HYDROGEOLOGICAL REPORT

Buswelu, Ilemela - MWANZA

REPORT ON HYDROGEOLOGICAL OR GEOPHYSICAL INVESTIGATION AT HISANI AREA, ILEMELA DISTRICT, MWANZA - TANZANIA

MAY, 2018

FOREWORD

CSR COMPANY LIMITED is a privately owned drilling company engaged in the water well drilling services that operates primarily in Tanzania.

It was founded on 29th December, 2016; Incorporated under the companies act 2002, and that the company is limited to carry out the business of groundwater prospecting or hydrogeological survey, Borehole drilling, Pump installation, Water supply, Dam construction, Civil engineering, Electrical engineering, Mechanical engineering, Structural designs, Logistics & transportation, to carry out the business of mining, mining machines such as caterpillar, Engines, dozer, crusher, cars, trucks, and other heavy duty mining machines or mining equipments, etc.

CSR COMPANY LIMITED has been registered with the Tanzania Revenue Authority and assigned the Taxpayer Identification Number 132-562-318.

For the last three years, we have completed a number of high-profile construction/drilling projects and achieved great success.

1.1 Specific objective

The main objective is to conduct hydrogeological and geophysical investigations in the specified areas in order to identify and locate sites with high potential for the children being cared at the aforesaid Centre in order to serve them with CLEAN and SAFE water.

1.2 Technical experts involved in identification of new potential sites were as follows: -

The team from Groundwater Exploration a Non Government Organisation company dealing with underground water investigation and drilling visited the area and did the reconnaissance on May 11,2018.

2. GEOLOGY AND HYDROGEOLOGY:

Based on field observation, the area is geologically composed of laterite and sand as main superficial formations; while consolidated basement rock consists of foliated

gneissose granite and granodiorite with some massive porphyroblastic formations. Also some fractures were observed in the outcrops in vicinity of the area with dominant NW-SE orientation. These structures are possible pathways through which groundwater is recharged to the area of study.

2.1 EXISTING WATER SOURCE

Currently, there is an existing shallow well used as a water source for the institution. However, the yield of this shallow well is not sufficient due to low yield of water compared to the number of children required to be served. The system of the pump used is known as Hand operated pump.

3. GROUNDWATER INVESTIGATION

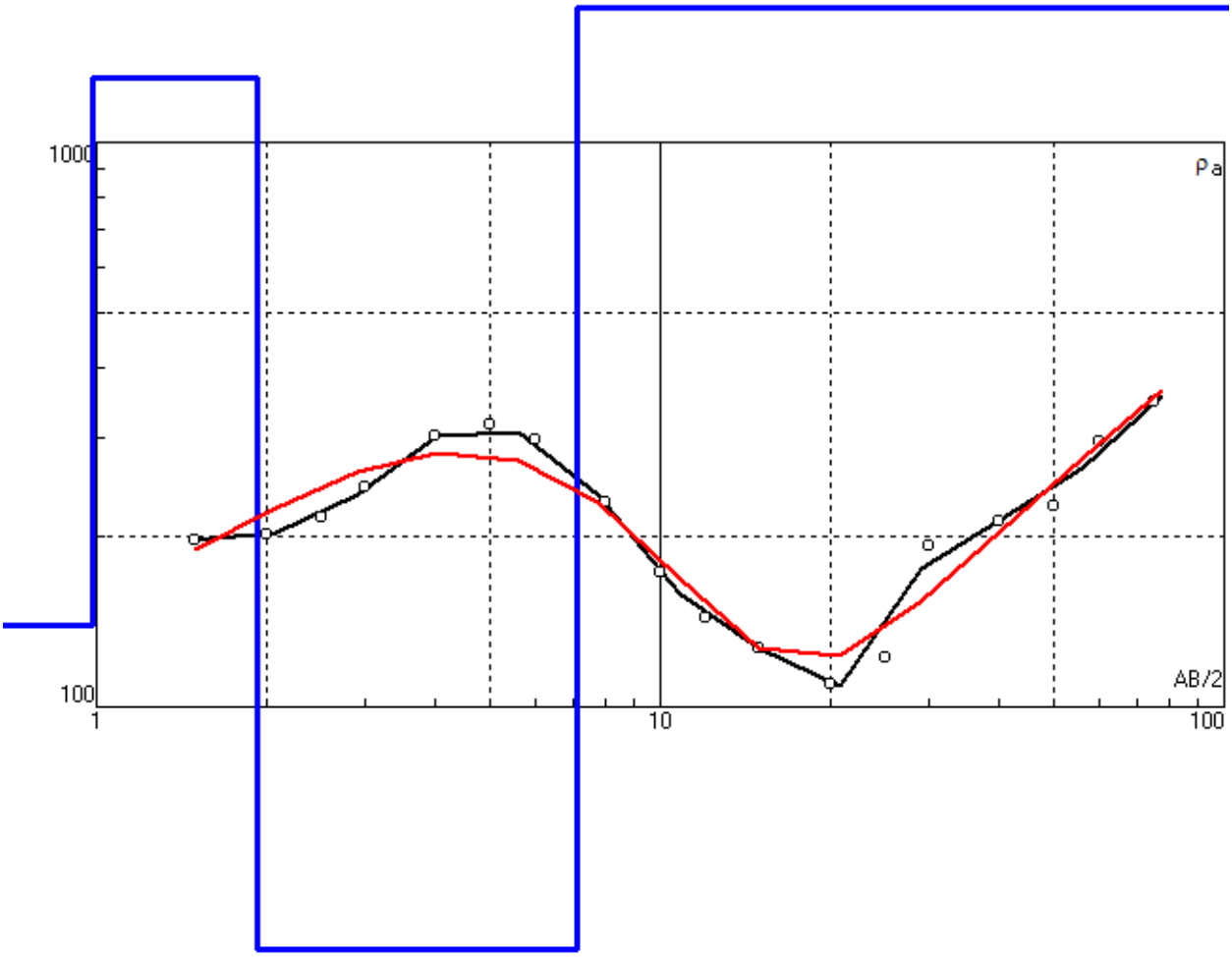
Groundwater study was conducted in the area using Electric Soundings (often referred to as "Vertical Electric Sounding" (VES) using schlumberger configuration layout.

