AMARA Mining Plc

ESIA Report
Yaoure Gold Project, Côte d'Ivoire

Appendix 5
Hydrogeological Baseline Study

March 2015

Revision	Date	Description	Prepared	Reviewed	Approved		
					Study Manager	Sign-off	Client
1	31/05/2015	Final	RC	CK			

Table of Contents

List of Tables

List of Figures

1. GEOLOGICAL SETTING

The regional geology of the Project area (SRK, 2008) is comprised of a series of Archaean, Birimian, greenstone belts separated by older migmatites and granites. The Angovia deposit itself occurs within one of the Birimian greenstone belts and is hosted by the Yaoure Unit, which is comprised of a mafic and metavolcanic series, felsic intrusives and minor conglomerates in association with calk-alkaline and ultramafic intrusives, all of which strike in a north-north-east orientation.

The geology of the Yaoure deposit area is relatively simple. The majority of the Project area is underlain by mafic volcanics, which are predominantly massive and in the form of pillowed basalts. The north part of the area is intruded by massive granodiorite that locally has a subtle porphyritic texture. Elsewhere, but mainly associated with the main Yaoure Zone, there are numerous porphyry sills. A volcaniclastic unit, mainly of epiclastic origin, is situated near the contact of the granodiorite to the north. The granodiorite intrusive to the north is not mineralised while the one in the Yaoure pit contains quartz veins which are well mineralised.

The mineralisation at Yaoure is contained within two shallow dipping (<30 degrees) gold bearing north-south trending packages controlled by a thick zone of brittle-ductile shearing. The Yaoure Central package is a 200 metre thick, lower grade mineralised zone with higher grade lenses and cross-cutting high grade sub-vertical quartz veins. The CMA package is a more discrete, relatively continuous 20 metre thick zone approximately 140 metres above the Yaoure Central body.

The Yaoure unit forms a syncline of tholeiitic basic metavolcanics and sediments overlain by more acidic volcanic rocks (SRK, 2008). The tholeiitic rocks are thought to have been formed following hydrothermal alteration and are composed of chert, disseminations and veinlets of pyrite, pyrrhotite, chlorite, epidote, tourmaline and carbonates. The overlying acidic to intermediate volcano-sedimentary rocks are thought to represent pyroclastic and acidic pyroclastic flows.

All of the above rocks have been intruded by basic to ultra-basic plutonic rocks and acidic intermediate calc-alkaline volcano-plutonic rocks and the whole package is in turn overlain by the Benou polygenic conglomerate. All of these have been deformed by a series of east west striking shear zones and intruded by associated greyish quartz veining.

Primary and secondary lateritic weathering profiles have also developed throughout the area above the conglomerate. The gold mineralisation itself appears to be primarily located in structurally controlled alteration zones in intermediate volcanic rocks.

Figure 1-1 comprises a regional geological map for the project.

The 2014 Preliminary Economic Assessment (PEA) Report indicates that there is a major NE-trending regional fault passing through the Yaoure Central pit. Movement along this fault line generated two additional NNE-SSW trending faults branching into the Yaoure gold deposits. Some additional geological structures have been identified by Steenkamp in 2012. Structures have the potential to act

as pathways for groundwater and could either lead to seepage into the pit or transportation of potential contaminants into groundwater resources. They could also act as containment barriers. The potential linkage of structures to surface water resources will have to be further investigated as part of the DFS and hydrogeological investigation.

