A-7　地質調査結果報告書（現地再委託）

REPORT ON PREPARATORY SURVEY
ON THE PROJECT
FOR
EMERGENCY REHABILITATION OF LAGOS TRANSMISSION SUBSTATION
IN THE FEDERAL REPUBLIC OF NIGERIA.

SOIL INVESTIGATION

CLIENT

JICA STUDY TEAM

YACHIYO ENGINEERING CO., LTD.

SUBMITTED BY:

BEST & CROMPTON ENGINEERING AFRICA LTD.,
PLOT NO.633, DAVID JEMIBEWON CRESCENT
B01 CADASTRAL ZONE
GUDU, ABUJA

TABLE OF CONTENT

1.0 INTRODUCTION

The client commissioned Best & Crompton Engineering Africa Ltd to conduct Soil investigation at the proposed development at Apapa and Akangba Substations in Lagos State. This report is a consequence of the soil investigation and analysis, which is presented in an objective and professional manner.

The purpose of the subsoil investigation and attendant report is as follows:

- Determine the subsoil and surface/groundwater conditions of the designated location.
- Evaluation of the subsoil stratigraphic sequence geotechnical/engineering properties of the soil and the subsequent effects on foundation design and construction.
- Analysis of the data/results of tests carried out on the soil samples obtained and provide recommendations on the fit-for-purpose type of foundation for the proposed structure.

2.0 SITE LOCATIONS AND AREAS

The project sites are located in Lagos State with areas approximately 3,500 m^2 for the Apapa road substation and approximately 9,000 m^2 for the Akangba substation.

2.1 ACCESSIBILITY

The two project sites are easily accessible by road and the geographical location of Apapa road substation and the Akangba substation are indicated below:

(1) Apapa Road Substation Site

Region:	Lagos
Latitude:	N6°27'15.37"
Longitude:	E3°21'56.08"
Altitude:	6m

(2) Akangba Substation Site

Region:	Lagos
Latitude:	N6°29'43.74"
Longitude:	E3°20'52.70"
Altitude:	6m

3.0 DESCRIPTION OF WORK

The soil investigation comprised of and carried out in three parts;

- Field Work: At the Apapa Road site substation Two Standard Penetration Test (SPT) was done and one Dynamic Cone Penetration Test (DCPT) was carried out. (2Nos. Borehole and 1No. DCPTs). The SPT was subjected to laboratory analysis and collation of the test results. The results are shown later in this report. At the Akangba substation, site however, only two DCPT was carried out.

3.1 FIELD WORK

The site works were carried out during September, 2017. The Scope of Work executed involved the performance of 1No. 2.5tons Dutch Cone Penetrometer Tests (DCPTs) to a depth of 5mtrs and 2Nos. Borehole/SPT to -21.45m

3.1.1 Borehole

This stage involved carrying out 2Nos borehole to a depth of -21.45m below the existing ground level.

3.1.2 Drilling Method

The tools are attached to the wire rope, which is then operated by the winch. The tools are operated using percussive techniques to progress the borehole to depths generally up to 21.45m but occasionally deeper. As the borehole progresses, temporary casing is installed to provided support to the borehole sides. In firm or stiff cohesive soils casing is sometimes not required, as the clay is self-supporting. For the drilling of deeper boreholes, it is sometimes necessary to commence the borehole at one diameter, and then reduce to a smaller diameter to deepen the borehole. This would normally require the use of two or more strings of casing. Where it is necessary to add water to advance the borehole, only potable water will be used and the only the minimum amount necessary will be used. The amount added will be recorded on the driller's log. SPT is taken at 1.0 m interval

3.1.3 Sampling Method

1.Ordinary disturbed samples were collected at changes of strata and as deemed fit for strata identification purposes, through visual inspection and classification tests.

2.Undisturbed 100mm diameter samples were collected from cohesive strata. The operation is effected through a "jarring arrangement." The arrangement allows 100mm I.D. by 450mm length-sampling tube complete with a cutting shoe to be driven by the weight of the string rod above the sampler with minimum disturbance of the sample. The number of blows recorded is that used to obtain the last 300mm of penetration by the driven weight referred to above.

3.1.4 Dutch Cone Penetrometer

The apparatus consists of a cylindrical probe, of 1000mm^2 cross sectional area, and a conic head of apex angle of 60°. The probe is forced down through the soil at a steady rate of about 20mm/s in the closed position by exerting pressure force on outer sounding tube. If desired the point resistance and the resistance to side friction can be measured separately. 1No. static cone penetration test was carried out using a 2.5tons capacity testing equipment (machine) on the site. The test involves advancing the cone into the ground slowly at a constant rate and the resistant to penetration measured at predetermined intervals of 0.25m depth. The test was terminated at depths where the machine anchor legs lifted. These tests were taken from the existing ground level down to depth of -4.00m in Pen 1. The cone penetration test results are presented in a graphical form respectively in the Appendix to this Report.

3.1.5 Laboratory Analysis

Laboratory tests relevant to the engineering objectives of the investigation were scheduled on selected samples recovered from the Boreholes. In all, the following tests have been scheduled and performed on soil samples recovered from the Boreholes in general accordance with B.S. 1377:1990, "Method of tests for Civil Engineering purposes" Part 1 – 9. Laboratory test carried out are as follows:

- Natural moisture(water) content determination
- Grain (Seive Analysis) size distribution
- Atterberg (Liquid & Plastic) Limit Test
- Specific gravity
- Unit weight
- Triaxial compression test
- Unconfined Compression test
- Sodium Chloride Concentration test

3.2 ANALYSIS OF TEST RESULTS

3.2.1 Geological Description

The geology of Lagos was extensively studied alongside the geology of the Nigerian portion of Dahomey basin by many researchers (Jones and Hockey, 1964; Omatshola and Adegoke, 1981; Agagu, 1985; Enu, 1990; and Nton, 2001). Lagos falls within Recent Alluvium Deposits and Coastal Plain Sand Formation which is made up of loose sediment ranging from silt, clay and fine to coarse grained sand. The exposed rock unit in the area consists of poorly sorted sands with lenses of clays. The sands are in part cross bedded and show transitional to continental characteristics according to Jones and Hockey (1964), Omatshola and Adegoke (1981), Agagu (1985), Enu (1990) and Nton (2001). The age Oligocene to Recent was assigned to this formation on the basis of fauna contents.

3.2.2 Subsoil Condition

The subsoil condition of the site based on the DCP reveals cohessionless soil and Borehole/SPT carried out reveals cohesive and cohessionless soil. Details of the subsoil characteristics encountered during the Penetrometer tests and Borehole/SP test are outlined below:

Subsoil Condition based on the field work.

Dutch Cone Penetrometer Test

Depth (m)	**Description of Stratum**
0.00 to –3.00	Loose cohessionless soil
3.00 to –5.00	Medium dense cohessionless soil.

Geotechnical Properties

Depth (m)	**Geotechnical Properties**
0.00 to –3.00	Poor to moderate geotechnical properties, low to moderate shear strength and moderate to high compressibility potential.
3.00 to –5.00	Moderate geotechnical properties, moderate shear strength and low compressibility potential.

Geotechnical Engineering Parameters

Depth (m)	*P1*
0.00 – 3.00m	*5 – 40*
3.00 – 5.00m	*43 – 90*

Borehole/SPT Test 1

Depth (m)	**Description of Stratum**
0.00- 3.00	Loose brown silty fine and medium sand.
3.00- 8.00	Medium dense light grey to brown silty fine and medium sand.
8.00-12.00	Medium dense brown silty sand
12.00-13.00	Loose yellowish brown silty clayey SAND
13.00-17.00	Stiff greyish brown sandy CLAY.
17.00 -18.00	Hard reddish brown/yellowish brown sandy CLAY.
18.00 -19.00	Stiff grey/reddish brown silty CLAY
19.00 -21.00	Medium dense light grey to yellowish grey clayey SAND.
21.00 -21.45	Medium dense light brown silty SAND with occasional gravel.

Geotechnical Properties

Depth (m)	Geotechnical Properties
0.00 - 3.00	Poor to moderate geotechnical properties low to moderate shear strength and moderate to high compressibility.
3.00 - 8.00	Moderate geotechnical properties moderate shear strength and low compressibility potential.
8.00 -12.00	Moderate geotechnical properties, moderate shear strength and low compressibility potential.
12.00- 13.00	Poor geotechnical properties, low shear strength and moderate compressibility potential.
13.00 -17.00	Moderate to good geotechnical properties, moderate to high shear strength and low compressibility potential
17.00 - 18.00	Good geotechnical properties, high shear strength and low compressibility potential
18.00 -19.00	Moderate to good geotechnical properties, moderate to high shear strength and low compressibility potential
19.00 -21.00	Moderate to good geotechnical properties, moderate to high shear strength and low compressibility potential.
21.00 -21.45	Good geotechnical properties, high shear strength and low compressibility potential.

Geotechnical Engineering Parameters

Depth (m)	*N-value*	*U4 sample*
0.00 – 3.00m	*5 – 9*	*N/A*
3.00 – 8.00m	*13 – 16*	*N/A*
8.00 – 12.00m	*18 – 24*	*N/A*
12.00 – 13.00m	*5*	*N/A*
13.00 – 17.00m	*11 – 14*	*Taken*
17.00 – 18.00m	*22*	*Abortive*
18.00 – 19.00m	*17*	*Abortive*
19.00 – 21.00m	*11 – 19*	*N/A*
21.00 – 21.45m	*21*	*N/A*

Borehole/SPT Test 2

Depth (m)	**Description of Stratum**
0.00 -4.00	Loose brown to light grey silty fine and medium SAND
4.00 -8.00	Medium dense light brown silty fine and medium SAND with occasional gravels.
8.00 -12.00	Medium dense yellowish brown silty SAND.
12.00-16.00	Stiff reddish brown / grey CLAY.
16.00 -17.00	Medium dense yellowish grey silty SAND.
17.00 -21.00	Medium dense light grey silty clayey SAND.
21.00 -21.45	Medium dense light brown SAND with occasional gravels

Geotechnical Properties

Depth (m)	Geotechnical Properties
0.00- 4.00	Poor to moderate geotechnical properties low to moderate shear strength and moderate compressibility potential.
4.00-8.00	Moderate Geotechnical properties low to moderate shear strength and low To moderate compressibility potential.
8.00-12.00	Moderate to Good geotechnical properties Moderate to high shear strength And low compressibility potential.
12.00-16.00	Moderate to Good geotechnical properties, Moderate to high shear strength and low compressibility potential.
16.00-17.00	Moderate to Good geotechnical properties, Moderate to high shear strength and low compressibility potential.
17.00- 21.00	Moderate to Good geotechnical properties, Moderate to high shear strength and low compressibility potential
21.00-21.45	Good geotechnical properties, high shear strength and low compressibility potential

Geotechnical Engineering Parameters

Depth (m)	*N-value*	*U4 sample*
0.00 – 4.00m	*7 – 9*	*N/A*
4.00 – 8.00m	*14 – 20*	*N/A*
8.00 – 12.00m	*22 – 23*	*N/A*
12.00 – 16.00m	*19 – 21*	*Abortive*
16.00 – 17.00m	*22*	*N/A*
17.00 – 21.00m	*17 – 22*	*N/A*
21.00 – 21.45m	*24*	*N/A*

3.2.3 Groundwater Condition

Groundwater was encountered at between depth -1.50 and - 2.00m during the subsoil investigation. This level is subjected to variation due to season.

3.2.4 Site Description and Condition

The project sites are a pieces of land fenced at both the Apapa Substation and the Akangba Substation.

3.2.5 Topography.

The topography of the project sites at both the Apapa Substation and Akangba Substations are generally flat.

3.2.6 Vegetation.

Grasses were found around the two project site areas with sections having thick vegetation due to the presence of a watercourse.

4.1 FOUNDATION DISCUSSION AND RECOMMENDATION

4.1.1 Proposed Development

No structural detail of the proposed development was made available to us prior to the subsoil investigation, at both the Apapa and Akangba substations, thus our recommendations are based on the DCP and Borehole/SPT carried out.

The geotechnical issues considered relevant to the proposed development include

- Soil bearing pressure
- Level of groundwater
- Recommendation of a suitable foundation type
- Excavation

4.1.2 RECOMMENDATION

The foundation type to be chosen for a particular structure depends largely on the followings;

- Loads to be transmitted
- Receiving soil strata
- Factor of safety against shear failure of the supporting soil must be adequate.
- Settlement should neither cause any unacceptable damage nor interfere with the function of the structure.

Foundations can be classified as shallow foundation or as deep foundation.

The choice between shallow foundation and deep foundation can be arrived at after careful consideration of the following elements.

1. The magnitude of the transmitted loads from the stratum,
2. The soil nature,
3. The economic aspects of the elements of the foundation work,
4. Problems concerning foundation construction

4.1.3 Site Preparation and Earthworks

Strip and remove the topsoil and other deleterious materials from the construction area. All exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. Exposed areas, which will receive fill or to be constructed upon, once properly cleared should be scarified to a minimum depth of 1.50m, conditioned to near optimum moisture content and compacted.

4.1.4 Allowable Bearing Pressure

Allowable bearing pressure calculated in accordance with theoretical soil mechanics principle for depths are indicated below:

KPA VALUES

Differential Depth (m)	**Allowable bearing Capacity (KN/m2)**
0.00 – 0.50	**13**
0.50 – 1.00	**20**
1.00 – 1.50	**34**
1.50 – 2.00	**52**
2.00 – 2.50	**72**
2.50 – 3.00	**92**
3.00 – 3.50	**116**
3.50 – 4.00	**157**
4.00 – 4.50	**151**
4.50 – 5.00	**162**

4.1.5 Foundation recommendation

Shallow Foundation

Shallow Foundation should be considered for any development with foundation pressure not exceeding the allowable bearing pressure stated above. Shallow foundation should be restricted to the use of stiffened raft slab because it minimizes differential settlement.

4.1.6 Settlement

Settlement for this allowable bearing pressure stated above would not exceed ***50mm***. Our analysis on settlement is based on the method stated below

$S = 1.1Mv \times 0.55qn \times h$

Where S = Total settlement

Mv = Volume of compressibility potential

qn = net foundation base pressure

h = depth of foundation

Mv	qn	h
1.058 x 10^3	50	1
3.652 x 10^4	86	2
1.898 x 10^4	125	3
1.208 x 10^4	159	4
8.47 x 10^5	195	5

The table below shows the permissible settlement as per I.S Code.

Soil type	Permissible total settlement		Permissible differential settlement	
	For isolated footings	For raft footings	For isolated footings	For raft footings
Sandy	4.0cm	4.cm to 6.5cm	2.5cm	2.5cm
Clays	6.5cm	6.5 to 10.0cm	4.0cm	4.0cm

4.1.7 Factor of Safety

Factor of safety of 3 was adopted for our estimation of allowable bearing pressure.

4.1.8 Excavation

- Adequate preparation should be put in place to excavate into loose brown silty sand.
- Excavation could be achieved using conventional excavating equipment.
- Excavation support would be required.

4.2 GENERAL PRECAUTION FOR SHALLOW FOUNDATION CONSTRUCTION

It is recommended that the following general guidelines that govern the construction of shallow foundation should be observed when work starts on the site:

- Over excavation beyond the depths stated should not be done.
- Ingress of water into the excavated foundation trench should be prevented if the stated bearing value at the founding depth is to be achieved. A layer of concrete blinding should therefore be provided within a trench once it has been excavated.
- Adequate cover to the concrete should be allowed for the reinforcement bars to protect them from possible effect of corrosion.
- The sides of foundation should be backfilled up to existing ground level as soon as they are cast.

Should the foundation pressure of the proposed development exceed the allowable bearing pressure stated above, Deep foundation should be utilized.

4.2.1 Deep Foundation

PILES

Piles are special form of deep foundation employed in the transfer of structural loads which may be vertical or inclined loads, through relative weak and incompetent subsoil strata to stronger, more competent subsoil strata at depth. This is to ensure that a sufficient factor of safety against failure can be achieved and/ or that settlement occurring at the design loads is within tolerable limits.

Pile Types

The B.S. 8004: 1986(Presently CP 2004: 1972) Code of practice for foundations classified piles into 3 main categories and into which all various types fall. These can be summarized as follows:

Large Displacement Piles – Driven or Jacked Piles

Small Displacement Piles – All forms of small section driven, screwed or jacked piles e.g. open ended steel cased driven piles

Non - Displacement Piles (or Replacement Piles) – These are piles formed by boring or drilling by means of various methods e.g. hand augers or various forms of mechanical augers such as grab augers or spiral plates (continuous flight augers.) Piles that could be adopted on the site to support the proposed building could be

driven or bored.

Piles may be designed as friction piles, end bearing piles or a hybrid of both types.

Type: Replacement (Bored) Pile

Depth: -9.00m for light to moderate load and -21.00m for moderate to heavy load

Find below working loads of piles terminated at depth -9.00m.

Pile diameter (mm)	Working load (KN)
300	101
400	180
450	229
600	407

Factor of safety adopted for Deep foundation analysis is 2.5

It is essential that pile load test be performed to confirm the theoretical working loads stated above. Load test to a maximum of 1.5 times the stated pile capacity would be adequate on a working load.

Find below working loads of piles terminated at depth -12.00m.

Pile diameter (mm)	Working load (KN)
400	253
450	320
600	570

Factor of safety adopted for Deep foundation analysis is 2.5

It is essential that pile load test be performed to confirm the theoretical working loads stated above. Load test to a maximum of 1.5 times the stated pile capacity would be adequate on a working load.

4.2.2 General Precaution For deep Foundation Construction

It is recommended that the following general guidelines that govern the construction of deep foundation should be observed when works starts on the site:

- Adequate reinforcement- with ample cover- should be provided for the piles.
- Care consideration should be given to the spacing of piles where group occur. A spacing of 2.5 to 3.0 times the diameter of the piles is usually adequate.
- The pile cap of ample dimensions should be constructed over individual piles and the pile groups so that piles that deviate from their intended positions can be accommodated.
- Pile cap should be deep enough to ensure full transfer of the load from the column to the cap in the punching shear and from the cap of the piles.
- Ground beam should be used to inter-connect the pile or pile cap so as to take care of out-of-balance moment resulting from wind effect at ground level both in normal and punching shear.

4.3 ADDITIONAL DETAIL STUDY

APAPA EXECUTIVE SUMMARY

ALLOWABLE BEARING PRESSURE KPA VALUES:

Differential Depth (m)	Allowable bearing Capacity (KN/m^2)
0.00 – 0.50	13
0.50 – 1.00	20
1.00 – 1.50	34
1.50 – 2.00	52
2.00 – 2.50	72
2.50 – 3.00	92
3.00 – 3.50	116
3.50 – 4.00	157
4.00 – 4.50	151
4.50 – 5.00	162

FOUNDATION RECOMMENDATION

Shallow Foundation

Shallow Foundation should be considered for any development with foundation pressure not exceeding the allowable bearing pressure stated above.

Shallow foundation should be restricted to the use of stiffened raft slab because it minimizes differential settlement.

Should the foundation pressure exceed the allowable bearing pressure stated in the report, Deep foundation should be adopted.

Deep Foundation

Type: Replacement (Bored) Pile

Depth: -9.00m for light to moderate load and -21.00m for moderate to heavy load

Groundwater

Groundwater was encountered at between depth 1.50m and 2.00m during the subsoil investigation. This level is subjected to variation due to season

METHOD OF CALCULATING ALLOWABLE BEARING PRESSURE IN COHESSIONLESS SOIL IS GIVEN BY:

$q_a = 2.7q_c .Rw_2$ (Meyerhof method) (for all width of foundation and limit settlement to 25mm)

If Reinforced Raft Foundation is to be adopted q_a calculated above could be doubled.

Correlation between **q_c** and SPT **(N – Values)** in Cohessionless Soil

$N = q_C / 4 = N$

q_a = 10N, or 5.0N (If Submerged)

For 0.5m, average qc is 5,
qa = 2.7 x 5 x 0.5 = 6.75 (for footing at 25mm settlement)
therefore qa = 13.5 (we used 13) for reinforced raft at 50mm settlement.

For 1m, average qc is 7,
qa = 2.7 x 7 x 0.5 = 9.45 (for footing at 25mm settlement)
therefore qa = 18.9 (we used 20) for reinforced raft at 50mm settlement.

For 1.5m, average qc is 12.75,
qa = 2.7 x 12.75 x 0.5 = 17.213 (for footing at 25mm settlement)
therefore qa = 34.425 (we used 34) for reinforced raft at 50mm settlement.

For 2m, average qc is 19.5,
qa = 2.7 x 19.5 x 0.5 = 26.325 (for footing at 25mm settlement)
therefore qa = 52.65 (we used 52) for reinforced raft at 50mm settlement.

For 2.5m, average qc is 26.75,
qa = 2.7 x 26.75 x 0.5 = 36.11 (for footing at 25mm settlement)
therefore qa = 72.225 (we used 72) for reinforced raft at 50mm settlement.

For 3m, average qc is 34.25,

qa = 2.7 x 34.25 x 0.5 = 46.23 (for footing at 25mm settlement)

therefore qa = 92.475 (we used 92) for reinforced raft at 50mm settlement.

For 3.5m, average qc is 43.25,

qa = 2.7 x 43.25 x 0.5 = 58.387 (for footing at 25mm settlement)

therefore qa = 116.775 (116 can be used) for reinforced raft at 50mm settlement.

For 4m, average qc is 58.25,

qa = 2.7 x 58.25 x 0.5 = 78.637 (for footing at 25mm settlement)

therefore qa = 157.27 (157 can be used) for reinforced raft at 50mm settlement.

Mayerhof studied various the influence of various soil type on the SPT and the qc value, the test showed that in sandy soil, the value n = qc / N = 4 and in clayey soil it is = 2
Using N = 14 for depth 4.00 – 4.50 and N = 15 for depth 4.50 – 5.00

4.00 – 4.50m:- qc = 4 x 14 = 56,

qa = 2.7 x 56 x 0.5 = 75.6 (for footing at 25mm settlement)

therefore qa = 151.2 (151 can be used) for reinforced raft at 50mm settlement.

4.50 – 5.00m:- qc = 4 x 15 = 60,

qa = 2.7 x 60 x 0.5 = 81 (for footing at 25mm settlement)

therefore qa = 162 (162 can be used) for reinforced raft at 50mm settlement.

DEEP FOUNDATION

Type: Replacement (Bored) Pile

Depth: -9.00m for light to moderate load and -21.00m for moderate to heavy load

Find below working loads of piles terminated at depth -9.00m.

Pile diameter (mm)	Working load (KN)
300	101
400	180
450	229
600	407

- **Factor of safety adopted for Deep foundation analysis is 2.5**

It is essential that pile load test be performed to confirm the theoretical working loads stated above. Load test to a maximum of 1.5 times the stated pile capacity would be adequate on a working load

AKANGBA EXECUTIVE SUMMARY
ALLOWABLE BEARING PRESSURE

KPA VALUES:

Differential Depth (m)	Allowable bearing Capacity (KN/m2)	
	Pad footing	Raft foundation
0.00 – 0.50	21	43
0.50 – 1.00	27	55
1.00 – 1.50	36	73
1.50 – 2.00	40	81
2.00 – 2.50	47	94
2.50 – 3.00	54	109
3.00 – 3.50	62	124
3.50 – 4.00	68	137
4.00 – 4.50	74	149
4.50 – 5.00	81	162

FOUNDATION RECOMMENDATION

Shallow Foundation

Shallow Foundation should be considered for the proposed development with foundation pressure not exceeding the allowable bearing pressure stated above.

Should the foundation pressure exceed the allowable bearing pressure stated in the report, Deep foundation should be adopted.

Deep Foundation

Type: Replacement (Bored) Pile

Depth: -12.00m

METHOD OF CALCULATING ALLOWABLE BEARING PRESSURE IN COHESIVE SOIL IS GIVEN BY:

$q_{ult} = 5.14Cu + \Sigma D$

$q_a = q_{ult}/F.S$ (3) – For Shallow foundation

Or

If the Clay is very Sandy

Correlation between q_c and SPT (N – Values)

$N = q_C / 2$

$q_a = 10N$, or 5.0N (If Submerged)

Correlation between q_c and Cu

$Cu = q_c / 20$ (KN/m^2)

Groundwater

Groundwater was encountered during the subsoil investigation. This level is subjected to variation due to season.

DEEP FOUNDATION

Type: Replacement (Bored) Pile

Depth: -12.00m

Find below working loads of piles terminated at depth -12.00m.

Pile diameter (mm)	Working load (KN)
300	142
400	253
450	320
600	570

- Factor of safety adopted for Deep foundation analysis is 2.5
- It is essential that pile load test be performed to confirm the theoretical working loads stated above. Load test to a maximum of 1.5 times the stated pile capacity would be adequate on a working load.

Method adopted in estimating Safe working load of piles

Cohesive soil

$Qu = qb\ Ab + qs\ As$

$qb = cb\ Nc$

$qs = \alpha\ \underline{Cu}$

$Qu = cb\ Nc\ Ab + \alpha\ \underline{Cu}\ As$

Where,

Cb = Undrained shear strength of clay at base level of pile

Nc = Bearing capacity factor generally considered as 9

Ab = Base area of pile in m2

As = Shaft surface area in m2

α = average adhesion factor

$\underline{Cu}$ = average shear strength of clay under undrained condition along the length of pile considered

5.0 CONCLUSION

Shallow Foundation should be considered for any development with foundation pressure not exceeding the allowable bearing pressure stated above. Shallow foundation should be restricted to the use of stiffened raft slab because it minimizes differential settlement. Should the foundation pressure of the proposed development exceed the allowable bearing pressure stated in the report, Deep foundation should be utilized. Despite an objective soil investigation and reporting, a poorly designed and/or constructed foundation may lead to structural failure if all other environmental conditions remain constant.

Best &Crompton Engineering Africa Ltd therefore recommends that a competent company in accordance with good and strict engineering practice expected of a professional carry out the design and construction of all foundation and earthwork. The construction contractor shall be guided by reference Code of Practices such as; British Institution CP 2004, 1973: Code of Practice for Foundation and BS 6031: Code of Practice for Earth Works.

For Best & Crompton Engineering Africa Ltd

(A.Boovaragavan)

APPENDIX

SURVEY POSITION

BOREHOLE LOGS

PENETROMETER PLOT

LABORATORY

PICTURES

NOTES RELATING TO REPORT

SURVEY POSITION

TRANSMISSION COMPANY OF NIGERIA
TOPOGRAPHICAL SURVEY
OF
APAPA SUBSTATION, APAPA, LAGOS , LAGOS STATE.
ORIGIN:UTM WGS84 (ZONE 31)
AREA: 3177.818qm

LEGEND

- CROSS SECTIONS
- PROFILES
- CPT AND SPT LOCATION
- GANTRY
- TOWER
- 132 KV TRANSFORMER
- 33 KV TRANSFORMER
- GIS CIRCUIT BREAKER
- TRANSMISSION LINE
- COMMUNICATION MAST
- 20 INDEX CONTOUR

Reference Drawings

Drawing No.:	Title:

☐ Approved ☐ Approved with comments ☐ Not Approved ☐ For Information

Date: _____ Signature/Stamp: _____ Project Consultant

TRANSMISSION COMPANY OF NIGERIA

Japan International Cooperation Agency

YACHIYO ENGINEERING CO.,LTD.
Consulting Engineers & Architects

Best & Crompton Engineering Limited

SURVEYED BY: PENGATE

Project Drawing No. DC-132-XXX-X-X-X

	Name	Date:
Prepared:	J.AMAGLO	12.2017
Drawn:	J.AMAGLO	12.2017
Checked:	S.ISHOLA	12.2017
Approved:		

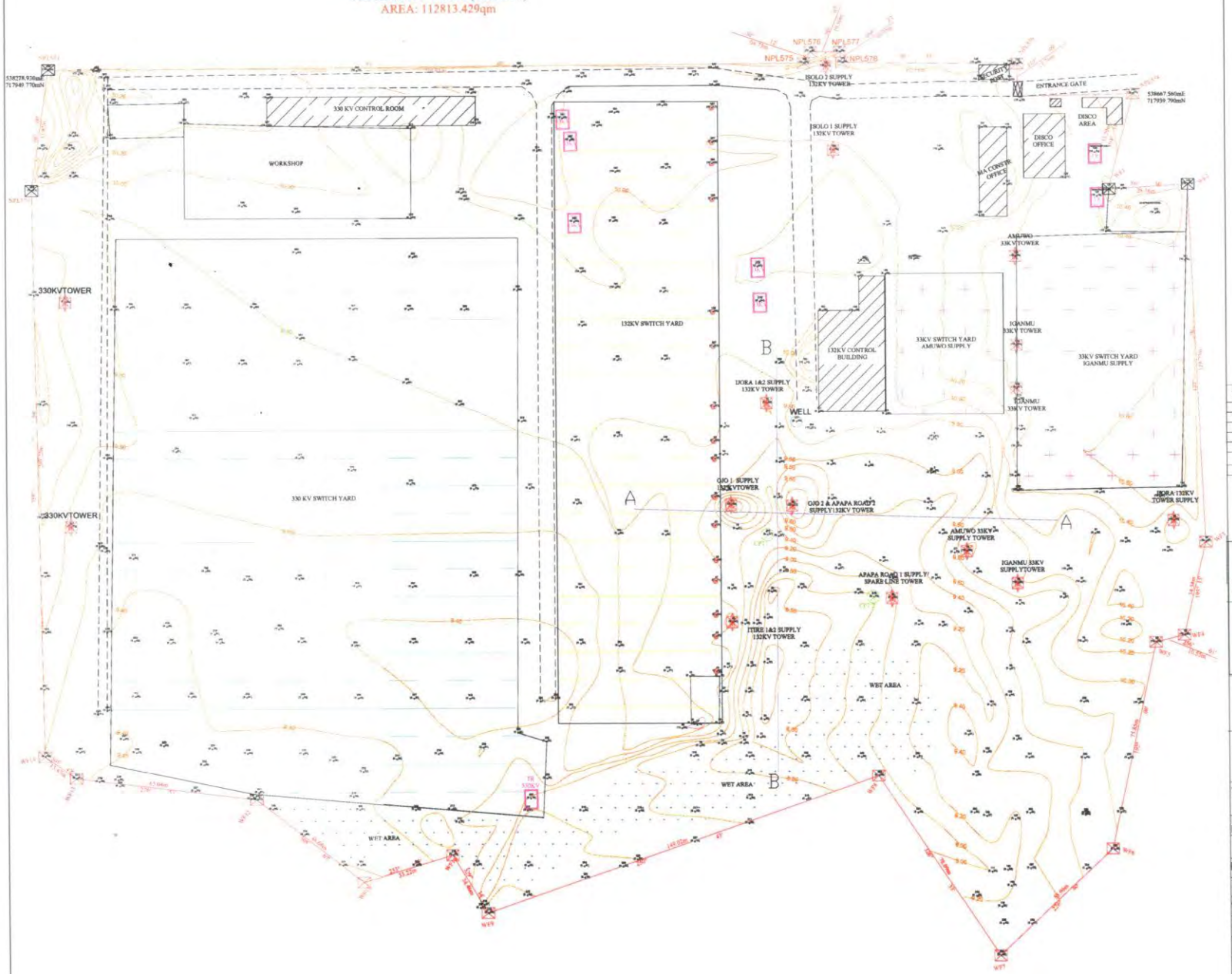
Drawing Detail
Lot :
Project: APAPA ROADSIDE SUBSTATION
Title: TOPOGRAPHIC SURVEY

Revisions No.	Name	Date	Notes / Description
B			
A			
0		12.11.17	First Issue

SCALE: H=1:200 V=1:200
Contractor's Drawing No. XX-XXX-XXX-X-X
Sheet No. 1 Total Sheet 1

SURVEY POSITION

TRANSMISSION COMPANY OF NIGERIA
TOPOGRAPHICAL SURVEY
OF
AKANGBA SUBSTATION, AKANGBA, LAGOS ,
LAGOS STATE.
ORIGIN:UTM WGS84 (ZONE 31)
AREA: 112813.429qm



LEGEND

- CROSS SECTIONS
- PROFILES
- CPT AND SPT LOCATION
- GANTRY
- TOWER
- 132 KV TRANSFORMER
- 33 KV TRANSFORMER
- GIB CIRCUIT BREAKER
- TRANSMISSION LINE
- COMMUNICATION MAST
- 20 INDEX CONTOUR
- 132 SWITCH YARD (EQUIPMENT SUPPORTS AND TRANSFORMERS)
- 33 KV SWITCH YARD (EQUIPMENT SUPPORTS)
- 330KV SWITCH YARD (EQUIPMENT SUPPORTS AND TRANSFORMERS)

Reference Drawings

Drawing No.:	Title:

☐ Approved ☐ Approved with comments ☐ Not Approved ☐ For Information

Date: _____ Signature/Stamp: _____ Project Consultant

TRANSMISSION COMPANY OF NIGERIA

Japan International Cooperation Agency

YACHIYO ENGINEERING CO.,LTD.
Consulting Engineers & Architects

Best & Crompton Engineering Limited

SURVEYED BY: PENGATE

Project Drawing No. DC-132-XXX-X-X-X

	Name	Date:
Prepared:	J.AMAGLO	12.2017
Drawn:	J.AMAGLO	12.2017
Checked:	S.ISHOLA	12.2017
Approved:		

Drawing Detail
Lot :
Project: AKANGBA SUBSTATION
Title: TOPOGRAPHIC SURVEY

Revisions

No.	Name	Date	Notes / Description
	PAPER SIZE: 841mm X 1189mm (A0-SIZE)		
R			
A			
0		12.11.17	First Issue

SCALE: H=1:500 Contractor's Drawing No. XX-XXX-XXX-X-X Sheet No. 1 Total Sheet 1

BOREHOLE LOG

GEOTECHNICAL INVESTIGATION AT APAPA TRANSMISSION SUB-STATION LAGOS STATE.

