3A01

Documenting Incidents of Ground Failure Resulting from the August 17, 1999 Kocaeli, Turkey Earthquake: Data Report Characterizing Subsurface Conditions

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APPENDICES

Acknowledgements

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1. Introduction

The August 17, 1999 Kocaeli earthquake (M_w = 7.4) in Turkey caused severe damage to hundreds of structures and lifelines in the City of Adapazari. According to data provided by the Turkish Federal Government, a total of 5,078 buildings (27% of the building stock) were severely damaged or destroyed in Adapazari (Bray et al., 2000). A large number of modern reinforced concrete buildings, generally of 3 to 5 stories, penetrated the surrounding ground or tilted due in part to liquefaction and ground softening. Many of these buildings also had significant structural damage.

Additionally, within Adapazari and outside the city, several significant and minor lateral spreads developed. Documentation of these case histories will assist researchers developing empirically based lateral spread displacement models.

In a joint effort of the University of California at Berkeley, the University of California at Los Angeles, Brigham Young University, Sakarya University, ZETAS Corporation, Middle Eastern Technical University, and Bosphorus University, an extensive field investigation program was conducted that included the documentation of soil conditions at selected sites affected by ground failure throughout Adapazari and the affected region (Bray et al. 2001a, 2001b).

2. Project Objectives

Significant occurrences of ground failure in the form of liquefaction, ground softening, and lateral spreading were documented by NSF-sponsored reconnaissance teams in several areas affected by the 1999 Kocaeli earthquake (M_w = 7.4). The primary goal of this project is to characterize the subsurface conditions at sites where ground deformations and/or building movements were well documented. Site characterization was completed through the use of cone penetration testing (some with pore pressure and shear wave velocity measurements) and rotary wash borings with primarily standard penetration testing (with energy measurements using the SPT Analyzer). In this research emphasis is given to:

- Developing the data necessary to analyze the relationship between ground failure and building damage.
- Assessing the threshold for liquefaction triggering for soils with significant fines (both non-plastic and plastic).

- Assessing the threshold for liquefaction triggering for soils with significant fines (both non-plastic and plastic).
- Documenting ground conditions and displacements at several sites of minor and significant lateral spreading.

The data collected through this research are made available through the website (http://peer.berkeley.edu/turkey/adapazari) to support the efforts of other investigators interested in these topics.

3. Project Benefits for California

The goal of California's Seismic Hazards Mapping Act is "to protect public safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes" (CDMG SP-117, 1997). The seismic hazards mapping effort is largely based on empirical methods that require re-evaluation and updating as important case histories emerge. Critical lessons can be learned from studying ground failure during the Turkey earthquake, because the soils and earthquake shaking represent one of the controlling earthquake hazards in California (i.e. poor soils close to large magnitude earthquakes). Ground failure incidents were widespread in Turkey, where hundreds of structures settled, tilted and collapsed due in part to liquefaction and ground softening. There were also observations of ground failure that have not been documented previously, such as horizontal translation of building founded on softened ground. An in-depth examination of these cases is required to ensure the profession is not ignoring an important earthquake hazard. Observations from design level earthquakes are invaluable in advancing the state-of-practice in earthquake engineering, and observations of ground failure in Turkey are transferable to California.

4. Description of Field Investigation Program

As part of the investigation program of the project, a detailed geotechnical investigation was performed for each of the phases of the project as described in the next sections. The methods of investigation performed in each phase and site differ depending on the complexity of the local conditions and the required information but generally consist of the following methods:

- Cone Penetration Test (CPT)
- Seismic Cone Penetration Test (SCPTU)

- Standard Penetration Test (SPT)
- Undisturbed Sampling (UD)
- Field Vane Shear Test

In the following section a concise description of the in-situ performed tests and the instrumentation used will be made, emphasizing in the most important issues relevant to the investigation needs of the project.

4.1. Cone Penetration Test (CPT)

Cone penetration tests (CPTs) were performed by Zemin Teknolojisi, A. S. (ZETAS) and the instruments used were manufactured by A. P. van den Berg. Table 4-1 lists the specifications of the equipment employed, which consists of a 60° cone, with a cross-sectional area of 10 cm^2. The friction sleeve, located above the tip, has an area of 150 cm^2. Figure 4-1 shows the dimensions of the cone and the standards followed in its fabrication.

The piezocone has the filter located behind the cone (i.e. between it and the friction sleeve. The cross-sectional area at the location of the filter is 7.5 cm^2, hence the cone area ratio is 0.75 as depicted in Figure 4-2.

The length of the rod increment used was 50 cm and the depth interval at which the tip resistance, sleeve friction, and pore water pressure were measured was 2 cm. The penetration speed was kept as much as possible constant at 2 cm/s.

Table 4-1: Specifications of CPT equipment and procedure

Tip Area	10 cm^2
Internal Angle of Cone	60°
Sleeve Area	150 cm^2
Cone Area Ratio	0.75
Penetration Speed	2 cm/s
Measurement Interval	At every 2 cm
Rod Interval Length	50 cm

A.P. van den Berg machinefabriek b.v. tel. : 0513-631355 fax. : 0513-631212	DEVIATION of Straightness + MINIMAL Dimensions tip, (friction)jacket, thread adapter	Standards: NEN 3680 NEN 5140 APB standard

Type of cone:	10 cm^2
Diameter of tip: (volgens NEN 5140)	$35,3 \leq d_1 \leq 36,0$
Tip: (production dimension)	$d_1 = 35,7\ ^{+0,2}_{0}$
Jacket (C-cone):	$d_2 = 35,7\ ^{+0,2}_{0}$
Friction jacket (CF-cone):	$d_2 = 35,9\ ^{+0,1}_{0}$
Tip for used cone:	$d_1 = 35,5\ ^{+0,1}_{0}$
Minimal diameter jacket: (C-cone)	$d_2 = 35,2$ (APB std.)
Minimal diameter of fr. jacket: (CF-cone)	$d_1 = 35,3$
Use tip for used cone when friction jacket:	$d_2 \leq 35,65$
Minimal diameter of thread adaptor:	$d = 35,3$
Height dimension tip edge	$7 \leq h_e \leq 10$
Maximal deviation of straightness:	1mm on a length of 1000 mm (max. oscillation 1,0 mm.)

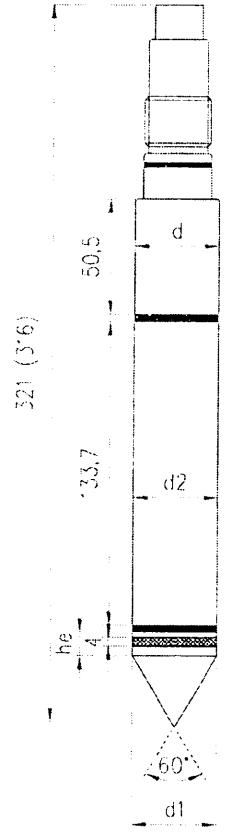
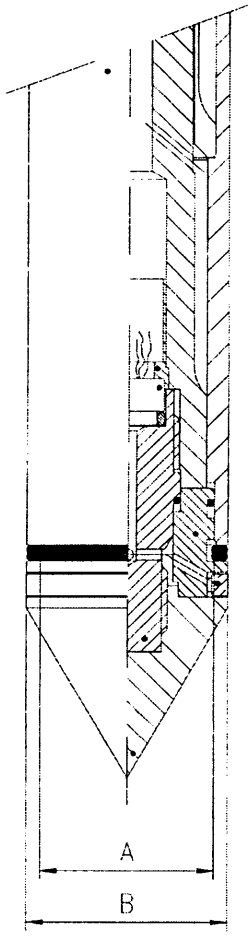


Figure 4-1: Dimensions of the cone and standards followed



A=0,25x3,14x30,9x30,9=750 MM^2
B=0,25x3,14x35,7x35,7=1000 MM^2

α = A/B β = 1 – A/B

α = 750/1000 = 0,75

β = 1 – 0,75 = 0,25

Figure 4-2: Cross-section of the piezocone

4.2. Seismic Cone Penetration Test (SCPTU)

Downhole seismic wave profiling was performed using a cone instrumented with two geophones separated 1 meter apart. The source for both shear and compressive waves, as shown in Figure 4-3, consisted of a wooden log with metallic plates located at both ends and on the upper center. As shown in Figure 4-4, the first are for the generation of shear waves on either side of the cone, and the latter for generating compressive waves. The use of two geophones allows obtaining the seismic velocity of the layer of soil between them.

4.3. Exploratory Borings and Standard Penetration Test (SPT)

The exploratory borings were performed by ZETAS using the equipment shown in Figure 4-5. The drilling machine used was custom made in Ankara, Turkey and is the equivalent of a Crealius XC90H with 32 hp of power. The tower has an elevation of 6 meters above the ground. The Solid Flight Auger (SFA) shown in Figure 4-6 was used initially to drill through pavement, rubble and hard ground above the water table. The rotary wash drilling technique (with bentonite drilling mud to stabilize the hole) using a tri-cone drill bit, shown in Figure 4-7 and Figure 4-8, was used to reach the depth at which the SPT was to be performed. Casing was used to support the walls of the boring. The casing was advanced to a depth of 5 to 10 cm above the depth at which the SPT was to be performed. The last 30 cm were advanced without the use of drilling mud. Rotary wash was then used to reach the depth at which the test was to be performed.

The Standard Penetration Test (SPT) is typically used for earthquake engineering purposes and is a typical exploration method in liquefaction engineering. However, in order to retrieve quality data using the SPT, knowledge of the actual energy delivered to the split spoon sampler is of importance. As it has been extensively studied, the percentage of the total theoretical energy delivered to the sampler, or energy ratio, is strongly influenced by many factors such as: type of hammer release equipment, expertise of the operator, size of the cathead, diameter of the cathead, diameter of the rope, number of wraps of the rope around the cathead, hammer type, borehole diameter, rod length, rod diameter, tightness of the rod joints, verticality of the rod string, type of sampler, and others. This problem was recognized, and in an attempt to standardize the test, procedures stipulated in ASTM D 6066-98 and ASTM D 1586 were

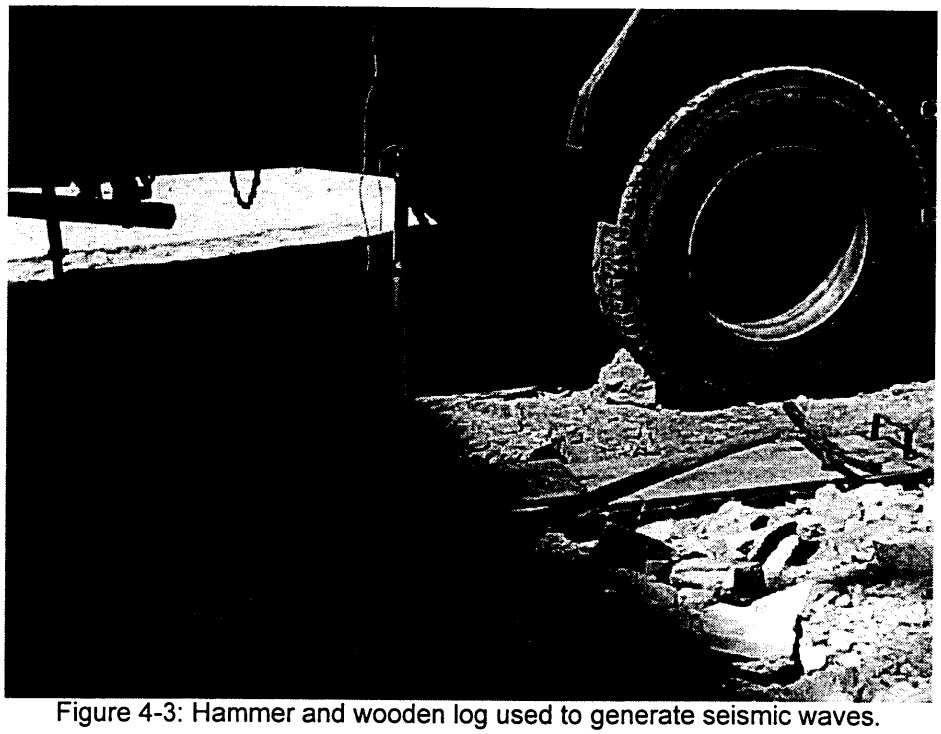


Figure 4-3: Hammer and wooden log used to generate seismic waves.

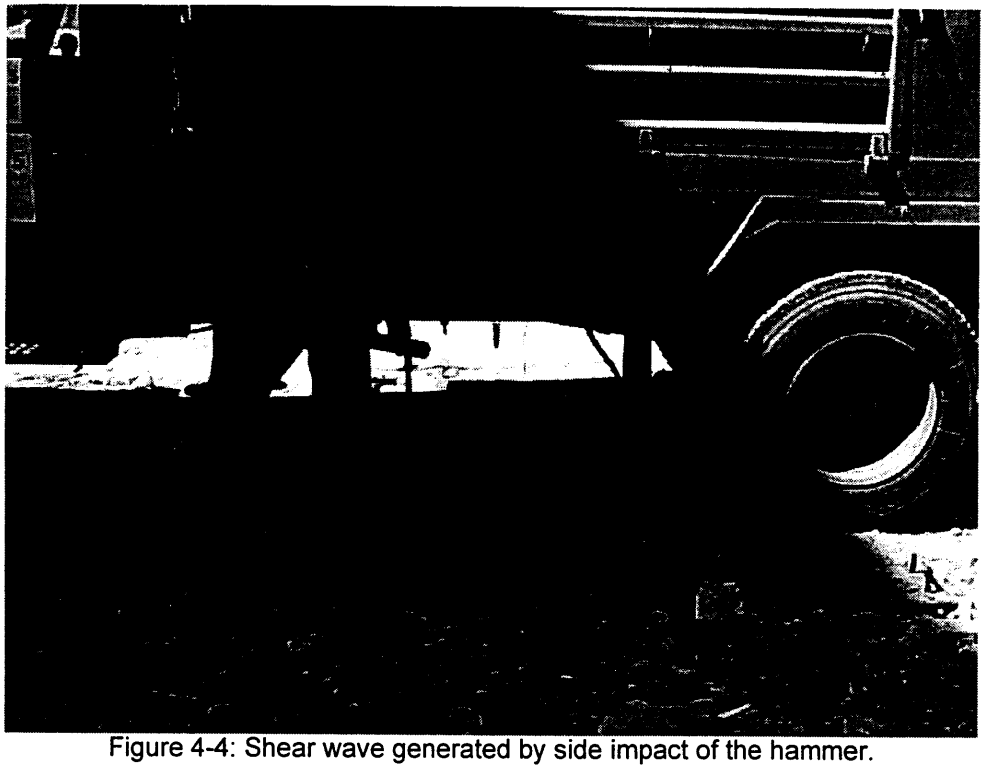


Figure 4-4: Shear wave generated by side impact of the hammer.

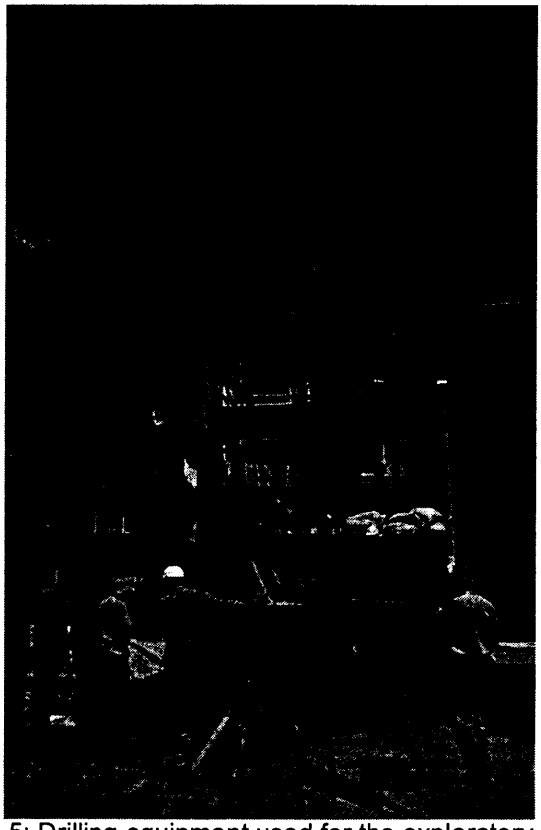


Figure 4-5: Drilling equipment used for the exploratory borings.

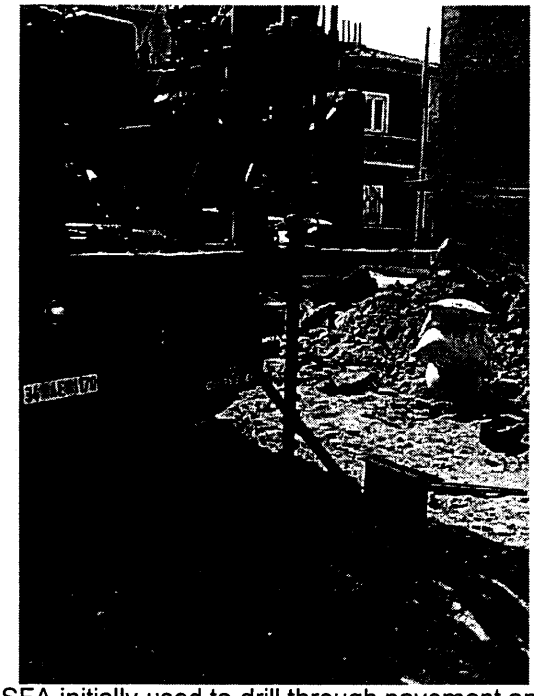


Figure 4-6: View of the SFA initially used to drill through pavement and above the water table.

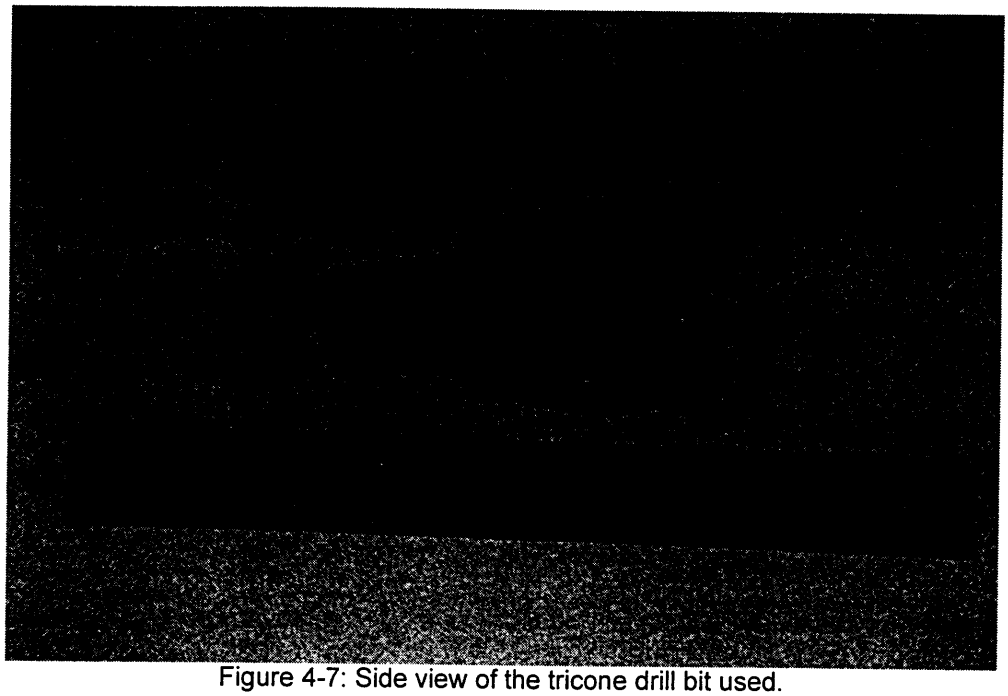


Figure 4-7: Side view of the tricone drill bit used.

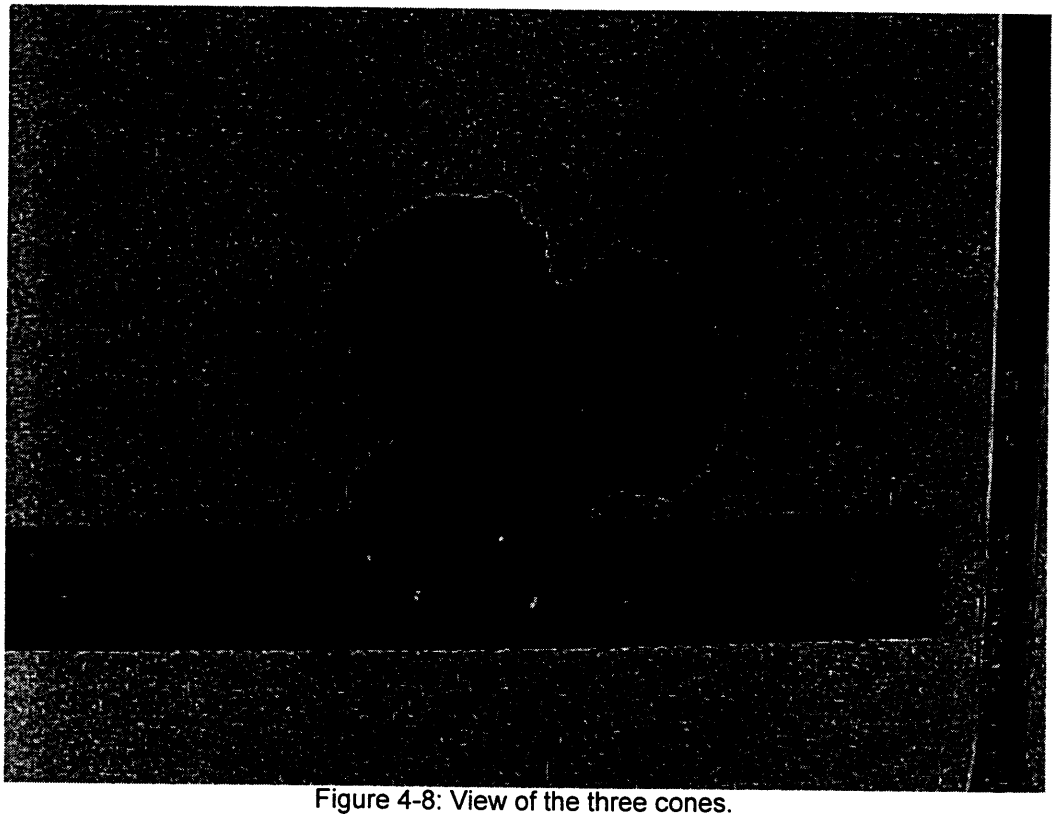


Figure 4-8: View of the three cones.

followed. Table 4-2 presents a list of the methods used to perform the SPT in the Adapazari soils.

A rope and cathead system was used to perform the Standard Penetration Test. The diameter of the rope used was 2 cm and the diameter of the cathead was approximately 11.2 cm. The driving energy was delivered by the 76 cm-high drop of a safety hammer weighing approximately 63.5 kg. The safety hammer, shown in Figure 4-9, was custom made in Ankara, Turkey following the specifications described in Kovacs et al., 1983. Also, the rod string consisted of 1.5 m-long (5 feet) AWJ rods as shown in Figure 4-10, which have a cross-sectional area of 5.94 cm^2. The sampler used is shown in Figure 4-11 and has an outer diameter of 50.8 mm (2 inches), a constant inner diameter of 35 mm (1 3/8 inch) and a total length of 600 mm.

Table 4-2: List of Methods and equipment used for the performance of SPT

Drilling Technique	Rotary Wash
Borehole Support	Casing, ID = 10 cm
Drill Bit	Tri-cone bit, 9 cm diameter
Drill Rod	AWJ Type (Area = 5.94 cm^2)
Length of Rod Section	152 cm (5 feet)
Sampler	O.D. = 50.8 mm I.D. = 35 mm (constant) Length = 600 mm
Cathead Diameter	11.2 cm
Rope Diameter	2 cm
Rope & Cathead	2 1/4 turns on a clockwise rotating cathead
Hammer Type	Safety Hammer
Penetration Resistance	Blows recorded over three intervals, each of 15 cm. N = number of blows over the last 2 intervals.

Figure 4-9: Custom made safety hammer used for the SPT.

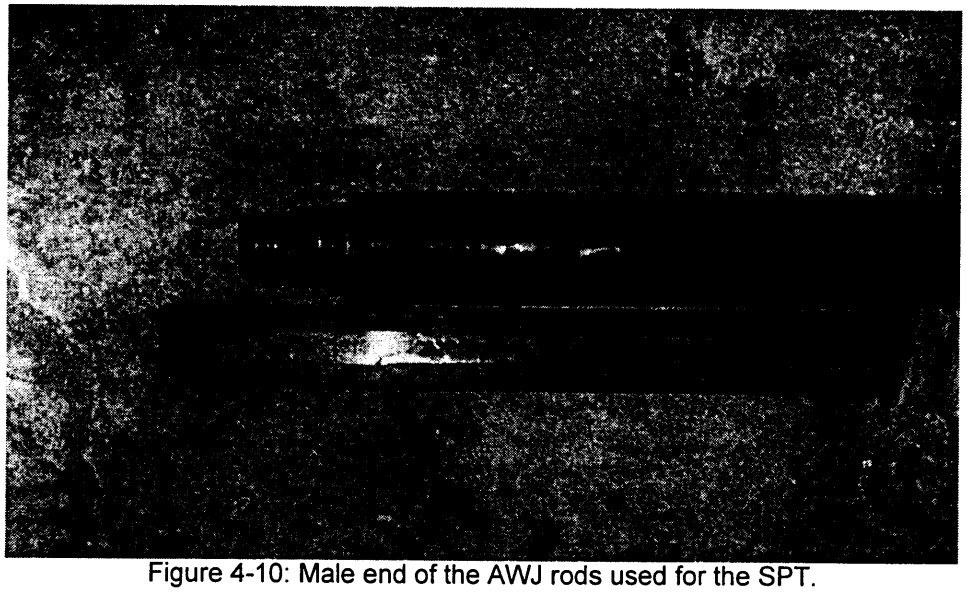


Figure 4-10: Male end of the AWJ rods used for the SPT.

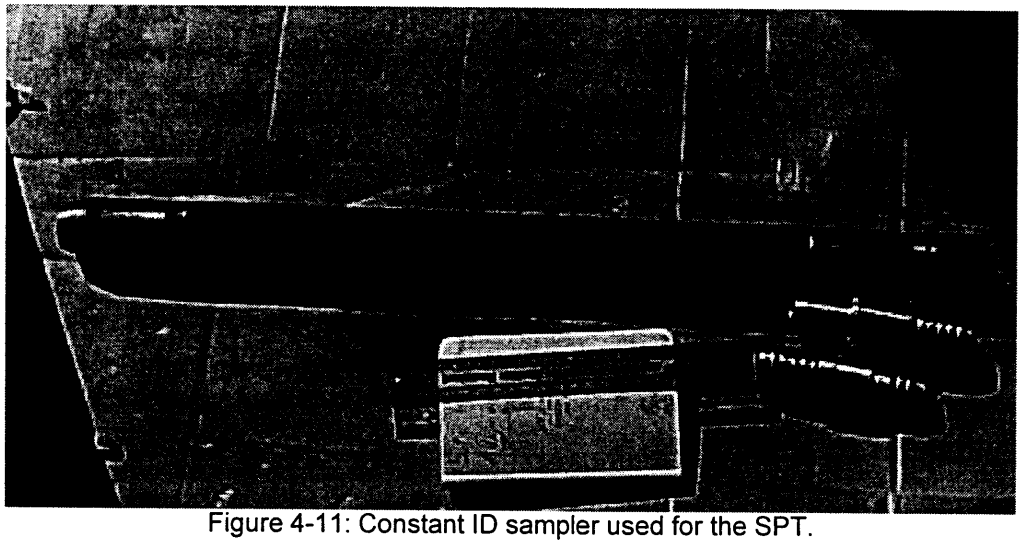


Figure 4-11: Constant ID sampler used for the SPT.

Although the methods and procedures used for this test comply with ASTM 6066-98 and ASTM 1586, the energy delivered by the system was measured for each blow of the hammer to be able to normalize as accurately as possible the blow count number to 60% of the theoretical energy. These measurements were made by instrumenting a portion of the rod string with two accelerometers and two strain gages as shown in Figure 4-12. When the rod string is loaded by the impact of the falling hammer, a compression wave travels down to the sampler penetrating it into the ground in only fractions of a second. Further reflections of this wave travel upwards and downwards until all the energy is dissipated. The integration of the waves over time permits the calculation of the energy delivered by the system. This task is performed automatically by a stress wave measurement system such as the SPT Analyzer™ commercialized by Pile Dynamics Inc. shown in Figure 4-13 and used in our investigation. A typical record of the force and particle velocity imposed to the rods by the impact of the hammer is depicted in Figure 4-14.

Using the average energy ratio for each test, ER, and Equation 1 as recommended by Seed et al. (1985), the blowcount normalized to 60% of the theoretical energy, N_{60} can be computed. It must be noted that the reliable N_{60} values computed were found to differ significantly from those measured in the field by local companies using donut hammers and nonstandard procedures.

$$N_{60} = N_{field} * \frac{ER}{60} \qquad (1)$$

4.4. Undisturbed Sampling

When the soil type was suitable, "undisturbed" soil samples were obtained using a 50 cm-long, 70 mm OD and 64 mm ID steel Shelby type tube as shown in Figures 4-15 and 4-16. This tube was pushed into the soil at a constant rate with the aid of the hydraulic jacks of the drilling rig. Once brought back to the surface, the soil inside the tube was described visually and each of its sides was covered with wax to avoid moisture migration. It must be noted that only a limited number of strength and consolidation tests were performed as part of this study.

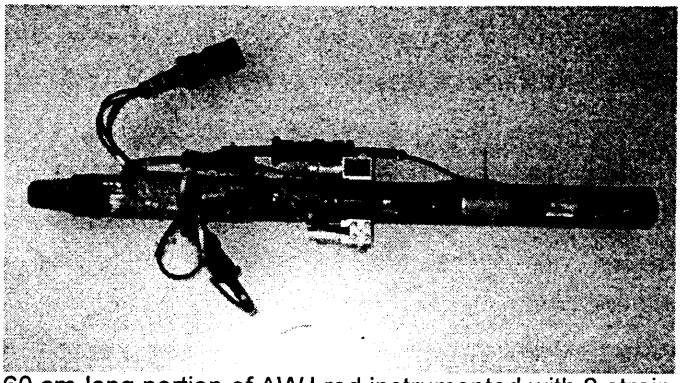


Figure 4-12: 60 cm-long portion of AWJ rod instrumented with 2 strain gages and 2 accelerometers.

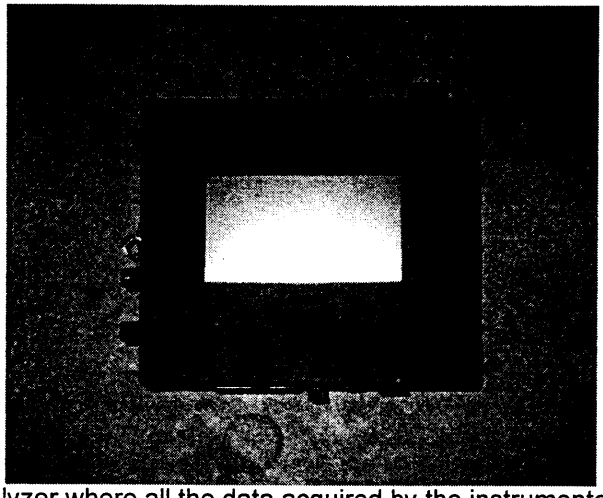


Figure 4-13: SPT Analyzer where all the data acquired by the instrumented rod was stored and processed.

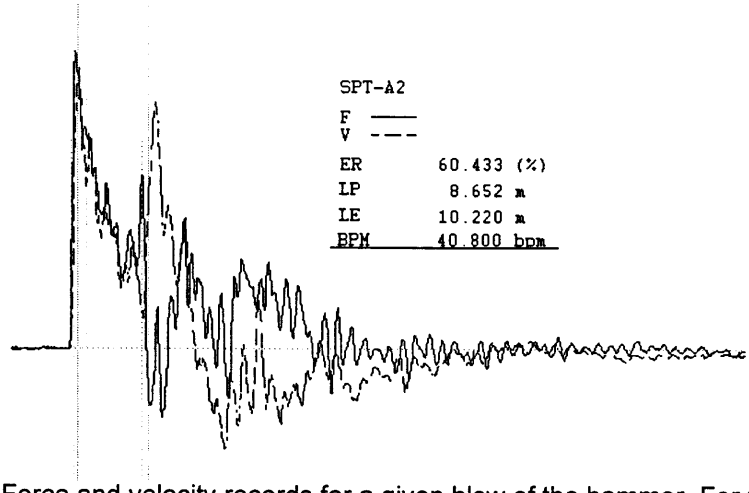


Figure 4-14: Force and velocity records for a given blow of the hammer. For this particular example the transmitted energy, ER is 60.4%.

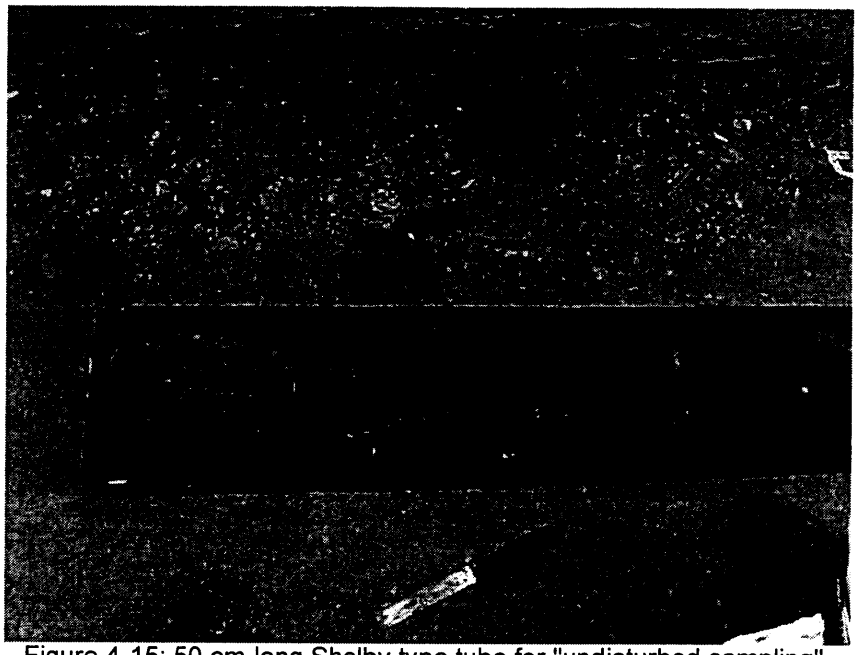


Figure 4-15: 50 cm-long Shelby type tube for "undisturbed sampling".

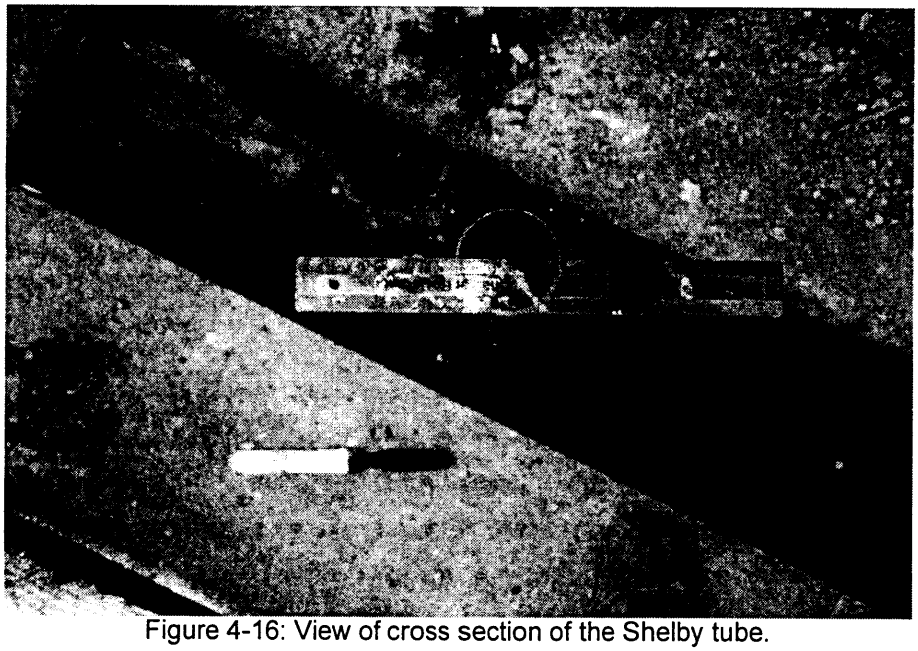


Figure 4-16: View of cross section of the Shelby tube.

4.5. Field Vane Shear Test

A GEONOR H-10 field shear vane borer was used to obtain peak and residual undrained strength of the soil in boring SPT-A4. The height and diameter of the rectangular vane used, shown in Figure 4-17, was 110 mm and 55 mm respectively in compliance with the 2:1 ratio specified in ASTM D 2573-94. Figure 4-18 depicts the vane-boring instrument from which the torque is transmitted to the vane, and the readings are taken. The vane shear test was performed 40 to 50 cm below the drilling depth and the rate at which the test was performed was approximately 0.2° per second.

5. Project Phases

Focusing on the objectives of the project as delineated in Section 2, the research has been divided into 4 phases:

- Phase 1: Ground failure and building performance in Adapazari
- Phase 2: CPT liquefaction investigations in Adapazari
- Phase 3: Geotechnical site investigation at electrical sub-stations
- Phase 4: Geotechnical site investigation at lateral spread sites

5.1. Phase 1: Ground Failure and Building Performance in Adapazari

The August 17, 1999 Kocaeli, Turkey earthquake (M_w = 7.4) provides an exceptional opportunity to investigate both the effects of local soil conditions on damage patterns under strong shaking conditions, as well as the performance of building foundations in areas that experienced ground failure. The severity of ground failure and structural damage in the City of Adapazari was especially dramatic. It triggered a series of field surveys from a number of reconnaissance teams, including the US-Turkey NSF geotechnical team. These preliminary reconnaissance efforts warranted follow-up documentation to characterize the subsurface conditions at locations of important observations of building and ground performance. Ground failure in Adapazari resulted principally from soil liquefaction and ground softening. Hence, this study hopes to advance the profession's understanding of these phenomena and their effects on structures.

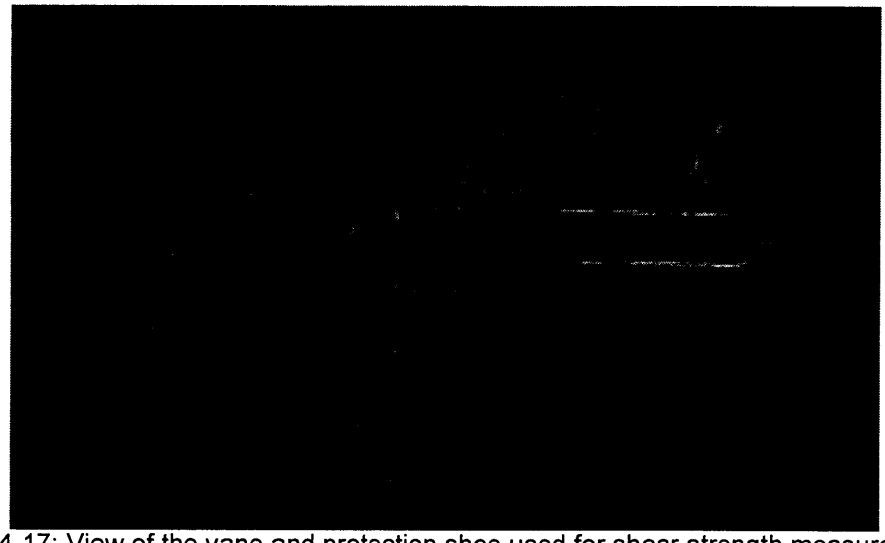


Figure 4-17: View of the vane and protection shoe used for shear strength measurements.

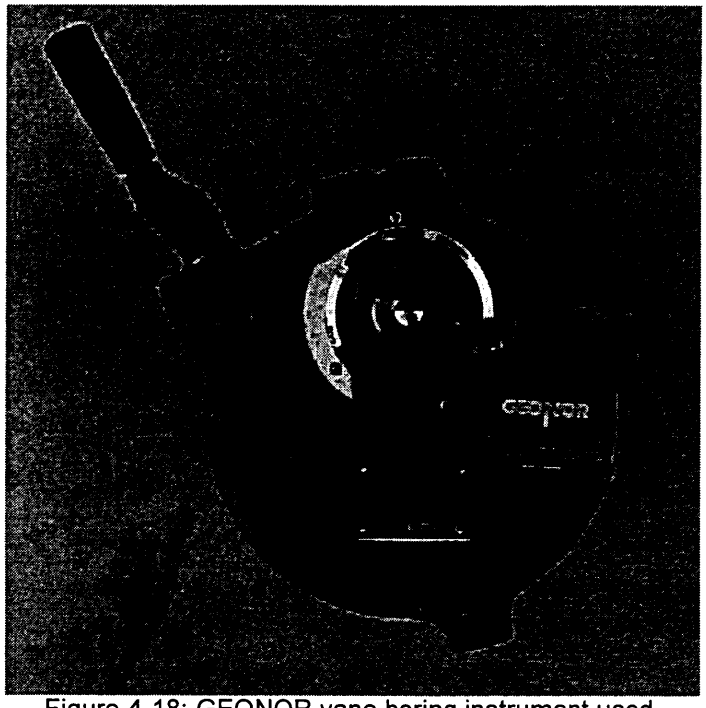


Figure 4-18: GEONOR vane boring instrument used.

The primary goal of this phase is to develop well-documented case histories of building performance at sites undergoing severe ground failure, so that the profession can use these case histories to advance our understanding of these phenomena and enhance our ability to numerically simulate the associated physical processes. A parallel goal is to provide a comprehensive record of observed building and ground performance data in Adapazari so that the lessons learned from specific case histories can be generalized.

As part of the first phase of the project, twelve sites have been studied and investigations of the local soil conditions were performed to provide a detailed description of the soil profile and properties. The location of each site is shown in Appendix I. A brief description of the sites can be found in the following sections.

A total of 42 Cone Penetration Tests (CPT) were performed, 11 of which included seismic profiling by means of a pair of geophones incorporated in the cone penetrometer. These tests were combined with 30 exploration borings with closely spaced SPTs. Moreover, the Spectral Analysis of Surface Waves method (SASW) was performed by other investigators (Stokoe, Rathje and Bay) at selected sites when this information was considered useful. The in-situ tests performed in each site are listed in Table 5-1.

Table 5-1: Summary of In-Situ Tests Performed at Select Building Sites

	CPT (Cone Penetration Test)	SCPTU (Seismic Cone Penetration Test)	Boring & SPT (Standard Penetration Test)	SASW (Spectral Analysis of Surface Waves)
Site A	Yes	Yes	Yes	Yes
Site B	Yes	Yes	Yes	Yes
Site C	Yes	Yes	Yes	Yes
Site D	Yes	Yes	Yes	Yes
Site E	Yes	Yes	Yes	No
Site F	Yes	Yes	Yes	No
Site G	Yes	Yes	Yes	Yes
Site H	Yes	Yes	Yes	No
Site I	Yes	Yes	Yes	No
Site J	Yes	Yes	Yes	Yes
Site K	Yes	No	Yes	No
Site L	Yes	No	Yes	No

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Site F	Yes	Yes	Yes	No
Site G	Yes	Yes	Yes	Yes
Site H	Yes	Yes	Yes	No
Site I	Yes	Yes	Yes	No
Site J	Yes	Yes	Yes	Yes
Site K	Yes	No	Yes	No
Site L	Yes	No	Yes	No

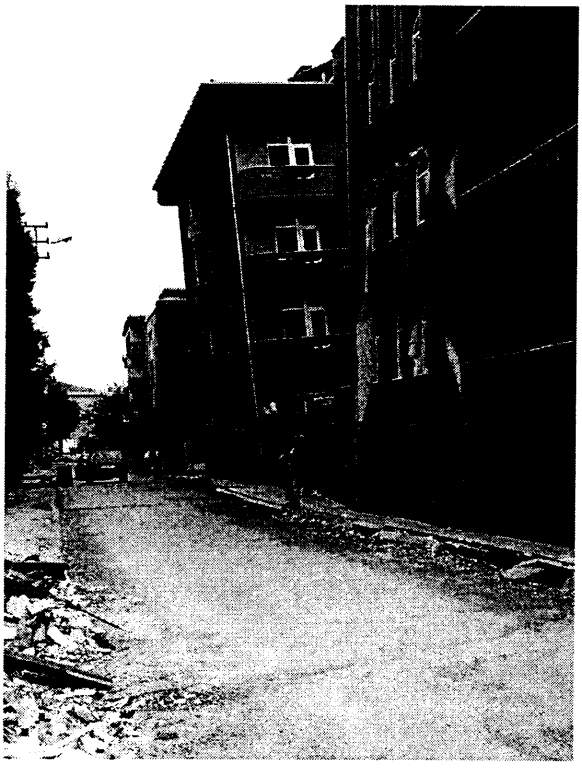

Figure 5-1a: 5-story high building A1 seen in the background. Building A2 is seen in the foreground (Photo courtesy of D. Frost).

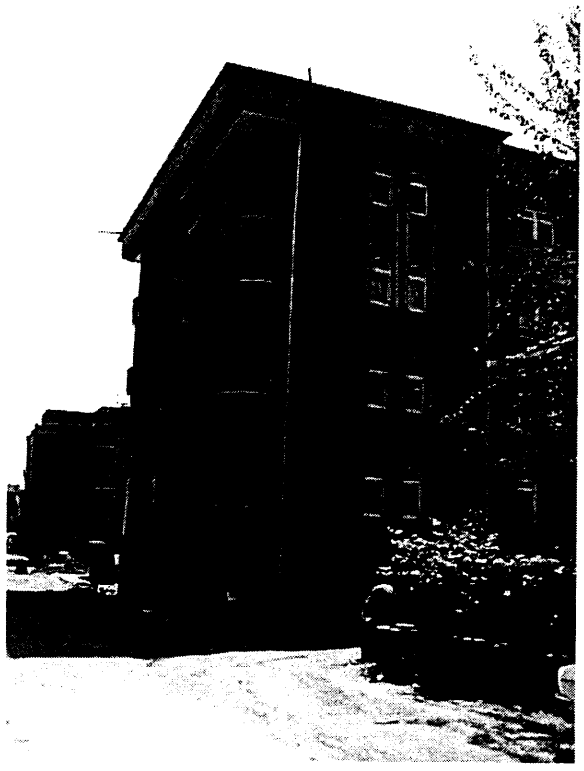

Figure 1b: Building A2 as seen 8 months after the earthquake. Note than building A1 has been demolished.

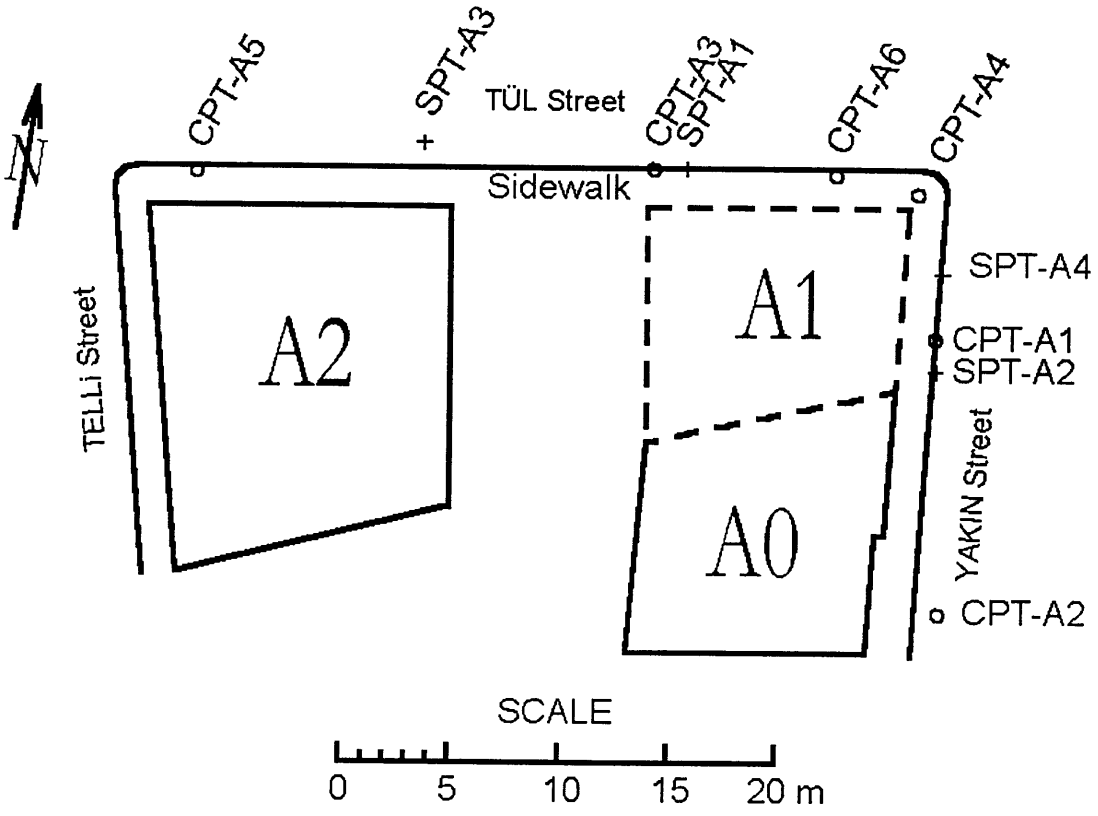

Figure 5-2: Plan view of Site A and location of subsurface exploration points.

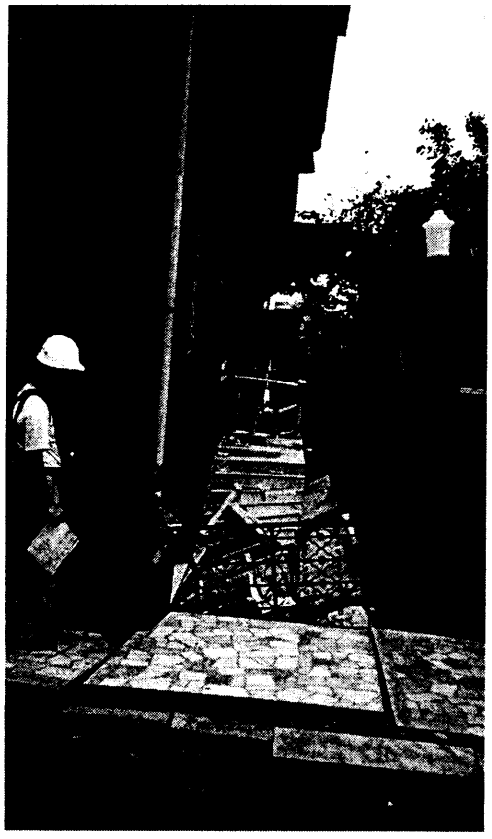

Figure 5-3a: Entrance gate to building A1. 150 cm of settlement were measured at this location 8 days after the earthquake

Figure 5-3b: Entrance gate to building A2. 30 cm to 35 cm of settlement were measured at this location 8 months after the earthquake.

Figure 5-4a: East to west view of Tül street 8 days after the Kocaeli event. Note the cracking of the pavement with apparent bulging. (Photo courtesy of J. P. Bardet)

Figure 5-4b: View of the northeast corner of building A1 in which pavement cracking is also evident. However, bulging is not apparent on the east side of the building (Photo courtesy of J. P. Bardet)

As depicted in Figure 5-2, these buildings had an irregular plan view shape. Building A1 had major and minor dimensions of 12m in the E-W direction and 8.4m in the N-S direction along Yakin Street. Given that the height of this building was 13.6m, the height to width ratio is 1.6. The major and minor dimension of building A2 is 16.8m in the N-S direction and 12.9m in the E-W direction and also has a height of 13.6m. Therefore its height to width ratio is 1.1.

According to the building drawings, both buildings were built with the same design for which the base of the mat foundation is located at 1.5 m below the sidewalk elevation. As is shown in Figure 5-5, the mat consists of 1.2 m-deep reinforced concrete tie beams over a solid, 30 cm-thick slab. The space between the beams was filled and the first floor slab placed over this fill.

The building drawings also specify that the surface over which the foundation will be placed should be prepared with a layer of coarse aggregate over which a thin layer of fine aggregate concrete is placed.

As shown in Figure 5-2, 6 Cone Penetration Tests (CPT), two of them with downhole seismic wave profiling (SCPTU) and 4 exploratory borings with the implementation of the Standard Penetration Test (SPT) were performed to identify and characterize the shallow subsurface soils at the site. Shelby tube samples were retrieved and the samples were tested to obtain the stress history and triaxial undrained shear strength of the shallow deposits. Additionally the field vane test was used at shallow depths in the boring identified as SPT-A4.

Details of the exploratory borings and CPTs performed at this site are provided in Table 5-2. The sidewalk of Tül Street was used as datum to reference the depth of exploration and the elevation of soil strata.

Table 5-2: Summary of In-Situ tests performed at Site A

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-A1	13-June-2000	CPTU	9.06	-
CPT-A2	13-June-2000	CPT	8.91	-
CPT-A3	13-June-2000	SCPTU	9.03	-
CPT-A4	13-June-2000	CPT	8.47	-
CPT-A5	14-June-2000	CPTU	8.87	-
CPT-A6	19-July-2000	SCPTU	9.90	-
SPT-A1	23-June-2000	Boring w/ SPT	9.49	10
SPT-A2	24-June-2000	Boring w/ SPT	10.54	10
SPT-A3	27-June-2000	Boring w/ SPT	9.13	8
SPT-A4	19-July-2000	Boring w/ SPT	15.63	11

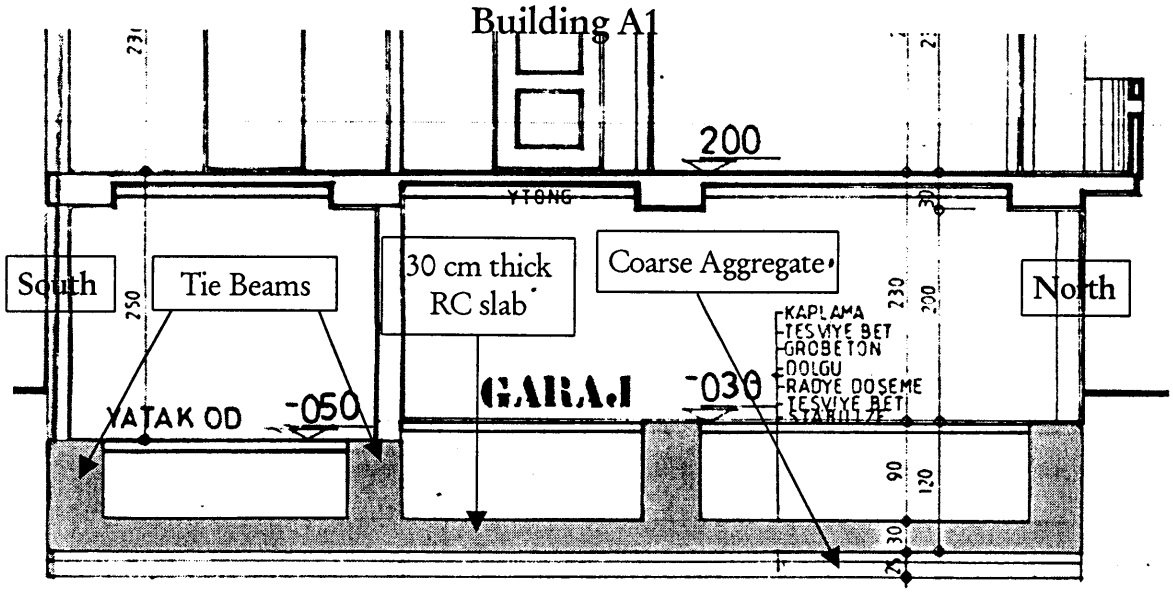

Figure 5-5: North-south cross section across the foundation and ground floor of building A1.

5.1.B. Site B – Group of Buildings in Kuyudibi Avenue

The group of buildings shown in Figures 5-6a and 5-6b are located along Kuyudibi Avenue, between Gül Street and Yaprak Street, Karaosman District, Adapazari. The GPS coordinates of the site are N 40.78513° and E 30.40024°.

The tilted building seen in Figure 5-6a, designated B1 in Figure 5-7 was demolished at the time when the photograph shown in Figure 5-6b was taken. Buildings designated B2 through B5 in Figure 5-7, are shown in Figure 5-6b.

Building B1 had major and minor dimensions of 20 m along Yaprak St. and 5.2 m along Kuyudibi Ave. Given that the height of this building was 16.45 m, the height to width ratio is 3.2.

As can be seen in Figure 5-8a, building B1 was founded on a reinforced concrete shallow mat foundation. According to building drawings, and similar to most of the reinforced concrete buildings in Adapazari, this mat consisted of a 35 cm-thick slab reinforced by 1.2 m-high tie beams. The base of the mat was located approximately 1 m below the sidewalk level. Other than the effect of the impact against the neighboring building, the structure of building B1 appeared to be undamaged, essentially rotating as a rigid body.

According to building drawings building B2 was meant to have 5 stories instead of 3 and building B5 was meant to have 5 stories instead of 4.

Based on measurements made by Stewart and Baturay 13 days after the Kocaeli earthquake (Stewart and Baturay, 1999), the two 4-story buildings, designated B4 and B5 in Figure 5-7, had a downward movement of 22 cm. Additionally, buildings B4 and B5 translated 31 cm and 22 cm towards the east (away from the street), respectively as shown in Figures 5-8b and 5-9a. Buckling of the back access gate shown in Figure 5-9b also evidenced sliding of building B5.

The major and minor dimensions of building B5 are 23.45 m along Gül St. and 6.07 m along Kuyudibi Ave. The height of this building is 14.1 m, therefore its height to width ratio is 2.3. Had it been built as planned, its height to width ratio would be 2.8

Similar to building B1, building B5 is founded on a 30 cm-thick shallow mat foundation, reinforced with 1.2 m-high tie beams.

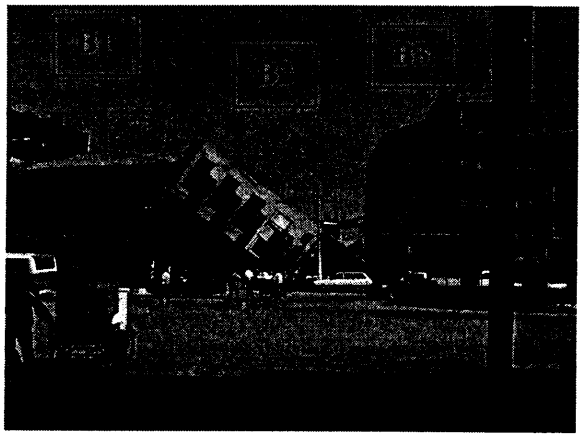

Figure 5-6a: 5-story high building B1. Buildings B2, B3, and B4 are located to the right (Photo courtesy of D. Frost)

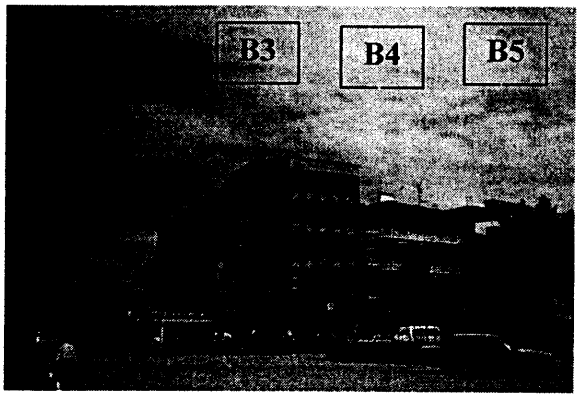

Figure 5-6b: North to south view of buildings B2, B3, B4 and B5. Note that the last floor of building B5 has not been built.

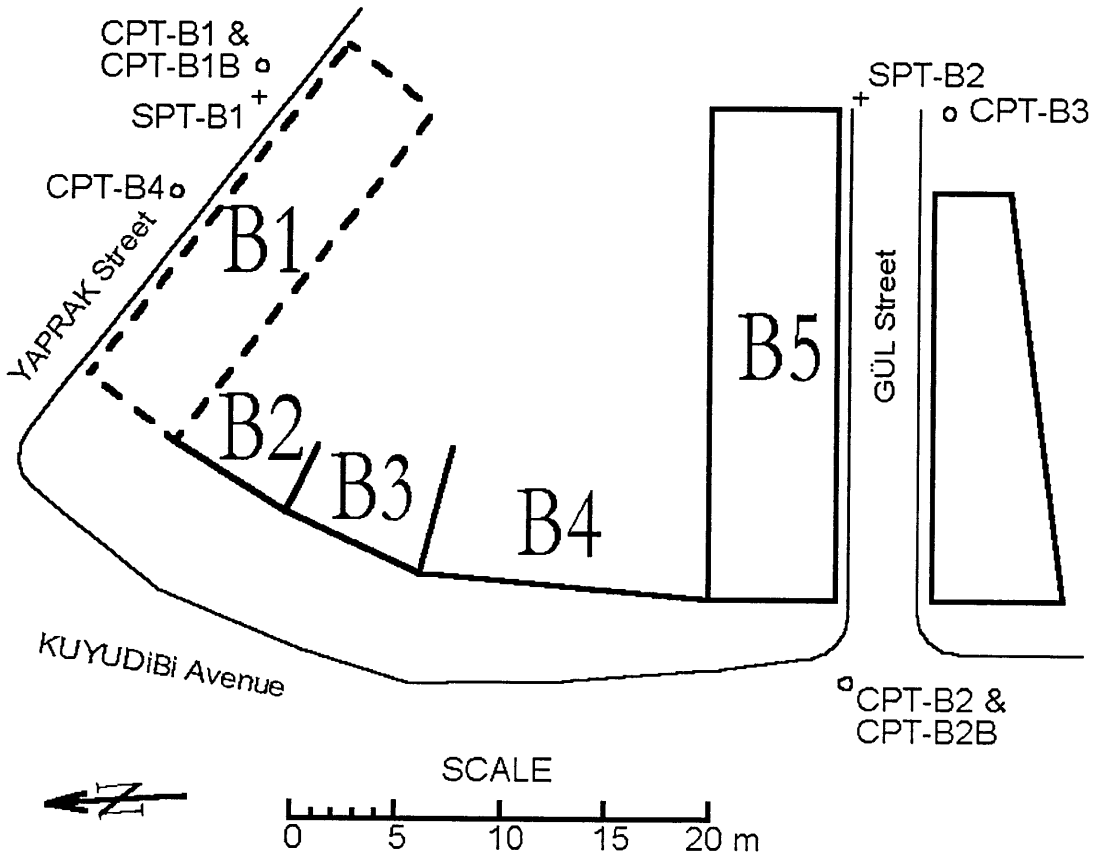

Figure 5-7: Plan view of Site B and location of subsurface exploration points

Figure 5-8a: Close-up of the reinforced concrete mat foundation of building B1 (08/25/1999)

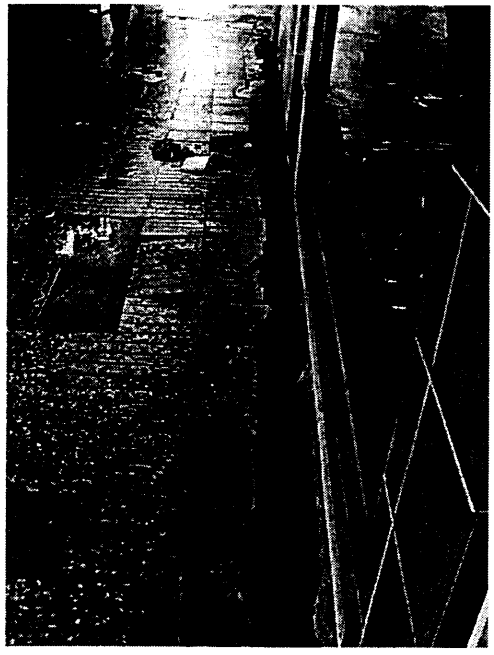

Figure 5-8b: Gap between the structure of building B4 and the sidewalk along Kuyudibi Ave. (08/25/1999)

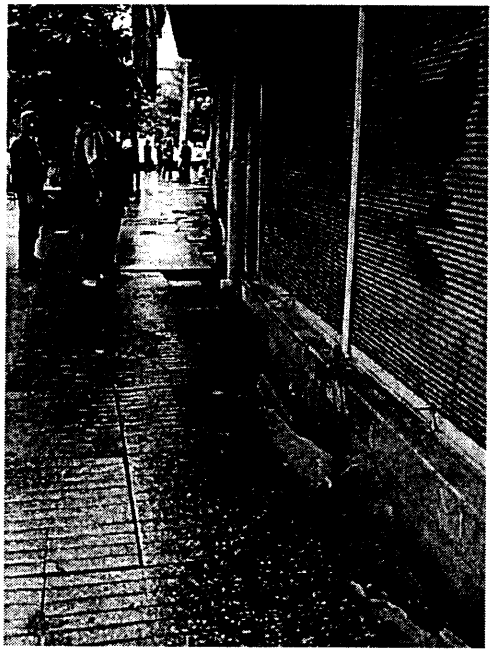

Figure 5-9a: Gap between the structure of building B5 and the sidewalk along Kuyudibi Ave. (08/25/1999)

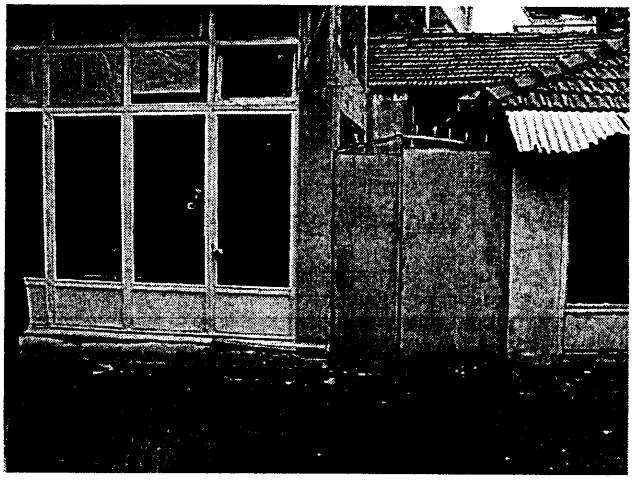

Figure 5-9b: Buckled gate in the back of building B5 evidencing earthquake induced lateral translation of the structure (08/25/1999)

Table 5-3 summarizes the in-situ testing performed at this site to characterize the subsurface conditions and identify soil strata that might of led to the observed performance of these structures.

Table 5-3: Summary of In-Situ tests performed at Site B

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-B1	18-June-2000	CPT	23.38	-
CPT-B1b	18-June-2000	SCPTU	7.05	-
CPT-B2	18-June-2000	CPT	4.84	-
CPT-B2b	18-June-2000	CPT	8.31	-
CPT-B3	18-July-2000	CPT	11.22	-
CPT-B4	20-July-2000	CPTU	7.29	-
SPT-B1	04-July-2000	Boring w/ SPT	16.45	11
SPT-B2	05-July-2000	Boring w/ SPT	8.45	8

5.1.C. Site C – Three reinforced concrete 5-soty apartment buildings in Boluk Street.

The three reinforced concrete 5-story apartment buildings shown in Figure 5-10a are located along Bölük Street, Istiklal District, northeast from downtown Adapazari. The GPS coordinates of the site are N 40.78370° and E 30.39221°.

The middle building with the black roof (designated C2 in Figure 5-11) and the building to its North (designated C1) moved toward the street and settled. For example, building C2 translated 57 cm towards the street (west) as shown in Figure 5-12a, 34 cm towards building C1 (north), and the relative vertical movement between it and the pavement was about 35 cm. However, there was no evidence of distress to the building (designated C3) that is located to the left of the middle building with the black roof (Figure 5-10a) and shown in Figure 5-10b. Significant pavement distress and evidence of liquefaction was observed in the alley between buildings C1 and C2 as seen in Figure 5-12b, but no ground failure was observed in the alley between buildings C2 and C3.

CONTENTS

APPENDICES

Figure 5-10a: North to south aerial view of Site C before building C1 was demolished. (Photo courtesy of I. M. Idriss)

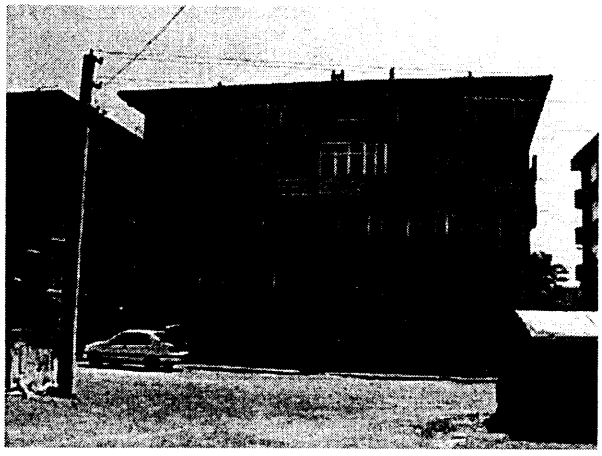

Figure 5-10b: West to east view of Building C3

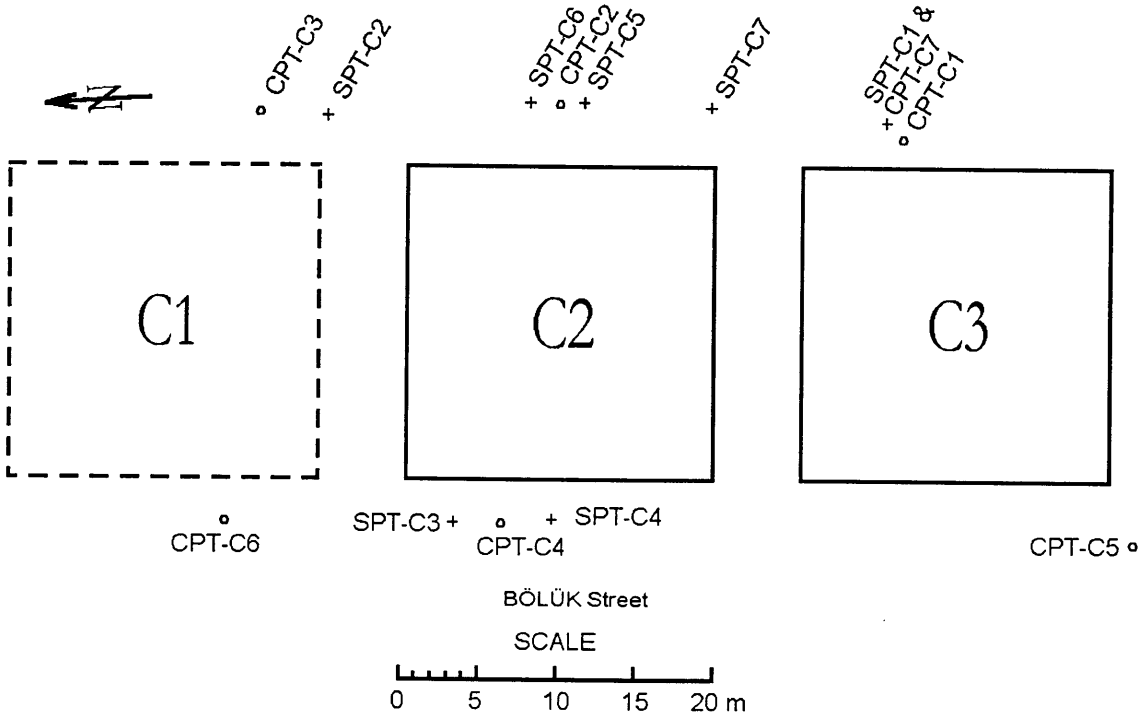

Figure 5-11: Plan view of Site C and location of subsurface exploration points

Figure 5-12a: Gap between the perimetral sidewalk and eastern side of building C2

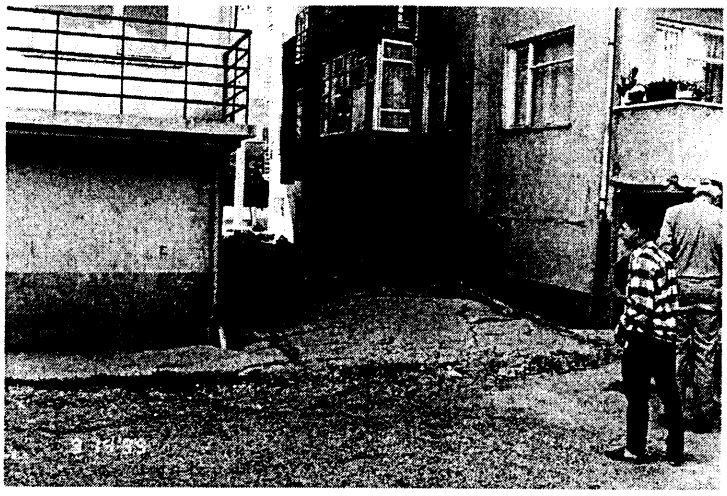

Figure 5-12b: Ground distress observed in alley between buildings C1 and C2. Building C1 is located on the right side of the photograph. (Photo courtesy of I. M. Idriss)

Inspection of the structural components such as beams and columns of buildings C2 and C3, 10 months after the earthquake, showed no evidence of cracking or distress. At this time, building C1 had been demolished for reasons that are unknown to the authors.

These apparently identical buildings are stout. The height, width and length of this regular structure are approximately 13.7 m, 19.5 m and 20.1 m, respectively. Thus, the height to width ratio is 0.7.

The overall structural design and construction of these buildings is similar to most of the reinforced concrete buildings studied in Adapazari. Although building drawings have not yet been obtained, a mat foundation is assumed to lie at a depth of approximately 1.5-m, in agreement with other similar structures studied.

Particle grain size analyses of the brown sediment boil found near the southeast corner of building C1 are shown in Figure 5-13. One of the samples was found to be low plasticity silt (LL=24) and the other, silty fine sand.

As shown in Figure 5-11, 7 Cone Penetration Tests (CPT), two of them with downhole seismic wave profiling (SCPTU) and 7 exploratory borings with the implementation of the Standard Penetration Test (SPT) were performed to identify and characterize the shallow subsurface soils at the site. Shelby tube samples were retrieved and the samples were tested to obtain the stress history and triaxial undrained shear strength of the shallow deposits.

Details on the exploratory borings and CPTs performed at this site are provided in Table 5-4. The datum used as reference is the elevation of the thin concrete slab located at the entrance of building C2.

Table 5-4: Summary of In-Situ tests performed at Site C

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-C1	14-June-2000	CPTU	7.21	-
CPT-C2	15-June-2000	SCPTU	6.34	-
CPT-C3	15-June-2000	CPT	12.66	-
CPT-C4	15-June-2000	CPTU	11.18	-
CPT-C5	15-June-2000	CPT	12.95	-
CPT-C6	16-June-2000	CPTU	11.80	-
CPT-C7	19-June-2000	SCPTU	12.12	-
SPT-C1	26-June-2000	Boring w/ SPT	10.19	8
SPT-C2	27-June-2000	Boring w/ SPT	9.51	9
SPT-C3	27-June-2000	Boring w/ SPT	10.27	7
SPT-C4	19-July-2000	Boring w/ SPT	4.87	3
SPT-C5	27-July-2000	Boring w/ SPT	7.61	7
SPT-C6	27-July-2000	Boring w/ SPT	3.11	3
SPT-C7	27-July-2000	Boring w/ SPT	3.89	4

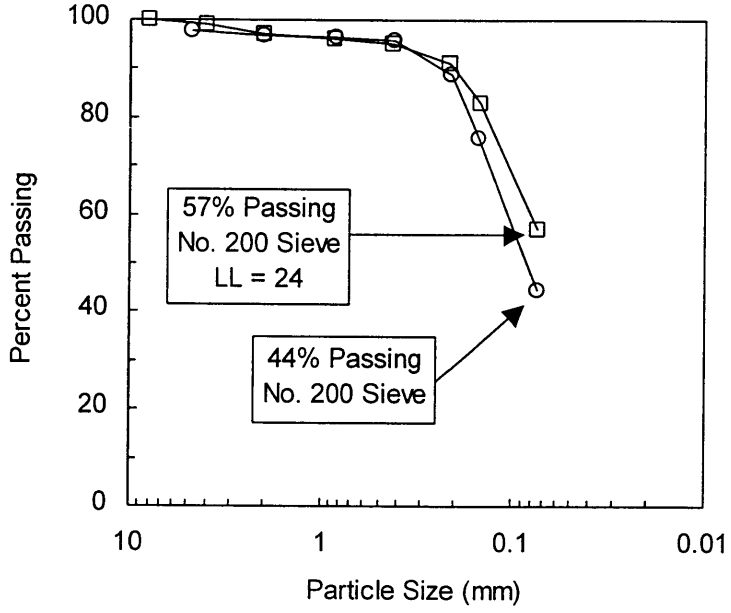

Figure 5-13: Particle size analysis curve for the samples of ejecta recovered at Site C. The soil can be described as Silty Sand to low plasticity Silt.

5.1.D. Site D – 4 story reinforced concrete building in Meydan Street

The 4-story reinforced concrete building shown in Figures 5-14a and 5-14b is located along Meydan Street, Çukurahmediye District, Adapazari as indicated in Figure 5-15.

According to Bray et al. (2000), this building experienced approximately 44 cm of vertical settlement, 50cm to 55cm of lateral displacement to the west and 100 cm of lateral displacement to the south after the August 17, (1999), Kocaeli earthquake.

As depicted in Figure 5-16, this building has lateral dimensions of 11 m in the E-W direction and 9.8 m in the N-S direction. The height of the building, as indicated by the building drawings is 12.75 m. However on June 16, 2000 the height of the building was measured to be 13.5 m. Considering the latter, the height to width ratio is 1.4.

Tilt measurements performed on the roof 10 months after the Kocaeli earthquake showed that the building is inclined towards the west and the south by approximately 1° and 2°, respectively.

Inspection of the structural components such as beams and columns showed no evidence of cracking or distress. Non-structural components, such as infill walls and hardwood floors, also appeared undamaged.

According to the building drawings, the building was built over a mat foundation consisting of 1.2 m-deep reinforced concrete tie beams over a solid, 30 cm-thick slab. It can be noticed in the E-W cross section of the structure and foundation of the building shown in Figure 5-17 that the to first story of the building has a greater height than the other stories as it is used for commercial purposes.

As shown in Figure 5-16, 3 Cone Penetration Tests (CPT), one of them with downhole seismic wave profiling (SCPTU) and 4 exploratory borings with the implementation of the Standard Penetration Test (SPT) were performed to identify and characterize the shallow subsurface soils at the site. Shelby tube samples were retrieved at the boring named SPT-D2 and the samples were tested to obtain the stress history and triaxial undrained shear strength of the shallow deposits.

Figure 5-14: a) View from Meydan street of the north and east sides of the building b) view of the north and west sides of the structure.

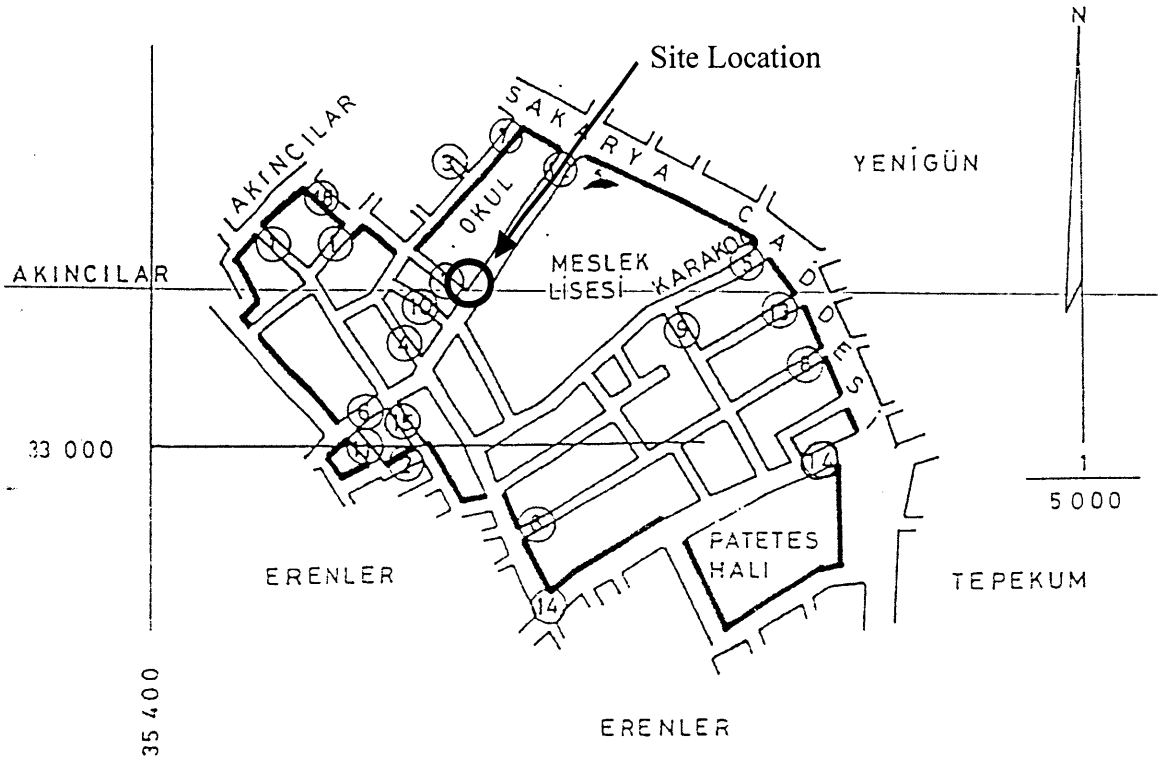

Figure 5-15: Map of Çukurahmediye district showing the location of the 4-story building studied.

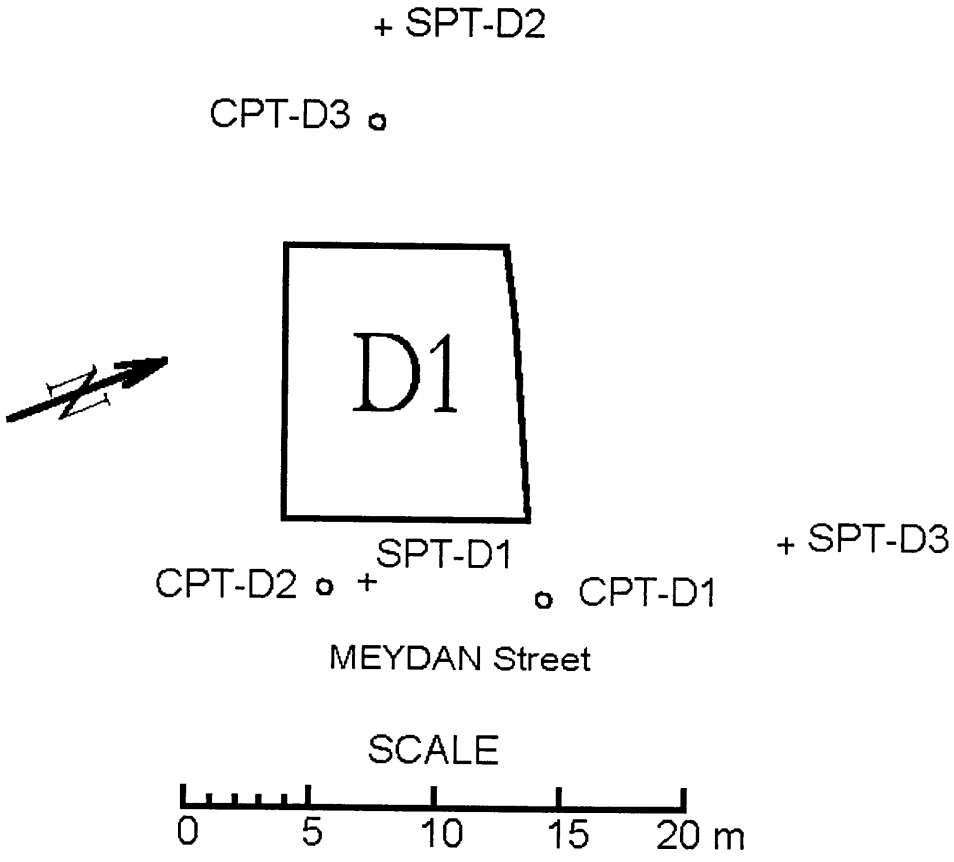

Figure 5-16: Plan view of Site D and location of subsurface exploration points

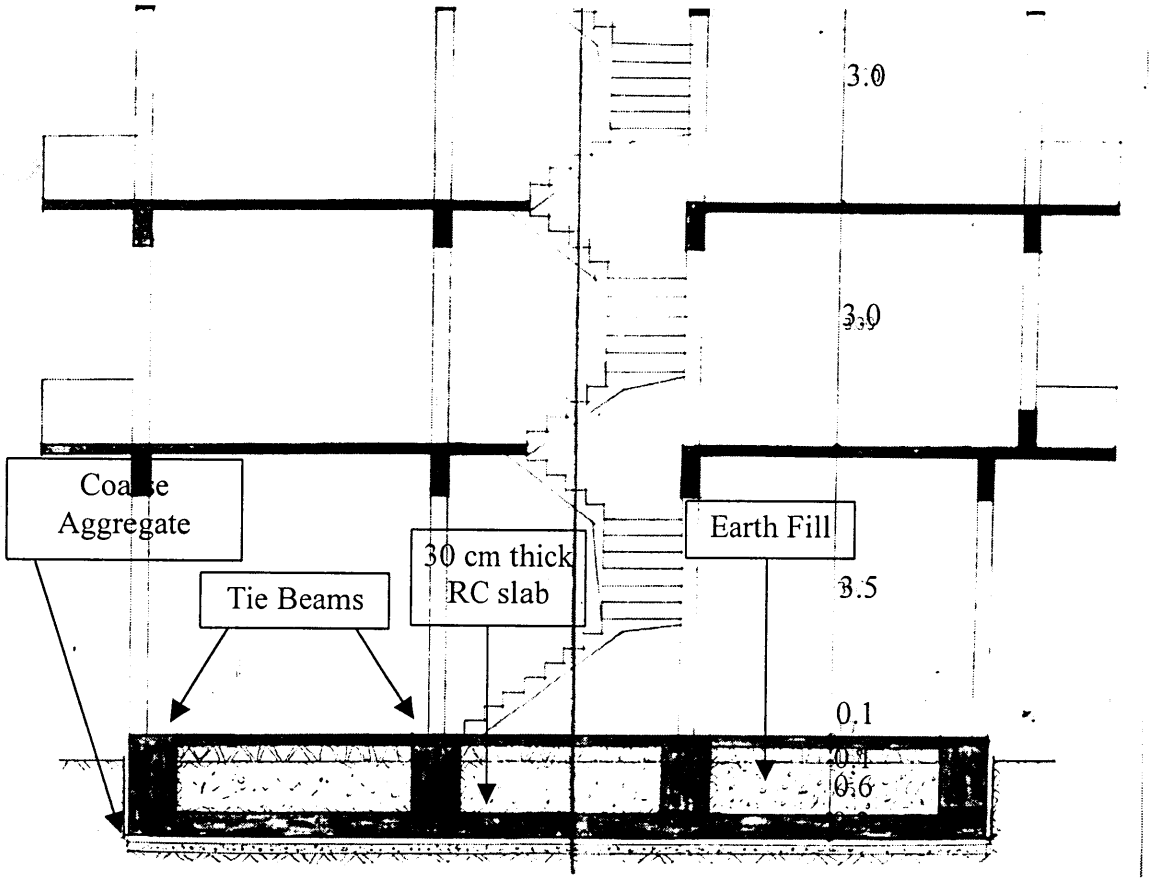

Figure 5-17: East-west cross section across the foundation, ground floor, and first floor of building D1

Details of the exploratory borings and CPTs performed at this site are provided in Table 5-5. The elevation of CPT-D1 was used as datum to reference the depth of exploration and elevation of soil strata.

Table 5-5: Summary of In-Situ tests performed at Site A

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-D1	16-June-2000	CPT	24.74	-
CPT-D2	17-June-2000	SCPTU	7.32	-
CPT-D3	17-June-2000	CPT	10.92	-
SPT-D1	28-June-2000	Boring w/ SPT	10.60	8
SPT-D2	29-June-2000	Boring w/ SPT	7.49	7
SPT-D3	26-July-2000	Boring w/ SPT	4.84	4

5.1.E. Site E - 2-story and 5-story buildings in Kavaklar Street

The 2-story and 5-story buildings shown in Figure 5-18a and 5-18b, respectively, are located along Kavaklar Street, Tigcilar District, in downtown Adapazari. The GPS coordinates of the site are N 40.77778° and E 30.40518°.

The timber-brick building shown of Figure 5-18a, designated E2 in Figure 5-19, was probably supported by shallow spread footings. This building, as shown in Figure 5-20a, experienced heave of the ground floor and excessive relative settlement between it and the sidewalk causing buckling of the metallic frame seen in Figure 18a. Evidence of liquefaction in the form of brown sand boils was observed along the east wall of the building as seen in Figure 5-21a.

The 5-story reinforced concrete building, designated E1 in Figure 5-19, was probably supported on a 1m to 1.2 m-thick reinforced concrete mat foundation typical of this type of structures in the city of Adapazari. Settlement measurements performed 10 months after the earthquake showed a downward movement of 5 cm to 6 cm at the southwest corner of the building and 20 cm to 25 cm at its southeast corner. The latter measurement is less reliable due to uncertainty of the settlement of the wall used as reference.

Figure 5-18a: 2-story high masonry-brick building (E1 in Figure 2) (08/25/1999)

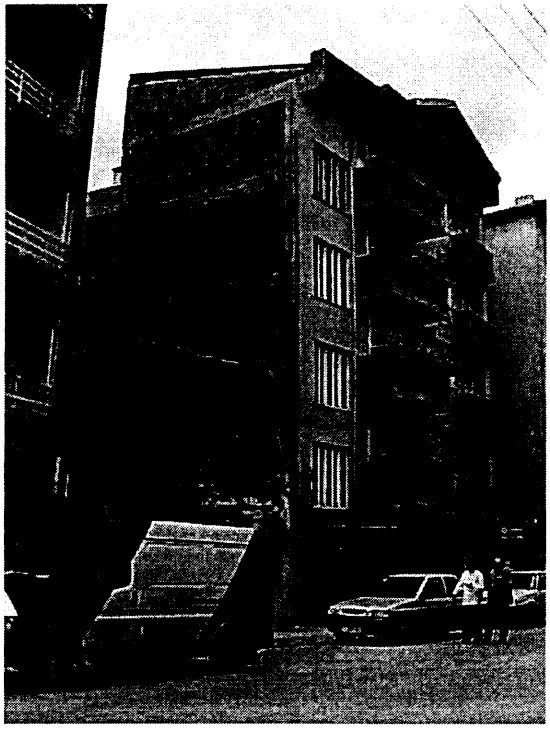

Figure 5-18b: 5-story high reinforced concrete building (E2 in Figure 2)

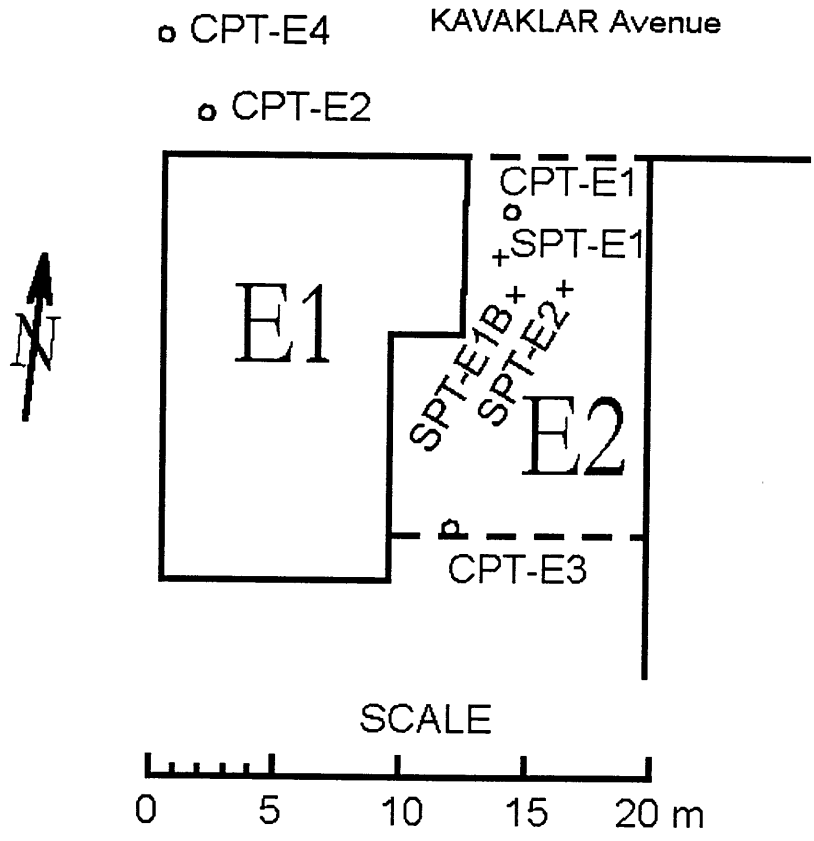

Figure 5-19: Plan view of Site E and location of subsurface exploration points

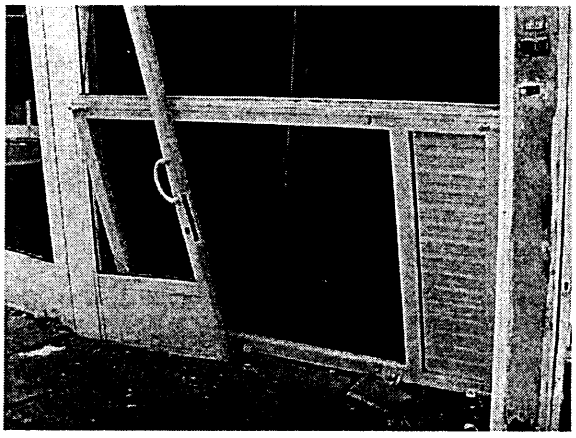

Figure 5-20a: Column punching and floor heave in building E2 (08/25/1999)

Figure 5-20b: Ground distress and bulging between building E1 and the building located to the west (08/25/1999)

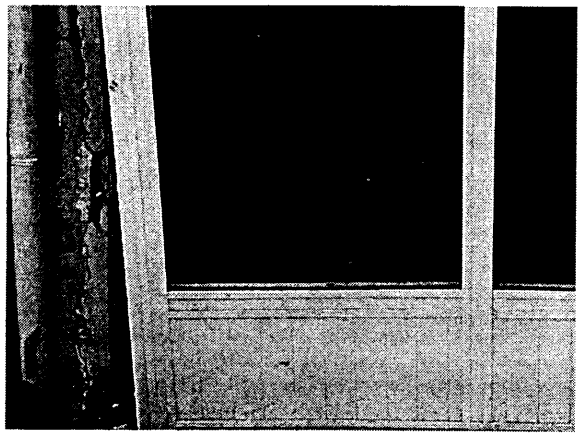

Figure 5-21a: Sand ejecta found along the east wall of building E2 8 days after the earthquake (08/25/1999)

Figure 5-21b: Sand ejecta found along the front (street) of building E1 8 days after the earthquake. (08/25/1999)

Tilt measurements performed at the ground floor level of building E1, 10 months after the earthquake, show that the structure is inclined to the east by 1° to 2°. Tilt in the north-south direction is small (< 0.1°).

Ground bulging was observed in the alleyway between building E1 and the building located to the west as seen in Figure 5-20b, which is a photograph taken 8 days after the Kocaeli earthquake. Additionally, as shown in Figure 4b, brown sand boils were found along the north side (street front) of the building.

As depicted in Figure 5-19, building E1 has a length of 17 m in the north-south direction and a major and minor width of 9.05 m and 12.05 m in the east-west direction. Although the height of this building was not measured, it is estimated to be approximately 14.4 m, so its height to width ratio is 1.6.

Building E2 was composed of a 2-story structure approximately 15.25 m long and an attached 1-story structure located in the back (the front being the street). This configuration has been reconstructed by the markings left on the structure to the east by the now demolished building E2 similar to those seen on the east side of building E1 in Figure 18b.

Table 5-6 summarizes the in-situ tests performed at this site to characterize the subsurface soil conditions under the buildings that might have led to the observed performance. A total of 4 CPTs, 1 of which enabled seismic wave profiling (CPT-E1), and 3 exploratory borings were performed at locations shown in Figure 2.

Table 5-6: Summary of In-Situ tests performed at Site E

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-E1	20-June-2000	SCPTU	25.74	-
CPT-E2	20-June-2000	CPT	10.00	-
CPT-E3	20-June-2000	CPTU	7.68	-
CPT-E4	18-July-2000	CPT	10.25	-
SPT-E1	03-July-2000	Boring w/ SPT	9.20	8
SPT-E1B	03-June-2000	Boring w/ SPT	2.65	1
SPT-E2	26-July-2000	Boring w/ SPT	5.90	5

5.1.F. Site F – 4-story reinforced concrete building in Sonmez Street

The 4-story reinforced concrete building shown in Figure 5-22 is located along Sönmez Street, Yenigün District, Adapazari. The GPS coordinates are N 40.77148° and E 30.40795°.

As shown in Figure 5-23, this building has a length of 13 m in the east-west direction and a major and minor width of 7.7 m and 7.3 m in the north-south direction. The height of the structure is 10.8 m, so the height to width ratio is approximately 1.4.

According to field observations by Stewart and Baturay on September 3, 1999, the estimated settlement of this building was 90 cm. Additionally it translated approximately 25 cm towards the west and 30 cm to 40 cm to the north.

Before the earthquake this building had 1-story timber-brick buildings with half basement, to the north and south. However, these have now been demolished due to unsatisfactory performance.

Evidence of liquefaction in the form of sand boils was observed in the vicinity of the site. Figure 5-24 shows the particle size gradation curve for a sample of the brown sediment that was collected. The soil has 16% of material finer than 75 μm and classifies as silty sand according to the USCS.

Consistent with most of the foundation systems in the city of Adapazari, the foundation of this structure consists of a 40 cm-thick reinforced concrete mat strengthened with 120 cm-high tie beams as depicted in the cross section shown in Figure 5-25. The space left between the tie beams was filled with soil to provide support for the 10 cm-thick concrete floor.

Table 5-7 summarizes the in-situ tests performed at this site to characterize the subsurface soil conditions under the building that might have led to the observed performance. A total of 3 CPTs, 1 of which enabled seismic wave profiling (CPT-F1), and 1 exploratory boring were performed at locations shown in Figure 5-23.

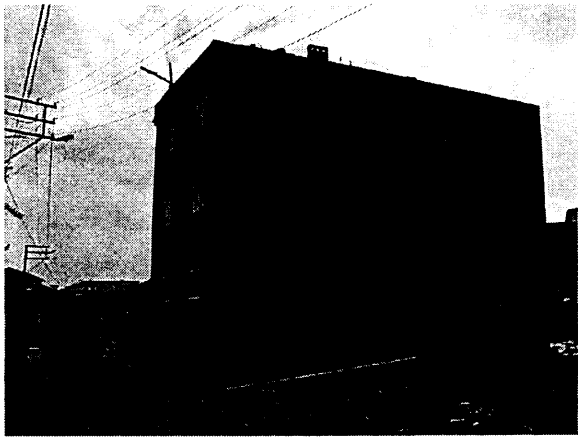

Figure 5-22: 4-story reinforced concrete building

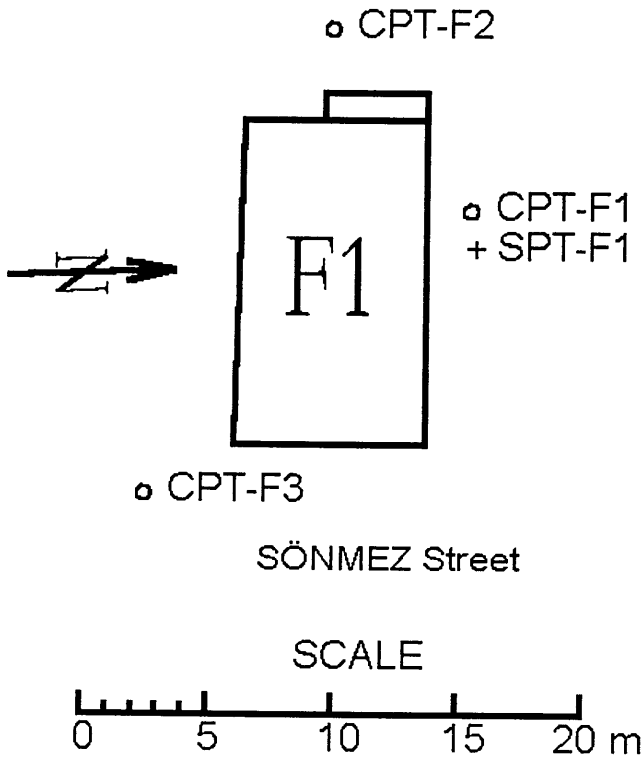

Figure 5-23: Plan view of Site F and location of subsurface exploration points

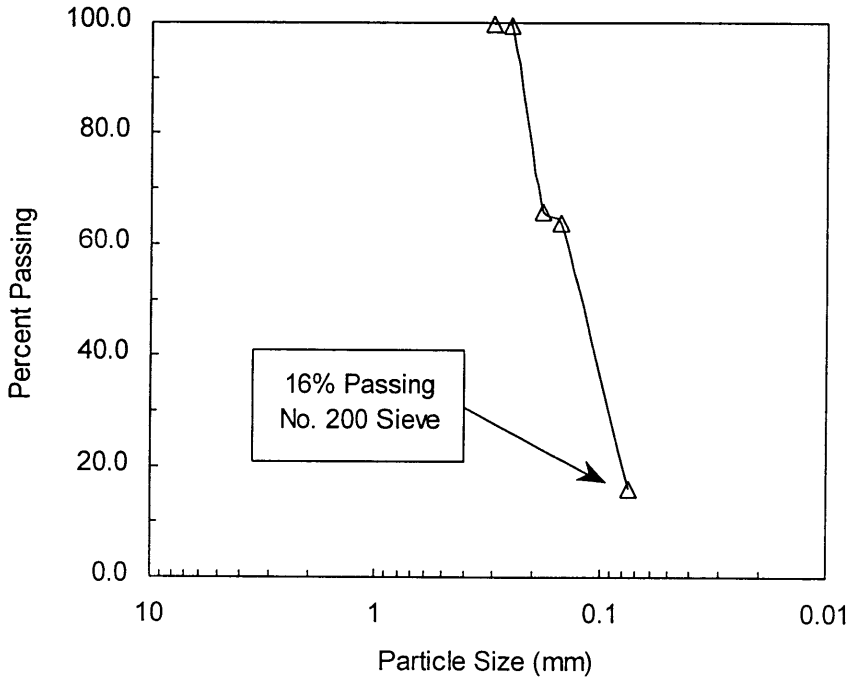

Figure 5-24: Particle size analysis curve for the sample of brown sediment ejecta recovered at Site F few days after the Kocaeli earthquake. The soil classifies as silty fine sand

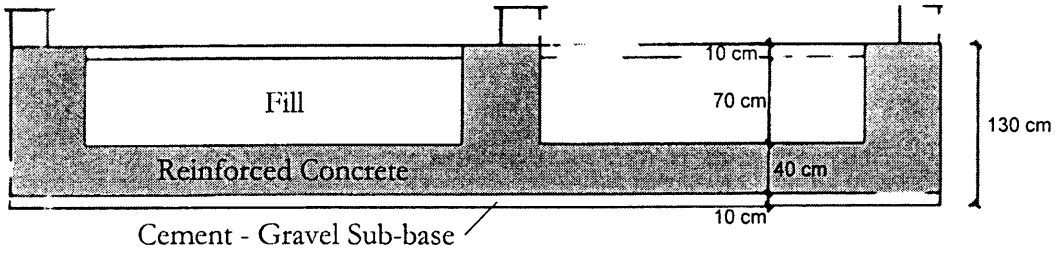

Figure 5-25: Cross section of the reinforced concrete mat foundation

Table 5-7: Summary of In-Situ tests performed at Site F

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-F1	14-July-2000	SCPTU	26.77	-
CPT-F2	14-July-2000	CPT	10.00	-
CPT-F3	14-July-2000	CPT	10.35	-
SPT-F1	20-July-2000	Boring w/ SPT	12.50	12

5.1.G. Site G – Group of buildings in Hasircilar Street

The group of buildings shown in Figure 5-26 is located along Hasircilar Street, Yenigün District, Adapazari. The GPS coordinates of the site are N40.77450° and E30.40896°.

As shown in Figure 5-27, the irregularly shaped building, designated G1 in Figures 5-26 and 5-27, has a length (E-W) of 22.2 m and a total width (N-S) of 14.1 m. According to the building drawings, the height of the structure is 11.15 m. Therefore the height to width ratio is approximately 0.8. According to Stewart and Baturay (1999), this building subsided approximately 10 cm with no significant tilting.

The 4-story building (designated G2 in Figure 27) and 5-story G3 have been demolished due to their poor performance after the Kocaeli earthquake. As can be noted in Figure 5-26, these buildings experienced bearing capacity type failure, and tilted severely and fell on the neighboring buildings G1 and G4.

According to the building drawings building G3 had a length of 21.7 m and an irregular width varying between 8.6 m and 6.2 m. The height of the structure was approximately 14 m, therefore its height to width ratio was between 1.6 and 2.3.

Building G4 or Yagcioglu Apartments, has a length (E-W) of 11.2 m and a width of 10.7 m. Although the height of this building has not been measured, it is estimated to be approximately 14 m, hence the height to width ratio is about 1.3.

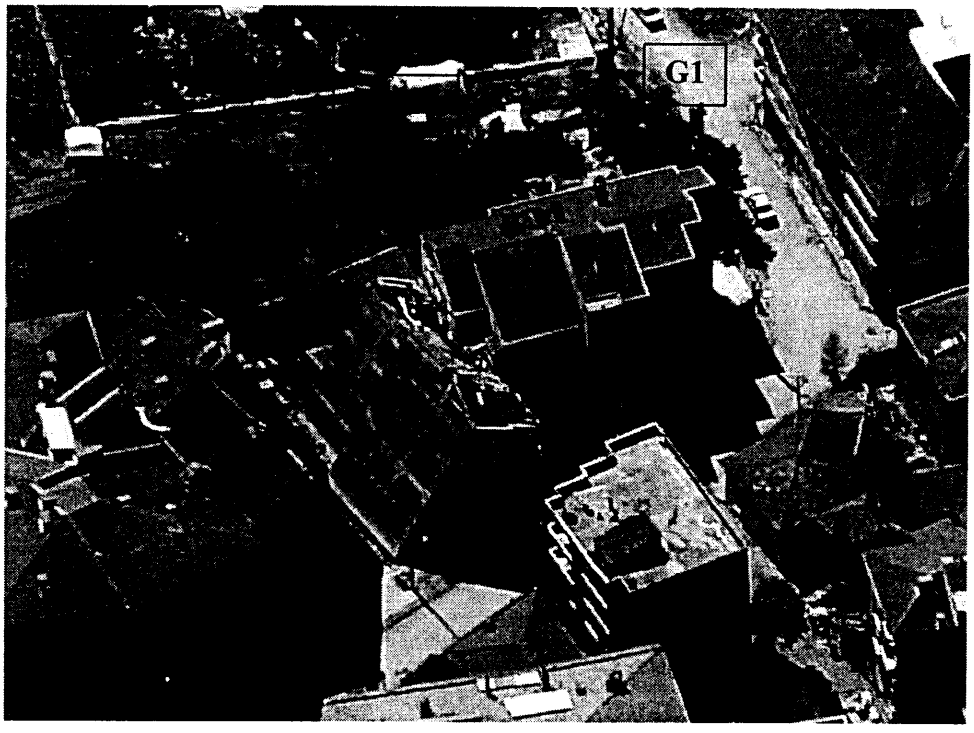

Figure 5-26: Aerial view of Site G 13 days after the Kocaeli earthquake. Buildings G2 and G3 have been demolished (Photo Courtesy of Ellen Rathje)

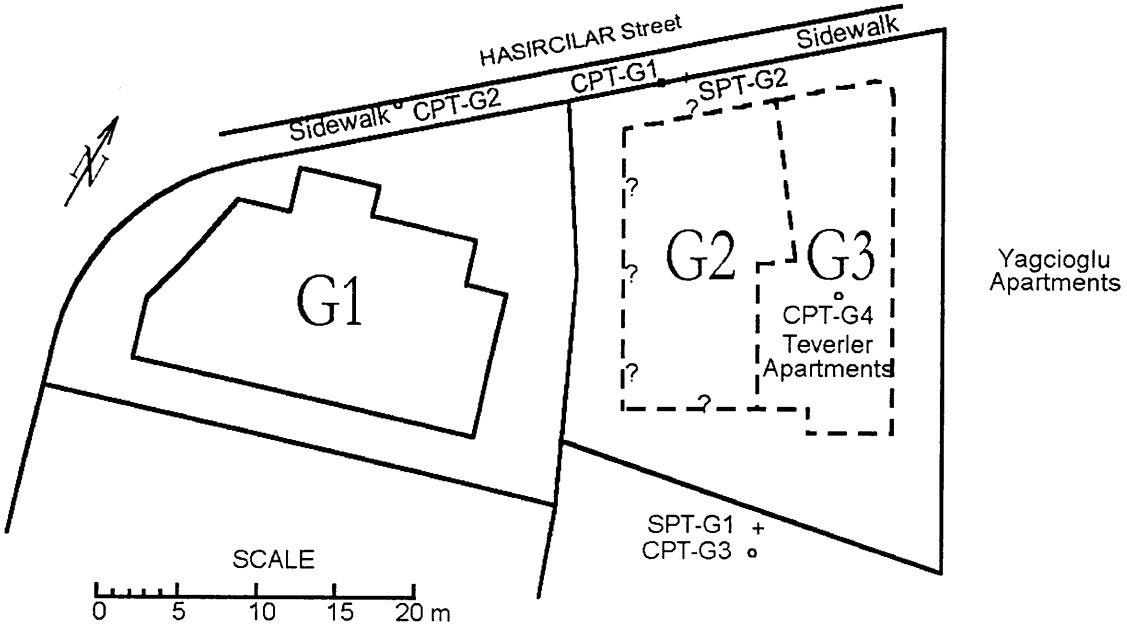

Figure 5-27: Plan view of Site G and location of subsurface exploration points

One year after the Kocaeli earthquake occurred, the structure and facade of building G1 had been repaired and it was inhabited. Although some services have not been completely re-established, Buildings G4 and G5 are also inhabited.

The grounds around these buildings were littered with brown sediment ejecta, evidence of liquefaction. Samples of these sand boils were taken and tested for classification purposes. As shown in Figure 5-28, the soil classifies as silty sand (SM).

It is interesting to note that according to the reconnaissance parties that visited the site after the earthquake, sand boils were not observed in the fields that are in the rear of the buildings (see Figure 5-26).

Building G1 is founded on a 25 cm-thick shallow mat foundation reinforced by 1 m-high tie beams whereas building G3, was founded on a 30 cm-thick mat reinforced with 1.2 m-high tie beams.

Table 5-7 summarizes the in-situ tests performed at this site to characterize the subsurface soil conditions under the buildings that might have led to the observed performance. A total of 4 CPTs, 1 of which enabled seismic wave profiling (CPT-G1), and 2 exploratory borings were performed at locations shown in Figure 2.

Table 5-7: Summary of In-Situ tests performed at Site G

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-G1	21-June-2000	SCPTU	24.61	-
CPT-G2	21-June-2000	CPT	10.30	-
CPT-G3	21-June-2000	CPTU	11.37	-
CPT-G4	14-July-2000	CPT	12.12	-
SPT-G1	05-July-2000	Boring w/ SPT	9.45	9
SPT-G2	06-July-2000	Boring w/ SPT	14.45	11

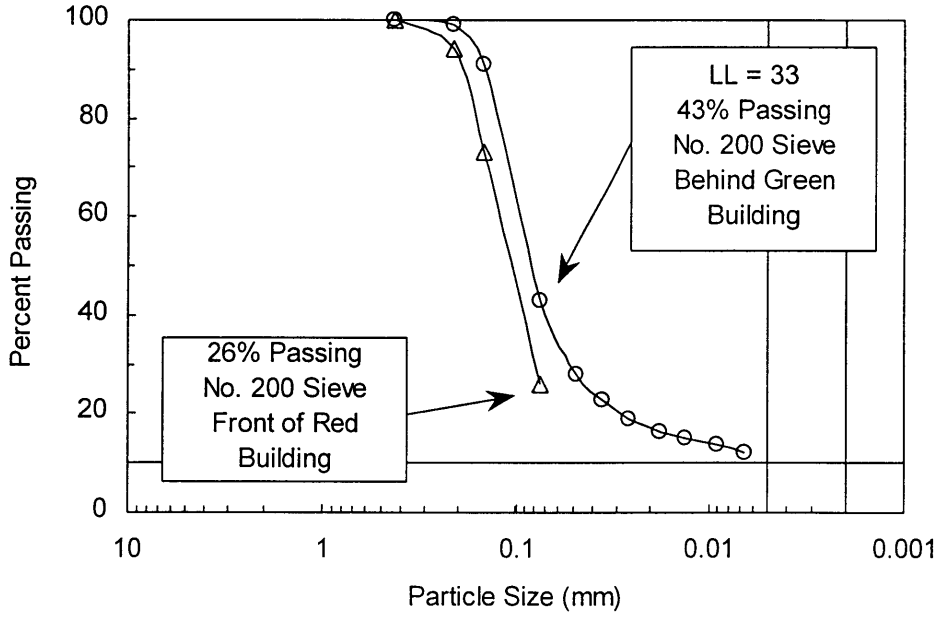

Figure 5-28: Particle size analysis curve for different samples of brown sediment ejecta recovered at Site G a few days after the Kocaeli earthquake. Both samples classify as silty fine sand (SM) according to the USCS

5.1.H. Site H – Two 4-story buildings in Kinali Street

The two 4-story buildings shown in Figure 5-29, designated H1 and H2 in Figure 5-30 are located along Kinali St., Yagcilar District, Adapazari. The GPS coordinates are N40.78419° and E30.41295°.

The general area around the building experienced widespread and significant liquefaction (Bray and Stewart, 2000). As shown in Figure 5-31, two samples of sediment boils were collected within 20 meters of building H1. Also shown in Figure 5-31 is a sample that was collected at a depth of 2.4 m at SPT-H1.

Vertical movement of building H1 with respect to the ground was measured across gates mounted on the building walls. The measured displacement on August 30, 1999, was 32 cm at the SW corner and 33 cm at the NW corner, i.e. the building did not experience significant tilt. The displacement at the SW corner increased to 33 cm on September 1, 1999, possibly due to an aftershock, while no difference was observed at the NW corner. The structure of the building was essentially undamaged by the earthquake, although goods on shelves in a first-story store were reportedly thrown to the floor (Bray and Stewart, 2000).

Table 5-8 summarizes the in-situ testing performed at this site to characterize the subsurface conditions and identify soil strata that might of led to the observed performance of these structures.

Table 5-8 Summary of In-Situ tests performed at Site H

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-H1	17-July-2000	CPT	10.29	-
CPT-H2	17-July-2000	CPTU	28.72	-
CPT-H3	17-July-2000	CPTU	9.96	-
SPT-H1	21-July-2000	Boring w/ SPT	11.45	11

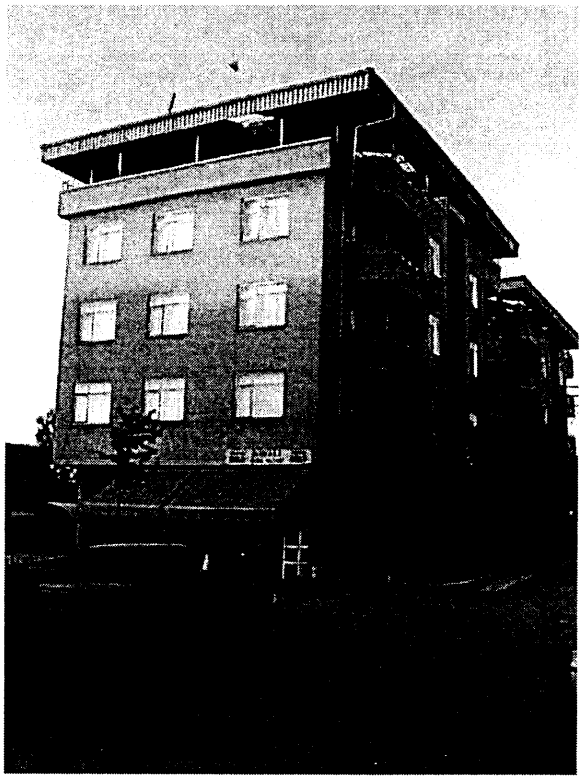

Figure 5-29: 4-story high building H1 seen in the foreground. Building H2 is seen in the background

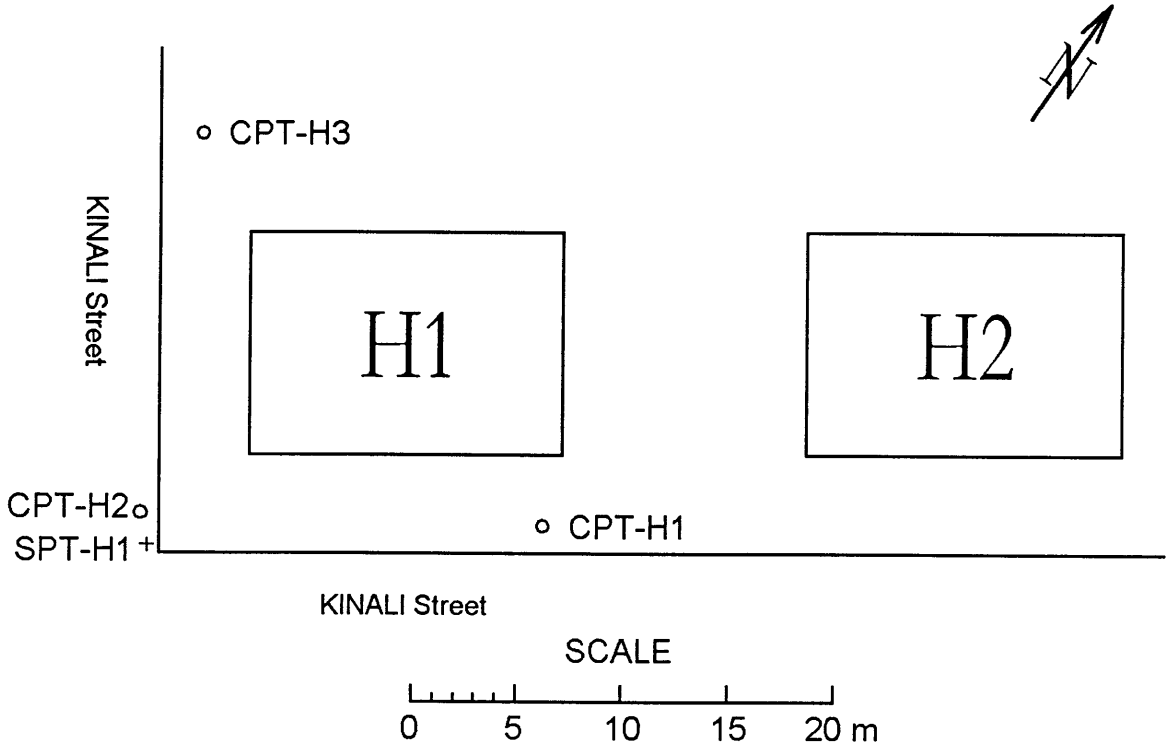

Figure 5-30: Plan view of Site H and location of subsurface exploration points

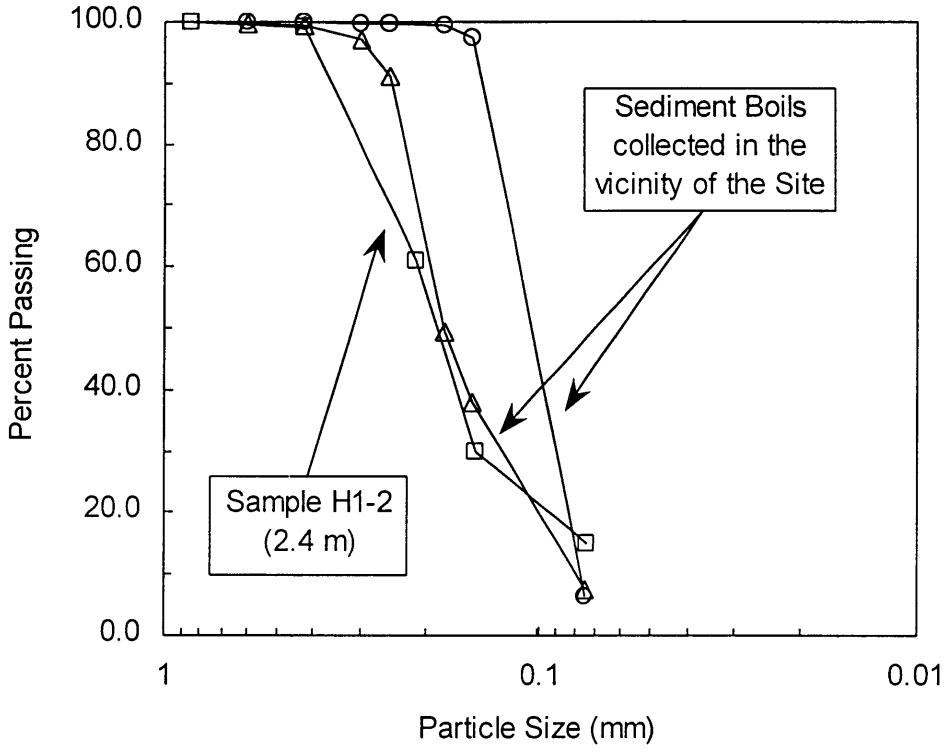

Figure 5-31: Particle size gradation curves for two samples of ejected sediment (SP-SM) and a sample of silty sand (SM) recovered at a depth of 2.4m

5.1.I. Site I – Two 6-story high buildings in Çark Avenue

The two 6-story high buildings shown in Figure 5-32a, designated I3 and I4 in Figure 5-33, correspond to a block located along Çark Avenue, near the intersection with Sedat Kirtetepe Avenue, Semerciler District, Adapazari. The GPS coordinates are N 40.77681° and E 30.39223°.

The first building of the group from east to west, designated I1 in Figure 5-33, experienced total failure of the columns of its first story as shown in Figure 5-32b. The structure of the other three buildings suffered light to moderate damage (D1 to D2) as reported by Stewart and Erten, 1999. However, all three buildings experienced vertical movements without apparent bulging of the surrounding pavement as shown for building I2 in Figure 5-32b. The measured relative vertical movement for these buildings is listed in Table 5-9.

Table 5-9: Measured vertical movement as reported by Stewart and Erten, 1999

Building	Number of Stories	Vertical Movement (cm)
I2	4	30 - 35
I3	6	17
I4	6	12

As shown in Figure 5-34 and consistent with most foundation systems in Adapazari, building I3 is founded on a 35 cm-thick mat foundation, reinforced with 1.2 m-high tie beams. As also depicted, the length of the building is reduced from 15 m at the ground floor and first two stories to 10.4 m for the following 4 stories. The width of the structure, measured along Çark Ave. is 13.3 m. According to the building's drawings the height is 17.15 m, therefore the height to width ratio is 1.3.

The height to width ratio of buildings I2 and I4 is 1.3 and 1.15, respectively when the height is estimated to be proportional to the number of stories.

Table 5-10 summarizes the in-situ tests performed at this site to characterize the subsurface soil conditions under the building that might have led to the observed performance. A total of 4 CPTs, 1 of which enabled seismic wave profiling (CPT-I2), and 1 exploratory boring were performed at locations shown in Figure 5-33.

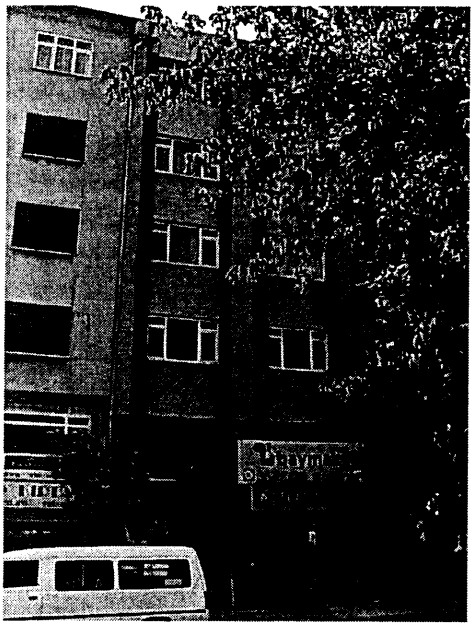

Figure 5-32a: 6-story high building I3 to the right and building I2 to the left

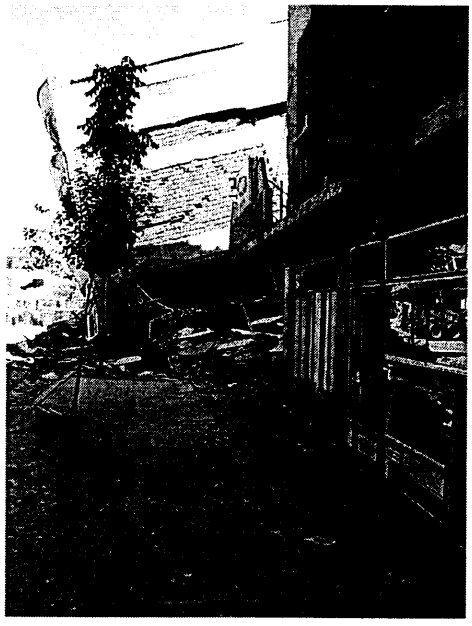

Figure 5-32b: West to east view along the Çark Avenue sidewalk. Collapsed building is I1.

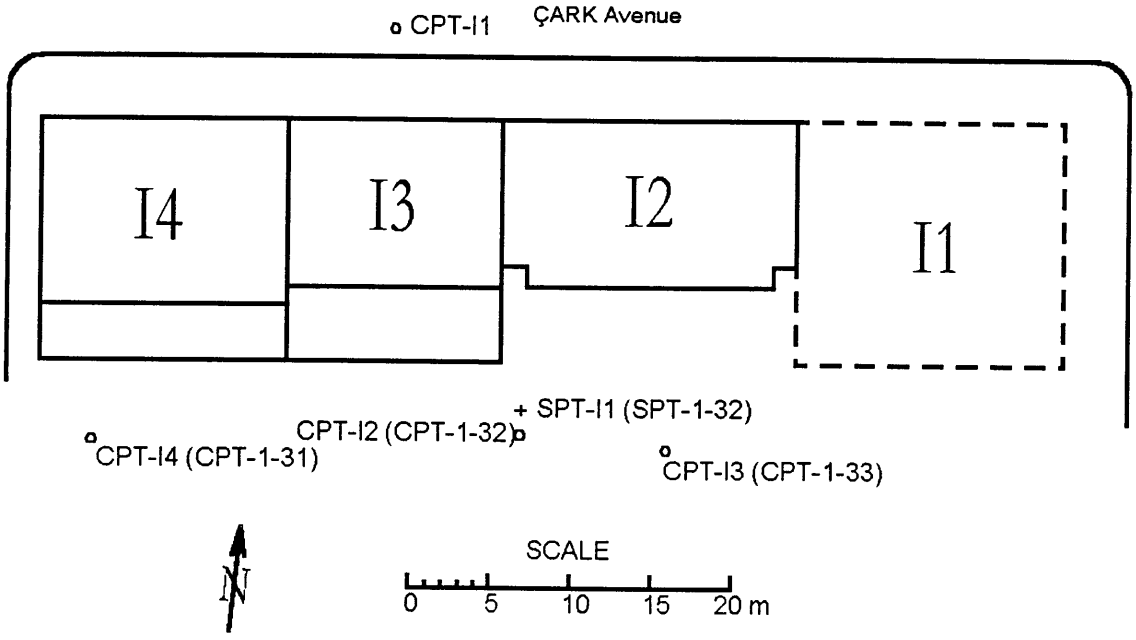

Figure 5-33: Plan view of Site I and location of subsurface exploration points

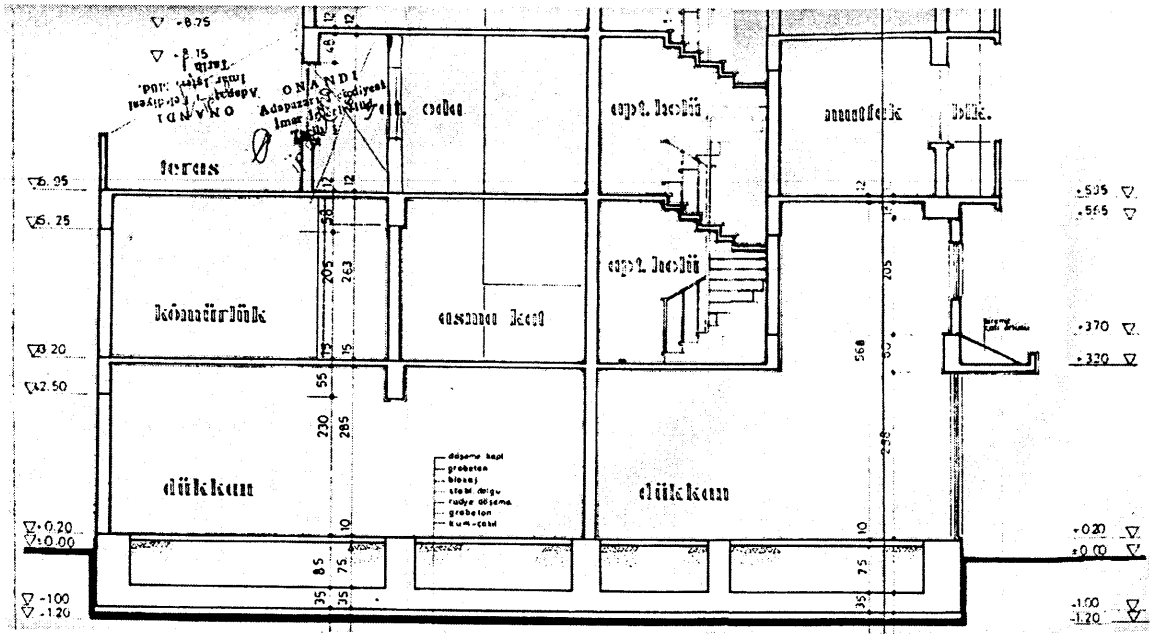

Figure 5-34: North-south cross section of building I3. Note that the structure changes after the first two stories.

Table 5-10: Summary of In-Situ tests performed at Site I

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-I1	18-August-2000	CPT	9.46	-
CPT-I2 CPT-1-32	30-June-2000	SCPTU	9.23	-
CPT-I3 CPT-1-33	30-June-2000	CPT	10.25	-
CPT-I4 CPT-1-31	30-June-2000	CPT	9.94	-
SPT-I1 SPT-1-32	10-July-2000	Boring w/ SPT	9.25	9

5.1.J. Site J – Two 5-story twin buildings in Çirak Street

The two 5-story twin buildings shown in Figure 5-35 are located along Çirak Street, Yenigün District, southeast from downtown Adapazari. The GPS coordinates of the site are N 40.77518° and E 30.41077°.

The building in the foreground of Figure 5-35, designated J1 in Figure 5-36, and its twin, designated J2 in Figure 5-36, experienced relatively uniform settlement of approximately 26 cm and 21 cm, respectively.

As depicted in Figure 5-36, these buildings have a regular plan view. The lateral dimensions are approximately 18.3 m (N-S) by 23 m (E-W). The height was measured to be approximately 12.95 m, so its height to width ratio is 0.7.

For these buildings, only schematic drawings of the typical floor plan have been obtained. In agreement with most of the reinforced concrete buildings studied in Adapazari, a mat foundation will be assumed to lie at a depth of 1.5 m below the surface. As shown in Figure 37a heave was observed along the western side of building J1, but was absent on the eastern side of the building shown in Figure 37b.

Soil samples were collected from the tan brown ejecta found at the northeast corner and along the eastern side of building J1 shown in Figure 5-37b. The results of the particle grain size analyses are shown in Figure 5-38. Both curves indicate that the soil can be classified as SM (silty fine sand) according to the Unified Soil Classification System (USCS).

Figure 5-35: View of the western side of building J1. The photograph was taken along Çirak Street.

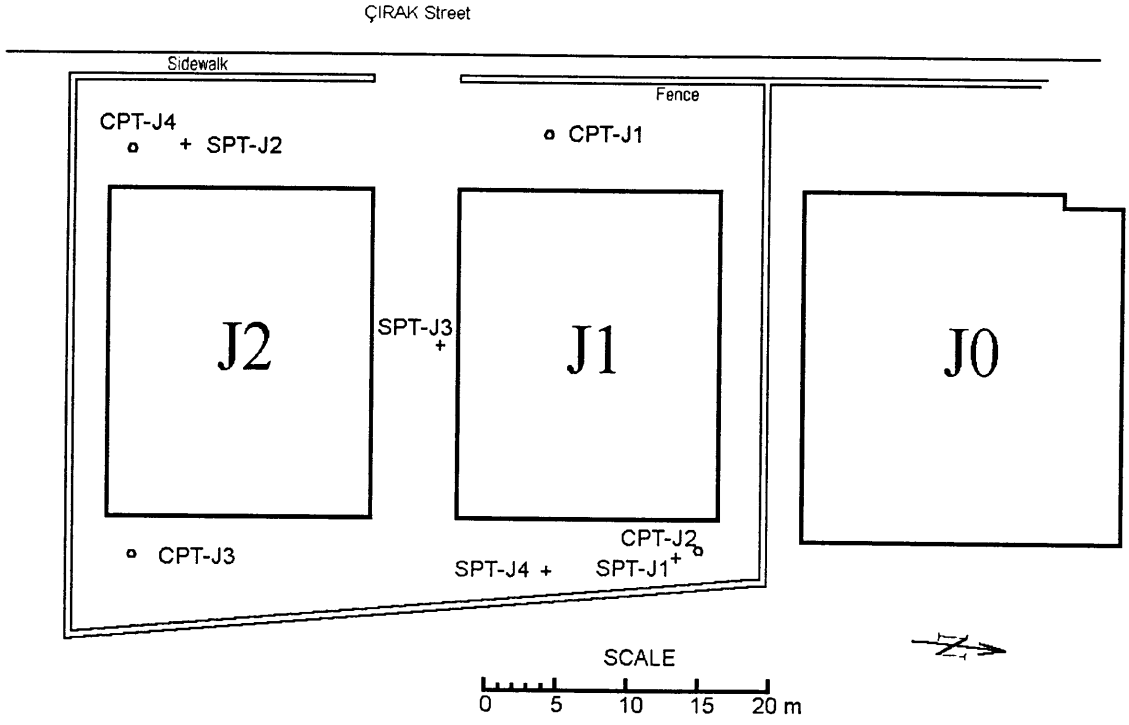

Figure 5-36: Plan view of Site J and location of subsurface exploration points

Figure 5-37a: Apparent heave observed at the eastern side of Building J1 (06/30/00)

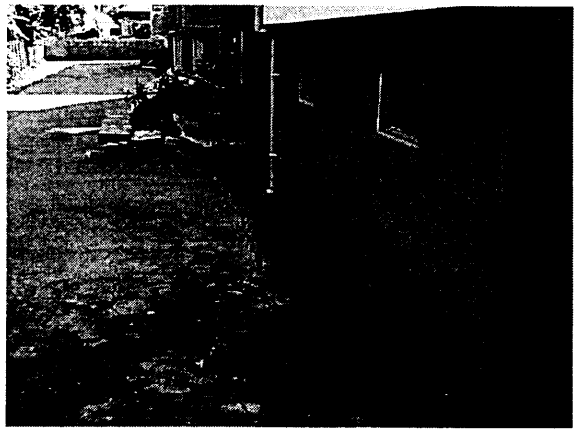

Figure 5-37b: Sand boil found eight days after the earthquake at the northeast corner of Building J1.

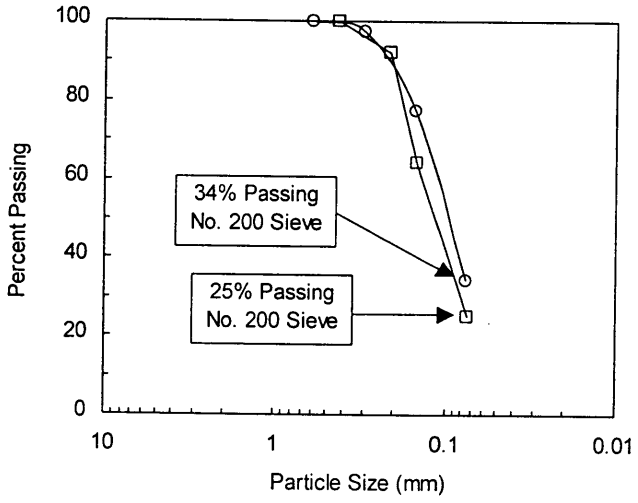

Figure 5-38: Particle size analysis curve for the samples of the tan brown sediment boil ejecta recovered near the northeast corner of building J1. Both soils classify as SM according to the USCS.

As shown in Figure 5-36, 4 Cone Penetration Tests (CPT), one of them with downhole seismic wave profiling (SCPTU), and 4 exploratory borings with the implementation of the Standard Penetration Test (SPT) were performed to identify and characterize the shallow subsurface soils at the site. A Shelby tube sample was retrieved in the boring designated SPT-J3 at a depth of approximately 2.35 m below the surface. The sample was tested to obtain its stress history and undrained triaxial shear strength.

Details on the exploratory borings and CPTs performed at this site are provided in Table 5-11. The concrete slab seen in Figure 5-37a and 5-37b was used as the datum to refer the extent of the explorations and the depth of the soil strata.

Table 5-11: Summary of In-Situ tests performed at Site J

Test Name	Date Performed	Type of Test	Depth Explored (m)	Number of Samples
CPT-J1	17-June-2000	CPT	24.37	-
CPT-J2	19-June-2000	SCPTU	24.98	-
CPT-J3	19-June-2000	CPT	10.30	-
CPT-J4	19-June-2000	CPTU	10.37	-
SPT-J1	29-July-2000	Boring w/ SPT	10.65	10
SPT-J2	30-June-2000	Boring w/ SPT	8.85	7
SPT-J3	03-July-2000	Boring w/ SPT	9.45	6
SPT-J4	25-July-2000	Boring w/ SPT	4.85	5

5.2. Phase 2 - CPT Liquefaction Investigations

Liquefaction induced building settlement and loss of foundation bearing strength were major causes of damage to buildings in Adapazari during the August, 17, 1999 Kocaeli, Turkey earthquake. Hundreds of buildings in the city settled and tilted due to apparent liquefaction of the subsurface soils. With so many affected buildings, Adapazari provides a natural laboratory for the study of the effects of liquefaction on building performance. To obtain information on the stratigraphy of the subsurface soils in Adapazari, ninety cone penetrometer (CPT) soundings and fourteen borings were made along four lines laid out through the damage areas. Most CPT soundings were to a depth of ten meters, but fourteen soundings were pushed to greater depths. Some of these soundings reached depths close to thirty meters. Eighteen of the CPT soundings included pore

pressure measurements and seven of the soundings included shear wave velocity measurements. Boreholes were drilled adjacent to fourteen of the soundings to provide soil samples and standard penetration data for comparisons with the CPT data. Laboratory soil classification tests, including grain size distributions and Atterberg limits, were performed on representative split spoon samples.

The four investigation lines, which were laid out through the damage areas, are shown in Figure 5-39 and extend along the following districts:
Line 1: Along the districts Arabacialani Mithatpasa, Semerciler, Cumhuriyet, Orta, Yahyalar, Yagcilar. 46 CPT soundings were performed along this line in addition to 7 exploration borings with SPT.
Line 2: Along Cumhuriyet district, which included 12 CPT soundings and 2 exploration borings with SPT.
Line 3: Along Yenigün and Tigcilar districts and included 8 CPT soundings and 2 exploration borings with SPT.
Line 4: Along Karaosman, Orta, Tigcilar, Yunigun, Çukuramediye, Hacioglu districts and included 24 CPT soundings and 3 exploration borings with SPT.

Figure 5-40 is a geologic map of the City of Adapazari showing Holocene alluvium throughout most of the city with upper Cretaceous flysch in hills at the southwestern part of the city (Bray and Stewart, 2000). Figure 5-41 illustrates the percentage of severely damaged buildings based on structural damage data compiled by the Turkish government (Bray and Stewart, 2000).

The location of the soundings, the boreholes and any additional methods of exploration, along with the data retrieved during the performance of CPT and the borings are shown in Appendix II.

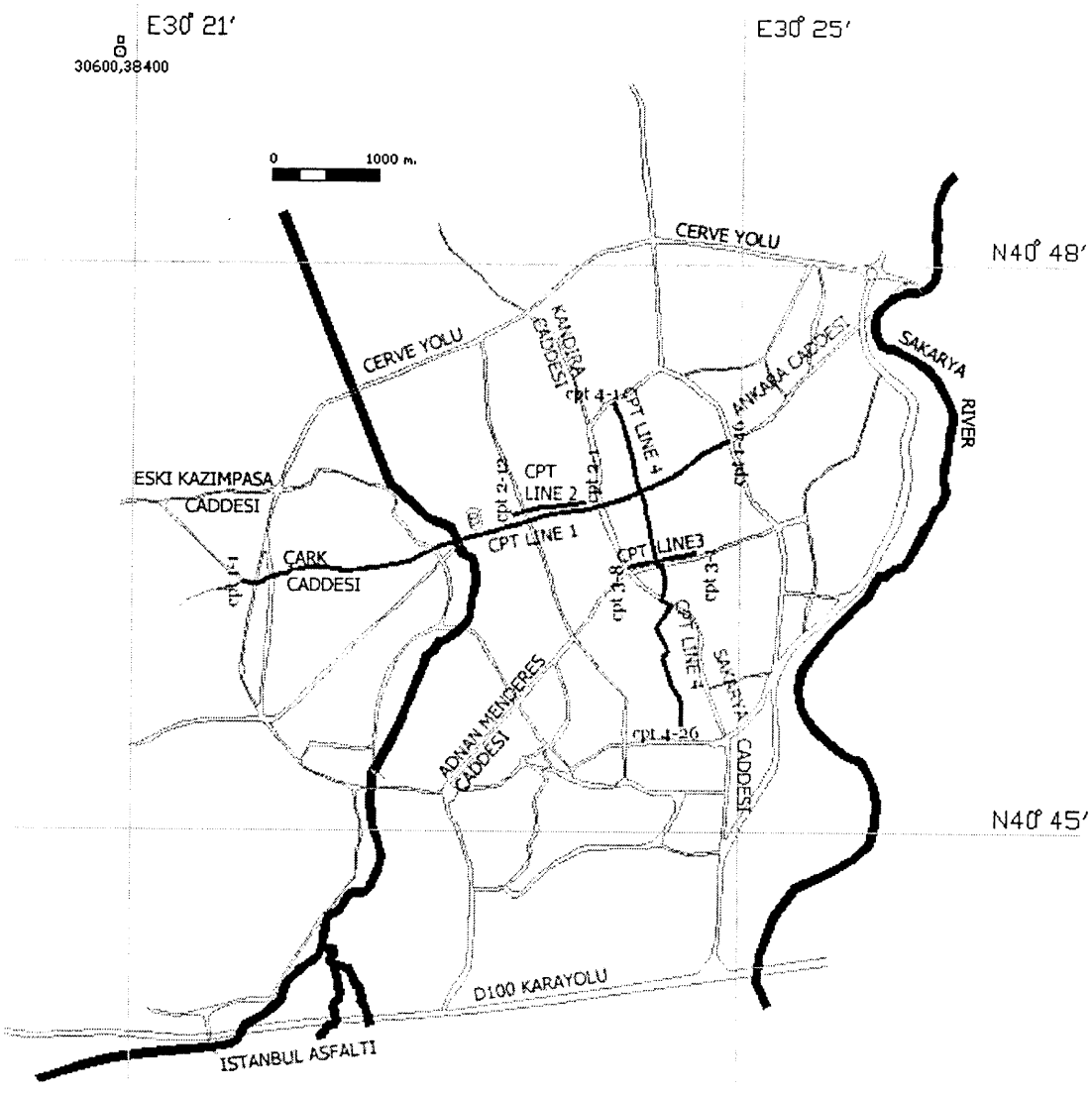

Figure 5-39: Location of the investigation lines in the City of Adapazari during Phase 2.

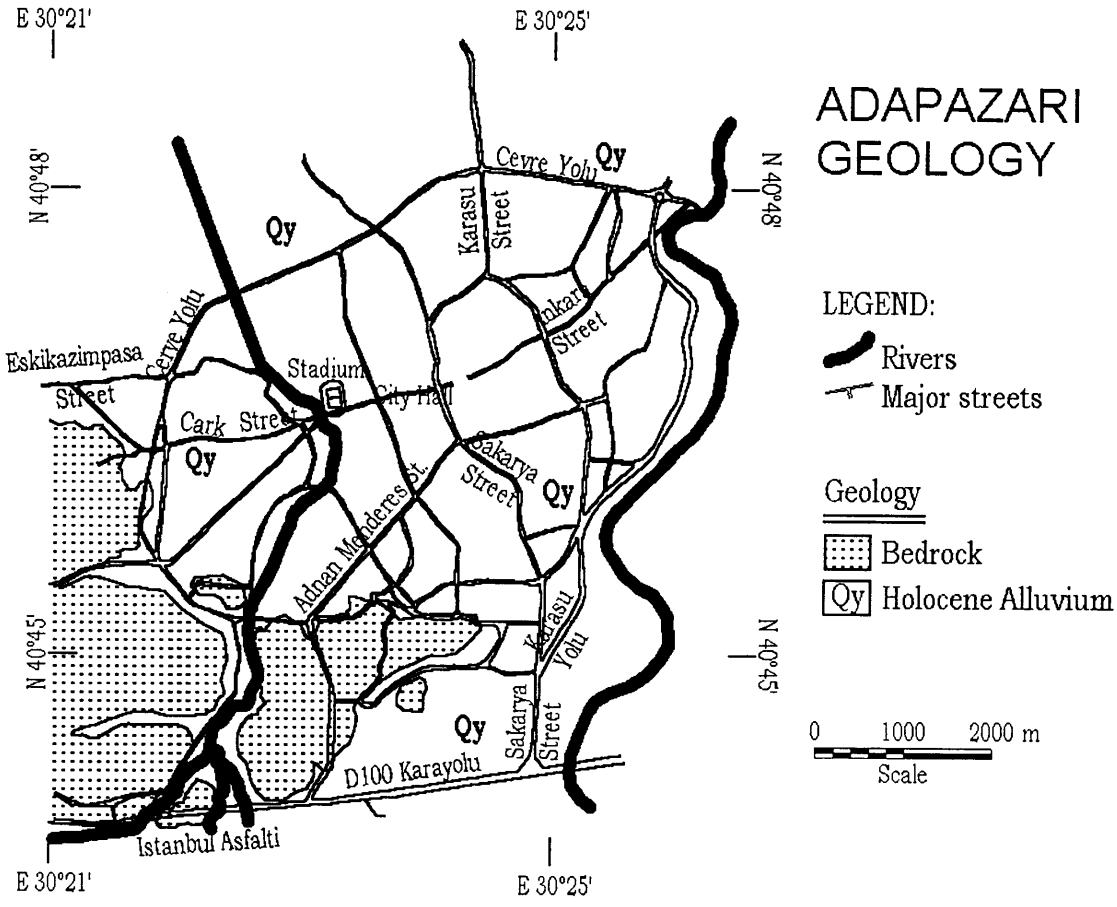

Figure 5-40: Geologic Map of the City of Adapazari.

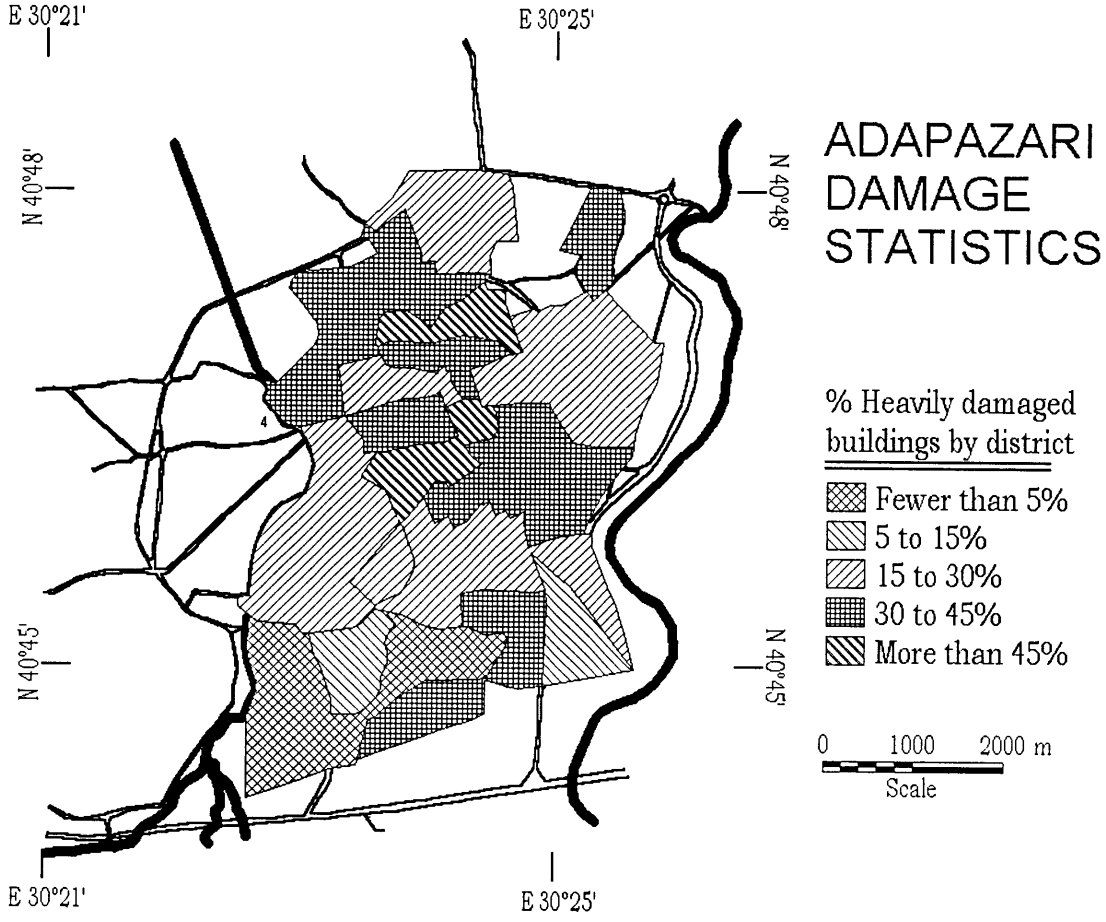

Figure 5-41: Extent of damage in the City of Adapazari during the 1999 Earthquake.

5.3. Phase 3: Geotechnical Site Investigation at Electrical Sub-stations

The primary goals of this phase are to document the geotechnical conditions prevailing under the electrical substations and investigate the relation of the damage of the sub-station with the subsoil conditions. As stated by O' Rourke et al, (2000) "The August 17, 1999 Kocaeli, Turkey earthquake (M_w = 7.4) caused an immediate, countrywide blackout of the transmission system due to high-voltage substation damage and power plants tripping off. Nine transmission substations suffered damage or disruption to transformers, switching equipment, and buildings. All damage was associated with strong shaking".

The damaged Adapazari Electrical Sub-station is located at a cut and fill site in the southern part of the city as shown in a Figure in Appendix III. The damage, which is associated with strong ground shaking, is described by Bray et al. (2000) and generally consists of moderate damage of structures, and damage of rigid pipe connections and other utilities.

Figure 5-42, shows from South to North, the T-shaped circuit breaker isolators that now replace the damaged Y-shaped ones. Figure 5-43 shows from North to South the tied-down Y-shaped circuit breaker isolators that were not damaged during the earthquake. In the same Figure, only a small distance to the back, one can see the new T-shaped circuit breaker isolators.

A detailed investigation program, which included 5 CPT soundings and 3 exploration boreholes with SPT, was performed. Figure 5-44 provides a view from the west of the location of CPT-AS2 with the sub-station in the background. Also, Figure 5-45 is a view, from north to south, of the western side of the sub-station. Along which CPT-AS4, AS2, and AS3 were performed. The data and logs of the exploration program can be found in Appendix III.

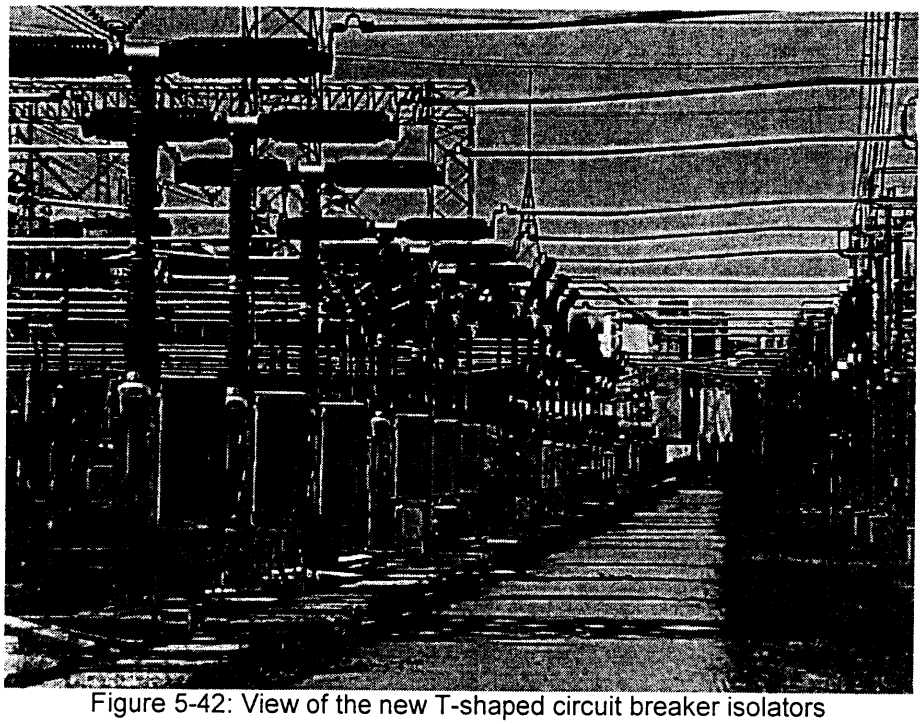

Figure 5-42: View of the new T-shaped circuit breaker isolators

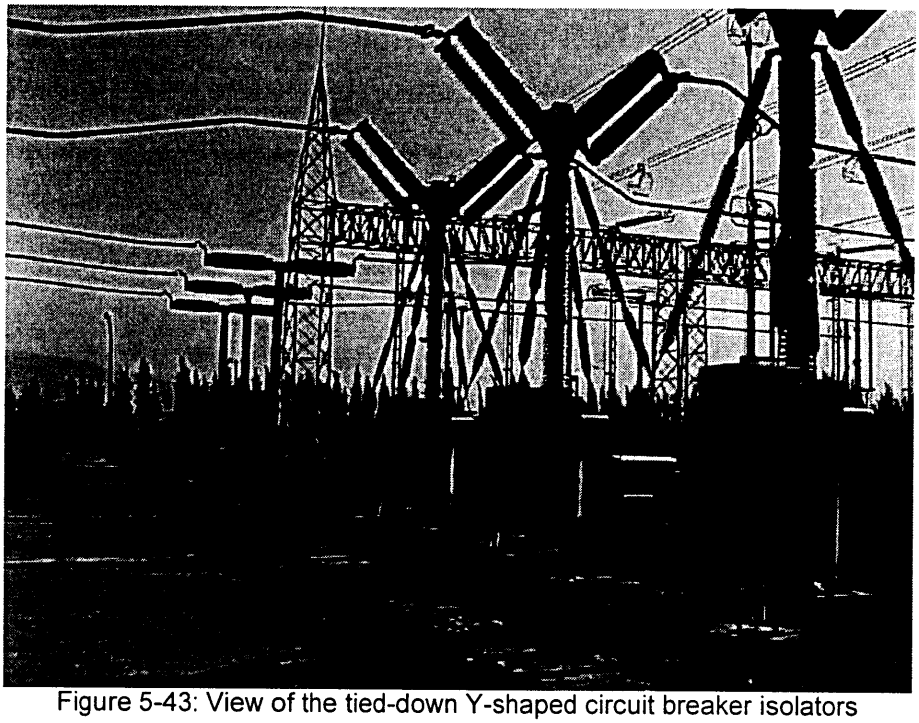

Figure 5-43: View of the tied-down Y-shaped circuit breaker isolators

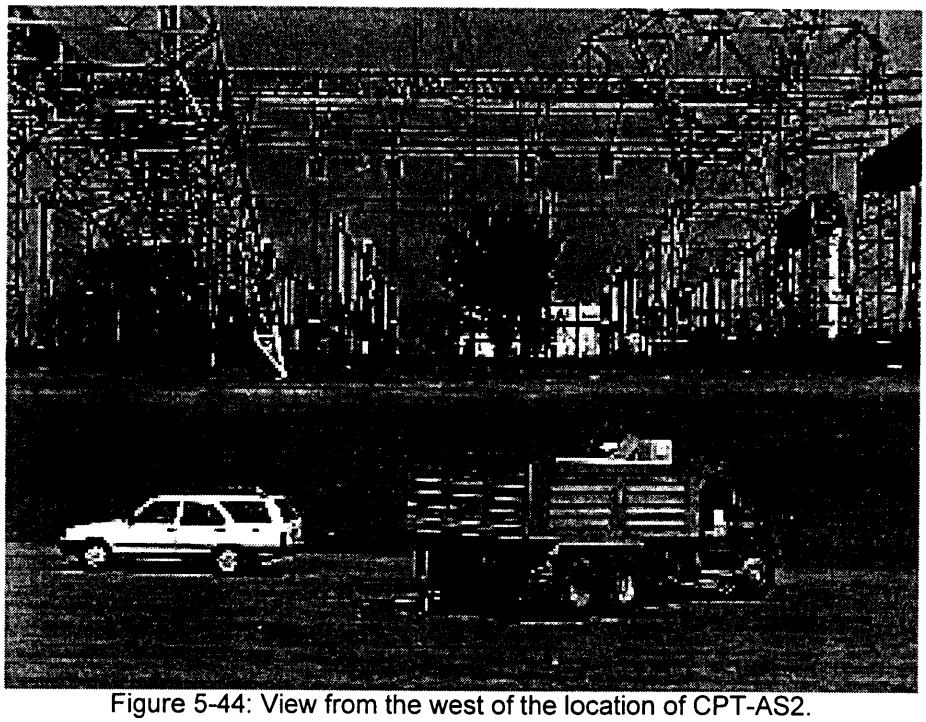

Figure 5-44: View from the west of the location of CPT-AS2.

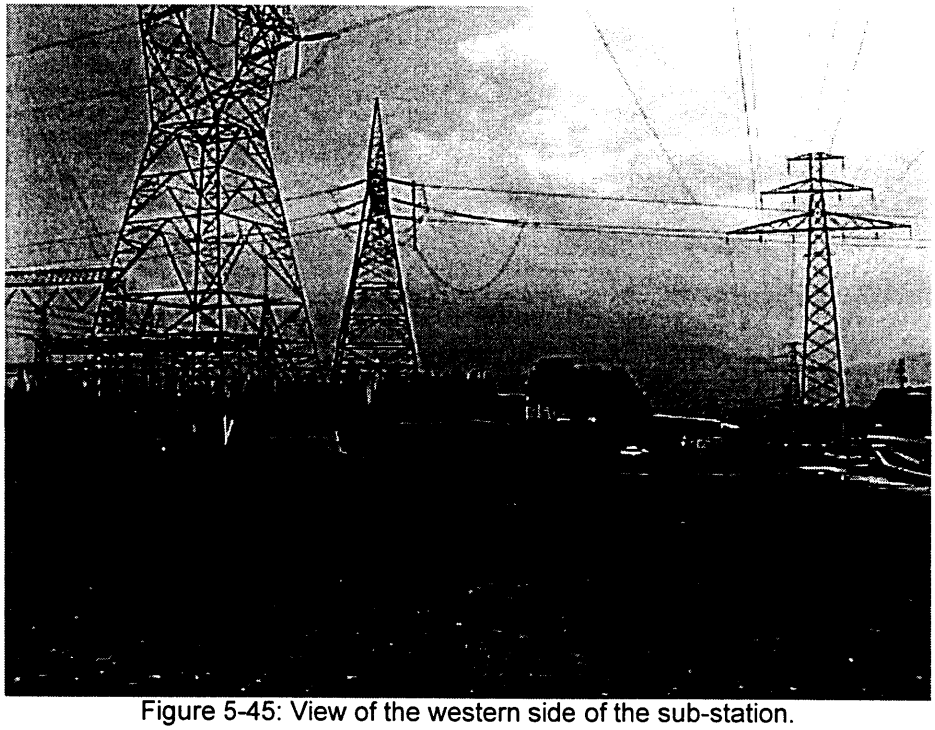

Figure 5-45: View of the western side of the sub-station.

5.4. Phase 4: Geotechnical Site Investigation at Lateral Spread Sites

Ground failure and ground deformations were significant features of the August 17, 1999 Kocaeli, Turkey earthquake (Mw = 7.4) and occurred throughout much of the heavily shaken zone. Numerous coastal failures and lateral spreads occurred around the northern, eastern, and southern edges of the Bay of Izmit. These ranged from minor lateral spreads that occurred benignly in open areas or did minor damage to seawalls, to major slope failures that carried people and structures into the bay. Other cases of lateral spreading were identified along the margins of Sapanca Lake, Sakarya River, as well as in the densely populated City of Adapazari.

The primary goal of this study is to develop well-documented case histories of liquefaction-induced lateral deformations, so that the profession can use these case histories to advance our understanding of these phenomena and enhance our ability to numerically simulate the associated physical processes. A total of 8 sites are studied and the geotechnical exploration in each site is summarized in Table 5-12. The locations of these sites are shown in Figure 5-46.

Table 5-12: Sites of Phase 4 and geotechnical investigation methods applied

Site Name	CPT - CPTU	SCPTU	Boring & SPT	SASW
Cark Canal	4	1	2	Yes
Degirmendere Nose	2	1	2	Yes
Hotel Sapanca	11	2	5	Yes
Cumhuriyet Avenue	2	1	2	No
Police Station	5	1	3	Yes
Soccer Field	4	1	2	Yes
Yalova Harbor	3	1	3	Yes
Yakin Street	4	2	4	Yes

The general location of the sites, and the data of the boreholes and CPT soundings retrieved can be found in Appendix IV.

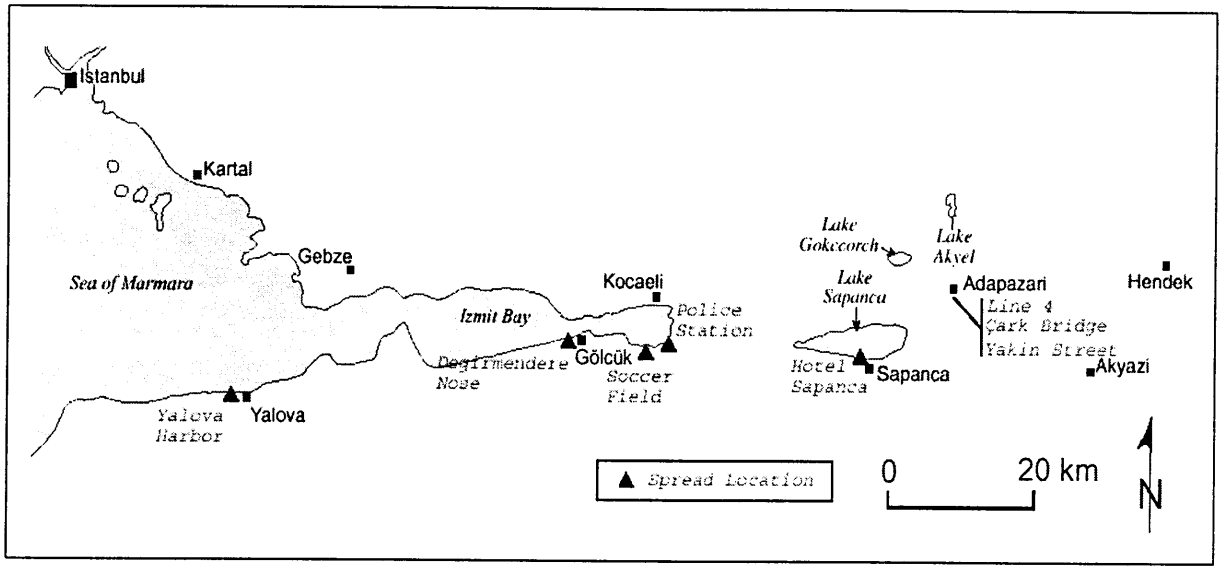

Figure 5-46: Location of Lateral Spread Sites investigated in Phase 4

5.4.A. The Çark Canal Site

The Çark Canal site is located in the city of Adapazari. Figure 5-47 is a view of the site whereas Figure 5-48, shows a cross-section of the canal. A schematic of the site and of the investigation performed are illustrated in Figure 5-49. The GPS coordinates of the site are N 40.7763° and E 30.3830°.

5.4.B. Degirmendere Nose Site

The largest and most significant edge failure occurred at Degirmendere, just west of Gölcük, where a major coastal slide carried a relatively large section of fill, along with two restaurants and a hotel, into the bay, killing a number of people in the hotel. Figure 5-50 is a map of this failure, showing the remaining shoreline and the principal observable onshore features of this slide. As shown in Figures 5-51 and 5-52, this failure left a relatively sharp scarp, with minor spreading inboard of the new coastline. Figure 5-53 shows an aerial view of this failure. In this photograph a barge-mounted crane can be seen at the final location of the hotel, which fully collapsed and disappeared beneath the waters. The clamshell is excavating the hotel debris for the purpose of exhuming bodies (Bardet et al, 2000).

The GPS coordinates of the site are N 40.7219° and E 29.7820°. The geotechnical investigation performed in the site is summarized in Table 5-12. Figure 5-54 is a schematic of the site and of the location of the investigation boreholes and soundings whereas Figure 5-55 is a cross-section of the site along with some results of the geotechnical investigation.

5.4.C. Hotel Sapanca Site

Hotel Sapanca is a government-owned hotel on the south shore of Sapanca Lake in the town of Sapanca. Sapanca Lake is located approximately 20 km from Izmit Bay, southwest of Adapazari. The hotel consists of two four-story structures connected by an atrium. The east structure was built in 1957, and survived the 1967 earthquake with only minimal settlement and damage. The west structure and atrium were completed in 1989. Massive subsidence, liquefaction, and lateral spreading were observed on the hotel grounds during the 1999 earthquake. People working at the hotel reported that water and soil were "boiling out of the ground" as they ran from the hotel immediately after the earthquake.

Figure 5-47: A north to south view of the canalized river (Photo by Brady Cox)

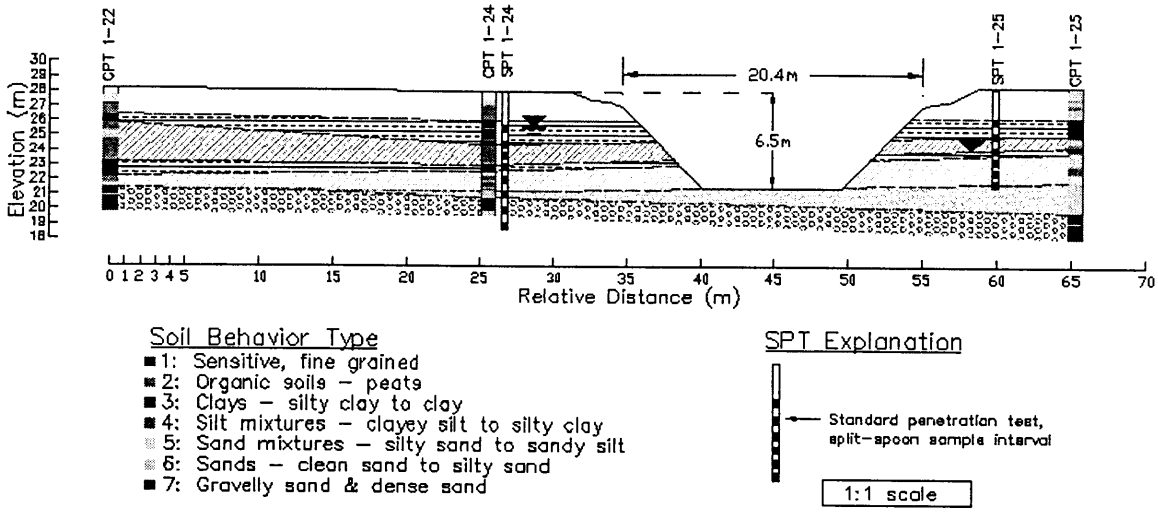

Figure 5-48: Çark Canal Cross-section

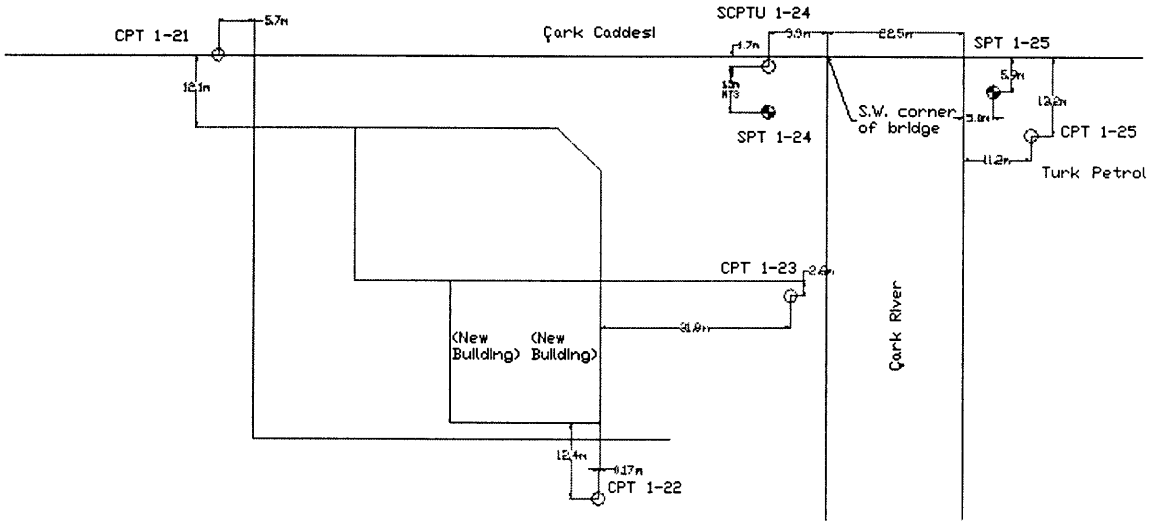

Figure 5-49: Çark Canal Site Map

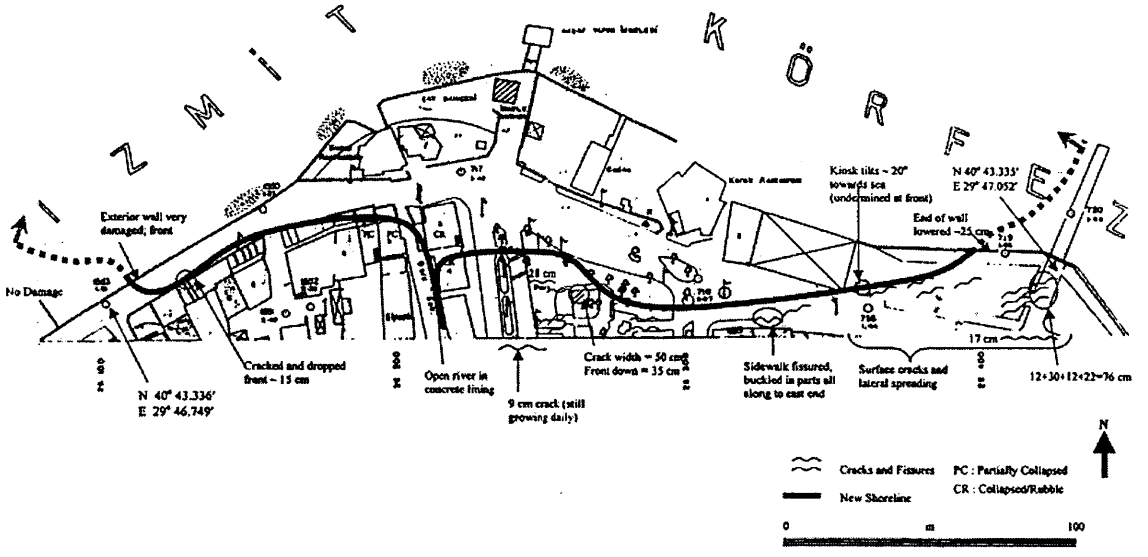

Figure 5-50: Map of failure in the Degirmendere Nose Site.

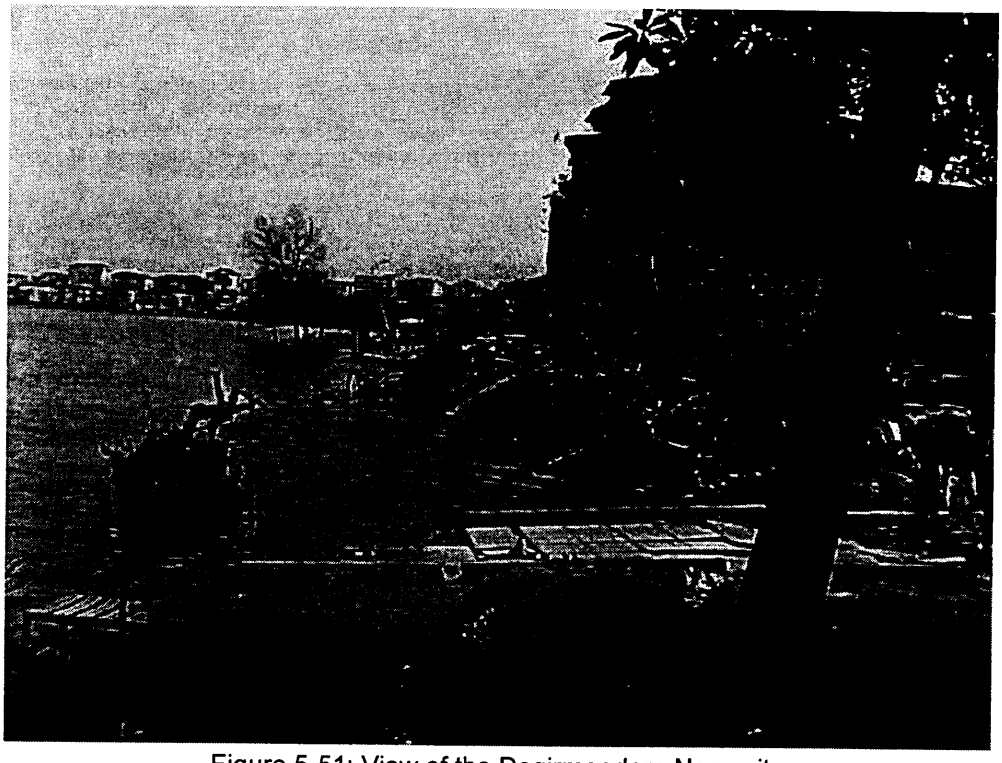

Figure 5-51: View of the Degirmendere Nose site

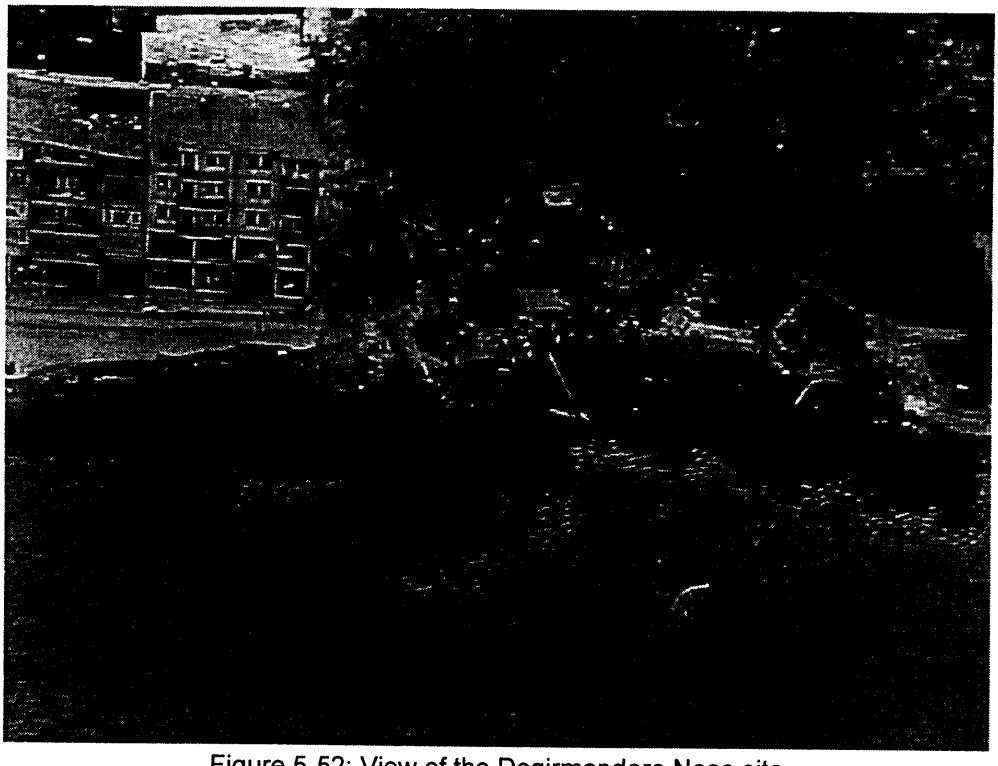

Figure 5-52: View of the Degirmendere Nose site

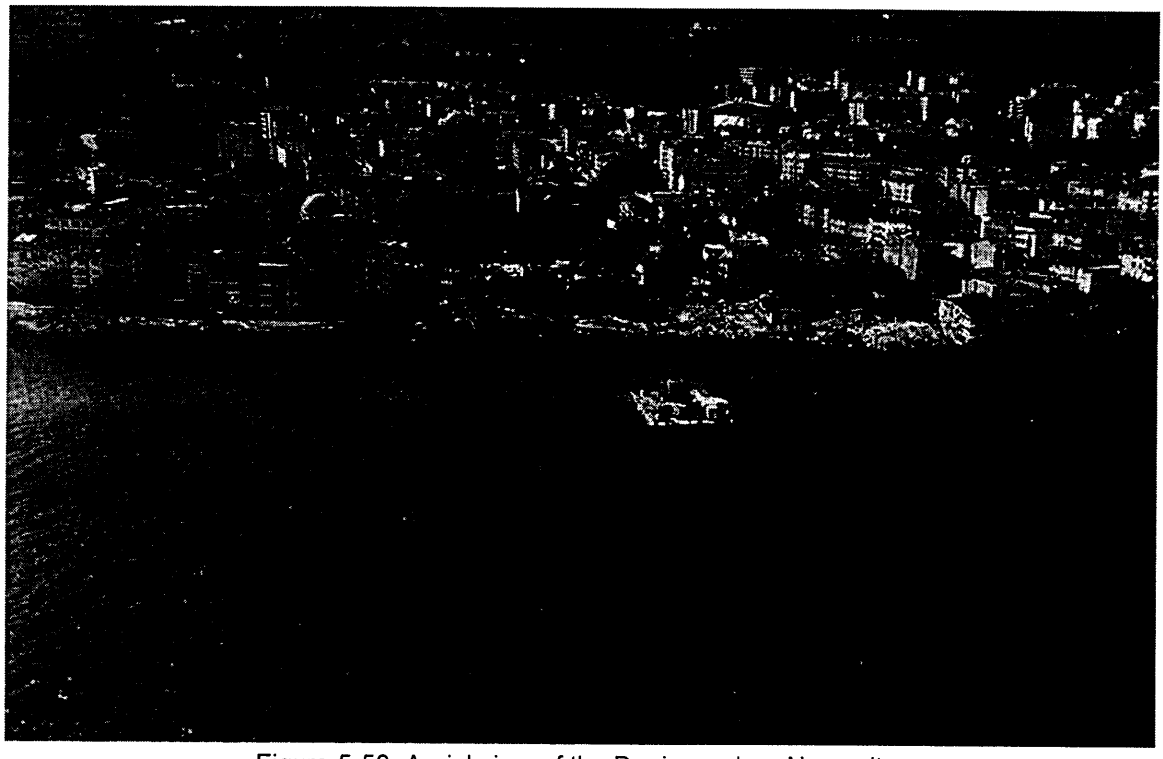

Figure 5-53: Aerial view of the Degirmendere Nose site.

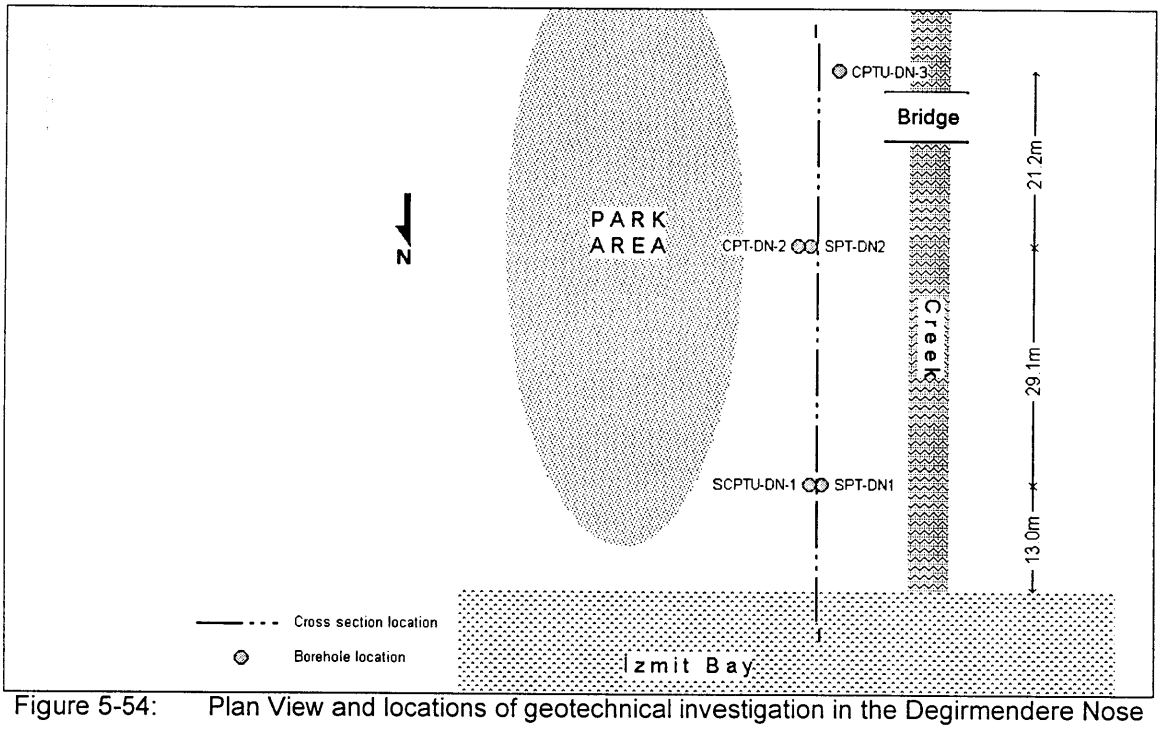

Figure 5-54: Plan View and locations of geotechnical investigation in the Degirmendere Nose

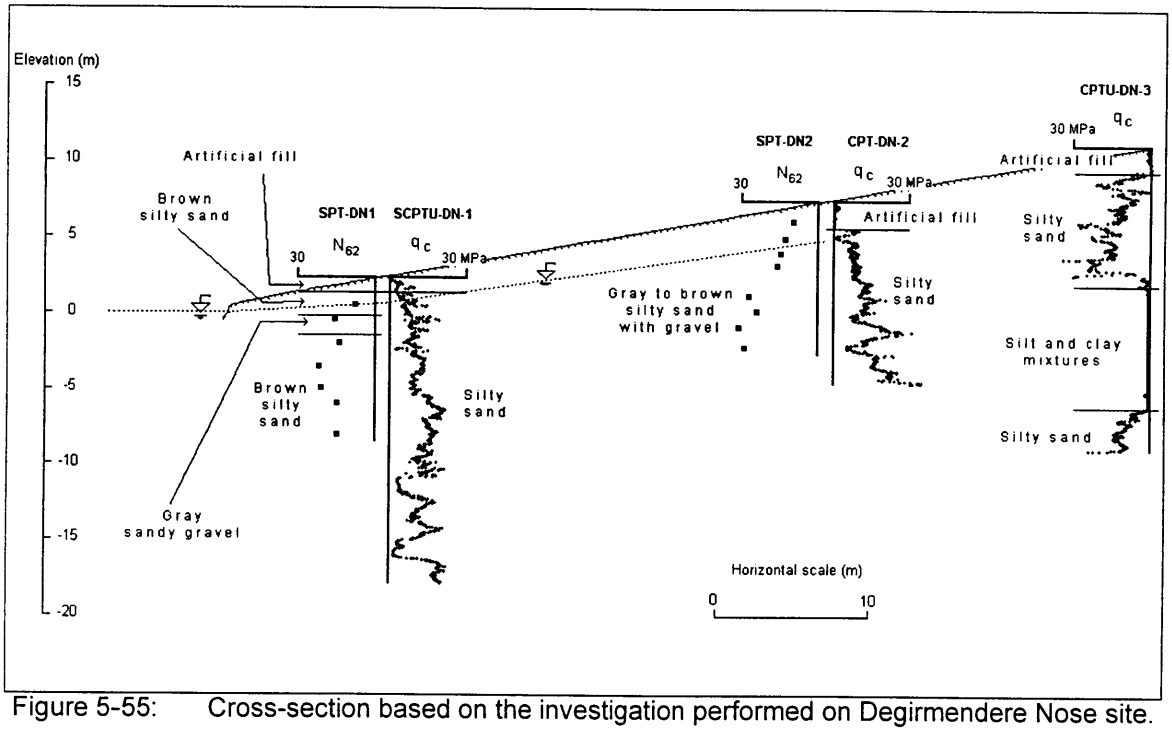

Figure 5-55: Cross-section based on the investigation performed on Degirmendere Nose site.

More than half of the grounds was covered with soil ejecta which was up to 30 cm thick at some locations (Bardet et al., 2000)

The driveway, which was constructed of paving stones underlain by a base fill of sandy gravel, was covered fully by soil ejecta. Extensive ground cracking, associated with lateral spreading, was observed throughout the grounds. Generally, these cracks were associated with soil venting (Figure 5-56), although one crack appeared fresh and without vented soil (Figure 5-57). This crack may be due to continued movement and creep after the earthquake. The total extension towards Sapanca Lake ranged from 0.5 to 2.0 m along different transects.

The hotel settled approximately 0.3 m more than the surrounding ground due to partial bearing capacity failure. Subsidence of the coastline caused the hotel to be inundated by the lake (Figure 5-58), and approximately 10 to 50 m of the coastline became submerged due to subsidence. A dramatic monoclinal warp or scarp was observed through the swimming pool behind the hotel (Figure 5-59). Based on the warped swimming pool and displaced fences in the water, it appears that the offshore scarp is between 1 and 3 m high. The scarp may be the headwall of a large offshore landslide or lateral spread, or the scarp may be the result of tectonic normal faulting along the southern margin of the Sapanca Lake pull-apart basin. Damage to the hotel included separation of the older structure from the newer structure, which resulted in the collapse of a walkway inside the hotel, however, no casualties were reported at the Hotel Sapanca. A second visit to the hotel two days later showed continued coastal subsidence and submergence of the hotel and hotel grounds (Bardet et al, 2000). The lateral spreads initiated by the earthquake appear to be undergoing continued post-seismic creep. The rate and decay of creep with time following the earthquake is not known.

Coastal subsidence and lateral spreading extended more than 0.5 km to the east of the hotel and 0.2 km west. To the east, coastal submergence of 10 to 15 m was observed. Ground cracking, soil venting, and lateral movement was observed in this area, including 10 cm of extension in a water pipe. 1-2 km further east, partial collapse of a pool was observed. Photos taken from the air indicate that a significant zone of subsidence and lateral movement occurred along the southern coast of Lake Sapanca (Figure 5-60).

Figure 5-56: Extensive ground cracking, associated with lateral spreading, was observed throughout the grounds of Hotel Sapanca. Generally, these cracks were associated with soil venting.

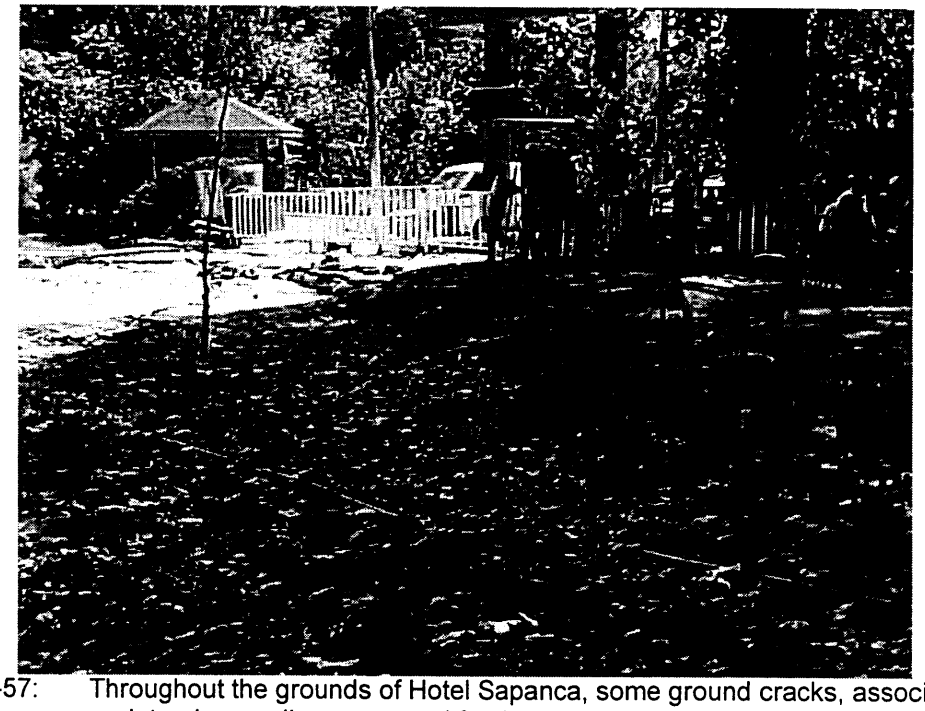

Figure 5-57: Throughout the grounds of Hotel Sapanca, some ground cracks, associated with lateral spreading, appeared fresh and without vented soil.

Figure 5-58: Subsidence of the coastline caused Hotel Sapanca to be inundated by the lake, and approximately 10 to 50 m of the coastline became submerged due to subsidence.

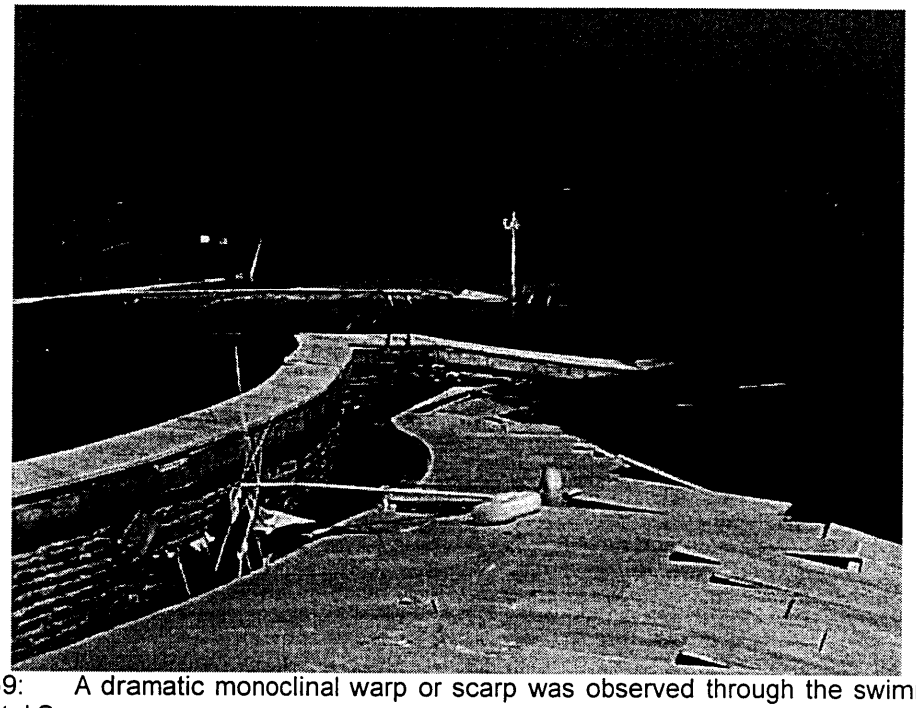

Figure 5-59: A dramatic monoclinal warp or scarp was observed through the swimming pool behind Hotel Sapanca.

Figure 5-60: Photos taken from the air indicate that a significant zone of subsidence and lateral movement occurred along the coast of Lake Sapanca.

Identification and measurements of the cracks and fissures along the site, as well as measurements of cracks in a wall of the hotel were made and are illustrated in Figures 5-61 and 5-62 respectively.

It is not the first time that the vicinity of Hotel Sapanca was damaged by an earthquake. It was also damaged by the 1967 Mudurnu Valley Earthquake (M_w = 7.1), the epicenter of which was located about 25 km to the southeast of Adapazari. Berg (1967) reported that there was liquefaction evidenced by sand boils and large ground fissures beside Lake Sapanca near the town of Sapanca. Water ejected up to 1 to 2 m above the ground according to residents. Walls were fractured by ground distortions, some walls with gaps of half a meter or more. The Kumbaz Hotel was torn in two along a construction joint, with the two halves of the building being separated by lateral movement of as much as 70 cm. There were also reports of sand boils, water ejection, and fine sand ejecta covering parts of the fields throughout the Sakarya Valley, e.g. in the village of Cihadiyi, near Pamukova, and lateral spreading toward the Sakarya River.

Extensive investigation was performed in this site. Figure 5-63, is a schematic of the site and shows the location of the soundings and borings performed. Figures 5-64 to 5-67 are subsurface cross-sections along the site based on the exploration data.

5.4.D. Cumhuriyet Avenue Site

Lateral spreading was not observed along Cumhuriyet Avenue (Survey Line 4) in the City of Adapazari, although the ground surface slopes downward at 0.3% in an area prone to liquefaction. The GPS coordinates are N 40.7629° and E 30.4092°. Figure 5-68 is a subsurface cross-section as interpreted from the geotechnical investigations performed at the site.

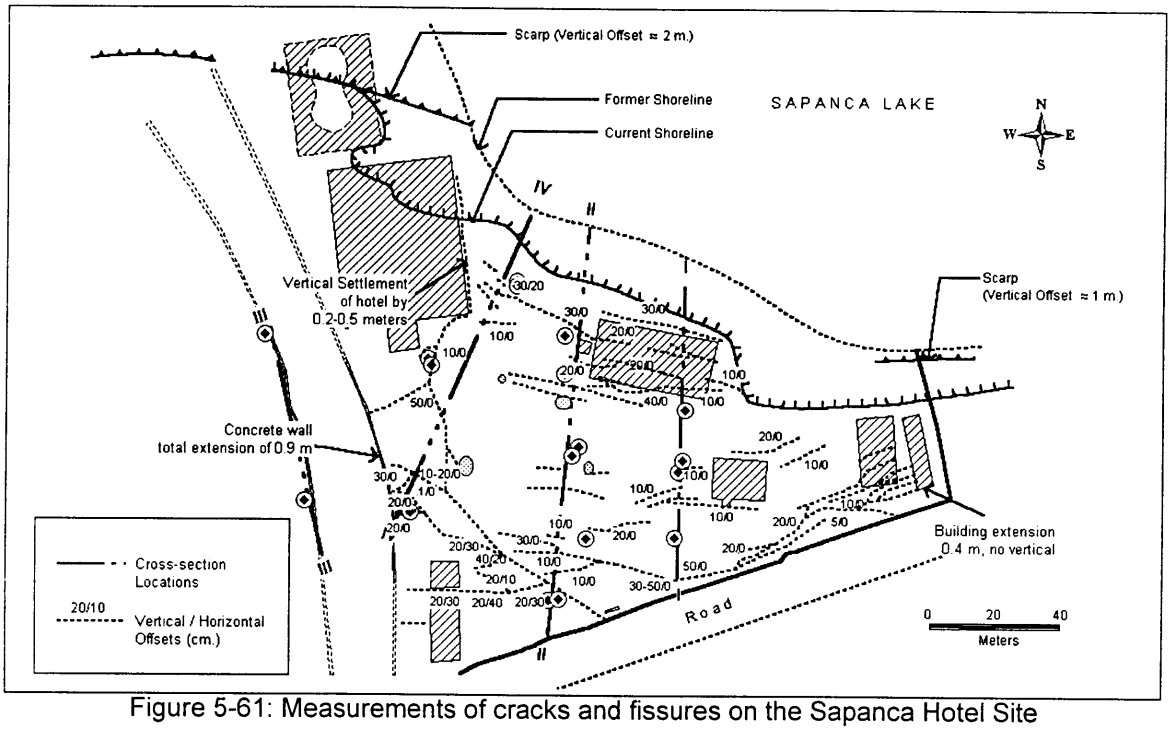

Figure 5-61: Measurements of cracks and fissures on the Sapanca Hotel Site

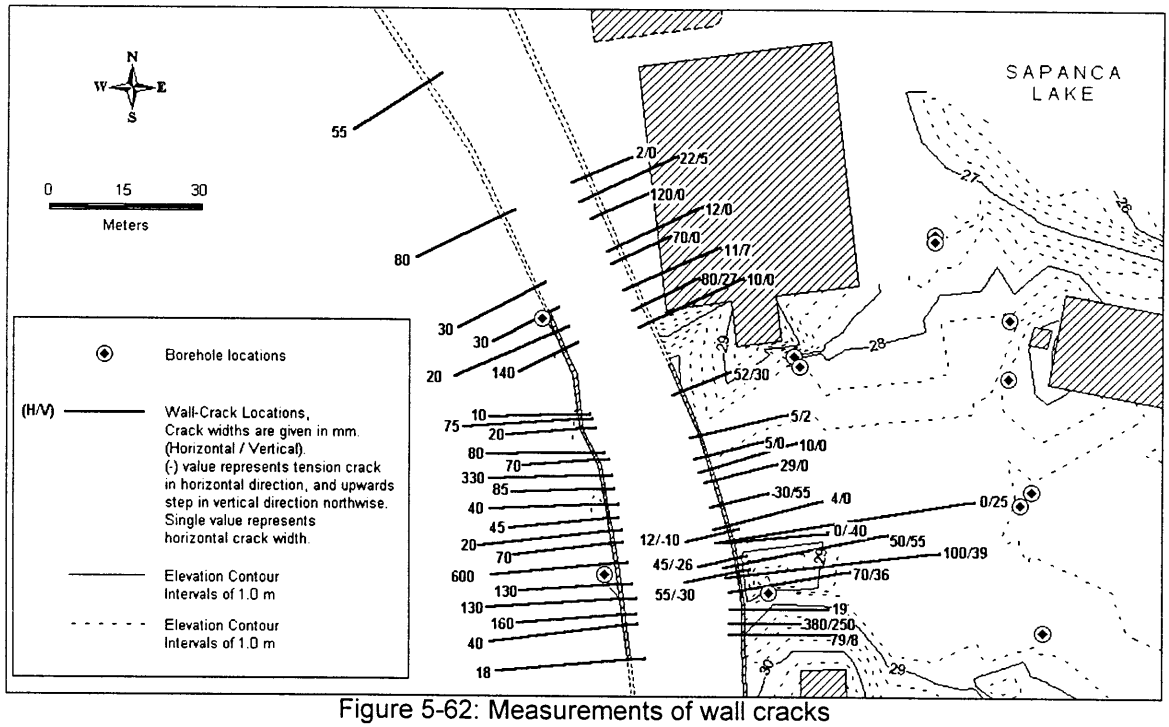

Figure 5-62: Measurements of wall cracks

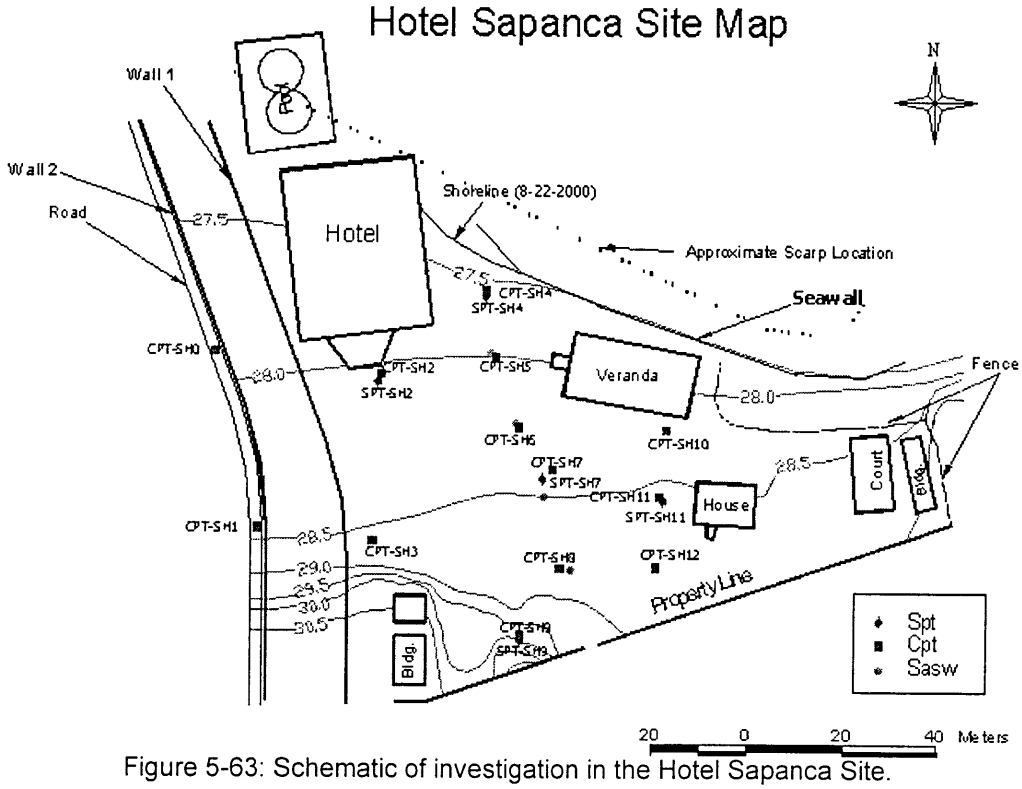

Figure 5-63: Schematic of investigation in the Hotel Sapanca Site.

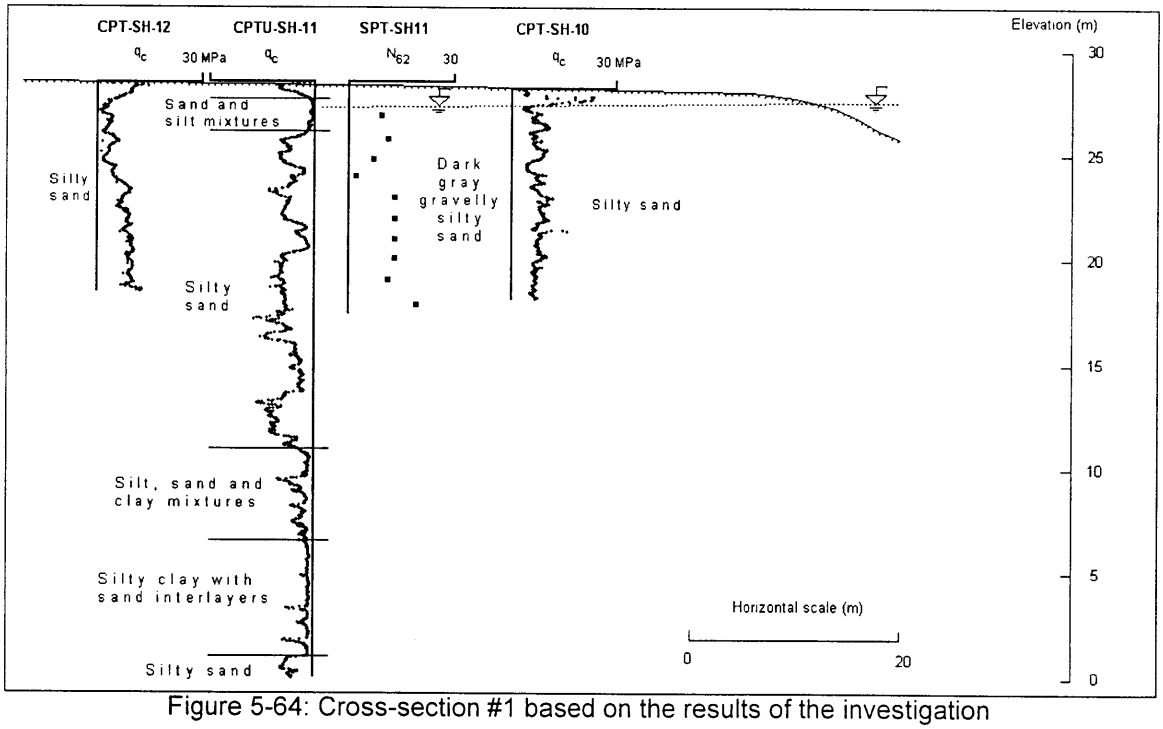

Figure 5-64: Cross-section #1 based on the results of the investigation

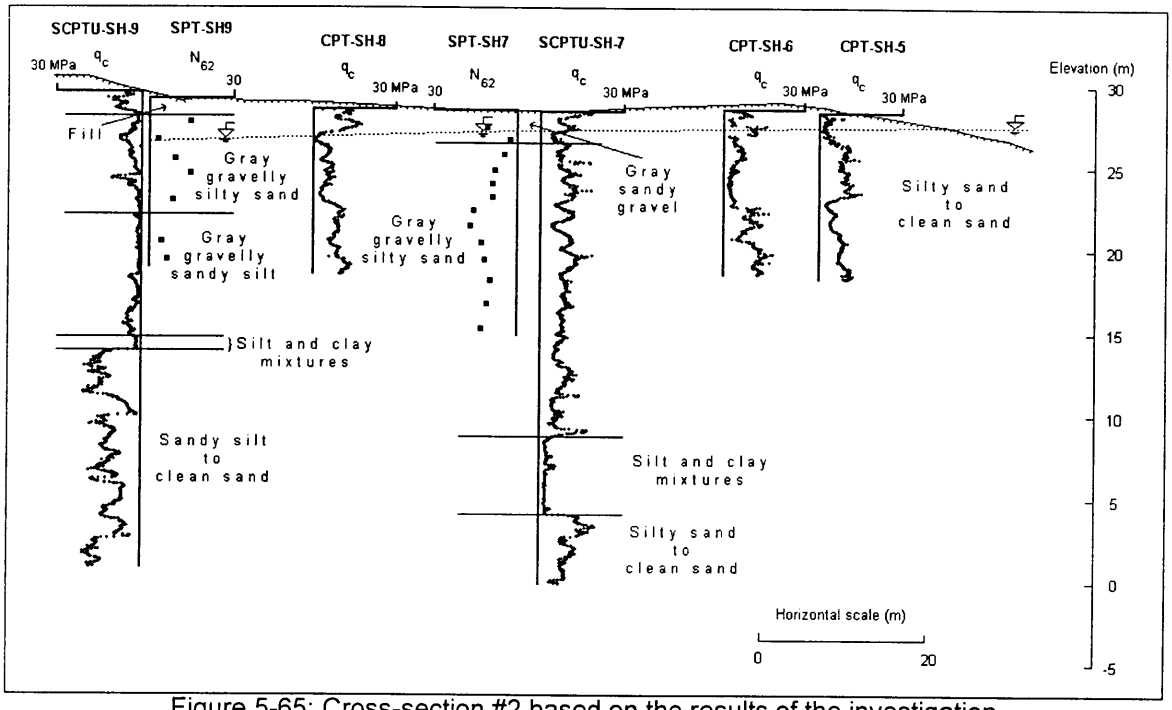

Figure 5-65: Cross-section #2 based on the results of the investigation

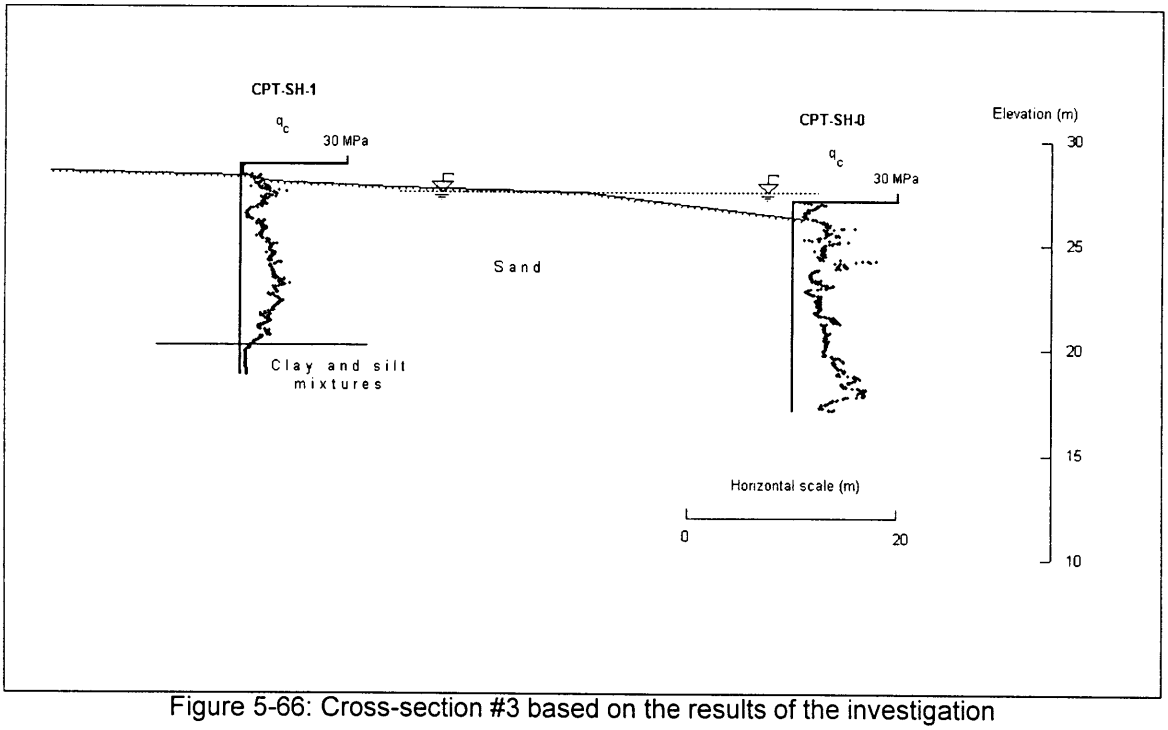

Figure 5-66: Cross-section #3 based on the results of the investigation

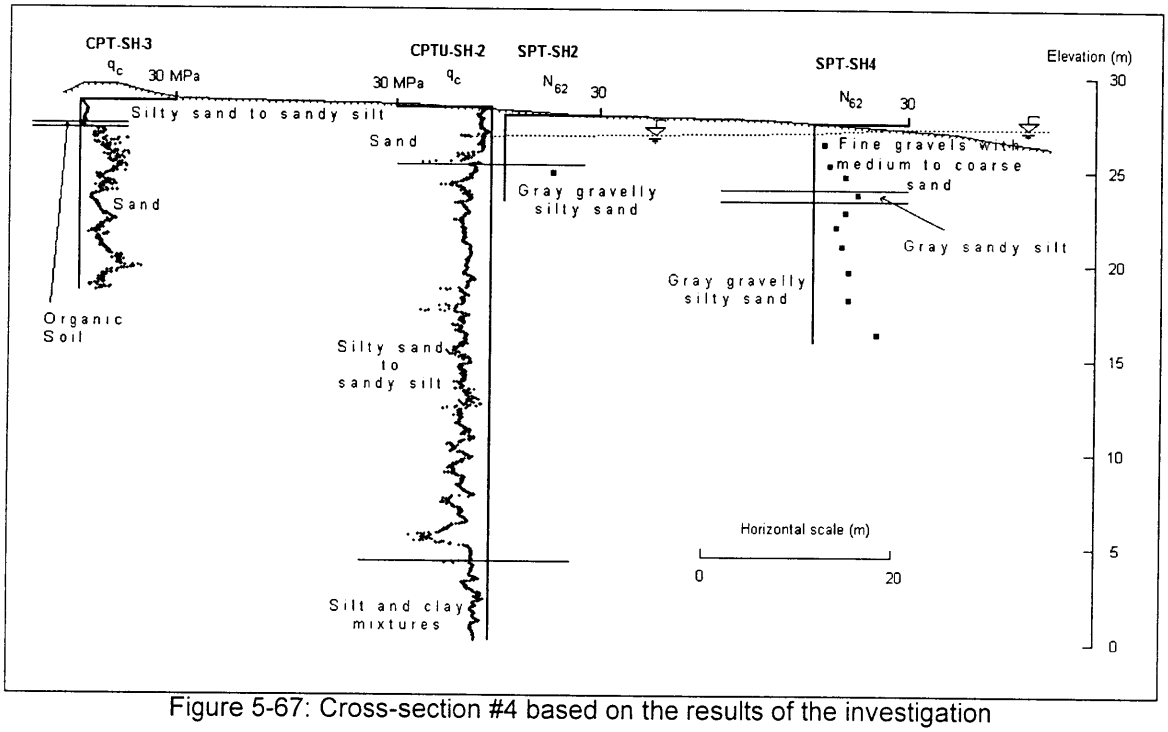

Figure 5-67: Cross-section #4 based on the results of the investigation

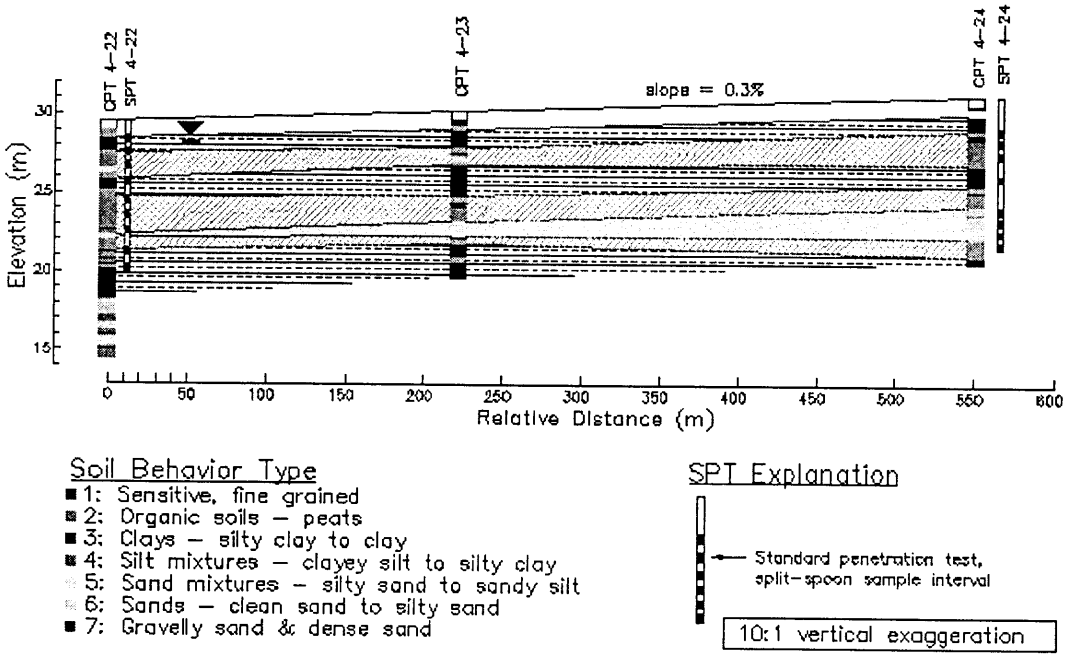

Figure 5-68: Cross-section based on the investigations performed on the Cumhuriyet lateral spread site.

5.4.E. Police Station Site

The police station site is located in the Eastern end of the Bay of Izmit. The GPS coordinates of the site are N 40.7215° and E 29.9372°. Liquefaction of shallow strata was apparent at the site. However, this phenomenon was localized and was overshadowed by surface fault rupture (Bardet et al, 2000). Figure 5-69 illustrates the lateral spreading that occurred on site.

Figure 5-70 is a schematic of the shoreline on the site, whereas Figures 5-71 to 5-73 are cross-sections along the site based on the exploration performed.

5.4.F. Soccer Field Site

The shore next to a soccer field in the City of Golcuk was another site that underwent lateral spreading. The GPS coordinates of the site are N 40.7177° and E 29.9272°. Figure 5-74 shows the extension cracking that occurred as a result of the lateral movement of the site. A schematic of the site as well as the location of the investigations are provided in Figure 5-75. Figures 5-76 and 5-77 are cross-sections along the site based on the geotechnical investigations performed.

5.4.G. Yalova Harbor

Lateral deformations were observed across broad portions of the harbor in Yalova shown in Figure 5-78. The GPS coordinates of the site are N 40.6596° and E 29.2689°. Spreading towards the water was observed in the circular marina at the west end of the harbor (right side of Figure 5-78), and in the parking lot south of the pier/ferry terminal (center of Figure 5-78). The amount of spreading in the marina area could not be evaluated as the ground cracking occurred in cobblestone pavements and lawn areas where reliable measurements of crack offsets were not possible. However, near the pier for the ferry a paved parking area enables detailed mapping.

As shown in Figure 5-79, the mapped area near the pier includes three distinct zones. One zone is paved with asphalt concrete. Figure 5-80 shows a representative ground crack in this area. A second zone is a pile-supported waterfront structure. A third zone, located between the asphalt parking lot and

Figure 5-69: View of the police station site that underwent lateral spreading

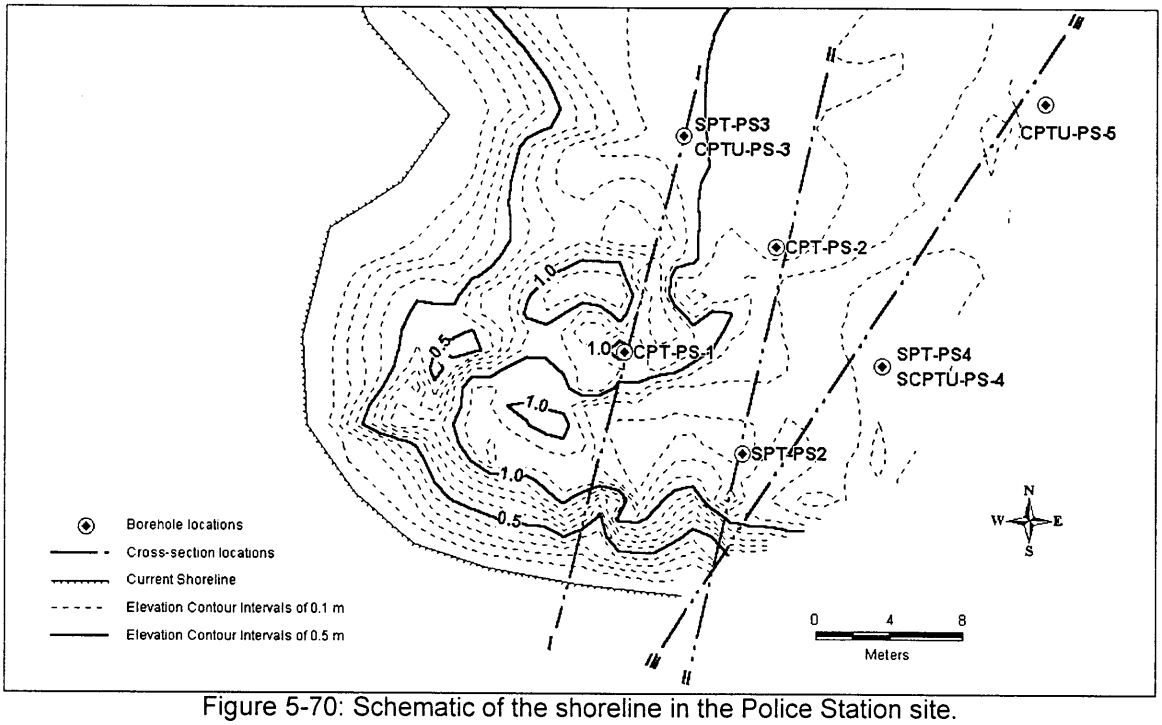

Figure 5-70: Schematic of the shoreline in the Police Station site.

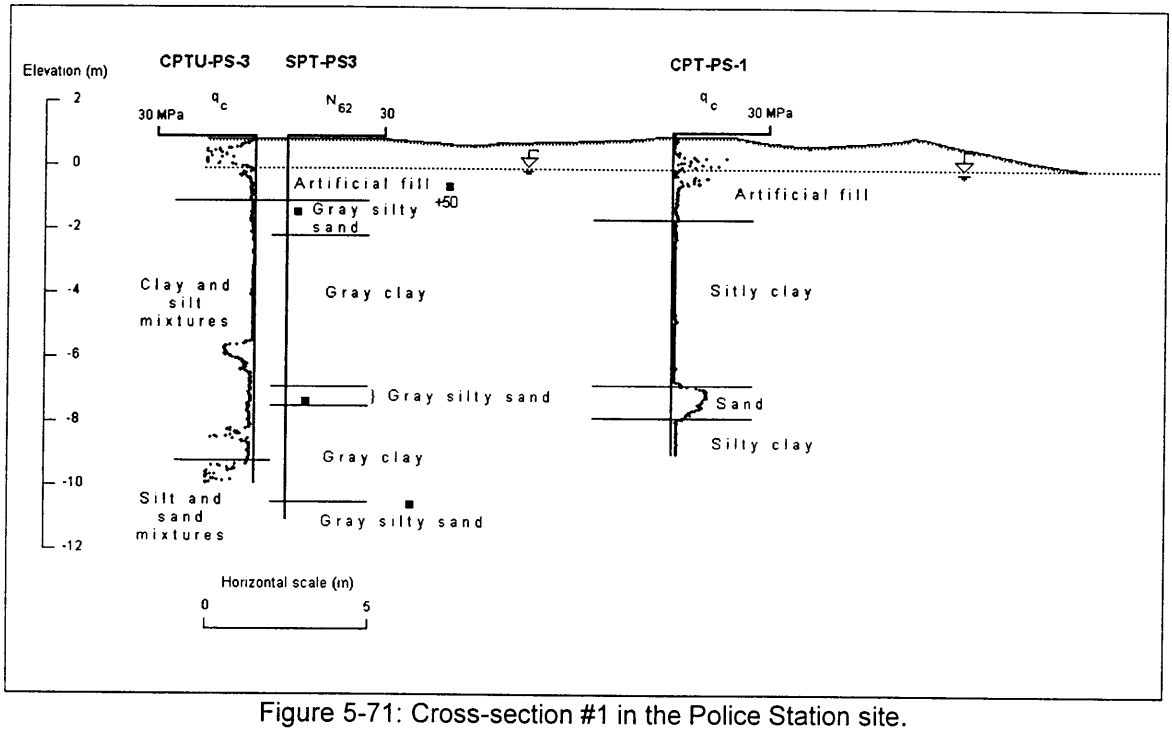

Figure 5-71: Cross-section #1 in the Police Station site.