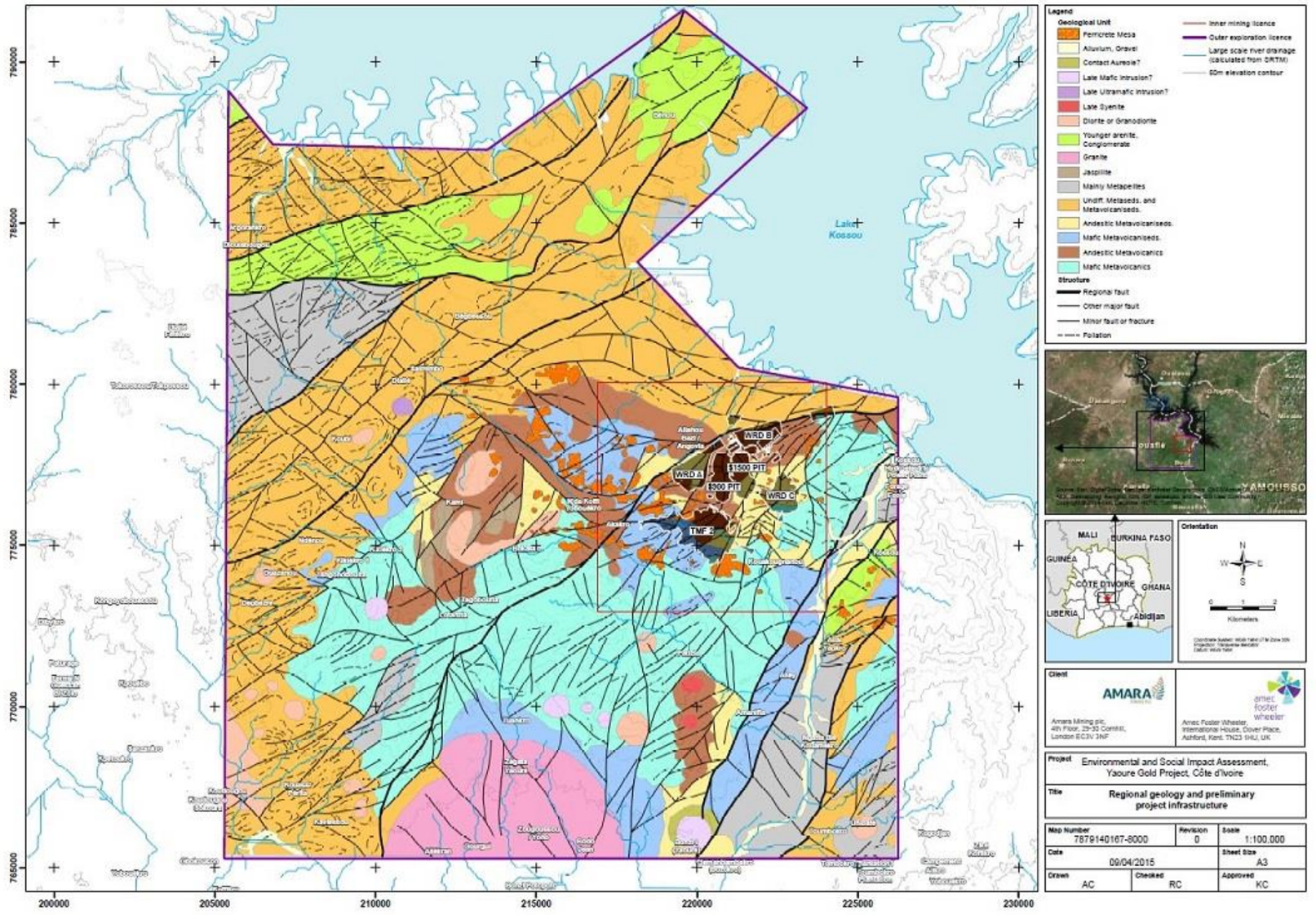

Figure 1-1 Regional Geology

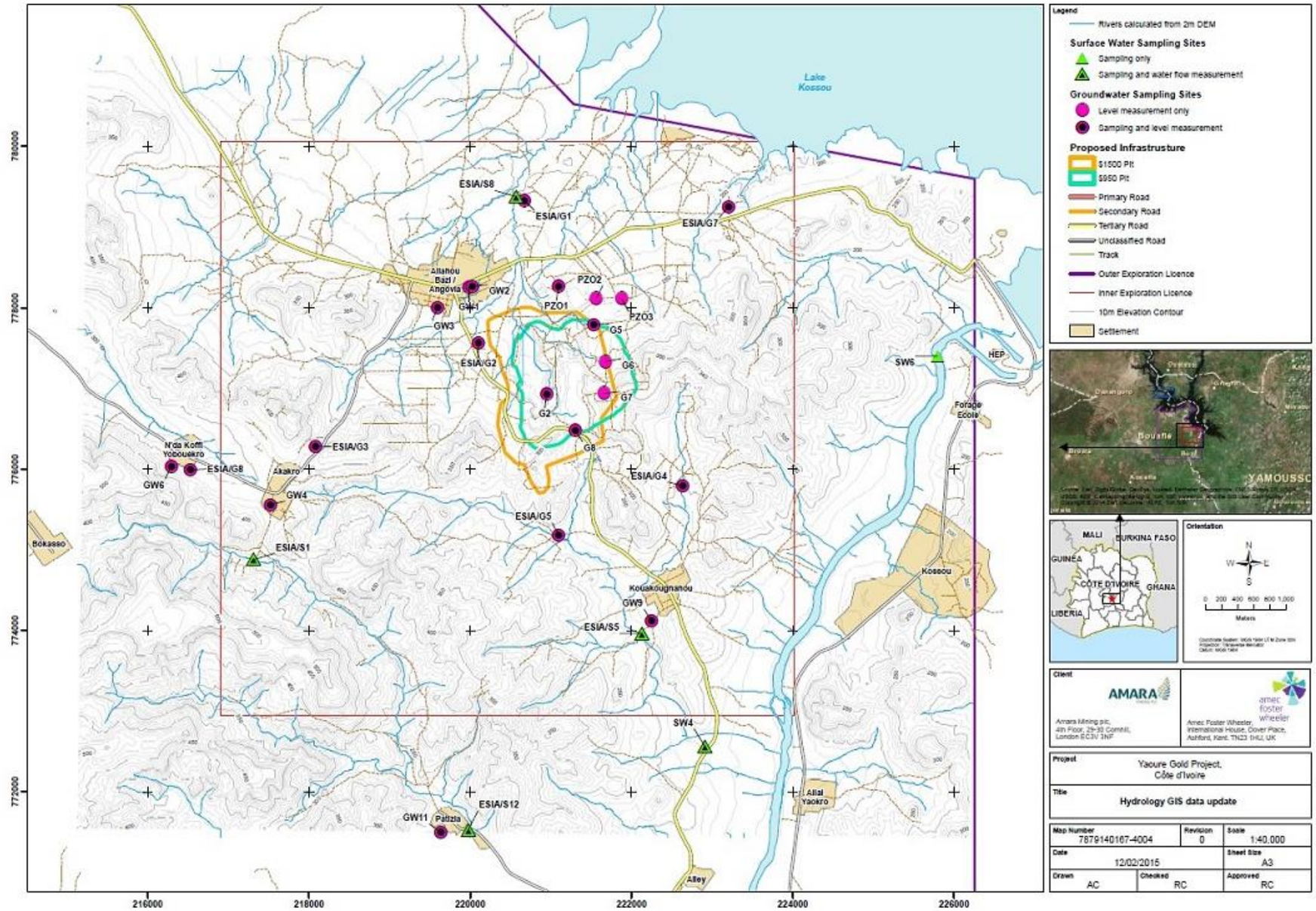

Figure 1-2 Topography and Drainage of the Project Locality and Current Monitoring Locations

2. HISTORIC STUDIES AND DATA

2.1 GROUNDWATER LEVELS AND PROPERTIES

It is understood (GBM, 2005) that a hydrogeological study was carried out by BRGM in 1993 but Amec Foster Wheeler has not seen this document. It was summarised as:

> *The detailed analysis of the hydrogeological work carried out on the Angovia site during the spring of 1993 can be found in the BRGM report: N 0264 of September 1993 "Development Study for the Angovia Deposit, Hydrogeological Study of the Site and its Environment."*

SGS (2007) (French version only available) describe the general likely occurrences of groundwater in the project area, which for the most part will be contained in open fractures in the more competent formations and their associated structures; and in possibly increased porosity lithologies associated with alteration and weathered zones.

With respect to fracture distribution, SGS carried out a satellite image assessment, the map for which is included as Map 3.2 in SGS (2007).

2.2 AQUIFERS

SRK (2008) indicated that there are two main aquifer types associated with the Project:

- Shallow Weathered Aquifers: Shallower aquifers mainly associated with weathered sedimentary rock (schist) and transitions of granite. The permeability is low and porosity is weak as a result of relatively high clay content. The water table generally follows the topography. There are vertical and lateral variations in the aquifer which cause water assurance to be deemed unstable. Most of the villages draw their groundwater from this aquifer. Water quality is influenced by the high clay contents of the base rock. Due to the shallow nature of the aquifer it is at risk of pollution.

- Fractured Aquifers: These are deeper aquifers associated with geological fractures and fissures within the rock mass. The porosity is very low. Permeability is high in areas where fissuring and fracturing is dense, otherwise groundwater can be contained within fissures and fractures. The water table varies between 40 m to 60 m below surface. As far as can be established no water quality data for this aquifer are currently available. Where aquifers are connected, dewatering can lead to the formation of a drawdown cone.

2.3 GROUNDWATER QUALITY

A baseline groundwater monitoring programme was proposed to the then Cluff Gold in 2006 (SGS, 2006). This included the monitoring sites shown in Table 2-1.