BOREHOLE NO: BH 1 **DIAMETER: 203mm and 150mm**

Depth(m)	Legend	Strata thickness	SPT Blows	Description of Strata
2.00		(3.00)	N9 N5 N13	*Loose brown silty fine SAND*
4.00 6.00 8.00		(5.00)	N14 N16 N14 N16	*Medium dense light grey to brown silty fine to medium SAND*
10.00 12.00		(4.00) (1.00)	N18 N21 N22 N24 N5	*Medium dense brown silty SAND* *Loose yellowish brown silty clayey fine SAND*
14.00 16.00		(4.00)	N11 N16 N18 N14	*Stiff greyish brown sandy CLAY*
18.00		(1.00) (1.00)	N22 N17	*Hard reddish brown / yellowish brown sandy CLAY* *Stiff grey/reddish brown silty CLAY*
20.00		(2.00)	N11 N19	*Medium dense yellowish grey clayey SAND*
21.45		(1.45)	N21	*Medium dense light brown silty SAND with occasional fine gravel*
				End of drilling

N- Number of blows U4*- Undisturbed Samples abortive U4- Undisturbed Samples
Depth of hole: -21.45m Depth cased: 21.45m

Table 1: DAILY PROGRESS AND N-VALUE (SPT) RECORD

Borehole No.: B1, Apapa Road Substation

Name of Driller **Hope**

Date	Depth(M)			Soil Description	SPT VALUE Blow/cm			N-VALUE Blow/cm	G.W.L
	from		to						
26-08-17	1.00	-	1.45	Brown Silty Fine Sand	2/15	4/15	5/15	**9/30**	**1.6M**
	2.00	-	2.45	Brown Silty Fine Sand	4/15	3/15	2/15	5/30	
	3.00	-	3.45	Light brown silty fine grain sand	3/15	5/15	8/15	13/30	
	4.00	-	4.45	Light grey silty fine sand	5/15	7/15	7/15	14/30	
	5.00	-	5.45	Brownish silty fine to Medium grain sand	5/15	7/15	9/15	16/30	
	6.00	-	6.45	Brownish silty fine to Medium grain sand	4/15	7/15	7/15	14/30	
	7.00	-	7.45	Brownish silty fine to Medium grain sand	5/15	7/15	9/15	16/30	
	8.00	-	8.45	Yellowish silty grain sand with tiny gravel	6/15	8/15	10/15	18/30	
	9.00	-	9.45	Brownish silty dense sand	7/15	9/15	12/15	21/30	
	10.00	-	10.45	Brownish silty dense sand	8/15	9/15	13/15	22/30	
	11.00	-	11.45	Brownish silty dense sand	7/15	11/15	13/15	24/30	
	12.00	-	12.45	Yellowish, Brownish greyish silty fine Clayey sand	2/15	3/15	2/15	5/30	
	13.00	-	13.45	Greyish Brownish silty Sandy clay	3/15	5/15	6/15	11/30	
	14.00	-	14.45	Greyish, Brown, Red stiff clay with traces of sand	3/15	7/15	9/15	16/30	
	15.00	-	15.45	Greyish, Brown, Red stiff clay with hard pan	5/15	5/15	13/15	18/30	
	16.00	-	16.45	Light Grey, Brown Silty sandy Clay	4/15	4/15	10/15	14/15	
28-08-17	17.00	-	17.45	Reddish, Yellowish brownish, grey very hard clay with sand stone	6/15	9/15	13/15	22/15	
	18.00	-	18.45	Greyish, Red silty Clay	3/15	8/15	9/15	17/15	
	19.00	-	19.45	Light greyish silty clayey sand	4/15	4/15	7/15	11/30	
	20.00	-	20.45	Greyish, Yellowish silty clayey sand	7/15	8/15	11/15	19/30	
	21.00	-	21.45	Light Brown silty sand with tiny gravel	5/15	8/15	13/15	21/30	

BOREHOLE LOG

GEOTECHNICAL INVESTIGATION AT APAPA TRANSMISSION SUB-STATION LAGOS STATE.

BOREHOLE NO: BH 2 **DIAMETER: 203mm and 150mm**

Depth(m)	Legend	Strata thickness	SPT Blows	Description of Strata
2.00		(4.00)	N7 N8 N9	*Loose brown silty fine SAND*
4.00		(4.00)	N14 N15 N18 N20	*Medium dense light brown silty fine SAND with occassional fine gravels*
8.00 10.00 12.00		(4.00)	N22 N23 N23 N23	*Medium dense yellowish brown silty fine and medium SAND*
14.00 16.00		(4.00)	N19 N21 N20 N20	*Stiff reddish grey CLAY*
		(1.00)	N22	*Medium dense yellowish grey silty SAND*
18.00 20.00		(4.00)	N21 N17 N22 N20	*Medium dense light grey silty clayey SAND*
21.45		(1.45)	N24	*Medium dense light brown SAND with occasional fine gravel*
				End of drilling

N- Number of blows U4*- Undisturbed Samples abortive U4- Undisturbed Samples
Depth of hole: -21.45m Depth cased: 21.45m

Table 2: DAILY PROGRESS AND N-VALUE (SPT) RECORD

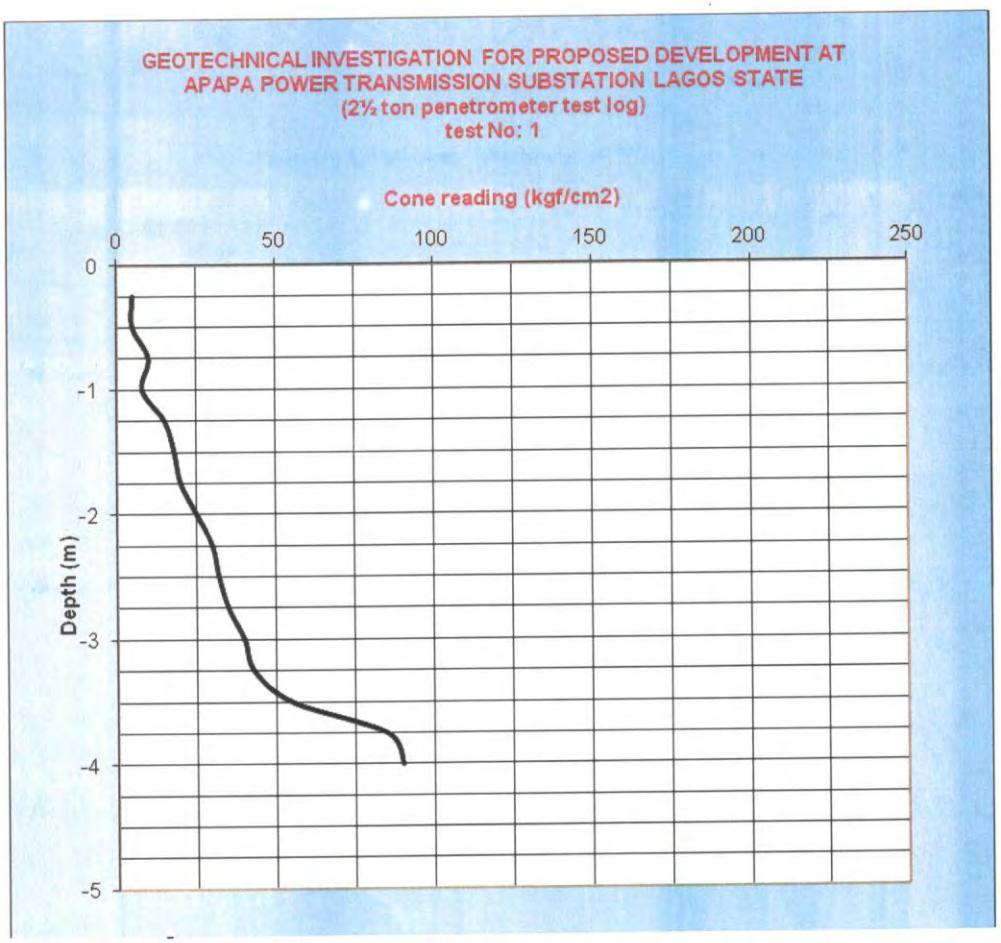
Borehole No.: B2, . Apapa Road Substation

Name of Driller **Hope**

Date	Depth(M)			Soil Description	SPT VALUE Blow/cm			N-value Blow/cm	G.W.L
	from		to						
29-08-17	1.00	-	1.45	Brown Silty Fine Sand	3/15	4/15	3/15	7/30	
	2.00	-	2.45	Brown Silty Fine Sand	3/15	4/15	4/15	8/30	
	3.00	-	3.45	Light grey silty fine sand	2/15	4/15	5/15	9/30	
	4.00	-	4.45	Light brown silty fine sand	3/15	7/15	7/15	14/30	
	5.00	-	5.45	Light brown silty fine sand with tiny gravel	7/15	6/15	9/15	15/30	
	6.00	-	6.45	Light brownish silty sand	4/15	7/15	11/15	18/30	
	7.00	-	7.45	Brownish silty fine grain sand	5/15	8/15	12/15	20/30	
	8.00	-	8.45	Yellowish silty dense sand	8/15	9/15	13/15	22/30	
	9.00	-	9.45	Yellowish silty dense sand	7/15	11/15	12/15	23/30	
	10.00	-	10.45	Yellowish silty dense sand	12/15	10/15	13/15	23/30	
	11.00	-	11.45	Yellowish silty dense sand	13/15	11/15	12/15	23/30	
	12.00	-	12.45	Greyish, red stiff clay	4/15	9/15	10/15	19/30	
	13.00	-	13.45	Greyish, red stiff clay	6/15	8/15	13/15	21/30	
	14.00	-	14.45	Greyish, red stiff clay	5/15	10/15	10/15	20/30	
30-08-17	15.00	-	15.45	Greyish Red Stiff Clay	4/15	8/15	12/15	20/30	1.5
	16.00	-	16.45	Yellowish Grey Silty Sand	13/15	10/15	12/15	22/30	
	17.00	-	17.45	Light grey silty clayey sand	7/15	9/15	12/15	21/30	
	18.00	-	18.45	Light grey silty clayey sand	5/15	7/15	10/15	17/30	
	19.00	-	19.45	Light grey silty clayey sand	7/15	9/15	13/15	22/30	
	20.00	-	20.45	Light grey silty clayey sand	4/15	8/15	12/15	20/30	
	21.00	-	21.45	Light brown sand with tiny gravel	11/15	10/15	14/15	24/30	

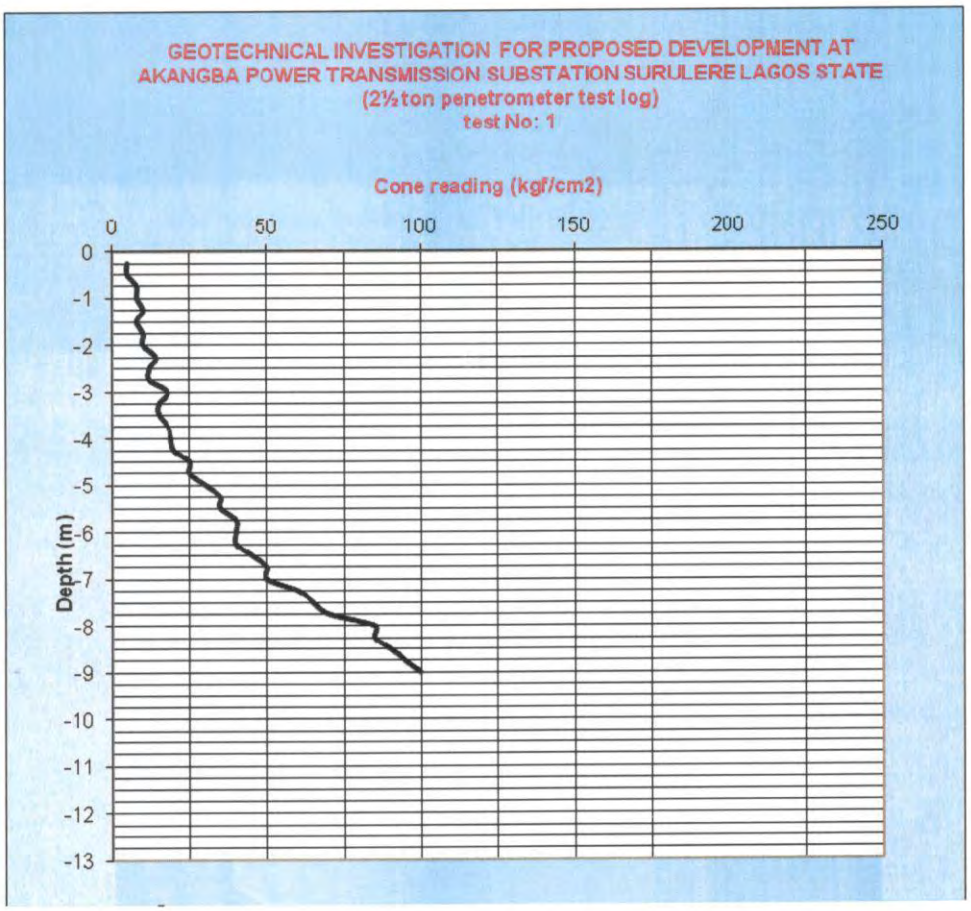
PENETROMETER 1

Qc	Depth
0	0
5	-0.25
5	-0.5
10	-0.75
8	-1
15	-1.25
18	-1.5
20	-1.75
25	-2
30	-2.25
32	-2.5
35	-2.75
40	-3
43	-3.25
55	-3.5
85	-3.75
90	-4
	-4.25
	-4.5
	-4.75
	-5
	-5.25
	-5.5
	-5.75
	-6
	-6.25
	-6.5



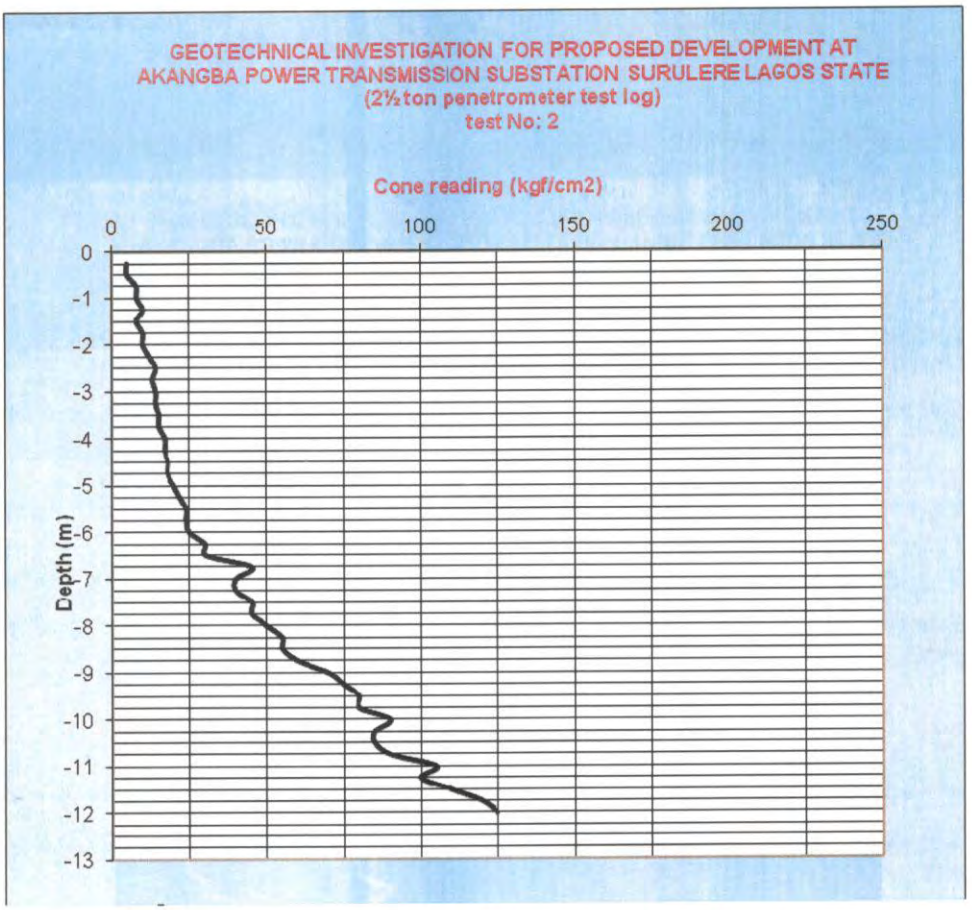
PENETROMETER 1

Qc	Depth
0	0
5	-0.25
10	-0.5
8	-0.75
8	-1
10	-1.25
12	-1.5
14	-1.75
10	-2
14	-2.25
12	-2.5
12	-2.75
18	-3
15	-3.25
15	-3.5
18	-3.75
19	-4
20	-4.25
25	-4.5
25	-4.75
30	-5
35	-5.25
35	-5.5
40	-5.75
40	-6
40	-6.25
45	-6.5
50	-6.75
50	-7
60	-7.25
65	-7.5
70	-7.75
85	-8
85	-8.25
90	-8.5
95	-8.75
100	-9



PENETROMETER 2

Qc	Depth
0	0
5	-0.25
5	-0.5
8	-0.75
8	-1
10	-1.25
8	-1.5
10	-1.75
10	-2
12	-2.25
14	-2.5
13	-2.75
14	-3
14	-3.25
15	-3.5
15	-3.75
17	-4
17	-4.25
18	-4.5
18	-4.75
20	-5
22	-5.25
24	-5.5
24	-5.75
25	-6
30	-6.25
30	-6.5
45	-6.75
40	-7
40	-7.25
45	-7.5
45	-7.75
50	-8
55	-8.25
55	-8.5
60	-8.75
70	-9
75	-9.25
80	-9.5
80	-9.75
90	-10
85	-10.25
85	-10.5
90	-10.75
105	-11
100	-11.25
110	-11.5
120	-11.75
125	-12



DAILY REPORT BASED ON DCPT

Dutch cone penetrometer test measures resistance of subsoil in kg/cm2 in situ. The test involves advancing the cone into the ground slowly at a constant rate and the resistant to penetration measured at predetermined intervals of 0.25m depth. It does not determine N value. Meyerhof came up with a method to correlate the qc value obtain from DCPT with N value.

Correlation between q_c and SPT (N – Values) cohesive soil

$$N = q_c / 2$$

Correlation between q_c and SPT (N – Values) in Cohessionless Soil

$$N = q_c / 4$$

The meyerhof's correlation based on cohesive and cohessionless soil was used in the tables below.

Note: Samples cannot be taken while conducting DCP test, the readings are taken in-situ.

APAPA (Cohessionless soil)

Depth/rod (m)	Readings at 0.25m/rod	Readings at 0.50m/rod	Readings at 0.75m/rod	Readings at 1.00m/rod	Average reading (approx)	N value (approx)	Soil Description
1	5	5	10	8	7	2	Loose sand
2	15	18	20	25	20	5	Loose sand
3	30	32	35	40	34	9	Loose sand
4	43	55	85	90	68	17	Medium dense sand

AKANGBA (Cohesive soil)

Penetrometer 1

Depth/rod (m)	Readings at 0.25m/rod	Readings at 0.50m/rod	Readings at 0.75m/rod	Readings at 1.00m/rod	Average reading (approx)	N value (approx)	Soil Description
1	5	10	8	8	8	4	Soft clay
2	10	12	14	10	12	6	Firm clay
3	14	12	12	18	14	7	Firm clay
4	15	15	18	19	17	9	Firm clay
5	20	25	25	30	25	13	Stiff clay
6	35	35	40	40	38	19	Stiff clay
7	40	45	50	50	46	23	Very stiff clay
8	60	65	70	85	70	35	Very stiff clay
9	85	90	95	100	93	47	Hard clay

Penetrometer 2

Depth/rod (m)	Readings at 0.25m/rod	Readings at 0.50m/rod	Readings at 0.75m/rod	Readings at 1.00m/rod	Average reading (approx)	N value (approx)	Soil Description
1	5	5	8	8	7	4	Soft clay
2	10	8	10	10	10	5	Firm clay
3	12	12	14	13	13	7	Firm clay
4	14	14	15	15	15	8	Firm clay
5	17	17	18	18	18	9	Firm clay
6	20	22	24	24	23	12	Stiff clay
7	25	30	30	45	33	17	Stiff clay
8	40	40	45	45	43	22	Stiff clay
9	50	55	55	60	55	28	Very stiff clay
10	70	75	80	80	76	38	Very Stiff clay
11	90	85	90	105	93	47	Hard clay
12	100	110	120	125	114	57	Hard clay

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1

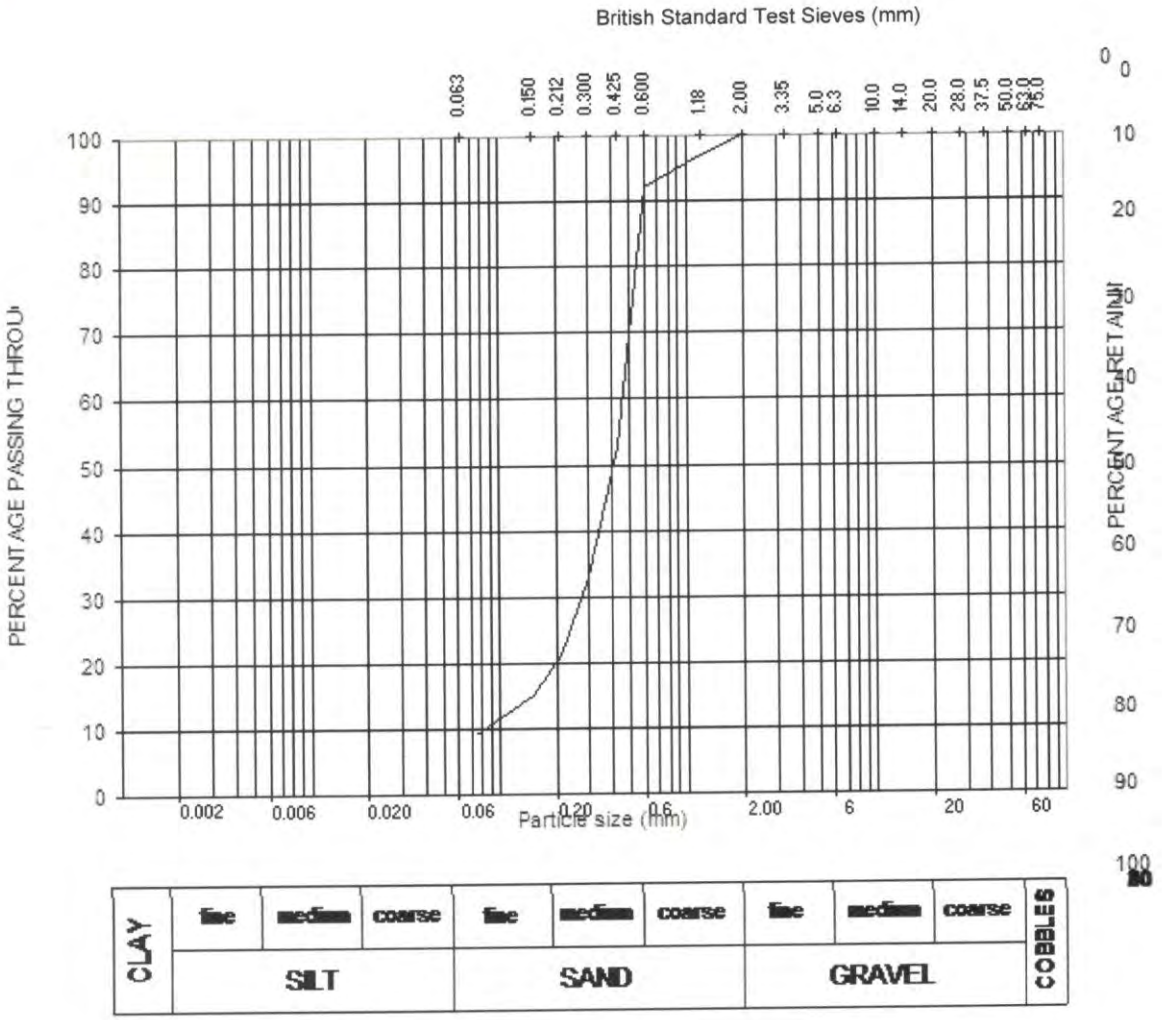
SUMMARY OF LABORATORY TEST RESULT

DATE: SEPTEMBER 2017

BH NO	DEPTH (m)	PARTICLE SIZE DISTRIBUTION % PASSING					NATURAL M.C %	ATTERBERG LIMIT TEST			Wet Unit Weight y_B KN/m³	Dry Unit Weight	Gs	UNCONFINED COMPRESSION TEST	QUICK UNDRAINED TRIAXIAL TEST		NaCl concentration ppm
		2.00 mm	0.600 mm	0.425 mm	0.300 mm	0.075 mm		L.L %	PL %	PI %				qu KN/m²	Cu KN/m²	Ø Deg	
1	2.00	100	92	53	33	9	13.0				20.08	18.34	2.60				754
1	4.00	100	90	57	41	7	11.95				20.60	18.49	2.59				712
1	6.00	100	85	51	36	6	12.45				20.54	18.41	2.67				809
1	8.00	100	88	52	35	5	13.45				21.90	18.93	2.65				699
1	10.00	100	90	60	40	8	11.35				22.10	19.32	2.74				656
1	12.00	100	80	47	28	6	12.70				22.25	20.04	2.82				702
1	14.00	100	91	80	63	44	35.50				18.75	17.32	2.75				691
1	16.00	100	93	82	59	40	36.50				18.55	17.04	2.86				629
1	18.00	100	89	77	53	41	35.75				19.45	17.01	2.85				643
1	20.00	100	77	49	32	18	21.56				22.85	20.01	2.83				666
1	13.00						34.85	33	14	19	19.05	18.02	2.61				
1	14.00						35.50	30	16	14	18.75	17.32	2.69				
1	16.00						36.50	32	16	16	18.55	17.04	2.53				
1	17.00						35.06	30	15	15	18.70	16.50	2.64				
1	18.00						35.75	29	19	10	19.45	17.01	2.77				
1	13.00						34.85	33	14	19	19.05	16.88	2.61				
1	15.50										17.45	16.45	2.64	170	85	11	
1	16.45										19.15	16.83	2.76	210	105	9	

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

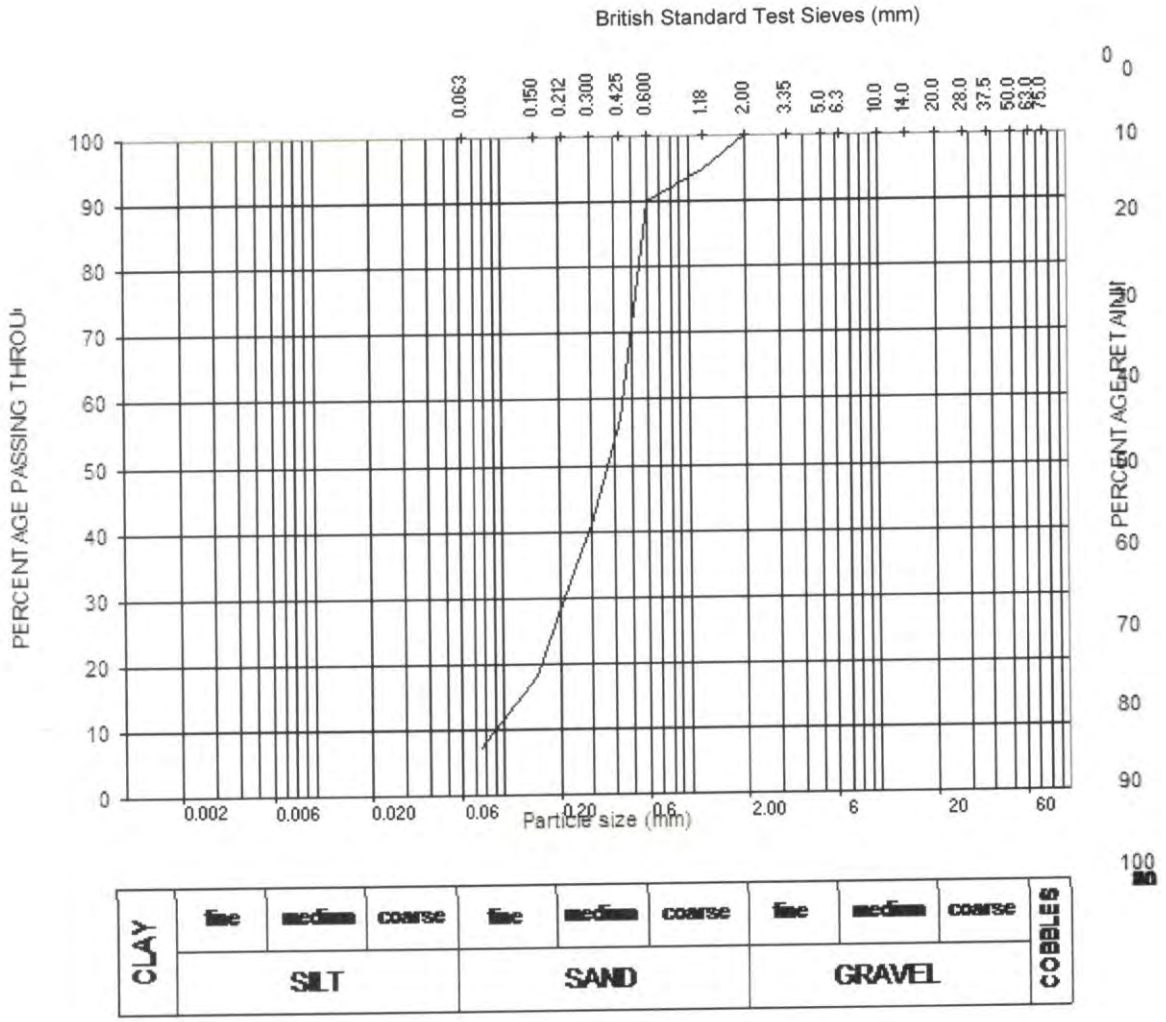
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION
BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION	CLAY [%]	SILT [%]	SAND [%]	GRAVEL [%]	Cu	Cc
———	1	2.00m	Brown silty fine,medium and coarse SAND					-	-