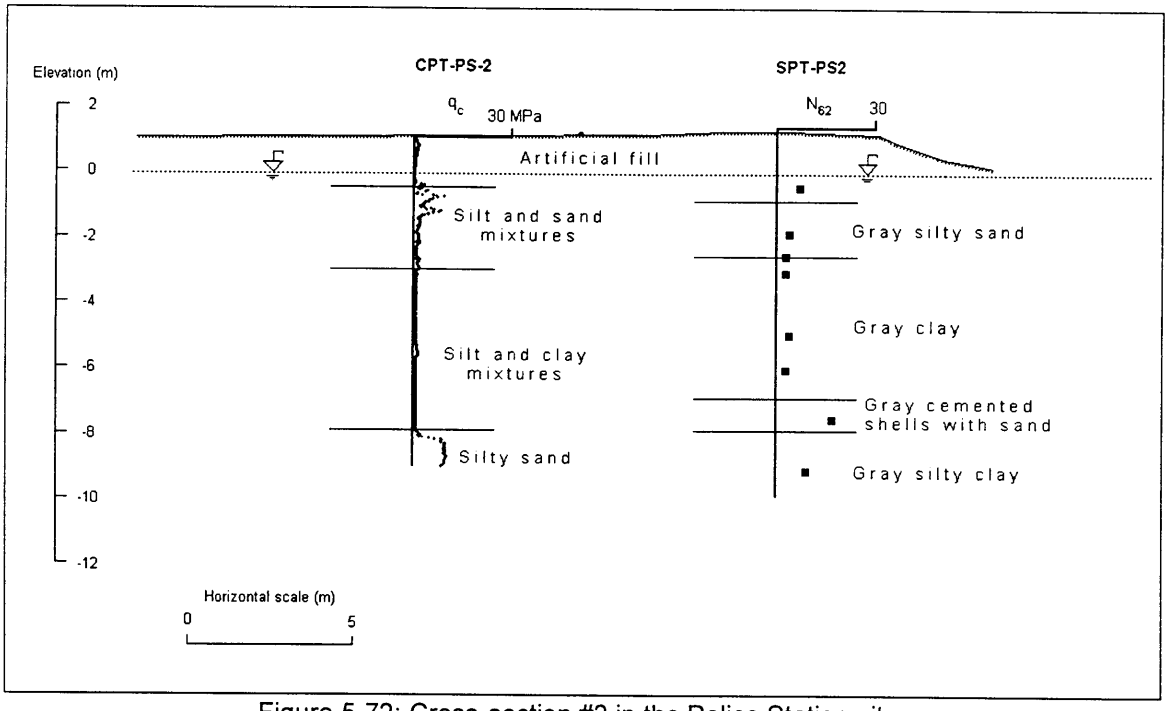

Figure 5-72: Cross-section #2 in the Police Station site.

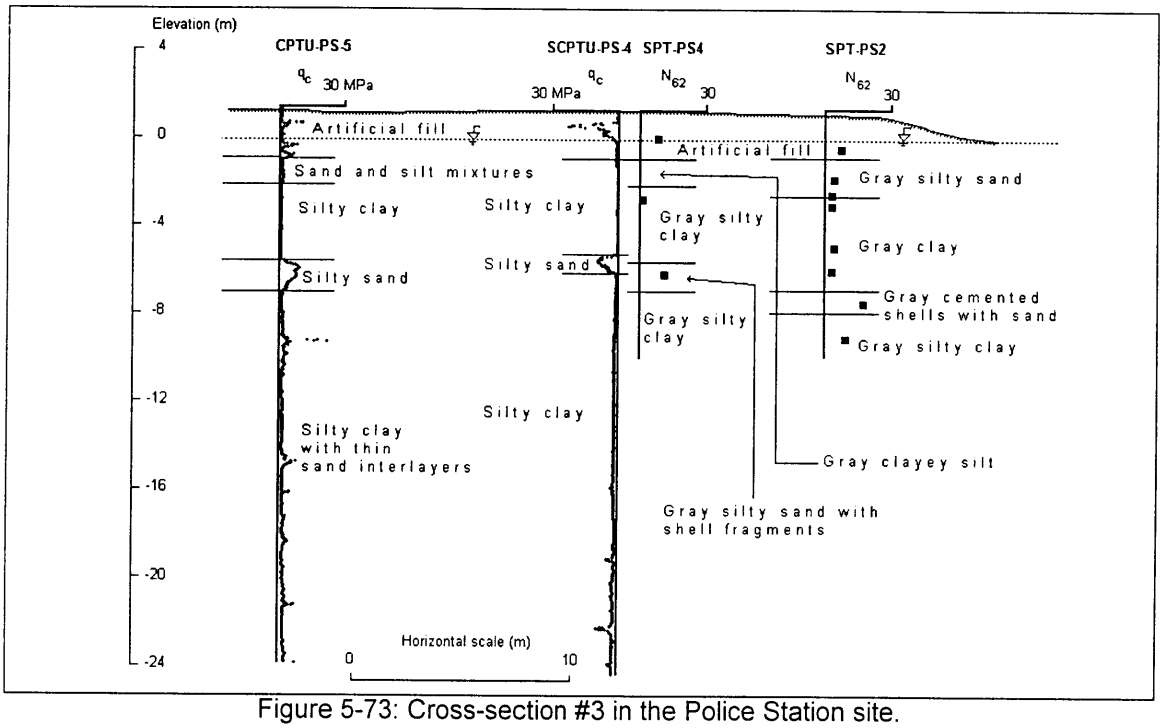

Figure 5-73: Cross-section #3 in the Police Station site.

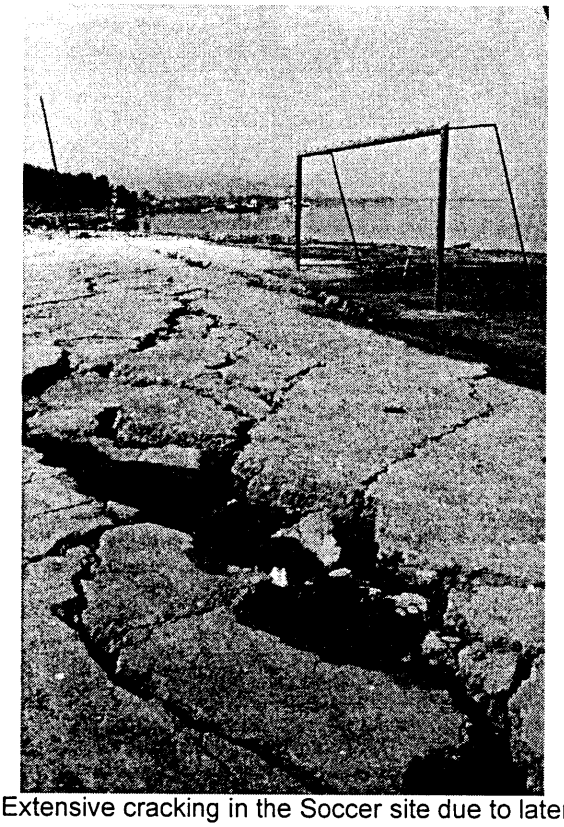

Figure 5-74: Extensive cracking in the Soccer site due to lateral spreading

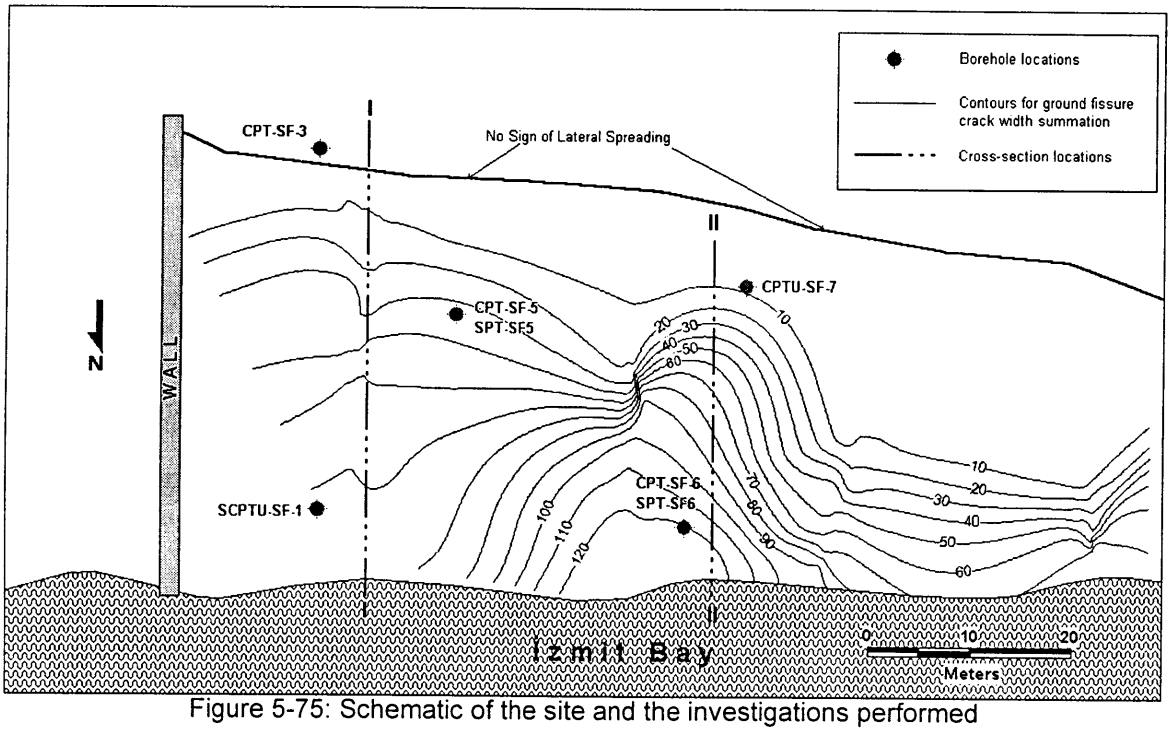

Figure 5-75: Schematic of the site and the investigations performed

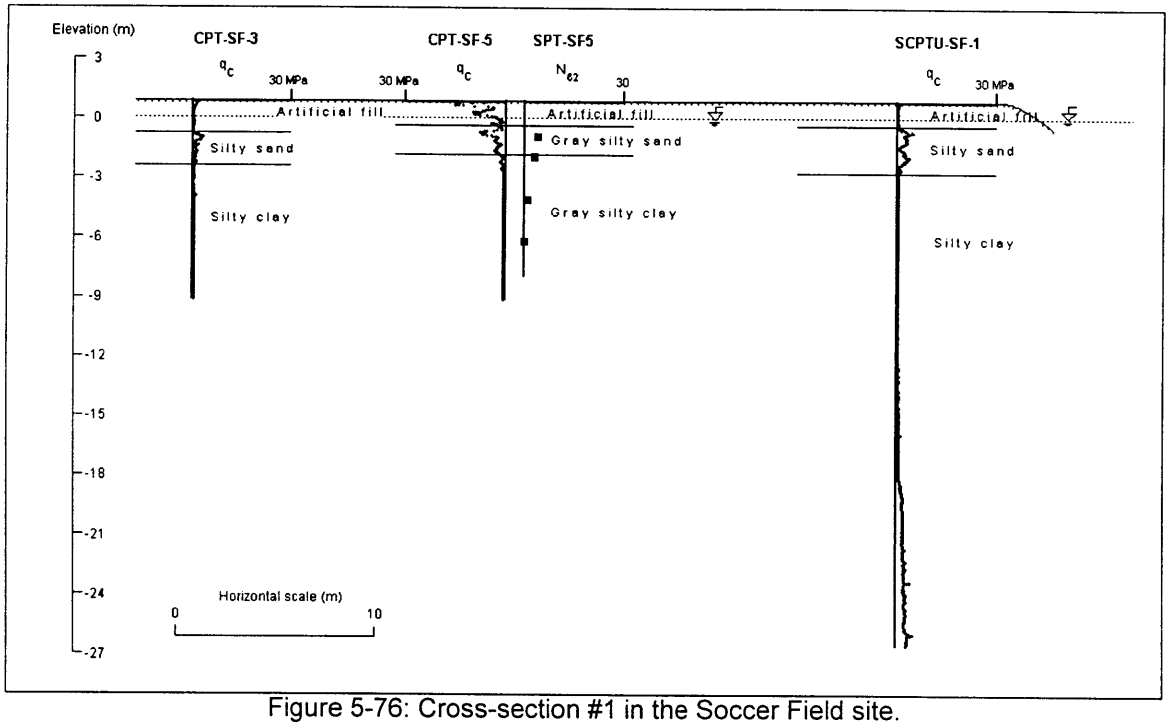

Figure 5-76: Cross-section #1 in the Soccer Field site.

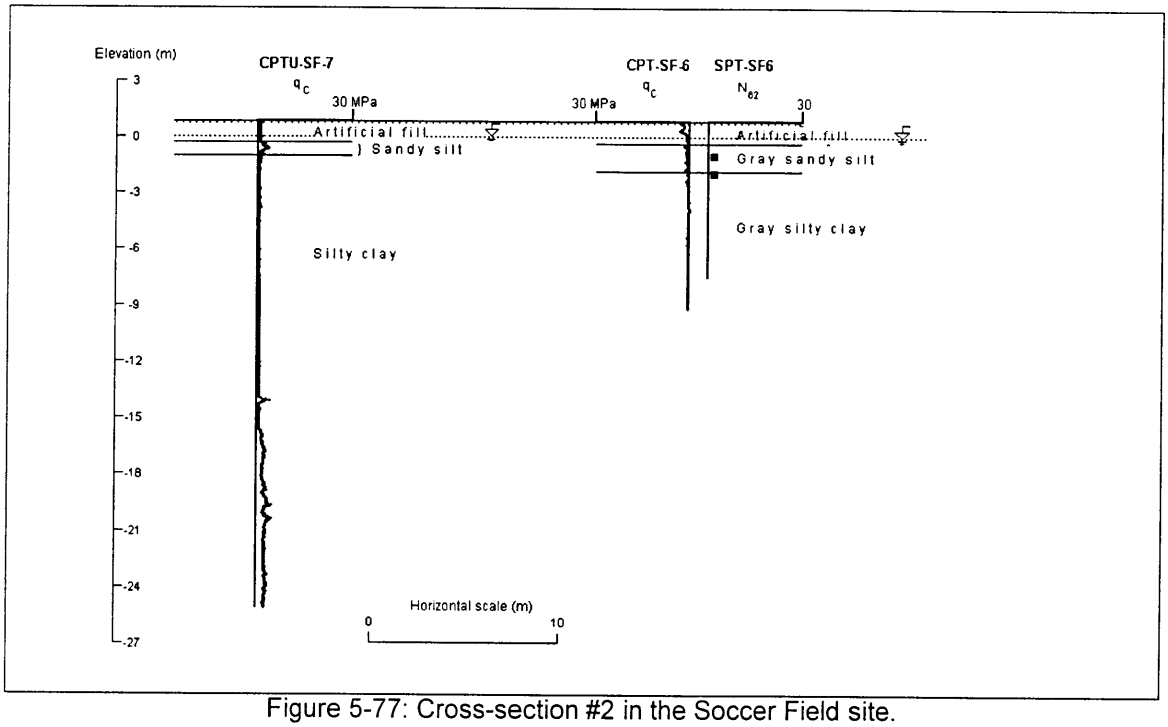

Figure 5-77: Cross-section #2 in the Soccer Field site.

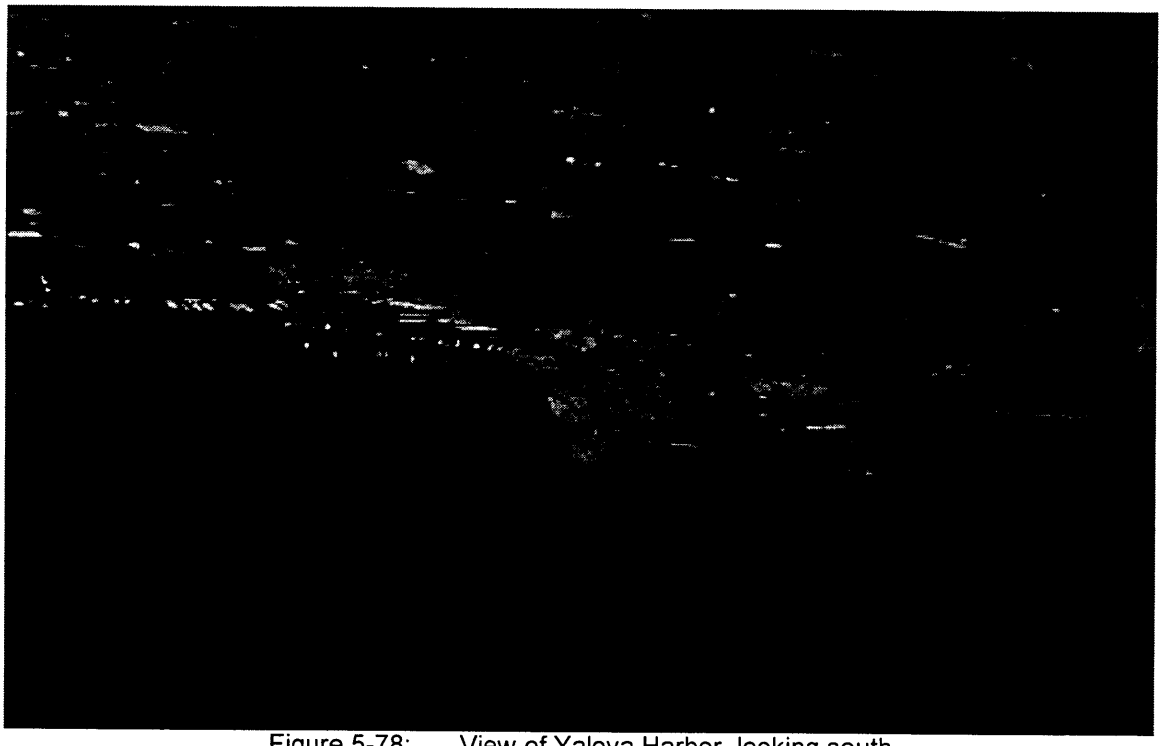

Figure 5-78: View of Yalova Harbor, looking south

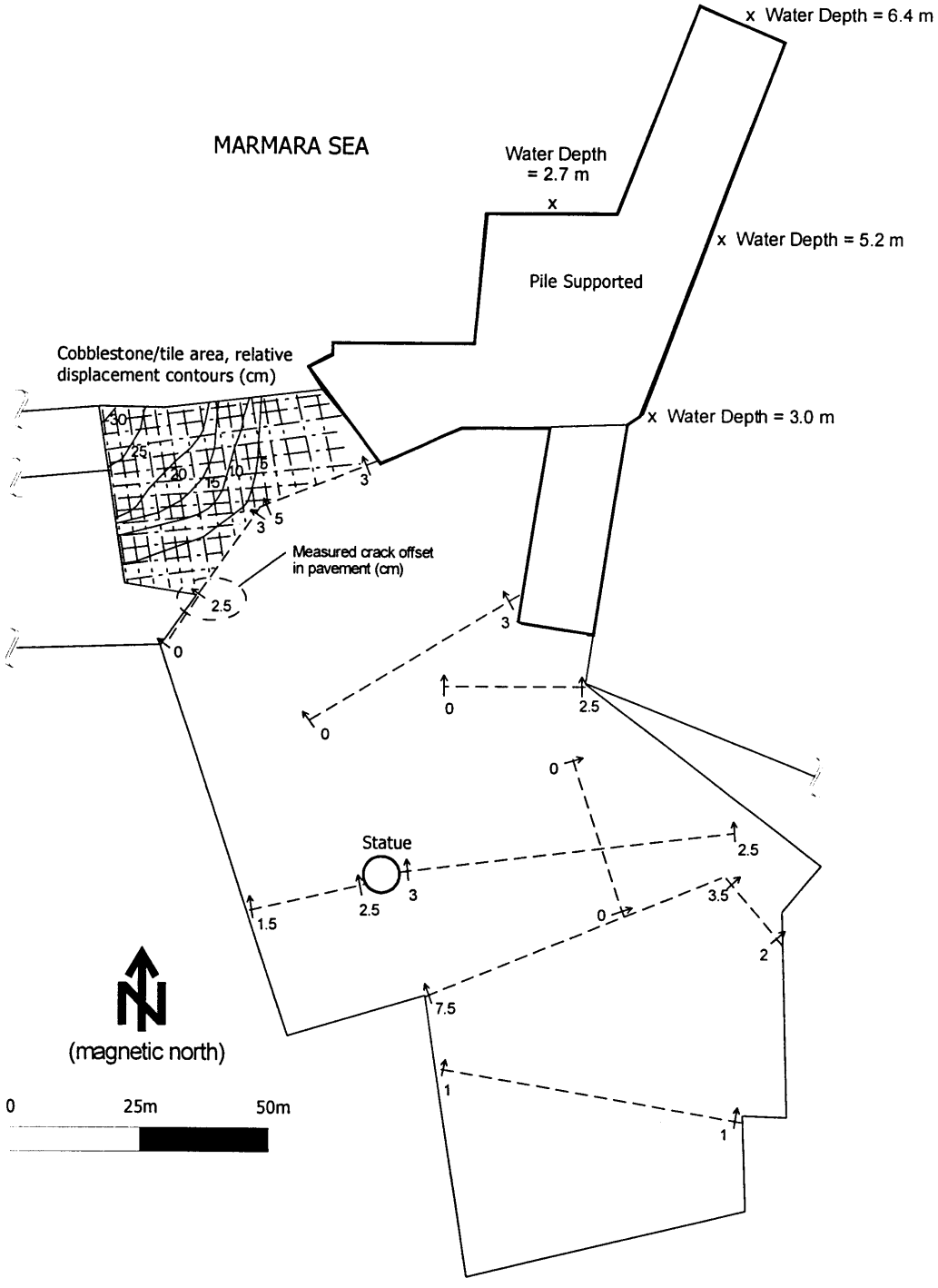

Figure 5-79: Sketch of parking lot and pier at Yalova Harbor

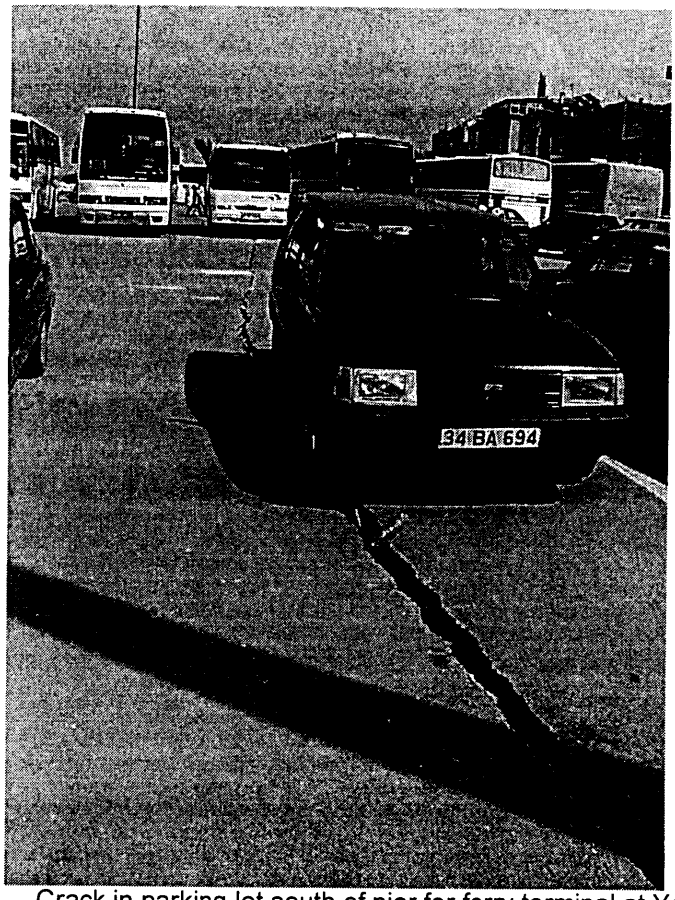

Figure 5-80: Crack in parking lot south of pier for ferry terminal at Yalova Harbor

seawall, is paved with cobblestones traversed with marble tiles (Figure 5-81). The tiles/parking area slopes down gently to the north with an average slope of about 3%. The bathymetry around the harbor is not known, but measured water depths at several points around the pier are shown in Figure 5-79.

As shown in Figure 5-79, ground deformations include offsets across cracks in the parking lot, and contours of cumulative deformations across the tiles relative to the south and east ends of the tiled area. The base map in Figure 5-79 is based on length measurements established by pacing, and azimuths from a hand compass. Crack widths were measured with a steel tape.

Figure 5-82 shows a plan view of the site and the location of the investigations while Figure 5-83 is a cross-section of the site based on the results of the exploration.

5.4.H. The Yakin Street Site

Minor lateral spreading was observed Along Yakin Street, of the City of Adapazari. The GPS coordinates of the site are N 40.77922° and E 30.39487°. Buckling of the pavement (Figure 5-84) and extension cracks (Figure 5-85) of width up to 8cm, were observed. The location of the ground cracks along with the investigation performed on the site is shown in Figure 5-86.

Figure 5-81: Ground cracking in cobblestone/tiles area at Yalova Harbor

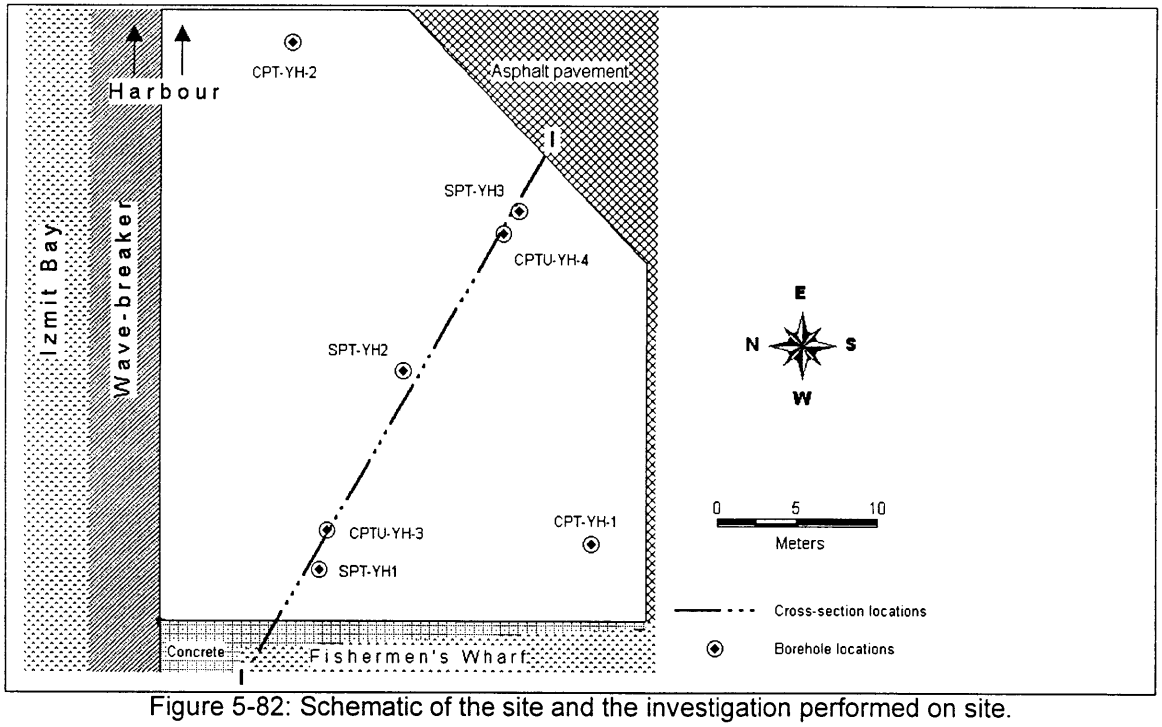

Figure 5-82: Schematic of the site and the investigation performed on site.

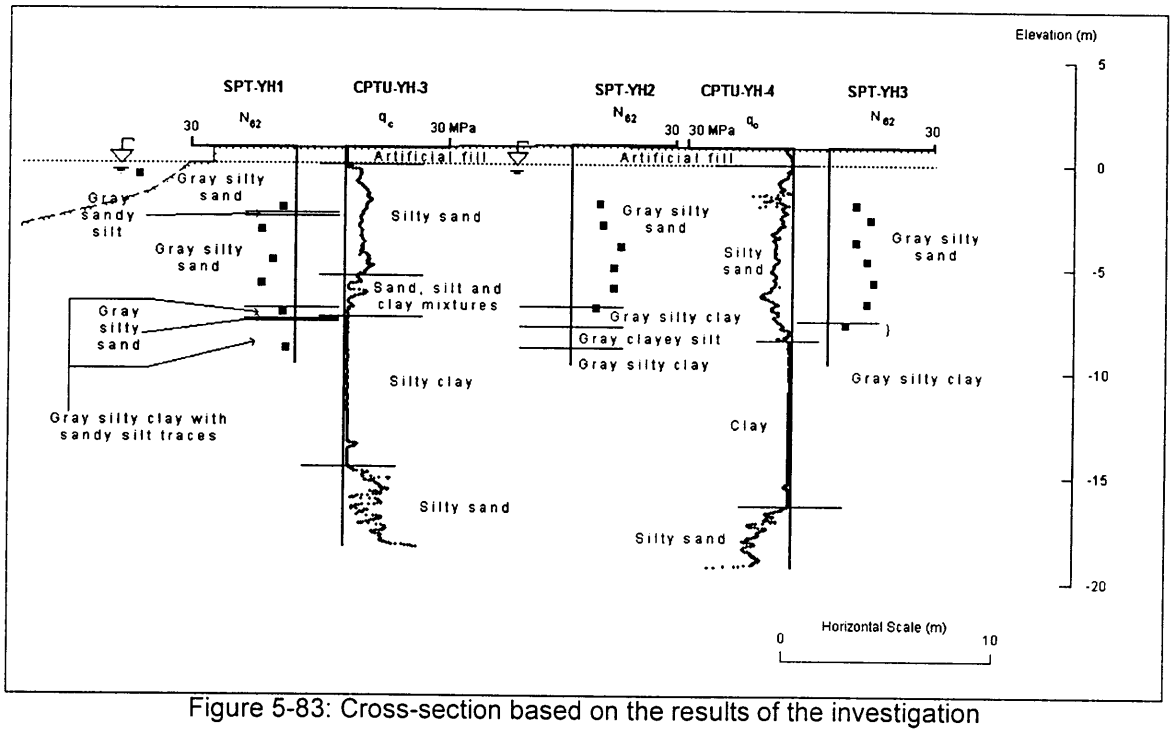

Figure 5-83: Cross-section based on the results of the investigation

Figure 5-84: Buckling of the pavement in Yakin Street

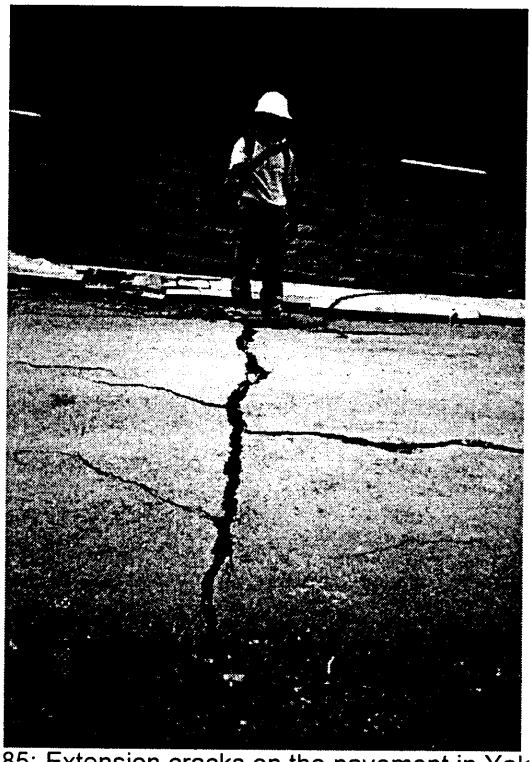

Figure 5-85: Extension cracks on the pavement in Yakin Street

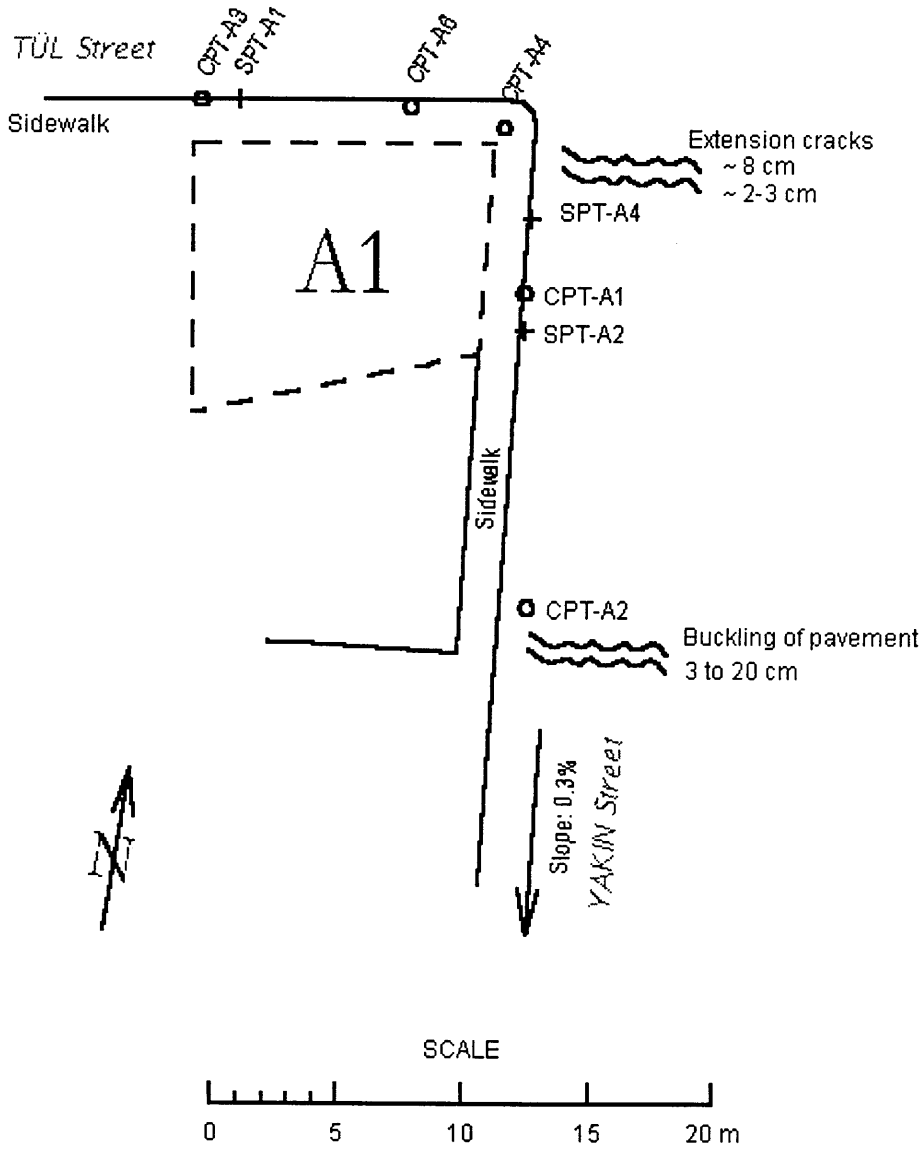

Figure 5-86: Schematic showing the investigation performed on the site and the observations made.

6. Summary

This geotechnical data report provides subsurface characterization of sites in Adapazari, a city of 180,000 which experienced severe ground failure, of the electrical substation in Adapazari, which experienced some localized equipment failures and of several minor and significant lateral spread sites in the affected region of the August 17, 1999 Kocaeli Earthquake. All data contained in this report is available in digital format in the enclosed CD-ROM and at the PEER website <http://peer.berkeley.edu/turkey/adapazari/>. It is hoped that the collected performance and subsurface data will advance understanding of liquefaction and ground softening of soils, especially fine grain soils, and promote further developments in empirically based and numerical models of lateral spreading.

7. References

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Bray, J.D., Sancio, R.B., Youd, L.F., Christensen, C., Cetin, O., Onalp, A., Durgunoglu, T., Stewart, J. P., C., Seed, R. B., Baturay, M.B., Karadayilar, T., and Emrem, C. (2001b) "Documenting Incidents of Ground Failure Resulting from the August 17, 1999 Kocaeli, Turkey Earthquake," Pacific Earthquake Engineering Research Center website: <http://peer.berkeley.edu/turkey/adapazari/ >.

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Appendices

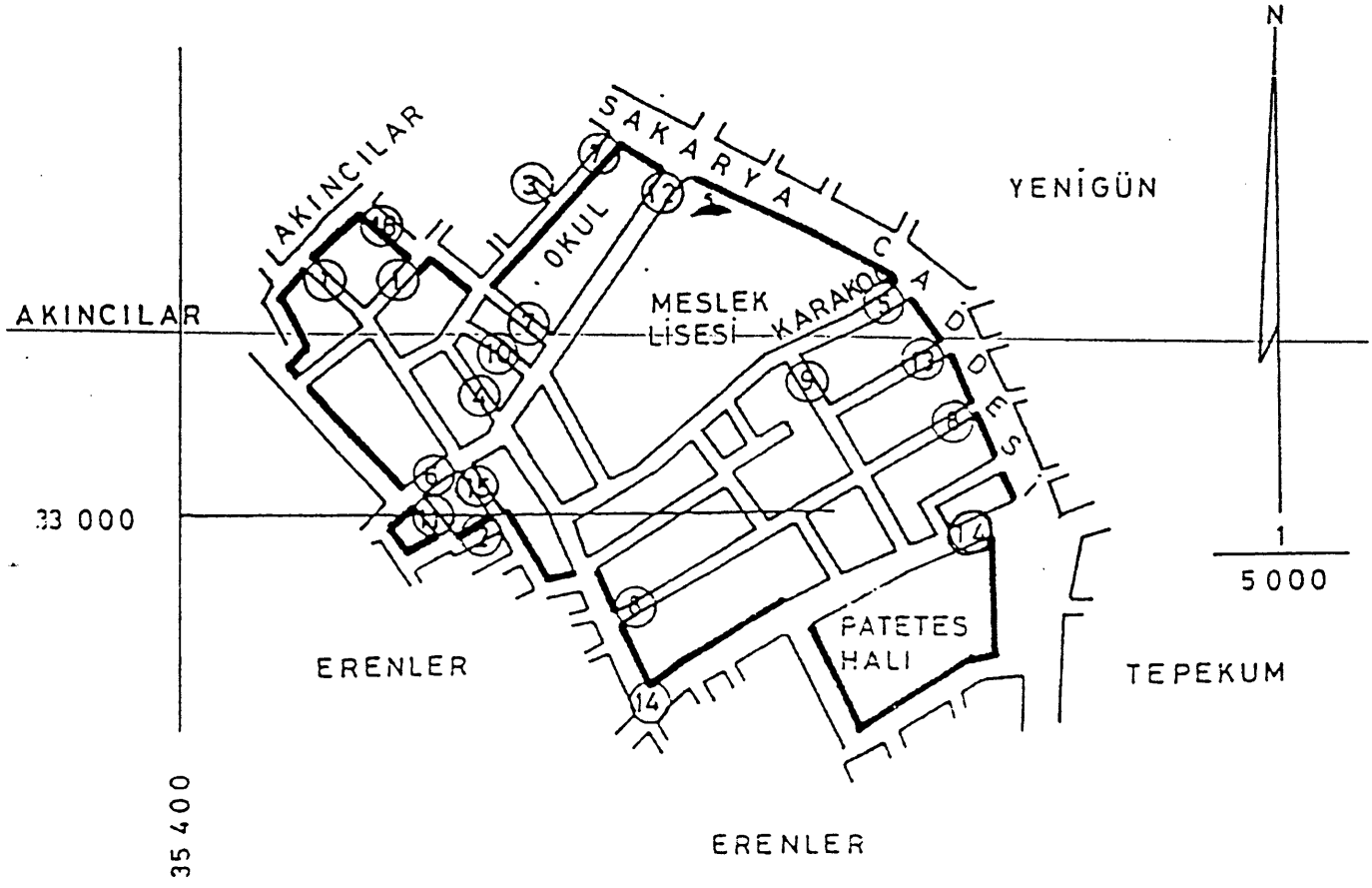
Note on the structure of the Appendices

The Appendices of this report are divided to the four phases of the project. Each Appendix is also divided to the sites under investigation and for each site, the site investigation location and the retrieved data are listed. For each site, a map of the location of the site and of the exploration means is attached. Next the site investigation data are provided with the following order when available: (a) the soundings of the CPT and CPTU, (b) the exploration boreholes with the SPT, and (c) shear wave velocity measurements using the SCPTU and SASW test.

Appendix I

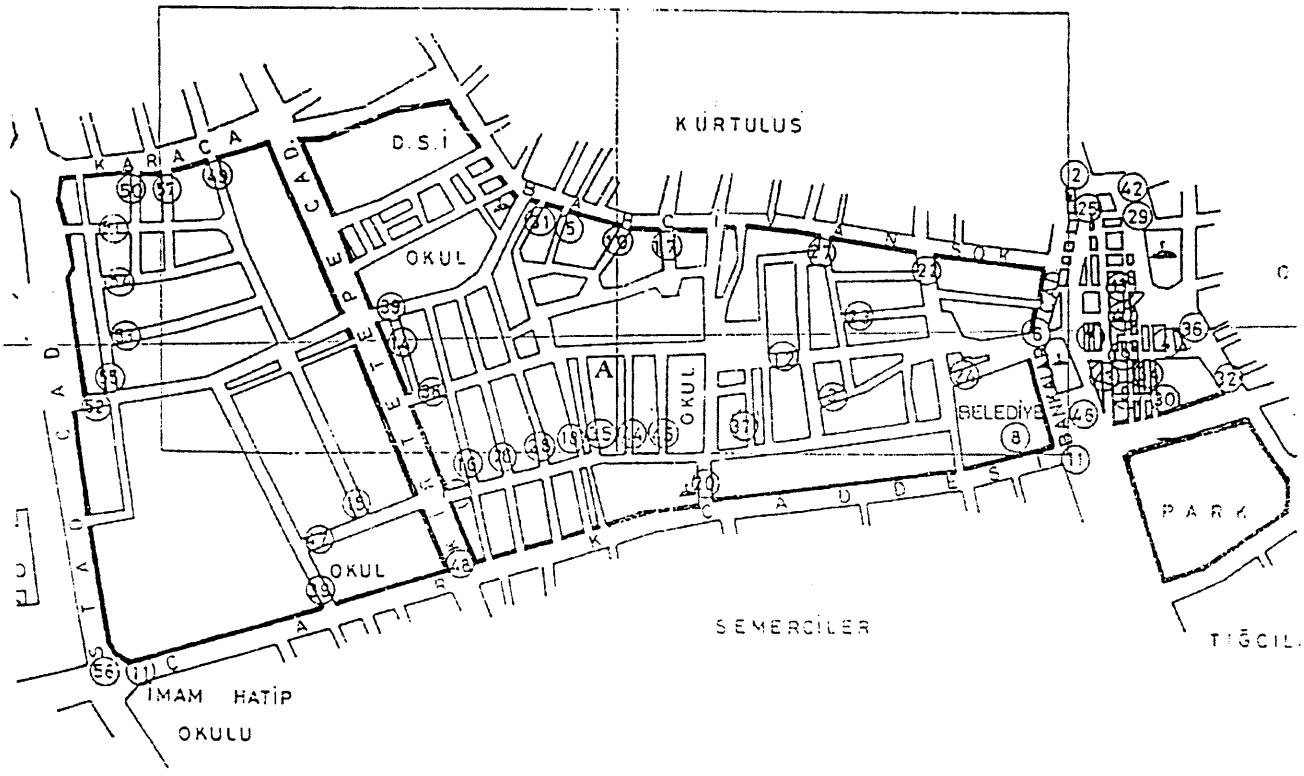
Phase 1

ÇUKURAHMEDİYE DİSTRİCT, ADAPAZARI



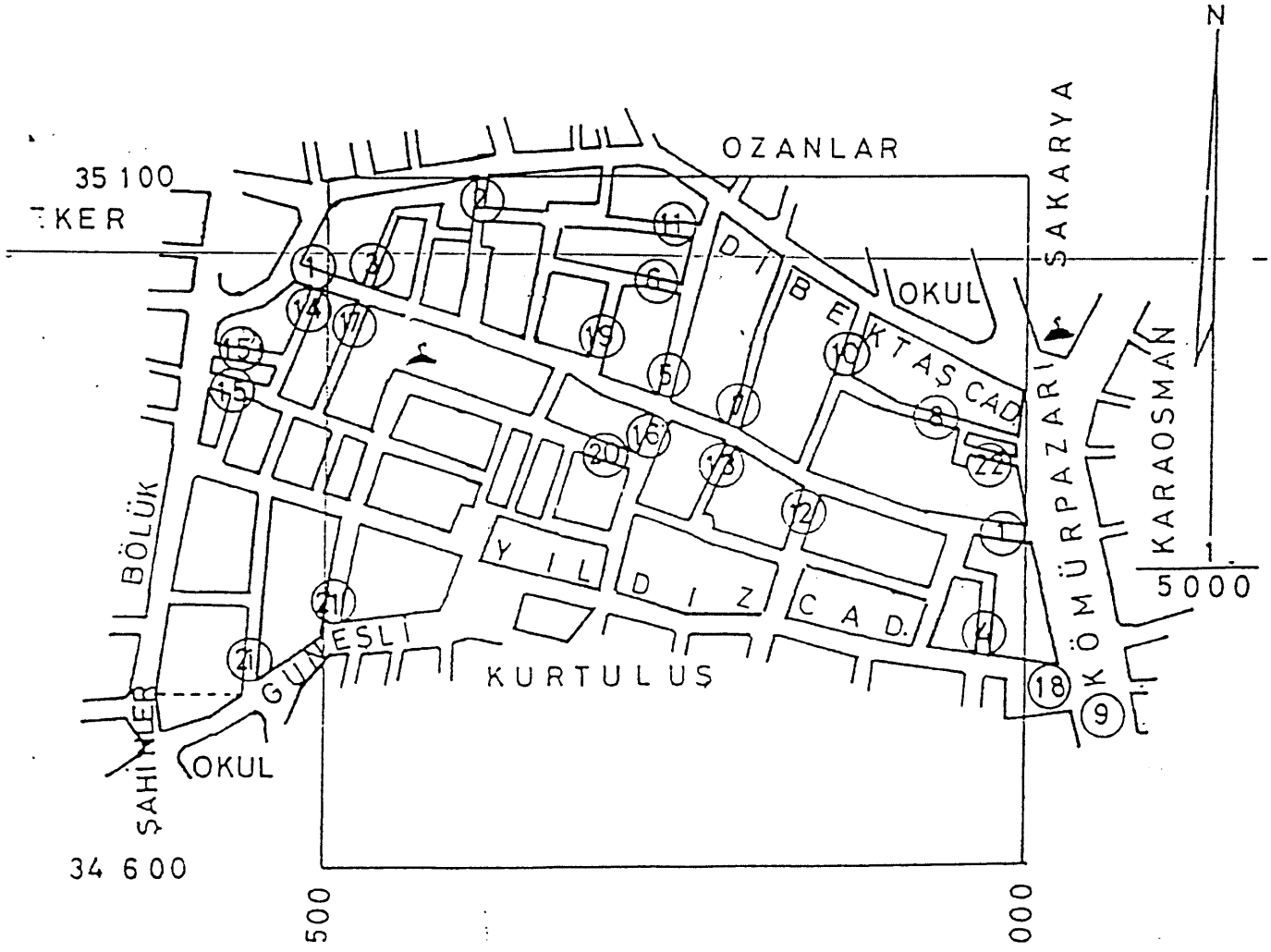
1	Akay Sokak	9	Düz Sokak
2	Akbay Sokak	10	Eren Sokak
3	Bala Sokak	11	Kırım Sokak
4	Cantek Sokak	12	Meydan Sokak
5	Çayır Sokak	13	Orta Sokak
6	Çile Sokak	14	Oğul Sokak
7	Çukur Sokak	15	Yumak Sokak
8	Demirci Sokak	16	Ada Sokak

CUMHURİYET DİSTRİCT, ADAPAZARI



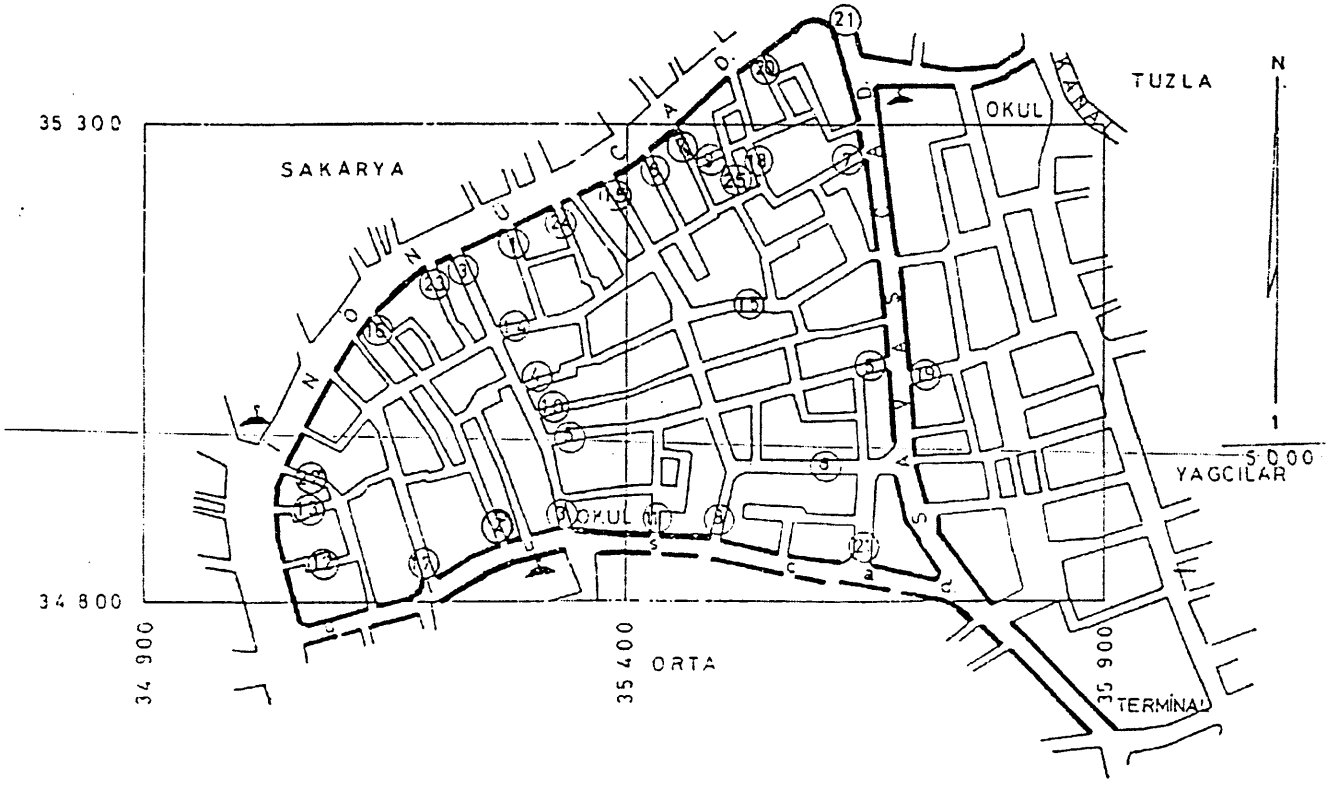
1	Arabacılar Çarş	17	Hatip Sokak	33	Şal Sokak	49	Bal Sokak
2	Ağa Cami	18	Hüseyin Rahmi Sokak	34	Tenekeciler Çarş	50	Bilen Sokak
3	Annem Sokak	19	2. Nci Gecit	35	Telli Sokak	51	Birlik Sokak
4	Aynalı Kavak Sokak	20	Kanara Sokak	36	Ticaret Sarayı	52	Değerli Sokak
5	Basık Sokak	21	Kasaplar Çarş Sokak	37	Toplu Sokak	53	Nadir Sokak
6	Bankalar Caddesi	22	Kayı Sokak	38	Tül Sokak	54	Pancar Sokak
7	Bakırcılar Çarş	23	Kiraz Sokak	39	Tümen Sokak	55	Sefa Sokak
8	Belediye Meydanı	24	Kolağası Sokak	40	3. Ncü Gecit	56	Stad Sokak
9	1. Nci Gecit.	25	Kuyumcular Çarş	41	Usta Sokak	57	Yel Sokak
10	Çalım Sokak	26	Menekşe Sokak	42	Unkapanı Çarş		
11	Çark Caddesi	27	Onat Sokak	43	Uzun Çarş		
12	Dr. Kamil Sokak	28	Papatya Sokak	44	Yakın Sokak		
13	4. Ncü Gecit.	29	Pirinç Pazarı	45	Yalı Sokak		
14	Fikret Sokak	30	Şal Sokak	46	Yazan Çarş		
15	Fulya Sokak	31	Serpil Sokak	47	Yasemin Sokak		
16	Gökalp Sokak	32	Soğan Pazarı	48	Sedat Kirtepe		

İSTİKLAL DİSTRİCT, ADAPAZARI



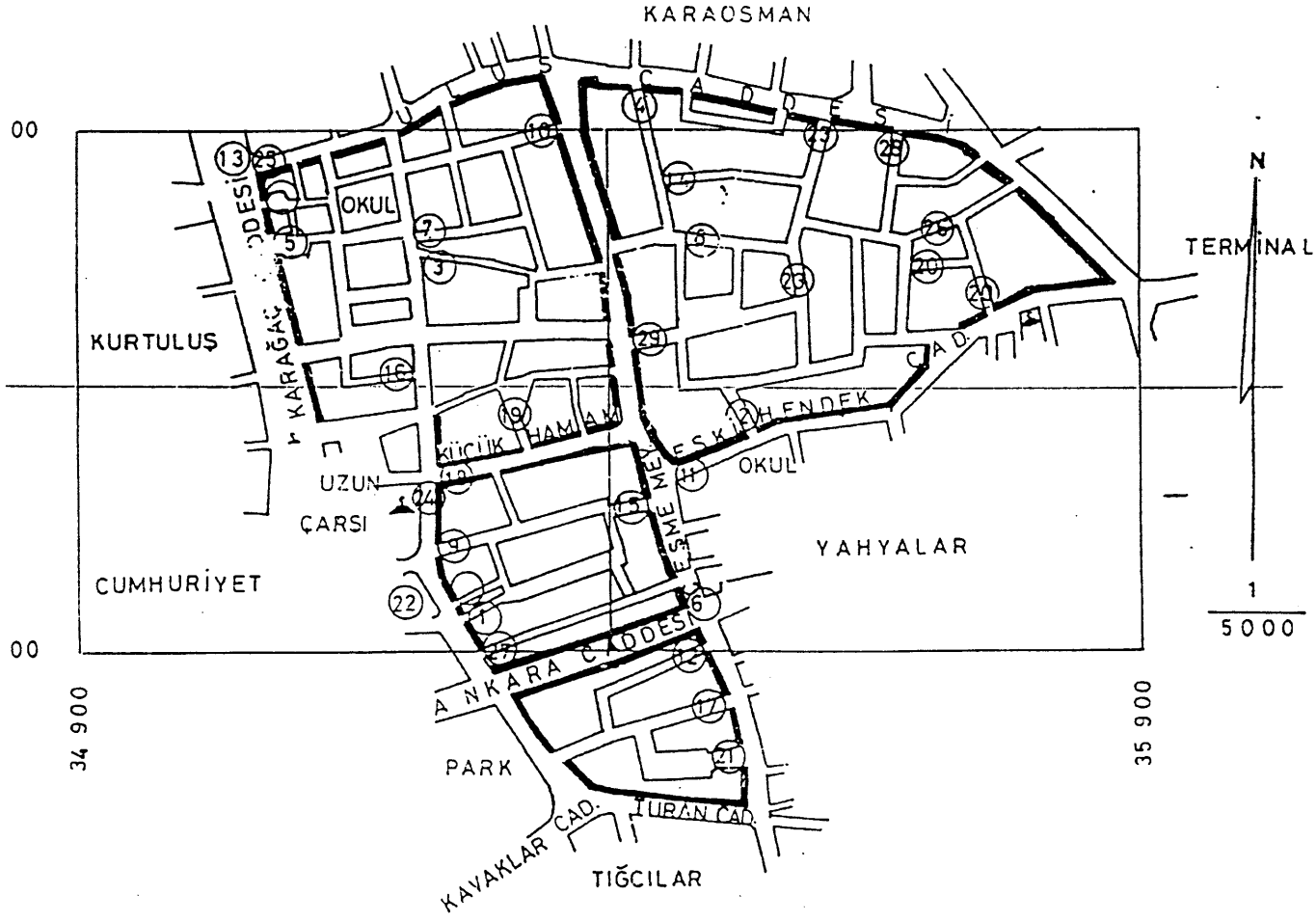
1	Aydın Sokak	10	Melik Sokak	19	Yonca Sokak
2	Bağ Sokak	11	Melal Sokak	20	Zembil Sokak
3	Çerez Sokak	12	Pilavci Sokak	21	Kertal Sokak
4	Çeşme Sokak	13	Sağlam Sokak	22	Bayram Sokak
5	Çimen Sokak	14	Sırım Sokak		
6	Biçer Sokak	15	Şeref Sokak		
7	Derin Sokak	16	Tüten Sokak		
8	Karanfil Sokak	17	Yay Sokak		
9	Kömürpazarı Caddesi	18	Yıldız Caddesi		

KARAOSMAN DİSTRİCT, ADAPAZARI



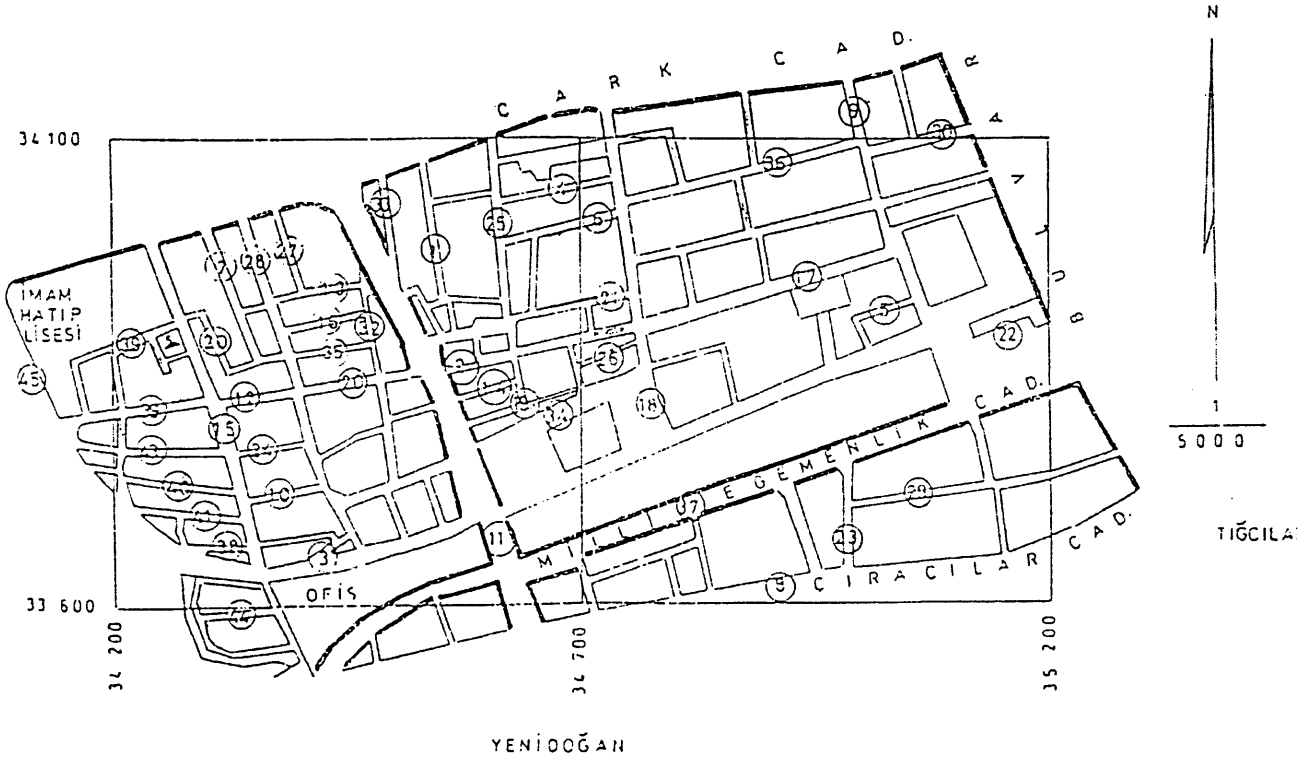
1	Ayan Sokak	10	Dutlu Sokak	19	Pınar Sokak
2	Başkan Sokak	11	Eski Sokak	20	Saka Sokak
3	Bayraklı Sokak	12	Ender Sokak	21	Barış Caddesi
4	Beşik Sokak	13	Gül Sokak	22	Yaprak Sokak
5	Bezirci Sokak	14	Kavşak Sokak	23	Şehitler Sokak
6	Ceylan Sokak	15	Kader Sokak	24	Yavru Sokak
7	Çıkırıkçi Sokak	16	Köroğlu Sokak	25	Zemin Sokak
8	Çövenci Sokak	17	Mestci Sokak		
9	Duman Sokak	18	Mert Sokak		

ORTA DİSTRİCT, ADAPAZARI



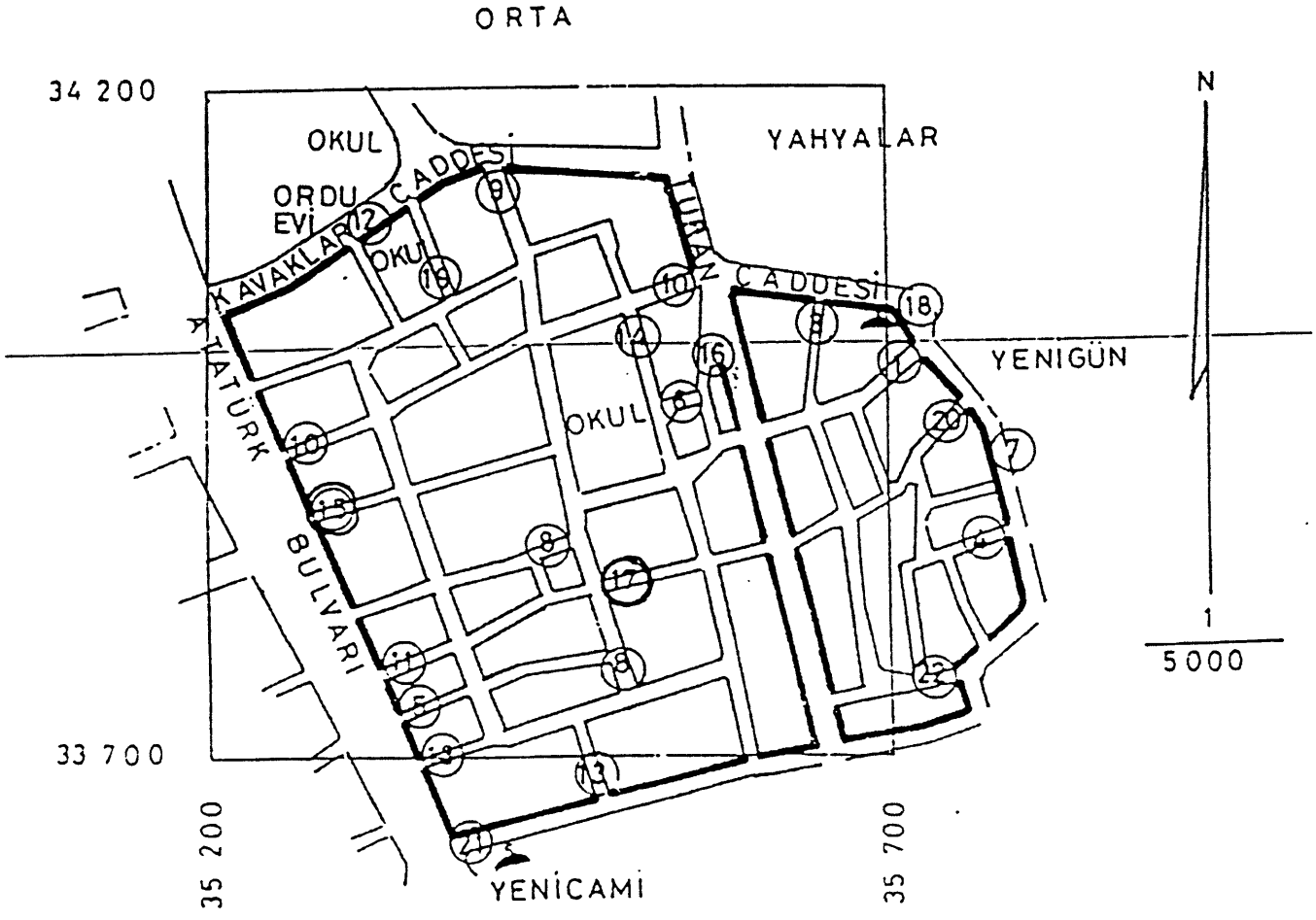
1	Acun Sokak	11	Eski Hendek Caddesi	21	Yonca Sokak
2	Adaş Sokak	12	Ipçi Sokak	22	Mutaflar Çarşısı
3	Avcılar Sokak	13	Karağaç Caddesi	23	Teğmen Çarşısı
4	Boyacı Sokak	14	Katip Sokak	24	Tozlu Camii Çarşısı
5	Can Sokak	15	Keçeci Sokak	25	Ulus Caddesi
6	Çeşme Meydanı Caddesi	16	Kökçü Sokak	26	Nazlı Sokak
7	Çil Sokak	17	Kuzu Sokak	27	Pazar Geçidi
8	Demirkapı Sokak	18	Küçükhamam Caddesi	28	1 Nolu
9	Altan Kutluata Sokak	19	Küçükhamam Çıkmazı	29	Duran Sokak
10	Doğu Sokak	20	Lale Sokak		

SEMERCILER DİSTRİCT, ADAPAZARI



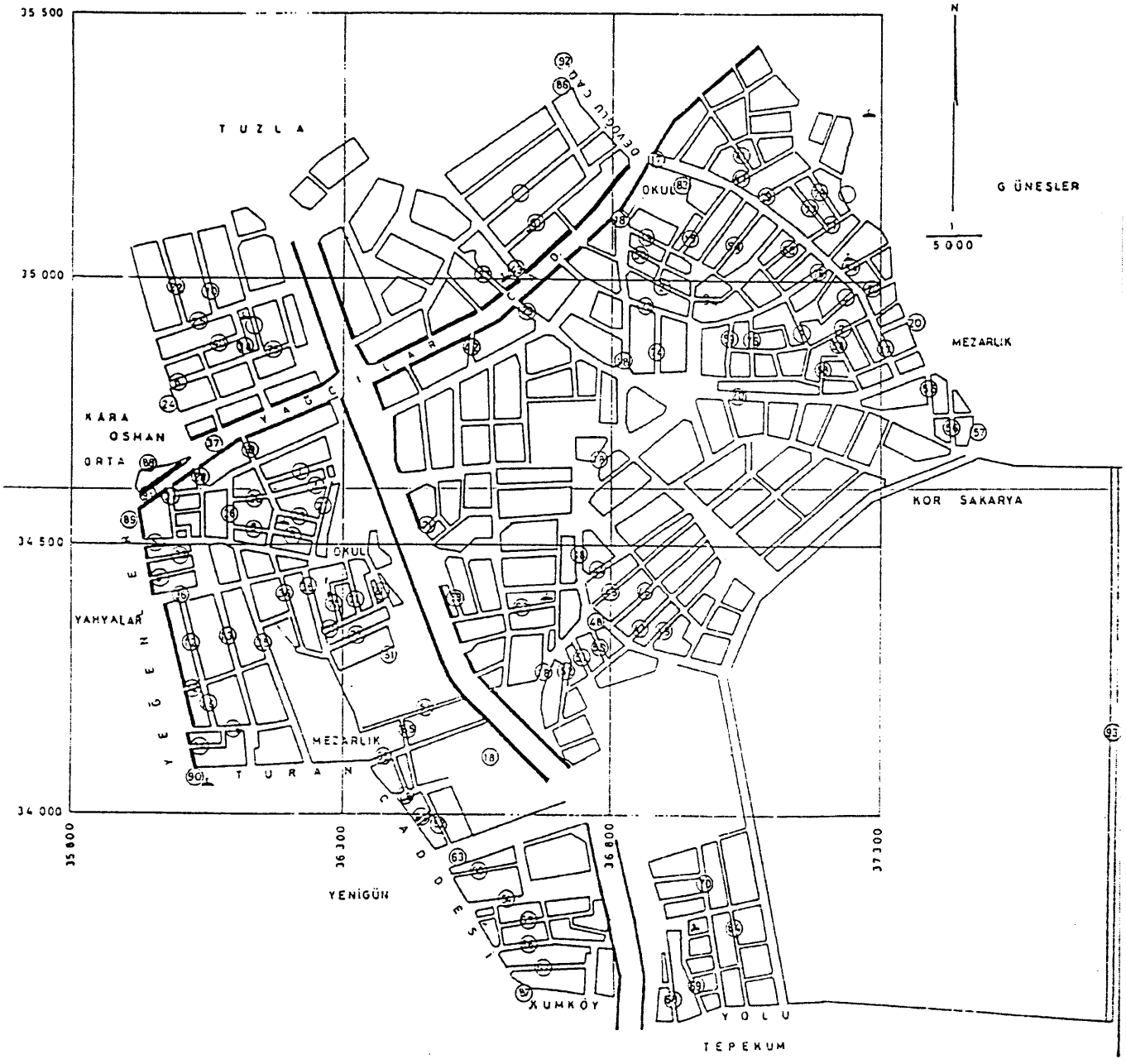
1	Anbarlı Sokak	13		25	Lüleci Sokak	37	Milli Egemenlik Caddesi
2	Alev Sokak	14	Fener Sokak	26	Mine Sokak	38	Çevik Sokak
3	Badem Sokak	15	Gökçe Sokak	27	Önder Sokak	39	Çiğdem Sokak
4	Badem Sokak	16	Gömeç Sokak	28	Parlak Sokak	40	Kardeş Sokak
5	Bozkurt Sokak	17	Hal Sokak	29	Sait Faik Sokak	41	Kıyı Sokak
6	Çakır Sokak	18	İtfaiye Sokak	30	Postane Sokak	42	Pelin Sokak
7	Çınar Sokak	19	Kadı Sokak	31	Saraçlar Sokak	43	Poyraz Sokak
8	Çırarcılar Caddesi	20	Kanca Sokak	32	Şen Sokak	44	Yalım Sokak
9	Drç Nuri Bayar Cad	21	Karşı Sokak	33	Yavuz Sokak	45	Anecdet Güven Cad.
10	Dalli	22	Kerem Sokak	34	Yamanlar Sokak		
11	Demiryolu Gecidi	23	Küçük Sokak	35	Yörük Sokak		
12		24	Latif Sokak	36	Yuvam Sokak		

TIĞCILAR DİSTRİCT, ADAPAZARI



1	Akça Sokak	10	Karaosman Sokak	19	Tekin Sokak
2	Atatürk Bulvarı	11	Kadirhoca Sokak	20	Yağcıoğlu Sokak
3	Çetin Sokak	12	Kavaklar Caddesi	21	Yenicami Sokak
4	Diken Sokak	13	Kesçi Sokak	22	Yunusağa Sokak
5	Döner Geçit Sokak	14	Kol Sokak		
6	Duyar Sokak	15	Küçükosman Sokak		
7	Hasırcılar Sokak	16	Müftü Sokak		
8	İnce Sokak	17	Pamuklar Sokak		
9	İpek Sokak	18	Turan Caddesi		

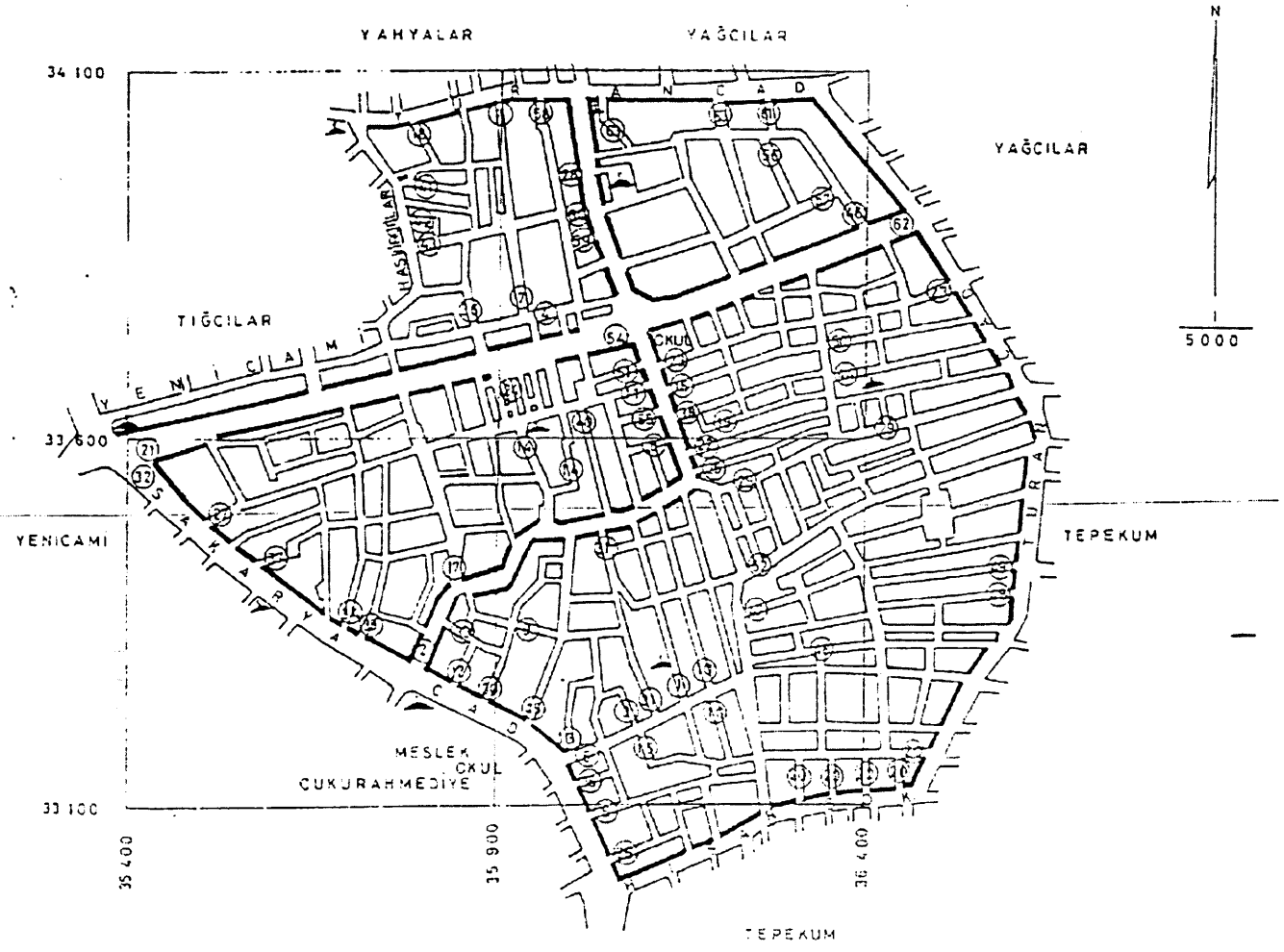
YAĞCILAR DİSTRİCT, ADAPAZARI



YAĞCILAR DİSTRİCT, ADAPAZARI

1	Açık Sokak	25	Kovan Sokak	49	Millet Sokak	73	Kemer Sokak
2	Adaşlar Sokak	26	Levent Sokak	50	Binnur Sokak	74	Tuna Sokak
3	Araç Sokak	27	Mesudiye Sokak	51	Destan Sokak	75	Kınalı Sokak
4	Arar Sokak	28	Nar Sokak	52	Derya Sokak	76	Emir Sokak
5	Ari Faga Sokak	29	Sadet Sokak	53	Endamlı Sokak	77	Nilüfer Sokak
6	Atar Sokak	30	Seçkin Sokak	54	1 Nolu Sokak	78	Merve Sokak
7	Besler Sokak	31	Sümbül Sokak	55	2 Nolu Sokak	79	Burcu Sokak
8	Boylu Sokak	32	Şebboy Sokak	56	3 Nolu Sokak	80	Günes Sokak
9	Cem Sokak	33	Pak Sokak	57	4 Nolu Sokak	81	Gülhan Sokak
10	Çiçeklı Sokak	34	Pul Sokak	58	5 Nolu Sokak	82	Berna Sokak
11	Çörek Sokak	35	Uygun Sokak	59	6 Nolu Sokak	83	Fatih Sokak
12	Daraba Sokak	36	Uzay Sokak	60	7 Nolu Sokak	84	Kaptan Sokak
13	Dayı Sokak	37	Yağcilar Caddesi	61	8 Nolu Sokak	85	Mercan Sokak
14	Diler Sokak	38	Yeni Carşı Sokak	62	9 Nolu Sokak	86	S.H.T. İsmail Şeremet
15	Düzgün Sokak	39	Yıldırım Sokak	63	10 Nolu Sokak	87	Kumköy Yolu
16	Er Sokak	40	Yuvalı Sokak	64	11 Nolu Sokak	88	E. Hendek Caddesi
17	Gazeller Sokak	41	Gonca Sokak	65	12 Nolu Sokak	89	Yeğenler Caddesi
18	Güler Sokak	42	Hayat Sokak	66	13 Nolu Sokak	90	Turan Caddesi
19	Güzeller Sokak	43	Ihlamur Sokak	67	14 Nolu Sokak	91	Ankara Caddesi
20	Göl Sokak	44	Kerim Sokak	68	15 Nolu Sokak	92	Devoğlu Caddesi
21	Halı Sokak	45	Oruc Sokak	69	16 Nolu Sokak	93	Sed Arkası Sokak
22	Has Sokak	46	Gürz Sokak	70	17 Nolu Sokak	94	H. Mehmet Bekler Sokak
23	Hilal Sokak	47	Barış Sokak	71	18 Nolu Sokak		
24	Kanal Sokak	48	Bakır Sokak	72	Kıbrıs Sokak		

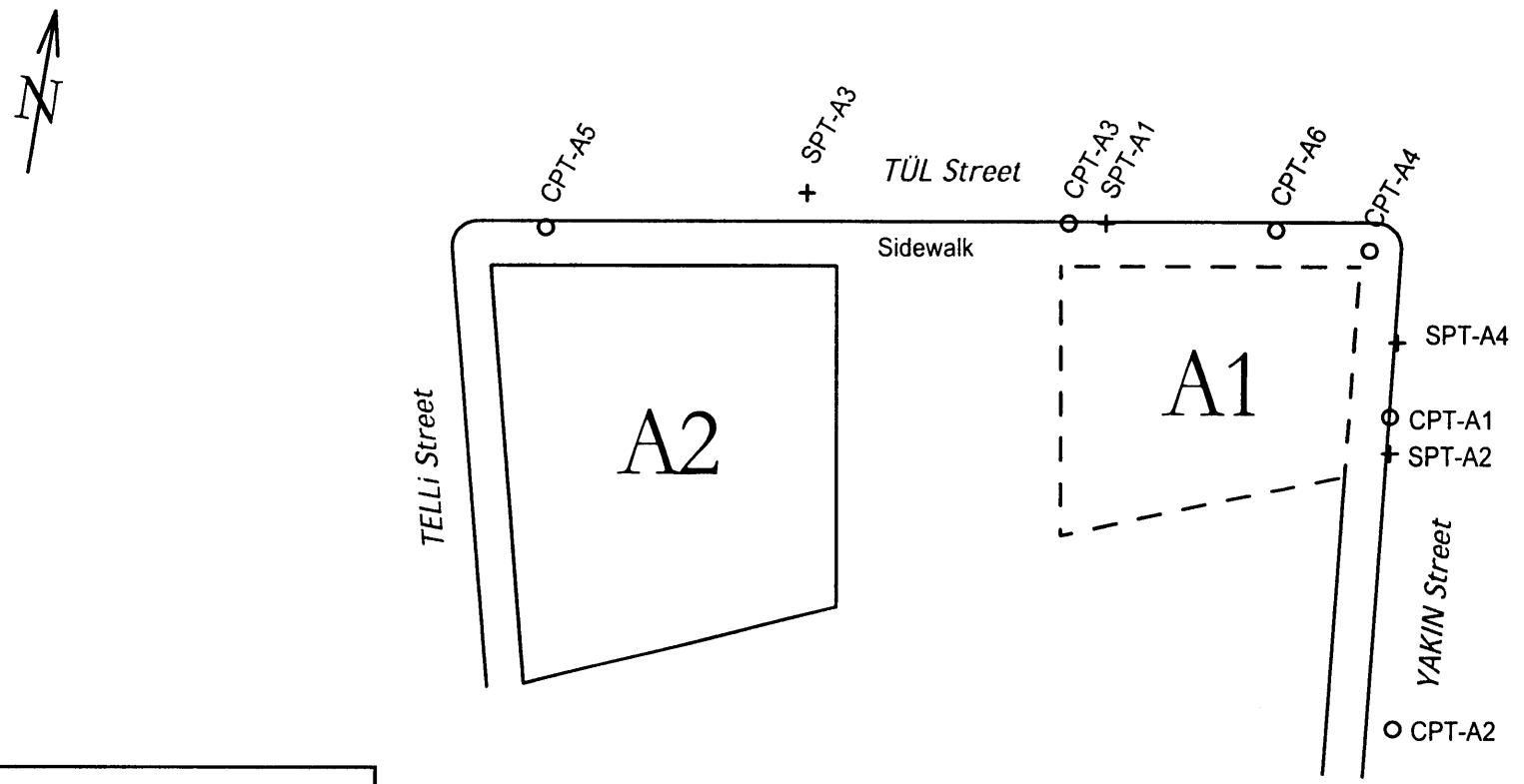
YENİGÜN DİSTRİCT, ADAPAZARI



1	Bağıslar Sokak	17	Hacı Sadık	33	Somun Sokak	49	Başak Sokak
2	Başlar Sokak	18	Heybetli Sokak	34	Sönmez Sokak	50	Gönül Sokak
3	Babalık Sokak	19	Kesik Sokak	35	Tekerci Sokak	51	Kılıç Sokak
4	Bebek Sokak	20	Kır Sokak	36	Terzioğlu Sokak	52	Barçın Sokak
5	Büyük Çıkmaz	21	Kurbanlar Sokak	37	Tepeli Sokak	53	Beyler Sokak
6	Çakmak Sokak	22	Metin Sokak	38	Ünlü Sokak	54	Serap Sokak
7	Çırak Sokak	23	Eser Sokak	39	Yazar Sokak	55	Arda Sokak
8	Danış Sokak	24	Mehtap Sokak	40	Yağız Sokak	56	Gültekin Sokak
9	Dilim Sokak	25	Kare Sokak	41	Yavaş Sokak	57	Aytekin Sokak
10	Doğan Sokak	26	Nal Sokak	42	Yamuk Sokak	58	Emektar Sokak
11	Can Sokak	27	Ömer Sokak	43	Yassı Sokak	59	Gül Sokak
12	Elibos Sokak	28	Özal Sokak	44	Zeybek Sokak	60	Alemdar Sokak
13	Erişen Sokak	29	Özbek Sokak	45	Zümrüt Sokak	61	Gün Sokak
14	Engin Sokak	30	Paralı Sokak	46	Yağmur Sokak	62	Yenigün Caddesi
15	Emin Sokak	31	Recep Sokak	47	Gemi Sokak	63	Şener Sokak
16	Gülsen Sokak	32	Sakarya Caddesi	48	Esen Sokak		

Phase 1

Site A



Difference in elevation with respect to CPT-A3

CPT-A1	-6 cm
CPT-A2	-10 cm
CPT-A3	0 cm
CPT-A4	-14 cm
CPT-A5	+54 cm
CPT-A6	-18 cm
SPT-A1	0 cm
SPT-A2	-5 cm
SPT-A3	-14 cm
SPT-A4	-14 cm
Tül street sidewalk	+4 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

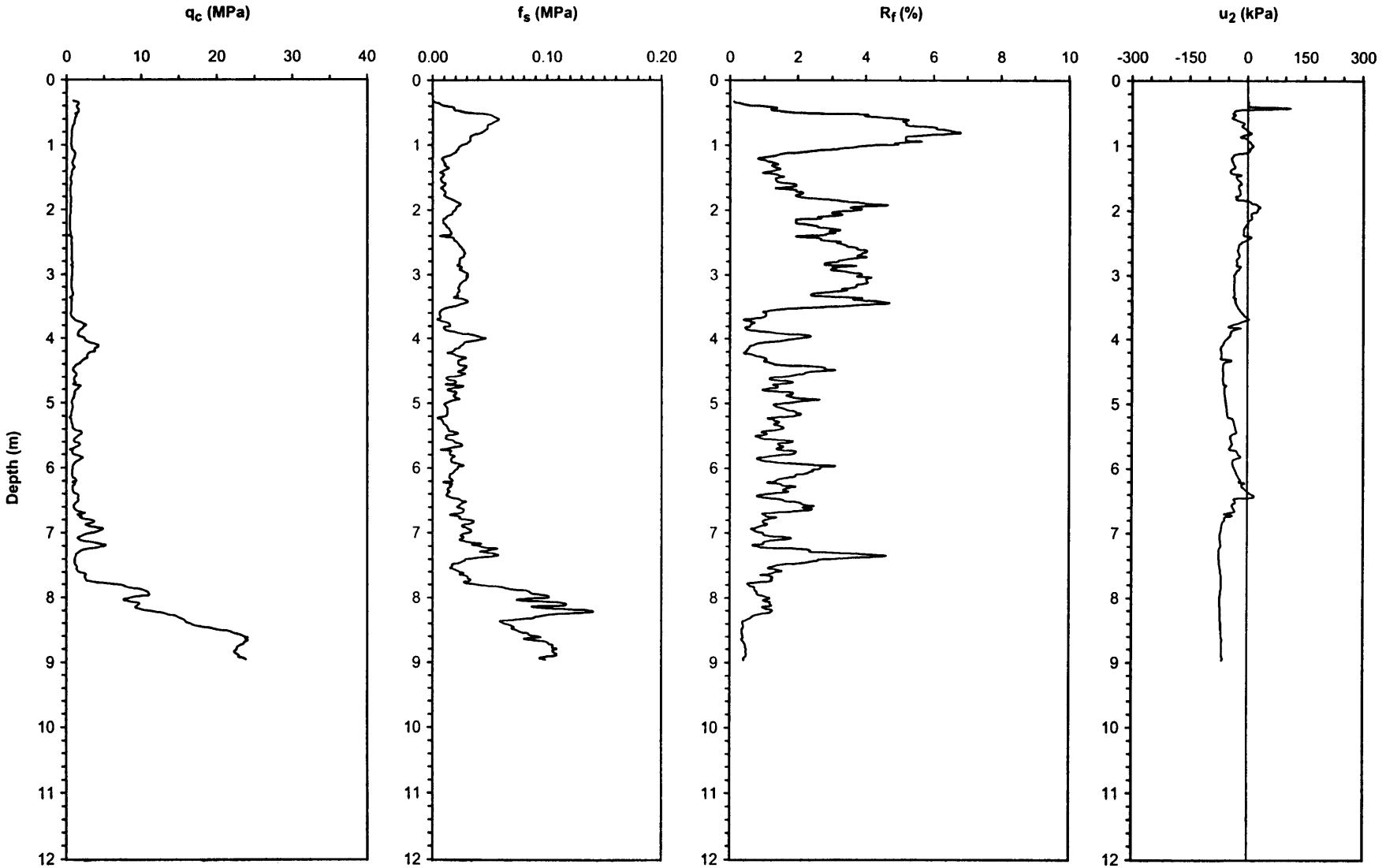
Contents: Plan view of Site A and location of subsurface exploration points

Location: Tül and Yakin Streets, Cumhuriyet District, Adapazari
GPS Coordinates: 40.77922° N 30.39487° E

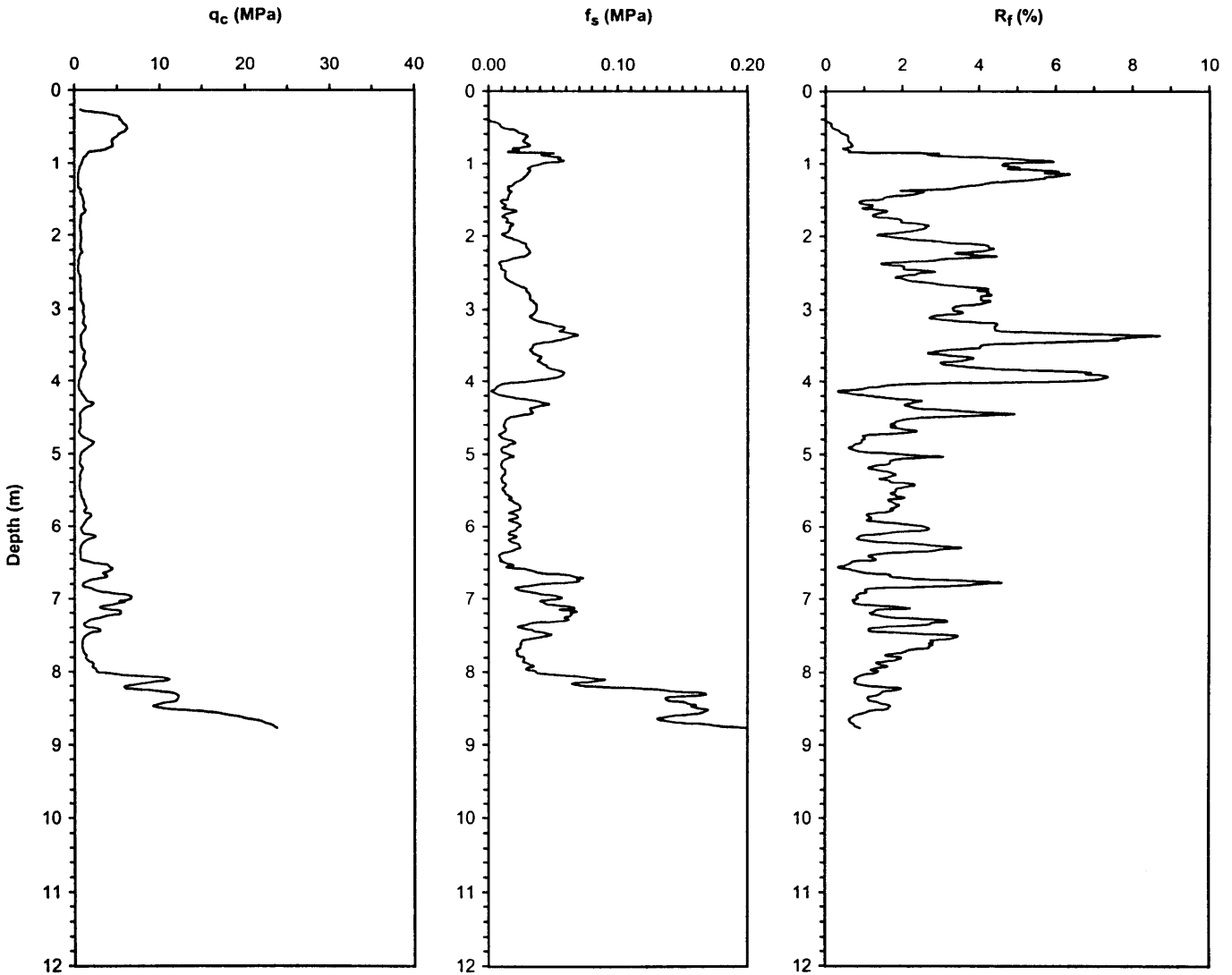
Scale: Graphic Scale | File Name: site_a.fcw - site_a.pdf

Date: 08/09/00 | Drawing: Rodolfo B. Sancio

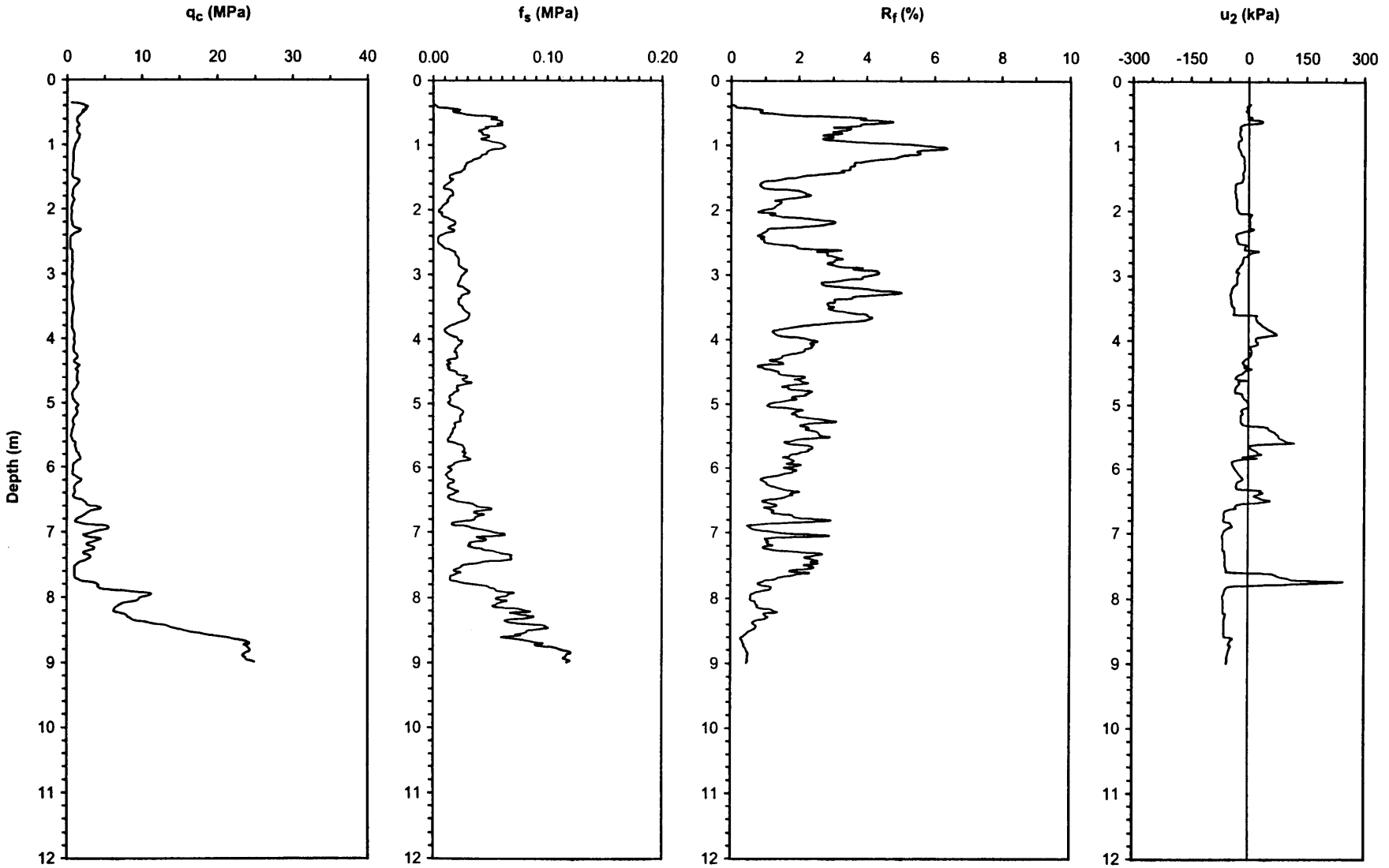
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A1	**Elevation:** -6 cm with respect to CPT-A3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 13, 2000 10:17
Sponsored by:	**File Name:**	cpta1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Pre-excavated depth was not measured, 30 cm was estimated.	



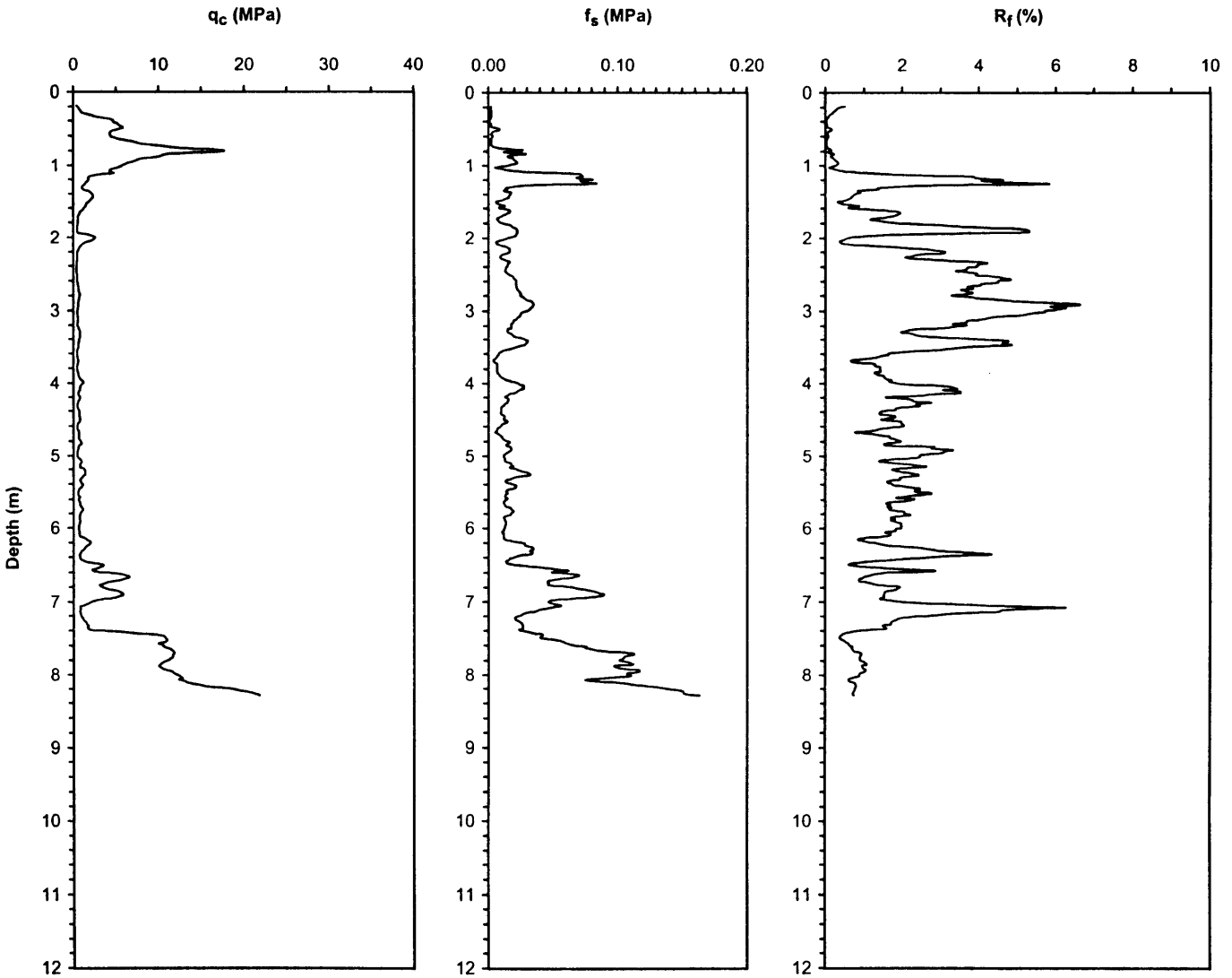
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A2	**Elevation:** -10 cm with respect to CPT-A3
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 13, 2000 11:35
Sponsored by:	**File Name:**	cpta2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



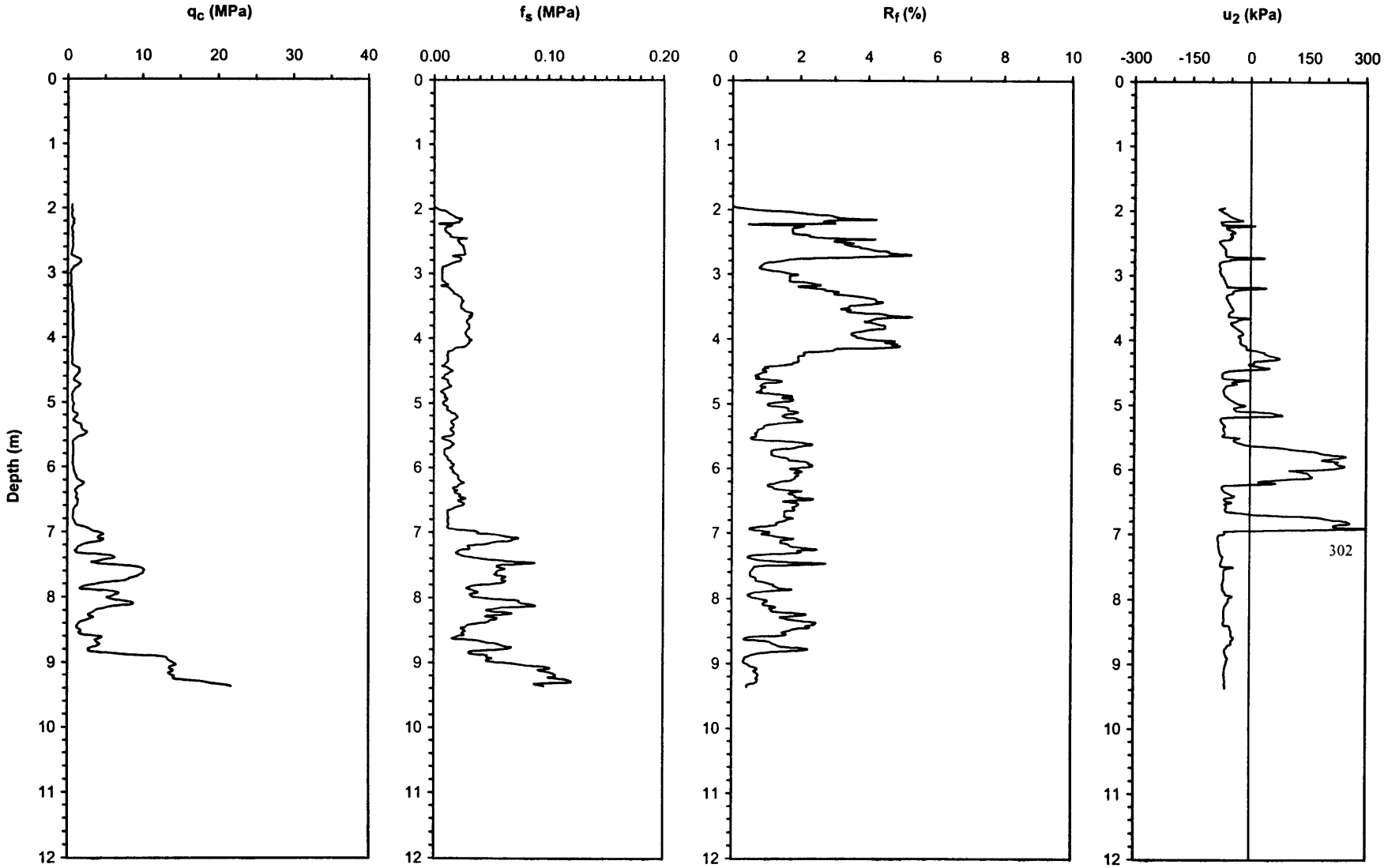
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A3	**Elevation:** 0 cm with respect to CPT-A3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 13, 2000
Sponsored by:	**File Name:**	cpta3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



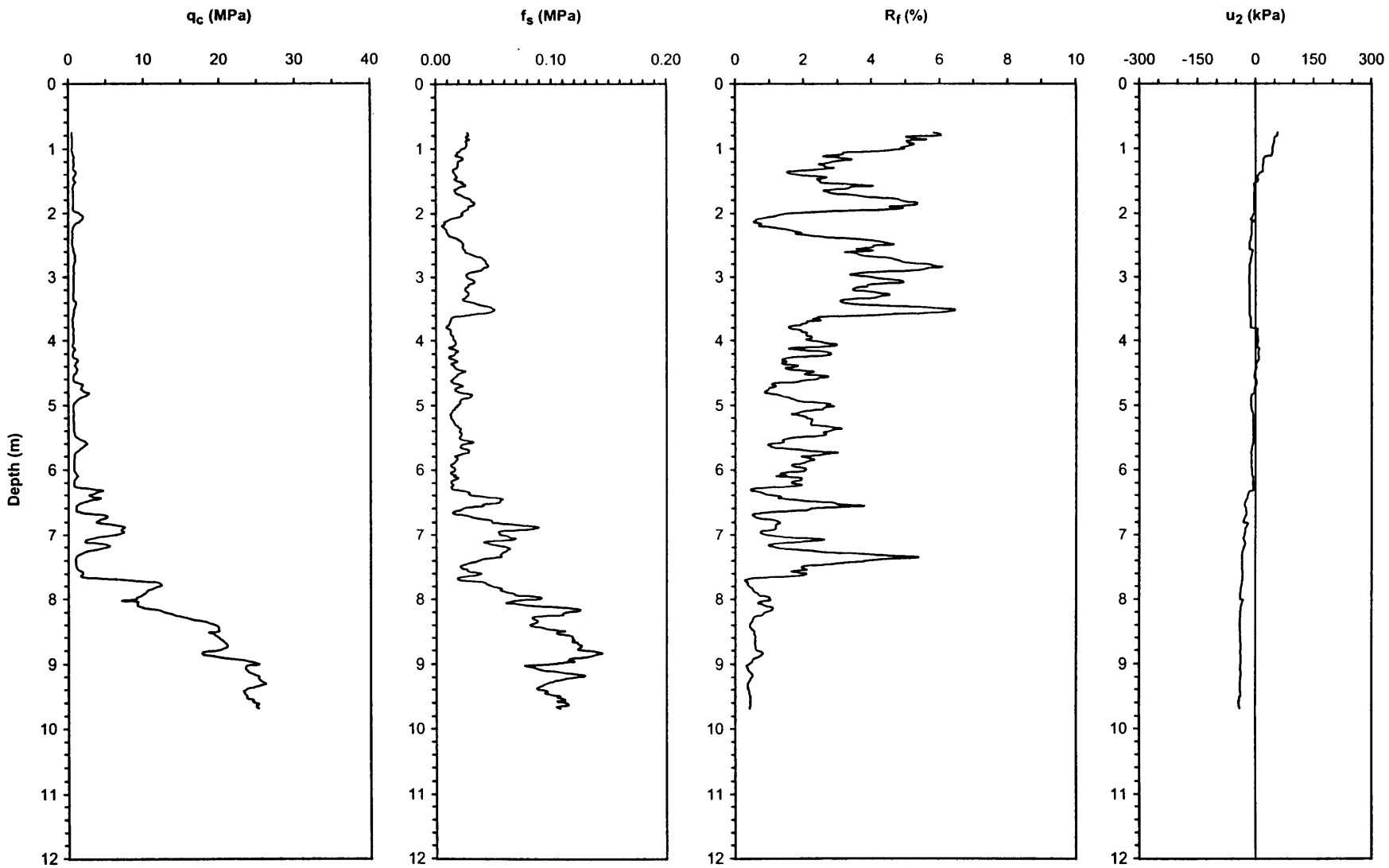
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A4	**Elevation:** -14 cm with respect to CPT-A3
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 13, 2000 16:22
Sponsored by:	**File Name:**	cpta4.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A5	**Elevation:** +54 cm with respect to CPT-A3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 14, 2000
Sponsored by:	**File Name:**	cpta5.txt	**Water Table Elevation:** 146 cm
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A6	**Elevation:** -18 cm with respect to CPT-A3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** July 19, 2000
Sponsored by:	**File Name:**	cpta6.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percusion hammer 75 cm to check for utilities	



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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: June 23, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL=0.90m 06/24/00, 0.77m 06/26/00, 0.77m 06/28/00
Notes: Solid flight auger used to a depth of 1.5 m

Test ID: SPT-A1
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -0 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									ASPH: Boring performed through asphalt and subgrade of Tul street											
1		ML	S-A1-1	18/45	1-3-3		4.27	37	FILL: Materials transition from a brown to gray gravelly sand to red silty clay of hard consistency			38	41	13	90					
2		MH/CH	S-A1-2	40/45	3-2-5		5.80	46	CH: Brown, moist, sticky, high plasticity silty clay without visible sand particles. S-A1-4 shows darker tones and some fine to medium sand content		28	39	53	23	94					
3		CH	S-A1-3	31/45	2-3-4		5.80	42		140	50	39	65	35	100	61	36	0.0035	<2μm	
		CL	S-A1-4	36/45	1-2-2		7.32	57		80	22	37	46	23	87					
4		ML/ML-CL	S-A1-5	40/45	2-2-2		7.32	53	ML: Gray silt with sand. Field description: ML	70	23	29	29	6	74	16	>10	0.045	0.003	
5		CH	S-A1-6	45/45	1-2-1		8.84	55	ML: Brown, low plasticity silt with fine sand and some red clay points	80	25	44	55	28	92					
6		CL/ML	S-A1-7	39/45	1-1-2		8.84	50	CH: High plasticity gray clay with low sand content (traces). At 5.3 m a thin fine sand seam was identified. Sample A1-7 exhibits some sand seams	75	26	39	47	20	97	31	18	0.012	<2μm	
7		ML	S-A1-8	37/45	6-6-9		10.37	65	ML: Gray sandy silt. Increasing sand content with depth	450		27	30		70	15	10	0.057	0.002	
8		ML	S-A1-9	41/45	6-9-10		11.89	75		275		27	29		58					
9		SP	S-A1-10	41/45	11-20-23		11.89	64	SP: Medium to fine poorly graded gray sand	300		24			5			0.29	0.12	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: June 24, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWT = 0.70m 06/24/00, 0.79m 06/26/00, 0.85m 06/28/00
Notes: Solid flight auger was used to a depth of 1m

Test ID: SPT-A2
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -5 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									ASPH: Asphalt of Yakin Street.											
1		ML/CL	S-A2-1	28/45	1-2-1	-	4.27	37	Fill	150	10	37	31	8	74	-	-	-	-	
2		ML	S-A2-2	42/45	1-2-2	-	5.80	53	ML: Brown clayey silt to silty clay with some red oxidation points and some fine sand	75	18	36	35	8	86	-	-	-	-	
3		CH/MH	SH-A2-3	42/42		2.55	-	-	CH: Brown high plasticity silty clay to clayey silt. Some fine to medium sand in a silty clay matrix was observed in the wash water	-	48	44	51	23	100	75	57	0.001	<2µm	
4		CL/CH	S-A2-4	40/45	2-1-1	3.35	7.32	52		120	53	37	49	25	85	-	-	-	-	
5		ML	S-A2-5	28/45	2-3-4	4.15	7.32	65	ML: Brown/gray clayey silt with traces of fine sand	160	35	34	35	7	93	18	12	0.018	0.001	
6		CL	SH-A2-6	42/42		4.95	-	-	CH: Gray silty clay of medium to high plasticity. Sticky to the fingers. Softens when remoulded	-	31	44	43	20	95	-	-	-	-	
7		MH/CH	S-A2-7	39/45	1-1-2	5.95	8.84	65		75	37	43	51	22	99	42	30	0.007	<2µm	
8		ML	S-A2-8	32/45	3-5-5	6.95	10.37	60	ML: Gray clayey silt with some fine sand	170	36	33	39	11	85	20	13	0.026	0.001	At approximately 7.15 m, an 8-cm thick stratum of black, fibrous material (Peat) was identified in the sample
9		SP-SM	S-A2-9	38/45	12-20-16	8.45	11.89	61	SP-SM: Poorly graded gray fine sand with silt. Gravel content ~ 8% in sample S-A2-10	380	-	33	-	-	8	-	-	0.12	0.08	
10		SP-SM	S-A2-10	38/45	7-10-15	9.95	12.82	-		320	-	22	-	-	6	-	-	0.33	0.1	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: June 26, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.87 m 06/26/00, 0.70 m 06/28, 0.72 m 07/08
Notes: Solid flight auger was used to a depth of 1.8 m

Test ID: SPT-A3
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -14 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Asphalt, subgrade and fill consisting of dark brown clayey gravelly sand.											
1		-	S-A3-1	0/45	2-1-2		4.27	47		-	-	-	-	-	-	-	-	-	-	
2		CH	S-A3-2	25/45	1-2-3		5.80	55	CH: Brown, high plasticity silty clay. At about 2 m there is a layer of brown fine sandy silt	170	61	39	61	33	99	-	-	-	-	
3		CH	S-A3-3	28/45	1-2-2		5.80	43		150	47	38	59	33	99	50	35	0.005	<2μm	
4		ML	S-A3-4A S-A3-4B	34/45	2-3-2		7.32	56	ML: Gray low plasticity clayey silt with fine sand.	70	12	30	31	6	79	-	-	- -	- -	A 3 cm-thick fine sand seam at 20 cm above the tip of the sampler
5		ML	SH-A3-5	42/42	-	4.45	-	-		80	18	39	38	9	91	13	3	0.024	0.004	
6		ML	S-A3-6	38/45	2-2-2	5.55	8.84	62		40	30	42	43	15	96	-	-	-	-	
7		ML	S-A3-7	38/45	3-4-10	6.45	10.37	61		170	-	31	37	8	88	-	-	-	-	
8									SAND: Gray poorly graded sand with silt and traces (8%) of fine rounded gravel											
		SP-SM	S-A3-8	35/45	7-18-24	8.45	11.89	65		360	-	23	-	-	9	-	-	0.22	0.08	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: July 24, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.82m 07/25/00
Notes:

Test ID: SPT-A4
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -14 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Asphalt, pavement and fill on Yakin Street											
1																				
2		CL/ML	SH-A4-1A	39/42	-	1.2	-	-	CL: Low to high plasticity, brown silty clay to clayey silt with traces of fine sand. Soil is highly inhomogeneous, showing variable FC	75	41	24	34	11	80	35	24	0.017	<2μm	
		CL/ML	SH-A4-1B		-	1.2	-	-		75	41	33	42	17	94	45	34	0.006	<2μm	Shear Vane @ 1.65 m. Peak = 16 kPa, Residual = 4 kPa
		CL	SH-A4-2	33/42	-	1.2	-	-		60	32	35	48	24	99	32	25	0.02	<2μm	Shear Vane @ 2.45 m. Peak = 29 kPa, Residual = 9 kPa
3		-	SH-A4-3	41/42	-	1.2	-	-		70	26	-	-	-	-	-	-	-	-	Shear Vane @ 3.45 m. Peak = 15 kPa, Residual = 5 kPa
4		ML	S-A4-4	30/45	3-3-3	4.05	7.32	51	ML: Brown low plasticity silt with traces of fine sand	-	-	32	36	10	97	24	18	0.017	<2μm	
5		CL/MH	S-A4-5	28/45	3-1-2	4.95	8.84	53	CL: Low to high plasticity gray silty clay to clayey silt with traces of fine sand	75	27	39	49	22	98	56	42	0.004	<2μm	
6																				
7		CL	S-A4-6	-	6-5-11	6.45	10.37	59		-	-	37	38	14	92	43	37	0.007	<2μm	Initially no sample was recovered at a depth of 6.5 m. In a second attempt, a sample was obtained at 6.6 m with the aid of a sand catcher.
8		ML	S-A4-7	33/45	11-12-17	7.95	11.89	60	SANDY SILT: Gray low plasticity sandy silt	440	-	25	25	-	66	35	32	0.018	<2μm	
9																				
10		SP-SM	S-A4-8	40/45	24-38-36	9.45	12.82	-	SAND: Gray poorly to well graded sand with silt. 22% gravel content in S-A4-9, very low (< 5%) in other samples.	-	-	18	-	-	8	-	-	0.3	0.185	
11		SW-SM	S-A4-9	39/45	14-18-20	10.95	14.94	54		-	-	17	-	-	10	-	-	0.61	0.074	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Joint Research

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NSF, Caltrans
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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: July 24, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.82m 07/25/00
Notes:

Test ID: SPT-A4
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -14 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

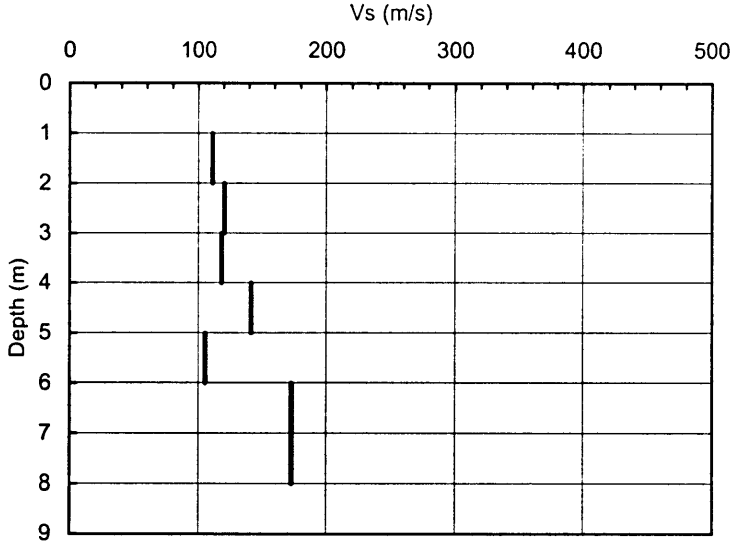
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
11		SW-SM	S-A4-9	39/45	14-18-20	10.95	14.94	54		-	-	17	-	-	10	-	-	0.61	0.074	
12																				
		SP-SM	S-A4-10	33/45	14-17-18	12.45	16.46	62		-	-	16	-	-	7	-	-	0.5	0.1	
13																				
14									CH: Gray, high plasticity stiff clay.											
15		CH	S-A4-11	26/45	4-4-7	14.95	17.92	62		250	53	37	69	45	100	86	73	<2μm	<2μm	BW rods were used for the SPT at 15 m

Legend
S: Spit Spoon (SPT) SH: Shelby tube

Shear Wave Velocity Profile Determined
using the Seismic Cone (Downhole Method)

Test ID: CPT-A3

Cone Depth (m)	Depth Interval (m)	$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.26	1.00	109	114	111
	2.00	109	114	111
3.26	2.00	116	125	121
	3.00	116	125	121
4.26	3.00	128	109	118
	4.00	128	109	118
5.26	4.00	122	161	142
	5.00	122	161	142
6.26	5.00	109	102	105
	6.00	109	102	105
7.26	6.00	179	167	173
	7.00	179	167	173
8.26	7.00	167	179	173
	8.00	167	179	173

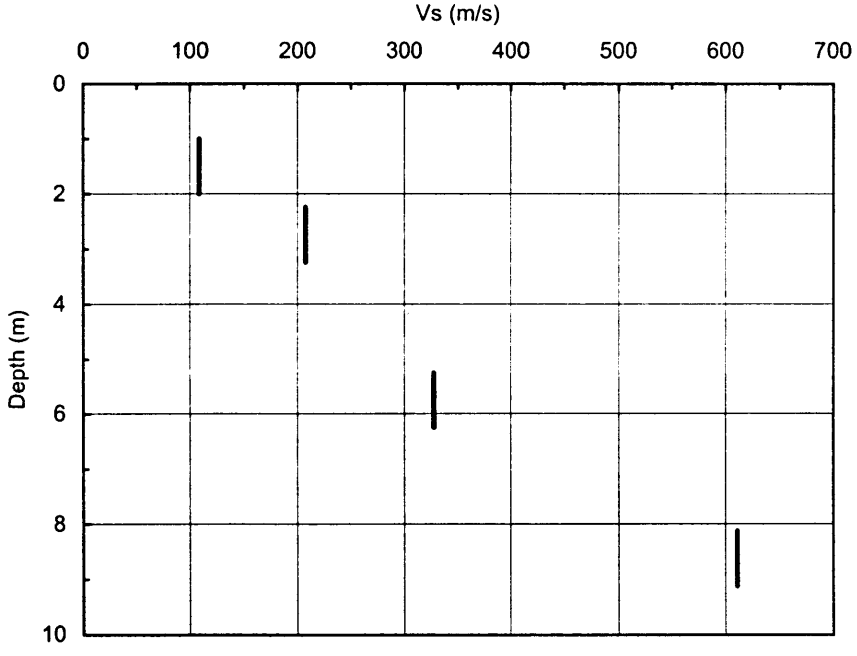


Data processed by: ZETAS (Zemin Teknolojisi AS)

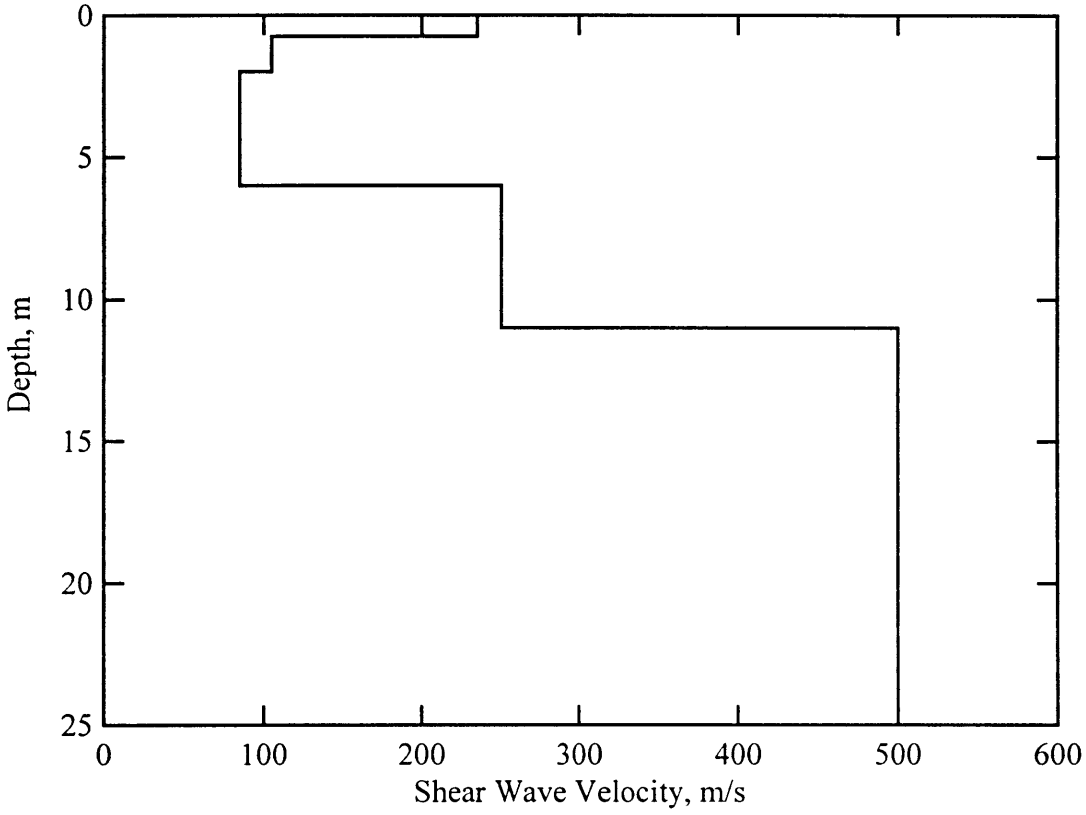
Shear Wave Velocity Profile Determined
using the Seismic Cone (Downhole Method)

Test ID: CPT-A6

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.26	1.00	2.00	47	169	108
3.50	2.24	3.24	313	102	207
6.50	5.24	6.24	238	417	327
9.38	8.12	9.12	556	667	611



Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Site A.

Tabulated values of layer properties determined from forward modeling of Site A

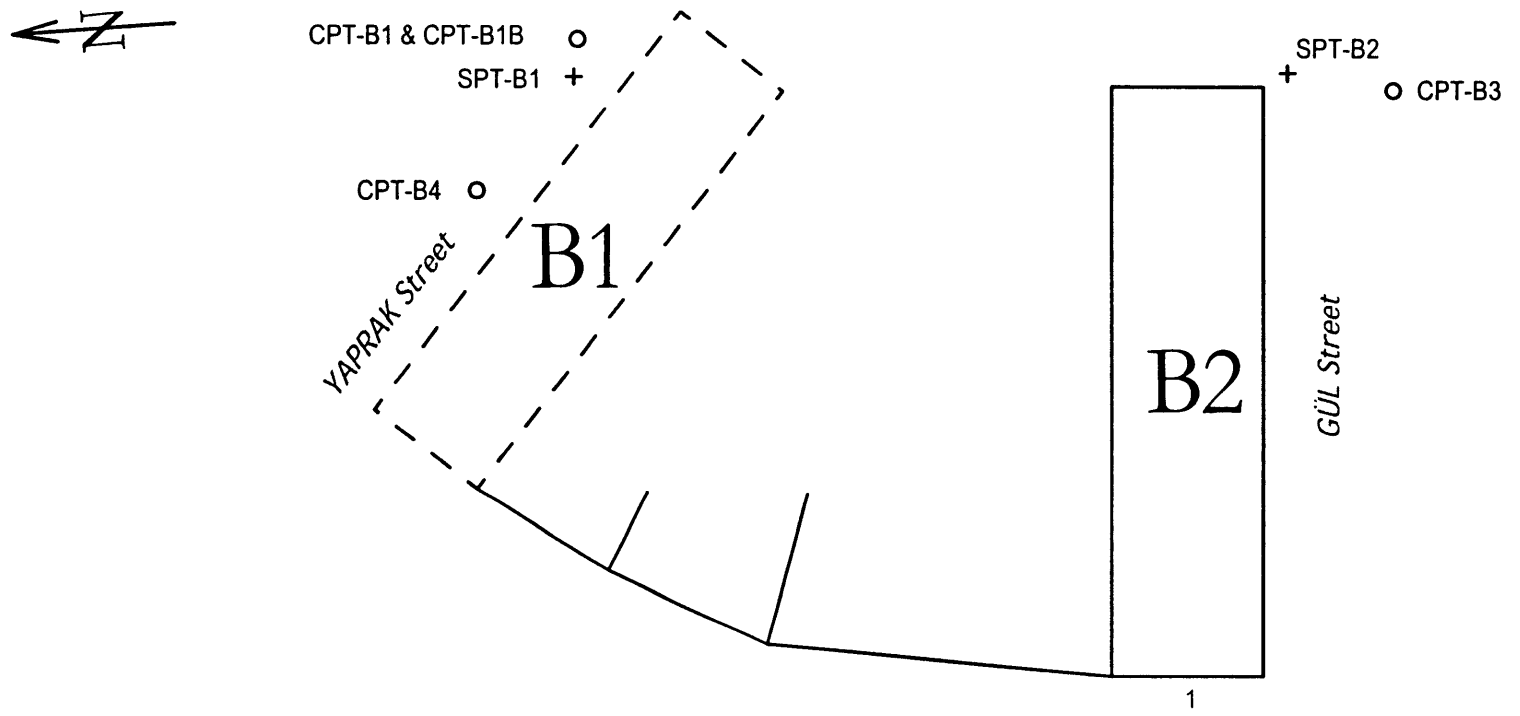
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.75	235	439.6	0.3	1.92
0.75	1.25	105	615.2	0.485	2.0
2.0	4.0	85	1500	0.4984	2.0
6.0	5.0	250	1500	0.4857	2.0
11.0	14.0	500	1500	0.4375	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

Phase 1

Site B



Difference in elevation with respect to CPT-B3

CPT-B1	-20 cm
CPT-B2	-31 cm
CPT-B3	0.0 cm
CPT-B4	-29 cm
SPT-B1	-22 cm
SPT-B2	-14 cm
Point 1 on Kuyudibi Avenue sidewalk	-07 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

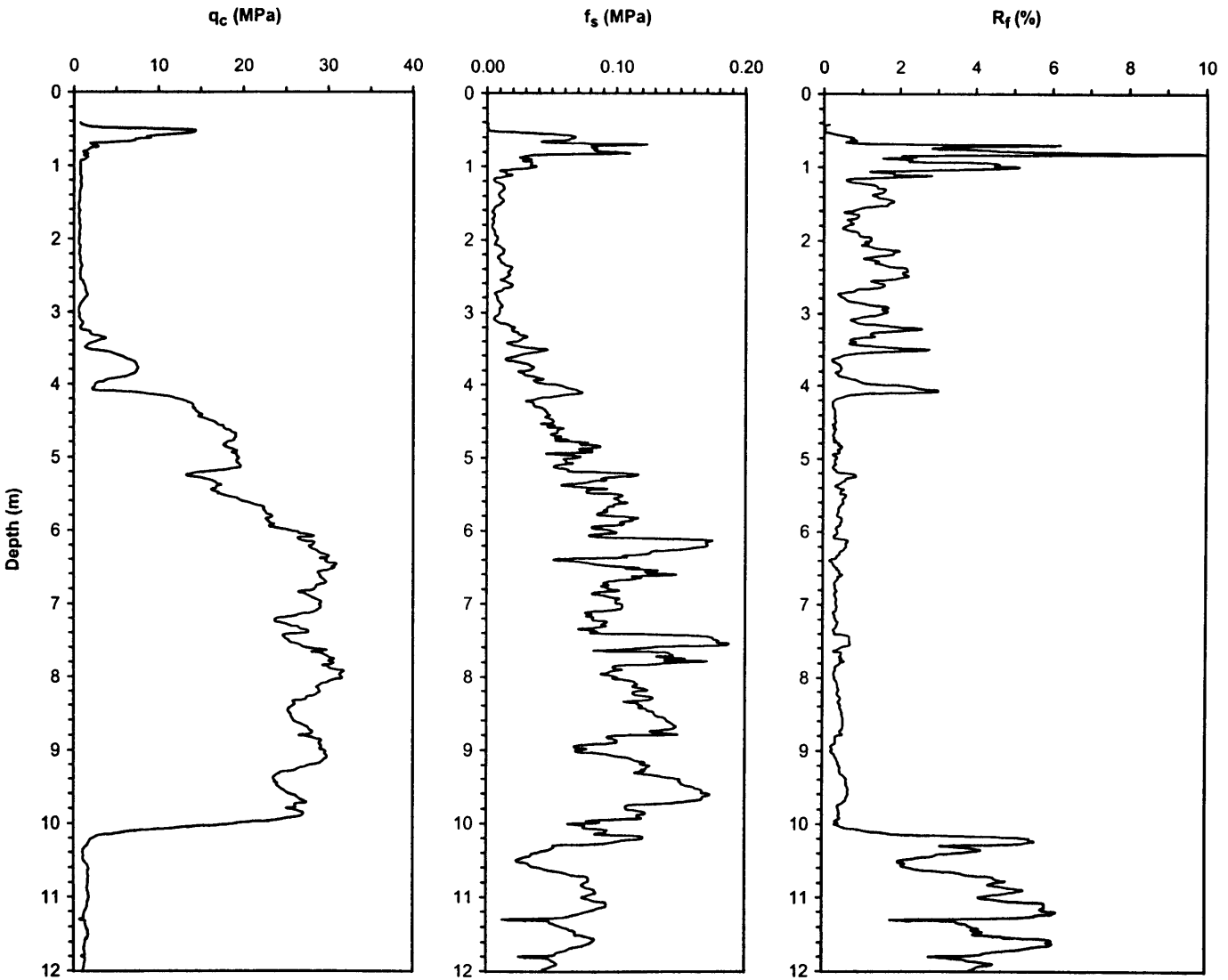
Contents: Plan view of Site B and location of subsurface exploration points

Location: Kuydudibi Avenue, Karaosman District, Adapazari
GPS Coordinates: 40.78513° N 30.40024° E

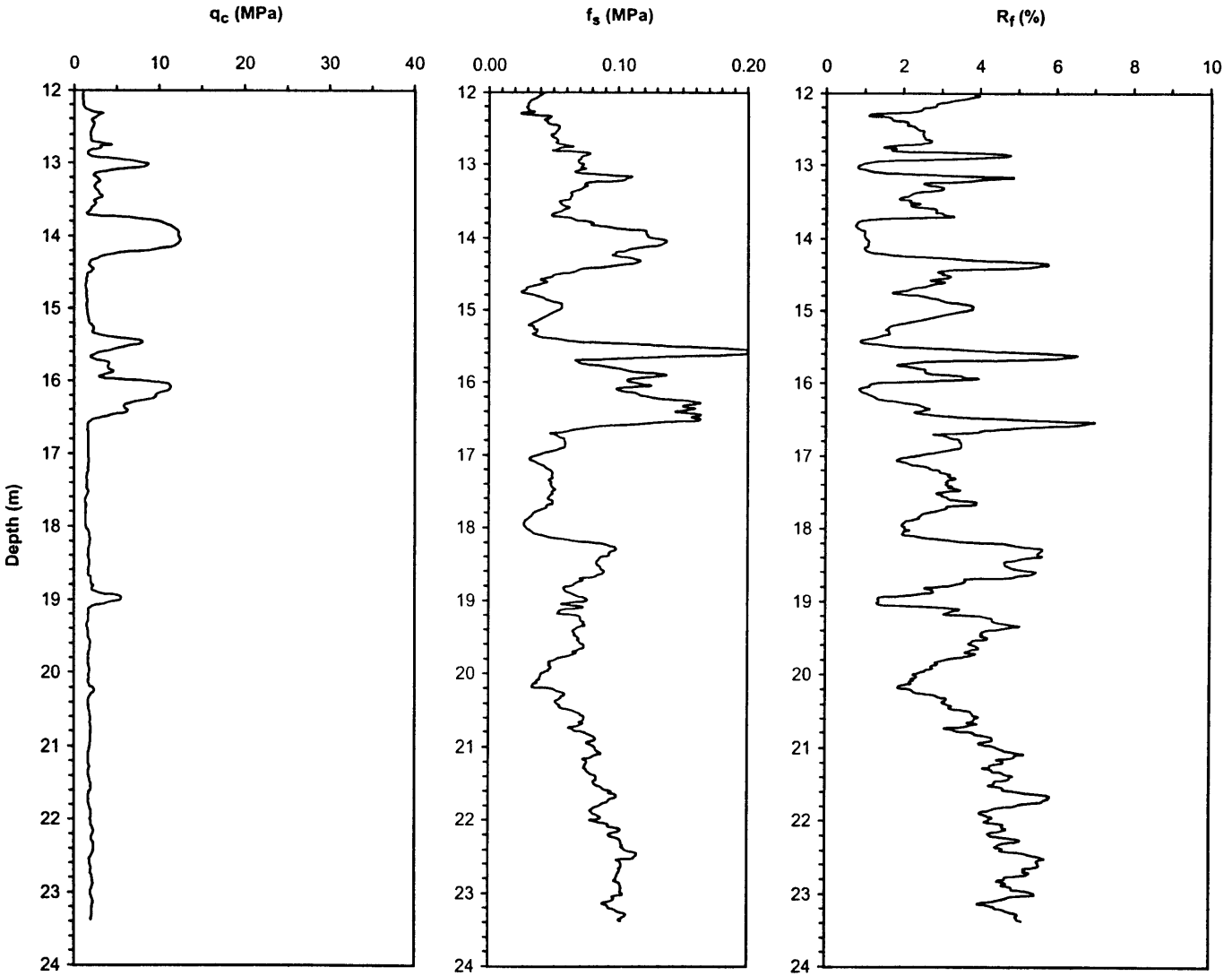
Scale: Graphic Scale | File Name: site_b.fcw - site_b.pdf

Date: 10/23/00 | Drawing: Rodolfo B. Sancio

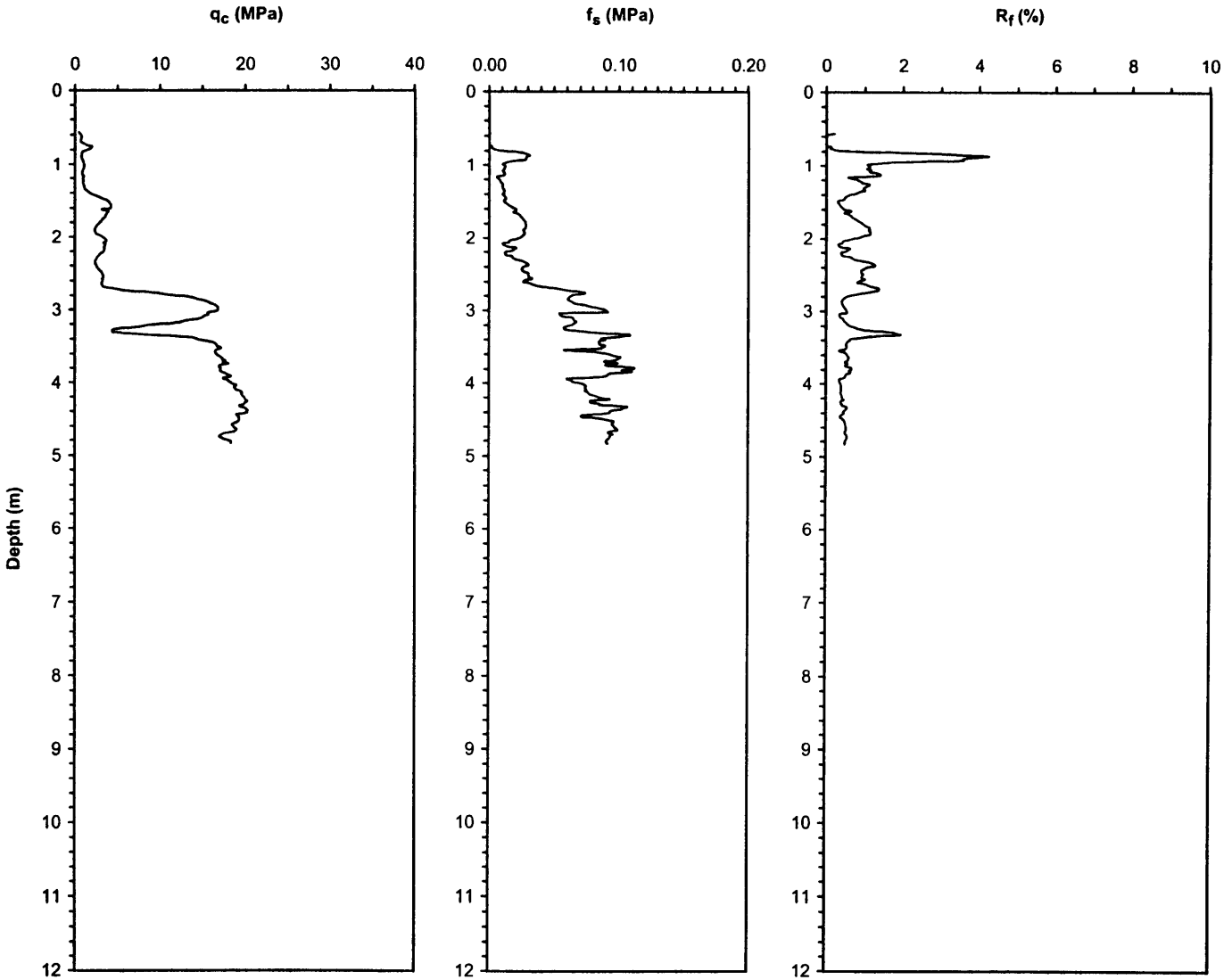
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 2
ZETAŞ-SAU	**Location:**	Site B - Kuyudibi Av. and Yaprak Street, Karaosman District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78513°N 30.40024°E	
	Test Number:	CPT-B1	**Elevation:** -20 cm with respect to CPT-B3
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 18, 2000 10:08
Sponsored by:	**File Name:**	cptb1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



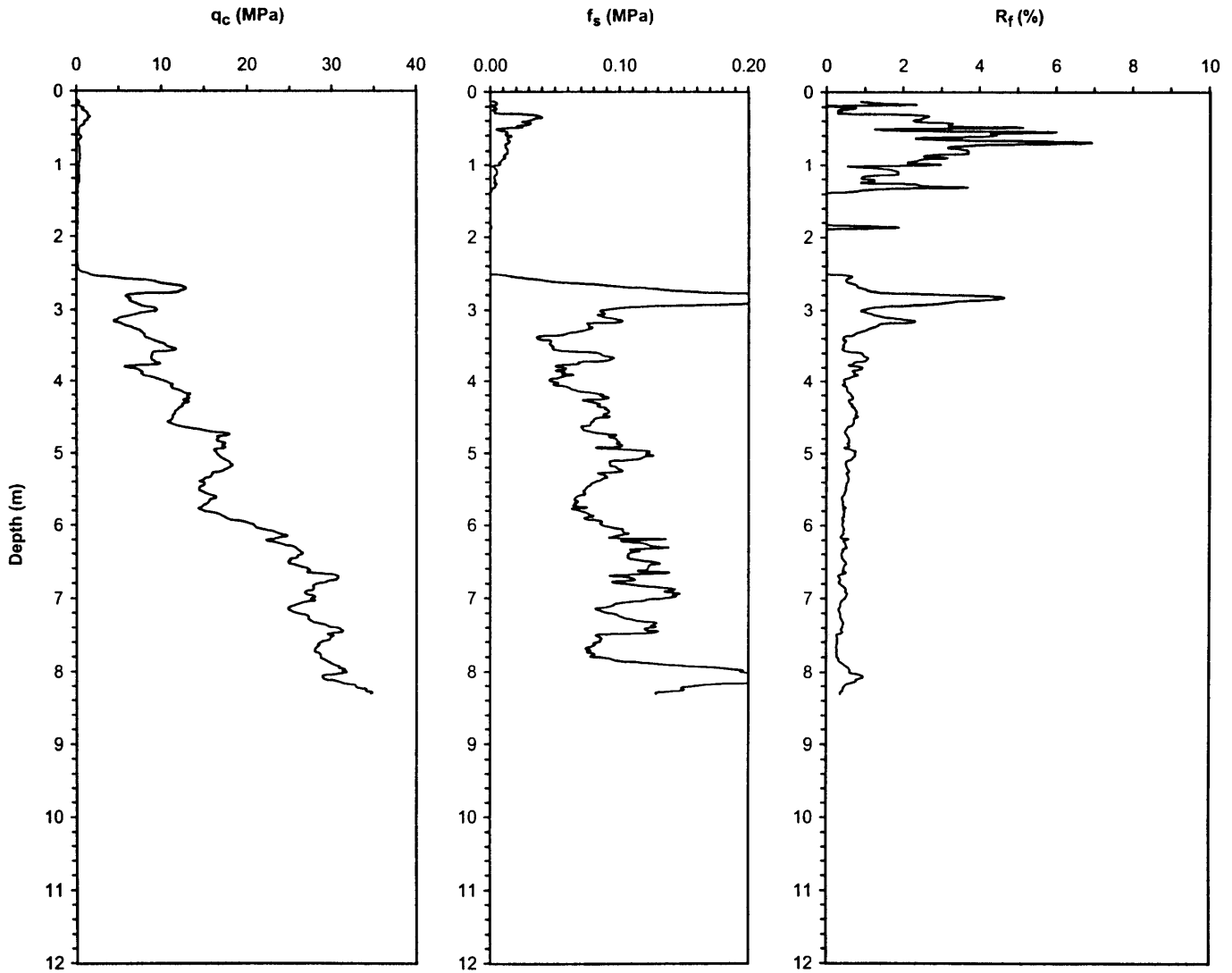
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 2
ZETAŞ-SAU	**Location:**	Site B - Kuyudibi Av. and Yaprak Street, Karaosman District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78513°N - 30.40024°E	
	Test Number:	CPT-B1	**Elevation:** -20 cm with respect to CPT-B3
	Type of Cone:	ELC10 CF (a.p. v.d. Berg)	**Date:** June 18, 2000 10:08
Sponsored by:	**File Name:**	cptb1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



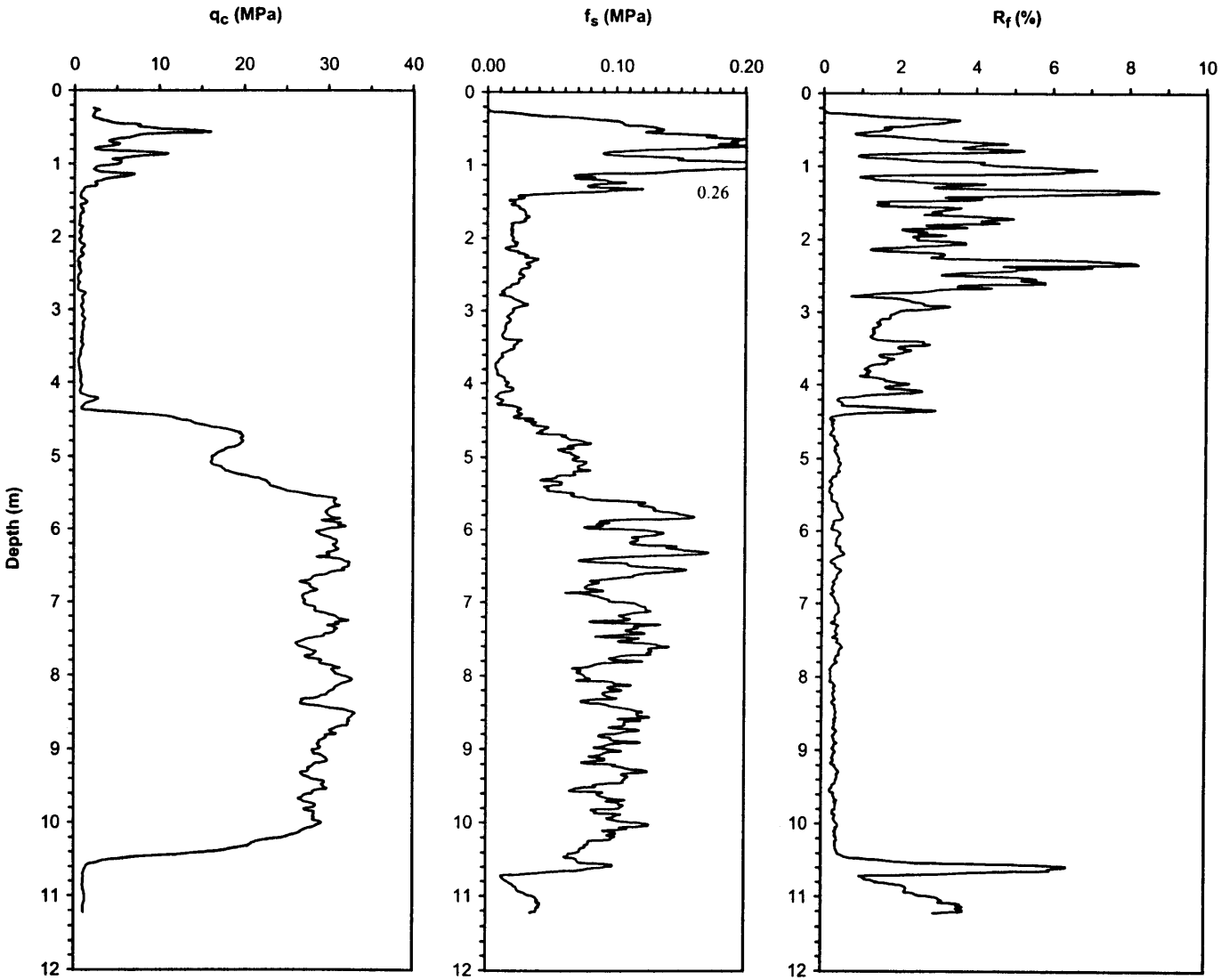
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site B - Kuyudibi Av. and Yaprak Street, Karaosman District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78513°N 30.40024°E	
	Test Number:	CPT-B2	**Elevation:** -31 cm with respect to CPT-B3
	Type of Cone:	ELC10 CF No. 991232 (a.p. v.d. Berg)	**Date:** June 18, 2000 14:56
Sponsored by:	**File Name:**	cptb2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Electronics failed at 4.84 m of penetration	



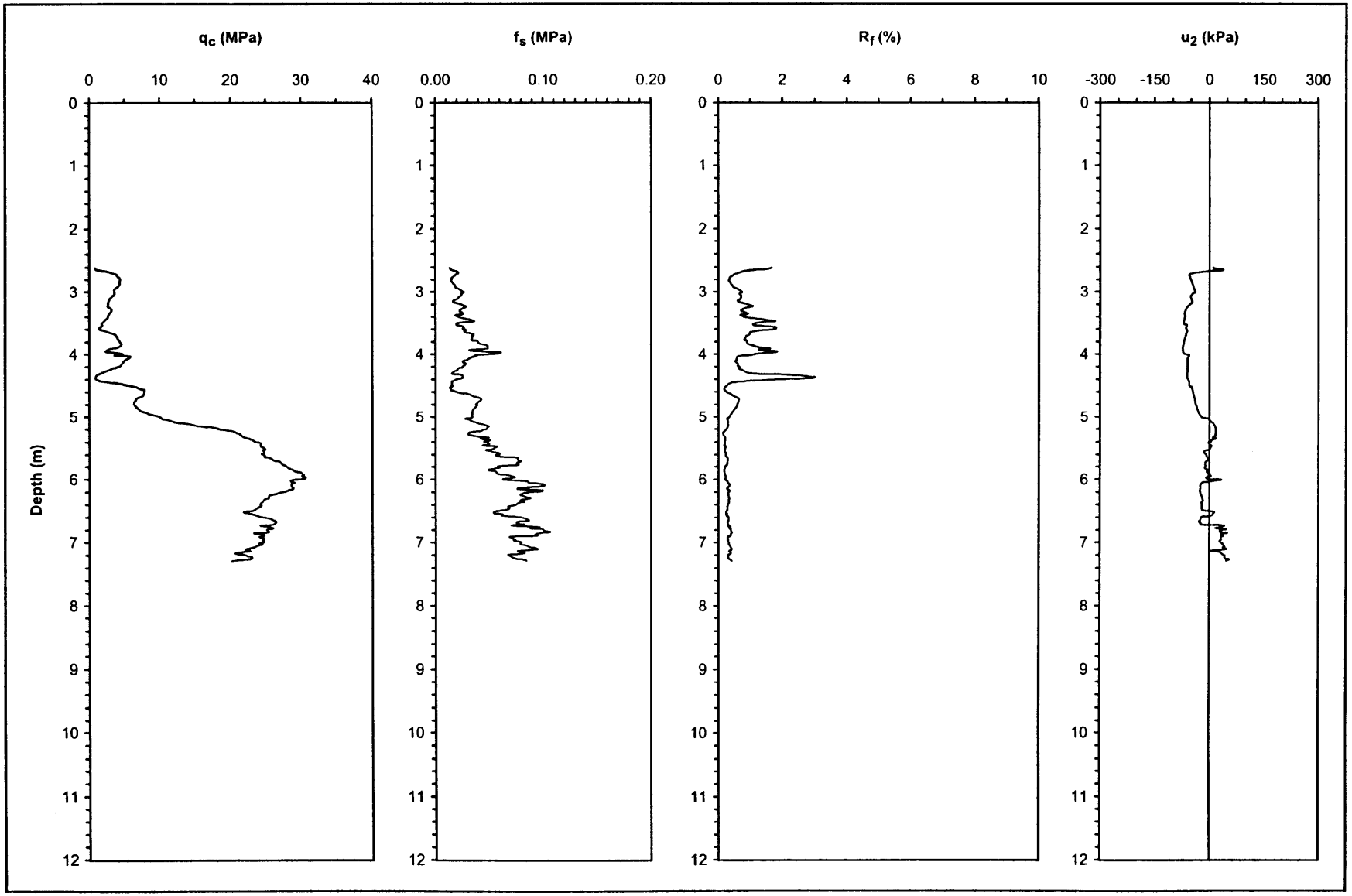
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site B - Kuyudibi Av. and Yaprak Street, Karaosman District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78513°N 30.40024°E	
	Test Number:	CPT-B2B	**Elevation:** -31 cm with respect to CPT-B3
	Type of Cone:	ELC10 CF (a.p. v.d. Berg)	**Date:** June 18, 2000 15:25
Sponsored by:	**File Name:**	cptb2b.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Performed through the same orifice of CPT-B2	



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site B - Kuyudibi Av. and Yaprak Street, Karaosman District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78513°N 30.40024°E	
	Test Number:	CPT-B3	**Elevation:** 0 cm with respect to CPT-B3
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** July 18, 2000 12:34
Sponsored by:	**File Name:**	cptb3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site B - Kuyudibi Av. and Yaprak Street, Karaosman District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78513°N 30.40024°E	
	Test Number:	CPT-B4	**Elevation:** -29 cm with respect to CPT-B3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** July 20, 2000 11:00
Sponsored by:	**File Name:**	cptb4.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Pre-drilled with auger 2.6 m. At 1.04 m the rods dropped 10 cm due to loose fill in predrilled hole.	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site B - Kuyudibi Ave. and Yaprak Street,Karaosman District, Adapazari
Date: July 4, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 3.3 m 06/05/00, Caved in at 3.05 m 07/08
Notes: Solid flight auger used to a depth of 1 m

Test ID: SPT-B1
GPS Coordinates: 40.78513°N 30.40024°E
Elevation: -22 cm with respect to CPT-B3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery / Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Rubble from demolition of building B1. Brown sandy silty clay											
1																				
2		ML	S-B1-1	31/45	1-1-1	1.55	5.80		CLAYEY SILT: Olive gray clayey silt with traces of fine sand. S-C2-B is gray brown clayey silt. The brown tones may be due to oxidation of ferric minerals	50		32	37	-	96	33	28	0.012	<2µm	
3		ML	S-B1-2A	32/45	2-1-2	2.55	5.80	49		60		32	31	-	82	<15	<10	0.05	0.014	
		ML	S-B1-2B					49		70		31	42	-	93	44	33	0.007	<2µm	
4		SM	S-B1-3A	41/45	2-5-3	3.35	7.32	63	SAND AND SILT: Brown low plasticity silt to silty fine sand. FC of recovered samples varies from 14% to 66%	250		24	-	-	21	-	-	0.17	0.05	
		ML	S-B1-3B					63		110		30	-	-	59	<15	<10	0.07	0.018	
		SM	S-B1-4A	27/45	4-3-6	4.15	8.84	68		150		27	27	-	14	3	2	0.13	0.06	
		ML	S-B1-4B					68		110		23	-	-	66	18	15	0.05	<2µm	
5		SM	S-B1-5	30/45	10-12-14	4.95	8.84	63	SILTY SAND: Gray sand mixtures grading with depth from sandy silt to sand with silt and sand with silt and fine to coarse gravel. Gravel content is irregularly variable from 2% to 27%. The shape of the gravel particles is variable from flat and elongated to well proportioned angular and rounded			17	-	-	29	-	-	0.5	-	
6		SW-SM	S-B1-6	21/45	9-13-16	6.15	10.37	66				11	-	-	5	-	-	1.7	0.21	
7																				
8		SP-SM	S-B1-7	18/45	9-15-17	7.95	11.89					15	-	-	5	-	-	0.6	0.17	
9																				
10									CH: Stiff gray moist high plasticity silty clay. Wash water shows traces of shells.											
11		CH	S-B1-8	35/45	3-3-5	10.45	13.42	67		200	38	35	62	40	100	68	59	0.001	<2µm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site B - Kuyudibi Ave. and Yaprak Street,Karaosman District, Adapazari
Date: July 4, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 3.3 m 06/05/00, Caved in at 3.05 m 07/08
Notes: Solid flight auger used to a depth of 1 m

Test ID: SPT-B1
GPS Coordinates: 40.78513°N 30.40024°E
Elevation: -22 cm with respect to CPT-B3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
11																				
12			S-B1-9	32/45	4-5-8	10.45	16.46	63	CLAY AND SAND: Interbedded thin strata of gray silty sand to sandy silt and gray silty clay to clayey silt	170										
13																				
14		SM	S-B1-10	38/45	7-5-5	10.45	17.99	67		275		28	27	-	36	<15	<10	0.09	0.037	
15									CH: Moist gray high plasticity silty clay. Very thin (< 1 cm) red oxidized seams found in S-B1-11											SPT-B1-11 was peformed using BW rods and donut hammer
16		CH	S-B1-11	27/45	3-5-7	10.45				220		37	58	34	100	80	58	0.001	<1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site B - Kuyudibi Ave. and Yaprak Street,Karaosman District, Adapazari
Date: July 5, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.68 m 07/08/00
Notes: Solid flight auger used up to 1 m

Test ID: SPT-B2
GPS Coordinates: 40.78513°N 30.40024°E
Elevation: -14 cm with respect to CPT-B3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

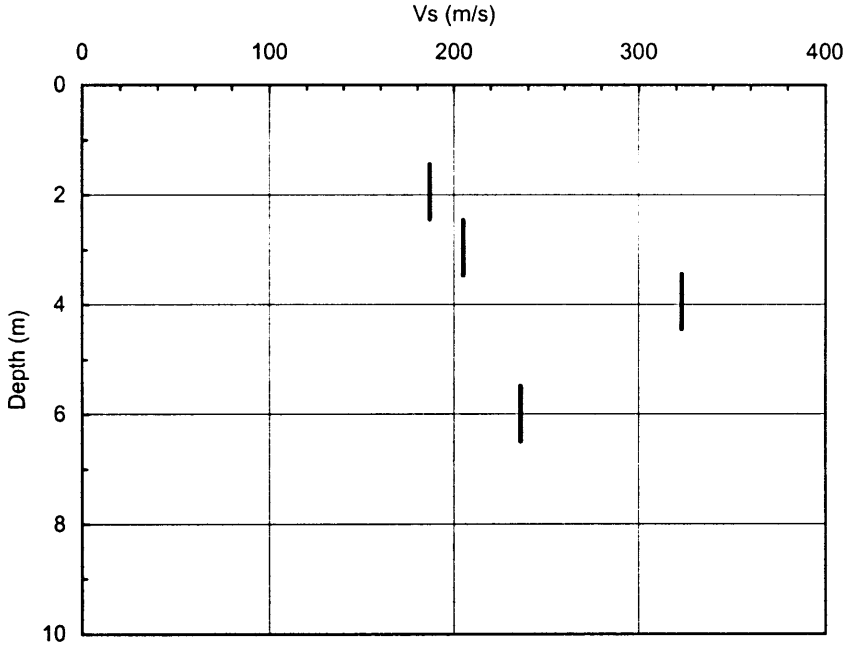
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Dark brown well graded sand with fine gravel											
1																				
2	SH	CL	S-B2-1	31/45	1-2-1	1.35	4.27	54	CLAYEY SILT: Brown clayey silt with fine sand and red oxidized zones			34	42	18	87	30	21	0.014	<2μm	
	SH		S-B2-2	0/45	1-2-1	2.15	5.80	51												
3	SH	ML	S-B2-3	35/45	1-1-1	2.95	7.32	54				33	37	9	91	8	4	0.038	0.005	
									SANDY SILT: Gray sandy silt											
4		SP-SM	S-B2-4A S-B2-4B	35/45	4-8-3	3.85	7.32	63 63	SAND: Well to poorly graded gray sand. Sand with silt in the upper 2 m of the layer. Gravel content in recovered samples is variable from 0% in S-B2-5 to 12 % in S-B2-7			16	-	-	5	-	-	0.4	0.15	
5		SP-SM	S-B2-5	27/45	9-9-10	4.65	8.84	65				20	-	-	5	-	-	0.48	0.15	
			S-B2-6	0/45	9-14-17	5.45	9.77													
6																				
7		SW	S-B2-7	15/45	9-14-16	6.95	11.29					11	-	-	3	-	-	1.0	0.22	
8		SW	S-B2-8	15/45	11-15-16	7.95	11.89	67				15	-	-	4	-	-	0.9	0.21	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

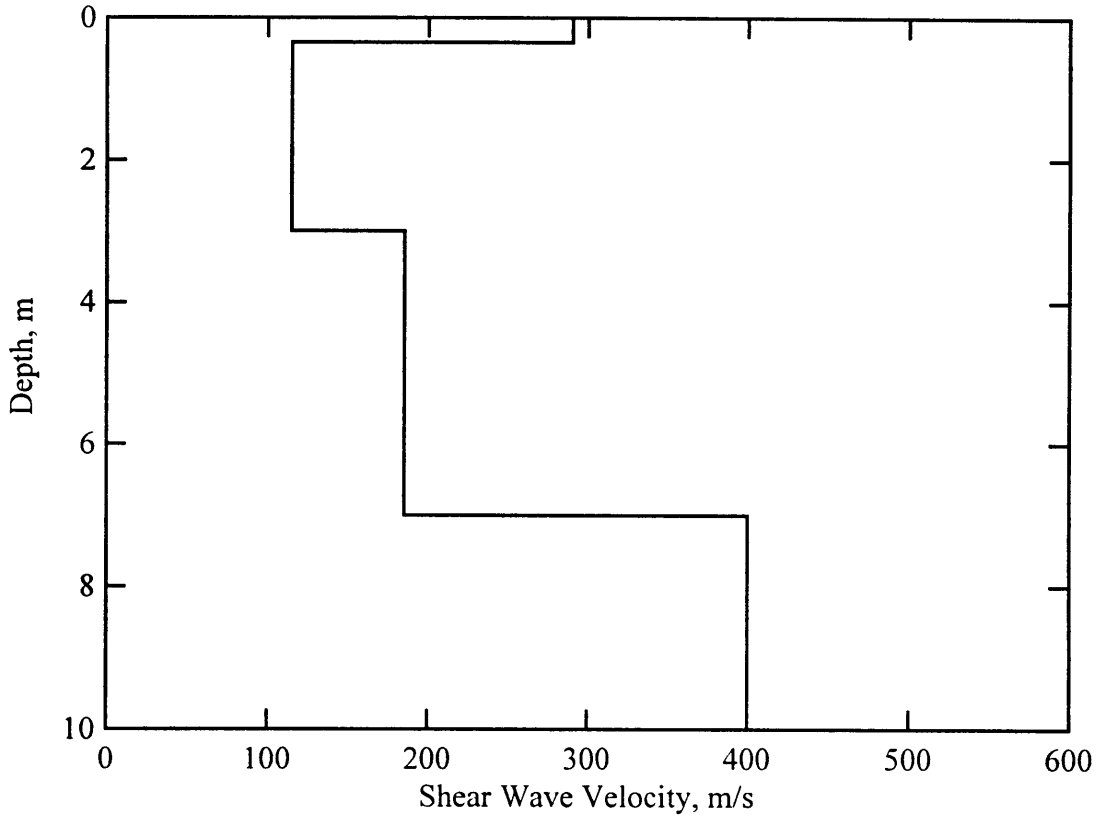
Shear Wave Velocity Profile Determined
using the Seismic Cone (Downhole Method)

Test ID: CPT-B1B

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.70	1.44	2.44	217	156	187
3.72	2.46	3.46	217	192	205
4.70	3.44	4.44	313	333	323
6.74	5.48	6.48	208	263	236



Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Site B.

Tabulated values of layer properties determined from forward modeling of Site B

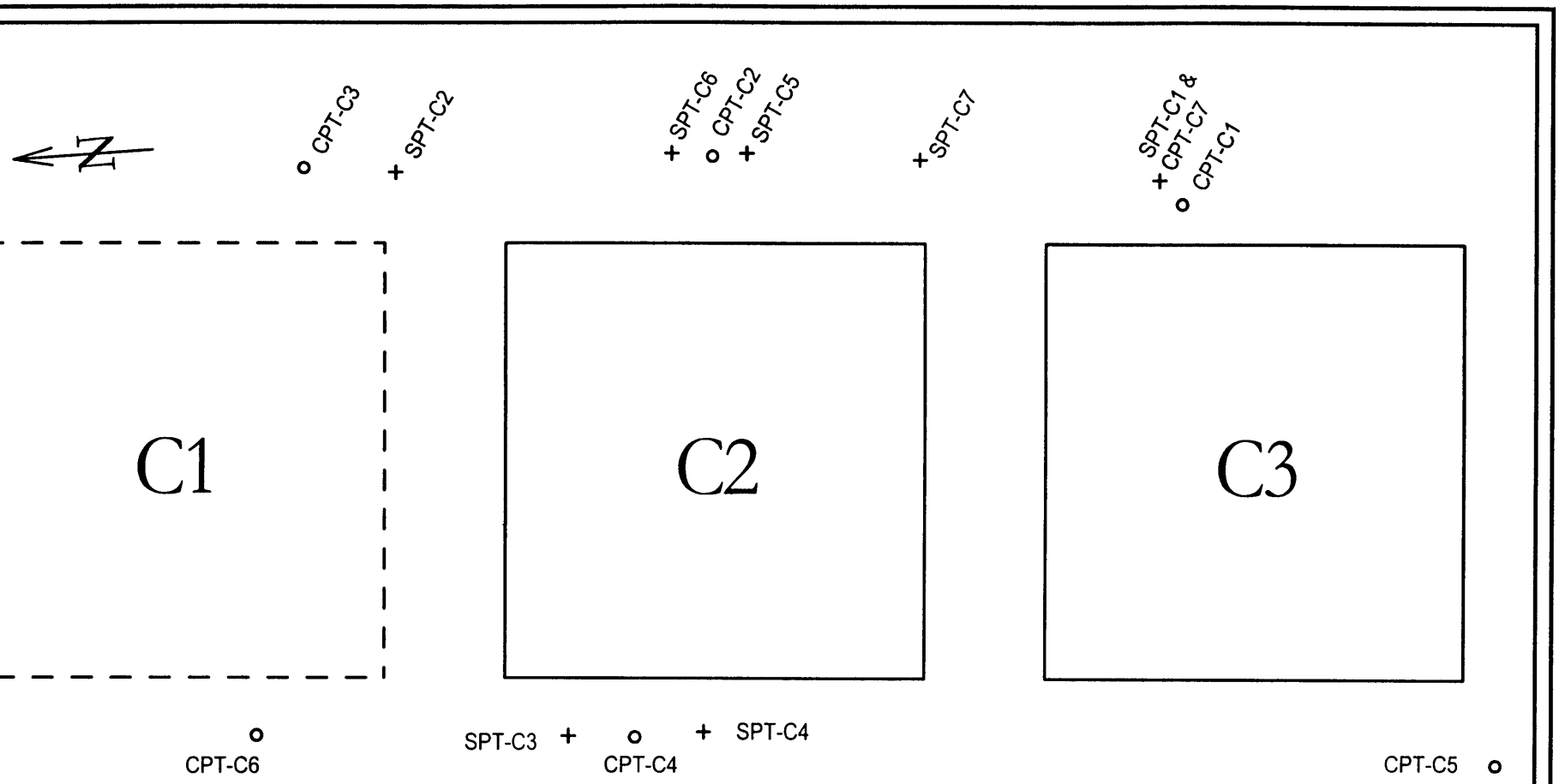
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.35	290	542.5	0.3	1.92
0.35	1.65	115	215.2	0.3	1.92
2.0	1.0	115	1500	0.497	2.0
3.0	4.0	185	1500	0.4923	2.0
7.0	3.0	400	1500	0.4617	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

Phase 1

Site C



Difference in elevation with respect to CPT-C4

CPT-C1	-15 cm	SPT-C1	-18 cm
CPT-C2	-12 cm	SPT-C2	-11 cm
CPT-C3	-9 cm	SPT-C3	-2 cm
CPT-C4	0 cm	SPT-C4	-2 cm
CPT-C5	-22 cm	SPT-C5	-16 cm
CPT-C6	0 cm	SPT-C6	-16 cm
CPT-C7	-18 cm	SPT-C7	-14 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

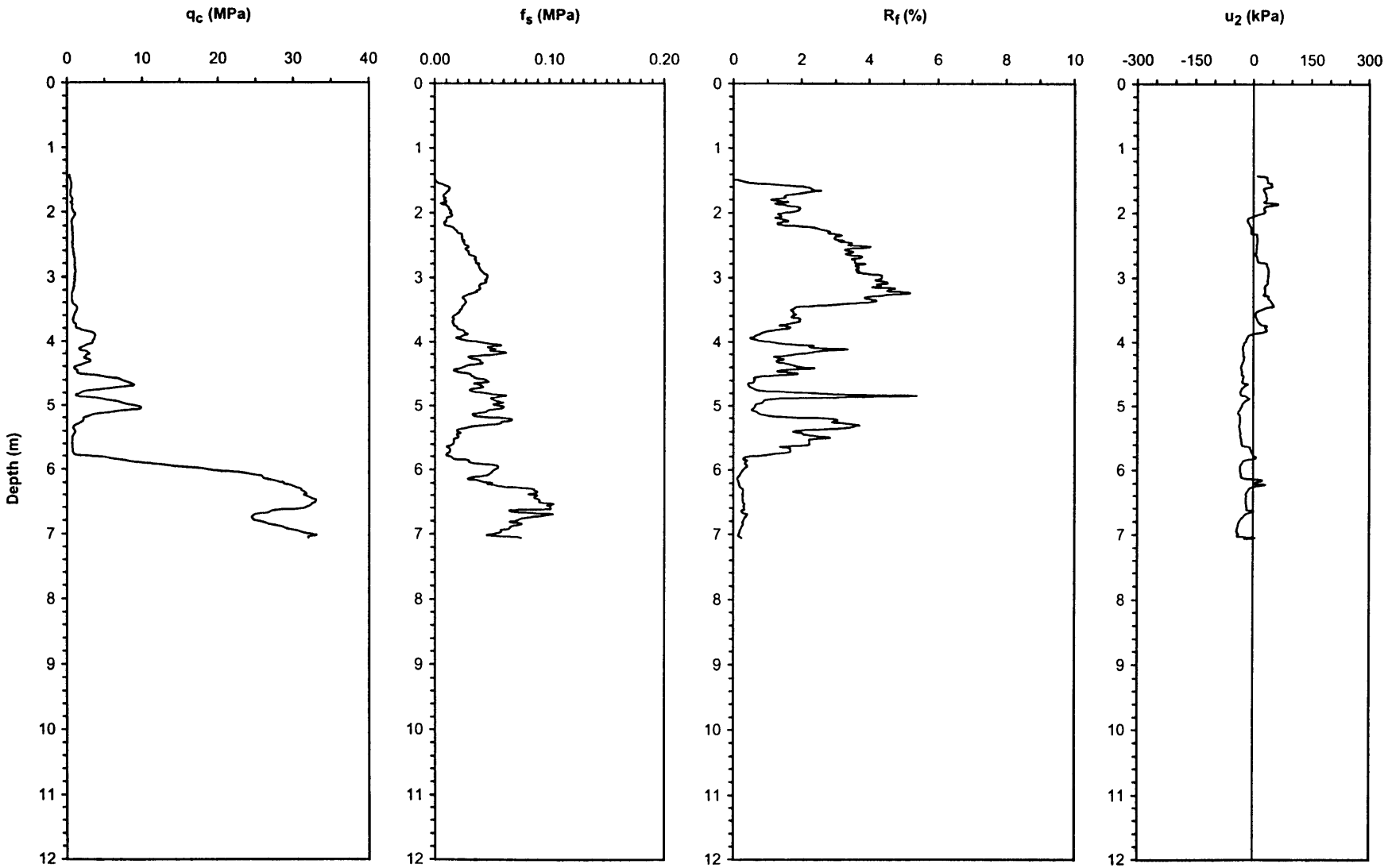
Contents: Plan view of Site C and location of subsurface exploration points

Location: Bölük Street, istiklal District, Adapazari
GPS Coordinates: 40.78370° N 30.39221° E

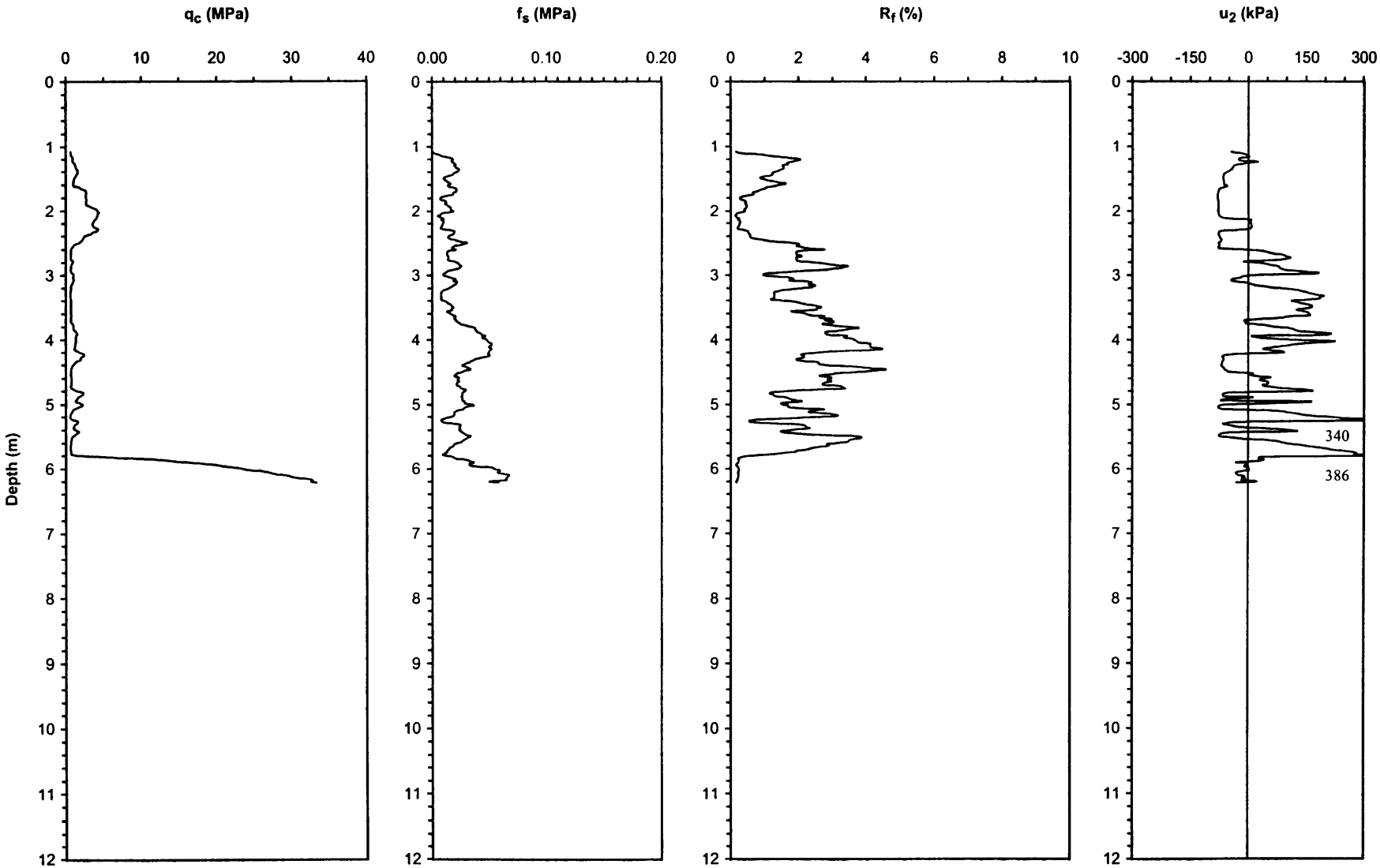
Scale: Graphic Scale | File Name: site_c.fcw - site_c.pdf

Date: 10/23/00 | Drawing: Rodolfo B. Sancio

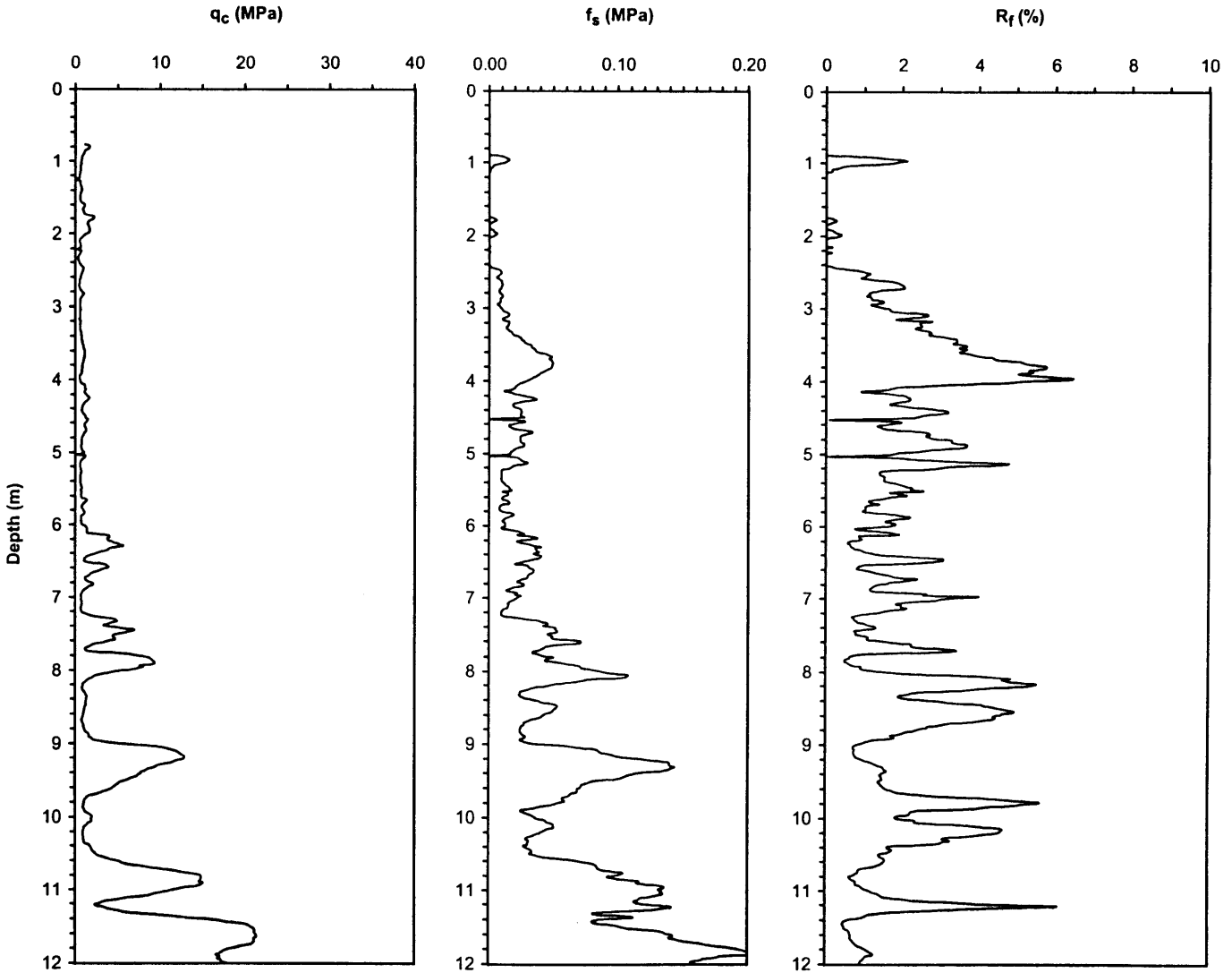
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site C - Bölük Street, İstiklal District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78370°N 30.39221°E	
	Test Number:	CPT-C1	**Elevation:** -15 cm with respect to CPT-C4
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 14, 2000
Sponsored by:	**File Name:**	cptc1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



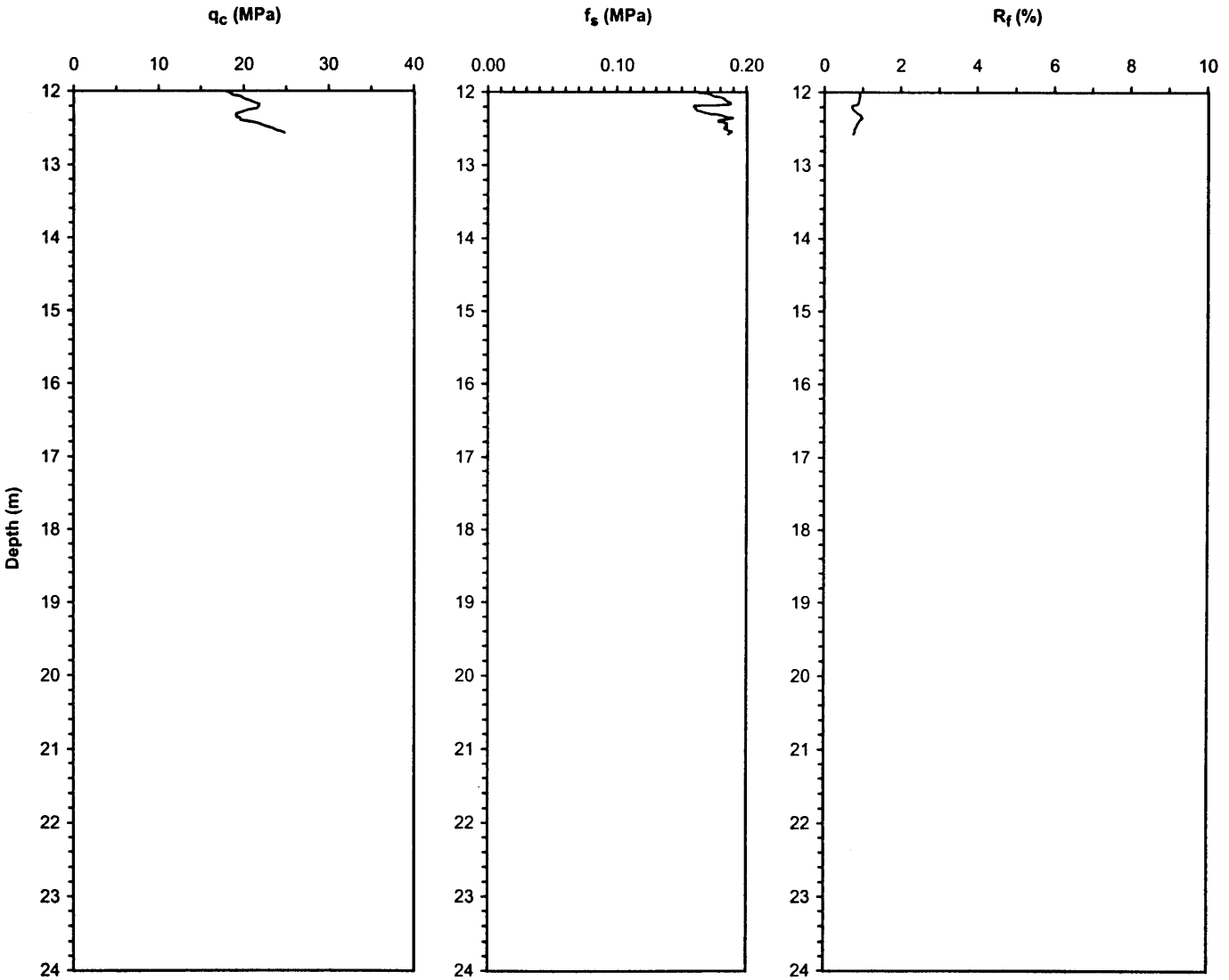
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site C - Bölük Street, İstiklal District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78370°N 30.39221°E	
	Test Number:	CPT-C2	**Elevation:** -12 cm with respect to CPT-C4
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 15, 2000
Sponsored by:	**File Name:**	cptc2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



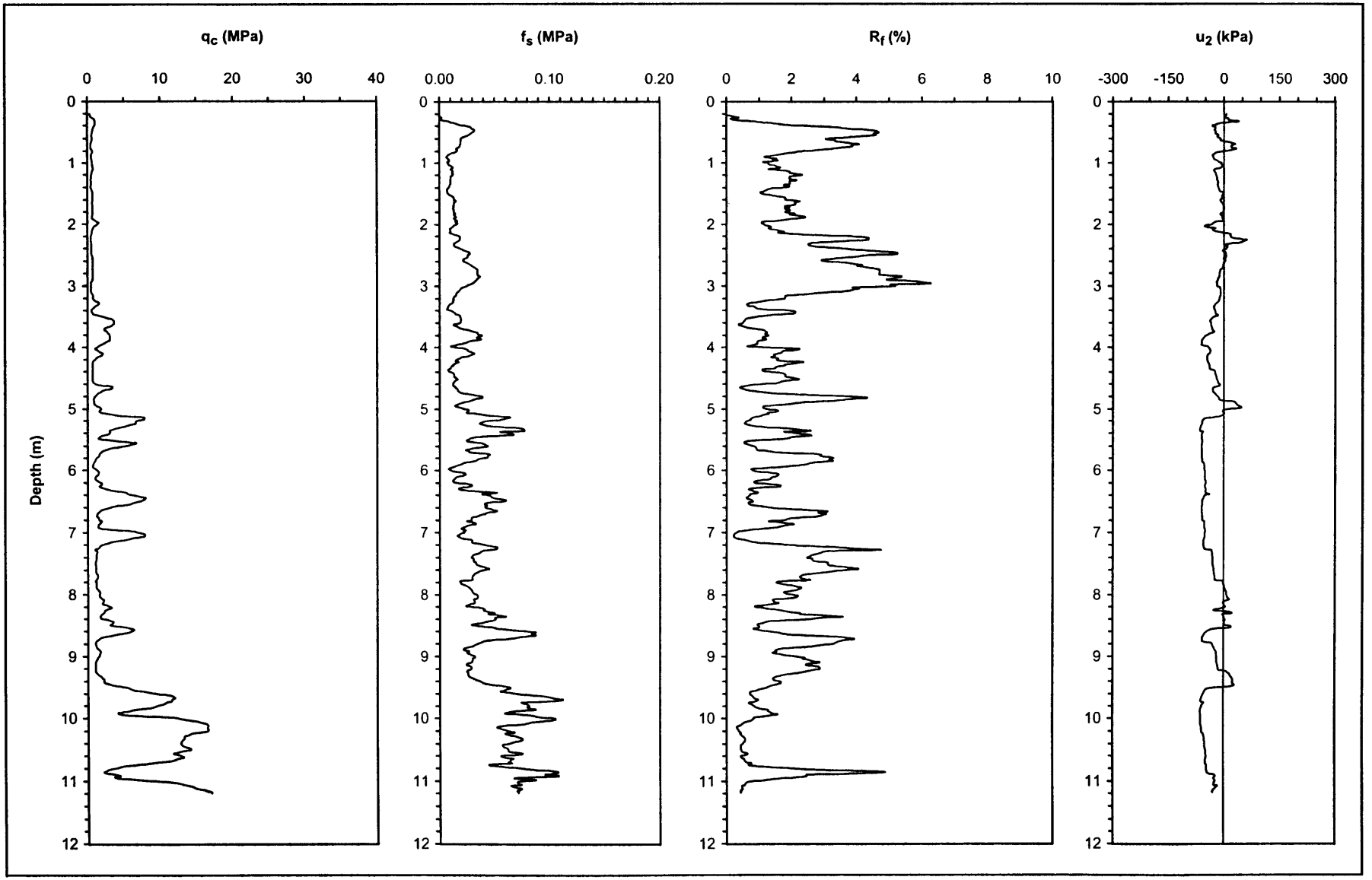
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 2
ZETAŞ-SAU	**Location:**	Site C - Bölük Street, İstiklal District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78370°N 30.39221°E	
	Test Number:	CPT-C3	**Elevation:** -9 cm with respect to CPT-C4
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 15, 2000 12:04
Sponsored by:	**File Name:**	cptc3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



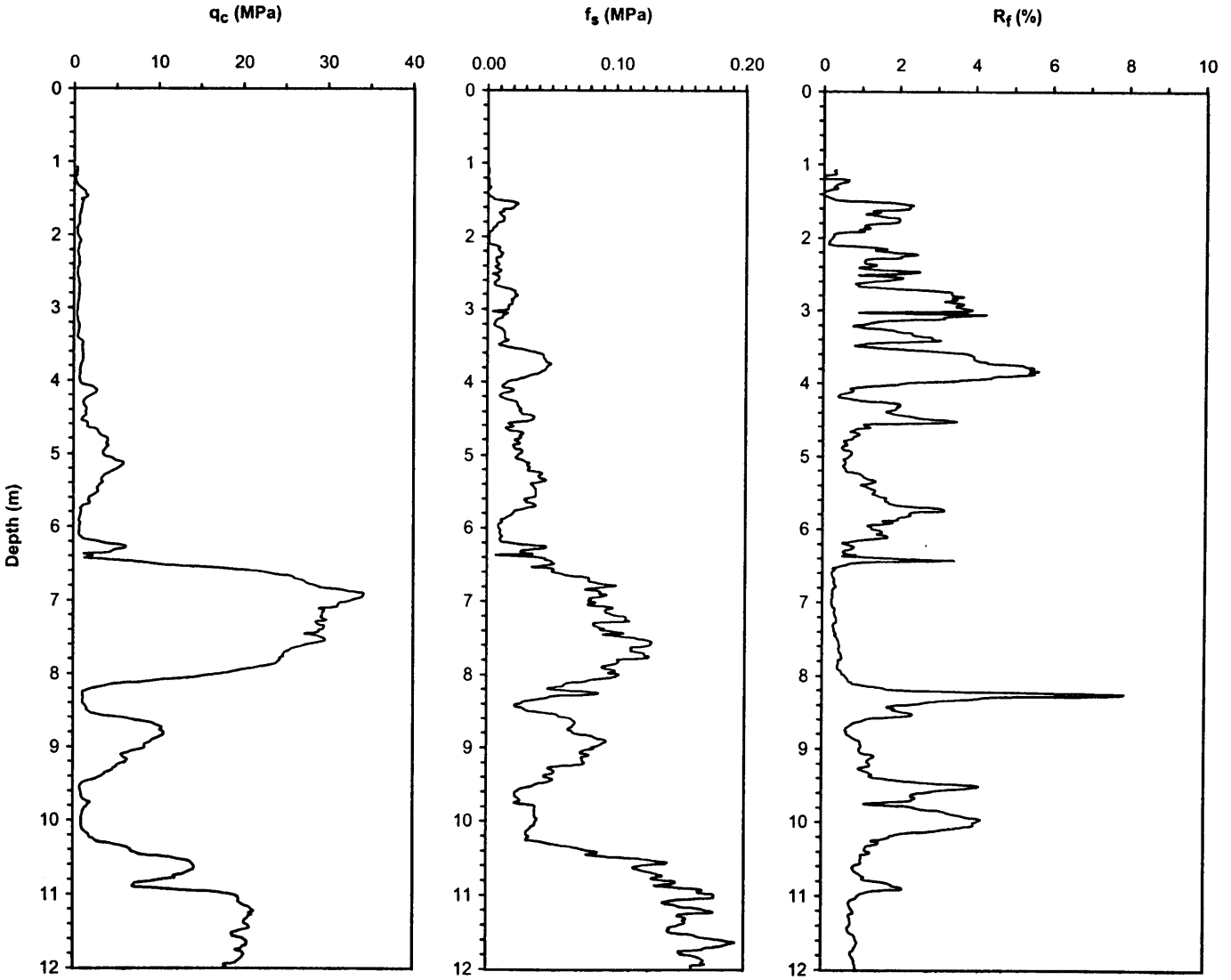
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 2
ZETAŞ-SAU	**Location:**	Site C - Bölük Street, İstiklal District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78370°N 30.39221°E	
	Test Number:	CPT-C3	**Elevation:** -9 cm with respect to CPT-C4
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 15, 2000 12:04
Sponsored by:	**File Name:**	cptc3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



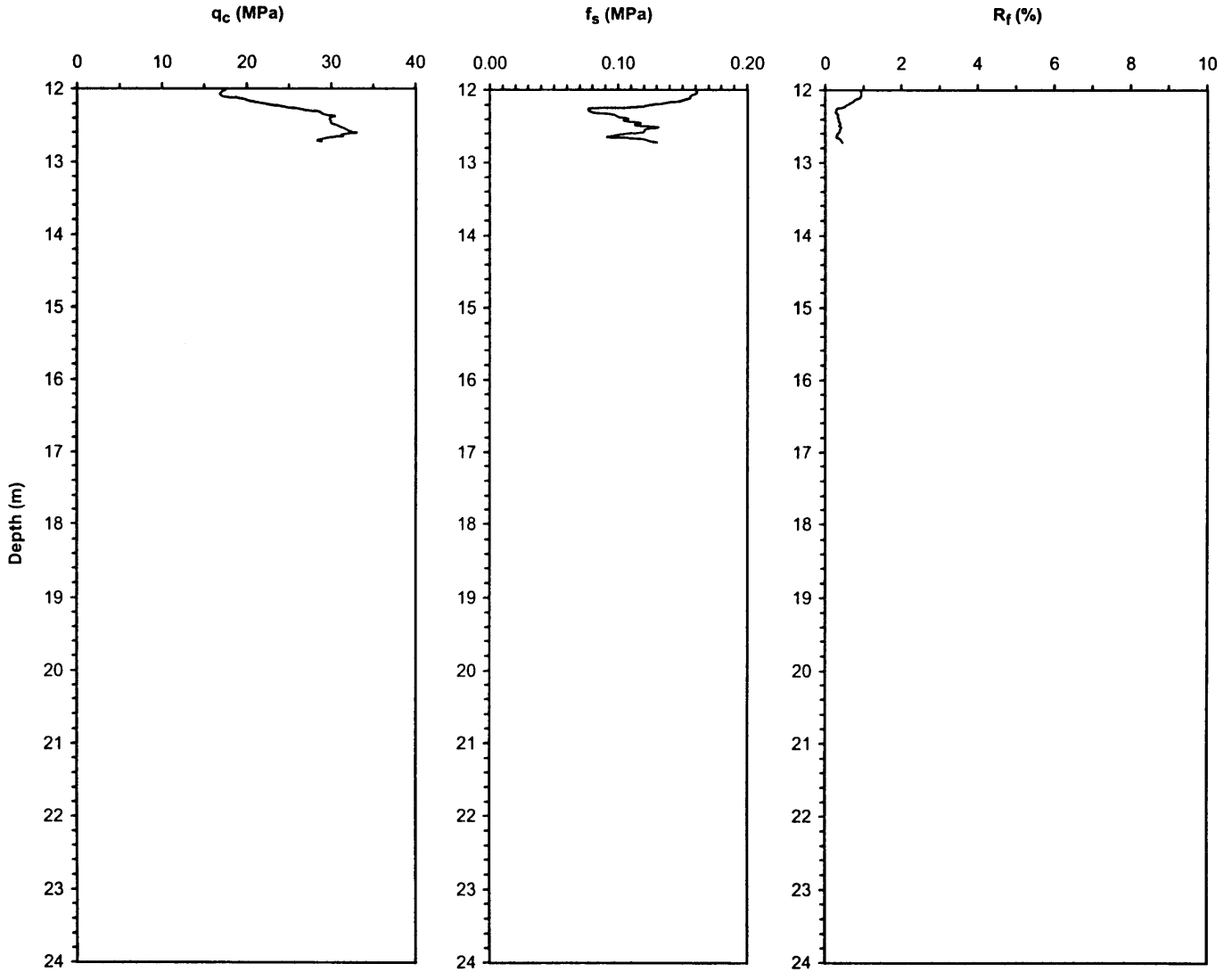
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site C - Bölük Street, İstiklal District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78370°N 30.39221°E	
	Test Number:	CPT-C4	**Elevation:** 0 cm with respect to CPT-C4
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 15, 2000
Sponsored by:	**File Name:**	cptc4.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 2
ZETAŞ-SAU	**Location:**	Site C - Bölük Street, İstiklal District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78370°N 30.39221°E	
	Test Number:	CPT-C5	**Elevation:** -22 cm with respect to CPT-C4
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 15, 2000 17:52
Sponsored by:	**File Name:**	cptc5.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 2
ZETAŞ-SAU	**Location:**	Site C - Bölük Street, İstiklal District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78370°N 30.39221°E	
	Test Number:	CPT-C5	**Elevation:** -22 cm with respect to CPT-C4
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 15, 2000 17:52
Sponsored by:	**File Name:**	cptc5.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



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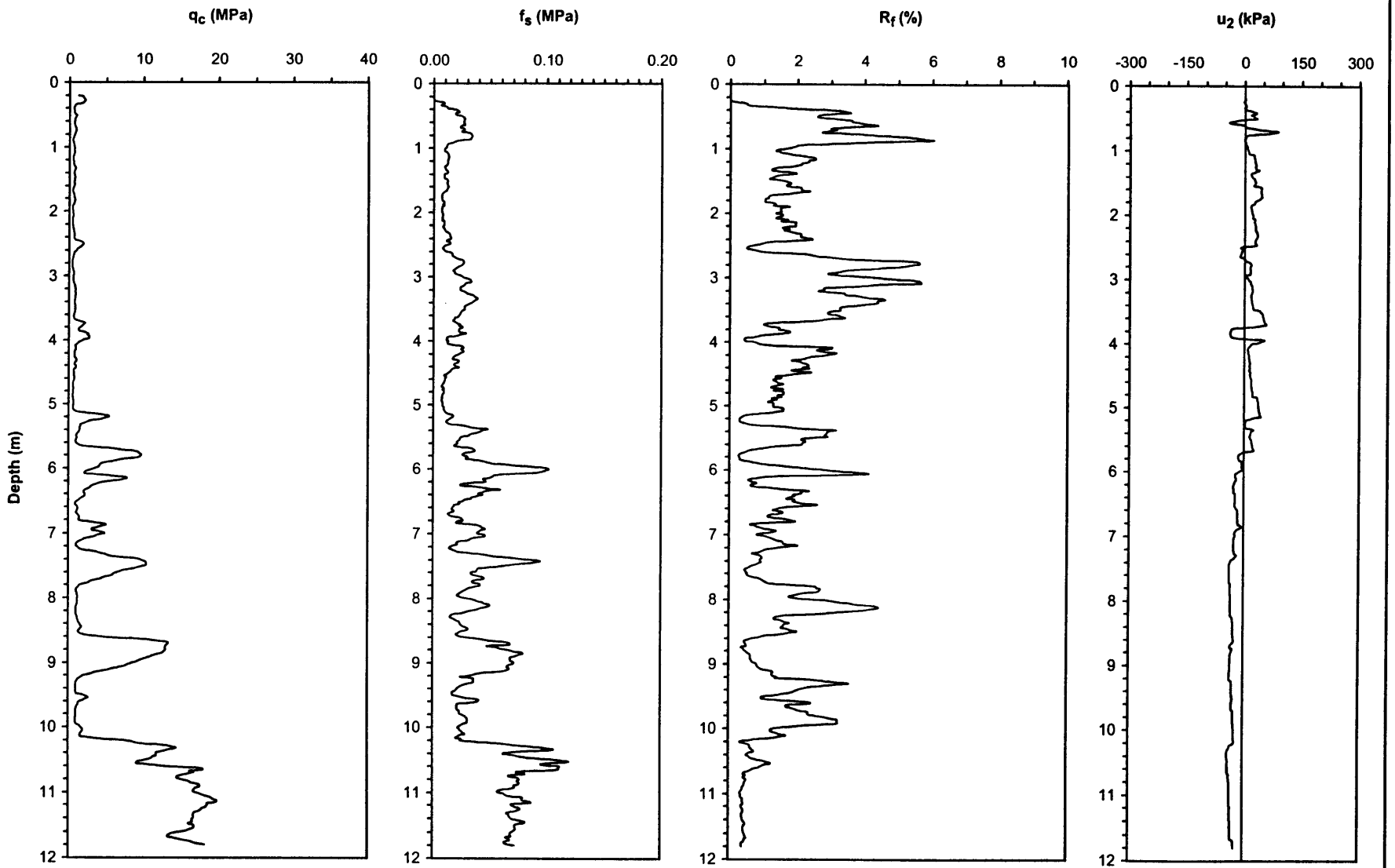
Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site C - Bölük Street, İstiklal District, Adapazarı
GPS Coordinates: 40.78370°N 30.39221°E
Test Number: CPT-C6
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cptc6.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation: 0 cm with respect to CPT-C4
Date: June 16, 2000
Water Table Elevation: Not measured
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley



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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site C - Bölük Street, Istiklal District, Adapazari
Date: June 26, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.42 m 06/28, 1.56 m 07/08, 1.53 m 07/19
Notes: Approximately 1.5 m away from CPT-C1

Test ID: SPT-C1
GPS Coordinates: 40.78370°N 30.39221°E
Elevation: -18 cm with respect to CPT-C4
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Dark brown clayey fill											
1																				
2		ML/CL	S-C1-1	43/45	1-1-1	-	5.80	-	CLAY: Brown tan silty clay to clayey silt. Red oxidation points in samples indicating oxidation of ferric minerals	30	14	40	44	17	99	-	-	-	-	
		CH	S-C1-2	35/45	1-2-2	-	5.80	47		120	32	42	64	42	99	84	67	<2µm	<2µm	
3			SH-C1-3	40/42	-	2.0	-	-		100	24									
4		ML	S-C1-4A	33/45	2-3-5	4.15	7.32	63		180	23	35	36	8	98	-	-	-	-	
		ML	S-C1-4B					63	SANDY SILT: Gray low plasticity sandy silt interbedded with gray silty clay with traces of fine sand. Thin gray clay layer at approximately 5.15 m.	130	-	29	30	-	90	18	14	0.027	<2µm	
5		ML	S-C1-5	35/45	2-5-9	5.0	8.84	64		170	23	28	26	-	67	-	-	-	-	
6		ML	S-C1-6A	40/45	5-12-30	5.95	8.84	59		180	-	29	31	-	53	14	11	0.07	0.001	
		SW-SM	S-C1-6B					59	SAND: Gray sand to silty sand of variable gradation interspersed with thin layers of silty clay. Variable gravel content in samples S-C1-6B and S-C1-7 (10 % - 20 %)	-	-	-	-	-	7	-	-	1	0.11	
7																				
		SP	S-C1-7	38/45	7-13-7	7.3	10.37	56		-	-	14	-	-	1	-	-	2.8	1	
8																				
9																				
10		ML	S-C1-8	36/45	3-3-8	9.45	11.89	71	ML: Gray low plasticity clayey silt with fine sand	-	30	30	32	-	89	42	32	0.007	<2µm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site C - Bölük Street, Istiklal District, Adapazari
Date: June 27, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.45 m 06/28/00, 1.59 m 07/08, 0.98 m 08/03
Notes: Solid flight auger used to a depth of 1.6 m

Test ID: SPT-C2
GPS Coordinates: 40.78370°N 30.39221°E
Elevation: -11 cm with respect to CPT-C4
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									CLAYEY SILT: Dark brown clayey silt with uniform color. Moist, soft consistency.											Located near the sediment ejecta
1									CLAYEY SILT: Brown clayey silt to high plasticity silty clay. Traces of fine sand											
2		CL/ML	S-C2-1	38/45	1-1-1		4.27	54		50	20	37	40	15	97	-	-	-	-	
		ML/CL	SH-C2-2	42/42	-	2.4	-	-		80	45	43	42	15	94	22	8	0.013	0.003	
3		CH	S-C2-3	35/45	2-2-4	3.2	7.32	69		170	72	41	74	45	99	-	-			
4		MH	SH-C2-4	40/42	-	4.05	-	-		85	53	26	73	28	99	60	41	0.003	<2µm	
5		ML/CL	S-C2-5	36/45	2-4-3	4.85	8.84	73	CLAYEY SILT: Olive gray clayey silt with fine sand to sandy silt interbedded with clay seams. Very thin lamination at about 5.25 m.	230		33	42	15	87	-	-	-	-	
6		ML	S-C2-6A	38/45	5-15-19	5.65	8.84	70				26	27	-	71	34	24	0.014	<2µm	
		SW-SM	S-C2-6B						SW-SM: Well graded gray sand with silt. Approximately 8% gravel content			13	-	-	5	-	-	0.7	0.15	
7		ML	S-C2-7	36/45	2-5-6	6.45	10.37	75		300		29	34	-	92	-	-	-	-	Black fibrous wood chip at approx. 6.5 m
8		CL/CH	S-C2-8	35/45	1-3-3	7.5	10.37	65	CLAYEY SILT: Alternating strata of gray silty clay and clayey silt.	130		38	49	26	99	48	40	0.006	<2µm	
9		ML	S-C2-9	43/45	4-3-4	8.9	13.42	71		280	50	36	37	-	99	60	49	0.002	<2µm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site C - Bölük Street, Istiklal District, Adapazari
Date: June 27, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.30 m 07/08/2000
Notes: Solid flight auger to a depth of 1.5 m

Test ID: SPT-C3
GPS Coordinates: 40.78370°N 30.39221°E
Elevation: -2 cm with respect to CPT-C4
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: The boring was drilled through a thin concrete slab on grade under which lies a gray silty sandy fill											
1									SILT: Brown silt to clayey silt with traces of fine sand interspersed with strata of brown silty sand to sandy silt											
2																				An attempt to obtain a Shelby tube sample at 1.5 m failed
3			SH-C3-1	42/42	-	2.8	-	-												
4		SM	S-C3-2	38/45	3-3-4	3.75	7.32	67		90		27	-	-	28	-	-	0.18	-	
5		CL/ML	S-C3-3	43/45	2-2-1	4.55	8.84	66		130		38	40	15	88	-	-	-	-	Traces of shells in sample S-C3-3
6		CL/ML SM	S-C3-4A S-C3-4B	38/45	3-10-8	5.45	8.84	66	SM: Gray silty fine sand	125 250		34 23	45 -	20 -	97 37	- 13	- 10	- 0.09	- 0.001	
7		ML	S-C3-5	36/45	3-4-7	6.65	10.37		SILTY CLAY: Gray silty clay to clayey silt with some fine sand			31	31	-	83	23	16	0.027	<2μm	Traces of wood fragments in sample S-C3-5
8		CH/MH	S-C3-6	35/45	1-3-2	7.65	10.37	62	CLAY AND SILT: Gray low plasticity silt with sand interbedded with gray high plasticity clay. Red oxidation zone towards the upper portion of sample S-C3-6. The clay loses strength when remolded	70	23	42	67	36	98	-	-	-	-	
9																				
10		ML	S-C3-7	45/45	2-7-14	9.75	13.42	65		370		25	28	-	75	18	15	0.033	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site C - Bölük Street, Istiklal District, Adapazari
Date: July 19, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.44 m 08/03/00
Notes:

Test ID: SPT-C4
GPS Coordinates: 40.78370°N 30.39221°E
Elevation: -2 cm with respect to CPT-C4
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: The boring was drilled through a thin (~5 cm) concrete slab on the west entrance of building C2											
1				0/45	S 2-1-2	1.45	4.27	48	CLAYEY SILT: Brown silty clay/clayey silt to sandy silt/silty sand											Sand catcher was used to aid sample recovery
2		CL	S-C4-1	29/45	S 3-1-1	2.45	5.80	47		60	31	42	45	22	99	57	46	0.003	<2μm	Sand catcher was used
3				0/45	S 2-1-1	3.45	7.32	61												Sand catcher was used
4		ML	S-C4-2A	27/45	S 3-2-3	4.35	8.84	62		40		29	-	-	51	15	14	0.07	0.003	Sand catcher was used
5		ML	S-C4-2B							50	24	34	30	-	83	35	29	0.018	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Sponsored by:
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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site C - Bölük Street, Istiklal District, Adapazari
Date: July 27, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Hole caved in 08/03/00
Notes: 1.5 m south of CPT-C2

Test ID: SPT-C5
GPS Coordinates: 40.78370°N 30.39221°E
Elevation: -16 cm with respect to CPT-C4
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Top soil of garden area on the east side of building C2. Wash water shows a fine to coarse sub-angular to sub-rounded colorful clean sand at 1.8 m											Vane shear test at 1.25 m. First reading = 2.5 kPa, Average second reading = 3.5 kPa. Although the test was performed correctly, the first reading must be wrong
1			SH-C5-1	0/70	-		-	-												
2		-		0/45																
		-	S-C5-2	0/45	1-1-1	1.75	5.80	-	CL: Brown silty clay w/ red oxidized zones											
3		CL	S-C5-3	27/45	1-0-1	2.85	7.32	56		40		41	44	24	96	50	38	0.005	<2µm	Sand catcher was used for S-C5-2. One blow was sufficient to drive the rods > 45 cm at 1.9 m. No sample was recovered. The sampler was reinserted at 2.3 m and driven 45 cm. No sample was recovered
4									CL: Gray silty clay											
		CL	SH-C5-4	44/50	-	4.25	-	-				41	48	27	91	-	-	-	-	
5		CL	S-C5-5	38/45	1-1-3	5.05	8.84	64				40	42	18	100	70	50	0.002	<2µm	
6		ML	S-C5-6	40/45	6-17-23	5.95	10.37	67	SILT: Gray clayey silt			37	36	-	99	31	25	0.017	<2µm	
7		SP	S-C5-7	22/45	14-17-17	6.95	11.89	67	SAND: Gray fine to coarse sand with traces of gravel. Fine gravel content in S-C5-7 = 8%			14	-	-	4	-	-	0.7	0.2	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Sponsored by:
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CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site C - Bölük Street, Istiklal District, Adapazari
Date: July 27, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.96 m 08/03/00
Notes:

Test ID: SPT-C6
GPS Coordinates: 40.78370°N 30.39221°E
Elevation: -16 cm with respect to CPT-C4
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Top soil and brown clayey fill in east yard of building C2											
1		ML	S-C6-1	28/45	1-1-1	0.95	4.27	48	ML: Brown silt to silt with sand w/ red oxidized zones	60		13	40	-	94	30	25	0.014	<2μm	
2		ML	S-C6-2	41/45	1-0-1	1.50	5.80	53		60		36	31	-	87	28	20	0.015	<2μm	
3		CH	S-C6-3A	35/45	2-4-6	1.50	7.32	65	CH: Brown high plasticity silty clay.	70	47	45	56	33	99	57	44	0.003	<2μm	
		SM	S-C6-3B						SILTY SAND: Brown silty sand			32	36	-	45	<15	<10	0.08	0.01	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site C - Bölük Street, Istiklal District, Adapazari
Date: July 27, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Hole caved in, 08/03/00
Notes:

Test ID: SPT-C7
GPS Coordinates: 40.78370°N 30.39221°E
Elevation: -14 cm with respect to CPT-C4
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

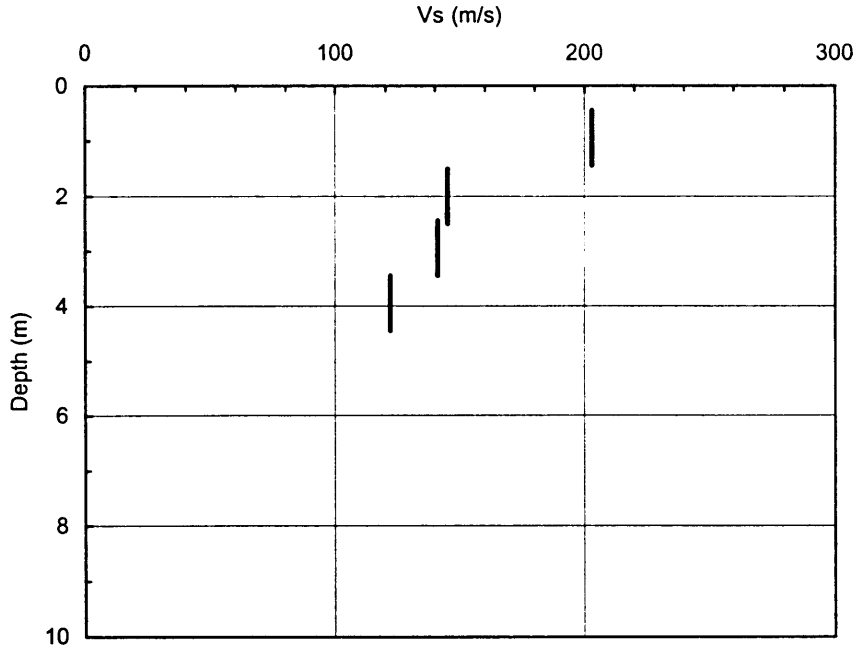
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Top soil and brown clayey fill in east yard of building C2											
1		ML	S-C7-1	33/45	1-1-3	0.95	4.27	50	ML: Brown low plasticity silt with sand to sandy silt. Soil has red oxidized points	70		33	34	-	84	29	23	0.017	<2µm	
2		ML	S-C7-2	38/45	1-2-1	1.50	5.80	51		40		33	33	-	72	22	18	0.034	<2µm	
3		CL/CH	S-C7-3	40/45	1-1-2	0.95	7.32	50	CLAY: Brown high plasticity silty clay w/ red oxidized points	100		17	49	28	99	58	40	0.004	<2µm	
		CH	S-C7-4	33/45	2-2-3	0.95	7.32	62				38	65	43	99	70	53	0.002	<2µm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

Shear Wave Velocity Profile Determined
using the Seismic Cone (Downhole Method)

Test ID: CPT-C2

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
1.70	0.44	1.44	179	227	203
2.76	1.50	2.50	179	111	145
3.70	2.44	3.44	135	147	141
4.70	3.44	4.44	125	119	122

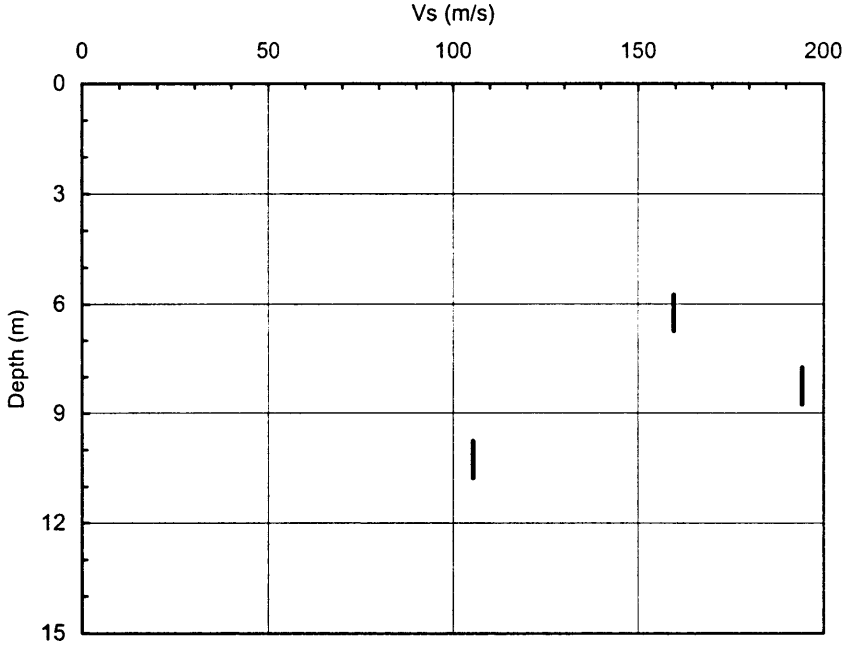


Data processed by: ZETAS (Zemin Teknolojisi AS)

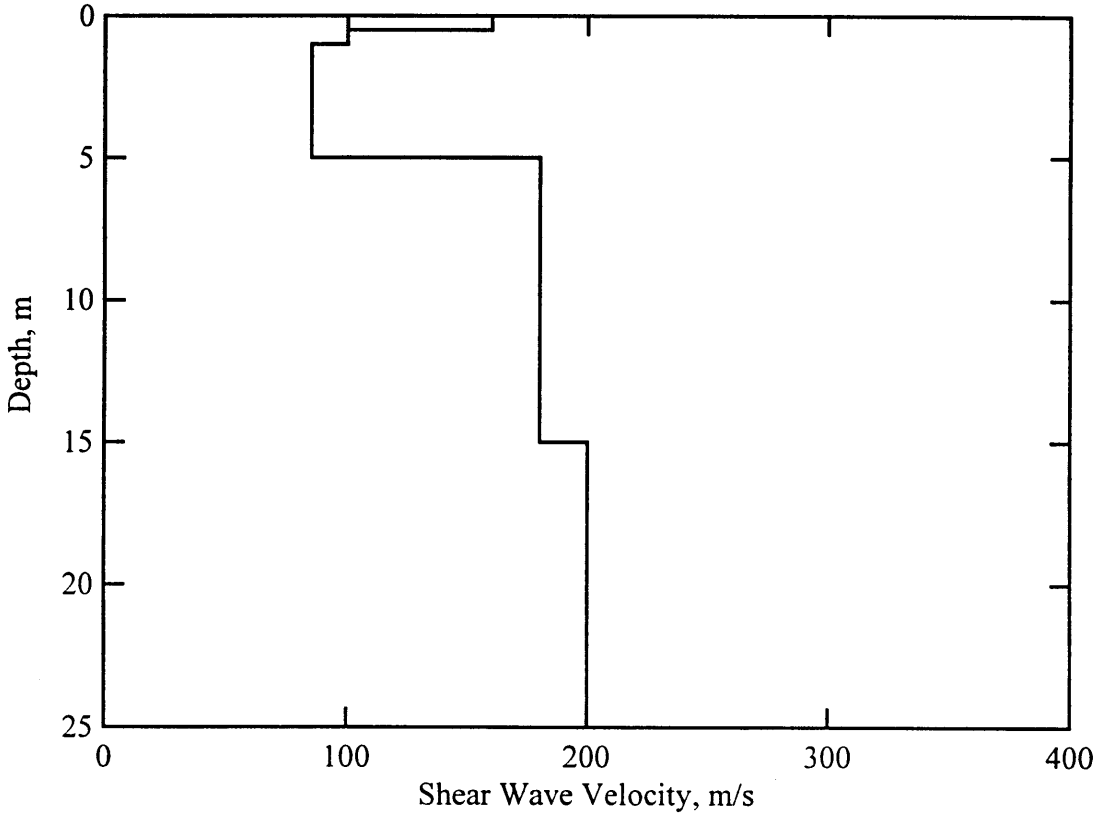
Shear Wave Velocity Profile Determined
using the Seismic Cone (Downhole Method)

Test ID: CPT-C7

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
7.00	5.74	6.74	200	119	160
9.00	7.74	8.74	111	278	194
11.02	9.76	10.76	97	114	105



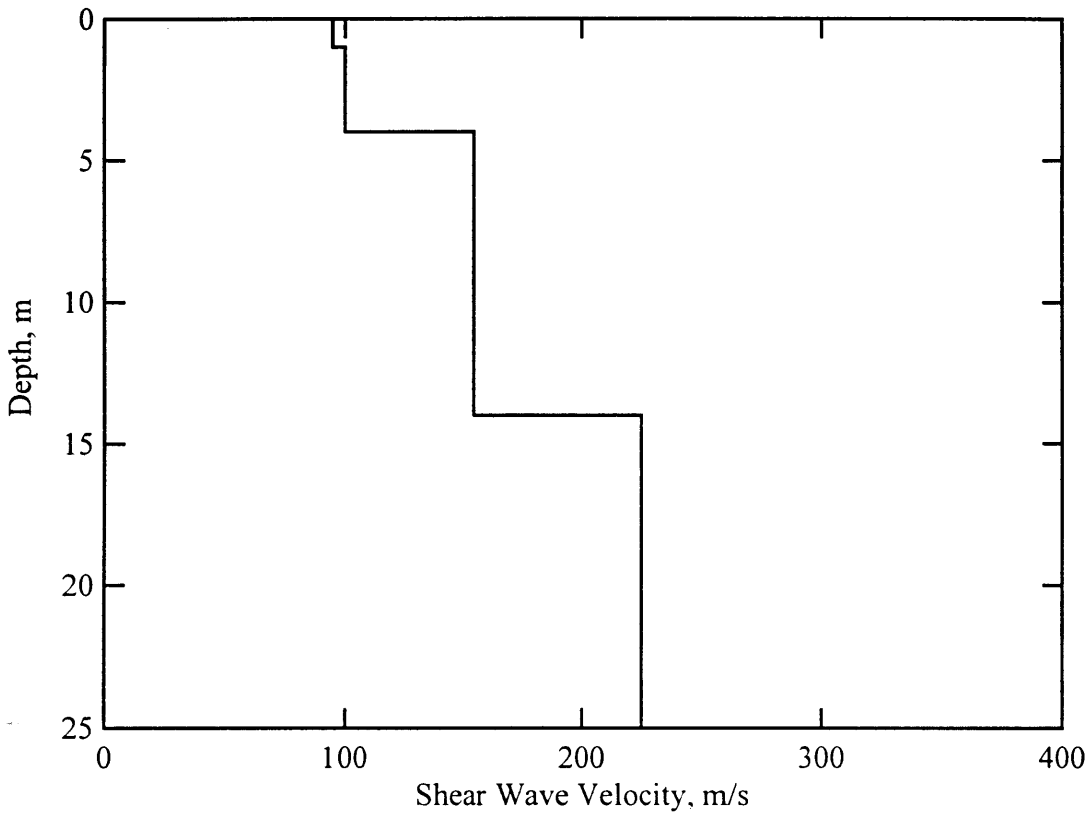
Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Site C North Centerline.

Tabulated values of layer properties determined from forward modeling of Site C North Centerline

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	160	299.3	0.3	1.92
0.5	0.5	100	187.1	0.3	1.92
1.0	4.0	85	1500	0.4984	2.0
5.0	10.0	180	1500	0.4927	2.0
15.0	10.0	200	1500	0.491	2.0



Shear wave velocity profile determined from forward modeling of Site C South Centerline.

