

*Mohammed Yagoub for Water Services
and Consultancy Enterprises*

MYWSCE



*Hydro-geological/Geophysical Surveys in
Kassib and Regiala villages*

October , 2022

**Hydro-geological/Geophysical Surveys in
kassib and Regiala villages**

INTRODUCTION

1.1 Project Location and Description

The subject of this TOR is to conduct Geophysical Survey at two (2) locations targeted with new borehole as a part of humanitarian aids intervention and rural areas development in Sudan, Alight – east Darfur is intended to drill two (2) boreholes at East Darfur states, at the following specified villages:

No	Village	Locality	State	Boreholes No
1-	Kassib	Yaseen	East Darfur	1
2-	Regiala	Yaseen	East Darfur	1

The geophysical survey has been carried out and executed up on the contract carried with Mohammed Yagoub water service enterprises with an objective:

- To define the suitability of the area to drill new borehole
- Contributing on providing safe drinking water for the community of kassib and regiala villages

1.2 General geology and hydrogeology

The studied areas can be subdivided into three main unconformable overlain geological formations:

1- Basement complex:

Is the old rocks of Precambrian age , which is mainly consist of schist , gnieis and grante rock type, its consider as a massive rocks cannot be consider as water bearing formation

2- Nubian sandstone formation :

Its unconformably overlaing the old basement, and its mainly consist of sandstone and mudstone ,which are chractrised by is hemogenity of sand particles content as well as can be considered as the main water bearing formation and grounwatr occurance in the areas .

3- Alluvial and superficial deposit:

Its Pleistocene- recent deposit unconformable over lain, Umrowaba formation, it's mainly consisting of sand and clay which resulted from the formation of several wadies (valleys of seasonal water courses) and wind below.

1.3 The scope of the work and study:

Using SAS4000- resistivity- meter instrument geo-electrical resistivity measurement of vertical electrical sounding with respect to schlumberger arrays with an objective to:

- Delineate the subsurface formation sequences.*
- Determine the depth and the water bearing formation*
- To select the best site for well driling and the suitable drilling tool option.*

1- GROUNDWATER INVESTIGATION IN

KASSIB VILLAGE

1.1 Location

kassib village is located at Yaseen locality, at East Darfur state, about 80 km west Aldaen town the state capital , between long: 25.56087^o, and latt: 11.74128^ocross section.

1.2 the study :