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

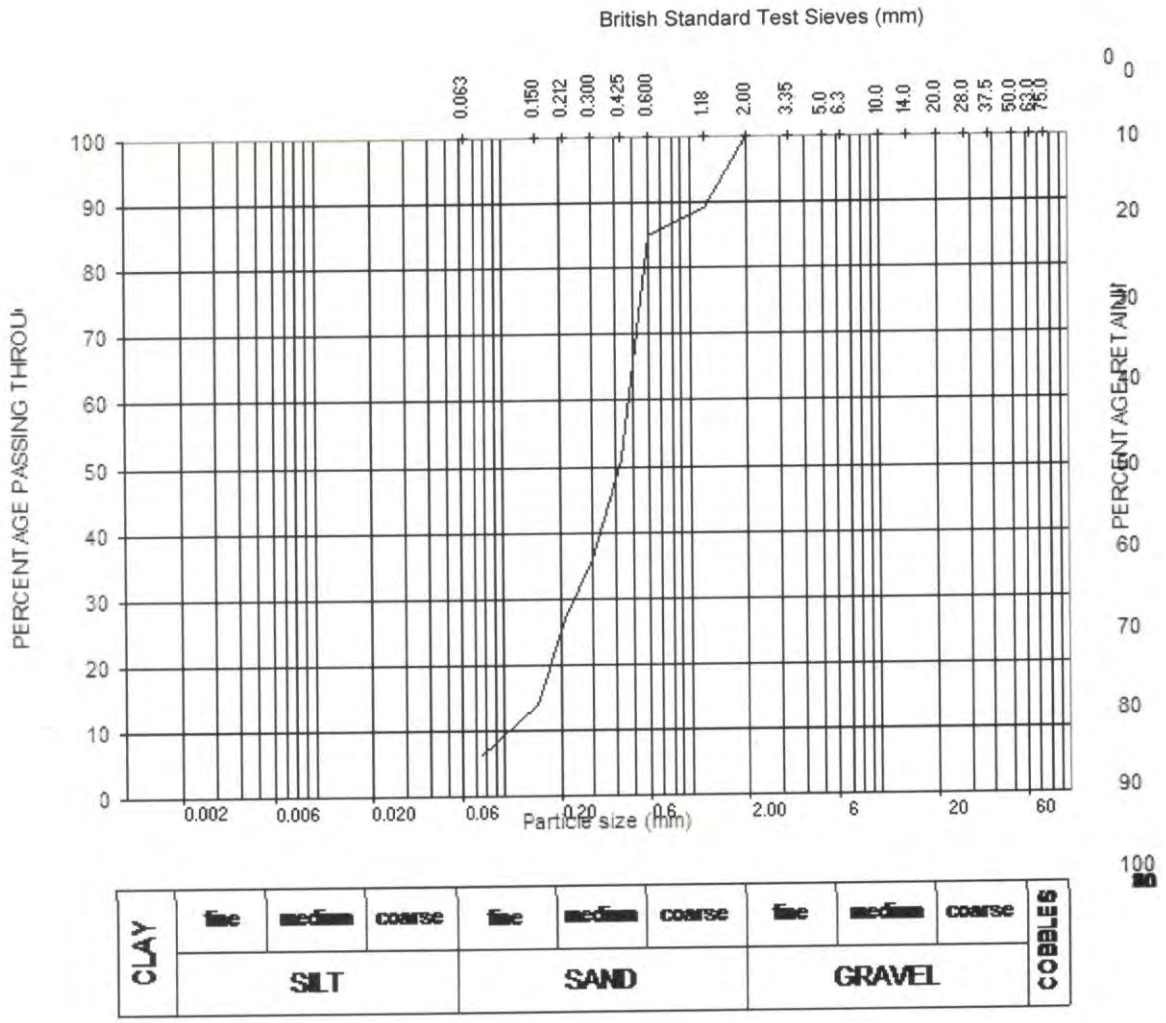
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	4.00m	Light brown silty fine, medium and coarse SAND

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

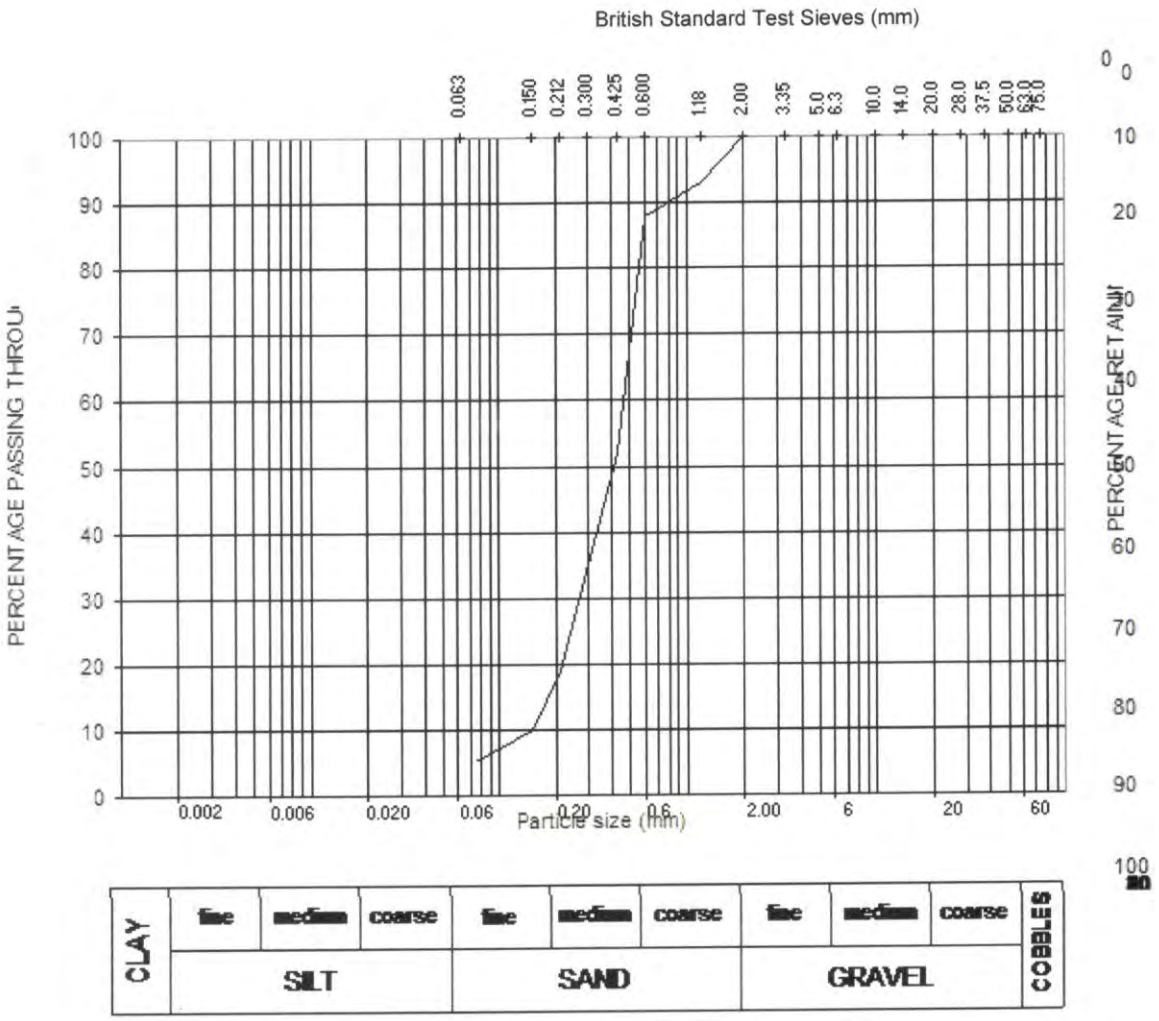
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION
BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	6.00m	Brown silty fine, medium and coarse sand

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

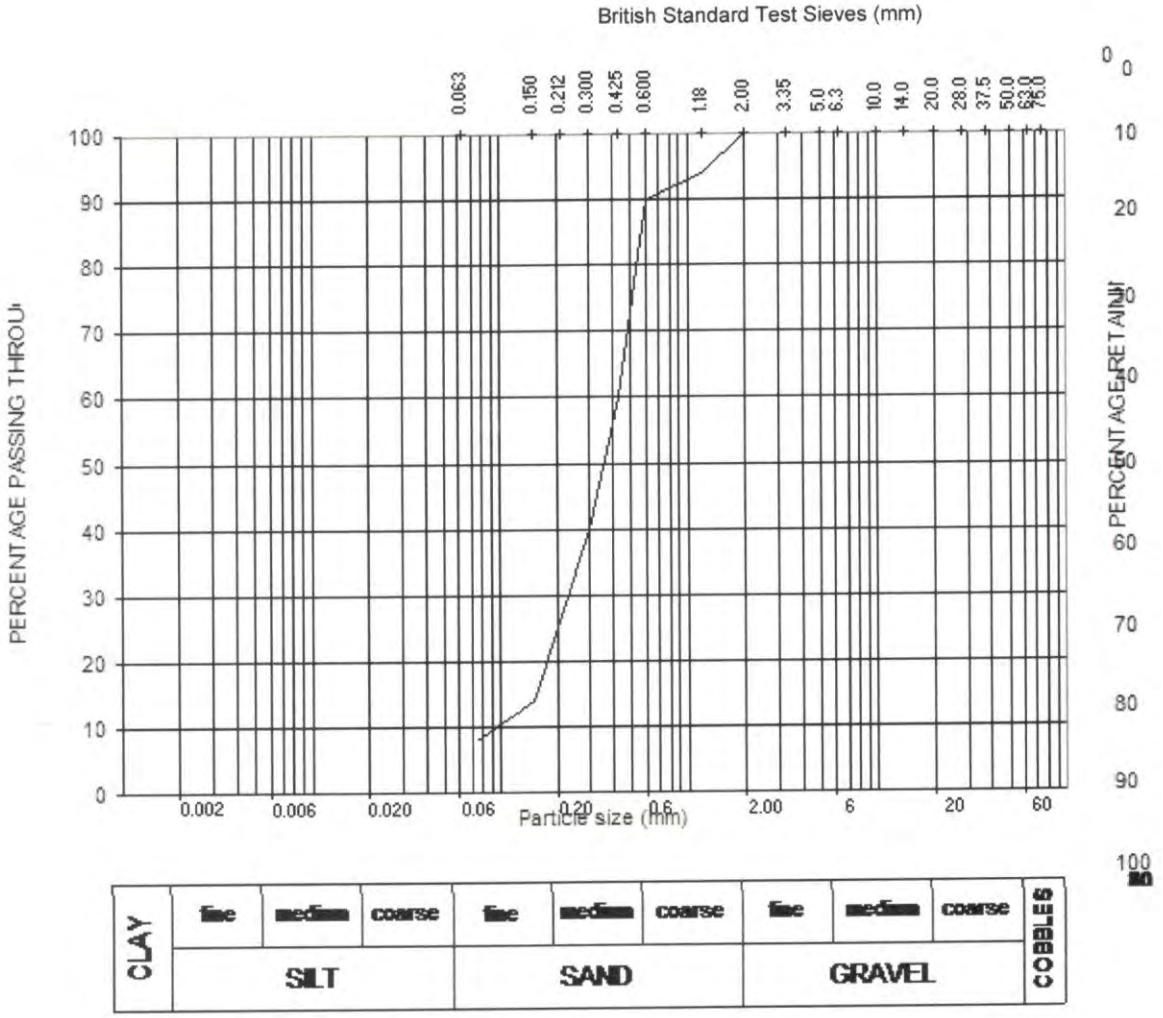
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION
BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	8.00m	Brown silty fine, medium and coarse sand

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

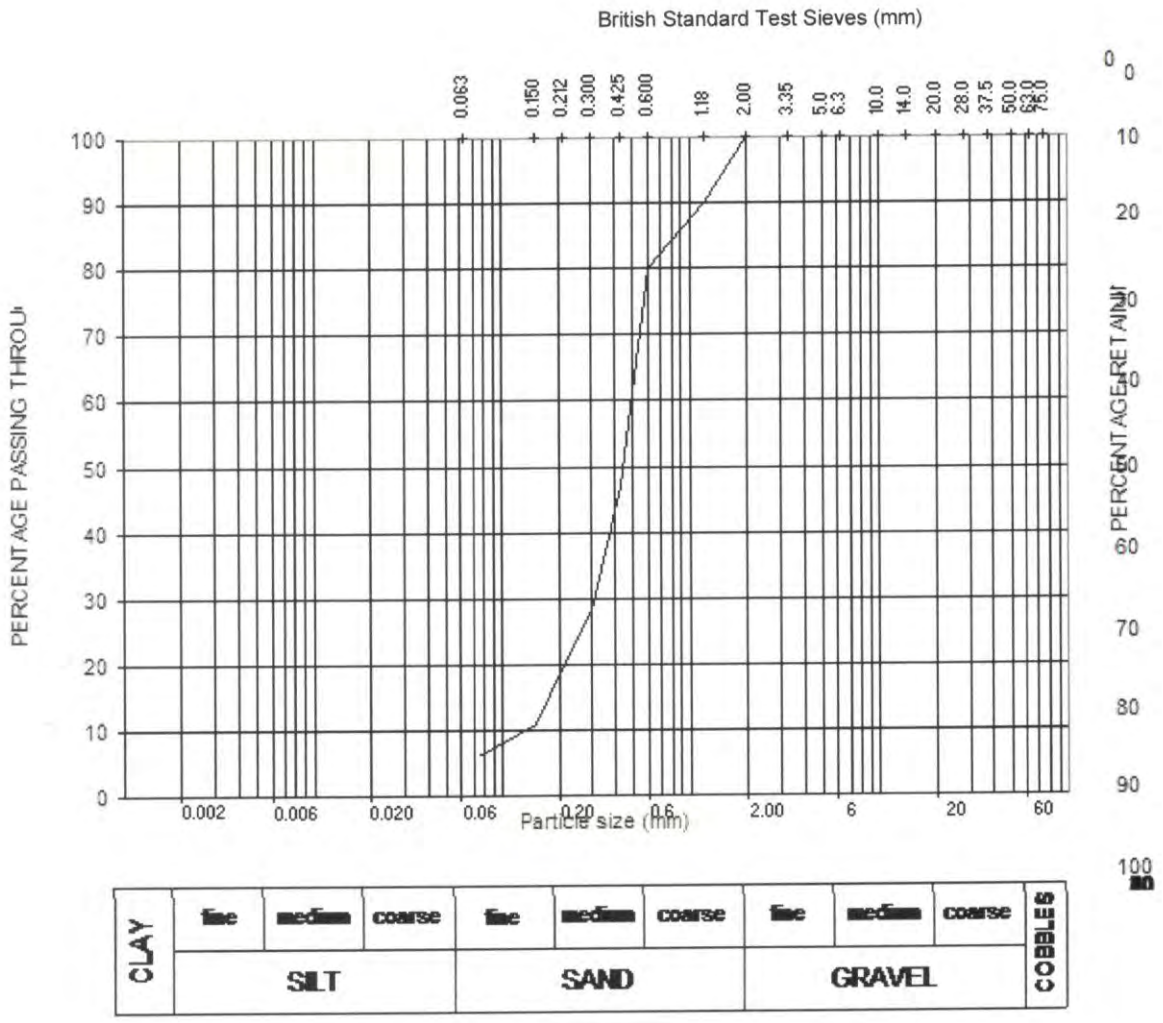
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	10.00m	Yellowish brown silty sand

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

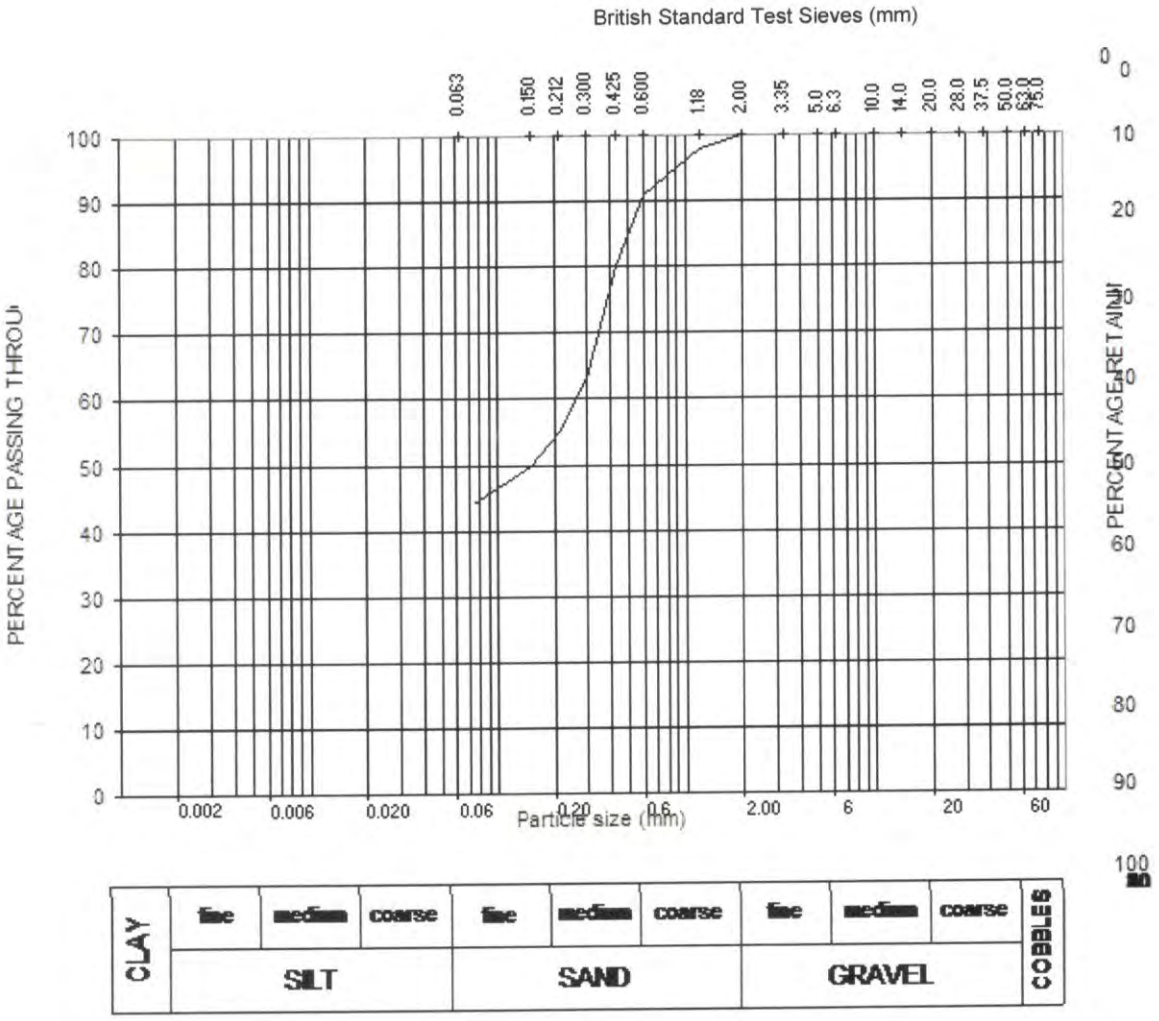
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	12.00m	Yellowish brown silty sand

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

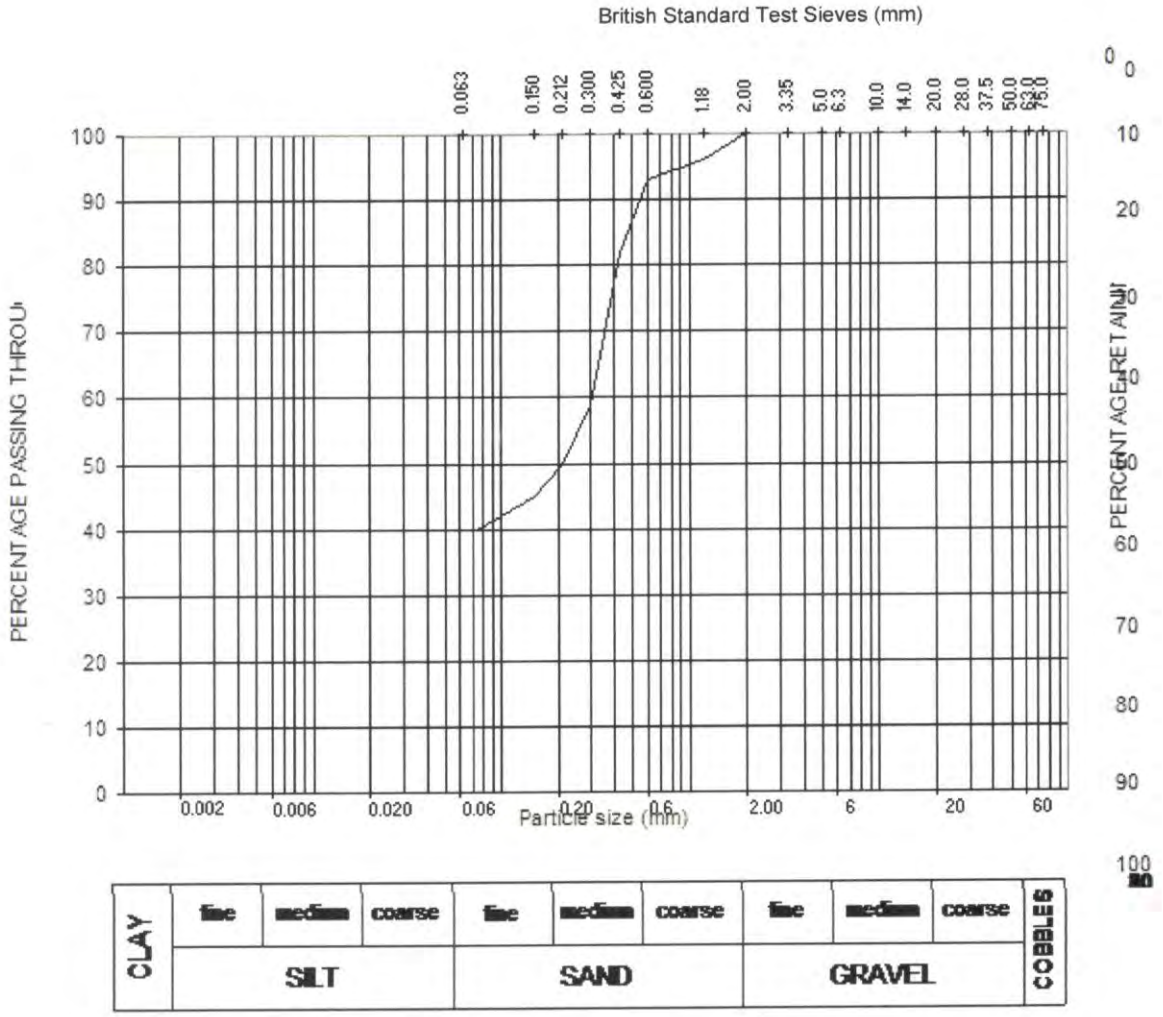
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION
BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	14.00m	reddish brown/grey clay

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

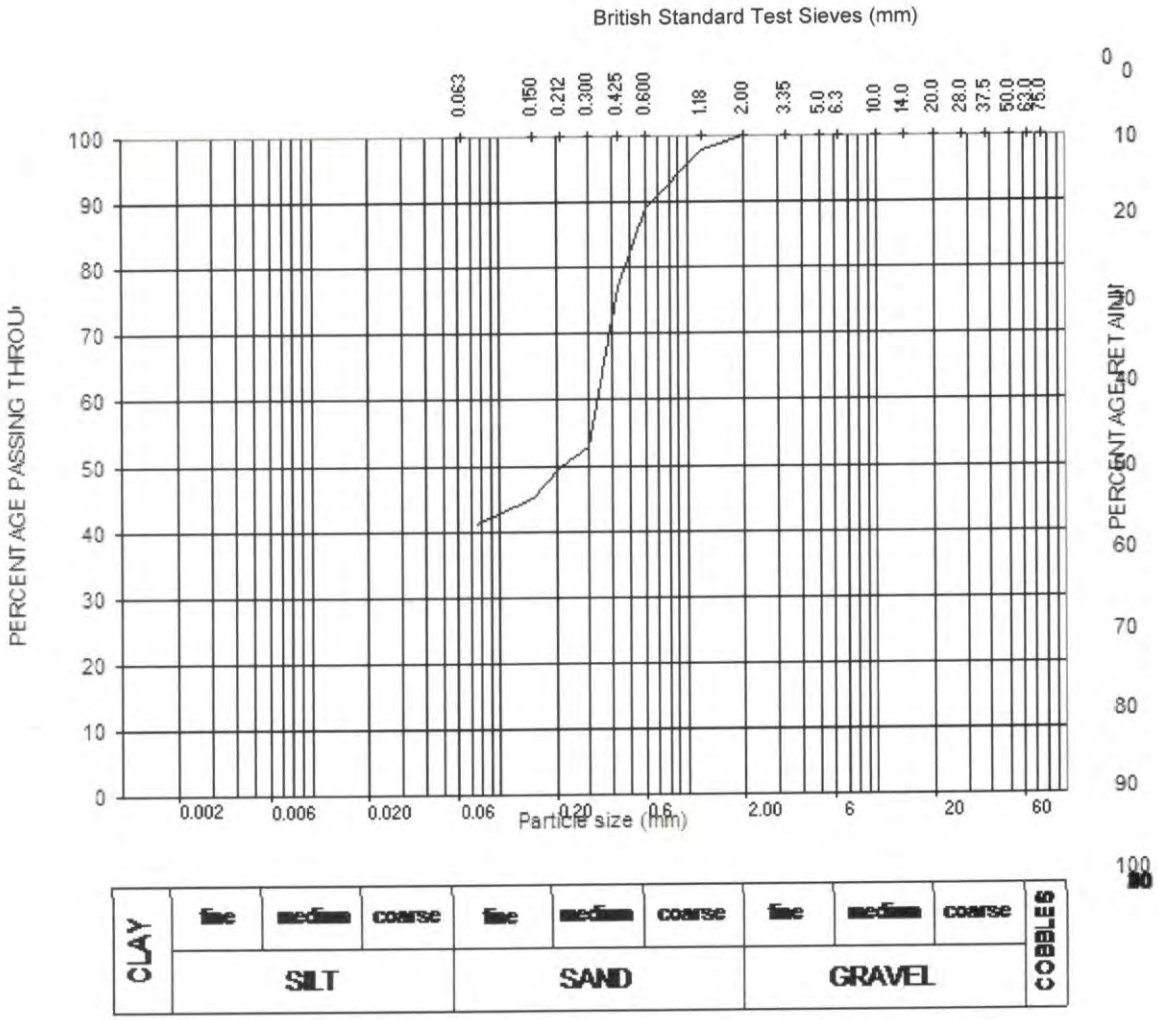
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION
BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	16.00m	reddish brown/grey clay

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

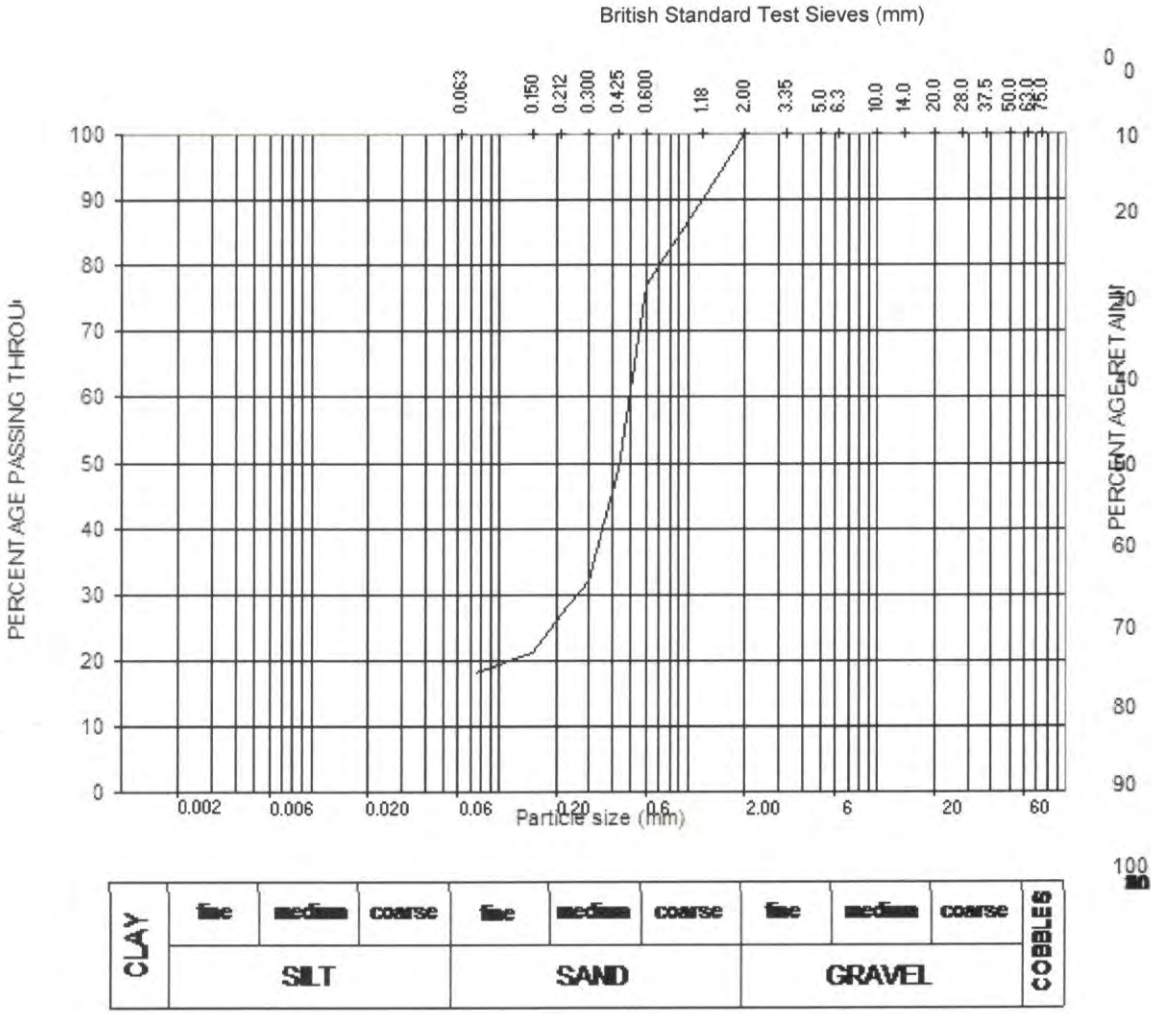
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION
BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	18.00m	Reddish brown/grey CLAY

