ROTARY CLUB INTERNATIONAL

GEOPHYSICAL INVESTIGATIONS FOR SIXTEEN (16) POTENTIAL BOREHOLE DRILLING POINTS EIGHT (8) SCHOOLS, THREE (3) HEALTH FACILITIES AND FIVE (5) COMMUNITIES

IN THE

AHAFO, ASHANTI AND BONO REGIONS

prepared and submitted by

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1.0 Introduction

Rotary Club International intend to provide safe water drilling, sanitation and hygiene related facilities needy **Eight (8)** Schools, **Four (4)** Health Facilities and **Five (5)** Communities in the Ahafo, Ashanti and Bono Regions. The selected schools, health centers and communities are presented in **Table 1** below.

The hydrogeological investigations were conducted in the selected schools, health centers and communities to assess the groundwater potentials, identify and delineate the most suitable point(s) for the drilling of successful boreholes.

Table 1: Beneficiary Schools, Health Centers and Communities

Region	District/Municipal	Community	Facility	Type of Water Project	Contact Person Number
Bono	Sunyani Municipal	New Dormaa	New Dormaa SDA School	Mechanized	0246892633
Bono	Sunyani Municipal	Wawasua	Wawasua M/A School	Mechanized	0242942722
Bono	Sunyani Municipal	Yawhima New Town	Community	Mechanized	0209120384
Bono	Sunyani Municipal	Baakoniaba	Methodist Senior High Technical and Vocational School	Mechanized	02444114921
Bono	Sunyani Municipal	Baakoniaba	M/A School	Mechanized	0242529327
Bono	Sunyani Municipal	Abesim	Abesim Health Center	Mechanized	0509009583
Bono	Sunyani Municipal	Kojonukurom	Community	Mechanized	
Bono	Sunyani Municipal	Asufufu Kwaware	Community	Mechanized	0208168905
Bono	Dormaa Municipal	Abonsrakrom	Abonsrakrom Technical School	Mechanized	
Bono	Dormaa Municipal	St. Ambrose	St. Ambrose College of Edu.	Mechanized	0243866256
Bono	Sunyani West	Ayakomaso	Methodist Basic School	Mechanized	
Ahafo	Asunafo North Municipal	Goaso	Asunafo North Municipal Health Directorate	Mechanized	0244794554
Ahafo	Asunafo North Municipal	Tweneboah	Tweneboah Health Center	Mechanized	0244794554
Ahafo	Asunafo South	Kukuom	Mfrekrom Health Center	Mechanized	0244794554
Ashanti	Kwabre North	Amoako Ewe	Community	Handpump	0247539624
Ashanti	Afigya Kwabre North	Dwenewoho Village	Community	Handpump	0248433496
Ashanti	Afigya Kwabre North	Esaase	Community	Mechanized	0243769931

3.0 Work Carried Out

3.1 Geology and hydrogeological of Project Area

The area is underlain predominantly by the Birimian formation which covered over 54 % of the Ghana. The major rock types in the area include phyllite, pyroclastic, amphibolite, schist, slate, greywacke, tuff and lava. The rocks exhibit sequence of deformational features such as low-high grade metamorphism, folding, foliation, jointing, fracturing and intense weathering. The exploitation of groundwater in the Birimian formation is often reliable with good water quality except localized high concentration of Iron and manganese.

Borehole drilling success rates in the crystalline basement is estimated to be more 80%. However, the yields and depths of boreholes varies significantly from one place to another thus, aquifers in the crystalline basement are not vertically and laterally extensive. Additionally, the characteristics of aquifers varies as a result of the varying intensity of weathering and the anisotropic nature of fractures.

As part of the hydrogeological assessment, reconnaissance and terrain evaluation were conducted on selected schools, health centers and communities prior to the geophysical investigation to engage representatives of the beneficiaries on the preferred location of the boreholes. The team also considered potential groundwater contamination points such as abandoned and functional toilets facilities, dumping sites and graveyards in the selection of all transverse lines.

3.2 Geophysical Investigation

The survey was conducted by using the electrical resistivity imaging (ERI) technique. ABEM Terameter LS of cable length 400 m, and 41 electrodes was used in Dipole-Dipole, Schlumberger or Wenner configurations.

The ERI data were cleaned and processed by using the RES2DINV software (version 4.8.10 dated 20-05-2018) with a Root Mean Square (RMS) error ranging between 12.7 to 66.9 % with 3 iterations.

4.0 Results Pseudo-sections with the Potential Drilling Point(s)

The pseudo-sections with potential drilling marked with red arrays for the various project's sites are presented in **Figure 4.1-17**.

