EDAL DRILLING COMPANY LTD.

35A Clewery's Lane, off Main Motor Road, Congo Cross, Freetown, Sierra Leone
Cell Numbers: 076 204 816/076 601 550 Email: edalltd@gmail.com

BORE-HOLE DRILLING REPORT
REF NO. 1

SUBMITTED TO:
PLAN SIERRA LEONE

1.0: INTRODUCTION

EDAL Drilling Company Limited, based at 35^{A} Clewry's Lane off Main Motor Road, Congo Cross was thus contacted by plan Sierra Leone to drill a borehole at their site to investigate for water. This report presents a summary of field work and tests carried out from the 1^{st} to 7^{th} July, 2015.

1.1 TERMS OF REFERENCE

Borehole drilling and development of successful exploration and completion for water

2.0 FIELD WORK

2.1 METHODOLOGY OF THE DRILLING PROCESS

The methodology adopted in carrying out the drilling process includes:

i. Mobilization
ii. Borehole drilling-this includes
    - Drilling through all sort of formation(consolidated and competent) for completion of 203mm borehole
    - Supply and installation of casings, plains and screens
    - Develop borehole by surging with compressed air and airlifting test
iii. Aquifer pumping yield test
iv. Borehole water quality analysis
v. Pump installation
vi. Demobilization

2.2 BOREHOLE DRILLING

The drilling was positioned on the best drilling point identified from some basic feasibility studies. The process was carried out using the PRD 350 Rig and ELGI DS-1100 cfm/350 psi Compressor. The airlift method was used to drill to a maximum depth of 70m. At the end of the drilling, the hole was certified to be successful with its delivery rate of $5.28m^3$/hr. as its constant discharged calculated from the pumping test which was carried out for 8hr of 6hr of pumping and 2hrs. recovery. The sample of the water was then taken to do water quality analysis at the National Water Quality Laboratory-Ministry of Water Resources.

3.0 RESULTS

The following figures show the drilling and tests result

3.1. DIALY LOG SHEET

3.2. BOREHOLE RECORD-Diagram

3.3. CASSING AND BOREHOLE COMPLETION FORM

3.4 BOREHOLE DEVELOPMENT FORM

3.5. CONSTANT DISCHARGE TEST

3.6. WATER QUALITY MONITORING SHEET

3.7. CONCLUSION AND RECOMMENDATION

3.1 DAILY LOG FOR DRILLING SUPERVISION

CONTRACT		**CONTRACTION**	**EDAL DRILING COMPANY LIMITED**	
OWNER NAME	PLAN INTERNATIONAL	DEPTH OF HOLES	70m	
OWNER ADDRESS	NATIONAL YOUTH FARM-MASIAKS	WEATHER	RAINY AND SUNNY	
RIG MAKE	PRD OZ 350	USE		
COMPRESSOR MAKE	ELGI 1100 cfm/ 350 psi	DATE	START DATE: COMPLETION DATE:	01/07/15 07/07/15
BORE-HOLE REFERENCE NO.	BORE-HOLE ONE(1)	DRILLING METHOD	AIR	

LITHOLOGICAL BOUNDARIES AND SAMPLE FORMATION.

DEPTH OF CONTACT ZONE		**DRILLING PROCESS**			**DESCRIPTION OF FORMATION**	**REMARKS(Drilling Method including change of bit)15;**
DEPTH (m)	**SAMPLE**	**FROM**	**TO**	**PENETRATION RATE (min/m)**	SAMPLES COLLECTED	
0-5	5	16:35	15:42	1.4	Reddish-brown laterites	12'' hammer bit
5-10	5	16:46	15:53	1.4	Light – yellow clay materials	
10-15	5	16:59	17:05	1.2		
15-20	5	17:09	17:15	1.2		
20-25	5	17:20	17:28	1.6	Weathered amphibolite gneiss	
25-30	5	16:21	16:35	2.8	Hard amphibolite gneiss	8'' hammer bit throughout
30-35	5	16:41	16:51	2.0		
35-40	5	16:55	17:07	2.4	Hard amphibolite gneiss	
40-45	5	18:16	16:35	2.2		
45-50	5	18:37	18:48	2.2	Hard amphibolite gneiss	
50-55	5	18:51	19:00	1.8		
55-60	5	19:07	19:17	2.0	Hard amphibolite gneiss	
60-65	5	13:25	13:34	1.8		
65-70	5	13:44	13:53	1.8	Hard amphibolite gneiss	

Depth strike water: 35m

3.3: CASING AND BOREHOLE COMPLETION

Temporal Casing Material : **METAL** Permanent Casing Material: **POLY-VINLY CHLORIDE (PVC)** Casing Joints: **THREADED**	BUTTOM PLUG: ☐ YES

