TOROS GEOTECHNICAL ENGINEERING LTD.CO.

ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER TREATMENT PLANT SLUDGE INCINERATOR UNIT AREA AND FOUNDATION STUDY DATA REPORT

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1. GENERAL INFORMATION

1.1 PURPOSE AND SCOPE OF THE STUDY:

This report is for the determination of the ground parameters of the Sludge Incineration Unit construction planned to be built within the borders of Hurma Wastewater Facility in Konyaaltı District of Antalya Province. Drilling works were carried out on 23.02.2020 and 29.02.2020, and geophysical studies were carried out on 25.03.2020 by TOROS Geotechnical Engineering Ltd. Co. within the points given by the employer for the determination of the ground parameters of the construction. It was evaluated in the 2nd category according to the categorical classification of buildings and building type structures.

The ground and foundation survey data report of the planned residential construction has been prepared based on geological and geophysical studies. Preparation of the ground and foundation survey report of the Sludge Incineration Unit building within the Hurma Wastewater Treatment Plant Area has been requested by our companies. In accordance with the provisions of the Planned Areas Type Zoning Regulation and the Turkish Building Earthquake Regulation dated 18.03.2018 and numbered 30364, this ground survey report has been prepared to determine the bearing capacity of the ground for the building, the foundation feature and type of the geological unit, to examine the groundwater status and the possible effects of groundwater on the foundation, to reveal the seismic characteristics of the region, to investigate the slope sensitivity, and to cover other geological hazards and precautions that may occur when necessary.

1.2 INTRODUCTION OF THE STUDY AREA:

1.2.1. Geomorphological and environmental information:

The study area offers a low-sloping topography. The slope direction is south-southeast. The study area can be reached by city roads. There are residential areas around it. The study area is approximately 17 km from the center. There is vegetation. There is an electricity line and a water line on the plot. Percentage slope values vary between 0-5%.





Figure 1: Survey Area Location Map

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1.2.3. Zoning Plan Status

The study area is zoned as “Water Treatment Plant area” on the zoning plan sheets. The study area is not located in any disaster area. There is no construction ban.

1.2.4. Information About the Reconstruction Island

There are buildings belonging to the Treatment Plant in the study area. Development island (https://parselsorgu.tkgm.gov.tr/) is a "Treatment Facility area" according to the information received from the address. The slope in the development island is between 0-5 degrees. There are no risks such as mass movement.



Photo-1: Hurma Wastewater Facility Lot parcel query image(https://parselsorgu.tkgm.gov.tr/)

Table-1: Wastewater facility area parcel coordinate list

Koordinat Listesi	Kenar Uzunlukları	
No	Enlem	Boylam
1	36.8357	30.5888
2	36.8356	30.5888
3	36.8354	30.5864
4	36.8353	30.5858
5	36.8353	30.5852
6	36.8352	30.5846
7	36.8349	30.5824
8	36.8357	30.5819
9	36.8372	30.5813
10	36.8373	30.5813
11	36.8374	30.5813
12	36.8374	30.5813
13	36.8381	30.5884
14	36.8357	30.5888

1.2.5. Climate Information

The climate of Konyaaltı district is Mediterranean. Summers are dry and hot, winters are warm and rainy. Snow does not fall on the coastline of the district, the north is closed by mountains, and it is open to warm and southern winds, which means that even in winter months the coldest days usually do not drop below 1 degree. The fact that sea water does not drop below 15 degrees even in winter months provides the opportunity to benefit from the sea all the way except for a few very rainy weeks.

1.2.6. Information about the project:

The parcel in question has been allocated as a Treatment Facility area in the current zoning plan prepared and approved by the municipality. Within the wastewater treatment facility area; Product acceptance point, Incineration boiler, laboratory and administrative building area construction has been planned. Incineration boiler foundation depth is approximately -6.00 m and building height is between 7-7.50 meters. Product acceptance areas foundation depth is approximately -5.00 meters. Administrative Building and laboratory area has been planned as a single-storey structure without a basement.

1.2.7. Natural Disaster Hazards

For the building type located in the mentioned study area, Building Usage Class Bks = 1 and Building Importance Coefficient I = 1.5 were determined in accordance with the provisions of the Turkish Building Earthquake Regulation (TBDY, 2018).

Table-2: Building Usage Class

Building Usage Class	Purpose of Use of the Building	Bma Importance Coefficient (/)
BKS=1	Buildings that need to be used after an earthquake, buildings where people stay for long periods of time and in large numbers, buildings where valuables are stored, and buildings containing hazardous materials. a) Buildings that need to be used immediately after an earthquake (Hospitals, dispensaries, health centers, fire departments and facilities, PTT and other communication facilities, transportation stations and terminals, energy production and distribution facilities, provincial, district governorship and municipality administration buildings, first aid and disaster planning stations) b) Schools, other educational facilities, dormitories and boarding houses, military barracks, prisons, etc.	1.5
	d) Buildings where substances with toxic, explosive, flammable, etc. properties are located or stored.	
BKS = 2	Buildings where people stay densely and for short periods of time Shopping malls, sports facilities, cinemas, theaters, concert halls, places of worship, etc.	1.2
BKS = 3	Other buildings Other buildings not included in the definitions given for BKS=1 and BKS=2 (Housing, workplaces, hotels, industrial buildings of the BMA type, etc.)	1.0



Figure-3: Location of the study area in the Türkiye Landslide Inventory Map.(http://yerbilimleri.mta.gov.tr)

During the studies carried out in the study area, no environmental events such as landslides, avalanches, rock falls, floods, inundations, inundations, etc. were encountered and the field is not within the flood/inundation areas.

No mass movement such as rockfall or landslide within the scope of law number 7269 is expected in the study area and its immediate surroundings. No environmental events such as landslide, avalanche, rockfall, flood etc. affecting the study area were observed.

During the field studies, no unit was encountered in the study area that would create swelling or collapse potential due to the ground structure.

The study area is within the borders of Beldibi neighborhood of Kemer district, Antalya Province, and is located at 30.83678° Latitude and 30.586347° Longitude. As a result of the analysis made using Türkiye Earthquake Hazard Maps Interactive Web Application, the effective acceleration ground coefficient was found to be PGA475 = 0.270 g. According to the Türkiye Earthquake Regulation, the earthquake ground motion level of Antalya province is defined as DD-2 (Earthquake Ground Motion Level-2).

Earthquake Ground Motion Level (DD-2): It characterizes the rare earthquake ground motion where the probability of exceeding the spectral magnitudes in 50 years is 10% and the corresponding recurrence period is 475 years. This earthquake ground motion is also called the standard design earthquake ground motion.

Standard Earthquake Ground Motion Spectra

Earthquake ground motion spectra are defined in standard form or specifically by site-specific earthquake hazard analyses based on map spectral acceleration coefficients and local ground action coefficients for a certain earthquake ground motion level and 5% damping ratio. Map spectral acceleration coefficients Ss and S1 are converted to design spectral acceleration coefficients SDS and SD1 as follows. FS and F1 are local ground action coefficients. Local ground action coefficients Fs and F1 depending on local ground classes are given in the following tables, respectively.

Table-3: Local Ground Effect Coefficients

Local Soil Class	Ground Impact Factor Fs for short period region					
	Hs <0.25	*Hs* =0.50	SD = 0.75	SE = 1.00	SD = 1.25	SD> 1.50
Z A	0.8	0.8	0.8	0.8	0.8	0.8
ZB	0.9	0.9	0.9	0.9	0.9	0.9
ZC	1.3	1.3	1.2	1.2	1.2	1.2
ZD	1.6	1.4	1.2	1.1	1.0	1.0
Z E	2.4	1.7	1.3	1.1	0.9	0.8
ZF	To the bottom*special soil behavior analysis will be performed.*					

Local Ground Class ZE, Local ground influence coefficient F for short period regions**= 1,575**

Local Soil Class	Local Ground Action Coefficient for 1.0 second period					
	S, £0.10	S,=0.20	S = 0.30	S,=0.40	S,=0.50	S, a 0.60
Z A	0.8	0.8	0.8	0.8	0.8	0.8
ZB	0.8	0.8	0.8	0.8	0.8	0.8
ZC	1.5	1.5	1.5	1.5	1.5	1.4
ZD	2.4	2.2	2.0	1.9	1.8	1.7
Z E	4.2	3.3	2.8	2.4	2.2	2.0
ZF	*Site-specific soil behavior analysis will be performed.*					

Local Ground Class ZE, Local ground influence coefficient F for short period region1**= 3.696**

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Table-4: Outputs obtained from Türkiye Earthquake Hazard Maps Interactive Web Application;

S_S (Short period map spectral acceleration coefficient)	0.578
S_1(Map spectral acceleration coefficient for 1.0 second period)	0.156
Sds (Short Period Design Spectral Acceleration Coefficient	0.910
Sd1 (Design Spectral Acceleration Coefficient for 1.0 second period)	0.577

S_{DS}= Short period design spectral acceleration coefficient
S_{D1}= design spectral acceleration coefficient for 1.0 second period

S_{DS}= $S_S F_S$= 0.578 x 1.575 = 0.910
S_{D1}= $S_1 F_1$= 0.156 x 3.396 = 0.577 was determined.

Horizontal elastic design spectrum TA: 0.127 (s) TB : 0.633 (s) TL: 6.000 (s)
Vertical elastic design spectrum TAD: 0.042 (s) TBD: 0.211 (s) TLD: 3.000 (s)

Depending on the Building Usage Classes and the Short Period Design Spectral Acceleration Coefficient for the DD-2 earthquake ground motion level, the Earthquake Design Classes (DTS) to be taken as basis in design under earthquake effect in this Regulation will be determined according to the table.

Table-5: Earthquake Design Classes

DD-2 Short Period Design Spectral Acceleration Coefficient (SDS) at Earthquake Ground Motion Level	Building Usage Class	
	IIKS1	BKS=2,3
^<0.33	DTS=4a	DTS=4
0.33<SDS<0.50	DTS=3a	DTS=3
0.50<SDS<0.75	DTS = 2a	DTS = 2
0.75<S_{DS}	DTS=I	DTS-1

The Maximum Ground Acceleration taken from the Türkiye Earthquake Hazard Map for the study area was determined as SDS=0.910, the Earthquake Ground Motion Level was determined as "DD-2" and the Earthquake Design Class was determined as "DTS=1a".

2.GEOLOGY

2.1 General Geology:

Beydağları autochthonous, Antalya nappes, Lycian nappes and Yeşilbarak nappes outcrop in the study area and its surroundings located to the west of Antalya Gulf in the Western Taurus Mountains.

The Beydağları autochthonous is represented by the Beydağları formation consisting of Malm-Upper Cretaceous neritic limestones, the Söbütepe formation consisting of Paleocene limestone-sandy limestones, the Küçükköy formation consisting of Upper Lutetian-Priabonian calcarenite, sandstone, claystone etc. rock types, the Karabayır formation consisting of Lower Miocene algal limestones, the Karakuştepe formation consisting of sandstone and siltstones and the Kasaba formation consisting of Upper Burdigalian-Langgian conglomerate and sandstones.

Antalya nappes are divided into the Çataltepe nappe, which is composed of Upper Triassic-Upper Cretaceous rocks, the Alakırçay nappe, which is composed of Upper Permian-Upper Cretaceous rocks, the Tahtalıdağ nappe, which is composed of Middle Cambrian-Upper Cretaceous rocks, and the Tekirova ophiolite nappe, which is composed of Tekirova ophiolite and Kırkdirek formation, according to their structural and stratigraphic features.

The Lycian nappes in this area are represented only by the Gülbahar nappe, which consists of Jurassic-Cretaceous aged cherty limestones.

In addition, the Yeşilbarak nappe, which is composed of Upper Lutetian-Lower Miocene clastic lithologies and offers lateral continuity between the Beydağları autochthonous and Lycian nappes, is located in the region.

Mafic ultramafic rocks (serpentine, dunite, harzburgite, gabbro, diabase etc.) belonging to the Tekirova ophiolite nappe are widely exposed in the study area.

The nappes that came together in the Upper Campanian-Maastrichtian time interval (Çataltepe nappe, Alakırçay nappe, Tahtalıdağ nappe and Tekirova ophiolite nappe from bottom to top) were emplaced on the Beydağları autochthonous in the Danian. In the Lower Langhian, the Lycian nappes originating from the northwest and north were emplaced on the Beydağları autochthonous, taking the Yeşilbarak nappe under them. The Antalya nappes, which were also affected by the horizontal movements at the end of the Eocene, were re-impaved from east to west in the Langhian. In the probable Pliocene after the Middle Miocene, a large-scale slope was observed in the region.

Dip-slip normal faults and vertical-slip normal faults have developed and, as a result of these ruptures, large-scale depressions and elevations have developed in the region.

ANTALYA NAPES

The allochthonous rock units in the region were named as Antalya nappes by Lefevre (1967). Antalya nappes, which were previously divided into Lower nappe (Çataltepe unit), Middle nappe (Alakırçay unit) and Upper nappe (Tahtalıdağ unit) by Brunn et al. (1971), were later re-divided into Çataltepe nappe, Alakırçay nappe, Tahtalıdağ nappe and Tekirova ophiolite nappe according to their structural and stratigraphic features (Şenel et al., 1992, 1996). Çataltepe nappe, which is the lowest structural unit of Antalya nappes, is not observed in the study area.

ALAKIRÇAY NAPPE

The Alakırçay nappe is structurally located above the Çataltepe nappe and below the Tahtalıdağ nappe. In the region, the Alakırçay nappe is superimposed on the Beydağları autochthonous without the Çataltepe nappe. The Alakırçay nappe, which is composed of Upper Permian and Scythian-Lower Anisian aged platform origin, Middle-Upper Triassic (Upper Anisian-Norian) aged slope, basin, rift etc. origin, and Jurassic-Cretaceous aged platform and basin origin rocks, consists of two structural units, the Kumluca and Alakırçay units, with more or less different stratigraphic features. The formations belonging to the Alakırçay nappe have mixed with each other as a result of excessive folding and faulting and have taken on a chaotic appearance in places. For this reason, it is difficult to separate the formations in the Alakırçay nappe from each other in most areas. The Alakırçay unit includes the Upper Permian Dinek formation, the Scythian-Lower Anisian Kesmeköprü formation and the Upper Anisian-Norian Alakırçay group from bottom to top. The Alakırçay group consists of the Tesbihli formation, Karadere formation, Gökdere formation and Çandır formation, which are transitional in lateral and vertical directions. The Kumluca unit is represented by the Ladinian Tesbihli formation, the Upper Triassic Gökdere and Çandır formations and the Jurassic-Cretaceous Ballık formation. The Upper Campanian-Masastrichtian Keçili formation overlies both sequences.

Dinek Formation (Permian)

The unit, which consists of neritic limestones, was named by Kalafatçıoğlu (1973). The Dinek formation, which is generally found in the Tahtalıdağ nappe, is also found, albeit rarely, at the base of the Alakırçay nappe. The Dinek formation consists of medium-thick layered, dark gray, black, grey coloured limestones.

It is known for its mizzian formations. It has abundant macro fossil remains, fine shale and local dolomite, dolomitic limestone intermediate levels. It is hard and frequently cracked. The cracks contain calcite and asphaltite fillings.

In the study area, the unit's lower relationship is tectonic in the Alakırçay nappe. In the Tahtalıdağ nappe, Ordovician rocks are found unconformably in Öter. It is unconformably covered by the Kesmeköprü formation at the top. It is approximately 280 meters thick. The Dinek formation, which contains macro fossils such as brachiapods, corals, etc., is Upper Permian in age according to Mizzia sp., Permocalculus sp., Geinitzina sp., Schwagerina sp., Stafella sp., Globivalvulina sp., Pachyphloia sp., Kamurana sp., etc. (det.; T. Süer; Şenel et al., 1981). The unit was deposited in a shallow carbonate shelf environment.

Kesmeköprü Formation (Turkish)

The formation, which is generally composed of variegated marls, was named by Marcoux (1977). Ayan (1968) defined this unit as Variegated Marls in his studies in the Finike region. Kesmeköprü formation spreads over a small area. The unit consists of thin-medium bedded, dirty yellow, green, gray, pink, red, beige coloured thin limestone intercalated marl, claystone and clayey limestone. It contains gypsum lenses in places. There are vermicular limestone levels of varying thicknesses in the formation. Thin limestone levels are abundantly lamellar shell accumulations. It contains traces of dwarf gastropods in places. Kesmeköprü formation, which is locally unconformably covered by Gökdere formation from above, is approximately 350 m thick. The age of the formation is accepted as Anisian-Scythian (Middle-Lower Triassic) according to the fossil content. The unit was deposited in a shallow self (tidal environment) environment.

Alakirchay Group (TRa)

The group consisting of basic volcanic, layered chert, pelagic limestone, vegetated sandstone and shale, interbedded laterally and vertically with each other, was named by Şenel et al. (1981). The basic volcanic rocks within the unit are distinguished as Karadere formation; layered chert, Tesbihli formation; halobia limestones, Gökdere formation; vegetated sandstone and shale, Çandır formation. The unit has gained a very mixed and chaotic structure due to excessive folding and faulting. For this reason, it is difficult to separate the formations from each other.

Tesbihli Formation (Trat)

The unit, which is generally composed of layered cherts, was named by Kalafatçıoğlu (1973). Although it is mostly found at the base of the Alakırçay group, it can also be found in thinner layers in other formations. In some areas, it is difficult to distinguish it from Jurassic-Cretaceous layered cherts. The Tesbihli formation is seen in the Alakırçay and Kumluca units, sometimes in the Tahtalıdağ nappe. The Tesbihli formation consists of thin-medium layered, mostly red, reddish brown, locally green, gray, dirty yellow, black, blue colored radiolarite, chert and shale. In some areas, it contains abundant Daonella traces and rare halobia traces. Cherty limestones are common at the base and top of the unit. It contains local sedimentary folds. It is transitional with the Çandır Gökdere formations in lateral and vertical directions; it is primarily related to the Karadere formation. Its thickness varies between 20-70 m.

Gokdere Formation (TRag)

The formation, consisting of plaque-like halobia limestones, was named by Kalafatçıoğlu (1973). In the Alakırçay group, it can be seen generally on the Tesbihli formation and sometimes in other levels. It is found in both stacks of the Alakırçay nappe. In the Tahtalıdağ nappe, the Upper Anisian-Norian rocks are generally represented by the Gökdere formation.

Gökdere formation consists of thin-medium bedded, beige, cream, gray colored, plaque-like, mostly chert nodular, abundant radiolarian, locally halobia, micritic textured limestones. It includes rare thin calcarenite, shale, layered chert, tuffite, pillow lava intermediate levels. It occasionally contains red limestone level in ammonitico-rosso facies (Hallstatt facies). The unit is transitional with Tesbihli and Çandır formations in lateral and vertical directions and is primarily related with Karadere formation. The formation is transitional with Ballık formation in Kumluca unit on top and Tekedağı formation in Tahtalıdağ nappe. Its thickness varies between 10-350 meters. Gökdere formation was deposited in basin environment where volcanism was active from time to time.

Çandır Formation (TRaç)

The formation, consisting of vegetated sandstone and shale, was named by Kalafatçıoğlu (1973). It is found in both stacks of the Alakırçay nappe. The formation consists of thin-medium-thick bedded, gray, light gray, green, yellowish brown colored sandstone, siltstone and claystone. It is

locally composed of conglomerate, limestone, clayey-sandy limestone bands and lenses, and locally volcanic intermediate levels. Sandstones are sometimes plant-accumulated and contain quartz, quartzite, carbonate and volcanic elements. Silt and claystones are sometimes foliated and have a shale appearance. Halobia is frequently seen in limestone levels and silicified tubes (Torlessia) in sandstones.

There are conglomerate levels in the unit. The Çandır formation, which consists of turbiditic clastic rocks, covers larger areas than the other formations in the Alakırçay group. It is transitional with the Gökdere and Tesbihli formations laterally and vertically, and interfingering with the Karadere formation. It has a variable thickness between 150-450 meters. No fossiliferous levels were found in the unit except for the Halobia-traced limestone lenses and local silicified tubes in the sandstones. It is accepted as Upper Anisian-Norian due to its interfingering with the other formations of the Alakırçay group. The turbiditic formation was deposited in a basin environment where volcanism was active.

Karadere Formation (Thrac)

This unit is composed of basic volcanics. It is generally composed of dark brown, pillow-shaped, basic submarine lava flows. It shows spilitization in places. Its general shape is bean-shaped and its dimensions are around 20-70 cm. In places, it contains the Gökdere, Tesbihli and Çandır Formations in the form of lenses. It is also seen that the formations in question have been taken up from the bottom during their flow. The observable binders are chlorite and carbonate.

The Karadere Formation, whose base is generally not visible, is sometimes seen in primary relation with the Çandır, Tesbihli and Gökdere Formations. It is laterally transitional with the Çandır, Tesbihli and Gökdere Formations. The Alakırçay Group, consisting of the Gökdere, Tesbihli, Çandır and Karadere Formations, is sometimes seen unconformably on the Kesmeköprü Formation. In some places, its base is not visible (Karadere Formation). It is seen unconformably on the Dinek Formation in the north of Koldurum Hill. It is transitional with the Tekedağı Formation at the top.

Ballık Formation (JKba)

The unit, consisting of layered cherts, was named by Robertson and Woodcock (1981b). It is a typical formation of the Kumluca unit. It is difficult to distinguish the Ballık formation, which is a typical formation of the Kumluca unit (Alakırçay nappe), from the Tesbihli formation.

The unit consists of thin-medium bedded, red, reddish brown, locally green, grey, dirty yellow, blue etc. coloured radiolarites, cherts and shales. Sometimes manganese nodules are found in these cherts. Rarely, basalts of approximately 1 meter thickness can be seen within the unit. The Ballık formation, which is found transitionally on the Gökdere formation, is overlain unconformably by the Keçili formation.

It reaches a thickness of approximately 130 meters. It is accepted as Jurassic-Cretaceous. The unit was deposited under the carbonate dissolution limit in a basin environment.

TAHTALIDAG NAPPE

The Tahtalıdağ nappe is structurally located on the Alakırçay nappe. Marcoux (1977, 1979) states that the upper nappe (Tahtalıdağ nappe) consists of three structural units, Kemer, Tahtalı Dağ and Bakırlı Dağ, which are more or less different from each other. However, the separation of this structural unit could not be made in the west of Antalya Bay. The Tahtalıdağ nappe, in general, has similar characteristics to the Jurassic-Cretaceous platform type carbonates found in the Alakırçay nappe, especially in the Karadere formation, which are locally associated with the Jurassic-Cretaceous platform type carbonates in the Tahtalıdağ nappe. For this reason, they are also studied within the Tahtalıdağ nappe. In the Tahtalıdağ nappe, from bottom to top, the Ordovician (Upper) aged Sarıyardere formation, the Upper Permian aged Dinek formation, the Scythian-Lower Anisian aged Kesmeköprü formation, the Upper Anisian-Norian aged Gökdere formation, the Rhaetian-Senonian aged Tekedağı formation and the Upper Campanian-Maastrichtian aged Keçili formation are found.

Tekedagi Formation (JKt)

This formation, consisting of thick-layered, uniform, neritic carbonates, has been named separately by different researchers. Colin (1955) defined it as the Lycian Series and Elmalı Series. Tolun (1965), Zaralıoğlu (1967) and Ayan (1968), in their studies in the Finike region, named it as the Finike Limestone Formation and Finike Limestones. Marcoux (1978) in his studies in the region, stated that there were Jurassic-Cretaceous neritic carbonates in the tectonic units he distinguished as «Beydağları Unit, Tahtalıdağ Unit, Kemer Unit and Bakırlıdağ Unit», and did not name them.

15The Jurassic-Cretaceous limestones that surface contain the same rock type and fossils. Since it gives a type section in Tekedağı, it is called Tekedağı Formation.

At the bottom, it starts with whitish, grayish, reddish, beige colored, medium-thick layered, locally cherty, massive looking dolomitic limestone and limestone. On this level, which is abundantly cracked and macro shelled, beige, light grey, cream coloured, medium-thick layered limestones are seen. These are algae, coral, gastropod, lamellar shelled and occasionally dolomitized. It is generally pelletic in texture. On this pelletic textured limestone, there are light gray, cream coloured, medium-thick layered, abundantly shelled, hard, generally oolitic, locally pelleted limestones. In the upper levels, lighter coloured, medium-thick layered, abundantly shelled, locally dolomitized limestones are seen. At the top level, there are rudist reefal limestone and brecciated limestone. Tekedağı Formation shows a transition with Alakırçay Group at the bottom. It shows an unconformity with Keçili Formation at the top. The Barremian-Cenomanian section of this formation in Toçakdağı is approximately 1200 meters. This unit, which contains abundant lamellar, gastropod, algae, coral remains, is rich in terms of microfauna. This microfauna gives the Rhaetian-Cenomanian age.

NEOAUTOCHTONOUS COVER ROCKS

Quaternary Antalya Travertine, alluviums, sand dune and beach formations on the Antalya nappes are the neo autochthonous cover units of the region.

Antalya Travertines "Qa": The travertines that have widespread surfaces and constitute the dominant lithology in the study area and its vicinity were defined as "**Antalya Travertines**" by POISSON (1977). This unit, which is brown yellow in colour and contains primary and secondary karstic dissolution structures, has an area of approximately 630 km2 (geometry). The travertines, defined in the literature as the product of a terrestrial and very shallow marsh environment, were evaluated as secondary carbonates deposited by calcium bicarbonate-rich karst waters (Kırkgöz et al. source groups) that were discharged from the autochthonous Jurassic-Cretaceous limestones (Beydağları formation) with widespread outcrops in the north of the study area, while flowing from the low-sloping and partially permeable bottom during uncontrolled flow periods.

$H_2O+CO_2 H_2CO_3$(Carbonic acid)

$H_2CO_3+CaCO_3$ $Ca(HCO_3)_2$ (Calcium bicarbonate)

$Ca(HCO_3)_2$ **$CaCO_3$ (travertine)**$+ H_2O + CO_2$

The widely distributed travertines are seen in 3 plateaus, one of which is underwater. The upper plateau (Döşemealtı plateau) which is approximately 17 km long and located between 250-300

meters, the lower plateau (Düden-Varsak plain) which is approximately 7.5 km long and located between 40-150 meters, and the 3rd plateau which continues below sea level continues 2.5-3 km south of the current coastline.

Travertine sedimentation presents stalactites where water forms waterfalls, stalagmites as a result of merging with the base, thin-layered structures in shallow waters where the water source has laminar flow, thick-layered structures in deep waters, and structures that do not show layering in places where there is turbulent flow. As a result of the evaluation of the existing deep drilling well data for drinking-using and irrigation purposes, it has been shown that at the beginning of the formation of travertines, surface waters were effective in the sedimentation basin from time to time and deposited the coarse-grained material they carried. In the Ismail-1 well opened in the Upper Travertine plateau, the presence of conglomerates with a thickness of 9 meters above the travertine base was determined. In another drilling well opened near the Düden waterfall, sand-gravel levels were passed between 82-106 meters and 134-151 meters.

Travertines, which continue to form in the study area where the Mediterranean type karstification developed as a result of the effect of the Mediterranean climate and the primary and effective porosity are widely observed, present different types of textures such as physically massive, plant-textured, spongy and oolitic according to the different ecological (temperature, depth) conditions in the depositional environment, carbonate density, flora and fauna changes according to the shape of the old topography. Therefore, observing more than one texture type in a very short distance within the study area makes it impossible to create a detailed texture-facies map.

During the period until the calcium bicarbonate waters spreading from Kırkgöz and spring groups were brought under control by people, the travertines covered approximately 630 km.^{2} It has reached a spread of 150-250 meters and a thickness varying between 150-250 meters. The Kırkgöz springs precipitate 56 mg/lt Ca (calcium) to the sea, while the waters coming out of Düdenbaşı precipitate 20 mg/lt.

Especially, the difference of up to 36 mg/lt in terms of calcium ions between Kırkgöz springs and Düdenbaşı shows that the flow continuing underground by sinking through Kırkgöz springs and Bıyıklı etc. sinkholes does not dissolve CaCO3 (calcium carbonate) (ÖZÜŞ, 1992). In this case, it is wrong to attribute the karstic dissolution cavities observed in travertines to the spring waters. The previous cavities are continuing today with the formation of new stalactites andM. Ersin BARBAROSM.

It tends to be covered by stalagmites that will form later. It is possible to see this feature in the stalactite and stalagmite formations of the travertines that are the product of the last 15-20 years at the Düden Waterfall.

Since the formation of secondary dissolution cavities observed in addition to the primary cavities seen in travertines cannot be attributed to spring waters, such structures are caused by rainwater with weak carbonic acid properties and acidic wastewater, which enters the travertine by taking the CO2 from the atmosphere and the soil and does not carry any Ca (calcium).

Today, travertine formation generally continues to deposit in high-flow waterfalls, small-flow rivers and especially in the upper travertine (Döşemealtı) plateau, where underground water flow develops. The unit is accepted as Upper Pliocene-Quaternary in chronological terms based on the rare Condora sp. findings (AKAY et al. 1985).

Old Stream Terrace Fills (Qt):

This unit, which is old fluvial sediments, mostly consists of conglomerates. These conglomerates cover the blocks. It also contains sand deposits. It is of a consolidated nature and shows a maximum thickness of 80 meters. The unit is generally of an alluvial fan nature.

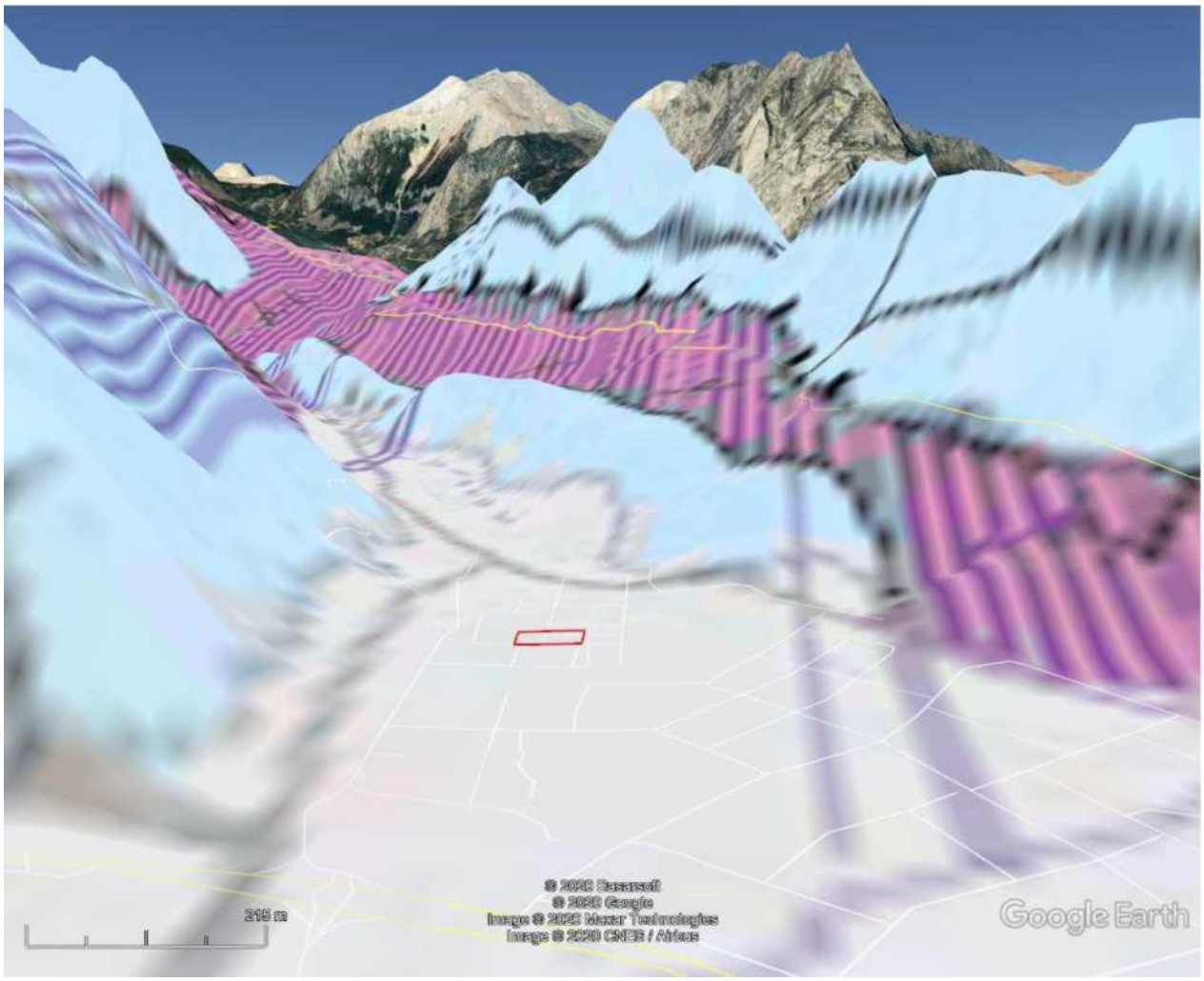
Talus and Talus Cones (Qym):

It is found on mountain slopes and foothills. It is sometimes cemented and sometimes loose. In some places it also includes accumulation cones.

Beach Formations "Qp": They are deposits of sand and gravel formed by wave action along the coast.

Alluvial Fans (Qay): Especially in the mouths of dry streams, alluvial fans of various sizes have developed. Alluvial cones have also developed in this area.

Alluvium "Qal": Quaternary aged alluvial ground is composed of irregular accumulations of different sized block-gravel-sand-clay type lithologies. In areas where streams and rivers reach the sea, alluvial fillings expand and turn into small delta formations.



Qal — **Alluvium**
ASkrrtum

Qym — Slope engine. puddlecone
Stopa*dabrt*, *dafoction ot*CGAA

Qay — **Alluviumyelpsralsri**
*At the aphtha! tan**

Qiym — **Effects**lope engine,**puddle**here
Ofdar dtbri. dejor.flon**Ugh**con»*

Qt — **Become an old stream, you crazy man**
*Otter fhjviat OofM*tts*

Qtr — Antalya**Travertine**
Antatfa travertine

JKo — **Orhaniye formation:**Cortiu**amount calcitu'toidite. radiotorrt. etc**
Orhaniye formation: Cherty mkrila, ca/cïturbidîte, ndManU ete.*

Tedi — **Ore olistostroma: Otiyolrti olistostroma**
Dm oftsffcMtfrc'rrM' Ophiotitic otisfaatrome

Tey — **Yavuz formation; Clint, sandstone, kıstan. srtttan**
Etc.*formatfon; Lima stDo a, sartdstona, ctaystone^ sïHstona*

Te — **E mAh tor ma ion**Drystone,thing
Elmak formalton: Sandzto.no. Shate

Kk — **Goat**formation**Blocked relationship |o*lyotetlk|**
Kacrt*formation: Wifd ttv*ch foptnolrtıc)*

Kkns — **Price**member **Calcilurbidite,**in shorts**mikrtl**
ıV»rVmambar Ca<crturto.,ditar chorty micnto*

Kkb — **Brecciam**ember.**Calcify**element breccia
tboccia membar tiroccta wrtb ».vnastonc tragmaets

Ktn — **■fchiruvaophryolite,**(not separated! Barpenlinil. harzburgit. dunil. verdi, gabbro. diabase etc. wibv«*ophvtjfrte, fundiffenrrliatedi: Sttrp^ntmrto, mivbufff/ttt, dunife. wehr(ife.gabbm, (fiabase otc.*

Ktogd — **Isbaoli(jabro and uncle complex**
La^Arod gabbfo and cMca co/npfvt

Ktod — **CKjrvt; Dunit.serpentinized dunite and dunite-harrburgite**my friends
Fourth: Dondo. evil>/wi dondo afte/nafn>n of dunda - haribufstle

Ktoh — Harzburgit;**LerroMik hartburgite, massive hartourgit.Bandharburgit, etc.**
W*rzbuyg/Fe.*LfroritdHic hafzburjjdeı. massive hariburgita. bonded bafibur^do. to the meat.*

Kkm — **Kırkoırek formation: Ohyolitic mephane|, g; Gabbro**
Kırkdtrak format/on: OfihMlbtic me/anye: g Gobbfo

JKt — **Ybkedağı formation Nerrtık cretaceous**
Tckodagi formMion: bleritic Hmostono

JKd — **Derekay**radiolabel:**Rediolarlt, chert**And**spectrum**
Derokc y radtoiarile: Radtolaritc. ehert and sbafe

JKy — **Yanlcebo^azidere formation: Calsnürblctt. radiolarft, chert, shale, microft/***Atnic »bagandan formatron: Calciturhidifa, radinfant», cbart, shafa, merin*

JKyk — **Limestone member KalsrtJrb drt**
Ltn^astano rnambac CafcrturtKirn

JKba — **Honeycomb**formation**Stratified**chdn, radiosH, thing
fiaıVd*farmatton-Badtiedchart, radMiarda. sban*

Trt — **TılkldaJi^itepe formation:Rasgarnetlens**and blocky mam*rM.'dnkğnan» fn/marton: Marn <vıth fmuutron* Zunc-Ss and InftT/etA**

Trtk — **Limestone member**Resulfal**limestone**
*Lirvutufnna nttuntm: finaM kma*tona*

Figure-4:3D geological map image of the study area (MTA 1/100000 scale O25 sheet was used)

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M. Süha AYKURTGeologic

2.2 Structural Geology and Active Tectonics

The structural (tectonic) and historical geology of the region has been evaluated by previous researchers within the framework of different views and is summarized below.

According to YALÇINKAYA, 1987, the basement rocks within the Tauride belt have tried to complete their sedimentology with clastic and carbonate rocks, apart from the discontinuities that developed within themselves from Paleozoic to Cretaceous. As a result of an opening in the rifted region immediately after the Lower Triassic, without the expected closure, on the one hand Mesozoic shallow marine carbonates, on the other hand hemipelagic-pelagic sediments in the semi-deep and deep parts of the basin and sedimentation continued until the Upper Cretaceous - Lower Paleocene and sedimentary assemblages were formed before the ophiolite settlement of the southern branch of Neotethys. While the region approximately south of the Homa - Balçıkhisar - Hoyran Lake - Anamasdağı line rose after the Upper Cretaceous - Lower Paleocene and showed a break in its sedimentation, while the region along the specified line and just north of this line continued its sedimentation with deep sea characteristics. The ophiolites surfaced in the northern branch of Neotethys, which constituted a different parameter of the same event, passed over the Menderes massif with the Upper Cretaceous Sea and settled to the north of the Homa-Anamasdağı line. The Paleocene Sea, which continued its sedimentation completely along the specified line, advanced southward in the Upper Paleocene-Lower Eocene and passed over all the Beydağları and accompanied the transfer of ophiolites to the south. The entire region that rose after the Lower Eocene was later covered by the Lutetian (middle Eocene) sea and at the end of the Lutetian, the ophiolitic complex series made its final advance from north to south.

BRUNN (1971), LEFEVRE (1970) and POISSON (1977) stated that the Antalya nappes (Çataltepe, Alakırçay, Tahtalıdağ) are products of a subducted oceanic crust, based on their ophiolitic melange characteristics, and that the Upper Triassic submarine basalts within the Alakırçay unit are the oldest rocks showing the first disintegration between the Anatolian and African Arabian plate margins.

RICOU and MAROUX (1982) argued that there was no ocean development south of the Taurus autochthonous during the Mesozoic, when the Antalya Unit was the product of subduction in the north; the research group of ŞENGÖR and YILMAZ (1982) argued that there was an ocean opening in the south, that the Antalya Unit was deposited on the slope of this ocean and was later pushed northwards. The same researchers argued that the collision of the Arabian-African plate and the Anatolian plate in the Upper Eocene-Middle Miocene, thus closing the southern Tethys branch, and that today's Eastern Mediterranean was formed as a remnant, that the continent-continent collision prevented the subduction and that the rocks in the collision zone formed mountain ranges, and that in the phase following this collision, It has been stated that the Anatolian plate was pushed westward along two newly formed transform faults (North and East Anatolian faults).

It was stated by KOÇYİĞİT (1984) that the north-south compressions formed NE-SW, NW-SE oriented strike-slip faults, north-south oriented tension fractures and east-west oriented thrusts, and that widespread ophiolitic mélange nappes were emplaced in the region as a result of horizontal compression tectonics during these thrusts.

ŞENEL (1997) stated that the Antalya nappes, which came together due to the thrusting of oceanic crust onto continental crust in the Upper Campanian - Maastrichtian (Upper Cretaceous), were emplaced to the east and northeast of the Beydağları autochthon in the Danian (Lower Paleocene) and to the south of the Anamas-Akseki autochthon. Again, the same researcher stated that the Antalya nappes, which were also affected by the horizontal movements at the end of the Eocene, were re-impalemented from east to west in the Langhian (Middle Miocene), and that large-scale dip-slip normal and vertical-slip normal faults developed in the region in the probable Pliocene after the Middle Miocene, and that large-scale depressions and elevations developed in the region due to these fractures.

According to the active fault map prepared by MTA in 2012 from the study area borders (Figure-5) and the "Turkey Earthquake Zones Map - Antalya and Surrounding Earthquake Zones and Active Fault Map" (Figure-7,8) published by the Ministry of Public Works and Settlement in 1996 and put into effect by the decision of the Council of Ministers dated 18.04.1996 and numbered 96/8109, the nearest faults to our area are the Kale fault, approximately 45 km away in the southwest, approximately 20 km long, and the Kekova fault zone, approximately 55 km away in the southwest. In addition, the Eşen fault, approximately 50 km long, is located approximately 90 km away in the northwest.

2.2.1. Active Tectonics

The tectonic structure of the study area is characterized by numerous faults, thrusts, imbricates and thrusts. It is seen that the tectonic units, namely anticlines and synclines, are stacked and more or less parallel to the western coast of Antalya Bay in general direction. The stacking shapes, facies, fold axes and directions of the layers indicate that the tectonics in the region do not have a more complex structure than a simple imbricate region. In the east of the Antalya region, in the Toroslar tectonic unit, according to M. Blumenthal (1963), movements ended before the Oligocene, that is, folds and imbricates took their place before the Oligocene. In the west, in Korkuteli, east of Bey Mountains and in the Fethiye region, tangential tectonic movements are limited between the Lower Miocene and Pliocene. The tectonics of the study area generally conform to the tectonic structure of the Alpine region.

Numerous normal and reverse faults, thrusts, imbricates and even small thrusts are visible, and if there are any, only parts of the large-scale nappes and thrusts in the Western Taurus region or under the influence of those large movements have been subjected to tectonic movements in our region to some extent, otherwise, as claimed, they do not directly show a nappe structure.

According to the active fault map prepared by MTA in 2012 from the study area borders (Figure-5) and the "Turkey Earthquake Zones Map - Antalya and surrounding earthquake zones and active fault map" (Figure-8,9) published by the Ministry of Public Works and Settlement in 1996 and put into effect by the decision of the Council of Ministers dated 18.04.1996 and numbered 96/8109, the nearest faults to our area are the Kale fault, approximately 45 km away in the southwest, approximately 20 km long, and the Kekova fault zone, approximately 55 km away in the southwest. In addition, there is the Eşen fault, approximately 50 km long, approximately 90 km away in the northwest.

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M. Süha AYKURTGeologic

LIST OF EARTHQUAKES WITH M>=4.5 THAT OCCURRED WITHIN 100 KM OF ANTALYA PROVINCE BETWEEN 01.01.1900-01.10.2010

Year	Latitude	Longitude	Depth (km)	Medicin	M	City	District	Year	Latitude	Longitude	Depth (km)	Medicin	M	City	District
1927	36.19	31.08	10	5.5	Ms	MEDITERR		1975	36.18	30.77	56	5.6	mb	MEDITERR	
1929	36.5	31	15	4.9	Ms	ANTALYA		1975	36,1938	30,7381	60.8	5.6	Mb	MEDITERR	
1930	37.39	31.18	80	5.9	Ms	ANTALYA	MANAVGAT	1977	36,243	31,344	67	5.7	Mb	ANTALYA	
1939	36.3	30.7	0	5.3	MS	ANTALYA		1977	36.24	31.34	67	5.7	mb	ANTALYA	
1951	36.83	30.54	120	5.4	Ms	ANTALYA	ANTALYA	1977	36.91	30,7343	90.3	4.7	Mb	ANTALYA	ANTALYA
1952	36.9	29.58	10	4.7	Ms	MUGLA	FETHIYE	1977	36.93	30.68	93	4.6	mb	ANTALYA	ANTALYA
1963	36.6	30	226	5.6	Mb	ANTALYA	WITH APPLES	1978	37.58	30.01	16	4.6	ML	BURDU	BURDU
1963	37.5	30	20	5.1	Mb	BURDU	BELT	1978	37.58	30,009	16	4.6	Mb	BURDU	BURDU
1963	37.07	29.68	60	4.7	Ms	BURDU	RYE	1979	36.41	31.75	98	5.9	mb	ANTALYA	
1964	37.41	29.89	59	5.3	Mb	BURDU	KARAMANLI	1979	36,409	31,751	98	5.9	Mb	ANTALYA	
1964	37.34	29.93	5	4.5	Mb	BURDU	KARAMANLI	1979	36.18	31.51	79	5.3	mb	MEDITERR	
1965	36.8	30.9	110	5.3	Mb	ANTALYA		1979	36,184	31.51	79	5.3	Mb	MEDITERR	
1966	37	30.9	118	5	Mb	ANTALYA	SERIK	1979	36,9877	30,2909	31.7	4.6	Mb	ANTALYA	KORKUTELI
1966	36.2	30.9	33	4.6	Mb	MEDITERR		1979	37	30.2	10	4.6	mb	ANTALYA	KORKUTELI
1967	37.59	30.44	49	4.5	Mb	BURDU	LET ME CRY	1981	36.56	30.71	70	5.4	mb	ANTALYA	
1969	36,963	31,075	109	5	Mb	ANTALYA	SERIK	1981	36,559	30,712	70	5.4	Mb	ANTALYA	
1970	36.74	29.55	44	4.5	Mb	MUGLA	FETHIYE	1981	36,184	30,376	53.7	5	Mb	FINIKEI	
1971	37,588	29,757	23	5.9	Ms	BURDU	YESILOVA	1981	36.18	30.38	53	5	mb	FINIKEI	
1971	37,526	29,725	33	5.5	Mb	BURDU	YESILOVA	1981	37,085	29,694	10	4.7	Mb	BURDU	RYE
1971	37.3	30,235	23	5.3	Mb	ANTALYA	KORKUTELI	1981	37.08	29.69	10	4.7	mb	BURDU	RYE
1971	37,569	29,736	33	5	Ms	BURDU	YESILOVA	1983	36,6889	30,5406	7.4	4.7	Mb	ANTALYA	
1971	37.2411	30,2979	46.9	5	Mb	ANTALYA	KORKUTELI	1984	36,874	30,356	80	4.9	Mb	ANTALYA	ANTALYA
1971	37,2169	30,1217	6	4.9	Mb	ANTALYA	KORKUTELI	1984	36.87	30.36	80	4.9	mb	ANTALYA	ANTALYA
1971	37,458	29,889	28	4.9	Mb	BURDU	KARAMANLI	1984	36.62	31.37	96	4.5	mb	ANTALYA	
1971	37,548	29,819	7	4.9	Mb	BURDU	YESILOVA	1984	36.62	31,3683	101.3	4.5	Mb	ANTALYA	
1971	37,511	29,651	7	4.9	Mb	BURDU	YESILOVA	1984	36,7322	31,0145	81.7	4.5	Mb	ANTALYA	
1971	37.2705	30,169	42.2	4.8	Mb	ANTALYA	KORKUTELI	1984	36.73	31.02	80	4.5	mb	ANTALYA	
1971	37.55	29,755	11	4.8	Mb	BURDU	YESILOVA	1985	37,5588	30,8401	10	4.7	Mb	ISPARTA	MILKMEN
1971	37,5534	29,7916	11.1	4.8	Mb	BURDU	YESILOVA	1985	37.51	30.7	33	4.5	mb	BURDU	BUCKET
1971	37,4751	29,8094	20.7	4.8	Mb	BURDU	YESILOVA	1985	37.49	30.91	38	4.5	mb	ISPARTA	MILKMEN
1971	37,5757	29,9782	22.7	4.8	Mb	BURDU	BURDU	1985	37,486	30,909	38.1	4.5	Mb	ISPARTA	MILKMEN
1971	37,495	29,876	36	4.8	Mb	BURDU	YESILOVA	1986	36,5976	31,7283	129.5	4.7	Mb	ANTALYA	
1971	37,493	29,835	35.7	4.8	Mb	BURDU	YESILOVA	1986	36.62	31.76	130	4.6	mb	ANTALYA	ALANYA
1971	37,478	29,829	33	4.8	Mb	BURDU	YESILOVA	1987	36,7399	31,0985	110.8	4.7	Mb	ANTALYA	
1971	37,2138	30,1487	32.3	4.7	Mb	ANTALYA	KORKUTELI	1987	36.76	31.11	109	4.7	mb	ANTALYA	
1971	37,1618	29,6368	33.7	4.7	Mb	BURDU	RYE	1988	36,629	30,397	28	5.2	Mb	ANTALYA	BELT
1971	37.55	29,904	33	4.7	Mb	BURDU	YESILOVA	1988	36.63	30.4	28	5.2	mb	ANTALYA	BELT
1971	37.5385	29.9493	18.1	4.7	Mb	BURDU	BURDU	1988	37,2184	30,6004	9.7	4.6	Mb	ANTALYA	ANTALYA
1971	37,576	29,957	28	4.7	Mb	BURDU	BURDU	1990	36.99	29.59	17	5.5	Mw	BURDU	RYE
1971	37,572	29,846	27	4.6	Mb	BURDU	YESILOVA	1990	36.99	29,595	17.2	5.2	Mb	BURDU	RYE
1971	37,555	29.9311	32.6	4.6	Mb	BURDU	YESILOVA	1990	37,0267	29,6006	18.5	5	Mb	BURDU	RYE
1971	37,156	30,579	37	4.6	Mb	ANTALYA	ANTALYA	1990	37.18	29.61	24	4.7	mb	BURDU	RYE
1971	37,275	30,241	33	4.5	Mb	ANTALYA	KORKUTELI	1990	37.02	29.53	25	4.5	ML	BURDU	WITH
1971	37.2393	30.1925	23.5	4.5	Mb	ANTALYA	KORKUTELI	1991	37,1211	29,4809	1	5.3	Mb	BURDU	GOLHISAR
1971	37,5463	29,777	23.8	4.5	Mb	BURDU	YESILOVA	1991	37.01	30.99	112	5.2	Mw	ANTALYA	SERIK
1971	37,4758	29,8926	2	4.5	Mb	BURDU	YESILOVA	1991	37,1183	29,5519	6.5	4.9	Mb	BURDU	GOLHISAR
1971	37,526	29,795	33	4.5	Mb	BURDU	YESILOVA	1991	37.29	29.74	22	4.5	MD	BURDU	TEFENNİ
1971	37,538	29.91	33	4.5	Mb	BURDU	YESILOVA	1991	37.08	30.83	24	4.5	MD	ANTALYA	ANTALYA
1971	37,5442	29,7713	27.6	4.5	Mb	BURDU	YESILOVA	1992	37	31	11	5	MD	ANTALYA	SERIK
1971	37,6122	29,9562	33.9	4.5	Mb	BURDU	BURDU	1992	37.34	30.99	19	4.8	ML	ANTALYA	MANAVGAT
1971	37,514	29,8348	0	4.5	Mb	BURDU	YESILOVA	1992	36.74	30.45	41.9	4.6	Mb	ANTALYA	BELT
1971	37,5936	30,063	13.2	4.5	Mb	BURDU	BURDU	1992	36.74	30.45	41	4.6	mb	ANTALYA	BELT
1971	37,5601	30,089	15	4.5	Mb	BURDU	BURDU	1996	36,9038	30,3498	82.9	4.5	Mb	ANTALYA	ANTALYA
1971	37,1279	30,2784	29.8	4.5	Mb	ANTALYA	KORKUTELI	1997	36.63	31.41	124	4.5	mb	ANTALYA	
1972	37	31	0	4.6	MI	ANTALYA	SERIK	1999	36.28	31.16	10.6	4.6	MD	MEDITERR	
1973	36.68	30.14	15	4.6	ML	ANTALYA	KUMLUCA	2002	37.1	30.85	124	4.5	mb	ANTALYA	ANTALYA
1973	36.68	30,141	15	4.6		ANTALYA	KUMLUCA	2002	37.07	30,878	123.4	4.5	Mb	ANTALYA	SERIK
1973	37.32	29.63	25	4.5	Mb	BURDU	TEFENNİ	2003	36.88	31.54	135	5.5	Mw	ANTALYA	MANAVGAT
1973	37.32	29.63	25	4.5	mb	BURDU	TEFENNİ	2003	36.84	31.49	15.8	4.6	MD	ANTALYA	MANAVGAT
1974	37.52	29.8	25	4.6	mb	BURDU	YESILOVA	2003	36.72	30.94	16.1	4.6	MD	ANTALYA	

2. FIELD RESEARCH AND EXPERIMENTS

Field studies were carried out in the form of opening ground boreholes, on-site SPT testing, supply and macroscopic description of disturbed and undisturbed samples, geological description on the outcrop surface, laboratory studies and evaluation of all data obtained as a result of these studies in an office environment.

Ground drilling works carried out in 5 different locations on the dominant ground structure within the study area were carried out with a D 500 type drilling machine operating with a rotary system and during the works, SPT (Standard Penetration Test) tests were carried out at every 1.50 m depth and on-site, and geotechnical data were obtained to determine the soil's density values and bearing capacity. In addition, laboratory studies such as sieve analysis of disturbed ground samples obtained during the said works were carried out by "Zemin Mühendislik Geoloji İnşaat Ltd. Şti" and the test results are given in the report annex.

In this study, a 12-channel Geometrics ES 3000 brand device was used. The system consists of a triggered sledgehammer that can select the sampling interval via computer, 12 geophones to record P and S seismic traces, and special connection units.

3. GEOPHYSICAL STUDIES

3.1 Seismic Refraction:

Method/Measurement/ Type of Device Used	Place of Receiving	Number	Explanation
Seismic Measurement	On the Land	3 dots	Each spread is 60 meters

Table-6: Seismic Refraction Information

In addition to geological studies in the field, 3 seismic studies were carried out, 60 m. straight and reverse shot, in order to determine the dynamic parameters of the ground and to reveal the underground structure sections in detail. Non-scaled sketches and evaluations of these study points are given in detail below.

SEISMIC REFRACTION METHOD

A total of 3 profiles were selected and a seismic refraction study was applied to obtain the dynamic elastic parameters.

In the seismic study, a sledgehammer, one of the impulsive energy sources, was used to create P and S waves, and the resulting P and S waves were plotted as a function of X, depending on time, and the velocities were obtained.

In this study, P and S records were taken and the first fractures on each were determined and marked on the distance-time graph. From these graphs, P and S velocities were determined from the slope of the line with EKKY. From the obtained P and S velocities, parameters such as soil layer thickness, water content, presence and frequency of void - fracture - crack systems, elastic parameters, soil dominant vibration period, soil bearing capacity and settlements were determined.

The Seismic Method involves determining the different responses of ground discontinuities to the passage of seismic waves through the ground. While the waves emitted from any source are monitored by receivers at different distances, depending on the propagation geometry, this method;

* Seismic Refraction
* Seismic Reflection

It is divided into two as follows. In the field of study, the seismic refraction method was applied among these methods.

A seismic-refraction study was carried out in the investigated area in order to reach the physical and elastic parameters determined by the dynamic method under natural conditions in the weathering zone where the foundation will be excavated, which constitutes the ground of the field with seismic-refraction, and thus to determine whether stripping is necessary or not and, if so, on which ground the foundation will be placed.

TYPE OF TOOL USED

Seismic Measurement: In this study, a 12-channel Geometrics ES-3000 brand device was used. The system consists of a laptop computer for recording, a sensor for detecting seismic traces, a triggered sledgehammer, 12 horizontal geophones, 12 vertical geophones and special connection units.

APPLICATION OF THE METHOD TO THE LAND AND EVALUATION PROCESS

Surface geology was investigated with geophysical seismic studies and lithological changes and physical properties of the formations were observed.

In addition to the geological study in the study area, seismic refraction (break) records were taken on the seismic profile selected at a suitable location, considering the building settlements. The data obtained from the field were evaluated and the underground sections and dynamic elastic parameters of the ground were determined.

The Seismic Refraction method was applied from geophysical methods. The seismic refraction method was carried out in the examined area in order to reach the physical and elastic parameters determined by the dynamic method under natural conditions in the weathering zone where the foundation will be excavated, which constitutes the ground of the field, and in particular, to reveal whether stripping is necessary or not and, if so, on which ground the foundation will be placed. The offset distance and geophone interval at these points were taken as 5.0 m. Elastic wave velocities were calculated with the help of P and S wave time-distance curves.

Seismic measurements are made by measuring both types of seismic waves propagating in the ground: longitudinal or compressional Vp, and transversal or shear Vs.

Vp seismic wave velocity was measured to determine underground structural locations and Vs seismic wave velocity was measured to better understand underground lateral discontinuities and mechanical properties. The seismic measurement records are presented in the appendix.

Measurement profile lengths (spread length) were kept at 60 meters. Geophone intervals were applied as 5.0 meters and Offset distance was applied as 5.0 meters. Longitudinal seismic waves were measured as double-sided and transverse seismic waves were measured as double-sided.

SEISMIC FIELDS MEASUREMENTS

In addition to the geological study, a seismic refraction study was carried out to reveal the geotechnical properties of the rock types and this was supported by formation monitoring in the close vicinity of the study area.

One or more of the following physical and structural properties of soils are the main factors that determine and affect the behavior of earthquake ground motions, namely seismic velocities, period,

acceleration, earthquake duration, and most importantly earthquake intensity (degree of damage) and should be determined in a ground survey. These properties and parameters are summarized below together with the reasons for their necessity.

Seismic velocities, seismic shear wave (Vs), and compression wave (Vp) form volume waves. Surface waves are Rayleigh, shear and love waves. During the arrival of P waves, particles vibrate parallel to the direction of propagation. They propagate in all types of media (solid, liquid, gas). S waves come secondarily. They cannot propagate in liquid media. Seismic velocities are high in rocks with low porosity, compactness and high density. Surface waves develop perpendicular to the direction of propagation, these are very dangerous waves. The most important factor affecting seismic waves is elastic parameters. These waves propagate globally while propagating. Seismic velocities are used to determine the ground's dominant vibration period, layer density, elastic parameters, layer locations and the ground's earthquake intensity increasing properties. Its unit is m/sn.

- **Intensity,**takes different values in soil and rock environments. d or$_{p}$is expressed with .

Its value decreases in porous, loose environments with high porosity. Its value is high in solid, uncracked environments. The density for all unweathered rocks is 1.20 gr/cm^{3} type. If the Vp - Vs ratio is low, the density is high, meaning the ground is solid. However, if the ratio is high, there is wetness on the ground. Its unit is gr/cm^{3}' kind. p~$^{0.31}$*Vp*is calculated with the formula.

- **Ground Bearing Capacity,**the ground reliably, cm^{2} kg per load

is the load amount in units. ^, C and depends on the base width. q$_{u}$ As the hardness increases, the carrying

capacity of pu= *p*Etc. /*200

The strength value also increases. Its unit is kg/cm2. It is calculated with the formula.

- **Ground Safety Stress,**to prevent ground deformation and earthquake horizontal load

used to keep at optimum level. q$_{suck}$It is one of the most important parameters that civil engineers take into consideration during the building number and project design phase and shows how many kg the ground is stressed per cm2. The larger this value, the more secure the rock can be.

Pm=[*p*Etc*^{2} */vp*] /100

The tension increases accordingly. It is calculated with the formula, whose unit is kg/cm2.

- **Ground Dominant Vibration Period,** it is used to prevent the building's core period from resonating .The value it takes in rocks is lower than the value it takes in soils. It is indicated with To.

- It takes value between 0 – 1.

It gives information about the height of the building. Its unit is seconds. If it has 2 layers:

To= 4(h1 +50-*hy vs 2*), if it has 3 or more layers:
*Etc*1

ughh2 50-(h1+*h2)*

To= 4(Vs¹ *Vs 2Vs 2* is calculated from the formulas.

- **Ground amplification,**It varies depending on whether the ground is loose, compact, watery or porous.

It is shown. It is known as the earthquake intensity increase coefficient. It is one of the physical features that increase the intensity of the earthquake. For example, if the ground amplification is 2, an earthquake with a magnitude of 6 will have an effect of magnitude 8. If there is soil liquefaction in the environment, it is also calculated separately.

n=1.67 ,(*vn pn* It is calculated with the formula. Here Vn is the lowest layer (lithosphere approximately 5 km).
logl ------
v*etcp*

m

p_n= 2.7 g/cm³ density of the substrate. Vn= 2500^{sn}Vn: speed of the nth layer.

- **Shear modulus,**shows the resistance of the formation against shear stresses. Gdwith

This module is zero for liquids since liquids have no resistance to shear. The higher the dynamic shear modulus, the greater the resistance of the formation to shear stresses. In short, it is the resistance to shear. As the water content of the soil increases, Gdp* *Etc.*

decreases. Gd= ^{100} is calculated with the formula.

- **Ground settlement**, how many times the ground is loaded depending on the ground safety stress and bearing capacity

*h** puy

cm indicates that it will sit. It is indicated with s. Its unit is cm. n=^{gd}is calculated with the formula.

- **Poisson's ratio,**the ratio of the formation's transverse unit change to its longitudinal unit change

It is defined as. In loose rocks, highly porous, fractured and cracked environments, its value is between 0-0.5. As rocks harden, its value decreases. In hard masses such as granite and basalt, its value

(Vp))$_2$- 2/

$_{CT}$=*Vss*

2*(VP))$_2$-2

Etc

It drops to 0.05.heIt is indicated with $_o$. It is unscientific. *V* with the

formula it is calculated.

- **Modulus of elasticity**, is defined as the ratio of stresses to strains in a direction and is engineers take into account in their calculations. Also known as Dynamic Young's Modulus. EdIt is indicated with . It gives information about the strength and durability of the soils. Its unit is kg/cm²

G$_d$***(3VP*^{2}*-4Vs*^{2}*)*

is. Ed = *(Vp*^{2}*-Vs2)* is calculated with this formula.

NOTES: During the seismic field study, the dynamic parameters of the ground were calculated using the seismic velocity values of the 1st, 2nd and 3rd series and are presented in the appendix.

Table-7: Local soil class table

Local Soil Class	Soil Type	TopAverage at 30 meters		
		(Kk[m/s]	[impact /30 cm]	(Cu)so [kPa]
Z A	Solid, hard rocks	> 1500	-	-
ZB	Slightly weathered, moderately strong rocks	760-1500	-	-
ZC	Very dense layers of sand, gravel and hard clay or weak, weathered, highly fractured rocks	360-760	>50	>250

ZD	Middletight —dense layers of sand, gravel or very solid clay	180-360	15-50	70 - 250
Z E	Loose sand,gravelor soft - hardhairlayers or *P!* >In total, satisfying the conditions of 20 and w > 40%3a layer of soft clay more than a metre thick(cu< 25kPa) containingProfiles	<180	<15	<70
ZF	Soils requiring site-specific research and evaluation: 1) Soils that have the risk of collapse and potential collapse under the influence of an earthquake (liquefiable soils, highly sensitive clays, collapsible weakly cemented soils, etc.), 2) TotalthicknessFrom 3 metersmorepeatand/or high organic contentkillers, 3) Total thickness is 8 metersmoreHigh plasticity (P1 >50)killers, 4) Very thick(>35 m) soft or medium hard clays.			

According to Table 5 of the 18.03.2018 Turkish Building Earthquake Code; Since Vs=168-182, The Soil Class has been determined as Local ZE.

3.2 APPLICATION OF RESISTIVITY METHOD TO LAND

In the resistivity method application, a resistivity device with a depth capacity of 50 m was used. The resistivity values obtained were plotted as a function of distance and the thickness, depth, water retention properties, diffusions and distributions of the units located underground were investigated. In the studies carried out in the study area; Schulumberger electrode array was used and 3 measurements were taken. The application was carried out with a profile opening as potential electrodes (MN): 2-6 m and current electrodes (AB/2): 30 m.

Note: Apparent resistivity values were calculated using the k geometric factor, scale value and applied current, and by switching to real resistivities with the computer program called Schlumberger Inversion-6, layer depths and real resistivity values were presented in the appendix with graphics.

3.3 Microtremor Studies

Microtremor is a continuous vibration on the earth that is emitted from different sources. The source of these micro tremors also varies. The rotation of the earth on a certain axis, tidal effects, geothermal activities, seismic activities underground, atmospheric effects, wind and cultural noises (traffic, industrial activities and some other human-induced effects). All these factors can be perceived as vibrations on the earth. The amplitudes of these vibrations vary between 0.1 microns and 1 micron, and their periods vary between 0.05 seconds and 2 seconds.

Vibrations in a region create the natural noise of the ground in that region. The natural noise of the ground belonging to different ground conditions will also be different. Factors such as the lithology and geometry of the ground will affect the amplitude and frequency content of the natural noise of the ground. By examining the very small amplitude natural oscillations of the ground, the effective oscillation periods of the ground can be determined, and, in this way, the behavioural characteristics of the ground can be determined. In this case, regional ground classifications can be made according to the parameters to be obtained by using these natural vibrations of the ground.

By taking measurements in various regions with the microtremor device, parameters such as the ground effective period and the amplification coefficient in the effective period as an

approximation are calculated. Three microtremor measurements were taken within the study area and the ground dominant vibration period and ground amplification values were calculated.

Microtremor measurements were made at 3 points using a three-component microtremor device (Epilepsy)It was made using. In the measurements made with this device, natural vibration records are taken.

A 12V battery is used as a power source for the recordings. The recordings in the field were taken digitally with a direct connection to a laptop computer. The coordinates of the points where the measurements were taken and the parameters obtained. It is given in Table 8.

Table-8: Parameters obtained from microtremor measurements

Measure No.	T_{he}	A_0	Ta (sec) (0.67*To)	Tb (sec) (1.5*T0)	FORMATION
MT1	**1.0466**	**4.0658**	0.69	1.56	**Alluvium**
MT2	**0.8638**	**4.51322**	0.57	1.29	**Alluvium**
MT3	**0.9790**	**4.38905**	0.64	1.45	**Alluvium**

In the microtremor measurements made in the study area, T_0 values vary between 0.8638-1.0466, and A_0 values vary between 4.0658-4.51322.

3.2 Research pit

No research pit work was carried out within the boundaries of the study area.

3.3 Drilling Wells:

In the locations whose coordinates are given in Table-9, 3 seismic, 3 des measurement, 3 microtremor studies were carried out on 25.03.2020 and 1 36.00 m, 3 39 m and 1 27-meter-deep drilling well was opened by Toros Geotechnical company with D500 machine between 13.02.2020 and 29.02.2020.

WELL NO	HISTORY	DIAMETER (mm)	DEPTH(m)	COORDINATES		GROUNDWATER LEVEL
				Y	X	
SK-1	13-15.02.2020	86.00	36.00 m	552321.568	4078511.630	3.05m
SK-2	17-18.02.2020	86.00	27.00 m	552277.883	4078557.566	3.60m
SK-3	19-20.02.2020	86.00	39.00 m	552276.760	4078592.415	3.45m
Sk-4	24-25-26.02.2020	86.00	39.00 m	552315.130	4078596.68	2.90 m
SK-5	28-29.02.2020	86.00	39.00 m	552332.169	4078547.930	3.20m

Table-9: Drilling Well Coordinates

3.4 Field Experiments

3.4.1. SPT Experiments

The Standard Penetration Test (SPT), which is widely used in determining the soil strength properties, was conducted within the plot of interest according to TS-5744 and was repeated every 1.50 m maneuverer by releasing a 63.5 kg ram from 76.50 cm. The maneuver length was 1.50 m and was performed using Oger. The SPT test was conducted regularly at every 1.50 m depth and the N 30 average values were used to obtain information about the consistency and compactness of the soil and the safe bearing capacity. The SPT values performed in the boreholes opened within the construction site are presented in Table-2.

In order to determine the strength parameters, Standard Penetration Test (SPT) experiments were carried out in every 1.50 meters of ground drilling wells opened at a depth of 39 meters in 3 locations, 36.00 meters in 1 location and 27 meters in 1 location within the study area. The obtained SPT values are presented in Tables 10-11-12-13-14.

Table-10: Sk-1 No. Drilling SPT-N impact numbers

DRILLING NO	SAMPLE-NO	DEPTH	COUP NUMBERS Advancement depth			N30
			15	30	45	
SK-1	SPT	1.50-1.95	10	9	8	17
	SPT	3.00-3.45	3	3	3	6
	Ud	4.50-4.95	Oud			
	SPT	6.00-6.45	6	4	2	6
	Ud	7.50-7.95	Oud			
	SPT	9.00-9.45	8	10	12	22
	Ud	10.50-10.95	Oud			
	SPT	12.00-12.45	1	2	3	5
	SPT	13.50-13.95	1	2	2	4
	SPT	15.00-15.45	2	2	3	5
	SPT	16.50-16.95	4	4	5	9
	SPT	18.00-18.45	1	1	1	2
	SPT	19.50-19.95	2	2	3	5
	SPT	21.00-21.45	4	5	5	10
	SPT	22.50-22.95	4	5	7	12
	SPT	24.00-24.45	4	5	4	9
	SPT	25.50-25.95	5	6	7	13
	SPT	27.00-27.45	6	6	7	13
	SPT	28.50-28.95	5	6	6	12
	SPT	30.00-30.45	8	13	16	29
	SPT	31.50-30.95	5	9	15	24
	SPT	33.00-33.45	26	R	R	R
	SPT	34.50-34.95	21	20	R	R
	SPT	36.00-36.45	18	20	32	52



Photo-2: SK-1 drilling operation image

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AYKURTGeologic

Photo-3: SK-1 drilling spt test images


















13.50 m


15.00 m


16.50 m


18.00 m


19.50 m


21.00 m


22.50 m


24.00 m


25.50 m


27.00 m


28.50 m


30.00 m


31.50 m


33.00 m


34.50 m


36.00 m

Table-11: Sk-2 No. Drilling SPT-N impact numbers

DRILLING NO	SAMPLE-NO	DEPTH	NUMBER OF IMPACTS Advancement			N30
			15	30	45	
SK-2	SPT	1.50-1.95	8	6	5	11
	SPT	3.00-3.45	10	8	4	12
	SPT	4.50-4.95	14	23	23	56
	SPT	6.00-6.45	8	4	2	6
	SPT	7.50-7.95	Oud			
	SPT	9.00-9.45	1	2	3	5
	SPT	10.50-10.95	Oud			
	SPT	12.00-12.45	3	3	4	7
	SPT	13.50-13.95	Oud			
	SPT	15.00-15.45	5	7	6	13
	SPT	16.50-16.95	1	2	2	4
	SPT	18.00-18.45	1	2	3	5
	SPT	19.50-19.95	2	4	9	13
	SPT	21.00-21.45	8	8	12	20
	SPT	22.50-22.95	19	16	21	37
	SPT	24.00-24.45	13	16	24	40
	SPT	25.50-25.95	9	16	25	41
	SPT	27.00-27.45	13	14	18	32



Photo-4: SK-2 drilling operation image

Photo-5: SK-2 drilling spt test images


1.50 m


3.00 m


4.50 m


6.00 m


7.50 m


9.00 m


10.50 m


12.00 m


13.50 m


15.00 m


16.50 m


18.00 m


19.50 m


21.00 m


22.50 m


24.00 m





Table-12: Sk-3 No. Drilling SPT-N impact numbers

DRILLING NO	SAMPLE-NO	DEPTH	COUP NUMBERS Advancement depth			N30
			15	30	45	
SK-3	SPT	1.50-1.95	5	6	10	16
	SPT	3.00-3.45	3	4	8	12
	SPT	4.50-4.95	6	8	4	12
	SPT	6.00-6.45	12	13	16	29
	SPT	7.50-7.95	Oud			
	SPT	9.00-9.45	4	6	9	15
	SPT	10.50-10.95	Oud			
	SPT	12.00-12.45	7	7	6	13
	SPT	13.50-13.95	Oud			
	SPT	15.00-15.45	4	4	3	7
	SPT	16.50-16.95	1	2	3	5
	SPT	18.00-18.45	1	2	2	4
	SPT	19.50-19.95	2	2	2	4
	SPT	21.00-21.45	2	3	4	7
	SPT	22.50-22.95	2	4	4	8
	SPT	24.00-24.45	3	3	5	8
	SPT	25.50-25.95	4	5	6	11
	SPT	27.00-27.45	4	5	6	11
	SPT	28.50-28.95	6	10	14	24
	SPT	30.00-30.45	7	7	7	14
	SPT	31.50-30.95	14	13	15	28
	SPT	33.00-33.45	5	8	12	20
	SPT	34.50-34.95	Refuge	Refuge	Refuge	Refuge
	SPT	36.00-36.45	18	20	Refuge	Refuge
	SPT	37.50-37.45	Refuge	Refuge	Refuge	Refuge
	SPT	39.00-39.45	Refuge	Refuge	Refuge	Refuge

Photo-6: SK-4 drilling spt test images



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13.50 m


15.00 m


16.50 m


18.00 m


19.50 m


21.00 m


22.50 m


24.00 m


25.50 m


27.00 m


28.50 m


30.00 m


31.50 m


33.00 m


34.50 m


36.00 m





Photo-7: SK-3 drilling operation image

Table-13: Sk-4 No. Drilling SPT-1'4 blow numbers

DRILLING NO	SAMPLE-NO	DEPTH	COUP NUMBERS Advancement depth			N30
			15	30	45	
SK-4	SPT	1.50-1.95	5	15	24	39
	SPT	3.00-3.45	Oud			
	SPT	4.50-4.95	6	5	2	7
	SPT	6.00-6.45	Oud			
	SPT	7.50-7.95	7	12	12	24
	SPT	9.00-9.45	Oud			
	SPT	10.50-10.95	5	5	6	11
	SPT	12.00-12.45	1	2	2	4
	SPT	13.50-13.95	2	2	3	5
	SPT	15.00-15.45	3	4	4	8
	SPT	16.50-16.95	2	3	3	6
	SPT	18.00-18.45	4	4	5	9
	SPT	19.50-19.95	2	4	4	8
	SPT	21.00-21.45	4	6	6	12
	SPT	22.50-22.95	4	4	6	10
	SPT	24.00-24.45	2	4	5	9
	SPT	25.50-25.95	2	4	5	9
	SPT	27.00-27.45	6	6	10	16
	SPT	28.50-28.95	13	17	21	38
	SPT	30.00-30.45	7	13	Refuge	Refuge
	SPT	31.50-30.95	-	-	-	Core
	SPT	33.00-33.45	-	-	-	Core
	SPT	34.50-34.95	-	-	-	Core
	SPT	36.00-36.45	-	-	-	Core
	SPT	37.50-37.45	-	-	-	Core
	SPT	39.00-39.45	-	-	-	Core



Photo-8: SK-4 drilling operation image

Photo-9: SK-4 drilling spt test images

































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25.50 m


27.00 m


28.50 m


30.00 m

Table-14: Sk-5 No. Drilling SPT-1\T pulse numbers

DRILLING NO	SAMPLE-NO	DEPTH	COUP NUMBERS			N30
			Advancement depth			
			15	30	45	
SK-5	SPT	1.50-1.95	Oud			
	SPT	3.00-3.45	9	12	11	23
	SPT	4.50-4.95	8	7	8	15
	SPT	6.00-6.45	Oud			
	SPT	7.50-7.95	5	6	9	15
	SPT	9.00-9.45	Oud			
	SPT	10.50-10.95	6	7	8	15
	SPT	12.00-12.45	1	2	3	5
	SPT	13.50-13.95	1	2	3	5
	SPT	15.00-15.45	3	4	4	8
	SPT	16.50-16.95	2	3	3	6
	SPT	18.00-18.45	4	4	5	9
	SPT	19.50-19.95	2	4	9	13
	SPT	21.00-21.45	8	11	20	31
	SPT	22.50-22.95	8	7	9	16
	SPT	24.00-24.45	27	13	13	26
	SPT	25.50-25.95	27	14	6	20
	SPT	27.00-27.45	15	11	15	26
	SPT	28.50-28.95	13	9	8	17
	SPT	30.00-30.45	13	20	30	50
	SPT	31.50-30.95	17	19	22	41
	SPT	33.00-33.45	15	33	28	61
	SPT	34.50-34.95	11	16	24	40
	SPT	36.00-36.45	Refuge	Refuge	Refuge	Refuge
	SPT	37.50-37.45	Refuge	Refuge	Refuge	Refuge
	SPT	39.00-39.45	-	-	-	Core



Photo-10: SK-5 drilling operation image

Photo-11: SK-5 drilling spt test images

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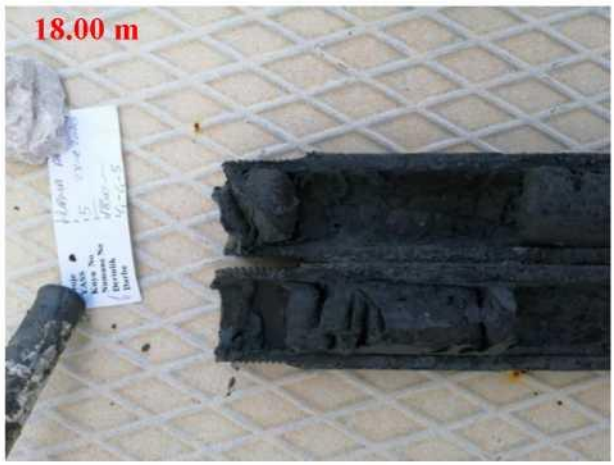
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13.50 m


15.00 m


16.50 m


18.00 m


19.50 m


21.00 m


22.50 m


24.00 m



According to macroscopic definition and laboratory results, cohesive and non-cohesive soils were defined within vertical depths at different locations of the borehole. In case the corrected N30 values given for the boreholes are evaluated according to Tables-10-11-12-13-14 developed by Terzaghi and Peck;

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SK-1 The silty sand unit detected between 0.00-2.50 meters of the well numbered was defined as cohesionless soil, the relative density of the soils was between 0.35-0.65 and the relative density was "medium dense".