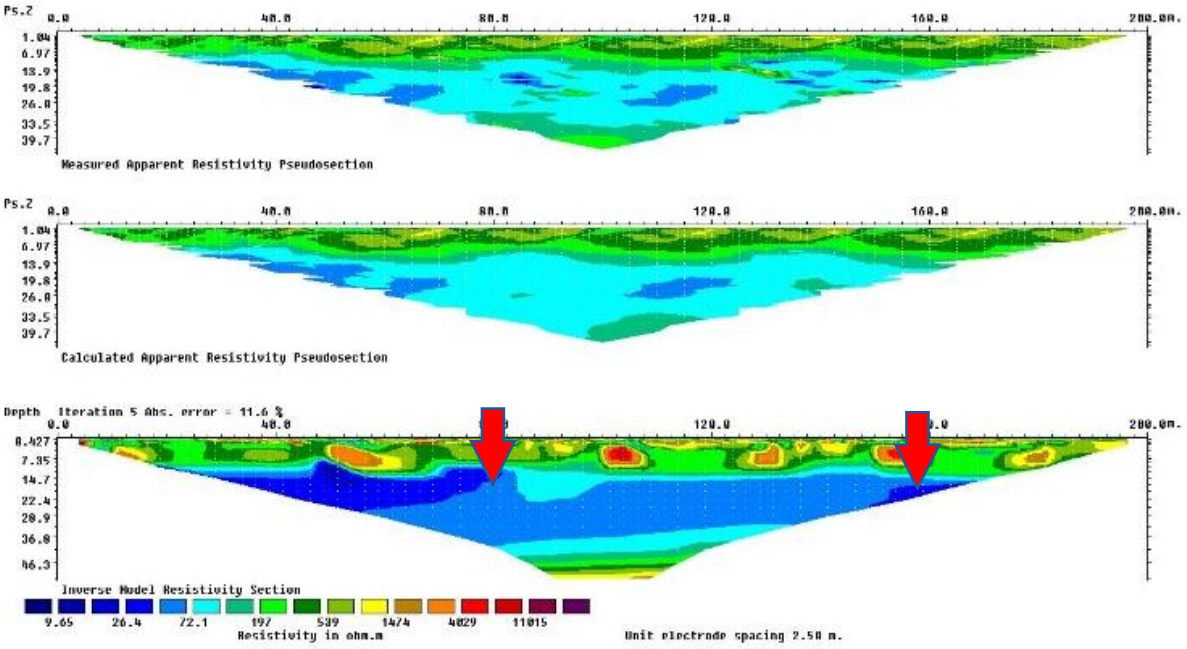

Figure 4.1: Pseudo-section of ERI Survey @ St. Ambrose College of Education

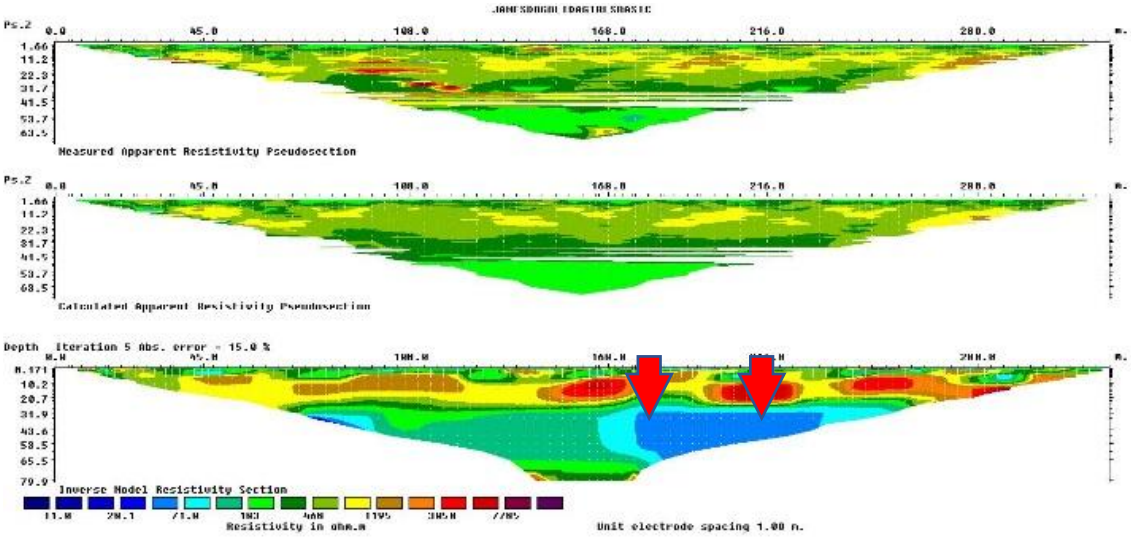

Figure 4.2: Pseudo-section of ERI Survey @ Abonsrakrom Technical School

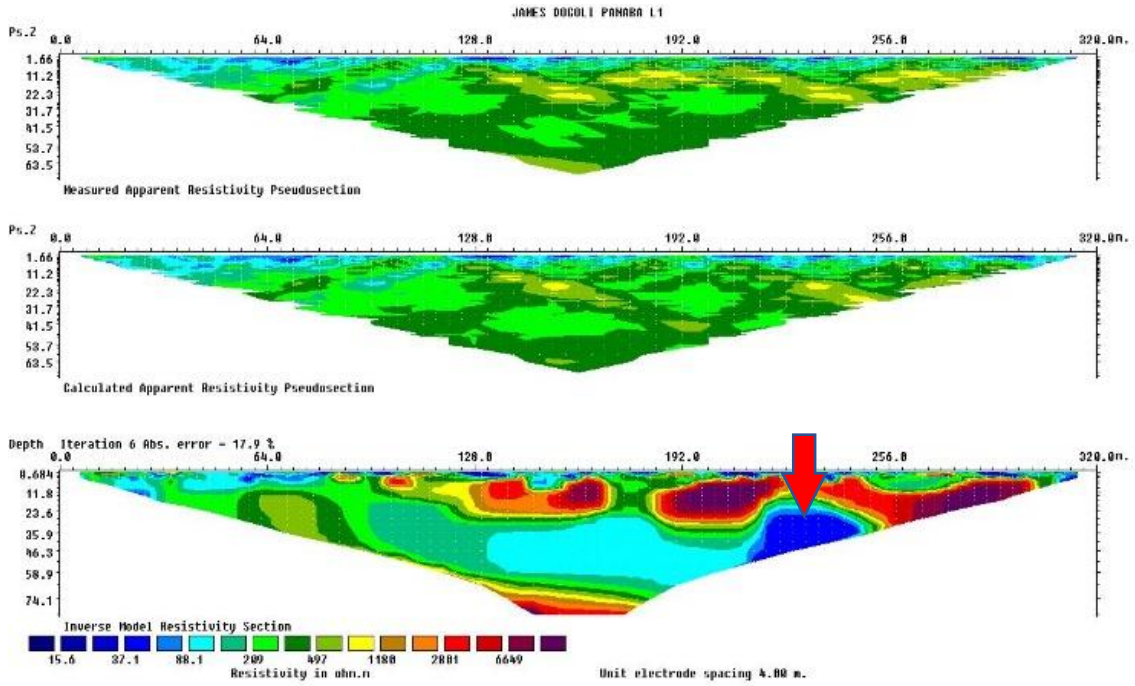

Figure 4.3: Pseudo-section of ERI Survey @ Asunafo North Municipal Health Directorate (L1)

