EDAL DRILLING COMPANY LTD.

BORE-HOLE SITTING REPORT
FOR TEMPORAL EBOLA TREATMENT CENTRE
KUNTOLON COMMUNITY

SUBMITTED TO:
OXFAM
15 SIR SAMUEL LOUIS ROAD
FREETOWN

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TABLE OF CONTENT

1. INTRODUCTION

To explore the possibility of getting ground water for a temporal Ebola center at Kuntolon community, OXFAM contracted **EDAL** Drilling Company to drill a borehole for the centre. OXFAM therefore requested for Hydrogeological and Geophysical investigations in sitting the borehole position in the project area.

These studies among others, provided enough data and information used in assessing the possibility of striking groundwater in the project area.

This report documents the work carried out during the investigations at the site.

2. BACKGROUND / GEOLOGY OF PROJECT AREA

The project area lies within the Freetown Basic Complex.

The Freetown Complex outcrop in the west as a result of younger igneous intrusions and it is predominantly of basaltic magmatism. The Freetown Complex is a layered gabbroic anorthosite intrusion, emplaced gneisses and schist of the Kasila group. It forms part of the Peninsula and Banana Island.

It is thought to have been due to multiple injections of magma that occurred intermittently. Therefore, groundwater potential within the Freetown Basic Complex lies within fractured zones of these igneous (crystalline) rocks which can be determined through resistivity survey.

3. FIELD WORK

The field exercise was carried out to select target areas for geophysical survey which included the following:

- Geomorphologic survey of the area
- Geological survey to determine the formation of the area and to identify possible hydrogeological features
- Demarcation of area for traverse lines for geophysical survey.
- Location of GPS coordinates

3.1.1 Selection of Traverse Line

The traverse line was selected on the basis of geomorphologic and physical features as well as hydrogeological features of the area. There was no visible strike direction of the geologic formation of the area due to weathering and surface erosion.
Selected point for the Vertical Electrical Sounding (VES) was marked with a peg for identification.

3.2 Geophysical Survey

The Geophysical survey consisted mainly of Electrical Resistivity i.e. Vertical Electrical Sounding (VES) using ABEM Terrameter Resistivity meter.

3.2.1 Selection of VES points

The Vertical Electrical Sounding (VES) point was selected based on the site location and geological features.

3.2.2 Vertical Electrical Sounding (VES)

Vertical Electrical Sounding (VES) was carried out with the aim of determining the formation resistivities and the depth to bedrock, as well as finding the possibility of obtaining fractures at depth.
The Schlumberger electrode configuration and the required procedures were used for the VES.

4. DATA ANALYSIS AND INTERPRETATION

The Vertical Electrical Sounding (VES) data and the corresponding curve are presented below:

Table 1: Selection of Promising Points from VES Data

No.	VES POINT	LAYER	THICKNESS (m)	DEPTH (m)	APPARENT RESISTIVITY (Ohm-m)	POSSIBLE WATER ZONES (M)	RANKING	MAX DRILLING DEPTH (M)
1	A	1 2 3	2 67.3 -	2 69.3 -	69.2 601 65108	 15-30 40-70	1^{st}	80

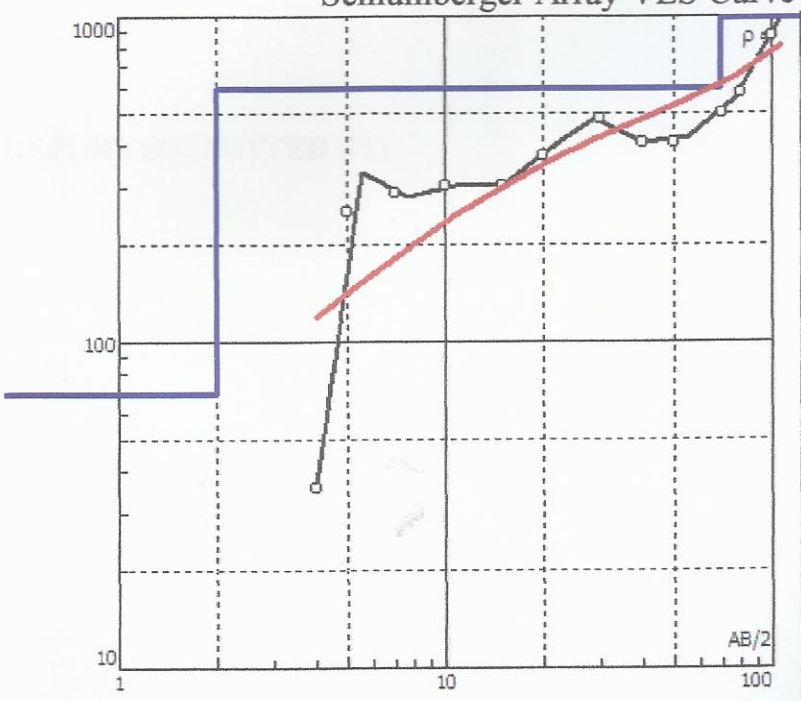
Figure 1. Schlumberger Array VES Data and Corresponding Curve and Model

Client: **OXFAM**	Community: **Kuntolon**
Project: **Borehole Sitting/Drilling**	Sounding Number: **1**
District**: Western Area**	GPS Coordinate East: **0700554**
Date: **9th December, 2014**	GPS Coordinate North: **0935705**
Field Operator: **Morlai Kanu**	Elevation: 82m

Schlumberger Array VES Field Data

No.	AB/2	MN	Resistance (ohm)	Apparent Resistivity (ohm-m)
1	4	0.8	0.5789	36.01
2	5	0.8	2.5666	250.39
3	7	0.8	1.4864	285.12
4	10	0.8	1.4520	302.43
5	15	1.5	0.7972	303.39
6	20	1.5	0.4458	372.99
7	30	1.5	0.2575	485.14
8	40	1.5	0.6205	406.74
9	50	7.6	0.4079	409.15
10	70	7.6	0.4584	499.06
11	80	14	0.4075	580.82
12	100	14	2.3406	868.45

Schlumberger Array VES Curve and Model



N	ρ	h	d	Alt
1	69.2	2	2	-2
2	601	67.3	69.3	-69.3
3	65108			

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Based on the analyses of the result in line with the aims of the study, the drawn conclusions are;

- The project area is within the Freetown Basic Complex.
- Groundwater potential could be high within the two promising zones as shown above at depth between 15 - 30m.and 40-70m respectively as indicated from the resistivity values.

5.2 Recommendation

In this regard, it is recommended that,

- Drilling could be carried out at the selected point to confirm the existence of groundwater.
- The maximum drilling depth should be 80m to cut across the first and second promising zone of 15- 30m and 40-70m respectively to ensure reliable productivity. However, the supervisor may exceed this depth based on the field conditions.
- Both physico- chemical and bacteriological test should be carried out on the borehole water samples from the completed well.

REPORT SUBMITTED BY:

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Morlai Kanu
Geologist / Field Operator