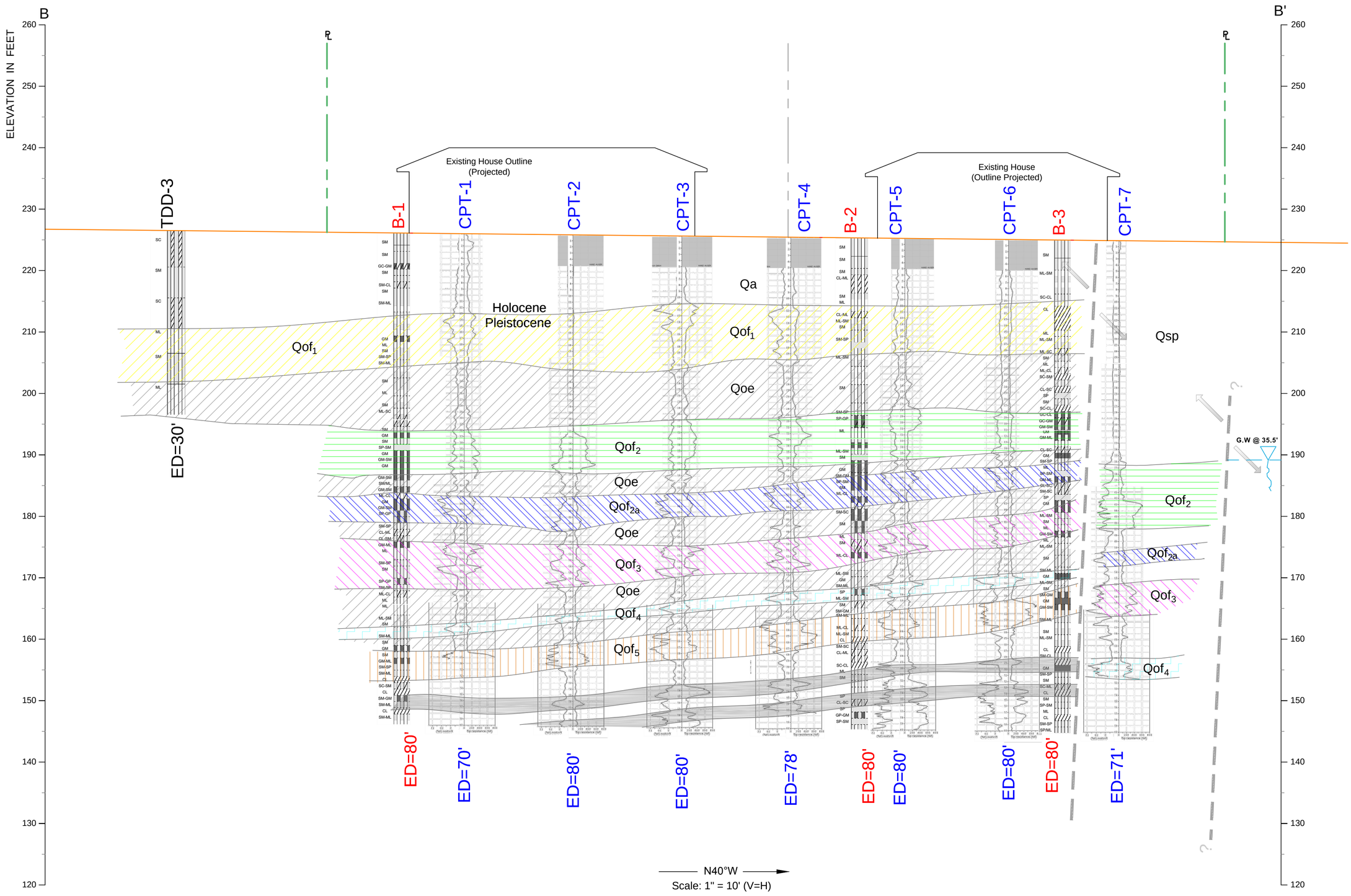

LEGEND

Holocene
- Af = Surficial Fill
- Qa = Recent Alluvium
- Qsp = Sag Pond Deposits

Pleistocene
- Qof = Older Fluvial & Alluvial Deposits
- Qoe = Older Estuarine Deposits

CPT-10 (ED=80') = Approximate Location of Proposed CPT Sounding (Approx. every 20', Estimated Depth=80')

B-3 (ED=80') = Approximate Location of Proposed Continuous Core Drilling (Estimated Depth=80')

B-7 (TD=10') = Location of Geotechnical Boring

= Location of Faults, Based on Subsurface Exploration (AES, 2015)

GEOLOGIC SECTION B-B'		PROJECT No:	15-363-26
DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Ave. & 1772 Glendon Ave., Los Angeles, CA 90024	CHECKED BY:	SM
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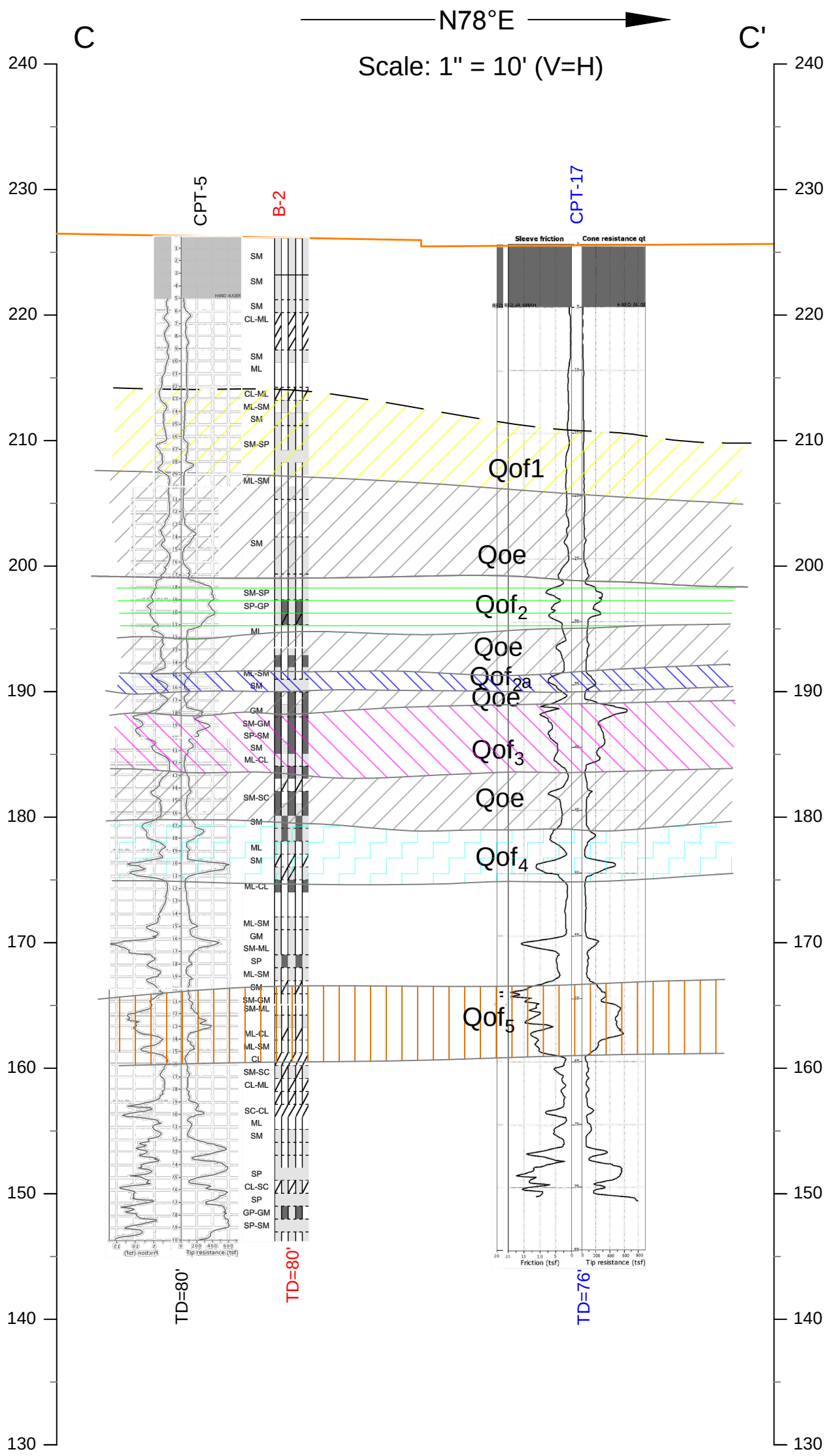

GEOLOGIC CROSS SECTION C-C'

DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Ave. & 1772 Glendon Ave., Los Angeles, CA 90024	CHECKED BY:	SM

PROJECT No: 15-363-26

DRAWING No: 4

SUPP. No: 1

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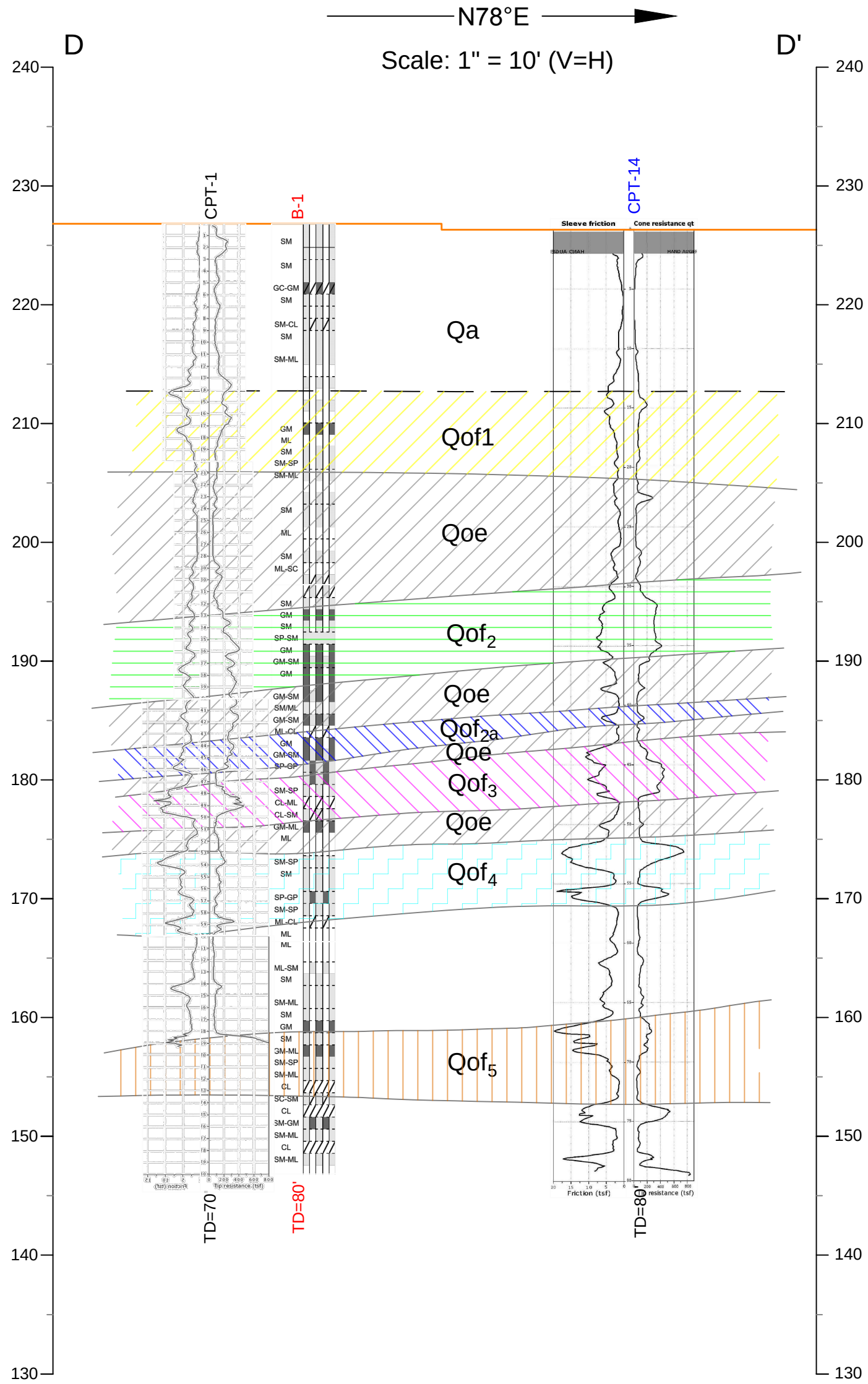

CPT-13 TD=80' = Location of Previously Advanced CPTs (Apr. 2015 By AES)

CPT-20 TD=80' =Location of New CPT Soundings (Oct. 2015 By AES)

B-5 TD=80' = Approximate Location of Previously Advanced Core Drilling (Apr. 2015 By AES)

GEOLOGIC CROSS SECTION D-D'

PROJECT No:	15-363-26		
DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Ave. & 1772 Glendon Ave., Los Angeles, CA 90024	CHECKED BY:	SM
DRAWING No:	5	SUPP. No:	1

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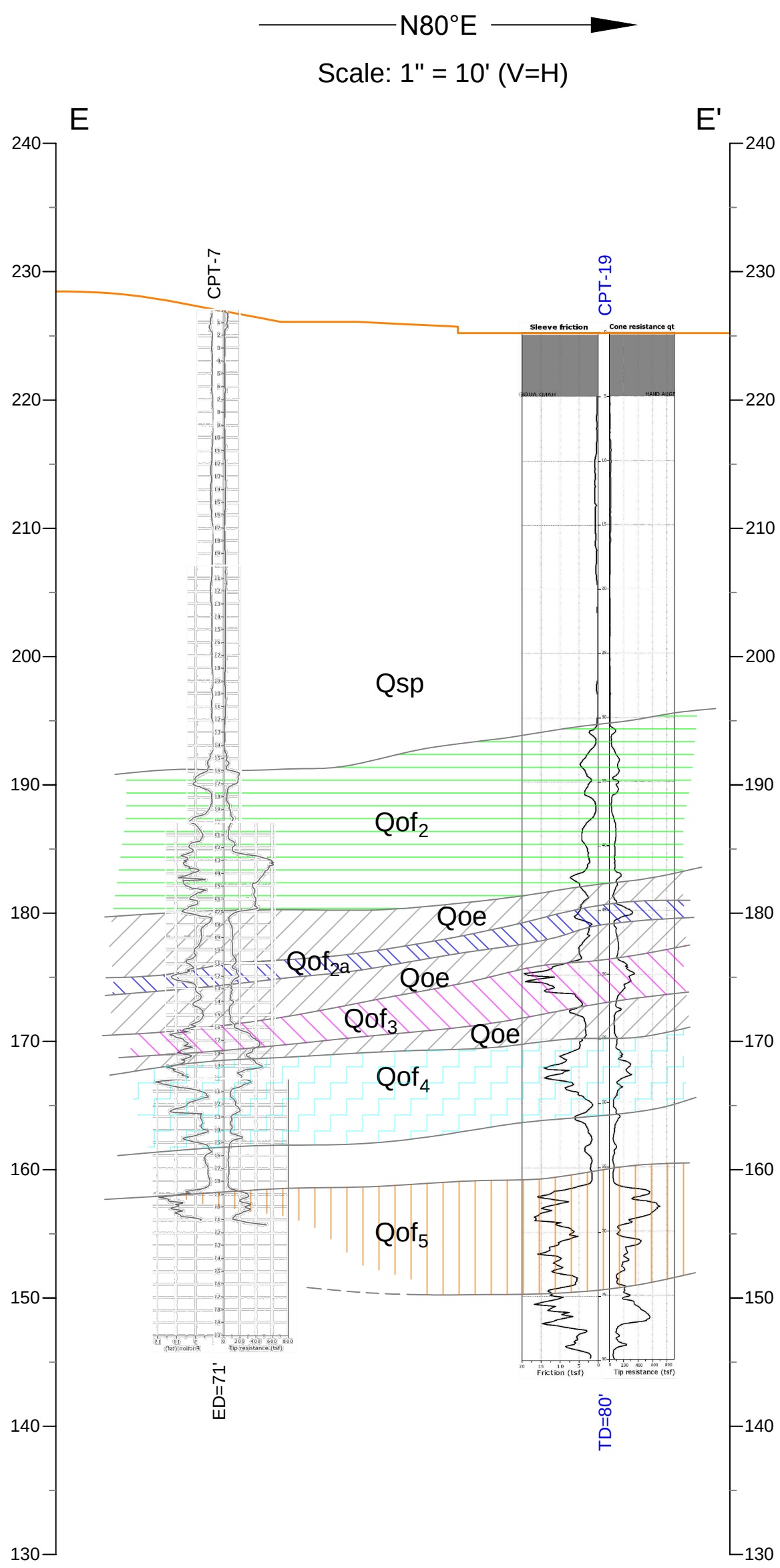

CPT-13

= Location of Previously Advanced CPTs (Apr. 2015 By AES)

TD=80'

CPT-20

=Location of New CPT Soundings (Oct. 2015 By AES)

TD=80'

GEOLOGIC CROSS SECTION E-E'

DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Ave. & 1772 Glendon Ave., Los Angeles, CA 90024	CHECKED BY:	SM

PROJECT No: 15-363-26

DRAWING No: 6

SUPP. No: 1

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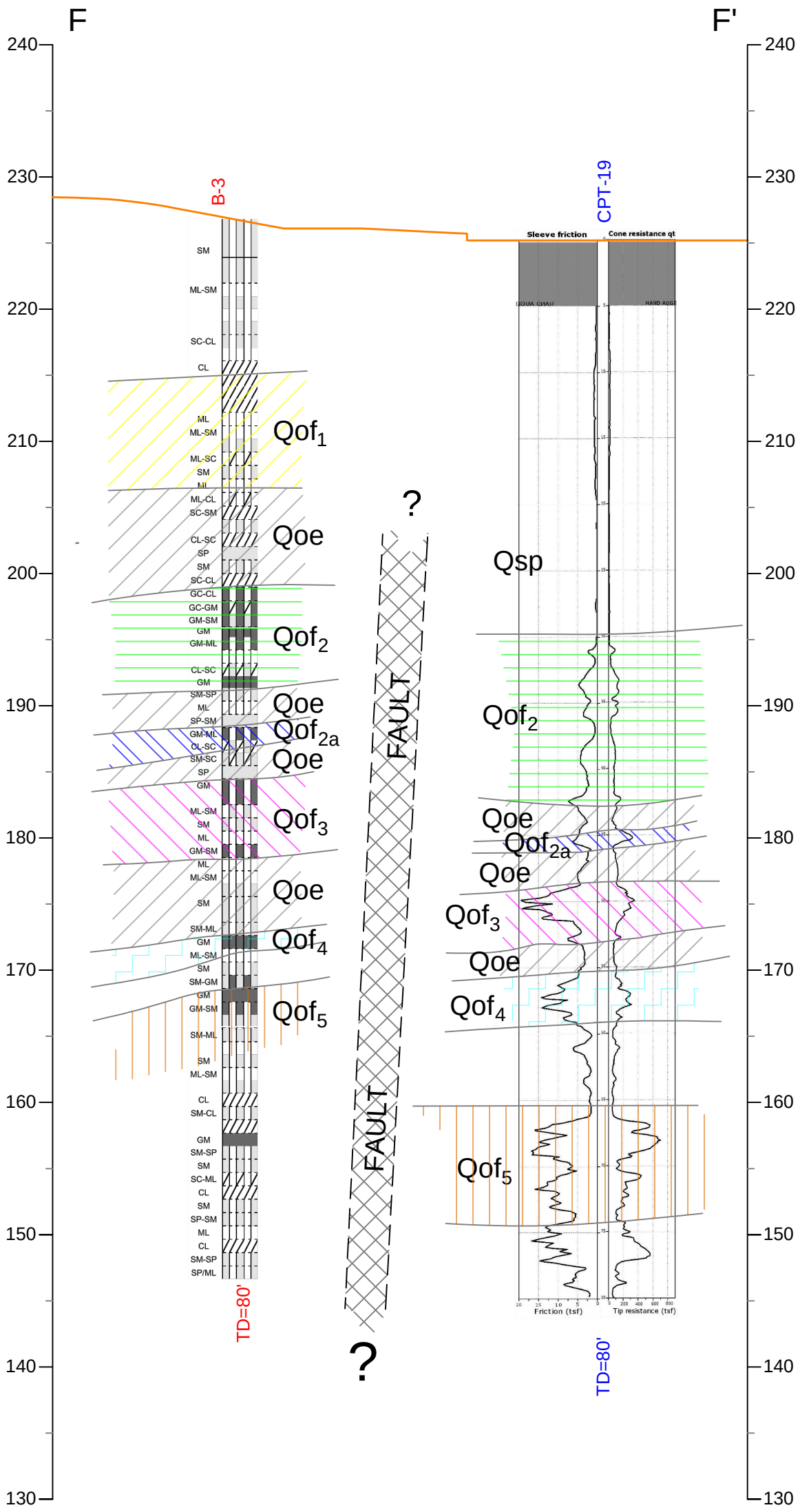
N67°E

Scale: 1" = 10' (V=H)



CPT-20

TD=80'

=Location of New CPT Soundings (Oct. 2015 By AES)

B-5

TD=80'

= Approximate Location of Previously Advanced Core Drilling (Apr. 2015 By AES)

GEOLOGIC CROSS SECTION F-F'

DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Ave. & 1772 Glendon Ave., Los Angeles, CA 90024	CHECKED BY:	SM

PROJECT No: 15-363-26

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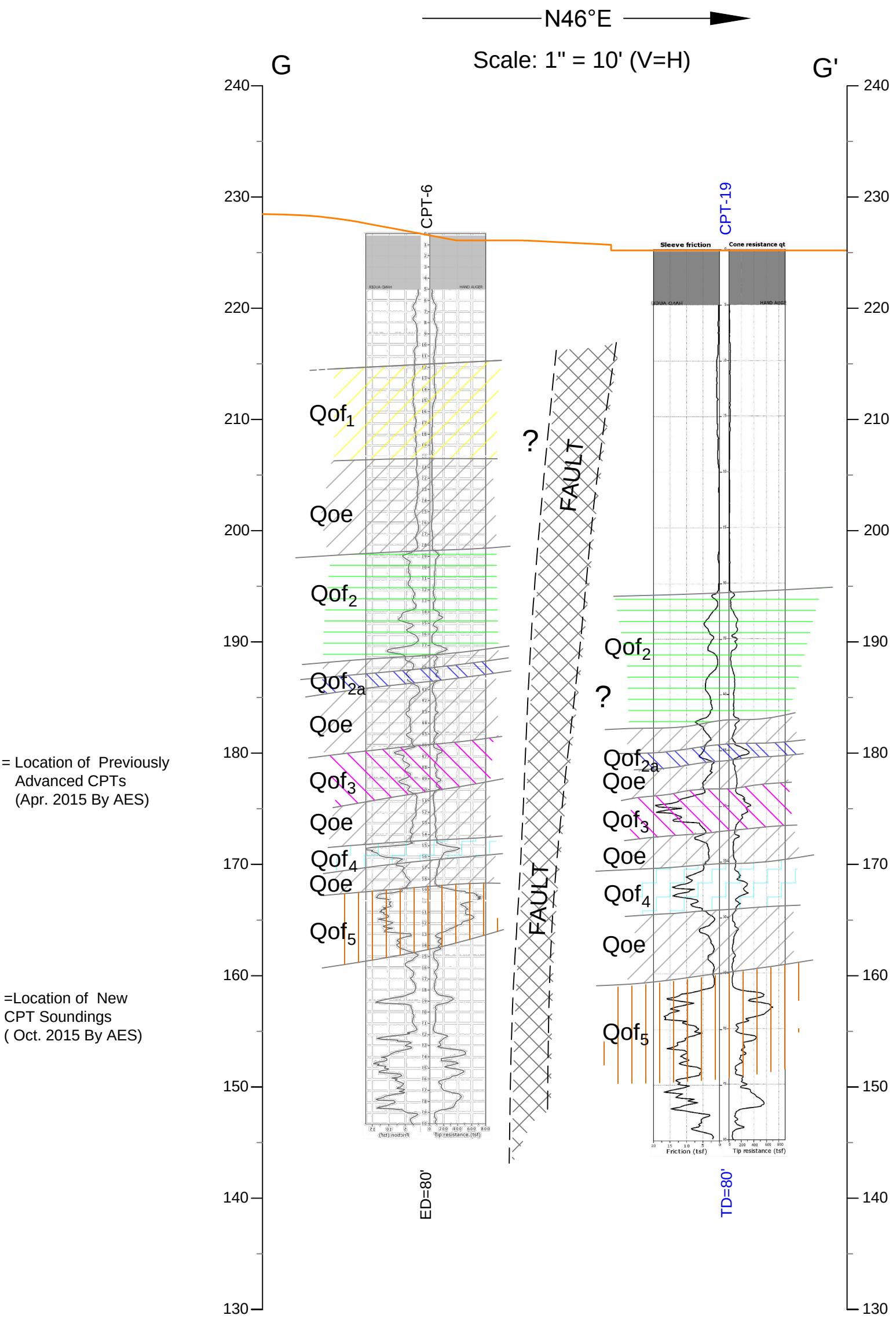
DRAWING No: 7

SUPP. No: 1



CPT-13

= Location of Previously Advanced CPTs (Apr. 2015 By AES)

TD=80'

CPT-20

=Location of New CPT Soundings (Oct. 2015 By AES)

TD=80'

GEOLOGIC CROSS SECTION G-G'

DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Ave. & 1772 Glendon Ave., Los Angeles, CA 90024	CHECKED BY:	SM

PROJECT No: 15-363-26

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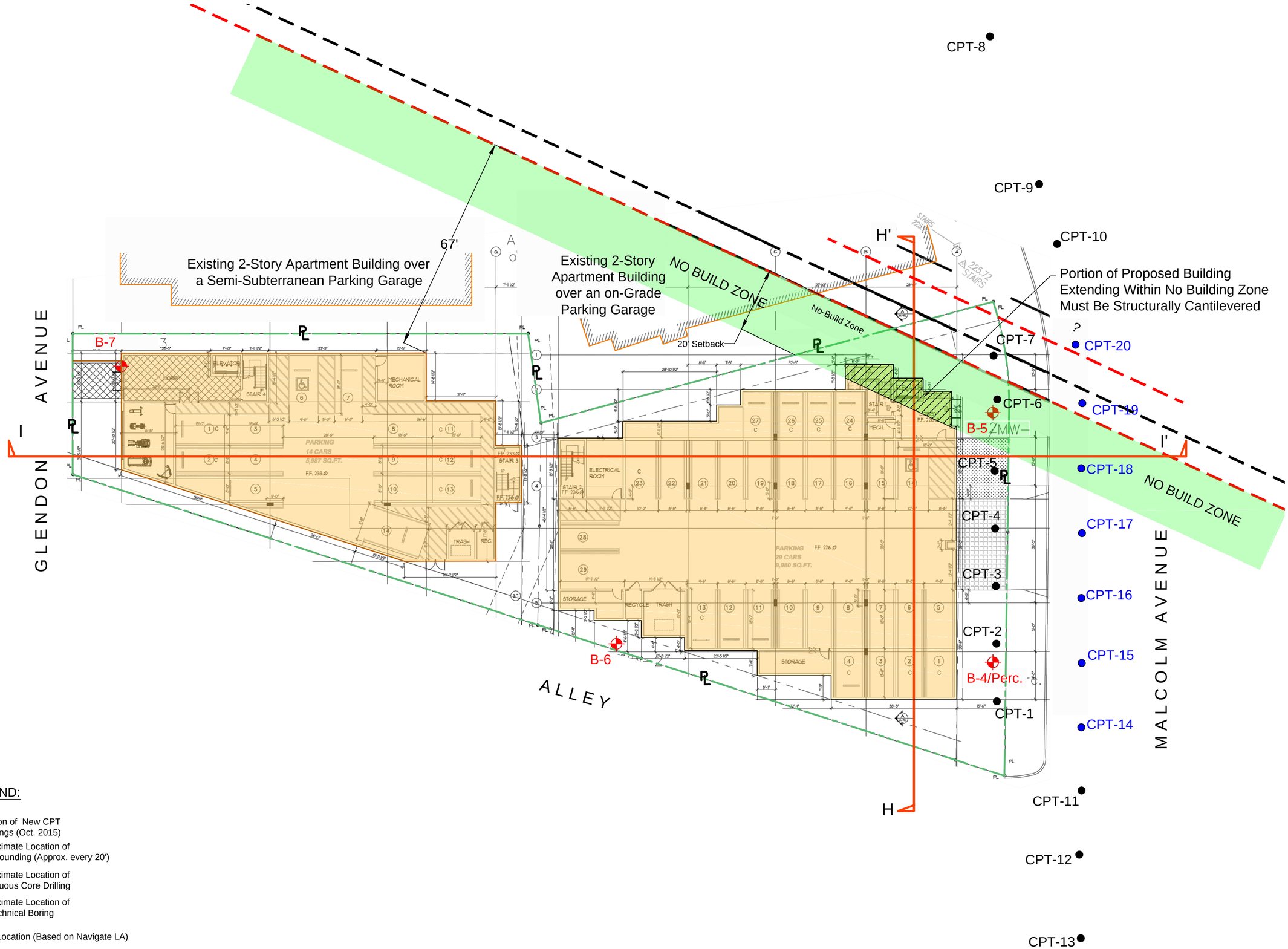
DRAWING No: 8

SUPP. No: 1



LEGEND:

- CPT-18 = Location of New CPT Soundings (Oct. 2015)
- CPT-13 = Approximate Location of CPT Sounding (Approx. every 20')
- B-3 = Approximate Location of Continuous Core Drilling
- B-7 = Approximate Location of Geotechnical Boring
- = Fault Location (Based on Navigate LA)
- = Fault Location (AES, 2015, Based on Site-specific Investigation)
- = Area of No-Build Zone
- = Area of 2' Mat Foundatiom

Scale: 1" = 20'

GEOTECHNICAL SITE PLAN		PROJECT No: 15-363-02
DESCRIPTION:	Proposed Multifamily Building	DATE: 11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY: ZS
ADDRESS:	1749 & 1751 Malcolm Ave. & 1772 Glendon Ave., Los Angeles, CA 90024	CHECKED BY: CM

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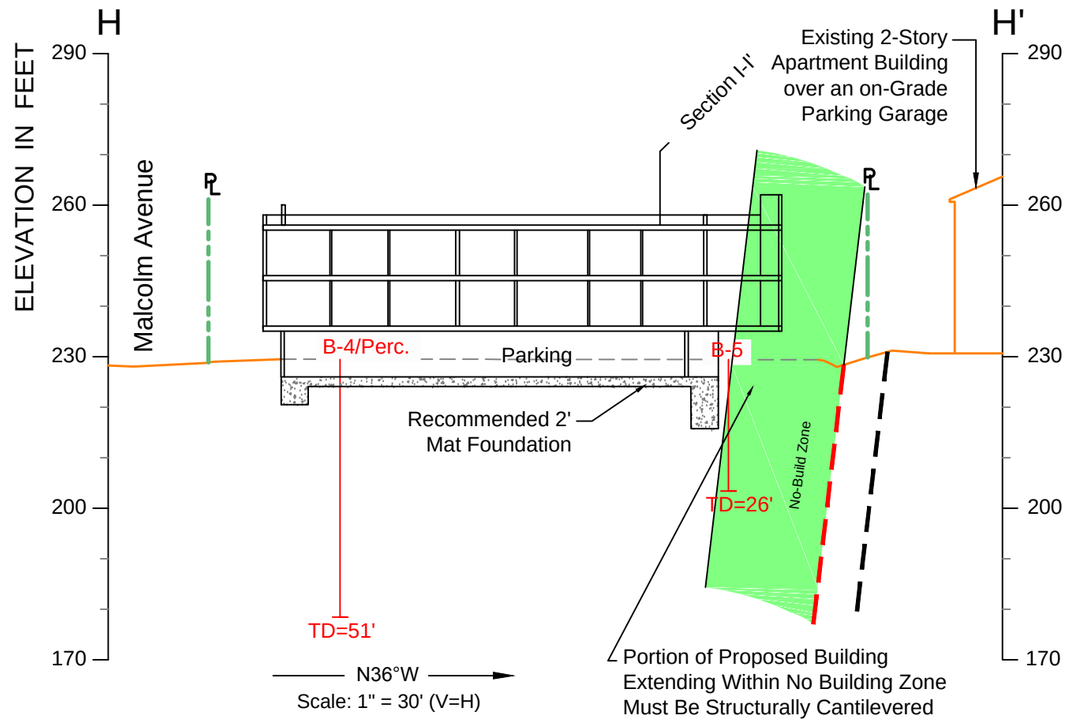
DRAWING No: 9 | SUPP. No: 1



LEGEND:

B-4
TD=10'
(Projected)

= Location & Number of Boring

= Fault Location (Based on Navigate LA)

= Fault Location (AES, 2015, Based on Site-specific Investigation)

= Area of No-Build Zone

GEOTECHNICAL CROSS SECTIONS H-H'

DESCRIPTION:	Proposed Multifamily Building
FOR:	Sinanian Development
ADDRESS:	1749 & 1751 Malcolm Avenue, Los Angeles, CA 90024

PROJECT No:	15-363-26
DATE:	11 / 30 / 2015
DRAWN BY:	ZS
CHECKED BY:	SM
DRAWING No:	10
SUPP. No:	1

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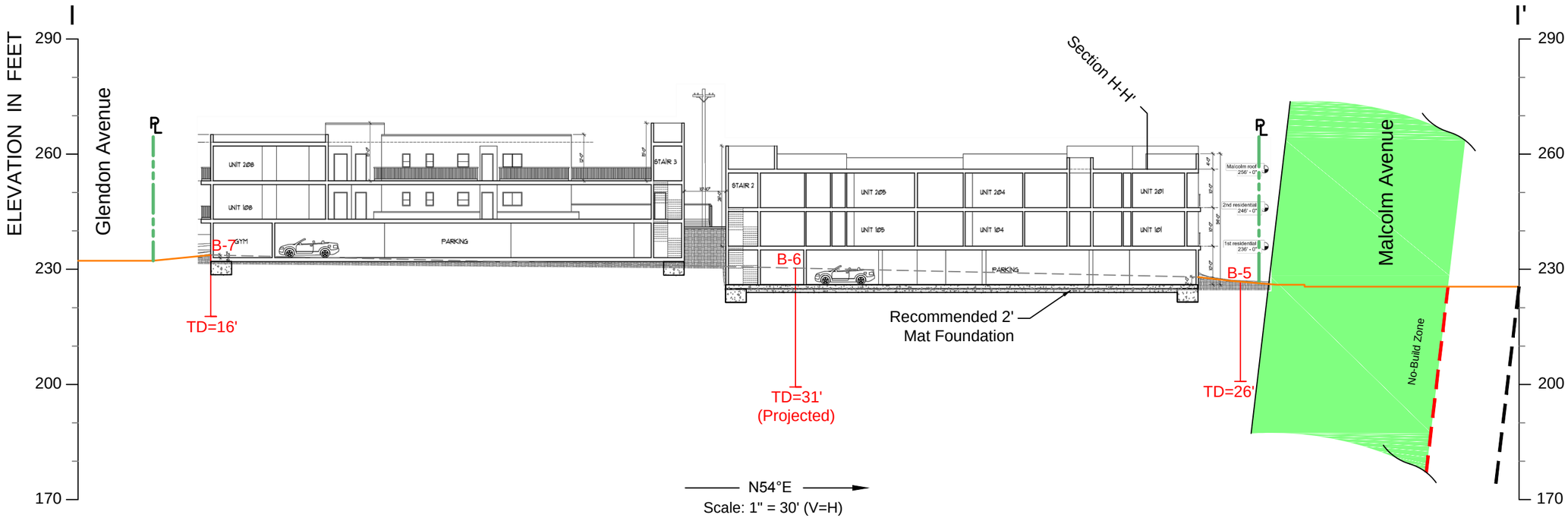

LEGEND:

B-4
TD=10'
(Projected)
= Location & Number of Boring

= Fault Location (Based on Navigate LA)

= Fault Location (AES, 2015, Based on Site-specific Investigation)

= Area of No-Build Zone

GEOTECHNICAL CROSS SECTIONS I-I'

DESCRIPTION:	Proposed Multifamily Building	DATE:	11 / 30 / 2015
FOR:	Sinanian Development	DRAWN BY:	ZS
ADDRESS:	1749 & 1751 Malcolm Avenue, Los Angeles, CA 90024	CHECKED BY:	SM

PROJECT No: 15-363-26

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DRAWING No: 11

SUPP. No: 1

SUMMARY

OF

CONE PENETRATION TEST DATA

Project:

1749 & 1751 Malcolm Avenue
Los Angeles, CA
October 6, 2015

Prepared for:

Mr. Shant Minas
Applied Earth Sciences
4742 San Fernando Road
Glendale, CA 91204
Office (818) 552-6000 / Fax (818) 552-6007

Prepared by:

KEHOE TESTING & ENGINEERING
5415 Industrial Drive
Huntington Beach, CA 92649-1518
Office (714) 901-7270 / Fax (714) 901-7289
www.kehoetesting.com

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3. **FIELD EQUIPMENT & PROCEDURES**
4. **CONE PENETRATION TEST DATA & INTERPRETATION**

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- CPT Classification/Soil Behavior Chart
- Interpretation Output (CPeT-IT)
- CPeT-IT Calculation Formulas

SUMMARY

OF

CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the project located at 1749 & 1751 Malcolm Avenue in Los Angeles, California. The work was performed by Kehoe Testing & Engineering (KTE) on October 6, 2015. The scope of work was performed as directed by Applied Earth Sciences personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at seven locations to determine the soil lithology. Groundwater measurements and hole collapse depths provided in **TABLE 2.1** are for information only. The readings indicate the apparent depth to which the hole is open and the apparent water level (if encountered) in the CPT probe hole at the time of measurement upon completion of the CPT. KTE does not warranty the accuracy of the measurements and the reported water levels may not represent the true or stabilized groundwater levels.