SK-2 The clayey sand unit detected between 4.00-6.00 meters of the well numbered was defined as cohesionless soil, and the relative density of the soil was determined to be more than 0.85 and the relative density was determined to be "Very tight".

SK-3 The sand unit detected between 4.00-7.00 meters of the well numbered was defined as cohesionless soil, the relative density of the soils was in the range of 0.35-0.65 and the relative density was "medium dense".

SK-4 The clayey sand unit detected between 4.00-6.00 meters of the well numbered was defined as cohesionless soil, the relative density of the soils was between 0.15-0.35 and the relative density was "Loose".

SK-5 The clayey sand unit detected between 2.50-5.50 meters of well no. was defined as cohesionless soil, and the relative density of the soil was found to be in the range of 0.35-0.65 and the relative density was found to be "medium dense".

Number of strokes (N1 30)	Relative Tightness	Relative Density
0-4	0.15 >	Too loose
4-10	0.15 - 0.35	Loose
10-30	0.35 - 0.65	Medium Tight
30-50	0.65 - 0.85	Tight
More than 50	More than 0.85	Very Tight

Table-15: Relation Between Blow Number and Relative Density in Cohesionless Soils (Terzaghi & Peck)

Table- 16: Cohesionless Impact Number and Relative Density According to Drilling Wellsnluk

DRILLING NO	DEPTH	N30	Relative Density
SK-1	1.50-1.95	17	Medium Tight
SK-2	4.50-4.95	56	Very Tight
Sk-3	4.50-4.95	12	Medium
	6.00-6.45	29	Medium
Sk-4	4.50-4.95	7	Loose
Sk-5	3.00-3.45	23	Medium
	4.50-4.95	15	Medium

Cohesive soils were defined according to macroscopic definition and laboratory results within vertical depths at different locations within the study area. The relationship between the corrected SPT impact numbers and consistency and unconfined compressive strength of SPT data in cohesive soils according to Terzaghi and Peck is given in Table-16.

Number of strokes (N_{30})	Consistency
Less than 2	Very soft
2-4	Soft
4-8	Middle
8-15	Thick
15-30	Very strict
More than 30	Hard

Table-17: Relation between the Number of Blows and Consistency in Cohesive Soils (Terzaghi & Peck)

In line with this data, it was determined that the soil was of "Soft-Medium-Solid-Very Solid-Hard Consistency" in terms of consistency for the clay unit detected in the vertical section where the building foundations will sit in the field where ground drilling work was carried out.

Table-18:SK-1 well Cohesionless soil Impact Number and Consistency connection

DRILLING NO	DEPTH	N30	Consistency
SK-1	1.50-1.95	-	
	3.00-3.45	6	Middle
	4.50-4.95	Oud	-
	6.00-6.45	6	Middle
	7.50-7.95	Oud	-
	9.00-9.45	22	Very strict
	10.50-10.95	Oud	-
	12.00-12.45	5	Middle
	13.50-13.95	4	Middle
	15.00-15.45	5	Middle
	16.50-16.95	9	Thick
	18.00-18.45	2	Soft
	19.50-19.95	5	Middle
	21.00-21.45	10	Thick
	22.50-22.95	12	Thick
	24.00-24.45	9	Thick
	25.50-25.95	13	Thick
	27.00-27.45	13	Thick
	28.50-28.95	12	Thick
	30.00-30.45	29	Very strict
	31.50-30.95	24	Very strict
	33.00-33.45	R	Hard
	34.50-34.95	R	Hard
	36.00-36.45	52	Hard

Table-19:SK-2: Consistency relation with the Impact Number of Cohesionless Soil in well no.hiss

DRILLING NO	DEPTH	N30	Consistency
SK-2	1.50-1.95	11	Thick
	3.00-3.45	12	Thick
	4.50-4.95	-	-
	6.00-6.45	6	Middle
	7.50-7.95	Oud	-
	9.00-9.45	5	Middle
	10.50-10.95	Oud	-
	12.00-12.45	7	Middle
	13.50-13.95	Oud	-
	15.00-15.45	13	Thick
	16.50-16.95	4	Middle
	18.00-18.45	5	Middle
	19.50-19.95	13	Thick
	21.00-21.45	20	Very strict
	22.50-22.95	37	Hard
	24.00-24.45	40	Hard
	25.50-25.95	41	Hard
	27.00-27.45	32	Hard

Table-20:SK-3: Consistency of Cohesionless Soil with Impact Numberwarm connection

DRILLING NO	DEPTH	N30	Consistency
SK-3	1.50-1.95	16	Very strict
	3.00-3.45	12	Thick
	4.50-4.95	12	-
	6.00-6.45	29	-
	7.50-7.95	Oud	-
	9.00-9.45	15	Thick
	10.50-10.95	Oud	-
	12.00-12.45	13	Thick
	13.50-13.95	Oud	-
	15.00-15.45	7	Middle
	16.50-16.95	5	Middle
	18.00-18.45	4	Middle
	19.50-19.95	4	Middle
	21.00-21.45	7	Middle
	22.50-22.95	8	Middle
	24.00-24.45	8	Middle
	25.50-25.95	11	Thick
	27.00-27.45	11	Thick
	28.50-28.95	24	Very strict
	30.00-30.45	14	Thick
	31.50-30.95	28	Very strict
	33.00-33.45	20	Very strict
	34.50-34.95	Refuge	Hard
	36.00-36.45	Refuge	Hard
	37.50-37.45	Refuge	Hard
	39.00-39.45	Refuge	Hard

T able-21:SK-4: Cohesionless soil's Impact Number and Consistency Relationthe link

DRILLING NO	DEPTH	N30	Consistency
SK-4	1.50-1.95	39	Hard
	3.00-3.45	Oud	-
	4.50-4.95	7	-
	6.00-6.45	Oud	-
	7.50-7.95	24	Very strict
	9.00-9.45	Oud	-
	10.50-10.95	11	Thick
	12.00-12.45	4	Middle
	13.50-13.95	5	Middle
	15.00-15.45	8	Middle
	16.50-16.95	6	Middle
	18.00-18.45	9	Thick
	19.50-19.95	8	Middle
	21.00-21.45	12	Thick
	22.50-22.95	10	Thick
	24.00-24.45	9	Thick
	25.50-25.95	9	Thick
	27.00-27.45	16	Very strict
	28.50-28.95	38	Hard
	30.00-30.45	Refuge	Hard

Table-22:SK-5: Cohesionless soil's Impact Number and Consistency Relationthe link

DRILLING NO	DEPTH	N30	
SK-5	1.50-1.95	Oud	-
	3.00-3.45	23	-
	4.50-4.95	15	-
	6.00-6.45	Oud	-
	7.50-7.95	15	Thick
	9.00-9.45	Oud	-
	10.50-10.95	15	Thick
	12.00-12.45	5	Middle
	13.50-13.95	5	Middle
	15.00-15.45	8	Middle
	16.50-16.95	6	Middle
	18.00-18.45	9	Thick
	19.50-19.95	13	Thick
	21.00-21.45	31	Hard
	22.50-22.95	16	Very strict
	24.00-24.45	26	Very strict
	25.50-25.95	20	Very strict
	27.00-27.45	26	Very strict
	28.50-28.95	17	Very strict
	30.00-30.45	50	Hard
	31.50-30.95	41	Hard
	33.00-33.45	61	Hard
	34.50-34.95	40	Hard
	36.00-36.45	Refuge	Hard
	37.50-37.45	Refuge	Hard

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3.4.1. TCR AND RQD

In the drilling works carried out in the study area, a beige-colored limestone unit with clay bands was detected between 30.50-39.00 meters in well SK-4 and between 37.50-39.00 meters in well SK-5. The TCR and RQD values obtained in the drilling works are given in Table-23.



SK-12 No. Drilling Core Box Image



SK-13 No. Drilling Core Box Image

Table-23: Drilling Well RQD %

Well meters	SK-4		Well meters	SK-4	
	TCR	RQD		TCR	RQD
30.50-31.50	15	9	37.50-39.00	27	7
31.50-34.50	43	40			
34.50-36.00	23	17			
36.00-37.50	47	34			
37.50-39.00	31	8			
39.00-40.00	53	34			

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4.HYDROGEOLOGY

1.1. Underground and Surface Waters

Groundwater: As a result of ground drilling studies within the examined parcel, groundwater was encountered and the groundwater depths are shown in Table-24.

WELL NO	GROUNDWATER LEVEL
SK-1	3.05m
SK-2	3.60m
SK-3	3.45m
Sk-4	2.90 m
SK-5	3.20m

Considering the negative impact of groundwater on the foundation and the risk of liquefaction due to the rise in groundwater levels as a result of seasonal rainfall, it would be appropriate to take the necessary engineering measures during and after the construction phase, such as drainage lines, soil reclamation, etc. The foundation excavation and foundation type should be evaluated by the project author, taking into account the static water level.

Surface Waters: There are no streams or rivers in the study area that can be considered as surface waters.

The groundwater samples taken from the boreholes SK-1 and SK-3 within the scope of the study area were analysed in terms of their harmful effects on concrete at the Çözüm Geotechnical Laboratory. As a result of the analysis, it was determined that the Sulphate, Magnesium and Lime Solvent Carbonic Acid contained in the groundwater did not have harmful effects in terms of concrete contact water (ANNEX-6). The measured groundwater levels may vary depending on seasonal rainfall. In addition, changes in the groundwater level negatively affect the foundation of the structure in terms of concrete-iron life and settlement problems. Therefore, in order to prevent surface and groundwater from leaking and damaging the foundation, appropriate environmental and underground drainage systems must be established, and the water must be drained from the construction site, and appropriate isolation measures must be taken in the foundation. While developing drainage systems, the water that will accumulate in the excavation pit must be collected with pumping systems and transferred to the wastewater network. In addition, bundling is recommended in the foundation.

Parameter	SK-1
PH	7.71
Sulfate	480.00
Chloride	260.78
Magnesium	98.66
Kmn04 Expenditure	0.53
Limescale Remover Carbonic Acid	0.00
Total Alkalinity	460.00
Ammonium	2.40
Hardness	923.65

Parameter	SK-3
PH	7.09
Sulfate	438.00
Chloride	281.92
Magnesium	99.15
Kmn04 Expenditure	0.35
Limescale Remover Carbonic Acid	0.00
Total Alkalinity	500.00
Ammonium	1.70
Hardness	913.50

Table-25: Concrete contact water analysis results

5. LABORATORY EXPERIMENTS AND ANALYSES:

In order to determine the soil distribution within the construction site, natural water content, void ratio, natural unit volume weight, dry unit volume weight, specific gravity, hydrometer, pole shear test, three-axis cell shear test, sieve analysis, Atterberg limit tests and uniaxial compressive strength test on core sample were performed on the soil sample taken from the drilling works in order to classify the construction site soil. Laboratory results are given in Annex-6.

5.1. Determination of Physical Properties of Soils:

Disturbed material obtained as a result of ground drilling work carried out within the parcel of interest

The physical properties of the soils are explained below.

Drilling No:	Sample	Depth(mt)	Wn	-most	Yn	yd	Gs	Sr	LL	PL	PI	+4"	200"	TS1500
SK-1	Ud	4.50	26.3	0.714	1.98	1.57	2.68	99	30.7	21.0	9.7	0	61	CL
SK-1	Ud	7.50	26.5	0.717	1.98	1.56	2.68	99	31.2	20.9	10.3	0	68	CL
SK-1	Ud	10.50	39.2	1,055	1.83	1.31	2.69	100	55.5	22.85	32.7	0	99	CH
SK-1	SPT	13.50							57.2	25.9	31.3	0	94	CH
SK-1	SPT	16.50							67.6	27.8	39.8	0	99	CH
SK-1	SPT	19.50							70.0	29.7	40.3	0	98	CH

Drilling No:	Sample	Depth(mt)	Wn	-most	Yn	yd	Gs	Sr	LL	PL	PI	+4"	200"	TS1500
SK-1	SPT	24.00							67.8	28.7	39.1	0	99	CH
SK-1	SPT	27.00							62.3	27.1	35.2	7	82	CH
SK-1	SPT	30.00							39.5	21.7	17.8	6	56	CL
SK-1	SPT	33.00							-	-	NP	77	4	GP
SK-1	SPT	34.50							44.1	23.2	20.9	33	40	GC
SK-2	SPT	3.00							41.5	22.3	19.2	8	64	CL
SK-2	SPT	6.00							37.7	20.3	17.4	1	87	CL
SK-2	Ud	7.50							36.8	22.6	14.2	0	83	CL
SK-2	Ud	10.50							49.0	25.1	23.9	0	99	CL
SK-2	Ud	13.50							71.9	29.7	42.2	0	99	CH
SK-2	SPT	15.00							64.8	29.2	35.6	0	97	CH
SK-2	SPT	18.00							66.8	26.7	40.1	1	96	CH
SK-2	SPT	19.50							53.5	20.7	32.8	27	39	SC
SK-2	SPT	22.20							40.6	22.5	18.1	31	36	SC
SK-2	SPT	25.50							45.3	24.6	20.7	5	55	CL
SK-2	SPT	27.00							46.5	24.3	22.2	15	63	CL
SK-3	SPT	1.50							33.1	21	12.1	3	61	CL
SK-3	Ud	7.50	28.2	0.760	1.96	1.53	2.69	100	45.2	22.3	22.9	0	97	CL
SK-3	Ud	10.50	27.3	0.737	1.97	1.55	2.69	100	37.2	21.9	15.3	0	83	CL
SK-3	Ud	13.50	34.0	0.912	1.89	1.41	2.69	100	49.5	23.9	25.6	0	90	CL
SK-3	SPT	15.00							55.4	26.8	28.6	0	90	CL
SK-3	SPT	18.00							72.5	30.2	42.3	0	99	CH
SK-3	SPT	21.00							67.3	28.6	38.7	0	99	CH
SK-3	SPT	24.00							75.7	31.4	44.3	0	99	CH
SK-3	SPT	30.00							52.3	26.4	25.9	12	55	CH
SK-3	SPT	31.50							32.7	19.5	13.2	60	17	GC
SK-3	SPT	33.00							56.6	26.5	30.1	16	48	SC
SK-3	SPT	36.00							44.6	23.2	21.4	17	39	SC
SK-3	SPT	37.50							42.7	22.8	19.9	43	37	GC
SK-4	Ud	3.00	28.2	0.761	1.96	1.53	2.69	100	32.6	20.7	11.9	1	62	CL
SK-4	Ud	6.00	33.6	0.903	1.89	1.42	2.69	100	52.4	26.8	25.6	0	98	CH
SK-4	Ud	9.00	32.3	0.867	1.91	1.44	2.69	100	42.2	22.7	19.5	0	97	CL
SK-4	SPT	12.00							56.9	27.6	29.3	0	97	CH
SK-4	SPT	18.00							69.7	30.3	39.4	0	98	CH
SK-4	SPT	22.50							73.7	31.4	42.3	0	99	CH
SK-4	SPT	28.50							40.9	22.1	18.8	1	72	CL
SK-5	Ud	1.50	25.6	0.698	1.98	1.58	2.68	98	29.1	19.7	9.4	4	54	CL
SK-5	Ud	6.00							27.9	20.1	7.8	22	28	SC
SK-5	Ud	9.00	33.0	0.888	1.90	1.43	2.69	100	42.1	23.7	18.4	0	98	CL
SK-5	SPT	13.50							58.3	27.6	30.7	1	94	CH
SK-5	SPT	18.00							64.6	29.5	35.1	0	99	CH
SK-5	SPT	21.00							38.5	22.3	16.2	15	51	CL
SK-5	SPT	27.00							32.8	20.7	12.1	54	21	GC
SK-5	SPT	34.50							55.4	26.8	28.6	4	82	CH

Table-26: Lab Results

According to the laboratory results given in Table-26 and in the annex of the report, the soils detected in the geotechnical drilling wells opened in the study area were tested under laboratory conditions in the study area,

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According to USC of the ground;

Sk-1 In the drilling operation numbered; "SM", symbol; silty sand, "CL" symbol; silty clay, "CH" symbol; clay, "GP" symbol, sandy gravel, "GC" symbol, in the drilling operation numbered Sk-2; "SC", symbol; clayey sand, "CL" symbol; silty clay, "CH" symbol; clay

Sk-3 In drilling operation no.; "SP", symbol; sand, "CL" symbol; silty clay, "CH" symbol; clay, "SC" symbol; clayey sand, "GC" symbol clayey gravel, In drilling operation no. Sk-4; "SC", symbol; clayey sand, "CL" symbol; silty clay, "CH" symbol; clay

Sk-5 In the drilling study numbered; it was determined that it contained clayey sand, symbolized as "SC", silty clay, symbolized as "CH", clay, clayey gravel, symbolized as "GC".

Drilling works in the study area were carried out by hydrometer test and the amount of clay, silt, sand and gravel was determined in detail and the hydrometer test results are given in Table-27 and Annex-6.

Drilling No:	Depth (m)	HAIR	PLATE	SAND	GRAVEL
SK-1	4.50	25	36	36	3
SK-1	7.50	28	40	32	0
SK-1	10.50	56	43	1	0
SK-1	16.50	63	36	1	0
SK-1	24.00	63	36	1	0
SK-1	30.00	24	32	28	16
SK-2	7.50	38	45	16	1
SK-2	10.50	51	48	1	0
SK-2	13.50	66	33	1	0
SK-2	18.00	54	42	3	1
SK-3	7.50	53	44	3	0
SK-3	10.50	39	44	17	0
SK-3	13.50	48	42	8	2
SK-3	18.00	58	41	1	0
SK-3	24.00	56	43	1	0
SK-4	3.00	25	37	35	3
SK-4	6.00	46	52	2	0
SK-4	9.00	46	51	3	0
SK-4	18.00	57	41	2	0
SK-4	28.50	28	44	22	6
SK-5	1.50	23	31	36	10
SK-5	9.00	40	58	2	0
SK-5	13.50	50	44	4	2
SK-5	21.00	20	31	21	28

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5.2. Determination of mechanical properties of soils

Mechanical properties determined according to direct cutting results for soils evaluated as cohesive and non-cohesive within the boundaries of the study area (cohesion "c" and internal friction angle "0") are summarized in the table below.

Table-28: Direct Shear Test C and**0**Values

Drilling No:	Depth (m)	C (kgf/cm2)	0 (°)
SK-1	1.50	0.22	20
SK-1	4.50	0.54	0
SK-1	7.50	0.58	0
SK-1	10.50	0.46	0
SK-2	4.50	0.21	17
SK-2	7.50	0.60	0
SK-2	10.50	0.54	0
SK-2	13.50	0.36	0
SK-3	6.00	0.19	20
SK-3	7.50	0.55	0
SK-3	10.50	0.45	0
SK-3	13.50	0.35	0
SK-4	4.50	0.20	20
SK-4	3.00	0.47	0
SK-4	6.00	0.59	0
SK-4	9.00	0.51	0
SK-5	1.50	0.66	0
SK-5	6.00	Sample could not be taken	
SK-5	9.00	0.50	0

Consolidation test was carried out for each well in the drillings carried out in the study area. Consolidation test results are given in Table-29 and Annex-6.

Table-29: Consolidation test results

Drilling No: '	P(kg/cm2)	mv(cm2/kg)	c_v(cm2/min)	Pc (kg/cm2)
SK-1	0.00-0.25	0.0272	0.0111	0.8
	0.25-0.50	0.0278	0.0103	Cc
	0.50-1.00	0.0232	0.0089	0.1769
	1.00-2.00	0.0215	0.0084	
	2.00-4.00	0.0157	0.0085	
	4.00-8.00	0.0096	0.0091	

Drilling No:	P(kg/cm2)	mv(cm2/kg)	cv(cm2/min)	Pc (kg/cm2)
SK-2	0.00-0.25	0.0280	0.0107	1.0
	0.25-0.50	0.0282	0.0099	Cc
	0.50-1.00	0.0253	0.0088	0.2386
	1.00-2.00	0.0228	0.0080	
	2.00-4.00	0.0164	0.0082	
	4.00-8.00	0.0089	0.0088	

Drilling No:	P(kg/cm2)	m_v(cm2/kg)	c_v(cm2/min)	Pc (kg/cm2)
SK-3	0.00-0.25	0.0154	0.0091	1.2
	0.25-0.50	0.0201	0.0083	Cc
	0.50-1.00	0.0245	0.0077	0.3156
	1.00-2.00	0.0358	0.0073	
	2.00-4.00	0.0250	0.0075	
	4.00-8.00	0.0140	0.0076	

Drilling No:	P(kg/cm2)	m_v(cm2/kg)	c_v(cm2/min)	Pc (kg/cm2)
SK-4	0.00-0.25	0.0175	0.0098	1.0
	0.25-0.50	0.0210	0.0091	Cc
	0.50-1.00	0.0231	0.0083	0.2226
	1.00-2.00	0.0323	0.0084	
	2.00-4.00	0.0261	0.0082	
	4.00-8.00	0.0138	0.0083	

Drilling No:	P(kg/cm2)	m_v(cm2/kg)	c_v(cm2/min)	Pc (kg/cm2)
SK-4	0.00-0.25	0.0247	0.0097	1.1
	0.25-0.50	0.0265	0.0096	Cc
	0.50-1.00	0.0221	0.0085	0.1743
	1.00-2.00	0.0198	0.0081	
	2.00-4.00	0.0145	0.0082	
	4.00-8.00	0.0093	0.0088	

5.3. Determination of Mechanical Properties of Rocks:

In order to determine the mechanical properties of the ground, uniaxial compressive strength test was carried out on core samples taken from the drillings of the beige colored limestone unit with clay bands between 30.50-39.00 meters in well SK-4 and between 37.50-39.00 meters in well SK-5. The laboratory test results are summarized below.

Table-30: Laboratory Uniaxial Compressive Strength Results

Well No.	Depth m	Height mm	Diameter mm	Weight Gram	Failure Load	Area cm^2	Volume cm^3	Correction factor	Y_n	qu Kgf/cm^2
SK-4	30.50	125.0	52.0	714.38	48.6	21.24	265.46	0.9756	2,691	227.6
Sk-4	31.50	122.0	52.0	701.85	153.0	21.24	259.09	0.9787	2,709	718.9
Sk-5	37.50	51.5	51.5	528.68	141.8	20.83	191.64	1.0157	2,759	705.0

6. Engineering Geology of the Study Area:

Quaternary sand, sandy gravel are commonly observed in the study area, and a unit consisting of irregular accumulations of sand, silty sand, sandy gravel and large-block gravel type units in the terrestrial environment (Alluvial-Quaternary) was detected, and large-block slope rubble and beige-colored clay-banded limestone unit belonging to the Tekedag formation (Jkt) were detected under the alluvial unit.

Drilling work was carried out in 5 locations within the examined parcel. The units identified as a result of the drilling work are presented in the Table below.

Table-31: Units detected in the study area

DRILLING NO	DEPTH (m)	LITOLOGY	FORMATION
SK-1	0.00-2.50	Brown Silty Sand	Alluvial Qal
	2.50-7.00	Brown, Silty sandy clay	
	7.00-33.00	Gray coloured Silty Clay	
	33.00-36.00	Limestone Fragmented Clay Filled Hillside Rubble	
SK-2	0.00-4.00	Brown, slightly sandy, gravelly Clay unit	Alluvial Qal
	4.00-6.00	Brown, gravelly clayey sand	
	6.00-22.00	Gray coloured Silty Clay	
	22.00-27.00	Brown slightly gravelly sandy clay	
SK-3	0.00-4.00	Brown slightly gravelly Clay unit	Alluvial Qal
	4.00-7.00	Brown Sand Unit	
	7.00-30.00	Gray coloured Silty Clay	
	30.00-31.50	Gray coloured gravelly clay	
	31.50-39.00	Brown coarse limestone block clay filled slope rubble	
SK-4	0.00-2.50	Filling Material	Alluvial Qal
	2.50-4.00	Brown Clay	
	4.00-6.00	Brown Clay, Sand Unit	
	6.00-27.00	Gray coloured Silty Clay	
	27.50-30.50	Gray coloured slightly gravelly Clay	
	30.50-39.00	Beige coloured, occasionally Clay Banded Limestone	Jkt-Tekedag fm.
SK-5	0.00-0.50	Filling Material	Alluvial Qal
	0.50-3.00	Brown Clay	
	3.00-5.50	Brown gravelly sand	
	5.50-7.00	Gray coloured, slightly sandy, silty clay unit	
	7.00-21.00	Gray coloured Silty Clay	
	21.00-23.00	Gray coloured, gravelly Clay Unit	
	23.00-28.00	Clay unit with brown limestone fragments	
	28.00-37.50	Brown, slightly gravelly, sandy clay unit	
	37.50-39.00	Beige coloured, occasionally Clay Banded Limestone	Jkt-Tekedag fm.

6.1. GEOLOGICAL SECTION

Quaternary sand, sandy gravel are widely observed in the study area, and a unit consisting of irregular accumulations of sand, silty sand, sandy gravel and large-block gravel type units in the terrestrial environment (Alluvial-Quaternary) has been identified, and large-block slope rubble and beige-colored clay-banded limestone unit belonging to the Tekedag formation (Jkt) have been identified under the alluvial unit. The geological section made according to the units identified in the study is given in Annex-8.

M. Ersin BARBAROS
Geophysical Eng.

M. Süha AYKURT
Geological Eng.

7. CONCLUSION AND RECOMMENDATIONS

1. This report is within the borders of Hurma Wastewater Facility, Konyaaltı District, Antalya Province.

In order to determine the ground parameters of the Sludge Incineration Unit planned to be constructed, drilling works were carried out on 23.02.2020-29.02.2020 within the points given by the employer in order to determine the ground parameters of the construction, and geophysical studies were carried out on 25.03.2020 by TOROS Geotechnical Engineering Ltd. Co. According to the categorical classification of buildings and building type structures, it was evaluated in the 2nd category.

2. Quaternary sand and sandy gravel are common in the study area.

It is observed as a unit consisting of irregular accumulations of sand, silty sand, sandy gravel and large-block gravel type units in the terrestrial environment (Alluvial-Quaternary). Under the alluvial unit, large-block slope rubble and beige-coloured clay-banded limestone unit belonging to the Tekedag formation (Jkt) were detected.

Drilling work was carried out in 5 locations within the examined parcel. The units identified as a result of the drilling work are presented in the Table below.

DRILLING NO	DEPTH (m)	LITOLOGY	FORMATION
SK-1	0.00-2.50	Brown Silty Sand	Alluvial Qal
	2.50-7.00	Brown, Silty sandy clay	
	7.00-33.00	Gray colored Silty Clay	
	33.00-36.00	Limestone Fragmented Clay Filled Hillside Rubble	
SK-2	0.00-4.00	Brown, slightly sandy, gravelly Clay unit	Alluvial Qal
	4.00-6.00	Brown, gravelly clayey sand	
	6.00-22.00	Gray colored Silty Clay	
	22.00-27.00	Brown slightly gravelly sandy clay	
SK-3	0.00-4.00	Brown slightly gravelly Clay unit	Alluvial Qal
	4.00-7.00	Brown Sand Unit	
	7.00-30.00	Gray colored Silty Clay	
	30.00-31.50	Gray coloured gravelly clay	
	31.50-39.00	Brown coarse limestone block clay filled slope rubble	
SK-4	0.00-2.50	Filling Material	Alluvial Qal
	2.50-4.00	Brown Clay	
	4.00-6.00	Brown Clay, Sand Unit	
	6.00-27.00	Gray coloured Silty Clay	
	27.50-30.50	Gray coloured slightly gravelly Clay	
	30.50-39.00	Beige colored, occasionally Clay Banded	Jkt-Tekedag fm.

DRILLING NO	DEPTH (m)	LITOLOGY	FORMATION
SK-5	0.00-0.50	Filling Material	Alluvial Qal
	0.50-3.00	Brown Clay	
	3.00-5.50	Brown gravelly sand	
	5.50-7.00	Gray colored, slightly sandy, silty clay	
	7.00-21.00	Gray colored Silty Clay	
	21.00-23.00	Gray colored, gravelly Clay Unit	
	23.00-28.00	Clay unit with brown limestone	
	28.00-37.50	Brown, slightly gravelly, sandy clay unit	
	37.50-39.00	Beige coloured, occasionally Clay	Jkt-Tekedag fm.

3. Groundwater: As a result of ground drilling works within the examined parcel, Groundwater was encountered and the groundwater depths are shown in the table below.

WELL NO	GROUNDWATER LEVEL
SK-1	3.05m
SK-2	3.60m
SK-3	3.45m
Sk-4	2.90 m
SK-5	3.20m

Considering the negative impact of groundwater on the foundation and the risk of liquefaction due to the rise in groundwater levels as a result of seasonal rainfall, it would be appropriate to take the necessary engineering measures during and after the construction phase, such as drainage lines, soil reclamation, etc. The foundation excavation and foundation type should be evaluated by the project author, taking into account the static water level.

The groundwater samples taken from the boreholes SK-1 and SK-3 within the scope of the study area were analysed in terms of their harmful effects on concrete at Çözüm Geotechnical Laboratory. As a result of the analysis, it was determined that the Sulphate, Magnesium and Lime Solvent Carbonic Acid contained in the groundwater did not have harmful effects in terms of concrete contact water (ANNEX-6). The measured groundwater levels may vary depending on seasonal rainfall. In addition, changes in the groundwater level negatively affect the foundation of the structure in terms of concrete-iron life and settlement problems. Therefore, in order to prevent surface and groundwater from leaking and damaging the foundation, appropriate environmental and underground drainage systems must be established and the water must be drained from the construction site, and appropriate isolation measures must be taken in the foundation. While developing drainage systems, the water that will accumulate in the excavation pit must be collected with pumping systems and transferred to the wastewater network. In addition, bundling is recommended in the foundation.

The study area defined as alluvial unit is in the range of Vs=168-182 and the Local Soil class is "ZE".

The excavation of the building foundation to be carried out in the study area must be carried out under the supervision of the relevant building inspection engineer. In case of any possible negativity during the excavation, the excavation must be stopped, and the necessary engineering measures must be taken and implemented.

4. Results and recommendations obtained from the 2nd layer of the 2nd series of the seismic study.

> Ground Elasticity Resistance (E) (Young Modulus): 1536.10 kg/cm^{2}' **is.**
> Ground Elasticity Resistance (G) (Shear Modulus): **522.87 kg/cm^{2}'is.**
> Poisson Ratio (*he*): **0.45**
> Intensity (*p*): **1.56 gr/cm^{3}**

For the resistivity measurement taken at a single point in the region in question, AB/2=30 m.

Resistivity Results

Layers	Resistivity (Rho)	Depth(m)
1	60.7	1.0
2	39.2	5.8
3	18.5	25
4	14.0	

Microtremor measurements in the study area$_0$values are in the range of 0.8638-1.0466, A$_0$The values vary between 4.0658-4.51322.

5. ***SDS = SS FS = 0.578 x 1.575 = 0.910***

SD1 = S1 F1 = 0.156 x 3.396= 0.577was determined as.

6. As a result of the studies carried out in the study area, no active or potential natural disaster events such as rock falls, landslides, floods, etc. and possible risk factors were encountered.

9. In the study area, drilling was carried out at a depth of 180 meters in total, with a depth of 39 meters in 3 locations, 36.00 meters in 1 location, and 27 meters in 1 location.

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10. Three seismic arrays, three DES and three microtremor studies were carried out in the field.

*This report has been prepared in accordance with the provisions of the Planned Areas Type Zoning Regulation and the Turkish Building Earthquake Regulation No. 30364 dated 18.03.2018.

Kind regards.

RESPONSIBLE GEOPHYSICAL ENGINEER	
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Date	
Signature	

RESPONSIBLE GEOLOGICAL ENGINEER	
Name Surname	:M. Suha AYKURT
Chamber Registration Number	:5767
TR ID Number	:31099005614
Date	:
Signature	:

8. RESOURCES USED

-Foundation Soil and Structure, Franz Kögler and Alfred Scheidig 1960
-Regulation on Buildings to be Constructed in Disaster Areas, 1996
-Engineering Geology, Dr. Erdal ŞEKERCİOĞLU
-Applied Geotechnical Information, Reşat ULUSAY 1994

9. ANNEXES

ANNEX-1. Location map of the study area

ANNEX-2. Spectral Acceleration Coefficients of the Study Area, Maximum Horizontal Acceleration Values

ANNEX-3. AFAD, 2018 Türkiye Earthquake Zone Map

ANNEX-4. General Geological Map of the Region

ANNEX-5. Drilling Logs of the Study Area

ANNEX-6. Laboratory Experiment Results

ANNEX-7. Engineering Geology Map of the Study Area (1/1000) and Drilling Location

ANNEX-8. Cross Section of the Study Area

ANNEX-9. Geophysical Measurements, Sections and Calculations



ANNEX-1: STUDY AREA LOCATION MAP

AFAD

Türkiye Earthquake Hazard Maps Interactive Web Application

User Inputs

Report Title:	ANTALYA PROVINCE KONYAALTI DISTRICT WASTEWATER TREATMENT PLANT
Earthquake Ground Motion Level	
Local Soil Class	
Latitude:	
Longitude	

SLUDGE INCINERATION UNIT AREA

DD-2	Earthquake ground motion level with a probability of being exceeded in 50 years of 10% (recurrence period of 475 years)
Z E	Profiles containing loose sand, gravel or soft to solid clay layers or a total of more than 3 m thick soft clay layer (Cu < 25 kPa) satisfying the conditions of Pl > 20 and w > 40%

36.83678°

30.586347°

Outputs

SD = 0.578 *Si* **=0.156** **PGA = 0.270** **PGV=11.434**

Ss : Short period map spectral acceleration coefficient [dimensionless]

S, : Map spectral acceleration coefficient for 1.0 second period [dimensionless]

PGA: Maximum ground acceleration [g]

PGV: Maximum ground speed [cm/sec]

Local Soil Classes

Local Soil Class	Soil Type	Average in the upper 30 meters		
		(^5)30 [m/s]	(^60)30 [blow/30cm]	(Cu)30 [kPa]
Z A	Solid, hard rocks	> 1500	-	-
ZB	Slightly weathered, moderately strong rocks	760-1500	-	-
ZC	Very dense layers of sand, gravel and hard clay or weak, weathered, highly fractured rocks	360-760	>50	>250
ZD	Medium dense - dense sand, gravel or very solid clay layers	180-360	15-50	70-250
Z E	Loose sand, gravel or soft - solid clay layers orPl> 20 and$w$Profiles containing a total of more than 3 meters thick, soft clay layer (Cu < 25 kPa) meeting the conditions of > 40%	< 180	< 15	<70
ZF	Soils requiring site-specific research and evaluation: 1) Soils that have the risk of collapse and potential collapse under the influence of an earthquake (liquefiable soils, highly sensitive clays, collapsible weakly cemented soils, etc.), 2) 3) High plasticity clays with a total thickness of more than 3 meters, peat and/or high organic content, with a total thickness of more than 8 meters. $(Pl>50)$ clays, 4) Very coarse (>35 m) soft or medium hard clays.			

Local Ground Effect Coefficients

Local Soil Class	For the short period region*Local Ground Effect Coefficient Fs*					
	Hs <0.25	SD = 0.50	SD = 0.75	SD = 1.00	SD = 1.25	SD> 1.50
Z A	0.8	0.8	0.8	0.8	0.8	0.8
ZB	0.9	0.9	0.9	0.9	0.9	0.9
ZC	1.3	1.3	1.2	1.2	1.2	1.2
ZD	1.6	1.4	1.2	1.1	1.0	1.0
Z E	2.4	1.7	1.3	1.1	0.9	0.8
ZF	*Site-specific soil behavior analysis will be performed.*					

Fs=1.575 for Local Soil Class ZE and Ss=0.578

Local Soil Class	For 1.0 second period Local *Ground Effect Coefficient*					
	S,S 0.10	*S*, =0.20	= 0.30	= 0.40	ST= 0.50	S 0.60
Z A	0.8	0.8	0.8	0.8	0.8	0.8
ZB	0.8	0.8	0.8	0.8	0.8	0.8
ZC	1.5	1.5	1.5	1.5	1.5	1.4
ZD	2.4	2.2	2.0	1.9	1.8	1.7
Z E	4.2	3.3	2.8	2.4	2.2	2.0
ZF	*Site-specific soil behaviour analysis will be performed.*					

Local Soil Class ZE and S_1 =0.156 for 7_1=3.696

Design Spectral Acceleration Coefficients

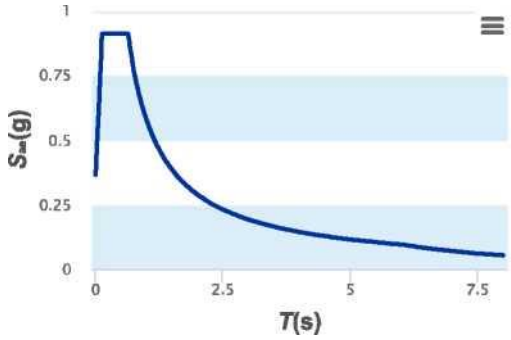
S_{DS} = Ss Fs = 0.578 x 1.575 = 0.910

S_{DI} = S1F1 = 0.156 x 3.696 = 0.577

S_{DS}: Short period design spectral acceleration coefficient [dimensionless]

S_{D1}: Design spectral acceleration coefficient for 1.0 second period [dimensionless]

Horizontal Elastic Design Spectrum



$$S_{ae}(T) = \left(0.4 + 0.6\frac{T}{T_A}\right) \qquad (o < T < Ta)$$

$$S_{ae}(T) = S_{DS} \qquad (T_A<T<T_B)$$

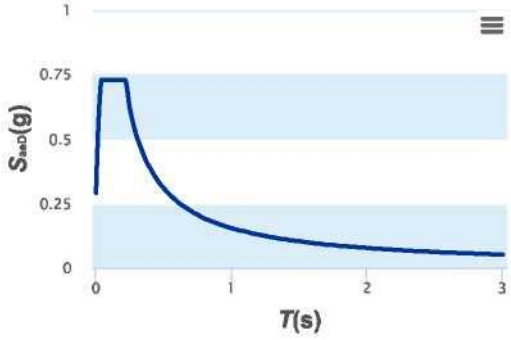
$$S_{ae}(T) = \frac{S_{D1}}{T} \qquad (T_B<T< T_L)$$

$$\frac{S_{DiTL}}{y2}$$

$$T_A = 0.2\cdot\frac{S_{D1}}{S_{DS}} \qquad T_B = \frac{S_{D1}}{S_{DS}} \qquad T_L = 6S$$

TA = 0.127(s)TB= 0.633 (s) TL = 6,000 (s)

Vertical Elastic Design Spectrum



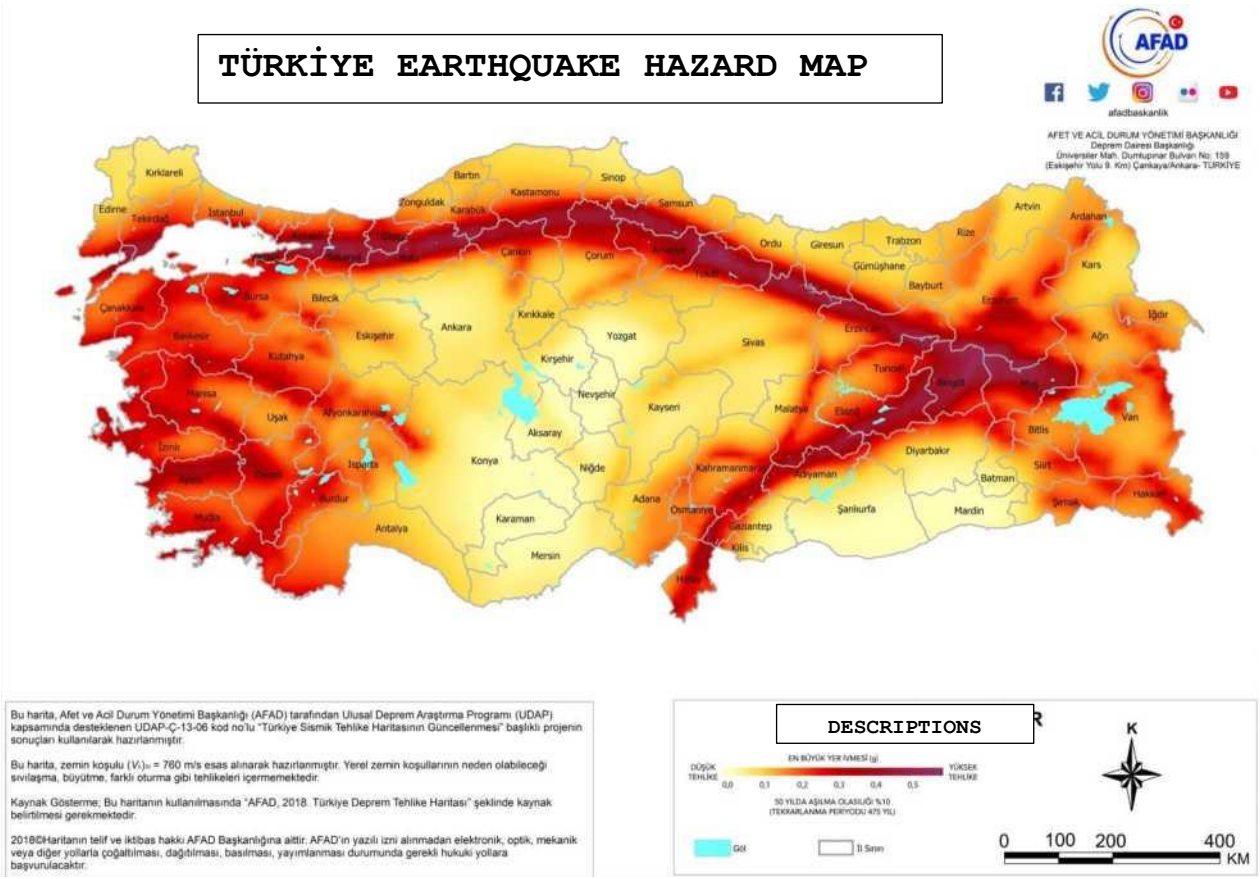
$$S_{aeD}(T) = \left(0.32 + 0.48\frac{T}{T_{AD}}\right)S_{DS} \qquad (0 \le T \le$$

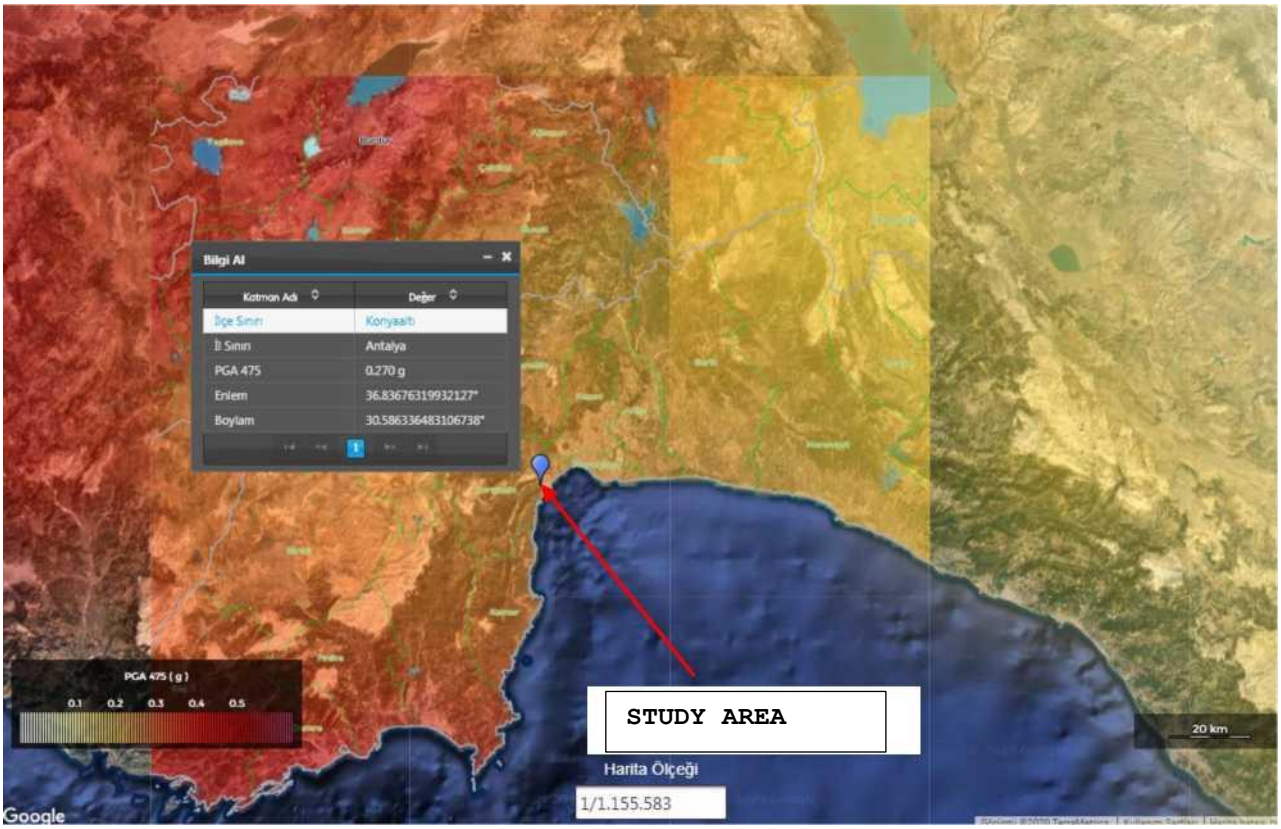
$$S_{aeD}(T) = 0.8S_{DS} \qquad (T_{AD} \le T$$

$$S_{aeD}(T) = 0.8S_{DS}\frac{T_{BD}}{T} \qquad (T_{BD} \le T$$

$$T_{AD} = \frac{T_A}{3} \qquad T_{BD} = \frac{T_B}{3} \qquad T_{LD} =$$

T_{AO}= 0.042 (s) TBD = 0.211 (s) TLD = 3.000 (s)





ANNEX-3: Türkiye EARTHQUAKE HAZARD MAP



Alluvium
Ath/^um

Dunes
To yesterday

BeachohisiAlan
Baar.ti fMdtmanta

Alluvial deposits»
Affirwa/*fan*

Slope rubble and debris
Sln/M r/*hrw*a*nd tiaiacuon of COf>»*

Old talus and debris cone
Oider sfope debna and dejectfon of cooe

Antalya travertine
Antalya ifamrtne

Bekts conglomerate: Conglomerate
fMtvt cnngIntnaratn Cnngfr^narafa

Kursunlu formation: Sandfoal,conglomerate
Crunch fo/mation. It was sent to him. eonglotnarafo

Yenimahalleformation*Mam. claystone. sihta, sandstone**
'HtnimahaNo (orfnalfon Mart. cJayjcfone. viflsfone. sandaüJfMf

flabblimestoneRaaifallimeTay
Gabtz dmastona: ftocfal (vnastono

D.mir D.mil. sarpa nlinized di.niE.Diminil-har/hilrgil«rrlıİHnmı
'Durvita.'*Dumte,serpafjlvjijoti dumto, aJtam sifon of dunc!a-Â3r^bufff.'le*

HünburgH: Larzollcık harzburgrt, masir harıburgrt, banded hanburgt etc.
X/W2T^fcphidr^J&or#ite tTMMKiUH 6arZbuMp>fa SFO.

but alsoformation: Nai-itfc klarushu
TiucıT.n'ji JtfffiatianrMHHÜTÜE **ummufams**

Ke-umoıoprij formation Variegated marl,clayey limestone, varms Jlar!imestone
KasrnaitâpnJfarmafitHi: l/anig'jjrt'rf knowledge. c/rjtay Amfr.Vinit. vwmFCUfar Ao-msroma

Dinek 1 o mi o ion: Mizziali limestone
HMIMA **fteymAfÂMk* iU'm «rtlfA**

Kızılbaş Jûmüiyoru: Dolomite, dolomite limestone,Mizziallimestone**Aronröian.' Datanvfa dbiamüc AmosraM,AmM.rfWrt'A-ftzzw**

Fa muca kyaylaformation: Sandstone ISL**t**orkc>z.lr şayi ;komurlu|/rA'/ri.vJflr.ırı,- ■S^ı^rnr.'M i'-^j^mtA-kak.l, /by/f/i GtMtf**

QürwTyynke rfirmHKynnu: Drıln-m il
t? umrK **fran; JJofa *mr*tB**

Seydişehir lorniasyanu: K.umteşirthing
SSS'rfşe^ıt'r farmaf/sec.'Sar?rf5f£wn s/ıafe
Aekırçay group {ay«ılmamif) Bıikili kumteşı.thing,radios.^front,basic volcanotlMl SanifsirD™wrâfApfort**faywnrat4 jtfiata-**
MiAntvrjT^ İMİUC ytıft^rAf* ^nf/WfP*i»

OöltdaM Formation:Halonlalimlkrlt, directional mlkrlı
Ijo.kcfev»ftJ/mjf.Bi?/ **lifcuTe ntâ/ı/tafobı'a* cMrfy mrenifa**

Candr formation:Btkprovincesandstone, shale
CantAır formabİM.* **Salıöjfono*wrih pı'anf fraçmanr, jr.ha.t***

I am determined.J* **Kpilh. Kpil**İ**Eİb hMialf**
Co.rjtfe/a .tarm jfi-on'-*Sprü'to, spüı'fjc basafî*

Formation with rosary: Radioactive. pol. thing rüsöAtiH famufMia- Hidftı.'.h'irttef/f,.

ANNEX-2: GENERAL GEOLOGY MAP OF THE STUDY AREA (SCALE: 1/100000)

ANN

ir

DRILLING LOG / BORING LOG

TOROS

Drilling/Boring No: SK-1 1/2
Page / Sheet No:

Project Name	Date Waste water	CoordinateY(N):	552321.568
Boring Locator	Konyaalti - Antalya	Coordinate/ CoordinateX (E)	4078511.630
Boring Depth	: 36.00 m.	Muh. Bor. Der / Casing Depth	
Drilling Elevation (m)	: 7	Start-Finish Date:	13.02.2020
Underground Water Der.	: 3.00m .		15.02.2020
Measurement Date	:		

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 10 20 30 40 50	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFILE Profile	DURABILITY Strength	DECOMPOSITION	BROKEN Fracture	CORE TCR %	RQD%
1								**0.00-2.50 meters** Brown Silty Sand Unit **(Alluvium-Qal)**						
2	SPT	1.50	10	9	8	17								
3									L'					
4	SPi	3-00"	3"	3"	3	"6			Y. ALSLS T "					
5	Ud	4.50						**2.50-7.00 meters** Sandy Silty Clay Unit **(Alluvium-Qal)**						
6	SPT	6.00	6	4	2	6								
7														
8	Ud	7.50												
9	SPT	9.00	8	10	12	22								
10														
11	Ud	10.50												
12	SPT	12.00	1	2	3	5								
13														
14	SPT	13.50	1	2	2	4		**7.00-33.00 meters** Gray colored Silty Clay **(Alluvium-Qal)**						
15	SPT	15.00	2	2	3	5								
16														
17	SPT	16.50	4	4	5	9								
18	SPT	18.00	1	1	1	2								
19														
20	SPT	19.50	2	2	3	5								
21	SPT	21.00	4	5	5	10								
22														

CONSISTENCY STATUS / STIFFNESS (Fine grain)

N = 0 - 2	Very soft	V. soft
N = 3 - 4	Soft	Soft
N = 5 - 8	Middle	M. stiff
N = 9 - 15	Thick	Stiff
N = 16 - 31	Very	V. stiff
N>30	Hard	Hard

DENSITY (Coarse grained)

N = 0 - 4	Too loose	V. loose
N = 5 - 10	Loose	Loose
N = 11 - 3ı	Medium	m. oose
N = 31 - 5ı	Tight	Try it
N> 50	Very tight	V. dense

RATIOS/ PROPORTION

	Slight (trace)
	AzLittle
	AdjectiveAdjective
	AndAnd

EXPLANATIONS

UD: Undisturbed Sample
U : Disturb. sample
SPT : Standard . Experiment / SPT Test
VST : Vane Test / Vane shear test
P : Pressuremeter
K: Core Sample

Weathering

ITAZE	Fresh
IIAZ DECOMPOSED	Slightly W.
III. MIDDLE D.	Moderately W.
IV HIGHLY	Highly W.
V COMPLETELY	Completely W.

DURABILITY / Strength

VERY WEAK	Very Weak
IIZZYIF	Weak
III MEDIUM WEAK	Moderately Weak
IV MEDIUM	Moderately Strong
V DURABLE	Strong

FRACTURES / 30 cm Fractures

<1	SPARKLINGWide (W)
2-2	MEDIUMModerate (M)
3-10	CYCClose (Cl)
11-20	VERY TIGHT (I)
>2	PARTIALCrushed (Cr)

ROCK QUALITY DEFINITION / RQD

0-25%	VERY WEAK	Very Poor
25-50%	WEAK	Poor
50-75%	MIDD	Fair
75-90%	GOO	Good
90-100%	VERY GOOD	Excellent

M.Suha AYKURT

DRILLING LOG / BORING LOG

TOROS GEOTECHNICAL

Drilling/Boring No.: SK-1
Page / Sheet Number: 2/2

Project Name Boring Locatior Boring	Date Wastewater Konyaalti - Antalya	CoordinateY(N):	552321.568
Depth Elevation (m) Groundwater Depth	36.00 m. 7 meters.	Coordinate/ CoordinateX (E):	4078511.630
Groundwater D Measurement Date Date	3.00 m.15.02.2020	Muh. Bor. Der / Casing Depth: Start-Finish Date :	13.02.2020

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 1020304050	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFILE Profile	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
_23	SPT	22.50	4	5	7	12								
_24														
_25	SPT	24.00	4	5	4	9		**7.00-33.00 meters** Gray colored Silty Clay **(Alluvium-Qal)**						
_26	SPT	25.50	5	6	7	13								
_27														
_28	SPT	27.00	6	6	7	13								
_29	SPT	28.50	5	6	6	12								
_29														
_30	SPT	30.00	8	13	16	29								
_31	SPT	31.50	5	9	15 R	24								
_32														
_33	SPT	33.00	26	R		R								
_34	SPT	34.50	21	20	R	R		**33.00-36.00 meters** Limestone fragmented Clay filled slope rubble	READ.O.					
_35														
_36	SPT	36.00	18	20	32	52								
_37								**Well End: 36.00 m**						
_38														
_39														
_40														
_41														
_42														
_43														

CONSISTENCY STATUS / STIFFNESS (Fine grain)	DENSITY (Coarse grained)	RATIOS/ PROPORTION	EXPLANATIONS
N=0-2Very softV. soft	N =0 -4Very looseV. loose	Slight (trace)	
N=3-4SoftSoft	N =5 -10Loose	AzLittle AdjectiveAdjective AndAnd	UD: Undisturbed Sample U: Disturb. sample SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample
N=5-8M. common floor. stiff	N =11- 3ıMedium tight M. loose		
N=9-15SolidStiff	N =31- 5ıTightDense		

Weathering	DURABILITY / Strength	FRACTURES / 30 cm Fractures	ROCK QUALITY DEFINITION / RQD
ITAZEFresh	VERY WEAK	<1SEYREKWide (W)	0-25% VERY POOR VeryPoor
IISLIGHTLY DISSOLVEDSlightly W.	IIZAYIFWeak	2-2MEDIUMModerate (M)	25% -50%WEAKPoor
IIIMEDIUM D. SEPARATIONModeratlyW.	IIIMEDIUM WEAKModeratly Weak	3-10SIKClose (Cl)	50-75% MEDIUM FAIR
	IVORTA RESISTANTModeratly Strong	11-20VERY TIGHTIntense (I)	75-90% GOOD
			90-100% VERY GOODExcellent

LOGGED BY	CHECKED / Checked by	APPROVED by

M.Suha AYKURT

DRILLING LOG / BORING LOG

TOROS GEOTECHNICAL

Drilling/Boring No.: SK-2
Page / Sheet Number: 1/2

Project Name Boring Locatior Boring	Date Wastewater Konyaalti - Antalya	CoordinateY(N):	552277.883
Depth Elevation (m) Groundwater Depth	27.50 m. 7 meters.	Coordinate/ CoordinateX (E):	4078557.566
Groundwater D Measurement Date Date	3.60 m.18.02.2020	Muh. Bor. Der / Casing Depth: Start-Finish Date :	17.02.2020

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 1020304050	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFILE Profile	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
_1														
_2								**0.00-4.00 meters** Brown, slightly sandy,						
_3	SPT	1.50	8	6	5	11		gravelly Clay unit						
_4	SPT	3.00	10	8	4	12		(Alluvium-Qal)----------						
_5	SPT	4.50	14	23	33	56		**4.00-6.00 meters** Brown gravelly clay sand						
_6														
_7	SPi	6.00	8	4	2	6		**6.00-22.00 meters** Gray colored Silty Clay **(Alluvium-Qal)**						
_8	Ud	7.50												
_9														
_10	SPT	9.00	1	2	3	5								
_11	Ud	10.50				0								
_12														
_13	SPT	12.00	3	3	4	7								
_14	Ud	13.50				0								
_15														
_16	SPT	15.00	5	7	6	13								
_17	SPT	16.50	1	2	2	4								
_18														
_19	SPT	18.00	1	2	3	5								
_20														
_21	SPT	19.50	2	4	9	13								
_22	SPT	21.00	8	8	12	20								

CONSISTENCY STATUS / STIFFNESS (Fine grain)	DENSITY (Coarse grained)	RATIOS/ PROPORTION	EXPLANATIONS
N=0-2Very softV. soft	N =0 -4Very looseV. loose	Slight (trace)	
N=3-4SoftSoft	N =5 -10Loose	AzLittle AdjectiveAdjective AndAnd	UD: Undisturbed Sample U: Disturb. sample SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample
N=5-8M. common floor. stiff	N =11- 3ıMedium tight M. loose		
N=9-15SolidStiff	N = 31 - 5		

Weathering	DURABILITY / Strength	FRACTURES / 30 cm Fractures	ROCK QUALITY DEFINITION / RQD
ITAZEFresh	VERY WEAK	<1SEYREKWide (W)	0-25% VERY POOR VeryPoor
IISLIGHTLY DISSOLVEDSlightly W.	IIZAYIFWeak	2-2MEDIUMModerate (M)	25% -50%WEAKPoor
IIIMEDIUM D. SEPARATIONModeratlyW.	IIIMEDIUM WEAKModeratly Weak	3-10SIKClose (Cl)	50-75% MEDIUM FAIR
	IVORTA RESISTANTModeratly Strong	11-20VERY TIGHTIntense (I)	75-90% GOOD
			90-100% VERY GOODExcellent

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M.Suha AYKURT

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TOROS

DRILLING LOG / BORING LOG

Drilling/Boring No: SK-2 2/2
Page / Sheet No:

Project Name Boring Locatior	: Hurma Wastewater Konyaalti - Antalya	CoordinateY(N):	552277.883
Boring Depth Elevation (m)	: 27.50 m.	Coordinate/ CoordinateX (E)	4078557.566
Groundwater Depth	: 7 meters.	Muh. Bor. Der / Casing Depth Start-	17.02.2020
Groundwater D Measurement	: 3.60 m.	Finish Date:	18.02.2020
Date Date	:		

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 10 20 30 40 50	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFIL E Profile	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
_23	SPT	22.50	19	16	21	37		**22.00-27.50 meters** Brown with little gravel sandy clay	---- :-------- ---- :---- - --------• ." •'•_--- _"_ ---- :-------- ■—— __ •'•_——					
_24														
	SPT	24.00	13	16	24	40								
_25														
_26	SPT	25.50	9	16	25	41								
_27														
	SPT	27.00	13	14	18	32								
_28								**Well End: 27.50 m**						
_29														
_29														
_30														
_31														
_32														
_33														
_34														
_35														
_36														
_37														
_38														
_39														
_40														
_41														
_42														
_43														

CONSISTENCY STATUS / STIFFNESS (Fine grain)

N=0-2Very soft	V. soft
	Soft
N=3-4Soft	M. stiff
	Stiff
N=5-8Partnership	V. stiff
	Hard
N=9-15Solid	

DENSITY (Coarse grained)

N =0 - 4 Very loose	V. loose
N = 5 - 10 Loose	Loose
N = 11 - 3ı Medium tight	M. loose
N = 31 - 5ı Tight	Try it
N > 50Very tight	V. dense

RATIOS/ PROPORTION

Slight (trace)
AzLittle
AdjectiveAdjective
AndAnd

EXPLANATIONS

UD: Undisturbed Sample U: Disturb. sample SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample

Weathering

ITAZE	Fresh
IIAZ DECOMPOSED	Slightly W.
	Moderately W.
IIIMEDIUM D. SEPARATION	Highly W.
	Completely W.

DURABILITY / Strength

VERY WEAK	Very Weak
	Weak
IIZZYIF	Moderatly Weak
III MEDIUM WEAK	Moderatly Strong
IV MEDIUM STRENGTH	Strong

FRACTURES / 30 cm Fractures

<1SEYREKWide (W)
2-2MEDIUMModerate (M)
3-10SIKClose (Cl)
11-20VERY TIGHTIntense (I)

ROCK QUALITY DEFINITION / RQD

0-25%	VERY WEAK	Very Poor
25-50%	WEAK	Poor
50-75%	MEDIUM	Fair
75-90%	GOOD	Good
90-100%	VERY GOOD	Excellent

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DRILLING LOG / BORING LOG

TOROS GEOTECHNICAL

Drilling/Boring No: SK-3
Page / Sheet No: 1/2

Project Name / ProjectName	: Date Palm	Coordinate/ Coordinate Y(N):	552276.760
Boring Locator	: Konyaaltı - Antalya	Coordinate/ CoordinateX (E):	4078592.415
Boring Depth	:39.00 m.	Muh. Bor. Der / Casing Depth:	
Drilling Elevation(m)	:6m.	Start-Finish Date :	19.02.2020
Underground Water Der. /Groundwat. D.			: 3.45 m.20.02.2020
Measurement Date	:		

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 1020304050	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFILE Profile	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
1								**0.00-4.00 meters** Brown with little gravel Clay unit **(Alluvium-Qal)**						
2			5	6	10									
3	SPT	1.50	3	4		16								
4	SPT-	3.00				12								
5								**4.00-7.00 meters** Brown Sand Unit **(Alluvium-Qal)**						
6	SPT	4.50	6	8	4	12								
7	SPT	6.00	12	13	16	29								
8	Ud	7.50						**7.00-30.00 meters** Gray colored Silty Clay **(Alluvium-Qal)**						
9	SPT	9.00	4	6	9	15								
10														
11	Ud	10.50												
12	SPT	12.00	7	7	6	13								
13														
14	Ud	13.50												
15	SPT	15.00	4	4	3	7								
16														
17	SPT	16.50	1	2	3	5								
18	SPT	18.00	1	2	2	4								
19														
20	SPT	19.50	2	2	2	4								
21	SPT	21.00	2	3	4	7								
22														

CONSISTENCY STATUS / STIFFNESS (Fine	DENSITY (Coarse grained)	RATIOS/ PROPORTION	EXPLANATIONS
N=0-2Very softV. soft	N =0 -4Very looseV. loose	Slight (trace) AzLittle AdjectiveAdjective AndAnd	UD: Undisturbed Sample U: Disturb. sample SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample
N=3-4SoftSoft	N =5 -10Loose		
N=5-8M. common floor. stiff	N =11- 3ıMedium tight M. loose		
N=9-15SolidStiff	N = 31 - 5		

Weathering	DURABILITY / Strength	FRACTURES / 30 cm Fractures	ROCK QUALITY DEFINITION / RQD
ITAZEFresh	VERY WEAK	<1SEYREKWide (W)	0-25% VERY POOR VeryPoor
IISLIGHTLY DISSOLVEDSlightly W.	IIZAYIFWeak	2-2MEDIUMModerate (M)	25% -50%WEAKPoor
IIIMEDIUM D. SEPARATIONModeratlyW.	IIIMEDIUM WEAKModeratly Weak	3-10SIKClose (Cl)	50-75% MEDIUM FAIR
	IVORTA RESISTANTModeratly Strong	11-20VERY TIGHTIntense (I)	75-90% GOOD
			90-100% VERY GOODExcellent

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DRILLING LOG / BORING LOG

TOROS GEOTECHNICAL

Drilling/Boring No: SK-3 2/2
Page / Sheet No:

Project Name Boring Locatior	: Date Wastewater	CoordinateY(N):	552276.760
Boring Depth Elevation (m)	: Konyaalti - Antalya	Coordinate/ CoordinateX (E)	4078592.415
Groundwater Depth	: 39.00 m.		
Groundwater D Measurement	: 6m.	Muh. Bor. Der / Casing Depth Start-	19.02.2020
Date Date	: 3.45m.	Finish Date:	20.02.2020

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 10 20 30 40 50	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFIL E Profile	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
_23	SPT	22.50	2	4	4	8		**7.00-30.00 meters** Gray colored Silty Clay **(Alluvium-Qal)**						
_24	SPT	24.00	3	3	5	8								
_25														
_26	SPT	25.50	4	5	6	11								
_27	SPT	27.00	4	5	6	11								
_28														
_29	SPT	28.50	6	10	14	24								
_29	SPT	30.00	7	7	7	14								
_30														
_31	SPT	31.50	14	13	15	28		**30.00-31.50 meters** Gray colored gravelly	* he ' he '?he ------- ■ _					
_32	SPT	33.00	5	8	12	20			*bCi&i îbl*YY t					
_33														
_34	SPT	34.50	R	R	R	R		**31.50-39.00 meters** Brown coarse limestone blocky clay filled slope rubble						
_35	SPT	36.00	18	20	R	R			*bCi&i*					
_36									*îbl*bug					
_37	SPT	37.50	R	R	R	R								
_38	SPT	39.00	R	R	R	R			*bCi&i îbl*YY t ...G1 .					
_39														
_40	.							**Well End: 39.00 m**						
_41														
_42														
_43														

CONSISTENCY STATUS / STIFFNESS (Fine grain)

N=0-2Very soft	V. soft
	Soft
N=3-4Soft	M. stiff
	Stiff
N=5-8Partnership	V. stiff
	Hard
N=9-15Solid	

DENSITY (Coarse grained)

N = 0 - 4	Very loose	V. loose
N = 5 - 10	Loose Medium tight	Loose
N = 11 - 3	Tight Very tight	M. loose
		Try it
N = 31 - 5		V. dense

RATIOS/ PROPORTION

Slight (trace)
AzLittle
AdjectiveAdjective
AndAnd

EXPLANATIONS

UD: Undisturbed Sample U: Disturb. sample
SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample

Weathering

ITAZE	Fresh
IIAZ DECOMPOSED	Slightly W.
	Moderately W.
IIIMEDIUM D. SEPARATION	Highly W.
	Completely W.

DURABILITY / Strength

I	VERY WEAK	Very Weak
II	WEAK	Weak
III	MEDIUM WEAK	Moderatly Weak
IV	MEDIUM	Moderatly Strong
V	STRENGTH	Strong
	DURABLE	

FRACTURES / 30 cm Fractures

<1SEYREKWide (W)	
2-2MEDIUMModerate (M)	
3-10SIKClose (Cl)	
11-20VERY TIGHTIntense (I)	

ROCK QUALITY DEFINITION / RQD

0-25%	VERY WEAK	Very Poor
25-50%	WEAK	Poor
50-75%	MEDIUM	Fair
75-90%	GOOD	Good
90-100%	VERY GOOD	Excellent

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DRILLING LOG / BORING LOG

TOROS GEOTECHNICAL

Drilling/Boring No.: SK-4
Page / Sheet Number: 1/2

Project Name Boring Locatior Boring	Date Wastewater	CoordinateY(N):	552315.130
Depth Elevation (m) Groundwater Depth	Konyaalti - Antalya	Coordinate/ CoordinateX (E):	4078596.68
Groundwater D Measurement Date Date	39.00 m. 8 meters. 2.90 m.26.02.2020	Muh. Bor. Der / Casing Depth: Start-Finish Date :	24.02.2020

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 1020304050	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFILE Profile	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
_1 _2	SPT	1.50	5	15	24	39		**0.00-2.50 meters** Filling Material						
_3 - _4	Ud	3.00						**2.50-4.00 meters** Brown Clay	/LASSY					
_5 _6 _7	SPT Ud	4.50 6.00	6	5	2	7		**4.00-6.00 meters** Brown Clay Sand Unit						
_8 _9 _10 _11 _12 _13 _14 _15 _16 _17 _18 _19 _20 _21 _22	SPT Ud SPT SPT SPT SPT SPT SPT SPT	7.50 9.00 10.50 12.00 13.50 15.00 16.50 18.00 19.50 21.00	7 5 1 2 3 2 4 2 4	12 5 2 2 4 3 4 4 6	12 6 2 3 4 3 5 4 6	24 11 4 5 8 6 9 8 12		**6.00-27.00 meters** Gray colored Silty Clay **(Alluvium-Qal)**						

CONSISTENCY STATUS / STIFFNESS (Fine grain)	DENSITY (Coarse grained)	RATIOS/ PROPORTION	EXPLANATIONS
N=0-2Very softV. soft	N =0 -4Very looseV. loose	Slight (trace)	
N=3-4SoftSoft	N =5 -10Loose	AzLittle AdjectiveAdjective	UD: Undisturbed Sample U: Disturb. sample
N=5-8M. common floor. stiff	N =11- 3ıMedium tight M. loose	AndAnd	SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample
N=9-15SolidStiff	N = 31 - 5		

Weathering	DURABILITY / Strength	FRACTURES / 30 cm Fractures	ROCK QUALITY DEFINITION / RQD
ITAZEFresh	VERY WEAK	<1SEYREKWide (W)	0-25% VERY POOR VeryPoor
IISLIGHTLY DISSOLVEDSlightly W.	IIZAYIFWeak	2-2MEDIUMModerate (M)	25% -50%WEAKPoor
IIIMEDIUM D. SEPARATIONModeratlyW.	IIIMEDIUM WEAKModeratly Weak	3-10SIKClose (Cl)	50-75% MEDIUM FAIR
	IVORTA RESISTANTModeratly Strong	11-20VERY TIGHTIntense (I)	75-90% GOOD
			90-100% VERY GOODExcellent

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M.Suha AYKURT

DRILLING LOG / BORING LOG

TOROS GEOTECHNICAL

Drilling/Boring No: SK-4 2/2
Page / Sheet No:

Project Name Boring Locatior	Date Wastewater	CoordinateY(N):	552315.130
Boring Depth Elevation (m)	Konyaalti - Antalya	Coordinate/ CoordinateX (E)	4078596.68
Groundwater Depth	39.00 m.		
Groundwater D Measurement	8 meters.	Muh. Bor. Der / Casing Depth Start-	24.02.2020
Date Date	2.90 m.	Finish Date:	26.02.2020

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 10 20 30 40 50	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
_23	SPT	22.50	4	4	6	10		**6.00-27.00 meters** Gray colored Silty Clay **Clay Unit (Alluvium-Qal)**					
_24	SPT	24.00	2	4	5	9							
_25	SPT	25.50	2	4	5	9							
_26	SPT	27.00	6	6	10	16							
_27	SPT	28.50	13	17	21	38		**27.00-30.50 meters** Gray colored with little **Clay Unit (Alluvium-Qal)**					
_28	SPT	30.00	7	13	R	R							
_29													
_30													
_31	core	31.50						**30.50-39.00 meters** Beige colored, **Clay Banded Limestone (Jkt-)**				15	9
_32													
33	core	34.50										43	40
34	core	34.50										23	17
35													
_36	core	36.00										47	34
_37	core	37.50										31	8
_38													
_39	core	39.00										53	34
_40	.							**Well End: 39.00 m**					
_41													
_42													
_43													

CONSISTENCY STATUS / STIFFNESS (Fine grain)

N=0-2Very soft	V. soft
	Soft
N=3-4Soft	M. stiff
	Stiff
N=5-8Partnership	V. stiff
	Hard
N=9-15Solid	

DENSITY (Coarse grained)

N = 0 - 4 Too loose	V. loose
N = 5 - 10 Loose	Loose
N = 11 31 Medium tight	M. loose
N = 31 5i Tight	Try it
N> 50 Very tight	V. dense

RATIOS/ PROPORTION

Slight (trace)
AzLittle
AdjectiveAdjective
AndAnd

EXPLANATIONS

UD: Undisturbed Sample U: Disturb. sample
SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample

Weathering

ITAZE	Fresh
IIAZ DECOMPOSED	Slightly W.
	Moderately W.
IIIMEDIUM D. SEPARATION	Highly W.
	Completely W.