Table 2-1 Groundwater Monitoring Points (SGS, 2006)

Code	Name	Description	GPS Coordinates (UTM)	
GW 1	Allahou-Bazi	Mechanised borehole with pipes that supplies Angovia and Allaou Bazi Villages	778257	219982
GW2	Allahou-Bazi	Hand pumped manual borehole	778263	220025
GW3	Angovia	Hand pumped manual borehole	778005	219593
GW4	Akakro I	Foot pumped manual borehole	775559	217521
GW5	Akakro II	Hand pumped manual borehole	775528	217408
GW6	N'Da Koffi Yobouékro II	Foot pumped manual borehole	776036	216295
GW7	N'Da Koffi Yobouékro II	Foot pumped manual borehole	776098	216212
GW8	Kouakou Gnanou I	Foot pumped manual borehole	774520	222333
GW9	Kouakou Gnanou II	Hand pumped manual borehole	774119	222246
GW10	Patizia II	Hand pumped manual borehole	769546	221538
GW11	Patizia II	Hand pumped manual borehole	771500	219636

In addition, monitoring boreholes drilled around the old heap leach pads and ponds (PZ01-PZ05) have also been sampled. Their locations are shown on the Yaoure Project Environment Parameters Monitoring plan dated 18 December 2013.

SGS (2007) carried out an inventory of village and other wells and boreholes, some of which are included in the monitoring programme. Selected characteristics are included in Table 2-2.

Table 2-2 Borehole Inventory (Source: SGS, 2007)

Villages	Prof_ Totale	Prof_ Socle	Arrive_ Eau1	Niv_ Statique	Debit_ Exploitable	Altér_ saturée	Arrivée/toit socle
AKAKRO	80,10	65,80		33,40	8,90	32,40	
AKLLAOU BAZI	48,42	30,15		19,20	1,50		
ALLEY KOSSOU	85,20	15,50		7,00	7,00	8,50	
ANGOVIA	84,70	64,70		12,70	2,70	52,00	
KOUAKOUGNANOU	38,80	16,10	25,00	12,30	1,50	3,80	8,90
KOUAKOUGNANOU	41,80	9,80	34,20	7,60	4,80	2,20	24,40
KOUBI	79,90	46,00		11,00	2,30	35,00	
PATIZIA2	66,90	24,70		10,90	1,00	13,80	
PATIZIA1	43,30	20,00		10,90	1,40	9,10	
MINE ANGOVIA	110,15	67,5		10,64	6,0	59,8	
Max	85,20	65,80	34,20	33,40	8,90	52,00	24,40
Moy	**63,24**	**32,53**	**29,60**	**13,89**	**3,46**	**19,60**	**16,65**
Min	38,80	9,80	25,00	7,00	1,00	2,20	8,90

Groundwater samples were analysed for the following:

- ***Physical Chemical Parameters:*** pH, Dissolved Oxygen, Conductivity, Total Dissolved Solids, Total Suspended Solids, Apparent Color, True Color, Turbidity, Alkalinity and Hardness ($CaCO_3$).
- ***Nutrient and Other Chemical Parameters:*** Sodium (Na), Potassium (K) Sulphate, Chloride, Nitrate, Nitrate, Calcium and Magnesium (Mg).
- ***Metals (Total):*** Fe, Mn, Cu, Zn, Pb, Hg, Cr, Ni, As, Cd, Al, Bi, Sb, Cd, Co and Se.
- ***Cyanide:*** Free and total Cyanide.
- ***Microbiological:*** total Plate Count, Total Coliforms and Faecal Coliforms (for drinking boreholes and wells.

In general the waters were all close to neutral in pH, can show elevated concentrations of calcium, magnesium, nitrate, iron, manganese, and there are cases of detectable arsenic in GW6-GW8 and PZ01-PZ05, and of bacteria in the village boreholes including *E Coli* in GW5. The bacterial contamination will be due to sanitation conditions in the villages upstream of the sample points. Otherwise quality appeared to be acceptable.

3. YAOURE PROJECT DRILLING AND TESTING

3.1 ENVIRONMENTAL AND GEOTECHNICAL BOREHOLES

Groundwater environmental monitoring sites were selected to provide suitable coverage of the project area to define baseline conditions, including use of historic monitoring locations, and longer term environmental monitoring during construction and operations.

Eight geotechnical boreholes (known as 'Gash' holes and referred to as G1 through G8) were drilled between July and September 2014. The bores were advanced at 80 degrees using diamond coring. Coring started at a diameter of 96 mm (HQ) and was reduced to 75.7 mm (NQ) until completion.

In October 2014, in support of baseline monitoring, a series of eight vertical boreholes were drilled, named ESIA G1 through ESIA G8. The bores were 140 mm in diameter and were advanced by reverse circulation.

In late October and November 2014, a series of pumping and observation wells were drilled to accompany the Gash holes, designated YRC761 through YRC767. The bores were 140 mm in diameter and were advanced by reverse circulation.

Figure 1-2 shows the location of the groundwater monitoring boreholes within the overall project and surrounding area.

Table 3-1 summarises the environmental and geotechnical boreholes drilled in 2014.