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-14	80	Refusal, groundwater @ 42 ft
CPT-15	66	Refusal, groundwater @ 42 ft
CPT-16	75	Refusal, hole open to 41 ft (dry)
CPT-17	76	Refusal, hole open to 40 ft (dry)
CPT-18	80	Hole open to 35 ft (dry)
CPT-19	80	Groundwater @ 47 ft
CPT-20	66	Refusal, groundwater @ 60 ft

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by **KTE** using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm^2 cone and recorded the following parameters at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (u)
- Inclination
- Penetration Speed

The above parameters were recorded and viewed in real time using a laptop computer. Data is stored at the KTE office for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. These plots were generated using the CPeT-IT program. Penetration depths are referenced to ground surface. The soil classification on the CPT plots is derived from the attached CPT Classification Chart (Robertson) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used along with cone resistance to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

Tables of basic CPT output from the interpretation program CPeT-IT are provided for CPT data averaged over one foot intervals in the Appendix. Spreadsheet files of the averaged basic CPT output and averaged estimated geotechnical parameters are also included for use in further geotechnical analysis. We recommend a geotechnical engineer review the assumed input parameters and the calculated output from the CPeT-IT program. A summary of the equations used for the tabulated parameters is provided in the Appendix.

It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u. In these situations, experience, judgement and an assessment of the pore pressure data should be used to infer the soil behavior type.

If you have any questions regarding this information, please do not hesitate to call our office at (714) 901-7270.

Sincerely,

KEHOE TESTING & ENGINEERING

Richard W. Koester, Jr.
General Manager

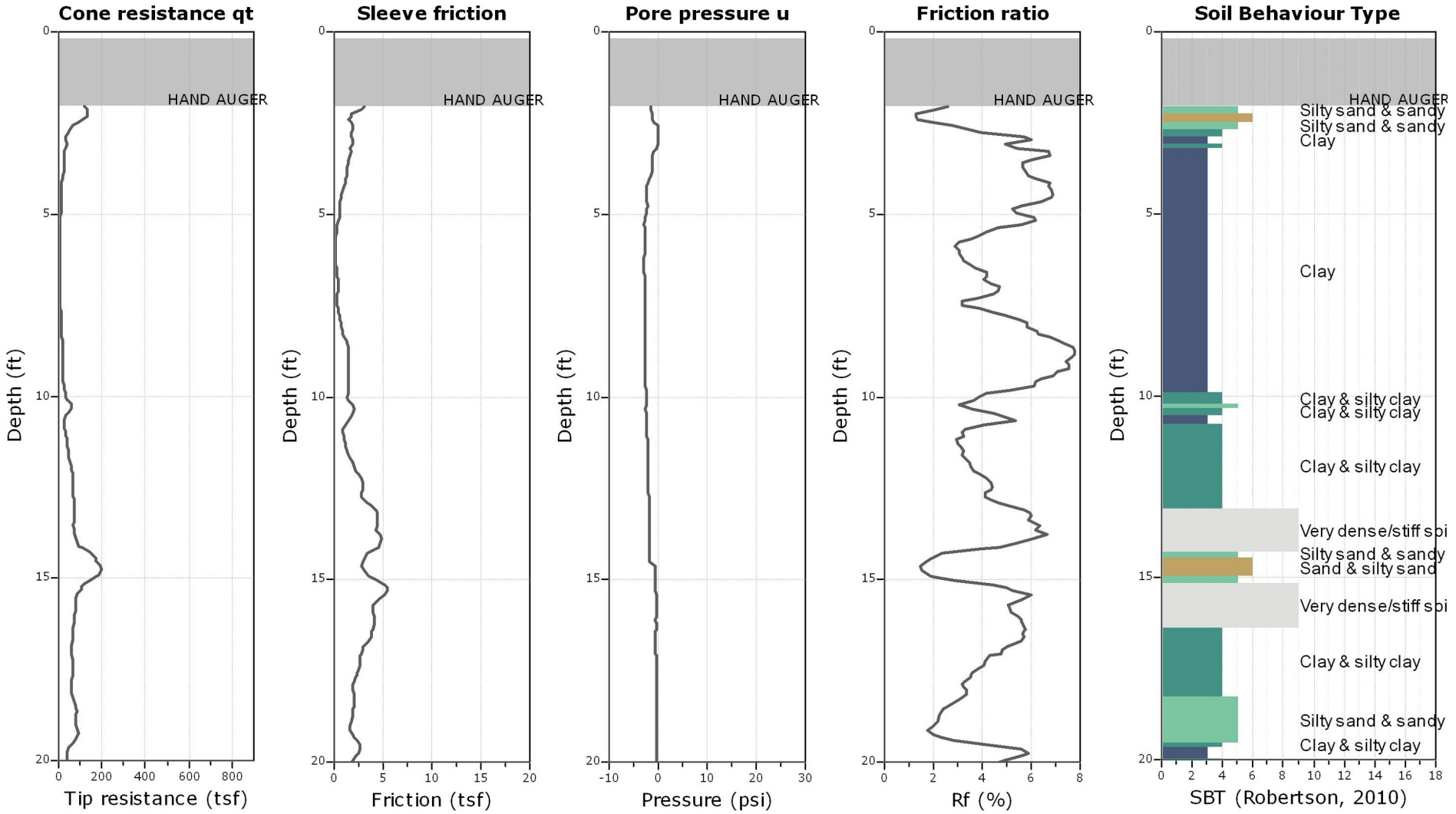
10/08/15-ms-5869-2

APPENDIX

Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

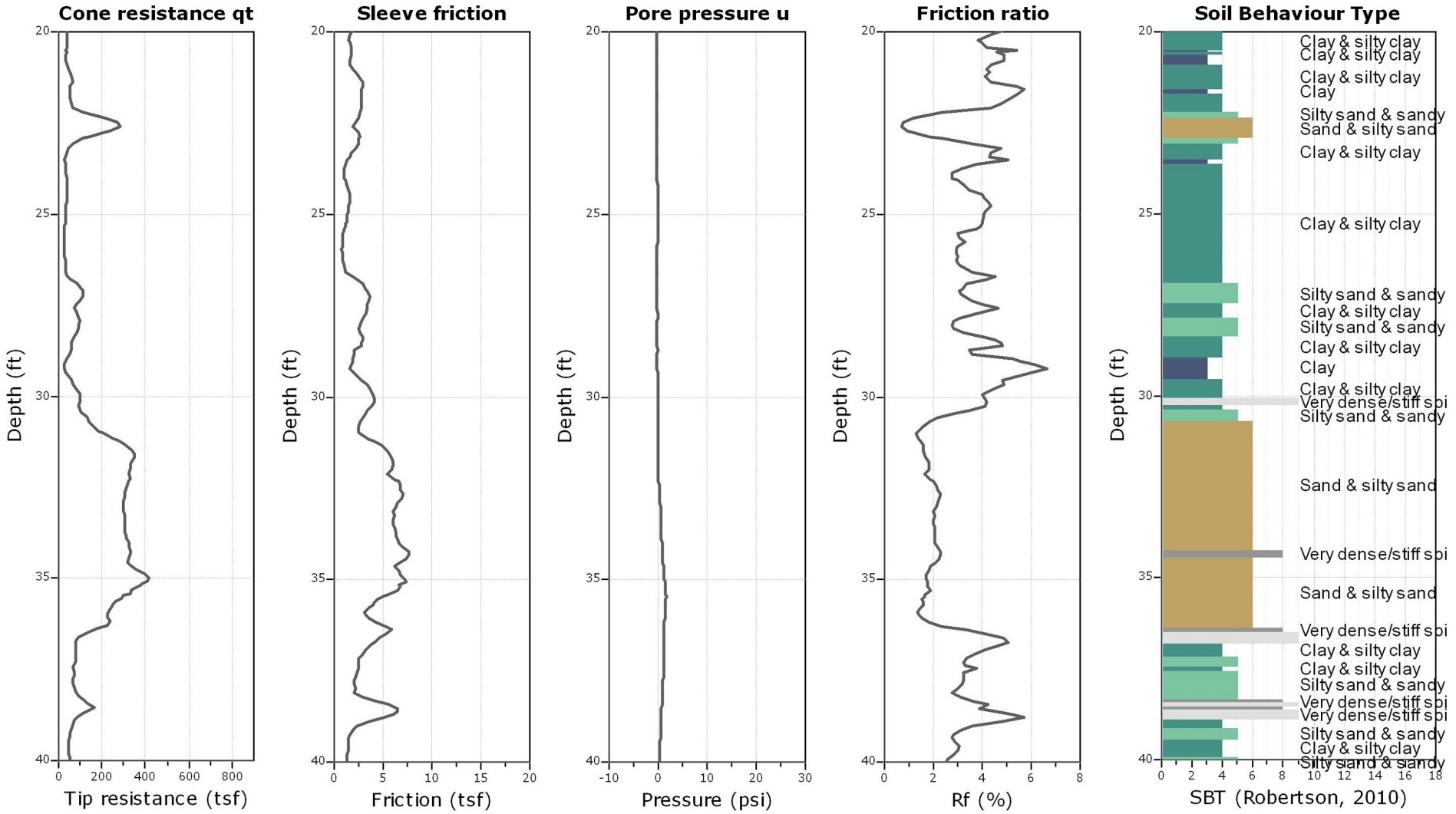
CPT: CPT-14
Total depth: 79.54 ft, Date: 10/6/2015
Cone Type: Vertek



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

CPT: CPT-14
Total depth: 79.54 ft, Date: 10/6/2015
Cone Type: Vertek



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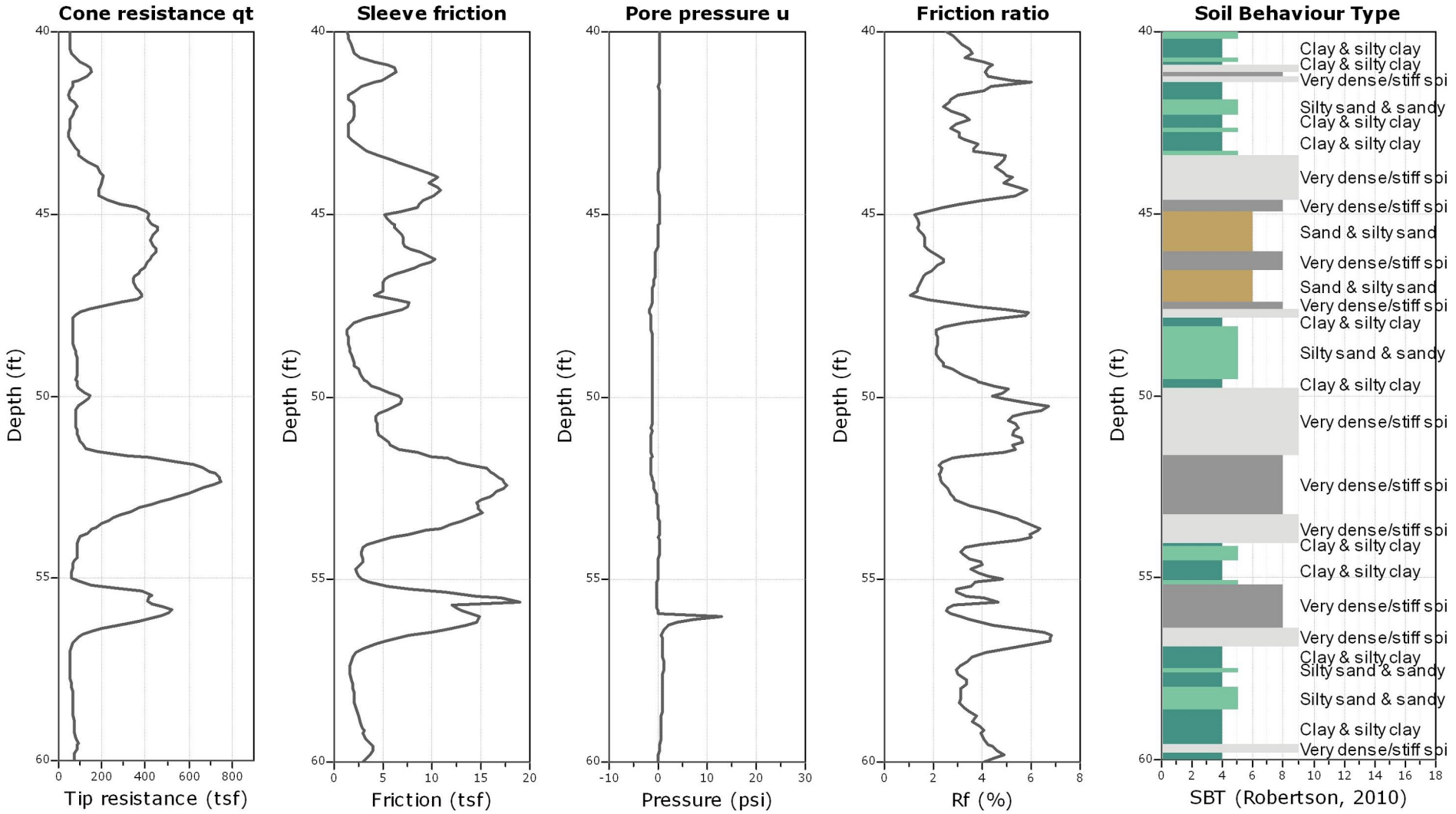
Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

CPT: CPT-14
Total depth: 79.54 ft, Date: 10/6/2015
Cone Type: Vertek



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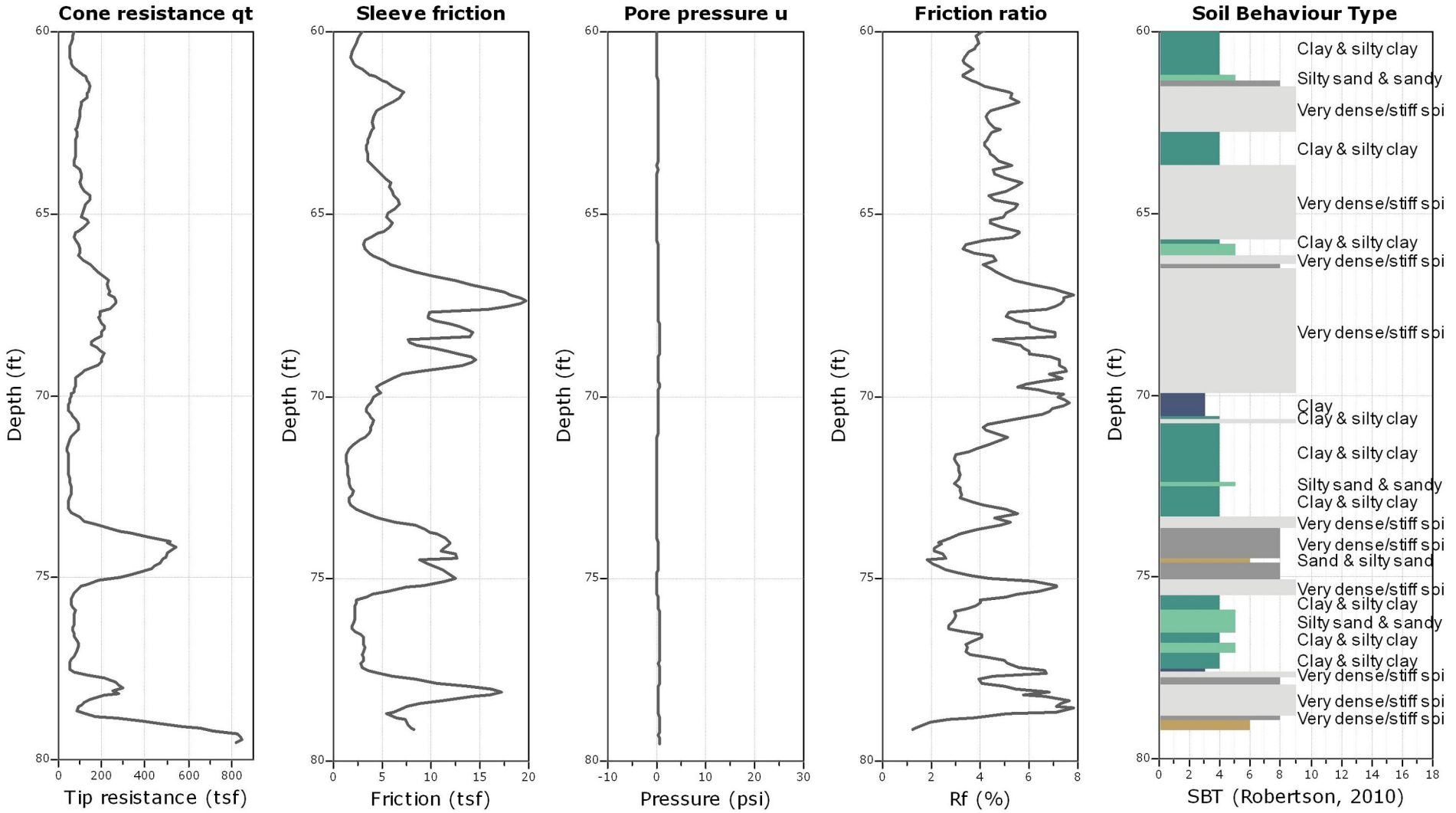
CPT: CPT-14
Total depth: 79.54 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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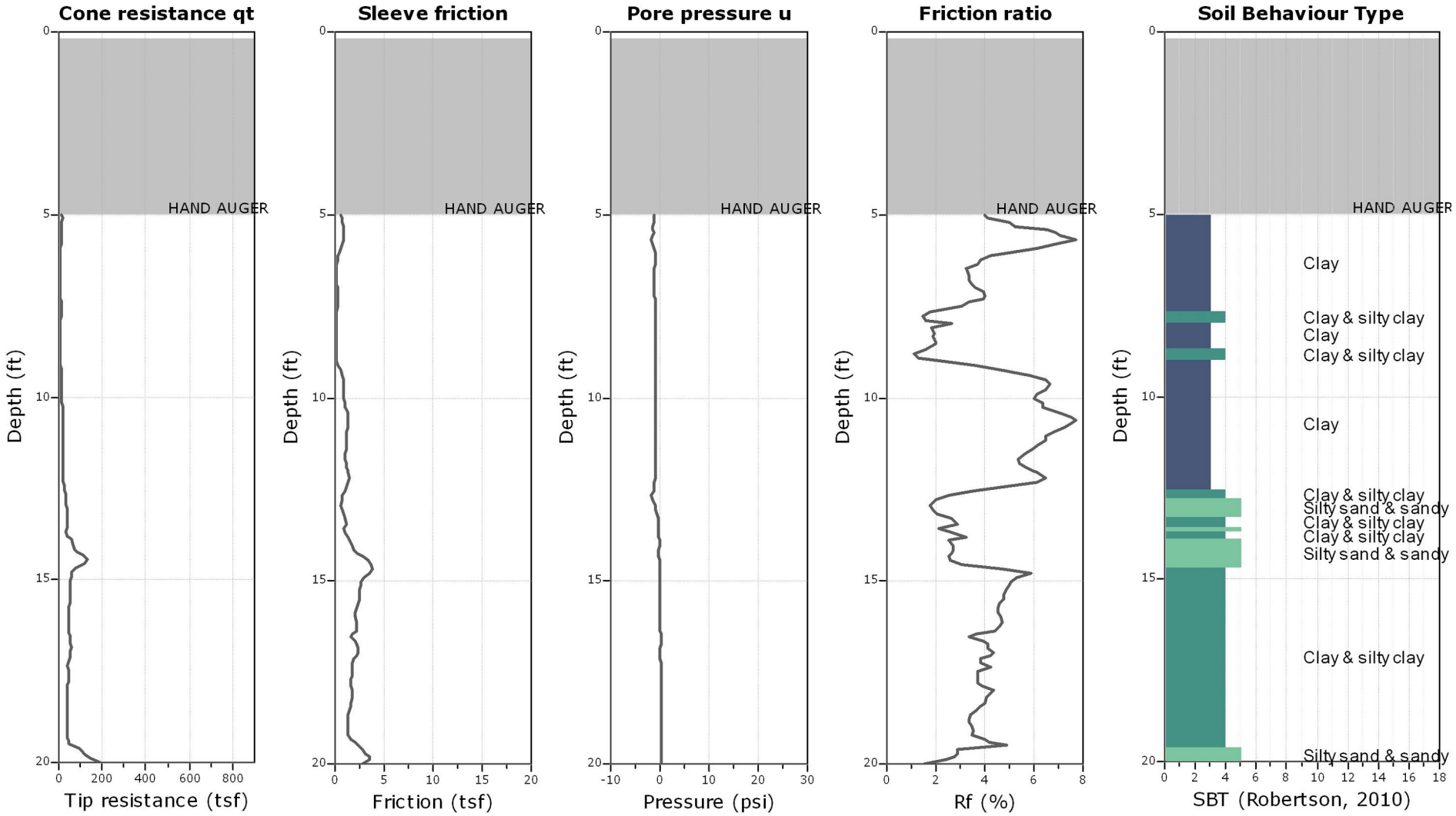
CPT: CPT-15

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 65.65 ft, Date: 10/6/2015
Cone Type: Vertek



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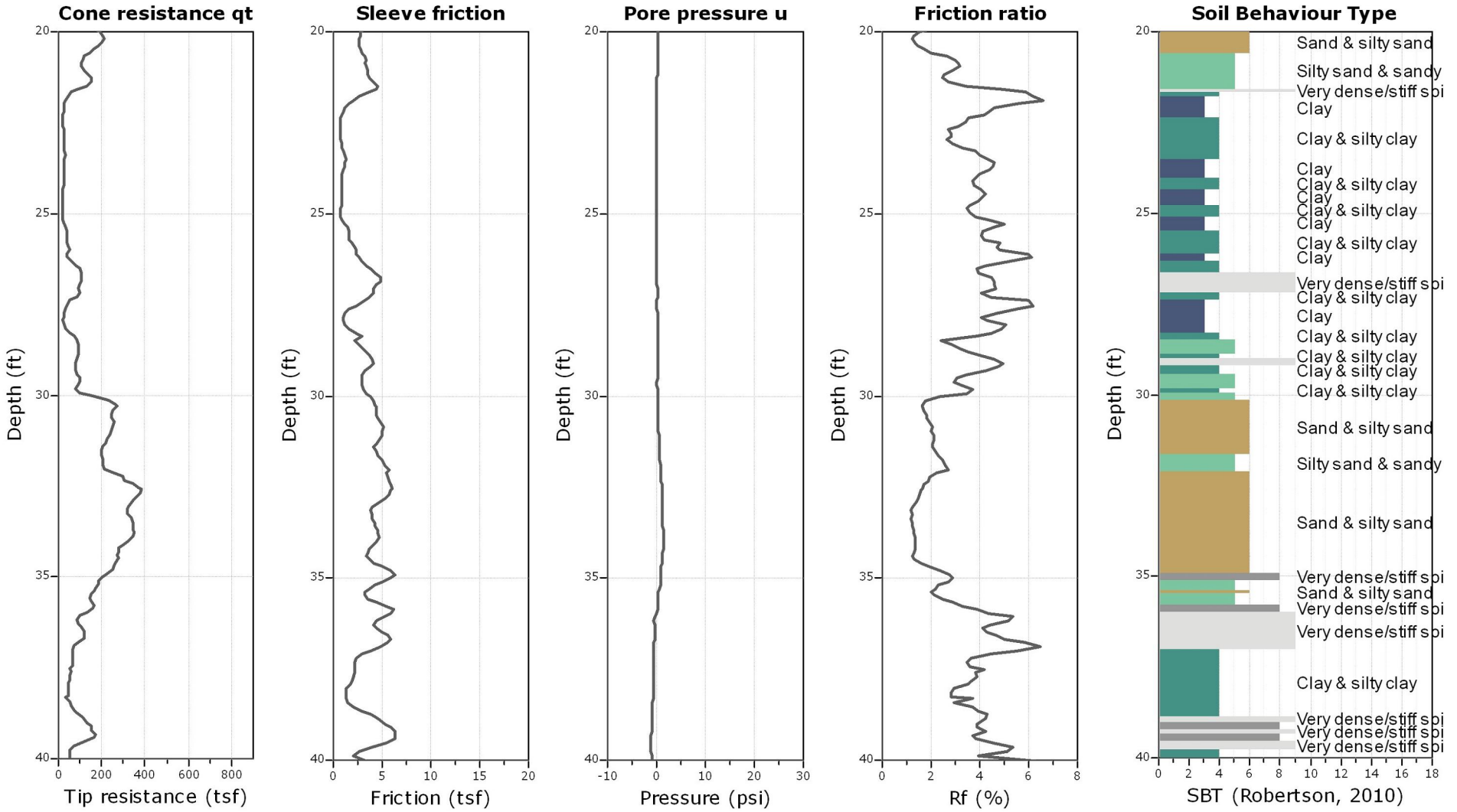
CPT: CPT-15
Total depth: 65.65 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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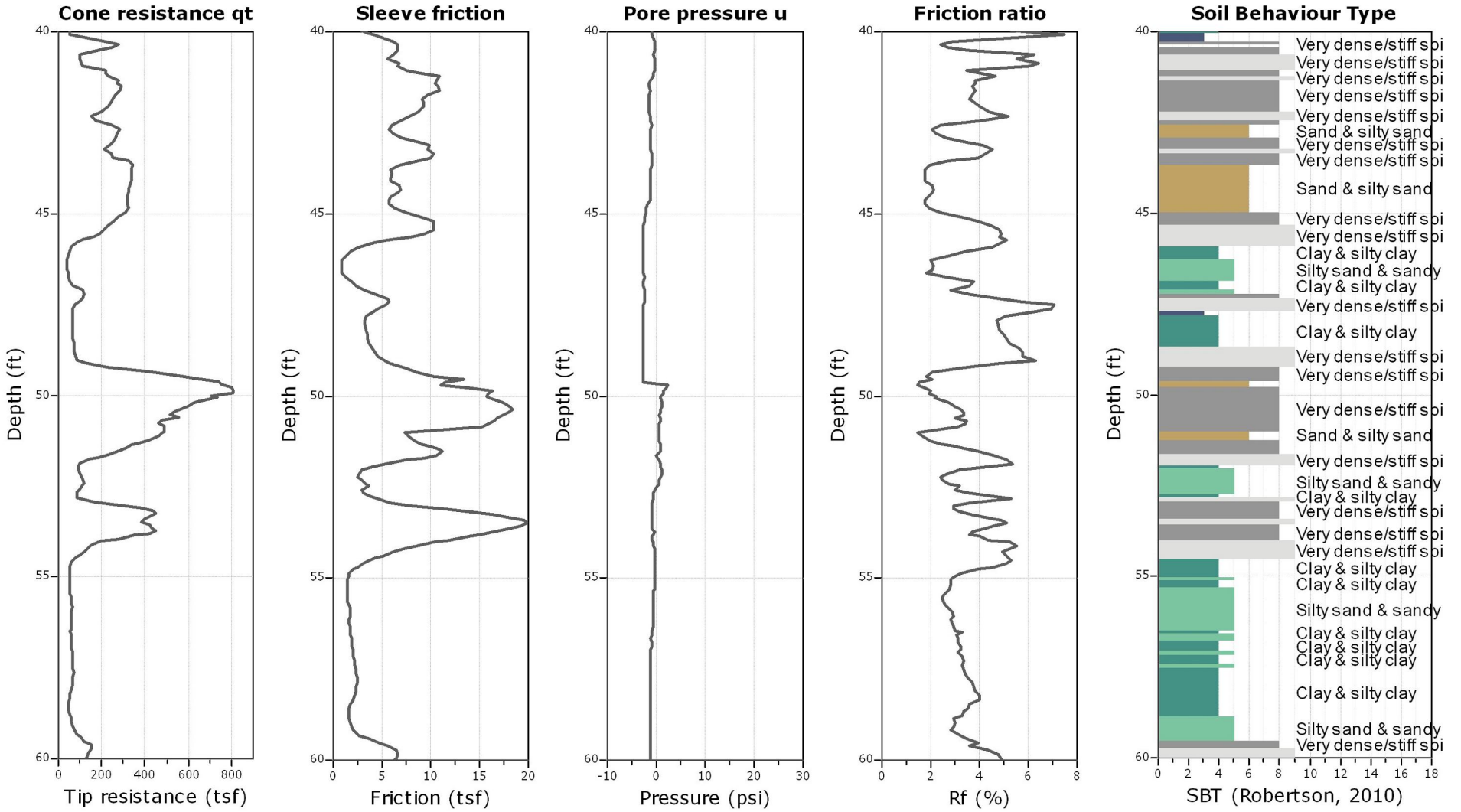
CPT: CPT-15
Total depth: 65.65 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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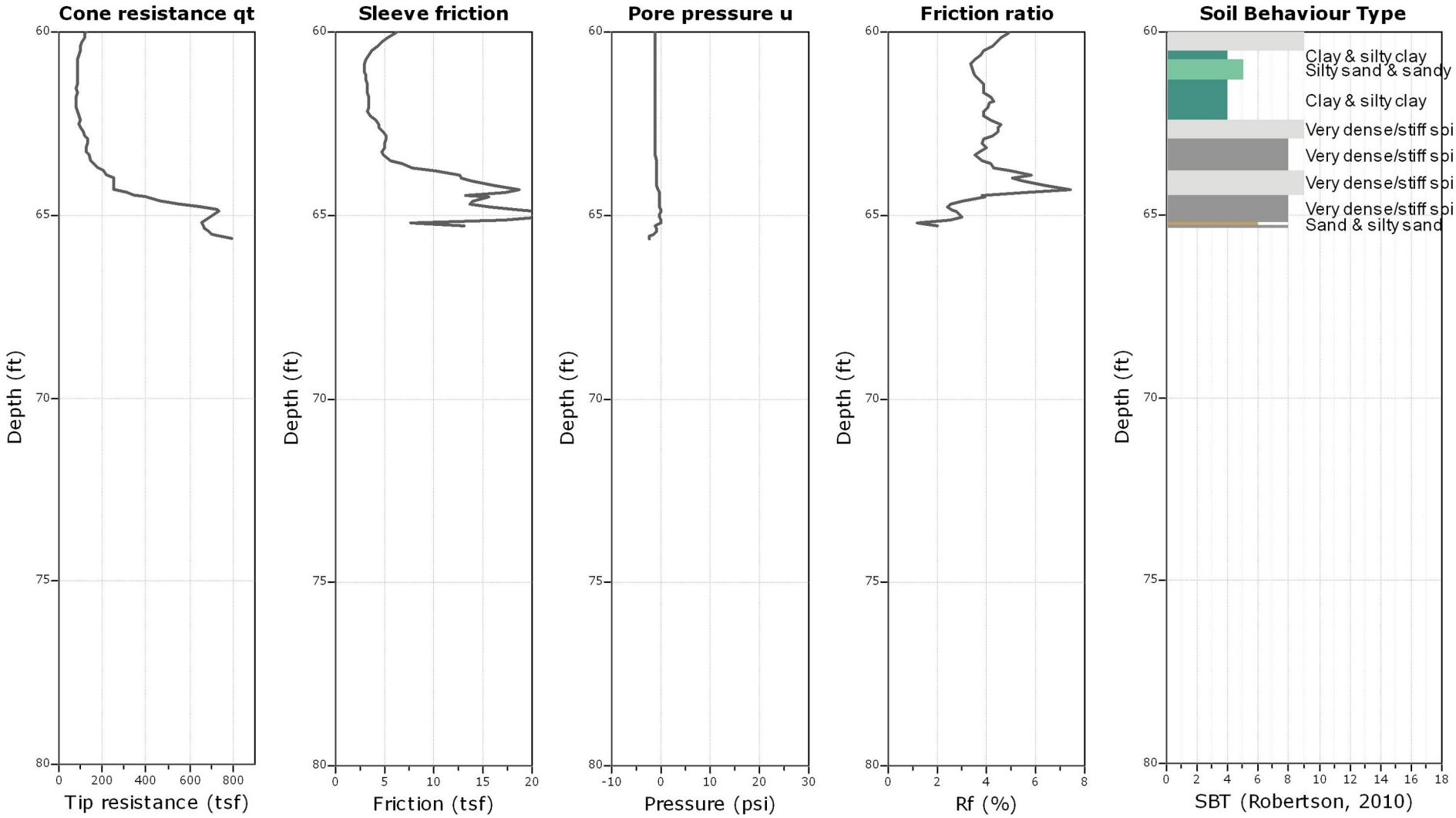
Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

CPT: CPT-15
Total depth: 65.65 ft, Date: 10/6/2015
Cone Type: Vertek



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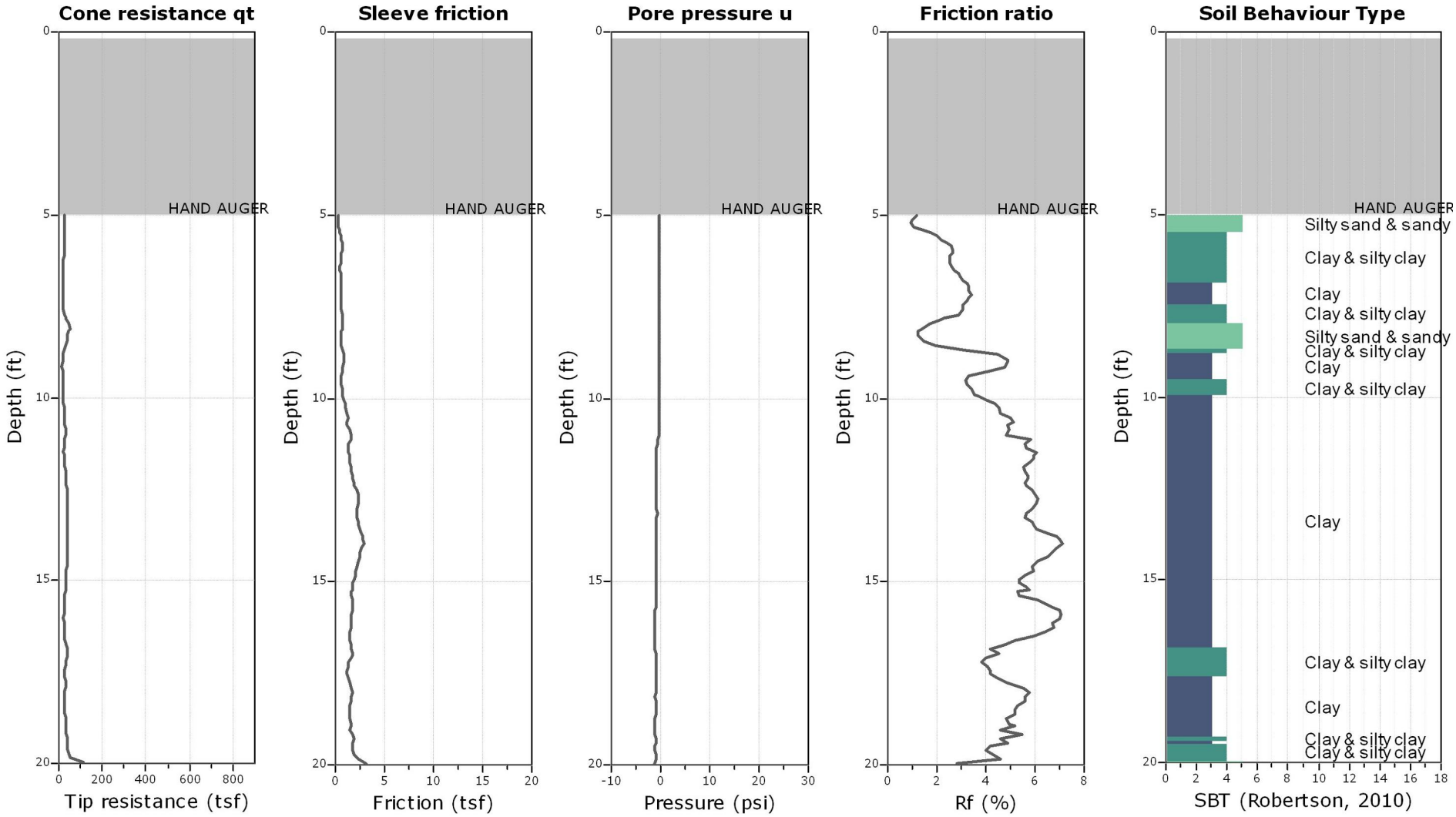
Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