DURABILITY / Strength

I VERY WEAK	Very Weak
II WEAK	Weak
III MEDIUM WEAK	Moderatly Weak
IV MEDIUM	Moderatly Strong
V STRENGTH	Strong
DURABLE	

FRACTURES / 30 cm Fractures

<1SEYREKWide (W)
2-2MEDIUMModerate (M)
3-10SIKClose (Cl)
11-20VERY TIGHTIntense (I)

ROCK QUALITY DEFINITION / RQD

0-25%	VERY WEAK	Very Poor
25-50%	WEAK	Poor
50-75%	MEDIUM	Fair
75-90%	GOOD	Good
90-100%	VERY GOOD	Excellent

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DRILLING LOG / BORING LOG

TOROS GEOTECHNICAL

Drilling/Boring No.: SK-5
Page / Sheet Number: 1/2

Project Name Boring Locatior Boring	Date Wastewater	CoordinateY(N):	552332.169
Depth Elevation (m) Groundwater Depth	Konyaalti - Antalya	Coordinate/ CoordinateX (E):	4078547.930
Groundwater D Measurement Date Date	39.00 m. 7 meters. 3.20 m.29.02.2020	Muh. Bor. Der / Casing Depth: Start-Finish Date :	28.02.2020

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 1020304050	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFILE Profile	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
								0.00-0.50 Filling						
_1 _2 _3	Ud	1.50						**0.50-3.00 meters** Brown Clay	-------- -----					
_4 5	"SPT" SPT	3.00 4.50	8	-^2— 7	—11— 8	23 15		**3.00-5.50 meters** Brown gravelly sand	**Y.A1S. S7"**					
_6 _7	Ud	6.00						**5.50-7.00 meters----------** Gray colored, slightly sandy, silty clay unit						
_8 _9 _10 _11 _12 _13 _14 _15 _16 _17 _18 _19 _20 _21	SPT Ud SPT SPT SPT SPT SPT SPT SPT	7.50 9.00 10.50 12.00 13.50 15.00 16.50 18.00 19.50	5 6 1 1 3 2 4 2	6 7 2 2 4 3 4 4	9 8 3 3 4 3 3 5 9	15 15 5 5 8 6 9 13		**7.00-21.00 meters** Gray colored Silty Clay **(Alluvium-Qal)**						
_22	SPT	21.00	8	11	20	31		**21.00-23.00 meters** Grey colored **gravelly clay unit**	I:Kl: k ı loi .k					

CONSISTENCY STATUS / STIFFNESS (Fine grain)	DENSITY (Coarse grained)	RATIOS/ PROPORTION	EXPLANATIONS
N=0-2Very softV. soft N=3-4SoftSoft N=5-8M. common floor. stiff N=9-15SolidStiff	N =0 -4Very looseV. loose N =5 -10Loose N =11- 3ıMedium tight M. loose N = 31 - 5	Slight (trace) AzLittle AdjectiveAdjective AndAnd	UD: Undisturbed Sample U: Disturb. sample SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample

Weathering	DURABILITY / Strength	FRACTURES / 30 cm Fractures	ROCK QUALITY DEFINITION / RQD
ITAZEFresh IISLIGHTLY DISSOLVEDSlightly W. IIIMEDIUM D. SEPARATIONModeratlyW.	VERY WEAK IIZAYIFWeak IIIMEDIUM WEAKModeratly Weak IVORTA RESISTANTModeratly Strong	<1SEYREKWide (W) 2-2MEDIUMModerate (M) 3-10SIKClose (Cl) 11-20VERY TIGHTIntense (I)	0-25% VERY POOR VeryPoor 25% -50%WEAKPoor 50-75% MEDIUM FAIR 75-90% GOOD 90-100% VERY GOODExcellent

LOGGED BY	CHECKED / Checked by	APPROVED by

M.Suha AYKURT

DRILLING LOG / BORING LOG

TOROS GEOTECHNICAL

Drilling/Boring No: SK-5
Page / Sheet No: 2/2

Project Name Boring Locatior	Date Wastewater	CoordinateY(N):	552332.169
Boring Depth Elevation (m) :	Konyaalti - Antalya	Coordinate/ CoordinateX (E)	4078547.930
Groundwater Depth :	39.00 m.		
Groundwater D Measurement :	7 meters.	Muh. Bor. Der / Casing Depth Start-	28.02.2020
Date Date :	3.20 m.	Finish Date:	29.02.2020

Depth Depth (m)	Sample Type & No. Sample Type&No.	Sample Depth	STANDARD PENETRATION TEST *Standard Penetration Test* NUMBER OF BLOWS 0-15cm	15-30cm	30-45cm	(N) 30cm	GRAPHIC/Graph 10 20 30 40 50	GEOTECHNICAL IDENTIFICATION / *Geotechnical Description*	PROFIL E	DURABILITY Strength	Weathering	FRACTURE	CORE TCR %	RQD%
_23	SPT	22.50	8	7	9	16		**21.00-23.00 meters** Grey colored **gravelly clay unit**						
_24	SPT	24.00	27	13	13	26								
_25								**23.00-28.00 meters** Brown Limestone						
_26	SPT	25.50	27	14	6	20		fragmentary clay unit						
_27	SPT	27.00	15	11	15	26								
_28														
_29	SPT	28.50	13	9	8	17								
_29								**28.00-37.50 meters** Brown with little gravel						
_30	SPT	30.00	13	20	30	50		sandy clay unit						
_31	SPT	31.50	17	19	22	41								
_32														
_33	SPT	33.00	15	33	28	61								
_34	SPT	34.50	11	16	24	40								
_35														
_36	SPT	36.00	R	R	R	R								
_37	SPT	37.50	R	R	R	R								
_38	core	39.00						**37.50-39.00 meters** Beige colored, **Clay Banded Limestone**					27	7
_39														
_40	.							**Well End: 39.00 m**						
_41														
_42														
_43														

CONSISTENCY STATUS / STIFFNESS (Fine grain)			DENSITY (Coarse grained)			RATIOS/ PROPORTION	EXPLANATIONS
N=0-2		V. soft	N = 0 - 4	Very loose	V. loose	Slight (trace)	
N=3-4	Very soft Soft Medium hard Hard	Soft M. stiff	N = 5 - 10	Loose Medium tight Tight Very tight	Loose M. loose	AzLittle AdjectiveAdjective AndAnd	UD: Undisturbed Sample U: Disturb. sample SPT: Standard Pen. Test/SPT Test VST: Vane shear test P: Pressuremeter K: Core Sample
N=5-8	Very hard Hard	Stiff V. stiff	N = 11 - 3		Try it V. dense		
N=9-15		Hard	N = 31 - 5				

Weathering		DURABILITY / Strength		FRACTURES / 30 cm Fractures	ROCK QUALITY DEFINITION / RQD		
ITAZE	Fresh	I	VERY WEAK Very Weak	<1SEYREKWide (W)	0-25%	VERY WEAK	Very Poor
IIAZ DECOMPOSED	Slightly W. Moderately W.	II	WEAK Weak	2-2MEDIUMModerate (M)	25-50%	WEAK	Poor
IIIMEDIUM D. SEPARATION	Highly W. Completely W.	III	MEDIUM WEAK Moderatly Weak		50-75%	MEDIUM	Fair
		IV	MEDIUM Moderatly Strong	3-10SIKClose (Cl)	75-90%	GOOD	Good
		V	STRENGTH Strong	11-20VERY TIGHTIntense (I)	90-100%	VERY GOOD	Excellent
			DURABLE				

LOGGED BY	CHECKED / Checked by	APPROVED by

M.Suha AYKURT

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EXPERIMENT RESULTS TEST RESULTS

THE MINISTRY OF ENVIRONMENT AND URBANIZATION

Document No: 0028

Sample									Sieve Analysis		Atterberg Limits								Triaxial Compression Test		
Borehole name	Type and name	Depth (m)	%	eB	tim3	L t/mJ	G.	Sr	#4 Remaining (%)	#200 Last (%)	LL (%)	PL (%)	PI (%)	USCS	8 1 hour	Hydrometer	Unconfined Compression Test qu (kgf cm')	Point load test Is (kg/cm2)	c (kg cm2)	0 Degree	MEDICINE
SK-1	Ud	4.50	26.3	0.714	1.98	1.57	2.68	99	0	61	30.7	21.0	9.7	CL					0.54	0	UU
■1	Ud	7.50	26.5	0.717	1.98	1.56	2.68	99	0	68	31.2	20.9	10.3	CL					0.58	0	uu
II	Ud	10.50	39.2	1,055	1.83	1.31	2.69	100	0	99	55.5	22.85	32.7	CH					0.46	0	uu
II	SPT	13.50							0	94	57.2	25.9	31.3	CH							
II	SPT	16.50							0	99	67.6	27.8	39.8	CH							
II	SPT	19.50							0	98	70.0	29.7	40.3	CH							
II	SPT	24.00							0	99	67.8	28.7	39.1	CH							
II	SPT	27.00							7	82	62.3	27.1	35.2	CH							
II	SPT	30.00							6	56	39.5	21.7	17.8	CL							
II	SPT	33.00							77	4	•	-	NP	GP							

Project: ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT

'Made by: Geological Engineer H.Onur ŞÎRÎN

Checked by: Geological Engineer Mustafa ÇITAK

Firm: TOROS GEOTECHNICAL ENG.ARCH.CONST.IND.TRADE.LTD.CO

Registration Number: 19398

Auditor Registration Number: 2563

Report Date: 30.03.2020

Arrival Date: 26.02.2020

Report No.: 10/583

BRN: 17323940

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APPLIED STANDARDS: Water content (wn), void ratio (e), natural unit weight (gn), dry unit weight (gd), specific gravity (Gs/liquid limit (LL), plastic limit (PL) tests were performed according to 1900-1, consolidation, free pressure and triaxial pressure tests were performed according to TS 1900-2, sieve analysis and hydrometer tests were performed according to TS-EN ISO 17892-4, point loading test was performed according to ASTM D 5731-05.

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EXPERIMENT RESULTS

TESTRESULTS

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Document No: 0

Sample									Sieve Analysis		Atterberg Limits								Triaxial Compression Test		
Drilling - well name	Type and name	Depth (m)	w,, %	ᶜn	L t/m3	t/mJ	G,	sr %	#4 Remaining (%)	#200 Last (%)	LL (%)	PL (%)	PI (%)	uses	§ t 3? 3M	Hydrometer	Free Pressure Ethene qu (kgf?cm3)	Point loading test Is (kg/cm3)	C (kgfcnû)	0 Degree	Medicine
SK-1	SPT	34.50							33	40	44.1	23.2	20.9	GC							
SK-2	SPT	3.00							8	64	41.5	22.3	19.2	CL							
II	SPT	6.00							1	87	37.7	20.3	17.4	CL							
••	Ud	7.50	27.0	0.723	1.98	1.56	2.69	100	0	83	36.8	22.6	14.2	CL					0.60	0	UU
II	Ud	10.50	30.3	0.813	1.94	1.49	2.69	100	0	99	49.0	25.1	23.9	CL					0.54	0	uu
II	Ud	13.50	43.2	1,168	1.79	1.25	2.71	100	0	99	71.9	29.7	42.2	CH					0.36	0	UU
II	SPT	15.00							0	97	64.8	29.2	35.6	CH							
II	SPT	18.00							1	96	66.8	26.7	40.1	CH							
II	SPT	19.50							27	39	53.5	20.7	32.8	SC							
II	SPT	22.20							31	36	40.6	22.5	18.1	SC							

Project	ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT	Experimenter: Geological Engineer H.Onur ŞİRİN	Checked by: Geological Engineer Mustafa ÇITAK
Firm	TOROS GEOTECHNICAL ENG.ARCH.CONST.IND.TRADE.LTD.CO	(jj^SkilNo: 19398	Auditor Document No»25563
Report Date	30.03.2020	Arrival Date	26.02.2020
Report No.	10/583	BRN	17323940

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APPLIED REGULATIONS: Water content (wn), void ratio (e), natural unit weight (gn), dry unit weight (gd), specific gravity (Gskliquid limit (LL), plastic limit (PL) tests were carried out according to 1900-1. consolidation, free pressure and triaxial pressure tests were carried out according to TS 1900-2, sieve analysis and hydrometer tests were carried out according to TS-ENISO 17892-4, point loading test was carried out according to ASTM D 5731-05.

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Document Number: 0028

Sample									Sieve Analysis		Atterberg Limits								Triaxial Compression Test		
Drilling .well name	Type and name	Depth (m)	w. %	to.	t/m3	t/m3	G,	sf %	«4 Remaining (%)	#200 Passing (%)	LL (%)	PL (%)	P1 (%)	USCS	Consolidation	Hydrometer	Unconfined Compression Test qu fkgfcm')	Point load test Is (kg/cm2)	c (kgf'cm2)	0 Degree	Medicine
SK-2	SPT	25.50							5	55	45.3	24.6	20.7	CL							
II	SPT	27.00							15	63	46.5	24.3	22.2	CL							
SK-3	SPT	1.50							3	61	33.1	21	12.1	CL							
II	Ud	7.50	28.2	0.760	1.96	1.53	2.69	100	0	97	45.2	22.3	22.9	CL					0.55	0	uu
II	Ud	10.50	27.3	0.737	1.97	1.55	2.69	100	0	83	37.2	21.9	15.3	CL					0.45	0	uu
phi	Ud	13.50	34.0	0.912	1.89	1.41	2.69	100	0	90	49.5	23.9	25.6	CL					0.35	0	uu
II	SPT	15.00							0	90	55.4	26.8	28.6	CH							
II	SPT	18.00							0	99	72.5	30.2	42.3	CH							
II	SPT	21.00							0	99	67.3	28.6	38.7	CH							
H	SPT	24.00							0	99	75.7	31.4	44.3	CH							

Project	ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT	Experimenter: Geological Engineer H.Onur ŞİRİN	Checked by: Geological Engineer Mustafa ÇITAK
Firm	TOROS GEOTECHNICAL ENGINEERING ARCHITECTURE INDUSTRY TRADE CO. LTD.	OjTSteilNo: 19398	Denettopeno:25563
Report Date	30.03.2020	Arrival Date	26.02.2020
Report No.	10/583	BRN	17323940

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EXPERIMENT
RESULT TEST

MINISTRY OF ENVIRONMENT AND

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Sample									Sieve Analysis		Atterberg Limits								Triaxial Compression Test		
Borehole name	Type and name	Depth (m)	%		L *tim3*	L t/m3	G,	sr %	«4 Remaining (%)	«200 Last (%)	LL (%)	PL (%)	PI (%)	USCS	Consolidation	Hydrometer	Unconfined Compression Test qu (kgfcm3)	Point loading test Is (kacnd)	C (kgf/cm2)	<zS Degree	Medicine
SK-3	SPT	30.00							12	55	52.3	26.4	25.9	CH							
II	SPT	31.50							60	17	32.7	19.5	13.2	GC							
H	SPT	33.00							16	48	56.6	26.5	30.1	SC							
»1	SPT	36.00							17	39	44.6	23.2	21.4	SC							
II	SPT	37.50							43	37	42.7	22.8	19.9	GC							
SK-4	Ud	3.00	28.2	0.761	1.96	1.53	2.69	100	1	62	32.6	20.7	11.9	CL					0.47	0	uu
II	Ud	6.00	33.6	0.903	1.89	1.42	2.69	100	0	98	52.4	26.8	25.6	CH					0.59	0	uu
II	Ud	9.00	32.3	0.867	1.91	1.44	2.69	100	0	97	42.2	22.7	19.5	CL					0.51	0	uu
II	SPT	12.00							0	97	56.9	27.6	29.3	CH							

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II	SPT	18.00							0	98	69.7	30.3	39.4	CH							
Project	ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT										Experimenter: Geological Engineer H.Onur ŞİRİN						Checked by: Geological Engineer Mustafa ÇITAK				
Firm	TOROS GEOTECHNICAL ENG.ARCH.CONST.IND.TRADE.LTD.CO										»AkSicily Number: 19398						Ocu 11 TfkOylo: £5563				
Report Date		30.03.2020			Arrival Date		26.02.2020														

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Sample									Sieve Analysis		Atterberg Limits							Triaxial Compression Test		
Borehole name	Type and name	Depth (m)	W, %	province	7. t/n'	t/m'1	G«	sr %	#4 Remaining (%)	#200 Passing (, %)	LL (%)	PL (%)	PI (%)	USCS	Consolidation	Hydrometer	Unconfined Compression Test <ju cm*>	Point loading experiment b (isem2)	c (kg £ cm2)	& Degree	Medicine
SK-4	SPT	22.50							0	99	73.7	31.4	42.3	CH							
II	SPT	28.50							1	72	40.9	22.1	18.8	CL							
SK-5	Ud	1.50	25.6	0.698	1.98	1.58	2.68	98	4	54	29.1	19.7	9.4	CL					0.66	0	UU
II	Ud	6.00							22	28	27.9	20.1	7.8	SC					Sample could not be taken		
II	Ud	9.00	33.0	0.888	1.90	1.43	2.69	100	0	98	42.1	23.7	18.4	CL					0.50	0	UU
II	SPT	13.50							1	94	58.3	27.6	30.7	CH							
II	SPT	18.00							0	99	64.6	29.5	35.1	CH							
II	SPT	21.00							15	51	38.5	22.3	16.2	CL							
II	SPT	27.00							54	21	32.8	20.7	12.1	GC							
II	SPT	34.50							4	82	55.4	26.8	28.6	CH							

Project	ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT	Experimenter: Geological Engineer H.Onur ŞİRİN	Checked by: Geological Engineer Mustafa ÇITAK
Firm	TOROS GEOTECHNICAL ENGINEERING CONSTRUCTION INDUSTRY TRADE CO. LTD.	Foreign Registration Number: 19398	AuditorBA^TM: 25563
Report Date	30.03.2020	Arrival Date	26.02.2020
Report No.	10/583	BRN	17323940

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SIEVE - HYDROMETER

(TS-EN ISO 17892-4)

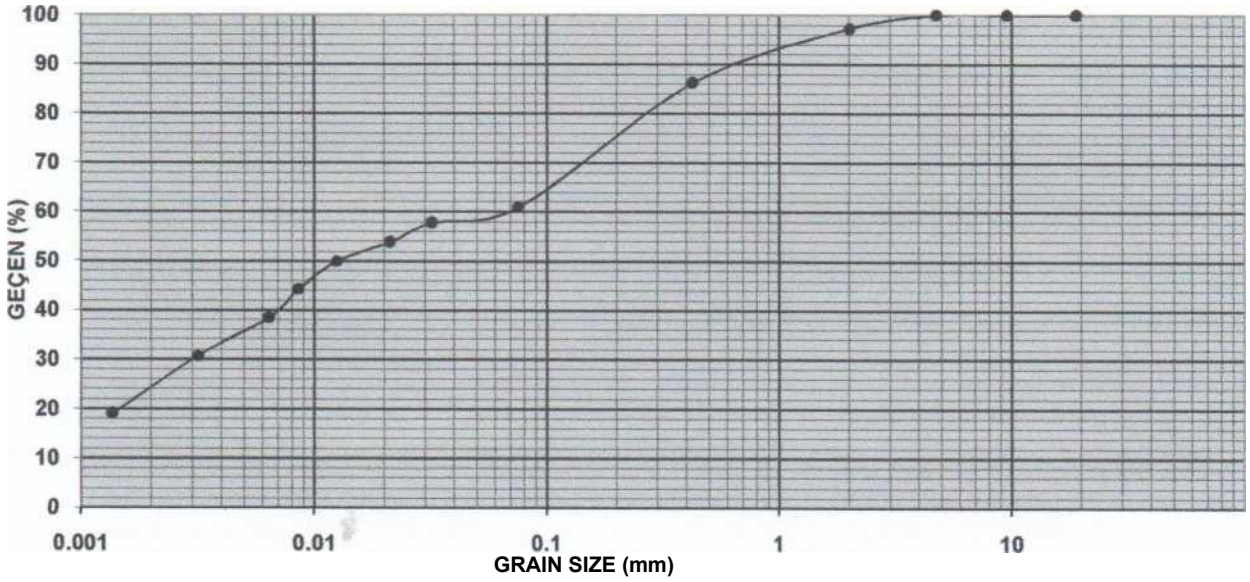
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MINISTRY OF ENVIRONMENT AND URBANIZATION

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-1	Total Weight (g)	309.0	G5	2.68
Sample No.	Ud	Elimination Method	Wet	w (g)	50.00
Depth (m)	4.50	Experimenter	H.Onur SIRIN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	100
9.5	0.0	0.0	0	100
4.75	0.0	0.0	0	100
2.00	8.6	8.6	3	97
0.425	33.9	42.5	14	86
0.075	78.3	120.8	39	61

t	r	s	M	R	P	P.	<*!	K.	that	k«	d
2	33	20	-3.1	29.9	59.4	57.8	0.0400	1.00	0.82	0.98	0.0321
5	31	20	-3.1	27.9	55.4	53.9	0.0260	1.00	0.83	0.98	0.0211
15	29	20	-3.1	25.9	51.5	50.0	0.0150	1.00	0.85	0.98	0.0125
30	26	20	-3.1	22.9	45.5	44.2	0.0100	1.00	0.87	0.98	0.0085
60	23	20	-3.1	19.9	39.5	38.4	0.0074	1.00	0.88	0.98	0.0064
250	19	20	-3.1	15.9	31.6	30.7	0.0036	1.00	0.90	0.98	0.0032
1440	13	20	.1.1	9.9	19.7	19.1	0.0015	1.00	0.93	0.98	0.0014



LL:30.7PL:21.0:PI: 9.7

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	USC	CL
61		39	0	0		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	TS 1500	CL
25	36	36	3	0		

'eneyi Made by Geological Engineer H.Onur ŞİRİN Controlled by Geological Engineer Mustafa ÇITAK
Register Number: 19398 DenetelppUeNto:25563

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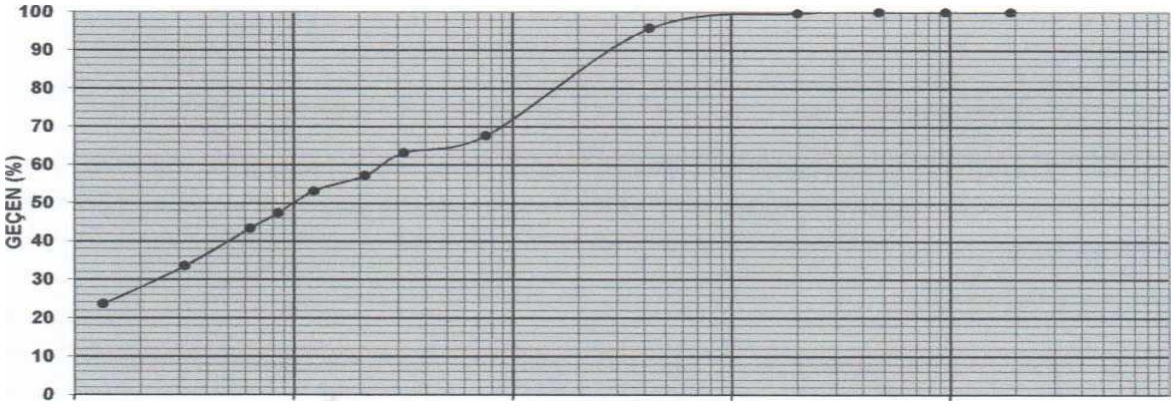
SIEVE - HYDROMETER

(TS-EN ISO 17892-4)

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-1	Total Weight (g)	199.9	Gs	2.68
Sample No.	LD	Elimination Method	Wet	W (g)	50.00
Depth (m)	7.50	Experimenter	H.Onur SIRIN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	100
9.5	0.0	0.0	0	100
4.75	0.0	0.0	0	100
2.00	0.6	0.6	0	100
0.425	7.8	8.4	4	96
0.075	56.2	64.6	32	68

t	*•	s	M	R	P	Pi	d.	k„	K		d
2	35	20	-3.1	31.9	63.4	**63.2**	0.0400	1.00	0.81	0.98	0.0318
5	32	20	-3.1	28.9	57.4	**57.2**	0.0260	1.00	0.83	0.98	0.0211
15	30	20	-3.1	26.9	53.4	**53.3**	0.0150	1.00	0.84	0.98	0.0123
30	27	20	-3.1	23.9	47.5	**47.3**	0.0100	1.00	0.86	0.98	0.0084
60	25	20	-3.1	21.9	43.5	**43.4**	0.0074	1.00	0.87	0.98	0.0063
250	20	20	-3.1	16.9	33.6	**33.5**	0.0036	1.00	0.90	0.98	0.0032
1440	15	20	-3.1	11.9	23.6	**23.6**	0.0015	1.00	0.92	0.98	0.0014



0.001 0.01 0.1 1 10
GRAIN SIZE (mm)

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CL**
68		32	0	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CL**
28	40	32	0	**0**		

LL:31.2 **PL:20.9** **PI:10.3**

Ed
Belge No

The person who said this is Geological Engineer H.Onur ŞİRİNOtlUneilNo: 19398

Control Auditor en:Geology Engineer Mustafa ÇITAKL25563

SIEVE - HYDROMETER

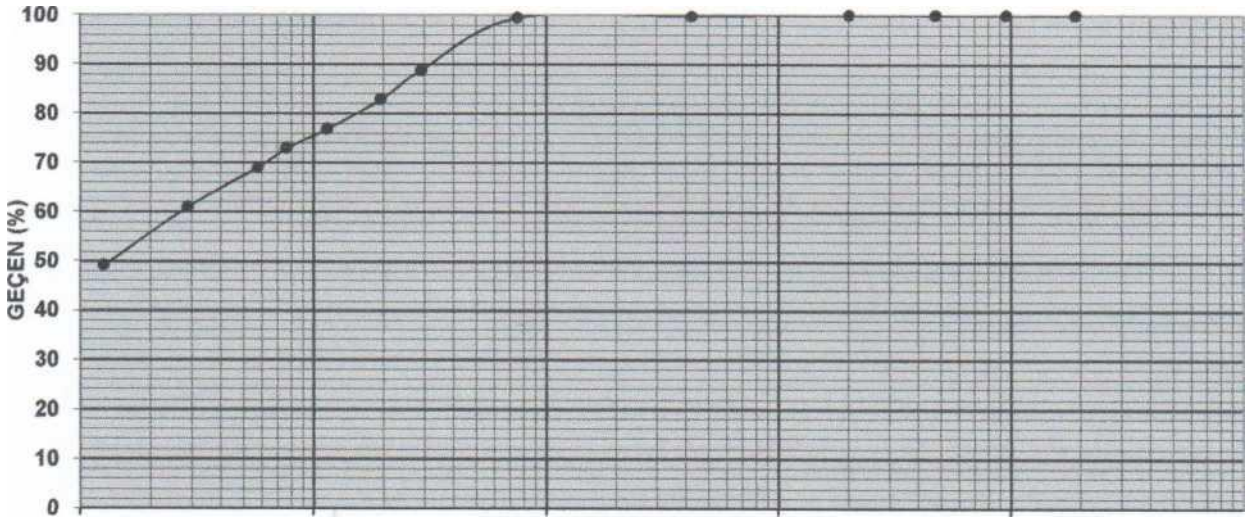
(TS-EN ISO 17892-4)

T.C. ENVIRONMENT AND URBANIZATION MINISTRY

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-1	Total Weight (g)	149.0	Gs	2.70
Sample No.	Ud	Elimination Method	Wet	W (g)	50.00
Depth (m)	10.50	Experimenter	H.Onur SIRIN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	**0**	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	**0.0**	**0**	**100**
0.425	0.2	0.2	0	**100**
0.075	0.6	0.8	1	**99**

t	r	s	M	R	F	Pi	said	K	K	kg	d
2	48	20	-3.1	44.9	88.8	**88.8**	0.0400	1.00	0.74	0.98	0.0290
5	45	20	-3.1	41.9	82.8	**82.8**	0.0260	1.00	0.76	0.98	0.0194
15	42	20	-3.1	38.9	76.9	**76.9**	0.0150	1.00	0.77	0.98	0.0114
30	40	20	-3.1	36.9	73.0	**73.0**	0.0100	1.00	0.78	0.98	0.0076
60	38	20	-3.1	34.9	69.0	**69.0**	0.0074	1.00	0.79	0.98	0.0057
250	34	20	-3.1	30.9	61.1	**61.1**	0.0036	1.00	0.82	0.98	0.0029
1440	28	20	-3.1	24.9	49.2	**49.2**	0.0015	1.00	0.86	0.98	0.0013



LL: 55.5PL: 22.8PI: 32.7

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	I sc	**CH**
99		1	0	**0**		
< 0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CH**
56	43	1	0	**0**		

ExperimenterGeological Engineer Onur ŞİRİNControl Ed^nGeological Engineer Mustafa ÇITAK

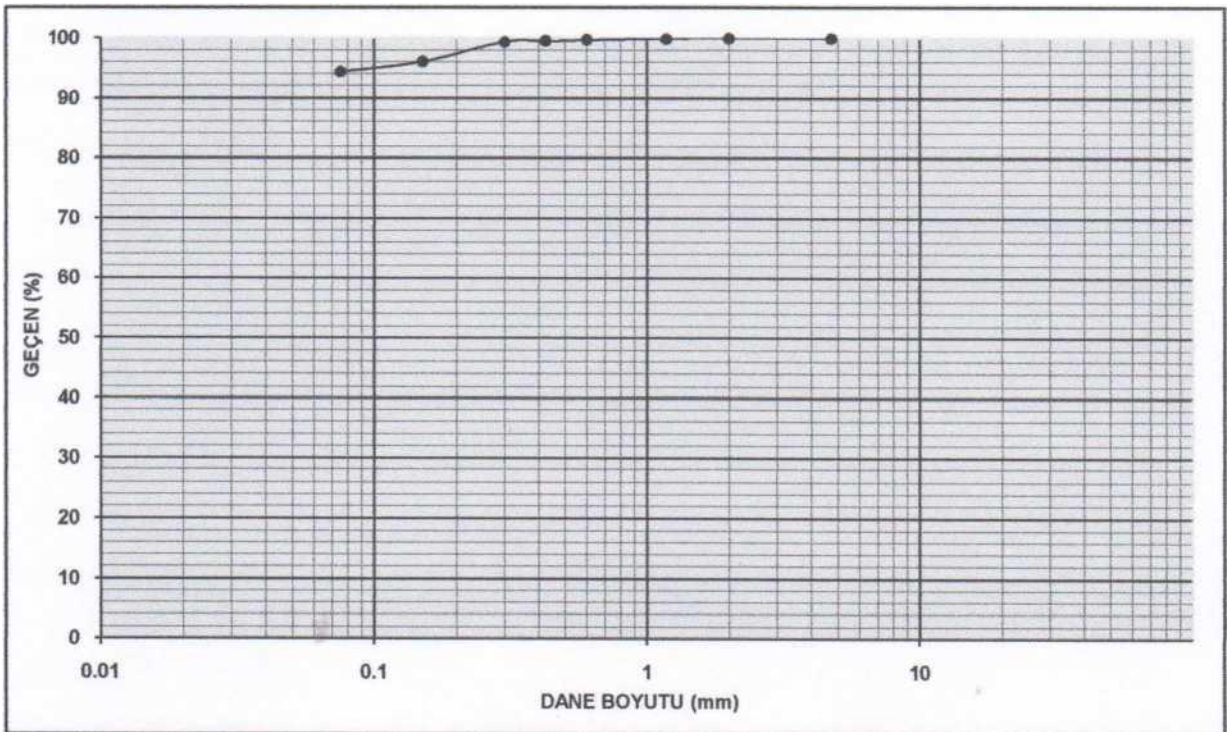
SIEVE ANALYSIS
(TS-EN ISO 17892-4)

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T.C. MINISTRY OF ENVIRONMENT AND URBANIZATION

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE		
Drilling No.	SK-1	Total Weight (g)	96.5
Sample No.	SPT	Elimination Method	Wet
Depth (m)	13.50	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	100
37.5	0.0	0.0	0	100
19.0	0.0	0.0	0	100
9.5	0.0	0.0	0	100
4.75	0.0	0.0	0	100
2.00	0.0	0.0	0	100
1.18	0.1	0.1	0	100
0.600	0.2	0.3	0	100
0.425	0.2	0.5	1	99
0.300	0.1	0.6	1	99
0.150	3.2	3.8	4	96
0.075	1.6	5.4	6	94



D_{10} :	D_{30} :	D_{60} :	C_u :	C_z :

LL:57.2	PL:25.9|PI:	31.3	

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	USCCH
94	6	0	0	

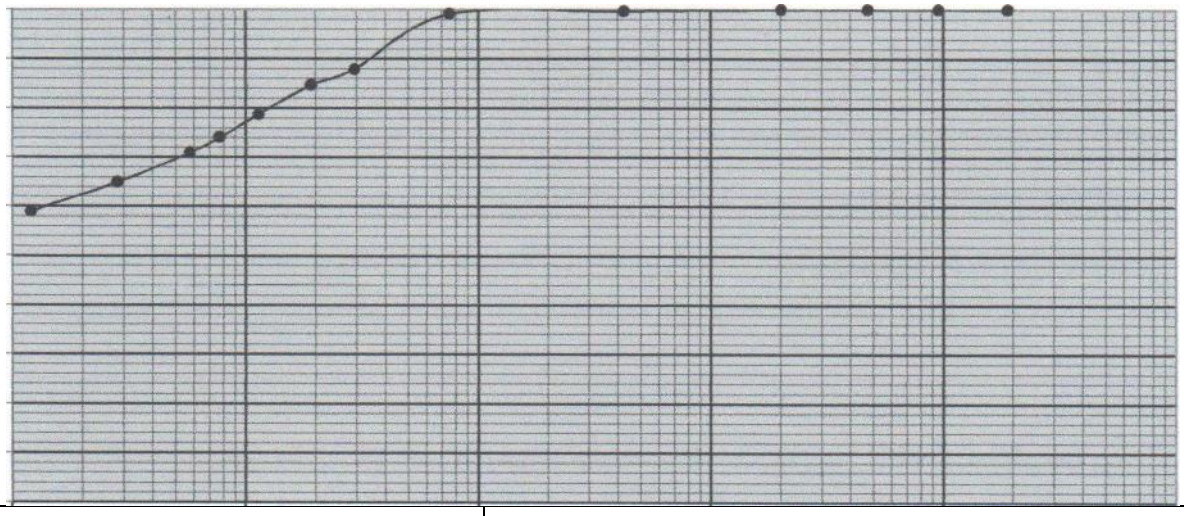
The person who did this is Geological Engineer Registration Number: 19398..

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Deneyci Belge No:25563

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	**SK-1**	Total Weight (g)	**69.2**	G.	**2.71**
Sample No.	SPT	Elimination Method	Wet	W (g)	**50.00**
Depth (m)	**16.50**	Experimenter	**H.Onur SIRIN**	a	**0.99**

Sieve Opening (mm)	Remaining Weight (g)	**Total Remaining Weight (g)**	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
0.425	0.2	0.2	0	**100**
0.075	0.4	0.6	1	99

t	**r**	S	M	**R**	P	Pi	was	k.	that	•s	d
2	48	19	-3.5	44.5	87.9	**87.9**	0.0400	1.01	0.74	0.98	0.0293
5	46	20	-3.1	42.9	84.7	**84.7**	0.0260	1.00	0.75	0.98	0.0191
15	43	20	-3.1	39.9	78.8	**78.8**	0.0150	1.00	0.77	0.98	0.0113
30	41	19	-3.5	37.5	74.1	**74.1**	0.0100	1.01	0.78	0.98	0.0077
60	39	20	-3.1	35.9	70.9	**70.9**	0.0074	1.00	0.79	0.98	0.0057
250	36	20	-3.1	32.9	65.0	**65.0**	0.0036	1.00	0.80	0.98	0.0028
1440	33	20	-3.1	29.9	59.1	**59.1**	0.0015	1.00	0.82	0.98	0.0012



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SIEVE - HYDROMETER

(TS-EN ISO 17892-4)

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g60 u 50 O IU 0 40

30 20

10 0

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GRAIN SIZE (mm)

100

90 80

70

LL: 67.6PL: 27.8PI: 39.8

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75 ram		0.075-4.75mm	4.75-75.0mm	> 75.0mm	**usc**	**CH**
99		1	0	**0**		
<0.002	0.002-0.075mm	0.075-2.00 ram	2.00-60.0mm	> 60.0mm	**TS 1500**	**CH**
63	**36**	1	0	**0**		

[Defeci made by Geology Engineer H.Onur ŞİRİNControl £4pn Geology Engineer Mustafa C ÇITA]
Od^jSreti-No: 19398Try)|^^oe£jo:25563

SIEVE ANALYSIS

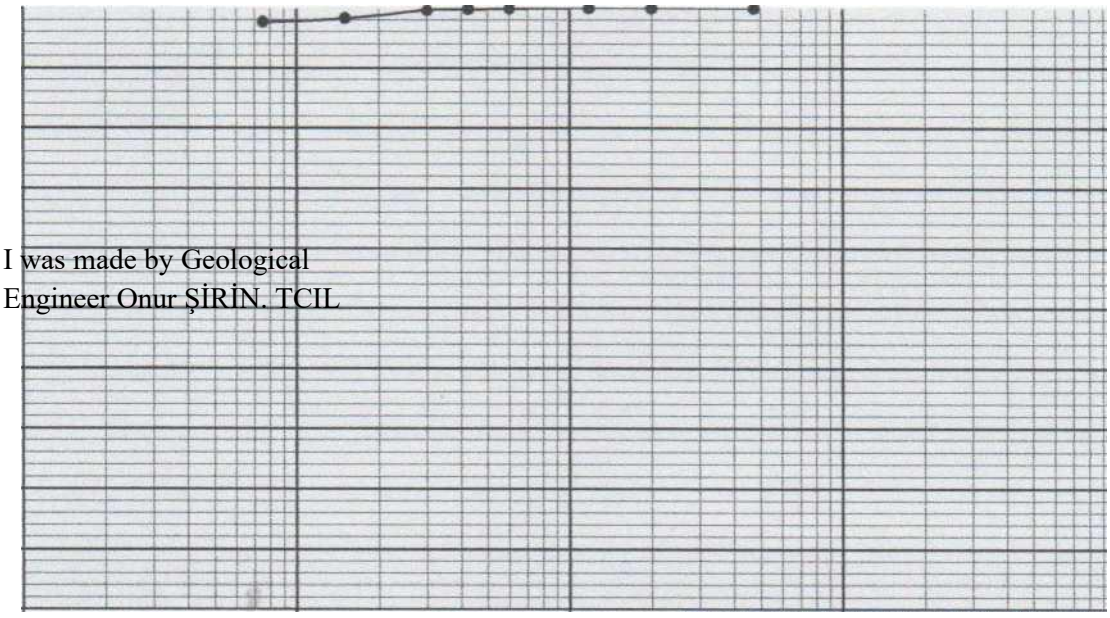
(TS-EN ISO 17892-4)

GROUND ENGINEERING GEOLOGY LTD.CO. /SOIL

T.C. MINISTRY OF ENVIRONMENT AND URBANIZATION

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
Drilling No.	**SK-1**	**Total Weight (g)**	**79.6**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**19.50**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
1.18	0.0	0.0	0	**100**
0.600	0.1	0.1	0	**100**
0.425	0.1	0.2	0	**100**
0.300	0.1	0.3	0	**100**
0.150	1.1	1.4	2	**98**
0.075	0.5	1.9	2	**98**



I was made by Geological Engineer Onur ŞİRİN. TCIL

0.010.1110

GRAIN SIZE (mm)

P|g; ¡P30 *Dso •C u:C 2:

LL:70.0	**PL: 29.71 PI: 40.3**			/	
Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CH**
98	2	0	0		

Controlled by: Geological Engineer Mustafa ÇITAK

From:25563

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SIEVE - HYDROMETER

(TS-EN ISO 17892-4)

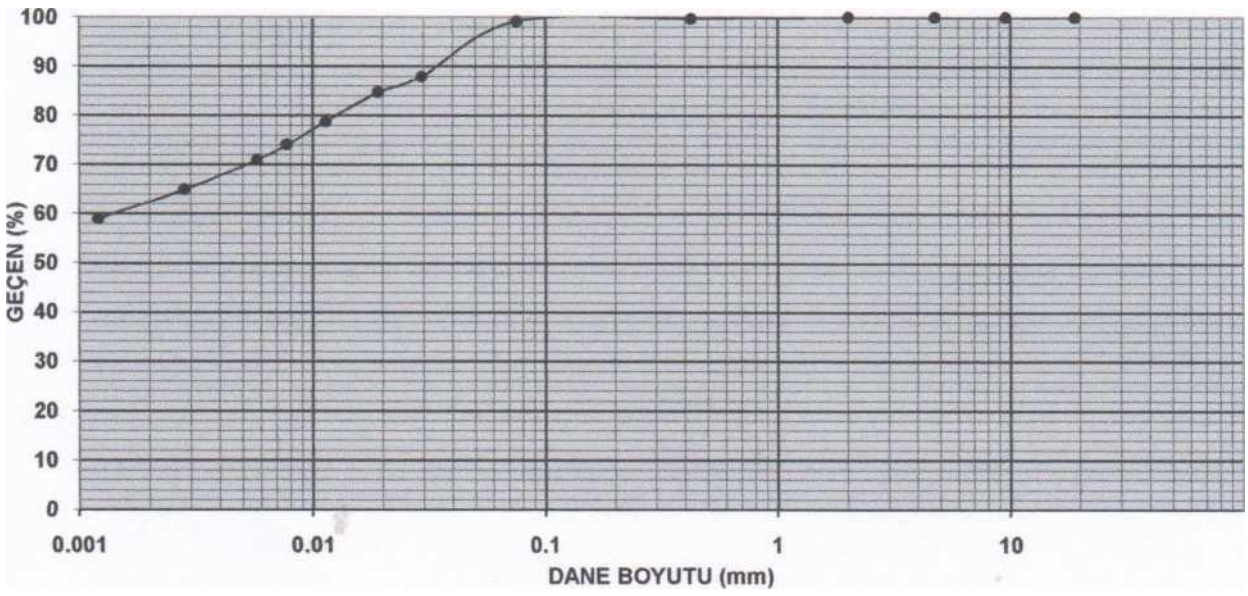
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PROJECT	ANTALYA KONYAALTI HIRMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-1	Total Weight (g)	73.0	G.	2.71
Sample No.	SPT	Elimination Method	Wet	W (g)	50.00
Depth (m)	24.00	Experimenter	H.Onur SİİRİN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	**0.0**	**0.0**	0	**100**
4.75	0.0	**0.0**	0	**100**
2.00	0.0	0.0	0	**100**
0.425	**0.2**	**0.2**	0	**100**
0.075	0.4	0.6	1	**99**

t	r	s	M	R	P	P.	was	k"	»9	k»	d
2	48	19	-3.5	44.5	87.9	**87.9**	0.0400	1.01	0.74	0.98	0.0293
5	46	20	-3.1	42.9	84.7	**84.7**	0.0260	1.00	0.75	0.98	0.0191
15	43	20	-3.1	39.9	78.8	**78.8**	0.0150	1.00	0.77	0.98	0.0113
30	41	19	-3.5	37.5	74.1	**74.1**	0.0100	1.01	0.78	0.98	0.0077
60	39	20	-3.1	35.9	70.9	**70.9**	0.0074	1.00	0.79	0.98	0.0057
250	36	20	-3.1	32.9	65.0	**65.0**	0.0036	1.00	0.80	0.98	0.0028
1440	33	20	-3.1	29.9	59.1	**59.1**	0.0015	1.00	0.82	0.98	0.0012



Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	>75.0mm	usc	**CH**
99		1	0	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CH**
63	36	1	0	**0**		

LL:67.8	PL:28.7	PI:39.1

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Project Author: Geological Engineer
H.Onur ŞİRİN İte-Scıl No: 19398

Co eological Engineer
Mustafa ÇITAK:25563

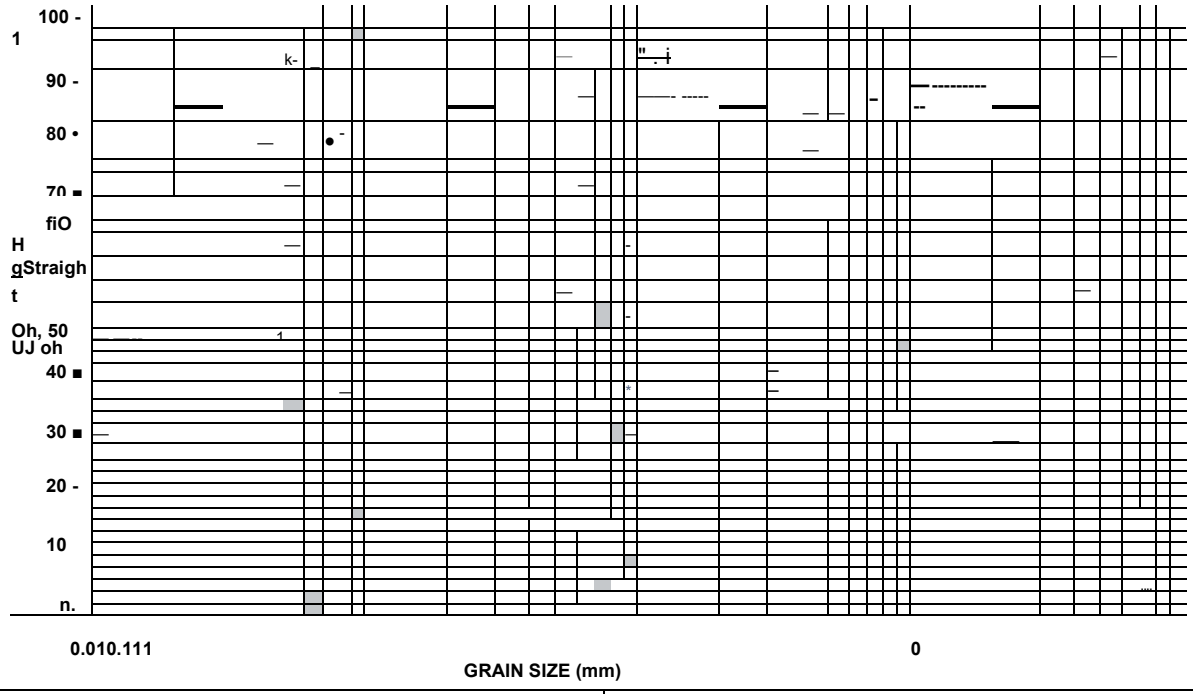
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SIEVE ANALYSIS
(TS-EN ISO 17892-4)

MINISTRY

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-1	Total Weight (g)	132.9
Sample No.	SPT	Elimination Method	Wet
Depth (m)	27.00	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	8.0	8.0	6	**94**
4.75	1.6	9.6	7	**93**
2.00	3.2	12.8	10	**90**
1.18	2.0	14.8	11	**89**
0.600	3.7	18.5	14	**86**
0.425	1.1	19.6	15	**85**
0.300	0.5	20.1	15	**85**
0.150	2.2	22.3	17	**83**
0.075	2.0	24.3	18	**82**



Dlo:	D»:	C„:	C:
LL:623	PL:27.1	PI:35.2	/

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	
82	11	7	0	**USC ! CH**

What was done by Geological Engineer H.Onur ŞİRİN? Controlled by Geological Engineer Mustafa ÇITAK?
ra-Sieil No: 19398Dene^iR^ge»No:25563

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SIEVE - HYDROMETER

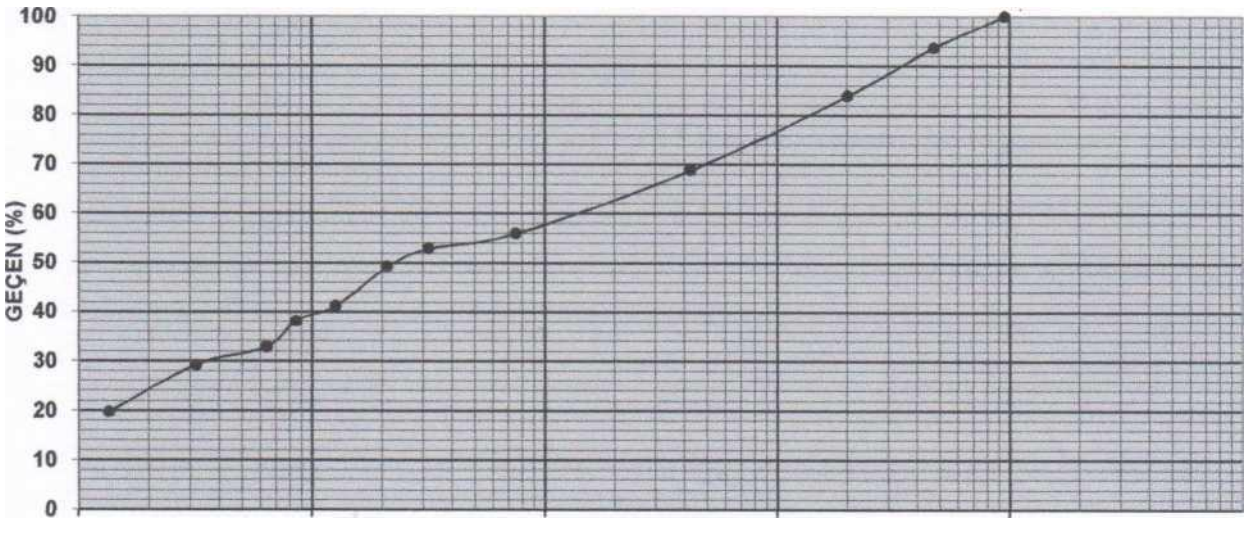
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(TS-EN ISO 17892-4)

PROJECT	ANTALYA KONYAALTIHURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-1	Total Weight (g)	194.5	G.	2.68
Sample No.	SPT	Elimination Method	Wet	W (g)	50.00
Depth (m)	30.00	Experimenter	H.Onur SIRIN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	100
9.5	0.0	0.0	0	100
4.75	12.1	12.1	6	94
2.00	19.1	31.2	16	84
0.425	29.4	60.6	31	69
0.075	25.1	85.7	44	56

t	r	s	**M**	**R**	**P**	**Pi**	was	K	K		**d**
2	35	19.5	-3.3	31.7	63.0	**52.9**	0.0400	1.00	0.81	0.98	0.0318
5	33	19	-3.5	29.5	58.6	**49.2**	0.0260	1.01	0.82	0.98	0.0211
15	28	19.5	-3.3	24.7	49.1	**41.2**	0.0150	1.00	0.86	0.98	0.0126
30	26	20	-3.1	22.9	45.5	**38.2**	0.0100	1.00	0.87	0.98	0.0085
60	23	19.5	-3.3	19.7	39.1	**32.9**	0.0074	1.00	0.88	0.98	0.0064
250	21	19	-3.5	17.5	34.8	**29.2**	0.0036	1.01	0.89	0.98	0.0032
1440	15	20	-3.1	11.9	23.6	**193»**	0.0015	1.00	0.92	0.98	0.0014



LL:39.5	**PL:21.7**	**PI:17.8**

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
< 0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	[1] **usc**	**CL**
56		38	6	**0**		
< 0.002	O.OO2-O.O75 mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CI**
24	32	28	16	**0**		

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oLhheilNo: 19398 DenefciBtelgeNo:25563

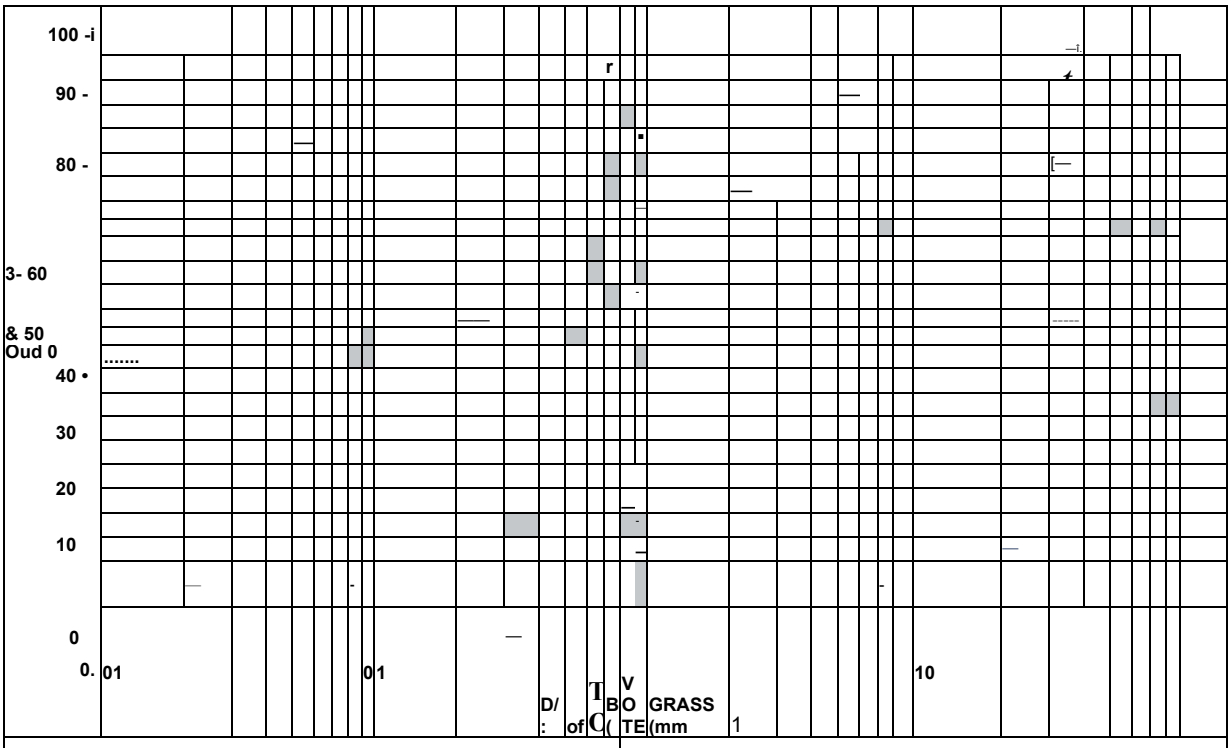
PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-1	Total Weight (g)	192.0
Sample No.	SPT	Elimination Method	Wet
Depth (m)	33.00	Report Date	30.03.2020

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SIEVE ANALYSIS

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ENVIRONMENT AND URBANIZATION

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	122.9	122.9	64	**36**
9.5	13.0	135.9	71	**29**
4.75	12.4	148.3	77	**23**
2.00	16.3	164.6	86	**14**
1.18	6.3	170.9	89	**11**
0.600	7.3	178.2	93	**7**
0.425	2.1	180.3	94	**6**
0.300	0.9	181.2	94	**6**
0.150	2.6	183.8	96	**4**
0.075	1.4	185.2	96	**4**



D1#:0.990 | DM:**10,291** | **Dwl: 24,520** | **Cu:24.8** | **Ct:4.36**

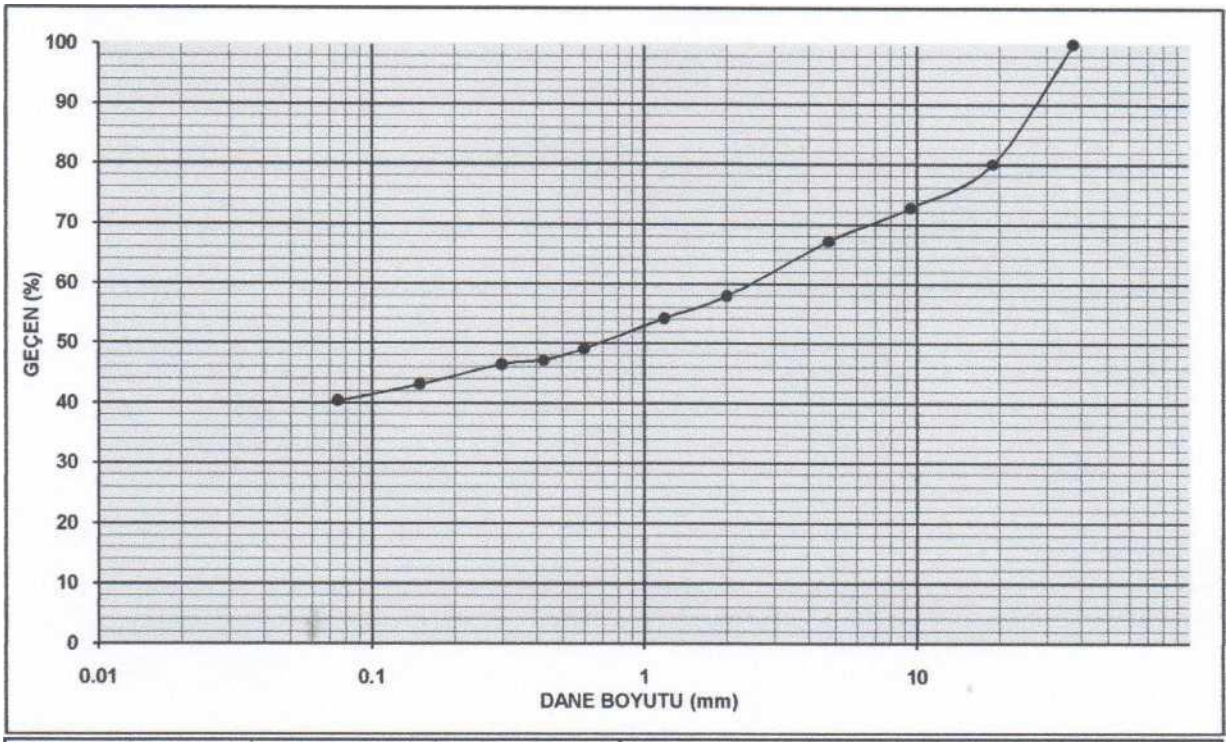
LL: **PL:** **PI: NP**

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	**USC : GP**
4	19	77	0	

SIEVE ANALYSIS
(TS-EN ISO 17892-4)

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	**SK-1**	**Total Weight (g)**	**349.9**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**34.50**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	69.8	69.8	20	**80**
9.5	25.5	95.3	27	73
4.75	19.6	114.9	33	67
2.00	32.4	147.3	42	**58**
1.18	13.1	160.4	46	**54**
0.600	17.6	178.0	51	**49**
0.425	6.8	184.8	53	47
0.300	2.6	187.4	54	**46**
0.150	11.6	199.0	57	**43**
0.075	9.7	208.7	60	**40**



D_{10}:	D_{30}:	D_{60}:	C_u:	C_z:

LL: 44.1	PL: 23.2	PI: 20.9

Kil-Silt (%)	Kum (%)	Çakıl (%)	Moloz (%)	Sınıflandırma	
< 0.075 mm	0.075-4.75 mm	4.75-75.0 mm	> 75.0 mm	USC	GC
40	27	33	0		

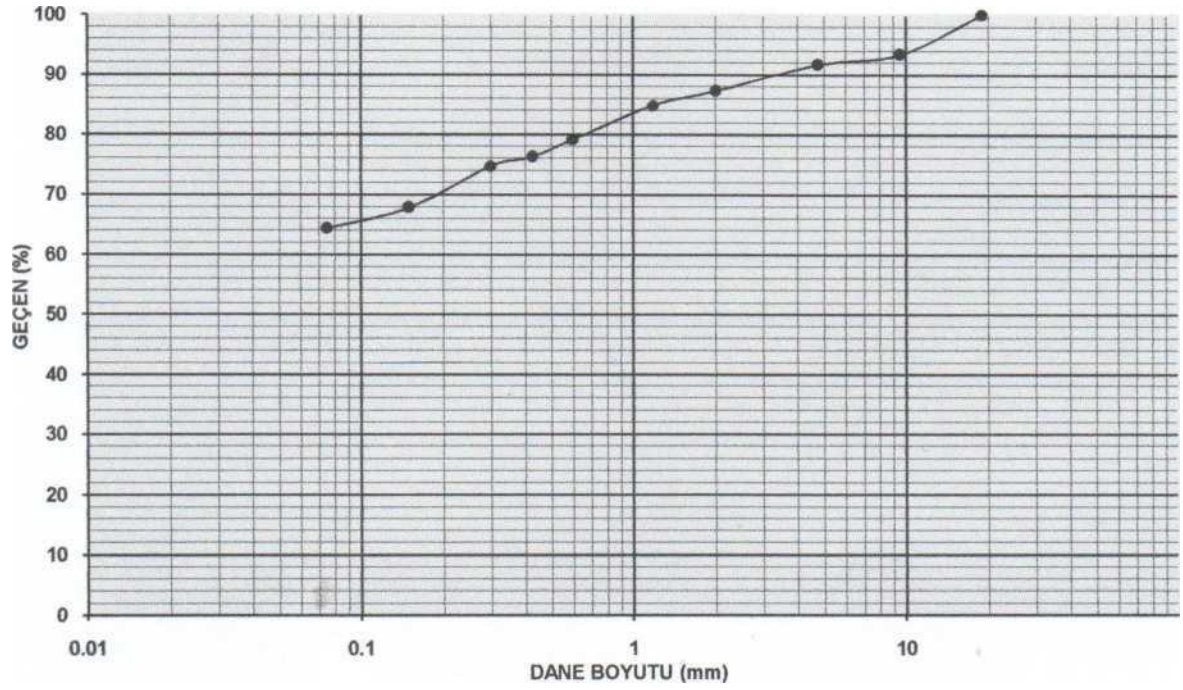
Experimenter. Geological Engineer.
H. Onur ŞİRİN «^Register Number:

Controlled byGeological Engineer Mustafa ÇITAK
Denetçi Belge No:25563

SIEVE ANALYSIS (TS EN ISO 17892-4)

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	**SK-2 ....**	**Total Weight (g)**	**249.6**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (n)	**3.00**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	16.4	16.4	7	**93**
4.75	4.3	20.7	8	**92**
2.00	11.1	31.8	13	**87**
1.18	6.1	37.8	15	**85**
0.600	14.1	52.0	21	**79**
0.425	7.3	59.3	24	**76**
0.300	3.8	63.1	25	**75**
0.150	17.2	80.3	32	**68**
0.075	8.7	88.9	36	**64**



Dioi Pja • **Cu:** **C2:**

LL: 41.5 **PL: 22.3** **PI:19.2**

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.075mm 64	0.075-4.75mm 28	4.75-75.0mm	> 75.0mm0	usc	**CL**

Author: Geological Engineer Onur ŞİRİN HrSicil No: 19398 -

Controlled byGeological Engineer Mustafa ÇITAK Try. Kd. Belde No:2556

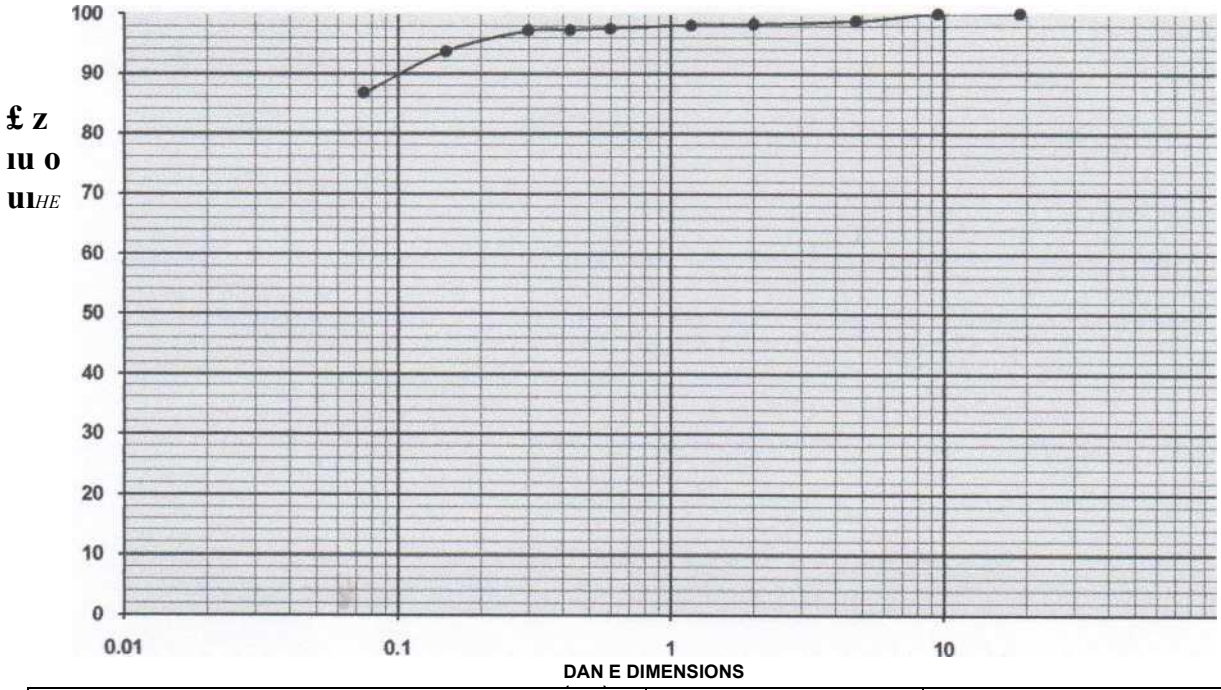
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ANTALYA MÜHENDİSLİK JEOLOJİ LTD. ŞTİ.
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SIEVE ANALYSIS

TR
MINISTRY OF ENVIRONMENT

PROJECT	ANTALYA KONYAALTI TURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	**SK-2**	**Total Weight (g)**	**111.4**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**6.00**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	1.4	1.4	1	**99**
2.00	0.6	2.0	2	**98**
1.18	0.2	2.1	2	**98**
0.600	0.6	2.7	2	**98**
0.425	0.3	3.0	3	**97**
0.300	0.2	3.2	3	**97**
0.150	3.8	7.0	6	**94**
0.075	7.8	14.7	13	**87**



DAN E DIMENSIONS

Dio:	DJ:	D6II:	Cu:	C2:
LL:37.7		**PL:20.3**	**PI:17.4**	

Ku-Siit (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	**ESC** **CL**
87	12	1	he	

*The experiment*Made by Geological Engineer H.Onur

Controlled byGeological Engineer Mustafa ÇITAK
Try [illegible] Belge Ntr.25563

GROUND ENGINEERING GEOLOGY LTD.CO.

