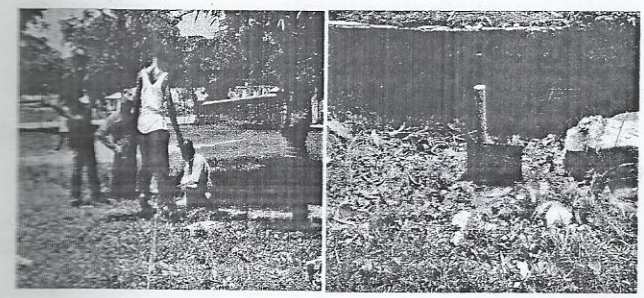
EDAL DRILLING COMPANY LIMITED

SIERRA LEONE ROADS AUTHORITY

BOREHOLE SITTING REPORT



HYDROGEOLOGICAL INVESTIGATION

S.L.R.A MILE 91

PREPARED BY:

EDALL DRILLING COMPANY

49 WATERLOO STREET

SIERRA LEONE

FREETOWN

FOR:

S.L.R.A

PMB 1324

KISSY, FREETOWM

1.0 INTRODUCTION

Water they say is life and without water there is no life. It is in this vain that S.L.R.A strongly wishes to have a suitable and more reliable Water Supply System on their of land situated at Mile 91, Sierra Leone for his intended for domestic use

Edal Drilling Company, based at 49 Waterloo Street was thus contracted by Sierra Leone Roads Authority which in turn engaged Edal Sitting Team to carry out Geophysical and Hydrogeological Investigations to determine groundwater potential of the area for a possible borehole to be drilled and mechanized within the area.

This report presents a summary of the work carried out on the 3rd July 2009.

2.0 BACKGROUND

2.1 Location, Topography and Drainage

The study area is situated at Mile 91 in S.L.R.A yard and can be reached via Freetown – Bo road with a branch off to the right towards S.L.R.A yard. The topography is generally flat (approx 200m elevation).

2.2 List of Boreholes in the area

Community Name		Depth	Yield	Water Quality	Remarks
NONE					

3.0 FIELD WORK

3.1 SITTING METHOD USED: (Tick appropriate Box)

- ☐ Terrain evaluation only
- ☐ Terrain evaluation = Geophysical studies (VES)
- ☒ Terrain evaluation + Geophysical studies (Electrical Profiling + VES)
- ☐ Terrain evaluation + Geophysical studies (Electrical Profiling /EM. VLF + VES

3.2 Geophysical Survey

All geophysical measurements were carried out using ABEM Terrameter SAS 1000C equipment.

3.2.1 Traverse Line

A 70m traverse line denoted as A was cut and pegged at 10m interval in the E-W direction using a magnetic compass to cut the general NE-SW foliation of the area. B traverse line was pegged at 5m interval with 65m lengh

3.2.2 Resistivity Profiling

Electrical resistivity profiling was carried along the selected traverses at 10m intervals to provide a lateral inventory of subsurface resistivity so as to delineate any anomalies for groundwater that may exist.

The ground resistivity measurement were obtain for two depth horizons (i.e the weathered zone bedrock interface and at depth in the fresh bedrock based on Shlumberger electrode configuration of (L/2,a/2) = (20m,0.5) and (40m, 5m) using DRAG Cable set. Readings were taken and their respective correspondent plots are shown in Annex 1.

`3.2.3 Resistivity Sounding (VES) Points

Anomalous zones were determined from the electrical resistivity profiling for vertical electrical sounding (VES) and Dipole-Dipole electrical configuration was used to carry out sounding at this selected point. The purpose of this measurement is to determine resistivity in the bedrock at the depth evaluate the possible that aquifer exists at the selected point.

Clearly labeled metal pegs were fixed at promising sounding points.

4.0 DATA ANALYSIS AND INTERPRETATION

4.1 Resistivity Profiling

The interesting feature of resistivity profiling interpretation is the identification and selection of anomalous zone. These anomalous zones generally have apparent resistivity values below the average apparent resistivity value for points along a given profile.

4.2 Resistivity Sounding (VES)

Apparent resistivity values of vertical electrical sounding, VES at all the chosen anomalous points are generally low with curves suggesting series of fractured or weathered zones that could probably contain groundwater.