CPT: CPT-16
Total depth: 74.91 ft, Date: 10/6/2015
Cone Type: Vertek



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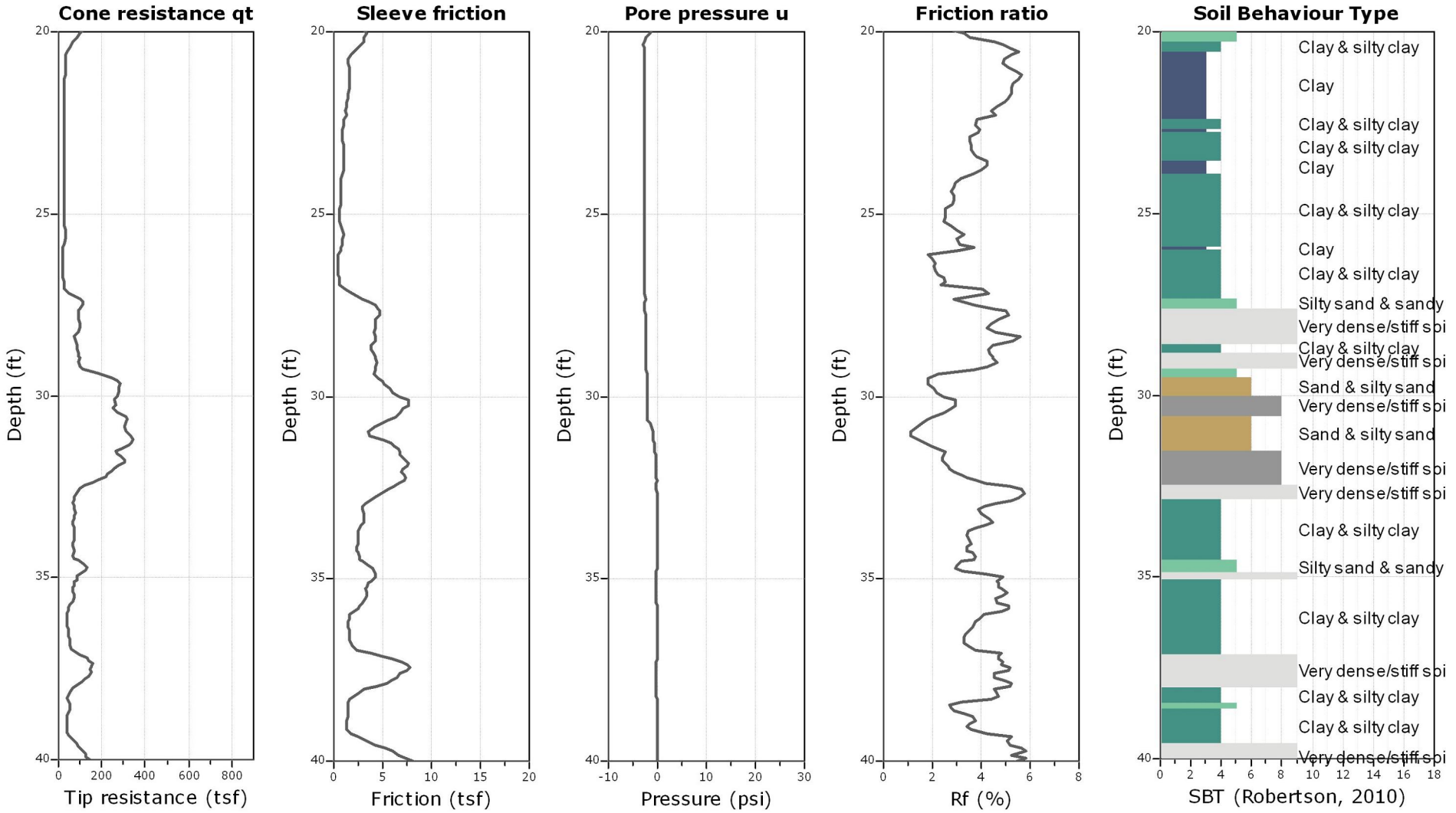
Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

CPT: CPT-16
Total depth: 74.91 ft, Date: 10/6/2015
Cone Type: Vertek



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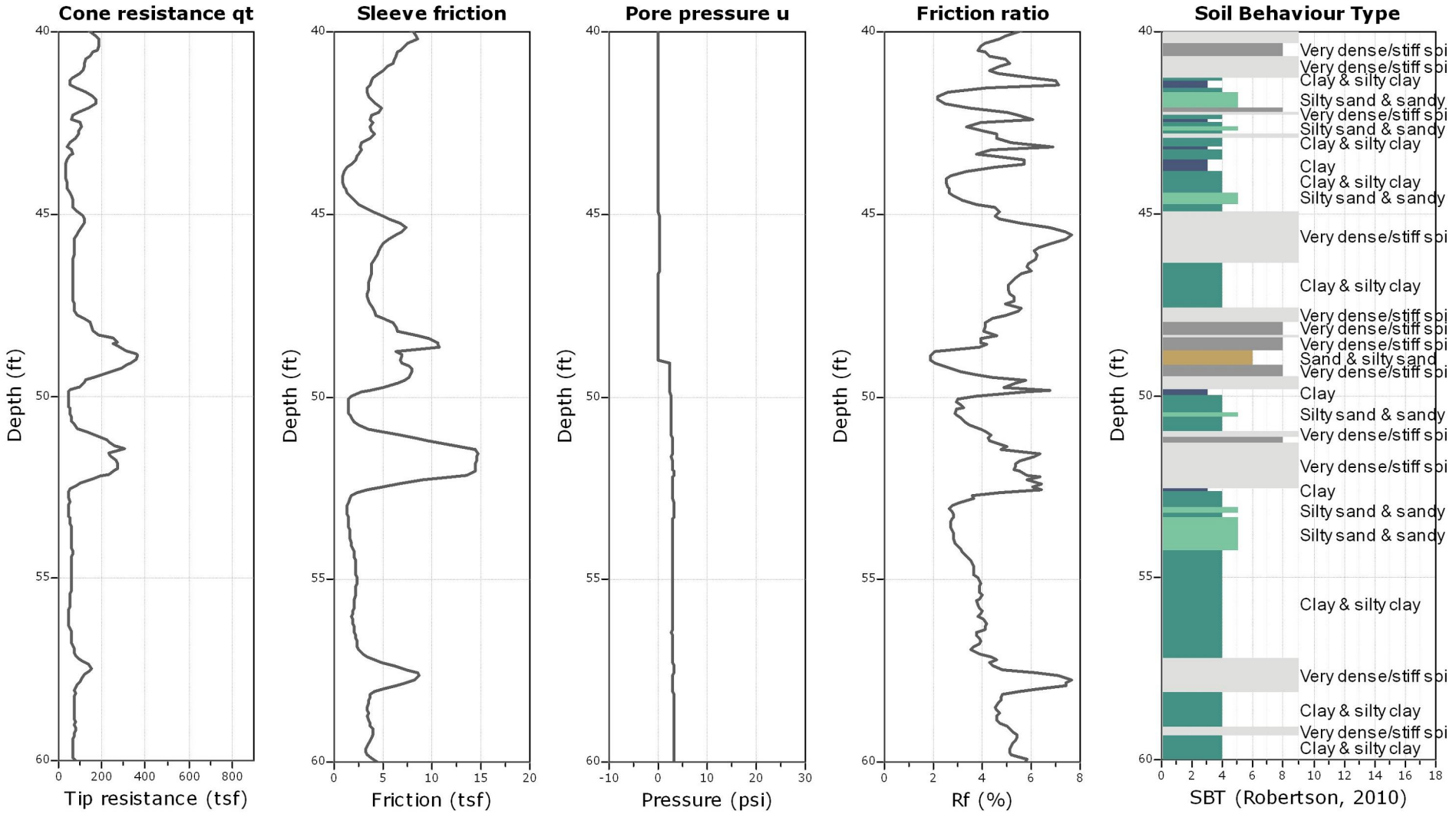
CPT: CPT-16

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 74.91 ft, Date: 10/6/2015
Cone Type: Vertek



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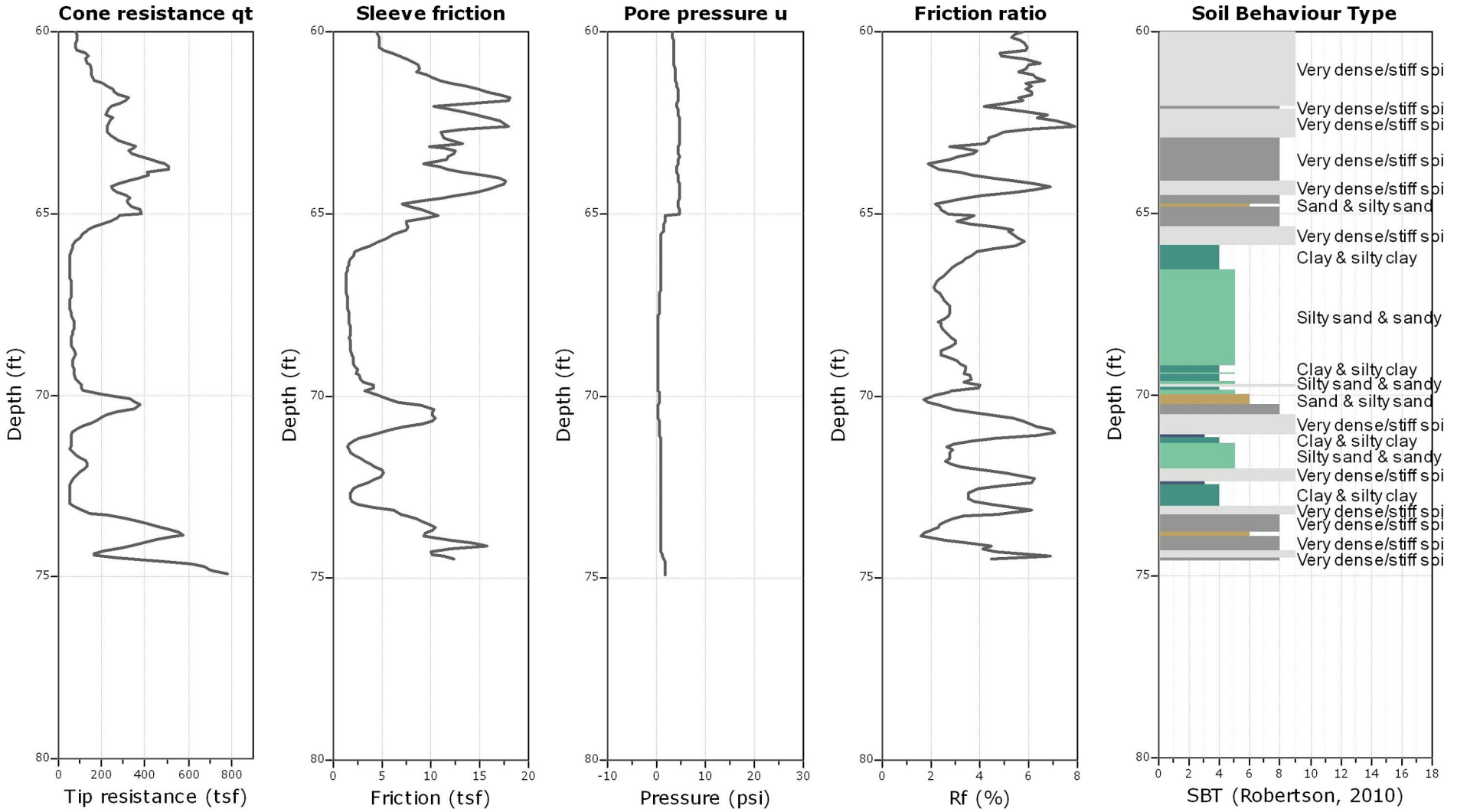
CPT: CPT-16

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 74.91 ft, Date: 10/6/2015
Cone Type: Vertek



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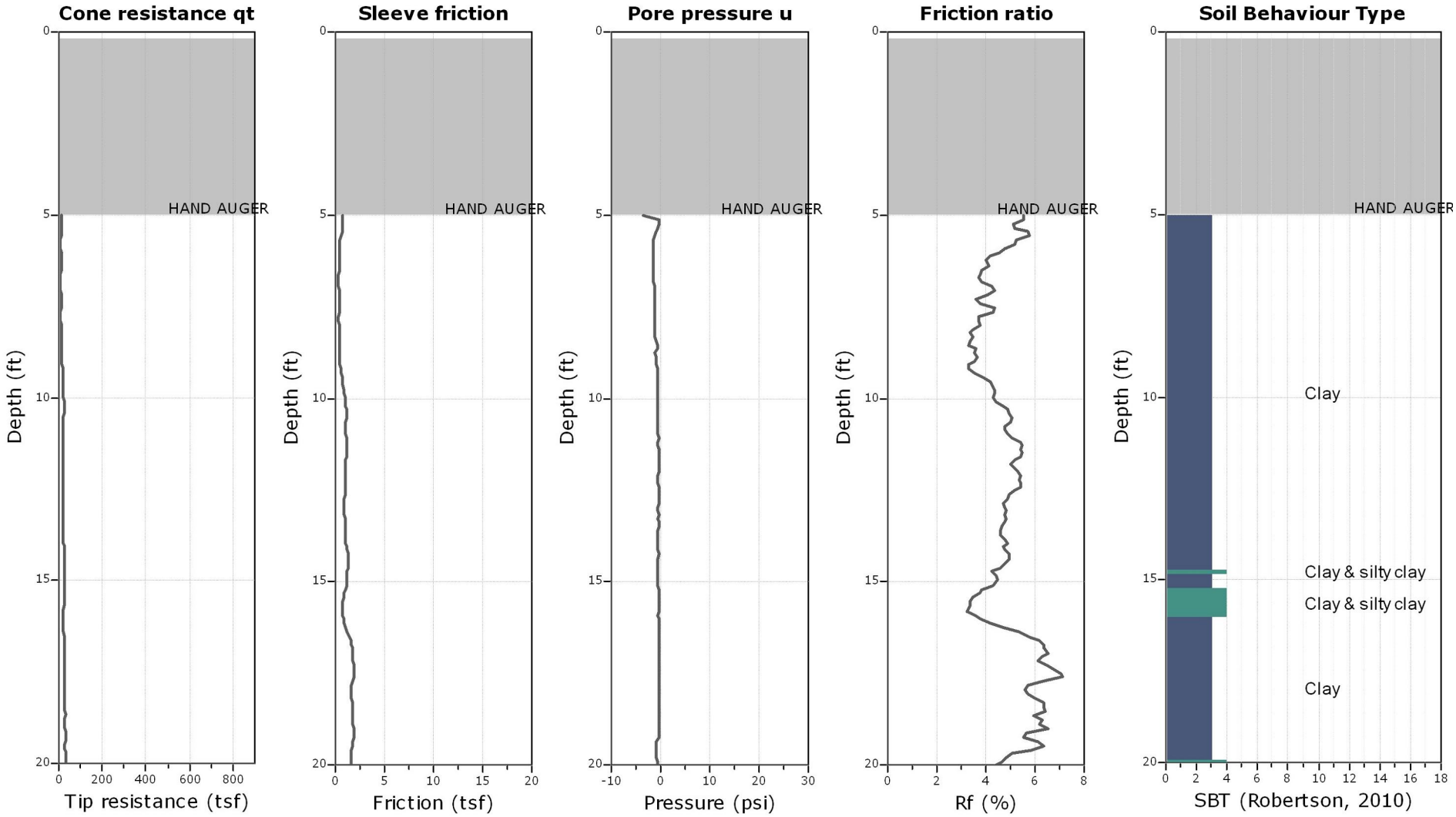
CPT: CPT-17

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 76.08 ft, Date: 10/6/2015
Cone Type: Vertek



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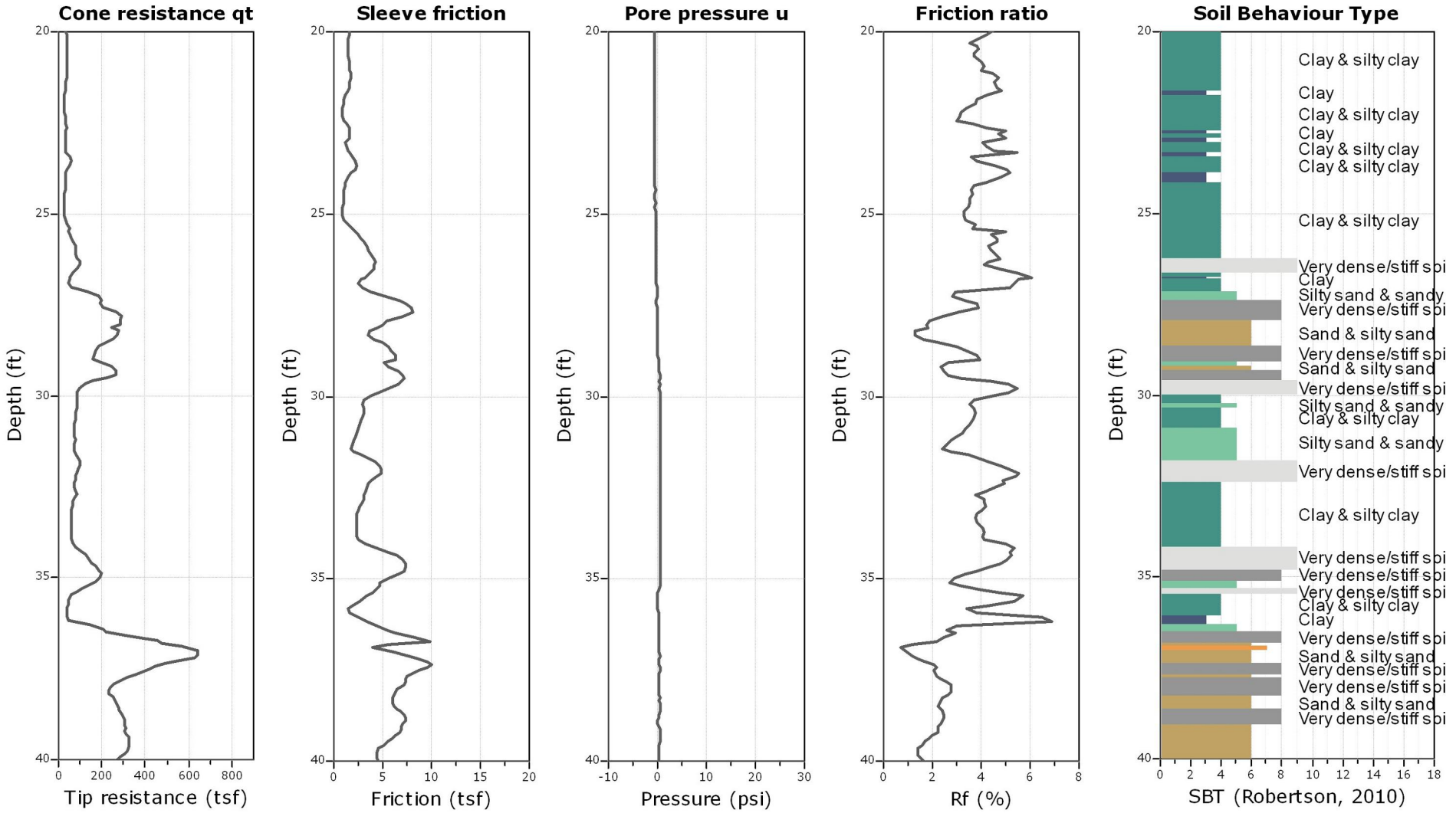
CPT: CPT-17

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 76.08 ft, Date: 10/6/2015
Cone Type: Vertek



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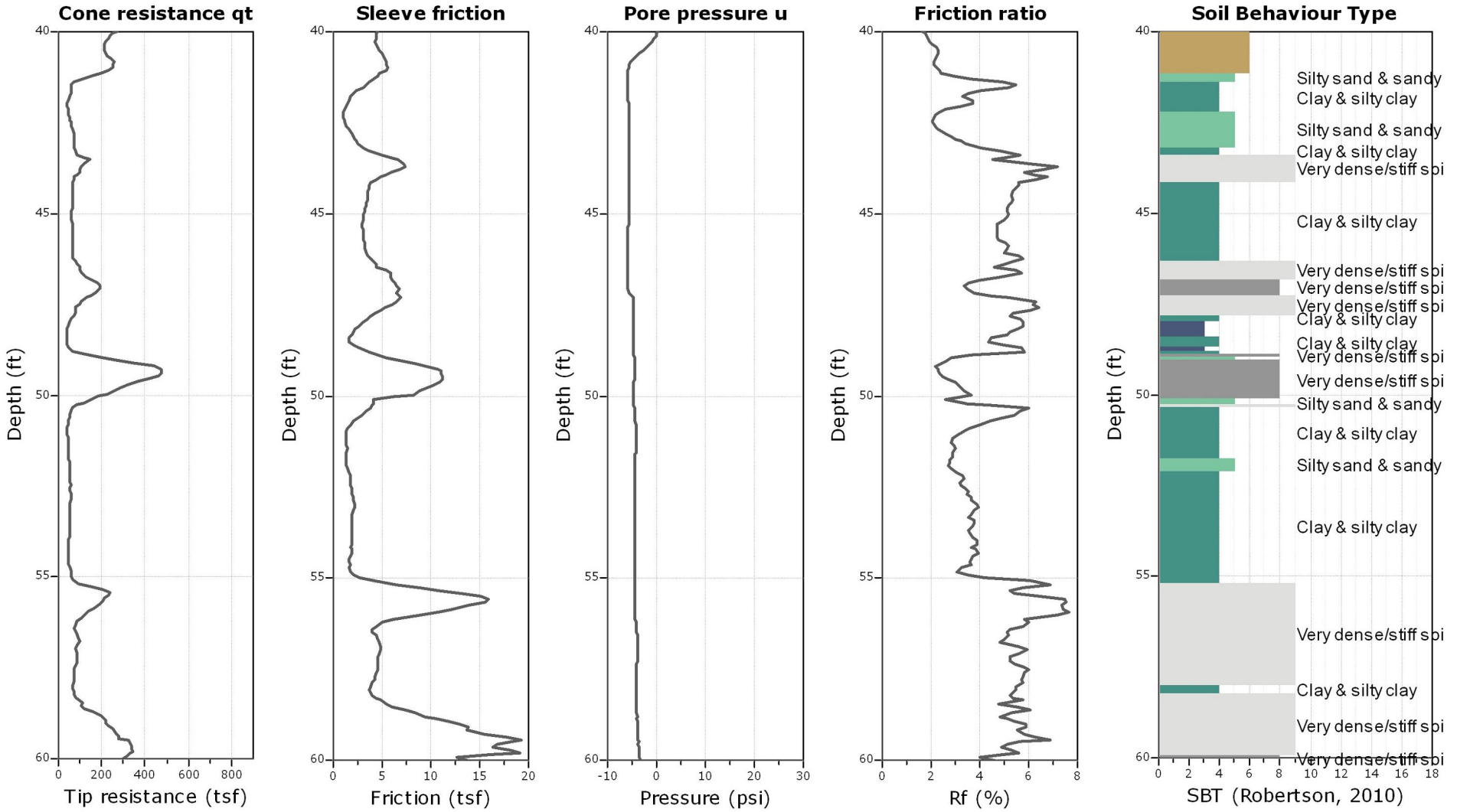
CPT: CPT-17
Total depth: 76.08 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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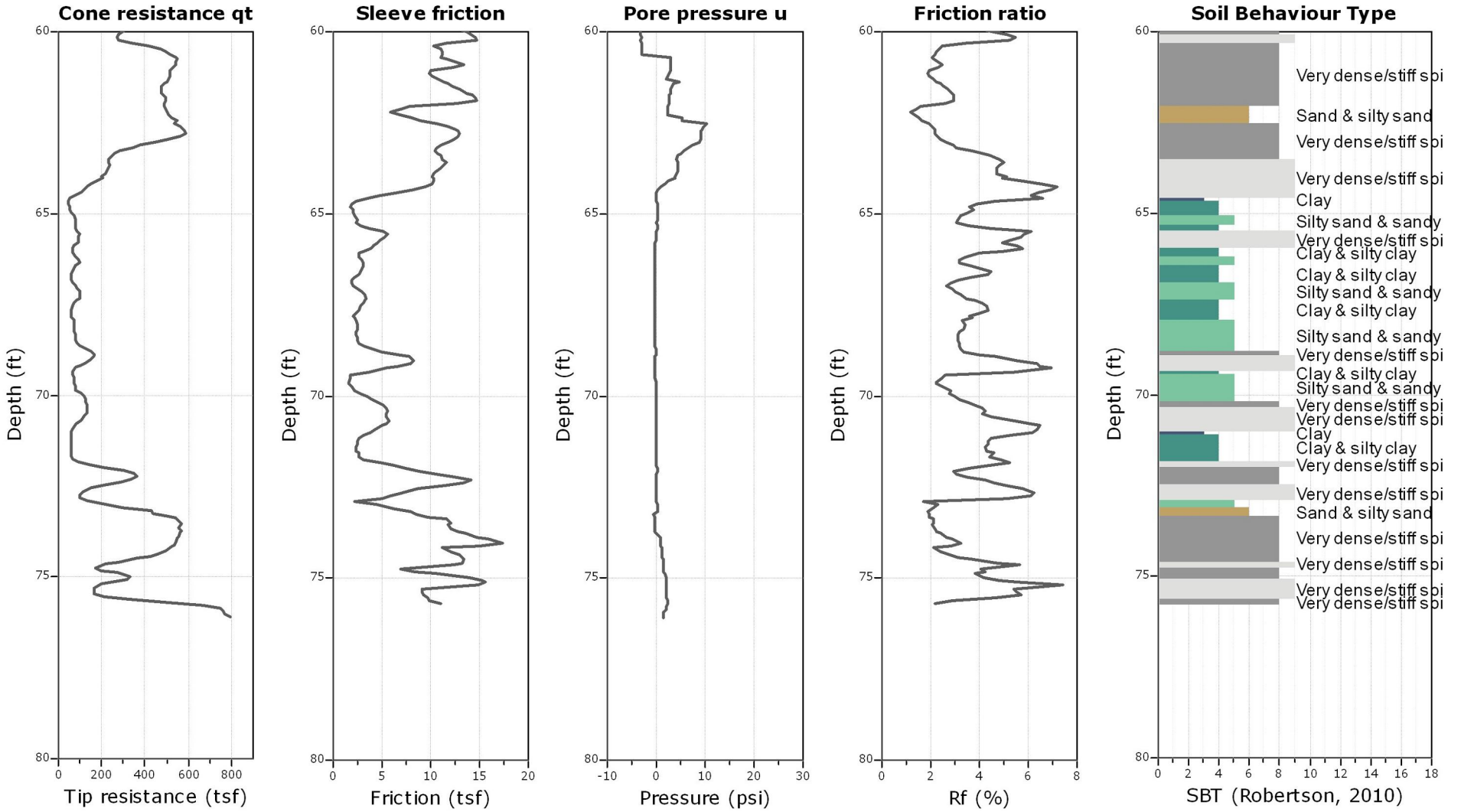
CPT: CPT-17

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 76.08 ft, Date: 10/6/2015
Cone Type: Vertek



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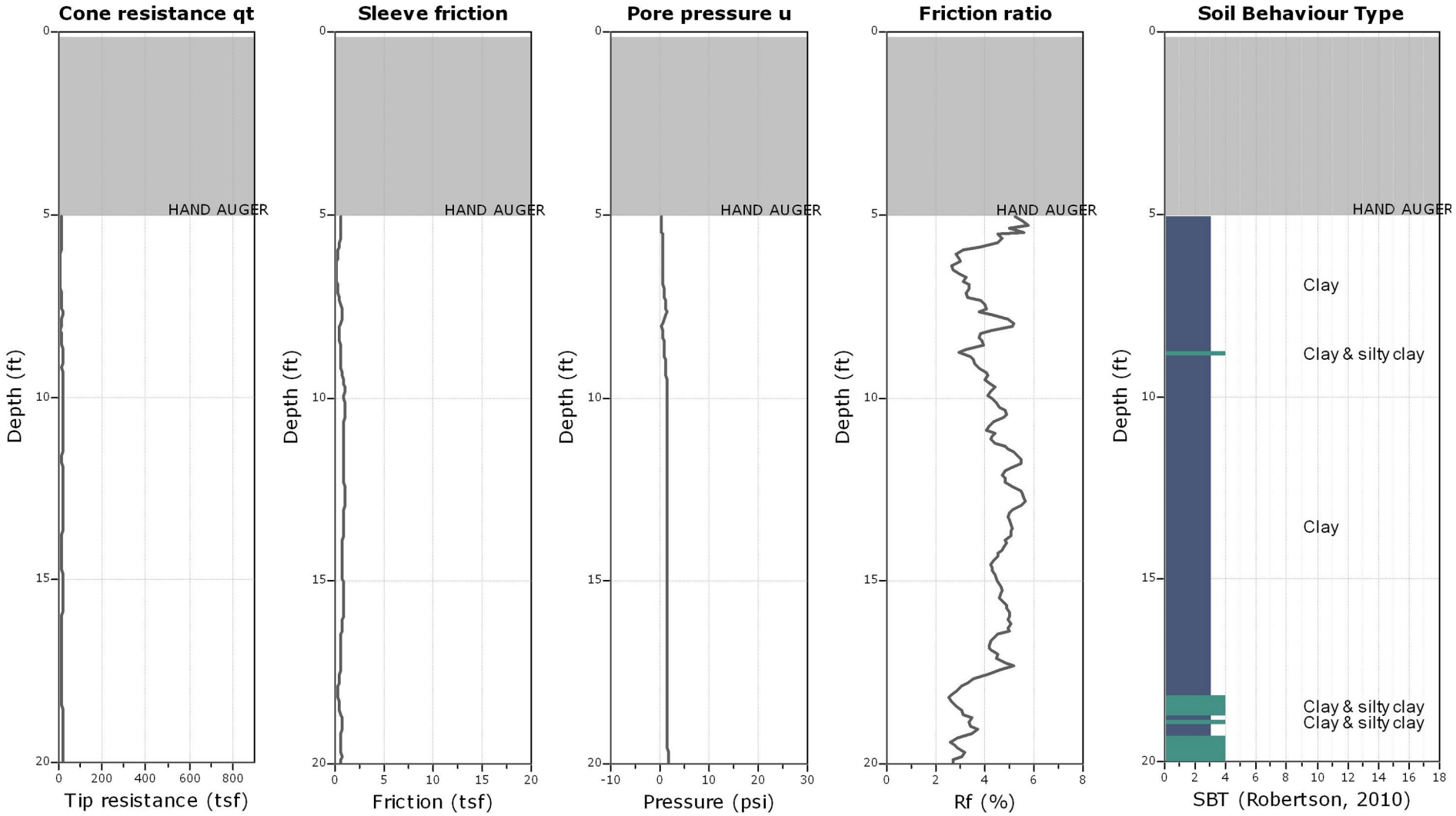
CPT: CPT-18

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 80.27 ft, Date: 10/6/2015
Cone Type: Vertek



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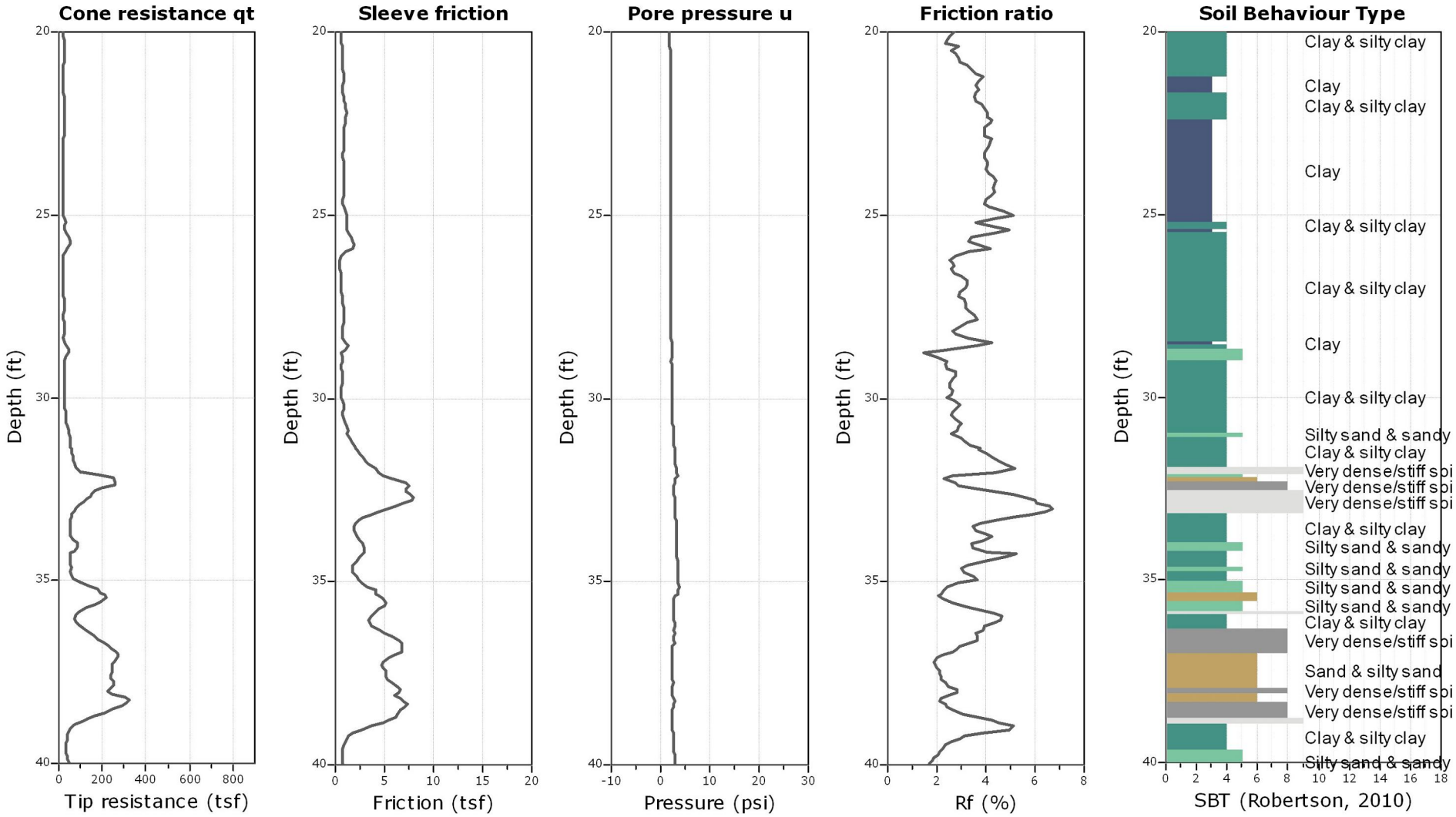
Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

