



EDAL DRILLING COMPANY LTD.

GEOPHYSICAL SURVEY REPORT

MAKENI

SUBMITTED TO:

TEAM AND TEAM INTERNATIONAL

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3. FIELD WORK

3.1 Reconnaissance Survey

The aim of the reconnaissance survey was to select suitable area (s) for geophysical survey.

The activities included the following:

- **Geomorphological Survey of the Area**

This includes the landscape and other physical features.

The project area is relatively rugged with visible outcrops and elevated grounds in the surroundings.

- **Geological / hydrogeological survey to determine the formation of the area and to identify possible features.**

The project area is overlain by weathered materials which are the direct product of the crystalline granitic rocks.

The intense weathering in the area is a prospect for the existence of groundwater.

Groundwater occurs mostly in weathered and unconsolidated materials as compared to consolidated and crystalline rocks.

- **Selection of Traverse Line for Geophysical Survey**

The traverse line for resistivity survey (Vertical Electrical Sounding) was selected on the basis of geomorphological and geological/hydrogeological features as well as the location of the project area. There were no visible strike directions of the geological formation of the area due to weathering and engineering activities.

3.2 Geophysical Survey

The Geophysical survey consisted mainly of Electrical Resistivity i.e. Vertical Electrical Sounding (VES) using the ABEM SAS -1000 Terrameter System.

3.2.1 Resistivity Profiling

Electrical resistivity profiling is usually carried out along a selected traverse of 50 - 100m length at 10m interval to determine the lateral variation in subsurface resistivities so as to delineate anomalous point(s) with groundwater potential which can be used for the Vertical Electrical Sounding (VES).

However, there was no resistivity profiling for this site because of the unavailability of the required land extent as well as other environmental limitations.

Therefore, the Vertical Electrical Sounding (VES) was carried out at the selected point.

3.2.2 Selection of VES points

The Vertical Electrical Sounding (VES) point was selected based on the available space and location of the project area; considering the environmental and other physical conditions. The selected point was marked with a peg for identification.

3.2.3 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 the possibility of finding water bearing fractures or aquifer(s) at depth with the corresponding thicknesses of such aquifers. The Schlumberger electrode configuration and the required procedures were used for the Vertical Electrical Sounding (VES).

4.0 DATA ANALYSIS AND INTERPRETATION

Table 1: Schlumberger Array VES Data

Client: Team and Team International			Community: Makeni
Project: Geophysical Survey			Sounding Number: 1
District: Bombali			
Date: 5 th June, 2015			
Schlumberger Array VES Field Data			
No.	AB/2	MN	Apparent Resistivity (ohm-m)
1	4	0.8	417.41
2	5	0.8	284.01
3	7	0.8	575.25
4	10	0.8	575.55
5	15	1.5	441.25
6	20	1.5	525.29
7	30	1.5	539.21
8	40	7.6	427.85
9	50	7.6	468.83
10	70	7.6	647.545

Schlumberger Array- VES curve (A)

Model Parameters				
N	ρ	h	d	Alt
1	365	2	2	-2
2	510	67.2	69.2	-69.22
3	30575			

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The data shows a three-layer subsurface in which $p_1 < p_2 < p_3$. The apparent resistivity values registered in layers 1, 2 and 3 respectively show little groundwater potential. However, groundwater potential might increase beyond the investigated depth of 70m.