Tabulated values of layer properties determined from forward modeling of Site C South Centerline

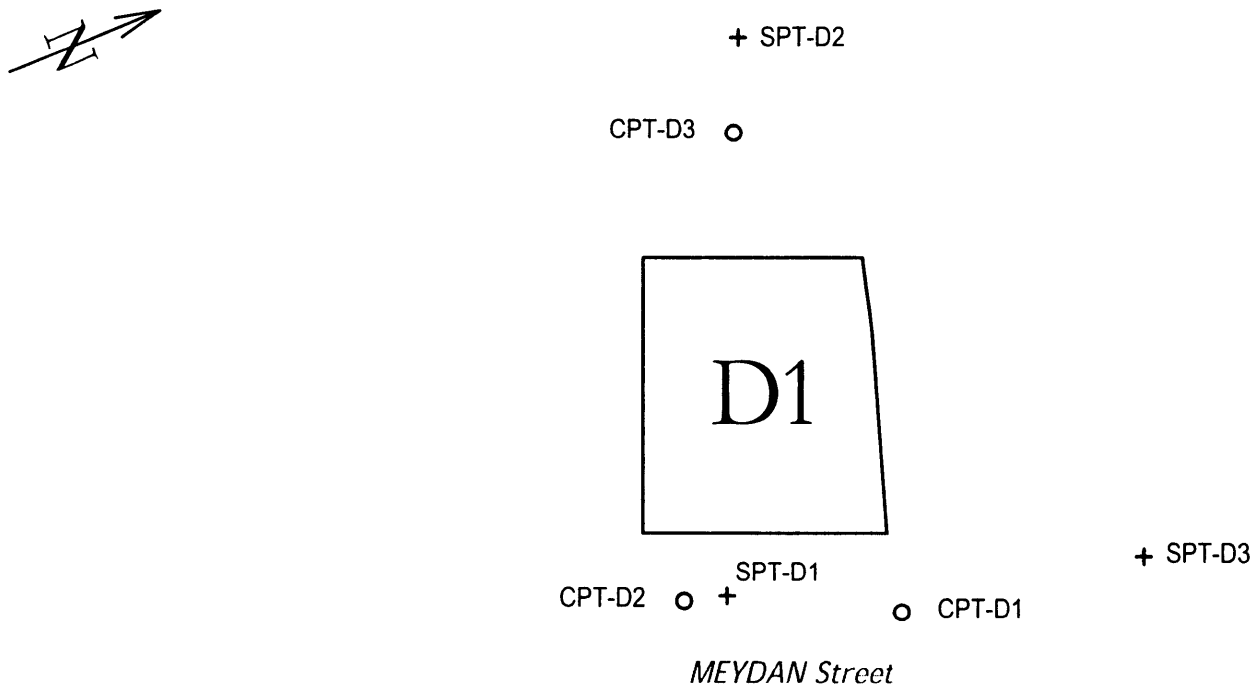
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	1.0	95	177.7	0.3	1.92
1.0	3.0	100	1500	0.4978	2.0
4.0	10.0	155	1500	0.4946	2.0
14.0	11.0	225	1500	0.4885	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

Phase 1

Site D



Difference in elevation with respect to CPT-D1

CPT-D1	0 cm
CPT-D2	-10 cm
CPT-D3	-4 cm
SPT-D1	-10 cm
SPT-D2	-4 cm
SPT-D3	-3 cm
Ground floor slab of the building	-10 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

Contents: Plan view of Site D and location of subsurface exploration points

Location: Meydan Street, Çukuramediye District, Adapazari
GPS Coordinates: 40.76929° N 30.40828° E

Scale: Graphic Scale | File Name: site_d.fcw - site_d.pdf

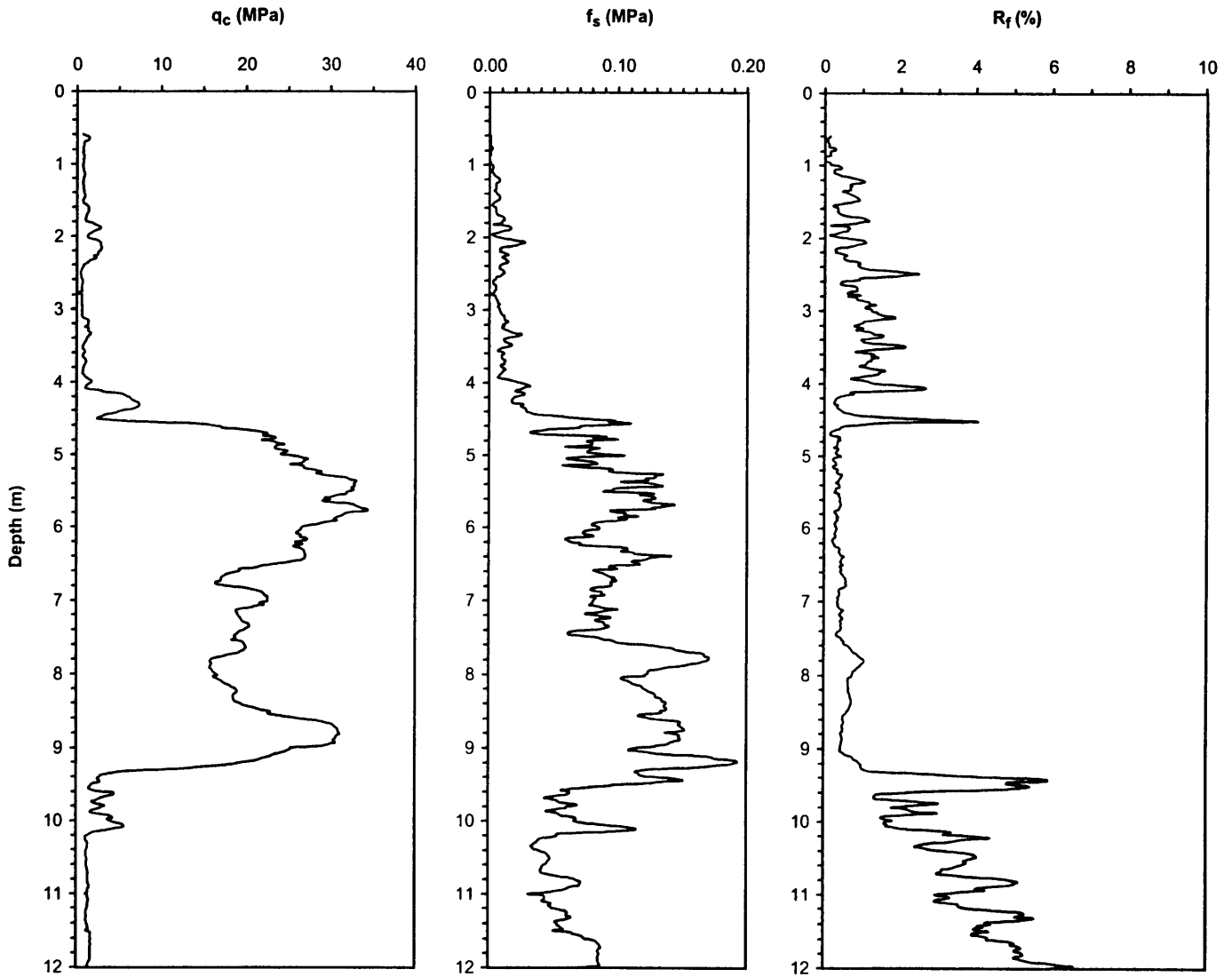
Date: 10/23/00 | Drawing: Rodolfo B. Sancio

UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

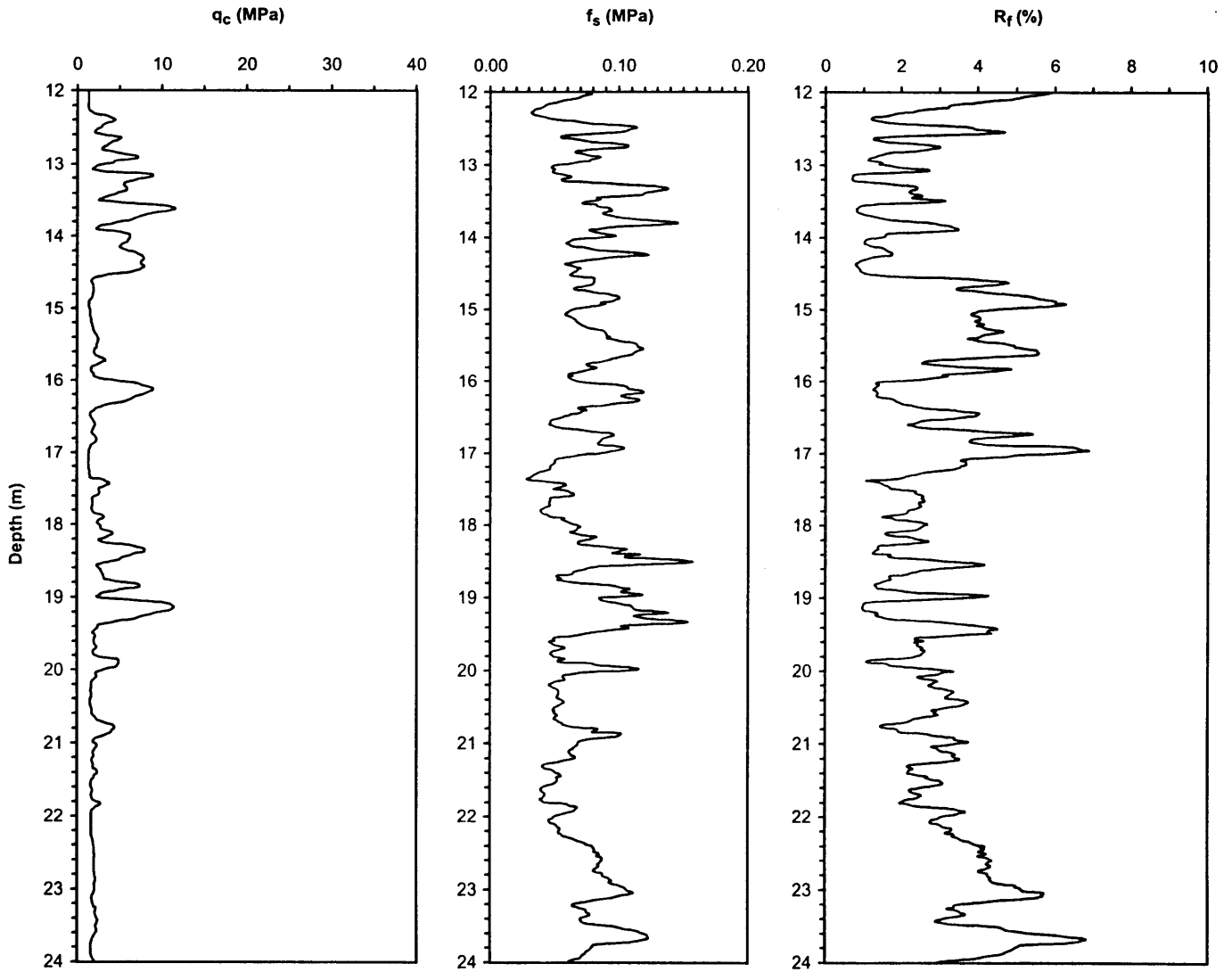
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site D - Meydan Street, Çukurahmediye District, Adapazarı
GPS Coordinates: 40.76929°N 30.40828°E
Test Number: CPT-D1
Type of Cone: ELC10 CF No. 990617 (a.p. v.d. Berg)
File Name: cptd1.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

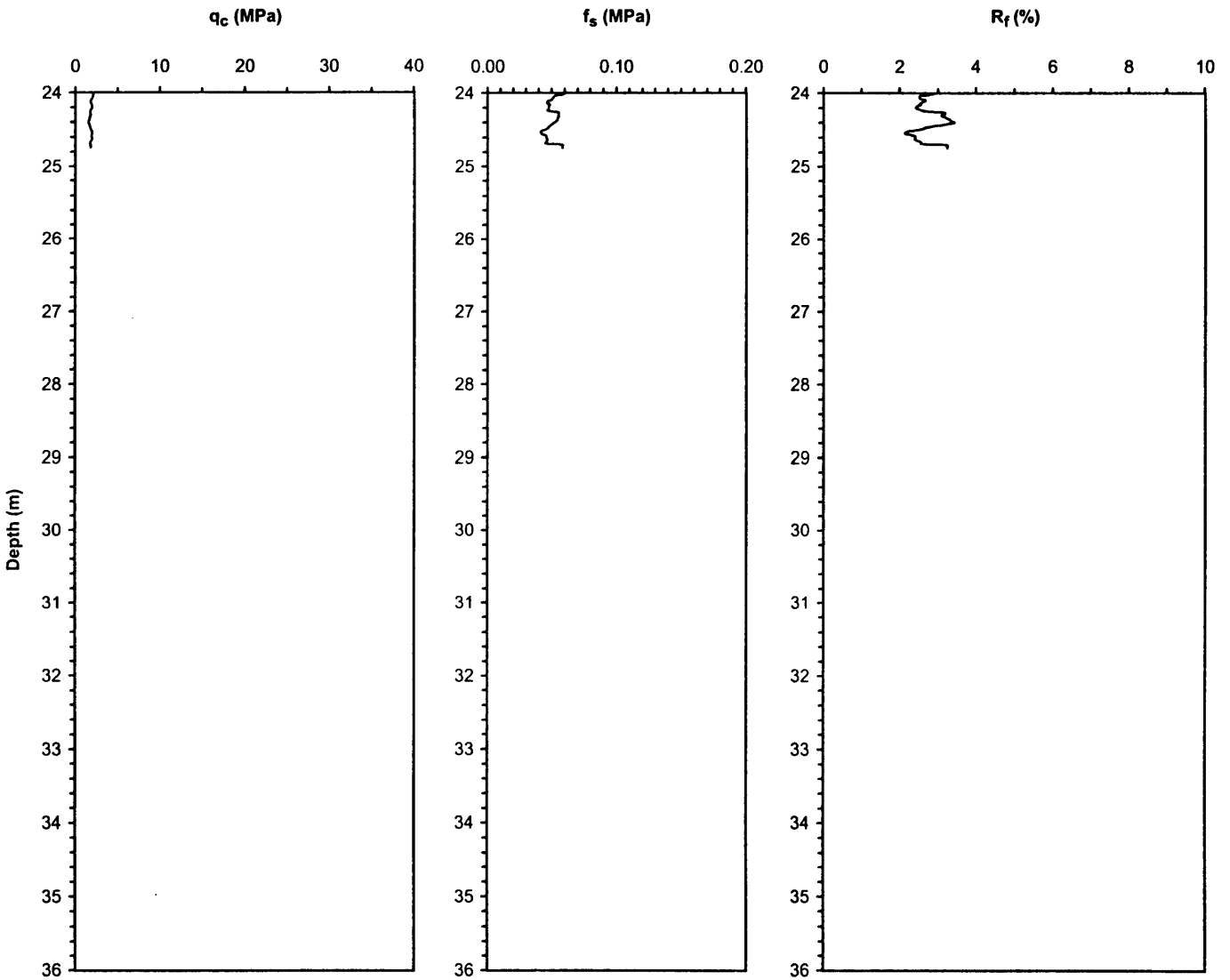
Elevation: 0 cm with respect to CPT-D1
Date: June 16, 2000 16:54
Water Table Elevation: Not measured
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley



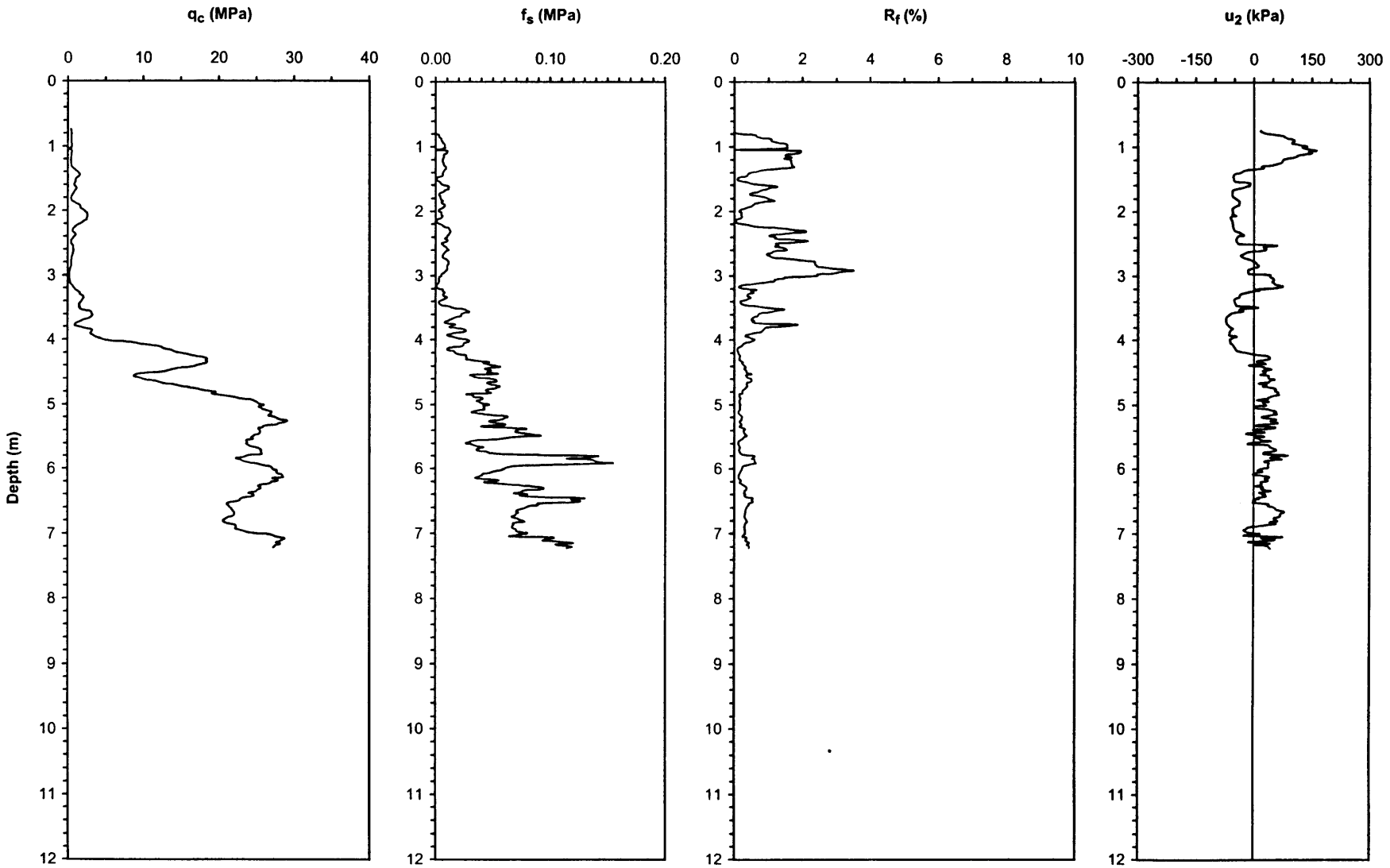
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Site D - Meydan Street, Çukurahmediye District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.76929°N 30.40828°E	
	Test Number:	CPT-D1	**Elevation:** 0 cm with respect to CPT-D1
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 16, 2000 16:54
Sponsored by:	**File Name:**	cptd1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



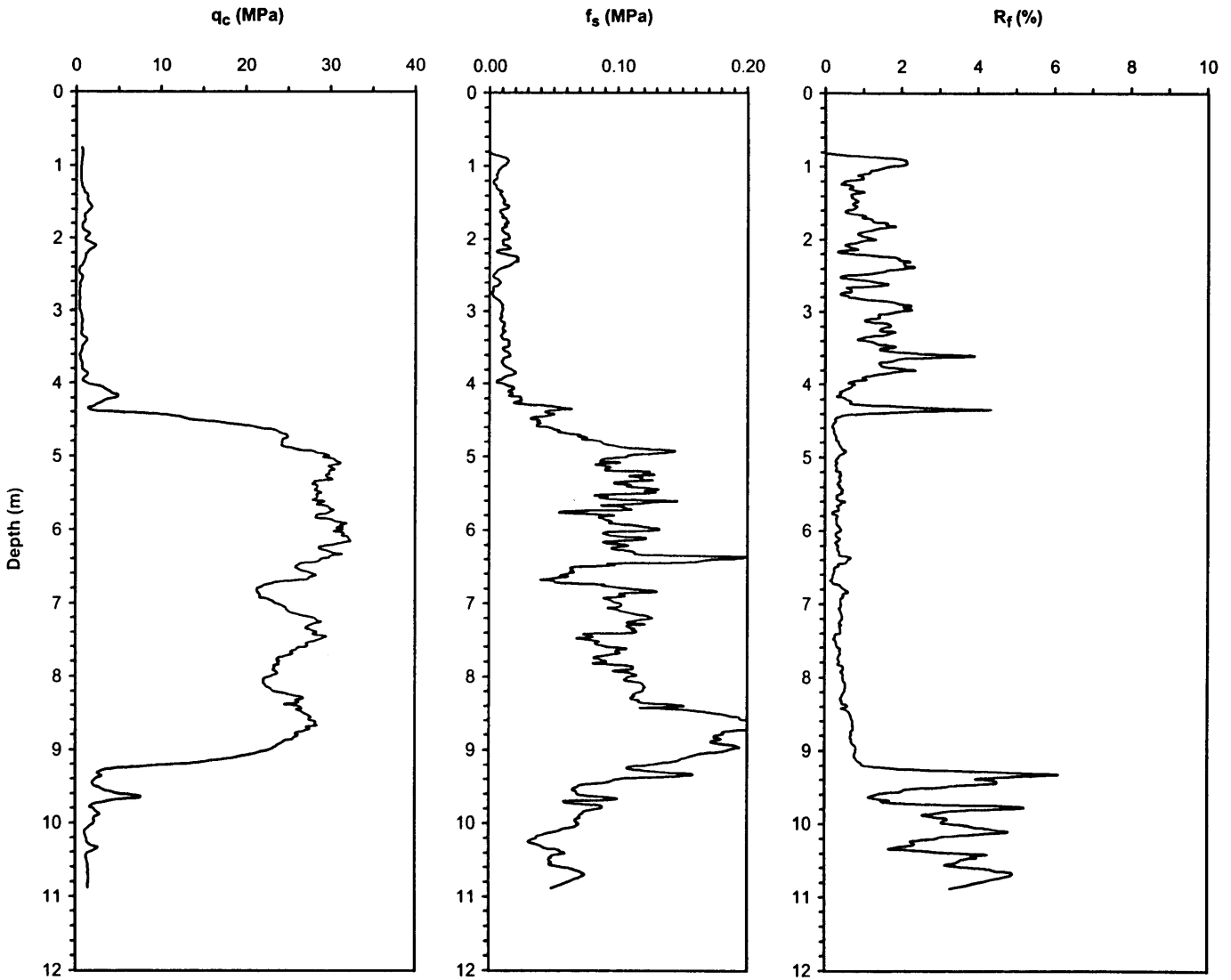
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Site D - Meydan Street, Çukurahmediye District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.76929°N 30.40828°E	
	Test Number:	CPT-D1	**Elevation:** 0 cm with respect to CPT-D1
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 16, 2000 16:54
Sponsored by:	**File Name:**	cptd1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site D - Meydan Street, Çukurahmediye District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.76929°N 30.40828°E	
	Test Number:	CPT-D2	**Elevation:** -10 cm with respect to CPT-D1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 17, 2000
Sponsored by:	**File Name:**	cptd2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site D - Meydan Street, Çukurahmediye District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.76929°N 30.40828°E	
	Test Number:	CPT-D3	**Elevation:** -4 cm with respect to CPT-D1
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 17, 2000 13:25
Sponsored by:	**File Name:**	cptd3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site D - Meydan Street, Çukurahmediye District, Adapazari
Date: June 28, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.68m 06/29/00, 1.70m 06/29/00
Notes:

Test ID: SPT-D1
GPS Coordinates: 40.76929°N 30.40828°E
Elevation: -10 cm with respect to CPT-D1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Sandy clayey subgrade of sidewalk											
1		CL	S-D1-1	26/45	1-0-1	1.05	4.27	41	CL: Black to dark gray clayey silt with some fine sand. The soil has organic odor but not related to soil composition. Probably due to nearby septic tank	10	-	30	33	14	81	37	30	0.011	<2μm	
2		ML	S-D1-2A	39/45	2-1-1	1.85	5.80	53		-	-	30	28	-	71	-	-	-	-	
		ML	S-D1-2B							-	-	32	29	-	59	-	-	0.06	-	
		CH/CL	S-D1-3	36/45	1-1-1	2.65	7.32	53	ML: Dark gray to black sandy silt	70	42	38	50	26	99	54	36	0.004	<2μm	
3		ML	S-D1-4	40/45	3-3-4	3.4	7.32	63	CH: Brown silty clay with traces of red oxidized spots. Does not soften when remoulded	-	-	34	28	-	89	-	-	-	-	
4		SW	S-D1-5	12/45	8-11-12	4.45	8.84	64	ML: Brown silt with traces of fine sand and red oxidized spots.	-	-	15	-	-	4	-	-	1.1	0.24	
5		SW	S-D1-6	10/45	9-12-12	5.4	10.37	67	SAND: Well graded gray sand to well graded sand with fine gravel. Gravel content is inhomogeneous and varies from 3% to 24%. FC in all recovered samples is < 6%	-	-	11	-	-	3	-	-	1.7	0.33	
6																				
7		SW-SM	S-D1-7	31/45	10-14-18	7.5	10.37	66		-	-	24	-	-	5	-	-	0.7	0.16	
8																				
9									MH: High plasticity silty clay with traces of fine sand											
10		MH/CH	S-D1-8	36/45	3-3-4	10	13.42	75		220	57	34	56	25	94	42	34	0.007	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site D - Meydan Street, Çukurahmediye District, Adapazari
Date: June 29, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Hole caved in 07/08/00
Notes: Boring on footprint of collapsed buiding

Test ID: SPT-D2
GPS Coordinates: 40.76929°N 30.40828°E
Elevation: -4 cm with respect to CPT-D1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Hard brick and brown fill material. The soild flight auger had difficulty, maybe due to a spread footing of the collapsed building											
1			SH-D2-1	42/42	-	1.25	-	-		110	37									
2		ML/CL	SH-D2-2	42/42	-	2.05	-	-	CLAYEY SILT: Gray clayey silt to silty clay with fine sand and traces of shells. Strong organic odor, but not due to soil composition	-	-	36	36	12	94	24	19	0.02	<2μm	
		ML	S-D2-3	41/45	1-2-1	2.05	5.80	44		90	-	41	42	13	99	-	-	-	-	
3		CL/ML	S-D2-4	37/45	1-1-2	3.15	7.32	51	CLAYEY SILT: Brown clayey silt to silty clay with traces of fine sand and red oxidized spots to sandy silt	70	-	36	35	12	95	22	16	0.021	<2μm	
4		ML	S-D2-5A	36/45	3-9-9	4.05	8.84	65		-	-	40	24	-	71	23	20	0.03	<2μm	
		SW-SM	S-D2-5B						SAND: Gray well to poorly graded sand with low silt content (< 6%) and varying fine gravel content (< 16%)	-	-	10	-	-	5	-	-	1.2	0.15	
5		SW	S-D2-6	29/45	9-12-12	5.15	8.84	65		-	-	10	-	-	4	-	-	1.3	0.25	
6																				
7		SW-SM	S-D2-7	30/45	10-13-17	7.00	10.37	-		-	-	10	-	-	5	-	-	0.4	0.13	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site D - Meydan Street, Çukurahmediye District, Adapazari
Date: July 26, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 2.28 m, 08/04/00
Notes:

Test ID: SPT-D3
GPS Coordinates: 40.76929°N 30.40828°E
Elevation: +16 cm with respect to CPT-D1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

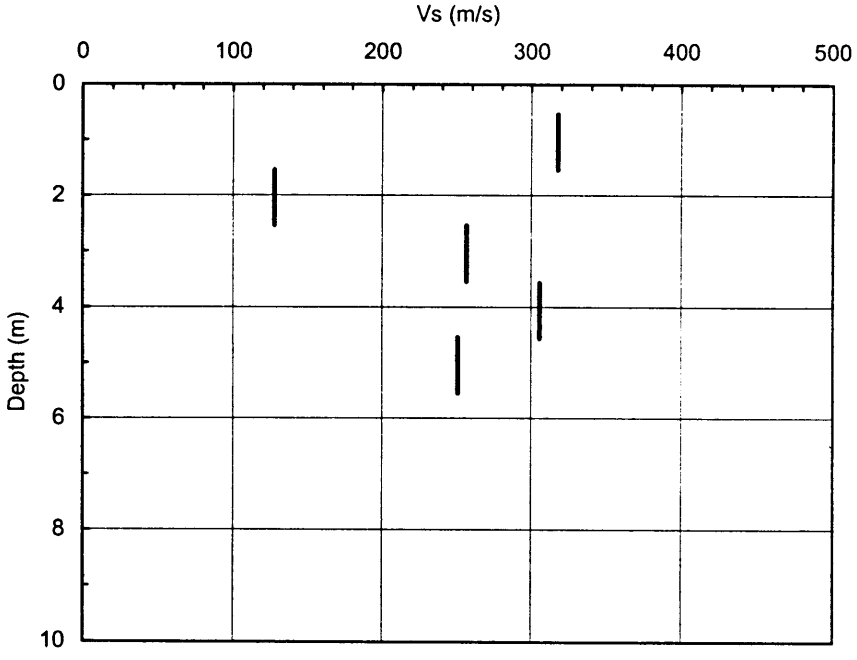
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: The soil in the wash water is a medium to coarse sand that is pressumed to be fill for a neighboring pipe.											
1																				
2		-	S-D3-1	0/45	3-2-2	2.15	5.80	53	SILT: Brown sandy silt to low plasticity silt with traces of fine sand	-	-	-	-	-	-	-	-	-	-	
3		ML	S-D3-2	25/45	2-2-2	2.85	7.32	59		-	-	30	30	-	52	17	16	0.07	<2µm	No sample was recovered at 2.9 m. In a second attempt the rods sank 25 cm (3.15 m) and the sampler was driven 45 cm
4		ML	S-D3-3A	40/45	3-6-4	3.75	7.32	55		-	-	27	31	-	55	14	10	0.062	0.002	
		CL	S-D3-3B						CLAYEY SILT: Brown low plasticity clayey silt	150	-	30	32	12	96	30	9	0.011	0.002	
5		SW	S-D3-4	32/45	7-6-13	4.5	8.84	57	SAND: Well graded gray sand with traces of gravel and silt	-	-	18	-	-	4	-	-	1.5	0.46	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

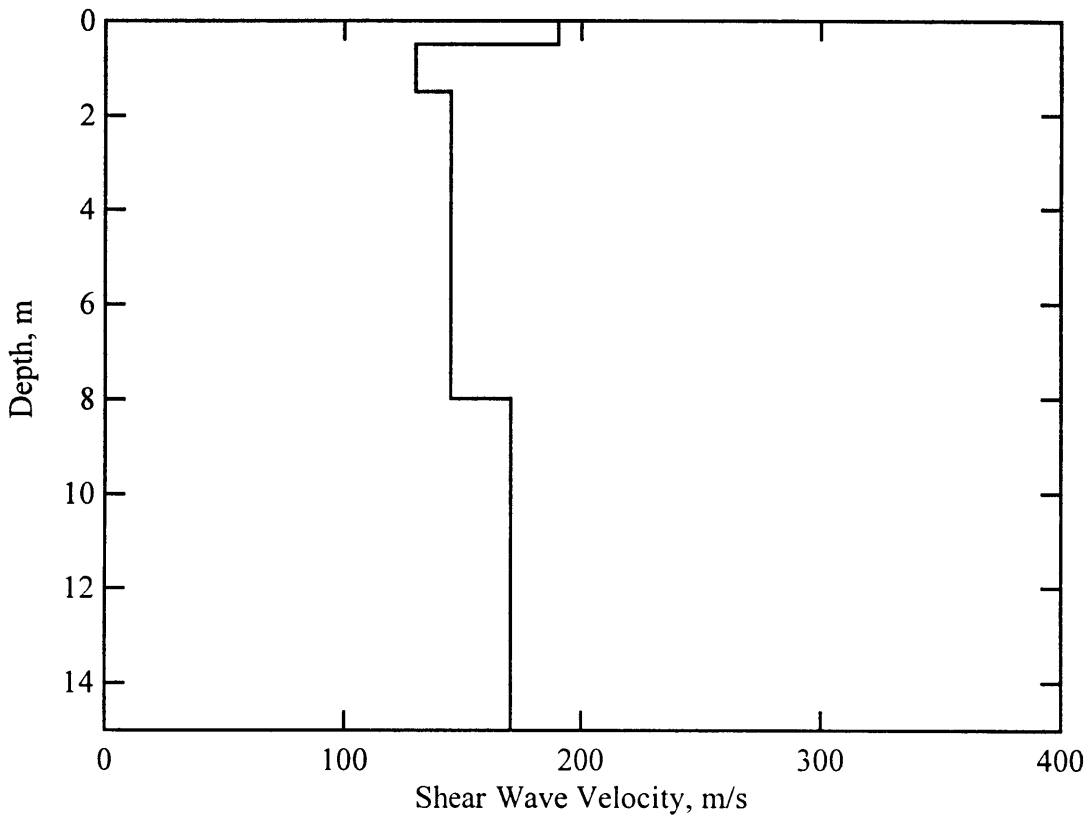
Shear Wave Velocity Profile Determined
using the Seismic Cone (Downhole Method)

Test ID: CPT-D2

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
1.80	0.54	1.54	500	135	318
2.80	1.54	2.54	104	152	128
3.80	2.54	3.54	128	385	256
4.82	3.56	4.56	278	333	306
5.80	4.54	5.54	238	263	251



Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Site D.

Tabulated values of layer properties determined from forward modeling of Site D

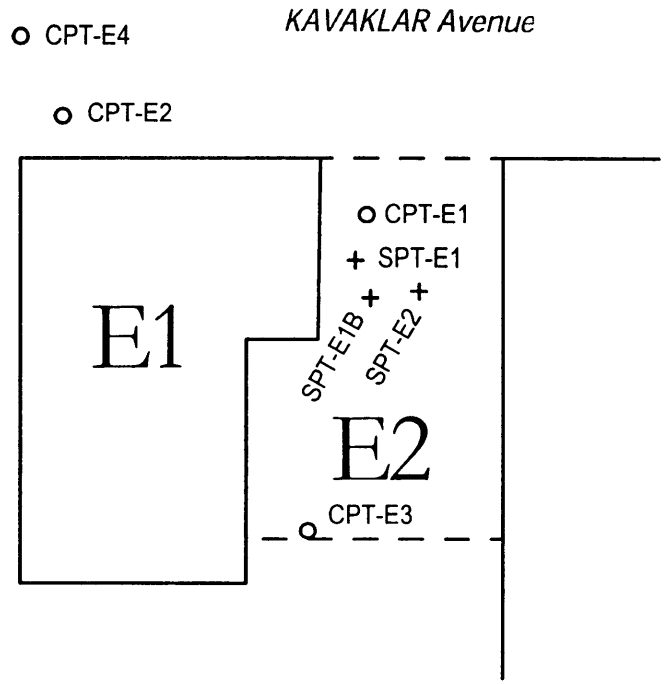
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	190	355.5	0.3	1.92
0.5	1.0	130	243.2	0.3	1.92
1.5	6.5	145	1500	0.4953	2.0
8.0	7.0	170	1500	0.4935	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

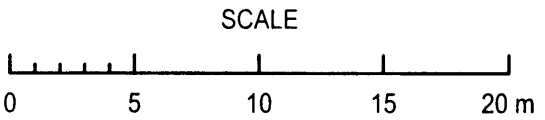
These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

Phase 1

Site E



Difference in elevation with respect to CPT-E1	
CPT-E1	0 cm
CPT-E2	+9 cm
CPT-E3	-5 cm
CPT-E4	+6 cm
SPT-E1	0 cm
SPT-E1B	0 cm
SPT-E2	0 cm



UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

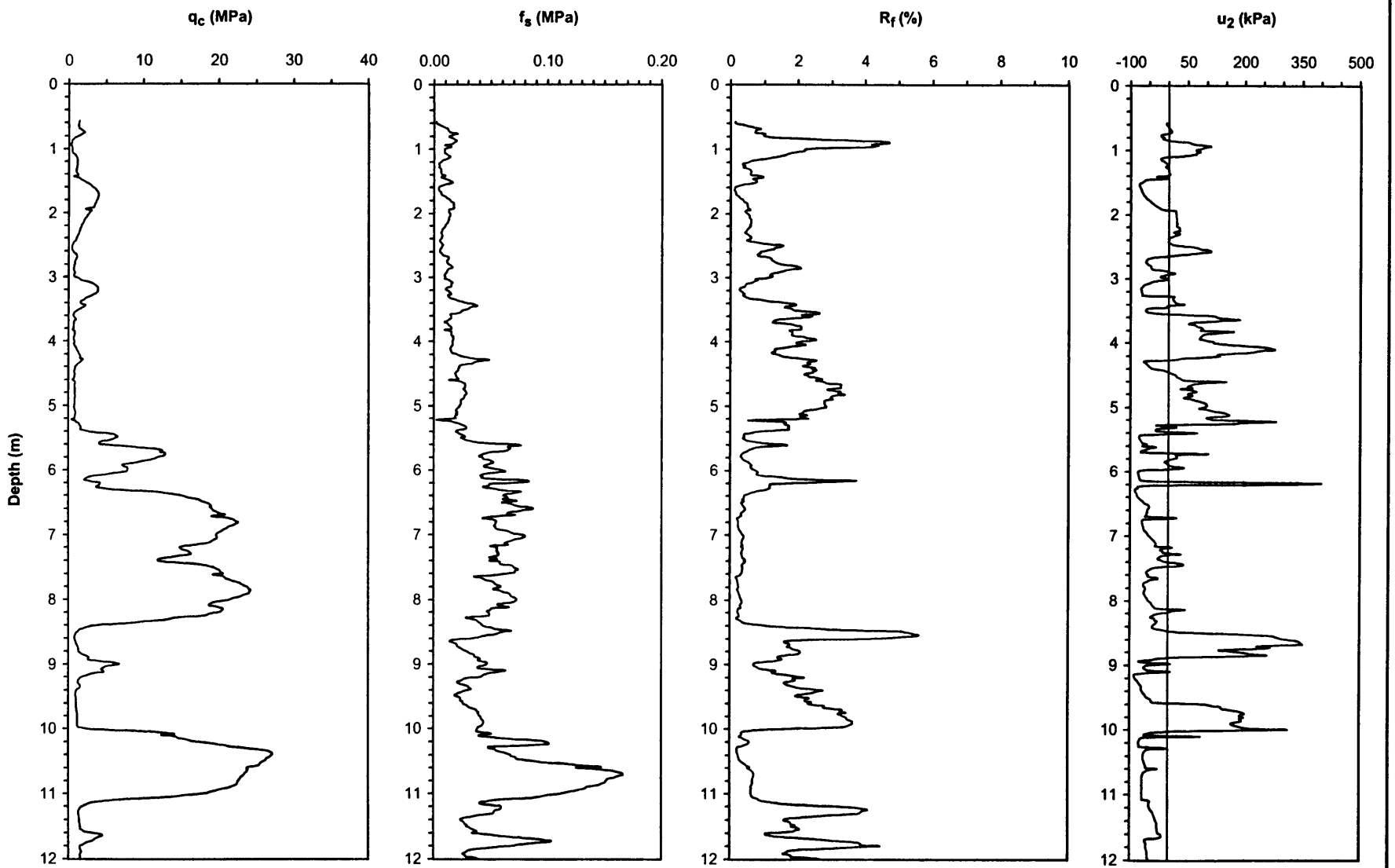
Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

Contents: Plan view of Site E and location of subsurface exploration points

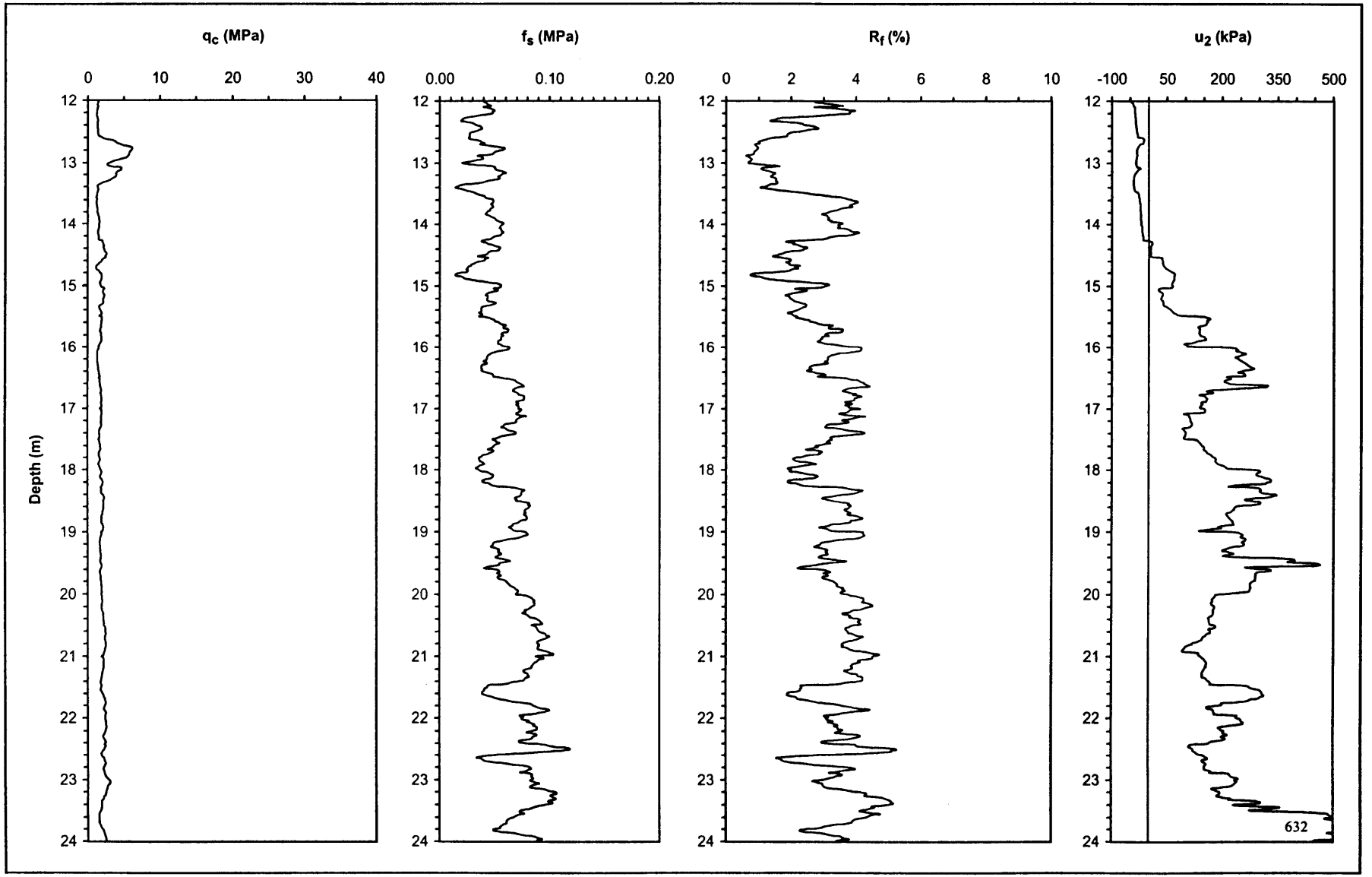
Location: Kavaklar Avenue, Tigcilar District, Adapazari
GPS Coordinates: 40.40.77778° N 30.40518° E

Scale: Graphic Scale	File Name: site_e.fcw - site_e.pdf
Date: 08/15/00	Drawing: Rodolfo B. Sancio

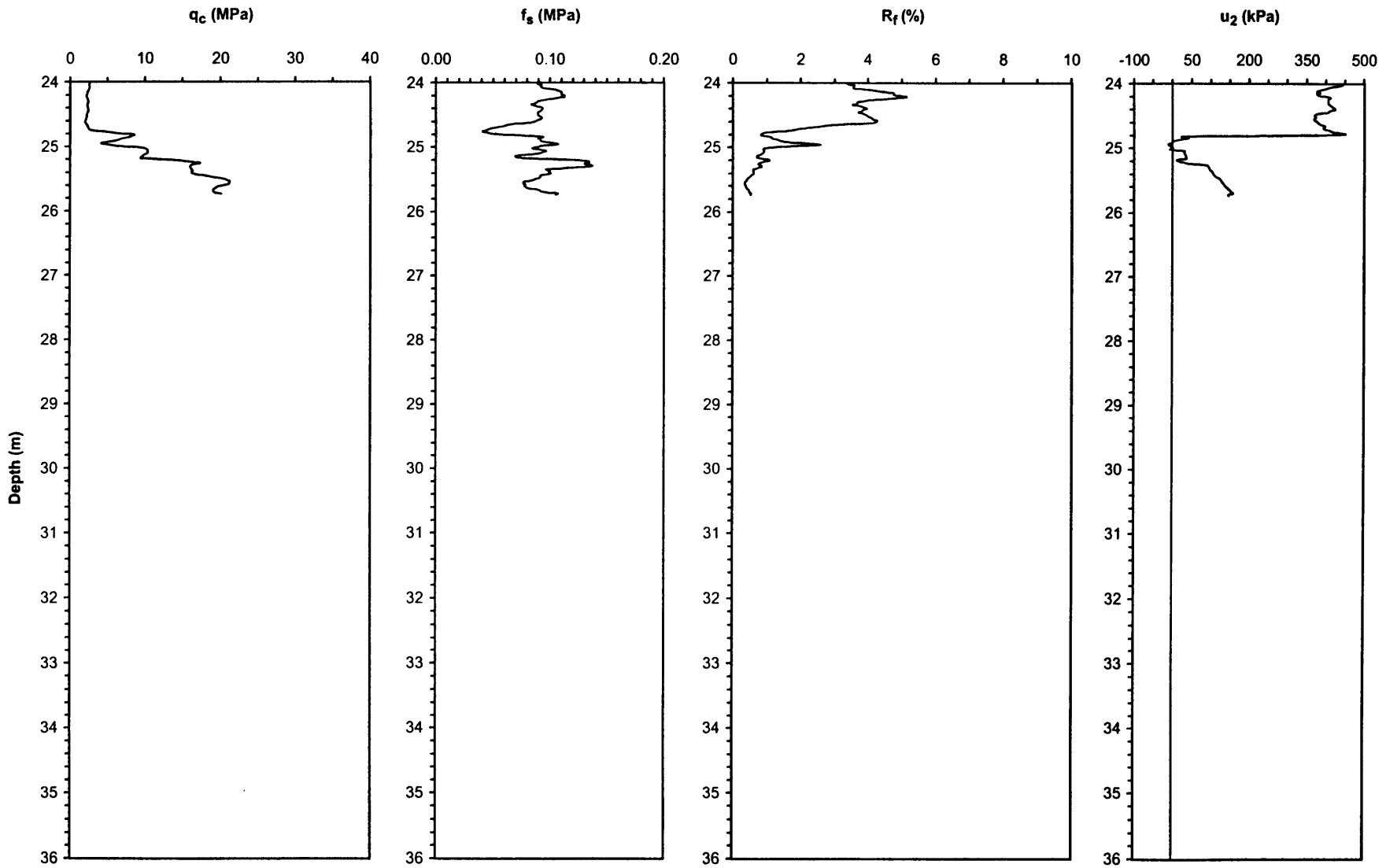
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Site E - Kavaklar Avenue, Tığcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77778°N 30.40518°E	
	Test Number:	CPT-E1	**Elevation:** 0 cm with respect to CPT-E1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 20, 2000
Sponsored by:	**File Name:**	cpte1.txt	**Water Table Elevation:** 28 cm
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



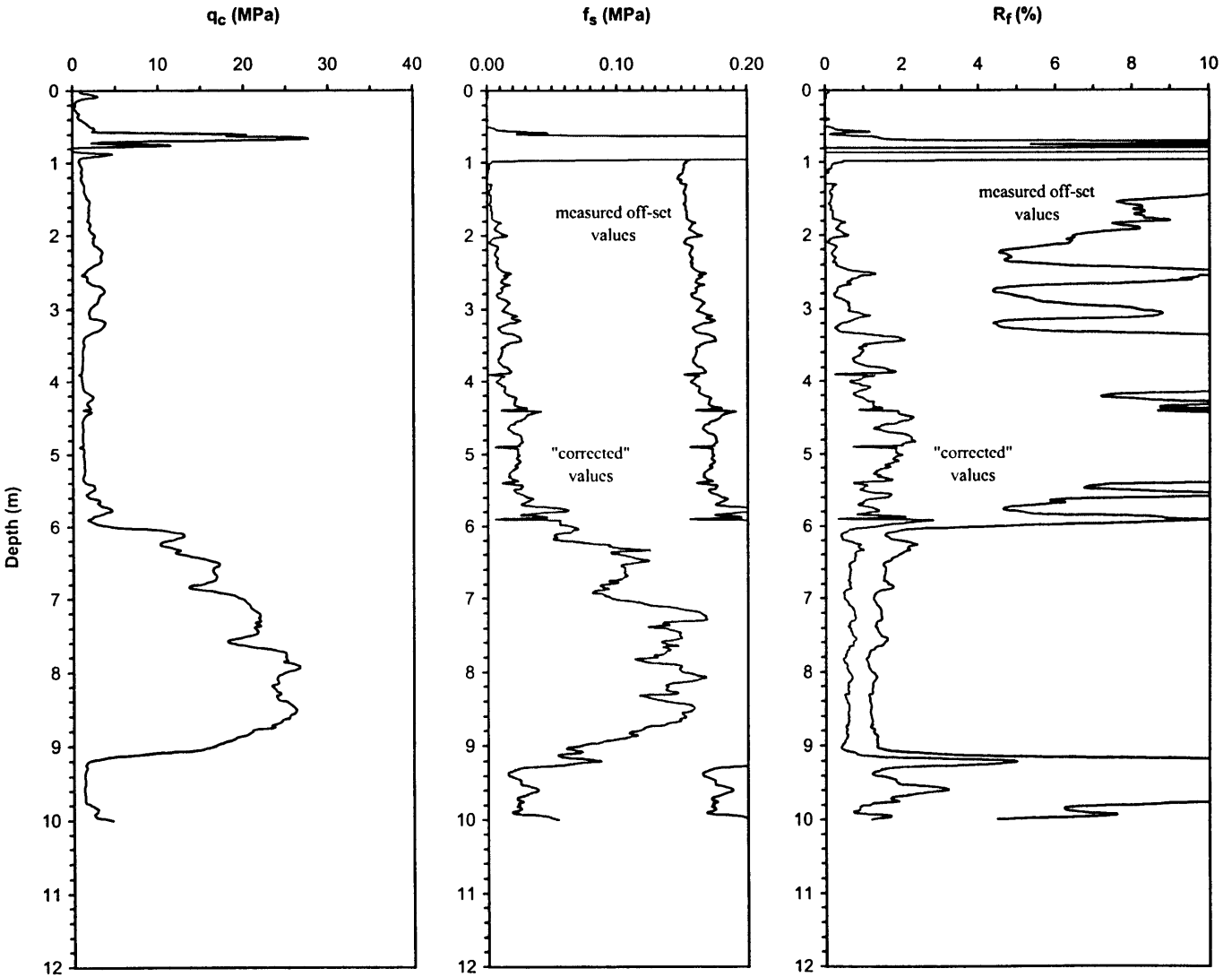
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Site E - Kavaklar Avenue, Tığcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77778°N 30.40518°E	
	Test Number:	CPT-E1	**Elevation:** 0 cm with respect to CPT-E1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 20, 2000
Sponsored by:	**File Name:**	cpte1.txt	**Water Table Elevation:** 28 cm
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Site E - Kavaklar Avenue, Tığcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77778°N 30.40518°E	
	Test Number:	CPT-E1	**Elevation:** 0 cm with respect to CPT-E1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 20, 2000
Sponsored by:	**File Name:**	cpte1.txt	**Water Table Elevation:** 28 cm
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site E - Kavaklar Avenue, Tığcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77778° N 30.40518° E	
	Test Number:	CPT-E2	**Elevation:** +9 cm with respect to CPT-E1
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 20, 2000 14:24
Sponsored by:	**File Name:**	cpte2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Cone punctured abandoned utility line and fs readings were offset by approximately 0.15 MPa	



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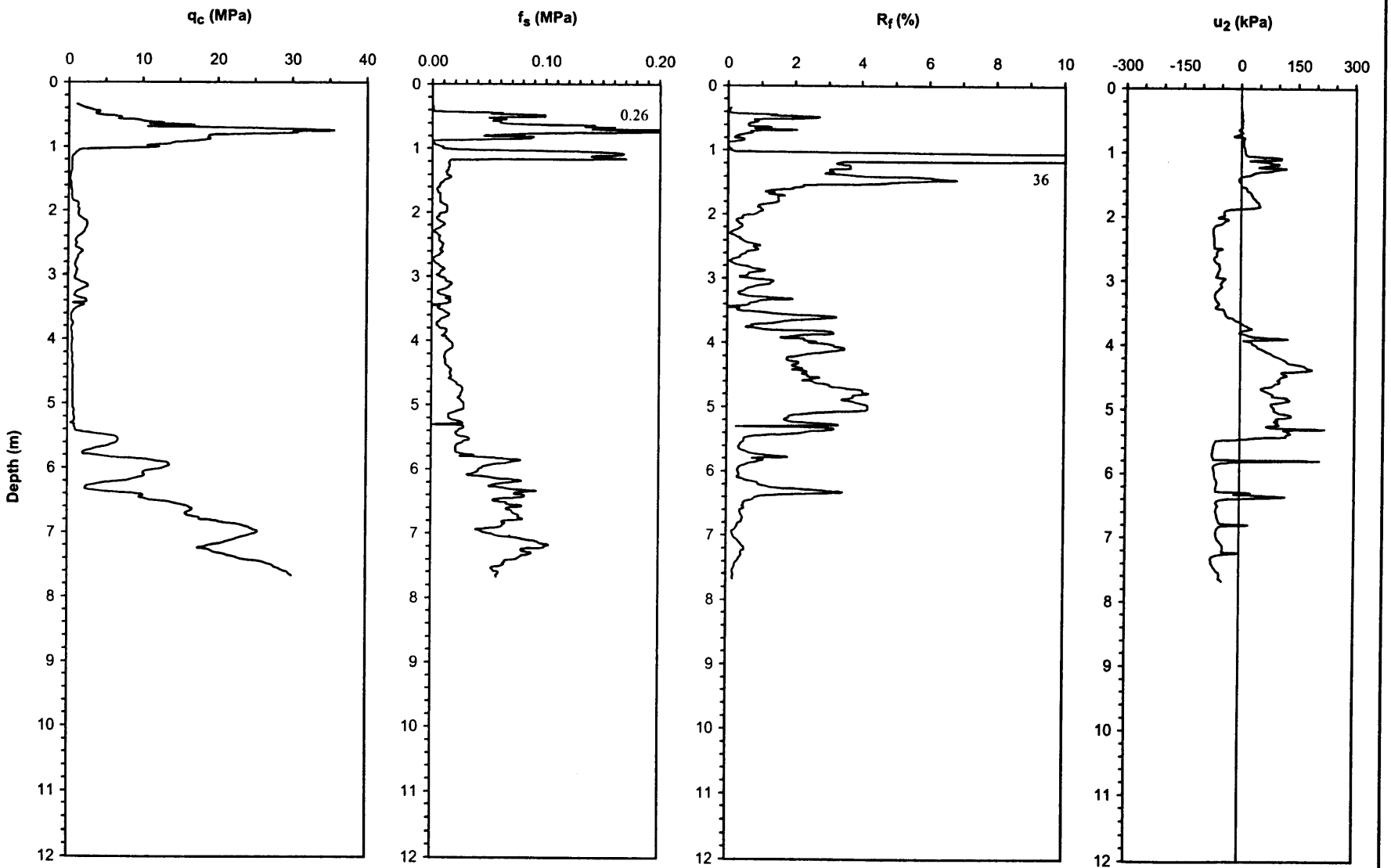
Joint Research

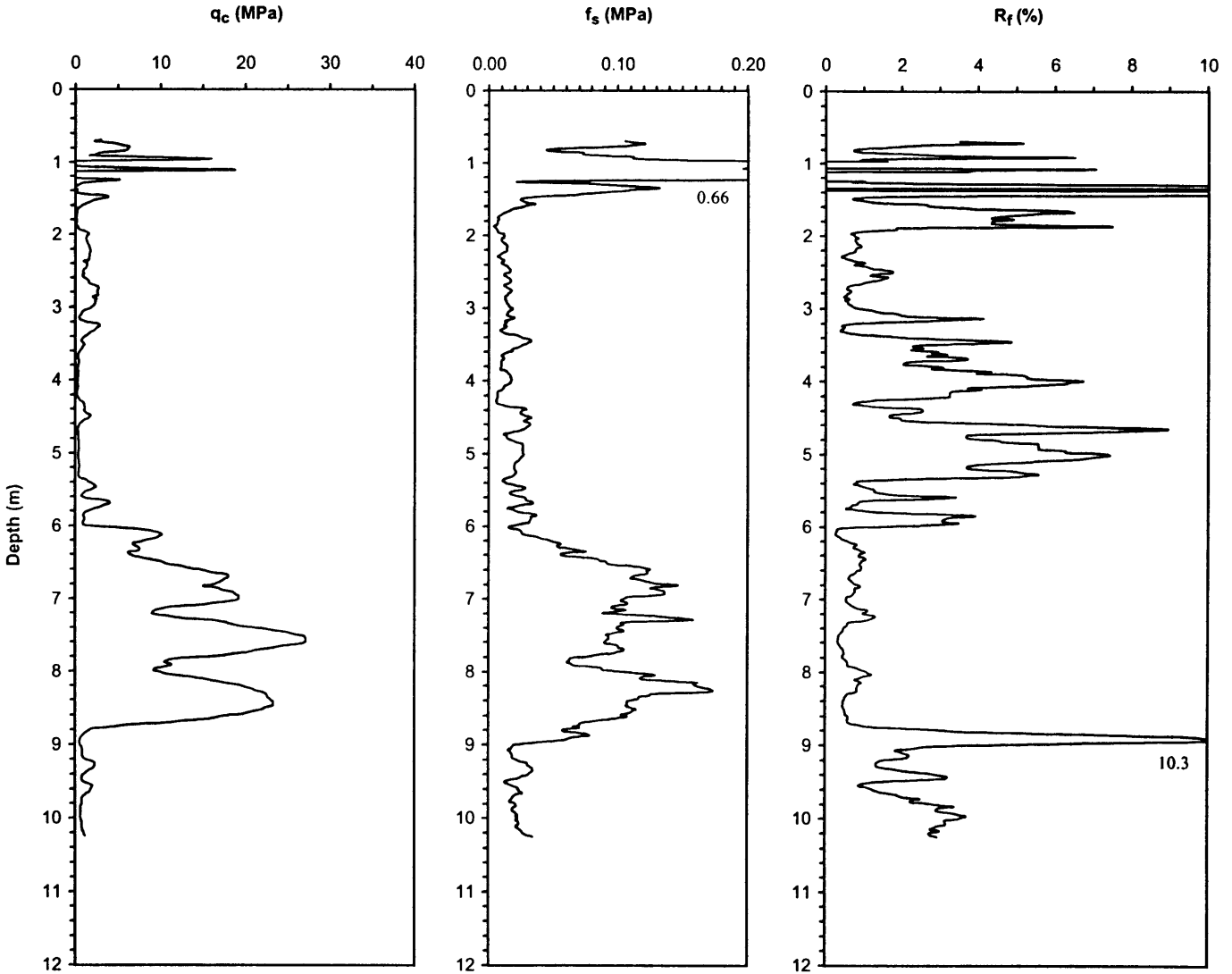
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site E - Kavaklar Avenue, Tığcılar District, Adapazarı
GPS Coordinates: 40.77778° N 30.40518° E
Test Number: CPT-E3
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cpte3.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation: -5 cm with respect to CPT-E1
Date: June 20, 2000
Water Table Elevation: Not measured
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site E - Kavaklar Avenue, Tığcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77778° N 30.40518° E	
	Test Number:	CPT-E4	**Elevation:** +6 cm with respect to CPT-E1
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** July 18, 2000 10:30
Sponsored by:	**File Name:**	cpte4.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 68 cm to check for utilities	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site E - Kavaklar Ave., Tigcilar District, Adapazari
Date: July 3, 2000
Field Log by: Jonathan D. Bray
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 70 cm 07/03/00, 46 cm 07/08/00, 0.34 m 08/04/00
Notes: Solid flight auger was used to a depth of 0.8 m

Test ID: SPT-E1
GPS Coordinates: 40.77778°N 30.40518°E
Elevation: -0 cm with respect to CPT-E1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Brown sandy fill with rubble (bricks and concrete) and some fines. Black clayey soil with slight smell.											
1																				
2		SP	S-E1-1	34/45	2-2-4	1.55	4.27		SP: Poorly graded, medium to fine brown clean sand		-	23	-	-	2	-	-	0.51	0.2	
3		ML	S-E1-2A	36/45	2-2-3	2.85	5.80		SILT AND SAND: Interbedded strata of brown low plasticity sandy silt and clayey silt with brown medium sand	125		33	28	-	59	-	-	0.06	-	
		ML	S-E1-2B									34	33	-	90	28	20	0.014	<2μm	
4		MH/CH	S-E1-3	41/45	1-2-1	3.65	7.32		SILTY CLAY: Brown clayey silt/silty clay. Traces of organics and oxidation veins	60	30	49	52	22	99	-	-	-	-	
		CH	SH-E1-4A	35/42	-	4.45	-			110	50		61	32	96	40	24	.007	<2μm	
		CH	SH-E1-4B										61	33	95	54	33	.004	<2μm	
5		CH	SH-E1-4C										62	35	95	53	37	.005	<2μm	
		SM	S-E1-5A	45/45	3-4-5	5.35	8.84		SAND: Gray fine to medium sand interbedded with gray low plasticity silt deposits. FC in this stratum varies from 3% to 61%	80		33	-	-	47	-	-	0.08	-	
		SP	S-E1-5B									17	-	-	7	-	-	0.4	0.1	
6		ML	S-E1-6A	41/45	5-13-19	6.35	10.37			-		25	26	-	61	16	11	0.048	<2μm	
		SW-SM	S-E1-6B							450		18	-	-	12	-	-	0.2	0.06	
7																				
			S-E1-7	40/45	9-16-18	7.35	11.89			280										
8																				
9		SP	S-E1-8A	45/45	1-4-8	8.08	11.89			100		21	-	-	3	-	-	0.6	0.2	
		CL	S-E1-8B						CLAY: Gray clay with traces of fine sand	125		30	39	17	97	31	24	0.014	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site E - Kavaklar Ave., Tigcilar District, Adapazari
Date: July 3, 2000
Field Log by: Jonathan D. Bray
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.44 m 07/08/00
Notes: Solid flight auger used to adepth of 0.8 m

Test ID: SPT-E1B
GPS Coordinates: 40.77778°N 30.40518°E
Elevation: 0 cm with respect to CPT-E1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Dark clayey soil and rubble											
1									SP-SM: Olive gray fine to medium sand with silt											
2		SP-SM	S-E1B-1	37/45	2-3-3	2.15	5.80					21	-	-	5	-	-	0.46	0.1	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Joint Research

Sponsored by:
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CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site E - Kavaklar Ave., Tigcilar District, Adapazari
Date: July 26, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.35 m 08/04/00
Notes:

Test ID: SPT-E2
GPS Coordinates: 40.77778°N 30.40518°E
Elevation: -0 cm with respect to CPT-E1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

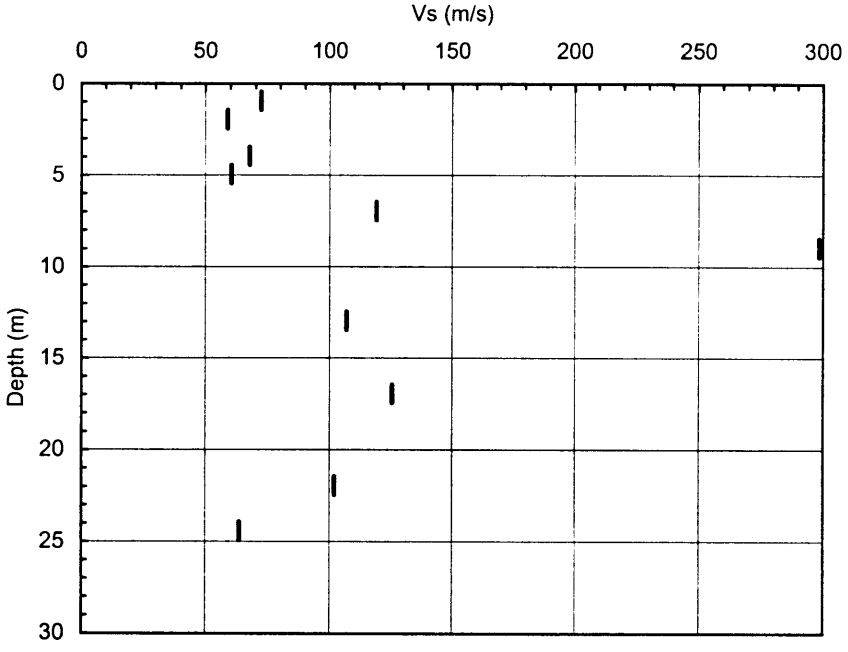
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Bricks from the foundation of the collapsed building. Maybe a septic tank as evidenced by the dark color of the wash water.											
1		SP-SM	S-E2-1	33/45	4-5-7	1.55	4.13	55	SP: Poorly graded fine to medium brown sand. FC <= 5%			24	-	-	5	-	-	0.28	0.1	
2		SP	S-E2-2A	40/45	3-2-1	2.3	4.13	52		60		13	-	-	2	-	-	0.56	0.18	
		ML	S-E2-2B						ML: Brown silt to sandy silt with red oxidized points			35	31	-	94	22	17	0.018	<2μm	
3		ML	S-E2-3	40/45	3-3-3	3.05	5.65	64		110		34	20	-	59	14	11	0.053	0.001	
									CLAY: Gray silty clay											
4		CH	S-E2-4A	37/45	2-1-2	3.95	7.17	62				52	62	34	99	70	51	0.002	<2μm	
		CL	S-E2-4B									39	44	21	99	58	48	0.003	<2μm	
5																				
		CL	S-E2-5A	40/45	5-6-11	5.35	8.70	67	SILT AND SAND: Gray silt with sand to sandy silt/silty sand	80		36	43	22	98	58	45	0.003	<2μm	
		ML	S-E2-5B							120		31	34	-	89	33	26	0.01	<2μm	
6		SM/ML	S-E2-5C									27	22	-	49	18	15	0.075	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

Shear Wave Velocity Profile Determined
using the Seismic Cone (Downhole Method)

Test ID: CPT-E1

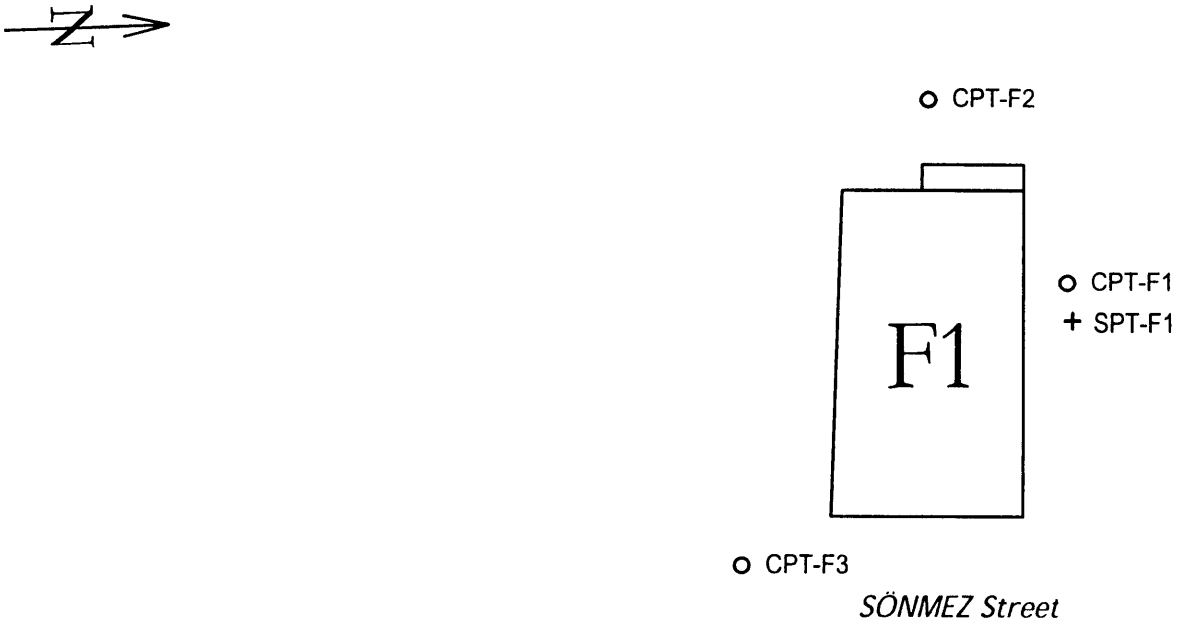
Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
1.70	0.44	1.44	63	81	72
2.70	1.44	2.44	72	45	59
4.70	3.44	4.44	75	60	67
5.70	4.44	5.44	68	53	60
7.70	6.44	7.44	91	147	119
9.70	8.44	9.44	294	303	299
13.70	12.44	13.44	114	100	107
17.70	16.44	17.44	175	76	126
22.70	21.44	22.44	167	37	102
25.18	23.92	24.92	82	45	64



Data processed by: ZETAS (Zemin Teknolojisi AS)

Phase 1

Site F



Difference in elevation with respect to CPT-F3

CPT-F1	-27 cm
CPT-F2	-42 cm
CPT-F3	0 cm
SPT-F1	-28 cm

SCALE

0 5 10 15 20 m

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Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

Contents: Plan view of Site F and location of subsurface exploration points

Location: Sönmez Street, Yenigün District, Adapazari
GPS Coordinates: 40.77148° N 30.40795° E

Scale: Graphic Scale | File Name: site_f.fcw - site_f.pdf

Date: 08/16/00 | Drawing: Rodolfo B. Sancio

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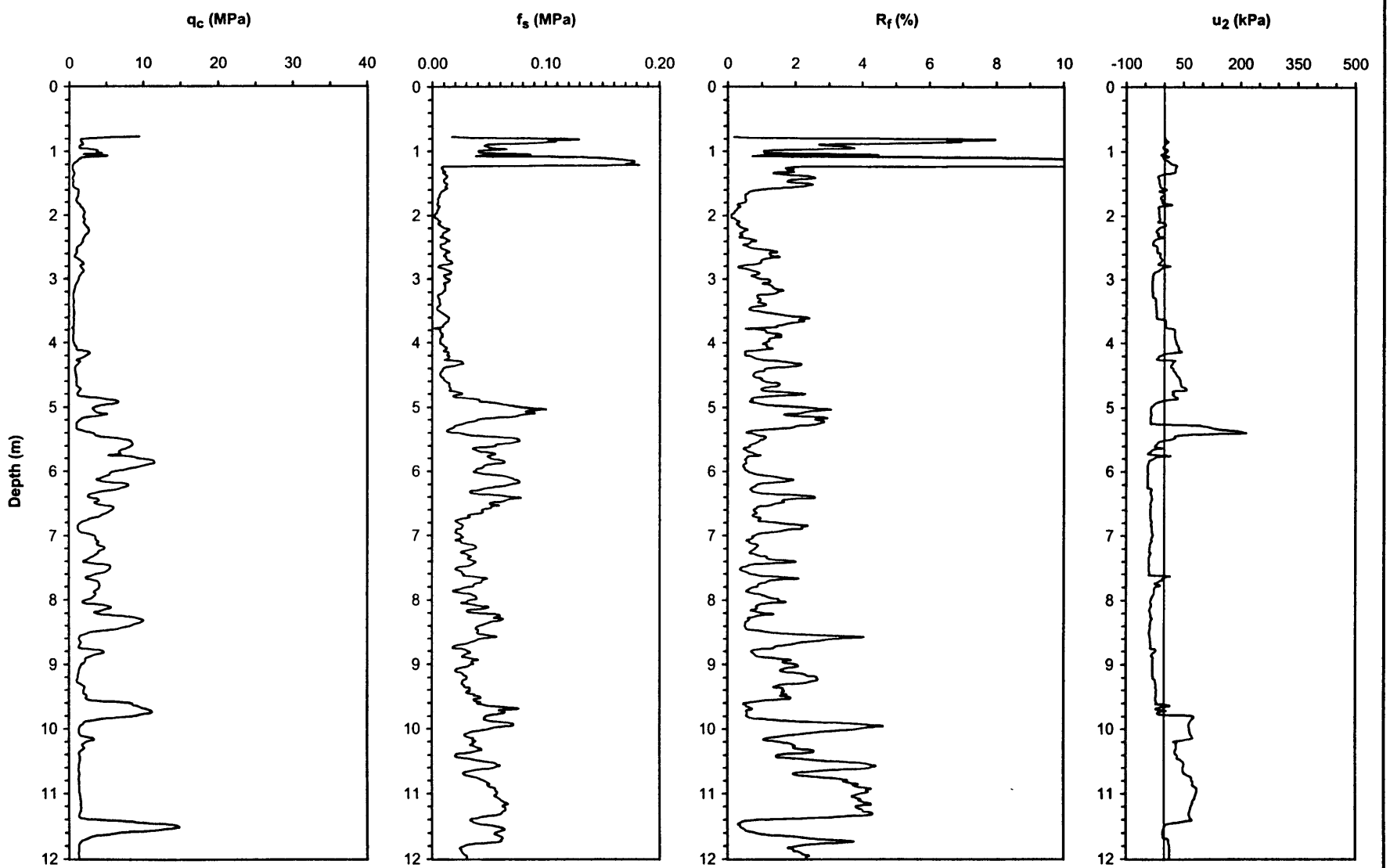
Joint Research

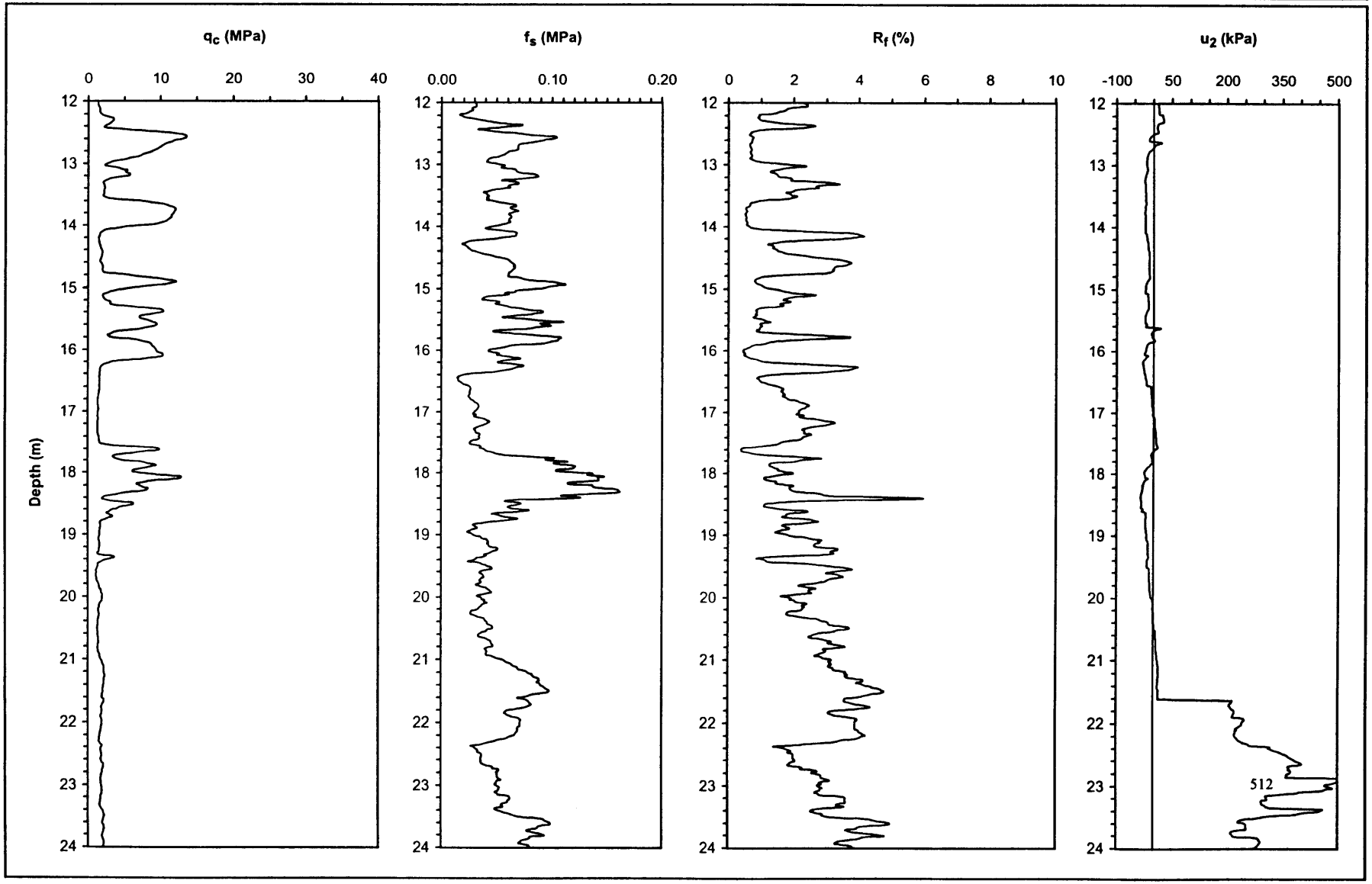
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site F - Sönmez Street, Yenigün District, Adapazarı
GPS Coordinates: 40.77148°N 30.40795°E
Test Number: CPT-F1
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cptf1.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Probed with percussion hammer 75 cm to check for utilities

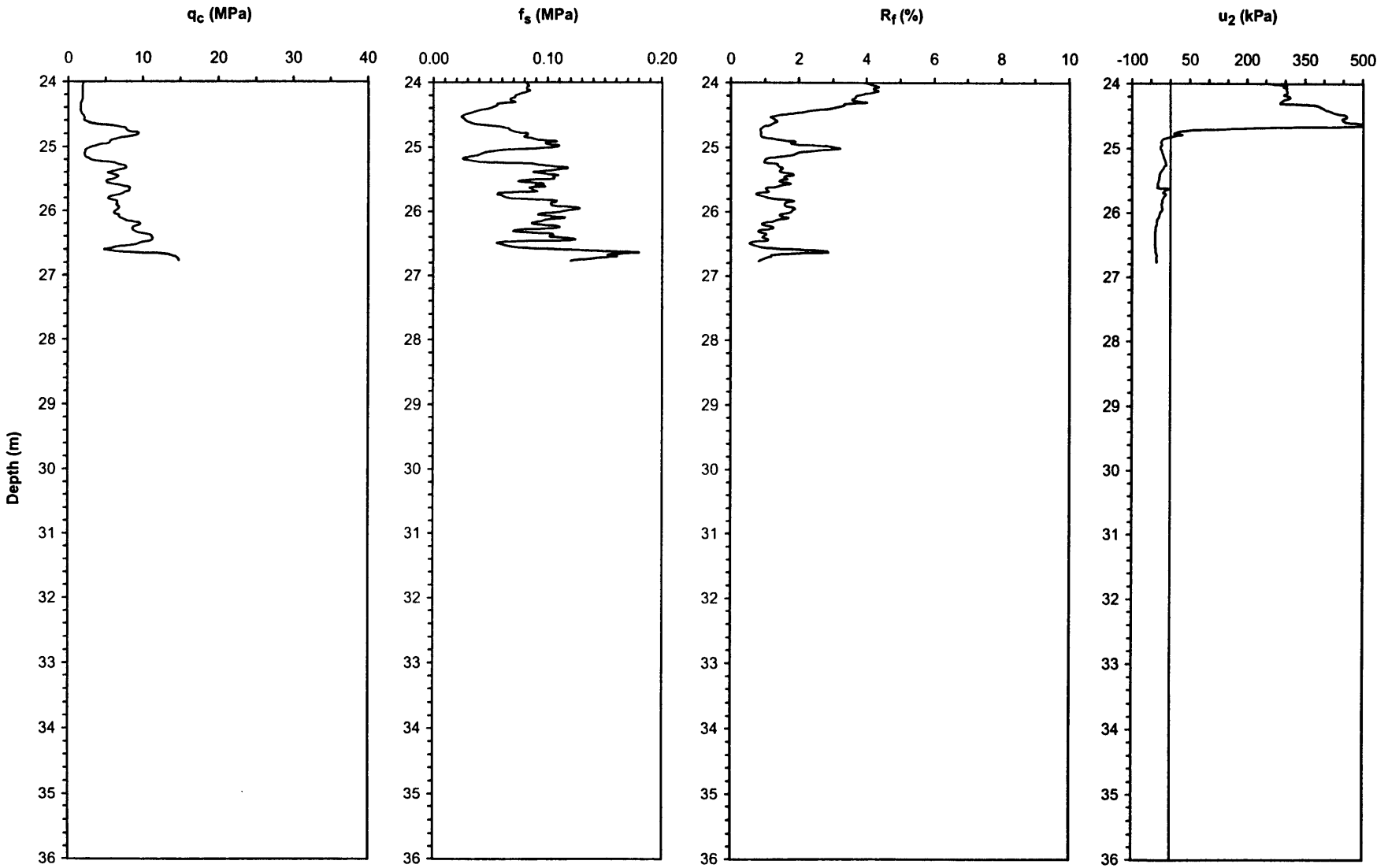
Elevation: -27 cm with respect to CPT-F3
Date: July 14, 2000
Water Table Elevation: Not measured
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Site F - Sönmez Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77148°N 30.40795°E	
	Test Number:	CPT-F1	**Elevation:** -27 cm with respect to CPT-F3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** July 14, 2000
Sponsored by:	**File Name:**	cptf1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Site F - Sönmez Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77148°N 30.40795°E	
	Test Number:	CPT-F1	**Elevation:** -27 cm with respect to CPT-F3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** July 14, 2000
Sponsored by:	**File Name:**	cptf1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	

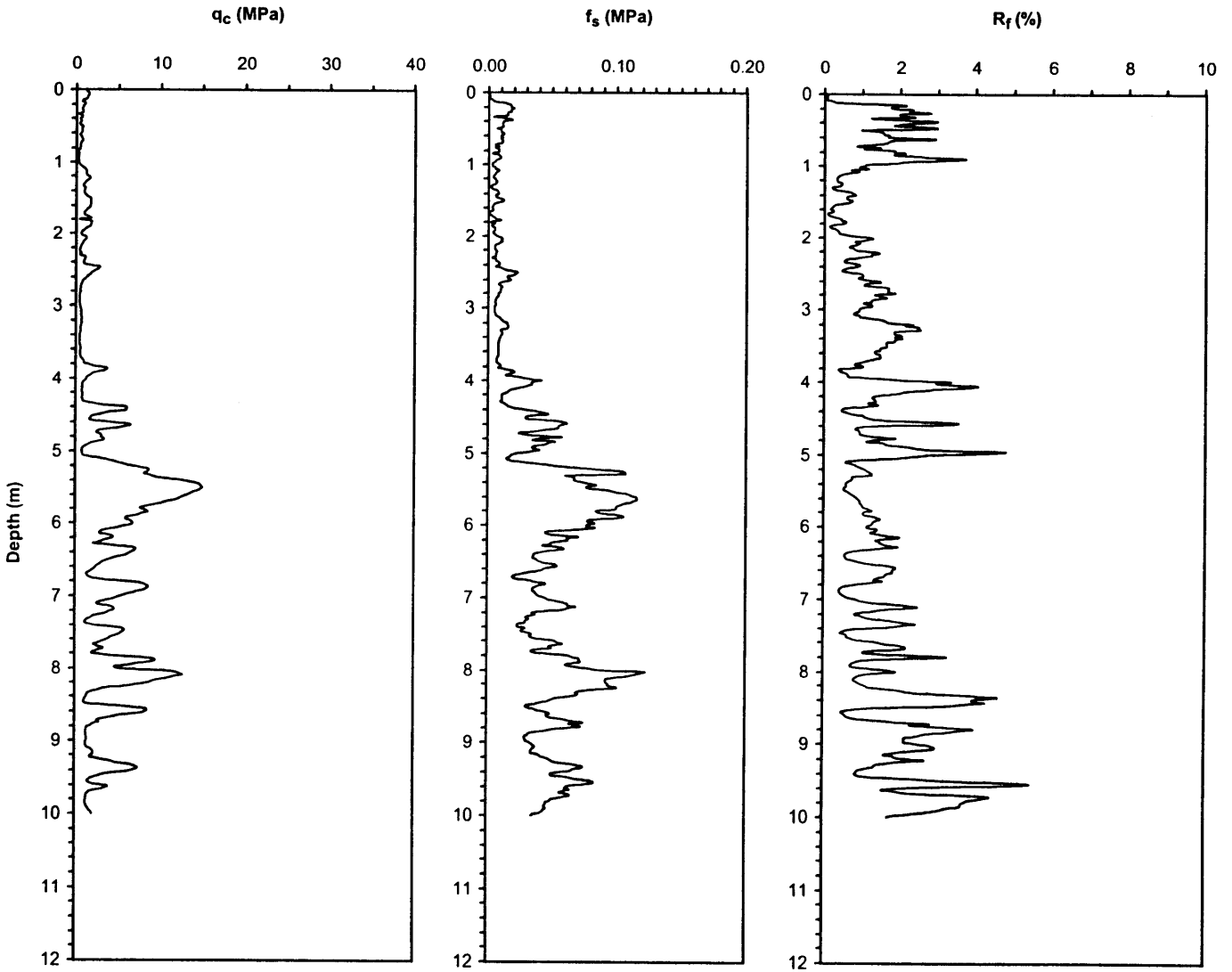


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

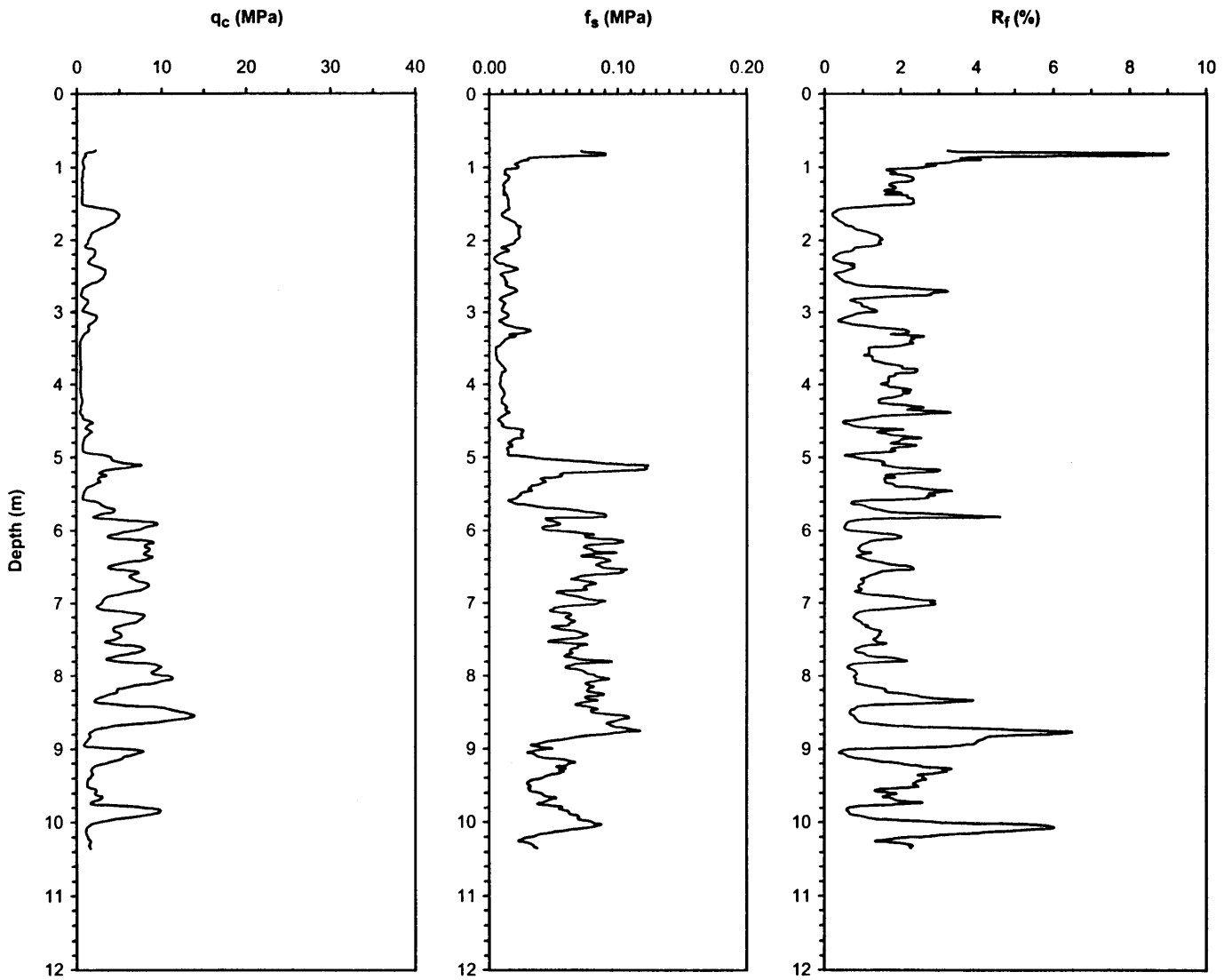
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site F - Sönmez Street, Yenigün District, Adapazarı
GPS Coordinates: 40.77148°N 30.40795°E
Test Number: CPT-F2
Type of Cone: ELC10 CF No. 990618 (a.p. v.d. Berg)
File Name: cptf2.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation: -42 cm with respect to CPT-F3
Date: July 14, 2000 14:40
Water Table Elevation: Not measured
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site F - Sönmez Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77148°N 30.40795°E	
	Test Number:	CPT-F3	**Elevation:** 0 cm with respect to CPT-F3
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** July 14, 2000 16:02
Sponsored by:	**File Name:**	cptf3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site F - Sönmez Street, Yenigün District, Adapazari
Date: July 20, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.64 m 07/21/00, caved in 08/04/00
Notes: Located approx. 1.5 m from CPT-F1

Test ID: SPT-F1
GPS Coordinates: 40.77148ºN 30.40795ºE
Elevation: -28 cm with respect to CPT-F3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Hole is drilled through fill and rubble of the foundation of the building that was located to the north of building F1											
1		ML	S-F1-1	38/45	1-2-3	0.95	4.27	50	ML: Brown low plasticity sandy silt to silt			32	28	-	72	11	7	0.06	0.004	
2		ML	S-F1-2	32/45	3-2-2	1.75	5.80	57				28	27	-	68	11	9	0.048	0.007	
3		ML	S-F1-3	32/45	2-3-2	2.55	5.80	51				33	31	-	92	42	38	0.008	<2µm	
4		ML/CL	S-F1-4	32/45	2-1-2	3.45	7.32	54	CL: Brown low plasticity silty clay to clayey silt with traces of fine sand	75	28	37	47	19	97	40	27	0.008	<2µm	
		CL	S-F1-5A	36/45	2-3-6	4.45	8.84	64				31	35	13	85	18	14	0.019	<2µm	
5		ML	S-F1-5B						SILT AND SAND: Gray sandy silt to silty sand. FC of recovered samples varies from 35% to 77%			28	30	-	77	18	14	0.041	<2µm	
		ML	S-F1-6	35/45	5-7-7	5.35	8.84	67				27	28	-	51	8	6	0.07	0.013	
6		ML	S-F1-7A	33/45	3-7-7	6.15	10.37	59				34	28	-	72	20	15	0.05	<2µm	
		SM	S-F1-7B									28	-	-	35	-	-	0.1	-	
7		SM	S-F1-8	45/45	4-4-9	6.95	10.37	59				26	-	-	42	<15	<10	0.085	0.013	Thin brown organic seam at approx. 7.35 m
8		ML	S-F1-9	34/45	5-6-7	7.95	11.89	57				29	31	-	74	17	13	0.034	<2µm	Wood fragments were found in the sample at approx. 8.1 m
9		CH	S-F1-10A	37/45	2-4-7	8.95	11.89	61	CLAY: Gray silty clay to clayey silt with traces of fine sand. LL of recovered samples varies from 38 to 57	170	55	38	57	29	100	50	26	0.005	<2µm	
		CL/ML	S-F1-10B									34	41	17	99	-	-	0.007	<2µm	
10		ML	S-F1-11A	31/45	3-4-5	9.95	13.42	70				33	38	-	96	23	17	0.019	<2µm	
		CH/MH	S-F1-11B									23	58	29	100	40	22	0.007	<2µm	
11																				

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Joint Research

Sponsored by:
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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site F - Sönmez Street, Yenigün District, Adapazari
Date: July 20, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.64 m 07/21/00, caved in 08/04/00
Notes: Located approx. 1.5 m from CPT-F1

Test ID: SPT-F1
GPS Coordinates: 40.77148°N 30.40795°E
Elevation: -28 cm with respect to CPT-F3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

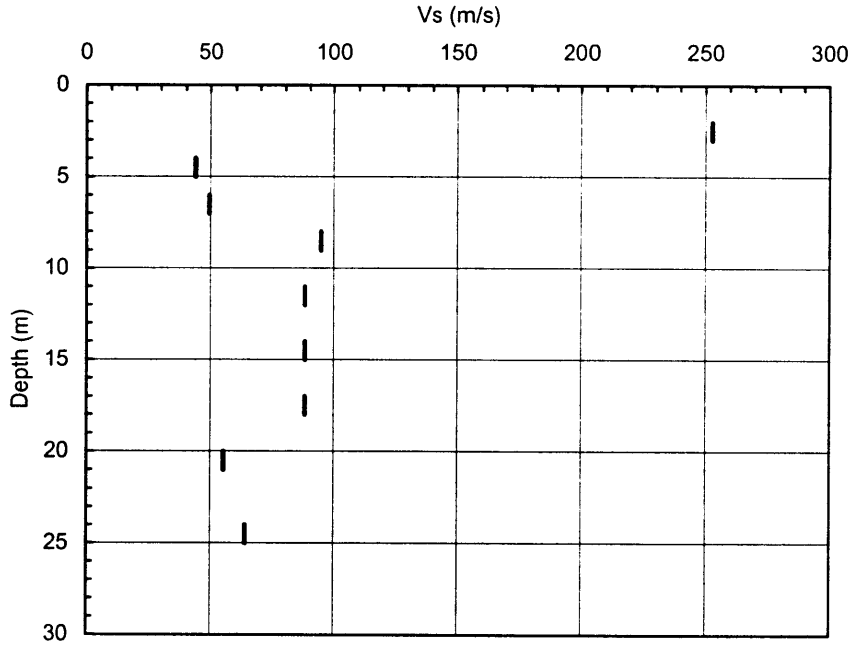
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
11																				
12		ML/CL SM	S-F1-12A S-F1-12B	37/45	4-13-20	11.95	14.94	54	SM: Gray silty fine sand			29 25	38 26	12 -	90 30	21 -	14 -	0.019 0.1	0.001 -	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-F1

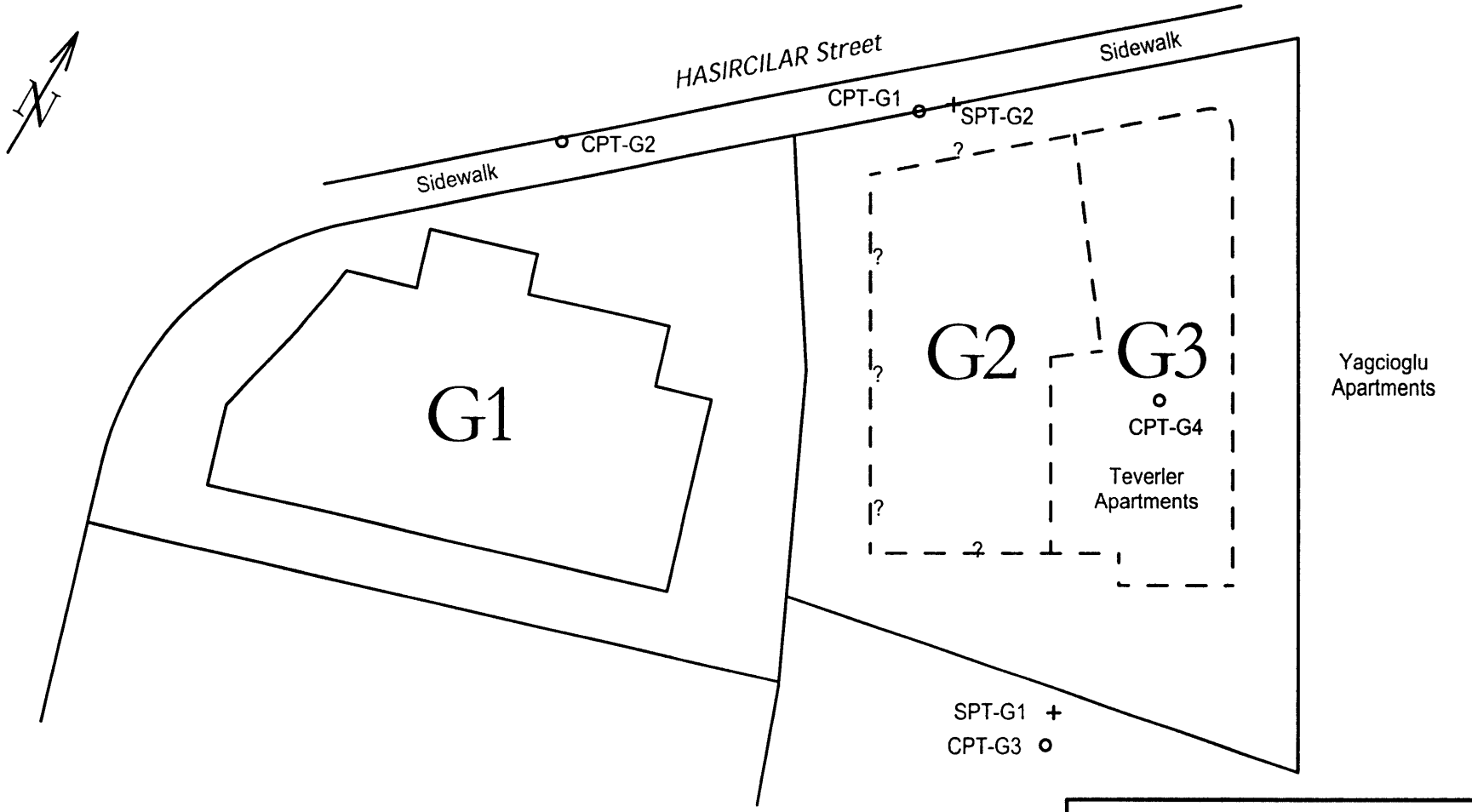
Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
3.26	2.00	3.00	227	278	253
5.26	4.00	5.00	40	47	44
7.26	6.00	7.00	51	48	49
9.26	8.00	9.00	78	111	95
12.26	11.00	12.00	91	85	88
15.26	14.00	15.00	91	85	88
18.26	17.00	18.00	104	71	88
21.26	20.00	21.00	61	50	55
25.26	24.00	25.00	70	57	64



Data processed by: ZETAS (Zemin Teknolojisi AS)

Phase 1

Site G



Difference in elevation with respect to CPT-G1	
CPT-G1	0 cm
CPT-G2	-11 cm
CPT-G3	-2 cm
CPT-G4	-2 cm
SPT-G1	-7 cm
SPT-G2	-3 cm

SCALE

0 5 10 15 20 m

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Joint Research
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NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

Contents: Plan view of Site G and location of subsurface exploration points

Location: Hasircilar Street, Yenigün District, Adapazari
GPS Coordinates: 40.77450° N 30.40896° E

Scale: Graphic Scale | File Name: site_g.fcw - site_g.pdf

Date: 11/02/00 | Drawing: Rodolfo B. Sancio

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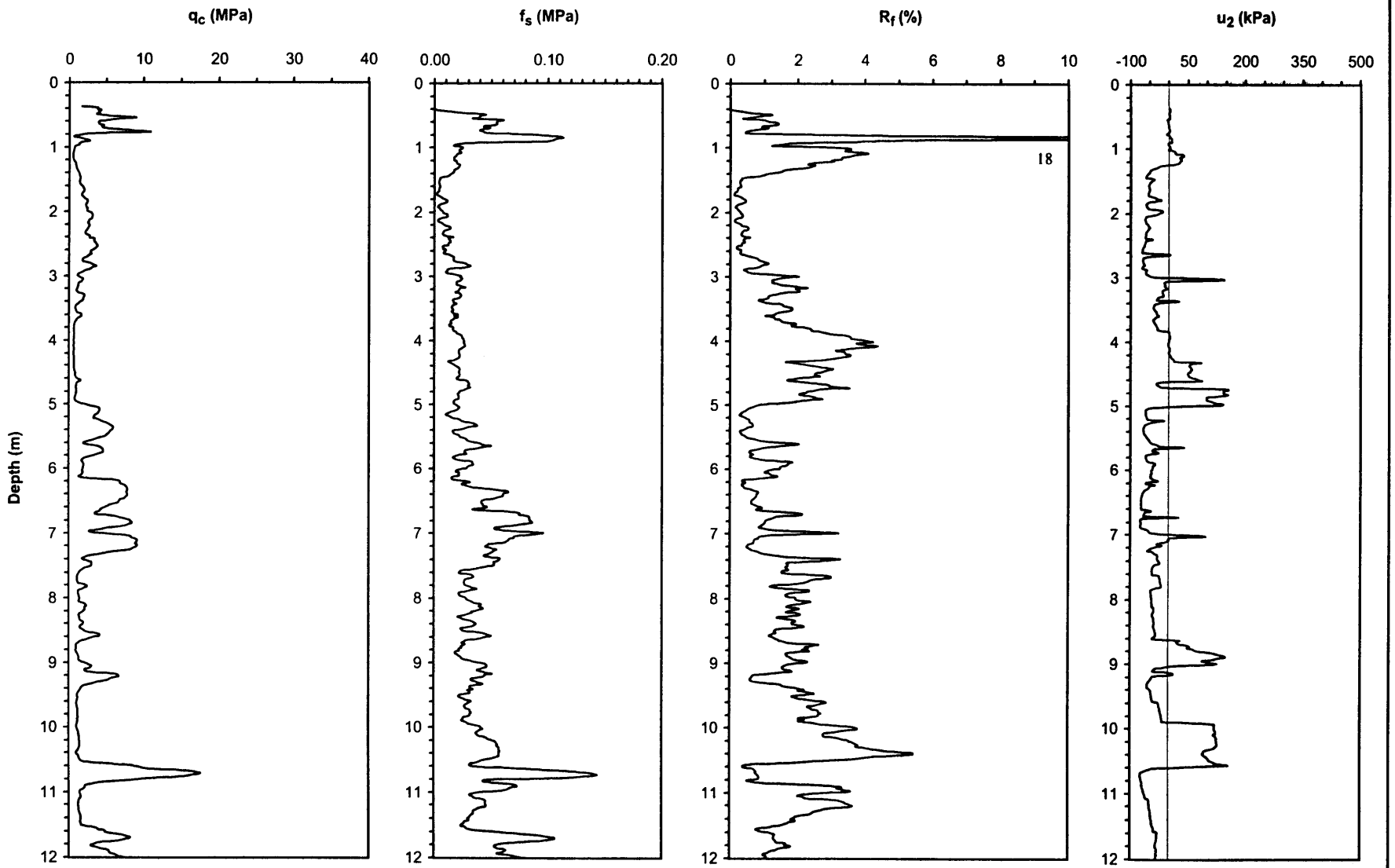
Joint Research

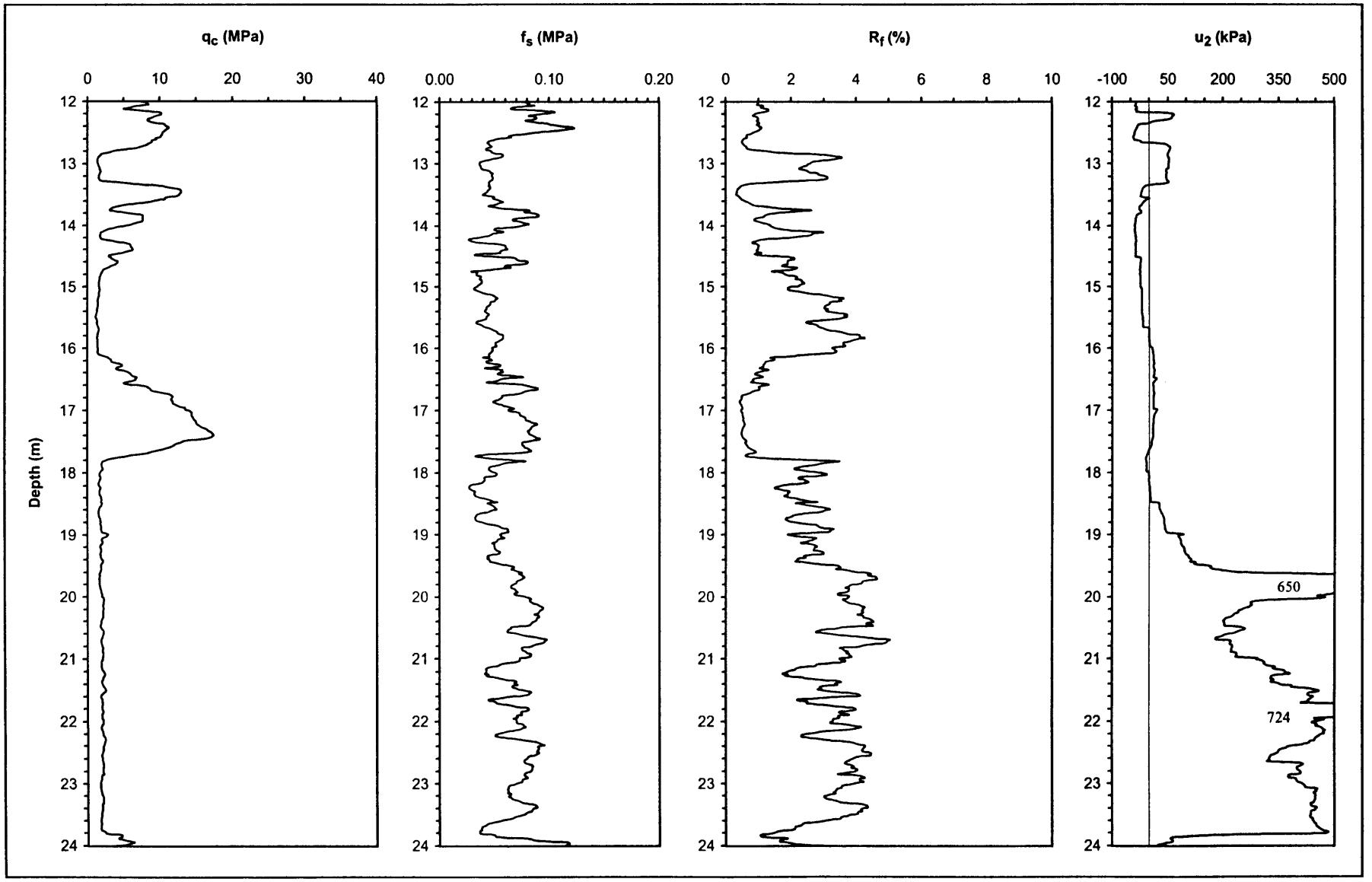
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site G - Hasırcılar Street, Yenigün District, Adapazarı
GPS Coordinates: 40.77450°N 30.40896°E
Test Number: CPT-G1
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cptg1.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

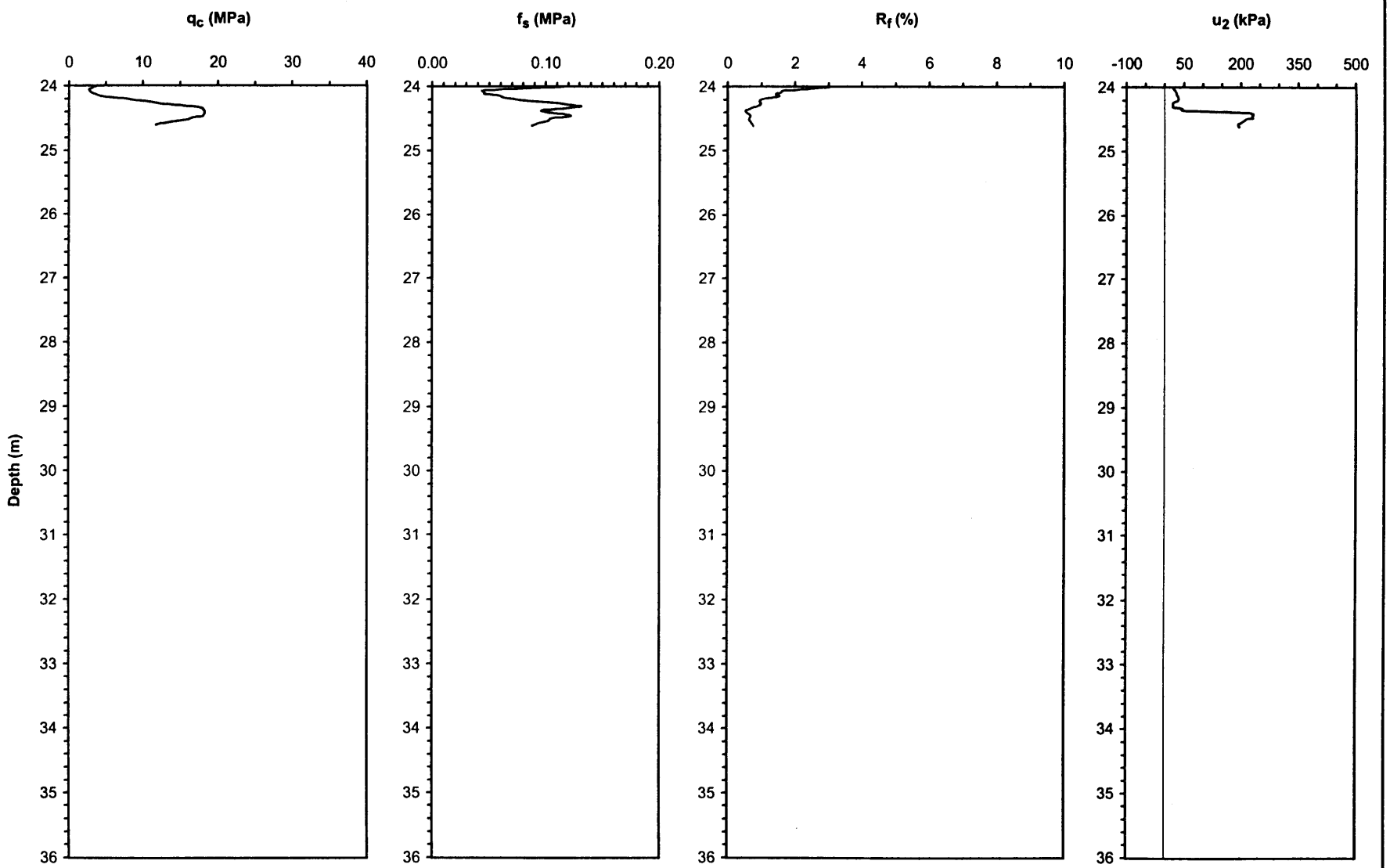
Elevation: 0 cm with respect to CPT-G1
Date: June 21, 2000
Water Table Elevation: Not measured
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley



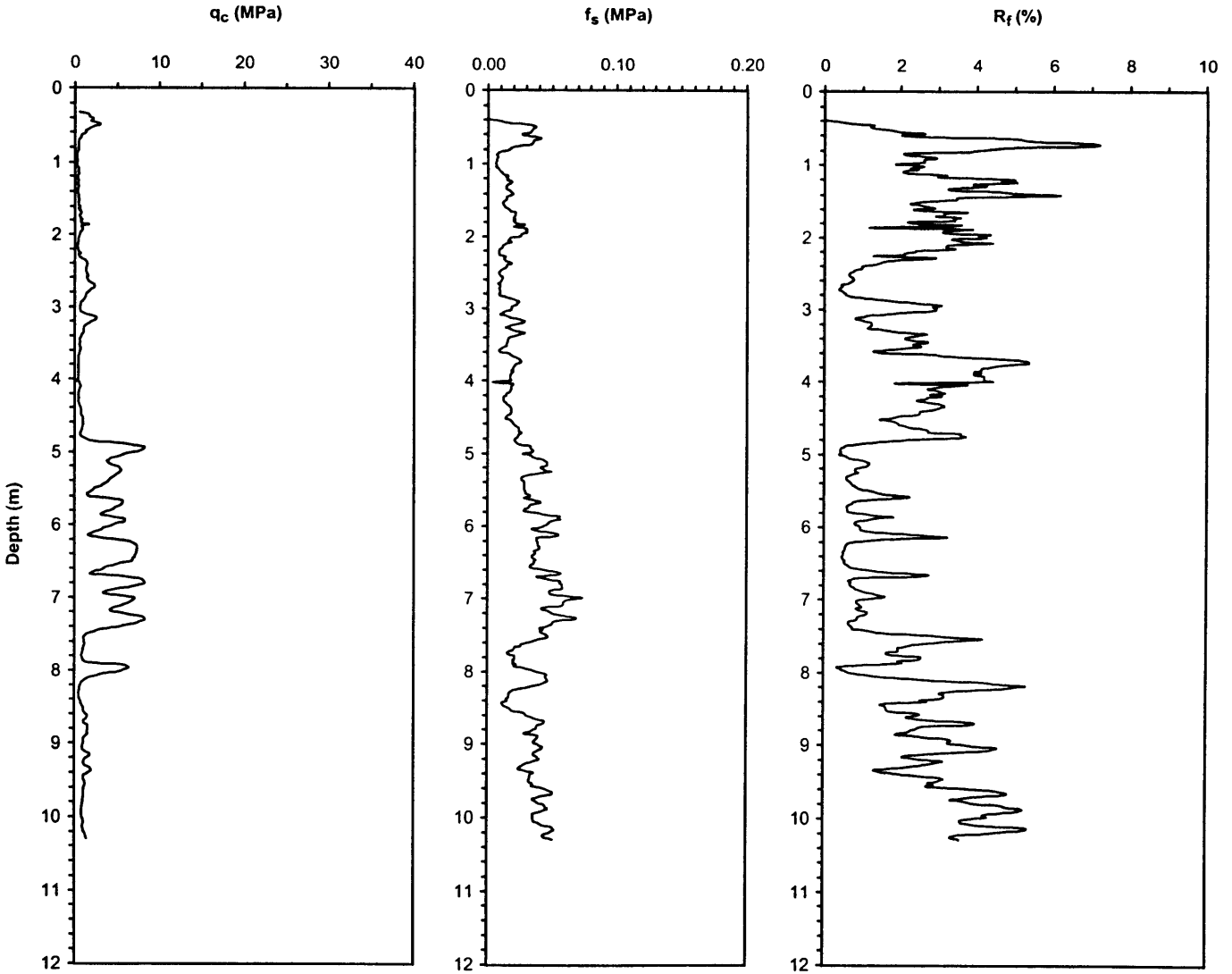
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Site G - Hasırcılar Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77450°N 30.40896°E	
	Test Number:	CPT-G1	**Elevation:** 0 cm with respect to CPT-G1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 21, 2000
Sponsored by:	**File Name:**	cptg1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



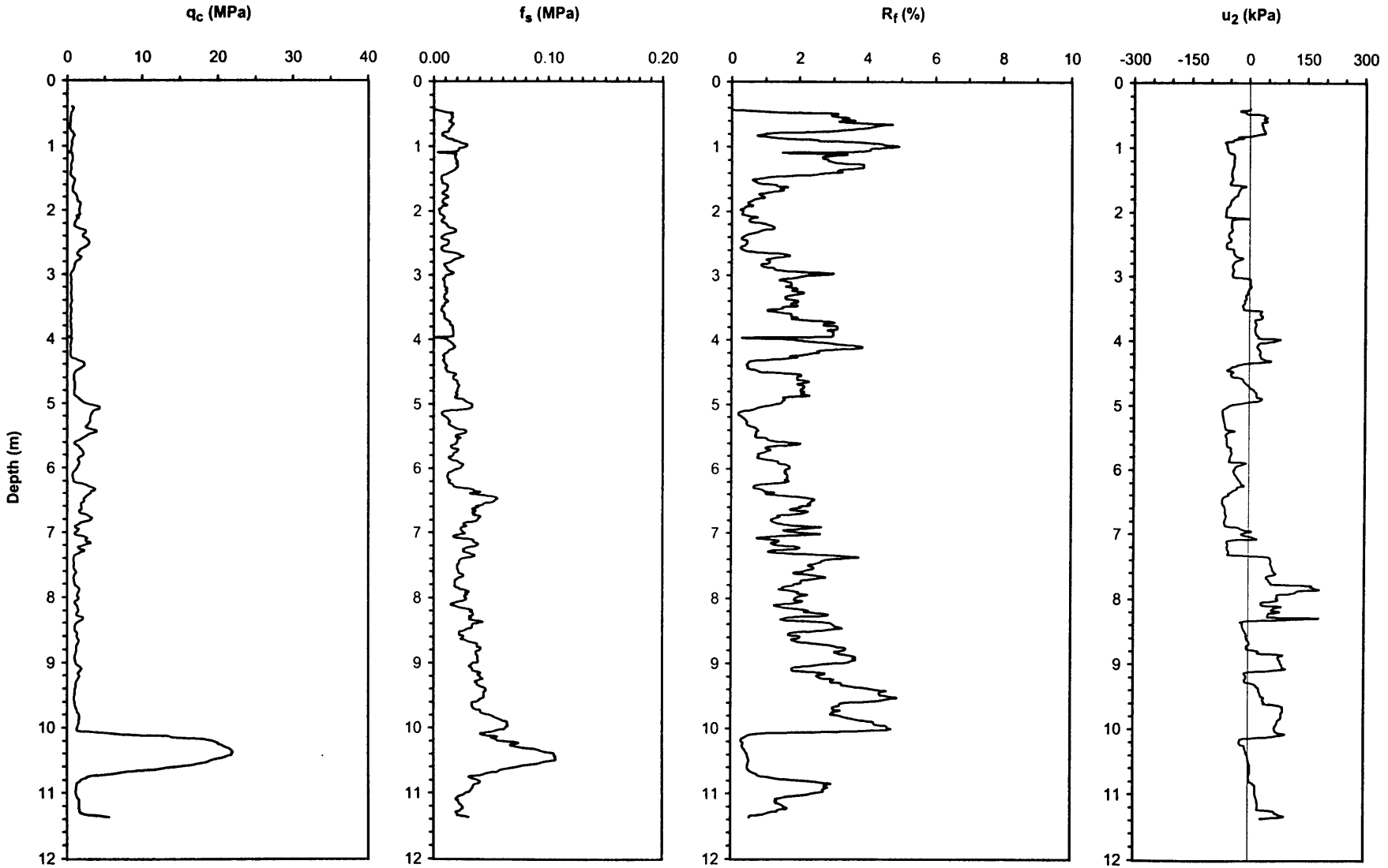
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Site G - Hasırcılar Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77450°N 30.40896°E	
	Test Number:	CPT-G1	**Elevation:** 0 cm with respect to CPT-G1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 21, 2000
Sponsored by:	**File Name:**	cptg1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



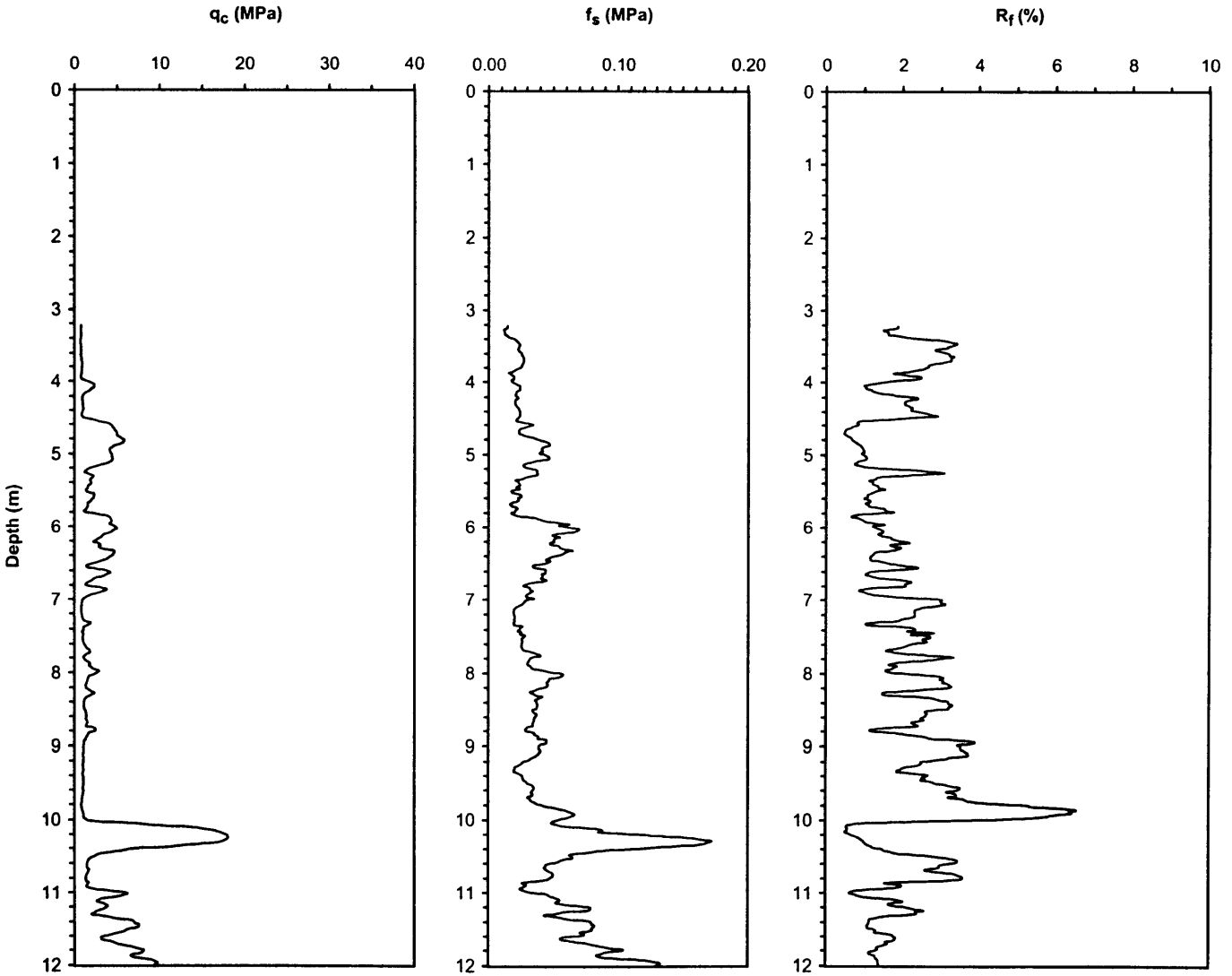
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site G - Hasırcılar Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77450°N 30.40896°E	
	Test Number:	CPT-G2	**Elevation:** -11 cm with respect to CPT-G1
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** June 21, 2000 15:21
Sponsored by:	**File Name:**	cptg2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site G - Hasırcılar Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77450°N 30.40896°E	
	Test Number:	CPT-G3	**Elevation:** -2 cm with respect to CPT-G1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 21, 2000
Sponsored by:	**File Name:**	cptg3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site G - Hasırcılar Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77450°N 30.40896°E	
	Test Number:	CPT-G4	**Elevation:** -2 cm with respect to CPT-G1
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** July 14, 2000 08:57
Sponsored by:	**File Name:**	cptg4.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Pre-drilled 3.2 m with auger. A casing was inserted up to 2.12 m	



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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site G - Hasircilar Street, Yenigün District, Adapazari
Date: July 5, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.67 m 07/08/00, 0.41 m 08/04
Notes: Solid flight auger was used to a depth of 1 m

Test ID: SPT-G1
GPS Coordinates: 40.77450°N 30.40896°E
Elevation: -7 cm with respect to CPT-G1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: 20 cm of topsoil followed by a dark brown to black clayey silt with sand											
1		CL/ML	S-G1-1	33/45	1-1-2	1.45	4.27	50	CLAYEY SILT: Interbedded strata of olive brown to brown clayey silt with traces of fine sand and brown sandy silt	50		35	41	16	97	35	26	0.013	<2μm	Roots were found in sample S-G1-1
2		ML	S-G1-2	38/45	2-3-4	2.25	5.80	51		200		32	29	-	69	-	-	-	-	
3		ML	S-G1-3	32/45	2-2-2	3.05	7.32	55		60		36	33	-	95	-	-	-	-	
4		CH	S-G1-4	33/45	1-2-2	3.95	7.32	-	CLAY: High plasticity gray silty clay	100	39	38	53	33	97	50	40	0.005	<2μm	
5		CL ML	S-G1-5A S-G1-5B	36/45	2-3-6	4.75	8.84	67	SILT AND SAND: Gray silt and sandy silt to silty sand. FC varies from 22% to 90%. 4 mm red silty clay to clayey silt seam found at approx. 7.2 m	120		30 26	48 25	25 -	84 71	42 -	32 -	0.009 -	<2μm -	
6		ML SM	S-G1-6A S-G1-6B	40/45	4-3-5	5.55	10.37	61		120		34 27	34 -	- -	90 22	25 -	19 -	0.028 0.15	<2μm -	
7		ML	S-G1-7	31/45	5-4-6	6.95	11.89	62				27	27	-	67	-	-	-	-	
8		MH	S-G1-8	33/45	2-3-3	7.95	11.89	64	MH: High plasticity gray clayey silt. Softens when remoulded. Red oxidized 5 mm-thick seam at approx. 9.2 m	150	34	36	58	22	99	50	34	0.005	<2μm	
9		MH/CH	S-G1-9	30/45	2-3-4	8.95	13.42	70		120	24	34	52	22	99	-	-	-	-	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site G - Hasircilar Street, Yenigün District, Adapazari
Date: July 6, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.45 m 07/08/00, 0.45 m 07/14, 0.44 m 08/04
Notes: Solid flight auger was used to a depth of 1.3 m

Test ID: SPT-G2
GPS Coordinates: 40.77450°N 30.40896°E
Elevation: -3 cm with respect to CPT-G1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Rubble from sidewalk. Black clayey sand with strong odor, probably due to a nearby septic tank											
1		-	S-G2-1	0/45	1-2-2	-	3.67	-	ML: Brown low plasticity silt with fine sand to sandy silt			-	-	-	-	-	-	-	-	
2		ML	S-G2-2	35/45	3-4-5	2.45	5.80	58		75		29	25	-	65	22	18	0.04	<2µm	
3				80/90		3.25														
4		ML	SH-G2-3A				-	-				15	33	7	78	14	6	0.028	0.003	
		ML	SH-G2-3B									15	37	10	77	17	9	0.022	0.002	
		CH/MH	SH-G2-3C						CH: Gray high plasticity silty clay with traces of fine sand			15	60	30	95	68	40	0.003	<2µm	
5		ML	S-G2-4	40/45	2-3-3	5.15	8.84	60	ML: Gray low plasticity clayey silt to silt with sand. Red clay seams from approximately 6.15 m to 6.2 m	75		34	30	-	75	-	-	-	-	
6		ML	S-G2-5A	35/45	2-6-7	5.95	10.37	66		110	24	37	44	13	99	43	20	0.007	<2µm	
		ML	S-G2-5B									28	26	-	92	-	-	-	-	
7		CH	SH-G2-6	41/40		7.45	-	-	CH: Soft gray, high plasticity silty clay	60	25	47	58	31	99	85	59	0.001	<1µm	
8		ML	S-G2-7A	32/45	3-4-4	8.45	11.29	-	ML: Gray clayey silt with traces of fine sand			36	36	-	89	21	18	0.029	<2µm	
		CL/ML	S-G2-7B									33	43	18	99	40	30	0.007	<2µm	
9		CL	SH-G2-8	42/42		9.45	-	-	CLAY: Gray silty clay to clayey silt. Some shells at approx. 10.3 m	120	35	39	48	24	99	45	30	0.006	<2µm	
10																				
11		CH/CL	S-G2-9	37/45	2-4-5	10.95	14.94	61		200	55	31	51	30	98	61	51	0.001	<1µm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Joint Research

Sponsored by:
NSF, Caltrans
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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site G - Hasircilar Street, Yenigün District, Adapazari
Date: July 6, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.45 m 07/08/00, 0.45 m 07/14, 0.44 m 08/04
Notes: Solid flight auger was used to a depth of 1.3 m

Test ID: SPT-G2
GPS Coordinates: 40.77450°N 30.40896°E
Elevation: -3 cm with respect to CPT-G1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
11		CH/CL	S-G2-9	37/45	2-4-5	10.95	14.94	61		200	55	31	51	30	98	61	51	0.001	<1μm	
12		ML ML	S-G2-10A S-G2-10B	39/45	5-10-15	11.95	14.94	69	ML: Interbedded strata of gray low plasticity silt with sand and gray clayey silt. Some red clay seams	320		36 26	35 26	- -	97 76	18 -	15 -	0.021 -	<2μm -	
13																				
14		ML/CL	S-G2-11	37/45	3-4-7	13.95	17.99	70		175		32	47	18	99	47	35	0.006	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
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Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site G - Hasircilar Street, Yenigün District, Adapazari
Date: July 7, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Not measured
Notes: Hole drilled to allow for CPT-G4 on building footprint

Test ID: SPT-G3
GPS Coordinates: 40.77450°N 30.40896°E
Elevation: +28 cm with respect to CPT-G1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

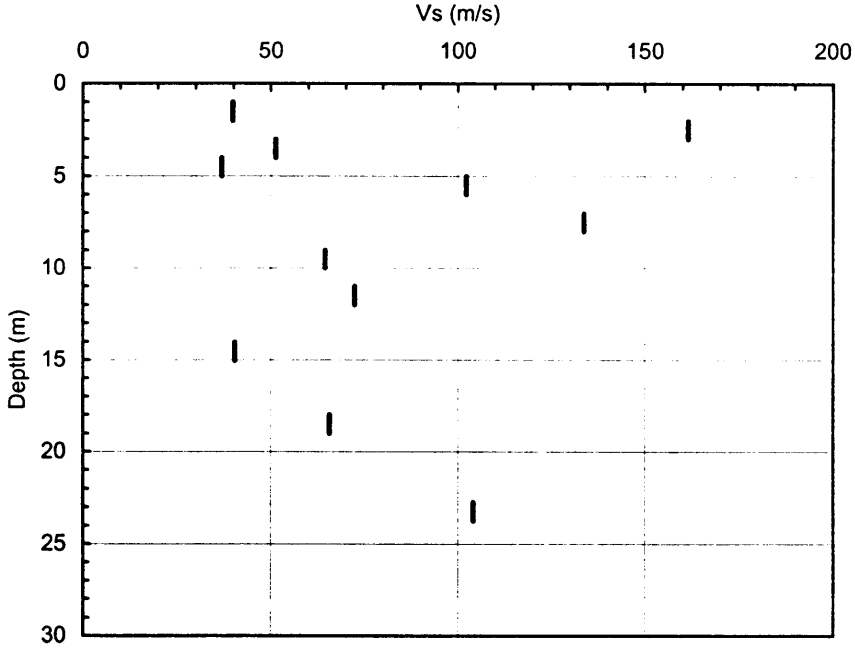
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Concrete and brick rubble from the demolition of buildings G2 and G3. The SFA and rock coring bits were used to drill through hard material											
1																				
2																				
3		ML	S-G3-1						SANDY SILT: Red brown sandy silt. Very similar to the soil seen at the surface (ejecta) in Yagcioglu apartments			27	26		62	12	<10	0.05	.003	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

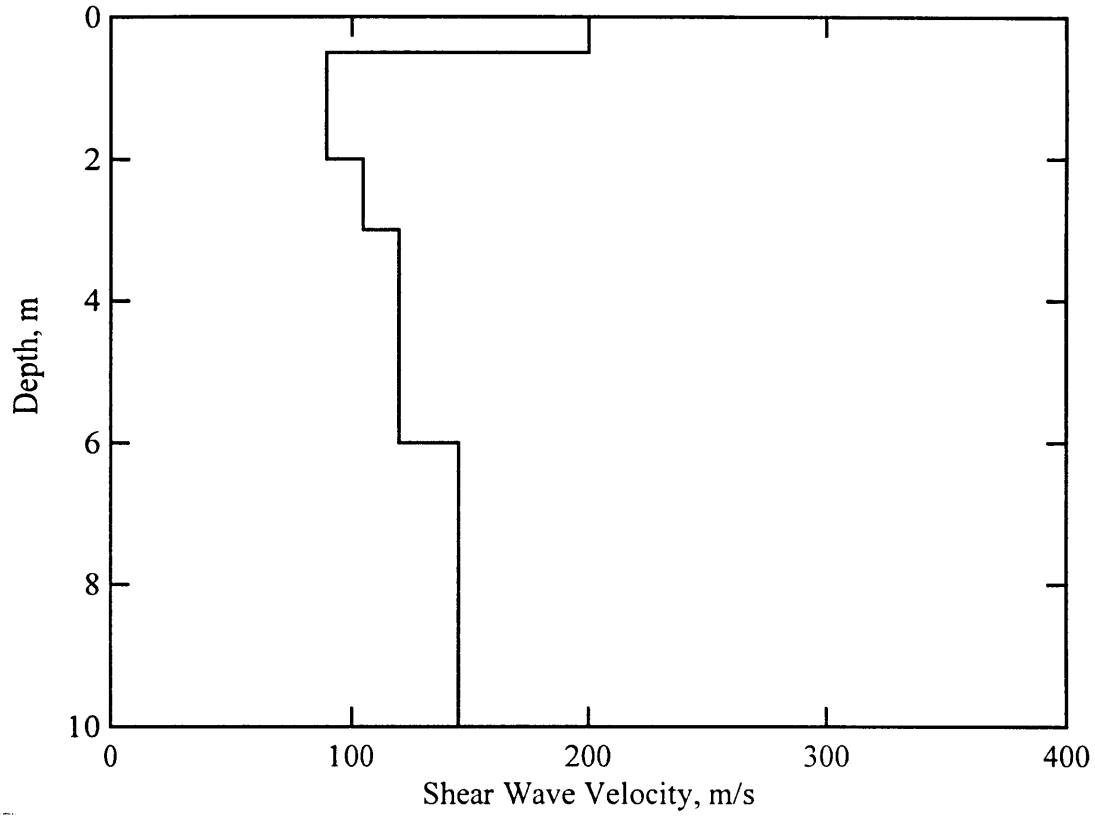
Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-G1

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.26	1.00	2.00	36	44	40
3.26	2.00	3.00	156	167	161
4.26	3.00	4.00	42	60	51
5.26	4.00	5.00	36	37	37
6.26	5.00	6.00	69	135	102
8.26	7.00	8.00	98	169	134
10.26	9.00	10.00	65	64	65
12.26	11.00	12.00	81	64	72
15.30	14.04	15.04	45	36	40
19.26	18.00	19.00	50	82	66
24.00	22.74	23.74	102	106	104



Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Site G.

Table 3.6 Tabulated values of layer properties determined from forward modeling of Site G

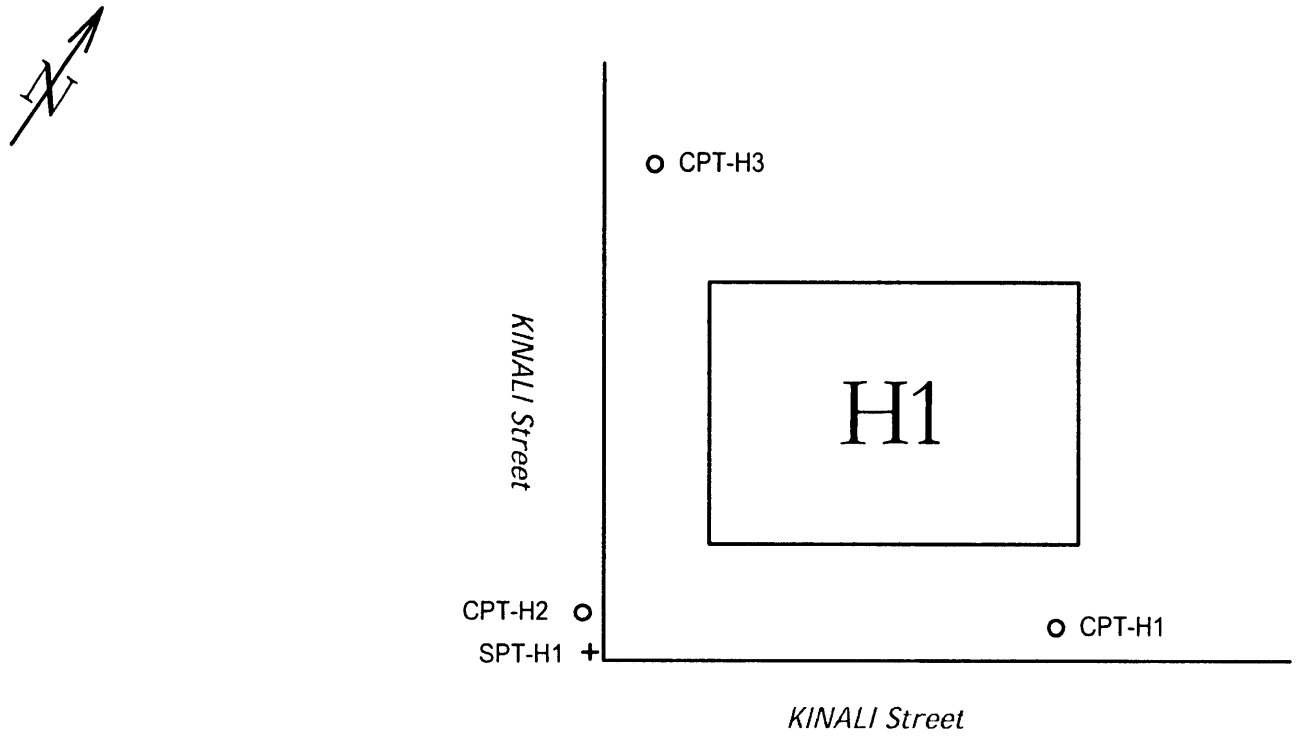
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	200	374.2	0.3	1.92
0.5	1.5	90	527.4	0.485	2.0
2.0	1.0	105	1500	0.4975	2.0
3.0	3.0	120	1500	0.4968	2.0
6.0	4.0	145	1500	0.4953	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

Phase 1

Site H



Difference in elevation with respect to CPT-H1

CPT-H1	0 cm
CPT-H2	-24 cm
CPT-H3	-10 cm
SPT-H1	-24 cm
Ground floor of southern corner of building	-16 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

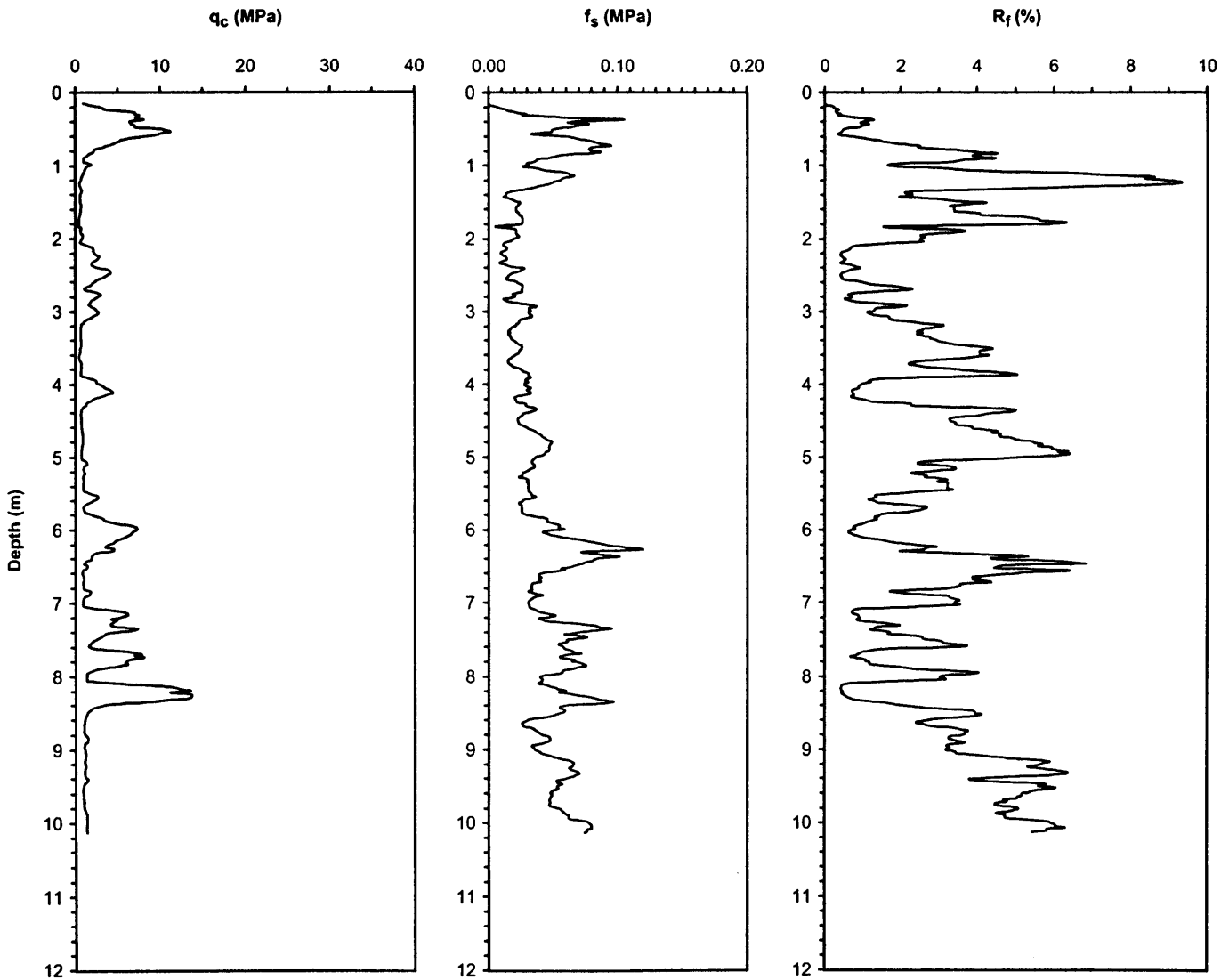
Contents: Plan view of Site H and location of subsurface exploration points

Location: Kinali Street, Yagcilar District, Adapazari
GPS Coordinates: 40.78419° N 30.41295° E

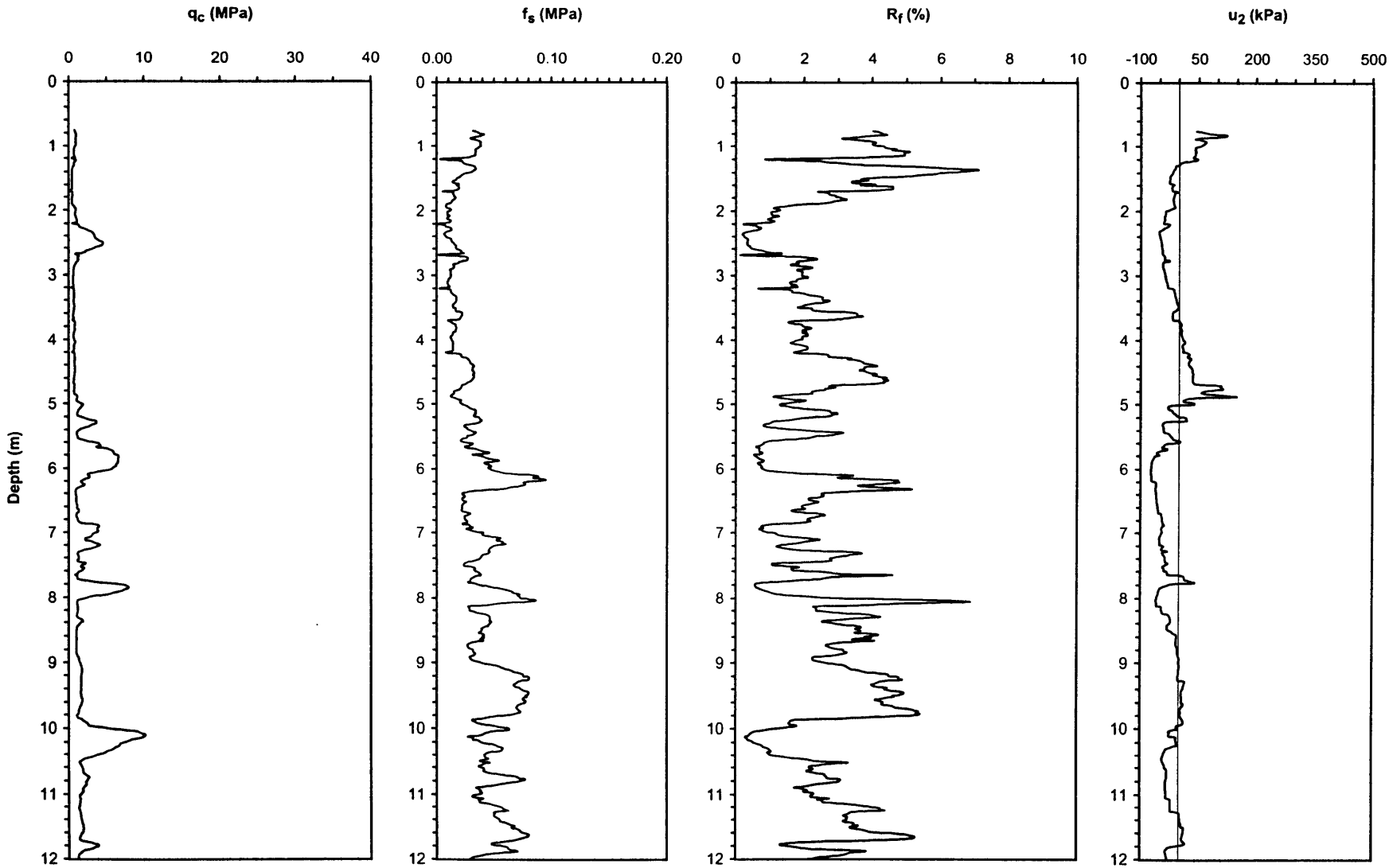
Scale: Graphic Scale | File Name: site_h.fcw - site_h.pdf

Date: 29/10/00 | Drawing: Rodolfo B. Sancio

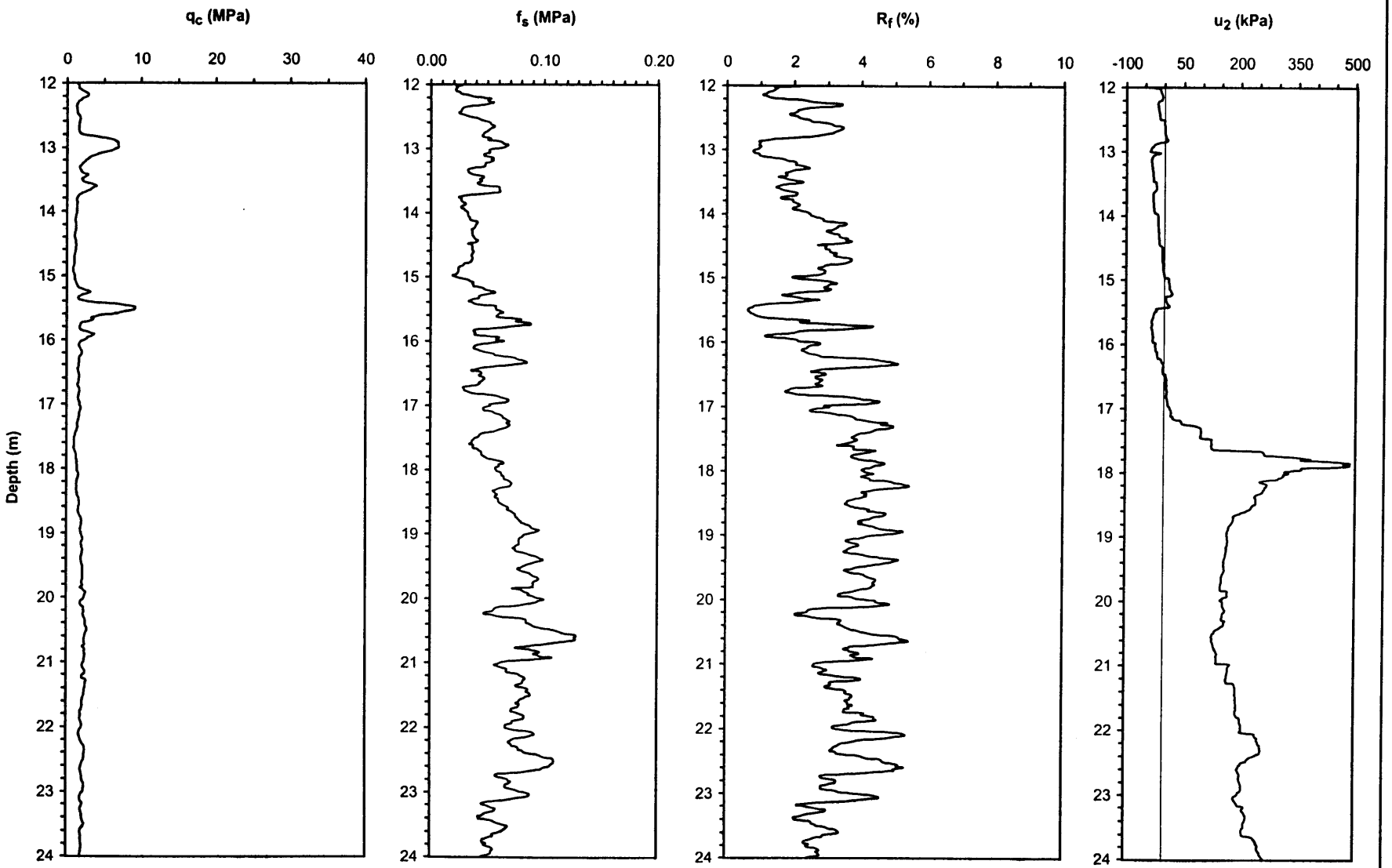
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site H - Kınalı Street, Yağcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78419°N 30.41295°E	
	Test Number:	CPT-H1	**Elevation:** 0 cm with respect to CPT-H1
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** July 14, 2000
Sponsored by:	**File Name:**	cpth1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



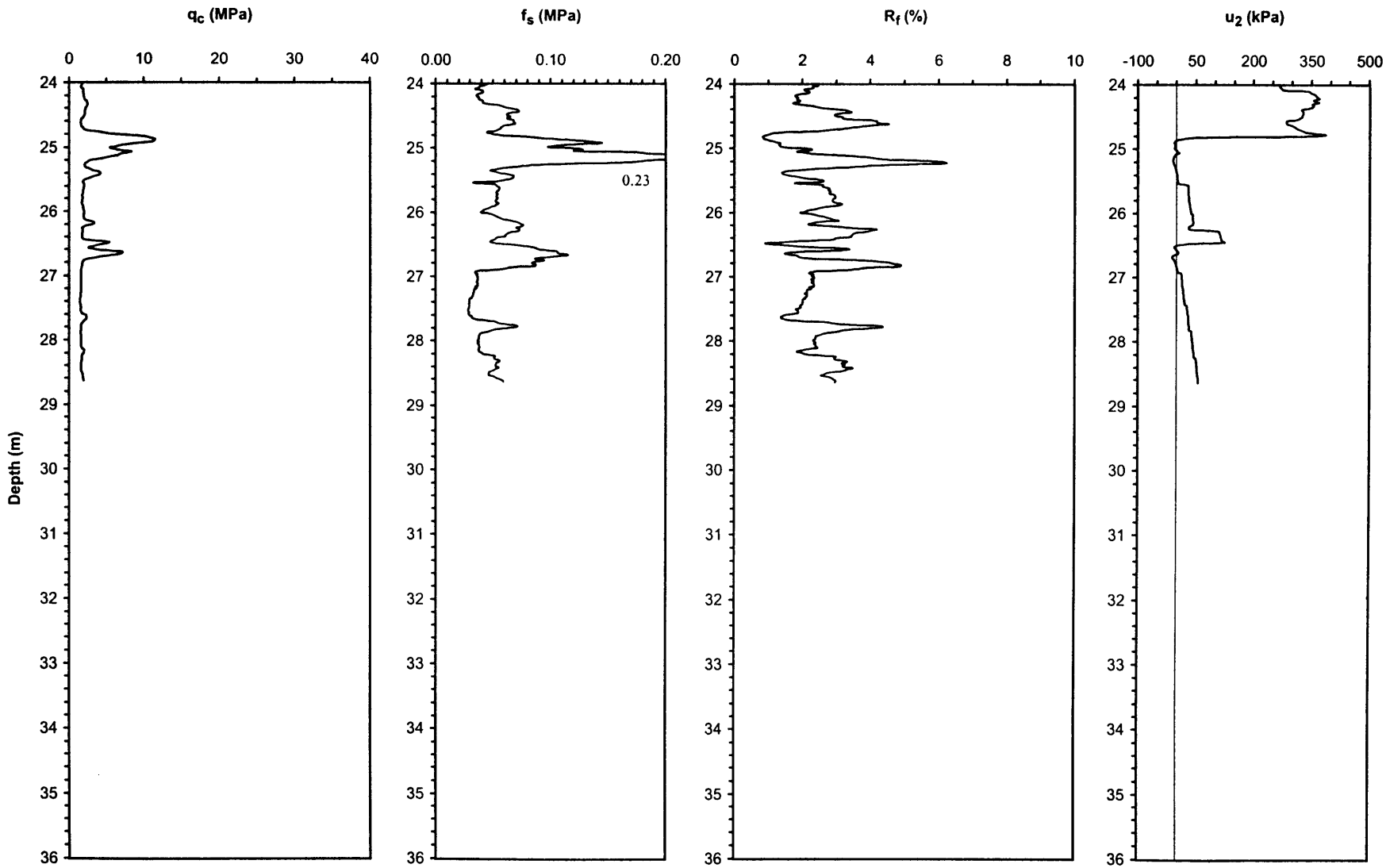
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Site H - Kınalı Street, Yağcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78419°N 30.41295°E	
	Test Number:	CPT-H2	**Elevation:** -24 cm with respect to CPT-H1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** July 14, 2000
Sponsored by:	**File Name:**	cpth2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



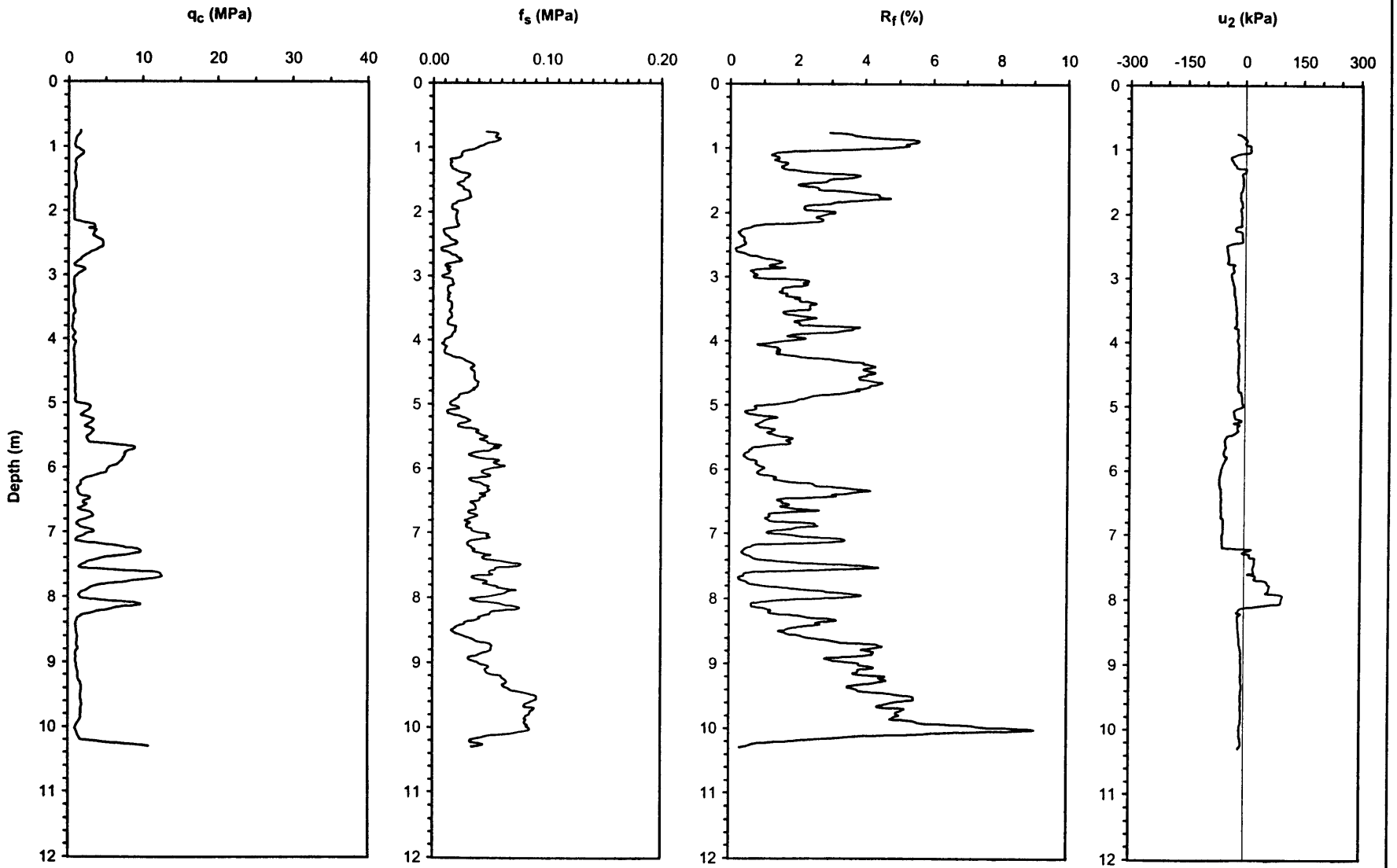
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Site H - Kınalı Street, Yağcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78419°N 30.41295°E	
	Test Number:	CPT-H2	**Elevation:** -24 cm with respect to CPT-H1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** July 14, 2000
Sponsored by:	**File Name:**	cpth2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Site H - Kınalı Street, Yağcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78419°N 30.41295°E	
	Test Number:	CPT-H2	**Elevation:** -24 cm with respect to CPT-H1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v̧d. Berg)	**Date:** July 14, 2000
Sponsored by:	**File Name:**	cpth2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site H - Kınalı Street, Yağcılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.78419°N 30.41295°E	
	Test Number:	CPT-H3	**Elevation:** -10 cm with respect to CPT-H1
	Type of Cone:	ELC10 CFP No. 000606 (a.p. v.d. Berg)	**Date:** July 14, 2000
Sponsored by:	**File Name:**	cpth3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site H - Kinali Street, Yagcilar District, Adapazari
Date: July 21, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.72 m 07/14/00, caved in, 08/04/00
Notes: Vertical scale is reduced to fit in 1 page

Test ID: SPT-H1
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -24 cm with respect to CPT-H1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Asphalt: Pavement of Kinali street											
1									Fill: Black sandy fill											
		CL	S-H1-1	22/45	2-2-1	1.1	4.27	44	CL: Dark gray to black clay with sand	60	40	29	43	23	75	30	21	0.038	<2μm	
2									SM: Gray to brown silty sand											
		SM	S-H1-2	33/45	3-7-4	2.15	5.80	58				31	-	-	15	-	-	0.19	-	
3									CLAY: Brown, grading to gray clayey silt to silty clay											
		CL/ML	S-H1-3	39/45	1-1-2	2.9	5.80	42		60	35	43	43	17	98	29	10	0.009	0.002	
4		CH/MH	S-H1-4	41/45	1-2-1	3.75	7.32	55		190	39	45	70	37	100	71	50	0.002	<2μm	
5		CL	S-H1-5A	38/45	2-2-3	4.85	8.84	55				35	40	17	99	25	14	0.013	<2μm	
		ML	S-H1-5B					55	ML: Gray low plasticity silt with sand			33	31	-	80	8	7	0.045	0.009	
6		ML	S-H1-6	38/45	4-5-8	5.65	8.84	55				31	33	-	80	10	5	0.04	0.005	
									CLAYEY SILT: Gray high plasticity silty clay to clayey silt interspersed with thin layers of silty sand to sandy silt											
		MH	S-H1-7A	38/45	2-2-5	6.45	10.37	60		75	32	38	51	21	99	34	18	0.008	<2μm	
7		ML	S-H1-7B					60				33	32	-	79	-	-	-	-	
		CL/MH	S-H1-8	32/45	2-4-4	7.25	11.89	60		60	50	38	49	22	99	38	20	0.008	<2μm	
8																				
		MH	S-H1-9	31/45	2-3-4	8.45	11.89	60		190	51	42	68	32	98	58	34	0.004	<2μm	
9									SP-SM: Gray fine to medium sand with silt											
10		SP-SM	S-H1-10A	45/45	3-6-3	9.85	13.42	59				28	-	-	9	-	-	0.3	0.08	
		ML	S-H1-10B					59	ML: Gray clayey silt			38	37	9	94	20	13	0.02	<2μm	
11		CH	S-H1-11	39/45	2-3-4	10.95	14.94	60	CH: Dark gray stiff high plasticity clay	170	80	38	70	46	98	70	55	0.001	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site H - Kinali Street, Yagcilar District, Adapazari
Date: July 21, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.72 m 07/14/00, caved in, 08/04/00
Notes: Vertical scale is reduced to fit in 1 page

Test ID: SPT-H1
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -24 cm with respect to CPT-H1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

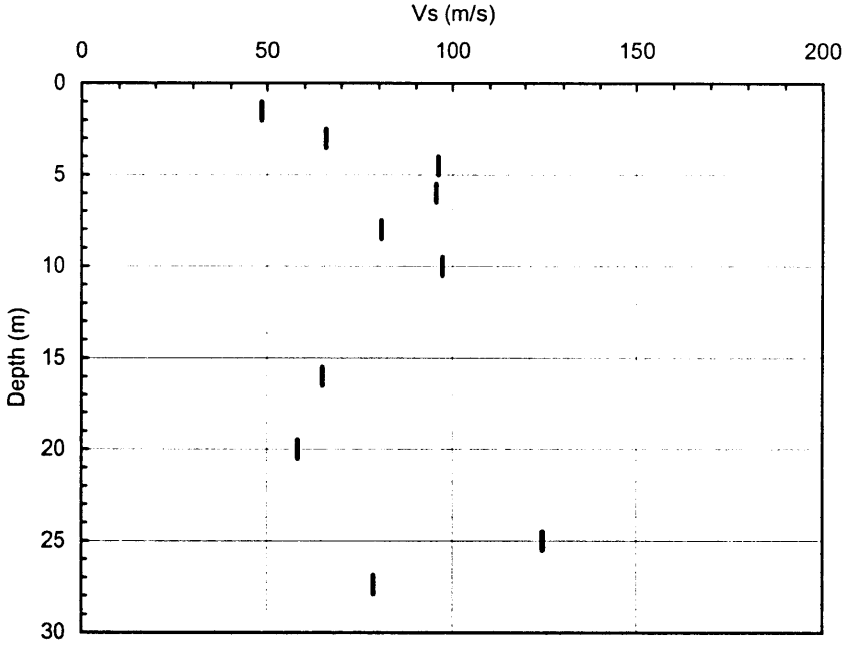
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks

Legend
S: Spit Spoon (SPT) SH: Shelby tube

Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-H2

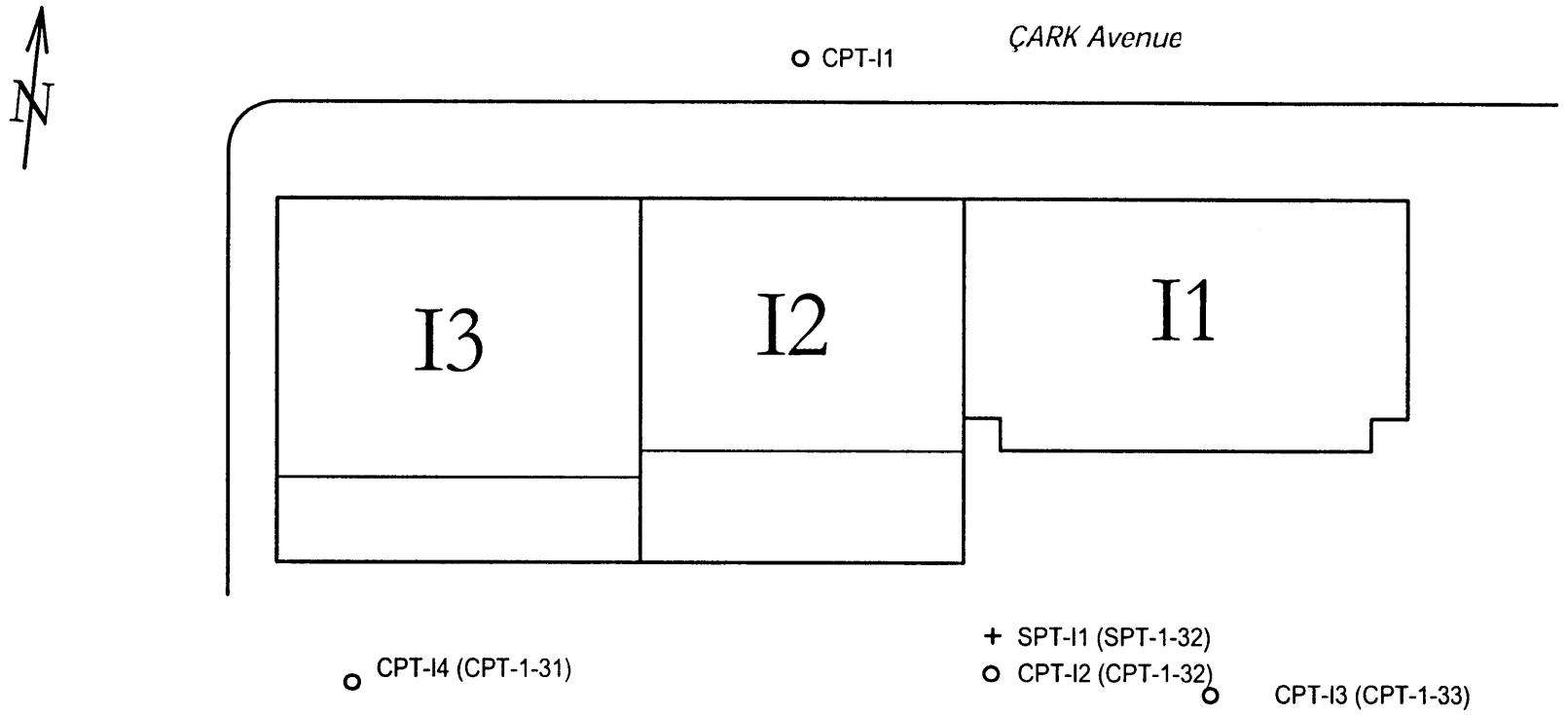
Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.26	1.00	2.00	56	41	49
3.76	2.50	3.50	56	76	66
5.26	4.00	5.00	104	88	96
6.76	5.50	6.50	109	82	95
8.76	7.50	8.50	79	82	81
10.76	9.50	10.50	98	96	97
16.76	15.50	16.50	71	59	65
20.76	19.50	20.50	50	67	58
25.76	24.50	25.50	114	135	124
28.14	26.88	27.88	102	55	78



Data processed by: ZETAS (Zemin Teknolojisi AS)

Phase 1

Site I



Difference in elevation with respect to CPT-I1	
CPT-I1	0 cm
CPT-I2	-10 cm
CPT-I3	0 cm
CPT-I4	-23 cm
SPT-I1	-13 cm
Ground floor of building I2	+11 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

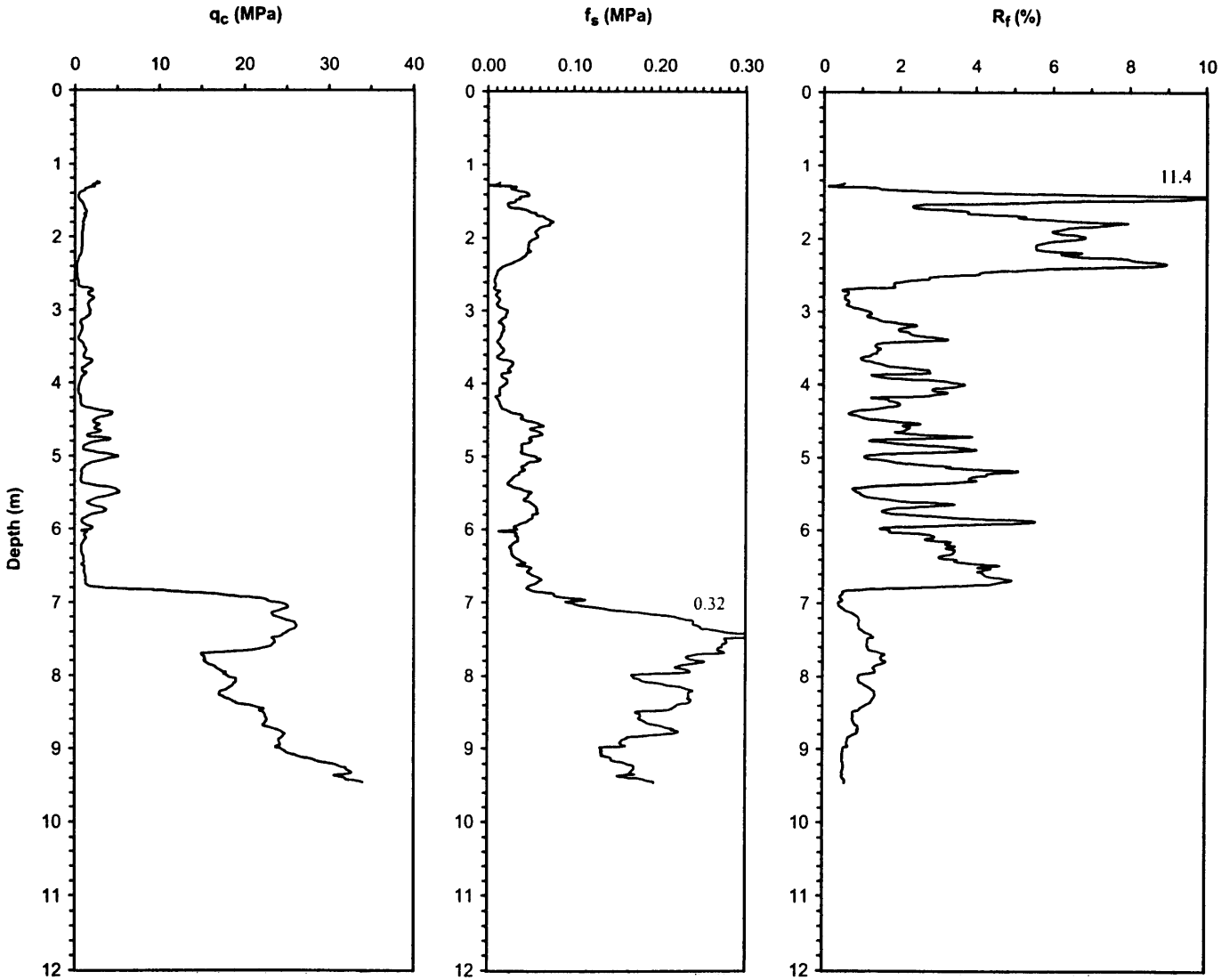
Contents: Plan view of Site I and location of subsurface exploration points

Location: Çark Street, Semerciler District, Adapazari
GPS Coordinates: 40.77681° N 30.39223° E

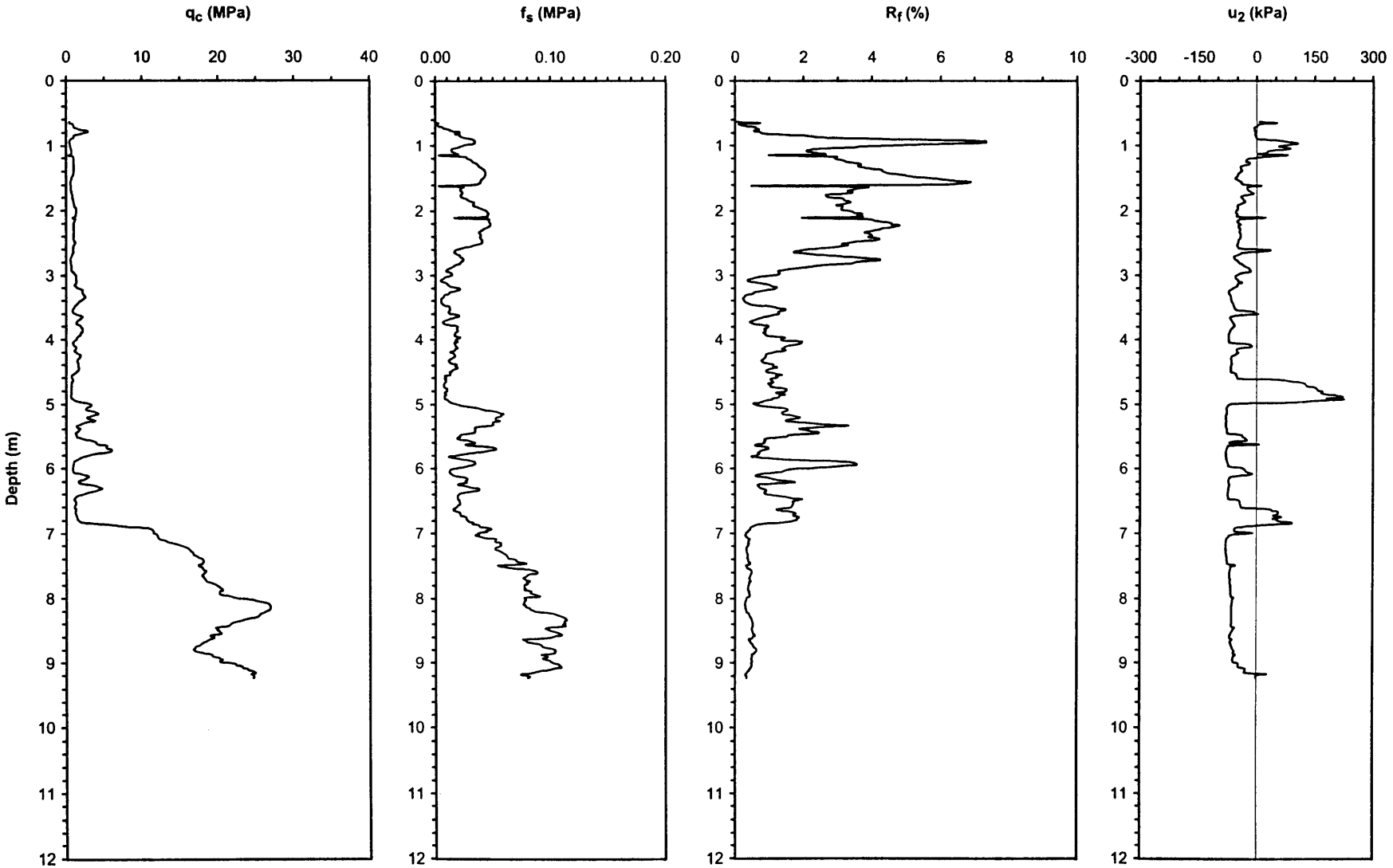
Scale: Graphic Scale | File Name: site_i.fcw - site_i.pdf

Date: 02/11/00 | Drawing: Rodolfo B. Sancio

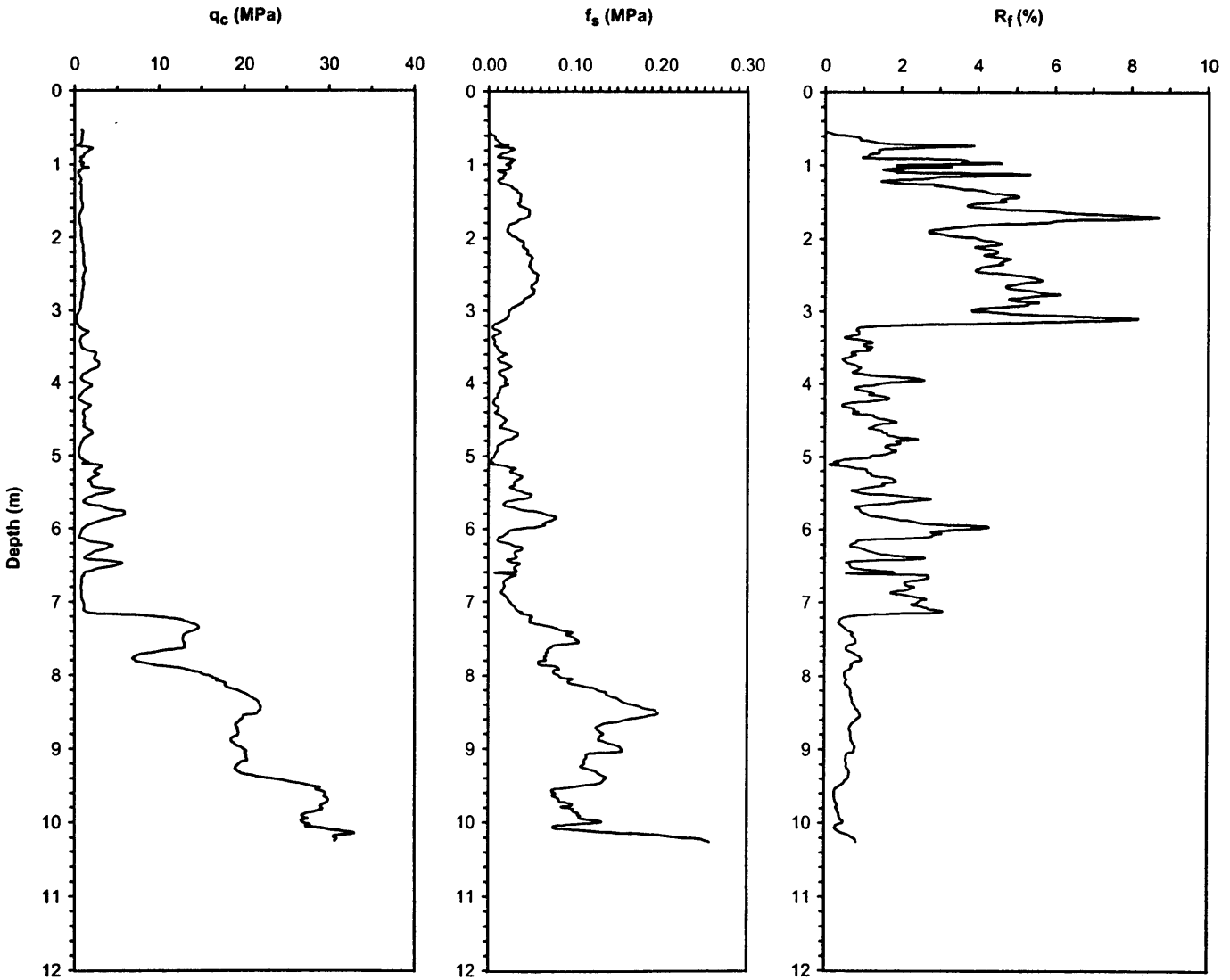
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site I - Çark Avenue, Semerciler District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77681°N 30.39223°E	
	Test Number:	CPT-I1	**Elevation:** 0 cm with respect to CPT-I1
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 18, 2000 12:03
Sponsored by:	**File Name:**	cpti1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	A 122 cm hole was pre-excavated in search for utilities. The soil was then replaced.	



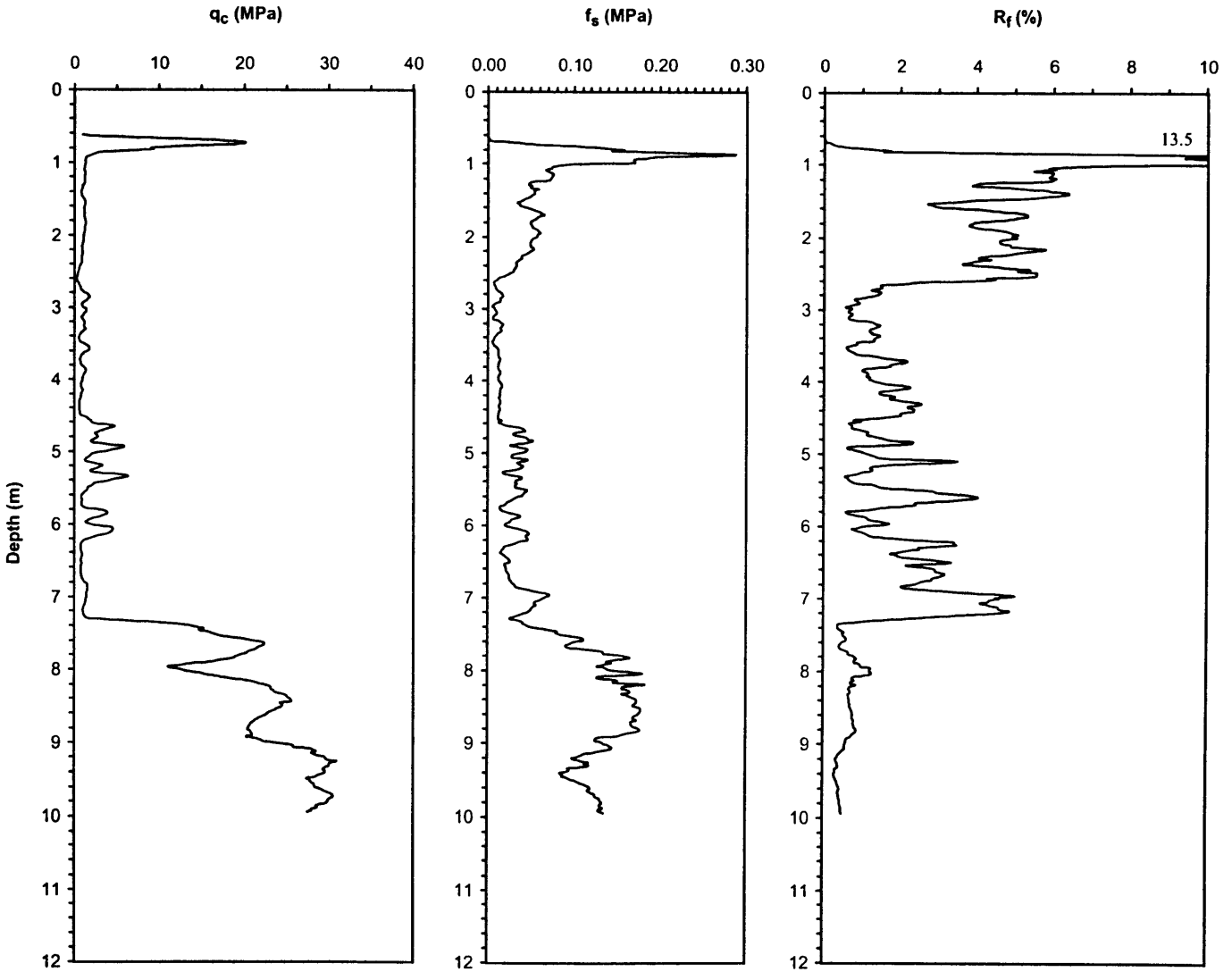
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site I - Çark Avenue, Semerciler District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77681°N 30.39223°E	
	Test Number:	CPT-I2 (CPT-1-32)	**Elevation:** -10 cm with respect to CPT-I1
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 30, 2000
Sponsored by:	**File Name:**	cpti2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. L. Youd and C. Christensen , B. Y. U.
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site I - Çark Avenue, Semerciler District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77681°N 30.39223°E	
	Test Number:	CPT-I3 (CPT-1-33)	**Elevation:** 0 cm with respect to CPT-I1
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** June 30, 2000 15:15
Sponsored by:	**File Name:**	cpti3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. L. Youd and C. Christensen, B.Y.U.
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site I - Çark Avenue, Semerciler District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77681°N 30.39223°E	
	Test Number:	CPT-I4 (CPT-1-31)	**Elevation:** -23 cm with respect to CPT-I1
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** June 30, 2000 11:44
Sponsored by:	**File Name:**	cpti4.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. L. Youd and C. Christensen, B.Y.U.
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m north from CPT-1-32
Date: July 10, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL =0.71 m 07/11/00, 0.76 m 07/19
Notes:

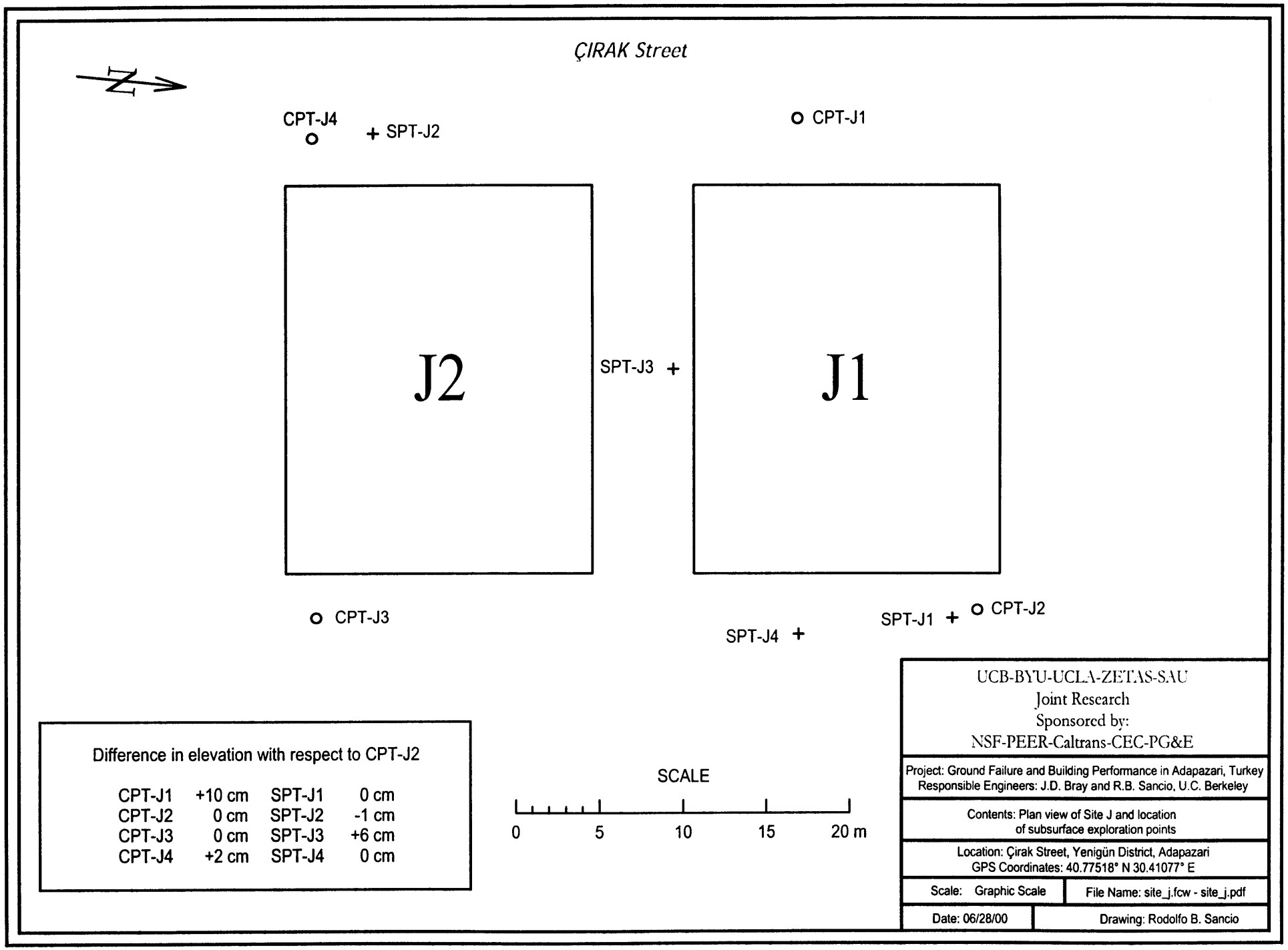
Test ID: SPT-1-32
GPS Coordinates: 40.77651°N 30.39246°E
Elevation: 27.409 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Top soil and black silty clay with organic odor											
1		CH	S-1-32-1	29/45	2-2-4	0.95	4.27	54	CH: Gray high plasticity silty clay	160	40	37	73	48	99	77	61	<1μm		
2			S-1-32-2	0/45	3-2-4	1.95	5.80	57	SANDY SILT: Brown sandy silt											
3		ML	S-1-32-3A	43/45	2-1-3	2.75	7.32	60		50	17	20	29	-	64	28	22	0.036	<1μm	
		ml	S-1-32-3B									30	-	-	61	20	16	0.005	<2μm	
4		ML/CL	S-1-32-4A	36/45	2-2-2	3.95	8.84	53	CLAYEY SILT: Gray clayey silt to silty clay with traces of fine sand	50	24	36	39	13	89	27	20	0.019	<2μm	
		ML	S-1-32-4B									38	39	12	96	23	18	0.021	<2μm	
5		CH	S-1-32-5A	34/45	2-4-5	4.75	8.84	63		50	29	42	53	33	94	48	39	0.006	<1μm	
		ML	S-1-32-5B									30	33	-	91	25	22	0.020	<1μm	
6		ML	S-1-32-6	30/45	5-5-5	5.95	10.37	62		50	39	36	35	-	96	36	27	0.010	<1μm	
7		SP-SM	S-1-32-7	37/45	8-15-13	6.95	11.89	-	SP-SM: Fine to medium gray poorly graded sand with silt			23	-	-	8	-	-	0.30	0.087	
8		SP-SM	S-1-32-8	31/45	13-21-20	7.85	11.89	-				21	-	-	9	-	-	0.25	0.081	
9		SP-SM	S-1-32-9	30/45	12-20-23	8.75	11.89	-				19	-	-	5	-	-	0.32	0.10	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

Phase 1

Site J



Difference in elevation with respect to CPT-J2			
CPT-J1	+10 cm	SPT-J1	0 cm
CPT-J2	0 cm	SPT-J2	-1 cm
CPT-J3	0 cm	SPT-J3	+6 cm
CPT-J4	+2 cm	SPT-J4	0 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

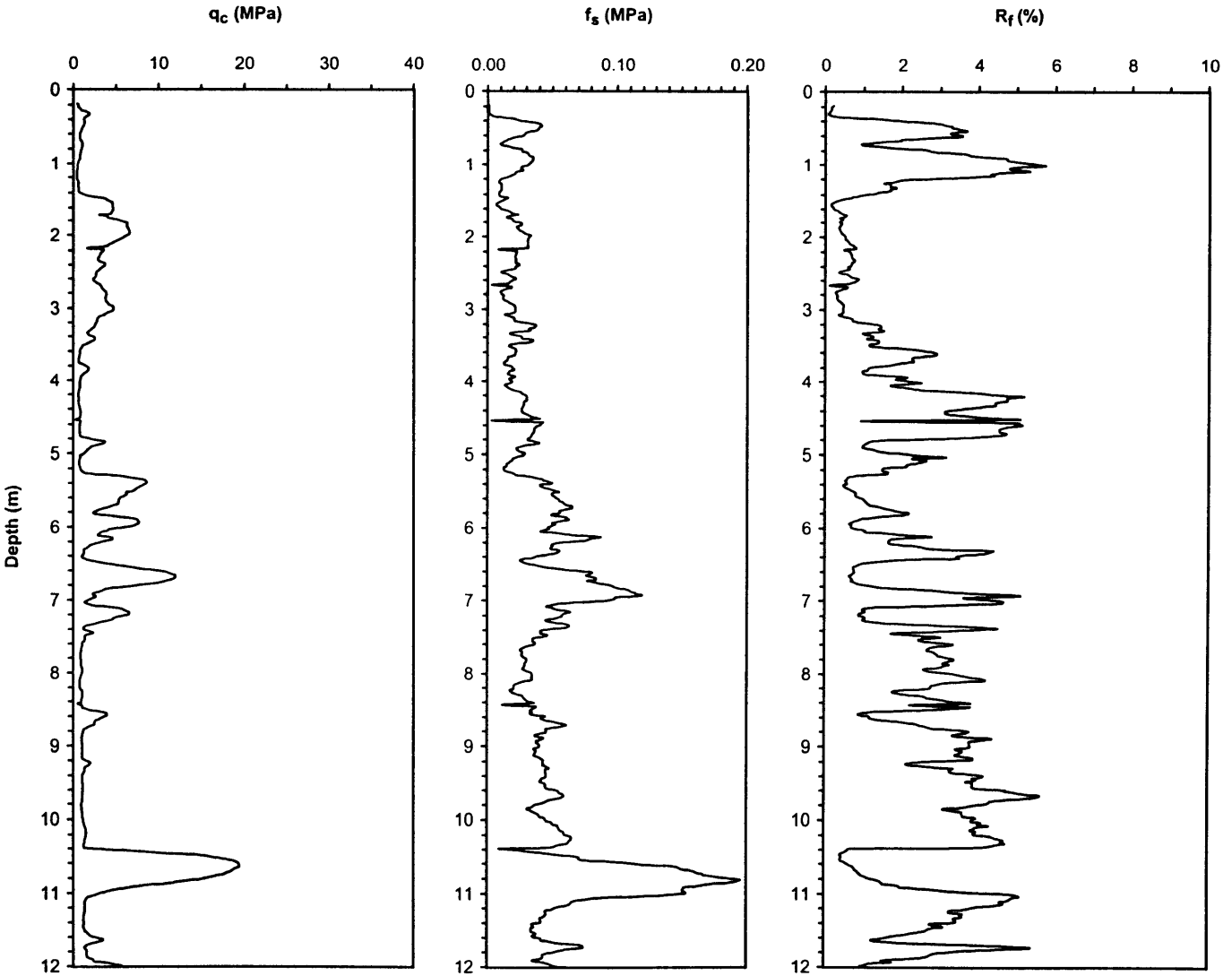
Contents: Plan view of Site J and location of subsurface exploration points

Location: Çirak Street, Yenigün District, Adapazari
GPS Coordinates: 40.77518° N 30.41077° E

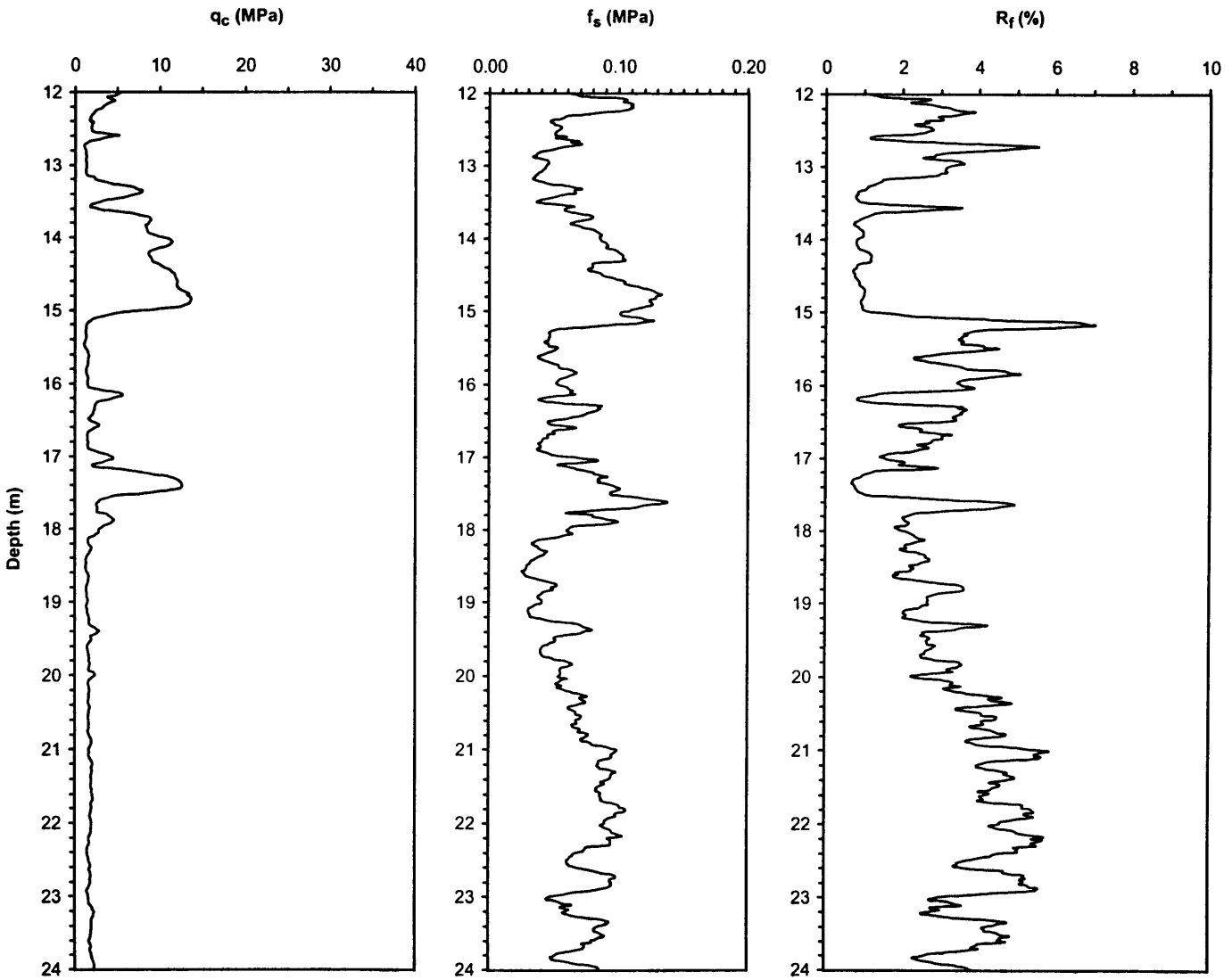
Scale: Graphic Scale | File Name: site_j.fcw - site_j.pdf

Date: 06/28/00 | Drawing: Rodolfo B. Sancio

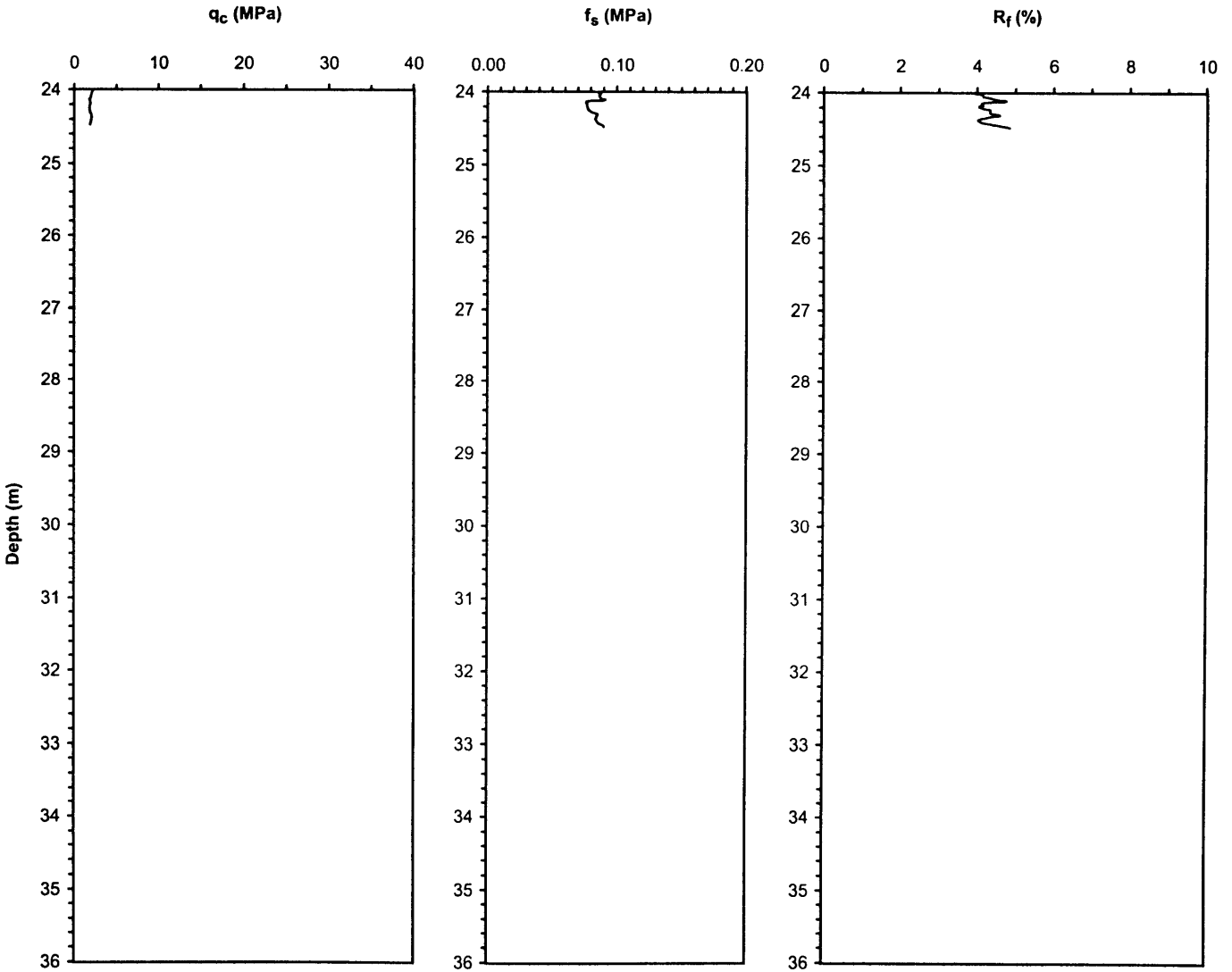
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Site J - Çırak Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77518°N 30.41077°E	
	Test Number:	CPT-J1	**Elevation:** +10 cm with respect to CPT-J2
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 17, 2000 16:34
Sponsored by:	**File Name:**	cptj1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



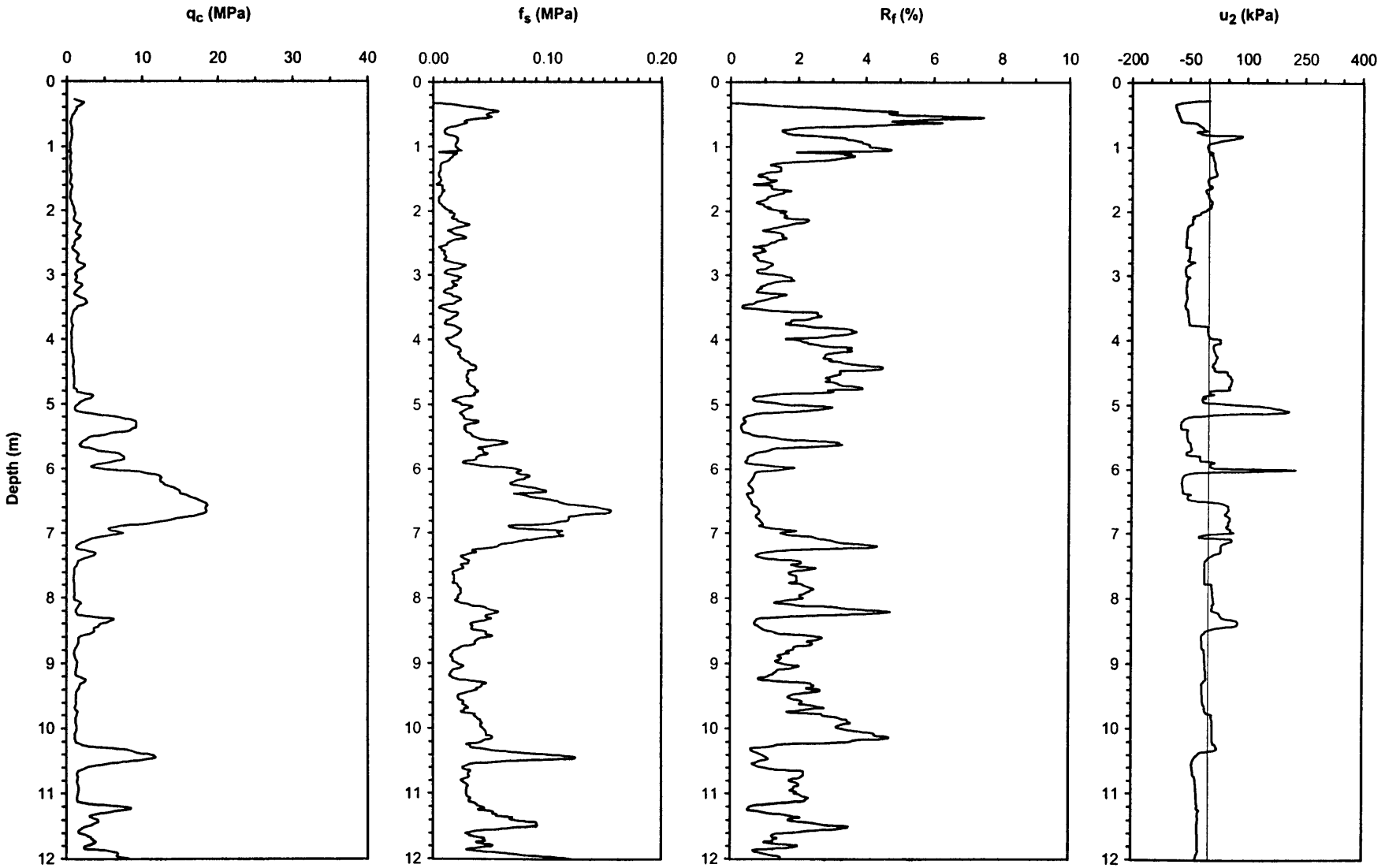
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Site J - Çırak Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77518°N 30.41077°E	
	Test Number:	CPT-J1	**Elevation:** +10 cm with respect to CPT-J2
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 17, 2000 16:34
Sponsored by:	**File Name:**	cptj1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



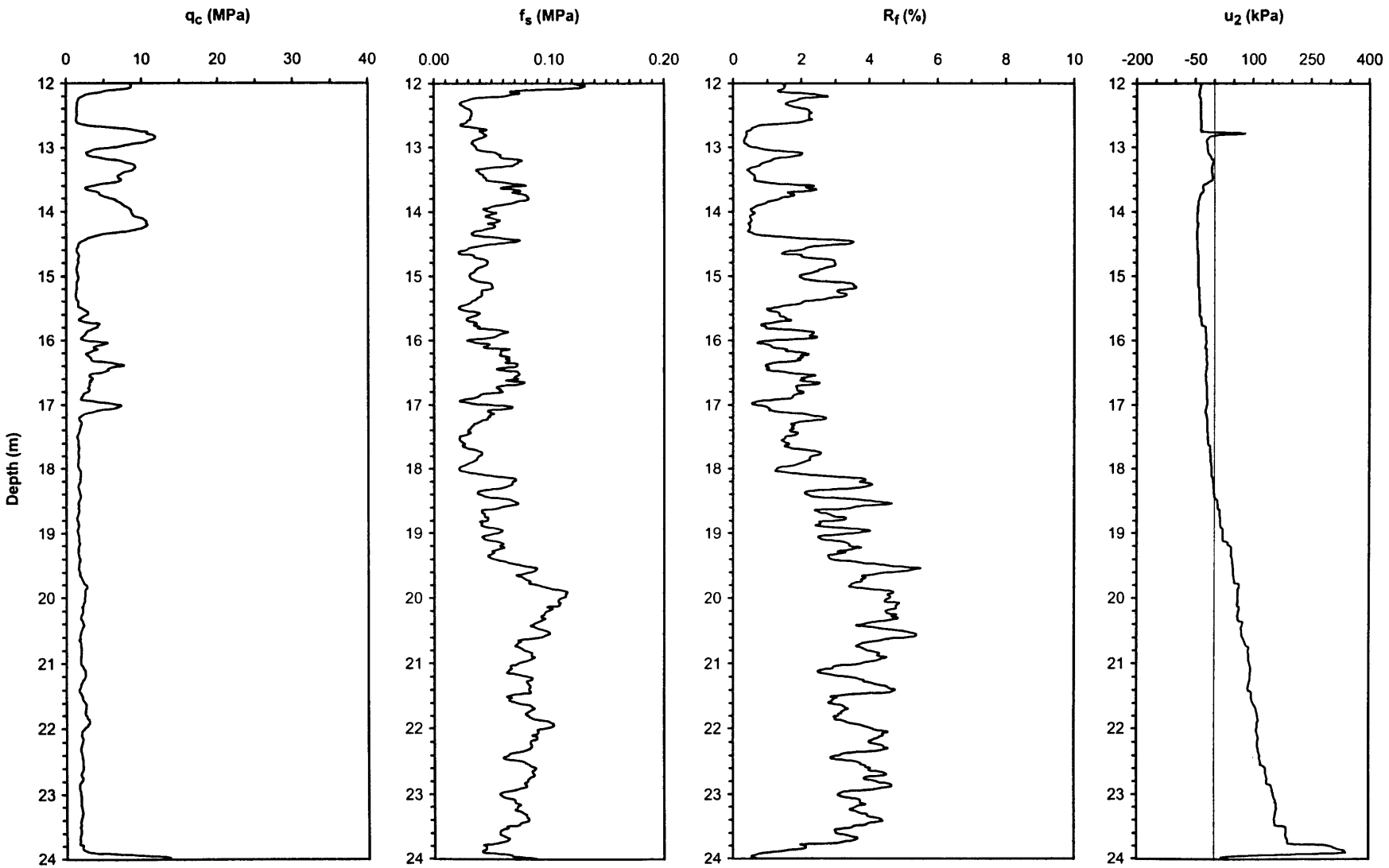
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Site J - Çırak Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77518°N 30.41077°E	
	Test Number:	CPT-J1	**Elevation:** +10 cm with respect to CPT-J2
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 17, 2000 16:34
Sponsored by:	**File Name:**	cptj1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



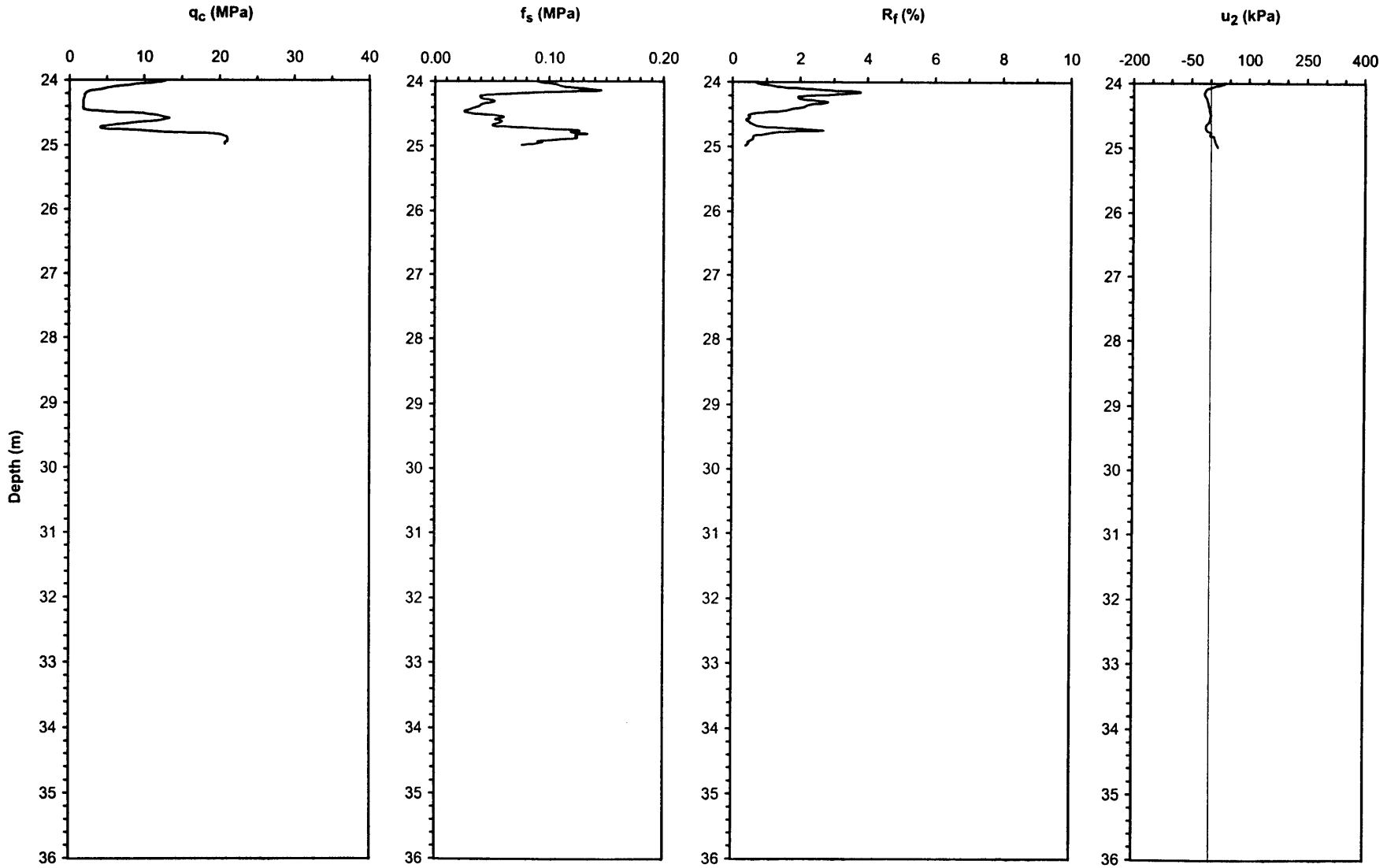
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Site J - Çırak Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77518°N 30.41077°E	
	Test Number:	CPT-J2	**Elevation:** 0 cm with respect to CPT-J2
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 19, 2000
Sponsored by:	**File Name:**	cptj2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



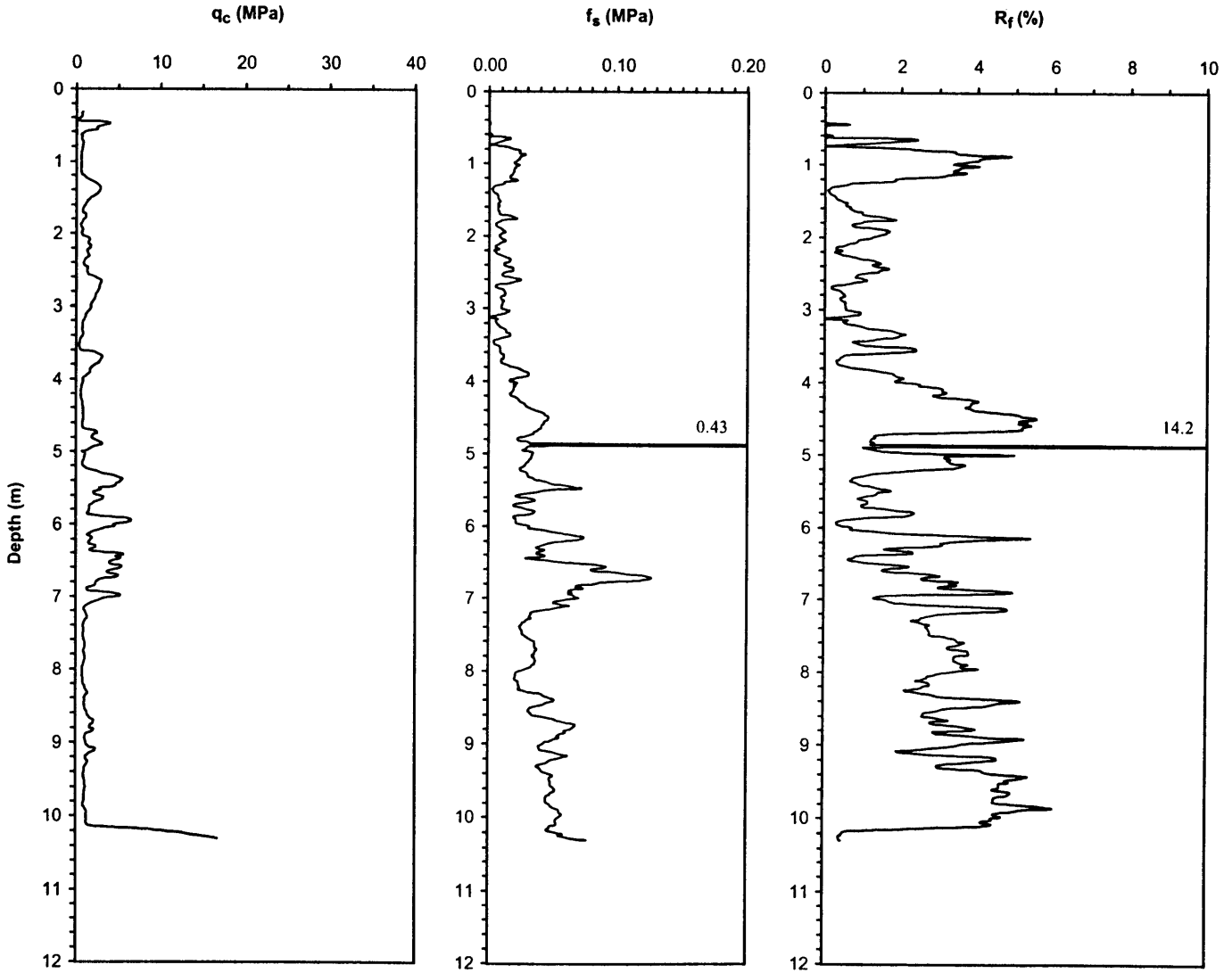
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Site J - Çırak Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77518°N 30.41077°E	
	Test Number:	CPT-J2	**Elevation:** 0 cm with respect to CPT-J2
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 19, 2000
Sponsored by:	**File Name:**	cptj2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



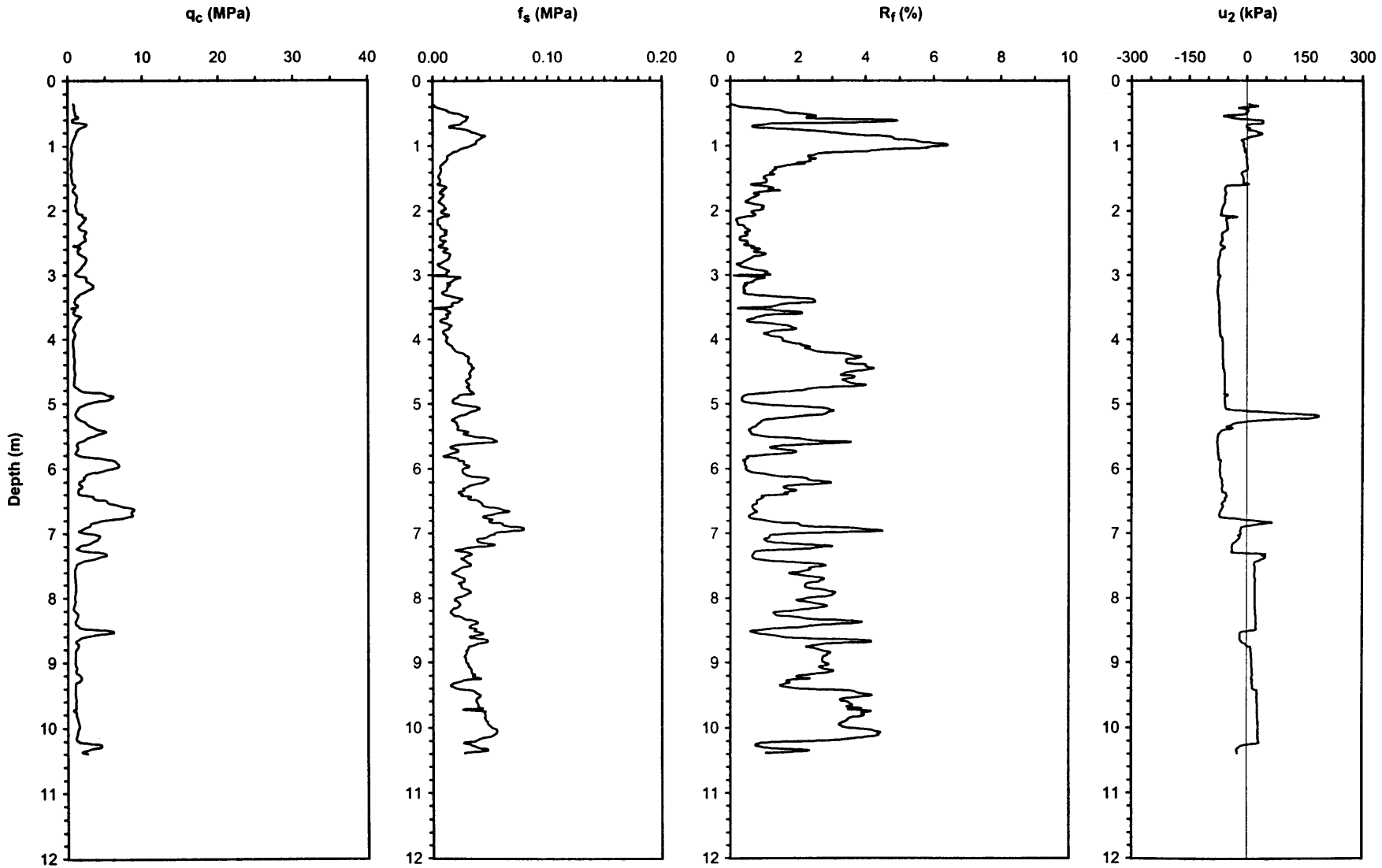
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Site J - Çırak Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77518°N 30.41077°E	
	Test Number:	CPT-J2	**Elevation:** 0 cm with respect to CPT-J2
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 19, 2000
Sponsored by:	**File Name:**	cptj2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site J - Çırak Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77518°N 30.41077°E	
	Test Number:	CPT-J3	**Elevation:** 0 cm with respect to CPT-J2
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 19, 2000 15:11
Sponsored by:	**File Name:**	cptj3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site J - Çırak Street, Yenigün District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77518°N 30.41077°E	
	Test Number:	CPT-J4	**Elevation:** +2 cm with respect to CPT-J2
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 19, 2000
Sponsored by:	**File Name:**	cptj4.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site J - Çirak Street, Yenigün District, Adapazari
Date: June 29, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.6 m 06/30, 0.7 m 07/08, 0.76 m 07/14, 0.41 m 08/04
Notes: Solid flight auger was used to a depth of 1.2 m

Test ID: SPT-J1
GPS Coordinates: 40.77518°N 30.41077°E
Elevation: 0 cm with respect to CPT-J2
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: 5 cm-thick concrete slab followed by brown clayey sand											
1		ML/CL	S-J1-1	35/45	1-1-1		4.27	44	ML: Brown to gray clayey silt with traces of fine sand to silt with sand. Red oxidized zones throughout the stratum	30		36	43	15	97	35	25	0.01	<2μm	
2		ML	S-J1-2	34/45	1-2-3		5.80	52		120		36	37	10	93	-	-	-	-	
3		ML	S-J1-3A	38/45	1-3-3	2.75	5.80	59				35	35	7	92	-	-	-	-	
		ML	S-J1-3B					59				32	29	-	76	32	26	0.02	<2μm	
4		CH	S-J1-4	38/45	1-1-1	3.55	7.32	57	CH: Gray high plasticity silty clay with traces of fine sand. Wood pieces found at approximately 3.9 m and 4.7 m	90	26	40	55	29	96	50	37	0.005	<2μm	
5		CH/MH	S-J1-5	36/45	1-2-2	4.35	8.84	59		80	43	41	62	32	94	-	-	-	-	
6		SM	S-J1-6	41/45	6-7-6	5.15	8.84	66	SILT AND SAND: Interbedded strata of gray low plasticity clayey silt and silty fine sand	300		25	-	-	18	-	-	0.12	<0.08	
		ML	S-J1-7	42/45	6-12-16	5.95	10.37	65		450		24	28	-	88	-	-	-	-	
7		SM	S-J1-8A	43/45	5-5-7	6.75	10.37	67		230		28	-	-	14	-	-	0.13	<0.08	
		ML/MH	S-J1-8B					67				37	49	16	99	58	41	0.003	<2μm	
8																				
		ML	S-J1-9	36/45	3-4-4	8.3	11.89	66		210		31	30	-	91	18	11	0.013	0.002	
9																				
10		SM	S-J1-10	40/45	9-15-12	10.15	13.42	-				23	-	-	19	-	-	0.15	<0.08	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site J - Çirak Street, Yenigün District, Adapazari
Date: June 30, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.89 m 07/08/00, 0.69 m 08/04, 0.93 m 07/14
Notes: Solid flight auger was used to a depth of 1 m

Test ID: SPT-J2
GPS Coordinates: 40.77518°N 30.41077°E
Elevation: -1 cm with respect to CPT-J2
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Electric power line burried at 0.5 m											
1									ML: Brown low plasticity clayey silt with fine sand to sandy silt. Silt layers alternate with silty clay/clayey silt											
2		ML	S-J2-1	32/45	1-2-1	1.75	5.80	50		50		32	32	-	81	-	-	-	-	
3		ML	S-J2-2	35/45	2-4-4	2.65	7.32	62		230		33	28	-	53	-	-	0.07	-	
4		CH	S-J2-3	44/45	1-1-2	4.00	7.32	56	CH: Gray high plasticity silty clay with traces of brown roots. Does not soften when remoulded	100	30	48	75	44	99	80	68	<2μm	<2μm	
5		SM	S-J2-4	36/45	3-8-7	5.15	8.84	65	SILT AND SAND: Alternating strata of gray silty fine sand and low plasticity clayey silt to sandy silt. Traces of wood at approximately 7.2 m. Seaming of gray silty clay with sandy silt in S-J2-6	310		26	-	-	39	-	-	0.09	<0.07	
6		ML	S-J2-5A	39/45	2-5-12	6.25	10.37	63		130		35	37	10	99	47	36	0.006	<2μm	
		ML	S-J2-5B					63		>450		24	26	-	70	21	18	0.038	<2μm	
7		ML	S-J2-6	35/45	3-6-5	7.05	11.89	61		110	48	32	36	-	98	31	25	0.013	<2μm	
8		CH	S-J2-7A	33/45	2-6-4	8.35	11.89	65	CLAY AND SAND: Interbedded strata of high plasticity, gray silty clay and silty fine sand	120		40	66	40	100	70	55	<2μm	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site J - Çirak Street, Yenigün District, Adapazari
Date: July 3, 2000
Field Log by: Jonathan D. Bray
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.7 m 07/08/00, 0.8 m 07/14
Notes: Solid flight auger used to a depth of 1 m

Test ID: SPT-J3
GPS Coordinates: 40.77518°N 30.41077°E
Elevation: +6 cm with respect to CPT-J2
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Drilled through the concrete slab between buildings J1 and J2. Without prior knowledge, the boring was drilled through the buildings septic tank											
1																				
2				0/42		1.75			ML: Brown to gray clayey silt to silt with fine sand.											A Shelby tube sample was attempted at 1.8 m. No sample was recovered
			SH-J3-1	38/45		1.75			Transition from brown to gray occurs at approx. 2.5 m	110										
3																				
		ml	S-J3-2A	36/45	2-3-3	3.45	7.32			200		30	-	-	98	36	30	0.01	<1μm	
4		ML	S-J3-2B							70		28	30	-	78	30	24	0.029	<1μm	
									CH: Gray high plasticity silty clay											
		CH	S-J3-3	42/42		4.55				70	40	41	95	66	98	63	46	0.003	<1μm	
5									ML: Gray low plasticity silt with sand to sandy silt											
		ML	S-J3-4	41/45	4-2-4	5.45	10.37			130		32	30	-	72	-	-	-	-	
6																				
		ML	S-J3-5	37/45	6-13-18	6.45	10.37			400		40	28	-	64	25	22	0.043	<2μm	
7																				
									CH: Gray silty clay											
8																				
9		CH	S-J3-6	34/45	2-3-5	8.95	11.89			150	56	36	61	33	97	65	50	0.002	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site J - Çirak Street, Yenigün District, Adapazari
Date: July 25, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.4 m 08/04/00
Notes:

Test ID: SPT-J4
GPS Coordinates: 40.77518°N 30.41077°E
Elevation: 0 cm with respect to CPT-J2
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

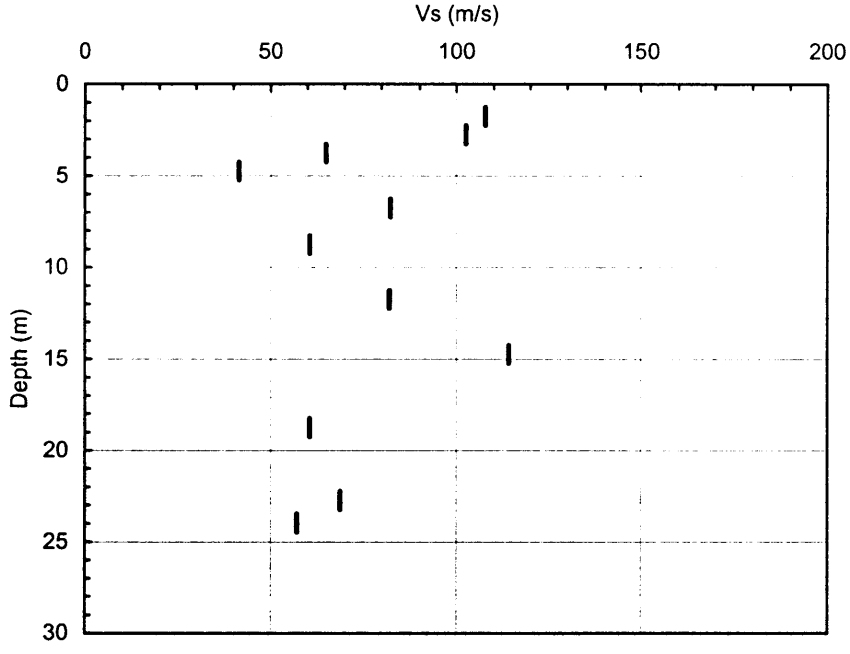
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Borehole drilled through 5 cm-thick concrete slab behind building J1											
1		ML	S-J4-1A	27/45	1-2-1		4.27	38	ML: Brown and gray clayey silt to brown low plasticity sandy silt. FC varies from 56% to 91%	80		31	40	10	91	43	36	0.008	<2μm	
		ML	S-J4-1B							120		31	30	-	67	23	20	0.039	<2μm	
2		ML	S-J4-2	35/45	1-3-2	1.95	5.80	46				29	33	-	56	26	23	0.05	<2μm	
3		ML	S-J4-3A	35/45	2-4-6	2.75	5.80	34				38	25	-	65	15	13	0.041	<2μm	
		ML	S-J4-3B							150		32	35	-	87	22	17	0.02	<2μm	
		CH/CL	S-J4-4A	33/45	2-2-2	3.55	8.84	56	SILTY CLAY: High plasticity gray silty clay/clayey silt interspersed with gray silt with sand	180	35	38	50	26	97	49	35	0.005	<2μm	
4		ML	S-J4-4B									34	32	-	79	23	20	0.023	<2μm	
		MH	S-J4-5	32/45	2-2-3	4.35	8.84	60		175	75	40	72	34	99	70	46	0.002	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

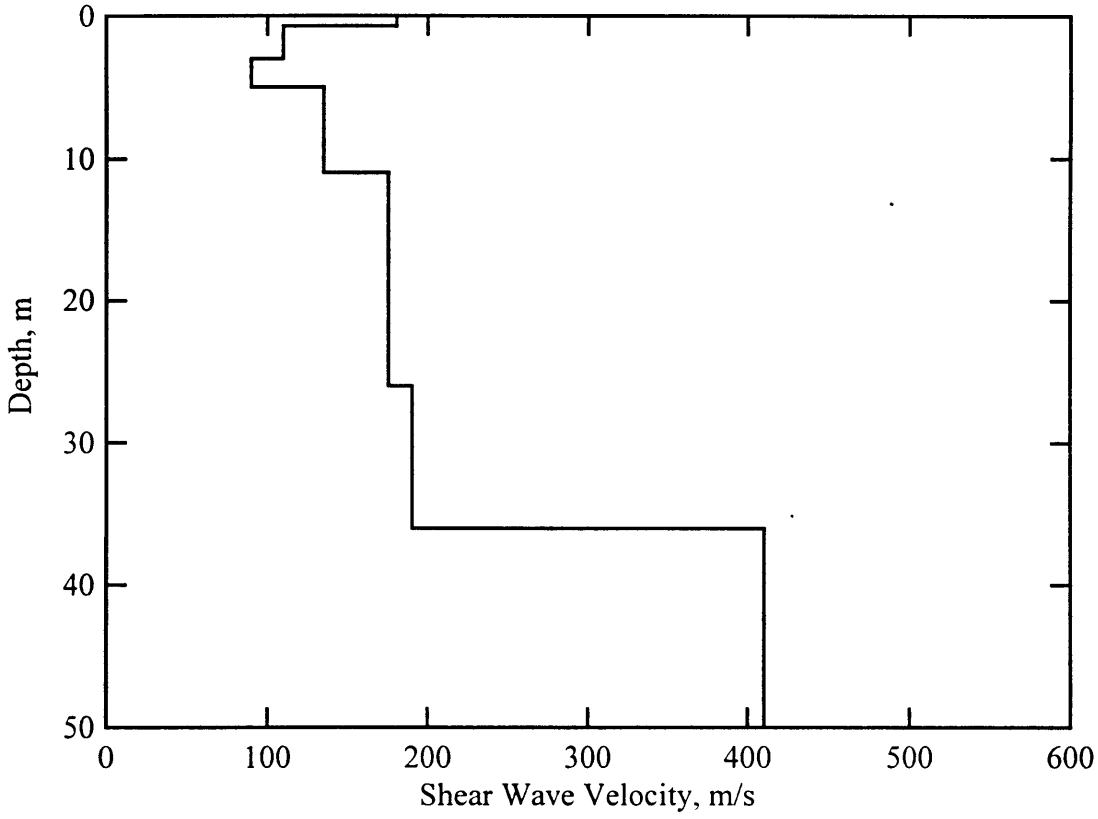
Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-J2

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.50	1.24	2.24	96	119	108
3.50	2.24	3.24	38	167	103
4.50	3.24	4.24	63	68	65
5.50	4.24	5.24	44	39	42
7.50	6.24	7.24	77	88	82
9.50	8.24	9.24	45	76	61
12.50	11.24	12.24	79	85	82
15.50	14.24	15.24	152	77	114
19.50	18.24	19.24	59	63	61
23.50	22.24	23.24	83	54	69
24.72	23.46	24.46	56	59	57



Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Site J.