CPT: CPT-18
Total depth: 80.27 ft, Date: 10/6/2015
Cone Type: Vertek



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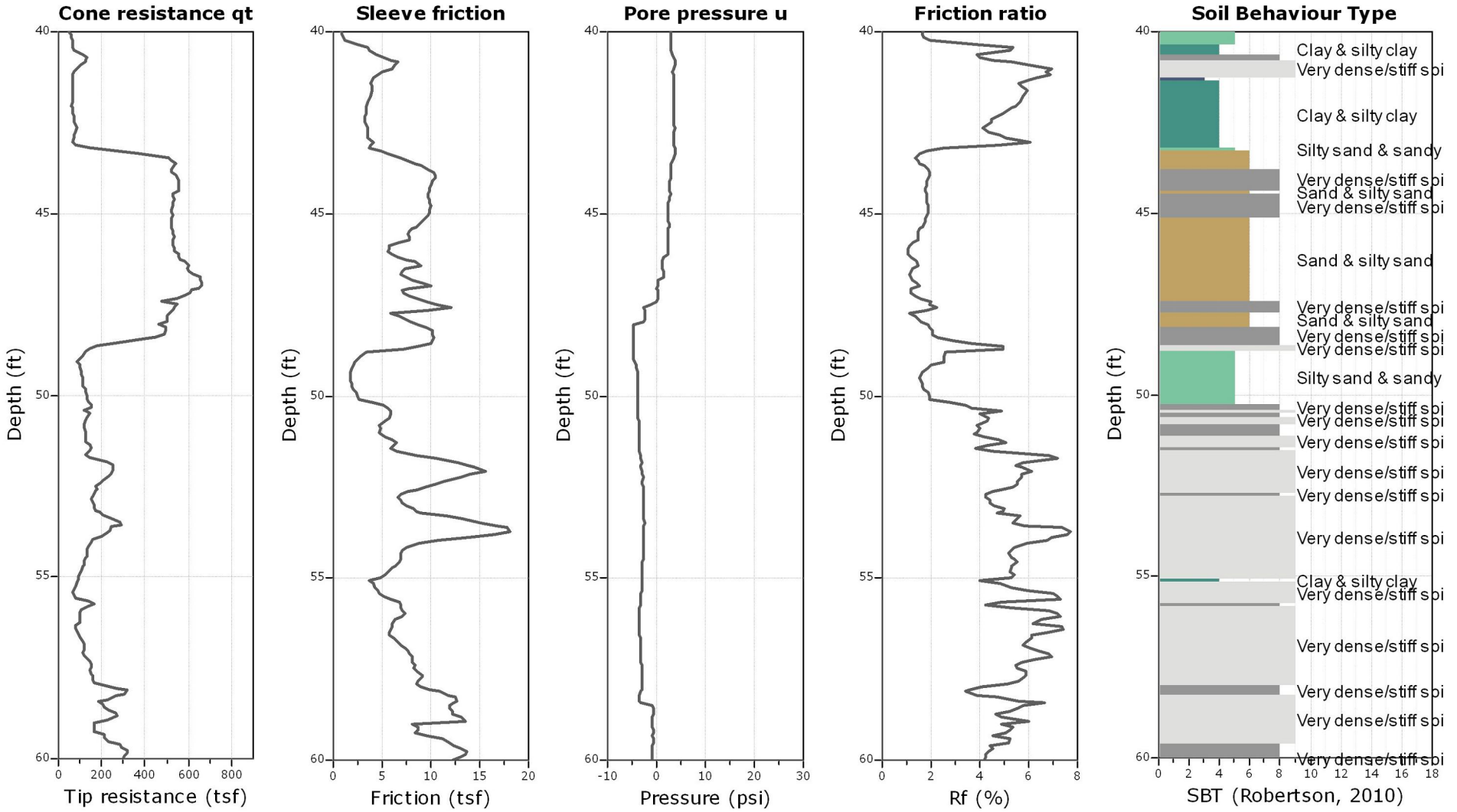
CPT: CPT-18
Total depth: 80.27 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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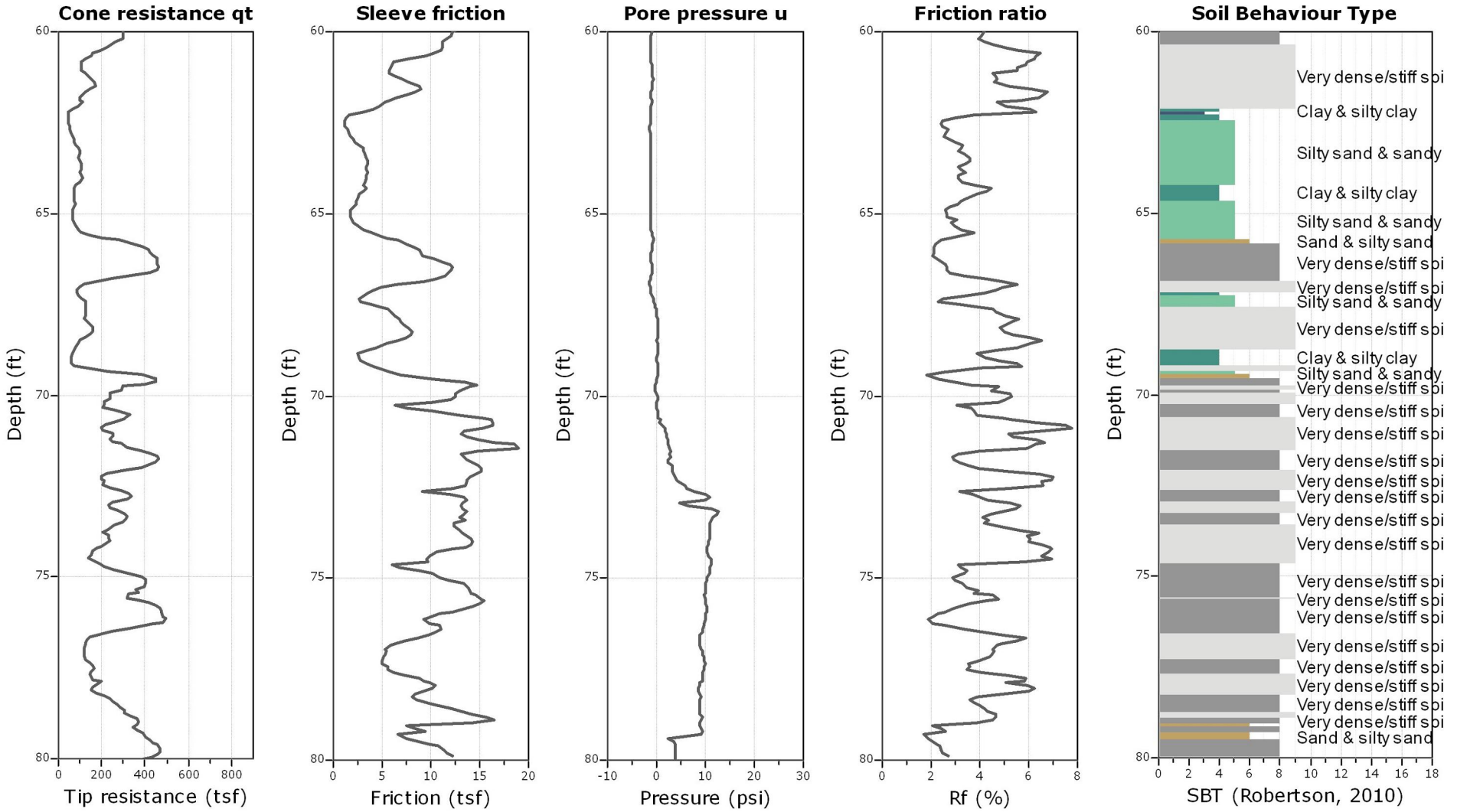
CPT: CPT-18
Total depth: 80.27 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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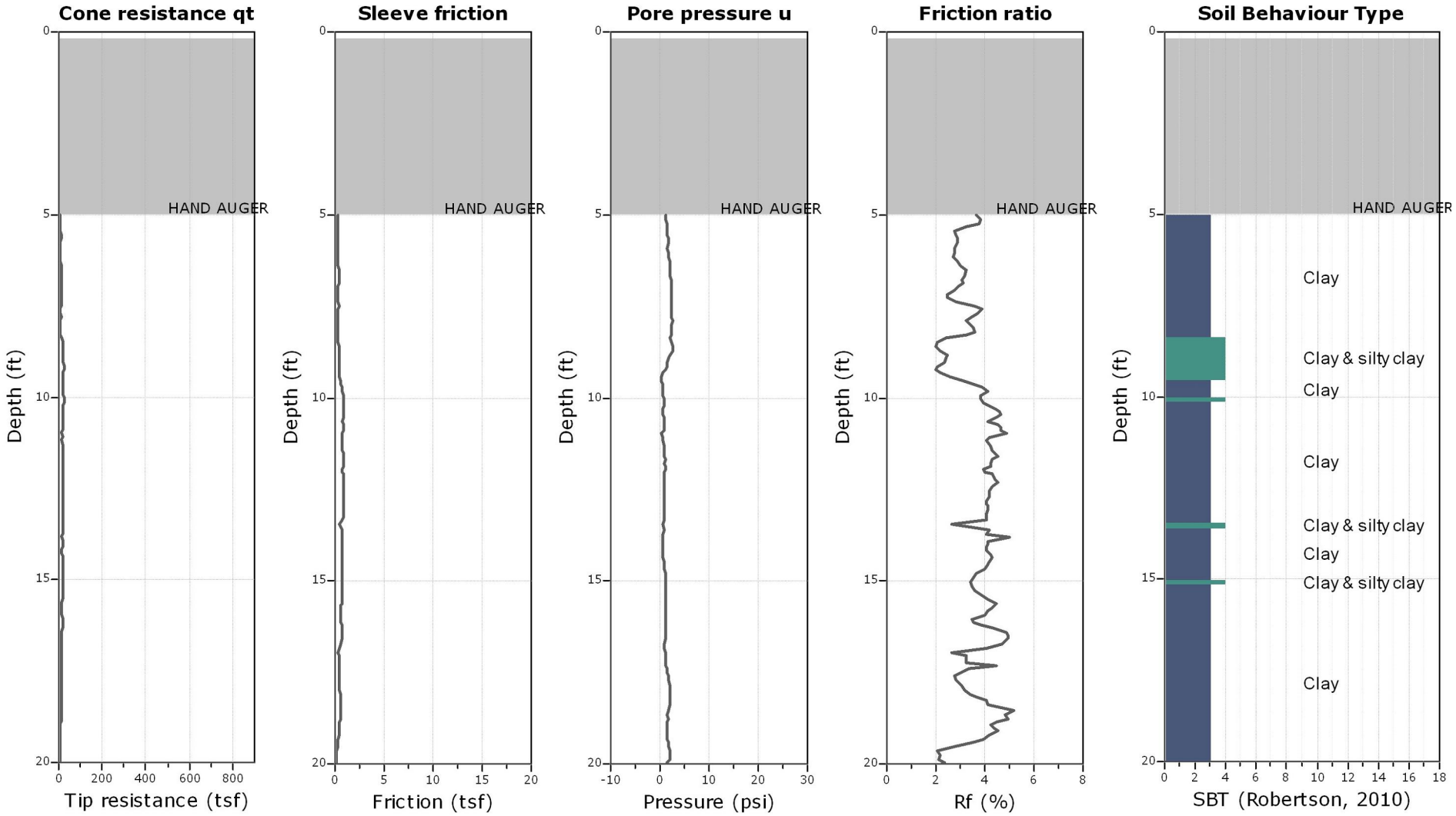
CPT: CPT-19
Total depth: 80.21 ft, Date: 10/6/2015
Cone Type: Vertek

Project: Applied Earth Sciences
Location: 1749 & 1751 Malcolm Ave Los Angeles, CA



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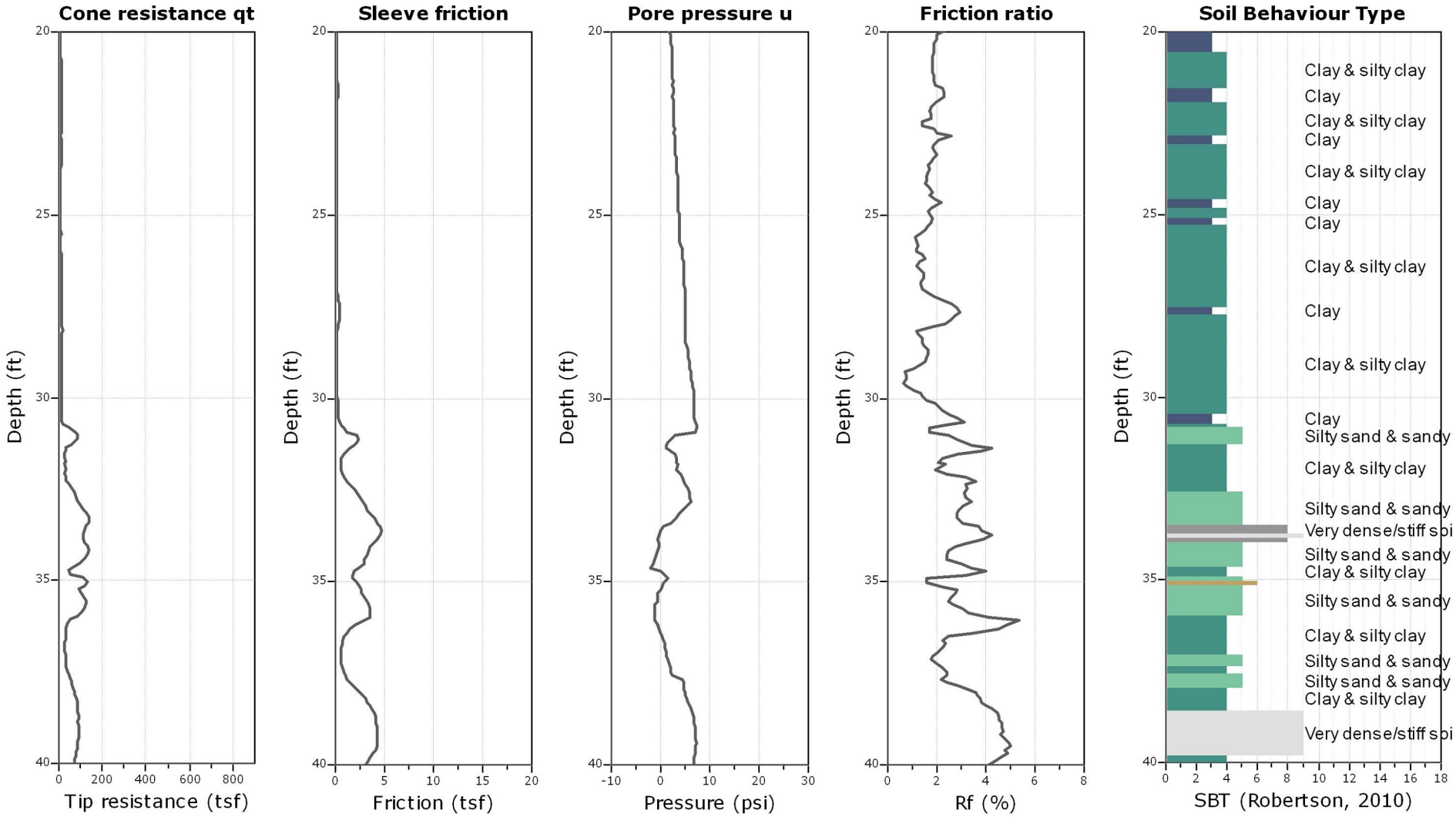
Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

CPT: CPT-19
Total depth: 80.21 ft, Date: 10/6/2015
Cone Type: Vertek



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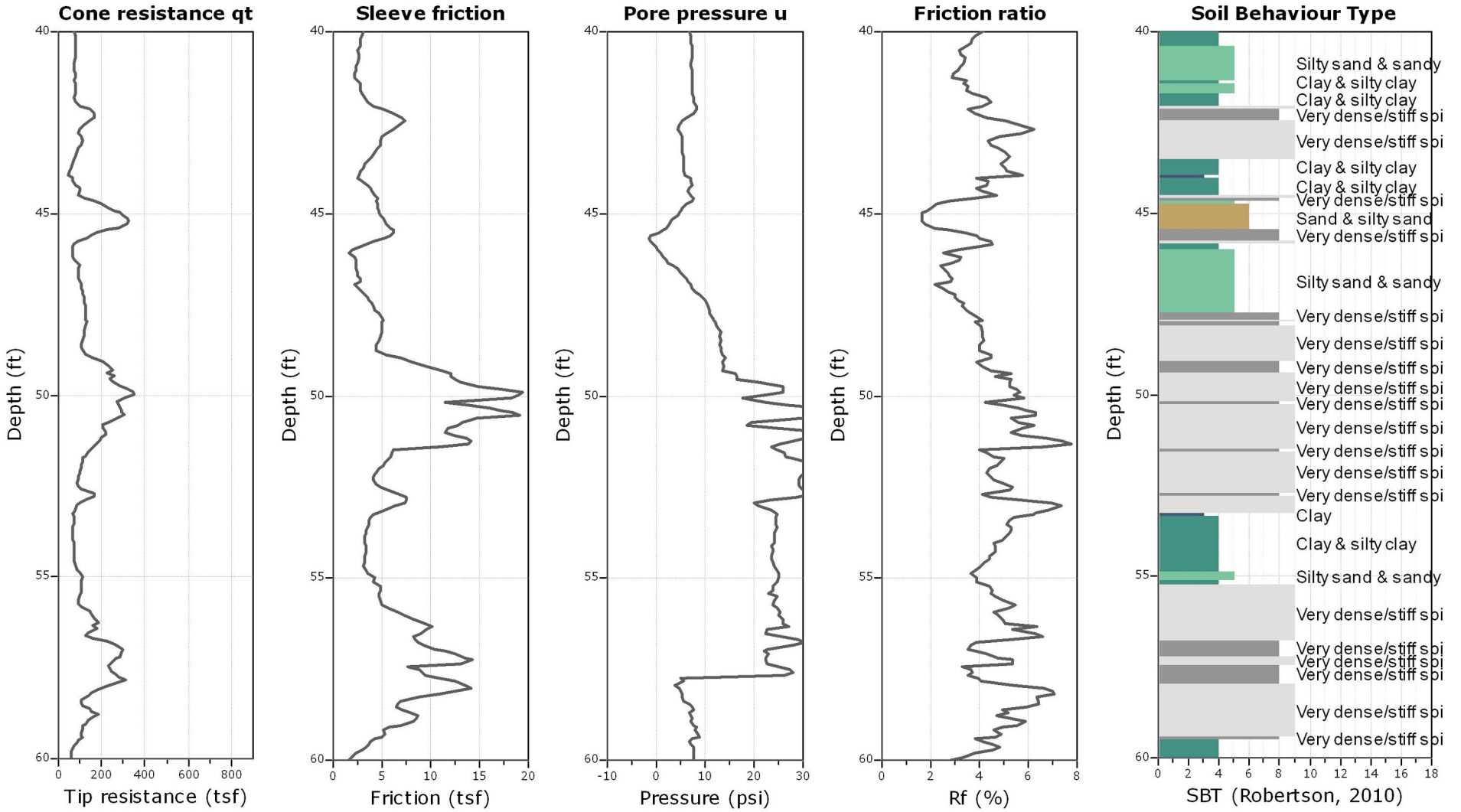
CPT: CPT-19
Total depth: 80.21 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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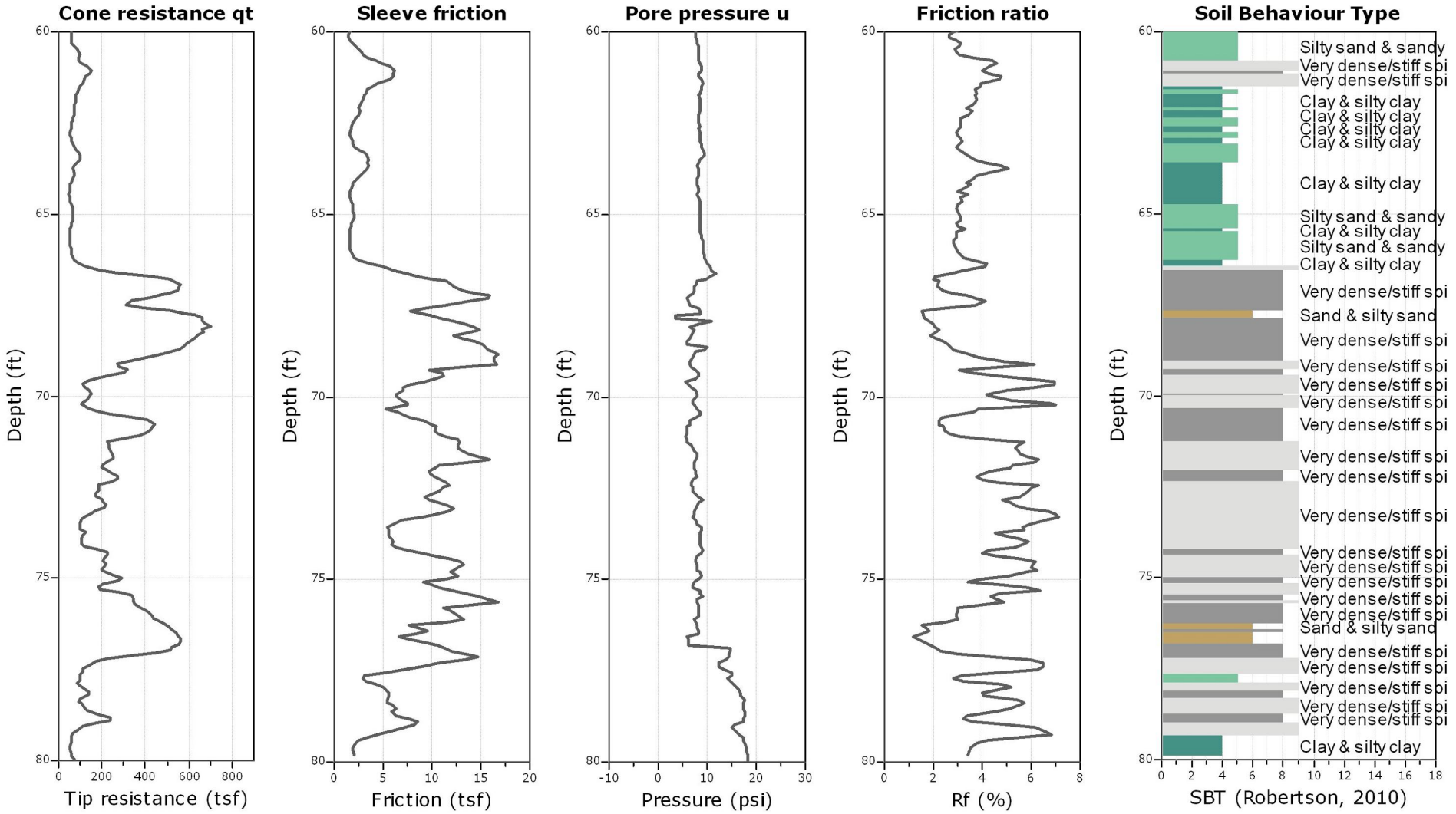
CPT: CPT-19

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 80.21 ft, Date: 10/6/2015
Cone Type: Vertek



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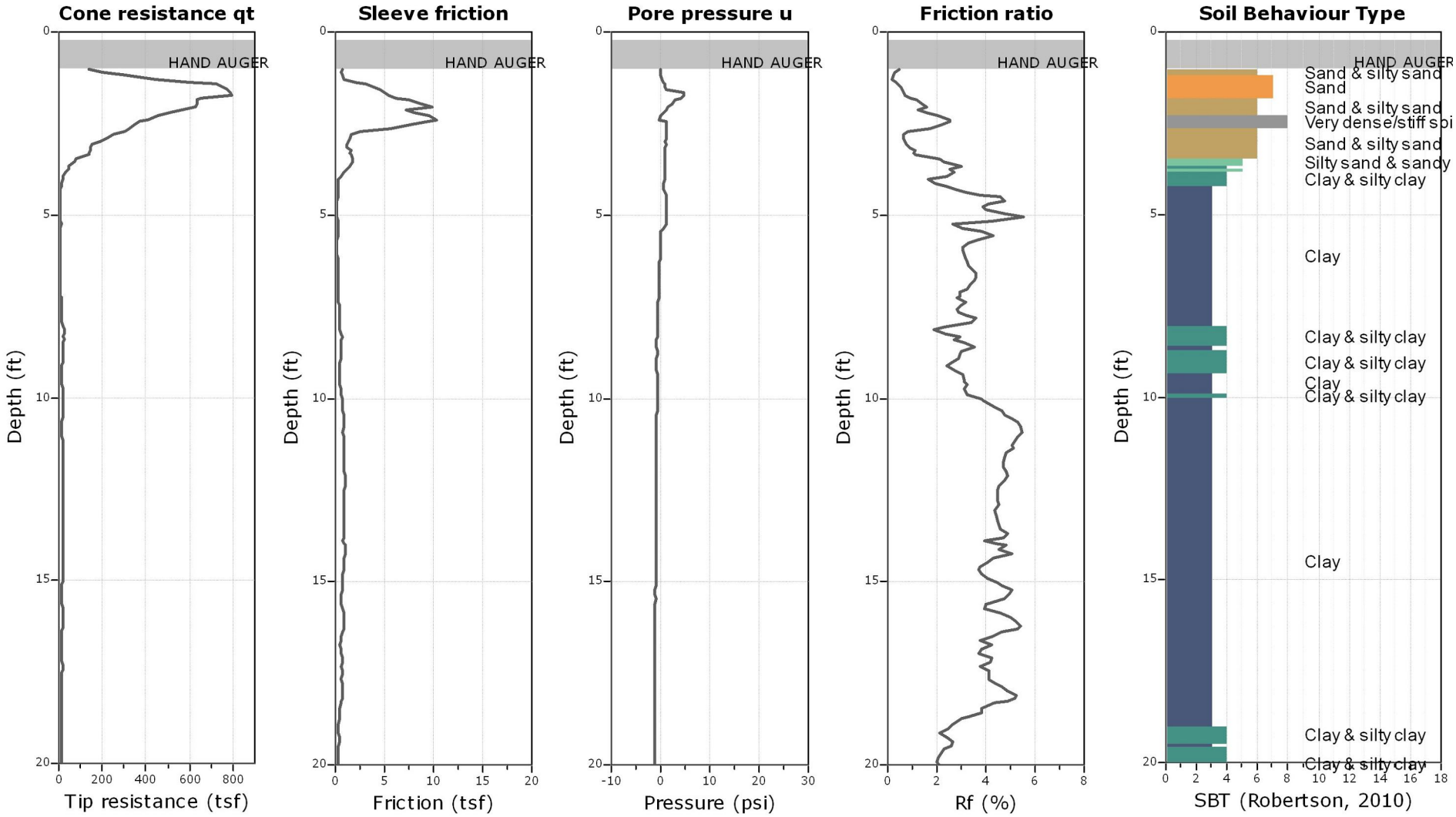
CPT: CPT-20
Total depth: 66.26 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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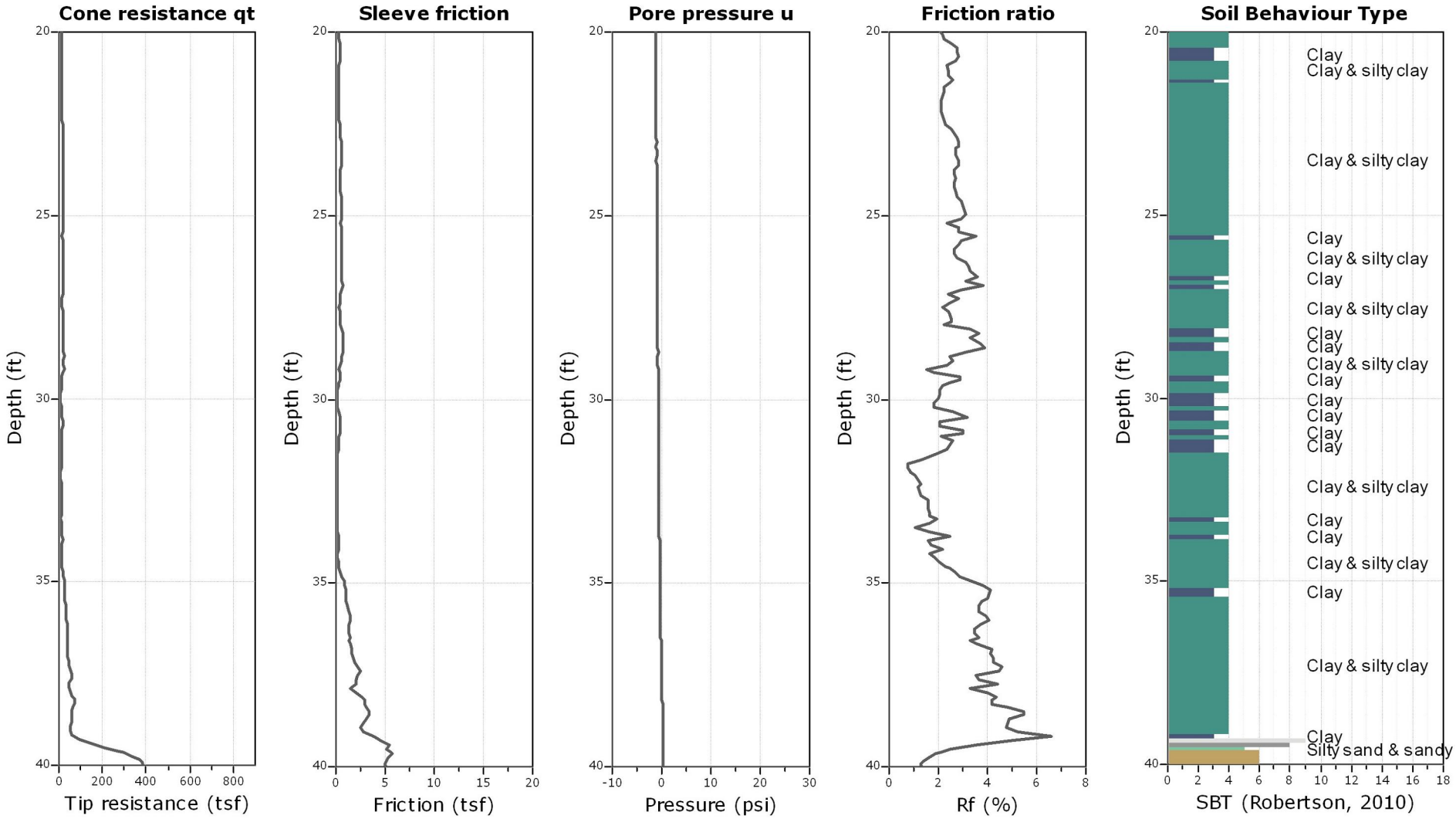
CPT: CPT-20

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 66.26 ft, Date: 10/6/2015
Cone Type: Vertek



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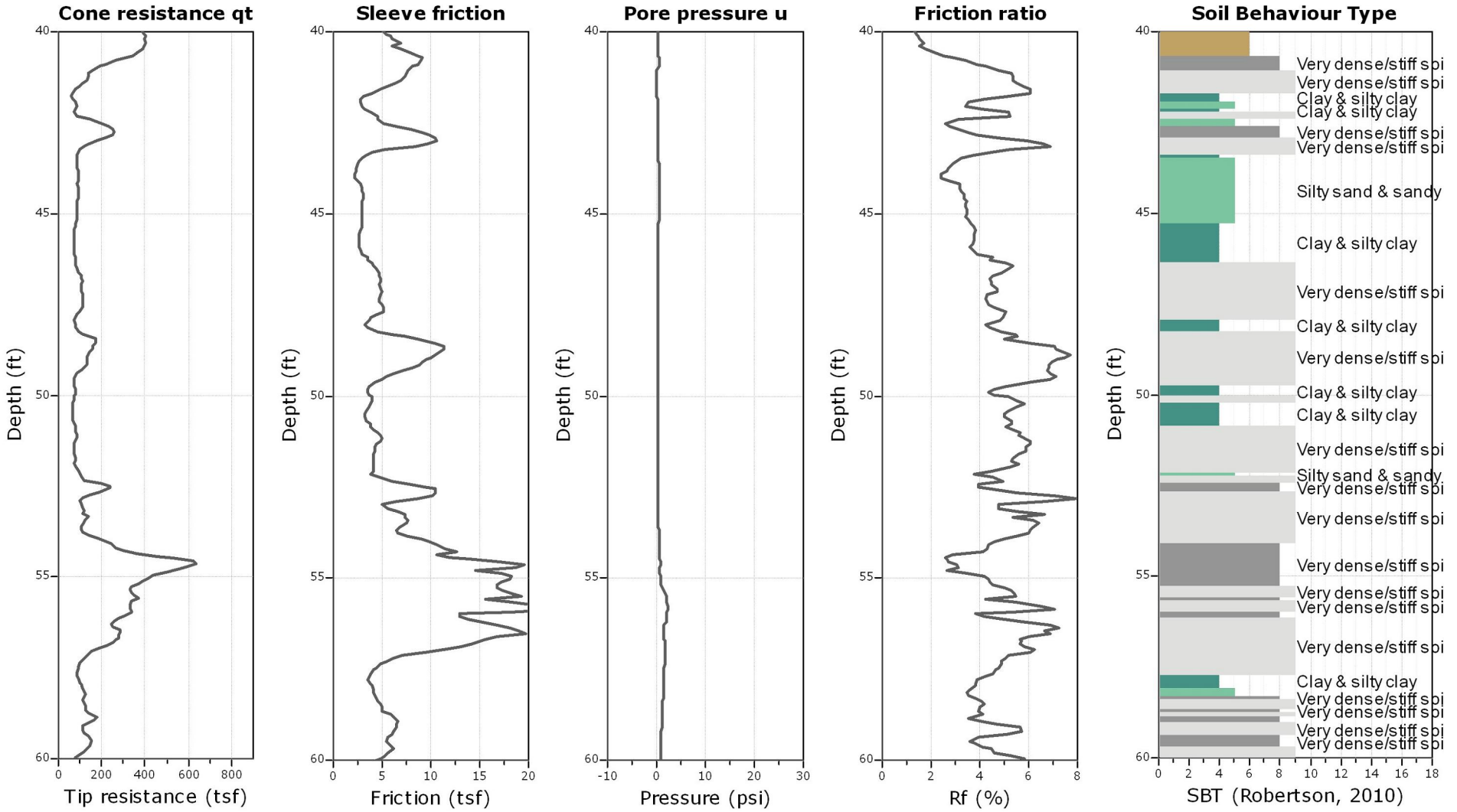
CPT: CPT-20
Total depth: 66.26 ft, Date: 10/6/2015
Cone Type: Vertek

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**



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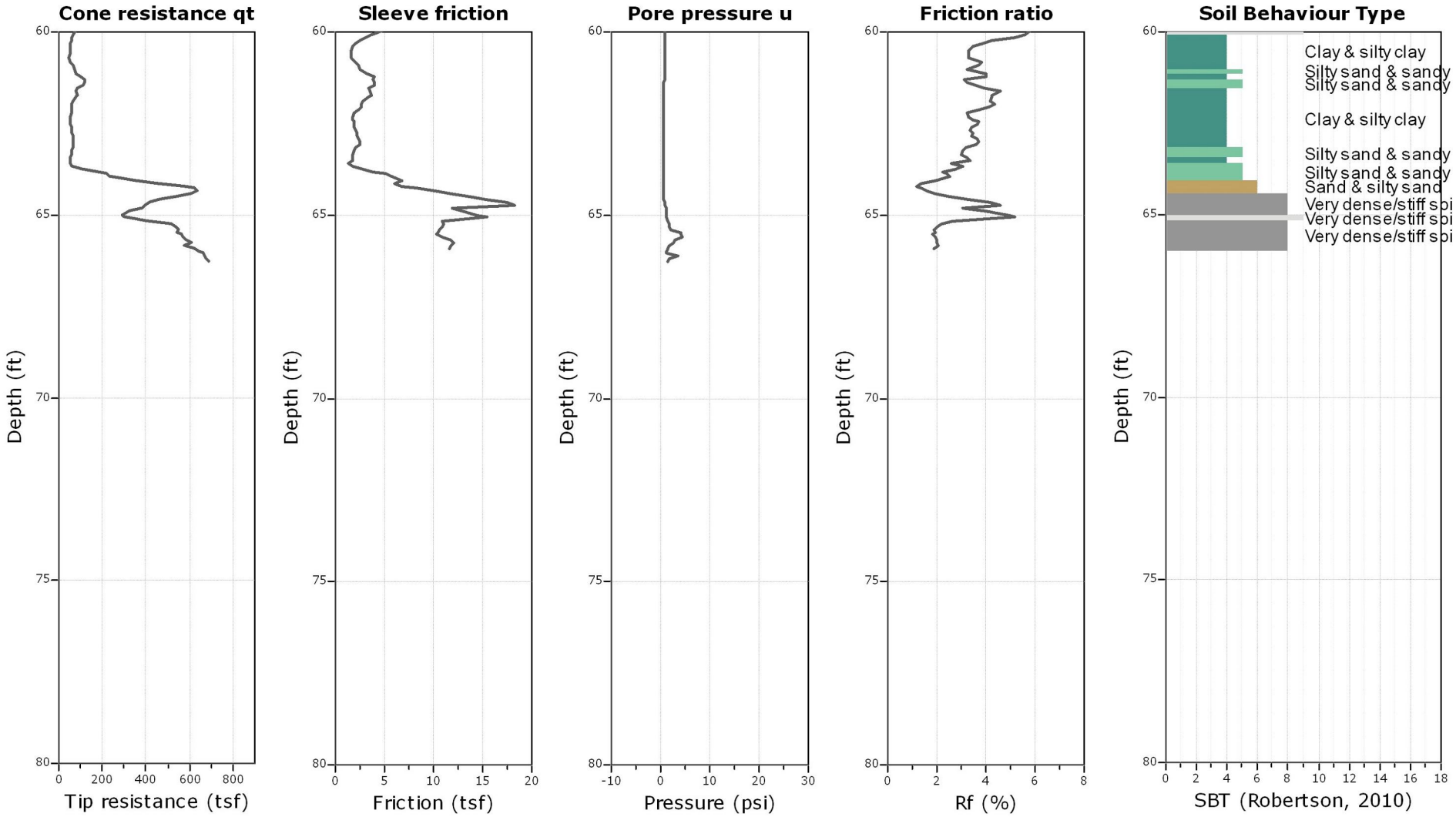
CPT: CPT-20

Project: **Applied Earth Sciences**
Location: **1749 & 1751 Malcolm Ave Los Angeles, CA**

