

Technical Report for the Yaramoko Gold Mine, Burkina Faso

Report Prepared for
Roxgold Inc.



Report Prepared by



SRK Consulting (Canada) Inc.
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Roxgold Inc.

360 Bay Street, Suite 500
Toronto, Ontario, Canada
M5H 2V6
E-mail: info@roxgold.com
Website: www.roxgold.com
Tel: +1 416 203 6401
Fax: +1 416 203 0341

SRK Consulting (Canada) Inc.

Suite 1500, 155 University Avenue
Toronto, Ontario, Canada
M5H 3B7
E-mail: toronto@srk.com
Website: www.srk.com
Tel: +1 416 601 1445
Fax: +1 416 601 9046

SRK Project Number 3CR016.008

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Signature date: December 20, 2017

Qualified Persons:

["signed"]
Sebastien Bernier, PGeo
Principal Consultant (Resource Geology)
SRK Consulting (Canada) Inc.

["signed"]
Yan Bourassa, PGeo
VP Geology
Roxgold Inc.

["signed"]
Paul Criddle, FAUSIMM
Chief Operating Officer
Roxgold Inc.

["signed"]
Benny Zhang, PEng
Principal Consultant (Mining)
SRK Consulting (Canada) Inc.

["signed"]
Craig Richards, PEng
Principal Mining Engineer
Roxgold Inc.

Reviewed by:

["signed"]
Glen Cole, PGeo
Principal Consultant (Resource Geology)
SRK Consulting (Canada) Inc.

Contributing Authors:

Ken Reipas, PEng

Ryan Hairsine

Caitlyn Adams, GIT

Cover: Yaramoko processing plant.

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Executive Summary

Introduction

The Yaramoko gold mine is located 200 kilometres (km) southwest of Ouagadougou, the capital city of Burkina Faso. This mine is 90% owned by Roxgold (Roxgold) a Canadian public company domiciled in Toronto, Ontario with shares listed on the Toronto Stock Exchange under the symbol ROXG while the Burkina Faso Government hold 10% carried interest in the mine.

In June 2013, Roxgold commissioned SRK to provide certain technical engineering services and to prepare a feasibility study and technical report pursuant to Canadian Securities Administrators' National Instrument 43-101 for the gold mineralization contained in the 55 Zone of the Yaramoko Gold Project in Burkina Faso. The study was documented in a technical report published on June 4, 2014 and summarizes the design of the currently operating Yaramoko gold mine. Commercial production on 55 Zone was declared on October 1, 2016.

The Bagassi South Zone gold project is a pre-development gold mining project located 1.8 kilometres south of Roxgold's operational Yaramoko gold mine.

During the latter half of 2016 and 2017, Roxgold in collaboration with various consultants demonstrated the economic viability of developing an underground mine at Bagassi South, targeting the Indicated mineral resource and leveraging off the operational synergies of the existing Yaramoko gold mine on the property.

In 2017, Roxgold commissioned SRK to visit the property and to prepare a revised mineral resource model for the 55 Zone. This mandate also incorporated support to Roxgold to prepare an updated mineral reserve statement and accompanying life of mine plan. SRK also provided support to the Bagassi South feasibility study leading to the maiden Mineral Reserve Statement for the Bagassi South Zone accompanied by a life of mine plan.

This technical report summarizes the technical information that is relevant to support the disclosure of a Mineral Resource and Reserve Statement for the Yaramoko Gold Project (55 Zone and Bagassi South Zone) pursuant to Canadian Securities Administrators' National Instrument 43-101. Also, it presents the assumptions and designs at a level of accuracy that is required to demonstrate the economic viability of the mineral resources defined for the 55 Zone and the Bagassi South Zone. The opinions contained herein and effective December 20, 2017, are based on information collected by the various consultants throughout the course of their investigations.

Property Description and Ownership

The Yaramoko property is located approximately 200 kilometres southwest of Ouagadougou in the Balé Province in western Burkina Faso. The centroid of the 55 Zone gold deposit in the Yaramoko gold mine ("Yaramoko") is located at 3 degrees and 16 minutes longitude west (3.28 degrees west) and 11 degrees and 45 minutes latitude north (11.75 degrees north).

The QV1 Zone which is the main deposit of the Bagassi South Zone project, is geologically similar to the 55 Zone and is located about 1.8 kilometres south of the 55 Zone which is currently being mined.

Roxgold Sanu SA was awarded a *Permis d'exploitation industrielle*, the Burkina Faso equivalent of a Mining Permit, through *Decree 2015-074 PRES-TRANS/PM/MME/MEF/MERH* for Yaramoko on 30th January 2015. This was followed by the approval of the National Mines Commission meeting held on 24th May 2015. Roxgold is the sole owner of the property subject to a 10% carried interest held by the Government of Burkina Faso.

The deposits of the Bagassi South Zone are outside the existing mining permit but within the exploration permit. The Yaramoko exploration permit lapsed on September 8, 2016 and was renewed under the new name of Bagassi Exploration Permit on December 2, 2016.

In accordance with Article 34 of the Mining Code, the holder of a mining license may request the extension of the geographical area of its license. The extension decree only defines the geographic scope of the original mining license which thus stays under the Mining Code which granted it (2003 in this case), and the dates of grant or renewal remain unchanged. Roxgold intends to follow this prescribed process at both the Mines and Environment Ministries to effectively permit the Bagassi South Zone project and bring it into the Yaramoko Mining Permit.

Accessibility, Climate, Local Resources, Infrastructure, and Physiography

The closest major city to the Yaramoko Gold Project is Boromo, located 50 km away. It is serviced by the national power grid and it hosts a hospital and additional suppliers. However, major purchases and procurements come from Ouagadougou. The Bagassi South Zone project is approximately 2 kilometres south of the Yaramoko gold mine. It can be reached via the highway system by traveling west from Ouagadougou on paved highway for approximately 200 kilometres, or alternatively traveling east from Bob-Dioulasso for approximately 150 kilometres to the village of Ouahabou, and then north-northwest by laterite road for approximately 20 kilometres to the village of Bagassi.

Roxgold's exploration camp has been relocated from the village of Koussaro to Yaramoko's Sabarya camp. The 306-person camp was newly built in 2015 with indoor plumbing, electricity (grid, or back-up diesel generated power), internet and DSTV connection. The camp offers a secure area for logging and processing drill core and for storing exploration equipment as well as housing the workforce. From the camp, the Bagassi South project is accessed by a 2-kilometre laterite road constructed by Roxgold.

The village of Bagassi South, which is adjacent to the project, and has a population of approximately 1,500. The next closest village is Bagassi, which is adjacent to Bagassi South, and has a population of approximately 3,000 people. It has recently been connected to the country's national power grid. Agriculture is the main industry in the region with production of millet, groundnut, and cotton.

The surface area covered by the Yaramoko exploitation permit is sufficient for the infrastructure necessary for an underground mining operation, most of which will be leveraged from Yaramoko for the development of the Bagassi South mine (e.g. tailings storage areas, and processing facilities).

The climate is semi-arid, with a rainy season from April to October and a dry season that is mild to warm from November to February and hot from March to June. Temperatures range from a low of about 15 degrees Celsius in December to highs of about 45 degrees Celsius in March and April. Annual total rainfall in the area averages 800 millimetres.

Geology and Mineralization

The north-northeast-trending Boni shear zone divides the Yaramoko Gold Project between the predominantly Houndé volcanic and volcanoclastic rock to the west and the Diébougou granitoid domain composed predominantly of granitic rock with minor volcanic rock to the east. The main lithological units are mafic volcanic rocks, felsic intrusions, and late dolerite dikes. This region is considered prospective for orogenic gold deposits, which typically exhibit a strong relationship with regional arrays of major shear zones.

The largest granitic intrusion found on the Yaramoko concession is host to both the 55 Zone and Bagassi South Zone gold deposits. Both deposits are set on the eastern margin of the intrusive in the footwall of the Yaramoko shear along conjugated dextral faults located in extensional position to the regional shear zone. The bulk of the gold mineralization occurs in dilatational segments of the shear zones where quartz veins are thicker and exhibit greater continuity.

The Bagassi South Zone deposit is located 1.8 kilometres south of 55 Zone and the surface definition of the veins can be traced over a strike length of some 800 metres and dips to the northeast. Gold typically occurs as coarse free grain in quartz and is associated with pyrite.

Exploration Status

Riverstone Resources Inc. (Riverstone) started exploration work on the Yaramoko property in 2005 before Roxgold became involved in late 2010. The exploration programs have comprised soil and rock sampling, airborne and ground geophysics, rotary air blast, auger, reverse circulation, and core drilling.

The rotary air blast drilling was used to follow up soil anomalies in 2011 and 2012 (1,887 rotary air blast boreholes). The auger drilling was used for collecting soil samples under the transported cover in 2012 and 2013 (2,669 auger boreholes totalling 13,480 metres). Rotary air blast and reverse circulation drilling was then used to trace gold in soil anomalies to bedrock, positive results from reverse circulation drilling were followed with core drilling to confirm the geological setting of each target. This method successfully identified the 55 Zone, and thereafter other gold mineralized zones on the property including Bagassi South.

In 2015, Roxgold drilled 11 RC pre-collars holes with diamond tails at Bagassi South on the QV1 structure to infill and extended mineralisation up and down dip. In addition to the RC holes, a total of 114 diamond holes were drilled targeting the QV1 and QV' structures. A 12-hole program using RC pre-collars and diamond tails targeting the down dip extension of the QV' structure was undertaken in the fourth quarter of 2016 at Bagassi South and was completed in early 2017. At Bagassi South a total of 114 core holes for 25,017 metres have been drilled targeting the QV1 and QV' structures. Core drilling was also used for metallurgical studies. The 2016 and 2017 core drilling programs focused mainly on mineral resource conversion and extensional drilling program at depth at both the Bagassi South and 55 zones. A deep drilling program was conducted at the 55 Zone in the fourth quarter of 2016, the program targeted the mineralized shoot at elevation between 700 metres and 1,000 metres below the topographic surface. A second phase a deep drilling was conducted in 2017 totalling 8 holes and targeting the down-plunge projection of the mineralized shoot below the 2016 drilling.

At the end of the 2017 third quarter, total drilling on the Yaramoko property for the year amounted to 47,455 metres with drilling in the fourth quarter continuing along the QV' structure, at depth at the 55 Zone and testing regional IP targets.

A deep drilling program was conducted at the 55 Zone in the fourth quarter of 2016, the program targeted the mineralized shoot at elevation between 700 metres and 1,000 metres below the topographic surface. A second phase a deep drilling was conducted in 2017 totalling 8 holes and targeting the down-plunge projection of the mineralized shoot below the 2016 drilling.

Mineral Resource and Mineral Reserve Estimates

Since 2014, Roxgold has completed an infill drilling program on the 55 Zone in support of the first five-years of production at the Yaramoko Gold Project. In November 2016, Roxgold commissioned SRK to prepare a new mineral resource model for the Yaramoko Gold Project using updated geological wireframes prepared by Roxgold using drilling information to December 31, 2016. The mineral resources reported herein have been estimated using a geostatistical block modelling approach informed from gold assay data collected in core boreholes. This new mineral resource model formed the basis of the 2016 year-end mineral resources and mineral reserves of the Yaramoko Gold Project. The Mineral Resource Statement for the 55 Zone is presented in Table i.

Table i: Mineral Resource Statement*, 55 Zone, Yaramoko Gold Project, Burkina Faso, SRK Consulting (Canada) Inc., December 31, 2016

Category	Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Measured	265	26.88	229
Indicated	1,076	14.73	509
Measured + Indicated	1,341	17.13	738
Inferred	669	16.14	347

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Underground mineral resources are reported at a cut-off grade of 5.0 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$100 per tonne, G&A cost of \$28.30 per tonne, processing cost of \$38.90 per tonne, process recovery of 98.5 percent.

The 55 Zone mineral resource block model was used to estimate mineral reserves using modifying factors. Mining shapes were designed targeting the Measured and Indicated mineral resources only, using an in-situ mining cut-off grade of 5.2 grams of gold per tonne (g/t gold) based on a gold price of \$1,250 per ounce, an estimated site operating cost of \$167 per tonne processed, and a metallurgical gold recovery of 98.5 percent.

The mining shapes follow the grade shell control model (wireframes) without attempting to trim off any areas below the cut-off grade. Mining recovery and dilution parameters are based on the selected mining method and geotechnical considerations. External dilution averages 34 percent, with grades from wall rock dilution directly extracted from the block model and null grade from backfill. Dilution is defined as waste/ore tonnes. Development ore dilution was included in the selected sill profiles and mining software directly reported diluted tonnes and grades. Mining recoveries vary from 70 to 95 percent, dependent on stope location or stope category. The Mineral Reserve Statement for the 55 Zone is presented in Table ii.

Table ii: Mineral Reserve Statement*, 55 Zone, Yaramoko Gold Project, Burkina Faso, SRK Consulting (Canada) Inc., December 31, 2016

Category	Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Proven	343	17.69	195
Probable	1,453	10.01	467
Proven + Probable	1,796	11.47	662

* Mineral reserves included in mineral resources. All figures have been rounded to reflect the relative accuracy of the estimates.

** The mineral reserve estimates are prepared in accordance with the CIM Definition Standards for Mineral Resources and Mineral Reserves, adopted by the CIM Council on May 10, 2014, and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines, adopted by CIM Council on November 23, 2003, using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit. Mineral reserves are reported at a cut-off grade of 5.2 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$100.00 per tonne, G&A cost of \$28.30 per tonne, processing cost of \$38.90 per tonne, and process recovery of 98.5 percent. Mineral reserves are the economic portion of the Measured and Indicated mineral resources. Mineral reserve estimates include mining dilution and mining recovery. Mining dilution and recovery factors vary with specific reserve sources and are influenced by several factors including deposit type, deposit shape and mining methods.

For the Bagassi South Zone, the geological and gold mineralization wireframes were modelled internally by Roxgold and reviewed by SRK. Minor adjustments were made to the wireframes following SRK’s validation. The mineral resource estimation was undertaken by Roxgold’s personnel, gold grades were interpolated into a block model using ordinary kriging. The estimation parameters, capping levels, estimation results and mineral resource classification were reviewed and validated by SRK. The updated Bagassi South Zone Mineral Resource Statement (Table iii) was disclosed in a press release on July 19, 2017.

Table iii: Mineral Resource Statement*, Bagassi South Zone, Yaramoko Gold Project, Burkina Faso, Roxgold Inc., July 19, 2017

Category		Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Indicated	QV1 Structure	352	16.6	188
	QV' Structure	-	-	-
Total Indicated		352	16.6	188
Inferred	QV1 Structure	79	13.0	33
	QV' Structure	51	22.0	36
Total Inferred		130	16.6	69

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Underground mineral resources are reported at a cut-off grade of 5.0 g/t gold assuming: metal price of US\$1,250 per ounce of gold, mining cost of US\$100 per tonne, G&A cost of US\$28.30 per tonne, processing cost of US\$38.90 tonne, process recovery of 98.5 percent.

The Bagassi South mineral resource block model was used to estimate mineral reserves using modifying factors. Mining shapes were designed targeting the Indicated mineral resources only, using an in-situ mining cut-off grade of 4.8 g/t gold based on a gold price of \$1,250 per ounce, an estimated site operating cost of \$145 per tonne processed, and a metallurgical gold recovery of 98.5 percent. The mining shapes were designed using the cut-off grade as a guide with application of minimum mining width of 1.2 metres. Mining recovery and dilution parameters are based on the selected mining method and geotechnical considerations. External dilution averages 27 percent with a gold grade averaging 1.18 g/t gold. Dilution is defined as waste/ore tonnes. Development ore dilution was included in the selected sill profiles and mining software directly reported diluted tonnes and grades. Mining recoveries vary from 85 to 95 percent, dependent on stope location or stope category. The Mineral Reserve Statement for the Bagassi South Zone is presented in Table iv.

Table iv: Mineral Reserve Statement*, Bagassi South Zone, Yaramoko Gold Project, Burkina Faso, SRK Consulting (Canada) Inc., November 06, 2017

Category	Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Proven	-	-	-
Probable	458	11.54	170
Proven + Probable	458	11.54	170

* Mineral reserves included in mineral resources. All figures have been rounded to reflect the relative accuracy of the estimates.

** The mineral reserve estimates are prepared in accordance with the CIM *Definition Standards for Mineral Resources and Mineral Reserves*, adopted by the CIM Council on May 10, 2014, and the CIM *Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines*, adopted by CIM Council on November 23, 2003, using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit. Mineral reserves are reported at a cut-off grade of 4.8 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$73.47 per tonne, G&A cost of \$35.74 per tonne, processing cost of \$35.65 per tonne, and process recovery of 98.5 percent. Mineral reserves are the economic portion of the Measured and Indicated mineral resources. Mineral reserve estimates include mining dilution and mining recovery. Mining dilution and recovery factors vary with specific mineral reserve sources and are influenced by several factors including deposit type, deposit shape and mining methods.

Mining Methods

Planned mine operations for the Yaramoko property are comprised of the existing 55 Zone Mine, which was commissioned in 2016, and a new proposed underground mine for the Bagassi South QV1 deposit.

55 Zone Mine

The 55 Zone mine is an operating 750 tonne-per-day underground operation which utilizes longhole stoping with cemented rock fill as its primary mining method. Stopping at 55 Zone utilizes 17-metre sublevel spacing, with longitudinal stope sequencing, retreating towards centralized access declines. Mine development and stoping operations are conducted for Roxgold by African Underground Mining Services (AUMS) under a mining services agreement which extends through to late 2019. The 55 Zone mine has proven and probable ore reserves to a depth of 750 metres of 1.80 million tonnes grading 11.47 g/t gold. Mine life at the planned production rate is to the end of 2023.

Project to date, ore sublevels have been developed in advance of stoping to the 5100 level, 220 metres below surface and the access decline has reached a depth of 260 metres. Seven longhole stoping faces have been established to the 5168-metre level (150 metres depth), providing operational flexibility. Sublevel development is well-advanced, with 18 to 24 months of developed reserves ahead of stoping operations.

Bagassi South QV1 Deposit

The Bagassi South QV1 deposit has been studied at a feasibility study level of detail, confirming robust economics, for a potential 350-tonne-per-day underground mine. The Bagassi South QV1 deposit contains probable mineral reserves of 458,000 tonnes grading 11.54 g/t gold. It is proposed that the mine would initially be developed and operated by AUMS through 2018 and 2019, taking advantage of operational synergies with the 55 Zone mine. A transition to owner operated mining is contemplated commencing in 2020, with initial mine life extending until mid-2023.

Bagassi South mine access would be by a single decline to an ultimate depth of 260 metres. The decline is planned to be 4.5 by 4.5 metres in size to accommodate 20-tonne underground haulage trucks. The decline would provide access to ore sublevels on the QV1 vein structure at 15 metres vertical spacing. Stopping is planned to be by longhole stoping with cemented rock fill, the same method being applied in the 55 Zone mine. Stope advance would be in a longitudinal fashion from orebody strike extremities back toward the central access decline. A centrally located return air shaft and escape ladderway system are also planned. Bagassi South mine operations would benefit from shared infrastructure, management and support services already in place for the 55 Zone mine and is anticipated to significantly enhance gold production and the overall economic performance of the Yaramoko property through 2023.

Recovery Methods

The mineral processing and metallurgical test work conducted on the Bagassi South Zone QV1 gold deposit by ALS Metallurgy confirms the coarse free gold nature of the deposit. Gold extraction using gravity and leaching processes yields excellent gold recoveries comparable to that obtained from the 55 Zone ore body. As a result, the operational Yaramoko gold processing plant is expected to return a similar performance in treating the Bagassi South Zone ore. Expansion works will be necessary to increase its throughput capacity. The existing process plant for the Yaramoko gold mine was designed for a throughput of 270,000 tonnes per annum. The Yaramoko Expansion Project will increase the process plant throughput to 400,000 tonnes per year (1,100 tonnes per day) and was designed by DRA (Pty.) Ltd in Johannesburg, South Africa.

The design of the existing Yaramoko plant considered a future expansion and the necessary allowances were made in the layout and mechanical equipment selection to facilitate a modular type expansion. The expansion maintains the design philosophy that was implemented originally.

The following upgrades are anticipated to facilitate the additional throughput:

- A secondary crushing circuit with a throughput of 100 tonnes per hour, operating at 70 percent availability, and aiming to achieve a design crush of 80 percent passing 20 millimetres.
- A milling circuit with a throughput of 50.2 tonnes per hour, a 20 to 27 percent volume ball charge (24 to 35 percent volume total load), operating at 91.3 percent availability, and aiming to achieve a design grind of 80 percent passing 90 micrometres.
- A mill scats return conveyor.
- A carbon-in-leach (CIL) circuit consisting of an additional two adsorption tanks and 8-metre diameter high rate thickener.
- A gravity circuit designed to recover 70 percent of head grade consisting of an additional Acacia leach reactor and two electrowinning cells.
- Additional raw water storage and power reticulation infrastructure.

Water, which will be used in a wide range of services, will be sourced primarily from the existing water storage facility and supplemented from the underground mining dewatering activities and a bore field network. The water storage dam is located approximately 2 kilometres from the plant, adjacent to the tailings storage facility.

The economic model is based on an average gold recovery of 98.5 percent over the life-of-mine at an average head grade of 11.47 g/t gold and 11.54 g/t gold for the Bagassi South Zone and 55 Zone deposits, respectively.

Project Infrastructure

The existing infrastructure and services at Yaramoko adequately support the current operations. This infrastructure consists of a process plant, a mine service area (offices, workshops, and a warehouse), a tailings storage facility, a water storage facility, mine access and haulage roads, an explosives magazine, a gendarmerie, an electrical grid connection, and an accommodation camp.

In 2017, the site was connected to the Burkina Faso electricity grid by teeing into the 90-kilovolt powerline from the Pa substation to the Mana mine site. The capacity of the 90/11-kilovolt substation is 13 megavolt amperes, which has sufficient spare capacity for the Bagassi South Zone mine and expansion works. In the event of a power outage, there is an emergency diesel generator power station, which is sized to power the entire site operations (except the accommodation camp which has a dedicated emergency generator).

The proposed new / updated infrastructure required for the Bagassi South project is as follows:

- Yaramoko plant expansion
- Development of the Bagassi South mine and services to access to the QV1 gold deposit
- Mine access and haulage roads
- Sabarya camp expansion
- Additional tailings storage facility embankment raises
- Additional site security fencing

Environmental Studies, Permitting, and Social or Community Impact

The primary environmental approval required to develop Yaramoko was an Avis de Conformité et de Faisabilité Environnementale (Avis). Roxgold contracted the consulting firm BEGE to undertake the original project baseline studies in 2012 and 2013 and compile the environmental and social impact assessment (ESIA) required to obtain the Avis. The ESIA identifies the potential social and environmental impacts of the development of the project and proposed mitigation measures. The ESIA was submitted on May 2014 and the approval was received in August 2014. Because of the need of an economic resettlement to compensate the loss of farming land, the ESIA included a Resettlement Action Plan (RAP) negotiated with the impacted communities.

Considering the characteristics of the Bagassi South project and the expansion of the initial project, updates of the same governmental approval processes is required (i.e. ESIA and RAP). In addition, similar social and environmental impacts can be expected although impacting a smaller area. The management of the approbation process and the preparation of these documents will benefit from the previous experience and from the established Environmental and Social Management System (ESMS).

At present, the main potential environmental issues identified concern water quality due to seepage or runoff from mine infrastructure; reduced groundwater supply due to the impact of a potential drawdown cone around the mine; and dust from waste rock dumps and the tailings storage facility. The main social issues identified concerned livelihood changes due to the loss of farmland and income from artisanal mining. Roxgold has been able to manage these aspects through a comprehensive ESMS based on ISO 14001 and IFC Performance Standards.

Roxgold has engaged with the local stakeholders through a stakeholder engagement management plan since 2014. A specific stakeholder engagement strategy and plan will be developed for the Bagassi South project based on the community analysis (stakeholder mapping), the existing tools and the experience of the Community Relations (CR) team, including presentations of the expansion projects, community representatives' meetings, special committee, public enquiries, billboard and/or broadcasting.

One of the main social aspects of this expansion will be the potential resettlement of the artisanal miners' community at Bagassi South. Apart of the requirement of elaborating a RAP included in the ESIA process, there is no specific regulation or guidelines in Burkina Faso. Therefore, the land acquisition and resettlement will follow guidelines specified in IFC Performance Standard 5 (PS5).

The closure plan for Yaramoko will be updated to incorporate plans for the additional Bagassi South mine and infrastructure. It currently assumes the preferred final post-closure land use will be a savannah landscape commensurate with the existing small-scale agriculture and livestock grazing land uses. The plan assumes no salvage value. The mine areas will be reclaimed to a safe and environmentally sound condition consistent with closure commitments developed during the life of the project.

Economic Analysis

Bagassi South Zone

The Bagassi South QV1 Zone, a satellite deposit and expansion to the main 55 Zone, has been evaluated separately on a discounted cash flow basis. The cash flow analysis was prepared on a constant 2017 US dollar basis. No inflation or escalation of revenue or costs has been incorporated. The Bagassi South QV1 Zone has robust economics. The pre-tax present value of the net cash flow with a 5 percent discount rate (NPV_{5%}) is \$68 million using a base gold price of \$1,300 per ounce. Project after-tax NPV_{5%} at a \$1,300 per ounce of gold price is \$50 million on an all equity basis. The internal rates of return are respectively 74.6 percent pre-tax and 53.2 percent post-tax.

Payback period is expected to be less than two years at a gold price of \$1,300 per ounce. Payback period is defined as the time after expanded process plant start-up that is required to recover the initial expenditures incurred.

The key economic indicators of NPV_{5%} and internal rate of return are most sensitive to changes in gold price and gold grade. If the gold price rises 15 percent to \$1,500 per ounce, the after-tax NPV_{5%} would rise 42 percent to \$71 million and the internal rate of return would rise to 73 percent. Conversely, a 15 percent reduction in the gold price to \$1,100 per ounce results in a 38 percent drop to \$31 million and a reduction in internal rate of return to 34 percent. At the lower price, the payback period rises from 1.8 years to 2.3 years. The project NPV_{5%} sensitivity to changes in capital costs is nearly the same as sensitivity to operating costs. This is attributed to the fact that total base case capital costs are about the same as total operating costs excluding royalties.

The internal rate of return is more sensitive to changes in project capital costs, which are weighted heavily at the front-end of the project, than to operating costs.

Yaramoko Combined Project

The Yaramoko combined project (55 Zone mine combined with the Bagassi South project) has been evaluated on a discounted cash flow basis. The cash flow analysis was prepared on a constant 2017 US dollar basis. No inflation or escalation of revenue or costs has been incorporated. The Yaramoko combined project is economically robust. The pre-tax present value of the net cash flow with a 5 percent discount rate (NPV_{5%}) is \$380 million using a base gold price of \$1,300 per ounce. The mine is in production without annual negative cash flow predicted, thus internal rates of return is not applicable.

The government of Burkina Faso is entitled to a 10 percent interest in the project. On this basis, Roxgold's 90 percent interest in the project is expected to provide a NPV_{5%} of \$272 million after-tax to the parent company.

Conclusion and Recommendations

Roxgold, in collaboration with independent consultants, has confirmed the continued economic viability of Yaramoko's 55 Zone deposit and has demonstrated the economic viability of developing the nearby Bagassi South Zone QV1 deposit based on mineral reserves. This technical report provides a summary of the results and findings from each major area of investigation to a level that is considered to be consistent with that normally expected with feasibility studies for resource development projects. The financial analysis performed from the results of this report demonstrates the robust economic viability of the proposed Bagassi South Zone project using the base case assumptions considered.

Analysis of the Bagassi South Zone study results has identified a series of risks and opportunities associated with each of the technical aspects considered for the development of the proposed project.

The key risks include:

- Uncertainty about the accuracy of the tonnage and grade estimates and the geological continuity of the gold mineralization at the reported cut-off grade. Sensitivity studies on modelling assumptions and structural geology investigations suggest this is a low risk.
- Increased mining dilution arising from development gouging of wall rock and/or production blast hole deviation.
- Availability of grid power. Use of diesel generators more frequently / longer than anticipated has an adverse impact on power costs.
- Hydrogeology model based on limited testing data. Understanding of fault permeability remains an ongoing item. There is a risk that water ingress into the underground mine will be higher than predicted and require additional pumping capacity.
- Delay in obtaining environmental approvals and access to land leading to construction delays.
- Unmet community expectations leading to potential for loss of social license to operate.
- Indirect reputational risks associated with artisanal mining activities active on the project.
- Long term impact of groundwater movement away from mine workings after closure.
- Impact on community water supply requiring provision of alternative water supply to communities.

The key opportunities include:

- Exploration potential to increase the mineral resources of the Bagassi South Zone deposits.
- Exploration potential to define new mineral resources elsewhere on the Yaramoko and Bagassi South Zone projects.
- Water ingress into underground mine could be lower than modelled, leading to lower pumping requirements.
- Further optimized mining methods resulting in operating cost savings and lower total mining dilution, thus increased head grade.
- Further optimized mine scheduling, resulting in fully utilized contractor fleet.
- Optimized mining contract for development of both (55 Zone and Bagassi South) in tandem.

Analysis of the Bagassi South Zone study and findings from each major area of investigation suggests several recommendations for further investigations during the next phase of study to mitigate risks and improve the base case project definition to be incorporated during the development and operations of the project, including:

- Exploration drilling targeting areas of Inferred mineral resources within the QV1 and QV' zones with a potential to upgrade to Indicated category, and other gold occurrences on the property.
- Additional structural geology investigations to improve the structural geology model of the QV1 and QV' zones with a specific emphasis on the brittle fault model to improve hydrogeology and rock geotechnical modelling.
- Optimization of the mine design to correctly size development infrastructure and equipment.
- Optimization of the mining contract and mine schedules at both the Bagassi South Zone and 55 Zone to fully and best utilize personnel and equipment resources.
- Additional metallurgical modelling as part of the design process of Bagassi South to better understand SAG breakage that will come with secondary crushing of the feed.
- Review of the SAG mill lifter angle.
- Continue ongoing climate monitoring.
- Ongoing hydrogeology modelling to confirm mine dewatering requirements, and better understand the rebound of groundwater levels and movement post closure.
- Kinetic leaching testing to characterize long term leaching potential of tailings materials and geochemical modelling to predict water quality from seepage from tailings, other project infrastructure, and from underground workings during operation and after closure.
- Continue regular monitoring of drinking water quality and seepage from project infrastructure.
- Review and stochastic modelling of the site water balance.
- Locate additional air and noise monitoring points and consider cover designs or dust suppression systems for the waste rock dumps and tailings storage facility to minimize windblown dust.
- Develop a detailed project implementation plan to precisely define the strategy that will be executed to develop the project successfully.

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1 Introduction and Terms of Reference

The Yaramoko Gold Project is a new operating underground gold mine located approximately 200 kilometres southwest of Ouagadougou, the capital city of Burkina Faso. Roxgold Inc. (Roxgold), a Canadian public company domiciled in Toronto, Ontario, is the sole owner of the project, with shares listed on the Toronto Stock Exchange under the symbol ROXG. The Government of Burkina Faso retains a 10 percent carried interest in the project.

The project primarily targets high tenor gold mineralization in the 55 Zone associated with quartz veining. In 2014, SRK Consulting (Canada) Inc. (SRK) was the lead author of a feasibility study that examined the viability of the proposed mine and mill complex. The results of that study were disclosed by Roxgold in April 2014 and are supported by a technical report filed on June 4, 2016. Construction of the underground mine and gold concentrator began during the third quarter of 2015 and the project poured its first gold in May 2016. The Yaramoko Gold Project is now an operating gold mine.

Since the feasibility study, a substantial amount of new infill drilling has been completed on the 55 Zone which has led to the generation of a revised mineral resource model. New mineral resources were also delineated at the Bagassi South Zone, located 1.8 kilometres south of the 55 Zone. In April 2016, SRK prepared a maiden mineral resource model for that new gold deposit. New drilling at The Bagassi South Zone has also led to the generation of a revised mineral resource model for the project. The revised mineral resource models have also resulted in a revised Mineral Reserve Statement for the 55 Zone accompanied by an updated life of mine plan.

In February 2017, Roxgold commissioned SRK to visit the property and to prepare a revised mineral resource model for the 55 Zone. This mandate also incorporated support to Roxgold to prepare an updated mineral reserve statement and accompanying life of mine plan. SRK has also supported Roxgold undertaking a feasibility study for the Bagassi South Zone leading to the maiden Mineral Reserve Statement for the Bagassi South Zone accompanied by a life of mine plan.

SRK's services were rendered between March and December 2017 leading to the preparation of revised Mineral Resource Statements for the 55 Zone and Bagassi South Zone, a revised 55 Zone Mineral Reserve Statement and the maiden Mineral Reserve Statement reported herein for the Bagassi South Zone that was disclosed publicly by Roxgold in a news release on November 6, 2017.

This technical report documents the current status of the Yaramoko Gold Project. It was prepared by SRK for Roxgold following the guidelines of the Canadian Securities Administrators' National Instrument 43-101 and Form 43-101F1. The mineral resource statements reported herein were prepared in conformity with generally accepted CIM *Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines*.

1.1 Terms of Reference

In February 2017, SRK was commissioned by Roxgold to provide technical support and collaboration, leading to the revised mineral resource and reserve statements for the 55 Zone as well as an updated Mineral Resource Statement and maiden Mineral Reserve Statement for the Bagassi South Zone, supported by a feasibility study for the Bagassi South Zone. Responsibilities for each report section are listed in Table 1.

Table 1: Responsibility of Technical Report Sections

Section	Title	Responsible
-	Executive Summary	SRK / Roxgold
1	Introduction	SRK
2	Reliance on Other Experts	SRK
3	Property Description and Location	SRK / Roxgold
4	Accessibility, Climate, Local Resources, Infrastructure and Physiography	SRK / Roxgold
5	History	SRK / Roxgold
6	Geological Setting and Mineralization	SRK / Roxgold
7	Deposit Types	SRK / Roxgold
8	Exploration	SRK / Roxgold
9	Drilling	SRK / Roxgold
10	Sample Preparation, Analysis and Security	SRK / Roxgold
11	Data Verification	SRK / Roxgold
12	Mineral Processing and Metallurgical Testing	Roxgold
13	Mineral Resource Estimates	SRK / Roxgold
14	Mineral Reserve Estimates	SRK / Roxgold
15	Mining Methods	SRK / Roxgold
16	Recovery Methods	Roxgold
17	Project Infrastructure	SRK / Roxgold
18	Market Studies and Contracts	SRK / Roxgold
19	Environmental Studies, Permitting and Social or Community Impact	Roxgold
20	Capital Cost and Operating Costs	SRK / Roxgold
21	Economic Analysis	SRK / Roxgold
22	Adjacent Properties	SRK / Roxgold
23	Other Relevant Data and Information	SRK / Roxgold
24	Interpretation and Conclusions	SRK / Roxgold
25	Recommendations	SRK
26	References	SRK

1.2 Work Program

This technical report, which is a collaborative effort between Roxgold and SRK personnel, documents the following significant updates since the 2014 technical report:

- Updated 55 Zone mineral resources and reserves (reported in Roxgold news release dated April 18, 2017).
- Updated Bagassi South Zone Mineral Resource Statement (reported in Roxgold news release dated July 19, 2017).
- Maiden Bagassi South Zone Mineral Reserve Statement (reported in Roxgold news release dated November 6, 2017).
- Conceptual study that demonstrates the impact of the inclusion of Inferred material at 55 Zone and at Bagassi South to the life of mine plan.

The technical work to support the content of this technical report was primarily undertaken in Toronto, Ontario during the period of March to December 2017.

The mineral resource and reserve statements reported herein were prepared in conformity with the generally accepted *CIM Exploration Best Practices Guidelines* and *CIM Estimation of Mineral Resource and Mineral Reserves Best Practices Guidelines*. This technical report was prepared

following the guidelines of the Canadian Securities Administrators' National Instrument 43-101 and Form 43-101F1.

1.3 Basis of Technical Report

This report is based on information collected by SRK during their investigations, including site visits, and on additional information provided by Roxgold throughout the course of the work. The authors have no reason to doubt the reliability of the information provided by Roxgold. Other information was obtained from the public domain. This report is based on the following sources of information:

- Discussions with Roxgold personnel.
- A previous technical report prepared by SRK., "Technical Report for the Yaramoko Gold Project, Burkina Faso," dated June 4, 2014 (the Feasibility Study technical report).
- Site visits (details described in Section 11.2.1)
- Internal reports relating to various aspects of the 55 Zone and the Bagassi South Zone.
- Information obtained on current operational activities at the 55 Zone.
- Project information obtained from Roxgold including planned owners team mine manpower, planned labour rates, gold price, exchange rates, preliminary site layout, electrical power cost, and bulk cement cost.
- Additional information from the author's project databases, and from public domain sources.

A gold price of \$1,250 per ounce has been used for mine planning.

1.4 Qualifications of SRK and SRK Team

The SRK Group comprises more than 1,400 professionals, offering expertise in a wide range of resource engineering disciplines. The independence of the SRK Group is ensured by the fact that it holds no equity in any project it investigates and that its ownership rests solely with its staff. These facts permit SRK to provide its clients with conflict-free and objective recommendations. SRK has a proven track record in undertaking independent assessments of mineral resources and mineral reserves, project evaluations and audits, technical reports and independent feasibility evaluations to bankable standards on behalf of exploration and mining companies, and financial institutions worldwide. Through its work with many major international mining companies, the SRK Group has established a reputation for providing valuable consultancy services to the global mining industry.

The mineral resource evaluation work and the compilation of this technical report was completed by Mr. Sébastien Bernier, PGeo (APGO #1847), in collaboration with Mr. Yan Bourassa, PGeo (APGO #1336), VP Geology for Roxgold. Mr. Benny Zhang, PEng (PEO#100115459) and Mr. Craig Richards, PEng (APEGA#41653) Principal Mining Engineer for Roxgold are responsible for the mineral reserves. Mr. Paul Criddle, FAUSIMM (#309804), Chief Operating Office for Roxgold is responsible for the Sections 12,16 and 19 of this report. By virtue of their education, membership to a recognized professional association and relevant work experience, Messrs. Bernier, Bourassa, Zhang, Richards and Criddle are Qualified Persons as this term is defined by National Instrument 43-101. The above qualified persons have visited the site on various occasions.

Mr. Ryan Hairsine, Manager of Projects from Roxgold made significant contributions to the compilation of the technical report. Mr. Ken Reipas, PEng (PEO # 100015286) an Associate Consultant from SRK contributed to Sections 15, 20 and 21 and Ms. Caitlyn Adams, GIT a Consultant from SRK contributed to the overall compilation of the technical report.

Mr. Glen Cole, PGeo (APGO#1416), a Principal Consultant with SRK, reviewed drafts of this technical report prior to their delivery to Roxgold as per SRK internal quality management procedures. Mr. Cole did not visit the project.

1.5 Acknowledgement

SRK would like to acknowledge the support and collaboration provided by Roxgold personnel for this assignment. Their collaboration was greatly appreciated and instrumental to the success of this project.

1.6 Terminology

Metric units of measure and US dollars are used and referenced in this report, unless otherwise stated.

Referenced mine grid elevations are metres above sea level (masl) plus 5000. The terms levels, sublevels and elevations are used interchangeably to describe underground mining levels.

1.7 Declaration

SRK's opinion contained herein and effective **November 6, 2017** is based on information collected by SRK throughout the course of SRK's investigations. The information in turn reflects various technical and economic conditions at the time of writing this report. Given the nature of the mining business, these conditions can change significantly over relatively short periods of time. Consequently, actual results may be significantly more or less favourable.

This report may include technical information that requires subsequent calculations to derive subtotals, totals, and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, SRK does not consider them to be material.

SRK is not an insider, associate or an affiliate of Roxgold, and neither SRK nor any affiliate has acted as advisor to Roxgold, its subsidiaries or its affiliates in connection with this project. The results of the technical review by SRK are not dependent on any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings.

2 Reliance on Other Experts

SRK has not performed an independent verification of the land title and tenure information as summarized in section 3 of this report. SRK did not verify the legality of any underlying agreement(s) that may exist concerning the permits or other agreement(s) between third parties, but has relied on Maitre Bobson Coulibaly, Roxgold's solicitor in Burkina Faso, as expressed in a title opinion provided to Roxgold on December 15, 2017. A copy of the title opinion is provided in Appendix A. The reliance applies solely to the legal status of the rights disclosed in Sections 3.1 and 3.2 below.

SRK relied on the opinion of Ms. Natacha Garoute, CPA, Chief Financial Officer of Roxgold, regarding certain aspects of the taxation regime in Burkina Faso as it will apply to the Yaramoko Gold Project. The reliance only applies to the taxation information and assumptions considered for the preparation of a financial model for the Yaramoko Gold Project as discussed in Section 21.

SRK was informed by Roxgold that there are no known litigations potentially affecting the Yaramoko Gold Project.

3 Property Description and Location

The Yaramoko Gold Project is located approximately 200 kilometres southwest of Ouagadougou in the Balé Province in western Burkina Faso (Figure 1). The property consists of one exploration permit of approximately 180 square kilometres and one exploitation permit of approximately 16 square kilometres. Exploration permits are granted by order of the *Ministère des Mines, des Carrières et de l'Énergie* of Burkina Faso. The Government of Burkina Faso retains a 10 percent carried interest on the award of an Industrial Operating Permit, free of all charges, by granting these permits. This participation right will in no case be diluted.