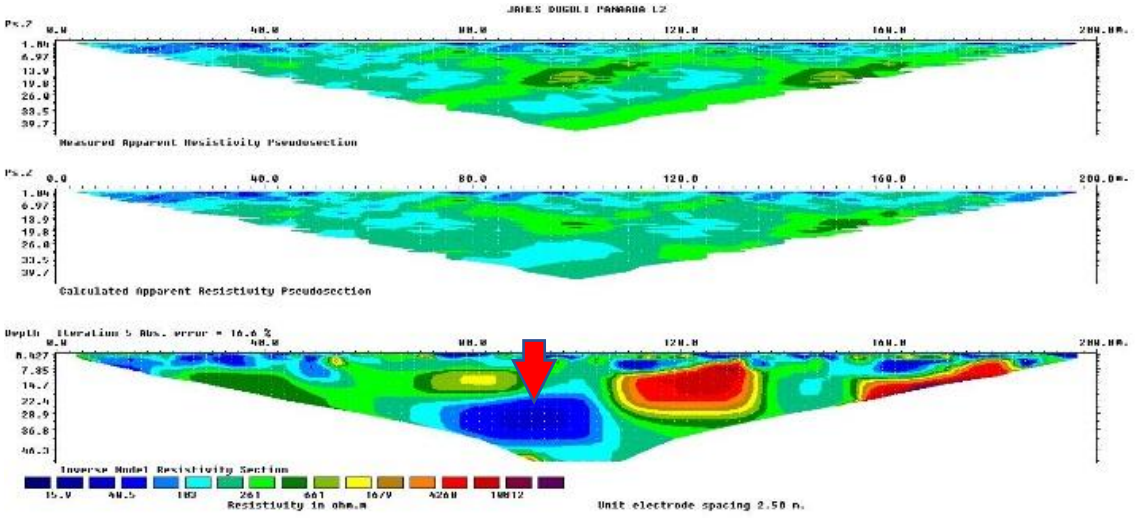

Figure 4.4: Pseudo-section of ERI Survey @ Asunafo North Municipal Health Directorate (L2)