Total depth: 66.26 ft, Date: 10/6/2015
Cone Type: Vertek



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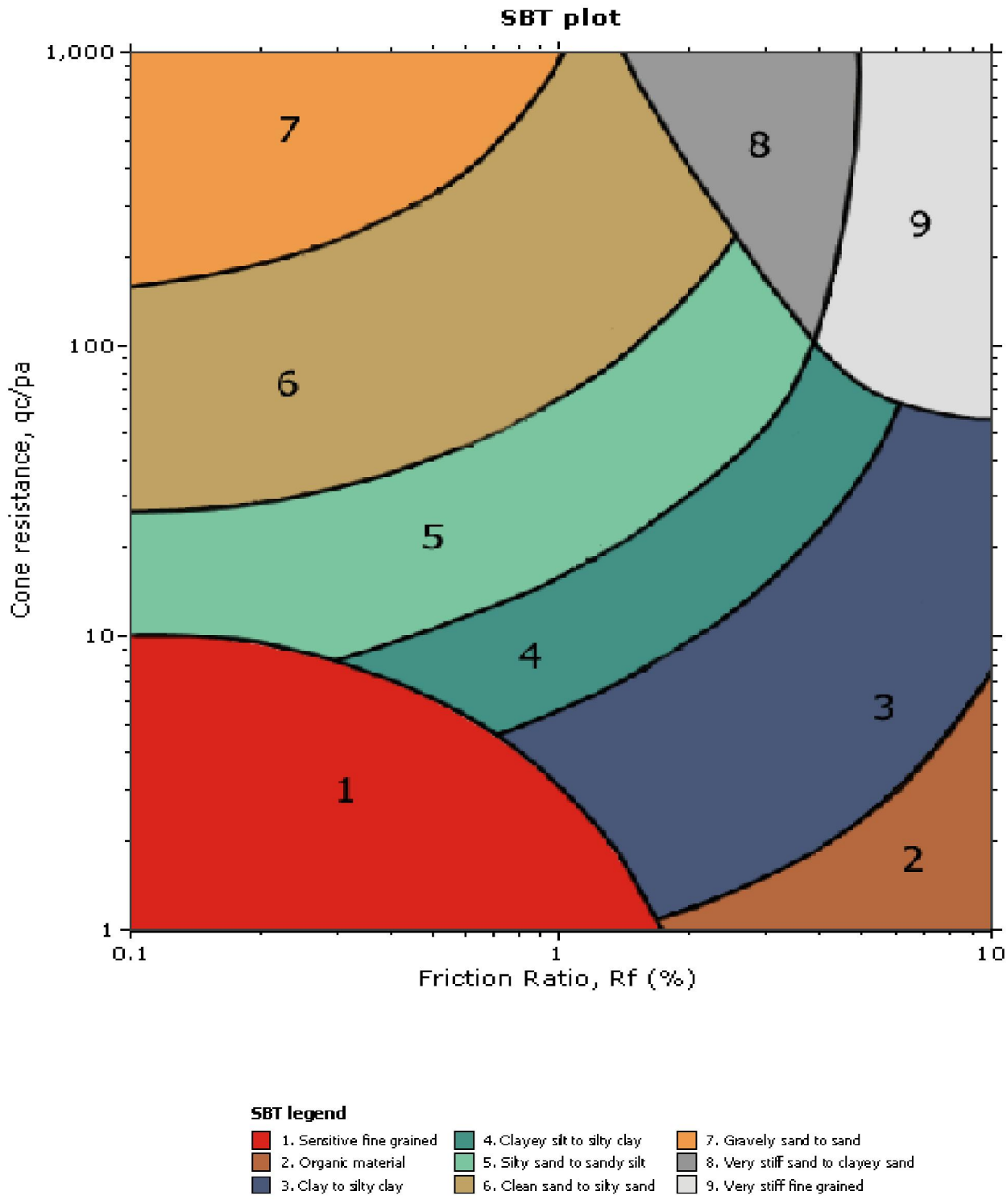

	CPT-14	In situ data						Basic output data											
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	8.7	0.21	0.01	-0.16	8.70012	2.4138	3	3.01607	104.1285	0.05206	0	0.0521	166.1	2.4283	8E-05	5	0.7187	8.7116	2.2789	71.20101
2	103.4	2.97	-1.25	-0.43	103.385	2.8728	5	2.2377	129.5495	0.11684	0	0.1168	883.85	2.876	-9E-04	8	0.5854	3.632	1.9146	354.4714
3	33.1	1.88	0.13	-0.51	33.1016	5.6795	3	2.79236	123.4258	0.17855	0	0.1786	184.39	5.7103	0.0003	9	0.7753	3.9729	2.4095	123.6157
4	20	1.22	-1.61	-0.39	19.9803	6.106	3	2.97261	119.0305	0.23807	0	0.2381	82.927	6.1797	-0.006	9	0.8511	3.5595	2.5998	66.41344
5	10.3	0.58	-2.48	-0.29	10.2696	5.6477	3	3.17072	111.9665	0.29405	0	0.2941	33.925	5.8142	-0.018	3	0.9311	3.2945	2.8018	31.06013
6	5.9	0.17	-2.81	-0.35	5.86561	2.8983	3	3.20341	101.6208	0.34486	0	0.3449	16.009	3.0793	-0.037	3	0.9552	2.918	2.855	15.22485
7	8.7	0.4	-2.74	-0.43	8.66646	4.6155	3	3.17599	108.8338	0.39928	0	0.3993	20.705	4.8384	-0.024	3	0.9687	2.5704	2.8852	20.08257
8	12.1	0.71	-2.58	-0.48	12.0684	5.8831	3	3.12738	113.8399	0.4562	0	0.4562	25.454	6.1143	-0.016	3	0.9715	2.2644	2.8861	24.8509
9	19.9	1.47	-2.58	-0.57	19.8684	7.3987	3	3.03127	120.3808	0.51639	0	0.5164	37.476	7.5961	-0.01	3	0.9564	1.9859	2.839	36.32087
10	35.1	1.33	-2.43	-0.65	35.0703	3.7924	4	2.65273	121.0344	0.57691	0	0.5769	59.79	3.8558	-0.005	4	0.8321	1.6565	2.5063	54.00048
11	30.5	0.96	-2.2	-0.72	30.4731	3.1503	4	2.64487	118.3063	0.63606	0	0.6361	46.909	3.2175	-0.005	4	0.84	1.5334	2.5196	43.24023
12	61	2.21	-1.97	-0.72	60.9759	3.6244	4	2.46731	126.0991	0.69911	0	0.6991	86.22	3.6664	-0.002	4	0.7896	1.3871	2.3781	79.01857
13	75.1	3.88	-1.82	-0.74	75.0777	5.168	9	2.5217	130.7249	0.76447	0	0.7645	97.209	5.2211	-0.002	9	0.8217	1.3062	2.4551	91.73522
14	88.3	4.7	-1.75	-0.84	88.2786	5.3241	9	2.48722	132.5228	0.83073	0	0.8307	105.27	5.3746	-0.001	9	0.8191	1.2192	2.4403	100.7589
15	159.2	4.15	-0.53	-0.93	159.194	2.6069	5	2.08512	133.0502	0.89726	0	0.8973	176.42	2.6217	-2E-04	5	0.6769	1.1181	2.0589	167.2694
16	74.9	4.07	-0.46	-1.04	74.8944	5.4343	9	2.53914	131.0687	0.96279	0	0.9628	76.789	5.5051	-5E-04	9	0.8575	1.0843	2.5248	75.76234
17	57.8	2.76	-0.53	-1.02	57.7935	4.7756	4	2.57068	127.5945	1.02659	0	1.0266	55.297	4.862	-7E-04	4	0.8792	1.0269	2.5739	55.09498
18	59.3	1.95	-0.46	-1.09	59.2944	3.2887	4	2.44558	125.1151	1.08915	0	1.0892	53.441	3.3502	-6E-04	4	0.8404	0.976	2.4644	53.6883
19	81.2	1.64	-0.46	-1.02	81.1944	2.0198	5	2.19973	124.6149	1.15145	0	1.1515	69.515	2.0489	-4E-04	5	0.7535	0.9383	2.2285	70.97852
20	38.1	1.82	-0.38	-0.98	38.0954	4.7775	4	2.69612	123.5312	1.21322	0	1.2132	30.4	4.9346	-7E-04	3	0.9576	0.8772	2.7567	30.57693
21	44.3	1.87	-0.38	-0.92	44.2954	4.2217	4	2.61181	124.0973	1.27527	0	1.2753	33.734	4.3468	-6E-04	4	0.9328	0.8402	2.6838	34.15986
22	59.9	2.83	-0.46	-0.92	59.8944	4.725	4	2.55682	127.8649	1.3392	0	1.3392	43.724	4.8331	-6E-04	4	0.9171	0.8057	2.6347	44.58587
23	87.8	2.51	-0.38	-0.94	87.7954	2.8589	5	2.28373	127.9196	1.40316	0	1.4032	61.57	2.9054	-3E-04	5	0.8167	0.7941	2.3628	64.8387
24	38.2	1.06	-0.23	-1	38.1972	2.7751	4	2.53459	119.5824	1.46295	0	1.463	25.11	2.8856	-5E-04	4	0.9323	0.7393	2.6588	25.66685
25	34.1	1.38	-0.15	-1.02	34.0982	4.0471	4	2.68088	121.2359	1.52357	0	1.5236	21.38	4.2364	-3E-04	3	0.999	0.6947	2.8267	21.38813
26	27.3	0.79	-0.23	-1	27.2972	2.8941	4	2.65792	116.6118	1.58188	0	1.5819	16.256	3.0721	-6E-04	4	1	0.6689	2.8317	16.25622
27	98.1	3.16	-0.23	-0.93	98.0972	3.2213	5	2.29014	129.8752	1.64681	0	1.6468	58.568	3.2763	-2E-04	4	0.8466	0.6876	2.4104	62.68128
28	95.7	2.67	-0.23	-0.94	95.6972	2.7901	5	2.25063	128.582	1.7111	0	1.7111	54.927	2.8409	-2E-04	5	0.8393	0.668	2.3831	59.33788
29	35.2	1.91	-0.26	-1.08	35.1968	5.4266	3	2.75953	123.6914	1.77295	0	1.773	18.852	5.7145	-6E-04	3	1	0.5968	2.9538	18.85213
30	100.2	4.08	-0.04	-1.11	100.2	4.0719	9	2.36203	131.7966	1.83885	0	1.8389	53.49	4.148	-3E-05	4	0.8954	0.6097	2.5149	56.67257
31	201.6	2.54	-0.08	-1.22	201.599	1.2599	6	1.7775	130.034	1.90386	0	1.9039	104.89	1.2719	-3E-05	6	0.6644	0.6769	1.901	127.7493
32	328.2	5.84	0.15	-1.34	328.202	1.7794	6	1.76605	137.28	1.9725	0	1.9725	165.39	1.7902	3E-05	6	0.6573	0.6641	1.8741	204.7362
33	299	6.37	0.52	-1.46	299.006	2.1304	6	1.85359	137.28	2.04114	0	2.0411	145.49	2.145	0.0001	6	0.6988	0.6318	1.9744	177.3288
34	323.4	6.7	0.83	-1.67	323.41	2.0717	6	1.82485	137.28	2.10978	0	2.1098	152.29	2.0853	0.0002	6	0.6922	0.6202	1.9487	188.3271
35	416.6	7.25	1.31	-1.74	416.616	1.7402	6	1.70253	137.28	2.17842	0	2.1784	190.25	1.7494	0.0002	6	0.6458	0.6273	1.8181	245.7029
36	225.5	3.27	1.37	-1.76	225.517	1.45	6	1.79189	132.1559	2.2445	0	2.2445	99.475	1.4646	0.0004	6	0.6998	0.5908	1.9516	124.6676
37	78	3.06	1.29	-1.9	78.0158	3.9223	4	2.42001	129.0813	2.30904	0	2.309	32.787	4.0419	0.0012	4	0.9763	0.4668	2.6691	33.40048
38	72.1	2.13	0.99	-1.42	72.1121	2.9537	5	2.35278	126.2385	2.37216	0	2.3722	29.399	3.0542	0.001	4	0.9602	0.4606	2.6187	30.35939
39	64.3	2.31	0.53	-1.06	64.3065	3.5922	4	2.44855	126.5527	2.43544	0	2.4354	25.404	3.7336	0.0006	4	1	0.4345	2.7343	25.40448
40	52.5	1.32	0.46	-1.1	52.5056	2.514	5	2.40288	121.9635	2.49642	0	2.4964	20.032	2.6395	0.0007	4	1	0.4239	2.7196	20.03237
41	146.1	6.24	0.3	-1.25	146.104	4.2709	9	2.27881	135.8254	2.56433	0	2.5643	55.975	4.3472	0.0002	4	0.9301	0.439	2.5152	59.54802
42	77.1	1.95	0.23	-1.67	77.1028	2.5291	5	2.28428	125.7556	2.62721	0	2.6272	28.348	2.6183	0.0002	4	0.9601	0.4176	2.5865	29.39561
43	56.6	1.96	0.23	-1.92	56.6028	3.4627	4	2.47569	125.0392	2.68973	0.0312	2.6585	20.279	3.6355	-3E-04	3	1	0.398	2.8016	20.27928
44	202.8	10.66	0.15	-2.04	202.802	5.2564	9	2.27515	137.28	2.75837	0.0624	2.696	74.201	5.3288	-3E-04	9	0.9312	0.4186	2.5019	79.13154
45	414.5	5.11	0.23	-1.9	414.503	1.2328	6	1.5772	136.9069	2.82682	0.0936	2.7332	150.62	1.2413	-2E-04	6	0.6436	0.5429	1.7429	211.2417
46	451.2	8.31	-0.46	-2.01	451.194	1.8418	6	1.7064	137.28	2.89546	0.1248	2.7707	161.8	1.8537	-4E-04	6	0.6938	0.5128	1.8703	217.2752
47	360.2	4.94	-1.06	-2.28	360.187	1.3715	6	1.6498	136.3167	2.96362	0.156	2.8076	127.23	1.3829	-7E-04	6	0.6821	0.514	1.8347	173.5156
48	64.6	1.86	-1.41	-2.42	64.5827	2.88	5	2.37858	124.9777	3.02611	0.1872	2.8389	21.683	3.0216	-0.005	4	1	0.3727	2.7284	21.68318
49	84.2	1.94	-1.14	-2.57	84.1861	2.3044	5	2.22872	125.9324	3.08908	0.2184	2.8707	28.25	2.3922	-0.004	4	0.9626	0.3826	2.5627	29.32527
50	146	6.71	-1.16	-2.89	145.986	4.5963	9	2.30499	136.3547	3.15725	0.2496	2.9077	49.122	4.6979	-0.002	4	0.9741	0.3736	2.589	50.4242
51	86	4.47	-1.34	-3.21	85.9836	5.1987	9	2.48629	132.0914	3.2233	0.2808	2.9425	28.126	5.4011	-0.005	3	1	0.3596	2.81	28.12584
52	675.7	15.76	-1.41	-3.29	675.683	2.3325	8	1.72136	137.28	3.29194	0.312	2.9799	225.64	2.3439	-6E-04	8	0.7032	0.4828	1.8694	306.8024
53	417.6	14.64	0	-3.34	417.6	3.5058	8	1.96924	137.28	3.36058	0.3432	3.0174	137.28	3.5342	-8E-04	8	0.8177	0.4245	2.1651	166.1876
54	88.2	4	0.23	-3.57	88.2028	4.535	9	2.43333	131.3407	3.42625	0.3744	3.0519	27.779	4.7183	-0.004	3	1	0.3467	2.7735	27.77874
55	62.8	2.8	-0.11	-3.72	62.7987	4.4587	4	2.52435	127.9024	3.4902	0.4056	3.0846	19.227	4.7211	-0.007	3	1	0.343	2.8925	19.22726
56	489.8	14.59	8.22	-3.78	489.901	2.9782	8	1.87525	137.28	3.55884	0.4368	3.122	155.78	3	0.0003	8	0.7845	0.4279	2.0649	196.6932
57	52.6	2.13	0.99	-4.05	52.6121	4.0485	4	2.54639	125.4695	3.62158	0.468	3.1536	15.535	4.3478	-0.008	3	1	0.3355	2.9403	15.53491
58	62.9	1.97	0.98	-4.25	62.912	3.1314	5	2.41236	125.3342	3.68424	0.4992	3.185	18.596	3.3261	-0.007	4	1	0.3322	2.8066	18.59558
59	73.5	2.83	0.61	-4.43	73.5075	3.85	4	2.43119	128.3644	3.74843	0.5304	3.218	21.678	4.0568	-0.007	3	1	0.3288	2.81	21.67759
60	72.4	2.92	0.15	-4.62	72.4018	4.0331	4	2.4506	128.5565	3.8127	0.5616	3.2511	21.097	4.2572	-0.008	3	1	0.3255	2.8326	21.09718
61	74.7	2.71	0.15	-4.82	74.7018	3.6278	4	2.40736	128.0867	3.87675	0.5928	3.284	21.567	3.8263	-0.008	3	1	0.3222	2.7953	21.56706
62	103.8	5.46	0.23	-4.92	103.803	5.26	9	2.43985	134.0146	3.94376	0.624	3.3198	30.08	5.4677	-0.006	3	1	0.3187	2.7928	30.08025
63	82.6	3.52	0.23	-5.11	82.6028	4.2614	4	2.43093	130.2454	4.00888	0.6552	3.3537	23.435	4.4787	-0.008	3	1	0.3155	2.8128	23.43515
64	105.7	5.22	0.15	-5.28	105.702	4.9384	9	2.4133	133.7299	4.07574	0.6864	3.3893	29.984	5.1365	-0.007	3	1	0.3122	2.7749	29.98401
65	109.8	5.34	0.1	-5.52	109.801	4.8633	9	2.39798	133.989	4.14274	0.7176	3.4251	30.848	5.054	-0.007	3	1	0.3089	2.7611	30.84796
66	99.3	3.47	0.23	-5.71	99.3028	3.4944	5	2.31348	130.5898	4.20803	0.7488	3.4592	27.49	3.649	-0.008	4	1	0.3059	2.7019	27.49014
67	228.5	15.28	0.3	-6.02	228.504	6.687	9	2.33937	137.28	4.27667	0.78	3.4967	64.126	6.8145	-0.003	9	1	0.3026	2.6424	64.12583
68	196.7	11.66	0.58	-6.57	196.707	5.9276	9	2.32664	137.28	4.34531	0.8112	3.5341	54.43	6.0615	-0.004	3	1	0.2994	2.6491	54.43002

69	202.1	14.59	0.46	-7.03	202.106	7.219	9	2.39451	137.28	4.41395	0.8424	3.5716	55.352	7.3802	-0.004	3	1	0.2963	2.7096	55.35176
70	59.2	4.25	0.33	-7.34	59.204	7.1786	3	2.69737	130.812	4.47936	0.8736	3.6058	15.177	7.7662	-0.016	3	1	0.2935	3.1131	15.17703
71	82.3	3.72	0.23	-7.43	82.3028	4.5199	4	2.45147	130.6408	4.54468	0.9048	3.6399	21.363	4.7841	-0.011	3	1	0.2907	2.8619	21.36284
72	46.6	1.45	0.08	-7.59	46.601	3.1115	4	2.50381	122.3598	4.60586	0.936	3.6699	11.443	3.4528	-0.022	3	1	0.2883	2.9843	11.44325
73	44.6	1.88	0.08	-7.71	44.601	4.2152	4	2.60922	124.1531	4.66793	0.9672	3.7007	10.791	4.7079	-0.024	3	1	0.2859	3.0857	10.79057
74	512.6	11.89	0.24	-7.91	512.603	2.3195	8	1.76899	137.28	4.73657	0.9984	3.7382	135.86	2.3412	-0.002	5	0.791	0.3685	2.0051	176.8735
75	267.2	12.34	-0.06	-8.18	267.199	4.6183	9	2.16593	137.28	4.80521	1.0296	3.7756	69.497	4.7029	-0.004	4	0.9767	0.2887	2.4879	71.58802
76	73.9	2.2	0.61	-8.33	73.9075	2.9767	5	2.34779	126.5351	4.86848	1.0608	3.8077	18.132	3.1866	-0.015	4	1	0.2779	2.8037	18.1315
77	88.2	3.01	0.61	-8.4	88.2075	3.4124	5	2.33938	129.2602	4.93311	1.092	3.8411	21.68	3.6146	-0.013	4	1	0.2755	2.7776	21.67975
78	289	15.38	0.46	-8.59	289.006	5.3217	9	2.20352	137.28	5.00175	1.1232	3.8786	73.224	5.4154	-0.004	9	0.9967	0.274	2.5274	73.54125
79	461.7	7.67	0.63	-8.8	461.708	1.6612	6	1.66253	137.28	5.07039	1.1544	3.916	116.61	1.6797	-0.002	6	0.7692	0.3655	1.9253	157.7234

	CPT-15	In situ data						Basic output data												
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	23.4	0.56	0.67	-0.33	23.4082	2.3923	4	2.65942	113.7192	0.05686	0	0.0569	410.68	2.3982	0.0021	5	0.6402	6.4991	2.0699	143.4278
2	75.6	2.13	0.59	-0.41	75.6072	2.8172	5	2.32371	126.3539	0.12004	0	0.12	628.87	2.8217	0.0006	8	0.6066	3.7443	1.9695	267.1259
3	28.5	1.27	-1.16	-0.37	28.4858	4.4584	3	2.76677	120.1894	0.18013	0	0.1801	157.14	4.4867	-0.003	9	0.7609	3.8464	2.3725	102.8957
4	21.9	0.91	-3.11	-0.33	21.8619	4.1625	3	2.83312	117.105	0.23868	0	0.2387	90.594	4.2084	-0.01	4	0.801	3.296	2.469	67.3557
5	16.1	0.64	-1.3	-0.29	16.0841	3.9791	3	2.92355	113.781	0.29557	0	0.2956	53.416	4.0536	-0.006	4	0.8479	2.9487	2.5841	43.9989
6	8.6	0.44	-1.04	-0.31	8.58727	5.1239	3	3.20631	109.5088	0.35033	0	0.3503	23.512	5.3418	-0.009	3	0.9632	2.8998	2.8762	22.57387
7	6.7	0.24	-1.08	-0.39	6.68678	3.5892	3	3.20559	104.4636	0.40256	0	0.4026	15.611	3.8191	-0.012	3	0.9783	2.574	2.9106	15.2872
8	6.5	0.16	-1	-0.5	6.48776	2.4662	3	3.12955	101.4231	0.45327	0	0.4533	13.313	2.6514	-0.012	3	0.967	2.2699	2.8741	12.94543
9	8	0.18	-0.93	-0.29	7.98862	2.2532	3	3.03191	102.7925	0.50467	0	0.5047	14.829	2.4052	-0.009	4	0.9471	2.0162	2.8155	14.26032
10	15.7	0.95	-0.85	-0.29	15.6896	6.055	3	3.04852	116.6106	0.56297	0	0.563	26.869	6.2803	-0.004	3	0.9723	1.8469	2.8754	26.40354
11	18.2	1.2	-0.85	-0.25	18.1896	6.5972	3	3.02538	118.6806	0.62231	0	0.6223	28.229	6.8309	-0.003	3	0.9784	1.6809	2.8842	27.90681
12	22.1	1.33	-0.93	-0.27	22.0886	6.0212	3	2.93646	119.9069	0.68227	0	0.6823	31.375	6.2131	-0.003	3	0.9586	1.5229	2.8247	30.81004
13	37	0.64	-0.87	-0.51	36.9894	1.7302	5	2.41605	115.8122	0.74017	0	0.7402	48.974	1.7656	-0.002	5	0.7741	1.3187	2.3337	45.17588
14	64.7	1.76	-0.09	-1.06	64.6989	2.7203	5	2.36059	124.5778	0.80246	0	0.8025	79.625	2.7545	-1E-04	5	0.7658	1.2359	2.3036	74.63205
15	53.7	2.73	0.06	-1.11	53.7007	5.0837	4	2.61224	127.3354	0.86613	0	0.8661	61.001	5.1671	8E-05	4	0.8708	1.1905	2.5717	59.44314
16	45.8	2.13	0.14	-1.04	45.8017	4.6505	4	2.63152	125.1314	0.9287	0	0.9287	48.318	4.7467	0.0002	4	0.8881	1.1228	2.6093	47.61778
17	52.5	2.3	0.14	-0.9	52.5017	4.3808	4	2.57172	126.0262	0.99171	0	0.9917	51.941	4.4652	0.0002	4	0.8747	1.0583	2.5665	51.5206
18	40	1.73	0.29	-0.82	40.0036	4.3246	4	2.65063	123.2793	1.05335	0	1.0534	36.978	4.4416	0.0005	4	0.9154	1.0041	2.6657	36.96341
19	39	1.37	0.36	-0.78	39.0044	3.5124	4	2.59622	121.5105	1.1141	0	1.1141	34.01	3.6157	0.0007	4	0.9043	0.9544	2.6289	34.17801
20	182.9	3	0.29	-0.72	182.904	1.6402	6	1.89143	131.0145	1.17961	0	1.1796	154.05	1.6509	0.0001	6	0.6354	0.9333	1.9151	160.2817
21	109.8	3.43	0.39	-0.69	109.805	3.1237	5	2.2481	130.7501	1.24499	0	1.245	87.198	3.1596	0.0003	5	0.7818	0.8806	2.2912	90.34703
22	27.6	1.49	-0.02	-0.66	27.5998	5.3986	3	2.83351	121.2813	1.30563	0	1.3056	20.139	5.6667	-5E-05	3	1	0.8104	2.9301	20.13909
23	27.7	0.73	0.06	-0.63	27.7007	2.6353	4	2.62739	116.0697	1.36366	0	1.3637	19.314	2.7718	0.0002	4	0.959	0.7841	2.7414	19.51557
24	23.7	0.9	-0.09	-0.62	23.6989	3.7976	4	2.78061	117.2209	1.42227	0	1.4223	15.663	4.0401	-3E-04	3	1	0.744	2.9175	15.66271
25	21.2	0.77	-0.17	-0.6	21.1979	3.6324	3	2.80542	115.8074	1.48018	0	1.4802	13.321	3.9051	-6E-04	3	1	0.7149	2.9636	13.32122
26	49.6	2.41	-0.17	-0.6	49.5979	4.8591	4	2.62137	126.2293	1.54329	0	1.5433	31.138	5.0151	-3E-04	3	0.9717	0.693	2.7526	31.4721
27	95.1	4.34	0.16	-0.62	95.102	4.5635	9	2.41476	132.1213	1.60935	0	1.6094	58.093	4.6421	0.0001	4	0.8903	0.6884	2.5302	60.82875
28	23.3	1.08	0.25	-0.63	23.3031	4.6346	3	2.84283	118.5139	1.66861	0	1.6686	12.966	4.992	0.0008	3	1	0.6341	3.0391	12.96557
29	86.2	3.96	0.29	-0.7	86.2036	4.5938	9	2.44398	131.2112	1.73421	0	1.7342	48.708	4.6881	0.0003	4	0.9177	0.6355	2.5865	50.72991
30	141.9	3.68	0.42	-0.79	141.905	2.5933	5	2.11468	131.8904	1.80016	0	1.8002	77.829	2.6266	0.0002	5	0.7896	0.6573	2.2426	87.0383
31	244.7	5.03	0.47	-0.84	244.706	2.0555	6	1.8902	135.506	1.86791	0	1.8679	130	2.0713	0.0001	5	0.7007	0.6715	2.001	154.1105
32	210.2	5.77	0.82	-0.96	210.21	2.7449	8	2.03076	136.1397	1.93598	0	1.936	107.58	2.7704	0.0003	5	0.7639	0.6304	2.1583	124.0772
33	331.7	4.22	1.12	-1.02	331.714	1.2722	6	1.64397	134.9632	2.00346	0	2.0035	164.57	1.2799	0.0002	6	0.613	0.6762	1.7537	210.6973
34	323.6	4.39	1.43	-1.27	323.618	1.3565	6	1.67282	135.1919	2.07106	0	2.0711	155.26	1.3653	0.0003	6	0.6304	0.6548	1.7912	198.9942
35	204	5.83	0.89	-1.49	204.011	2.8577	8	2.05255	136.1424	2.13913	0	2.1391	94.371	2.888	0.0003	5	0.7923	0.5725	2.2077	109.227
36	125.5	5.77	0	-1.48	125.5	4.5976	9	2.34359	134.8816	2.20657	0	2.2066	55.876	4.6799	0	4	0.9229	0.5075	2.541	59.1346
37	68	3.7	-0.55	-1.49	67.9933	5.4417	4	2.56659	130.1356	2.27164	0	2.2716	28.931	5.6298	-6E-04	3	1	0.4658	2.8138	28.93137
38	46.3	1.37	-0.62	-1.67	46.2924	2.9595	4	2.49109	121.9283	2.3326	0	2.3326	18.846	3.1165	-0.001	4	1	0.4536	2.7846	18.84582
39	135.2	5.29	-1	-1.55	135.188	3.9131	8	2.26817	134.4275	2.39982	0	2.3998	55.333	3.9838	-5E-04	4	0.9119	0.4739	2.4877	59.47098
40	53.4	3.23	-0.88	-1.55	53.3892	6.0499	3	2.67012	128.5518	2.46409	0	2.4641	20.667	6.3426	-0.001	3	1	0.4294	2.9551	20.66689
41	165.3	6.79	-0.39	-1.84	165.295	4.1078	8	2.23405	136.7445	2.53246	0	2.5325	64.27	4.1717	-2E-04	4	0.9062	0.4535	2.456	69.75284
42	241	9.38	-1.38	-2.07	240.983	3.8924	8	2.12477	137.28	2.6011	0	2.6011	91.646	3.9349	-4E-04	9	0.8587	0.4619	2.3247	104.0633
43	257.5	8.05	-1.15	-2.02	257.486	3.1264	8	2.02878	137.28	2.66974	0.0312	2.6385	96.575	3.1591	-5E-04	5	0.8233	0.4713	2.2269	113.4985
44	337.1	6.12	-1.15	-2.15	337.086	1.8156	6	1.76696	137.28	2.73838	0.0624	2.676	124.94	1.8304	-4E-04	6	0.7179	0.5137	1.9454	162.3248
45	301.8	7.85	-2.11	-2.28	301.774	2.6013	8	1.92451	137.28	2.80702	0.0936	2.7134	110.18	2.6257	-8E-04	5	0.7851	0.4774	2.1172	134.898
46	53.5	2.01	-2.47	-2.28	53.4698	3.7591	4	2.51845	125.0847	2.86957	0.1248	2.7448	18.435	3.9723	-0.006	3	1	0.3855	2.858	18.43515
47	71.8	2.43	-2.43	-2.43	71.7703	3.3858	5	2.39714	127.191	2.93316	0.156	2.7772	24.787	3.5301	-0.005	4	1	0.381	2.7265	24.78684
48	67.9	3.18	-2.44	-2.49	67.8701	4.6854	4	2.51794	129.023	2.99767	0.1872	2.8105	23.082	4.9019	-0.006	3	1	0.3765	2.8439	23.08239
49	83.4	5.04	-2.6	-2.59	83.3682	6.0455	9	2.54592	132.8942	3.06412	0.2184	2.8457	28.219	6.2762	-0.005	3	1	0.3718	2.8547	28.21923
50	723.6	15.73	1.08	-3	723.613	2.1738	8	1.68172	137.28	3.13276	0.2496	2.8832	249.89	2.1833	-2E-04	8	0.6786	0.5065	1.8166	344.8978
51	487.6	7.32	0.58	-3.65	487.607	1.5012	6	1.61258	137.28	3.2014	0.2808	2.9206	165.86	1.5111	-5E-04	6	0.6674	0.5079	1.7821	232.497
52	94.3	3.42	1.05	-3.95	94.3129	3.6262	5	2.34024	130.3578	3.26658	0.312	2.9546	30.815	3.7563	-0.003	4	1	0.3581	2.6733	30.8153
53	245.5	7.2	-0.77	-3.93	245.491	2.9329	8	2.01665	137.28	3.33522	0.3432	2.992	80.934	2.9733	-0.002	5	0.8522	0.4124	2.2589	94.37231
54	220	10.84	-0.74	-3.93	219.991	4.9275	9	2.23283	137.28	3.40386	0.3744	3.0295	71.494	5.0049	-0.002	9	0.9434	0.3707	2.4923	75.88213
55	52.2	1.49	-0.39	-3.77	52.1952	2.8547	5	2.44231	122.8354	3.46528	0.4056	3.0597	15.927	3.0577	-0.009	3	1	0.3458	2.8375	15.9265
56	61.3	1.79	-0.67	-3.85	61.2918	2.9205	5	2.39896	124.5695	3.52756	0.4368	3.0908	18.689	3.0988	-0.008	4	1	0.3424	2.7859	18.68931
57	63.3	2.03	-1.08	-3.98	63.2868	3.2076	4	2.41799	125.5682	3.59035	0.468	3.1224	19.119	3.4005	-0.009	4	1	0.3389	2.8031	19.11909
58	63.7	2.41	-1.15	-4.09	63.6859	3.7842	4	2.46788	126.8391	3.65377	0.4992	3.1546	19.03	4.0145	-0.01	3	1	0.3354	2.8503	19.03024
59	60.6	1.82	-1.21	-4	60.5852	3.004	5	2.41116	124.6628	3.7161	0.5304	3.1857	17.851	3.2003	-0.011	4	1	0.3321	2.8102	17.85138
60	127.8	6.24	-1.08	-3.82	127.787	4.8831	9	2.36004	135.4987	3.78385	0.5616	3.2223	38.483	5.0321	-0.005	4	1	0.3284	2.6917	38.48337
61	86.3	2.96	-1.08	-3.52	86.2868	3.4304	5	2.34743	129.0839	3.84839	0.5928	3.2556	25.322	3.5906	-0.008	4	1	0.325	2.7243	25.32211
62	80.6	3.32	-1.08	-3.36	80.5868	4.1198	4	2.4268	129.7571	3.91327	0.624	3.2893	23.31	4.3301	-0.009	3	1	0.3217	2.8048	23.31021
63	131.3	5.03	-1.13	-3.24	131.286	3.8313	8	2.26855	133.9873	3.98026	0.6552	3.3251	38.287	3.9511	-0.006	4	1	0.3182	2.6194	38.28679
64	251.7	12.76	-0.85	-3.28	251.69	5.0697	9	2.21397	137.28	4.0489	0.6864	3.3625	73.648	5.1526	-0.003	9	0.9611	0.3292	2.4979	77.03465
65	707.7	20.62	-0.41	-3.2	707.695	2.9137	8	1.8036	137.28	4.11754	0.7176	3.3999	206.94	2.9307	-0.001	8	0.765	0.4095	1.9792	272.267