Table 3-1 Monitoring and test bore summary details

Borehole ID		Survey (UTM)				Drilling							
Drilled ID	Amara / Local name	Date	Easting (m)	Northing (m)	Ground Elevation (m)	Dates Drilled		Method	Drill angle (degrees)	Azimuth (degrees)	Drill hole diameter (mm) **	Total Depth (mbgl)	Purpose
						Start	Complete						
G1	YDD0223G	18/07/2014	220775	777333.1	216.147	11/07/2014	14/07/2014	DD	80	270	HQ to NQ at 56.7m bgl	301.8	None
G2-OB	YDD0216G	17/07/2014	220950	776934.6	248.336	05/07/2014	09/07/2014	DD	80	270	HQ to NQ at 17.4m bgl	380.15	C1 Observation well - Bedrock; & baseline monitoring
G3	YDD0242	08/08/2014	221202	777333.0	269.842	28/07/2014	04/08/2014	DD	80	270	HQ to NQ at 72.4m bgl	394.8	None
G4	YDD0263	13/08/2014	221349	776933.3	295.915	02/08/2014	10/08/2014	DD	80	270	HQ to NQ at 59.9m bgl	400.8	None
G5 -OB	YDD0349	24/09/2014	221531	777792.4	253.834	17/09/2014	22/09/2014	DD	80	82	HQ to NQ at 35.5m bgl	440	C2 Observation well - Bedrock; & baseline monitoring
G6	YDD0359	30/09/2014	221675	777333.4	273.219	22/09/2014	27/09/2014	DD	80	90	HQ to NQ at 92.5m bgl	388.9	None
G7-OB	YDD0360	02/10/2014	221660	776937.9	317.693	24/09/2014	29/09/2014	DD	80	270 tbc	HQ to NQ at 59.5m bgl	350.25	C3 Observation well - Bedrock; & baseline monitoring
G8	YDD0361	01/10/2014	221301	776484.8	276.623	22/09/2014	30/09/2014	DD	80	270 tbc	HQ to NQ at 77.4m bgl	300	Baseline monitoring
ESIA G1	YRC754	28/10/2014	220670	779326.0	202.649	20/10/2014		RC	90	N/A	tbc	41	Baseline monitoring
ESIA G2	YRC757	31/10/2014	220101	777559.1	236.151	23/10/2014		RC	90	N/A	tbc	40	Baseline monitoring
ESIA G3	YRC756	31/10/2014	218080	776279.7	362.593	22/10/2014		RC	90	N/A	140	80	Baseline monitoring
ESIA G4	YRC759	11/11/2014	222632	775795.2	246.314	24/10/2014		RC	90	N/A	140	40	Baseline monitoring
ESIA G5	YRC760	11/11/2014	221095	775180.3	230.036	24/10/2014		RC	90	N/A	140	21	Baseline monitoring
ESIA G6	YRC758	11/11/2014	222166	777021.3	362.210	23/10/2014		RC	90	N/A	140	80	Baseline monitoring
ESIA G7	YRC753	28/10/2014	223202	779248.5	217.600	21/10/2014		RC	90	N/A	tbc	58	Baseline monitoring
ESIA G8	YRC755	31/10/2014	216529	775989.4	348.386	22/10/2014		RC	90	N/A	140	83	Baseline monitoring
G2-PW	YRC761	17/11/2014	220951	776927.4	248.217		24/10/2014	RC	90	N/A	140	80	C1 Pumping well - Regolith
G2-PW	YRC762	17/11/2014	220947	776941.6	248.353		29/10/2014	RC	90	N/A	140	270	C1 Pumping well - Bedrock
G2-OW	YRC763	17/11/2014	220958	776934.3	248.356		29/10/2014	RC	90	N/A	140	80	C1 Observation well - Regolith
G5-PW	YRC764	17/11/2014	221538	777800.9	253.915		31/01/2014	RC	90	N/A	140	270	C2 Pumping well - Bedrock
G5-OB	YRC765	17/11/2014	221545	777794.4	254.061		01/11/2014	RC	90	N/A	140	71	C2 Observation well - Regolith
G5-PW	YRC766	17/11/2014	221539	777786.2	254.486		01/11/2014	RC	90	N/A	140	77	C2 Pumping well - Regolith
G7-PW	YRC767	17/11/2014	221652	776937.6	317.206		02/11/2014	RC	90	N/A	140	186	C3 Pumping well - Bedrock

3.2 PACKER TESTS

Packer testing was carried out for the 'Gash' geotechnical drill holes, G5 to G8, as summarised in Table 3-2. The packer tests were carried out in selected intervals of the NQ portions of the borehole. Packer intervals and results are summarised in Table 3-3.