Tabulated values of layer properties determined from forward modeling of Site J

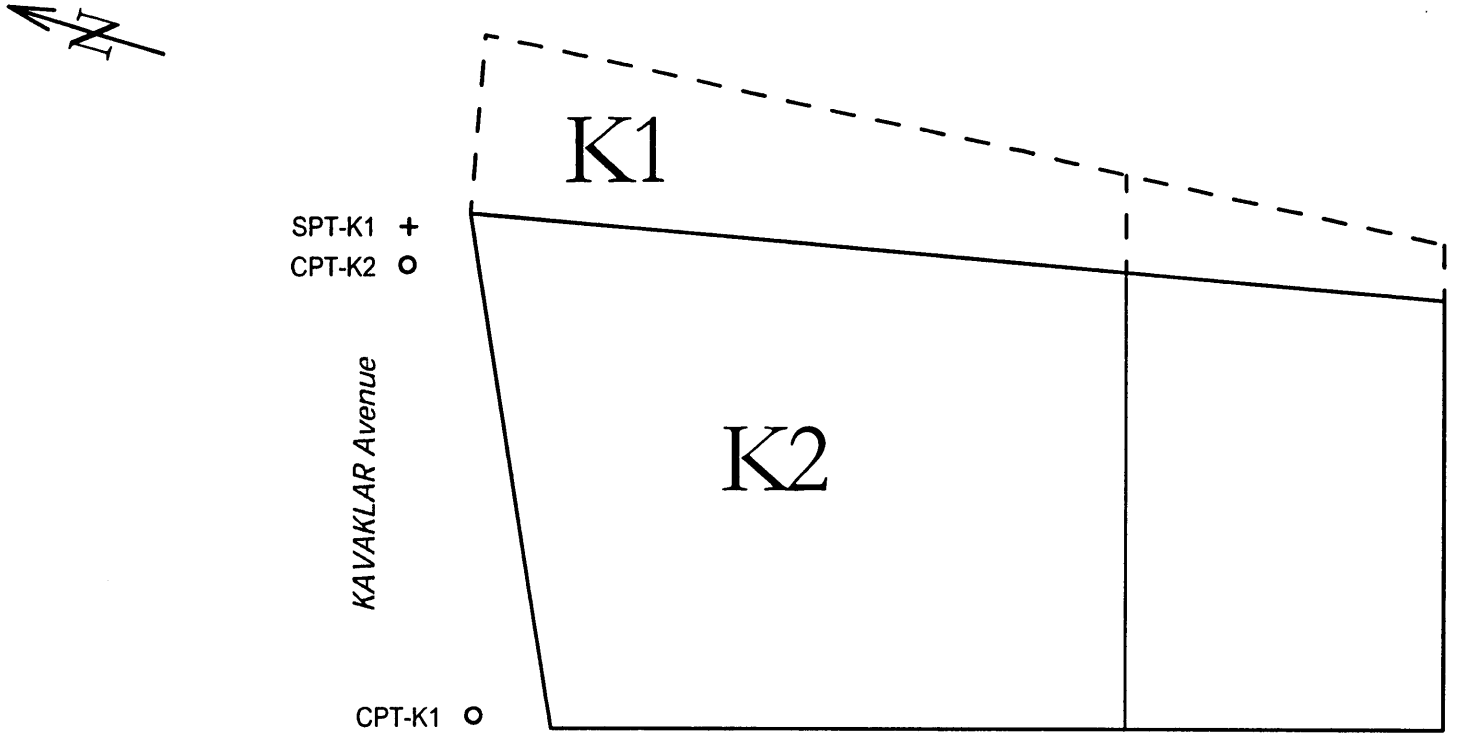
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.7	180	336.8	0.3	1.92
0.7	2.3	110	1500	0.4973	2.0
3.0	2.0	90	1500	0.4982	2.0
5.0	6.0	135	1500	0.4959	2.0
11.0	15.0	175	1500	0.4931	2.0
26.0	10.0	190	1500	0.4918	2.0
36.0	14.0	410	1500	0.4596	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

Phase 1

Site K



Difference in elevation with respect to CPT-K1	
CPT-K1	0 cm
CPT-K2	+3 cm
SPT-K1	+2 cm
Ground floor of building K2	+4 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

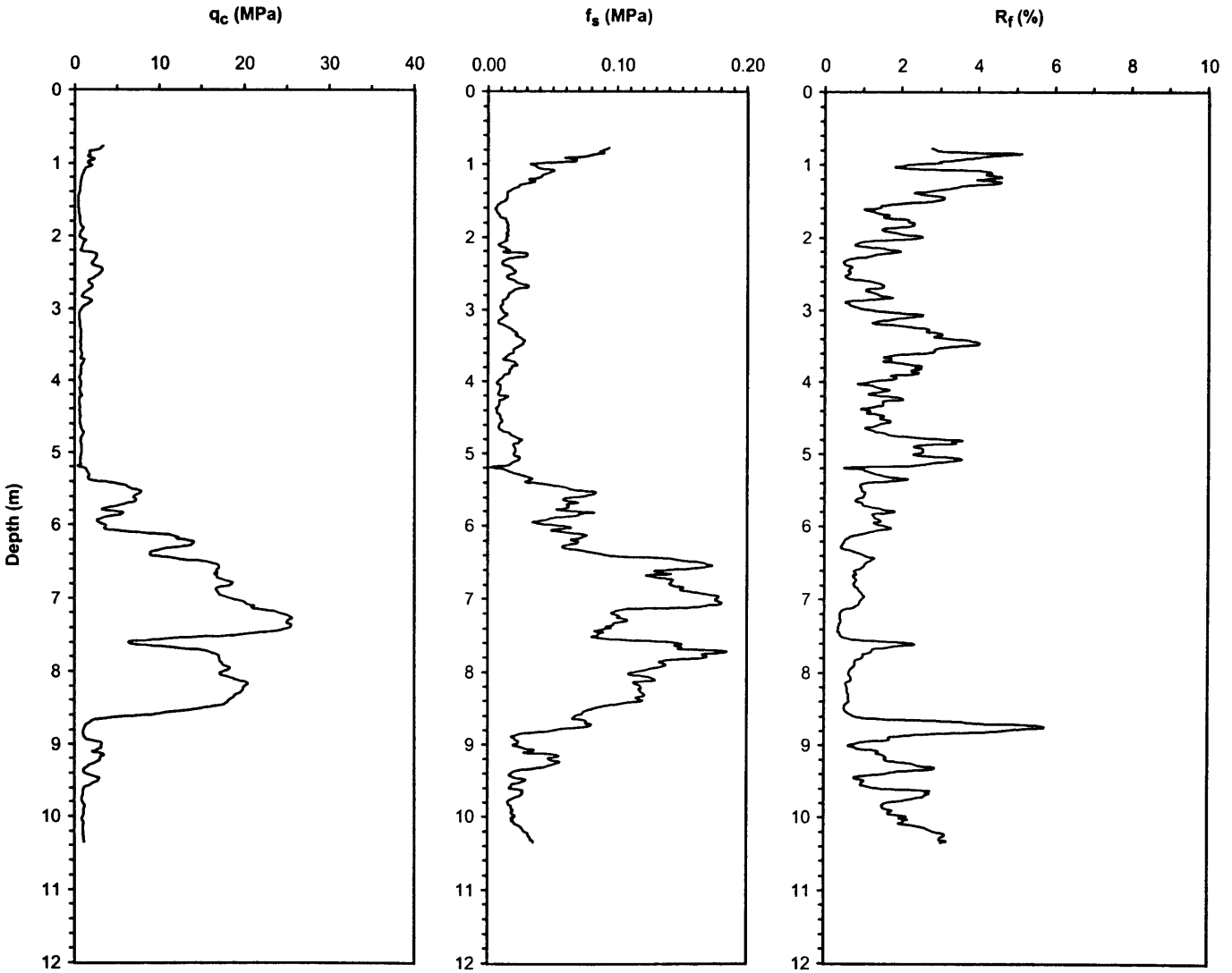
Contents: Plan view of Site K and location of subsurface exploration points

Location: Kavaklar Avenue, Tigcilar District, Adapazari
GPS Coordinates: 40.7775° N 30.4034° E

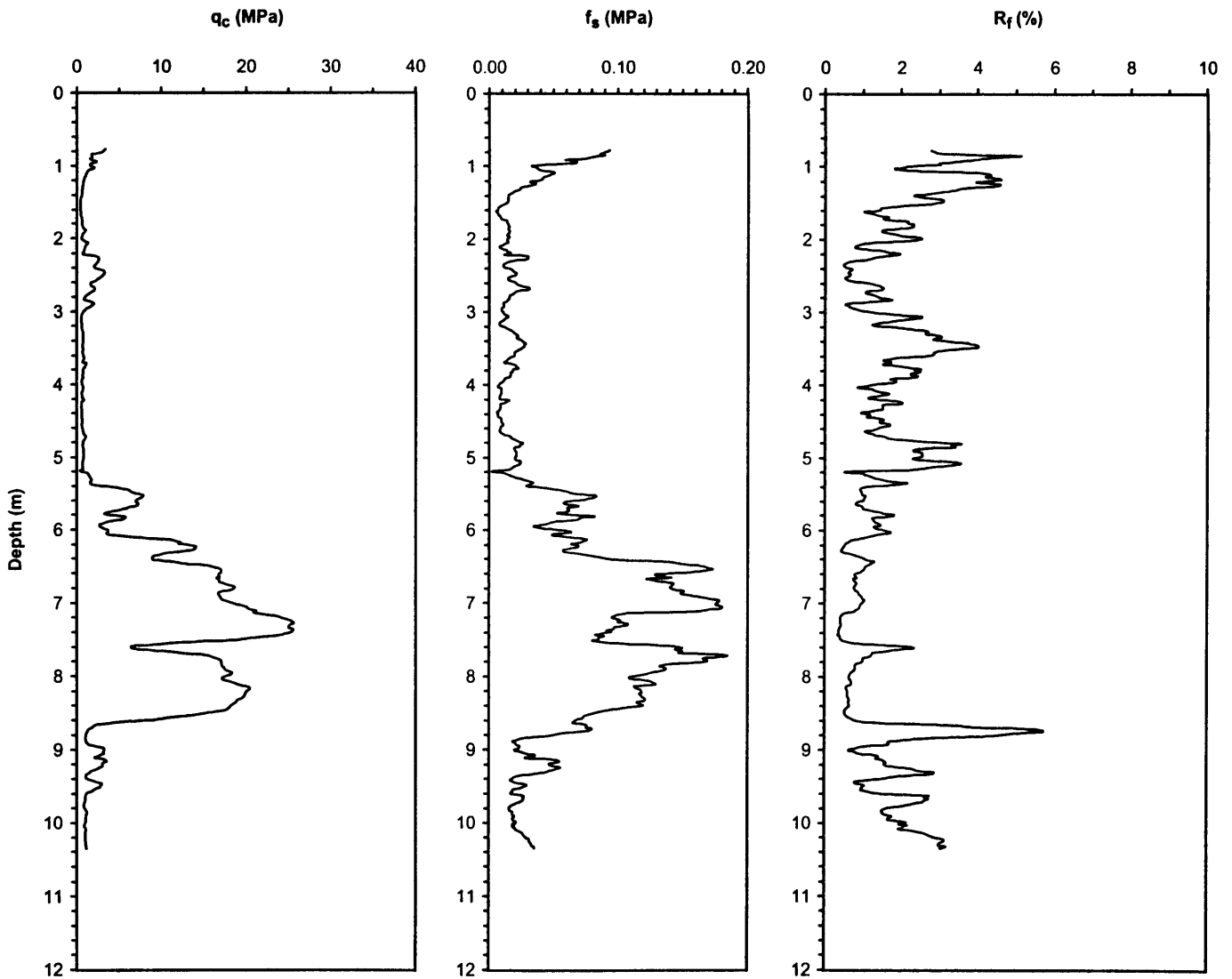
Scale: Graphic Scale | File Name: site_k.fcw - site_k.pdf

Date: 10/30/00 | Drawing: Rodolfo B. Sancio

UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site K - Kavaklar Avenue, Tığılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.7775°N 30.4034°E	
	Test Number:	CPT-K1	**Elevation:** 0 cm with respect to CPT-K1
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** July 18, 2000 18:09
Sponsored by:	**File Name:**	cptk1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site K - Kavaklar Avenue, Tığılar District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.7775°N 30.4034°E	
	Test Number:	CPT-K1	**Elevation:** 0 cm with respect to CPT-K1
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** July 18, 2000 18:09
Sponsored by:	**File Name:**	cptk1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site K - Kavaklar Avenue, Tigcilar District, Adapazari
Date: July 26, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.8 m 07/26/00
Notes:

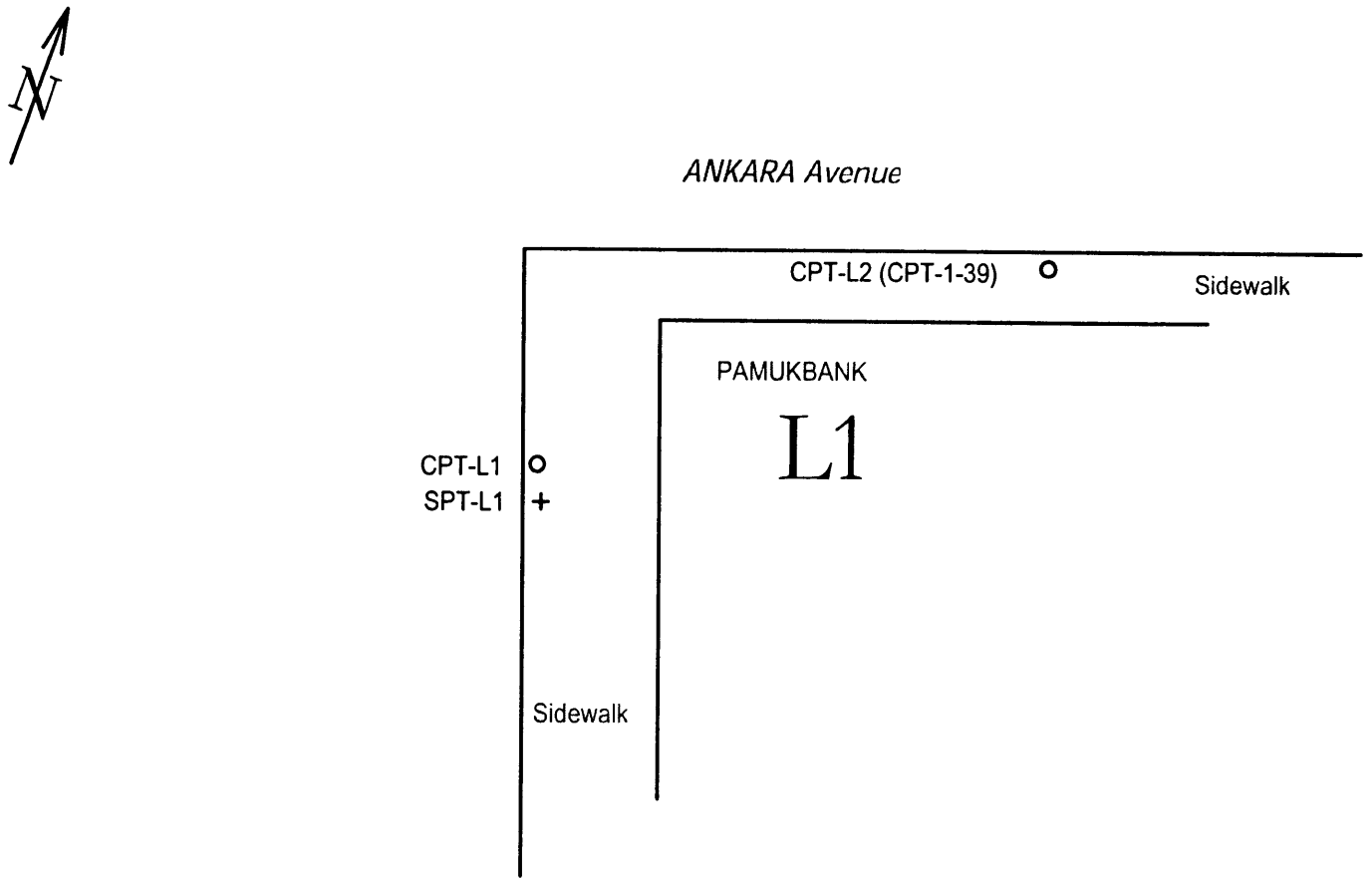
Test ID: SPT-K1
GPS Coordinates: 40.7775°N 30.4034°E
Elevation: +2 cm with respect to CPT-K1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Clayey fill											
1		CL	S-K1-1	26/45	1-1-2	1.05	4.27	51	CLAY AND SILT: Brown low plasticity clayey silt/silty clay with traces of fine sand. S-K1-1 is dark gray and has a light odor, probably due to a nearby septic tank. Transition to gray color occurs at approx. 5.5 m	70	26	39	46	23	99	54	40	0.004	<2μm	
2			S-K1-2	0/45	1-2-2	2.05	5.80	53												
3		ML	S-K1-3	38/45	2-2-3	2.95	7.32	53		30		34	35	9	85	29	25	0.028	<2μm	
4		ML/CL	S-K1-4	38/45	1-2-1	3.75	7.32	55		40	24	36	41	14	95	17	9	0.019	0.002	
5		CL	S-K1-5	34/45	2-1-2	4.55	8.84	62		70	36	39	46	21	98	60	47	0.003	<2μm	
		ML	S-K1-6A	38/45	2-9-11	5.45	8.84	59				33	37	11	89	30	21	0.02	<2μm	
6		SM	S-K1-6B						SILTY SAND: Gray silty sand to sand with silt			24	-	-	34	-	-	0.1	<0.07	
7		SP-SM	S-K1-7	40/45	10-13-17	5.5	10.37	65				23	-	-	8	-	-	0.024	0.08	
8		SM	S-K1-8	43/45	2-6-8	8.0	11.89	70				31	-	-	25	-	-	0.1	<0.07	
9		ML	S-K1-9A	34/45	4-8-5	9.0	13.42	66	ML: Gray low plasticity silt to sandy silt	190	36	29	37	10	81	50	41	0.005	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

Phase 1

Site L



Difference in elevation with respect to CPT-L1	
CPT-L1	0 cm
CPT-L2	-3 cm
SPT-L1	-1 cm

SCALE

0 5 10 15 20 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Ground Failure and Building Performance in Adapazari, Turkey
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

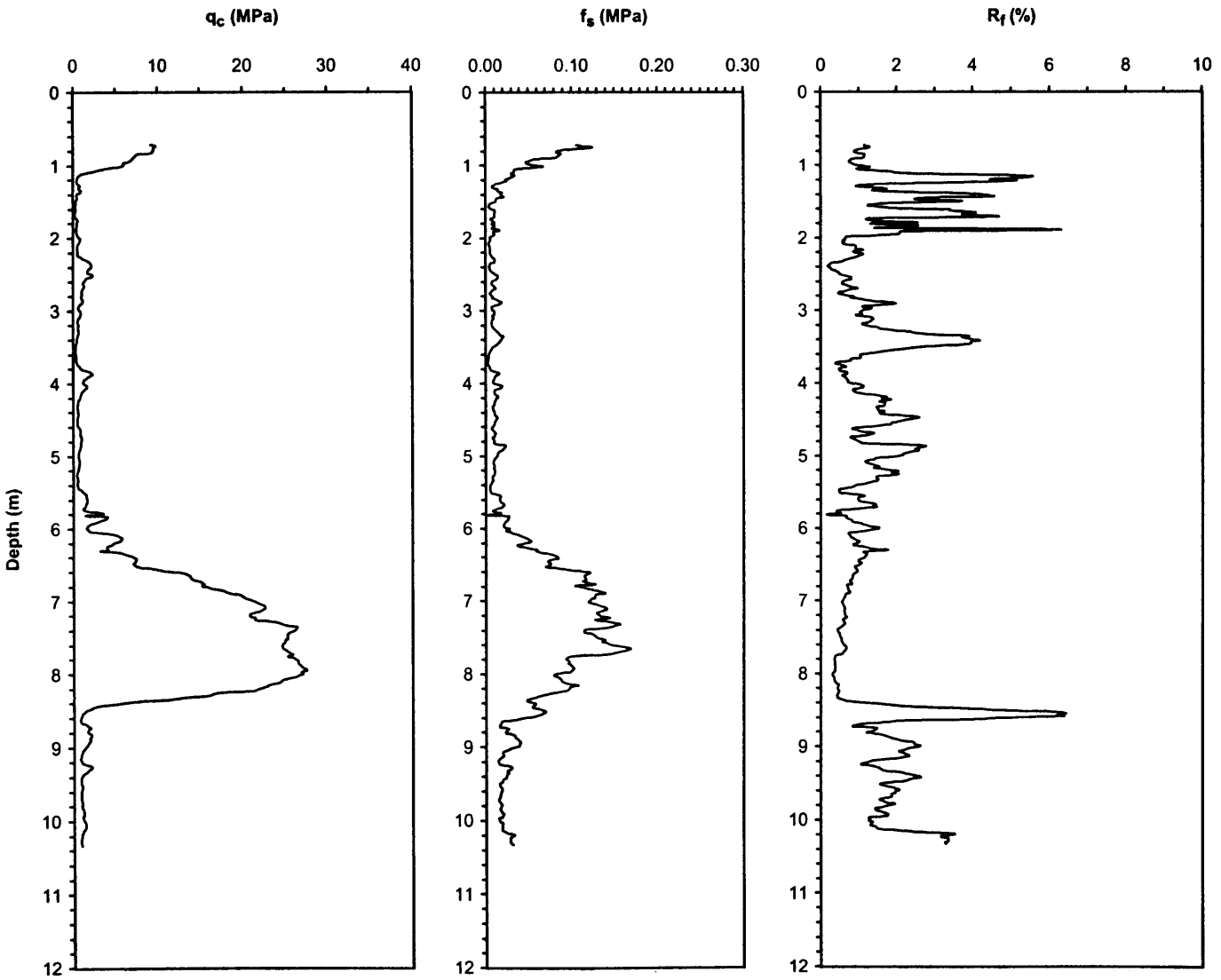
Contents: Plan view of Site L and location of subsurface exploration points

Location: Ankara Avenue, Orta District, Adapazari
GPS Coordinates: 40.77855° N 30.40272° E

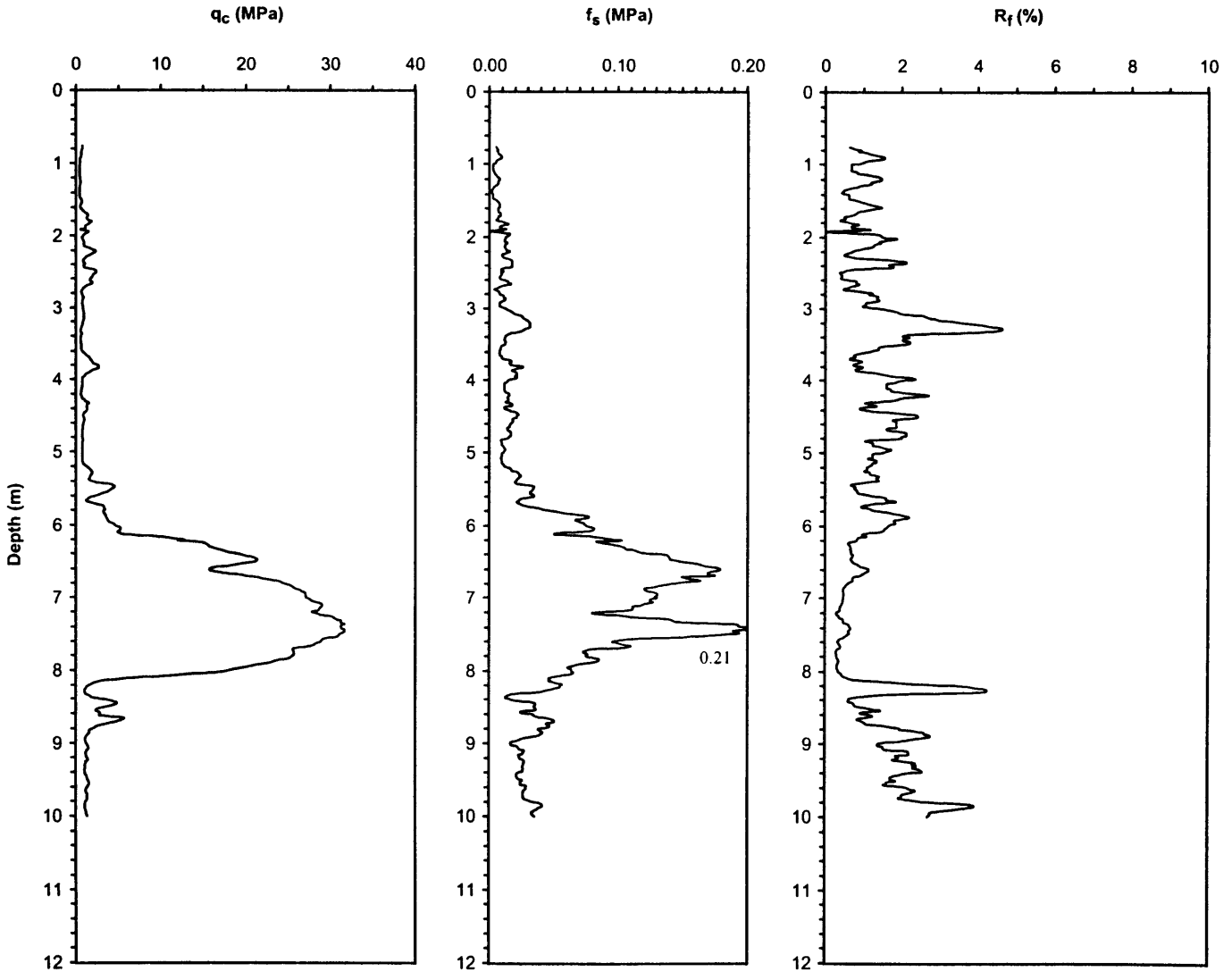
Scale: Graphic Scale | File Name: site_l.fcw - site_l.pdf

Date: 10/30/00 | Drawing: Rodolfo B. Sancio

UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site L - Ankara Avenue, Orta District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77855°N 30.40272°E	
	Test Number:	CPT-L1	**Elevation:** 0 cm with respect to CPT-L1
	Type of Cone:	ELC10 CF No.990618 (a.p. v.d. Berg)	**Date:** July 18, 2000 08:30
Sponsored by:	**File Name:**	cptl1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 70 cm to check for utilities	



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site L - Ankara Avenue, Orta District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77855°N 30.40272°E	
	Test Number:	CPT-L2 (CPT-1-39)	**Elevation:** -3 cm with respect to CPT-L1
	Type of Cone:	ELC10 CF No.990618 (a.p. v.d. Berg)	**Date:** July 6, 2000 08:36
Sponsored by:	**File Name:**	cptl2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. L. Youd and C. Christensen, B. Y. U.
Caltrans, CEC, PG&E	**Notes:**	Probed with percussion hammer 75 cm to check for utilities	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site L - Ankara Avenue, Orta District, Adapazari
Date: July 24, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.68 m 07/24/00
Notes:

Test ID: SPT-L1
GPS Coordinates: 40.77855°N 30.40272°E
Elevation: -1 cm with respect to CPT-L1
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Pavement and bricks followed by sand subgrade and black to gray clayey silt with fine sand and some gravel											
1		CL	S-L1-1	16/45	3-2-2	0.95	4.27	49		180	40	40	46	24	77	40	30	0.009	<2μm	
2		ML	S-L1-2	28/45	3-3-2	2.15	5.80	57				31	26	-	74	<15	<10	0.06	0.028	
3		ML/CL	S-L1-3	0/45	2-1-1	3.0	7.32	54	CLAYEY SILT: Brown low plasticity silt with sand to sandy silt interspersed with brown low plasticity silty clay. Samples exhibit red oxidation areas. FC varies from 57% to 97%			44	41	15	93	56	41	0.003	<2μm	A piece of gravel got stuck in the sampler and no sample was recovered at 3.05 m (S-L1-3). When rods were reinserted in the hole, they reached the same depth and they were pushed to obtain a representative sample
4		ML	S-L1-4A	37/45	4-3-2	3.75	7.32	52				31	28	-	79	<15	<10	0.059	0.02	
		ML	S-L1-4B							50		38	37	9	97	22	10	0.01	0.002	
		ML	S-L1-5A	38/45	2-2-2	4.45	8.84	58				33	31	-	57	10	6	0.063	0.005	
5		CL	S-L1-5B							150	45	35	42	21	93	39	30	0.01	<2μm	
		ML	S-L1-6	38/45	3-3-6	5.45	8.84	59		160		34	33	6	87	12	4	0.03	0.004	
6									SILTY SAND: Brown (S-L1-7) to gray (S-L1-8) silty sand to sand with silt. Approx. 5% fine gravel in S-L1-8										
		SM	S-L1-7A	37/45	16-15-18	6.45	10.37	57				22	22	-	45	9	1	0.08	0.007	
7		SP-SM	S-L1-7B									22	-	-	11	-	-	0.27	0.07	
		SP-SM	S-L1-8	39/45	10-13-18	7.45	11.89					17	-	-	8	-	-	0.43	0.1	
8									CLAYEY SILT: Gray clayey silt interbedded with silt with sand											
		MH/CH	S-L1-9A	32/45	3-8-6	8.45	11.89	61		50	28	39	51	22	98	32	18	0.01	<2μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

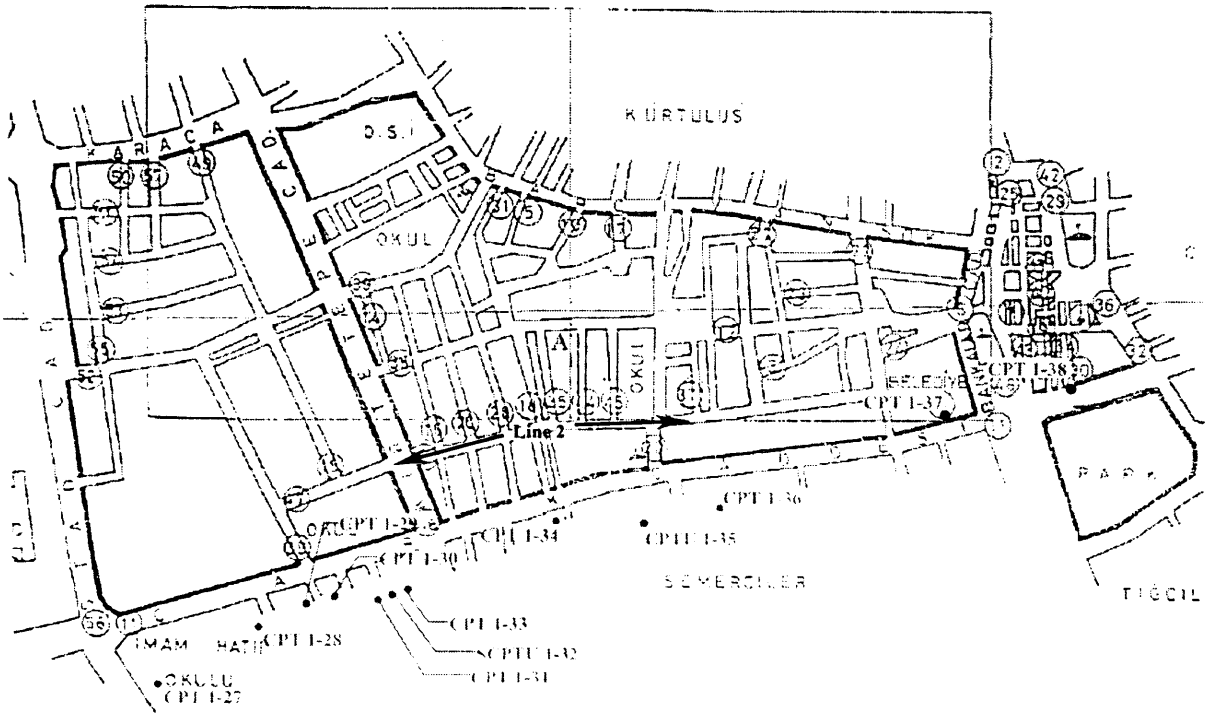
Appendix II

Phase 2

Phase 2

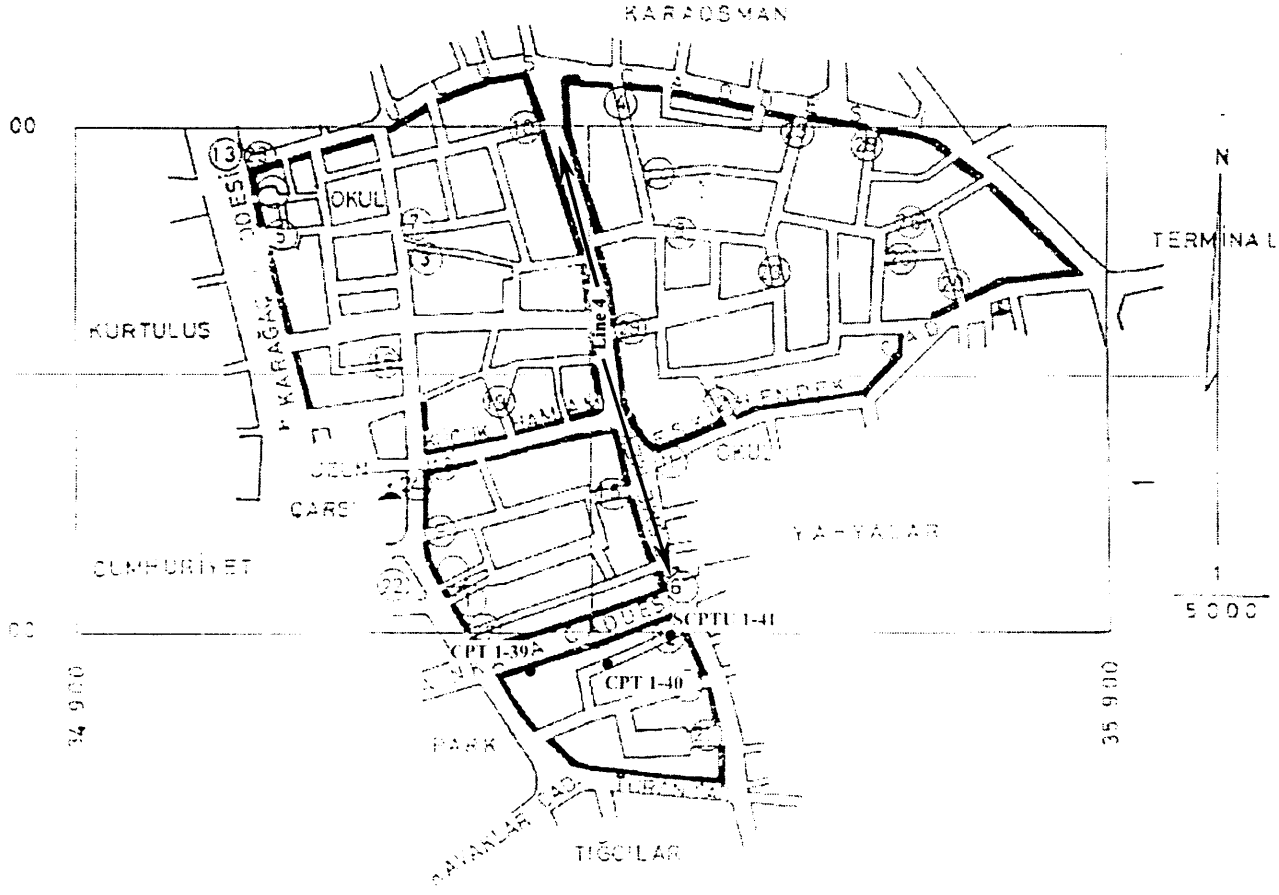
Line 1

CUMHURIYET DISTRICT, ADAPAZARI



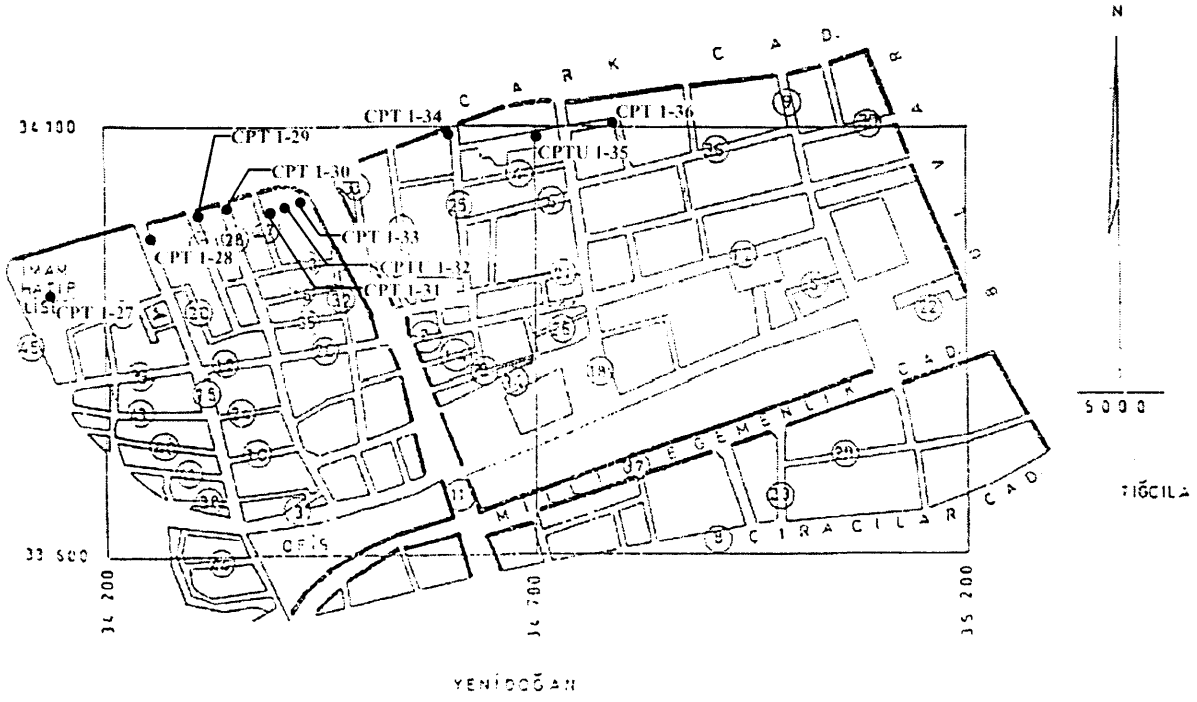
1	Arabacılar Çarş	17	Hatip Sokak	33	Şal Sokak	49	Bal Sokak
2	Ağa Cami	18	Hüseyin Rahmi Sokak	34	Tenekeciler Çarş	50	Bilen Sokak
3	Annem Sokak	19	2. Nci Geçit	35	Telli Sokak	51	Birlik Sokak
4	Aynalı Kavak Sokak	20	Kanara Sokak	36	Ticaret Sarayı	52	Değerli Sokak
5	Basık Sokak	21	Kasaplar Çarş Sokak	37	Toplu Sokak	53	Nadir Sokak
6	Bankalar Caddesi	22	Kavı Sokak	38	Tül Sokak	54	Pancar Sokak
7	Bakırcılar Çarş	23	Kiraz Sokak	39	Tümen Sokak	55	Sefa Sokak
8	Belediye Meydanı	24	Kolağası Sokak	40	3. Nci Geçit	56	Stad Sokak
9	1. Nci Geçit.	25	Kuyumcular Çarş	41	Usta Sokak	57	Yel Sokak
10	Çalım Sokak	26	Menekşe Sokak	42	Unkapanı Çarş		
11	Çark Caddesi	27	Onat Sokak	43	Uzun Çarş		
12	Dr. Kamil Sokak	28	Papatya Sokak	44	Yakın Sokak		
13	4. Ncü Geçit.	29	Pirinç Pazarı	45	Yalı Sokak		
14	Fikret Sokak	30	Şal Sokak	46	Yazarı Çarş		
15	Fulya Sokak	31	Serpil Sokak	47	Yasemin Sokak		
16	Gökalp Sokak	32	Soğan Pazarı	48	Sedat Kirtepe		

ORTA DISTRICT, ADAPAZARI



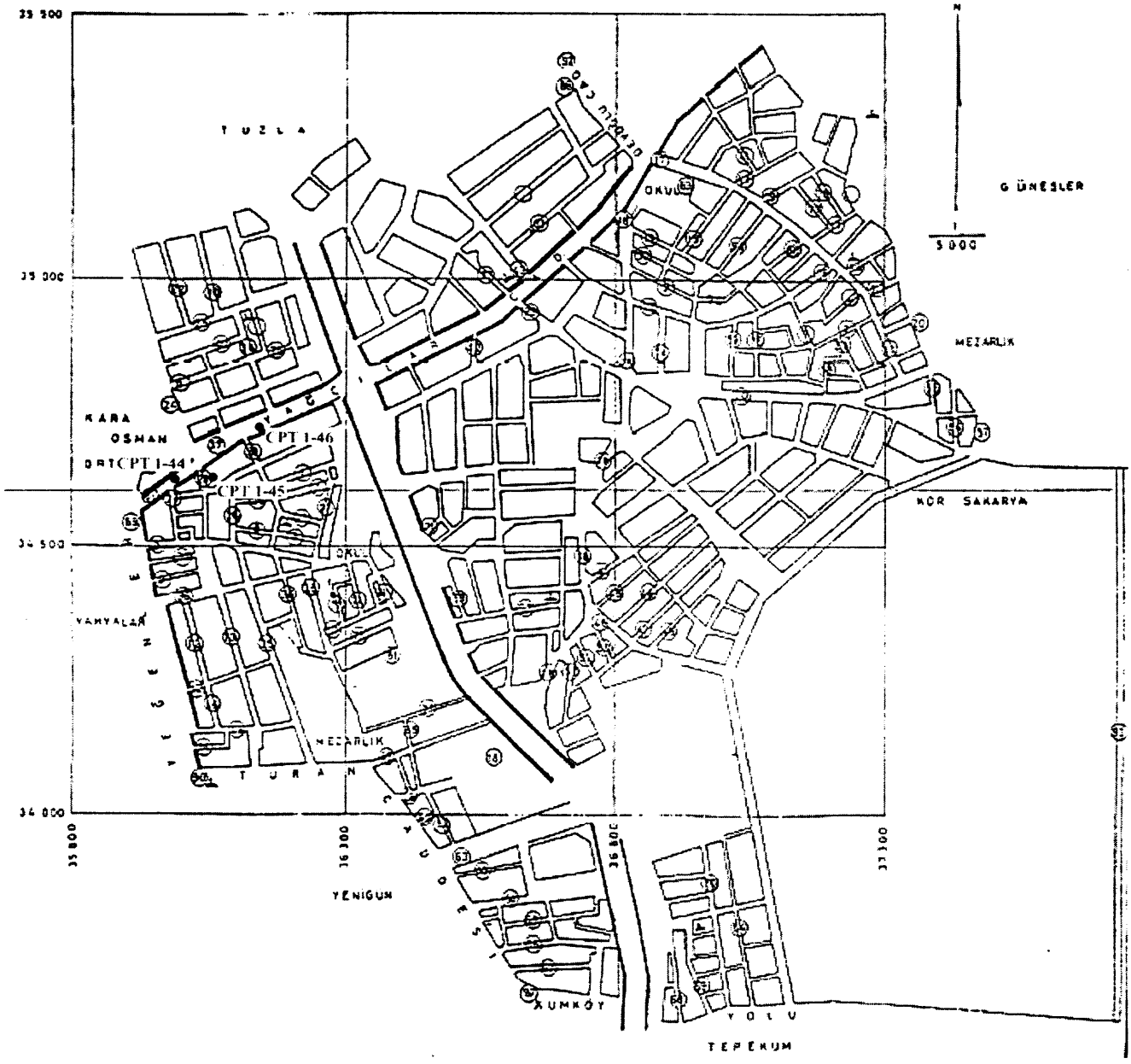
1	Acun Sokak	11	Eski Hendek Caddesi	21	Yonca Sokak
2	Adaş Sokak	12	Ipçi Sokak	22	Mutaflar Çarşısı
3	Avcılar Sokak	13	Karağaç Caddesi	23	Teğmen Çarşısı
4	Boyacı Sokak	14	Katip Sokak	24	Tozlu Camii Çarşısı
5	Can Sokak	15	Keçeci Sokak	25	Ulus Caddesi
6	Çeşme Meydanı Caddesi	16	Kökçü Sokak	26	Nazlı Sokak
7	Çil Sokak	17	Kuzu Sokak	27	Pazar Geçidi
8	Demirkapı Sokak	18	Küçükhamam Caddesi	28	1 Nolu
9	Altan Kutluata Sokak	19	Küçükhamam Çıkmazı	29	Duran Sokak
10	Doğu Sokak	20	Lale Sokak		

SEMERCILER DISTRICT, ADAPAZARI



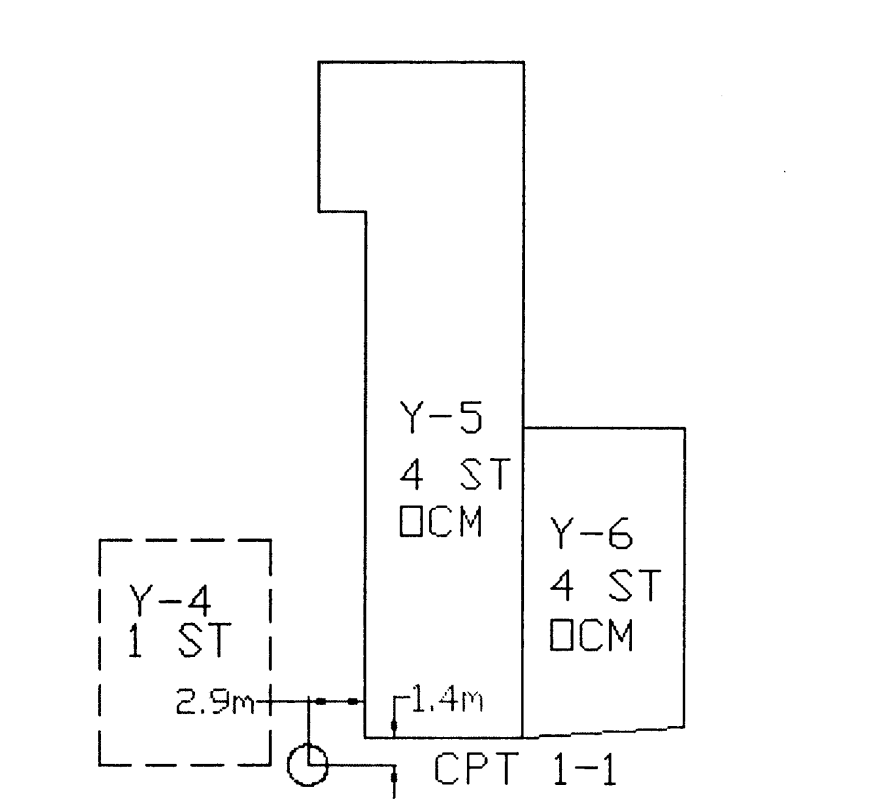
1	Anbarlı Sokak	13		25	Lüleci Sokak	37	Milli Egemenlik Caddesi
2	Alev Sokak	14	Fener Sokak	26	Mine Sokak	38	Çevik Sokak
3	Badem Sokak	15	Gökçe Sokak	27	Onder Sokak	39	Çiğdem Sokak
4	Badem Sokak	16	Gömeç Sokak	28	Parlak Sokak	40	Kardeş Sokak
5	Bozkurt Sokak	17	Hal Sokak	29	Sait Faik Sokak	41	Kıvı Sokak
6	Çakır Sokak	18	İtfaiye Sokak	30	Postane Sokak	42	Pelin Sokak
7	Çınar Sokak	19	Kadı Sokak	31	Saraçlar Sokak	43	Poyraz Sokak
8	Çırarcılar Caddesi	20	Kanca Sokak	32	Şen Sokak	44	Yalım Sokak
9	Dr.ç Nuri Bayar Cad	21	Karşı Sokak	33	Yavuz Sokak	45	Anecdet Güven Cad.
10	Dalli	22	Kerem Sokak	34	Yamanlar Sokak		
11	Demiryolu Geçidi	23	Küçük Sokak	35	Yörük Sokak		
12		24	Latif Sokak	36	Yuvam Sokak		

YAĞCILAR DISTRICT, ADAPAZARI

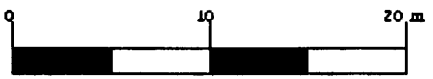


YAĞCILAR DISTRICT, ADAPAZARI

1	Açık Sokak	25	Kovan Sokak	49	Millet Sokak	73	Kemer Sokak
2	Adaşlar Sokak	26	Levent Sokak	50	Binnur Sokak	74	Tuna Sokak
3	Araç Sokak	27	Mesudiye Sokak	51	Destan Sokak	75	Kınalı Sokak
4	Arar Sokak	28	Nar Sokak	52	Derya Sokak	76	Emir Sokak
5	Ari Fagı Sokak	29	Sadet Sokak	53	Endamlı Sokak	77	Nilüfer Sokak
6	Atar Sokak	30	Seçkin Sokak	54	1 Nolu Sokak	78	Merve Sokak
7	Besler Sokak	31	Sümbül Sokak	55	2 Nolu Sokak	79	Burcu Sokak
8	Boylu Sokak	32	Şebboy Sokak	56	3 Nolu Sokak	80	Güneş Sokak
9	Cem Sokak	33	Pak Sokak	57	4 Nolu Sokak	81	Gülhan Sokak
10	Çiçekli Sokak	34	Pul Sokak	58	5 Nolu Sokak	82	Berna Sokak
11	Çörek Sokak	35	Uygun Sokak	59	6 Nolu Sokak	83	Fatih Sokak
12	Daraba Sokak	36	Uzay Sokak	60	7 Nolu Sokak	84	Kaptan Sokak
13	Dayı Sokak	37	Yağcılar Caddesi	61	8 Nolu Sokak	85	Mercan Sokak
14	Diler Sokak	38	Yeni Çarşı Sokak	62	9 Nolu Sokak	86	S.H.T. İsmail Şeremet
15	Duzgun Sokak	39	Yıldırım Sokak	63	10 Nolu Sokak	87	Kumköy Yolu
16	Er Sokak	40	Yuvalı Sokak	64	11 Nolu Sokak	88	E. Hendek Caddesi
17	Gazeller Sokak	41	Gonca Sokak	65	12 Nolu Sokak	89	Yeşenler Caddesi
18	Güler Sokak	42	Hayat Sokak	66	13 Nolu Sokak	90	Turan Caddesi
19	Güzeller Sokak	43	Ihlamur Sokak	67	14 Nolu Sokak	91	Ankara Caddesi
20	Göl Sokak	44	Kerim Sokak	68	15 Nolu Sokak	92	Devoğlu Caddesi
21	Hali Sokak	45	Orue Sokak	69	16 Nolu Sokak	93	Sed Arkası Sokak
22	Has Sokak	46	Gürz Sokak	70	17 Nolu Sokak	94	H. Mehmet Bekler Sokak
23	Hilal Sokak	47	Barış Sokak	71	18 Nolu Sokak		
24	Kanal Sokak	48	Bakır Sokak	72	Kıbrıs Sokak		



Selnit Mahmet Karabauoglu



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Joint Research
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NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

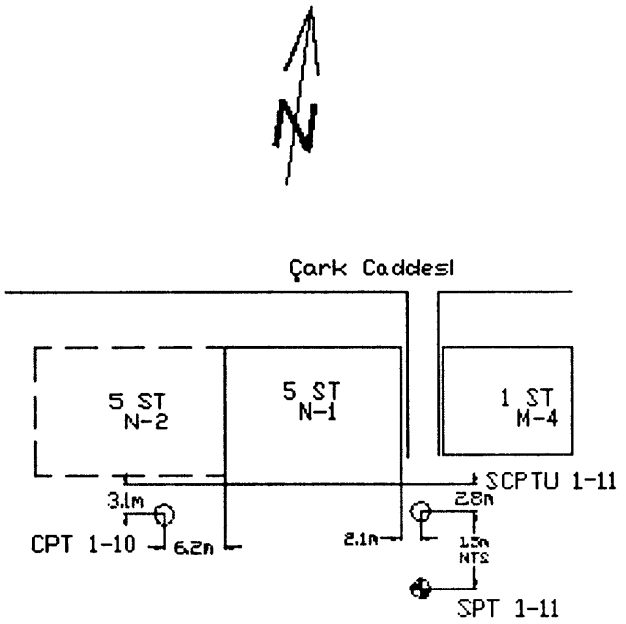
Location: [illegible]

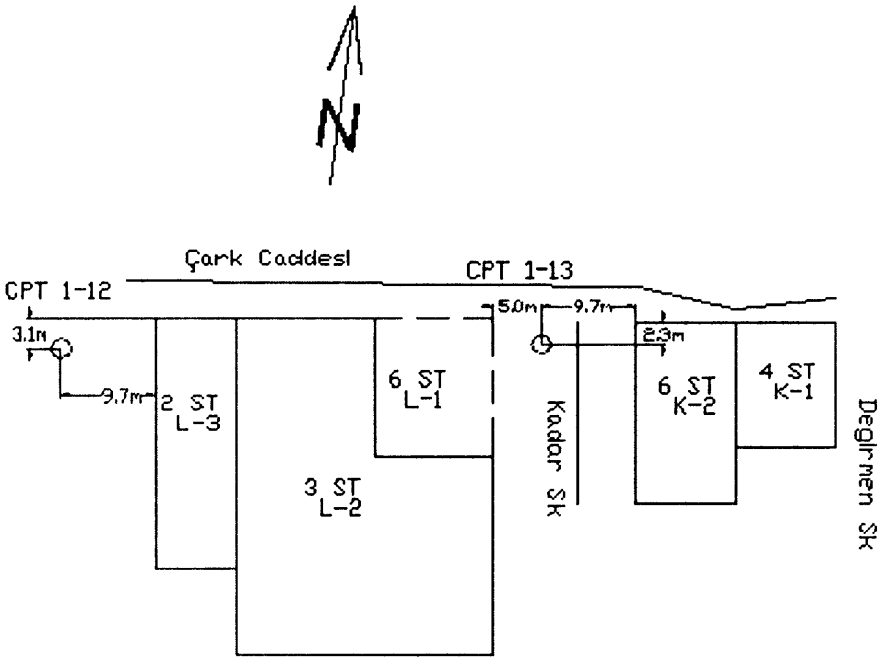
Scale: Graphic scale

Line: 1
CPT 1-1

Drawn by: Mark Hill

Date: 05/01/01



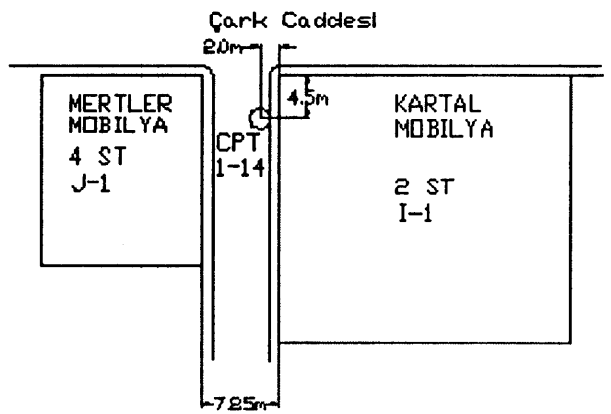


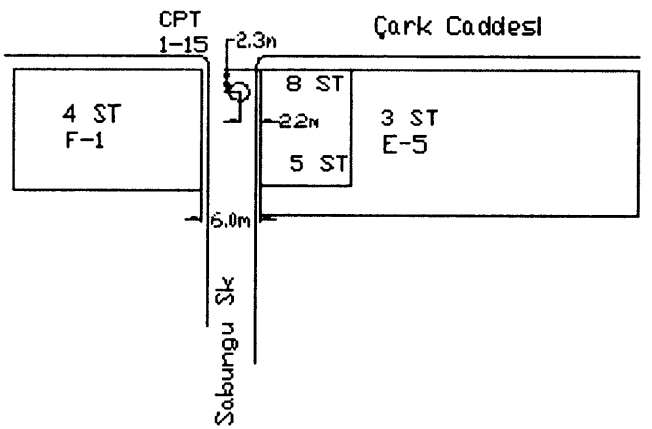
BYU-UCB-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

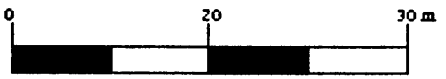
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Izmit District/ Sambas District

Scale: Graphic scale	Line: 1 CPT 1-10 TO CPT 1-13
Drawn by: Mark Hill	Date: 05/01/01







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Joint Research
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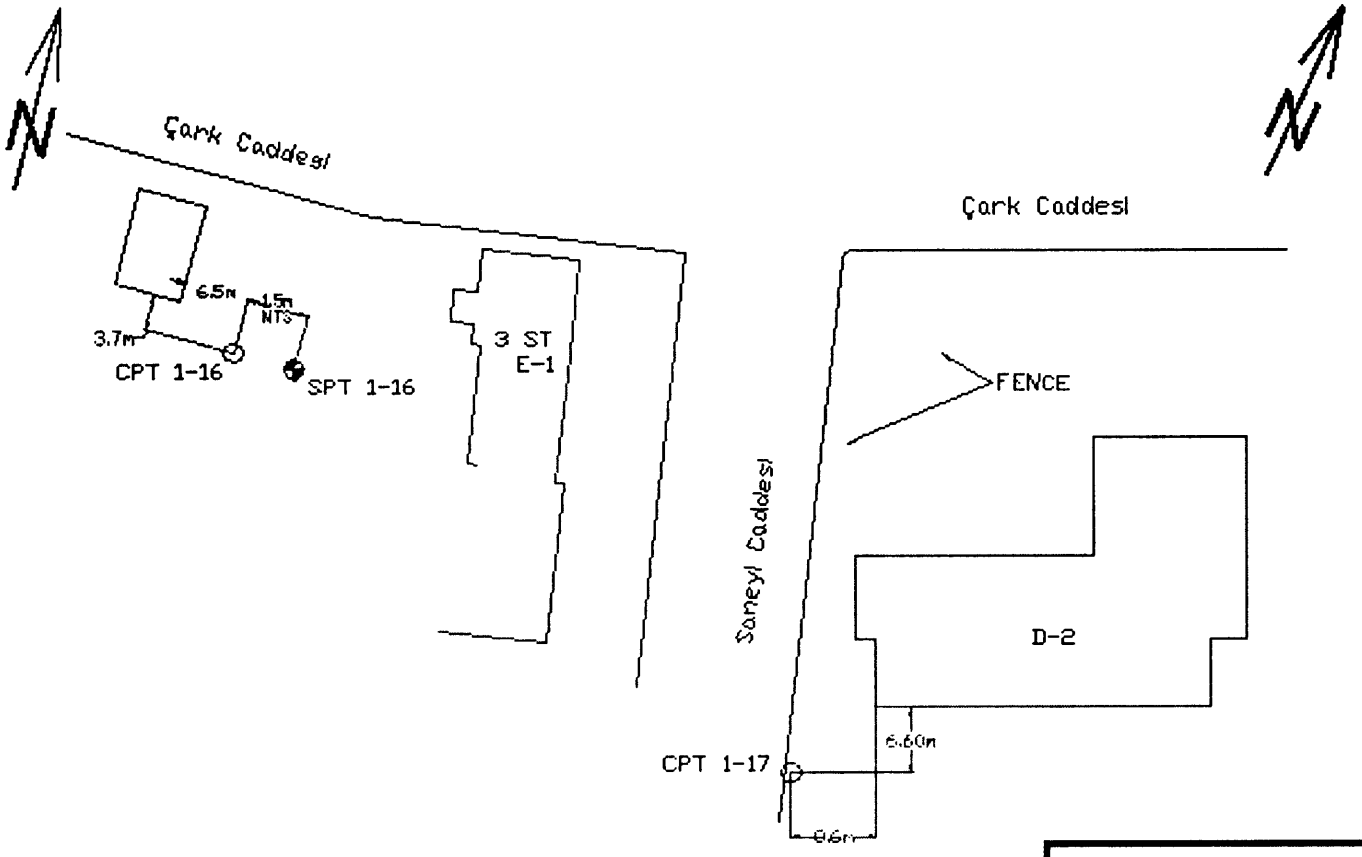
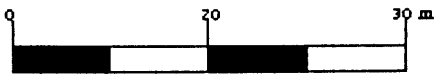
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Semiwa District

Scale: Graphic scale	Line: 1 CPT 1-14 TO CPT 1-15
Drawn by: Mark Hill	Date: 05/01/01





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Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

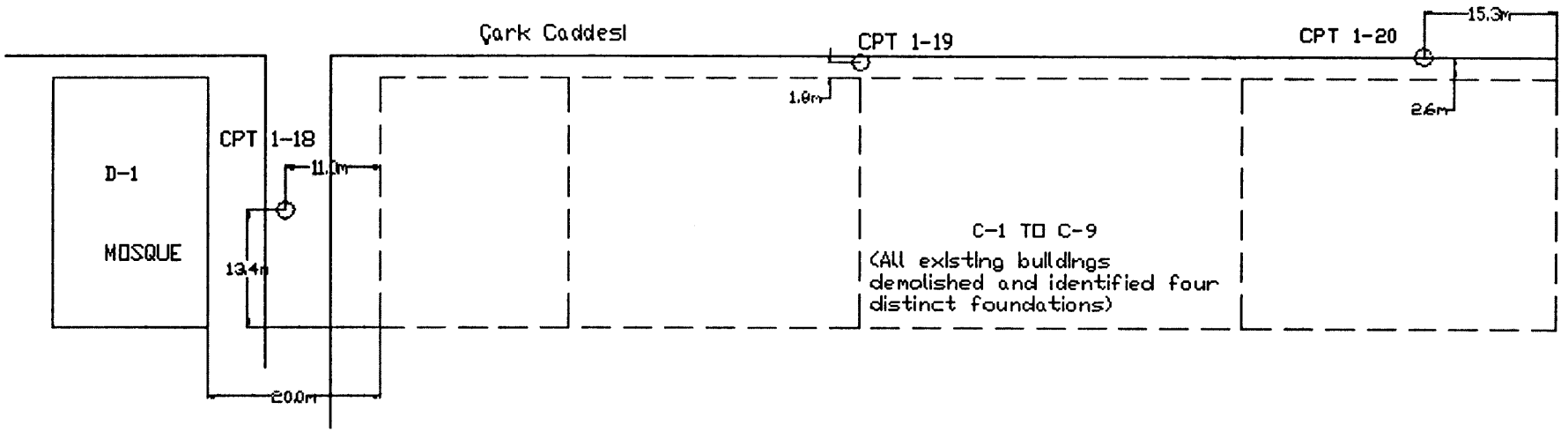
Location: Sanitwa District

Scale: Graphic scale

Line: 1
CPT 1-16 TO CPT 1-17

Drawn by: Mark Hill

Date: 05/01/01



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Sponsored by:
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Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

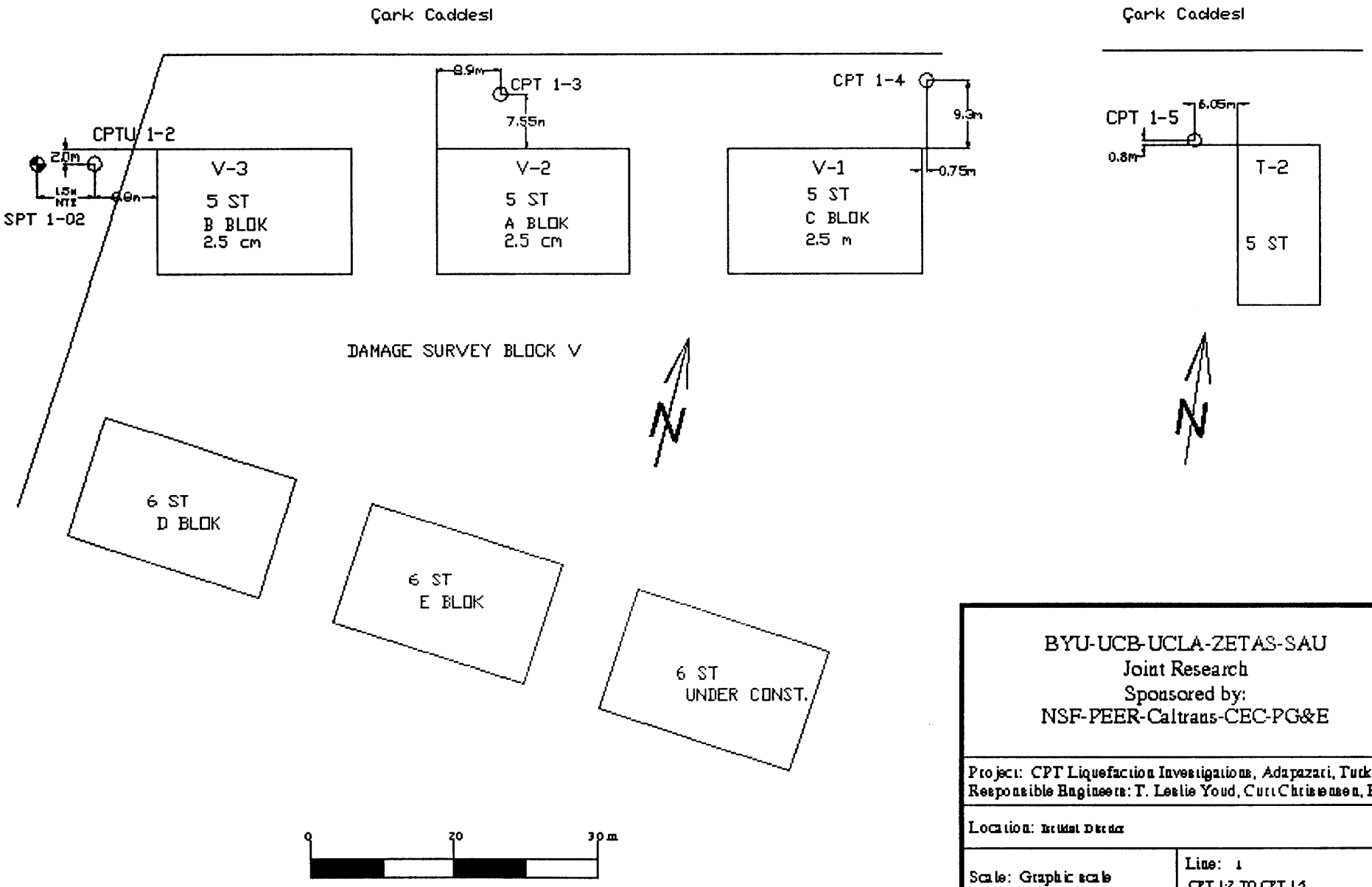
Location: Sambas District

Scale: Graphic scale

Line: 1
CPT 1-18 TO CPT 1-20

Drawn by: Mark Hill

Date: 05/01/01



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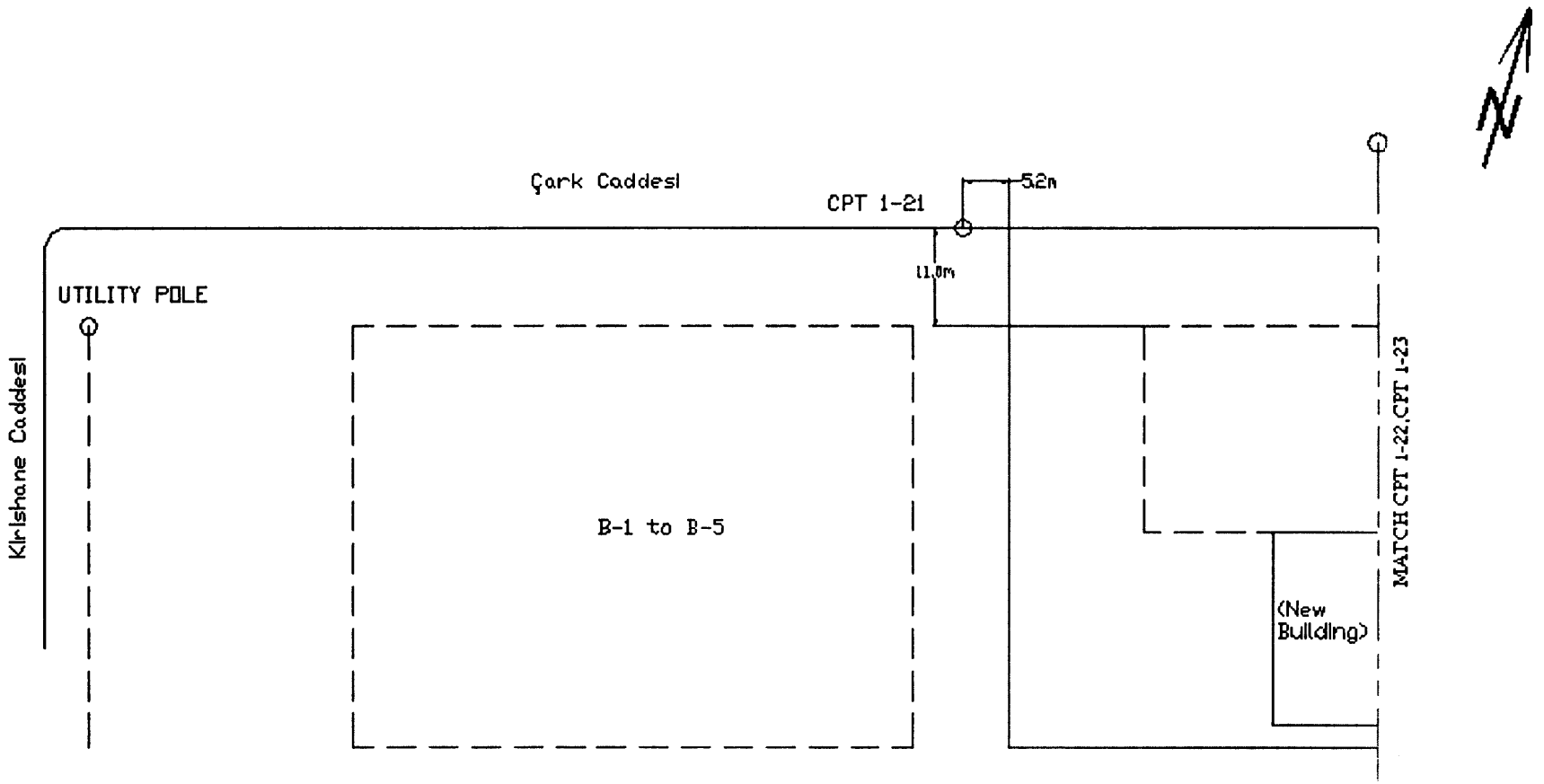
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Istikbal District	
Scale: Graphic scale	Line: 1 CPT 1-2 TO CPT 1-5
Drawn by: Mark Hill	Date: 05/01/01



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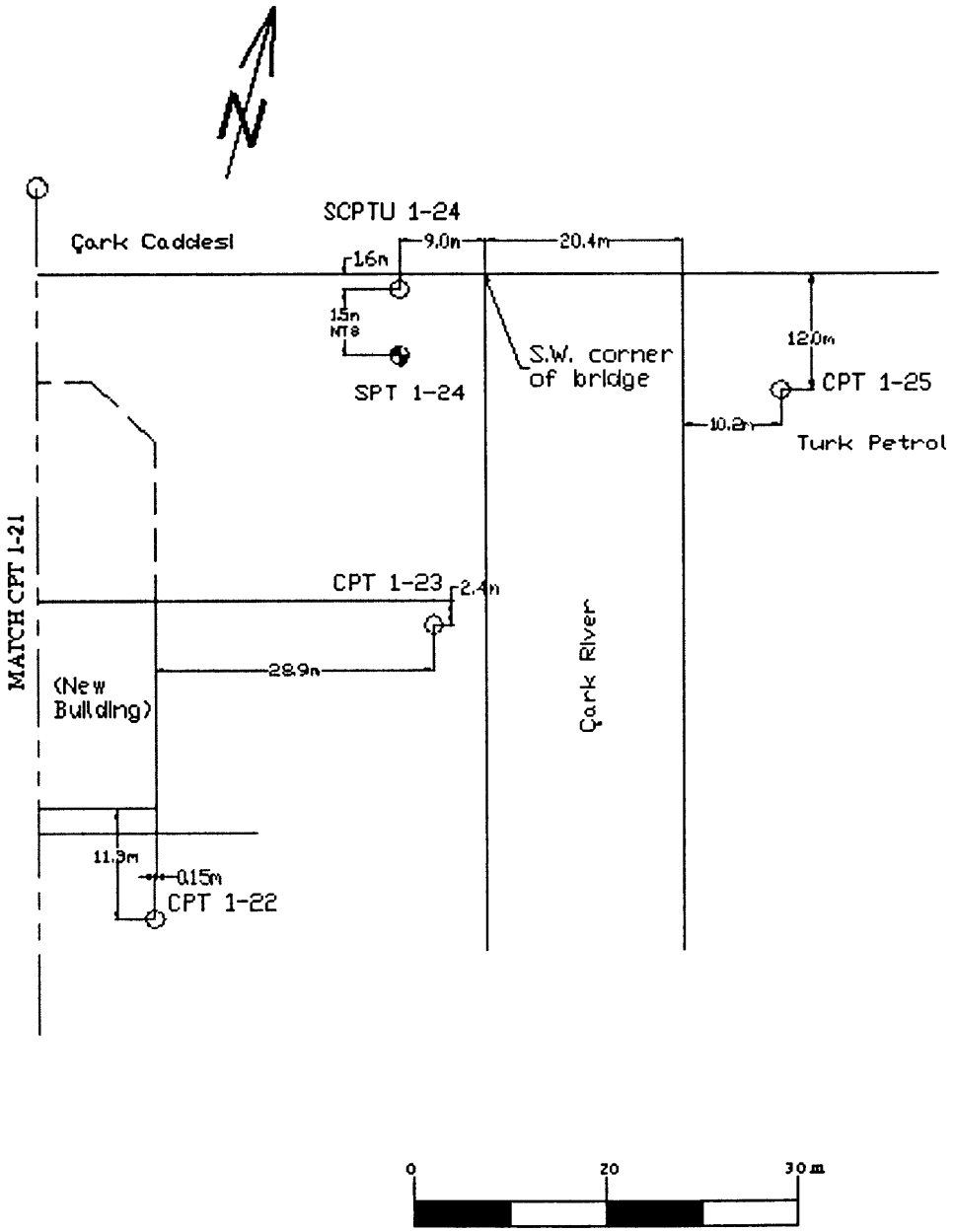
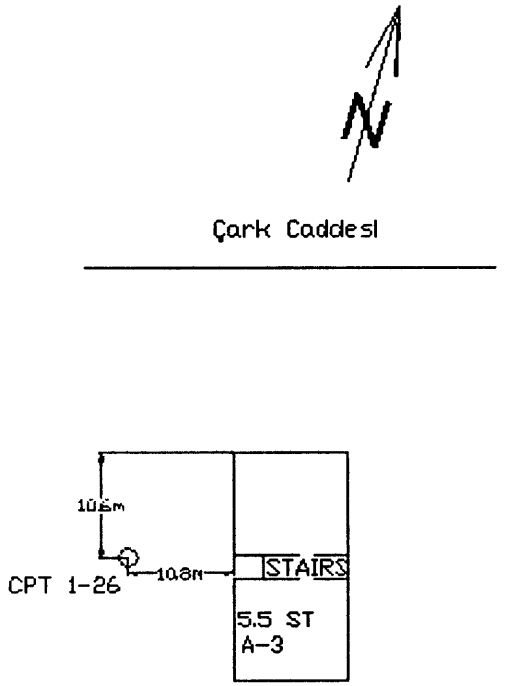
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Mekanpasa District	
Scale: Graphic scale	Line: 1 CPT 121
Drawn by: Mark Hill	Date: 05/01/01





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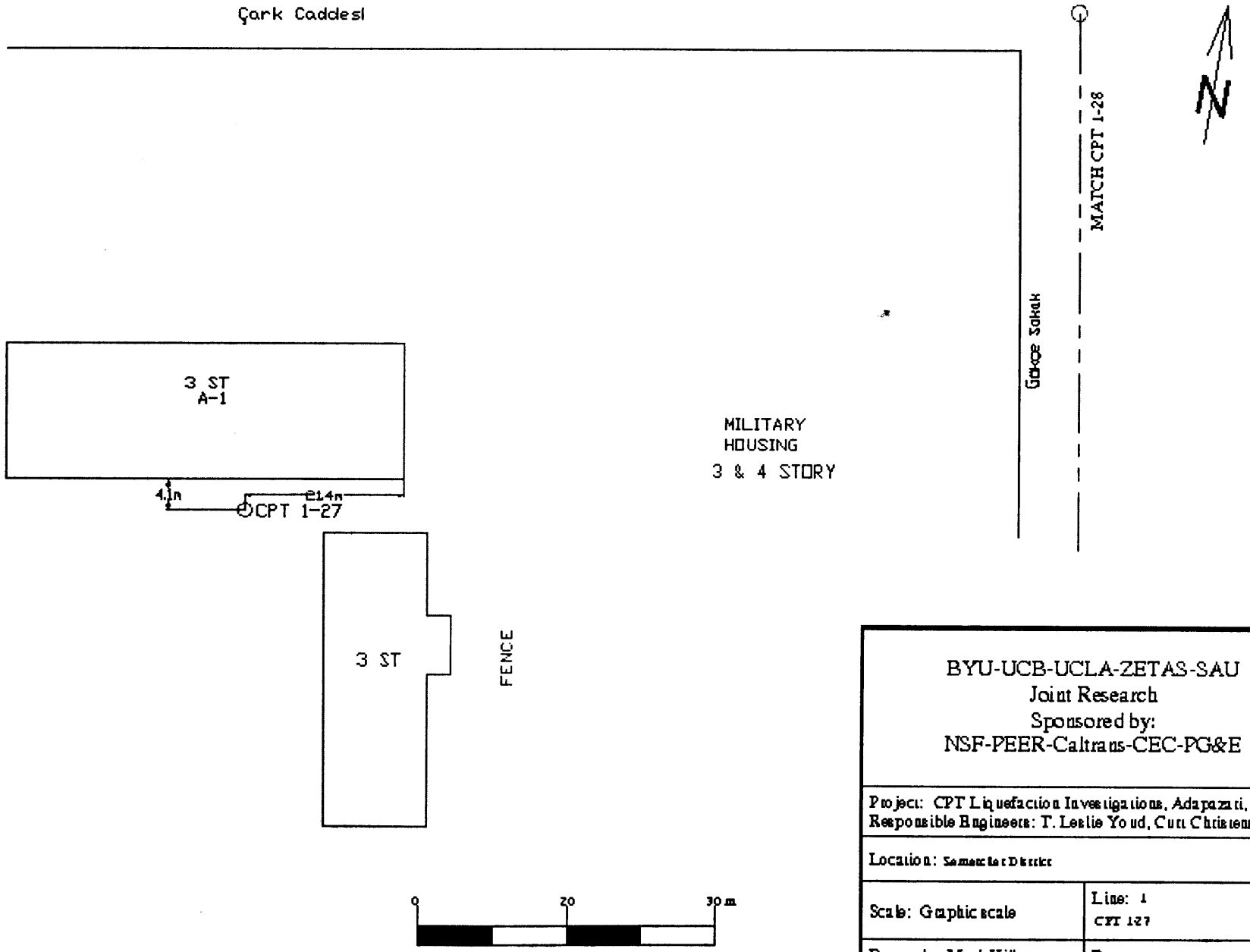
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Mekanpasa District	
Scale: Graphic scale	Line: 1 CPT 1-22 TO CPT 1-26
Drawn by: Mark Hill	Date: 05/01/01



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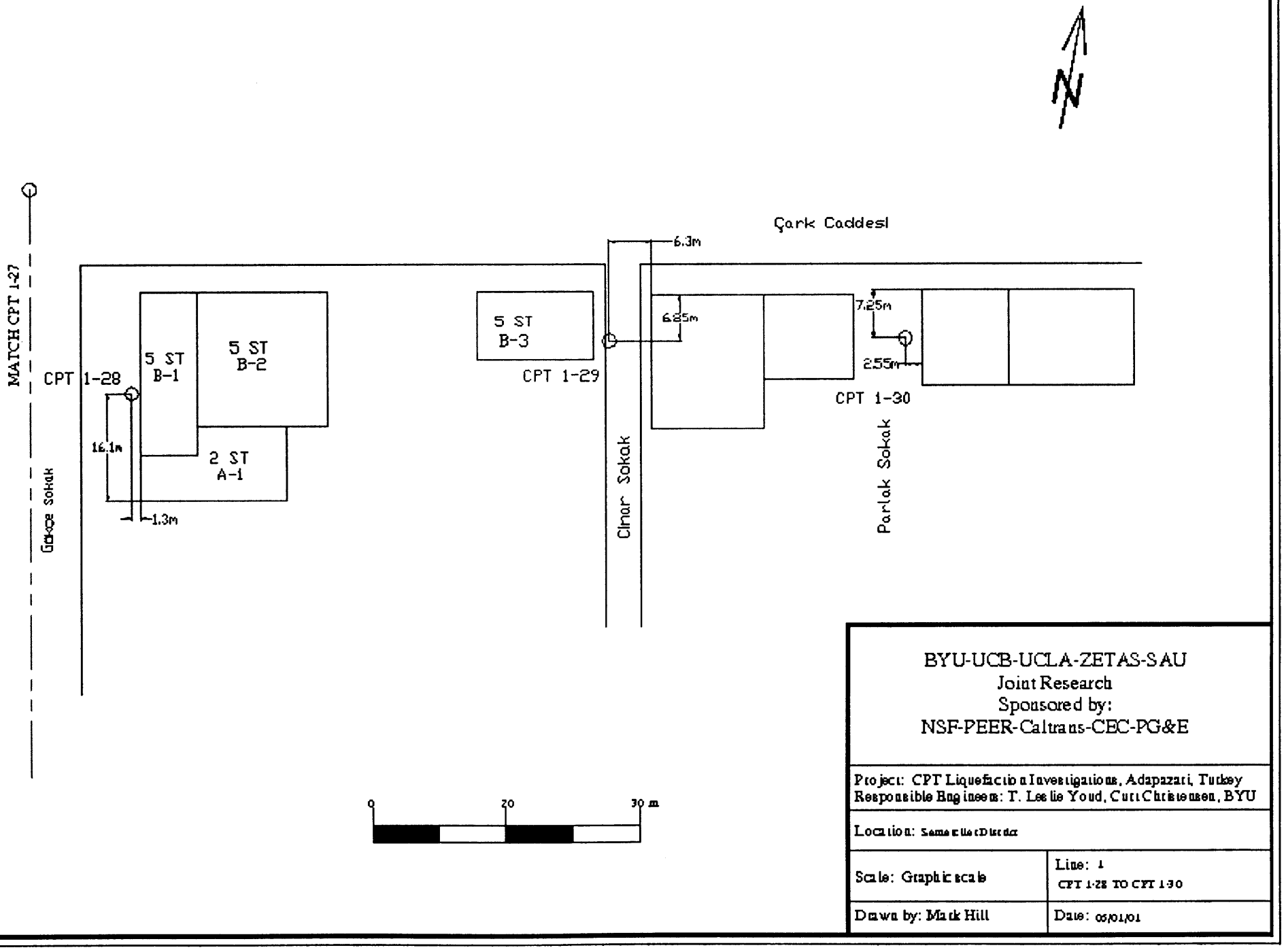
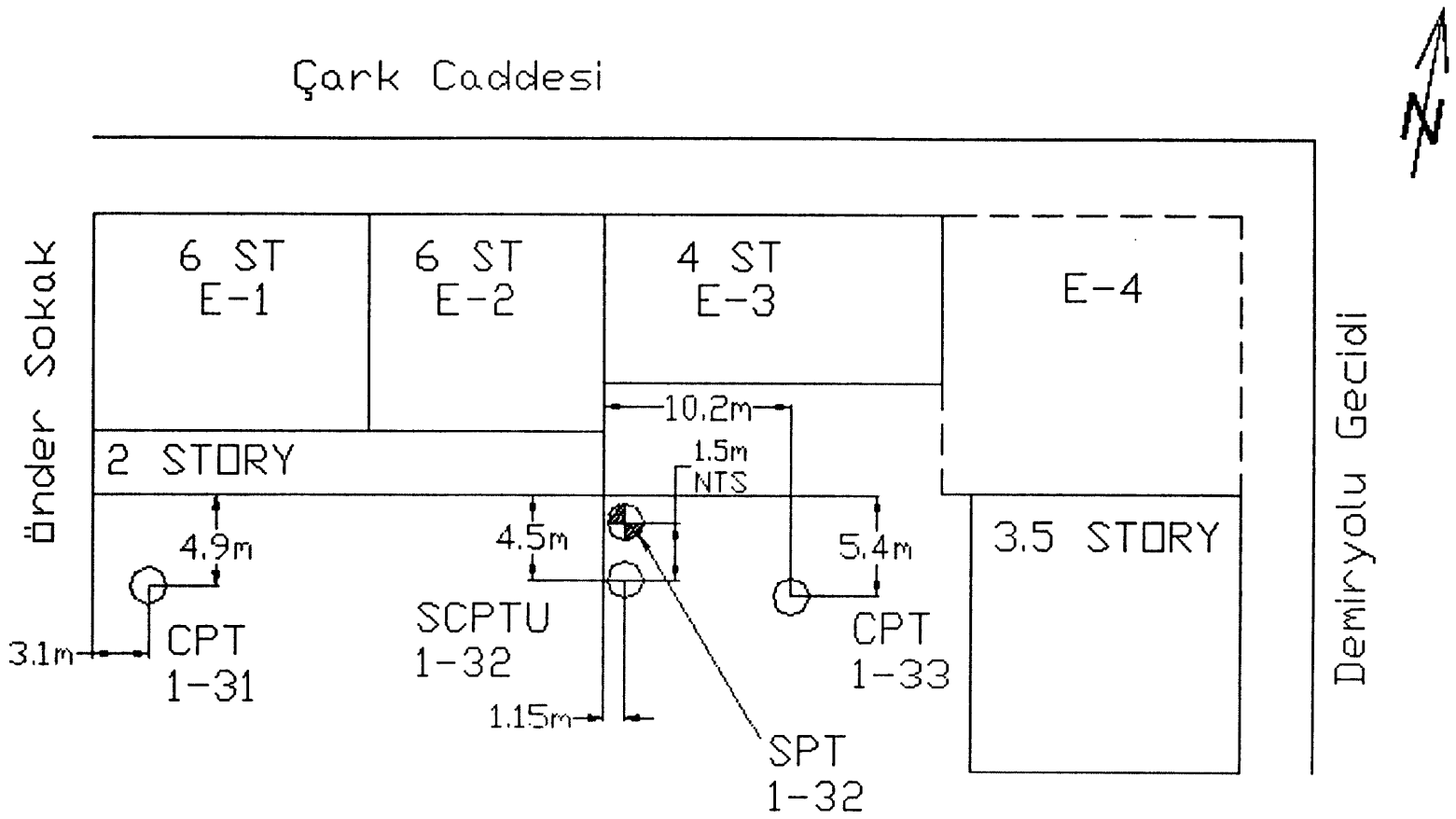
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Semercler District

Scale: Graphic scale	Line: 1 CPT 1-27
Drawn by: Mark Hill	Date: 05/01/01


MATCH CPT 1-27
Çark Caddesi
6.3m
5 ST
B-1
5 ST
B-2
CPT 1-28
16.1m
2 ST
A-1
1.3m
Gökçe Sokak
5 ST
B-3
CPT 1-29
Çınar Sokak
6.85m
7.25m
2.55m
CPT 1-30
Parlak Sokak
0
20
30 m
BYU-UCB-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU
Location: Sakarya Merkez
Scale: Graphic scale
Line: 1
CPT 1-28 TO CPT 1-30
Drawn by: Mark Hill
Date: 05/01/01



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Joint Research
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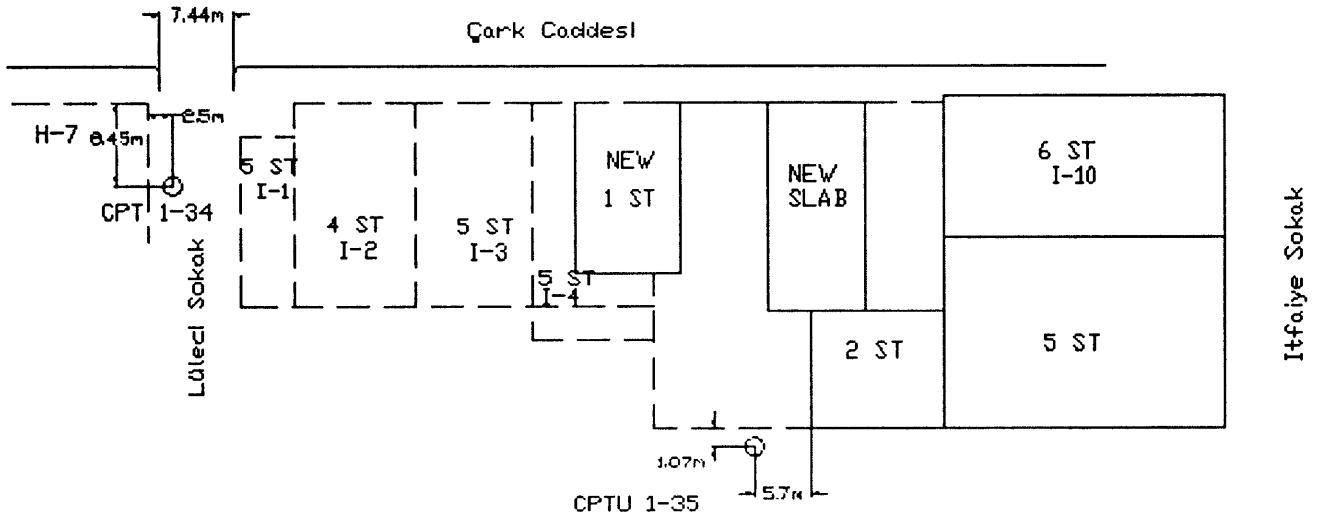
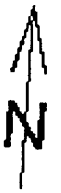
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Semantec District	
Scale: Graphic scale	Line: 1 CPT 1-31 TO CPT 1-33
Drawn by: Mark Hill	Date: 05/01/01





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Joint Research
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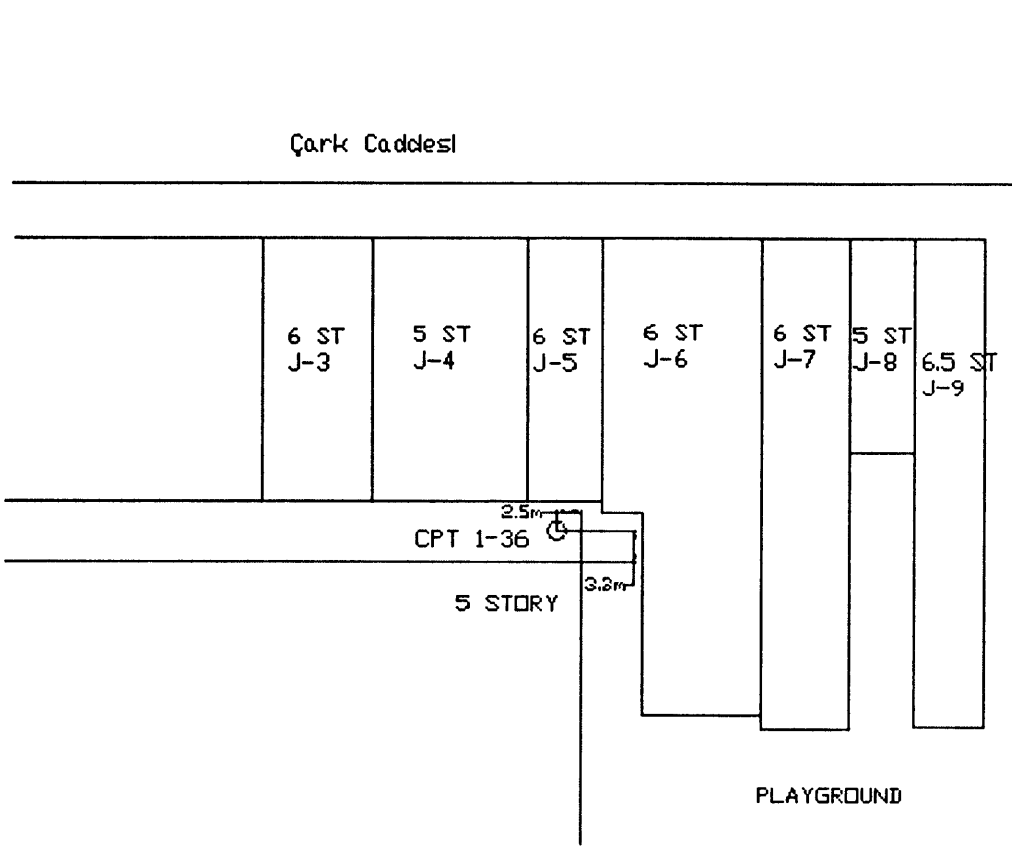
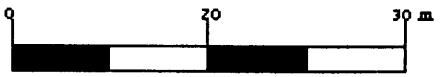
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Semantec District

Scale: Graphic scale	Line: 1 CPT 1-34 TO CPTU 1-35
Drawn by: Mark Hill	Date: 05/01/01





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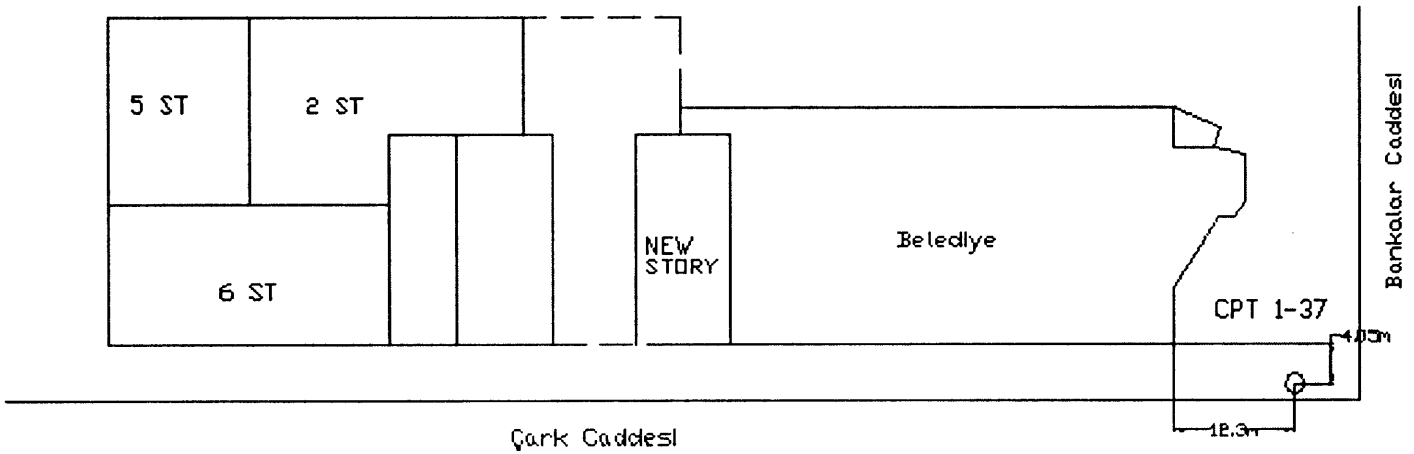
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Samanlar District

Scale: Graphic scale	Line: 1 CPT 1-36
Drawn by: Mark Hill	Date: 05/01/01



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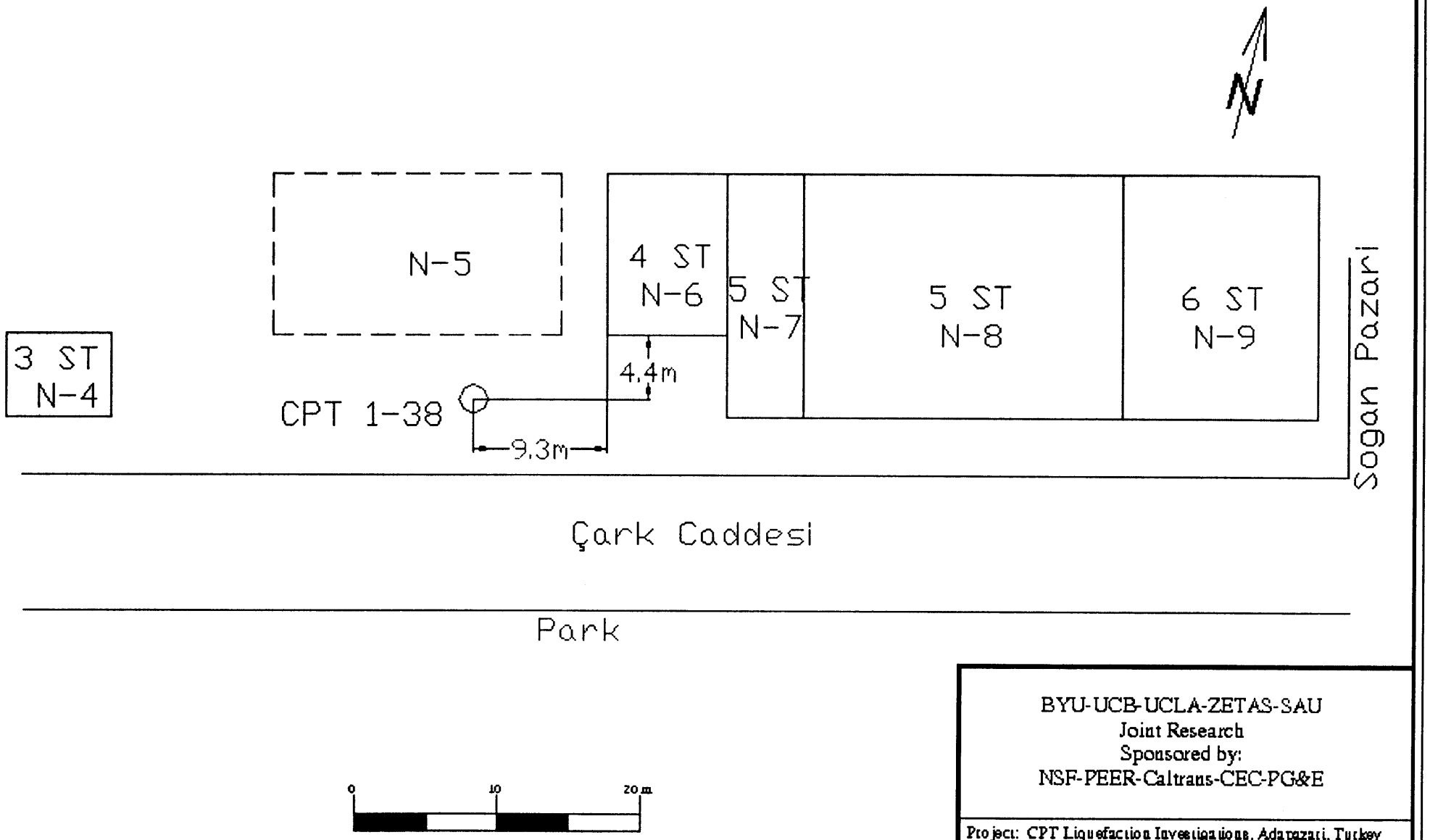
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Cumhuriyet District

Scale: Graphic scale	Line: 1 CPT 1-37
Drawn by: Mark Hill	Date: 05/01/01



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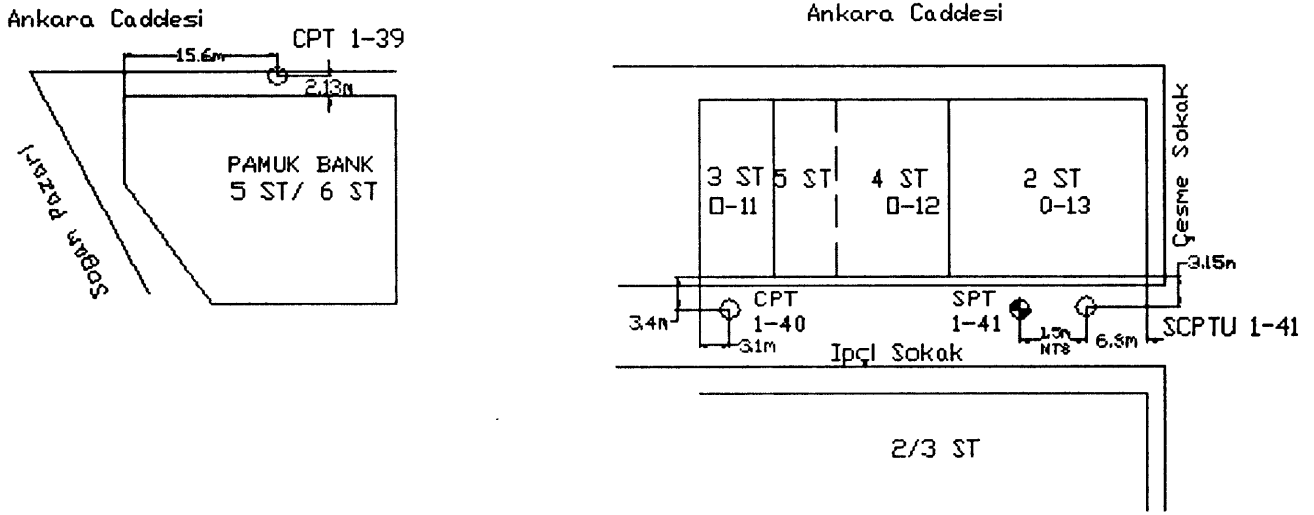
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Cumhuriyet District	
Scale: Graphic scale	Line: 1 CPT 1-38
Drawn by: Mark Hill	Date: 05/04/01



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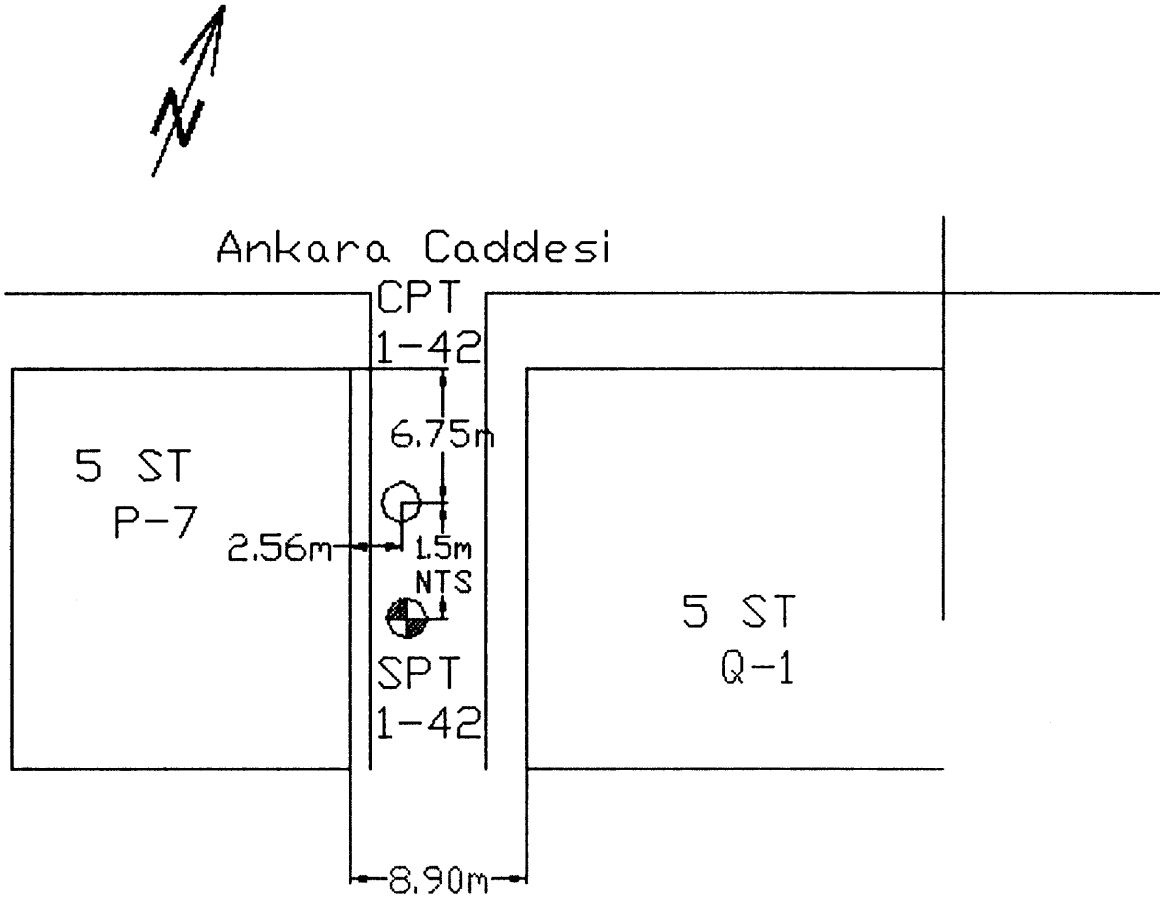
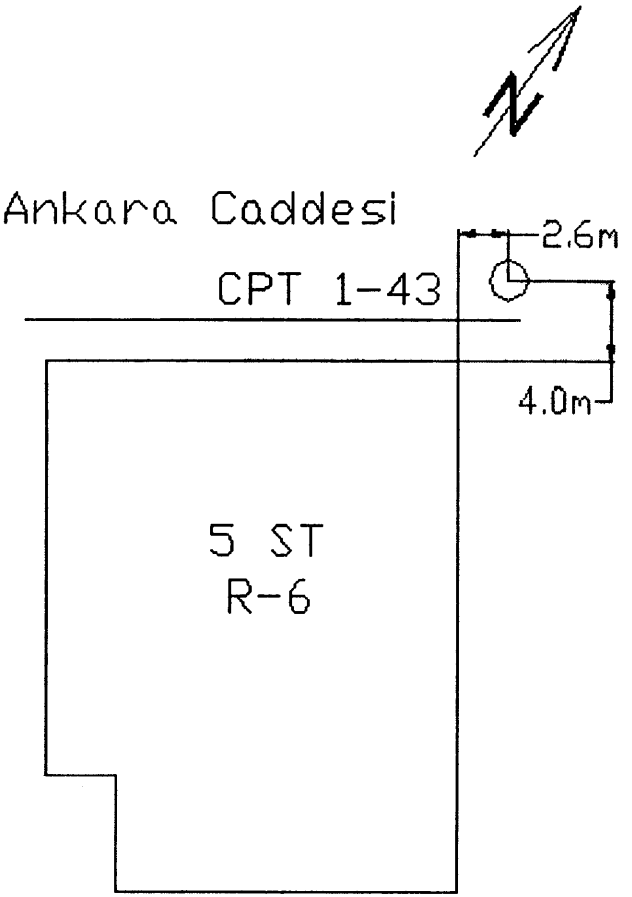
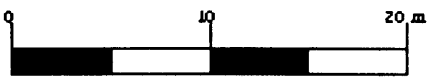
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Ova Dereler

Scale: Graphic scale	Line: 1 CPT 1-39 TO SCPTU 1-41
Drawn by: Mark Hill	Date: 05/01/01







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Sponsored by:
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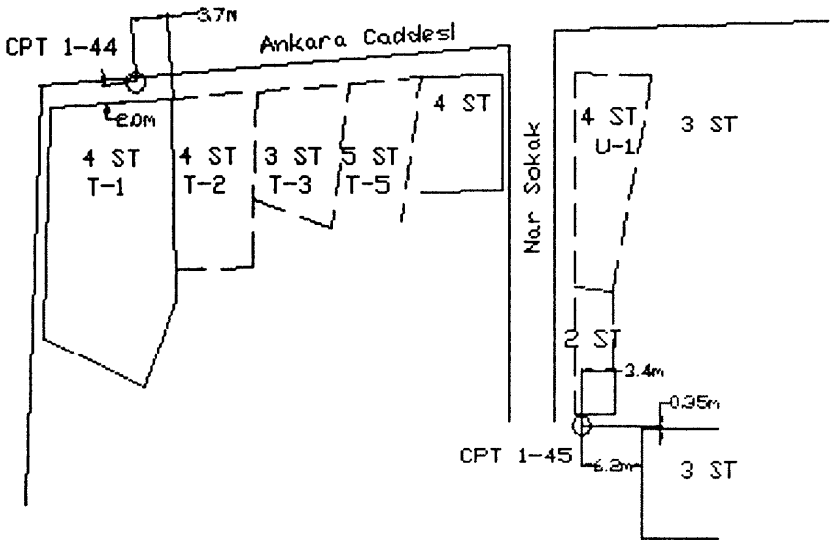
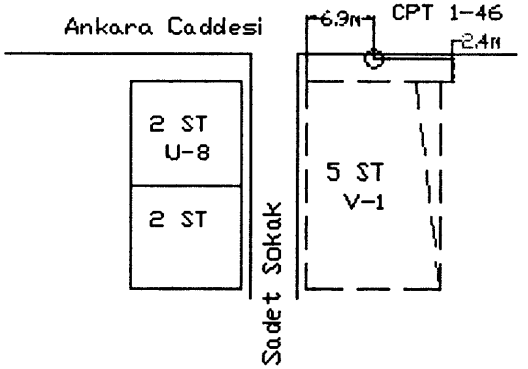
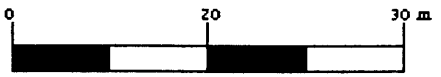
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Yenigun District

Scale: Graphic scale	Line: 1 CPT 1-42 TO CPT 1-43
Drawn by: Mark Hill	Date: 05/01/01







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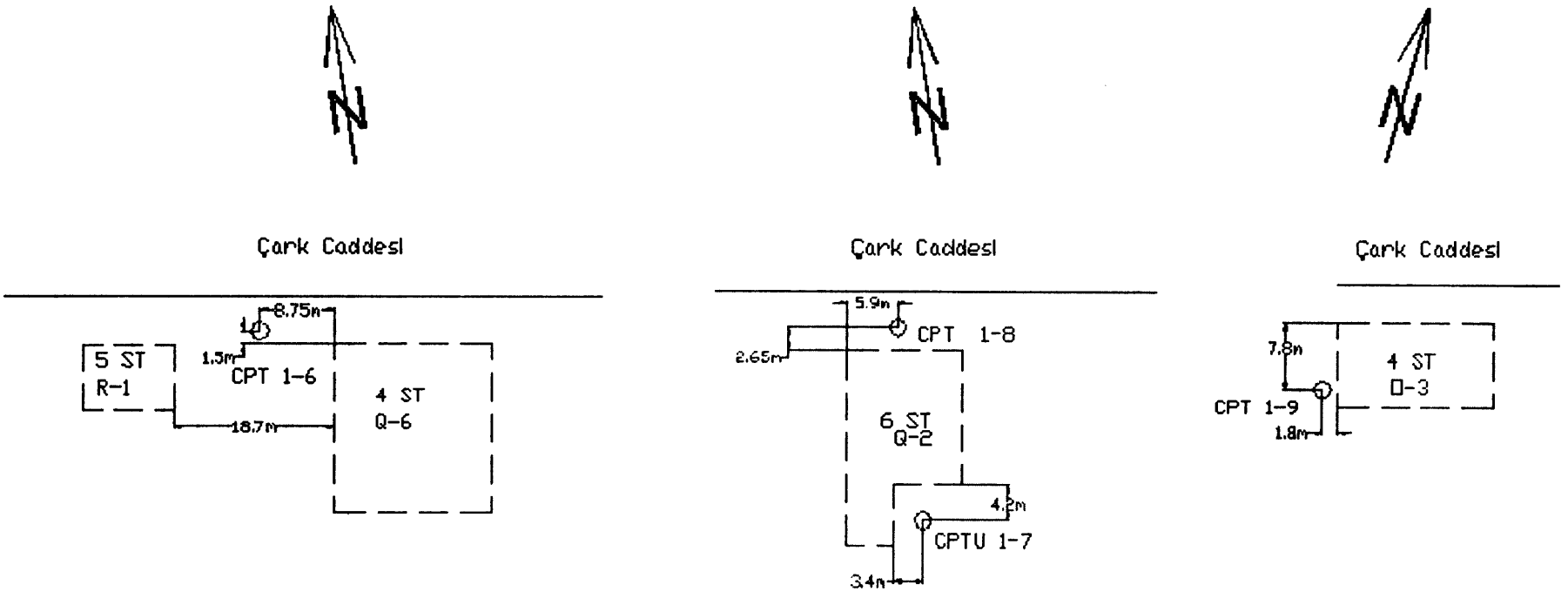
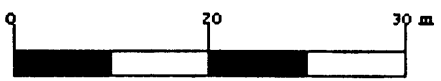
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Yagcilar District

Scale: Graphic scale	Line: 1 CPT 1-44 TO CPT 1-46
Drawn by: Mark Hill	Date: 05/01/01





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Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Istiklal District

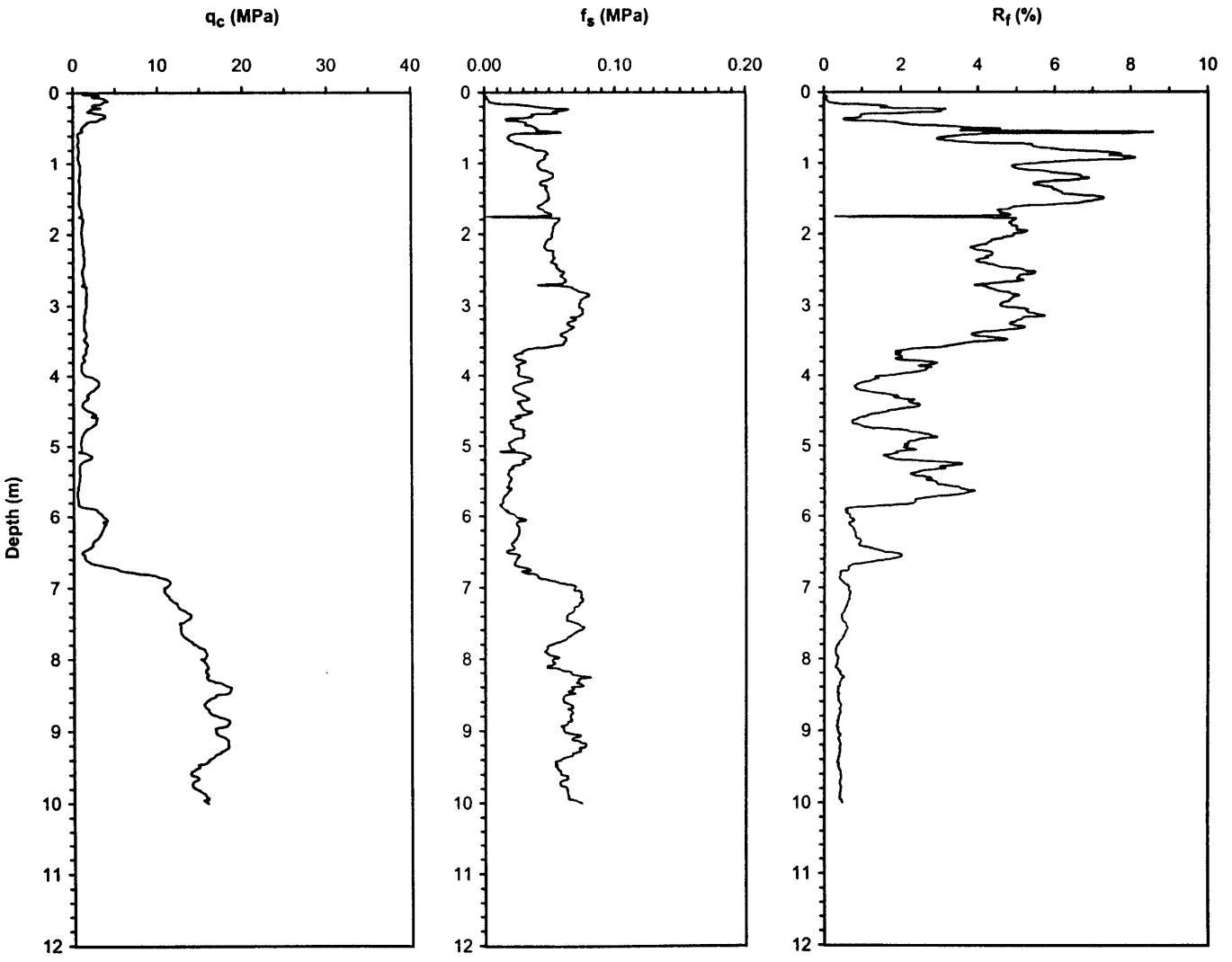
Scale: Graphic scale

Line: 1
CPT 1-6 TO CPT 1-9

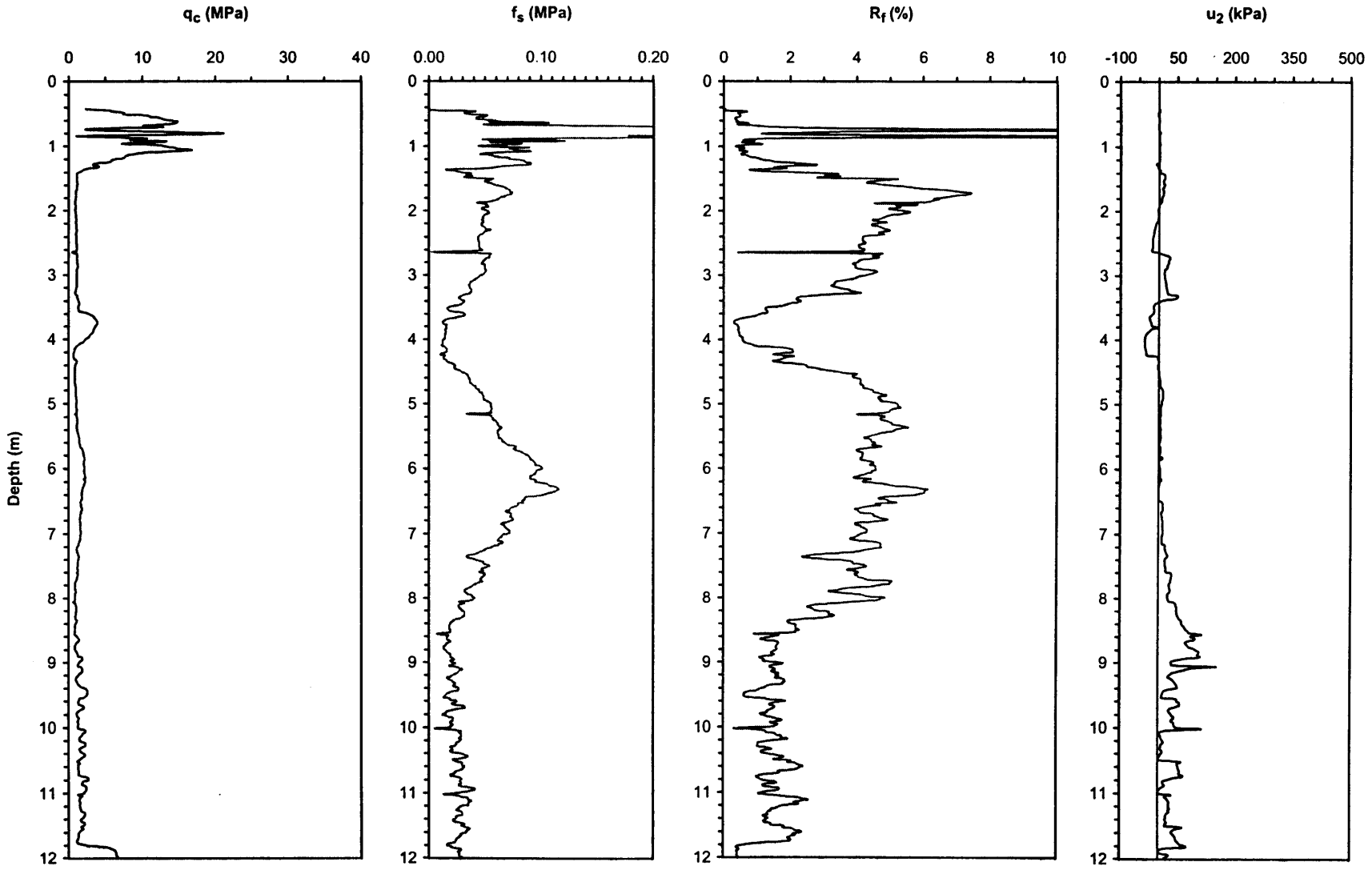
Drawn by: Mark Hill

Date: 05/01/01

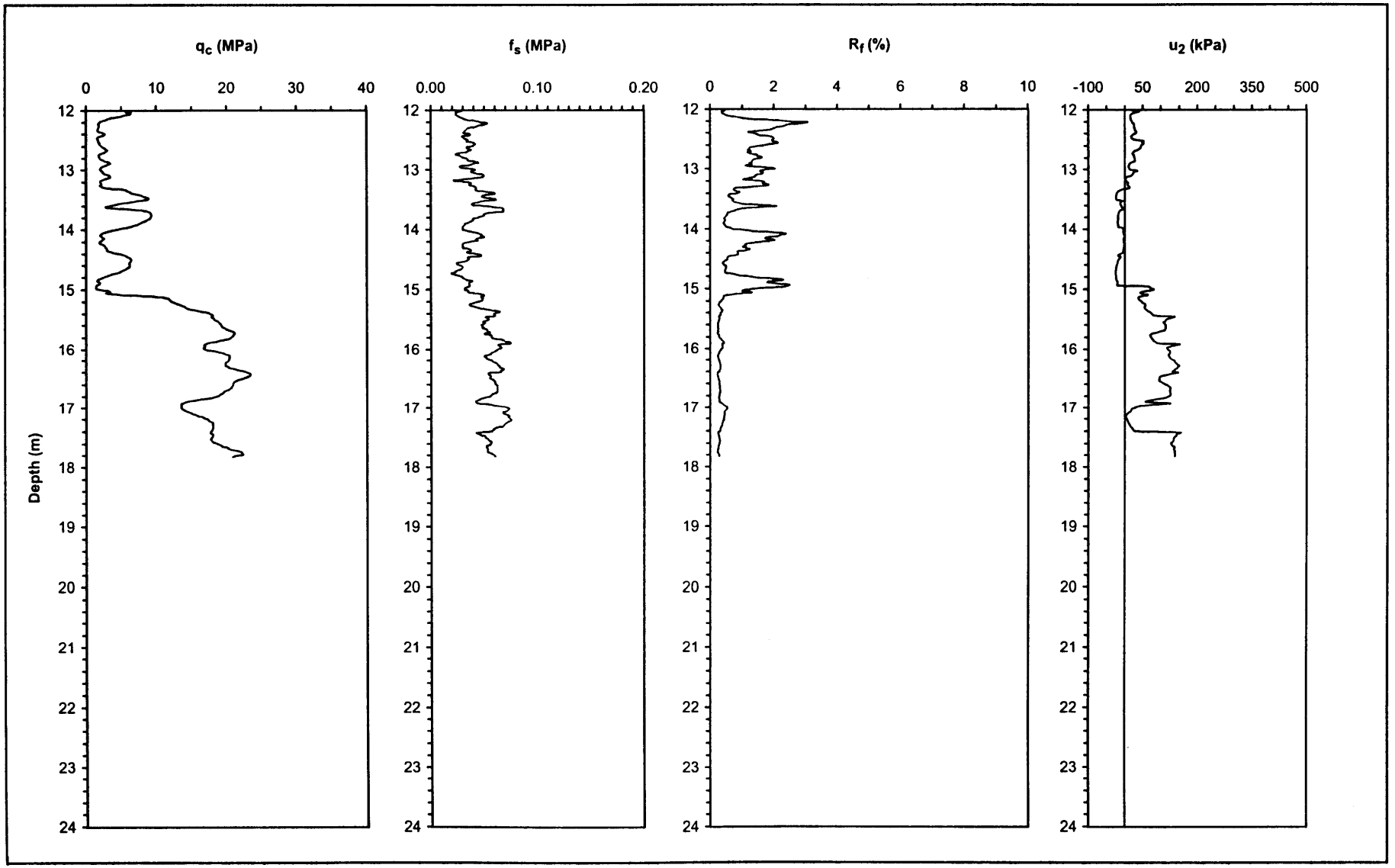
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Selnit Mehmet Karabanöglu (West of intersection with Çark Caddesi)	
Joint Research	**GPS Coordinates:**	40.77281° N, 30.35998° E	**Survey Coordinates (m):** 31,892.38 N, 33,519.06 W
	Test Number:	CPT 1 - 01	**Elevation (m):** 27.025
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 22 June 2000 10:07
Sponsored by:	**File Name:**	cpt 1 - 01.txt	**Water Table Elevation (m):** 26.76
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**		



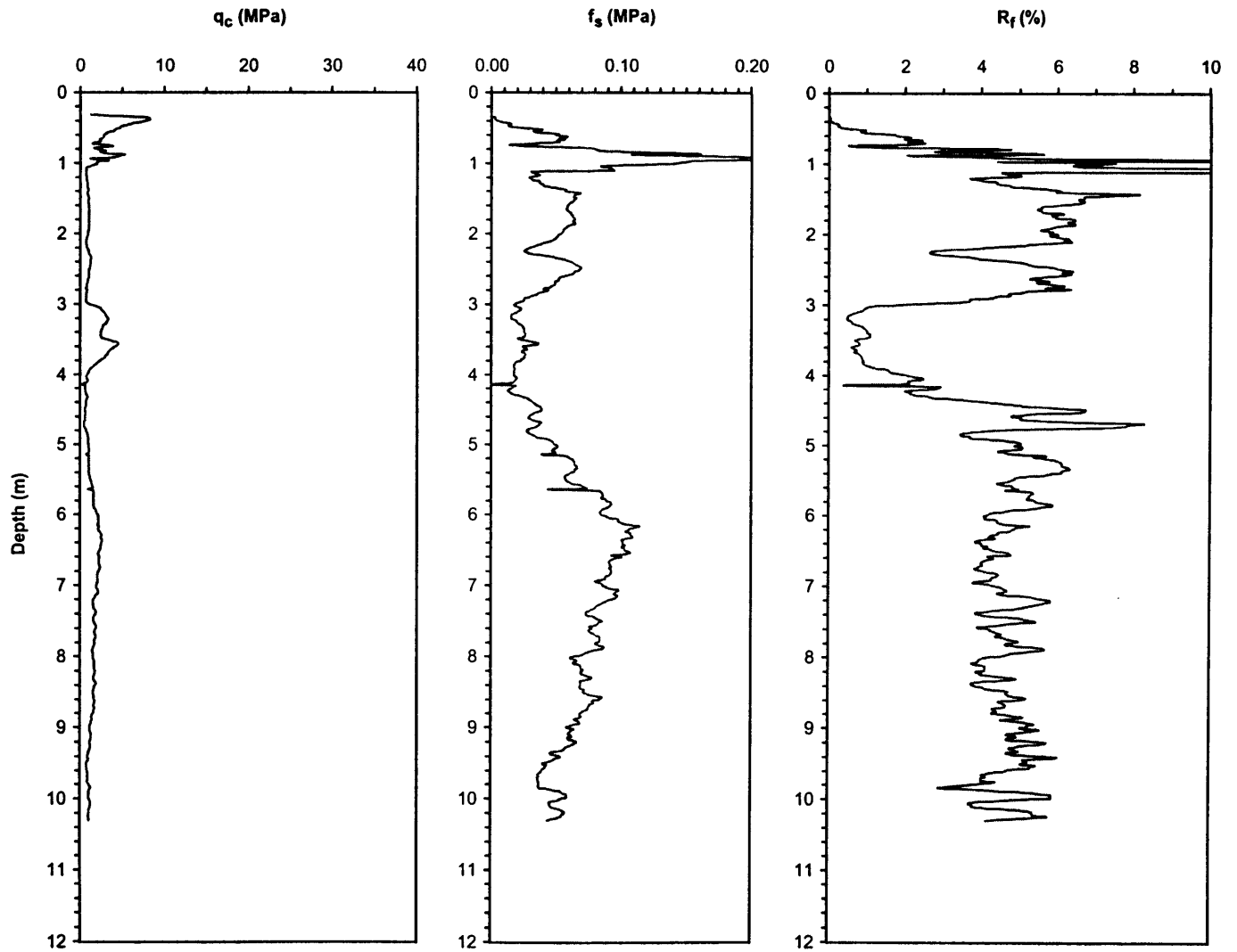
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 2
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77346° N, 30.36374° E	**Survey Coordinates (m):** 32,042.84 N, 33,255.31 W
	Test Number:	CPTU 1 - 02	**Elevation (m):** 26.712
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 22 June 2000 11:34
Sponsored by:	**File Name:**	cptu 1 - 02.txt	**Water Table Elevation (m):** 26.17
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Sounding pre-explored to a depth of approximately 0.4 m to clear utilities.	



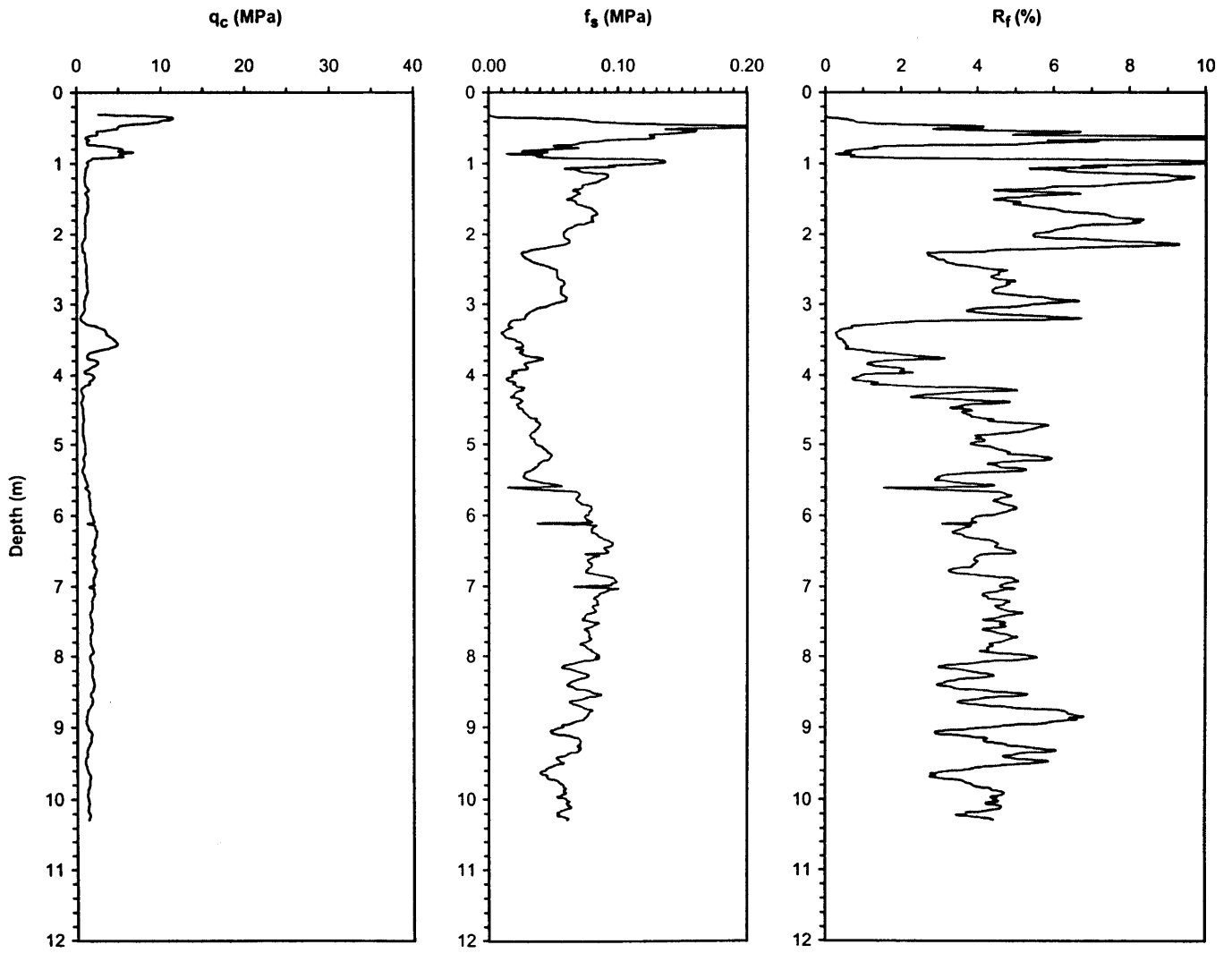
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 2 of 2
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77346° N, 30.36374° E	**Survey Coordinates (m):** 32,042.84 N, 33,255.31 W
	Test Number:	CPTU 1 - 02	**Elevation (m):** 26.712
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 22 June 2000 11:34
Sponsored by:	**File Name:**	cptu 1 - 02.txt	**Water Table Elevation (m):** 26.17
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Sounding pre-explored to a depth of approximately 0.4 m to clear utilities.	



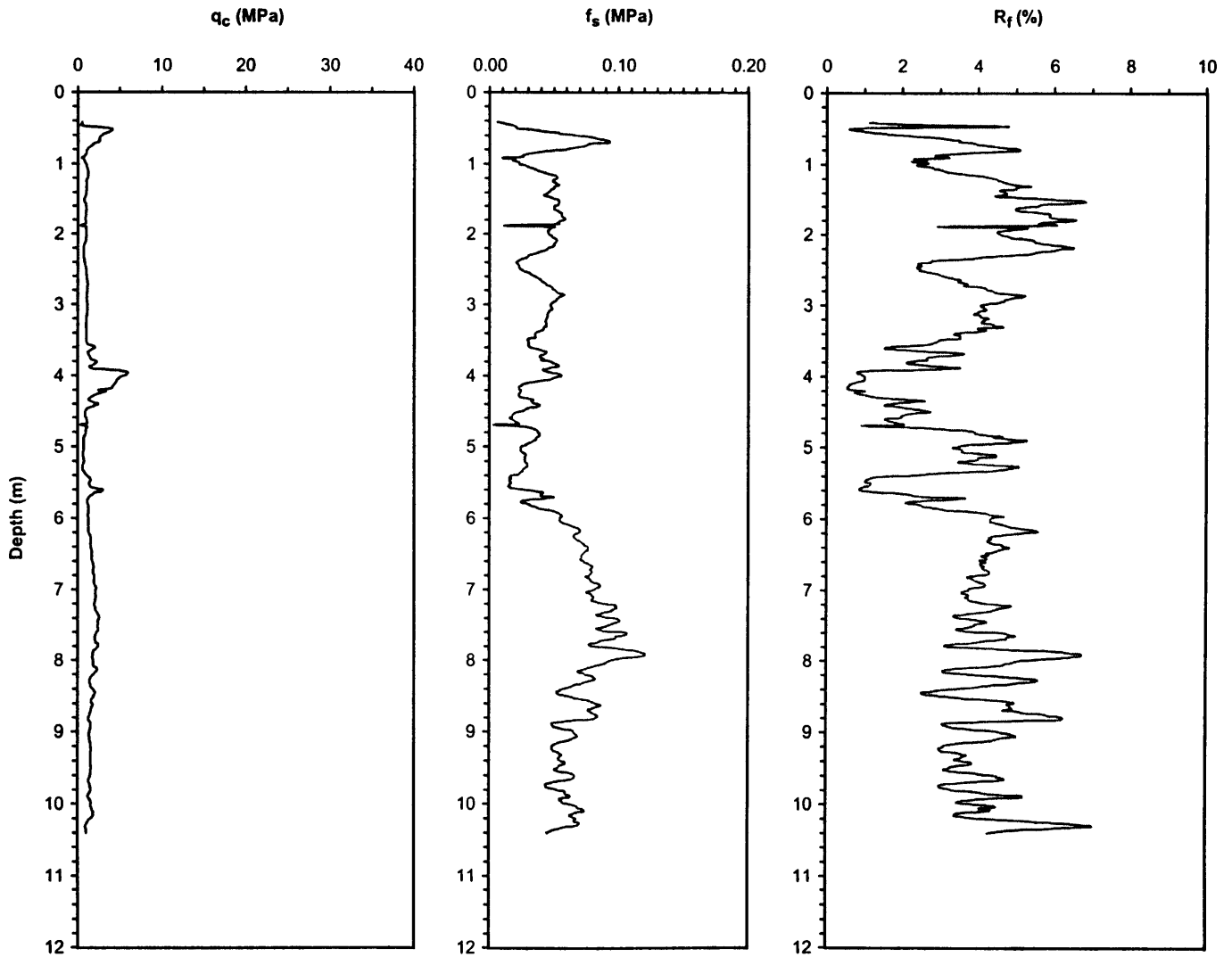
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77374° N, 30.35406° E	**Survey Coordinates (m):** 32,081.59 N, 33213.30 W
	Test Number:	CPT 1 - 03	**Elevation (m):** 26.703
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 22 June 2000 14:25
Sponsored by:	**File Name:**	cpt 1 - 03.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.3 m to clear utilities.	



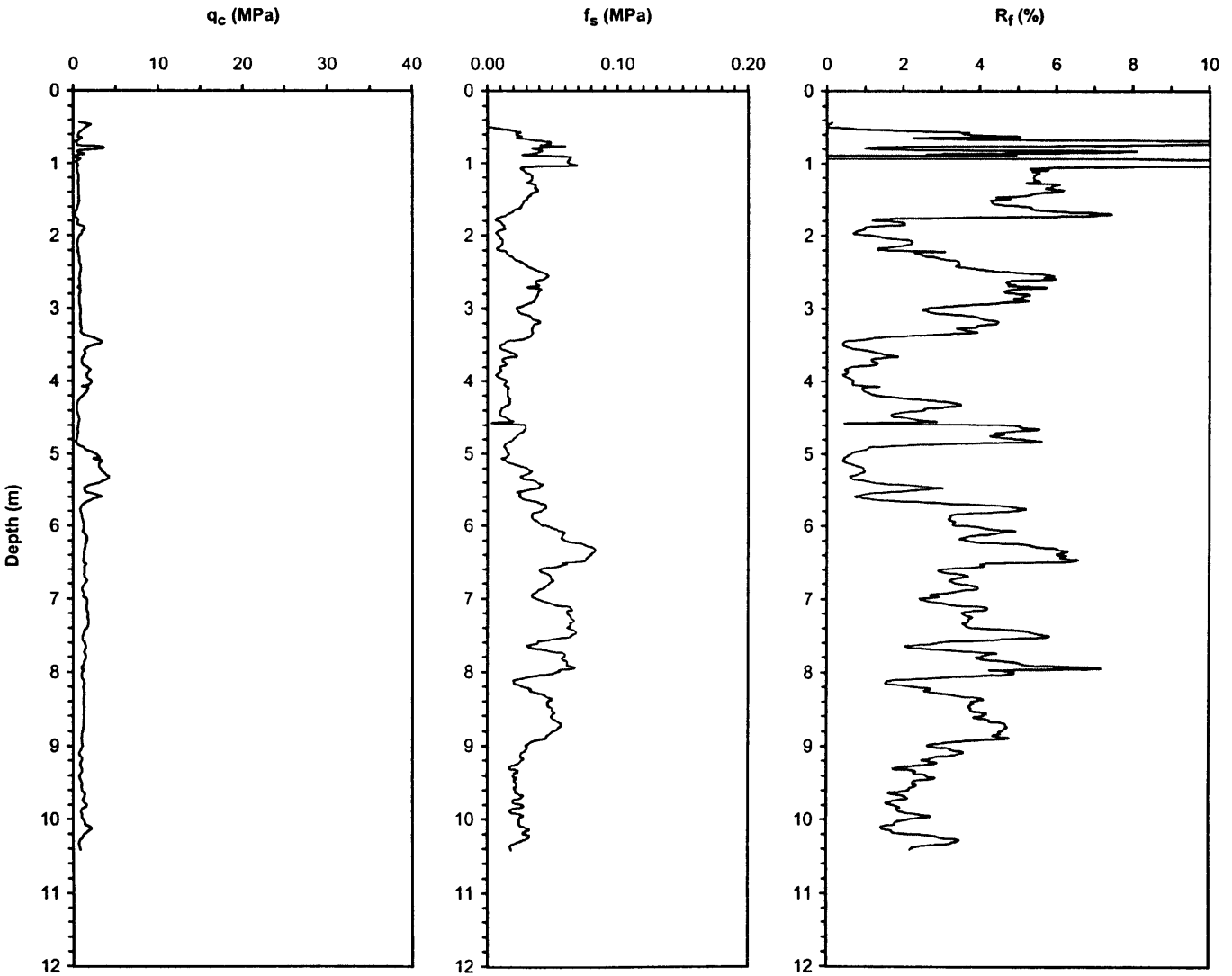
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77394° N, 30.36475° E	**Survey Coordinates (m):** 32,114.58 N, 33,164.40 W
	Test Number:	CPT 1 - 04	**Elevation (m):** 26.695
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 22 June 2000 15:36
Sponsored by:	**File Name:**	cpt 1 - 04.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.29 m to clear utilities.	



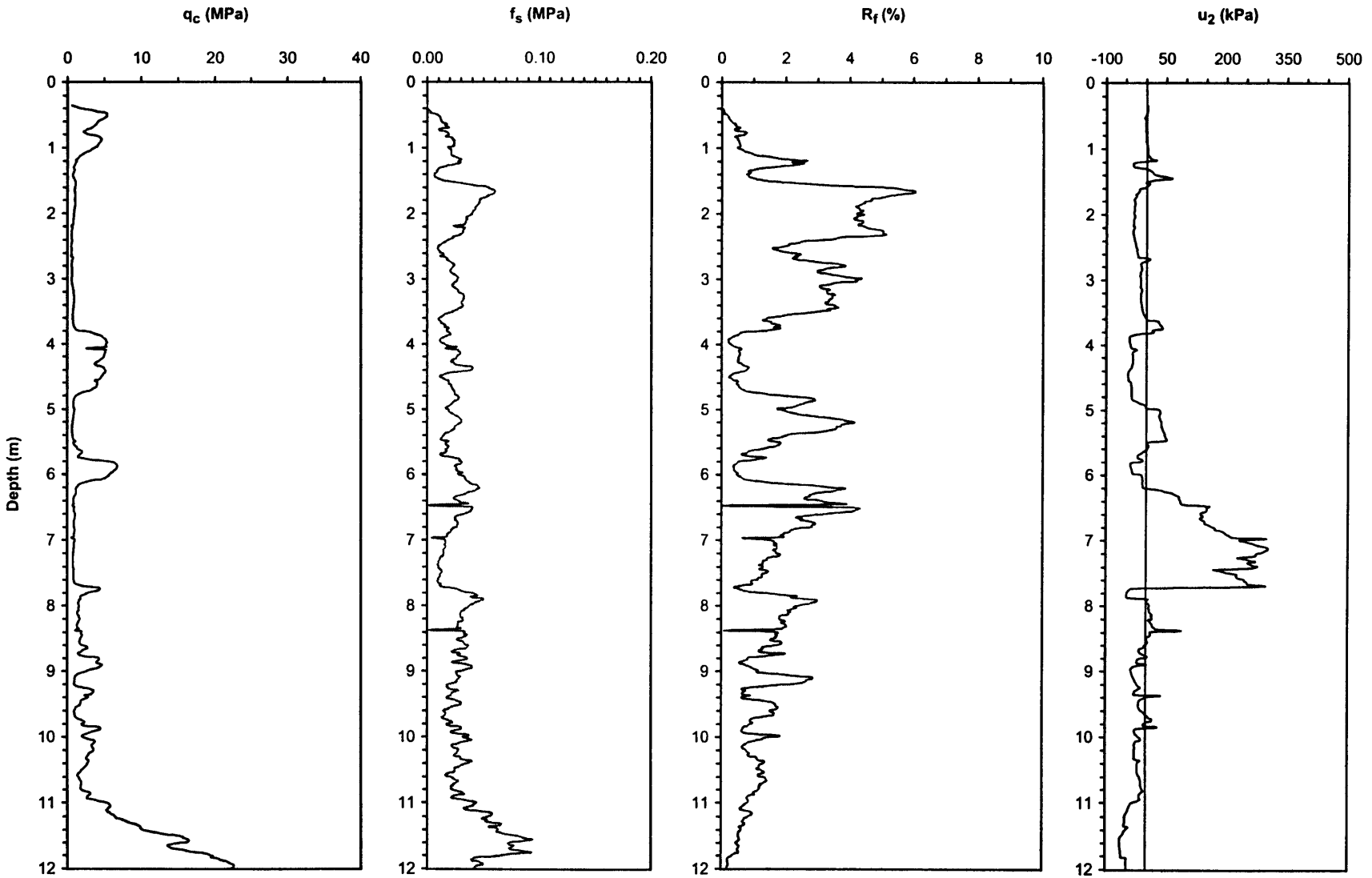
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77425° N, 30.36651° E	**Survey Coordinates (m):** 32,189.36 N, 33,039.16 W
	Test Number:	CPT 1 - 05	**Elevation (m):** 26.622
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 22 June 2000 16:53
Sponsored by:	**File Name:**	cpt 1 - 05.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.4 m to clear utilities and debris.	



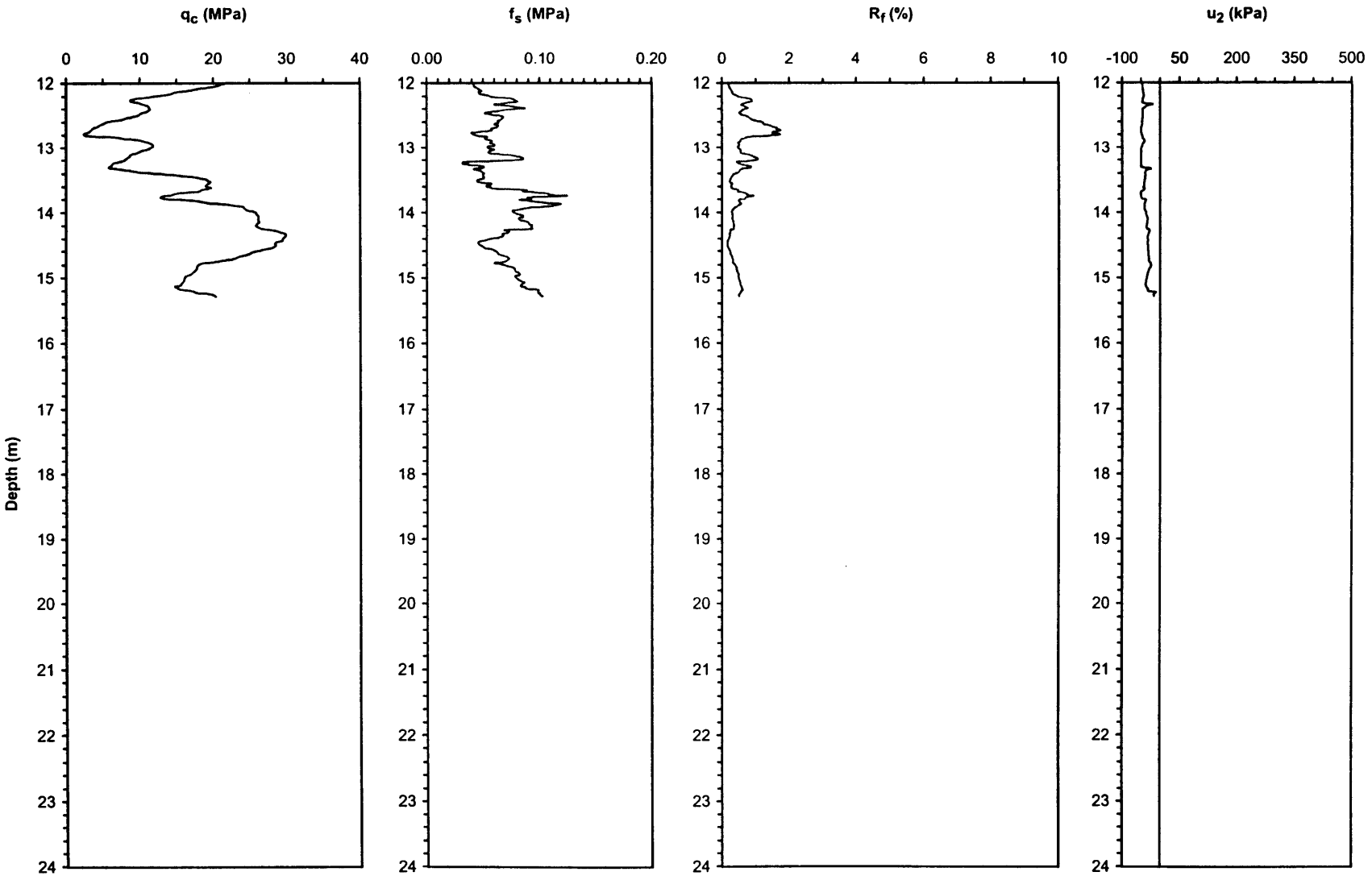
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77429° N, 30.36806° E	**Survey Coordinates (m):** 32,239.18 N, 32,915.79 W
	Test Number:	CPT 1 - 06	**Elevation (m):** 26.157
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 22 June 2000 18:03
Sponsored by:	**File Name:**	cpt 1 - 06.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.41 m to clear utilities and debris.	



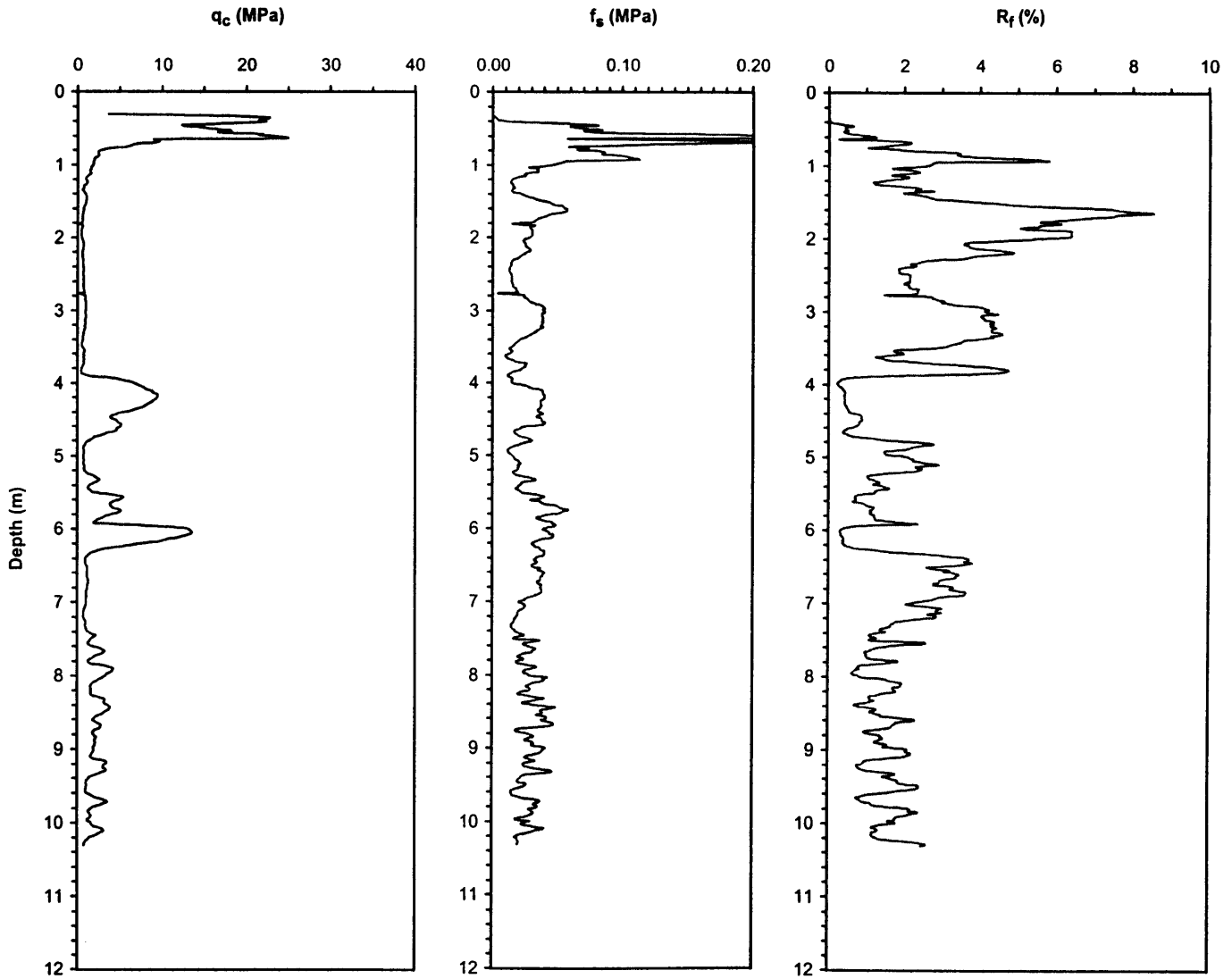
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 2
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77393° N, 30.36911° E	**Survey Coordinates (m):** 32,230.40 N, 32,816.77 W
	Test Number:	CPTU 1 - 07	**Elevation (m):** 26.644 m
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 23 June 2000 9:15
Sponsored by:	**File Name:**	cptu 1 - 07.txt	**Water Table Elevation (m):** N/A
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Sounding pre-explored to a depth of approximately 0.33 m to clear utilities and debris.	



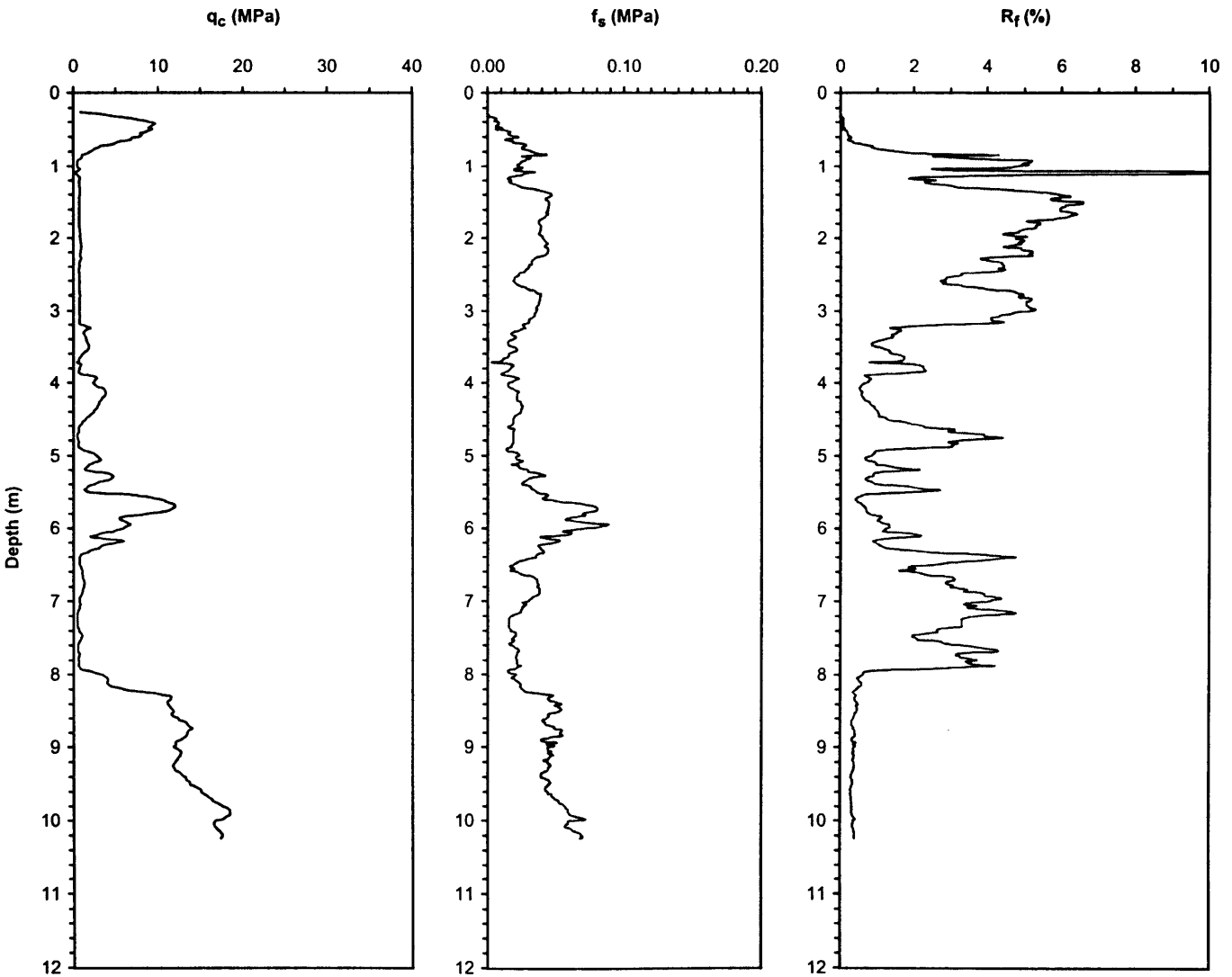
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 2 of 2
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77393° N, 30.36911° E	**Survey Coordinates (m):** 32,230.40 N, 32,816.77 W
	Test Number:	CPTU 1 - 07	**Elevation (m):** 26.644 m
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 23 June 2000 9:15
Sponsored by:	**File Name:**	cptu 1 - 07.txt	**Water Table Elevation (m):** N/A
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Sounding pre-explored to a depth of approximately 0.33 m to clear utilities and debris.	



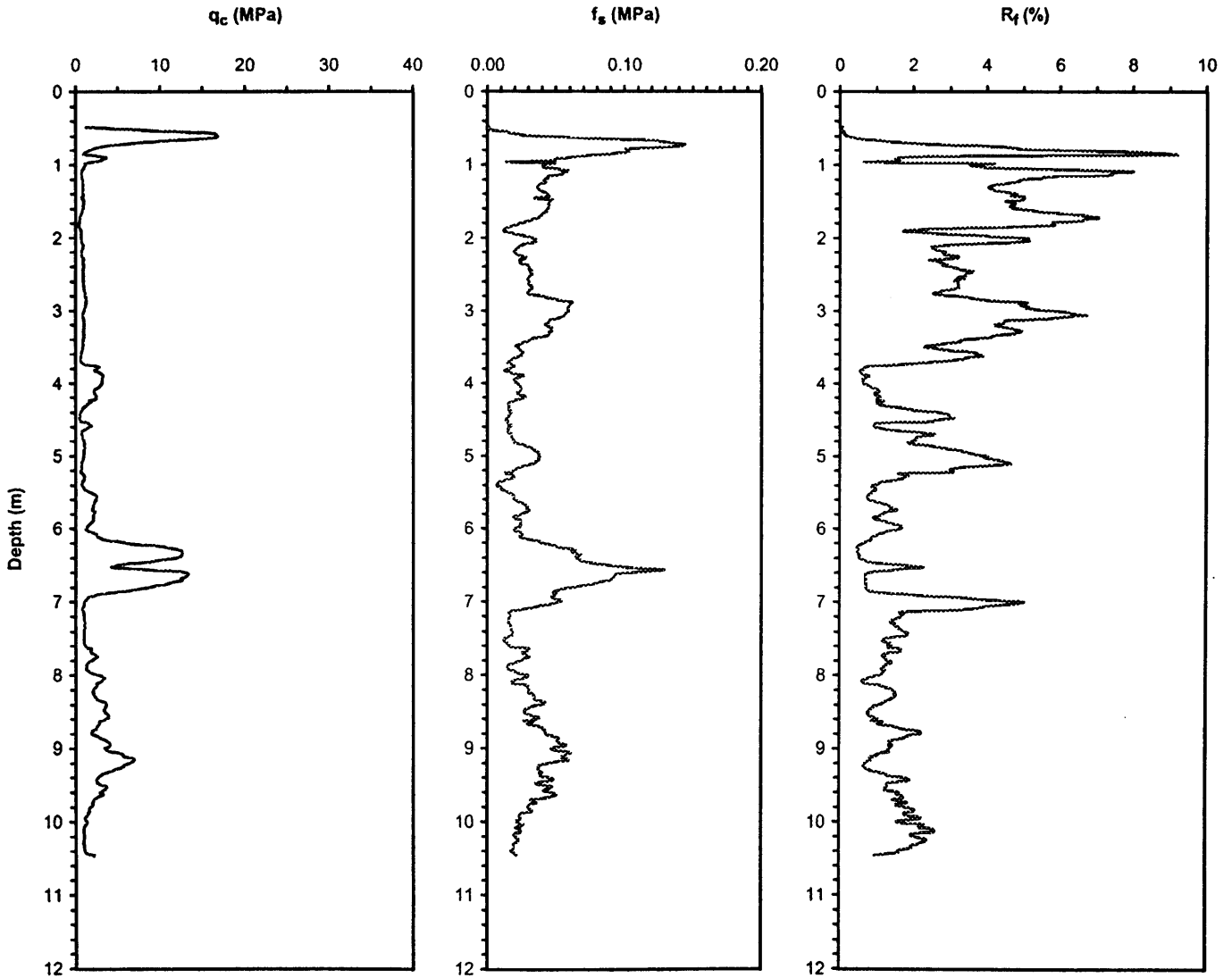
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77412° N, 30.36897° E	**Survey Coordinates (m):** 32,251.88 N, 32,827.50 W
	Test Number:	CPT 1 - 08	**Elevation (m):** 26.657
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 23 June 2000 11:04
Sponsored by:	**File Name:**	cpt 1 - 08.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.29 m to clear utilities and debris.	



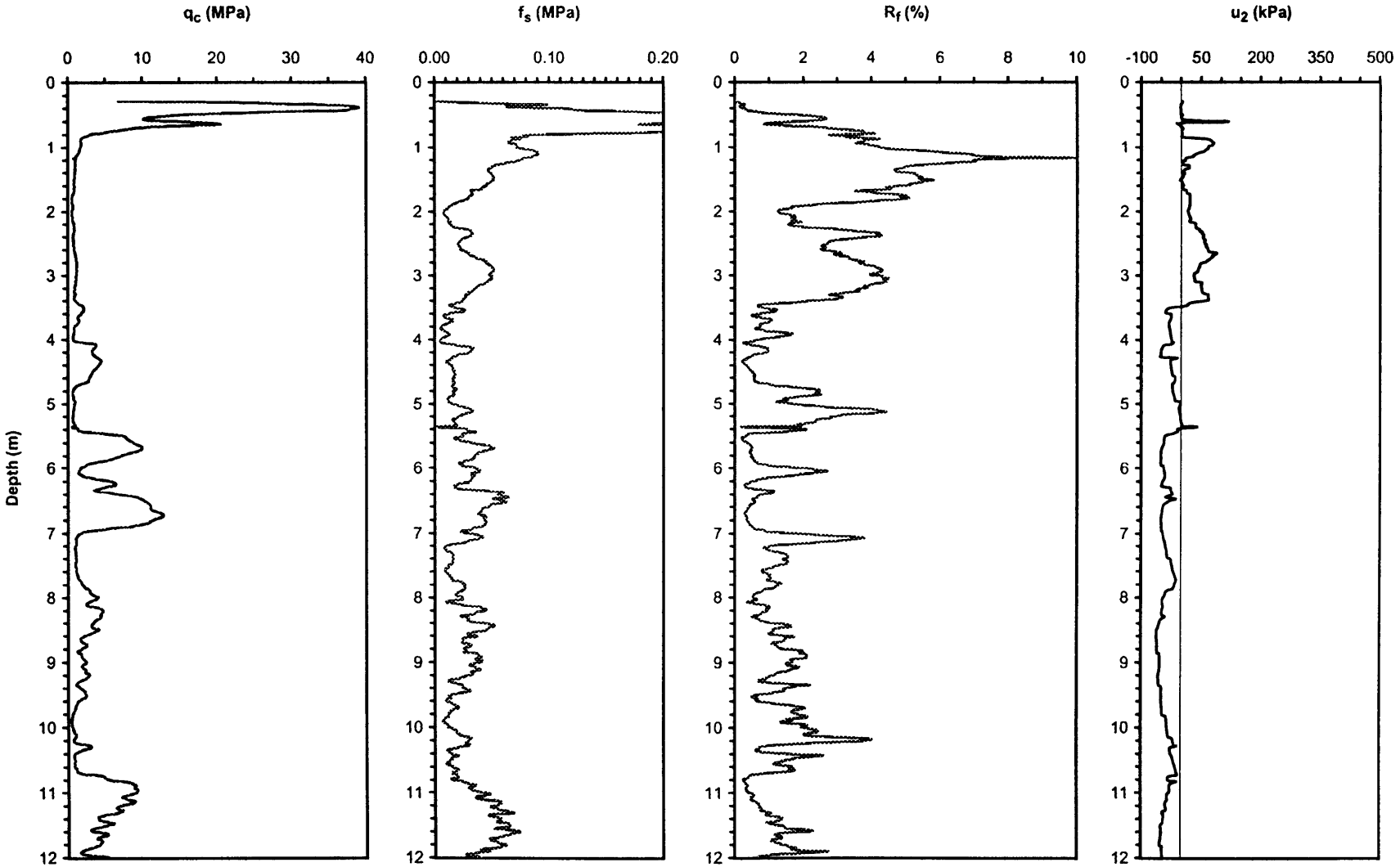
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77385° N, 30.37071° E	**Survey Coordinates (m):** 32,261.88 N, 32,687.93 W
	Test Number:	CPT 1 - 09	**Elevation (m):** 26.264
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 23 June 2000 12:20
Sponsored by:	**File Name:**	cpt 1 - 09.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.24 m to clear utilities and debris.	



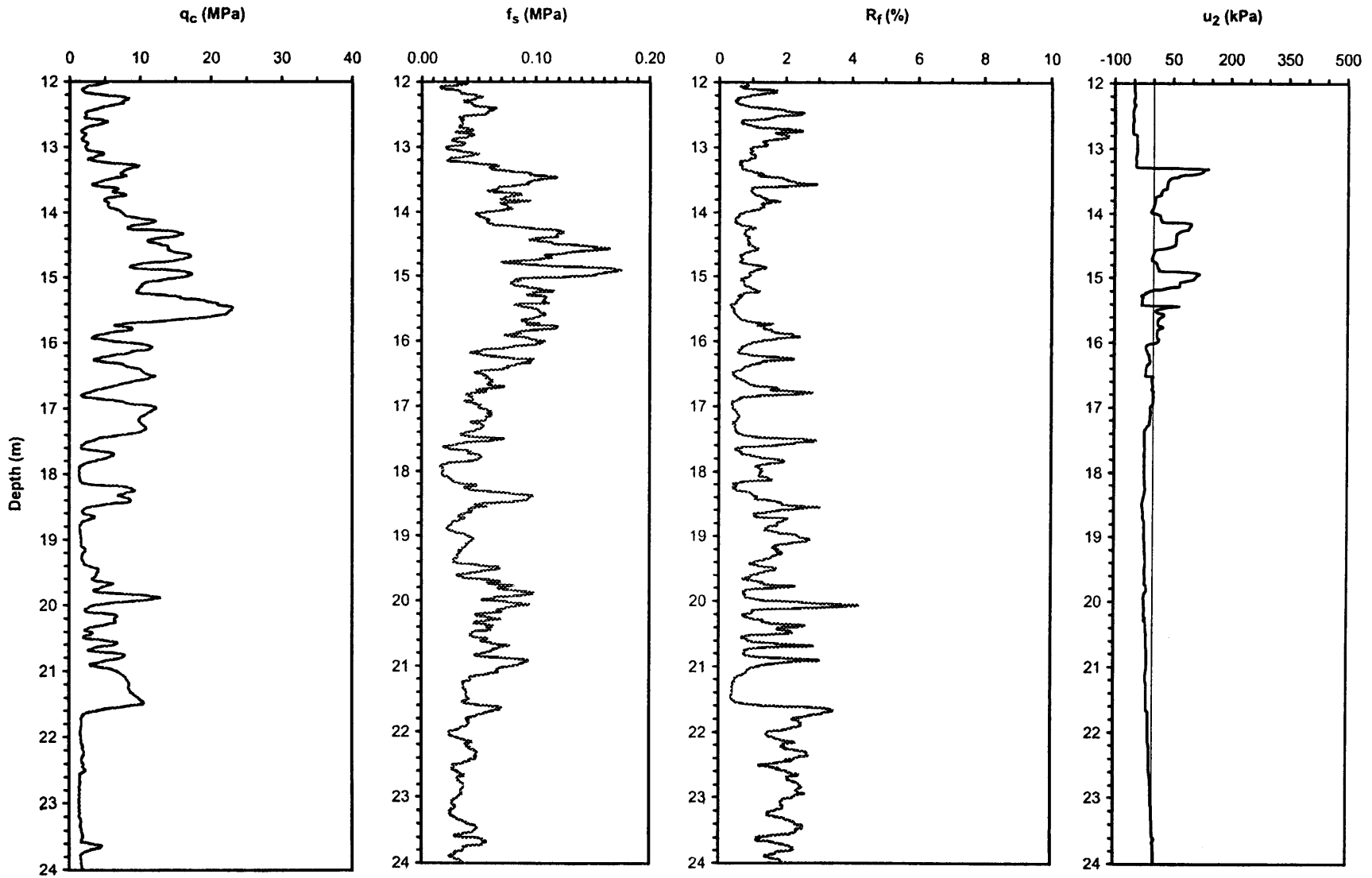
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77387° N, 30.37172° E	**Survey Coordinates (m):** 32,287.13 N, 32,603.19 W
	Test Number:	CPT 1 - 10	**Elevation m:** 26.257
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 23 June 2000 15:37
Sponsored by:	**File Name:**	cpt 1 - 10.txt	**Water Table Elevation (m):** 25.73
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.46 m to clear utilities and debris.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77380° N, 30.37207° E	**Survey Coordinates (m):** 32,297.44 N, 32,578.89 W
	Test Number:	SCPTU 1 - 11	**Elevation (m):** 26.333
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 24 June 2000 10:10
Sponsored by:	**File Name:**	scptu 1 - 11.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.27 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77380° N, 30.37207° E	**Survey Coordinates (m):** 32,297.44 N, 32,578.89 W
	Test Number:	SCPTU 1 - 11	**Elevation (m):** 26.333
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 24 June 2000 10:10
Sponsored by:	**File Name:**	scptu 1 - 11.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.27 m to clear utilities.	

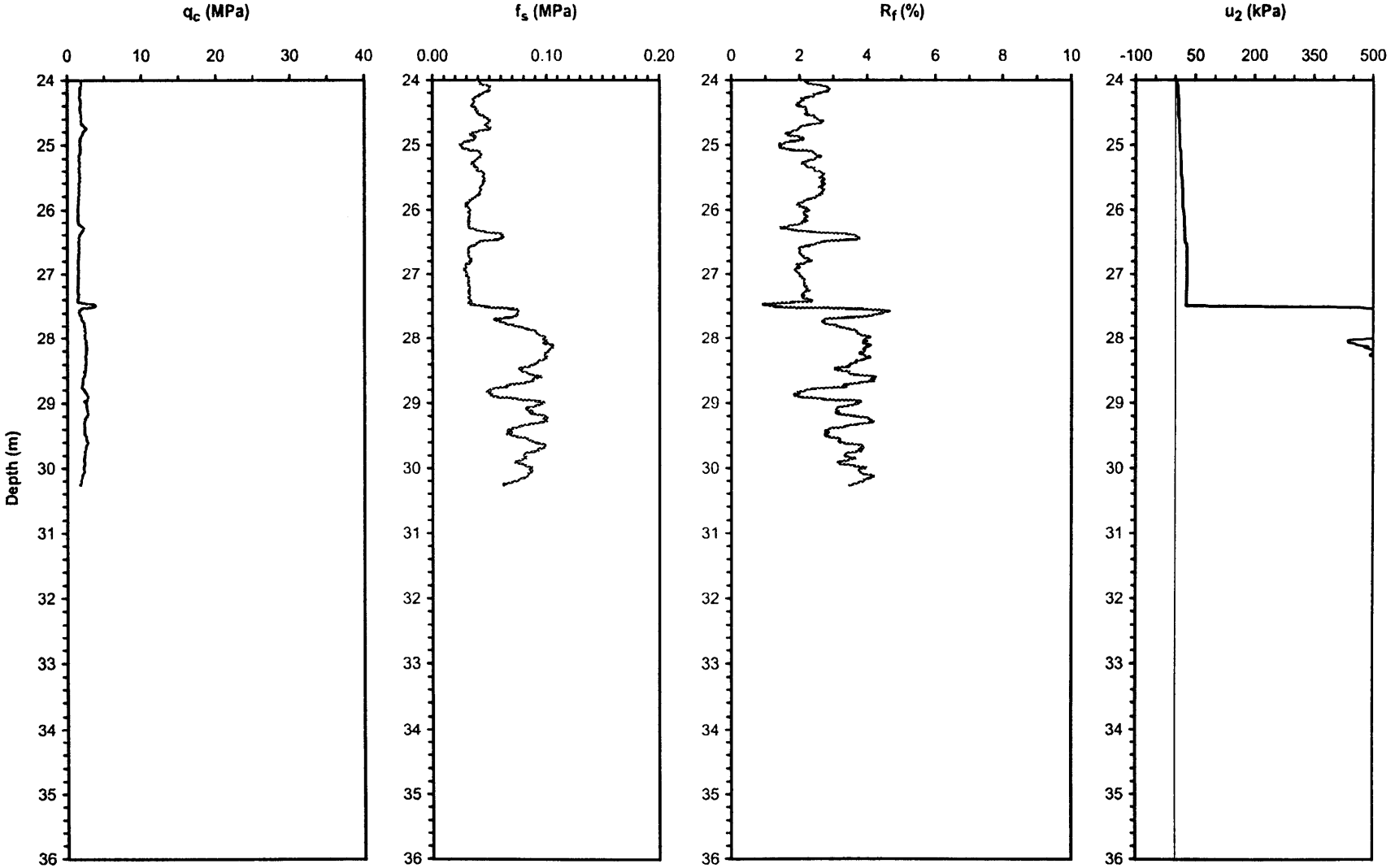


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

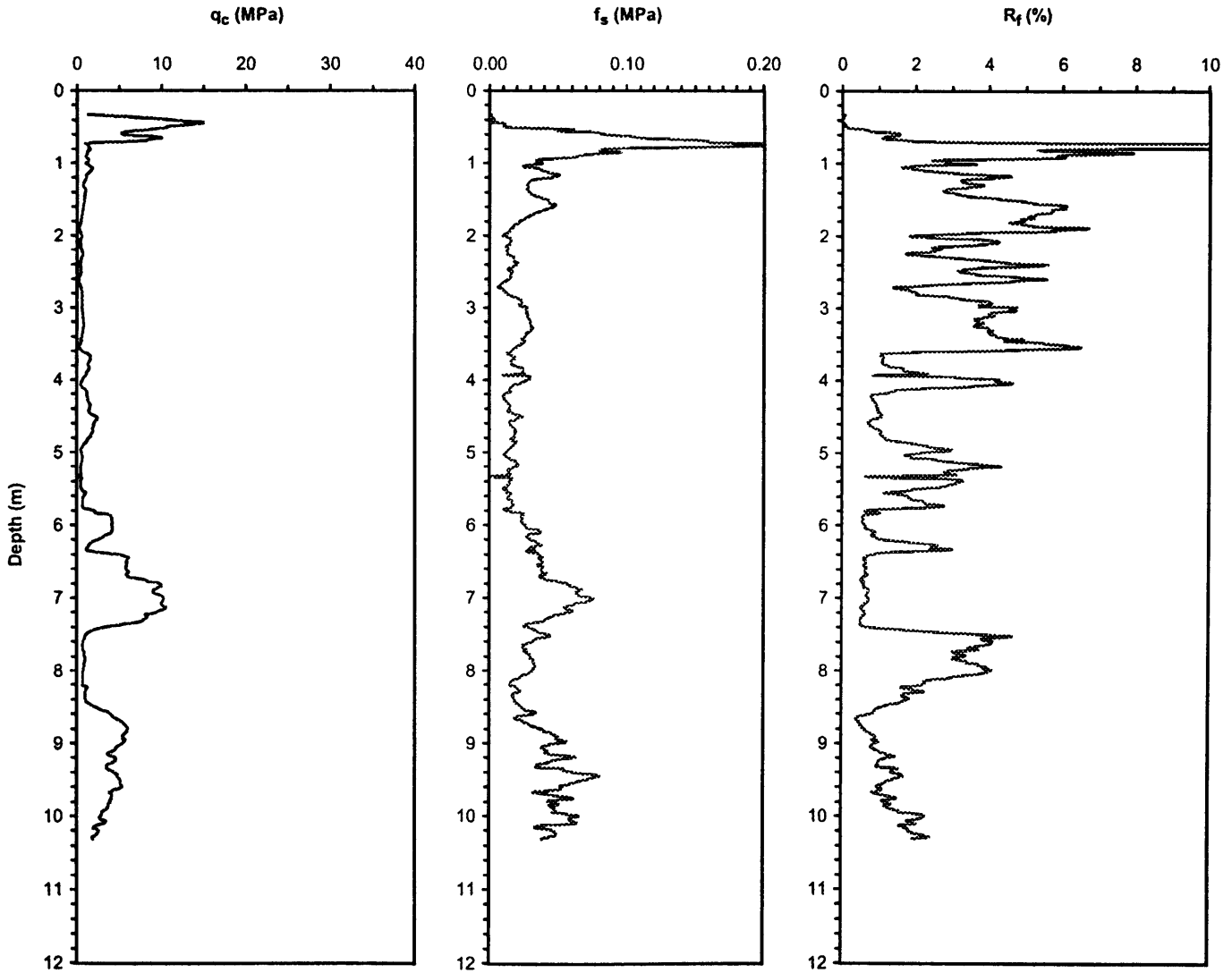
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line One: Çark Caddessi
GPS Coordinates: 40.77380° N, 30.37207° E
Test Number: SCPTU 1 - 11
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: scptu 1 - 11.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of approximately 0.27 m to clear utilities.

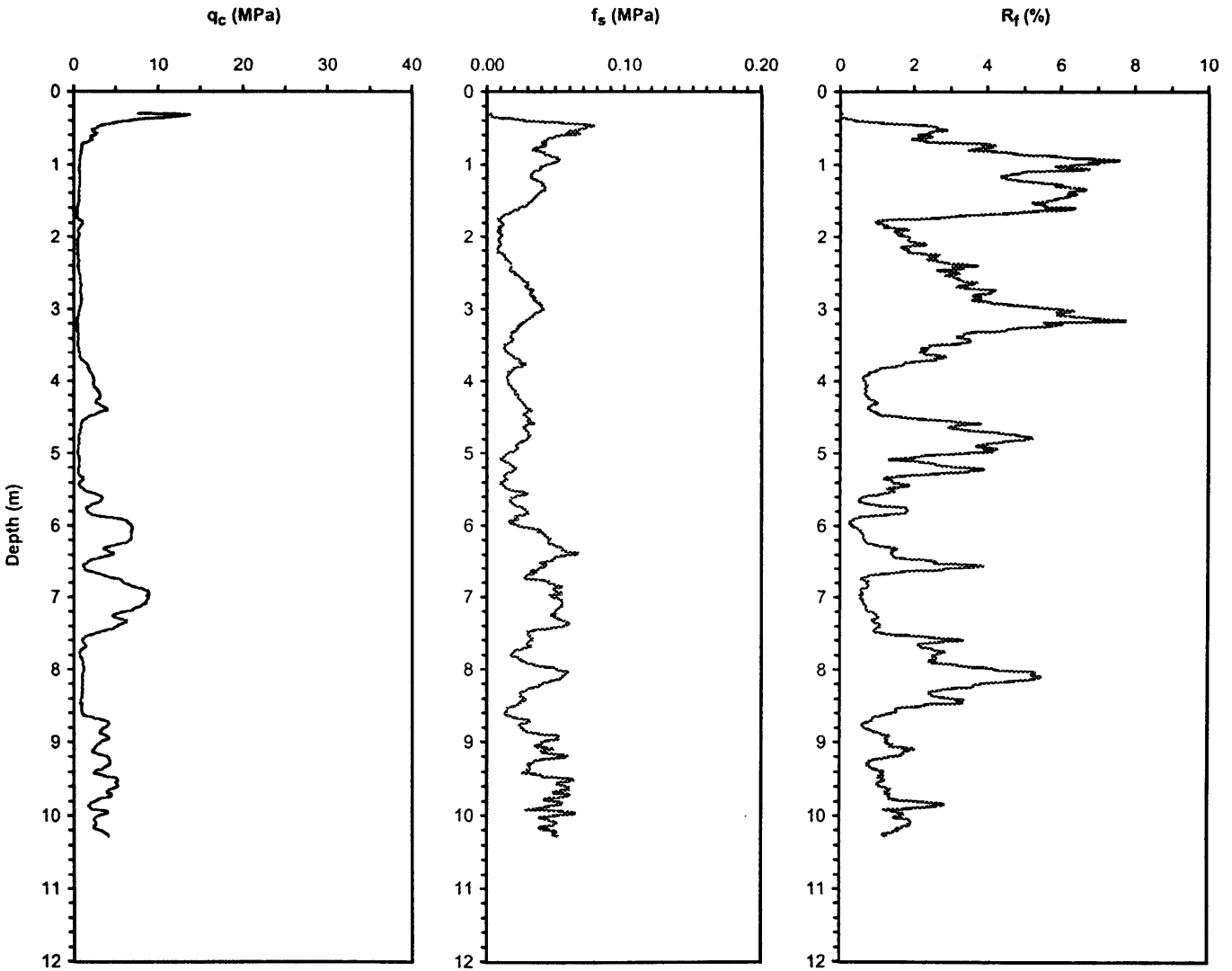
Survey Coordinates (m): 32,297.44 N, 32,578.89 W
Elevation (m): 26.333
Date: 24 June 2000 10:10
Water Table Elevation (m): N/R
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



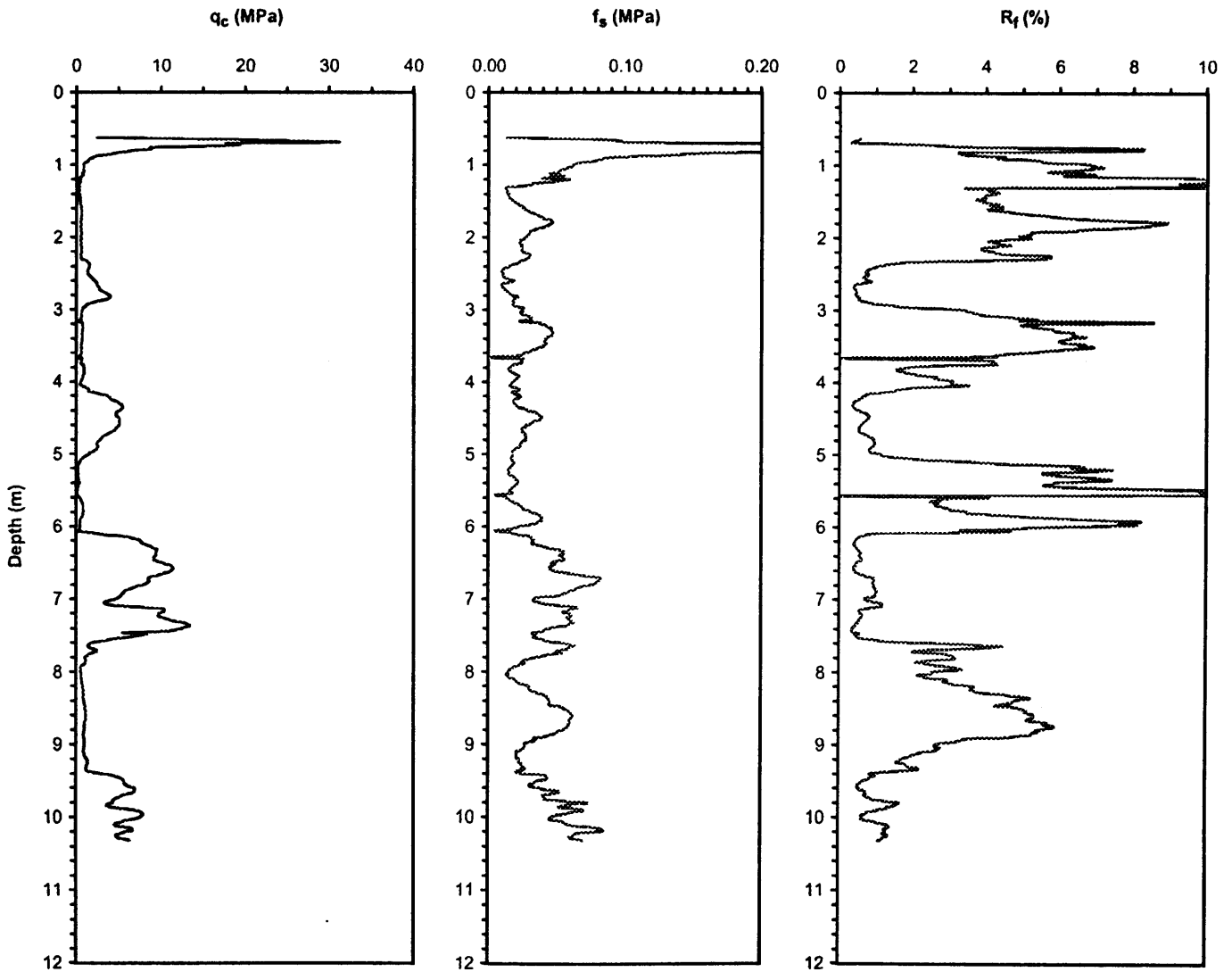
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77407° N, 30.37260° E	**Survey Coordinates (m):** 32,326.41 N, 32,547.82 W
	Test Number:	CPT 1 - 12	**Elevation (m):** 26.371
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 23 June 2000 14:29
Sponsored by:	**File Name:**	cpt 1 - 12.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of approximately 0.31 m to clear utilities.	



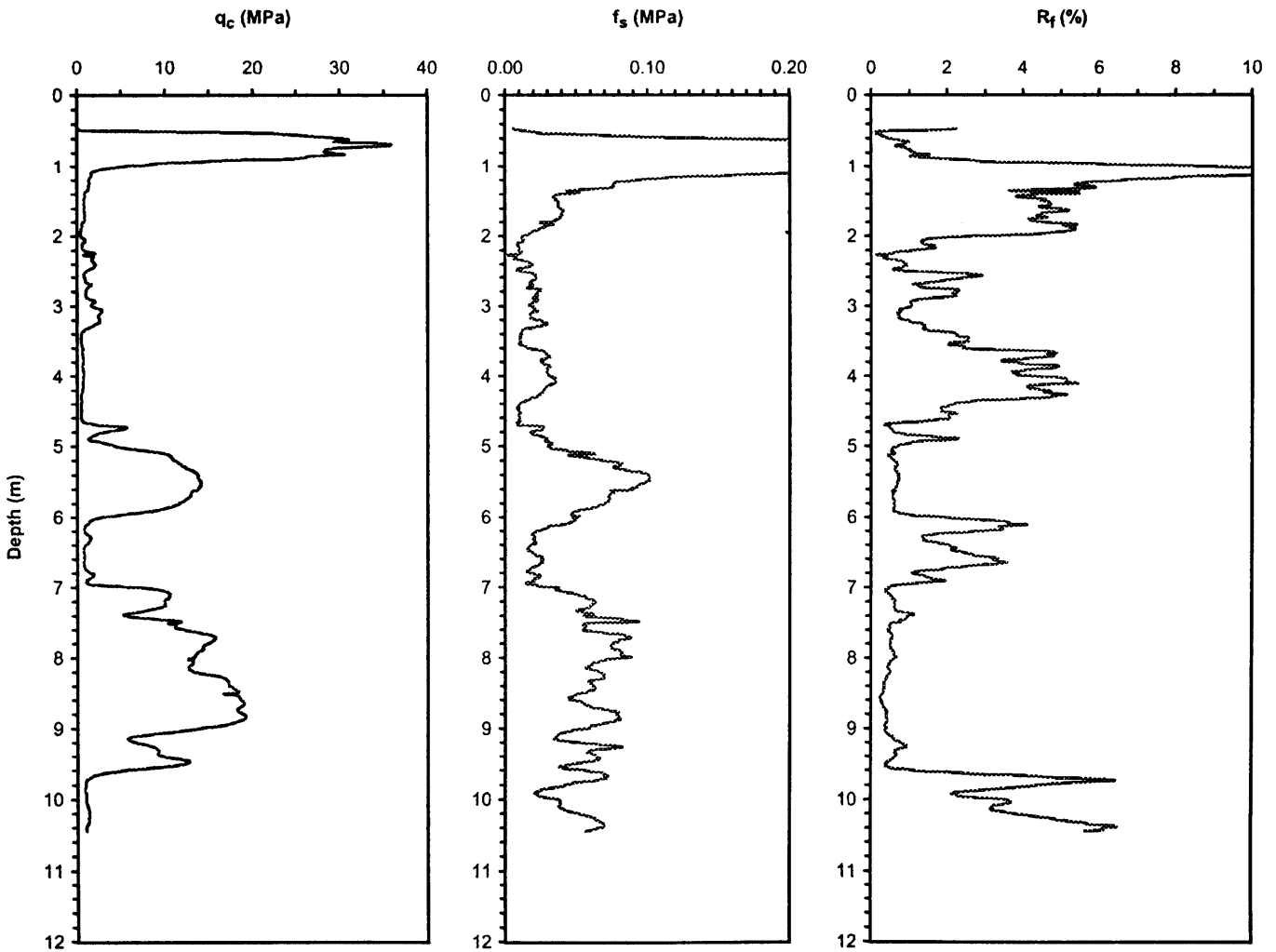
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Kader Sokak (Immediately south of Çark Caddesi)	
Joint Research	**GPS Coordinates:**	40.77413° N, 30.37301° E	**Survey Coordinates (m):** 32,348.15 N, 32,503.25 W
	Test Number:	CPT 1 - 13	**Elevation (m):** 26.747
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 23 June 2000 16:50
Sponsored by:	**File Name:**	cpt 1 - 13.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.28 m to clear utilities and debris.	



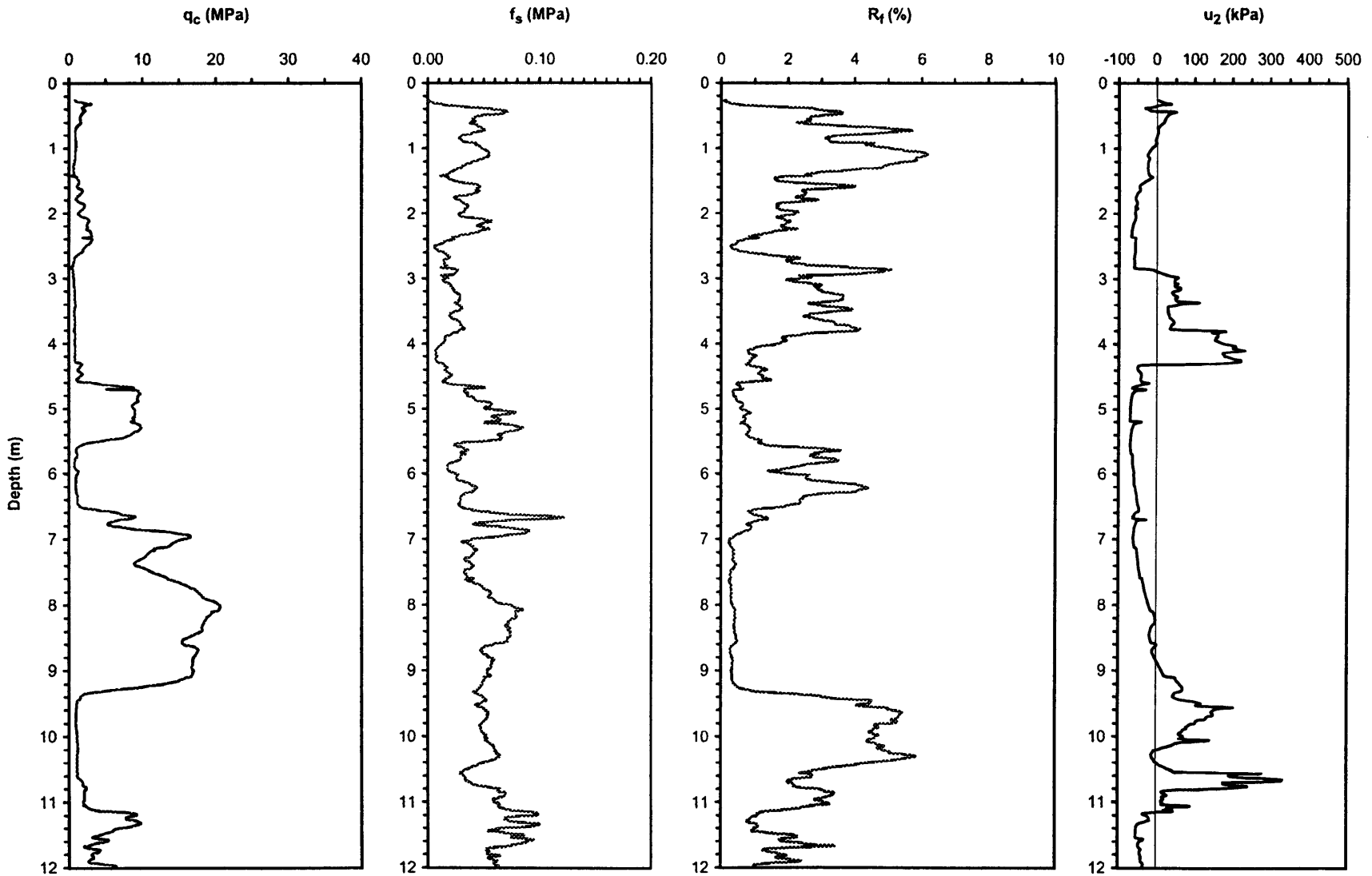
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi (Between Mertler Mobilya and Kartal Mobilya)	
Joint Research	**GPS Coordinates:**	40.77418° N, 30.37397° E	**Survey Coordinates (m):** 32,383.56 N, 32,427.77 W
	Test Number:	CPT 1 - 14	**Elevation (m):** 26.456
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 26 June 2000 15:32
Sponsored by:	**File Name:**	cpt 1 - 14.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.6 m to clear utilities.	



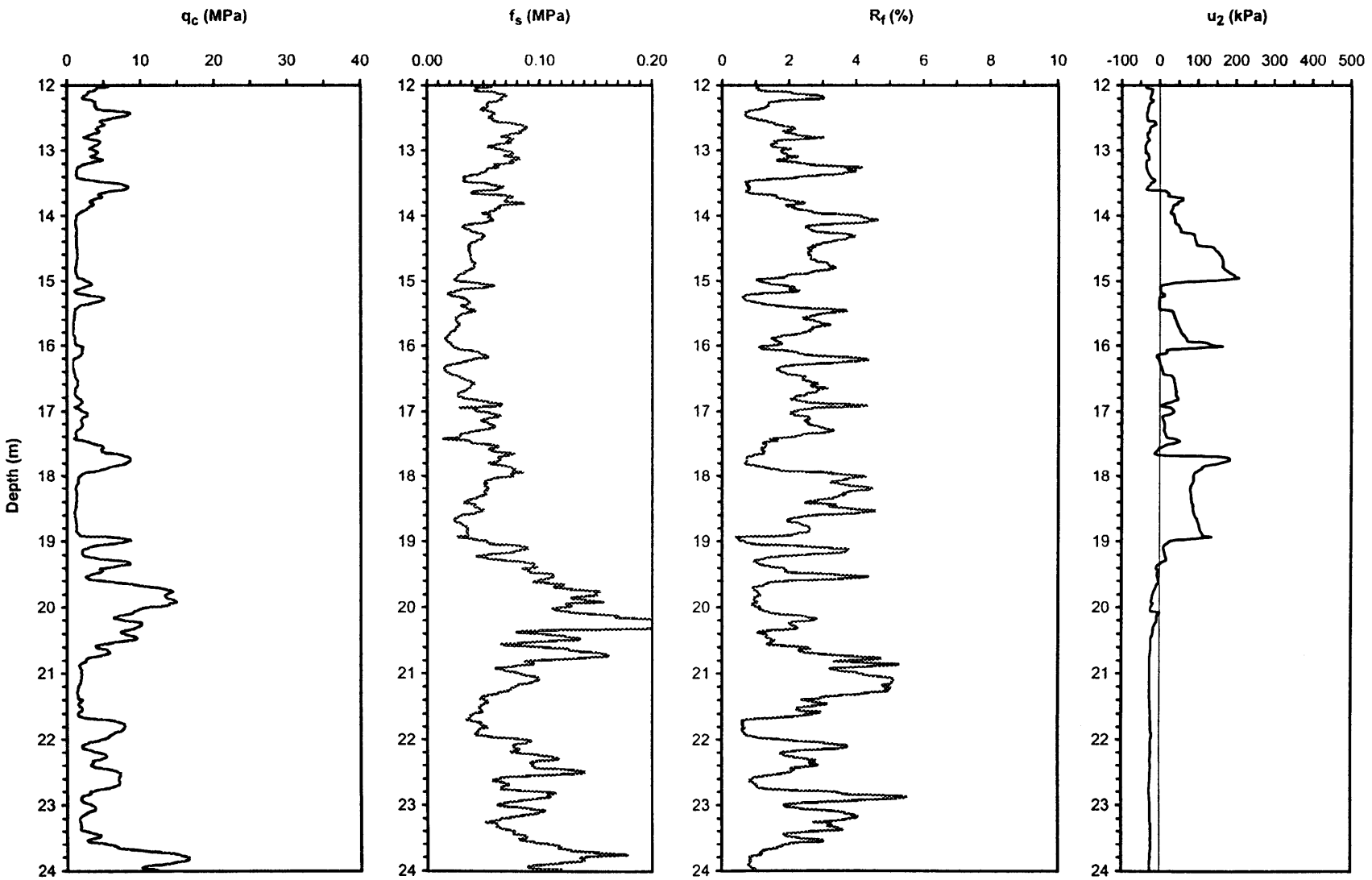
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Sabungu Sokak (Immediately south of Çark Caddesi)	
Joint Research	**GPS Coordinates:**	40.77441° N, 30.37597° E	**Survey Coordinates (m):** 32,467.64 N, 32,274.68 W
	Test Number:	CPT 1 - 15	**Elevation (m):** 26.575
	Type of Cone:	ELC10 CF No.990618 (a.p. v.d. Berg)	**Date:** 26 June 2000 16:59
Sponsored by:	**File Name:**	cpt 1 - 15.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.45 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77449° N, 30.37755° E	**Survey Coordinates (m):** 32,507.21 N, 32,147.78 W
	Test Number:	CPTU 1 - 16	**Elevation (m):** 26.303
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** 24 June 2000 14:50
Sponsored by:	**File Name:**	cptu 1 - 16.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.24 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77449° N, 30.37755° E	**Survey Coordinates (m):** 32,507.21 N, 32,147.78 W
	Test Number:	CPTU 1 - 16	**Elevation (m):** 26.303
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** 24 June 2000 14:50
Sponsored by:	**File Name:**	cptu 1 - 16.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.24 m to clear utilities.	

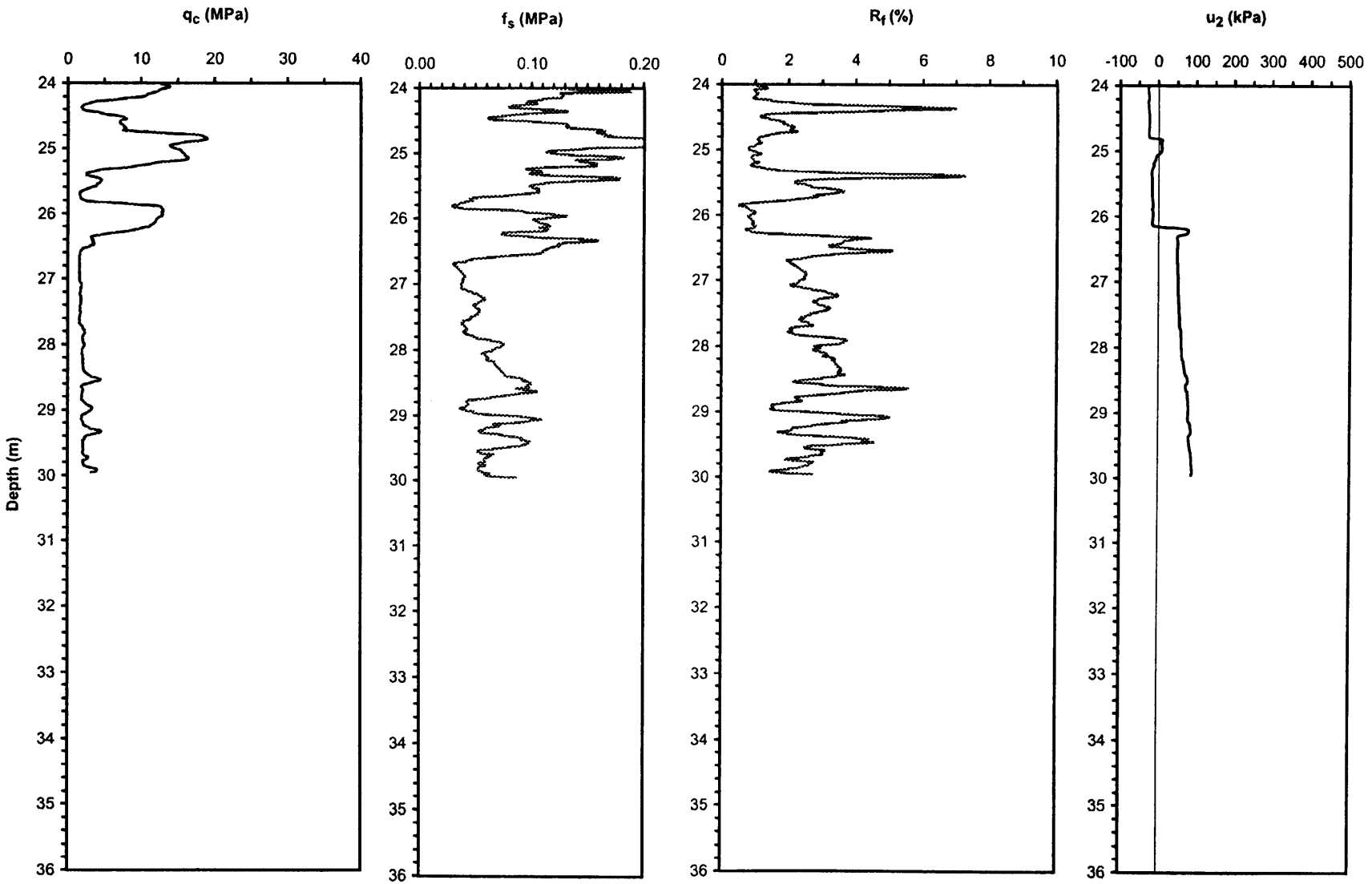


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

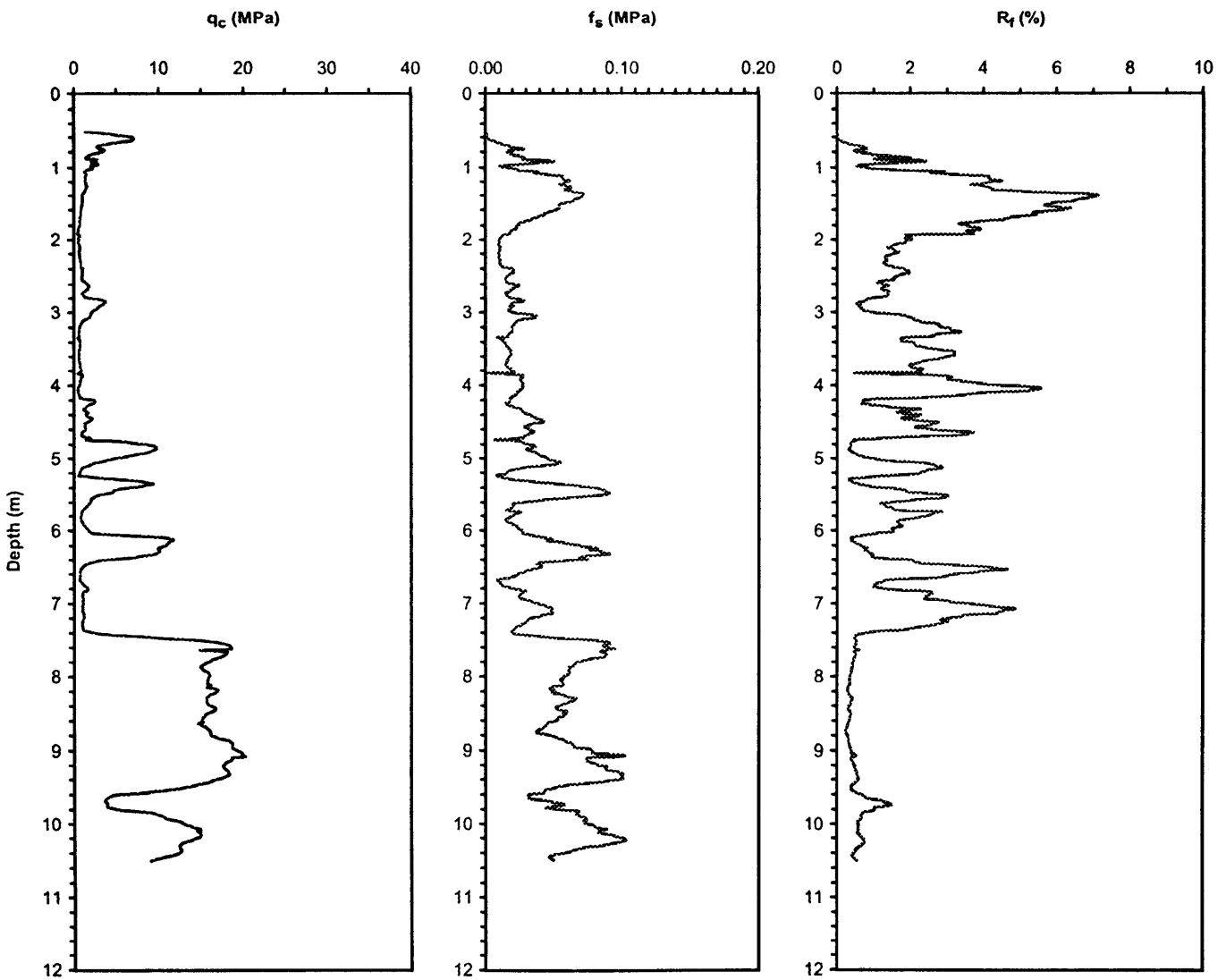
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line One: Çark Caddessi
GPS Coordinates: 40.77449° N, 30.37755° E
Test Number: CPTU 1 - 16
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptu 1 - 16.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.24 m to clear utilities.

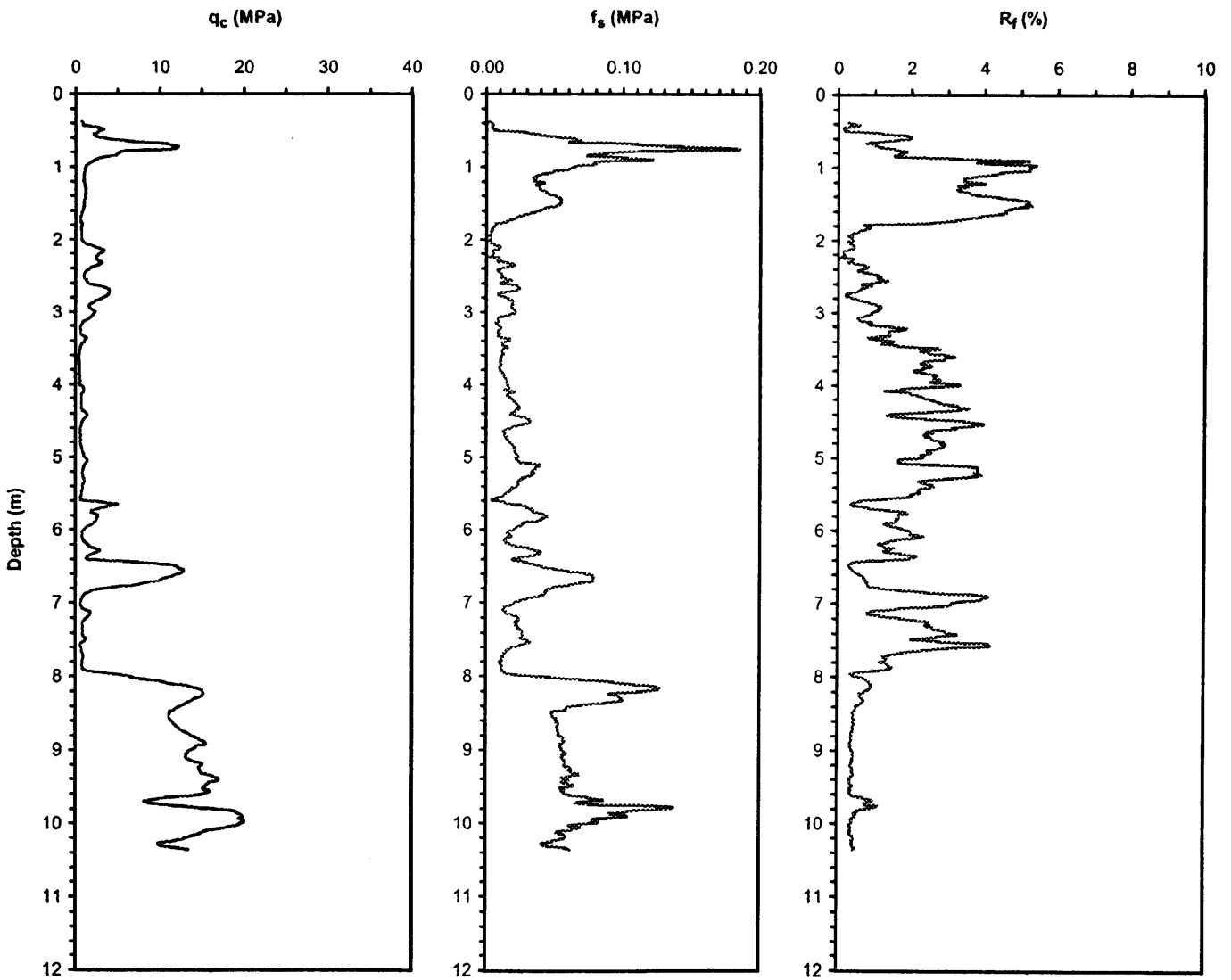
Survey Coordinates (m): 32,507.21 N, 32,147.78 W
Elevation (m): 26.303
Date: 24 June 2000 14:50
Water Table Elevation (m): N/R
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



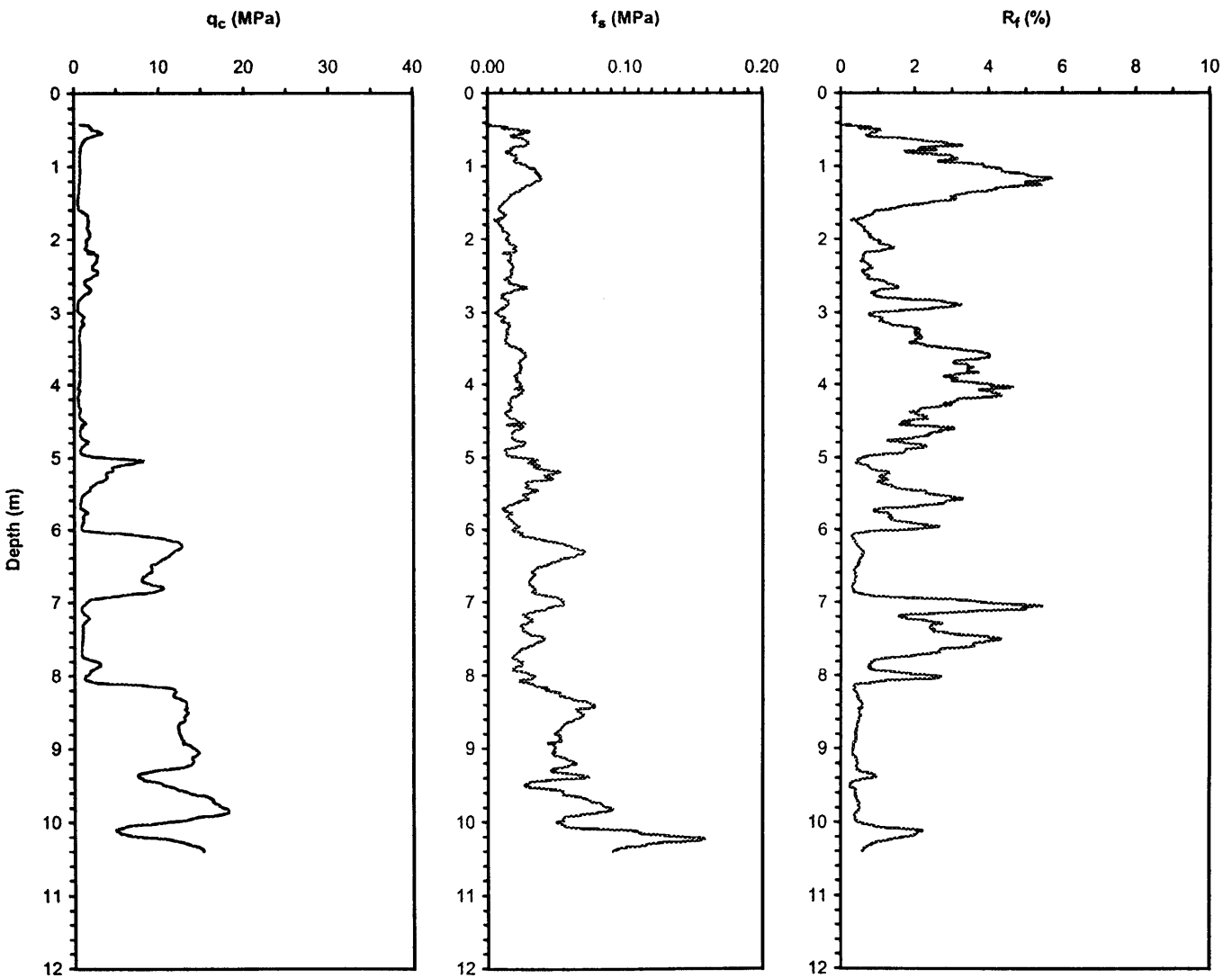
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77452° N, 30.37828° E	**Survey Coordinates (m):** 32,521.39 N, 32,102.73 W
	Test Number:	CPT 1 - 17	**Elevation (m):** 26.854
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 26 June 2000 18:27
Sponsored by:	**File Name:**	cpt 1 - 17.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.5 m to clear utilities.	