	CPT-16	In situ data			Basic output data														
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	26.4	0.62	0.01	0.37	26.4001	2.3485	4	2.61297	114.7573	0.05738	0	0.0574	459.1	2.3536	3E-05	5	0.6292	6.2585	2.0409	155.8117
2	23	0.39	-0.14	0.56	22.9983	1.6958	4	2.57869	111.0289	0.11289	0	0.1129	202.72	1.7041	-4E-04	5	0.6528	4.31	2.0877	93.21841
3	38.7	0.77	-0.29	0.53	38.6965	1.9899	5	2.43781	117.2753	0.17153	0	0.1715	224.59	1.9987	-5E-04	5	0.6459	3.239	2.066	117.9285
4	25.1	0.85	-0.29	0.49	25.0965	3.3869	4	2.72956	116.9424	0.23	0	0.23	108.11	3.4183	-8E-04	5	0.7624	3.2012	2.3697	75.23145
5	26.2	0.31	-0.29	0.47	26.1965	1.1834	5	2.44604	109.6667	0.28484	0	0.2848	90.971	1.1964	-8E-04	5	0.6772	2.4319	2.1349	59.55461
6	25.2	0.67	-0.29	0.48	25.1965	2.6591	4	2.66207	115.211	0.34244	0	0.3424	72.579	2.6957	-8E-04	5	0.7738	2.3941	2.3839	56.23494
7	17.6	0.58	-0.29	0.51	17.5965	3.2961	3	2.84238	113.2799	0.39908	0	0.3991	43.092	3.3726	-0.001	4	0.8518	2.2946	2.5805	37.29325
8	46.1	0.77	-0.22	0.63	46.0973	1.6704	5	2.33104	117.7022	0.45793	0	0.4579	99.664	1.6871	-4E-04	5	0.6889	1.7806	2.146	76.80372
9	16.8	0.82	-0.29	0.62	16.7965	4.882	3	2.96522	115.7001	0.51578	0	0.5158	31.565	5.0367	-0.001	3	0.9298	1.9505	2.7687	30.01217
10	22	0.84	-0.29	0.67	21.9965	3.8188	3	2.80692	116.5343	0.57405	0	0.5741	37.318	3.9211	-1E-03	4	0.8863	1.7194	2.647	34.8116
11	32.5	1.59	-0.38	0.68	32.4954	4.893	3	2.75275	122.1549	0.63513	0	0.6351	50.164	4.9906	-9E-04	4	0.8816	1.5683	2.6276	47.22078
12	29.9	1.66	-0.9	0.67	29.889	5.5539	3	2.8171	122.2662	0.69626	0	0.6963	41.928	5.6864	-0.002	3	0.9174	1.468	2.7146	40.50246
13	37.8	2.23	-0.82	0.61	37.79	5.901	3	2.76392	124.9981	0.75876	0	0.7588	48.805	6.022	-0.002	3	0.9097	1.3533	2.6869	47.36105
14	40	2.86	-0.9	0.57	39.989	7.152	3	2.80805	126.9567	0.82224	0	0.8222	47.634	7.3021	-0.002	3	0.9376	1.2668	2.7526	46.89111
15	34.6	1.85	-0.9	0.6	34.589	5.3485	3	2.76043	123.4153	0.88394	0	0.8839	38.13	5.4888	-0.002	3	0.9302	1.1821	2.7253	37.6543
16	23	1.62	-1.05	0.59	22.9872	7.0474	3	2.97096	121.4474	0.94467	0	0.9447	23.334	7.3495	-0.003	3	1	1.1201	2.9616	23.33356
17	39.1	1.75	-0.97	0.48	39.0881	4.4771	4	2.66835	123.307	1.00632	0	1.0063	37.843	4.5954	-0.002	4	0.9149	1.047	2.6702	37.68131
18	29.7	1.71	-0.97	0.41	29.6881	5.7599	3	2.83025	122.4669	1.06756	0	1.0676	26.809	5.9747	-0.002	3	0.9884	0.9913	2.8555	26.81222
19	32.4	1.61	-1.05	0.34	32.3872	4.9711	3	2.75856	122.2382	1.12867	0	1.1287	27.695	5.1506	-0.002	3	0.9701	0.9393	2.8	27.74832
20	104.4	3.29	-1.25	0.28	104.385	3.1518	5	2.26533	130.3217	1.19384	0	1.1938	86.436	3.1883	-9E-04	5	0.7825	0.9099	2.2993	88.73554
21	31.1	1.59	-2.57	0.23	31.0685	5.1177	3	2.78032	122.0454	1.25486	0	1.2549	23.759	5.3331	-0.006	3	0.9987	0.8434	2.8594	23.76372
22	27.2	1.3	-2.53	0.17	27.169	4.7849	3	2.80267	120.2448	1.31498	0	1.315	19.661	5.0282	-0.007	3	1	0.8047	2.9032	19.66117
23	27	0.95	-2.57	0.15	26.9685	3.5226	4	2.71672	117.9317	1.37395	0	1.374	18.629	3.7117	-0.007	3	0.9954	0.7711	2.8354	18.65109
24	25	0.82	-2.57	0.11	24.9685	3.2841	4	2.72271	116.6671	1.43228	0	1.4323	16.433	3.484	-0.008	3	1	0.7388	2.8613	16.43273
25	24	0.61	-2.57	0.11	23.9685	2.545	4	2.66751	114.4027	1.48948	0	1.4895	15.092	2.7136	-0.008	4	0.9969	0.7111	2.8253	15.10766
26	21.7	0.67	-2.57	0.11	21.6685	3.092	4	2.75407	114.8431	1.5469	0	1.5469	13.008	3.3298	-0.009	3	1	0.684	2.9302	13.0077
27	27	0.76	-2.49	0.13	26.9695	2.818	4	2.65469	116.2991	1.60505	0	1.6051	15.803	2.9963	-0.007	4	1	0.6592	2.835	15.80289
28	97.4	4.27	-2.41	-0.08	97.3705	4.3853	9	2.39487	132.0598	1.67108	0	1.6711	57.268	4.4619	-0.002	4	0.8895	0.666	2.5203	60.23529
29	96.5	4.38	-2.26	-0.08	96.4723	4.5402	9	2.40912	132.2233	1.73719	0	1.7372	54.533	4.6234	-0.002	4	0.9026	0.6392	2.5466	57.23044
30	270.8	6.69	-2.03	0.04	270.775	2.4707	8	1.93102	137.28	1.80583	0	1.8058	148.94	2.4873	-5E-04	5	0.7089	0.6846	2.0303	174.0209
31	319.2	3.52	-0.9	0.02	319.189	1.1028	6	1.60466	133.5422	1.8726	0	1.8726	169.45	1.1093	-2E-04	6	0.587	0.7153	1.702	214.4994
32	256.9	7.03	-0.36	-0.08	256.896	2.7365	8	1.98067	137.28	1.94124	0	1.9412	131.34	2.7574	-1E-04	5	0.7414	0.6377	2.0987	153.6521
33	70.7	2.99	-0.06	0.02	70.6993	4.2292	4	2.47287	128.6718	2.00558	0	2.0056	34.251	4.3527	-6E-05	4	0.9646	0.5397	2.6763	35.0348
34	69.7	2.49	-0.06	0.11	69.6993	3.5725	4	2.42285	127.2981	2.06923	0	2.0692	32.684	3.6818	-6E-05	4	0.9533	0.5276	2.6385	33.72277
35	85.8	4.1	-0.29	0.02	85.7965	4.7788	9	2.45852	131.4539	2.13496	0	2.135	39.187	4.9007	-3E-04	4	0.9689	0.5066	2.6714	40.05242
36	40.3	1.65	-0.06	-0.14	40.2993	4.0944	4	2.63175	122.9509	2.19643	0	2.1964	17.348	4.3304	-1E-04	3	1	0.4817	2.9022	17.3476
37	71	3.22	-0.09	-0.26	70.9989	4.5353	4	2.4944	129.2243	2.26104	0	2.261	30.401	4.6845	-9E-05	3	1	0.468	2.7429	30.40093
38	75.5	3.58	-0.29	-0.28	75.4965	4.7419	4	2.4916	130.1496	2.32612	0	2.3261	31.456	4.8927	-3E-04	3	1	0.4549	2.7452	31.45597
39	36.8	1.26	0.02	-0.09	36.8002	3.4239	4	2.60733	120.7562	2.3865	0	2.3865	14.42	3.6613	4E-05	3	1	0.4434	2.9193	14.42019
40	143.7	7.92	0.02	-0.02	143.7	5.5115	9	2.37368	137.28	2.45514	0	2.4551	57.53	5.6073	1E-05	4	0.9559	0.4473	2.5972	59.70651
41	115.8	4.9	-0.06	-0.07	115.799	4.2315	9	2.33598	133.4896	2.52188	0	2.5219	44.918	4.3257	-4E-05	4	0.9548	0.4364	2.5859	46.71588
42	164.4	4.49	-0.01	-0.14	164.4	2.7312	5	2.09246	133.7049	2.58873	0	2.5887	62.506	2.7748	0	5	0.8567	0.4647	2.3207	71.05947
43	63.9	3.23	-0.08	-0.18	63.899	5.0549	4	2.55998	128.9901	2.65323	0	2.6532	23.083	5.2738	-9E-05	3	1	0.3988	2.8653	23.08349
44	32.4	0.77	0.02	-0.23	32.4002	2.3765	4	2.54622	116.8422	2.71165	0	2.7117	10.949	2.5936	5E-05	3	1	0.3902	2.9288	10.94853
45	102.2	4.72	0.22	-0.29	102.203	4.6183	9	2.39931	132.9111	2.77811	0	2.7781	35.789	4.7473	0.0002	4	1	0.3809	2.696	35.78862
46	73.5	4.5	0.24	-0.44	73.5029	6.1222	9	2.58434	131.7579	2.84399	0	2.844	24.845	6.3686	0.0002	3	1	0.3721	2.8985	24.84505
47	69.2	3.47	0.17	-0.5	69.2021	5.0143	4	2.53462	129.7089	2.90884	0	2.9088	22.79	5.2343	0.0002	3	1	0.3638	2.8672	22.79027
48	148.5	6.13	0.08	-0.54	148.501	4.1279	8	2.26268	135.7349	2.97671	0	2.9767	48.888	4.2124	4E-05	4	0.9637	0.3691	2.5526	50.76083
49	354.3	6.79	0.28	-0.63	354.303	1.9164	6	1.77505	137.28	3.04535	0	3.0454	115.34	1.9331	6E-05	6	0.7507	0.4522	1.9855	150.1218
50	47.1	1.43	2.6	-0.56	47.1318	3.034	4	2.49273	122.2858	3.10649	0	3.1065	14.172	3.2481	0.0043	3	1	0.3406	2.8938	14.17205
51	137.8	5.89	2.75	-0.38	137.834	4.2733	9	2.29386	135.2609	3.17412	0	3.1741	42.424	4.374	0.0015	4	0.9977	0.3342	2.6179	42.53197
52	268.8	14.44	3.09	-0.24	268.838	5.3713	9	2.22196	137.28	3.24276	0	3.2428	81.904	5.4369	0.0008	9	0.9504	0.345	2.4844	86.58588
53	48.6	1.23	3.13	-0.43	48.6383	2.5289	5	2.42922	121.2602	3.30339	0	3.3034	13.724	2.7131	0.005	4	1	0.3203	2.8591	13.72376
54	61	1.76	3.05	-0.56	61.0373	2.8835	5	2.39637	124.4357	3.36561	0	3.3656	17.136	3.0518	0.0038	4	1	0.3144	2.8117	17.1356
55	60.3	2.34	2.97	-0.78	60.3364	3.8783	4	2.49175	126.4916	3.42885	0	3.4289	16.597	4.1119	0.0038	3	1	0.3086	2.9028	16.59665
56	47.3	1.8	2.9	-1.12	47.3355	3.8026	4	2.55936	123.98	3.49084	0	3.4908	12.56	4.1054	0.0048	3	1	0.3031	2.9972	12.5599
57	74.6	2.8	2.95	-1.43	74.6361	3.7515	4	2.41841	128.3236	3.55501	0	3.555	19.995	3.9392	0.003	3	1	0.2976	2.8285	19.99465
58	78.2	4.85	3.05	-1.75	78.2373	6.1991	9	2.57158	132.4582	3.62123	0	3.6212	20.605	6.4999	0.0029	3	1	0.2922	2.9633	20.60515
59	75.6	3.67	3.33	-1.73	75.6408	4.8519	4	2.49864	130.3359	3.6864	0	3.6864	19.519	5.1005	0.0033	3	1	0.287	2.9097	19.51885
60	77.8	4.46	3.28	-1.76	77.8402	5.7297	9	2.5463	131.8324	3.75232	0	3.7523	19.745	6.0199	0.0032	3	1	0.282	2.9542	19.74454
61	148.8	8.96	3.72	-1.81	148.846	6.0197	9	2.39696	137.28	3.82096	0	3.821	37.955	6.1783	0.0019	3	1	0.2769	2.7602	37.95502
62	276.5	12.97	4.18	-1.68	276.551	4.6899	9	2.16444	137.28	3.8896	0	3.8896	70.1	4.7568	0.0011	4	0.9834	0.278	2.4915	71.63631
63	284.9	12.26	4.64	-1.66	284.957	4.3024	8	2.1254	137.28	3.95824	0	3.9582	70.991	4.363	0.0012	4	0.9731	0.277	2.4555	73.55751
64	393.8	16.5	4.39	-1.57	393.854	4.1894	8	2.04989	137.28	4.02688	0	4.0269	96.806	4.2327	0.0008	9	0.9351	0.2866	2.3456	105.5853
65	381.4	10.24	4.55	-1.36	381.456	2.6845	8	1.88479	137.28	4.09552	0	4.0955	92.14	2.7136	0.0009	5	0.8777	0.3049	2.1885	108.7272
66	60.3	2.54	0.85	-0.75	60.3104	4.2116	4	2.51798	127.0907	4.15906	0	4.1591	13.501	4.5235	0.0011	3	1	0.2544	2.9986	13.50095
67	62.2	1.33	0.77	-1.19	62.2094	2.1379	5	2.30104	122.4323	4.22028	0	4.2203	13.741	2.2935	0.001	4	1	0.2507	2.8171	13.74059
68	70	1.65	0.47	-1.47	70.0058	2.357	5	2.29262	124.2978	4.28243	0	4.2824	15.347	2.5105	0.0005	4	1	0.2471	2.8	15.34721

69	69.5	2.05	0.47	-1.91	69.5058	2.9494	5	2.36347	125.8686	4.34536	0	4.3454	14.995	3.1461	0.0005	3	1	0.2435	2.8659	14.99538
70	215.8	4.58	0.62	-2.44	215.808	2.1223	6	1.93372	134.5137	4.41262	0	4.4126	47.907	2.1666	0.0002	5	0.9552	0.2556	2.3504	51.07018
71	69.6	4.9	0.62	-2.92	69.6076	7.0395	9	2.64639	132.2481	4.47874	0	4.4787	14.542	7.5236	0.0007	3	1	0.2363	3.1175	14.54176
72	124.9	4.81	1	-3.22	124.912	3.8507	8	2.28346	133.5387	4.54551	0	4.5455	26.48	3.9961	0.0006	4	1	0.2328	2.7402	26.48033
73	63	3.04	0.77	-3.29	63.0094	4.8247	4	2.54885	128.5123	4.60977	0	4.6098	12.669	5.2055	0.001	3	1	0.2295	3.0584	12.66867
74	435.3	12.97	0.77	-3.35	435.309	2.9795	8	1.898	137.28	4.67841	0	4.6784	92.046	3.0119	0.0001	5	0.924	0.2532	2.238	103.0513

	CPT-17	In situ data						Basic output data											
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	46.6	2.42	-0.04	-0.17	46.5995	5.1932	4	2.66096	126.1075	0.06305	0	0.0631	738.04	5.2002	-6E-05	9	0.6823	6.8501	2.1749	301.2728
2	8.2	0.32	0.23	-0.25	8.20282	3.9011	3	3.15273	107.0669	0.11659	0	0.1166	69.358	3.9574	0.0021	4	0.829	6.2246	2.5528	47.56906
3	13.6	0.75	-0.67	-0.27	13.5918	5.518	3	3.06987	114.5309	0.17385	0	0.1739	77.18	5.5895	-0.004	4	0.848	4.6249	2.6013	58.64866
4	15.7	0.95	-0.6	-0.27	15.6927	6.0538	3	3.0484	116.6111	0.23216	0	0.2322	66.595	6.1447	-0.003	3	0.8707	3.7461	2.652	54.73643
5	13.7	0.75	-3.42	-0.35	13.6581	5.4912	3	3.06689	114.5428	0.28943	0	0.2894	46.19	5.6101	-0.018	3	0.8963	3.1959	2.7112	40.37873
6	10.8	0.5	-1.52	-0.27	10.7814	4.6376	3	3.10143	110.9991	0.34493	0	0.3449	30.257	4.7909	-0.01	3	0.9244	2.8185	2.7778	27.79933
7	8.9	0.38	-1.29	-0.27	8.88421	4.2773	3	3.14777	108.519	0.39919	0	0.3992	21.256	4.4785	-0.011	3	0.9584	2.5453	2.8579	20.4111
8	11	0.42	-1.14	-0.35	10.9861	3.823	3	3.04455	109.7692	0.45407	0	0.4541	23.194	3.9879	-0.008	3	0.939	2.213	2.7999	22.02756
9	13.9	0.49	-0.83	-0.37	13.8898	3.5278	3	2.94197	111.4692	0.50981	0	0.5098	26.245	3.6622	-0.004	4	0.918	1.9548	2.7378	24.71895
10	22.8	0.98	-0.6	-0.42	22.7927	4.2996	3	2.82858	117.7489	0.56868	0	0.5687	39.08	4.4097	-0.002	4	0.8935	1.7416	2.6668	36.5799
11	22.3	1.09	-0.51	-0.45	22.2938	4.8893	3	2.87263	118.4733	0.62792	0	0.6279	34.504	5.031	-0.002	3	0.923	1.6187	2.7375	33.14443
12	20.1	1.06	-0.46	-0.47	20.0944	5.2751	3	2.92827	118.0158	0.68693	0	0.6869	28.253	5.4618	-0.002	3	0.9562	1.5115	2.8179	27.72301
13	19.1	0.91	-0.53	-0.53	19.0935	4.766	3	2.91603	116.7747	0.74531	0	0.7453	24.618	4.9596	-0.002	3	0.9638	1.4018	2.8307	24.30773
14	23.2	1.1	-0.53	-0.56	23.1935	4.7427	3	2.85101	118.6366	0.80463	0	0.8046	27.825	4.9132	-0.002	3	0.9508	1.2974	2.7893	27.45248
15	27.1	1.21	-0.53	-0.62	27.0935	4.466	3	2.78335	119.7131	0.86449	0	0.8645	30.34	4.6132	-0.001	3	0.936	1.2082	2.743	29.95036
16	21.5	0.8	-0.48	-0.66	21.4941	3.722	3	2.80749	116.1209	0.92255	0	0.9226	22.299	3.8889	-0.002	3	0.9569	1.1402	2.7907	22.16715
17	27.5	1.76	-0.46	-0.69	27.4944	6.4013	3	2.88617	122.4906	0.98379	0	0.9838	26.947	6.6389	-0.001	3	0.9961	1.0752	2.8862	26.9396
18	27.6	1.56	-0.41	-0.72	27.595	5.6532	3	2.84739	121.6168	1.0446	0	1.0446	25.417	5.8756	-0.001	3	0.9917	1.0128	2.8671	25.41401
19	28.6	1.86	-0.46	-0.74	28.5944	6.5048	3	2.87897	122.9906	1.1061	0	1.1061	24.852	6.7665	-0.001	3	1	0.9566	2.9169	24.85156
20	36	1.59	-0.76	-0.76	35.9907	4.4178	4	2.69001	122.4041	1.1673	0	1.1673	29.832	4.5659	-0.002	3	0.9489	0.911	2.7396	29.98239
21	41	1.66	-0.61	-0.78	40.9925	4.0495	4	2.6231	123.0367	1.22882	0	1.2288	32.359	4.1747	-0.001	4	0.9313	0.87	2.6855	32.69366
22	26.2	0.97	-0.61	-0.8	26.1925	3.7034	4	2.74049	118.013	1.28783	0	1.2878	19.339	3.8949	-0.002	3	0.9916	0.823	2.836	19.37063
23	30.4	1.24	-0.56	-0.81	30.3932	4.0799	4	2.72	120.1726	1.34791	0	1.3479	21.548	4.2692	-0.001	3	0.9906	0.7868	2.8257	21.59757
24	31.2	1.51	-0.53	-0.84	31.1935	4.8408	3	2.76235	121.6774	1.40875	0	1.4088	21.143	5.0697	-0.001	3	1	0.7511	2.882	21.14268
25	28.5	0.94	-0.46	-0.82	28.4944	3.2989	4	2.68004	117.9885	1.46774	0	1.4677	18.414	3.4781	-0.001	3	0.9945	0.7222	2.8214	18.44664
26	80.1	3.53	-0.3	-0.9	80.0963	4.4072	4	2.45074	130.191	1.53284	0	1.5328	51.254	4.4932	-3E-04	4	0.8975	0.717	2.5588	53.23836
27	54.5	2.81	-0.17	-1.1	54.4979	5.1562	4	2.61247	127.5827	1.59663	0	1.5966	33.133	5.3118	-2E-04	3	0.9736	0.67	2.7508	33.49529
28	286.9	5.21	-0.1	-1.29	286.899	1.816	6	1.8063	136.1512	1.66471	0	1.6647	171.34	1.8266	-3E-05	6	0.6472	0.7458	1.8859	201.0461
29	167.3	6.06	0.24	-1.18	167.303	3.6222	8	2.18638	135.9417	1.73268	0	1.7327	95.557	3.6601	0.0001	5	0.8078	0.6714	2.2976	105.0603
30	84.9	3.81	0.61	-1	84.9075	4.4872	4	2.44036	130.8917	1.79812	0	1.7981	46.22	4.5843	0.0005	4	0.924	0.6127	2.5952	48.12089
31	73.6	2.38	0.68	-0.78	73.6083	3.2333	5	2.37503	127.1006	1.86167	0	1.8617	38.539	3.3172	0.0007	4	0.9095	0.5982	2.5489	40.5605
32	93.6	4.84	0.61	-0.51	93.6075	5.1705	9	2.46145	132.8805	1.92811	0	1.9281	47.549	5.2793	0.0005	4	0.9448	0.5673	2.6337	49.15011
33	64	2.68	0.68	-0.25	64.0083	4.187	4	2.49858	127.6284	1.99193	0	1.9919	31.134	4.3214	0.0008	4	0.9754	0.5395	2.7063	31.62267
34	64.8	3.07	0.76	-0.05	64.8093	4.737	4	2.53477	128.6528	2.05625	0	2.0563	30.518	4.8922	0.0009	3	0.9967	0.5157	2.754	30.58523
35	189.2	5.15	0.53	-0.09	189.206	2.7219	5	2.05454	135.0512	2.12378	0	2.1238	88.089	2.7528	0.0002	5	0.7933	0.5754	2.2122	101.7348
36	40	2.02	0.23	-0.15	40.0028	5.0496	4	2.6982	124.4133	2.18599	0	2.186	17.3	5.3415	0.0004	3	1	0.484	2.9623	17.29966
37	640.8	5.98	0.46	-0.23	640.806	0.9332	6	1.37445	137.28	2.25463	0	2.2546	283.22	0.9365	5E-05	6	0.5164	0.6766	1.4689	408.3362
38	240.4	6.52	0.38	-0.35	240.405	2.7121	8	1.99336	137.28	2.32327	0	2.3233	102.48	2.7386	0.0001	5	0.7829	0.5402	2.1602	121.5557
39	306.5	7.02	0.23	-0.47	306.503	2.2904	6	1.87413	137.28	2.39191	0	2.3919	127.14	2.3084	5E-05	5	0.7371	0.5482	2.0313	157.5448
40	269.3	4.5	0.27	-0.52	269.303	1.671	6	1.79301	134.9249	2.45937	0	2.4594	108.5	1.6864	7E-05	6	0.7153	0.547	1.9655	137.9477
41	246.6	5.63	-5.72	-0.63	246.53	2.2837	6	1.92561	136.3487	2.52754	0	2.5275	96.537	2.3074	-0.002	5	0.7748	0.5093	2.1135	117.4472
42	41.8	1.43	-5.69	-0.67	41.7304	3.4268	4	2.56745	121.9889	2.58854	0	2.5885	15.121	3.6534	-0.01	3	1	0.4088	2.9024	15.1212
43	73.4	2.33	-5.62	-0.64	73.3312	3.1774	5	2.37064	126.936	2.65201	0	2.652	26.651	3.2966	-0.006	4	0.9977	0.3999	2.6826	26.70893
44	71.6	4.83	-5.54	-0.45	71.5322	6.7522	9	2.62487	132.2094	2.71811	0	2.7181	25.317	7.0189	-0.006	3	1	0.3893	2.9224	25.31688
45	61.5	3.16	-5.69	-0.31	61.4304	5.144	4	2.57699	128.7336	2.78248	0	2.7825	21.078	5.3881	-0.007	3	1	0.3803	2.9007	21.07757
46	65.6	3.33	-5.79	-0.3	65.5291	5.0817	4	2.55451	129.2746	2.84712	0	2.8471	22.016	5.3125	-0.007	3	1	0.3716	2.8826	22.01597
47	193.8	6.56	-5.92	-0.29	193.728	3.3862	8	2.12583	136.8794	2.91555	0	2.9156	65.446	3.4379	-0.002	5	0.8952	0.4036	2.3812	72.78472
48	51.6	2.99	-4.55	-0.25	51.5443	5.8008	3	2.66665	127.9011	2.97951	0	2.9795	16.3	6.1567	-0.007	3	1	0.3551	3.0225	16.29962
49	235.2	6.29	-4.48	-0.36	235.145	2.6749	8	1.99379	137.0444	3.04803	0	3.048	76.147	2.7101	-0.001	5	0.8496	0.407	2.2451	89.27692
50	206.5	8	-4.55	-0.6	206.444	3.8751	8	2.15909	137.28	3.11667	0	3.1167	65.239	3.9345	-0.002	4	0.9252	0.3681	2.433	70.72876
51	41.4	1.38	-4.17	-0.56	41.349	3.3375	4	2.56254	121.7061	3.17752	0	3.1775	12.013	3.6153	-0.008	3	1	0.333	2.9792	12.01296
52	51.9	1.48	-4.25	-0.62	51.848	2.8545	5	2.4444	122.7699	3.23891	0	3.2389	15.008	3.0447	-0.006	3	1	0.3267	2.8571	15.00787
53	55.9	2.21	-4.4	-0.65	55.8461	3.9573	4	2.52127	125.8848	3.30185	0	3.3019	15.914	4.206	-0.006	3	1	0.3205	2.9231	15.9136
54	48.8	1.9	-4.48	-0.66	48.7452	3.8978	4	2.5579	124.4472	3.36407	0	3.3641	13.49	4.1868	-0.007	3	1	0.3145	2.9779	13.48993
55	63.1	2.82	-4.48	-0.66	63.0452	4.473	4	2.52423	127.964	3.42805	0	3.4281	17.391	4.7302	-0.005	3	1	0.3087	2.9261	17.39095
56	130.7	9.67	-4.28	-0.87	130.648	7.4016	9	2.50307	137.28	3.49669	0	3.4967	36.363	7.6051	-0.002	3	1	0.3026	2.8391	36.36319
57	83.2	4.88	-3.95	-1.43	83.1517	5.8688	9	2.53651	132.6519	3.56302	0	3.563	22.337	6.1315	-0.004	3	1	0.297	2.9204	22.33741
58	68.6	3.71	-4.02	-1.84	68.5508	5.4121	4	2.56248	130.1752	3.62811	0	3.6281	17.894	5.7145	-0.004	3	1	0.2916	2.9707	17.89437
59	220.2	12.58	-3.95	-2.06	220.152	5.7142	9	2.28802	137.28	3.69675	0	3.6968	58.553	5.8118	-0.001	4	1	0.2862	2.6145	58.5528
60	301.2	13.59	-3.34	-2.3	301.159	4.5126	8	2.13194	137.28	3.76539	0	3.7654	78.981	4.5697	-8E-04	9	0.9566	0.2969	2.4356	83.45796
61	527.9	11.02	2.88	-2.4	527.935	2.0874	8	1.72229	137.28	3.83403	0	3.834	136.7	2.1027	0.0004	6	0.7788	0.3669	1.961	181.7418
62	490.5	10.74	2.56	-2.28	490.531	2.1895	8	1.75523	137.28	3.90267	0	3.9027	124.69	2.207	0.0004	5	0.8002	0.3519	2.0088	161.8351
63	472.4	12.05	9.05	-2.18	472.511	2.5502	8	1.82163	137.28	3.97131	0	3.9713	117.98	2.5718	0.0014	5	0.833	0.3323	2.0865	147.1418
64	202.5	10.19	3.84	-2.26	202.547	5.0309	9	2.25922	137.28	4.03995	0	4.04	49.136	5.1333	0.0014	4	1	0.2619	2.6249	49.13605
65	62.9	2.15	0.23	-2.54	62.9028	3.418	4	2.4396	125.9736	4.10293	0	4.1029	14.331	3.6565	0.0003	3	1	0.2579	2.9211	14.33118
66	64	3.29	-0.25	-2.65	63.9969	5.1409	4	2.56505	129.1285	4.1675	0	4.1675	14.356	5.499	-3E-04	3	1	0.2539	3.0319	14.3562
67	78.5	2.12	-0.23	-2.55	78.4972	2.7007	5	2.29921	126.411	4.2307	0	4.2307	17.554	2.8546	-2E-04	4	1	0.2501	2.7858	17.55417
68	71.9	2.41	-0.3	-2.66	71.8963	3.3521	5	2.39344	127.1348	4.29427	0	4.2943	15.742	3.565	-3E-04	3	1	0.2464	2.8821	15.74238

69	153.2	8.23	-0.33	-2.84	153.196	5.3722	9	2.3489	137.28	4.36291	0	4.3629	34.113	5.5297	-2E-04	3	1	0.2425	2.7576	34.11324
70	115.9	3.5	0	-3.21	115.9	3.0198	5	2.22174	131.0297	4.42843	0	4.4284	25.172	3.1398	0	4	1	0.2389	2.6887	25.17183
71	60.7	3.68	0	-3.38	60.7	6.0626	3	2.63426	129.8192	4.49334	0	4.4933	12.509	6.5473	0	3	1	0.2355	3.1266	12.5089
72	212.5	7.54	0.23	-3.38	212.503	3.5482	8	2.12019	137.28	4.56198	0	4.562	45.581	3.626	8E-05	4	1	0.2319	2.5391	45.58131
73	206.7	4.65	0.24	-3.32	206.703	2.2496	6	1.9652	134.5196	4.62924	0	4.6292	43.652	2.3011	9E-05	5	0.9904	0.2318	2.4143	44.27582
74	542.7	16.94	0.97	-3.3	542.712	3.1214	8	1.87524	137.28	4.69788	0	4.6979	114.52	3.1486	0.0001	5	0.9046	0.2596	2.1847	132.0152
75	329.2	14.34	1.92	-3.3	329.224	4.3557	8	2.10017	137.28	4.76652	0	4.7665	68.07	4.4197	0.0004	4	1	0.222	2.4819	68.07006
76	769.7	0	1.52	-3.58	769.719	0	0	0	120.9	4.82697	0	4.827	158.46	0	0.0001	0	1	0.2192	0	0

	CPT-18	In situ data						Basic output data												
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	31	1.74	0.41	0.2	31.005	5.612	3	2.80888	122.7	0.06135	0	0.0614	504.38	5.6231	0.001	9	0.7167	7.6984	2.2649	225.1333
2	20.1	1.04	4.1	0.18	20.1502	5.1612	3	2.92109	117.8832	0.12029	0	0.1203	166.51	5.1922	0.0147	9	0.7792	5.4428	2.4225	103.0309
3	15.5	0.94	4.71	0.18	15.5577	6.042	3	3.05068	116.5126	0.17855	0	0.1786	86.134	6.1122	0.0221	9	0.8476	4.5185	2.5992	65.67381
4	11	0.65	1.58	0.18	11.0193	5.8987	3	3.15868	112.9721	0.23503	0	0.235	45.884	6.0273	0.0106	3	0.9041	3.8968	2.7388	39.71671
5	12.1	0.65	0.49	0.17	12.106	5.3692	3	3.10123	113.2015	0.29163	0	0.2916	40.511	5.5018	0.003	3	0.9074	3.2201	2.7401	35.95359
6	10.5	0.32	0.68	0.16	10.5083	3.0452	3	3.003	107.6711	0.34547	0	0.3455	29.417	3.1487	0.0048	4	0.8869	2.6986	2.6797	25.91975
7	8.8	0.29	0.86	0.14	8.81053	3.2915	3	3.08523	106.521	0.39873	0	0.3987	21.096	3.4475	0.0074	4	0.9349	2.4904	2.7951	19.79839
8	10.8	0.56	0.45	0.14	10.8055	5.1825	3	3.13024	111.8338	0.45465	0	0.4547	22.767	5.4102	0.0031	3	0.971	2.2711	2.8851	22.21644
9	17.1	0.61	1.08	0.12	17.1132	3.5645	3	2.8728	113.581	0.51144	0	0.5114	32.461	3.6743	0.0047	4	0.8933	1.9145	2.6751	30.03814
10	22.3	0.94	1.42	0.1	22.3174	4.212	3	2.82966	117.3926	0.57013	0	0.5701	38.144	4.3224	0.0047	4	0.8941	1.7383	2.6681	35.72614
11	19.1	0.84	1.47	0.06	19.118	4.3938	3	2.89274	116.1922	0.62823	0	0.6282	29.432	4.5431	0.0057	3	0.9299	1.6238	2.7555	28.37453
12	17.6	0.85	1.52	0	17.6186	4.8245	3	2.94604	116.0796	0.68627	0	0.6863	24.673	5.02	0.0065	3	0.9626	1.517	2.8347	24.27628
13	17.8	0.94	1.52	-0.06	17.8186	5.2754	3	2.96755	116.8435	0.74469	0	0.7447	22.927	5.5055	0.0064	3	0.9833	1.4125	2.882	22.79317
14	16.1	0.79	1.52	-0.11	16.1186	4.9012	3	2.98002	115.3269	0.80236	0	0.8024	19.089	5.1579	0.0072	3	1	1.3188	2.9201	19.08911
15	17.9	0.81	1.52	-0.14	17.9186	4.5204	3	2.92222	115.7681	0.86024	0	0.8602	19.83	4.7484	0.0064	3	0.9897	1.2274	2.8847	19.78765
16	15.9	0.79	1.52	-0.19	15.9186	4.9628	3	2.98766	115.2965	0.91789	0	0.9179	16.343	5.2664	0.0073	3	1	1.1528	2.9769	16.34265
17	13.2	0.6	1.43	-0.24	13.2175	4.5394	3	3.0259	112.83	0.9743	0	0.9743	12.566	4.9007	0.0084	3	1	1.086	3.0446	12.56612
18	12.1	0.34	1.44	-0.3	12.1176	2.8058	3	2.93188	108.4622	1.02853	0	1.0285	10.781	3.0661	0.0094	3	1	1.0288	2.9754	10.78146
19	19.3	0.68	1.49	-0.35	19.3182	3.52	3	2.82815	114.6715	1.08587	0	1.0859	16.791	3.7296	0.0059	3	0.9956	0.9745	2.8722	16.79247
20	22.2	0.6	1.67	-0.37	22.2204	2.7002	4	2.70926	114.097	1.14292	0	1.1429	18.442	2.8466	0.0057	4	0.9582	0.9288	2.7669	18.50138
21	22.2	0.73	1.9	-0.35	22.2233	3.2849	4	2.76192	115.5323	1.20068	0	1.2007	17.509	3.4725	0.0065	3	0.9881	0.8826	2.8382	17.53521
22	26.2	1.01	1.9	-0.26	26.2233	3.8515	4	2.75126	118.3115	1.25984	0	1.2598	19.815	4.0459	0.0055	3	0.9912	0.8412	2.8385	19.84522
23	21.8	0.91	2.02	-0.26	21.8247	4.1696	3	2.83416	117.1008	1.31839	0	1.3184	15.554	4.4377	0.0071	3	1	0.8026	2.9456	15.55407
24	19.7	0.86	2.05	-0.24	19.7251	4.3599	3	2.88019	116.4406	1.37661	0	1.3766	13.329	4.687	0.008	3	1	0.7686	3.0126	13.32874
25	22.7	1.16	2.05	-0.22	22.7251	5.1045	3	2.87891	118.9755	1.4361	0	1.4361	14.824	5.4488	0.0069	3	1	0.7368	3.0187	14.82419
26	32.2	1.2	1.91	-0.22	32.2234	3.724	4	2.67457	120.0753	1.49614	0	1.4961	20.538	3.9053	0.0045	3	0.9941	0.7087	2.8165	20.58006
27	20.9	0.66	2.05	-0.22	20.9251	3.1541	4	2.77132	114.6479	1.55346	0	1.5535	12.47	3.407	0.0076	3	1	0.6811	2.9508	12.46999
28	25.2	0.77	2.13	-0.26	25.2261	3.0524	4	2.69909	116.2317	1.61158	0	1.6116	14.653	3.2607	0.0065	3	1	0.6566	2.8833	14.65305
29	27.7	0.67	2.14	-0.35	27.7262	2.4165	4	2.60373	115.4443	1.6693	0	1.6693	15.609	2.5713	0.0059	4	0.9957	0.6351	2.7994	15.64009
30	26.8	0.66	2.43	-0.41	26.8297	2.46	4	2.61975	115.2541	1.72693	0	1.7269	14.536	2.6292	0.007	4	1	0.6127	2.8309	14.53614
31	46.1	1.05	2.68	-0.51	46.1328	2.276	5	2.41626	119.9734	1.78691	0	1.7869	24.817	2.3678	0.0044	4	0.9268	0.6153	2.6038	25.7874
32	99.9	4.55	3.32	-0.61	99.9406	4.5527	9	2.40048	132.5881	1.85321	0	1.8532	52.929	4.6387	0.0024	4	0.9118	0.5999	2.5561	55.61162
33	84.8	5.69	3.01	-0.83	84.8368	6.707	9	2.57691	133.8244	1.92012	0	1.9201	43.183	6.8623	0.0026	3	0.9907	0.5541	2.7543	43.42203
34	83.7	2.88	3.26	-1.06	83.7399	3.4392	5	2.35692	128.8104	1.98452	0	1.9845	41.196	3.5227	0.0029	4	0.9138	0.5629	2.5449	43.49021
35	79.5	2.49	3.57	-1	79.5437	3.1304	5	2.34176	127.6203	2.04833	0	2.0483	37.833	3.2131	0.0033	4	0.9166	0.5458	2.5441	39.97628
36	76.6	3.53	2.78	-0.94	76.634	4.6063	4	2.47779	130.0832	2.11338	0	2.1134	35.261	4.7369	0.0027	4	0.9768	0.5088	2.695	35.83205
37	270.6	6.06	2.43	-0.97	270.63	2.2392	6	1.89562	137.1147	2.18193	0	2.1819	123.03	2.2574	0.0007	5	0.7297	0.5897	2.038	149.6172
38	230.2	6.67	2.43	-1.15	230.23	2.8971	8	2.02762	137.28	2.25057	0	2.2506	101.3	2.9257	0.0008	5	0.7904	0.5507	2.1889	118.6568
39	62.7	3.17	2.4	-1.29	62.7294	5.0535	4	2.56519	128.8078	2.31498	0	2.315	26.097	5.2471	0.0029	3	1	0.4571	2.8249	26.0972
40	50.2	0.84	2.96	-1.62	50.2362	1.6721	5	2.30211	118.5485	2.37425	0	2.3743	20.159	1.7551	0.0045	4	0.9536	0.4627	2.6006	20.92995
41	90.6	6.22	3.47	-1.89	90.6425	6.8621	9	2.56749	134.6375	2.44157	0	2.4416	36.125	7.0521	0.0028	3	1	0.4334	2.8168	36.12468
42	62.8	3.47	3.54	-2.01	62.8433	5.5217	4	2.59366	129.4739	2.50631	0	2.5063	24.074	5.751	0.0042	3	1	0.4222	2.8777	24.07408
43	68.3	4.04	3.57	-2.27	68.3437	5.9113	4	2.59265	130.7913	2.5717	0	2.5717	25.575	6.1424	0.0039	3	1	0.4114	2.8785	25.57528
44	548.7	10.45	2.96	-2.38	548.736	1.9044	8	1.67915	137.28	2.64034	0	2.6403	206.83	1.9136	0.0004	6	0.6671	0.5433	1.8167	280.415
45	524.3	9.83	2.51	-2.52	524.331	1.8748	8	1.68208	137.28	2.70898	0	2.709	192.55	1.8845	0.0004	6	0.6749	0.5302	1.8286	261.3751
46	536.4	5.66	2.46	-2.84	536.43	1.0551	6	1.45981	137.28	2.77762	0	2.7776	192.13	1.0606	0.0003	6	0.5941	0.5636	1.6076	284.2507
47	655.7	9.84	0.2	-2.99	655.702	1.5007	6	1.55212	137.28	2.84626	0	2.8463	229.37	1.5072	2E-05	6	0.6288	0.5368	1.6904	331.1801
48	484.4	8.24	-3.57	-3.28	484.356	1.7012	6	1.66126	137.28	2.9149	0	2.9149	165.17	1.7115	-5E-04	6	0.6857	0.4992	1.8311	227.1156
49	99.6	2.51	-4.53	-3.3	99.5446	2.5215	5	2.20665	128.2259	2.97901	0	2.979	32.415	2.5993	-0.003	4	0.9581	0.3709	2.5373	33.85115
50	128.7	2.53	-3.87	-3.39	128.653	1.9665	5	2.05179	128.9096	3.04347	0	3.0435	41.272	2.0142	-0.002	5	0.8944	0.3887	2.3631	46.14473
51	123.7	4.77	-3.49	-3.27	123.657	3.8574	8	2.28674	133.4529	3.1102	0	3.1102	38.759	3.957	-0.002	4	0.9937	0.3425	2.6138	39.02465
52	253.7	14.78	-3.16	-3.14	253.661	5.8267	9	2.26508	137.28	3.17884	0	3.1788	78.797	5.9006	-9E-04	9	0.9633	0.3466	2.5268	82.03942
53	162.6	7.42	-2.58	-3.29	162.568	4.5642	9	2.27583	137.28	3.24748	0	3.2475	49.06	4.6573	-0.001	4	0.9919	0.3288	2.5917	49.50654
54	155.5	10.12	-2.81	-3.38	155.466	6.5095	9	2.41513	137.28	3.31612	0	3.3161	45.882	6.6514	-0.001	3	1	0.3191	2.7283	45.88183
55	91.8	4.88	-2.96	-3.45	91.7638	5.318	9	2.47639	132.8922	3.38256	0	3.3826	26.128	5.5215	-0.002	3	1	0.3128	2.8397	26.12848
56	101.2	7.29	-3.49	-3.62	101.157	7.2066	9	2.5565	136.0667	3.4506	0	3.4506	28.316	7.4611	-0.003	3	1	0.3067	2.9072	28.31589
57	120.2	7.69	-3.26	-3.72	120.16	6.3998	9	2.47122	136.8774	3.51903	0	3.519	33.146	6.5929	-0.002	3	1	0.3007	2.8211	33.14576
58	238.9	8.98	-2.99	-3.72	238.863	3.7595	8	2.11395	137.28	3.58767	0	3.5877	65.579	3.8168	-9E-04	4	0.9445	0.3156	2.4255	70.17383
59	179.2	7.94	-0.97	-3.94	179.188	4.4311	9	2.24154	137.28	3.65631	0	3.6563	48.008	4.5234	-4E-04	4	1	0.2894	2.5917	48.00786
60	297.4	12.4	-0.99	-4.2	297.388	4.1696	8	2.10448	137.28	3.72495	0	3.725	78.837	4.2225	-2E-04	4	0.9433	0.3051	2.4052	84.67041
61	105.8	5.87	-0.98	-4.47	105.788	5.5488	9	2.45342	134.5906	3.79225	0	3.7923	26.896	5.7551	-7E-04	3	1	0.279	2.8432	26.89584
62	100.9	4.97	-1.03	-4.74	100.887	4.9263	9	2.42485	133.2571	3.85888	0	3.8589	25.144	5.1222	-8E-04	3	1	0.2742	2.8295	25.14423
63	73.8	2.16	-1.21	-4.98	73.7852	2.9274	5	2.34306	126.3968	3.92208	0	3.9221	17.813	3.0918	-0.001	4	1	0.2698	2.8018	17.81279
64	109	3.41	-1.1	-5.11	108.987	3.1288	5	2.25074	130.6891	3.98742	0	3.9874	26.333	3.2477	-8E-04	4	1	0.2654	2.6831	26.33259
65	65.8	1.74	-1.06	-5.18	65.787	2.6449	5	2.34687	124.5348	4.04969	0	4.0497	15.245	2.8184	-0.001	4	1	0.2613	2.8317	15.24496
66	415.2	8.83	-0.99	-5.3	415.188	2.1268	8	1.77857	137.28	4.11833	0	4.1183	99.815	2.1481	-2E-04	5	0.8346	0.3217	2.0723	124.9642
67	103.1	5.16	-1.31	-5.49	103.084	5.0056	9	2.4246	133.5842	4.18512	0	4.1851	23.631	5.2175	-1E-03	3	1	0.2528	2.8547	23.63106
68	134.5	6.99	0.43	-5.62	134.505	5.1968	9	2.36906	136.4541	4.25335	0	4.2534	30.623	5.3665	0.0002	3	1	0.2488	2.7816	30.62339