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 1



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	20.00	Light brown clayey SAND

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION

NATURAL MOISTURE CONTENT DETERMINATION

SPT 1

BH NO	DEPTH	WT OF CAN	WT OF CAN + WT OF WET SAND	WT OF CAN + WT OF DRY SAND	WT OF MOISTURE	WT OF SOIL	NMC (%)
1	2.00	16.9	63.00	57.7	5.30	40.8	13.0
1	4.00	17.5	58.36	54.0	4.36	36.5	11.95
1	6.00	18.3	51.583	47.9	3.685	29.6	12.45
1	8.00	15.8	70.743	66.6	4.143	30.8	13.45
1	10.00	16.6	59.543	55.2	4.343	38.6	11.35
1	12.00	16.2	53.842	49.6	4.242	33.4	12.70
1	14.00	21.4	53.956	50.3	3.656	28.9	35.50
1	16.00	15.8	50.43	45.9	4.53	30.1	36.50
1	18.00	16.8	66.1	57.9	8.20	44.1	35.75
1	20.00	18.3	51.583	47.9	3.685	29.6	21.56
1	13.00	15.8	70.743	66.6	4.143	30.8	34.85
1	14.00	16.6	59.543	55.2	4.343	38.6	35.50
1	16.00	16.2	53.842	49.6	4.242	33.4	36.50
1	17.00	21.4	53.956	50.3	3.656	28.9	35.06
1	18.00	15.8	50.43	45.9	4.53	30.1	35.75
1	13.00	16.8	66.1	57.9	8.20	44.1	34.85

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1 DEPTH: 13.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	16	32	40	52
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	32.7	33.3	31.5	32.1
WT OF DRY SOIL AND CONTAINER	28.1	29.4	28.5	29.3
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	4.60	3.90	3.00	2.80
WT OF DRY SOIL	11.73	10.56	9.20	9.52
MOISTURE WEIGHT	39.2	36.9	32.6	29.4

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	31.5
WT OF DRY SOIL AND CONTAINER	28.7
WT OF CONTAINER	8.7
WT OF MOISTURE	2.80
WT OF DRY SOIL	20.00
MOISTURE WEIGHT	14

LIQUID LIMIT	33
PLASTIC LIMIT	14
PLASTICITY INDEX	19

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1 DEPTH: 14.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	13	24	32	39
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	32.47	33.11	31.43	30.57
WT OF DRY SOIL AND CONTAINER	28.27	29.4	28.68	28.17
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	4.20	3.50	2.75	2.40
WT OF DRY SOIL	11.90	10.77	9.38	8.39
MOISTURE WEIGHT	35.3	32.5	29.3	28.6

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	23.55
WT OF DRY SOIL AND CONTAINER	21.5
WT OF CONTAINER	8.7
WT OF MOISTURE	2.05
WT OF DRY SOIL	12.8
MOISTURE WEIGHT	16

LIQUID LIMIT	30
PLASTIC LIMIT	16
PLASTICITY INDEX	14

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1 DEPTH: 16.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	15	26	36	43
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	30.09	34.88	33.35	31.97
WT OF DRY SOIL AND CONTAINER	26.34	30.73	30	29.17
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	3.75	4.15	3.35	2.80
WT OF DRY SOIL	9.97	11.89	10.7	9.39
MOISTURE WEIGHT	37.6	34.9	31.3	29.8

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	26.57
WT OF DRY SOIL AND CONTAINER	24.1
WT OF CONTAINER	8.7
WT OF MOISTURE	2.47
WT OF DRY SOIL	15.4
MOISTURE WEIGHT	16

LIQUID LIMIT	32
PLASTIC LIMIT	16
PLASTICITY INDEX	16

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1 DEPTH: 17.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	17	23	34	40
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	32.17	34.88	33.35	31.57
WT OF DRY SOIL AND CONTAINER	28.17	29.74	32.85	29.02
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	4.0	3.45	3.05	2.55
WT OF DRY SOIL	11.8	10.9	10.5	9.24
MOISTURE WEIGHT	33.8	31.65	29.0	27.6

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	33.55
WT OF DRY SOIL AND CONTAINER	30.3
WT OF CONTAINER	8.7
WT OF MOISTURE	3.25
WT OF DRY SOIL	21.6
MOISTURE WEIGHT	15

LIQUID LIMIT	30
PLASTIC LIMIT	15
PLASTICITY INDEX	15

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1 DEPTH: 18.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	11	20	31	38
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	32.82	33.66	32.65	31.25
WT OF DRY SOIL AND CONTAINER	28.67	30.16	29.7	28.81
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	4.15	3.50	2.95	2.44
WT OF DRY SOIL	12.3	11.32	10.4	9.03
MOISTURE WEIGHT	33.7	30.9	28.3	27.0

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	28.24
WT OF DRY SOIL AND CONTAINER	25.12
WT OF CONTAINER	8.7
WT OF MOISTURE	3.12
WT OF DRY SOIL	16.42
MOISTURE WEIGHT	19

LIQUID LIMIT	29
PLASTIC LIMIT	19
PLASTICITY INDEX	10

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION

UNIT WEIGHT DETERMINATION

SPT 1

BH NO	DEPTH	NMC	VOLUME OF SOIL (V)	MASS OF SOIL (M)	DENSITY OF SOIL (pb)	WET UNIT WEIGHT OF SOIL (yb)	DRY DENSITY OF SOIL	DRY UNIT WEIGHT OF SOIL (yb)
1	2.00	13.0	56.84	133.20	2.343	20.08	2.010	18.34
1	4.00	11.95	56.84	133.35	2.346	20.60	1.993	18.49
1	6.00	12.45	56.84	133.22	2.344	20.54	1.987	18.41
1	8.00	13.45	56.84	133.25	2.344	21.90	2.067	18.93
1	10.00	11.35	56.84	133.33	2.346	22.10	2.123	19.32
1	12.00	12.70	56.84	133.15	2.343	22.25	2.098	20.04
1	14.00	12.65	56.84	133.2	2.343	18.75	2.045	17.32
1	16.00	15.05	56.84	133.10	2.342	18.55	1.912	17.04
1	18.00	19.95	56.84	133.0	2.339	19.45	1.898	17.01
1	20.00	13.0	56.84	133.20	2.343	22.85	2.010	20.01
1	13.00	11.95	56.84	133.35	2.346	19.05	1.993	18.02
1	14.00	12.45	56.84	133.22	2.344	18.75	1.987	17.32
1	16.00	13.45	56.84	133.25	2.344	18.55	2.067	17.04
1	17.00	11.35	56.84	133.33	2.346	18.70	2.123	16.50
1	18.00	12.70	56.84	133.15	2.343	19.45	2.098	17.01
1	13.00	12.65	56.84	133.2	2.343	19.05	2.045	16.88
1	15.50	15.05	56.84	133.10	2.342	17.45	1.912	16.45
1	16.45	19.95	56.84	133.0	2.339	19.15	1.898	16.83

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION

SPECIFIC GRAVITY DETERMINATION SPT 1

BH NO	DEPTH	MASS OF EMPTY BOTTLE (M1)	MASS OF BOTTLE + SOIL M2	MASS OF BOTTLE + SOIL +WATER, M3	MASS OF BOTTLE + WATER ONLY, M4	WEIGHT OF SAMPLE M2 – M1	TEMP DEG. CENT	GS
1	2.00	215	535	710	175	320	0.9998	2.60
1	4.00	215	535	705.4	170.4	320	0.9998	2.59
1	6.00	215	535	713.5	178.5	320	0.9998	2.67
1	8.00	215	535	713.1	178.1	320	0.9998	2.65
1	10.00	210	530	715	185	320	0.9998	2.74
1	12.00	215	535	710.5	175.5	320	0.9998	2.82
1	14.00	215	535	705.5	170.5	320	0.9998	2.75
1	16.00	210	535	710.5	175.5	320	0.9998	2.86
1	18.00	215	535	714.3	179.3	320	0.9998	2.85
1	20.00	215	535	710	175	320	0.9998	2.83
1	13.00	215	535	705.4	170.4	320	0.9998	2.61
1	14.00	215	535	713.5	178.5	320	0.9998	2.69
1	16.00	215	535	713.1	178.1	320	0.9998	2.53
1	17.00	210	530	715	185	320	0.9998	2.64
1	18.00	215	535	710.5	175.5	320	0.9998	2.77
1	13.00	215	535	705.5	170.5	320	0.9998	2.61
1	15.50	210	535	710.5	175.5	320	0.9998	2.64
1	16.45	215	535	714.3	179.3	320	0.9998	2.76

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1

UNCONFINED COMPRESSION TEST

BOREHOLE NO: 1 DEPTH: 15.50m

DEFORMATION	LOAD (KN)	SAMPLE	STRESS	STRAIN	CORRECTED	STRESS
Dial readings		Deformation			Area	KN/m2
0	0	0	0	0	0.0011134	14.4222051
20	3.34	0.2	0.002432	0.2432	0.0011167	20.34698995
40	5.76	0.4	0.004891	0.4891	0.00111905	24.85960579
60	6.32	0.6	0.007588	0.7588	0.00112232	28.63564213
80	7.89	0.8	0.009762	0.9762	0.00112675	31.93743885
100	10.82	1.0	0.012567	1.2567	0.00112876	34.89985673
120	11.40	1.2	0.015687	1.5687	0.00113145	37.60319135
140	15.15	1.4	0.018763	1.8763	0.00113597	40.09987531
160	16.20	1.6	0.021341	2.1341	0.00113975	42.42640687
180	17.13	1.8	0.025466	2.5466	0.00114111	44.60941605
200	18.70	2.00	0.029824	2.9824	0.00114432	46.66904756
250	20.45	2.50	0.033765	3.3765	0.00114865	64.69917732
300	22.10	3.00	0.036167	3.6167	0.00115354	76.23166368
350	22.70	3.50	0.039215	3.9215	0.00115693	77.70615219
400	23.10	4.00	0.042674	4.2674	0.00116453	89.126982
450	25.05	4.50	0.047568	4.7568	0.00116997	90.49793385
500	26.15	5.00	0.056234	5.6234	0.00117568	101.82232606
550	26.55	5.50	0.064456	6.4456	0.00117812	123.10309026
600	27.85	6.00	0.073543	7.3543	0.00118342	134.34283177
650	29.05	6.50	0.086845	8.6845	0.00118764	155.54387843
700	29.75	7.00	0.097752	9.7752	0.00119643	159.70832032
750	30,45	7.50	0.11	11	0.0012342	161.83804242

UCS = 170KN/m2

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1

UNCONFINED COMPRESSION TEST

BOREHOLE NO: 1 DEPTH: 16.45m

DEFORMATION	LOAD (KN)	SAMPLE	STRESS	STRAIN	CORRECTED	STRESS
Dial readings		Deformation			Area	KN/m2
0	0	0	0	0	0.0011134	45.4222051
20	3.34	0.2	0.003532	0.3532	0.0011167	70.34698995
40	5.76	0.4	0.005091	0.5091	0.00111905	74.85960579
60	6.32	0.6	0.009388	0.9388	0.00112232	86.63564213
80	7.89	0.8	0.011562	1.1562	0.00112675	91.93743885
100	10.82	1.0	0.012337	1.2337	0.00112876	98.89985673
120	11.40	1.2	0.015119	1.5119	0.00113145	101.60319135
140	15.15	1.4	0.017656	1.7656	0.00113597	110.09987531
160	16.20	1.6	0.024534	2.4534	0.00113975	119.42640687
180	17.13	1.8	0.026456	2.6456	0.00114111	125.60941605
200	18.70	2.00	0.028765	2.8765	0.00114432	133.66904756
250	20.45	2.50	0.034533	3.4533	0.00114865	142.69917732
300	22.10	3.00	0.036323	3.6323	0.00115354	146.23166368
350	22.70	3.50	0.039987	3.9987	0.00115693	155.70615219
400	23.10	4.00	0.045673	4.5673	0.00116453	161.126982
450	25.05	4.50	0.049654	4.9654	0.00116997	167.49793385
500	26.15	5.00	0.058324	5.8324	0.00117568	171.82232606
550	26.55	5.50	0.067654	6.7654	0.00117812	176.10309026
600	27.85	6.00	0.076982	7.6982	0.00118342	182.34283177
650	29.05	6.50	0.089235	8.9235	0.00118764	195.54387843
700	29.75	7.00	0.12	12	0.00119643	199.70832032
750	30,45	7.50	0.17	17	0.0012342	204.83804242

UCS = 210KN/m2

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1

ORIGINAL VOLUME OF SPECIMEN – 0.00087650m2

AREA OF SPECIMEN 1 – 0.001203487m2

AREA OF SPECIMEN 2 – 0.001360121m2

AREA OF SPECIMEN 3 – 0.001203487

DEVIATOR STRESS OF SPECIMEN (1) – 56.3KN/m2

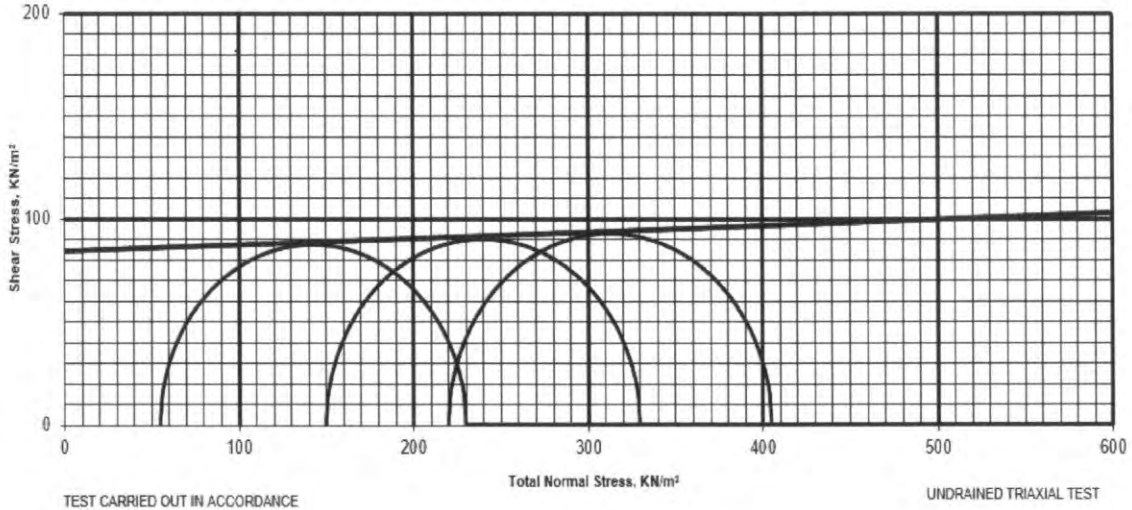
DEVIATOR STRESS OF SPECIMEN (2) – 150.0 KN/m2

DEVIATOR STRESS OF SPECIMEN (3) – 220.0 KN/m2

TEST NO	CELL PRESSURE KN/m2	DEVIATOR STRESS KN/m2	MAJOR PRINCIPAL STRESS KN/m2
1	100	56.3	230
2	200	150.0	331.1
3	300	220.0	404.7

BH • .1 Depth: 15.50m

Undrained Cohesion	85N/m2
Angle of Friction (PHI)	11eg



TEST CARRIED OUT IN ACCORDANCE WITH BS 1377

UNDRAINED TRIAXIAL TEST

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 1

ORIGINAL VOLUME OF SPECIMEN – 0.00087650m2

AREA OF SPECIMEN 1 – 0.001203487m2

AREA OF SPECIMEN 2 – 0.001360121m2

AREA OF SPECIMEN 3 – 0.001203487m2

DEVIATOR STRESS OF SPECIMEN (1) – 79.8KN/m2

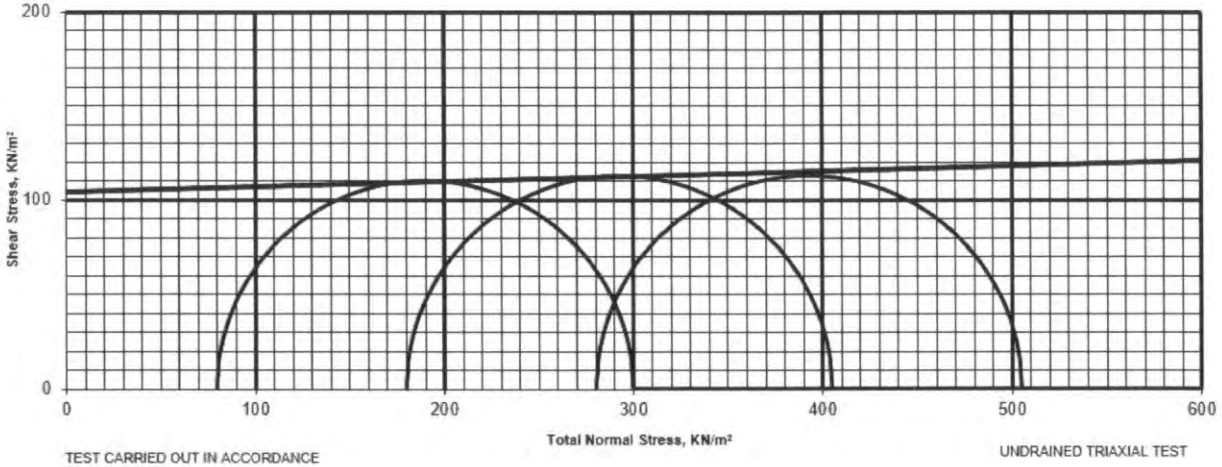
DEVIATOR STRESS OF SPECIMEN (2) – 180.0 KN/m2

DEVIATOR STRESS OF SPECIMEN (3) – 280.1 KN/m2

TEST NO	CELL PRESSURE KN/m2	DEVIATOR STRESS KN/m2	MAJOR PRINCIPAL STRESS KN/m2
1	100	79.8	300
2	200	180.0	406.3
3	300	280.1	503.9

BH 1 Depth: 16.45m

Undrained Cohesion	105N/m2
Angle of Friction (PHI)	9deg



TEST CARRIED OUT IN ACCORDANCE WITH BS 1377

UNDRAINED TRIAXIAL TEST

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2

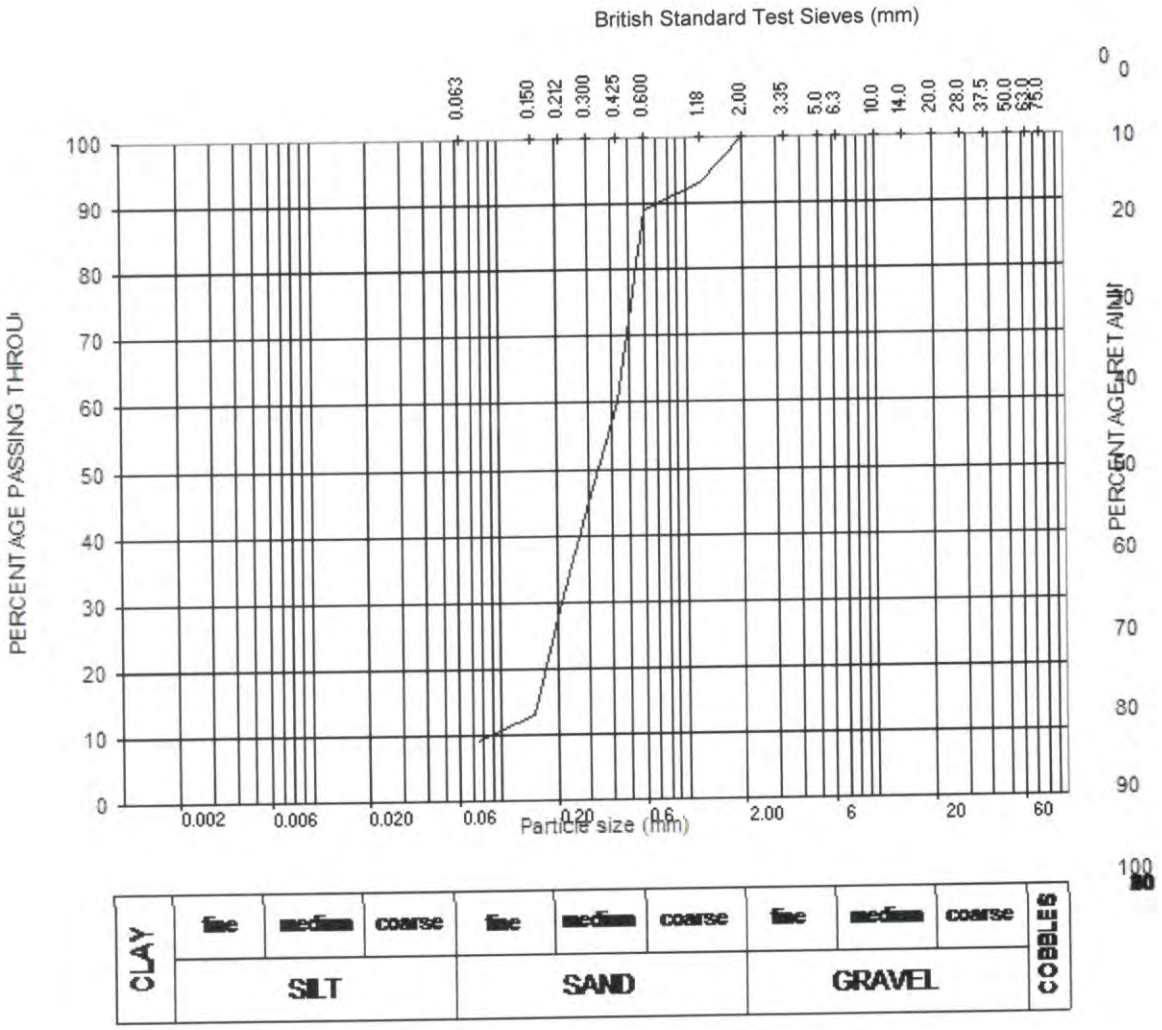
SUMMARY OF LABORATORY TEST RESULT

DATE: SEPTEMBER 2017

BH NO	DEPTH (m)	PARTICLE SIZE DISTRIBUTION % PASSING					NATURAL M.C %	ATTERBERG LIMIT TEST			Wet Unit Weight γ_B KN/m³	Dry Unit Weight KN/m³	Gs	UNCONFINED COMPRESSION TEST	QUICK UNDRAINED TRIAXIAL TEST		NaCl concentration ppm
		2.00 mm	0.600 mm	0.425 mm	0.300 mm	0.075 mm		L.L %	PL %	PI %				qu KN/m²	Cu KN/m²	Ø Deg	
2	2.00	100	89	60	45	9	12.15				19.95	17.02	2.69				688
2	4.00	100	94	61	34	3	12.15				20.50	18.12	2.59				702
2	6.00	100	90	57	40	5	15.15				20.65	18.34	2.56				694
2	8.00	100	85	55	26	7	13.30				20.98	18.65	2.58				732
2	10.00	100	87	55	35	6	14.25				21.60	18.97	2.82				745
2	12.00	100	91	70	55	44	34.00				21.90	18.54	2.71				674
2	14.00	100	90	80	69	50	33.90				22.55	20.04	2.64				599
2	16.00	100	82	50	30	9	21.20				22.20	20.01	2.81				616
2	18.00	100	83	55	42	21	19.50				22.55	20.10	2.77				655
2	20.00	90	71	42	18	0	9.45				22.09	19.01	2.80				641
2	12.00						34.00	30	16	14	18.80	16.55	2.74				
2	13.00						33.60	32	15	17	18.95	16.63	2.68				
2	14.00						33.90	28	14	14	19.66	16.95	2.80				
2	15.00						36.00	31	18	13	19.50	17.01	2.75				
2	12.50										18.15	16.20	2.70	140	70	7	
2	14.50										18.95	16.50	2.69	192	96	9	

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

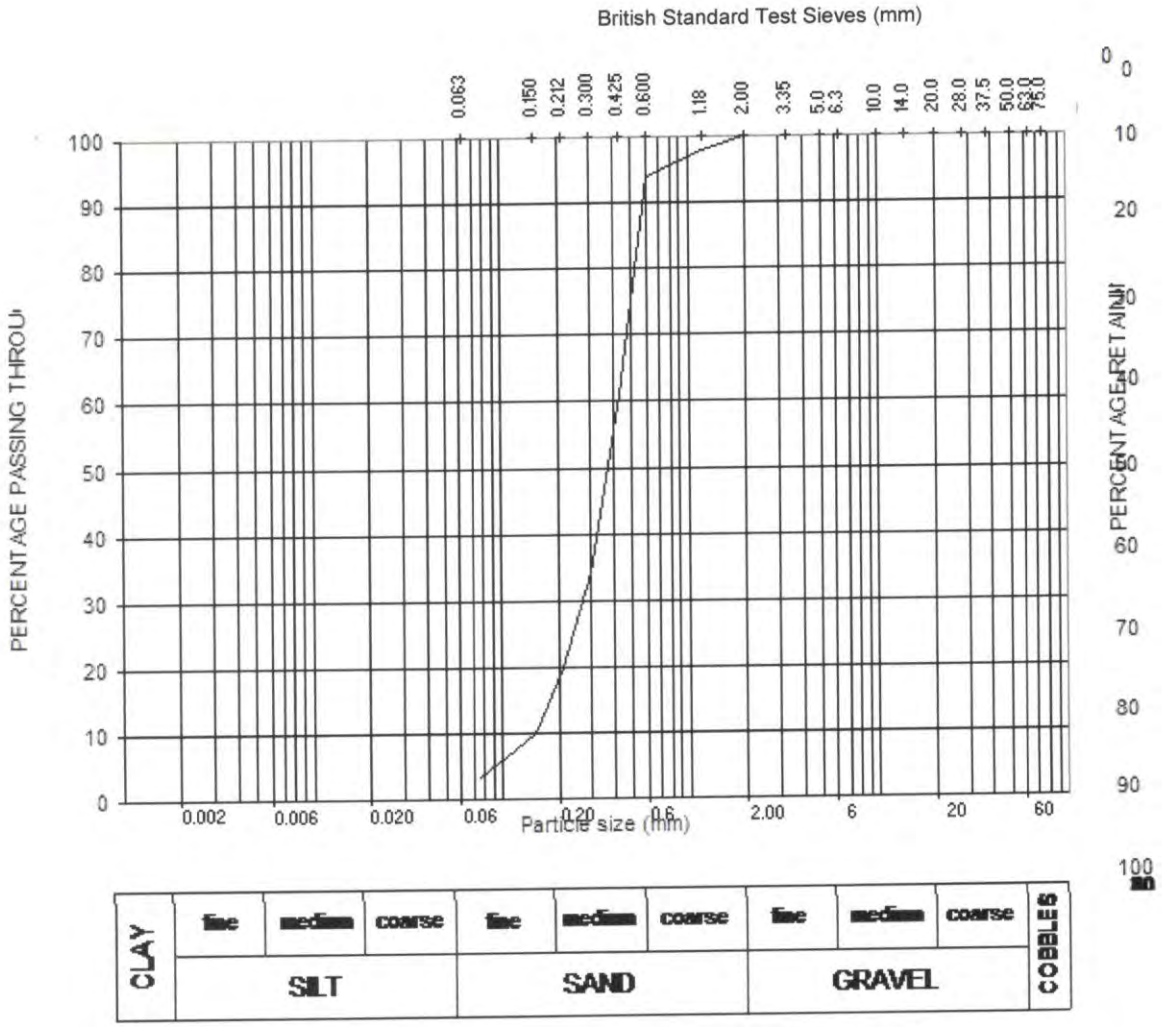
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	2	2.00m	Light brown silty sand

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

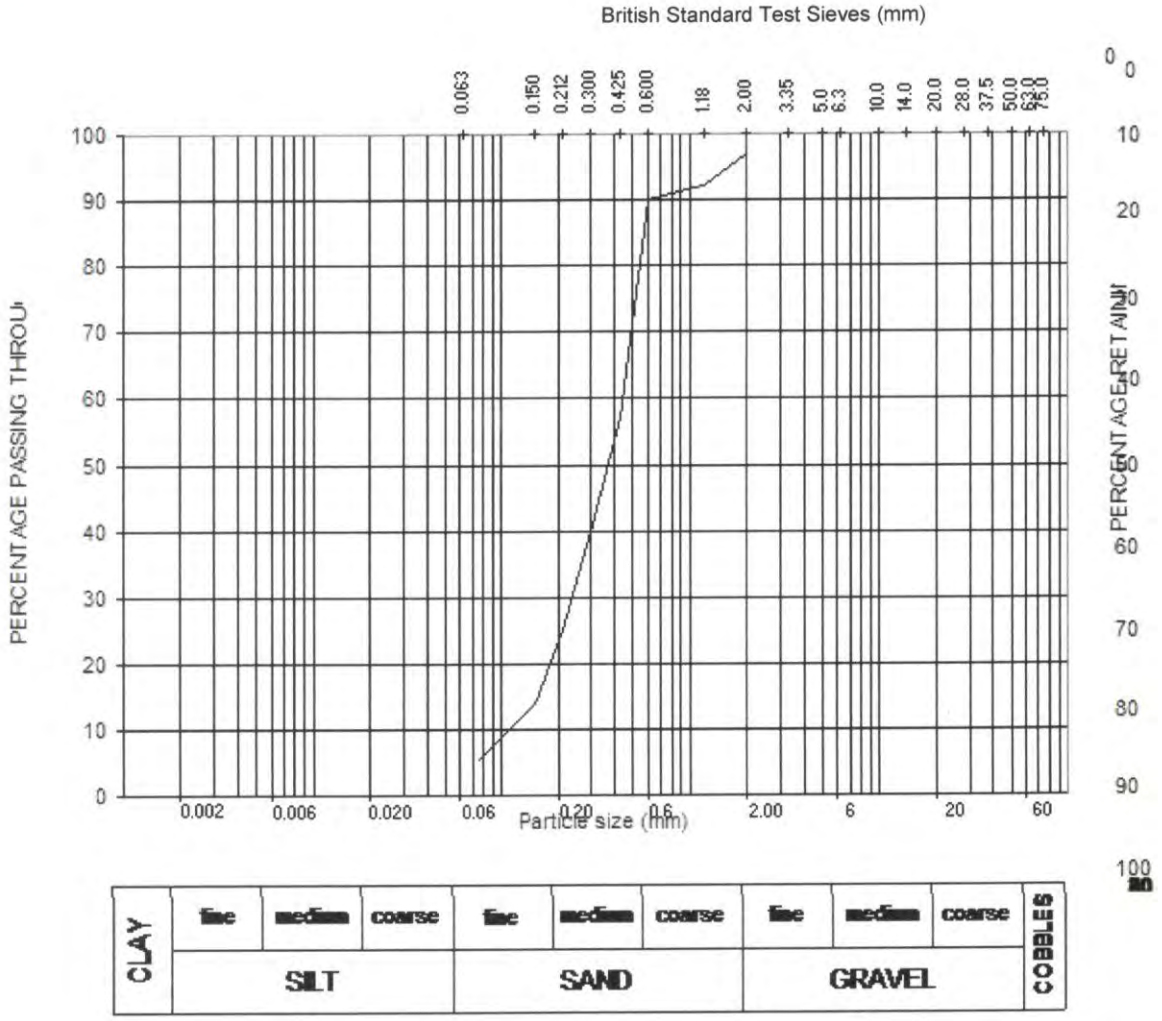
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	2	4.00m	Light brown silty sand