The centre of the 55 Zone gold deposit on the Yaramoko Gold Project is located at 11.75 degrees latitude north and 3.28 degrees longitude west.

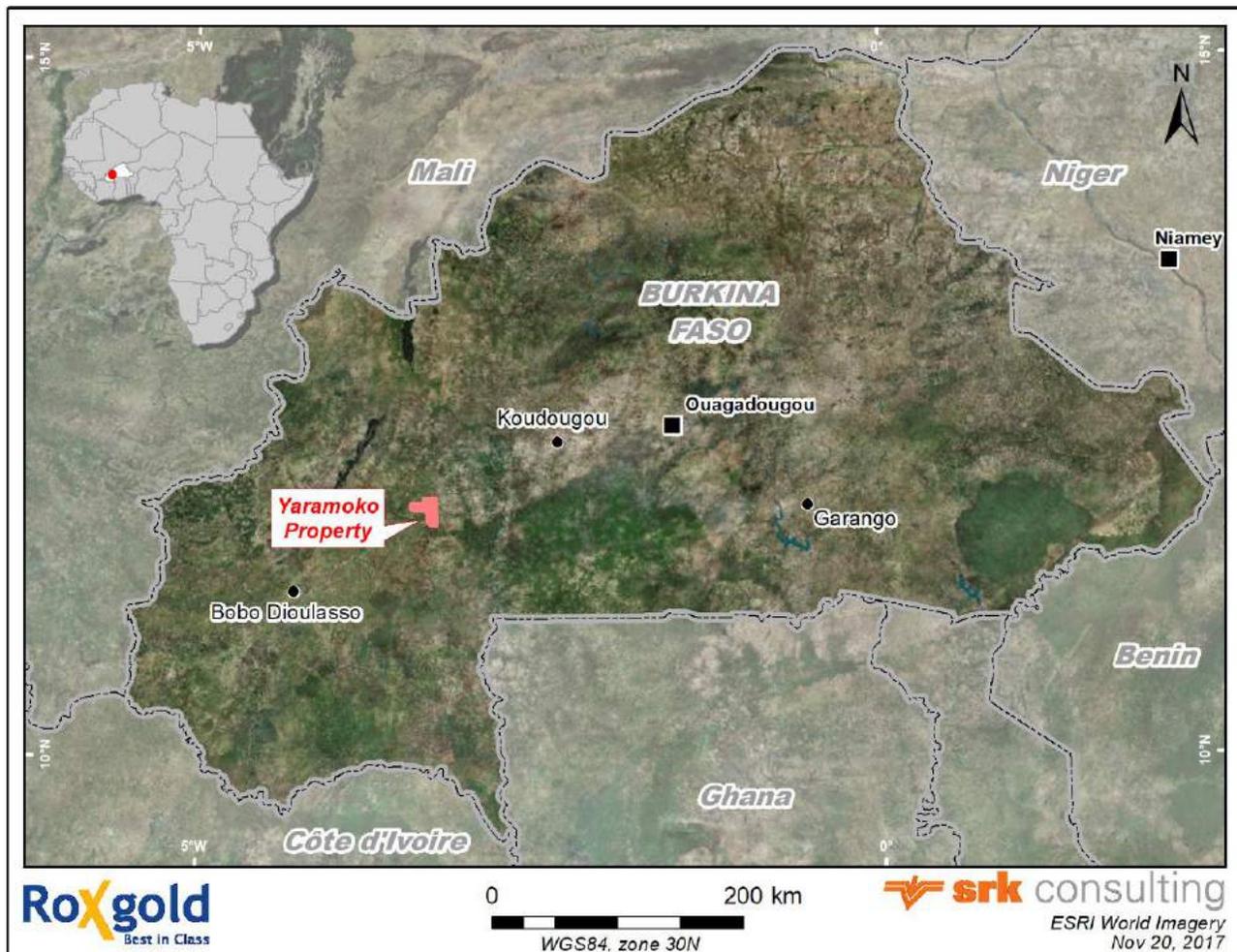


Figure 1: Location of the Yaramoko Gold Project

3.1 Mineral Tenure

The land tenure information presented herein is derived from copies of the order of the *Ministère des Mines, des Carrières et de l'Énergie* granting the exploration permit. The original Yaramoko Exploration Permit was issued for gold exploration and granted by *Arrêté ministériel* No. 2013-000102/MME/SG/DGMD and was registered in the name of Roxgold Burkina Faso SARL (Roxgold BF), a wholly owned subsidiary of Roxgold. The Yaramoko Exploration Permit lapsed on September 8, 2016, and was renewed under the new name of Bagassi Exploration Permit on December 2, 2016. The Yaramoko Gold Project operates under a separate mining lease, the Yaramoko exploitation permit. The permit is situated in the Province of Balé and covers an area of 167 square kilometres. The boundary of the permit is not physically marked on the ground and has not been legally surveyed, but is defined by corner posts positioned according to geographic coordinates (UTM Clarke 1880 ellipsoid, Adindan datum, Zone 30) as indicated on the land tenure map (Table 2 and Figure 2).

The deposits of the Bagassi South Zone are outside the existing mining permit but within the exploration permit, as per Figure 2.

Table 2: Boundary of the Bagassi South Zone Exploration Permit

Corner	Easting*	Northing*
A	465,800	1,300,250
B	464,000	1,300,250
C	464,000	1,301,205
D	452,800	1,301,205
E	452,800	1,306,000
F	462,968	1,306,000
AQ	465,600	1,310,000
AR	471,700	1,310,000
AS	471,700	1,301,823
AT	468,327	1,301,823
AU	468,327	1,299,200
BI	469,118	1,298,008
BP	470,108	1,297,377
BQ	470,108	1,295,883
BR	471,700	1,295,883
BS	471,700	1,295,542
BT	472,500	1,295,542
BU	472,500	1,289,000
BV	467,500	1,289,000
BW	467,500	1,291,195
BX	465,800	1,291,195

* UTM Projection – Clarke 1880 Adindan datum, Zone 30

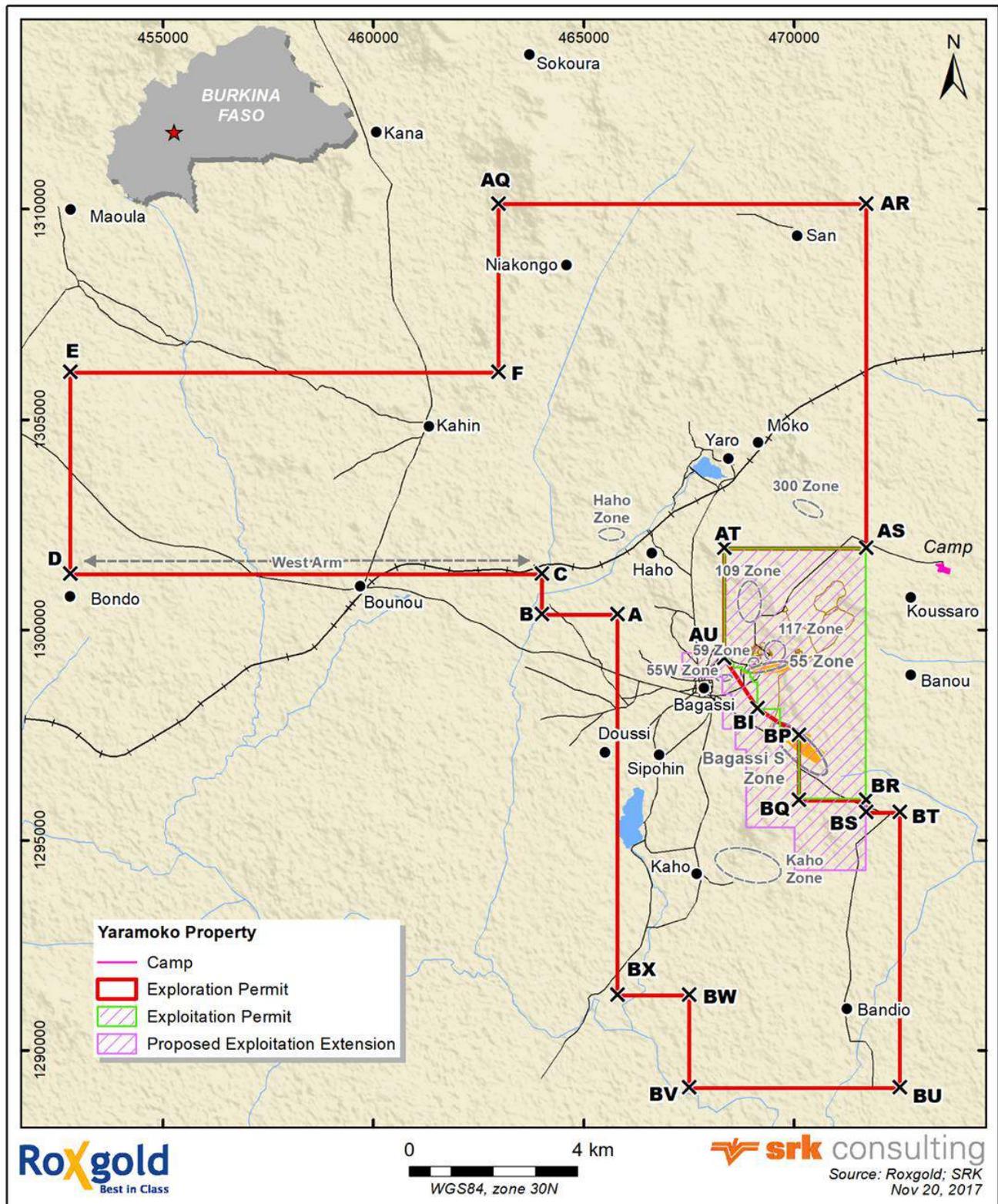


Figure 2: Land Tenure Map

Roxgold Sanu SA was awarded a *Permis d'exploitation industrielle* through *Decree 2015-074 PRES-TRANS/PM/MME/MEF/MERH* for the Yaramoko property on January 30, 2015. This was followed by the approval of the National Mines Commission meeting held on May 24, 2015. Roxgold is the sole owner of the property subject to a 10 percent carried interest held by the Government of Burkina Faso. The boundary of the permit is defined by corner posts positioned according to geographic coordinates (UTM Clarke 1880 ellipsoid, Adindan datum, Zone 30).

In accordance with Article 34 of the Mining Code, the holder of a mining license may request the extension of the geographical area of its license. The extension request must be made during the first period of the license concerned. The requested perimeter must be contiguous to the initial mining title and extended through lines drawn on the map in north-south and east-west directions (i.e. horizontal or vertical lines only). The requested perimeter should also not exceed half the area of the existing permit (i.e. extend to a maximum of 23.55 square kilometres). The extension decree only defines the geographic scope of the original mining license, which thus stays under the Mining Code that granted it (2003 in this case), and the dates of grant or renewal are unchanged. Roxgold intends to follow the prescribed process at both the Mines and Environment Ministries to effectively permit the Bagassi South Zone and bring it into the Yaramoko Mining Permit.

The coordinates of the existing and proposed exploitation permit extension are listed in Table 3 and correspond to the perimeters illustrated in Figure 3.

Table 3: Coordinates of the Existing and Proposed Exploitation Permit Extension

UTM Projection – Clarke 1880 Adindan Datum, Zone 30N					
Roxgold SANU Exploitation Permit			Proposed Extension		
Area:	15.7	km ²	Area:	23.43	km ²
Point	Easting (mE)	Northing (mN)	Point	Easting (mE)	Northing (mN)
A	468327	1301823	A	468327	1301823
B	471689	1301823	B	471689	1301823
C	471689	1295883	C1	471689	1294180
D	470108	1295883	D1	470000	1294180
E	470108	1297377	E1	470000	1295200
F	469893	1297377	F1	468850	1295200
G	469893	1297483	G1	468850	1297050
H	469710	1297483	H1	468600	1297050
I	469710	1297570	I1	468600	1297530
J	469650	1297570	J1	468300	1297530
K	469650	1298008	K1	468300	1298050
L	469118	1298008	L1	468500	1298050
M	469118	1298653	M1	468500	1298370
N	469021	1298653	N1	468280	1298370
O	469021	1298760	O1	468280	1298770
P	468941	1298760	P1	467340	1298770
Q	468941	1298870	Q1	467340	1299340
R	468859	1298870	R1	468327	1299340
S	468859	1298930			
T	468765	1298930			
U	468765	1298990			
V	468555	1298990			
W	468555	1299090			
X	468450	1299090			
Y	468450	1299200			
Z	468327	1299200			

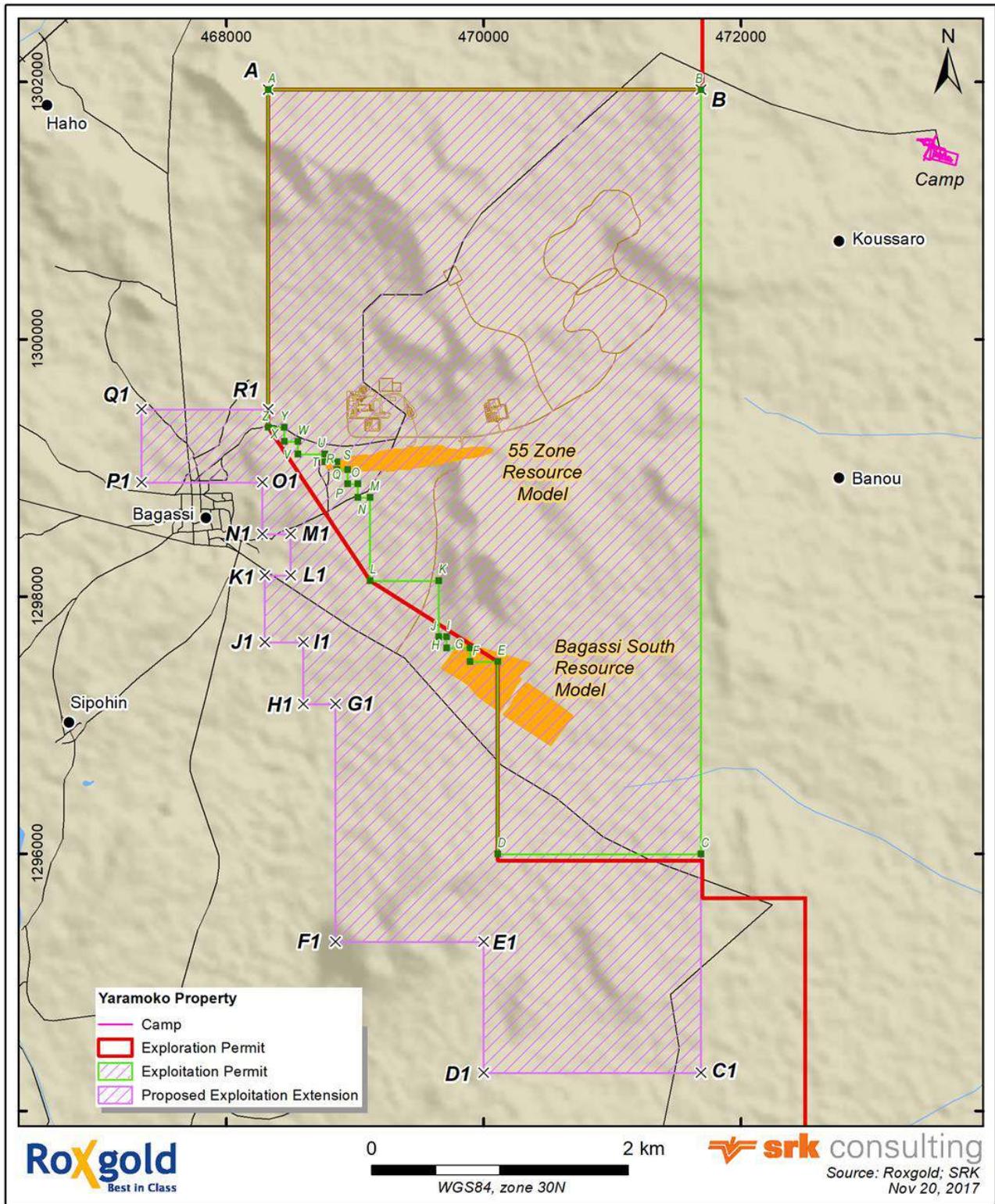


Figure 3: Proposed Exploitation Permit Extension

3.2 Underlying Agreements

On October 27, 2010, Roxgold announced the completion of the acquisition of all outstanding shares of 0877148 B.C. Ltd. The transition consisted of the exchange of one common share of Roxgold for each outstanding share on 0877148 B.C. Ltd. (5,625,000 shares). Pursuant to the acquisition of 0877148 B.C. Ltd., Roxgold complied with the terms of an option agreement between 0877148 B.C. Ltd. and Riverstone Resources Inc. (Riverstone, renamed True Gold Mining Inc.) to earn up to 60 percent in the various exploration permits in Burkina Faso, including the Yaramoko property.

On September 21, 2011, Roxgold announced the acquisition of the remaining 40 percent interest in the Yaramoko exploration permit and other Riverstone permits in Burkina Faso. Under the terms of the agreement, Riverstone received a total consideration of approximately C\$33.5 million, comprising C\$17 million in cash and 16 million Roxgold common shares valued at C\$1.03 per common share (based on the closing share price of Roxgold common shares on September 20, 2011).

In light of the ownership change, the *Ministère des Mines, des Carrières et de l'Énergie* issued the transfer of the exploration permit to Roxgold from Riverstone on September 18, 2012. The permit is now 100 percent controlled by Roxgold (subject to the 10 percent Burkina Faso carried interest).

3.3 Permits and Authorization

Roxgold Sanu SA was awarded a *Permis d'exploitation industrielle*, the Burkina Faso equivalent of a mining permit, through *Decree 2015-074 PRES-TRANS/PM/MME/MEF/MERH* for the Yaramoko property on January 30, 2015. This was followed by the approval of the National Mines Commission at a meeting held on May 24, 2015.

The Convention document was approved on May 28, 2015 by the Council of Ministers, and was signed by Minister Ba on July 13, 2015. Roxgold built the mine, and is presently operating, under this document, which was designed under Mining Code 2003 (Law 031-2003/AN dated May 8, 2003) and to which grandfathering clauses still apply.

The primary environmental approval required to develop a project in Burkina Faso is an *Avis de Conformité et de Faisabilité Environnementale*, which is issued by the Ministry of Environment and Sustainable Development through its branch *Bureau Nationale des Evaluations Environnementales* (BUNEE). Such an *Avis* indicates a positive decision of the Minister of Environment. As the deposits of the Bagassi South Zone are outside the existing mining permit, an environmental and social impact assessment (ESIA) is required, which was submitted to the government on October 13, 2017, and is expected to be approved in December 2017. Further information on the environmental permitting processes undertaken for the Yaramoko Gold Project can be found in Section 19.

In accordance with Article 34 of the Mining Code, the holder of a mining license may request the extension of the geographical area of its license. The extension request must be made during the first period of the license concerned. The requested perimeter must be contiguous to the initial mining title and extended through lines drawn on the map in north-south and east-west directions (i.e. horizontal or vertical lines only). The requested perimeter should also not exceed half the area of the existing permit.

The request for extension of the geographical scope of a permit must be filed in ten (10) copies to Mining Cadastral Office and contain the following:

- A written request to the Minister of Mines.
- References of the mining license for which extension is sought.
- Definition of the vertices of the perimeter requested and its area.
- A detailed report specifying the reasons for the extension.
- An extract of the topographic map at 1:200,000 scale on which is plotted the original mining license and the requested perimeter.
- A detailed plan at an appropriate scale where the coordinates of the vertices of the perimeter requested are linked to notable points and well defined.
- An updated study of the development and exploitation plan provided at the permit application for the initial mining but this time, taking into account the extension requested.

The study process at the Ministry shall check the following:

- Verification of component parts of the filed application.
- A projection of the requested perimeter upon the cadastral topographic map to check for potential overlaps in relation to existing mining or exploration titles.
- The determination of the area of the requested perimeter.
- Scrutiny of the development and operating plan.

If the application is non-compliant, the requester is notified about the identified weaknesses and allowed fifteen (15) working days to provide the missing data, or correct the shape of the perimeter of the application. Beyond this period, any incomplete request for extension is rejected. In case of rejection, the applicant shall be notified as to the grounds for rejection.

If the expansion request is deemed appropriate and the *Avis de Conformité et de Faisabilité Environnementale* has been granted, the process continues as if it were the award of a new mining license. This gives rise to a decree approved by the Council of Ministers

The extension decree only defines the geographic scope of the original mining license, which thus stays under the Mining Code that granted it (2003 in this case), and the dates of grant or renewal are unchanged.

Commencing with the filing of the application, the law allows the Ministry of Mines four months to submit it to the Council of Ministers.

Roxgold intends to follow this prescribed process at both the Mines and Environment Ministries to effectively permit the Bagassi South Zone.

SRK is unaware of any significant factors and risks, other than those discussed herein, that may affect access, title, or the right or ability of Roxgold to perform work on the Yaramoko Gold Project.

3.4 Environmental Considerations

The Yaramoko Gold Project is situated in a rural part of Burkina Faso characterised by no industrial activities. Environmental liabilities on the project site are limited to minor land disturbance and the use of mercury for gold extraction by artisanal miners. The presence of these artisanal miners is a social risk to the project, and Roxgold is undertaking the necessary steps to manage this risk. The environmental and social aspects are discussed in greater detail in Section 19.

3.5 Mining Rights in Burkina Faso

The state owns title to all mineral rights in Burkina Faso. The Government of Burkina Faso passed into law Order No. 031-2003/AN pertaining to the mining code that is administered by the *Ministère des Mines, des Carrières et de l'Énergie*. The mining code provides the legal framework for the mining industry in the country. Mineral rights are acquired through a map based system by direct application to the *Ministère des Mines, des Carrières et de l'Énergie*. The government retains 10 percent free equity in all mining ventures. The Yaramoko Gold Project is permitted under the framework of the 2003 code. An updated code has been passed in 2015 and is applicable to new projects.

There are six types of mineral rights:

- Exploration Permit (*Permis de recherche*)
- Industrial Operating Permit (*Permis d'exploitation industrielle*)
- Semi-Mechanized Small-Scale Operating Permit (*Permis d'exploitation artisanale semi-mécanisée*)
- Prospecting Authorization (*Autorisation de prospection*)
- Traditional Artisanal Mining Authorization (*Autorisation d'exploitation artisanale traditionnelle*)
- Quarrying Authorization (*Autorisation d'exploitation de carriers*)

An Exploration Permit (*Permis de recherche*), such as the Bagassi Exploration Permit granted to Roxgold, is granted by order of the Minister of Mines to any person or legal entity (not necessarily a Burkinabe company) by application to the administrative authorities. The surface area of an exploration permit cannot exceed 250 square kilometres and the application document must include payment of the application fee of 1,000,000 CFA francs. The conditions for granting a permit require the submission of an exploration program and a yearly budget to maintain the permit, with work starting within six months of being granted the permit. A minimum sum of money must be spent by the permit holder each year on exploration, and annual reports and quarterly summary reports documenting the exploration undertaken are to be submitted. An Exploration Permit may be assigned or transferred subject to approval of the Minister of Mines.

The Exploration Permit is valid for three years commencing on the date of the grant of the order. It may be renewed twice for subsequent periods of three years. At the second renewal, the size of the permit must be reduced by at least 25 percent. The Bagassi exploration permit covers 179 square kilometres. A renewal application must be filed within at least three months of the expiration date of the permit. The renewal is granted provided that the holder has fulfilled their obligations pursuant to the mining code and that the application complies with mining regulations.

Exploration Permits give holders the exclusive right to research the mineral substances applied for and to use freely the products extracted during research. An Exploration Permit can be extended, via subsequent application, to other mineral substances within its perimeters. The Bagassi South Exploration Permit is solely for the exploration of gold. During the validation of an Exploration Permit, its holder has the right to apply for an Industrial Operating Permit if, in conducting exploration activities, the holder has outlined a mineable reserve in compliance with the mining code.

Industrial Operating Permits (*Permis d'exploitation industrielle*) are granted by the Council of Ministers on the proposal of the Minister of Mines to holders of Exploration Permits who are in compliance with the mining code and have submitted an application at least three months before the

expiry of the validity period of the Exploration Permit. Applications must include a feasibility study and a mining and development plan noting environmental impact with attenuation and monitoring plans. Any change to the feasibility study, ore deposit development, and production plan during the life of the permit must be approved by the Mining Administration and the National Mining Commission.

The Exploration Permit for the property perimeter is terminated once an Industrial Operating Permit is granted, and the holder is given the exclusive right to conduct exploration and exploitation of the deposit in the area, where they may possess, hold, transport, and sell extracted mineral substances on domestic or foreign markets. They are also given the right to build ore treatment installations and transport extracted minerals. For large mines, the permit is valid for 20 years from the date of grant and 10 years from the date of grant for small mines; in both cases the permit is renewable for a consecutive period of five years until the deposit is exhausted. An Industrial Operating Permit is subject to variable application, renewal, or transfer fees based on size of the operation. The surface area of an Industrial Operating Permit is contingent on the size of the deposit and infrastructure requirements, and must have its perimeter marked by a chartered surveyor. The holder of an exploitation permit may request the extension of the geographical area of its license. The extension request must be made during the first period of the permit concerned. The requested perimeter must be contiguous to the initial mining title and extended through lines drawn on the map in north-south and east-west directions (i.e. horizontal or vertical lines only). The requested perimeter should also not exceed half the area of the existing permit.

Industrial Operating Permit holders must begin production activities within two years of the grant date, however, an exemption to this may be obtained from the Minister of Mines subject to payment of fees for two years and is renewable for two additional two-year periods. After a six-year exemption, the issuing authority may withdraw the permit. Licensing for small mine operations are subject to an allotment of 10 percent of the company or vendor's shares of the venture to the state. Large mine operations are not subject to this allotment.

Semi-Mechanized Small-Scale Operating Permits (*Permis d'exploitation artisanale semi-mécanisée*) are granted by the Mining Administration after a public survey and following the opinion of the relevant administrative authorities and concerned local communities. Their holders have the exclusive right to research and mine deposits on surface and at depth within the permit perimeters. These permits have real estate rights open to mortgage or pledge and further confer to their holders the right to own, hold, and transport extracted mineral substances, and then to sell the products on domestic or foreign markets. The permits are valid for five years from the date of the grant and, following the submission of a mining regulation compliant application, are renewable thereafter for consecutive periods of three years each by the authority who issued them originally.

Semi-Mechanized Small-Scale Operating Permits are granted for surface areas of 100 hectares, of which the perimeter is required to be marked out by a chartered surveyor. Holders are required to mine mineral substance within the perimeter rationally, observing public health, work safety, environmental, and product marketing standards. Permit holders are prohibited from interfering with cultivation activities and must pay compensation for losses to farmers. Deposits are to be mined in compliance with the deposit summary evaluation and mine plan, and changes must be approved by the Mining Administration. A mining title must be obtained by persons or entities other than the permit holder before mining masses consisting in barrows, waste heaps, and quarrying residues.

Prospecting Authorizations (*Autorisation de prospection*) are issued by the Mining Administration to physical or legal entities irrespective of nationality and confer to their holders the non-exclusive right of prospecting all mineral substances on the surface of the granted perimeter, excluding prohibited or protection areas. The authorization is personal and nominal, not assignable or conveyable, and may

be withdrawn from holders who do not fulfill their obligations in accordance with the mining code. As of the date of issue, prospecting authorizations are valid for one year and are renewable by request for further one-year terms by the decision of the issuing authority, as many times as requested by the holder.

Traditional Artisanal Mining Authorization (*Autorisation d'exploitation artisanale traditionnelle*) are granted by the Mining Administration following the opinion of administrative authorities and concerned local communities to Burkinabe physical entities, exclusively Burkinabe sharing cooperatives, and companies governed by Burkinabe law with a majority of Burkinabe capital. They confer to their holders the exclusive right of traditional small-scale mining of mineral substances within the granted perimeter, determined conditions and to a depth set by mining regulations, with no special right for obtaining an Industrial Operating Permit. Permit holders must mine mineral substances rationally while observing public health, work safety, environment, and marketing standards and may not undertake activities in cultivation fields or block normal irrigation. Permit holders must compensate for losses to farmers. Permits cannot prevent authorized research activities on their granted surface, which is to be square or rectangle, ranging from 1 to 10 hectares in size. When an Industrial Operating Permit occupies the same surface, it will not be renewed, however, its holders are entitled to indemnity from the new owner.

These permits are real property and are not open to mortgage, and are a lease of land following the authorization of the Mining Administration. They are not assignable and may be conveyed following death of personal incapacity subject to the approval of the Mining Administration. Demarcation must be carried out on the permit surface area, or the Mining Administration will do so at the permit holder's expense. Permits are valid for two years and are renewable for further two-year periods by the original issuing authority, provided the perimeter is not subject to a request for an Industrial Operating permit.

Quarrying Authorizations (*Autorisation d'exploitation de carriers*) are made by the Mining Administration according to mining regulation and to the provisions applicable to mining titles with changes made where necessary. There are two types of Quarrying Authorizations: permanent and temporary, which confer to their recipients the exclusive right to quarry substances within their perimeters and entitle them to own, hold, or transport extracted mineral substances and to dispose of them on domestic markets and export them. Authorizations for both are granted by the Minister of Mines following opinion of administrative authorities and concerned local communities to all physical or legal entities submitting a mining regulation compliant application. Both allow their holder to establish packaging and primary processing facilities for quarrying substances. Temporary operating authorizations for quarries can intervene only after the payment of operating tax. Landowners must obtain authorization if they wish to operate quarrying themselves on their lands. They do not however require authorization when quarrying for exclusively interior purposes.

Permanent Quarrying Authorizations are valid for five years from the date of the grant and are renewable for three years each, under the same conditions as other permits. Temporary Quarrying Authorizations are not renewable and valid only for the period defined, not exceeding one year.

The surface for which Quarrying Authorizations are granted is defined in the authorization and must be marked in compliance with mining regulations with a chartered surveyor. Failure to do so will result in the Mining Administration doing so at the recipient's expense.

4 Accessibility, Climate, Local Resources, Infrastructure, and Physiography

4.1 Accessibility

The Yaramoko Gold Project is located approximately 200 kilometres southwest of Ouagadougou in the Balé Province of Burkina Faso. It can be reached by two routes via the country's highway system. The first route travels west on paved highway from Ouagadougou for approximately 200 kilometres to the village of Ouahabou, then north-northwest by laterite road for approximately 20 kilometres to the village of Bagassi, located at the centre of the property. The second route is accessed via the city of Boromo, approximately 180 kilometres southwest of Ouagadougou, then west on laterite road for approximately 50 kilometres.

Burkina Faso can be reached by plane with international flight service available at the Ouagadougou and Bobo-Dioulasso airports. Numerous secondary airfields are found throughout the country. Burkina Faso has a reasonably developed asphalt highway system that connects the country's major cities with neighbouring countries.

The National Railway of Burkina Faso is a narrow-gauge railroad that connects Kaya and Ouagadougou with the port city of Abidjan in Cote d'Ivoire, and divides the Yaramoko Gold Project.

4.2 Local Resources and Infrastructure

Roxgold's exploration camp has been relocated from the village of Koussaro to Yaramoko's Sabarya camp. The 306-person camp was newly built in 2015 with indoor plumbing, electricity (grid, or back-up diesel generated power), internet and DSTV connection. The camp offers a secure area for logging and processing drill core and for storing exploration equipment as well as housing the workforce. From the camp, the mine is accessed by a 2-kilometre laterite road constructed by Roxgold. The village of Bagassi is centred on the property and has a population of approximately 3,000 people. It has recently been connected to the country's national power grid.

The closest major city is Boromo, located some 50 kilometres away. It is served by the national power grid, and hosts a hospital and additional suppliers, however, major purchases and procurements are made in Ouagadougou.

Burkina Faso is covered by a mobile telephone network allowing for clear and reliable international and national communication from almost anywhere in the country.

Agriculture is the main industry in the region with many fields of millet, groundnut, and cotton. Bagassi or any of the larger surrounding villages could provide mining personnel. Local artisanal miners, known as *orpailleurs*, are currently working in the Bagassi South Zone area of the property.

Roxgold has established a capable community relations function that ensures interactions with this group are cordial, and to date, no major issues have been encountered between the company, company representatives, and the *orpailleurs*. Security measures are in place to monitor the situation.

4.3 Climate

The climate is semi-arid, with a rainy season from April to October and a dry season that is mild to warm from November to February and hot from March to June during the onset of the rainy season. Temperatures range from a low of approximately 15 degrees Celsius in December to high of approximately 45 degrees Celsius in March and April.

Annual total rainfall in the area averages 800 millimetres. Burkina Faso's climate allows for exploration to be carried out year-round. Geological fieldwork and rotary drilling are usually conducted during the dry season between January and May, while diamond drilling can be conducted throughout the year.

4.4 Physiography

The Yaramoko Gold Project is covered by hills of volcanic rocks rising to a maximum of 450 metres above sea level and is surrounded by vast lateritic plains extending below the hills. A network of backwaters and rivers, flowing generally to the northeast-southwest and north-south toward the large Basle River which drains the property.

Vegetation in uncultivated areas comprises mostly savannah woodlands, with dense bush growing near streams and rivers. Typical landscape images from the Yaramoko Gold Project area during the dry and wet season are shown in Figure 4.

Agriculture is the main industry in the region with farmers cultivating staple crops such as millet, rice, sorghum, maize corn, and cash crops such as cotton and groundnuts. Deforestation is widespread over the permit area. Wildlife is mostly restricted to small game and birds, but snakes are common, and a few monkeys have been reported.

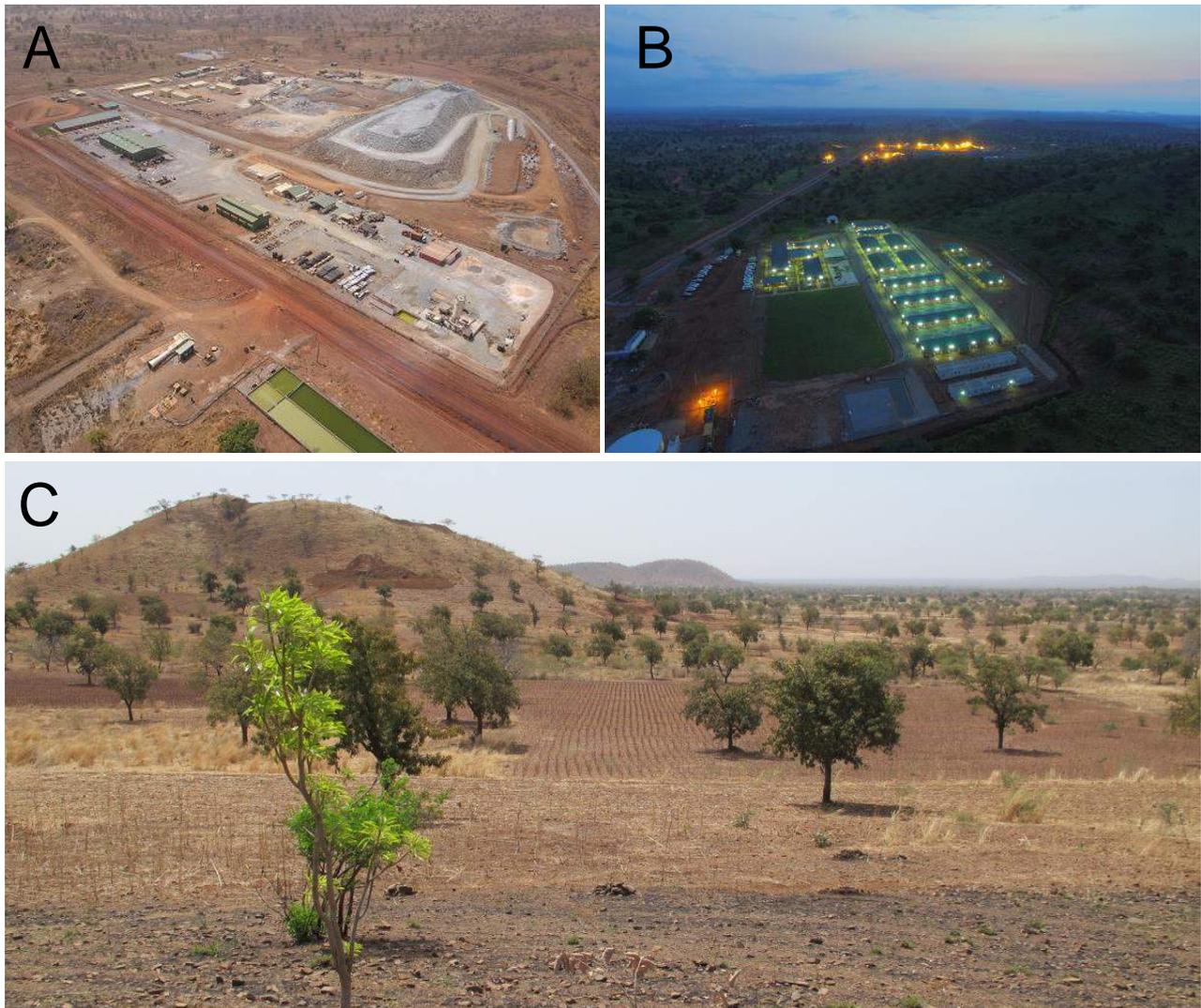


Figure 4: Infrastructure and Landscape in the Project Area

A: Aerial view of the Yaramoko Gold Project – Processing and Mining Facilities

B: Aerial view of the Yaramoko Gold Project – Accommodation Camp

C: Typical landscape in the project area

5 History

The Yaramoko Gold Project area has been explored since 1974. Ownership of the property has changed only once; the Yaramoko Exploration Permit was initially granted to Riverstone in 2006, and was transferred to Roxgold in September 2012.

Between 1974 and 1995, *le Programme des Nations Unies pour le Développement* (PNUD) and the *Bureau des Mines et de la Géologie du Burkina* (BUMIGEB) conducted intermittent exploration work in and around the current permit area including regional and detailed soil geochemistry surveys, an airborne geophysical survey, ground geophysics, trenching, and drilling. The significant results obtained at that time were reported by Willemyns of PNUD in 1982 (as cited in Riverstone, 2008) from two quartz vein core samples collected in the area of Bagassi East that returned 2.9 grams of gold per tonne (g/t gold) over a core length interval of 1.45 metres, and 6.36 grams of gold per tonne over a core length interval of 0.30 metres.

In 1995, Placer Outokumpu Exploration Limited conducted soil sampling in the area of Bagassi-Yaramoko on behalf of Supply Services and Burkina. The sampling returned a small number of isolated values greater than 100 parts per billion (ppb) gold. A single sample returned a value of 760 ppb gold and was reported to have been collected in an area underlain by Tarkwaian sedimentary rocks (Riverstone, 2008).

In 1996, S.à.r.l. Shield Resources of Burkina Faso conducted exploration work in the Bagassi area. A ground survey parallel to the railroad was undertaken. A few anomalous points were returned; however, no follow-up work was conducted (Riverstone, 2008).

Other than small scale *orpaillage* conducted on a few areas of the property, and Roxgold's recent Yaramoko underground mining (55 Zone) and processing operation, there has not been any known production from the Yaramoko Gold Project.

5.1 Previous Mineral Resource Estimates

In 2014, SRK was the lead author of a feasibility study that examined the viability of the proposed mine and mill complex at the Yaramoko Gold Project. The results of that study were disclosed by Roxgold in April 2014 and are supported by a technical report filed on June 4, 2016 (SRK, 2014). Construction of the underground mine and gold concentrator began during the third quarter of 2015 and the project poured its first gold in May 2016.

A tabulation of the mineral resources and reserves from this study in the 55 Zone is provided in Table 4.

Table 4: Mineral Resource and Mineral Reserve Statement*, 55 Zone Gold Deposit, Yaramoko Gold Project, Burkina Faso, SRK Consulting (Canada) Inc., April 22, 2014

Category	Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Mineral Reserves			
Proven	-	-	-
Probable	1,996	11.83	759
Proven and Probable	1,996	11.83	759
Mineral Resources			
Measured	-	-	-
Indicated	1,600	15.80	810
Measured + Indicated	1,600	15.80	810
Inferred	840	10.26	278

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Mineral resources include mineral reserves. Underground mineral resources and mineral reserves are reported at a cut-off grade of 5.0 and 4.9 g/t gold, respectively; assuming: metal price of \$1,300 per ounce of gold, mining cost of \$94 per tonne, G&A cost of \$26 per tonne, processing cost of \$27 tonne, process recovery of 96%, exchange rate of C\$1.00 equal \$1.00.

6 Geological Setting and Mineralization

6.1 Regional Geology

Burkina Faso lies within the West African Precambrian craton, which is composed of two Archean nuclei surrounded by extensive lower and middle Proterozoic volcanic and sedimentary rocks, and an outer fringe of upper Proterozoic and Phanerozoic rocks (Figure 5). The northern Archean core is located in Morocco and Mauritania and the southern Archean nucleus is situated in Liberia, Guinea and Sierra Leone. The Liberian Archean nucleus and the surrounding Proterozoic rocks form the Man Shield. It is bound to the east by Pan African orogenic belts and is overlain to the west and north by flat-lying sedimentary rocks of the Voltaic basin, intruded by various generations of granitoids.