69	60.1	2.72	0.15	-5.77	60.1018	4.5257	4	2.54197	127.5832	4.31714	0	4.3171	12.922	4.8759	0.0002	3	1	0.2451	3.0338	12.92168
70	236.5	12.57	0.28	-5.55	236.503	5.3149	9	2.2452	137.28	4.38578	0	4.3858	52.925	5.4154	9E-05	4	1	0.2413	2.6204	52.92507
71	225.1	12.82	1.79	-5.78	225.122	5.6947	9	2.28186	137.28	4.45442	0	4.4544	49.539	5.8097	0.0006	3	1	0.2375	2.6623	49.539
72	361.6	15.22	3.26	-6.26	361.64	4.2086	8	2.06819	137.28	4.52306	0	4.5231	78.955	4.2619	0.0007	4	0.987	0.2384	2.4225	80.46363
73	234.2	13.05	6.34	-6.26	234.278	5.5703	9	2.26492	137.28	4.5917	0	4.5917	50.022	5.6817	0.002	3	1	0.2304	2.6523	50.02198
74	238	14.31	10.71	-6.46	238.131	6.0093	9	2.2901	137.28	4.66034	0	4.6603	50.097	6.1293	0.0033	3	1	0.2271	2.6764	50.09737
75	386.4	11.16	10.31	-6.57	386.526	2.8873	8	1.90979	137.28	4.72898	0	4.729	80.736	2.923	0.0019	5	0.9409	0.2445	2.2729	88.2122
76	475.2	10.83	10.08	-6.58	475.323	2.2785	8	1.77688	137.28	4.79762	0	4.7976	98.075	2.3017	0.0015	5	0.8824	0.2635	2.1134	117.1638
77	117.4	5.38	9.23	-6.62	117.513	4.5782	9	2.35925	134.2092	4.86472	0	4.8647	23.156	4.7759	0.0059	3	1	0.2175	2.8353	23.15615
78	168	10.46	8.76	-6.55	168.107	6.2222	9	2.38038	137.28	4.93336	0	4.9334	33.076	6.4103	0.0039	3	1	0.2145	2.813	33.07558
79	367.3	12.43	8.88	-6.51	367.409	3.3832	8	1.98088	137.28	5.002	0	5.002	72.452	3.4299	0.0018	5	0.9938	0.2136	2.379	73.15034
80	383.8	0	3.74	-6.22	383.846	0	0	0	120.9	5.06245	0	5.0625	74.822	0	0.0007	0	1	0.209	0	0

	CPT-19	In situ data						Basic output data											
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	19.2	0.65	8.74	-0.22	19.307	3.3667	4	2.8163	114.3399	0.05717	0	0.0572	336.71	3.3767	0.0327	8	0.6929	7.5525	2.1981	137.4009
2	4.8	0.06	1.27	-0.25	4.81554	1.246	3	3.10439	93.51938	0.10393	0	0.1039	45.335	1.2735	0.0194	5	0.7825	6.1457	2.4265	27.36586
3	8.9	0.5	-1.37	-0.29	8.88323	5.6286	3	3.21938	110.5268	0.15919	0	0.1592	54.802	5.7313	-0.011	3	0.8824	5.3195	2.6935	43.85855
4	7.2	0.48	1.56	-0.32	7.21909	6.649	3	3.33491	109.7222	0.21405	0	0.2141	32.726	6.8522	0.016	3	0.9499	4.5625	2.8612	30.20525
5	8.7	0.32	1.23	-0.31	8.71506	3.6718	3	3.11609	107.2147	0.26766	0	0.2677	31.56	3.7882	0.0105	4	0.8962	3.4273	2.7142	27.36214
6	8.4	0.23	1.65	-0.27	8.4202	2.7315	3	3.05688	104.7144	0.32002	0	0.32	25.312	2.8394	0.0147	4	0.8942	2.9133	2.7021	22.30214
7	11.4	0.32	2.26	-0.21	11.4277	2.8002	3	2.95236	107.8756	0.37396	0	0.374	29.559	2.895	0.0147	4	0.8788	2.4943	2.6547	26.05708
8	9.1	0.3	2.27	-0.23	9.12778	3.2867	3	3.07218	106.8553	0.42738	0	0.4274	20.357	3.4481	0.0188	4	0.9395	2.3437	2.8042	19.27156
9	18.6	0.43	1.55	-0.27	18.619	2.3095	4	2.73061	111.2281	0.483	0	0.483	37.549	2.371	0.0062	4	0.8331	1.922	2.5209	32.94241
10	23	0.89	0.8	-0.25	23.0098	3.8679	3	2.79554	117.0672	0.54153	0	0.5415	41.49	3.9611	0.0026	4	0.8743	1.7961	2.6213	38.13856
11	16.4	0.77	0.5	-0.23	16.4061	4.6934	3	2.96208	115.1824	0.59912	0	0.5991	26.384	4.8713	0.0023	3	0.9487	1.7153	2.8086	25.62417
12	19.9	0.79	1.01	-0.27	19.9124	3.9674	3	2.85075	115.8425	0.65704	0	0.657	29.306	4.1028	0.0038	4	0.9205	1.5505	2.7274	28.21613
13	20.3	0.84	0.91	-0.27	20.3111	4.1357	3	2.85569	116.3399	0.71521	0	0.7152	27.399	4.2866	0.0033	3	0.9347	1.4421	2.7579	26.70679
14	17	0.7	0.61	-0.29	17.0075	4.1158	3	2.91384	114.5728	0.7725	0	0.7725	21.016	4.3117	0.0027	3	0.9689	1.3564	2.8407	20.81123
15	19.8	0.68	1.2	-0.27	19.8147	3.4318	4	2.81266	114.7334	0.82987	0	0.8299	22.877	3.5818	0.0046	4	0.9416	1.2571	2.7619	22.5544
16	15.4	0.58	1.29	-0.26	15.4158	3.7624	3	2.923	112.9572	0.88635	0	0.8864	16.393	3.9919	0.0064	3	0.9963	1.193	2.8991	16.38191
17	13.2	0.39	1.09	-0.27	13.2133	2.9516	3	2.91374	109.6772	0.94118	0	0.9412	13.039	3.1779	0.0064	3	1	1.1242	2.9173	13.03906
18	14.9	0.47	1.9	-0.31	14.9233	3.1495	3	2.88753	111.3393	0.99685	0	0.9969	13.97	3.3749	0.0098	3	1	1.0615	2.9088	13.97035
19	9.7	0.41	1.59	-0.35	9.71946	4.2183	3	3.11272	109.2941	1.0515	0	1.0515	8.2434	4.7301	0.0132	3	1	1.0063	3.1801	8.24342
20	8.2	0.18	1.69	-0.35	8.22069	2.1896	3	3.01483	102.8623	1.10293	0	1.1029	6.4535	2.5289	0.0171	3	1	0.9594	3.1162	6.45348
21	10.4	0.19	2.42	-0.35	10.4296	1.8217	4	2.88508	103.8384	1.15485	0	1.1549	8.0311	2.0486	0.0188	3	1	0.9162	2.9876	8.03114
22	10.8	0.19	2.66	-0.36	10.8326	1.754	4	2.86251	103.9309	1.20682	0	1.2068	7.9761	1.9739	0.0199	3	1	0.8768	2.9819	7.97614
23	10.6	0.21	2.99	-0.35	10.6366	1.9743	4	2.89589	104.6186	1.25913	0	1.2591	7.4476	2.2394	0.023	3	1	0.8404	3.0356	7.4476
24	8.8	0.14	3.42	-0.38	8.84186	1.5834	4	2.91675	101.2011	1.30973	0	1.3097	5.7509	1.8587	0.0327	3	1	0.8079	3.0925	5.75092
25	8.7	0.15	3.72	-0.37	8.74553	1.7152	3	2.93794	101.6792	1.36057	0	1.3606	5.4279	2.0312	0.0363	3	1	0.7777	3.1331	5.42786
26	9.3	0.11	4.33	-0.35	9.353	1.1761	4	2.83438	99.5736	1.41035	0	1.4104	5.6317	1.3849	0.0393	3	1	0.7502	3.0411	5.63167
27	13.4	0.19	4.85	-0.37	13.4594	1.4117	4	2.73345	104.4604	1.46258	0	1.4626	8.2025	1.5838	0.0291	4	1	0.7235	2.9239	8.20246
28	15.6	0.34	5.05	-0.33	15.6618	2.1709	4	2.77699	109.0879	1.51713	0	1.5171	9.3233	2.4037	0.0257	3	1	0.6974	2.969	9.32333
29	10.6	0.16	5.77	-0.38	10.6706	1.4994	4	2.83398	102.6367	1.56845	0	1.5685	5.8033	1.7578	0.0456	3	1	0.6746	3.0774	5.80331
30	15	0.22	6.76	-0.31	15.0827	1.4586	4	2.69803	105.8108	1.62135	0	1.6214	8.3026	1.6343	0.0362	4	1	0.6526	2.9259	8.30258
31	86.1	2.09	3.52	-0.25	86.1431	2.4262	5	2.23768	126.5334	1.68462	0	1.6846	50.135	2.4746	0.003	5	0.8331	0.6788	2.3702	54.18051
32	30	0.62	3.72	-0.16	30.0455	2.0635	4	2.53423	115.0728	1.74215	0	1.7422	16.246	2.1906	0.0095	4	0.977	0.6144	2.7417	16.43342
33	108	3.18	4.79	0.01	108.059	2.9429	5	2.23295	130.1573	1.80723	0	1.8072	58.792	2.9929	0.0033	5	0.8412	0.6374	2.3759	64.00906
34	124.7	3.72	-0.38	0.05	124.695	2.9833	5	2.19734	131.6542	1.87306	0	1.8731	65.573	3.0288	-2E-04	5	0.8314	0.622	2.3433	72.2028
35	128.3	1.93	0.97	0.09	128.312	1.5042	6	1.96829	126.9225	1.93652	0	1.9365	65.259	1.5272	0.0006	5	0.7496	0.6357	2.1208	75.92025
36	72.6	3.27	-1.17	0.06	72.5857	4.505	4	2.48589	129.391	2.00122	0	2.0012	35.271	4.6328	-0.001	4	0.9684	0.5395	2.6869	35.98771
37	29.5	0.55	1.27	0.04	29.5155	1.8634	4	2.51387	114.1528	2.05829	0	2.0583	13.34	2.0031	0.0033	4	1	0.5141	2.7953	13.33982
38	68.5	2.41	4.95	-0.09	68.5606	3.5151	4	2.42261	127.019	2.1218	0	2.1218	31.312	3.6274	0.0054	4	0.9598	0.5128	2.649	32.20101
39	92	4.29	6.95	-0.15	92.0851	4.6587	9	2.43053	131.9579	2.18778	0	2.1878	41.091	4.7721	0.0056	4	0.9621	0.4971	2.647	42.23659
40	75.7	3.15	6.83	-0.17	75.7836	4.1566	4	2.44725	129.2226	2.25239	0	2.2524	32.646	4.2839	0.0067	4	0.9812	0.4765	2.6892	33.11381
41	72.5	2.31	7.17	-0.27	72.5878	3.1824	5	2.37418	126.8481	2.31582	0	2.3158	30.344	3.2872	0.0074	4	0.9618	0.4708	2.63	31.26618
42	94.2	3.83	8.09	-0.3	94.299	4.0616	4	2.37794	131.1859	2.38141	0	2.3814	38.598	4.1668	0.0063	4	0.9624	0.4581	2.6234	39.79415
43	113	4.89	5.39	-0.25	113.066	4.3249	9	2.34983	133.4163	2.44812	0	2.4481	45.185	4.4206	0.0035	4	0.9532	0.4495	2.5909	46.99365
44	59.7	2.55	6.57	-0.13	59.7804	4.2656	4	2.52465	127.0979	2.51167	0	2.5117	22.801	4.4527	0.0083	3	1	0.4213	2.82	22.80109
45	286.5	4.74	4.5	-0.2	286.555	1.6541	6	1.77356	135.4566	2.5794	0	2.5794	110.09	1.6692	0.0011	6	0.7168	0.528	1.9544	141.7012
46	63.3	1.96	0.37	-0.23	63.3045	3.0961	5	2.40697	125.3121	2.64205	0	2.6421	22.96	3.231	0.0004	4	1	0.4005	2.7274	22.96037
47	105.6	2.49	7.16	-0.58	105.688	2.356	5	2.16735	128.3134	2.70621	0	2.7062	38.054	2.4179	0.005	5	0.9129	0.4243	2.4513	41.29766
48	129.3	4.99	12.04	-0.63	129.447	3.8549	8	2.27438	133.8945	2.77316	0.0312	2.742	46.199	3.9392	0.0066	4	0.9501	0.4047	2.5458	48.44852
49	166.3	7.22	14.01	-0.43	166.471	4.3371	9	2.25171	137.211	2.84176	0.0624	2.7794	58.873	4.4124	0.0058	4	0.9366	0.4047	2.5055	62.59101
50	343.7	19.2	21.27	-0.45	343.96	5.582	9	2.18771	137.28	2.9104	0.0936	2.8168	121.08	5.6297	0.0042	9	0.8921	0.4175	2.3835	134.5738
51	216	11.53	35.7	-0.39	216.437	5.3272	9	2.26552	137.28	2.97904	0.1248	2.8542	74.786	5.4015	0.0115	9	0.9401	0.3934	2.5057	79.36528
52	104.6	4.67	32.23	-0.41	104.995	4.4479	9	2.37924	132.8989	3.04549	0.156	2.8895	35.283	4.5807	0.0212	4	1	0.3662	2.6896	35.2827
53	91	6.6	20.54	-0.51	91.2514	7.2328	9	2.5841	135.0877	3.11303	0.1872	2.9258	30.124	7.4882	0.0147	3	1	0.3616	2.8898	30.12419
54	68.8	3.27	24.11	-0.48	69.0951	4.7326	4	2.51609	129.2708	3.17767	0.2184	2.9593	22.275	4.9608	0.023	3	1	0.3576	2.8588	22.2749
55	109	4.16	24.79	-0.37	109.303	3.8059	5	2.31545	132.1508	3.24374	0.2496	2.9941	35.422	3.9223	0.0145	4	0.9979	0.3542	2.6409	35.49835
56	150	7.36	25.25	-0.1	150.309	4.8966	9	2.32026	137.1025	3.3123	0.2808	3.0315	48.49	5.0069	0.0105	4	0.9918	0.3521	2.6183	48.91121
57	295.2	11.16	22.23	0.14	295.472	3.777	8	2.06842	137.28	3.38094	0.312	3.0689	95.177	3.8207	0.0044	8	0.8723	0.395	2.3021	109.0451
58	219.6	13.99	4.52	0	219.655	6.3691	9	2.32934	137.28	3.44958	0.3432	3.1064	69.601	6.4707	-8E-05	9	0.9871	0.3454	2.5988	70.57774
59	131.6	7.57	7.41	-0.18	131.691	5.7483	9	2.41022	136.9858	3.51807	0.3744	3.1437	40.772	5.9061	0.0012	3	1	0.3366	2.7246	40.77167
60	58	1.66	7.75	-0.51	58.0949	2.8574	5	2.40897	123.8871	3.58001	0.4056	3.1744	17.173	3.045	0.0028	4	1	0.3333	2.8104	17.17321
61	144.5	6.02	8.77	-0.76	144.607	4.163	9	2.27242	135.5376	3.64778	0.4368	3.211	43.899	4.2707	0.0014	4	0.9927	0.3322	2.5983	44.2591
62	75.2	2.7	8.65	-1	75.3059	3.5854	4	2.40124	128.0792	3.71182	0.468	3.2438	22.071	3.7713	0.0022	4	1	0.3262	2.7835	22.0709
63	60	1.89	8.67	-1.06	60.1061	3.1444	4	2.42761	124.9196	3.77428	0.4992	3.2751	17.2	3.3551	0.0022	3	1	0.3231	2.8356	17.20014
64	67.1	2.49	8.13	-1.31	67.1995	3.7054	4	2.44527	127.209	3.83789	0.5304	3.3075	19.157	3.9298	0.0009	3	1	0.3199	2.8422	19.15704
65	65.9	2.02	8.58	-1.39	66.005	3.0604	5	2.39063	125.6347	3.9007	0.5616	3.3391	18.599	3.2526	0.0009	4	1	0.3169	2.8005	18.5991
66	56.8	1.67	9.14	-1.43	56.9119	2.9344	5	2.42342	123.8809	3.96264	0.5928	3.3698	15.713	3.154	0.0012	3	1	0.314	2.8503	15.71267
67	558.3	12.25	7.43	-1.34	558.391	2.1938	8	1.73096	137.28	4.03128	0.624	3.4073	162.7	2.2098	-2E-04	6	0.7466	0.4177	1.9297	218.8222
68	674.6	13.42	8.17	-1.3	674.7	1.989	8	1.65803	137.28	4.09992	0.6552	3.4447	194.67	2.0012	-1E-04	6	0.714	0.4305	1.8395	272.8583

69	350.1	16.29	6.53	-1.35	350.18	4.6519	8	2.11332	137.28	4.16856	0.6864	3.4822	99.367	4.7079	-6E-04	9	0.9197	0.3344	2.373	109.3423
70	145.6	6.34	8.11	-1.3	145.699	4.3514	9	2.2861	135.9349	4.23653	0.7176	3.5189	40.2	4.4818	-9E-04	4	1	0.3007	2.6426	40.20049
71	399.2	10.63	5.76	-1.45	399.271	2.6624	8	1.87212	137.28	4.30517	0.7488	3.5564	111.06	2.6914	-9E-04	5	0.8266	0.3671	2.1212	137.0458
72	215.5	9.85	7.58	-1.55	215.593	4.5688	9	2.20937	137.28	4.37381	0.78	3.5938	58.773	4.6634	-0.001	4	0.9866	0.2993	2.5369	59.74426
73	214.9	11.72	7.92	-1.65	214.997	5.4512	9	2.2756	137.28	4.44245	0.8112	3.6313	57.984	5.5663	-0.001	4	1	0.2914	2.6031	57.98402
74	103.8	5.88	8.62	-1.65	103.906	5.659	9	2.46493	134.5593	4.50973	0.8424	3.6673	27.103	5.9157	-0.002	3	1	0.2885	2.8491	27.10304
75	284.6	10.51	8.09	-1.65	284.699	3.6916	8	2.06786	137.28	4.57837	0.8736	3.7048	75.611	3.752	-0.001	4	0.9305	0.3116	2.3734	82.4953
76	428.5	12.59	8.33	-1.75	428.602	2.9375	8	1.89555	137.28	4.64701	0.9048	3.7422	113.29	2.9697	-7E-04	5	0.8479	0.3427	2.1542	137.2947
77	480.8	12.68	14.57	-1.76	480.978	2.6363	8	1.83108	137.28	4.71565	0.936	3.7797	126.01	2.6624	0.0002	5	0.821	0.3516	2.0788	158.2654
78	106.7	5.14	16.18	-1.94	106.898	4.8083	9	2.40113	133.6444	4.78247	0.9672	3.8153	26.765	5.0335	0.0019	3	1	0.2773	2.8045	26.76495
79	148.5	7.99	15.54	-2.3	148.69	5.3736	9	2.35624	137.28	4.85111	0.9984	3.8527	37.335	5.5548	0.0008	3	1	0.2746	2.7317	37.3345
80	76.1	0	18.18	-2.23	76.3225	0	0	0	120.9	4.91156	1.0296	3.882	18.396	0	0.0039	0	1	0.2726	0	0

	CPT-20	In situ data			Basic output data														
Depth (ft)	qc (tsf)	fs (tsf)	u (psi)	Other	qt (tsf)	Rf(%)	SBT	Ic SBT	ã (pcf)	ó,v (tsf)	u0 (tsf)	ó',vo (tsf)	Qt1	Fr (%)	Bq	SBTn	n	Cn	Ic	Qtn
1	134	0.83	0.15	0.25	134.002	0.6194	6	1.70115	120.8538	0.06043	0	0.0604	2216.6	0.6197	8E-05	6	0.3693	2.8783	1.3601	364.3555
2	631.5	9.4	1.86	-1.38	631.523	1.4885	6	1.55613	137.28	0.12907	0	0.1291	4892	1.4888	0.0002	8	0.4019	2.3292	1.4307	>1,000
3	187.9	1.3	0.99	-2.11	187.912	0.6918	6	1.6166	124.9616	0.19155	0	0.1916	980.02	0.6925	0.0004	6	0.3964	1.9688	1.4084	349.2899
4	19.9	0.35	0.99	-1.48	19.9121	1.7577	4	2.6393	109.8857	0.24649	0	0.2465	79.782	1.7798	0.0036	5	0.7297	2.8953	2.2774	53.81177
5	3.6	0.17	1.14	-1.45	3.61395	4.704	3	3.49353	100.4396	0.29671	0	0.2967	11.18	5.1247	0.0247	3	1	3.5661	3.0964	11.18007
6	6.2	0.19	-0.15	-1.47	6.19816	3.0654	3	3.19599	102.5692	0.34799	0	0.348	16.811	3.2478	-0.002	3	0.9543	2.8899	2.8523	15.97795
7	8.1	0.26	-0.3	-1.48	8.09633	3.2113	3	3.10968	105.5158	0.40075	0	0.4008	19.203	3.3786	-0.003	4	0.9438	2.5001	2.8185	18.18284
8	14.8	0.39	-0.56	-1.46	14.7932	2.6364	4	2.84536	109.9527	0.45573	0	0.4557	31.46	2.7202	-0.003	4	0.8665	2.0749	2.612	28.11455
9	17.5	0.48	-0.83	-1.38	17.4898	2.7445	4	2.79657	111.8804	0.51167	0	0.5117	33.182	2.8272	-0.004	4	0.8647	1.8744	2.6001	30.07544
10	17.7	0.67	-0.76	-1.38	17.6907	3.7873	3	2.87785	114.3484	0.56884	0	0.5688	30.099	3.9131	-0.003	4	0.9102	1.7593	2.7107	28.46835
11	15.3	0.81	-0.83	-1.36	15.2898	5.2976	3	3.0193	115.3811	0.62653	0	0.6265	23.404	5.524	-0.004	3	0.9764	1.6681	2.8785	23.11657
12	19.6	0.94	-0.92	-1.32	19.5887	4.7987	3	2.90953	117.0745	0.68507	0	0.6851	27.594	4.9726	-0.004	3	0.9487	1.5104	2.7983	26.98473
13	20.5	0.9	-0.96	-1.28	20.4883	4.3928	3	2.86974	116.8658	0.7435	0	0.7435	26.556	4.5582	-0.004	3	0.9459	1.3962	2.7838	26.05372
14	21.5	1.05	-0.99	-1.28	21.4879	4.8865	3	2.88443	118.11	0.80256	0	0.8026	25.774	5.0761	-0.003	3	0.9632	1.3051	2.8222	25.5134
15	17.8	0.77	-0.99	-1.28	17.7879	4.3288	3	2.91264	115.3797	0.86025	0	0.8603	19.678	4.5488	-0.004	3	0.9861	1.2265	2.8752	19.62116
16	17.9	0.9	-1.06	-1.28	17.887	5.0316	3	2.95288	116.5347	0.91852	0	0.9185	18.474	5.3039	-0.005	3	1	1.152	2.9388	18.47382
17	15.7	0.58	-1.06	-1.24	15.687	3.6973	3	2.91237	112.9998	0.97502	0	0.975	15.089	3.9424	-0.005	3	1	1.0852	2.9236	15.08899
18	15.1	0.74	-1.06	-1.26	15.087	4.9049	3	3.00233	114.6872	1.03236	0	1.0324	13.614	5.2652	-0.005	3	1	1.0249	3.0374	13.61411
19	14.5	0.35	-1.06	-1.32	14.487	2.416	4	2.83114	109.1099	1.08691	0	1.0869	12.329	2.6119	-0.006	3	1	0.9735	2.8879	12.32857
20	15.6	0.33	-1.06	-1.34	15.587	2.1172	4	2.77263	108.8578	1.14134	0	1.1413	12.657	2.2844	-0.005	4	0.9881	0.9279	2.8455	12.66819
21	14.3	0.34	-1.06	-1.32	14.287	2.3798	4	2.83242	108.8639	1.19578	0	1.1958	10.948	2.5972	-0.006	3	1	0.8849	2.9291	10.94791
22	13.3	0.28	-1.06	-1.28	13.287	2.1073	4	2.82935	107.2662	1.24941	0	1.2494	9.6347	2.326	-0.006	3	1	0.8469	2.9493	9.63465
23	18.5	0.52	-1	-1.24	18.4878	2.8127	4	2.78359	112.6014	1.30571	0	1.3057	13.159	3.0264	-0.004	3	1	0.8104	2.9016	13.15917
24	17.6	0.47	-0.99	-1.15	17.5879	2.6723	4	2.78777	111.74	1.36158	0	1.3616	11.917	2.8965	-0.004	3	1	0.7771	2.9256	11.91726
25	18.4	0.58	-0.99	-1.13	18.3879	3.1543	4	2.81558	113.3872	1.41827	0	1.4183	11.965	3.4179	-0.004	3	1	0.7461	2.9661	11.96498
26	20.2	0.54	-0.91	-1.15	20.1889	2.6747	4	2.73991	113.0922	1.47482	0	1.4748	12.689	2.8855	-0.004	3	1	0.7175	2.9024	12.68904
27	20.5	0.64	-0.91	-1.15	20.4889	3.1237	4	2.7759	114.3714	1.532	0	1.532	12.374	3.3761	-0.003	3	1	0.6907	2.9512	12.37389
28	18.4	0.42	-0.9	-1.15	18.389	2.284	4	2.73222	111.0256	1.58752	0	1.5875	10.583	2.4998	-0.004	3	1	0.6665	2.9321	10.58348
29	20.4	0.53	-0.83	-1.16	20.3898	2.5993	4	2.72901	112.9796	1.64401	0	1.644	11.403	2.8273	-0.003	3	1	0.6436	2.9353	11.40252
30	8.5	0.17	-0.76	-1.15	8.4907	2.0022	3	2.98282	102.5229	1.69527	0	1.6953	4.0085	2.5017	-0.008	3	1	0.6242	3.2922	4.00847
31	13.2	0.31	-0.7	-1.09	13.1914	2.35	4	2.85806	107.9934	1.74927	0	1.7493	6.5411	2.7093	-0.004	3	1	0.6049	3.1269	6.54113
32	9	0.08	-0.68	-1.13	8.99168	0.8897	4	2.79683	97.14738	1.79784	0	1.7978	4.0014	1.1121	-0.007	3	1	0.5885	3.1349	4.00138
33	10.6	0.18	-0.53	-1.11	10.5935	1.6992	4	2.86384	103.4808	1.84958	0	1.8496	4.7275	2.0586	-0.004	3	1	0.5721	3.1884	4.72752
34	15.6	0.29	-0.46	-1.13	15.5944	1.8597	4	2.74146	107.9135	1.90354	0	1.9035	7.1923	2.1182	-0.002	3	1	0.5559	3.0362	7.19231
35	24.4	0.87	-0.38	-1.08	24.3954	3.5663	4	2.75338	117.0435	1.96206	0	1.9621	11.434	3.8782	-0.001	3	1	0.5393	3.0146	11.43355
36	36.2	1.48	-0.23	-1.01	36.1972	4.0887	4	2.665	121.8934	2.023	0	2.023	16.893	4.3308	-5E-04	3	1	0.523	2.9111	16.89278
37	41.1	1.71	-0.08	-0.99	41.099	4.1607	4	2.6305	123.2602	2.08464	0	2.0846	18.715	4.383	-2E-04	3	1	0.5076	2.8804	18.71521
38	51.6	2.09	0.08	-0.93	51.601	4.0503	4	2.55241	125.2835	2.14728	0	2.1473	23.031	4.2262	0.0001	3	1	0.4928	2.8018	23.03089
39	53.2	2.63	0.26	-0.95	53.2032	4.9433	4	2.60603	127.0396	2.2108	0	2.2108	23.065	5.1576	0.0004	3	1	0.4786	2.859	23.06516
40	385.7	5.12	0.3	-0.95	385.704	1.3274	6	1.62131	136.7455	2.27917	0	2.2792	168.23	1.3353	6E-05	6	0.6247	0.6192	1.7501	224.3772
41	178.1	7.91	0.28	-0.98	178.103	4.4412	9	2.24383	137.28	2.34781	0	2.3478	74.859	4.5006	0.0001	9	0.8899	0.492	2.4363	81.72597
42	82.8	2.88	0.3	-0.94	82.8037	3.4781	5	2.36381	128.783	2.4122	0	2.4122	33.327	3.5825	0.0003	4	0.9644	0.4517	2.6249	34.3197
43	173.2	10.49	0.29	-0.91	173.204	6.0565	9	2.36355	137.28	2.48084	0	2.4808	68.816	6.1445	0.0001	9	0.9492	0.4454	2.5763	71.86259
44	92.3	2.22	0.61	-1.01	92.3075	2.405	5	2.21412	127.1435	2.54441	0	2.5444	35.279	2.4732	0.0005	4	0.9183	0.4468	2.4859	37.90129
45	85.9	2.98	0.53	-0.95	85.9065	3.4689	5	2.35233	129.1224	2.60897	0	2.609	31.927	3.5775	0.0005	4	0.9801	0.4129	2.6419	32.50719
46	74.3	2.75	0.38	-1.01	74.3047	3.701	4	2.41534	128.1809	2.67306	0	2.6731	26.798	3.8391	0.0004	4	1	0.3958	2.7248	26.79756
47	105.6	4.8	0.3	-1.07	105.604	4.5453	9	2.38509	133.1139	2.73962	0	2.7396	37.547	4.6664	0.0002	4	0.999	0.3866	2.6757	37.58228
48	76.2	3.45	0.3	-1.09	76.2037	4.5273	4	2.47369	129.9017	2.80457	0	2.8046	26.171	4.7003	0.0003	3	1	0.3773	2.7913	26.17123
49	133	9.64	0.37	-1.27	133.005	7.2479	9	2.49118	137.28	2.87321	0	2.8732	45.291	7.4079	0.0002	3	1	0.3683	2.7672	45.29123
50	78	3.79	0.46	-1.55	78.0056	4.8586	4	2.49048	130.6465	2.93854	0	2.9385	25.546	5.0488	0.0004	3	1	0.3601	2.8202	25.54575
51	80.2	4.53	0.38	-1.58	80.2047	5.6481	9	2.53329	132.0193	3.00454	0	3.0045	25.694	5.8679	0.0004	3	1	0.3522	2.8633	25.69444
52	83.5	4.17	0.38	-1.58	83.5047	4.9937	9	2.48075	131.5117	3.0703	0	3.0703	26.198	5.1844	0.0003	3	1	0.3446	2.8201	26.19755
53	106.2	5.07	0.38	-1.56	106.205	4.7738	9	2.40038	133.5282	3.13706	0	3.1371	32.855	4.9191	0.0003	3	1	0.3373	2.7333	32.85478
54	211	9.86	0.67	-1.3	211.008	4.6728	9	2.2226	137.28	3.2057	0	3.2057	64.823	4.7449	0.0002	4	0.9566	0.3464	2.5053	68.0196
55	426.9	18.41	0.88	-1.21	426.911	4.3124	8	2.04617	137.28	3.27434	0	3.2743	129.38	4.3457	0.0002	9	0.8674	0.3754	2.2637	150.2963
56	335.5	12.84	2.05	-0.8	335.525	3.8268	8	2.04666	137.28	3.34298	0	3.343	99.367	3.8654	0.0004	8	0.8824	0.3624	2.2946	113.7622
57	174.5	10.99	1.67	-0.23	174.52	6.2973	9	2.37617	137.28	3.41162	0	3.4116	50.155	6.4228	0.0007	3	1	0.3102	2.6914	50.15464
58	106.9	4.03	1.44	-0.31	106.918	3.7693	5	2.31823	131.8647	3.47756	0	3.4776	29.745	3.896	0.001	4	1	0.3043	2.6953	29.74504
59	141.6	6.51	1.08	-0.7	141.613	4.597	9	2.31269	136.0592	3.54559	0	3.5456	38.941	4.7151	0.0006	4	1	0.2984	2.668	38.9407
60	77	4.46	0.91	-0.9	77.0111	5.7914	9	2.55284	131.8062	3.61149	0	3.6115	20.324	6.0763	0.0009	3	1	0.293	2.9477	20.32392
61	71.6	2.38	0.83	-1.06	71.6102	3.3236	5	2.39193	127.0335	3.67501	0.0312	3.6438	18.644	3.5033	0.0004	3	1	0.2904	2.8198	18.64401
62	61	2.62	0.71	-1.09	61.0087	4.2945	4	2.5208	127.3457	3.73868	0.0624	3.6763	15.578	4.5748	-2E-04	3	1	0.2878	2.9534	15.57825
63	65.5	2.42	0.68	-1.11	65.5083	3.6942	4	2.45188	126.9382	3.80215	0.0936	3.7086	16.639	3.9218	-7E-04	3	1	0.2853	2.889	16.6389
64	287	6.13	0.6	-1.09	287.007	2.1358	6	1.86434	137.28	3.87079	0.1248	3.746	75.584	2.165	-3E-04	5	0.8537	0.3399	2.1687	90.94115
65	293.5	14.53	1.22	-1.19	293.515	4.9503	9	2.17264	137.28	3.93943	0.156	3.7834	76.538	5.0177	-2E-04	9	0.9748	0.2888	2.482	79.03482
66	647.6	0	1.12	-1.32	647.614	0	0	0	120.9	3.99988	0.1872	3.8127	168.81	0	-2E-04	0	1	0.2775	0	0

Presented below is a list of formulas used for the estimation of various soil properties. The formulas are presented in SI unit system and assume that all components are expressed in the same units.