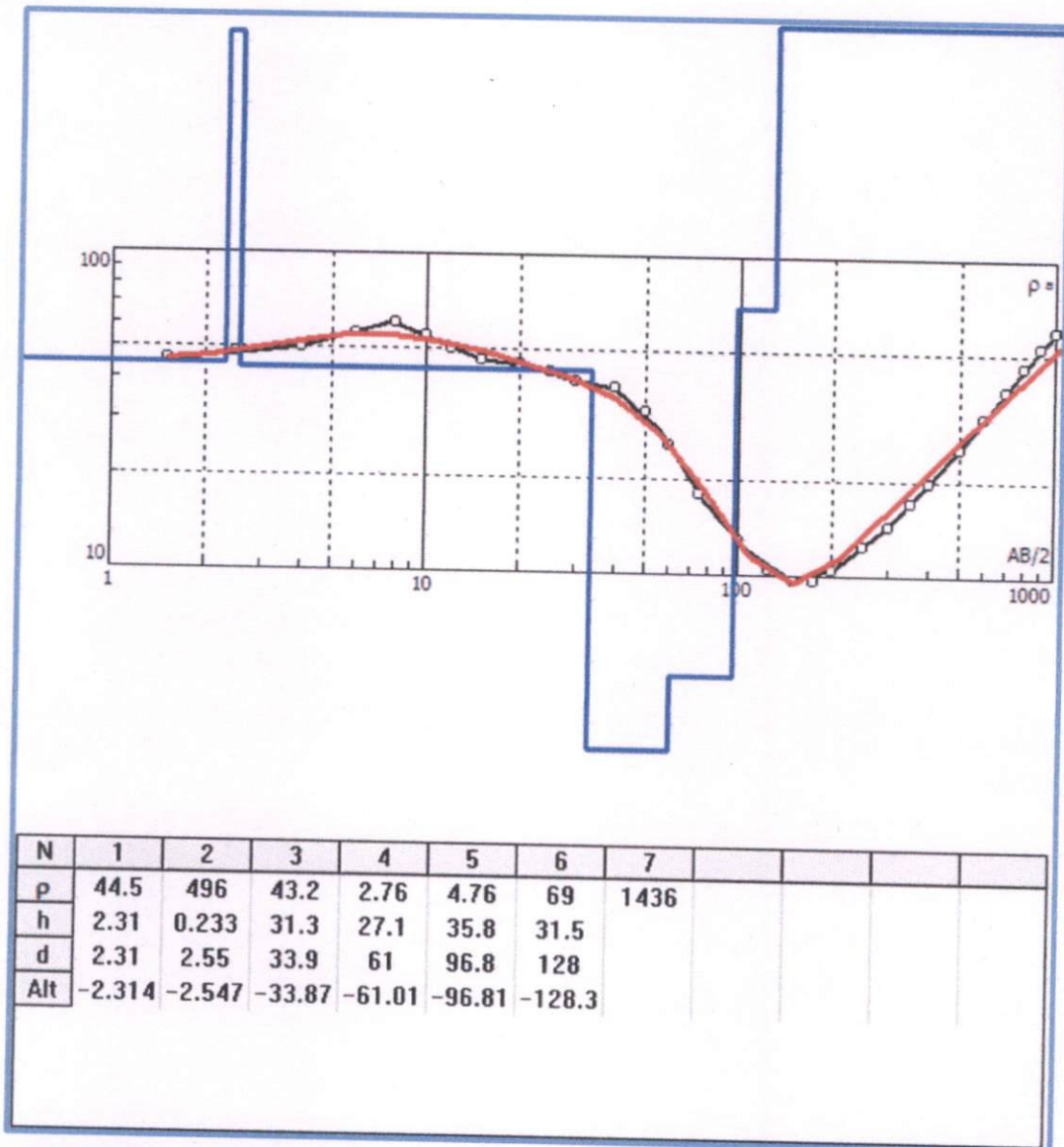
Three geo-electrical resistivity sounding of 1000m current spread were carried out at kassib village at flowing describe locations:

VES No	location	Coordinates	
		Longitude	Latitude
1-	Alasal-7km SE village	25.61319 ^o	11.69725 ^o
2-	Ragabat al gamal – 10 km south villge	25.62077 ^o	11.66831 ^o
3-	840 m ,NE village and railway	25.56087 ^o	11.74128 ^o