The geology of Burkina Faso can be subdivided into three major litho-tectonic domains: a Paleoproterozoic basement underlying the majority of the country; a Neoproterozoic sedimentary cover developed along the western, northern and southeastern portions of the country; and a Cenozoic mobile belt forming small inliers in the northwestern and extreme eastern regions of the country.

The Paleoproterozoic basement comprises Birimian volcano-sedimentary and plutonic rock intruded by large batholiths of Eburnean granitoid. Two major north-northeast trending sinistral shear zones define the overall structure of this basement: the Houndé-Ouahigouya Shear Zone in the west and the Tiébélé-Dori-Markoye Shear Zone in the east. Two major Birimian greenstone belts, the Houndé and the Boromo belts, traverse the country over more than 400 kilometres and host numerous gold and base metal deposits (Huot et al., 1987). The Yaramoko Gold Project is situated at the northern end and eastern edge of the Houndé greenstone belt.

The Houndé greenstone belt is composed of an up to six-kilometre-thick basal sequence of tholeiitic basalts, gabbros, and related volcanoclastic rocks. The sedimentary rocks in the belt were deposited in a near-shore, shallow detrital environment, and consist of poorly sorted conglomerates, sandstones, and gritstones, to arkoses and pelites (Villeneuve and Cornée 1994). The Houndé greenstone belt is bound by the Boni shear zone to the west, which places the volcano-sedimentary sequence in contact with a belt of younger Tarkwaian type sedimentary rocks with a maximum age of 2.12 billion years (Metelka et al., 2011).

The Houndé and Boromo greenstone belts are affected by three episodes of penetrative strain (D_1 to D_3 ; Metelka, 2012). D_1 deformation is characterized by north to north-northeast trending foliation and anastomosing shear zones. Intensive folding of the volcano-sedimentary sequences is documented by outcrop-scale isoclinal to open folds with north-northeast to northeast trending, steep dipping axial planes. The D_1 deformation is constrained by syn-tectonic intrusions (2.16 billion years) and the maximum depositional age of the Tarkwaian type sedimentary rocks (2.12 billion years).

The D_2 deformation is marked by steep dipping brittle-ductile to brittle shear zones and locally anastomosing faults. D_1 fabrics, such as penetrative foliation and high strain zones, are crosscut at low angles by D_2 structures. East-northeast trending dextral and northwest to north-northeast trending sinistral D_2 shear zones in granitoid domains crosscut the foliation associated with D_1 . The age of the D_2 deformation is based on the ages of syn- to late tectonic granites and is circa 2.11 to 2.10 billion years.

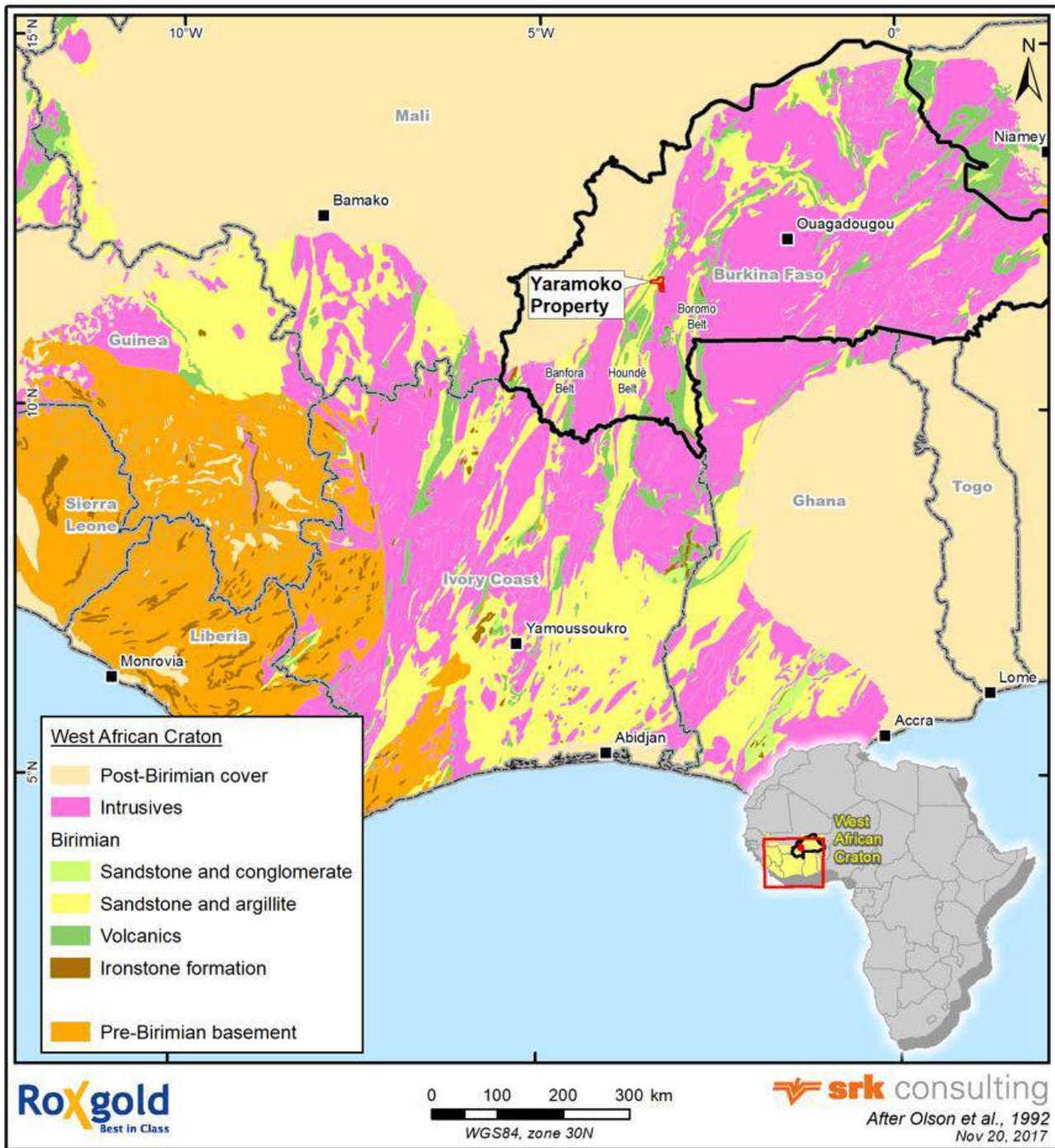


Figure 5: Regional Geology Setting (modified from After Olson et al., 1992)

The D₃ deformation is recognized by the development of crenulation cleavage, as well as chevron and kink folds in volcano-sedimentary and sedimentary rocks. The D₃ brittle faults and fractures strike northwest, and thrusts dip to the north and south. The D₃ deformation is assigned to Late Eburnean (2.2 to 2.0 billion years) to Pan-African age.

6.2 Property Geology

The north-northeast trending Boni shear zone divides the Yaramoko Gold Project between predominantly Houndé volcanic and volcanoclastic rocks to the west and the minor volcanic rocks of the Diébougou granitoid domain to the east (Figure 6).

The eastern assemblage contains several intrusive bodies, including a diorite body east of the village of Yaramoko, a large quartz bearing granitoid which stretches south from the town of Bagassi, and a smaller granitoid body to the east of Bagassi. The granitoid body east of Bagassi hosts the 55 Zone gold deposit. A diabase (dolerite) dike trends north-northeast across the southern portion of the property.

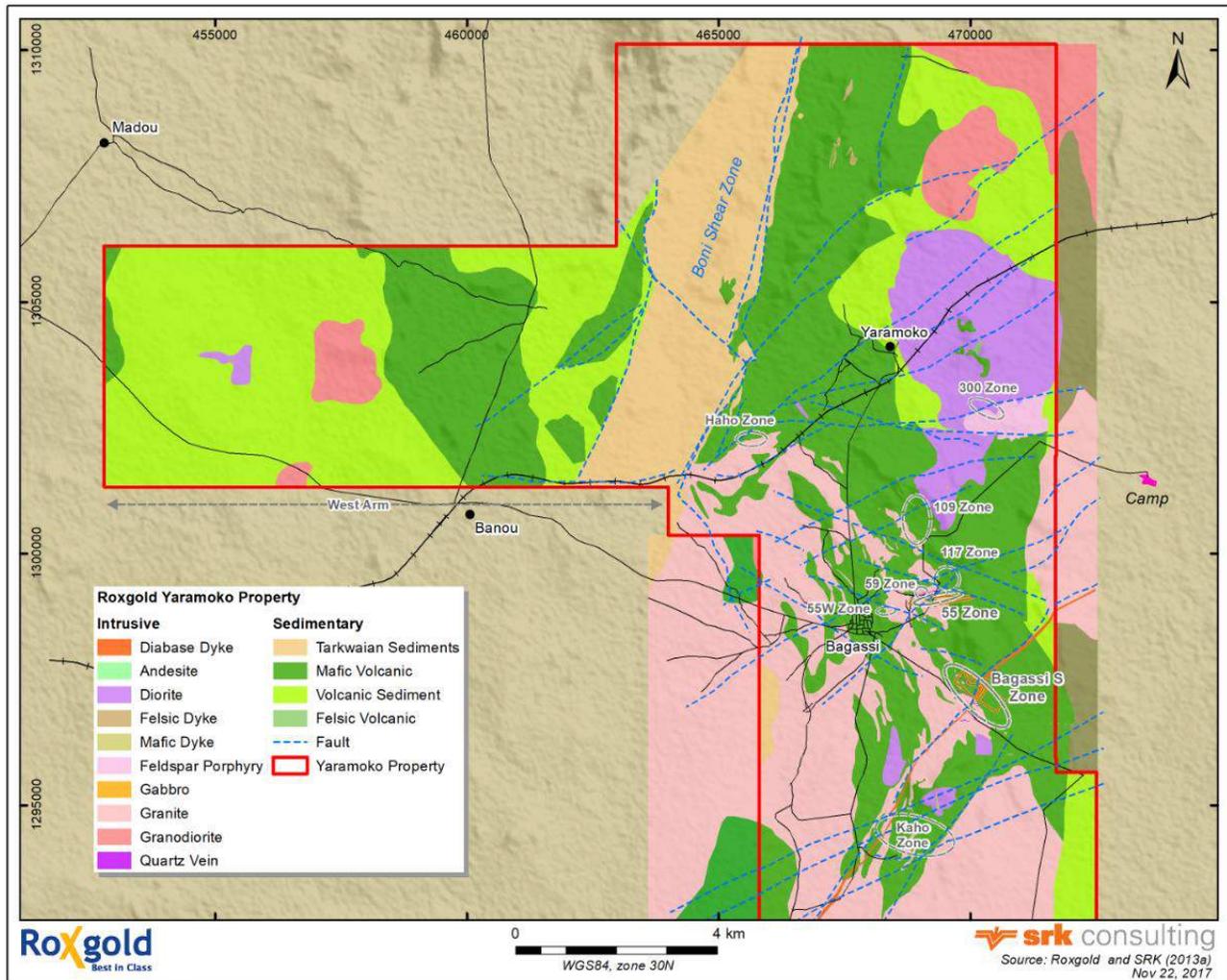


Figure 6: Local Geology Setting of the Yaramoko Gold Project

Outcrop and core observations document the main lithological units present on the Yaramoko Gold Project as mafic volcanic rocks, felsic dikes, and late dolerite dikes (Figure 7). The mafic volcanic rocks constitute the main country rock, and are locally strongly magnetic and in places affected by calc-silicate skarn alteration (garnet, calcite, epidote, and magnetite; Figure 8). The mafic rocks are crosscut by multiple generations of felsic dikes with aplitic, pegmatitic, or porphyritic textures. Late dolerite dikes crosscut mafic volcanic rocks, felsic dikes and gold mineralization (SRK, 2013b).

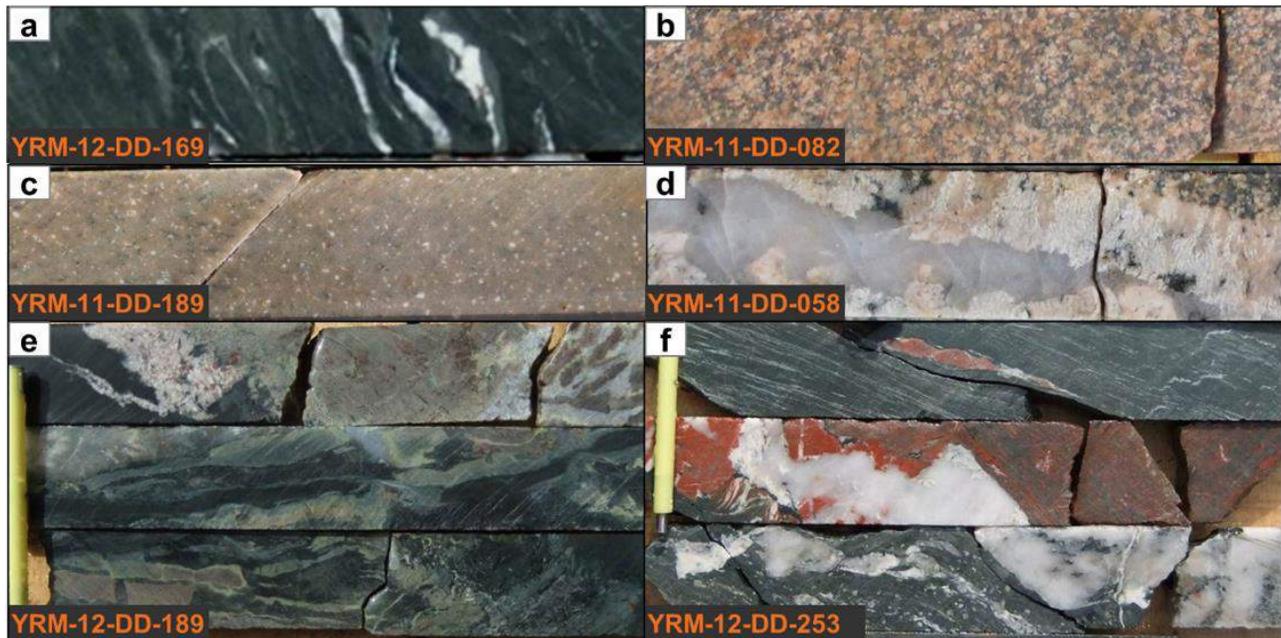


Figure 7: Overview of the Main Lithologies and Alteration on the Yaramoko Gold Project

- A: Mafic volcanic rock.
- B: Granite.
- C: Feldspar porphyry dike.
- D: Pegmatite dike.
- E: Epidote-garnet skarn alteration.
- F: Hematite alteration.

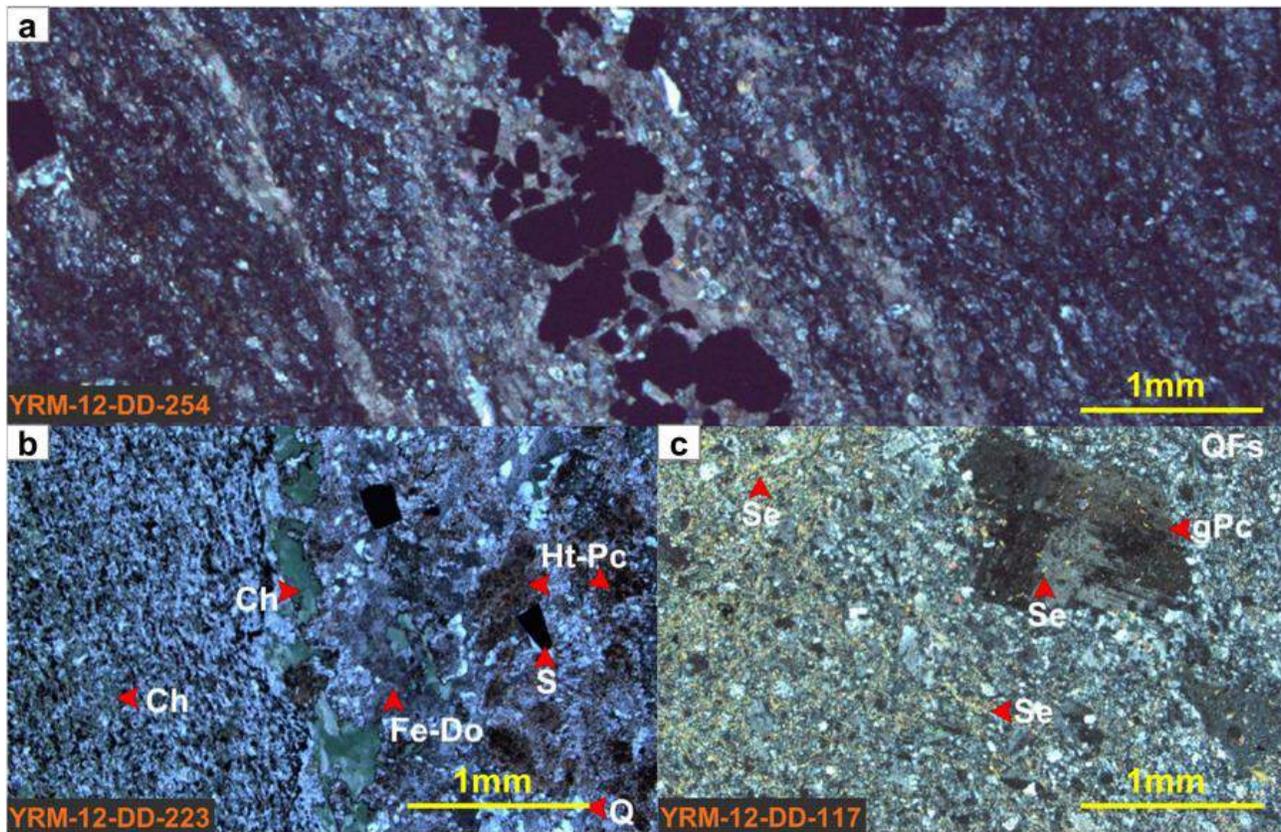


Figure 8: Main Lithologies on the Yaramoko Gold Project in Thin Section

A: Mafic volcanic rock bleaching of schist by carbonate-rich halo in immediate vicinity to the vein.
 B: Contact between foliated chlorite (Ch), quartzofeldspathic schist and feldspar-rich (Pc) and quartz (Q) metagranitoid. Hematite alteration after Plagioclase (Ht-Pc) and disseminated Fe-dolomite (Fe-Do). (C) Aplite dike. Glomeroporphyritic texture of plagioclase (Pc) in fine-grained quartzofeldspathic (QFs) groundmass. Sericite (Se) replacement after plagioclase in the groundmass. Images from GeoMinEx (2013).

6.3 Structural Geology

The regional fabric at the Yaramoko Gold Project is the most pervasive structural feature observed on the concession, and is characterized by a penetrative foliation generally oriented N020 to N030 and steeply dipping to the east. The fabric is sub-parallel to the overall orientation of the Houndé belt and the Boni Shear Zone, but local deflection of the fabric has been observed in the mafic volcanic units around the granitic intrusion that hosts the 55 Zone and Bagassi South Zone deposits. Two other fabrics have been observed on the concession, a sub-vertical crenulation oriented northwest and a flat crenulation which appears to be late- to post-Eburnean. Local structural geology trends and other features are illustrated in Figure 6.

Large structures also characterize the structural setting of Yaramoko of which the north-striking, belt-parallel, Boni Shear Zone is the most prominent. A second shear zone, the Yaramoko Shear, is observed east of the 55 Zone and Bagassi South Zone deposits (SRK, 2013b). It is marked by thick, strongly foliated high strain zone and it dips moderately to the east and northeast. Both the 55 Zone and Bagassi South Zone deposits appear to be hosted along the youngest structural lineaments found on the Yaramoko Gold Project, a set of conjugated east-northeast striking faults and shear zones

(e.g., the 55 Zone shear zone) and northwest striking faults (e.g., the Bagassi South structures). These deposits are in the footwall of the Yaramoko Shear Zone and hosted in granitic intrusions.

6.4 Mineralization

Gold is the main mineralization of economic interest found on the Yaramoko Gold Project. The main areas of gold mineralization are the 55 Zone, Bagassi South Zone, 109 Zone, and 117 Zone. The 55 Zone and Bagassi South Zone are the two main zones, both of which are hosted in the Diebougou granitoid domain.

Both the 55 Zone and Bagassi South Zone deposits occur along dextral shear zones and gold is primarily associated with quartz veining. The bulk of the gold mineralization occurs in dilational segments of the shear zone where quartz veins are thicker and exhibit greater continuity. Gold typically occurs as coarse free grains in quartz and is associated with pyrite (Figure 9). The gold bearing veins range in size from a few centimetres to over 5 metres in width, and contain only minor concentrations of disseminated pyrite (frequently less than one percent). Adjacent sheared vein wall rock locally contains a small percentage of pyrite.

At the Bagassi South Zone, the gold mineralization is associated with laminated quartz-carbonate veins developed in two shear zones: QV1 and QV'. The average thickness of the gold mineralization at QV1 varies from less than one metre to over 18 metres and extends from the surface to over 300 metres depth; gold mineralization remains open along strike and at depth. Gold mineralization at the Bagassi South Zone is associated with quartz and pyrite alteration in similar structural settings as at the 55 Zone.

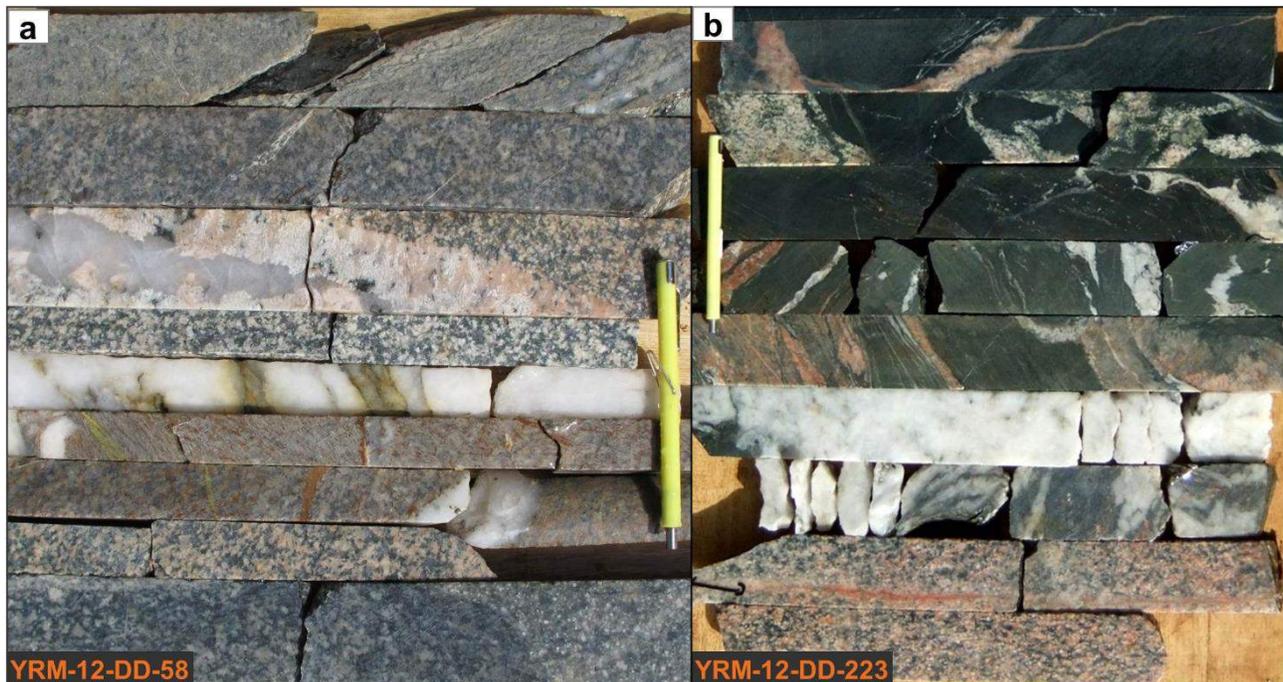


Figure 9: Mineralization on the Yaramoko Gold Project

Composite Section through Boreholes YRM-12-DD-58 and YRM-12-DD-223.

A: The auriferous zone is located completely within foliated granitic rock.

B: The quartz vein is at the contact between mafic volcanic rock and granite.

Four mineralogically distinct hydrothermal veins were defined from samples from the 55 Zone: quartz rich veins, iron-dolomite rich veins with quartz and muscovite, iron-dolomite and quartz veins with albite, and albite rich veins with quartz and iron-dolomite (GeoMinEx, 2013). Native gold is present in each vein type, with accompanying sulphides of pyrite and trace tellurides. The most abundant sulphide mineral, pyrite, occurs in veins and altered wall rock. Textural and chemical complexity of pyrite document a protracted period of crystallization from a compositionally evolving hydrothermal fluid. Native gold occurs in numerous textural associations and at a wide range of grain size ranging from less than 1 and up to 300 micrometres (Figure 10, GeoMinEx 2013).

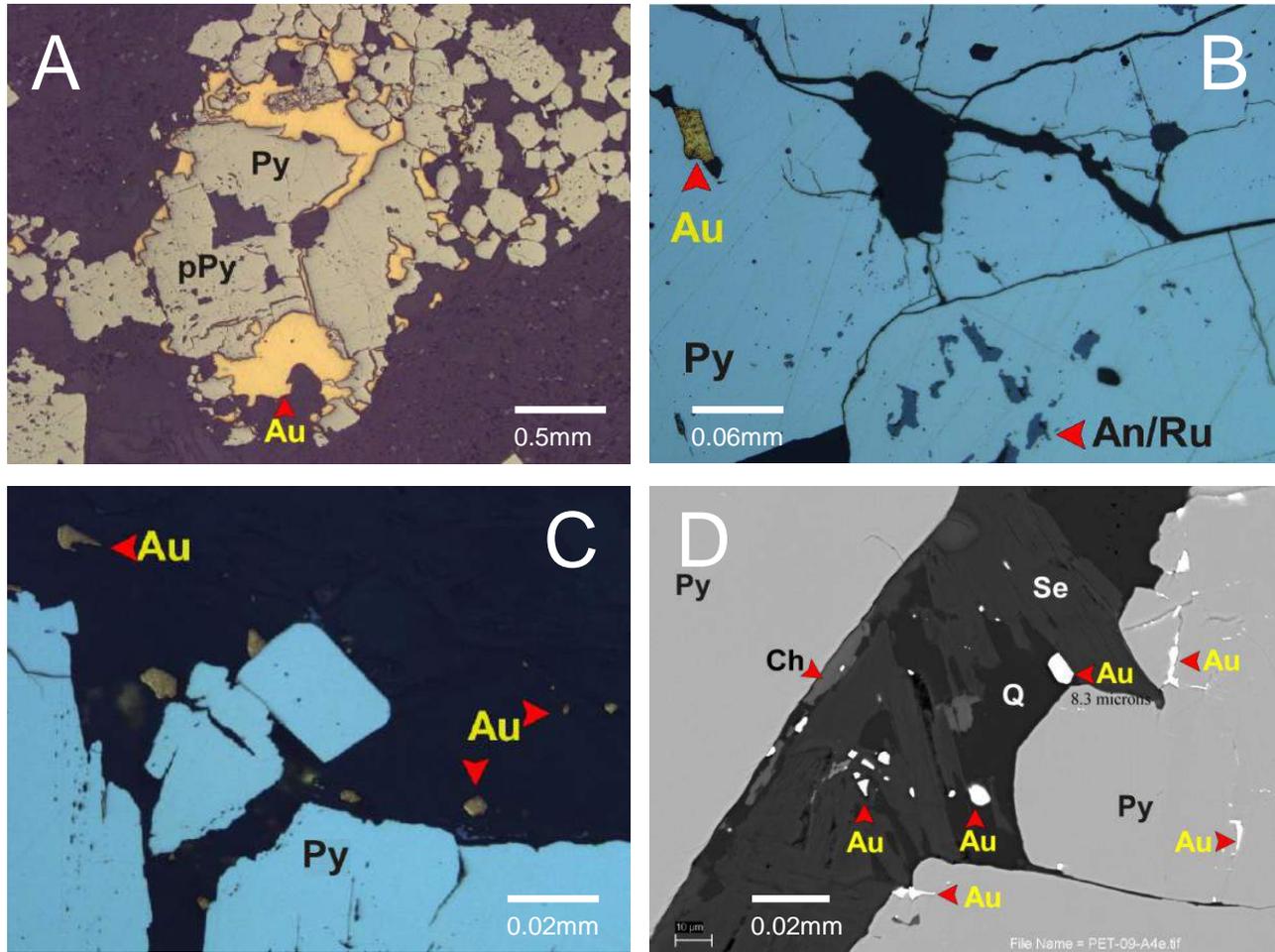


Figure 10: Photomicrograph of Gold Mineralization From the 55 Zone

Images from GeoMinEx (2013)

- A: Coarse-grained native gold interstitial to poikiloblastic (pPy) and pyrite (Py). Reflected light microscope. YRM-12-DD-254: 788. 1-788.2 m.
- B: Textural zoning in pyrite. Heterogenous pyrite (Py), native gold (Au), and inclusions of anastase/rutile (An/Ru) in pyrite. Reflected light microscope. YRM-11-DD-042: 55.8-55.9 m.
- C: Gold (Au) in quartz adjacent to pyrite (Py). Reflected light microscope. YRM-12-DD-223: 240.35-240.45 m.
- D: Native gold (Au) in relation to pyrite (Py), sericite (Se) and chlorite (Ch). Backscattered electron microscope. YRM-12-DD-223: 240.35 to 240.45 m.

The second type of gold mineralization encountered is also associated with pyrite, occurring in zones of conspicuous shearing primarily in the volcanic rocks, with minimal to no significant quartz veining. These two styles of mineralization represent two end-members of brittle-ductile deformation within the 55 Zone where coarse gold in veining, usually seen in a granitic host, defines a more brittle environment while pyrite and shearing in the volcanic rocks is typical of a ductile domain.

No detailed mineralogical studies have been conducted at the Bagassi South Zone.

7 Deposit Types

Primary gold deposits in Burkina Faso occur within the Paleoproterozoic Birimian belt. Mineralization was synchronous with regional metamorphism and deformation. Gold deposits found within the Birimian greenstone belts of the West African shield are typically late orogenic hydrothermal deposits that exhibit a strong relationship with regional arrays of major shear zones. The gold mineralization is typically associated with an organized network of quartz veins containing subordinate amounts of carbonate, tourmaline, sulphides, and native gold. In these deposits, the gold is typically free milling. Alternatively, gold mineralization can also be associated with disseminated sulphides in strongly deformed alteration zones. In the alteration zones, gold may be free milling, but also refractory.

Gold mineralization is related to regional arrays of alteration and deformation zones, commonly located at major lithological discontinuities. The local controls on the distribution of the gold mineralization are structural and lithological.

In Burkina Faso, the weathering profile is deep and typically results in extensive surface oxidation of bedrock to a depth reaching more than 100 metres locally. In such areas, gold deposits typically comprise a surface oxide zone, an intermediate transition zone, and a deeper fresh rock zone. Gold is typically free milling in the oxide zone.

The gold mineralization found at the 55 Zone and Bagassi South Zone deposits is associated with low sulphide quartz veins and is free milling. The weathering profile over the deposit is shallow and ranges from approximately 10 to 30 metres.

8 Exploration

Exploration activities on the Yaramoko Gold Project were initiated by Riverstone in 2005, with subsequent involvement by Roxgold in late 2010. Exploration programs have comprised soil and rock sampling, airborne and ground geophysical surveys, rotary air blast, auger, reverse circulation, and core drilling. The exploration activities completed on the Yaramoko Gold Project are summarized in Figure 11 and Table 5.

Drilling activities are further detailed in Section 9.

8.1 Exploration by Riverstone 2005-2011

8.1.1 Soil Geochemistry and Prospecting

In 2005, Riverstone conducted a geochemical soil sampling survey over two grids on the Yaramoko property, collecting 3,027 samples. Concurrent with the soil sampling survey, geological mapping and prospecting in the vicinity of the villages of Bagassi and Haho were conducted, and 199 rock samples were collected from outcrop and orpailage workings.

In 2007, a further 196 rock samples were collected from outcrop and orpailage workings in the Bagassi South, Bagassi Central, Haho, and Niakongo areas of the property. The most prospective gold grades were collected from the Bagassi Central and Bagassi South areas; one sample near the 55 Zone returned a grade of 18.57 g/t gold.

In October and November 2010, under an option agreement with Roxgold, Riverstone collected 368 soil samples. The survey aimed to test the soil geochemistry of the area above a granitoid intrusion at Bagassi Central and a small eastern extension to Bagassi South. Sample locations were established using a handheld GPS device and were collected at 50-metre intervals along 200-metre spaced lines.

Between January and March 2011, an additional 1,795 soils samples were collected to infill the main grid at Bagassi Central and for reconnaissance testing at the West Arm area of the property. Sampling at Bagassi Central involved collecting samples every 50 metres along 100-metre spaced infill lines. The survey at the West Arm involved the collection of samples every 100 metres along 400-metre spaced lines. The objective of the survey was to identify if gold bearing structures similar to those occurring on the SEMAFO Inc. property, located to the north, extended across the West Arm of the Yaramoko property. Samples in the West Arm returned generally low gold values, with only four sample returning gold values above 100 ppb gold.

8.1.2 Ground VLF Survey

A ground very low frequency electromagnetic (VLF) survey was completed by Riverstone over the Bagassi area in 2005 with the objective of defining potential conducting zones. The results of the VLF survey showed an overall east-west trend that was different from the greenstone belt and gold-in-soil anomalies, but may be indicative of the 55 Zone trend.

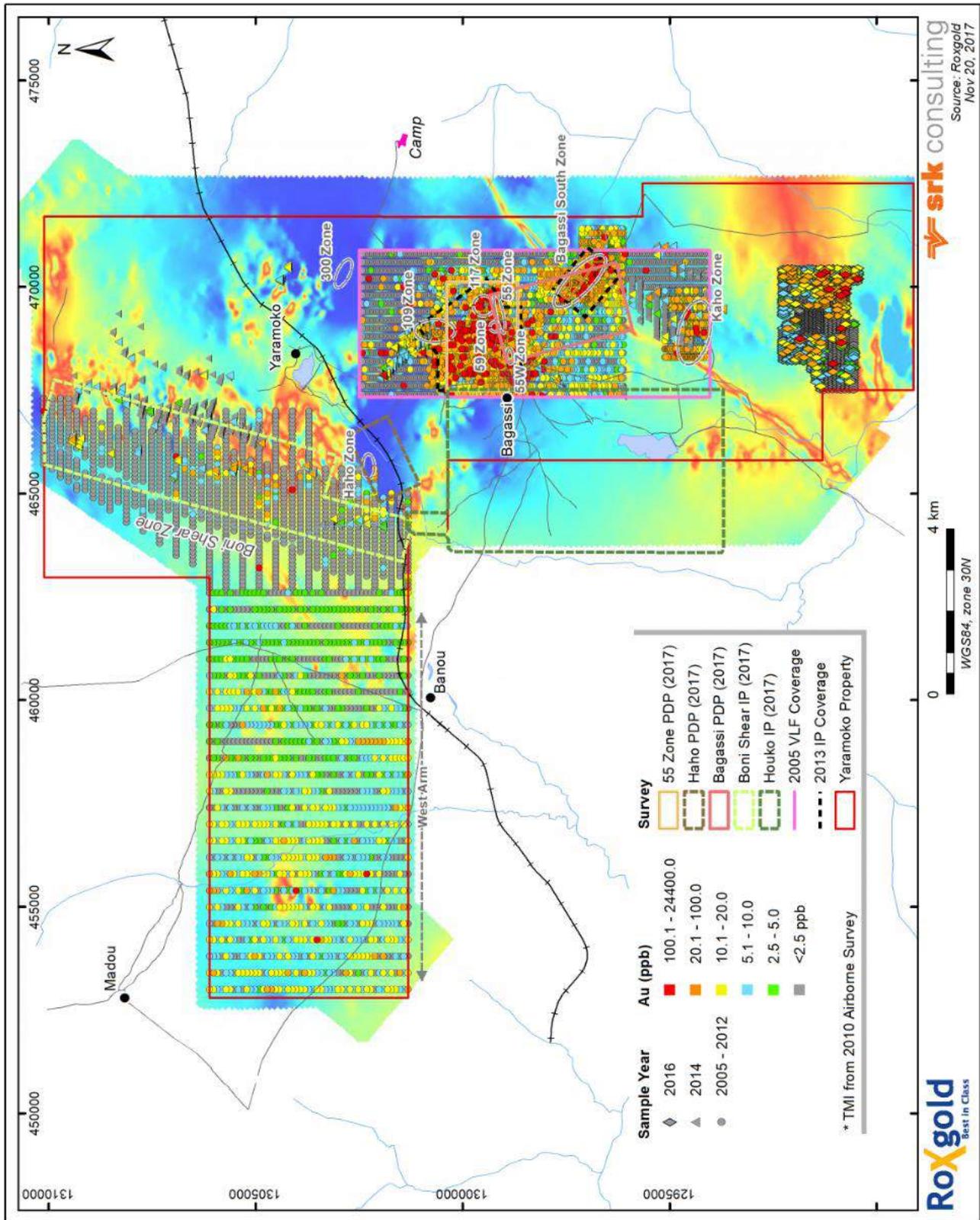


Table 5: Summary of Exploration Work Completed by Riverstone and Roxgold on the Yaramoko Gold Project

Year	Company	Exploration Activity*
2005	Riverstone	Reconnaissance soil geochemistry in the Bagassi Central, Bagassi South, Kaho and Boni Shear areas (3,027 samples at 200 m line spacing) 199 rock samples collected during prospecting activities Very low frequency (VLF) ground electromagnetic survey at Bagassi
2007	Riverstone	22 RC boreholes totalling 1,974 m in areas proximal to orpaillage sites including Bagassi 196 rock samples collected from outcrops and pits
2010	Riverstone/ Roxgold	368 soil samples at Bagassi Central and Bagassi South (200 m line spacing and 50 m sample spacing) Airborne magnetic and radiometric survey flown over the entire permit area (50 m line spacing and 40 m terrain clearance) 33 RC boreholes totalling 2,724 m testing Bagassi Central and Bagassi South
2011	Riverstone/ Roxgold	570 soil samples at Bagassi Central (100 m line spacing and 50 m sample spacing) 1,225 reconnaissance soil samples at West Arm (400 m line spacing and 100 m sample spacing) 352 RAB boreholes totalling 5,558 m following up soil sample anomalies at Bagassi Central, Bagassi South, and Haho 44 core boreholes totalling 6,182 m, primarily at 55 Zone
2011	Roxgold	1,136 soil samples collected, including infill sampling at Bagassi Central and Bagassi South (25 m line spacing and 25 m sample spacing) 23 core boreholes totalling 5,297 m at 55 Zone 19 RC boreholes totalling 1,497 m at Bagassi Central and Bagassi South
2012	Roxgold	743 soil samples including infill sampling at Bagassi South (25 m line spacing and 25 m sample spacing), and reconnaissance in Koho area (200 m line spacing and 25 m sample spacing) 131 auger boreholes at 55 Zone and Bagassi South to test sampling methodology over known areas totalling 1,143 m 1,535 RAB boreholes totalling 34,122 m at Bagassi Central, Bagassi South, and West Arm areas 136 RC boreholes totalling 22,883 m at Bagassi Central, Bagassi South, and southern extremity of permit area 199 core boreholes totalling 82,111 m (155 core boreholes at 55 Zone and 47 core boreholes on regional targets)
2013	Roxgold	Ground induced polarization (IP) and magnetic survey of 55 Zone 2,538 auger boreholes totalling 12,337 m drilled from January to April at Bagassi Central, Bagassi South, 300 Zone, Haho Zone and Boni Shear Zone 42 RC boreholes totalling 12,981 m at Bagassi Central 138 core boreholes totalling 36,194 m including 54 boreholes at 55 Zone, 14 geotechnical boreholes, 5 metallurgical boreholes, and 65 boreholes on regional targets
2014	Roxgold	IP survey infill between grids and extended north to Haho and south to Kaho zones 239 soil samples collected in the Niakongo area and within the Boni Shear Zone 6,666 auger boreholes totalling 44,682 m drilled at Bagassi Central, Bagassi South, 300 Zone, 109 Zone, Haho Zone and Boni Shear Zone 14 trenches excavated and sampled at Haho, Boni Shear and 109 Zone areas 67 RC boreholes totalling 5,414 m at Boni Shear, Haho and Yaro areas 94 core boreholes totalling 19,524 m including 9 geotechnical boreholes in 55 Zone, 57 boreholes on QV1 and QV', and 28 boreholes on regional targets
2015	Roxgold	11 RC pre-collars totalling 2,389.3 m at QV1 106 core boreholes totalling 11,182 m including 76 boreholes and 2 geotechnical boreholes at 55 Zone, and 2 boreholes at the 109 Zone
2016	Roxgold	1,002 soil samples collected south of Kaho 61 core boreholes totalling 22,377 m drilled at 55 Zone 15 core boreholes totalling 4,225 m drilled at Bagassi South with 9 holes targeting the QV1 structure and 6 holes the QV' structure
2017	Roxgold	IP and Pole-Dipole surveys over 4 grids totalling 481 km of IP lines and 108 km of pole Dipole lines As of the end of the third quarter, 147 core boreholes totalling 33,250 m drilled at Bagassi South of which 117 holes targeted the QV1 structure and 30 holes the QV' structure 8 core boreholes totalling 9,214 m drilled at the 55 Zone targeting extension at depth

* RAB = Rotary air blast, RC = Reverse circulation

8.1.3 Airborne Magnetic and Radiometric Survey

In October 2010, Riverstone commissioned Xcalibur Airborne Geophysics (Pty) Ltd. (Xcalibur) of South Africa to perform a high resolution airborne magnetic and radiometric survey of the entire Yaramoko property. The survey was flown using an Islander BN-2T along 130 degree striking survey lines spaced 50 metres apart, at a ground clearance of 40 metres.