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

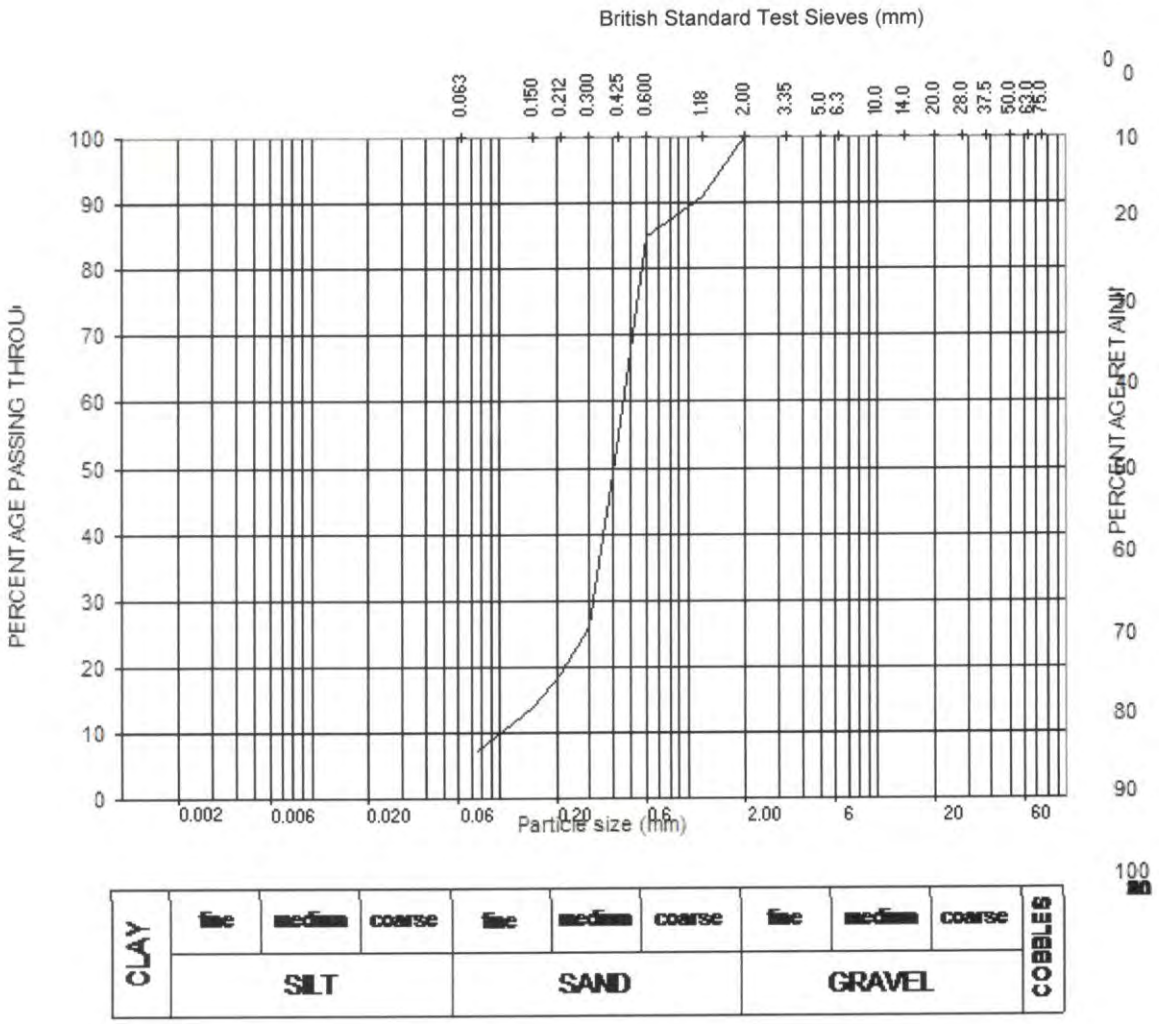
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	2	6.00m	Light brown silty sand with occasional gravels

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

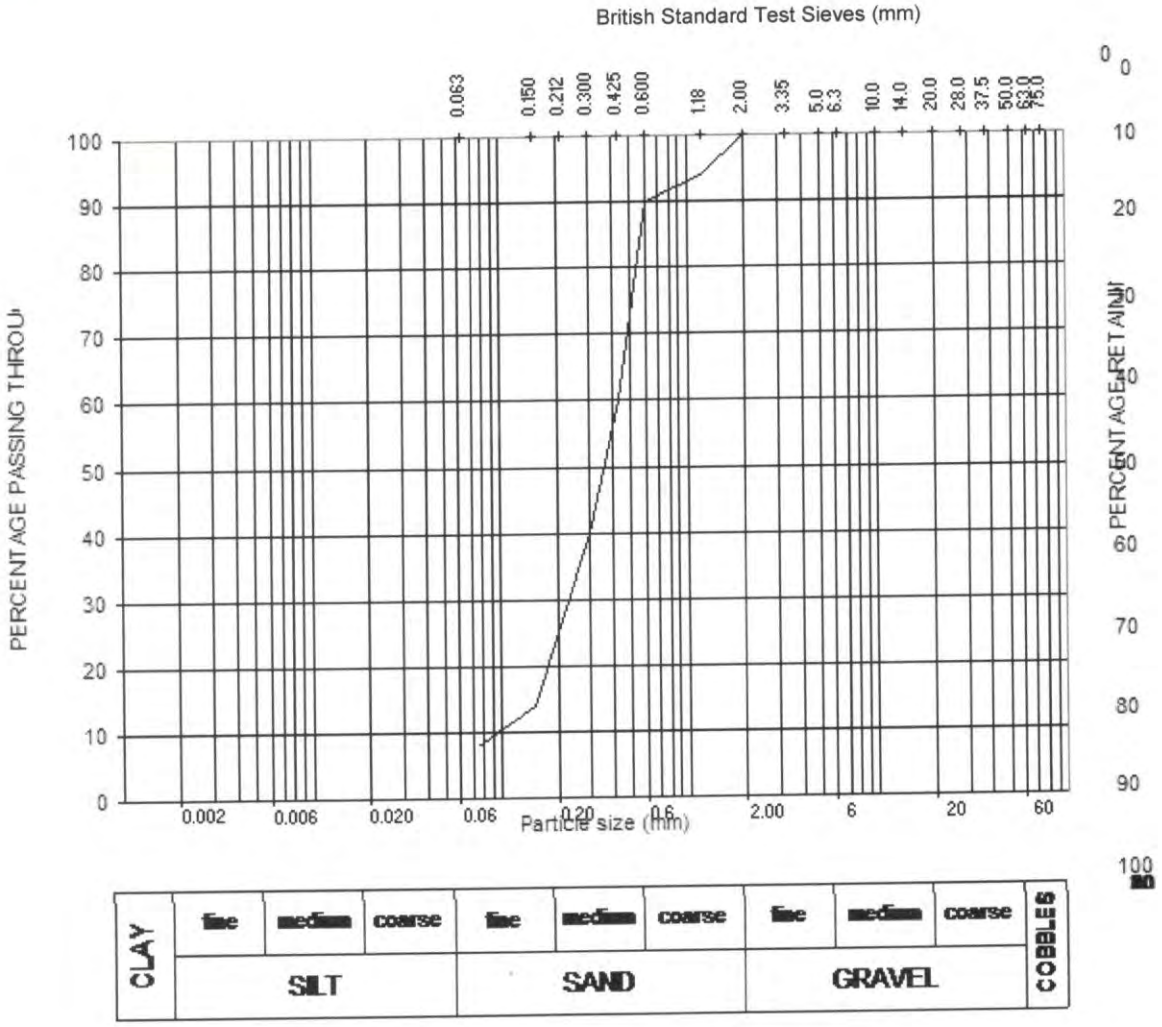
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	2	8.00m	yellowish brown silty SAND

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

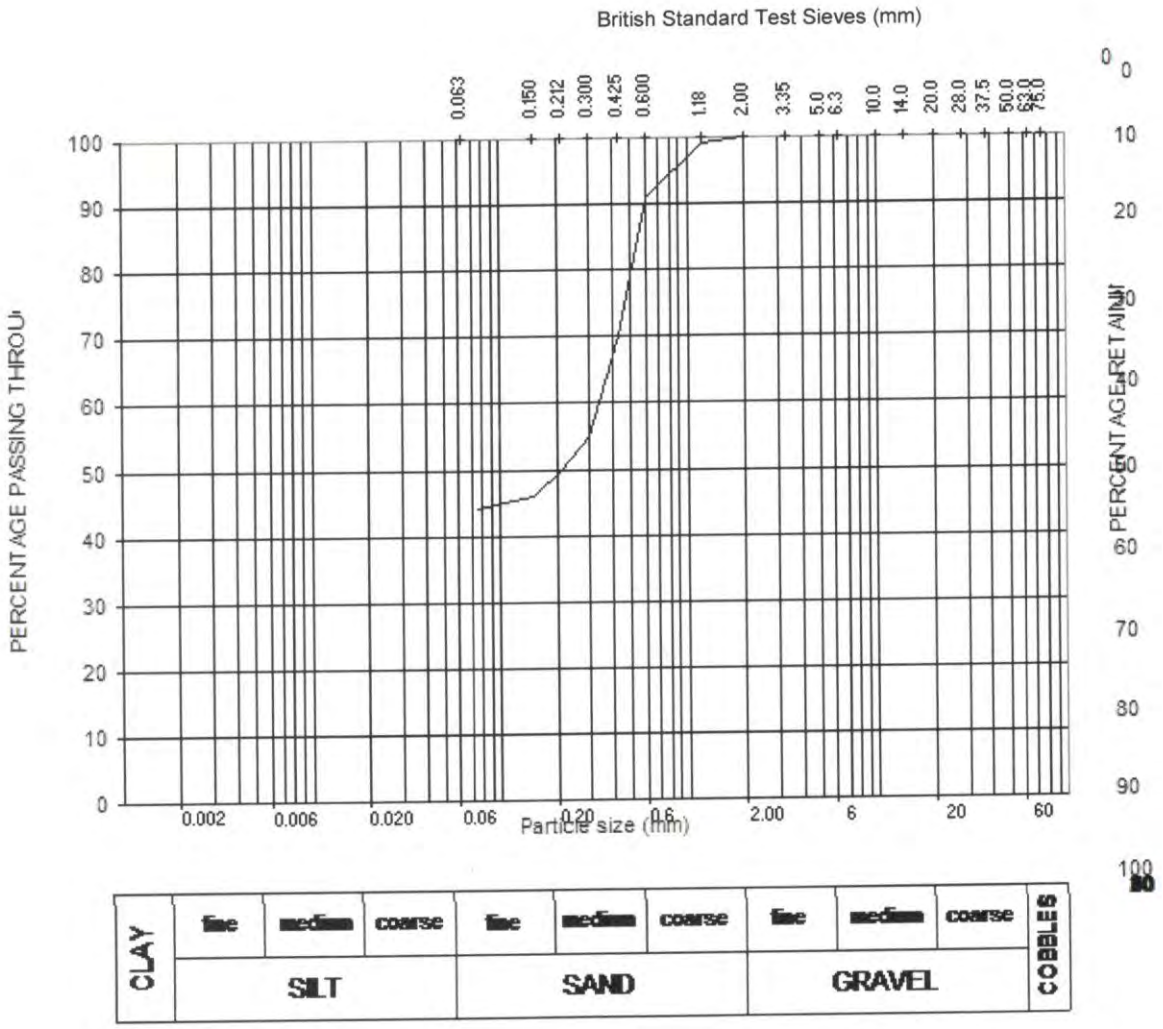
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	10.00m	Yellowish brown silty sand

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

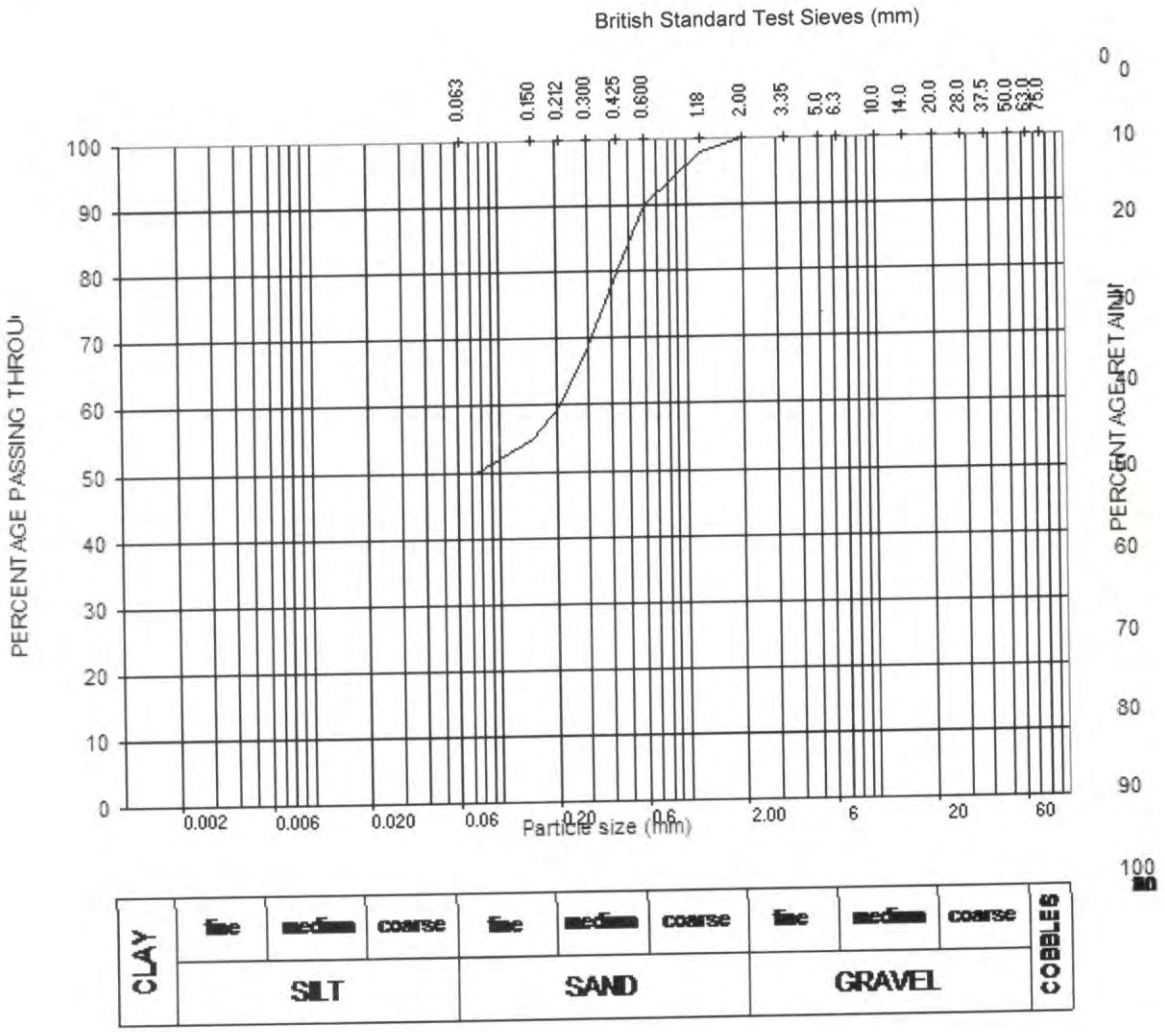
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	2	12.00m	Reddish grey CLAY

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

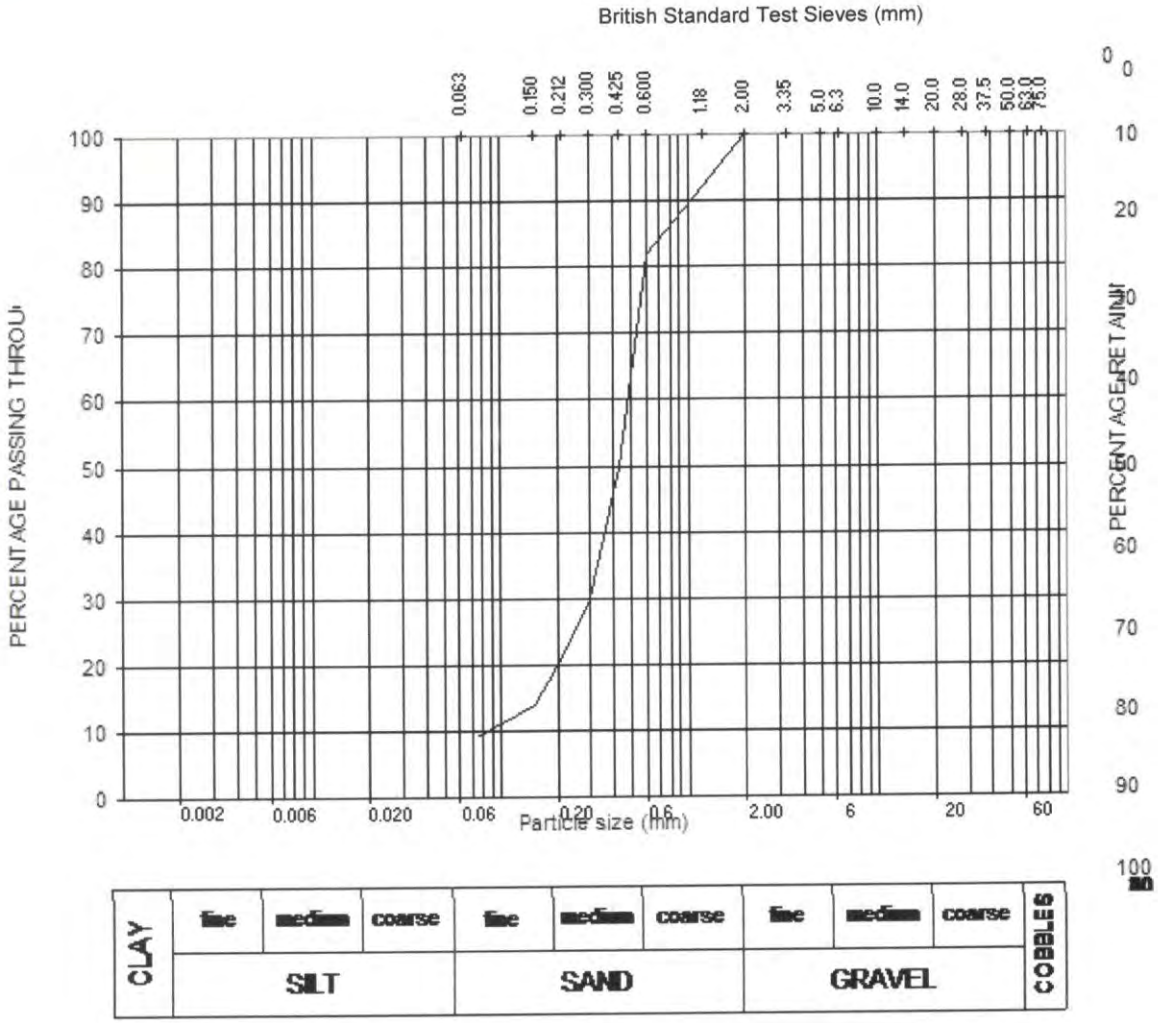
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	2	14.00	Reddish grey CLAY

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

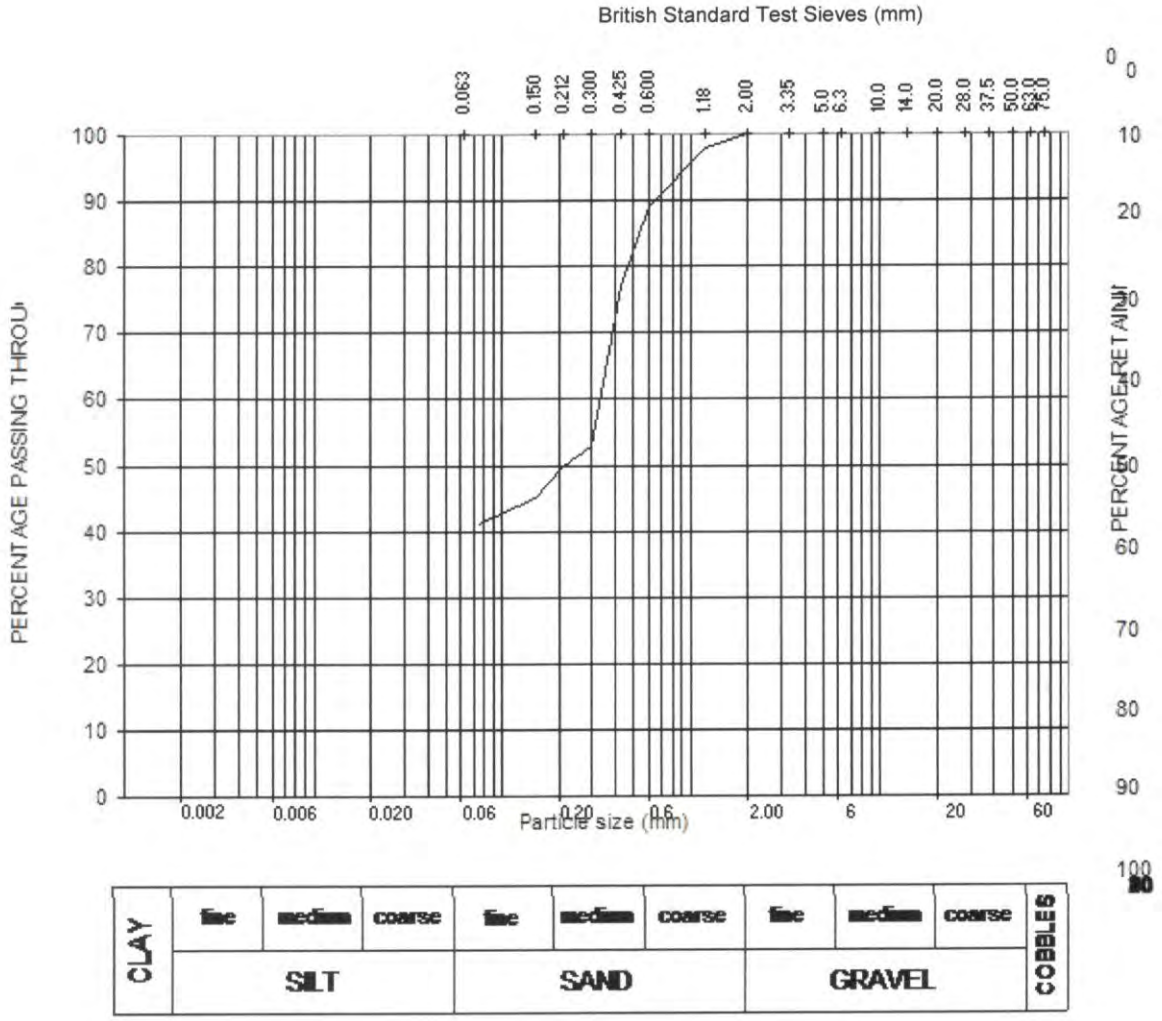
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	2	16.00	Light grey silty SAND

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

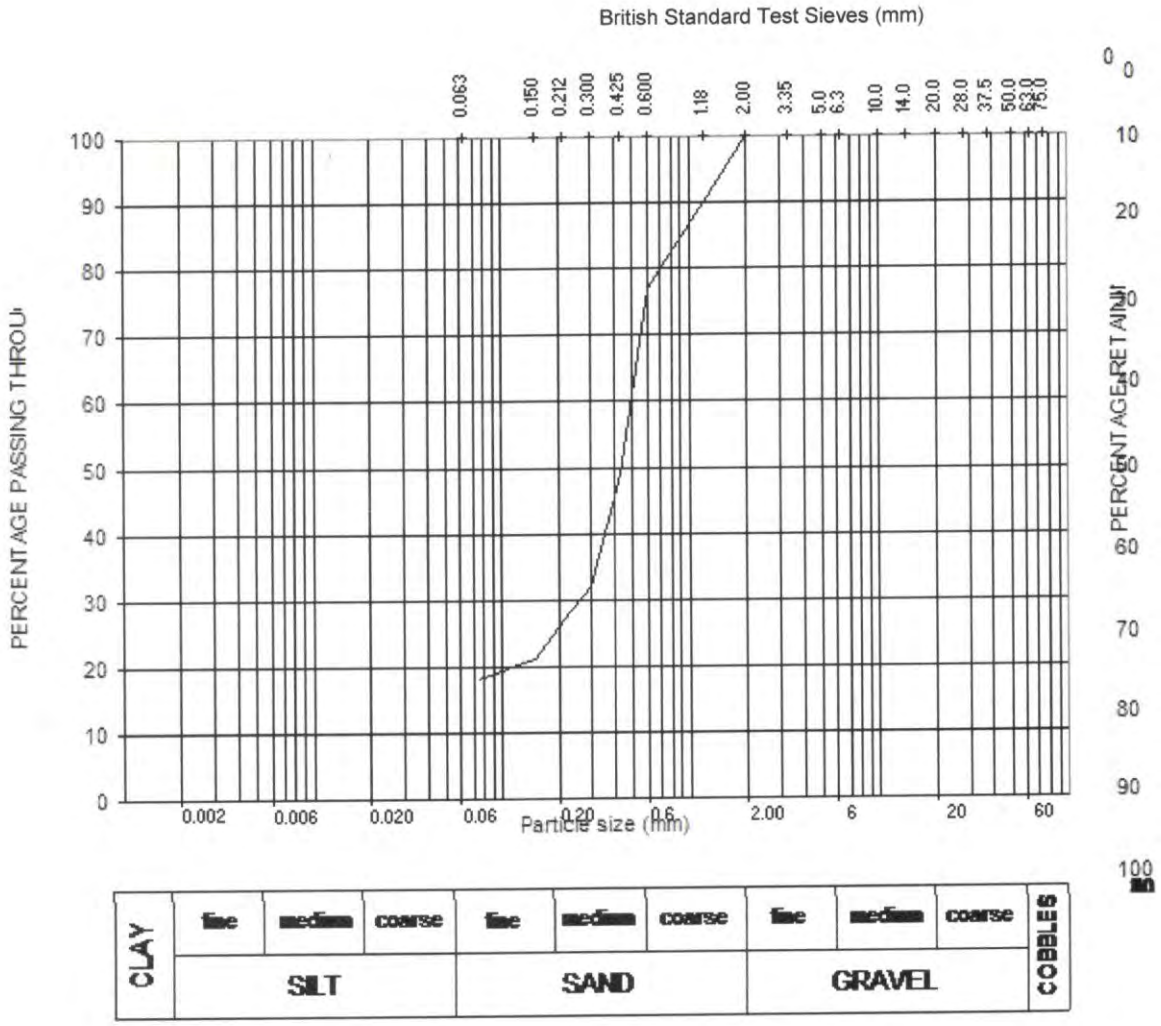
PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	18.00m	Reddish brown/grey CLAY

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION BOREHOLE 2



CURVE	SAMPLE	DEPTH [m]	SAMPLE DESCRIPTION
———	1	20.00	Light brown clayey SAND

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION

NATURAL MOISTURE CONTENT DETERMINATION

SPT 2

BH NO	DEPTH	WT OF CAN	WT OF CAN + WT OF WET SAND	WT OF CAN + WT OF DRY SAND	WT OF MOISTURE	WT OF SOIL	NMC (%)
2	2.00	16.2	56.68	52.3	4.38	36.1	12.15
2	4.00	16.6	56.54	52.1	4.44	35.5	12.15
2	6.00	16.9	56.86	51.6	5.26	34.7	15.15
2	8.00	17.5	54.10	49.8	4.30	32.3	13.30
2	10.00	21.4	68.98	63.00	5.93	41.6	14.25
2	12.00	16.8	60.78	56.3	4.48	39.5	34.00
2	14.00	18.3	66.02	58.5	7.52	40.2	33.90
2	16.00	17.7	59.39	52.1	7.29	34.4	21.20
2	18.00	15.8	61.81	54.3	7.51	38.5	19.50
2	20.00	18.0	64.08	60.1	3.98	42.1	9.45
2	12.00	16.8	60.78	56.3	4.48	39.5	34.00
2	13.00	17.5	66.02	51.6	4.42	38.6	33.60
2	14.00	18.3	66.02	58.5	7.52	40.2	33.90
2	15.00	16.8	61.81	63.0	7.90	42.3	36.00

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2 DEPTH: 12.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	14	19	27	34
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	32.17	34.88	33.35	31.57
WT OF DRY SOIL AND CONTAINER	28.17	29.74	32.85	29.02
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	3.7	3.45	3.05	2.55
WT OF DRY SOIL	11.19	10.9	10.5	9.24
MOISTURE WEIGHT	33.1	31.65	29.0	27.6

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	37.6
WT OF DRY SOIL AND CONTAINER	34.05
WT OF CONTAINER	8.7
WT OF MOISTURE	3.55
WT OF DRY SOIL	25.35
MOISTURE WEIGHT	14

LIQUID LIMIT	30
PLASTIC LIMIT	16
PLASTICITY INDEX	14

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2 DEPTH: 13.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	13	24	32	39
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	30.1	30.94	30.26	30.21
WT OF DRY SOIL AND CONTAINER	26.40	27.89	27.66	27.96
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	3.70	3.05	2.60	2.25
WT OF DRY SOIL	10.03	9.05	8.36	8.18
MOISTURE WEIGHT	36.9	33.7	31.1	27.5

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	29.01
WT OF DRY SOIL AND CONTAINER	26.36
WT OF CONTAINER	8.7
WT OF MOISTURE	2.65
WT OF DRY SOIL	17.66
MOISTURE WEIGHT	15

LIQUID LIMIT	32
PLASTIC LIMIT	15
PLASTICITY INDEX	17

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2 DEPTH: 14.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	12	21	29	37
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	32.17	34.66	34.12	33.26
WT OF DRY SOIL AND CONTAINER	28.12	30.99	30.94	30.52
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	4.05	3.67	3.18	2.74
WT OF DRY SOIL	11.75	12.15	11.64	10.74
MOISTURE WEIGHT	34.46	30.2	27.3	25.5

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	33.21
WT OF DRY SOIL AND CONTAINER	30.2
WT OF CONTAINER	8.7
WT OF MOISTURE	3.01
WT OF DRY SOIL	21.5
MOISTURE WEIGHT	14

LIQUID LIMIT	28
PLASTIC LIMIT	14
PLASTICITY INDEX	14

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2 DEPTH: 15.00m

ATTERBERG LIMIT TEST

LIQUID LIMIT

NO OF BLOWS	15	27	38	45
CONTAINER NO	8	11	13	16
WT OF WET SOIL AND CONTAINER	33.19	35.41	35.24	34.11
WT OF DRY SOIL AND CONTAINER	28.85	31.35	31.55	30.94
WT OF CONTAINER	16.37	18.84	19.3	19.78
WT OF MOISTURE	4.34	4.06	3.69	3.17
WT OF DRY SOIL	12.48	12.51	12.25	11.16
MOISTURE WEIGHT	34.76	32.45	30.1	28.4

PLASTIC LIMIT

CONTAINER NO	10
WT OF WET SOIL AND CONTAINER	40.07
WT OF DRY SOIL AND CONTAINER	34.46
WT OF CONTAINER	8.7
WT OF MOISTURE	3.61
WT OF DRY SOIL	27.76
MOISTURE WEIGHT	13