:: Unit Weight, g (kN/m³) ::

$$g = g_w \cdot \left(0.27 \cdot \log(R_f) + 0.36 \cdot \log(\frac{q_t}{p_a}) + 1.236 \right)$$

where g_w = water unit weight

:: Permeability, k (m/s) ::

$I_c < 3.27$ and $I_c > 1.00$ then $k = 10^{0.952-3.04 \cdot I_c}$

$I_c \leq 4.00$ and $I_c > 3.27$ then $k = 10^{-4.52-1.37 \cdot I_c}$

:: N_{SPT} (blows per 30 cm) ::

$$N_{60} = \left(\frac{q_c}{P_a} \right) \cdot \frac{1}{10^{1.1268-0.2817 \cdot I_c}}$$

$$N_{1(60)} = Q_{tn} \cdot \frac{1}{10^{1.1268-0.2817 \cdot I_c}}$$

:: Young's Modulus, Es (MPa) ::

$(q_t - \sigma_v) \cdot 0.015 \cdot 10^{0.55 \cdot I_c + 1.68}$

(applicable only to $I_c < I_{c\_cutoff}$)

:: Relative Density, Dr (%) ::

$100 \cdot \sqrt{\frac{Q_{tn}}{k_{DR}}}$ (applicable only to SBT_n: 5, 6, 7 and 8 or $I_c < I_{c\_cutoff}$)

:: State Parameter, ψ ::

$\psi = 0.56 - 0.33 \cdot \log(Q_{tn,cs})$

:: Peak drained friction angle, φ (°) ::

$\varphi = 17.60 + 11 \cdot \log(Q_{tn})$

(applicable only to SBT_n: 5, 6, 7 and 8)

:: 1-D constrained modulus, M (MPa) ::

If $I_c > 2.20$

$\alpha = 14$ for $Q_{tn} > 14$

$\alpha = Q_{tn}$ for $Q_{tn} \leq 14$

$M_{CPT} = \alpha \cdot (q_t - \sigma_v)$

If $I_c \leq 2.20$

$M_{CPT} = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 \cdot I_c + 1.68}$

:: Small strain shear Modulus, Go (MPa) ::

$G_0 = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 \cdot I_c + 1.68}$

:: Shear Wave Velocity, Vs (m/s) ::

$$V_s = \left(\frac{G_0}{\rho} \right)^{0.50}$$

:: Undrained peak shear strength, Su (kPa) ::

$N_{kt} = 10.50 + 7 \cdot \log(F_r)$ or user defined

$$S_u = \frac{(q_t - \sigma_v)}{N_{kt}}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Remolded undrained shear strength, Su(rem) (kPa) ::

$S_{u(rem)} = f_s$ (applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Overconsolidation Ratio, OCR ::

$$k_{OCR} = \left[\frac{Q_{tn}^{0.20}}{0.25 \cdot (10.50 \cdot +7 \cdot \log(F_r))} \right]^{1.25}$$ or user defined

$OCR = k_{OCR} \cdot Q_{tn}$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: In situ Stress Ratio, Ko ::

$K_O = (1 - \sin\varphi') \cdot OCR^{\sin\varphi'}$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Soil Sensitivity, S_t ::

$$S_t = \frac{N_S}{F_r}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Effective Stress Friction Angle, φ' (°) ::

$\varphi' = 29.5° \cdot B_q^{0.121} \cdot (0.256 + 0.336 \cdot B_q + \log Q_t)$

(applicable for $0.10 < B_q < 1.00$)

References

- Robertson, P.K., Cabal K.L., Guide to Cone Penetration Testing for Geotechnical Engineering, Gregg Drilling & Testing, Inc., 5th Edition, November 2012
- Robertson, P.K., Interpretation of Cone Penetration Tests - a unified approach., Can. Geotech. J. 46(11): 1337–1355 (2009)

CITY OF LOS ANGELES
CALIFORNIA

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

RAYMOND S. CHAN, C.E., S.E.
GENERAL MANAGER

FRANK BUSH
EXECUTIVE OFFICER

GEOLOGY AND SOILS REPORT CORRECTION LETTER

August 19, 2015

LOG # 89430
SOILS/GEOLOGY FILE - 2
LIQ/PFRSA

Sinan Sinanian
18980 Ventura Boulevard, Suite 200
Tarzana, CA 91356

TRACT:	7803
BLOCK:	15
LOT(S):	20 / 19 / 11
LOCATION:	1749 & 1751 Malcolm Ave. And 1772 Glendon Ave.

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Geology/Soils Report	15-363-26	07/21/2015	Applied Earth Sciences
Oversized Doc(s).	``	``	``

The Grading Division of the Department of Building and Safety has reviewed the referenced report that provides recommendations for a proposed multi-unit residential development with a parking garage. According to the report, the site is relatively flat and occupied by existing residential structures.

The earth materials at the subsurface exploration locations consist of up to 4 feet of uncertified fill underlain by recent and older alluvium, sag pond and estuarine deposits. The consultants recommend to support the proposed structures on conventional foundations bearing on native undisturbed soils.

The site is located within a City of Los Angeles Preliminary Fault Rupture Study Area designated for the Santa Monica fault. The report includes the results of a fault rupture investigation that consisted of a transect of continuous core borings and cone penetrometer test soundings in Malcolm Avenue on the east side of the property. An active fault splay was identified through the northeastern corner of the property. The consultants recommend that proposed buildings be setback at least 10 feet from the fault splay and that a reinforced (thick mat) foundation be used to support the eastern building.

The site is located in a designated liquefaction hazard zone as shown on the "Seismic Hazard Zones" map issued by the State of California.

The review of the subject report can not be completed at this time and will be continued upon submittal of an addendum to the report which shall include, but not be limited to, the following:

(Note: Numbers in parenthesis ( ) refer to applicable sections of the 2014 City of LA Building Code. P/BC numbers refer the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. The proposed 10-ft. setback from the active fault splay appears small given that the fault was identified at only one location and there is no direct evidence of the orientation of the fault. In addition, the fault trace may be closer to B-3 than estimated. Additional exploration is required to determine the fault's trend in at least two locations to warrant the recommended reduced setback. Alternatively, a larger setback could be recommended.

2. Provide more detailed discussion on the stratigraphic correlation from CPT-13 to B-3. The upper soils of CPT-11 to CPT-13 appear more fine-grained than the soils observed from CPT1 and B-1. It seams like Qof-1is missing from CPT-2 (back to fine-grained) and the top of Qof-2 appears to be lower.

3. What is the purple marker bed shown at depth on the northern portion of Cross Section A-A'.

The geologist and soils engineer shall prepare a report containing the corrections indicated in this letter. The report shall be in the form of an itemized response. It is recommended that once all correction items have been addressed in a response report, to contact the report review engineer and/or geologist to schedule a verification appointment to demonstrate compliance with all the corrections. Do not schedule an appointment until all corrections have been addressed. Bring three copies of the response report, including one unbound wet-signed original for microfilming in the event that the report is found to be acceptable.

DANIEL C. SCHNEIDEREIT
Engineering Geologist I

GLEN RAAD
Geotechnical Engineer I

DCS/GR:dcs/gr
Log No. 89430
213-482-0480

cc: Applied Earth Sciences, Project Consultant
WL District Office

THRIFTY OIL CO.

January 5, 2011 O-1174

City of Los Angeles Fire Department
Environmental Unit- Underground Storage Tanks
Attn: Eloy Luna, Engineering Geologist Associate IV
221 North Figueroa Street, Suite 1500
Los Angeles, CA 90012

RE: **Former Thrifty Station No. 020 (ARCO #9517)**
10801 Santa Monica Boulevard
Los Angeles, California 90025

Subject: **Site Assessment Report & Proposed Remedial Action**

Dear Mr. Luna:

Enclosed, please find a copy of the *Site Assessment Report* (SAR), dated December 30, 2010, and prepared by Wayne Perry , Inc. (Wayne Perry) (**Attachment A**) for Thrifty Oil Co. (Thrifty) Station No. 020, located at 10801 Santa Monica Boulevard, Los Angeles, California (**Figure 1**). The SAR summarizes the site assessment activities conducted at the site on November 16 through 18, 2010, and proposes a 36-hour continuous mobile high vacuum dual-phase extraction (HVDPE) event using the newly installed wells SB-1, SB-2S and SB-2D as extraction point. The site assessment activities were conducted in response to the City of Los Angeles Fire Department (LAFD) letter, dated June 9, 2010.

Thrifty will implement the HVDPE event upon approval from the LAFD.

Should you have any questions regarding the enclosed documents, please contact Simon Tregurtha at (562) 921-3581 Ext. 260, or Chris at Ext. 390.

Sincerely,

Simon Tregurtha
Project Manager

Chris Panaitescu
General Manager
Environmental Affairs

cc: BP West Coast Products LLC, Mr. John Skance
File

13116 Imperial Hwy, Santa Fe Springs, CA 90670-0138 • Ph: (562)921-3581

REQUIRED INFORMATION FORM

INSTRUCTIONS: This form is to be filled out completely and must be the first page of any document, including all reports, submitted to the Los Angeles Fire Department (LAFD) Underground Storage Tank Unit (UST). To ensure accuracy this form must be completed on the computer or typed out. **Hand printing or writing will not be accepted.** The correct LAFD **Facility I.D. No.** and **Division 5 Permit No.** must be included for the submittal to be processed.
**** (SOME INFORMATION MAY ALREADY BE PRE-ENTERED FOR YOUR CONVENIENCE)**

PLEASE NOTE THAT AN ACCOMPANYING INTRODUCTORY LETTER ON YOUR COMPANY LETTERHEAD CANNOT BE SUBSTITUTED FOR THIS FORM.

Today's Date: 1/5/2011

Mail to: City of Los Angeles Fire Department
Environmental Unit – Underground Storage Tanks
Attn: Eloy Luna, Engineering Geologist Associate IV
221 North Figueroa Street, Suite 1500
Los Angeles, CA., 90012

Report Title
(Please select the applicable title from the drop down menu)
Site Assessment Report & Proposed Remedial Action

LAFD Facility I.D. No. 26137

LAFD Division 5 Permit No.
LAFD Site Assessment Permit No. 24288

Site/Facility Name: Former Thrifty Oil Station No. 020

Site Address: 10801 Sant Monica Blvd. **City/State/Zip: Los Angeles, CA,**

Site Facility Description: Former Thrifty Oil Station No. 020

Tank Owner/Tank Operator/Responsible Party Contact Information

Contact Name and Title:
Simon Tregurtha / Project Geologist

Contact Phone No.
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SITE ASSESSMENT REPORT

THRIFTY OIL CO STATION NO. 020
10801 SANTA MONICA BOULEVARD
LOS ANGELES, CALIFORNIA 90025

December 30, 2010

SUBMITTED TO:

Thrifty Oil Co.
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Santa Fe Springs, California 90670
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LOS ANGELES FIRE DEPT. FACILITY ID: 26137
PERMIT NO. 24288
WPI PROJECT: 10.184

WARRANTY STATEMENT

This Site Assessment Report has been prepared by Wayne Perry, Inc. (WPI) for the exclusive use of Thrifty Oil Co., as it pertains to Thrifty Oil Co Station No. 020 located at 10801 Santa Monica Boulevard, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists, hydrogeologists, and engineers practicing in this field. No other warranty, express or implied, is made as to the professional advice in this report.

Should you have questions or require additional information, please contact Eric Floyd at (714) 826-0352.

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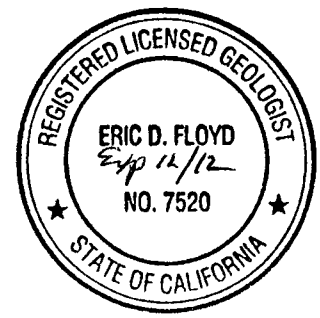

December 30, 2010

WPI PROJECT NO. 10.184

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1.0 INTRODUCTION

In correspondence dated June 9, 2010, the Los Angeles Fire Department (LAFD) requested that additional assessment activities be conducted at Thrifty Station No. 020 located at 10801 Santa Monica Boulevard in Los Angeles, California (herein referred to as the "Site")to define the distribution of impacted soils, and submittal of a remedial action plan (RAP). The *Site Assessment Workplan and Remedial Action Plan* dated August 3, 2010 proposed the installation of three soil borings advanced to delineate the vertical extent of contaminants. If contaminant concentrations detected in soil samples were equal to or greater than those detected by previous investigations, the borings would be converted to vapor extraction wells. The workplan also specified that if detected concentrations were consistent with previous investigation results (both depths and concentrations), the threat to groundwater quality would be considered minimal, and interim remedial actions (IRA) by soil vapor extraction would be used to eliminate any potential impact to groundwater.

This report documents boring / well installation and sampling procedures, and discusses results obtained from the laboratory analysis of soil samples. Conclusions and recommendations based on these and data from previous investigations are also discussed.

2.0 BACKGROUND

2.1 Site Description

The Site is a retail gasoline sales facility that is owned by Thrifty and has been operated by ARCO Products Co. since April 22, 1997. The Site is located at the northwest corner of Santa Monica Boulevard and Malcolm Avenue in Los Angeles, California, at an approximate elevation is 255 feet above mean sea level. Local topography slopes gently to the southwest (USGS, 1966).

Residential properties are located north of the site. An Enterprise Rental Car is located east of the site, across Malcolm Avenue. South of the site, is Santa Monica Boulevard followed by a mix of commercial and multi-family residential. A motel is located adjacent to the site on the west. A site vicinity map is included as Figure 2.

Improvements on site include a double contained underground storage tank (UST) system consisting of two 20,000-gallon USTs (one of which is divided into two 10,000-gallon sections) containing gasoline, and associated product piping. The UST system was installed in October 1997. Additional features of the Site include three dispenser islands under a canopy and a kiosk. Main features of the Site are shown on the plot plan provided as Figure 3. Thrifty does not currently have any plans to alter the use of the property.

2.2 Site History

Date	Activity/Method	No. of Wells, Borings or Samples	Report Date	Consultant	Comments
6/97 & 7/97	Baselining Subsurface Investigation Report	7 Soil Borings (TDD-1 through TDD-7)	12/22/97	Pacific Environmental Group, Inc.	Total petroleum hydrocarbons as gasoline (TPH-G), benzene, and methyl tert butyl ether (MTBE) were detected in the soil samples at maximum concentrations of 1,200 mg/kg, 2,300 µg/kg, and 22,000 µg/kg, respectively, in the samples from TDD-5-15'.
10/97	UST Replacement Activities	Soil Samples	4/10/98	Tait Environmental Services	Four USTs were removed and replaced with two double walled USTs. TPH-G, total petroleum hydrocarbons as diesel (TPH-D), benzene and MTBE were detected in soil samples collected from beneath the USTs, the side walls and beneath the product piping at maximum concentrations of 19,000 mg/kg, 890 mg/kg, 30,000 µg/kg, and 270, 000 µg/kg, respectively. Approximately 1,278 tons of hydrocarbon-impacted soil was excavated and removed from the Site.
9/07	Agency Correspondence	--	9/18/07	LAFD	In response to the 4/10/98 report, LAFD requested that a workplan for additional site assessment be submitted.
9/08	Workplan for Site Assessment	--	9/8/08	Thrifty	Thrifty proposed installation of three soil borings. The borings would be converted to wells if groundwater was encountered.
12/08	Agency Correspondence	--	12/12/08	LAFD	LAFD approved the 9/8/08 workplan.

Date	Activity/Method	No. of Wells, Borings or Samples	Report Date	Consultant	Comments
3/09	Additional Site Assessment Report and Request for Closure	4 Soil Borings (B-8 through B-11)	3/11/09	GeoHydrologic Consultants Inc. (GHC)	TPH-G, TPH-D, benzene, MTBE and TBA were detected in soil samples at maximum concentrations of 1,400 mg/kg, 1,090 mg/kg, 3.8j µg/kg, 4.7 mg/kg , and 4.02 mg/kg, respectively. Groundwater was not encountered. GHC concluded that the lateral and vertical extent of contamination was defined and closure was requested.
6/10	Agency Correspondence	--	6/9/10	LAFD	LAFD denied the request for closure and requested additional assessment in the area of boring B-8 and the dispenser islands. LAFD also requested submittal of a RAP.
8/10	Additional Site Assessment Workplan and Remedial Action Plan	--	8/3/10	WPI	Three soil borings were proposed. If contaminant concentrations detected in soil samples were equal to or greater than those detected by previous investigations, the borings would be converted to vapor extraction wells. If detected concentrations were consistent with previous investigation results (both depths and concentrations), IRA by soil vapor extraction would be used.

Historical soil analytical data are provided in Appendix A.

2.3 Geology

The Site is located on the Hollywood Piedmont Slope, and is underlain by Holocene-age alluvium, followed by Pleistocene-age deposits of the Lakewood Formation (CDWR, 1961). Soil types encountered beneath the Site during previous site assessment activities consisted predominantly of silty, clayey sand from the ground surface to depths of 30 feet beneath ground surface (bgs) underlain by predominantly silty sand to a depth of approximately 55 feet bgs. From 55 feet to 65 feet bgs, the soil type consisted of clayey sand with gravel. Below a depth of 65 feet, the majority of sediments encountered consisted of sandy silt and silt, with lesser

amounts of lean clay and silty sand, to a total depth of 90 feet bgs, the maximum depth explored. Geologic cross sections are provided as Figures 4 through 6.

2.4 Hydrogeology

The site is located within the Santa Monica Sub-basin of the Central Groundwater Basin of the Los Angeles – San Gabriel Hydrologic Unit (CRWQCB-LAR, 1994). The regional Ballona Aquifer (groundwater expected at 70 to 80 feet bgs) occurs within the Lakewood Formation deposits (CDWR, 1961). Groundwater was encountered at the nearby Exxon Mobil Oil Corporation Service Station, located at 10857 Santa Monica Blvd. (430 feet southwest of the site), at a depth of approximately 118 feet during the March 2010 groundwater monitoring event. Based on the local topographic gradient of the area, groundwater is expected to flow toward the southwest. Historically, groundwater has not been encountered beneath the Site to a total depth of 90 feet (the maximum depth explored). However, during this investigation, soils at or near saturation were encountered at depths of about 55 to 59 feet (drilling of SB-2 and SB-3). The existence of water at these locations and depths appears to be due to perched conditions, as the sandy layer where groundwater was encountered is underlain by finer grained sediments at both locations. Although indications of moisture were observed at SB-1, there was no indication of saturated soils, suggesting that the observed water bearing sediments are localized and of limited extent.

2.5 Potential Sensitive Receptors

According to the Los Angeles Department of Public Works, Water Resources Department, there are no active wells within a 1-mile radius of the site (DPW, 2010). However, there are six schools / child care centers within a 1/2-mile radius of the site (Google Earth, 2010). These are listed below.

Summary of Potential Sensitive Receptors

Facility/Sensitive Receptor	Distance from Site (feet)	Direction from Site
Emerson Middle School	415	Northeast
Global Montessori School of Westwood	940	Southwest
Westwood Charter School	1,100	Southeast
Chalk Preschool	1,305	South
Pacific Western University	1,370	Northwest
Creative Center for Children	2,600	Northeast

The locations of these schools / child care centers are shown on Figure 1.

3.0 HYDROCARBON DISTRIBUTION

3.1 Soil

In January 2009 four soil boring (B-8 through B-11) were advanced to depths ranging from 85 to 95 feet bgs. Soil samples were collected at 5-foot intervals, and (according to laboratory analytical results) only minor to trace hydrocarbon concentrations were detected in borings B-9, B-10, and B-11. Hydrocarbon concentrations detected in boring B-8 were significantly higher.

Elevated TPH-G concentrations (>1,000 mg/kg) were limited to boring B-8 at depths between 30 to 40 feet. TPH-D concentrations greater than 10 mg/kg were only detected in boring B-8 up to 45 feet and B-11 up to 40 feet. Benzene was only detected at trace levels in borings B-9 (30 feet) and B-11 (25 and 30 feet). MTBE was detected at concentrations greater than 1,000 µg/kg between 35 and 50 feet in boring B-8, at 45 feet in boring B-9, and at 40 feet in boring B-11. TBA was detected at concentrations greater than 1,000 µg/kg at 20 and 25 feet in boring B-8, from 60 to 75 feet in B-9, and from 10 to 25 feet and 45 to 50 feet in B-11.

Soil analytical data are summarized in Table 1. Isoconcentration plots showing the distribution of hydrocarbons in soil are provided as Figures 5 through 8. Groundwater was not encountered during the investigation to the maximum depth drilled of 95 feet.

Based on previous investigations, it appears that the maximum soil concentrations are limited to the 25 to 45 foot interval for TPH-G / benzene, toluene, ethylbenzene and xylenes (BTEX), and 25 to 55 feet for MTBE. Below these depths, the concentrations were either non-detect or at low levels, which should not pose a significant threat to the groundwater quality.

4.0 SITE INVESTIGATION ACTIVITIES

The LAFD required additional site assessment to further define the vertical and lateral extent of petroleum hydrocarbons in soils underlying the site, specifically in the area of soil boring B-8 and the product dispenser. In a June 2010 telephone conversation with Thrifty, LAFD Inspector Luna stated that the hydrocarbon plume was not vertically defined in the area of soil borings B-8 and B-9. In response, it was proposed (in the August 2010 Workplan) that three borings be drilled and sampled at the locations shown on Figure 3. Selected soil samples would be analyzed by a California certified mobile analytical laboratory.

If petroleum fuel contaminant concentrations detected in the soil samples were equal to or greater than those detected during the 2009 investigation, the boring(s) would be converted to SVE well(s). Also, if detected concentrations were consistent with those detected during previous investigations (in both depth and concentration), the threat to groundwater quality would be considered minimal, and interim remedial actions (IRAs) by soil vapor extraction would be sufficient to eliminate any potential impact to groundwater. The proposed borings

were advanced and sampled on November 16th, 17th, and 18th, 2010. Procedures and findings are discussed below.

4.1 Pre-Field Activities

Pre-field activities included the following:

- Preparing a site-specific Health and Safety Plan (HASP),
- Coordinating and scheduling subcontractors for soil boring drilling and laboratory analysis.
- Notifying Underground Service Alert (USA) and performing an underground utility clearance for the planned drilling locations.
- Obtaining any necessary permits.

4.2 Field Procedures

Underground Services Alert was notified of pending drilling activities at the station at least 48 hours prior to commencement of work. A geophysical utility locator was also used for borehole clearance. Prior to drilling, all borehole locations were hand augered to a depth of approximately 5 feet.

All drilling, soil sampling, and well installation activities were performed in accordance with WPI's site-specific HASP and under the direct supervision of a California Professional Geologist. The borings were drilled using a truck-mounted, hollow stem auger rig, operated by Test America Drilling Corporation, a California licensed C-57 contractor. The workplan specified that soil samples would be collected at 5-foot intervals to 90 feet bgs and that samples would be collected at 2.5-foot intervals from 90 feet to the terminal depth in each boring (estimated to be 110 feet). The borings were to be advanced until TPH-G was below detection limits in four consecutive samples (20 feet) and MTBE was below its detection limit in eight consecutive samples (40 feet) or to a maximum depth of 110 feet bgs.

Undisturbed soil samples were obtained from all borings using a modified California split-spoon sampler lined with three 6-inch long by 2-inch diameter brass tubes. The sampler was lowered to the target depth and driven 18 inches into the soil by the repeated drop of a 140-pound hammer from a height of approximately 30 inches.

After the sampler was driven to the desired depth, it was retrieved and the tubes were removed. The tube nearest the sampler toe was commonly selected for laboratory analysis. An aliquot of soil was collected from this tube and preserved using EPA Method 5035. The tube was preserved by sealing each end with Teflon sheets and plastic end caps. Select tubes and all preserved soil aliquots were labeled with a unique number, and recorded on a chain-of-custody form.

A field headspace test was conducted on a portion of soil from each sample interval with a portable photo-ionization detector (PID) calibrated to hexane. The soil was placed in a ZipLoc® bag, and allowed to sit undisturbed for approximately 10 minutes. The PID probe was inserted

into the bag and the organic vapor emission from the soil into the bag headspace was measured. This reading was recorded on a soil boring log maintained for each sampling location and used to select soil samples for analysis by an on-site mobile laboratory.

Soil in the remaining tubes was examined in the field for observable signs of petroleum hydrocarbons and soil classification. Soil was classified in general accordance with the Unified Soil Classification System. Soil classifications and descriptions, including blow counts, grain size, subordinate constituents, color, density, and moisture content were recorded on each boring log.

Samples with headspace measurements greater than 5 ppmv were submitted to the mobile laboratory for analysis. Samples with PID readings less than 5 ppmv were submitted to a stationary California certified laboratory for analysis.

All samples were analyzed for TPH-G using modified EPA Method 8015B and for BTEX, the fuel oxygenate compounds and ethanol using EPA Method 8260B. Method detection limits were set in accordance with the California Water Quality Control Board – Los Angeles Region's (CRWQCB-LAR) UST Program analytical requirements (CRWQCB-LAR, 2005).

Samples SB-2D5, SB-2D15, SB-3D5 through SB-3D45, and SB-3D55 were analyzed by Associated Laboratories, a fixed laboratory. Samples SB-1D5 through SB-1D60, SB2-5D, SB2-D20 through SB2D60, and SB3-D50 and SB3-D60 were analyzed by an on-site mobile laboratory operated by American Analytics.

4.3 Boring / Well Installations

Boring sample results and well installation details for SB-1, SB-2, and SB-3 are discussed in order of installation below. Samples collected from these borings were labeled by boring number and depth. For example the 15-foot sample from boring SB-3 was labeled as SB-3D15.

4.3.1 Boring SB-2

Boring SB-2 was installed on November 16, 2010 at the location shown on Figure 3. High concentrations of volatile organic compounds (VOCs) were measured in the breathing space adjacent to the drill rig at a depth of about 35 feet bgs. VOC concentrations exceeded HASP guidelines for Level D work, and the drill crew was instructed to don full-face air purifying respirators with organic vapor cartridges. VOC concentrations varied widely over the next 5-foot interval. As a precautionary measure, the boring was halted at 45 feet bgs and allowed to vent. Auger were left in the hole, and covered with a metal plate. The plate was sealed with a cold patch asphalt cover, and the crew set up on SB-3.

Once advancement was re-initiated at SB-2, increasing moisture was noted at 50 feet bgs, and appeared to increase in the 55-foot sample. The boring was advanced in 2.5-foot intervals to a depth of 60 feet bgs, with both moisture and clay content continued to increase. At 60 feet bgs, drilling was halted for the day. Augers were left in the hole, just below the ground surface. The hole was covered with a steel plate, and sealed with an asphalt cold patch. The following morning when drilling resumed, approximately two feet of water was measured in the auger.

Since groundwater was not expected to be encountered at this depth, WPI was not prepared to install groundwater monitoring wells during this phase of investigation (groundwater monitoring well permits had not been obtained and there were no provisions for groundwater sampling) and did not want to advance the boring further through a potential confining layer. Therefore the boring was terminated at 62 feet bgs. Results from the SB-2 soil sample laboratory analyses are summarized below.

Chemical	SB-2D5	SB-2D10	SB-2D15	SB-2D20	SB-2D25	SB-2D30	SB-2D35	SB-2D40	SB-2D45	SB-2D50	SB-2D55	SB-2D60
benzene	ND	No Recovery	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
toluene	ND		ND	ND	1	35	ND	14	ND	2.4	0.0027	0.0029
ethyl benzene	ND		ND	4.3	35	25	21	64	1	3.7	0.0093	ND
m,p xylenes	ND		ND	25	100	81	16	220	2.3	12	0.032	ND
o-xylene	ND		ND	19	41	35	60	110	1.1	4.3	0.014	ND
MTBE	ND		ND	ND	ND	ND	28	4.4	0.22	ND	0.28	0.014
TBA	ND		ND	ND	ND	ND	ND	ND	ND	ND	0.22	ND
ETBE	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TAME	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIPE	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TPH (GRO)	ND		ND	580	1300	1000	890	3000	180	360	0.81	ND

All concentrations are in mg/kg. Samples collected from 20-60 feet were sampled by the mobile laboratory.

The boring was sealed with bentonite chips from 51 to 62 feet. A dual nested vapor extraction well was set in the boring with screened intervals from 20 to 35 feet bgs (SB-2S) and 40 to 50 feet bgs (SB-2D). A well construction diagram is provided on the SB-2 boring log (Appendix B). Laboratory reports and chain-of-custody documentation are provided as Appendix C.

4.3.2 Boring SB-3

Boring SB-3 was the second boring to be advanced on November 17, 2010. This boring was drilled and sampled as previously described at 5-foot intervals to a depth of 50 feet with no indication of impacted soils from field headspace testing. After 50 feet, the boring was advanced in 2.5-foot intervals to a depth of 60.5 feet bgs. As with SB-2, there were indications of increasing moisture over this depth interval, and soils were at or near saturation at 59 feet bgs. As a precautionary measure, the boring was terminated at 60.5 feet bgs.

The 50 foot sample from SB-3 was analyzed by the mobile laboratory. All other samples were transported under chain-of-custody to Associated Laboratories for analysis. Results are summarized below.

Chemical	SB-3D5	SB-3D10	SB-3D15	SB-3D20	SB-3D25	SB-3D30	SB-3D35	SB-3D40	SB-3D45	SB-3D50	SB-3D55	SB-3D60
benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.0049**	ND	ND
ethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.0039**	ND	ND
o-xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.0017**	ND	ND
MTBE	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.075**	**0.0082**	ND
TBA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.0092j**	ND
ETBE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TAME	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIPE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TPH (GRO)	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.12**	ND	ND

All concentrations are in mg/kg.
"j" – Flag indicating the value is between the practical quantitation limit and the method detection limit.

Based on the PID field tests and the mobile laboratory results, a vapor extraction well was not set in this boring. The boring was abandoned by tremie grouting to the surface with neat cement. The grout was allowed to settle for approximately four hours then topped off to within 6-inches of the surface. The remaining borehole was filled with concrete and finished at the surface to match existing grade. The boring log is provided in Appendix B. Laboratory reports and chain-of-custody documentation are provided as Appendix C.

4.2.3 Boring SB-1

Boring SB-1 was the final boring to be advanced on November 18, 2010. This boring was also drilled and sampled at 5- foot intervals to a depth of 50 feet with no indication of impacted soils from field headspace testing. All of the soil samples from SB-1 were analyzed by the mobile laboratory. Results are summarized below.

Chemical	SB-1D5	SB-1D10	SB-1D15	SB-1D20	SB-1D25	SB-1D30	SB-1D35	SB-1D40	SB-1D45	SB-1D50	SB-1D55	SB-1D60
benzene	ND	ND	ND	ND	ND	**0.0025**	ND	ND	ND	ND	ND	ND
toluene	**0.0012**	**0.0013**	**0.0015**	ND	**0.0014**	ND	**0.0037**	**0.0016**	**0.0022**	ND	**0.0014**	**0.0017**
ethyl benzene	ND	ND	ND	ND	ND	**0.041**	ND	ND	ND	ND	ND	ND
m,p xylenes	ND	ND	ND	ND	ND	**0.052**	**0.0067**	**0.0067**	**0.0022**	ND	ND	ND
o-xylene	ND	ND	ND	ND	ND	**0.0077**	ND	ND	ND	ND	ND	ND
MTBE	ND	ND	ND	**0.098**	**0.033**	**0.92**	**0.36**	**0.68**	**0.124**	ND	**0.0052**	**0.002**
TBA	ND	ND	ND	**0.11**	**0.11**	**0.13**	**0.14**	**0.3**	**0.3**	ND	**2.2**	**0.93**
ETBE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TAME	ND	ND	ND	ND	ND	**0.0048**	ND	**0.0049**	ND	ND	ND	ND
DIPE	ND	ND	ND	ND	ND	**0.0057**	ND	**0.0028**	ND	ND	ND	ND

Chemical	SB-1D5	SB-1D10	SB-1D15	SB-1D20	SB-1D25	SB-1D30	SB-1D35	SB-1D40	SB-1D45	SB-1D50	SB-1D55	SB-1D60
Ethanol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TPH (GRO)	ND	ND	ND	ND	ND	**0.73**	**0.35**	**0.46**	**0.16**	ND	ND	ND

After 50 feet, the boring was advanced in 2.5-foot intervals to a depth of 60.5 feet bgs. As with SB-1 and SB-2 both moisture and clay content increased over this depth interval, however, the amount of moisture was much less than observed at SB-2. As a precautionary measure, the boring was terminated at 60.5 feet bgs.

A vapor extraction well was set in boring SB-1, with a screened interval of 30 to 50 feet bgs. The interval from 51 to 60.5 feet bgs was sealed with bentonite chips. A well construction diagram is provided on the SB-1 boring log (Appendix B). Laboratory reports and chain-of-custody documentation are provided as Appendix C.

4.4 Disposal of Investigation Derived Wastes

Soil generated from the borings and sample decontamination water was placed in DOT approved 55-gallon drums. These drums were sealed and labeled as they were filled and upon completion of each work day. Analytical results from the soil analyses will be used to select an appropriate off-site disposal facility for these wastes. Manifest documenting transportation and the off-site disposal of these wastes will be provided under separate cover if requested.

5.0 CONCLUSIONS

The following conclusions are based on the results of this investigation:

- Elevated concentrations of petroleum fuel contaminants were detected on the west side of the western most dispenser islands and the western end of the UST pit. The highest concentrations were detected adjacent to the western most dispenser island.

- The most highly impacted depth interval is approximately 25 to 40 feet bgs. Isoconcentration maps for TPH-G/GRO, benzene, MTBE, and TBA are provided as Figures 7, 8, 9, and 10, respectively.

- Benzene was only detected in one soil sample (SB-1D30 at a concentration of 0.0025 mg/kg). This may indicate an older release, and/or active natural degradation of contaminants.

- Soils at or near saturation were encountered at depths of about 55 to 59 feet during drilling of SB-2 and SB-3. The existence of water at these locations and depths appears to be due to perched conditions, as the sandy layer where groundwater was encountered is underlain by finer grained sediments at both locations. Although indications of

moisture were observed at SB-1, there was no indication of saturated soils, suggesting that the observed water bearing sediments are localized and of limited extent.

- Sediments observed at terminal depth generally consisted of silty sands with trace amounts of clay, comprising a potential confining layer. The existence of these finer grained sediments may prohibit or retard the downward migration of contaminants.

6.0 RECOMMENDATIONS

A mobile vacuum extraction event is recommended to evaluate the effectiveness of vapor extraction at the site. Objectives of the test would include evaluating vapor flow rates, mass removal rates and contaminant rebound. Extraction should be performed with a mobile SVE rig capable of extracting vapors at 250 standard cubic feet per minute (scfm) and achieving a vacuum of at least 12 inches of mercury (inches Hg). Extraction wells should be sealed at the surface to prevent intrusion of atmospheric air.

The test should utilize SB-1, SB-2S and SB-2D, and be conducted for 36 hours (twelve hours at each well), or until vapor phase contaminant concentrations become asymptotic at low levels. Well head vacuums, extracted vapor flow rates and contaminant vapor concentration (as measured with a PID calibrated to hexane) should be measured periodically as described below.

As extraction is conducted on each well, influent contaminant vapor concentrations should be measured with the PID at the beginning of extraction and every hour thereafter. Other parameters such as manifold applied vacuum (inches of Hg), vapor system flow rate (scfm), system flow temperature (degrees Fahrenheit) and extraction wellhead vacuum should be recorded every hour.

Influent contaminant vapor samples for laboratory analysis should be collected one hour, 6 hours and at the end of extraction for each well. These samples should be analyzed for total petroleum hydrocarbons as gasoline using modified EPA method 8015B, and for benzene, toluene, ethyl benzene, total xylenes and the fuel oxygenates using EPA method 8260B.

After the test is completed, a report will be prepared that documents test procedures and provides an evaluation of SVE effectiveness, including mass removal rates, and total mass removed from each well.

7.0 REFERENCES

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TABLES