SIEVE - HYDROMETER

(TS-EN ISO 17892-4)

TR ENVIRONMENT AND URBANIZATION MINISTRY

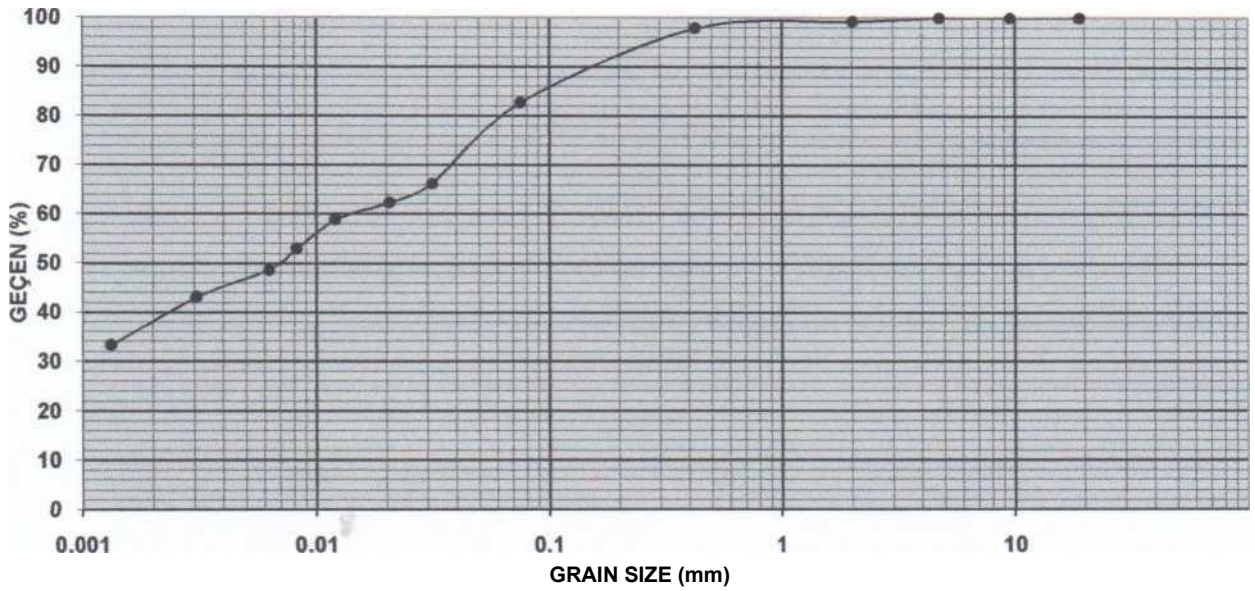
Date: 30.03.2020

PROJECT ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT

Drilling No.	**SK-2**	**Total Weight (g)**	**174.9**	**G.**	**2.69**
	Ud	**Elimination**	**Wet**	**W (g)**	**50.00**
Depth (m)	**7.50**	**Experimente**	**H.Onur**	**a**	**0.99**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	100
2.00	1.3	1.3	1	**99**
0.425	2.5	3.8	2	**98**
0.075	26.6	30.4	17	**83**

t	r	s	M	R	P	P.	d:	K,	K	kg	d
2	37	19.5	-3.3	33.7	66.8	**66.3**	0.0400	1.00	0.80	0.98	0.0314
5	35	19.5	-3.3	31.7	62.8	**62.4**	0.0260	1.00	0.81	0.98	0.0206
15	33	20	-3.1	29.9	59.3	**58.8**	0.0150	1.00	0.82	0.98	0.0121
30	30	20	-3.1	26.9	53.3	**52.9**	0.0100	1.00	0.84	0.98	0.0082
60	28	19.5	-3.3	24.7	49.0	**48.6**	0.0074	1.00	0.86	0.98	0.0062
250	25	20	-3.1	21.9	43.4	**43.1**	0.0036	1.00	0.87	0.98	0.0031
1440	20	20	-3.1	16.9	33.5	**33.3**	0.0015	1.00	0.90	0.98	0.0013



LL: **36.8** **PL:** **22.6** **PI:14.2**

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	• usc	CL
83		17	0	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	TS 1500	CI
38	45	16	1	**0**		

;What was done by Geological Engineer H.Onur ŞİRİN, Serial Number: 19398

Controlled by Geological Engineer Mustafa ÇITAK

Belge No:2556

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SIEVE - HYDROMETER

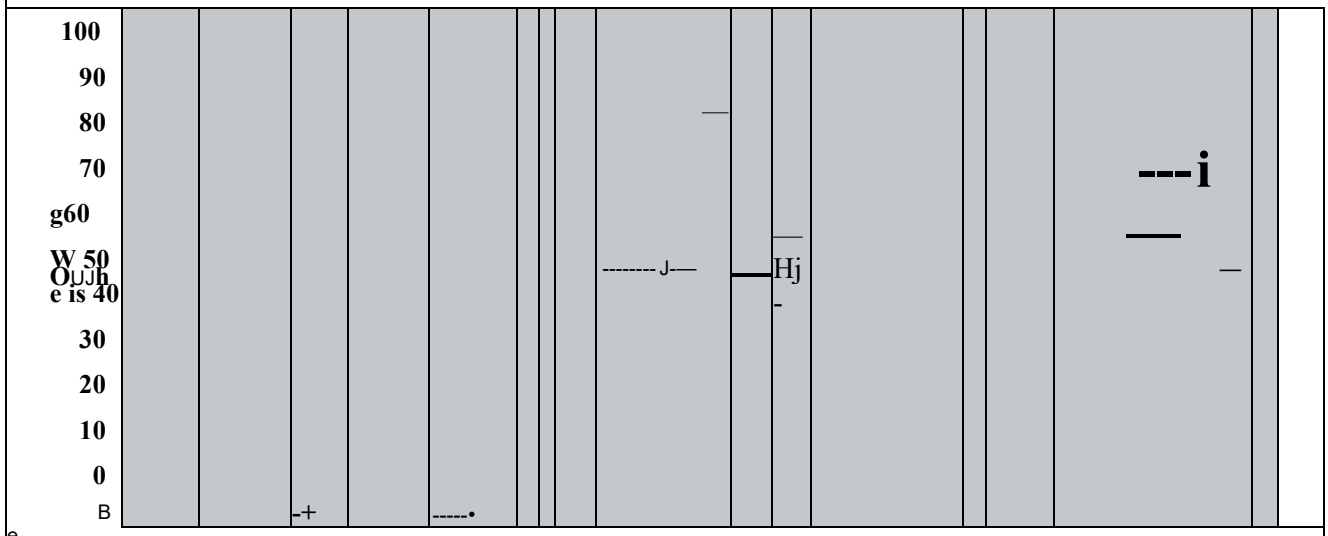
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MINISTRY

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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-2	Total Weight (g)	121.4	Gs12.69	
Sample No.	Ud	Sieving MethodWet		W (g) i 50.00	
Depth (m)	10.50	Experimenter	H.Onur SIRIN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remaining (%)	Passing (%)
19	0.0	0.0	0	100
9.5	0.0	0.0	he	100
4.75	0.0	0.0	0	100
2.00	0.0	0.0	0	1 >0
0.425	0.2	0.2	0	1 10
0.075	I	0.8	1I	99

t	r	S	M	R	P	P.	was	1 K.		"Si	d
2	48	20	-3.1	44.9	88.9	88.9	0.0400	1.00	0.74	0.98	0.0290
5	45	20	-3.1	41.9	83.0	83.0	0.0260	1.00	0.76 i	0.98	0.0194
15	41.5	1 20	-3.1	38.4	76.1	76.1	0.0150	1.00	0.77 I	0.98	0.0113
30	38	20	-3.1	34.9	69.1	69.1	0.0100	1.00	0.790.98		0.0077
60	35	20	-3.1	31.9	63.2	63.2	0.0074	1.00	0.81	0.98	0.0059
250	31	20	-3.1	27.9	55.3	55.3	0.0036	1.00	0.83 10.98		0.0029
1440	29	19	-3.5	25.5	50.5	50.5	0.0015	1.01	0.85	0.98	0.0013



LL:49.0 PL:25.1|PI:23.9

Hair (%)	Mattress	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.( )75 iiiin		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	CL
99		1	0	0		
<0.002	O.OO2-O.O75 mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	TC İfiDA	r't
51	48	1	0	0	- „-----	

Grandfather Made by: Geological Engineer H. Onur ŞİRİNKont
ULHMCI NUMBER:19398Try

Acting: Eng.Mustafa ÇITAK >563
Geology

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ELEK - HİDROMETRE

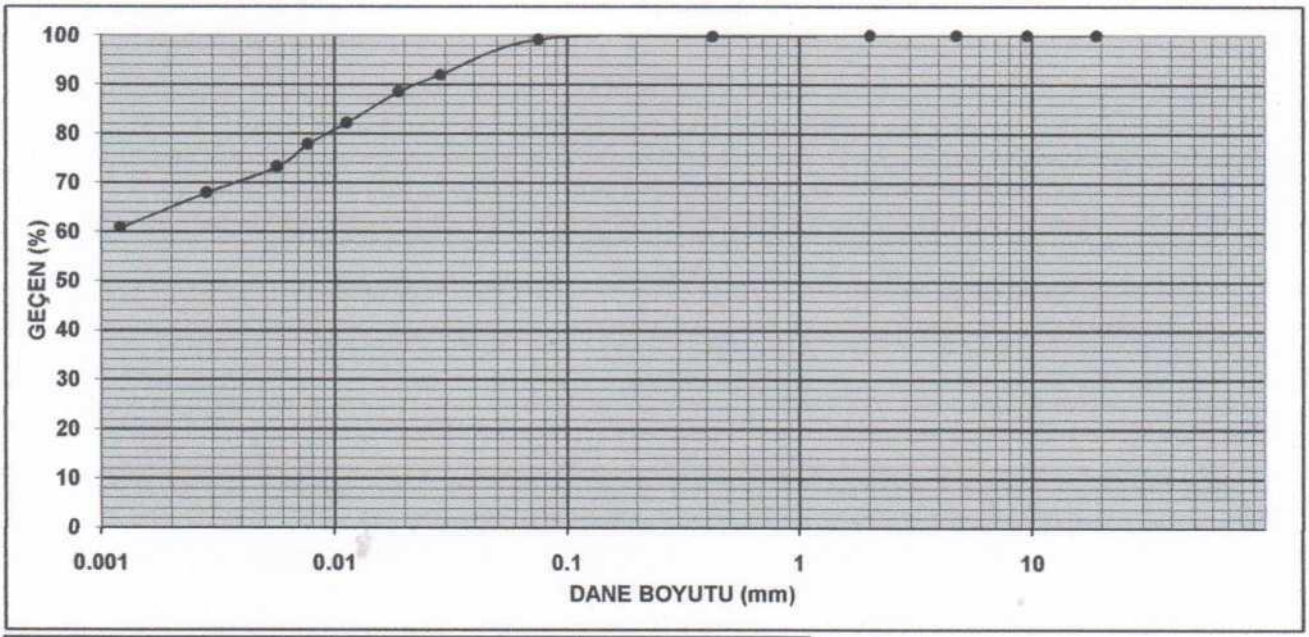
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T.C. ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI

PROJECT	ANTALYA KONYAALTIHURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	**SK-2**	Total Weight (g)	100.2	*G.*	**2.72**
Sample No.	Ud	Elimination Method	Wet	W (g)	**50.00**
Depth (m)	**13.50**	Experimenter	H.Onur SIRIN	a	**0.99**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	**Last (%)**
19	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
0.425	0.2	0.2	0	**100**
0.075	0.6	0.8	1	**99**

t	r	S	M	R	P	Pi	d!		K		d
2	50	19.5	-3.3	46.7	92.1	**92.1**	0.0400	1.00	0.73	0.98	0.0286
5	48	20	-3.1	44.9	88.5	**88.5**	0.0260	1.00	0.74	0.98	0.0189
15	45	19.5	-3.3	41.7	82.2	**82.2**	0.0150	1.00	0.76	0.98	0.0112
30	43	19	-3.5	39.5	77.9	**77.9**	0.0100	1.01	0.77	0.98	0.0076
60	40.5	19.5	-3.3	37.2	73.3	**73.3**	0.0074	1.00	0.78	0.98	0.0057
250	38	19	-3.5	34.5	68.0	**68.0**	0.0036	1.01	0.79	0.98	0.0028
1440	34	20	-3.1	30.9	60.9	**60.9**	0.0015	1.00	0.82	0.98	0.0012



LL:	71.9	PL:	29.7	PI:	42.2

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0	75mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CH**
99		1	0	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CH**
66	33	1	0	**0**		

Deneyi Yapan:Jeoloji Müh.H.Onur ŞIRIN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Deneyci Belge No:25563

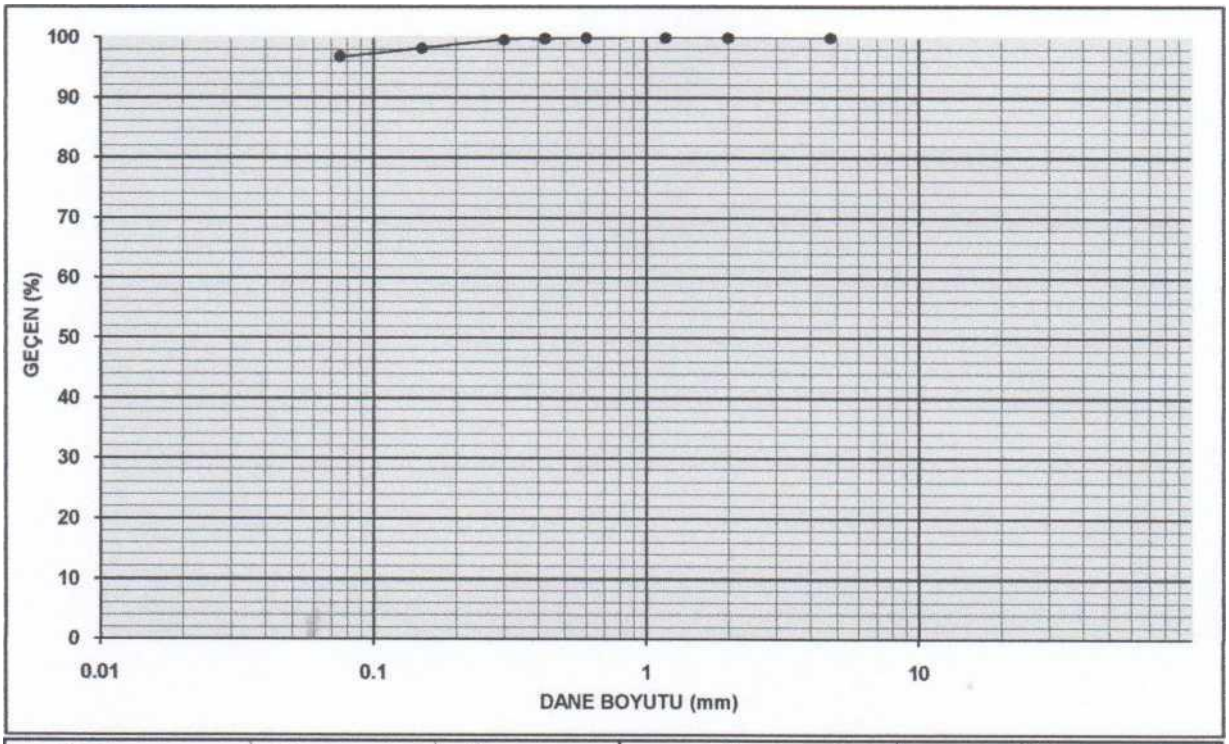
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SIEVE ANALYSIS
(TS-EN ISO 17892-4)

T.C.
MINISTRY OF ENVIRONMENT AND URBANIZATION

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE**		
Drilling No.	**SK-2**	**Total Weight (g)**	**833**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**15.00**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	**0.0**	0.0	**0**	**100**
2.00	0.0	0.0	**0**	**100**
1.18	0.0	0.0	**0**	**100**
0.600	0.1	0.1	**0**	**100**
0.425	0.1	0.2	0	**100**
0.300	0.1	0.3	**0**	**100**
0.150	1.2	1.5	2	**98**
0.075	1.2	2.7	3	**97**



D_{10} :	D_{30} :	D_{60} :	C_u :	C_z :

LL:64.8	**PL:29.2|PI:35.6**			
Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc **CH**
97	3	0	he	

:What didGeological Engineer H.Onur ŞİRİN
fcr-Register Number: 19398••

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Deneyci Belge No:25563

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ELEK - HİDROMETRE

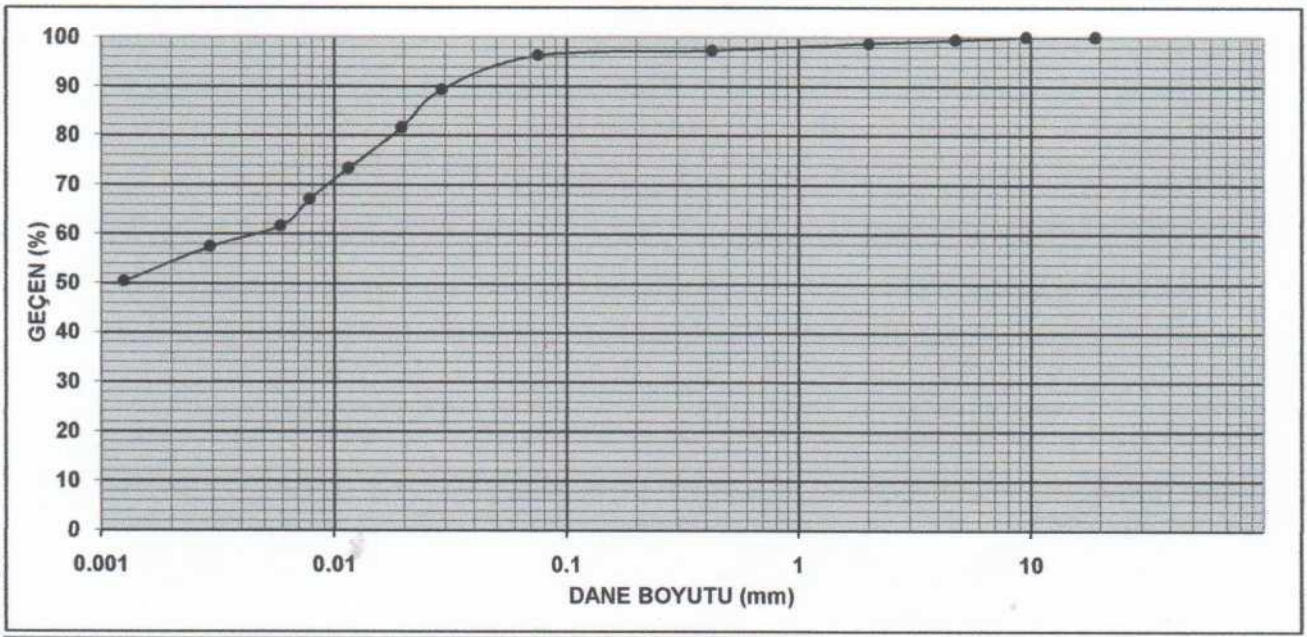
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T.C. ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI

PROJECT	ANTALYA KONYAALTI Ilı RMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			History :	**30.03.2020**
Drilling No.	**SK-2**	**Total Weight (g)**	**113.5**	G5	**2.72**
Sample No.	**SPT**	**Elimination Method**	**Wet**	**w (g)**	**50.00**
Depth (m)	**18.00**	**Experimenter**	**H.Onur SİİRİN**	**a**	**0.99**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.6	0.6	1	**99**
2.00	0.8	1.4	1	**99**
0.425	**1.6**	**3.0**	3	**97**
0.075	1.2	4.2	4	**96**

t	r	s	M	R	P	Pi	d.	K.	K		d
2	49	20	-3.1	45.9	90.5	**89.4**	0.0400	1.00	0.74	0.98	0.0290
5	45	20	-3.1	41.9	82.6	**81.6**	0.0260	1.00	0.76	0.98	0.0194
15	41	19.5	-3.3	37.7	74.3	**73.4**	0.0150	1.00	0.78	0.98	0.0115
30	38	19	-3.5	34.5	68.0	**67.2**	0.0100	1.01	0.79	0.98	0.0078
60	35	19.5	-3.3	31.7	62.5	**61.7**	0.0074	1.00	0.81	0.98	0.0059
250	33	19	-3.5	29.5	58 2	**57.4**	0.0036	1.01	0.82	0.98	0.0029
1440	29	20	-3.1	25.9	51.1	**50.4**	0.0015	1.00	0.85	0.98	0.0012



LL:	66.8	PL:	26.7	PI:	40.1

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75 rent		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CH**
96		3	1	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CH**
54	42	3	1	**0**		

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Deneyci Belge No:25563

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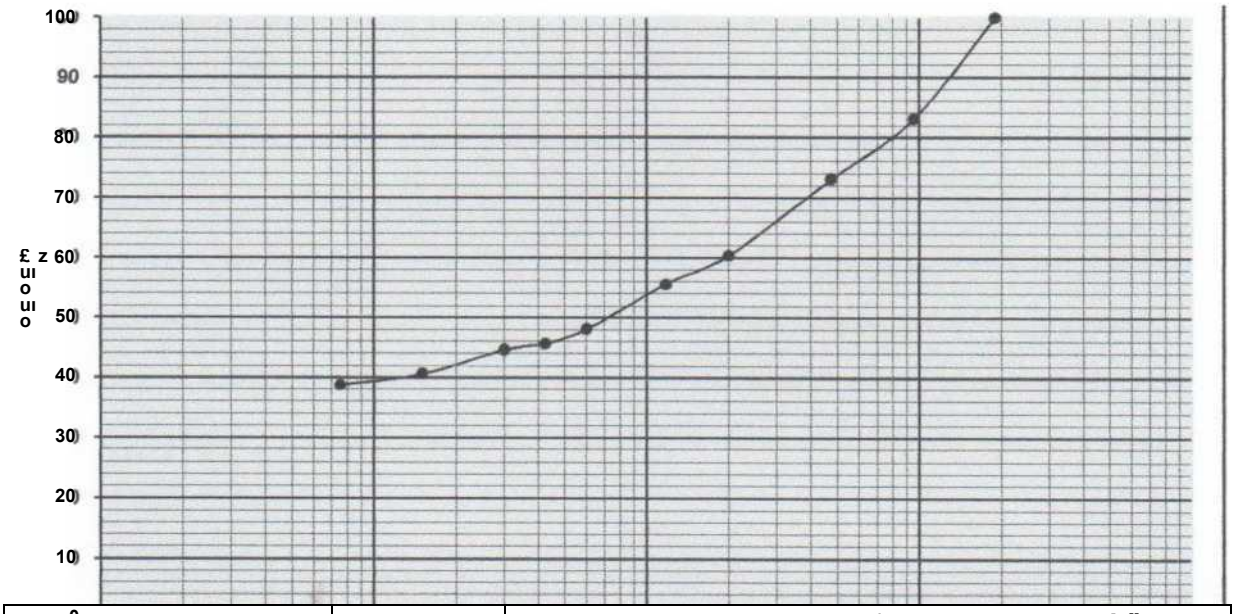
SIEVE ANALYSIS
(TS-EN ISO 17892-4)

TR MINISTRY OF ENVIRONMENT AND URBANIZATION

24/88 No:0028

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
Drilling No.	**SK-2**	**Total Weight (g)**	**126.9**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**19.50**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	21.5	21.5	17	**83**
4.75	12.6	34.1	27	**73**
2.00	16.1	50.2	40	**60**
1.18	6.1	56.3	44	**56**
0.600	9.5	65.8	52	**48**
0.425	3.0	68.8	54	**46**
0.300	1.4	70.2	55	**45**
0.150	5.1	75.3	59	**41**
0.075	2.3	77.6	61	**39**



Dl0: DM: DOO **:C„:**

LL:53.5 **PL:** **20.7PI:** **32.8**

Clay-Silt (%)	Sand (%)	Gravel (%)	Rubble (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	I
39	34	27	0	

:Done by Geological Engineer Onur ŞİRİN Registry Number: 19398-

Controlled by Geological Engineer Mustafa ÇITAK, No: 25563

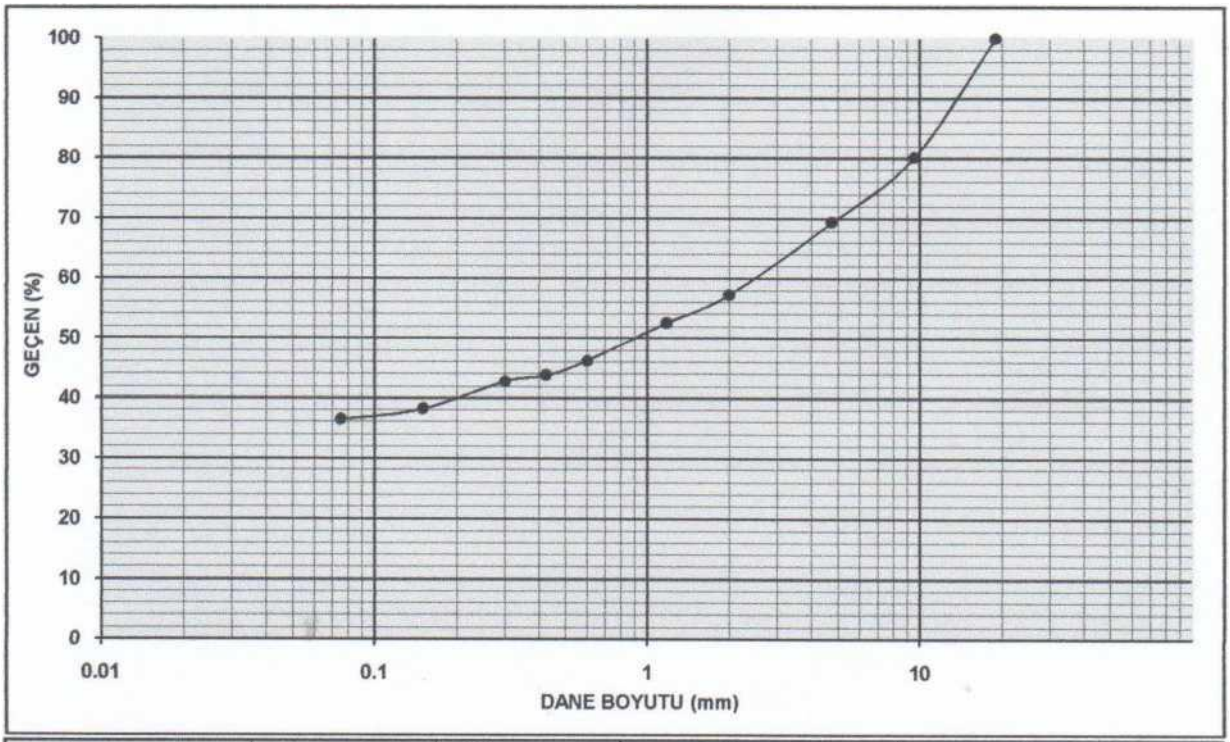
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SIEVE ANALYSIS
(TS-EN ISO 17892-4)

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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE		
Drilling No.	**SK-2**	**Total Weight (g)**	**174.6**
Sample No.	**SPT**	**Elimination Method**	Wet
Depth (m)	**22.50**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	**0**	**100**
9.5	34.7	34.7	20	**80**
4.75	18.8	53.5	31	**69**
2.00	21.0	74.5	43	**57**
1.18	8.3	82.8	47	**53**
0.600	10.9	93.7	54	**46**
0.425	4.3	98.0	56	**44**
0.300	1.8	99.8	57	**43**
0.150	8.0	107.8	62	**38**
0.075	3.1	110.9	64	**36**



D_{10} :	D_{30} :	D_{60} :	C_u :	C_z :

LL:40.6	**PL:22.5|PI:**		**18.1**	
Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	**USCSC**
36	33	31	0	

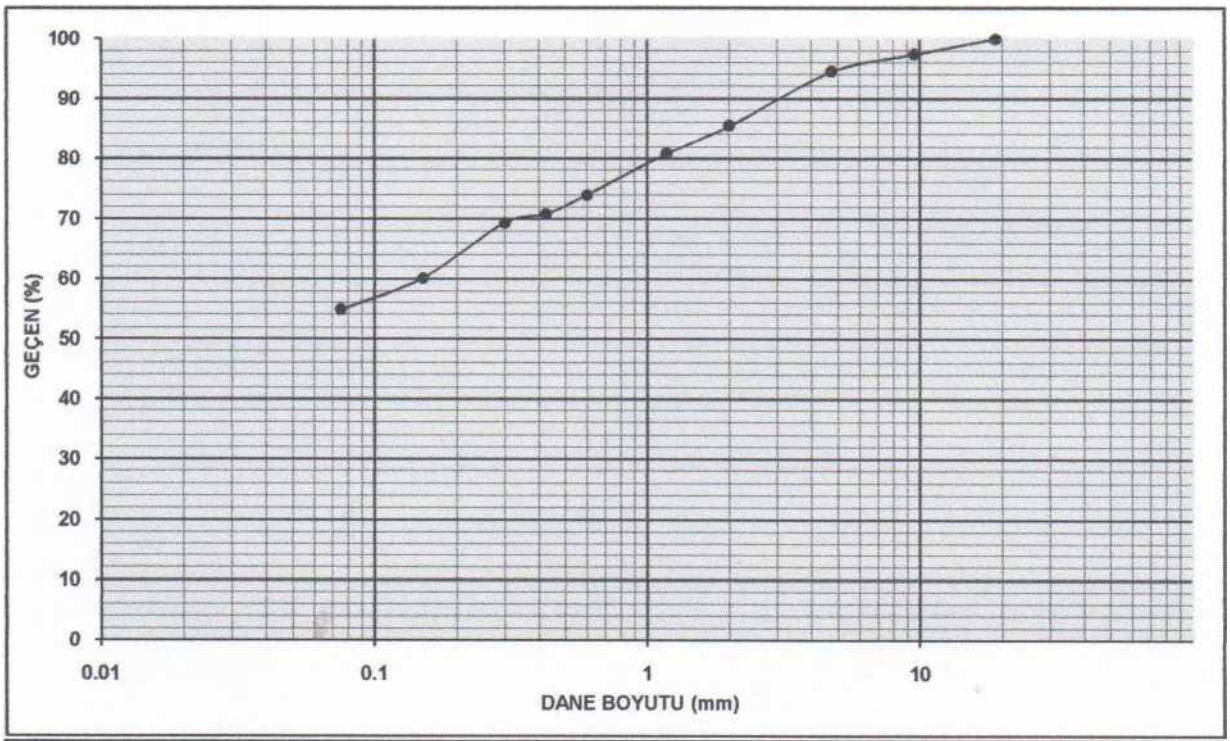
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Counte EfromGeology Engineer
r Mustafa ÇITAK No:25563

SIEVE ANALYSIS
(TS-EN ISO 17892-4)

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE**		
Drilling No.	**SK-2**	Total Weight (g)	**106.0**
Sample No.	**SPT**	Elimination Method	Wet
Depth (m)	**25.50**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	**Last (%)**
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	2.8	2.8	3	**97**
4.75	3.0	5.8	5	**95**
2.00	9.6	15.4	15	**85**
1.18	4.9	20.3	19	**81**
0.600	7.3	27.6	26	**74**
0.425	3.3	30.9	29	**71**
0.300	1.6	32.5	31	**69**
0.150	9.7	42.2	40	**60**
0.075	5.6	47.8	45	**55**



D_{10} :	D_{30} :	D_{60} :	C_u :	C_z :

LL:45.3 **PL:24.6|PI: 20.7**

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	**USC** **CL**
55	40	5	0	

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Deneme Belge No:25563

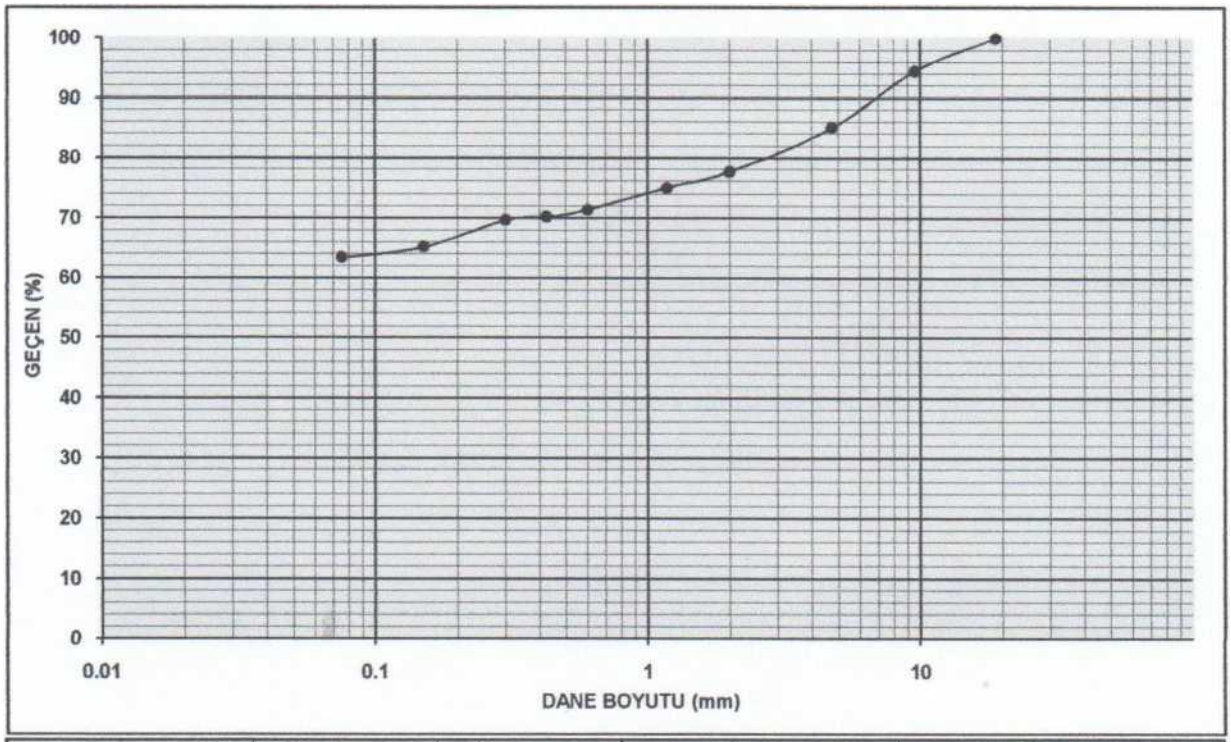
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SIEVE ANALYSIS
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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE		
Drilling No.	SK-2	Total Weight (g)	173.3
Sample No.	SPT	Elimination Method	Wet
Depth (m)	27.00	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	100
37.5	0.0	0.0	0	100
19.0	0.0	0.0	0	100
9.5	9.6	9.6	6	94
4.75	16.2	25.8	15	85
2.00	12.9	38.7	22	78
1.18	4.6	43.3	25	75
0.600	6.3	49.6	29	71
0.425	2.1	51.7	30	70
0.300	0.9	52.6	30	70
0.150	7.7	60.3	35	65
0.075	3.1	63.4	37	63



D_{10} :	D_{30} :	D_{60} :	C_u :	C_z :

LL:46.5	PL:24.3|PI:22.2			f
Clay-Silt (%)	**Sand (%)**	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0 ram	usc **CL**
63	22	15	0	

•Environment Made by Geological Engineer Onur

Controlled byGeological Engineer Mustafa ÇITAK
Chec tc Belge No:25563

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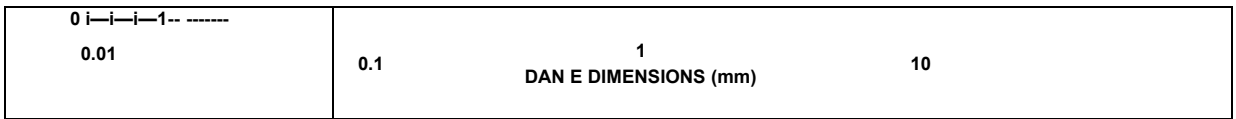
Controlled by Geological Engineer Mustafa ÇITAK Den< |eNo:25563

28/88 No:0028

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
Drilling No.	**SK-3**	**Total Weight (g)**	**66.1**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**1.50**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	2.1	2.1	3	**97**
2.00	1.3	3.4	5	**95**
1.18	0.5	3.9	6	**94**
0.600	1.7	5.6	8	**92**
0.425	1.4	7.0	11	***89***
0.300	1.1	8.1	12	***88***
0.150	10.5	18.6	28	**72**
0.075	7.5	26.1	39	**61**





Dls:D w:	**Cu:**	**C:**
LL:33.1	**PL:21.0**	**PI: 12.1**

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	**0.075-**	**4.75-75.0mm**	**> 75.0mm**	**USCCL**
61	**36**	**3**	**he**	

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SIEVE - HYDROMETER

(TS-EN ISO 17892-4)

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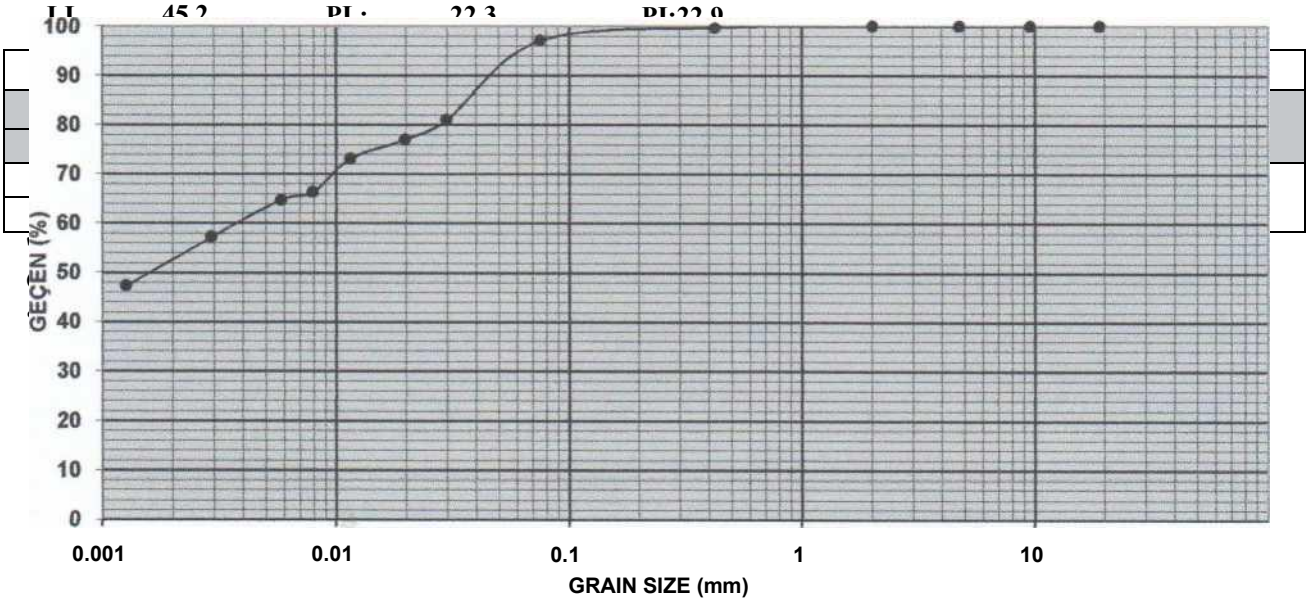
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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-3	Total Weight (g)	119.5	G,	2.69
Sample No.	Ud	Elimination Method	Wet	W (g)	50.00
Depth (m)	7.50	Experimenter	H.Onur SIRIN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	**0**	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
0.425	0.3	0.3	0	**100**
0.075	3.2	3.5	**3**	**97**

t	r	S	M	R	P	P1	d!		K	K	d
2	44	20	-3.1	40.9	81.0	**81.0**	0.0400	1.00	0.76	0.98	0.0298
5	42	20	-3.1	38.9	77.0	**77.0**	0.0260	1.00	0.77	0.98	0.0197
15	40	20	-3.1	36.9	73.1	**73.1**	0.0150	1.00	0.78	0.98	0.0115
30	37	19	-3.5	33.5	66.3	**66.3**	0.0100	1.01	0.80	0.98	0.0079
60	36	19.5	-3.3	32.7	64.8	**64.8**	0.0074	1.00	0.80	0.98	0.0058
250	32	20	-3.1	28.9	57.2	**57.2**	0.0036	1.00	0.83	0.98	0.0029
1440	27	20	-3.1	23.9	47.3	**47.3**	0.0015	1.00	0.86	0.98	0.0013

LL 45.2 PL : 22.3 PI:22.9



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SIEVE - HYDROMETER

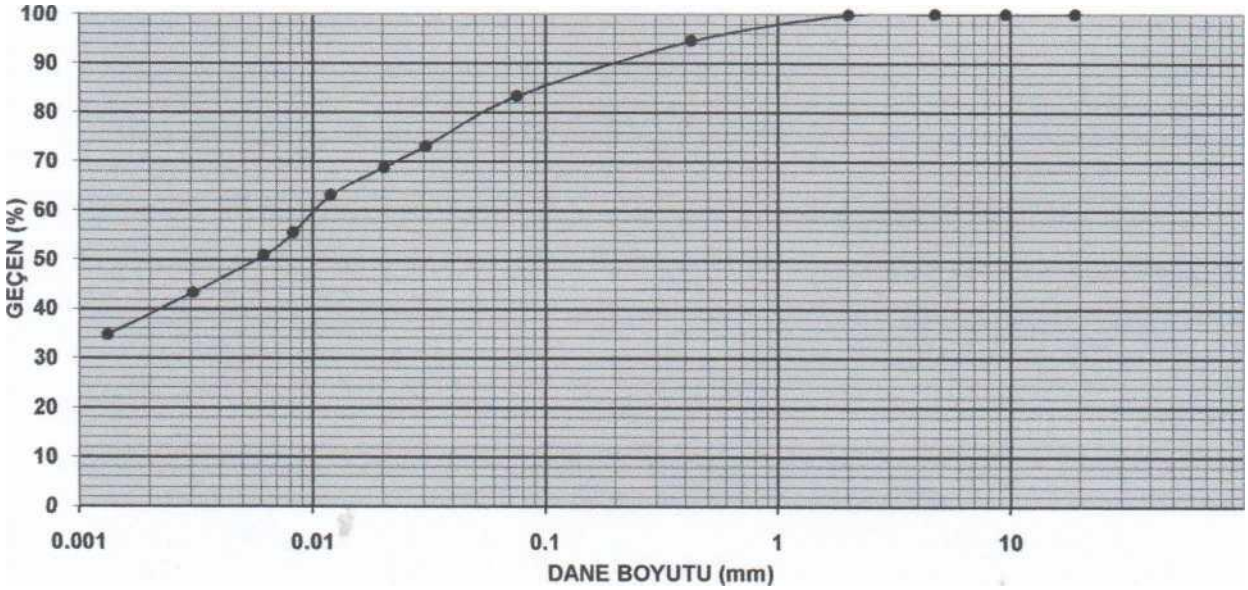
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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			**Date: 30.03.2020**	
Drilling No.	**SK-3**	**Total Weight (g)**	**168.0**	**G,**	**2.69**
Sample No.	**ID**	**Elimination Method**	**Wet**	**W (g)**	**50.00**
Depth (m)	**10.50**	**Experimenter**	**H.Onur SIRIN'**	**a**	**0.99**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	**0**	**100**
4.75	0.0	0.0	0	**100**
2.00	0.2	0.2	0	**100**
0.425	8.9	9.1	**5**	**95**
0.075	19.0	28.1		**83**

t	r	s	M	R	P	Pi	d.		k.	k.	d
2	40	20	-1,	36.9	73.2	**73.1**	0.0400	1.00	0.78	0.98	0.0306
5	38	19.5	-3.3	34.7	68.9	**68.8**	0.0260	1.00	0.79	0.98	0.0201
15	35	20	-3.1	31.9	63.3	**63.2**	0.0150	1.00	0.81	0.98	0.0119
30	31.5	19	-3.5	28	55.6	**55.5**	0.0100	1.01	0.83	0.98	0.0082
60	29	19.5	-3.3	25.7	51.0	**50.9**	0.0074	1.00	0.85	0.98	0.0062
250	25	20	-3.1	21.9	43.5	**43.4**	0.0036	1.00	0.87	0.98	0.0031
1440	21	19	-3.5	17.5	34.7	**34.7**	0.0015	1.01	0.89	0.98	0.0013



LL: 37.2PL: 21.9PI: 15.3

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	**USC**	**CL**
83		17	0	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**Cl**
39	44	17	0	**0**		

Made by Geological Engineer H.Onur ŞİRİNControlled by Geological Engineer Mustafa ÇITAK
ksicil No: 19398DenatGkBelga No:25563

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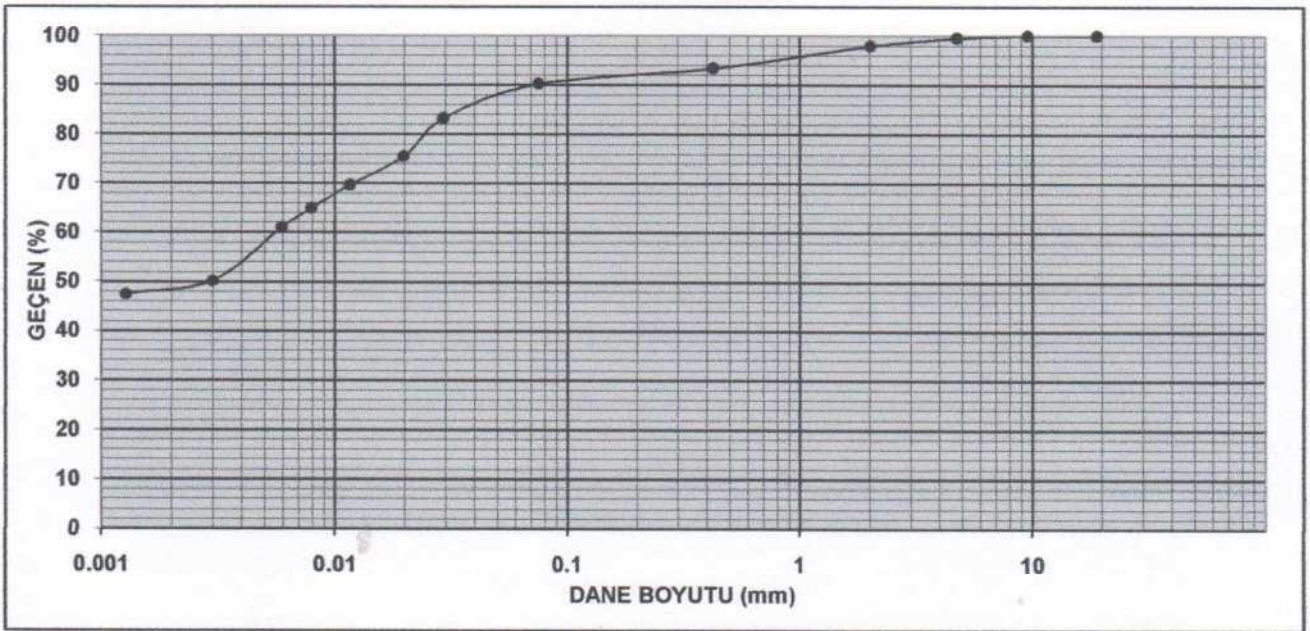
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BAKANLIĞI

PROJE	ANTALYA KONYAALTI HURMA ATIKSU ARITMA TESİSİ ÇAMUR YAKMA ÜNİTESİ			Tarih :	30.03.2020
Sondaj no	SK-3	Toplam Ağırlık (g)	92.3	G_s	2.69
Numune no	UD	Eleme Yöntemi	Islak	W (g)	50.00
Derinlik (m)	13.50	Deneyi Yapan	H.Onur ŞİRİN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.4	0.4	0	**100**
2.00	1.5	1.9	2	**98**
0.425	4.2	6.1	7	**93**
0.075	*2,*	9.0	10	**90**

t	*•	s	M	R	P	P.	<lt		K		d
2	46	20	-3.1	42.9	85.0	**83.2**	0.0400	1.00	0.75	0.98	0.0294
5	42	20	-3.1	38.9	77.1	**75.5**	0.0260	1.00	0.77	0.98	0.0197
15	39	20	-3.1	35.9	71.1	**69.7**	0.0150	1.00	0.79	0.98	0.0116
30	37	19	-3.5	33.5	66.4	**65.0**	0.01(M)	1.01	0.80	0.98	0.0079
60	35	19	-3.5	31.5	62.4	**61.1**	0.0074	1.01	0.81	0.98	0.0059
250	29	20	-3.1	25.9	51.3	**50.3**	0.0036	1.00	0.85	0.98	0.0030
1440	28	19	-3.5	24.5	48.5	**47.5**	0.0015	1.01	0.86	0.98	0.0013



LL: 49.5	PL: 23.9	PI: 25.6

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc ..	CL
90		10	0	**0**		
< 0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0 ram	TS 1500	CI
48	42	8	2	**0**		

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Deneyci Belge No:25563

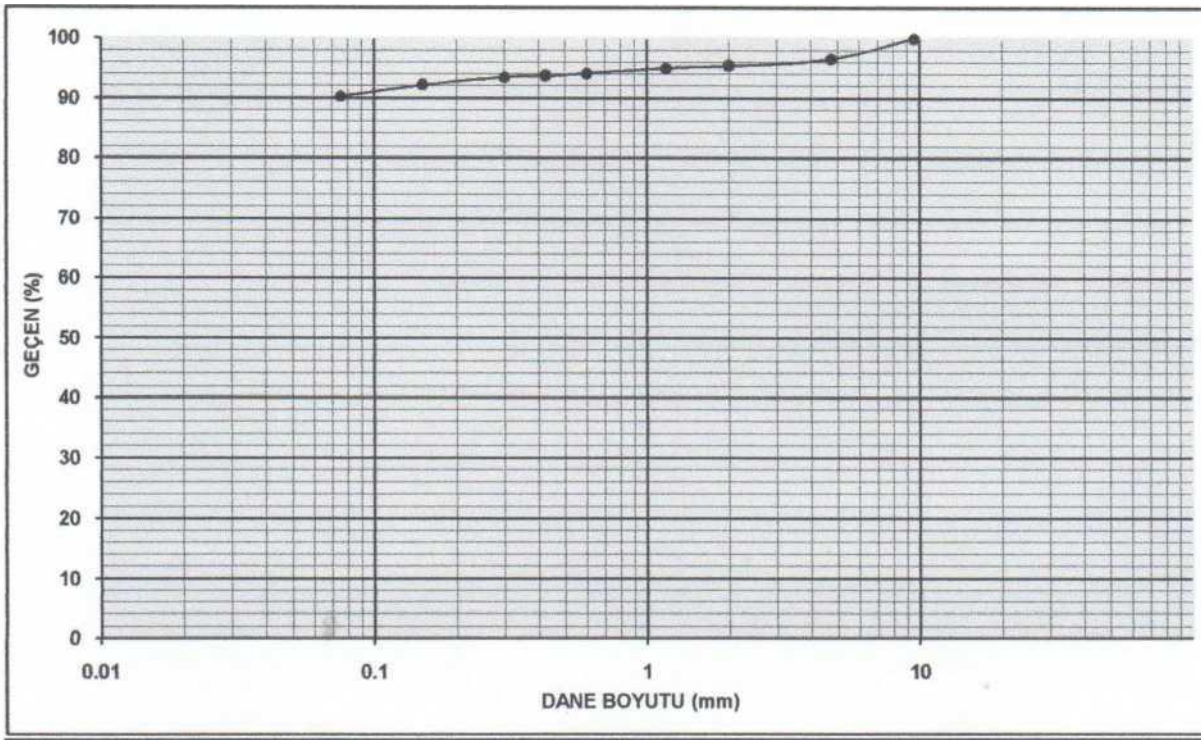
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SIEVE ANALYSIS
(TS-EN ISO 17892-4)

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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-3	Total Weight (g)	100.2
Sample No.	SPT	Elimination Method	Wet
Depth (m)	15.00	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	3.4	3.4	3	**97**
2.00	1.2	4.6	5	**95**
1.18	0.4	5.0	5	**95**
0.600	0.9	5.9	6	**94**
0.425	0.4	6.3	6	94
0.300	0.2	6.5	6	**94**
0.150	1.3	7.8	8	**92**
0.075	1.9	9.7	10	**90**



D_{10} :	D_{30} :	D_{60} :	C_u :	C_z :

LL: 55.4	PL: 26.8	PI: 28.6

Kil-Silt (%)	Kum (%)	Çakıl (%)	Moloz (%)	Sınıflandırma	
< 0.075 mm	0.075-4.75 mm	4.75-75.0 mm	> 75.0 mm	USC	CH
90	7	3	0		

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Deneyi Belge No:25563

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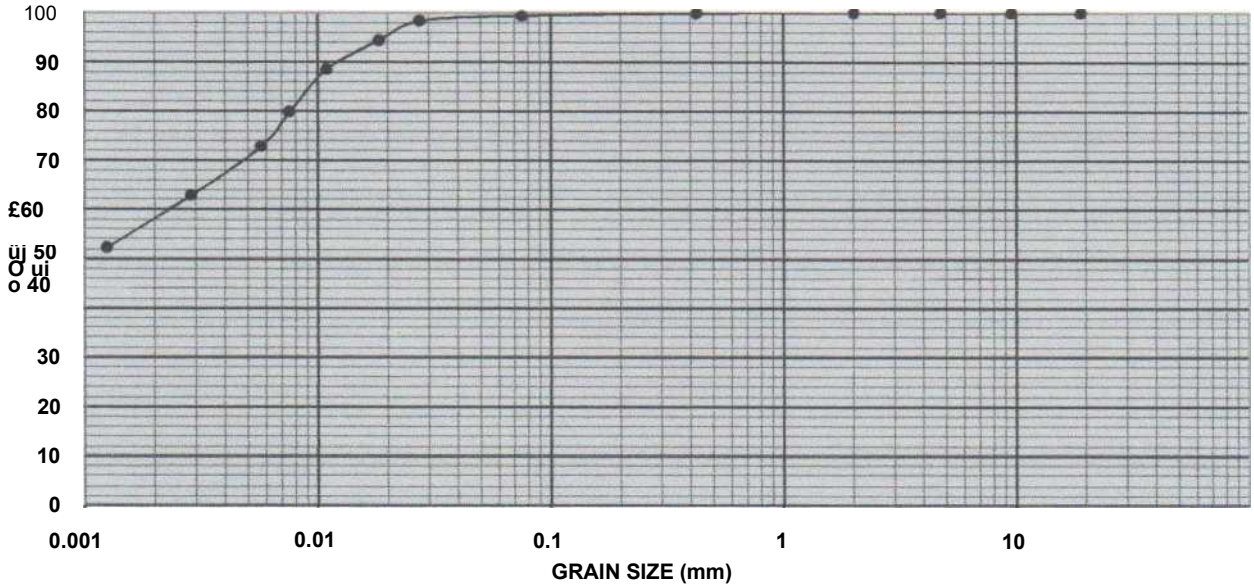
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PROJECT				Date: 30.03.2020	
Drilling No.	SK-3	Total Weight (g)	86.9	Gs	2.72
Sample No.	SPT	Elimination Method	Wet	W (g)	50.00
Depth (m)	18.00	Experimenter	H.Onur SIRIN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	100
9.5	0.0	0.0	0	100
4.75	0.0	0.0	0	100
2.00	0.0	0.0	0	100
0.425	0.1	0.1	0	100
0.075	0.4	0.5	1	99

t	r	s	M	*	P	Pff	said	k.	K		d
2	53	20	-3.1	49.9	98.4	98.4	0.0400	1.00	0.70	0.98	0.0274
5	51	20	-3.1	47.9	94.4	94.4	0.0260	1.00	0.72	0.98	0.0183
15	48	20	-3.1	44.9	88.5	88.5	0.0150	1.00	0.74	0.98	0.0109
30	44	19	-3.5	40.5	79.8	79.8	0.0100	1.01	0.76	0.98	0.0075
60	40.5	19	-3.5	37	72.9	72.9	0.0074	1.01	0.78	0.98	0.0057
250	35	20	-3.1	31.9	62.9	62.9	0.0036	1.00	0.81	0.98	0.0029
1440	30	19	-3.5	26.5	52.2	52.2	0.0015	1.01	0.84	0.98	0.0012



LL: 72.5 **PL:** 30.2 **PI:42.3**

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm 5HJ		0.075-4.75mm 1	4.75-75.0 ram 0	> 75.0 ram 0	usc	CH
< 0.002 58	0.002-0.075mm 41	0.075-2.00mm 1	2.00-60.0mm 0	> 60.0mm 0	TS 1500	CH

Made by Geological Engineer Onur SİRİN License No: E, 19398

Control Eden: Geology Engineer Mustafa Denetçi Belge No: CITAK o: 25563

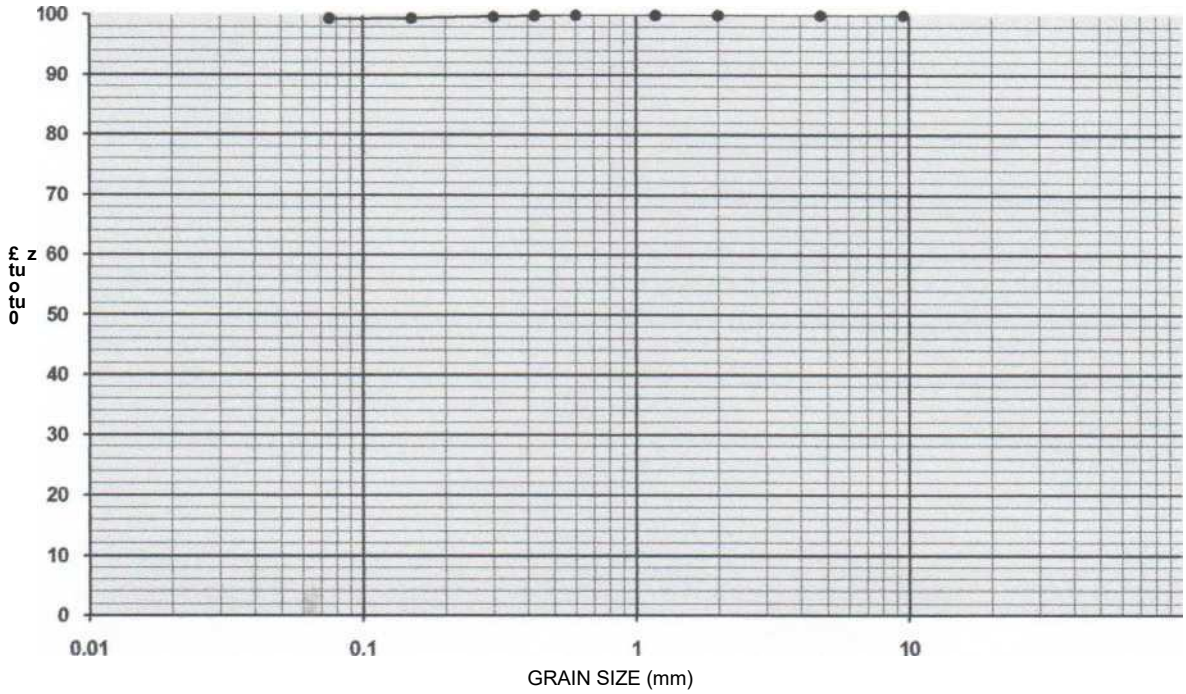
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SIEVE ANALYSIS
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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-3	Total Weight (g)	73.7
Sample No.	SPT	Elimination Method	Wet
Depth (m)	21.00	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
1.18	0.0	0.0	0	**100**
0.600	0.0	0.0	0	**100**
0.425	0.1	0.1	0	**100**
0.300	0.1	0.2	0	**100**
0.150	0.2	0.4	1	***99***
0.075	0.1	0.5	1	**99**



Pı«: **HE** **CH** C:

LL:67.3	**PL:28.6|PI:38.7**				
Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CH**
99	1	0	0		

Reported by Geological Engineer
Onur ŞİRİN, Report No: 19398

Controlled by: Geological Engineer
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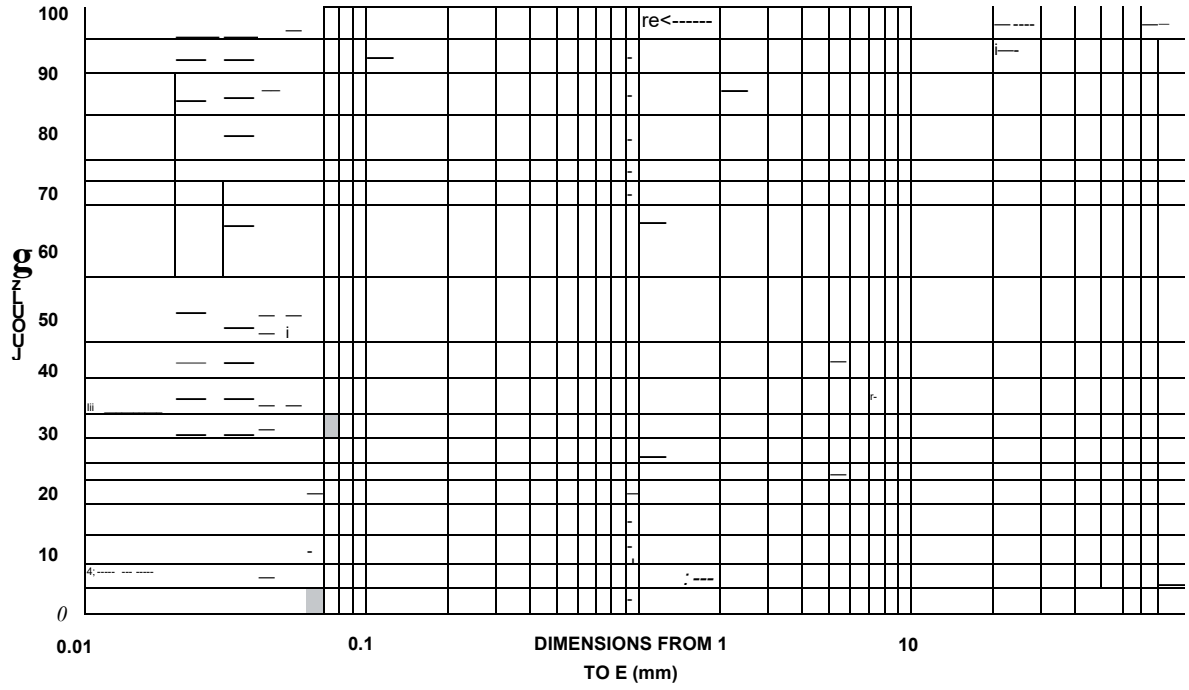
SIEVE ANALYSIS

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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-3	Total Weight (g)	73.7
Sample No.	SPT	Elimination Method	Wet
Depth (m)	21.00	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
1.18	0.0	0.0	0	**100**
0.600	0.0	0.0	0	**100**
0.425	0.1	0.1	0	**100**
0.300	0.1	0.2	0	**100**
0.150	0.2	0.4	1	**99**
0.075	0.1	0.5	1	**99**



Auto; PW: D»t Cu: C:

LL:67.3	PL:28.6	PI: 38.7	/

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	**USCCH**
99	1	0	0	

Done by Geological Engineer
Onur ŞİRİN Registration Number: 19398

Controlled by: Geological Engineer
Mustafa CITAK No:2556

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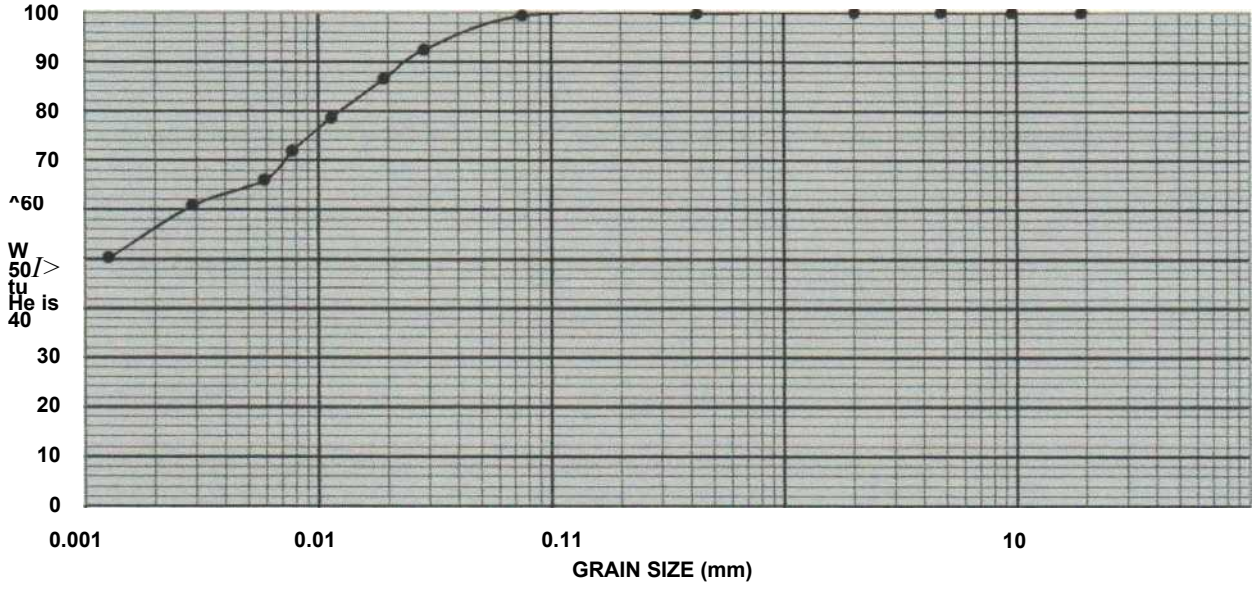
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PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-3	Total Weight (g)	**76.8**	**G.**	**2.72**
Sample No.	**SPT**	Elimination Method	**Wet**	W (g)	**50.00**
Depth (m)	**24.00**	Experimenter	**H.Onur SIRIN**	a	**0.99**

Sieve Opening (mm)	**Remaining Weight (g)**	**Total Remaining Weight (g)**	Remainder (%)	**Last (%)**
19	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
0.425	0.1	0.1	0	**100**
0.075	0.4	0.5	1	**99**

t	r	S	M	R	P	Pi	was	k,,	k,	•s	d
2	50	20	-3.1	46.9	92.5	**92.5**	0.0400	1.00	0.73	0.98	0.0286
5	47	20	-3.1	43.9	86.5	**86.5**	0.0260	1.00	0.75	0.98	0.0191
15	43	20	-3.1	39.9	78.7	**78.7**	0.0150	1.00	0.77	0.98	0.0113
30	40	19	-3.5	36.5	72.0	**72.0**	0.0100	1.01	0.78	0.98	0.0077
60	37	19	-3.5	33.5	66.0	**66.0**	0.0074	1.01	0.80	0.98	0.0059
250	34	20	-3.1	30.9	60.9	**60.9**	0.0036	1.00	0.82	0.98	0.0029
1440	29	19	-3.5		50.3	**503**	0.0015	1.01	0.85	0.98	**0.0013**



LL:75.7	PL:31.4	P: 443

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CH**
99		1	0	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CH**
56	43	1	0	**0**		

Draughtsman Geological Engineer
H.Onur ŞİRİN Office Number: 19398

Controlled by: Geological Engineer
Mustafa ÇITAK Chec: 2556
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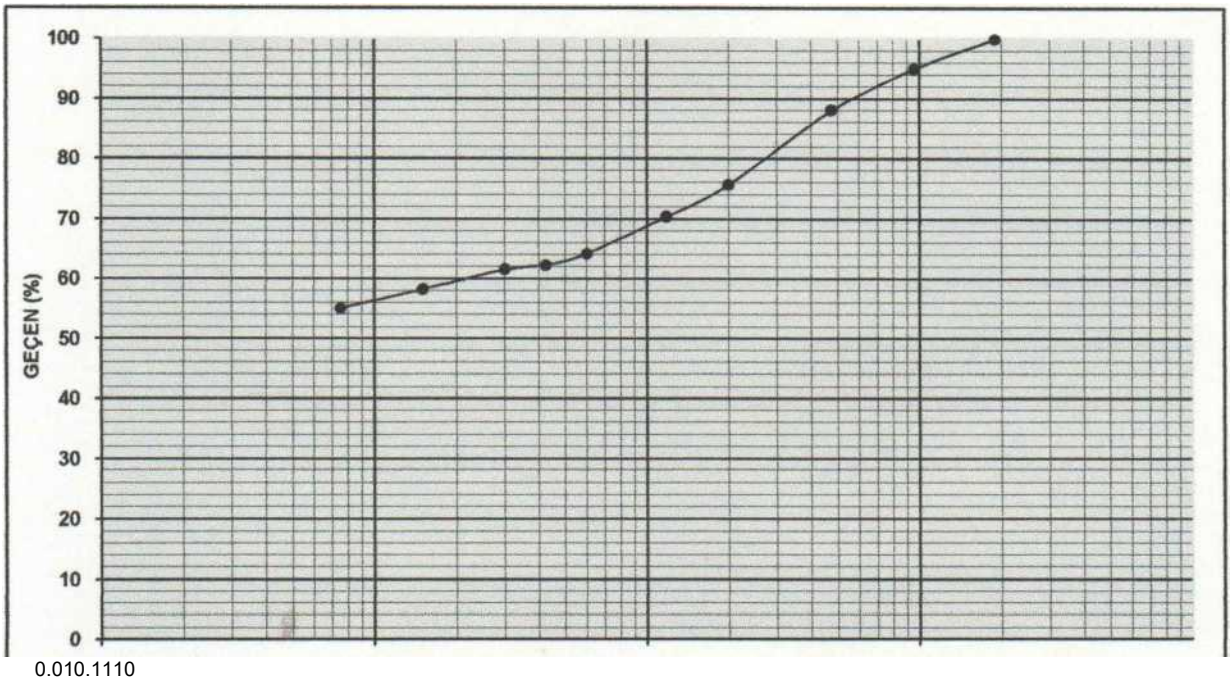
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SIEVE ANALYSIS
(TS-EN ISO 17892-4)

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MINISTRY

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
Drilling No.	**SK-3**	**Total Weight (g)**	**117.0**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**30.00**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0 .	0.0	0	**100**
9.5	5.9	5.9	5	**95**
4.75	8.1	14.0	12	**88**
2.00	14.4	28.4	24	**76**
1.18	6.3	34.7	30	**70**
0.600	7.2	41.9	36	**64**
0.425	2.2	44.1	38	62
0.300	0.9	45.0	38	**62**
0.150	3.9	48.9	42	**58**
0.075	3.6	52.5	45	**55**



0.010.1110

GRAIN SIZE (mm)

D1#:D **w:| D** **MI;**		**Cu:**	
LL:52.3	**PL:26.4**	**PI:25.9**	/

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	**USCCH**
55	**33**	12	0	

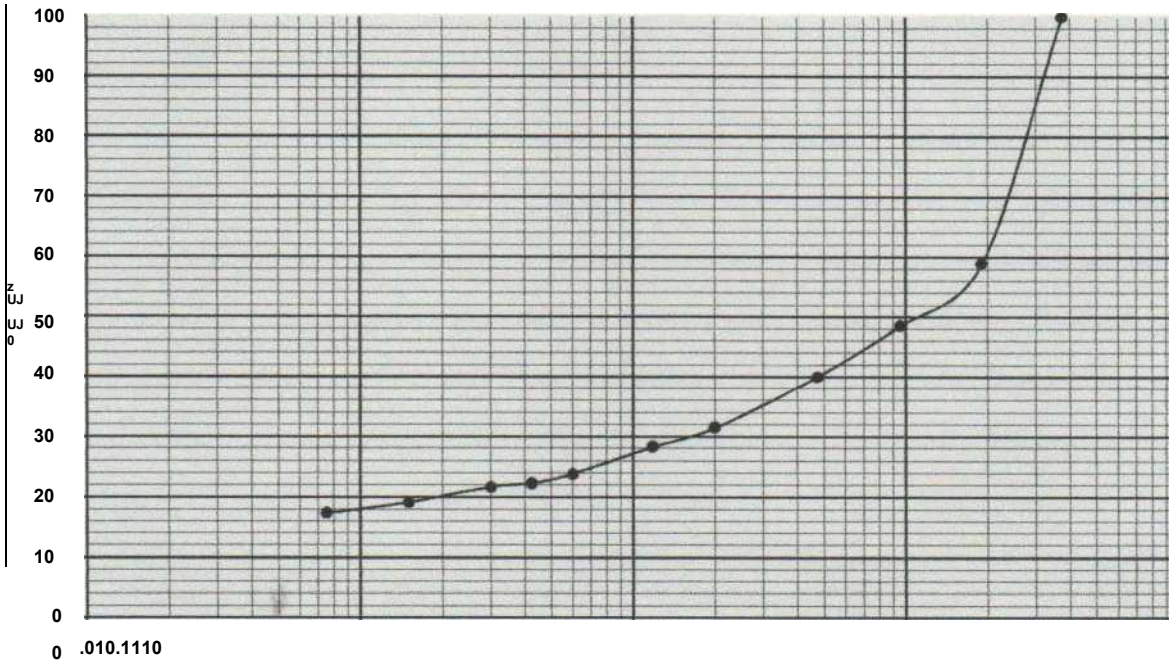
Experimenter Geological Engineer Onur ŞİRİN Controlled by Geological Engineer Mustafa ÇITAK

%îrRegistered Number: 19398Dene^ıBİke\No:25563

SIEVE ANALYSIS
(TS-EN ISO 17892-4)

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-3	Total Weight (g)	5003
Sample No.	SPT	Elimination Method	Wet
Depth (m)	31.50	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	205.6	205.6	41	**59**
9.5	51.7	257.3	51	**49**
4.75	42.3	299.6	60	**40**
2.00	43.0	342.6	68	**32**
1.18	16.1	358.7	72	**28**
0.600	21.9	380.6	76	**24**
0.425	8.1	388.7	78	**22**
0.300	3.0	391.7	78	**22**
0.150	12.5	404.2	81	**19**
0.075	9.1	413.3	83	**17**



DJ:	D«0:	Cu:	C:
LL:32.7	PL: 19.5	PI:13.2	/

Kii-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc GC
17	23	60	0	

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Denetçi Belge No:25563

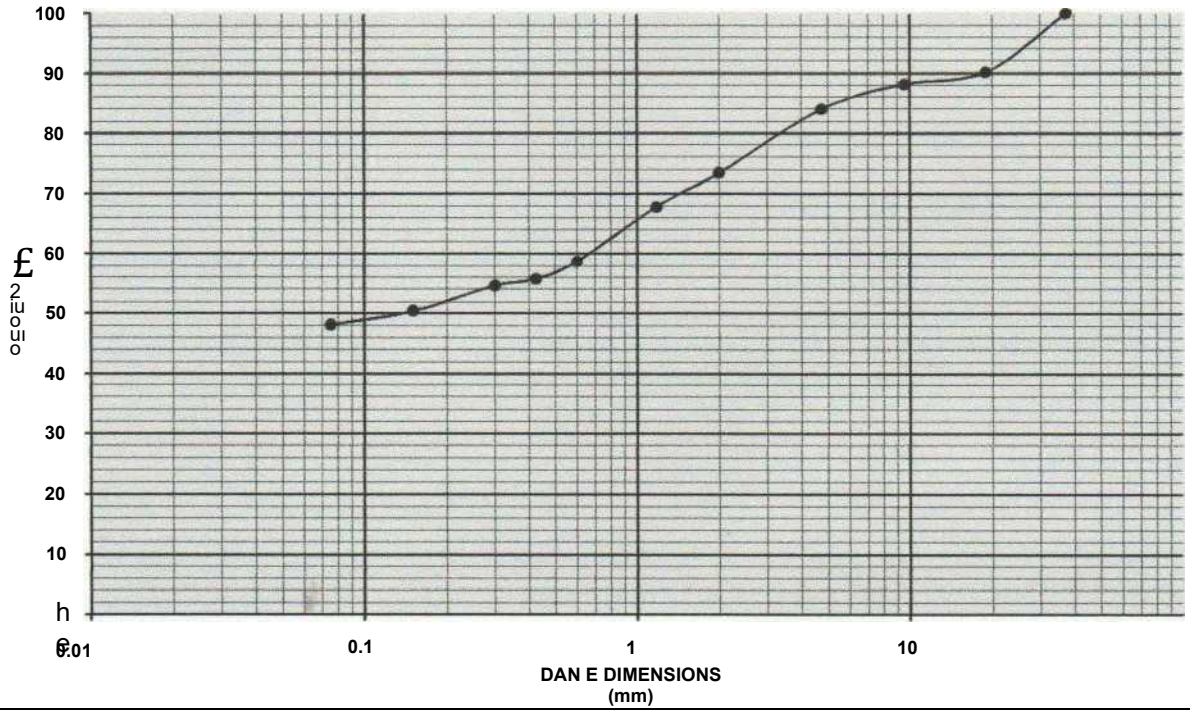
GROUND ENGINEERING GEOLOGY LTD.CO.
İKSOIL ENGINEERiNG i GEOLOGYCO.LTD.

SIEVE ANALYSIS
(TS-EN ISO 17892-4)

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ENVIRONMENT AND
URBANIZATION

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE		
Drilling No.	SK-3	Total Weight (g)	163.4
Sample No.	SPT	Elimination Method	Wet
Depth (m)	33.00	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	16.0	16.0	10	**90**
9.5	3.3	19.3	12	**88**
4.75	6.7	26.0	16	**84**
2.00	17.3	43.3	26	**74**
1.18	9.3	52.6	32	**68**
0.600	14.8	67.4	41	**59**
0.425	4.8	72.2	44	**56**
0.300	1.9	74.1	45	**55**
0.150	6.9	81.0	50	**50**
0.075	3.7	84.7	52	**48**



>D»		Cu:	C:
LL:56.6	PL:26.5	PI:30.1	/

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc SC
48	36	16	0	

The person who made the project is
Geological Engineer H.Onur ŞİRİN
Registration Number: 19398

Controlled by: Geological Engineer
Mustafa ÇITAK
Hy Chamber No:2556
3

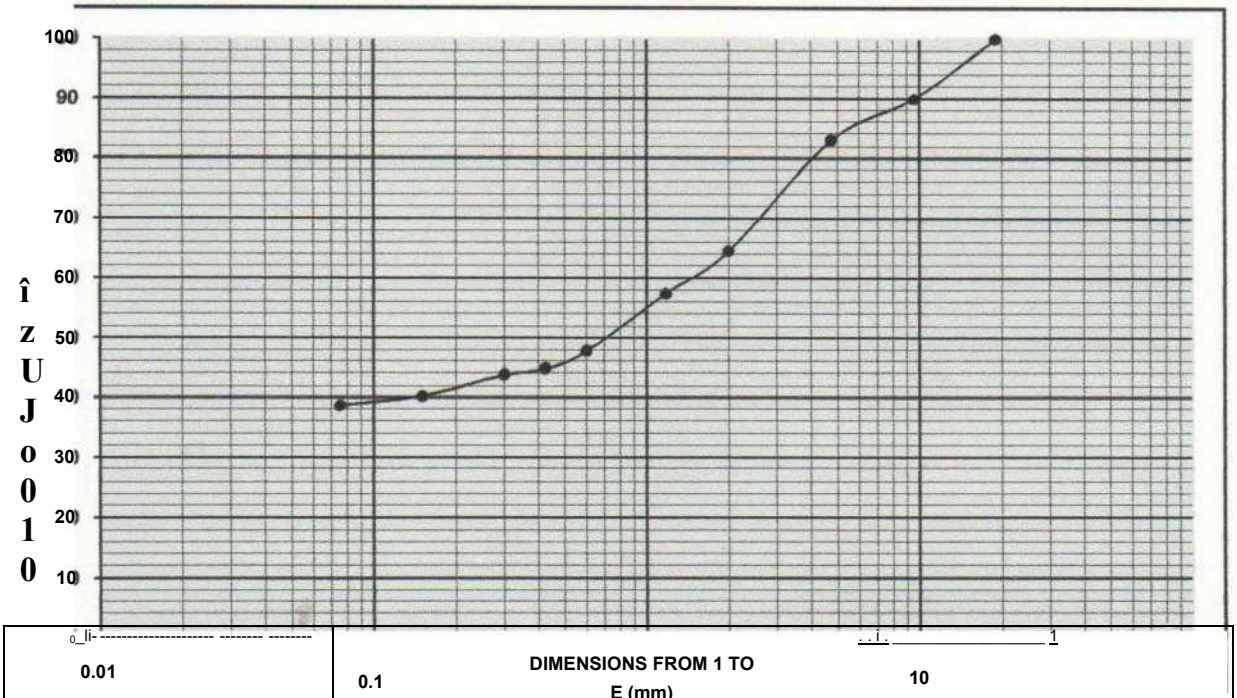
GROUND ENGINEERING GEOLOGY LTD.CO.JSOIL ENGINEERING t GEOLOGY CO. LTD.