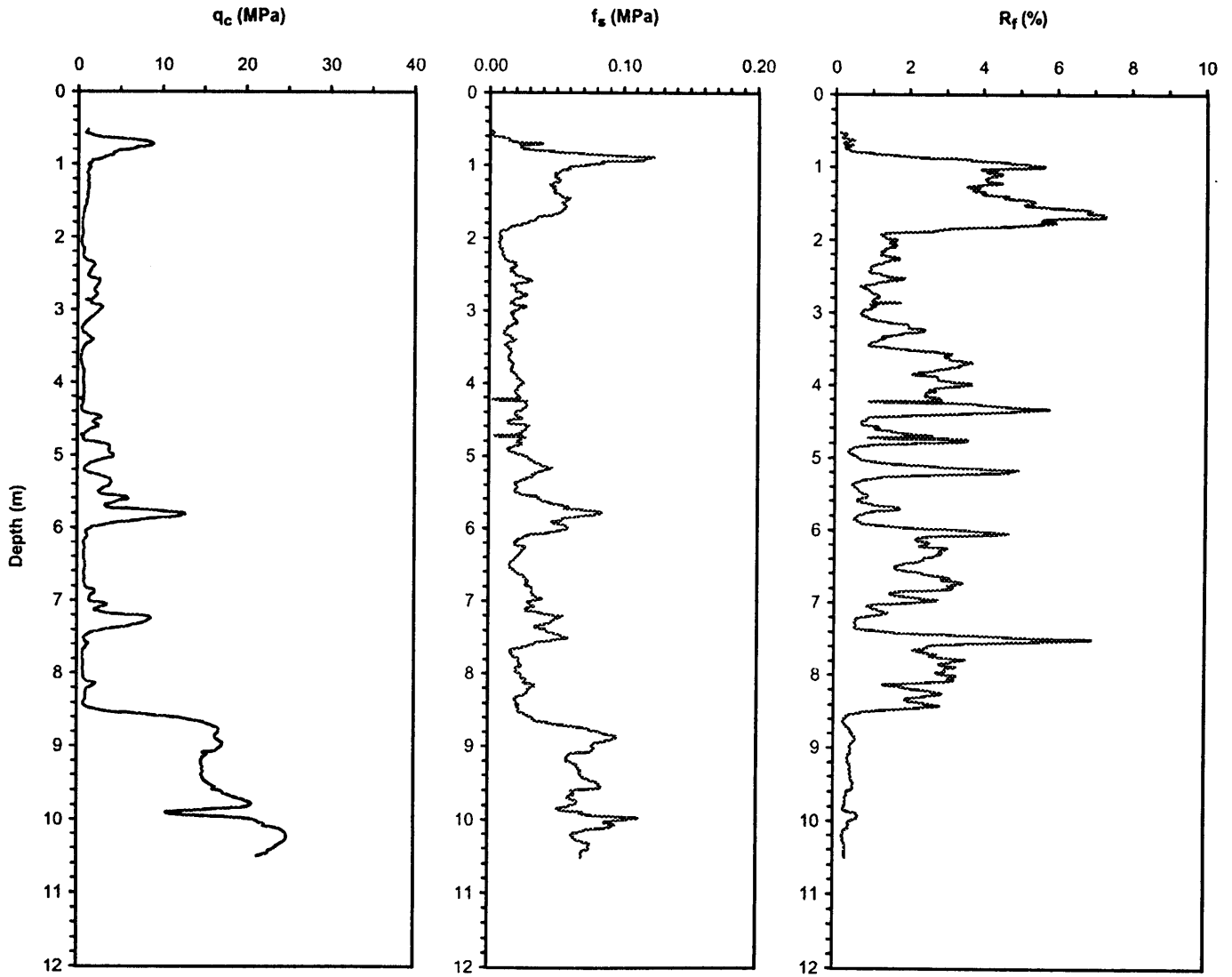
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77510° N, 30.37904° E	**Survey Coordinates (m):** 32,611.84 N, 32,049.61 W
	Test Number:	CPT 1 - 18	**Elevation (m):** 27.025
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 9:36
Sponsored by:	**File Name:**	cpt 1 - 18.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.36 m to clear utilities and debris.	



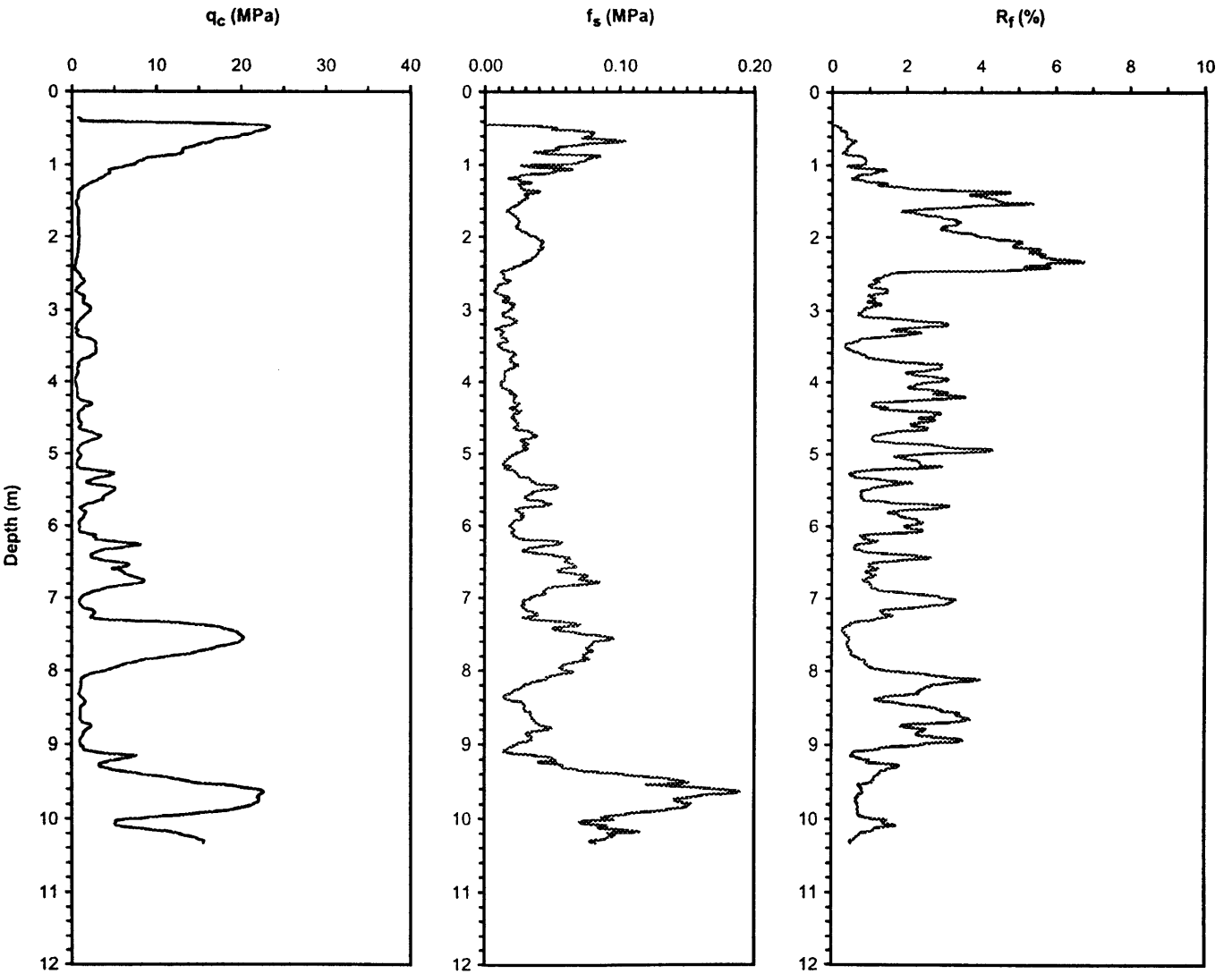
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	Page: 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77547° N, 30.37979° E	**Survey Coordinates (m):** 32,667.82 N, 32,014.68 W
	Test Number:	CPT 1 - 19	**Elevation (m):** 27.090
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 10:49
Sponsored by:	**File Name:**	cpt 1 - 19.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.4 m to clear utilities and debris.	



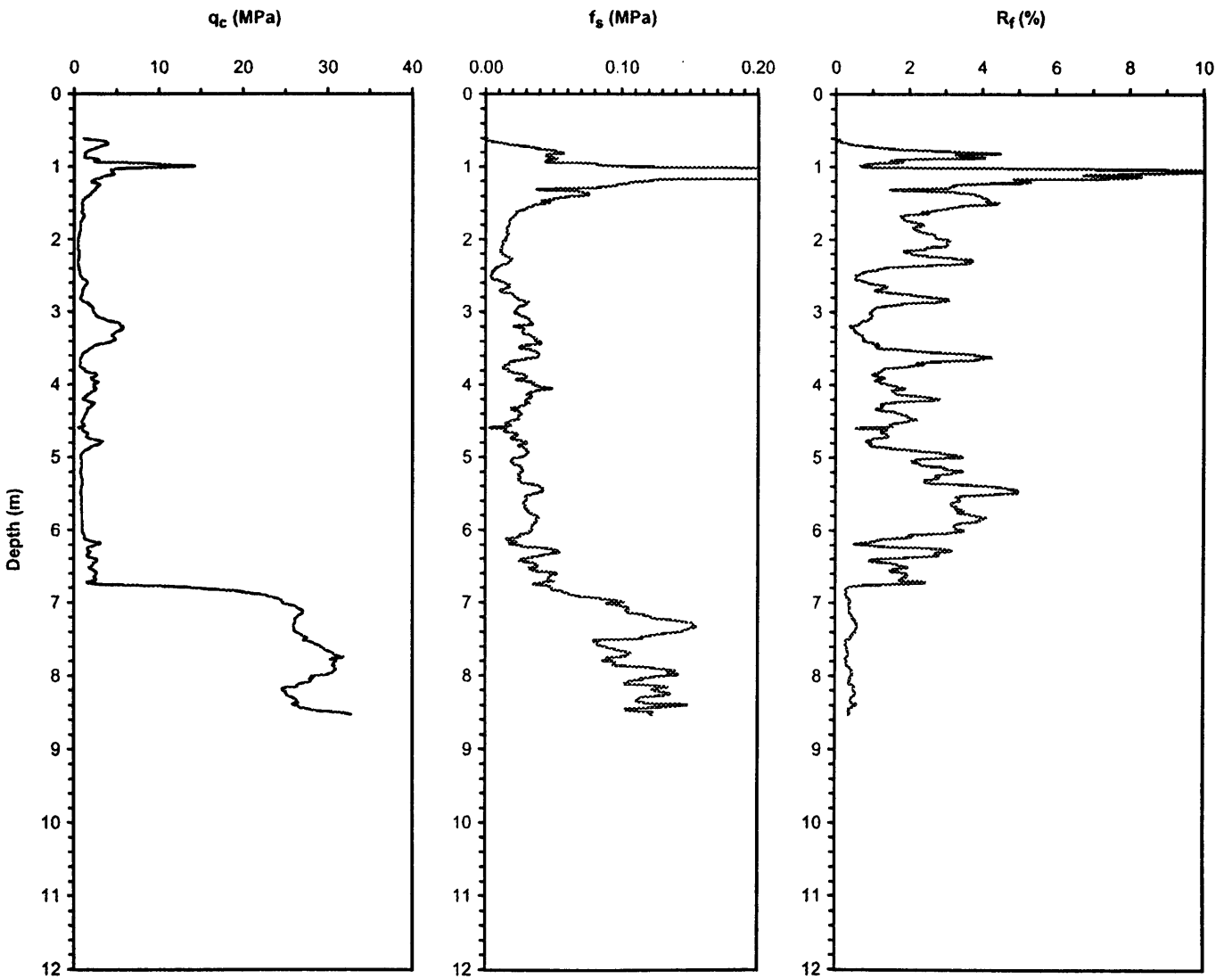
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77578° N, 30.38048° E	**Survey Coordinates (m):** 32,714.79 N, 31,969.42 W
	Test Number:	CPT 1 - 20	**Elevation (m):** 27.795
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 12:29
Sponsored by:	**File Name:**	cpt 1 - 20.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.51 m to clear utilities and debris.	



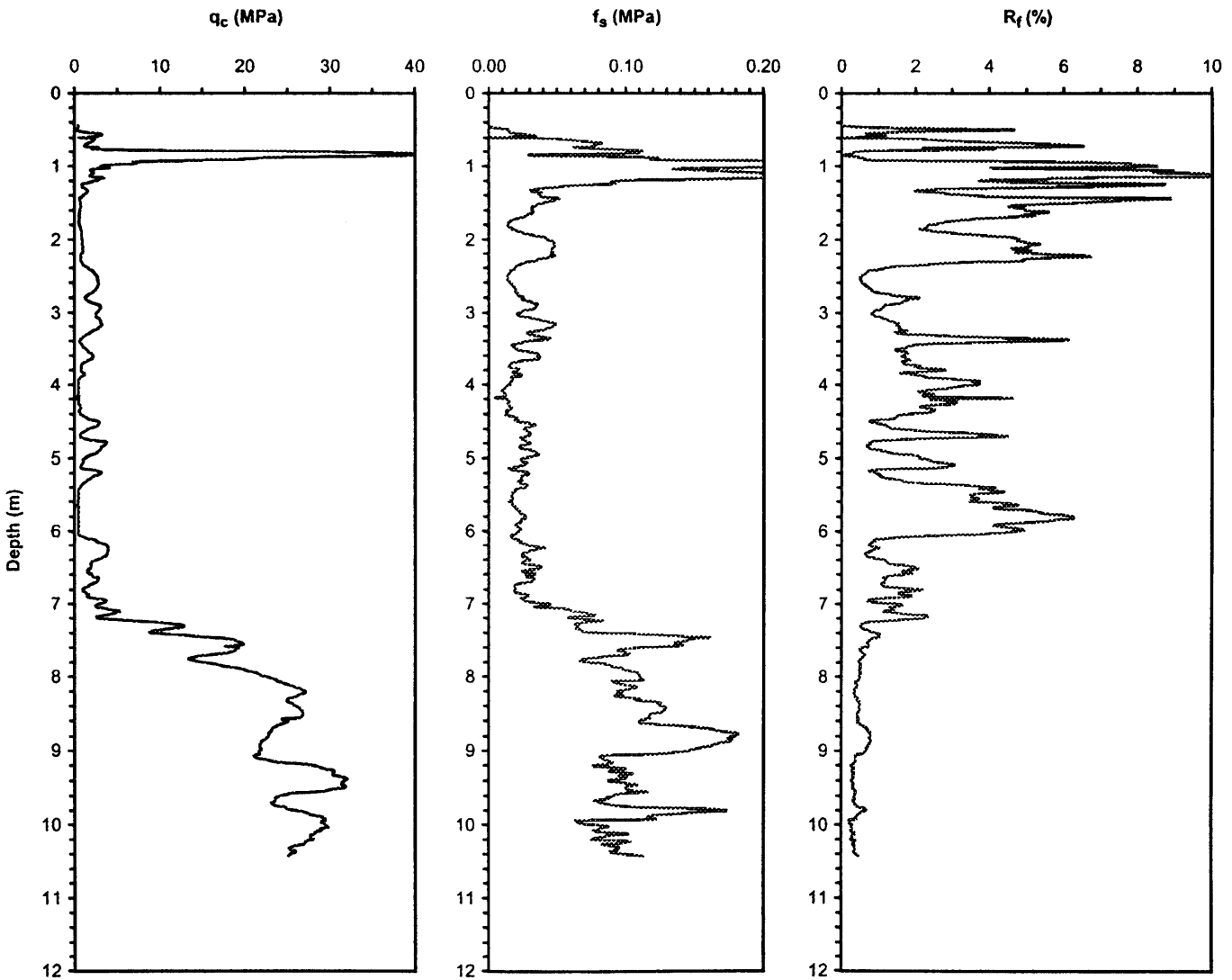
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77615° N, 30.38189° E	**Survey Coordinates (m):** 32,798.59 N, 31,862.39 W
	Test Number:	CPT 1 - 21	**Elevation (m):** 27.660
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 14:24
Sponsored by:	**File Name:**	cpt 1 - 21.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.33 m to clear utilities and debris.	



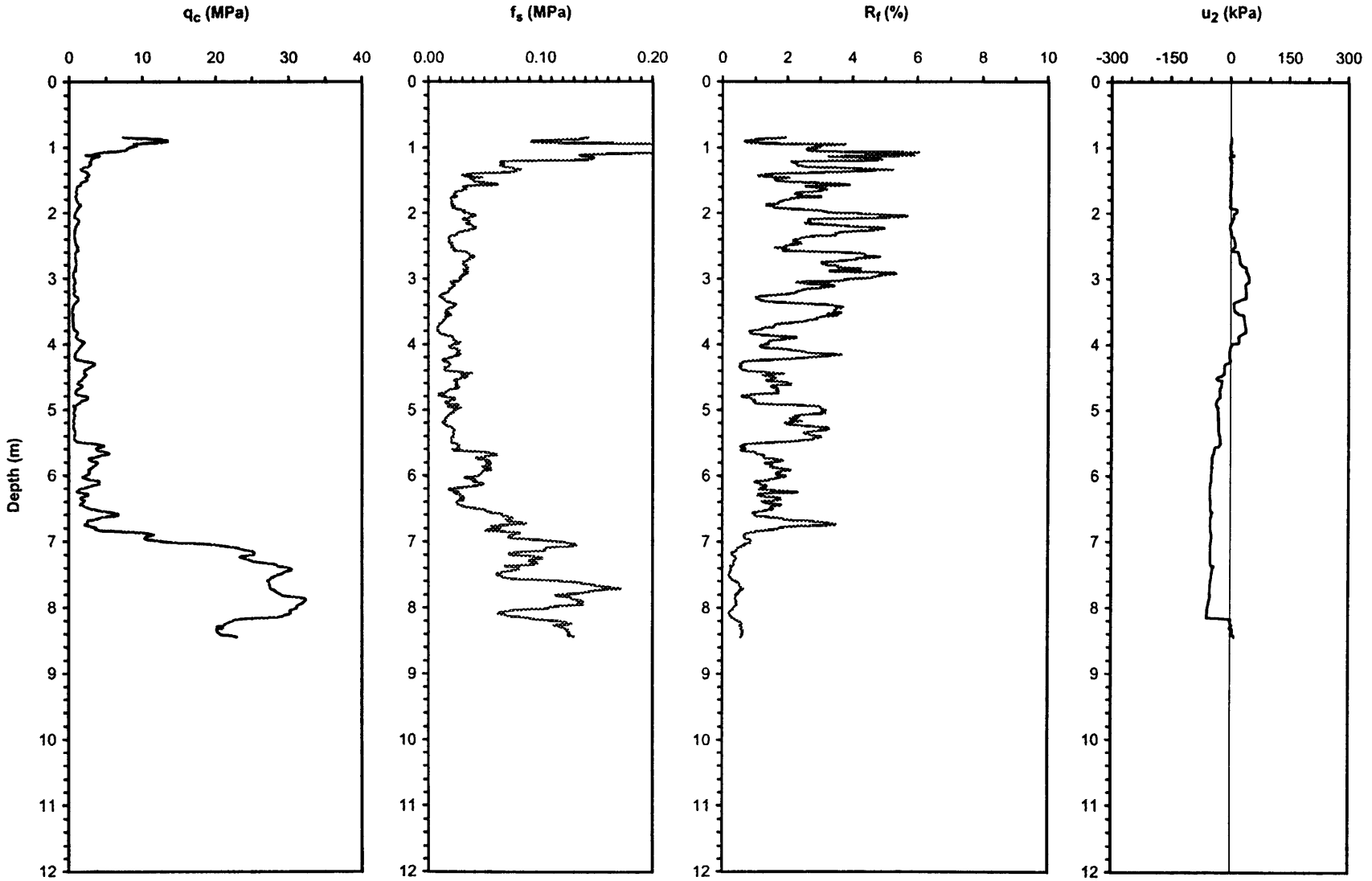
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations. Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77587° N, 30.38283° E	**Survey Coordinates (m):** 32,794.12 N, 31,780.45 W
	Test Number:	CPT 1 - 22	**Elevation (m):** 28.237
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 18:28
Sponsored by:	**File Name:**	cpt 1 - 22.txt	**Water Table Elevation (m):** 25.04
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.59 m to clear utilities and debris.	



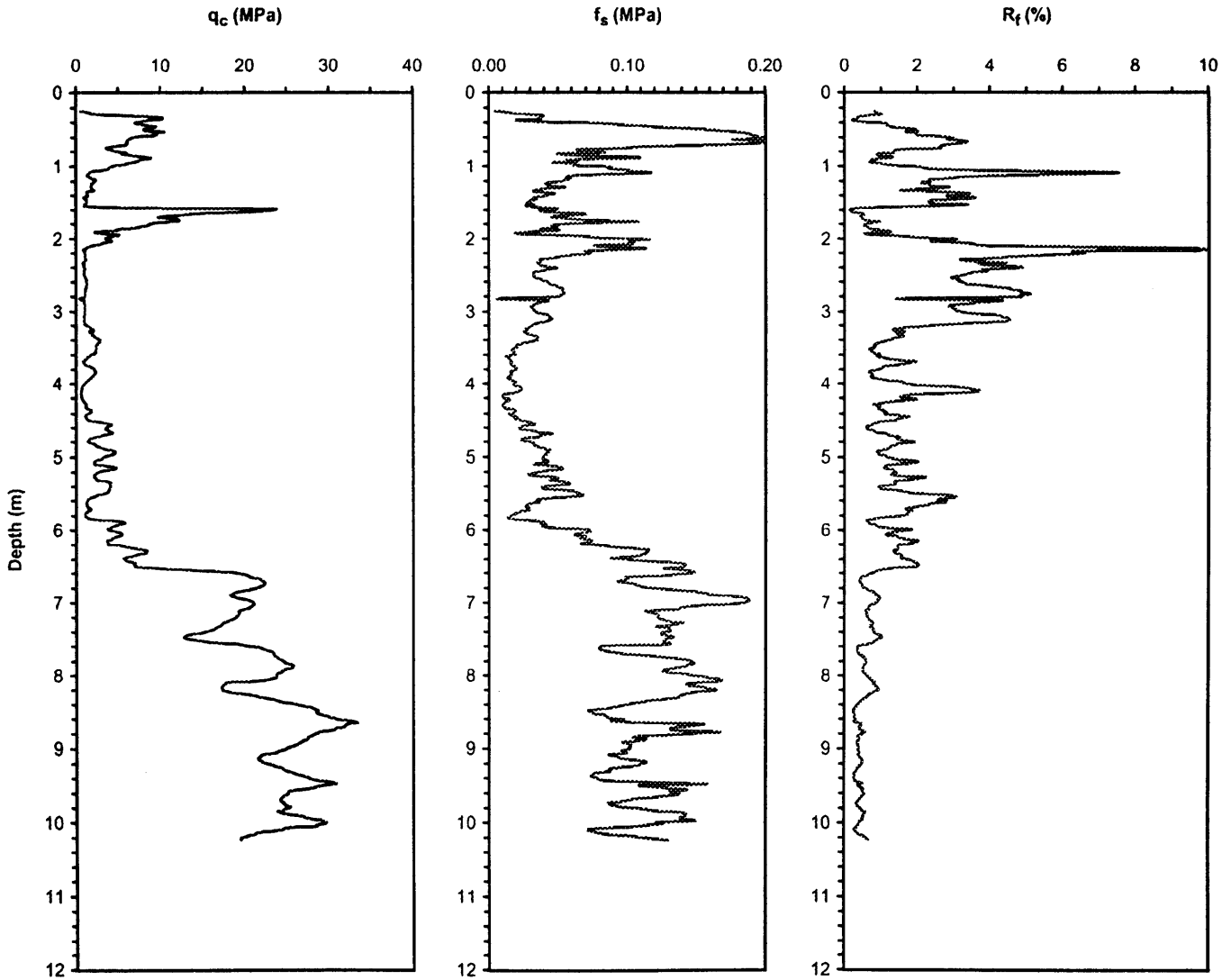
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations. Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77629° N, 30.38307° E	**Survey Coordinates (m):** 32,829.33 N, 31,779.92 W
	Test Number:	CPT 1 - 23	**Elevation (m):** 28.329
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 15:53
Sponsored by:	**File Name:**	cpt 1 - 23.txt	**Water Table Elevation (m):** 25.09
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.42 m to clear utilities.	



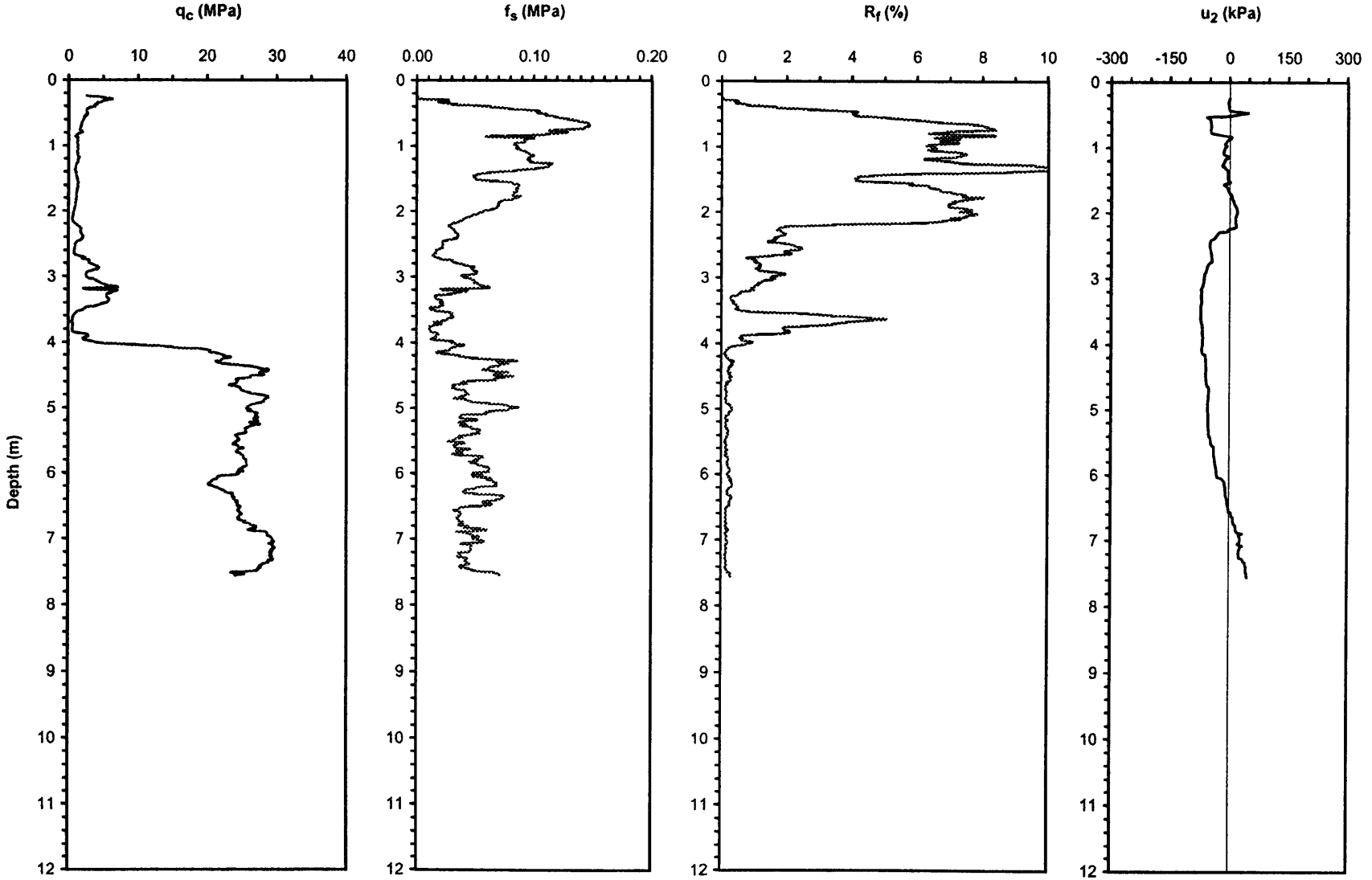
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations. Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77639° N, 30.38296° E	**Survey Coordinates (m):** 32,848.47 N, 31,777.18 W
	Test Number:	SCPTU 1 - 24	**Elevation (m):** 28.001
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 28 June 2000 11:00
Sponsored by:	**File Name:**	scptu 1 - 24.txt	**Water Table Elevation (m):** 25.40
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.53 m to clear utilities.	



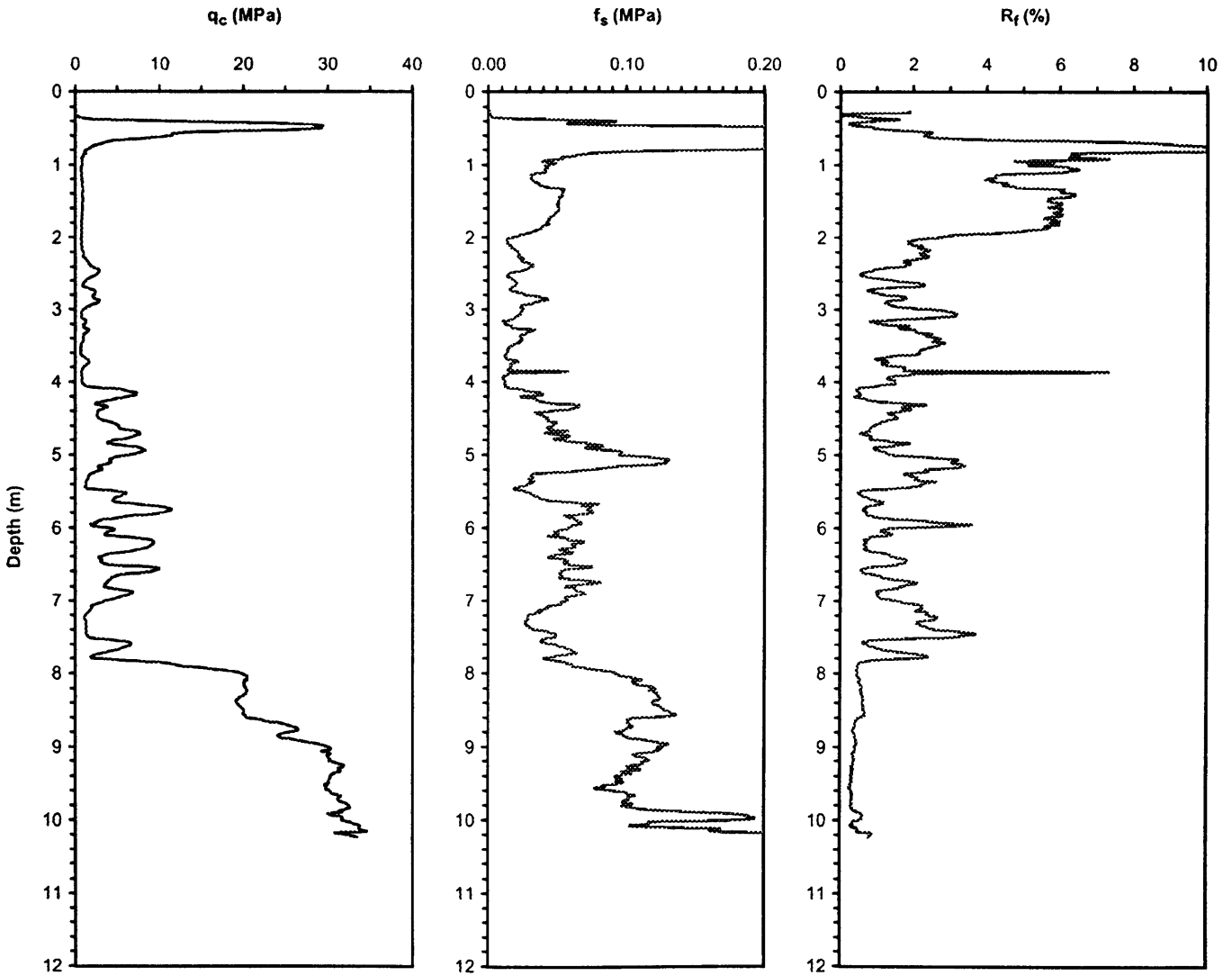
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations. Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77638° N, 30.38354° E	**Survey Coordinates (m):** 32,860.02 N, 31,737.89 W
	Test Number:	CPT 1 - 25	**Elevation (m):** 28.266
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 28 June 2000 14:07
Sponsored by:	**File Name:**	cpt 1 - 25.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.23 m to clear utilities.	



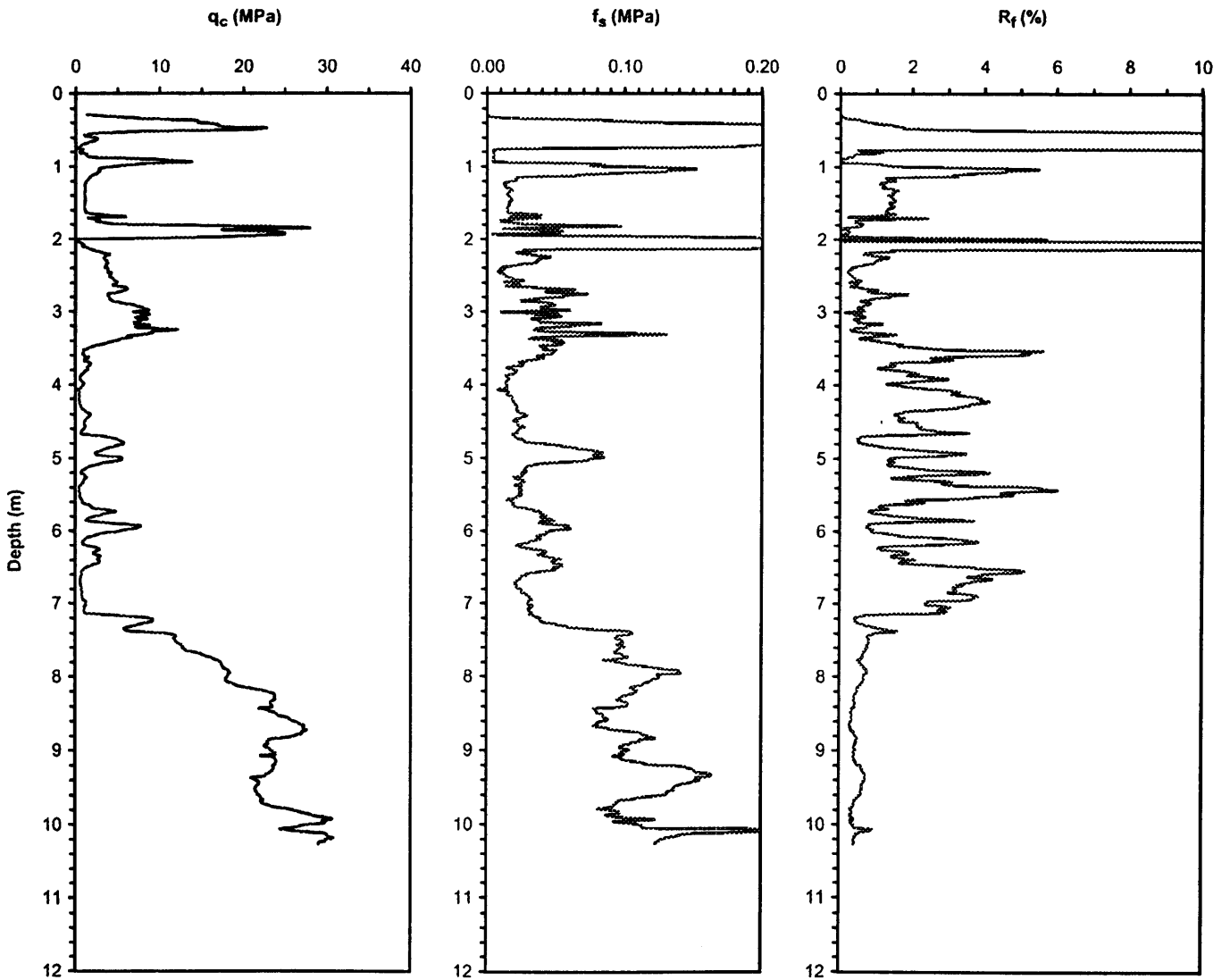
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77664° N, 30.38521° E	**Survey Coordinates (m):** 32,925.32 N, 31,613.40 W
	Test Number:	CPTU 1 - 26	**Elevation (m):** 27.342
	Type of Cone:	ELC10 CFP No. 000606 (a.p. v.d. Berg)	**Date:** 28 June 2000 15:30
Sponsored by:	**File Name:**	cptu 1 - 26.txt	**Water Table Elevation (m):** 26.47
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.23 m to clear utilities.	



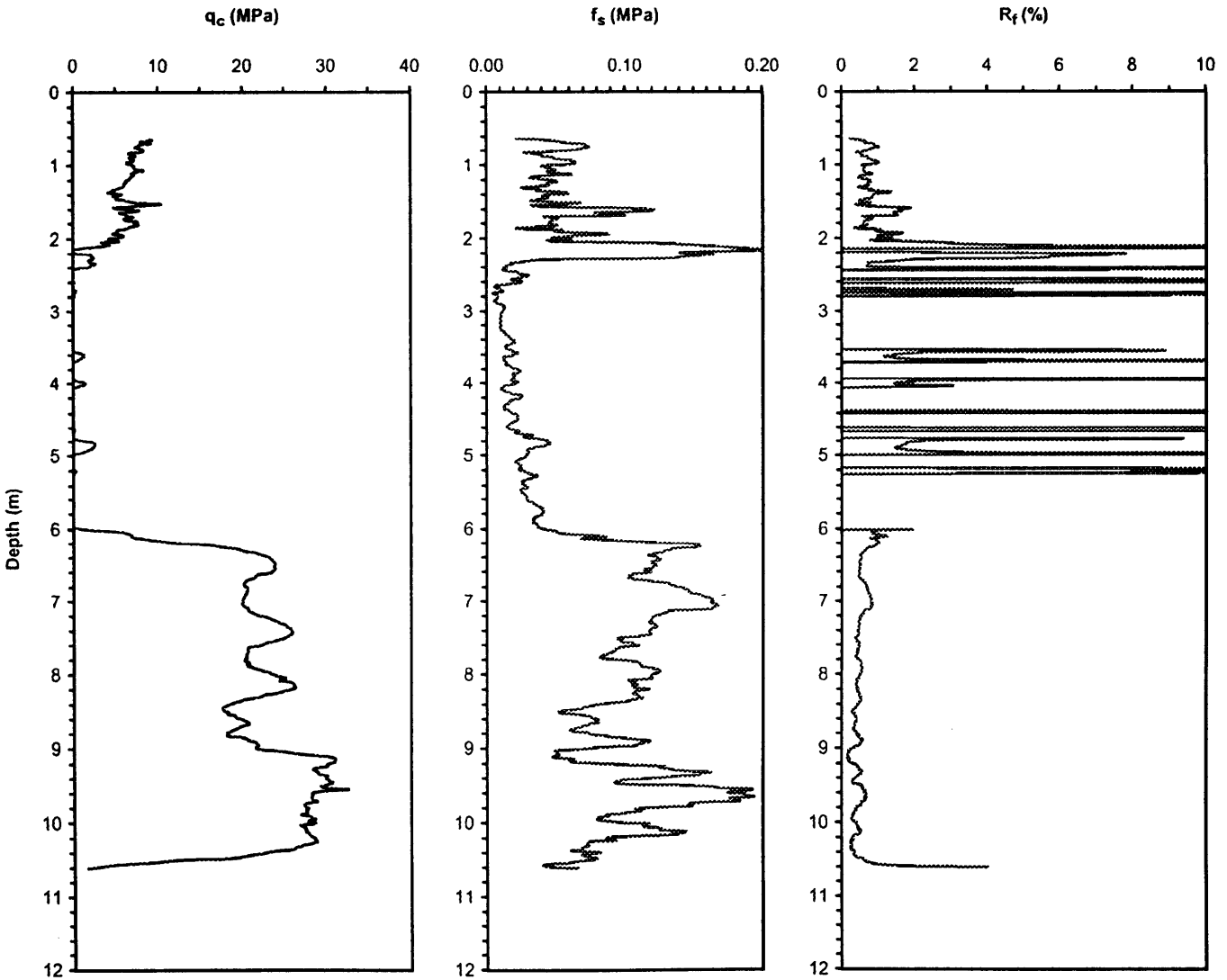
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations. Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77687° N, 30.38750° E	**Survey Coordinates (m):** 32,999.50 N, 31,444.07 W
	Test Number:	CPT 1 - 27	**Elevation (m):** 27.248
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 29 June 2000 11:30
Sponsored by:	**File Name:**	cpt 1 - 27.txt	**Water Table Elevation (m):** 25.71
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.24 m to clear utilities and debris.	



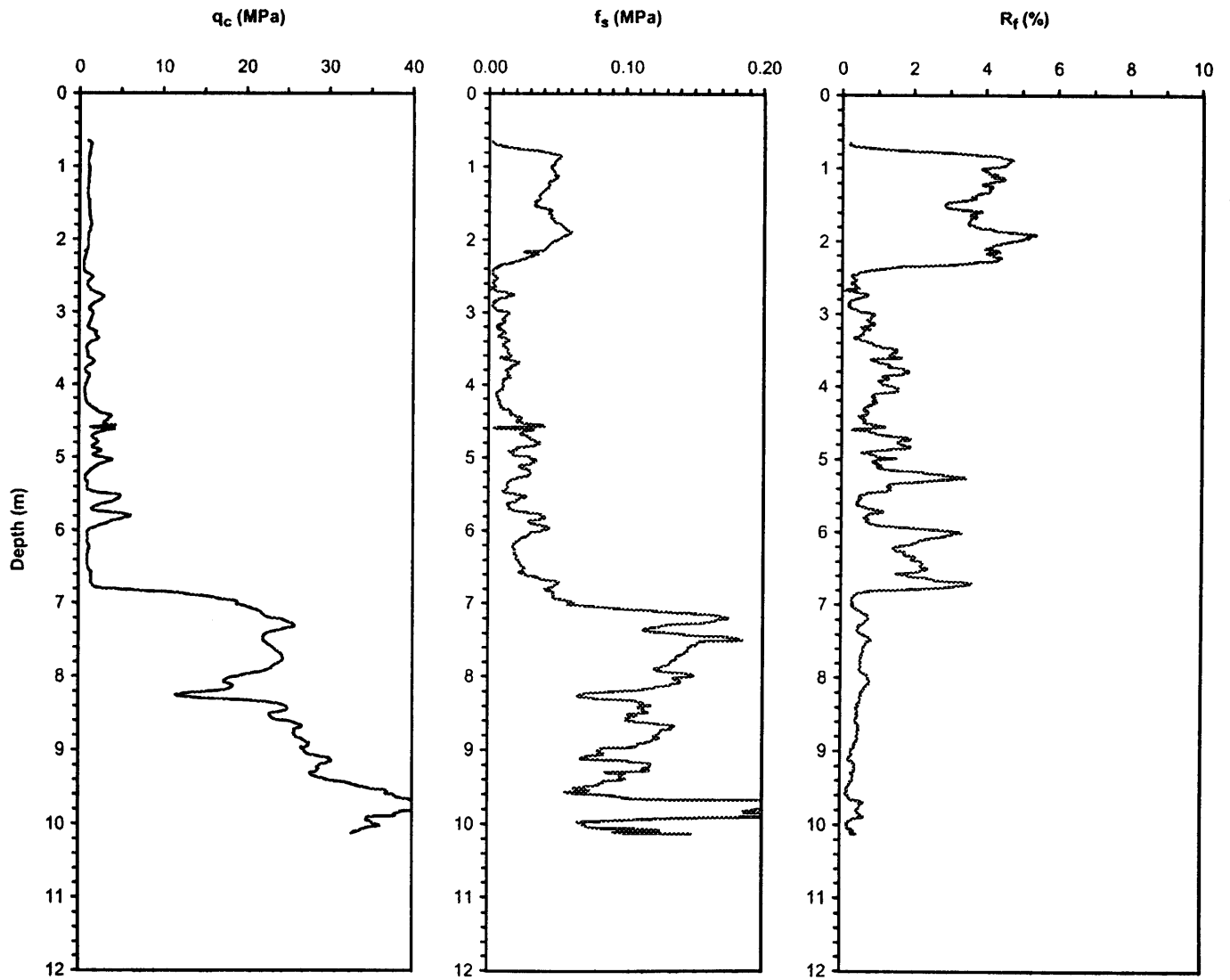
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations. Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77754° N, 30.38888° E	**Survey Coordinates (m):** 33,113.18 N, 31,344.85 W
	Test Number:	CPT 1 - 28	**Elevation (m):** 27.510
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 29 June 2000 13:56
Sponsored by:	**File Name:**	cpt 1 - 28.txt	**Water Table Elevation (m):** 26.71
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.27 m to clear utilities and debris.	



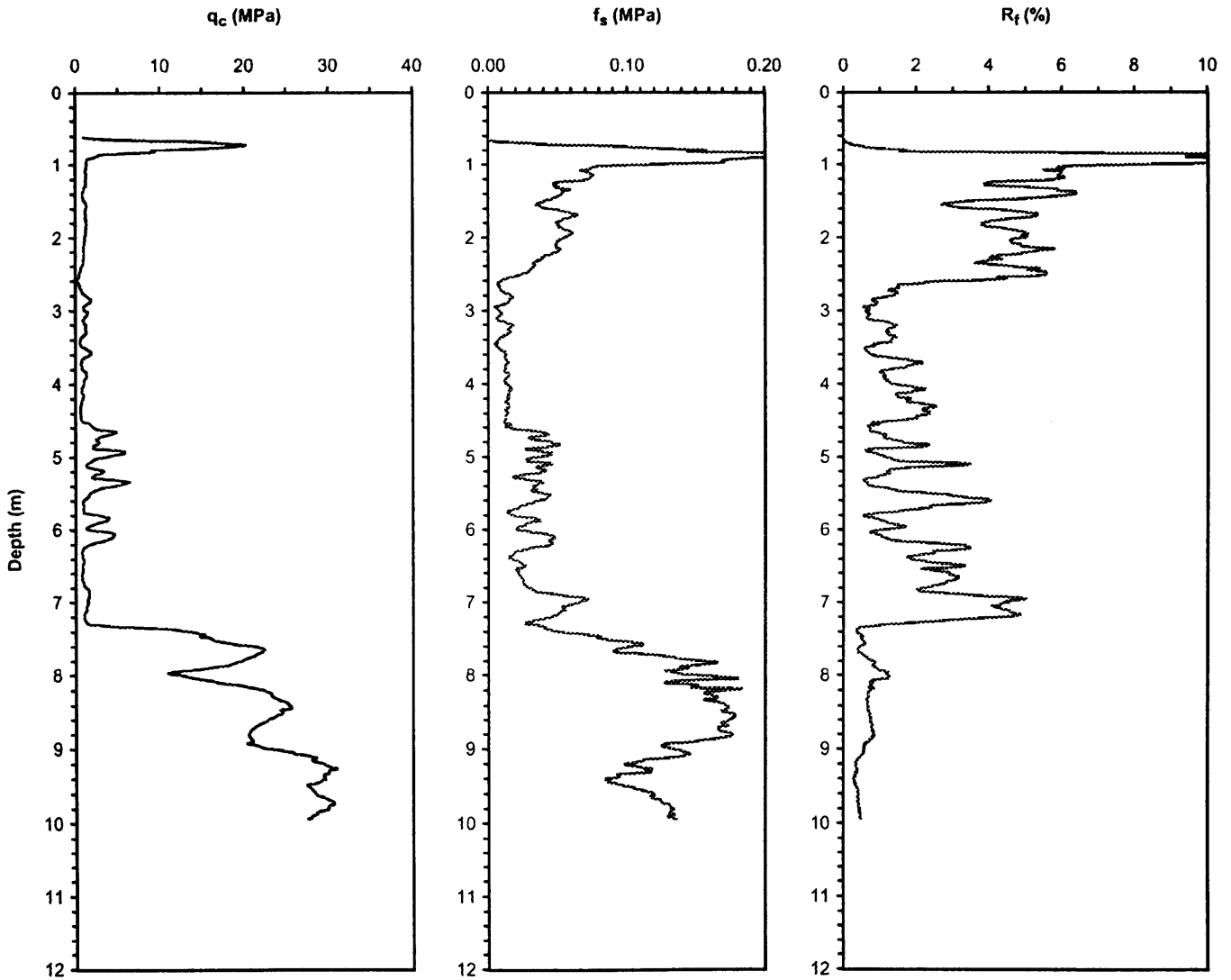
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77636° N, 30.39111° E	**Survey Coordinates (m):** 33,147.50 N, 31,309.59 W
	Test Number:	CPT 1 - 29	**Elevation (m):** 27.181
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 29 June 2000 15:33
Sponsored by:	**File Name:**	cpt 1 - 29.txt	**Water Table Elevation (m):** 26.87
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.61 m to clear utilities and debris.	



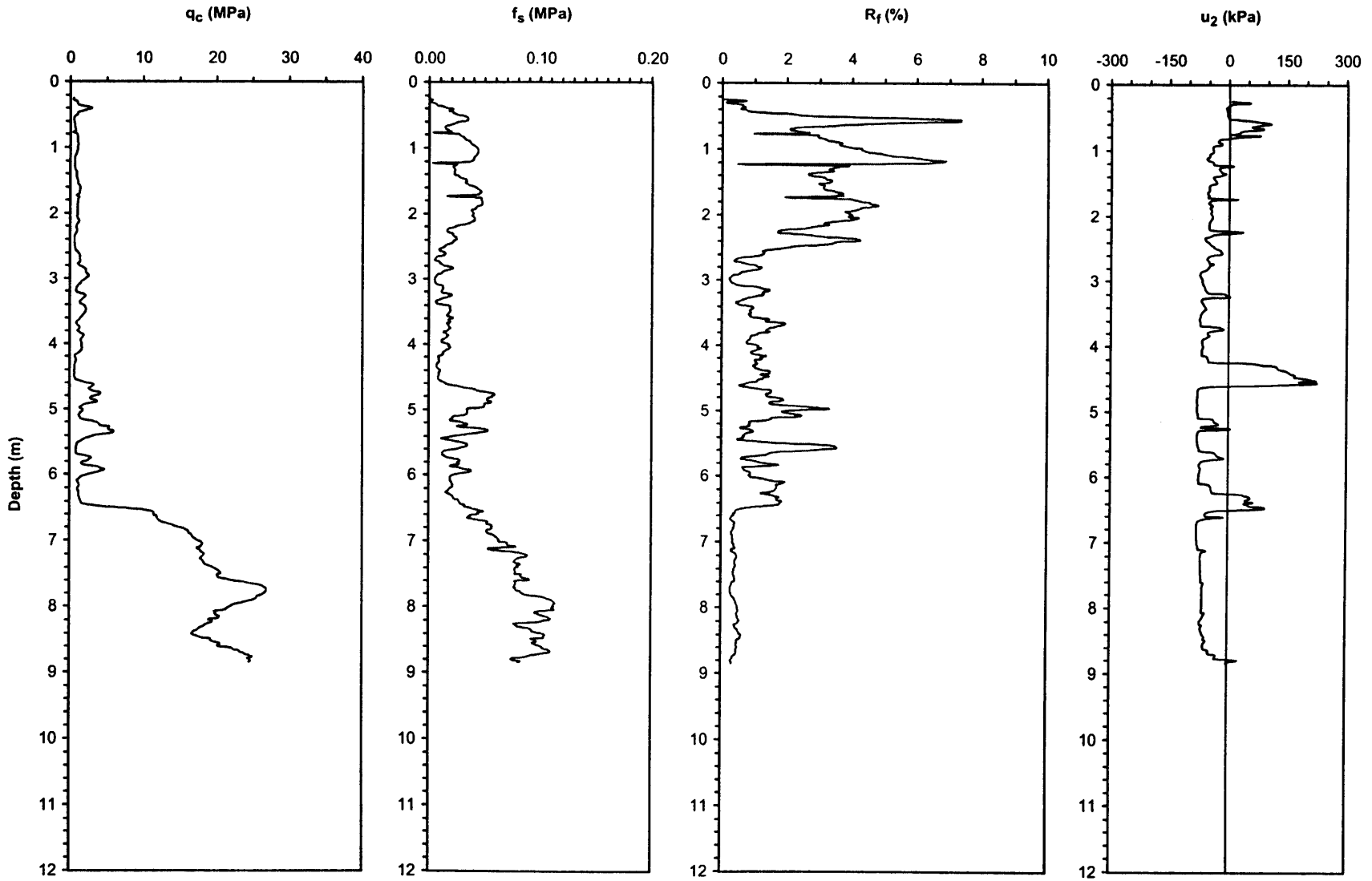
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations. Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77786° N, 30.38979° E	**Survey Coordinates (m):** 33,171.88 N, 31,272.85 W
	Test Number:	CPT 1 - 30	**Elevation (m):** 27.228
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 30 June 2000 10:17
Sponsored by:	**File Name:**	cpt 1 - 30.txt	**Water Table Elevation (m):** 25.83
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.63 m to clear utilities and debris.	



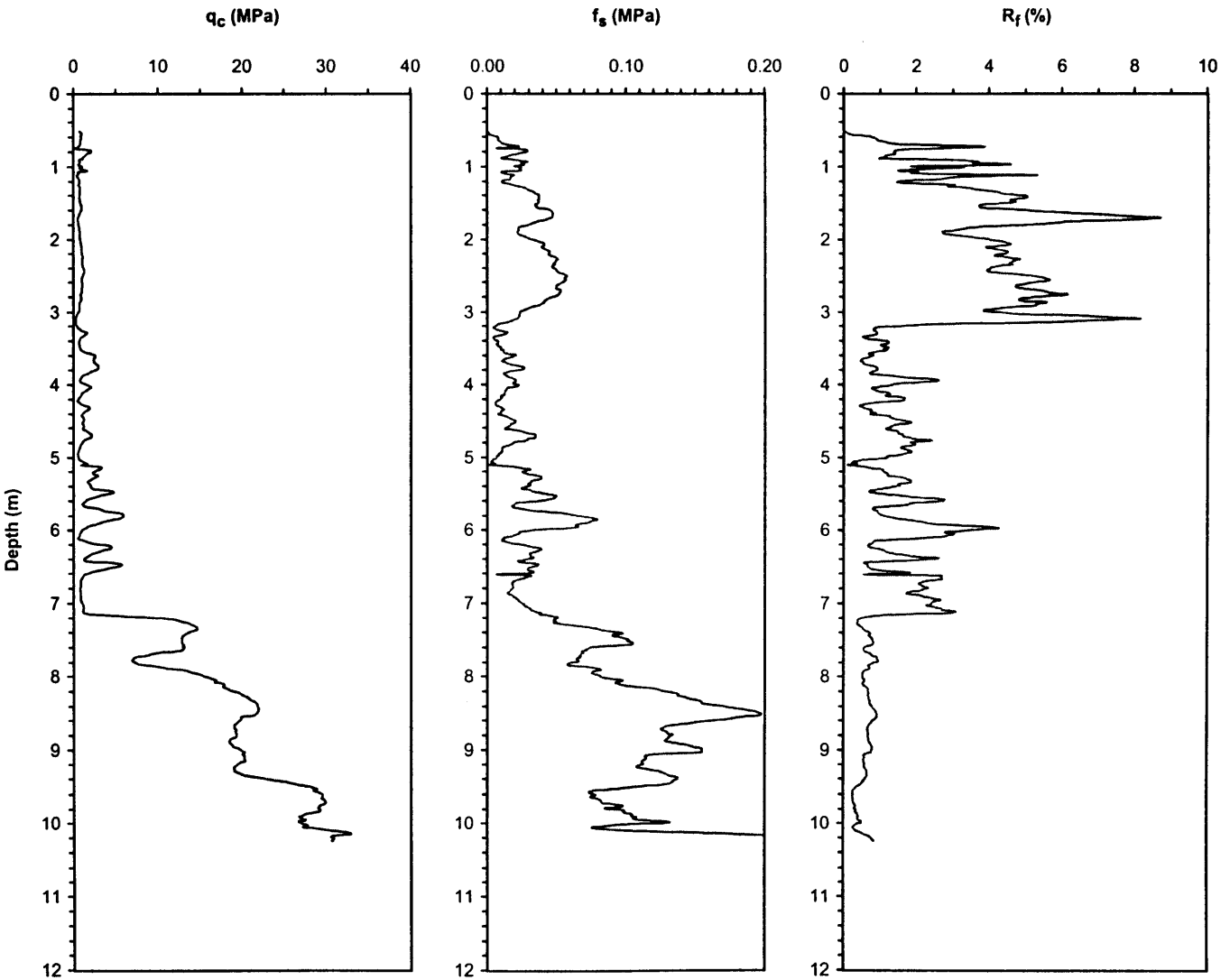
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations. Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77784° N, 30.39042° E	**Survey Coordinates (m):** 33,184.74 N, 31,231.08 W
	Test Number:	CPT 1 - 31	**Elevation (m):** 27.286
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 30 June 2000 11:44
Sponsored by:	**File Name:**	cpt 1 - 31.txt	**Water Table Elevation (m):** 26.59
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.6 m to clear utilities and debris.	



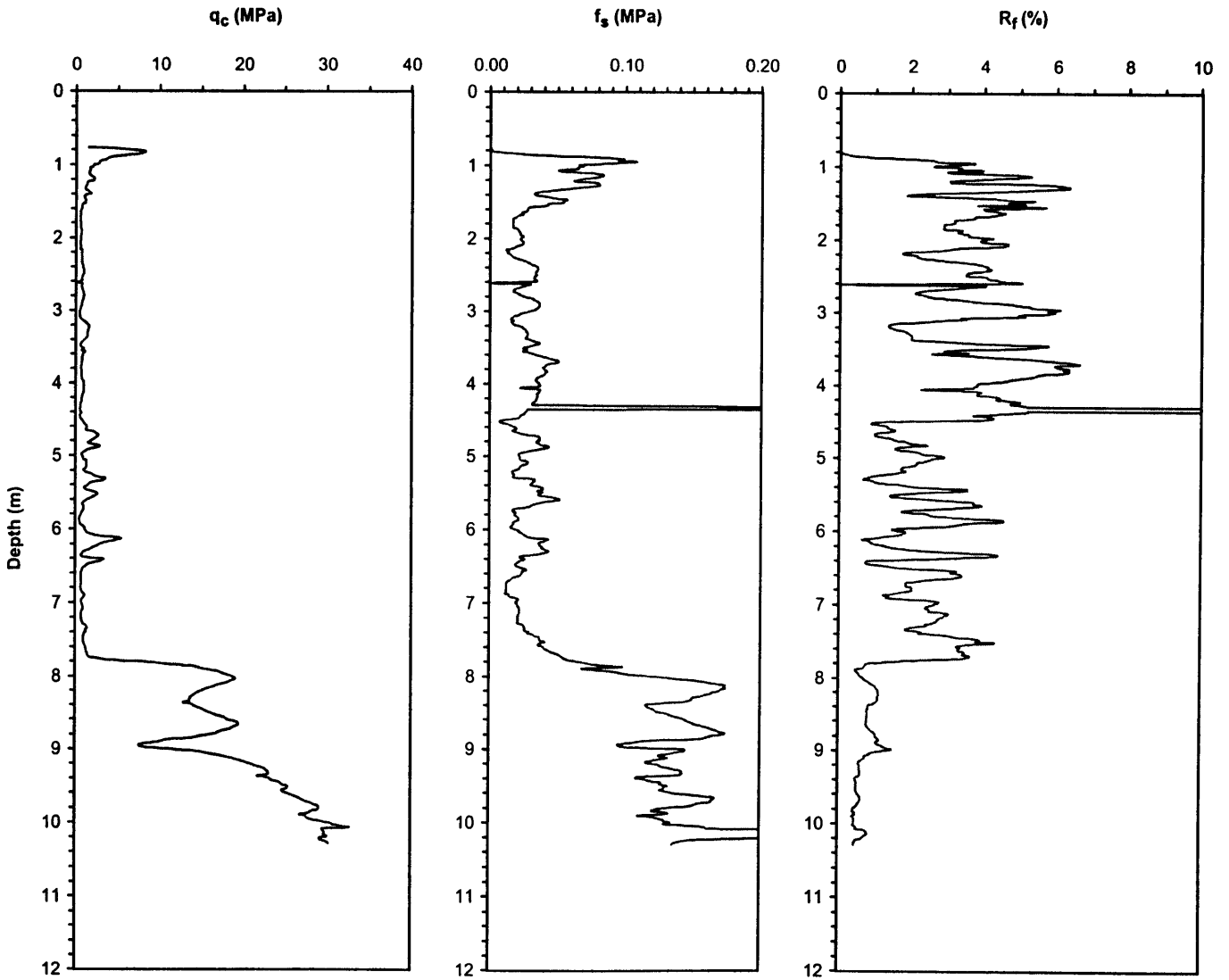
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77651° N, 30.39246° E	**Survey Coordinates (m):** 33,198.79 N, 31,210.17 W
	Test Number:	SCPTU 1 - 32	**Elevation (m):** 27.409
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 30 June 2000 17:15
Sponsored by:	**File Name:**	scptu 1 - 32.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.61 m to clear utilities.	



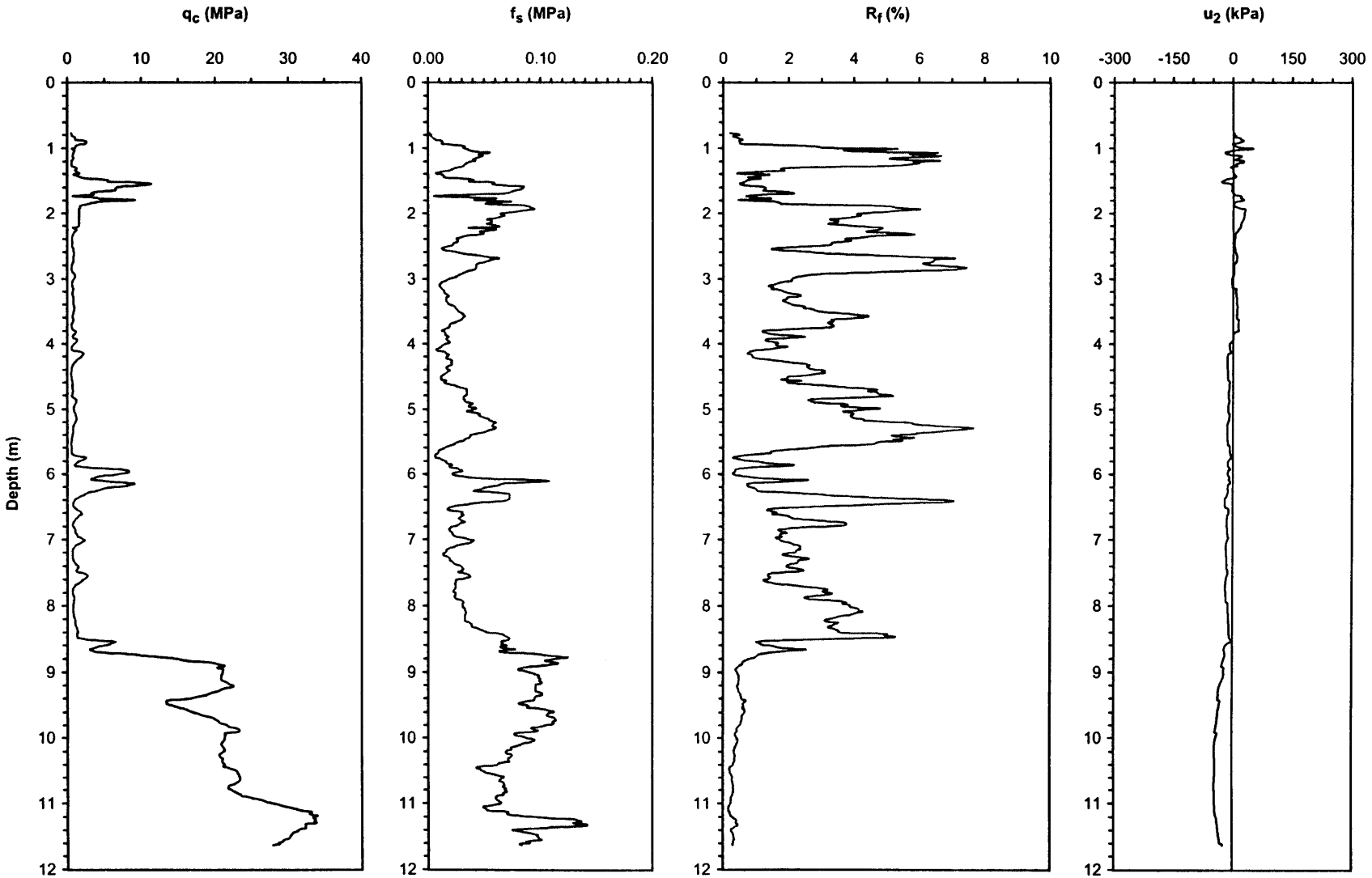
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77793° N, 30.39076° E	**Survey Coordinates (m):** 33,203.02 N, 31,202.02 W
	Test Number:	CPT 1 - 33	**Elevation (m):** 27.514
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 30 June 2000 15:15
Sponsored by:	**File Name:**	cpt 1 - 33.txt	**Water Table Elevation (m):** 26.61
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.51 m to clear utilities and debris.	



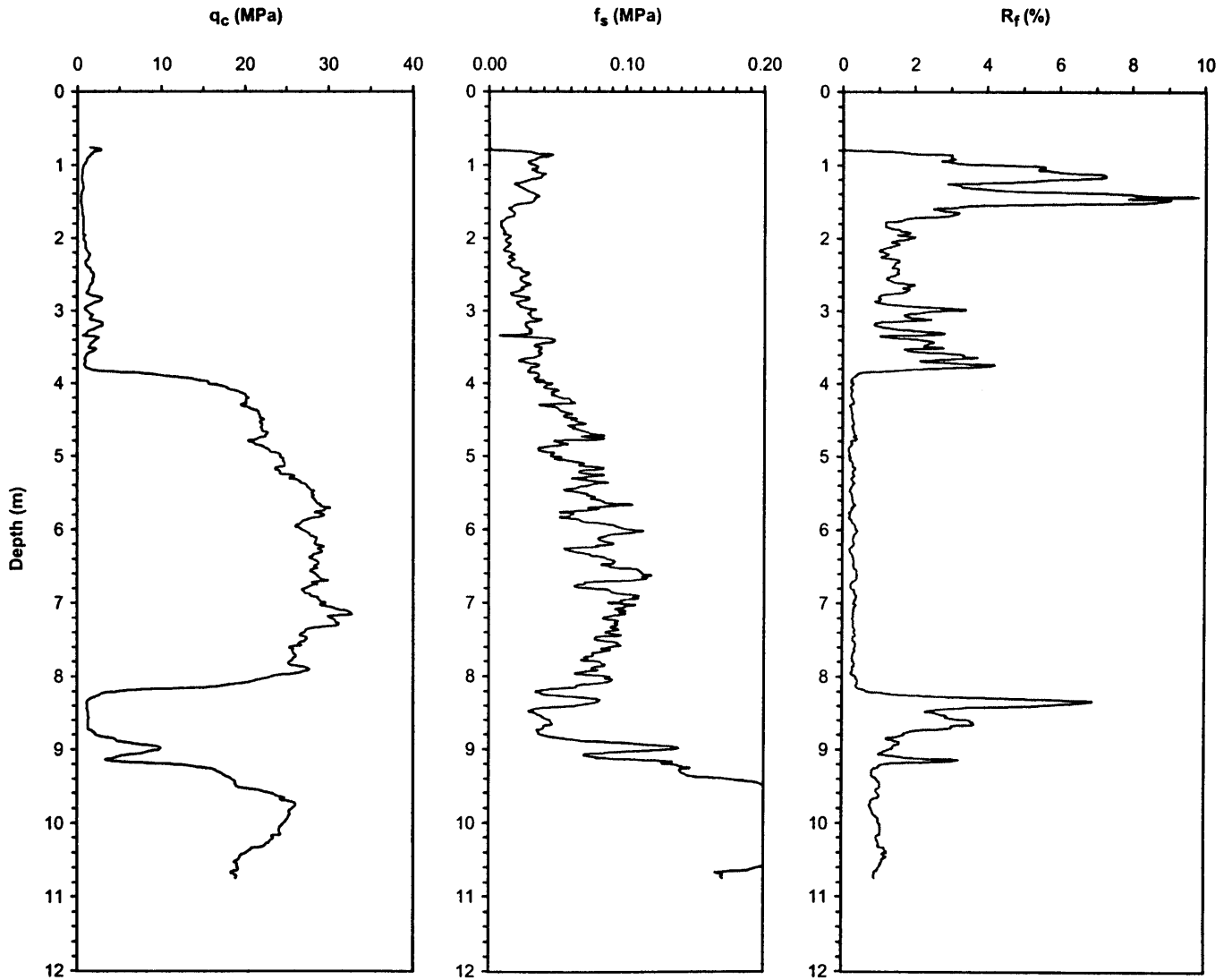
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77858° N, 30.39304° E	**Survey Coordinates (m):** 33,322.79 N, 31,044.56 W
	Test Number:	CPT 1 - 34	**Elevation (m):** 27.749
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 06 July 2000 12:12
Sponsored by:	**File Name:**	cpt 1 - 34.txt	**Water Table Elevation (m):** 26.84
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities and debris.	



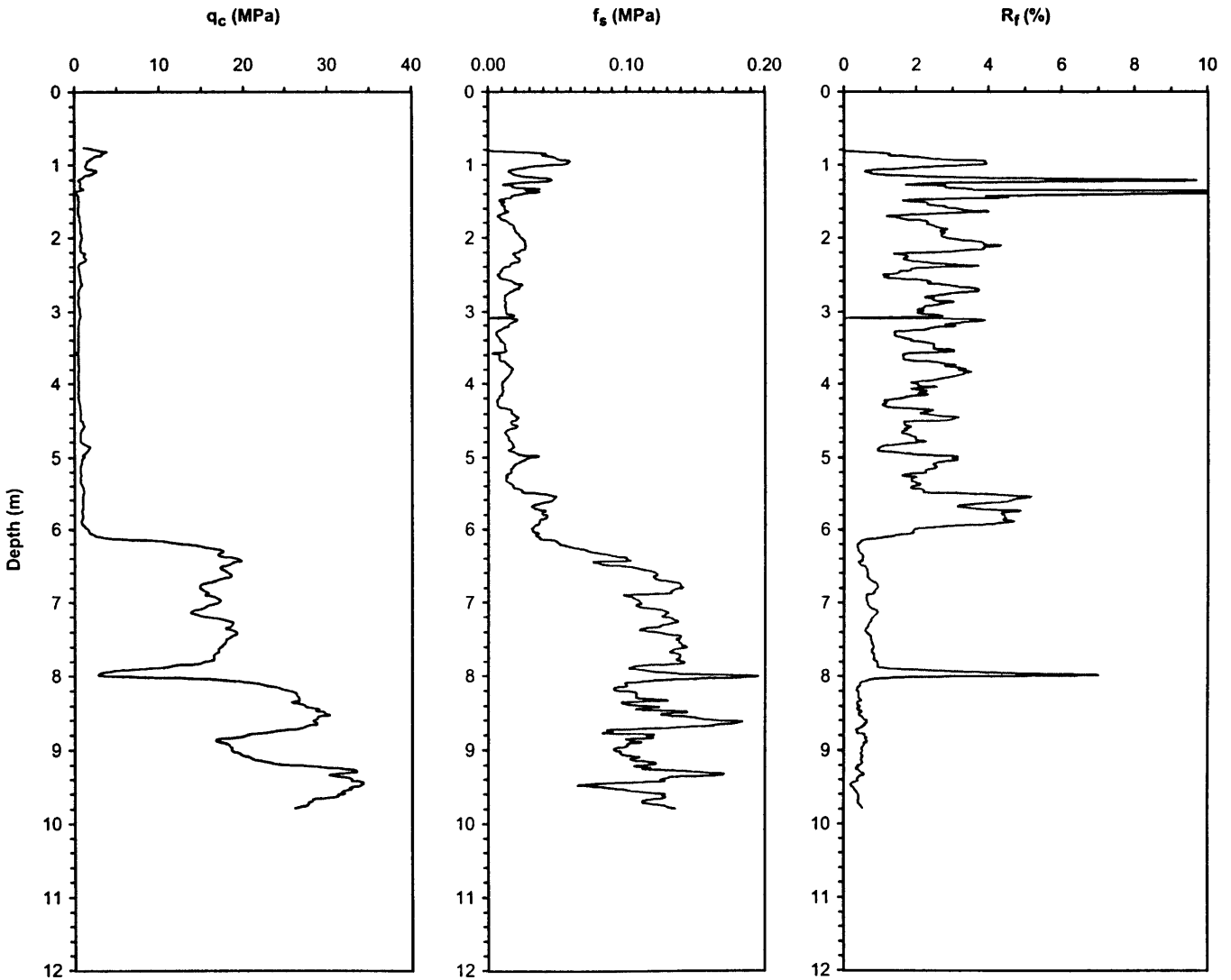
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77833° N, 30.39393° E	**Survey Coordinates (m):** 33,343.25 N, 30,969.27 W
	Test Number:	CPTU 1 - 35	**Elevation (m):** 28.591
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** 06 July 2000 14:30
Sponsored by:	**File Name:**	cptu 1 - 35.txt	**Water Table Elevation (m):** 27.74
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



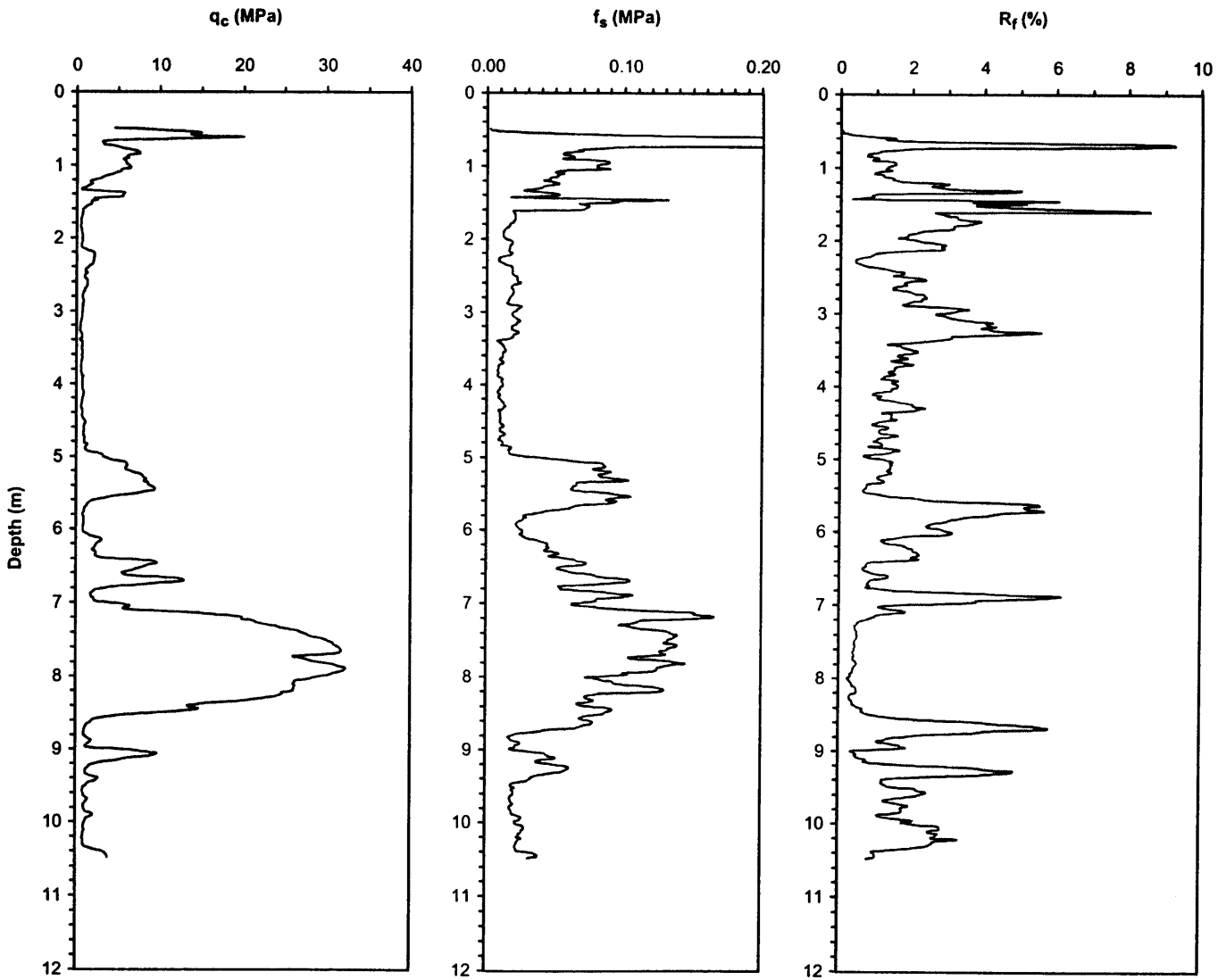
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	N/R	**Survey Coordinates (m):** 33,394.46 N, 30,870.88 W
	Test Number:	CPT 1 - 36	**Elevation (m):** 28.921
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 08 July 2000 8:37
Sponsored by:	**File Name:**	cpt 1 - 36.txt	**Water Table Elevation (m):** 27.77
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.74 m to clear utilities and debris.	



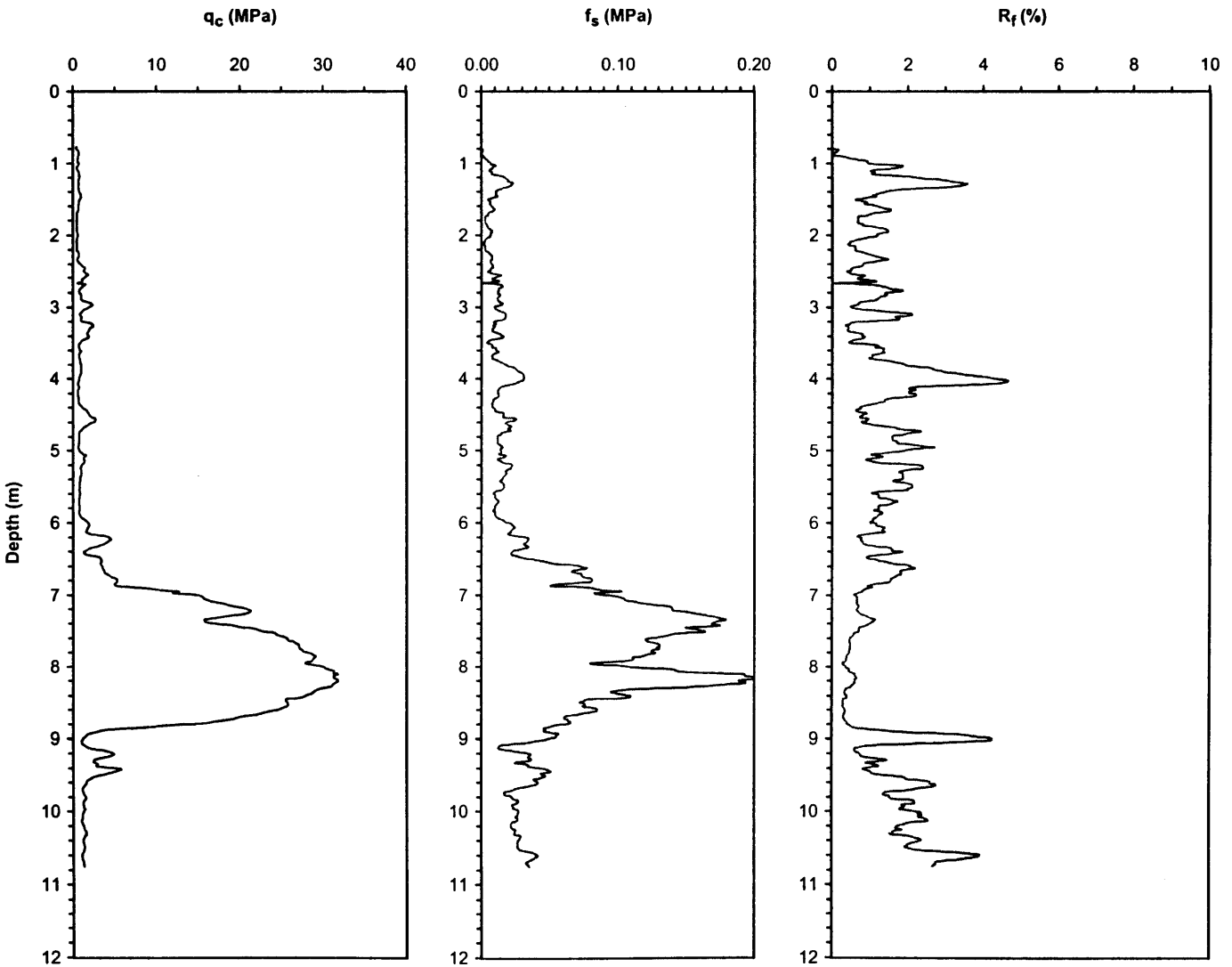
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77848° N, 30.39986° E	**Survey Coordinates (m):** 33,565.11 N, 30,642.81 W
	Test Number:	CPT 1 - 37	**Elevation (m):** 30.565
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 06 July 2000 10:28
Sponsored by:	**File Name:**	cpt 1 - 37.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



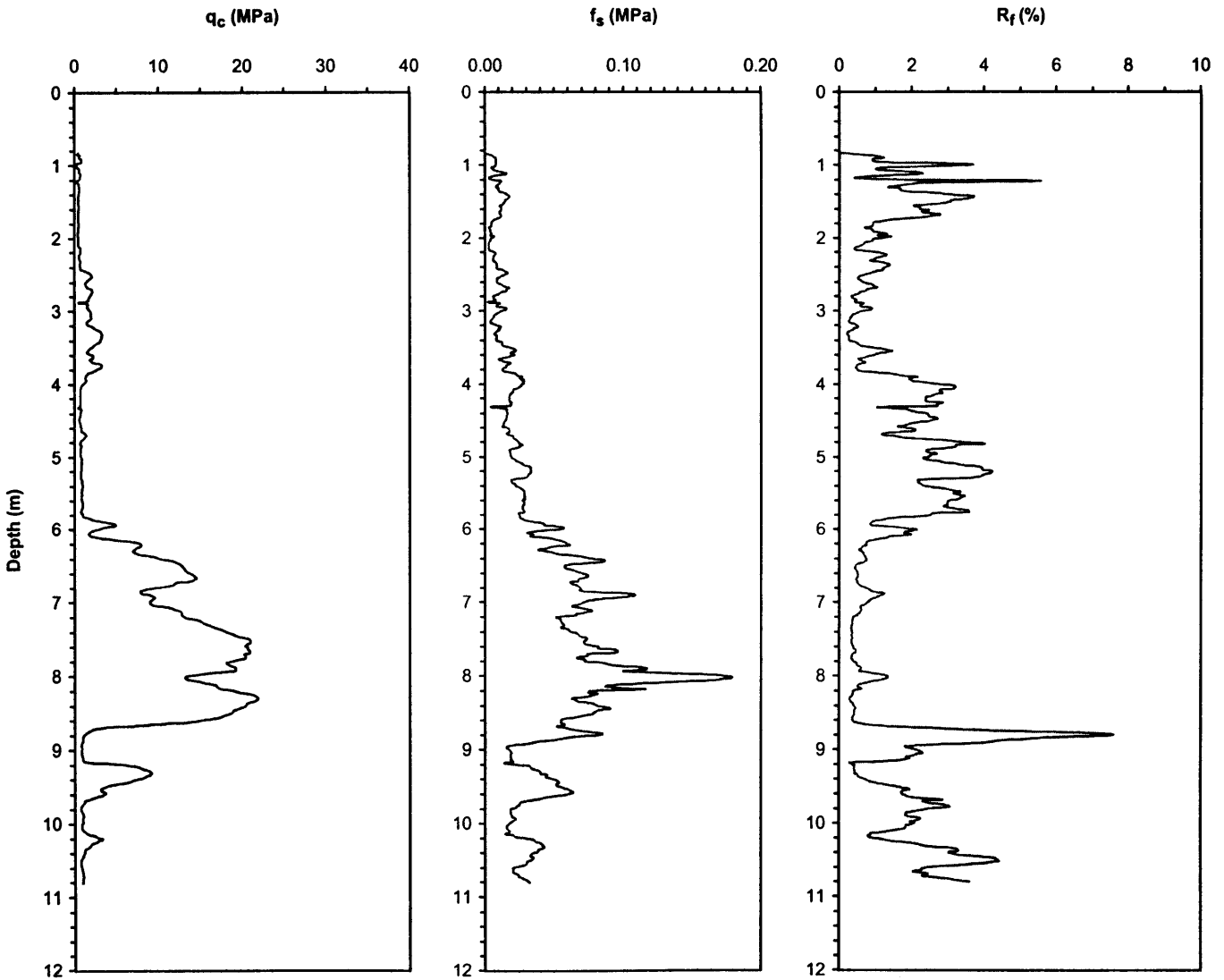
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77988° N, 30.40023° E	**Survey Coordinates (m):** 33,658.11 N, 30,498.14 W
	Test Number:	CPT 1 - 38	**Elevation (m):** 29.959
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 07 July 2000 9:09
Sponsored by:	**File Name:**	cpt 1 - 38.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.48 m to clear utilities and debris.	



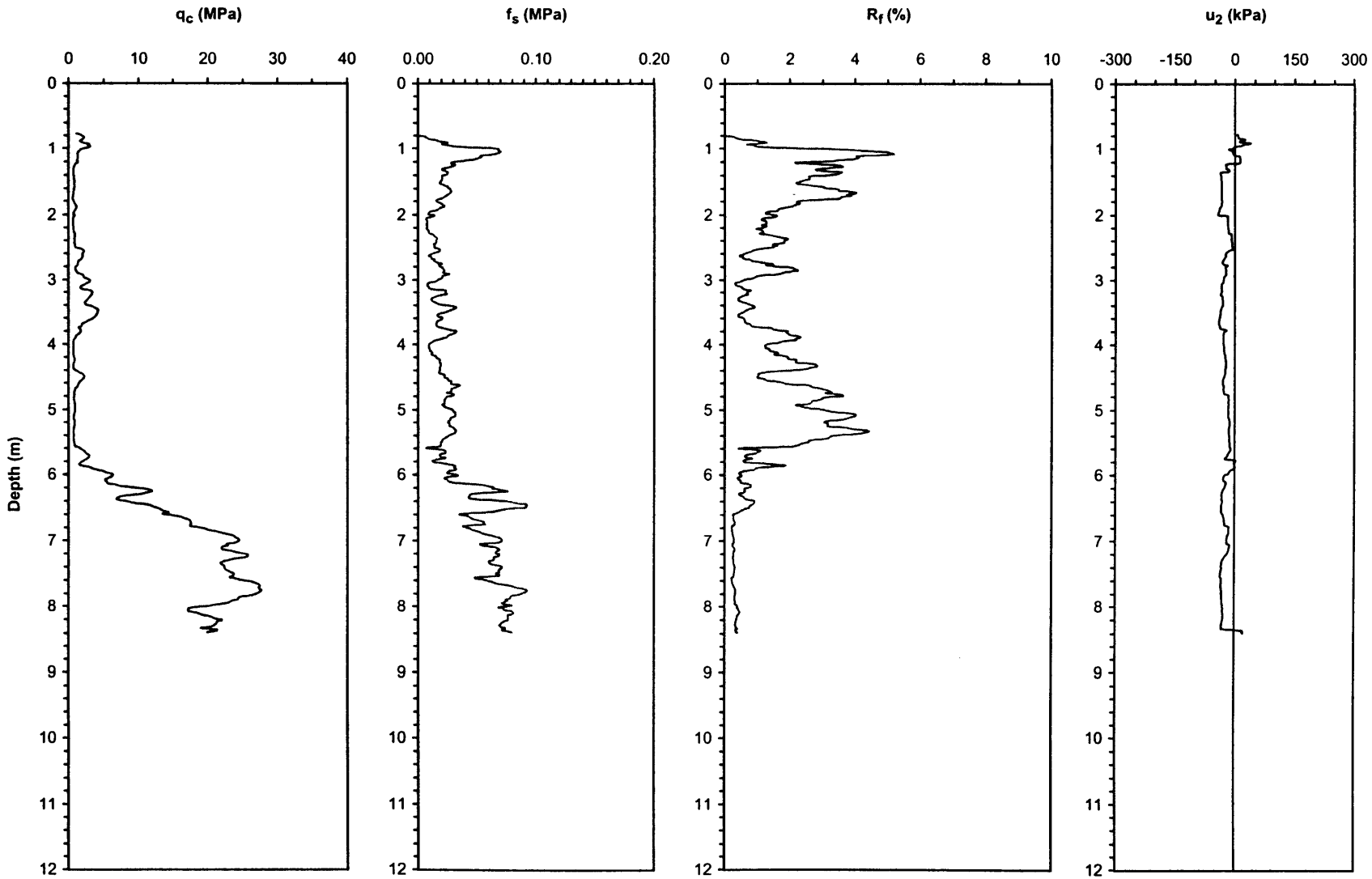
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Ankara Caddesi	
Joint Research	**GPS Coordinates:**	40.78004° N, 30.40141° E	**Survey Coordinates (m):** 33,701.94 N, 30,417.72 W
	Test Number:	CPT 1 - 39	**Elevation (m):** 29.753
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 06 July 2000 8:36
Sponsored by:	**File Name:**	cpt 1 - 39.txt	**Water Table Elevation (m):** 28.89
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



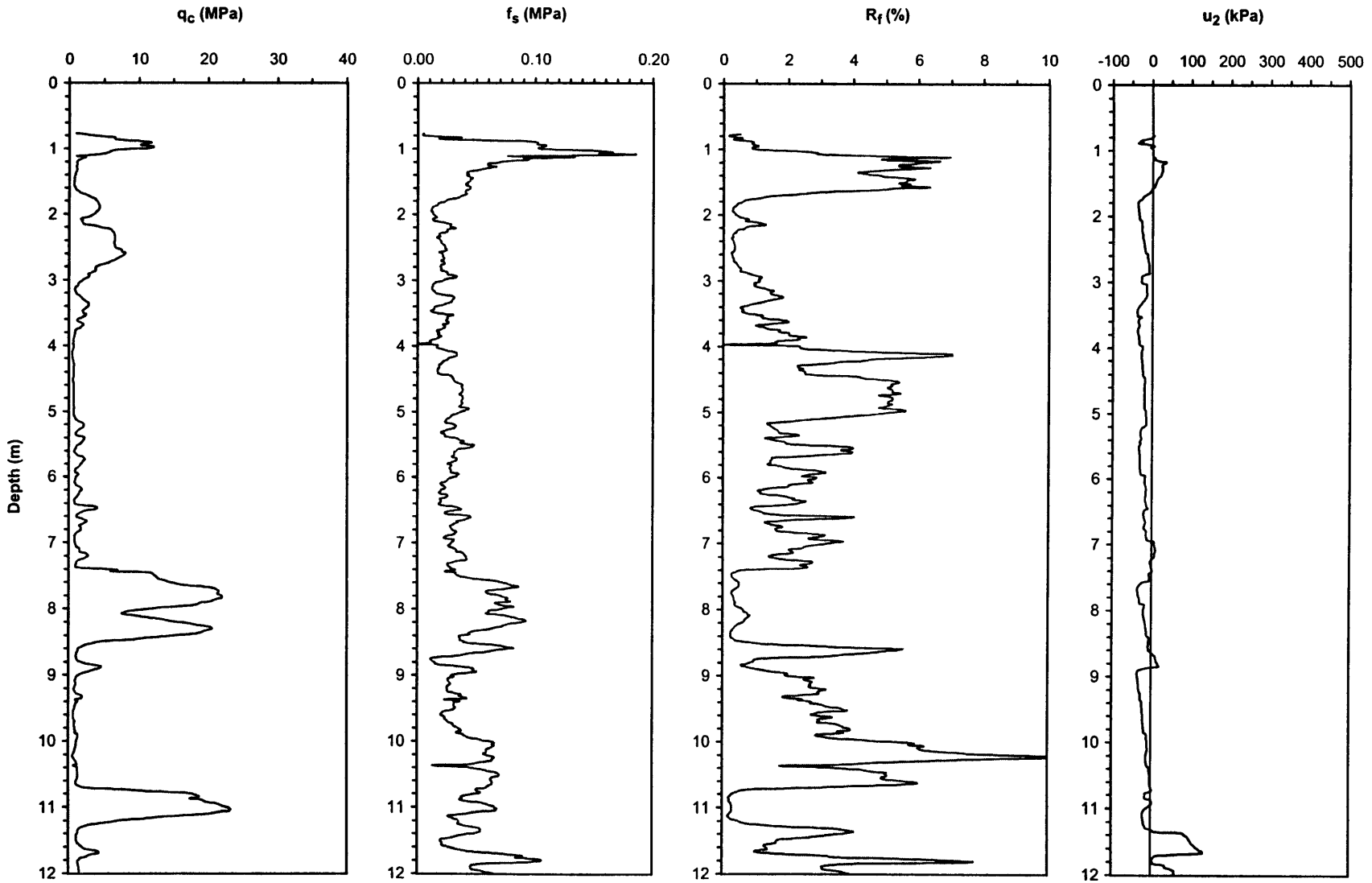
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Ipçi Sokak (One block south of Ankara Caddesi, behind the Hotel Oba)	
Joint Research	**GPS Coordinates:**	40.77896° N, 30.40495° E	**Survey Coordinates (m):** 33,769.82 N, 30,286.53 W
	Test Number:	CPT 1 - 40	**Elevation (m):** 29.482
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 05 July 2000 17:46
Sponsored by:	**File Name:**	cpt 1 - 40.txt	**Water Table Elevation (m):** 28.55
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.8 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Ipçi Sokak (One block south of Ankara Caddesi)	
Joint Research	**GPS Coordinates:**	40.77906° N, 30.40523° E	**Survey Coordinates (m):** 33,789.29 N, 30,262.36 W
	Test Number:	SCPTU 1 - 41	**Elevation (m):** 29.240
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 05 July 2000 16:00
Sponsored by:	**File Name:**	scptu 1 - 41.txt	**Water Table Elevation (m):** 28.59
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Line One: Ankara Caddesi	
Joint Research	**GPS Coordinates:**	40.77948° N, 30.40696° E	**Survey Coordinates (m):** 33,897.27 N, 30,155.20 W
	Test Number:	CPTU 1 - 42	**Elevation (m):** 29.534
	Type of Cone:	ELC10 CFP No. 000606 (a.p. v.d. Berg)	**Date:** 05 July 2000 10:45
Sponsored by:	**File Name:**	cptu 1 - 42.txt	**Water Table Elevation (m):** 28.99
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	

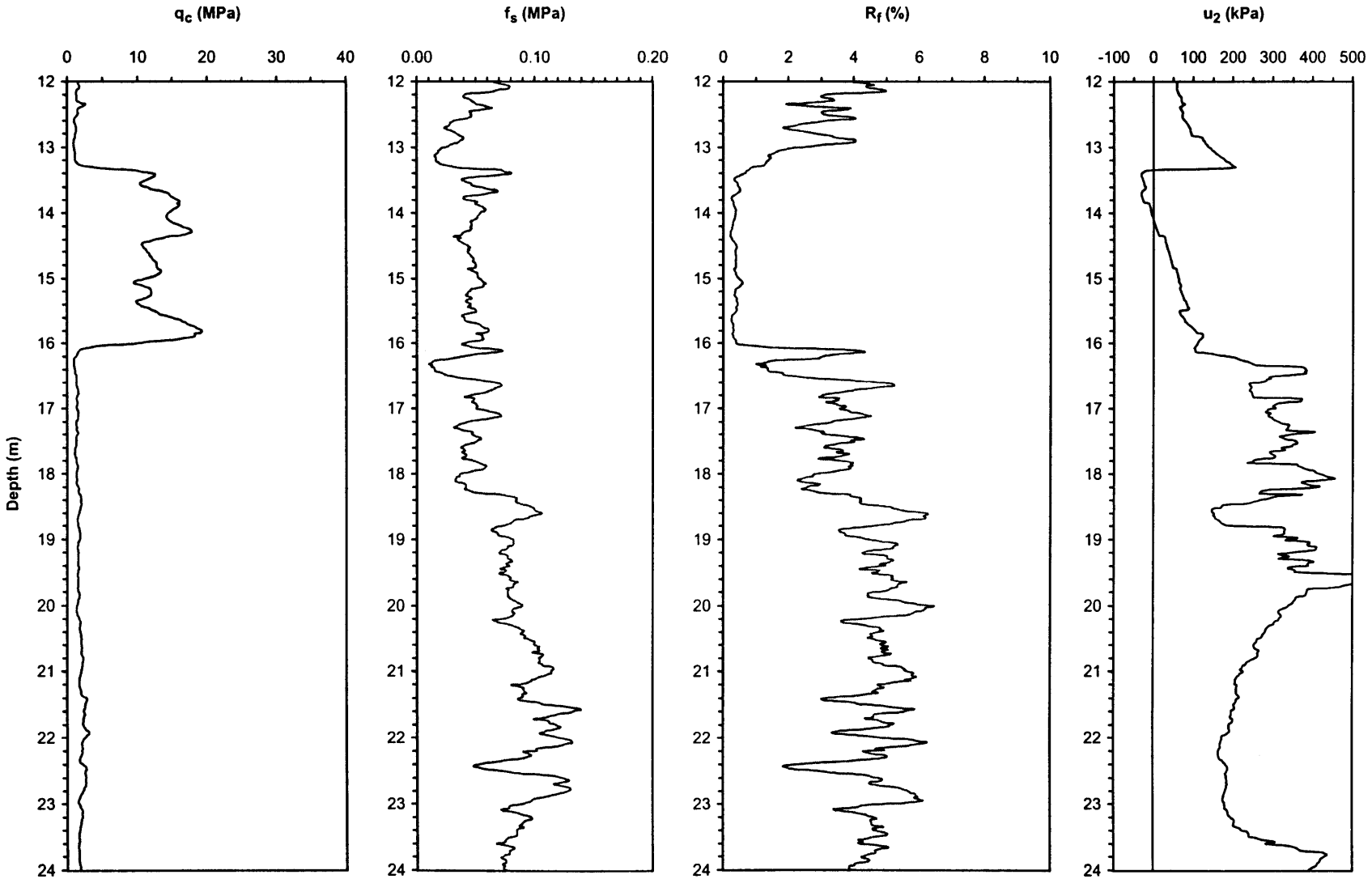


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line One: Ankara Caddesi
GPS Coordinates: 40.77948° N, 30.40696° E
Test Number: CPTU 1 - 42
Type of Cone: ELC10 CFP No. 000606 (a.p. v.d. Berg)
File Name: cptu 1 - 42.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

Survey Coordinates (m): 33,897.27 N, 30,155.20 W
Elevation (m): 29.534
Date: 05 July 2000 10:45
Water Table Elevation (m): 28.99
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU

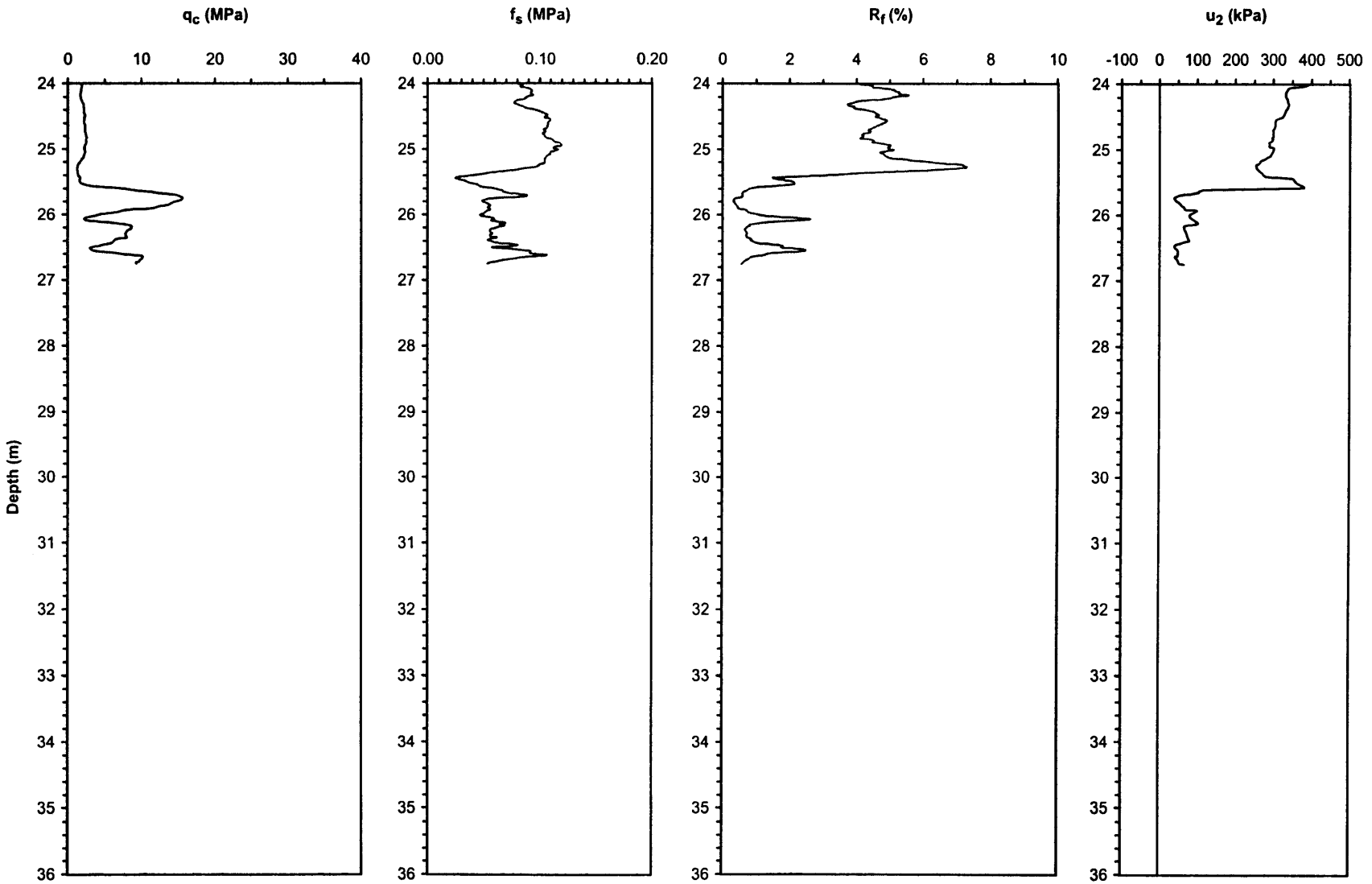


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

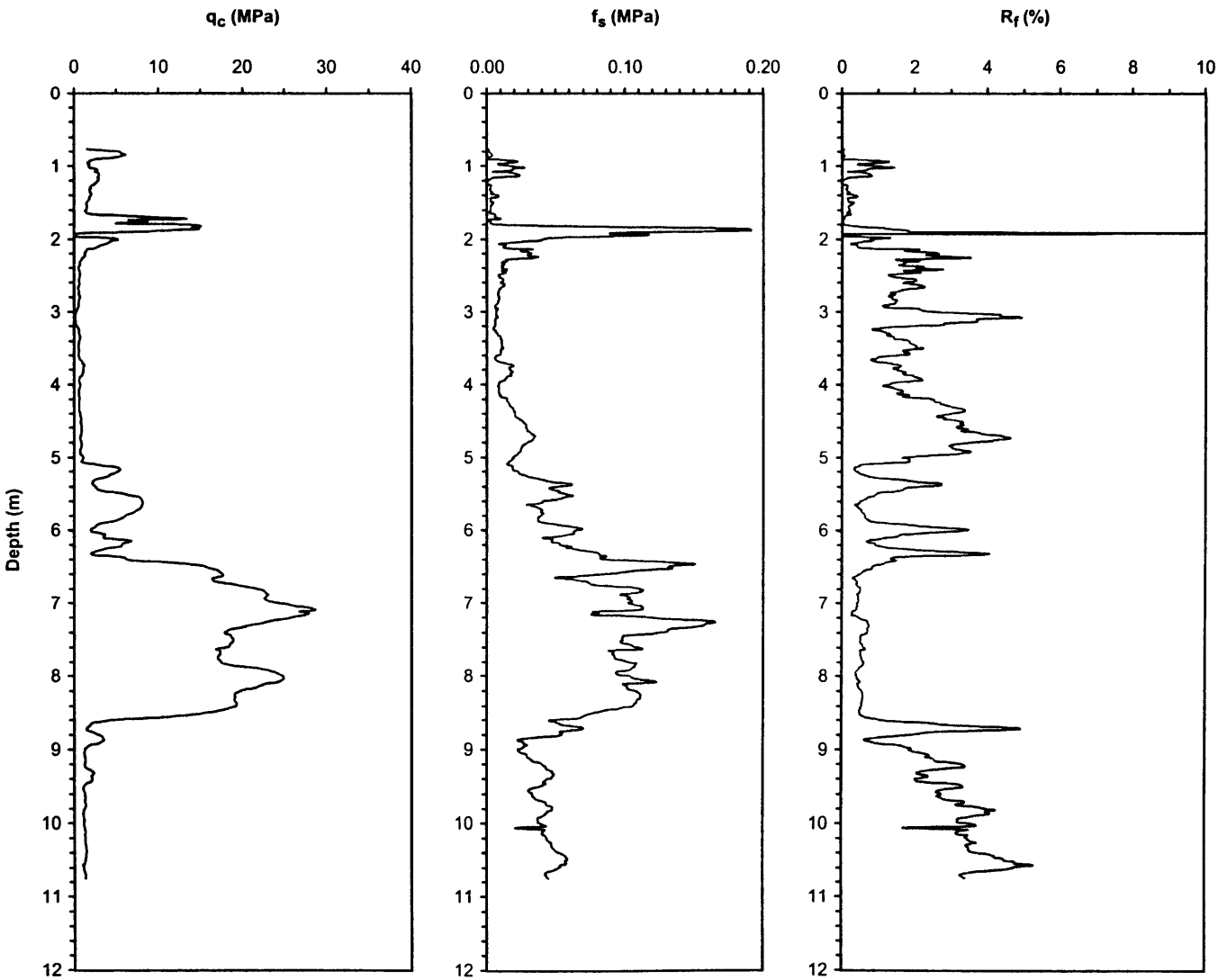
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line One: Ankara Caddesi
GPS Coordinates: 40.77948° N, 30.40696° E
Test Number: CPTU 1 - 42
Type of Cone: ELC10 CFP No. 000606 (a.p. v.d. Berg)
File Name: cptu 1 - 42.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

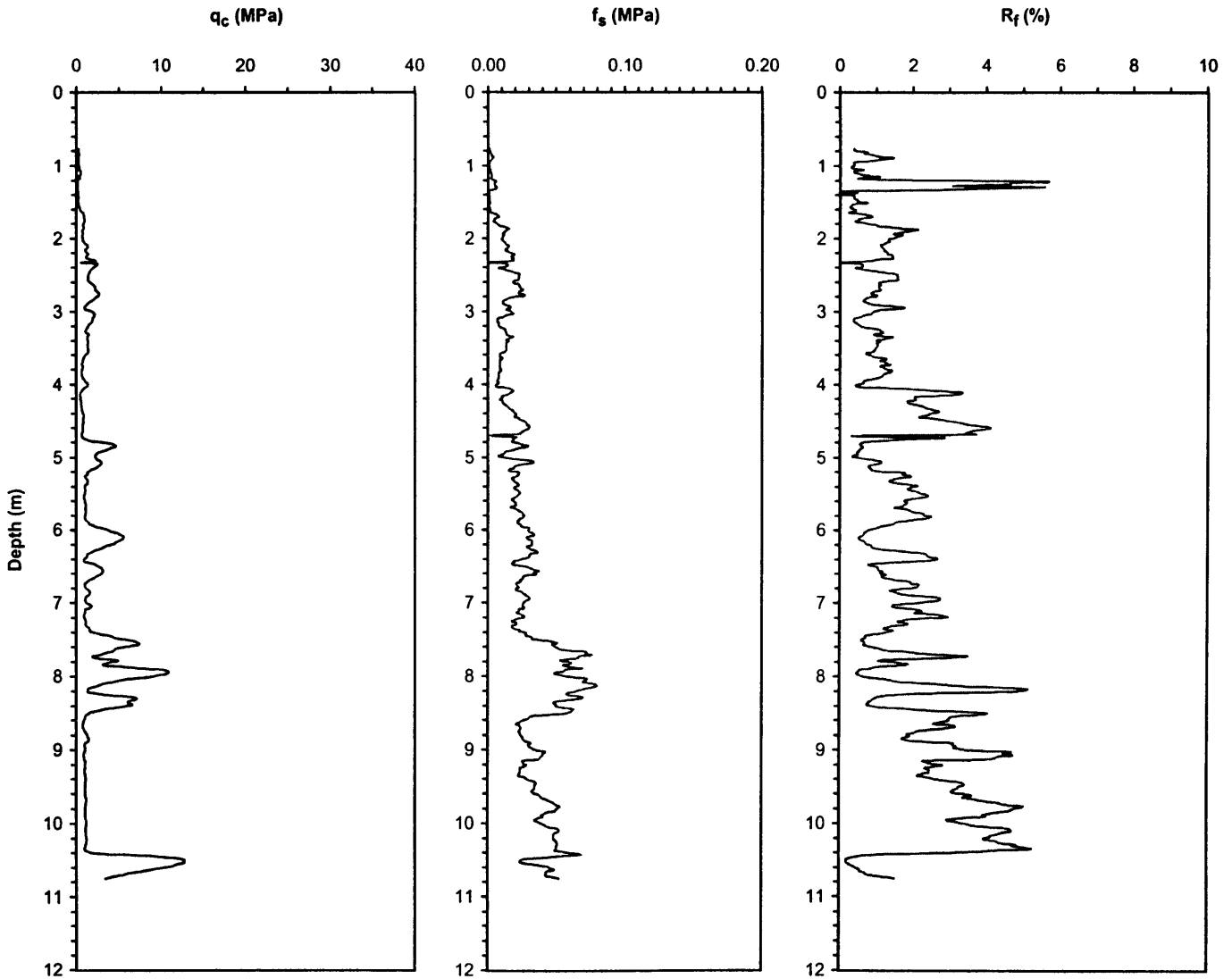
Survey Coordinates (m): 33,897.27 N, 30,155.20 W
Elevation (m): 29.534
Date: 05 July 2000 10:45
Water Table Elevation (m): 28.99
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



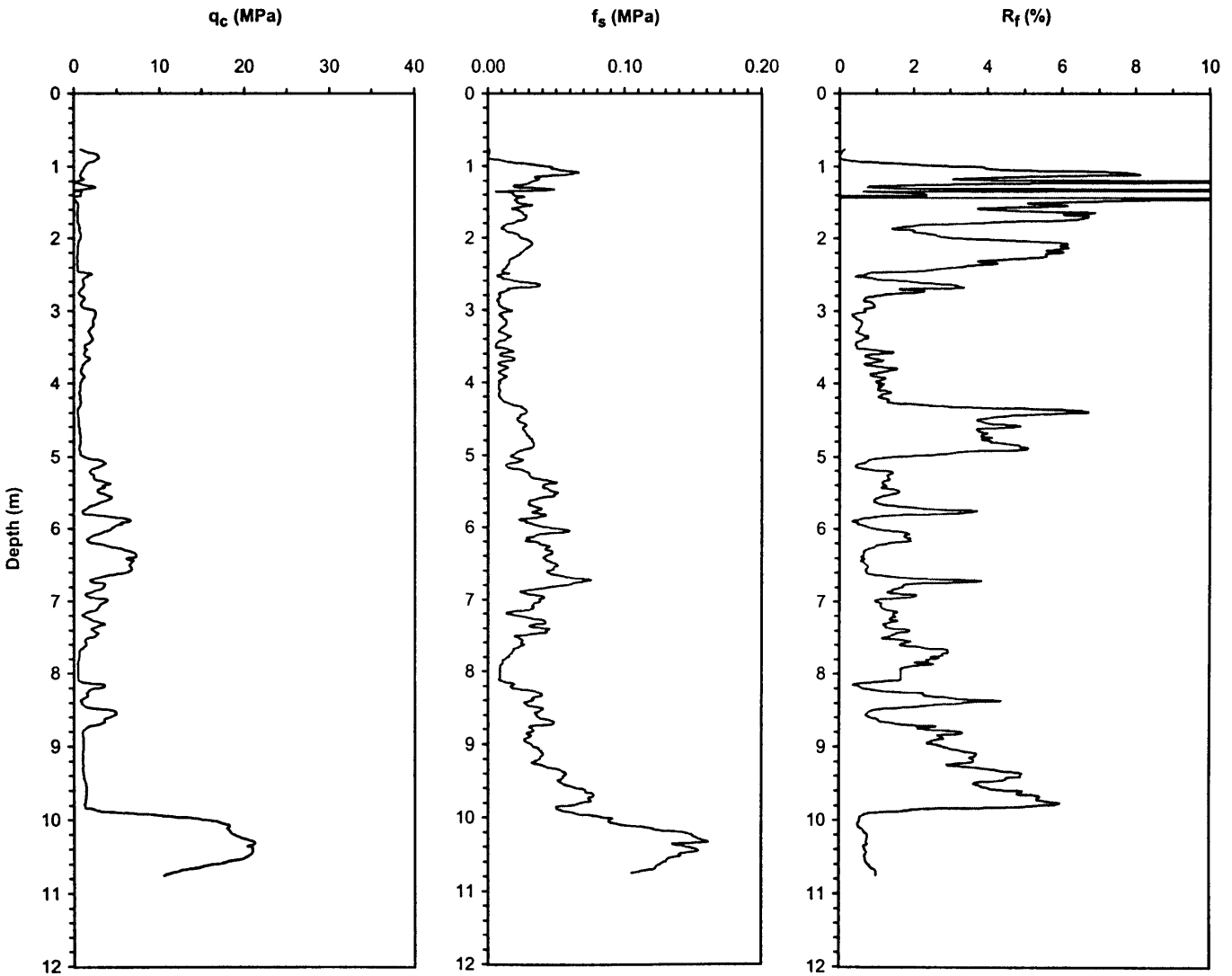
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Ankara Caddesi	
Joint Research	**GPS Coordinates:**	40.78192° N, 30.40713° E	**Survey Coordinates (m):** 34,042.09 N, 30,024.80 W
	Test Number:	CPT 1 - 43	**Elevation (m):** 28.425
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 05 July 2000 9:10
Sponsored by:	**File Name:**	cpt 1 - 43.txt	**Water Table Elevation (m):** 27.70
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie. Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.74 m to clear utilities.	



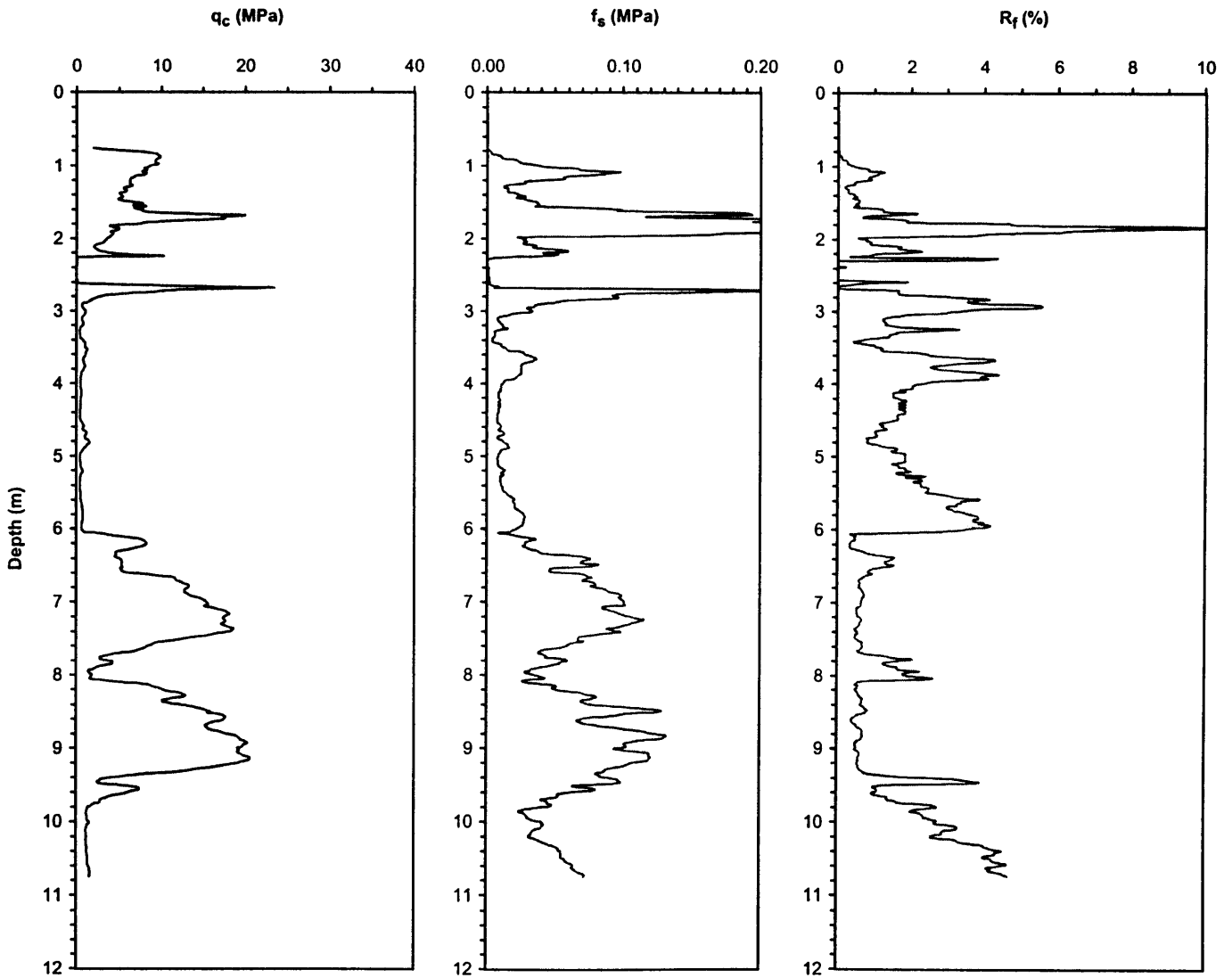
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Ankara Caddesi	
Joint Research	**GPS Coordinates:**	40.78330° N, 30.40941° E	**Survey Coordinates (m):** 34,248.74 N, 29,881.87 W
	Test Number:	CPT 1 - 44	**Elevation (m):** 30.237
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 04 July 2000 18:39
Sponsored by:	**File Name:**	cpt 1 - 44.txt	**Water Table Elevation (m):** 30.04
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities and debris.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Nar Sokak (About 35 m south of Ankara Caddesi)	
Joint Research	**GPS Coordinates:**	40.78330° N, 30.41006° E	**Survey Coordinates (m):** 34,258.62 N, 29,829.33 W
	Test Number:	CPT 1 - 45	**Elevation (m):** 29.963
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 04 July 2000 16:51
Sponsored by:	**File Name:**	cpt 1 - 45.txt	**Water Table Elevation (m):** 29.04
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities and debris.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Ankara Caddesi	
Joint Research	**GPS Coordinates:**	40.78415° N, 30.41093° E	**Survey Coordinates (m):** 34,369.86 N, 29,781.01 W
	Test Number:	CPT 1 - 46	**Elevation (m):** 30.899
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 04 July 2000 15:11
Sponsored by:	**File Name:**	cpt 1 - 46.txt	**Water Table Elevation (m):** 29.77
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.74 m to clear utilities and debris.	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m away from CPT-1-02
Date: July 13, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.11 m 07/17/00
Notes: SPT energy was not measured

Test ID: SPT-1-02
GPS Coordinates: 40.77346°N 30.36374°E
Elevation: 26.712 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Hole drilled through pavement (asphalt and subgrade) followed by sand											
1		CH	S-1-02-1	20/45	5-2-3	0.95	3.67	50*	CH: Gray to reddish brown high plasticity silty clay		88	37	69	39	98	64	55	<1μm		
2		CH	S-1-02-2	27/45	2-3-3	1.95	5.20	55*		90	41	32	58	35	98	61	51	0.002	<1μm	
3		ML	S-1-02-3	30/45	3-3-4	3.35	6.72	60*	ML: Sandy silt to silt with sand	230		31	24	-	71	16	12	0.045	<2μm	
4		CH	S-1-02-4	33/45	2-3-3	4.45	8.24	65*	CH: Gray high plasticity silty clay. Traces of shells in S-1-02-5 and S-1-02-6	150	76	40	79	51	97	67	57	<1μm		
5		CH	S-1-02-5	32/45	3-5-9	5.45	8.24	65*		460	115	32	75	50	99	73	60	<1μm		
6																				
7		CH	S-1-02-6	28/45	2-4-4	6.95	11.29	65*		240	90	34	65	43	100	65	40	0.003	<1μm	
8		CL	S-1-02-7	22/45	2-1-2	7.95	11.29	65*		65	29	34	44	25	99	50	40	0.005	<1μm	
9		ML	S-1-02-8	35/45	2-2-3	8.95	12.82	65*	ML: Dark gray silt with traces of fine sand	70		32	29	-	95	21	16	0.027	<1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m south of CPT-1-11
Date: July 7, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 2.4 m 07/11/00
Notes:

Test ID: SPT-1-11
GPS Coordinates: 40.77380°N 30.37207°E
Elevation: 26.333 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Borehole drilled through street pavement (asphalt and subgrade)											
1		CH	S-1-11-1	29/45	2-4-4	1.15	4.27	57	CH: Gray with reddish brown zones, high plasticity silty clay	120	69	37	63	39	99	73	59	<1μm	-	
2		ML CL	S-1-11-2A S-1-11-2B	33/45	2-2-2	2.15	5.80	49	ML: Gray brown silt with sand CLAY: Gray silty clay with black organic points throughout sample	130	31	33 36	31 48	- 26	77 98	20 45	16 37	0.041 0.007	<1μm <1μm	
3		CL ML	S-1-11-3A S-1-11-3B	34/45	2-3-3	2.95	7.32	57		120	48	31 29	48 32	27 -	94 82	56 21	46 17	0.003 0.030	<1μm <1μm	
4		ML	S-1-11-4	38/45	2-1-4	3.75	7.32	66	CLAYEY SILT: Gray clayey silt with varying sand content to silty clay with traces of fine sand			34	40	-	68	18	15	0.048	<1μm	
5		CL	S-1-11-5	35/45	2-2-2	4.75	8.84	61		80	30	34	39	21	94	53	40	0.004	<1μm	
6		ML ml	S-1-11-6A S-1-11-6B	37/45	2-2-6	5.65	10.37	64				35 31	37	-	99 87	43 16	34 13	0.007 0.028	<1μm <2μm	
7		SM	S-1-11-7	35/45	6-4-2	6.55	10.37	64	SILT: Gray low plasticity clayey silt with sand. Roots in sample S-1-11-7. Cemented silt clusters in sample S-1-11-9			26	-	-	20	10	8	0.14	0.005	
8		ML	S-1-11-8	38/45	2-2-4	7.55	11.89	65				13	34	-	80	26	21	0.025	<1μm	
9		ML	S-1-11-9	37/45	2-3-5	8.45	13.42	65		100		29	33	-	78	24	19	0.022	<1μm	
10		ML CL	S-1-11- S-1-11-	36/45	1-2-2	9.45	13.42	66		40		31 33	28 35	-	78 88	24 47	19 38	0.031 0.006	<1μm <1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

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Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m away from CPT-1-16
Date: July 11, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.37 m 07/12/00
Notes: SPT energy was recorded without accelerometers

Test ID: SPT-1-16
GPS Coordinates: 40.77449°N 30.37755°E
Elevation: 26.303 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Borehole performed at level ground in a vacant lot. Brown clayey soil											
1			S-1-16-1	0/45	2-2-1	0.95	4.27		SILT: Brown silt with fine sand											Although no sample was recovered, the walls of the sampler show olive-gray sandy silt
2		ML ML	S-1-16-2A S-1-16-2B	40/45	2-2-5	1.85	5.80					34 48	31 31	- -	82 82	20 32	17 -	0.032 0.023	<1μm <3μm	
3		CL	S-1-16-3	37/45	1-2-1	2.75	5.80		CLAYEY SILT: Gray clayey silt to silty clay with fine sand interspersed with sandy clayey silt			42	48	26	98	83	69	<1μm		At approx. 2.7 m the wash water shows medium to coarse sand
4		ML	S-1-16-4	37/45	1-2-2	3.75	7.32					33	34	6	82	37	31	0.011	<1μm	
5		ML	S-1-16-5	39/45	5-6-9	4.85	8.84					31	39	-	65	15	12	0.051	<2μm	
6		CL ML	S-1-16-6A S-1-16-6B	44/45	2-3-9	6.15	10.37					30 23	40 26	22 -	81 63	44 19	35 16	0.008 0.044	<1μm <1μm	
7		SM	S-1-16-7	28/45	5-7-10	7.15	11.89		SAND: Gray silty fine sand to poorly graded fine to medium sand with silt			27	-	-	13	5	-	0.20	0.042	
8																				
		SP-SM	S-1-16-8	40/45	7-11-16	8.35	11.89					21	-	-	7	-	-	0.30	0.10	
9		CH	S-1-16-9	31/45	2-3-3	9.15	11.89		CH: Olive gray high plasticity silty clay. Does not soften when remoulded			45	68	44	99	70	59	<1μm		

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

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Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 3.2 m away from CPT-1-24
Date: July 10, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Not measured, see CPT-1-24
Notes: SFA was used to a depth of 2 m

Test ID: SPT-1-24
GPS Coordinates: 40.77639°N 30.38296°E
Elevation: 28.001 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Dark brown to black silty gravelly sand. Fill for burried sewer canal. Roots from nearby tree											
1																				
2									SILTY CLAY: Alternating strata of brown-gray, low to high plasticity silty clay and clayey silt with fine sand interbedded with deposits of silty sand and sandy silt. Gray color prevails beyond a depth of approx. 4 m											
		ML	S-1-24-3A	30/45	2-2-2	2.15	5.80	57				23	30	-	65	32	-	0.026	<3μm	
		CL	S-1-24-3B									29	45	24	80	51	44	0.004	<1μm	
3																				
		CL	S-1-24-4	32/45	2-1-2	3.25	7.32	62		70		31	41	18	78	30	-	0.019	<3μm	
4																				
		SM	S-1-24-5A	36/45	3-3-3	4.05	8.84	67				29	-	-	33	<15	<10	0.094	<2μm	
		ML	S-1-24-5B									33	34	-	90	28	20	0.016	<1μm	
5		CH	S-1-24-6	39/45	2-2-3	4.85	8.84	55		120	35	43	61	35	99	70	52	0.002	<1μm	
6		ML	S-1-24-7	34/45	3-4-4	5.65	10.37	61		125	36	37	37	8	98	31	23	0.011	<1μm	
									SAND: Gray fine to medium sand with silt to silty sand grading to sand with gravel. Sample S-1-24-10 is 22% rounded fine gravel											
7		SM	S-1-24-8	39/45	9-14-20	6.65	10.37	66				21	-	-	17	-	-	0.20	<0.08	
8		SP-SM	S-1-24-9	36/45	10-14-19	7.65	11.89	67				22	-	-	11	-	-	0.20	<0.08	
9		SP	S-1-24-10	20/45	17-21-22	8.85	13.42	66				10	-	-	4	-	-	1.3	0.23	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

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Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m north from CPT-1-32
Date: July 10, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL =0.71 m 07/11/00, 0.76 m 07/19
Notes:

Test ID: SPT-1-32
GPS Coordinates: 40.77651°N 30.39246°E
Elevation: 27.409 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Top soil and black silty clay with organic odor											
1		CH	S-1-32-1	29/45	2-2-4	0.95	4.27	54	CH: Gray high plasticity silty clay	160	40	37	73	48	99	77	61	<1μm		
2			S-1-32-2	0/45	3-2-4	1.95	5.80	57	SANDY SILT: Brown sandy silt											
3		ML ml	S-1-32-3A S-1-32-3B	43/45	2-1-3	2.75	7.32	60		50	17	20 30	29 -	- -	64 61	28 20	22 16	0.036 0.005	<1μm <2μm	
4		ML/CL ML	S-1-32-4A S-1-32-4B	36/45	2-2-2	3.95	8.84	53	CLAYEY SILT: Gray clayey silt to silty clay with traces of fine sand	50	24	36 38	39 39	13 12	89 96	27 23	20 18	0.019 0.021	<2μm <2μm	
5		CH ML	S-1-32-5A S-1-32-5B	34/45	2-4-5	4.75	8.84	63		50	29	42 30	53 33	33 -	94 91	48 25	39 22	0.006 0.020	<1μm <1μm	
6		ML	S-1-32-6	30/45	5-5-5	5.95	10.37	62		50	39	36	35	-	96	36	27	0.010	<1μm	
7		SP-SM	S-1-32-7	37/45	8-15-13	6.95	11.89	-	SP-SM: Fine to medium gray poorly graded sand with silt			23	-	-	8	-	-	0.30	0.087	
8		SP-SM	S-1-32-8	31/45	13-21-20	7.85	11.89	-				21	-	-	9	-	-	0.25	0.081	
9		SP-SM	S-1-32-9	30/45	12-20-23	8.75	11.89	-				19	-	-	5	-	-	0.32	0.10	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

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Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m west of CPT-1-41
Date: July 12, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.74 m 07/12/00
Notes: SPT energy was measured without accelerometers

Test ID: SPT-1-41
GPS Coordinates: 40.77906°N 30.40523°E
Elevation: 29.240 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Pavement (asphalt and subgrade) of Ipçi street followed by dark clay											
1		ML	S-1-41-1A	36/45	1-0-1	1.35	4.27		SILT: Brown to olive brown sandy silt to silt with sand	40		31	26	-	51	18	15	0.070	<2μm	
		ML	S-1-41-1B									33	29	-	75	25	18	0.027	<2μm	
2																				
		ml	S-1-41-2A	38/45	1-2-2	2.45	5.80					34	-	-	83	26	22	0.016	<1μm	The soil recovered in S-1-41-2B at approx. 2.6 m was identified by Bora Baturay as being very similar to the soil ejected to the surface after the Kocaeli earthquake
		ML	S-1-41-2B									32	30	-	65	15	12	0.046	<2μm	
3		ML	S-1-41-3A	40/45	2-2-2	3.25	7.32			70	36	33	29	-	83	20	17	0.027	<2μm	
		cl	S-1-41-3B									46	-	-	99	63	48	0.002	<1μm	
4		ML	S-1-41-4A	40/45	2-1-3	4.05	7.32			75		38	35	8	94	25	19	0.022	<1μm	
		CH	S-1-41-4B						CH: Brown gray to gray high plasticity silty clay			42	53	30	100	67	51	0.002	<1μm	
5		CH	S-1-41-5	38/45	2-2-3	4.85	8.84			130	59	26	54	30	92	50	40	0.005	<1μm	
6		SP-SM	S-1-41-6A	37/45	2-5-7	5.65	8.84		SP-SM: Gray poorly graded fine sand with silt grading to poorly graded fine to medium sand with silt. Sand is interspersed with thin strata of ssilt with sand (S-1-41-6B)			23	-	-	9	-	-	0.22	0.08	
		ml	S-1-41-6B									28	-	-	84	16	13	0.028	<2μm	
7		SP-SM	S-1-41-7	37/45	12-17-22	6.45	10.37					19	-	-	5	-	-	0.44	0.11	
8		SP-SM	S-1-41-8	35/45	14-16-20	7.45	11.89					20	-	-	8	-	-	0.35	0.088	
9		CH	S-1-41-9A	38/45	2-2-5	8.45	11.89		CH: Gray high plasticity silty clay		65	39	51	25	98	57	44	0.003	<1μm	
		ML	S-1-41-9B						ML: Gray low plasticity silt with traces of fine sand	150		31	32	-	91	26	21	0.016	<1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

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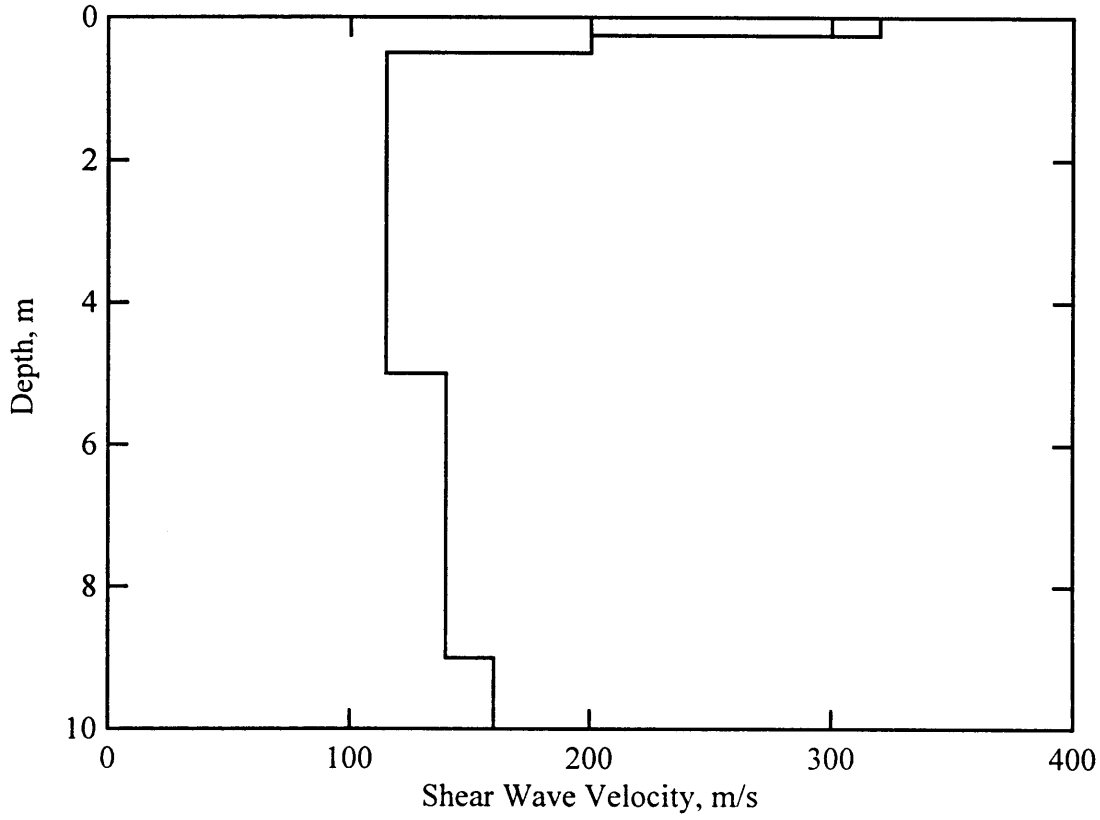
Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m south of CPT-1-42
Date: July 18, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.62 m 07/20/00
Notes: SPT energy was not measured

Test ID: SPT-1-42
GPS Coordinates: 40.77948°N 30.40696°E
Elevation: 29.534 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill											
1		ML	S-1-42-1	37/45	1-1-1	1.35	3.67		SILTY SAND: Brown sandy silt/silty sand to sand with silt			28	26	-	51	20	17	0.07	<2μm	
2		SP-SM	S-1-42-2	42/45	5-3-2	3.85	5.20					24	-	-	9	-	-	0.29	0.08	
3		CL	S-1-42-3	38/45	2-2-2	3.15	6.72		CLAYEY SILT: Red brown to gray alternating layers and seams of low to high plasticity silty clay and clayey silt interspersed with some deposits of silt with sand			35	39	14	98	49	34	0.005	<1μm	
4		ML MH	S-1-42-4A S-1-42-4B	42/45	2-1-2	3.95	8.24			110 88	33 45	37 42	48 75	20 34	100 97	61 72	48 61	0.002 <2μm	<1μm	
5		ML	S-1-42-5	42/45	2-2-3	4.95	8.24			80	22	27	39	-	100	70	54	0.002	<1μm	
6		CL ML	S-1-42-6A S-1-42-6B	42/45	2-3-5	5.85	9.77			80 150	31 34	37 33	43 35	18 -	98 94	28 35	21 28	0.013 0.012	<1μm <1μm	
7		CL	S-1-42-7	42/45	2-3-8	6.75	11.29					38	40	16	97	63	48	0.002	<1μm	
8		SP-SM CH	S-1-42-8A S-1-42-8B	31/45	11-5-3	7.95	11.29		SP-SM: Gray poorly graded fine sand with silt CH: Gray high plasticity silty clay	190		23 35	- 64	- 36	9 98	- 63	- 46	0.26 0.003	0.078 <1μm	
9		CH CH	S-1-42-9A S-1-42-9B	33/45	2-2-2	8.95	12.82			90 125	39 55	34 42	51 58	23 31	97 100	45 80	34 69	0.006 <1μm	<1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio



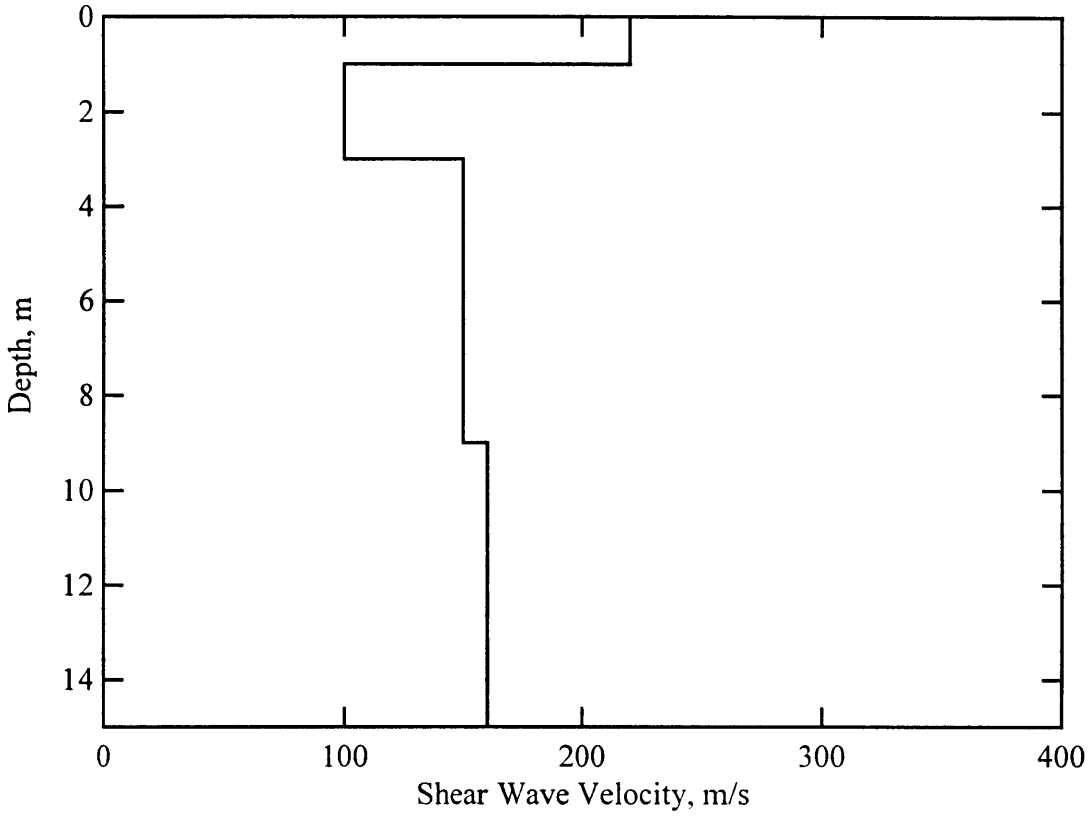
Shear wave velocity profile determined from forward modeling of Site 1-11.

Tabulated values of layer properties determined from forward modeling of Site 1-11

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.25	320	598.7	0.3	1.92
0.25	0.25	200	489.9	0.4	1.92
0.5	4.5	115	1500	0.497	2.0
5.0	4.0	140	1500	0.4956	2.0
9.0	1.0	160	1500	0.4942	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them



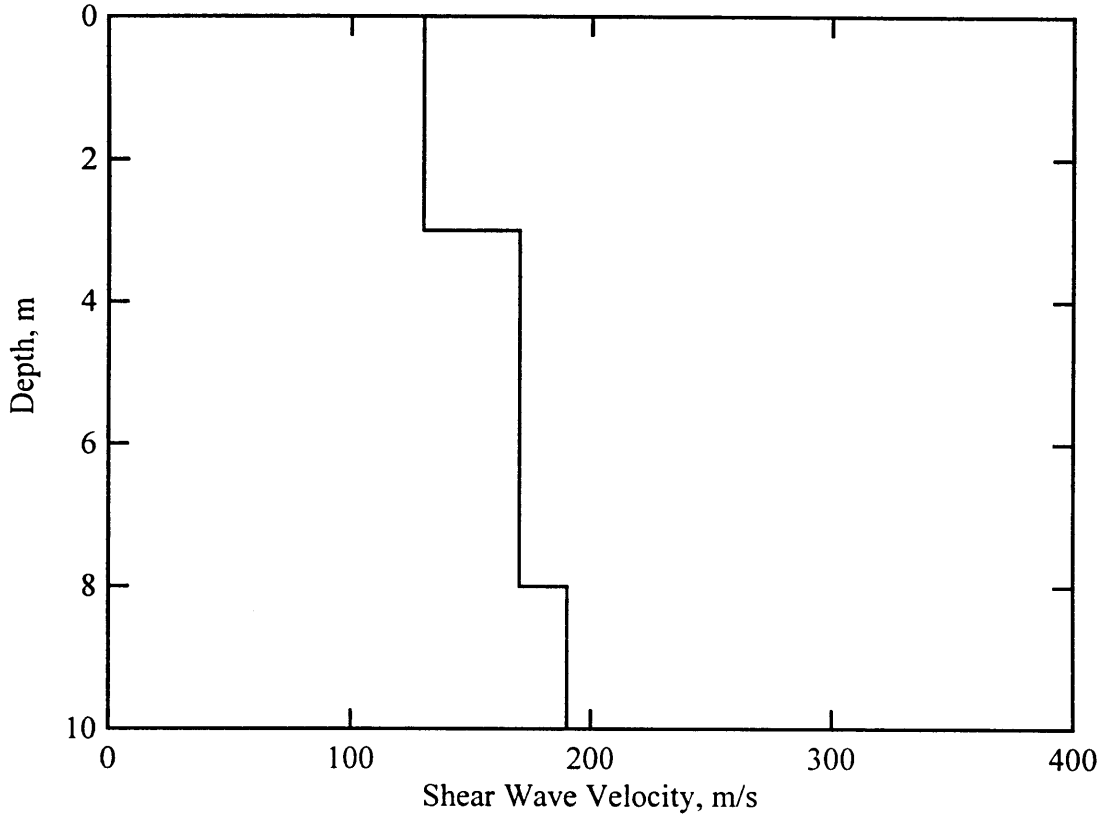
Shear wave velocity profile determined from forward modeling of Site 1-24.

Tabulated values of layer properties determined from forward modeling of Site 1-24

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	1.0	220	411.6	0.3	1.92
1.0	1.5	100	187.1	0.3	1.92
2.5	0.5	100	1500	0.4978	2.0
3.0	6.0	150	1500	0.4949	2.0
9.0	6.0	160	1500	0.4942	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them



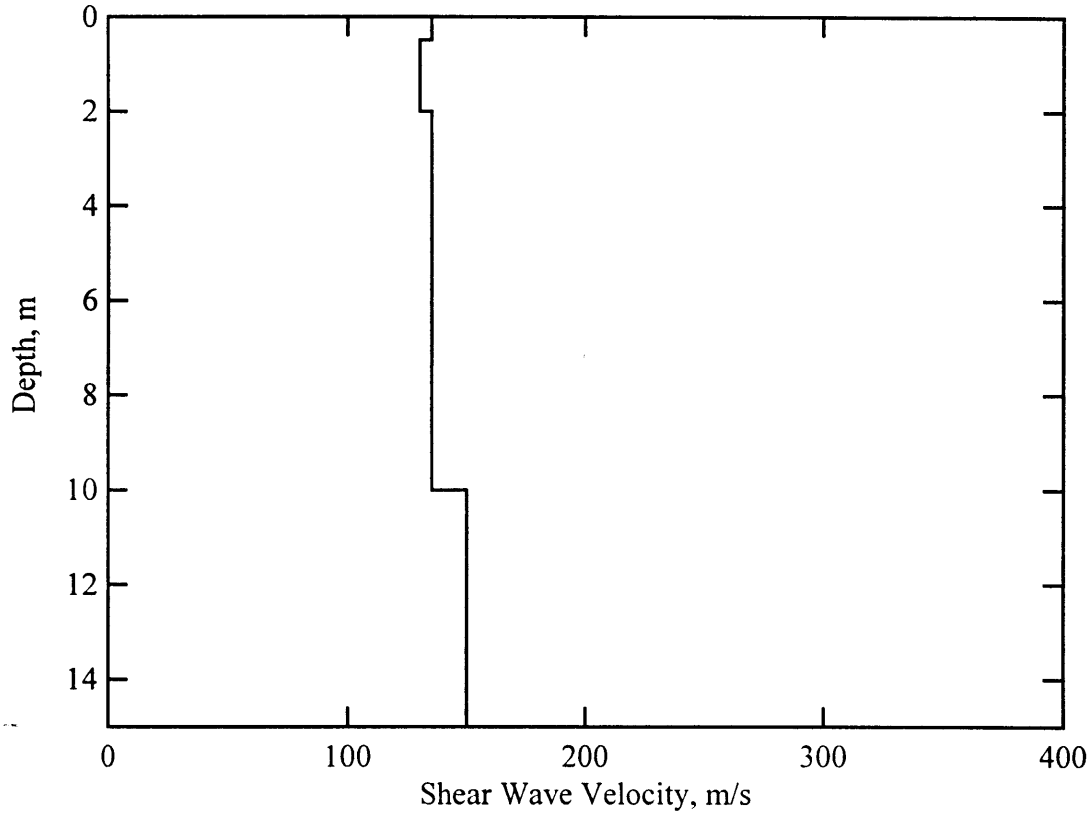
Shear wave velocity profile determined from forward modeling of Site 1-41.

Tabulated values of layer properties determined from forward modeling of Site 1-41

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	130	243.2	0.3	1.92
0.5	2.5	130	1500	0.4962	2.0
3.0	5.0	170	1500	0.4935	2.0
8.0	2.0	190	1500	0.4918	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them



Shear wave velocity profile determined from forward modeling of Site 1-42.

Tabulated values of layer properties determined from forward modeling of Site 1-42

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	135	252.6	0.3	1.92
0.5	1.5	130	761.7	0.485	2.0
2.0	8.0	135	1500	0.4959	2.0
10.0	5.0	150	1500	0.4949	2.0

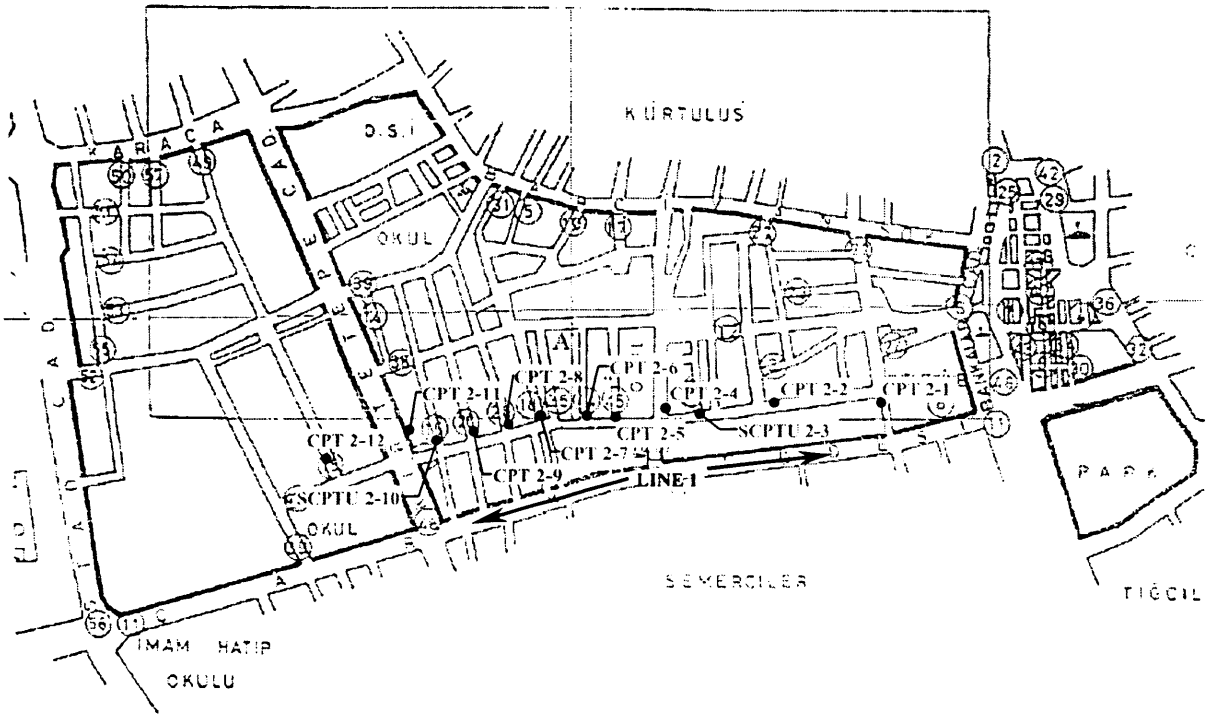
Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

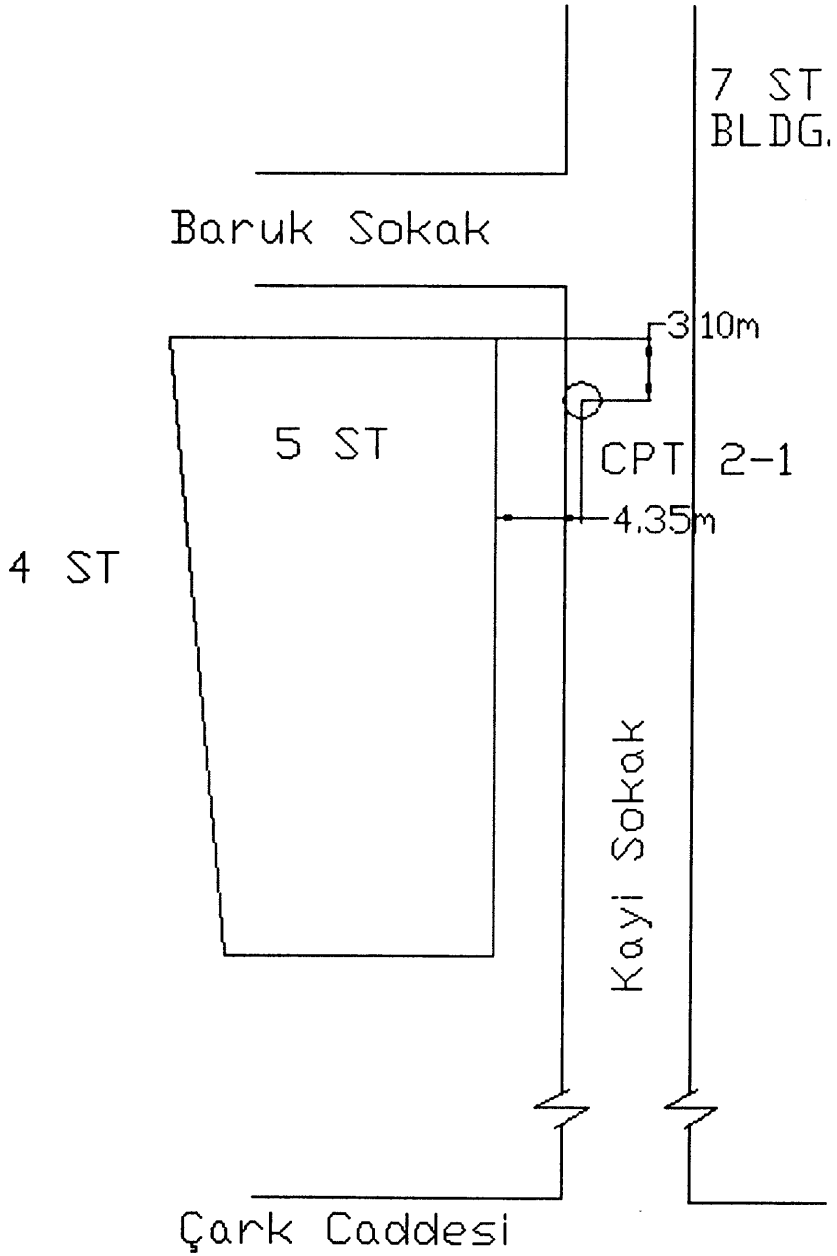
Phase 2

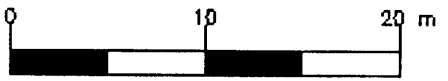
Line 2

CUMHURIYET DISTRICT, ADAPAZARI



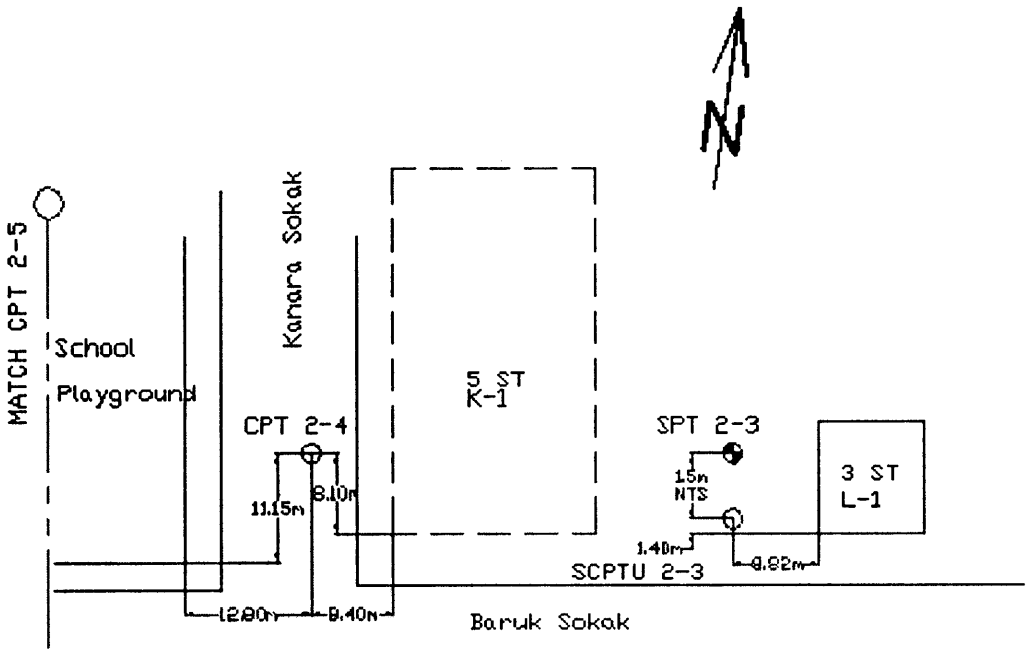
1	Arabacılar Çarş	17	Hatip Sokak	33	Şal Sokak	49	Bal Sokak
2	Ağa Cami	18	Hüseyin Rahmı Sokak	34	Tenekeciler Çarş	50	Bilen Sokak
3	Annem Sokak	19	2. Nci Gecit	35	Telli Sokak	51	Birlik Sokak
4	Avnalı Kavak Sokak	20	Kanara Sokak	36	Ticaret Sarayı	52	Değerli Sokak
5	Basık Sokak	21	Kasaplar Çarş Sokak	37	Toplu Sokak	53	Nadir Sokak
6	Bankalar Caddesi	22	Kayı Sokak	38	Tül Sokak	54	Pancar Sokak
7	Bakırcılar Çarş	23	Kiraz Sokak	39	Tümen Sokak	55	Sefa Sokak
8	Belediye Meydanı	24	Kolağası Sokak	40	3. Ncü Gecit	56	Stad Sokak
9	1. Nci Gecit.	25	Kuyumcular Çarş	41	Usta Sokak	57	Yel Sokak
10	Çalım Sokak	26	Menekşe Sokak	42	Unkapanı Çarş		
11	Çark Caddesi	27	Ornat Sokak	43	Uzun Çarş		
12	Dr. Kamil Sokak	28	Papatya Sokak	44	Yakın Sokak		
13	4. Ncü Gecit.	29	Pirinç Pazarı	45	Yalı Sokak		
14	Fikret Sokak	30	Şal Sokak	46	Yazarı Çarş		
15	Fulya Sokak	31	Serpil Sokak	47	Yasemin Sokak		
16	Gökalp Sokak	32	Soğan Pazarı	48	Sedat Kirtepe		

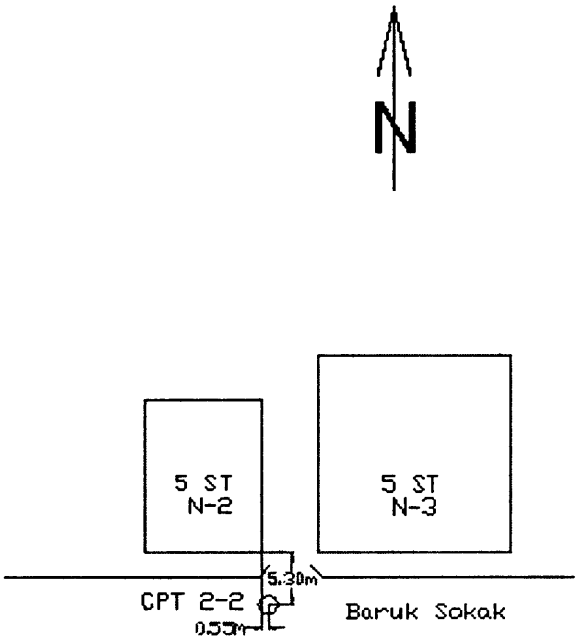


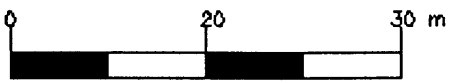


BYU-UCB-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Cumhuriyet District	
Scale: Graphic scale	Line: 2 CPT 2-1
Drawn by: Mark Hill	Date: 05/01/01





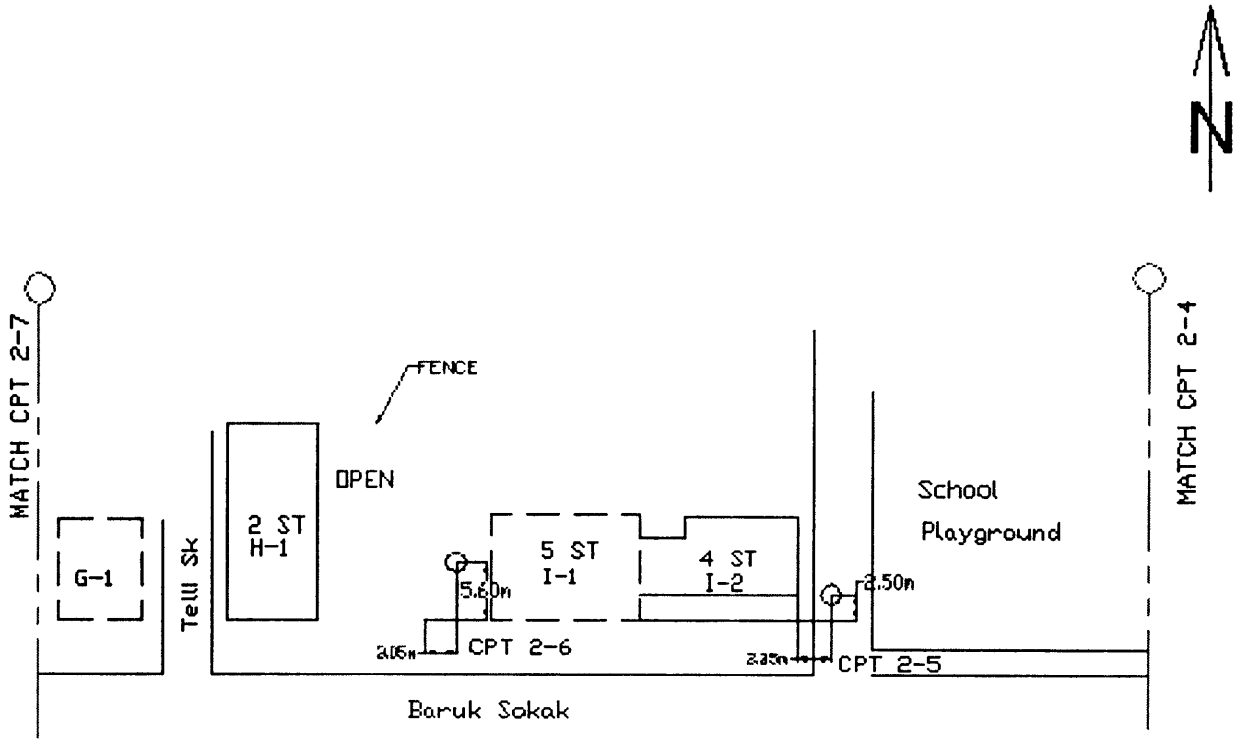


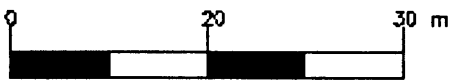
BYU-UCB-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

Location: Cumhuriyet District

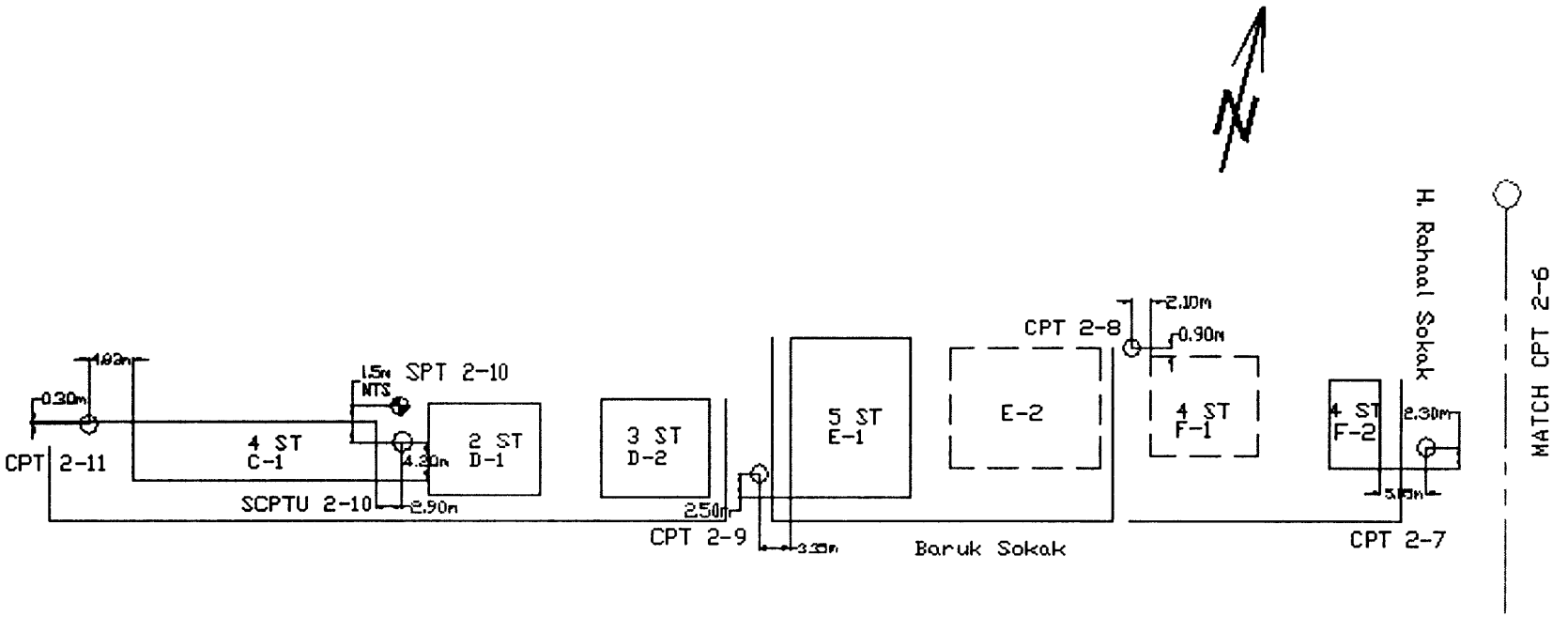
Scale: Graphic scale	Line: 2 CPT 2-2 TO CPT 2-4
Drawn by: Mark Hill	Date: 05/01/01

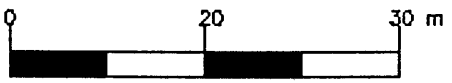




BYU-UCB-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

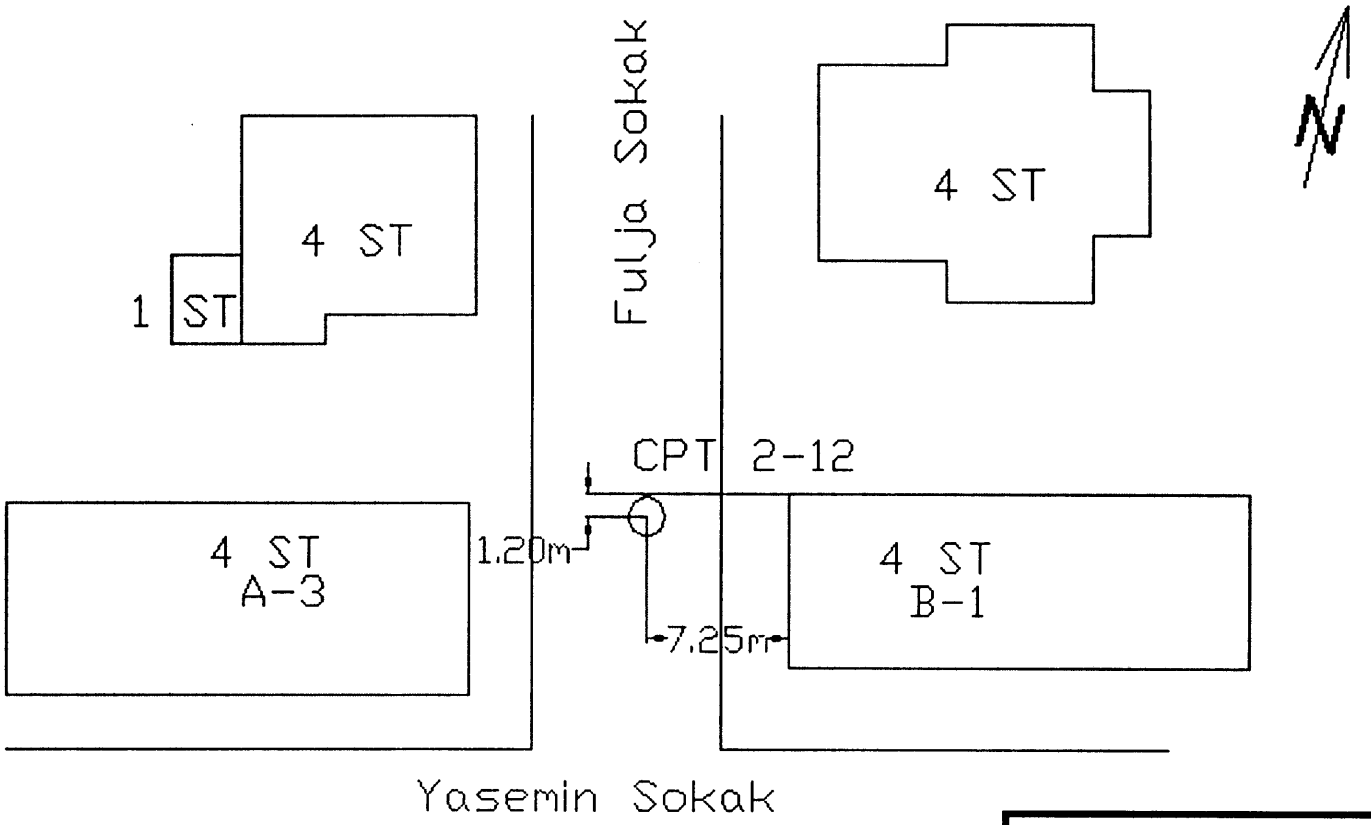
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Cumhuriyet District	
Scale: Graphic scale	Line: 2 CPT 2-5 TO CPT 2-6
Drawn by: Mark Hill	Date: 05/01/01





BYU-UCB-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Cumhuriyet District	
Scale: Graphic scale	Line: 2 CPT 2-7 TO CPT 2-11
Drawn by: Mark Hill	Date: 05/01/01



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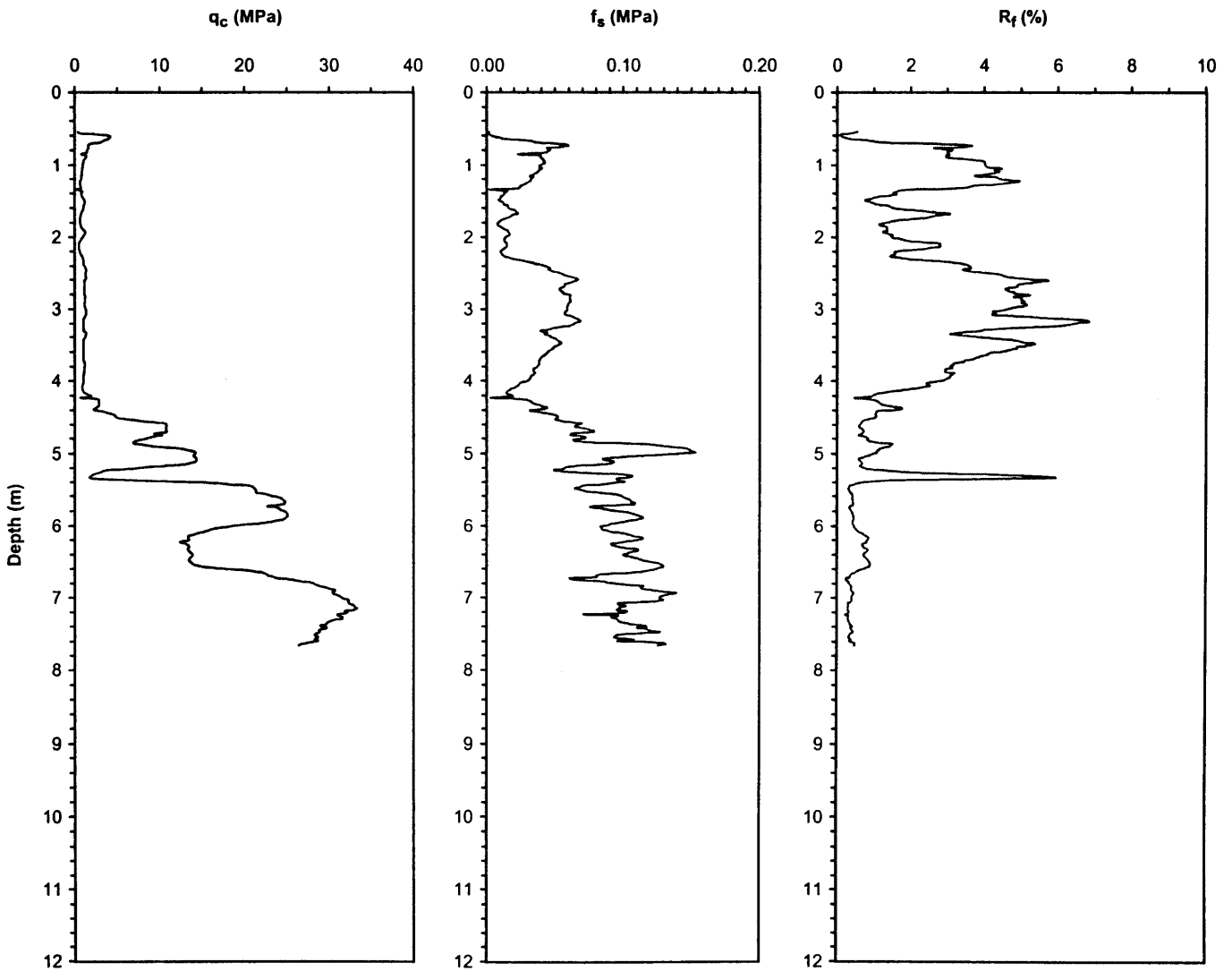
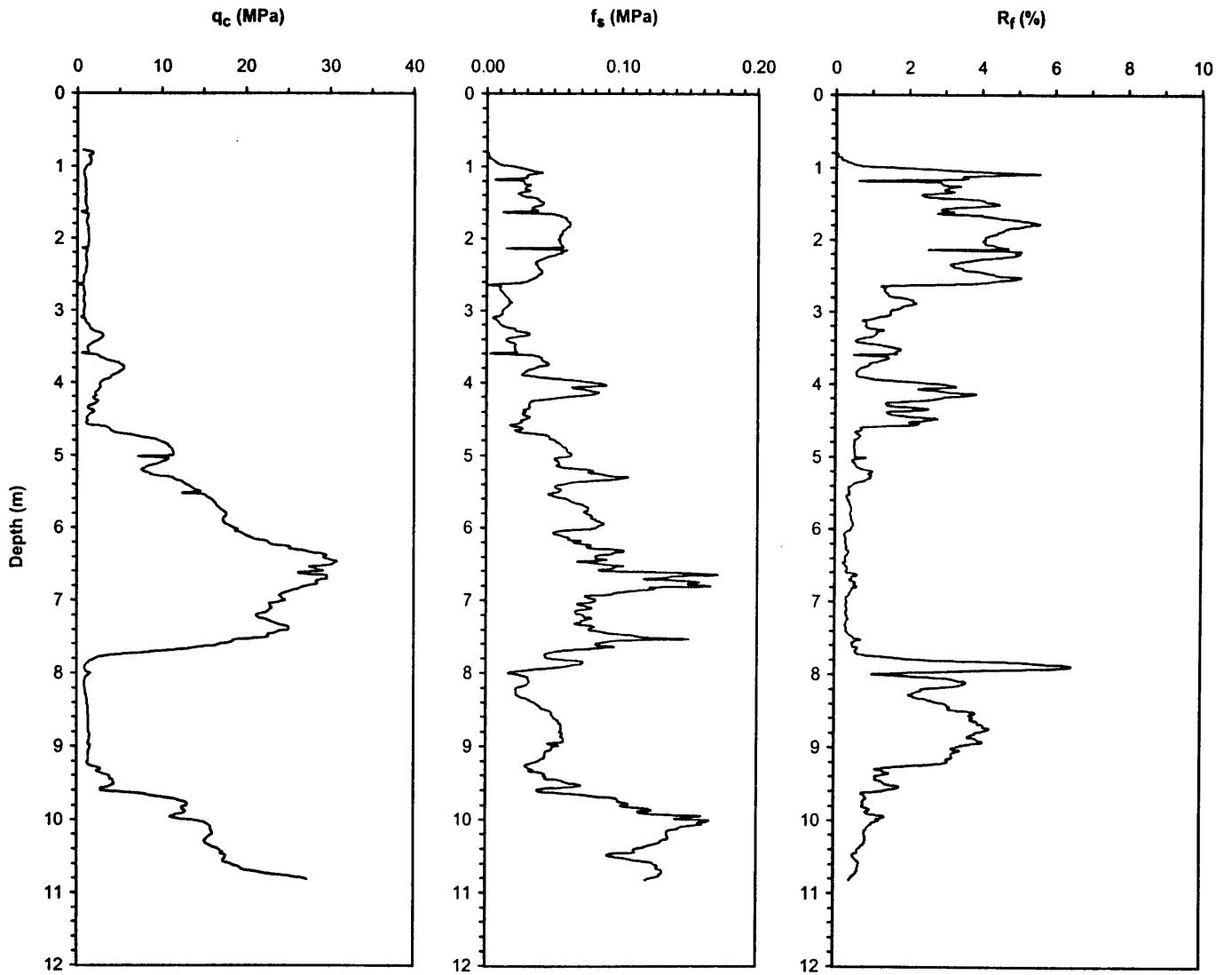
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Cumhuriyet District	
Scale: Graphic scale	Line: 2 CPT 2-12
Drawn by: Mark Hill	Date: 05/01/01

UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak (One block north of Çark Caddesi)	
Joint Research	**GPS Coordinates:**	40.77958° N, 30.39753° E	**Survey Coordinates (m):** 33,560.46 N, 30,737.43 W
	Test Number:	CPT 2 - 01	**Elevation (m):** 28.891
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 01 July 2000 9:43
Sponsored by:	**File Name:**	cpt 2 - 01.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.53 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77974° N, 30.39593° E	**Survey Coordinates (m):** 33,527.68 N, 30,840.16 W
	Test Number:	CPT 2 - 02	**Elevation (m):** 28.568
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 04 July 2000 8:27
Sponsored by:	**File Name:**	cpt 2 - 02.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.76 m to clear utilities.	

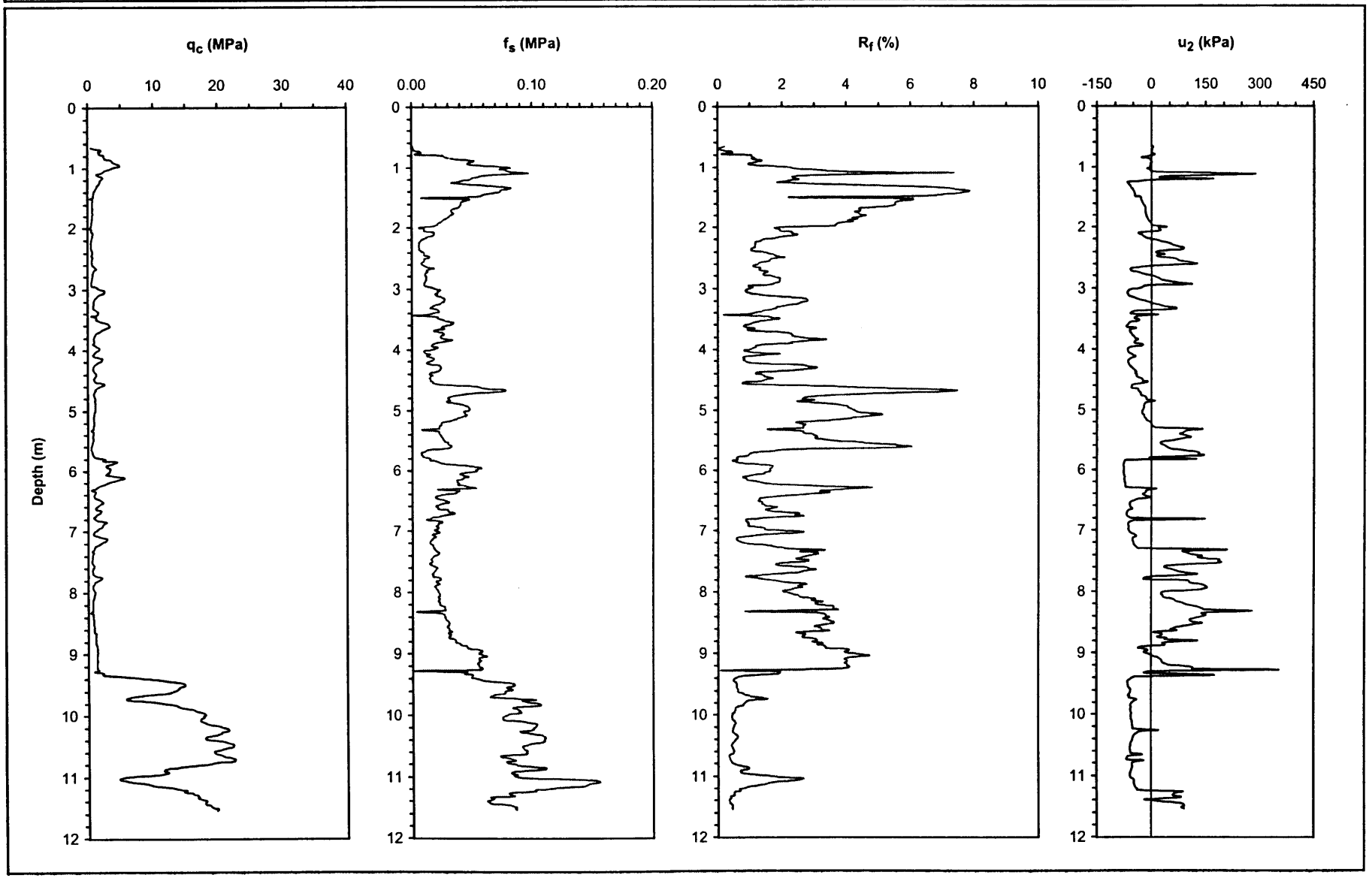


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

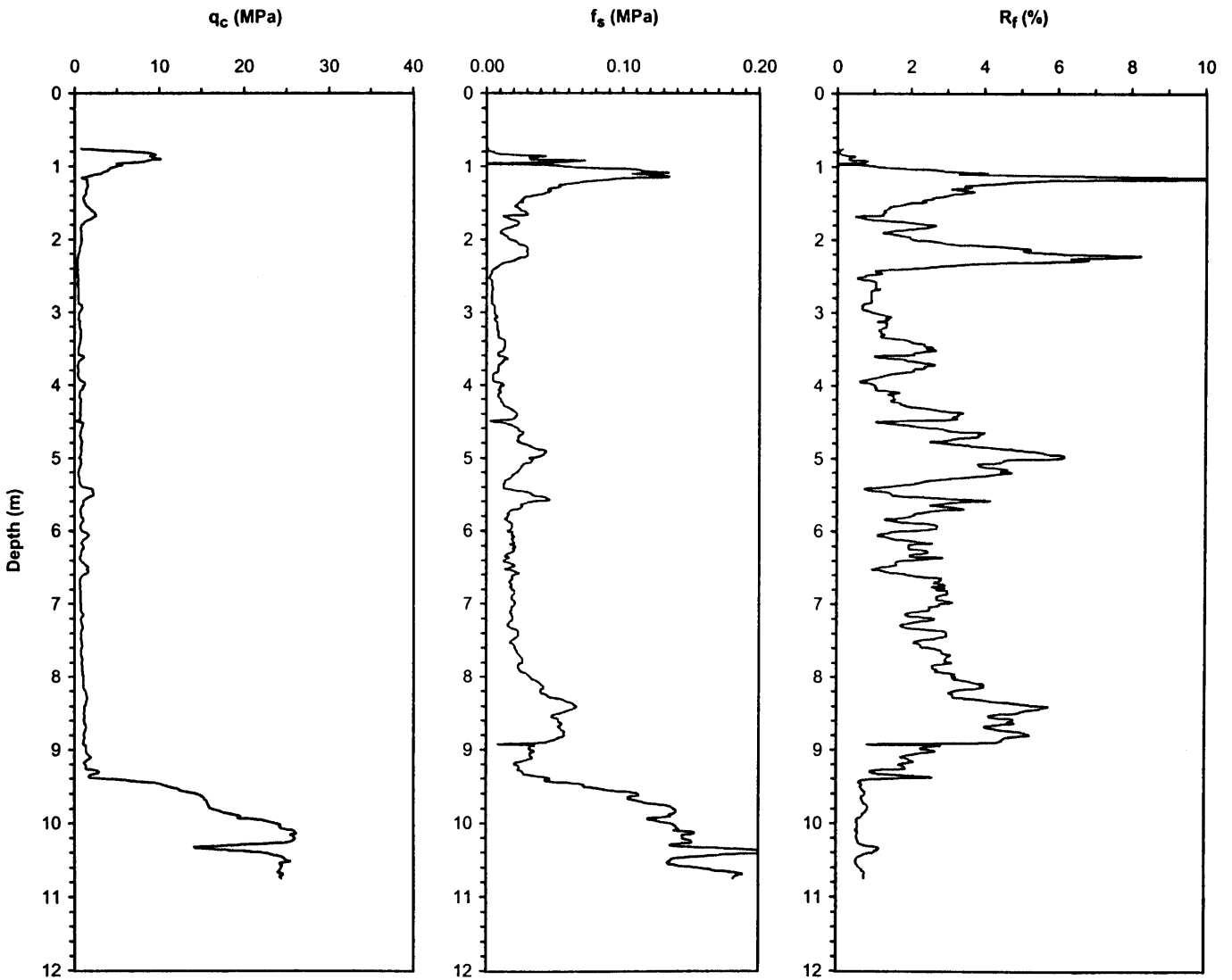
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Two: Baruk Sokak
GPS Coordinates: 40.77969° N - 30.39469° E
Test Number: SCPTU 2 - 03
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: scptu 2 - 3.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.64 m to clear utilities and debris.

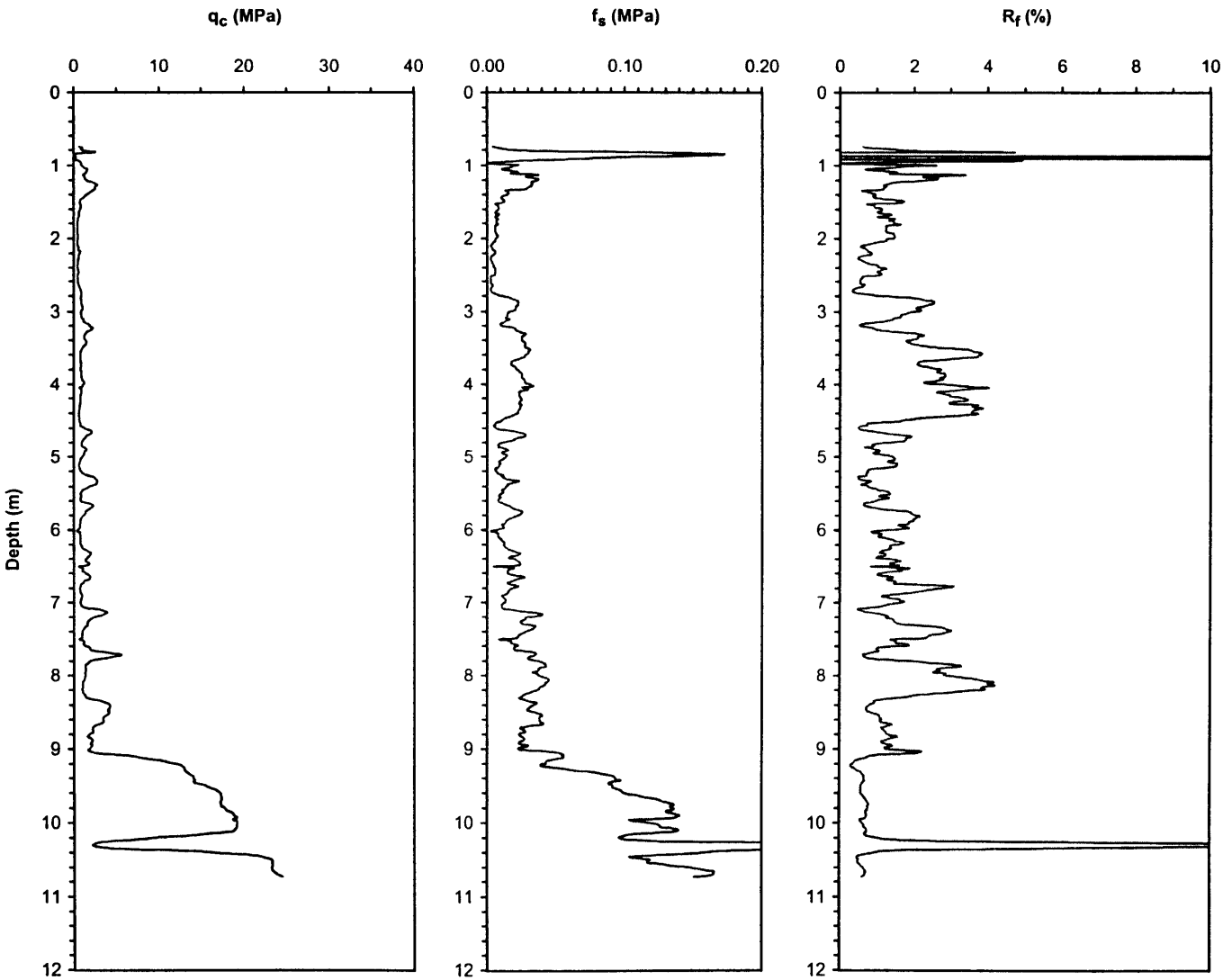
Survey Coordinates (m): 33,488.94 N, 30,945.65 W
Elevation (m): 28.407
Date: 20 July 2000 9:00
Water Table Elevation (m): 27.71
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



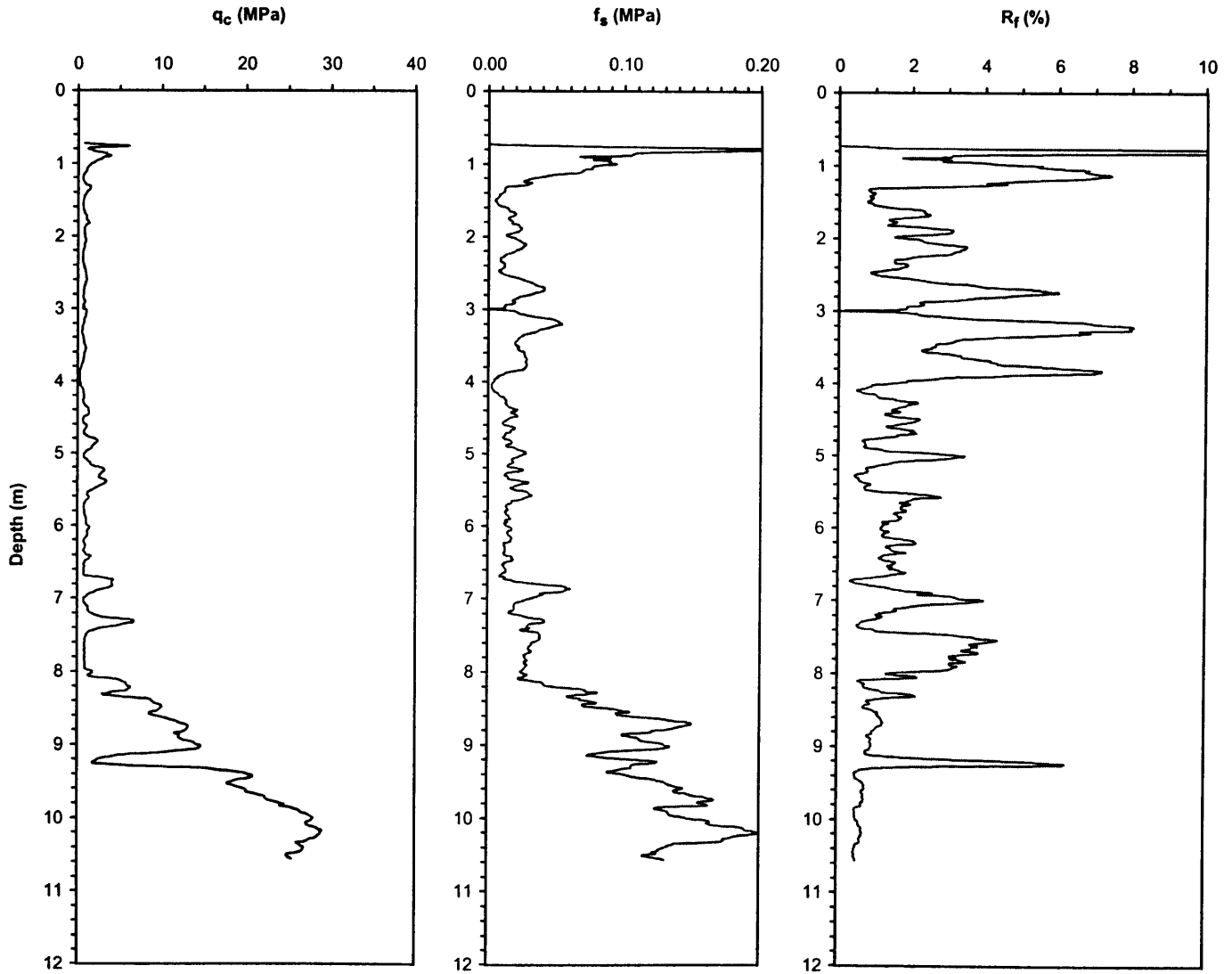
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77960° N, 30.39426° E	**Survey Coordinates (m):** 33,475.52 N, 30,981.17 W
	Test Number:	CPT 2 - 04	**Elevation (m):** 28.384
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 03 July 2000 17:16
Sponsored by:	**File Name:**	cpt 2 - 04.txt	**Water Table Elevation (m):** 27.71
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.74 m to clear utilities and debris.	



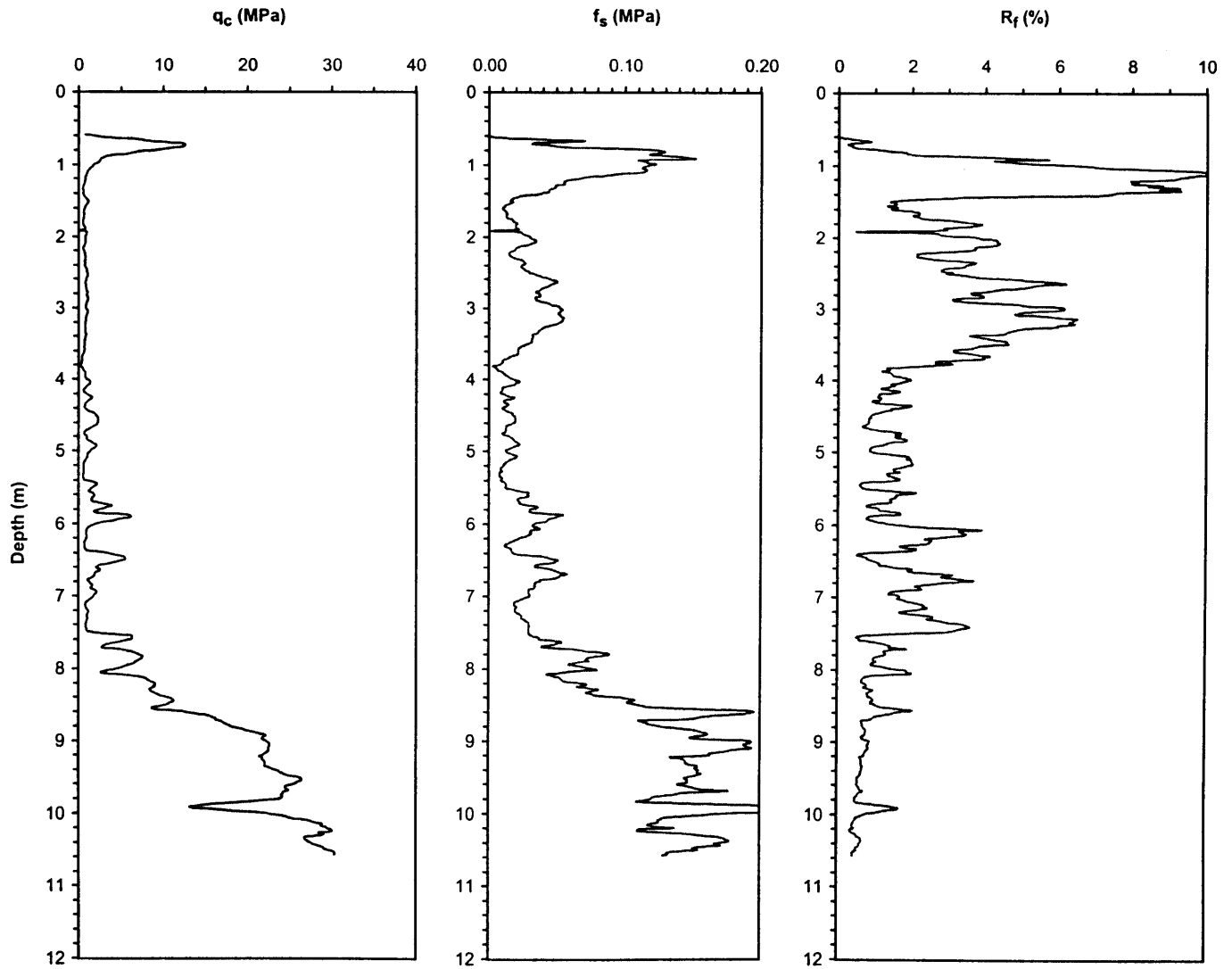
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77803° N, 30.39336° E	**Survey Coordinates (m):** 33,449.38 N, 31,036.07 W
	Test Number:	CPT 2 - 05	**Elevation (m):** 27.904
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 03 July 2000 14:59
Sponsored by:	**File Name:**	cpt 2 - 05.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.73 m to clear utilities.	



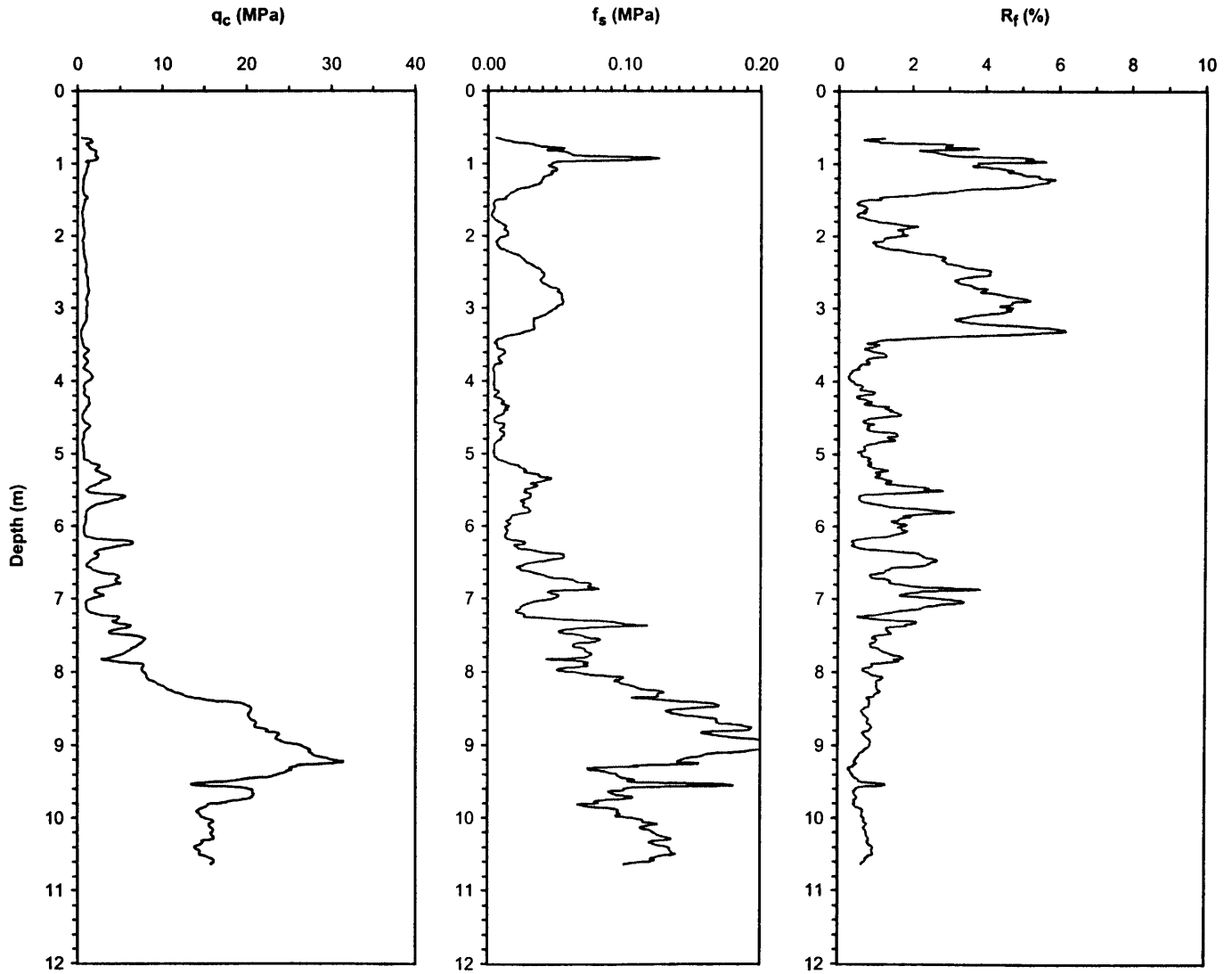
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77951° N, 30.39306° E	**Survey Coordinates (m):** 33,437.78 N, 31,071.89 W
	Test Number:	CPT 2 - 06	**Elevation (m):** 27.735
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 03 July 2000 13:21
Sponsored by:	**File Name:**	cpt 2 - 06.txt	**Water Table Elevation (m):** 26.77
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.7 m to clear utilities.	



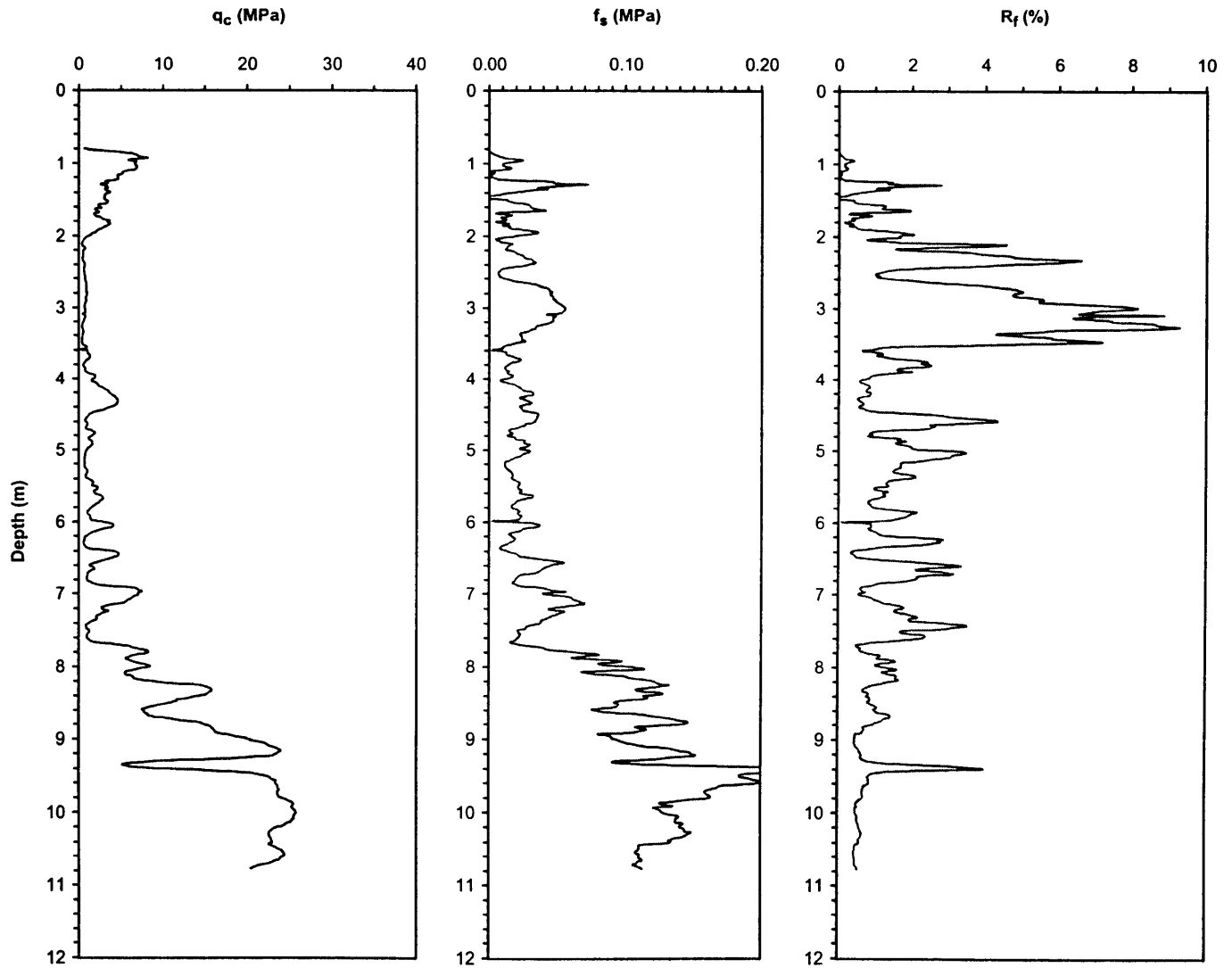
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: H. Rahmi Sokak (Immediately north of Baruk Sokak)	
Joint Research	**GPS Coordinates:**	40.77957° N, 30.39259° E	**Survey Coordinates (m):** 33,426.25 N, 31,117.54 W
	Test Number:	CPT 2 - 07	**Elevation (m):** 27.346
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 03 July 2000 10:40
Sponsored by:	**File Name:**	cpt 2 - 07.txt	**Water Table Elevation (m):** 26.50
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.57 m to clear utilities.	



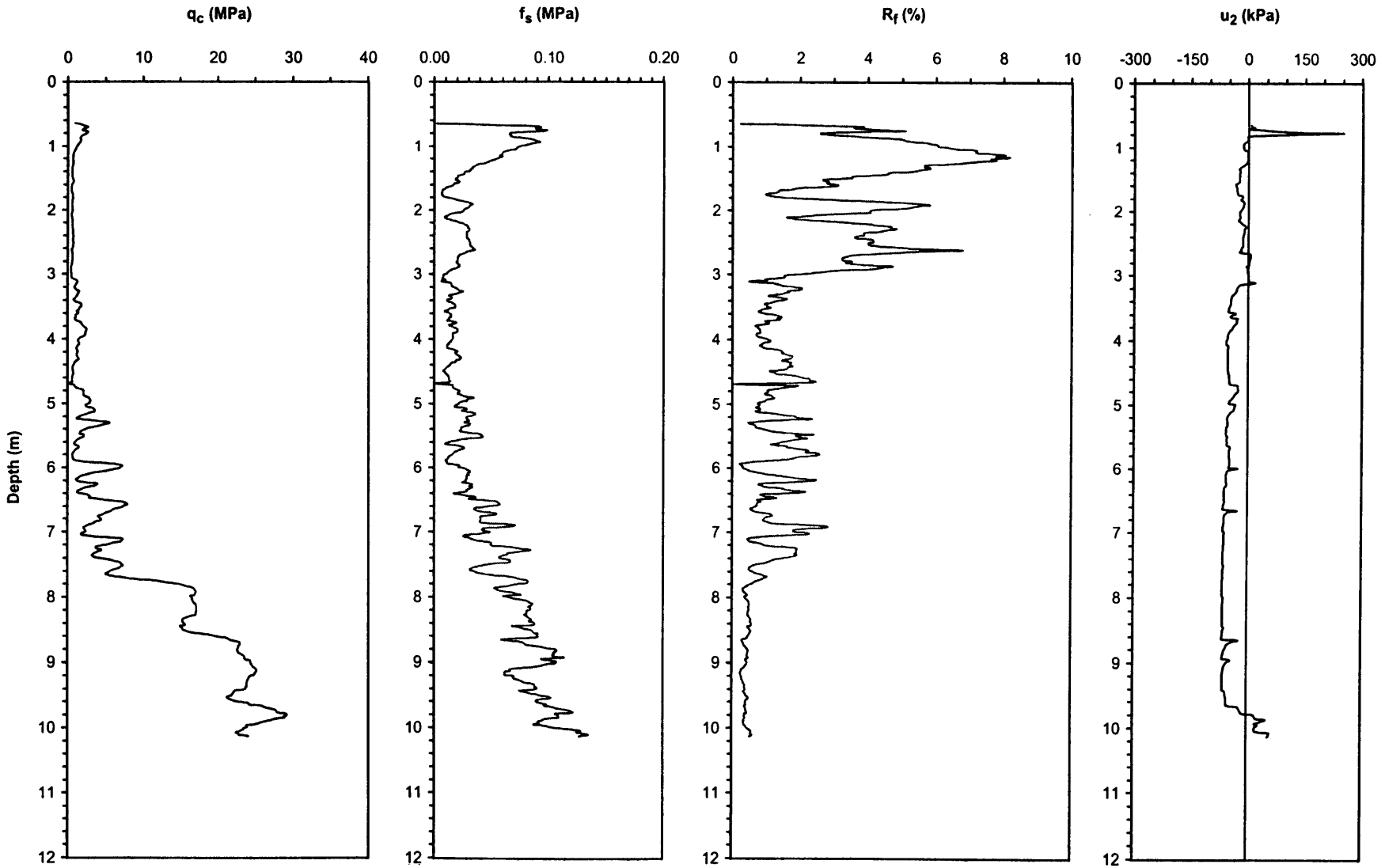
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77947° N, 30.39209° E	**Survey Coordinates (m):** 33,408.07 N, 31,150.70 W
	Test Number:	CPT 2 - 08	**Elevation (m):** 27.238
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 03 July 2000 9:23
Sponsored by:	**File Name:**	cpt 2 - 08.txt	**Water Table Elevation (m):** 26.94
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.63 m to clear utilities.	



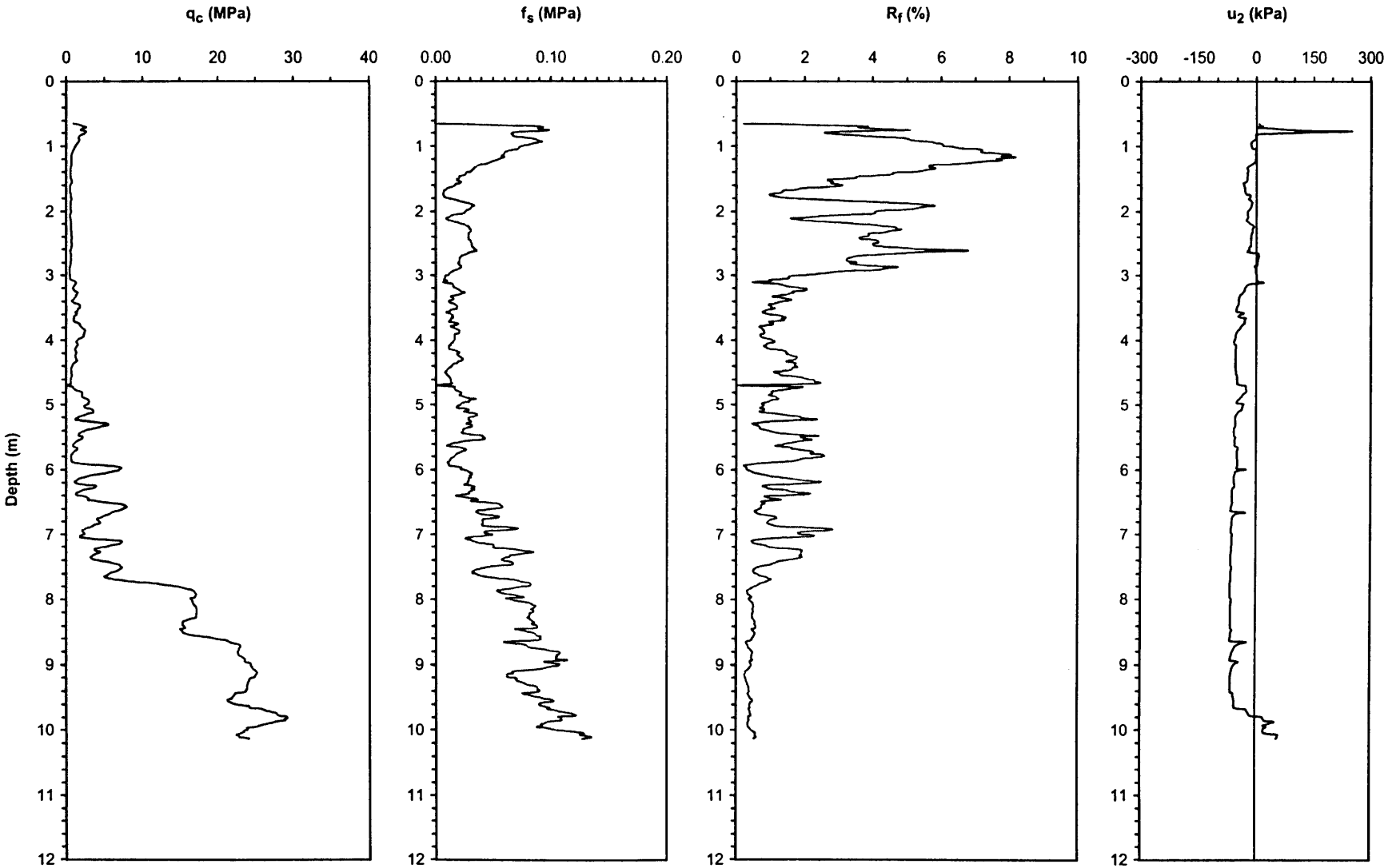
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77931° N, 30.39163° E	**Survey Coordinates (m):** 33,375.87 N, 31,181.56 W
	Test Number:	CPT 2 - 09	**Elevation (m):** 27.390
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 01 July 2000 16:30
Sponsored by:	**File Name:**	cpt 2 - 09.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.77 m to clear utilities.	



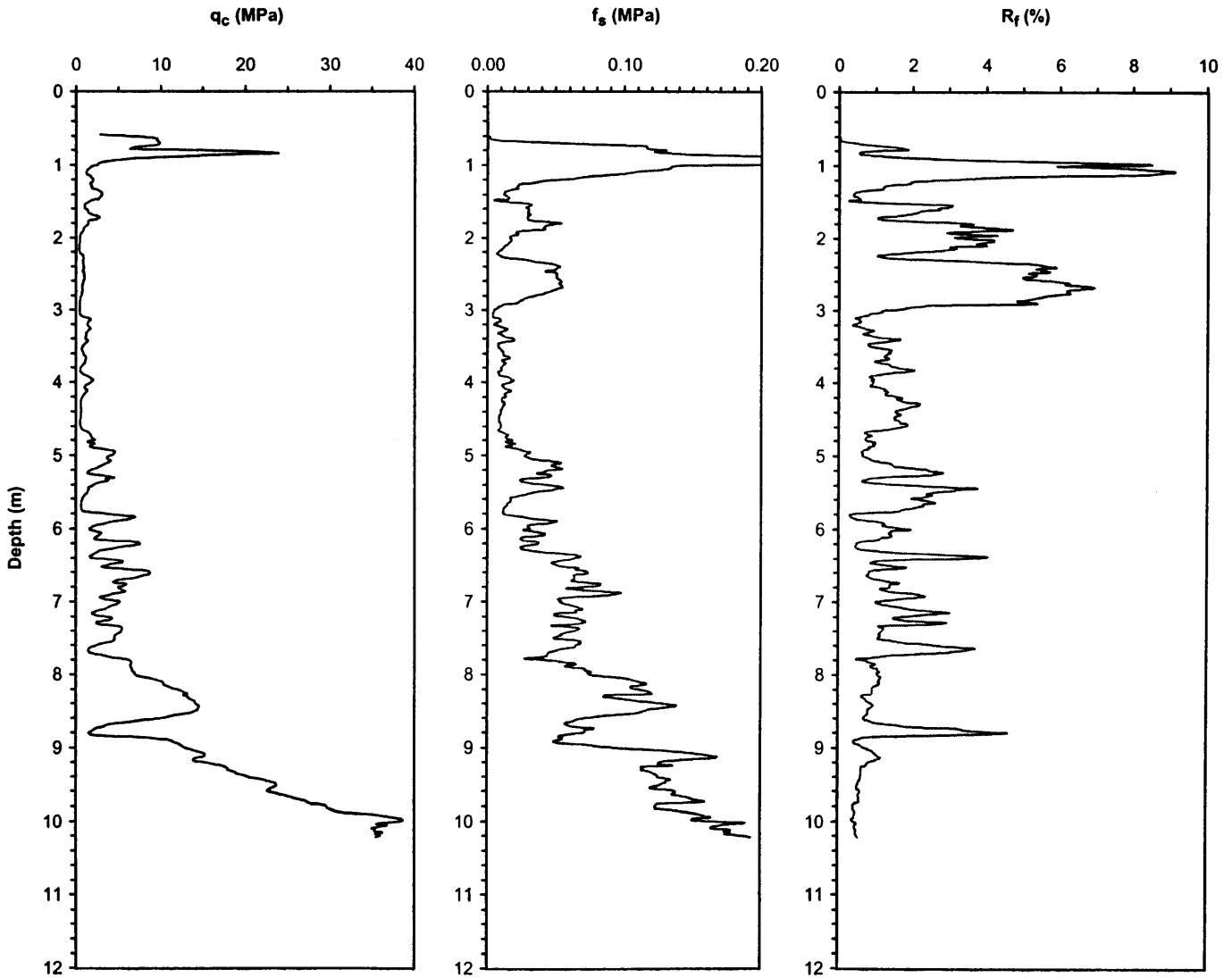
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77883° N, 30.39171° E	**Survey Coordinates (m):** 33,353.44 N, 31,215.60 W
	Test Number:	SCPTU 2 - 10	**Elevation (m):** 27.344
	Type of Cone:	ELC10 SeisCFP No.991232 (a.p. v.d. Berg)	**Date:** 01 July 2000 14:05
Sponsored by:	**File Name:**	scptu 2 - 10.txt	**Water Table Elevation (m):** 26.57
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.63 m to clear utilities.	