5.0 RANKING OF SITES AND RECOMMENDATIONS

The combined result of the Terrain evaluation, electrical resistivity profiling and vertical electrical sounding were used to rank sites for the borehole drilling as presented in the table below,
It was done on the basis of the comparative potential of the selected stations

Ranking of Promising Sites

Site ID	Ranking	GPS Localization	Remarks
A20/VES-1	2	5^0 44.892' N/O^0 20.881'W	
B35/VES-2	1	5^0 44.888'N/O^0 20.908' W	

5.2 Recommendations

B35/VES-2, a good drilling point but with extremely low apparent resistivity values and probably pointing to the good drinkable water.

Site selected for drilling	Possible fractures (water zones)	Max drilling depth	Remarks
B35/VES-2	18-20, 25-35, 40-45, 60-70m	75	

Alternative site for drilling	Possible fractures (water zones)	Max drilling depth	Remarks
A20/VES-1	25-30, 40 -50, 70 - 80	80	

SKETCH PLAN OF COMMUNITY

BOREHOLE LOCATION SCHEM

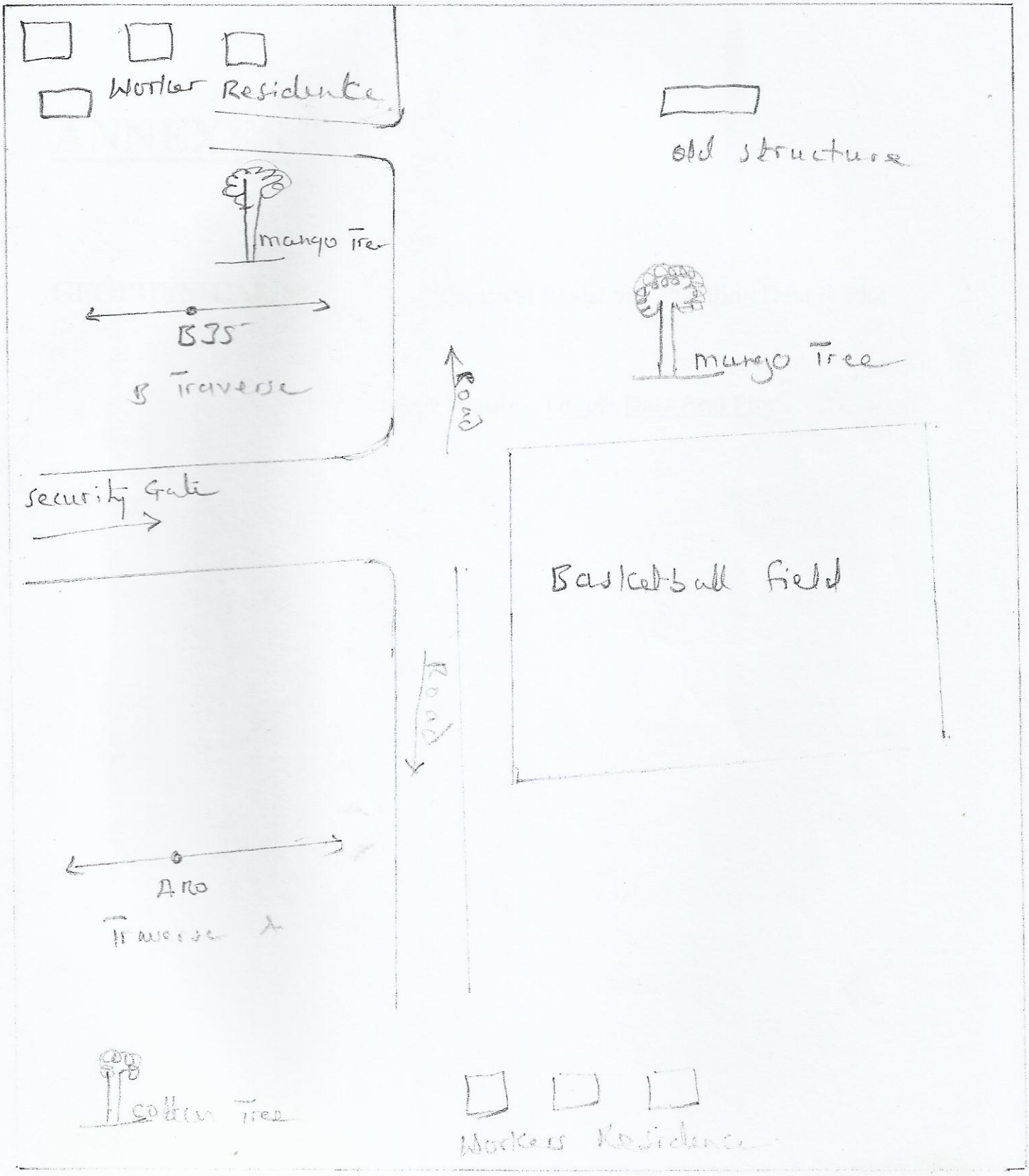
Community: Mile 91 (S.L.R.A) **Region:** Northern