SIEVE ANALYSIS
(TS-EN ISO 17892-4)

TR. ENVIRONMENT AND URBANIZATION MINISTRY

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
Drilling No.	**SK-3**	**Total Weight (g)**	**149.4**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**36.00**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	15.0	15.0	10	**90**
4.75	10.4	25.4	17	**83**
2.00	27.6	53.0	35	**65**
1.18	10.6	63.6	43	**57**
0.600	14.4	78.0	52	**48**
0.425	4.4	82.4	55	45
0.300	1.6	84.0	56	**44**
0.150	5.2	89.2	60	**40**
0.075	2.4	91.6	61	**39**



Dw:	DM:	**Cu:**	C:
LL:44.6	**PL:23.2**	**PI:** 21.4	/

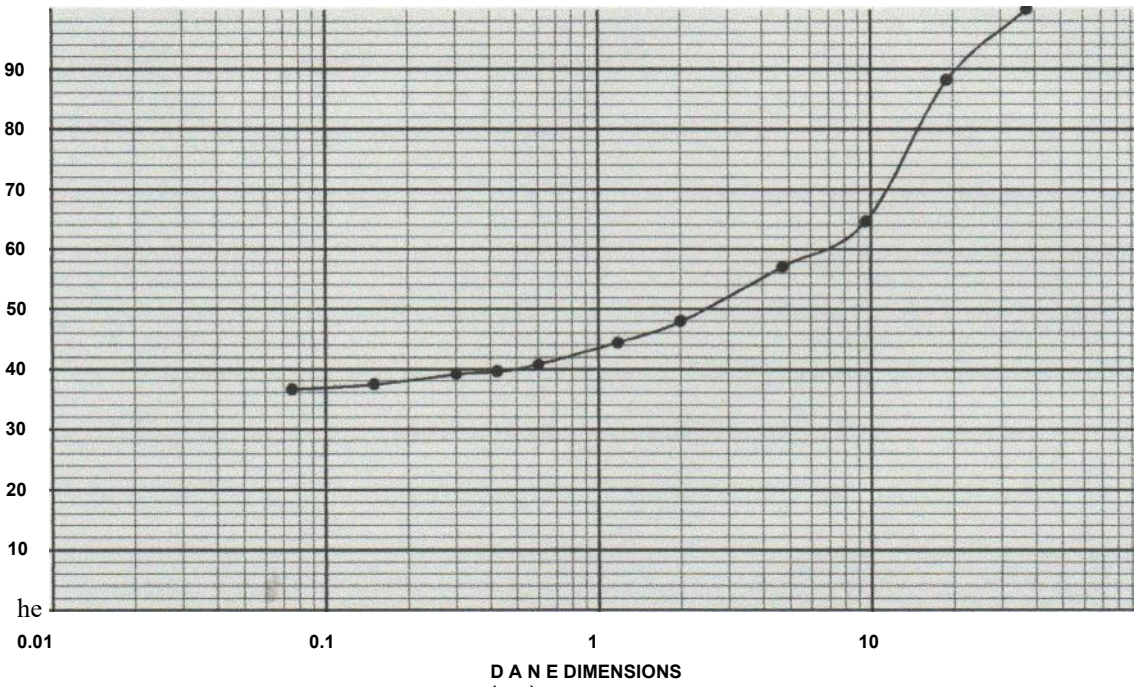
Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	s.c.
39	44	17	0		

Made by Geological Engineer Onur ŞİRİN ta-Registration Number: 19398'

Controlled by Geological Engineer Mustafa ÇITAK Registration No:2556

SIEVE ANALYSIS (TS EN ISO 17892-4)

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-3	Total Weight (g)	351.2
Sample No.	SPT	Elimination Method	Wet
Depth (m)	37.50	Report Date	30.03.2020



Cu:

LL: 42.7 **PL: 22.8** **PI:19.9**

Clay-Silt (%)	Kmn (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0 mm0	usc GC
3~	20	43		

Geological Engineer H.Onur ŞİRİN
bRegister No. 19398'

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	41.6	41.6	12	**88**
9.5	82.8	124.4	35	**65**
4.75	26.0	150.4	43	**57**
2.00	32.0	182.4	52	**48**
1.18	12.4	194.8	55	**45**
0.600	12.8	207.6	59	**41**
0.425	4.2	211.8	60	**40**
0.300	1.6	213.4	61	**39**
0.150	6.2	219.6	63	**37**
0.075	3.0	222.6	63	**37**

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PW:

Controlled by: Geological Engineer Mustafa ÇITAK
Den Igc No:25563

Geological Engineer H.Onur ŞİRİN
bRegister No. 19398'



ZEMİN MÜHENDİSLİK

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SIEVE - HYDROMETER

(TS-EN ISO 17892-4)

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ENVIRONMENT AND
URBANIZATION

I: 41/88

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			**Date: 30.03.2020**	
Drilling No.	**SK-4**	**Total Weight (g)**	**105.7**	**Gs**	**2.68**
Sample No.	**Ud**	**Elimination Method**	**Wet**	**W (g)**	**50.00**
Depth (m)	**3.00**	**Experimenter**	**H.Onur SIRIN**	**a**	**0.99**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	**0.0**	**o1100**	
9.5	0.0	**0.0**	**0**	**100**
4.75	**0.8**	**0.8**	**1**	**99**
2.(F)	**2.7**	**3.5**	**3**	**97**
0.425	**11.8**	**15.3**	**14**	**86**
0.075	**24.8**	**40.1**	**38**	**62**

t	r	s	M	R	P	P1	dt	K.	>9	k:	d
2	35	20	-3.1	31.9	63.4	**61.3**	0.0400	1.00	0.81	0.98	0.0318
5	33	20	-3.1	29.9	59.5	**57.5**	0.0260	1.00	0.82	0.98	0.0209
15	31.5	20	-3.1	28.4	56.5	**54.6**	0.0150	1.00	0.83	0.98	0.0122
30	28	19	-3.5	24.5	48.7	**47.1**	0.0100	1.01	0.86	0.98	0.0085
60	25.5	19	-3.5	22	43.7	**42.3**	0.0074	1.01	0.87	0.98	0.0064
250	19	20	-3.1	15.9	31.6	**30.6**	0.0036	1.00	0.90	0.98	0.0032
1440	14	20	-3.1	10.9	21.7	**21.0**	0.0015	1.00	0.93	0.98	0.0014

100

90

U/**50 O m 0 40**

32.6 **PL:** **20.7** **PI:11.9**

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CL**
62		37	1	**0**		
<0.002	0.002-0.075	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CL**
25	37	35	3	**0**		

[What is done by Geological Engineer Onur ŞİRİN Lsictl No: 19398

Controlled byGeological Engineer Mustafa ÇITAK Den number: 25563

0.001 **0.01** **0.11**

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ELEK - HİDROMETRE

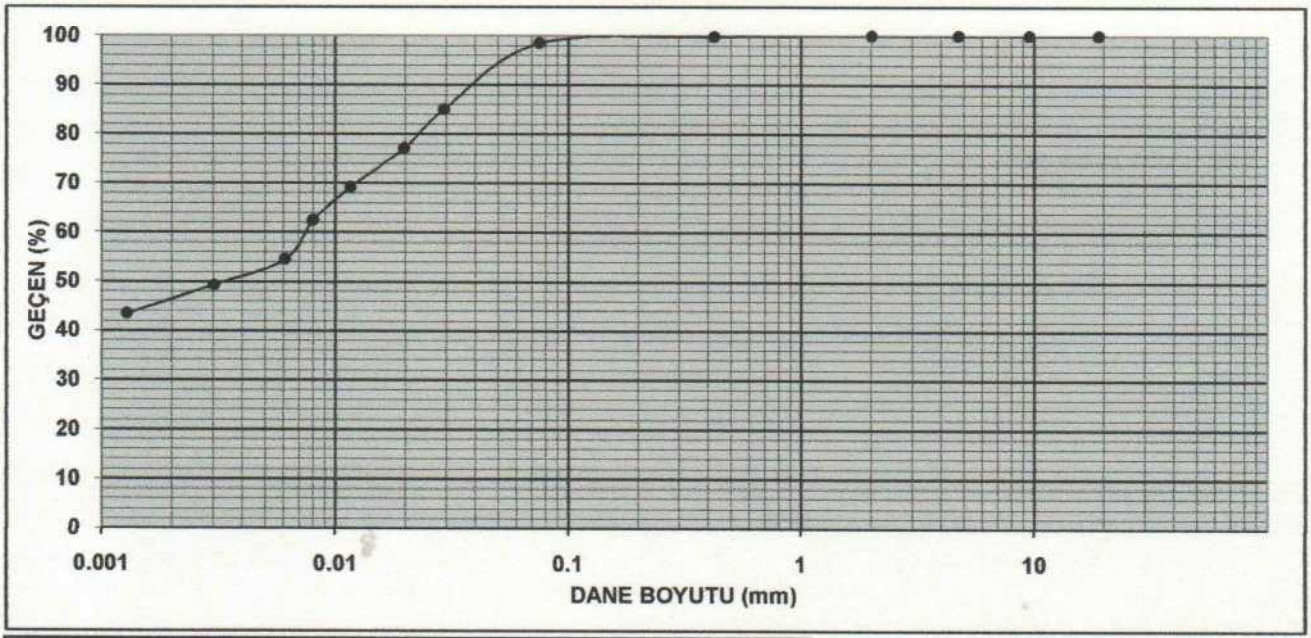
(TS-EN ISO 17892-4)

T.C. ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-4	Total Weight (g)	138.9	G.	2.69
Sample No.	Ud	Elimination Method	Wet	W (g)	50.00
Depth (m)	6.00	Experimenter	H.Onur ŞtRİN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	100
9.5	0.0	0.0	0	100
4.75	0.0	0.0	0	100
2.00	0.0	0.0	0	100
0.425	0.3	0.3	0	100
0.075	1.8	2.1	2	98

t	r	s	M	R	P	P.	said		K		d
2	46	20	-3.1	42.9	85.1	**85.1**	0.0400	1.00	0.75	0.98	0.0294
5	47	20	-3.1	38.9	77.2	**77.2**	0.0260	1.00	0.77	0.98	0.0197
15	38	20	-3.1	34.9	69.2	**69.2**	0.0150	1.00	0.79	0.98	0.0116
30	35	19	-3.5	31.5	62.5	**62.5**	0.0100	1.01	0.81	0.98	0.0080
60	31	19	-3.5	27.5	54.5	**54.5**	0.0074	1.01	0.83	0.98	0.0061
250	28	20	-3.1	24.9	49.4	**49.4**	0.0036	1.00	0.86	0.98	0.0030
1440	25	20	-3.1	21.9	43.4	**43.4**	0.0015	1.00	0.87	0.98	0.0013



LL:	52.4	PL:	26.8	PI:	25.6

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	CH
98		2	0	0		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	TS 1500	CH
46	52	2	0	0		

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Deneyi Belge No:25563

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ELEK - HİDROMETRE

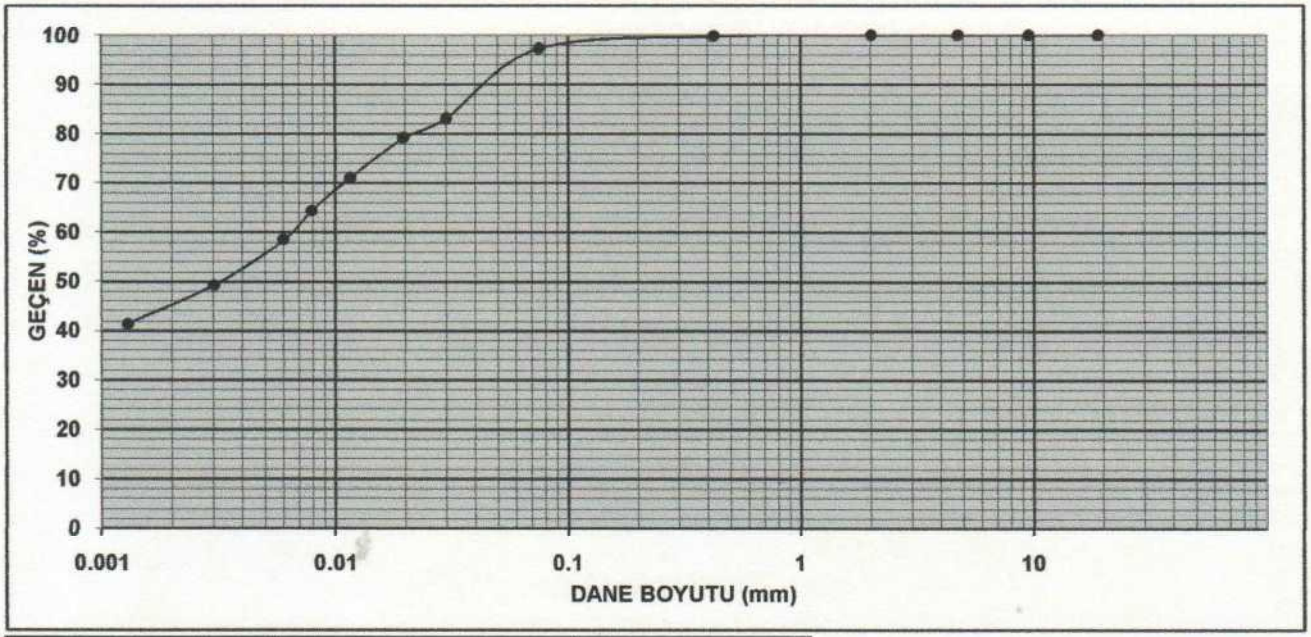
(TS-EN ISO 17892-4)

T.C. ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI

PROJE	ANTALYA KONYAALTI HURMA ATIKSU ARITMA TESİSİ ÇAMUR YAKMA ÜNİTESİ			Tarih :	30.03.2020
Sondaj no	SK-4	Toplam Ağırlık (g)	130.8	G_s	2.69
Numune no	UD	Eleme Yöntemi	Islak	W (g)	50.00
Derinlik (m)	9.00	Deneyi Yapan	H.Onur ŞİRİN	a	0.99

Elek Açıklığı (mm)	Kalan Ağırlık (g)	Toplam Kalan Ağırlık (g)	Kalan (%)	Geçen (%)
19	0.0	0.0	0	100
9.5	0.0	0.0	0	100
4.75	0.0	0.0	0	100
2.00	0.0	0.0	0	100
0.425	0.3	0.3	0	100
0.075	3.2	3.5	3	97

t	r	s	M	R	P	P_1	d_1	k_n	k_l	k_g	d
2	45	20	-3.1	41.9	83.1	**83.1**	0.0400	1.00	0.76	0.98	0.0299
5	43	20	-3.1	39.9	79.1	**79.1**	0.0260	1.00	0.77	0.98	0.0196
15	39	20	-3.1	35.9	71.2	**71.2**	0.0150	1.00	0.79	0.98	0.0116
30	36	19	-3.5	32.5	64.5	**64.5**	0.0100	1.01	0.80	0.98	0.0079
60	33	19	-3.5	29.5	58.5	**58.5**	0.0074	1.01	0.82	0.98	0.0060
250	28	20	-3.1	24.9	49.4	**49.4**	0.0036	1.00	0.86	0.98	0.0030
1440	24	20	-3.1	20.9	41.5	**41.5**	0.0015	1.00	0.88	0.98	0.0013



LL:	42.2	PL:	22.7	PI:	19.5

Kil (%)	Silt (%)	Kum (%)	Çakıl (%)	Moloz (%)	Sınıflandırma	
< 0.075 mm		0.075-4.75 mm	4.75-75.0 mm	> 75.0 mm	USC	CL
97		3	0	0		
< 0.002	0.002-0.075 mm	0.075-2.00 mm	2.00-60.0 mm	> 60.0 mm	TS 1500	CI
46	51	3	0	0		

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Denetçi Belge No:25563

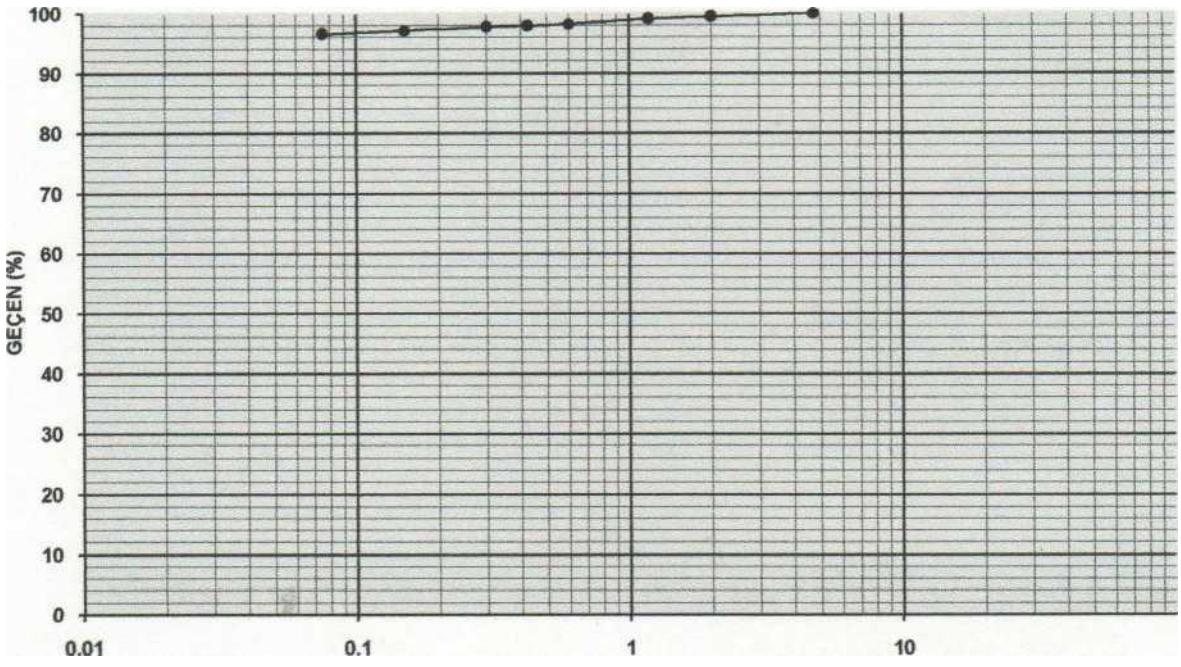
GROUND ENGINEERING GEOLOGY LTD,$Tİ,
*İgSOİL ENGINEERING i GECLOGY*CO.*LTD.*

SIEVE ANALYSIS
(TS-EN ISO 17892-4)

T.C.
MINISTRY OF ENVIRONMENT AND URBANIZATION

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
Drilling No.	**SK-4**	**Total Weight (g)**	**10S.5**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**12.00**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.6	0.6	1	**99**
1.18	0.4	1.0	1	**99**
0.600	0.9	1.9	2	**98**
0.425	0.3	2.2	2	**98**
0.300	0.2	2.4	2	**98**
0.150	0.6	3.0	3	**97**
0.075	0.6	3.6	3	**97**

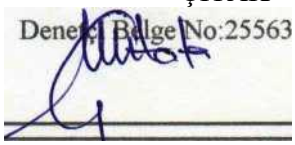


Dlo:	**Do:**	**CS**	**C.:**
LL:56.9	**PL:27.6**	**PI:29.3**	

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
< 6.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	
97	3	0	0	**USC | CH**

oZî)eyi Made by Geological Engineer Onur ŞİRİN
OVICE No: 19398•

Controlled byGeological Engineer Mustafa ÇITAK



oZî)eyi Made by Geological Engineer Onur ŞİRİN
OVICE No: 19398•

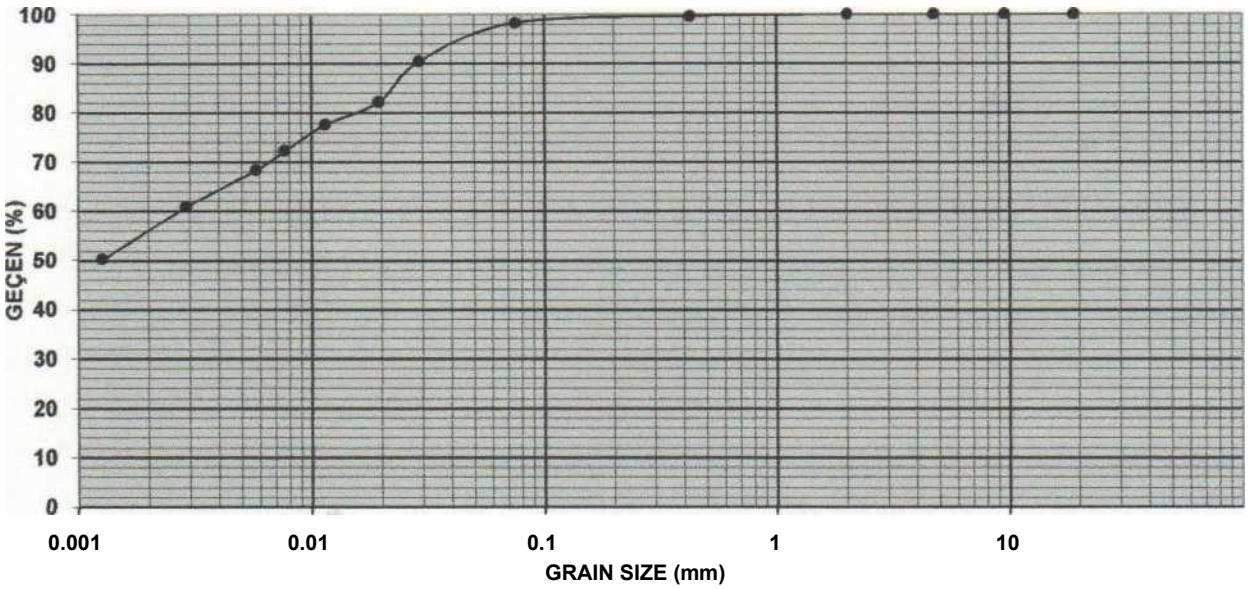
SIEVE - HYDROMETER (TS-EN ISO 17892-4)

Date: 30.03.2020

PROJECT	| ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT				
Drilling No.	SK-4	Total Weight (g)	54.6	G	2.72
Sample No.	SPT	Elimination	Wet	W (g)	50.00
Depth (m)	18.00	Method Experimenter	H.Onur SIRIN		0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0		100
9.5	0.0	0.0		100
4.75	0.0	0.0		100
2.00	0.0	0.0		100
0.425	0.2	0.2		100
0.075	0.7	0.9		98

						Pi	was	=h=1.00	that		
	49	20	-3.1	45.9	90.5	**90.5**	0.0400		0.74	0.98	0.0290
	45	19.5	-3.3	41.7	82.2	**82.2**	0.0260	1.00	0.76	0.98	0.0194
15	42.5	20	-3.1	39.4	77.7	**77.7**	0.0150	1.00	0.77	0.98	0.0114
30	40	19.5	-3.3	36.7	72.3	**72.3**	0.0100	1.00	0.78	0.98	0.0076
60	38	19.5	-3.3	34.7	68.4	**68.4**	0.0074	1.00	0.79	0.98	0.0057
250	34	20	-3.1	30.9	60.9	**60.9**	0.0036	1.00	0.82	0.98	0.0029
1440	29	19	-3.5	25.5	50.3	**50.3**	0.0015	1.01	0.85	0.98	0 0013



LL: 69.7 **PL: 30.3** **PI:39.4**

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	[Class] resemblance
<0.075mm 98		0.075-4.75mm	4.75-75.0mm	> 75.0mm **0**	usc **CH**
<0.002 57	I 0.002-0.075 mm 41	0.075-2.00mm	2.00-60.0 ram	> 60.0mm	**TS 1500 CH**

The person who made the turn is Geological Engineer Onur SIRIN (kkbRegistration Number: 19398

Controlled byGeological Engineer Mustafa CITAK Reg.No:25563

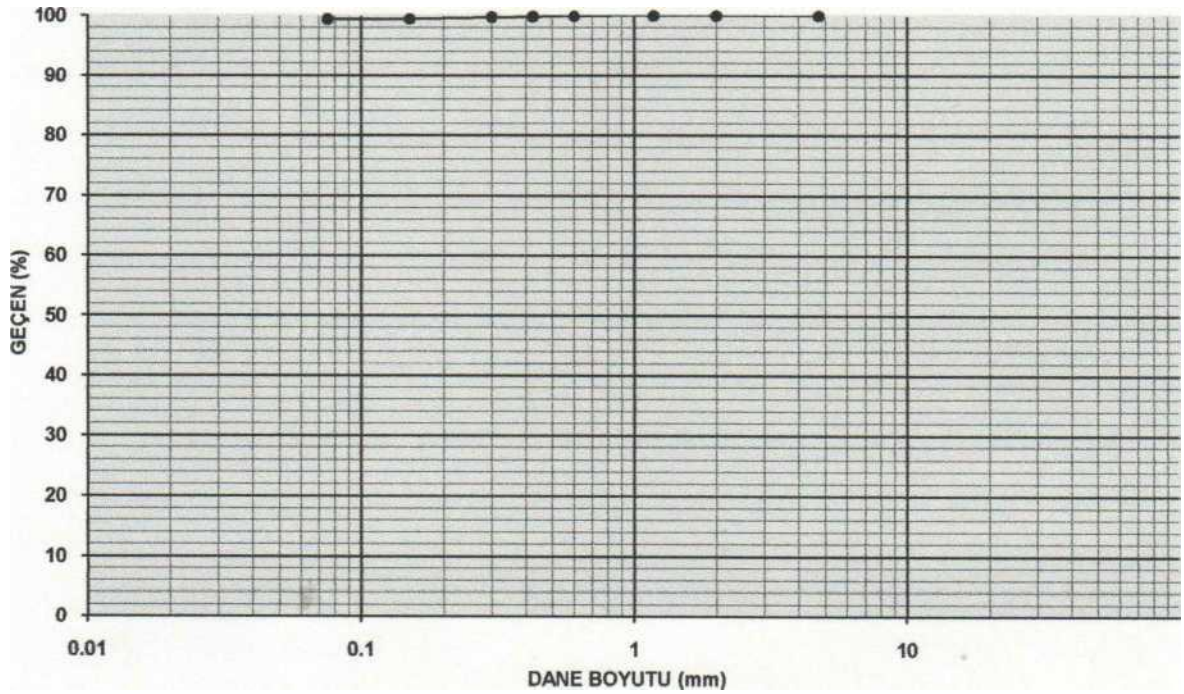
GROUND ENGINEERING GEOLOGY LTD.CO.
PROVINCIAL ENGINEERING t GEOLOGY CO. LTD.

SIEVE ANALYSIS (TS EN ISO 17892-4)

TR.
MINISTRY OF ENVIRONMENT AND URBANIZATION

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-4	Total Weight (g)	913
Sample No.	SPT	Elimination Method	Wet
Depth (m)	22.50	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	00	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
1.18	0.0	0.0	0	**100**
0.600	0.1	0.1	0	**100**
0.425	0.1	0.2	0	**100**
0.300	0.1	0.3	0	**100**
0.150	0.2	0.5	1	**99**
0.075	0.1	0.6	1	**99**



Div **Pja •** **Pfi«** **Cu:**

LL: 73.7 **PL: 31.4** **PI:42.3**

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc
99				**CH**

PROVINCE

Performed by: Geological Engineer Onur ŞİRİN
Registration Number: 19398'

Control Officer: Geological Engineer Mustafa ÇITAK, Inspector No: 25563

Performed by: Geological Engineer Onur ŞÎRÎN
Registration Number: 19398'



ZEMİN MÜHENDİSLİK JEOLOJİ LTD.STİ.
SOIL ENGINEERING & GEOLOGY CO. LTD.

ELEK - HİDROMETRE

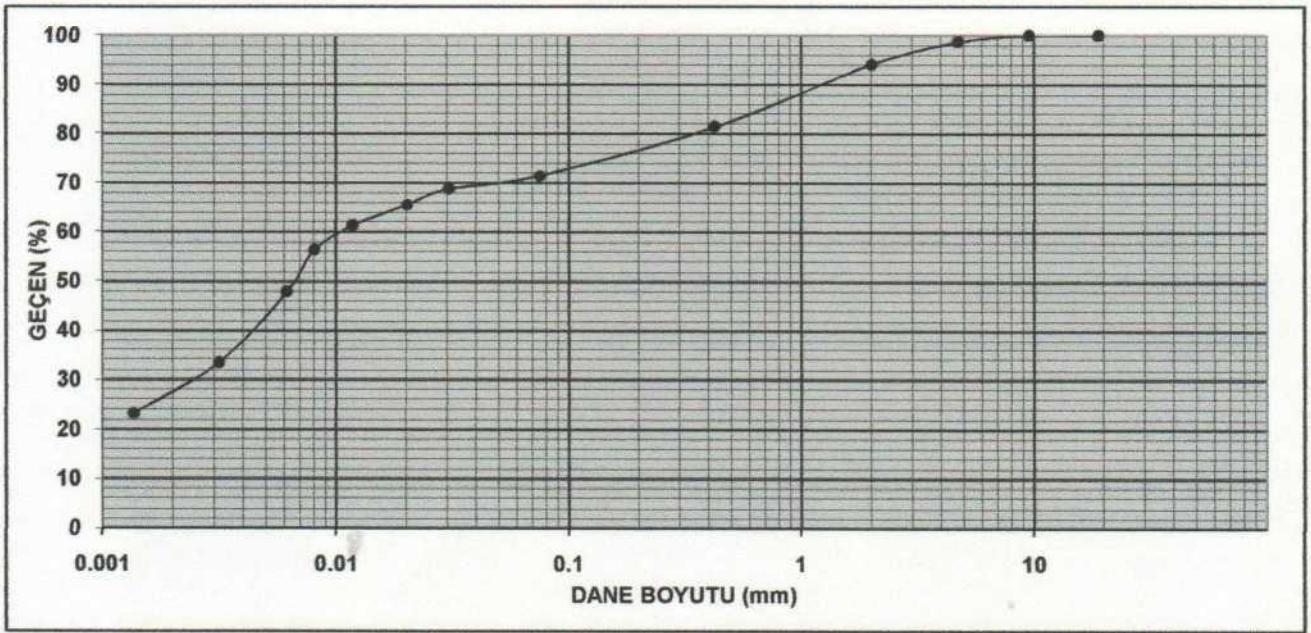
(TS-EN ISO 17892-4)

T.C. ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI

PROJE	ANTALYA KONYAALTI HURMA ATIKSU ARITMA TESİSİ ÇAMUR YAKMA ÜNİTESİ			Tarih :	30.03.2020
Sondaj no	SK-4	Toplam Ağırlık (g)	155.6	G_s	2.69
Numune no	SPT	Eleme Yöntemi	Islak	W (g)	50.00
Derinlik (m)	28.50	Deneyi Yapan	H.Onur ŞİRİN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	2.0	2.0	1	**99**
2.00	7.2	9.2	6	**94**
0.425	19.7	28.9	19	**81**
0.075	15.4	44.3	28	**72**

t	r	s	M	R	P		was	k.	K	kg	d
2	40	20	-3.1	36.9	73.2	**68.8**	0.0400	1.00	0.78	0.98	0.0306
5	38.5	19.5	-3.3	35.2	69.8	**65.7**	0.0260	1.00	0.79	0.98	0.0201
15	36	20	-3.1	32.9	65.2	**61.4**	0.0150	1.00	0.80	0.98	0.0118
30	33.5	19.5	-3.3	30.2	59.9	**56.3**	0.0100	1.00	0.82	0.98	0.0080
60	29	19.5	-3.3	25.7	51.0	**48.0**	0.0074	1.00	0.85	0.98	0.0062
250	21	20	-3.1	17.9	35.5	**33.4**	0.0036	1.00	0.89	0.98	0.0031
1440	16	19	-3.5	12.5	24.8	**23.3**	0.0015	1.01	0.92	0.98	0.0014



LL:	40.9	PL:	22.1	PI:	18.8

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CL**
72		27	1	**0**		
< 0.002	0.002-0.075mm	0.075-2.00 ram	2.00-60.0mm	> 60.0mm	**TS 1500**	**CI**
28	44	22	6	**0**		

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Denetçi Belge No:25563

ZEMENGINEERING GEOLOGY LTD.CO.j
ISOIL ENGINEERING & GEOLOGY CO. LTD.

SIEVE - HYDROMETER (TS-EN ISO 17892-4)

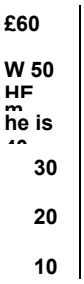
TR
MINISTRY OF ENVIRONMENT AND URBANIZATION

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-5	Total Weight (g)	162.7	Gs	2.68
Sample No.	Ud	Elimination Method	Wet	W (g)	50.00
Depth (m)	1.50	Experimenter	H.Onur SIRIN		0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	3.4	3.4	2	**98**
4.75	3.5	6.9	4	**96**
2.00	9.0	15.9	10	**90**
0.425	29.4	45.3	**28**	**72**
0.075	30.2	75.5	46	**54**

t	r	s	M	R	P	Pi	was	k»	k>	■*>	d
2	34	20	-3.1	30.9	61.4	**55.4**	0.0400	1.00	0.82	0.98	0.0321
5	31	19.5	-3.3	27.7	55.1	**49.7**	0.0260	1.00	0.83	0.98	0.0211
15	28.5	20	-3.1	25.4	50.5	**45.6**	0.0150	1.00	0.85	0.98	0.0125
30	26	19.5	-3.3	22.7	45.1	**40.7**	0.0100	1.00	0.87	0.98	0.0085
60	24.5	19.5	-3.3	21.2	42.2	**38.0**	0.0074	1.00	0.87	0.98	0.0063
250	21	20	-3.1	17.9	35.6	**32.1**	0.0036	1.00	0.89	0.98	0.0031
1440	13	19	-3.5	9.5	18.9	**17.0**	0.0015	1.01	0.93	0.98	0.0014

100



29.1 **19.7**

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
0 <0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	[1] usc CL
f=0.00 54	**0.01**	42 **0.11**	4	**0**	
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	TS 1500 CL
23	31	36	10	**0**	

GRAIN SIZE (mm)

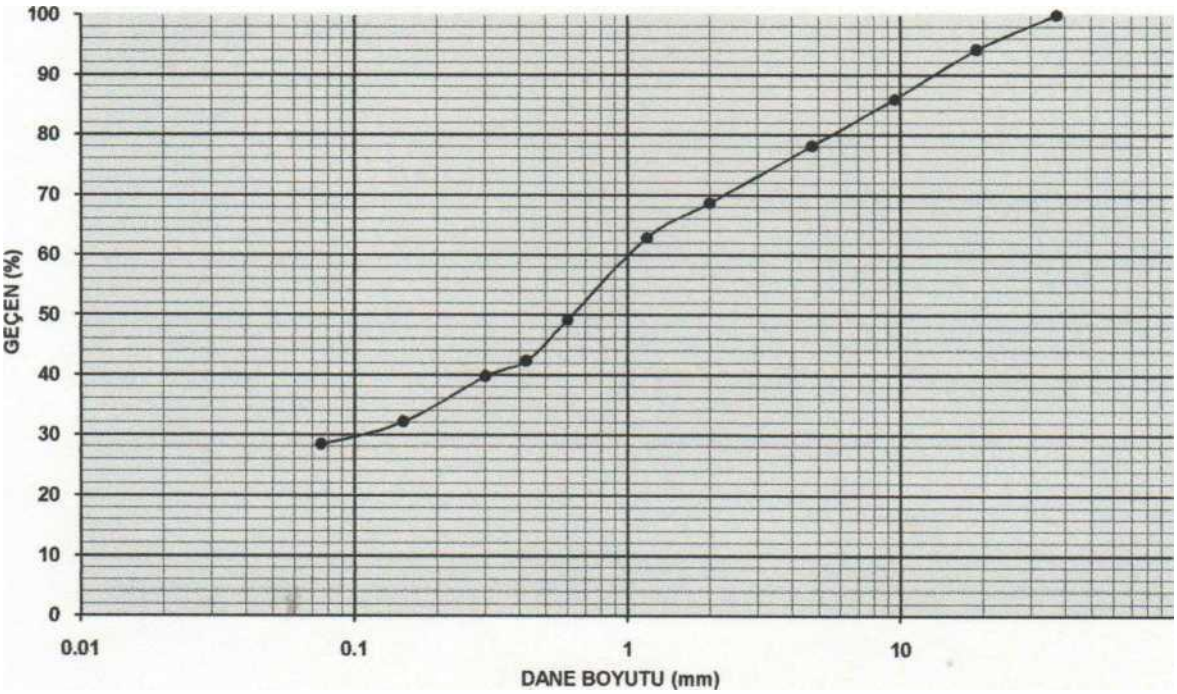
Experimenter Geological Engineer Onur ŞİRİN Hotel Number: 19398

Controlled by: Geological Engineer Mustafa ÇITAK Dem ÜGAN No:255

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-S	Total Weight (g)	397.7
Sample No.	GROUND ENGINEERING GEOLOGY LTD.CO.	Elimination Method	Wet
Depth (m)	SOIL ENGINEERING GEOLOGY CO.LTD.	Report Date	30.03.2020

SIEVE ANALYSIS (TS EN ISO 17892-4)

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	23.1	23.1	6	**94**
9.5	32.7	55.8	14	**86**
4.75	30.8	86.6	22	**78**
2.00	37.8	124.4	31	**69**
1.18	23.0	147.4	37	**63**
0.600	54.6	202.0	51	**49**
0.425	27.1	229.1	58	**42**
0.300	10.3	239.4	60	**40**
0.150	30.5	269.9	68	**32**
0.075	14.8	284.7	72	**28**



P18: P30 C„:

LL: 27.9 **PL:** 20.1 **PI:** 7.8

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	s.c.
28	50	22	__ 0____		

leyi Made by Geological Engineer H.Onur ŞİRİN »-Registration

Controlled byGeological Engineer Mustafa ÇITAK Denetoi Belge No:2556

f2 £ SOIL ENGINEERINGDİSLİK GEOLOGY LTD.CO.
kM ffSOİL ENGINEERING & GEOLOGY CO. LTD.

SIEVE - HYDROMETER

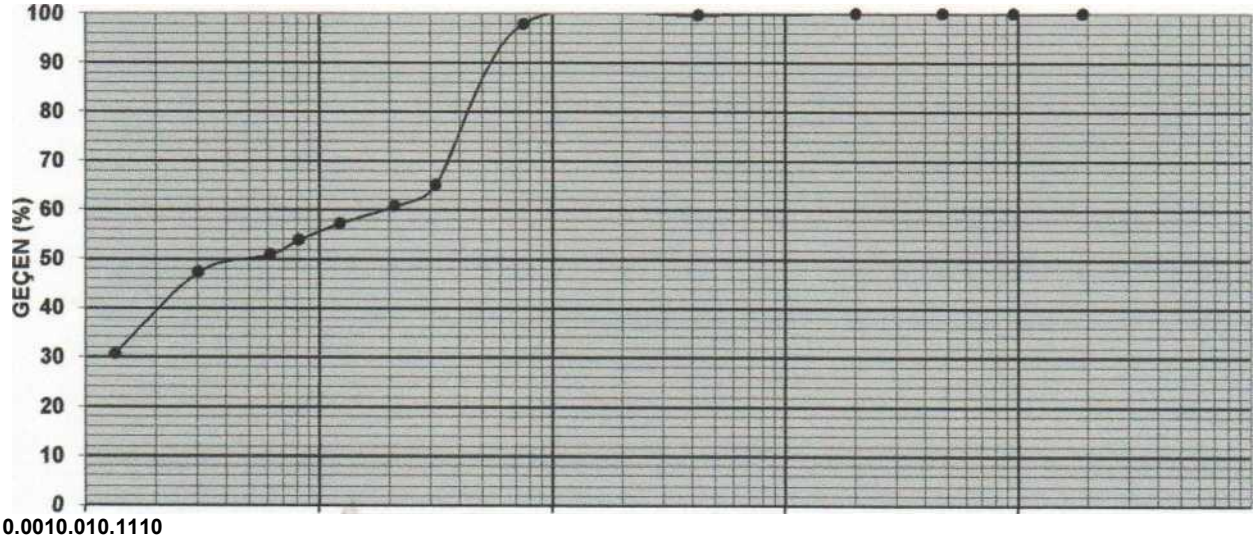
(TS-EN ISO 17892-4)

ENVIRONMENT AND CITYMINISTERIAL

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Date: 30.03.2020	
Drilling No.	SK-5	Total Weight (g)	122.3	Gs	2.69
Sample No.	ID	Elimination Method	Wet	W (g)	50.00
Depth (m)	9.00	Experimenter	H.Onur SIRIN	a	0.99

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	**0**	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
0.425	0.4	0.4	0	**100**
0.075	2.2	2.6	2	**98**

t	r	s	M	R	P	Pi	was		K		d
2	36	20	-3.1	32.9	65.2	**65.2**	0.0400	1.00	0.80	0.98	0.0314
5	34	19.5	-3.3	30.7	60.8	**60.8**	0.0260	1.00	0.82	0.98	0.0209
15	32	20	-3.1	28.9	57.3	**57.3**	0.0150	1.00	0.83	0.98	0.0122
30	30.5	19.5	-3.3	27.2	53.9	**53.9**	0.0100	1.00	0.83	0.98	0.0081
60	29	19.5	-3.3	25.7	50.9	**50.9**	0.0074	1.00	0.85	0.98	0.0062
250	27	20	-3.1	23.9	47.4	**47.4**	0.0036	1.00	0.86	0.98	0.0030
1440	19	19	-3.5	15.5	30.7	**30.7**	0.0015	1.01	0.90	0.98	0.0013



LL: 42.1: PL: 23.7' PI: 18.4

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	**usc**	**CL**
98		2	0	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CI**
40	58	2	0	**0**		

:What is done by Geological Engineer H.Onur ŞİRİNControlled by Geological Engineer Mustafa ÇITAK
ba-REGISTRATION NUMBER: 19398DetıeJ^HieLc No:25563

ZEMİN MÜHENDİSLİK JEOLOJİ LTD.ŞTİ.
SOIL ENGINEERING & GEOLOGY CO. LTD.

ELEK - HİDROMETRE

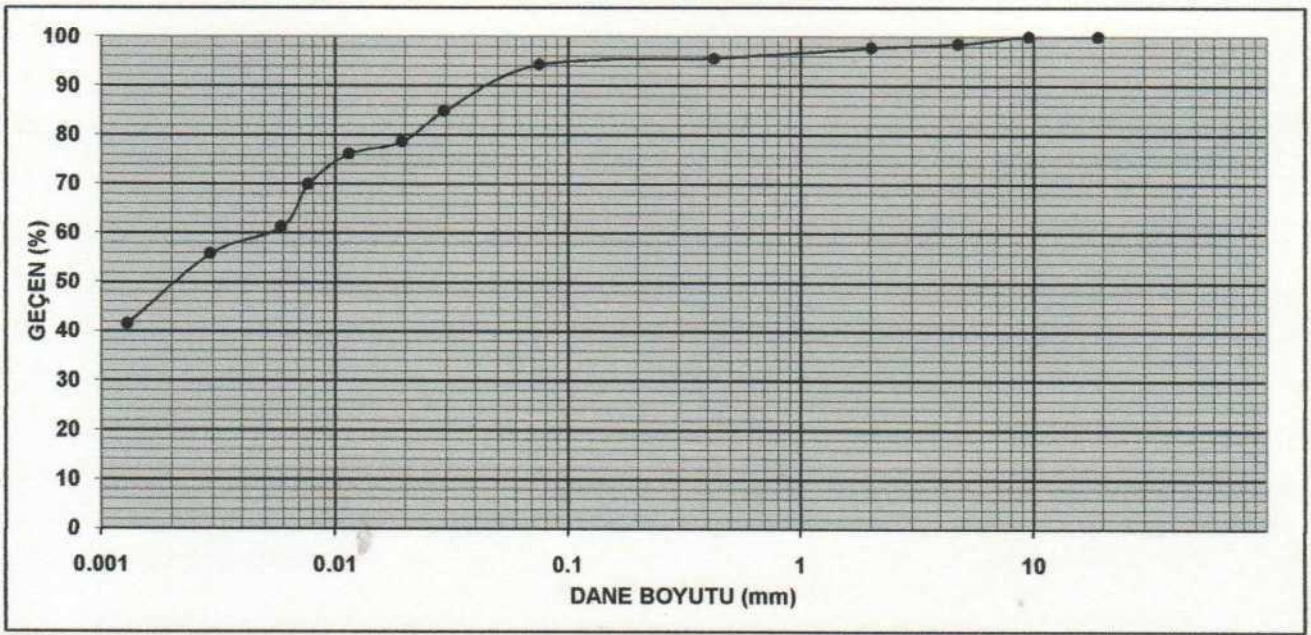
(TS-EN ISO 17892-4)

T.C. ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			**Date: 30.03.2020**	
Drilling No.	**SK-5**	**Total Weight (g)**	**110.0**	**G,**	**2.70**
Sample No.	**SPT**	**Elimination Method**	**Wet**	**w (g)**	**50.00**
Depth (m)	**1X50**	**Experimenter**	**H.Onur SIRIN**	**a**	**0.99**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	1.6	1.6	1	**99**
2.00	0.9	2.5	2	**98**
0.425	2.3	4.8	4	**96**
0.075	L5	6.3	6	**94**

t	r	s	M	R	P	Pi	was	k„	K	•Q:	d
2	47	20	-3.1	43.9	86.8	**84.8**	0.0400	1.00	0.75	0.98	0.0294
5	44	19.5	-3.3	40.7	80.5	**78.6**	0.0260	1.00	0.76	0.98	0.0194
15	42.5	20	-3.1	39.4	77.9	**76.1**	0.0150	1.00	0.77	0.98	0.0114
30	39.5	19.5	-3.3	36.2	71.6	**69.9**	0.0100	1.00	0.78	0.98	0.0076
60	35	19.5	-3.3	31.7	62.7	**61.3**	0.0074	1.00	0.81	0.98	0.0059
250	32	20	-3.1	28.9	57.1	**55.8**	0.0036	1.00	0.83	0.98	0.0029
1440	25	19	-3.5	21.5	42.5	**41.5**	0.0015	1.01	0.87	0.98	0.0013



LL:	58.3	PL:	27.6	PI:	30.7

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	CH
94		5	1	0		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	TS 1500	CH
50	44	4	2	0		

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Denetim Belge No:25563

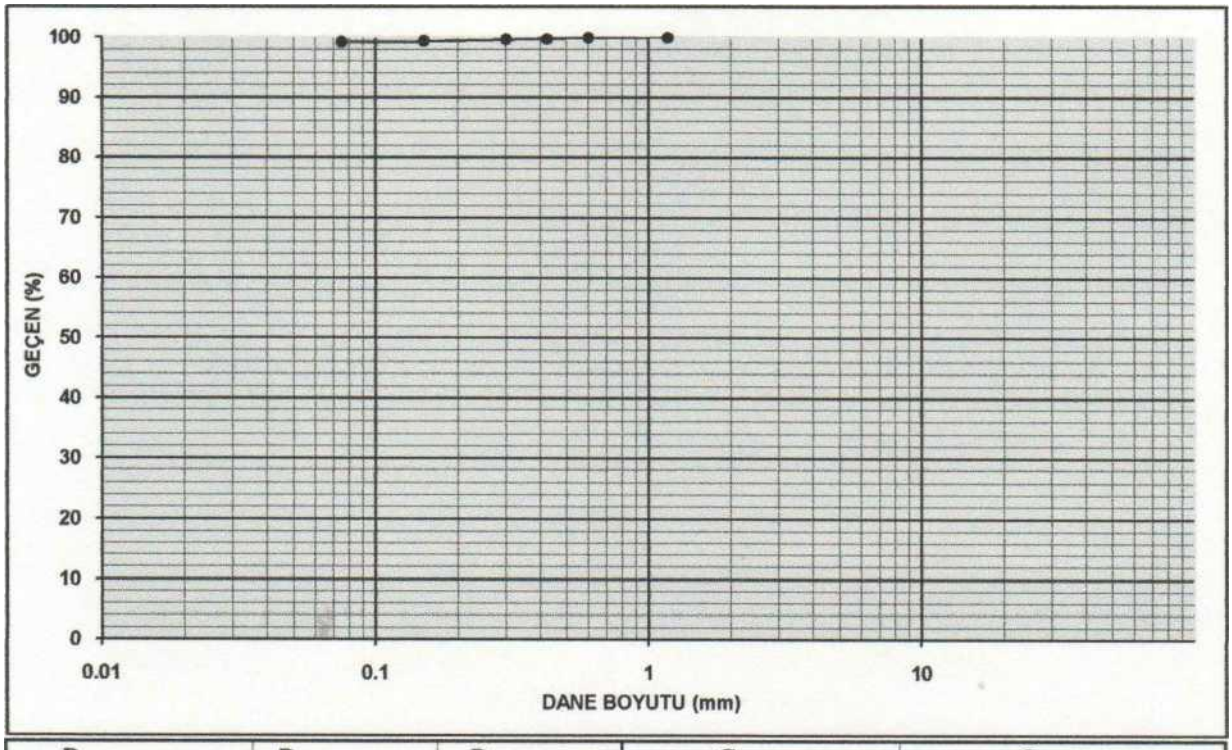
GROUND ENGINEERING GEOLOGY LTD.CO.
VM ffSOIL ENGINEERING i GEOLOGYCO.LTD.

SIEVE ANALYSIS
(TS-EN ISO 17892-4)

T.C. MINISTRY OF ENVIRONMENT AND URBANIZATION

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE**		
Drilling No.	**SK-5**	**Total Weight (g)**	**72.6**
Sample No.	**SPT**	**Elimination Method**	**Wet**
Depth (m)	**18.00**	**Report Date**	**30.03.2020**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	0.0	0.0	0	**100**
4.75	0.0	0.0	0	**100**
2.00	0.0	0.0	0	**100**
1.18	0.0	0.0	0	**100**
0.600	0.1	0.1	0	**100**
0.425	0.1	0.2	0	**100**
0.300	0.1	0.3	0	**100**
0.150	**0.2**	0.5	1	**99**
0.075	0.1	0.6	1	**99**



D_{10}:	D_{30}:	D_{60}:	C_u:	C_z:

LL:64.6	PL:29.5	i	P: 35.1	/

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	**USC**	**CH**
99	1	0	0		

Experimenter Geological Engineer Onur ŞİRİN KMA Registration Number: 19398■

Controlled by Geological Engineer Mustafa ÇITAK

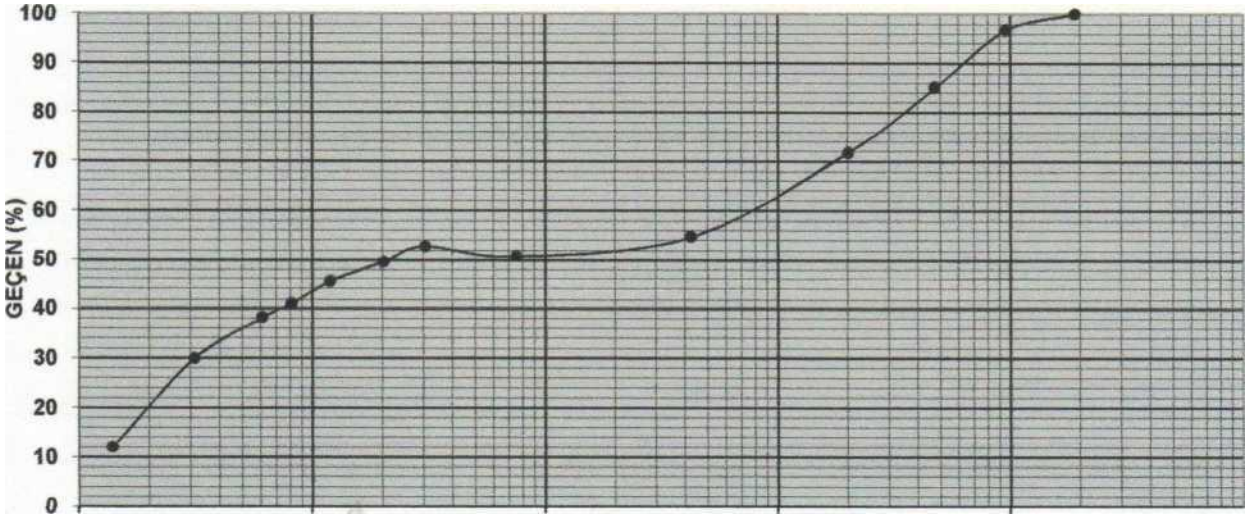
Denetçi Belge No:25563

SIEVE - HYDROMETER

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			**Date: 30.03.2020**	
Drilling No.	**SK-5**	**Total Weight (g)**	**145.9**	**Gs**	**2.68**
Sample No.	**SPT**	**Elimination Method**	**Wet**	**W (g)**	**50.00**
Depth (m)	**21.00**	**Experimenter**	**H.Onur SIRIN**	**a**	**0.99**

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
19	0.0	0.0	0	**100**
9.5	4.9	4.9	3	**97**
4.75	16.8	21.7	15	**85**
2.00	19.4	41.1	28	**72**
0.425	24.9	66.0	45	**55**
0.075		71.9	49	**51**

t	r	s	M	R	P	ₚ	was	k»	K	ke	d
2	40	20	-3.1	36.9	73.4	**52.7**	0.0400	1.00	0.78	0.98	0.0306
5	38	19.5	-3.3	34.7	69.0	**49.6**	0.0260	1.00	0.79	0.98	0.0201
15	35	20	-3.1	31.9	63.4	**45.6**	0.0150	1.00	0.81	0.98	0.0119
30	32	19.5	-3.3	28.7	57.1	**41.0**	0.0100	1.00	0.83	0.98	0.0081
60	30	19.5	-3.3	26.7	53.1	**38.1**	0.0074	1.00	0.84	0.98	0.0061
250	24	20	-3.1	20.9	41.6	**29.9**	0.0036	1.00	0.88	0.98	0.0031
1440	12	19	-3.5	8.5	16.9	**12.1**	0.0015	1.01	0.94	0.98	0.0014



LL: 38.5PL: 22.3; PI: 16.2

Hair (%)	Mattress (%)	Sand (%)	Gravel (%)	Debris (%)	Classification	
<0.0 75mm		0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc	**CL**
51		34	15	**0**		
<0.002	0.002-0.075mm	0.075-2.00mm	2.00-60.0mm	> 60.0mm	**TS 1500**	**CI**
20	31	21	28	**0**		

Prepared by Geological Engineer H.Onur ŞİRİN Control Engineer Geological Engineer Mustafa ÇITAK

OAa-Registration Number: 19398I)enetçİfteklebt>:25563

(z GROUND ENGINEERING GEOLOGY LTD.CO.
jğSOİL ENGINEERING i GEOLOGYCO. LTD.

SIEVE ANALYSIS

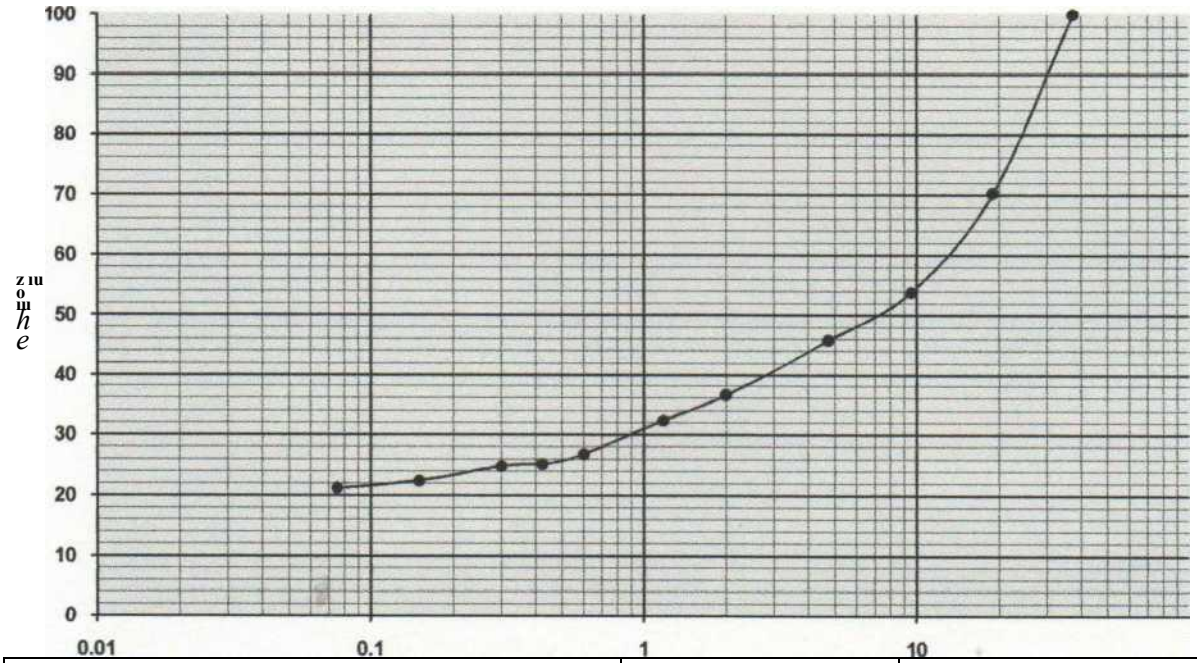
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TR MINISTRY OF ENVIRONMENT AND

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-5	Total Weight (g)	314.9
Sample No.	SPT	Elimination Method	Wet
Depth (m)	27.00	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	93.5	93.5	30	**70**
9.5	51.8	145.3	46	**54**
4.75	25.2	170.5	54	**46**
2.00	29.1	199.6	63	**37**
1.18	13.4	213.0	68	**32**
0.600	17.3	230.3	73	**27**
0.425	5.0	235.3	75	**25**
0.300	1.2	236.5	75	**25**
0.150	7.5	244.0	77	**23**
0.075	4.0	248.0	79	**21**

GRAIN SIZE (mm)



Dt#:	DM:	I»6o:	Cu:	C:
LL:32.8		**PL:20.7**	**PI:12.1**	4

Clay-Silt (%)	Sand (%)	Gravel (%)	Debris (%)	Classification
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	usc **GC**
21	25	54	0	

Made by Geological Engineer H.Onur ŞİRİN
Volume No: 19398'

Control Engineer. Geological Engineer. Mustafa ÇITAK Try

Belge No:

(zaL kM ₁GROUND ENGINEERING GEOLOGY LTD,$Tİ, &SOIL ENGINEERING4GEOLOGYCO.LTD.

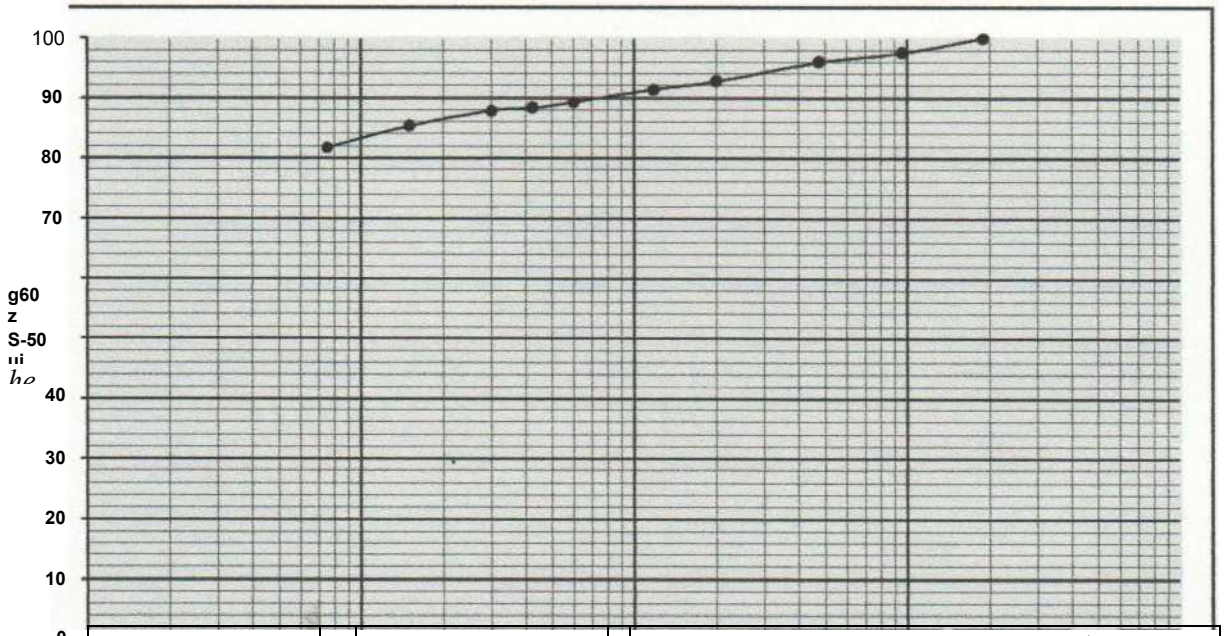
(TS-EN ISO 17892-4)

TR
ENVIRONMENT AND URBANIZATION MINISTRY

55/88 No:0028

PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		
Drilling No.	SK-5	Total Weight (g)	145.4
Sample No.	SPT	Elimination Method	Wet
Depth (m)	34.50	Report Date	30.03.2020

Sieve Opening (mm)	Remaining Weight (g)	Total Remaining Weight (g)	Remainder (%)	Last (%)
75	0.0	0.0	0	**100**
37.5	0.0	0.0	0	**100**
19.0	0.0	0.0	0	**100**
9.5	3.6	3.6	2	**98**
4.75	2.2	5.8	4	**96**
2.00	4.6	10.4	7	**93**
1.18	2.0	12.4	9	**91**
0.600	3.1	15.5	11	**89**
0.425	1.4	16.9	12	**88**
0.300	0.7	17.6	12	**88**
0.150	3.7	21.3	15	**85**
0.075	5.2	26.5	18	**82**



Outside: »M : Cu: C:

LL:55.4	PL:26.8	PI:28.6	
Clay-Silt (%)	Sand (%)	Gravel (%)	Debris. (%)	Class! Reminiscence
<0.075mm	0.075-4.75mm	4.75-75.0mm	> 75.0mm	USCCH
82	14	4	0	

leyi Made by Geological Engineer H.Onur ŞİRİN Controlled by Geological Engineer
rRegister Number: 19398• Mustafa ÇITAK Register Number:25563

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TRIAXIAL CELL SPLITTING EXPERIMENT (UU)

(1900-2)

Document number: 28

ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT

PROJECT

DEFINITION OF EXAMPLE **SANDY SILTY CLAY**

DRILLING NO	**SK-1**	**PAGE NUMBER**	**56/88**		
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,683**		
DEPTH (m)	**4.S0**	**TEST SPEED (mm/min)**	**0.76**		
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**		
SAMPLE NO			**1**	**2**	
SAMPLE DIAMETER, (cm)			**3.79**	**3.79**	
SAMPLE AREA, (cm2)			**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)			**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)			**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)			**50**	**100**	
AGE SAMPLE WEIGHT, (g)			**170.30**	**170.47**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)			**163.85**	**164.02**	
DRY SAMPLE WEIGHT, (g)			**129.74**	**129.86**	
WATER WEIGHT, (g)			**34.11**	**34.16**	
WATER CONTENT, (%)			**26.29**	**2631**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)			**19.38**	**19.40**	
DRY UNIT WEIGHT, (kN/m3)			**1535**	**1536**	
DIE VOLUME, (cm3)			**50.26**	**5030**	
CAVITY VOLUME, (cm 3)			**35.93**	**35.89**	
POROSITY, (%)			**41.69**	**41.64**	
VACUUM RATE			**0.715**	**0.713**	
DEGREE OF SATURATION, (•/,)			**99**	**99**	
UNIT SHORTENING IN BREAKING, (%)			**11.13**	**10.47**	
UNDRAINED MODULUS OF ELASTICITY, (MPa)			**4.2**	**4.9**	

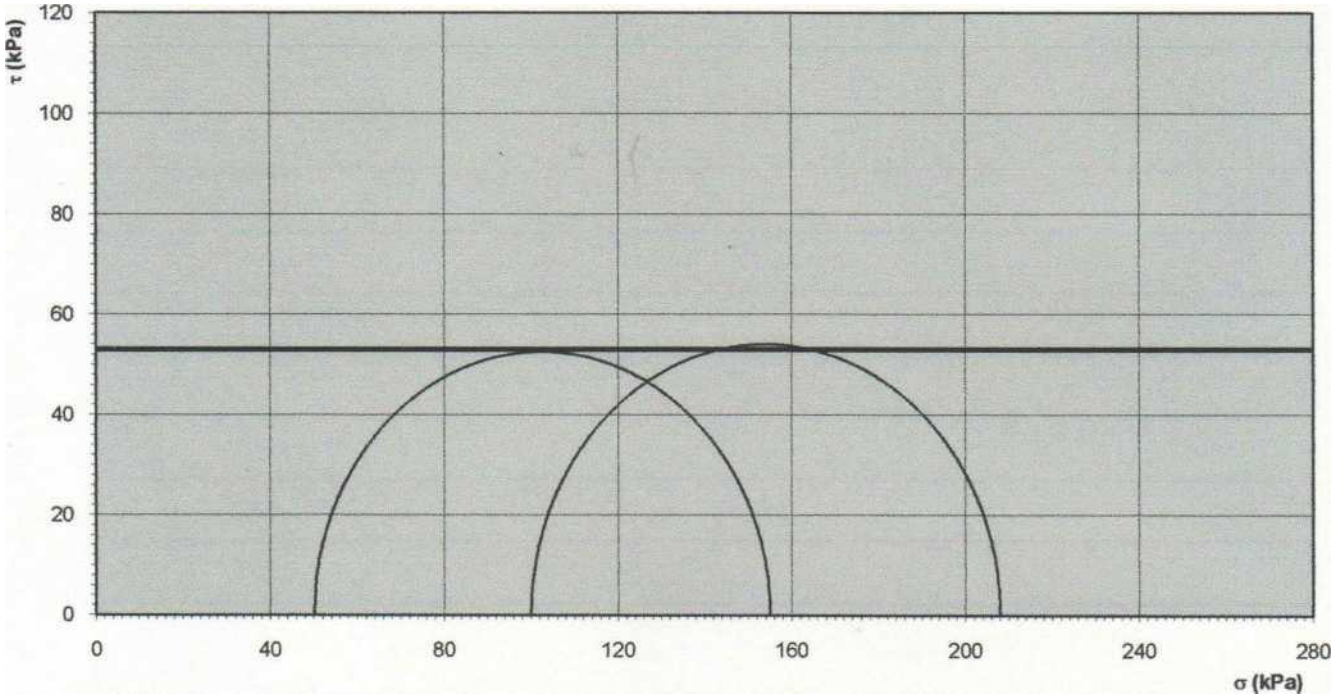
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H.Onur ŞİRN »internal No: 19398

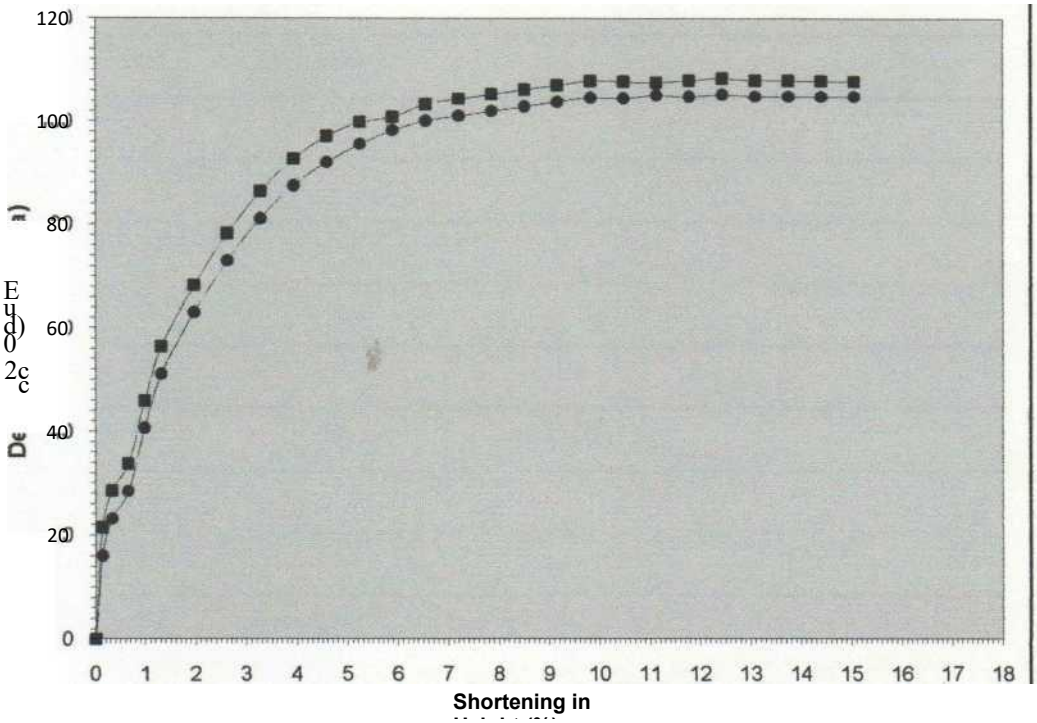
Checked by:
Geological Engineer Mustafa ÇITAK
getyo:25563

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FLYAXIAL CELL CUTTING TEST (UU)
(1900-2)

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●	<*3	50
■	o3=	100

1		50
	<*1	155
2	a3	100
	Oi	208

CONCL	
c (kPa)	53
<j>	0

Document number: 28

PROJECT: FALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT	**Page No: 57/88**
Well number: SK-1 Sample number: UD Depth (m): 4.50 Date:	**30.03.2020**

ûcyi Made by: Geological Engineer H.Onur ŞİRİN
sfcilNo: 19398

Checked by: Geological Engineer Mustafa ÇITAKo: 25563

Deneyci Belge No.

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FLYAXİAL CELL CUTTING TEST (UU)

Document number: 28

HISTORY	30.03.2020	RING COEFFICIENT		0.2054	
SAMPLE NO			1	2	
SAMPLE DIAMETER, (cm)			3.8	3.79	
PROJECT	ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNIN				
DEPTH FROM (m)	EXAMPLE	SANDY SILTY CLAY	11.28	11.28	
SAMPLE HEIGHT, (cm)			7.64	7.64	
DRILLINGNO	SK-1	PAGE NUMBER		58/88	
SAMPLE VOLUME, (cm3)			86.19	86.19	
SAMPLE NO	Ud	GRAIN SPECIFIC GRAVITY		2,682	
ENVIRONMENTAL PRESSURE, (kPa)			50	100	
DEPTH (m)	7.50	TEST SPEED (mm/min)		0.70	
AGE SAMPLE WEIGHT, (g)			170.21	170.37	
END OF EXPERIMENT SAMPLE WEIGHT, (g)			162.87	163.05	
DRY SAMPLE WEIGHT, (g)			128.76	128.94	
WATER WEIGHT, (g)			34.11	34.11	
WATER CONTENT, (%)			26.49	26.45	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)			19.37	19.39	
DRY UNIT VOLUME WEIGHT, (kN/m3)			1532	1533	
GRAIN VOLUME, (cm3)			50.17	50.23	
CAVITY VOLUME, (cm 3)			36.02	35.96	
POROSITY, (%)			41.79	41.72	
VACUUM RATE			0.718	0.716	
DEGREE OF SATURATION, (%)			99	99	
UNIT SHORTENING IN BREAKING, (%)			11.13	' 10.47	
UNDRAINED MODULUS OF ELASTICITY, (MPa)			5.5	6.1	

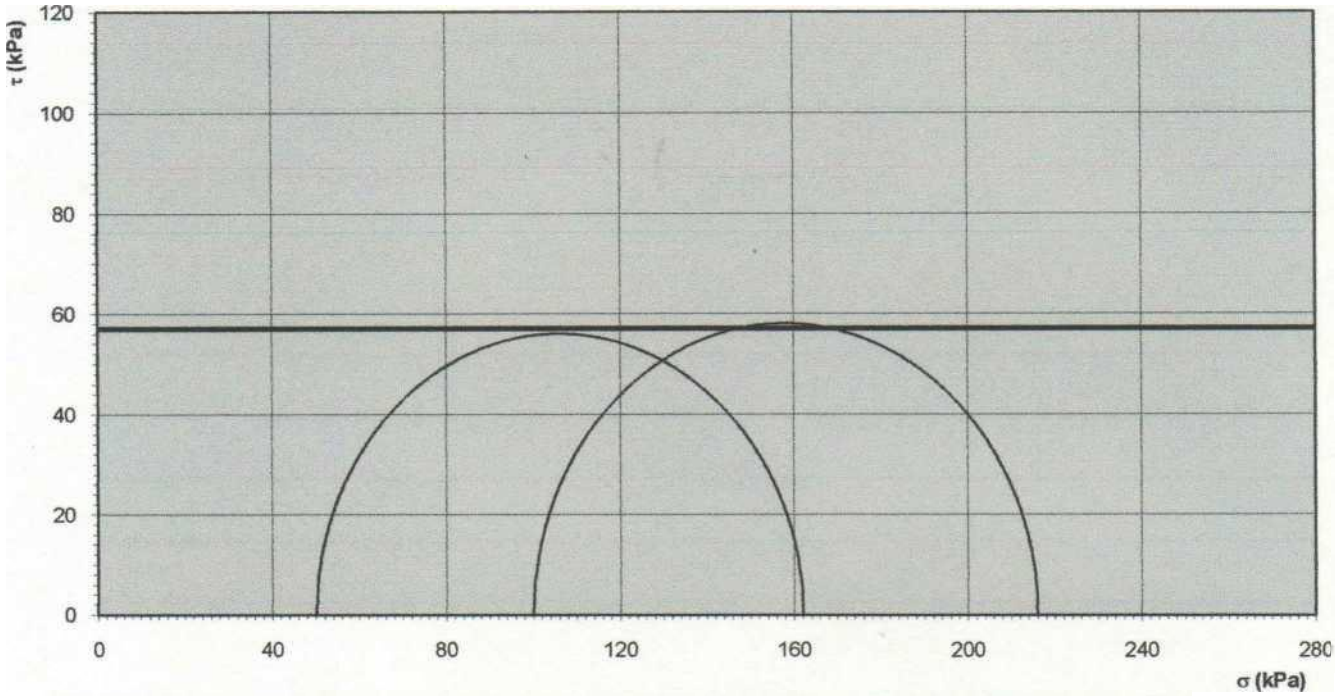
: Geological Engineer
Mustafa ÇITAK

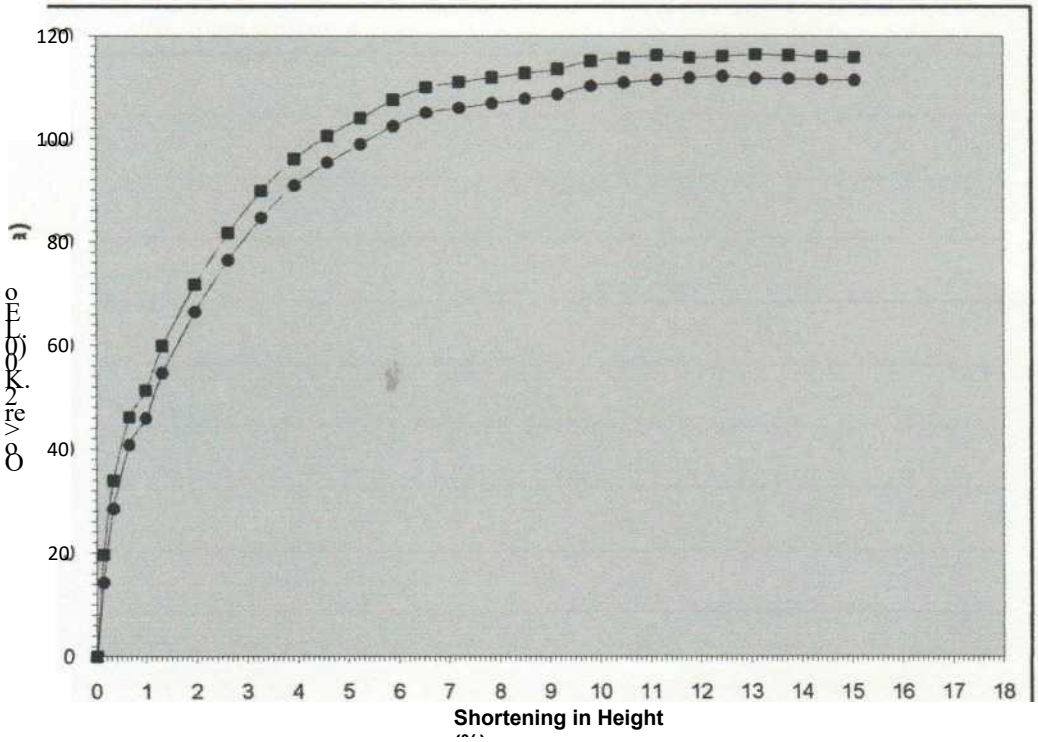
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H.Onur ŞİRN yİ No: 19398

Control Eden
Denetci Belge Note

TRIAXIAL CELL UNIT EXPERIMENT (UU)

(1900-2)





•	a3= 50
■	a3= 100

1	a3	50
	Be	162
2	o3	100
	Gl	216
		.....