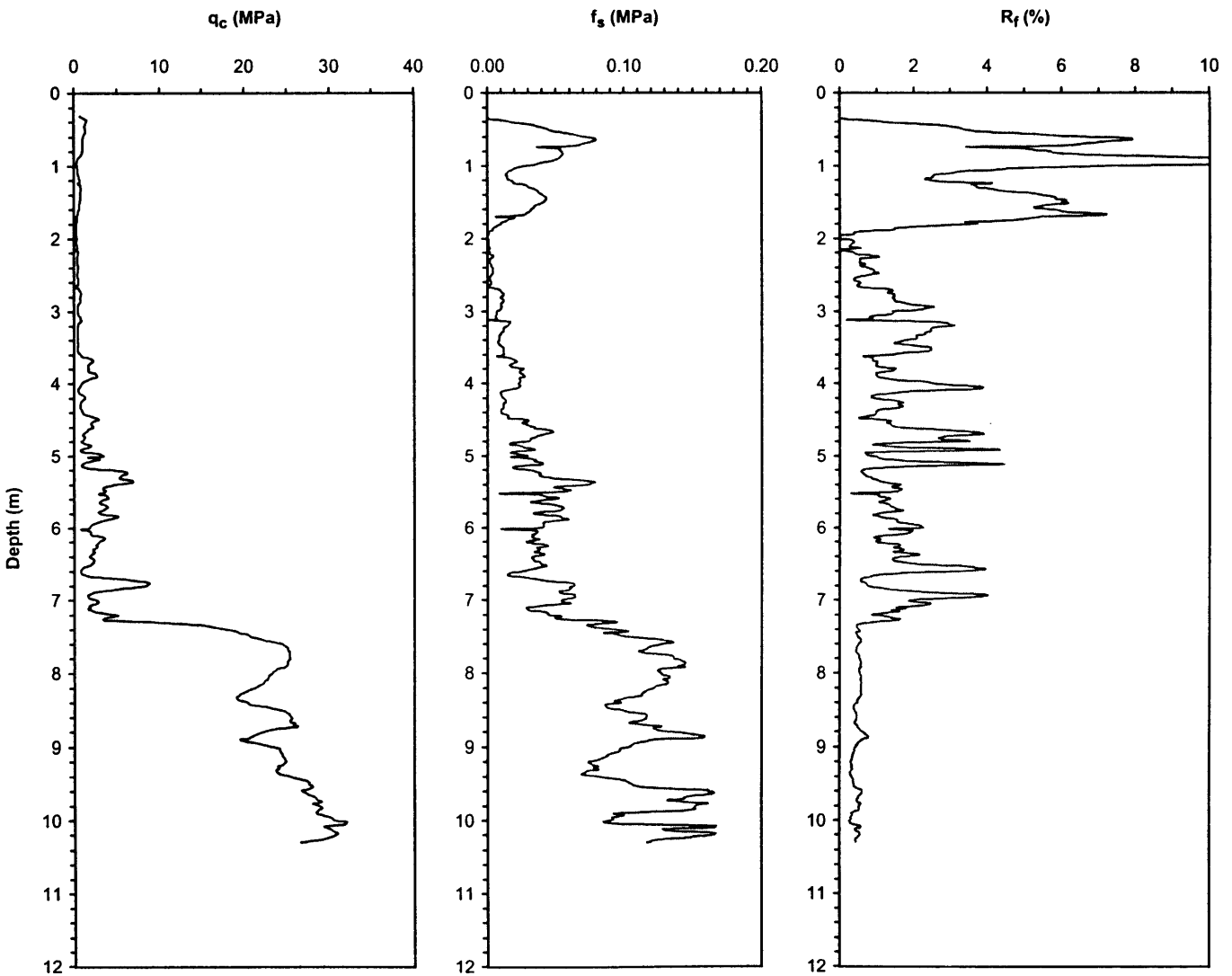
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	Page: 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77883° N, 30.39171° E	**Survey Coordinates (m):** 33,353.44 N, 31,215.60 W
	Test Number:	SCPTU 2 - 10	**Elevation (m):** 27.344
	Type of Cone:	ELC10 SeisCFP No.991232 (a.p. v.d. Berg)	**Date:** 01 July 2000 14:05
Sponsored by:	**File Name:**	scptu 2 - 10.txt	**Water Table Elevation (m):** 26.57
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.63 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Baruk Sokak	
Joint Research	**GPS Coordinates:**	40.77913° N, 30.39074° E	**Survey Coordinates (m):** 33,334.14 N, 31,243.97 W
	Test Number:	CPT 2 - 11	**Elevation (m):** 27.387
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 01 July 2000 10:58
Sponsored by:	**File Name:**	cpt 2 - 11.txt	**Water Table Elevation (m):** 26.22
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.56 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Two: Fulya Sokak	
Joint Research	**GPS Coordinates:**	40.77892° N, 30.38969° E	**Survey Coordinates (m):** 33,286.33 N, 31,321.17 W
	Test Number:	CPT 2 - 12	**Elevation (m):** 26.846
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 26 June 2000 10:11
Sponsored by:	**File Name:**	cpt 2 - 12.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.3 m to clear utilities.	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
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Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m away from CPT-2-03, in Migros parking lot
Date: July 13, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.92 m 07/13/00
Notes: The accelerometers malfunctioned and recorded high values

Test ID: SPT-2-03
GPS Coordinates: 40.77969°N 30.39469°E
Elevation: 28.407 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Gravel pack for parking lot followed by sandy clayey soil											
1		CH	S-2-3-1	30/45	1-2-2	0.5	4.27		CH: Brown gray high plasticity silty clay	140	52	38	64	38	97	64	48	0.002	<1μm	Roots in the tip of the sampler
2		ML	S-2-3-2	22/45	1-1-1	1.95	5.80		CLAYEY SILT: Tan brown clayey silt with traces of fine sand	25		31	33	-	87	30	23	0.016	<1μm	
3		ML	S-2-3-3	33/45	2-2-3	2.95	5.80			60		37	34	-	90	20	15	0.022	<2μm	
4		ML	S-2-3-4	25/45	3-2-3	3.95	7.32		SILTY CLAY: Brown stiff silty clay			37	47	18	96	38	29	0.009	<1μm	
5		CH ML	S-2-3-5A S-1-3-5B	32/45	1-1-2	4.85	8.84		CLAYEY SILT: Gray clayey silt with fine sand	75	42	43 30	67 37	42 -	100 85	66 27	54 20	0.001 0.018	<1μm <1μm	
6		CL/ML ML	S-2-3-6A S-2-3-6B	32/45	2-3-3	5.75	8.84					32 31	37 36	13 9	88 86	36 25	26 21	0.009 0.019	<1μm <1μm	
7		CH/MH CL	S-2-3-7A S-2-3-7B	34/45	2-2-2	6.55	10.37		SILTY CLAY: Gray high plasticity silty clay			39 36	58 39	28 16	98 97	47 55	36 40	0.006 0.004	<1μm <1μm	
8		CH	S-2-3-8	29/45	2-2-4	7.95	11.29				45	40	65	40	100	72	61	<2μm	-	
9		SM	S-2-3-9	37/45	5-12-19	9.15	13.42		SAND: Gray silty fine sand to fine sand with silt			23	-	-	20	10	8	0.17	0.005	
10		SP-SM	S-2-3-10	42/45	11-17-28	9.95	12.82					21	-	-	11	-	-	0.20	0.07	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

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Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m north of CPT-2-10
Date: July 11, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Hole was filled in immediately after drilling ended
Notes: Accelerometers failed at S-2-10-5

Test ID: SPT-2-10
GPS Coordinates: 40.77883°N 30.39171°E
Elevation: 27.344 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

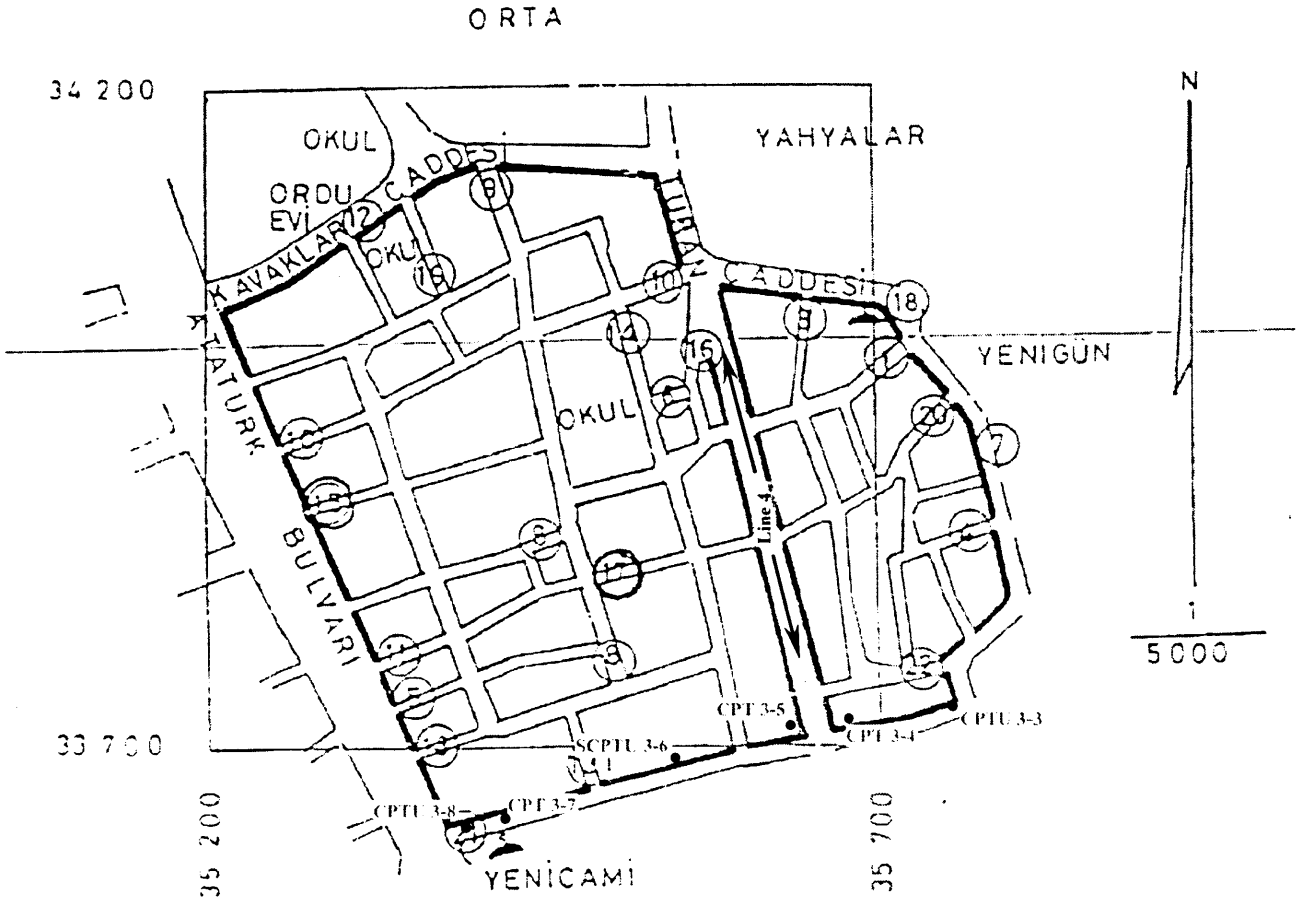
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Hole drilled through pavement (asphalt and subgrade). Gravel in wash water at aprox. 0.7 m											
1		CH	S-2-10-1	22/45	2-2-1	0.95	4.27	53	CH: Brown gray to gray silty clay with traces of fine sand	80	46	38	64	36	95	-	-	<1μm	<1μm	
2		CH	S-2-10-2	29/45	2-1-2	1.75	5.80	53		130	50	42	70	44	99	74	57	0.001	<1μm	
3		CL/ML ML	S-2-10-3A S-2-10-3B	39/45	1-2-2	2.75	5.80	51		40	190	35 30	41 25	16 -	91 86	43 25	32 21	0.009 0.018	<1μm <1μm	
4		ML CL	S-2-10-4A S-2-10-4B	30/45	1-1-1	3.95	7.32	59	ML: Brown clayey silt with fine sand CL: Brown clayey silt	40		33 38	31 47	- 22	78 94	24 43	18 22	0.023 0.007	<2μm 0.001	
5		ML SM	S-2-10-5A S-2-10-5B	30/45	3-6-6	4.75	8.84	-	SILT: Silt with fine sand			30 23	34 -	- -	92 45	25 18	20 14	0.029 0.082	<2μm <2μm	
6		ML ML	S-2-10-6A S-2-10-6B	33/45	4-5-8	6.05	10.37	-				26 28	32 32	- -	80 84	26 23	17 19	0.021 0.032	<2μm <2μm	
7		SM	S-2-10-7	27/45	10-15-19	7.45	11.89	-	SM: Gray silty fine sand			24	-	-	41	14	10	0.088	0.002	
8		SM	S-2-10-8	41/45	12-15-22	8.45	11.89	-				23	-	-	20	<10	<10	0.15	0.02	3 to 5 mm thick clay seams in sample S-2-10-8
9		SM SM	S-2-10-9A S-2-10-9B	40/45	11-14-19	9.45	13.42	-				23 26	- -	- -	24 20	- -	- -	0.15 0.14	<.08 <.08	At approx. 9.4 m, the wash water shows fine gravel
10																				

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

Phase 2

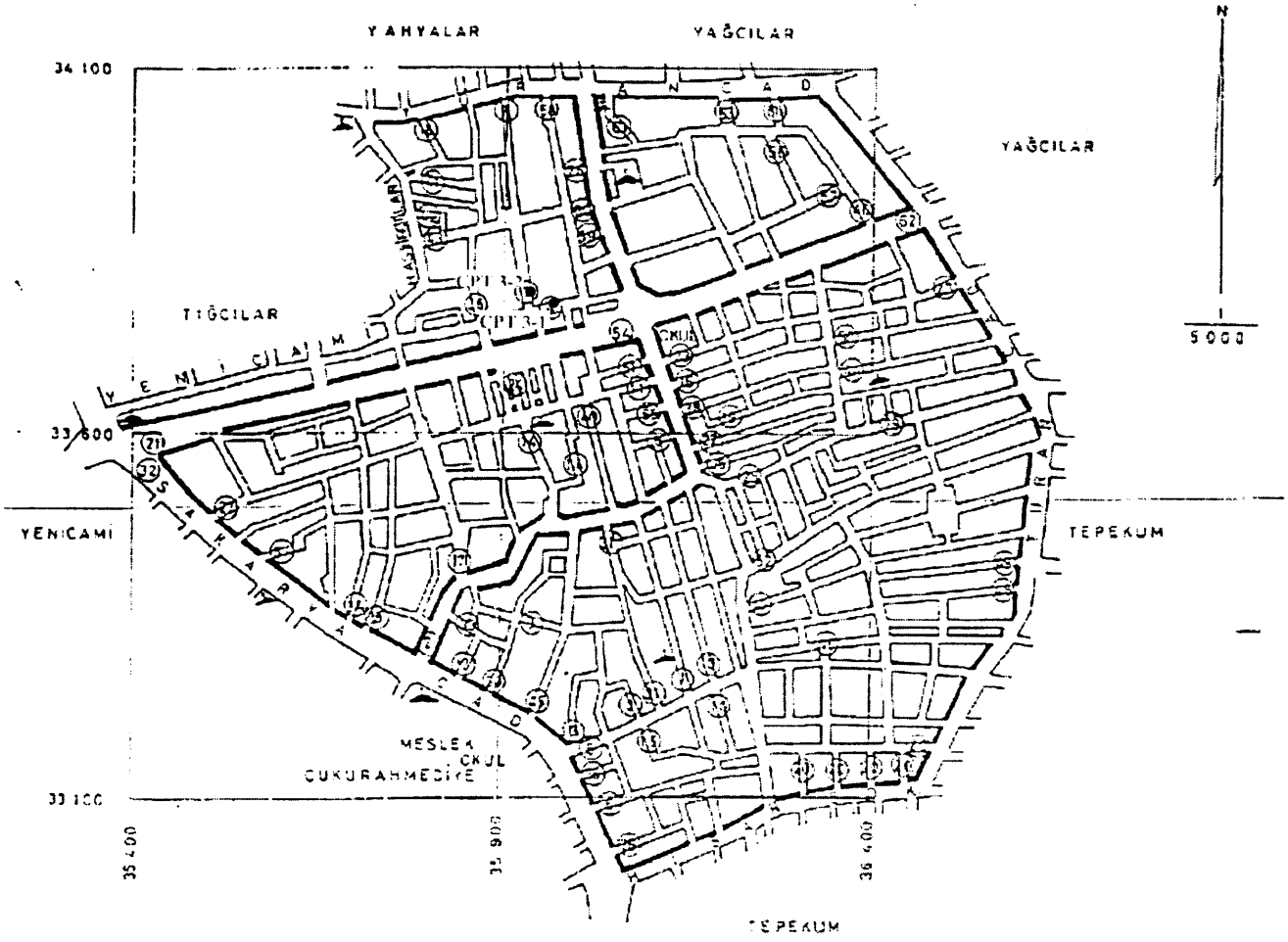
Line 3

TIĞCILAR DISTRICT, ADAPAZARI

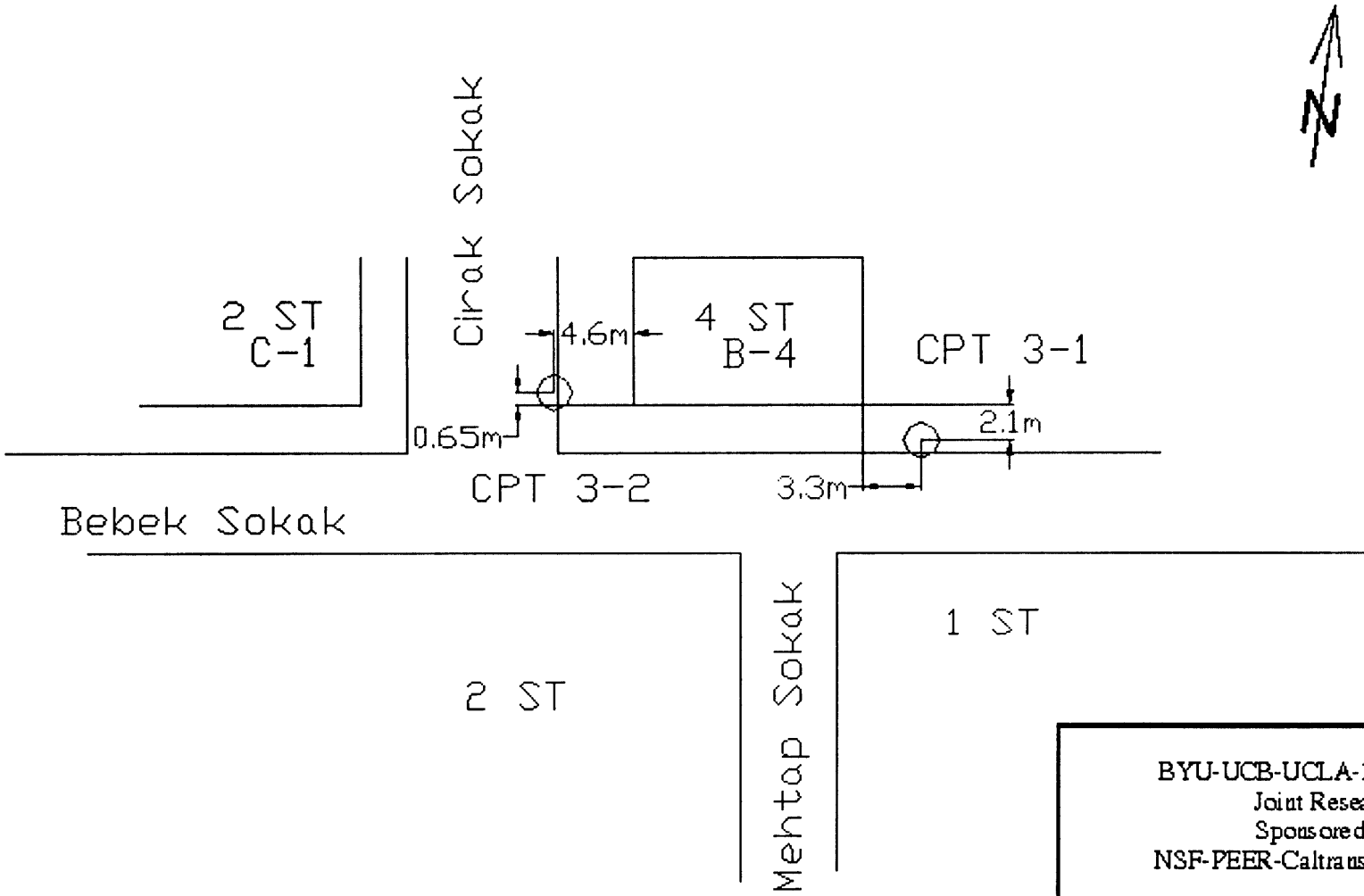


1	Akça Sokak	10	Karaosman Sokak	19	Tekin Sokak
2	Atatürk Bulvarı	11	Kadirhoca Sokak	20	Yağcıoğlu Sokak
3	Çetin Sokak	12	Kavaklar Caddesi	21	Yenicami Sokak
4	Diken Sokak	13	Kesçi Sokak	22	Yunusağa Sokak
5	Döner Geçit Sokak	14	Kol Sokak		
6	Duvar Sokak	15	Küçükosman Sokak		
7	Hasırcılar Sokak	16	Müftü Sokak		
8	İnce Sokak	17	Pamuklar Sokak		
9	İpek Sokak	18	Turan Caddesi		

YENIGÜN DISTRICT, ADAPAZARI



1	Bağıslar Sokak	17	Hacı Sadık	33	Somun Sokak	49	Başak Sokak
2	Başlar Sokak	18	Heybetli Sokak	34	Sönmez Sokak	50	Gönül Sokak
3	Babalık Sokak	19	Kesik Sokak	35	Tekerci Sokak	51	Kılıç Sokak
4	Bebek Sokak	20	Kır Sokak	36	Terzioğlu Sokak	52	Barçın Sokak
5	Büyük Çıkmaz	21	Kurbanlar Sokak	37	Tepeli Sokak	53	Beyler Sokak
6	Çakmak Sokak	22	Menn Sokak	38	Ünlü Sokak	54	Serap Sokak
7	Çırak Sokak	23	Eser Sokak	39	Yazar Sokak	55	Arda Sokak
8	Danış Sokak	24	Mehtap Sokak	40	Yağız Sokak	56	Gültekin Sokak
9	Dilim Sokak	25	Kare Sokak	41	Yavaş Sokak	57	Aytekin Sokak
10	Doğan Sokak	26	Nal Sokak	42	Yamuk Sokak	58	Emektar Sokak
11	Can Sokak	27	Ömer Sokak	43	Yassa Sokak	59	Gül Sokak
12	Elibos Sokak	28	Özal Sokak	44	Zeybek Sokak	60	Alemdar Sokak
13	Erişen Sokak	29	Özbek Sokak	45	Zümrüt Sokak	61	Gün Sokak
14	Engin Sokak	30	Paralı Sokak	46	Yağmur Sokak	62	Yenigün Caddesi
15	Emin Sokak	31	Recep Sokak	47	Germi Sokak	63	Şener Sokak
16	Gülsen Sokak	32	Sakarya Caddesi	48	Esen Sokak		



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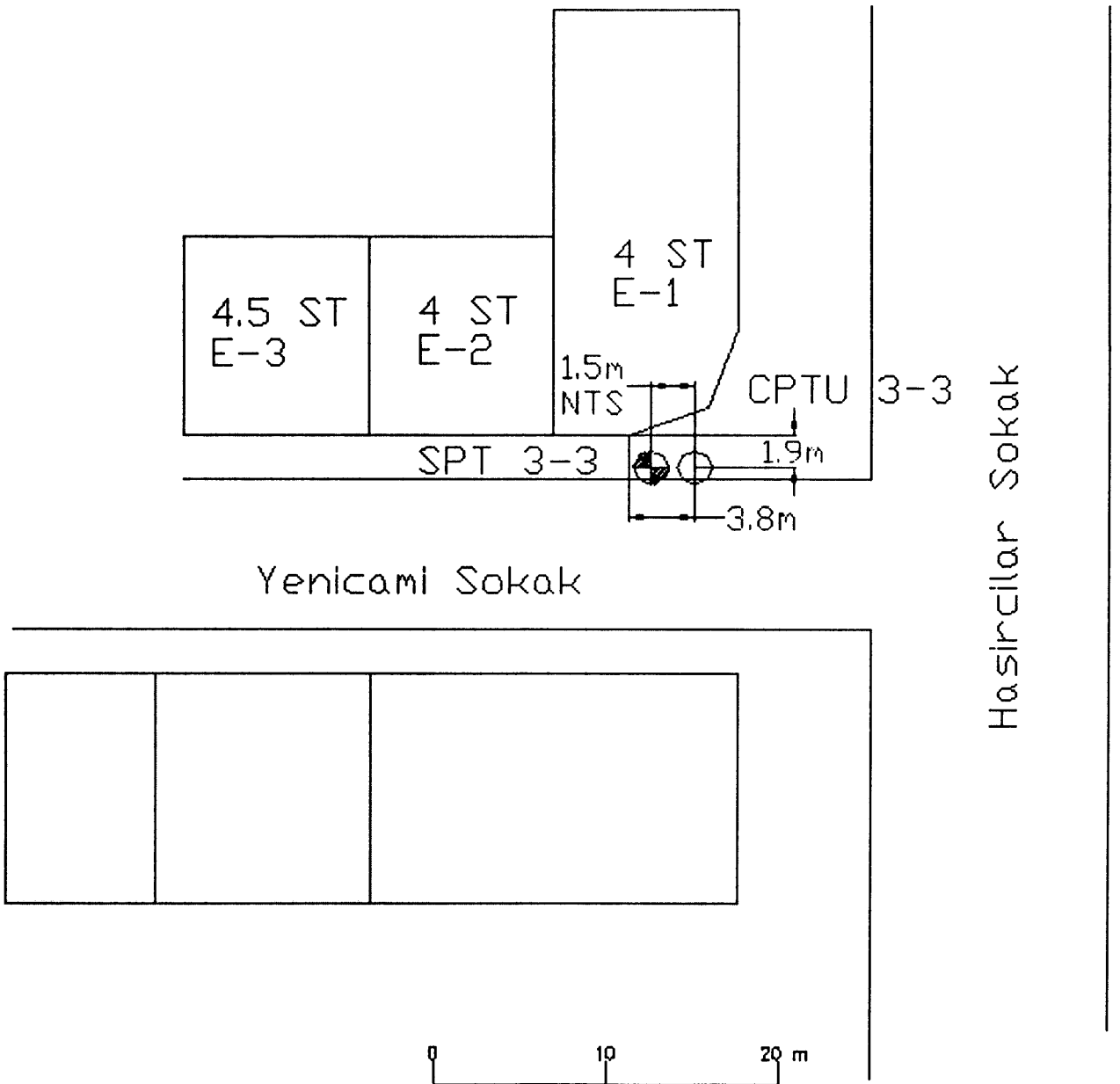
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Yenigun District	
Scale: Graphic scale	Line: 3 CPT 3-1 TO CPT 3-2
Drawn by: Mark Hill	Date: 05/01/01



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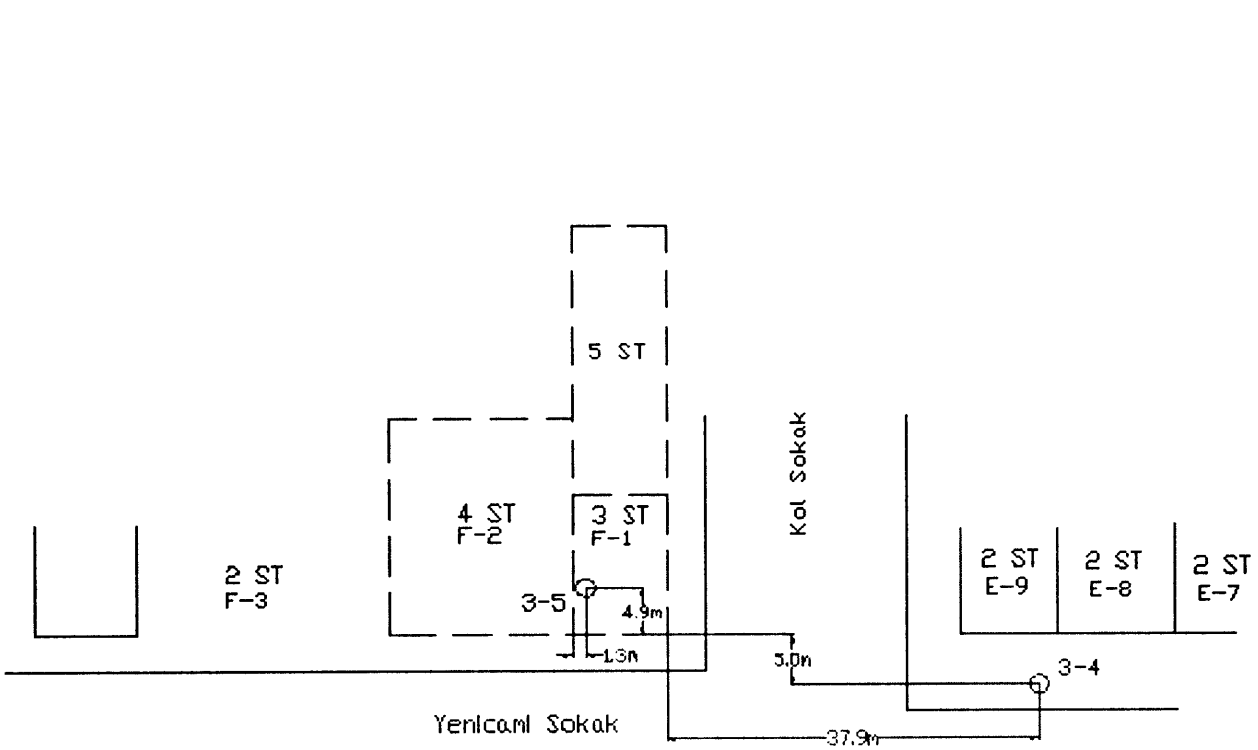
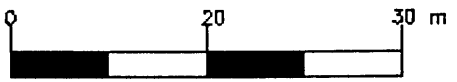
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Tigcilar District	
Scale: Graphic scale	Line: 3 CPTU 3-3
Drawn by: Mark Hill	Date: 05/01/01





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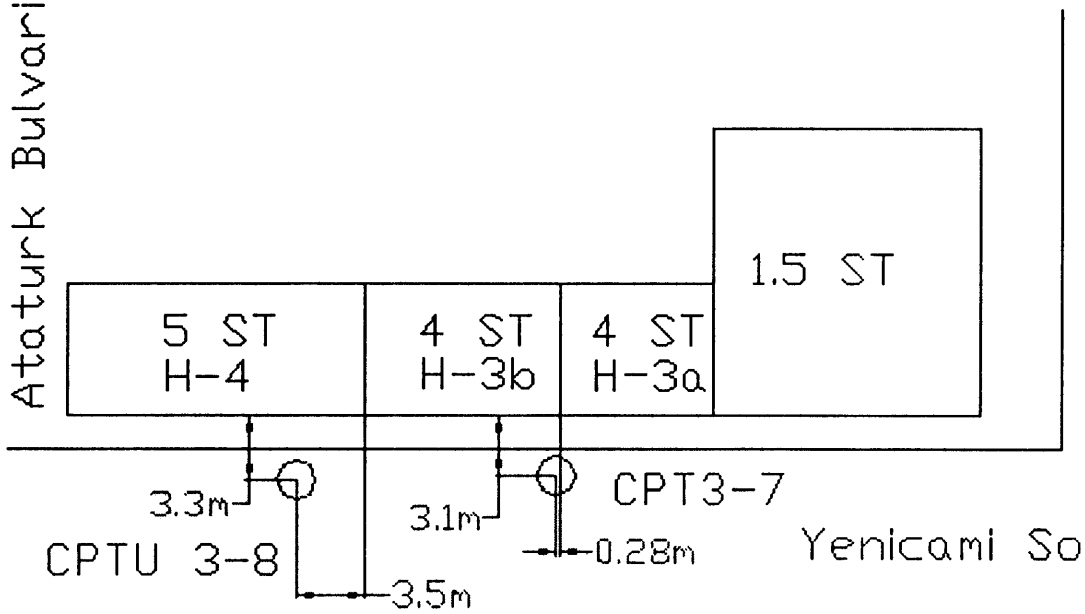
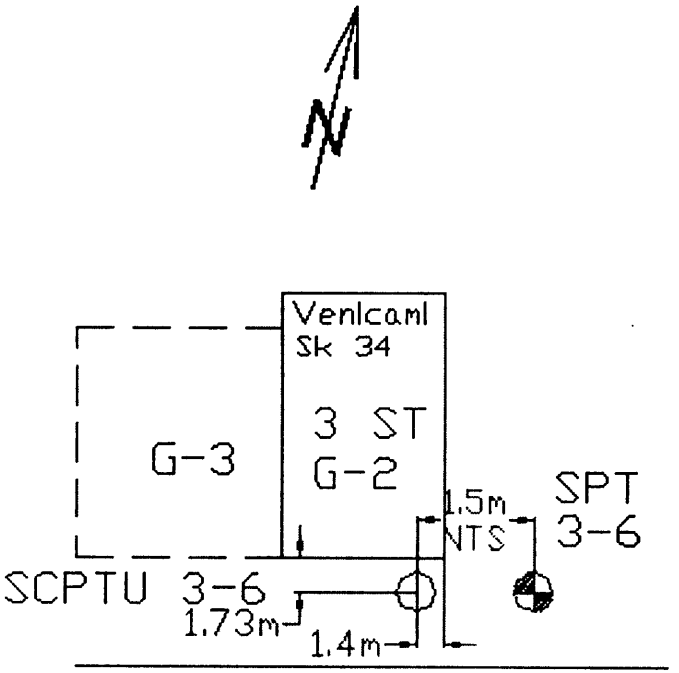
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Tigcilar District	
Scale: Graphic scale	Line: 3 CPT 3-4 TO CPT 3-5
Drawn by: Mark Hill	Date: 05/01/01





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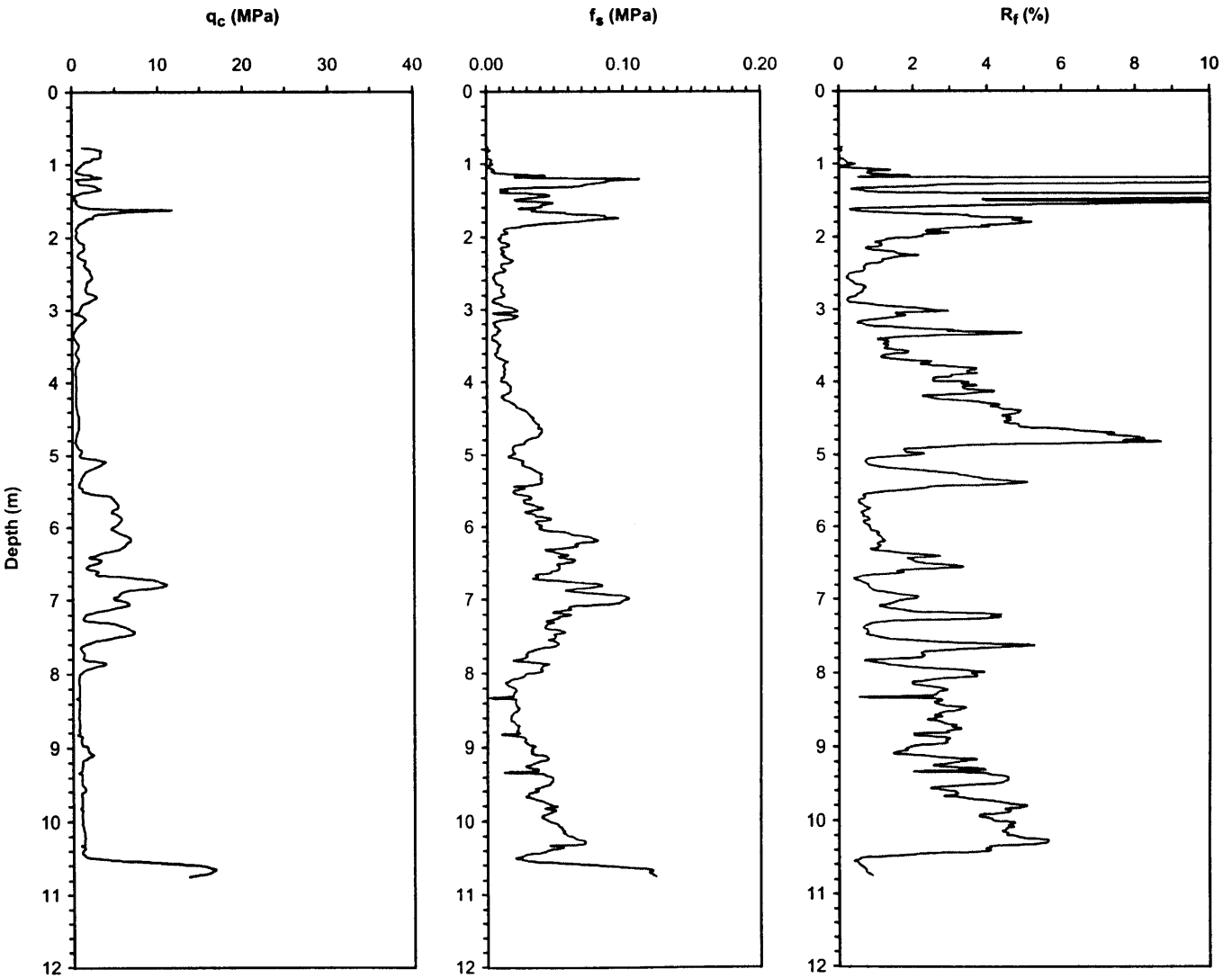
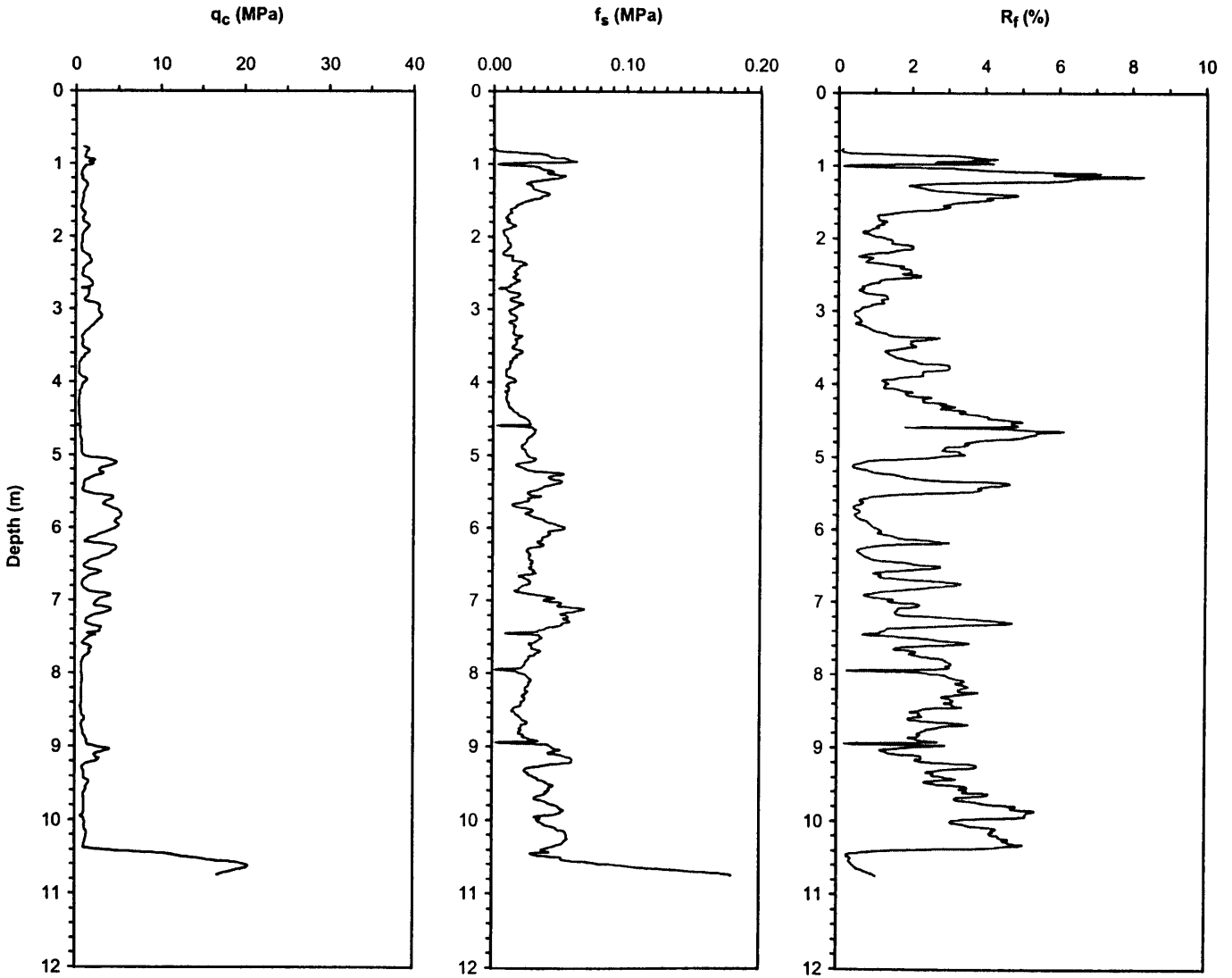
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Tigcilar District	
Scale: Graphic scale	Line: 3 SCPTU 3-6 TO CPTU 3-8
Drawn by: Mark Hill	Date: 05/01/01

UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	Page: 1 of 1
ZETAŞ-SAU	**Location:**	Line Three: Venicami Sokak (At intersection with Mehtap Sokak)	
Joint Research	**GPS Coordinates:**	40.77564° N, 30.40914° E	**Survey Coordinates (m):** 33,427.87 N, 29,641.40 W
	Test Number:	CPT 3 - 01	**Elevation (m):** 29.276
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 06 July 2000 17:02
Sponsored by:	**File Name:**	cpt 3 - 01.txt	**Water Table Elevation (m):** 28.63
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities and debris.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Three: Venicami Sokak (At intersection with Mehtap Sokak)	
Joint Research	**GPS Coordinates:**	40.77565° N, 30.40900° E	**Survey Coordinates (m):** 33,418.84 N, 29,659.18 W
	Test Number:	CPT 3 - 02	**Elevation (m):** 29.267
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 06 July 2000 18:34
Sponsored by:	**File Name:**	cpt 3 - 02.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



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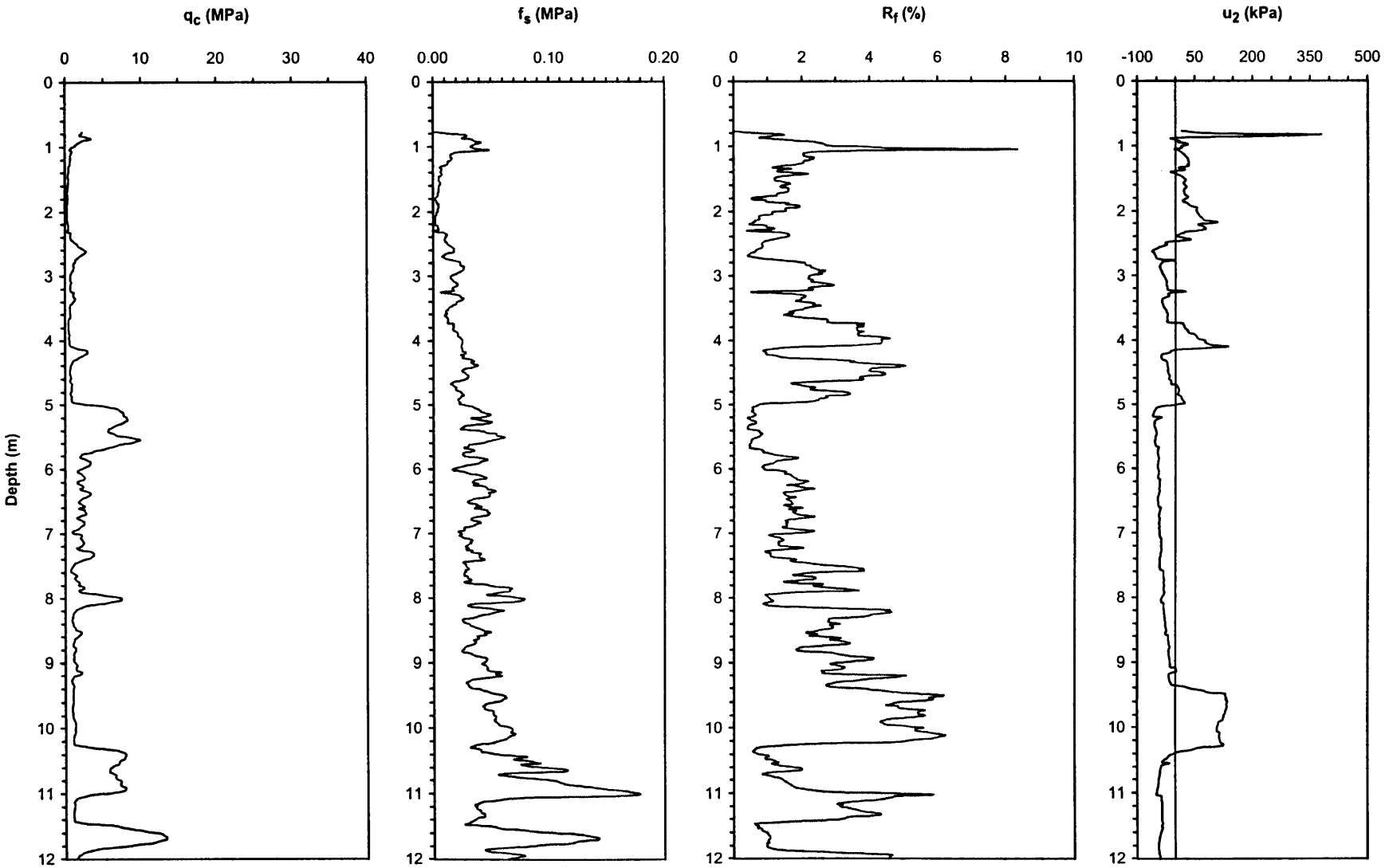
Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Three: Venicami Sokak
GPS Coordinates: 40.77522° N, 30.40665° E
Test Number: CPTU 3 - 03
Type of Cone: ELC10 CFP No. 000606 (a.p. v.d. Berg)
File Name: cptu 3 - 03.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.76 m to clear utilities and debris.

Survey Coordinates (m): 33,316.42 N, 29,833.89 W
Elevation (m): 29.269
Date: 03 July 2000 11:30
Water Table Elevation (m): N/R
Responsible Engineers: T. L. Youd and C. Christensen, BYU



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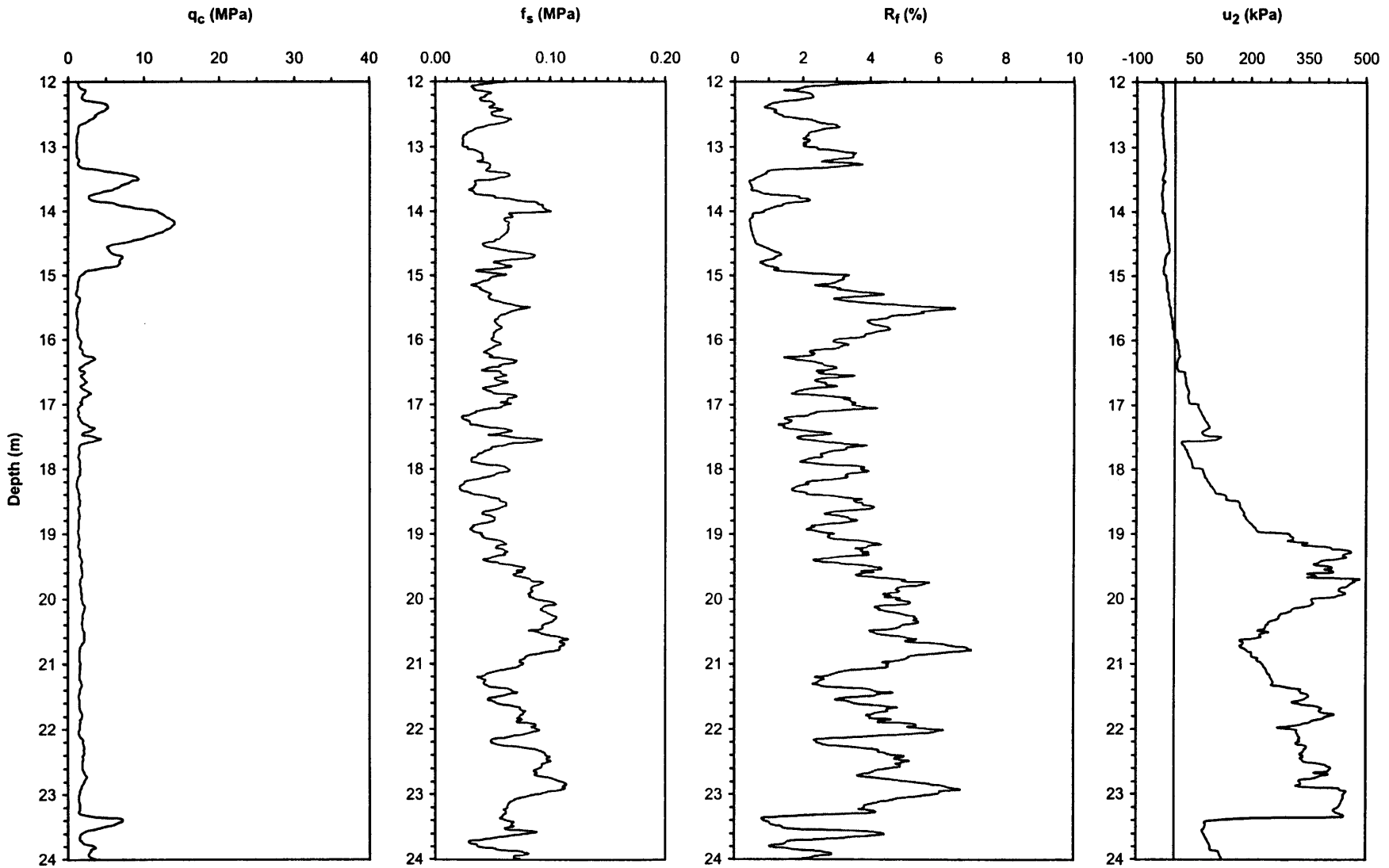
Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Three: Venicami Sokak
GPS Coordinates: 40.77522° N, 30.40665° E
Test Number: CPTU 3 - 03
Type of Cone: ELC10 CFP No. 000606 (a.p. v.d. Berg)
File Name: cptu 3 - 03.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.76 m to clear utilities and debris.

Survey Coordinates (m): 33,316.42 N, 29,833.89 W
Elevation (m): 29.269
Date: 03 July 2000 11:30
Water Table Elevation (m): N/R
Responsible Engineers: T. L. Youd and C. Christensen, BYU



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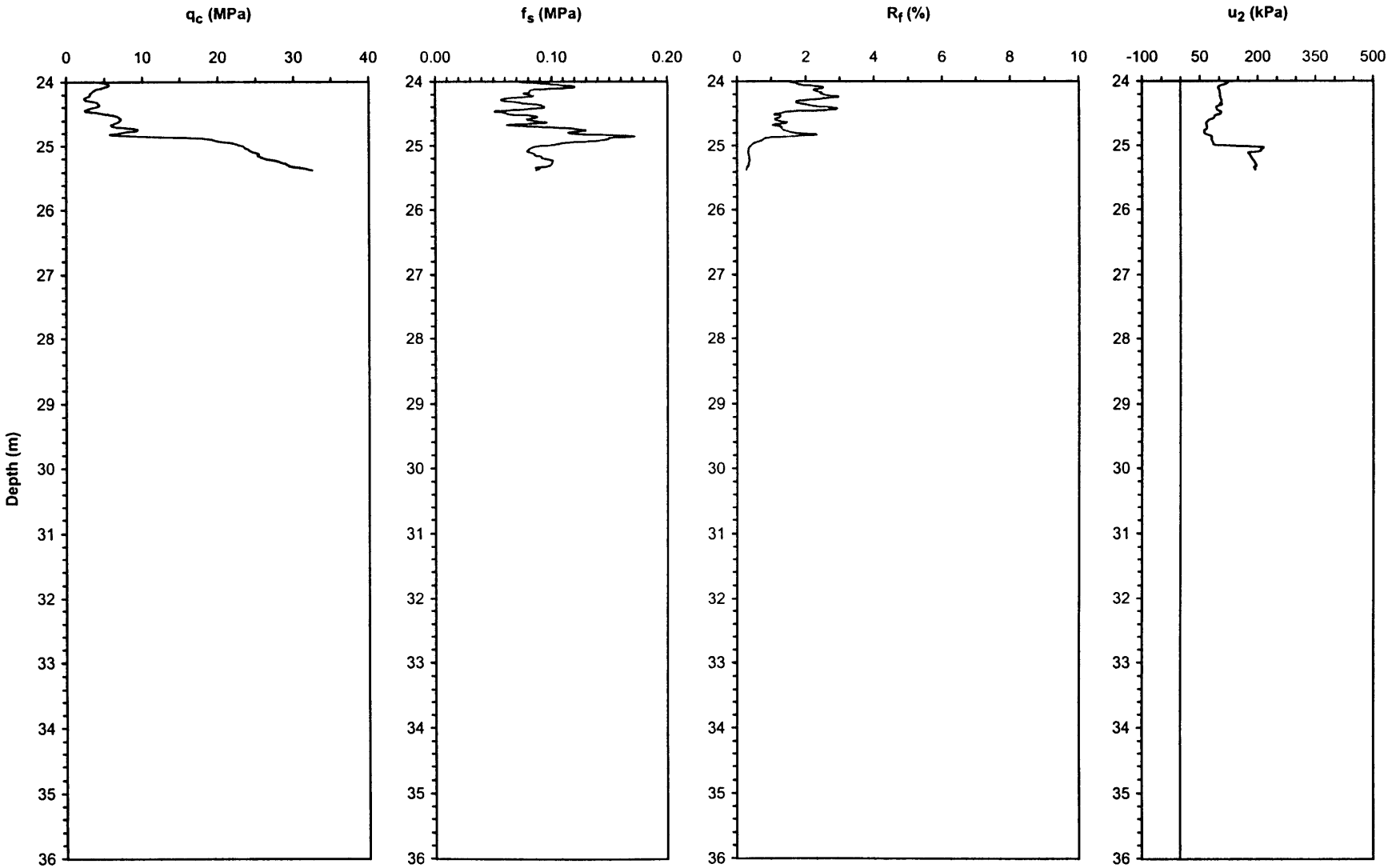
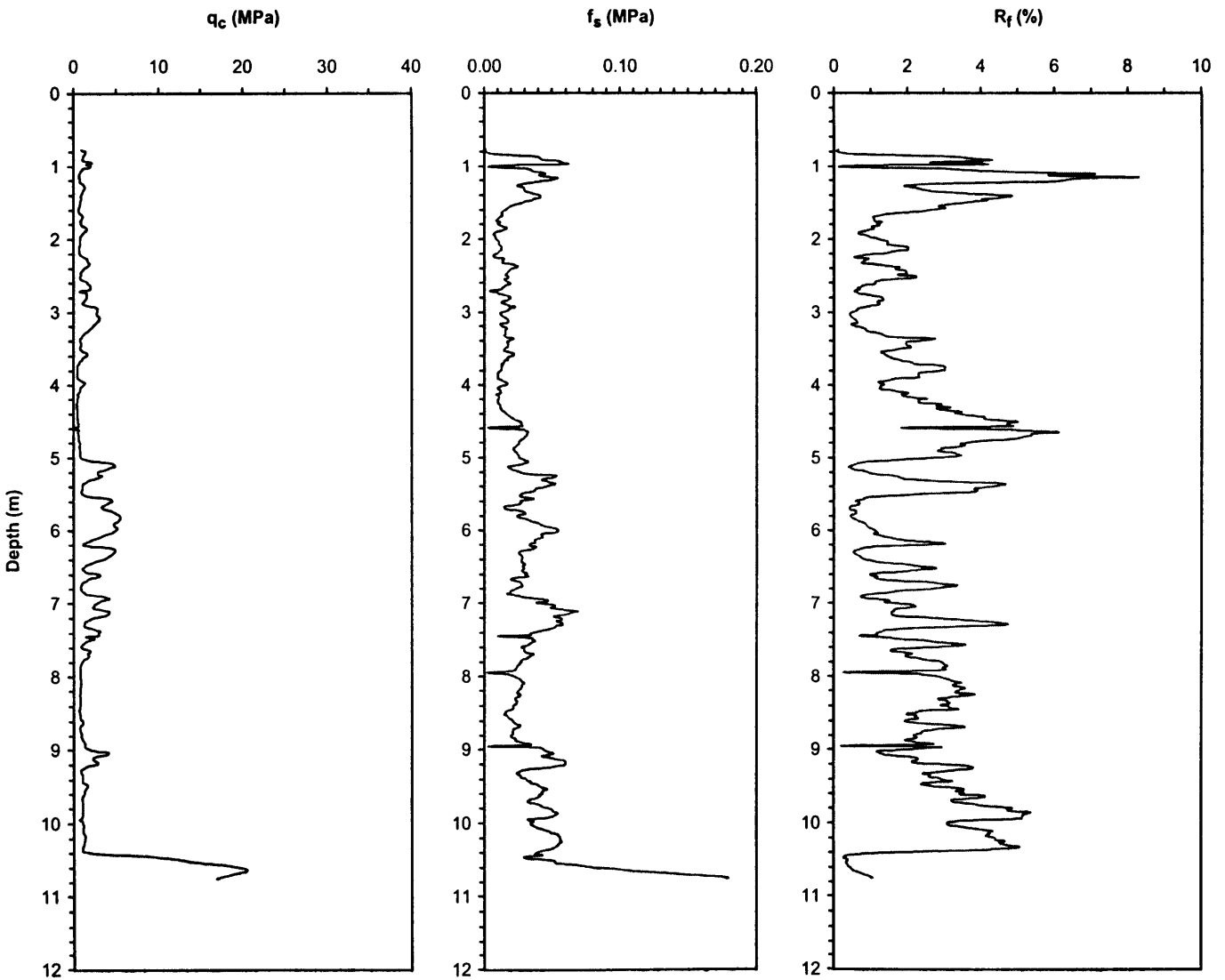
Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Three: Venicami Sokak
GPS Coordinates: 40.77522° N, 30.40665° E
Test Number: CPTU 3 - 03
Type of Cone: ELC10 CFP No. 000606 (a.p. v.d. Berg)
File Name: cptu 3 - 03.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.76 m to clear utilities and debris.

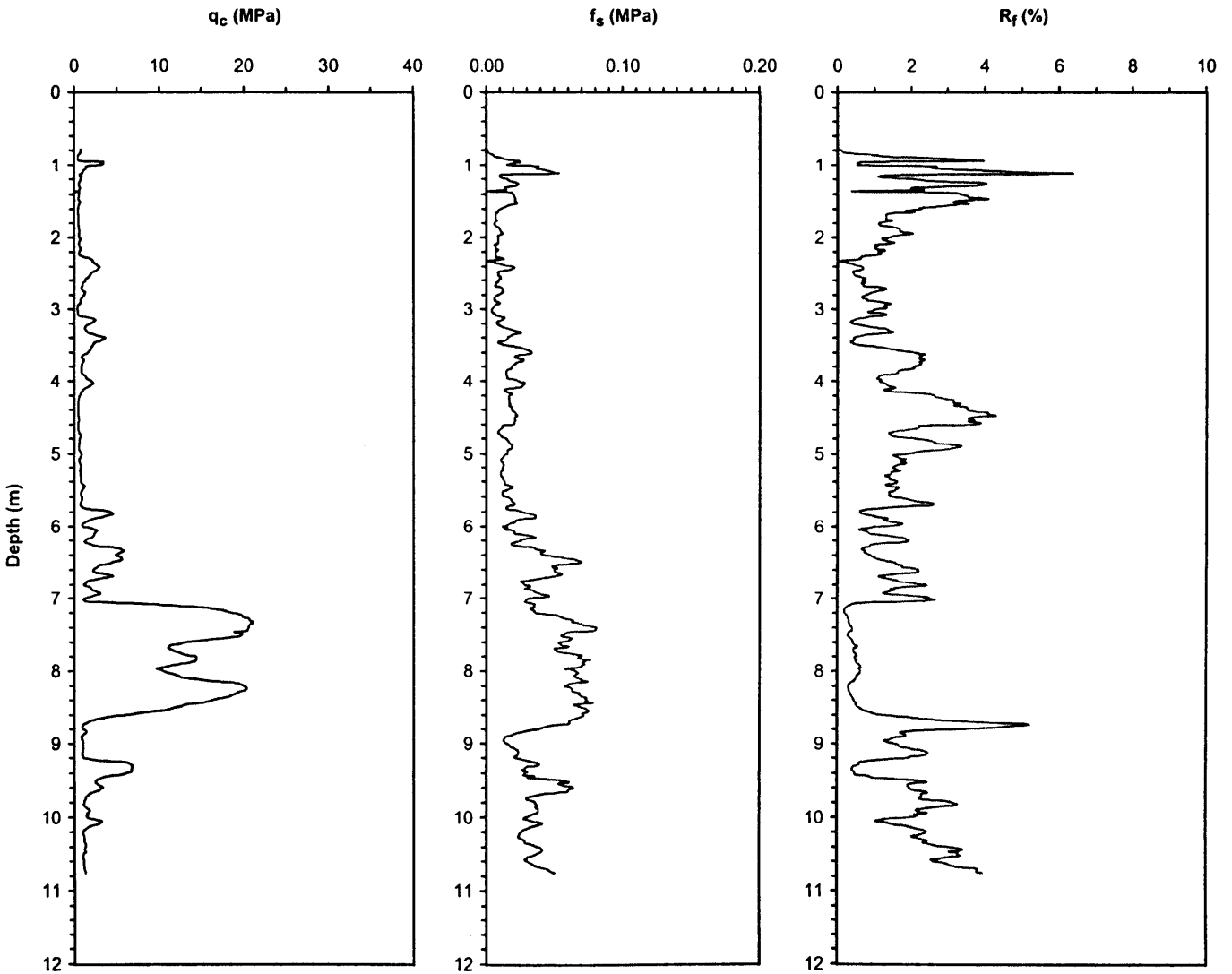
Survey Coordinates (m): 33,316.42 N, 29,833.89 W
Elevation (m): 29.269
Date: 03 July 2000 11:30
Water Table Elevation (m): N/R
Responsible Engineers: T. L. Youd and C. Christensen, BYU



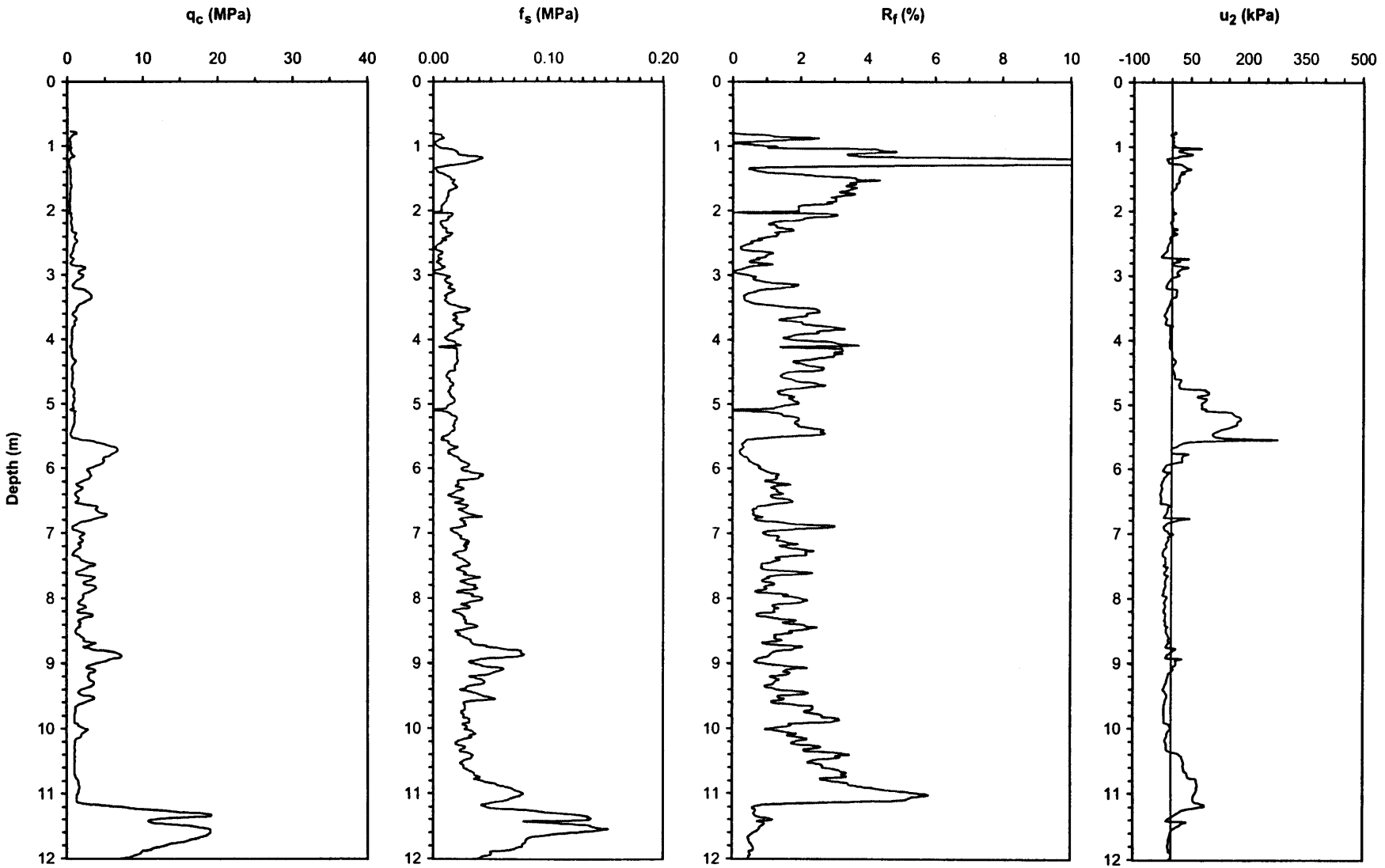
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Three: Venicami Sokak	
Joint Research	**GPS Coordinates:**	40.77496° N, 30.40565° E	**Survey Coordinates (m):** 33,272.28 N, 29,902.38 W
	Test Number:	CPT 3 - 04	**Elevation (m):** 29.256
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 07 July 2000 18:18
Sponsored by:	**File Name:**	cpt 3 - 04.txt	**Water Table Elevation (m):** 29.16
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Three: Venicami Sokak	
Joint Research	**GPS Coordinates:**	40.77507° N, 30.40518° E	**Survey Coordinates (m):** 33,258.53 N, 29,945.67 W
	Test Number:	CPT 3 - 05	**Elevation (m):** 29.447
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 08 July 2000 10:20
Sponsored by:	**File Name:**	cpt 3 - 05.txt	**Water Table Elevation (m):** 28.32
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.76 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Line Three: Venicami Sokak No. 34	
Joint Research	**GPS Coordinates:**	40.77487° N, 30.40471° E	**Survey Coordinates (m):** 33,231.50 N, 29,980.15 W
	Test Number:	SCPTU 3 - 06	**Elevation (m):** 29.482
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 07 July 2000
Sponsored by:	**File Name:**	scptu 3 - 06.txt	**Water Table Elevation (m):** 28.52
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. L. Youd and C. Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



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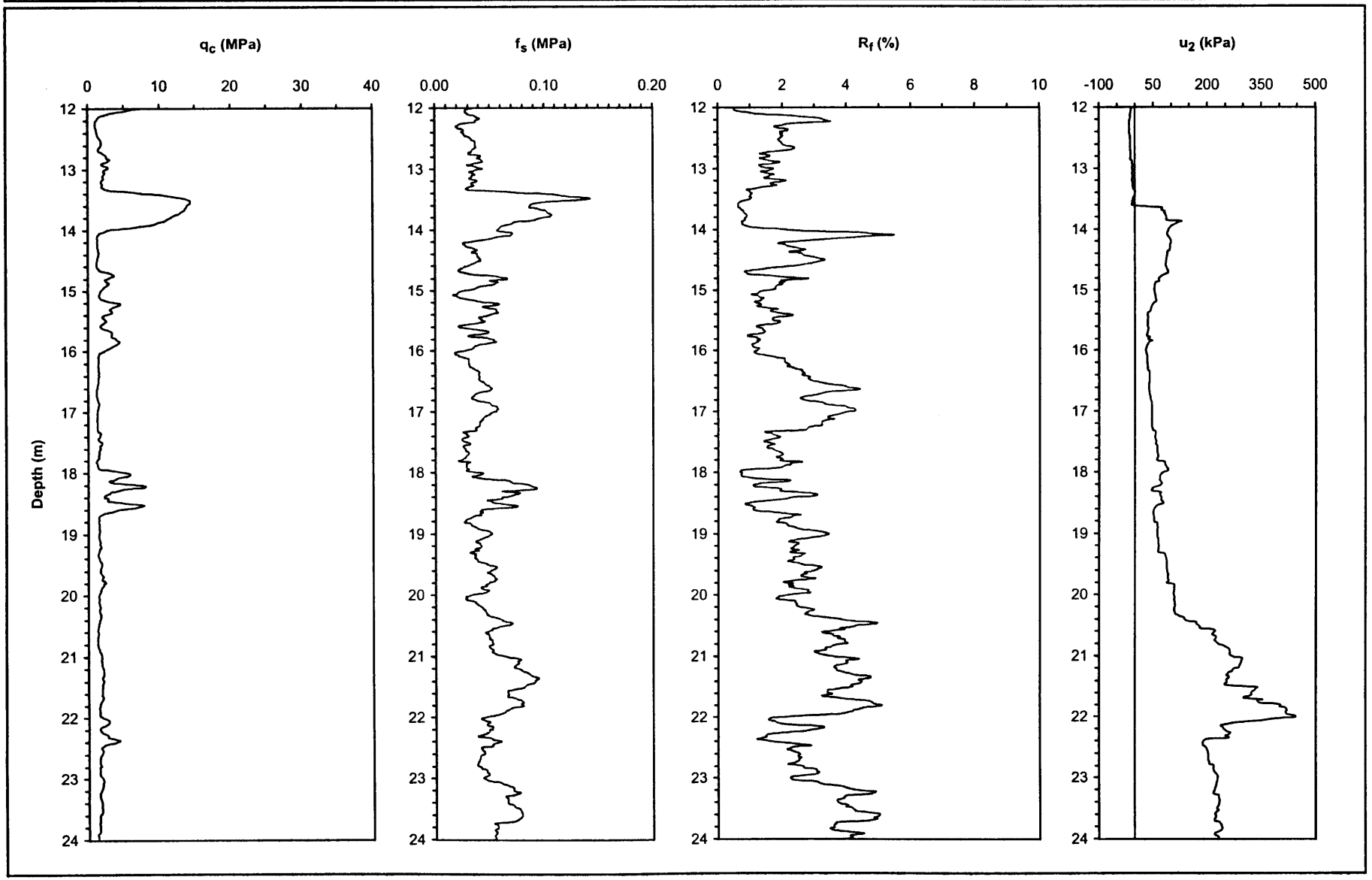
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Three: Venicami Sokak No. 34
GPS Coordinates: 40.77487° N, 30.40471° E
Test Number: SCPTU 3 - 06
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: scptu 3 - 06.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

Survey Coordinates (m): 33,231.50 N, 29,980.15 W
Elevation (m): 29.482
Date: 07 July 2000 0:00
Water Table Elevation (m): 28.522
Responsible Engineers: T. L. Youd and C. Christensen, BYU

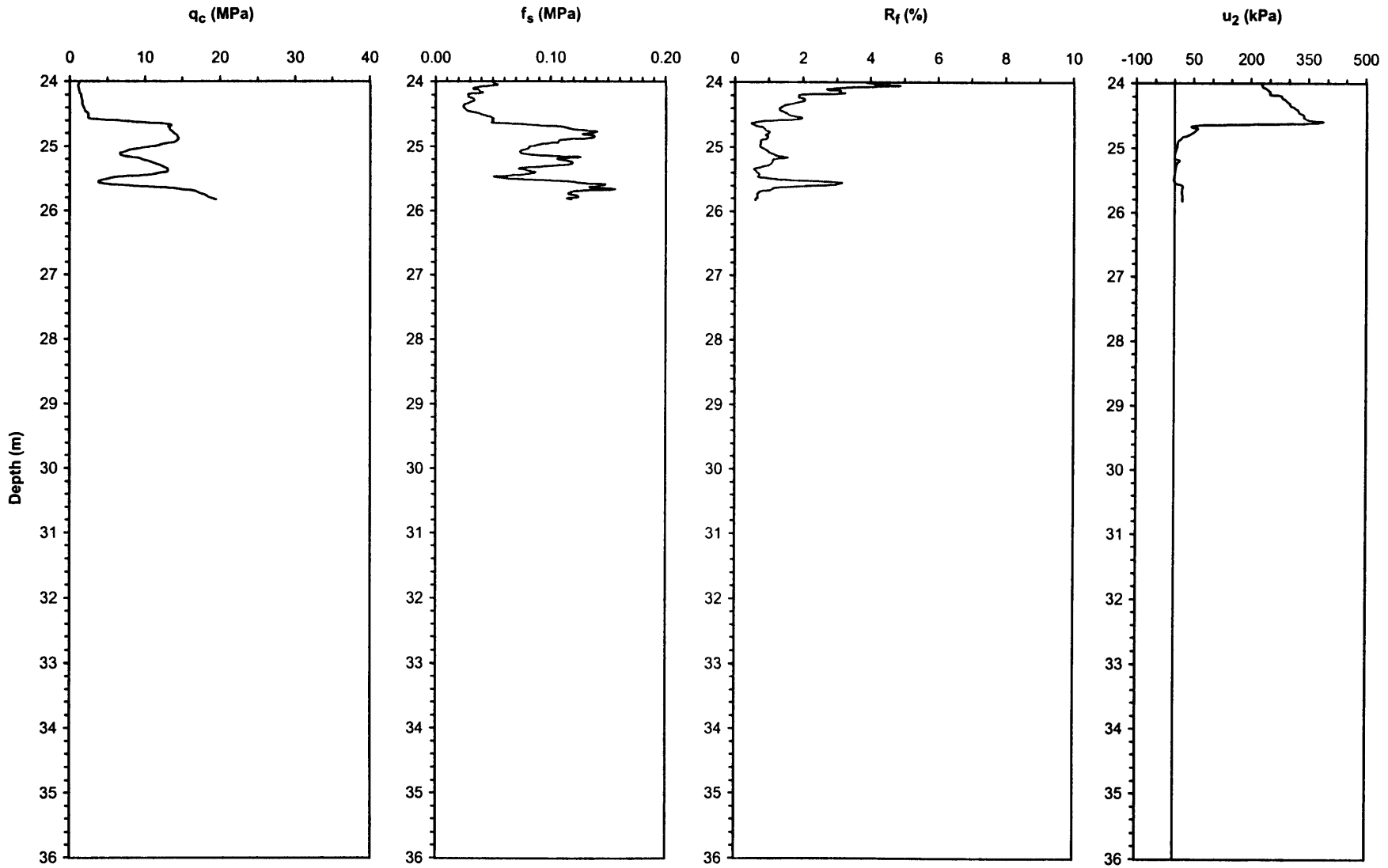


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

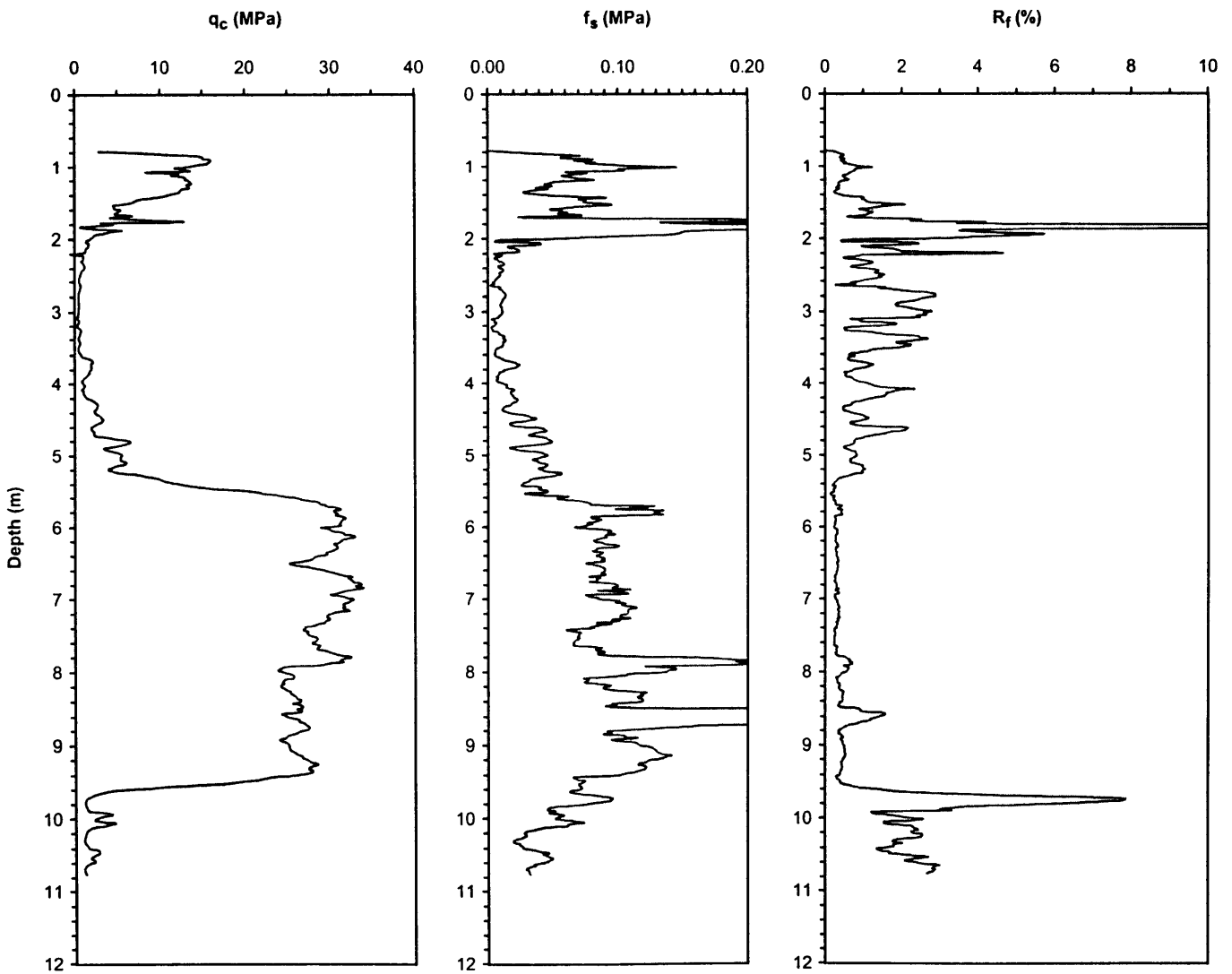
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Three: Venicami Sokak No. 34
GPS Coordinates: 40.77487° N, 30.40471° E
Test Number: SCPTU 3 - 06
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: scptu 3 - 06.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

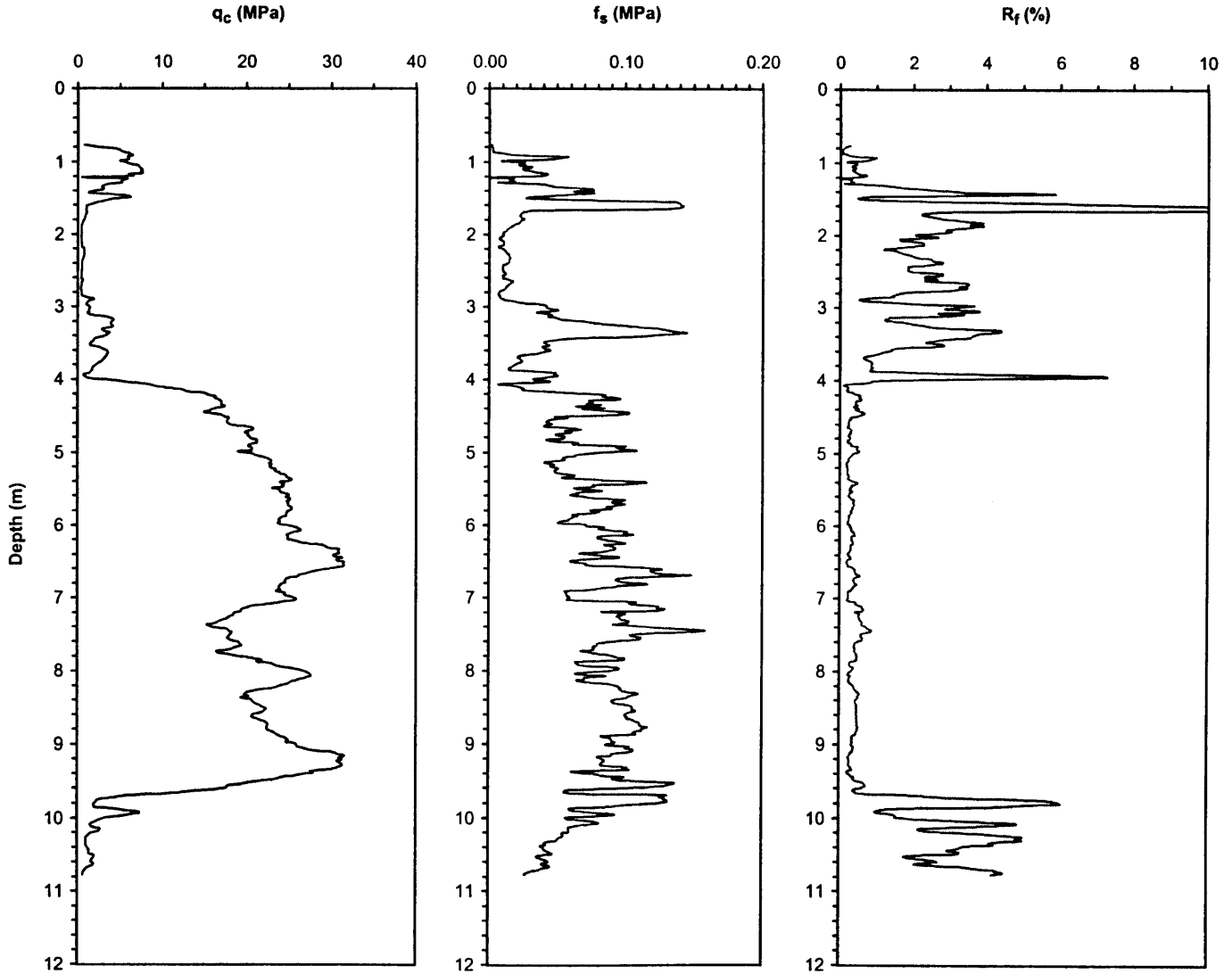
Survey Coordinates (m): 33,231.50 N, 29,980.15 W
Elevation (m): 29.482
Date: 07 July 2000 0:00
Water Table Elevation (m): 28.522
Responsible Engineers: T. L. Youd and C. Christensen, BYU



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Three: Venicami Sokak	
Joint Research	**GPS Coordinates:**	40.77438° N, 30.40246° E	**Survey Coordinates (m):** 33,123.30 N, 30,150.01 W
	Test Number:	CPT 3 - 07	**Elevation (m):** 29.286
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 08 July 2000 13:54
Sponsored by:	**File Name:**	cpt 3 - 07.txt	**Water Table Elevation (m):** 28.03
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.76 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Three: Venicami Sokak	
Joint Research	**GPS Coordinates:**	40.77431° N, 30.40237° E	**Survey Coordinates (m):** 33,117.56 N, 30,158.91 W
	Test Number:	CPT 3 - 08	**Elevation (m):** 29.464
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 08 July 2000 11:58
Sponsored by:	**File Name:**	cpt 3 - 08.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m west of CPT-3-3
Date: July 15, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.50 m 07/20/00
Notes:

Test ID: SPT-3-03
GPS Coordinates: 40.77496°N 30.40665°E
Elevation: 29.269 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Drilled through pavement (asphalt and subgrade)											
1		ML	S-3-3-1	36/45	1-1-2	1.25	3.67	-	ML: Gray silt with fine sand to silt with traces of fine sand			33	29	-	84	23	19	0.023	<2μm	Casing was initially left at 0.95 m, but it moved downward 0.3 m
2		ml	S-3-3-2A	35/45	2-3-4	2.05	5.80	60	SILT AND SAND: Brown clayey silt with variable fine sand content			31	-	-	91	83	48	0.022	<2μm	
		ML	S-3-3-2B									31	25	-	69	15	12	0.045	<2μm	The soil of samples S-2-3-2B and S-2-3-4A is very similar in appearance to the soil seen at the surface (sand boil ejecta) of the nearby Site G (Phase 1)
3		ML/CL	S-3-3-3A	32/45	1-2-2	2.85	5.80	59				45	42	15	97	36	27	0.009	<2μm	
		ML	S-3-3-3B									31	31	-	83	23	17	0.022	<2μm	
4		ML	S-3-3-4A	34/45	2-2-3	3.95	7.32	63				39	31	-	83	35	28	0.019	<1μm	
		cl	S-3-3-4B									34	-	-	99	44	36	0.007	<1μm	
5		ML	S-3-3-5A	36/45	4-6-6	4.95	8.84	-	SILTY SAND: Gray sandy silt to silty sand			27	28	-	54	18	15	0.065	<2μm	
		SM	S-3-3-5B									23	-	-	35	-	-	0.096	<.08	
6		ML	S-3-3-6A	33/45	3-6-7	5.95	10.37	-	CLAYEY SILT: Gray clayey silt			33	38	10	99	24	20	0.015	<1μm	Too much clipping and high velocity values in the SPT energy records. The data cannot be used.
		ML	S-3-3-6B									33	30	-	98	31	26	0.012	<1μm	
7		ML	S-3-3-7A	34/45	3-5-6	6.95	10.37	-				37	37	-	95	23	20	0.020	<1μm	
		ML	S-3-3-7B									30	32	-	96	14	10	0.024	0.001	
8		CH	S-3-3-8	32/45	2-2-3	7.75	11.89	-	CLAY: Gray, stiff silty clay			40	53	27	99	65	47	0.002	<1μm	
9		ML/CL	S-3-3-9	28/45	3-3-4	8.95	13.42	-				38	43	15	100	42	34	0.008	<1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5m east of CPT-3-6
Date: July 17, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.16 m 07/20/00
Notes: SPT energy was not measured

Test ID: SPT-3-06
GPS Coordinates: 40.77487°N 30.40471°E
Elevation: 29.482 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

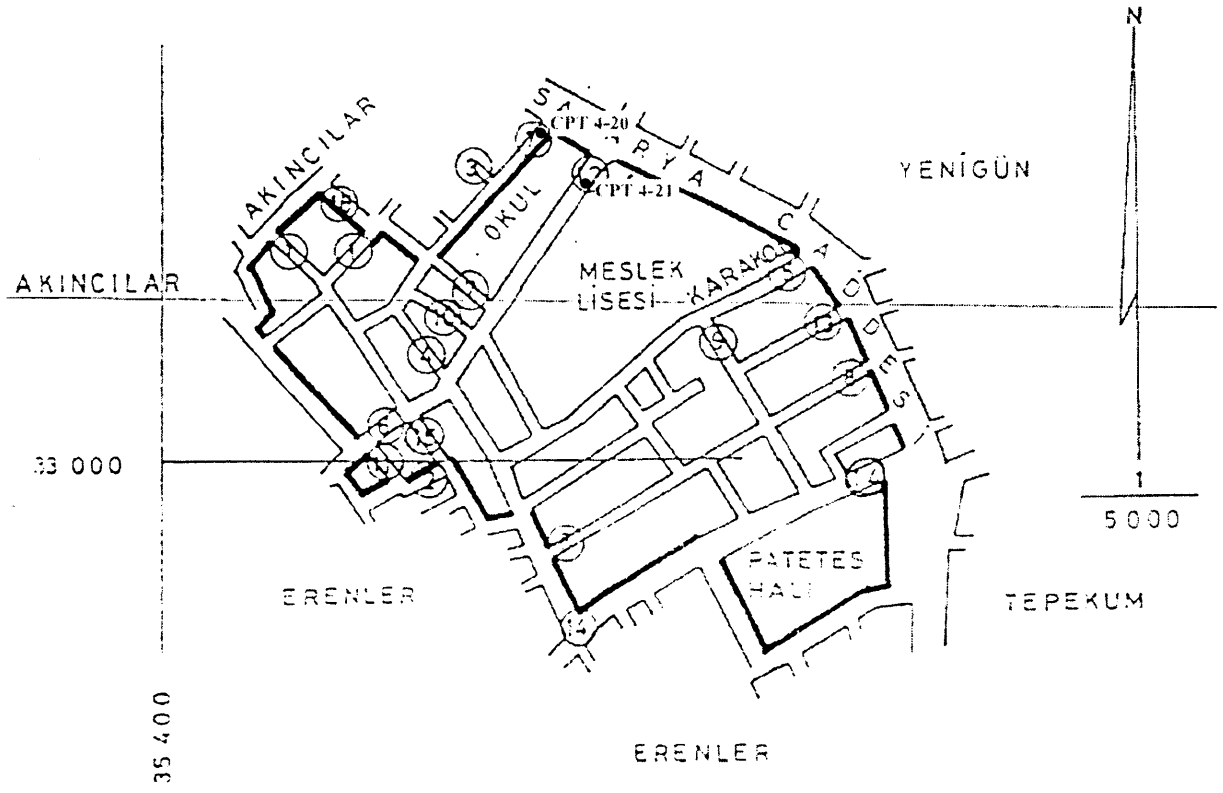
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill											
1		CL	S-3-6-1	32/45	1-1-1	0.95	3.67	-	SILTY CLAY: Olive gray silty clay with traces of fine sand	35	34	36	42	20	89	40	32	0.008	<1μm	Sampler penetrated an extra 10 cm with the last blow of the hammer
2		ML	S-3-6-2	36/45	2-3-2	1.95	5.20	-	SILT AND SAND: Interspersed strata of brown and gray sandy silt and silty sand			30	27	-	57	8	-	0.060	0.010	Rods sank 10 cm after being inserted in the hole (sloughing)
3		CH	S-3-6-3	47/45	1-1-2	2.95	6.72	-	SILTY CLAY: Brown silty clay to clayey silt interbedded with thin deposits of silt with sand and sandy silt	41	41	45	69	40	99	85	75	<1μm		
4		CL/ML	S-3-6-4	41/45	2-1-2	3.85	6.72	-		60	26	32	34	12	92	50	40	0.005	<1μm	
5		SM	S-3-6-5	41/45	6-5-7	4.95	8.24	-	SILTY SAND: Silty fine sand			25	-	-	35	11	9	0.094	0.004	
6		ML	S-3-6-6	39/45	4-3-6	5.95	9.77	-	ML: Clayey silt with variable fine sand content			30	30	-	82	16	14	0.036	<2μm	
7		ML	S-3-6-7	34/45	3-5-5	6.95	11.29	-		75		41	31	-	93	22	17	0.020	<2μm	
8		ML	S-3-6-8	42/45	3-4-8	7.95	11.29	-				30	33	-	58	14	12	0.055	<2μm	
9		CH/MH	S-3-6-9	27/45	3-3-5	8.95	11.29	-	CH: Gray silty clay interbedded with thin layers of silt with sand	190	78	31	57	28	99	68	55	0.001	<1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

Phase 2

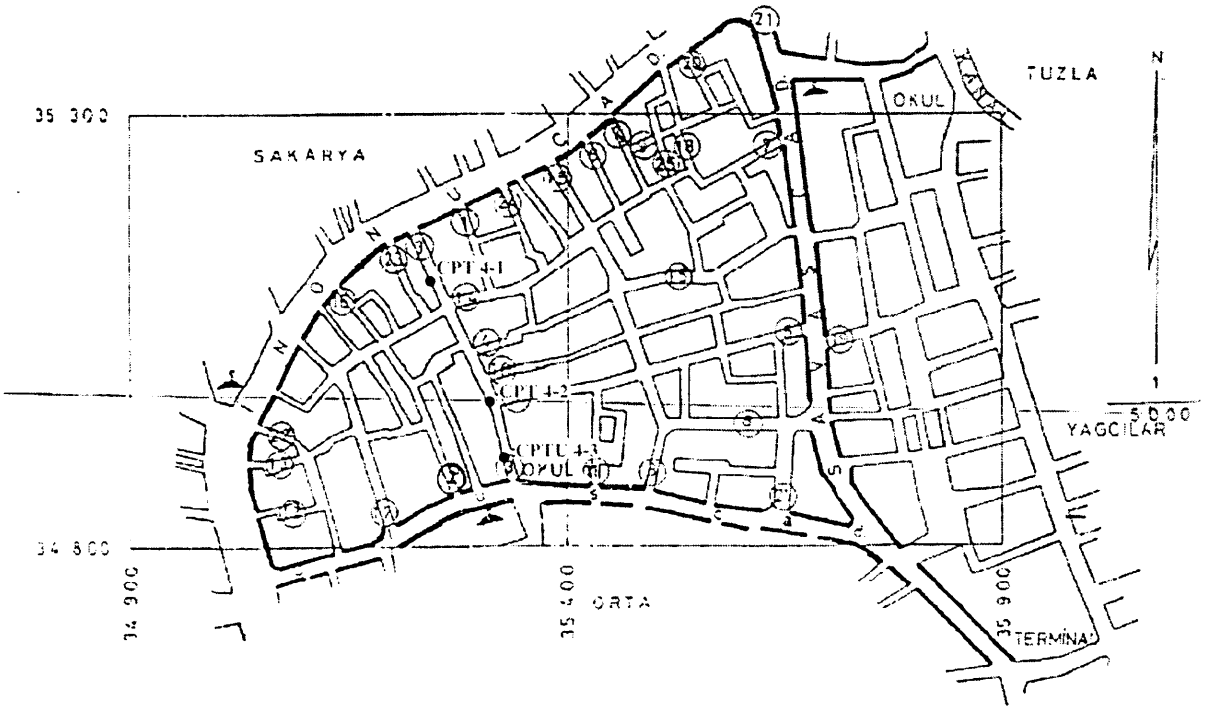
Line 4

ÇUKURAHMEDIYE DISTRICT, ADAPAZARI



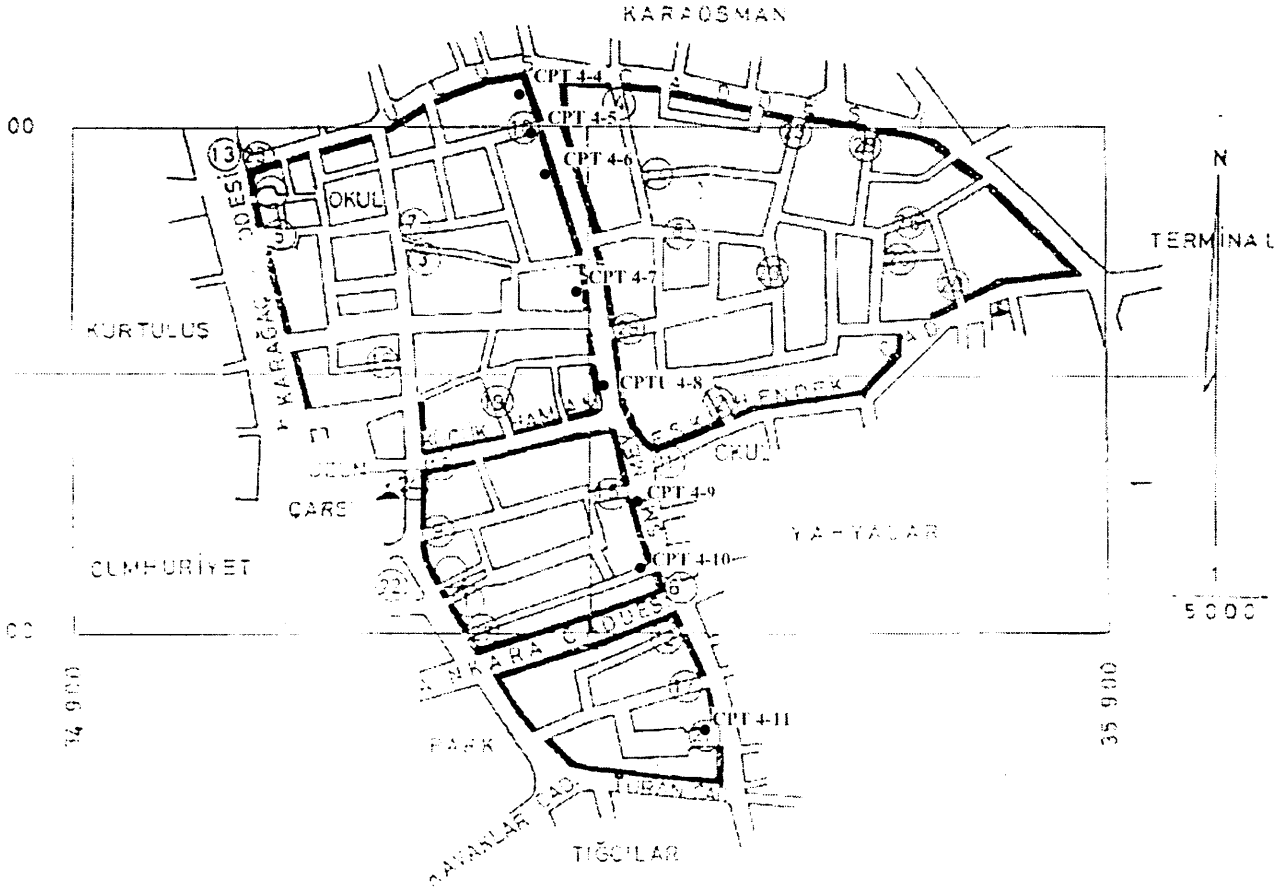
1	Akay Sokak	9	Düz Sokak
2	Akbay Sokak	10	Eren Sokak
3	Bala Sokak	11	Kırım Sokak
4	Cantek Sokak	12	Meydan Sokak
5	Çayır Sokak	13	Orta Sokak
6	Çile Sokak	14	Oğul Sokak
7	Çukur Sokak	15	Yumak Sokak
8	Demirci Sokak	16	Ada Sokak

KARAOSMAN DISTRICT, ADAPAZARI



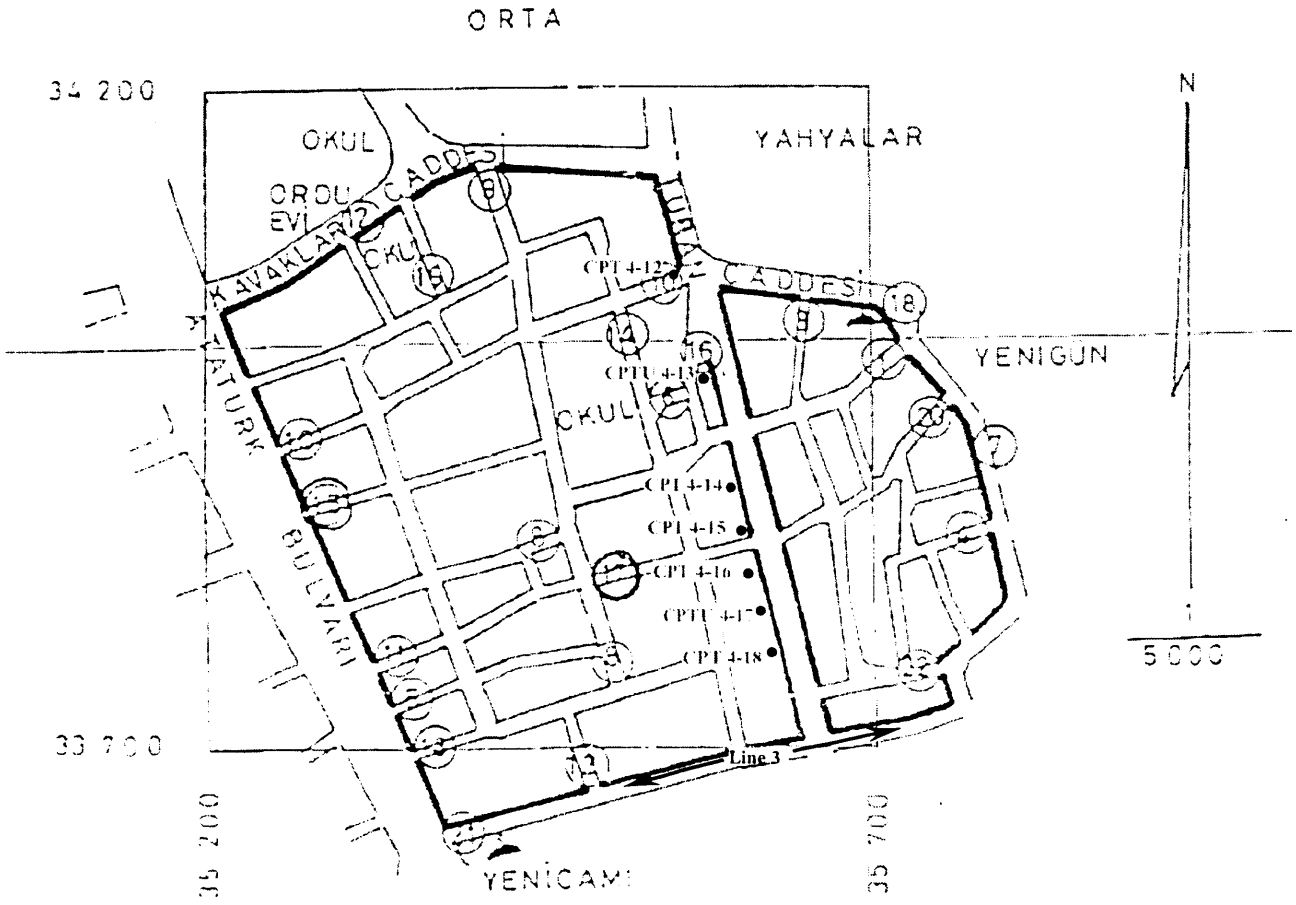
1	Ayan Sokak	10	Dutlu Sokak	19	Pınar Sokak
2	Başkan Sokak	11	Eski Sokak	20	Saka Sokak
3	Bayraklı Sokak	12	Ender Sokak	21	Barış Caddesi
4	Beşik Sokak	13	Gül Sokak	22	Yaprak Sokak
5	Bezirci Sokak	14	Kavşak Sokak	23	Şehitler Sokak
6	Ceylan Sokak	15	Kader Sokak	24	Yavru Sokak
7	Çıkınkçi Sokak	16	Köroğlu Sokak	25	Zemin Sokak
8	Çövenci Sokak	17	Mestci Sokak		
9	Duman Sokak	18	Mert Sokak		

ORTA DISTRICT, ADAPAZARI



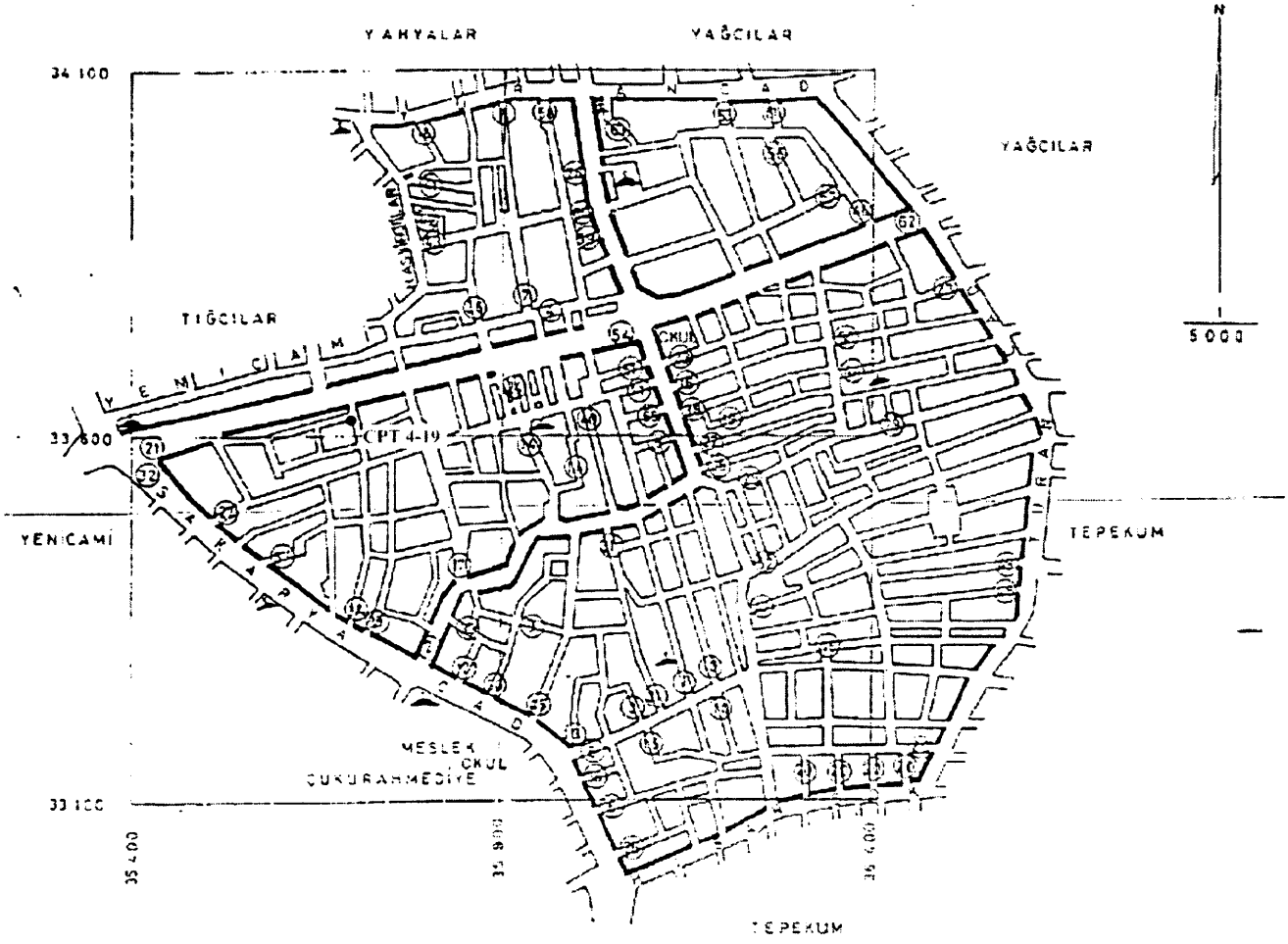
1	Acun Sokak	11	Eski Hendek Caddesi	21	Yonca Sokak
2	Adaş Sokak	12	Ipçi Sokak	22	Mutaflar Çarşısı
3	Avcılar Sokak	13	Karağaç Caddesi	23	Teğmen Çarşısı
4	Boyacı Sokak	14	Katip Sokak	24	Tozlu Camii Çarşısı
5	Can Sokak	15	Keçeci Sokak	25	Ulus Caddesi
6	Çeşme Meydanı Caddesi	16	Kökçü Sokak	26	Nazlı Sokak
7	Çil Sokak	17	Kuzu Sokak	27	Pazar Geçidi
8	Demirkapı Sokak	18	Küçükhamam Caddesi	28	1 Nolu
9	Altan Kutluata Sokak	19	Küçükhamam Çıkmazı	29	Duran Sokak
10	Doğu Sokak	20	Lale Sokak		

TIĞCILAR DISTRICT, ADAPAZARI

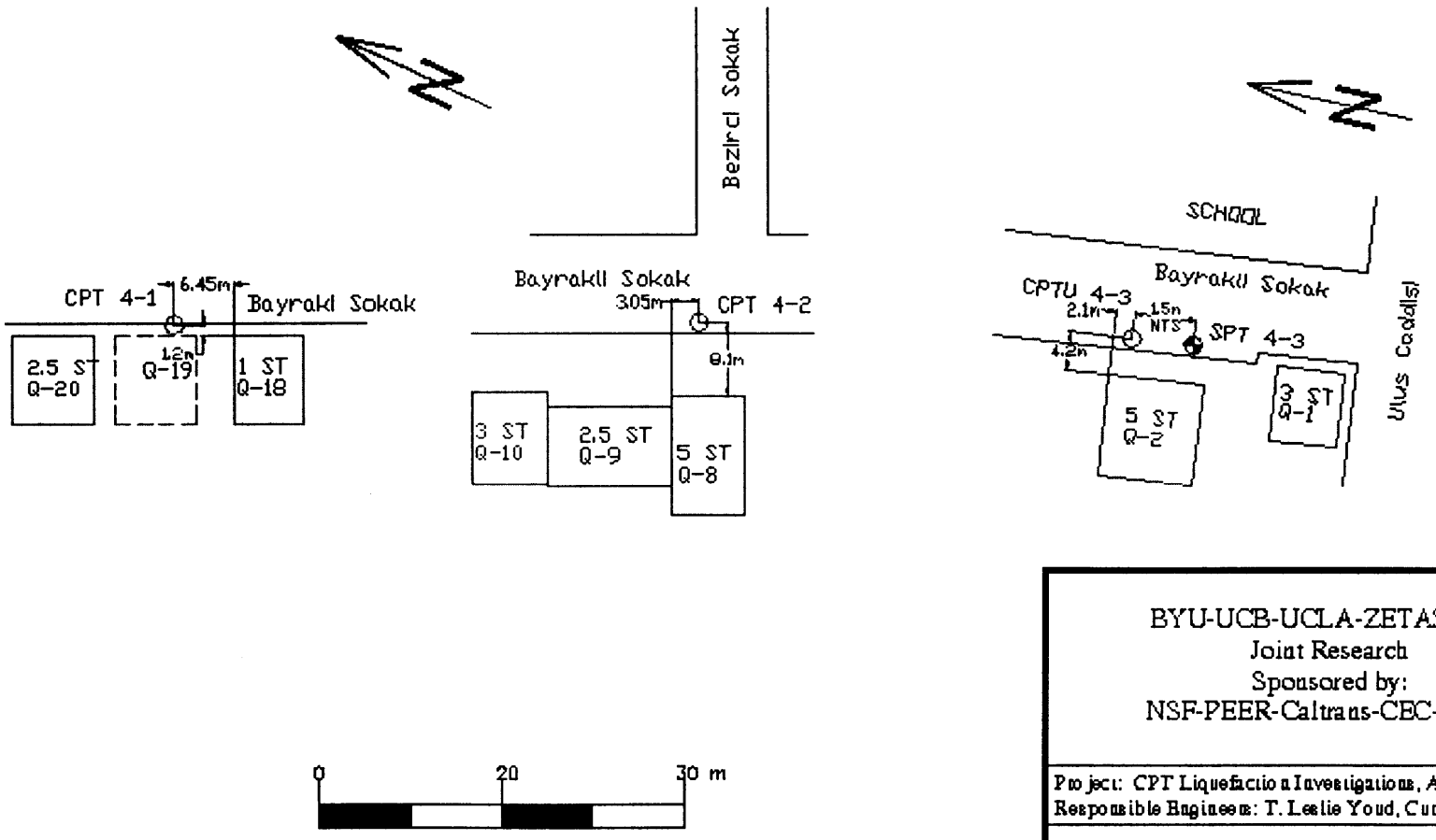


1	Akça Sokak	10	Karaosman Sokak	19	Tekin Sokak
2	Atatürk Bulvarı	11	Kadirhoca Sokak	20	Yağcıoğlu Sokak
3	Çetin Sokak	12	Kavaklar Caddesi	21	Yenicami Sokak
4	Diken Sokak	13	Kesçi Sokak	22	Yunusağa Sokak
5	Döner Geçit Sokak	14	Kol Sokak		
6	Duvar Sokak	15	Küçükosman Sokak		
7	Hasırcılar Sokak	16	Müftü Sokak		
8	İnce Sokak	17	Pamuklar Sokak		
9	İpek Sokak	18	Turan Caddesi		

YENIGÜN DISTRICT, ADAPAZARI



1	Bağıslar Sokak	17	Hacı Sadık	33	Somun Sokak	49	Başak Sokak
2	Başlar Sokak	18	Heybetli Sokak	34	Sönmez Sokak	50	Gönül Sokak
3	Babalık Sokak	19	Kesik Sokak	35	Tekerci Sokak	51	Kılıç Sokak
4	Bebek Sokak	20	Kır Sokak	36	Terzioğlu Sokak	52	Barçın Sokak
5	Büyük Çıkmaz	21	Kurbanlar Sokak	37	Tepeli Sokak	53	Beyler Sokak
6	Çakmak Sokak	22	Metin Sokak	38	Ünlü Sokak	54	Serap Sokak
7	Çırak Sokak	23	Eser Sokak	39	Yazar Sokak	55	Arda Sokak
8	Danış Sokak	24	Mehtap Sokak	40	Yağız Sokak	56	Gültekin Sokak
9	Dilim Sokak	25	Kare Sokak	41	Yavaş Sokak	57	Aytekin Sokak
10	Doğan Sokak	26	Nal Sokak	42	Yamuk Sokak	58	Emektar Sokak
11	Can Sokak	27	Ömer Sokak	43	Yassı Sokak	59	Gül Sokak
12	Elibos Sokak	28	Özal Sokak	44	Zeybek Sokak	60	Alemdar Sokak
13	Erişen Sokak	29	Özbek Sokak	45	Zümrüt Sokak	61	Gün Sokak
14	Engin Sokak	30	Paralı Sokak	46	Yağmur Sokak	62	Yenigün Caddesi
15	Emin Sokak	31	Recep Sokak	47	Gemi Sokak	63	Şener Sokak
16	Gülsen Sokak	32	Sakarya Caddesi	48	Esen Sokak		



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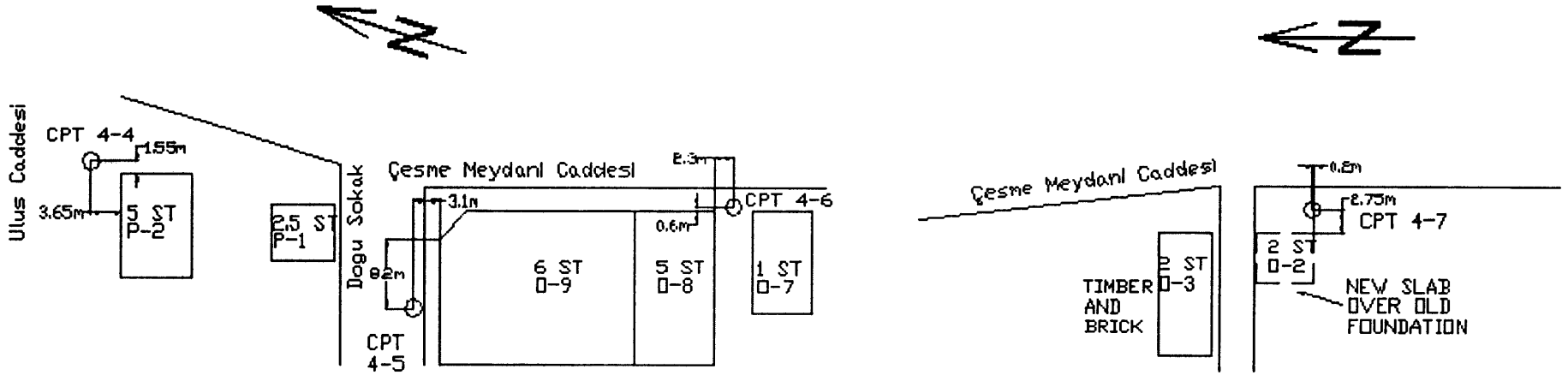
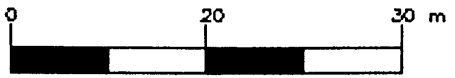
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Karaosman District	
Scale: Graphic scale	Line: 4 CPT 4-1 TO CPTU 4-3
Drawn by: Mark Hill	Date: 05/01/01





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Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

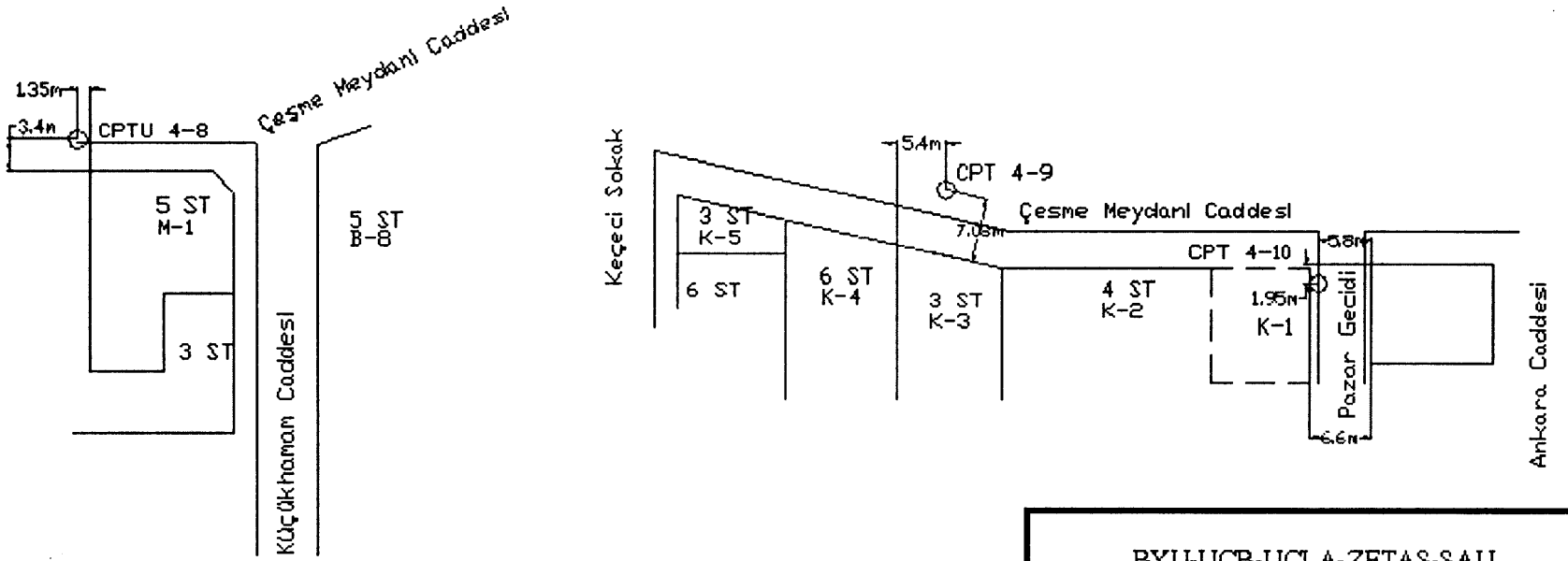
Location: Orta District

Scale: Graphic scale

Line: 4
CPT 4-4 TO CPT 4-7

Drawn by: Mark Hill

Date: 05/01/01



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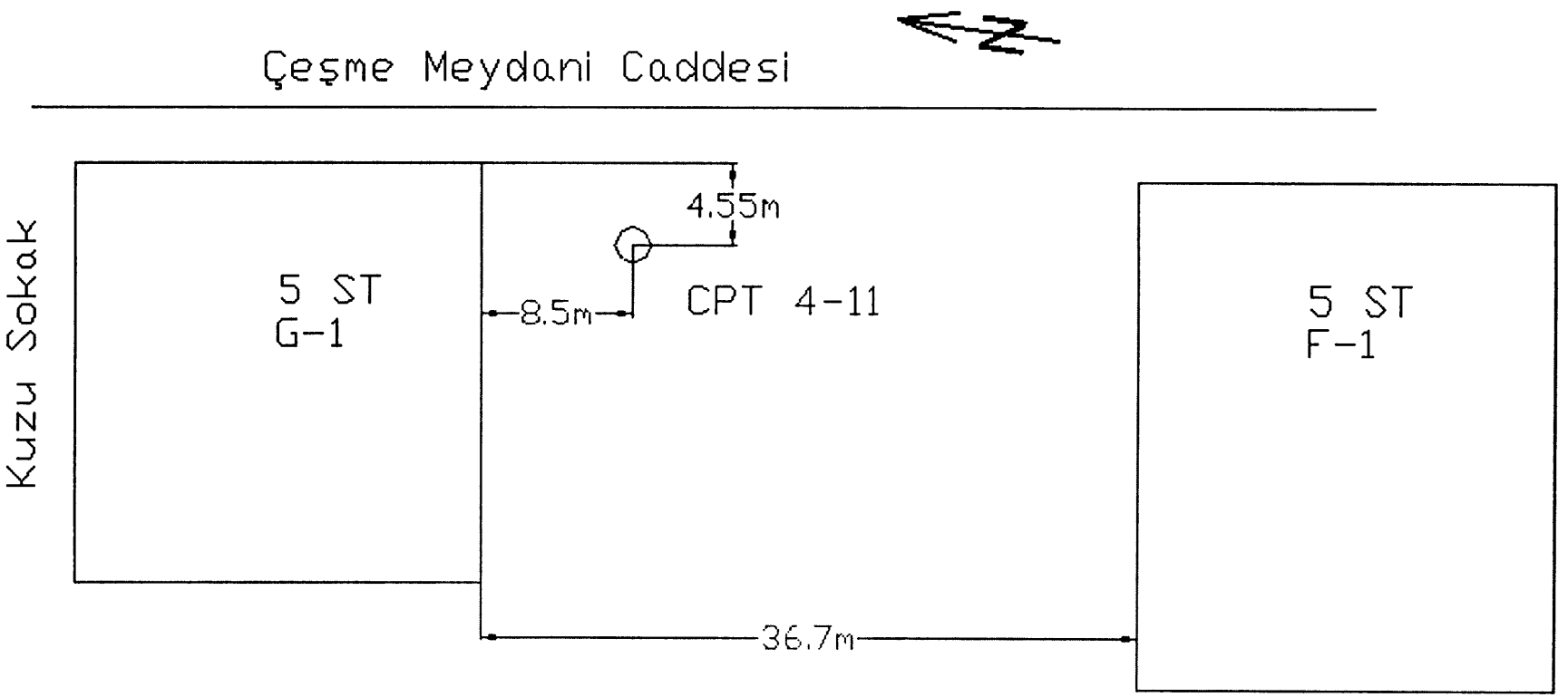
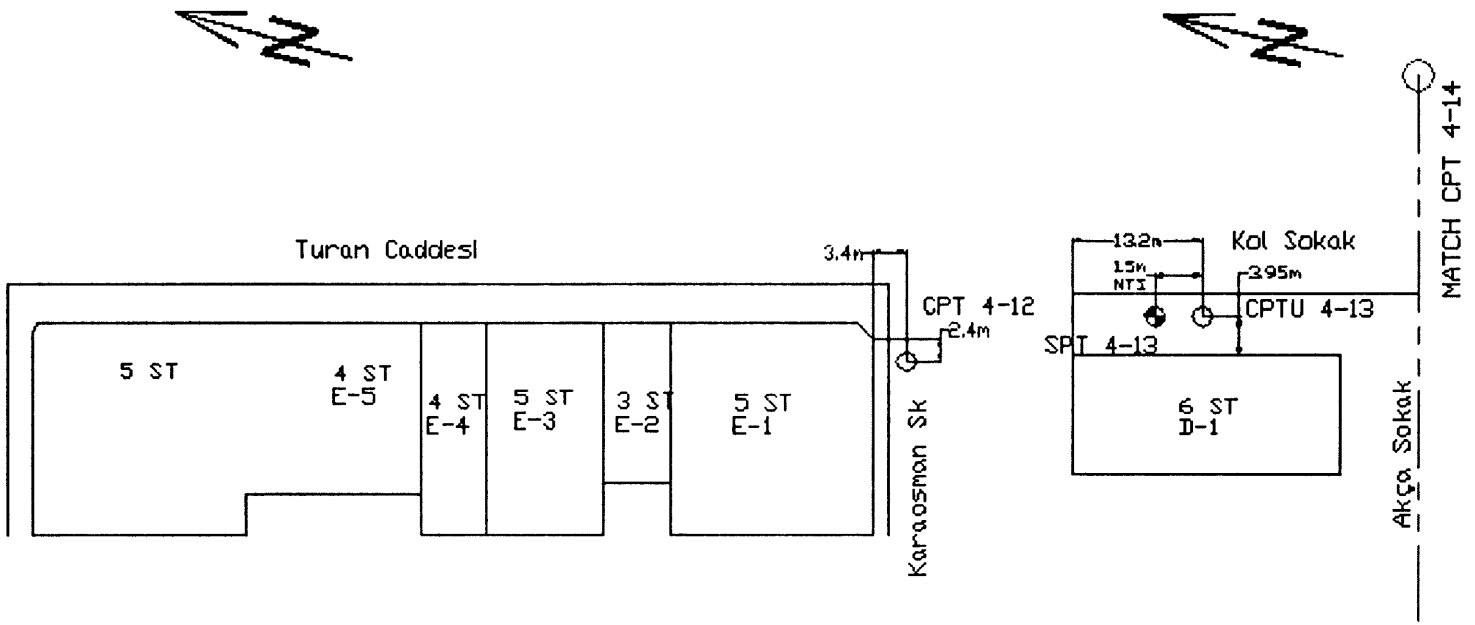
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

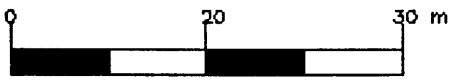
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Orta District	
Scale: Graphic scale	Line: 4 CPTU 4-8 TO CPT 4-10
Drawn by: Mark Hill	Date: 05/01/01



BYU-UCB-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Orta District	
Scale: Graphic scale	Line: 4 CPT 4–11
Drawn by: Mark Hill	Date: 05/01/01





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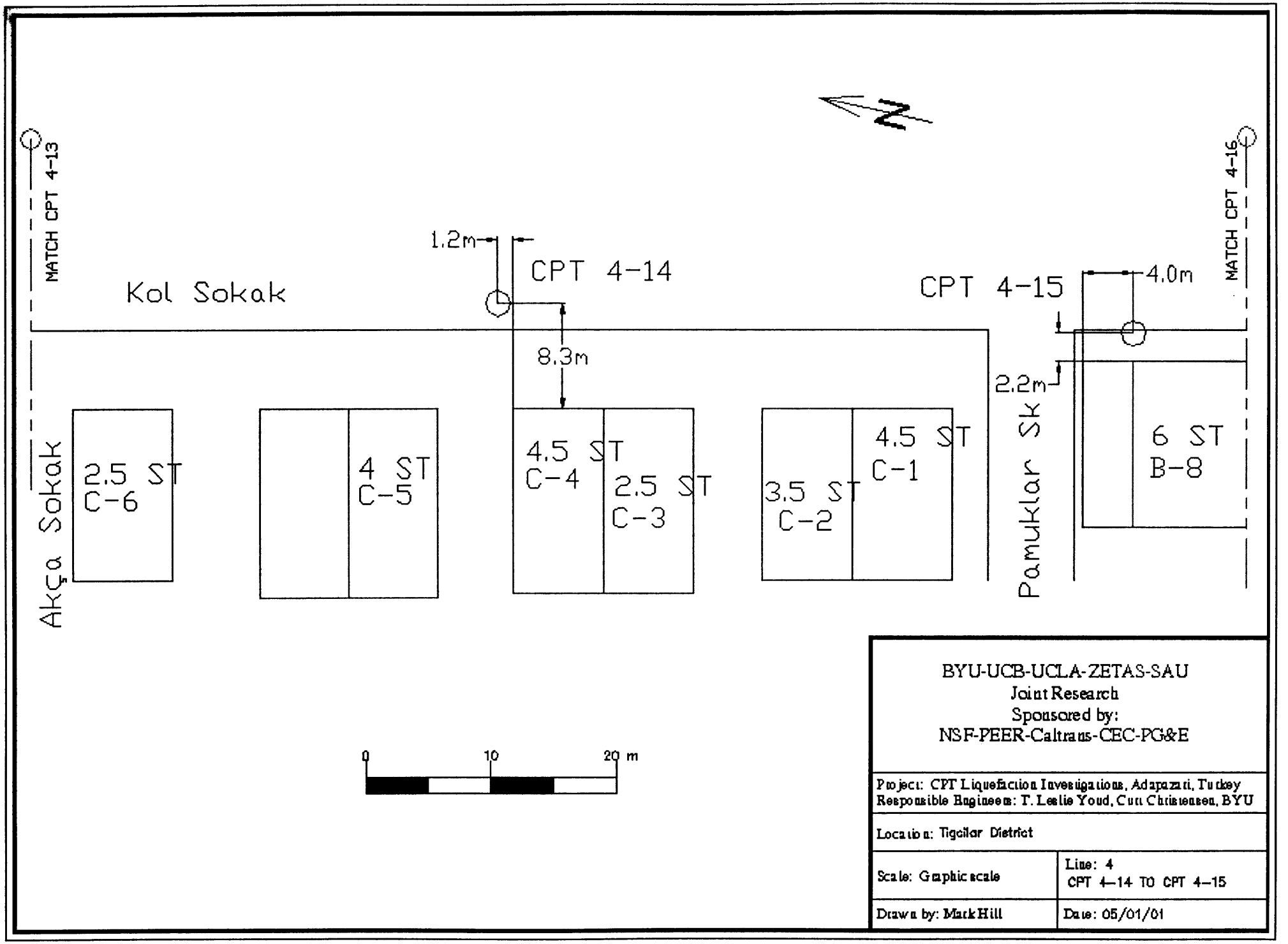
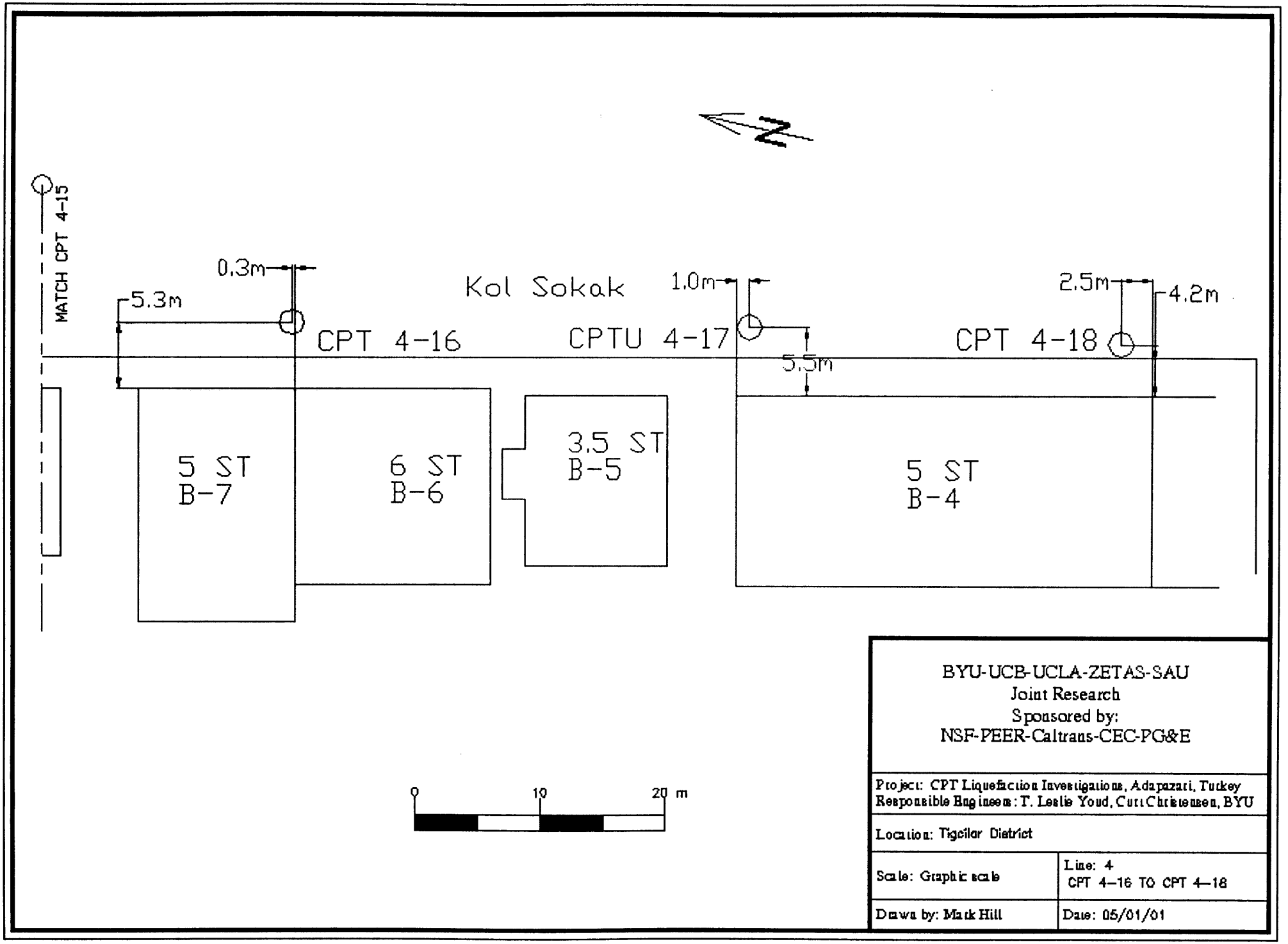
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Tigciler District	
Scale: Graphic scale	Line: 4 CPT 4-12 TO CPTU 4-13
Drawn by: Mark Hill	Date: 05/01/01


MATCH CPT 4-13
MATCH CPT 4-16
Kol Sokak
1.2m
CPT 4-14
CPT 4-15
4.0m
8.3m
2.2m
Akça Sokak
Pamuklar Sk
2.5 ST
C-6
4 ST
C-5
4.5 ST
C-4
2.5 ST
C-3
3.5 ST
C-2
4.5 ST
C-1
6 ST
B-8
0
10
20 m
BYU-UCB-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E
Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU
Location: Tigcilar District
Scale: Graphic scale
Line: 4
CPT 4-14 TO CPT 4-15
Drawn by: Mark Hill
Date: 05/01/01



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Joint Research
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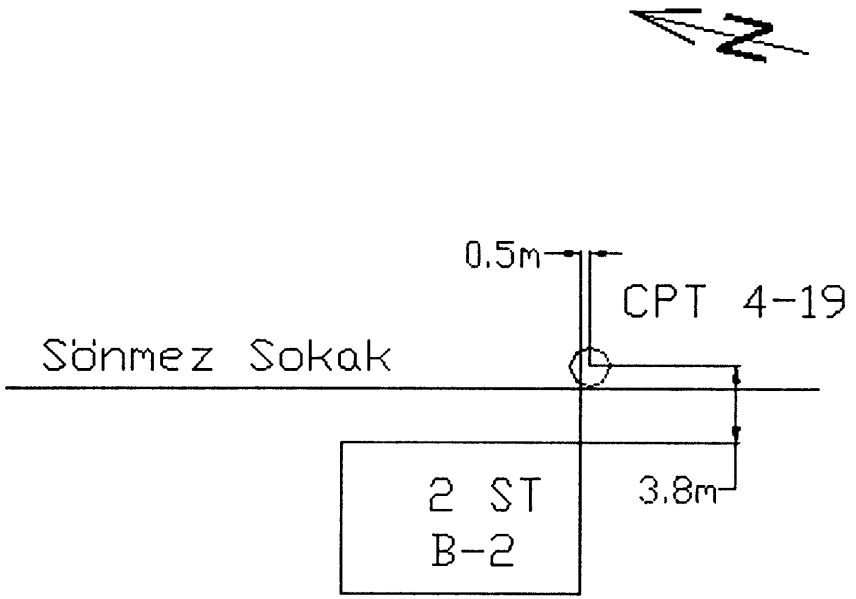
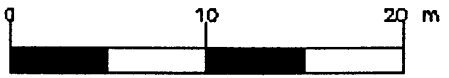
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Tigcilar District	
Scale: Graphic scale	Line: 4 CPT 4-16 TO CPT 4-18
Drawn by: Mark Hill	Date: 05/01/01





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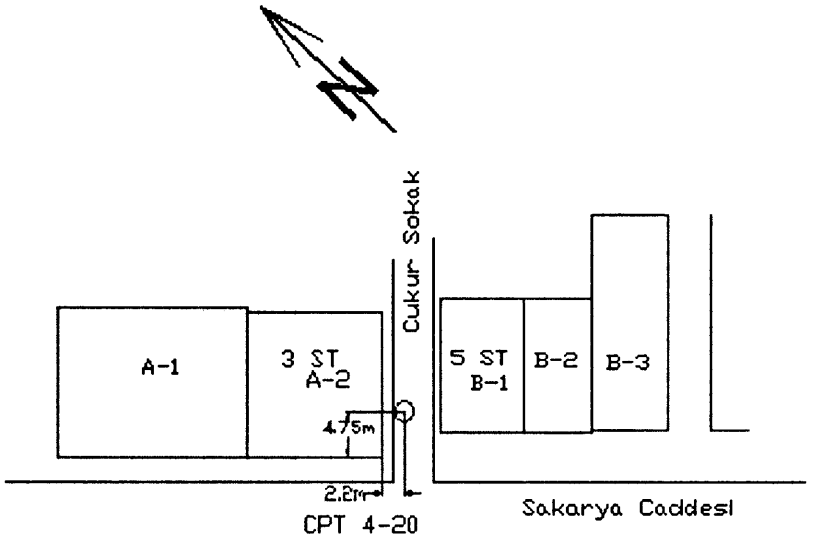
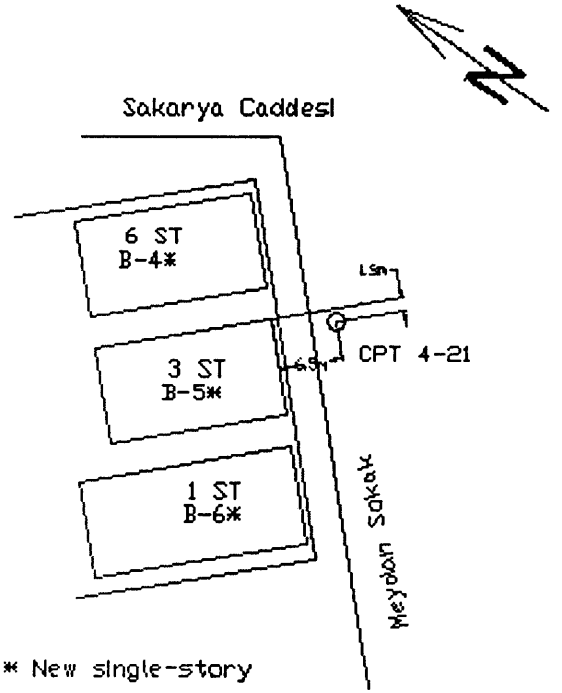
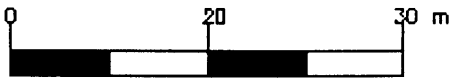
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Yenigun District	
Scale: Graphic scale	Line: 4 CPT 4-19
Drawn by: Mark Hill	Date: 05/01/01





* New single-story buildings



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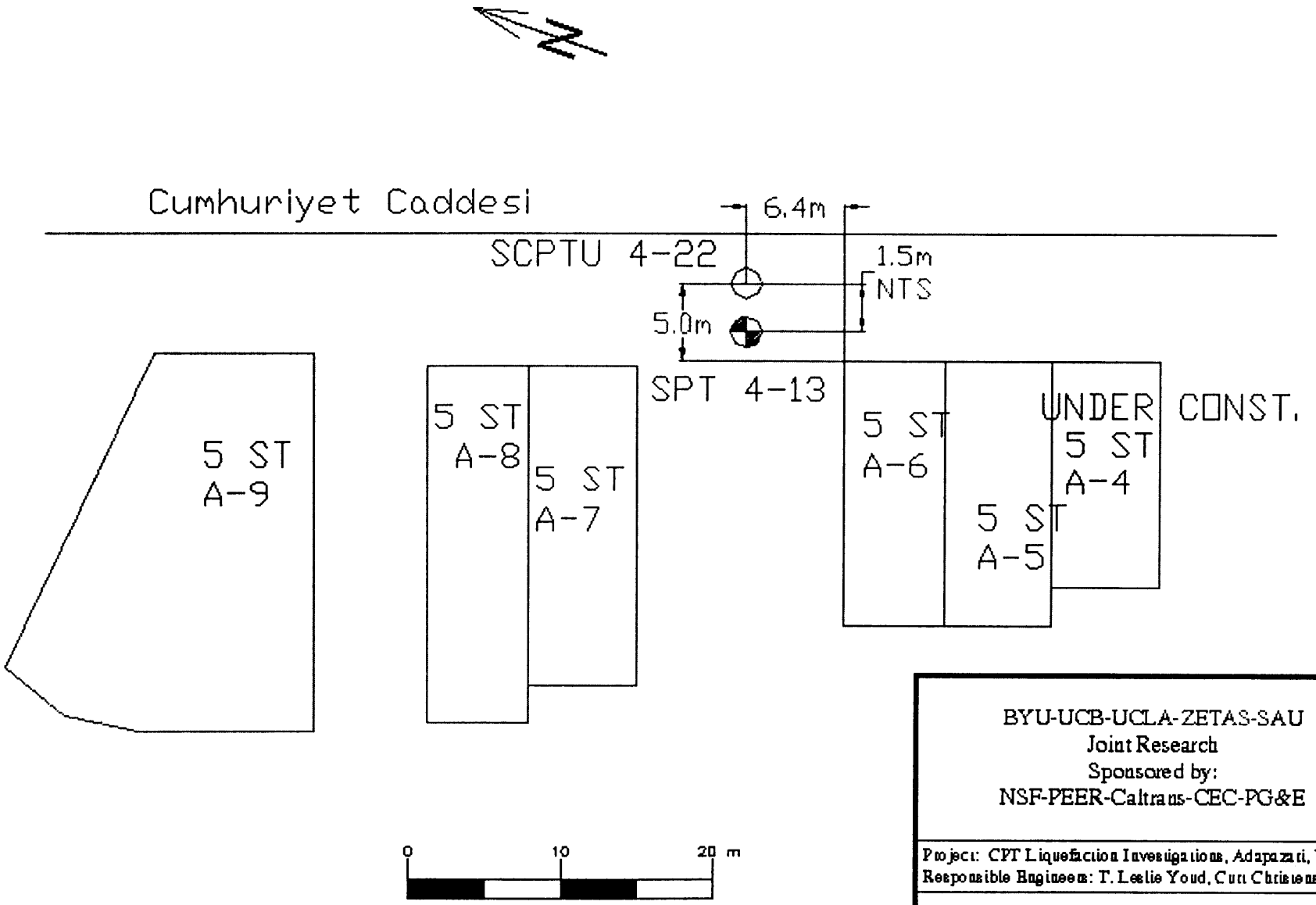
Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Cukurahmediye District	
Scale: Graphic scale	Line: 4 CPT 4-20 TO CPT 4-21
Drawn by: Mark Hill	Date: 05/01/01



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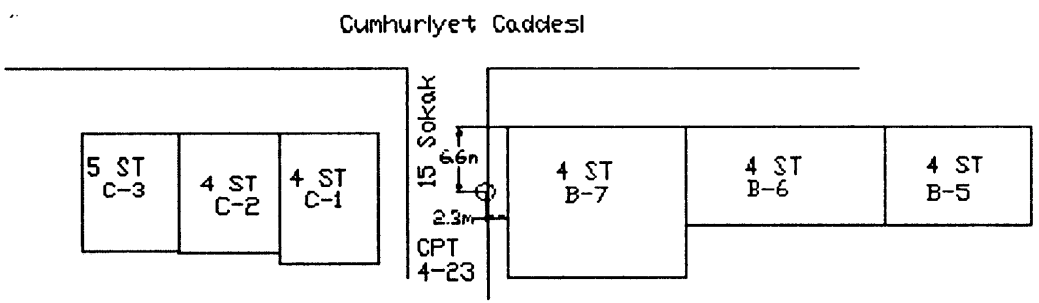
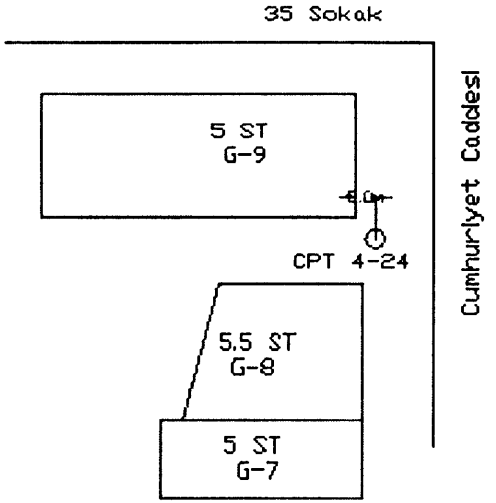
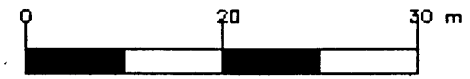
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: CPT Liquefaction Investigations, Adapazari, Turkey Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU	
Location: Tabakhane District	
Scale: Graphic scale	Line: 4 CPT 4-22
Drawn by: Mark Hill	Date: 05/01/01







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Joint Research
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Project: CPT Liquefaction Investigations, Adapazari, Turkey
Responsible Engineers: T. Leslie Youd, Curt Christensen, BYU

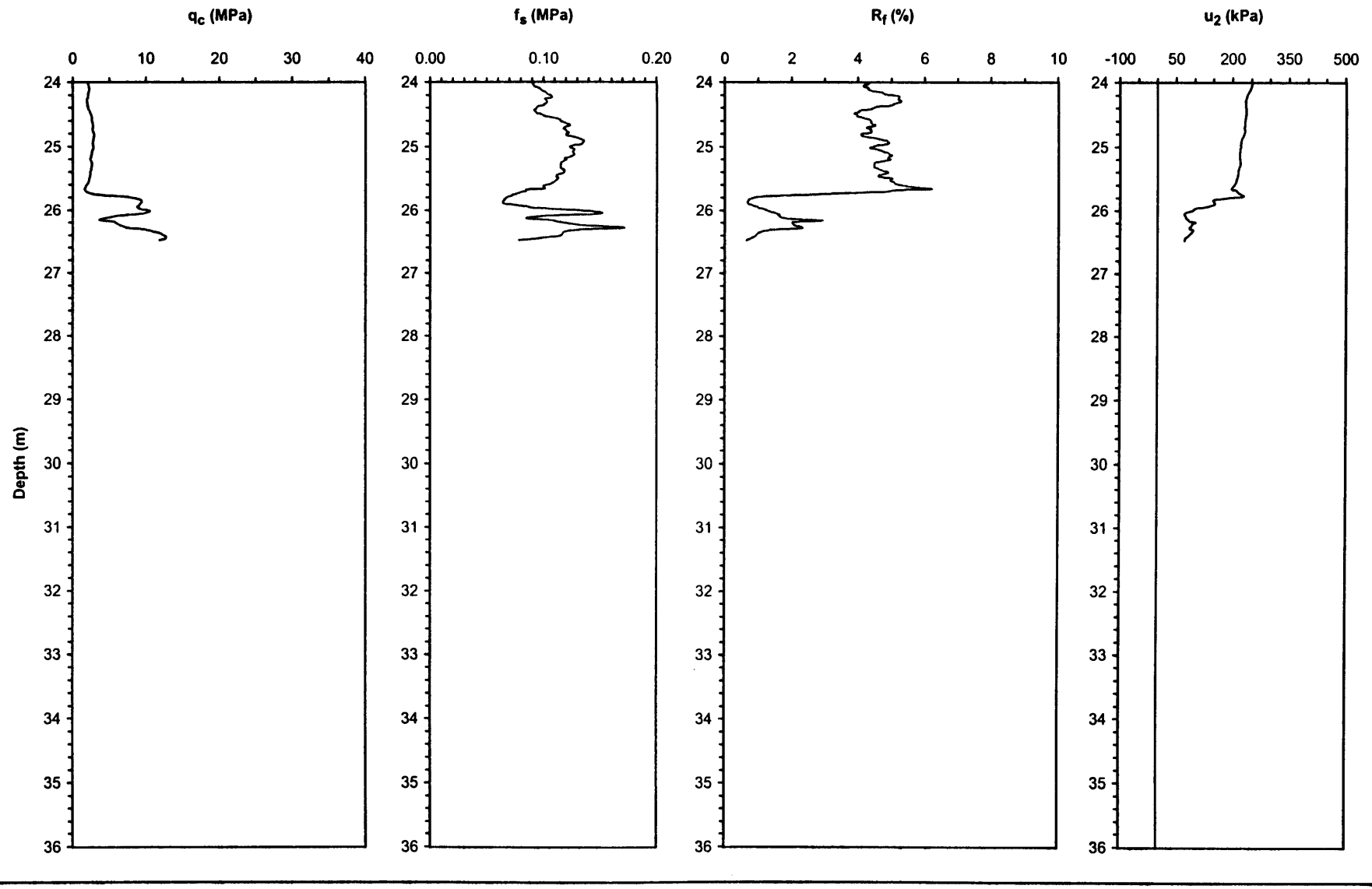
Location: Tabakhane District

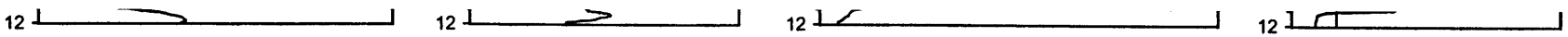
Scale: Graphic scale	Line: 4 CPT 4-23 TO CPT 4-24
Drawn by: Mark Hill	Date: 05/01/01

Test Number: CPTU 4 - 03
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptu 4 - 03.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

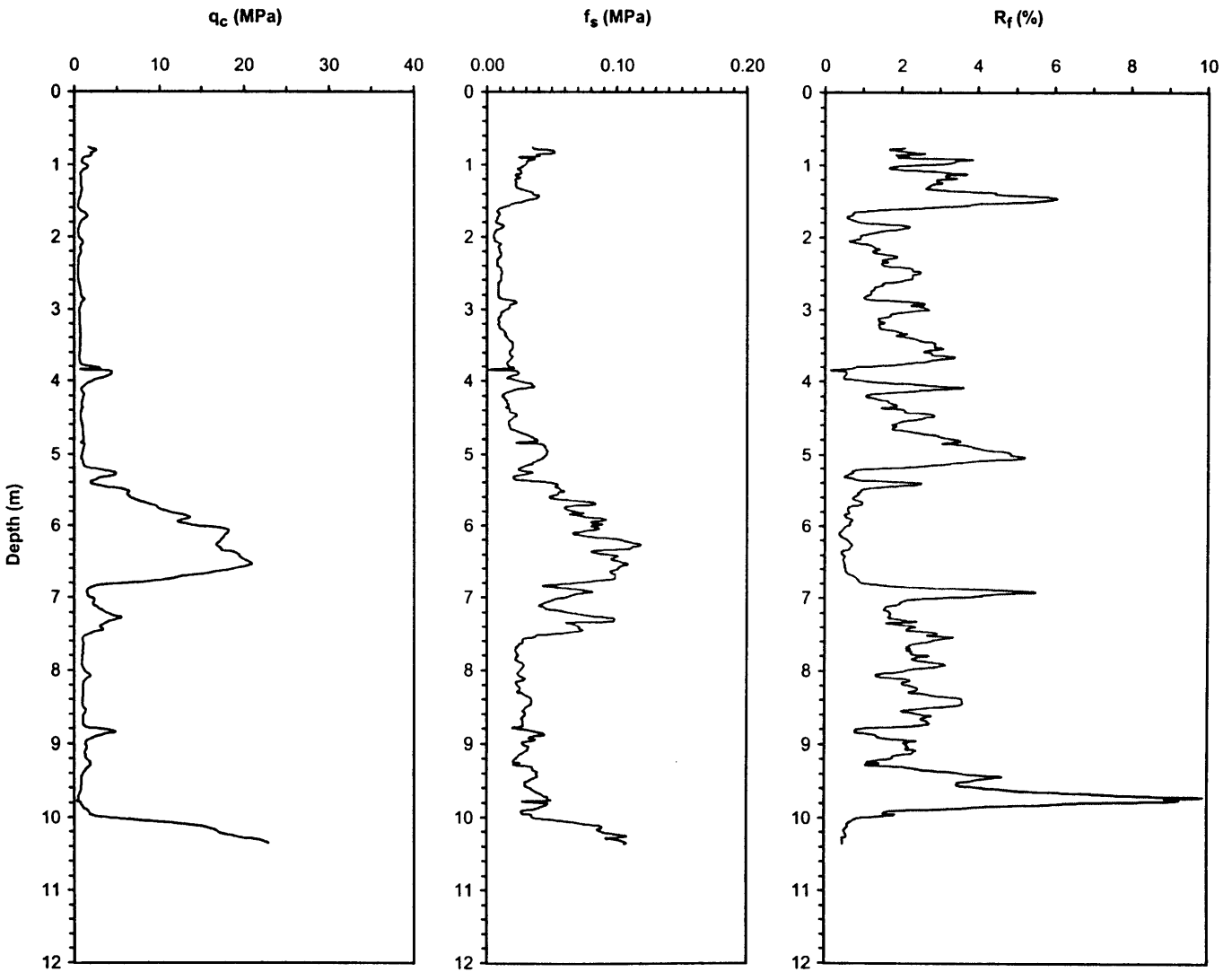
Elevation (m): 29.149
Date: 11 July 2000 12:15
Water Table Elevation (m): 28.999
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

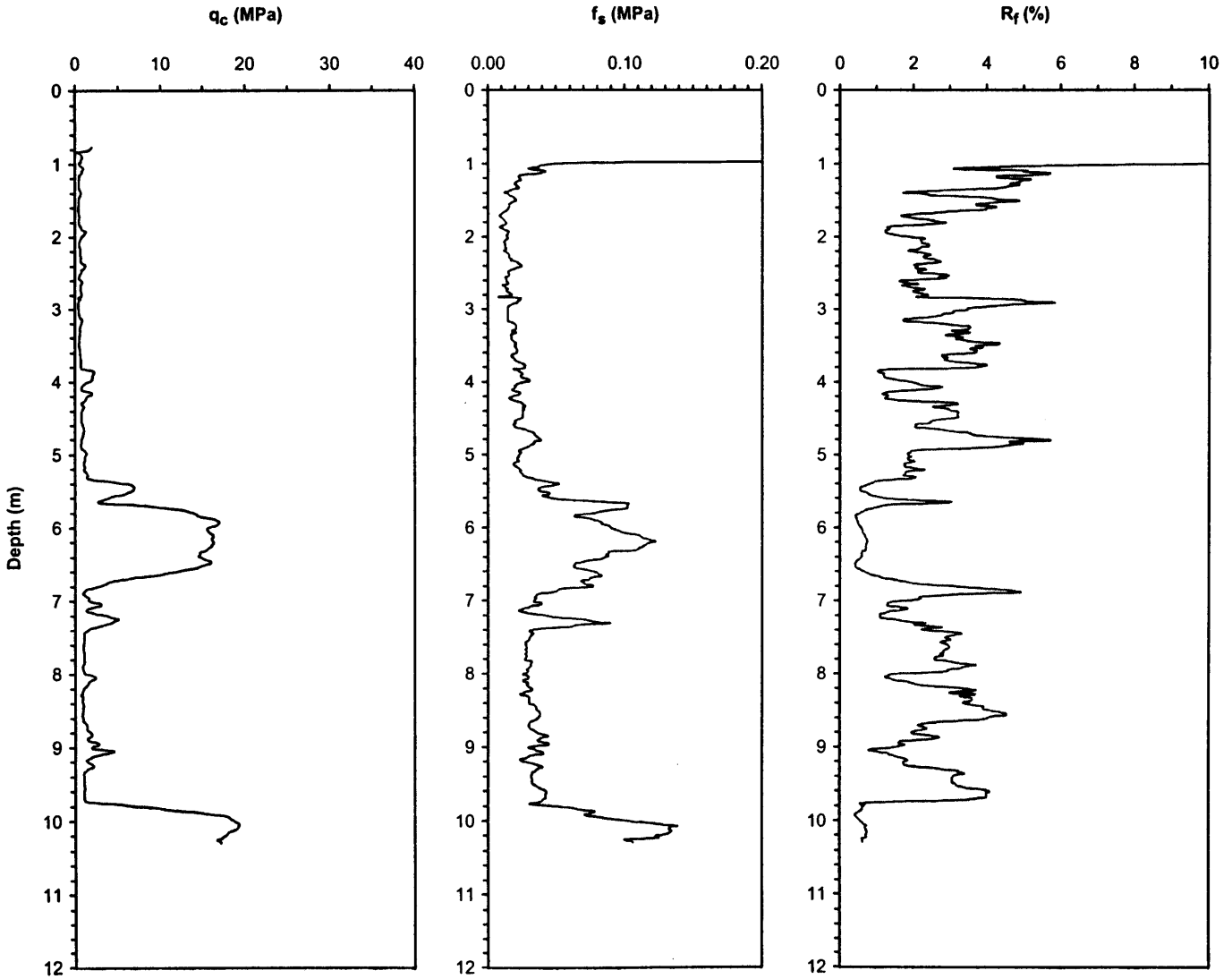




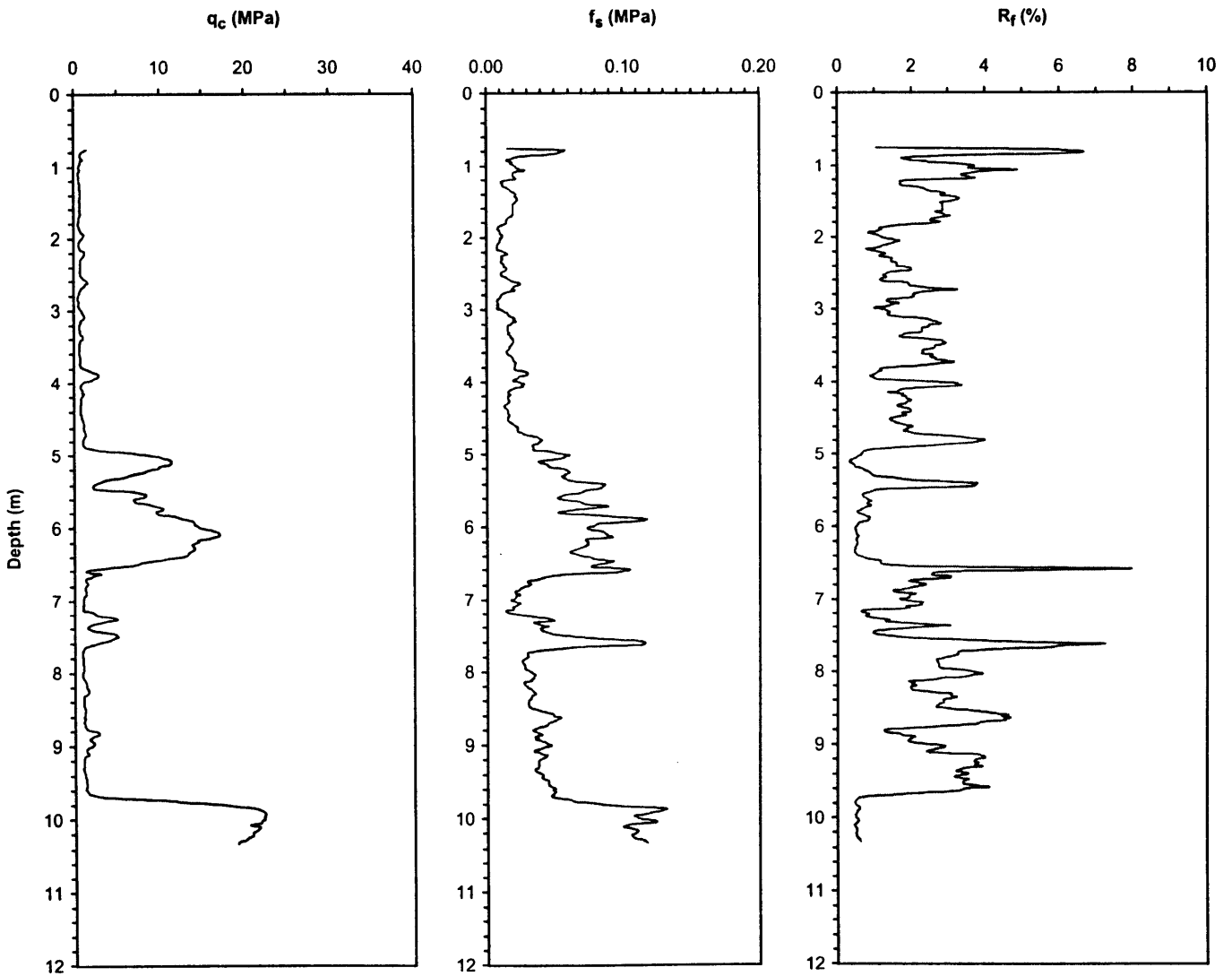
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Meydani Caddesi (South of Ulus Caddesi)	
Joint Research	**GPS Coordinates:**	40.78556° N, 30.40191° E	**Survey Coordinates (m):** 34,255.32 N, 30,560.91 W
	Test Number:	CPT 4 - 04	**Elevation (m):** 29.244
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 11 July 2000 18:32
Sponsored by:	**File Name:**	cpt 4 - 04.txt	**Water Table Elevation (m):** 28.98
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



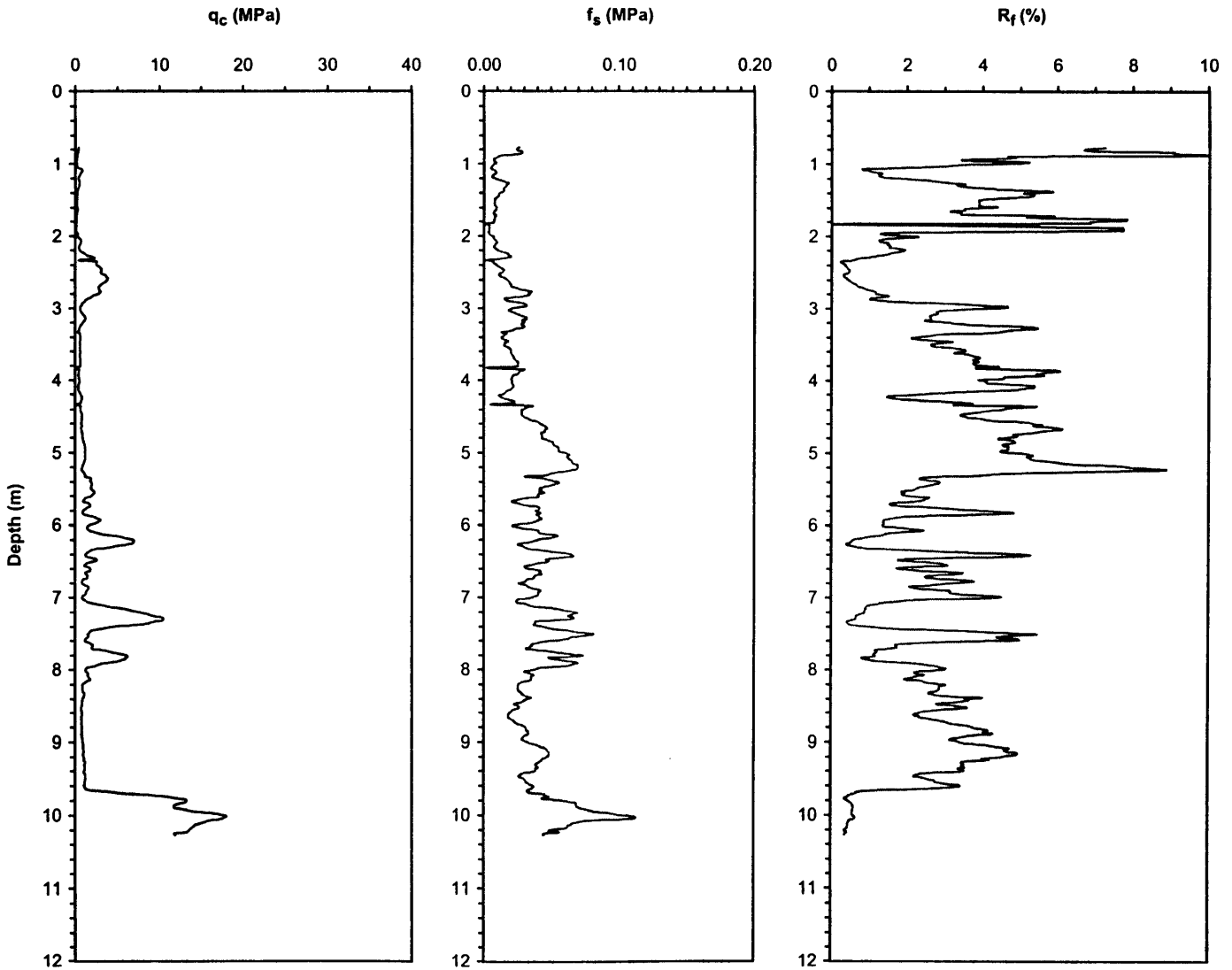
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Dogu Sokak (West of Meydani Caddesi)	
Joint Research	**GPS Coordinates:**	40.78333° N, 30.40378° E	**Survey Coordinates (m):** 34,223.50 N, 30,537.94 W
	Test Number:	CPT 4 - 05	**Elevation (m):** 29.163
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 12 July 2000 11:19
Sponsored by:	**File Name:**	cpt 4 - 05.txt	**Water Table Elevation (m):** 28.26
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



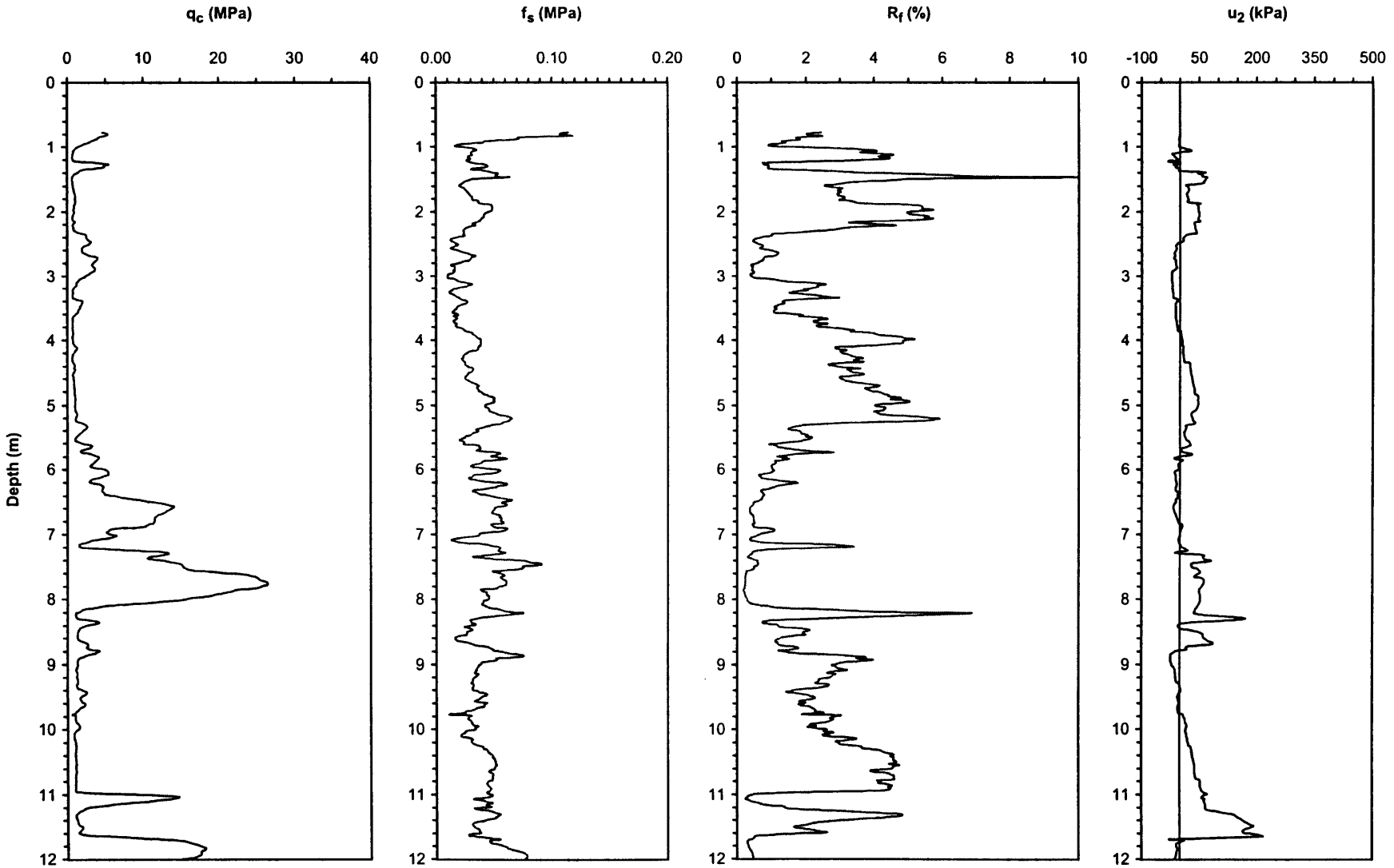
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Meydani Caddesi	
Joint Research	**GPS Coordinates:**	40.78320° N, 30.40379° E	**Survey Coordinates (m):** 34,194.66 N, 30,519.36 W
	Test Number:	CPT 4 - 06	**Elevation (m):** 29.302
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 11 July 2000 19:29
Sponsored by:	**File Name:**	cpt 4 - 06.txt	**Water Table Elevation (m):** 29.20
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Meydani Caddesi	
Joint Research	**GPS Coordinates:**	40.78230° N, 30.40429° E	**Survey Coordinates (m):** 34,103.95 N, 30,460.60 W
	Test Number:	CPT 4 - 07	**Elevation (m):** 29.244
	Type of Cone:	ELC10 CF No. 970510 (a.p. v.d. Berg)	**Date:** 12 July 2000 13:28
Sponsored by:	**File Name:**	cpt 4 - 07.txt	**Water Table Elevation (m):** 27.81
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Line Four: Çesme Sokak (Near intersection with Küçük Hamam Caddesi)	
Joint Research	**GPS Coordinates:**	40.78119° N, 30.40425° E	**Survey Coordinates (m):** 33,989.21 N, 30,402.67 W
	Test Number:	CPTU 4 - 08	**Elevation (m):** 29.737
	Type of Cone:	ELC10 CFP No. 000606 (a.p. v.d. Berg)	**Date:** 11 July 2000 9:40
Sponsored by:	**File Name:**	cptu 4 - 08.txt	**Water Table Elevation (m):** 28.09
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



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Joint Research

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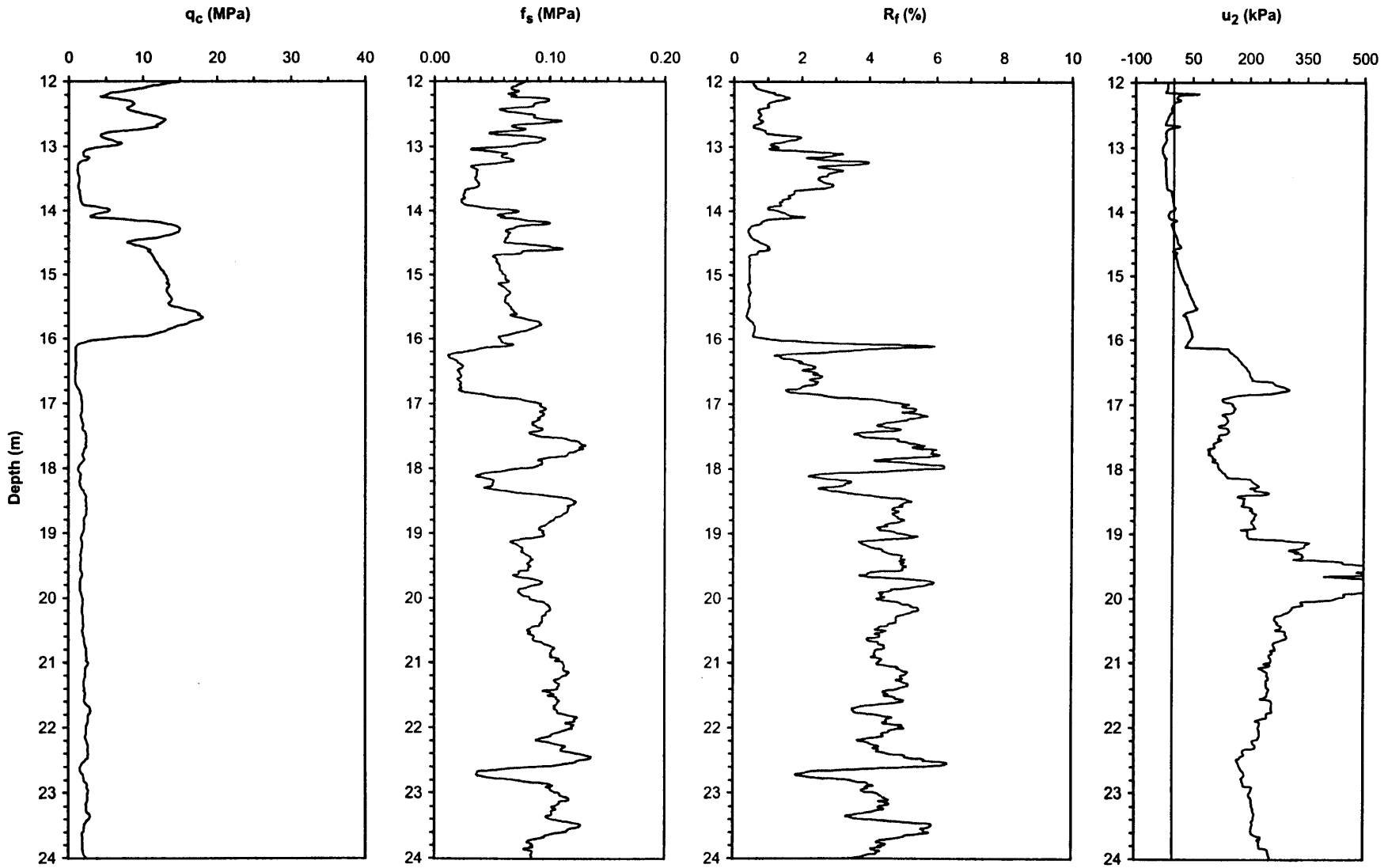
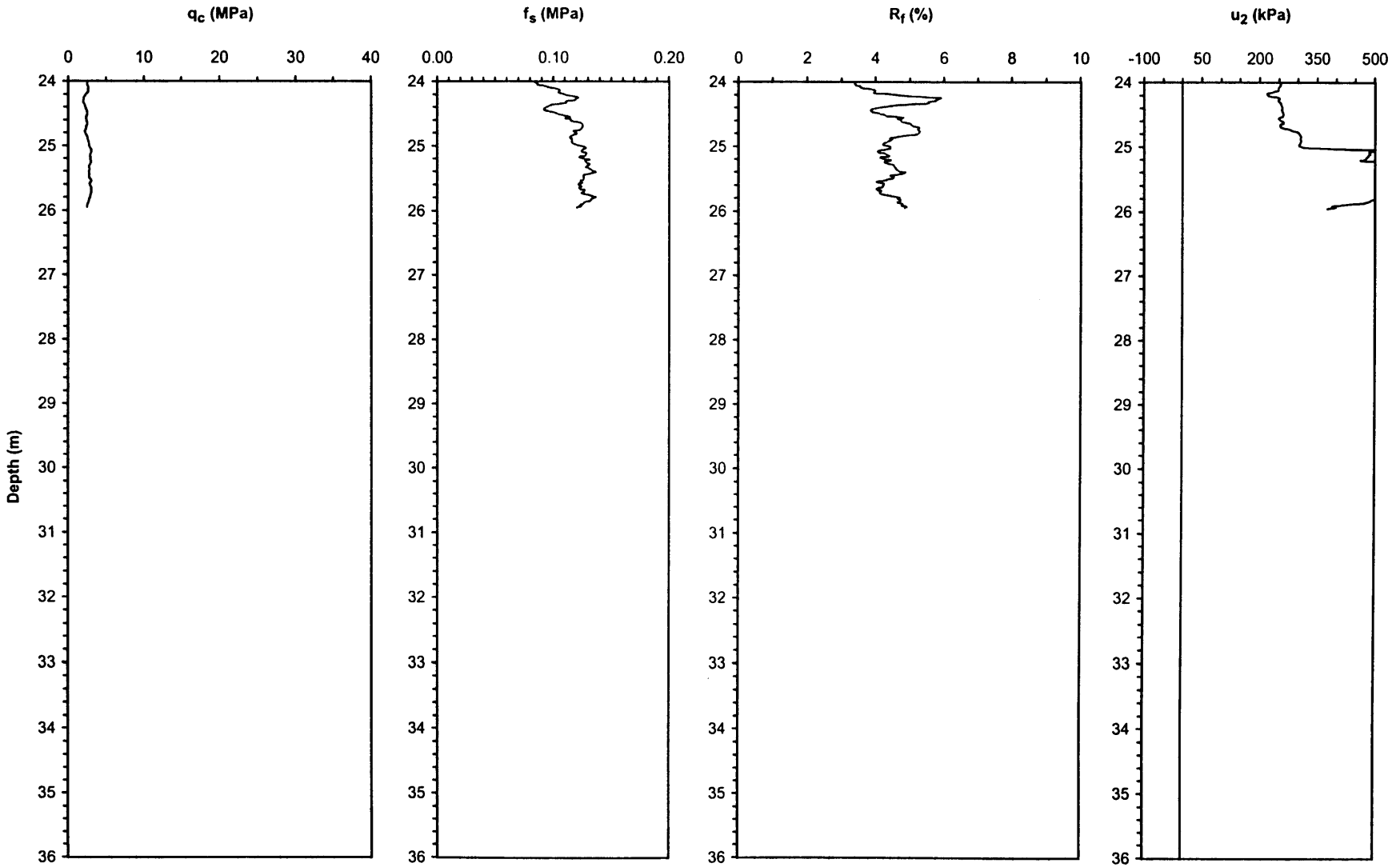
NSF, PEER
Caltrans, CEC, PG&E

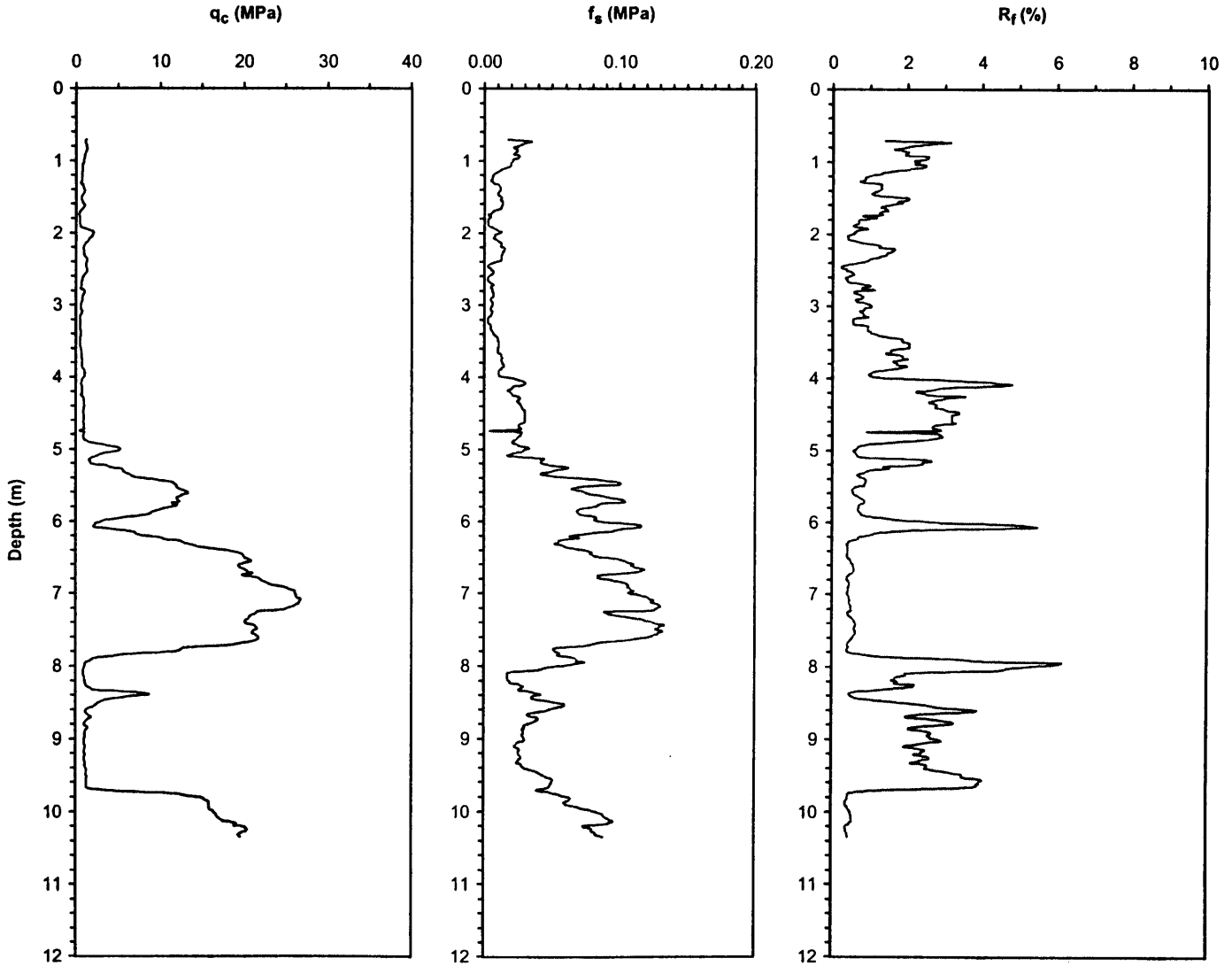
Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Çesme Sokak (Near intersection with Küçük Hamam Caddesi)
GPS Coordinates: 40.78119° N, 30.40425° E
Survey Coordinates (m): 33,989.21 N, 30,402.67 W
Test Number: CPTU 4 - 08
Elevation (m): 29.737
Type of Cone: ELC10 CFP No. 000606 (a.p. v.d. Berg)
Date: 11 July 2000 9:40
File Name: cptu 4 - 08.txt
Water Table Elevation (m): 28.087
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU
Notes: Pre-explored to a depth of 0.75 m to clear utilities.



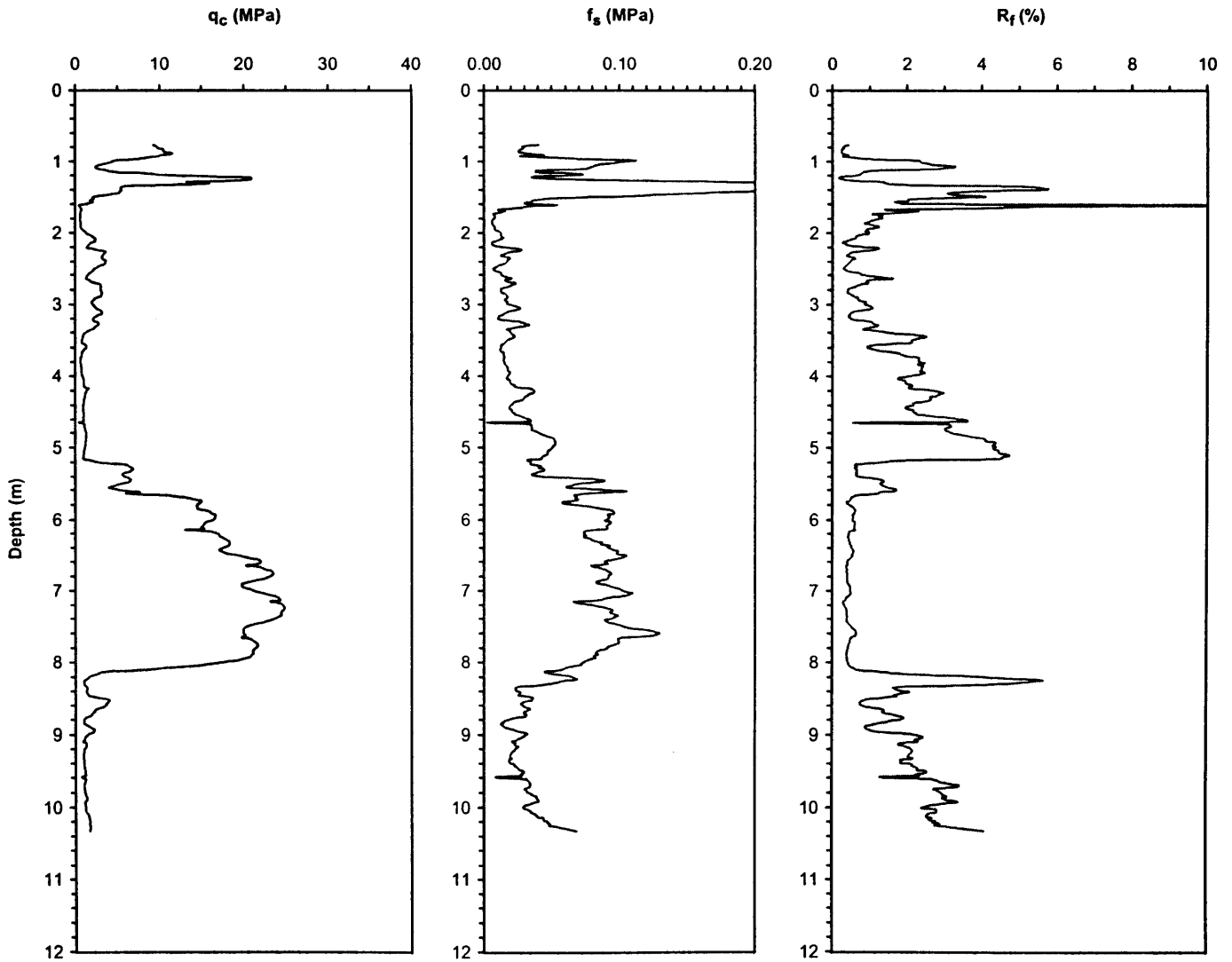
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	
ZETAŞ-SAU	**Location:**	Line Four: Çesme Sokak (Near intersection with Küçük Hamam Caddesi)	
Joint Research	**GPS Coordinates:**	40.78119° N, 30.40425° E	**Survey Coordinates (m):** 33,989.21 N, 30,402.67 W
	Test Number:	CPTU 4 - 08	**Elevation (m):** 29.737
	Type of Cone:	ELC10 CFP No. 000606 (a.p. v.d. Berg)	**Date:** 11 July 2000 9:40
Sponsored by:	**File Name:**	cptu 4 - 08.txt	**Water Table Elevation (m):** 28.087
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



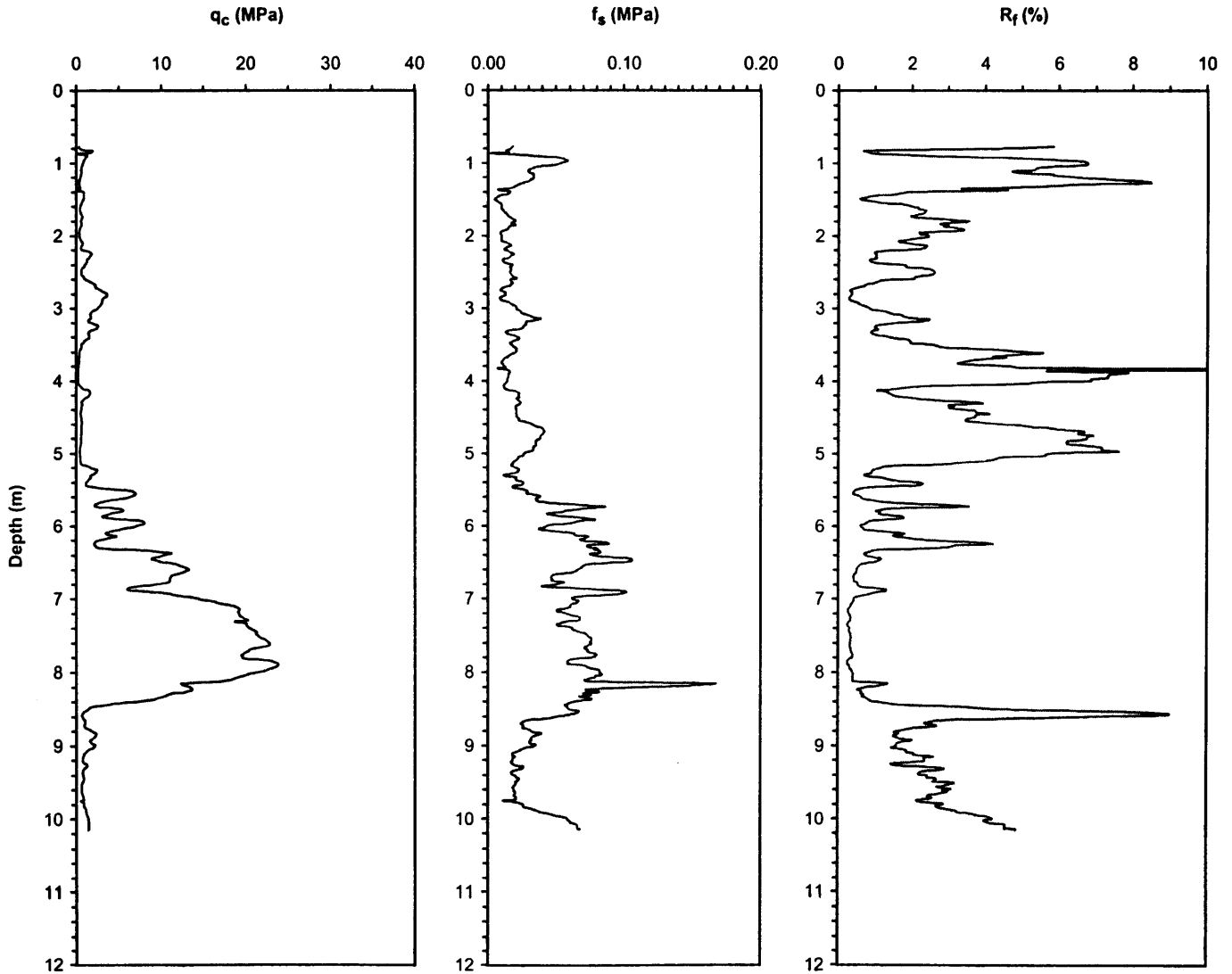
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Çesme Sokak	
Joint Research	**GPS Coordinates:**	40.77966° N, 30.40485° E	**Survey Coordinates (m):** 33,883.07 N, 30,326.05 W
	Test Number:	CPT 4 - 09	**Elevation (m):** 29.257
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 12 July 2000 8:39
Sponsored by:	**File Name:**	cpt 4 - 09.txt	**Water Table Elevation (m):** 28.11
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.69 m to clear utilities.	



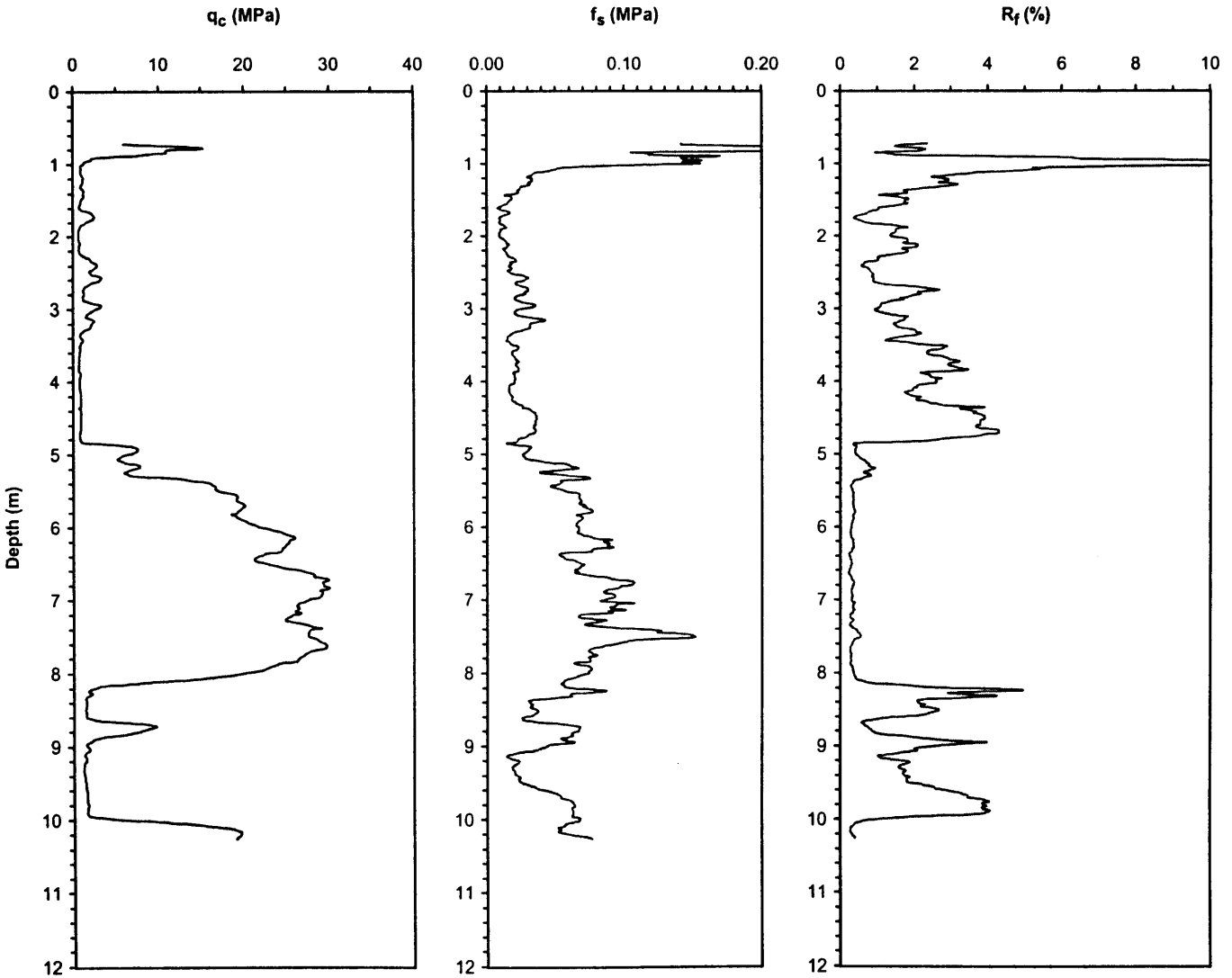
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Çesme Sokak	
Joint Research	**GPS Coordinates:**	40.77957° N, 30.40483° E	**Survey Coordinates (m):** 33,847.29 N, 30,306.46 W
	Test Number:	CPT 4 - 10	**Elevation (m):** 29.476
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 12 July 2000 9:55
Sponsored by:	**File Name:**	cpt 4 - 10.txt	**Water Table Elevation (m):** 29.03
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities and debris.	



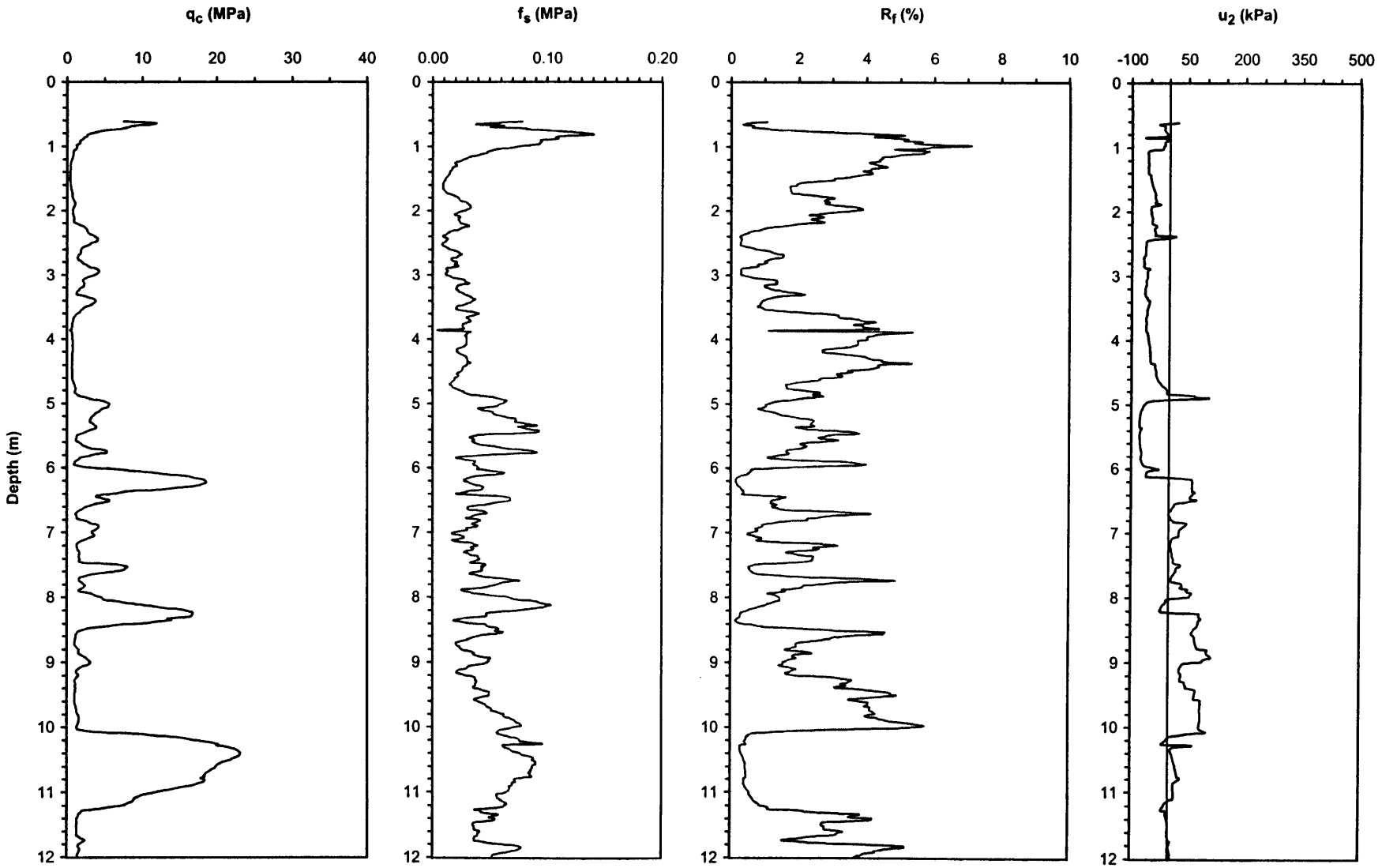
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Çesme Sokak	
Joint Research	**GPS Coordinates:**	40.77816° N, 30.40511° E	**Survey Coordinates (m):** 33,719.65 N, 30,209.69 W
	Test Number:	CPT 4 - 11	**Elevation (m):** 29.632
	Type of Cone:	ELC10 CF no. 970510 (a.p. v.d. Berg)	**Date:** 12 July 2000 14:41
Sponsored by:	**File Name:**	cpt 4 - 11.txt	**Water Table Elevation (m):** 29.43
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Karaosman Sokak (At intersection with Çesme Sokak)	
Joint Research	**GPS Coordinates:**	40.77700° N, 30.40577° E	**Survey Coordinates (m):** 33,574.36 N, 30,124.88 W
	Test Number:	CPT 4 - 12	**Elevation (m):** 29.288
	Type of Cone:	ELC10 CF No. 970510 (a.p. v.d. Berg)	**Date:** 12 July 2000 16:03
Sponsored by:	**File Name:**	cpt 4 - 12.txt	**Water Table Elevation (m):** 29.14
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.7 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Line Four: Kol Sokak	
Joint Research	**GPS Coordinates:**	40.77612° N, 30.40458° E	**Survey Coordinates (m):** 33,490.38 N, 30,067.07 W
	Test Number:	CPTU 4 - 13	**Elevation (m):** 29.246
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** 10 July 2000 14:55
Sponsored by:	**File Name:**	cptu 4 - 13.txt	**Water Table Elevation (m):** 29.20
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.45 m to clear utilities and debris.	



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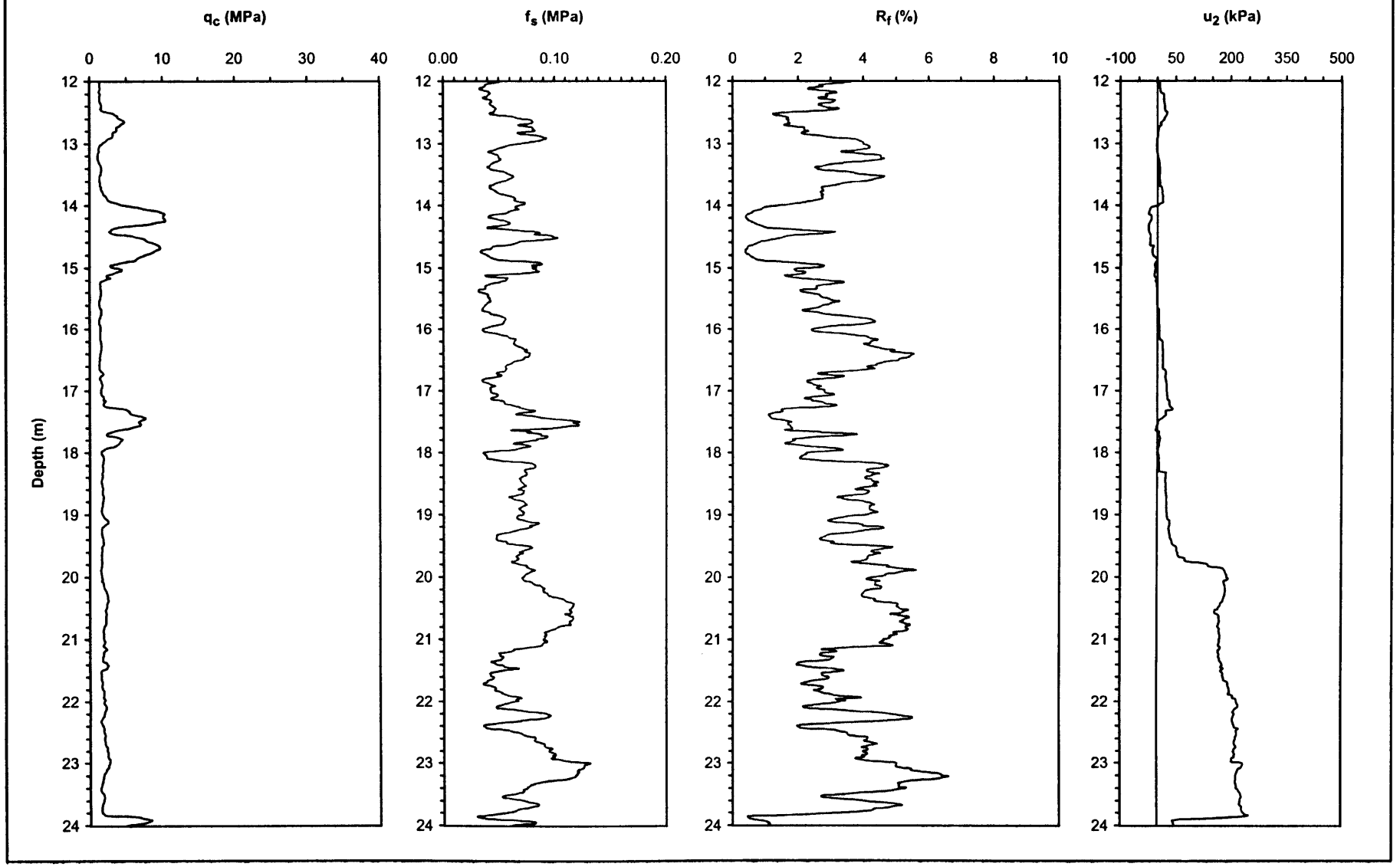
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Kol Sokak
GPS Coordinates: 40.77612° N, 30.40458° E
Test Number: CPTU 4 - 13
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptu 4 - 13.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.45 m to clear utilities and debris.

Survey Coordinates (m): 33,490.38 N, 30,067.07 W
Elevation (m): 29.246
Date: 10 July 2000 14:55
Water Table Elevation (m): 29.196
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



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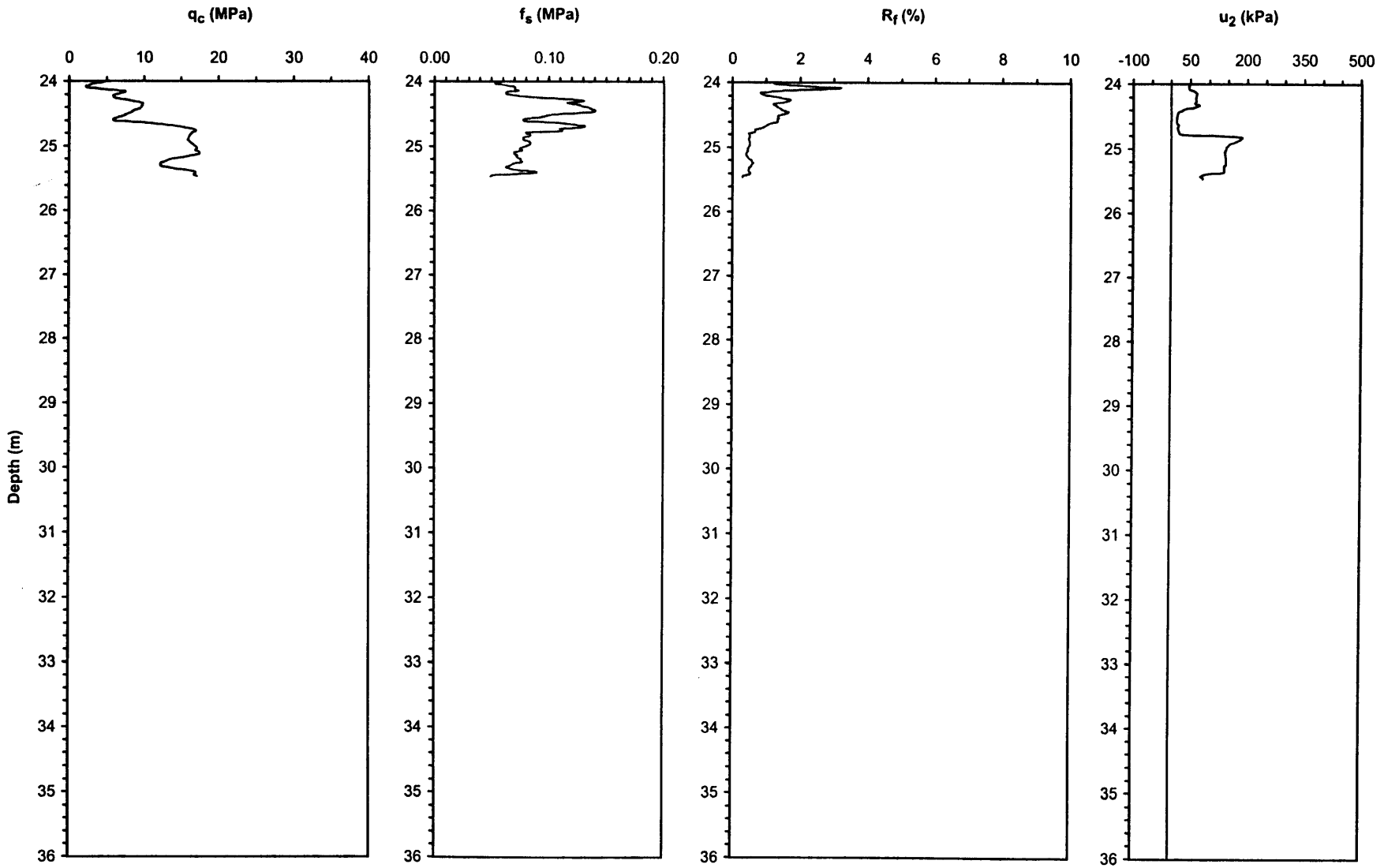
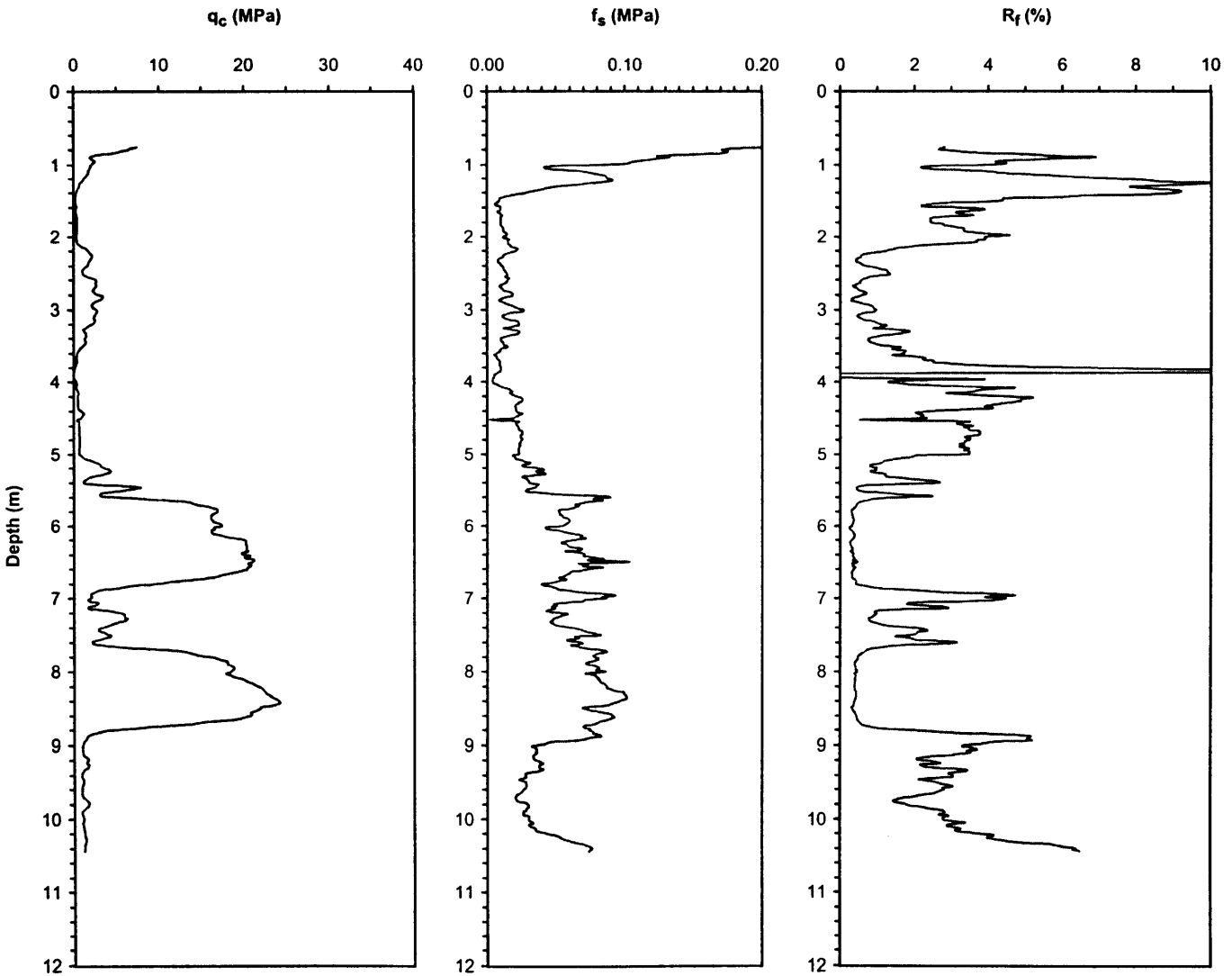
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Kol Sokak
GPS Coordinates: 40.77612° N, 30.40458° E
Test Number: CPTU 4 - 13
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptu 4 - 13.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.45 m to clear utilities and debris.