TEMPORAL CASING			
From(m)	To(m)	Diameter (mm)	Type
0.5	25	254 mm THROUGHOUT	POLYVINLY – CHLORIDE (PVC)

PERMANENT CASING (SCREEN and PLAIN)					
	From (m)	To (m)	Diameter ☐ mm	Type	Slot Size
PVC Plain	00	17	152.4 mm THROUGHOUT	PVC	147.32 mm THROUGHOUT
PVC Screen	17	20			
PVC Plain	20	29			
PVC Screen	29	35			
PVC Plain	35	50			
PVC Screen	50	56			
PVC Plain	56	59			
PVC Screen	59	65			
PVC Plain	65	68			
Bottom plug	68	70			

Upper Grouting: Cement-1-2m
Lower Grouting: Bentonite; 15-17m

3.4: BORE HOLE DEVELOPMENT FORM

COMMUNITY: Masiaka (Youth Farm) DATE: 06/07/15

BOREHOLE REF. No: ONE (1) TEST BY: EDAL DRILLING CO.LTD

TYPE OF TEST ☐ Constant discharge HT of DATUM: 0.4cm

DEPTH: 80m

DATUM LEVEL ☐ Top of casing TOTAL TIME OF DEVELOPMENT: 3hrs:30min

TIME		YEILD (m^3/hr.)	OBSERVATION
From	To		
13:40	14:43		Reddish water with sediments flush out
14:43	15:46		Slightly clean water flushed out
15:46	17:25	Total : 6.0	Purely clean water flushed out

NOTE: YIELD BEFORE PUMPING TEST

YIELD : (Liter / hour)

$$Y = \frac{\text{Liter x 3,600}}{\text{Time}}$$

$$Y = \frac{20x3\ 600}{12}$$

$$Y = \frac{72,000}{12}$$

Y= 6,000 l/hr.

EDAL DRILLING COMPANY LIMITED
CONSTANT DISCHARGE PUMPING TEST (C.D.T)

Community: Masiaka (Youth Farm) **Date: 14/07/2015**

Client:Plan Sierra Leone

Time: Start:**12:00**
End: **7:00**

Tested by: EDAL DRILLING COMPANY Ltd

Borehole Ref. No. 1

Ht. of datum above GL(m): Nil

Datum level: ☐ Top of casing

Depth: 70m

Datum water level: 31.16

Static water level: 11.74

Pump setting: 50m

Time (Minute)	Water level below datum (m)	Cumulative Drawdown (m)	Discharge (m^3/h)	Recovery (m)	Observation
0	11.74	3.46	Constant Discharge 0f 5.4mm^3/h	36.18	Clean H_20 Pump out
1	15.20	5.06		33.00	
2	16.80	6.86		30.90	
3	18.60	7.86		29.50	
4	19.60	9.26		28.60	Brownish water pump out
5	21.00	12.76		27.50	
10	24.50	14.46		21.40	
15	26.20	15.66		19.80	
20	27.40	16.56	Constant discharge of 5.3m^3/h	18.30	
25	28.30	17.26		17.30	
30	29.00	17,86		16.40	
35	29.60	17.99		15.35	
40	29.73	18.15		14.48	Slightly clean water pump out
45	29.89	18.76		13.36	
50	30.50	19.06		12.82	
55	30.80	19.46		12.01	
60	31.20	20.16		11.90	Clean H_20 pump out
70	31.90	20.46			
80	32.20	21.16			
90	32.90	21.46	Constant discharge of 5.28 m^3/h		
100	33.20	21.56			
110	33.30	21.66			
120	33.40	22.36			Purely Clean and cool water pump out
140	34.10	22.66			
160	34.40	22.96			
180	34.70	23.18			
210	34.92	23.46			
240	35.20	23.53			
270	35.70	23.96			
300	35.92	24.18			
330	36.11	24.37			
360	36.18	24.44			

Sustainable rate:	24hrs
Pumping time:	6hrs
Resting time:	2hrs
Flow rate:	5.3m^3/h
Borehole strength:	6.8m^3/h

3.7: CONCLUSION AND RECOMMENDATION

1. From the pumping test results and analysis, the borehole is successful. To maintain the life span of the submersible pump we advise a pumping time of 6hrs. at a rate of 5.3 m^3/hr. (constant discharge) and a resting time of at least 2hrs.

2. EDAL Drilling Company Limited will be responsible for borehole repair and rehabilitation in the case of damage due to construction/technical defects for a period of **SIX (6) MONTHS**. However, EDAL Drilling Company Limited will not be responsible for any damage caused as a result of misuse.

SUMITTED BY:

MORLAI KANU
GEOLOGIST
CONTACT No: +23276950032
E-mail: mrlaikanu@edallted.com