CONCLUSION	
e (kPa)	57
4» (degree)	he

Document number: 28

PROJECT PAL YA KONYAALTI HURMA WASTEWATER TREATMENT PLANT : SLUDGE BURNING UNIT	**Page Number : 59/88**
Well number: SK-1Sample no:UD Depth (m):7.50Date:	**30.03.2020**

pvi Made by: Geological Engineer H.Onur ŞİRİN
Registration Number: 19398

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FLYAXİAL CELL CUTTING TEST (UU)

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Document number : 28

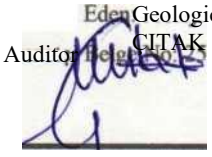
PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
DEFINITION OF EXAMPLE	**SILTY CLAY**		
DRILLING NO	**SK-1**	**PAGE NUMBER**	**60/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,696**
DEPTH (m)	**10.50**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**1138**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**150**	
AGE SAMPLE WEIGHT, (g)	**15736**	**15733**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**160.24**	**16039**	
DRY SAMPLE WEIGHT, (g)	**115.05**	**115.21**	
WATER WEIGHT, (g)	**45.19**	**45.18**	
WATER CONTENT, (%)	**39.28**	**39.22**	
NATURAL UNIT VOLUME WEIGHT, (kN/rn3)	**17.91**	**17.93**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**12.86**	**12.88**	
DIE VOLUME, (cm3)	**41.91**	**41.97**	
CAVITY VOLUME, (cm 3)	**44.28**	**44.22**	
POROSITY, (%)	**5138**	**51.30**	
VACUUM RATE	**1,057**	**1,054**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**'10.47**	
MODULUS OF ELASTICITY WITHOUT DRAINAGE, (MPa)	**3.2**	**3.9**	

Control

Made by: Geological Engineer H.Onur ŞİRN
Registry Number: 19398

Eden Geological Engineer Mustafa ÇITAK
Auditor Registration

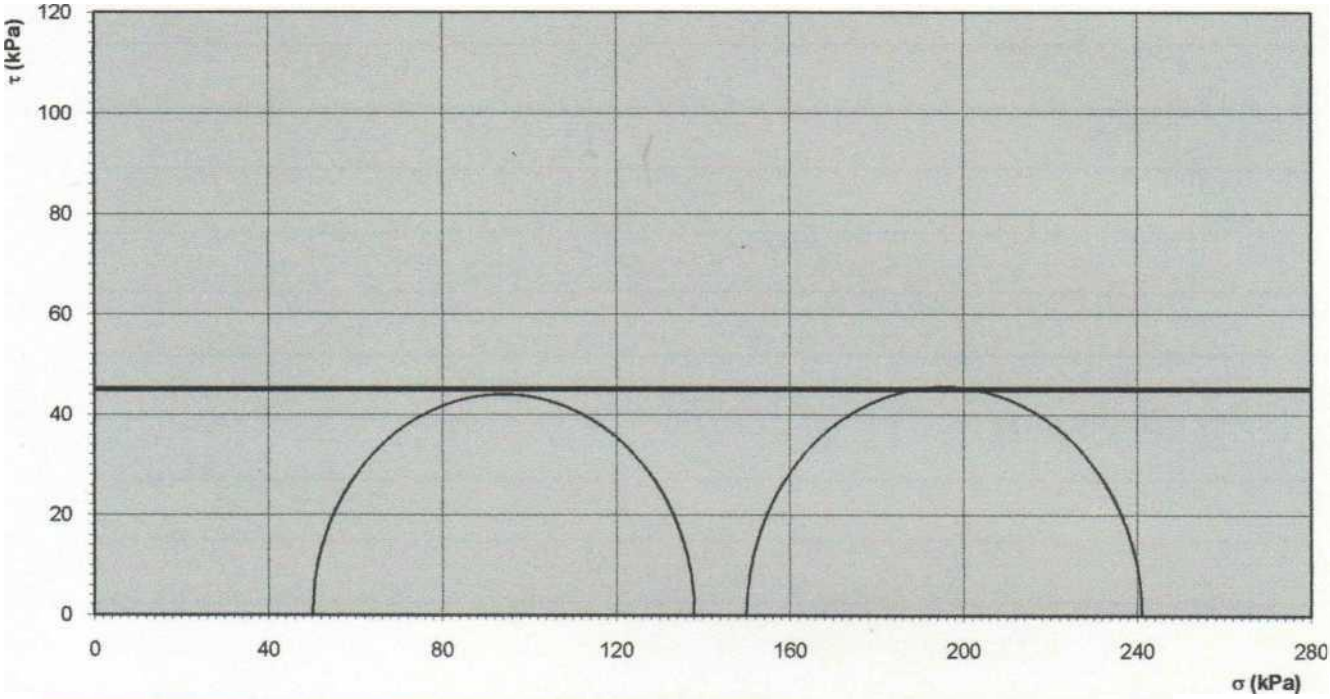


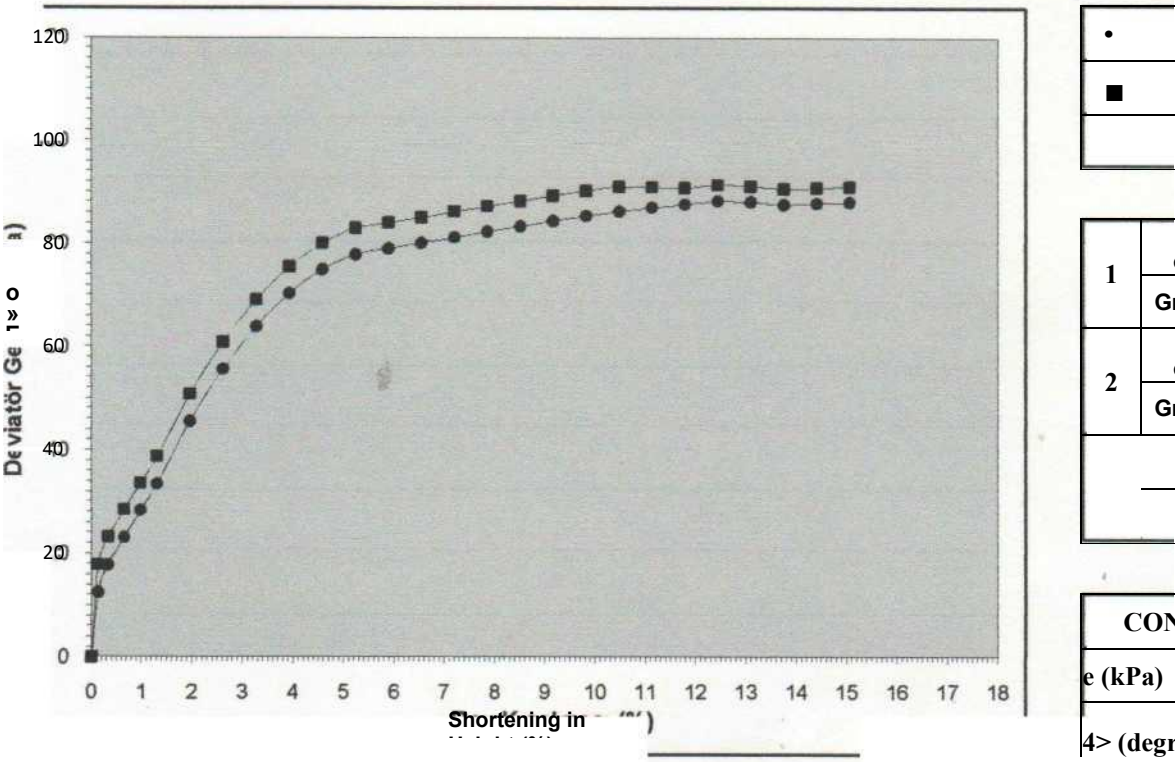
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MINISTRY

FLYAXIAL CELL CUTTING TEST (UU)

(1900-2)





•	O3=	50
■	O3=	150

1	o3	50
	Grass	138
2	o3	150
	Grass	241

CONCLUSION	
e (kPa)	45
4> (degree)	he

Kontrol Ede
Dereto

Made by: Geological Engineer H.Onur ŞİRİN
Registration Number: 19398

en: Geological Engineer Mustafa ÇITAK
: 25563

Well number: SK-1 **Sample no:UD** **Depth (m): 10.50** **Date: 30.03.2020**

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FLYAXİAL CELL CUTTING TEST (UU)

Document number: 28

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
DEFINITION OF EXAMPLE	**SANDY SILTY CLAY**		
DRILLING NO	**SK-2**	**PAGE NUMBER**	**62/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,687**
DEPTH (m)	**7.50**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm1)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**100**	
AGE SAMPLE WEIGHT, (g)	**170.63**	**170.80**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**165.75**	**165.89**	
DRY SAMPLE WEIGHT, (g)	**130.43**	**130.63**	
WATER WEIGHT, (g)	**3532**	**35.26**	
WATER CONTENT, (%)	**27.08**	**26.99**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**19.42**	**19.44**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**15.28**	**1531**	
DANEHACMI, (cm3)	**49.97**	**50.05**	
CAVITY VOLUME, (cm3)	**36.22**	**36.14**	
POROSITY, (%)	**42.02**	**41.93**	
VACUUM RATE	**0.725**	**0.722**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
UNDRAINED MODULUS OF ELASTICITY, (MPa)	**6.0**	**6.7**	

:Done by: Geological Engineer H.Onur
ŞİRN fe-Registration No. 19398

Checked by: Geological Engineer Mustafa CIT
Den Yeterlilik Belge No: 25563

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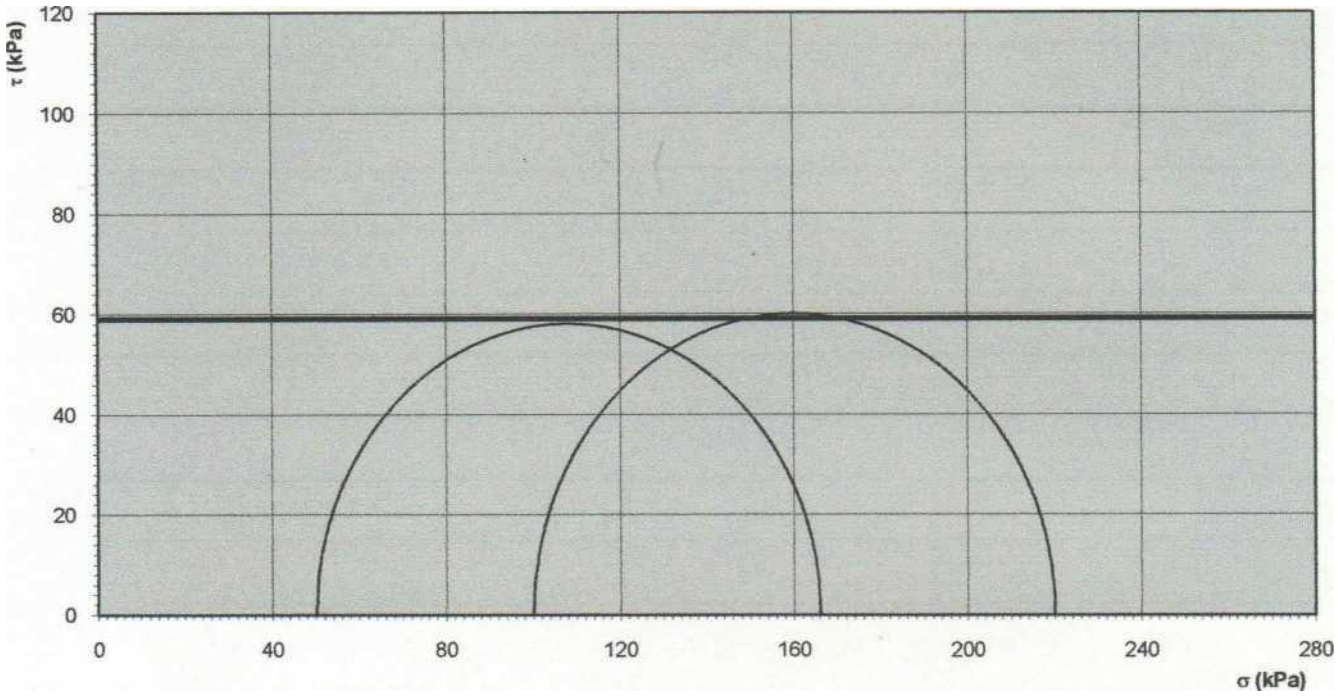
FLY AXIAL CELL CUTTING TEST (UU)
(1900-2)

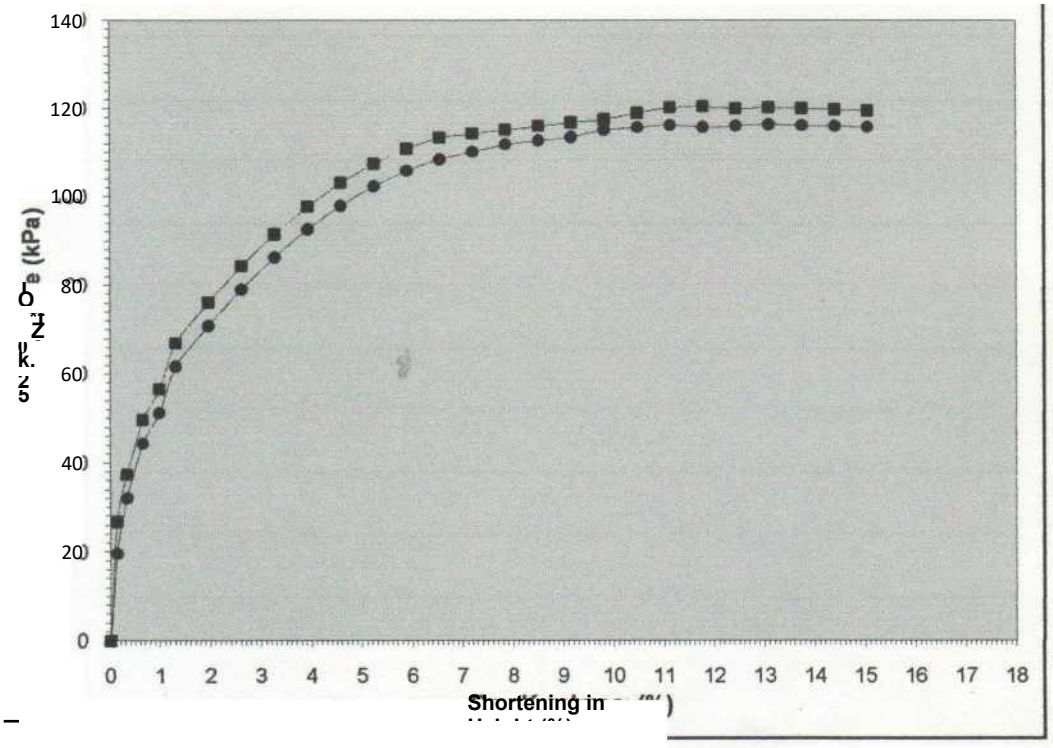
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MINISTRY

Document number: 28

PROJECT : FALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING CENTER

Well number: **SK-2** **Sample no:UD Depth (m):** **7.50** **History:** **30.03.2020**





•	CT3=	50
■	o3=	100

1	<*3	50
	Be	166
2		100
	Be	220

CONCLUSION	
c (kPa)	59
(degree)	0

Mustafa ÇITAK

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er
Dereice Engg Inc.

FLYAXİAL CELL CUTTING TEST (UU)

Document number: 28

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
DEFINITION OF EXAMPLE	**SILTY CLAY**		
DRILLINGNO	**SK-2**	**PAGE NUMBER**	**64/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,694**
DEPTH (m)	**10.50**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**150**	
AGE SAMPLE WEIGHT, (g)	**166.79**	**166.97**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**160.87**	**161.04**	
DRY SAMPLE WEIGHT, (g)	**12338**	**123.64**	
WATER WEIGHT, (g)	**37.49**	**37.40**	
WATER CONTENT, (%)	**30.39**	**30.25**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**18.98**	**19.00**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**14.56**	**14.59**	
DIE VOLUME, (cm3)	**47.48**	**47.58**	
CAVITY VOLUME, (cm 3)	**38.71**	**38.61**	
POROSITY, (%)	**44.91**	**44.79**	
VACANT RATE	**0.815**	**0.811**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
UNDRAINED MODULUS OF ELASTICITY, (MPa)	**4.7**	**5.4**	

Made by: Geological Engineer H.Onur ŞÎRN
h-Register Number: 19398

Checked by: Geological Engineer Mustafa ÇITAK

Den :25563

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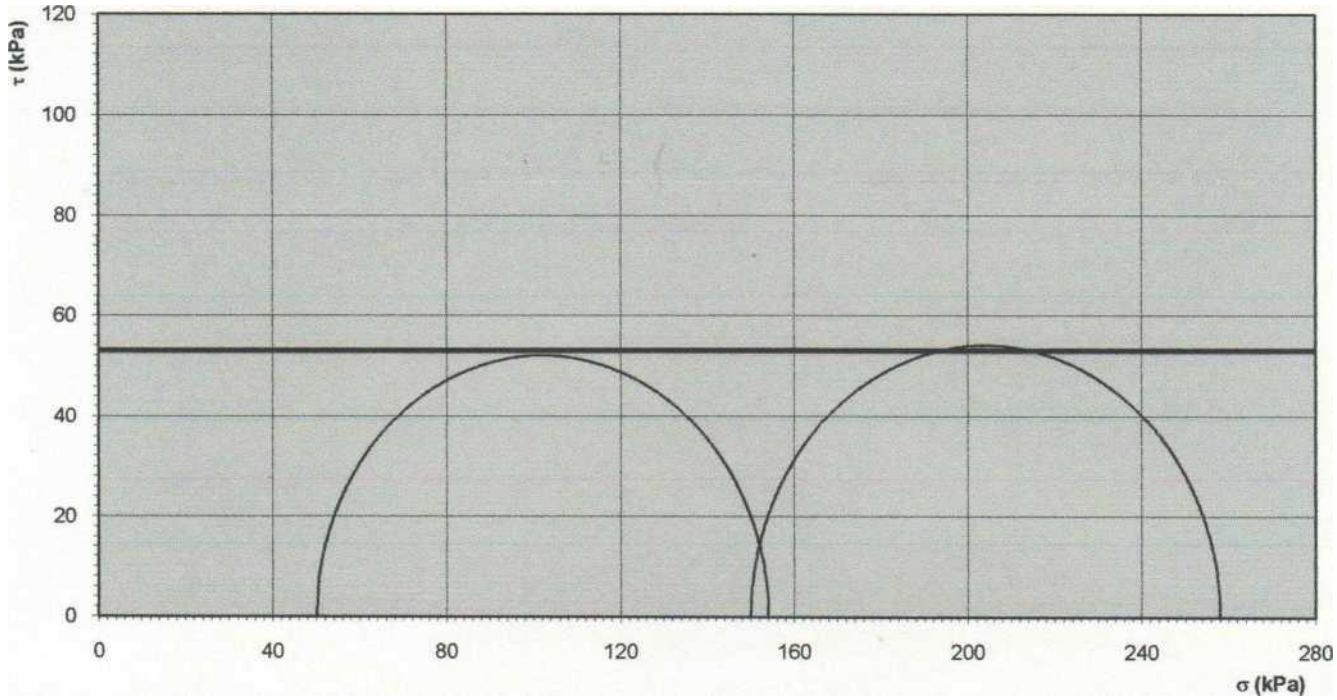
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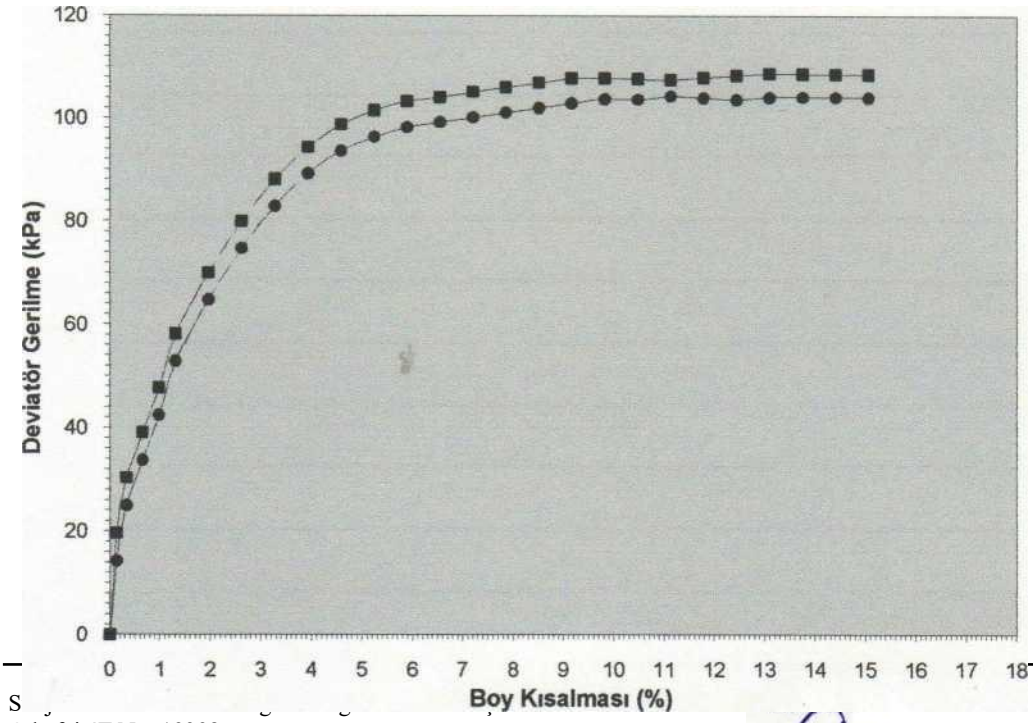
TRIAXIAL CELL CUTTING TEST (UU)
(1900-2)

Document number: 28

PROJECT : PAL YA KONYAALTI HURMA WASTE WATER TREATMENT PLANT SLUDGE BURNING UNIT	**Page Number : 65/88**
Well number: 1ii SK-2Sample no:UDepth (m):10.50Date:	**30.03.2020**

Author: Geological Engineer





•	O3=	**50**
■	**o3=**	**150**

1	**O3**	**50**
	Be	**154**
2	**o3**	**150**
	Be	**258**

CONCLUSION	
c (kPa)	**53**
| (degree)	**0**

S
OdatfeiciT No: 19398

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flyAXIAL CELL

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CUTTING TEST (UU)

(1900-2)

Document number: 28

PROJECT **ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**

DEFINITION OF EXAMPLE **SILTY CLAY**

DRILLING NO	**SK-2**	**PAGE NUMBER**	**66/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,709**
DEPTH (m)	**13.50**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**100**	**150**	
AGE SAMPLE WEIGHT, (g)	**154.10**	**154.24**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**157.32**	**157.48**	
DRY SAMPLE WEIGHT, (g)	**109.86**	**110.01**	
WATER WEIGHT, (g)	**47.46**	**47.47**	
WATER CONTENT, (%)	**43.20**	**43.15**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**17.54**	**17.56**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**12.25**	**12.26**	
DIE VOLUME, (cm3)	**39.72**	**39.77**	
CAVITY VOLUME, (cm 3)	**46.47**	**46.42**	
POROSITY, (%)	**53.91**	**53.85**	
VACUUM RATE	**1,170**	**1,167**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
UNDRAINED MODULUS OF ELASTICITY, (MPa)	**3.3**	**3.9**	

leyi Author: Geological Engineer H.Onur ŞÎRN
►Registration Number: 19398

Control Eden: : Geological Engineer Mustafa
Denetçi Belge No ÇITAK o: 25563

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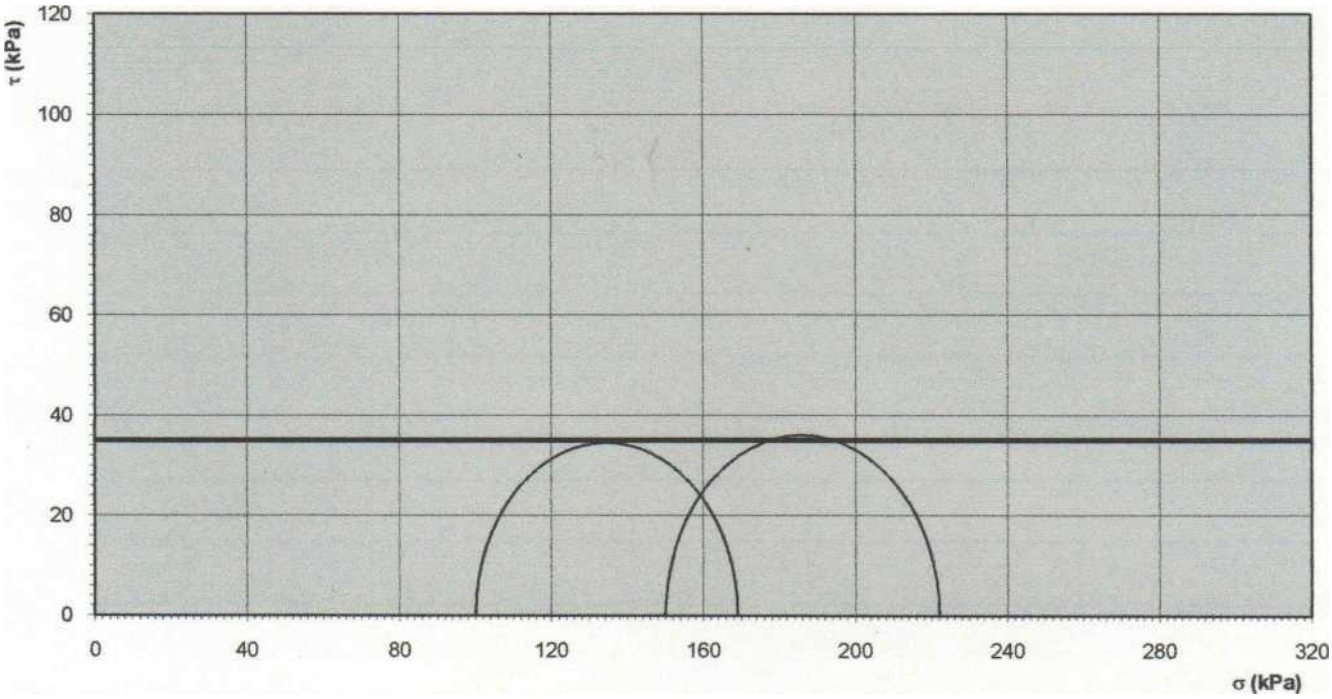
FLYAXIAL CELL CUTTING TEST (UU)

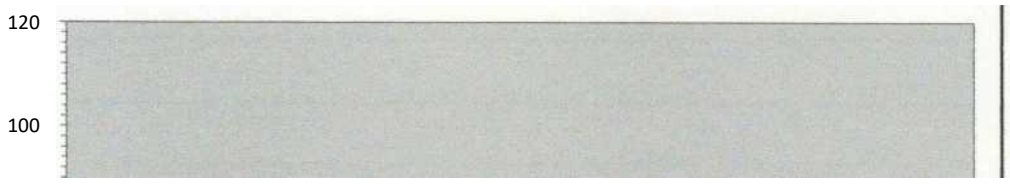
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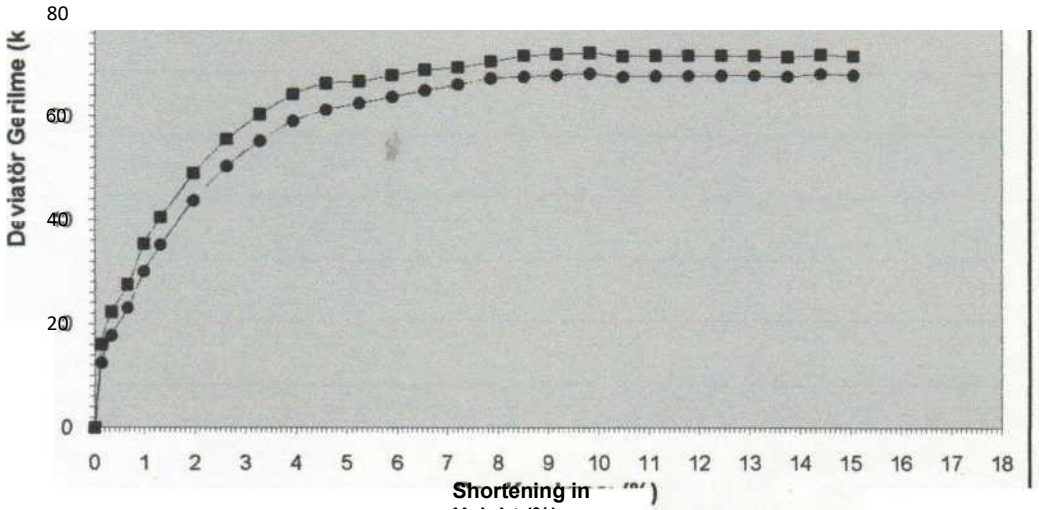
Document number: 28

PROJECT TALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT
: SLUDGE BURNING UNFL





•	CT3=	100
■	«3=	150



1	«3	100
	<*1	169
2		150
		222

CONCLUSION	
c (kPa)	35
<|> (degree)	0

Kontrol Edc
Dereli Belec No:

ıstafa ÇITAK

Well number:	**SK-2Sample no:UD Depth (m):13.50Date:**	**30.03.2020**

syi Made by: Geological Engineer H.Onur ŞİRİN
Registration Number: 19398

en: Geological Engineer Mustafa ÇITAK
: 25563

TRIAXIAL CELL SPLITTING EXPERIMENT (UU)

(1900-2) **Document number: 28**

PROJECT **ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**

Kİ Made by: Geological Engineer
H.Onur ŞİRN Registration Number:

Control Eden: Geological Engineer
Inspection: Mustafa ÇITAK

DEFINITION OF EXAMPLE **SILTY CLAY**

DRILLING NO	**SK-3**	**PAGE NUMBER**	**68/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,692**
DEPTH (m)	**7.50**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

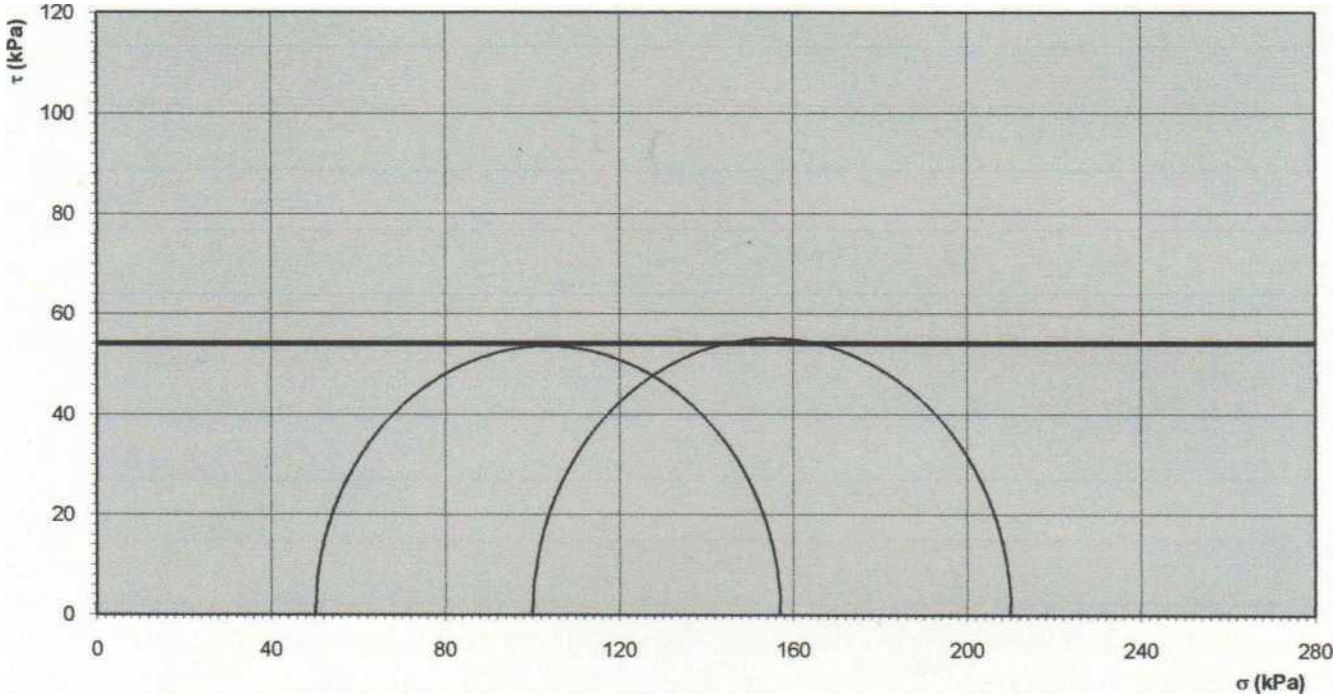
SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**100**	
AGE SAMPLE WEIGHT, (g)	**168.99**	**169.17**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**165.24**	**16539**	
DRY SAMPLE WEIGHT, (g)	**128.86**	**128.99**	
WATER WEIGHT, (g)	**36.38**	**36.40**	
WATER CONTENT, (%)	**28.23**	**28.22**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**19.23**	**19.25**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**15.00**	**15.02**	
DIE VOLUME, (cm3)	**48.95**	**49.01**	
CAVITY VOLUME, (cm 3)	**37.24**	**37.18**	
POROSITY, (%)	**43.20**	**43.14**	
VACUUM RATE	**0.761**	**0.759**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**■ 10.47**	
DRAINAGE ELASTICITY MODULUS, (MPa)	**53**	**6.0**	

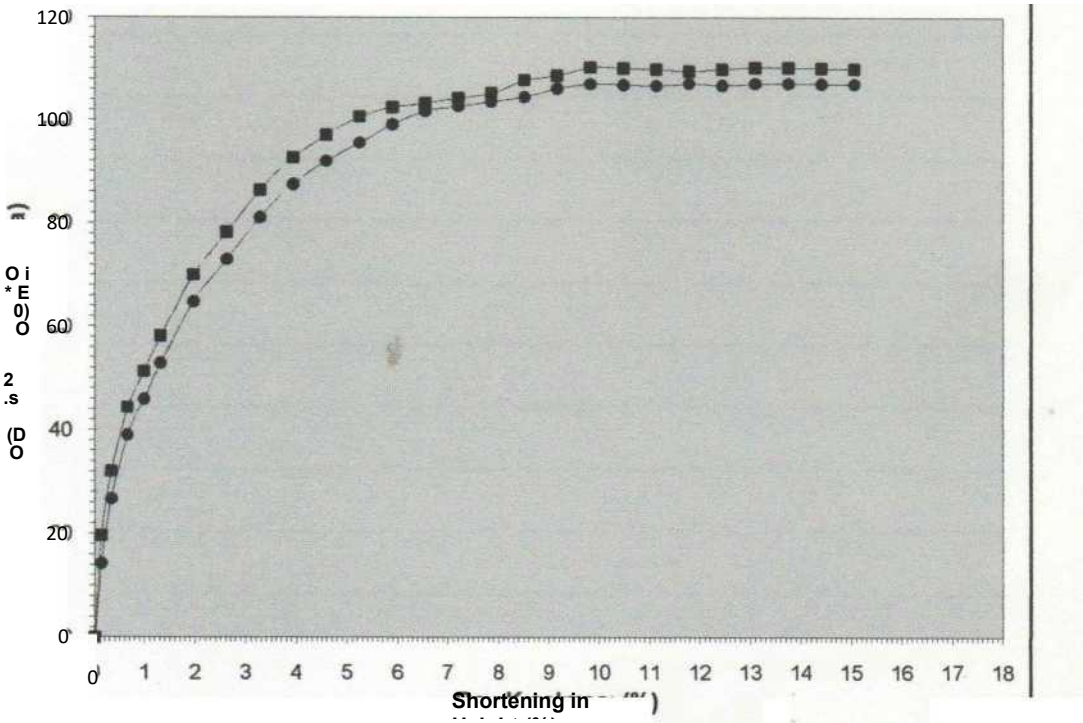
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MINISTRY

FLYAXIAL CELL CUTTING TEST (UU)

(1900-2)





•ct	$_3$= 50	
■o	$_3$=100	
1	<*3	50
	«TI	157
2	^3	100
	CTI	210
CONCLUSION		
e (kPa)		**54**
1 (degree)		**he**

Made by: Geological Engineer H.Onur
ŞİRİN /Registration Number: 19398

Kontrol Eden: Jeol
Dendro Geoge

ıtafa ÇITAK

PROJECT : FALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING FAMOUS	Page No: 69/88
Well number: SK-3 Sample no: UD Depth (m): 7.50 Date:	30.03.2020

H 30.03.2020 RING 0.2054

R COEFFICIENT 2

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TR MINISTRY OF ENVIRONMENT AND

FLYAXİAL CELL[1] CUTTING TEST (UU)

Document number: 28

PROJECT ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNIN

DEFINITION OF EXAMPLE SILTY CLAY

DRILLINGNO SK-3 **PAGE NUMBER** 70/88

SAMPLE NO Ud **GRAIN SPECIFIC GRAVITY** 2,688

DEPTH (m) 10.50 **TEST SPEED (mm/min)** 0.76

SAMPLE DIAMETER, (cm)	3.79	3.79	
SAMPLE AREA, (cm2)	11.28	11.28	
SAMPLE HEIGHT, (cm)	7.64	7.64	
SAMPLE VOLUME, (cm2)	86.19	86.19	
ENVIRONMENTAL PRESSURE, (kPa)	50	150	
AGE SAMPLE WEIGHT, (g)	169.70	169.87	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	166.35	166.49	
DRY SAMPLE WEIGHT, (g)	130.58	130.82	
WATER WEIGHT, (g)	35.77	35.67	
WATER CONTENT, (%)	27.39	27.27	
NATURAL UNIT VOLUME WEIGHT, (kN/m2)	19.31	19.33	
DRY UNIT VOLUME WEIGHT, (kN/m2)	15.16	15.19	
GRAIN VOLUME, (cm2)	49.56	49.66	
CAVITY VOLUME, (cm 2)	36.63	36.53	
POROSITY, (%)	42.50	42.39	
VACUUM RATE	0.739	0.736	
DEGREE OF SATURATION, (%)	100	100	
UNIT SHORTENING IN BREAKING, (%)	11.13	10.47	
DRAINAGE ELASTICITY MODULUS, (MPa)	3.9	4.6	

fi Made by: Geological Engineer
H.Onur ŞİRNSecondaryNo: 19398

Checked by: Geological Engineer Mustafa
Denetçi Belge No: AK: 25563

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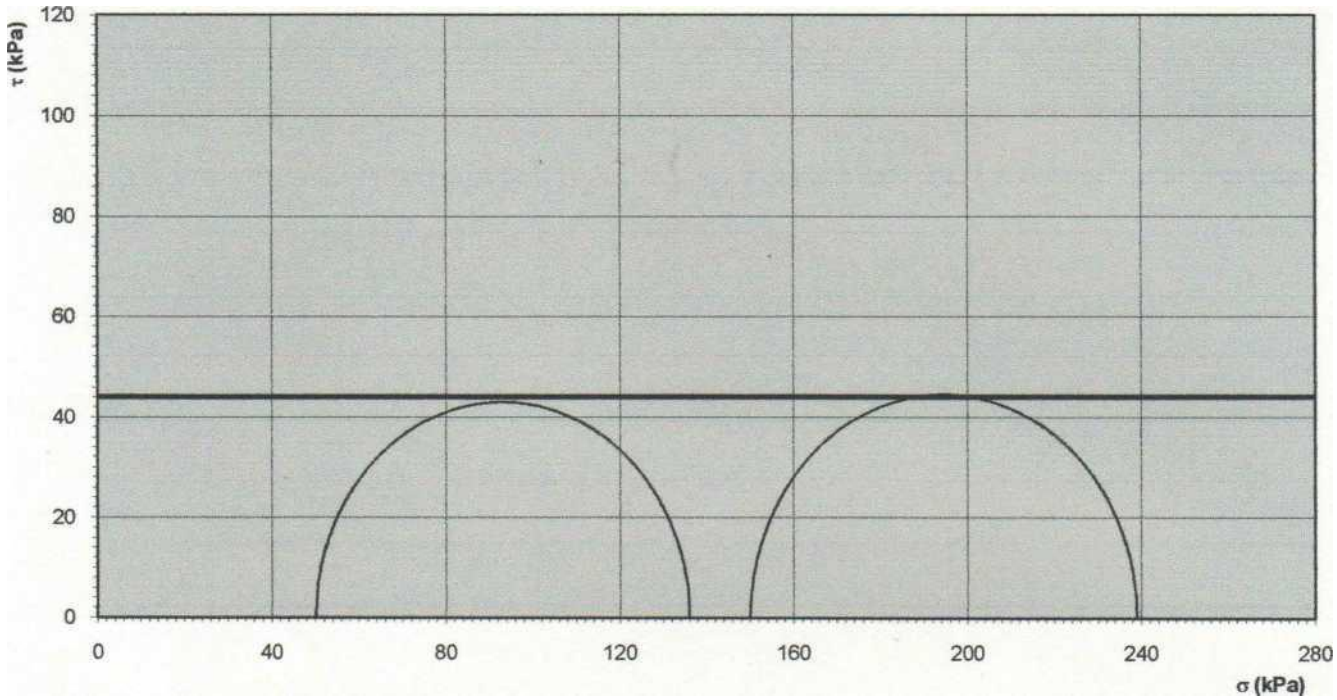
FLYAXIAL CELL CUTTING TEST (UU)

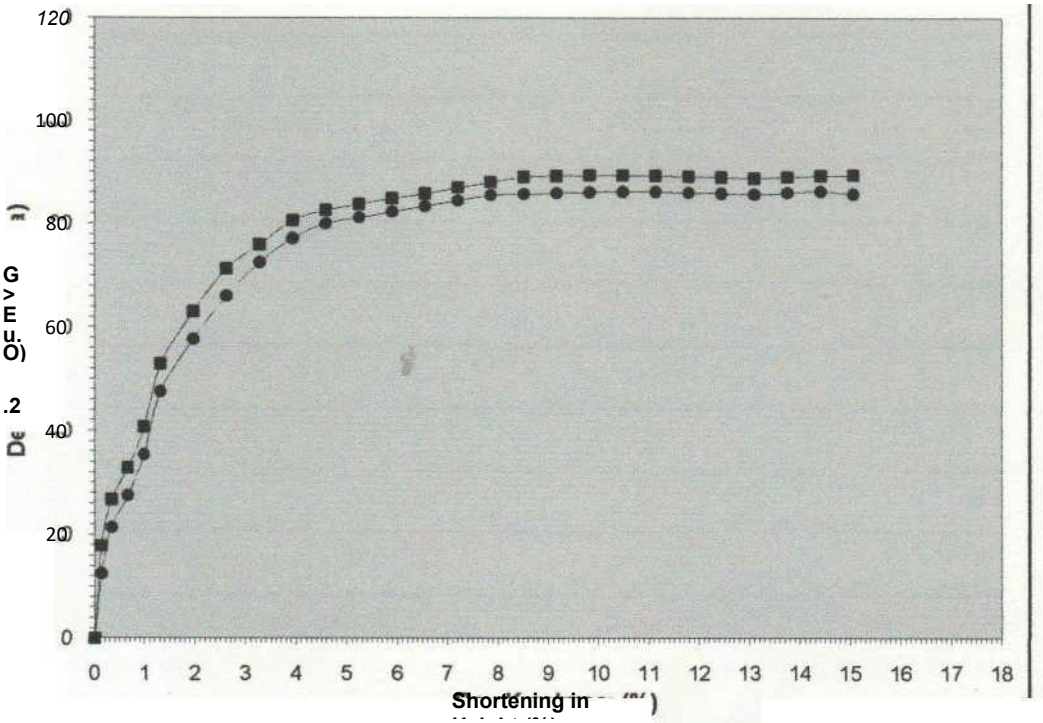
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(1900-2)

Document number: 28

PROJECT : FALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT	**Page Number : 71 / 88**
Well number: SK-3 Sample no: UD Depth (m): 10.50 Date:	**30.03.2020**





•he $_3$=50	
■o $_3$=150	

1	<33	50
	<31	136
2	<33	150
	<31	239

CONCLUSION	
c (kPa)	44
4» (degree)	0

ÇITAK

TRIAXIAL CELL SPLITTING EXPERIMENT (UU)

Also

Document number: 28

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
DEFINITION OF EXAMPLE	**LITTLE SANDWICH SILTY CLAY**		
DRILLINGNO	**SK-3**	**PAGE NUMBER**	**72/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,694**
DEPTH (m)	**13.50**	**TEST SPEED (mm/s)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

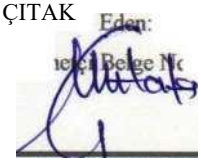
SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**100**	**150**	
AGE SAMPLE WEIGHT, (g)	**162.64**	**162.83**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**161.34**	**161.49**	
DRY SAMPLE WEIGHT, (g)	**120.38**	**120.59**	
WATER WEIGHT, (g)	**40.96**	**40.90**	
WATER CONTENT, (%)	**34.03**	**33.92**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**18.51**	**18.53**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**13.81**	**13.84**	
GRAIN VOLUME, (cm3)	**45.04**	**45.13**	
CAVITY VOLUME, (cm3)	**41.15**	**41.06**	
POROSITY, (%)	**47.74**	**47.64**	
VACUUM RATE	**0.913**	**0.910**	
DEGREE OF SATURATION, ('/•)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
UNDRAINED MODULUS OF ELASTICITY, (MPa)	**3.5**	**4.0**	

Checked by: Geological Engineer Mustafa ÇITAK

leyi Author: Geological Engineer H.Onur ŞÎRN
►Registration Number: 19398

o: 25563

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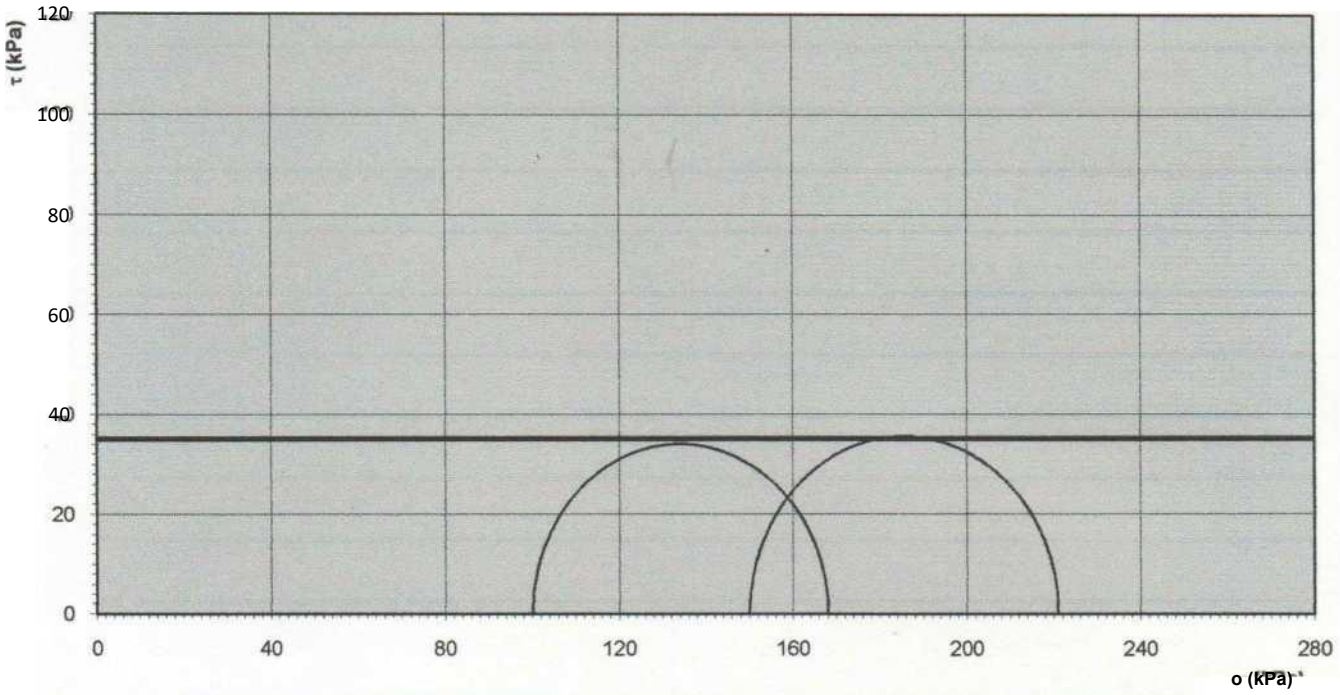


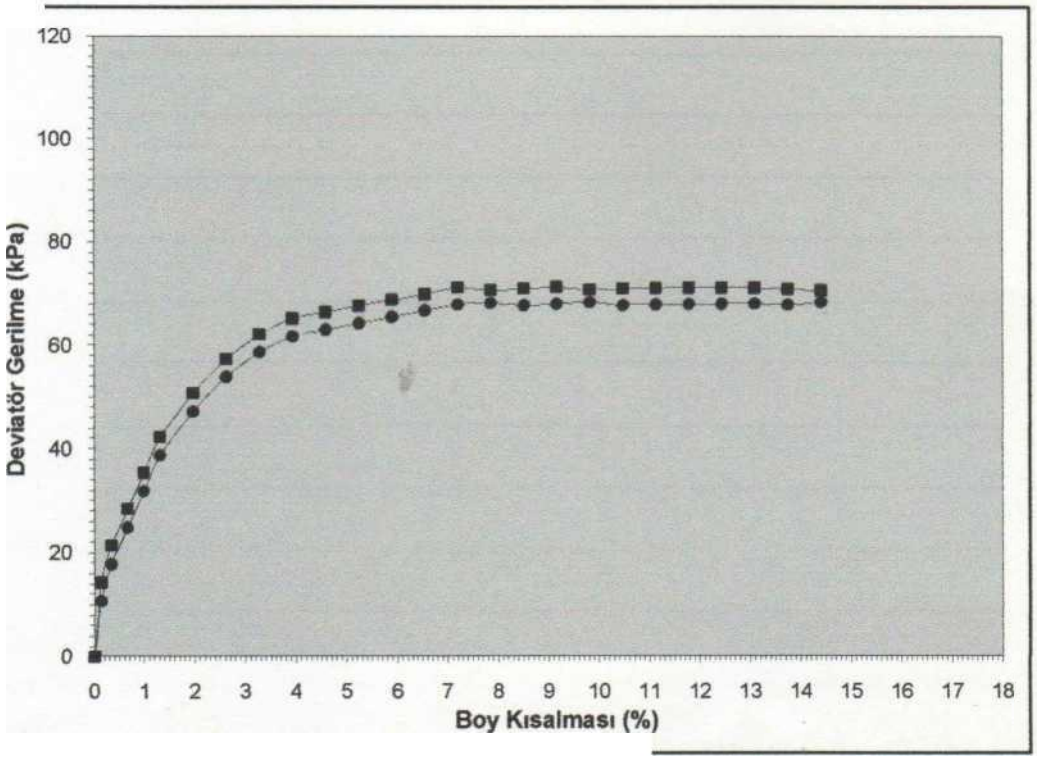
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FLYAXIAL CELL CUTTING TEST (UU)

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MINISTRY

(1900-2)





● a3=100
■ a3=150

1	«3	100
	Be	168
2	o3	150
	Gı	221

CONCLUSION	
c (kPa)	35
4> (degree)	0

no : 28

PROJECT : FALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING FAMOUS	Page Number : 73/88
Well number: SK-3Sample no:UD Depth (m):13.50Date:	30.03.2020

KontrgLLder): Geological Engineer Mustafa ÇITAK D

pvi Made by: Geological Engineer H.Onur ŞİRİN
Registration Number: 19398

FLYAXİAL CELL CUTTING TEST (UU)

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
DEFINITION OF EXAMPLE	**SANDY SILTY CLAY**		
DRILLINGNO	**SK-4**	**PAGE NUMBER**	**74/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,686**
DEPTH (m)	**3.00**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**100**	
AGE SAMPLE WEIGHT, (g)	**168.47**	**168.64**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**162.73**	**162.89**	
DRY SAMPLE WEIGHT, (g)	**126.84**	**127.13**	
WEIGHT, (g)	**35.89**	**35.76**	
WATER CONTENT, (%)	**28.30**	**28.13**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**19.17**	**19.19**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**14.95**	**14.98**	
GRAIN VOLUME, (cm3)	**48.89**	**49.00**	
CAVITY VOLUME, (cm3)	**37.30**	**37.19**	
POROSITY, (%)	**43.28**	**43.15**	
VACUUM RATE	**0.763**	**0.759**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
DRAINAGE ELASTICITY MODULUS, (MPa)	**4.1**	**4.7**	

:Done by: Geological Engineer H.Onur
ŞİRN IfrRegistration Number: 19398

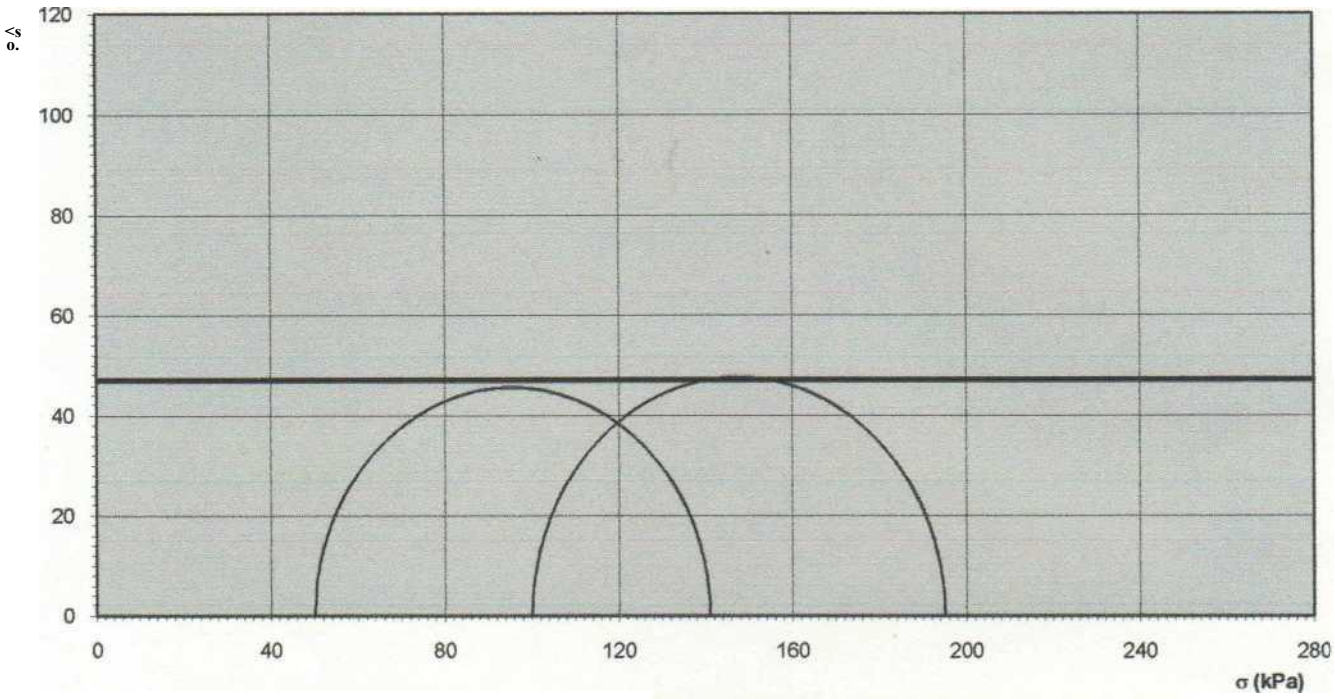
Checked by: Geological Engineer Mustafa ÇITAK
Denetim Belge No: 25563

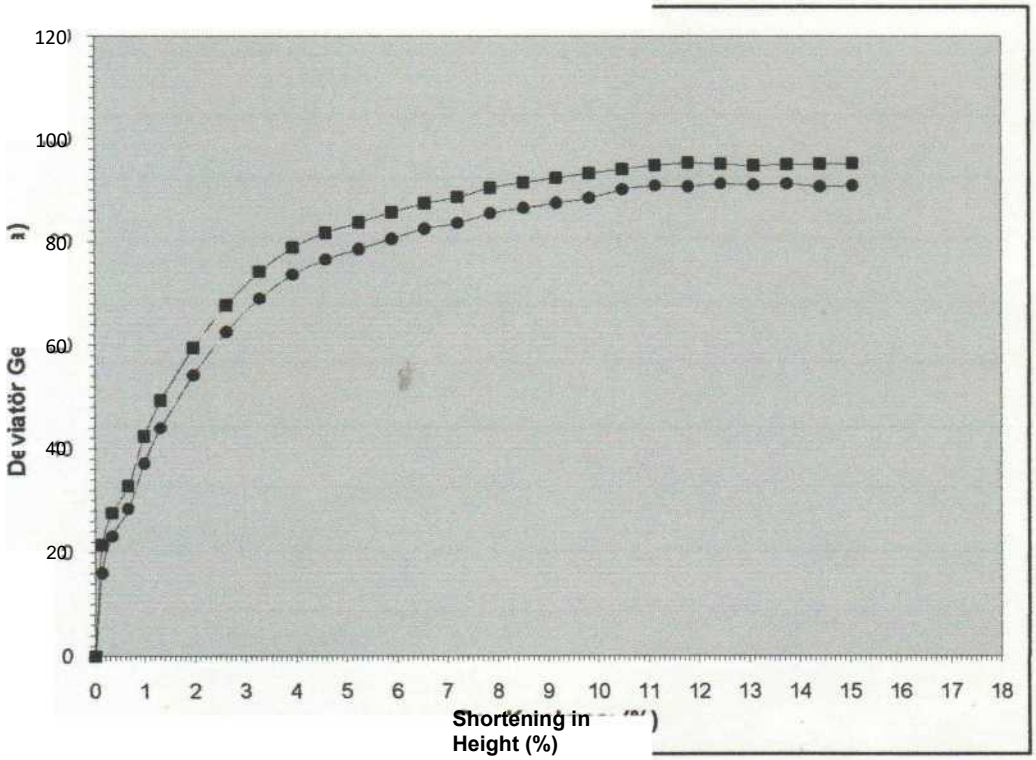
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URBANIZATION

FLYAXIAL CELL CUTTING TEST (UU)
(1900-2)

PROJECT TALYA KONYAALTI HURMA ATEKWATER TREATMENT PLANT SLUDGE BURNING UNIT1	**Document number: 28** **Page Number : 75/88**
Well number: ..... SK-4Sample no:UD Depth (m):3.00	**History: 30.03.2020**





•	o3=	50
■	o3=	100

1	«3	50
		141
2	°3	100
	Be	195

CONCLUSION	
c (kPa)	47
4> (degree)	0

Performed by: Geological Eng. H.
Onur ŞİRİN rRegistry Number: 19398

Kontrol E(lcn: Geological Engineer
Mustafa CITAK
25563

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FLYAXIAL CELL
CUTTING TEST (UU)
(1900-2)

PROJECT **ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**

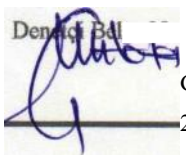
Document number: 28

DEFINITION OF EXAMPLE **SILTY CLAY**

DRILLINGNO	**SK-4**	**PAGE NUMBER**	**76/88**
SAMPLE NO	**ID**	**GRAIN SPECIFIC GRAVITY**	**2,694**
DEPTH (m)	**6.00**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**100**	
AGE SAMPLE WEIGHT, (g)	**162.89**	**163.02**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**160.77**	**160.93**	
DRY SAMPLE WEIGHT, (g)	**120.35**	**120.49**	
WATER WEIGHT, (g)	**40.42**	**40.44**	
WATER CONTENT, (%)	**33.59**	**33.56**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**18.54**	**18.55**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**13.88**	**13.89**	
GRAIN VOLUME, (cm3)	**45.26**	**4531**	
CAVITY VOLUME, (cm3)	**40.93**	**40.88**	
POROSITY, (%)	**47.49**	**47.44**	
VACUUM RATE	**0.904**	**0.902**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
DRAINAGE ELASTICITY MODULUS, (MPa)	**5.2**	**5.9**	

Other Done by: Geological Engineer
H.Onur ŞİRN Registration Number:



Checked by:
Geological Engineer Mustafa ÇITAK gej|Mo: 25563

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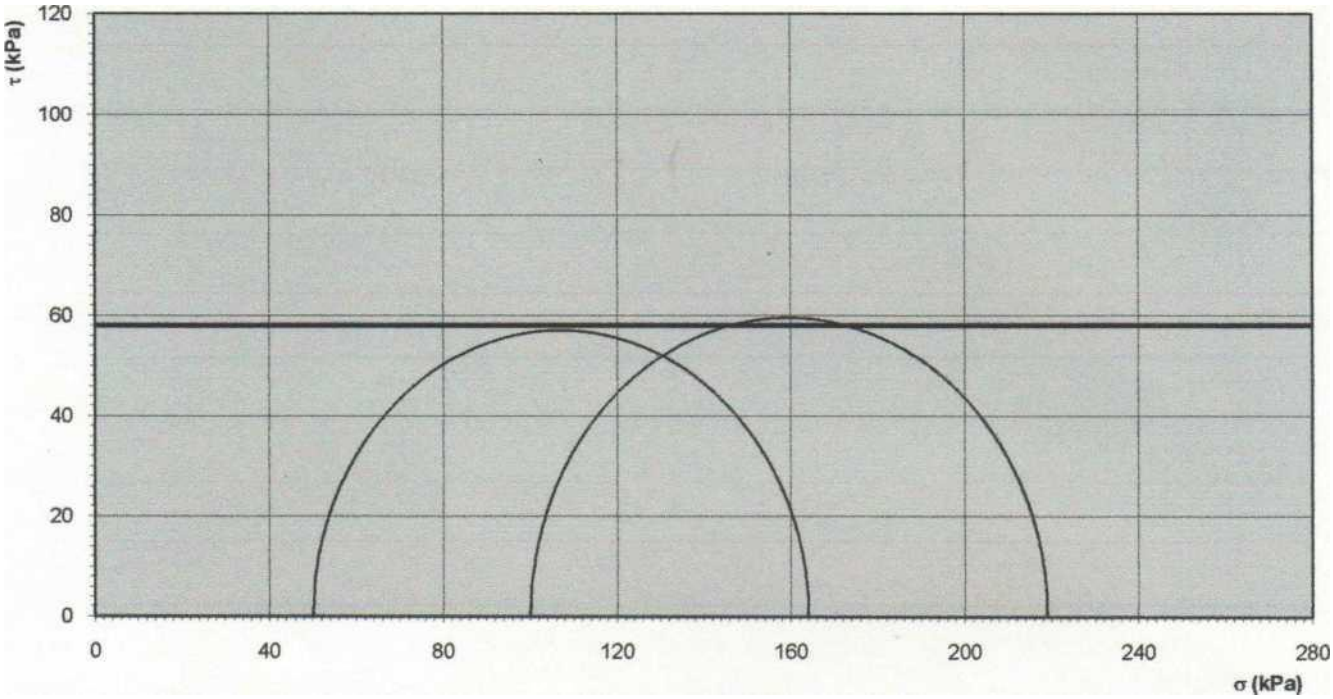
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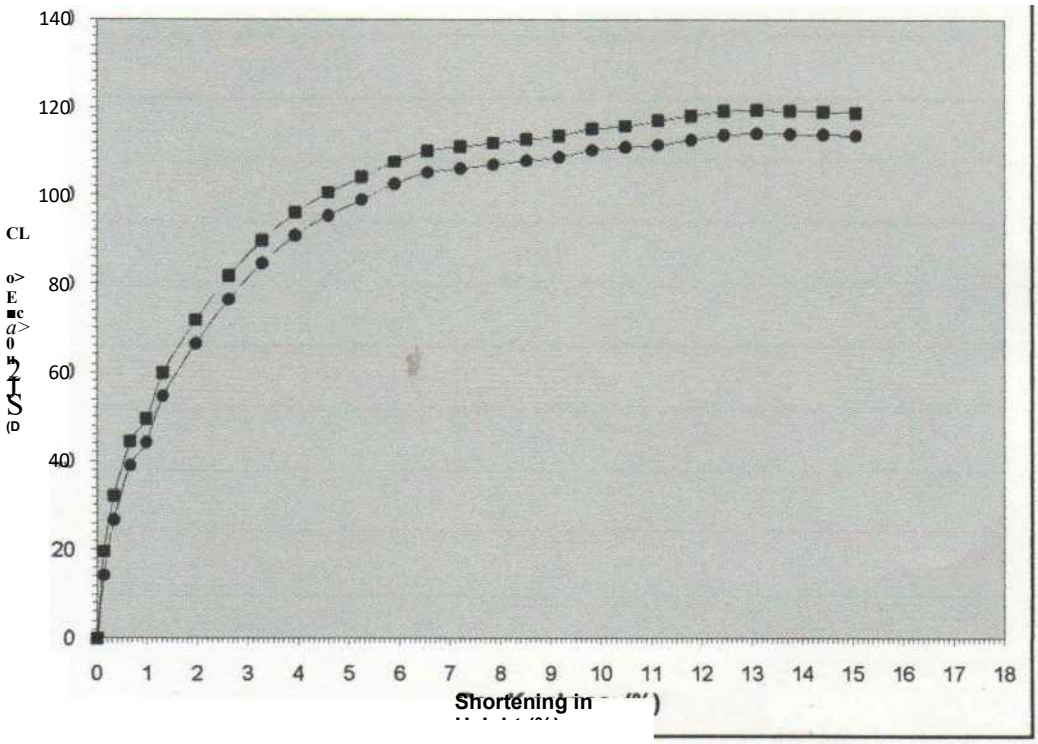
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FLYAXIAL CELL CUTTING TEST (UU)
(1900-2)

Document number: 28

PROJECT : PAL YA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT	**Page Number : 77/88**
Well number: SK-4Sample no:UD Depth (m):6.00Date:	**30.03.2020**





a3=50

100

1	G.1	50
	CTI	164
2	<*3	100
		219

CONCLUSION	
e (kPa)	58
(degree)	he

D®« Made by: Geological Engineer
H.Onur ŞİRİN

KontrgL.E<jen, Geological Engineer.
Dcnetci Belge No:25563

Document number: 28

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
DEFINITION OF EXAMPLE	**SILTY CLAY**		
DRILLINGNO	**SK-4**	**PAGE NUMBER**	**78/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,692**
DEPTH (m)	**9.00**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

FLEXİBLE CELL COMPRESSION TEST (UU)

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**150**	
AGE SAMPLE WEIGHT, (g)	**164.29**	**164.47**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**167.04**	**167.19**	
DRY SAMPLE WEIGHT, (g)	**126.26**	**126.43**	
WATER WEIGHT, (g)	**40.78**	**40.76**	
WATER CONTENT, (%)	**32.30**	**32.24**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**18.70**	**18.72**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**14.13**	**14.16**	
GRAIN VOLUME, (cm3)	**46.13**	**46.20**	
CAVITY VOLUME, (cm 3)	**40.06**	**39.99**	
POROSITY, (%)	**46.48**	**46.40**	
VACUUM RATE	**0.868**	**0.866**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
DRAINAGE ELASTICITY MODULUS, (MPa)	**4.4**	**5.1**	

Checked by: Geological Engineer Mustafa ÇITAK

lg4No: 25563

leyi Author: Geological Engineer H.Onur ŞİRN
»Registration Number: 19398

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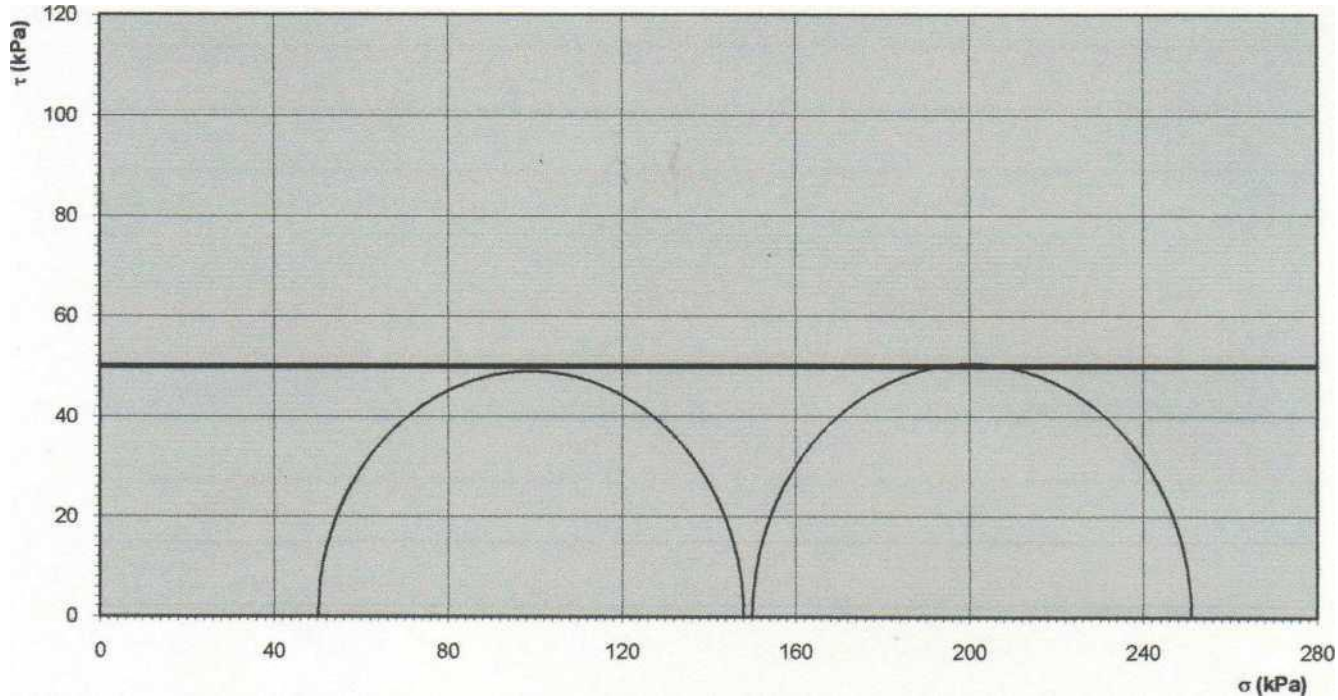
TRIAXIAL CELL SPLITTING EXPERIMENT (UU)

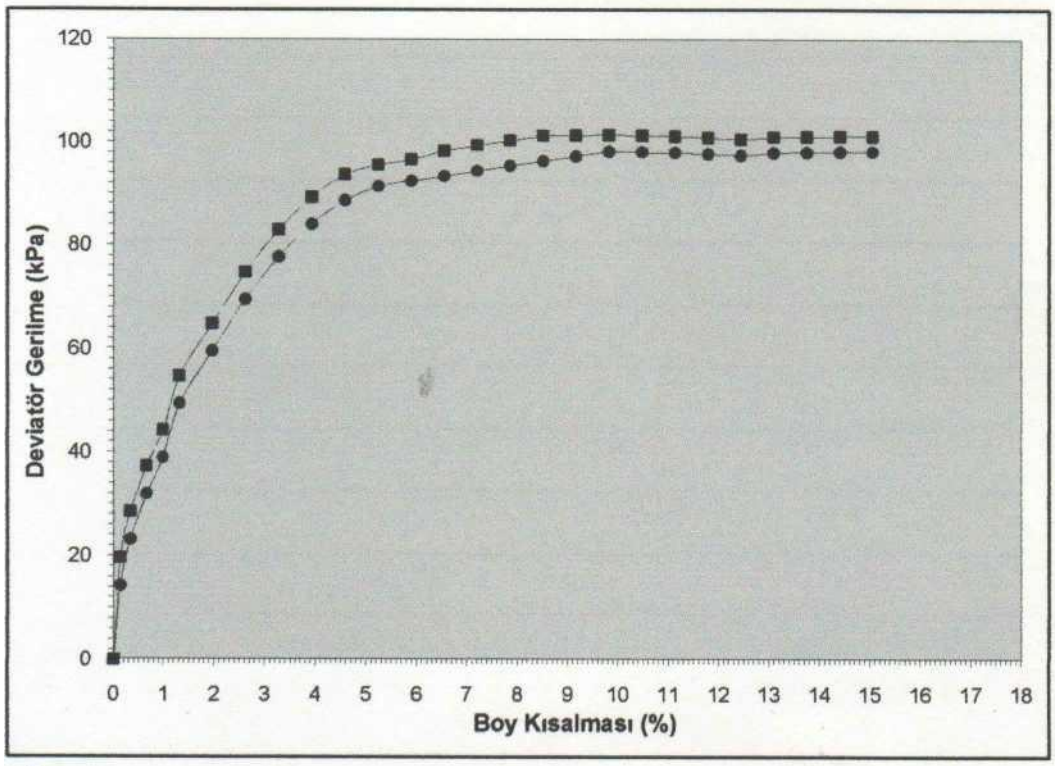
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(1900-2)

No: 28

PROJECT :	**TALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING FAMOUS**	**Page Number :**	**79/88**
Well number:	**SK-4Sample no:UD Depth (m):9.00**	**History:**	**30.03.2020**





•	a3=	**50**
■	Gj=	**150**

1	«3	**50**
		148
2	**o3**	**150**
	Be	**251**

CONCLUSION	
c (kPa)	**50**
4> (degree)	**0**

syi Made by: Geological Engineer
H.Onur ŞİRİN Registration Number:

Kontrol Eden: Geological Engineering
Dereceli Belge No:Mustafa ÇITAK :25563

FLYAXIAL CELL
CUTTING TEST (Uü)
(1900-2)

Document number: 28

PROJECT **ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**

DEFINITION OF EXAMPLE **SANDY SILTY CLAY**

DRILLING NO	**SK-5**	**PAGE NUMBER**	**80/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,681**
DEPTH (m)	**7.50**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm 3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**100**	
AGE SAMPLE WEIGHT, (g)	**170.76**	**170.97**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**166.81**	**166.98**	
DRY SAMPLE WEIGHT, (g)	**132.82**	**132.98**	
WATER WEIGHT, (g)	**33.99**	**34.00**	
WATER CONTENT, (%)	**25.59**	**25.57**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**19.44**	**19.46**	
DRY UNIT WEIGHT, (kN/m3)	**15.48**	**15.50**	
GRAIN VOLUME, (cm3)	**50.71**	**50.79**	
CAVITY VOLUME, (cm 3)	**35.48**	**35.40**	
POROSITY, (%)	**41.16**	**41.08**	
VACUUM RATE	**0.700**	**0.697**	
DEGREE OF SATURATION, (/,)*	**98**	**98**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
UNDRAINED MODULUS OF ELASTICITY, (MPa)	**6.3**	**7.0**	

4 Made by: Geological Engineer
H.Onur ŞİRN »internal No: 19398

Ç Den Na 25363 ical Engineer Mustafa

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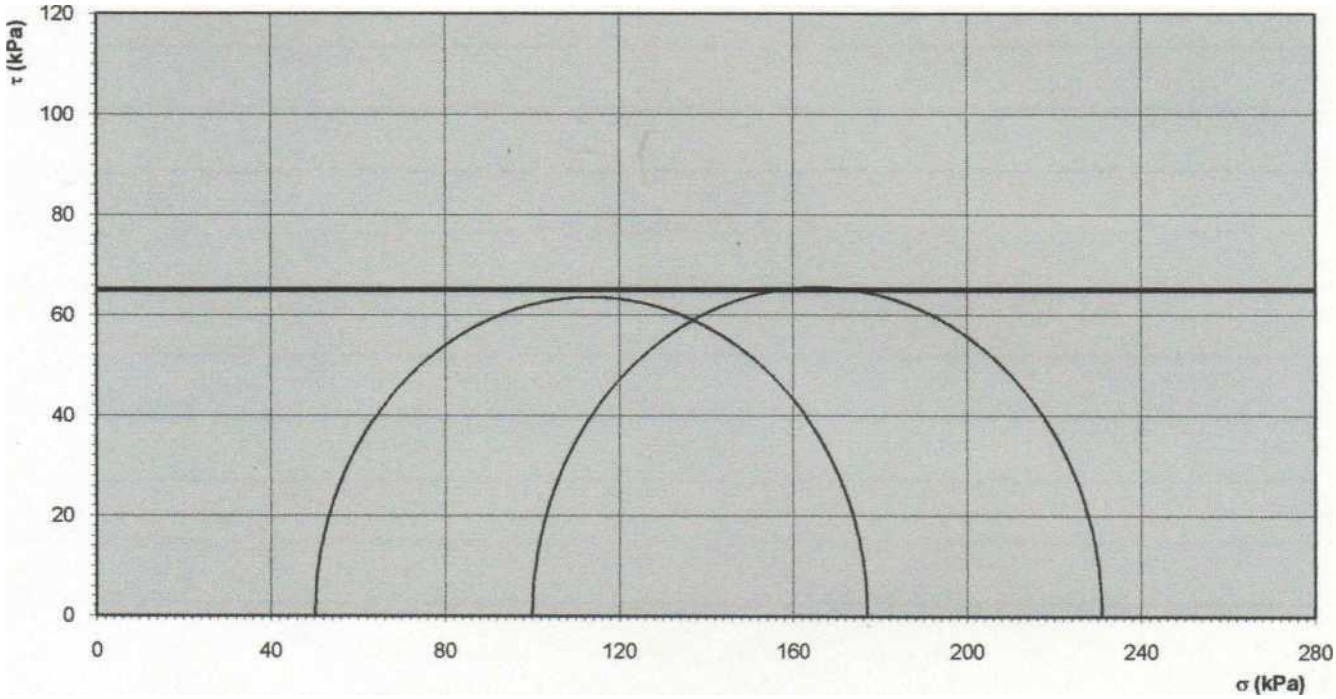
FLYAXIAL CELL CUTTING TEST (UU)

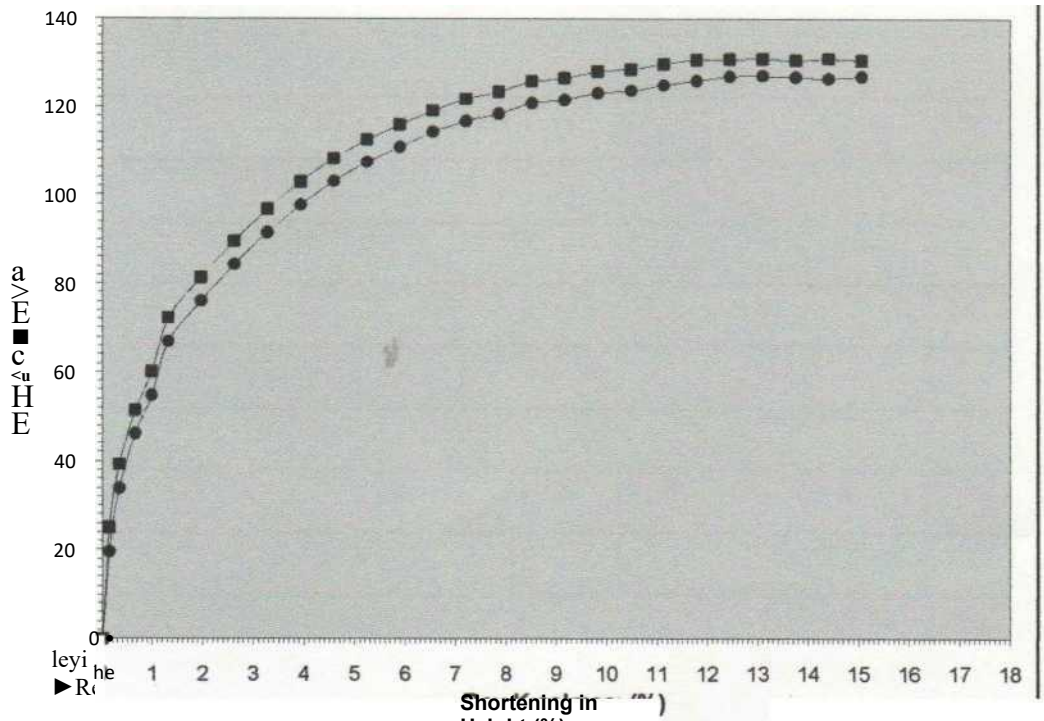
(1900-2)

Document number: 28

PROJECT : FALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT

Well number: SK-5 **Sample no:UD Depth (m):** 7.50 **History:** 30.03.2020





● a3=50
■ a3=100

1	«3	50
		177
2	c3	100
	01	231

CONCL

c (kPa) 65

4> 0

syi Made by: Geological Engineer
H.Onur ŞÎRÎN Registration Number:

Kontrol E4en: Geological Engineer
Mustafa ÇITAK :25563

FLYAXİAL CELL CUTTING TEST (UU)

Document number: 28

PROJECT	**ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**		
DEFINITION OF EXAMPLE	**SANDY SILTY CLAY**		
DRILLINGNO	**SK-5**	**PAGE NUMBER**	**80/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,681**
DEPTH (m)	**1.50**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**100**	
AGE SAMPLE WEIGHT, (g)	**170.76**	**170.97**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**166.81**	**166.98**	
DRY SAMPLE WEIGHT, (g)	**132.82**	**132.98**	
WATER WEIGHT, (g)	**33.99**	**34.00**	
WATER CONTENT, (%)	**25.59**	**25.57**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**19.44**	**19.46**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**15.48**	**15.50**	
GRAIN VOLUME, (cm3)	**50.71**	**50.79**	
CAVITY VOLUME, (cm 3)	**35.48**	**35.40**	
POROSITY, (%)	**41.16**	**41.08**	
VACUUM RATE	**0.700**	**0.697**	
DEGREE OF SATURATION, (%)	**98**	**98**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
UNDRAINED MODULUS OF ELASTICITY, (MPa)	**6.3**	**7.0**	

Checked by: Geological Engineer Mustafa ÇITAK

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leyi Author: Geological Engineer H.Onur ŞÎRN
►Registration Number: 19398

Eden:
ı Belge N



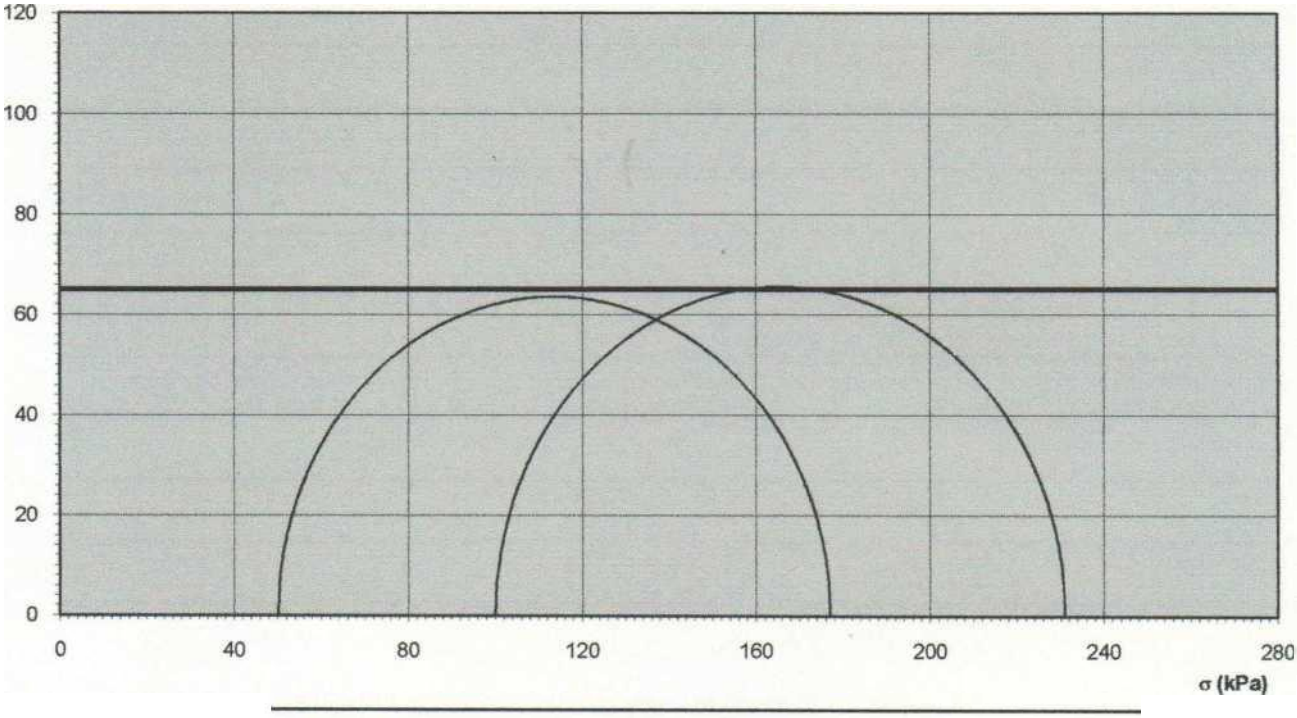
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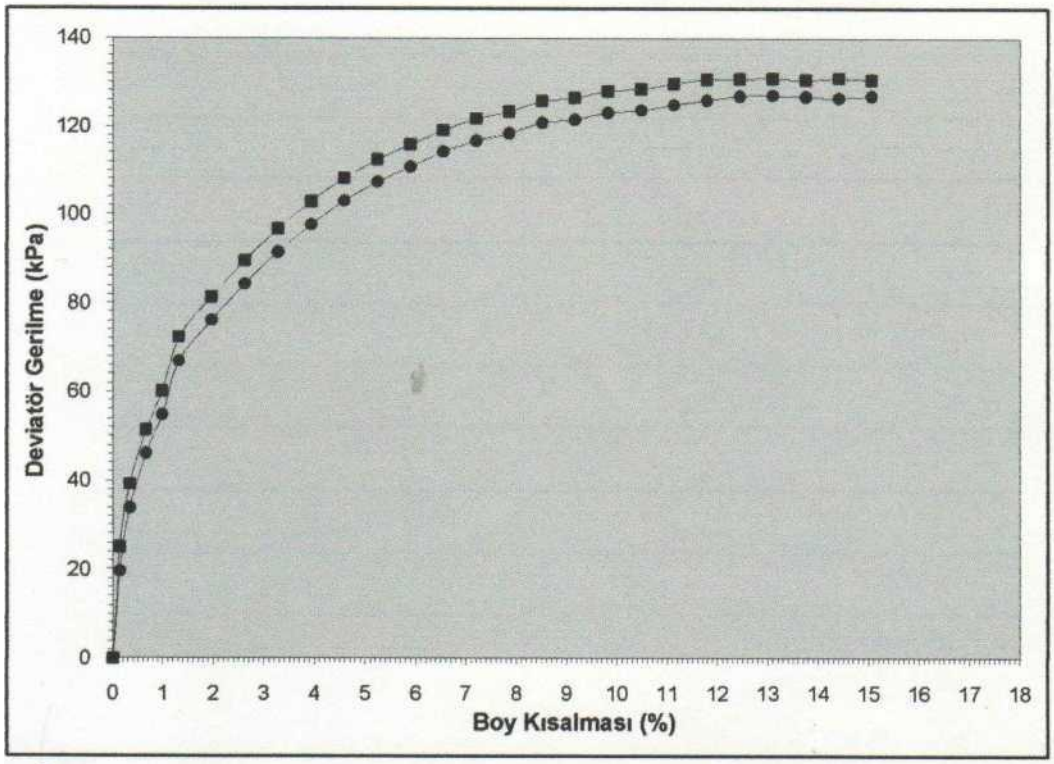
FLYAXIAL CELL CUTTING TEST (UU)

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MINISTRY

(1900-2)

r.