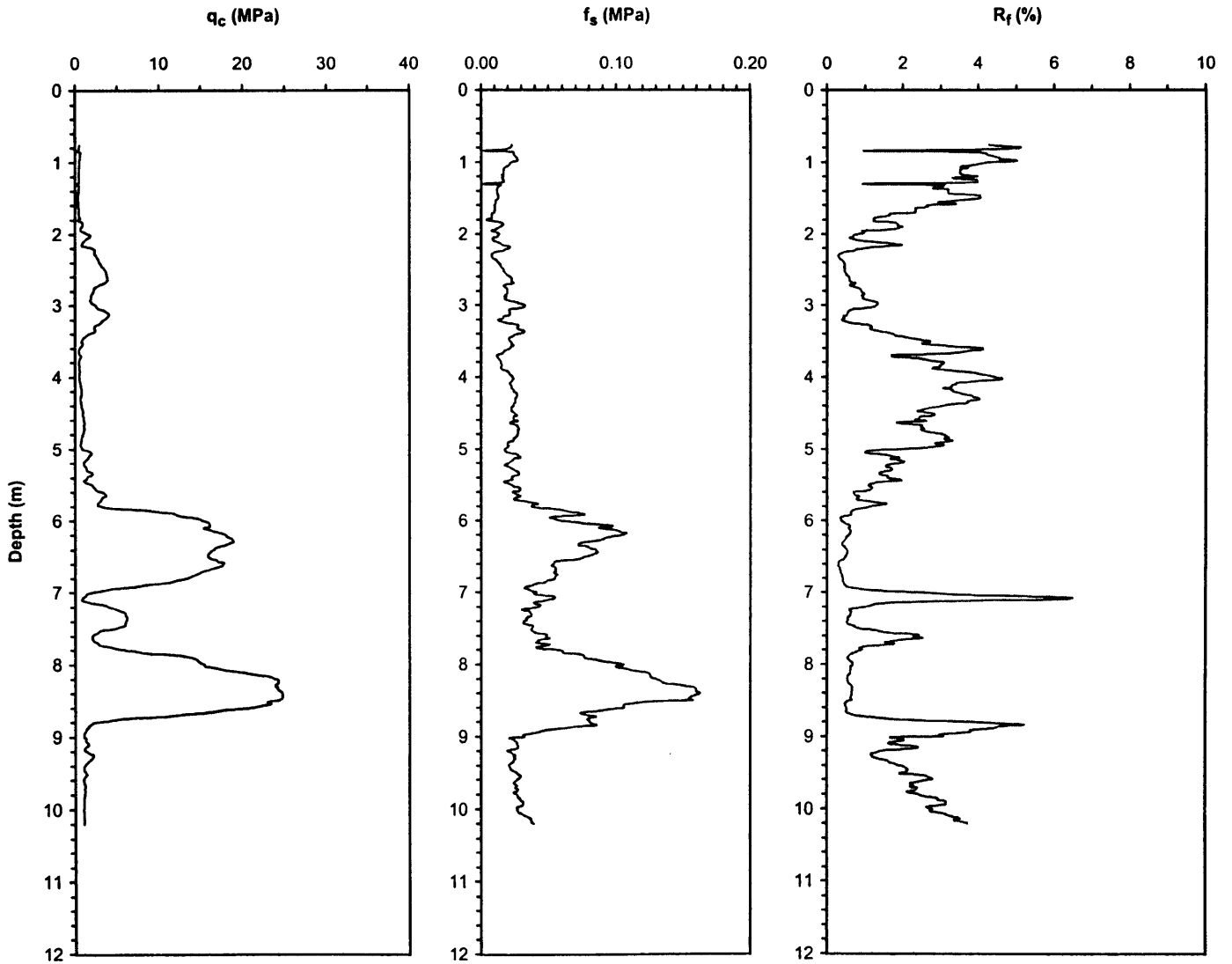
Survey Coordinates (m): 33,490.38 N, 30,067.07 W
Elevation (m): 29.246
Date: 10 July 2000 14:55
Water Table Elevation (m): 29.196
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



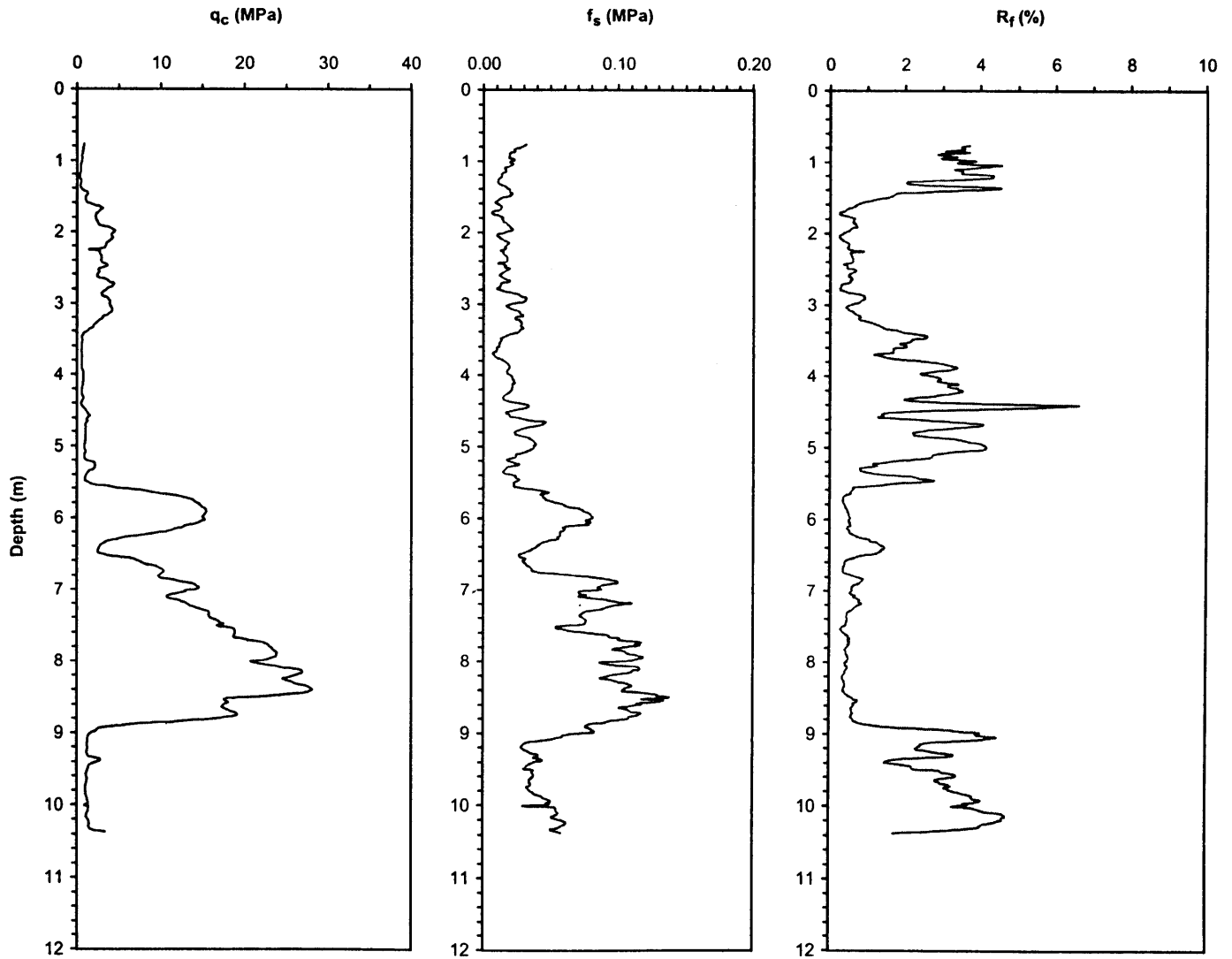
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Kol Sokak	
Joint Research	**GPS Coordinates:**	40.77522° N, 30.40634° E	**Survey Coordinates (m):** 33,431.96 N, 30,031.22 W
	Test Number:	CPT 4 - 14	**Elevation (m):** 29.359
	Type of Cone:	ELC10 CF No. 970510 (a.p. v.d. Berg)	**Date:** 12 July 2000 17:28
Sponsored by:	**File Name:**	cpt 4 - 14.txt	**Water Table Elevation (m):** 28.66
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Kol Sokak (Adjacent to Pamuklar Sokak)	
Joint Research	**GPS Coordinates:**	40.77628° N, 30.40503° E	**Survey Coordinates (m):** 33,395.09 N, 30,007.96 W
	Test Number:	CPT 4 - 15	**Elevation (m):** 29.461
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 08 July 2000 17:26
Sponsored by:	**File Name:**	cpt 4 - 15.txt	**Water Table Elevation (m):** 29.14
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Kol Sokak	
Joint Research	**GPS Coordinates:**	40.77537° N, 30.40526° E	**Survey Coordinates (m):** 33,364.36 N, 29,988.13 W
	Test Number:	CPT 4 - 16	**Elevation (m):** 31.458
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 08 July 2000 16:28
Sponsored by:	**File Name:**	cpt 4 - 16.txt	**Water Table Elevation (m):** 30.86
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



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Sponsored by:
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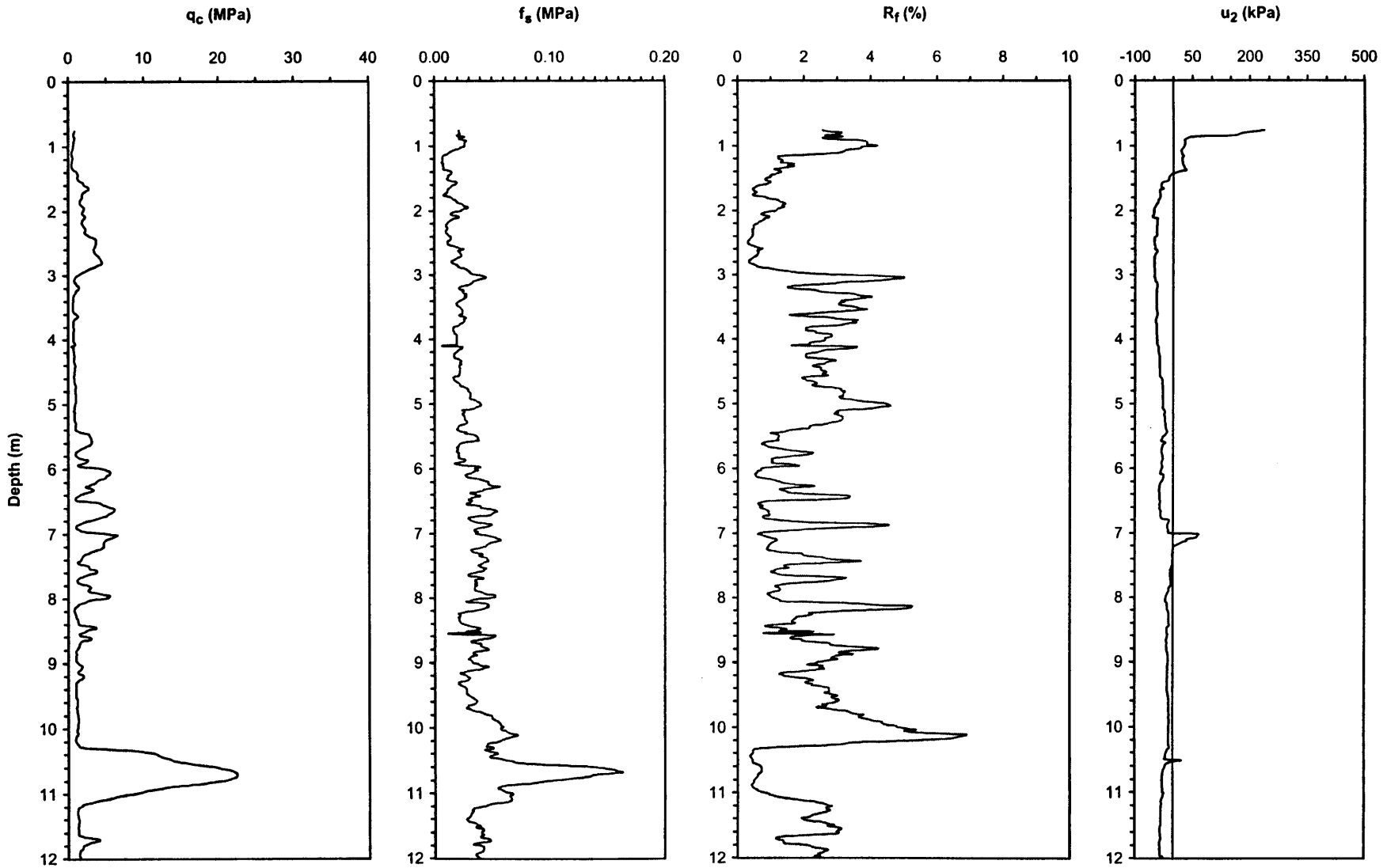
Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Kol Sokak
GPS Coordinates: 40.77449° N, 30.40637° E
Test Number: CPTU 4 - 17
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: cptu 4 - 17.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

Survey Coordinates (m): 33,334.87 N, 29,969.24 W
Elevation (m): 29.527
Date: 10 July 2000 11:36
Water Table Elevation (m): 29.48
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



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Sponsored by:
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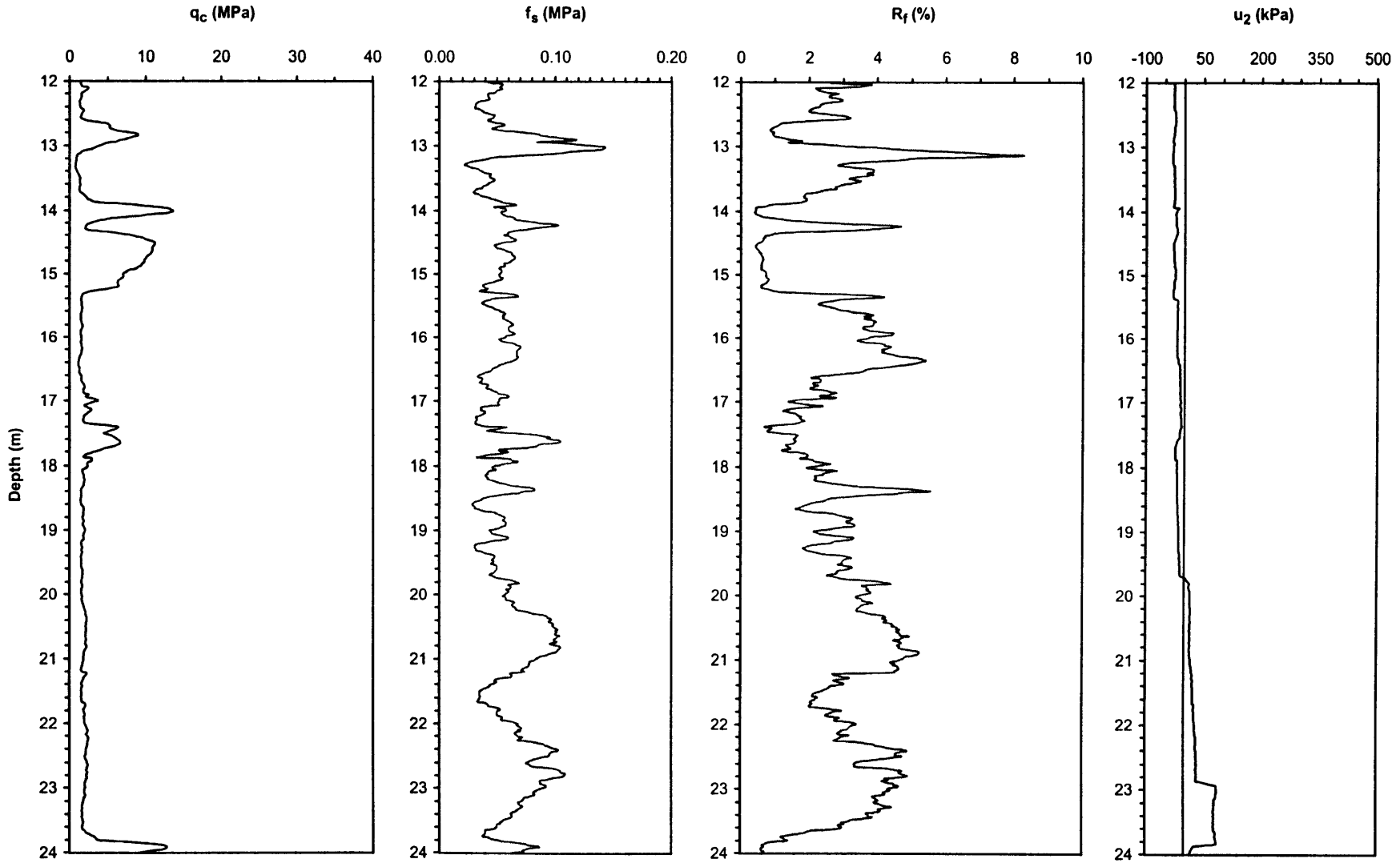
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Kol Sokak
GPS Coordinates: 40.77449° N, 30.40637° E
Test Number: CPTU 4 - 17
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: cptu 4 - 17.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

Survey Coordinates (m): 33,334.87 N, 29,969.24 W
Elevation (m): 29.527
Date: 10 July 2000 11:36
Water Table Elevation (m): 29.477
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



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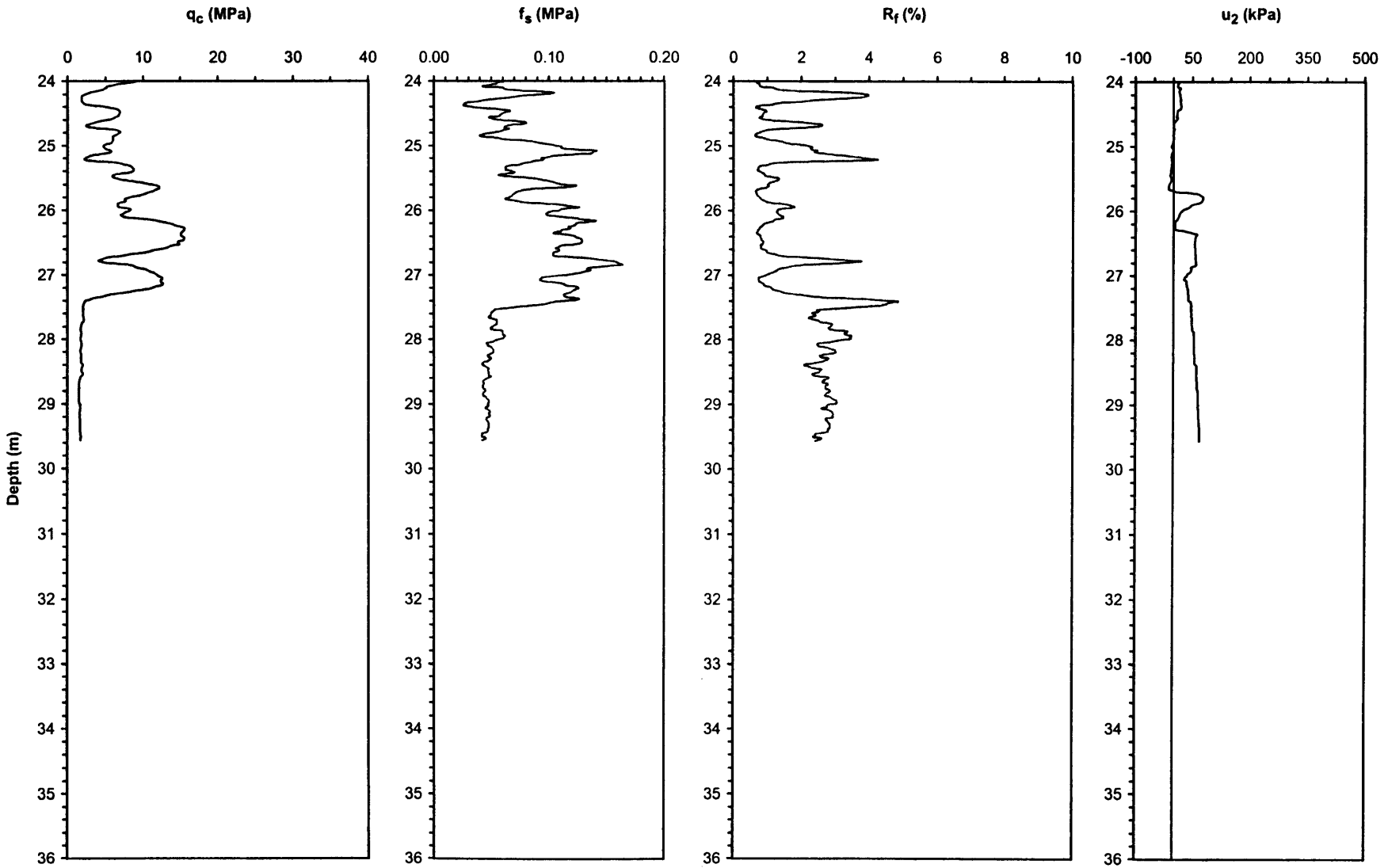
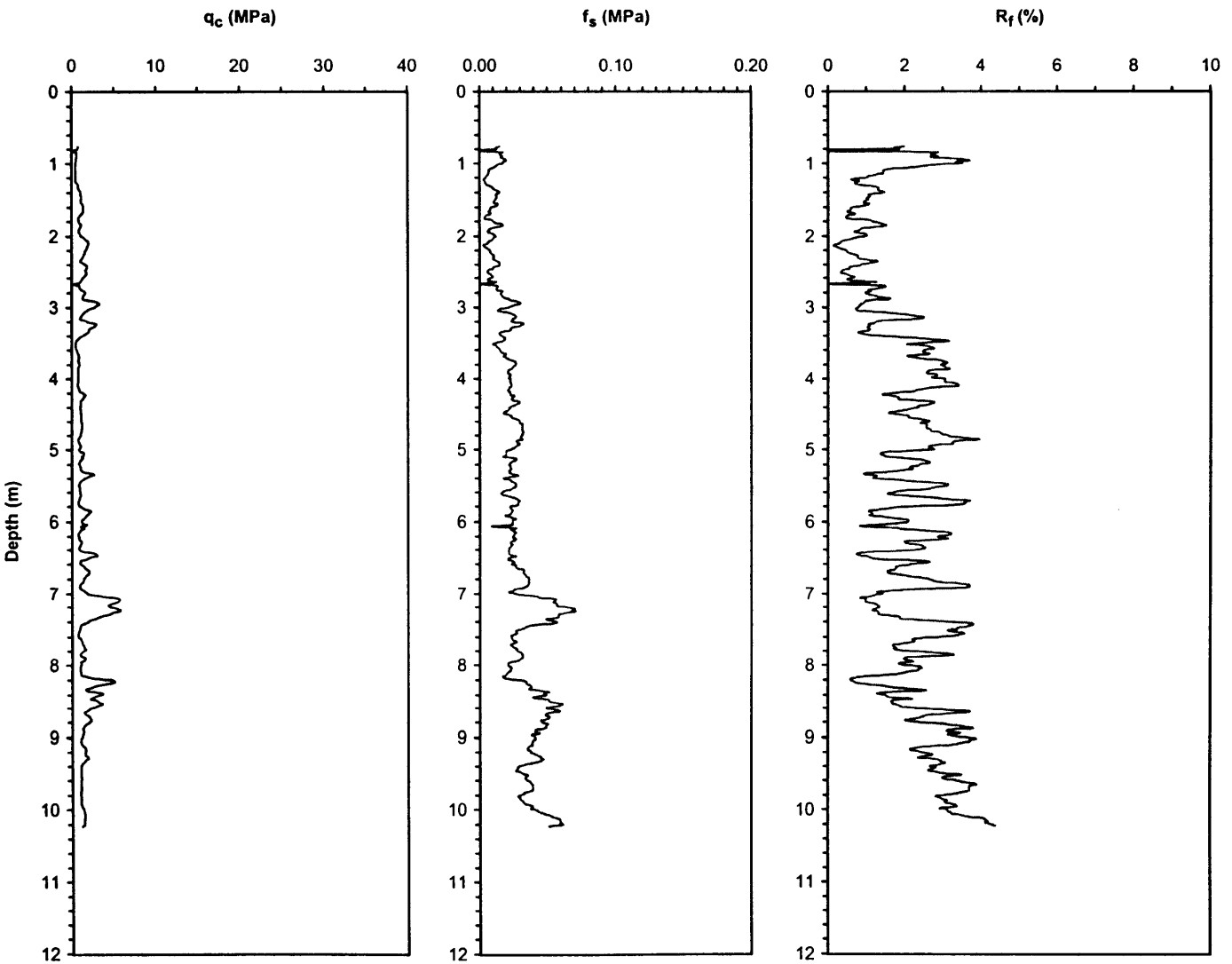
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Kol Sokak
GPS Coordinates: 40.77449° N, 30.40637° E
Test Number: CPTU 4 - 17
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: cptu 4 - 17.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

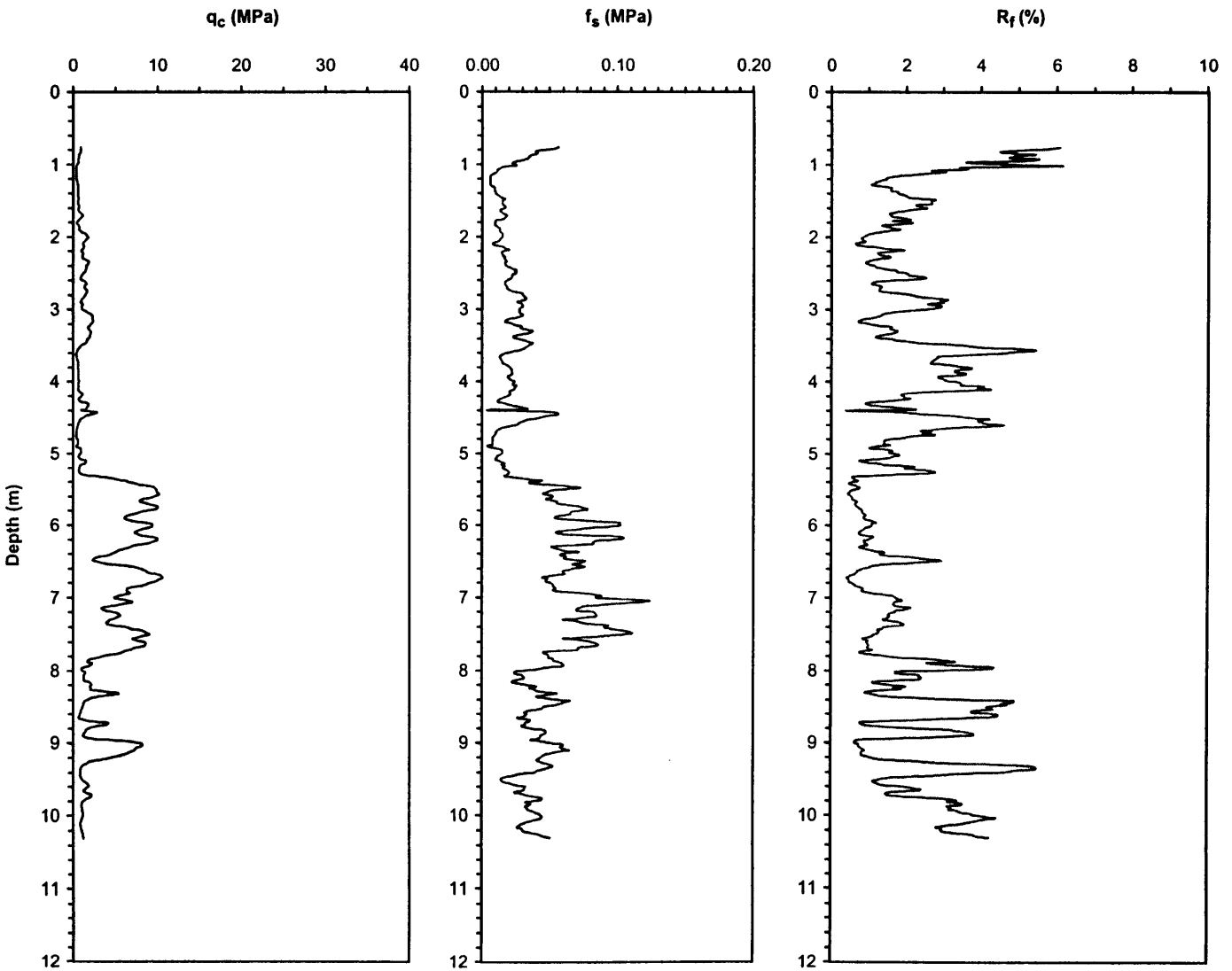
Survey Coordinates (m): 33,334.87 N, 29,969.24 W
Elevation (m): 29.527
Date: 10 July 2000 11:36
Water Table Elevation (m): 29.477
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



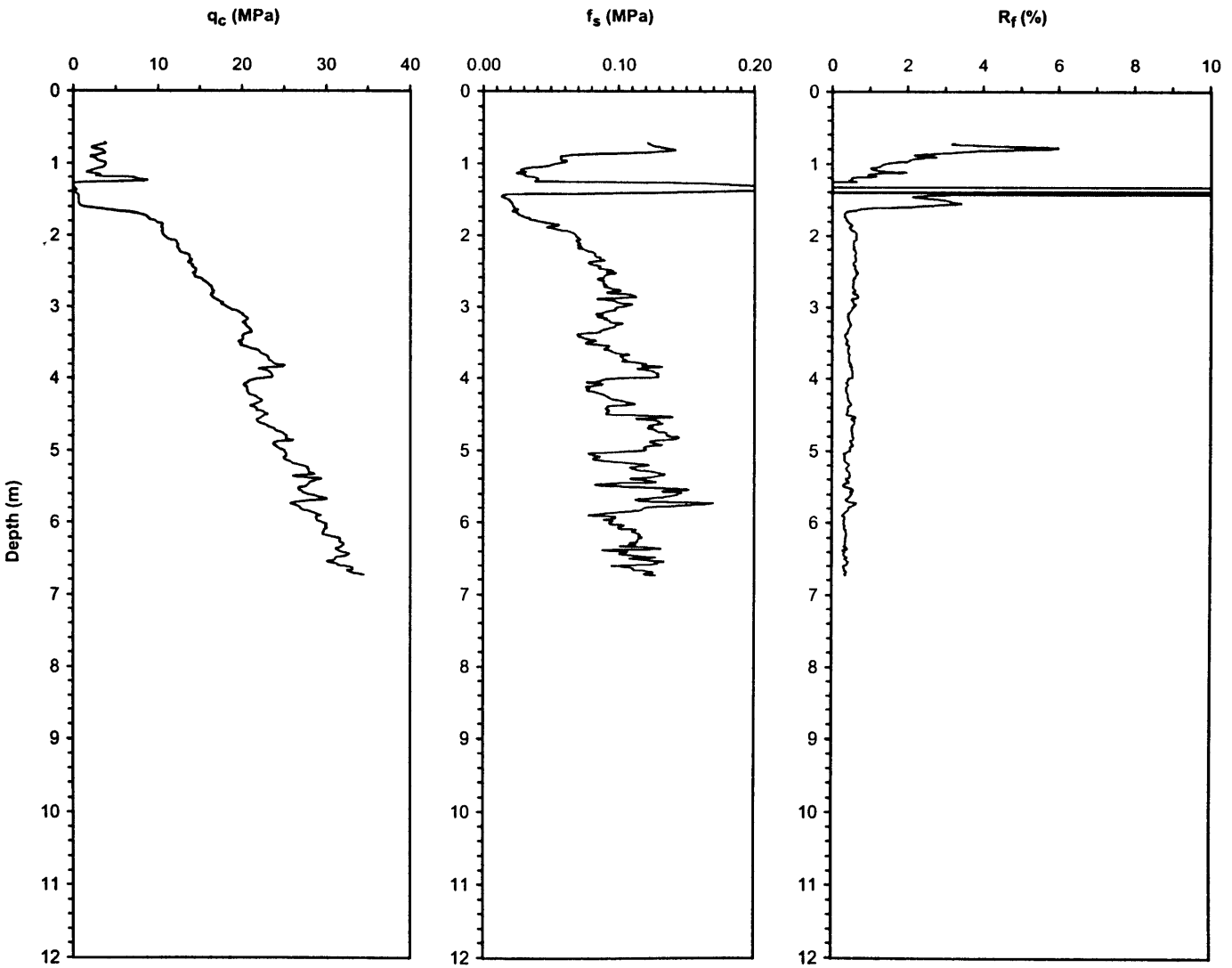
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Kol Sokak	
Joint Research	**GPS Coordinates:**	40.77537° N, 30.40526° E	**Survey Coordinates (m):** 33,309.19 N, 29,955.27 W
	Test Number:	CPT 4 - 18	**Elevation (m):** 29.500
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 08 July 2000 15:12
Sponsored by:	**File Name:**	cpt 4 - 18.txt	**Water Table Elevation (m):** 28.82
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



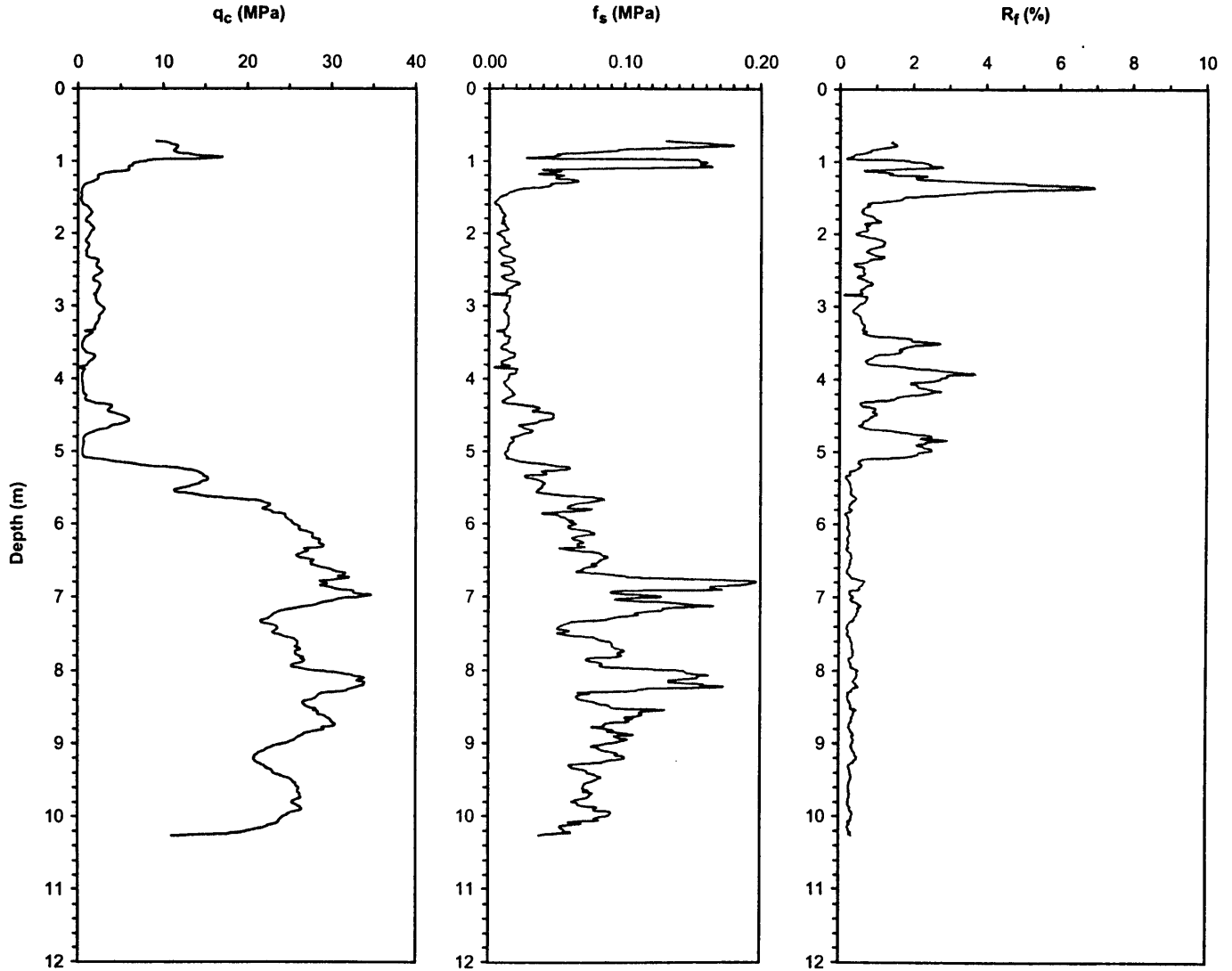
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four	
Joint Research	**GPS Coordinates:**	40.77274° N, 30.40745° E	**Survey Coordinates (m):** 33,197.58 N, 29,840.68 W
	Test Number:	CPT 4 - 19	**Elevation (m):** 29.657
	Type of Cone:	ELC10 CF No. 970510 (a.p. v.d. Berg)	**Date:** 12 July 2000 18:34
Sponsored by:	**File Name:**	cpt 4 - 19.txt	**Water Table Elevation (m):** 27.49
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



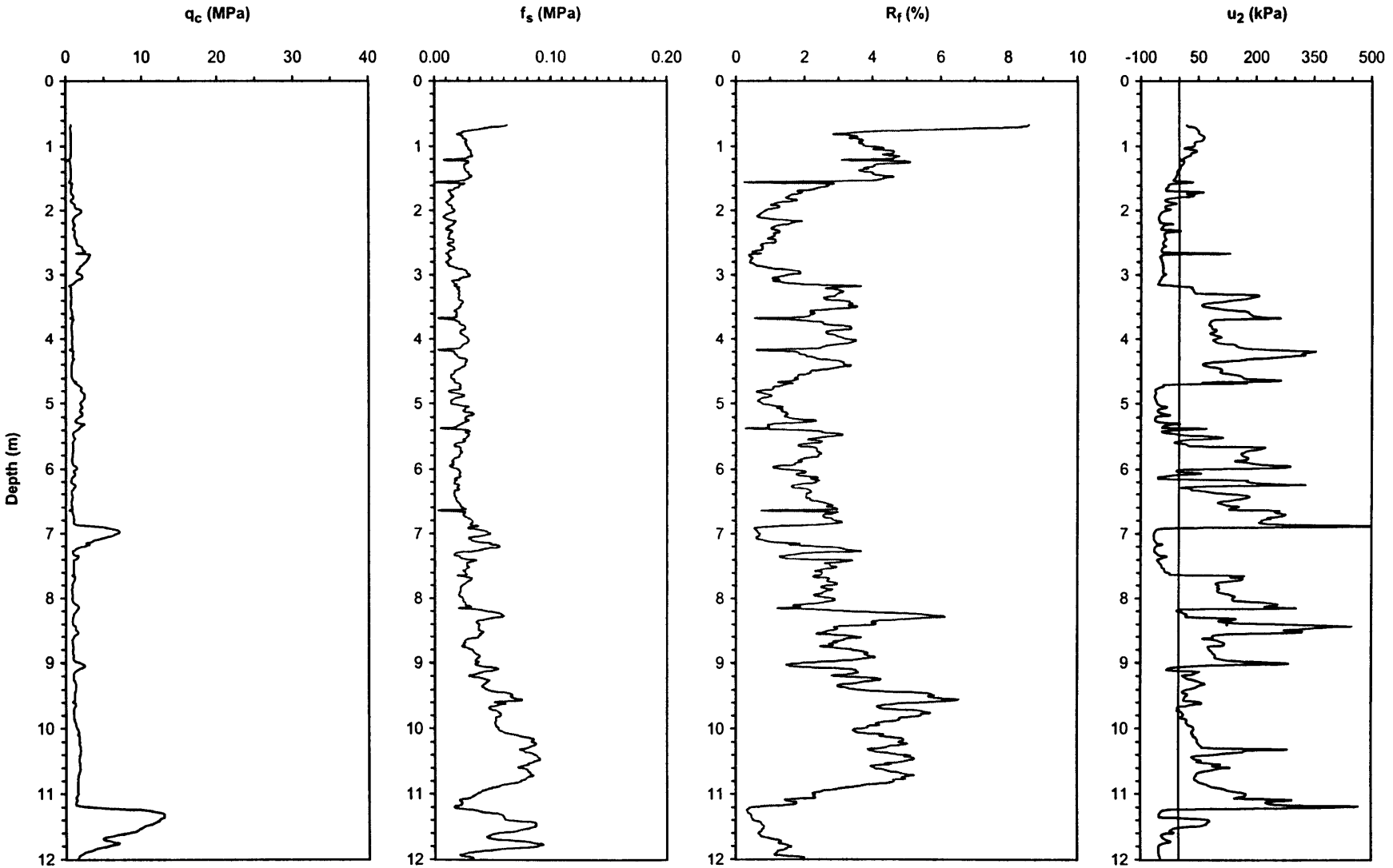
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Çukur Sokak (Immediately south of Sakarya Caddesi)	
Joint Research	**GPS Coordinates:**	40.76994° N, 30.40794° E	**Survey Coordinates (m):** 32,903.32 N, 29,722.19 W
	Test Number:	CPT 4 - 20	**Elevation (m):** 29.768
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 13 July 2000 10:27
Sponsored by:	**File Name:**	cpt 4 - 20.txt	**Water Table Elevation (m):** 29.05
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.7 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: Immediately south of Sakarya Caddesi	
Joint Research	**GPS Coordinates:**	40.76978° N, 30.40805° E	**Survey Coordinates (m):** 32,874.78 N, 29,672.63 W
	Test Number:	CPT 4 - 21	**Elevation (m):** 29.852
	Type of Cone:	ELC10 CF No. 970510 (a.p. v.d. Berg)	**Date:** 13 July 2000 9:08
Sponsored by:	**File Name:**	cpt 4 - 21.txt	**Water Table Elevation (m):** 28.91
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.7 m to clear utilities and debris.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Line Four: Cumhuriyet Caddesi	
Joint Research	**GPS Coordinates:**	40.76464° N, 30.40897° E	**Survey Coordinates (m):** 32,368.12 N, 29,535.34 W
	Test Number:	SCPTU 4 - 22	**Elevation (m):** 29.511
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 10 July 2000 17:50
Sponsored by:	**File Name:**	scptu 4 - 22.txt	**Water Table Elevation (m):** 28.56
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.65 m to clear utilities.	



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Joint Research

Sponsored by:
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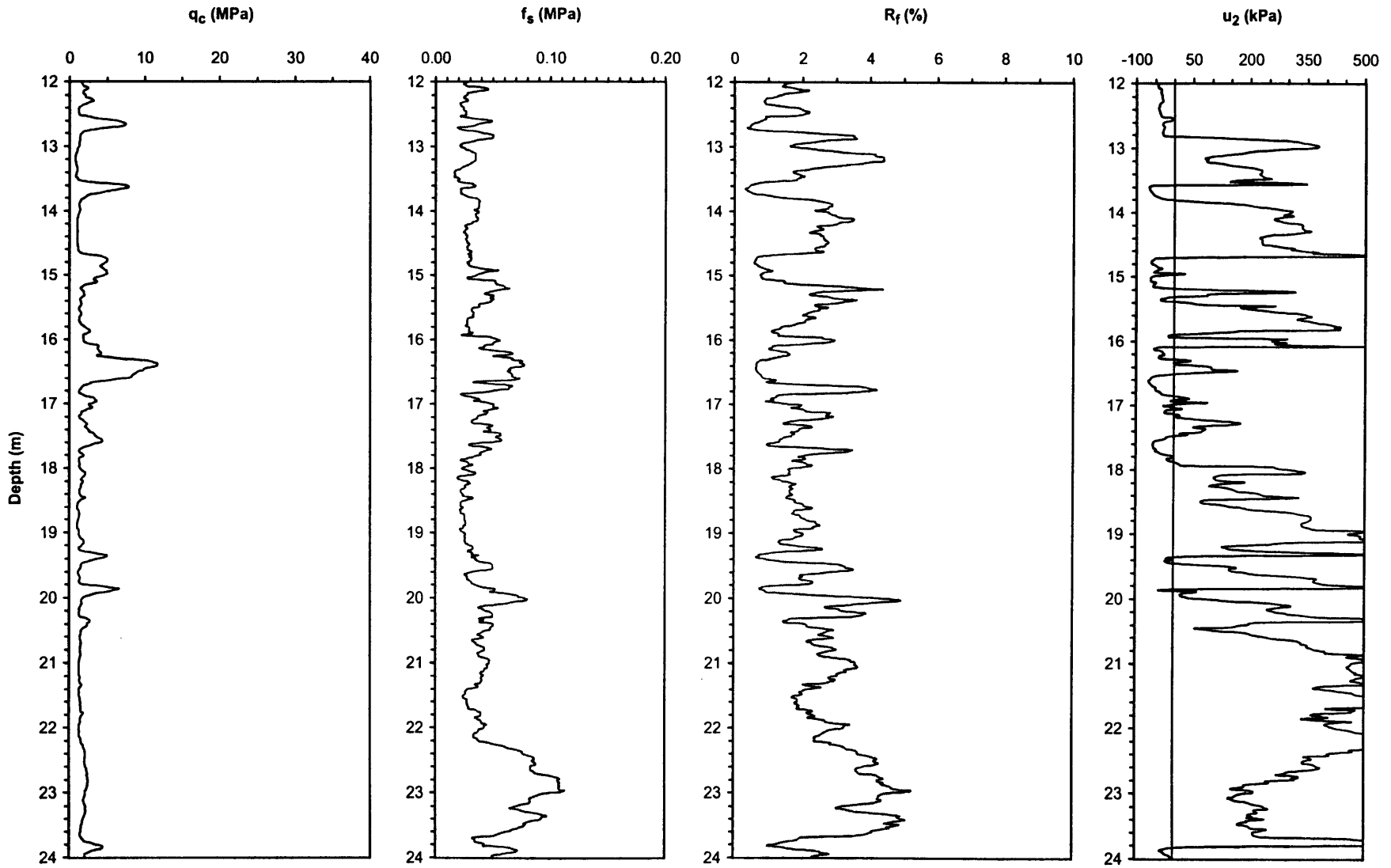
Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Cumhuriyet Caddesi
GPS Coordinates: 40.76464° N, 30.40897° E
Test Number: SCPTU 4 - 22
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: scptu 4 - 22.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.65 m to clear utilities.

Survey Coordinates (m): 32,368.12 N, 29,535.34 W
Elevation (m): 29.511
Date: 10 July 2000 17:50
Water Table Elevation (m): 28.561
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



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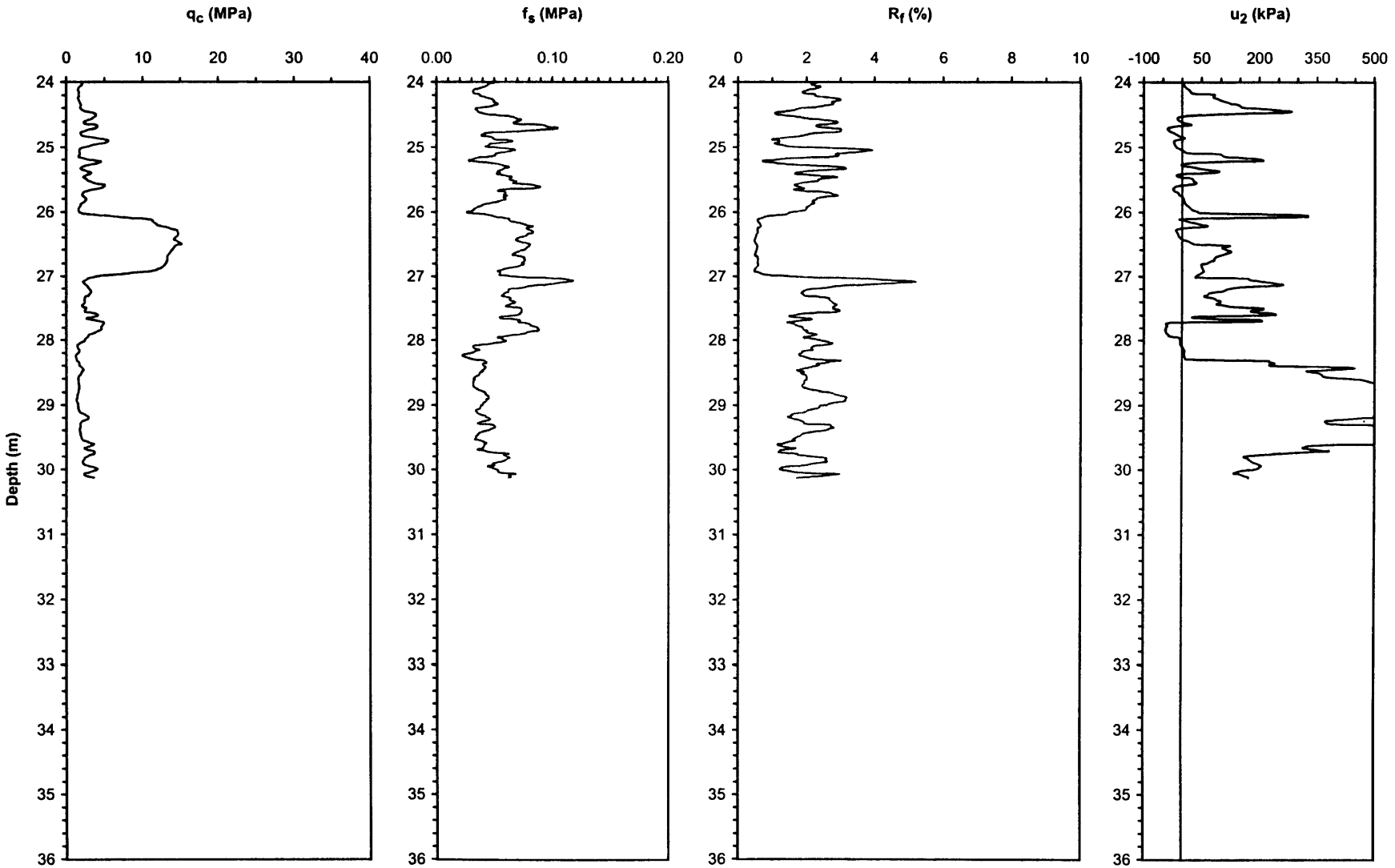
Joint Research

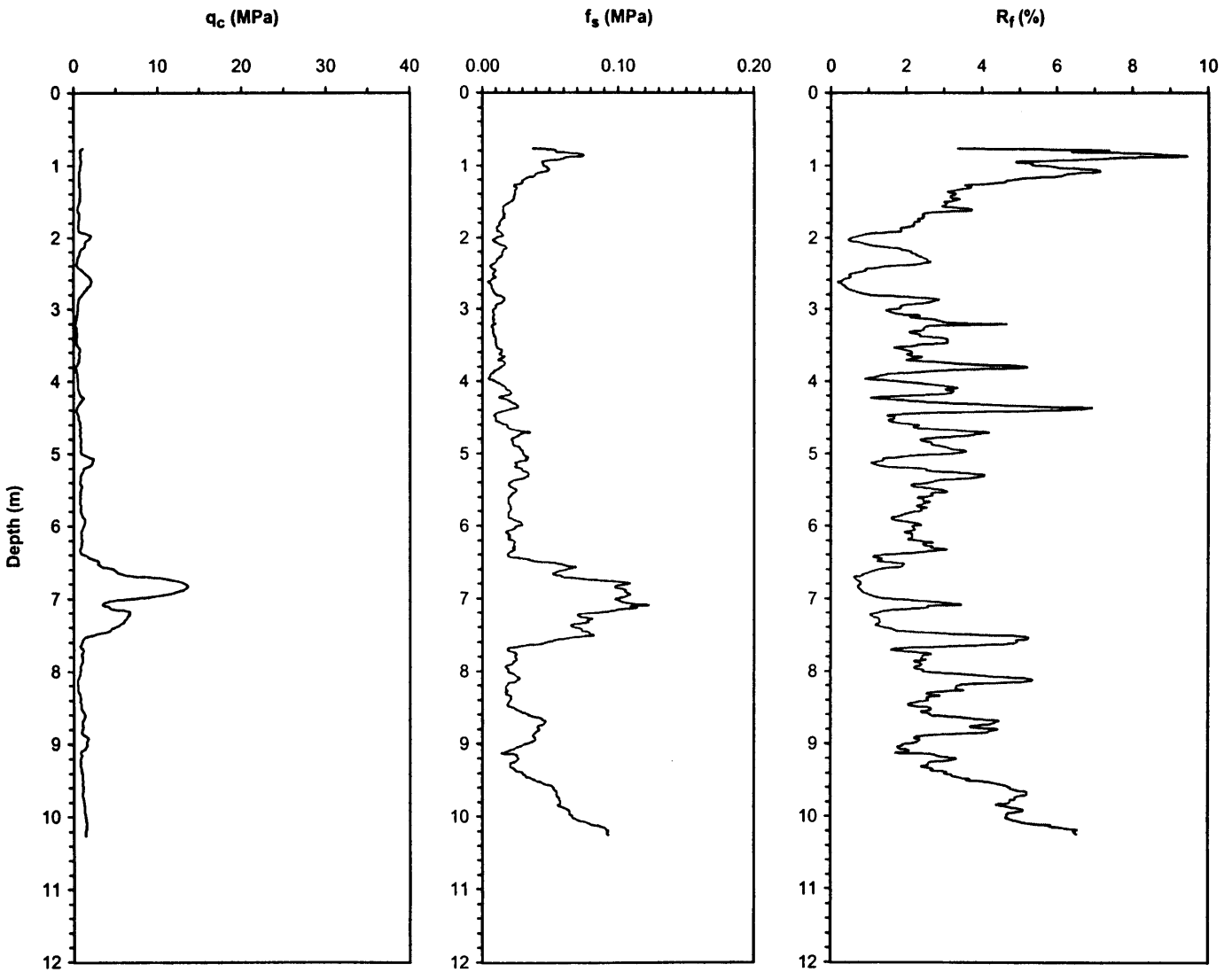
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Cumhuriyet Caddesi
GPS Coordinates: 40.76464° N, 30.40897° E
Test Number: SCPTU 4 - 22
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: scptu 4 - 22.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.65 m to clear utilities.

Survey Coordinates (m): 32,368.12 N, 29,535.34 W
Elevation (m): 29.511
Date: 10 July 2000 17:50
Water Table Elevation (m): 28.561
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: 15 Sokak (Immediately east of Cumhuriyet Caddesi)	
Joint Research	**GPS Coordinates:**	40.76294° N, 30.40944° E	**Survey Coordinates (m):** 32,201.40 N, 29,378.2163 W
	Test Number:	CPT 4 - 23	**Elevation (m):** 30.259
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 13 July 2000 12:17
Sponsored by:	**File Name:**	cpt 4 - 23.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



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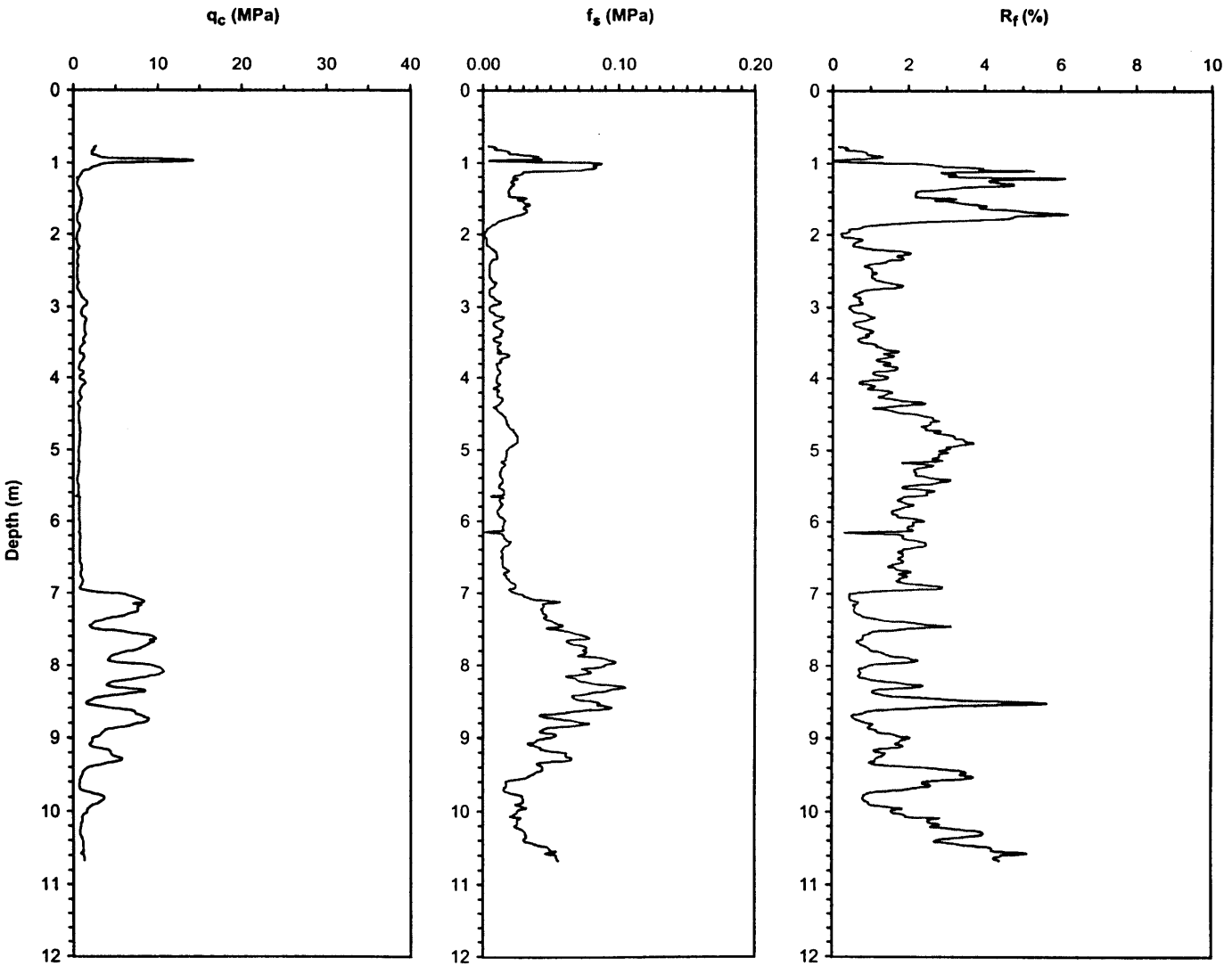
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Cumhuriyet Caddesi
GPS Coordinates: 40.76006° N, 30.40983° E
Test Number: CPT 4 - 24
Type of Cone: ELC10 CF No. 990618 (a.p. v.d. Berg)
File Name: cpt 4 - 24.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

Survey Coordinates (m): 31,918.31 N, 29,211.62 W
Elevation (m): 31.305
Date: 13 July 2000 13:24
Water Table Elevation (m): 30.04
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
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CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m south of CPT-4-3
Date: July 19, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 1.65 m 07/20/00
Notes: SPT energy was measured without accelerometers

Test ID: SPT-4-03
GPS Coordinates: 40.78579°N 30.40174°E
Elevation: 29.149 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Pavement, coarse sand.											
1		cl	S-4-3-1	5/45	6-5-2	1.05	3.67		SILTY CLAY: Brown silty clay with traces of fine sand			32	-	-	89	56	47	0.003	<1μm	
2			S-4-3-2	0/45	1-1-1	1.85	5.20		SILT AND SAND: Brown clayey sandy silt to silty sand											
3			S-4-3-3	0/45	2-2-2	2.65	5.20													
4		ML ML	S-4-3-4A S-4-3-4B	39/45	4-2-2	3.45	6.72			45	30	25 27	23 33	- -	65 70	17 27	13 23	0.046 0.023	<2μm <1μm	
5		CH	S-4-3-5	25/45	2-3-2	4.65	8.24		CH: Light brown silty clay			51	59	35	97	61	53	0.001	<1μm	
6		SM SP-SM	S-4-3-6A S-4-3-6B	39/45	13-13-14	5.75	9.77		SAND AND SILT: Brown silty fine sand to fine to medium sand with silt	250		24 22	- -	- -	34 12	<10 -	<15 -	0.092 0.27	<2μm <0.08	
7		ML	S-4-3-7	27/45	5-4-4	6.95	11.29		CLAYEY SILT: Gray clayey silt with traces of fine sand	280	67	23	29	-	84	35	29	0.014	<1μm	
8		ML CL	S-4-3-8A S-4-3-8B	40/45	3-4-6	8.25	11.29			225	50	30 34	29 40	- 18	96 97	87 38	51 30	0.020 0.013	<1μm <1μm	
9		ML CH	S-4-3-9A S-4-3-9B	35/45	5-3-4	9.15	11.29		CH: Gray silty clay	90 75	51	36 39	36 60	- 37	94 100	25 68	18 56	0.022 <2μm	<2μm	
10		SM SP-SM	S-4-3-10A S-4-3-10B	43/45	14-18-22	9.95	12.82		SAND AND SILT: Gray silty fine sand grading to fine to medium sand with silt			22 18	- -	- -	32 7	- -	- -	0.12 0.32	<8μm 0.09	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m north of CPT-4-13
Date: July 18, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.64 m 07/20/00
Notes: SPT energy was measured without accelerometers

Test ID: SPT-4-13
GPS Coordinates: 40.77612°N 30.40458°E
Elevation: 29.246 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Pavement, gravel, dark gray silty clay with sand and black organic fragments											
1		CL	S-4-13-1	26/45	2-2-2	0.95	4.27			80	60	32	39	19	87	48	41	0.006	<1μm	
2		SM	S-4-13-2	34/45	2-4-4	1.95	5.80		SAND AND SILT: Brown with red oxidized points, silty fine sand to low plasticity sandy silt	40		29	-	-	43	<20	<15	0.080	<1μm	
3		ML	S-4-13-3A	45/45	1-0-2	2.95	7.32					30	22	-	57	18	15	0.054	<2μm	
		CL	S-4-13-3B						SILTY CLAY: Light brown with red oxidation points, silty clay with traces of fine sand	75	23	37	41	18	96	40	33	0.008	<1μm	
4		CH	S-4-13-4A	42/45	2-1-3	3.95	7.32			80	41	39	54	32	95	57	45	0.003	<1μm	
		CL	S-4-13-4B									36	40	21	83	38	30	0.013	<1μm	
5		ML	S-4-13-5	33/45	3-4-5	4.95	8.84		ML: Brown to gray interbedded strata of low plasticity silt with traces of fine sand to silt with sand and sandy silt	290	55	29	33	-	91	27	22	0.022	<1μm	
6		ML	S-4-13-6	31/45	6-4-6	5.95	10.37			130	31	27	-	-	58	12	11	0.062	<2μm	
7		ML	S-4-13-7	39/45	2-3-6	6.95	10.37					32	30	-	93	25	20	0.019	<1μm	
8		ml	S-4-13-8A	42/45	2-4-4	7.85	11.89			125	32	45	-	-	89	35	30	0.013	<1μm	
		ML	S-4-13-8B									31	26	-	74	22	16	0.028	<2μm	
9		ML	S-4-13-9	34/45	3-4-3	8.75	13.42		SAND: Gray silty sand grading to fine to medium sand with silt	140	39	39	39	-	100	42	34	0.008	<1μm	
10		SP-SM	S-4-13-10	46/45	4-13-20	9.75	13.42			60		17	-	-	7	-	-	0.32	0.086	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m south of CPT-4-22
Date: July 20, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Not measured
Notes:

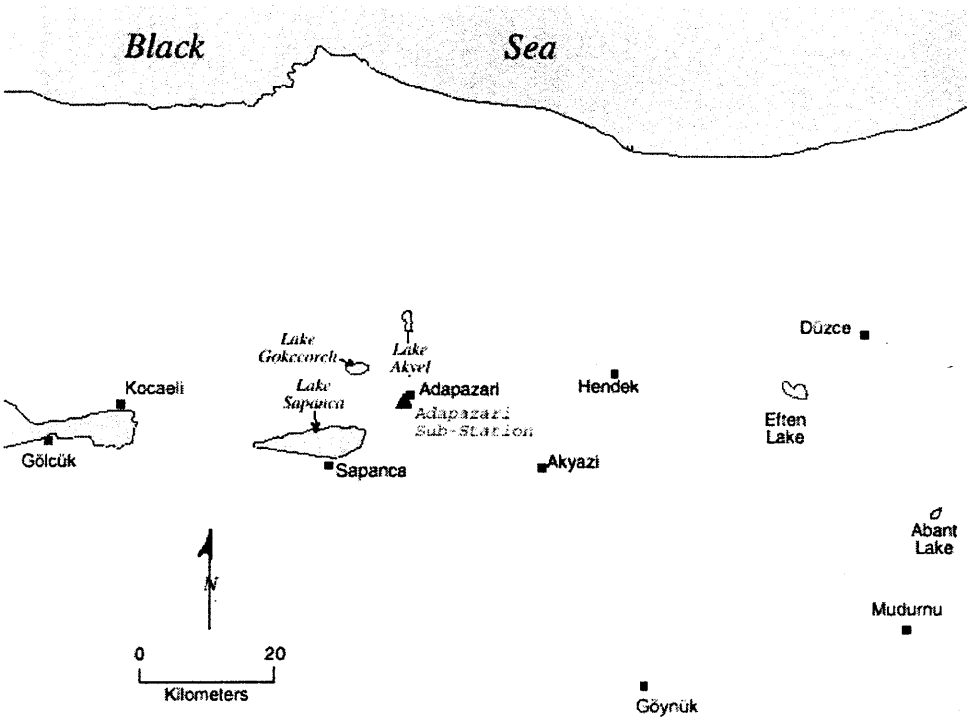
Test ID: SPT-4-22
GPS Coordinates: 40.76464°N 30.40897°E
Elevation: 29.511 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill											
1		CH/CL	S-4-22-1A	33/45	2-1-3	0.85	4.27		CH: Gray to brown high plasticity silty clay	1.60		40	50	28	97	53	46	0.004	<1μm	
		CH	S-4-22-1B							1.65	52	38	55	32	99	55	44	0.004	<1μm	
2			S-4-22-2	0/45	2-2-2	1.65	5.80		SILT AND SAND: Brown silty sand to sandy silt grading to low plasticity silt with fine sand											
3		ML	S-4-22-3A	44/45	2-2-2	2.55	5.80					29	25	-	54	15	10	0.062	0.002	Sand catcher was used
		ML	S-4-22-3B									35	32	-	89	20	17	0.024	<2μm	
4		CH	S-4-22-4	43/45	2-1-2	3.55	7.32		SILTY CLAY: Brown, grading to gray interbedded strata of silty clay and clayey silt	85	40	41	55	28	100	50	38	0.005	<1μm	Sand catcher was used
5		ML	S-4-22-5	44/45	2-1-2	4.65	8.84			110	29	38	34	-	97	26	23	0.018	<1μm	Sand catcher was used
6		ML/CL	S-4-22-6A	40/45	2-2-2	5.65	10.37			70	23	32	41	15	99	54	39	0.004	<1μm	Sand catcher was used
		ML	S-4-22-6B									40	39	-	99	31	26	0.013	<1μm	
7		ML	S-4-22-7	33/45	6-8-6	6.65	10.37		SANDY SILT: Gray sandy silt to silty fine sand			29	36	-	54	16	14	0.063	<2μm	Sand catcher was used
8		CH	S-4-22-8A	42/45	2-2-3	7.95	11.89		CH: Gray high plasticity silty clay interspersed with some brown clay seams. Traces of shells and wood chips	90	65	39	57	33	100	60	45	0.003	<1μm	Sand catcher was used
		CH	S-4-22-8B							120	67	40	64	40	100	75	56	0.001	<1μm	
9		CH	S-4-22-9	31/45	2-3-5	8.95	11.89			160	57	43	65	38	99	81	64	<2μm		Sand catcher was used

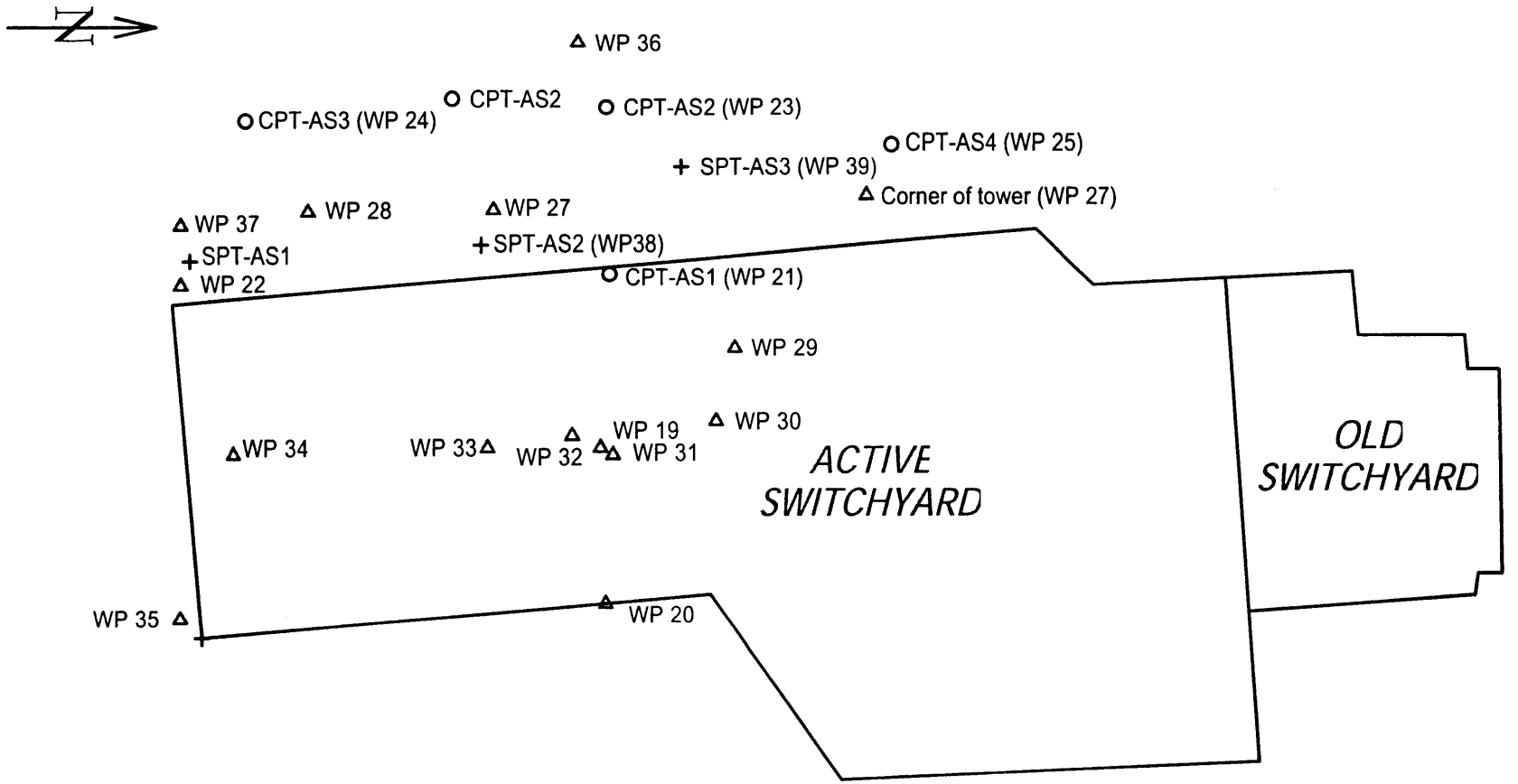
Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

Appendix III

Phase 3



Location of the Adapazari Sub-Station investigated in Phase 3.



Difference in elevation with respect to WP 27	
CPT-AS1	-0.01m
CPT-AS2	-1.05 m
CPT-AS3	-5.40 m
CPT-AS4	+0.21 m
CPT-AS5	-3.09 m
SPT-AS1	-0.10 m
SPT-AS2	-0.09 m
SPT-AS3	-0.28 m

SCALE

0 40 80 120 160 m

UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Geotechnical Site Investigation at Electrical Sub-Stations
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

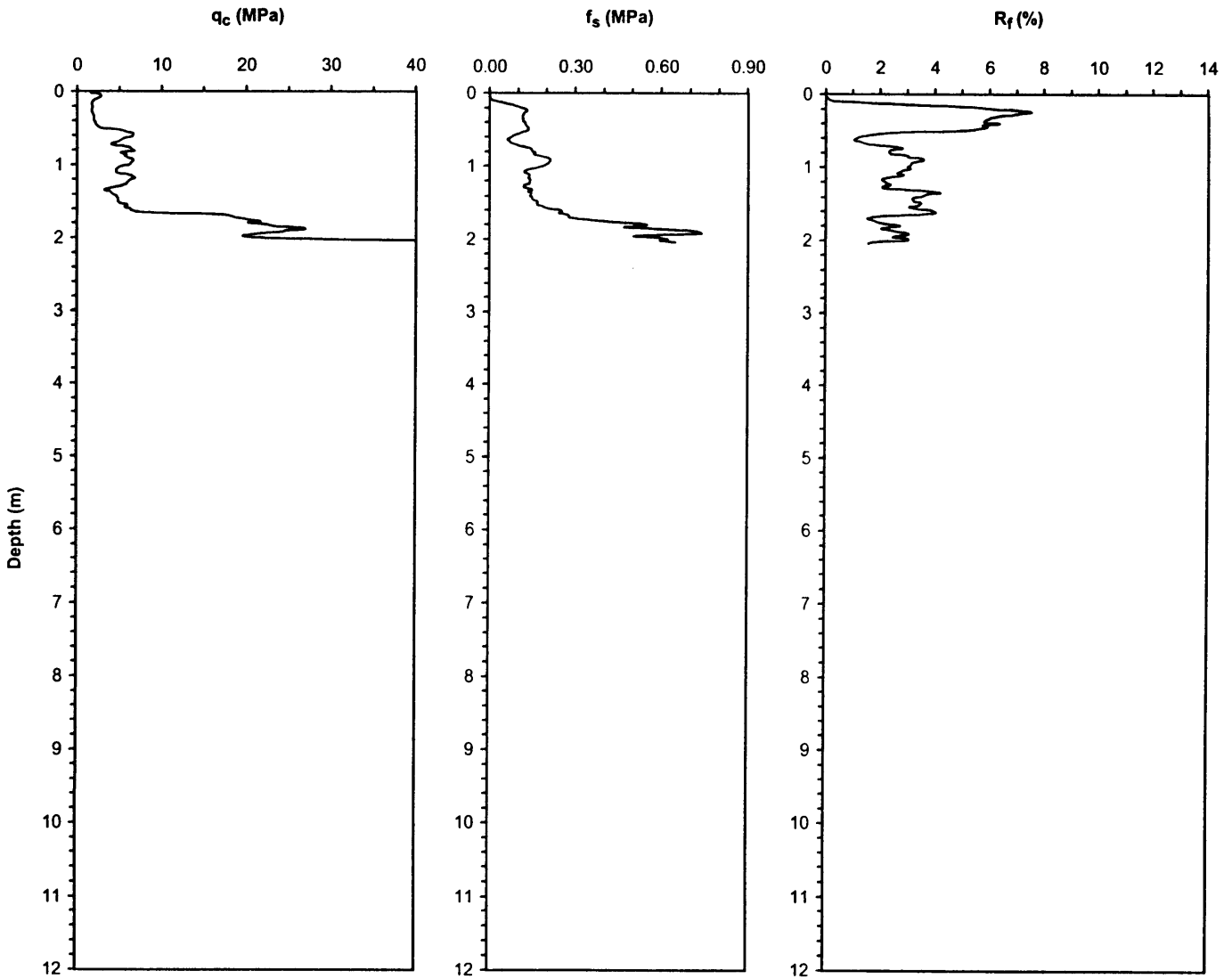
Contents: Plan view of the switchyard and location of subsurface exploration points

Location: TEAS Electrical Substation, Adapazari
GPS Coordinates: 40.74250° N 30.38408° E

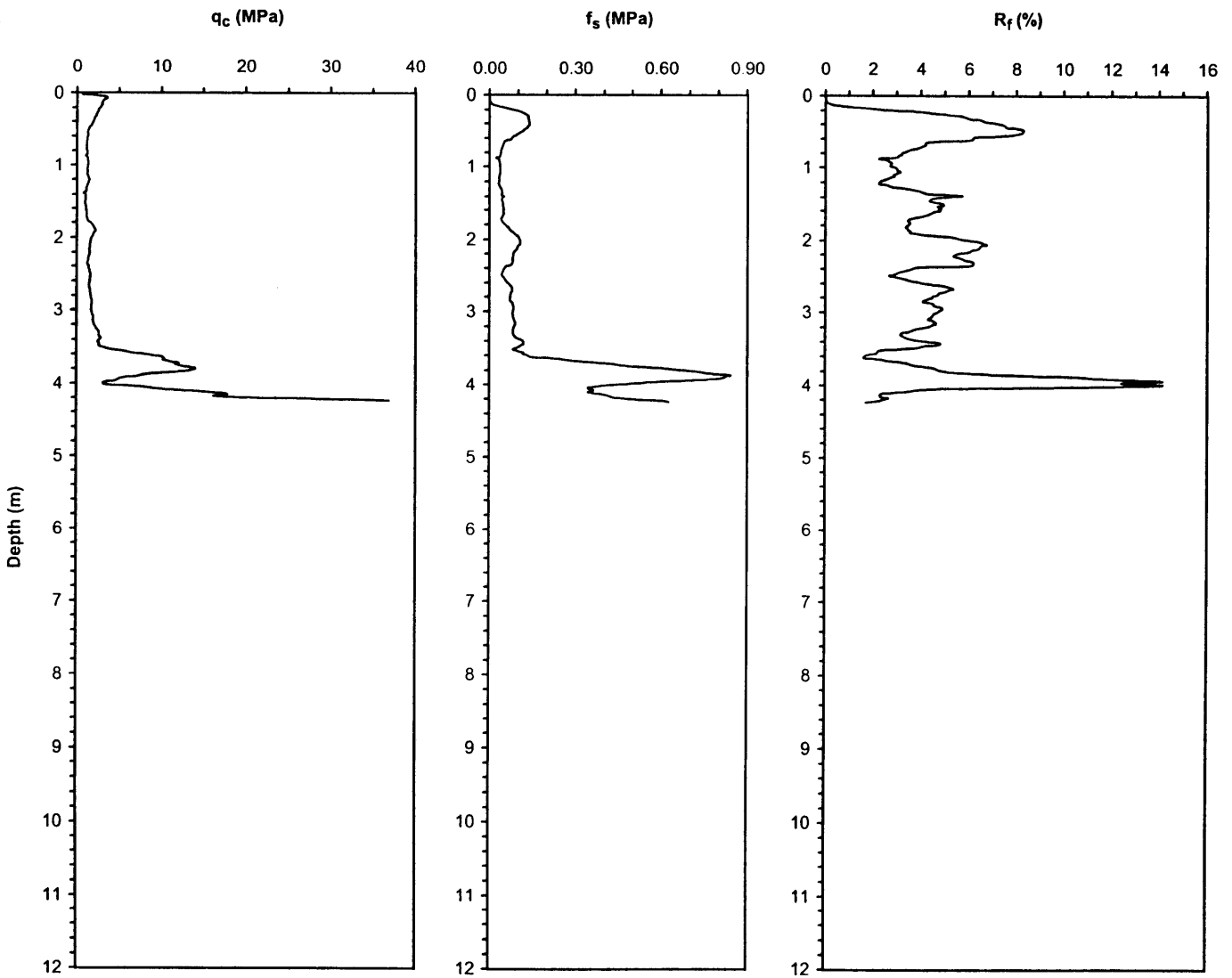
Scale: Graphic Scale | File Name: teas.fcw - teas.pdf

Date: 01/26/01 | Drawing: Rodolfo B. Sancio

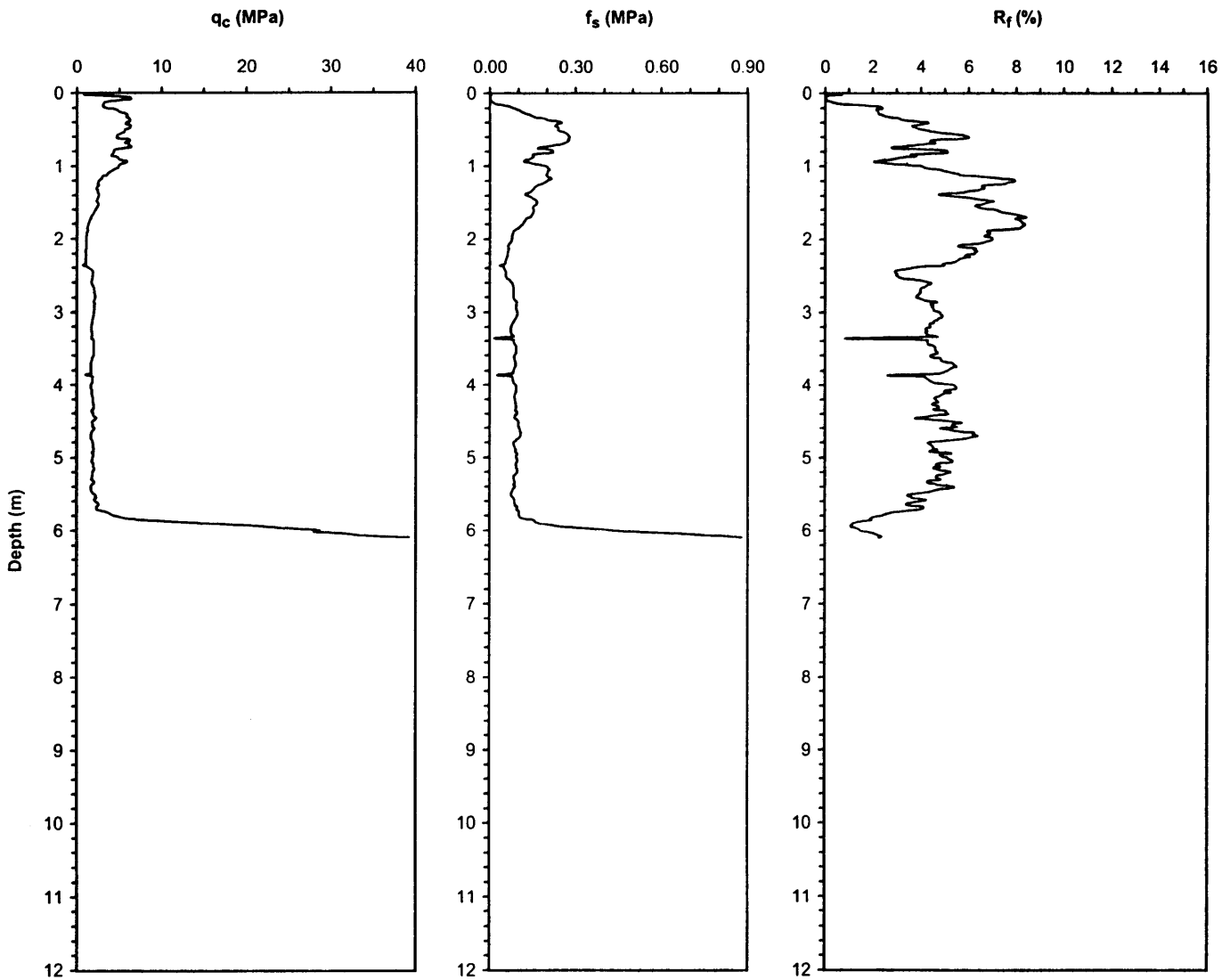
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Electrical Sub-Stations	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	TEAS Electrical Substation, Adapazarı	
Joint Research	**GPS Coordinates:**	40.74250°N 30.38408°E	
	Test Number:	CPT-AS1	**Elevation:** -0.01 m with respect to WP27
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 17, 2000 14:10
Sponsored by:	**File Name:**	cptas1.csv	**Water Table Elevation:** Not present
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



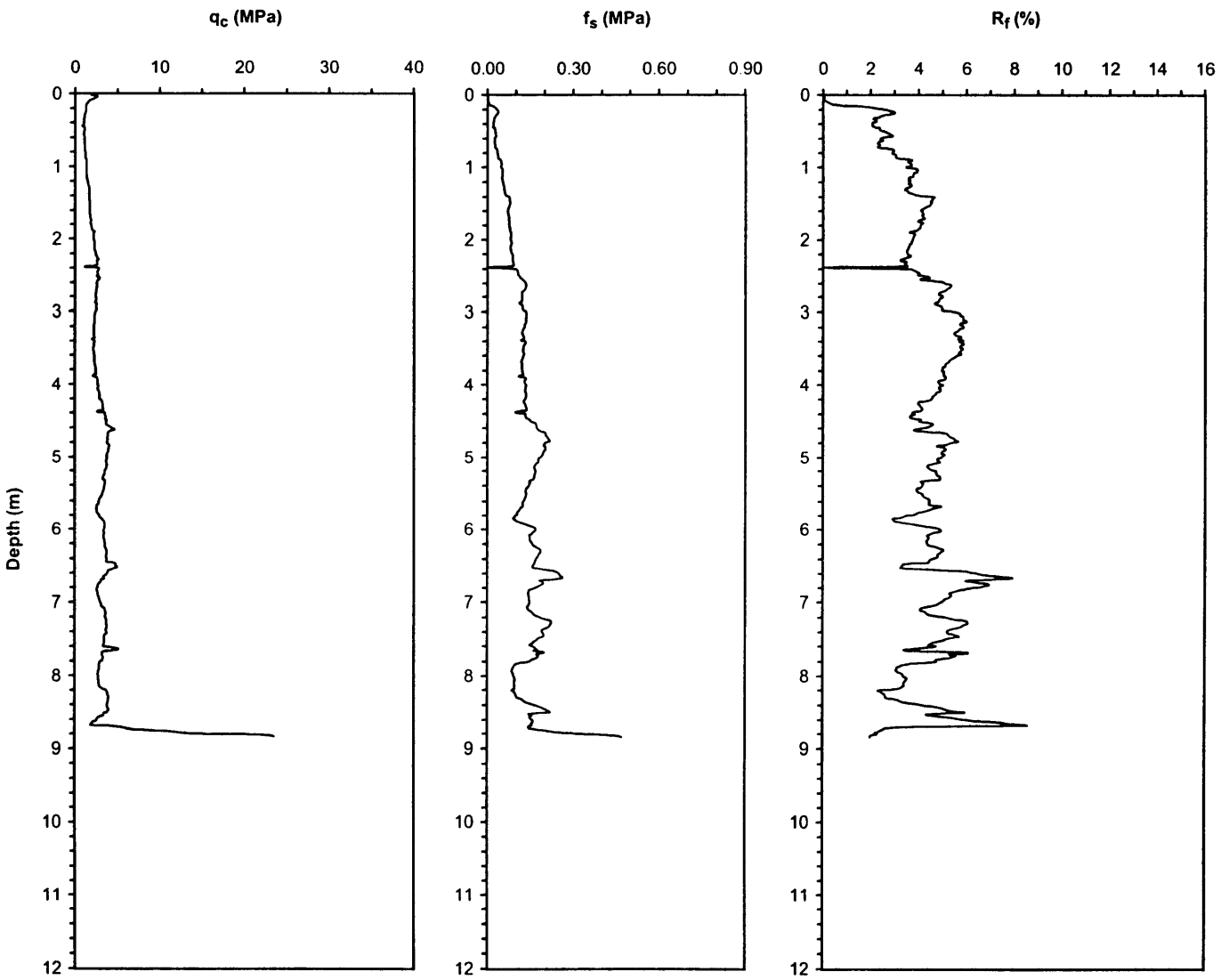
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Electrical Sub-Stations	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	TEAS Electrical Substation, Adapazarı	
Joint Research	**GPS Coordinates:**	40.74250°N 30.38408°E	
	Test Number:	CPT-AS2	**Elevation:** -1.05 m with respect to WP27
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 17, 2000 15:21
Sponsored by:	**File Name:**	cptas2.csv	**Water Table Elevation:** Not present
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



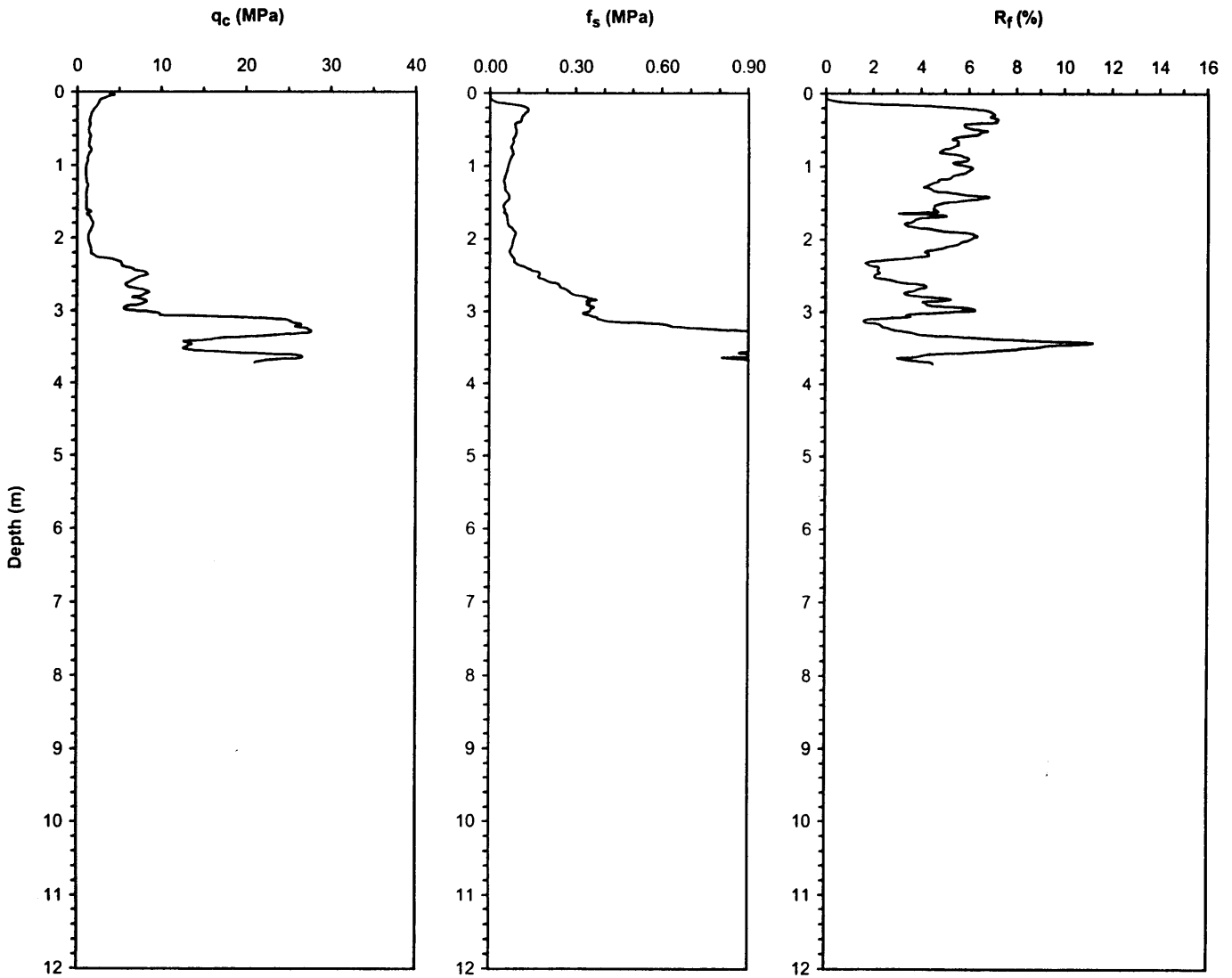
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Electrical Sub-Stations	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	TEAS Electrical Substation, Adapazarı	
Joint Research	**GPS Coordinates:**	40.74250°N 30.38408°E	
	Test Number:	CPT-AS3	**Elevation:** -5.40 m with respect to WP27
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 17, 2000 16:01
Sponsored by:	**File Name:**	cptas3.csv	**Water Table Elevation:** Not present
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Electrical Sub-Stations	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	TEAS Electrical Substation, Adapazarı	
Joint Research	**GPS Coordinates:**	40.74250°N 30.38408°E	
	Test Number:	CPT-AS4	**Elevation:** +0.21 m with respect to WP27
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 18, 2000 15:10
Sponsored by:	**File Name:**	cptas4.csv	**Water Table Elevation:** Not present
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Electrical Sub-Stations	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	TEAS Electrical Substation, Adapazarı	
Joint Research	**GPS Coordinates:**	40.74250°N 30.38408°E	
	Test Number:	CPT-AS5	**Elevation:** -3.09 m with respect to WP27
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 18, 2000 16:33
Sponsored by:	**File Name:**	cptas5.csv	**Water Table Elevation:** Not present
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigation at Electrical Sub-Stations
Location: Adapazari Electrical Sub-Station
Date: August 20, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Not present up to depth explored
Notes:

Test ID: SPT-AS1
GPS Coordinates: 40.74250°N 30.38408°E
Elevation: -0.10 m with respect to WP 27
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Medium dense, yellow, gravelly compacted fill. At a depth of approximately 5.2 m there appears to be a trnsition to stiff brown clay											Very difficult to excavate with manual equipment. The rock used as fill appears to be gray sandstone weathered to light brown silty sandy gravel
1																				
2		GP-SC	S-AS1-1	22/45	4-10-12	1.95	5.80	60				8	27	10	11	-	-	20	0.07	
3																				
4		SM	S-AS1-2	24/45	5-7-5	3.45	7.32	60				14	27	-	34	17	10	0.14	0.002	
5		CL/CH	S-AS1-3	22/45	4-5-7	3.45	8.84	64				22	49	36	82	57	52	0.001	<1μm	
6									SM: Yellow to brown clayey silty sand with gravel. This soil may be the product of extensive weathering of bedrock (residual soil)											
7		SM	S-AS1-4	16/45	3-3-5	6.00	10.37	69				19	26	-	35	20	15	0.15	<3μm	
8		CL	S-AS1-5	32/45	8-18-34	7.50	11.89	66	SANDSTONE: Light gray to brown, weathered (decomposed) sandstone to siltstone. Red oxidized seams indicate that parent rock may be Flysh			18	30	12	89	36	24	0.01	<1μm	
9																				

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigation at Electrical Sub-Stations
Location: Adapazari Electrical Sub-Station
Date: August 20, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Not present up to depth explored
Notes: SPT energy was not measured

Test ID: SPT-AS2
GPS Coordinates: 40.74250°N 30.38408°E
Elevation: -0.09 m with respect to WP 27
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Yellow gravelly, silty, clayey fill											
1																				
2		GC	S-AS2-1	17/17	53-53/2	-			SANDSTONE: Yellow to tan weathered sandstone. Specimen can be crumbled with fingers. Some structure still remains			11	28	13	31	15	10	6	0.002	
3		GC	S-AS2-2	7/10	100/10	-						11	29	12	25	-	-	9	<0.07	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigation at Electrical Sub-Stations
Location: Adapazari Electrical Sub-Station
Date: August 20, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Not present up to depth explored
Notes: SPT energy was not measured

Test ID: SPT-AS3
GPS Coordinates: 40.74250°N 30.38408°E
Elevation: -0.28 m with respect to WP 27
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Dark brown very stiff clay											
1																				
2		CH	S-AS3-1	23/45	2-3-3							30	63	42	94	74	65	<1μm	<1μm	
3									SANDSTONE: Yellow to tan weathered sandstone											
4		GC	S-AS3-2	7/7	100/7							17	30	14	32	12	<10	3	0.003	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

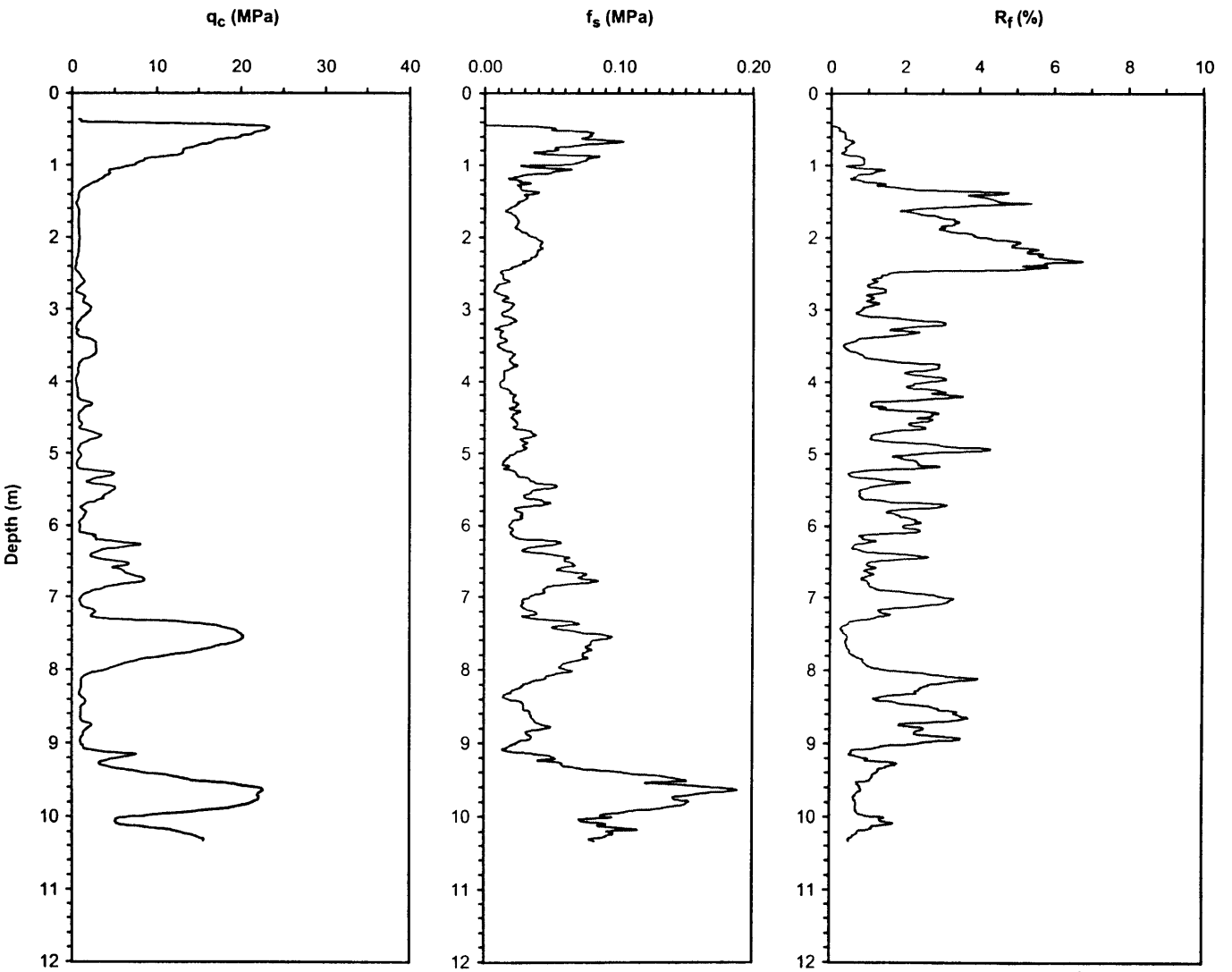
Appendix IV

Phase 4

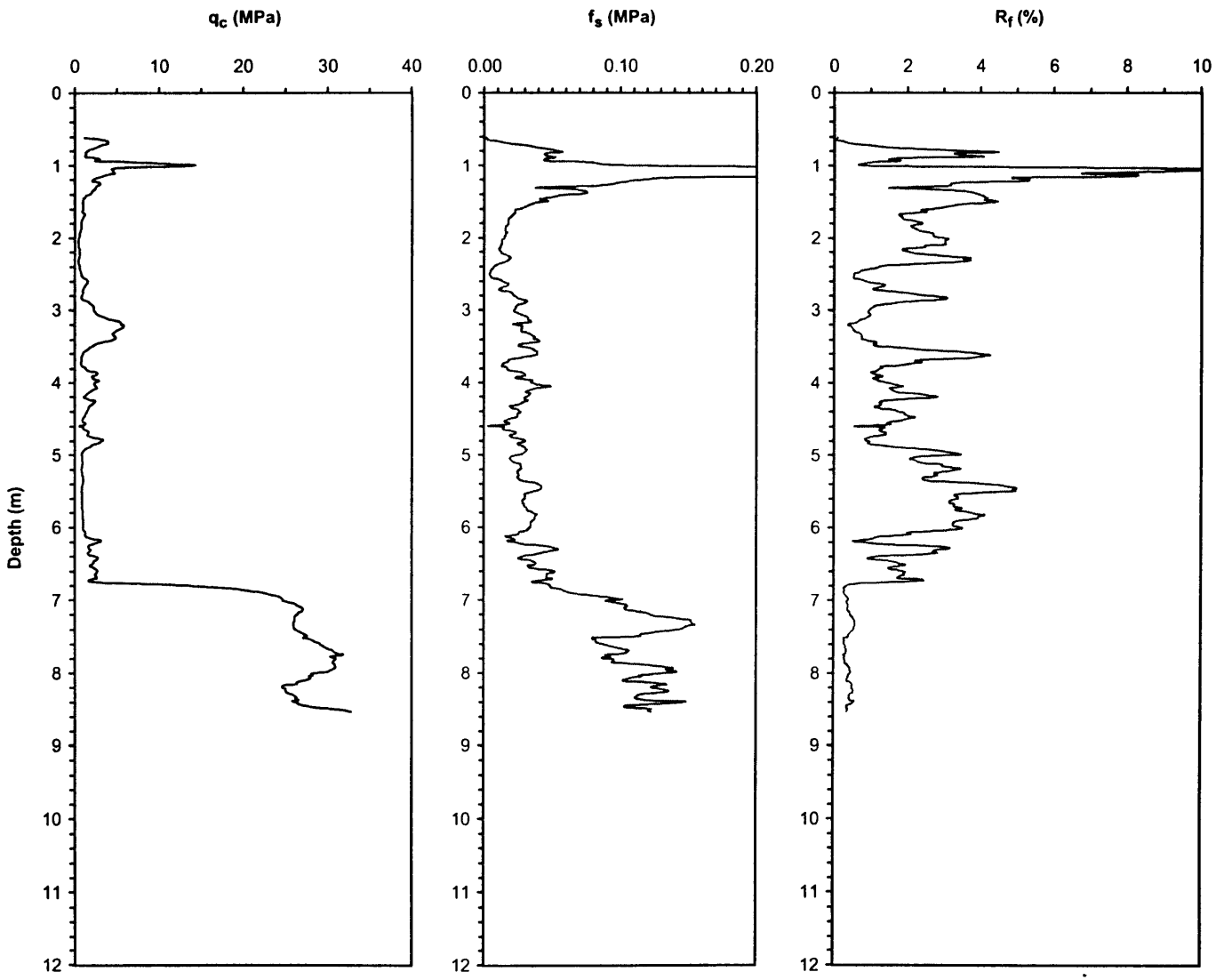
Phase 4

Site: Cark Canal

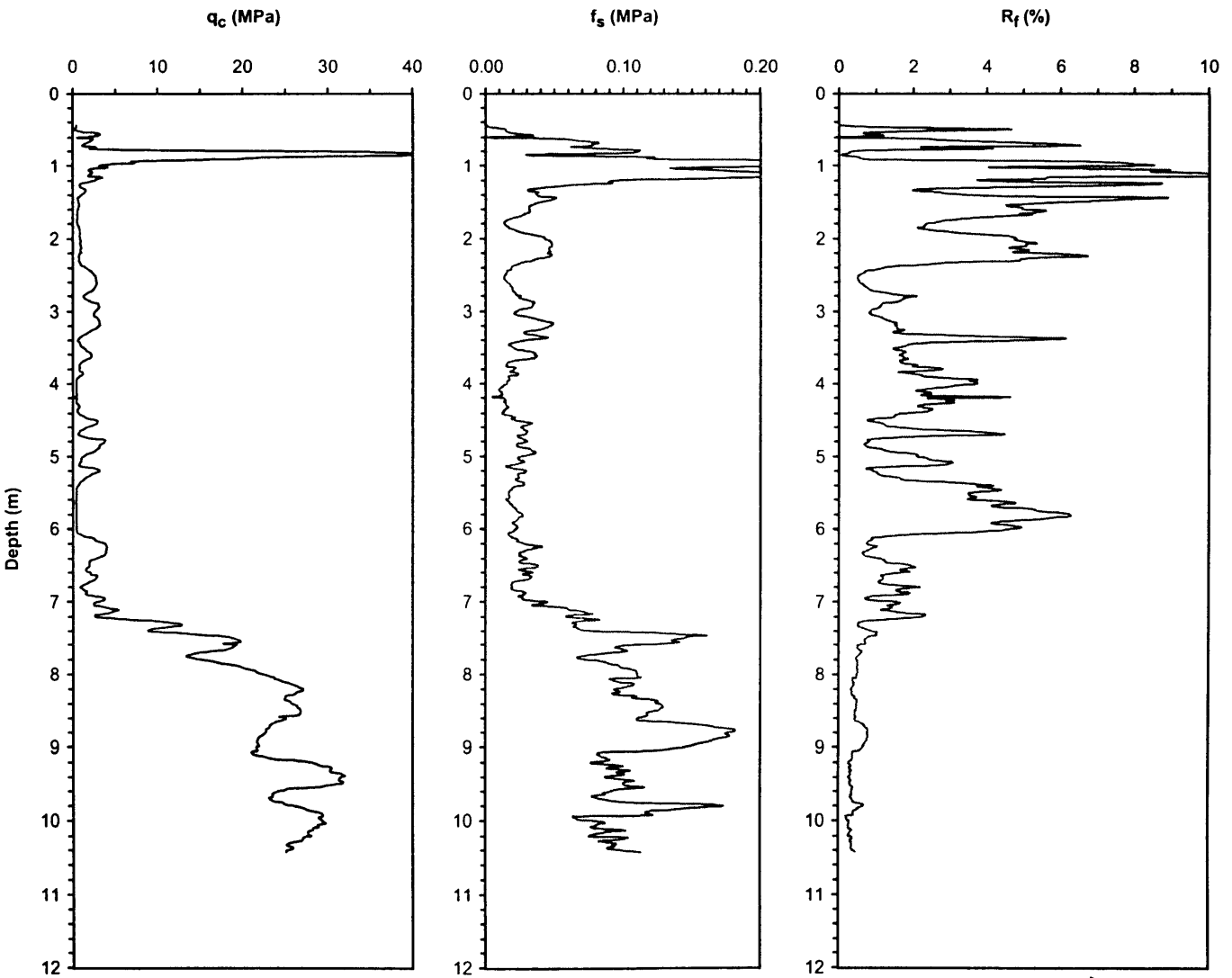
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77615° N, 30.38189° E	**Survey Coordinates (m):** 32,798.59 N, 31,862.39 W
	Test Number:	CPT 1 - 21	**Elevation (m):** 27.660
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 14:24
Sponsored by:	**File Name:**	cpt 1 - 21.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.33 m to clear utilities and debris.	



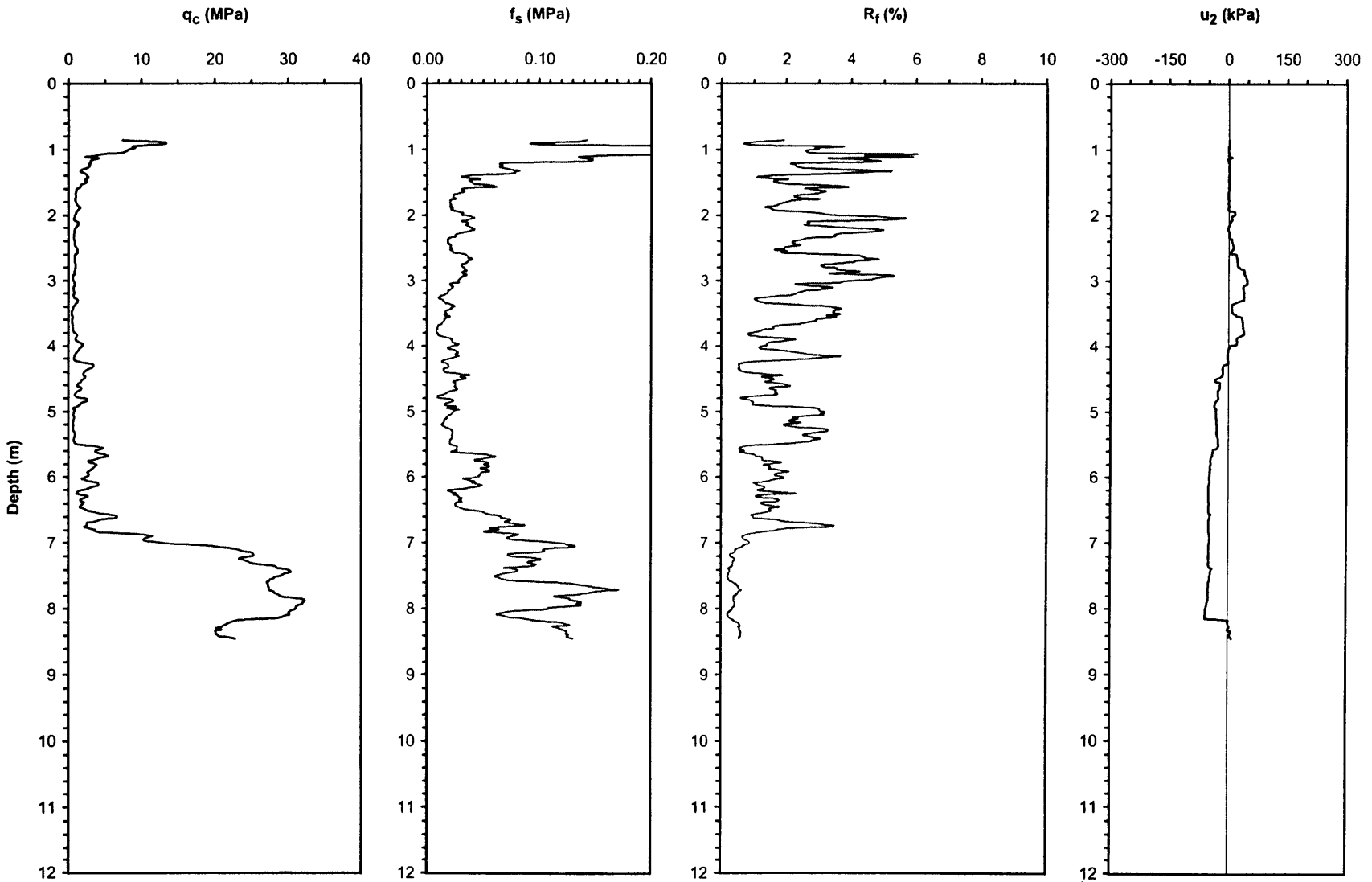
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77587° N, 30.38283° E	**Survey Coordinates (m):** 32,794.12 N, 31,780.45 W
	Test Number:	CPT 1 - 22	**Elevation (m):** 28.237
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 18:28
Sponsored by:	**File Name:**	cpt 1 - 22.txt	**Water Table Elevation (m):** 25.04
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.59 m to clear utilities and debris.	



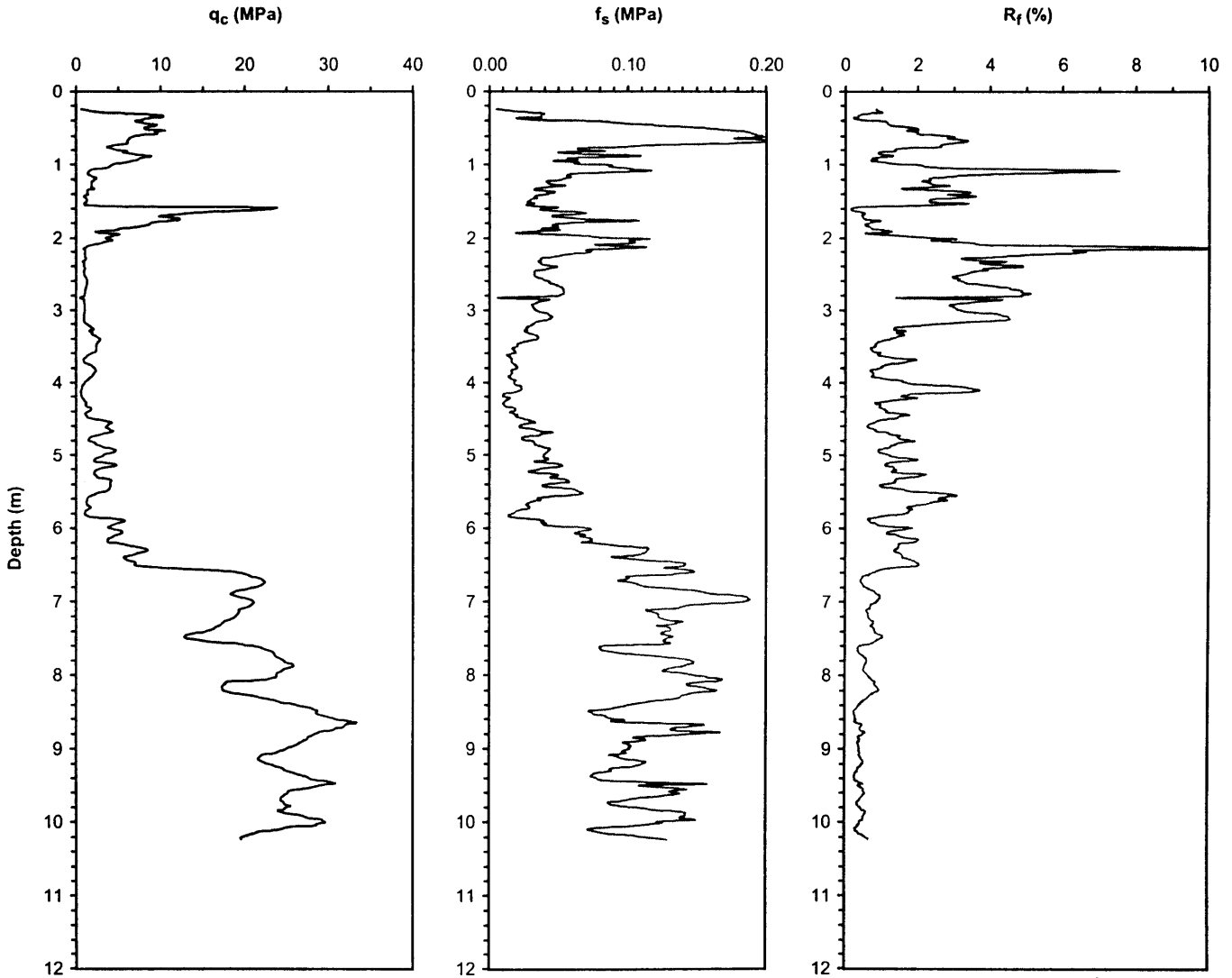
UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77629° N, 30.38307° E	**Survey Coordinates (m):** 32,829.33 N, 31,779.92 W
	Test Number:	CPT 1 - 23	**Elevation (m):** 28.329
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 27 June 2000 15:53
Sponsored by:	**File Name:**	cpt 1 - 23.txt	**Water Table Elevation (m):** 25.09
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.42 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddessi	
Joint Research	**GPS Coordinates:**	40.77639° N, 30.38296° E	**Survey Coordinates (m):** 32,848.47 N, 31,777.18 W
	Test Number:	SCPTU 1 - 24	**Elevation (m):** 28.001
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 28 June 2000 11:00
Sponsored by:	**File Name:**	scptu 1 - 24.txt	**Water Table Elevation (m):** 25.40
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.53 m to clear utilities.	



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line One: Çark Caddesi	
Joint Research	**GPS Coordinates:**	40.77638° N, 30.38354° E	**Survey Coordinates (m):** 32,860.02 N, 31,737.89 W
	Test Number:	CPT 1 - 25	**Elevation (m):** 28.266
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 28 June 2000 14:07
Sponsored by:	**File Name:**	cpt 1 - 25.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.23 m to clear utilities.	



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

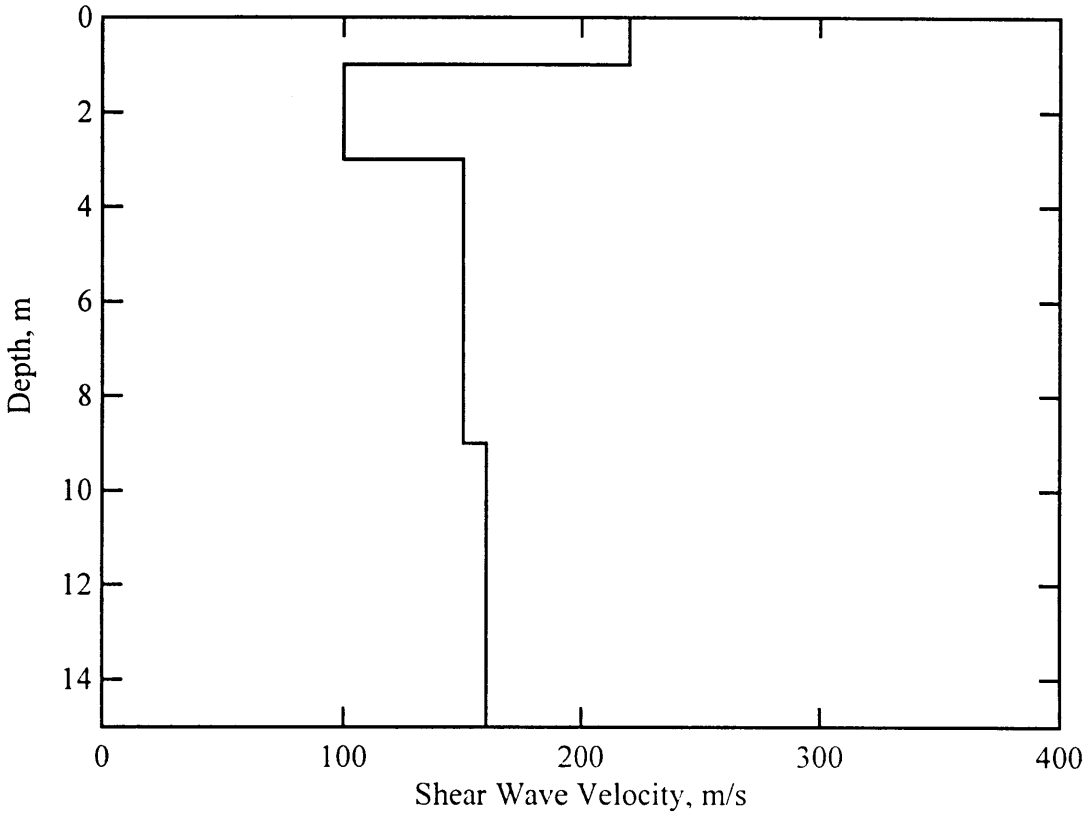
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 3.2 m away from CPT-1-24
Date: July 10, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Not measured, see CPT-1-24
Notes: SFA was used to a depth of 2 m

Test ID: SPT-1-24
GPS Coordinates: 40.77639°N 30.38296°E
Elevation: 28.001 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_{tu} Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Dark brown to black silty gravelly sand. Fill for burried sewer canal. Roots from nearby tree											
1																				
2		ML	S-1-24-3A	30/45	2-2-2	2.15	5.80	57	SILTY CLAY: Alternating strata of brown-gray, low to high plasticity silty clay and clayey silt with fine sand interbedded with deposits of silty sand and sandy silt. Gray color prevails beyond a depth of approx. 4 m			23	30	-	65	32	-	0.026	<3µm	
3		CL	S-1-24-3B									29	45	24	80	51	44	0.004	<1µm	
		CL	S-1-24-4	32/45	2-1-2	3.25	7.32	62		70		31	41	18	78	30	-	0.019	<3µm	
4		SM	S-1-24-5A	36/45	3-3-3	4.05	8.84	67				29	-	-	33	<15%	<10%	0.094	<2µm	
		ML	S-1-24-5B									33	34	-	90	28	20	0.016	<1µm	
5		CH	S-1-24-6	39/45	2-2-3	4.85	8.84	55		120	35	43	61	35	99	70	52	0.002	<1µm	
6		ML	S-1-24-7	34/45	3-4-4	5.65	10.37	61		125	36	37	37	8	98	31	23	0.011	<1µm	
7		SM	S-1-24-8	39/45	9-14-20	6.65	10.37	66	SAND: Gray fine to medium sand with silt to silty sand grading to sand with gravel. Sample S-1-24-10 is 22% rounded fine gravel			21	-	-	17	-	-	0.20	<0.08	
8		SP-SM	S-1-24-9	36/45	10-14-19	7.65	11.89	67				22	-	-	11	-	-	0.20	<0.08	
9		SP	S-1-24-10	20/45	17-21-22	8.85	13.42	66				10	-	-	4	-	-	1.3	0.23	

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio



Shear wave velocity profile determined from forward modeling of Site 1-24.

Tabulated values of layer properties determined from forward modeling of Site 1-24

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	1.0	220	411.6	0.3	1.92
1.0	1.5	100	187.1	0.3	1.92
2.5	0.5	100	1500	0.4978	2.0
3.0	6.0	150	1500	0.4949	2.0
9.0	6.0	160	1500	0.4942	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

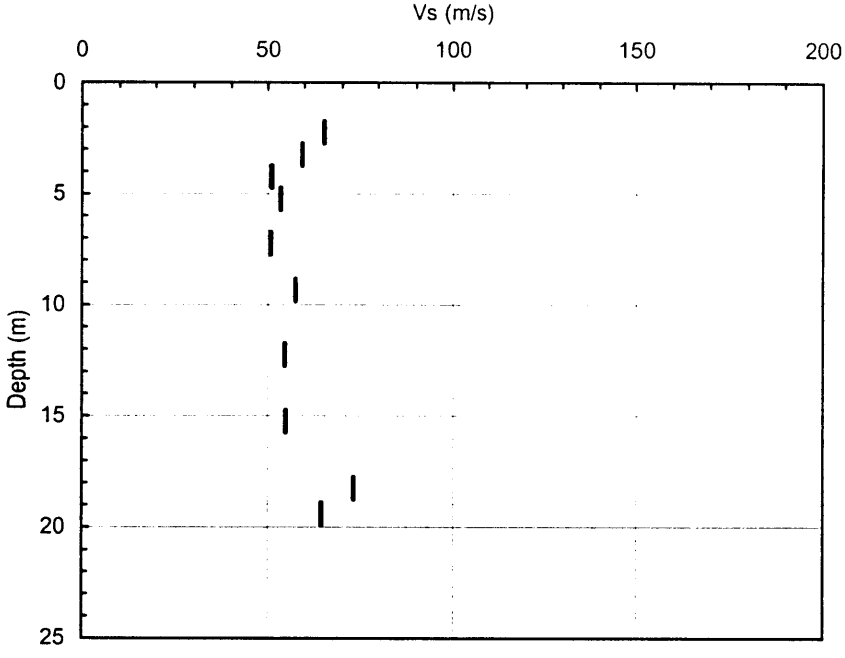
Phase 4

Site: Degirmendere Nose

Shear Wave Velocity Profile Determined
using the Seismic Cone (Downhole Method)

Test ID: CPT-DN1

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
3.00	1.74	2.74	67	64	65
4.00	2.74	3.74	56	63	59
5.00	3.74	4.74	46	56	51
6.00	4.74	5.74	52	54	53
8.00	6.74	7.74	59	43	51
10.10	8.84	9.84	57	57	57
13.00	11.74	12.74	57	52	54
16.00	14.74	15.74	53	56	55
19.00	17.74	18.74	77	69	73
20.16	18.90	19.90	59	70	65



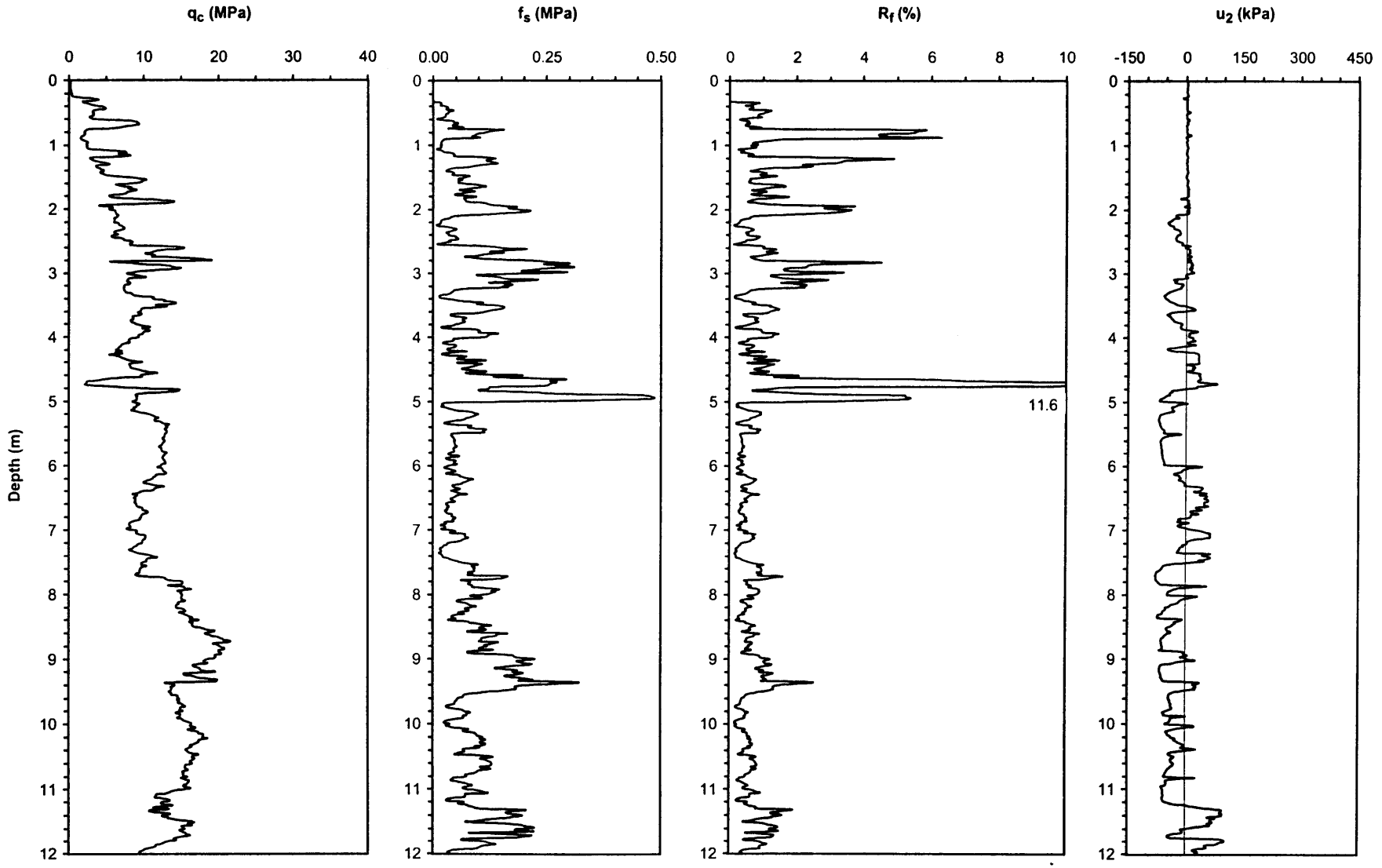
Data processed by: ZETAS (Zemin Teknolojisi AS)

UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Değirmendere Nose, Değirmendere.
GPS Coordinates: 40.7219°N 29.7820°E
Test Number: CPT-DN1
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cptdn1.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation:
Date: September 7, 2000
Water Table Elevation: 1.7 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.

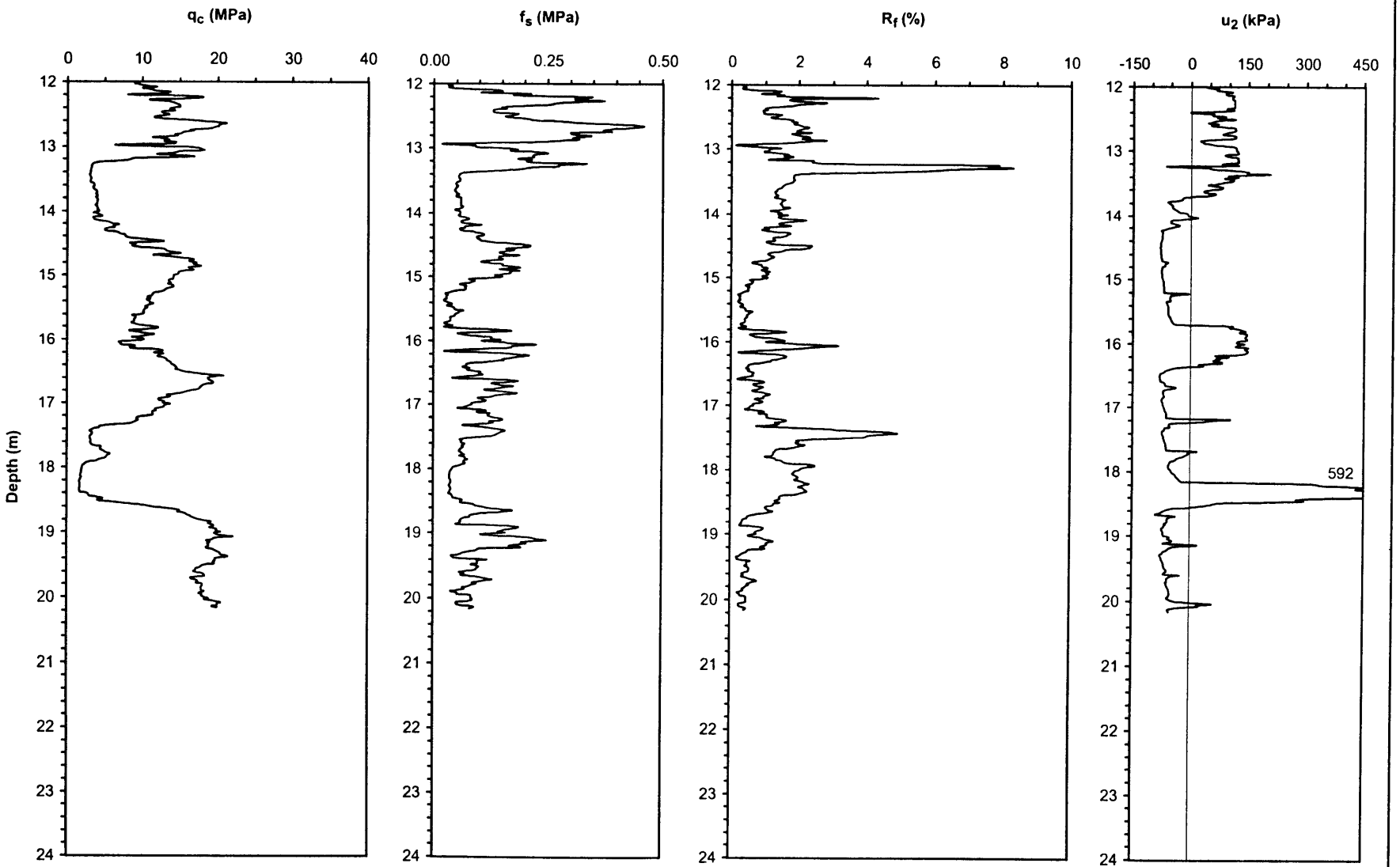


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

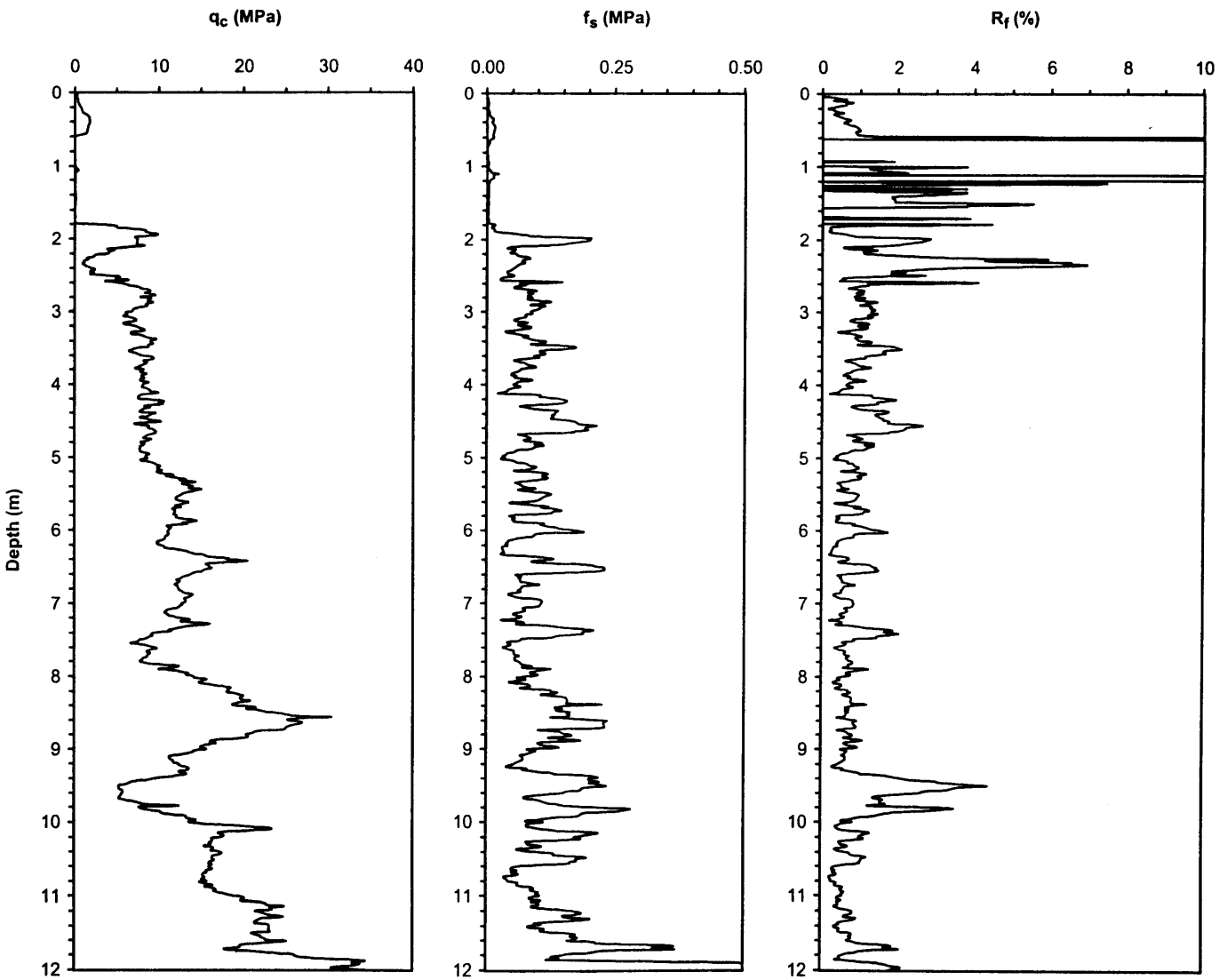
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnica Site Investigation at Lateral Spread Sites
Location: Değirmendere Nose, Değirmendere.
GPS Coordinates: 40.7219°N 29.7820°E
Test Number: CPT-DN1
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cptdn1.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation:
Date: September 7, 2000
Water Table Elevation: 1.7 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Değirmendere Nose, Değirmendere.	
Joint Research	**GPS Coordinates:**	40.7219°N 29.7820°E	
	Test Number:	CPT-DN2	**Elevation:**
	Type of Cone:	ELC10 CF No. 991232 (a.p. v.d. Berg)	**Date:** September 7, 2000 10:45
Sponsored by:	**File Name:**	cptdn2.csv	**Water Table Elevation:** 2.5 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**		

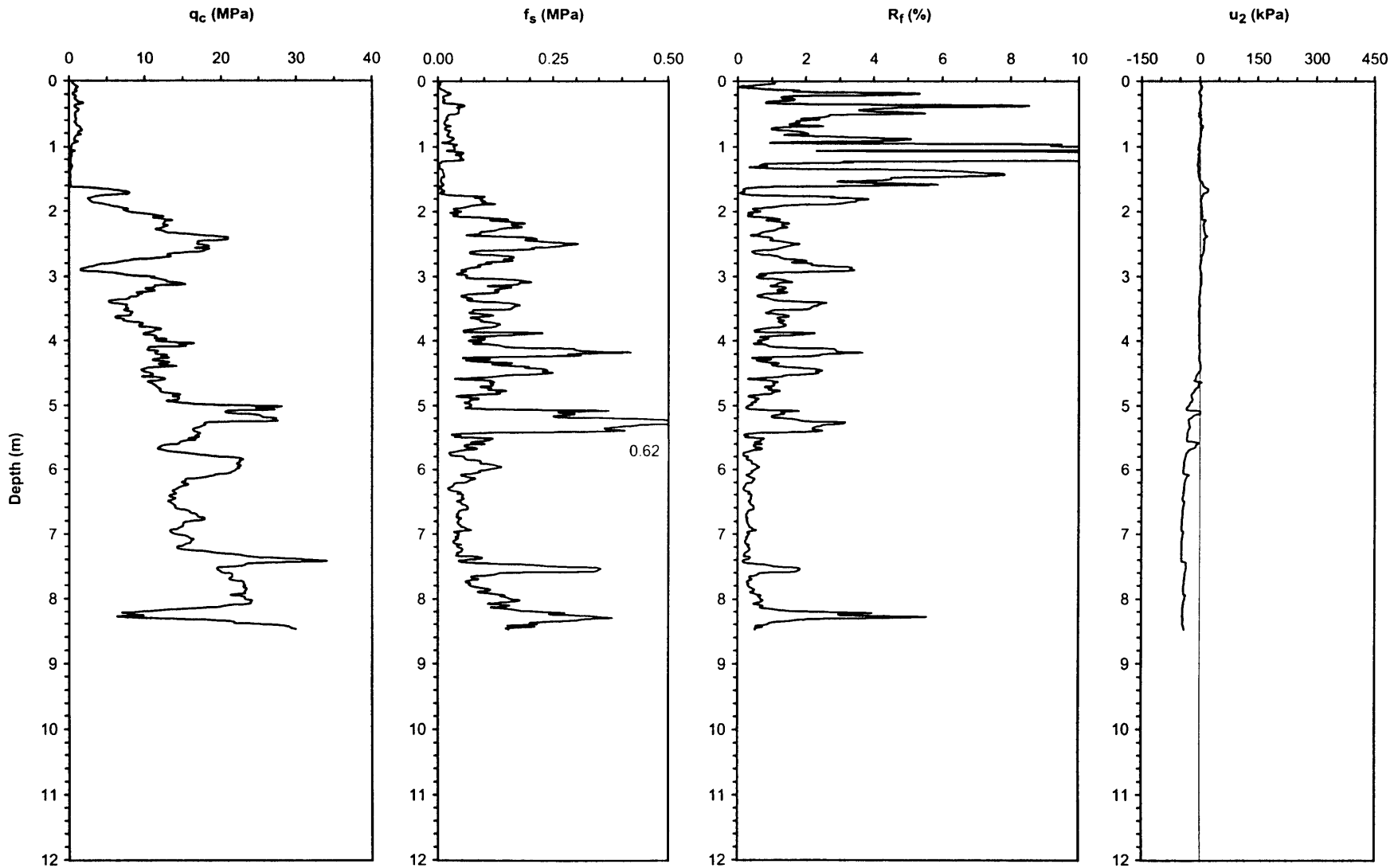


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Değirmendere Nose, Değirmendere.
GPS Coordinates: 40.7219°N 29.7820°E
Test Number: CPT-DN3
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptdn3.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation:
Date: September 7, 2000
Water Table Elevation:
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Degirmendere Nose, Degirmendere
Date: August 29, 2000
Field Log by: M. T. Yilmaz, K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.70 m
Notes:

Test ID: SPT-DN1
GPS Coordinates: 40.72194°N 29.78207°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Materials transition from brown gravelly sand to red silty clay											
1									SM: Brown silty sand											
2		SM	S-DN1-1	16/45	4-4-4	1.70	5.20	55*					NP	NP	20	-	-	2.9	<0.07	
3		GW-GM	S-DN1-2	14/45	8-9-7	2.70	6.72	60*	GW: Gray sandy gravel				NP	NP	7	-	-	8.8	0.18	
4		SM	S-DN1-3	19/45	4-4-10	4.20	8.24	65*	SM: Brown silty sand. Decreasing silt content with depth.				NP	NP	40	-	-	0.12	<0.07	
5																				
6		SM	S-DN1-4	22/45	10-10-12	5.70	9.77	65*					NP	NP	14	-	-	2.6	<0.07	
7		SW-SM	S-DN1-5	19/45	7-12-9	7.20	11.29	65*					NP	NP	10	-	-	4.1	0.074	
8		SP-SM	S-DN1-6	27/45	6-7-8	8.32	11.29	65*					NP	NP	9	-	-	2.6	0.10	
9		SW-SM	S-DN1-7	22/45	6-6-10	9.20	12.82	65*					NP	NP	8	-	-	3.7	0.10	
10		SM	S-DN1-8	19/45	7-8-7	10.20	14.34	65*					NP	NP	17	-	-	1.9	<0.07	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

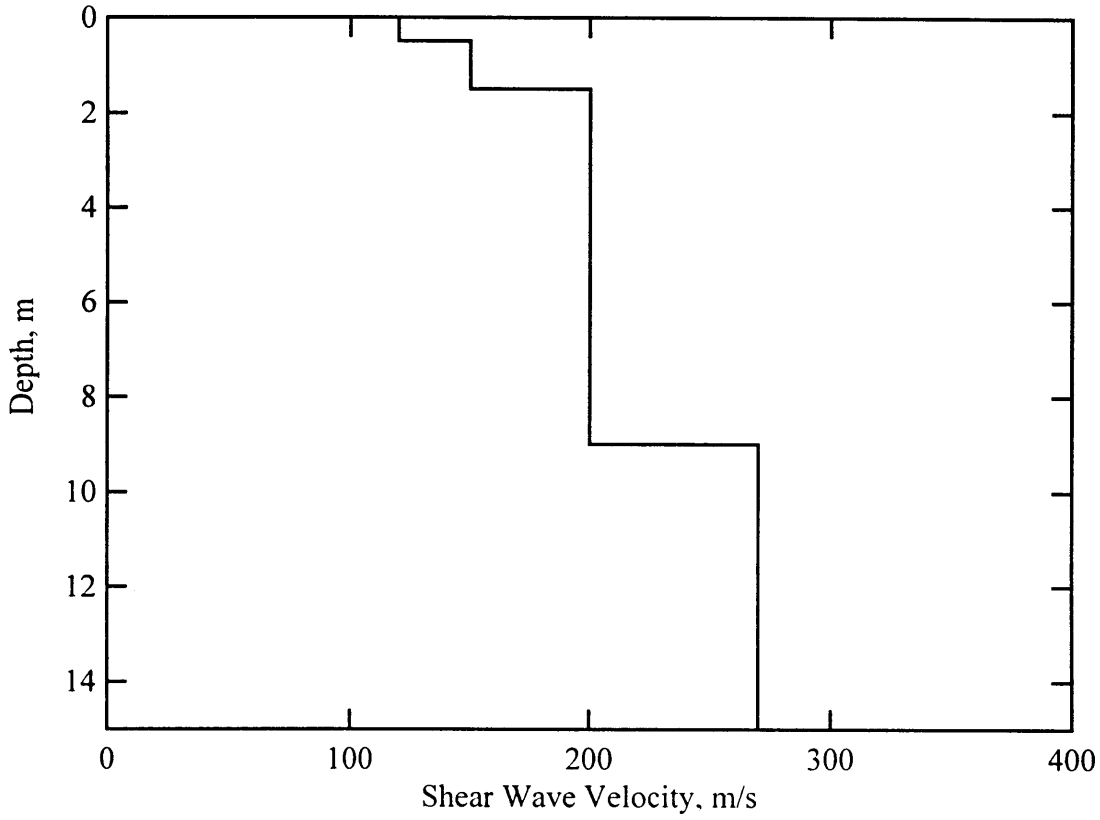
UCB-BYU-UCLA ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Degirmendere Nose, Degirmendere
Date: August 30, 2000
Field Log by: M. T. Yilmaz, K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 2.5 m
Notes:

Test ID: SPT-DN2
GPS Coordinates: 40.72194°N 29.78207°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									SM: Gray to brown silty sand with gravel.											
1		SM	S-DN2-1	13/45	4-4-6	1.20	3.67	50*					NP	NP	12	-	-	4.5	<0.07	
2		SM	S-DN2-2	5/45	5-6-7	2.38	6.72	55*					NP	NP	14	-	-	3.0	<0.07	
3		SP-SM	S-DN2-3	15/45	7-7-8	3.34	6.72	55*					NP	NP	11	-	-	4.1	<0.07	
4		SM	S-DN2-4	20/45	6-8-8	4.20	8.24	60*					NP	NP	13	-	-	2.6	<0.07	
5																				
6		SW-SM	S-DN2-5	23/45	10-13-14	6.20	9.77	65*					NP	NP	10	-	-	5.2	0.075	
7		SW-SM	S-DN2-6	22/45	7-12-12	7.20	11.29	65*					NP	NP	6	-	-	2.6	0.13	
8		SM	S-DN2-7	31/45	5-14-17	8.20	11.29	65*					NP	NP	17	-	-	1.3	<0.07	
9																				
10		SW-SM	S-DN2-8	33/45	11-13-16	9.50	12.82	65*					NP	NP	10	-	-	3.0	0.074	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic



Shear wave velocity profile determined from forward modeling of Degirmendere Nose.

Tabulated values of layer properties determined from forward modeling of Degirmendere Nose

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	120	224.5	0.3	1.92
0.5	1.0	150	280.6	0.3	1.92
1.5	7.5	200	1500	0.491	2.0
9	6.0	270	1500	0.4833	2.0

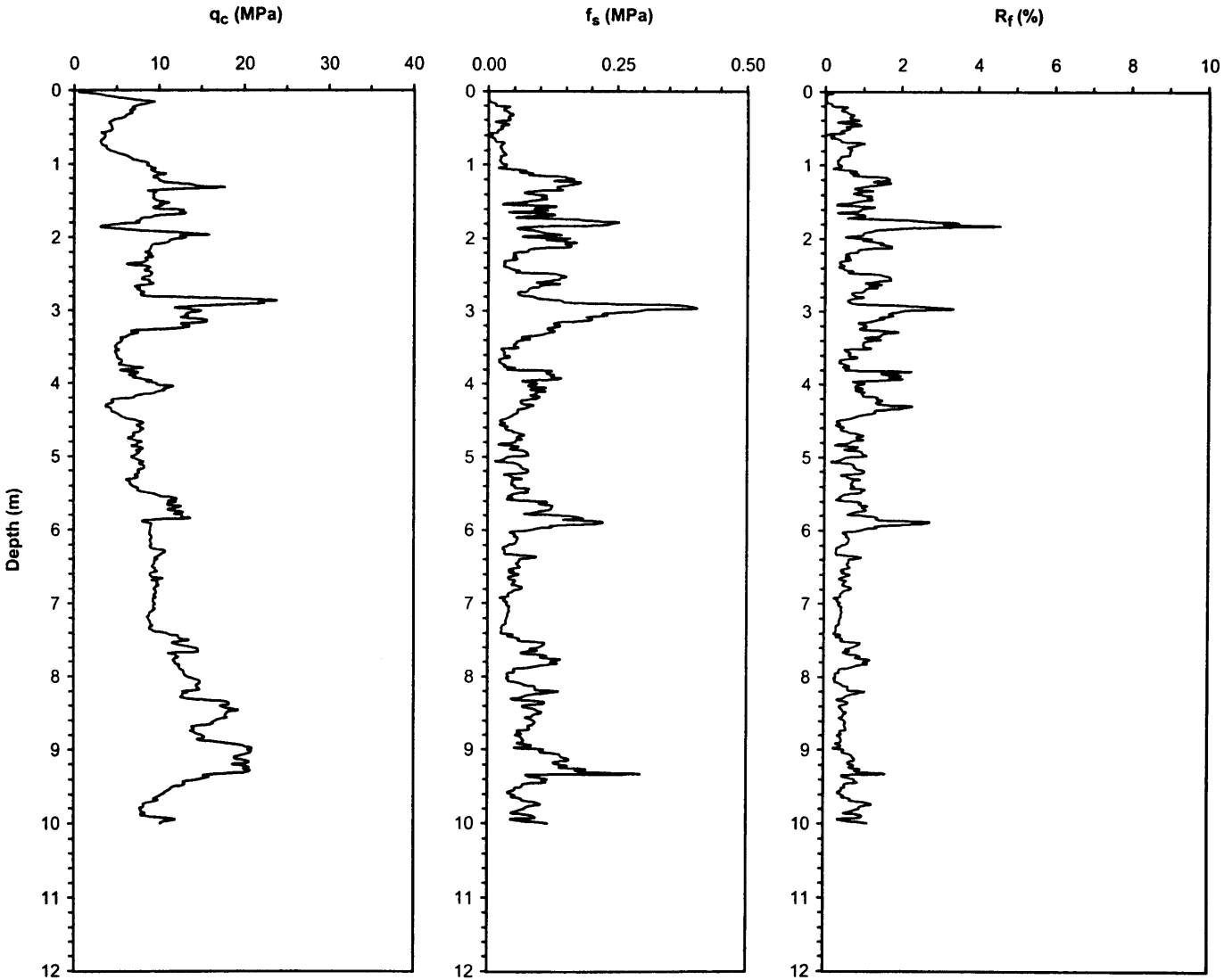
Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

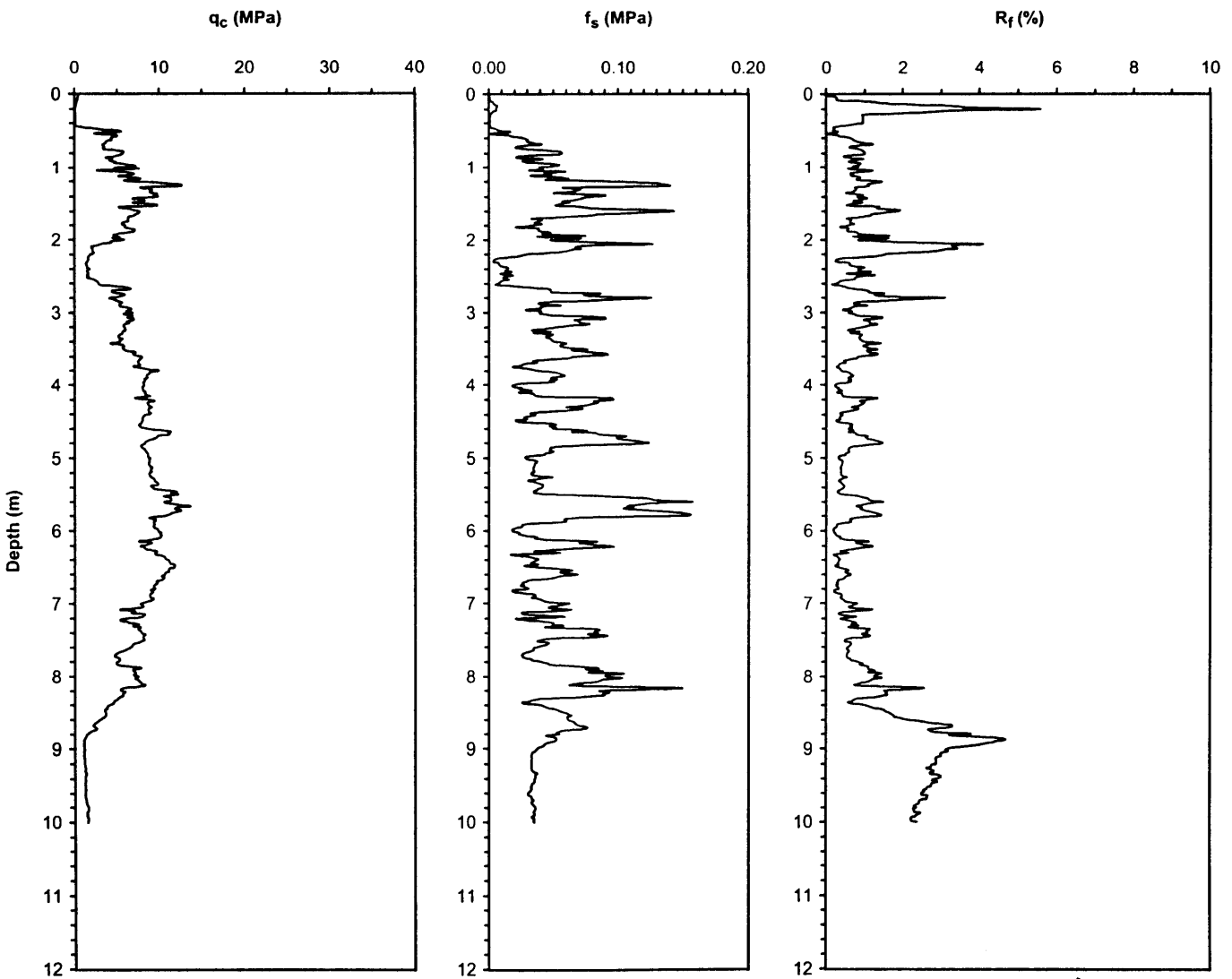
Phase 4

Site: Sapanca Hotel

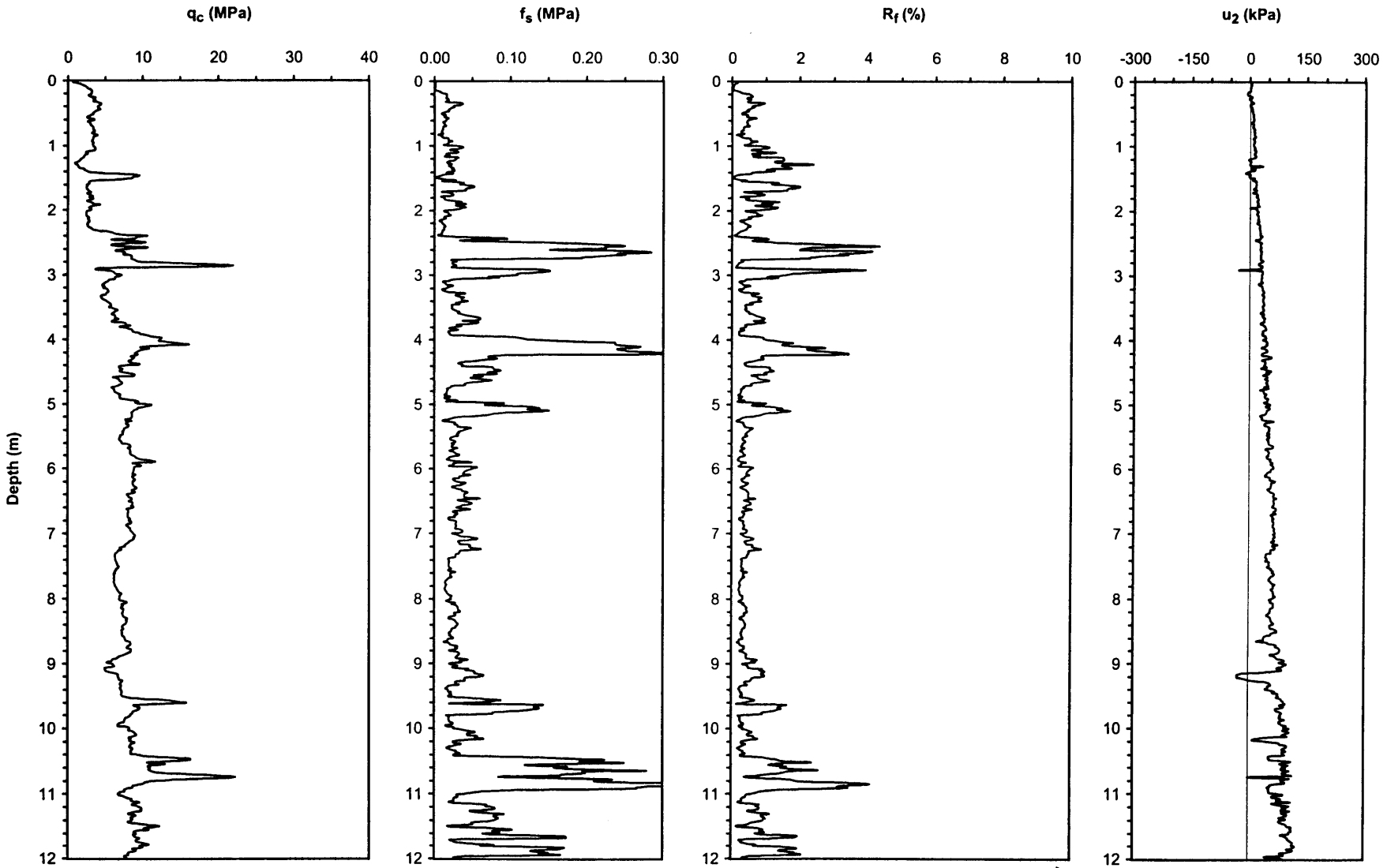
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH0	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 24, 2000 10:25
Sponsored by:	**File Name:**	cptsh0.csv	**Water Table Elevation:** 0.45 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.00 m ; starting depth: 0.00 m	



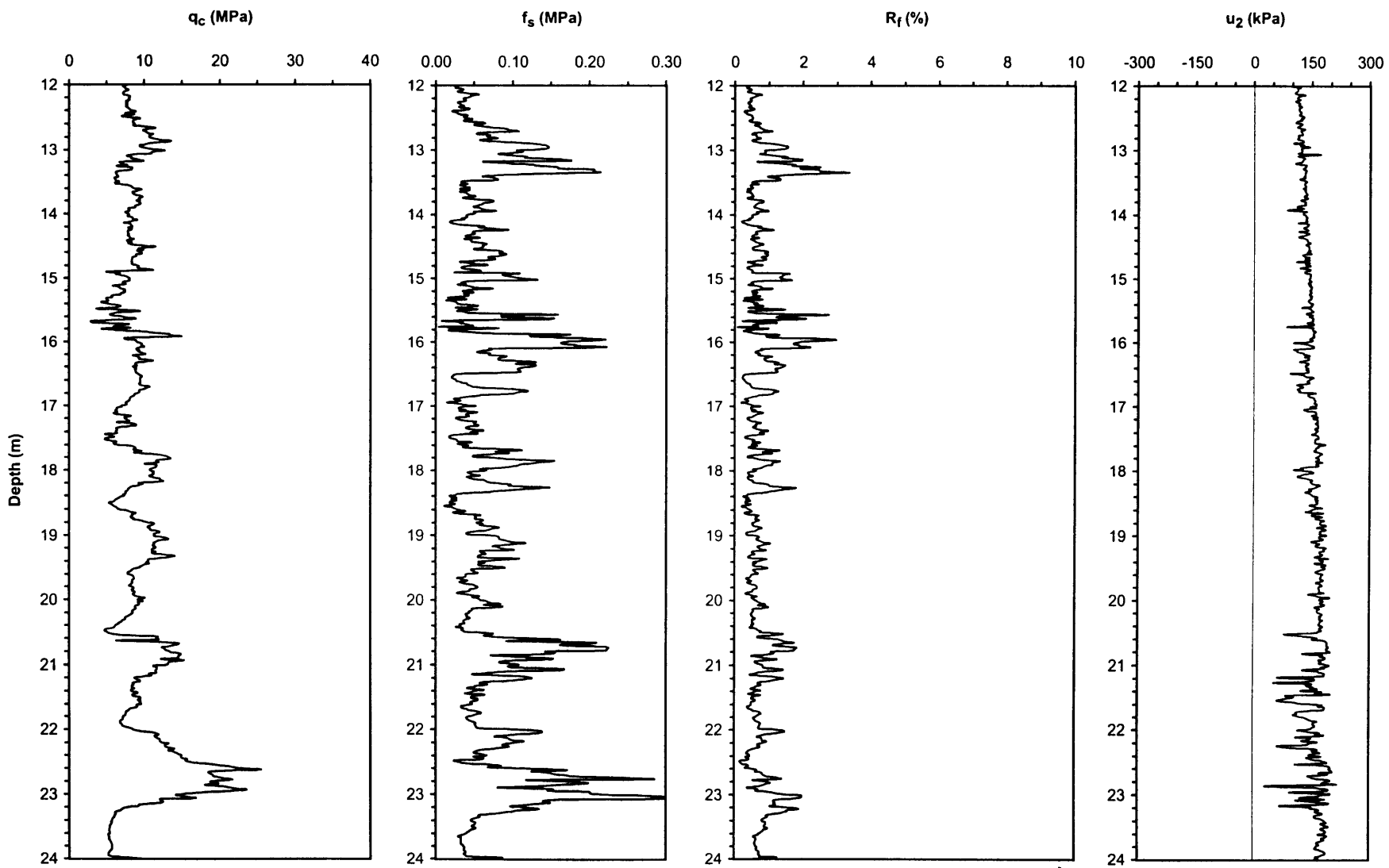
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH1	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 24, 2000 11:45
Sponsored by:	**File Name:**	cptsh1.csv	**Water Table Elevation:** 0.84 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.40 m ; starting depth: 0.70 m	



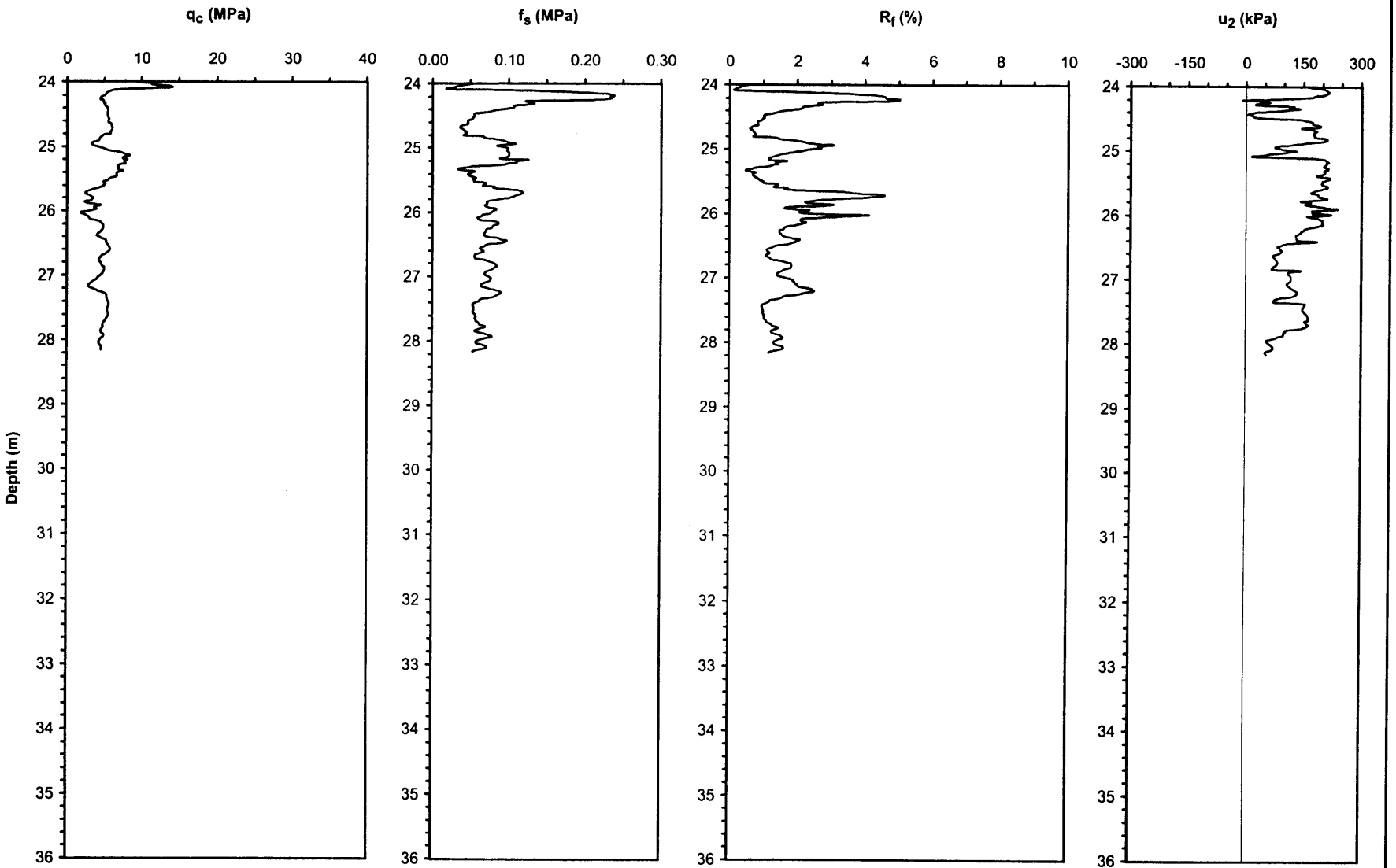
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH2	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh2.csv	**Water Table Elevation:** 1.30 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.40 m ; starting depth: 0.17 m	



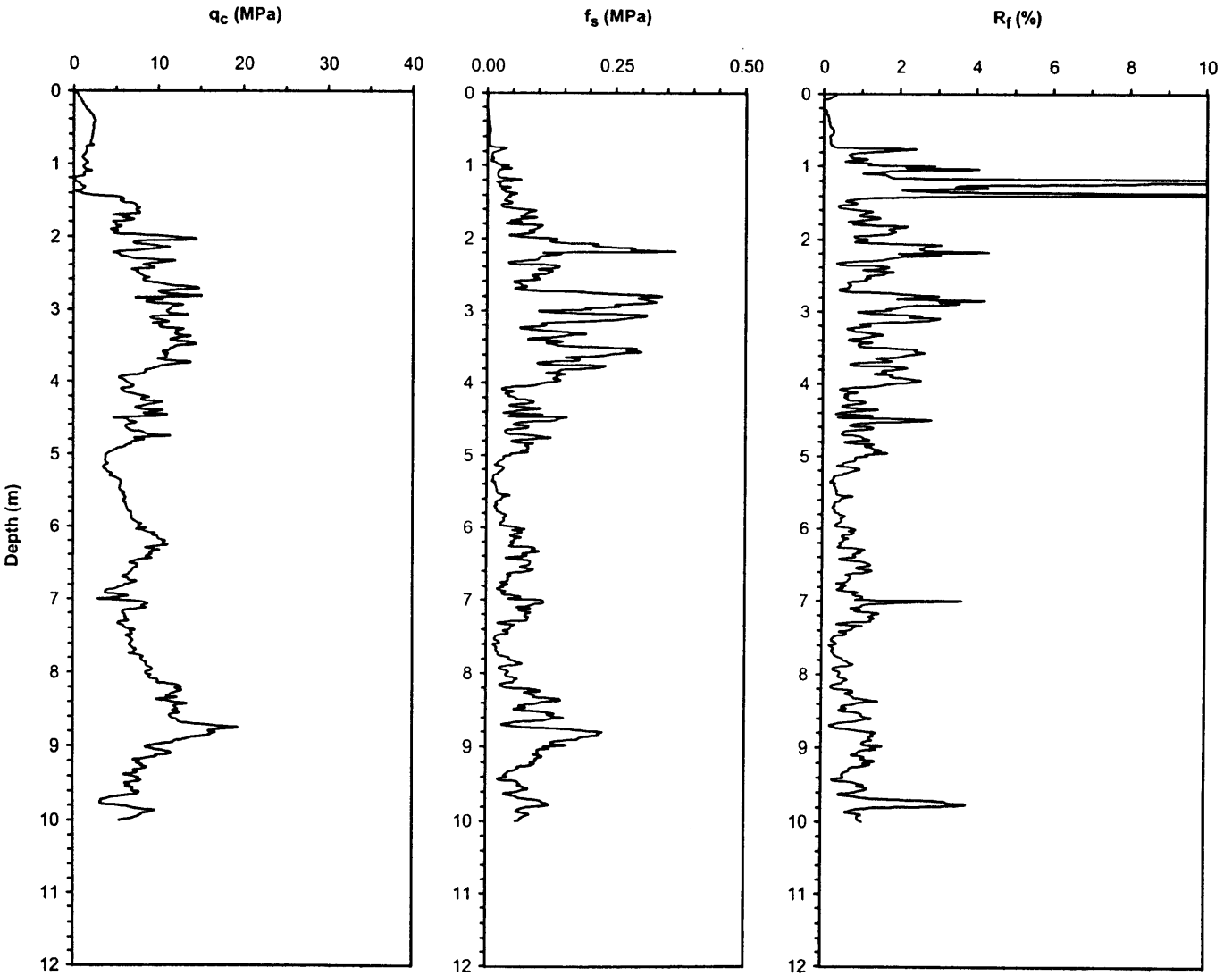
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SII2	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh2.csv	**Water Table Elevation:** 1.30 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.40 m ; starting depth: 0.17 m	



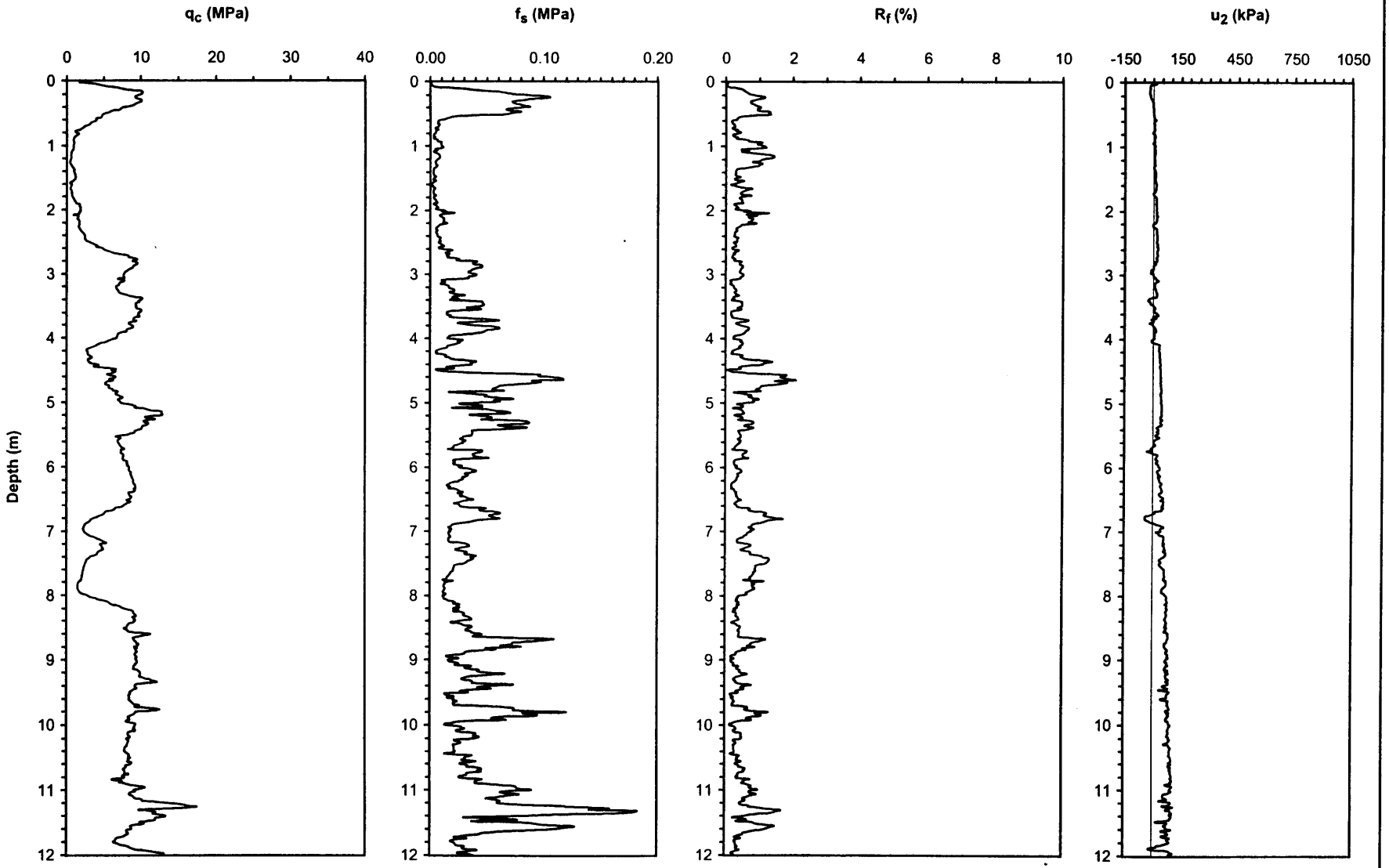
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH2	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh2.csv	**Water Table Elevation:** 1.30 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.40 m ; starting depth: 0.17 m	



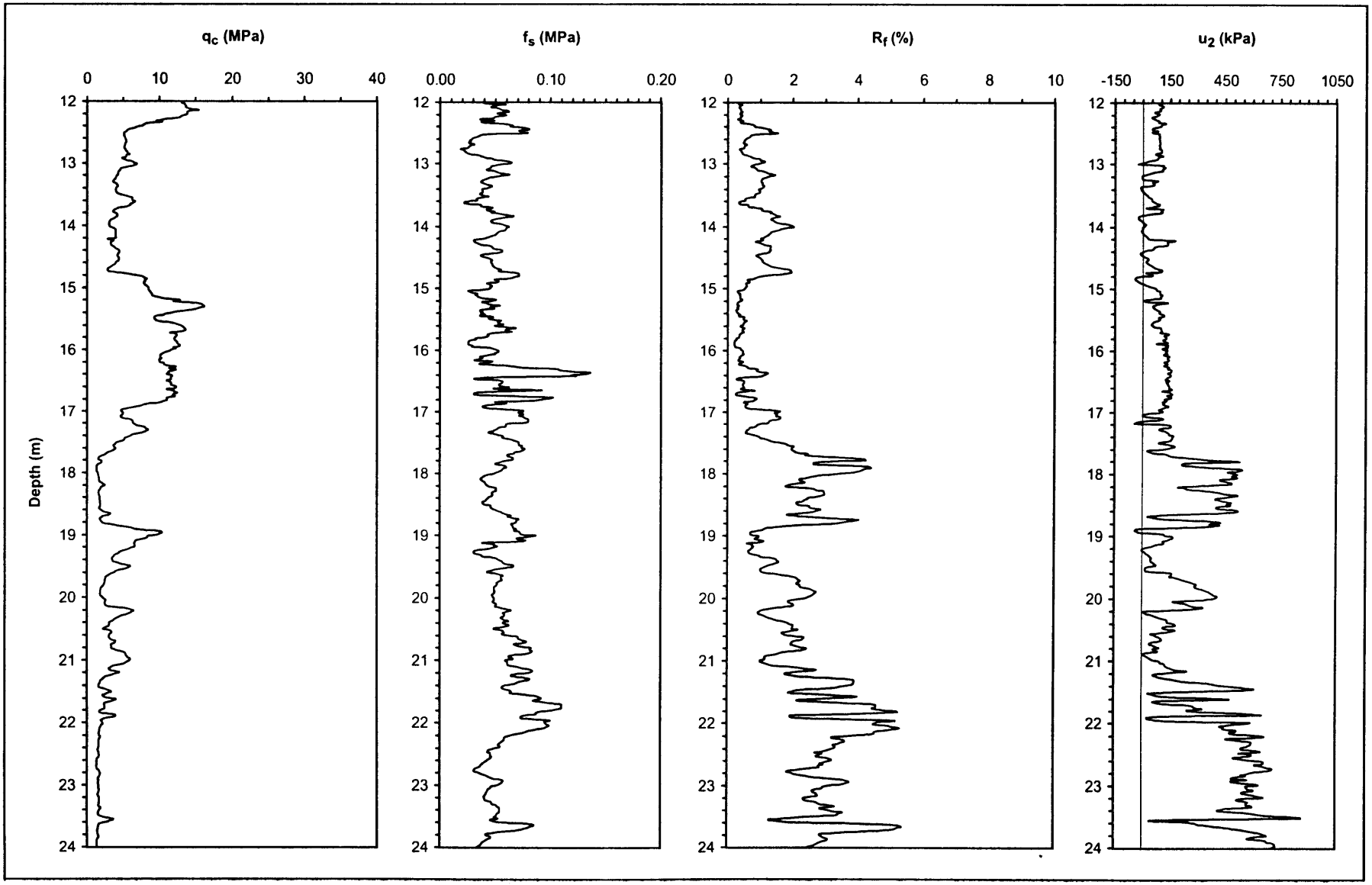
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH3	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 24, 2000 9:25
Sponsored by:	**File Name:**	cptsh3.csv	**Water Table Elevation:** 1.30 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.15 m ; starting depth: 0.20 m	



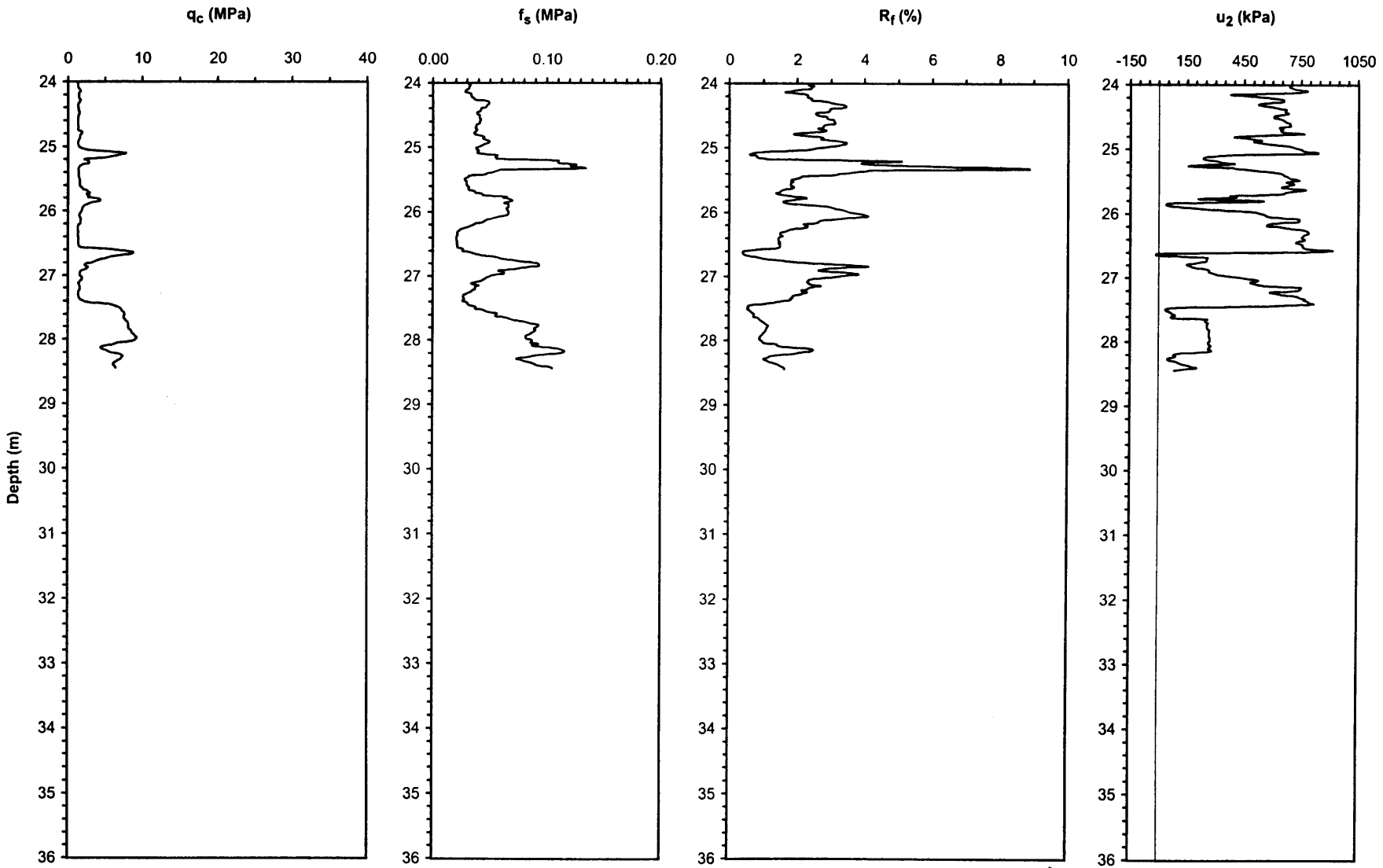
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH4	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh4.csv	**Water Table Elevation:** 0.50 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.53 m ; starting depth: 0.53 m	



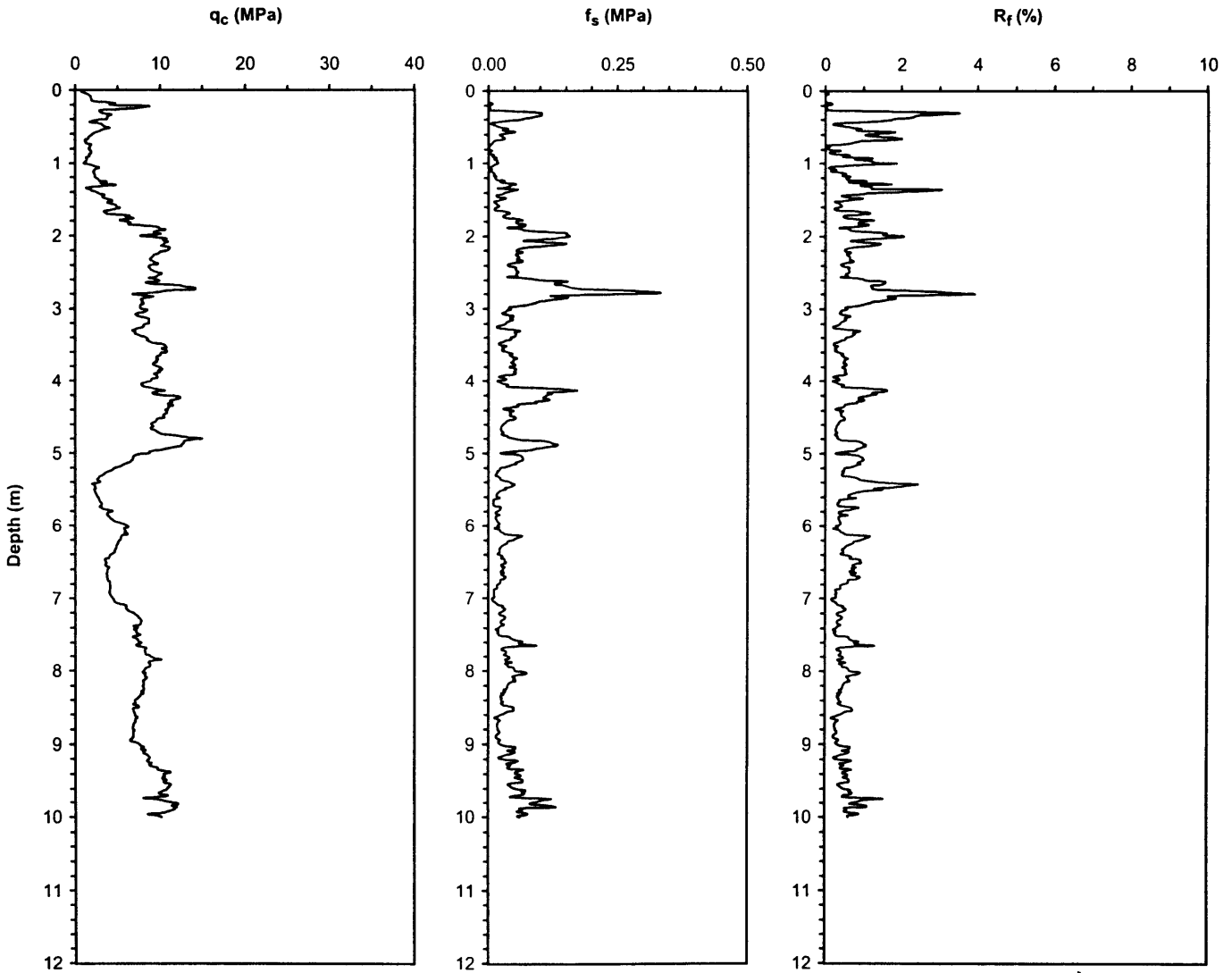
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH4	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh4.csv	**Water Table Elevation:** 0.50 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.53 m ; starting depth: 0.53 m	



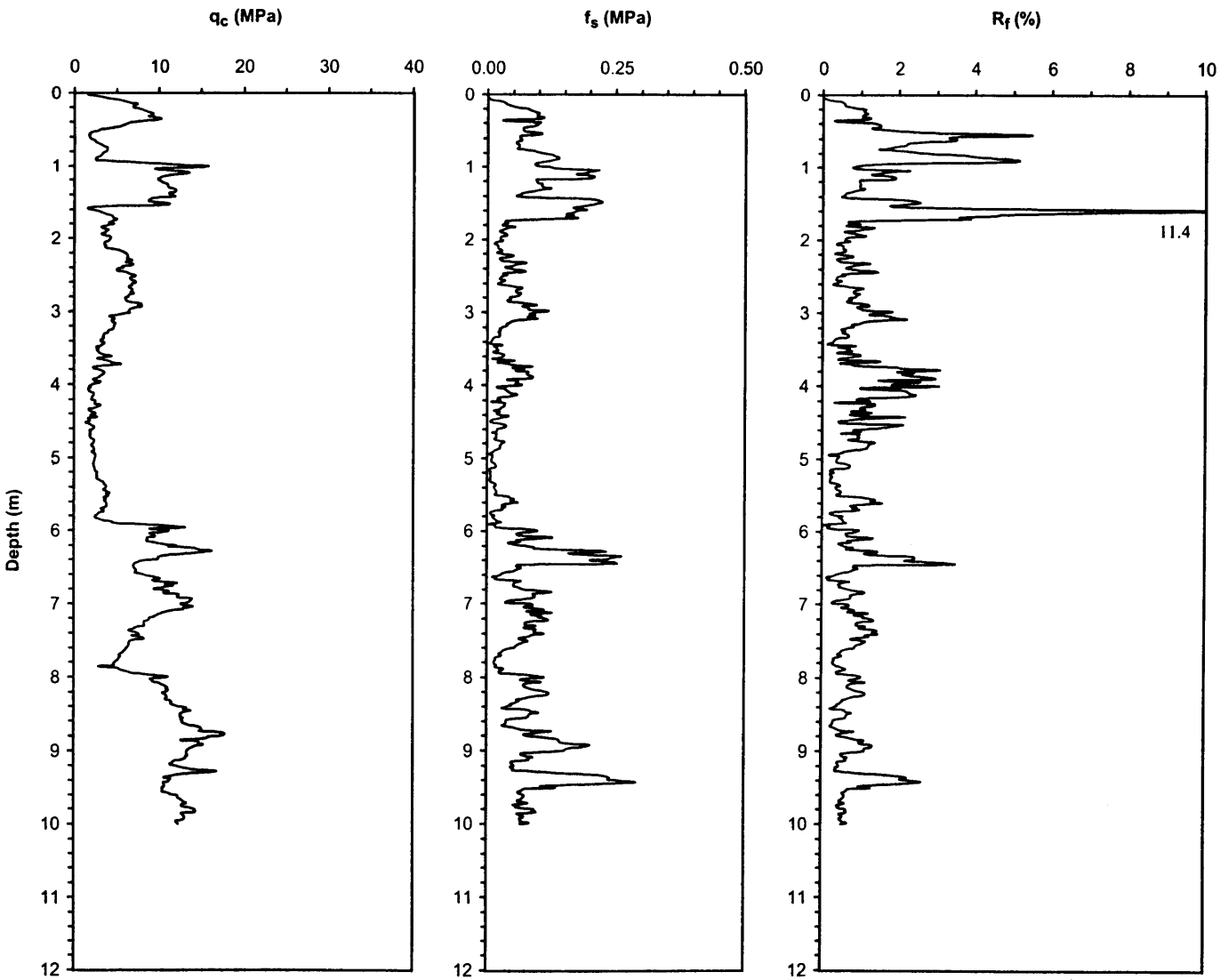
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH4	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh4.csv	**Water Table Elevation:** 0.50 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.53 m ; starting depth: 0.53 m	



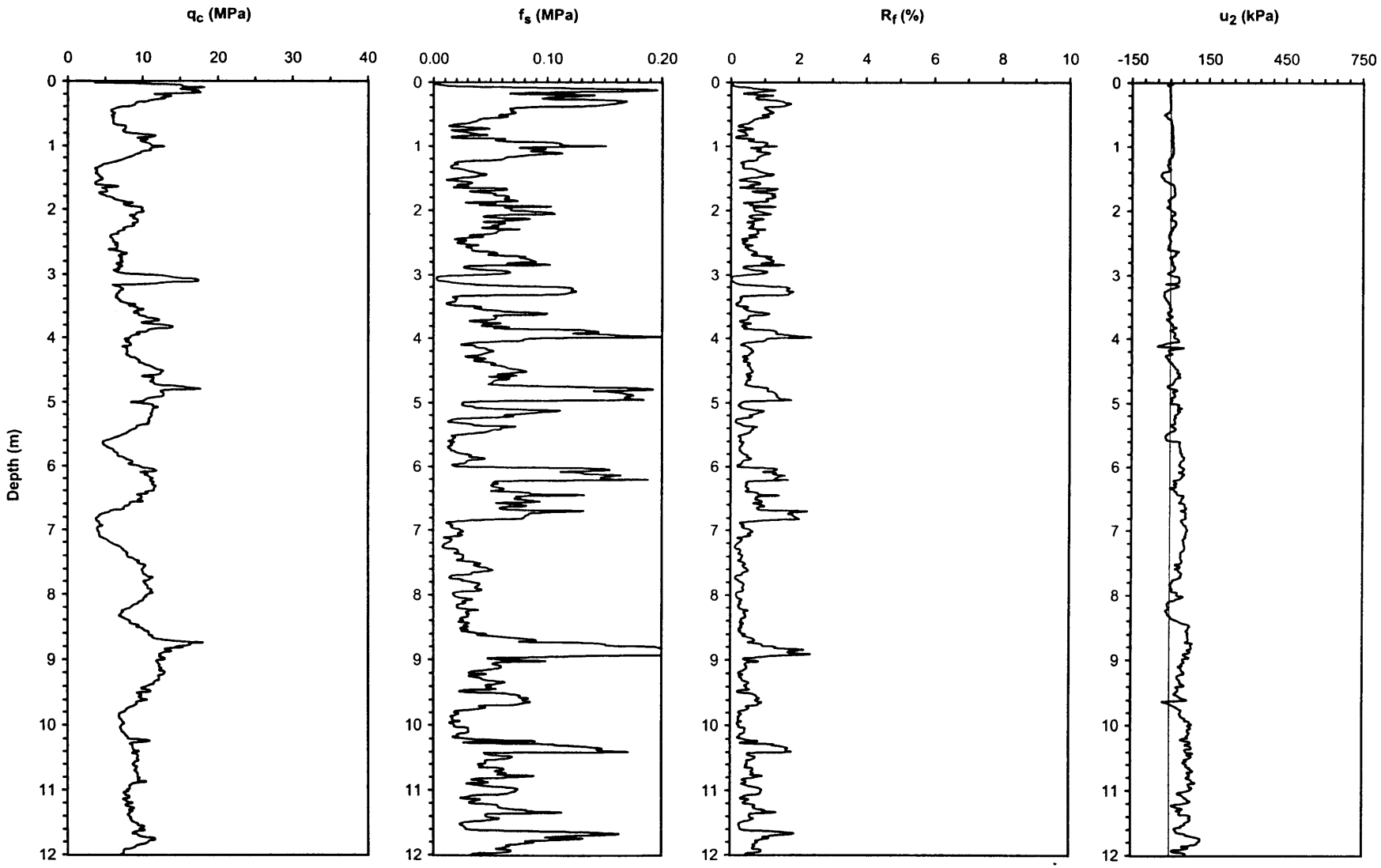
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH5	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 22, 2000 12:17
Sponsored by:	**File Name:**	cptsh5.csv	**Water Table Elevation:** 1.20 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.90 m ; starting depth: 0.90 m	



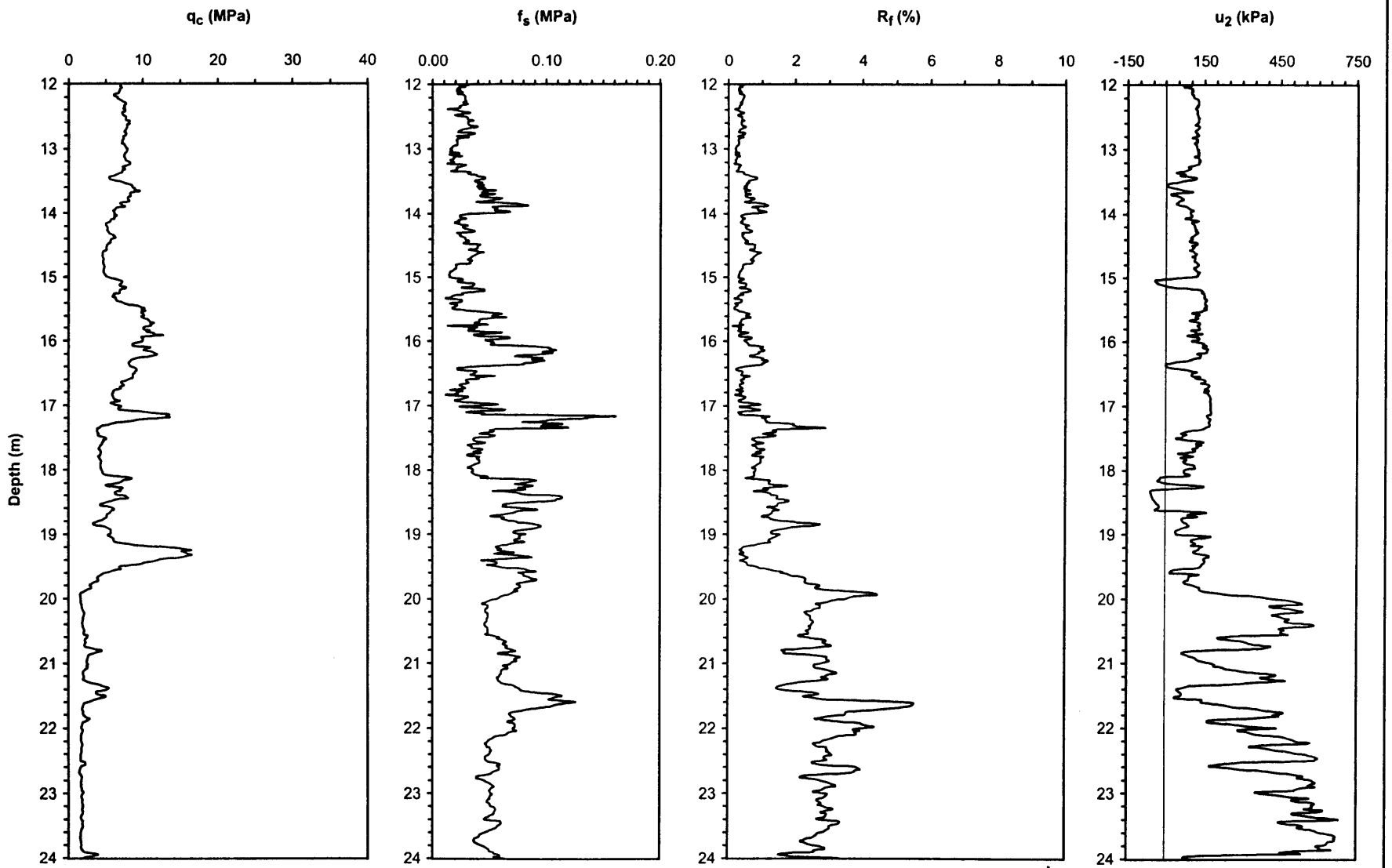
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH6	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 21, 2000 9:41
Sponsored by:	**File Name:**	cptsh6.csv	**Water Table Elevation:** 1.20 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.31 m ; starting depth: 0.31 m	



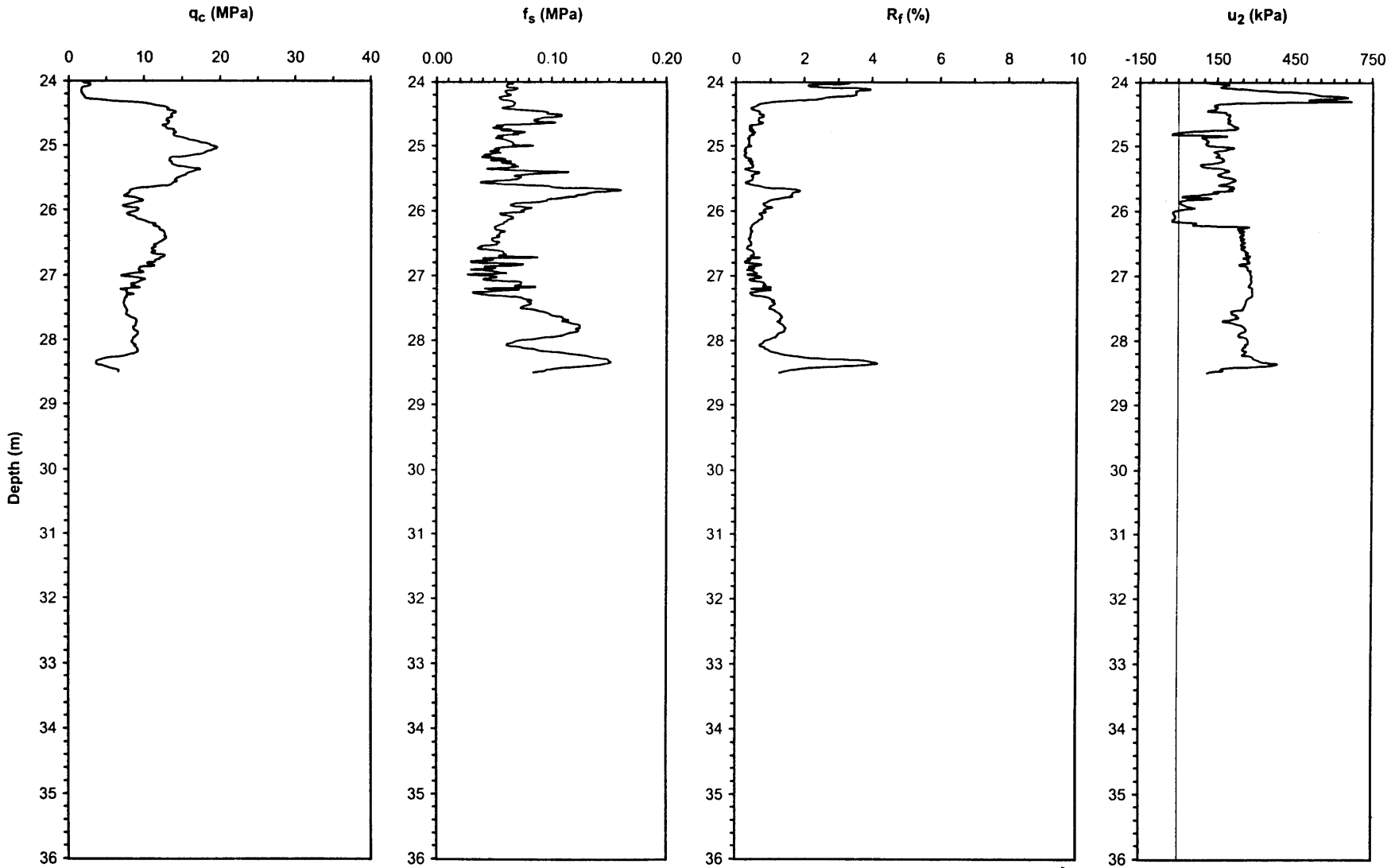
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH7	**Elevation:**
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh7.csv	**Water Table Elevation:**
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth : 1.05 m. ; starting depth : 1.05 m.	



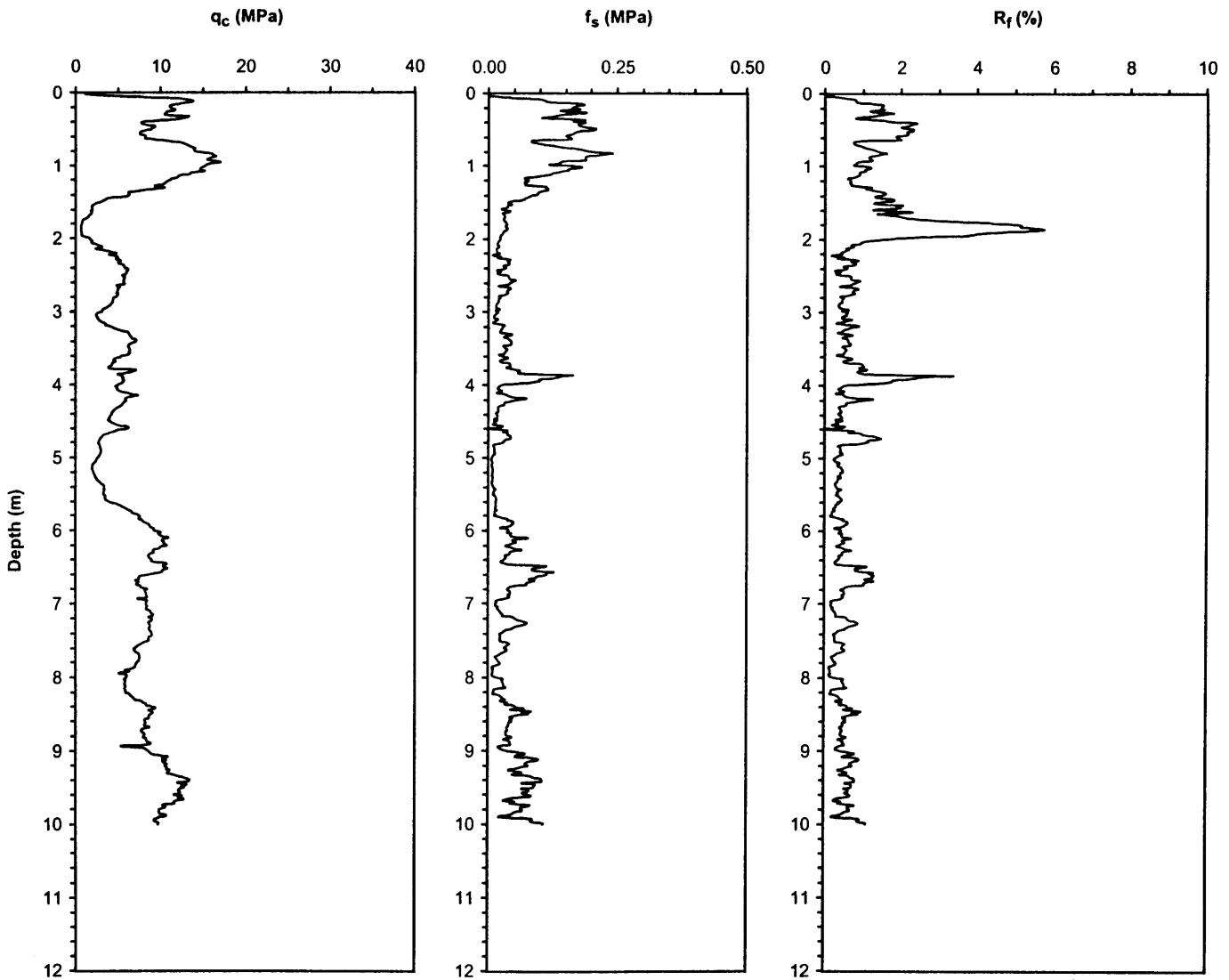
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH7	**Elevation:**
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh7.csv	**Water Table Elevation:**
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth : 1.05 m. ; starting depth : 1.05 m.	



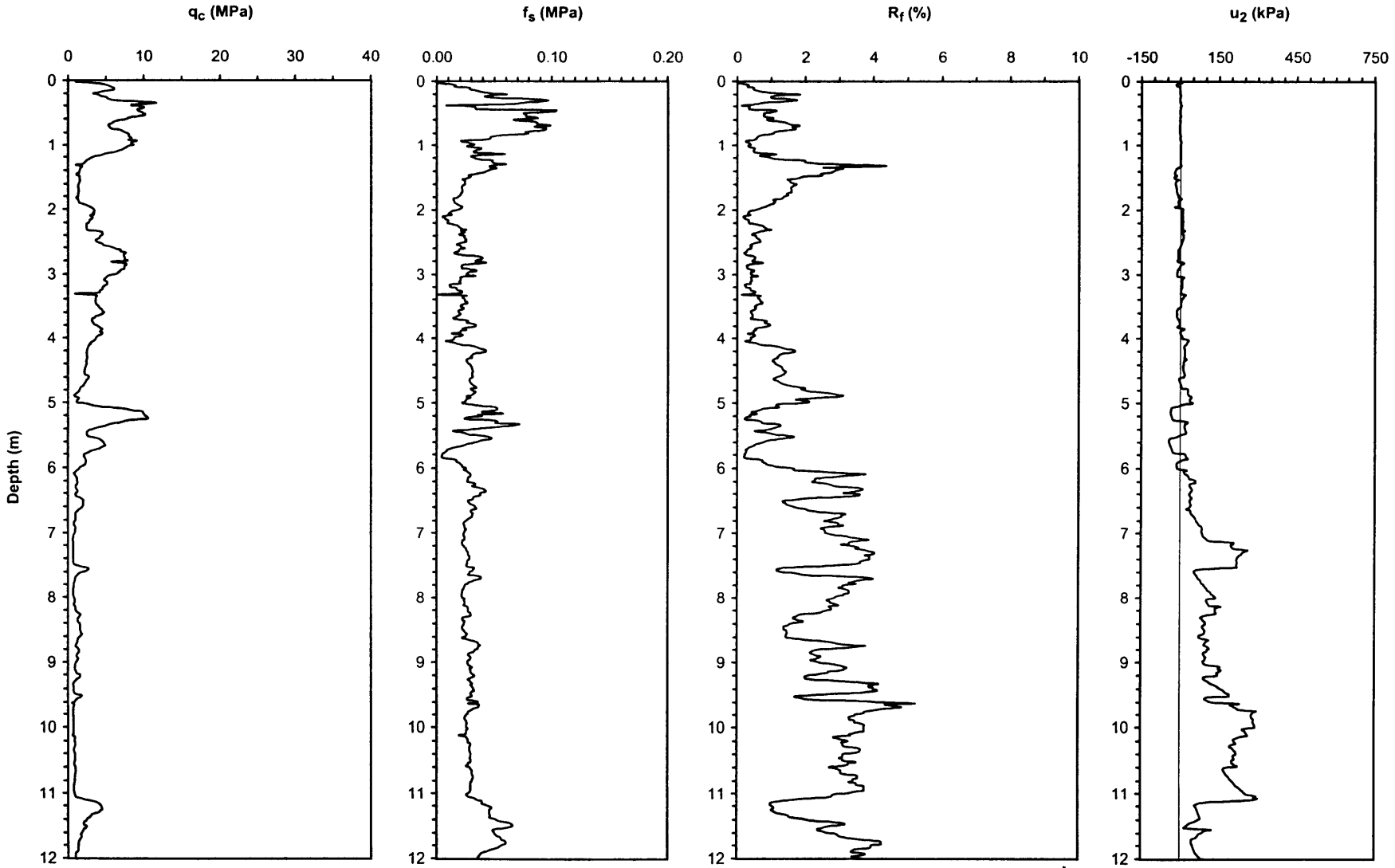
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH7	**Elevation:**
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh7.csv	**Water Table Elevation:**
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth : 1.05 m. ; starting depth : 1.05 m.	



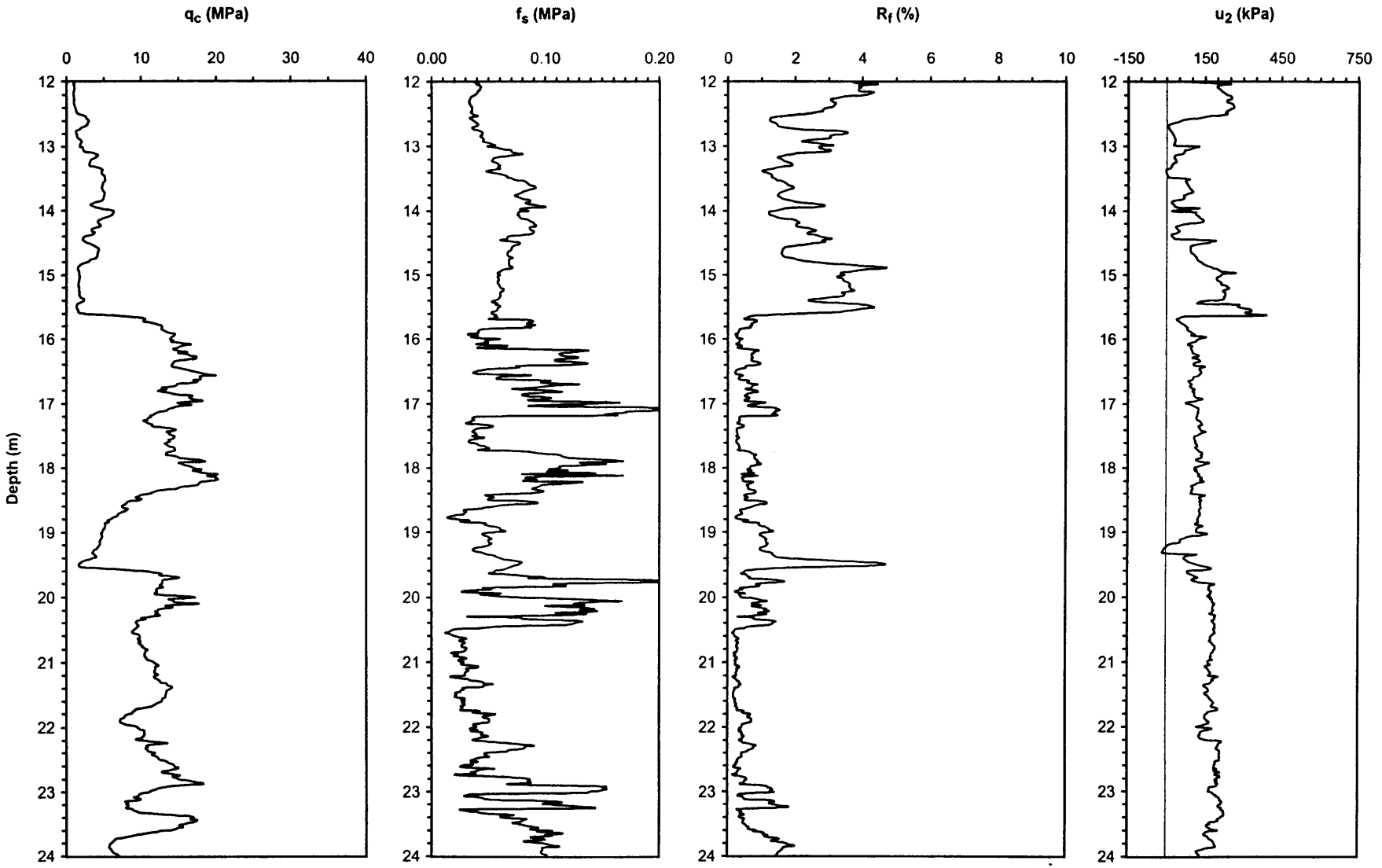
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH8	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 21, 2000 11:34
Sponsored by:	**File Name:**	cptsh8.csv	**Water Table Elevation:** 0.95 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.90 m ; starting depth: 0.90 m	



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH9	**Elevation:**
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh9.csv	**Water Table Elevation:**
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth : 0.76 m. ; starting depth : 0.76 m.	



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH9	**Elevation:**
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh9.csv	**Water Table Elevation:**
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth : 0.76 m. ; starting depth : 0.76 m.	



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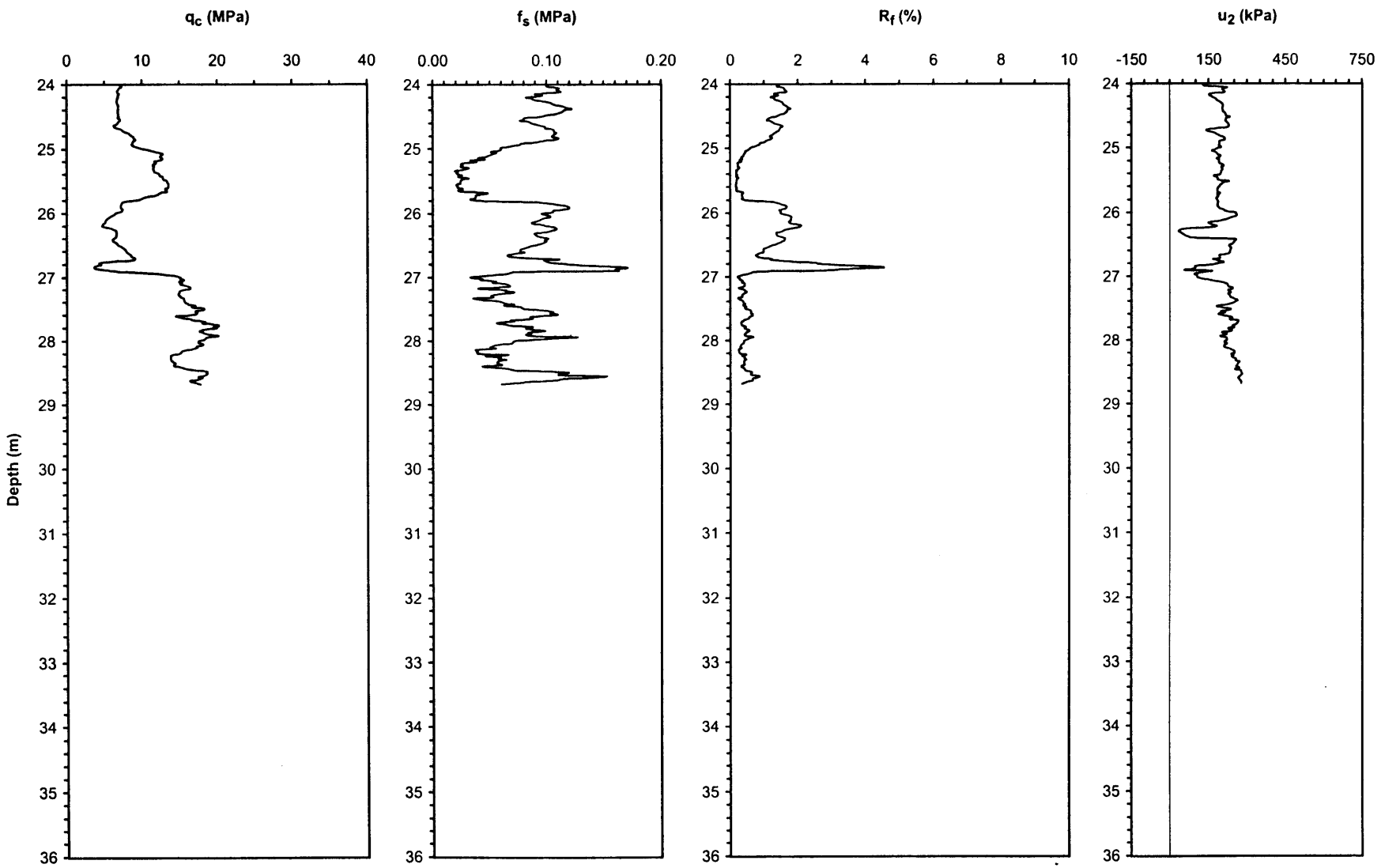
ZETAŞ-SAU
Joint Research

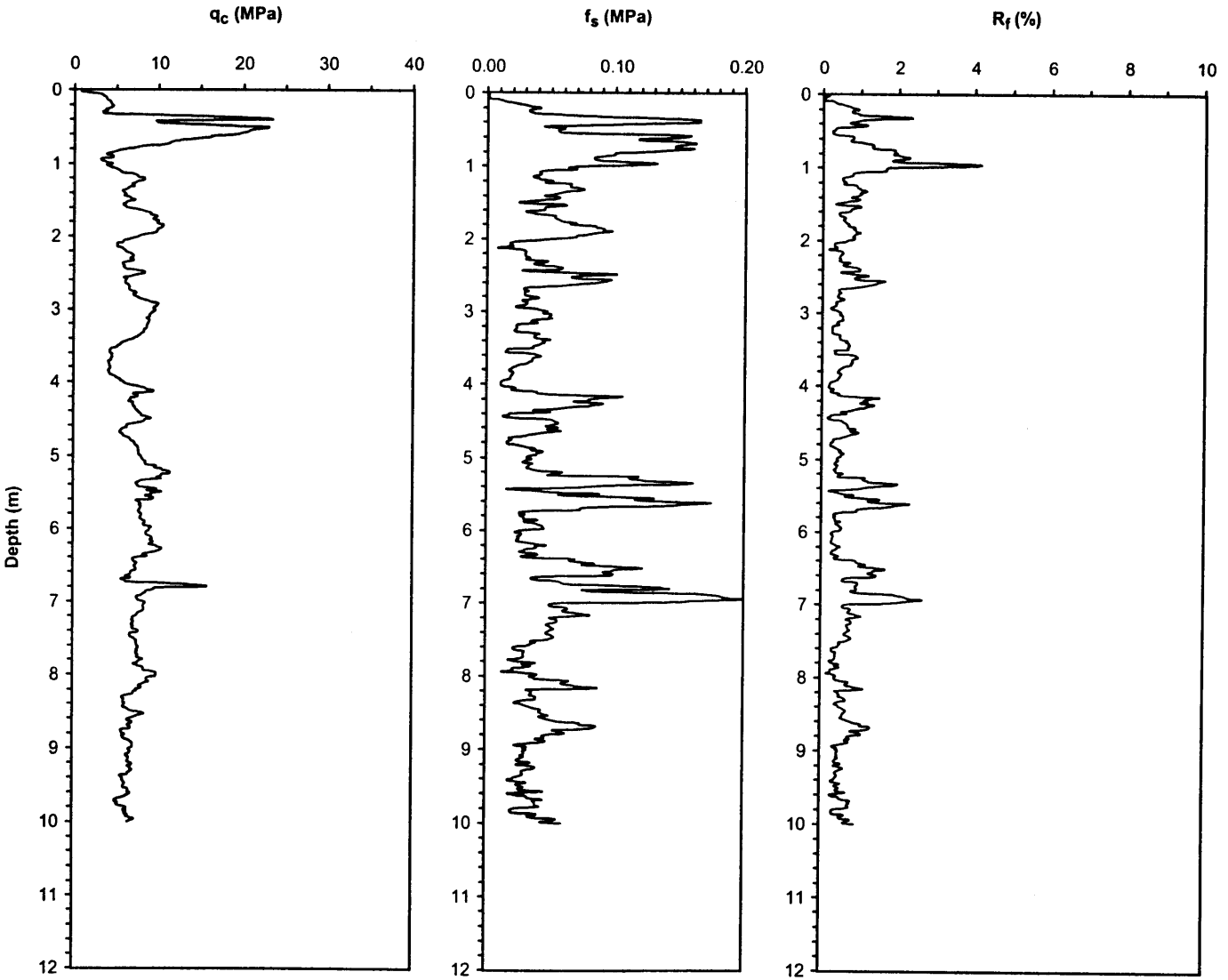
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Hotel Sapanca, Sapanca
GPS Coordinates: 40.6987°N 30.2654°E
Test Number: CPT-SH9
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cptsh9.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-boring depth : 0.76 m. ; starting depth : 0.76 m.

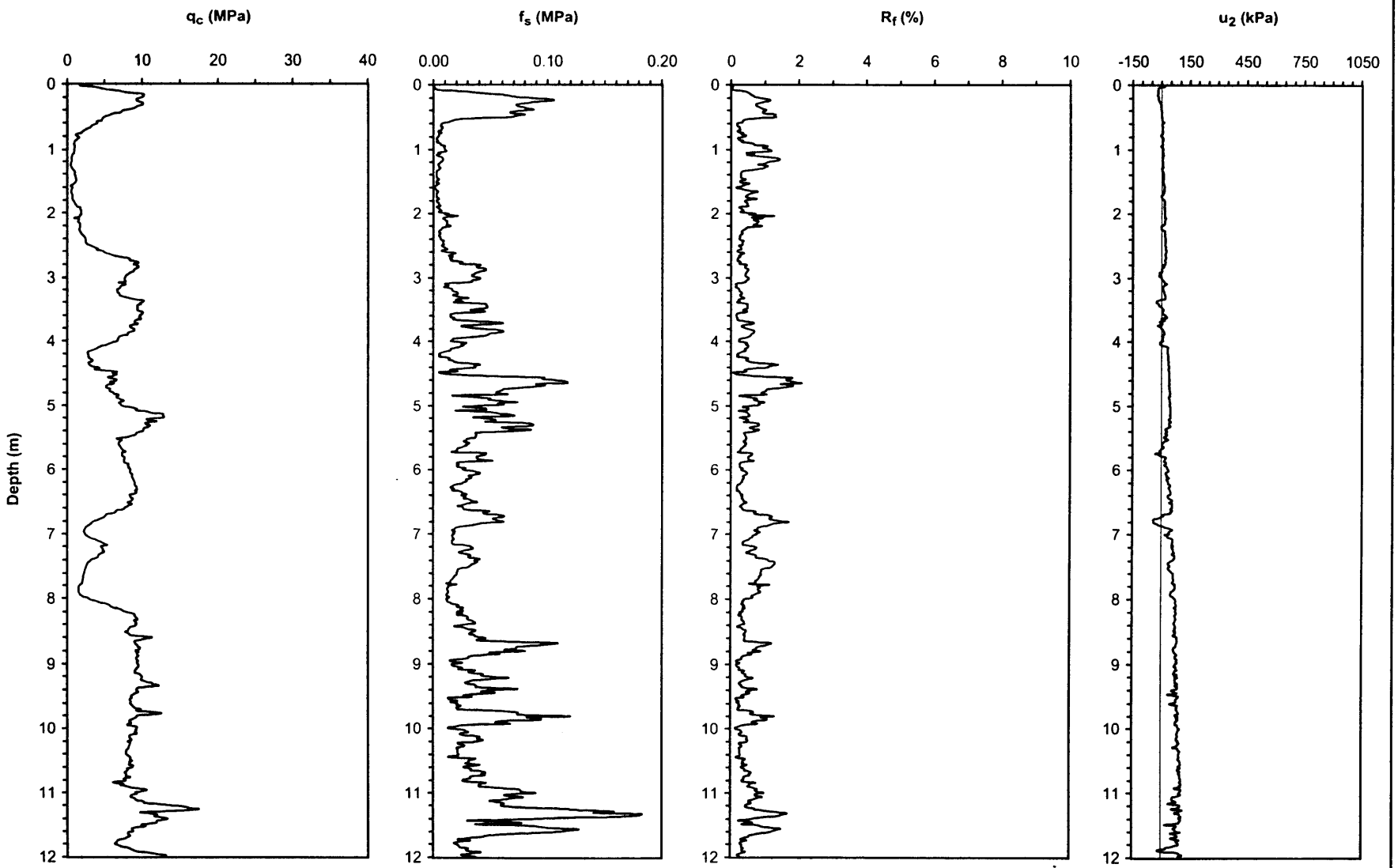
Elevation:
Date: August 21, 2000
Water Table Elevation:
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



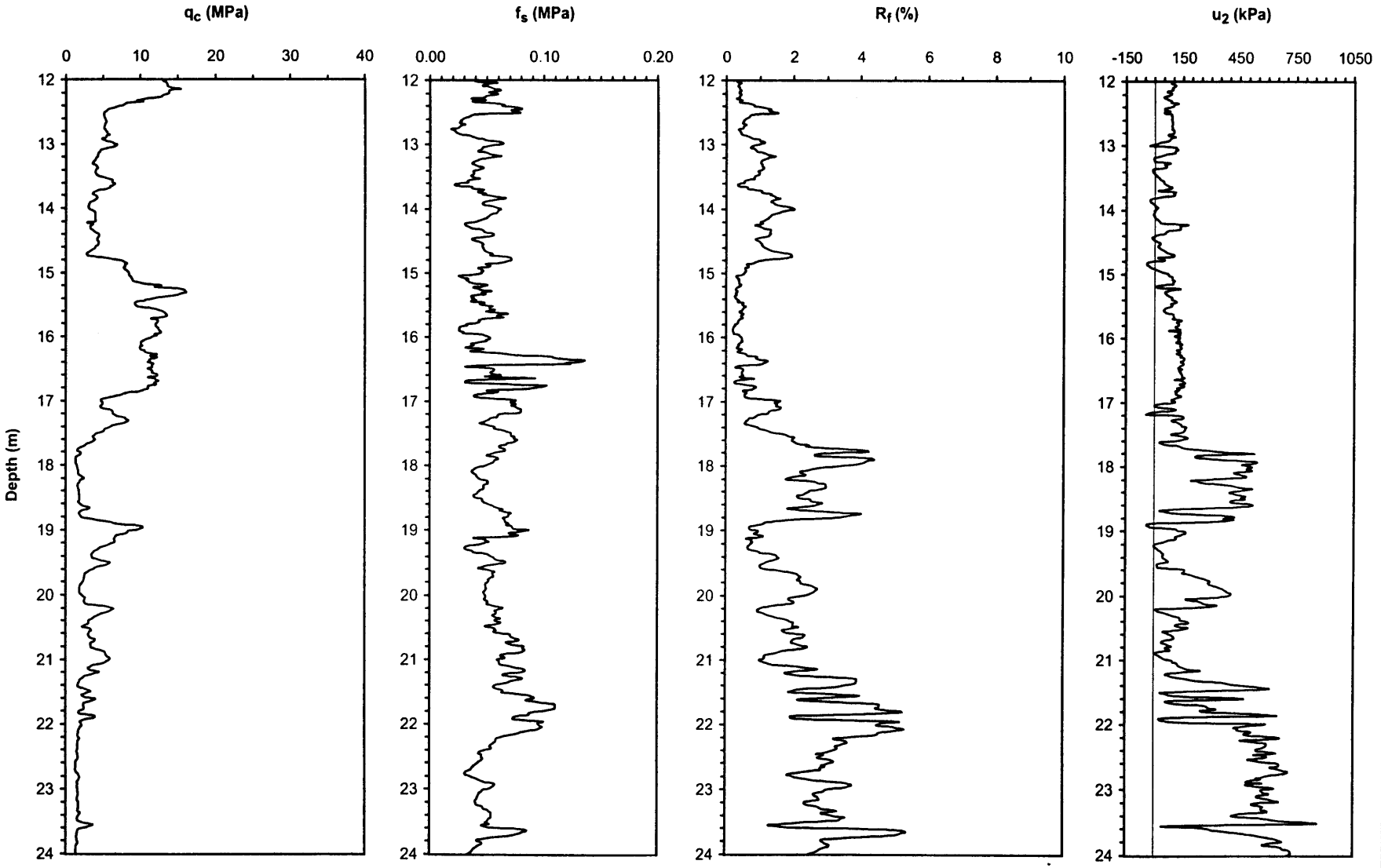
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH10	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 23, 2000 14:38
Sponsored by:	**File Name:**	cptsh10.csv	**Water Table Elevation:** 1.25 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.40 m ; starting depth: 1.40 m	



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH11	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh11.csv	**Water Table Elevation:** 1.38 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.00 m ; starting depth: 1.00 m	



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Hotel Sapanca, Sapanca	
Joint Research	**GPS Coordinates:**	40.6987°N 30.2654°E	
	Test Number:	CPT-SH11	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 21, 2000
Sponsored by:	**File Name:**	cptsh11.csv	**Water Table Elevation:** 1.38 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.00 m ; starting depth: 1.00 m	



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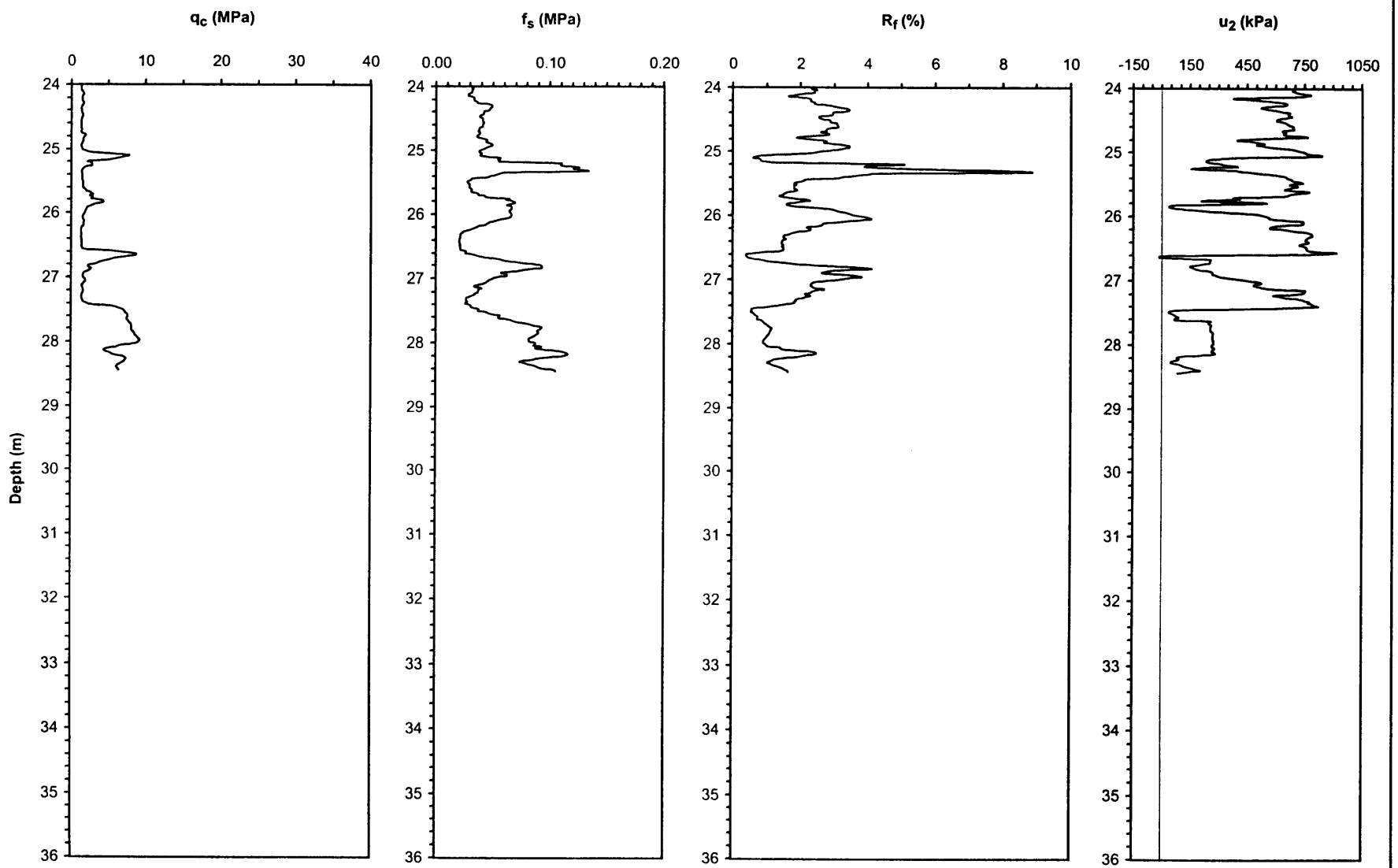
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Hotel Sapanca, Sapanca
GPS Coordinates: 40.6987°N 30.2654°E
Test Number: CPT-SH11
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptsh11.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-boring depth: 1.00 m ; starting depth: 1.00 m

Elevation:
Date: August 21, 2000
Water Table Elevation: 1.38 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



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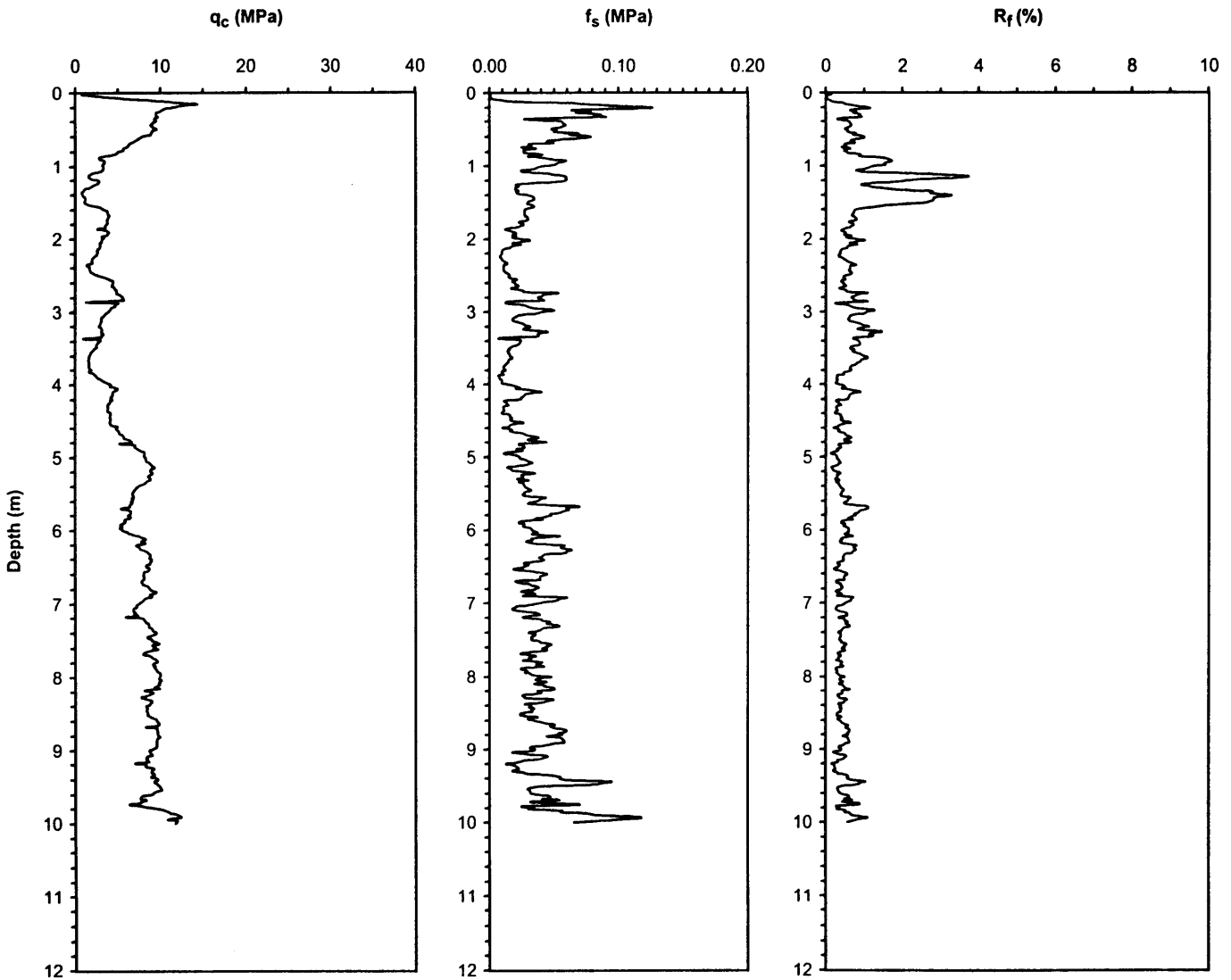
ZETAŞ-SAU
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Hotel Sapanca, Sapanca
GPS Coordinates: 40.6987°N 30.2654°E
Test Number: CPT-SH12
Type of Cone: ELC10 CF No. 990618 (a.p. v.d. Berg)
File Name: cptsh12.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-boring depth: 1.10 m ; starting depth: 1.10 m

Elevation:
Date: August 23, 2000 17:23
Water Table Elevation: 1.35 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Sapanca Hotel, Sapanca
Date: August 24, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.10 m
Notes:

Test ID: SPT-SH2
GPS Coordinates: 40.69852°N 30.26563°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									SM: Gray gravelly silty sand											
1																				
2																				
3		SW-SM	S-SH2-1	24/45	7-7-8	3.00	7.32	50					NP	NP	9	-	-	4.1	0.12	
4																				

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Sapanca Hotel, Sapanca
Date: August 22, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 0.50 m
Notes:

Test ID: SPT-SH4
GPS Coordinates: 40.69852°N 30.26563°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery / Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									GW: Fine gravels with medium to coarse sand											
1		GW	S-SH4-1	18/45	4-2-1	0.95	4.27	55*					NP	NP	5	-	-	6.4	0.42	
2			S-SH4-2	0/45	2-2-3	1.80	5.80	56												
3		GW-GM	S-SH4-3	10/45	5-5-5	2.60	5.80	59					NP	NP	5	-	-	9.5	0.38	Fine material could be washed out.
4		ML	S-SH4-4	23/45	6-8-6	3.60	7.32	55	ML: Gray sandy silt				NP	NP	73	-	-	<0.07	<0.07	
		SW-SM							SILTY SAND: Gray gravelly silty sand				NP	NP	9	-	-	4.3	0.099	
5		SW-SM	S-SH4-5	20/45	4-4-6	4.50	8.84	56					NP	NP	7	-	-	4.7	0.21	
6		SW	S-SH4-6	23/45	2-3-4	5.40	8.84	64					NP	NP	4	-	-	3.2	0.39	
7			S-SH4-7	0/45	3-4-5	6.40	10.37	64												
8		SW-SM	S-SH4-8	13/45	5-5-6	9.32	11.89	64					NP	NP	11	-	-	3.0	0.074	
9																				
10		SW-SM	S-SH4-9	13/45	5-5-6	9.20	13.42	64					NP	NP	7	-	-	3.9	0.19	
11																				

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Sapanca Hotel, Sapanca
Date: August 22, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 0.50 m
Notes:

Test ID: SPT-SH4
GPS Coordinates: 40.69852°N 30.26563°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery / Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
11		SW-SM	S-SH4-10	18/45	6-6-14	11.00	14.94	66					NP	NP	7	-	-	4.5	0.19	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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Joint Research

Sponsored by:
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Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Sapanca Hotel, Sapanca
Date: August 21, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.25 m
Notes:

Test ID: SPT-SH7
GPS Coordinates: 40.69852°N 30.26563°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery / Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									GW: Gray sandy gravel											
1		GM	S-SH7-1	23/45	9-7-4	0.90	4.27	60					NP	NP	14	-	-	5.0	<0.07	
2		GW	S-SH7-2	14/45	4-2-1	1.30	4.27	-					NP	NP	1	-	-	8.4	1.7	
									SW: Gray gravelly silty sand											
3		SW	S-SH7-3	10/45	4-3-2	2.60	5.80	60					NP	NP	5	-	-	3.0	0.23	
4		SW	S-SH7-4	22/45	3-4-4	3.40	7.32	63					NP	NP	4	-	-	3.9	0.33	
5		SW	S-SH7-5	21/45	3-5-4	4.20	7.32	66					NP	NP	6	-	-	4.5	0.20	
			S-SH7-6	0/45	3-4-5	5.00	8.84	65												
6		SM	S-SH7-7	14/45	7-7-9	5.90	10.37	60					NP	NP	13	-	-	1.5	<0.07	
7		SW-SM	S-SH7-8	13/45	4-6-11	6.80	11.89	68					NP	NP	11	-	-	1.6	<0.07	
8		SW-SM	S-SH7-9	22/45	6-7-6	7.80	11.89	65					NP	NP	12	-	-	2.0	<0.07	
9		SW-SM	S-SH7-10	18/45	7-6-6	9.00	13.42	63					NP	NP	6	-	-	3.1	0.29	
10		SW-SM	S-SH7-11	20/45	1-4-6	10.30	13.42	63					NP	NP	9	-	-	2.0	0.12	
11																				

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Sapanca Hotel, Sapanca
Date: August 21, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.25 m
Notes:

Test ID: SPT-SH7
GPS Coordinates: 40.69852°N 30.26563°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
11																				
12		SP-SM	S-SH7-12	22/45	2-5-6	11.80	14.94	61					NP	NP	5	-	-	0.84	0.24	
13		SM	S-SH7-13	11/45	3-8-5	13.50	16.46	65					NP	NP	14	-	-	0.84	<0.07	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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Joint Research
Sponsored by:
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CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Sapanca Hotel, Sapanca
Date: August 23, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 2.57 m
Notes:

Test ID: SPT-SH9
GPS Coordinates: 40.69852°N 30.26563°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Brown, silty clayey artificial fill											
1		SM	S-SH9-1	18/45	5-7-7	1.28	4.27	57	SM: Gray gravelly silty sand				NP	NP	46	-	-	0.12	<0.07	
2		SM	S-SH9-2	29/45	2-1-2	2.30	5.80	63					NP	NP	15	-	-	1.7	<0.07	
3		ML											NP	NP	56	-	-	<0.07	<0.07	
4		SM	S-SH9-3	16/45	6-6-3	3.50	7.32	62					NP	NP	16	-	-	1.9	<0.07	
5		SM	S-SH9-4	23/45	6-8-6	3.60	8.84	62					NP	NP	15	-	-	2.6	<0.07	
6		SM	S-SH9-5	18/45	5-3-5	6.00	10.37	64					NP	NP	14	-	-	1.6	<0.07	
7									ML: Gray gravelly sandy silt											
8		ML											NP	NP	51	-	-	0.074	<0.07	Sample stuck into casing, retrieved as disturbed.
9		ML	S-SH9-8	39/45	2-1-3	8.15	11.89	63					NP	NP	86	19	9	0.015	2µm	
10		ML	S-SH9-9	41/45	2-2-4	9.60	13.42	63					NP	NP	98	17	9	0.015	2µm	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Sapanca Hotel, Sapanca
Date: August 23, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.20 m
Notes:

Test ID: SPT-SH11
GPS Coordinates: 40.69852°N 30.26563°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

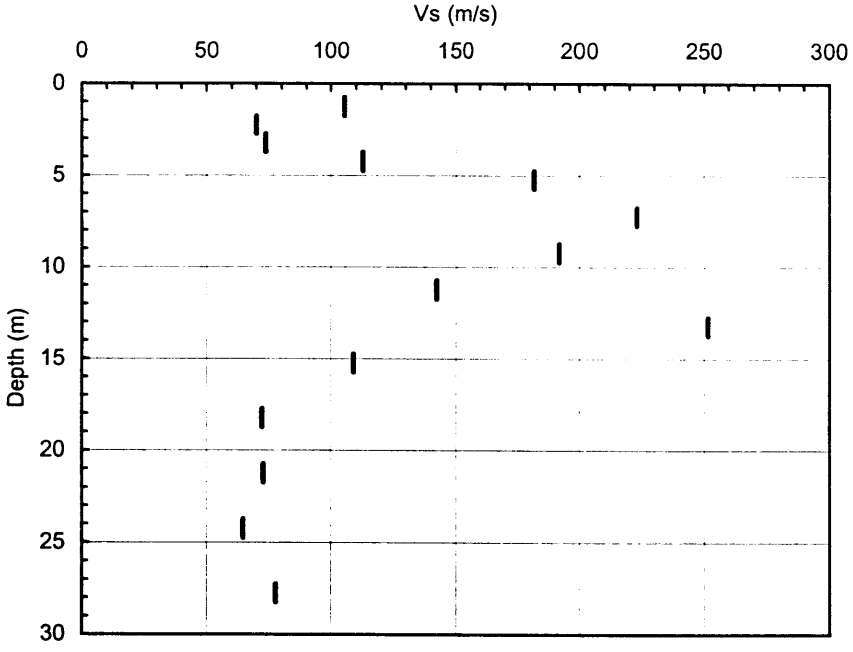
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									SM: Dark gray gravelly silty sand											
1																				
2		SM	S-SH11-1	20/45	6-6-3	1.50	4.27	60					NP	NP	14	-	-	1.9	<0.07	
3		GW-GM	S-SH11-2	13/45	9-7-4	2.62	5.80	64					NP	NP	9	-	-	5.8	0.12	
4		ML SW-SM	S-SH11-3	30/45	2-3-4	3.50	7.32	65					NP NP	NP NP	66 10	- -	- -	<0.07 1.8	<0.07 0.07	
5			S-SH11-4	0/45	1-1-1	4.40	7.32	53												
6		SW-SM	S-SH11-5	25/45	5-6-7	5.40	8.84	56					NP	NP	11	-	-	1.9	<0.07	
7		SW-SM	S-SH11-6	26/45	6-6-7	6.40	10.37						NP	NP	8	-	-	3.0	0.11	
8		SM	S-SH11-7	19/45	2-5-8	7.40	11.89	57					NP	NP	12	-	-	1.1	<0.07	
9		SW-SM	S-SH11-8	24/45	2-2-4	8.40	11.89	62					NP	NP	7	-	-	2.4	0.21	
10		SM	S-SH11-9	12/45	10-5-6	9.40	13.42	63					NP	NP	21	-	-	0.42	<0.07	
11			S-SH11-10	0/45	6-9-10	10.61	13.42	60												

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-SH7

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.00	0.74	1.74	94	116	105
3.00	1.74	2.74	70	69	70
4.00	2.74	3.74	83	64	74
5.00	3.74	4.74	106	119	113
6.00	4.74	5.74	179	185	182
8.00	6.74	7.74	238	208	223
10.00	8.74	9.74	167	217	192
12.00	10.74	11.74	106	179	142
14.00	12.74	13.74	286	217	252
16.00	14.74	15.74	114	104	109
19.00	17.74	18.74	63	82	72
22.00	20.74	21.74	85	61	73
25.00	23.74	24.74	58	71	65
28.50	27.24	28.24	94	61	78

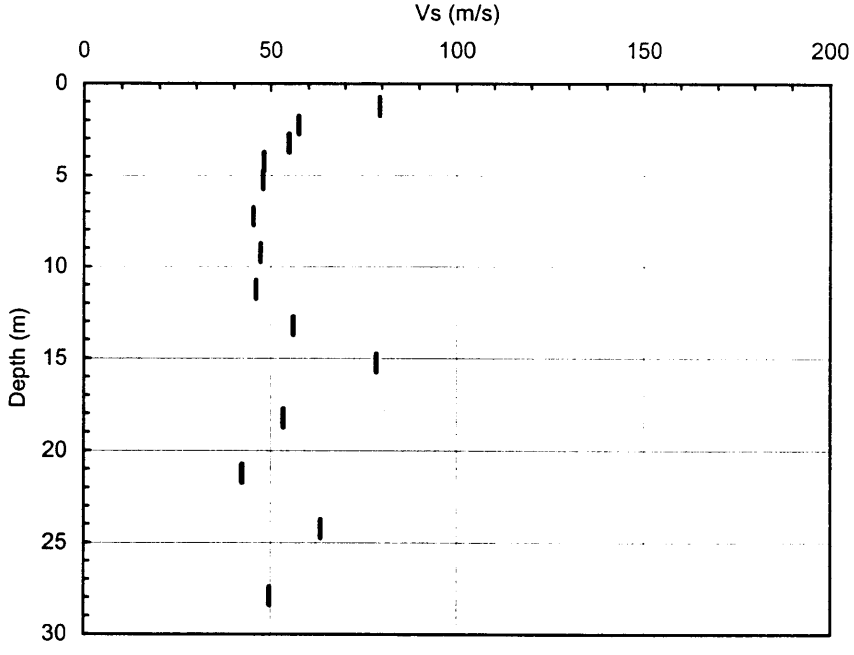


Data processed by: ZETAS (Zemin Teknolojisi AS)

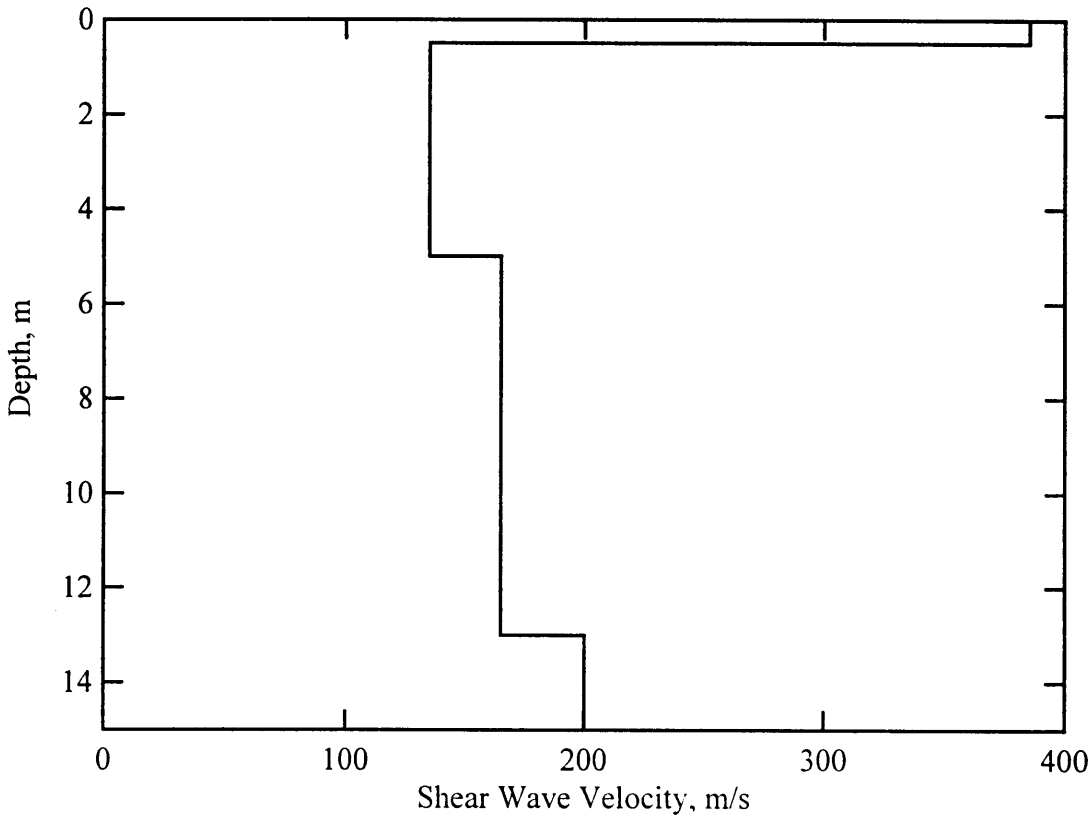
Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-SH9

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.00	0.74	1.74	50	109	79
3.02	1.76	2.76	49	66	57
4.00	2.74	3.74	44	66	55
5.00	3.74	4.74	45	52	48
6.00	4.74	5.74	45	51	48
8.00	6.74	7.74	43	47	45
10.00	8.74	9.74	44	51	47
12.00	10.74	11.74	45	46	46
14.00	12.74	13.74	51	61	56
16.00	14.74	15.74	74	83	78
19.00	17.74	18.74	48	59	53
22.00	20.74	21.74	42	42	42
25.00	23.74	24.74	33	94	64
28.68	27.42	28.42	47	53	50



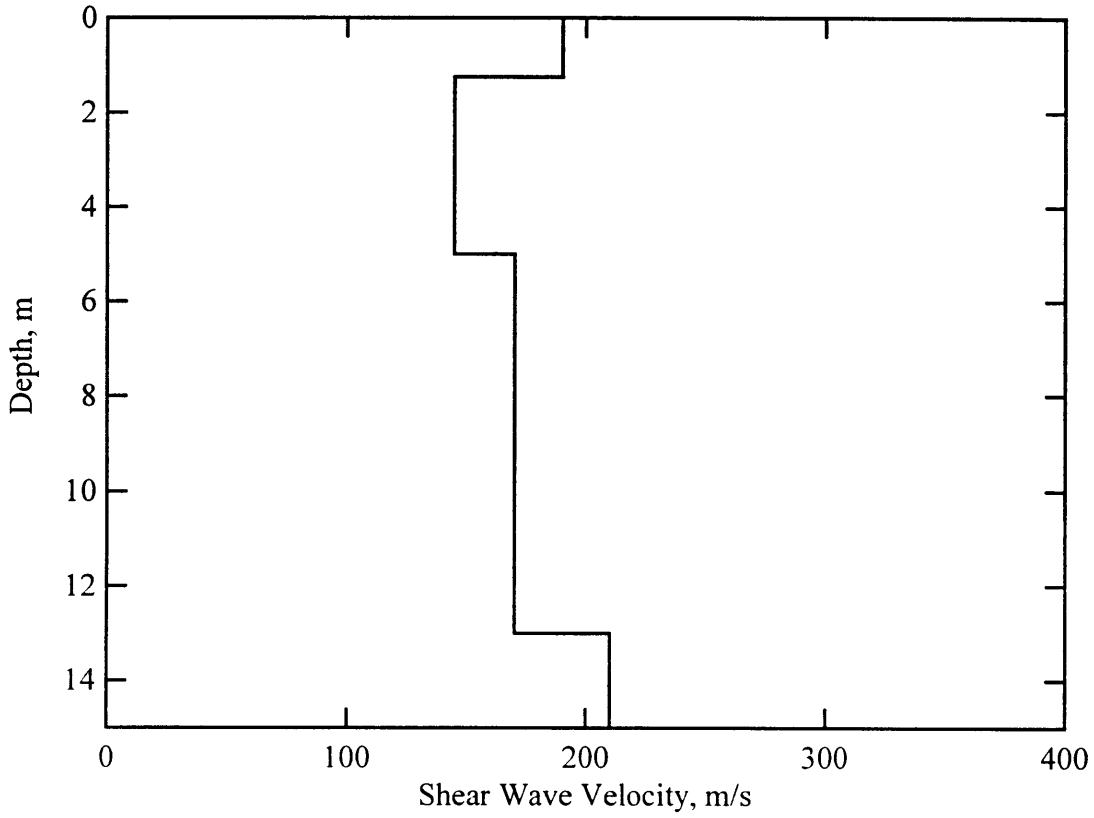
Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Hotel Sapanca Centerline 1.

