

1 INTRODUCTION

Lehabtek Company Limited was contracted by TURBO GHANA to provide groundwater prospecting, leading to the construction of one borehole within Atonobi community which is located in the Mampong Municipal Assembly in the Ashanti Region of Ghana.

The scope of works included groundwater prospecting to delineate potential sites for the drilling of the borehole, drilling and construction, well head construction, pumping test and water quality analysis, and pump installation.

Lehabtek Company Limited works carried out the groundwater prospecting to ensure a smooth and successful implementation of the project and also to achieve high success rate for the drilling works. This was done by a conscientious terrain evaluation after a desk study and by applying the most scientific approach to the site selection activity. The study did not show potential sources of pollution that may affect the groundwater point sources recommended. The ensuing pages elaborate on the studies carried out.

2 SITE LOCATION AND DESCRIPTION

The project site is located Atonobi community which is located in the Mampong Municipal Assembly in the Ashanti Region of Ghana. The site is approximately located on latitude of 7.06079 N and longitude of 1.40322 W.

3 GEOLOGY/HYDROGEOLOGY

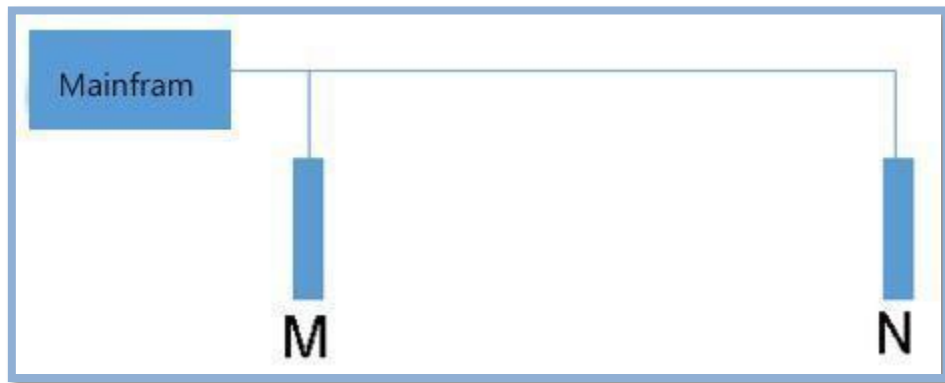
The local geology indicates that the study area is underlain by rocks of the Kwahu-Morago Group of the Voltaian Supergroup. The Kwahu-Morago is mainly well-consolidated and closely compacted basal sandstone (Geological Survey Department, 2009). It also includes sandstones, dune-bedded to cross-bedded, medium grained, arkosic, and with mudstone towards the base 'Anyaboni Formation'. The main rock types underlying the study area are thus sandstones, and mudstones.

Groundwater is the major source of water supply for communities in and around the district. The occurrence of groundwater depends on the geology and areas where the rocks are highly weathered, fractured, or inter-bedded with quartz veins. With the application of improved geophysical exploration methodology, boreholes drilled in hydro-geologically difficult terrains have improved drastically (Mainoo, Duah, Agyekum, & Menyah, 2012). The groundwater flow is mostly restricted to joints, fractures, or other openings within the metamorphosed sedimentary rocks.

In some areas, the regolith provides the potential for increased groundwater storage. The metamorphosed sedimentary rock is not inherently permeable but secondary permeability or porosity has developed because of fracturing and weathering. In general, two types of aquifers are identified: weathered rock aquifers and fractured rock aquifers that can be categorized as confined or semi-confined. The water quality is commonly good for potable use.

4 METHODOLOGIES

The ADMT 200S water detector was used for the groundwater prospecting. The ADMT 200S water detector uses the natural electromagnetic field of the earth as the working field source to study the electrical structure within the earth to delineate aquifers for groundwater exploitation. The electrode and line measurement methods are used for this system of water detector as shown in the figure below.



The operator is responsible for the main unit and the M electrode, and the other person is responsible for the N pole, and the measuring point is at the midpoint of the electrodes M and N. The data collected by the instrument is processed by Aidu Intelligent Data Processing Software and presented in a contour map form where inference can be made of the position, width and judgement depth of geological anomalies.

5 INTERPRETATIONS OF RESULTS AND BOREHOLE SITE SELECTION

The data collected by the ADMT 200S water detector is processed by Aidu Intelligent Data Processing Software and presented in a contour map form where inference can be made of the position, width and judgement depth of geological anomalies. The results which are presented in the contour map are shown in the appendix, where the abscissa indicates the measuring point number, the ordinate indicates the depth, the green area is the aquifer zones and the blue area is the low resistivity area. Three sites were selected and prioritized as prime and alternate sites

(ie. 1ST Choice and 2ND Choice). Accessibility of site for drilling machinery was also considered in the selection and prioritization of sites.

The table below summarise the results from the geophysical investigations indicating the order of drilling, average weathering depth and the expected aquifer zones.