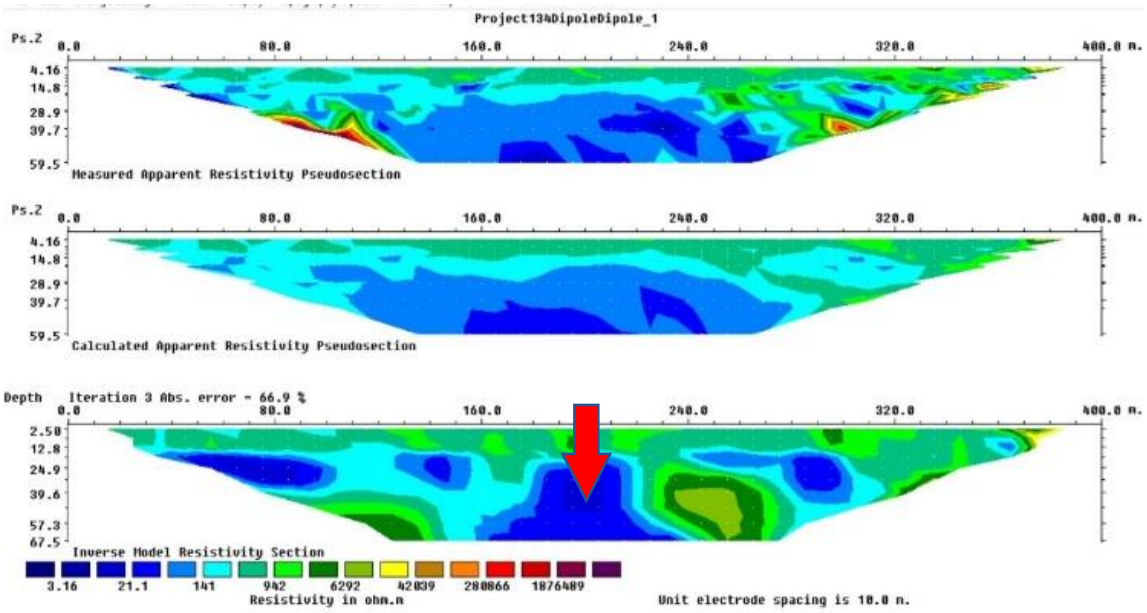

Figure 4.5: Pseudo-section of ERI Survey @ Tweneboah Health Center

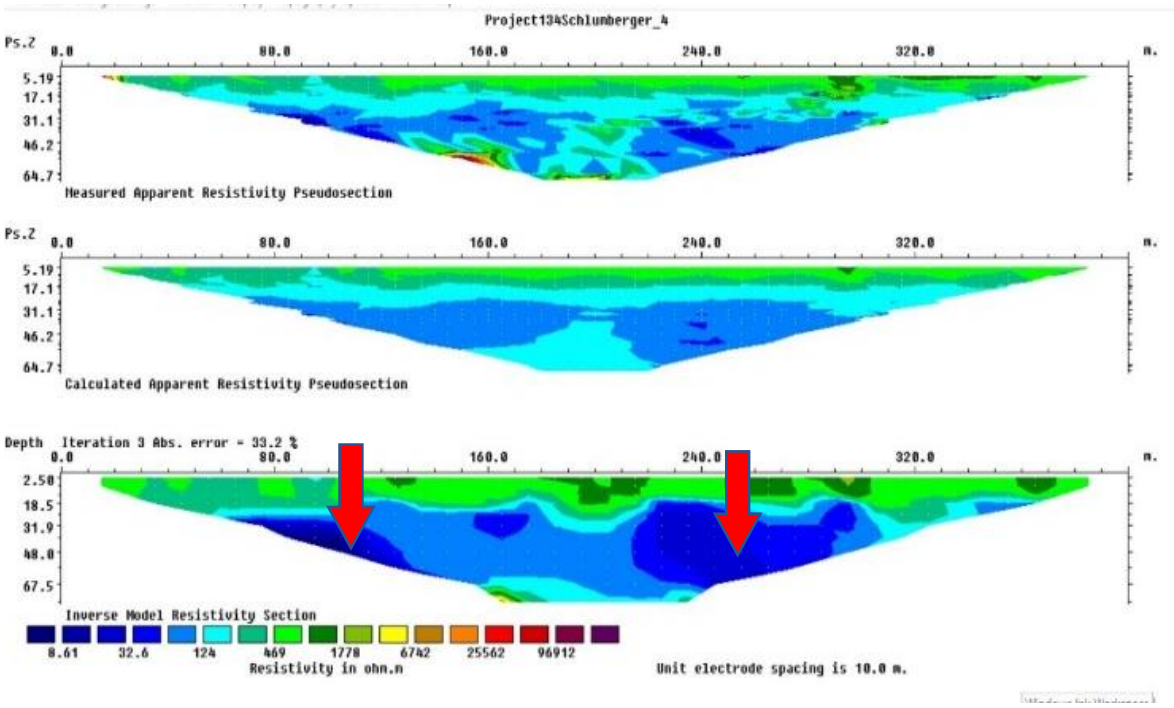

Figure 4.6: Pseudo-section of ERI Survey @ Asufufu Konum Community

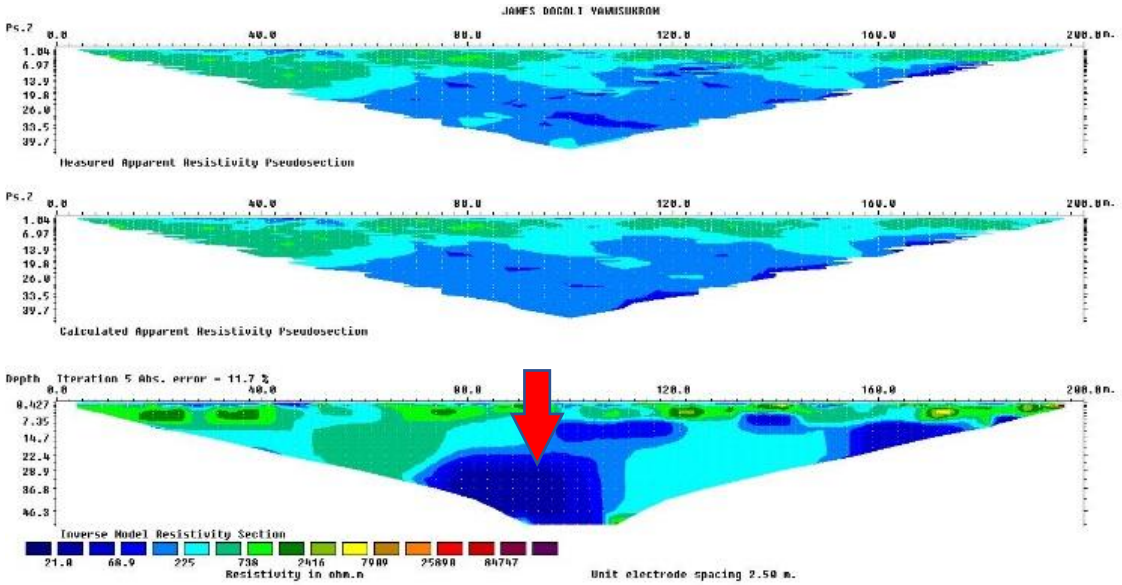

Figure 4.7: Pseudo-section of ERI Survey @ Asufufu Kwadwo Addae Community