Table 3-2 Geotechnical borehole summary

Borehole IDs Gash / Amara		Water Level*	Date	Comment
G1	YDD223G	4.71	5/12/14	Blocked at 26.1m
G2	YDD216G	30.12	24/10/14	
G3	YDD242G	1.61	5/12/14	Blocked at 30.82m
G4	YDD263G	14.78	04/11/14	Slight response
G5	YDD349G	26.48	04/11/14	Packer Test - flow
G6	YDD359G	36.17	04/11/14	Packer Test - flow
G7	YDD360G	77.86	04/11/14	Packer Test - no flow
G8	YDD361G	34.95	04/11/14	Packer Test - no flow

Double and single packers were used, with single packers used in the lower section and double packers at zones that indicated fracture (through examining core recovery or noting loss of drilling water). The packers were inflated by nitrogen and could be inflated to a maximum pressure of 550 psi. The rig water pump was used to pressurise the test section and was capable of delivering up to 160 psi. A 'no flow' was recorded when the maximum water pressure was used with insignificant indication of flow on the flow meter.

3.3 WELL INSTALLATION AND DEVELOPMENT

The environmental monitoring bores (ESIA G1 through ESIA G8) were drilled and installed by Amara. The monitoring bores were installed with 53 mm internal diameter (ID) PVC with screened intervals (1mm aperture machine slotted) targeting the water table in the weathered strata and weathered/unweathered contact. Installation depths ranged from 20 m to 80 m below ground level (bgl). A sand pack was installed in the bore annulus and bentonite seal emplaced above the screened interval.

Pumping test wells (YRC761 through YRC767) were installed with 125 mm ID PVC with screen intervals in the fractured bedrock or the weathered strata depending on the target. Corresponding observation wells were installed using 53 mm ID PVC screened at the same interval as the associated pumping test well. Sand pack and bentonite seals were not installed in the pumping test or observation wells.

Angled geotechnical drill holes were installed with 19 mm ID galvanised steel pipe with manual perforations cut to target fracture zones identified in the unweathered bedrock. A sand pack was installed in the bore annulus and bentonite seal emplaced above the perforated intervals where possible. Piezometers were installed in G1-G4 prior to arrival on site and G8 had been abandoned.

At surface each bore was completed with a cement plug and raised concrete plinth and metal casing with a lockable cap.

Table 3-3 Packer test intervals

Single / Double	Test Section (mbgl)	Hydraulic conductivity (m/s)
Single	400-440	2.9E-7
Single	260-440	1.2E-7
Double	260-263	6.6E-6
Double	146-149	4.9E-6
Double	143-146	1.6E-6
Double	107-110	No Flow
Single	248-389	No Flow
Single	200-389	No Flow
Single	173-389	No Flow
Single	170-389	No Flow
Single	71-389	5.2 E-6
Double	71-74	No Flow
Double	68-71	No Flow
Double	59-62	No Flow
Double	56-59	No Flow
Single	280-350	No Flow
Single	200-350	No Flow
Single	172-350	No Flow
Double	175-178	No Flow
Single	166-350	No Flow
Single	250-300	No Flow
Single	199-300	No Flow
Single	148-300	No Flow
Single	100-300	No Flow
Single	79-300	No Flow

3.4 FALLING HEAD TESTS

A total of 20 falling head tests were carried out in installed geotechnical, environmental, and pumping test boreholes, although only four provided useable results due to low permeability or too rapid change in water level following introduction of the slug of water.

Following measurement of the rest water level, a 25 litre 'slug' of water was poured into the borehole in approximately one minute and water level recovery back to the rest water level monitored. Results of the falling head tests are presented in Table 3-4.

The first four geotechnical boreholes (G1-G4) were particularly unresponsive due to clogging as a consequence of the installation method. Recovery monitoring in the other four 'gash' holes (G5-G6) was difficult due to the inclination of the borehole causing friction between the borehole wall and the dip meter tape.

Table 3-4 Falling head test results

Well	Hydraulic Conductivity (m/s)
ESIAG2 - YRC757	5E-07
ESIAG3 - YRC756	3E-07
ESIAG7 - YRC753	1E-06
ESIAG8 - YRC755	2E-07

3.5 PUMPING TESTS

Pumping tests were conducted at three locations proximal to the planned open pit area (site G2, G5 and G7). Pumping tests were conducted in the weathered and unweathered bedrock strata at sites G5 and G2. The unweathered bedrock was the target for testing at site G7.