LIQUID LIMIT	31
PLASTIC LIMIT	18
PLASTICITY INDEX	13

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION

UNIT WEIGHT DETERMINATION

SPT 2

BH NO	DEPTH	NMC	VOLUME OF SOIL (V)	MASS OF SOIL (M)	DENSITY OF SOIL (pb)	BULK UNIT WEIGHT OF SOIL (yb)	DRY DENSITY OF SOIL	DRY UNIT WEIGHT OF SOIL (yb)
2	2.00	12.15	56.84	133.3	2.345	19.95	1.965	17.02
2	4.00	12.15	56.84	133.27	2.345	20.50	1.976	18.12
2	6.00	15.15	56.84	133.31	2.345	20.65	2.032	18.34
2	8.00	13.30	56.84	133.35	2.346	20.98	2.111	18.65
2	10.00	14.25	56.84	133.40	2.347	21.60	1.998	18.97
2	12.00	34.00	56.84	133.38	2.347	21.90	1.959	18.54
2	14.00	33.90	56.84	133.29	2.345	22.55	2.102	20.04
2	16.00	21.20	56.84	133.58	2.350	22.20	2.004	20.01
2	18.00	19.50	56.84	133.34	2.345	22.55	2.109	20.10
2	20.00	9.45	56.84	133.75	2.353	22.09	1.999	19.01
2	12.00	34.00	56.84	133.31	2.345	18.80	2.111	16.55
2	13.00	33.60	56.84	133.35	2.346	18.95	1.996	16.63
2	14.00	33.90	56.84	133.40	2.345	19.66	2.005	16.95
2	15.00	36.00	56.84	133.38	2.350	19.50	2.111	17.01
2	12.50		56.84	133.29	2.346	18.15	1.965	16.20
2	14.50		56.84	133.58	2.347	18.95	1.976	16.50

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION

SPECIFIC GRAVITY DETERMINATION SPT 2

BH NO	DEPTH	MASS OF EMPTY BOTTLE (M1)	MASS OF BOTTLE + SOIL M2	MASS OF BOTTLE + SOIL +WATER, M3	MASS OF BOTTLE + WATER ONLY, M4	WEIGHT OF SAMPLE M2 – M1	TEMP DEG. CENT	GS
2	2.00	215	535	713.4	178.4	320	0.9998	2.69
2	4.00	215	530	712.5	182.5	320	0.9998	2.59
2	6.00	210	535	714.4	179.4	320	0.9998	2.56
2	8.00	215	535	715.4	180.4	320	0.9998	2.58
2	10.00	215	530	715	185	320	0.9998	2.82
2	12.00	210	535	713.4	178.4	320	0.9998	2.71
2	14.00	215	535	713.1	178.3	320	0.9998	2.64
2	16.00	215	535	712.5	182.5	320	0.9998	2.81
2	18.00	210	530	715.0	179.4	320	0.9998	2.77
2	20.00	215	535	714.4	180.4	320	0.9998	2.80
2	12.00	215	535	713.4	185	320	0.9998	2.74
2	13.00	210	530	713.3	178.4	320	0.9998	2.68
2	14.00	215	535	715.4	181.1	320	0.9998	2.80
2	15.00	215	530	715	184	320	0.9998	2.75
2	12.50	210	535	713.4	178.5	320	0.9998	2.70
2	14.50	215	535	713.1	178.4	320	0.9998	2.69

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2

UNCONFINED COMPRESSION TEST

SPT NO: 2 DEPTH: 12.50m

DEFORMATION	LOAD (KN)	SAMPLE	STRESS	STRAIN	CORRECTED	STRESS
Dial readings		Deformation			Area	KN/m2
0	0	0	0	0	0.0010545	10.1089951
20	3.34	0.2	0.002121	0.2121	0.0010899	15. 06256795
40	5.76	0.4	0.003613	0.3613	0.0011147	19. 95192579
60	6.32	0.6	0.005591	0.5591	0.0011189	23. 00559113
80	7.89	0.8	0.006712	0.6712	0.0011197	28.93743885
100	10.82	1.0	0.008923	0.8923	0.0011234	31. 99346673
120	11.40	1.2	0.011346	1.1346	0.0011288	33. 04867235
140	15.15	1.4	0.014287	1.4287	0.0011303	36.09987531
160	16.20	1.6	0.017765	1.7765	0.0011311	40. 01131187
180	17.13	1.8	0.019934	1.9934	0.0011378	41. 03673405
200	18.70	2.00	0.022674	2.2674	0.0011410	44. 01168796
250	20.45	2.50	0.027459	2.7459	0.00114488	58.69917732
300	22.10	3.00	0.029132	2.9132	0.0011524	66.23166368
350	22.70	3.50	0.032156	3.2156	0.0011578	70.70615219
400	23.10	4.00	0.036734	3.6734	0.0011605	89.126982
450	25.05	4.50	0.040267	4.0267	0.00116354	90.49793385
500	26.15	5.00	0.048672	4.8672	0.00116879	93. 119768606
550	26.55	5.50	0.053674	5.3674	0.00116952	101. 32156606
600	27.85	6.00	0.062567	6.2567	0.00117451	105. 36743177
650	29.05	6.50	0.079519	7.9519	0.00117976	112. 11695243
700	29.75	7.00	0.083911	8.3911	0.00118223	123.74026732
750	30,45	7.50	0.099899	9.9899	0.00119768	131. 79519242

UCS = 140KN/m2

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2

UNCONFINED COMPRESSION TEST

SPT NO: 2 DEPTH: 14.50m

DEFORMATION	LOAD (KN)	SAMPLE	STRESS	STRAIN	CORRECTED	STRESS
Dial readings		Deformation			Area	KN/m2
0	0	0	0	0	0.0011112	25. 1119051
20	3.34	0.2	0.003112	0.3112	0.0011138	48.34698995
40	5.76	0.4	0.004992	0.4992	0.0011161	51. 87830579
60	6.32	0.6	0.008783	0.8783	0.0011190	64.63564213
80	7.89	0.8	0.010233	1.0233	0.0011202	73.93743885
100	10.82	1.0	0.010899	1.0899	0.0011215	80. 13674673
120	11.40	1.2	0.013674	1.3674	0.0011269	89.62411235
140	15.15	1.4	0.015534	1.5534	0.0011293	97.09987531
160	16.20	1.6	0.021399	2.1399	0.0011314	105. 95662687
180	17.13	1.8	0.024112	2.4112	0.0011334	111.60941605
200	18.70	2.00	0.025767	2.5767	0.0011379	127. 55344756
250	20.45	2.50	0.029461	2.9461	0.0011401	134.69917732
300	22.10	3.00	0.032455	3.2455	0.0011477	139. 48367368
350	22.70	3.50	0.036119	3.6119	0.0011523	141.70615219
400	23.10	4.00	0.040455	4.0455	0.0011597	144.126982
450	25.05	4.50	0.043322	4.3322	0.0011637	148.49793385
500	26.15	5.00	0.048367	4.8367	0.0011682	149. 32455606
550	26.55	5.50	0.053976	5.3976	0.0011764	150.10309026
600	27.85	6.00	0.063453	6.3453	0.0011798	152. 14774567
650	29.05	6.50	0.077567	7.7567	0.0011854	161.52411243
700	29.75	7.00	0.095662	9.5662	0.0011973	173. 43322032
750	30.45	7.50	0.10	10	0.0012113	182. 24554242

UCS = 192KN/m2

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2

ORIGINAL VOLUME OF SPECIMEN – 0.00087650m2

AREA OF SPECIMEN 1 – 0.001203487m2

AREA OF SPECIMEN 2 – 0.001360121m2

AREA OF SPECIMEN 3 – 0.001203487m2

DEVIATOR STRESS OF SPECIMEN (1) – 56.7KN/m2

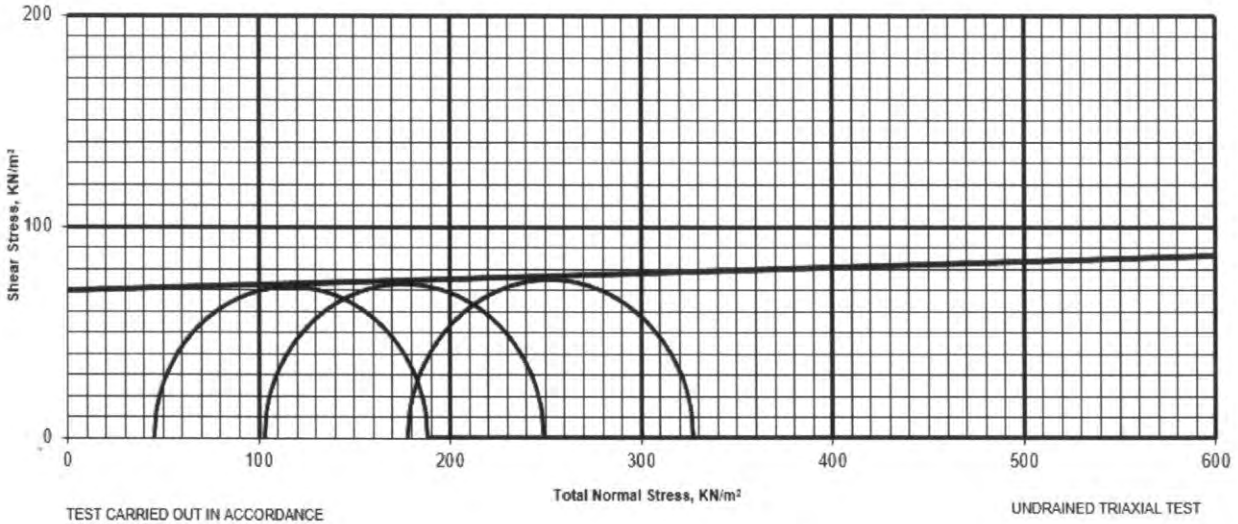
DEVIATOR STRESS OF SPECIMEN (2) – 103.9KN/m2

DEVIATOR STRESS OF SPECIMEN (3) – 179.2 KN/m2

TEST NO	CELL PRESSURE KN/m2	DEVIATOR STRESS KN/m2	MAJOR PRINCIPAL STRESS KN/m2
1	100	56.7	188.9
2	200	103.9	250.0
3	300	179.2	327.9

BH 2 Depth: 12.50m

Undrained Cohesion	70N/m2
Angle of Friction (PHI)	7deg



TEST CARRIED OUT IN ACCORDANCE WITH BS 1377

UNDRAINED TRIAXIAL TEST

LABORATORY: UNIVERSITY OF LAGOS (SOIL MECH LAB)

PROJECT: PROPOSED DEVELOPMENT AT APAPA TRANSMISSION SUBSTATION SPT 2

ORIGINAL VOLUME OF SPECIMEN – 0.00087650m2

AREA OF SPECIMEN 1 – 0.001203487m2

AREA OF SPECIMEN 2 – 0.001360121m2

AREA OF SPECIMEN 3 – 0.001203487m2

DEVIATOR STRESS OF SPECIMEN (1) – 62.6KN/m2

DEVIATOR STRESS OF SPECIMEN (2) – 200.0KN/m2

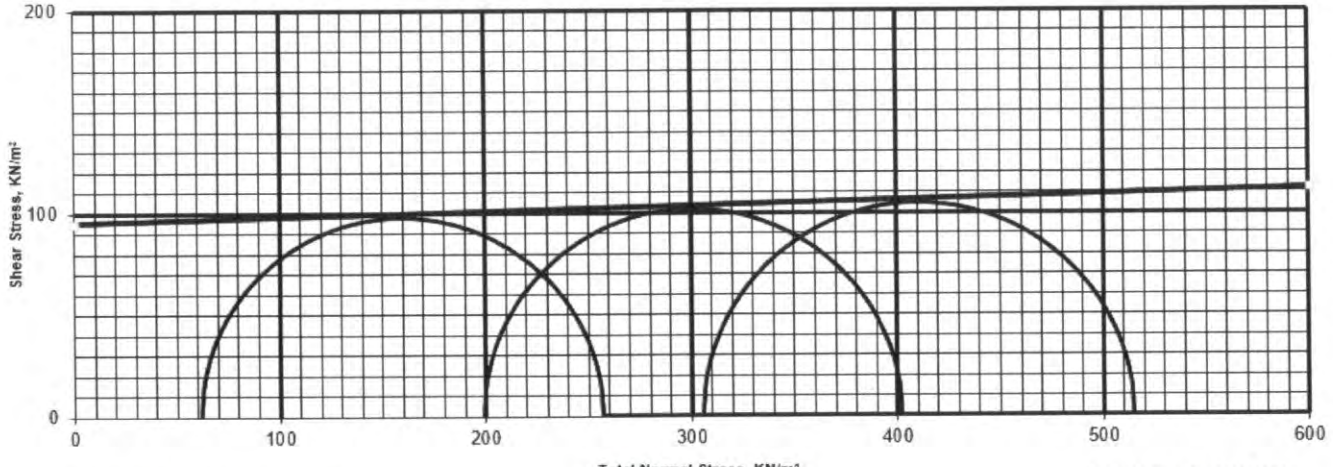
DEVIATOR STRESS OF SPECIMEN (3) – 306.8 KN/m2

TEST NO	CELL PRESSURE KN/m2	DEVIATOR STRESS KN/m2	MAJOR PRINCIPAL STRESS KN/m2
1	100	62.6	257.8
2	200	200.0	401.1
3	300	306.8	514.7

BH 2

Depth: 14.50m

Undrained Cohesion	96N/m2
Angle of Friction (PHI)	9deg



TEST CARRIED OUT IN ACCORDANCE WITH BS 1377

UNDRAINED TRIAXIAL TEST

SITE PICTURES

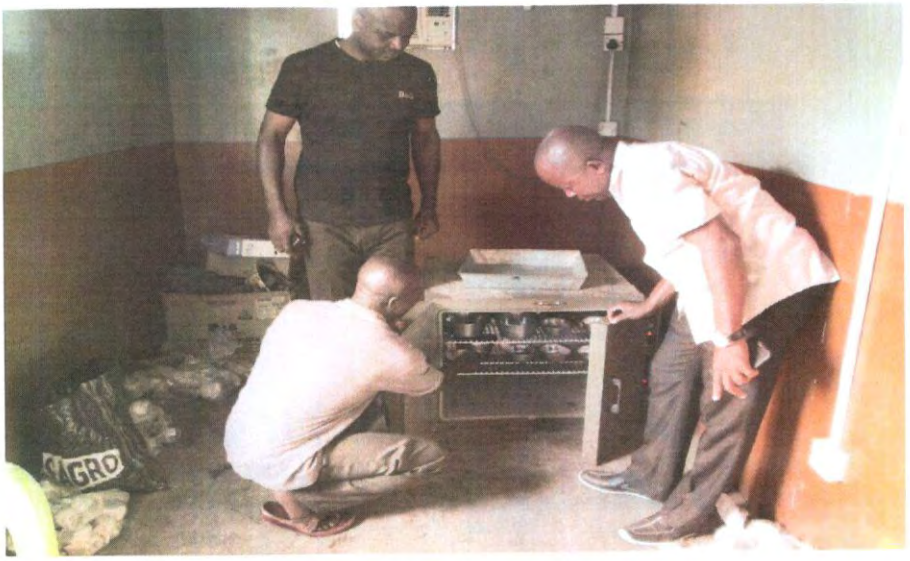
PICTURES SHOWING FIELD OPERATIONS ON THE PROJECT SITE

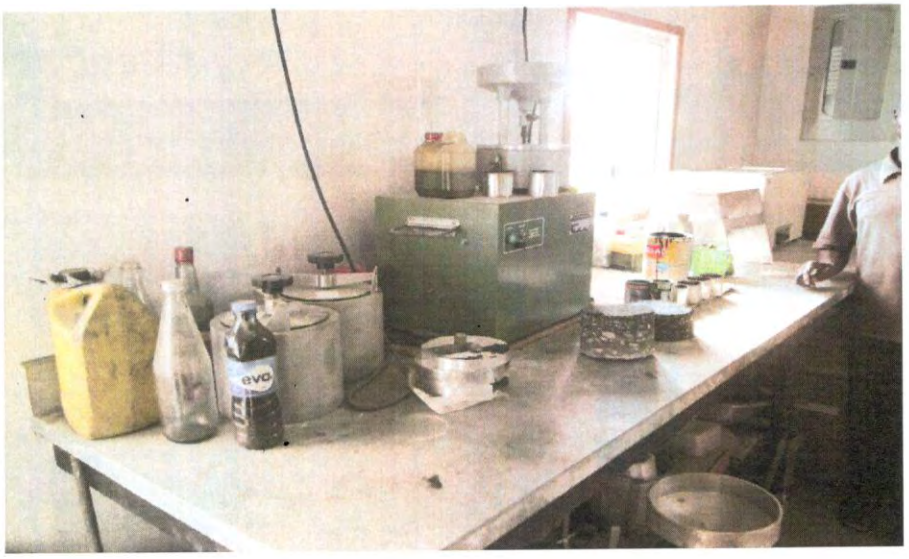
THE PROJECT FOR EMERGENCY REHABILITATION OF LAGOS TRANSMISSION SUBSTATION IN THE FEDERAL REPUBLIC OF NIGERIA

PROGRESS PICTURES

SOIL SAMPLES

PICTURES FOR THE SAMPLES AT LABORATORY





NOTES RELATING TO THIS REPORT

Introduction

These notes have been provided to amplify the geotechnical report in regard to classification methods, specialist field procedures and certain matters relating to the Discussion and Comments section. Not all, of course, are necessarily relevant to all reports.

Geotechnical reports are based on information gained from limited subsurface test boring and sampling, supplemented by knowledge of local geology and experience.

For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods

In general, descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (e.g. sandy clay) on the following bases:

Soil Classification Particle Size

Clay less than 0.002 mm

Silt 0.002 to 0.06 mm

Sand 0.06 to 2.00 mm

Gravel 2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination.

The strength terms are defined as follows.

Classification	**Undrained Shear Strength kPa**
Very soft	less than 12
Soft	12—25
Firm	25—50
Stiff	50—100
Very stiff	100—200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone Penetrometer tests (CPT) as below:

Relative Density	SPT "N" Value (blows/300 mm)	CPT Cone Value (qc — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	10—30	5—15
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock. Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin walled sample tube into the soil and withdrawing with a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

Standard Penetration Tests

Standard penetration tests (abbreviated as SPT) are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

• In the case where full penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7 as 4, 6, 7 ~`N = 13

• In the case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as 15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil.

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the bore logs in brackets.

Laboratory Testing

Every care is taken with the report as it relates to interpretation of subsurface condition, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

• Unexpected variations in ground conditions — the potential for this will depend partly on bore spacing and sampling frequency.

Bore Logs

The bore logs presented herein are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable, or possible to justify on economic grounds. In any case, the boreholes represent only a

very small sample of the total subsurface profile.

• Changes in policy or interpretation of policy by statutory authorities

• The actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes, the frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems;

Reproduction of Information for Contractual Purposes

• In low permeability soils, ground water although present, may enter the hole slowly or perhaps not at all during the time it is left open. Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers,

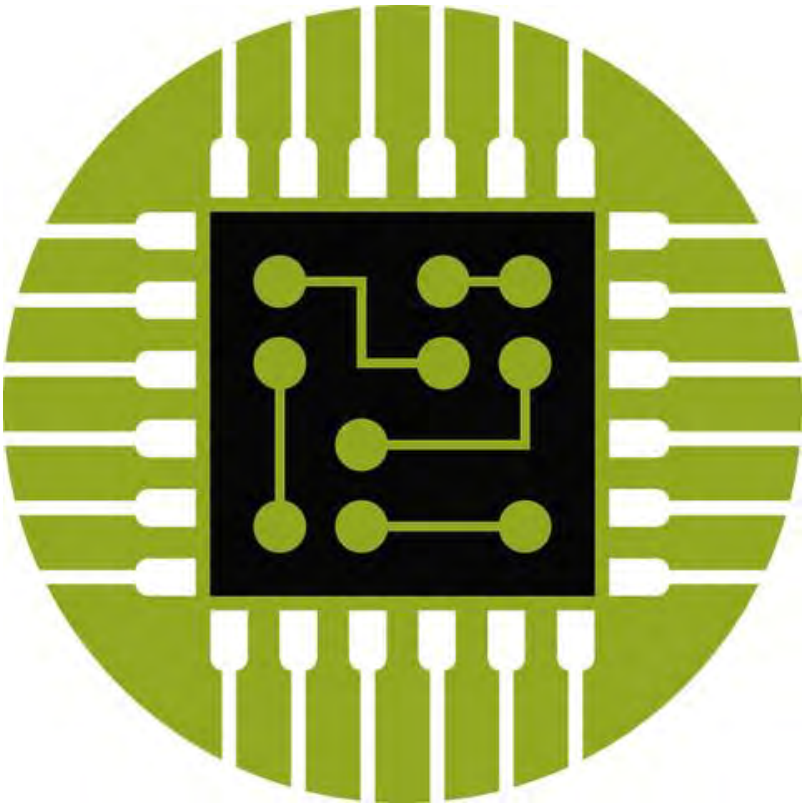
• A localised perched water table may lead to an erroneous indication of the true water table.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

A-8　課税項目および免税措置調査報告書
および免税情報シート

Deloitte.



Report to Yachiyo Engineering Co. Ltd.
Project Plato

20 December 2017

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1. Background/our understanding

Yachiyo Engineering Co., Ltd ("**YEC**") is one of the largest firms of planners, consulting engineers, architects and specialists operating around the world. YEC was founded in 1963 and provides planning, research, design, construction, technical cooperation and technical guidance services to its clients.

Based on the request from the Government of Nigeria (GoN), the Government of Japan (GoJ) is considering providing a grant-aid (hereinafter known as "the Aid") to Nigeria for the rehabilitation of the Apapa Road sub-station in Lagos State, Nigeria ("the Project").

The Project involves:

a. procurement of goods and materials sourced from Japan and countries other than Japan and Nigeria (hereinafter known as "third countries"). The third countries may include ECOWAS[1] and non-ECOWAS countries;

b. procurement of materials sourced from Nigeria such as cement, re-bars, gravel, etc.;

c. construction work in Nigeria to be undertaken by a Japanese company (hereinafter known as "JCo") and nationals of Japan and third countries;

d. engineering services to be undertaken by a Japanese company and nationals conducted in Japan (detailed design, bidding assistance and review and approval of drawings and technical documents related to the project) and Nigeria (construction supervision); and

e. construction works in Nigeria to be subcontracted to local contractors.

The purpose of the Project is to support the GoN's goal to provide sufficient and stable supply of electricity pursuant to the Nigeria Vision 20:2020 economic development strategy.

As part of the process of granting an aid, the Japan International Cooperation Agency (JICA) would typically conduct a preparatory survey to collect related information, and to confirm necessity and validity of implementing the grant aid project, while formulating outline design, cost estimation and implementation plan.

YEC has been appointed by JICA to carry out this preparatory survey involving collection of relevant information, including tax and customs information. The tax and customs information required are outlined as follows:

1.1. the structure of the tax system in Nigeria (General overview of Nigerian tax system);

1.2. corporate income taxes imposed on Japanese and local companies;

1.3. fiscal levies and personal income taxes to be imposed on the employees of Japanese and local companies;

[1] Economic Community of West African States

1.4. the value added tax system in Nigeria;

1.5. customs duties, import adjustment taxes and related fiscal charges to be imposed on import and/or re-export of materials and equipment (customs duties, VAT, comprehensive import supervision scheme (CISS), port development levy, ECOWAS Trade Liberalization Scheme duty etc.);

1.6. the Nigerian withholding tax system and other relevant local taxes;

1.7. pension fund contributions and other mandatory social contributions required to be made by employees;

1.8. previous controversial cases or issues on tax exemption status in Nigeria;

1.9. immigration consequences of the movement of non-resident individuals in and out of Nigeria; and

1.10. the application procedures and requirements for fiscal grants conferred on projects similar to the Project.

The above information is useful to the GoJ as it finalizes the grant aid to the GoN. Essentially, the GoJ would seek to ensure that customs duties, internal taxes and other fiscal levies which may be imposed in Nigeria with respect to the purchase of products and/or services, be exempted or be borne by the GoN or its agencies without using the grant aid, since the aid comes from Japanese tax payers.

2. Your request

You have requested for our opinion on the tax and customs consequences of executing the Project. Furthermore, pursuant to the GoJ's objective of ensuring exemptions from all taxes and levies, you would like to know the tax exemption procedures for each tax or levy.

3. Summary of applicable laws, regulations and policies

We have provided the requested advice within the context of the provisions of the following legislation and guidelines:

3.1 Companies and Allied Matters Act, Cap C20, Laws of the Federation of Nigeria (LFN) 2004, as amended (CAMA)

3.2 Companies Income Tax Act, Cap C21 LFN 2004 (CITA)

3.3 Withholding Tax (WHT) Regulations, 1997

3.4 Industrial Development (Income Tax Relief) Act, Cap I7, LFN 2004 (IDA)

3.5 Tertiary Education Trust Fund (Establishment, etc.) Act, 2011 (TETFA)

3.6 Personal Income Tax Act, Cap P10, LFN 2004, as amended (PITA)

3.7 Operations of the Pay As You Earn (PAYE) Regulations 2002

3.8 Value Added Tax Act, Cap V1, LFN 2004, as amended (VATA)

3.9 The Customs and Excise Management Act, Cap C45, LFN 2004 (CEMA)

3.10 Customs, Excise, Tariff, etc. (Consolidation) Act No 4, 1995, as amended (CETA)

3.11 The 2015 – 2019 ECOWAS Common External Tariff (CET)

3.12 Federal Government of Nigeria 2016 Fiscal Policy Measures (2016 FPM)

3.13 CBN Foreign Exchange Manual 2006 (Forex Manual)

3.14 Pension Reform Act 2014 (PRA)

3.15 National Housing Fund Act 1992 (NHFA)

3.16 National Health Insurance Scheme (NHIS) Act 1999

3.17 National Health Insurance Scheme (NHIS) Operational Guideline 2012

3.18 Industrial Training Fund Act 2007, as amended (ITFA)

3.19 Employee Compensation Act (ECA) 2010

3.20 Immigration Act, 2015

3.21 Immigration Regulations, 2017

3.22 Saipem Contracting Nigeria Limited vs Federal Inland Revenue Service, March 2014 ("The Saipem case")

3.23 JGC Corporation vs Federal Inland Revenue Service, September 2015 ("The JGC case")

3.24 Gazprom Oil and Gas Nigeria Limited vs Federal Inland Revenue Service, June 2016 ("The Gazprom case")

3.25 Vodacom Business Nigeria Limited vs Federal Inland Revenue Service, February 2016 ("The Vodacom case")

3.26 Edicomsa International Inc. & Associates v. CITEC International Estates Limited

4. Report

4.1 Doing business in Nigeria

4.1.1 Registration of a foreign company

Based on Section 54 of CAMA, a foreign company (or non-resident company (NRC)) is not permitted to carry on business in Nigeria unless it incorporates a local subsidiary. Foreign companies are permitted to do business in Nigeria by appointing an agent in Nigeria through which the contracts may be executed in Nigeria. The local company may be wholly owned or independent of the NRC. In so far as exemption is not granted for incorporation of a foreign company intending to do business in Nigeria,

the foreign company will be in violation of CAMA[2]. The exemptions provided by CAMA include the following:

i. foreign companies (other than those specified in paragraph 'iv' below) invited to Nigeria by or with the approval of the Federal Government to execute any specified individual project;

ii. foreign companies which are in Nigeria for the execution of a specific individual loan project on behalf of a donor country or international organization;

iii. foreign government-owned companies engaged solely in export promotion activities; and

iv. engineering consultants and technical experts engage on any individual specialist project under contract with any of the governments in the Federation or any of their agencies or with any other body or person, where such contract has been approved by the Federal Government.

There are specific procedures under CAMA by which foreign company intending to do business in Nigeria may obtain exemptions from incorporation.

4.1.2 The tax and regulatory framework

The tax and regulatory system in Nigeria is largely driven by the national tax policy. The Federal, State and Local Governments, through their agencies, are empowered to collect relevant taxes and levies in accordance with constitution of Nigeria. Specifically, there are taxes exclusively collected by the Federal Government and others collected by the State and/or Local Government.

An overview of these regulations are provided below:

4.1.2.1 Companies income tax (CIT)

CITA is the legal basis for the imposition of tax on the income of companies in Nigeria. Section 9(1) of CITA imposes tax upon the profits of any company **accruing in, derived from, brought into, or received in Nigeria**, in respect of a trade or business. Nigerian companies (i.e. companies incorporated in Nigeria) are liable to income tax on their worldwide income.

Generally, the profits of a NRC[3] are deemed to be derived from Nigeria where any of the following conditions are satisfied:

[2] In Edicomsa International Inc. & Associates v. CITEC International Estates Ltd, the Nigerian court interpreted Section 54 to mean that if a foreign company fails to comply with section 54(1) of the CAMA, all its acts shall be void. A foreign company cannot carry on business in Nigeria unless it is so incorporated in Nigeria.

[3] A NRC is a company incorporated outside Nigeria

a. the company has a fixed base (an identifiable place of business) in Nigeria through which it carries on its operation in Nigeria[4]

b. the company operates through an agent entitled to habitually conclude contracts on its behalf or where the company usually maintains a stock of merchandise in Nigeria and its agent makes deliveries from same

c. the business of the company in Nigeria involves a single contract for surveys, deliveries, installation or construction (generally referred to as turnkey contracts); and

d. the company engages in a transaction with another related entity which is on business terms that are not deemed to be on arm's length basis

Where a taxable presence is created by a NRC in Nigeria, the NRC would be required to register for CIT and file annual returns as appropriate.

Before March 2014, NRCs that performed work or executed offshore components of Nigerian contracts exclusively outside Nigeria were not considered liable to tax in Nigeria. This is on the basis that no tax presence is created in Nigeria with respect to the conditions outlined in 'a' – 'b' above. This position was reinforced by the clarification made by FIRS in Clause 6.2 of its **Information Circular 9302** which recognized that there may be no WHT obligations on transactions delivered by foreign entities, wholly outside Nigeria[5].

Accordingly, a single contract which splits performance obligations into offshore and onshore work used to afford protection to the fee allocated to the offshore work and the offshore contractor is not considered liable to tax in Nigeria. However, with the decision of a Federal High Court (FHC) in March 2014 in the Saipem case, a single contract comprising onshore and offshore elements may no longer afford such protection from Nigerian tax to the offshore contractor.

Separate contracting for onshore and offshore portions of contracts, if possible, should not trigger the risk represented by the decision in the Saipem case. This view is buttressed by the September 2015 decision of the FHC in the JGC case, where the profits derived by a NRC pursuant to a separate contract executed with its Nigerian customer was determined to be non-taxable[6] in Nigeria.

Notwithstanding the foregoing regulations on the taxation of NRCs or disputes on taxation of NRCs, the President may exempt

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[4] The taxable income in this case would be the amount attributable to the fixed base in Nigeria
[5] The NRC will not be deemed to have derived income from Nigeria.
[6] This is on the basis that offshore work executed by the NRC did not trigger any of the conditions set-out in '4.1.1 (i-iv)'

any company's (NRC or Nigerian company) profits (specific or all) from taxation on any grounds which appear sufficient. This is pursuant to the provisions of Section 23(2) of CITA.

4.1.2.2 Tertiary education tax (TET)

TETFA is the legal basis governing the imposition of TET in Nigeria. TET is applicable only to companies incorporated in Nigeria. NRCs are therefore exempted from TET.

4.1.2.3 Withholding tax (WHT)

WHT is governed by the provisions of CITA, PITA and the WHT regulations which all require tax to be deducted at source when payments on qualifying transactions become due from, or payable by, one company to another company. The company making the payment is required to, deduct and remit the deducted WHT to the relevant tax authority[7] . WHT is not a form of tax in itself, but an advance payment of income tax.