The data was processed and imaged by Xcalibur, who produced data sets for the analytical signal, total magnetic intensity, vertical gradient, line direction gradient, and the topography of the survey area. Data obtained from the radiometric survey was imaged for percent potassium, parts per million uranium, parts per million thorium, gamma ternary, and total channel. Figure 11 shows the magnetic data as total magnetic intensity.

The airborne survey data was used to develop an integrated lithological and structural geology interpretation of the Yaramoko property to outline the distribution, relative age, and interpreted kinematics of fault zones and major rock types (see Section 6.2). The survey assisted in identifying potential exploration targets based on known gold mineralization identified on the property.

8.2 Exploration by Roxgold 2011-2017

8.2.1 Soil Geochemistry and Prospecting

Between November 2011 and January 2012, a total of 1,879 soil samples were collected to infill the Bagassi Central, Bagassi South, and Kaho areas. In the vicinity of the 55 Zone, sample spacing was reduced to 25 metres by 25 metres and taken at a depth of 50 centimetres. In the Bagassi South and Kaho areas, samples were collected every 50 metres along 100 metre spaced lines.

In September 2016, a total of 1,002 soil samples were collected south of the Kaho area across a mafic – granite contact. Samples were spaced at 100 metres by 50 metres and 100 metres by 25 metres.

The results from the soil sampling program varied depending on the underlying geology. Most results from the Kaho area reported less than 90 ppb gold, with three anomalous areas with sample values of over 400 ppb gold. Gold values from the Bagassi South and Bagassi Central grids showed continuity along a northwestern trend. The results from the 2016 program did not define any clear trends, but anomalous gold values of up to 274 ppm were identified.

Auger programs are planned to be undertaken in the fourth quarter of 2017 over two grids at 200 metres by 25 metres spacing. The first grid covers an area of approximately 6 kilometres by 3 kilometres over the western portion of the Yaramoko Exploration Permit and the northern portion of the Houko Exploration Permit. The second grid will be conducted over the western contact of the Tarkwaian sedimentary package over a north-east oriented grid covering an area of approximately 6 kilometres by 1 kilometre.

8.2.2 Ground Induced Polarization Survey

In January 2013, Roxgold commissioned Sagax Afrique SA (Sagax) of Burkina Faso to conduct a ground induced polarization (IP) and resistivity survey over the 55 Zone. An orientation survey was performed around the 55 Zone area on north-south oriented lines spaced at 100 metres. The orientation survey included an induced polarization survey for conductivity, chargeability, and

resistivity gradients; two pole-dipole survey lines; and a ground magnetic survey. The IP survey was subsequently extended to two additional grids adjacent to the orientation grid near the 55 Zone, and a grid over the Bagassi South Zone. The work comprised 64.7 line kilometres of gradient array induced polarization surveys, 2.0 line kilometres of pole-dipole array surveys, and 11.0 line kilometres of ground magnetics. The surveys were conducted from April 16 to April 30, 2013.

A series of resistivity, conductivity, and chargeability maps and sections were prepared by Sagax. Results from the orientation grid surveys show that the 55 Zone and Bagassi South Zone are associated with a chargeability and resistivity anomaly. Generally, the felsic intrusions are more resistive than mafic volcanic and sedimentary rocks, and the lateritic cover generates high potential electrodes contact resistance. The magnetic survey did not reveal any significant magnetic anomalies (Sagax 2013).

The IP/resistivity method is well adapted to the type of mineralization observed at the Yaramoko Gold Project. The interpretation of the gradient IP array combines anomalous chargeability and resistivity zones to assist in the definition of the structural context of the gold mineralized zones, which in turn can help define targets for new gold mineralization.

Additional IP and pole-dipole surveys were conducted in 2017 to cover segments of the major structures that were not covered by the 2013 programs. Two pole-dipole grids were surveyed; the first grid covering the Bagassi corridor area, that includes the 55 Zone and Bagassi South Zone structures, while the second grid was conducted over the Haho anomaly. Two IP grids were also surveyed; the first over the Boni Shear Zone while the second was conducted over the western portion of the Yaramoko exploration permit and northern portion of the Houko exploration permit. In total, 481 line-kilometres of IP and 108 line-kilometres of pole-dipole were surveyed over the four grids.

8.2.3 Planned Exploration

Regards regional exploration, during 2017, a ground geophysical IP survey campaign commenced in early February to cover areas along the Boni Shear structure and along the Houko concession located west of the 55 Zone and Bagassi South deposits. Two deep auger programs are also planned for the fourth quarter to cover the northern portion of the Houko concession and the western contact of the Tarkwaian basin.

These generative regional programs conducted in 2017 are a precursor to the 2018 exploration program, which will focus more on regional exploration as opposed to infill and extension drilling at the 55 Zone and Bagassi South, which was the primary focus of the 2017 exploration programs.

9 Drilling

Auger, rotary air blast drilling, reverse circulation, and core drilling have been completed at the Yaramoko Gold Project (Table 5; Figure 12 and Figure 13). Auger drilling was used for the collection of soil samples under the transported cover, rotary air blast drilling was used to follow up soil anomalies, and reverse circulation drilling was used as an exploration probe to trace gold in soil anomalies to bedrock. Positive results from reverse circulation drilling were followed up with core drilling to confirm the geological setting of each target. The 55 Zone was identified successfully using this method, and thereafter other gold mineralized zones on the property such as the Bagassi South Zone.

The mineral resource and mineral reserve estimates discussed herein are solely informed from the core drilling information. Core drilling was also used for metallurgical and geotechnical engineering studies, but assay results from these boreholes were not considered for mineral resource evaluation.

9.1 Drilling by Riverstone 2007–2011

9.1.1 Reverse Circulation Drilling

In 2007, Riverstone drilled 22 reverse circulation boreholes totalling 1,974 metres at the Yaramoko property. Nine boreholes totalling 885 metres targeted the Haho Zone (YMR-07-RC-01 to YMR-07-RC-09), two boreholes totalling 140 metres were drilled at Bagassi East (YMR-07-RC-10 and YMR-07-RC-11), nine boreholes totalling 790 metres targeted the orpailage workings at Bagassi (YMR-07-RC-12 and to RC-YMR-07-20), and two boreholes totalling 150 metres tested geochemical soil anomalies approximately 300 metres southeast of the Bagassi orpailage site (YMR-07-RC-21 and YMR-07-RC-22).

Riverstone reported that the last borehole was abandoned due to unfavorable ground conditions.

9.1.2 Rotary Air Blast Drilling

Between April and May 2011, Riverstone conducted a rotary air blast program under an option agreement with Roxgold. During the program, 352 boreholes totalling 5,558 metres were drilled primarily to test results obtained during soil sampling programs. Borehole depths ranged from 1 to 35 metres to collect samples of the overburden, laterite, and saprolite material. The boreholes were terminated at the unweathered bedrock contact.

The rotary air blast program intended to intercept gold bearing structures which, at the time, were interpreted as trending northwest-southeast. The program was originally designed with approximately 14 northeast-southwest oriented lines at the Bagassi South and Bagassi Central zones. Boreholes were drilled at 50-metre spacing along 200-metre spaced lines.

Three additional lines were established to the northwest of the Bagassi zones to test a northeast trending structure. The lines were oriented in a northwest-southeast direction. Boreholes were drilled at 50-metre spacing along 400-metre spaced lines.

All rotary air blast boreholes were stationed using a handheld GPS unit and by chain and compass methods.

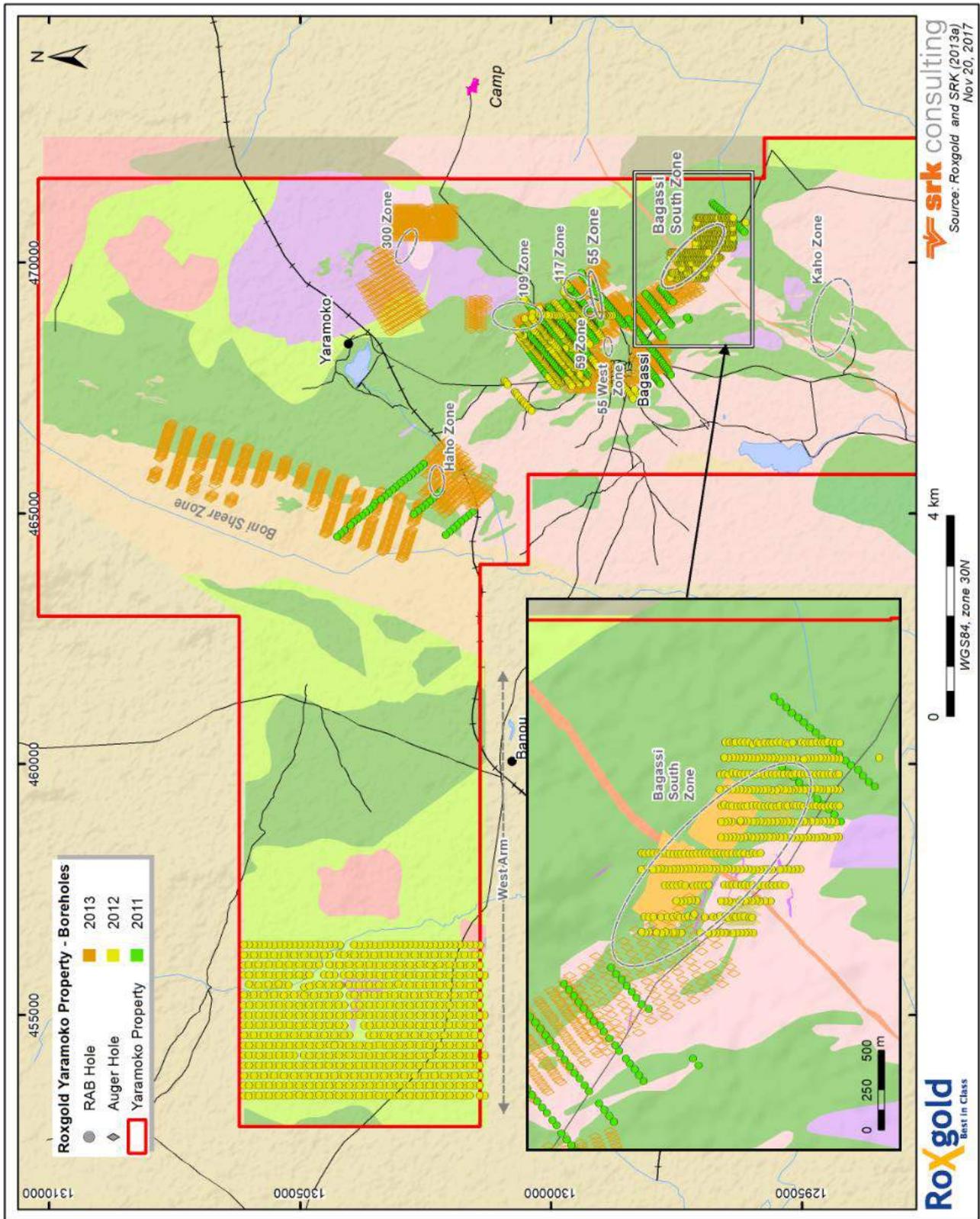


Figure 12: Distribution of Rotary Air Blast and Auger Drilling on the Yaramoko Gold Project

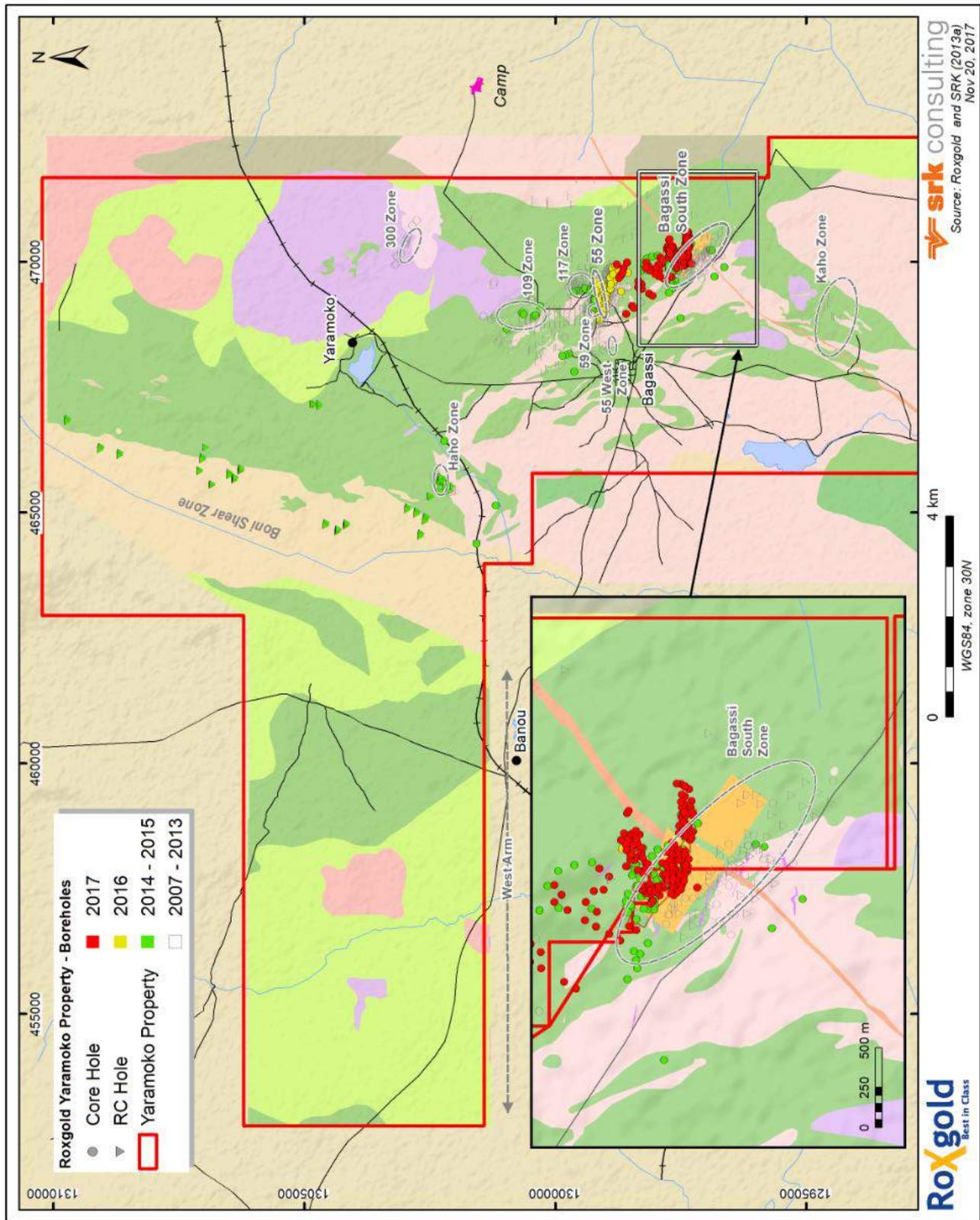


Figure 13: Distribution of Reverse Circulation and Core Drilling on the Yaramoko Gold Project

9.1.3 Core Drilling

Core drilling was conducted by Riverstone from August to November 2011 under an option agreement with Roxgold. During the program, 44 boreholes totalling 6,186 metres were drilled, with all but four of the boreholes testing the 55 Zone shear zone. The first 20 boreholes drilled at the 55 Zone were oriented to the south at an angle of 45 to 60 degrees from the horizontal. With a more robust understanding of the orientation of the south dipping shear zone, the collar locations of the 20 remaining boreholes were moved to the south and oriented northward to intersect the shear zone at a more perpendicular angle.

9.2 Drilling by Roxgold 2011-2017

9.2.1 Rotary Air Blast Drilling

From January to May 2012, a second phase of rotary air blast drilling was completed by Roxgold. The program consisted of 1,456 boreholes totalling 31,759 metres and targeted the Bagassi Central, Bagassi South and the West Arm zones.

The Bagassi Central grid involved infill drilling of the rotary air blast lines drilled during the initial phase by Riverstone in 2011. Boreholes were stations at 50-metre intervals on northwest-southeast lines spaced at 50 to 200 metres depending on the infill pattern. Upon determining that the strike of the 55 Zone was oriented east-west, a single line was oriented north-south.

The Bagassi South grid was constructed to follow-up the trends identified by soil sampling in the area. The drilling lines were oriented north-south and spaced 100 metres apart with boreholes stationed at 50 metres, or stationed at 25 metres in areas of artisanal mining.

The West Arm grid was designed to test for gold mineralization comparable to SEMAFO's Mana property, which is found adjacent and to the north of the West Arm. Drill lines were oriented north-south and spaced at 200 metres with drill stations every 50 metres. A total of 7,690 metres of rotary air blast drilling was completed on the West Arm Zone in 2012. Anomalous geochemical results originally identified during soil sampling relate to an alkaline intrusive body within the western part of the Western Arm; no follow-up work has been conducted in this area to date.

9.2.2 Auger Drilling

In November to December 2012, soil samples were collected with an auger drill rig to investigate the distribution of gold in the soil profile. The study was undertaken by Roxgold in response to field observations made on a layer of cover overlying the plateau region of the 55 Zone. The cover layer was described as ranging from 0 to 4 metres thick, and thicker in places of laterite occurrence. The program consisted of 131 short boreholes totalling 1,143 metres, from which 1,143 samples were collected and sent for assaying.

This orientation survey over the 55 Zone and Bagassi South demonstrated that anomalous gold exists in the soil profile below transported or covered material and that the transported material close to the surface did not necessarily reflect the distribution of gold below. To improve the quality of samples collected from the auger drill, transported material and laterite was not sampled during the subsequent auger programs.

Between January and April 2013, 2,538 auger boreholes were drilled totalling 12,337 metres along a grid pattern. A total of 6,105 samples were collected and sent for assaying.

In 2014, an additional 6,666 auger boreholes were drilled totalling 44,682 metres. These holes covered regional targets including the area between the 55 Zone and Bagassi South, as well as the 109 Zone, 300 Zone, Haho Zone and infilled along the Boni Shear contact. Variable hole spacing of 200 metres by 50 metres, 100 metres by 25 metres, and 50 metres by 50 metres was used.

9.2.3 Reverse Circulation Drilling

Between November 2010 and January 2011, Roxgold completed a reverse circulation drill program that consisted of 33 boreholes totalling 2,724 metres and targeted the Bagassi South and Bagassi Central zones.

At Bagassi South, the targets were designed to test the depth and strike extension of the orpaillage site and to follow up on encouraging intersections obtained during reverse circulation drilling conducted by Riverstone in 2007. A total of 17 reverse circulation boreholes were drilled totalling 1,565 metres. Most boreholes were drilled in a northeast or southwest direction with dips of 55 degrees from the horizontal. Significant results included 2.29 g/t gold over 6.0 metres (from 54 to 60 metres) in borehole YRM-10-RC029 and 2.28 g/t gold over 4.0 metres (from 8 to 12 metres) in borehole YRM-10-RC025. Although the boreholes were drilled nearly perpendicular to the interpreted strike of the gold mineralization, the true width of the reported intervals remain unknown.

The reverse circulation drilling program performed at Bagassi Central in 2010 and 2011 tested soil and rotary air blast drilling anomalies established from earlier exploration programs. During this program, 16 boreholes totalling 1,159 metres were drilled. Significant results related to the 55 Zone included 24.62 g/t gold over 6.0 metres (from 80 to 86 metres) in borehole YRM-10-RC036, 4.88 g/t gold over 11.0 metres (from 38 to 49 metres) in borehole YRM-11-RC055, and 85.53 g/t gold over 6.0 metres (from 16 to 22 metres) in YRM-11- RC055 drilled in the footwall of the 55 Zone.

In 2012, Roxgold completed 136 reverse circulation boreholes totalling 22,883 metres at Bagassi Central, Bagassi South and the Kaho Zone.

At Bagassi Central, the reverse circulation boreholes tested soil and rotary air blast drilling anomalies established from the earlier exploration programs, primarily outside of the 55 Zone. A total of 97 boreholes were drilled totalling 16,373 metres. Most boreholes were drilled to the north with a dip of 45 degrees from the horizontal. The most significant intercept occurred in the 109 Zone, where reverse circulation borehole YRM-12-RC-109 intersected an 8.0-metre interval (from 118 to 126 metres) with a composite grade of 9.96 g/t gold. Another interval of interest was identified in the 117 Zone, where a 2.0-metre sample in borehole YRM-12-RC-117 returned 14.97 g/t gold.

At Bagassi South, the targets were designed to further test the depth and strike extension of the large orpaillage site and to follow up on encouraging intersections obtained from previous drilling results. The boreholes were oriented either to the southwest, the north, or to the south with a dip of 45 or 50 degrees from the horizontal. During the program, 32 reverse circulation boreholes totalling 5,364 metres were drilled. The most significant intercept was a 2.0-metre sample in borehole YRM-12-RC-154 with 141.2 g/t gold. All samples grading over 2.0 g/t gold are single intercept samples of 2-metre length.

In the Kaho Zone, seven reverse circulation boreholes totalling 1,146 metres were drilled in 2012. The boreholes tested positive soil sampling results conducted by Roxgold in 2012. The boreholes

were drilled either to the north or to the south with a dip of 45 or 50 degrees from the horizontal. No noteworthy results were intercepted.

In 2013, Roxgold completed 42 reverse circulation boreholes totalling 6,763 metres. Drilling was primarily undertaken at Bagassi Central, with a few condemnation boreholes drilled in areas of potential infrastructure. In the 117 Zone, eight reverse circulation boreholes totalling 1,601 metres were drilled. Boreholes were drilled to the southwest at dip of approximately 50 degrees from the horizontal. Only four 2-metre samples returned values above 2.0 g/t gold. Additionally, 17 reverse circulation boreholes totalling 3,351 metres was drilled west of the 55 Zone. No significant gold mineralization was intercepted.

In 2014, Roxgold completed 67 reverse circulation boreholes totalling 5,414 metres at the Boni Shear, Haho and Yaro zones. The 40 boreholes drilled at the Boni Shear were drilled to the southeast with a dip of approximately 55 degrees from the horizontal. Many of the holes returned weakly anomalous results, with best intercepts of 8.0 metres at 1.76 g/t gold in YRM-14-RC-HHN-016 and 4.0 metres at 2.18 g/t gold in YRM-14-BSC-047. At Haho, 14 boreholes were drilled at different orientations to intersect the various structures. Few gold anomalies were intersected, with best intersections of 4.0 metres at 5.18 g/t gold from YRM-14-RC- HHN-016 and 2.0 metres at 6.4 g/t gold from YRM-14-RC-HAO-001. These two intersections were from south-southeast trending quartz veins. At Yaro, four boreholes were drilled through a northwest trending shear zone and intersected 2.0 metres at 1.09 g/t gold in YRM-14-RC-YRO-065.

In 2015, Roxgold drilled 11 reverse circulation pre-collars at the Bagassi South Zone for 2,389.2 metres on the QV1 structure. The boreholes were completed with diamond tails. The drill program infilled and extended mineralization at Bagassi South up and down dip. In the fourth quarter of 2016, a 6-borehole program using reverse circulation pre-collars at the Bagassi South Zone was conducted targeting the down dip extension of the QV' structure. In addition to these 6 boreholes, an additional 5 boreholes were drilled in the first quarter of 2017 as part of the same drilling program at the Bagassi South Zone with the last two holes of the program targeting the QV1 structure. In total for the 2016/2017 program, 2,630 metres of RC pre-collars were drilled at the Bagassi South Zone.

9.2.4 Core Drilling

Core drilling by Roxgold on the Yaramoko Gold Project has targeted the 55 Zone, Bagassi South Zone, 109 Zone, 300 Zone and Haho Zone areas. Most of the drilling, however, has been completed at the 55 Zone, and in the Bagassi South Zone targeting the QV1 structure. From November 2011 to July 2016, Roxgold completed 627 core boreholes totalling 169,544 metres (Figure 13). Of these, 381 core boreholes targeted the 55 Zone for mineral resource delineation, metallurgical testing, and geotechnical studies for a total of 118,640 metres drilled. At the Bagassi South Zone, a total of 114 boreholes for 25,017 metres were drilled, targeting the QV1 and QV' structures. Outside of the 55 Zone, and QV1 and QV' structures, regional targets on the Yaramoko Gold Project investigated by core drilling include:

- 36 core boreholes at Bagassi South Zone for 7,961 metres.
- 30 core boreholes at 109 Zone for 5,037 metres.
- 16 core boreholes at 300 Zone for 2,472 metres.
- 14 core boreholes at 59 Zone (on the footwall of 55 Zone) for 2,611 metres.
- 16 core boreholes at 117 Zone for 4,507 metres.
- 5 core boreholes at 55 Zone western extension for 900 metres.
- 3 core boreholes at 55 Zone northwest extension for 534 metres.
- 4 core boreholes 1 kilometre northwest of 55 Zone for 547.5 metres.
- 8 core boreholes in Haho Zone for 1,532 metres.

Mineral resource delineation drilling at the 55 Zone had two main objectives: delineation and infilling drilling in the upper 700 metres of the shear zone, and testing the depth extensions of the gold mineralization to a depth of approximately 1,000 metres. Drilling at the 55 Zone consisted of angled boreholes plunging from 45 to 70 degrees from the horizontal and primarily at an azimuth of 360 degrees.

Mineral resource delineation drilling at the Bagassi South Zone on the QV1 structure involved multiple phases of drilling. The gold mineralization was infilled and delineated to a depth of approximately 350 metres at the northwest end of the structure and to approximately 275 metres at the southeast end of the plunging shoot.

Core drilling recovered HQ sized core (63.5-millimetre diameter) from the top of the borehole to the point where the rock showed no signs of oxidation; typically, 20 to 30 metres in depth. At that point, the core size was reduced to NQ (47.6-millimetre diameter). Down-hole deviation was monitored using a Reflex Instruments device at 15, 25, and 50 metres, and then approximately every 50 metres thereafter.

Core recovered from the first 110 boreholes was oriented using a Reflex ACT II instrument. Core from subsequent boreholes was sporadically oriented. After borehole YRM-DD-13-260, core from all infill boreholes was oriented starting at 100 metres above the projected shear zone intercept. From 2015 to 2016 all core within each borehole was oriented using a Reflex ACT II instrument.

Prior to 2014, recovery and rock quality designation (RQD) measurements were collected before the core was transported to the base camp. Thereafter, these measurements were completed at the camp. Core was logged at the camp to collect additional information about lithology, mineralization, alteration, geotechnical properties, and was marked for sampling by a geologist. Core samples were collected from half core cut lengthwise using a diamond saw.

In 2012, Roxgold contracted the *Bureau d'Etudes des Géosciences, des Energies et de l'Environnement* (BEGE), a consultant group from Burkina Faso, to re-survey all core boreholes using a differential GPS. The collar locations of core boreholes drilled subsequently were surveyed with a differential GPS by CBM Surveys Limited based in Ghana.

Drilling on the 55 Zone successfully intersected the main shear zone and associated quartz vein from multiple setups; boreholes were drilled primarily at an azimuth of 360 degrees with plunge ranging from 45 to 65 degrees. Five metallurgical boreholes designed to maximize the quantity of material collected for metallurgical testing were drilled in 2013. In addition, 14 geotechnical boreholes were drilled in 2013 and a further nine were drilled in 2014 to test the mechanical behaviour of the surrounding rock for underground mining. Two additional geotechnical boreholes were drilled in 2015 at the planned vent shaft locations. Core recovery was measured and generally exceeded 95 percent, except across narrow intervals in saprolite and fractured rock where recovery is locally poor.

The 2016 and 2017 core drilling programs focused mainly on mineral resource conversion and an extensional drilling program at depth at both the Bagassi South and 55 zones. A deep drilling program was conducted at the 55 Zone in the fourth quarter of 2016, the program targeted the mineralized shoot at elevation between 700 metres and 1,000 metres below the topographic surface. A second phase a deep drilling was conducted in 2017 totalling 8 holes and targeting the down-plunge projection of the mineralized shoot below the 2016 drilling.

Drilling at the Bagassi South Zone was undertaken in the fourth quarter of 2016 and continued in 2017, drilling mainly focused on mineral resource conversion, targeting Inferred mineral resources.

At the end of the 2017 third quarter, total drilling on the Yaramoko property for the year amounted to 47,455 metres with drilling in the fourth quarter continuing along the QV' structure, at depth at the 55 Zone and testing regional IP targets.

9.3 Drilling Pattern and Density

Core boreholes considered for mineral resource modelling in the 55 Zone were drilled on centres of 12.5 metres to a vertical depth of 75 metres, 25- to 30-metre centres from 75 to 400 metres vertical depth, 25- to 50-metre centres from 400 to 800 metres vertical depth, and wider spacings at deeper depths. At Bagassi South, the QV1 structure was drilled to approximately 30- to 35-metre centres, except at the southeastern end.

9.4 SRK Comments

In the opinion of SRK, the drilling strategy and procedures used by Roxgold and Riverstone conform to generally accepted industry best practices. The drilling information is sufficiently reliable and the drilling pattern is sufficiently dense to interpret with confidence the geometry and the boundaries of the gold mineralization. All drilling sampling was conducted by appropriately qualified personnel under the direct supervision of appropriately qualified geologists.

SRK is not aware of any drilling, sampling or recovery factors that could materially impact the accuracy and reliability of the drilling results.

10 Sample Preparation, Analyses, and Security

Riverstone and Roxgold used various laboratories to prepare and assay samples collected on the Yaramoko Gold Project. These include Activation Laboratories Ltd. (Actlabs), ALS Chemex (ALS), BIGS Global S.A.R.L. (BIGS), and SGS Laboratories (SGS) located in Ouagadougou, Burkina Faso, as well as SGS in Tarkwa, Ghana and TSL Laboratories (TSL) in Saskatoon, Saskatchewan.

Actlabs, ALS, BIGS, SGS, and TSL are commercial laboratories independent of Roxgold and Riverstone. Actlabs is not accredited to ISO/IEC 17025, but received ISO 9001:2008 certification for its quality management system in April 2013. The ALS Ouagadougou laboratory is also not accredited under recognized accreditation; however, it is part of the ALS Group of laboratories that operates under a global quality management system accredited to ISO 9001:2008 and participates in international proficiency testing programs such as those managed by Geostats Pty Ltd. BIGS is currently seeking ISO 17025 certification. The SGS Ouagadougou and Tarkwa laboratories are not accredited under recognized accreditation, but are part of the SGS Group of laboratories that operates under a global quality management system accredited to ISO 9001:2008 and participates in international proficiency testing programs such as those managed by Geostats Pty Ltd. TSL has received ISO/IEC 17025:2005 certification by the Standards Council of Canada for numerous specific test procedures, including the method used to assay samples submitted by Roxgold.

10.1 Soil Samples

Soil samples weighing approximately 3.5 kilograms were collected by Riverstone and Roxgold using picks and shovels. Soil was collected to a depth of up to 50 centimetres, and each sample was placed in a plastic bag with a sample tag inserted in the bag. The samples were described in the field and later transferred to a main electronic spreadsheet. Sample locations were recording using a hand-held GPS unit.

Riverstone and Roxgold personnel transported the samples to the field office prior to shipping them to the laboratory for preparation and assaying. Samples were sent to various laboratories in Ouagadougou including Actlabs, ALS, BIGS, and SGS. Samples were assayed using standard fire assay procedures on pulverized subsamples with atomic absorption finish. Samples grading over 1.00 g/t gold were re-assayed with a gravimetric finish.

10.2 Rotary Air Blast Samples

Forages Technic Eau Burkina S.A.R.L. was contracted to carry out rotary air blast drilling for both Riverstone and Roxgold. Rotary air blast chips were processed through a cyclone and split using a riffle splitter, and samples were collected at three metre intervals. A four-kilogram sub sample was collected into a plastic sample bag and a paper tag with a corresponding sample number was inserted in the bag. The sample bag was weighed using a spring scale. The discarded portion of the riffle splitter was discarded on the ground and was used by the geologist for the initial lithological log.

Riverstone and Roxgold personnel transported the samples to the field office prior to shipping them to the laboratory for analyses. Samples were sent to Actlabs, ALS, BIGS, and SGS in Ouagadougou. Samples were assayed using standard fire assay procedures on pulverized subsamples with atomic absorption finish. Samples grading over 1.00 g/t gold were re-assayed with a gravimetric finish.

10.3 Auger Drilling Samples

Sahara Geoservices of Ouagadougou was contracted to execute auger drilling. Sample intervals were logged and categorized by a geologist that was present at the rig at all times. Following the initial orientation program over the 55 Zone in 2012, where the boreholes were sampled from top to bottom, the exploration auger drilling discarded the cover/lateritic material at the top of the borehole and sampling only occurred when the geologist identified the saprolite zone. Two 2-metre-long samples were collected. The average depth of successful auger boreholes was 5.5 metres. The samples were bagged and categorized with a blank or standard inserted every eleventh sample along with a field duplicate sample. Roxgold project geologists supervised the work conducted by the drilling contractor staff.

Samples were prepared and analyzed by Actlabs in Ouagadougou using standard fire assay procedures on pulverized subsamples with atomic absorption finish. Samples grading over 1.00 g/t gold were re-assayed with a gravimetric finish. A total of 2,820 samples in 2013 were also analyzed for a suite of 60 elements using an inductively coupled plasma mass spectrometry (ICP-MS) procedure.

10.4 Reverse Circulation Drilling Samples

Boart Longyear from Ouagadougou and Geodrill from Ghana were contracted to carry out reverse circulation drilling on the Yaramoko Gold Project; Boart Longyear was contracted from 2007 to 2012, and Geodrill was contracted in 2013. Boreholes were surveyed using a handheld GPS unit and the down-hole deviation was measured using a Reflex tool.

Reverse circulation samples were obtained by collecting the chip material from a two-metre drill run retrieved underneath the cyclone in a woven plastic bag. This material was then run through a riffle splitter to half the sample size, and a three- to four-kilogram subsample was placed in a numbered plastic sample bag with a paper sample tag. The bag was weighed using a spring scale. Each sample was logged by the geologist at site for lithology, recovery, and colour of the chips.

Samples were transported by Roxgold personnel to the field office, and then shipped to the laboratory for analyses. At the field office, the chips were logged in more detailed. The logs recorded lithology, colour, texture, alteration, veining, and estimated percentage of sulphide and iron oxide.

Samples were sent to Actlabs, ALS, BIGS, and SGS in Ouagadougou and assayed using standard fire assay procedures on pulverized subsamples with atomic absorption finish. Samples grading over 1.00 g/t gold were re-assayed with a gravimetric finish.

10.5 Core Drilling Samples

Standardized sampling protocols were used for core sampling by Riverstone in 2011 and by Roxgold between 2011 and 2017. Sample preparation and analyses were conducted by Actlabs, ALS, BIGS, and SGS in Ouagadougou, as well as by SGS in Tarkwa and TSL in Saskatoon (Table 6). Seventy-three percent of the core samples informing the mineral resource (36,029 out of 49,242 samples) were prepared and assayed by Actlabs in Ouagadougou. The use of BIGS, SGS Tarkwa, and TSL was discontinued in 2012.

Table 6: Laboratories Used to Assay Core Samples from the 55 Zone (2011-2017) and QV1 and QV' at Bagassi South Zone

Assay Laboratory	Samples from Date	Samples to Date	Samples	Percentage
55 Zone				
Actlabs Ouagadougou	January 2012	July 2016	36,052	73%
ALS Ouagadougou	December 2011	April 2013	3,261	7%
BIGS Ouagadougou	December 2011	July 2012	2,624	5%
SGS Ouagadougou	February 2012	June 2013	2,977	6%
SGS Tarkwa	August 2012	November 2012	1,768	4%
TSL Saskatoon	October 2011	October 2012	2,776	6%
Total			49,458	100%
QV1/QV'				
Actlabs Ouagadougou	May 2013	February 2016	13,256	100%
Total			13,256	100%

10.5.1 Core Sampling by Roxgold

Sampling of core was performed by Roxgold personnel. From the drill site, core was transported by truck to a secure logging facility at the Roxgold field office where it was photographed and logged by a geologist. Selective sampling was employed where, at the discretion of the geologist, samples were collected from visible alteration or vein zones outside of the expected intercepts. All core was sampled 100 metres above and below the 55 Zone in boreholes drilled prior to 2014, and thereafter were generally sampled starting from approximately 20 metres above the main mineralized zone.

Exploration core boreholes outside of the 55 Zone and Bagassi South Zone structures are typically sampled throughout the borehole. Waste intervals were sampled at 2.0-metre intervals, except where a significant geological change occurred and/or in mineralized zones where the sampling intervals averaged between 1.0 to 1.5 metres. The core was then cut in half lengthwise using an electrical rock saw. Half of the sample was placed inside a labelled plastic sample bag. The remaining half was returned to the core box for archiving. Samples were then inserted into woven polypropylene bags prior to being transported by truck to the preparation and assay laboratory.

10.5.2 Sample Preparation at Actlabs Ouagadougou

Samples received at Actlabs in Ouagadougou were first crushed to 90 percent under 2-millimetre grain size. A 300-gram split was then pulverized to 95 percent, passing 150 mesh (preparation code RX1). Prior to 2014, for samples marked as mineralized, a 1,000-gram split was pulverized (preparation code RX1+1.3). All samples were assayed using a 30-gram fire assay procedure with atomic absorption spectroscopy (AAS) finish with a detection limit of 5 parts per billion (ppb) gold (procedure code 1A2) prior to 2014. A 50-gram fire assay procedure was used subsequently.

All samples grading over 5.0 g/t gold were re-assayed with a gravimetric finish. Selected samples within the mineralized zones were re-assayed using a 1,000-gram screen metallic fire assay procedure with gravimetric finish (procedure code 1A4-1000). With this procedure, a representative 500- or 1,000-gram sample split is sieved at 100 mesh (150 micrometres) with fire assay performed on the entire +100 mesh fraction and two splits of the -100-mesh fraction. The final assay result is calculated based on the results and the weight of each fraction. A total of 63,635 samples have been analyzed using screen metallic fire assay at the 55 Zone and Bagassi South Zone.

10.5.3 Sample Preparation at ALS Ouagadougou

Samples processed at ALS Chemex in Ouagadougou were first crushed to 70 percent passing 2 millimetres or better (preparation code CRU-31). A 1.5-kilogram riffle split was pulverized to 85 percent passing 75 micrometres (preparation code PUL-36). All samples were then analyzed using a standard 30-gram fire assay procedure with AAS finish with a detection limit of 5 ppb gold (procedure code Au-AA23). Samples grading over 3.0 g/t gold were re-assayed using a 50-gram fire assay procedure with gravimetric finish (procedure code Au-GRA22).

10.5.4 Sample Preparation at BIGS Ouagadougou

Samples processed by BIGS in Ouagadougou were crushed and pulverized at undisclosed specifications. The samples were assayed using a 30 or 50-gram lead fusion fire assay procedure (codes FPF300 and FPF500, Fusion Plombeuse), with AAS finish with a detection limit of 5 ppb gold.

10.5.5 Sample Preparation at SGS Ouagadougou

At SGS Ouagadougou, samples were crushed and pulverized at undisclosed specifications. They were then assayed for gold using a combination of fire assay and atomic absorption spectroscopy (procedure code FAA505). The lower detection limit of this method is 0.01 g/t gold. A second analytical method (procedure code FAE505) involving a concentration step from aqueous liquid into diisobutyl ketone (an organic solvent) was used to determine gold concentrations between 0.001 and 1.0 g/t gold using atomic emission spectroscopy (AES).

10.5.6 Sample Preparation at SGS Tarkwa

Samples processed at SGS Tarkwa were crushed and pulverized at undisclosed specifications. Sample assays were performed using fire assay, concentration with an organic solvent, and measurement using AES (procedure code FAE505). This method can determine gold concentrations between 0.002 and 1.0 g/t gold.

10.5.7 Sample Preparation at TSL Saskatoon

At TSL Saskatoon, samples were prepared using a standard rock preparation procedure of drying, weighing, crushing, splitting, and pulverization. Samples were received, sorted, and verified according to a sample submittal form. Samples were crushed in oscillating jaw crushers to 70 percent, passing 10 mesh (1.7 millimetres). Samples were riffle split; typically, a 250-gram subsample was pulverized, and the remaining sample was stored as reject material. Ring mill pulverizers grinded samples to 95 percent, passing 150 mesh (106 micrometres). Crushers, rifflers, and pans were cleaned with compressed air between samples. Pulverizing pots and rings were brushed, hand cleaned, and air blown.