•	a3=	50
■		100

1	«3	50
	Grass	177
2	«3	100
	Be	231

CONCLUSION	
c (kPa)	65
4> (degree)	0

Good Done by: Geological Engineer
H.Onur ŞİRİN Registration Number

Counterpart_Eden: Geological Engineer Mustafa ÇITAK
Dereç: Belge No:25563

PROJECT :PAL YA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT1	Page Number : 81/88
Well no: SK-5 Sample no: UD Depth (m): 1.50 Date:	30.03.2020

il

leyi Author: Geological Engineer H.Onur ŞÎRN
►Registration Number: 19398

Eden:
ıcı Belge No

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FLYAXIAL CELL

CUTTING TEST (UU)

(1900-2)

Document number: 28

PROJECT **ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**

DEFINITION OF EXAMPLE **SILTY CLAY**

DRILLINGNO	**SK-5**	**PAGE NUMBER**	**82/88**
SAMPLE NO	**Ud**	**GRAIN SPECIFIC GRAVITY**	**2,692**
DEPTH (m)	**9.00**	**TEST SPEED (mm/min)**	**0.76**
HISTORY	**30.03.2020**	**RING COEFFICIENT**	**0.2054**

SAMPLE NO	**1**	**2**	
SAMPLE DIAMETER, (cm)	**3.79**	**3.79**	
SAMPLE AREA, (cm2)	**11.28**	**11.28**	
SAMPLE HEIGHT, (cm)	**7.64**	**7.64**	
SAMPLE VOLUME, (cm3)	**86.19**	**86.19**	
ENVIRONMENTAL PRESSURE, (kPa)	**50**	**150**	
AGE SAMPLE WEIGHT, (g)	**163.43**	**163.61**	
SAMPLE WEIGHT AT THE END OF THE EXPERIMENT, (g)	**165.43**	**165.54**	
DRY SAMPLE WEIGHT, (g)	**124.32**	**124.48**	
WATER WEIGHT, (g)	**41.11**	**41.06**	
WATER CONTENT, (%)	**33.07**	**32.99**	
NATURAL UNIT VOLUME WEIGHT, (kN/m3)	**18.60**	**18.62**	
DRY UNIT VOLUME WEIGHT, (kN/m3)	**13.98**	**14.00**	
DIE VOLUME, (cm3)	**45.62**	**45.70**	
CAVITY VOLUME, (cm 3)	**40.57**	**40.49**	
POROSITY, (%)	**47.07**	**46.98**	
VACUUM RATE	**0.889**	**0.886**	
DEGREE OF SATURATION, (%)	**100**	**100**	
UNIT SHORTENING IN BREAKING, (%)	**11.13**	**10.47**	
UNDRAINED MODULUS OF ELASTICITY, (MPa)	**4.2**	**4.7**	

fi Made by: Geological Engineer H.Onur ŞİRN Registration Number: 19398

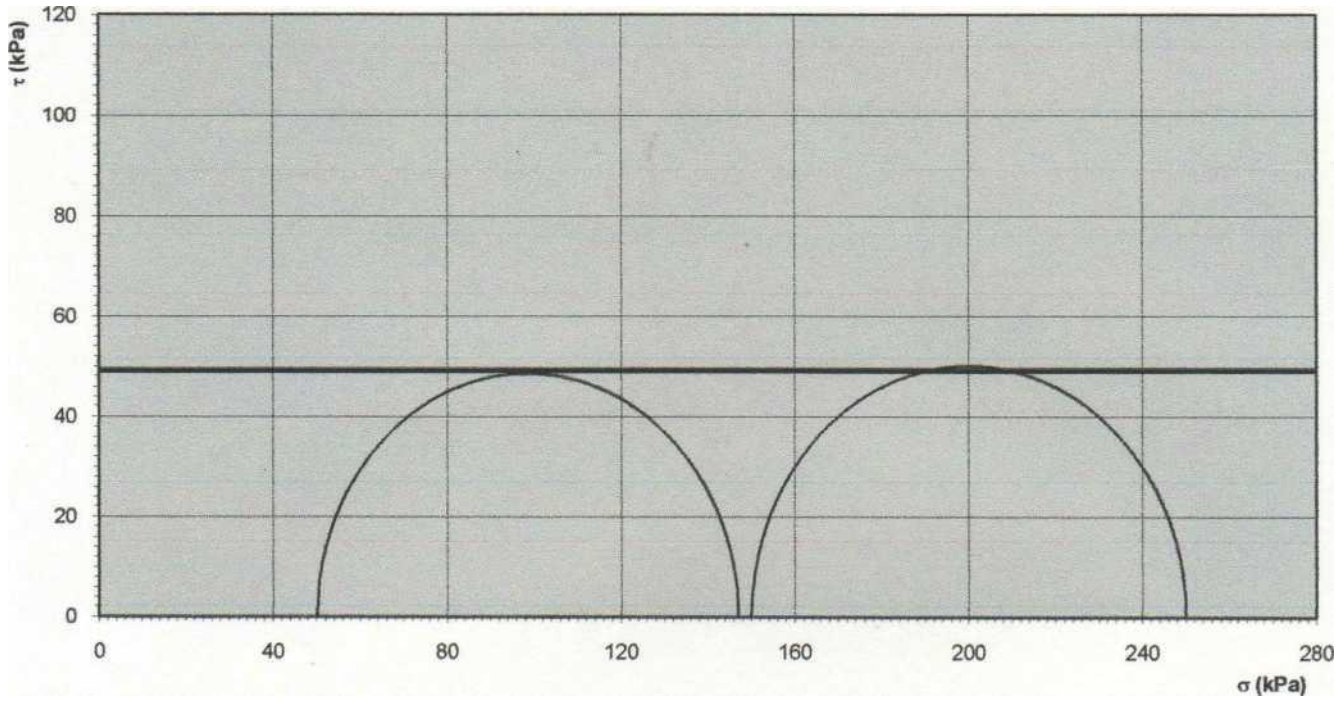
Control Eden■ Geological Engineer
Denetçi Belge No:2 Mustafa ÇITAK o:«25563

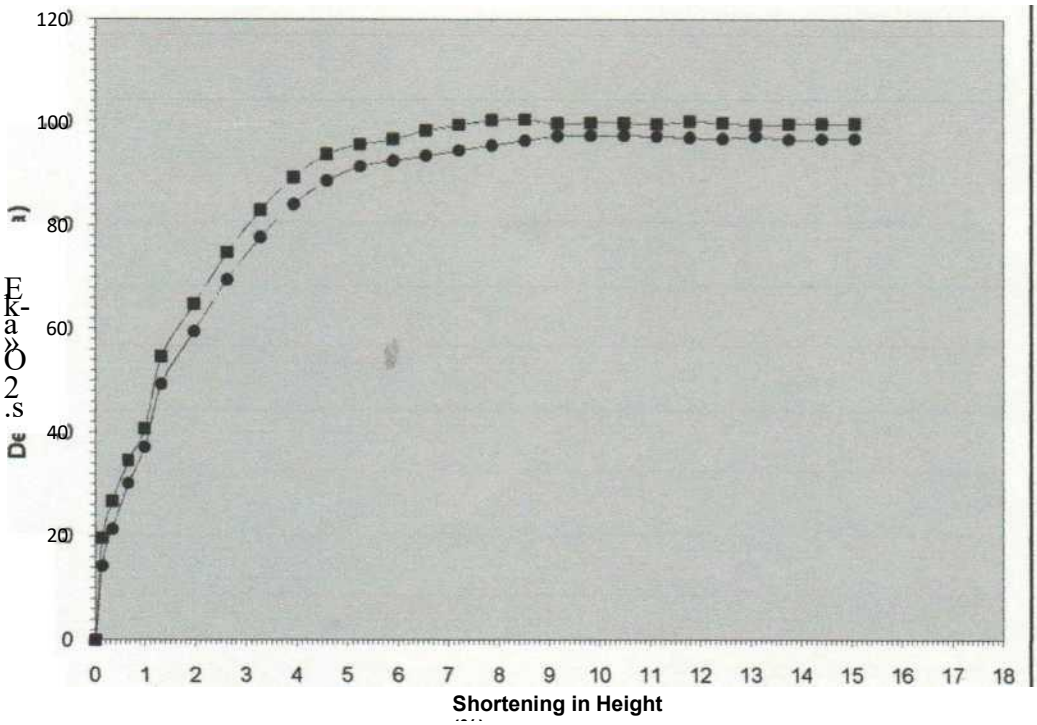
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FLYAXIAL CELL
CUTTING TEST (UU)

(1900-2)





●	^3= 50
■	a3=150

1		50
	Be	147
2	a3	150
	Be	250

CONCLUSION	
c (kPa)	49
1 (degree)	he

What Made By: Geological Engineer
H.Onur ŞİRİN-Register Number:

Checked by: Geological Engineer Mustafa ÇITAK
Denetçi Belge No: 25563

Document number: 28

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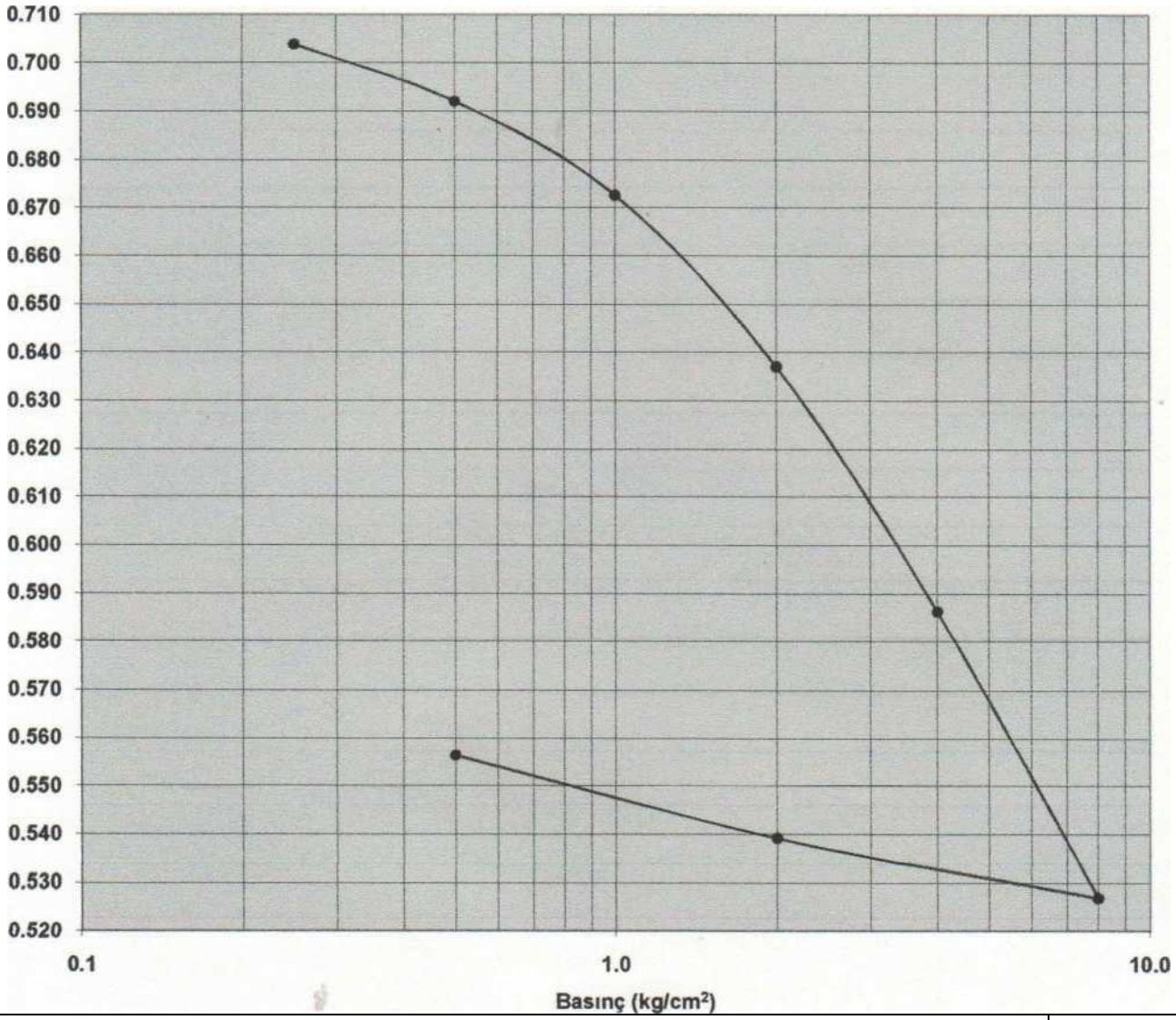
Well number:	**SK-5Sample no:UD Depth (m);9.00Date:**	**30.03.2020**

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(1900-2)



Project :	**ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT**	Page : 84/88
Well No : **SK-1**	Sample No:**Ud** Depth (m): **4.50**	History,**30.03.2020**

Natural water content(w„)	**26.7%**		**p (kg/cm2)**	**m, (cm2/kg)**	**c, (cm2/min)**	**p€ (kg/cm²)**
tick space ratio(e»)	**0.715**		**0.00-0.25**	**0.0272 0.0278**	**0.0111 0.0103**	**0.8**
Natural unit volume weight (yn) Dry	**1.983t/m** ³		**0.25-0.50**	**0.0232 0.0215**	**0.0089**	**c;**
unit volume weight (y(J Specific	**1,565t/m** ᴶ		**0.50-1.00**	**0.0157 0.0096**	**0.0084**	**0.1769**
gravity(G)	**2,684**		**1.00-2.00**		**0.0085**	**Q ____**
Degree of saturation(S ᵣ)	**100%**		**2.00-4.00**		**0.0091**	
Inflation pressure Inflation	**kg/cm2**		**4.00-8.00**			
percentage	**%**					

DAheyt Made by Geological Engineer H.Onur ŞİRİNControlled by Geological Engineer Mustafa ÇITAK
Voting Number: 19398DenetaİMgj^^5563

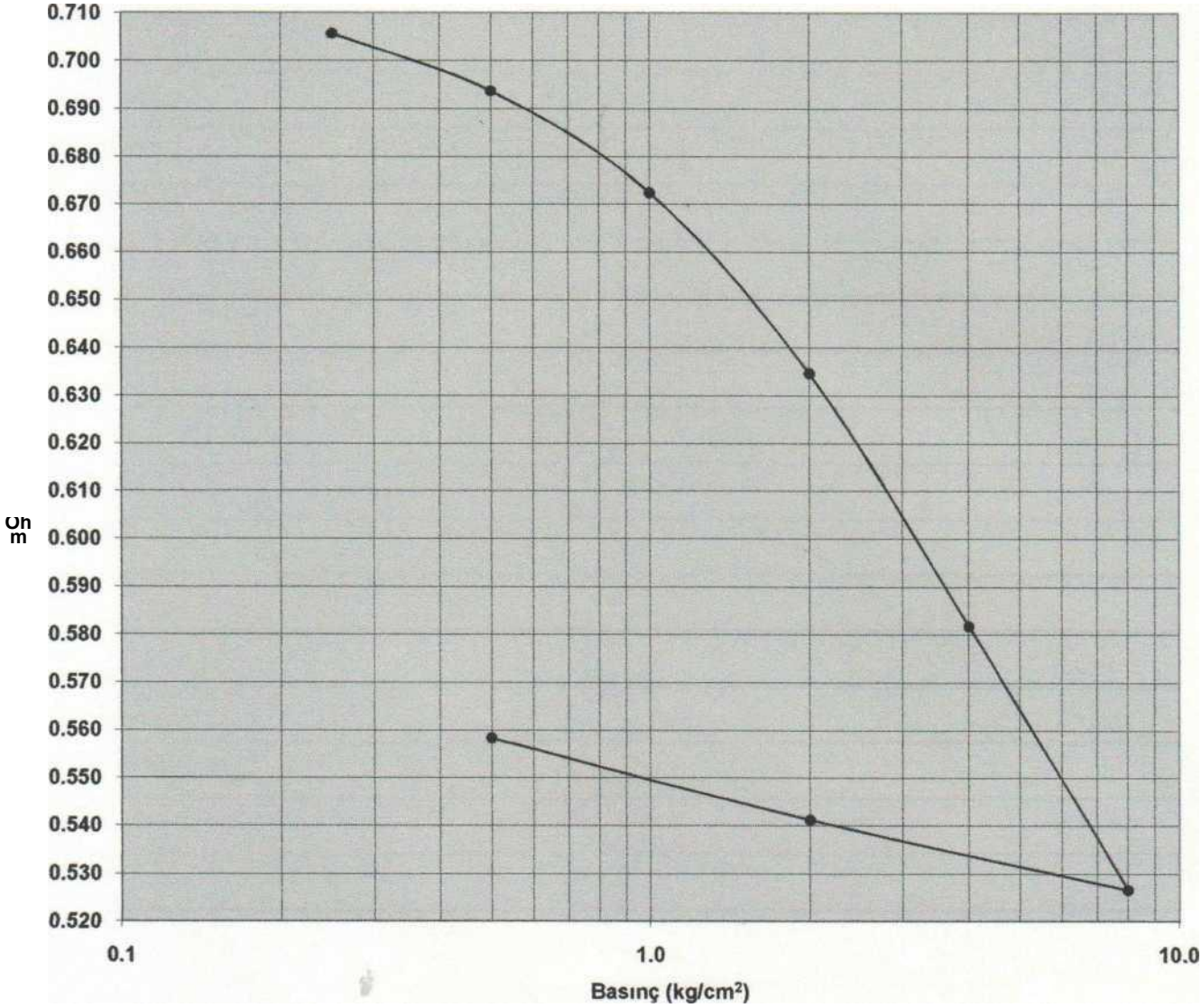
CONSOLIDATION EXPERIMENT

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(1900-2)

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Project	ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT		**Page: 85/88**
Well No : **SK-2**	Sample No: UD	Depth (m):7.50	History: **30.03.2020**



Natural water content	W	**26.8**	%
Initial vacancy rate	**(to.)**	**0.718**	
Natural unit volume weight	**(T.)**	**1,982**	t/m3
Dry unit weight	**(Yu)**	**1,564**	
Specific gravity	**(Gs)**	**2,686**	
Degree of saturation	**(Sr.)**	**100**	%
Inflation pressure			kg/cm2
Swelling percentage			%

p (kg/cm2)	m, (cm2/kg)	cv (cm2/min)	pc (kg/cm2)
0.00-0.25	0.0280	0.0107	1.0
0.25-0.50	0.0282	0.0099	Cc
0.50-1.00	0.0253	0.0088	0.2386
1.00-2.00	0.0228	0.(8180	
2.00-4.00	0.0164	0.0082	cr
4.00-8.00	0.0089	0.0088	

Designed by: Geological Engineer H.Onur ŞİRİN
Op^Sieil No: 19398

Control Ejen,Geology Engineer.Mustafa ÇITAK
Auditor

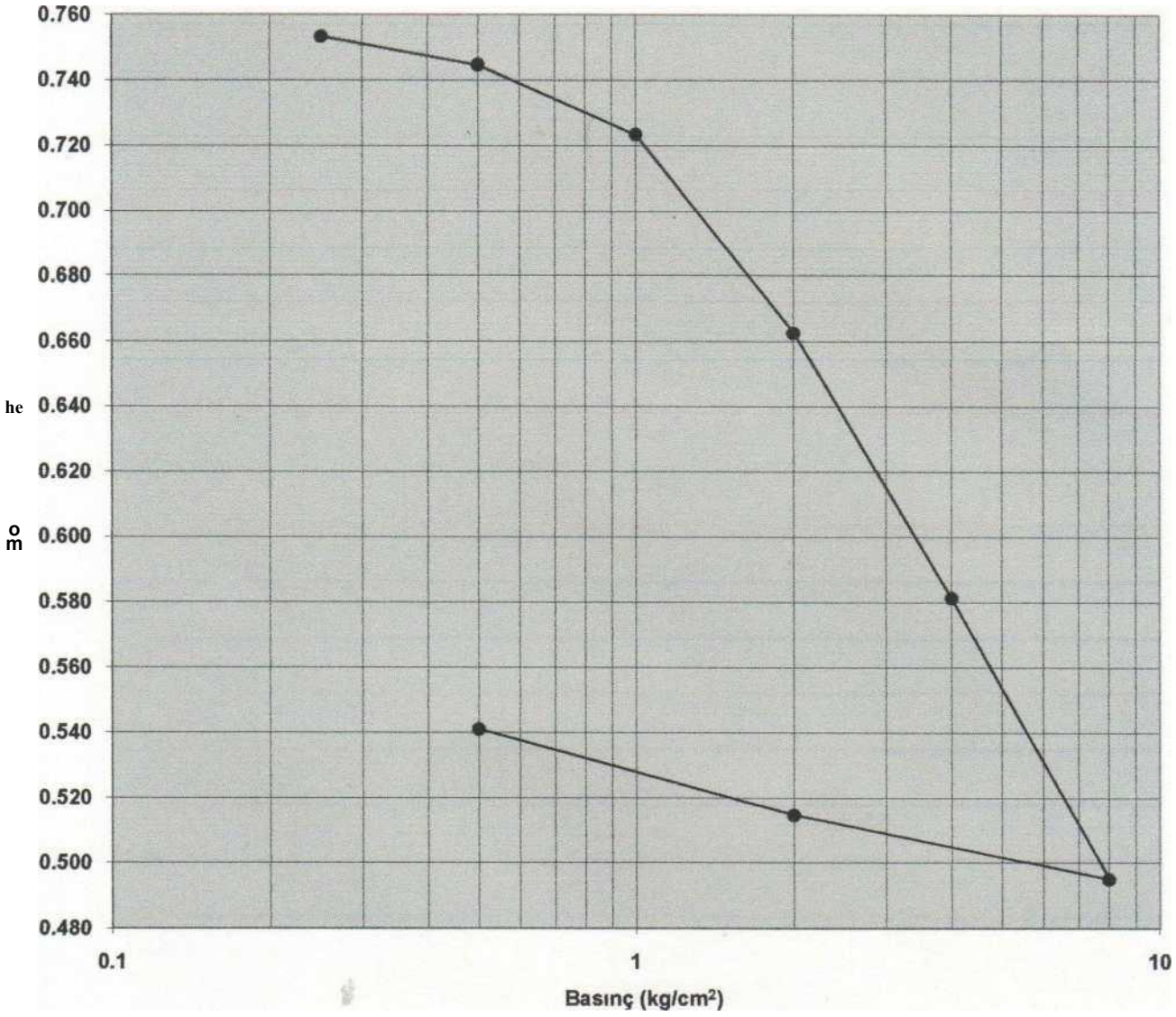
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CONSOLIDATION EXPERIMENT

(TS 1900-2)

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Project	ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT				Page: 86/88
Well No :	**SK-3**	Sample No:**Ud**	Depth (m):	**7.50**	History:**30.03.2020**



Natural water content	W	28.3	%
Initial vacancy rate	(to.)	0.760	
Natural unit volume weight	(i..)	1,962	t/m3
Dry unit volume weight	(Or)	1329	t/m3
Specific gravity	(Gs)	2,692	
Degree of saturation	(Sr.)	100	"/«
Inflation pressure			kg/cm!
Swelling percentage			%

p (kg/cm2)	mV (cm2/kg)	cv (cm2/min)	P< (kg/cm2)
0.00-0.25	0.0154	0.0091	1.2
0.25-0.50	0.0201	0.0083	Cc
0.50-1.00	0.0245	0.0077	0.3156
1.00-2.00	0.0358	0.0073	
2.00-4.00	0.0250	0.0075	cr
4.00-8.00	0.0140	0.0076	

Experimenter Geological Engineer H.Onur ŞİRİN
(Register Number: 19398)

ControlKecscience: Geological Engineer Mustafa
AuditorJJjÇITAK fe^'25563

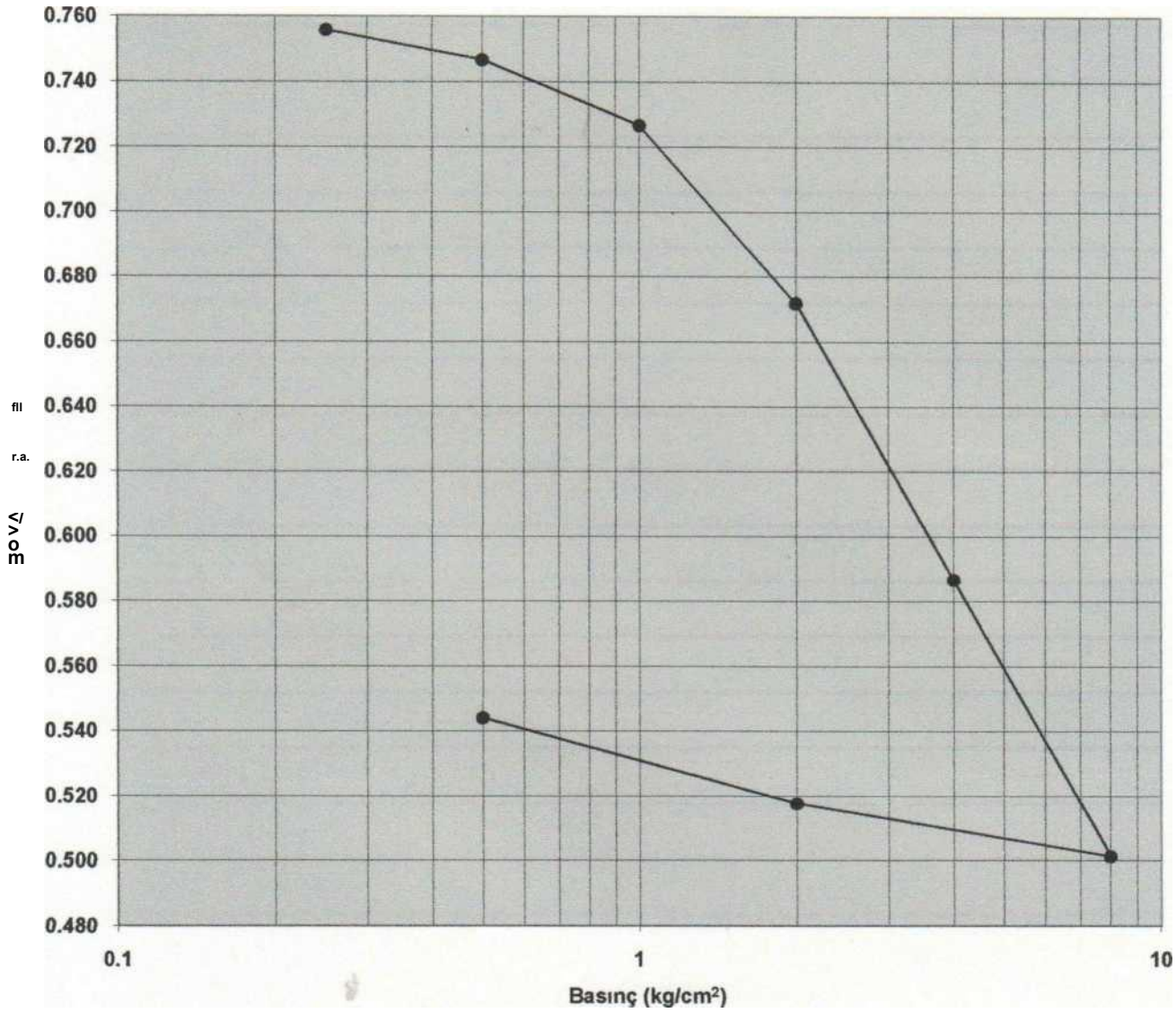
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Project	ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT				Page : 87/88
Well No :	SK-4	Sample No:Ud	Depth (m):	3.00	History:30.03.2020



Naturesu content	(w„)	28.3	%
Initial vacancy rate	(e0)	0.764	
Natural unit volume	(Tn)	1,959	t/mJ
Dry unit volume weight	(Or)	1526	t/mJ
Specific gravity	(G.)	2,692	
Degree of saturation	(Sr.)	HM»	%
Inflation pressure			kg/cm2
Swelling percentage			•/.

p (kg/cm2)	mV (cm2/kg)	Cv	pc (kg/cm2)
0.00-0.25	0.0175	0.0098	1.0
0.25-0.50	0.0210	0.0091	Cc
0.50-1.00	0.0231	0.0083	0.2226
1.00-2.00	0.0323	0.0084	
2.00-4.00	0.0261	0.0082	cr
4.00-8.00	0.0138	0.0083	

D&ıeyi Made by Geological Engineer H.Onur ŞİRİN
O^Register Number: 19398

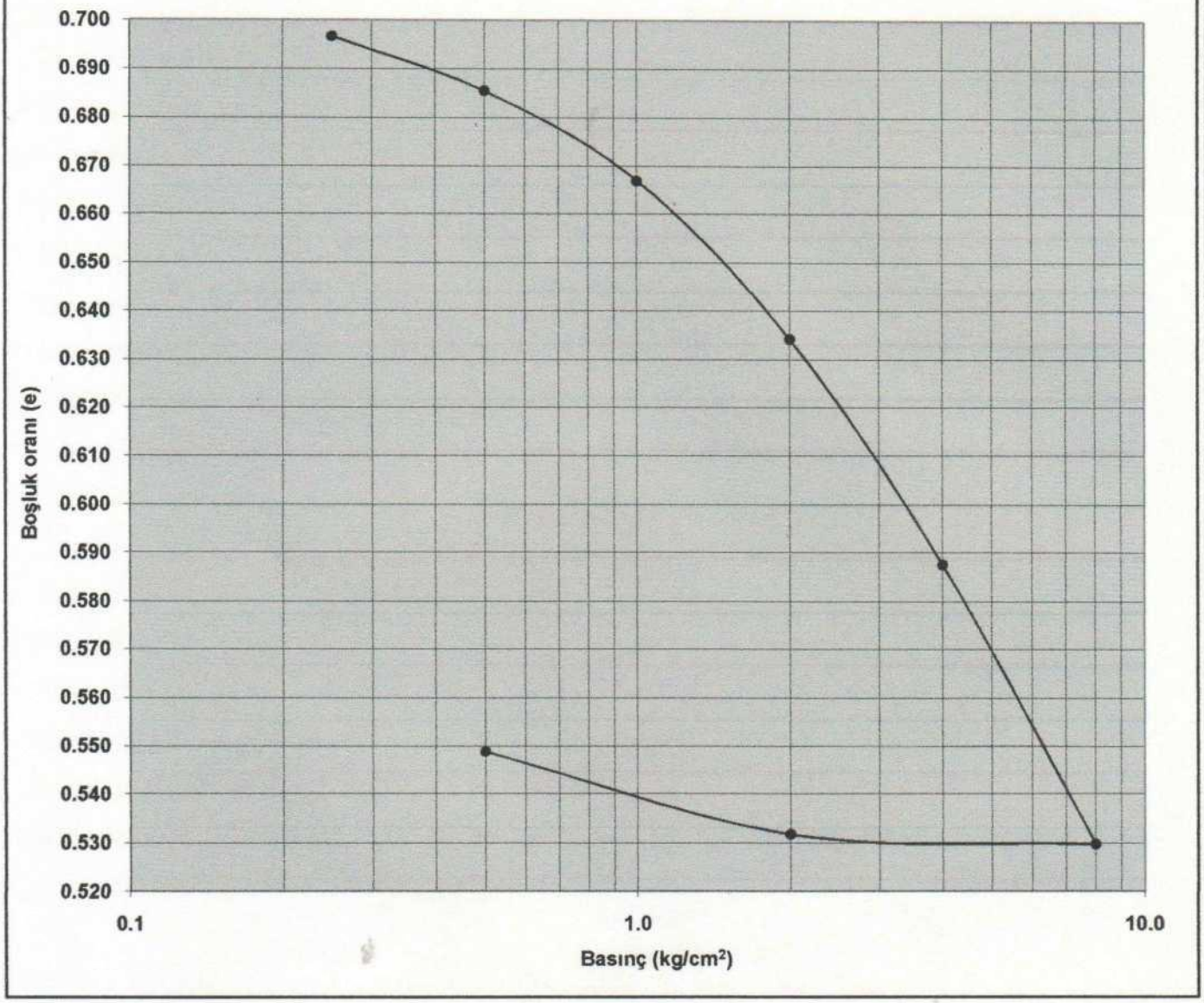
ControlT ictenGeology Engineer Mustafa ÇITAK
Den^t^| |J^gS^o:25563

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T.C.
ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI

Project : ANTALYA HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT			Page : 88/88
Well No : **SK-5**	Sample No:**Ud**	Depth (m): **1.50**	History:**30.03.2020**



Natural water content	(«n)	26.2	%
Initial vacancy rate	(to.)	0.707	
Natural unit volume weight	(Tn)	1,983	t/m3
Dry unit weight	(Or)	1,572	
Specific gravity	(G.)	2,683	
Degree of saturation	(S)	99	%
Inflation pressure			kg/cni2
Swelling percentage			%

p (kg/cm2)	mV (cm2/kg)	cv (cm2/min)	pc (kg/cm2)
0.00-0.25	0.0247	0.0097	1.1
0.25-0.50	0.0265	0.0096	Cc
0.50-1.00	0.0221	0.0085	0.1743
1.00-2.00	0.0198	0.0081	
2.00-4.00	0.0145	0.0082	cr
4.00-8.00	0.0093	0.0088	

Deneyi Yapan:Jeoloji Müh.H.Onur ŞİRİN
Oda Sicil No:19398

Kontrol Eden:Jeoloji Müh.Mustafa ÇITAK
Denetçi Belge No:25563

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TEK EKSENLİ BASMA DAYANIM DENEYİ
(ISRM)

T.C.
ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI
Belge No:0028

Business Owner : TOROS GEOTECHNICAL Co. Ltd. Etiler Mah. Adnan Menderes Blv.No:63/l 1 Muratpaşa/ANTALYA

Project : ANTALYA KONYAALTI HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT

Code : 10/583

BRN: 17323940

Well No.	Depth m	Height	Diameter	Weight in	Failure Load kN	Area cm2	Volume cm3	Correction Factor	Yn gr/cm3	Yd gr/cm3	»n %	qu kgf/cm2
SK-4	30.50	125.0	52.0	714.38	48.6	21.24	265.46	0.9756	2,691			227.6
	31.50	122.0	52.0	701.85	153.0	21.24	259.09	0.9787	2,709			718.9
SK-5	37.50	92.0	51.5	528.68	141.8	20.83	191.64	1.0157	2,759			705.0

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Den Done by: Geological Engineer H.Onur ŞİRİN
Registry Number: 19398

ControlEdgn: Geological Engineer Mustafa ÇITAK
DendM.I^lg^ghe:25563

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Antalya
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YENIANGORA SOIL AND SNOW MECHANICS LABORATORY

Alsancak District 2134. Street No:36/A Etimesgut/ANKARA Tel: 0312 245 55 68 / Fax: 0312 245 55 69

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DOCUMENT NO:419

TOTAL RESULTS REPORT

Test Standard			TS-EN ISO 17X92-3	TS-EN ISO 17H92-2	TS-EN ISO 17892-4			IS 1900-1				TS-699		TS 1900-2					S TS-EN ISO 17892-5		TS EN 1926	TS-699
Sample																						
Drilling Well Name	Type and Name	Depth (m)	**Natural Unit Volume Mass (gr/cm3)**	Natural Water Content (%)	Hydrometer	Sieve Analysis		Atterberg Limits			USCS	**Triaxial Compressive Strength of Rock**		Free Pressure (kgf/cm2)	Triaxial Pressure (UU)		Direct Cut (UU)		Consolidation (Oedometer)		Uniaxial Compression in Rock Strength (kgf/cm2)	Point Loading *Is=P/De2 (kgf/cm2)
						#4 Remaining (%)	#230 Passing (%)	LL (%)	PL (%)	PI (%)		***cup (Mpa)**	*fup (HE)		*cup (kN/m2)	*fup o	*Cup (kgf/cm2)	(")	Swelling Percentage (%)	Inflation Pressure (kgf/cm2)		
SK-l	SPT	1.50-	1.97	18.69		5.20	23.61	__		NP	SM	__	__	__	__		0.22	20	__	__	__	
SK-2	SPT	4.50-	1.94	20.36		10.79	29.26	27	20	7	SC		__	__	__		0.21	17	__	__	__	
SK-3	SPT	6.00-	1.98	24.34		20.22	8.50	__	__	NP	SP	__	__	__	__		0.19	20	__	__	__	__'
SK-4	SPT	4.50-	1.86	21.80	__	9.08	27.86	31	20	11	SC		__	__	__		0.20	20	__	__	__	

PROJECT	ANTALYA PROVINCE KONYAALTI MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA		
FIRM	TOROS GEOTECHNICAL	LABNO	0640/2020
REPORT DATE	11.03.2020	JUMUN ARRIVAL DATE	05.03.2020
REPORTNO	0674/2020	BRN	17261067

Experimenter

Geo. Eng. Hasan KARATAŞ

Chamber Registration Number: 18439

Signature:

Lab. Auditor Eng.

Geo. Eng. Yaşar ALKIL1Ç

Chamber Registration Number: 1091\

Yaşar ALK1LIC

Signature:____ Denetai Engineer

*Our laboratory is not responsible for any changes that may occur due to whether the sample/samples were taken by an expert or not, or due to partial or complete changes in the place and source of the sample.

*This test result form and the test result graphs given in the appendix are obtained without the permission of our laboratory. It cannot be copied or changed partially or completely.

*This test result form belongs only to the samples submitted to our laboratory for the above mentioned work and specified in the form.

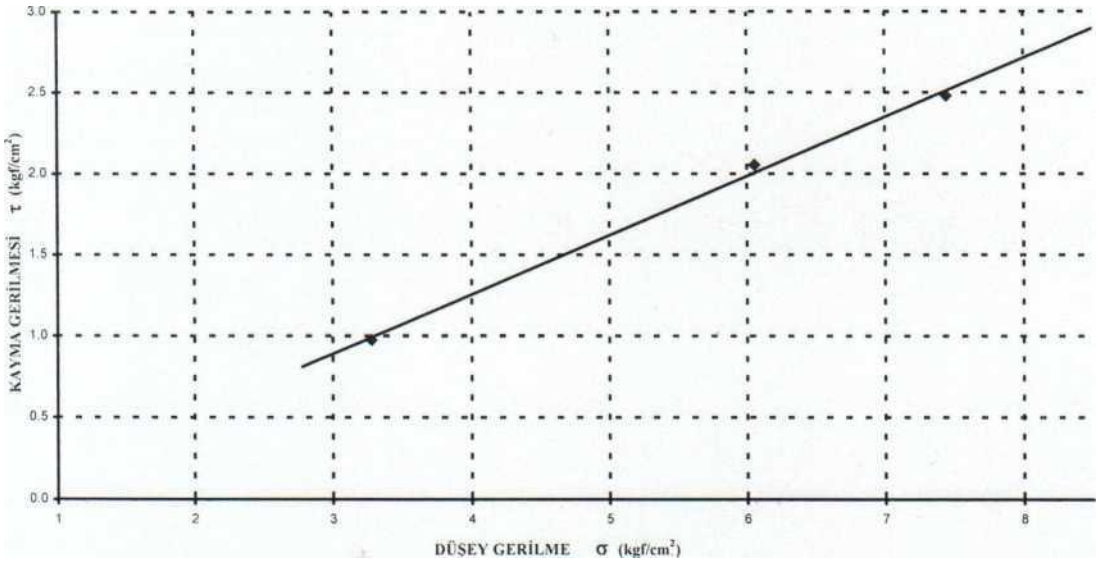
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MINISTRY OF URBAN PLANNING

NEW ANGORA SOIL AND ROCK MECHANICS LABORATORY
Tel: 0312 245 55 68 / Fax: 0312 245 55 69
Alsancak District 2134. Street No:30/A Etimesgut/ANKARA

RMINATION OF SLIP RESISTANCE BY CUTTING BOX TEST REPORT (TS 1900-2)

Employer		TOROS GEOTECHNICAL			
Project name		ANTALYA PROVINCE KONYAALTI MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA			
Drilling No.		SK.-4			
Label information		SPT			
Depth (m)		4.50-			
Type of experiment	uu				
Water saturation process		Experiment Start Date	05.03.2020		
Yes	No	Experiment End Date	05.03.2020	Lab Number:	0640/2020
	X				
Sample Information	Sample 1	Sample 2	3. Sample		
Weight Used (kgf)	10.00	20.00	25.00		
Vertical stress (o) (kgf/cm2)	2,778	5,556	6,944		
Cell area (cm2)	36.00	36.00	36.00		
Height (cm)	1.50	1.50	.50		
Volume(cm ^{3})	54.00	54.00	54.00		
Weight(gr)	i00.28	100.41	100.35		
Unit Volume Mass (gr/cm3)	1.86	1 86	86		
Max. cutting reading	35.2	74.0	89.3		
Shear stress (T) (kgf/cm3)	098	2.06	2.48		
Ring coefficient	1				
Internal friction angle (<|>) 20.0 0		Cohesion (e) 0.20 kgf/cm2			



* Address information is a declaration to the bakery
*The test results in question belong only to the tested test samples.
* Our laboratory has the Laboratory Permit Certificate No. 419 dated 05.04.2013 issued by the General Directorate of Construction Works of the Ministry of Environment and Urbanization in accordance with the law No. 4708.
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Rev.Date/No 03.03.201 7/03 Sheet-12 Page No 1/2

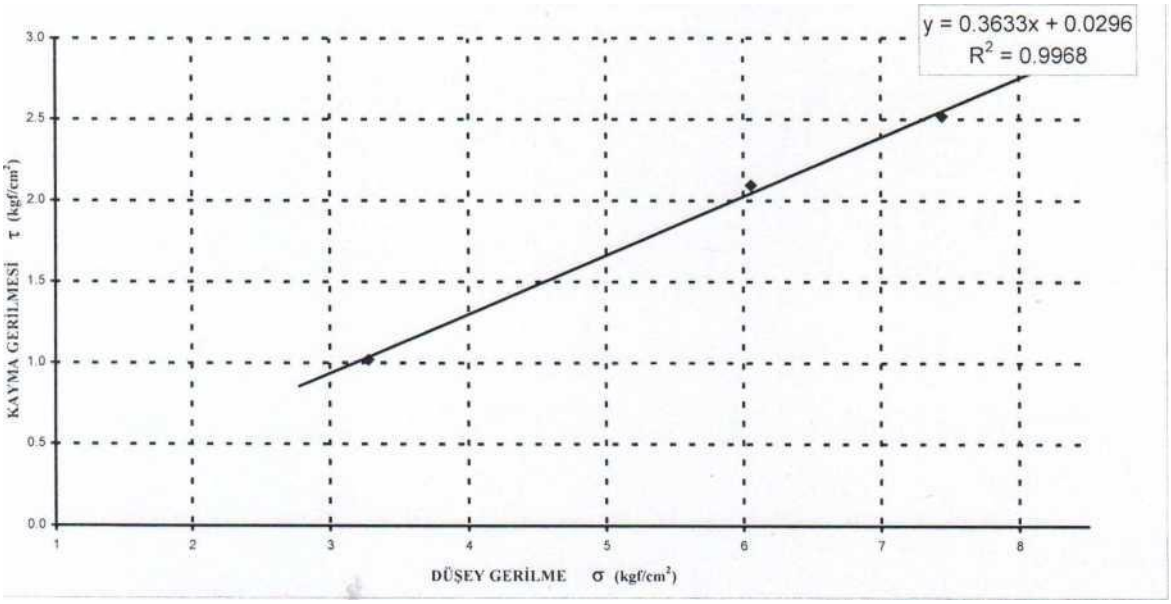
Experimenter
Geo. Eng. Hasan K. ARATAŞ
Chamber Registration Number: 18439
Signature:

Lab. Auditor Eng.
Geology Engineer Yaşar ALK1LIÇ
Chamber Registration Number: 1091
Signature:

YasarAVULIC
Auditor EngineerAuditor5296

Chamber RegistryİMOATOST1

NEW ANGORA SOIL AND ROCK MECHANICS LABORATORY
Alsancak District 2134. Street No:36/A Etimesgut/ANKARA



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Rev.Date/No 03.03.2017/03
Leaflet-12

Experimenter
Geo. Eng. Hasan KARATAŞ
Chamber Registration
Number: 18439
Signature:

Lab. Auditor Eng.
Geology Engineer Yaşar ALKILIÇ
Chamber Registry
Number: 1(

Yaşar ALKILIÇ
Denetçi Mühendis
Denetçi Belge No:5296
Oda Sicil No:1091

Tel: 0312 245 55 68 / Fax: 0312 245 55 69

DETERMINATION OF SLIP RESISTANCE BY CUTTING BOX TEST REPORT (TS 1900-2)

Employer		TOROS GEOTECHNICAL			
Project name		ANTALYA PROVINCE KONYAALTI MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA			
Drilling No.		SKI			
Label information		SPT			
Depth (m)		1.50-			
Type of experiment	DU				
Water saturation process		Experiment Start Date	05.03.2020		
Yes	No				
	x	Experiment End Date	05.03.2020	Lab Number:	0640/2020

Sample Information	Sample 1	Sample 2	3. Sample
Weight Used (kgf)	10.00	20.00	25.00
Vertical stress (o) (kgf/cm2)	2,778	5,556	6,944
Cell area (cm2)	36.00	36.00	36.00
Height (cm)	1.50	1 50	.50
Volume(cm ^{3})	54.00	54.00	54.00
Weight(gr)	106.16	106 24	106.33
Unit Volume Mass (gr/cm3)	1.97	1 97	97
Max. cutting reading	36.8	75.5	90.7
Shear stress (τ) (kgf/cm3)	1.02	2.10	2 52
Ring coefficient	1		

Internal friction angle (<|>)	Cohesion (e)
20.0 0	0-22 kgf/cm2

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Alsancak District 2134. Street No:36/A Etimesgut/ANKARA
Tel: 0312 245 55 68 / Fax: 0312 245 55 69

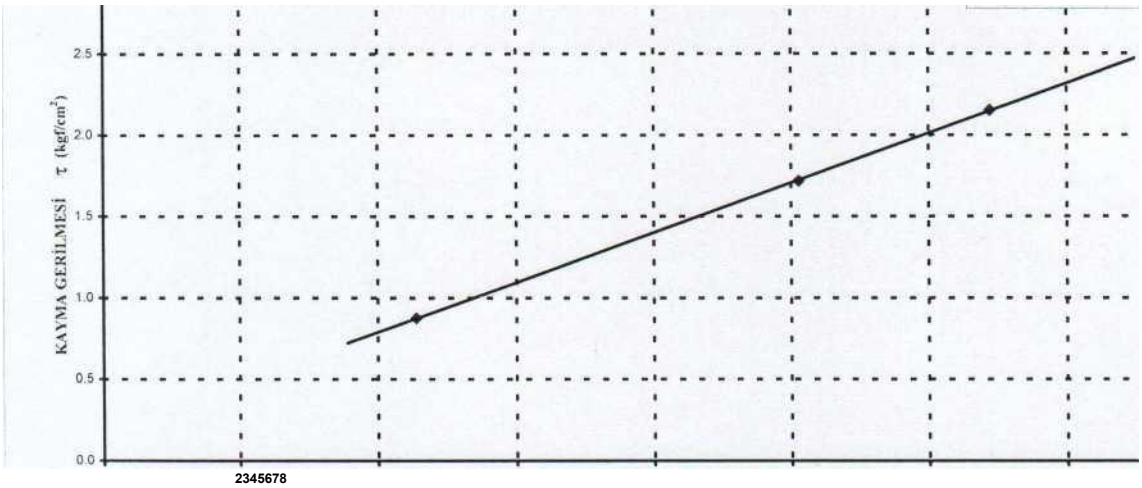
DETERMINATION OF SLIP RESISTANCE BY CUTTING BOX TEST REPORT (TS 1900-2)

Employer		TOROS .1EOTECHNIC			
Project name		ANTALYA PROVINCE KONYAALT1 MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA			
Drilling No.		SK.-2			
Label information		SPT			
Depth (m)		4.50-			
Type of experiment	uu				
Water saturation process		Experiment Start Date	05.03.2020		
Yes	No			Lab Number:	0640/2020
	X	Experiment End Date	05.03.2020		

Sample Information	Sample 1	Sample 2	3. Sample
Weight Used (kgf)	10.00	20.00	25.00
Vertical stress (a) (kgf/cm2)	2,778	5,556	6,944
Cell area (cm2)	36.00	36.00	36 00
Height (cm)	1.50	1.50	.50
Volume(cm 3)	54.00	54.00	54.00
Weight(gr)	104.69	104.72	104.55
Unit Volume Mass (gr/cm3)	1.94	1.94	.94
Max. cutting reading	31.6	61.9	77.5
Shear stress (T) (kgf/cm3)	088	1.72	2.15
Ring coefficient	1		

Internal friction angle (<t>) 17.0 0	Cohesion (e) 9-21 kgf/cm2

y = 0.3056x + 0.0272R2 = 0.9999



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Rev.Date/No 03.03.2017/03
Leaflet-12

Experimenter
Geo. Eng. Hasan K. ARATAŞ
Chamber Registration
Number: 18439
Signat

YENİ ANGORA JEOLOJİ LABORATUVARI
Alsancak Mahallesi

Lab. Auditor Eng.
Geology Engineer Yaşar
ALKILIÇ
Chamber Registration Number: 1091
Signature:

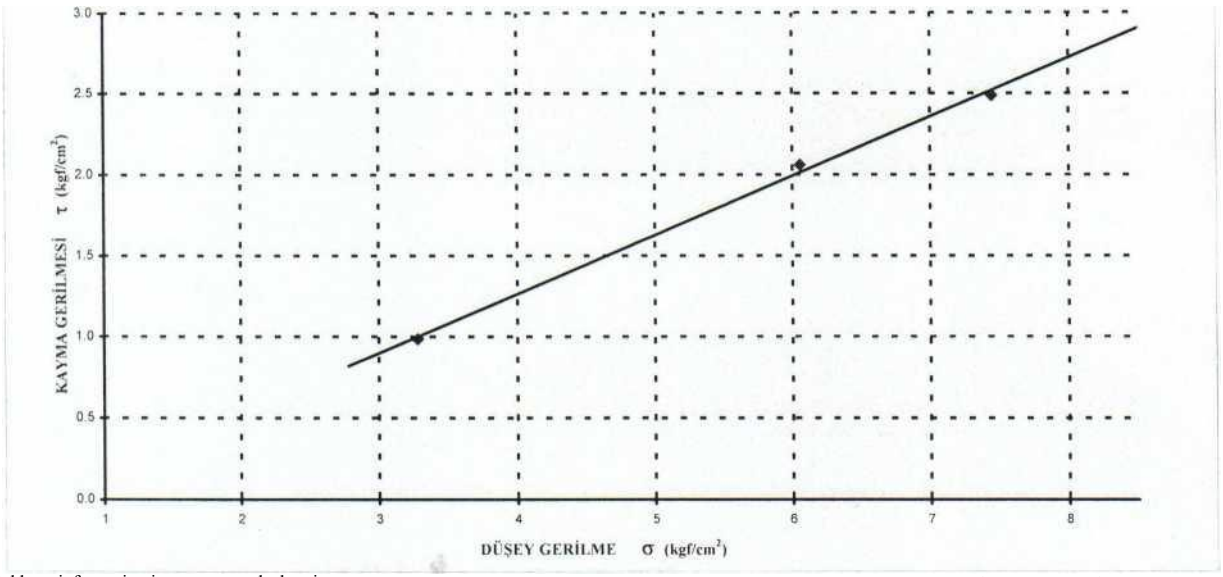
Yasar AS ILIC
Auditor M. myself
Auditor Rnh

NEW ANGORA SOIL AND ROCK MECHANICS LABORATORY
Alsancak District 2134. Street No:36/A Etimesgut/ANKARA
Tel: 0312 245 55 68 / Fax: 0312 245 55 69

/'a* TC ENVIRONMENT AND MINISTRY OF URBANIZATION!

DETERMINATION OF SHEAR BOX IEE RESISTANCE TEST REPORT (TS 1900-2)

Employer		TOROSGEOTECHNICAL			
Project name		ANTALYA PROVINCE KONYAALTI MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA			
Drilling No.		SK.-3			
Label information		SPT			
Depth (m)		6.00-			
Type of experiment	UU				
Water saturation process		| Experiment Start Date	05.03.2020		
Yes	No			Lab Number:	0640/2020
	X	|Experiment End Date	05.03.2020		
Sample Information		Sample 1	Sample 2	3. Sample	
Weight Used (kgf)		10.00	20.00	25.00	
Vertical stress (a) (kgf/cnı2)		2,778	5,556	6,944	
Cell area (cm2)		36.00	36.00	36.00	
Height (cm)		1.50	1.50	.50	
Volume(cm 3)		54.00	54.00	54.00	
Weight(gr)		106.69	106.82	106.80	
Unit Volume Mass (gr/cm3)		1.98	1.98	1.98	
Max. cutting reading		31.6	61.9	77.5	
Shear stress (T) (kgf/cm3)		0.99	2.06	2.49	
Ring coefficient		1			
Internal friction angle (<|>) 20.0 "			Cohesion (e) 0.19 kgf/cm2		

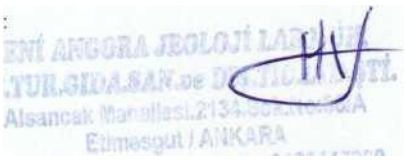


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Leaflet-12

Experimenter
Geo. Eng. Hasan KARATAŞ
Chamber Registration
Number: 18439
Lab. Auditor Eng.

Geology Engineer Yaşar ALKIL1Ç
Chamber Registration
Number: 1091



Signature:

Yaşar AİSKJLİÇ
Auditor Minjendis

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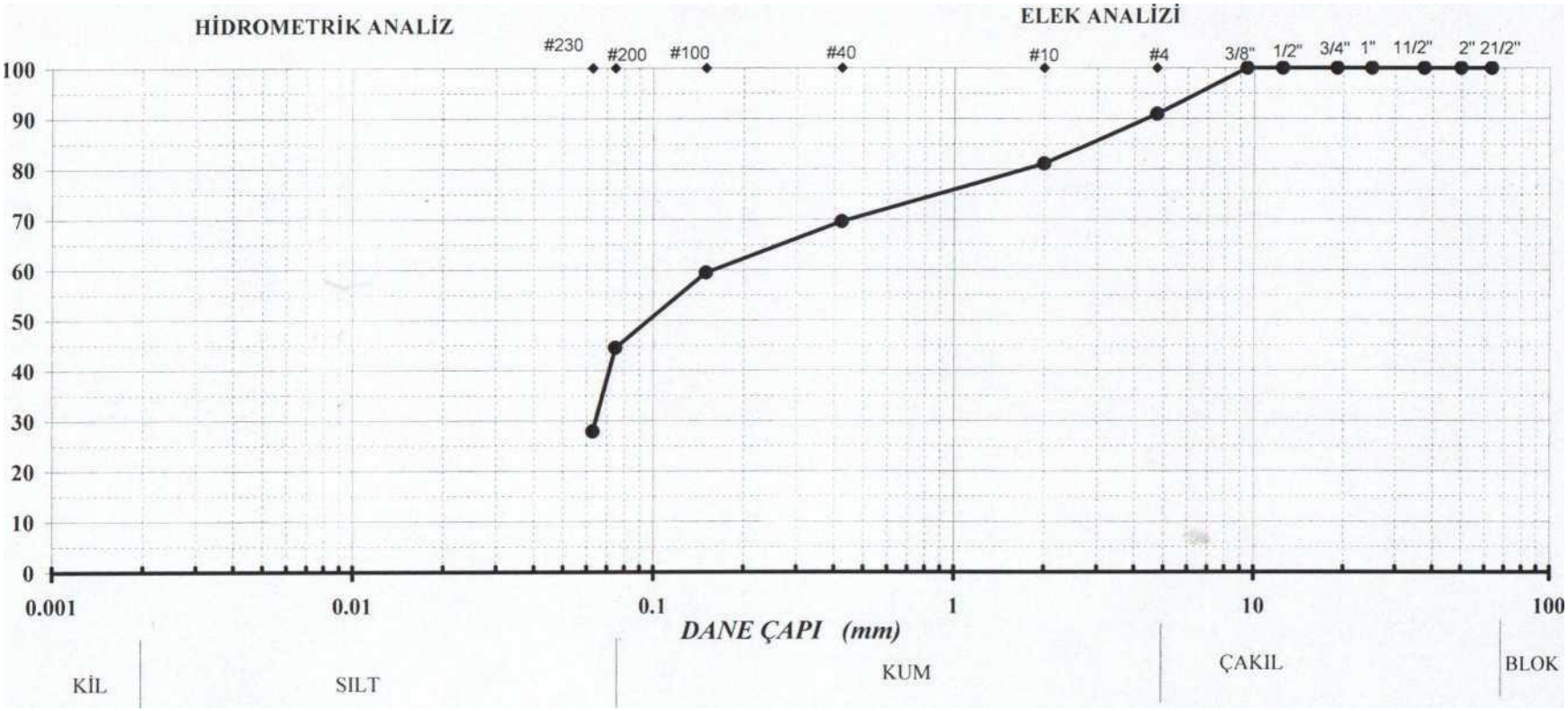
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Alsancak District 2134. Street No:36/A Etimesgut/ANKARA Tel: 0312 245 55 68/Fax: 0312 245 55 69

TC ENVIRONMENT AND MINISTRY OF URBAN PLANNING

FRO M E **DISTRIBUTION CURVE EXPERIMENT REPORT**

Contractor	TOROSGEOTECHNICAL				
Project name	ANTALYA PROVINCE KONYAALT1 MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA				
Borehole	SK-4				
Sample name/Depth(m)	SPT/4.50-	Gravel amount %	9.08	Experiment Start Date	06.03.2020
Test method	DRY	Sand amount %	63.07	Experiment End Date	06.03.2020
Test Standard	TS-EN ISO 17892-4	Fine(clay - silt) amount %	27.86	Lab No	0640/2020



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Experimenter

Geo. Eng. Hasan KARATAŞ
Chamber Registration Number: 18439
Signature:

Lab. Auditor Eng.

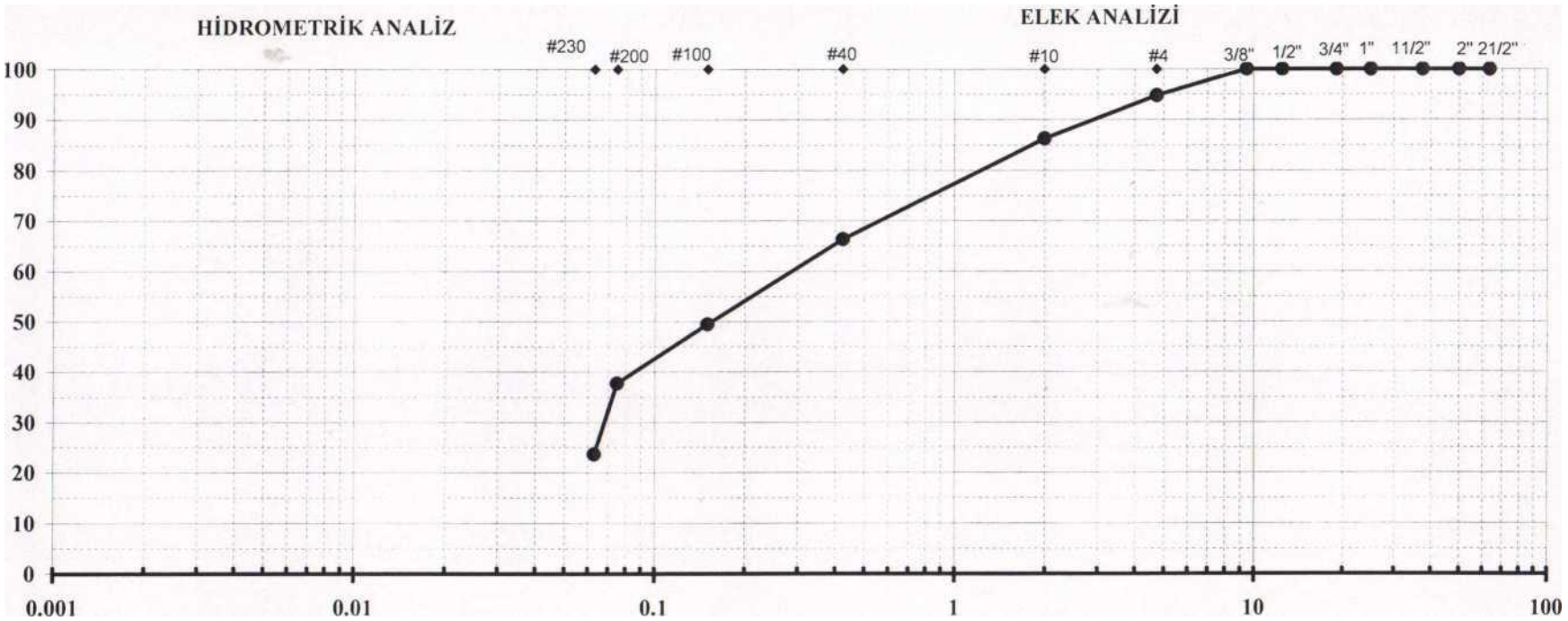
Geo. Eng. Yaşar ALKILIÇ
Chamber Registration Number: 1091
Signature: Yasar Ali
Auditor Eng.
Auditor N >298
Ckcla SalGi*

NEW ANGORA SOIL AND ROCK MECHANICS LABORATORY

Alsancak District 2134. Street No:36/A Etimesgut/ANKARA Tel: 0312 245 55 68 / Fax: 0312 245 55 69/*;

GRAIN DIAMETER DISTRIBUTION CURVE EXPERIMENT REPORT

Contractor	TOROS GEOTECHNICAL				
Project name	ANTALYA PROVINCE KONYAALTI MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA				
Borehole	SK-T-				
Sample name/Depth(m)	SPT / 1.50-	Gravel amount %	5.20	Experiment Start Date	06.03.2020
Test method	DRY	Sand amount %	71.18	Experiment End Date	06.03.2020
Test Standard	TS-EN ISO 17892-4	Fine(clay - silt) amount %	23.61	Lab No	O64Ö/2Ö20



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Experimenter

Geo. Eng. Hasan KARATAŞ
Chamber Registration Number: 18439 signature:

Lab. Auditor Eng.

Geo. Eng. Yaşar ALKILIÇ Chamber Registration Number: 1091

Auditing Engineer
Auditor Bele'Otla
Registry

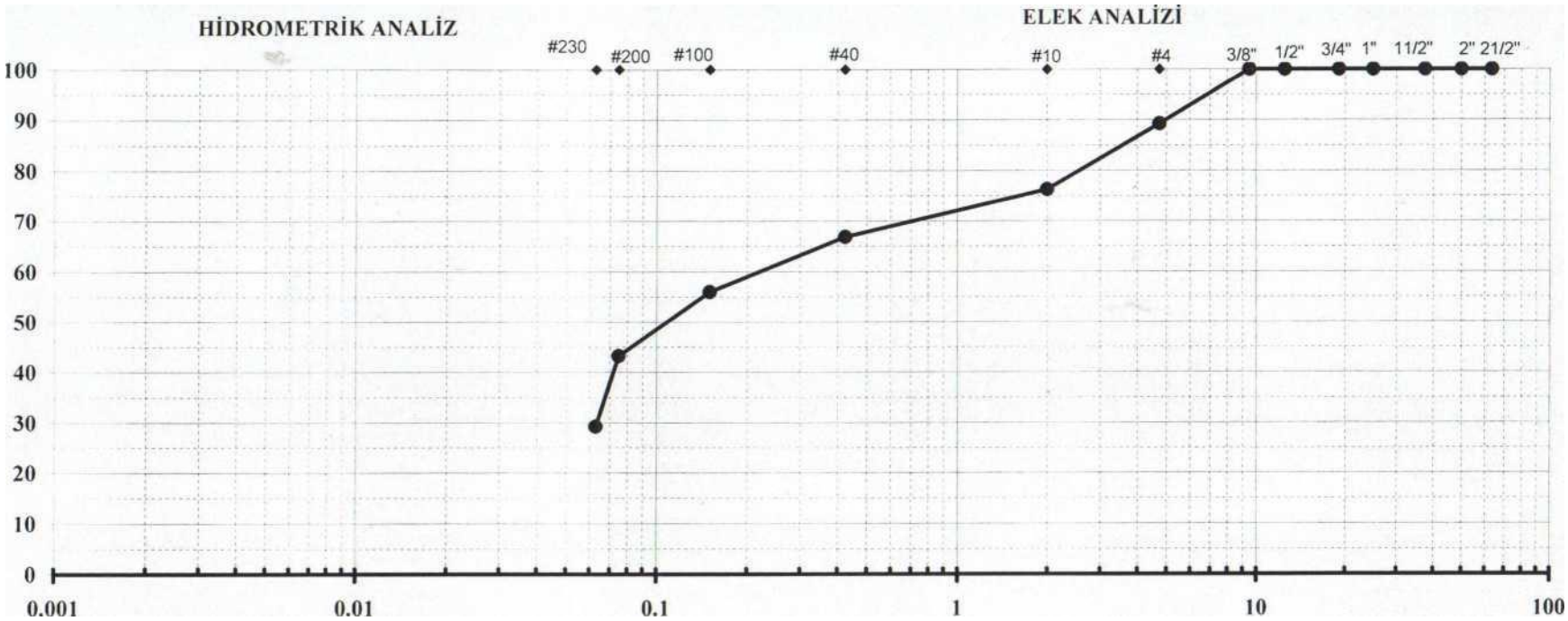
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Alsancak District 2134. Street No:36/A Etimesgut/ANKARA Tel: 0312 245 55 68 / Fax: 0312 245 55 69

ENVIRONMENT AND ŞEHISTRY

DRUNK DISTRIBUTION CURVE EXPERIMENT REPORT

Contractor	TOROS GEOTECHNICAL				
Project name	ANTALYA PROVINCE KONYAALTI MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA				
Borehole	SK-Z-				
Sample name/Depth(m)	SPT/4.50-	Gravel amount %	10.79	Experiment Start Date	06.03.2020
Test method	DRY	Sand amount %	59.95	Experiment End Date	06.03.2020
Test Standard	TS-EN ISO 17892-4	Fine(ki) - silt amount %	29.26	Lab No	O640/202O



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Experimenter

Geo. Eng. Hasan KARATAŞ
Chamber Registration
Number: 18439 signature:

Lab. Auditor Eng.