Project: **Client:** S.L.R.A

Sitting Date: 3rd July 2009 **Sitting By:** Divine

Remarks: Selected Point B35/VES-2

SKETCH LOCATION PLAN



ANNEXES

GEOPHYSICAL SURVEY – Electrical Resistivity Profiling Data & Plot

VES Dipole – Dipole Data And Plot

EDAL DRILLING COMPANY LIMITED:HYDROGEOLOGICAL STUDIES

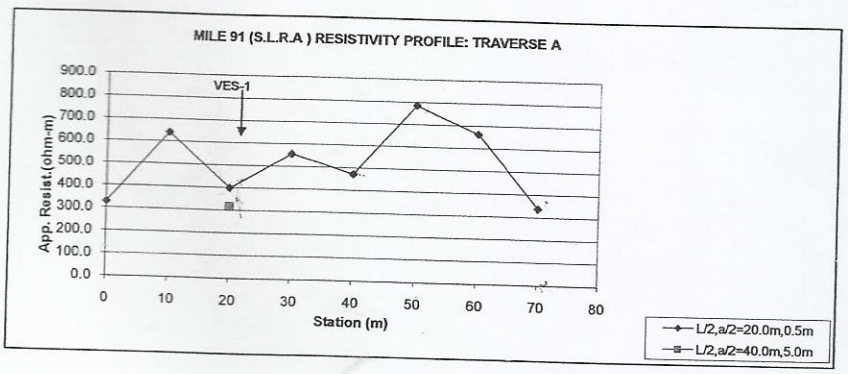
RESISTIVITY PROFILING DATA SHEET - SCHLUMBERGER METHOD

REGION: Northern
DISTRICT :
PROFILE NO: **A**
BEARING:
MEASSURED BY: AMLADO DIVINE

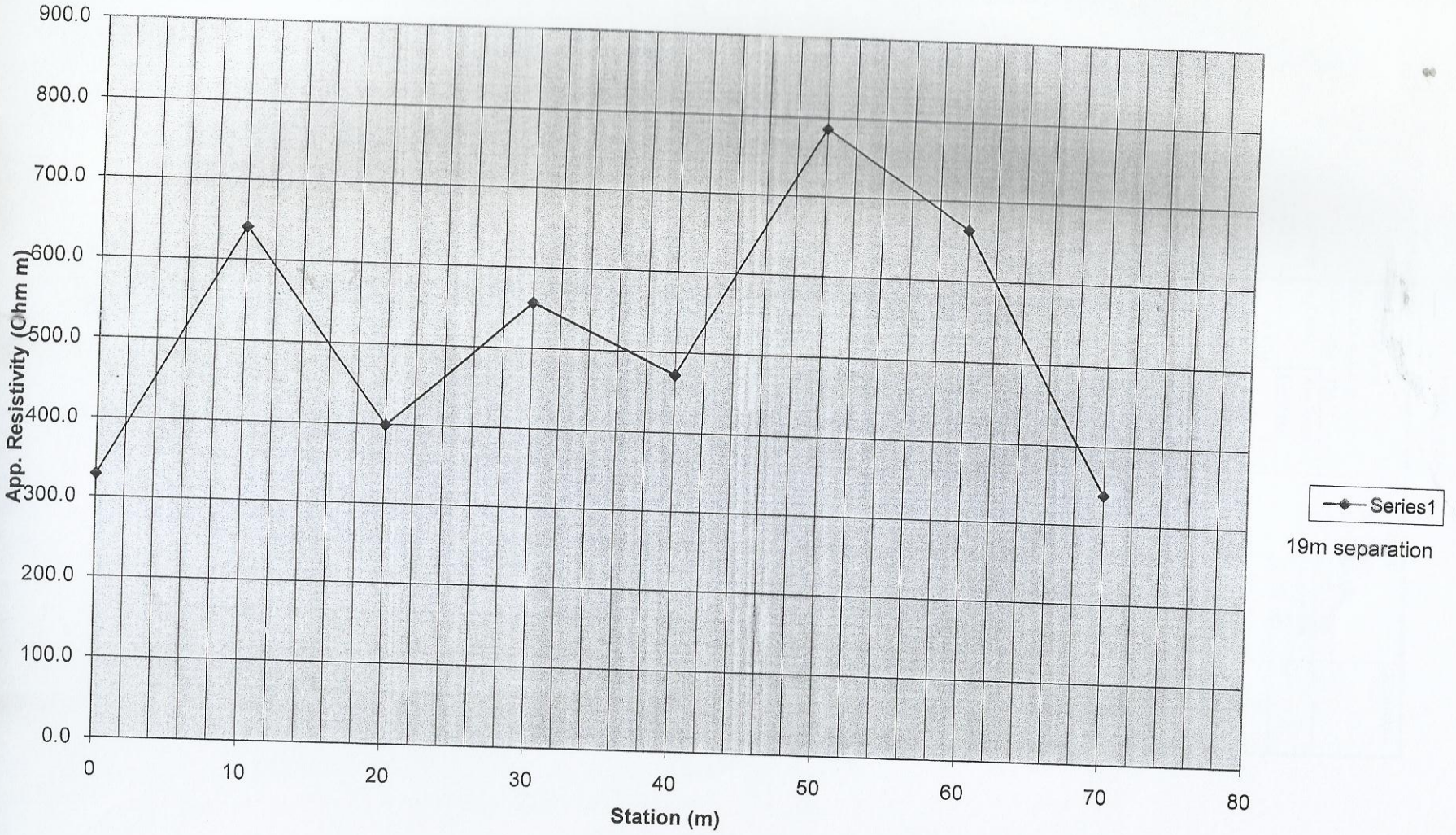
COMMUNITY: Mile 91 S.L.R.A

PROFILE LENGTH(m): **70**
STATION INTERVAL(M): **10**
DATE: 3rd **July, 2006**

STATION	ELECTRODE SEPARATION L/2, a/2 =9.1, 0.5 Mult Factor = 259.37		ELECTRODE SEPARATION L/2, a/2 = 20.0, 0.5 Mult Factor = 1255		ELECTRODE SEPARATION L/2, a/2 = 40.0 5.0 Mult Factor = 495		REMARKS
A	R (Ohum)	App.Resist (Ohm m)	R (Ohm)	App.Resist (Ohm m)	R (Ohm)	App.Resist (Ohm m)	
0			0.262	328.8			**elect. Cable**
10			0.5104	640.6			
20			0.3184	399.6	0.642	317.79	**VES-A20**
30			0.4432	556.2			
40			0.3766	472.6			
50			0.6262	785.9			
60			0.5289	663.8			
70			0.2696	338.3			