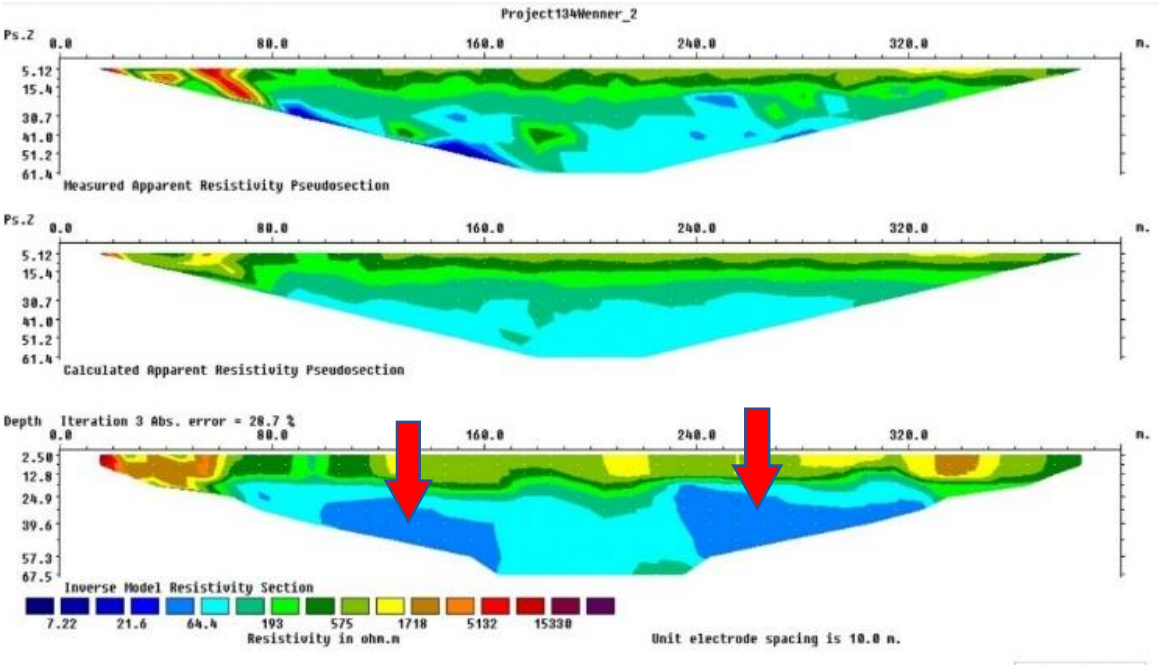

Figure 4.8: Pseudo-section of ERI Survey @ Wawasua M/A School

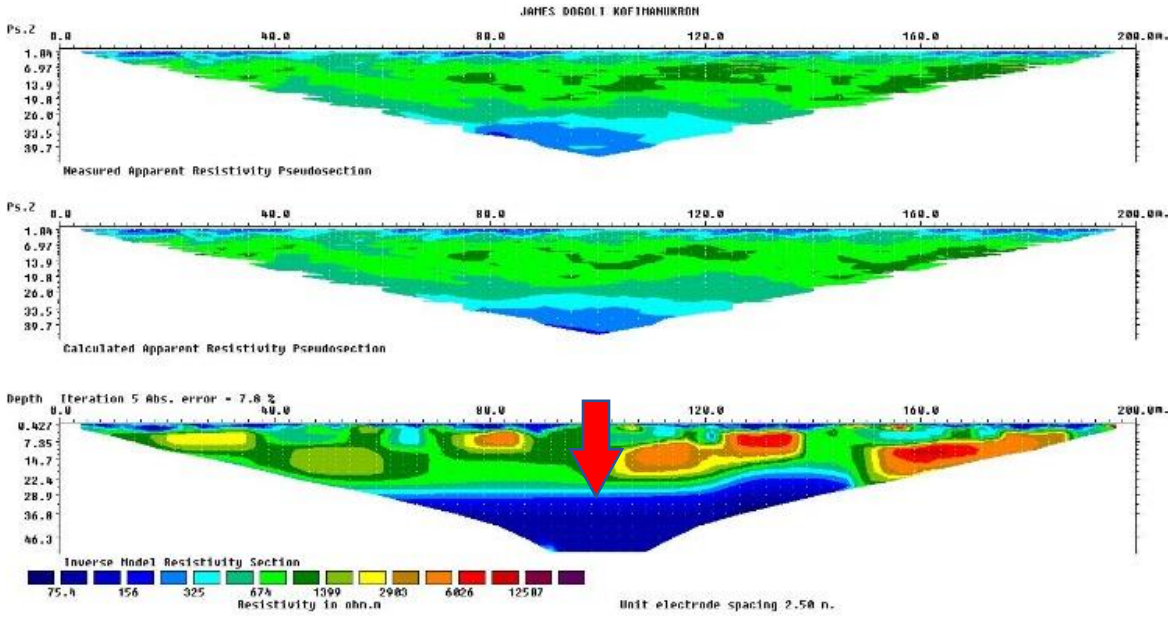

Figure 4.9: Pseudo-section of ERI Survey @ Baakoniaba Methodist Senior High Technical and Vocational School, Sunyani