Samples collected after October 2011 were assayed using standard fire assay procedures on 50-gram pulverized subsamples with AAS finish with a detection limit of 5 ppb gold. Samples grading over 3.0 g/t gold were re-assayed with a gravimetric finish. Earlier samples, from August to October 2011, were analyzed using a screen metallic assay procedure. The entire sample was first crushed, and a one-kilogram subsample was collected using a splitter. The lower detection limit of the screen metallic assay procedure is 0.03 g/t gold. The entire subsample was pulverized and subsequently sieved at 150 mesh. Each fraction was then assayed for gold. Results were reported as a calculated

weighted average of gold in the entire sample. A total of 482 out of the 3,018 samples assayed by TSL were analyzed using a screen metallic procedure like that used at Actlabs.

Roxgold no longer uses this laboratory, largely due to sample shipping costs to Canada.

10.5.8 Sample Security

Samples collected by Riverstone and Roxgold were accessible only to authorized Riverstone or Roxgold personnel until the samples were received at the laboratories. The samples shipped to Canada were sent via bonded freight carrier and were under their care until delivered.

10.6 Metallurgical Sampling

Three metallurgical testing programs have been carried out on representative samples from the 55 Zone. The metallurgical samples consisted of composite samples collected from quarter or half core intervals. The samples were collected at site and shipped to the respective laboratories in large sealed barrels. The samples were crushed, blended, and split to provide sample composites for metallurgical test work.

The details of the metallurgical testwork program performed in 2012 at Blue Coast Research in Nanaimo, British Columbia, Canada, the 2013 testing program at Mat-Solve Laboratories Inc. (Met-Solve) in Langley, British Columbia, Canada, and the follow-up 2014 metallurgical testwork program completed at Ammtec of ALS Global (ALS Metallurgy) in Perth, Western Australia, Australia are described in section 12.

Between August and September 2015, a metallurgical test work program was completed by ALS Metallurgy under the supervision of Roxgold on representative samples from the Bagassi South QV1 structure. The test work included:

- Sample preparation
- Bond ball mill work index (BWi) determination
- Head assays
- Grind establishment
- Gravity gold recovery and cyanide leach test work

10.7 Quality Assurance and Quality Control Programs

Quality control measures are typically set in place to ensure the reliability and trustworthiness of exploration data. These measures include written field procedures and independent verifications of aspects such as drilling, surveying, sampling and assaying, data management, and database integrity. Appropriate documentation of quality control measures and regular analysis of quality control data are important as a safeguard for project data and form the basis for the quality assurance program implemented during exploration.

Analytical control measures typically involve internal and external laboratory control measures implemented to monitor the precision and accuracy of the sampling, preparation, and assaying. They are also important to prevent sample mix-up and to monitor the voluntary or inadvertent contamination of samples.

Assaying protocols typically involve regularly duplicating and replicating assays and inserting quality control samples to monitor the reliability of assaying results delivered by the assaying

laboratories. Check assaying is normally performed as an additional test of the reliability of assaying results. This generally involved re-assaying a set number of sample rejects and pulps at a secondary umpire laboratory.

This technical report focusses on the analytical quality control measures implemented by Roxgold since 2014. Quality control measures implemented by Roxgold prior to 2014 are documented in SRK (2014). The review also focuses only on the analytical results for the core samples from the 55 Zone and the Bagassi South Zone samples informing the mineral resource. Analytical quality control data collected by Riverstone and Roxgold as part of the sampling programs on other areas of the Yaramoko Gold Project are described in the preliminary economic assessment technical report by APG (2013).

For the 55 Zone and Bagassi South Zone core sampling, Roxgold and Riverstone relied partly on the internal analytical quality control measures implemented by Actlabs, ALS, BIGS, SGS, and TSL. In addition, Roxgold implements external analytical control measures consisting of the use of control samples (blanks, certified reference materials and duplicate samples) inserted in all sample batches submitted for assaying. Some umpire check assaying has been performed.

Twenty-five certified reference materials sources from commercial suppliers were used by Roxgold. Wash gravel was primarily used as a field blank prior to 2014. Since October 2012, a pulverized blank from CDN Resource Laboratories Ltd. has also used as a blank for samples submitted to Actlabs. In September 2015, a coarse blank sourced from barren quartz material found close to Ouagadougou was introduced. Field duplicates were used on core samples analyzed by Actlabs, ALS, BIGS, SGS Ouagadougou, and TSL. Prior to September 2012, duplicates consisted of crush rejects inserted by the preparation laboratory. The field duplicate procedure was changed and samples are now taken from quarter core.

10.8 SRK Comments

In the opinion of SRK, the sample preparation, security and analytical procedures used by Riverstone and Roxgold on core samples collected from the 55 Zone and Bagassi South Zone are adequate, as they are consistent with generally accepted industry best practices.

11 Data Verification

11.1 Verifications by Roxgold

The exploration work carried out on the 55 Zone was conducted by Roxgold personnel and qualified subcontractors. Roxgold implemented a series of routine verifications to ensure the collection of reliable exploration data. All work was conducted by appropriately qualified personnel under the supervision of qualified geologists. In the opinion of SRK, the field exploration procedures used by Roxgold are consistent with generally accepted industry best practices.

The quality assurance and quality control program implemented by Roxgold is comprehensive and was supervised by adequately qualified personnel. The 55 Zone project database is maintained by subcontractor Rob Maynard of Taiga Consultants Ltd. (Taiga) of Calgary, Alberta. Exploration data were recorded digitally to minimize data entry errors. Core logging, surveying, and sampling were monitored by qualified geologists and verified routinely for consistency. Electronic data were captured and managed using an electronic database.

Assay results were delivered by the primary laboratories electronically to Roxgold and Taiga. Analytical data were examined for consistency and completeness prior to being entered into the database. Sampling intervals that did not meet analytical quality control standards were re-assayed where necessary. Due to poor analytical quality control results, select intervals from 21 core boreholes originally assayed by BIGS and TSL in 2011 were re-assayed at Actlabs in Ouagadougou. A total of 246 samples from BIGS and 44 samples from TSL were re-analyzed by Actlabs. A suite of 175 pulps assayed at TSL were also submitted to Actlabs in Ancaster, Ontario for check assaying. The Actlabs results are in good agreement with the original results delivered by TSL (Analytical Solutions Inc., 2014).

The database considered by SRK for the preparation of the geology and mineral resource model for the 55 Zone was also verified by Mr. Pierre Desautels of AGP for the preparation of the October 2013 technical report (AGP, 2013b). AGP verified all data entry for all samples assaying greater than 4.0 g/t gold. Two minor discrepancies were corrected, none within the mineralized envelopes.

Roxgold also contracted Analytical Solutions Ltd. (Analytical Solutions) of Toronto, Ontario to review the analytical quality control data produced for the 55 Zone between February and November 2013 (Analytical Solutions Ltd., 2013). The primary laboratory during this time period was Actlabs in Ouagadougou. After review, Analytical Solutions determined that there is no evidence of cross sample contamination. During that period, a total of 536 control samples were also analyzed. Only six failures were noted, for which re-assays were requested. Analytical Solutions evaluated 124 quarter-core duplicate sample pairs and noted that there was no evidence of bias that could have been introduced by preferentially submitting a more mineralized half core for assaying.

In August 2016, Roxgold contracted CSA Global to review all analytical control data for the 55 Zone generated between the January 1, 2010 and July 28, 2016. After review, CSA Global determined that there are multiple blank and certified reference material (CRM) failures that could be attributed to sample misidentification. Further review was completed by Roxgold personnel and a total of 54 standards and blanks were reassigned in the database. CSA Global also noted there was minor instances of samples bias, including for CRM CDN-GS-3K. Analysis of the duplicate data show that the repeatability of quality control data is low due to the coarse nature of the gold

mineralization in the deposit. The repeatability of quality control data produced after 2013 is generally of higher quality.

A comprehensive quality control review of assay data from the QV1 and QV' structures has not yet been undertaken, but a preliminary internal review of the data was undertaken in March 2016. From this review, it was determined that there were four CRM failures outside of +/- 3SD from the expected values that were located close to mineralized intervals. In addition, four coarse blank failures were noted, all of which were placed directly after samples that had returned assays over 100 g/t gold. The status of these failures needs to be reviewed.

11.2 Verifications by SRK

11.2.1 Site Visit

Principal Consultants Benny Zhang, PEng and Sebastien Bernier, PGeo from SRK visited the Yaramoko Gold Project site from December 5 to 7 and 13 to 15, 2016 respectively. During these visits discussions were held with project personnel and information / data was collected to be used for the compilation of this report.

11.2.2 Verifications of Analytical Quality Control Data

Roxgold provided SRK with external analytical control data containing the assay results for the quality control data produced by Roxgold during the core sampling programs investigating the 55 Zone and Bagassi South Zone areas from May 2013 to September 2017. All data was provided in Microsoft Excel spreadsheets. SRK aggregated the assay results of the external analytical control samples for further analyses. Control samples (blanks and standards) were summarized on time series plots to highlight their performance and paired data (field duplicates) were analyzed using bias charts, quantile-quantile, and relative precision plots.

SRK previously reviewed the external quality control data produced to 2013 by Roxgold, and considered the results sufficiently reliable for the purpose of mineral resource estimation as outlined in the Yaramoko technical report (SRK, 2014).

The external analytical quality control data produced for the 55 Zone and Bagassi South Zone are summarized in Table 7 and presented in graphical format in Appendix B. This study reviewed the external analytical quality control data generated on the Yaramoko gold project since that previously reviewed in the SRK (2014) report. The external quality control data produced on this project during this period represents approximately 10 percent of the total number of core samples collected on the Yaramoko Gold Project and submitted for assaying.

Control samples analyzed by Actlabs, where the majority of the core samples informing mineral resources were analyzed, as well as those analyzed by SGS Ouagadougou, show acceptable levels of performance. The majority of certified standards returned assay values within two standard deviations of the expected value. Analytical bias was not detected and samples deviating from the expected value can primarily be attributed to the mislabelling of other standards or blanks. Blank material was observed to return assay values generally under the arbitrary acceptable limit of 10 times the detection limit, however, some instances of contamination were observed. Roxgold actively records and investigates the failure of control samples, and is recommended to continue this practice.

Table 7: Summary of Analytical Quality Control Data Produced by Roxgold on the Yaramoko Gold Project

	Source	Expected Value Gold (g/t)	Reviewed by SRK (2014)	(%)	Reviewed by SRK (2017)	(%)
Sample Count			49,123		30,137	
Blanks		Total	956	1.9%	1,049	3.5%
Field Blank			941			
Standard Blank			15			
CDN-BL-10	CDN				775	
YRM-QBL-001					215	
YRM-CBL-01					46	
YRM-CBL-01					13	
Reference Material		Total	2,760	5.6%	1,497	5.0%
CDN-GS-P1	CDN	0.121	67			
CDN-GS-P3C	CDN	0.263	303		254	
CDN-GS-P3B	CDN	0.409	403			
CDN-GS-P4A	CDN	0.438	37			
CDN-PGMS-23	CDN	0.496			213	
CDN-GS-1P5B	CDN	1.46	66			
CDN-GS-1P5C	CDN	1.56	40			
CDN-GS-3L	CDN	3.18			90	
CDN-GS-3K	CDN	3.19	17		328	
CDN-GS-4B	CDN	3.77	37			
CDN-GS-4D	CDN	3.81	767		22	
CDN-GS-5F	CDN	5.27	14			
CDN-GS-8A	CDN	8.25	74			
CDN-GS-10D	CDN	9.50	745		281	
CDN-GS-12A	CDN	12.31			109	
CDN-GS-22	CDN	22.96			133	
OXC88	Rocklabs	0.203	90			
SH55	Rocklabs	1.375	7			
SJ53	Rocklabs	2.637			26	
SL61	Rocklabs	5.931			41	
OXN92	Rocklabs	7.643	88			
STD(unknown)	?	?	5			
Field Duplicates			698	1.4%	582	1.9%
Umpire Samples					57	0.2%
Total QC Samples			4,414	9.0%	3,185	10.6%

Paired field duplicate data suggests that gold grades display a nugget effect. Half absolute relative difference (HARD) plots suggest that approximately 40 percent of quarter core field duplicates have HARD below 10 percent (Appendix B). The poor reproducibility is not limited to samples nearing the detection limit and there is no evidence of bias that could have been introduced by preferentially submitting the more mineralized portion of the drill core for assay. Poor reproducibility of quarter core field duplicates is not unexpected for sampling mineralization characterized by coarse gold.

Some umpire sampling was conducted by Roxgold, by submitting pulp duplicate samples to SGS Ouagadougou to compare the repeatability of assay results between Actlabs and SGS. Similarly, coarse gold appears to have an effect on reproducibility, as HARD plots suggest that approximately 45 percent of pulp duplicates have HARD below 10 percent (Appendix B).

In the opinion of SRK, the review of analytical quality control data produced by Roxgold for samples submitted to Actlabs and SGS Ouagadougou suggest that the analytical results delivered by the laboratories are sufficiently reliable for the purpose of mineral resource estimation. No apparent analytical bias was observed in these results.

12 Mineral Processing and Metallurgical Testing

This section summarizes the metallurgical testing work completed on representative samples from the 55 Zone and the Bagassi South Zone QV1 gold deposits.

In June 2013, Roxgold commissioned SRK to provide certain technical engineering services and to prepare a feasibility study technical report pursuant to Canadian Securities Administrators' National Instrument 43-101 for the gold mineralization contained in the 55 Zone of the Yaramoko Gold Project in Burkina Faso. The study was documented in a technical report published on June 4, 2014.

Since 2014, there have been no further metallurgical test campaigns carried out for the 55 Zone deposit. The mineral processing and metallurgical test work discussed herein represents the campaign conducted on the Bagassi South Zone QV1 deposit. The test work program was performed in September 2015 at the ALS Metallurgy assay laboratory in Perth, Western Australia, Australia under the supervision of Roxgold.

By his education, relevant project experience, and affiliation to a recognized professional association, Mr. Paul Criddle, FAusIMM (#309804), Chief Operating Officer for Roxgold Inc., is the Qualified Person for the purposes of National Instrument 43-101.

12.1 Bagassi South Zone

12.1.1 ALS Metallurgy 2015

Between August and September 2015, a metallurgical test work program was completed by ALS Metallurgy under the supervision of Roxgold (ALS Metallurgy, 2015).

Test work conducted between August and September 2015 included:

- Sample preparation
- Bond ball mill work index (BWi) determination
- Head assays
- Grind establishment
- Gravity gold recovery and cyanide leach test work

The samples were received at ALS Metallurgy on July 31, 2015, and were comprised of 32 individually bagged samples of quarter-drill core. The samples were packaged in a single drum. Three samples were set aside for testing individually. These samples were individually control-crushed to -3.35 millimetres, homogenized and split into 500-gram charges. Details of these samples are summarized in Table 8.

The remaining samples were combined to generate three test work composites. Details of the three composites are summarised in Table 9.

A 1.0-kilogram sub-sample of each composite was combined to generate a master composite. The master composite was thoroughly homogenized and split into 500-gram charges for use in the test work program.

Table 8: Details of Samples Received at ALS Metallurgy on 31 July 2015

Hole ID	From	To	Length (m)	Weight (kg)
YRM-13KD-BG-015	128.14	129.57	1.43	1.32
YRM-15-DD-BGS-083	139.85	141.02	1.17	1.41
YRM-15-DD-BGS-086	189.00	190.50	1.50	1.62

Table 9: Details of the Bagassi South Zone Test Work Composites

Composite	Hole ID	From	To	Length (m)	Weight (kg)
QV1	YRM-13-BG-023	246.25	247.2	0.95	0.96
	YRM-13-BG-023	247.2	248.2	1	1.03
	YRM-13-BG-023	248.2	248.81	0.61	0.677
	YRM-13KD-BG-015	129.57	131	1.43	1.32
	YRM-13KD-BG-015	131	132.52	1.52	1.29
	YRM-14-BG-037	213.9	215.57	1.67	1.26
	YRM-14-DD-BGS-067	189.55	190.4	0.85	0.77
	YRM-14-DD-BGS-067	190.4	191.22	0.82	0.65
	YRM-14-DD-BGS-067	191.22	191.89	0.67	0.595
QV1 Ext	YRM-15-DD-BGS-083	138.15	138.85	0.7	0.937
	YRM-15-DD-BGS-083	141.91	142.23	0.32	0.299
	YRM-15-DD-BGS-083	142.75	143.4	0.65	1.09
	YRM-15-DD-BGS-083	144.05	144.75	0.7	0.719
	YRM-15-DD-BGS-083	145.75	146.75	1	0.782
	YRM-15-DD-BGS-083	147.56	148.15	0.59	0.7
	YRM-15-DD-BGS-083	143.4	144.05	0.65	0.885
	YRM-15-DD-BGS-083	146.75	147.56	0.81	0.88
	YRM-15-DD-BGS-086	185.5	186.2	0.7	0.578
	YRM-15-DD-BGS-086	186.2	187	0.8	0.911
	YRM-15-DD-BGS-086	187	188	1	1.42
	YRM-15-DD-BGS-086	188	189	1	1.06
QV1 South Ext	YRM-15-DD-BGS-090	228.6	229.3	0.7	0.595
	YRM-15-DD-BGS-090	230	230.75	0.75	0.95
	YRM-15-DD-BGS-090	231.5	232.05	0.55	0.53
	YRM-15-DD-BGS-090	233	233.7	0.7	0.836
	YRM-15-DD-BGS-090	234.5	235	0.5	0.673
	YRM-15-DD-BGS-090	230.75	231.5	0.75	0.65
	YRM-15-DD-BGS-090	235	235.75	0.75	0.768
	YRM-15-DD-BGS-090	232.05	233	0.95	0.8

12.1.2 Bond Ball Mill Work Index Determination

Test work conducted to evaluate the hardness of the ore was performed on composites QV1 and QV1 Extension using the standardized procedure detailed by F.C. Bond to determine the Bond BWi. A closing screen size of 106 micrometres was used, providing the results outlined in Table 10.

Table 10: QV1 and QV1 Extension Bond BWi

Composite ID	F ₈₀ (µm)	P ₈₀ (µm)	Bond BWi (kWh/t)
QV1	2672	77	17.4
QV1 Ext	2711	80	18.0

These results indicate the samples tested to be in the high hardness range for ores. Further tests are required to confirm the work indices for the orebody at depth, highlighting any variability. In addition, the results obtained indicate the ore is similar in hardness to the Zone 55 ore body and as such would be simply processed through the current circuit.

12.1.3 Head Assays

Detailed head assays were conducted on all the variability composites and a summary of critical elements as listed in Table 11.

There are large variations between the individual head assays for most samples because of the coarse nature of the gold.

No significant concentrations of elements deleterious to cyanidation were evident in the analyses. The organic carbon concentration is low which suggests that preg-robbing of the gold from solution is unlikely to occur.

Table 11: Summary of the Bagassi South Head Assays

Analyte	Units	QV1	QV1 Ext	QV1 South Ext	Master	YRM-13KD- BG-015	YRM-15-DD- BGS-083	YRM-15-DD- BGS-086
Au ₁	g/t	23.90	28.00	3.19	15.00	4.91	0.74	1.96
Au ₂	g/t	18.00	22.10	4.24	15.10	5.82	0.55	2.03
Ag	ppm	3.6	3	<0.3	1.8	1.2	<0.3	<0.3
C _{TOTAL}	%	1.47	0.39	0.96	0.99	3.42	3.57	0.12
C _{ORGANIC}	%	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
S _{TOTAL}	%	0.26	0.20	0.06	0.18	0.56	0.20	0.36
S _{SULPHIDE}	%	0.22	0.16	0.04	0.16	0.48	0.18	0.32
SiO ₂	%	70.0	78.6	76.2	74.2	53.4	56.4	76.6

12.1.4 Grind Establishment

Sub-samples of each composite were submitted for grind establishment test work. The objective of the grind establishment test was to determine grinding time required to grind a 500-gram sub-sample to a target P₈₀ of 75 micrometres using a laboratory rod mill. The results of this test work are summarized in Table 12.

Table 12: Summary of Bagassi South Grind Establishment Test Work

Composite ID	Grind Time Required to Achieve P ₈₀ 75 µm (min' sec")
QV1	8'17"
QV1 Ext	8'54"
QV1 South Ext	7'36"
Master	7'15"

12.1.5 Gravity/Cyanide Leach

Sub-samples of each composite were submitted for gold extraction test work. A 500-gram sub-sample was ground to P₈₀ 75 micrometres and submitted for gravity gold recovery ahead of cyanide leach test work, whilst an additional 500-gram sub-sample was submitted for direct cyanidation (i.e. no gravity recovery) at P₈₀ 75 micrometres. The three samples tested individually were stage-ground to 100 percent passing 106 micrometres and submitted for gravity gold recovery ahead of cyanide leach test work.

A summary of gold and extraction results is presented in Table 13.

Cyanide consumption was low, ranging between 0.28 to 0.35 kilograms per tonne with no noticeable difference between composites. The target pH of 10.5, indicates a lime consumption of around 0.35 kilograms per tonne and is consistent with previous test results from the Zone 55 test work.

Gravity separation indicated very high levels of gravity recoverable gold, at typically 70 to 90 percent. Leach kinetics of the gravity tailings was high, with most of the leaching being completed in the first 12 hours. Overall recoveries were in the 96 to 99 percent range. These gravity and leach recovery levels are similar to those from test work on the Zone 55 ore body.

Table 13: Summary of Bagassi South Zone Gravity Gold and Cyanide Leach Recoveries

Sample ID	Gold Head Grade (g/t)		Overall Gold Extraction (%) at Hours				Au Tail Grade (g/t)	Reagents (kg/t)		
	Assay	Calculated	Gravity	2	4	24		48	NaCN	Lime
QV1	23.9/18.0	26.65 27.72	90.5 -	98.2 46.6	98.4 63.2	98.9 96.9	98.9 99.6	0.29 0.11	0.30 0.35	0.38 0.38
QV1 Ext	28.0 / 22.1	11.42 18.13	85.7 -	96.6 46.7	98.2 64.5	99.6 98.9	99.7 99.6	0.04 0.08	0.28 0.30	0.30 0.26
QV1 South Ext	3.19 / 4.24	5.27 5.17	86.0 -	96.7 48.1	97.4 67.3	99.8 98.1	99.8 99.8	<0.02 <0.02	0.31 0.28	0.34 0.26
Master	15.0 / 15.1	12.67 18.24	87.4 -	95.8 46.5	96.6 64.5	97.7 99.1	98.2 99.8	0.23 0.04	0.31 0.32	0.36 0.42
YRM-13KD-BG-015	4.91 / 5.82	6.61	78.0	93.3	94.6	95.7	96.2	0.25	0.35	0.38
YRM-15-DD-BGS-086	1.96 / 2.03	3.16	72.1	95.6	96.7	97.7	98.7	0.04	0.31	0.28

13 Mineral Resource Estimates

The processes undertaken to derive the mineral resource estimates for the 55 Zone and for the Bagassi South Zone are described separately in this section.

13.1 55 Zone Mineral Resource Estimate

In June 2013, Roxgold commissioned SRK to provide certain technical engineering services and to prepare a feasibility study technical report pursuant to Canadian Securities Administrators' National Instrument 43-101 for the gold mineralization contained in the 55 Zone of the Yaramoko Gold Project in Burkina Faso. The study was documented in a technical report published on June 4, 2014.

Since 2014, Roxgold has completed an infill drilling program in support of the first five-years of production at the Yaramoko Gold Project. In November 2016, Roxgold commissioned SRK to prepare a new mineral resource model for the Yaramoko Gold Project using updated geological wireframes prepared by Roxgold using drilling information to December 31, 2016. This new mineral resource model formed the basis of the 2016 year-end mineral resources and mineral reserves of the Yaramoko Gold Project.

The mineral resource evaluation work discussed herein represents the fourth Mineral Resource Statement prepared for this project. This memorandum summarizes the work completed by SRK to prepare the mineral resource model and Mineral Resource Statement. The construction of the mineral resource model was a collaborative effort between Roxgold and SRK personnel. The optimization of the geological wireframes was primarily carried out by Roxgold and reviewed by Mr. Dominic Chartier, PGeo (OGQ #0874), whereas geostatistical analysis, variography, and mineral resource modelling were undertaken by Mr. Sébastien Bernier, PGeo (APGO #1847). All technical work was supervised by Mr. Glen Cole, PGeo (APGO #1416).

By their education, relevant project experience, and affiliation to a recognized professional association, Mr. Chartier, Mr. Bernier and Mr. Cole are Qualified Persons independent of Roxgold for the purposes of National Instrument 43-101. Mr. Bernier from SRK visited the Yaramoko Gold Project site from December 13 to 15, 2016.

The Mineral Resource Statement for the 55 Zone is presented in Table 14 and is reported at a cut-off grade of 5.0 grams of gold per tonne (g/t gold) assuming a gold price of \$1,250 per ounce and an average gold recovery of 98.5 percent. The mineral resource model was prepared in conformity with The Canadian Institute of Mining, Metallurgy and Petroleum's (CIM) *Estimation of Mineral Resources and Mineral Reserves Best Practices Guidelines* (November 2003) and are classified per the CIM *Definition Standards for Mineral Resources and Mineral Reserves* (May 2014). The effective date of the Mineral Resource Statement is December 31, 2016.

Mineral resources are not mineral reserves and have not demonstrated economic viability. There is no certainty that all or any part of the mineral resources will be converted into mineral reserves. SRK is unaware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant issues that may materially affect the mineral resources.

Table 14: Mineral Resource Statement*, 55 Zone, Yaramoko Gold Project, Burkina Faso, SRK Consulting (Canada) Inc., December 31, 2016

Category	Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Measured	265	26.88	229
Indicated	1,076	14.73	509
Measured + Indicated	1,341	17.13	738
Inferred	669	16.14	347

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Underground mineral resources are reported at a cut-off grade of 5.0 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$100 per tonne, G&A cost of \$28.30 per tonne, processing cost of \$38.90 tonne, process recovery of 98.5 percent.

13.1.1 Mineral Resource Estimation Methodology

The mineral resources reported herein have been estimated using a geostatistical block modelling approach informed from gold assay data collected in core boreholes. Underground chip samples collected routinely during the mining activities were not considered for the estimation, other than for visual validation. The geological wireframes consider structural and lithological framework of the gold mineralization.

The evaluation of the mineral resources involved the following procedures:

- Database compilation and verification.
- Generation of three-dimensional geological models and verification.
- Data conditioning (compositing and capping), statistical analysis, and variography.
- Selection of estimation strategy and estimation parameters.
- Block modelling, grade estimation and validation.
- Assessment of “reasonable prospects for economic extraction” and selection of reporting assumptions.
- Classification, and tabulation.
- Preparation of the Mineral Resource Statement.

Resource Database

The Yaramoko Gold Project database as of December 31, 2016, comprises 446 core boreholes (137,937 metres), all from NQ-sized drill rods. Information from five metallurgical boreholes (YRM-13-MET-01 to YRM-13-MET-05) that were sampled over a composite interval was not considered for mineral resource estimation.

Exploration drilling data was received as a set of the following CSV format tables: header, survey (directional survey data), lithology, assay, and specific gravity. The data was imported into Datamine RM and Leapfrog database for plotting, modelling, and validation. Validation tools were used to check for gaps in information, overlapping records, and data beyond the end of a borehole. No errors were found. The database includes 4,056 survey records; 41,695 lithology records; 51,185 assay records; and 6,034 specific gravity records.

Based on observations during the site visit and the review of the drilling database, SRK is satisfied that the exploration and infill drilling work carried out by Roxgold has been conducted in a manner

consistent with generally recognized industry best practices and that the drilling data are sufficiently reliable for supporting a mineral resource evaluation.

Mineralized Domain and Geological Modelling

Gold mineralization is associated with low-sulphide quartz veins and attendant altered schists forming one tabular zone inside a narrow reverse-oblique shear zone. Two distinct geological features were modelled by Roxgold, the shear zone and the quartz rich structure containing the bulk of the gold mineralization. The structure is always constrained within the shear zone.

Core photographs of each core borehole intersections were reviewed by SRK to ensure the wireframes were consistent with the logged lithology and not based solely on gold grades. The average thickness of the gold mineralization varies from less than one to more than 17 metres. The gold mineralization remains open below 1,100 metres. The shear zone dips moderately to steeply toward south-southeast. From the surface to a depth of approximately 400 metres the shear zone dips at approximately 70 to 75 degrees. Below that depth, the shear zone is steeper, dipping at approximately 80 to 85 degrees (Figure 14).

Within the structure, at least three generations of quartz veins have been reported by Roxgold, each associated with highly variable gold grade averages. To control the estimated gold grade dispersion within the structure, SRK generated a higher-grade sub-domain using a threshold of 3.0 g/t gold to constrain the higher-grade values.

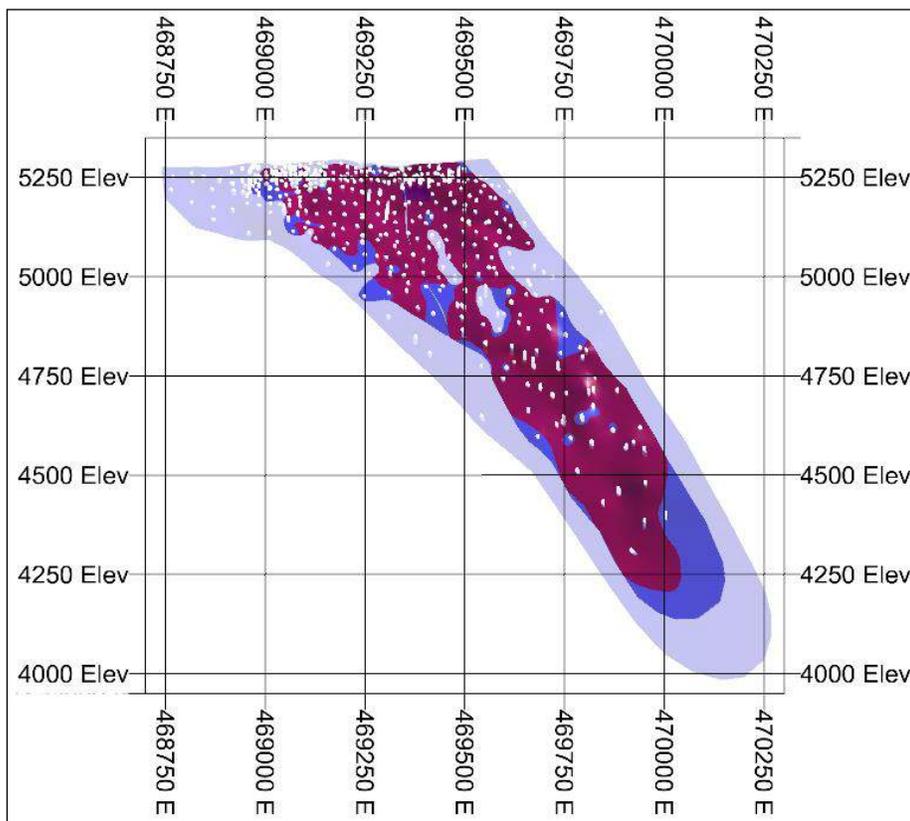


Figure 14: Longitudinal View Looking North

Structure (dark blue) within the shear zone (light blue) in relation to the boreholes (white) and the higher-grade sub-domain (red).

Specific Gravity

Roxgold measured specific gravity on several representative core samples from selected assay intervals using a water displacement technique. A total of 6,034 specific gravity measurements were taken, but only 501 are within the shear zone or the structure (Figure 15). A uniform specific gravity of 2.73 and 2.66 was used to covert volumes into tonnages in the Shear zone and the structure respectively. This represents the mean of the specific gravity measurements in each wireframe, after removing seven erroneous values (less than 1.00 and greater than 4.00).

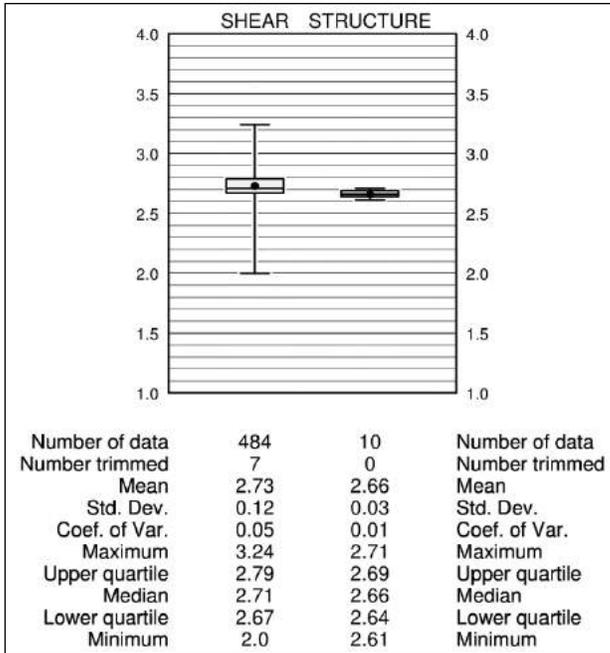


Figure 15: Summary of the Specific Gravity Database Within the Shear Zone and Structure

Compositing and Capping

Borehole gold assay data inside the shear zone or the structure were extracted individually and examined for determining an appropriate composite length (Figure 16).

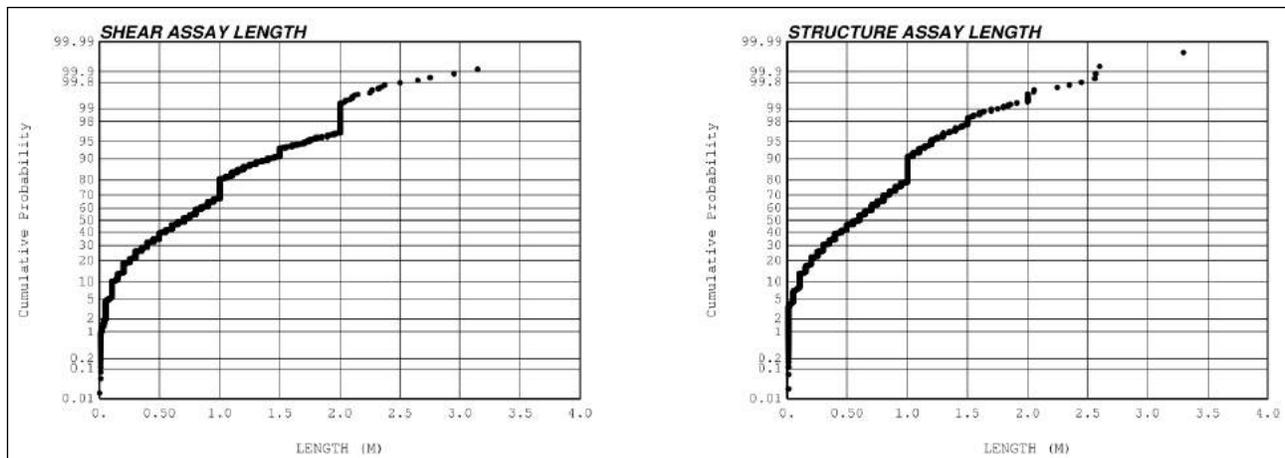


Figure 16: Distribution of the Sample Length Intervals

A modal composite length of 1.5 metres was applied to all data, honouring the shear zone, the structure and the higher-grade sub-domain boundaries. The impact of gold outliers was examined on composite data using log probability plots and cumulative statistics. Basic statistics for gold assays, composites, and capped composites are summarized in Table 15. Only three composites were capped in the structure. The same three composites were also capped in the higher-grade sub-domain. Their locations are shown in Figure 17.

Table 15: Basic Statistics

Domain	Element (g/t)	Sample Count	Minimum	Maximum	Mean	Standard Deviation	Coefficient of Variation	Capped Count
Original Assays								
Shear zone	Gold	3,102	0.00	51.53	0.55	1.58	2.87	
Structure	Gold	2,244	0.00	770.00	16.92	52.90	3.13	
HG sub-domain	Gold	1,396	0.00	770.00	26.80	65.79	2.45	
Composites								
Shear zone	Gold	1,672	0.00	26.30	0.57	1.29	2.26	
Structure	Gold	927	0.00	729.68	16.94	44.63	2.64	
HG sub-domain	Gold	586	0.00	729.68	26.70	54.92	2.06	
Capped Composites								
Shear zone	Gold	1,672	0.00	7.00	0.54	0.95	1.78	9
Structure	Gold	927	0.00	318.00	16.24	36.77	2.27	3
HG sub-domain	Gold	586	0.00	318.00	25.59	45.01	1.76	3

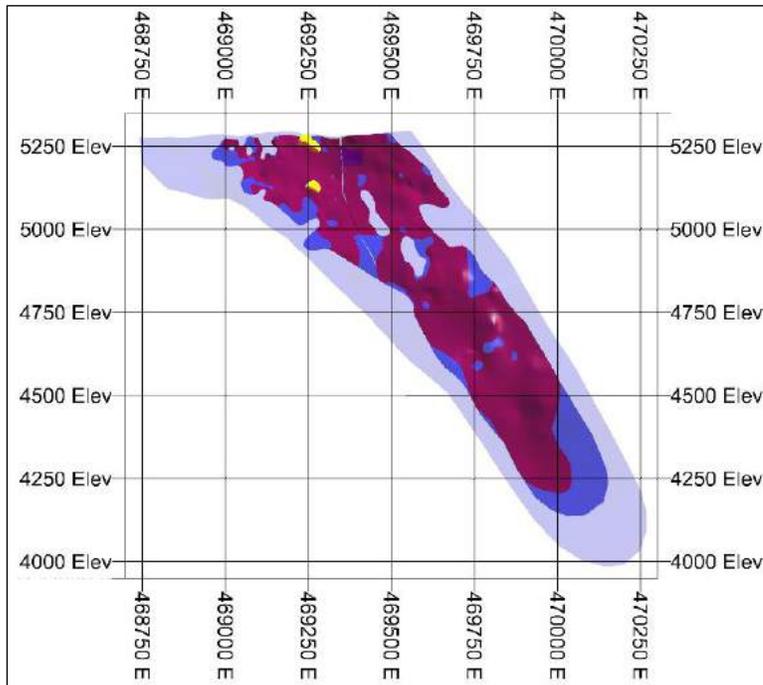


Figure 17: Longitudinal View Looking North

Showing the location of the three capped composites in the Structure.

Basic statistics, histograms, and cumulative probability plots for the shear zone, the structure and the higher-grade sub-domain were applied to determine appropriate capping grades. These are illustrated in Figure 18, Figure 19 and Figure 20. Composites from the shear zone, the structure and higher-grade sub-domain were capped at 7 g/t, 318 g/t and 318 g/t gold respectively.