1.3 Analysis and interpretation:

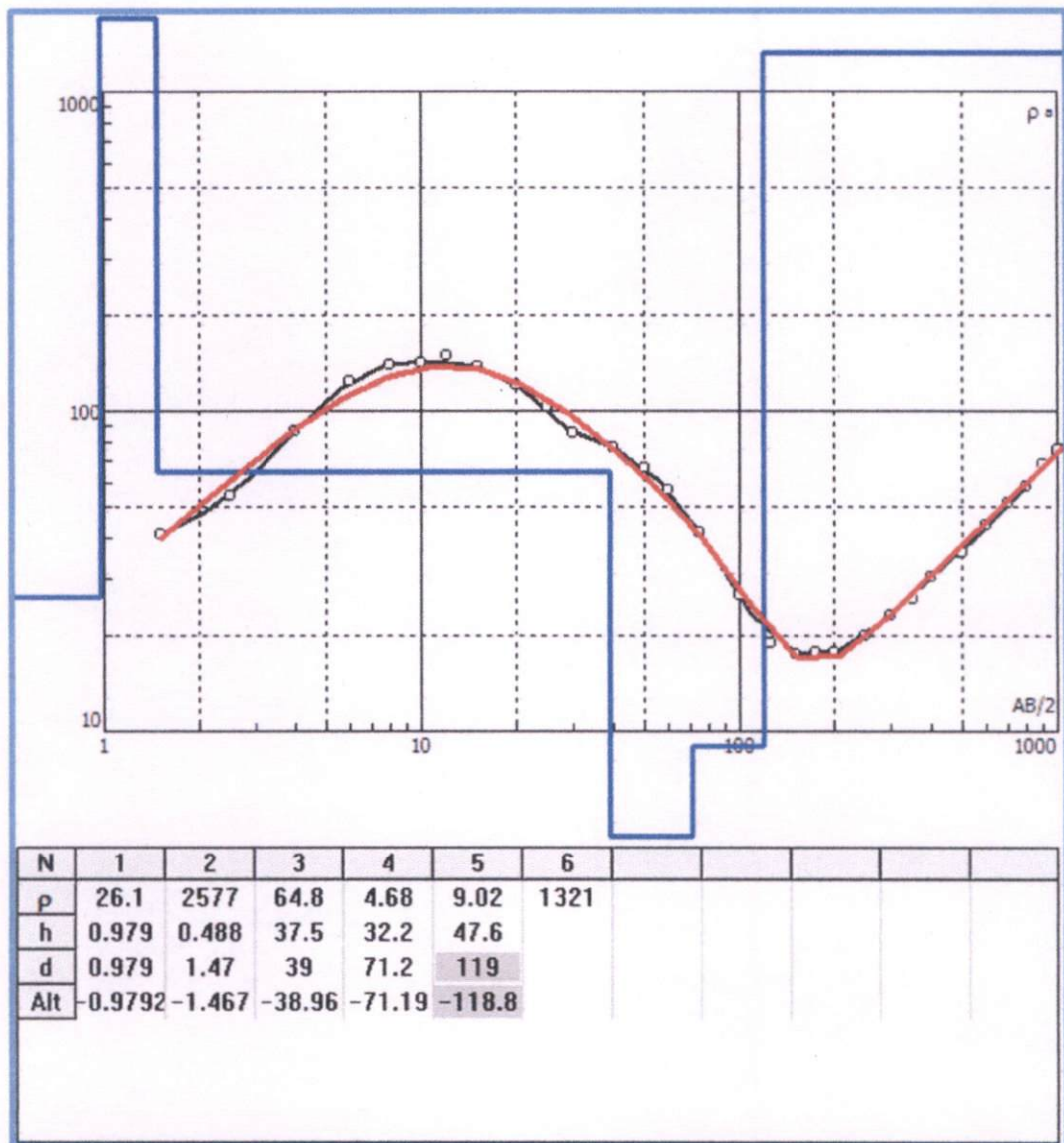
With an aid of IP2win geophysical software program the collected data were analysed and interpreted (see the curve and table attached)

Ves1:



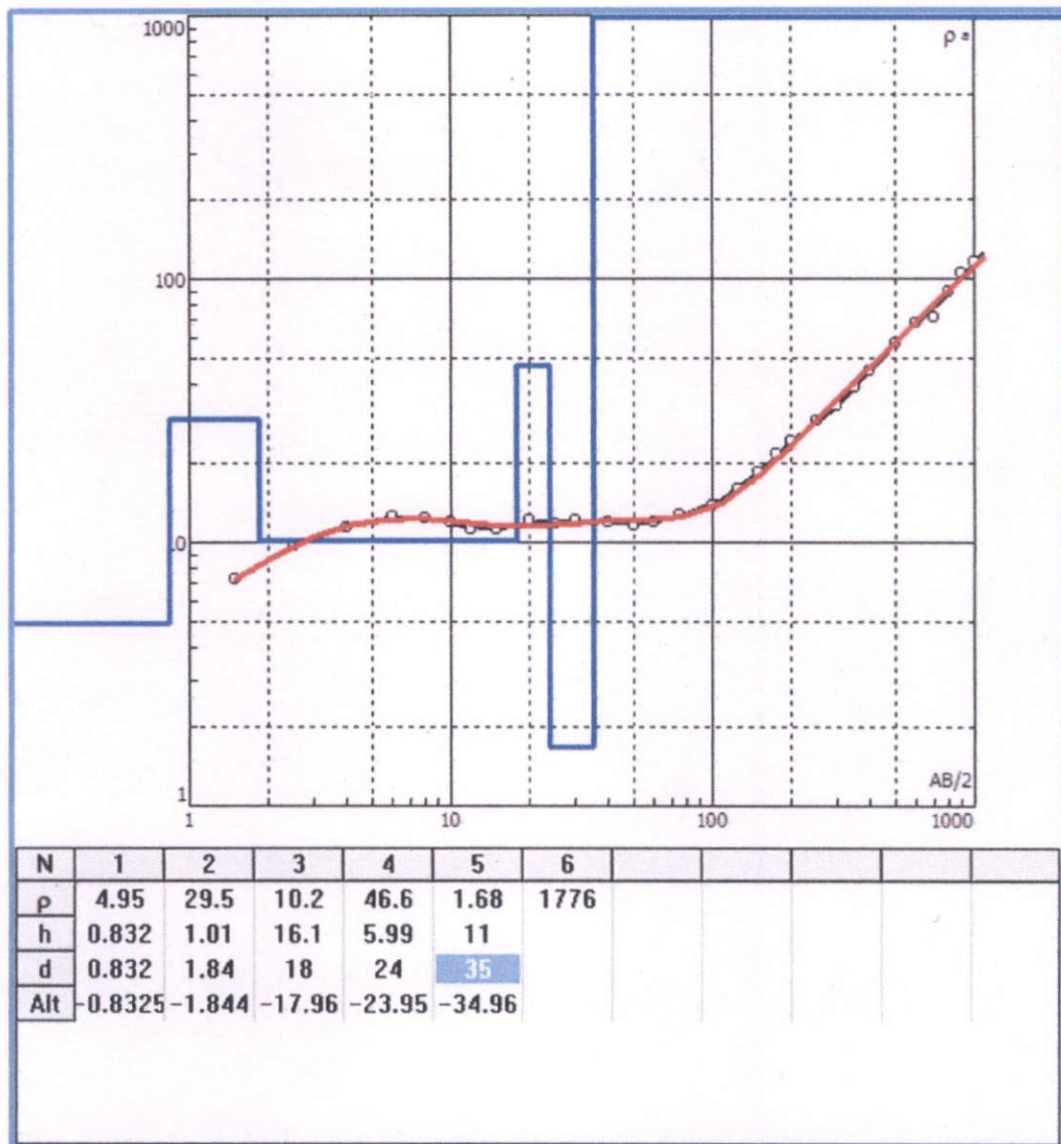
Depth (m)	Log description
0 - 2	Clayey sand
2 - 3	Sand
3 - 34	Sandstone with mudstone
34 - 90	Mudstone
90 - 128	Moderately hard formation
➤ 128	hard formation

Ves: 2



Depth (m)	Log description
0 - 1	Clay
1 - 2	Sand
2 - 40	Sandstone
40 - 71	Mudstone
71 - 119	Sandstone with mudstone sheets intercalated
> 119	Hard formation

VES: (3)



Depth (m)	Log description
0 - 1	Clay
1 - 2	Sandy clay
2 - 18	Mudstone
18 - 24	sandstone
24 - 35	Mudstone
> 35	Hard formation

Result and recommendations:

- 1- The superficial deposit its unconformably overlain the Nubian sandstone as wel as the Nubianstone is considered as the main water bearing formation and groundwater occurance in the studied area.
- 2- The thickness of Nubian sandstone ies range from 30 - 110m
- 3- The thicknees of nubian in ves 1, at alasal is more than 70m , but is dominated by by mudstone formation of weakly prossity
- 4- The thickness of nubian at ves2 its more than 80m , its maily intercalation of mudstone and sandstone , which can cosiderd the most fairly water bearing formation
- 5- Ves 3 ists of weakly thickness less than 40m
- 6- Is recommanded to drill at the slected point which is described below:

Ves No	Site	Cooedimates		Expected depth(m)
		longtitude	Latitude	
Ves2	Ragabat al gamal – 10 km south villge	25.62077 ^o	11.66831 ^o	115

- 7- The water quality it may parcially saline , there for is use Upvc , casing of 6 inch on 12 inch borehole diameter, in order to increase the volume of gravell pack.
- 8- Is recommanded to select filter of 0.020 inch slot size , of total length 24 - 30m
- 9- An expert hydrogeological engineer is recommended for the drilling operation supervision and, devolpment, as well as well completion report

11-Its recommended to use well logger for the aquifer utilization and screens distribution, in case of using rotary drillingrigs .

12-Its prefer to utilize percussion drilling rig

Hydrogeologist / Mohamed Yagoub Hamid



2-GROUNDWATER INVESTIGATION IN REGAILA VILLAGE

1.1 Location

Tegiala village is located at Yaseen locality, at East Darfur state, about 40 km west Yaseen, between long: 25.31090°, and latt: 11.52495°, cross section.

1.4 the study :

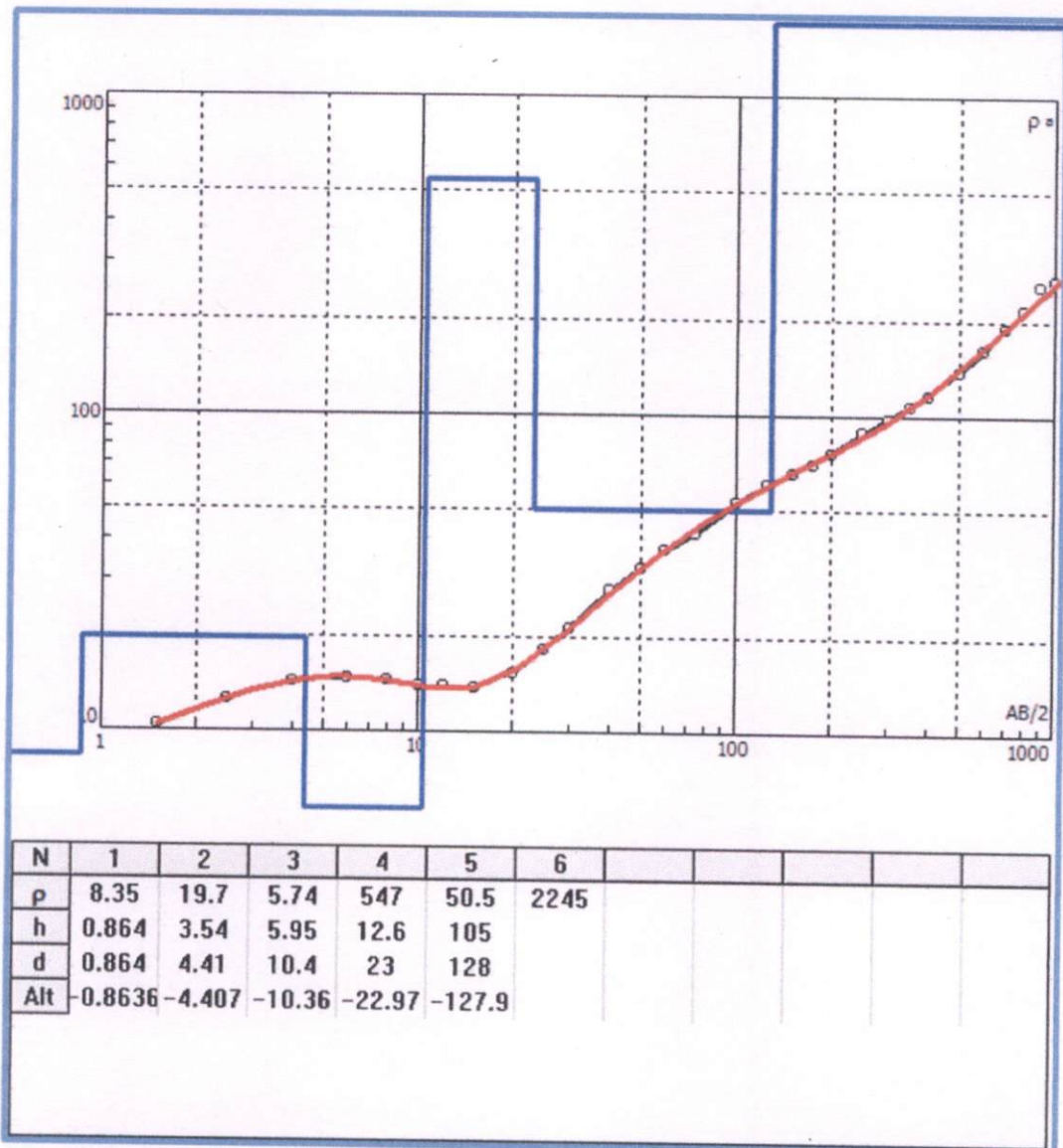
Three geo-electrical resistivity sounding of 1000m current spread were carried out at regiala village at flowing describe locations:

VES No	location	Coordinates	
		Longitude	Latitude
1-	700m east the village	25.31430°	11.53303°
2-	300m south the village	25.31090°	11.52495°
3-	3km north east village	25.32924°	11.54218°

1.5 Analysis and interpretation:

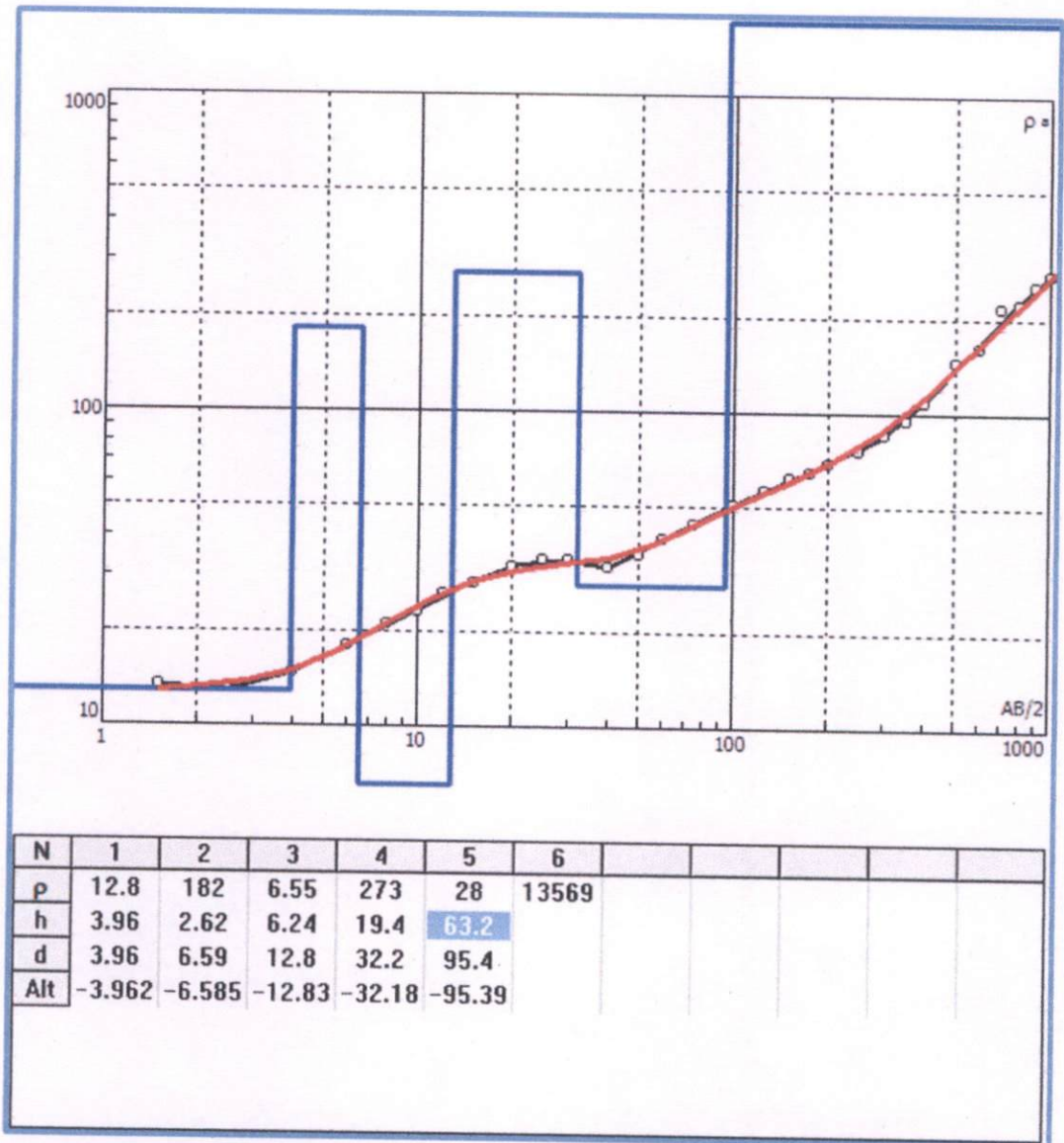
With an aid of IP2win geophysical software program the collected data were analysed and interpreted (see the curve and table attached)

Ves1:



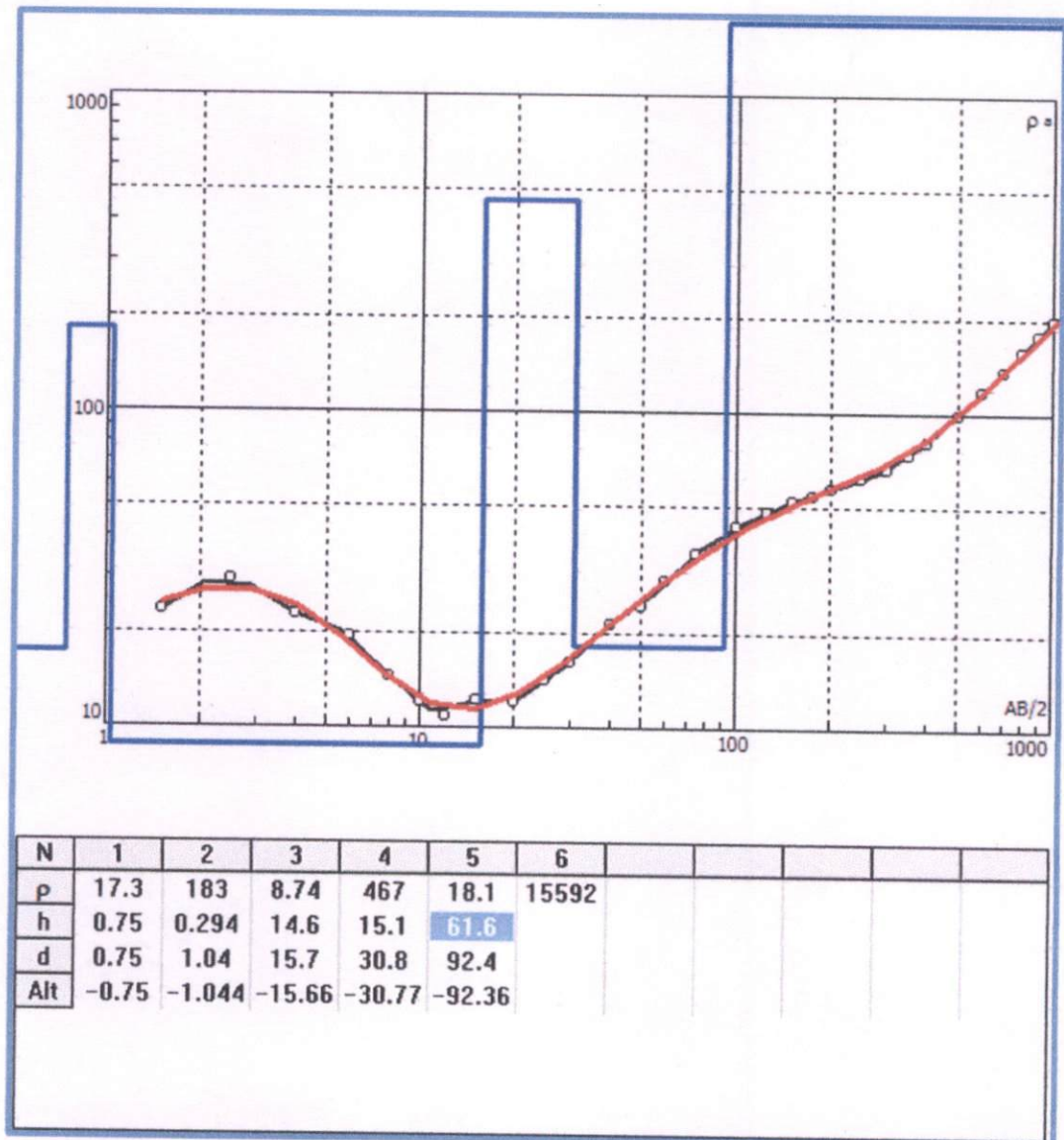
Depth (m)	Log description
0 - 1	Clay
1 - 10	Mudstone
10 - 23	Sandstone, hard
23- 128	Loose Sandstone
➤ 128	Basement

Ves 2



Depth (m)	Log description
0 - 4	Clay
4 - 6	Sand
6 -12	mudstone
12 - 32	Compact Sand
32 - 95	Loose sand
> 95	Hard formation (basement)

VES: (3)



Depth (m)	Log description
0 - 8	Clay and sand
16 - 30	Sandstone
30 - 92	Sandstone with mudstone lenses intercalated
> 92	Hard formation (basement)

Result and recommendations:

- 1- The superficial deposit its unconformably overlain the Nubian sandstone as wel as the Nubianstone is considered as the main water bearing formation and groundwater occurance in the studied area.
- 2- The thickness of Nubian sandstone ies range from 70 - 110m
- 3- Is recomanded to drill at the slected point according to thier priority which are stated below in sequence:

VES No	location	Coordinates		Expected depth(m)
		Longitude	Latitude	
1-	700m east the village	25.31430 ^o	11.53303 ^o	130
2-	300m south the village	25.31090 ^o	11.52495 ^o	100
3-	3km north east village	25.32924 ^o	11.54218 ^o	95

- 4- Is recomanded to select filter of 0.020 inch slot size , of total length 12 - 18m
- 5- An expert hydrogeological engineer is recommended for the drilling operation supervision and, devolpment, as well as well completion report
- 6- Its prefiable to use percussion drilling rig.

Hydrogeolgist / mohammed Yagoub hamid