A geophysical instrument called ABEM Terrameter SAS 1000 was deployed in the course of investigation. Schlumberger array was adopted with maximum current electrode separation (AB) of 75m and maximum potential electrode separation (MN) of 10m.

Only ONE VES was taken in the vicinity due to landscape of the area and plot boundaries below are the interpreted results for the data taken from the geophysical instrument.

The calculated apparent resistivity values (ρ_a) in Ohm.m from field data were plotted against half current spacings (AB/2) in metres to produce a resistivity sounding curve. Interpretation of these curves (data) was performed by using a computer program.

INTERPRETATION AT HISANI ORPHANAGE CENTRE – BUSWELU AREA VES 1.



N	ρ	h	d	Alt
1	139	0.982	0.982	-0.982
2	1302	0.939	1.92	-1.92
3	31.2	5.2	7.13	-7.12
4	1725			

Table : Interpreted results

S/village	Resistivity in ohm-m							Resistivity layers in m.					D/sr	R/d
	VES #	1	2	3	4	5	6	1	2	3	4	5		
HISANI	1	139	1302	31.2	1725	++	++	0.98	0.94	5.2	++	++	10	70m (1)

NB. D/sr = depth to solid rock, R/d= recommended depth to be drilled, number in brackets means priority site.

In this table, recommended depth to be drilled is given. The number in bracket indicates first and second priority site to be drilled. Resistivity sounding results indicate shallow to medium deep wells in general. The VES points indicate that the hard rock lies relatively shallow. The selection of the sites was based on hydrogeology, geophysical results, and geomorphology.

3.3 Location of the Vertical Electrical Soundings.

Ward	Village	Sub village	# VES	GPS Coordindtes		Remarks
				Elevation (m)	Reading Coordinates	
	Buswelu	HISANI	1	1262	0496161E, 9720482N	


ABEM
Terrameter System

CONCLUSIONS & RECOMMENDATIONS

- **Drilling was recommended at VES No. 1.** Based on results of geophysical survey, the point on **VES No.1** is selected as favourable site for borehole drilling. It should be drilled down to **70m**

- All necessary borehole completion procedures should be complied with, including installation of μPVC casings/screens, 2-4mmϕ uniform size gravel pack.

- Geo-electrical trend of promising VES indicate great possibility of application of DTH drilling (i.e. with a larger diameter of(6-8"ϕ) hole in unconsolidated formation and in stable formation).

- Installation of μPVC liners is strongly recommended.

- The selected points should be cement - or bentonite-grouted up to ≈ 2-4m bgl to prevent surface contamination.

- Proper borehole completion practices have to be adhered to; including installation of uniform size gravel pack (2-4mmϕ), thorough borehole development.

- It is recommended that a hydrogeologist or hydrogeology technician, preferably the one who participated during the investigation stage, supervise borehole drilling.

7.0 REMARKS

The surveyed site is known to Mr. Fredrick Kanyambo .

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