Resistivity Profile Mile 91 A Traverse



EDAL DRILLING COMPANY LIMITED:HYDROGEOLOGICAL STUDIES

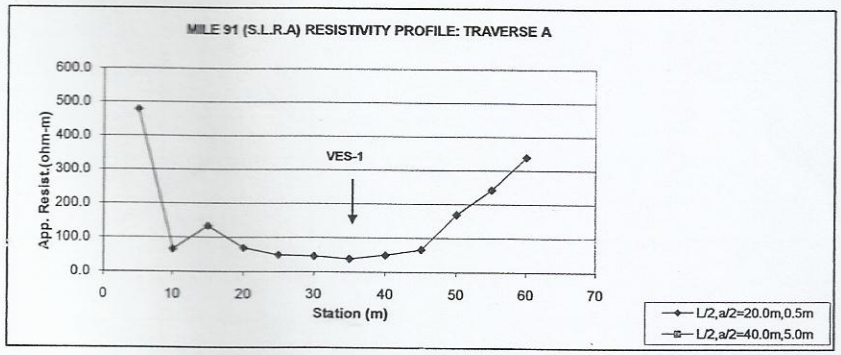
RESISTIVITY PROFILING DATA SHEET - SCHLUMBERGER METHOD

REGION: Northern
DISTRICT :
PROFILE NO: **B**
BEARING:
MEASSURED BY: AMLADO DIVINE

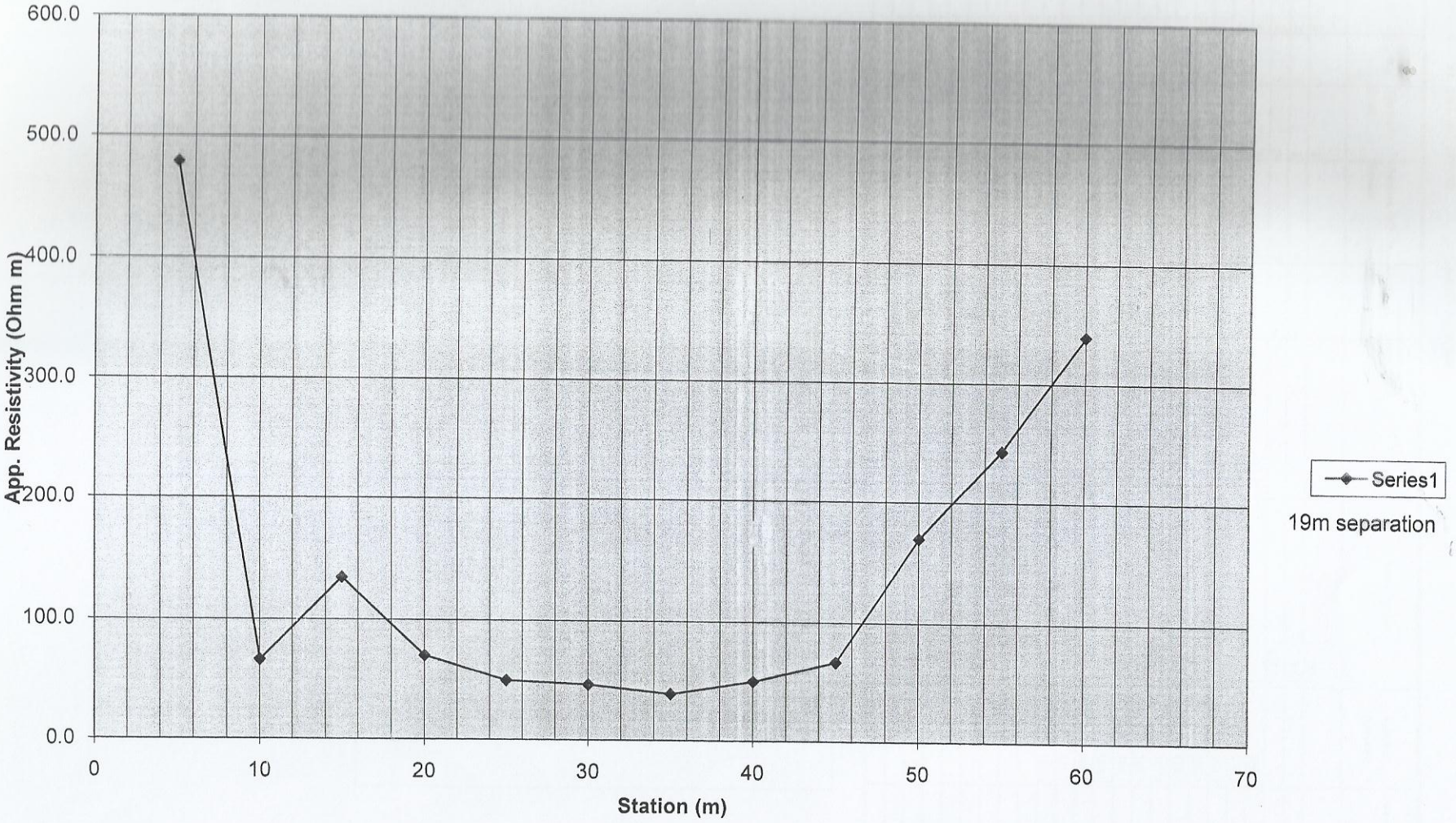
COMMUNITY: Mile 91 S.L.R.A

PROFILE LENGTH(m): 60
STATION INTERVAL(M): 5
DATE: 3rd **July, 2006**

STATION	ELECTRODE SEPARATION L/2, a/2 =9.1, 0.5 Mult Factor = 259.37		ELECTRODE SEPARATION L/2, a/2 = 20.0, 0.5 Mult Factor = 1255		ELECTRODE SEPARATION L/2, a/2 = 40.0 5.0 Mult Factor = 495		REMARKS
B	R (Ohum)	App.Resist (Ohm m)	R (Ohm)	App.Resist (Ohm m)	R (Ohm)	App.Resist (Ohm m)	
5			0.3816	478.9			
10			0.0531	66.6			
15			0.1071	134.4			
20			0.0561	70.4			
25			0.0399	50.1			
30			0.0372	46.7			
35			0.0313	39.3			VES-B35
40			0.04	50.2			
45			0.0534	67.0			
50			0.1355	170.1			
55			0.1936	243.0			
60			0.2708	339.9			