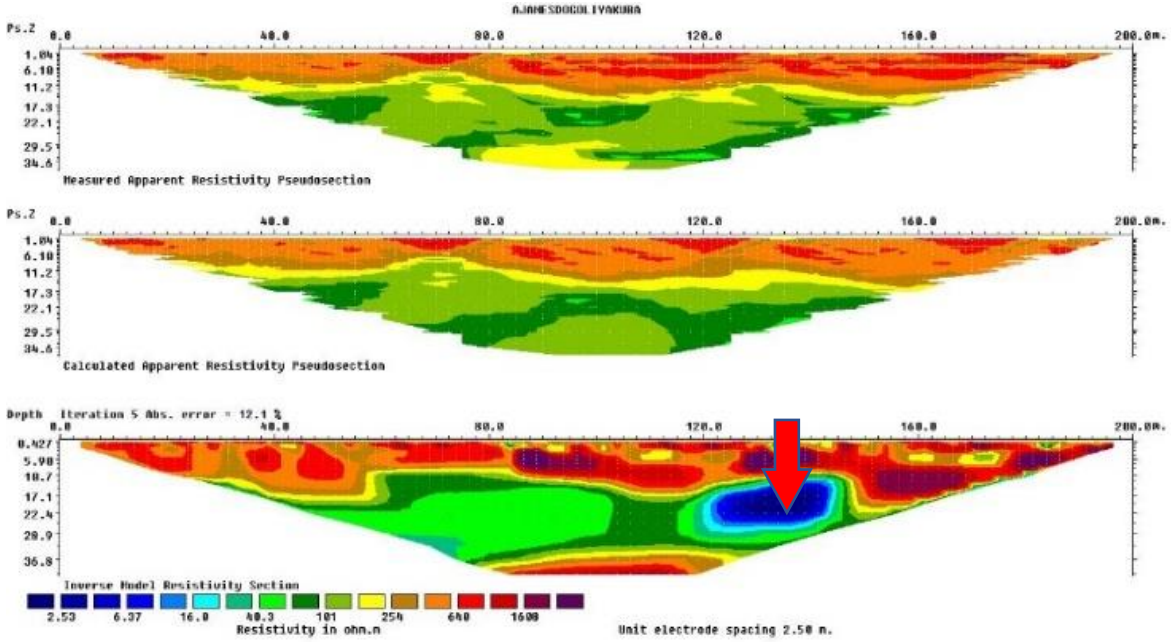

Figure 4.10: Pseudo-section of ERI Survey @ Baakoniaba Model (M/A) School

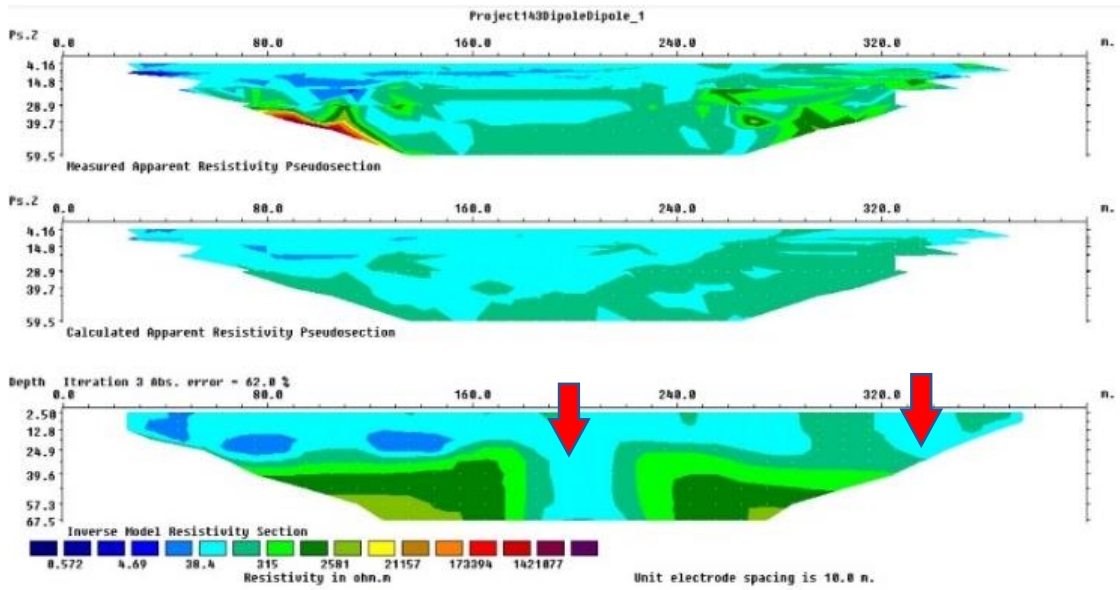

Figure 4.11: Pseudo-section of ERI Survey @ Yahima New Community

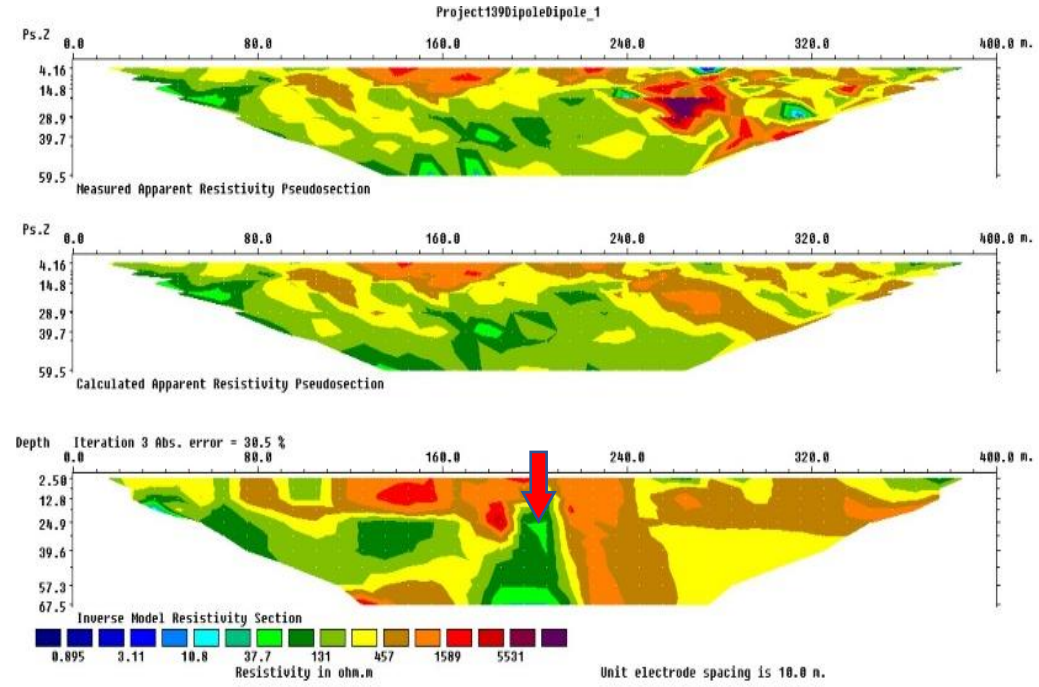

Figure 4.12: Pseudo-section of ERI Survey @ New Dormaa SDA School

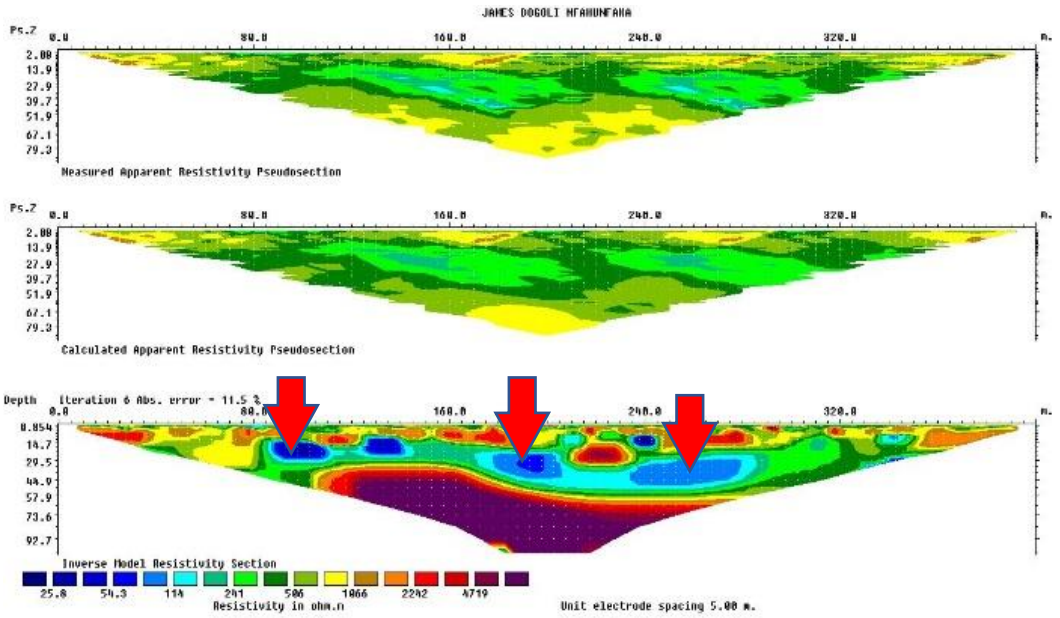

Figure 4.13: Pseudo-section of ERI Survey @ Ayakomaso Methodist School

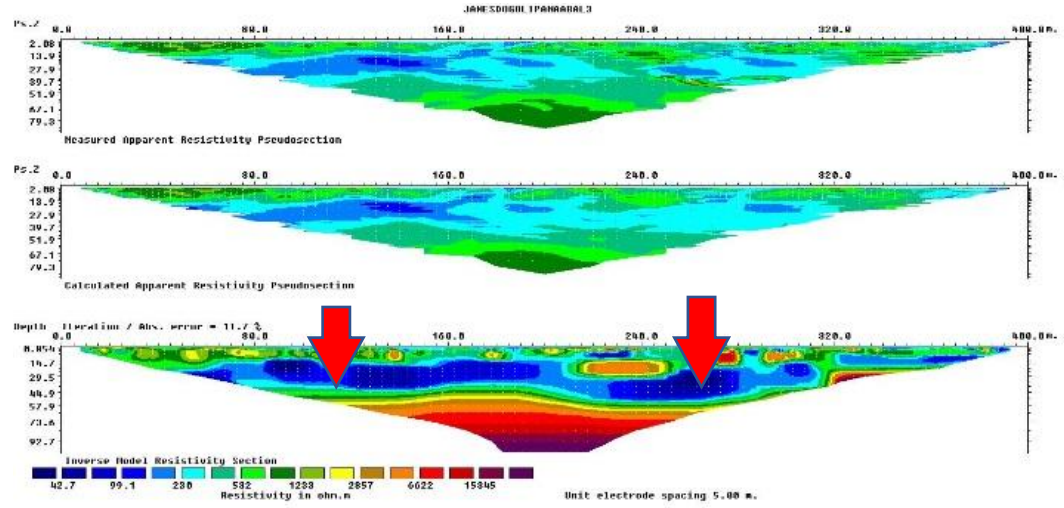

Figure 4.14: Pseudo-section of ERI Survey @ Abesim Health Center

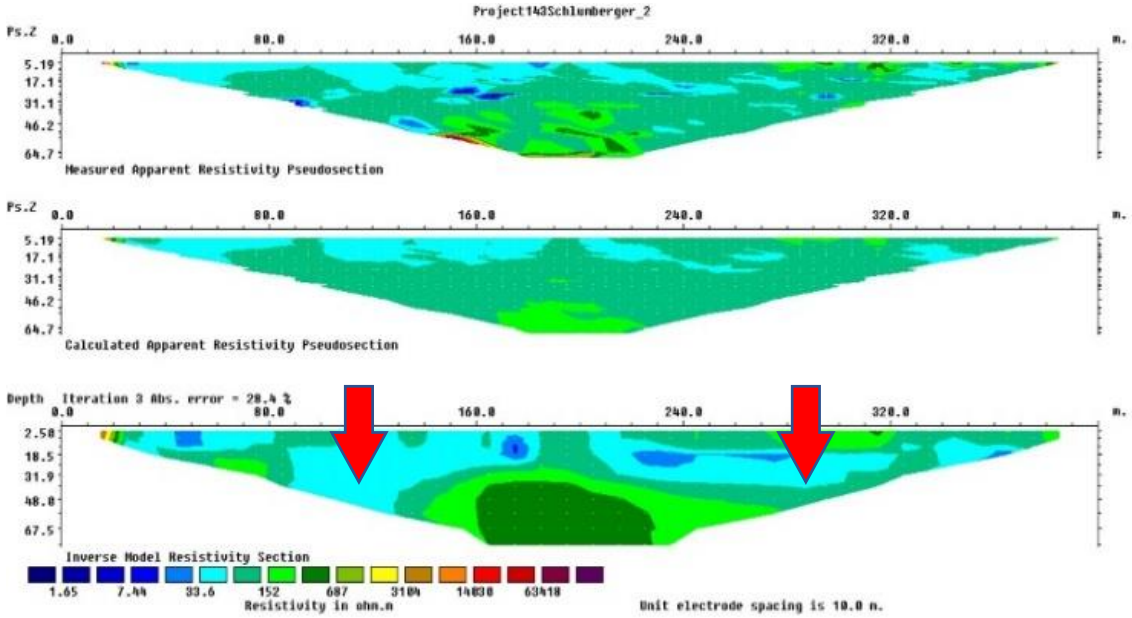

Figure 4.15: Pseudo-section of ERI Survey @ Esaase Methodist Basic School

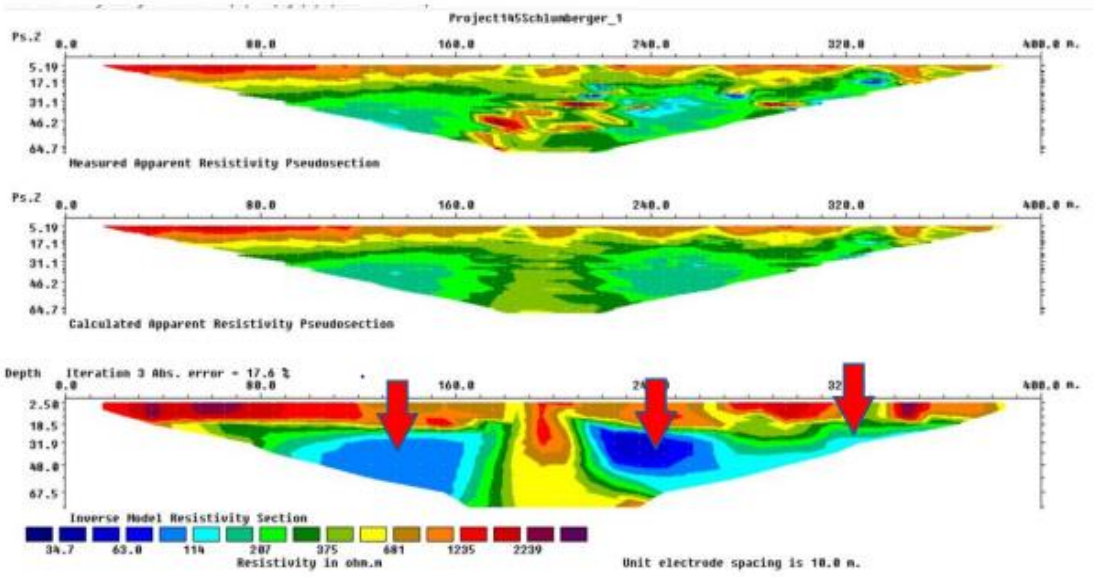

Figure 4.16: Pseudo-section of ERI Survey @ Amoaka Ewe community

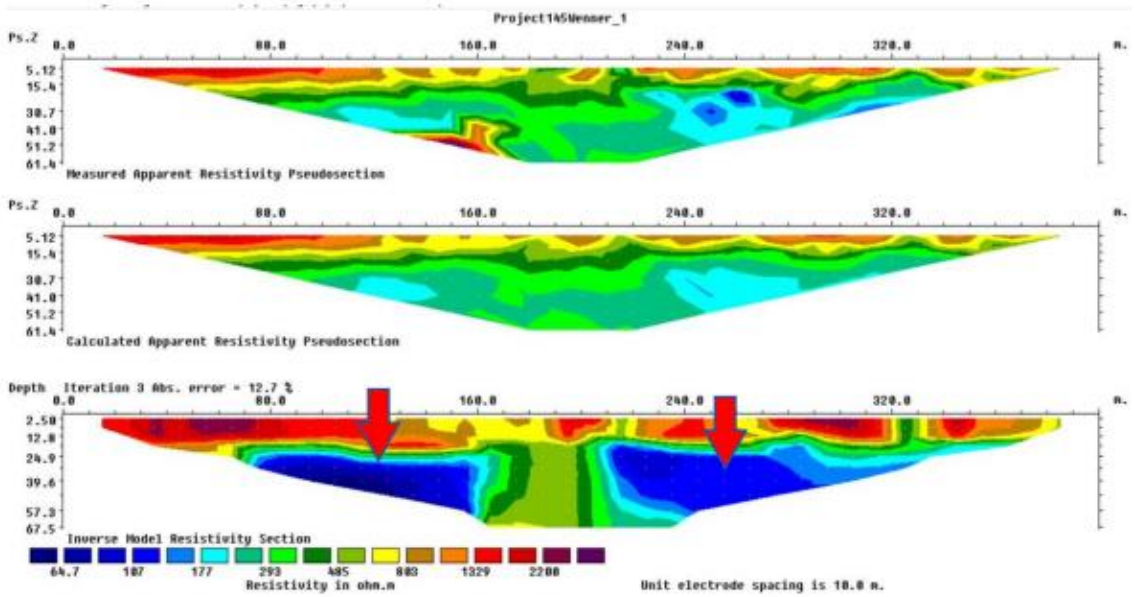

Figure 4.17: Pseudo-section of ERI Survey @ Dwenewoho Village

5.0 Summary of Results

The recommended drilling points, **Depth, GPS Coordinate** and **Contact Person for the Point(s) each site** is presented in **Table 2**.