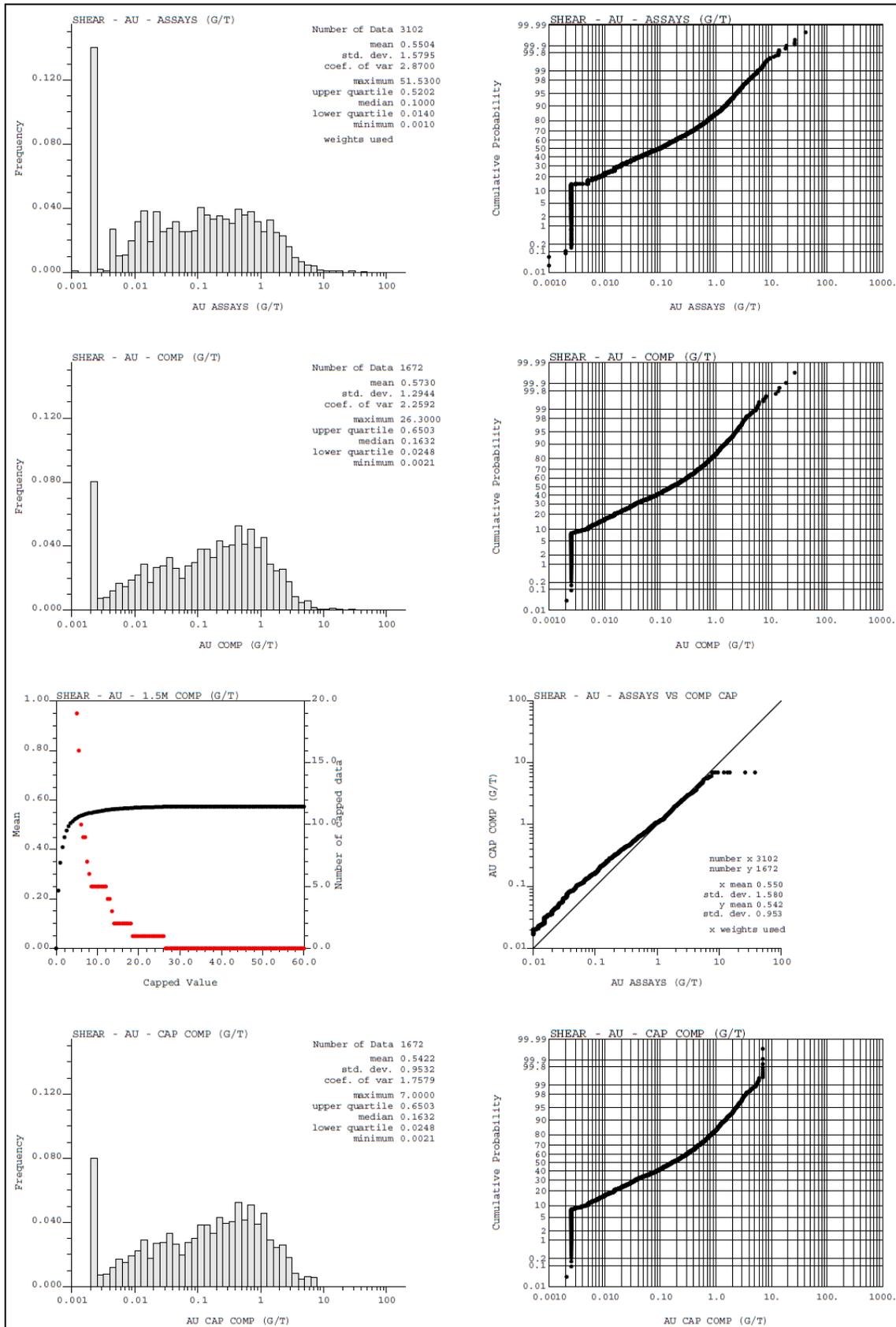


Figure 18: Basic Statistics of the Gold Data for the Shear Zone

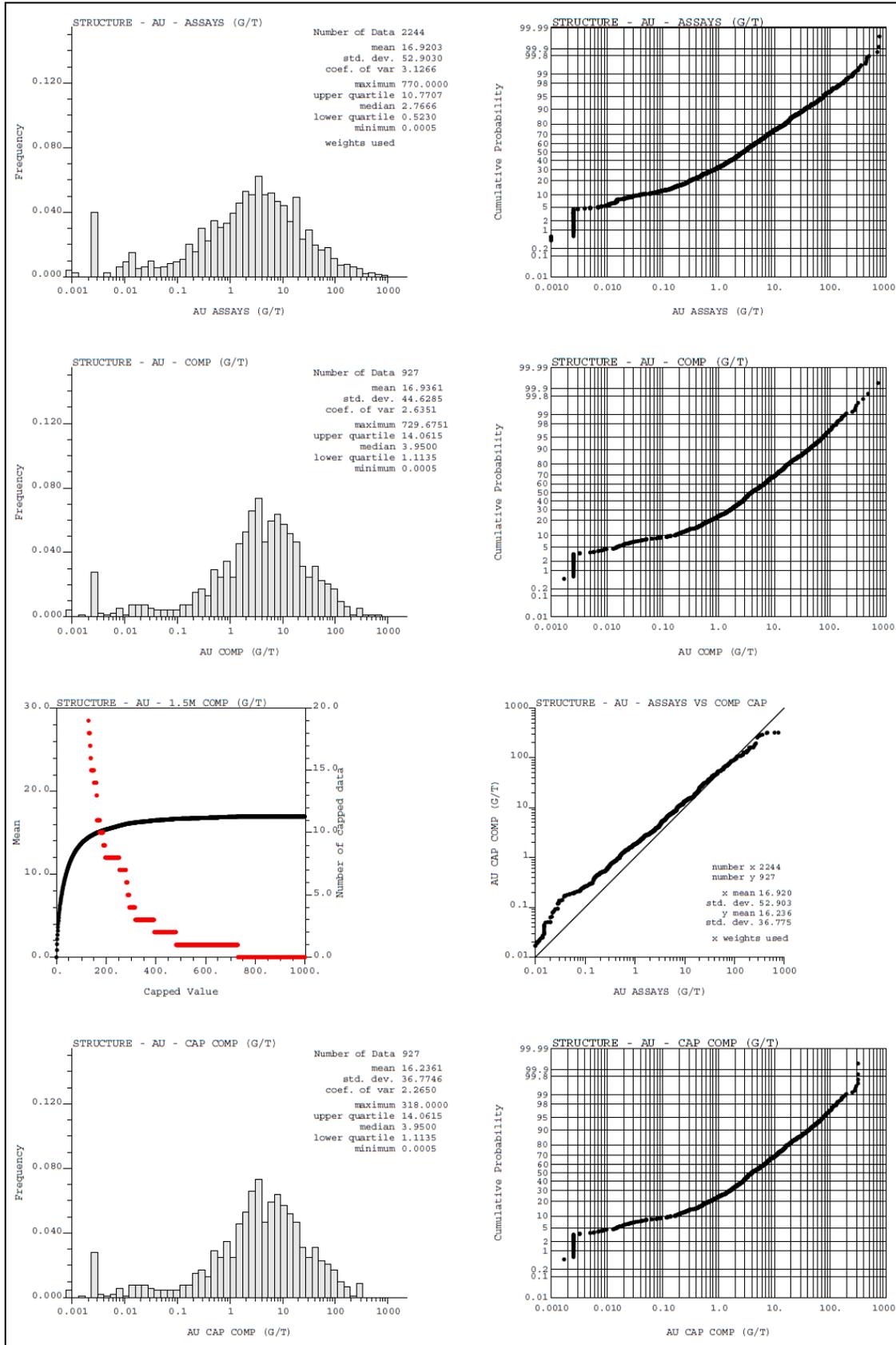


Figure 19: Basic Statistics of the Gold Data for the Structure

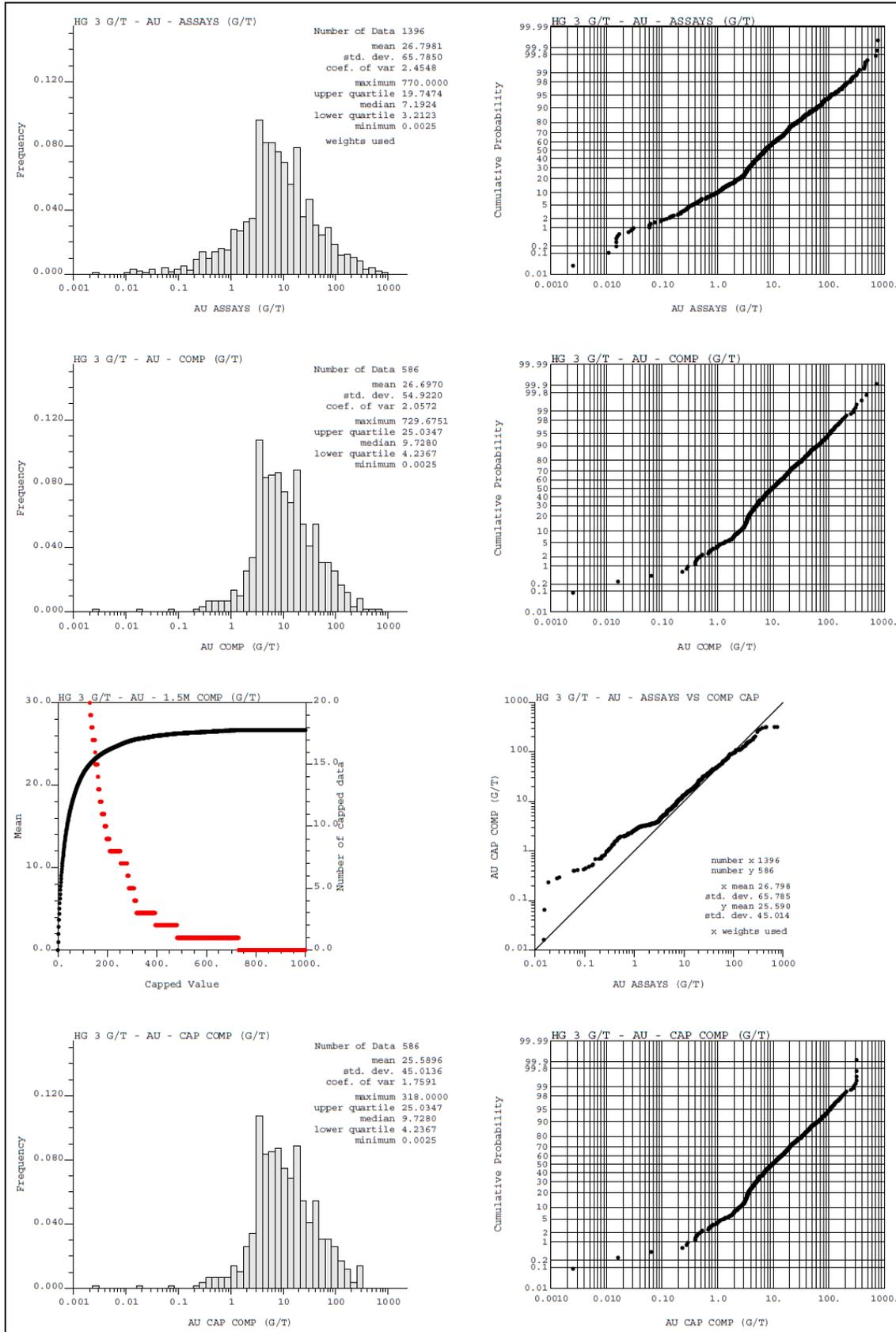


Figure 20: Basic Statistics of the Gold Data for the Higher-Grade Sub-Domain

Variography

Continuity directions were assessed based on the interpreted steep plunge of the dilatation zones inside the shear zone as determined from structural geology investigations, as well as the general orientation of the structure, the orientation of the higher-grade assays and the underground mapping. SRK further evaluated the spatial distribution of the gold mineralization using variogram and correlogram modeling of the original capped composite data within the structure. Further, variogram calculations considered sensitivities on orientation angles prior to finalizing the correlation orientation.

The information used for the variogram modelling was based on a single composite across the structure to avoid internal variation within the structure due to sampling length. The shear zone clearly steepens below the 4,850 elevation from 70 to 85 degrees' dip. Only the drilling information present in the upper portion was considered for the variogram calculation and modelling. However, the same variogram model was applied to the material below this elevation but the rotation angles were adjusted to account for the change in dip. The modelled variograms considered for gold grade estimation are presented in Figure 21 and variogram parameters are summarized in Table 16.

All variogram analysis and modelling was performed using Datamine RM and the Geostatistical Software Library. The use of correlograms yielded reasonably clear continuity long range structures allowing fitting variogram models. The variogram developed for the Structure was applied to the Shear zone and to the higher-grade sub-domain.

These models are oriented in the plane of the gold mineralization, representing the direction of maximum continuity. Consequently, in Figure 21, the horizontal blue model corresponds to the long axis of the variogram plunging steeply down dip, while the red horizontal model is perpendicular to this direction. The vertical model could not be modelled due to the single composite dataset. The range was derived from the thickness of the structure wireframe.

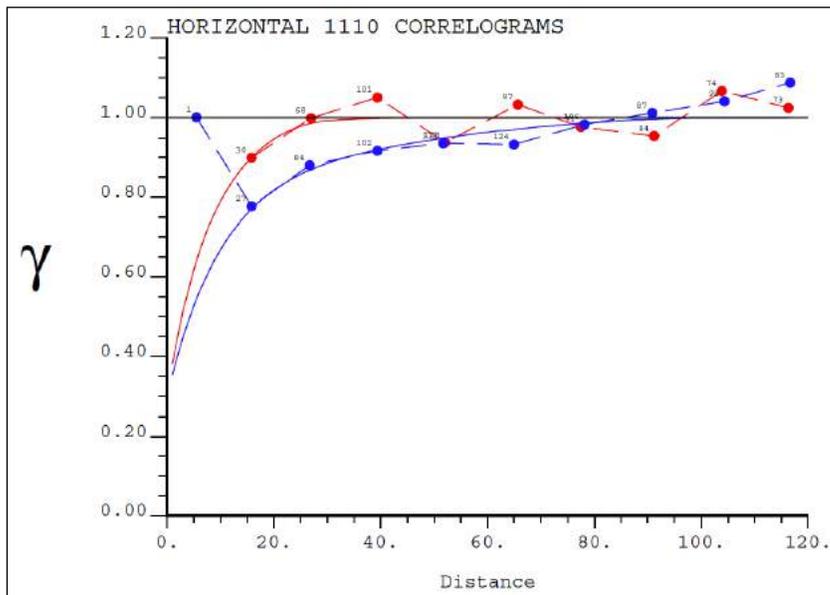


Figure 21: Gold Correlogram for the Structure

Note: The correlogram is inverted for the purposes of variogram modelling. The solid lines correspond to the fitted model, while the dashed lines correspond to the experimental variogram in those same directions.

Table 16: Gold Variogram Parameters for the Yaramoko Gold Project

Domain	Structure	Contribution	Model	R1x	R1y	R1z	Angle ¹	Angle ¹	Angle ¹	Axis	Axis	Axis
				(m)	(m)	(m)	1	2	3	1	2	3
HG (>4850)	C ₀	0.30	Nugget	-	-	-	-10	-70	48	3	1	3
	C ₁	0.55	Exp	30	21	9	-10	-70	48	3	1	3
	C ₂	0.15	Sph	105	30	20	-10	-70	48	3	1	3
<4850	C ₀	0.30	Nugget	-	-	-	-10	-88	48	3	1	3
	C ₁	0.55	Exp	30	21	9	-10	-88	48	3	1	3
	C ₂	0.15	Sph	105	30	20	-10	-88	48	3	1	3

1 The rotation angles are shown in Datamine RM convention.

Block Model Definition

The criteria used in the selection of the block size included the borehole spacing, geological understanding of the deposit, geometry of the modelled zones, and current mining techniques. In collaboration with Roxgold, SRK chose a block size of 5 by 2.5 by 5 metres for all domains. These dimensions also correspond to the grade control model used to guide daily production.

Subcells were used with 20, 10, and 20 splits in X, Y, and Z, respectively, allowing a resolution of 0.25 metres in all directions to honour the geometry of the modelled mineralization (within the separate structure domain and HG sub-domain), but also depletion of the mined-out areas. Subcells were assigned the same grade as the parent cell. The model is rotated on Z to be parallel to the shear zone. The characteristics of the final block model are summarized in Table 17.

At the request of Roxgold and to avoid having negative elevation values, a constant value of 5,000 metres was added to the elevation data and consequently to the associated wireframes and block model.

Table 17: Yaramoko Block Model Specifications

Domain	Axis	Block Size (m)		Origin*	Number of Cells	Rotation Angles	Rotation Priority
		Parent	Subcell				
All	X	5	0.25	468,793	306	-	-
	Y	2.5	0.25	1,298,802	89	-	-
	Z	5	0.25	3,900	282	-14	1

* Mine grid coordinates

Estimation Strategy

Table 18 summarizes the general estimation parameters used for the gold estimation. In all cases, grade estimation used ordinary kriging and five passes informed by capped composites. The first pass was the most restrictive in terms of search radii and number of boreholes required. Successive passes usually populated areas with less dense drilling, using relaxed parameters with generally larger search radii and less data requirements. SRK assessed the sensitivity of the gold block estimates to changes in minimum and maximum number of data, use of octant search, and the number of informing boreholes. Results from these studies show that globally the model is relatively insensitive to the selection of the estimation parameters and data restrictions.

For the first estimation pass, composites from at least four boreholes were necessary to estimate a block. This pass also used restrictive octant search options, designed to obtain the best estimation near existing underground workings where the drilling density is high. For subsequent passes, the

criteria were relaxed. In all cases, the search radii were chosen to reflect variogram continuity structure, ranges, and orientation, except for the short axis of the ellipse that was based on the wireframe thickness and slightly increased to account for the occasional and localized variation of the Shear zone wireframe.

To account for the change in dip of the shear zone below the 4,850 elevation, the orientation of the search ellipses was adjusted; like what was done to the variogram models. All the other parameters stayed the same. Table 19 provides a summary of the portions of the final block model coded during each estimation pass.

Because of their distinct geological identity, the shear and the structure were estimated independently using a hard boundary. To avoid domain boundary effects arising from use of hard domain boundaries or excessive grade smoothing using a soft boundary, a hybrid approach was used for the estimation. Only the blocks located within the higher-grade sub-domain and estimated during the first and second estimation passes using a hard boundary were considered sufficiently reliable to be considered as part of the higher-grade sub-domain. The remainder of the higher-grade sub-domain volume was estimated using a soft-boundary with the structure.

Table 18: Estimation Strategy Applied to all Resource Domains

Axis	1 st Pass	2 nd Pass	3 rd Pass	4 th Pass	5 th Pass
Search Increment	100% Sill	100% Sill	100% Sill	150% Sill	150% Sill
Interpolation Method	OK	OK	OK	OK	OK
Octant Search	Yes	Yes	Yes	No	No
Search Volume					
X (metres)	105	105	105	158	158
Y (metres)	30	30	30	45	45
Z (metres)	50	50	50	75	75
Minimum number of Octants	7	5	3	-	-
Minimum number of Composites per Octant	1	1	1	-	-
Maximum number of Composites per Octant	12	12	12	-	-
Minimum number of Composites	10	7	4	4	1
Maximum number of Composites	16	16	16	16	16
Maximum number of Composites per Borehole	3	3	3	-	-

Table 19: Volume Estimated per Pass

Domain	Estimation Pass	Volume Estimation	Percent Estimated
All	1	585,518	14%
	2	1,322,422	31%
	3	1,076,471	25%
	4	1,264,230	30%
	5	6,918	<1%

Resource Model Validation

To validate the block estimates, SRK constructed parallel block models using an inverse distance algorithm (power of two and power of three) and a nearest neighbour function. SRK visually compared ordinary kriging model results on plans and sections and found similar trends in both the shear zone and the structure. SRK also checked that the global quantities and average gold grade from each method were reasonably comparable. Block estimates were also checked against the declustered mean informing composite data (Figure 22 and Figure 23).

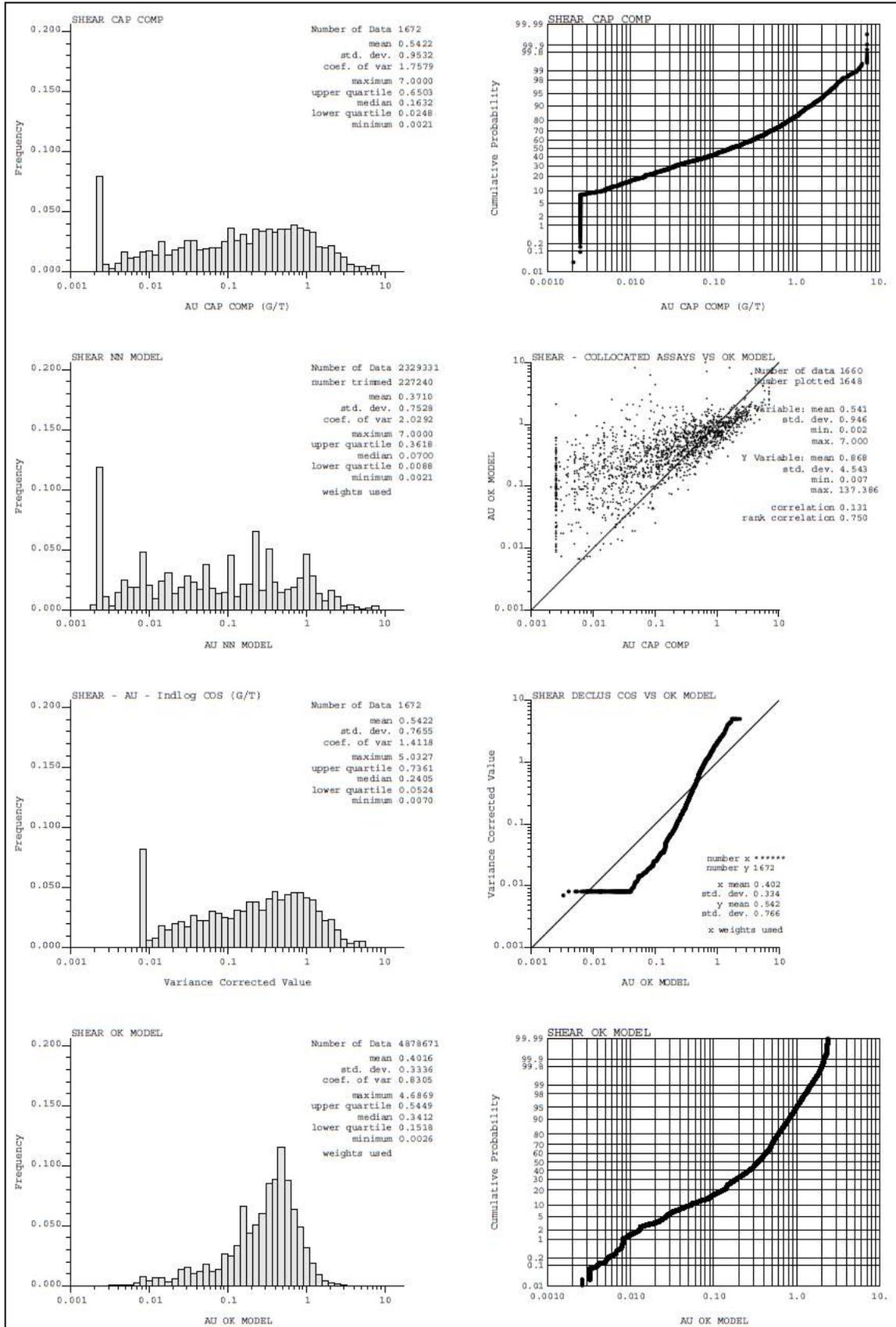


Figure 22: Summary of Block Model Validation in the Shear Zone

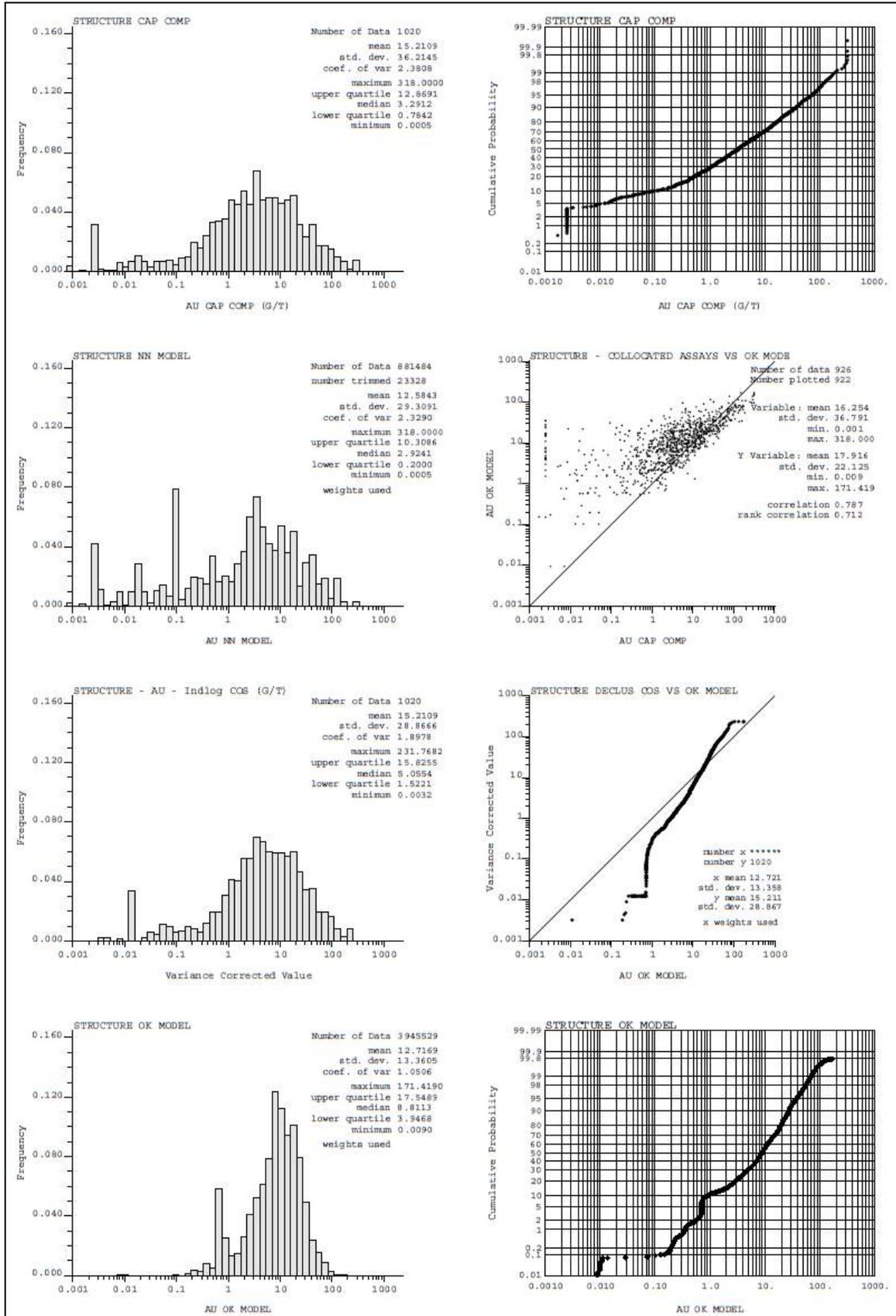


Figure 23: Summary of Block Model Validation in the Structure (inclusive of HG sub-domain)

13.1.2 Mineral Resource Classification

Block model quantities and grade estimates for the 55 Zone gold deposit were classified per the CIM *Definition Standards for Mineral Resources and Mineral Reserves* (May 2014) by Sébastien Bernier, PGeo (APGO #1847).

Mineral resource classification is typically a subjective concept and industry best practices suggest that mineral resource classification should consider the confidence in the geological continuity of the mineralized structures, the quality and quantity of exploration data supporting the estimates, and the geostatistical confidence in the tonnage and grade estimates. Appropriate classification criteria should aim at integrating these concepts to delineate regular areas at similar resource classification as well as the continuity of the targeted mineralization at the reporting cut-off grade.

SRK is satisfied that the geological and gold mineralization model for the 55 Zone honours the current geological information and knowledge. The location of the samples and the assay data are sufficiently reliable to support resource evaluation and do not present a risk that should be taken into consideration for resource classification. The mineral resource model is informed by data from core boreholes drilled with pierce points generally spaced approximately 15 to 25 metres apart in the upper portion of the deposit. In the upper part of the deposit, the geological information is sufficiently dense to demonstrate the continuity of the gold mineralization with a high level of confidence. Underground development and stopping also confirmed geological and grade continuity predicted by the mineral resource estimation model. Conversely, the confidence in the continuity of the gold mineralization in the deeper part of the deposit is less reliable because of the wider spacing of the drilling data.

On this basis, SRK considers most of the blocks near the existing underground infrastructure where the estimated grade has been confirmed by detailed underground sampling can be classified as Measured resources within the meaning of the CIM *Definition Standards for Mineral Resources and Mineral Reserves*. In the heart of the deposit, where the drilling is generally less than 50 metres apart and shows adequate grade continuity at the reporting cut-off grade, SRK considers that these blocks can be classified as Indicated resource since the level of confidence in the geological continuity and grade estimates is sufficient to allow the appropriate application of technical and economic parameters to support mine planning, and to allow the evaluation of the economic viability of the deposit.

To assist with the classification, a wireframe was constructed manually within Datamine RM to delineate regular areas encompassing the above parameters (for both Measured and Indicated resources). This wireframe also covers the entire width of the shear zone.

All other modelled blocks were classified in the Inferred category as the confidence in the block estimates is insufficient to allow for the meaningful application of technical and economic parameters or to enable an evaluation of economic viability.

13.1.3 Preparation of Mineral Resource Statement

CIM Definition Standards for Mineral Resources and Mineral Reserves defines a mineral resource as:

“[A] concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth’s crust in such form and quantity and of such a grade or quality that it has reasonable

prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.”

The “*reasonable prospects for economic extraction*” requirement generally implies that the quantity and grade estimates meet certain economic thresholds and that the mineral resources are reported at an appropriate cut-off grade that considers extraction scenarios and processing recoveries.

SRK considers that the gold mineralization in the 55 Zone deposit is amenable to underground extraction. SRK considered the assumptions listed in Table 20 to select appropriate reporting assumptions. Upon review, SRK considers that it is appropriate to report the 55 Zone mineral resources at a cut-off grade of 5.0 g/t gold. This is the same cut-off grade used for reporting the previous Mineral Resource Statement. The Mineral Resource Statement does not include any of the thin layer of oxide material near surface. The Statement as been depleted for any mined-out areas, including artisan workings near surface, as of December 31, 2016. No crown pillars were considered.

Mineral resources were estimated in conformity with the generally accepted CIM *Estimation of Mineral Resource and Mineral Reserve Best Practices Guidelines*. The mineral resources may be affected by further infill and exploration drilling, which may impact positively or negatively future mineral resource evaluations. The Mineral Resource Statement for the 55 Zone is presented in Table 21 while Figure 24 reveals the distribution of the estimated gold grade and the distribution of the classified material, respectively.

Table 20: Assumptions Considered for Selection of Reporting Cut-Off Grade

Parameter	Value
Mining Cost (\$/tonne)	\$100.00
General and Administration (\$/tonne)	\$28.30
Process Cost (\$/tonne of ore)	\$38.90
Gold Recovery (%)	98.5%
Mining Recovery / Mining Dilution (%)	95 / 15
Gold Price (\$/ounce)	\$1,250

Table 21: Mineral Resource Statement*, 55 Zone, Yaramoko Gold Project, Burkina Faso, SRK Consulting (Canada) Inc., December 31, 2016

Category	Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Measured	265	26.88	229
Indicated	1,076	14.73	509
Measured + Indicated	1,341	17.13	738
Inferred	669	16.14	347

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Underground mineral resources are reported at a cut-off grade of 5.0 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$100 per tonne, G&A cost of \$28.30 per tonne, processing cost of \$38.90 tonne, process recovery of 98.5 percent.

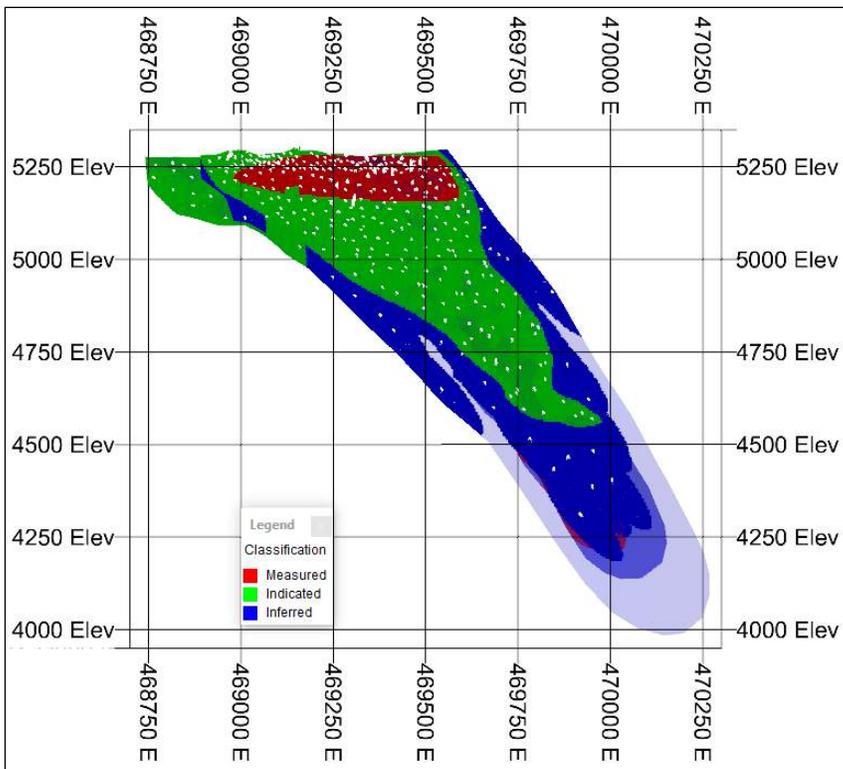
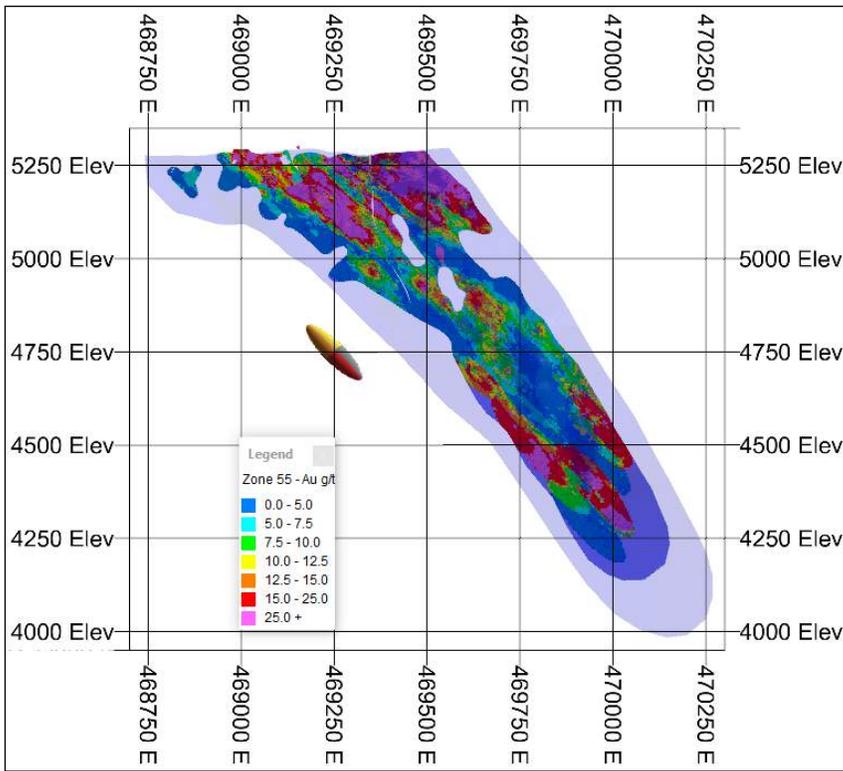


Figure 24: Longitudinal View Looking North

Top: Showing the distribution of the estimated gold grades in the Structure in relation to the first pass search ellipse (Table 18).

Bottom: Showing the block classification in relation to the boreholes (white).

Sensitivity Analyses

The mineral resource model is sensitive to the selection of the reporting gold cut-off grade. To illustrate this sensitivity, the quantities and grade estimates are presented in Table 22 at various cut-off grades and grade tonnage curves are presented in Figure 25. The reader is cautioned that the figures presented in this table should not be misconstrued with a Mineral Resource Statement. The figures are only presented to show the sensitivity of the block model estimates to the selection of gold cut-off grade.

Table 22: Global Block Model Quantities and Grade Estimates* at Various Gold Cut-Off Grades

Cut-Off Grade Au (g/t)	Measured and Indicated Blocks				Inferred Blocks			
	Volume (m ³)	Quantity (t)	Grade Gold (g/t)	Contained Gold (000' oz)	Volume (m ³)	Quantity (t)	Grade Gold (g/t)	Contained Gold (000' oz)
1	833,360	2,227,053	11.20	802	301,418	802,143	13.95	360
2	661,158	1,759,401	13.82	782	287,133	763,775	14.59	358
3	596,564	1,586,949	15.06	768	277,928	739,288	14.99	356
4	545,321	1,450,563	16.15	753	266,181	708,042	15.49	353
5	503,414	1,339,081	17.12	737	251,469	668,908	16.14	347
6	459,181	1,221,421	18.23	716	243,755	648,388	16.48	344
8	375,986	1,000,121	20.72	666	217,096	577,476	17.63	327
10	297,653	791,758	23.82	606	177,423	471,946	19.60	297
12	234,227	623,044	27.30	547	161,247	428,916	20.46	282
13	210,184	559,088	29.00	521	152,403	405,391	20.92	273
14	193,019	513,431	30.38	501	141,993	377,701	21.47	261
15	179,204	476,683	31.60	484	132,025	351,187	22.00	248
16	167,399	445,282	32.74	469	123,047	327,305	22.47	236
17	156,280	415,706	33.89	453	117,154	311,630	22.77	228
18	144,829	385,244	35.19	436	102,903	273,723	23.49	207
19	135,371	360,086	36.36	421	81,903	217,861	24.78	174

* The reader is cautioned that the figures in this table should not be misconstrued with a Mineral Resource Statement. The figures are only presented to show the sensitivity of the block model estimates to the selection of a cut-off grade. Figures are rounded to reflect the accuracy of the estimate.

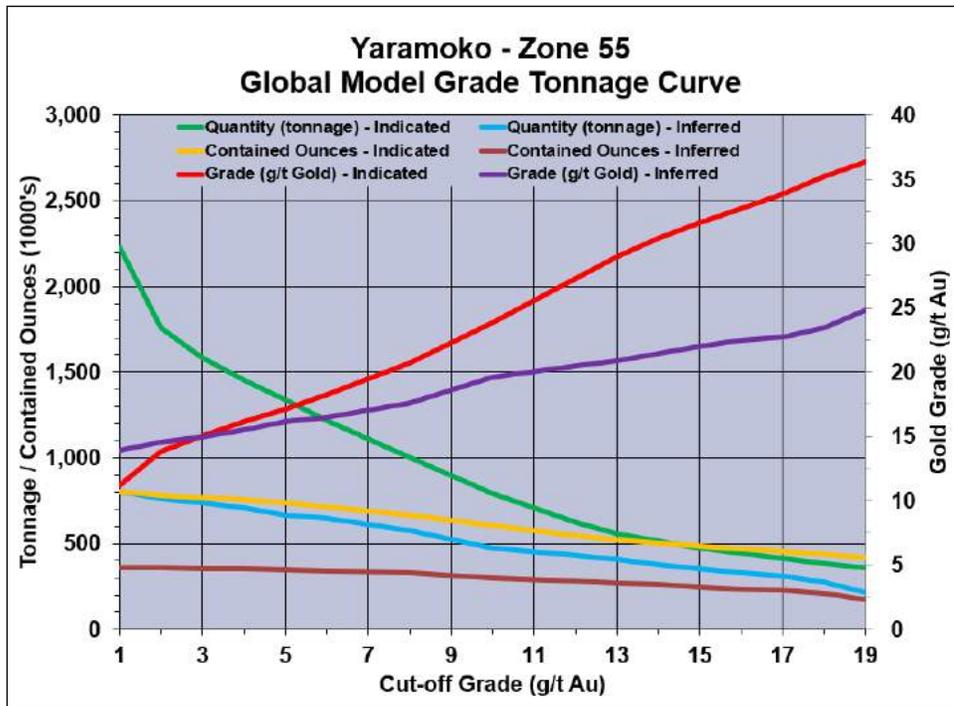


Figure 25: Global Grade Tonnage Curves for the 55 Zone Deposit

13.1.4 Reconciliation to Previous Mineral Resource Statement

A comparison between the 2014 and 2017 Mineral Resource Statements is provided in Table 23. Underground development, stoping, increased drilling and associated modeling and estimation confidence has allowed a significant part of the Indicated material to be upgraded to Measured. It can be noted that although the reported tonnage for Measured and Indicated material combined is down by 16 percent, the reported grade has increased by 8 percent, resulting in a drop in reported contained metal of 9 percent. This overall decrease is mostly attributed to the depletion of the mineral resource model.

Table 23: Reconciliation Between the 2014 and 2017 Mineral Resource Statements

Category	Quantity		Grade		Contained Gold	
	2014 (000' t)	2017 (000' t)	2014 Gold (g/t)	2017 Gold (g/t)	2014 (000' oz)	2017 (000' oz)
Measured	-	265	-	26.88	-	229
Indicated	1,600	1,076	15.80	14.73	810	509
Measured + Indicated	1,600	1,341	15.80	17.13	810	738
Inferred	840	669	10.26	16.14	278	347
Variance (2014-2017)	(000' t)	%	Gold (g/t)	%	(000'oz)	%
Change: Measured	265	new	26.88	new	229	new
Change: Indicated	-524	-33	-1.07	-7	-301	-37
Change M +I	-259	-16	1.33	8	-72	-9
Change: Inferred	-171	-20	5.88	57	69	25

Trends and variances noted in the comparative Mineral Resource Statements are due to the cumulative effect of the following factors:

- Significant (35 percent) increase in in-fill drill data available for mineral resource modelling.
- Complete revision of geological modelling within which mineral resources are constrained.
- Extension of the geological model at depth to account for new deep holes.
- Slight modification to aspects of the mineral resource estimation methodology to account for increased geological appreciation on the controls of mineralization.
- Consideration of production data (tonnes and grade reported by the mill).
- Mining depletion within the reported mineral resource.

13.1.5 Reconciliation to Production

All the material extracted at the Yaramoko Gold Project was processed on site at the Yaramoko mill. Table 24 compares the material extracted since the beginning of the underground production in 2016 until December 31, 2016 against that predicted from the block model described in this report.

The underground production material comprises contributions from both material processed and that still located on a stockpile as defined in Table 24.

The predicted estimate from the SRK 2017 mineral resource model was modified to account for a survey discrepancy between the underground excavations and the estimated blocks.

The block model is reported to underestimate tonnage, grade and metal ounces by approximately 2, 4 and 7 percent respectively. SRK considers this reconciliation between production and block model to be acceptable. Combined with the visual and statistical tests performed by SRK to validate the block model, this physical reconciliation confirms that the mineral resource model described in this report adequately represents the gold mineralization at the 55 Zone at the current level of sampling. This validation also supports the assumptions used to generate this model, including the use of a hybrid boundary between the structure and the higher-grade sub-domain. Reconciliation results will need to be monitored as production advances, as future exploitation areas may have slightly different grade and metallurgical characteristics.