Location	Site No:	GPS Co- ordinates	Expected aquifer Zones(m)	Average weathering depth(m)	Order of Drilling
Kontonoho Community	A42	7.20042 ^o N 1.51071 ^o W	70-120	30	1 ST
	A35	7.20043 ^o N 1.51067 ^o W	70-120	30	2 ND
	A30	-	70-120	30	3 RD

6 RECOMMENDATIONS

It is recommended that:

- The borehole was proposed for drilling at the point A42 and the recommended maximum drilling depth is 120m.
- Drilling should be supervised by a competent Hydrogeologist or Hydrogeological Technician to ensure that the borehole is properly constructed. This will ensure that prevailing aquifer systems are fully harnessed to guarantee sustainable water supply.
- Borehole should be drilled at points recommended and to depths as detailed in the pseudo-sections.
- Optimal drilling depth be determined by the Supervising Consultant to ensure prevailing aquifer regimes are technically harnessed as recommended in Table 1. This

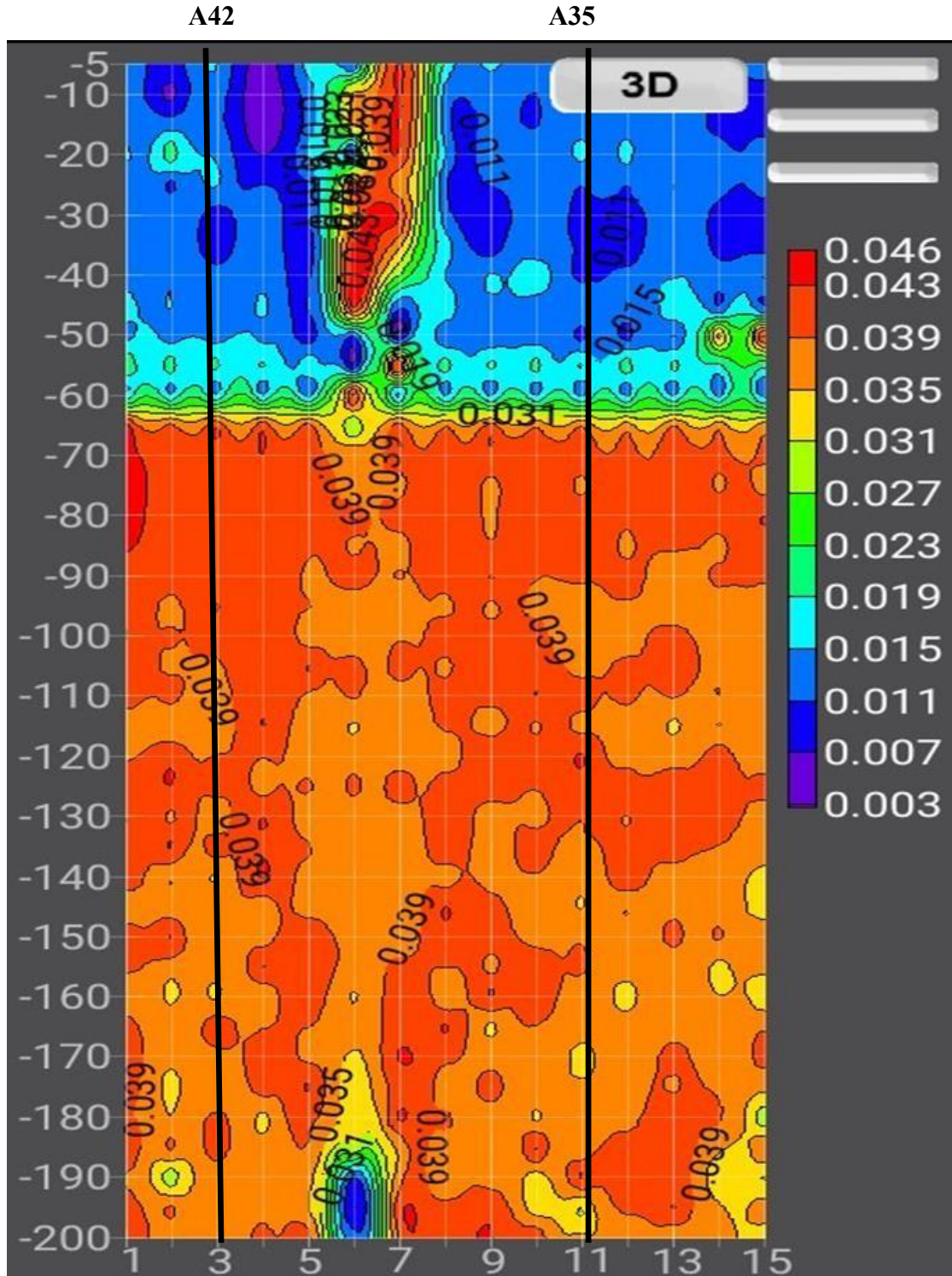
would ensure borehole drilled and constructed could guarantee sustainable water supply.

- To prevent pollution from septic tanks around the borehole, the borehole construction should be well grouted with cement to seal the infiltration of sewerage water polluting the fresh groundwater.
- Pumping test should be carried out to determine the aquifer characteristics and sustainable yield to ensure optimal utilization of groundwater resources for the intended purpose.
- The borehole should be sampled for physio-chemical and bacteriological assessment to ascertain the suitability of the groundwater for the intended use.

APPENDIX

ADMT 200S Water Detector Results

Location: Atonobi Line: A



ADMT 200S Water Detector Results

Location: Atonobi Line: B

B30