Table 2: The summary of the selected drilling points with the GPS coordinates with recommended drilling points

Name of Project Site	Selected Drilling Point(s)	Recommended Drilling Depth (m)	GPS Coordinate	Contact Person for the Point(s)
St. Ambrose college of education,	**80** & 160	70	7°18.3650N & 2°44.2550W **7°18.3640N & 2°44.2540W**	George Gyan (Vice Principal)/0246757516
Abonsrakrom	200 & **216**	75	7°20.1710N & 2°49.0100W **7°20.1700N & 2°49.0170W**	Peprah Randelf (Secretary, Water, and Sanitation Committee)/0241777400
Municipal Health Directorate, Goaso.	100 & **230**	80	6°48.9660N & 2°32.1020W **6°48.9470N 2°32.0940W**	Theresa krah (Director of Health Service Asunafo North)/0244794554
Tweneboah Chips Compound	200	70	6°38.8370N 2°33.7950W	Ramatu (Tweneboah Midwife)/0542395963
Konum, Asifufu Rd,Sunyani	250	70	7°17.1670N 2°49.0140W	
Kwadwo Addae, Community	90	60	7°19.1730N 2°20.5240W	
Wawasua M/A Primary Sch. Sunyani	260	70	7°17.4930N 2°24.3070W	Owusu Emmanuel/ 024584448