Table 24: Reconciliation of the Mill Production to the Block Model Prediction

Source	Quantity (t)	Grade Gold (g/t)	Contained Gold (oz)
Production*			
Processed	162,480	15.53	81,126
Stockpile and ROM	24,991	13.48	10,831
Total	187,471	15.26	91,957
Prediction			
Block Model [^]	183,116	14.65	86,265
Variance	-4,355 (-2%)	-0.61 (-4%)	-5,692 (-7%)

* Production data received from Roxgold

[^] Modified to account for survey discrepancy between block model and mining outlines

13.2 Bagassi South Zone Mineral Resource Estimate

The QV1 and QV' shears of the Bagassi South Zone lie approximately 1.6 kilometres to the south of the 55 Zone. A mineral resource estimation was carried out in April 2016 by SRK. In January 2016, Roxgold asked SRK to collate the exploration information available for the QV1 gold deposit to prepare an initial mineral resource evaluation of this new deposit, which was discovered in 2013. In 2014, SRK completed a structural geology study on this deposit, in support of ongoing exploration (SRK, 2014). Mr. Sébastien Bernier, PGeo (APGO #1847) from SRK visited the property between December 13-15, 2016. While on site, SRK reviewed logging and sampling procedures with site personnel, examined drilling locations and studied gold mineralization style in several core intersections. SRK audited the exploration data provided by Roxgold. Upon review, the project data were found to be sufficiently reliable for the modelling of the boundaries of the gold mineralization with confidence and to support mineral resource estimation.

In January 2017, Roxgold embarked on an intensive exploration program to target high grade areas along the QV1 and QV' structures to improve the confidence in these areas with the aim to convert Inferred resources to Indicated resources. The drilling program was completed in late May 2017. The geological and gold mineralization wireframes were modelled internally by Roxgold and reviewed by SRK. Minor adjustments were made to the wireframes following SRK's validation. The mineral resource estimation was undertaken by Mr. Mike Phipps, Pr. Sci.Nat from Roxgold under the supervision of Mr. Yan Bourassa, PGeo. Gold grades were interpolated into a block model using ordinary kriging. The estimation parameters, capping levels, estimation results and mineral resource classification were reviewed and validated by SRK. The updated Bagassi South Zone Mineral Resource Statement was disclosed in a press release on July 19, 2017 (Table 25).

Mineral resources are not mineral reserves and have not demonstrated economic viability. There is no certainty that all or any part of the mineral resources will be converted into mineral reserves.

Table 25: Mineral Resource Statement*, Bagassi South Zone, Yaramoko Gold Project, Burkina Faso, Roxgold Inc., July 19, 2017

Category		Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Indicated	QV1 Structure	352	16.6	188
	QV' Structure	-	-	-
Total Indicated		352	16.6	188
Inferred	QV1 Structure	79	13.0	33
	QV' Structure	51	22.0	36
Total Inferred		130	16.6	69

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Underground mineral resources are reported at a cut-off grade of 5.0 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$100 per tonne, G&A cost of \$28.30 per tonne, processing cost of \$38.90 tonne, process recovery of 98.5 percent.

13.2.1 Mineral Resource Estimation Methodology

The Mineral Resource Estimation for the Bagassi South Zone involved processes of data preparation, validation, geological and structural domain modelling including shear zones and individual quartz vein domains. Assay data was extracted from these wireframes for naïve statistical analysis, compositing, capping, variography, mineral resource evaluation using ordinary kriging, mineral resource classification.

The mineral resource estimation model contains 14 separate mineralized domains into which gold grades were estimated.

Resource Database

The exploration database cut off for the modelling process is May 23, 2017. The database at that time contained 269 diamond drill holes (57,712 metres) drilled by Roxgold since 2013. The data was exported from the Microsoft Access database in five main tables (collar, survey, lithology, assays and specific gravity).

The database includes 2,259 surveys records, 11,355 lithology records, 19,329 assay records and 3,293 specific gravity records.

The following validations were performed on the borehole data:

- Lithology and assay tables were checked for duplicates, gaps and overlaps with a macro designed for this purpose. Secondly files underwent standard checks in Datamine Studio RM desurvey process and on importation into Leapfrog Geo.
- Assay data was checked for out of range values.
- Collar Z elevations were checked visually with the topography surface.

The quality analytical data confirms that the data was deemed reliable for the purpose of supporting a mineral resource evaluation.

Mineralized Domain and Geological Modelling

Geological modelling was completed by Roxgold and was reviewed by SRK. The gold mineralization is associated with laminated quartz-carbonate veins developed in shear zones. The shear zone and mineralized structures/quartz veins domains were constructed using interval selection, not with grade interpolants. Two shear zones were modelled: QV1 and QV'. In addition, 10 gold mineralized structures were modelled within the QV1 shear zone (Domains 1010 to 1065). The average thickness of the gold mineralization at QV1 Main varies from less than one metre to more than 18 metres. The mineral resources extend from the surface to a depth of approximately 300 metres below the surface. The gold mineralization remains open along strike and at depth.

Four main lithological units are present in this area of the property: mafic volcanic flows, granitic intrusion, granodiorite, and diabase. The dominant country rock consists of dark green fine-grained mafic volcanic flows typically exhibiting a massive texture and generally absent of primary volcanic textures. The granite is an equigranular and homogeneous intrusive rock, with a distinctive pink colour due to hematite and potassic hydrothermal alterations. The granodiorite is equigranular to porphyritic with a dark grey colour. All geological units, including the QV1 shear zone, are cross-cut by a late approximately 50-metre-wide diabase dike at high angle to the main shear zone hosting the gold mineralization (Figure 26).

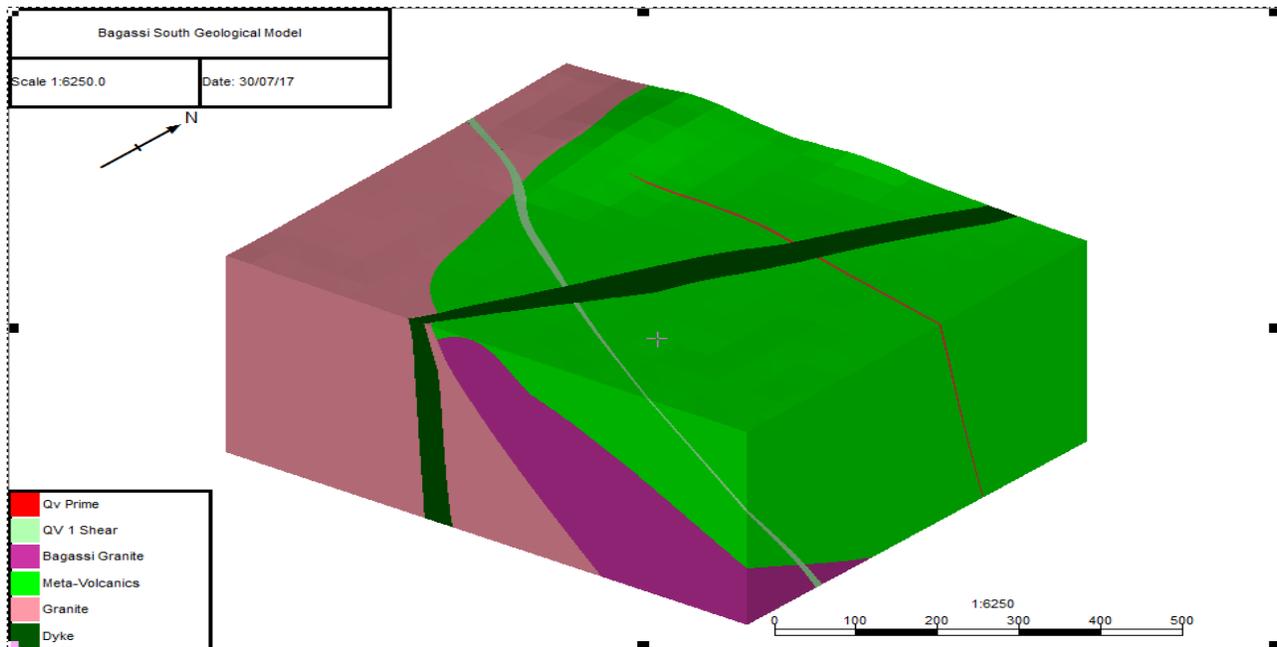


Figure 26: Geological Model Showing Main Lithologies Including the Two Structural Shear Zones used for Estimation

Structural geology investigations completed by SRK in 2014 show that at QV1, the gold mineralization is primarily associated with laminated quartz-carbonate veins forming a tabular zone inside a northwest striking, moderately dipping brittle-ductile shear zone. Gold is also hosted in quartz veins and chlorite filled fractures within brittle deformation zones. The QV1 shear zone strikes northwest (295 to 315 degrees) and dips steeply to the north-northeast (60 to 70 degrees). Stretching lineations plunge shallowly to the northwest and fold axes plunge moderately to the east-northeast. Kinematic indicators suggest dominantly dextral movement with a minor component of reverse movement. The thickest portion of the shear zone occurs west of the shear zone-granite contact, where the orientation of the shear zone deviates from approximately 300 to 315 degrees (SRK, 2014), forming a linear trend plunging east. The infill drilling program completed in 2017 confirmed the early interpretation and conclusion made by SRK in 2014.

At QV', the gold mineralization is hosted in millimetre- to centimetre-wide extensional quartz veins and quartz-chlorite veinlets, often associated with carbonate and green mica alteration. The higher-grade gold mineralization within QV' is clustered around a west-northwest striking steeply dipping shear zone. The QV' shear zone contains two mineralized sub domains QV'' main high grade and a smaller QV'' hanging wall.

Specific Gravity

Roxgold measured specific gravity on several representative core samples from selected assay intervals using a water displacement technique. A total of 862 specific gravity measurements were taken within the shear zone or the vein domains at the Bagassi South Zone. A uniform specific gravity of 2.70 and 2.66 was used to convert volumes into tonnages in the shear zones and the vein domains, respectively.

Compositing and Capping

A Box-and Whisker analysis was conducted on the raw data to determine the optimal compositing length within the individual domains.

On the basis of the analysis of all domains using histograms and mainly the box and whisker plots, the entire dataset was composited to 1-metre composite lengths with a minimum composite set to 0.5 metres (Figure 27).

The Bagassi South Zone capping strategy used various tools to assess adequate capping levels for each individual domain. The capping of the data was initially done by observing domains histograms and cumulative distribution function plots as well as the mean and variance plots for each domain. These were further refined by visual validation of the boreholes against model grades following the first pass estimation. Individual domain capping analysis are illustrated in Table 26 and Figure 28 to Figure 33.

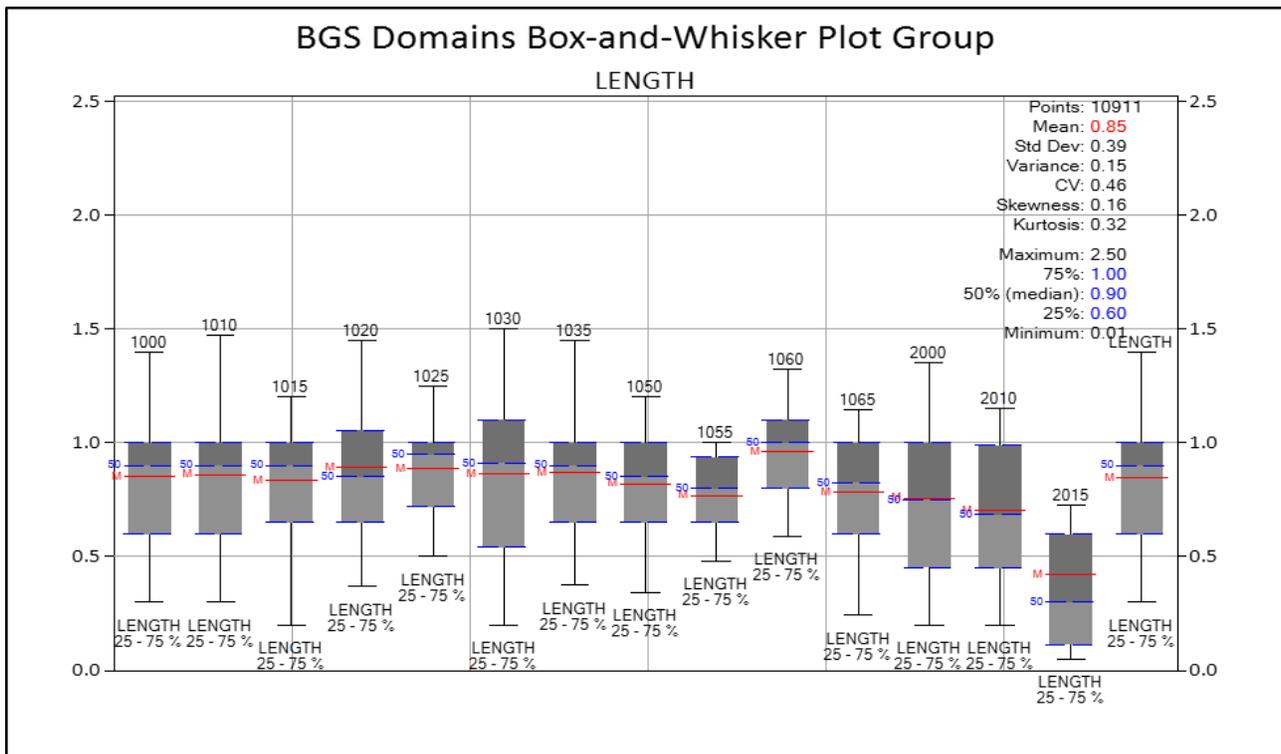


Figure 27: Box and Whisker Plot of Raw Assay Data Sample Length for All Domains

Note: 75 percent of the population is under or equal to 1.0 metres

Table 26: All Domains Data Capping Statistics

Domain Name Code	Uncapped			Capped	
	Minimum (g/t)	Maximum (g/t)	Mean (g/t)	Cap (g/t)	Mean (g/t)
QV1_SHR_1000	0.003	36.40	0.22	7.3	0.19
HW_WestDol_HG_1030	0.003	20.22	2.30	5.6	1.53
Main_WestDol_HG_1010	0.003	442.00	7.12	60	5.90
Main_WestDol_HG_Splay_1015	0.008	17.81	2.28	3.1	1.48
Main_WestDol_HG_Splay1_1020	0.020	7.70	1.25	3	0.73
Main_WestDol_HG_Splay2_1025	0.011	1.49	0.45	n/a	n/a
FW_HG_1035	0.003	30.00	4.98	n/a	n/a
Main_EastDol_HG_1050	0.003	257.61	7.22	30	4.67
Main_EastDol_HG_Splay_1055	0.003	9.93	3.11	n/a	n/a
Main_EastDol_HG_Splay1_1060	0.045	2.02	0.86	n/a	n/a
HW_Con_EastDol_HG_1065	0.005	195.10	13.10	31	6.31
QV'_SHR_2000	0.003	19.21	0.46	5.1	0.35
QV'_QV_2010	0.003	290.00	24.57	82	17.55
QV'_QV_HW_2015	0.903	21.99	11.45	n/a	n/a

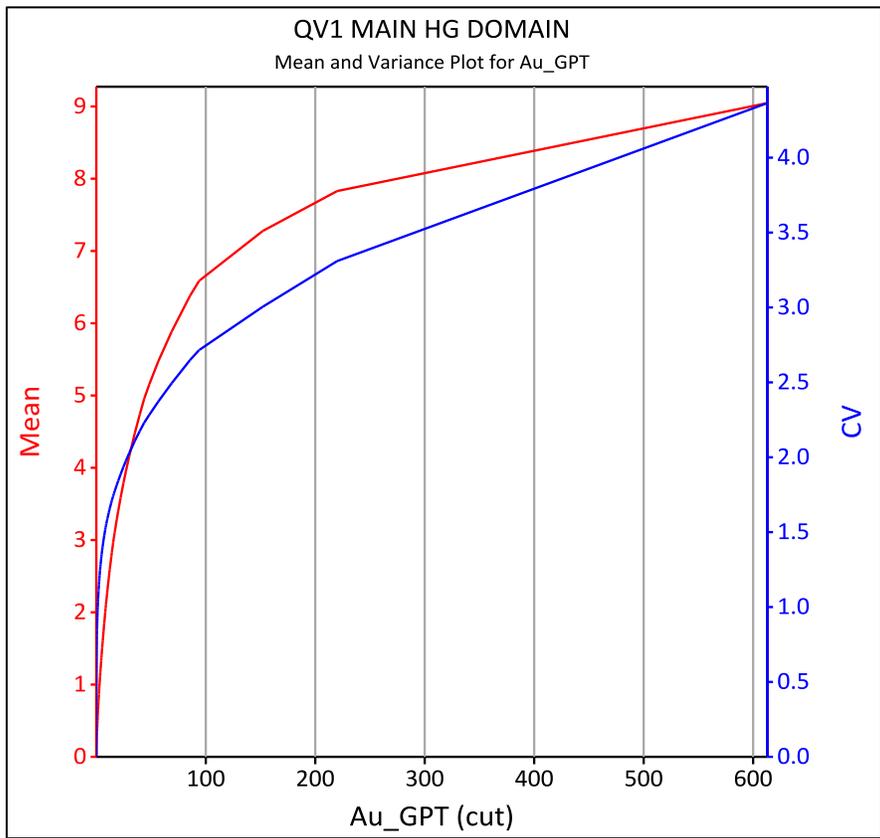


Figure 28: Mean and Variance Plot of Combined QV1 East and West High-grade Domain Demonstrating the Effect Capping has on the Mean Value of Domains Population

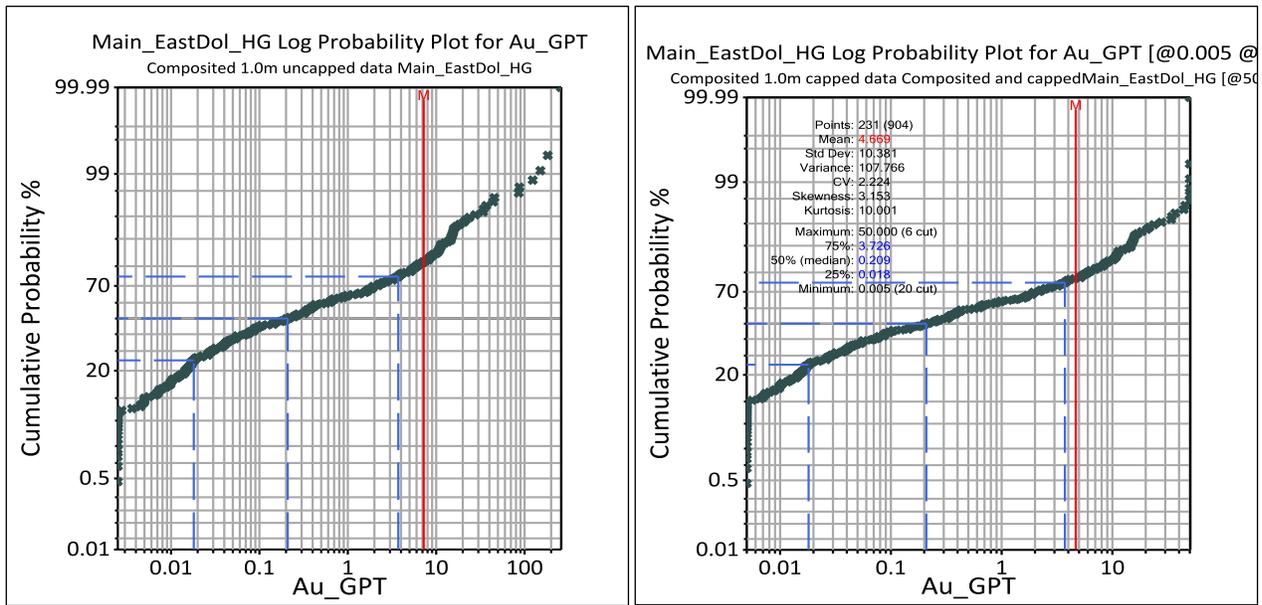


Figure 29: QV1 Main East Dolerite Capped at 30 g/t for +5 g/t Grade Shell Model

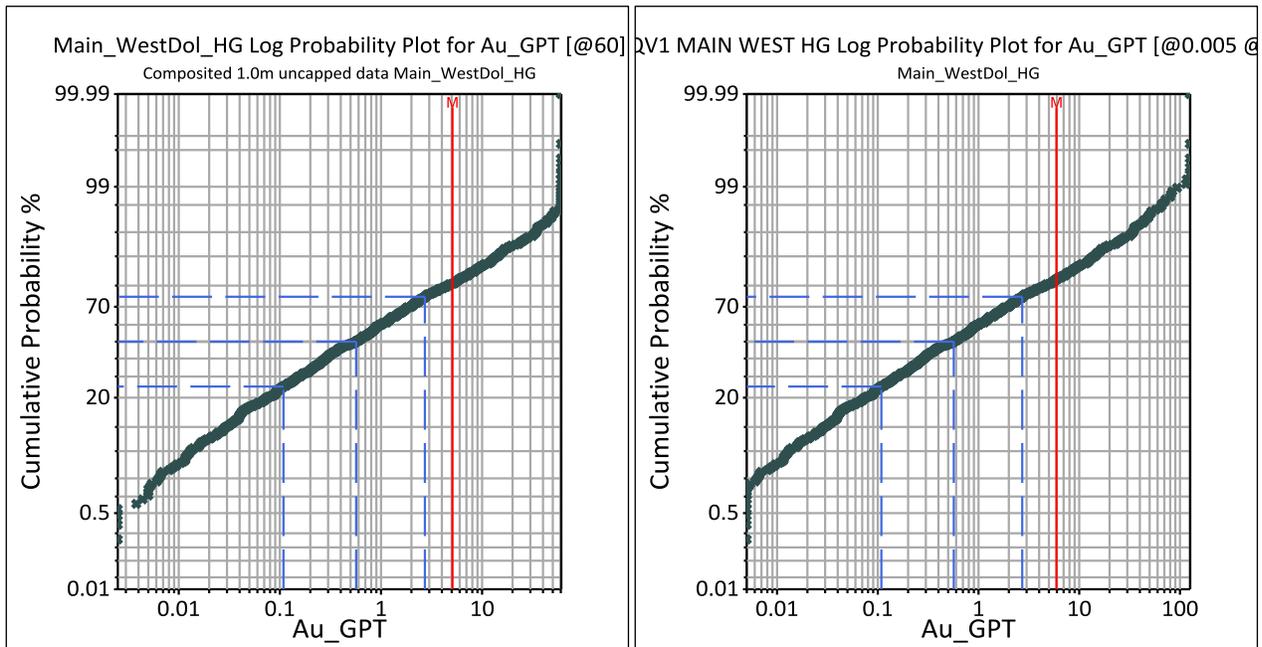


Figure 30: QV1 Main Wet Dolerite Capped at 60 g/t for +5 g/t Grade Shell Model

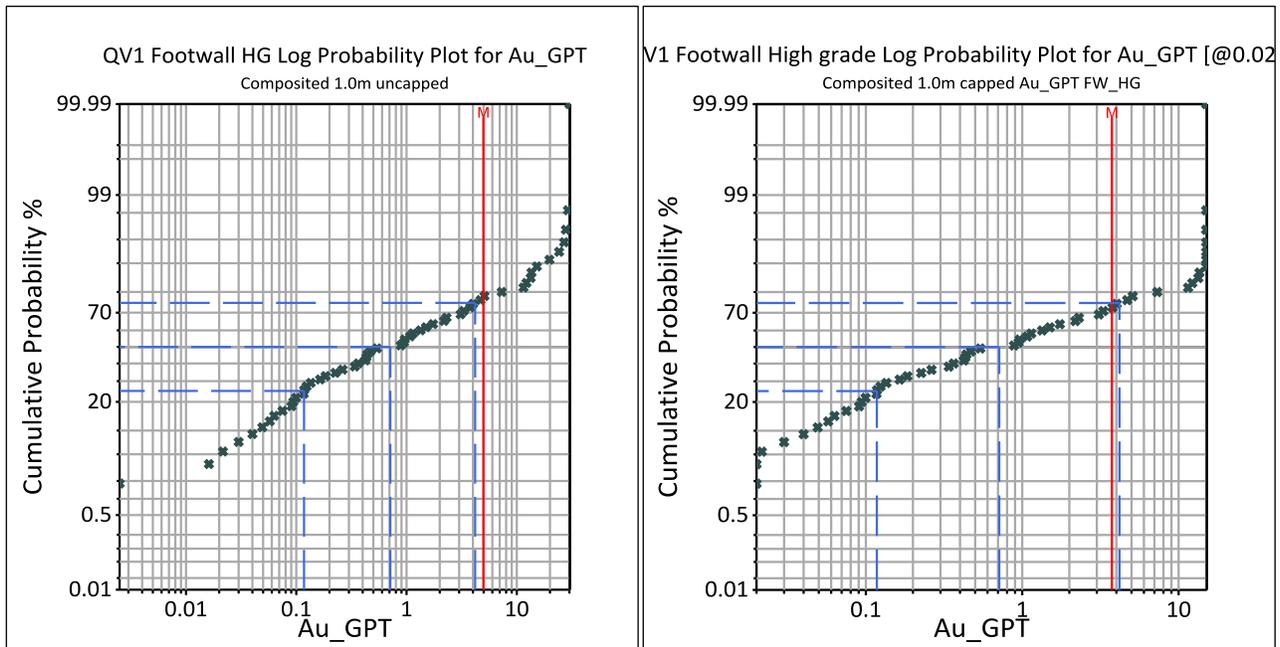


Figure 31: QV1 Footwall HG Capped at 30 g/t

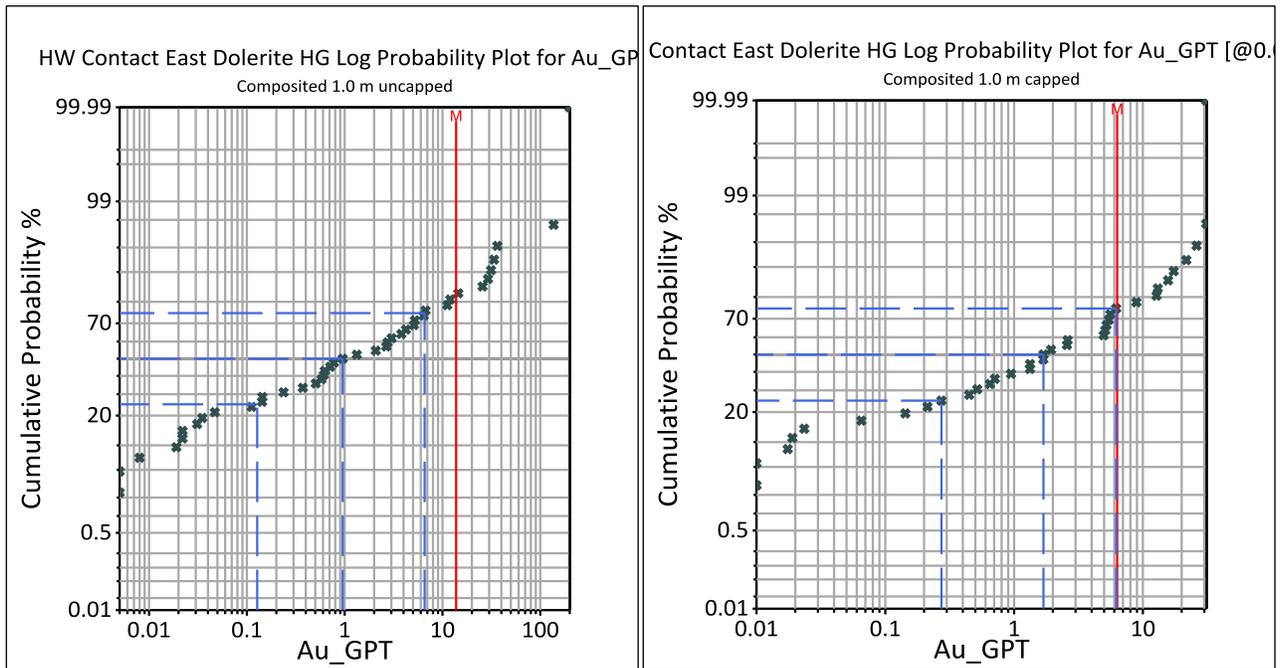


Figure 32: QV1 Hanging Wall Contact East Capped at 31 g/t

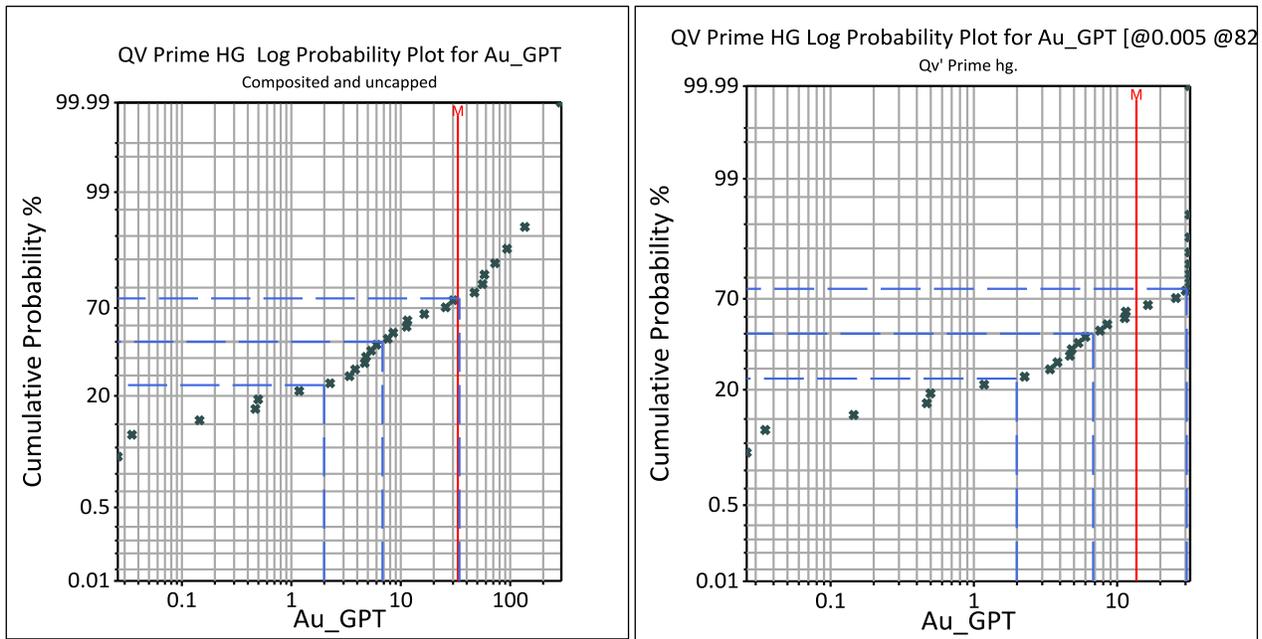


Figure 33: QV' Capped at 82 g/t

Variography

Roxgold evaluated the spatial distribution of the gold using variograms of composited data as well as their normal score transform. All variogram analysis and modelling was performed using Snowden Supervisor V8. Directions of continuity are set by using Snowden Supervisor continuity fan analyses followed by modelling experimental variograms in the three directions. The major axis of continuity lines up with the strike of the shear zones with a plunge of 40 degrees for QV1 shear and 30 degrees for QV' to the South East.

The modelled variograms considered for gold grade estimation are presented in Appendix C. These models are oriented in the plane of the gold mineralization, representing the direction of maximum continuity.

The horizontal direction model corresponds to the long axis of the variogram plunging shallowly towards the south-east at approximately 40 and 30 degrees, while the green horizontal model is perpendicular to that direction. The vertical blue model represents the short axis and is orientated perpendicular to the horizontal plane. Considering that the borehole orientation is generally at a high angle to the zone, the vertical model closely represents the downhole continuity model.

Most of the smaller domains use the variography models for the QV1 main East and West domains. The QV' high grade domain had very poor variography so the Inverse Distance to the power of 4 interpolation method was preferred for the mineral resource estimate, consequently, this domain was classified as Inferred.

Block Model Definition

The criteria used in the selection of the block size included the borehole spacing, geological understanding of the deposit, geometry of the modelled zones, and kriging neighborhood analysis for each domain in Snowden Supervisor.

Due to the nature of the mineralized wireframe which often pinch out along the edges a parent block size was chosen at 8 by 4 by 2 metres with subcell splitting of 16, 32 and 16 in the X, Y and Z respectively, allowing a resolution of 0.5 metre in the X and 0.125 metre in the Y and Z to honour the geometry of the modelled mineralization. Subcells were assigned the same grade as the parent cell. The model is rotated to honor the orientation and dip of the QV1 Main structure. The characteristics of the final block model are summarized in Table 27.

Table 27: Bagassi South Block Model Specifications

Domain	Axis	Block Size		Origin	Number of cells	Rotation Angles	Rotation Axis
		Parent	Subcell				
All	X	8	0.5	469606	118	36	3
	Y	4	0.125	1297315	157	65	1
	Z	2	0.125	320	200	0	3

Estimation Strategy

The Bagassi South Zone gold estimation model consists of 14 domains defined by wireframes created in Leapfrog Geo by the Roxgold. After the initial estimation run the QV1 Main East and West (Domains 1010 and 1050) were further sub-domained by greater than 5 g/t indicator grade shell developed in Leapfrog Geo (sub domains 10105 and 10505 respectively (coded under the field SHELL in model).

The estimation parameters were set up to estimate per domain for gold using ordinary kriging, inverse distance to the power of 3 and 4. Geostatistical fields, kriging variance (KV) and kriging efficiency (KEF) as well as slope of regression were also calculated during estimation. These were used as a measure of confidence in the kriged estimate. The capping was set relatively high initially and several estimation runs were examined to ascertain the effect visually against the boreholes in the model. Gold variogram parameters for the Bagassi South Zone domains can be found in Appendix C.

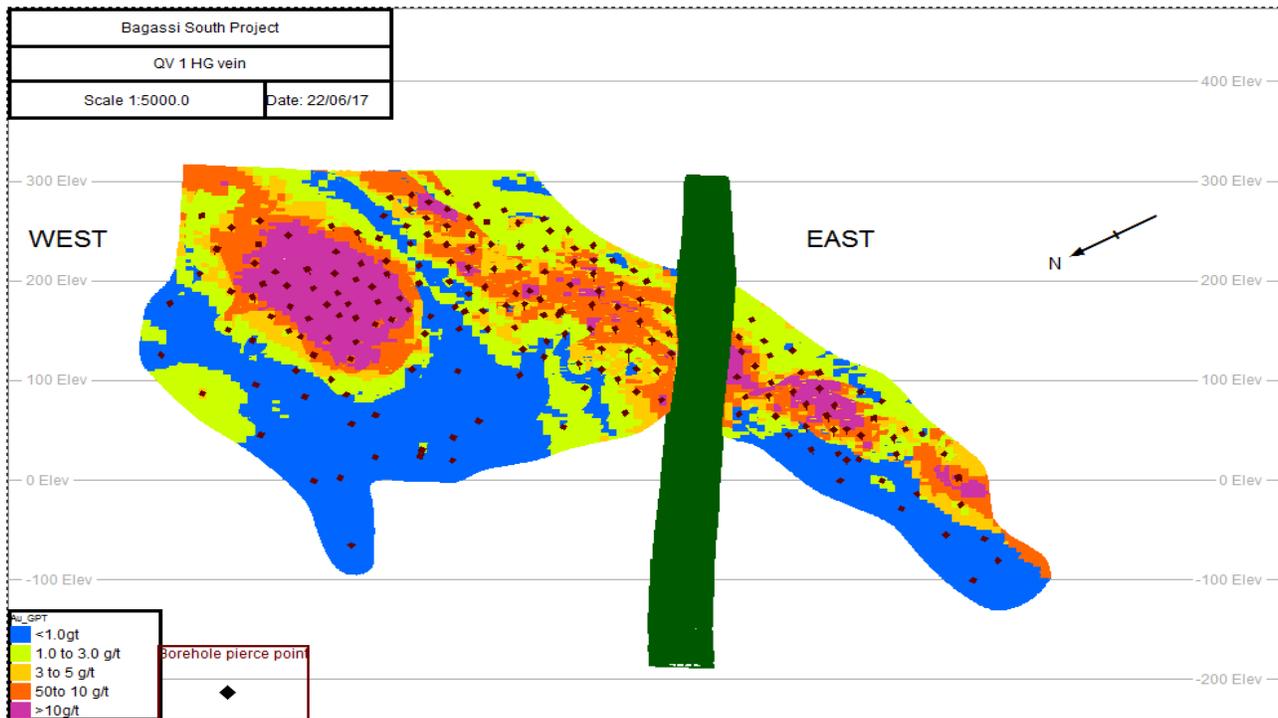


Figure 34: QV1 Grade Estimates Using Ordinary Kriging

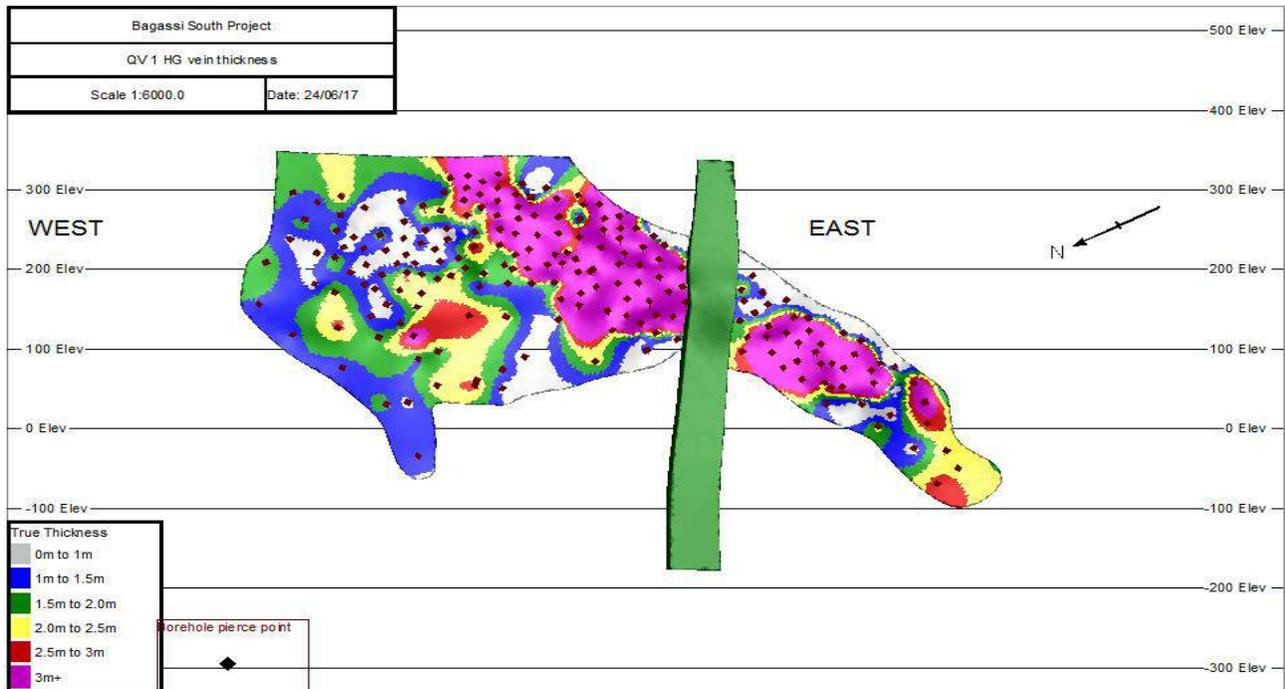


Figure 35: Plot QV1 HG Thicknesses

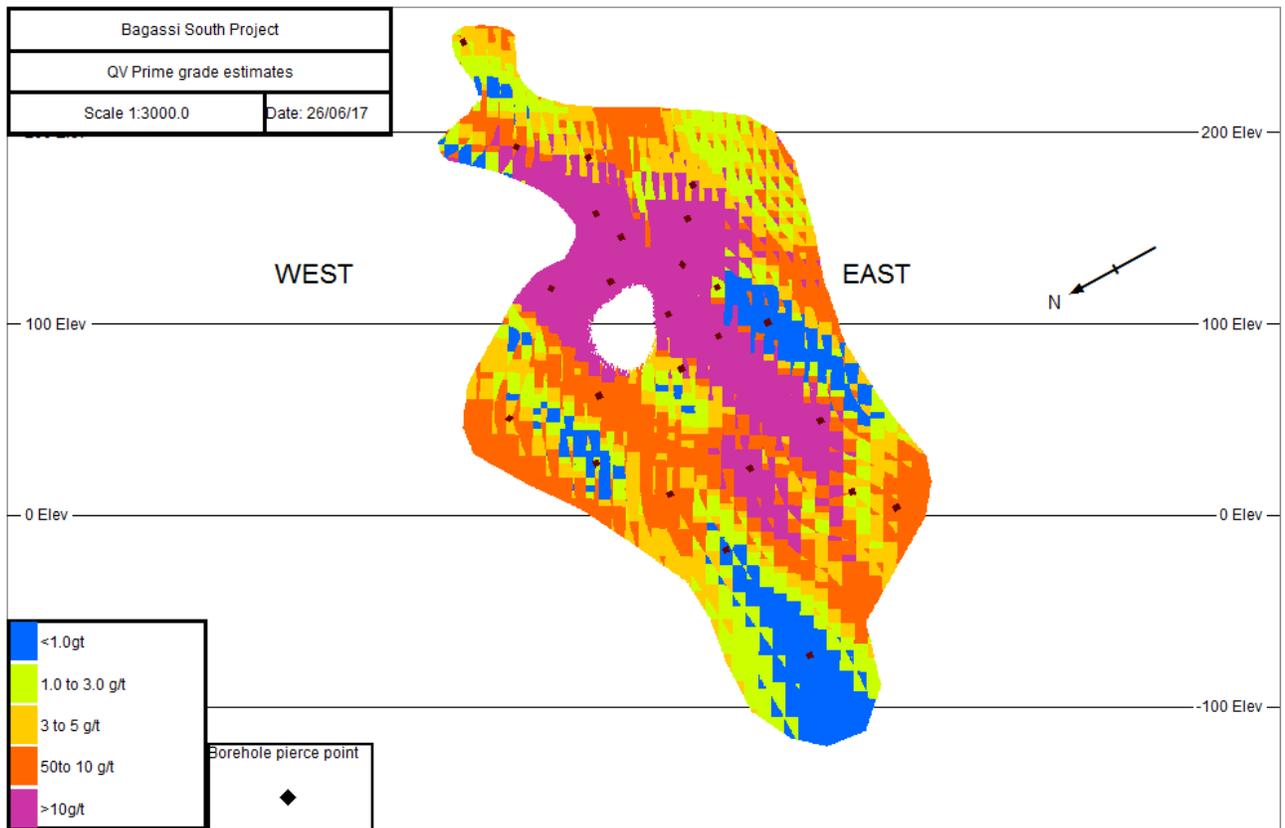


Figure 36: QV' Grade Estimates Inverse Distance to Power of 4

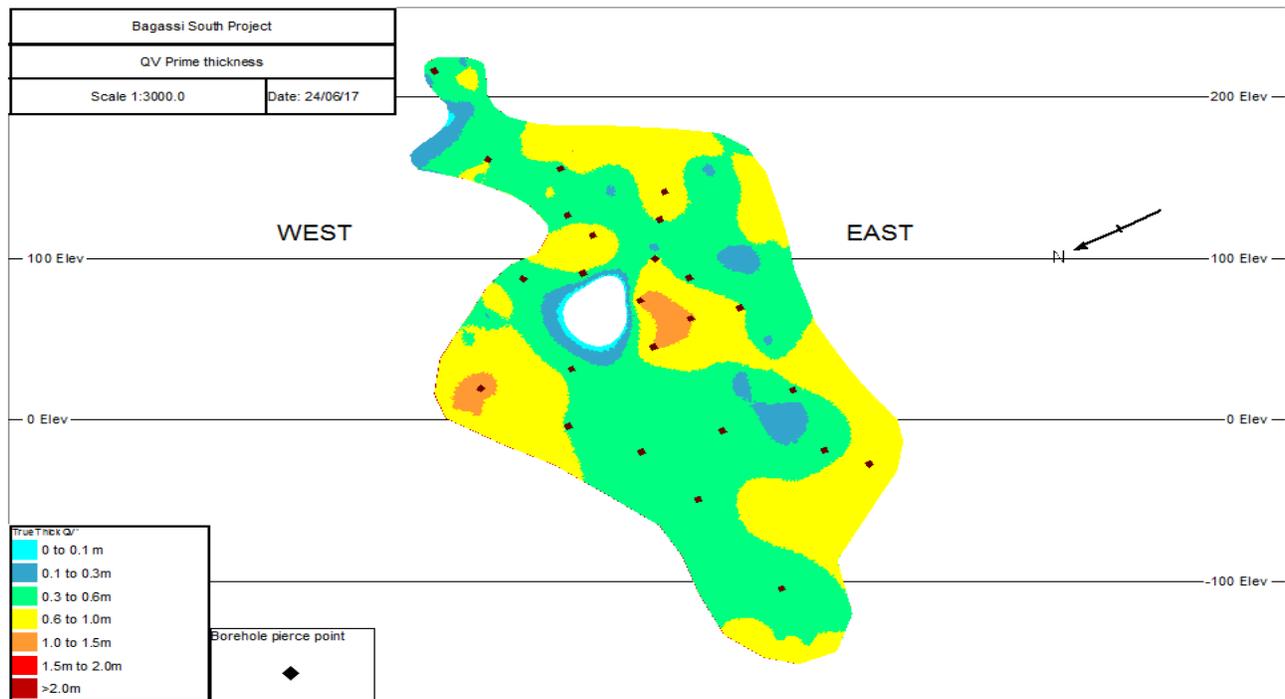


Figure 37: QV' Thickness Contours

Resource Model Validation

Model validation was carried out by using both Snowden Supervisor’s model validation procedures in addition to visual analyses of boreholes versus block model grades. Plots comparing naïve data to estimations for gold using ordinary kriging, inverse distance power of 3 and inverse distance power of 4 across the block model include swath plots in x, y and z directions, histograms, Quantile-Quantile plots and cumulative distribution function plots, were all applied.