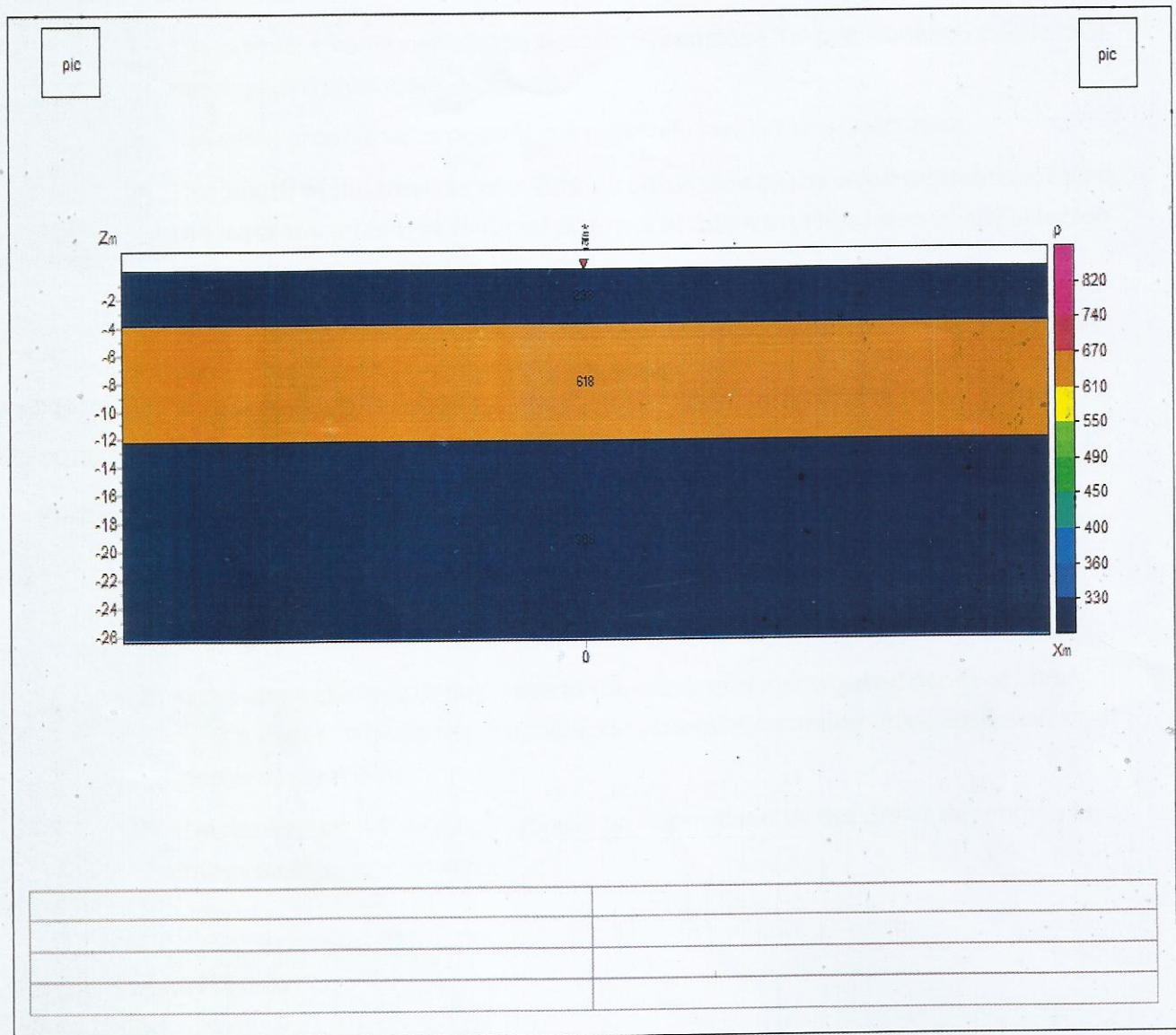


Figure 2. Pseudo - section Showing Apparent Resistivities and Layer Thicknesses

5.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the analyses of the entire results, and in line with the aims of the study, the conclusions are as follows:

- The project area lies within the Granite Greenstone Terrain (Basement Granites) lithological formation.
- However, groundwater potential is relatively low in the project area.
- The length of the traverse was 70m on either side of the selected location; failing to meet the minimum required distance of 100m on either side of any selected point.
- The proposed borehole location was selected in accordance with both national and international borehole siting guidelines.

Recommendations

Drilling should be carried out at the selected point based on the following:

- If the client wants to explore and probably develop the limited groundwater available.
- If the client decides to drill beyond the maximum investigated depth of 70m which might increase the groundwater potential assuming there are fractures at depth beyond 70m.
- The maximum drilling depth should be determined by the driller depending on the prevailing conditions.

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