Pumping tests were planned to comprise step-test, constant rate test, and recovery monitoring. Most testing was constrained however by excessive pumping drawdowns due to low yield conditions in the pumping boreholes. Table 3-5 summarises the pumping test borehole groupings and targets. Interpretation was carried out using Aquifer-32 analytical software. A summary of the step test results is provided in Table 3-6, and the constant rate test results in Table 3-7.

Table 3-5 Summary of pumping test configurations

Site	Well type	Well ID	Target	Depth
G5 (bedrock)	Pumping well	YRC764	Bedrock	270
	Observation well	YDD349	Bedrock	440
	Observation well	YRC766	Weathered strata	77
	Observation well	YRC765	Weathered strata	71
G5 (weathered strata)	Pumping well	YRC766	Weathered strata	77
	Observation well	YRC765	Weathered strata	71

Site	Well type	Well ID	Target	Depth
	Observation well	YRC764	Bedrock	270
	Observation well	YDD349	Bedrock	440
G2 (bedrock)	Pumping well	YRC762	Bedrock	270
	Observation well	YDD216	Bedrock	380
	Observation well	YRC761	Weathered strata	80
	Observation well	YRC763	Weathered strata	80
G2 (weathered strata)	Pumping well	YRC761	Weathered strata	80
	Observation well	YRC763	Weathered strata	80
	Observation well	YRC762	Bedrock	270
	Observation well	YDD216	Bedrock	380
G7 (bedrock)	Pumping well	YRC767	Bedrock	186
	Observation well	YDD360	Bedrock	380

Table 3-6 Summary of step test results

Pumped Well	Observation Well	Transmissivity (m^2/day)	r*r*S (m^2)	Coefficient Turbulent Head Loss (sq d / m5)
YRC762 (G2)	YRC761	78	6.3E-01	1.88E-06
YRC762 (G2)	YRC763	21	3.3E-02	-4.51E-05
YRC762 (G2)	YRC762 (G2)	8.6	1.7E-07	-2.87E-04
YRC762 (G2)	YDD216	16	6.5E-03	-4.13E-05
YRC761	YRC761	0.4	1.0E-02	4.80E-03
YRC761	YRC762 (G2)	Insufficient response to evaluate hydraulic parameters		
YRC761	YRC763	Insufficient response to evaluate hydraulic parameters		
YRC761	YDD216	No response was identified in well		
YRC764 (G5)	YRC764 (G5)	6.4	6.4E-02	5.65E-05
YRC764 (G5)	YRC766	No response was identified in well		
YRC764 (G5)	YDD349	6.3	1.3E-01	5.27E-05
GW7 (F1)	GW7 (F1)	18	1.1E-02	1.07E-05
GW8 (F2)	GW8 (F2)	1.2	3.4E-02	4.89E-03

Table 3-7 Summary of constant rate test results

Pumped Well	Observation Well	Constant Rate Pumping					Recovery
		Curve Fit	Pumping Rate (l/min)	Transmissivity (m^2/day)	Storage Coefficient Ratio	Curve Fit	Transmissivity (m^2/day)
YRC762 (G2)	YDD216	Hantush and Jacob 1955 Leaky Aquifer	15	1.50	1.3E-04	Theis 1946 Recovery	0.14
	YRC761	Hantush 1960 Leaky Aquifer with Storage	15	2.72	3.0E-04	Theis 1946 Recovery	26.71
	YRC762 (G2)	Hantush and Jacob 1955 Leaky Aquifer	15	0.64	1.1E-02	Theis 1946 Recovery	1.25
	YRC763	Cooper and Jacob 1946 Straight Line Method	15	1.52	9.6E-05	Theis 1946 Recovery	0.02
YRC764 (G5)	YDD349	Hantush 1960 Leaky Aquifer with Storage	19.5	0.16	4.3E-06	Theis 1946 Recovery	0.20
	YRC764 (G5)	Cooper and Jacob 1946 Straight Line Method	19.5	0.64	8.5E-02	Theis 1946 Recovery	0.53
	YRC765	Hantush 1960 Leaky Aquifer with Storage	19.5	2.82	1.2E-03	Theis 1946 Recovery	0.75
	YRC766	Hantush 1960 Leaky Aquifer with Storage	19.5	4.40	2.3E-03	Theis 1946 Recovery	18.48
YRC767 (G7)	YDD360	No measurable drawdown from pumping.					
	YRC767 (G7)	Well kept going dry. Insufficient data points. Pump rate not recorded					
GW7 (F1)	GW7 (F1)	Hantush 1960 Leaky Aquifer with Storage	5	24.074	0.457078	Theis 1946 Recovery	8.28
GW8 (F2)	GW8 (F2)	Hantush 1960 Leaky Aquifer with Storage	0.56	1.31899	0.0250913	Theis 1946 Recovery	0.53

4. GROUNDWATER MONITORING

4.1 WATER LEVEL MONITORING

Groundwater levels were periodically recorded throughout the field programme and have continued in accordance with the environmental baseline monitoring plan (attached to the Surface Water Baseline report).