NRCs are not required to deduct WHT when making payments to suppliers – Nigerian or NRCs. This is as it will be impracticable for the Nigerian tax authorities to inspect the books of the NRC to confirm deduction and remittance of WHT[8].

4.1.2.4 Value added tax (VAT)

VATA is the legal basis for the operation of VAT in Nigeria. Generally, VAT is chargeable on the supply of taxable goods and services or importation of all goods and services except those specifically listed in the First Schedule to the VATA i.e. exempt or zero rated[9]. The requirements of VATA demands that a taxpayer:

a. registers for VAT

b. issues a VAT invoice upon supply of a taxable good or service

c. submits a monthly VAT return, accounting for the supplies made and taxes collected in a given month.

NRCs who carry on business[10] in Nigeria are also required to register for VAT with FIRS using the address of the person with whom it has a subsisting contract as its address for the purpose of correspondences relating to VAT, issue VAT invoices and file monthly returns.

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[7] Federal Inland Revenue Service for deductions from companies and the relevant State Board of Internal Revenue for deductions from sole-proprietorships, partnerships and enterprises

[8] In recent times, the tax authorities have become more aggressive and may demand for evidence of WHT compliance from NRCs

[9] For zero-rated items, VAT is charged but at 0%.

[10] The courts have defined 'carrying on business' to mean conducting, prosecuting or to continue a particular vocation or business as a continuous operation or permanent occupation. It also means to hold oneself out to others in the selling of goods and services. In practice, having a physical presence in Nigeria (e.g. Vide an office or on the ground employees) for the purpose of concluding a transaction or dealing with owned goods in-country, is usually interpreted to mean carrying on business in Nigeria.

The issue of determining the trigger for the registration and accounting for VAT came to bear in the Gazprom case and Vodacom case.

In June 2015, a tribunal in 'the Gazprom case', ruled that to the extent that a NRC supplied services outside the country i.e. the NRC did not 'carry on business in Nigeria', the services would not be liable to VAT in Nigeria.

However, in February 2016, another tribunal in 'the Vodacom case', indicated consumption as the relevant factor for determining the obligation of NRCs to charge Nigerian VAT. Thus, where the service rendered by a NRC is consumed in Nigeria, such NRC is obliged charge VAT in Nigeria.

Given that the two conflicting judgments emanate from courts of equivalent status, until a higher court has opportunity to pronounce on this subject one way or the other, the determination of whether offshore services provided by NRCs to Nigerian companies, is liable to VAT, would remain a controversial issue.

Notwithstanding the foregoing, goods or services provided by a Nigerian or NRC may be exempted from VAT on the gazette order of the Minister of Finance. Specifically, Section 38(b) of the VATA grants the Minister of Finance the powers to amend, vary or modify items which are listed as exempt or zero-rated in first schedule to the VATA.

These powers have previously been exercised by the Minister of Finance e.g. exemption of VAT on disposal of government and corporate securities.

4.1.2.5 Cross border movement of goods

CEMA and CETA are the principal regulatory frameworks underpinning the importation of goods into Nigeria and imposition of ad valorem customs duties. The Nigeria Customs Service (NCS) is charged with the responsibility of administering the provisions of CEMA and CETA.

Based on the ECOWAS Common External Tariff (CET) as adjusted for fiscal policy measures adopted by the GoN, and other relevant legal frameworks for the imposition of levies, taxes etc., the following charges are applicable upon importation of goods into Nigeria:

a. <u>Import duties</u>

   This is levied on the cost, insurance and freight (cif) value of the goods imported into Nigeria. The import duty in Nigeria ranges from 0% to 35%. Additional levies may also be imposed depending on the commodity classification of the good.

b. ECOWAS trade liberalization scheme (ETLS) levy

The ETLS levy is imposed on non-ECOWAS originating goods imported into any ECOWAS country. The levy is used to finance the activities of the ECOWAS commission and its institutions. The levy is 0.5% of the cif value of imported goods.

c. Comprehensive import supervision scheme (CISS) fees

Nigeria currently runs a destination inspection scheme for items imported into the country. The CISS fees are imposed for inspection services provided by the NCS. The fee is 1% of the free on board (fob) value of imported goods.

d. Port development levy (i.e. surcharge)

The port development levy is imposed for maintenance and development of the ports. The levy is 7% of the import duties payable on imported goods.

e. VAT

As noted in 4.1.2.4, VAT applies to all imported goods except those specifically listed in First Schedule to the VATA. With respect to movement of goods into Nigeria, VAT is chargeable on all taxes, duties and other charges levied either outside or by reason of importation into Nigeria, including commission, parking, transport and insurance up to the port or place of importation.

Based on Section 11(1) of CETA, the President of Nigeria may by Order (and published in the Gazette) impose, vary or remove duties on imported goods. Generally, these alterations are executed vide fiscal policy measures but may equally be issued on a case by case basis. The current 2016 FPM[11] provides for duty free import of machinery and equipment relating to the power industry which are classified under chapters 84, 85 & 90 of the ECOWAS CET.

It is also important to note the duty exemptions provided under the ETLS. Items originating[12] from ECOWAS countries would be imported duty free in so far as the supplier has obtained an ETLS certificate for the specific items from the ECOWAS Commission.

With regard to exports, there are no charges applicable to non-commercial exports[13]. However, in Nigeria, items imported for short-term use and which are expected to be re-exported are usually brought in under the Temporary Import (TI) regime. To

[11] Fiscal policy measures are usually released every year and a new one is expected at the end of the 2017 fiscal year.
[12] Under the relevant protocols, items would be deemed to have originated from the ECOWAS region where they meet the wholly obtained or sufficiently transformed definitions.
[13] When payments are not expected for exported goods, they are regarded as non-commercial exports

qualify for the TI regime, the importer would have to apply to the NCS.

Under the TI regime, it is common practice for the NCS to grant full exemption to import taxes and levies, as listed above. However, there are occasions where the NCS excludes the port development levy and CISS on the basis that the amount relates to a service charge on activities carried out on the imported items and not actual taxes or levies. Either of these possibilities may be encountered in practice and may vary in application from one NCS office to another.

Further, please note that while there may be exemption from taxes and levies under the TI regime, companies intending to claim this exemption are required to obtain a bank guarantee from a local bank. There would be ancillary bank charges for obtaining a bank guarantee from a local bank and these charges vary from bank to bank.

4.1.2.6 Personal income tax (PIT)

PITA is the legal basis governing the imposition of PIT in Nigeria. PITA defines chargeable income as any salary, wage, fee, allowance or other gain or profit from employment including compensation, bonuses, premiums, benefits or other perquisites allowed, given or granted by any person to any temporary or permanent employee other than so much of any sums as expenses incurred by him in the performance of his/her duties, and from which it is not intended that the employee should make any profit or gain.

Nigerian residents are taxed on their worldwide income and an individual (local employee or expatriate[14]) would be deemed to be resident in Nigeria in an assessment year, if he/she performs duties partly/wholly in Nigeria, except all of the following conditions are met:

a. the duties are performed on behalf of an employer who is in a country other than Nigeria and the remuneration of the employee is not borne by a fixed base of the employer in Nigeria;

b. the employee is not in Nigeria for an aggregate period of 183 days or more (including annual leave and temporary absence) in any 12-month calendar period; and

c. the remuneration of the employee is liable to tax in that country with whom Nigeria has a tax treaty.

The PAYE tax system is applied in administering PIT due from employees. Based on the system, income tax chargeable should be recovered from any emolument paid, or from any payment made on account of the emolument, by the employer to the

[14] In practice, expatriates who attain residence status are only taxed on their Nigerian source income.

employee. For this purpose, the employer is required to register with the relevant State Board of Internal Revenue.

Further, where an employee works under the supervision of an entity who is not his employer, the supervising entity would be required to ensure PAYE tax is deducted from the employee's emolument and remit same to the tax authorities. It may do this directly or indirectly by ensuring the primary employer complies with this requirement.

Notwithstanding the foregoing, an individual's income may be exempt from PIT where:

- the Minister of Finance by notice stipulates that such individuals shall be exempt from PIT (Section 19(2) of PITA); or

- the individual provides technical assistance under the aegis of an arrangement between the GoN and the Government, Agency or Organization with whom it is employed (Paragraph 27 of Schedule 3 of PITA).

There are specific procedures which must be followed to obtain these exemptions from the GoN.

While seeking to obtain exemptions, it should be noted that where any exemption leads to the 'double non-taxation' of a Nigerian resident, such exemption may not be enforceable in Nigeria. A NRC who employs Nigerians may therefore be obliged to account for the PAYE tax of its Nigerian employees irrespective of an exemption.

4.1.2.7 Payroll related quasi taxes and social contributions

a. Pension contribution

The PRA is the principal law regulating the mandatory pension contributory scheme in Nigeria. PRA requires employers and their employees to make pension contributions on the basis of emoluments earned by the employees.

Pension contributions are to be remitted to the employees' chosen Pension Fund Administrators (PFA) and credited directly into the employees' Retirement Savings Account (RSA) opened with the PFA within seven (7) working days from the date of payment of employees' monthly salaries.

Employers under the PRA "include the Federal Government of Nigeria, Government of a State of Nigeria, Local Government Council or any organization or business that employs three persons or more".

Generally, expatriates working in Nigeria are exempted from the pension contributory scheme. However, pension

contributions are required to be made for Nigerian nationals irrespective of the employer's identity.

b. National Housing Fund (NHF) contribution

The NHF scheme is aimed at providing mortgage finance to Nigerians who are contributors to the scheme.

Against this backdrop, the NHFA requires every employer to deduct a portion (2.5%) of all employees' monthly basic salaries and within one month of deduction, remit same to the Federal Mortgage Bank of Nigeria (FMBN).

An employer is not defined by the NHFA, but in practice, an NRC who employs only non-Nigerian nationals would not be required to make deductions. Such NRC may be required to make deductions from is Nigerian employees (where applicable) and remit same to the FMBN.

c. National Health Insurance Scheme (NHIS) contribution

The NHIS was established under Act 35 of 1999 by the Federal Government of Nigeria to operate as a public private partnership directed at providing accessible, affordable and qualitative healthcare to all Nigerians.

Under the NHIS, every employer with a minimum of ten (10) employees is required to enroll with an NHIS-accredited Health Management Organization (HMO). The NHIS Act, defines an employer as "an employer registered under the Scheme and includes the Federal, State or Local Government or any Extra-Ministerial Department or a person with whom an employee has entered into a contract of service or apprenticeship and who is responsible for the payment of the wages or salaries of the employee including the lawful representative, successor or assignee of that person".

Generally, it is acceptable practice for a NRC to regard the scheme as optional for its non-Nigerian nationals. However, the NRC would need to consider enrolling under the scheme for the purpose of its Nigerian nationals.

d. Industrial Training Fund (ITF)

The objective of the ITF is to generate a pool of funds to be used in the promotion and encouragement of acquisition of skills in industry or commerce to generate a pool of indigenously trained man-power to meet the needs of the economy.

The ITFA requires every employer with 5 or more employees or an annual turnover of over ₦50 million to register with, and make contributions (1% of payroll cost) to the ITF.

Under the ITFA, an employer is defined as "any person engaged in industry or commerce with whom an employee entered into a contract of service or apprenticeship and who is responsible for the payment of wages or remuneration to the employee".

Generally, an NRC who employs only non-Nigerian nationals may not be required to make contributions. However, the NRC would need to consider making contributions where it also employs Nigerian nationals.

e. Employees Compensation (EC) Scheme

The ECA seeks to promote the working conditions of employees by ensuring relevant stakeholders contribute towards prevention of workplace hazard that could result in death or disability.

Additionally, it is designed to provide an open and fair system to guarantee adequate compensation for employees or their dependents in the event of death, injury, disease or disability arising during the course of employment.

Based on the ECA, an employer is required to make a minimum monthly contribution (1% of payroll cost) into the National Social Insurance Trust Fund.

Under the ECA, an employer is defined to include "...any individual, body corporate, Federal, State or Local Government or any of the government agencies who has entered into a contract of employment to employ any other person as an employee or apprentice".

Generally, an NRC who employs only non-Nigerian nationals would not be required to make contributions. However, the NRC would need to consider making contributions where it also employs Nigerian nationals.

4.1.2.8 Cross border movement of expatriates

The IMA contains provisions which, amongst others, regulate the entry and employment of expatriates in Nigeria. The principal regulatory agencies under the IMA are the Nigerian Immigration Service (NIS) and its supervising ministry, the Federal Ministry of Interior (FMI).

All expatriates that desire to enter Nigeria for the purpose of employment must possess appropriate immigration papers, which would be issued by the NIS and FMI, as the case may be, upon application by the relevant company.

For expatriates, the following permits are relevant for the purpose of entry and carrying on employment obligations in Nigeria:

a. Expatriate quota (EQ)

An EQ approval is required for permanent expatriate employment in Nigeria. EQ approvals are granted by the FMI **to a Nigerian company** for technical, managerial and professional positions, for which qualified Nigerians are not available.

EQ is valid for an initial term of two (2) years and is renewable for a maximum period of ten (10) years. In addition to renewal, EQs may be re-designated or transferred.

b. Residence permit

Expatriates that are placed on a company's EQ position are required to apply for and obtain the Combined Expatriate Residence Permit and Alien Card (CERPAC).

Under the CERPAC regime, non-ECOWAS nationals who intend to live and work in Nigeria on a permanent basis are required to apply for, and obtain, "Subject to Regularization" (STR) visas from the Nigerian Mission in their respective countries of residence[15]. The STR enables an expatriate to enter, work and stay in Nigeria while his CERPAC is being processed. However, this must be pursuant to the exercise of an employment in Nigeria. The NIS issues the CERPAC pursuant to an application by **the Nigerian company**, which employs the expatriate. The application will be made on the prescribed form as soon as the intended expatriate staff arrives Nigeria.

c. Temporary work permit (TWP)

TWP is required for expatriate staff that would be working in Nigeria on short-term basis. This is particularly necessary if the expatriates will be working in Nigeria before EQ approval is granted by the FMI.

The TWP is valid for an initial period of three (3) months and renewable for a further three (3) months. The TWP is granted by the NIS pursuant to an application (made by a Nigerian company) in the prescribed form supported by the relevant documentation.

d. Business Visa (BV)

A BV is required for expatriates who wish to visit Nigeria for meetings, conferences, seminars, contract negotiations, marketing, sales, trade fairs etc. The BV shall not be used for work purposes, is valid for three (3) months and is not renewable.

[15] The visa on arrival process is an optional mechanism that may be explored where the expatriate has all relevant documents.

Notwithstanding the above, any person or class of persons may be exempted from the entry requirements for a residence permit, a work permit or a visa. Specifically, pursuant to Section 21 of the IMA, the Minister of Interior may grant exemptions from the requirements highlighted in 4.1.2.8 (a) – (d). This would be the case where an NRC is coming to Nigeria to perform a specific project pursuant to an agreement with the GoN.

There are specific procedures for obtaining these exemptions from the GoN.

4.2 Tax and regulatory considerations for proposed project

4.2.1 Incorporating JCo

Based on the proposed onshore activities, JCo is ordinarily required to incorporate an entity in Nigeria to be able to perform those activities. However, in line with section 56 of CAMA, JCo may apply for exemption on the basis that it is a technical expert engaged on an individual specialist project under an approved contract with the GoN.

An application for exemption shall be in writing addressed to the Secretary to the GoN with specific information around:

i. the name and place of business of JCo in Japan;

ii. the name and place of business or the proposed name and place of business of JCo whilst in Nigeria;

iii. the name and address of each director, partner or other principal officer of JCo;

iv. a certified copy of the charter, statutes, or memorandum of association of JCo, or other instrument constituting or defining the constitution of JCo and if the instrument is not written in the English language, a certified translation thereof;

v. the names and addresses of some one or more person resident in Nigeria authorised to accept on behalf of JCo, services of process and any notices required to be served on JCo;

vi. the business or proposed business in Nigeria of JCo and the duration of such business;

vii. particulars of any project previously carried out by JCo as an exempted foreign company; and

viii. such other particulars as may be required by the Secretary to the GoN.

Where the President is of the opinion that the circumstances are such as to render it expedient that such an exemption should be granted, the President may, subject to such condition as it may prescribe, exempt JCo from incorporation.

The President shall cause to be published in the Gazette, the name of JCo and the period or, as the case may be, the project or series of projects for which the exemption is granted. In practice, the process could take one to six months.

4.2.2 CIT payable by entities undertaking the project

i. JCo

a. Obligations

Where JCo is deemed liable to CIT in Nigeria as a result of its activities, it would be required to:

- Register with the FIRS in order to obtain a unique Tax Identification Number (TIN); and
- File the required annual CIT returns, including its audited financial statement and tax/capital allowance computation (actual basis). The returns are expected to be filed within 6 months after JCo's year-end, failing which interest and penalties will apply.

b. Computation

Based on 'a' above, JCo would be required to pay income tax at the rate of 30% on the taxable profits attributable to the fixed base in Nigeria. In arriving at the taxable profit of JCo, the following should be noted:

- JCo would be allowed to deduct from its revenue, recurring expenses which were incurred wholly, reasonably, exclusively and necessarily for the purpose of generating its Nigerian revenue.
- The losses incurred in prior years as well as capital allowances claimable on the acquisition of capital expenditure may also be claimed.

There are specific non-taxable income e.g. unrealized exchange gains, and non-deductible expenses e.g. depreciation which are outlined in Sections 23 and 27 of CITA. Reference must be made to these provisions to give appropriate treatment to income and expenses incurred on the project.

c. Obtaining tax exemption

Where JCo wishes to obtain exemption from CIT, it would be required to write to the Presidency through the Federal Ministry of Finance. This is in line with section 23(2) of CITA. In the application, JCo would provide:

- details of the project being undertaken in Nigeria;
- specific justification for the exemption; and

- any other relevant supporting document.

After review of the application, the Presidency would make a decision and communicate same to JCo. In practice, the process could take one to six months.

ii. Consequences of potential Nigerian company (NCo) participating in the project as a subcontractor

a. Obligations

The obligations are similar to '4.2.2 (i) (a)' above.

b. Computation

The computation is similar to '4.2.2 (i) (b)' above. However, NCo would be liable to income tax on its worldwide income.

c. Obtaining exemption

The process is similar to '4.2.2 (i) (c)' above. This notwithstanding, as a Nigerian company, the chances of NCo obtaining exemption as a subcontractor is remote.

4.2.3 WHT from suppliers

i. JCo

a. Obligations

In practice, NRCs (and hence JCo) is not required to withhold tax from suppliers when making payments. This is due to the practical considerations around administering the withholdings by the NC. However, due to the recent aggressive posture of FIRS especially in relation to NRCs who have visibility in-country (i.e. who are visibly carrying on business in Nigeria), JCo may be required to account for withholding tax on payments to suppliers, unless it has an express exemption.

b. Computation

WHT is computed on the 'income' earned by the supplier. To this end, WHT is not deducted from recoverable expenses[16].

The current applicable WHT rates for qualifying transactions are summarized below:

[16] Recoverable expenses are incidental expenses incurred by the supplier on behalf of the customer. They are also known as reimbursable expenses

Payment	Corporate Beneficiary (%)	Individual Beneficiary (%)
Dividend*, Interest*, Rent & Director's Fees	10	10
Professional Fees	10	5
Technical/Management/Royalty*	10	5
Commission/Consultancy Fees	10	5
Construction	5	5
Other contracts	5	5

* The WHT for interest, dividend and royalty is reduced to 7.5% when paid to residents of a country with a double tax treaty with Nigeria.

c. Obtaining exemption

There are no specific mechanisms for obtaining exemptions from deducting WHT upon payment to suppliers. However, JCo may write to FIRS (attaching supporting documents of its projects in Nigeria and importantly, an exemption letter from the Presidency from CIT liability) seeking exemptions from WHT obligations. From experience, the FIRS may take between 4 and 8 weeks to respond to JCo.

ii. NCo

a. Obligations

As a Nigerian company carrying on business activities, NCo would be required to deduct and remit WHT to the relevant tax authority[17] on or before 21 days for FIRS and 30 days for SBIR after payment is made to the vendor or the liability is recognized in its books, whichever is earlier.

b. Computation

The computation is similar to '4.2.3 (i) (b)' above.

c. Obtaining exemption

There are no specific mechanisms for obtaining exemptions from deducting withholding upon payment to suppliers. Further, as a Nigerian company, the chances of NCo obtaining exemption as a subcontractor is remote.

[17] Federal Inland Revenue Service for deductions from companies and the relevant State Board of Internal Revenue for deductions from sole-proprietorships, partnerships and enterprises

4.2.4 Suppliers deducting WHT on the income of JCo and NCo

Generally, WHT is an advanced payment of income tax. Therefore, to the extent that JCo and NCo are able to obtain income tax exemptions from the Presidency, payments made to them would not be liable to WHT. If income tax exemptions are not obtained, WHT would apply accordingly.

4.2.5 TET

i. JCo

JCo as a NRC would be exempt from TET.

ii. NCo

a. Obligations

As a Nigerian company, TET returns are expected to be filed together with the CIT returns.

b. Computation

TET is charged at 2% of the assessable profit of a company, as computed under the provisions of CITA.

Assessable profit is the adjustment of accounting profit (PBT) by non-taxable income and disallowable expenses but before adjusting capital allowances.

c. Obtaining exemption

A CIT exemption could be extended to cover TET exemption. However for purpose of clarity, it is advised that a TET exemption is also requested alongside a CIT exemption. This notwithstanding, as a Nigerian company, the chances of NCo obtaining exemption as a subcontractor is remote.

4.2.6 Accounting for VAT on supplies made by JCo and NCo

i. JCo

a. Obligations

As discussed in '4.1.1.6' above, the two conflicting judgments in the Gazprom case and the Vodacom case has not put clarity around the application of VAT to supplies which were performed outside Nigeria but consumed in Nigeria.

However, the construction service provided by JCo to the GoN in Nigeria is ordinarily a taxable transaction. Therefore, to the extent that JCo is not granted any exemptions, it would be required to:

- register for VAT with FIRS using the address of the government agency supervising the project;
- include VAT in its invoices to the GoN; and
- file monthly VAT returns with the FIRS on or before the 21st day of the month following the month of transaction

In accordance with Section 13 of the VATA, the GoN is expected to deduct at source, the VAT charged by JCo and remit same to FIRS.

b. Computation

VAT is chargeable and payable on the value of the supply made to the GoN at 5%.

For the purpose of determining the VAT finally payable to the FIRS, JCo may be able to recoup the VAT incurred on the purchase of parts used in the project[18]. Since it is unable to deduct this VAT from sums it should have collected whilst charging VAT (since the GoN has collected the VAT at source), it may apply for a refund from the FIRS.

Please note that VAT incurred on fixed assets are to be capitalized, while the VAT incurred on overheads, services and general administration expenses are to be expensed. JCo would do well to ensure VAT incurred on these expense types are not included in the sums to be recouped from FIRS.

c. Obtaining exemption

There are no specific mechanisms for obtaining exemptions for VAT registration, issuing a VAT invoice and filing VAT returns as appropriate.

ii. NCo

a. Obligations

For supplies made by NCo to JCo, the obligations are similar to '4.2.6.1(a)' above.

b. Computation

The computation is similar to '4.2.6.1(b)' above. However, the ability to recoup VAT incurred on purchases would depend on the scope of NCo's work.

[18] Please note that from a strict interpretation of VATA, the project being undertaken by JCo may be characterized as a service. Therefore, since VATA notes that input VAT recoverability is limited to VAT on goods purchased or imported directly for resale and goods which form the stock-in-trade used for the direct production of any new product on which the out VAT is charged, it may be argued that VAT incurred by JCo is not recoverable. However, in practice, a case may be made for its recoverability under the cases characterized by the project.

c. Obtaining exemption

There are no specific mechanisms for obtaining exemptions for VAT registration, issuing a VAT invoice and filing VAT returns as appropriate.

4.2.7 VAT to be paid on purchases

i. JCo

VAT charged by JCo's local suppliers or upon importation of parts, machinery etc. is expected to be paid unless specifically exempted.

Section 38(b) provides a window for JCo to be granted exemption from paying VAT on its purchases. Specifically, JCo could write to the Minister of Finance with details of the project being undertaken in Nigeria and specific justification for the exemption.

Where the Minister is of the opinion that the circumstances are such as to render it expedient that such an exemption should be granted, the Minister may exempt JCo from paying VAT on purchases or imports. The Minister is required to ensure the notice for exemption is gazetted. In practice, the process could take between one and six months.

ii. NCo

Comments made in '4.2.7 (i)' above are also applicable to NCo.

4.2.8 PIT obligations

i. JCo

a. Obligations

Where an employee of JCo is deemed liable to PIT in Nigeria, JCo may be required to:

- register for PAYE tax within 6 months of commencement of business. At the end of the registration, JCo will be issued a taxpayer code for remittance of its employees' PAYE tax;
- account for the monthly PAYE tax of the relevant individuals; and
- file an annual employer tax return (Form H1) on or before 31 January every year (for the preceding reference year), showing the emoluments earned by each employee, and the taxes deducted and paid on their account.

The employee would also be required to file an individual tax return (Form A) on or before 31 March every year (for the preceding reference year).

It should be noted that as a NRC, JCo may not be required to register for PAYE compliance if it employs only non-Nigerian nationals who have a tax exempt status. Further, where it also employs Nigerian nationals, it may choose to outsource the PAYE compliance of the Nigerian nationals.

b. Computation

The PIT rate is on a graduated scale. Details of the tax rates and related income tax bands are shown in the table below:

Taxable income bands (₦)	Applicable tax rate (%)
First 300,000	7
Next 300,000	11
Next 500,000	15
Next 500,000	19
Next 1,600,000	21
Above 3,200,000	24

In arriving at the taxable income, PITA grants Consolidated Relief Allowances (CRA) to all taxable individuals in Nigeria before arriving at the taxable income subjected to the applicable tax rates.

The CRA is dependent on the annual income level of the tax payer. It is defined as the higher of ₦200,000 or 1% of gross income, plus 20% of gross income. This implies that employees with annual emolument of ₦20million or less will have a CRA equal to ₦200,000 plus 20% of gross income while those with annual income above ₦20,000,000 have CRA equal to 21% of their gross income.

In addition to the CRA, the following social contributions are exempt from tax in arriving at the taxable income:

- pension contributions to a Nigerian pension scheme;
- NHF contributions;
- NHIS contributions;
- premiums paid for life assurance; and
- interest paid on mortgage loan.

c. Obtaining exemption

JCo may only be able to obtain a tax exemption for its non-Nigerian employees.

Where JCo would be, in principle, providing technical assistance to the GoN, it may rely on of paragraph 27 under Schedule 3 to PITA in order to apply for exemption from PIT for its Non-Nigerian employees. This would require an application through the National Planning Commission.

We are of the view that the GoN may be reluctant to grant PIT exemptions to Nigerian employees as this may lead to a scenario where no jurisdiction receives taxes on the income of the Nigerian employees.

Notwithstanding the above, in line with section 19 of PITA, where the Minister is of the opinion that the circumstances of the project are such as to render it expedient that an exemption from PIT should be granted, the Minister may exempt the non-Nigerian nationals from PIT upon issuance of a notice.

In obtaining an exemption, JCo would be required to write to the Minister of Finance with details of the project being undertaken in Nigeria and specific justification for the exemption. The process of obtaining the PIT exemption for JCo's non-Nigerian nationals could typically take between one to six months.

ii. NCo

a. Obligations

The obligations are similar to '4.2.8.1(a)' above. However, unlike JCo, registration for PAYE tax by NCo is not optional and as such NCo would be required to account for the PAYE taxes of all its employees – Nigerian and non-Nigerian.

b. Computation

The process is similar to '4.2.8.1(b)' above.

c. Obtaining exemption

The process is similar to '4.2.8.1(c)' above; albeit the chances of NCo obtaining exemption as a subcontractor is remote.

4.2.9 Accounting for pension contributions

i. JCo

a. Obligations

Where JCo has Nigerian employees, JCo and the Nigerian employees are required to make contributions of ten percent (10%) and eight percent (8%) respectively of the employee's

monthly emolument[19]. Contributions are to be remitted to the employees' chosen Pension Fund Administrators and credited directly into the employees' Retirement Savings Account opened with the PFA within seven (7) working days from the date of payment of employees' monthly salaries.

b. Computation

Please refer to '4.2.9 (i) (a)' above.

c. Obtaining exemption

Currently, there are no specific mechanisms for JCo to obtain exemption for pension deduction and remittance obligations for its Nigerian employees. However, the Nigerian pension contributory scheme is optional for expatriate employees.

ii. NCo

a. Obligations

The obligations are similar to '4.2.9 (i) (a)' above.

b. Computation

Please refer to '4.2.9 (i) (a)' above.

c. Obtaining exemption

The comments in '4.2.9 (i) (c)' above are relevant.

4.2.10 Accounting for NHF contributions

i. JCo

a. Obligations

Where JCo has Nigerian employees, JCo would be required to deduct 2.5% of the Nigerian employees' monthly basic salary and remit same to the Federal Mortgage Bank of Nigeria within one month of deduction.

b. Computation

Please refer to '4.2.10 (i) (a)' above.

c. Obtaining exemption

Currently, there are no specific mechanisms for JCo to obtain exemption for NHF deductions and remittance obligations for its

[19] The PRA defines monthly emolument as total emoluments as may be defined in the employee's contract of employment but shall not be less than a total sum of basic salary, housing allowance and transport allowance.

Nigerian employees. However, in practice, JCo would not be required to register its expatriate employees for the NHF.

ii. NCo

a. Obligations

The obligations are similar to '4.2.10 (i) (a)' above.

b. Computation

Please refer to '4.2.10 (i) (a)' above.

c. Obtaining exemption

The comments in '4.2.10 (i) (c)' above are relevant.

4.2.11 Accounting for NHIS contributions

i. JCo

a. Obligations

Where JCo has Nigerian employees, JCo and its Nigerian employees are required to contribute a minimum of 10% and 5% of the employee's basic salary, respectively, to the NHIS. JCo may however opt to pay the entire contribution of 15% or undertake extra contributions for the employee to receive additional benefit cover.

b. Computation

Please refer to '4.2.11 (i) (a)' above.

c. Obtaining exemption

Currently, there are no specific mechanisms for JCo to obtain exemptions for NHIS deductions and remittance obligations for its Nigerian employees. However, in practice, a JCo would not be required to register its expatriate employees for the NHIS.

ii. NCo

a. Obligations

The obligations are similar to '4.2.11 (i) (a)' above.

b. Computation

Please refer to '4.2.11 (i) (a)' above.

c. Obtaining exemption

The comments in '4.2.11 (i) (c)' above are relevant.

4.2.12 Accounting for ITF contributions

i. JCo

a. Obligations

Where JCo has 5 or more Nigerian employees, or an annual turnover of over ₦50 million, it may be required to register with, and make contributions of 1% of its annual payroll cost to the ITF.

The contribution is due not later than 1st April of the following year and should be accompanied with the completed Annual Returns Form ITF 5.

b. Computation

Please refer to '4.2.12 (i) (a)' above.

c. Obtaining exemption

Currently, there are no specific mechanisms for JCo to obtain exemption for ITF contributions.

ii. NCo

a. Obligations

The obligations are similar to '4.2.12 (i) (a)' above.

b. Computation

Please refer to '4.2.12 (i) (a)' above.

c. Obtaining exemption

The comments in '4.2.12 (i) (c)' above are relevant.