Methodist Technical Institute, Sunyani.	100	60	7°17.8950N 2°20.3960W	Isaac Yeboaha/ 0558550276
South Rigde model Sch. Sunyani	130	60	7°19.4460N 2°21.0980W	Enest Agyapong/ 0246817176
Yahima New Community	200	70	7°20.9650N 2°15.1240W	Edame Agley/ 0209120384
New Dorma SDA	200	70	7°20.5030N 2°18.0420W	Daniel G. Nsiah/ 0246261872
Ayakomaso Methodist	250	60	7°23.9210N 2°24.4010W	Nana saamoa Amposia/ 0272609071
Abesim Health Center	100	60	7°17.5370N 2°16.2740W	Mr. Owusu Eammanuel /0500161692
Methodist Basic Sch. Esaase	110	70	6°50.1940N 1°39.8950W	Bright Afrani/ 02452738
Dwenewoho Village	250	70	7°6.4380N 1°38.9880W	Hamidu Mamudu 0248433496
Amoaka Ewe community	240	70	6°56.2340N 1°39.6300W	Agbozo Frank 0241722001

6.0 Conclusion and Recommendation

The potential groundwater-bearing zones of the area rages between 30 m to 60 m with varying resistivity values. Boreholes can be drilled at the delineated areas on the model sections at with expected drilling depths raging from 60 m to 75 m. Additionally, mud drilling and temporal casing of more 45 m is recommended for most of the places.