Tabulated values of layer properties determined from forward modeling of Hotel Sapanca Centerline 1

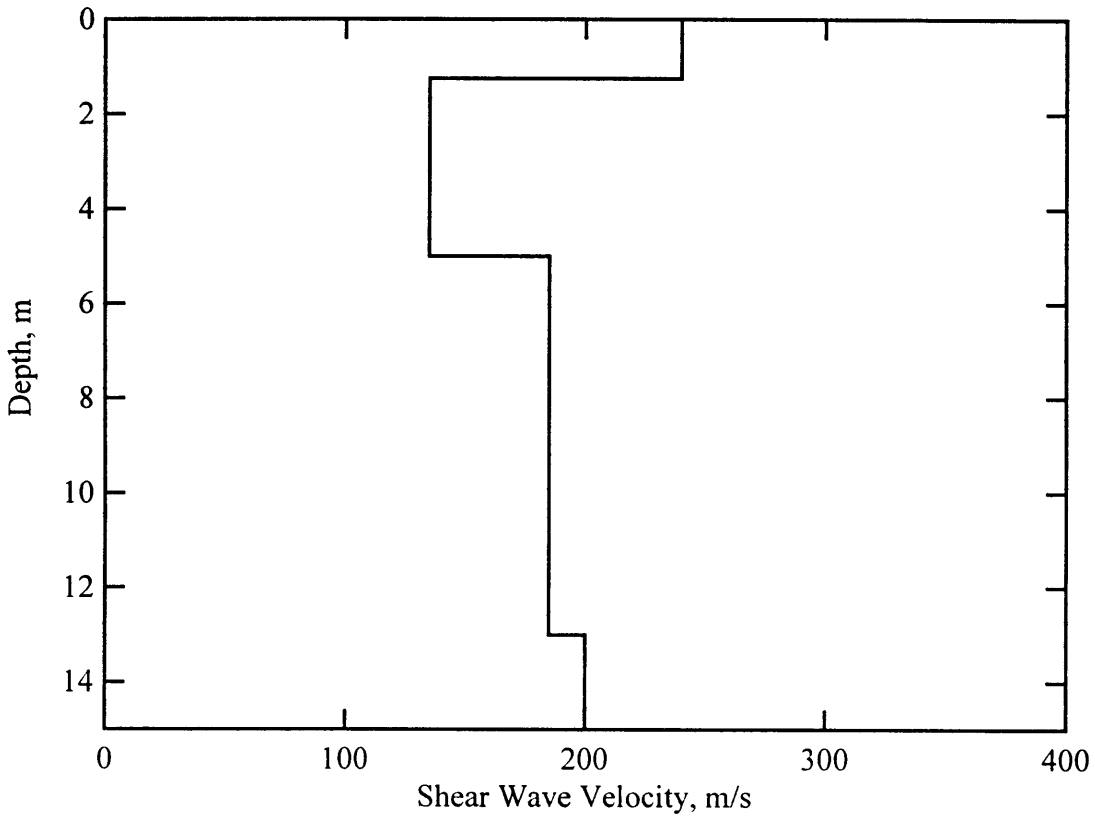
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	385	720.3	0.3	1.92
0.5	0.75	135	330.7	0.4	1.92
1.25	3.75	135	1500	0.4959	2.0
5.0	8.0	165	1500	0.4939	2.0
13.0	2.0	200	1500	0.491	2.0



Shear wave velocity profile determined from forward modeling of Hotel Sapanca Centerline 2.

Tabulated values of layer properties determined from forward modeling of Hotel Sapanca Centerline 2

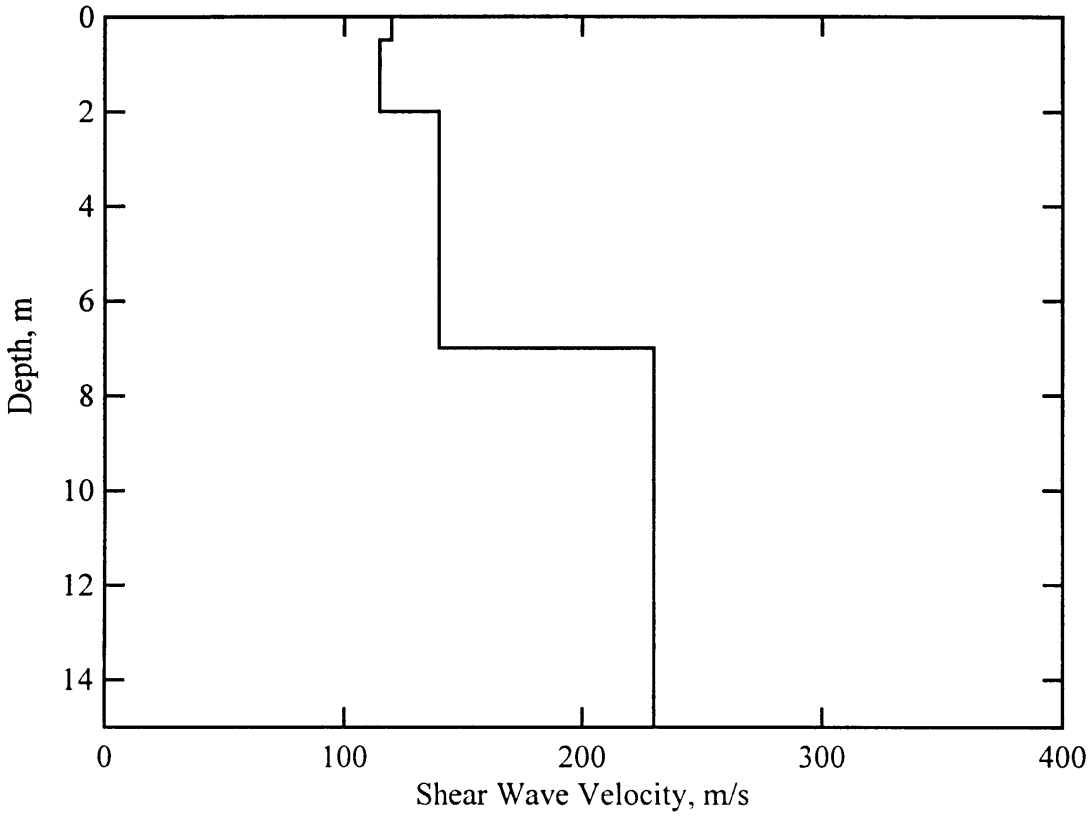
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	1.25	190	355.5	0.3	1.92
1.25	3.75	145	1500	0.4953	2.0
5.0	8.0	170	1500	0.4935	2.0
13.0	2.0	210	1500	0.49	2.0



Shear wave velocity profile determined from forward modeling of Hotel Sapanca Centerline 3.

Tabulated values of layer properties determined from forward modeling of Hotel Sapanca Centerline 3

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	1.25	240	499.6	0.35	1.92
1.25	3.75	135	1500	0.4959	2.0
5.0	8.0	185	1500	0.4923	2.0
13.0	2.0	200	1500	0.491	2.0



Shear wave velocity profile determined from forward modeling of Hotel Sapanca Centerline 4.

Tabulated values of layer properties determined from forward modeling of Hotel Sapanca Centerline 4

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	120	224.5	0.3	1.92
0.5	1.5	115	1500	0.497	2.0
2.0	5.0	140	1500	0.4956	2.0
7.0	8.0	230	1500	0.488	2.0

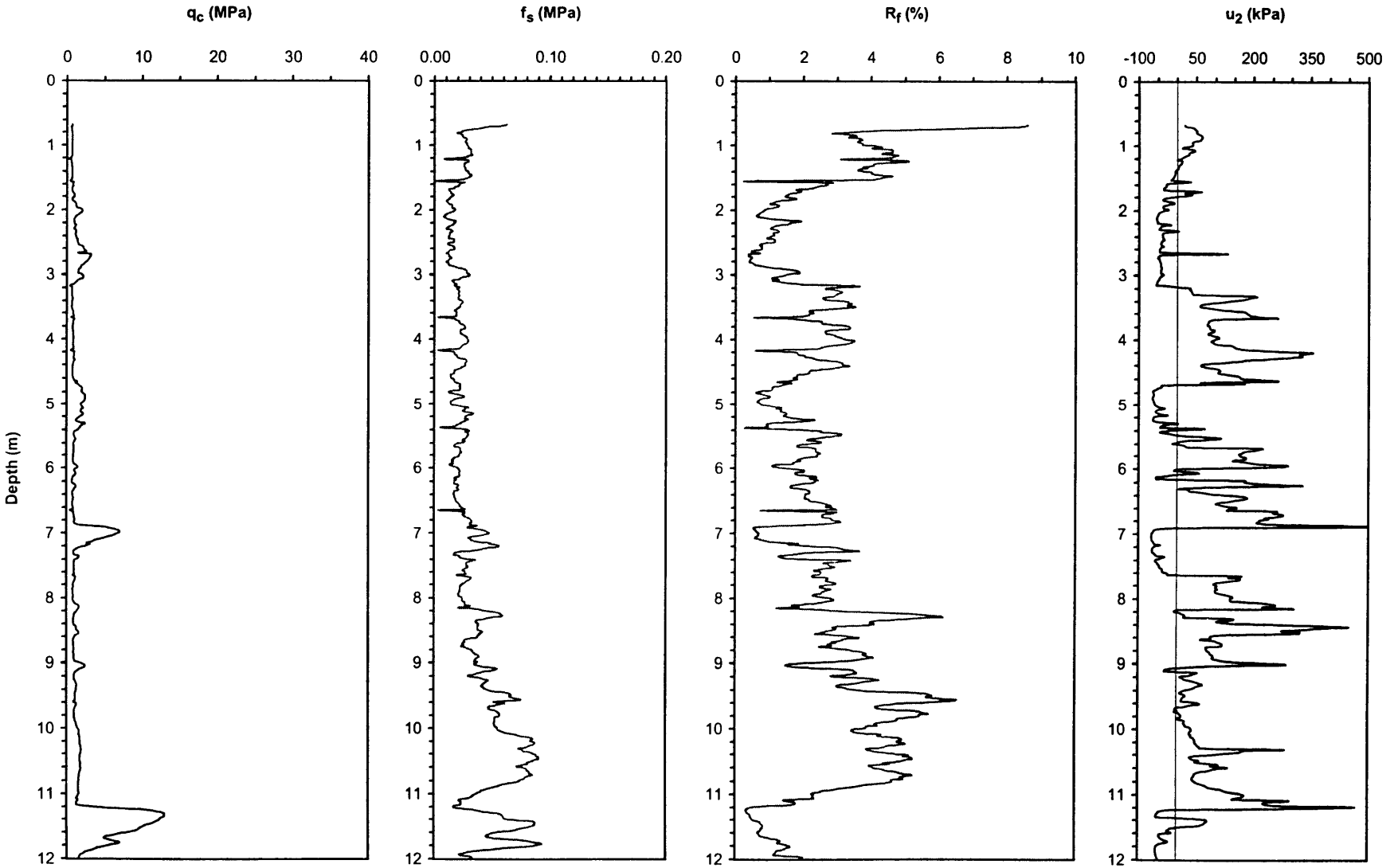
Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

Phase 4

Site: Cumhuriyet Caddesi

UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Line Four: Cumhuriyet Caddesi	
Joint Research	**GPS Coordinates:**	40.76464° N, 30.40897° E	**Survey Coordinates (m):** 32,368.12 N, 29,535.34 W
	Test Number:	SCPTU 4 - 22	**Elevation (m):** 29.511
	Type of Cone:	ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)	**Date:** 10 July 2000 17:50
Sponsored by:	**File Name:**	scptu 4 - 22.txt	**Water Table Elevation (m):** 28.56
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.65 m to clear utilities.	



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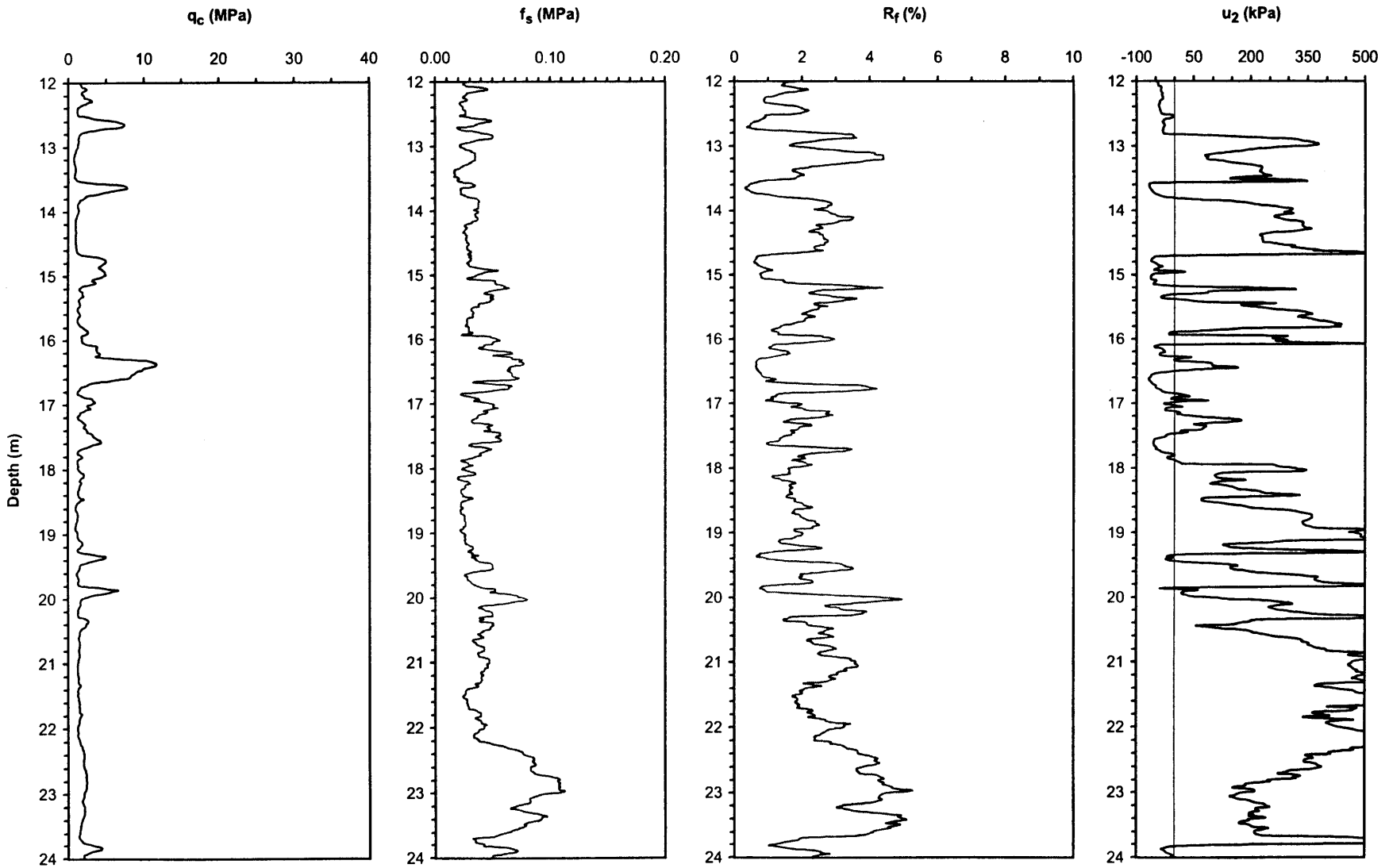
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Cumhuriyet Caddesi
GPS Coordinates: 40.76464° N, 30.40897° E
Test Number: SCPTU 4 - 22
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: scptu 4 - 22.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.65 m to clear utilities.

Survey Coordinates (m): 32,368.12 N, 29,535.34 W
Elevation (m): 29.511
Date: 10 July 2000 17:50
Water Table Elevation (m): 28.561
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



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Sponsored by:
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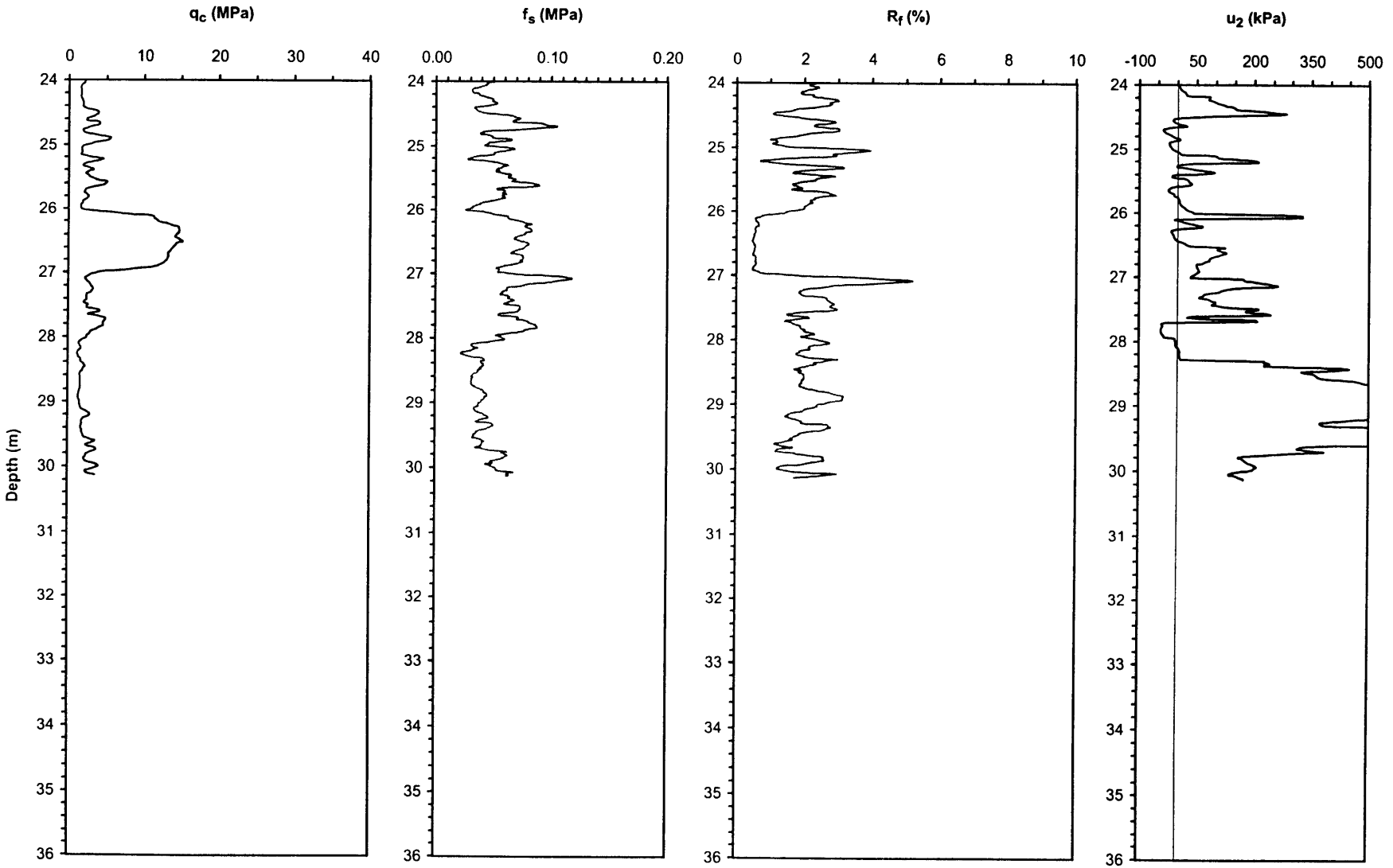
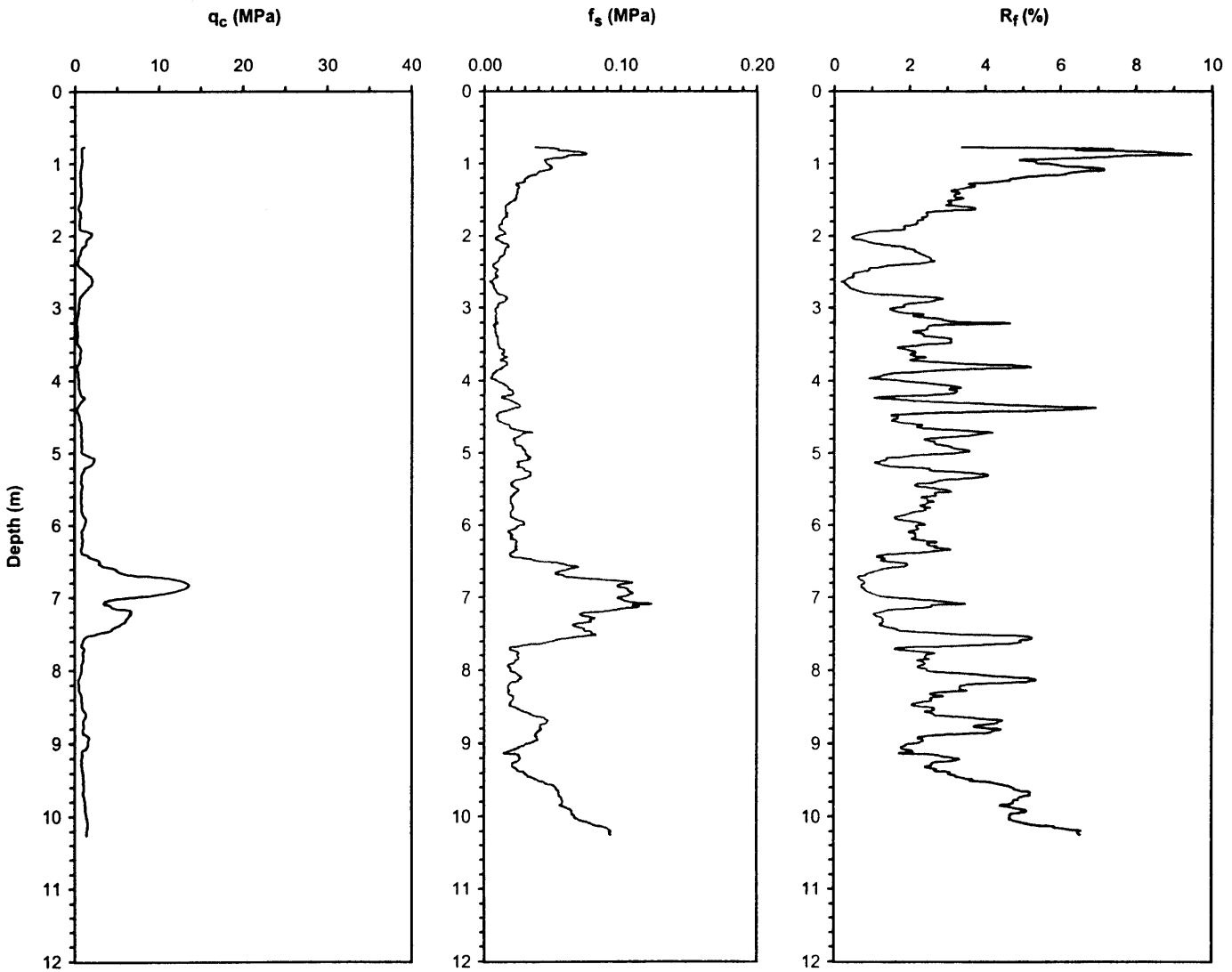
Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Cumhuriyet Caddesi
GPS Coordinates: 40.76464° N, 30.40897° E
Test Number: SCPTU 4 - 22
Type of Cone: ELC10 SeisCFP No. 991232 (a.p. v.d. Berg)
File Name: scptu 4 - 22.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.65 m to clear utilities.

Survey Coordinates (m): 32,368.12 N, 29,535.34 W
Elevation (m): 29.511
Date: 10 July 2000 17:50
Water Table Elevation (m): 28.561
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



UCB-BYU-UCLA	**Project Name:**	CPT Liquefaction Investigations, Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Line Four: 15 Sokak (Immediately east of Cumhuriyet Caddesi)	
Joint Research	**GPS Coordinates:**	40.76294° N, 30.40944° E	**Survey Coordinates (m):** 32,201.40 N, 29,378.2163 W
	Test Number:	CPT 4 - 23	**Elevation (m):** 30.259
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** 13 July 2000 12:17
Sponsored by:	**File Name:**	cpt 4 - 23.txt	**Water Table Elevation (m):** N/R
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** T. Leslie Youd and Curt Christensen, BYU
Caltrans, CEC, PG&E	**Notes:**	Pre-explored to a depth of 0.75 m to clear utilities.	



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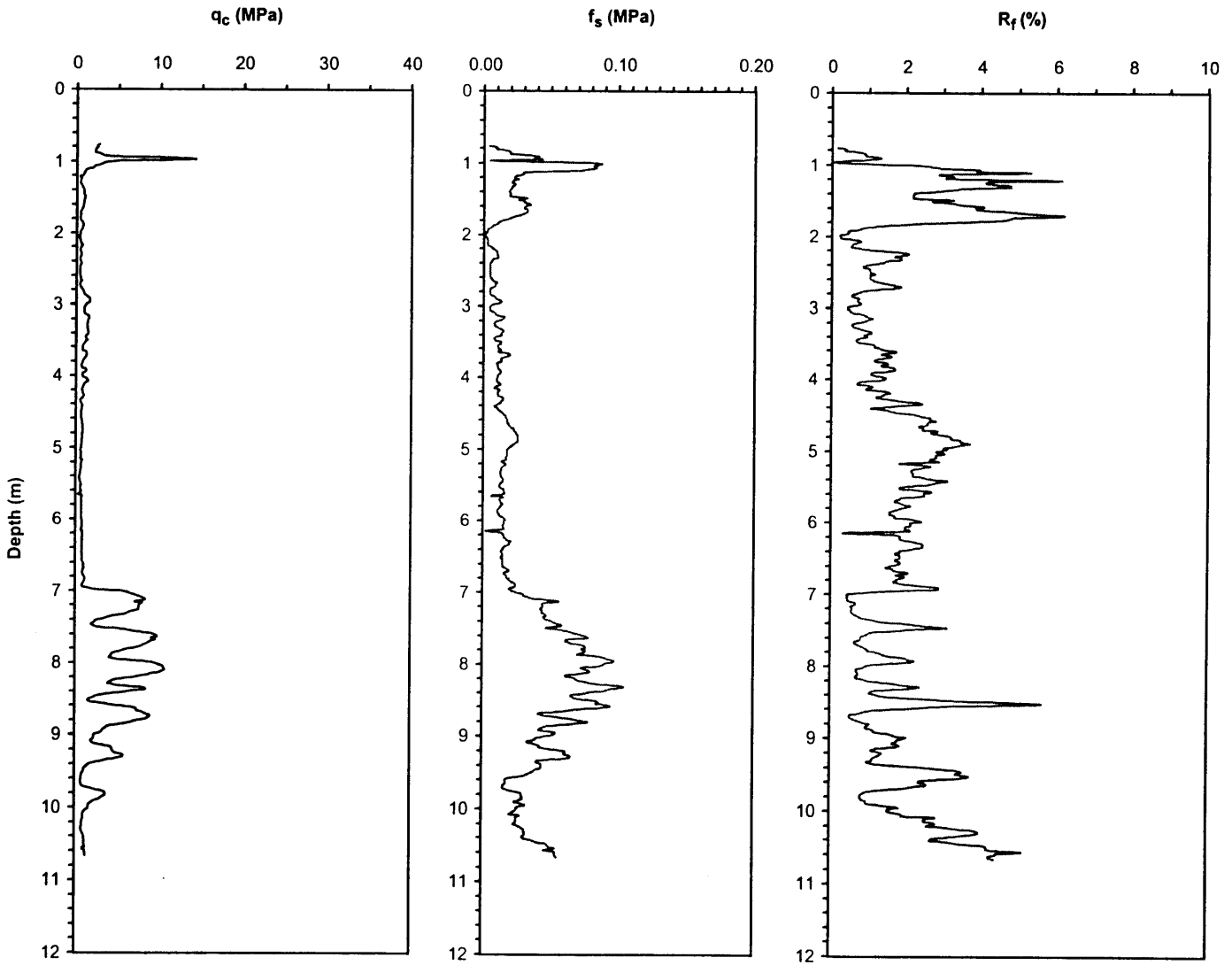
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: Line Four: Cumhuriyet Caddesi
GPS Coordinates: 40.76006° N, 30.40983° E
Test Number: CPT 4 - 24
Type of Cone: ELC10 CF No. 990618 (a.p. v.d. Berg)
File Name: cpt 4 - 24.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-explored to a depth of 0.75 m to clear utilities.

Survey Coordinates (m): 31,918.31 N, 29,211.62 W
Elevation (m): 31.305
Date: 13 July 2000 13:24
Water Table Elevation (m): 30.04
Responsible Engineers: T. Leslie Youd and Curt Christensen, BYU



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Joint Research

Sponsored by:
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CEC, PG&E

Project Name: CPT Liquefaction Investigations, Adapazari, Turkey
Location: 1.5 m south of CPT-4-22
Date: July 20, 2000
Field Log by: M. Bora Baturay
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: Not measured
Notes:

Test ID: SPT-4-22
GPS Coordinates: 40.76464°N 30.40897°E
Elevation: 29.511 m
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

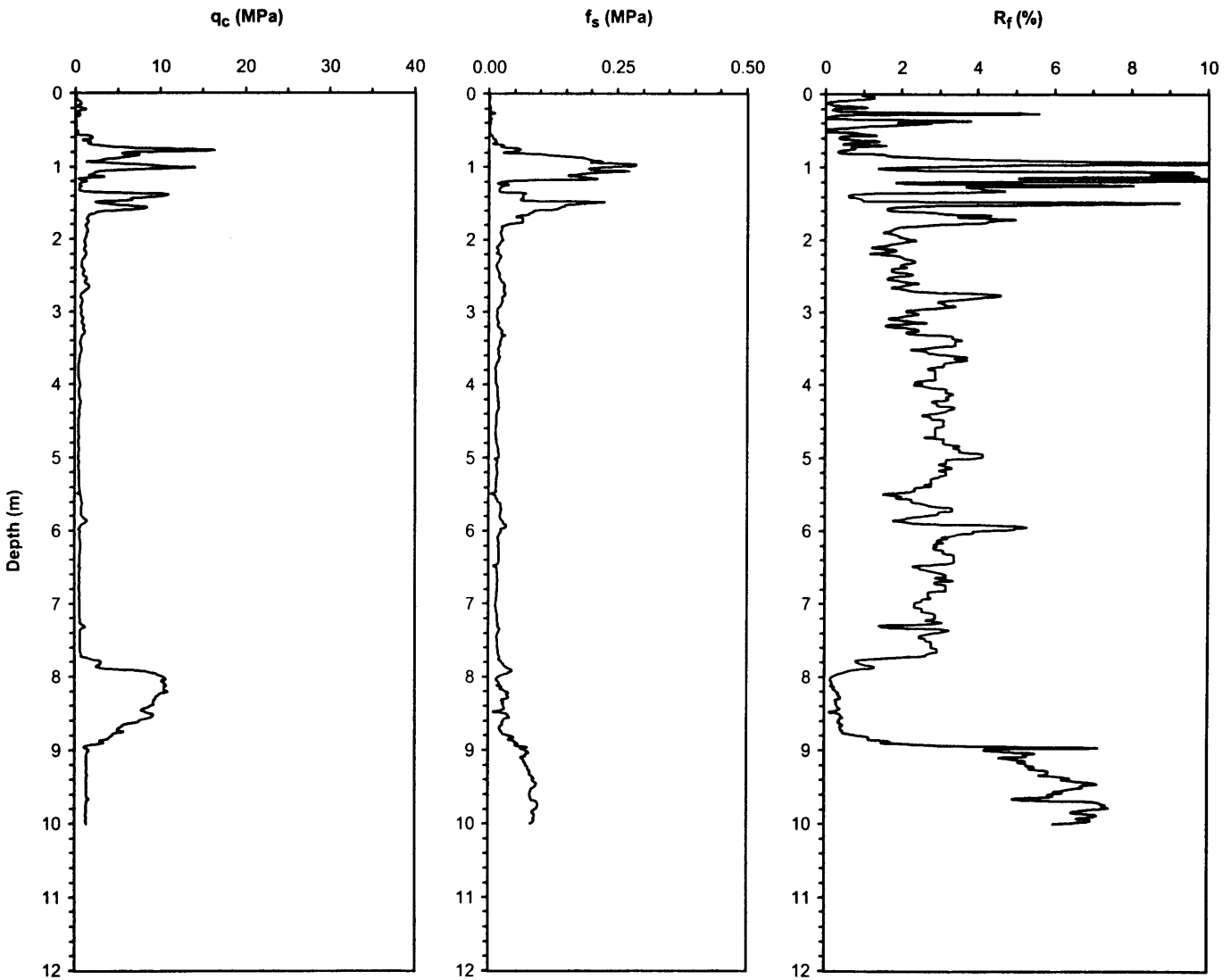
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill											
1		CH/CL	S-4-22-1A	33/45	2-1-3	0.85	4.27		CH: Gray to brown high plasticity silty clay	1.60		40	50	28	97	53	46	0.004	<1µm	
		CH	S-4-22-1B							1.65	52	38	55	32	99	55	44	0.004	<1µm	
2			S-4-22-2	0/45	2-2-2	1.65	5.80		SILT AND SAND: Brown silty sand to sandy silt grading to low plasticity silt with fine sand											
3		ML	S-4-22-3A	44/45	2-2-2	2.55	5.80					29	25	-	54	15	10	0.062	0.002	Sand catcher was used
		ML	S-4-22-3B									35	32	-	89	20	17	0.024	<2µm	
4		CH	S-4-22-4	43/45	2-1-2	3.55	7.32		SILTY CLAY: Brown, grading to gray interbedded strata of silty clay and clayey silt	85	40	41	55	28	100	50	38	0.005	<1µm	Sand catcher was used
5		ML	S-4-22-5	44/45	2-1-2	4.65	8.84			110	29	38	34	-	97	26	23	0.018	<1µm	Sand catcher was used
6		ML/CL	S-4-22-6A	40/45	2-2-2	5.65	10.37			70	23	32	41	15	99	54	39	0.004	<1µm	Sand catcher was used
		ML	S-4-22-6B									40	39	-	99	31	26	0.013	<1µm	
7		ML	S-4-22-7	33/45	6-8-6	6.65	10.37		SANDY SILT: Gray sandy silt to silty fine sand			29	36	-	54	16	14	0.063	<2µm	Sand catcher was used
8		CH	S-4-22-8A	42/45	2-2-3	7.95	11.89		CH: Gray high plasticity silty clay interspersed with some brown clay seams. Traces of shells and wood chips	90	65	39	57	33	100	60	45	0.003	<1µm	Sand catcher was used
		CH	S-4-22-8B							120	67	40	64	40	100	75	56	0.001	<1µm	
9		CH	S-4-22-9	31/45	2-3-5	8.95	11.89			160	57	43	65	38	99	81	64	<2µm		Sand catcher was used

Legend
S: Spit Spoon (SPT) SH: Shelby tube * Estimated Energy Ratio

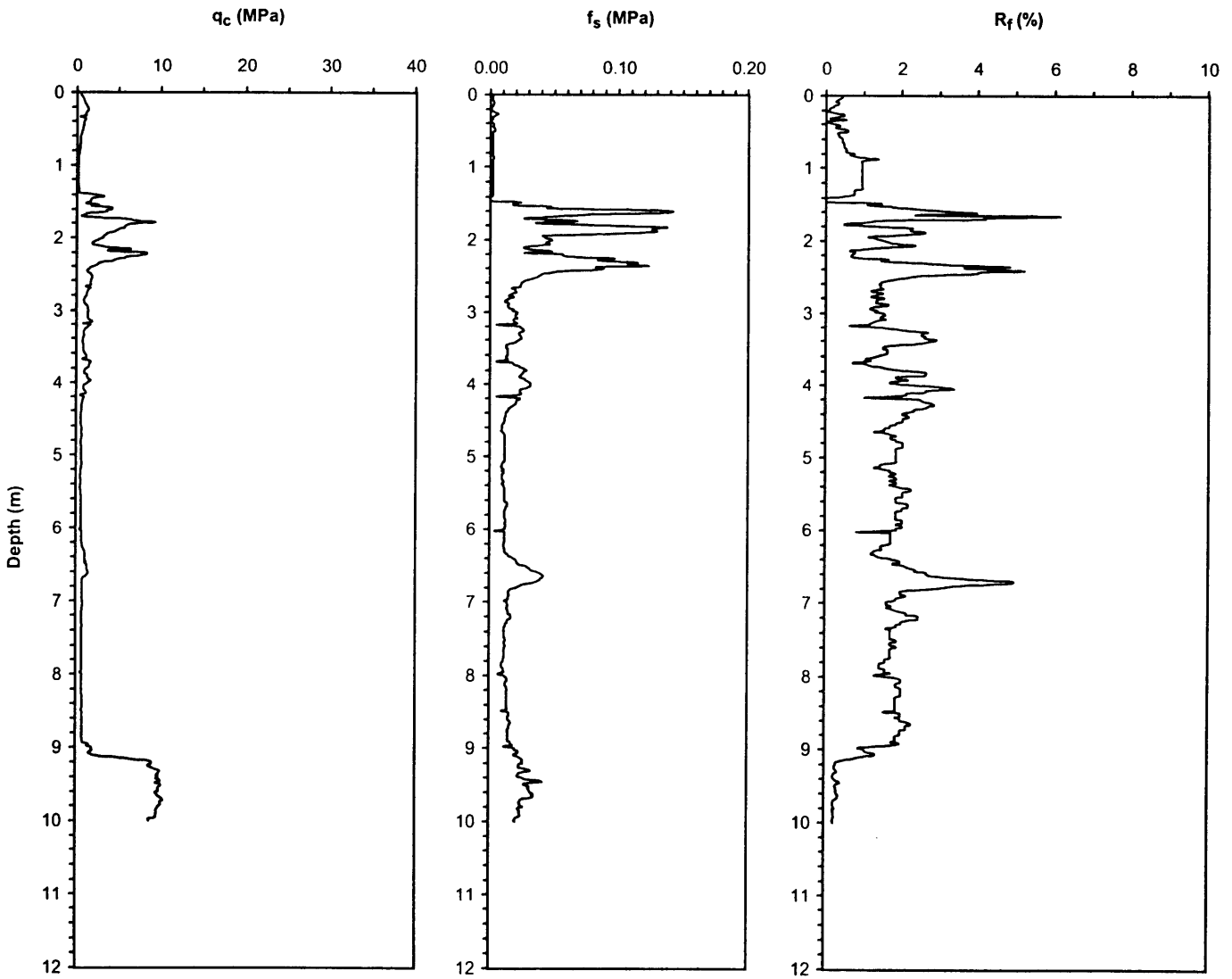
Phase 4

Site: Golcuk Police Station

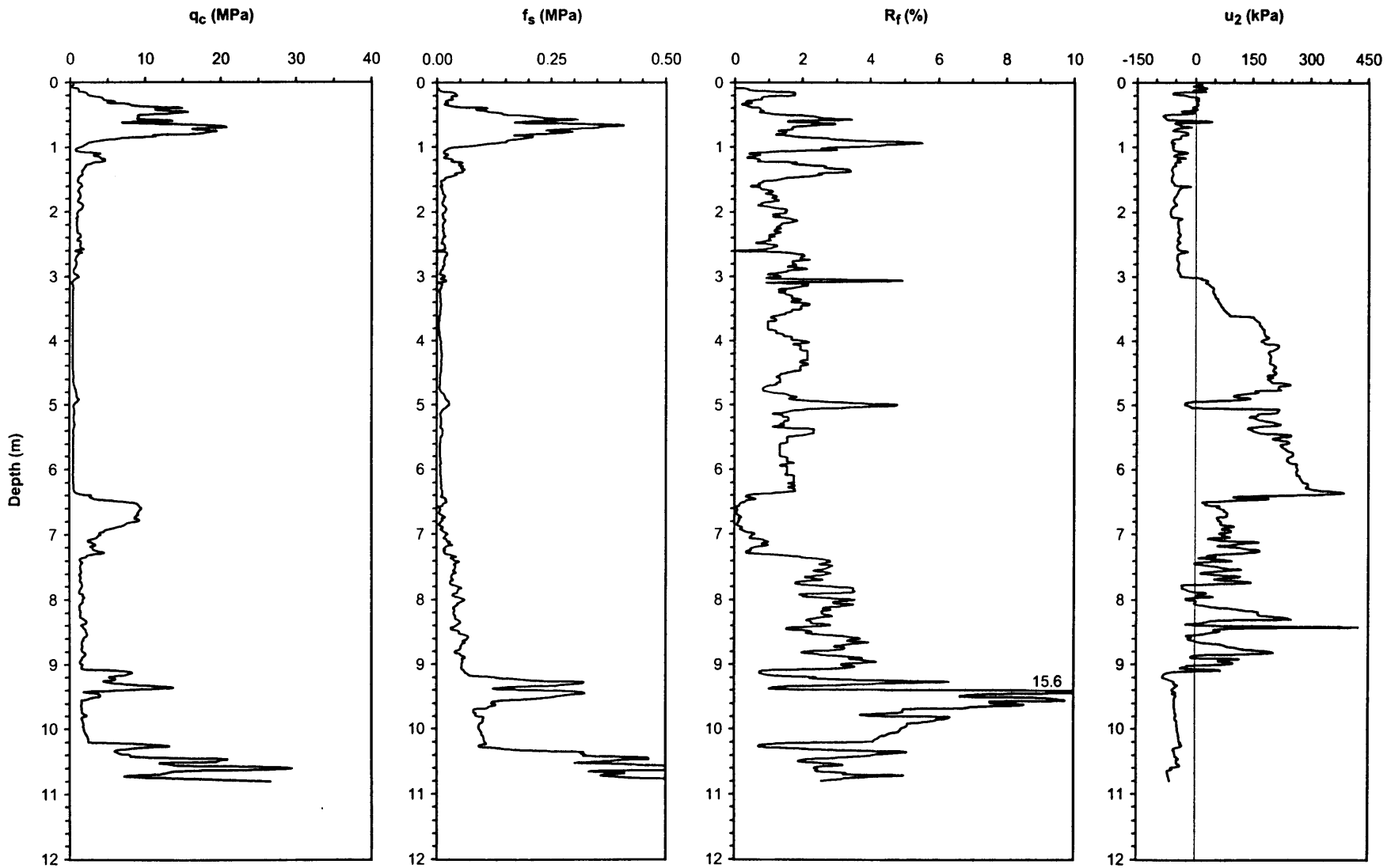
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Police Station, Gölcük	
Joint Research	**GPS Coordinates:**	40.7215°N 30.9373°E	
	Test Number:	CPT-PS1	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 25, 2000 15:11
Sponsored by:	**File Name:**	cptps1.csv	**Water Table Elevation:** 1.00 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.55 m ; starting depth: 1.25 m	



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Police Station, Gölcük	
Joint Research	**GPS Coordinates:**	40.7215°N 30.9373°E	
	Test Number:	CPT-PS2	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 26, 2000 10:22
Sponsored by:	**File Name:**	cptps2.csv	**Water Table Elevation:** 1.10 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.60 m ; starting depth: 0.00 m	



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Police Station, Gölcük	
Joint Research	**GPS Coordinates:**	40.7215°N 30.9373°E	
	Test Number:	CPT-PS3	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 25, 2000 13:50
Sponsored by:	**File Name:**	cptps3.csv	**Water Table Elevation:** 1.20 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.40 m ; starting depth: 1.40 m	



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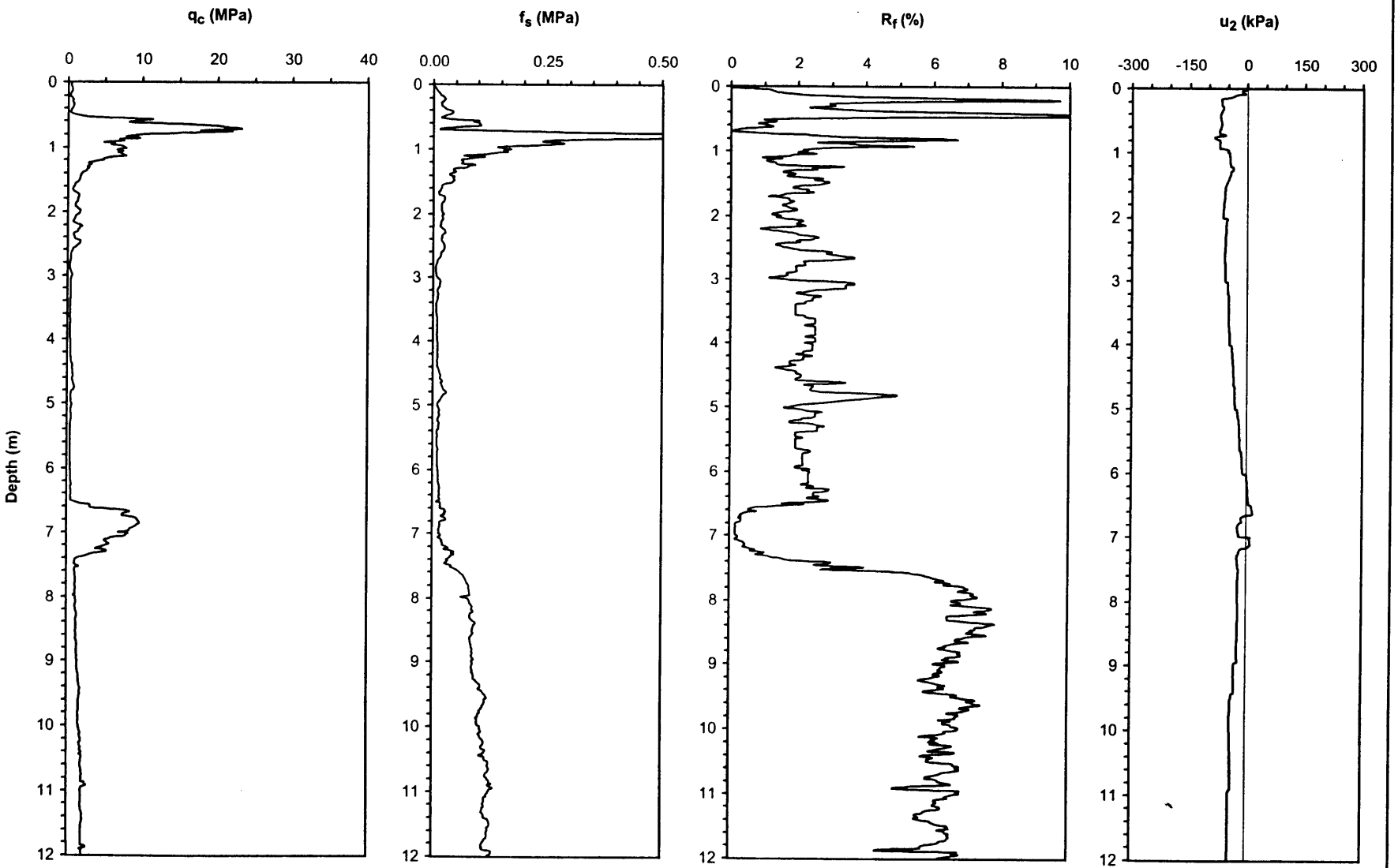
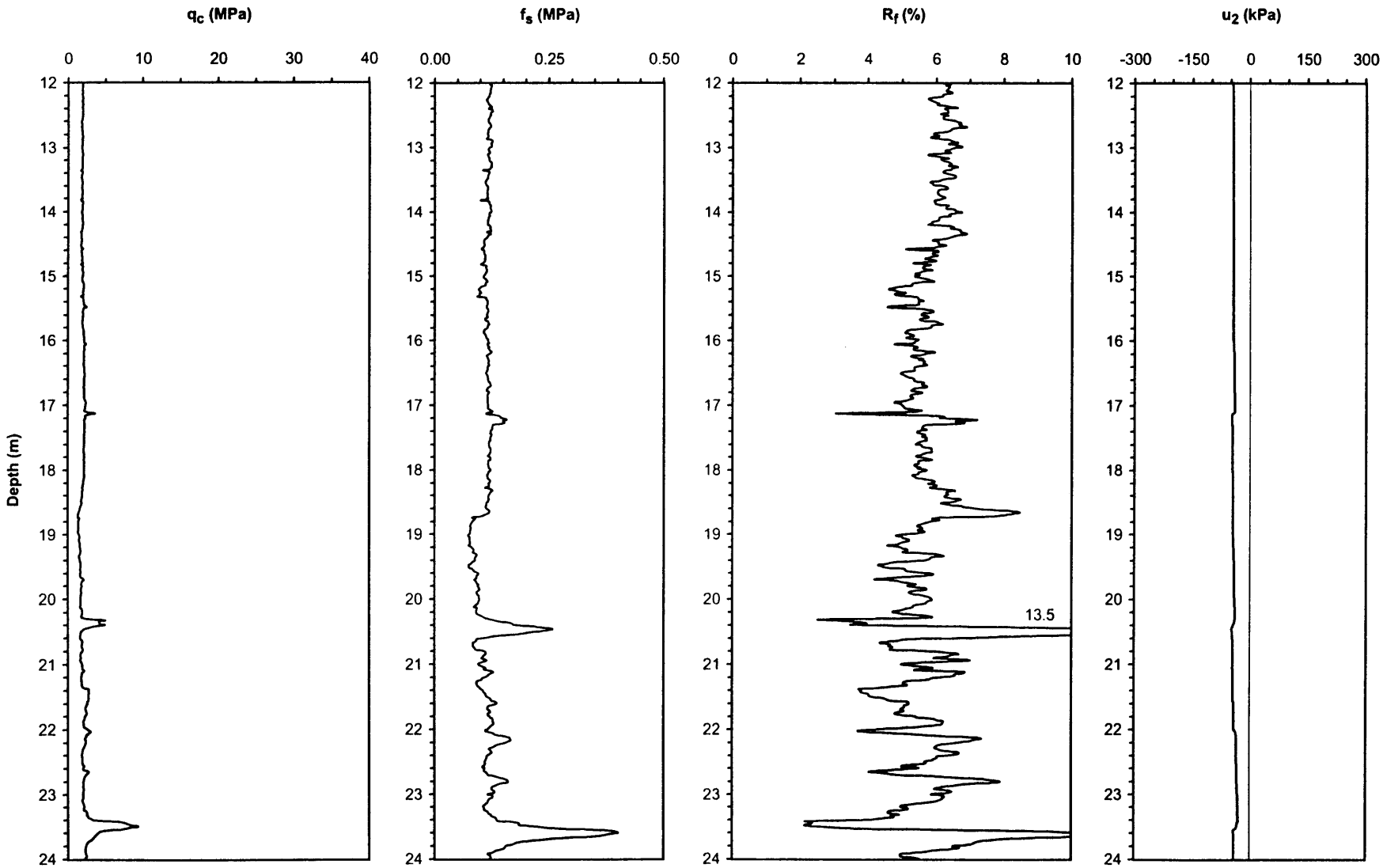
Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Police Station, Gölcük
GPS Coordinates: 40.7215°N 30.9373°E
Test Number: CPT-PS4
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cptps4.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-boring depth: 1.00 m ; starting depth: 1.00 m

Elevation:
Date: August 25, 2000 13:50
Water Table Elevation: 1.20 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 2 of 3
ZETAŞ-SAU	**Location:**	Police Station, Gölcük	
Joint Research	**GPS Coordinates:**	40.7215°N 30.9373°E	
	Test Number:	CPT-PS4	**Elevation:**
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** August 25, 2000 13:50
Sponsored by:	**File Name:**	cptps4.csv	**Water Table Elevation:** 1.20 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.00 m ; starting depth: 1.00 m	



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Sponsored by:
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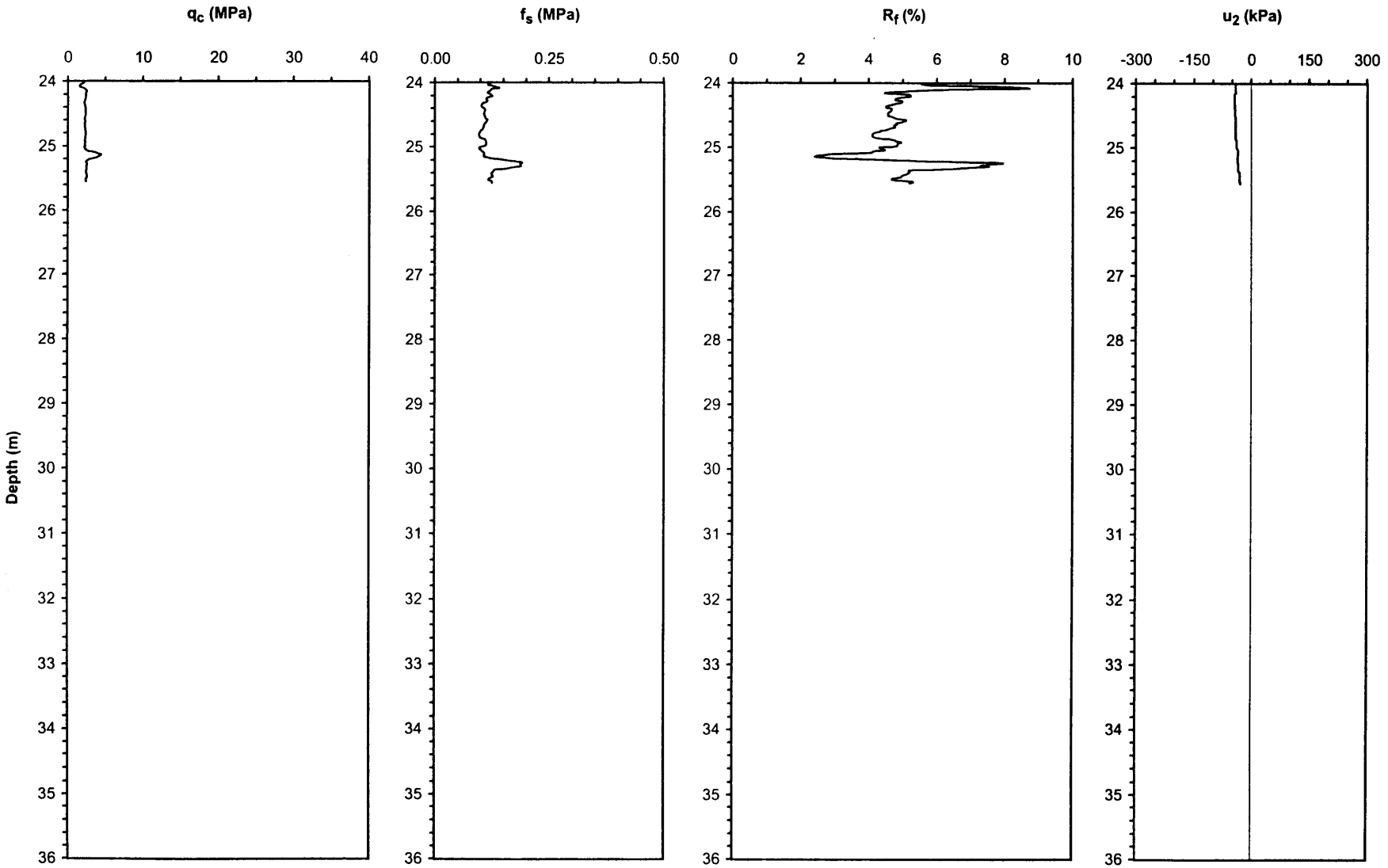
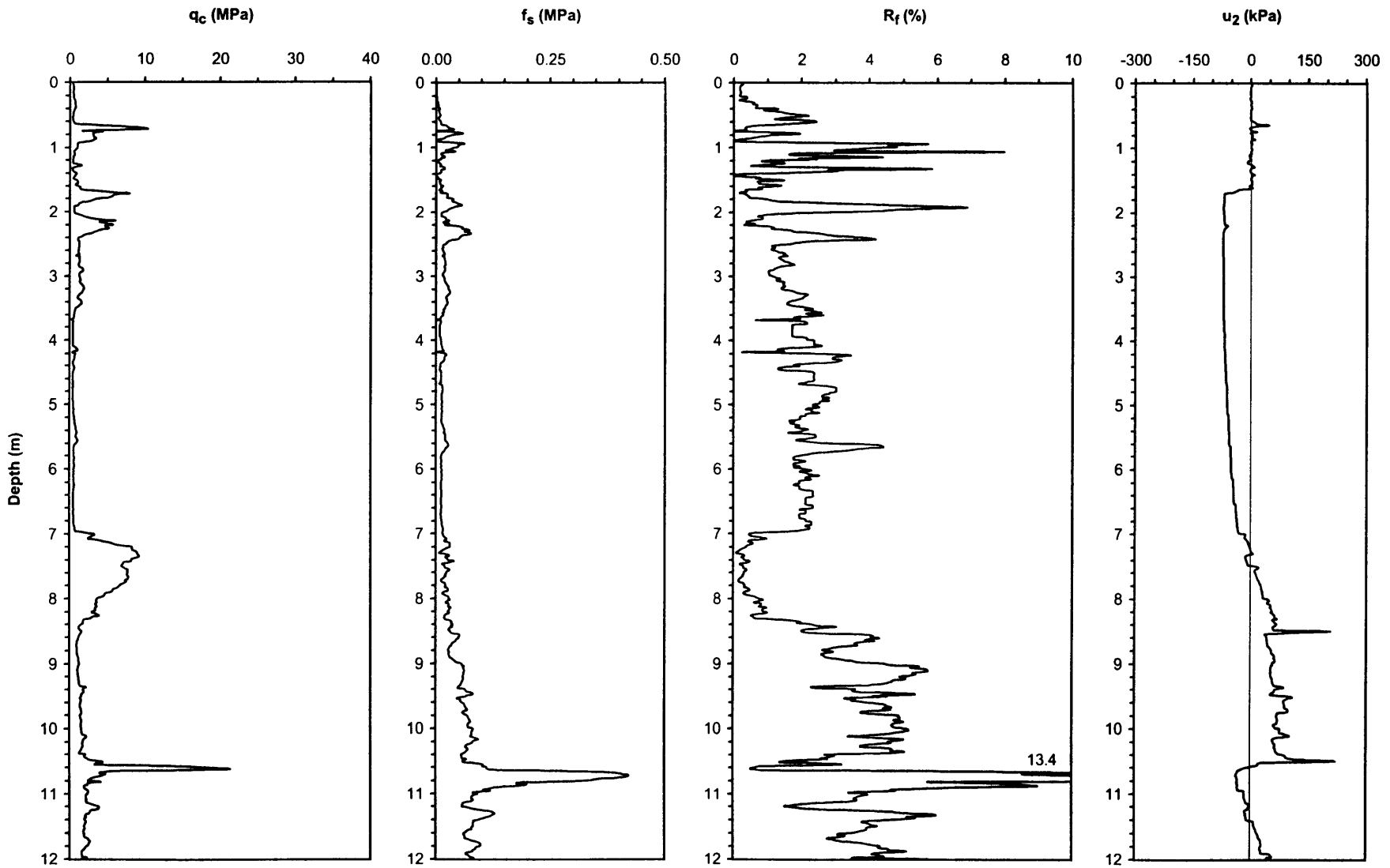
Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Police Station, Gölcük
GPS Coordinates: 40.7215°N 30.9373°E
Test Number: CPT-PS4
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cptps4.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-boring depth: 1.00 m ; starting depth: 1.00 m

Elevation:
Date: August 25, 2000 13:50
Water Table Elevation: 1.20 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Police Station, Gölcük	
Joint Research	**GPS Coordinates:**	40.7215°N 30.9373°E	
	Test Number:	CPT-PS5	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** August 26, 2000
Sponsored by:	**File Name:**	cptps5.csv	**Water Table Elevation:** 1.10 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.70 m ; starting depth: 0.00 m	



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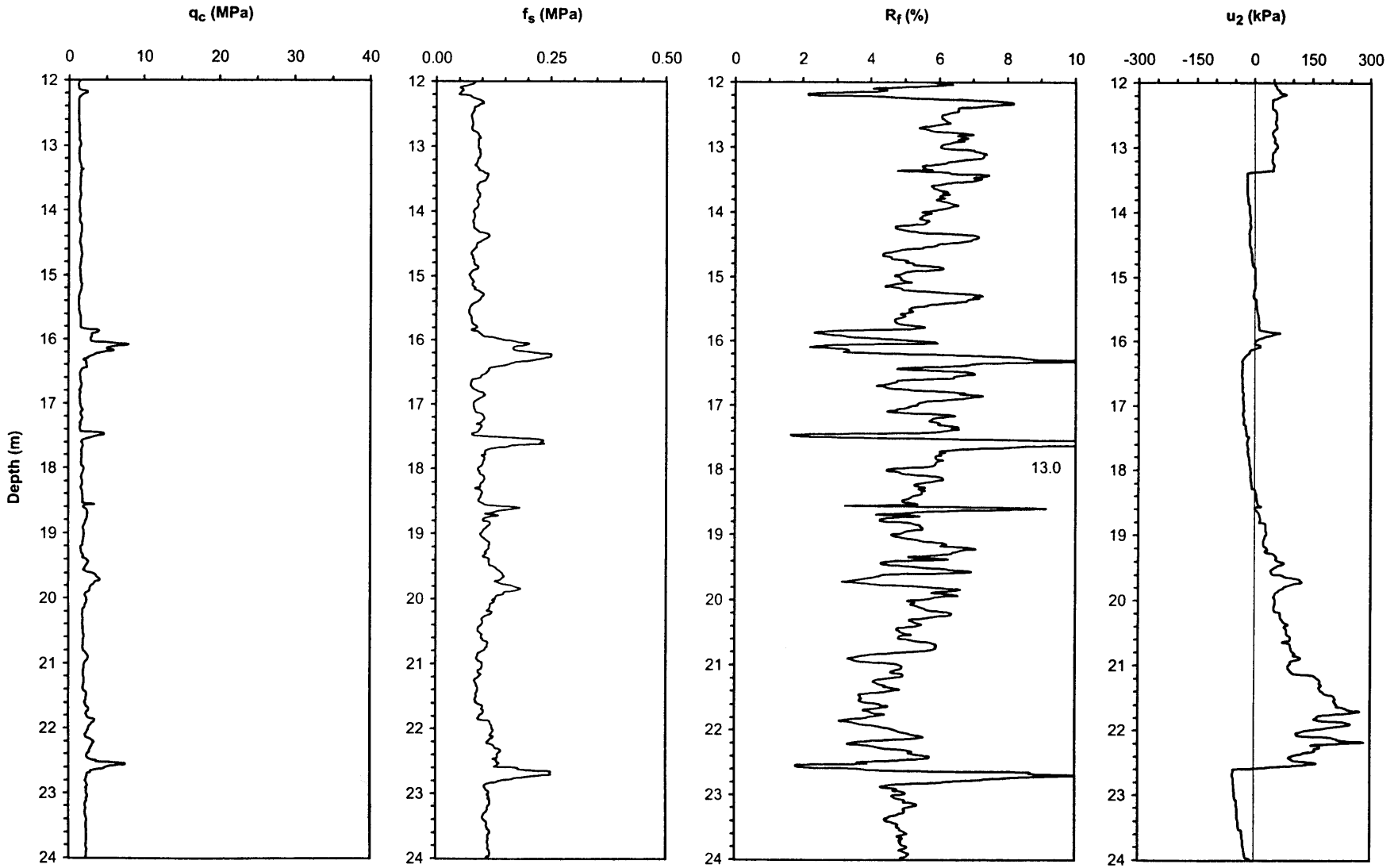
Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Police Station, Gölcük
GPS Coordinates: 40.7215°N 30.9373°E
Test Number: CPT-PS5
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptps5.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-boring depth: 1.70 m ; starting depth: 0.00 m

Elevation:
Date: August 26, 2000
Water Table Elevation: 1.10 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



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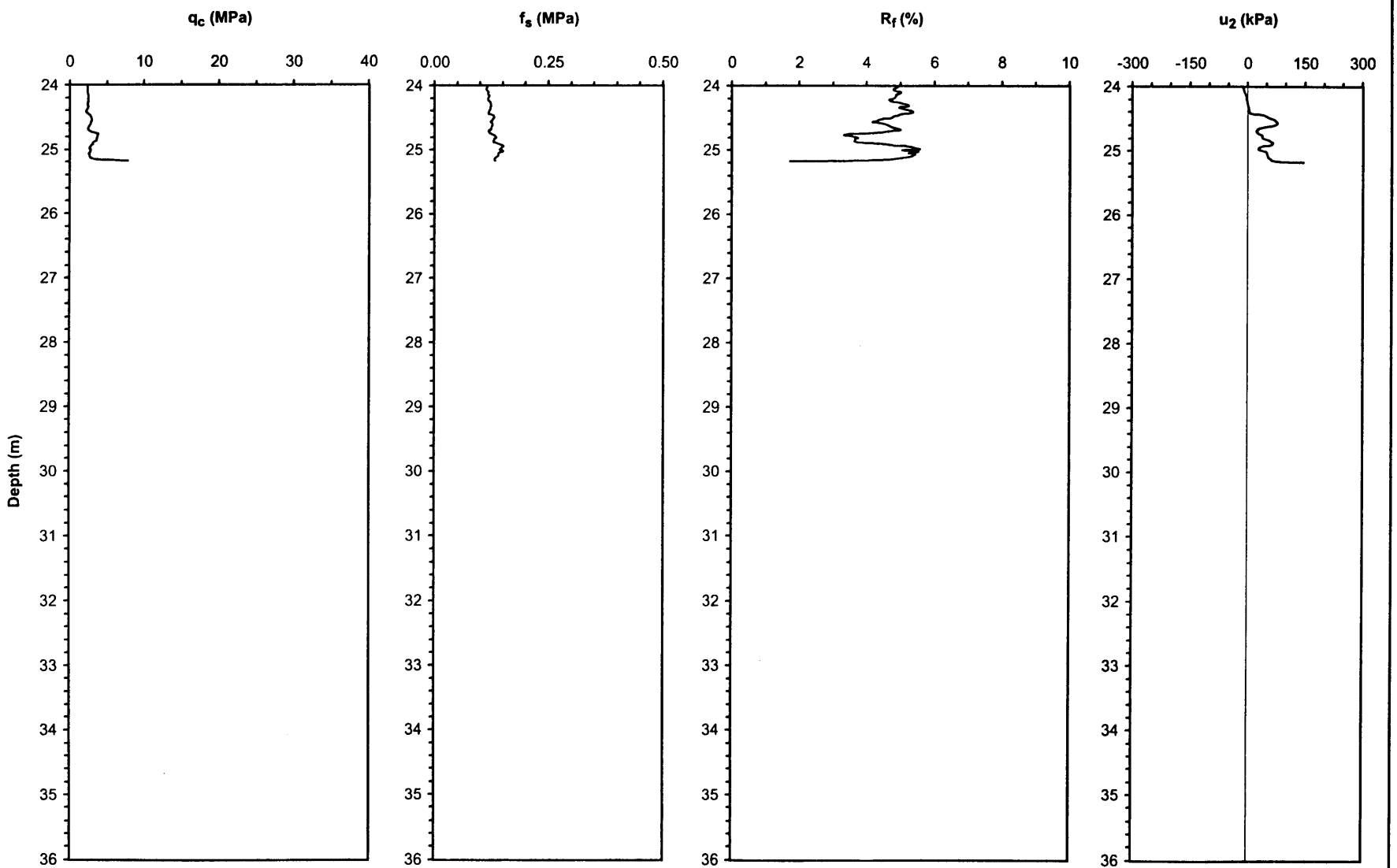
Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Police Station, Gölcük
GPS Coordinates: 40.7215°N 30.9373°E
Test Number: CPT-PS5
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptps5.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Pre-boring depth: 1.70 m ; starting depth: 0.00 m

Elevation:
Date: August 26, 2000
Water Table Elevation: 1.10 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



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Joint Research
Sponsored by:
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CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Police Station, eastern edge of Izmit Bay
Date: August 25, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.10 m
Notes:

Test ID: SPT-PS2
GPS Coordinates: 40.72120°N 29.73733°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Dessicated brown clay fill.											
1																				
2		SP-SM	S-PS2-1	8/45	3-4-4	1.70	5.20	55*	FILL: Brown to gray gravelly sandy silt.				NP	NP	12	-	-	1.6	<0.07	
3			S-PS2-2	0/45	1-2-2	3.10	6.72	60*	SM: Gray silty sand											
4		CL	S-PS2-3	40/45	1-1-2	3.80	8.24	65*	CL: Low plasticity gray clay.			41	40	19	97	40	31	9µm	<1µm	
5																				
6			SH-PS2-4	50/50		5.70														
		CL	S-PS2-5	35/45	1-2-2	5.70	9.77	65*				40	41	18	98	40	27	8µm	<1µm	
7																				
		CL	S-PS2-6	44/45	1-1-2	7.30	11.29	65*				42	41	18	98	56	42	3µm	<1µm	
8									SAND: Gray cemented shells with sand											
9		SW-SM	S-PS2-7	30/45	7-8-9	8.70	12.82	65*					NP	NP	11	-	-	0.97	<0.07	
									CL: Gray silty clay											
10																				
		CL	S-PS2-8	25/45	3-4-5	10.20	12.82	65*				38	37	17	78	39	29	9µm	<1µm	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Police Station, eastern edge of Izmit Bay
Date: August 26, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.40 m
Notes:

Test ID: SPT-PS3
GPS Coordinates: 40.72120°N 29.73733°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Brown silty clay.											
1																				
		SM	S-PS3-1	14/45	8-20->30	1.70	5.20	55*	FILL: Brown gravelly silty sand.				NP	NP	24	-	-	1.1	<0.07	
2		SM	S-PS3-2	0/45	3-1-2	2.20	5.20	55*	SM: Gray silty sand.				NP	NP	36	-	-	0.13	<0.07	
3									CL: Gray clay.											
4		CL	SH-PS3-3	45/50		3.70						35	45	23	89	24	17	0.02	<1µm	
5																				
6		CL	SH-PS3-4	45/50		5.70						40	41	18	99	32	18	0.014	<1µm	
7																				
8		SM	S-PS3-5	40/45	4-3-3	8.00	12.82	65*	SM: Gray silty sand.				NP	NP	26	-	-	0.98	<0.07	
		CL							CL: Gray clay.						89	-	-	<0.07	<0.07	
9																				
			SH-PS3-6	42/50		9.30														
10																				
			SH-PS3-7	45/50		10.40														
11																				

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Police Station, eastern edge of Izmit Bay
Date: August 26, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.40 m
Notes:

Test ID: SPT-PS3
GPS Coordinates: 40.72120°N 29.73733°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
11		SM	S-PS3-8	15/45	5-20-18	11.40	14.34	65*	SM: Gray silty sand.				NP	NP	36	-	-	3.4	<0.07	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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ZETAS-SaU-METU
Joint Research
Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Police Station, eastern edge of Izmit Bay
Date: August 26, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 1.20 m
Notes:

Test ID: SPT PS4
GPS Coordinates: 40.72120°N 29.73733°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

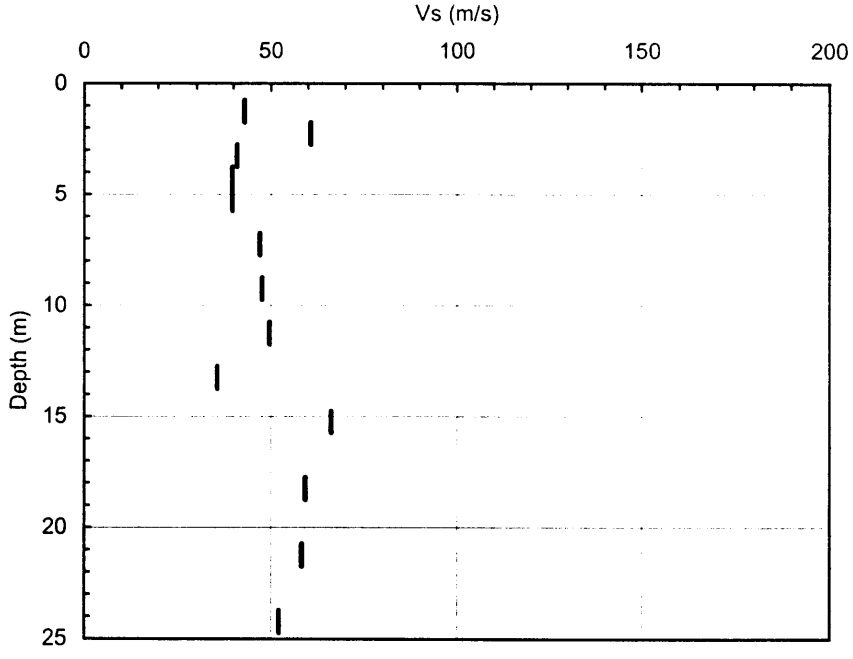
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_{lu} Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Brown silty clay.											
1		GP-GM	S-PS4-1	18/45	3-5-3	1.20	3.67	50*	FILL: Brown sandy silty gravel.				NP	NP	11	-	-	7.7	<0.07	
2									ML: Gray clayey silt.											
3		ML	SH-PS4-2	45/50		2.70						33	NP	NP	78	10	6	0.040	5µm	
4									CL: Gray silty clay.											
		CL	S-PS4-3	37/45	1-0-1	3.90	6.72	60*				40	39	17	93	35	28	10µm	<1µm	
5		CL	SH-PS4-4	42/50		4.70						41	39	19	96	40	31	9.9	<1µm	
6																				
7																				
		CL	S-PS4-5	44/45	1-3-8	7.20	11.29	65*				41	40	19	100	57	43	3.4µm	<1µm	
8		SM							SM: Gray silty sand with shell fragments				NP	NP	22	-	-	0.59	<0.07	
									CL: Gray silty clay											
9																				
10		CL	SH-PS4-6	45/50		9.70						41	39	19	82	45	33	9µm	<1µm	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

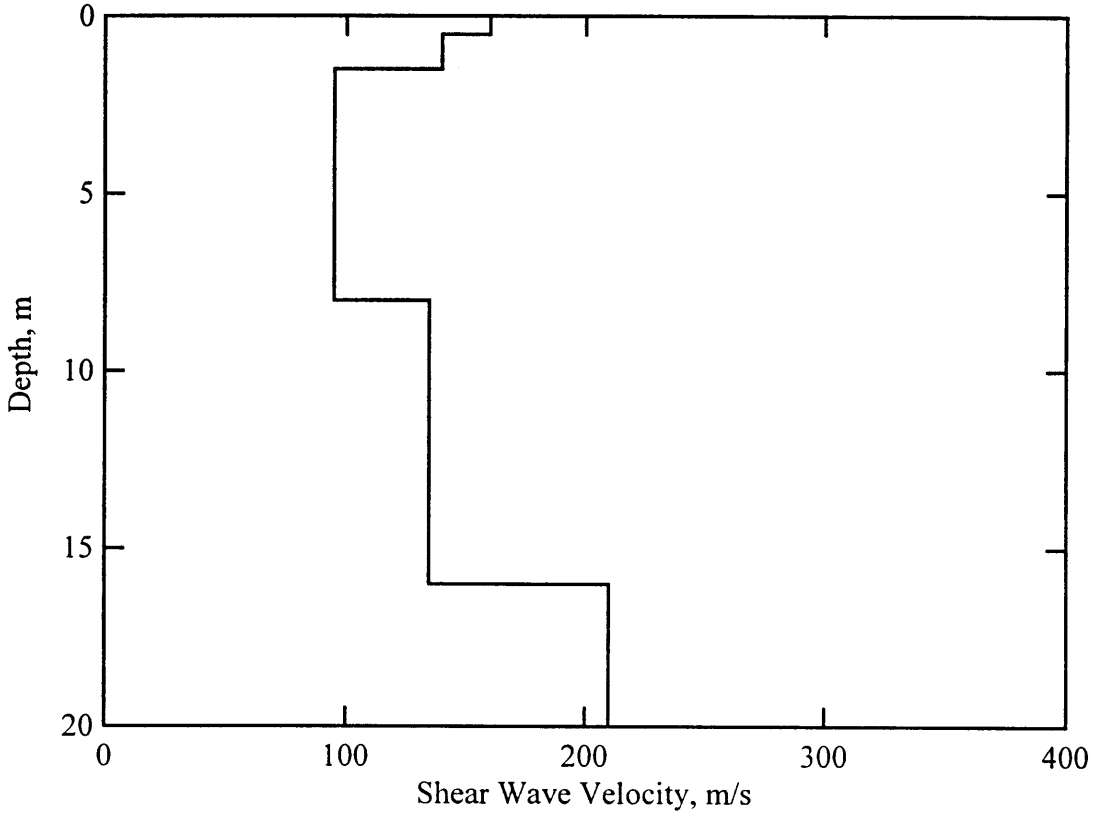
Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-PS4

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.00	0.74	1.74	34	52	43
3.00	1.74	2.74	66	56	61
4.00	2.74	3.74	45	37	41
5.00	3.74	4.74	45	34	40
6.00	4.74	5.74	45	34	40
8.00	6.74	7.74	53	42	47
10.00	8.74	9.74	54	42	48
12.00	10.74	11.74	63	36	49
14.00	12.74	13.74	39	32	36
16.00	14.74	15.74	62	70	66
19.00	17.74	18.74	65	54	59
22.00	20.74	21.74	71	45	58
25.00	23.74	24.74	63	42	52



Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Police Station.

Tabulated values of layer properties determined from forward modeling of Police Station

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0.0	0.5	160	299.3	0.3	1.92
0.5	0.5	140	216.9	0.3	1.92
1.0	0.5	140	820.3	0.485	2.0
1.5	6.5	95	1500	0.498	2.0
8.0	8.0	135	1500	0.4959	2.0
16.0	4.0	210	1500	0.49	2.0

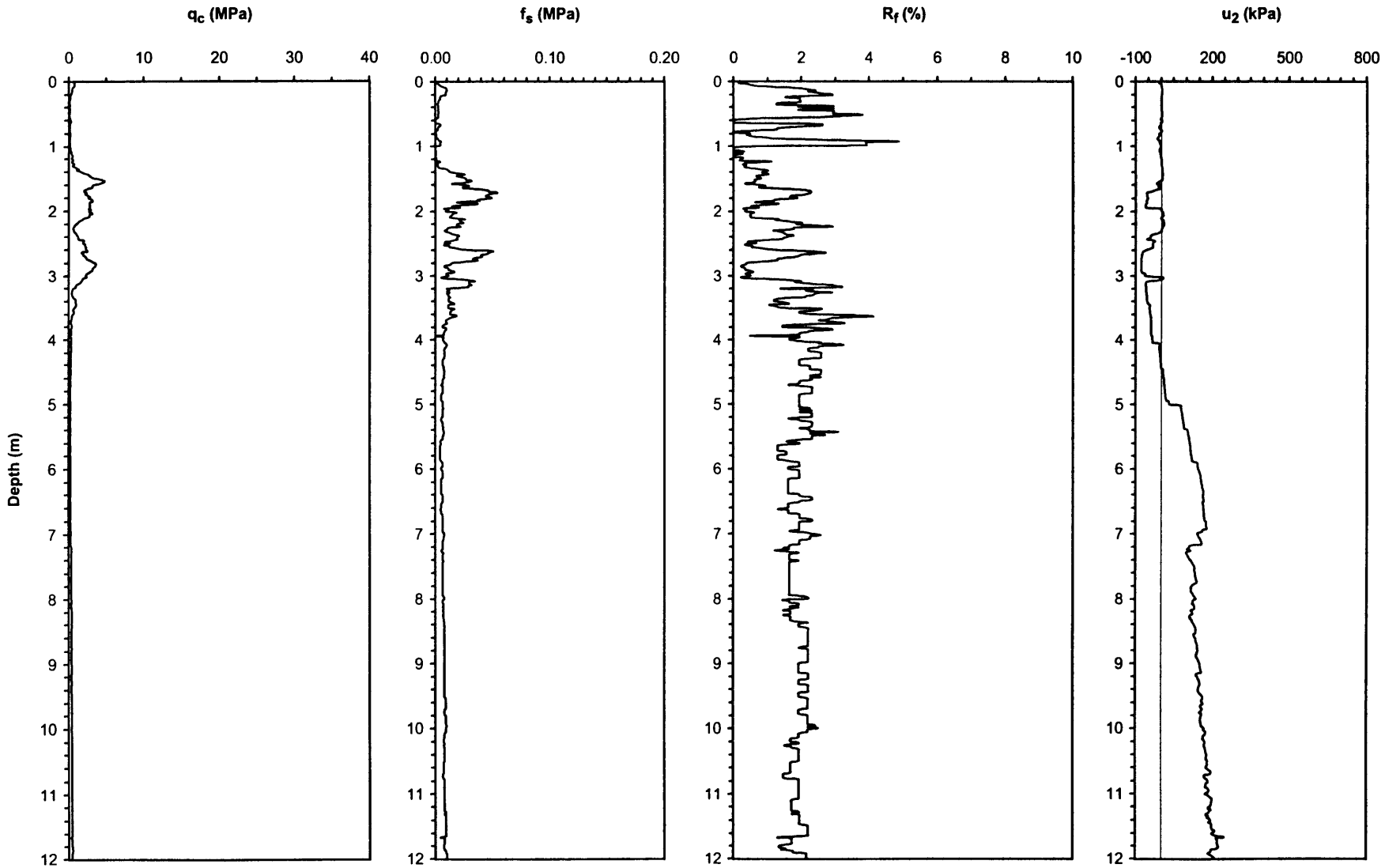
Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

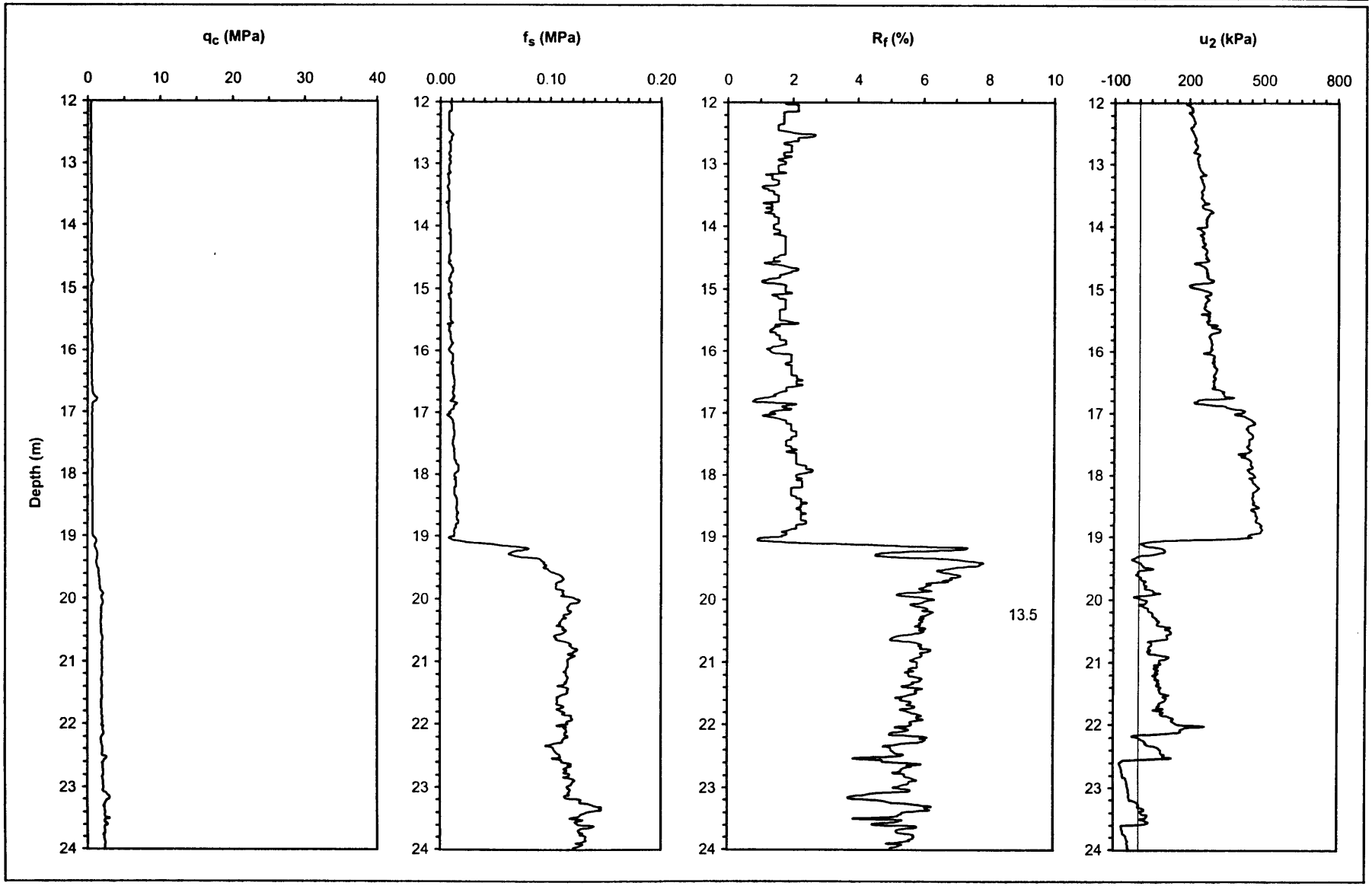
Phase 4

Site: Soccer Field

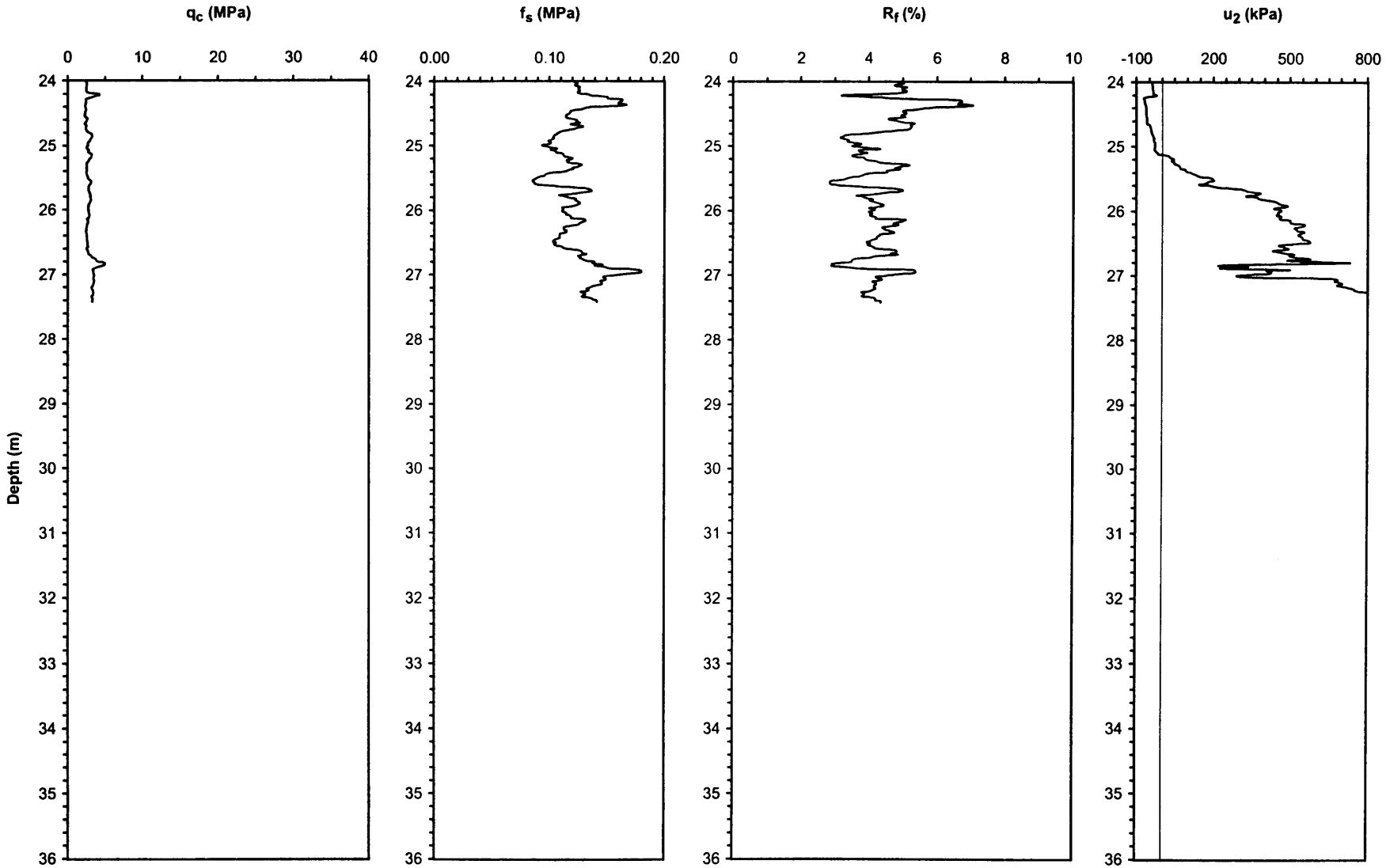
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Soccer Field, Gölcük	
Joint Research	**GPS Coordinates:**	40.7177°N 30.9273°E	
	Test Number:	CPT-SF1	**Elevation:**
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** August 25, 2000
Sponsored by:	**File Name:**	cptsf1.csv	**Water Table Elevation:** 1.00 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.50 m ; starting depth: 0.20 m	



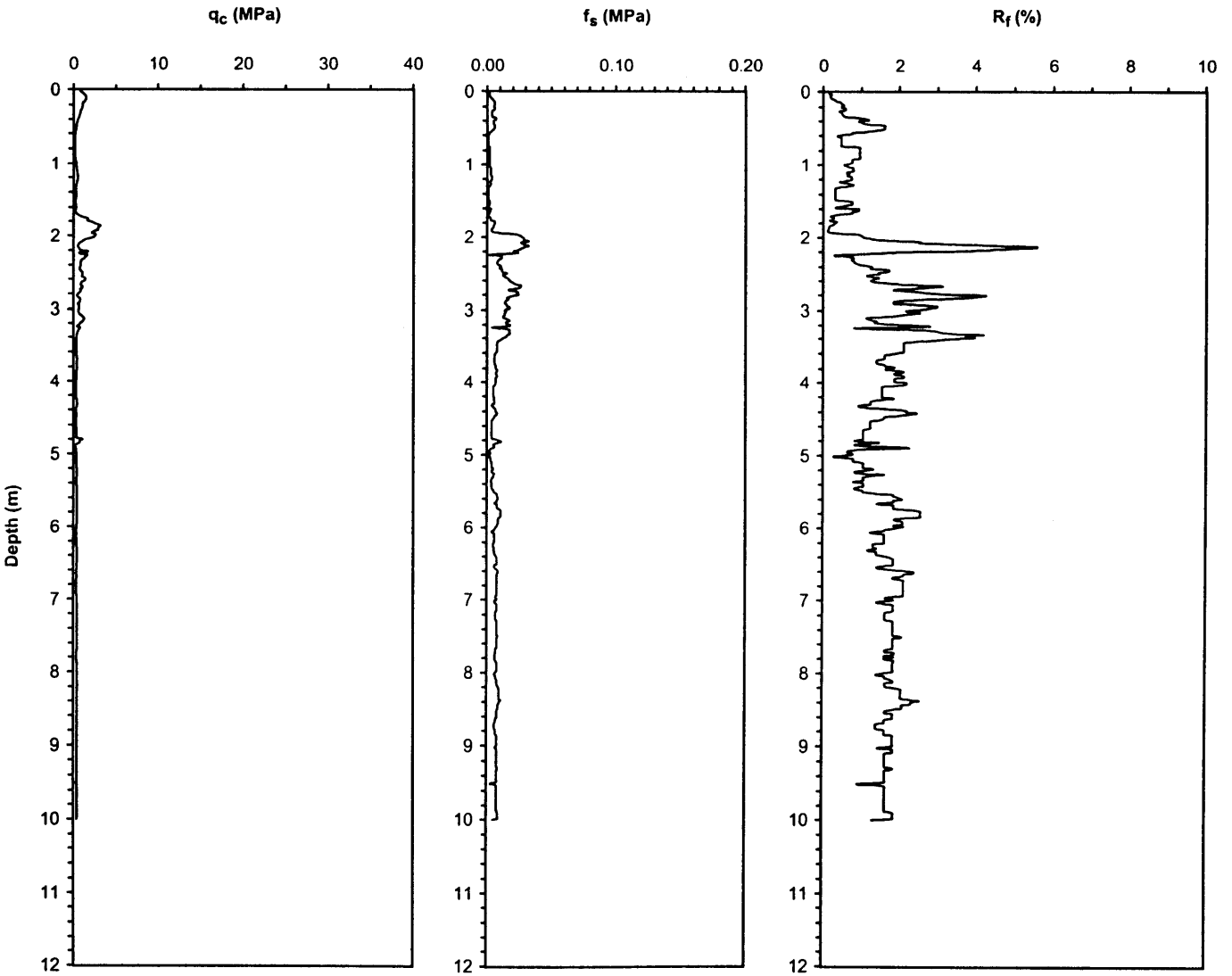
UCB-BYU-UCLA	**Project Name:** Geotechnical Site Investigation at Lateral Spread Sites		**Page:** 2 of 3
ZETAŞ-SAU	**Location:** Soccer Field, Gölcük		
Joint Research	**GPS Coordinates:** 40.7177°N 30.9273°E		
	Test Number: CPT-SF1	**Elevation:**	
	Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:**	August 25, 2000
Sponsored by:	**File Name:** cptsf1.csv	**Water Table Elevation:**	1.00 m
NSF, PEER	**Operator:** ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:**	K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:** Pre-boring depth: 1.50 m ; starting depth: 0.20 m		



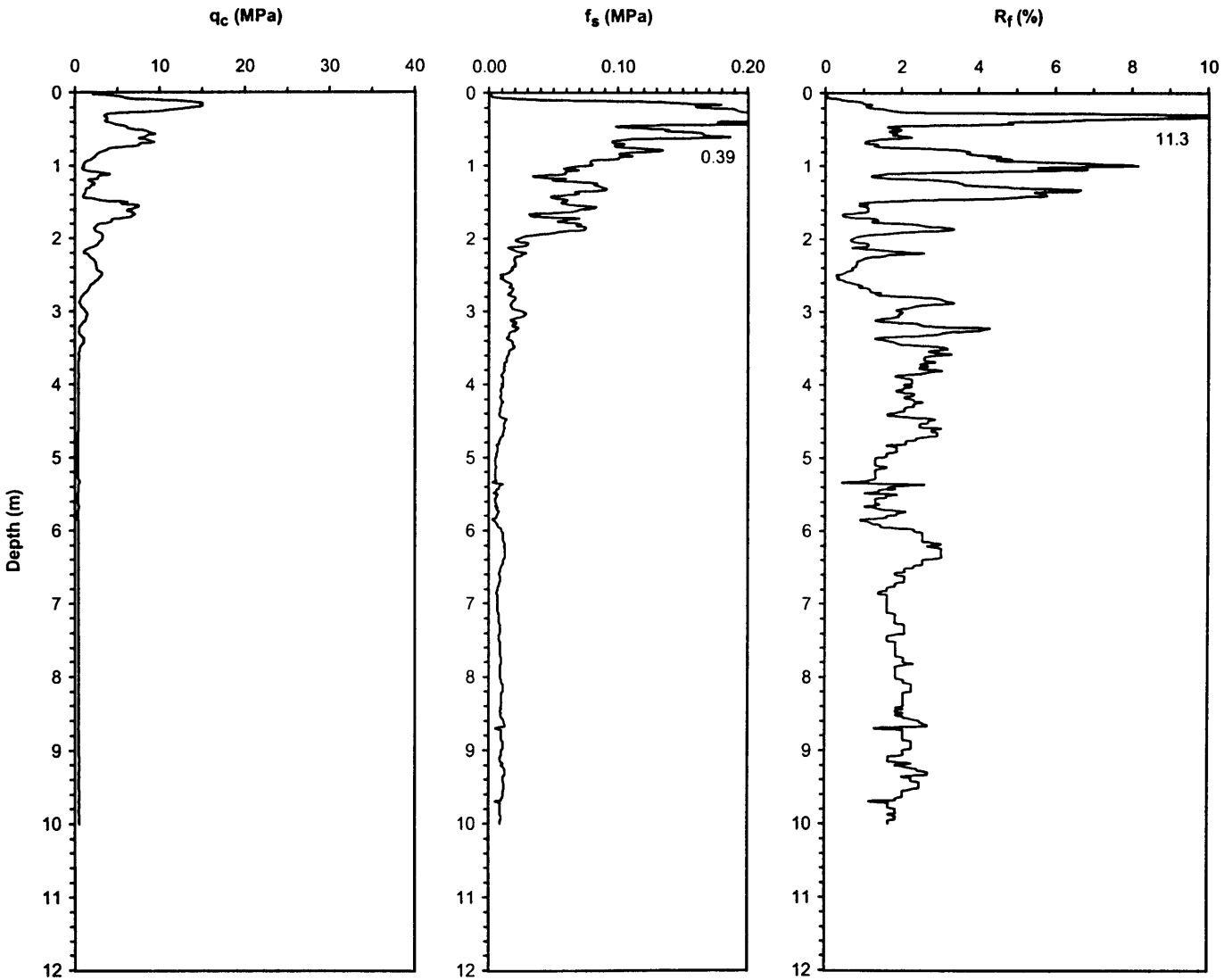
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 3 of 3
ZETAŞ-SAU	**Location:**	Soccer Field, Gölcük	
Joint Research	**GPS Coordinates:**	40.7177°N 30.9273°E	
	Test Number:	CPT-SF1	**Elevation:**
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** August 25, 2000
Sponsored by:	**File Name:**	cptsf1.csv	**Water Table Elevation:** 1.00 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.50 m ; starting depth: 0.20 m	



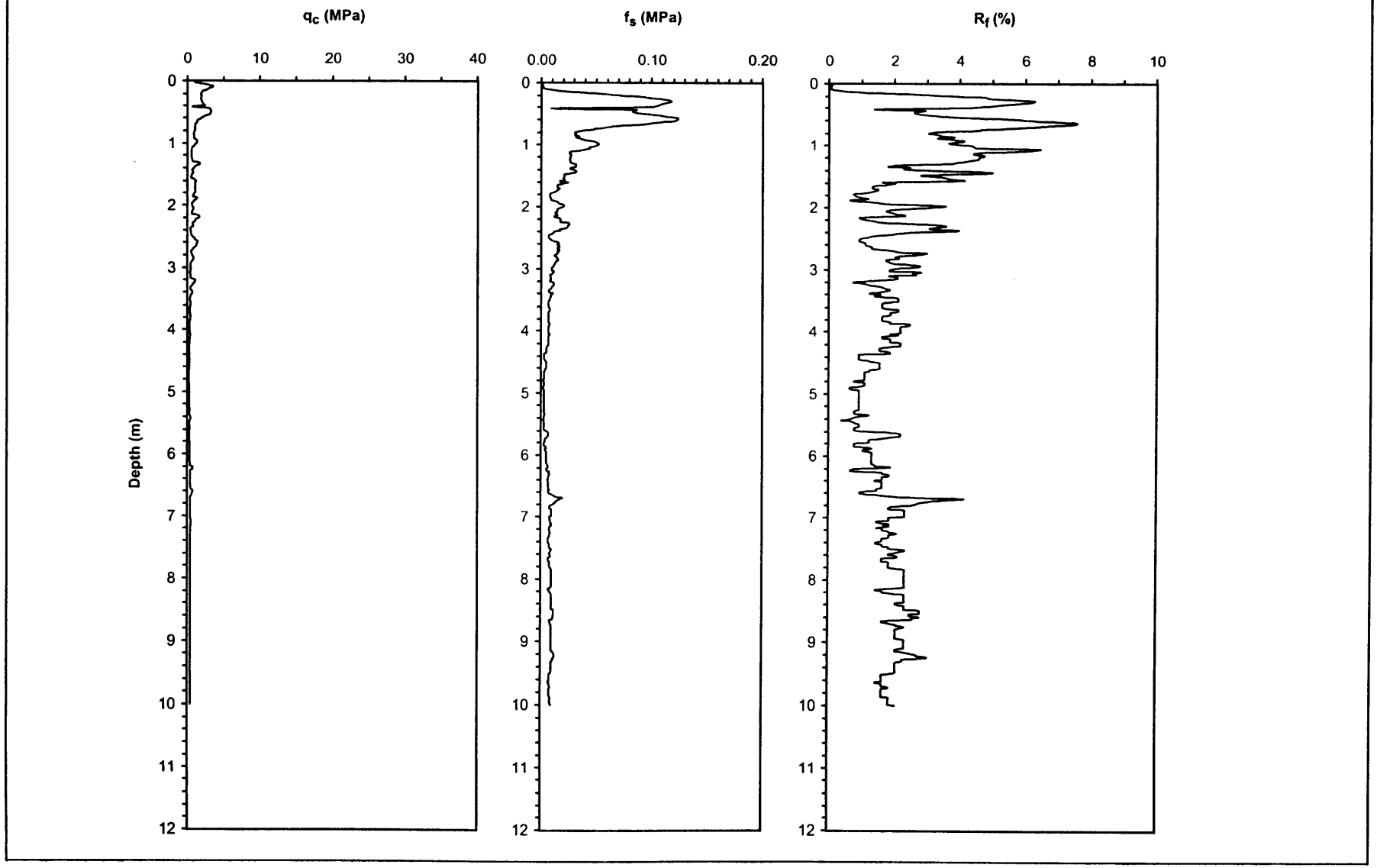
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Soccer Field, Gölcük	
Joint Research	**GPS Coordinates:**	40.7177°N 30.9273°E	
	Test Number:	CPT-SF2	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 28, 2000 14:42
Sponsored by:	**File Name:**	cptsf2.csv	**Water Table Elevation:** 0.90 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 1.65 m ; starting depth: 0.00 m	



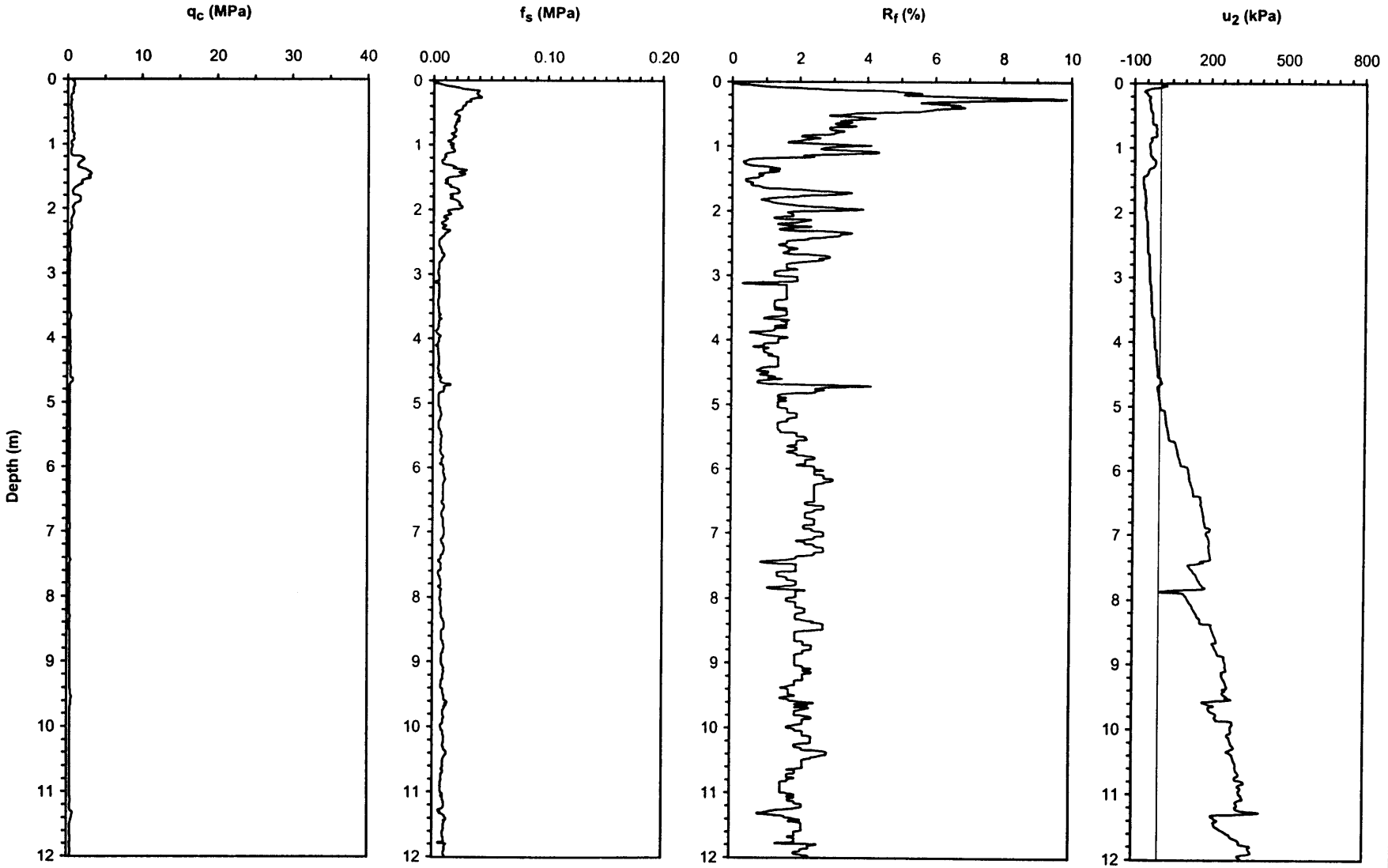
UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Soccer Field, Gölcük	
Joint Research	**GPS Coordinates:**	40.7177°N 30.9273°E	
	Test Number:	CPT-SF3	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 28, 2000 15:33
Sponsored by:	**File Name:**	cptsf3.csv	**Water Table Elevation:** 0.90 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.00 m ; starting depth: 0.00 m	



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Soccer Field, Gölcük	
Joint Research	**GPS Coordinates:**	40.7177°N 30.9273°E	
	Test Number:	CPT-SF4	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** August 28, 2000 19:05
Sponsored by:	**File Name:**	cptsf4.csv	**Water Table Elevation:** 0.80 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Pre-boring depth: 0.00 m ; starting depth: 0.00 m	



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 3
ZETAŞ-SAU	**Location:**	Soccer Field, Gölcük	
Joint Research	**GPS Coordinates:**	40.7177°N 30.9273°E	
	Test Number:	CPT-SF5	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000606 (a.p. v.d. Berg)	**Date:** August 25, 2000
Sponsored by:	**File Name:**	cptsf5.csv	**Water Table Elevation:** 1.00 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**	Starting depth: 0.81 m	

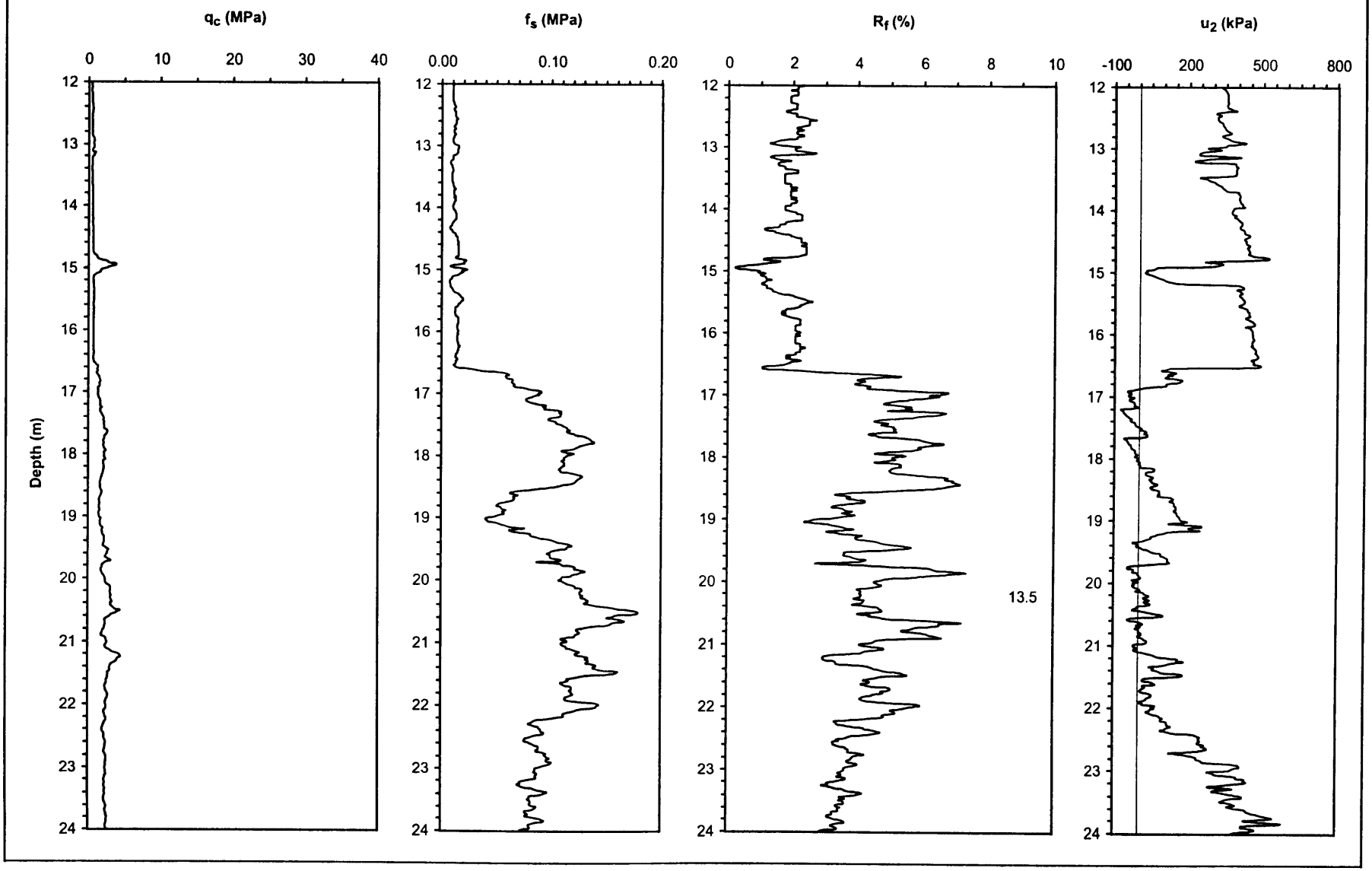


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Soccer Field, Gölcük
GPS Coordinates: 40.7177°N 30.9273°E
Test Number: CPT-SF5
Type of Cone: ELC10 CFP No. 000606 (a.p. v.d. Berg)
File Name: cptsf5.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Starting depth: 0.81 m

Elevation:
Date: August 25, 2000
Water Table Elevation: 1.00 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.

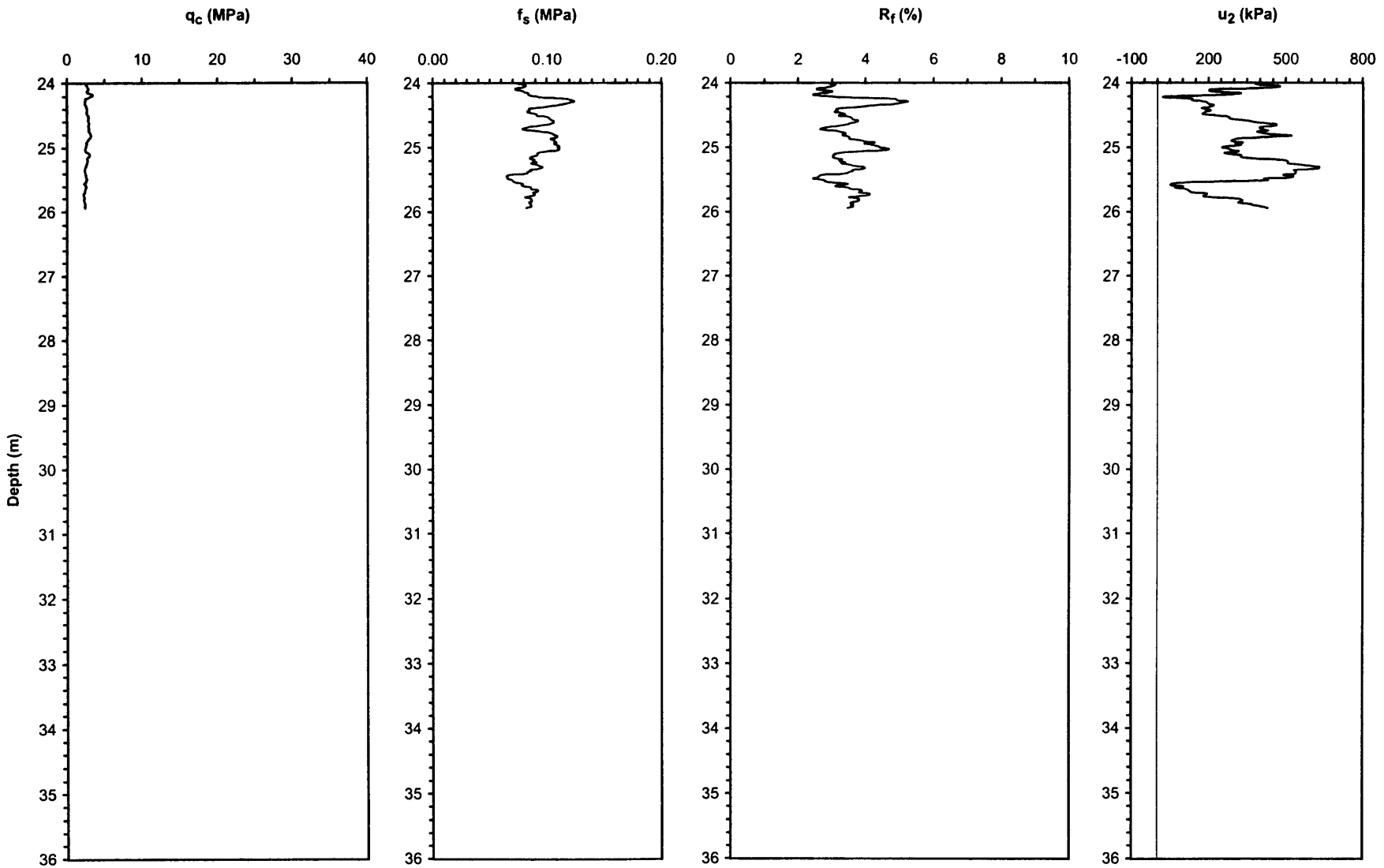


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Soccer Field, Gölcük
GPS Coordinates: 40.7177°N 30.9273°E
Test Number: CPT-SF5
Type of Cone: ELC10 CFP No. 000606 (a.p. v.d. Berg)
File Name: cptsf5.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes: Starting depth: 0.81 m

Elevation:
Date: August 25, 2000
Water Table Elevation: 1.00 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Soccer Field. Eastern Izmit Bay, next to the Navy Base
Date: August 27, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 0.90 m
Notes:

Test ID: SPT-SF5
GPS Coordinates: 40.71767°N 29.92704°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Brown silty clay.											
1																				
									SM: Gray silty sand.											
2		SM	S-SF5-1	23/45	3-3-1	1.70	5.20	55*					NP	NP	16	-	-	1.3	<0.07	
3		ML	S-SF5-2	17/45	1-1-2	2.66	5.20	55*	ML: Gray clayey silt.				NP	NP	66	-	-	<0.07	<0.07	
									CL: Gray silty clay											
4		CH	SH-SF5-3	45/50		3.70						57	57	32	96	42	32	9µm	<1µm	
5		CH	S-SF5-4	33/45	0-0-1	4.70	8.24	65*				60	58	32	86	37	29	0.011	<1µm	
6			SH-SF5-5	40/50		5.70														Laboratory test results will be available after testing "UD" samples.
7		CH	S-SF5-6	41/45	0-0-1	6.70	11.29	65*				58	56	32	96	41	33	9µm	<1µm	
8		CH	SH-SF5-7	42/50		8.26						59	55	34	96	40	32	9µm	<1µm	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

UCB-BYU-UCLA
ZETAS-SaU-METU
Joint Research

Sponsored by:
NSF, Caltrans
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Soccer Field. Eastern Izmit Bay, next to the Navy Base
Date: August 28, 2000
Field Log by: K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 0.80 m
Notes:

Test ID: SPT-SF6
GPS Coordinates: 40.71767°N 29.92704°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

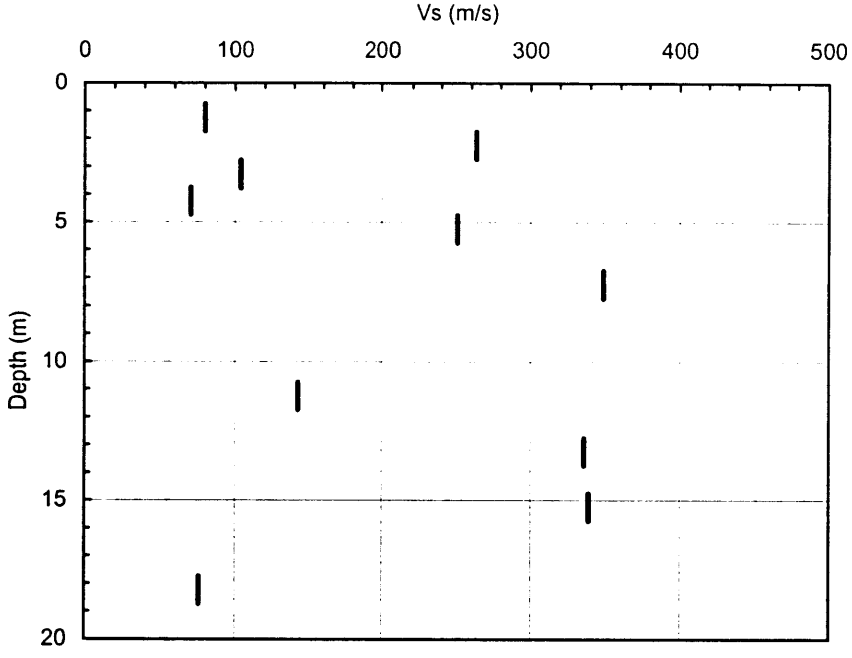
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Brown silty clay.											
1									ML: Gray sandy silt											
2		ML	S-SF6-1	16/45	2-1-1	1.70	5.20	55*					NP	NP	52	-	-	<0.07	<0.07	
3			S-SF6-2	0/45	1-1-1	2.70	5.20	55*	CL: Gray silty clay											
4		CH	SH-SF6-3	45/50		3.70						64	58	32	87	37	28	0.011	<1μm	
5																				
6		CH	SH-SF6-4	45/50		5.20						60	57	33	90	36	28	0.010	<1μm	
7																				
8		CH	SH-SF6-5	42/50		7.70						60	58	34	92	35	30	9μm	<1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

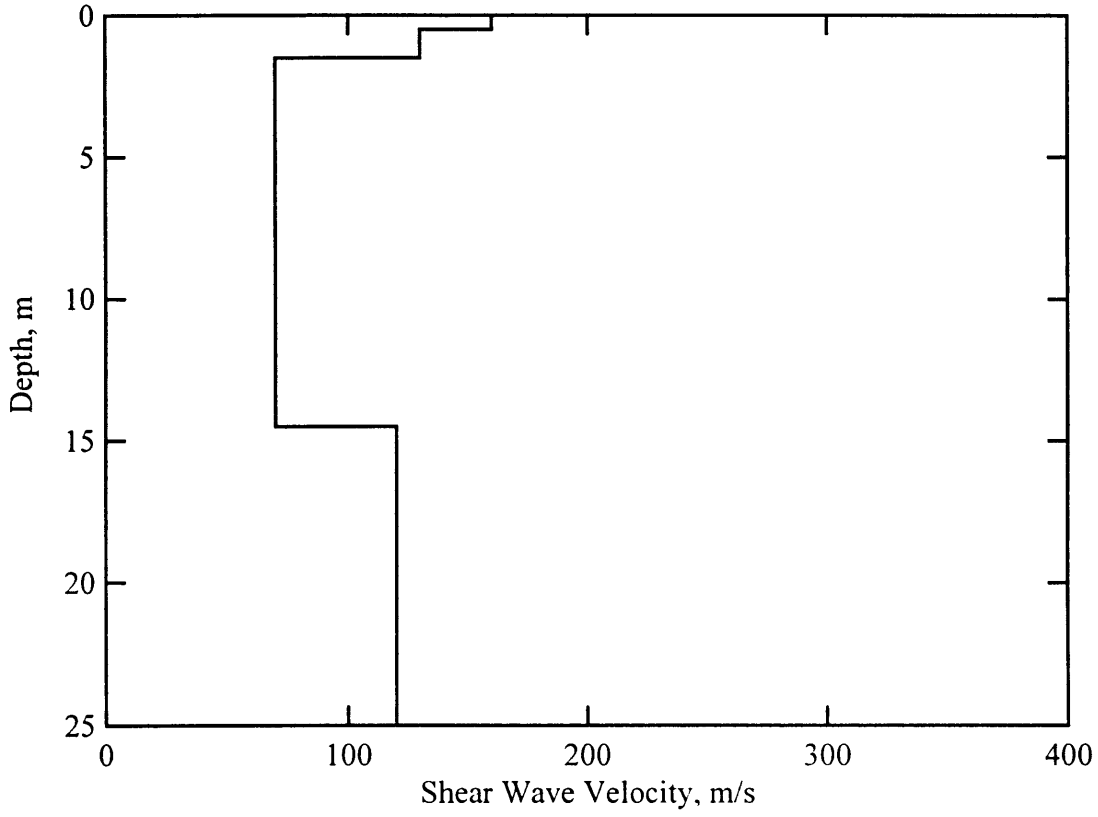
Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-SF1

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.00	0.74	1.74	68	93	80
3.00	1.74	2.74	263	263	263
4.04	2.78	3.78	65	143	104
5.00	3.74	4.74	96	45	70
6.00	4.74	5.74	263	238	251
8.00	6.74	7.74	313	385	349
10.00	8.74	9.74	455	556	505
12.00	10.74	11.74	143	143	143
14.00	12.74	13.74	500	172	336
16.00	14.74	15.74	179	500	339
19.00	17.74	18.74	53	100	76



Data processed by: ZETAS (Zemin Teknolojisi AS)



Shear wave velocity profile determined from forward modeling of Soccer Field.

Tabulated values of layer properties determined from forward modeling of Soccer Field

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.5	160	299.3	0.3	1.92
0.5	0.5	130	318.4	0.4	1.92
1.0	0.5	130	477.7	0.46	2.0
1.5	13.0	70	1500	0.4978	2.0
14.5	10.5	120	1500	0.4968	2.0

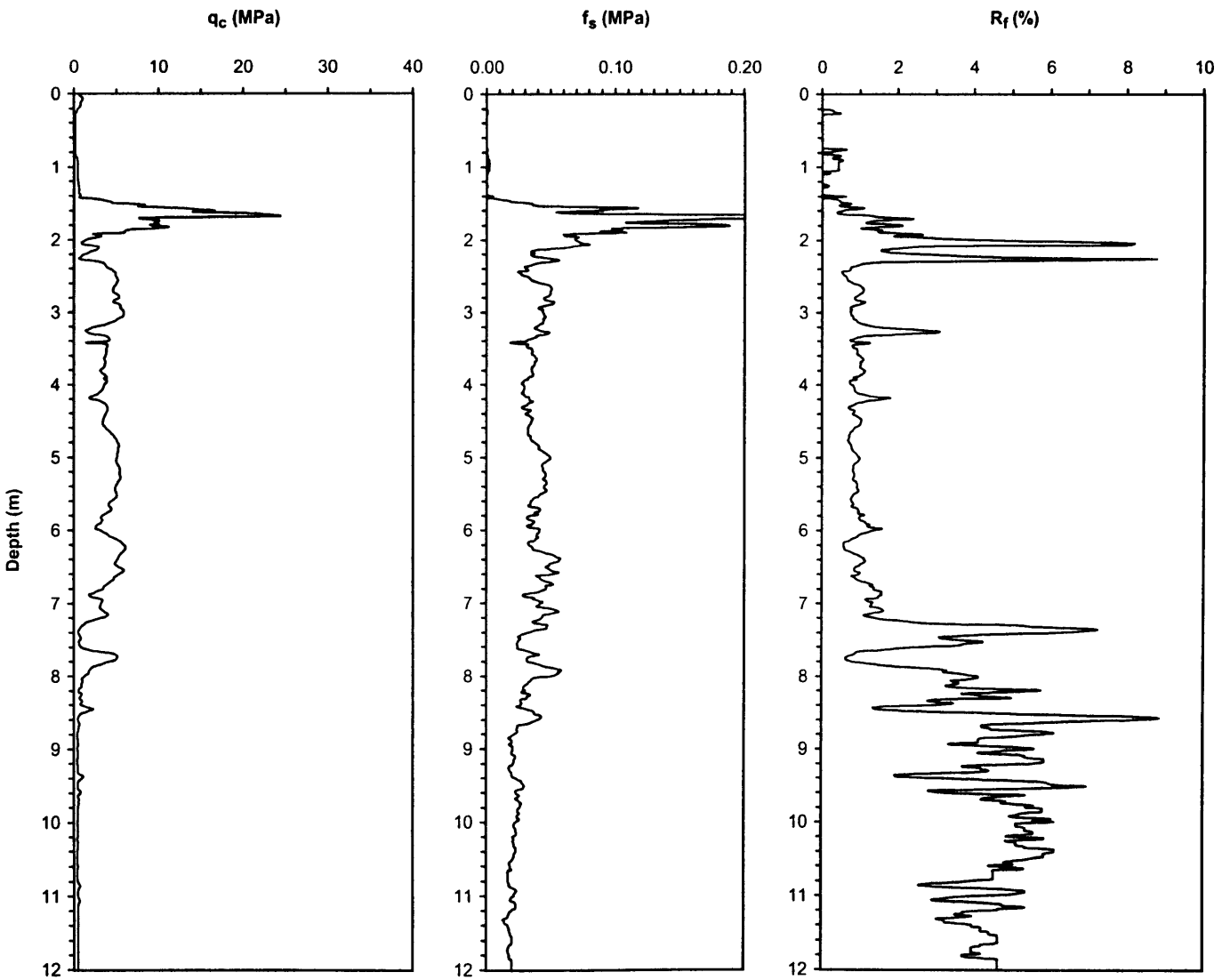
Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

Phase 4

Site: Yalova Harbor

UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 2
ZETAŞ-SAU	**Location:**	Yalova Harbor, Yalova	
Joint Research	**GPS Coordinates:**	40.6597°N 29.2689°E	
	Test Number:	CPT-YH1	**Elevation:**
	Type of Cone:	ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:** September 6, 2000 14:20
Sponsored by:	**File Name:**	cptyh1.csv	**Water Table Elevation:**
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**		

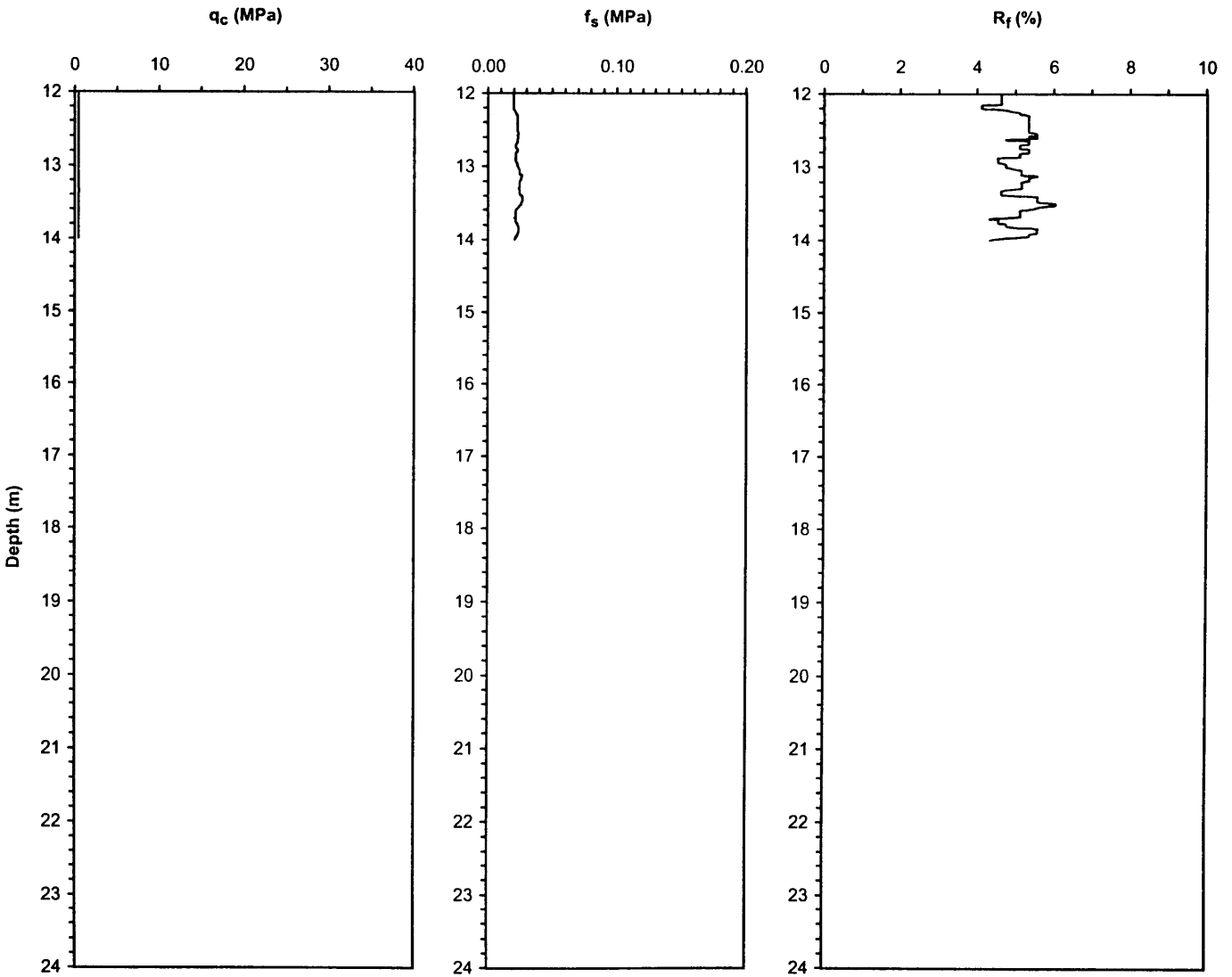


UCB-BYU-UCLA
ZETAŞ-SAU
Joint Research

Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnica Site Investigation at Lateral Spread Sites
Location: Yalova Harbor, Yalova
GPS Coordinates: 40.6597°N 29.2689°E
Test Number: CPT-YH1
Type of Cone: ELC10 CF No. 990618 (a.p. v.d. Berg)
File Name: cptyh1.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation:
Date: September 6, 2000 14:20
Water Table Elevation:
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



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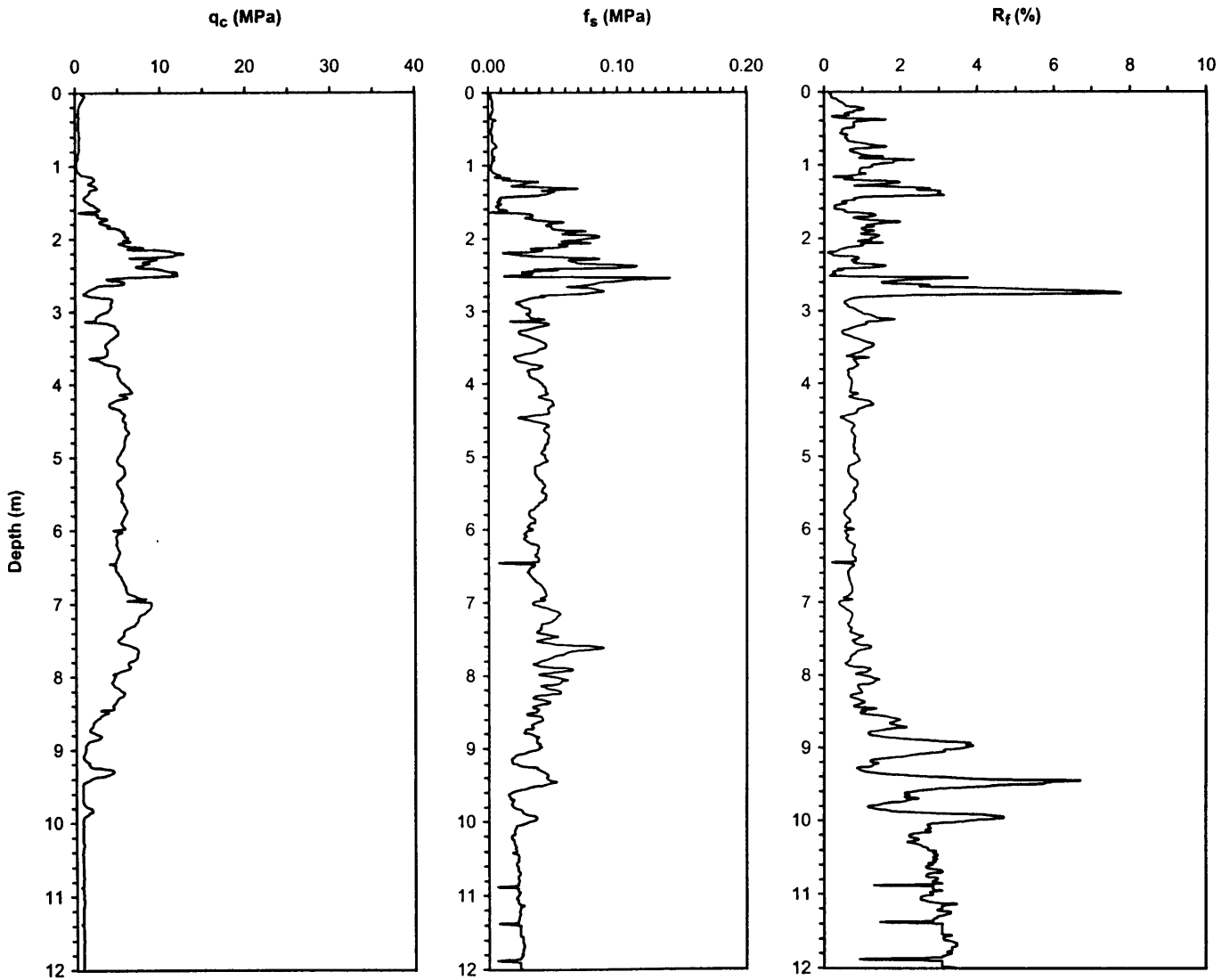
Joint Research

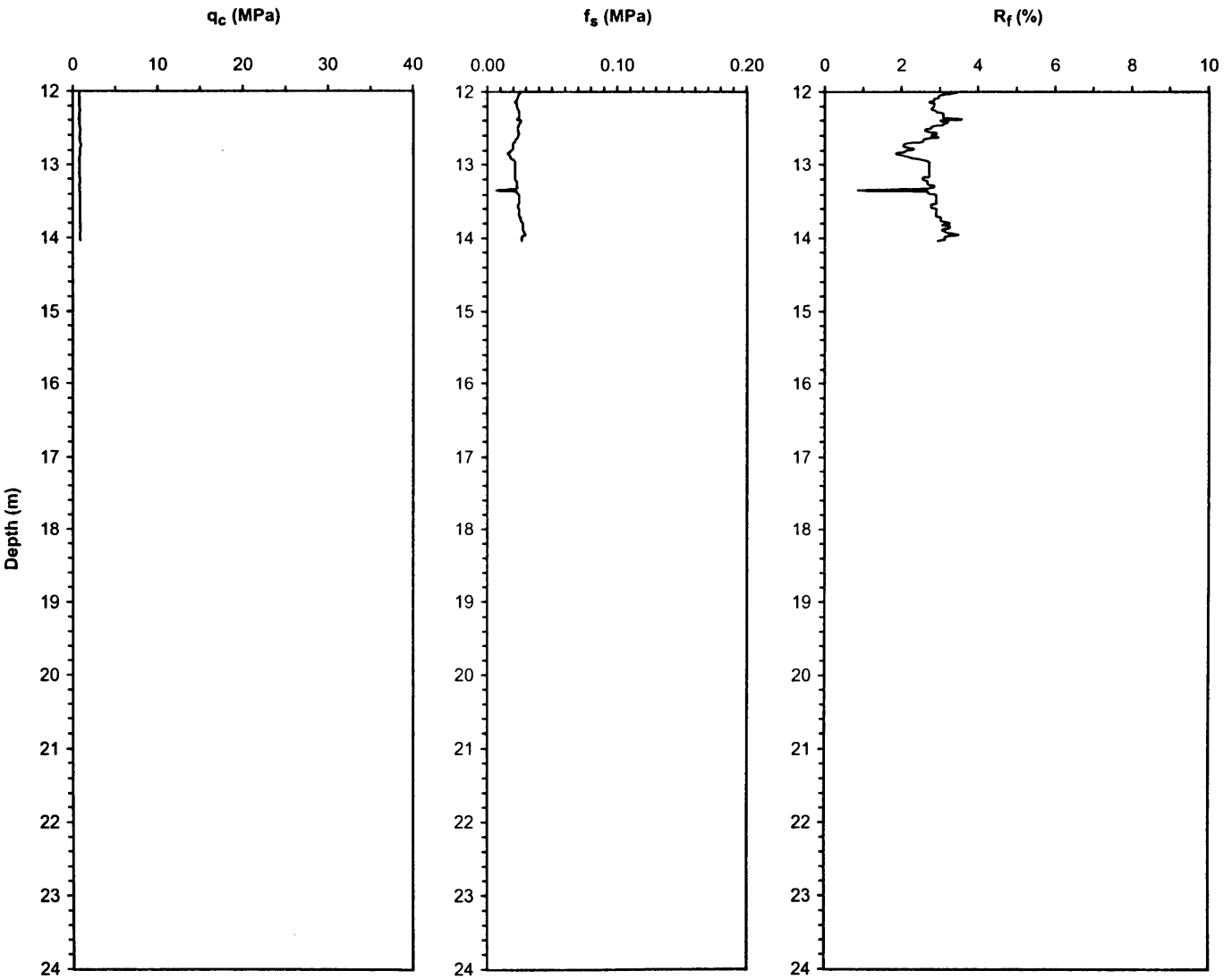
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Yalova Harbor, Yalova
GPS Coordinates: 40.6597°N 29.2689°E
Test Number: CPT-YH2
Type of Cone: ELC10 CF No. 990618 (a.p. v.d. Berg)
File Name: cptyh2.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation:
Date: September 6, 2000 12:53
Water Table Elevation:
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



UCB-BYU-UCLA	**Project Name:** Geotechnica Site Investigation at Lateral Spread Sites		**Page:** 2 of 2
ZETAŞ-SAU	**Location:** Yalova Harbor, Yalova		
Joint Research	**GPS Coordinates:** 40.6597°N 29.2689°E		
	Test Number: CPT-YH2	**Elevation:**	
	Type of Cone: ELC10 CF No. 990618 (a.p. v.d. Berg)	**Date:**	September 6, 2000 12:53
Sponsored by:	**File Name:** cptyh2.csv	**Water Table Elevation:**	
NSF, PEER	**Operator:** ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:**	K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**		



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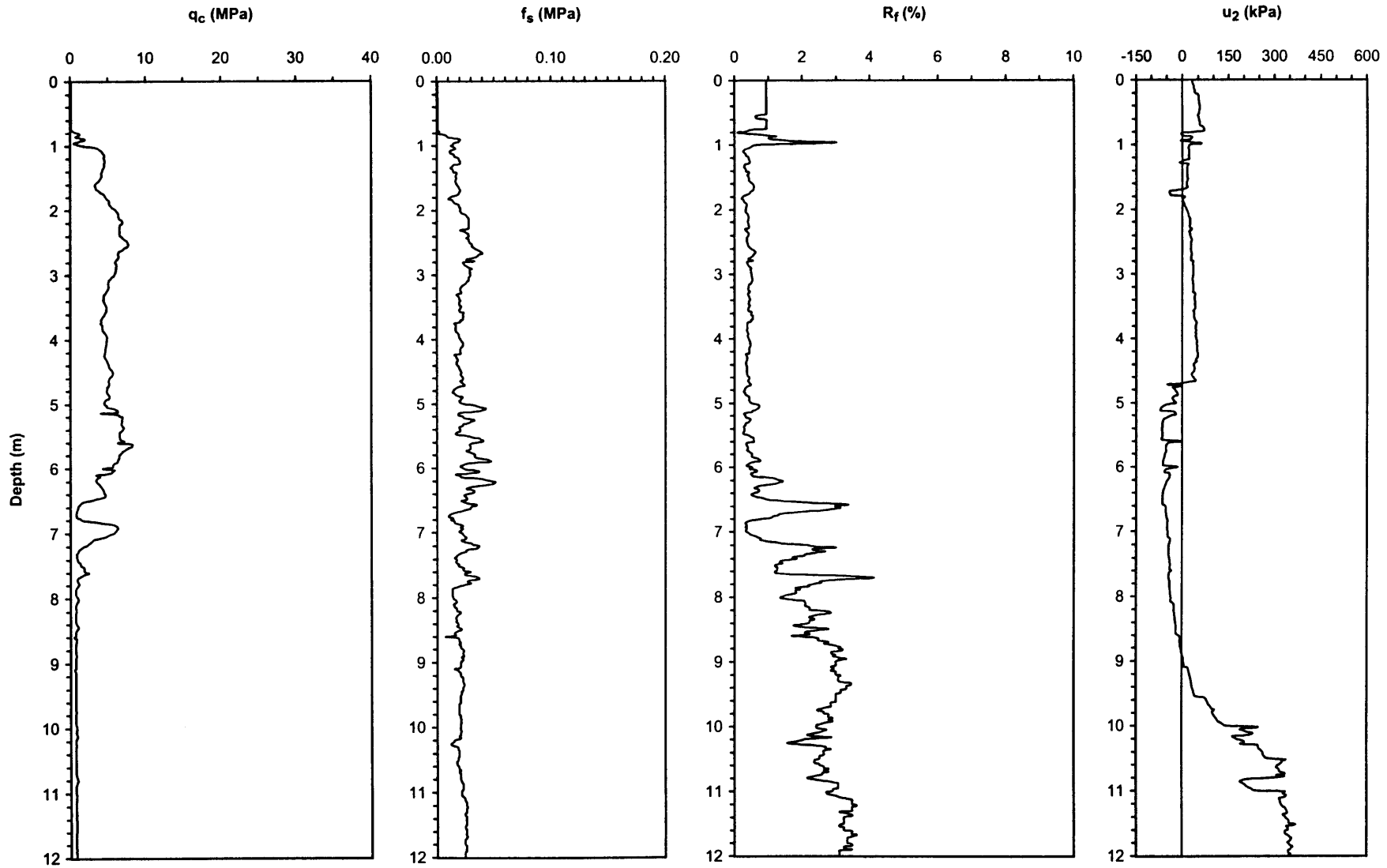
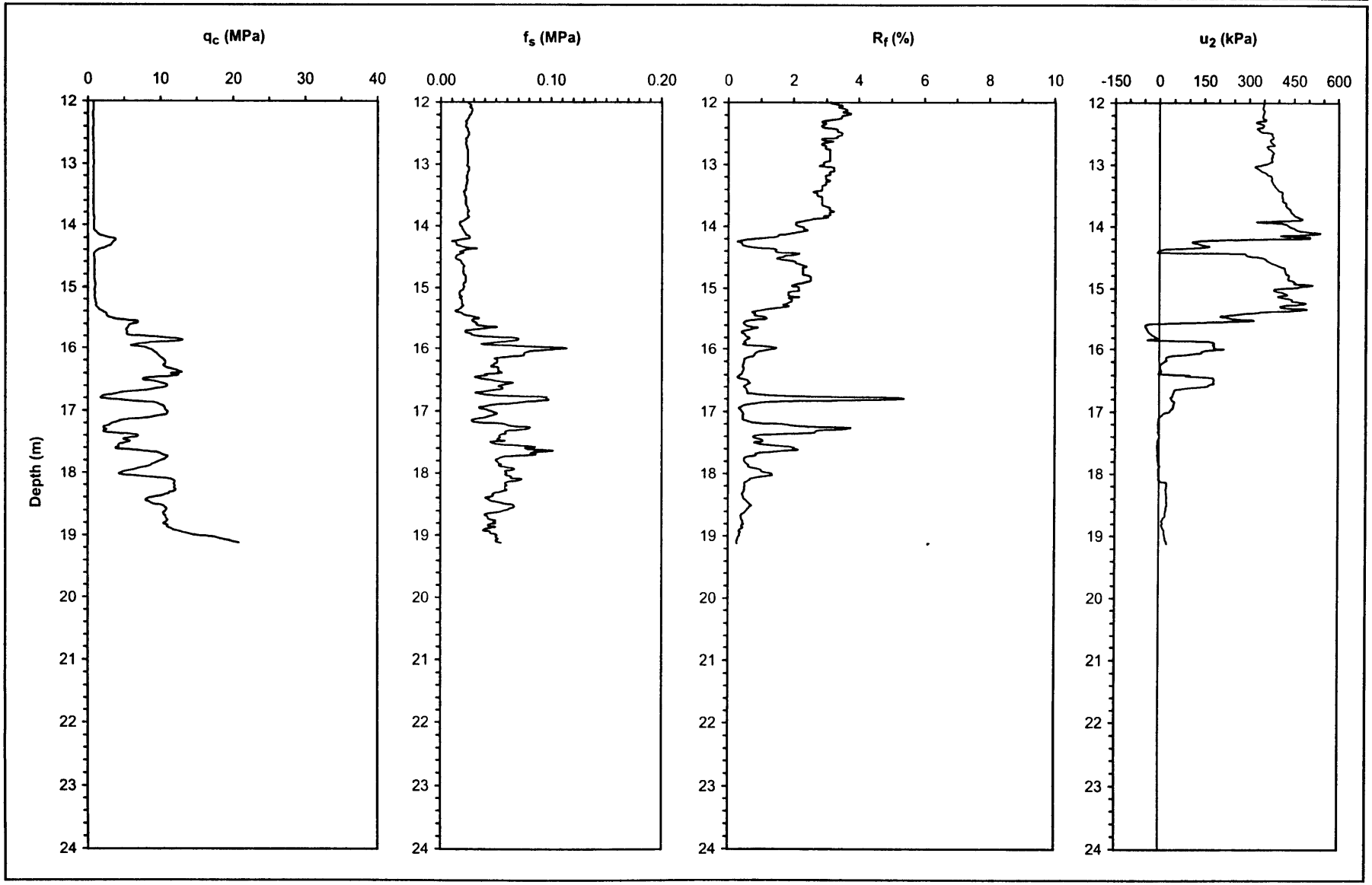
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Geotechnical Site Investigation at Lateral Spread Sites
Location: Yalova Harbor, Yalova
GPS Coordinates: 40.6597°N 29.2689°E
Test Number: CPT-YH3
Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)
File Name: cptyh3.csv
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

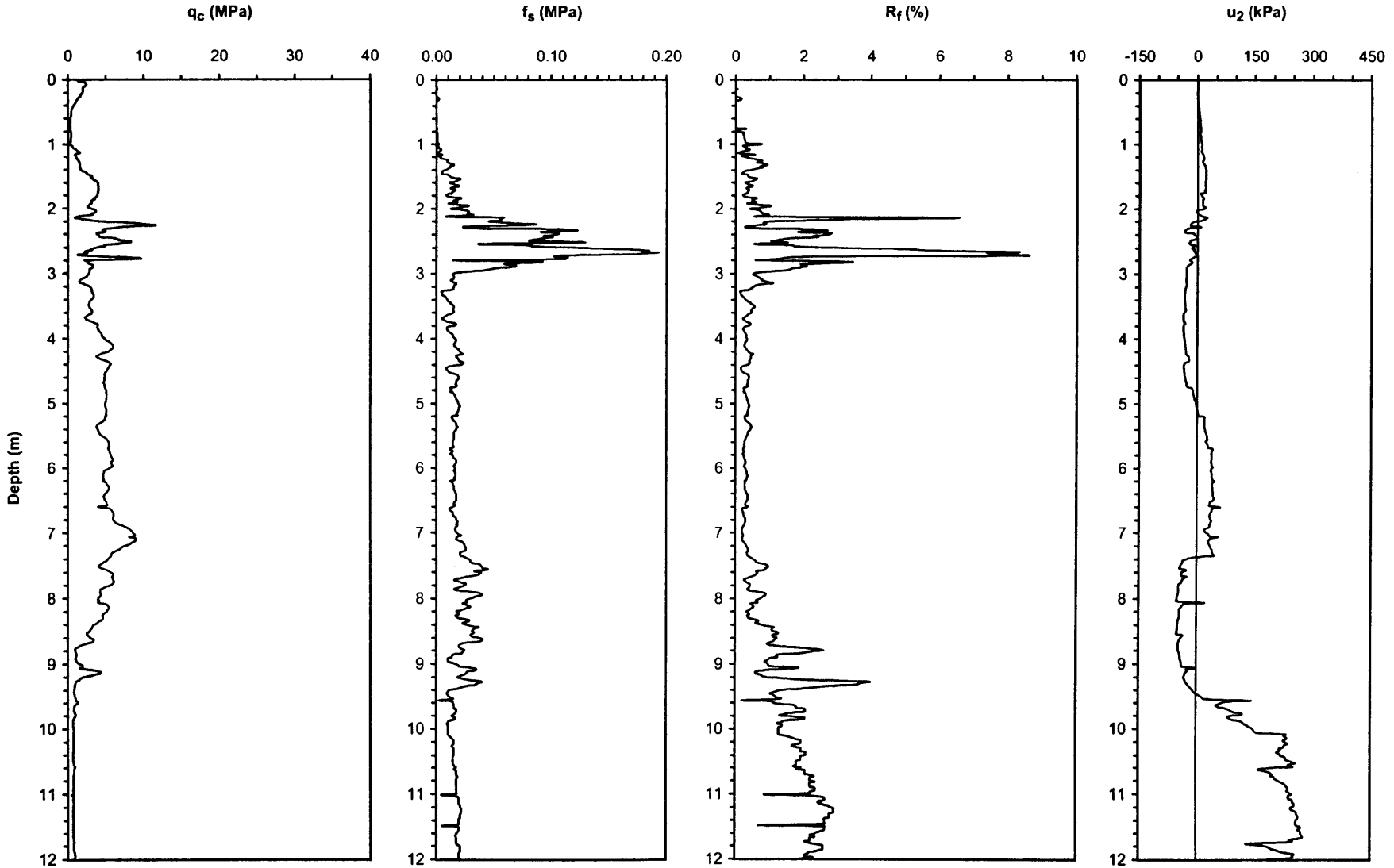
Elevation:
Date: September 6, 2000 17:07
Water Table Elevation: 0.75 m
Responsible Engineers: K. Ö. Çetin, T. Yilmaz, M.E.T.U.



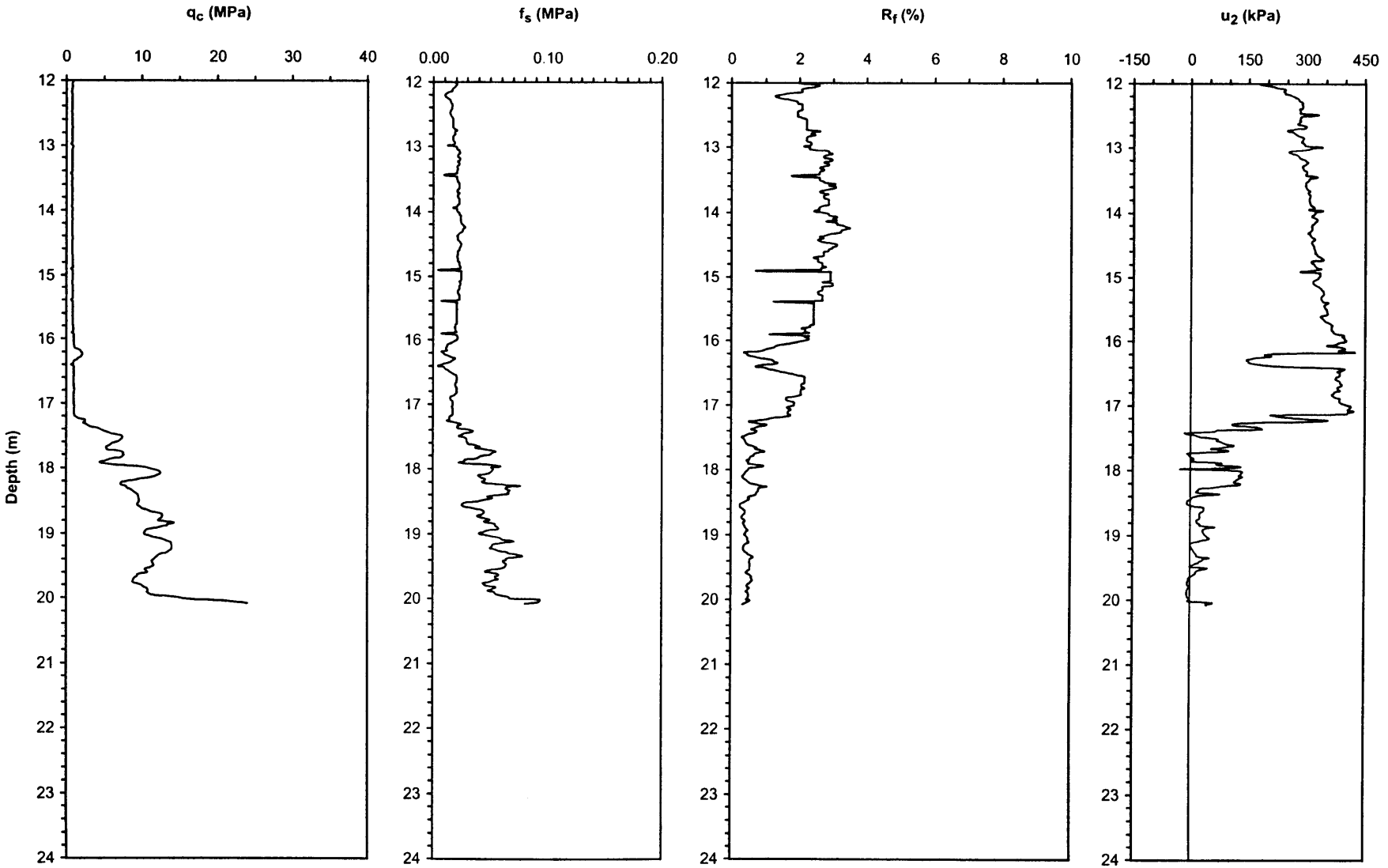
UCB-BYU-UCLA	**Project Name:**	Geotechnica Site Investigation at Lateral Spread Sites	**Page:** 2 of 2
ZETAŞ-SAU	**Location:**	Yalova Harbor, Yalova	
Joint Research	**GPS Coordinates:**	40.6597°N 29.2689°E	
	Test Number:	CPT-YH3	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** September 6, 2000 17:07
Sponsored by:	**File Name:**	cptyh3.csv	**Water Table Elevation:** 0.75 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Geotechnical Site Investigation at Lateral Spread Sites	**Page:** 1 of 2
ZETAŞ-SAU	**Location:**	Yalova Harbor, Yalova	
Joint Research	**GPS Coordinates:**	40.6597°N 29.2689°E	
	Test Number:	CPT-YH4	**Elevation:**
	Type of Cone:	ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:** September 6, 2000 16:14
Sponsored by:	**File Name:**	cptyh4.csv	**Water Table Elevation:** .80 m
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:** Geotechnica Site Investigation at Lateral Spread Sites		**Page:** 2 of 2
ZETAŞ-SAU	**Location:** Yalova Harbor, Yalova		
Joint Research	**GPS Coordinates:** 40.6597°N 29.2689°E		
	Test Number: CPT-YH4	**Elevation:**	
	Type of Cone: ELC10 CFP No. 000605 (a.p. v.d. Berg)	**Date:**	September 6, 2000 16:14
Sponsored by:	**File Name:** cptyh4.csv	**Water Table Elevation:**	.80 m
NSF, PEER	**Operator:** ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:**	K. Ö. Çetin, T. Yilmaz, M.E.T.U.
Caltrans, CEC, PG&E	**Notes:**		



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Joint Research

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Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Yalova Harbor, Yalova
Date: August 01, 2000
Field Log by: M. T. Yilmaz, K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 0.75 m
Notes:

Test ID: SPT-YH1
GPS Coordinates: 40.65971°N 30.26879°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									SM: Gray silty sand.											
1		SP-SM	S-YH1-1	21/45	10-20-25	1.20	3.67	50*					NP	NP	11	-	-	7.9	<0.07	
2																				
3		SP-SM	S-YH1-2	37/45	2-0-4	2.70	5.20	55*					NP	NP	7	-	-	0.33	0.12	
		SP-SM											NP	NP	12	-	-	0.20	<0.07	
		ML							ML: Gray sandy silt.						84	-	-	<0.07	<0.07	Not enough sample to perform Atterberg limit test
4		SP-SM	S-YH1-3	37/45	5-4-6	3.70	6.72	60*	SM: Gray silty sand.				NP	NP	9	-	-	0.29	0.087	
															74	-	-	<0.07	<0.07	
5																				
		SP-SM	S-YH1-4	36/45	3-3-4	5.20	8.24	65*					NP	NP	10	-	-	0.22	0.074	
		SP-SM											NP	NP	11	-	-	0.23	0.070	
6																				
		SM	S-YH1-5	40/45	3-5-5	6.20	9.77	65*					NP	NP	23	-	-	0.17	<0.07	
7		SP											NP	NP	5	-	-	0.24	0.021	
8		CL	S-YH1-6	42/45	2-2-2	7.70	11.29	65*	CL: Gray silty clay, with sandy silt traces.				30	20	59	19	15	0.074	<1μm	
		SM											NP	NP	29	-	-	0.12	<0.07	
									SM: Gray silty sand.											
9		CL	S-YH1-7	36/45	1-1-2	8.70	12.82	65*	CL: Gray silty clay, with sandy silt traces.				41	21	77	36	28	0.017	<1μm	
		CL	SH-YH1-8	43/50		9.50							43	24	72	34	28	0.018	<1μm	
10																				

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Yalova Harbor, Yalova
Date: September 2, 2000
Field Log by: M. T. Yilmaz, K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 0.9 m
Notes:

Test ID: SPT-YH2
GPS Coordinates: 40.65971°N 30.26879°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									SM: Gray silty sand.											
1																				
2																				
3			S-YH2-1	0/45	2-3-5	2.70	5.20	55*												
4		SP-SM SM	S-YH2-2	28/45	4-3-6	3.70	6.72	60*					NP NP	NP NP	7 45	- -	- -	0.32 0.095	0.10 <0.07	
5			S-YH2-3	0/45	6-8-6	4.70	8.24	65*												
6		SM SM	S-YH2-4	28/45	4-6-6	5.70	9.77	65*					NP NP	NP NP	12 21	- -	- -	0.24 0.20	<0.07 <0.07	
7		SM	S-YH2-5	27/45	6-6-6	6.70	11.29	65*					NP	NP	26	-	-	0.13	<0.07	
8		CL	S-YH2-6	6/45	2-2-5	7.70	11.29	65*	CL: Gray silty clay.				30	19	53	18	15	0.074	1μm	
9		ML	SH-YH2-7	40/50		8.70			ML: Gray clayey silt.			34	NP	NP	79	18	12	0.049	1μm	
10		CL	SH-YH2-8	40/50		9.70			CL: Gray silty clay.				43	23	74	33	28	0.018	1μm	

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic

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Joint Research

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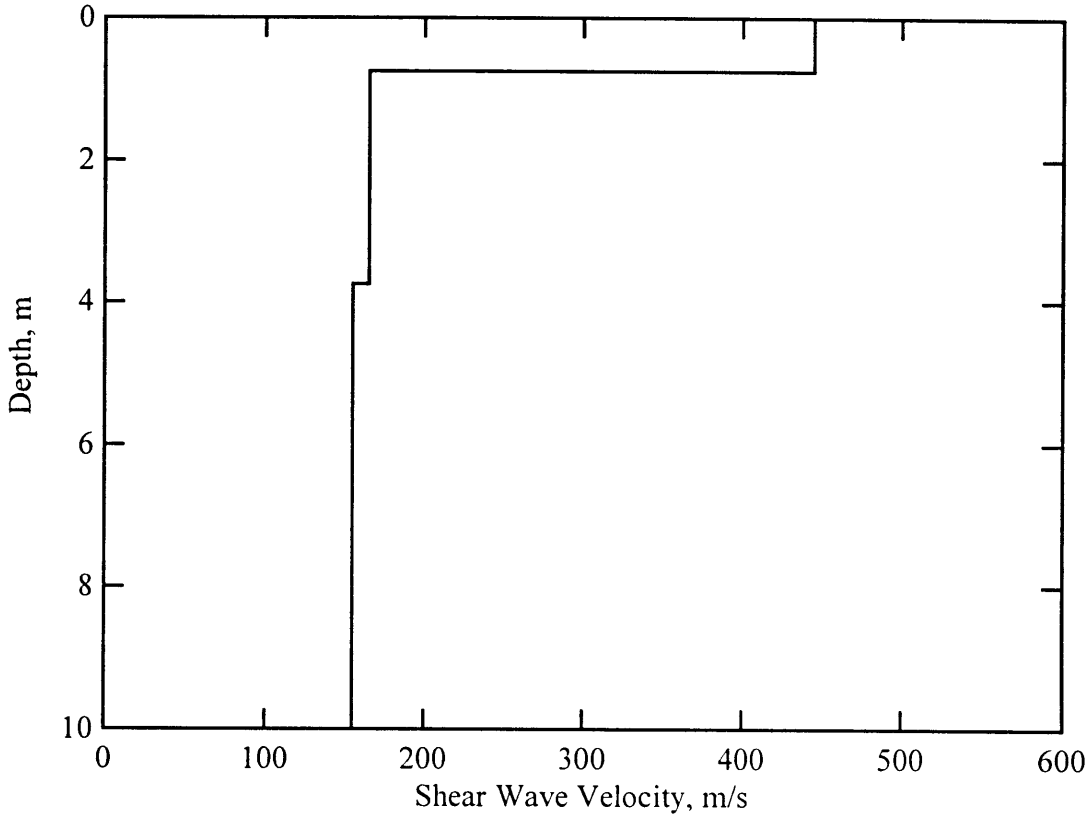
CEC, PG&E

Project Name: Geotechnical Site Investigations at Lateral Spread Sites
Location: Yalova Harbor, Yalova
Date: August 3, 2000
Field Log by: M. T. Yilmaz, K. Ö. Çetin
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: 0.8 m
Notes:

Test ID: SPT-YH3
GPS Coordinates: 40.65971°N 30.26879°E
Elevation:
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: K. Ö. Çetin and M. T. Yilmaz, M.E.T.U.
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									SM: Gray silty sand.											
1																				
2																				
3		SM	S-YH3-1	34/45	2-3-5	2.43	5.20	55*					NP	NP	16	-	-	0.20	<0.07	
		SM	S-YH3-2	30/45	5-6-6	3.20	6.72	60*					NP	NP	13	-	-	0.22	<0.07	
4		SP-SM											NP	NP	9	-	-	0.30	0.079	
		SP-SM	S-YH3-3	31/45	3-4-4	4.20	8.24	65*					NP	NP	10	-	-	0.25	0.074	
5		SM	S-YH3-4	35/45	3-5-6	5.20	9.77	65*					NP	NP	11	-	-	0.23	0.070	
6		SM	S-YH3-5	38/45	5-6-7	6.20	9.77	65*					NP	NP	17	-	-	0.18	<0.07	
7		SM	S-YH3-6	38/45	3-5-6	7.20	11.29	65*					NP	NP	33	-	-	0.10	<0.07	
8		CL	S-YH3-7	43/45	3-2-3	8.20	12.82	65*	CL: Gray silty clay.				31	19	56	18	16	0.074	<1μm	
9		CL	SH-YH3-8	40/50		9.10						31	35	17	90	25	18	0.026	<1μm	
10		CL	SH-YH3-8	40/50		10.40						32	36	18	80	24	17	0.028	<1μm	
11																				

Legend
S: Spit Spoon (SPT) SH: Shelby Tube * Estimated Energy Ratio NP: Nonplastic



Shear wave velocity profile determined from forward modeling of Yalova Harbor.

Tabulated values of layer properties determined from forward modeling of Yalova Harbor

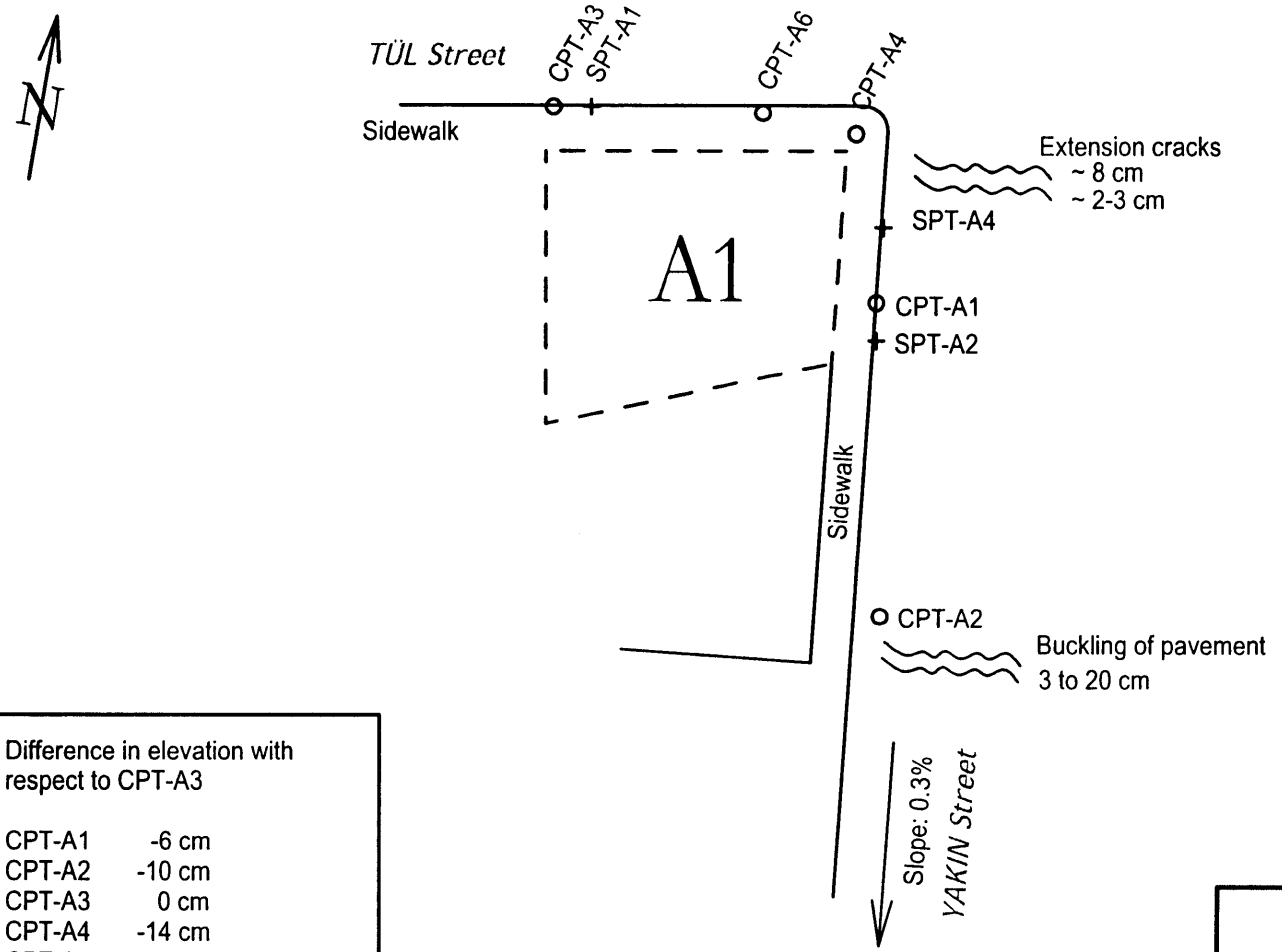
			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0.0	0.75	445	832.5	0.3	1.92
0.75	3.0	165	1500	0.4939	2.0
3.75	6.25	155	1500	0.4946	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them

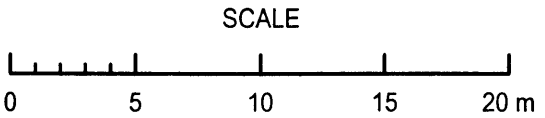
Phase 4

Site: Yakin Street



Difference in elevation with respect to CPT-A3

CPT-A1	-6 cm
CPT-A2	-10 cm
CPT-A3	0 cm
CPT-A4	-14 cm
CPT-A5	+54 cm
CPT-A6	-18 cm
SPT-A1	0 cm
SPT-A2	-5 cm
SPT-A3	-14 cm
SPT-A4	-14 cm
Tül street sidewalk	+4 cm



UCB-BYU-UCLA-ZETAS-SAU
Joint Research
Sponsored by:
NSF-PEER-Caltrans-CEC-PG&E

Project: Geotechnical Site Investigation at Lateral Spread Sites
Responsible Engineers: J.D. Bray and R.B. Sancio, U.C. Berkeley

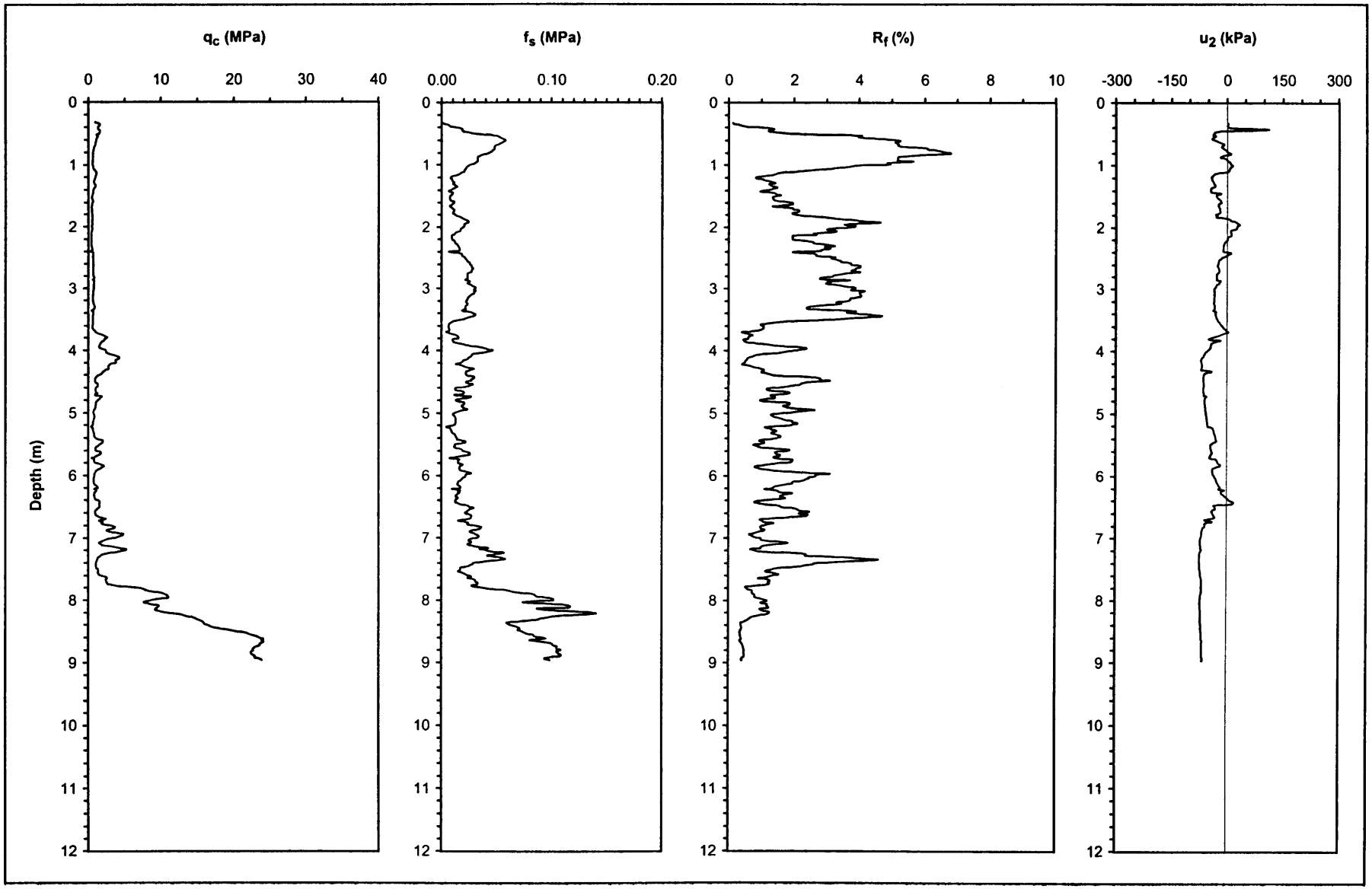
Contents: Plan view of Yakin street site and location of subsurface exploration points

Location: Yakin Street, Cumhuriyet District, Adapazari
GPS Coordinates: 40.77922° N 30.39487° E

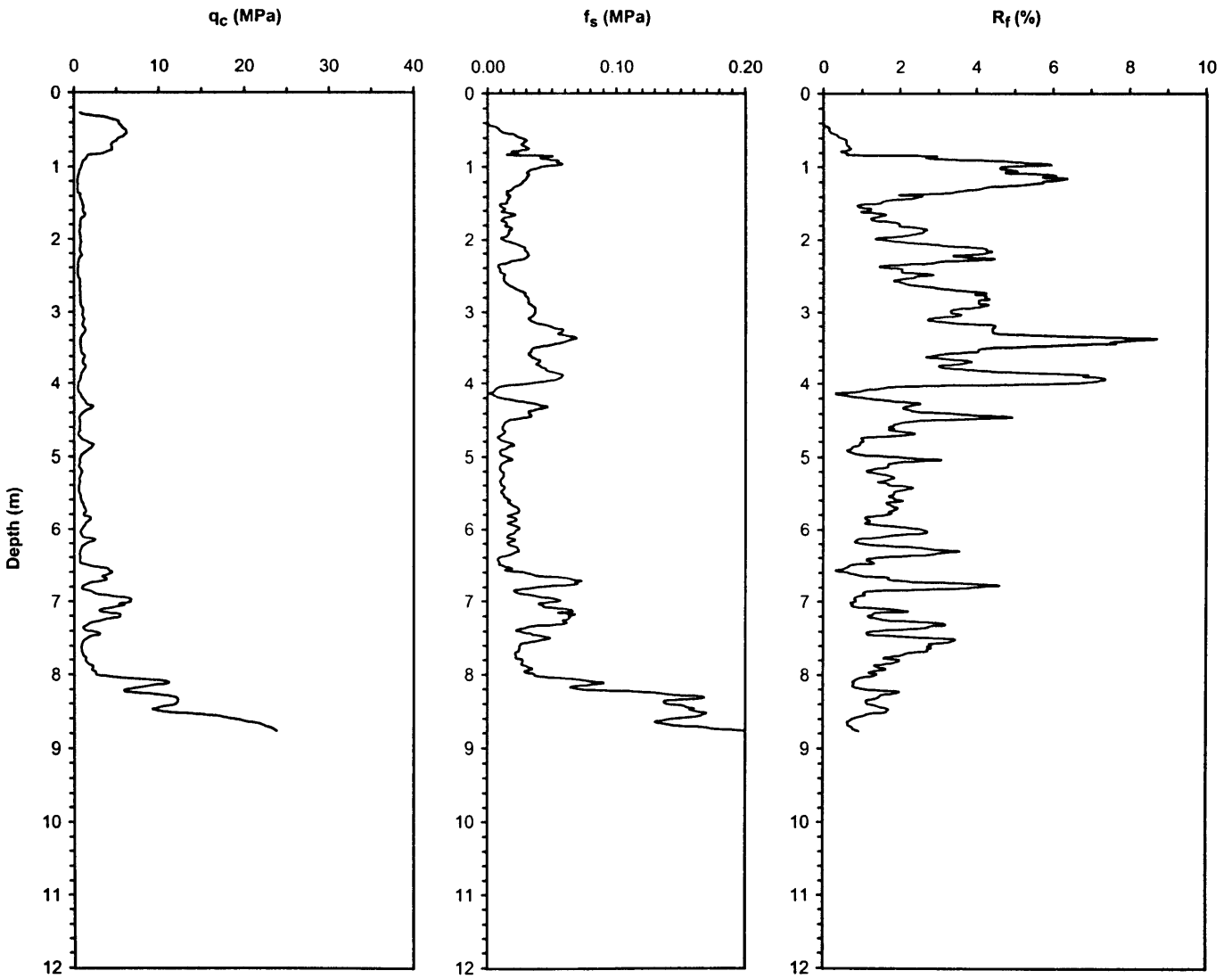
Scale: Graphic Scale | File Name: yakin_street.fcw

Date: 24/01/01 | Drawing: Rodolfo B. Sancio

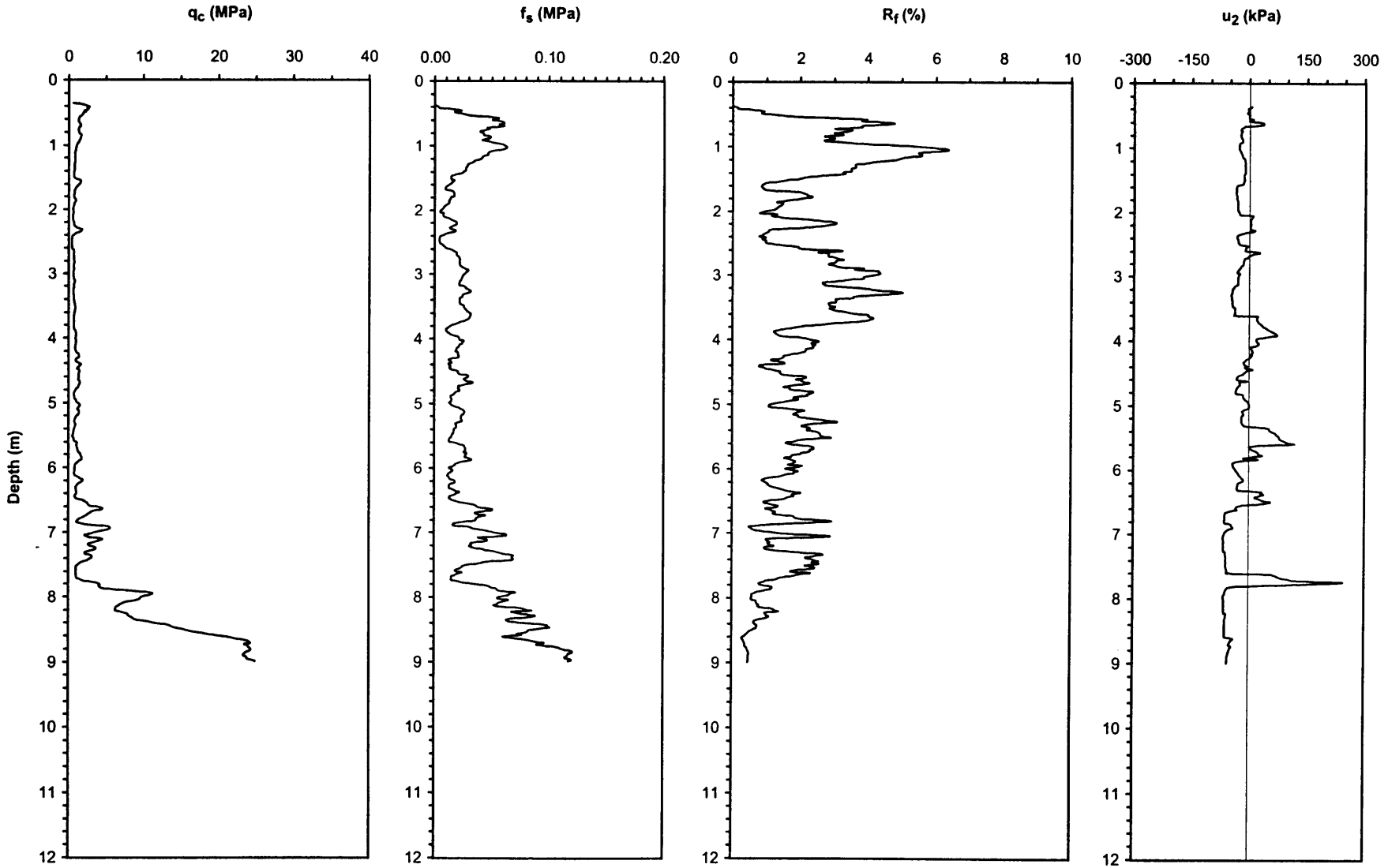
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A1	**Elevation:** -6 cm with respect to CPT-A3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 13, 2000 10:17
Sponsored by:	**File Name:**	cpta1.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Pre-excavated depth was not measured, 30 cm was estimated.	



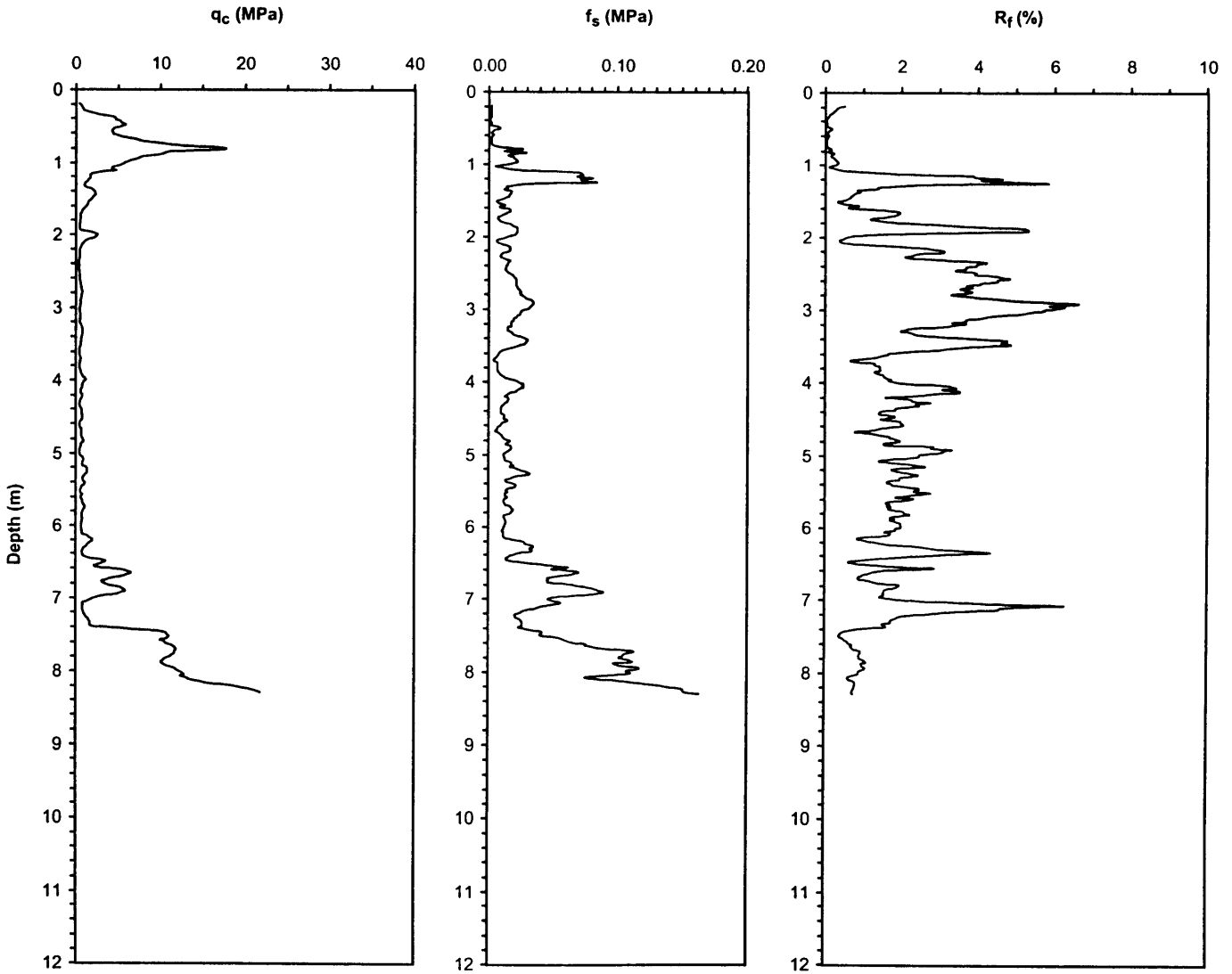
UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A2	**Elevation:** -10 cm with respect to CPT-A3
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 13, 2000 11:35
Sponsored by:	**File Name:**	cpta2.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A3	**Elevation:** 0 cm with respect to CPT-A3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** June 13, 2000
Sponsored by:	**File Name:**	cpta3.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A4	**Elevation:** -14 cm with respect to CPT-A3
	Type of Cone:	ELC10 CF No. 990617 (a.p. v.d. Berg)	**Date:** June 13, 2000 16:22
Sponsored by:	**File Name:**	cpta4.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**		



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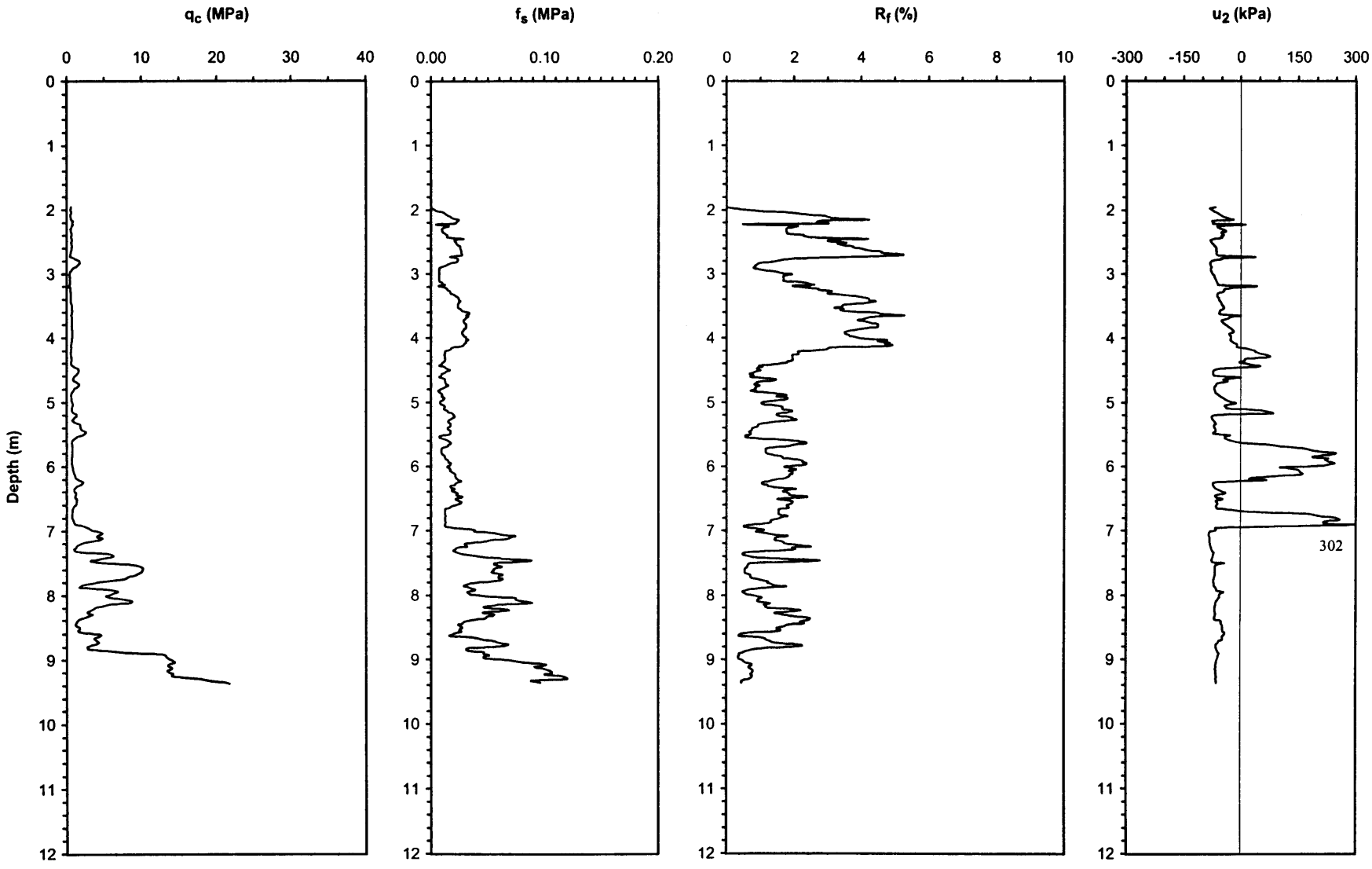
ZETAŞ-SAU
Joint Research

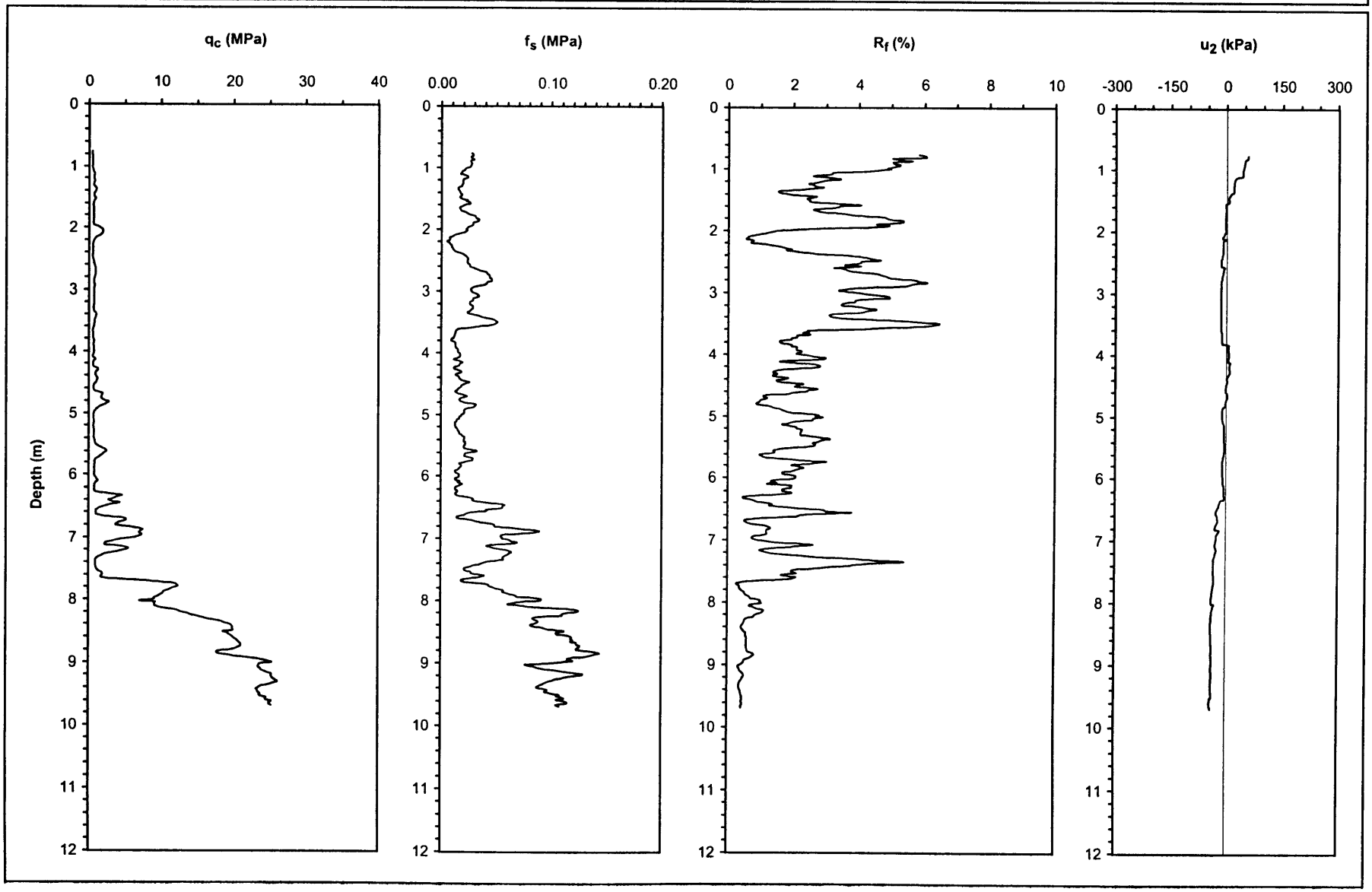
Sponsored by:
NSF, PEER
Caltrans, CEC, PG&E

Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı
GPS Coordinates: 40.77922°N 30.39487°E
Test Number: CPT-A5
Type of Cone: ELC10 CFPS No. 991232 (a.p. v.d. Berg)
File Name: cpta5.txt
Operator: ZETAŞ (Zemin Teknolojisi, A. Ş.)
Notes:

Elevation: +54 cm with respect to CPT-A3
Date: June 14, 2000
Water Table Elevation: 146 cm
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley



UCB-BYU-UCLA	**Project Name:**	Ground Failure and Building Performance in Adapazari, Turkey	**Page:** 1 of 1
ZETAŞ-SAU	**Location:**	Site A - Tül and Yakın Streets, Cumhuriyet District, Adapazarı	
Joint Research	**GPS Coordinates:**	40.77922°N 30.39487°E	
	Test Number:	CPT-A6	**Elevation:** -18 cm with respect to CPT-A3
	Type of Cone:	ELC10 CFPS No. 991232 (a.p. v.d. Berg)	**Date:** July 19, 2000
Sponsored by:	**File Name:**	cpta6.txt	**Water Table Elevation:** Not measured
NSF, PEER	**Operator:**	ZETAŞ (Zemin Teknolojisi, A. Ş.)	**Responsible Engineers:** J. D. Bray and R. B. Sancio, U. C. Berkeley
Caltrans, CEC, PG&E	**Notes:**	Probed with percusion hammer 75 cm to check for utilities	



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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: June 23, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL=0.90m 06/24/00, 0.77m 06/26/00, 0.77m 06/28/00
Notes: Solid flight auger used to a depth of 1.5 m

Test ID: SPT-A1
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -0 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									ASPH: Boring performed through asphalt and subgrade of Tul street											
1		ML	S-A1-1	18/45	1-3-3		4.27	37	FILL: Materials transition from a brown to gray gravelly sand to red silty clay of hard consistency			38	41	13	90					
2		MH/CH	S-A1-2	40/45	3-2-5		5.80	46			28	39	53	23	94					
3		CH	S-A1-3	31/45	2-3-4		5.80	42	CH: Brown, moist, sticky, high plasticity silty clay without visible sand particles. S-A1-4 shows darker tones and some fine to medium sand content	140	50	39	65	35	100	61	36	0.0035	<2μm	
		CL	S-A1-4	36/45	1-2-2		7.32	57		80	22	37	46	23	87					
4		ML/ML-CL	S-A1-5	40/45	2-2-2		7.32	53	ML: Gray silt with sand. Field description: ML	70	23	29	29	6	74	16	>10	0.045	0.003	
5		CH	S-A1-6	45/45	1-2-1		8.84	55	ML: Brown, low plasticity silt with fine sand and some red clay points	80	25	44	55	28	92					
6		CL/ML	S-A1-7	39/45	1-1-2		8.84	50	CH: High plasticity gray clay with low sand content (traces). At 5.3 m a thin fine sand seam was identified. Sample A1-7 exhibits some sand seams	75	26	39	47	20	97	31	18	0.012	<2μm	
7		ML	S-A1-8	37/45	6-6-9		10.37	65	ML: Gray sandy silt. Increasing sand content with depth	450		27	30		70	15	10	0.057	0.002	
8		ML	S-A1-9	41/45	6-9-10		11.89	75		275		27	29		58					
9		SP	S-A1-10	41/45	11-20-23		11.89	64	SP: Medium to fine poorly graded gray sand	300		24			5			0.29	0.12	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: June 24, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWT = 0.70m 06/24/00, 0.79m 06/26/00, 0.85m 06/28/00
Notes: Solid flight auger was used to a depth of 1m

Test ID: SPT-A2
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -5 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									ASPH: Asphalt of Yakin Street.											
1		ML/CL	S-A2-1	28/45	1-2-1	-	4.27	37	Fill	150	10	37	31	8	74	-	-	-	-	
2		ML	S-A2-2	42/45	1-2-2	-	5.80	53	ML: Brown clayey silt to silty clay with some red oxidation points and some fine sand	75	18	36	35	8	86	-	-	-	-	
3		CH/MH	SH-A2-3	42/42		2.55	-	-	CH: Brown high plasticity silty clay to clayey silt. Some fine to medium sand in a silty clay matrix was observed in the wash water	-	48	44	51	23	100	75	57	0.001	<2µm	
4		CL/CH	S-A2-4	40/45	2-1-1	3.35	7.32	52		120	53	37	49	25	85	-	-	-	-	
5		ML	S-A2-5	28/45	2-3-4	4.15	7.32	65	ML: Brown/gray clayey silt with traces of fine sand	160	35	34	35	7	93	18	12	0.018	0.001	
6		CL	SH-A2-6	42/42		4.95	-	-	CH: Gray silty clay of medium to high plasticity. Sticky to the fingers. Softens when remoulded	-	31	44	43	20	95	-	-	-	-	
7		MH/CH	S-A2-7	39/45	1-1-2	5.95	8.84	65		75	37	43	51	22	99	42	30	0.007	<2µm	
8		ML	S-A2-8	32/45	3-5-5	6.95	10.37	60	ML: Gray clayey silt with some fine sand	170	36	33	39	11	85	20	13	0.026	0.001	At approximately 7.15 m, an 8-cm thick stratum of black, fibrous material (Peat) was identified in the sample
9		SP-SM	S-A2-9	38/45	12-20-16	8.45	11.89	61	SP-SM: Poorly graded gray fine sand with silt. Gravel content ~ 8% in sample S-A2-10	380	-	33	-	-	8	-	-	0.12	0.08	
10		SP-SM	S-A2-10	38/45	7-10-15	9.95	12.82	-		320	-	22	-	-	6	-	-	0.33	0.1	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: June 26, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.87 m 06/26/00, 0.70 m 06/28, 0.72 m 07/08
Notes: Solid flight auger was used to a depth of 1.8 m

Test ID: SPT-A3
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -14 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
0									Fill: Asphalt, subgrade and fill consisting of dark brown clayey gravelly sand.											
1		-	S-A3-1	0/45	2-1-2		4.27	47		-	-	-	-	-	-	-	-	-	-	
2		CH	S-A3-2	25/45	1-2-3		5.80	55	CH: Brown, high plasticity silty clay. At about 2 m there is a layer of brown fine sandy silt	170	61	39	61	33	99	-	-	-	-	
3		CH	S-A3-3	28/45	1-2-2		5.80	43		150	47	38	59	33	99	50	35	0.005	<2μm	
4		ML	S-A3-4A S-A3-4B	34/45	2-3-2		7.32	56	ML: Gray low plasticity clayey silt with fine sand.	70	12	30	31	6	79	-	-	- -	- -	A 3 cm-thick fine sand seam at 20 cm above the tip of the sampler
5		ML	SH-A3-5	42/42	-	4.45	-	-		80	18	39	38	9	91	13	3	0.024	0.004	
6		ML	S-A3-6	38/45	2-2-2	5.55	8.84	62		40	30	42	43	15	96	-	-	-	-	
7		ML	S-A3-7	38/45	3-4-10	6.45	10.37	61		170	-	31	37	8	88	-	-	-	-	
8									SAND: Gray poorly graded sand with silt and traces (8%) of fine rounded gravel											
		SP-SM	S-A3-8	35/45	7-18-24	8.45	11.89	65		360	-	23	-	-	9	-	-	0.22	0.08	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: July 24, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.82m 07/25/00
Notes:

Test ID: SPT-A4
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -14 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 µm	< 5 µm (%)	< 2 µm (%)	D50 (mm)	D10 (mm)	Remarks
0									FILL: Asphalt, pavement and fill on Yakin Street											
1																				
2		CL/ML	SH-A4-1A	39/42	-	1.2	-	-	CL: Low to high plasticity, brown silty clay to clayey silt with traces of fine sand. Soil is highly inhomogeneous, showing variable FC	75	41	24	34	11	80	35	24	0.017	<2µm	
		CL/ML	SH-A4-1B		-	1.2	-	-		75	41	33	42	17	94	45	34	0.006	<2µm	Shear Vane @ 1.65 m. Peak = 16 kPa, Residual = 4 kPa
		CL	SH-A4-2	33/42	-	1.2	-	-		60	32	35	48	24	99	32	25	0.02	<2µm	Shear Vane @ 2.45 m. Peak = 29 kPa, Residual = 9 kPa
3		-	SH-A4-3	41/42	-	1.2	-	-		70	26	-	-	-	-	-	-	-	-	Shear Vane @ 3.45 m. Peak = 15 kPa, Residual = 5 kPa
4		ML	S-A4-4	30/45	3-3-3	4.05	7.32	51	ML: Brown low plasticity silt with traces of fine sand	-	-	32	36	10	97	24	18	0.017	<2µm	
5		CL/MH	S-A4-5	28/45	3-1-2	4.95	8.84	53	CL: Low to high plasticity gray silty clay to clayey silt with traces of fine sand	75	27	39	49	22	98	56	42	0.004	<2µm	
6																				
		CL	S-A4-6	-	6-5-11	6.45	10.37	59		-	-	37	38	14	92	43	37	0.007	<2µm	Initially no sample was recovered at a depth of 6.5 m. In a second attempt, a sample was obtained at 6.6 m with the aid of a sand catcher.
7																				
8		ML	S-A4-7	33/45	11-12-17	7.95	11.89	60	SANDY SILT: Gray low plasticity sandy silt	440	-	25	25	-	66	35	32	0.018	<2µm	
9																				
		SP-SM	S-A4-8	40/45	24-38-36	9.45	12.82	-	SAND: Gray poorly to well graded sand with silt. 22% gravel content in S-A4-9, very low (< 5%) in other samples.	-	-	18	-	-	8	-	-	0.3	0.185	
10																				
11		SW-SM	S-A4-9	39/45	14-18-20	10.95	14.94	54		-	-	17	-	-	10	-	-	0.61	0.074	

Legend
S: Spit Spoon (SPT) SH: Shelby tube

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Project Name: Ground Failure and Building Performance in Adapazari, Turkey
Location: Site A - Tul and Yakin Streets,Cumhuriyet District, Adapazari
Date: July 24, 2000
Field Log by: Rodolfo B. Sancio
Operator: ZETAS (Zemin Teknolojisi, A. S.)
Drilling Method: Rotary wash with 9 cm-diameter tricone bit
Water Table Elevation: GWL = 0.82m 07/25/00
Notes:

Test ID: SPT-A4
GPS Coordinates: 40.77922°N 30.39487°E
Elevation: -14 cm with respect to CPT-A3
Drilling Equipment: Custom made, equivalent to Crealius XC90H
Responsible Engineers: J. D. Bray and R. B. Sancio, U. C. Berkeley
SPT System: Rope, pulley and cathead method. AWJ rods.
Hammer Type: Safety Hammer (per Kovacs et al. 1983)

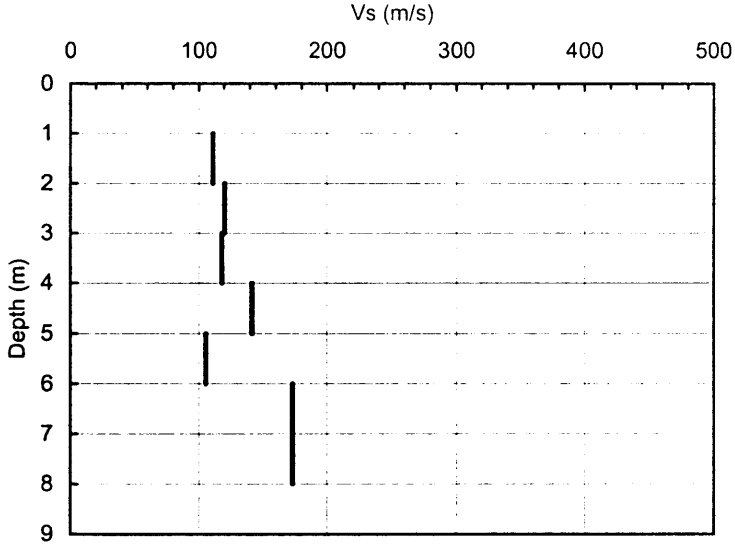
Depth Scale (m)	Lithology	USCS	Sample Type and No.	Recovery/ Length (cm)	SPT Blows/15 cm	Casing Depth (m)	Rod Length (m)	Energy Ratio (%)	Description	q_u Pocket Pen (kPa)	s_u Torvane (kPa)	Moisture Content (%)	Liquid Limit	Plasticity Index	% fines < 75 μm	< 5 μm (%)	< 2 μm (%)	D50 (mm)	D10 (mm)	Remarks
11		SW-SM	S-A4-9	39/45	14-18-20	10.95	14.94	54		-	-	17	-	-	10	-	-	0.61	0.074	
12		SP-SM	S-A4-10	33/45	14-17-18	12.45	16.46	62		-	-	16	-	-	7	-	-	0.5	0.1	
13																				
14									CH: Gray, high plasticity stiff clay.											
15		CH	S-A4-11	26/45	4-4-7	14.95	17.92	62		250	53	37	69	45	100	86	73	<2μm	<2μm	BW rods were used for the SPT at 15 m

Legend
S: Spit Spoon (SPT) SH: Shelby tube

Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-A3

Cone Depth (m)	Depth Interval (m)	$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.26	1.00	109	114	111
	2.00	109	114	111
3.26	2.00	116	125	121
	3.00	116	125	121
4.26	3.00	128	109	118
	4.00	128	109	118
5.26	4.00	122	161	142
	5.00	122	161	142
6.26	5.00	109	102	105
	6.00	109	102	105
7.26	6.00	179	167	173
	7.00	179	167	173
8.26	7.00	167	179	173
	8.00	167	179	173

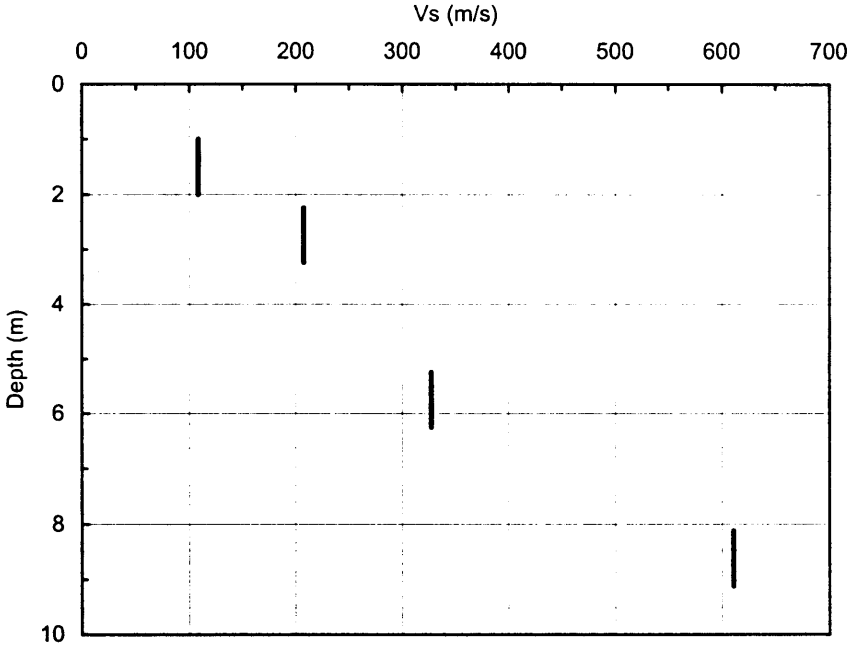


Data processed by: ZETAS (Zemin Teknolojisi AS)

Shear Wave Velocity Profile Determined using the Seismic Cone (Downhole Method)

Test ID: CPT-A6

Cone Depth (m)	Depth Interval (m)		$V_{s\ left}$ (m/s)	$V_{s\ right}$ (m/s)	$V_{s\ average}$ (m/s)
2.26	1.00	2.00	47	169	108
3.50	2.24	3.24	313	102	207
6.50	5.24	6.24	238	417	327
9.38	8.12	9.12	556	667	611



Data processed by: ZETAS (Zemin Teknolojisi AS)

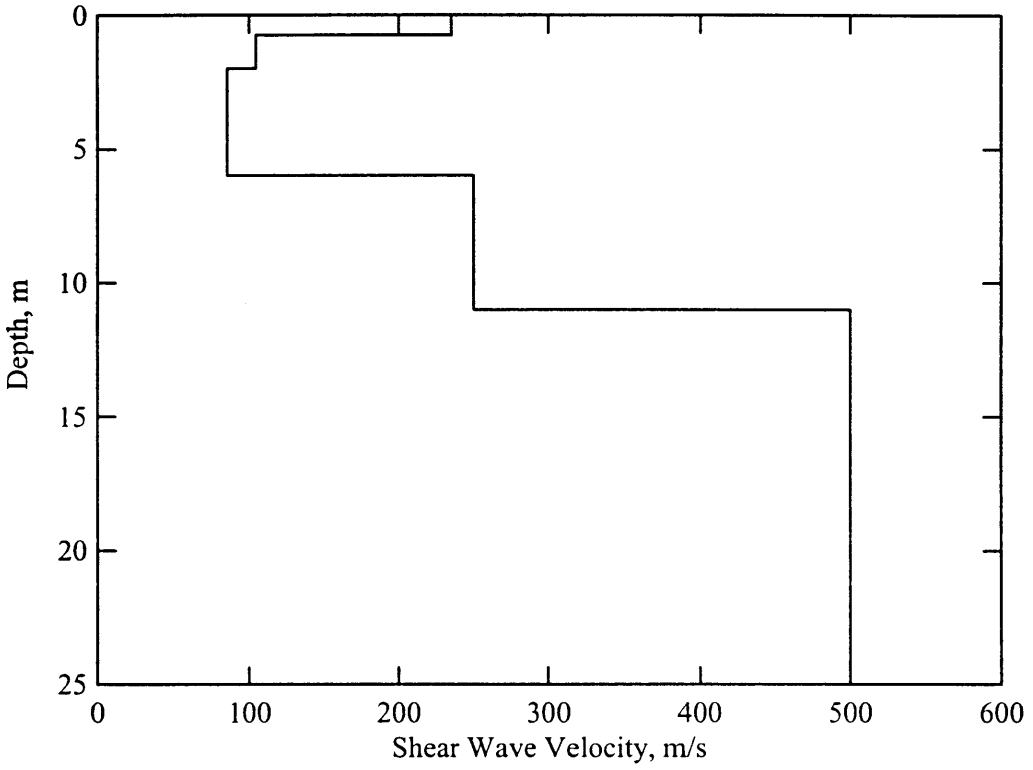


Figure 3.10 Shear wave velocity profile determined from forward modeling of Site A.

Table 3.1 Tabulated values of layer properties determined from forward modeling of Site A

			Assumed Values		
Depth to Top of Layer, m	Layer Thickness, m	Shear Wave Velocity, m/s	P-Wave Velocity, m/s	Poisson's Ratio	Mass Density, g/cc
0	0.75	235	439.6	0.3	1.92
0.75	1.25	105	615.2	0.485	2.0
2.0	4.0	85	1500	0.4984	2.0
6.0	5.0	250	1500	0.4857	2.0
11.0	14.0	500	1500	0.4375	2.0

Responsible Engineers: James A. Bay and Brady R. Cox, Utah State University

These data were developed through NSF-PEER funding of a project directed by Professors Stokoe, Rathje, and Bay of the University of Texas at Austin and Utah State, and are also available in a separate report prepared by them