4.2.13 Accounting for EC Scheme contribution

i. JCo

a. Obligations

Where JCo has Nigerian employees, it would be required to make a minimum monthly contribution of 1% of its monthly payroll cost into the Nigeria Social Insurance Trust Fund not later than the last day of each month.

b. Computation

Please refer to '4.2.13 (i) (a)' above.

c. Obtaining exemption

Currently, there are no specific mechanisms for JCo to obtain exemption for EC Scheme Contributions.

ii. NCo

a. Obligations

The obligations are similar to '4.2.13.1(a)' above.

b. Computation

Please refer to '4.2.13.1(a)' above.

c. Obtaining exemption

The comments in '4.2.13.1(c)' above are relevant.

4.2.14 Importing items into the country

i. JCo

a. Obligations

A NRC cannot ordinarily facilitate importation of items into Nigeria. To import goods whilst remaining an NRC, JCo would solicit the services of a third party logistics provider (3PL), who would perform all import clearance procedures on its behalf. JCo would need to ensure the items are sold and consigned to the 3PL to enable the 3PL initiate and complete all import clearance procedures.

However, due to the practical challenges around claiming potential exemptions from duties and taxes (i.e. where the 3PL imports the goods), the items could be sold and consigned to the agency of the GoN supervising the project, who may appoint a 3PL to clear the items on its behalf.

b. Computation

In the scenario where duties and taxes are payable on import of the items into Nigeria, the charges payable and mechanism for calculation are outlined below:

S/N	Item	Basis of charge
1.	Import duty	Rate (based on tariff classification) * cif value of imported item
2.	Surcharges (Port charges)	7% * import duty
3.	CISS fee	1% * fob value of imported item
4.	ETLS fee	0.5% * cif value of imported item
5.	VAT	5%* summation of the cif value of costs of imported item, and all taxes, duties and levies paid/payable outside or by reason of importation into Nigeria

c. Obtaining duty exemption

- Temporary importation:

  Under the TI regime, JCo vide its 3PL could apply to the NCS to import goods into the country under the temporary import procedure. In this case, the 3PL would require the following documents whilst declaring the items for import:

  - A bank guarantee from a reputable bank
  - Hire agreement or evidence of ownership
  - Details of project where items would be deployed
  - Technical manuals describing the items to be imported
  - Covering Letter to NCS applying for TI approval
  - A copy of JCo and 3PL's tax clearance certificate (or exemption status) for the past 3 years

  Under the TI regime, items may remain in the country for a maximum of two years (i.e. an initial period of one year and two possible extensions for six months each), after which the guarantee would be released.

- Total exemption

  As an entity engaged in power transmission, JCo could apply for duty exemption pursuant to the provisions of CETA and the concessions provided under the 2016 FPM. Duty exemption may equally be issued on a case by case basis.

  JCo would be required to submit a formal application to the Minister of Finance vide the ministry relevant to the item being imported to benefit from the concessions. The following are the documents required for a duty waiver application:

  - Evidence of Registration with the Corporate Affairs Commission (Where applicable)

- The Memorandum of Understanding duly signed by the Minister of Finance or Minister of state for Budget and National planning between the donor agency and the Federal Government of Nigeria
- A proforma invoice indicating the value of imported items
- Other supporting documents which may be requested by the Ministry of finance

Where the Minister is of the opinion that the circumstances are such as to render it expedient that such an exemption should be granted, the Minister would exempt JCo from import duties on items related to the project.

Notwithstanding the foregoing, items imported from the ECOWAS region under the aegis of the ETLS shall be duty and quota free. The supplier would need to ensure it has obtain the relevant ETLS certificate (supporting the claim that the items have originated from the ECOWAS region) for the items being imported.

ii. NCo

a. Obligations

To import physical goods into the country, NCo would:

- at the first instance be required to raise a Form M with its Authorized Dealer Bank[20]. Once approved, shipment at the port of loading can commence.

- Ensure clearance the items at the port (including paying applicable duties and taxes) either by itself or vide the support of a 3PL. The following would be required for clearance of imported items at the port:

  - Copy of approved Form M
  - Duly completed Single Goods Declaration endorsed by NCS
  - Import duty payment receipt
  - Bill of lading or Airway bill as applicable
  - Original Pre Arrival Assessment Report
  - Final commercial invoice
  - Combined Certificate of Value and Origin
  - Insurance certificate
  - Payment schedule
  - Regulatory permits (e.g. SONCAP Certificate)

b. Computation

The process is as outlined in '4.2.14.1(b)' above.

[20] Only Nigerian companies are able raise a Form M with Authorized Dealers.

c. Obtaining duty exemption

The process is as outlined in 4.2.14 (i) (c). However, the ability to obtain total duty exemptions (if referencing the national specific incentives i.e. 2016 FPMs) would depend on the scope of NCo's work.

4.2.15 Re-export of items

i. JCo

a. Obligations

A NRC cannot facilitate export or re-export of items from Nigeria. To export or re-export items whilst remaining an NRC, JCo would need to solicit the services of a 3PL (specifically, the 3PL who imported the goods being re-exported, either for its own account on or the account of the agency of the GoN), who would perform all export or re-export clearance processes on its behalf.

b. Computation

There are no duties applicable on exports. However, charges ae payable for inspection. Inspection fees are calculated as 0.5% of the fob price of the export[21].

c. Obtaining duty exemptions

There are no duties applicable on exports.

ii. NCo

a. Obligations

Where a Nigerian company intends to re-export items that were originally imported into Nigeria, it would be required to provide the original import documents supporting the temporary import.

b. Computation

The comments under '4.2.15.1(b)' above are relevant.

c. Obtaining exemption

There are no duties applicable on exports.

[21] These charges may not apply for re-exports i.e. items imported on a temporary basis.

4.2.16 Immigration

i. JCo

a. Obligations

Ordinarily, JCo would not be able to facilitate the entry of foreign employees into Nigeria. However, JCo may write to the Federal Ministry of Interior seeking approval to bring in expatriates for specific projects.

JCo would be required to ensure the conditions for the grant of visas, permits or exemptions (see '4.2.16.1(b)' below) are fulfilled whilst the expatriates are in the country.

b. Obtaining exemptions

Where JCo intends to obtain exemption from entry requirements under the IMA, JCo would be expected to submit a written application to the Honourable Ministry of Interior.

The written application to the Ministry of interior would be on the strength of the incorporation exemption obtained from the President (as discussed in '4.2.1' above) and the nature of the project (i.e. a grant aid to the GoN).

The timeframe for granting exemption ranges from two to eight weeks.

ii. NCo

a. Obligations

Where NCo facilitates the entry of an expatriate into the country (i.e. upon application and grant of visas or permits), it would be required to:

- File monthly immigration returns with the NIS
- File quarterly TWP returns with the NIS (i.e. for those on temporary work permits)
- File deletion slips with the Nigeria immigration service upon exit of the expatriates from Nigeria

NCo would also be required to ensure the conditions of the visas and permits (e.g. duration of stay, scope of work in Nigeria etc.) are fulfilled.

b. Obtaining exemption

The process is as outlined in '4.2.16.1(b)' above. However, the ability to obtain exemptions from entry requirements would depend on the scope of NCo's work.

4.3 General considerations

4.3.1 Practical considerations

Generally, projects executed under the aegis of an aid provided by any country to Nigeria are granted generous fiscal incentives. In practice, such fiscal incentives are stated in the agreements executed between the donor country and the GoN.

However, to ensure the benefits of such incentives are granted on the donor country, it is necessary to ensure that procedures to give full practical effect to such incentives are followed in post-execution of the contract. Otherwise, this may result in incentives referenced in executed agreements not being recognised by the relevant government agencies, especially the tax authorities.

From our experience, the best practice is usually to ensure the contracting ministry or agency of the GoN:

i. notifies the various administrative agencies relevant to each incentive of the exemption granted and provide these agencies with specific information on the contractor selected to execute the contract, who would in this case benefit from the exemption

ii. obtains a response letter or memo from the relevant ministry or agency re-affirming the incentives granted to the selected contractors and/or its employees

iii. provides JICA with a copy of the official correspondence where the relevant administrative agencies re-affirms the incentives granted to the selected contractors and/or its employees

Alternatively, a separate application or notification can be made to the agency with the powers to grant or confirm such incentives. On this point, Deloitte would be willing to provide professional support with the application or notification.

4.3.2 Review of tax exemption clause in grant agreement

Based on our review of the standard grant agreement between the GoJ and GoN, and our experience around similar arrangements, we recommend the following:

i. The standard grant agreement clearly indicates the contractors on the project and the ultimate beneficiaries of the incentives.

ii. The standard grant agreement clearly indicates that JICA would require as a pre-requisite for commencing the project, official confirmation of exemption from relevant administrative agencies.

These steps would help mitigate the risk of non-recognition of the incentives by the administrative agencies.

5. Basis of opinion

You have requested for a detailed report on the tax and customs implications of the proposed rehabilitation project.

The advice expressed herein is based on the facts and assumptions you have provided to us. We have assumed that these facts and assumptions are complete and accurate. A misstatement or omission of any fact or a change or amendment in any of the facts and assumptions we have relied upon may require a modification of all or a part of this advice.

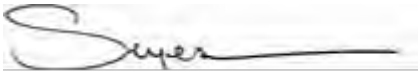
Our advice is based upon the law and existing administrative and judicial interpretations thereof as of the date of this letter, all of which are subject to change. If there is a change in the facts and assumptions, or in the law and interpretations thereof (including a change having retroactive effect), the advice expressed herein would necessarily have to be re-evaluated in the light of any such changes. We have no responsibility to update this advice for any such changes occurring after the date of this letter.

The advice expressed herein is not binding on the tax authorities or courts and there can be no assurance that the tax authorities or the courts will not take a position contrary to the advice expressed herein. We are under no obligation to assist you with any challenge of the advice expressed herein. We would generally, if permissible, be available to assist you for an additional fee that is mutually agreed upon.

This advice is solely for your benefit and may not be relied upon by anyone other than you. You will be solely responsible for all decisions regarding the accounting treatment of any item discussed herein.

We do hope you find our above comments useful. Please contact me on +234 817 4586 604, e-mail: oarowolo@deloitte.com.ng or Chijioke Odo on +234 (0) 802 398 0303, email: codo@deloitte.com.ng if you require further clarifications.

Yours faithfully,



Oluseye Arowolo
Partner | Tax & Regulatory Services

UPDATED:Dec 15th, 2017

Information on Tax Exemption in (name of country)

Sheet 1 Tax with respect to corporate income (Corporate Tax)

Sheet 2 Tax with respect to personal income (Personal Income Tax)

Sheet 3 Indirect taxes such as Value Added Tax (VAT)

Sheet 4 Custom Duties and related fiscal charges with respect to the import and/or re-export of materials and equipment

Sheet 5 Other taxes or fiscal charges

Followings are JICA internal use ONLY
Person in charge in JICA office (Name, Name of the office, E-mail)

更新日：2017年12月15日

●●国免税情報シート

（シート１）企業の所得に課される税金（法人税など）

（シート２）企業の従業員の所得に課される税金（個人所得税など）

（シート３）付加価値税（VAT)等の間接税

（シート４）資機材の輸入及び再輸出の際に課される税金や手数料

（シート５）その他、優先的に免税を確保すべき税目

以下、JICA内部情報
在外事務所の担当者（名前、連絡先）：

Sheet 1 Tax with respect to corporate income (Corporate Tax)

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Companies income tax (CIT)		The entity is required to present a written application to the Presidency through the Federal Ministry of Finance.	Companies Income Tax Act, Cap C21 LFN 2004 (CITA)	30%	For Nigerian companies, tax is levied on all taxable profits of the entity. However, for non-resident companies, tax is levied on the taxable profits attributable to its fixed base in Nigeria. In arriving at the taxable profit, the following should be noted: - The entity would be allowed to deduct from its revenue, recurring expenses which were incurred wholly, reasonably, exclusively and necessarily for the purpose of generating its Nigerian revenue. - The losses incurred in prior years as well as capital allowances claimable on the acquisition of capital expenditure may also be claimed.	**Organization in charge :** The Presidency ; The Federal Ministry of Finance ; The Federal Inland Revenue Service (FIRS) **Procedure :** The entity would be required to present a written application to the Presidency through the Federal Ministry of Finance. In the application, the entity would provide: - details of the project being undertaken in Nigeria; - specific justification for the exemption; and - any other relevant supporting document. After review of the application, the Presidency would make a decision and communicate same to applying entity **Duration :** One - six months	From experience, it is important that the FIRS is officially notified of the details of the exemption granted and the FIRS officially confirms the exemption granted to the selected contractor for the project. This notification may be done by either the Ministry or Agency of Government coordinating the grant or by the entity applying itself. It is also recommended that the agreemeent between JICA and the Government of Nigeria clearly states that JICA may not be the contractor who executes the project and in this case it would be the contractor selected for the project that would benefit from the exemption. Further, to ascertain confirmation of exemption, the donor agency can make the receipt of official confirmation from FIRS, a pre-requisite for commencing the project.
Tertiary Education Tax (TET)		A CIT exemption could be extended to cover TET exemption. However, for purpose of clarity, it is advised that a TET exemption is also requested alongside a CIT exemption.	Tertiary Education Trust Fund (Establishment, etc.) Act, 2011 (TETFA)	2%	Tertiary education tax is charged at 2% of the assessable profit of a company, as computed under the provisions of Companies Income Tax Act. Assessable profit is the adjustment of accounting profit (PBT) by non-taxable income and disallowable expenses but before adjusting capital allowances and brought forward losses. It should be noted that non-resident companies are ordinarily not liable to TET	A CIT exemption could be extended to cover TET exemption. However, for purpose of clarity, it is advised that a TET exemption is also requested alongside a CIT exemption.	From experience, it is important that the FIRS is officially notified of the details of the exemption granted and the FIRS officially confirms the exemption granted to the selected contractor for the project. This notification may be done by either the Ministry or Agency of Government coordinating the grant or by the entity applying itself It is also recommended that the agreemeent between JICA and the Government of Nigeria clearly states that JICA may not be the contractor who executes the project and in this case it would be the contractor selected for the project that would benefit from the exemption. Further, to ascertain confirmation of exemption, the donor agency can make the receipt of official confirmation from FIRS, a pre-requisite for commencing the project.

○ Exempt(Advanced)
- Exempt(borne by the Recipient)
Reimburse

Sheet 2 Tax with respect to personal income (Personal Income Tax)

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Personal Income tax		The entity is required to present a written application to the Federal Ministry of Finance.	Personal Income Tax Act, Cap P10, LFN 2004, as amended (PITA)	The PIT rate is on a graduated scale. Details of the tax rates and related income tax bands are provided below: - First NGN 300,000 @ 7% - Next NGN 300,000 @ 11% - Next NGN 500,000 @ 15% - Next NGN 500,000 @ 19% - Next NGN 1,600,000 @ 21% - Above NGN 3,200,000 @ 24%	In arriving at the taxable income of an taxable individual, PITA grants Consolidated Relief Allowances (CRA) before arriving at the taxable income subjected to the applicable tax rates. The CRA is dependent on the annual income level of the tax payer. It is defined as the higher of N200,000 or 1% of gross income, plus 20% of gross income. This implies that employees with annual emolument of NGN 20million or less will have a CRA equal to NGN 200,000 plus 20% of gross income while those individuals with annual income above NGN 20,000,000 have CRA equal to 21% of their gross income. In addition to the CRA, the following social contributions are exempt from personal inome tax in arriving at the taxable income of individuals: - Pension contributions to a Nigerian pension scheme; - National Housing Fund contributions; - National Health Insurance Scheme contributions; - Premiums paid for life assurance; and - Interest paid on mortgage loan.	**Organization in charge :** The Federal Ministry of finance ; The relevant SBIR at the states where the employees would be tax resident **Procedure :** The entity would be required to write to the Minister of Finance with details of the project being undertaken in Nigeria and specific justification for the exemption of the employees from personal income tax. **Duration :** One to six months	From experience, it is important that the relevant SBIR where the employees would be tax resident is/are officially notified of the details of the exemption granted and the relevant SBIR officially confirms the exemption granted. This notification may be done by either the Ministry or Agency of Government coordinating the grant or by the entity applying itself. It is also recommended that the agreemeent between JICA and the Government of Nigeria clearly states that JICA may not be the contractor who executes the project and in this case it would be the employees of the contractor selected for the project that would benefit from the exemption. Further, to ascertain confirmation of exemption, the donor agency can make the receipt of official confirmation from the SBIR, a pre-requisite for commencing the project. Meanwhile, please note that the chances of obtaining tax exemption for Nigerian nationals is remote and if obtained, may be deemed an ultra vires act on the part of agency granting such exemption.
Pension contribution		Currently, there are no specific mechanisms for an entity to obtain exemption for pension deduction and remittance obligations for its Nigerian employees. However, the Nigerian pension contributory scheme is optional for expatriate employees.	Pension Reform Act 2014 (PRA)	- Entity : 10% of employee's gross emolument - Employee: 8% of employee's gross emolument	Where an entity has Nigerian employees, the entity and the Nigerian employees are required to make contributions of ten percent (10%) and eight percent (8%) respectively of the employee' s monthly emolument.	Currently, there are no specific mechanisms for an entity to obtain exemption for pension deduction and remittance obligations for its Nigerian employees. However, the Nigerian pension contributory scheme is optional for expatriate employees.	
National Housing Fund (NHF) contribution		Currently, there are no specific mechanisms for an entity to obtain exemption for NHF deductions and remittance obligations for its Nigerian employees. However, in practice, an entity would not be required to register its expatriate employees for NHF contributions.	National Housing Fund Act 1992 (NHFA)	2.5% of employee's basic salary	Where an entity has Nigerian employees, the entity would be required to deduct 2.5% of the Nigerian employees' monthly basic salary and remit same to the Federal Mortgage Bank of Nigeria	Currently, there are no specific mechanisms for an entity to obtain exemption for NHF deductions and remittance obligations for its Nigerian employees. However, in practice, an entity would not be required to register its expatriate employees for NHF contributions.	
National Health Insurance Scheme (NHIS) contribution		Currently, there are no specific mechanisms for an entity to obtain exemptions for NHIS deductions and remittance obligations for its Nigerian employees. However, in practice, an entity would not be required to register its expatriate employees for the NHIS.	- National Health Insurance Scheme (NHIS) Act 1999 - National Health Insurance Scheme (NHIS) Operational Guideline 2012	- Entity: Minimum of 10% of employee's basic salary - Employee: 5% of employee's basic salary	Where an entity has Nigerian employees, the entity and its Nigerian employees are required to contribute a minimum of 10% and 5% of the employee' s basic salary, respectively, to the NHIS. The entity may however opt to pay the entire contribution of 15% or undertake extra contributions for the employee to receive additional benefit cover.	Currently, there are no specific mechanisms for an entity to obtain exemptions for NHIS deductions and remittance obligations for its Nigerian employees. However, in practice, an entity would not be required to register its expatriate employees for the NHIS.	
Industrial Training Fund (ITF) contribution		Currently, there are no specific mechanisms for an entity to obtain exemption for ITF contributions.	Industrial Training Fund Act 2007, as amended (ITFA)	1% of annual payroll cost	Where an entity has 5 or more Nigerian employees, or an annual turnover of over ₦50 million, it may be required to register with, and make contributions of 1% of its annual payroll cost to the ITF.	Currently, there are no specific mechanisms for an entity to obtain exemption for ITF contributions.	
Employee Compensation (EC) scheme contribution		Currently, there are no specific mechanisms for an entity to obtain exemption for EC Scheme Contributions.	Employee Compensation Act (ECA) 2010	1% of monthly payroll cost	Where an entity has Nigerian employees, it would be required to make a minimum monthly contribution of 1% of its monthly payroll cost into the Nigeria Social Insurance Trust Fund not later than the last day of each month.	Currently, there are no specific mechanisms for an entity to obtain exemption for EC Scheme Contributions.	

○ Exempt(Advanced)
- Exempt(borne by the Recipient)
Reimburse

(Sheet3) indirect tax etc (such as VAT, Commercial Tax)

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Value Added Tax to be charged by entity (Output VAT)		There are no specific mechanisms for an entity to obtain exemptions for VAT registration, issuing a VAT invoice and filing VAT returns as appropriate.	Value Added Tax Act, Cap V1, LFN 2004, as amended (VATA)	5%	VAT is chargeable on the supply of taxable goods and services or importation of all goods and services except those specifically listed in the First Schedule to the VATA i.e. the items listed as exempt or the items listed as zero rated.	**Organization in charge :** The Federal Ministry of Finance ; The Federal Inland Revenue Service **Procedure :** There are no specific mechanisms for obtaining exemptions for VAT registration, issuing a VAT invoice and filing VAT returns as appropriate. **Duration :** N/A	
Value Added Tax to be paid by entity on its purchases (Input VAT)		The entity is required to present a written application to the Minister of Finance with the details of the project being undertaken in Nigeria and specific justification for the exmption.	Value Added Tax Act, Cap V1, LFN 2004, as amended (VATA)	5%	VAT is chargeable on the supply of taxable goods and services or importation of all goods and services except those specifically listed in the First Schedule to the VATA i.e. the items listed as exempt or the items listed as zero rated.	**Organization in charge :** The Federal Ministry of Finance ; The Federal Inland Revenue Service **Procedure :** The entity could write to the Minister of Finance with details of the project being undertaken in Nigeria and specific justification for the exemption. Where the Minister is of the opinion that the circumstances are such as to render it expedient that such an exemption should be granted, the Minister may exempt the entity from paying VAT on purchases or imports. The Minister is required to ensure the notice for exemption is gazetted. **Duration :** One - Six months	From experience, it is important that a letter confirming the exemption of the entity from paying input VAT is provided by the FIRS to the entity. This would serve as documentary evidence for the entity's vendors not to charge VAT upon local purchases and for the Nigeria Customs Service not to impose VAT upon import of goods. It is also recommended that the agreemeent between JICA and the Government of Nigeria clearly states that JICA may not be the contractor who executes the project and in this case it would be the contractor selected for the project that would benefit from the exemption. Further, to ascertain confirmation of exemption, the donor agency can make the receipt of official confirmation from FIRS, a pre-requisite for commencing the project.

○ Exempt(Advanced)
- Exempt(borne by the Recipient)
Reimburse

(Sheet4) Duties etc.

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Import Duty		The entity is required to present a written application to the Federal Minister of Finance.	- The 2015 - 2019 ECOWAS Common External Tariff ; - The Customs, Excise, Tariff, etc. (Consolidation) Act No 4, 1995, as amended (CETA)	The rate to be applied is based on tariff classification of item being imported	Rate * CIF value of item being imported	**Organization in charge :** The Federal Ministry of Finance; The Nigeria Customs Service **Procedure :** There are 2 ways to obtain duty exemption (1) Under the Temporary importation (TI) regime or (2) Under the total duty exemption regime o Temporary importation: Under the TI regime, an enitity, directly or vide a 3PL could apply to the NCS to import goods into the country under the temporary import procedure. In this case, entity or the the 3PL would require the following documents whilst declaring the items for import (i.e. before begininning importation of the item): - A bank guarantee from a reputable bank - Hire agreement or evidence of ownership - Details of project where items would be deployed - Technical manuals describing the items to be imported - Covering Letter to NCS applying for TI approval - A copy of the entity's and or 3PL' s tax clearance certificate (or exemption status) for the past 3 years Under the TI regime, items may remain in the country for a maximum of two years (i.e. an initial period of one year and two possible extensions for six months each), after which the guarantee would be released. o Total exemption An entity engaged in power transmission could apply for duty exemption pursuant to the provisions of CETA and the concessions provided under the 2016 FPM. The entity would be required to submit a formal application to the Minister of Finance vide the ministry relevant to the item being imported to benefit from the concessions. The following are the documents required for a duty waiver application: - Evidence of Registration with the Corporate Affairs Commission (Where applicable) - the Memorandum of Understanding duly signed by the Minister of Finance or Minister of state for Budget and National planning between the donor agency and the Federal Government of Nigeria - A proforma invoice indicating the value of imported items - Other supporting documents which may be requested by the Ministry of Finance Where the Minister is of the opinion that the circumstances are such as to render it expedient that such an exemption should be granted, the Minister would exempt JCo from import duties on items related to the project. Notwithstanding the foregoing, items imported from the ECOWAS region under the aegis of the ETLS shall be duty and quota free. the supplier would need to ensure it has obtain the relevant ETLS certificate (supporting the claim that the items have originated from the ECOWAS region) for the items being imported. Duration: Three - Twelve months	From experience, it is important that the Ministry of finance notifies the Headquarters of the Nigeria Customs Service of the details of the exemption granted. The Headquarters of the Nigeria Customs Service would then notifify all the various border posts/commands of the exemption granted to the selected contractor. It is also recommended that the agreemeent between JICA and the Government of Nigeria clearly states that JICA may not be the contractor who executes the project and in this case it would be the contractor selected for the project that would benefit from the duty waiver. Further, to ascertain confirmation of exemption, the donor agency can make the receipt of official confirmation from the customs authorities a pre-requisite for commencing the project.
Port development levy (Surcharges)		Under the TI regime, it is common practice for the Nigeria Customs Service to grant full exemption from surcharge payments. However, there are occasions where the Nigeria Customs Service excludes the surcharge (port charges) on the basis that the amount relates to a service charge for activities carried out on imported items and not actual taxes or levies. Either of these possibilities may be encountered in practice and may vary in application from one Nigeria Customs Service office to another. Meanwhile, please note that companies intending to claim this exemption are required to obtain a bank guarantee from a local bank and there would be ancillary bank charges for obtaining a bank guarantee from a local bank and these charges vary from bank to bank. Under the Total duty exemption regime earlier discussed, we are not aware of a basis for obtaining exemption for the port development levy.	General Nigerian import guidelines	7%	Rate * import duty	**Organization in charge :** The Nigeria Customs Service **Procedure :** Please refer to our comments around the temporary import regime in the procedure section of the import duty coloumn **Duration :** One - three months	

(Sheet4) Duties etc.

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
comprehensive import supervision scheme (CISS)		Under the TI regime, it is common practice for the Nigeria Customs Service to grant full exemption from CISS fees. However, there are occasions where the Nigeria Customs Service excludes the CISS fees on the basis that the amount relates to a service charge for activities carried out on imported items and not actual taxes or levies. Either of these possibilities may be encountered in practice and may vary in application from one Nigeria Customs Service office to another. Meanwhile, please note that companies intending to claim this exemption are required to obtain a bank guarantee from a local bank and there would be ancillary bank charges for obtaining a bank guarantee from a local bank and these charges vary from bank to bank. Under the Total duty exemption regime earlier discussed, we are not aware of a basis for obtaining exemption for CISS fees.	General Nigerian import guidelines	1%	Rate * FOB value of imported item	**Organization in charge :** The Nigeria Customs Service **Procedure :** Please refer to our comments around the temporary import regime in the procedure section of the import duty coloumn **Duration :** One - three months	
ECOWAS Trade Liberalisation Scheme (ETLS) levy		Under the TI regime, it is common practice for the Nigeria Customs Service to grant full exemption from ETLS fees. However, please note that companies intending to claim this exemption are required to obtain a bank guarantee from a local bank and there would be ancillary bank charges for obtaining a bank guarantee from a local bank and these charges vary from bank to bank. Under the Total duty exemption regime earlier discussed, we are not aware of a basis for obtaining exemption for ETLS levy.	ECOWAS Regulations	0.5%	0.5% * CIF value of imported item	**Organization in charge :** The Nigeria Customs Service **Procedure :** We are not aware of any formal procedures for exempting this levy. **Duration :** N/A	In our opinion, the chances of obtaining an exemption from this fee may be remote. This is because the fee is imposed at a sub-regional level across West Africa rather than only at the National level (i.e. only Nigeria).
VAT		The entity is required to present a written application to the Minister of Finance with the details of the project being undertaken in Nigeria and specific justification for the exemption	Value Added Tax Act, Cap V1, LFN 2004, as amended (VATA)	5%	Rate * summation of the CIF value of costs of imported item, and all taxes, duties and levies paid/payable outside or by reason of importation into Nigeria	**Organization in charge :** The Federal Ministry of Finance ; The Federal Inland Revenue Service **Procedure :** The entity could write to the Minister of Finance with details of the project being undertaken in Nigeria and specific justification for the exemption. Where the Minister is of the opinion that the circumstances are such as to render it expedient that such an exemption should be granted, the Minister may exempt the entity from paying VAT on imports. The Minister is required to ensure the notice for exemption is gazetted. **Duration :** One - Six months	From experience, it is important that a letter confirming the exemption of the entity from paying input VAT is provided by the Federal Inland Revenue Service to the entity. This would serve as documentary evidence for the Nigeria Customs Service not to impose VAT upon import of goods. It is also recommended that the agreemeent between JICA and the Government of Nigeria clearly states that JICA may not be the contractor who executes the project and in this case it would be the contractor selected for the project that would benefit from the VAT exemption at the point of impotation of items.

○ Exempt(Advanced)
- Exempt(borne by the Recipient)
Reimburse

(Sheet 5) Other taxes and levies

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Withholding tax deducted from the entity's income		Generally, WHT is an advanced payment of income tax. Therefore, to the extent an entity obtains income tax exemptions from the Presidency, payments made to them would not be liable to WHT.	Companies Income Tax Act, Cap C21 LFN 2004 (CITA)	5%	WHT is deducted at the specified rate for payments to vendors or contractors	**Organization in charge :** The Presidency The Federal Ministry of Finance The Federal Inland Revenue Service **Procedure :** Companies Income tax exemption automatically exempts an entity from suffering WHT exemption. **Duration :** One to Six months	Generally, WHT is an advanced payment of income tax. Therefore, to the extent an entity obtains income tax exemptions from the Presidency, payments made to them would not be liable to WHT. If income tax exemptions are not obtained, WHT would apply accordingly. To this end, it is recommended that when an entity with an income exemption status submits an invoice to its cients or customers, the income tax exemption document should also be submitted.
Withholding tax to be deducted by entity when paying its suppliers or vendors		There are no specific mechanisms for obtaining exemptions from deducting WHT upon payment to suppliers. However, an entity may write to FIRS (attaching supporting documents of its projects in Nigeria and importantly, an exemption letter from the Presidency from CIT liability) seeking exemptions from WHT obligations.	Companies Income Tax Act, Cap C21 LFN 2004 (CITA) and the Personal Income Tax Act, Cap P10, LFN 2004, as amended (PITA)	5% or 10%	WHT is computed on the income earned by the supplier.	**Organization in charge :** The Federal Inland Revenue Service **Procedure :** There are no specific mechanisms for obtaining exemptions from deducting WHT upon payment to suppliers. However, an entity may write to FIRS (attaching supporting documents of its projects in Nigeria and importantly, an exemption letter from the Presidency from CIT liability) seeking exemptions from WHT obligations. **Duration :** One to Two months	From experience, it is important that a letter confirming the exemption of the entity from withholding tax obligations is provided by the FIRS to the entity selected to execute the project. This would serve as documentary evidence for the entity's vendors not to charge VAT upon local purchases and for the Nigeria Customs Service not to impose VAT upon import of goods. It is also recommended that the agreemeent between JICA and the Government of Nigeria clearly states that JICA may not be the contractor who executes the project and in this case it would be the contractor selected for the project that would benefit from the exemption. Further, to ascertain confirmation of exemption, the donor agency can make the receipt of official confirmation from FIRS, a pre-requisite for commencing the project.

○ Exempt(Advanced)
– Exempt(borne by the Recipient)
Reimburse