Table 4-1 provides a summary of the groundwater elevations.

4.2 GROUNDWATER QUALITY

Groundwater quality monitoring and results are included in the Surface Water Baseline report.

Table 4-1 Groundwater level monitoring

Bore ID	Amara drill hole ID / local	Easting	Northing	Target	Ground Elevation	Stick-up	24/10/14	25/10/14	27/10/14	29/10/14	3/11/14	4/11/14	27/11/14	3/12/14	4/12/14	5/12/14	6/12/14	7/12/14	18/1/15	19/1/15	23/1/15	27/1/15	28/1/15	16/2/15	17/2/15	18/2/15	16/3/15	17/3/15	20/3/15
G1	YDD0223G	220775	777333	Bedrock	216.15	0.80					211.97					212.24													
G2-OB	YDD0216G	220950	776935	Bedrock	248.34	0.50	218.72									218.82			218.2						217.67		217.66		
G3	YDD0242	221202	777333	Bedrock	269.84	0.80					269.37					269.03													
G4	YDD0263	221349	776933	Bedrock	295.92	0.70	276.82				282.32	281.84				283.05													
G5 -OB	YDD0349	221531	777792	Bedrock	253.83	0.40	227.53			228.21	227.69	227.75	227.75									227.56			227.51		227.41		
G6	YDD0359	221675	777333	Bedrock	273.22	0.50					237.62	237.55			236.82							235.69			235.41				235.77
G7-OB	YDD0360	221660	776938	Bedrock	317.69	0.50				239.09	240.23	240.33			240.56						241.2				241.4				241.37
G8	YDD0361	221301	776485	Bedrock	276.62	0.50					252.31	242.17				240.74						241.22			241.12				241.47
G2-PW	YRC761	220951	776927	Regolith	248.22	0.40										217.497			217.107						217.357		217.347		
G2-PW	YRC762	220947	776942	Bedrock	248.35																								
G2-OW	YRC763	220958	776934	Regolith	248.36																								
G5-PW	YRC764	221538	777801	Bedrock	253.92	0.90																							
G5-OB	YRC765	221545	777794	Regolith	254.06	0.80																							
G5-PW	YRC766	221539	777786	Regolith	254.49	0.50											228.786					228.566			228.526		228.406		
G7-PW	YRC767	221652	776938	Bedrock	317.21										241.666						243.476				240.496				243.596
ESIA G1	YRC754	220670	779330	Regolith	202.65	0.80			197.3					198.62							197.45				197.04			196.69	
ESIA G2	YRC757	220101	777559	Regolith	236.15	0.80			226.18						226.51						224.93				223.95		223.36		
ESIA G3	YRC756	218080	776280	Regolith	362.59	0.90		303.41								303.54					303.66			303.71				303.68	
ESIA G4	YRC759	222632	775795	Regolith	246.31	0.90		237.76									238.45			238.16					238.01		237.86		
ESIA G5	YRC760	221095	775180	Regolith	230.00	0.80		228.72									228.94			227.25					226.61		226.37		
ESIA G6	YRC758	222166	777021	Regolith	362.21	0.90																							
ESIA G7	YRC753	223202	779249	Regolith	217.60	0.90		208.01								207.3							206.2		206.63			206.34	
ESIA G8	YRC755	216529	775989	Regolith	348.39	0.95		315.57										316.17			316.56			316.54				316.45	
PZ01	Piezometer 1	221096	778268											-21.52								-21.71			-21.74		-21.81		
PZ02	Piezometer 2													-16.55								-16.55			-16.52		-16.56		
PZ03	Piezometer 3													-7.05								-7.7			-7.98		-8.22		
GW1	Electric Pump	219982	778257																										
GW2	Allahou-Bazi well	220025	778263																										
GW3	Angovia well	219593	778005												-8.87														
GW4	Akakro well	217521	775559																										
GW6	N'da Koffi Yobouerkro well	216295	776036																										
GW9	Kouakougnanou well	222246	774119																										
GW11	Patizia well	219636	771500																										

5. REFERENCES

SRK (2008) Technical Review of the Angovia Gold Mine, Mount Yaoure, Côte d'Ivoire (NI 43-101 Report), 2008

SGS (2006) Angovia Gold Project – Baseline Data Monitoring Programme

SGS, 2007: Environmental and Social Impact Assessment of the Angovia Gold Mine, Cluff Gold. Ghana.