Resistivity Profile Mile 91 B Traverse



EDAL DRILLING COMPANY LIMITED: HYDROGEOLOGICAL STUDIES

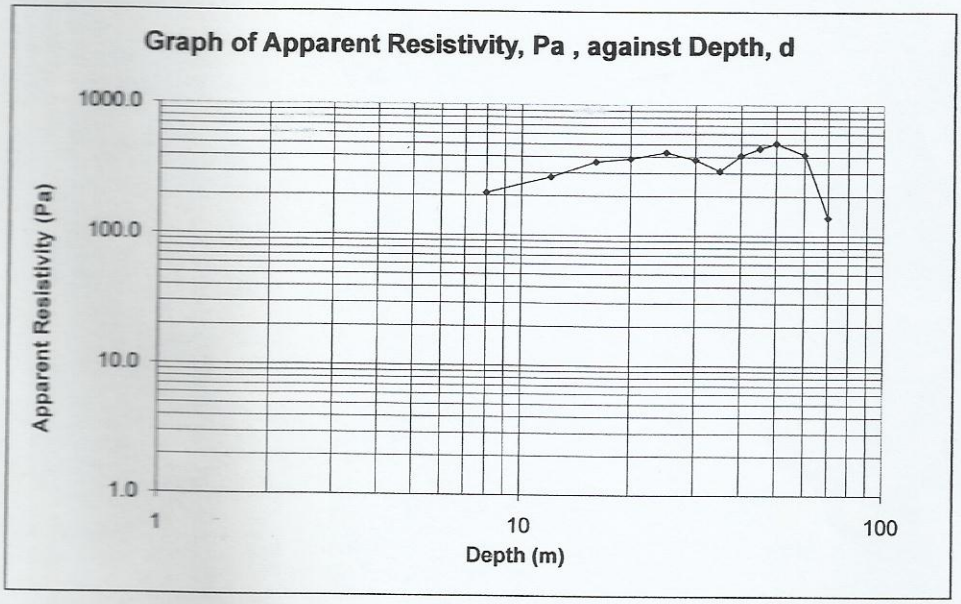
DIPOLE-DIPOLE RESISTIVITY SOUNDING DATA SHEET -

REGION: Central
DISTRICT : Mile 91
PROFILE NO: B
BEARING:
MEASSURED BY: AMLADO DIVINE

COMMUNITY: S.L.R.A Mile 91
GRID REFERENCE:
PROFILE LENGTH(m): 60
STATION INTERVAL(M): 5
DATE: July 3, 2009

B35/VES-2

a	n	Electrode Inner	Position (M) Outlet	Depth (m)	Resistance (Ohm)	Mult. Factor	App.Res. (Ohm m)	Remarks
2	1	1	3	2		37.7		
2	3	3	5	4		37.7		
2	5	5	7	6		1319.6		
4	3	6	10	8	0.2777	754.1	209.4	
4	5	10	14	12	0.1058	2639.3	279.2	
4	7	14	18	16	0.05758	6334.3	364.7	
10	3	15	25	20	0.2048	1885.2	386.1	
10	4	20	30	25	0.1147	3770.4	432.5	
10	5	25	35	30	0.0576	6598.2	380.1	
10	6	30	40	35	0.0294	10557.1	310.4	
10	7	35	45	40	0.0259	15835.7	410.1	
10	8	40	50	45	0.0206	22622.4	466.0	
20	4	40	60	50	0.0676	7540.8	509.8	
20	5	50	70	60	0.0315	13196.4	415.7	
20	6	60	80	70	0.0065	21114.2	137.2	
20	7	70	90	80		31671.4		
20	8	80	100	90		45244.8		
20	9	90	110	100		62211.6		
20	11	110	130	120		107833.4		
20	13	130	150	140		171553.2		
20	15	150	170	160		256387.2		
40	8	160	200	180		90489.6		
40	9	180	220	200		124423.2		



Possible Fractures (water zones): 18-20; 25-35; 40-45; 60-70m
Maximum Drilling Depth: 75m