Geo. Eng. Yaşar ALKILIÇ
Chamber Registry Number:
1091 signature: A
Yaşar ALKfbiÇ
Auditing Engineer
Unified BeFg-»
Oh No, ...

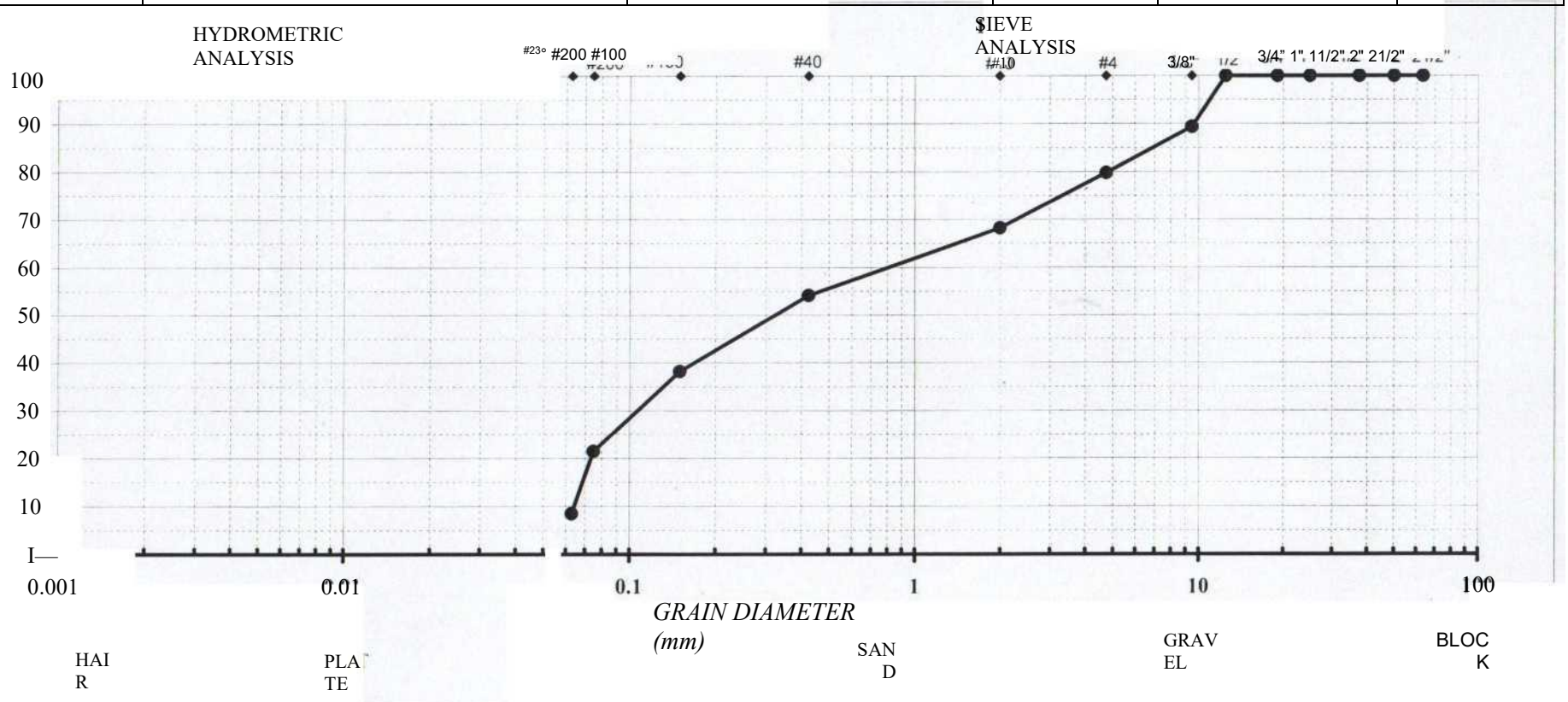
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Alsancak District 2134. Street No:36/A Etimesgut/ANKARA Tel: 0312 245 55 68 / Fax: 0312 245 55 69

TC ENVIRONMENT AND MINISTRY OF URBAN PLANNING

DRUNK DISTRIBUTION CURVE EXPERIMENT REPORT

Contractor	TOROS GEOTECHNICAL				
Project name	ANTALYA PROVINCE KONYAALTI MUNICIPALITY HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA				
Borehole	SR73				
Sample name/Depth(m)	SPT/6.00-	Gravel amount %	20.22	Experiment Start Date	06.03.2020
Test method	DRY	Sand amount %	71.28	Experiment End Date	06.03.2020
Test Standard	TS-EN ISO 17892-4	Fine(clay - silt) amount %	8.50	Lab No	0640/2020



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Experimenter

Geo. Eng. Hasan KARATAŞ
Chamber Registration Number: 18439 signature:

Lab. Auditor Eng.

Geo. Eng. Yaşar ALKILIÇ
Chamber Registration Number: 1091 signature:

YaşarsıLKlLlÇ
Auditor Inspector

Ocxâ &ıcıı

Çözüm Jeoteknik
Uygulamaları Mühendislik İnşaat Tic. Ltd. Şti
C.Atif Kansu St: Oguzlar Mh. 1378 . Sk. 7/A Balgat- ANKARA
Tel: 0312 285 55 56 Fax: 0312 285 55 57
www.cozumjeoteknik.com.tre-mail :info@cozumjeoteknik.com.tr

CONCRETE CONTACT WATER ANALYSIS REPORT

The company that took the sample is TOROS GEOTECHNICAL ENGINEERING MIM.LTD.CO.

Project It Belongs To ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA
Sample No. SK-1
Sample Recipe THIS
Sample Arrival Date 3.3.2020
Experiment Start Date 19.3.2020
Experiment End Date 20.3.2020
Laboratory No.

Parameter	Method	Harmful Activity Degree According to TS 3440			Measurement Temperatur	Unit	Value
		Weak	Strong	Very Strong			
pH (25 °C)	TS EN ISO 10523 / June 2012 Electrometric	6.5 ~ 5.5	5.5~4.5	Less than 4.5	18.2		7.71
Sulfate	Barium Sulfate - Turbidity	200~600	600 ~ 3000	More than 3000		mg/l	480.00
Chloride	TS 4164 ISO 9297	-	-	-		mg/l	260.78
Magnesium	SM 3500 - Mg B	300~1000	1000~3000	More than 3000		mg/l	98.66
KMn04 Expenditure	TS 3440	-				mg/l	0.53
Limescale Remover Carbonic Acid	TS 3440	15~40	40~100	More than 100		mg/l	0.00
Total Alkalinity	Acid, Indicator SM 18th Edition	-	-	-		mg/l	460.00
Ammonium	Salicylate SM 18th Edition	15~30	30~60	over 60		mg/l	2.40
Hardness	SM 2340 C EDTA	-	-	-		mg/l	923.65

***The result is calculated from hardness and calcium values.**

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2 - Samples coming to our laboratory are taken by the customer. Our laboratory is not responsible for the samples not being representative.

3 - The location and depth of the samples are written according to the customer's declaration. The responsibility belongs to the person and organization that makes the declaration.

4 - Test results belong only to the tested sample.

Çözüm Jeoteknik
Uygulamaları Mühendislik İnşaat Tic. Ltd. Şti
C.Atif Kansu St: Oguzlar Mh. 1378 . Sk. 7/A Balgat- ANKARA
Tel: 0312 285 55 56 Fax: 0312 285 55 57
www.cozumjeoteknik.com.tre-mail :info@cozumjeoteknik.com.tr

CONCRETE CONTACT WATER ANALYSIS REPORT

The company that took the sample is TOROS GEOTECHNICAL ENGINEERING MIM.LTD.CO.

Project It Belongs To ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER TREATMENT PLANT SLUDGE BURNING UNIT AREA
Sample No. SK-3
Sample Recipe THIS
Sample Arrival Date 3.3.2020
Experiment Start Date 19.3.2020
Experiment End Date 20.3.2020
Laboratory No.

Parameter	Method	Harmful Activity Degree According to TS 3440			Measurement Temperatur	Unit	Value
		Weak	Strong	Very Strong			
pH (25 °C)	TS EN ISO 10523 / June 2012 Electrometric	6.5 ~ 5.5	5.5~4.5	Less than 4.5	20.6		7.09
Sulfate	Barium Sulfate - Turbidity	200~600	600 ~ 3000	More than 3000		mg/l	438.00
Chloride	TS 4164 ISO 9297	-	-	-		mg/l	281.92
Magnesium	SM 3500 - Mg B	300~1000	1000~3000	More than 3000		mg/l	99.15
KMn04 Expenditure	TS 3440	-				mg/l	0.35
Limescale Remover Carbonic Acid	TS 3440	15~40	40~100	More than 100		mg/l	0.00
Total Alkalinity	Acid, Indicator SM 18th Edition	-	-	-		mg/l	500.00
Ammonium	Salicylate SM 18th Edition	15~30	30~60	over 60		mg/l	1.70
Hardness	SM 2340 C EDTA	-	-	-		mg/l	913.50

***The result is calculated from hardness and calcium values.**

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4 - Test results belong only to the tested sample.



SK-1DRILLING WELL

Qal **ALLUVIAL UNIT (CLAY, SAND, GRAVEL)**

ANNEX-7-B: INVESTIGATION AREA DRILLING LOCATION

Filling Material

Brown low gravel Clay Unit

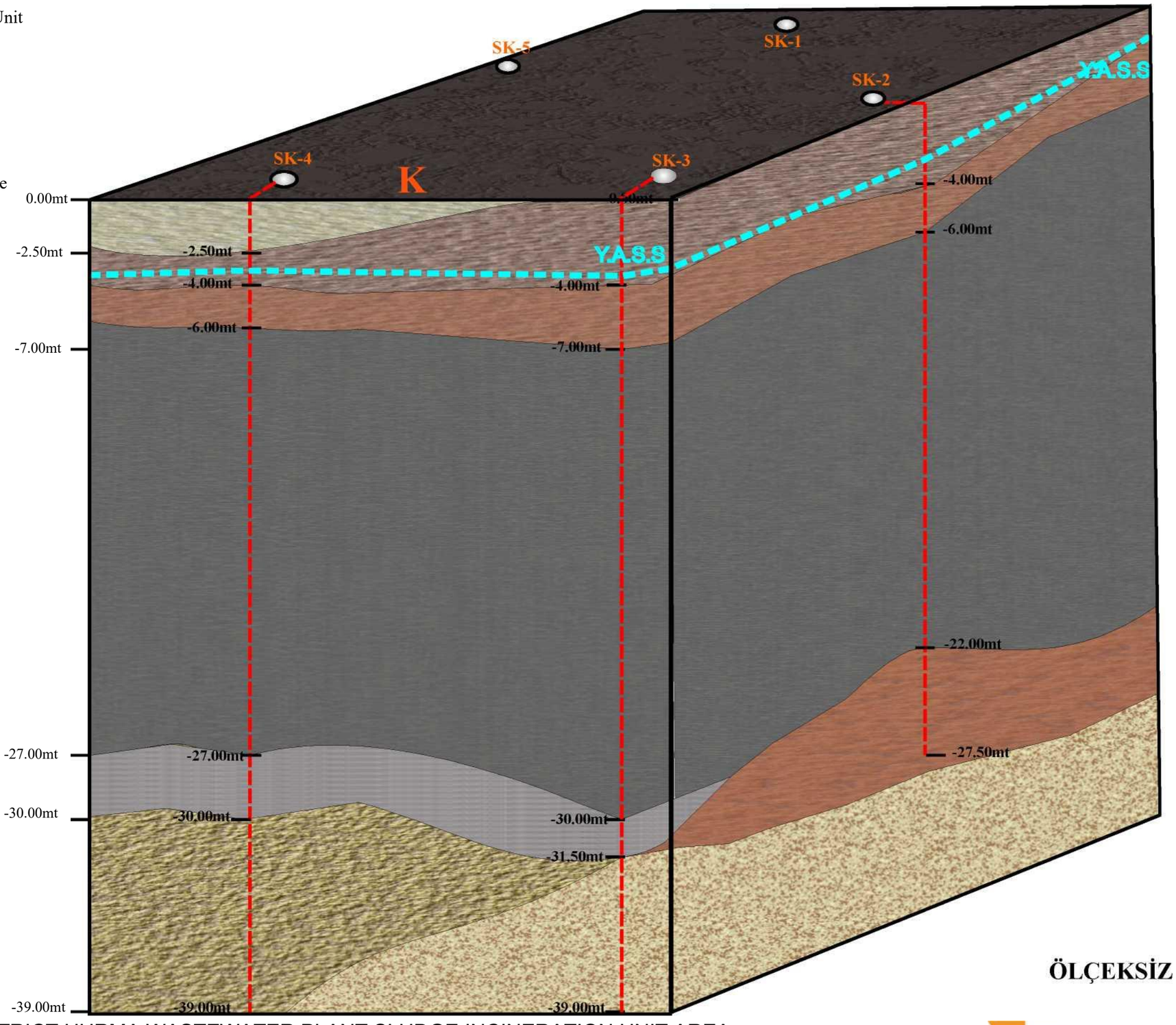
Brown clayey sand unit

Gray coloured Silty Clay

Clay-lined beige limestone

Brown big Limestone Block Slope Rubble

Brown, slightly gravelly, sandy clay unit



ÖLÇEKSİZ

ANTALYA KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT AREA
GEOLOGY SECTION

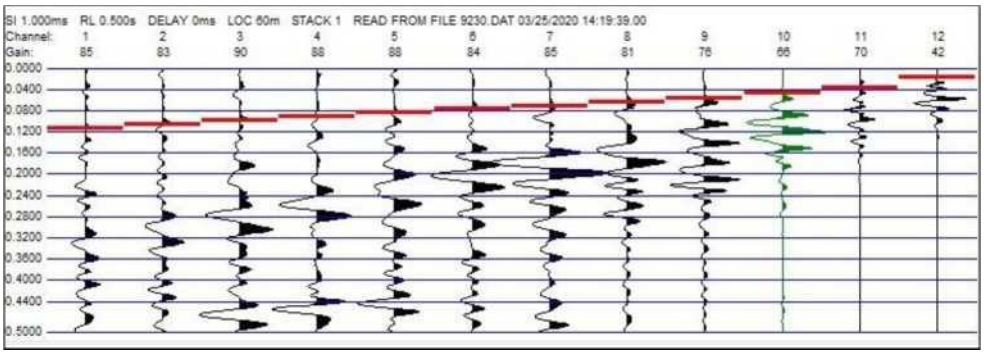
TOROS GEOTECHNICAL ENGINEERING CO. LTD.

ANNEX-9.

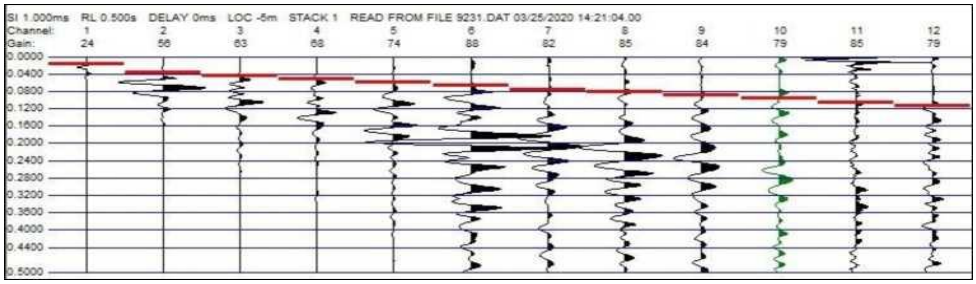
ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE BURNING UNIT AREA

1. SERIES

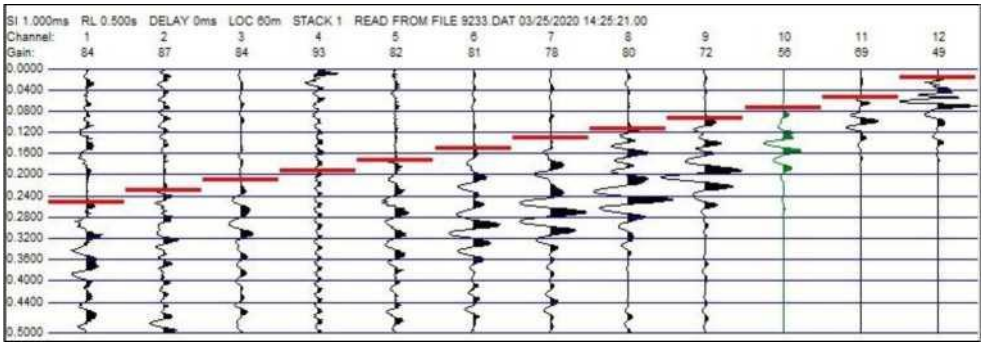
P REVERSE



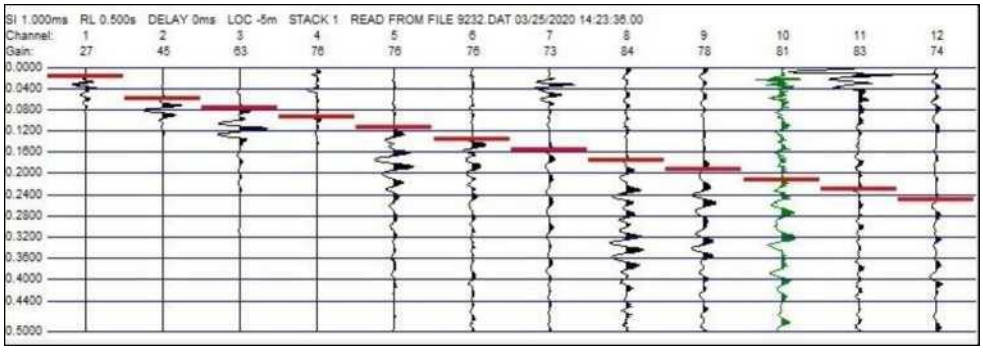
P FLAT



S REVERSE



S FLAT

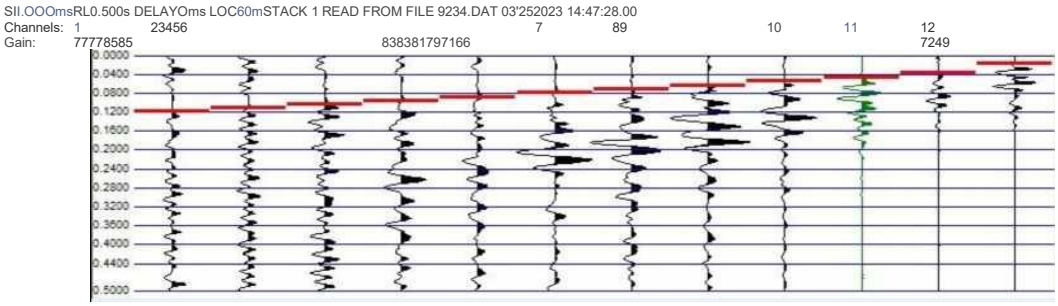


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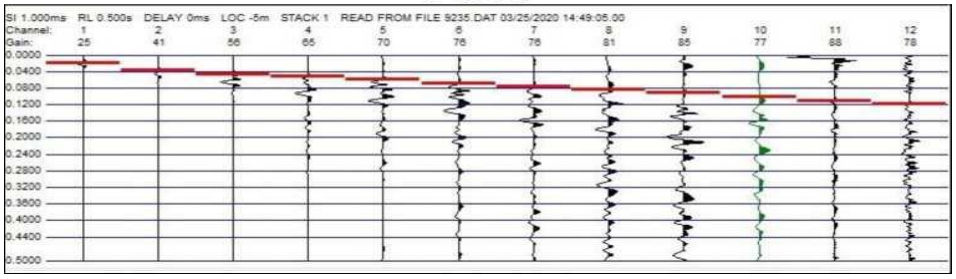
ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT AREA

2. SERIM

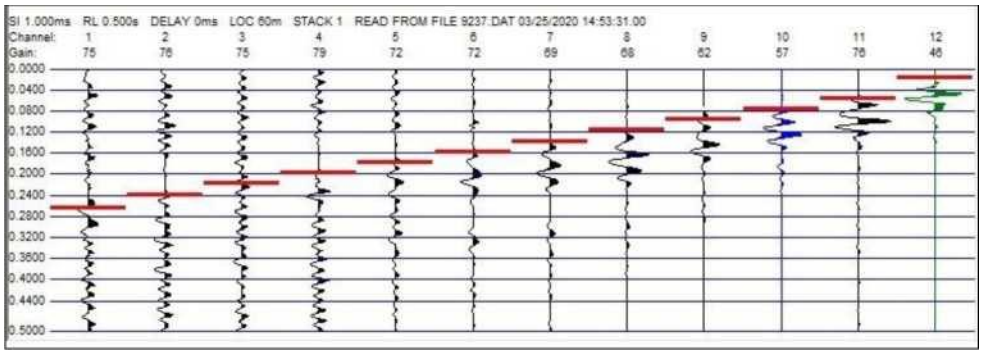
P REVERSE



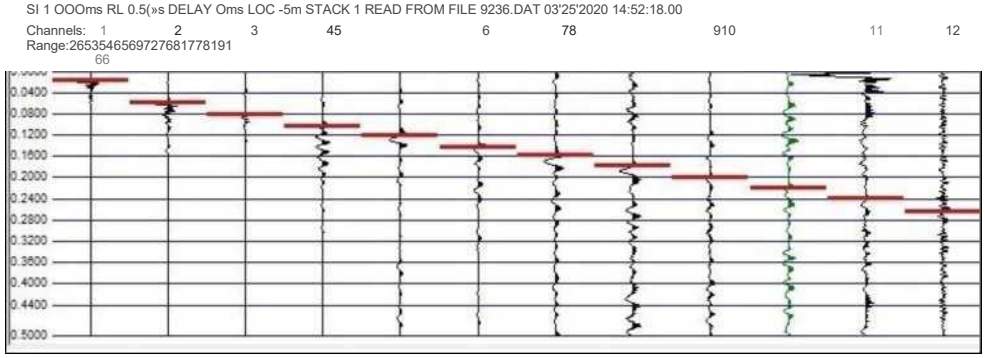
P DÜZ



REVERSE S



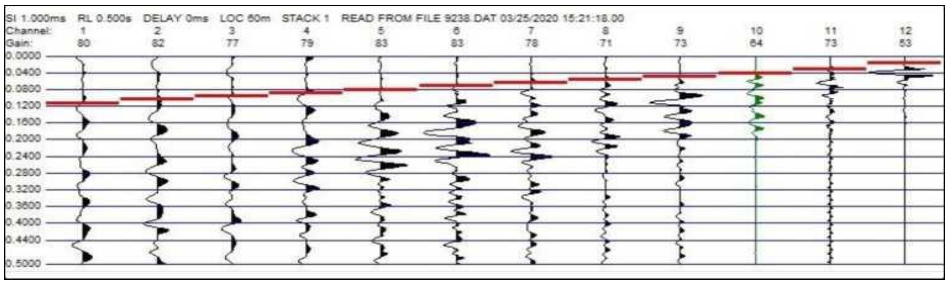
S FLAT



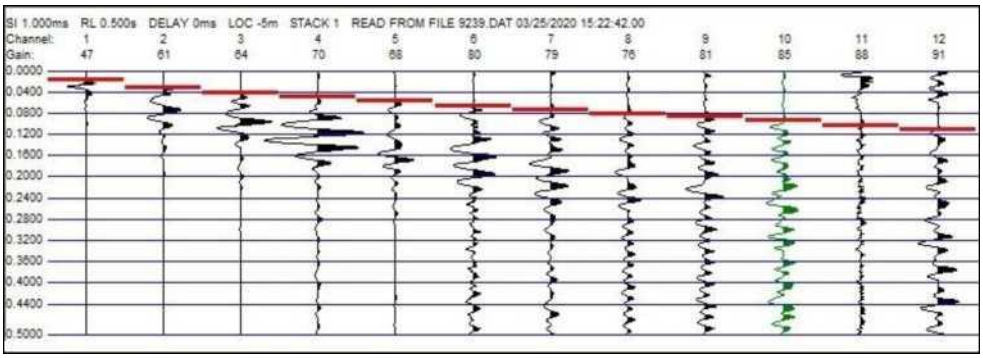
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3. SERIM

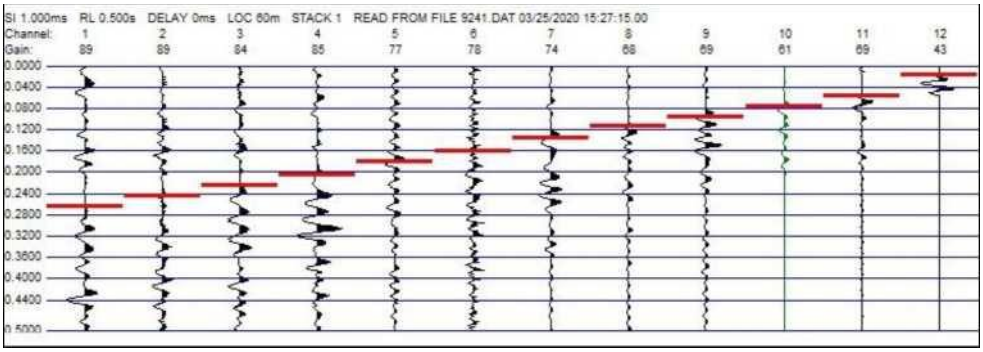
P REVERSE



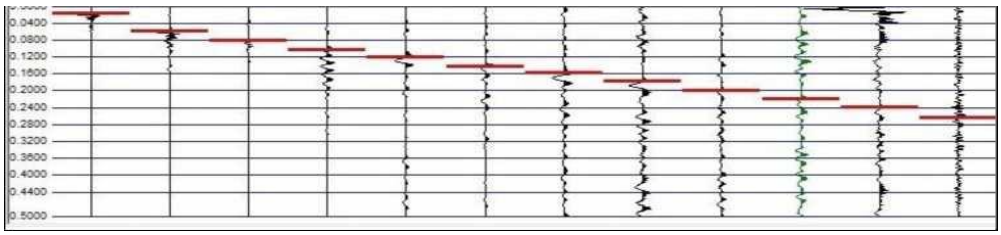
P FLAT



REVERSE S



S FLAT

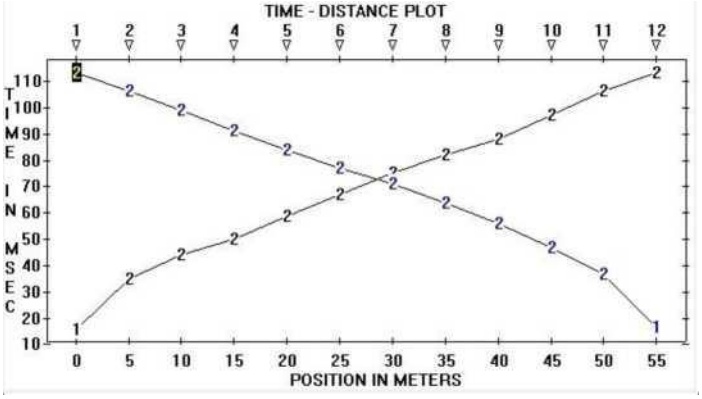


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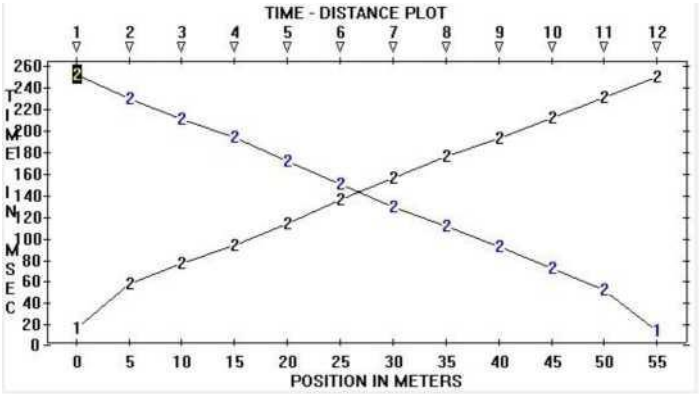
ANNEX-9.

ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT AREA

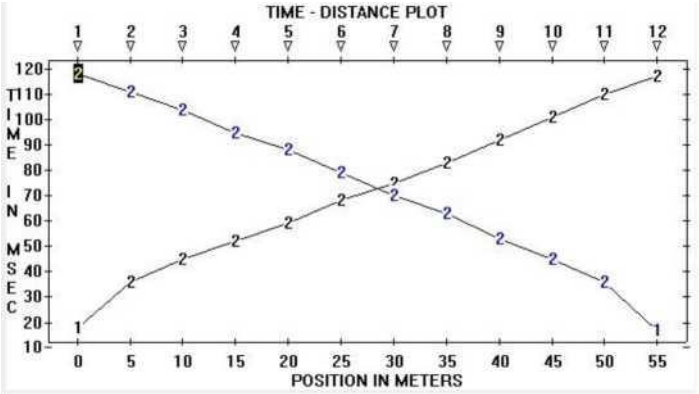
1. SERIM
P PATH TIME GRAPH



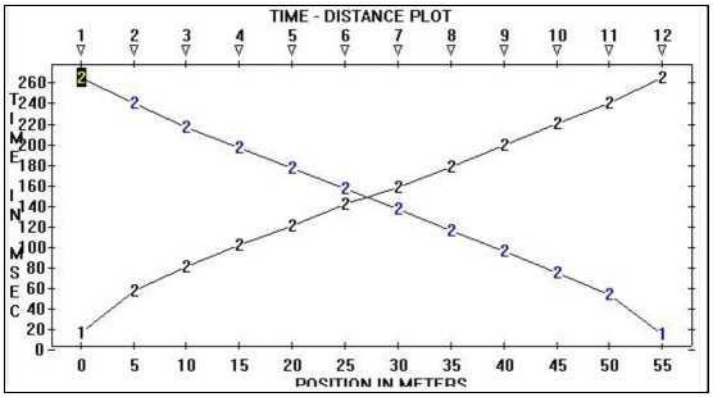
S TRAVEL TIME GRAPH



2. SERIM
P PATH TIME GRAPH



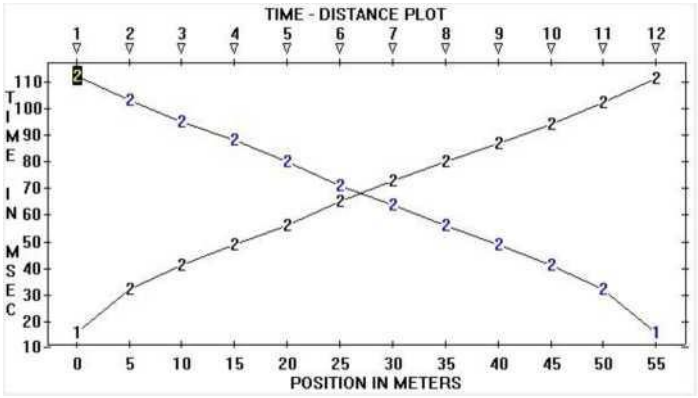
S TRAVEL TIME GRAPH



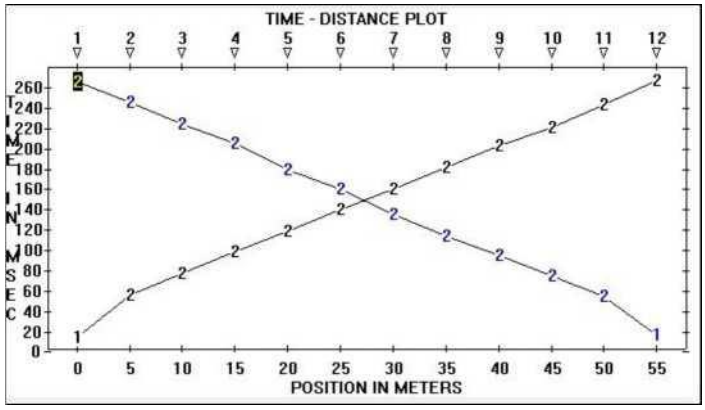
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ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE BURNING UNIT AREA

3. SERIES
P PATH TIME GRAPH



S TRAVEL TIME GRAPH

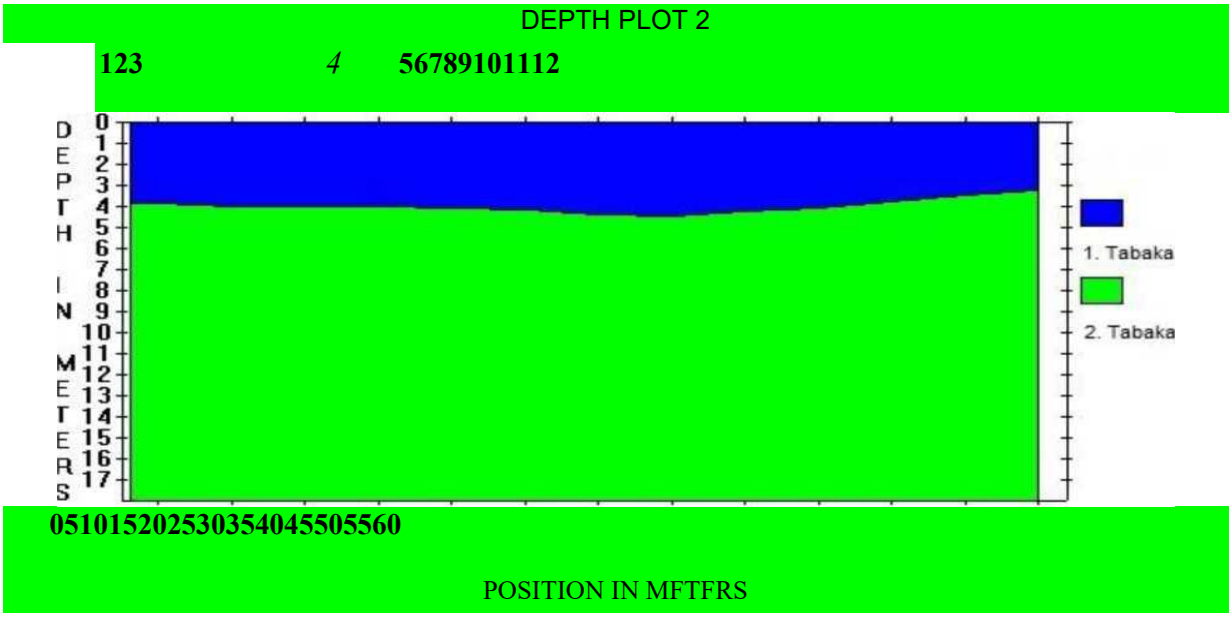


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1. SERIES SEISMIC RESULTS

SOIL PARAMETERS	SYMBOLS AND THEIR UNITS	LAYER I		LAYER II	
		STRAIGHT SHOT	REVERSE SHOT	STRAIGHT SHOT	REVERSE SHOT
LENGTHWAY SPEED	Vp (m/s)	296	296	701	701
TRANSVERSE SPEED	Vs (m/s)	82	82	198	198
LAYER THICKNESS	H (m)	4.00	4.00	....	....
LAYER DENSITY	d (gr/cm3)	1.29	1.29	1.60	1.60
SEISMIC VELOCITY RATE	Vp/Vs	3.61	3.61	3.54	3.54
POISSON RATIO	P	0.46	0.46	0.46	0.46
SHEAR MODULES	G (kg/cm2)	86.46	86.46	625.35	625.35
MODULUS OF ELASTICITY	E (kg/cm2)	252.19	252.19	1821.83	1821.83
DYNAMIC MODULES BULK	(kg/cm²)	1011.32	1011.32	7004.60	7004.60

1. SERİM P UNDERGROUND SECTION

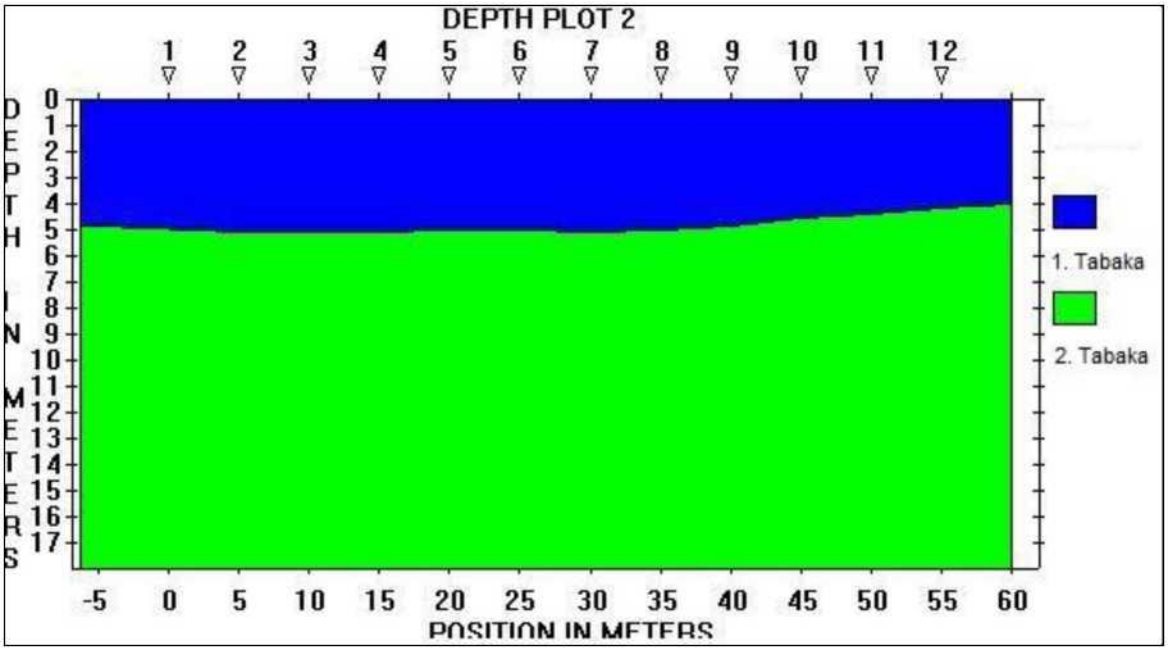


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2. SERIES SEISMIC RESULTS

SOIL PARAMETERS	SYMBOLS AND THEIR UNITS	LAYER I		LAYER II	
		STRAIGHT SHOT	REVERSE SHOT	STRAIGHT SHOT	REVERSE SHOT
LENGTHWAY SPEED	Vp (m/s)	286	286	640	640
TRANSVERSE SPEED	Vs (m/s)	87	87	184	184
LAYER THICKNESS	H (m)	5.00	5.00	....	....
LAYER DENSITY	d (gr/cm3)	1.27	1.27	1.56	1.56
SEISMIC VELOCITY RATE	Vp/Vs	3.29	3.29	3.48	3.48
POISSON RATIO	P	0.45	0.45	0.45	0.45
SHEAR MODULES	G (kg/cm2)	96.49	96.49	527.89	527.89
MODULUS OF ELASTICITY	E (kg/cm2)	279.64	279.64	1536.10	1536.10
DYNAMIC MODULES BULK	(kg/cm^2)	914.11	914.11	5682.70	5682.70

2. SERİM P UNDERGROUND SECTION

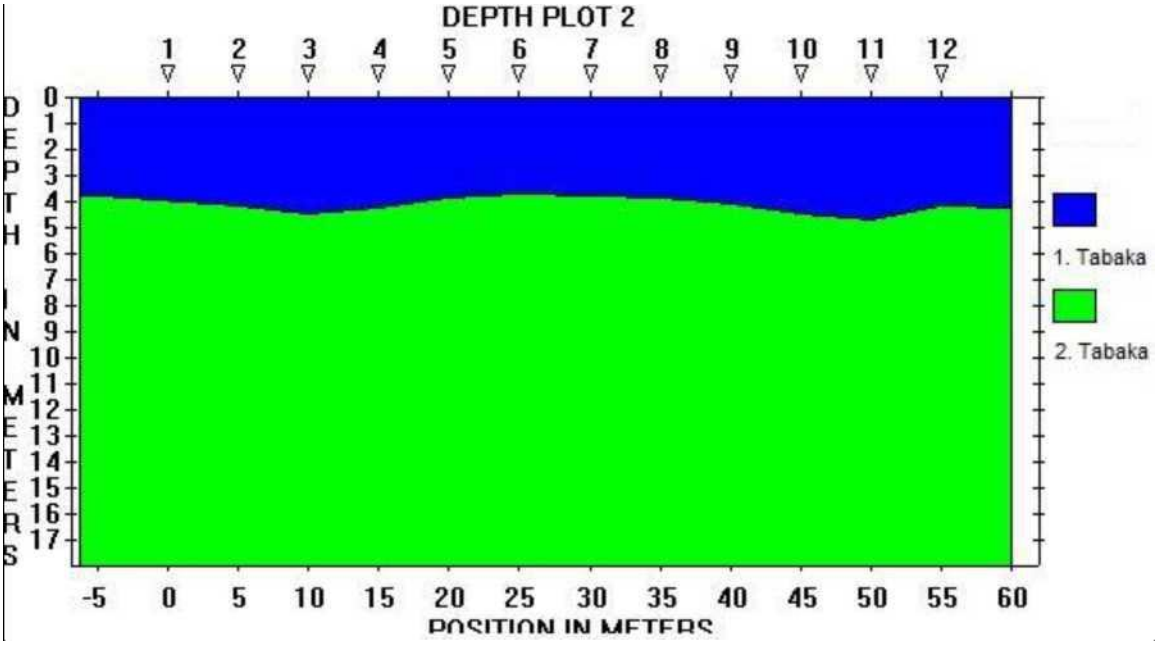


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3. SERIES SEISMIC RESULTS

SOIL PARAMETERS	SYMBOLS AND THEIR UNITS	LAYER I		LAYER II	
		STRAIGHT SHOT	REVERSE SHOT	STRAIGHT SHOT	REVERSE SHOT
LENGTHWAY SPEED	Vp (m/s)	301	301	663	663
TRANSVERSE SPEED	Vs (m/s)	96	96	191	191
LAYER THICKNESS	H (m)	4.50	4.50	....	....
LAYER DENSITY	d (gr/cm3)	1.29	1.29	1.57	1.57
SEISMIC VELOCITY RATE	Vp/Vs	3.14	3.14	3.47	3.47
POISSON RATIO	P	0.44	0.44	0.45	0.45
SHEAR MODULES	G (kg/cm2)	119.00	119.00	573.86	573.86
MODULUS OF ELASTICITY	E (kg/cm2)	343.52	343.52	1669.65	1669.65
DYNAMIC MODULES BULK	(kg/cm²)	1011.20	1011.20	6149.45	6149.45

3. SERİM P UNDERGROUND SECTION



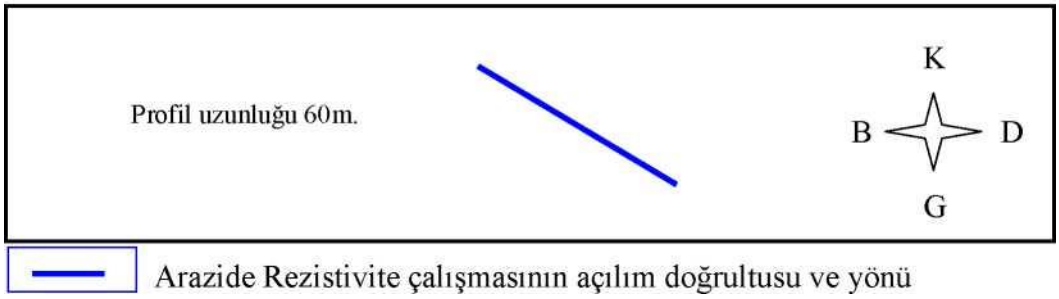
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RESISTIVITY MEASUREMENT REPORT - 1

25.03.2020

EU/2	MN	FLOW	RQ/CURREN
2	2	50	26.7
3	2	50	22.1
5	2	50	17.6
7	2	50	14.0
10	2	50	11.2
12	2	50	10.0
16	2	50	8.2
20	2	50	7.7
22	2	50	7.5
26	2	50	8.0
30	2	50	8.4

Rezistivite Profil Yeri

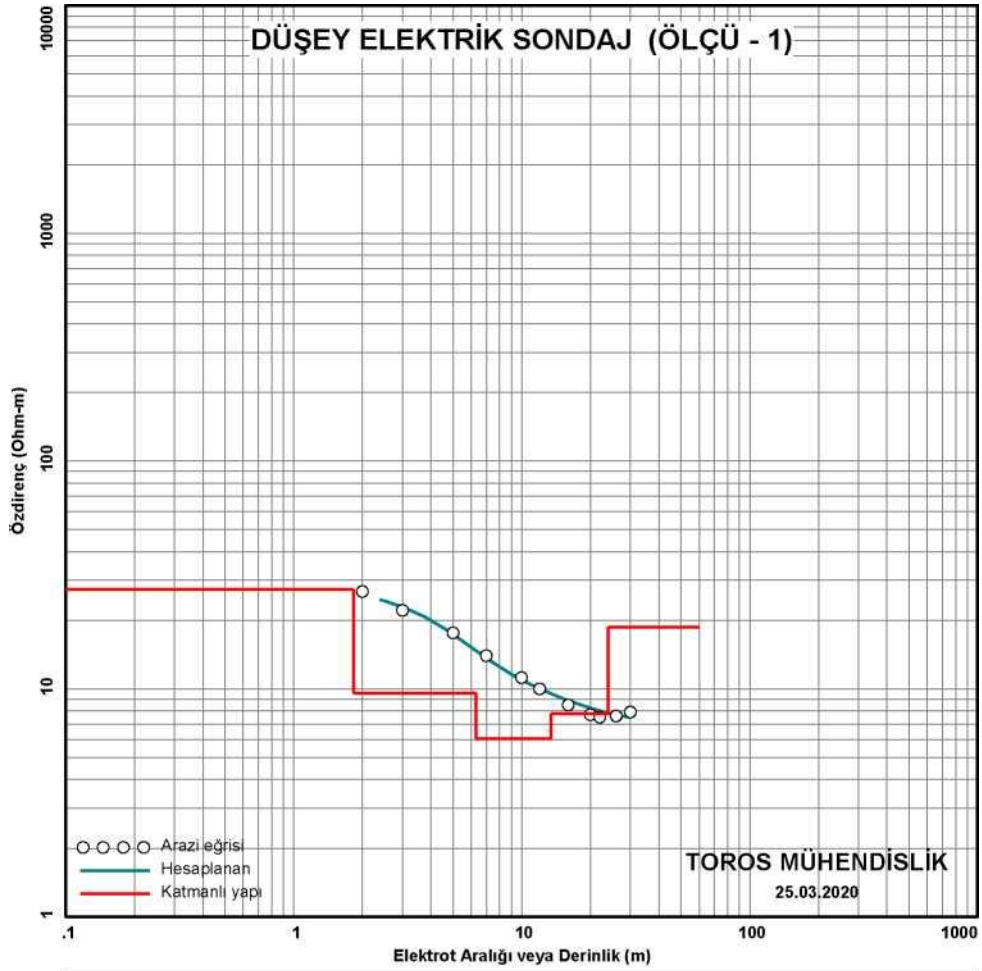


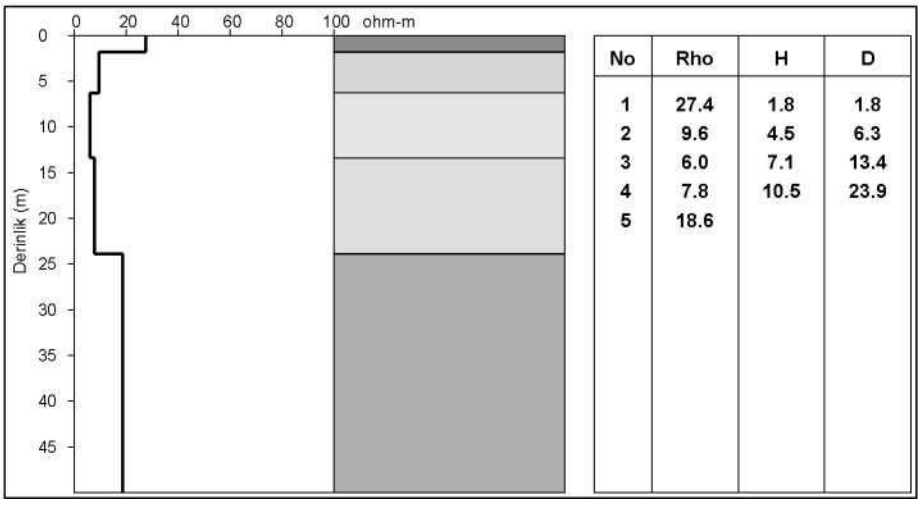
Arazide Rezistivite çalışmasının açılım doğrultusu ve yönü

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Room number: 3752

ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT AREA

HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT





No	Rho	H	D
1	27.4	1.8	1.8
2	9.6	4.5	6.3
3	6.0	7.1	13.4
4	7.8	10.5	23.9
5	18.6		

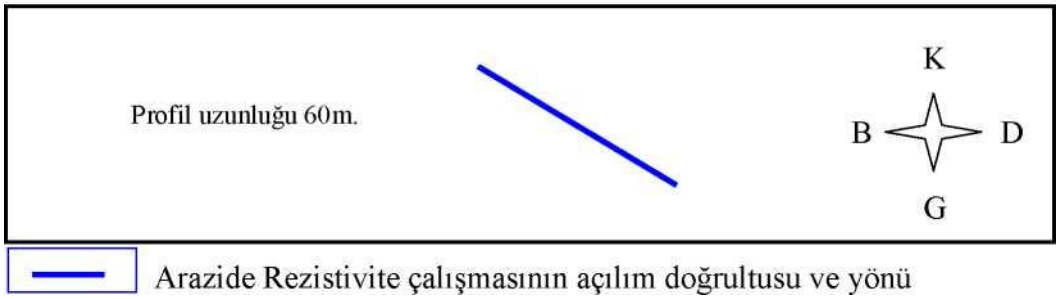
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RESISTIVITY MEASUREMENT REPORT 2

25.03.2020

EU/2	MN	FLOW	RQ/CURREN
2	2	50	52.4
3	2	50	47.1
5	2	50	42.6
7	2	50	39.9
10	2	50	36.3
12	2	50	33.4
16	2	50	29.7
20	2	50	26.2
22	2	50	25.1
26	2	50	23.7
30	2	50	22.0

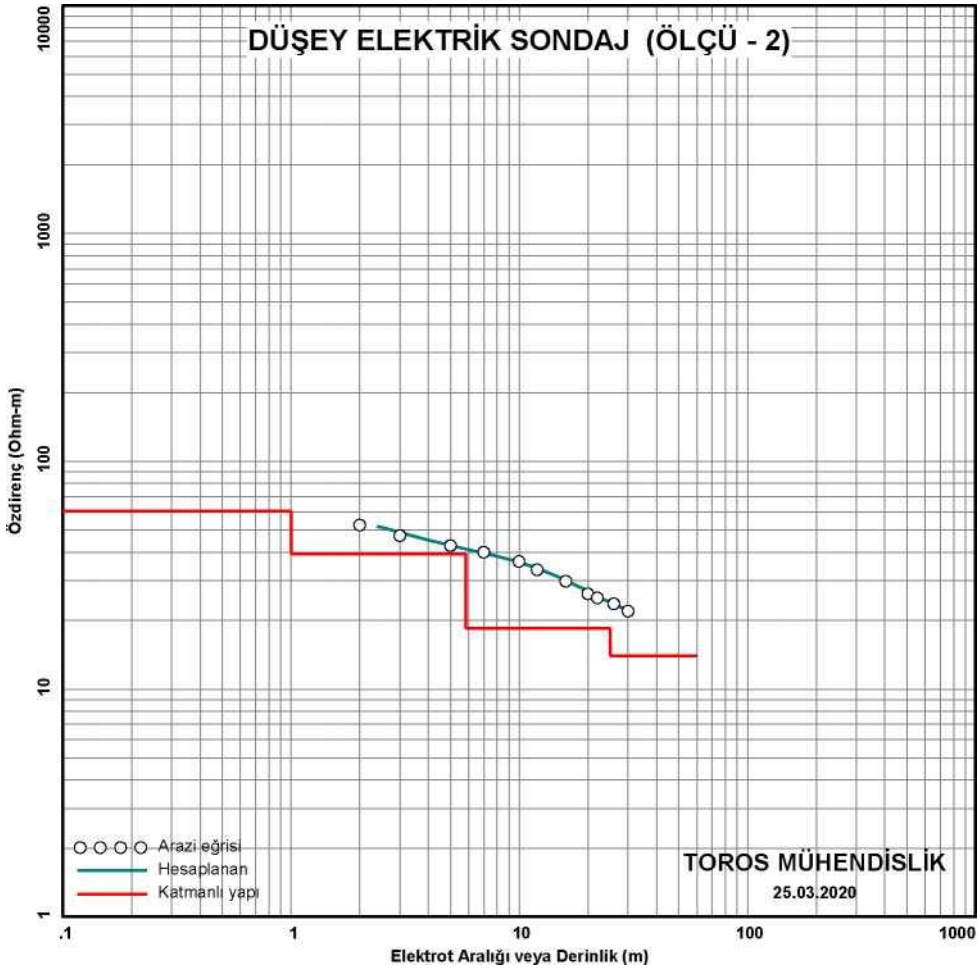
Rezistivite Profil Yeri

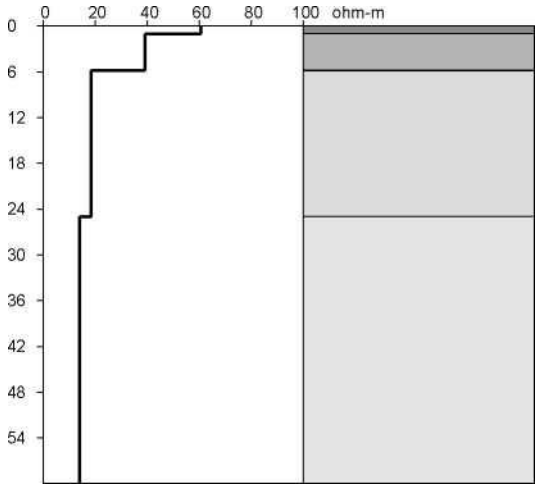


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ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT AREA

HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT





No	Rho	H	D
1	60.7	1.0	1.0
2	39.2	4.8	5.8
3	18.5	19.2	25.0
4	14.0		

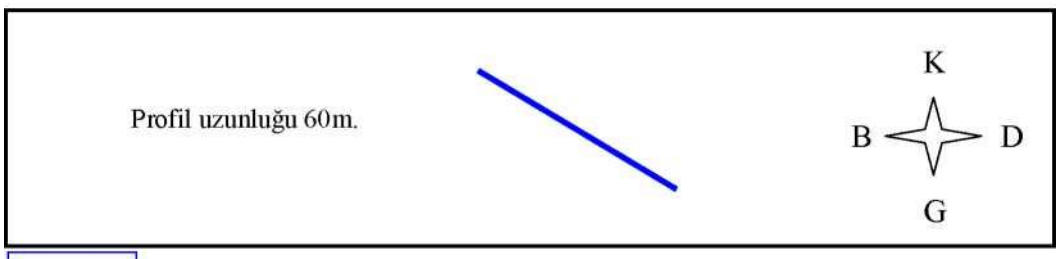
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RESISTIVITY MEASUREMENT REPORT 3

25.03.2020

EU/2	MN	FLOW	RQ/CURREN
2	2	50	46.7
3	2	50	43.0
5	2	50	41.5
7	2	50	39.2
10	2	50	36.6
12	2	50	34.8
16	2	50	31.2
20	2	50	30.2
22	2	50	27.4
26	2	50	26.8
30	2	50	25.7

Rezistivite Profil Yeri

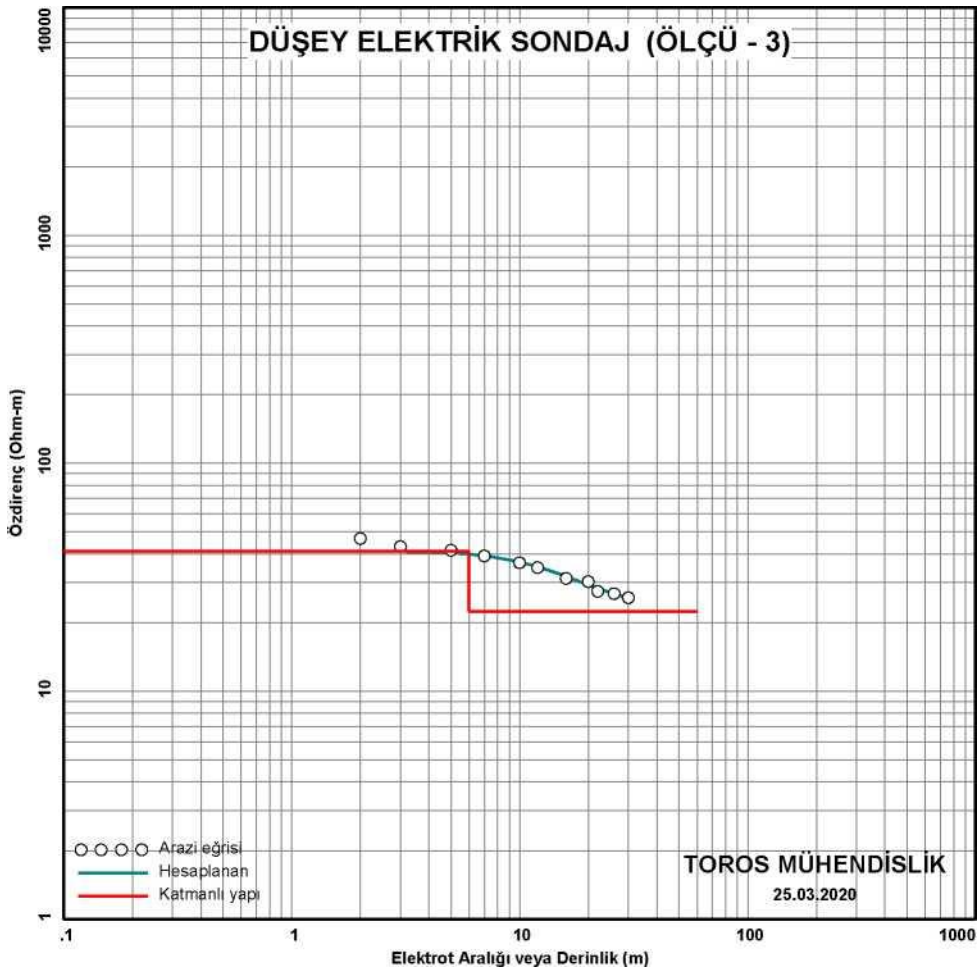


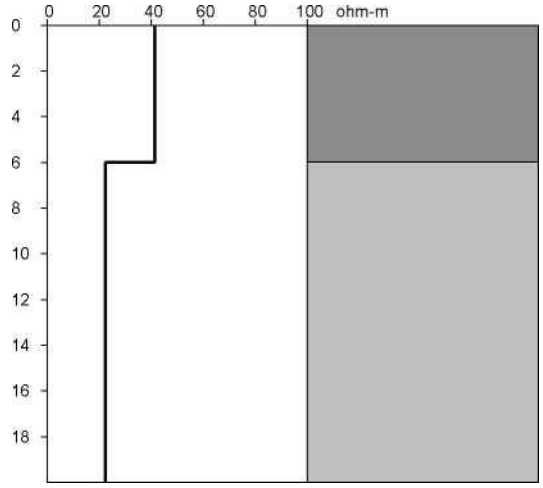
Arazide Rezistivite çalışmasının açılım doğrultusu ve yönü

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ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT AREA

HURMA WASTEWATER PLANT SLUDGE
INCINERATION UNIT





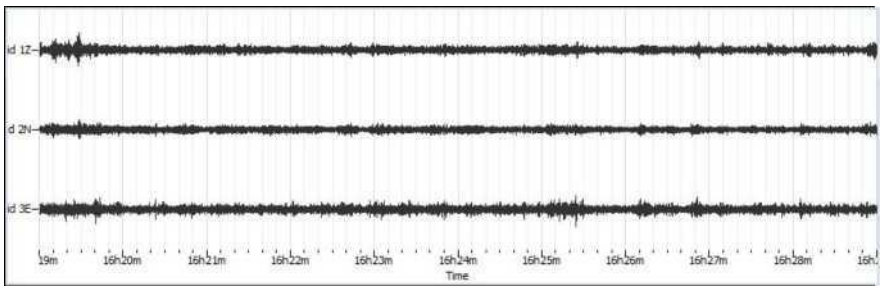
No	Rho	H	D
1	41.3	6.0	6.0
2	22.3		

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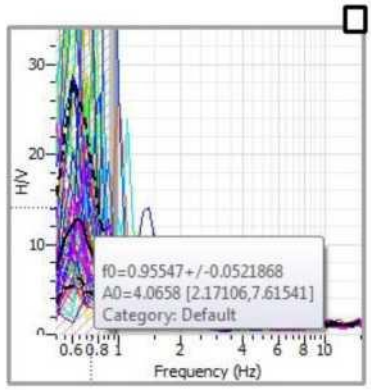
ANNEX-9.

ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE BURNING UNIT AREA

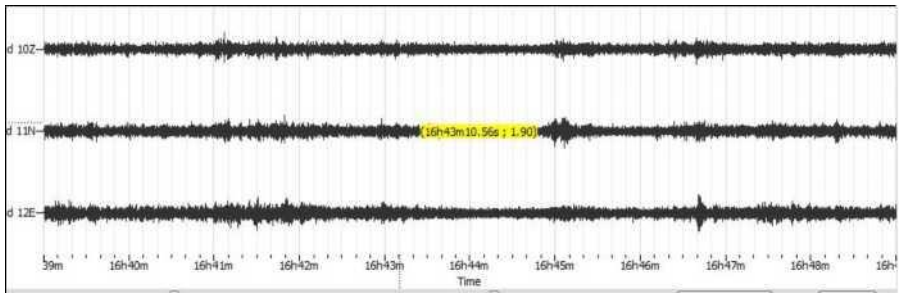
MICROTREMOR RECORD-1 GRAPH



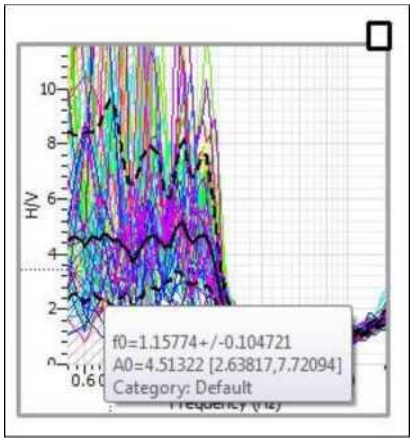
MICROTREMOR RECORD-1 LOG



MICROTREMOR RECORD-2 GRAPH



MICROTREMOR RECORD-2 LOG

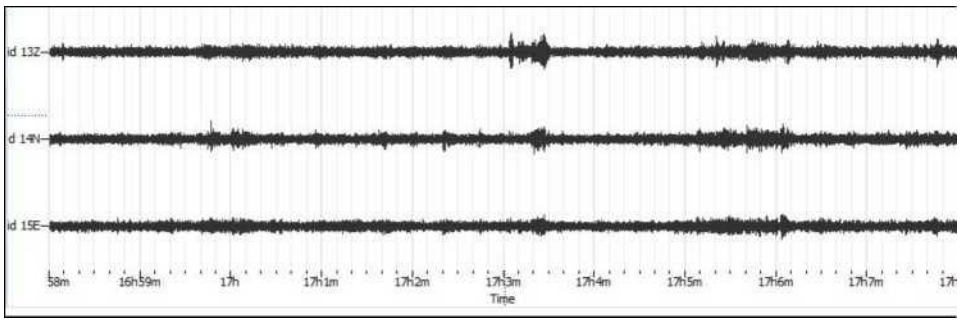


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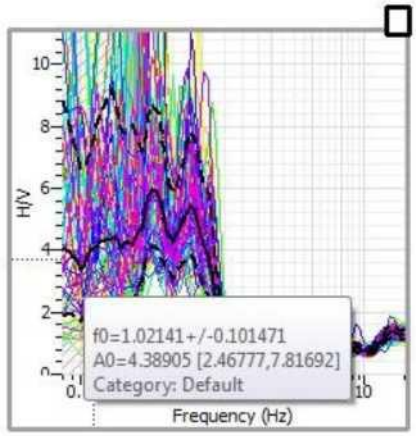
ANNEX-9.

ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE INCINERATION UNIT AREA

MICROTREMOR RECORDING-3 GRAPH



MICROTREMOR RECORD-3 LOG



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ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE BURNING UNIT AREA

PHOTOGRAPHS OF SEISMIC STUDIES



SEISMIC SERIES - 1



SEISMIC SERIES 2



SEISMIC SERIES - 3

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ANTALYA PROVINCE KONYAALTI DISTRICT HURMA WASTEWATER PLANT SLUDGE BURNING UNIT AREA

PHOTOGRAPHS OF RESISTIVITY STUDIES



RESISTIVITY SERIES - 1



RESISTIVITY SERIES - 2



RESISTIVITY SERIES - 3

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PHOTOGRAPHS OF MICROTREMOR STUDIES



MİKROTREMOR - 1



MİKROTREMOR - 2



MİKROTREMOR - 3

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ANTALYA HURMA WASTEWATER PLANT SLUDGE INCINERATION
UNIT AREA LAND DRILLING WORKS IMAGES



Photo-1: Sk-1 No. Well Drilling Image



Photo-2: SK-1 Well 1.5 m Standard Penetration Test Image



Photo-3: SK-1 Well 3.0 m Standard Penetration Test Image



Photo-4: 4.5 m UD Image of Well No. SK-1



Photo-5: SK-1 Well 6.0 m Standard Penetration Test Image



Sk-6: SK-1 Well 7.50 m ud Image



Photo-7: SK-1 Well 9.0 m Standard Penetration Test Image



Photo-8: SK-1 Well 10.50 m ud View



Photo-9: SK-1 Well 12.0 m Standard Penetration Test Image



Photo-10: SK-1 Well 13.50 m Standard Penetration Test Image



Photo-11: SK-1 Well 15.0 m Standard Penetration Test Image



Photo-12: SK-1 Well 16.50 m Standard Penetration Test Image



Photo-13: SK-1 Well 18.00 m Standard Penetration Test Image



Photo-14: SK-1 Well 19.50 m Standard Penetration Test Image



Photo-15: SK-1 Well 21.00 m Standard Penetration Test Image



Photo-16: SK-1 Well 22.50 m Standard Penetration Test Image



Photo-17: SK-1 Well 24.00 m Standard Penetration Test Image



Photo-18: Well No. SK-125.50 m Standard Penetration Test Image



Photo-19: SK-1 Well 27.00 m Standard Penetration Test Image



Photo-20: SK-1 Well 28.50 m Standard Penetration Test Image



Photo-21: SK-1 Well 30.00 m Standard Penetration Test Image



Photo-22: SK-1 Well 31.50 m Standard Penetration Test Image



Photo-23: SK-1 Well 33.00 m Standard Penetration Test Image



Photo-24: SK-1 Well 34.50 m Standard Penetration Test Image



Photo-25: SK-1 Well 36.00 m Standard Penetration Test Image



Photo-26: SK-2 No. Well Drilling Operation Image



Photo-27: SK-2 Well 1.50 m Standard Penetration Test Image



Photo-28: SK-2 Well 3.00 m Standard Penetration Test Image



Photo-29: SK-2 Well 4.50 m Standard Penetration Test Image



Photo-30: SK-2 Well 6.00 m Standard Penetration Test Image



Photo-31: SK-2 Well 7.50 m ud View



Photo-32: SK-2 Well 9.00 m Standard Penetration Test Image



Photo-33: SK-2 Well 10.50 m ud View



Photo-34: SK-2 Well 12.00 m Standard Penetration Test Image



Photo-35: SK-2 Well 13.50 m ud View



Photo-36: SK-2 Well 15.00 m Standard Penetration Test Image



Photo-37: SK-2 Well 16.50 m Standard Penetration Test Image



Photo-38: SK-2 Well 18.00 m Standard Penetration Test Image



Photo-39: SK-2 Well 19.50 m Standard Penetration Test Image



Photo-40: SK-2 Well 21.00 m Standard Penetration Test Image



Photo-41: SK-2 Well 22.50 m Standard Penetration Test Image



Photo-42: SK-2 Well 24.00 m Standard Penetration Test Image



Photo-43: SK-2 Well 25.50 m Standard Penetration Test Image



Photo-44: SK-2 Well 27.00 m Standard Penetration Test Image



Photo-45: SK-3 No. Well Drilling Operation Image



Photo-46: SK-3 Well 1.50 m Standard Penetration Test Image



Photo-47: SK-3 Well 3.00 m Standard Penetration Test Image



Photo-48: SK-3 Well 4.50 m Standard Penetration Test Image



Photo-49: SK-3 Well 6.00 m Standard Penetration Test Image



Photo-50: SK-3 Well 7.50 m ud View



Photo-51: SK-3 Well 9.00 m Standard Penetration Test Image



Photo-52: SK-3 Well 10.50 m ud View



Photo-53: SK-3 Well 12.00 m Standard Penetration Test Image



Photo-54: SK-3 Well 13.50 m Standard Penetration Test Image



Photo-55: SK-3 Well 15.00 m Standard Penetration Test Image



Photo-56: SK-3 Well 16.50 m Standard Penetration Test Image



Photo-57: SK-3 Well 18.00 m Standard Penetration Test Image



Photo-58: SK-3 Well 19.50 m Standard Penetration Test Image



Photo-59: SK-3 Well 21.00 m Standard Penetration Test Image



Photo-60: SK-3 Well 22.50 m Standard Penetration Test Image



Photo-61: SK-3 Well 24.00 m Standard Penetration Test Image



Photo-62: SK-3 Well 25.50 m Standard Penetration Test Image



Photo-63: SK-3 Well 27.00 m Standard Penetration Test Image



Photo-64: SK-3 Well 28.00 m Standard Penetration Test Image



Photo-65: SK-3 Well 30.00 m Standard Penetration Test Image



Photo-66: SK-3 Well 31.50 m Standard Penetration Test Image



Photo-67: SK-3 Well 33.00 m Standard Penetration Test Image



Photo-68: SK-3 Well 34.50 m Standard Penetration Test Image



Photo-69: SK-3 Well 36.00 m Standard Penetration Test Image



Photo-70: SK-3 Well 37.50 m Standard Penetration Test Image



Photo-71: SK-3 Well 39.00 m Standard Penetration Test Image



Photo-72: SK-4 borehole image



Photo-73: SK-4 Well 1.50 m Standard Penetration Test Image



Photo-74: SK-4 Well 3.00 m ud View



Photo-75: SK-4 Well 4.50 m Standard Penetration Test Image



Photo-76: SK-4 Well 6.00 m ud View



Photo-77: SK-4 Well 7.50 m Standard Penetration Test Image



Photo-78: SK-4 Well 9.00 m Standard Penetration Test Image



Photo-79: SK-4 Well 10.50 m Standard Penetration Test Image



Photo-80: SK-4 Well 12.00 m Standard Penetration Test Image



Photo-81: SK-4 Well 13.50 m Standard Penetration Test Image



Photo-82: SK-4 Well 15.00 m Standard Penetration Test Image



Photo-83: SK-4 Well 16.50 m Standard Penetration Test Image



Photo-84: SK-4 Well 18.00 m Standard Penetration Test Image



Photo-85: SK-4 Well 19.50 m Standard Penetration Test Image



Photo-86: SK-4 Well 21.00 m Standard Penetration Test Image



Photo-87: SK-4 Well 22.00 m Standard Penetration Test Image



Photo-88: SK-4 Well 24.00 m Standard Penetration Test Image



Photo-89: SK-4 Well 25.50 m Standard Penetration Test Image



Photo-90: SK-4 Well 27.00 m Standard Penetration Test Image



Photo-91: SK-4 Well 28.50 m Standard Penetration Test Image



Photo-92: SK-4 Well 30.00 m Standard Penetration Test Image



Photo-93: SK-4 No. Well 30.50-39.00 m core box image

ANTALYA HURMA WASTEWATER PLANT SLUDGE BURNING UNIT AREA



Photo-94: SK-5 No. Well Drilling Operation Image



Photo-95: SK-5 Well 1.5 m UD Image



Photo-96: Well No. SK-53.00 m Standard Penetration Test Image



Photo-97: SK-5 Well 4.50 m Standard Penetration Test Image



Photo-98: SK-5 Well 6.00 m ud View



Photo-99:SK-5 Well 7.50 m Standard Penetration Test Image



Photo-100: SK-5 Well 9.00 m ud View



Photo-101: SK-5 Well 10.50 m Standard Penetration Test Image



Photo-102: Well No. SK-512.00 m Standard Penetration Test Image



Photo-103: SK-5 Well 13.50 m Standard Penetration Test Image



Photo-104: SK-5 Well 15.00 m Standard Penetration Test Image



Photo-105: Well No. SK-516.50 m Standard Penetration Test Image



Photo-106: SK-5 Well 18.00 m Standard Penetration Test Image



Photo-107: SK-5 Well 19.50 m Standard Penetration Test Image



Photo-108:SK-5 Well 21.00 m Standard Penetration Test Image



Photo-109: SK-5 Well 22.00 m Standard Penetration Test Image



Photo-110: SK-5 Well 24.00 m Standard Penetration Test Image



Photo-111: Well No. SK-525.50 m Standard Penetration Test Image



Photo-112: SK-5 Well 27.00 m Standard Penetration Test Image



Photo-113: SK-5 Well 28.50 m Standard Penetration Test Image



Photo-114: Well No. SK-530.00 m Standard Penetration Test Image



Photo-115: SK-5 Well 33.00 m Standard Penetration Test Image



Photo-116: SK-5 Well 34.50 m Standard Penetration Test Image



Photo-117: SK-5 Well 37.50 m-39-00 Core Box Image