In the QV’ HG domain, the ordinary kriged results were poor and the decision was made to use the inverse distance power of 4 results for the Mineral Resource Statement.

Validation checks confirm that block estimates for well-informed mineral resource domains are a reasonable representation of informing data whilst the less informed areas have remained in the inferred category due to the lower confidence in the resource estimates.

13.2.2 Mineral Resource Classification

Block model quantities and grade estimates were prepared and classified by Michael Phipps, registered Professional Natural Scientist Geological Science with the South African Council for Natural Scientific Professions (400271/04) according to the CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014).

Mineral resource classification is typically a subjective concept, and industry best practices suggest that it should consider the quantity and quality of exploration data supporting the estimates, the confidence in the geological continuity of the mineralized structures, the geostatistical confidence in the tonnage and grade estimates, and the continuity at the reporting cut-off grade. Appropriate

classification criteria should aim at integrating these concepts to delineate regular areas at a similar classification.

13.2.3 Preparation of Mineral Resource Statement

CIM Definition Standards for Mineral Resources and Mineral Reserves defines a mineral resource as:

“[A] concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth’s crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.”

The “reasonable prospects for economic extraction” requirement generally implies that the quantity and grade estimates meet certain economic thresholds and that the mineral resources are reported at an appropriate cut-off grade that considers extraction scenarios and processing recoveries.

Roxgold satisfied that the geological model constructed for the QV1 deposit of the Bagassi South Zone honours the current geological information and knowledge. The location of the samples and the analytical data are sufficiently reliable to support mineral resource evaluation and do not present a risk that should be taken into consideration for classification. The mineral resource model is informed by data from core boreholes drilled with pierce points generally spaced approximately 25 metres or more apart.

Table 28: Mineral Resource Statement*, Bagassi South Zone, Yaramoko Gold Project, Burkina Faso, Roxgold Inc., July 19, 2017

Category		Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Indicated	QV1 Structure	352	16.6	188
	QV' Structure	-	-	-
Total Indicated		352	16.6	188
Inferred	QV1 Structure	79	13.0	33
	QV' Structure	51	22.0	36
Total Inferred		130	16.6	69

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Underground mineral resources are reported at a cut-off grade of 5.0 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$100 per tonne, G&A cost of \$28.30 per tonne, processing cost of \$38.90 tonne, process recovery of 98.5 percent.

The controls on the distribution of the gold mineralization are sufficient sufficiently well established to infer reasonable continuity of the gold mineralization between sampling points within the meaning of CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014). Considering the overall widely spaced sampling information and the uncertainty in the continuity of the gold mineralization, Roxgold considers that it is appropriate to classify modelled blocks within the QV1 gold deposit at a 25-metre drill spacing in the Indicated category and area where the spacing is greater than 25 metres are classified Inferred within the meaning of the CIM *Definition Standards for Mineral Resources and Mineral Reserves*. The updated Bagassi South Zone Mineral Resource Statement was disclosed in a press release on July 19, 2017 (Table 28).

Sensitivity Analysis

The mineral resource model is sensitive to the selection of the reporting gold cut-off grade. To illustrate this sensitivity, the quantities and grade estimates for the QV1 Main domain are presented at various cut-off grades as grade tonnages curves in Figure 38 and Figure 39. The reader is cautioned that the figures presented in this table should not be misconstrued with a Mineral Resource Statement. The figures are only presented to show the sensitivity of the block model estimates to the selection of gold cut-off grade.

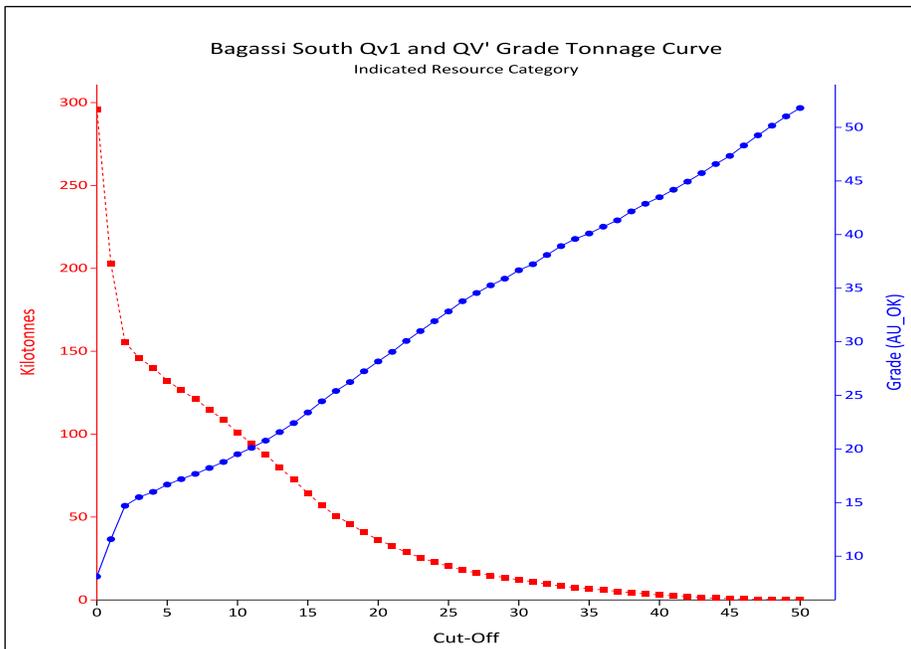


Figure 38: Grade Tonnage Curve for Bagassi South – Indicated Resource Category

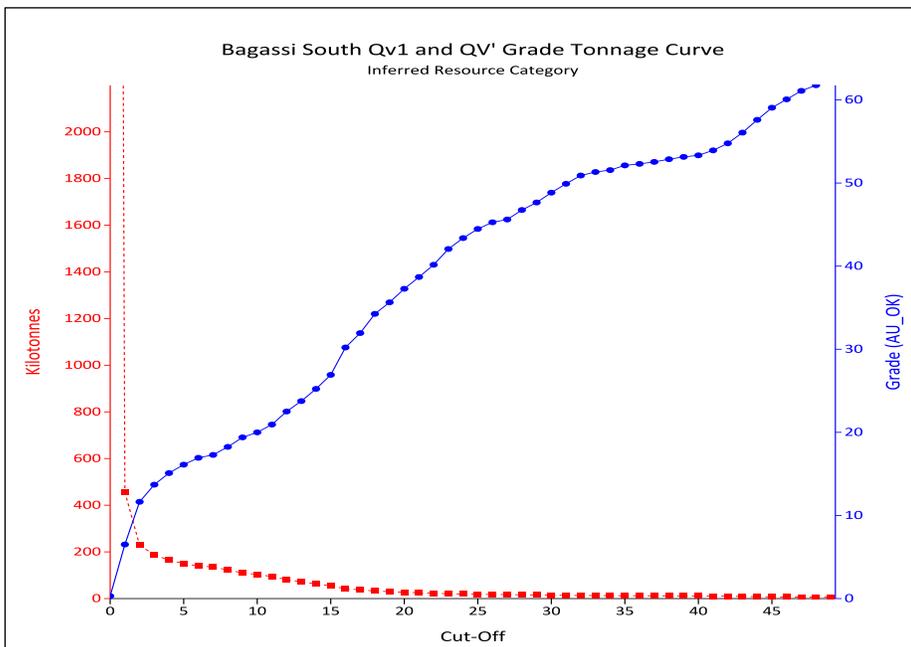


Figure 39: Grade Tonnage Curve for Bagassi South – Inferred Resource Category

13.2.4 Reconciliation to Previous Mineral Resource Statement

Estimated Indicated gold mineral resources at the Bagassi South Zone increased to 352,000 tonnes at 16.6 g/t gold for approximately 188,000 ounces of gold at a cut-off grade of 5.0 g/t gold as of July 19, 2017 (Table 29). There were previously no Indicated mineral resources disclosed at the Bagassi South Zone.

Estimated Inferred mineral resources decreased from 220,000 ounces of gold as of December 31, 2016 to 69,000 ounces of gold as of July 19, 2017, due to the conversion of 188,000 ounces of gold from Inferred Resources to Indicated Resources. The grade of the Inferred mineral resources increased from 12.1 g/t gold as of December 31, 2016 to 16.6 g/t gold as of July 19, 2017.

Table 29: Reconciliation to Previous Mineral Resource Statement

Category	Quantity		Grade		Contained Gold	
	2016 (000't)	2017 (000't)	2016 Gold (g/t)	2017 Gold (g/t)	2016 (000'oz)	2017 (000'oz)
QV1 Structure						
Measured	-	-	-	-	-	-
Indicated	-	352	-	16.6	-	188
M + I	-	352	-	16.6	-	188
Inferred	514	79	12.7	13.0	210	33
QV' Structure						
Measured	-	-	-	-	-	-
Indicated	-	-	-	-	-	-
M + I	-	-	-	-	-	-
Inferred	49	51	6.4	22.0	10	36
Bagassi Total						
Measured	-	-	-	-	-	-
Indicated	-	352	-	16.6	-	188
M + I	-	352	-	16.6	-	188
Inferred	563	130	12.1	16.6	220	69

14 Mineral Reserve Estimates

This section presents a summary of the methodologies used to prepare mineral reserve statements for the Yaramoko Gold Project. The Qualified Person accepting the professional responsibility for the mineral reserve estimates section is Mr. Benny Zhang, PEng (PEO#100115459). Mr. Zhang undertook the underground mine planning work supporting the preparation of the Mineral Reserve Statement for the Bagassi South Zone, whereas for the 55 Zone, Mr. Zhang reviewed mine planning work undertaken by others.

14.1 55 Zone Mineral Reserves

The 55 Zone mineral reserve estimates resulted from a collaboration between Roxgold and SRK. Roxgold performed the detailed mine design and planning work, and SRK mainly focused on estimation of cut-off grade, assessments of economic mine bottom and ventilation requirement, and reviewed all of Roxgold's work based on defined design criteria.

The following methodology was used to estimate mineral reserves:

SRK estimated an in-situ break even cut-off grade of 5.20 g/t gold to design mining shapes in the resource block model. This was based on a gold price of \$1,250 per ounce and estimated life of mine average operating costs derived from contractor mining to June 2019, followed by a transition to owner's mining from July 2019 to the end of mine life, including:

- Estimates of site operating costs totalling \$167.20 per tonne.
- Estimated process recovery of 98.5 percent.
- The stope designs targeted only Measured and Indicated mineral resources, but where Inferred mineral resources were unavoidably included within mining shapes they were treated as waste with zero gold grade.
- Stable stope dimensions were established by considering a 2014 feasibility study geotechnical assessment performed by SRK, and the actual stope geotechnical conditions observed at the 55 Zone during 2016-2017.
- Sublevel spacings of 17 metres and sublevel elevations were selected based on current mining practice.
- A sill drift excavated (including internal and external dilution) profile of 3.8 metres in width by 4.0 metres in height was selected for the standard stope sills, and 3.5 metres in width by 3.0 metres in height was selected for the benching sills.
- A maximum stope strike length of 25 metres was selected.
- SRK determined an economic mining depth limit at an elevation of 4,556 metres or 4,556 Level, which is equivalent to a vertical depth of 750 metres below surface.
- Practical mining shapes were designed (stope wireframes) using the cut-off grade as a guide and by slicing expanded grade control model (wireframes), expanding 0.35 metres on each of the hanging wall and footwall (0.70 metres in total) to include stope wall rock external dilution.
- Diluted quantities inside the excavated mining shapes were reported using mine planning software (Datamine Studio 5DP).
- An additional 3 percent of external dilution from backfill material at nil grade was applied.
- Mining shape total dilution (internal plus external dilution) was checked, and some shapes were optimized.
- Estimates for mining losses were applied.

External dilution on the stope mineral reserves averages approximately 34 percent, with grades from wall rock dilution directly extracted from the block model and null grade from backfill. Dilution is defined as waste/ore tonnes (W/O). Development ore dilution was included in the selected sill profiles and mining software directly reported diluted tonnes and grades.

Table 30 summarizes external dilution and mining recovery applied in the mineral resource to mineral reserve conversion. The Mineral Reserve Statement is presented in Table 31.

Table 30: Mineability Factors for 55 Zone Mineral Resource to Mineral Reserve Conversion

Source	External Dilution	Mining Recovery
Development	10% overbreak	100%
Stoping:		
Regular Stope	0.35 m on hangingwall	95%
Sill Stope	and footwall	85%
Crown Pillar	(0.7 m in total), plus	50%
Boundary Pillar	3% backfill dilution	70%

Table 31: Mineral Reserve Statement*, 55 Zone, Yaramoko Gold Project, Burkina Faso, SRK Consulting (Canada) Inc., December 31, 2016

Category	Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Proven	343	17.69	195
Probable	1,453	10.01	467
Proven + Probable	1,796	11.47	662

* Mineral reserves included in mineral resources. All figures have been rounded to reflect the relative accuracy of the estimates.

** The mineral reserve estimates are prepared in accordance with the CIM *Definition Standards for Mineral Resources and Mineral Reserves*, adopted by the CIM Council on May 10, 2014, and the CIM *Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines*, adopted by CIM Council on November 23, 2003, using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit. Mineral reserves are reported at a cut-off grade of 5.2 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$100.00 per tonne, G&A cost of \$28.30 per tonne, processing cost of \$38.90 per tonne, and process recovery of 98.5 percent. Mineral reserves are the economic portion of the Measured and Indicated mineral resources. Mineral reserve estimates include mining dilution and mining recovery. Mining dilution and recovery factors vary with specific reserve sources and are influenced by several factors including deposit type, deposit shape and mining methods.

14.2 Bagassi South Zone Mineral Reserves

The following methodology was used to estimate mineral reserves during the Bagassi South Zone feasibility study.

SRK estimated an in-situ break even cut-off grade of 4.80 g/t gold to design mining shapes in the resource block model. This was based on a gold price of \$1,250 per ounce and initial operating costs prepared by factoring costs in the 2017 budget for the Yaramoko Gold Project, including:

- Estimates of site operating costs totalling \$144.86 per tonne.
- Estimated process recovery of 98.5 percent.
- The stope designs targeted only Indicated mineral resources, but where Inferred mineral resources were unavoidably included within mining shapes they were treated as waste with zero gold grade.
- Stable stope dimensions were established by considering a feasibility study geotechnical assessment performed by AMC, and the actual stope geotechnical conditions observed at 55 Zone during 2016 to 2017.
- Sublevel spacing of 15 metres and sublevel elevations were selected.
- SRK determined an economic mining depth limit at an elevation of 5,055 metres or 5,055 Level, which is equivalent to a vertical depth of 250 metres below surface.
- Practical mining shapes were designed (stope wireframes) using the cut-off grade as a guide.
- A minimum in situ width criteria of 1.2 metres was considered in some narrow areas.
- In situ quantities inside the mining shapes were reported using mine planning software (Datamine Studio 5DP).
- Mining shape internal dilution was checked, and some shapes were optimized to reduce dilution.
- Estimates for external dilution, dilution grade, and mining losses were applied.

External dilution on the stope mineral reserves averages 26.8 percent with a gold grade averaging 1.18 g/t gold. Dilution is defined as waste/ore tonnes (W/O). For both the wider vein longhole stopes and the narrow vein longhole stopes, external dilution was estimated by assuming that a 1.0 metre layer (sum of hanging wall and footwall) of wall rock would be mined with each mining shape. An additional 3 percent was added to stopes only for backfill dilution. Development ore dilution was included in the designed sill profiles and mining software directly reported diluted tonnes and grades.

Mining recoveries for normal longhole stopes and sill level uphole retreat stopes were set at 95 and 85 percent respectively, while 100 percent recovery was used for the associated sill ore development.

The Mineral Reserve Statement for the Bagassi South Zone is presented in Table 32. Other than discussed herein, SRK is not aware of any mining, metallurgical, infrastructure, environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the mineral reserve estimates.

Table 32: Mineral Reserve Statement*, Bagassi South Zone, Yaramoko Gold Project, Burkina Faso, SRK Consulting (Canada) Inc., November 6, 2017

Category	Quantity (000' t)	Grade Gold (g/t)	Contained Gold (000' oz)
Proven	-	-	-
Probable	458	11.54	170
Proven + Probable	458	11.54	170

* Mineral reserves included in mineral resources. All figures have been rounded to reflect the relative accuracy of the estimates.

** The mineral reserve estimates are prepared in accordance with the CIM *Definition Standards for Mineral Resources and Mineral Reserves*, adopted by the CIM Council on May 10, 2014, and the CIM *Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines*, adopted by CIM Council on November 23, 2003, using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit. Mineral reserves are reported at a cut-off grade of 4.8 g/t gold assuming: metal price of \$1,250 per ounce of gold, mining cost of \$73.47 per tonne, G&A cost of \$35.74 per tonne, processing cost of \$35.65 per tonne, and process recovery of 98.5 percent. Mineral reserves are the economic portion of the Measured and Indicated mineral resources. Mineral reserve estimates include mining dilution and mining recovery. Mining dilution and recovery factors vary with specific mineral reserve sources and are influenced by several factors including deposit type, deposit shape and mining methods.

15 Mining Methods

This section describes the operating 55 Zone mine in Section 15.1 and the Bagassi South Zone mine feasibility study in Section 15.2.

15.1 55 Zone Mine

This section summarizes the mine design and planning work that supports the updated Mineral Reserve Statement for the 55 Zone Mine that has been in operation since 2016. The underground mine planning work was undertaken Roxgold and reviewed by Mr. Benny Zhang, PEng (PEO#100115459) of SRK, the Qualified Person taking professional responsibility. Mr. Craig Richards, PEng of Roxgold was the major contributor to the design and planning work.

15.1.1 Hydrogeology

A hydrogeological study was completed in 2014 by SRK to define the hydrogeological setting of the 55 Zone Mine and support mine planning. The work consisted of hydrogeological field work, analysis, and development of a numerical groundwater flow model. The model provided a tool for developing the initial conceptual understanding of the groundwater system and to quantify a range of possible dewatering rates to consider for mine design. The modelling relied on a diamond drill hole based structural geology interpretation prepared by SRK at the time. The 2014 estimated groundwater inflows to the underground mine were nominally 20 litres per second for the base case and 50 litres per second for the worst case.

Since construction, the 55 Zone mine has been developed along strike and to a depth of 260 metres. Ground water inflows have been lower than the feasibility study estimates. Total mine pumping in October and November 2017 has been 6 litres per second on a 24-hour basis. The developed mine is observed to be dry, with nearly all water recycled for used as mine service water.

The mine dewatering system for the 55 Zone mine is described in Section 15.1.10.

15.1.2 Mine Geotechnical

SRK completed the original geotechnical study for the 55 Zone mine feasibility study in 2014, which included comprehensive parameter evaluation, laboratory testing, and kinematic analyses. Analyses for excavation interaction and sequencing was undertaken using Map3D. A crown pillar assessment was completed by SRK using the Scaled Span method to result in a Class C crown. A 10-metre pillar thickness in the fresh rock, and a 20-metre pillar thickness in near surface weathered rock were recommended. Intact rock strengths of 280 MPa were estimated for the granite and mafic volcanic host rocks by SRK in the 2014 analysis.

Based on assumed 17-metre sublevel spacing, the 2014 SRK study recommended maximum stope dimensions of 34 metres high by 25 metres long by vein width. Since early 2017 stoping practices for the 55 Zone mine have been adapted to a standard single sublevel stope height (17 metres sublevel spacing, or 21 metres floor to back) and 25-metre strike length to successfully minimize dilution, with actual unplanned dilution averaging 20 to 25 percent to date.

In-situ stresses at 55-Zone are not expected to impact mine performance in the next several years based on experience to date, high intact rock strengths, and the modest impact of the mining method. This view was also confirmed by the numerical modelling conducted by SRK in 2014 for depths to 430 metres.

Below 250 metres depth, the orebody strike extent is variable, and opportunities exist for low grade pillars to be left. Future annual planning analyses will further evaluate depth related geotechnical issues of in-situ stress and mine sequencing.

Ground support standards and requirements for 55 Zone have been determined for the complete range of conditions encountered in development and stoping operations. The standards are documented in the mine's Ground Control Management Plan, which is regularly reviewed and amended as required.

Ground support standards in waste development headings call for 3.0 m and 2.4 m in lengths of SS-47 galvanized split sets and galvanized welded wire mesh, installed to the face each round. Walls are bolted and meshed to 2.6 m above floor level. Intersections are cable bolted with 6 m double strand bulbed cable bolts on 2 m centers. Ground support for on vein development consists of galvanized 2.4 m and 1.8 m in lengths of SS-39 split sets with galvanized welded wire mesh to 2.6 m above floor level. Ground support installed to the face each round.

Since the 55 Zone mine was commissioned in 2016, independent annual geotechnical reviews have been conducted by AMC (UK) Consultants. AMC reports that ground conditions are generally fair-to-good. Locally weaker conditions are experienced around major ductile and brittle structures and zones of intense foliation development. AMC also concluded that ground support standards and stoping practices currently in use are suitable for the extraction of the 55 Zone orebody.

15.1.3 Mining Method

The relevant characteristics of 55 Zone from a mining method selection perspective is provided below.

- The orebody is hosted within a steeply dipping shear-hosted quartz vein, at depth it comprises of a broader shear zone involving quartz veining that is less continuous.
- The vein has an average true in-situ thickness of 3 to 4 metres, ranging from 2 to 12 metres.
- Recovery of the high-grade orebody should be as high as practical, requiring cemented backfill.
- The steep dip and competent rock strengths permit a longhole open stoping method with delayed backfill.
- The narrow nature of the vein dictates a small hole size for production blasting (64-millimetre diameter) and a close sublevel spacing (17 metres) to limit the impact of hole deviation on external dilution.

Longitudinal longhole stoping with delayed cemented rockfill is the primary mining method. Sill pillar recovery is by uppers retreat with no backfill. A longitudinal stope mining sequence, along strike from vein extremities to ramp access points is practiced.

Figure 40 shows a typical cross-section through one sublevel of a longhole stope. Each such stope is mined in this fashion over a 25-metre strike length. Figure 41 shows a long section (vertical projection) of a typical longhole stoping panel.

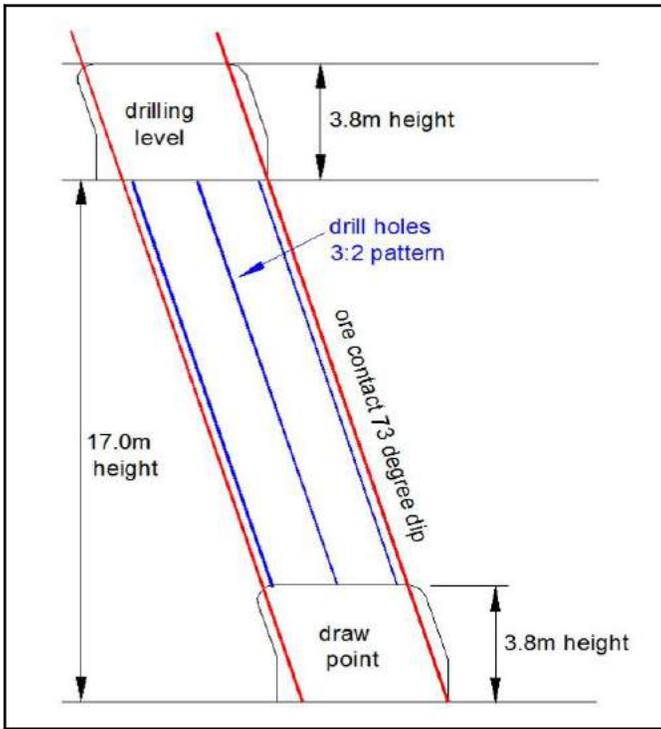


Figure 40: Typical Cross Section - Longhole Stope

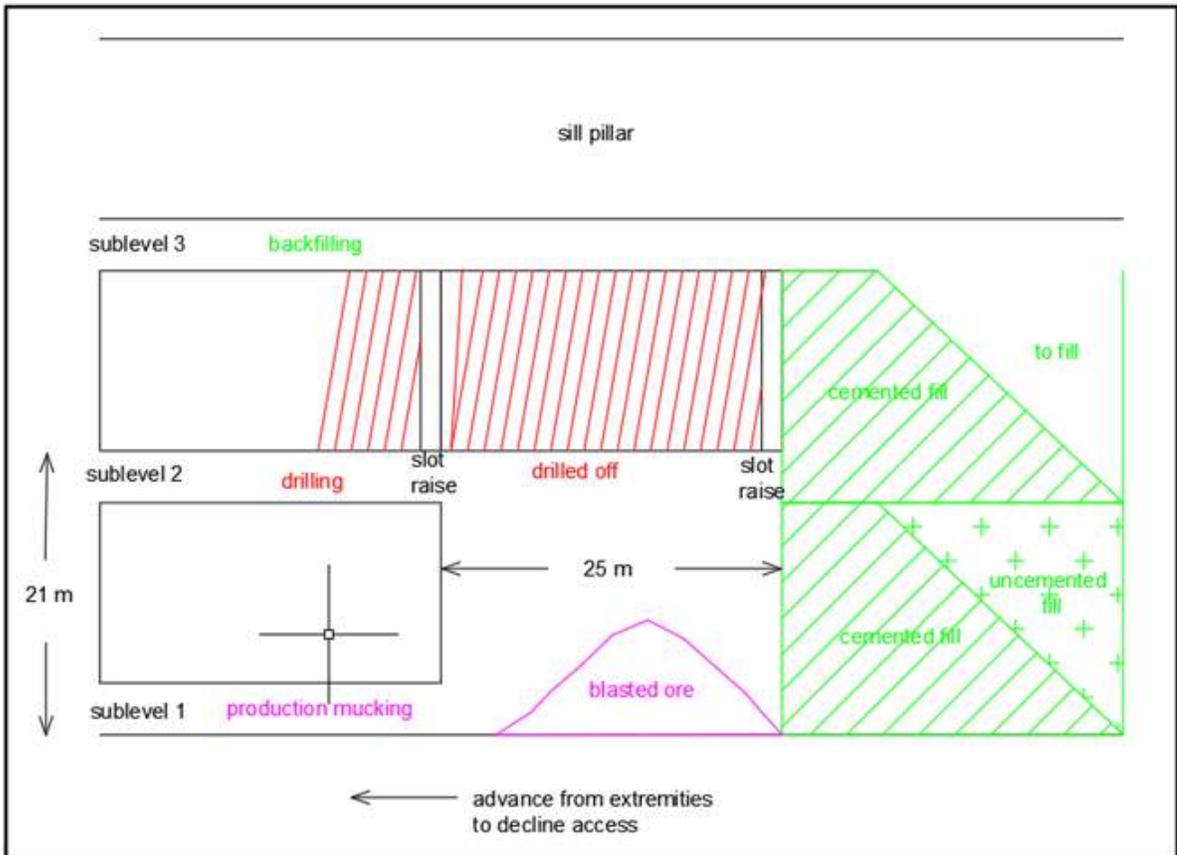


Figure 41: Typical Long-Section - Longhole Stopping Panel

Blast holes generally consist of parallel down holes 13 to 15 metres in length. Some drill holes are fanned out where vein widths exceed 5.0 metres. Drill factors average 4.1 tonnes per metre. Blast holes are loaded with ANFO to an average powder factor of 0.50 kilograms per tonne. Any wet holes are charged with cartridge packaged emulsion explosives. Stope slots are opened by modified drop raising against the cemented rock backfill (CRF).

Standard stope dimensions are 25 metres on strike, 21 metres height, and vein width. At an average in-situ true width of 2.5 to 3.0 metres, a standard stope yields 3000 to 4000 tonnes. Production mucking is undertaken by 3 cubic-metre LHDs, with tele remote mucking for final stope cleanup. Ore mucked from stope brows is trammed along the vein by LHD to remuck bays located on each level close to the main decline.

Longhole stopes are backfilled with 4.0 percent cemented development waste rock for the first 7 to 10 metres and then filled with uncemented waste rock. The current life-of-mine plan indicates that waste development can supply all the backfill needs of the 55 Zone mine. Development waste rock is mixed with cement slurry at a backfill mixing sump on each sublevel. Cement slurry is delivered from the surface batch plant to the backfill level by underground cement transmixers. Mixed CRF is hauled along the vein to the stope dumping point on the upper drilling level by 3 cubic-metre LHDs. Refer to Figure 41.

Sill pillar recovery progresses in a retreating sequence along strike, matching the timing of the stope block below. Geotechnical assessment by SRK indicates that the 17-metre span of hanging wall will remain stable over the strike length of the planned mining, and these mining voids are not backfilled. Slot raising to initiate ring blasting consists of inverse raises and conventional raises.

15.1.4 Stope Design

55 Zone mine stope design and reserve estimation generally follows these steps:

- Designing the practical mining shapes (stope wireframes) using selected cut-off grades as a guide.
- Applying a minimum in situ true width criteria of 1.6 metres in some narrow areas.
- Reporting of in-situ quantities inside the mining shapes using block modelling software.
- Checking internal dilution and optimizing mining shapes.
- Application of estimates for external dilution, dilution grade, and mining losses.

External dilution is estimated by assuming that an additional 0.7 metre layer (sum of hangingwall and footwall) of wall rock will be mined with each mining shape. Additional dilution of 3 percent is added for backfill dilution. For stopes located close to the brittle faults, an extra 5 percent wall dilution is added. External dilution values for mining shapes of all types ranges from 9 to 47 percent and averages 34 percent in the stoping ore reserve blocks.

Figure 42 shows a vertical projection view of the 55 Zone mine.

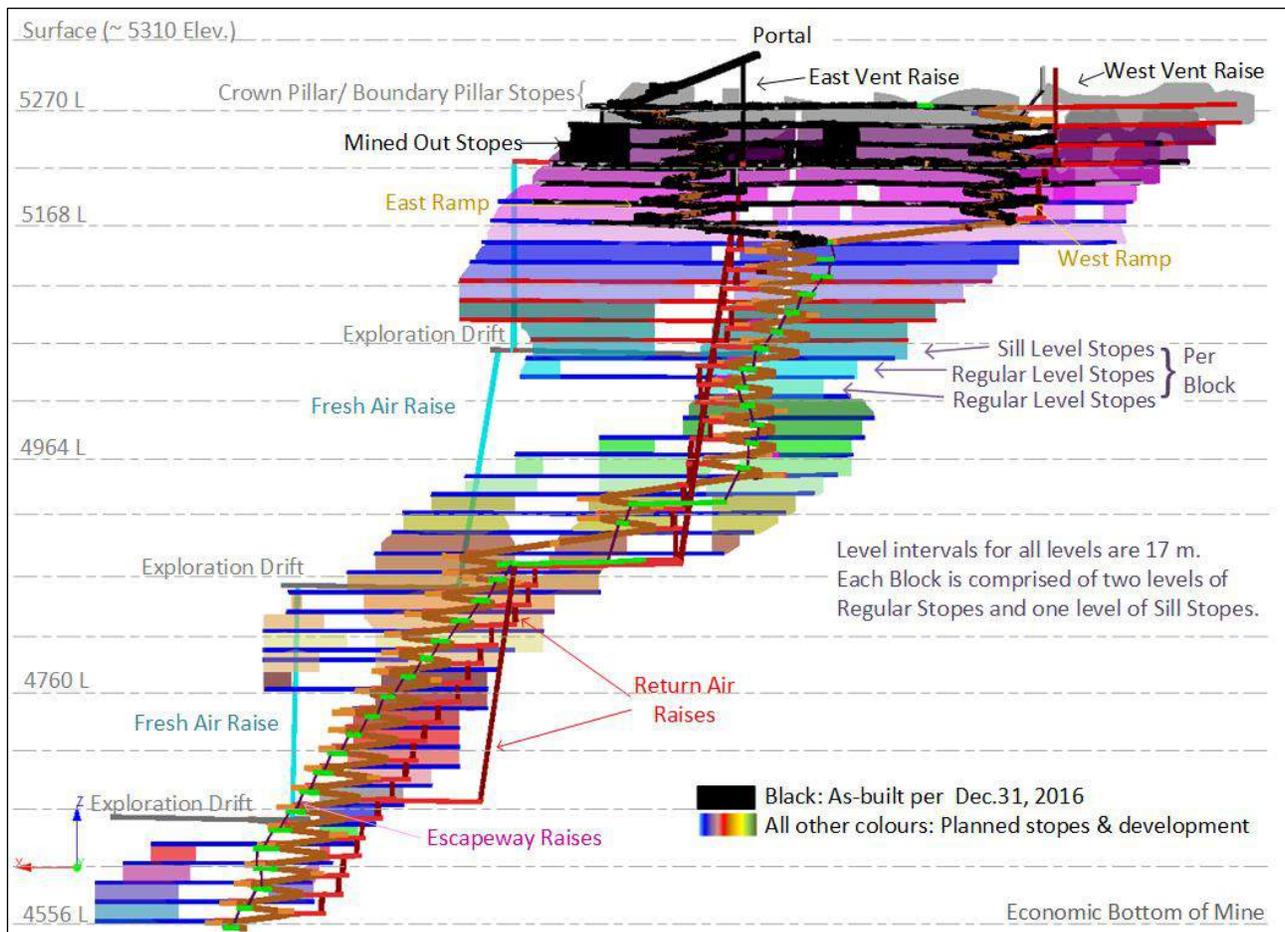


Figure 42: 55 Zone Mine - Vertical Projection Looking South – Reserve Based Mine Design

15.1.5 Status of Development and Production

The 55 Zone mine development commenced in October 2015. By the first quarter of 2016, mine ore development commenced, and stoping started in the third quarter. The mill was commissioned in June 2016 and the mine ramped up to full production of 750 tonnes per day by the start of the fourth quarter. Mine lateral and decline development in 2016 totaled 7,090 metres. The mine produced 174,060 tonnes of ore at a grade of 15.52 g/t in 2016. See Table 33 for mine key performance indicators by quarter in 2016.

Table 33: 2016 Mining Summary 55 Zone Mine

	Unit	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Total
Waste Development	(m)	970	870	1,090	880	3,810
Ore Development	(m)	400	990	830	1,060	3,280
Total Lateral & Decline	(m)	1,370	1,860	1,920	1,940	7,090
Vertical Development	(m)	90	80	20	40	230
Development Ore Mined	(t)	17,570	37,180	35,850	43,620	134,220
Stope Ore Mined	(t)	-	-	12,950	26,890	39,840
Ore Mined	(t)	17,570	37,180	48,800	70,510	174,060
Ore Grade	Gold (g/t)	21.83	13.42	14.64	15.66	15.52
Contained Gold	(oz)	12,330	16,040	22,970	35,500	86,840

15.1.6 Underground Mine Layout

Figure 42 shows the mine model in a vertical projection looking north. The orebody's strike length ranges from 300 to 600 metres depending on depth. 55 Zone mineral reserves extend down to 4556 level, at a depth of 750 metres. The deposit is currently fully developed along strike to 5100 level, with the decline developed to a depth of 260 metres. This is shown below in Figure 43.

Figure 43 is an isometric view looking southeast from the footwall side of the deposit. Most of the development infrastructure is on the footwall side. Colours in the view represent the following:

- Mined out stopes and development are shown in the upper levels in dark grey
- Green – main ramp;
- Light Blue – mine escape ladder raise system;
- Red – exhaust ventilation raises;
- Dark Blue – drill drifts for definition drilling; and
- Stope shapes are shown in gold and light grey colors.

Access to the underground mine is by decline, with a portal located near the east decline. The decline from the portal is at minus 12 to 15 percent gradient and has dimensions of 5.3 metres width by 5.8 metres height, these being selected based on the haul trucks in use and for potential mine deepening to up to and beyond 1,000 metres depth.

In initial upper levels of the mine, the access system included two declines along strike to provide early independent stoping faces. Once full production of 750 tonnes per day was reached in mid-2016, the access design was adapted to a single decline approach at 150 metres depth, to optimize waste development requirements and capital cost.

Ore development to support longhole stoping, not visible in the figures, is spaced on 17-metre sublevels.

The east exhaust ventilation raise extends from surface to the bottom of the mine. It is comprised of a raise bored section 3.5 metres in diameter to 90 metres depth, and then 4- by 4-metre drop raised sections beyond that.

The west ventilation raise is much shorter than the east raise, extending from surface to the 5168 level with a section of 3.5-metre bored raise to 90-metre depth and 4- by 4-metre drop raised sections thereafter. This raise may be configured as an intake or exhaust shaft, and is currently functioning as an intake airway.

The mine layout includes three dedicated exploration diamond drill drifts totaling 1,148 metres of waste development. This development and related definition drilling are included in the production schedule.

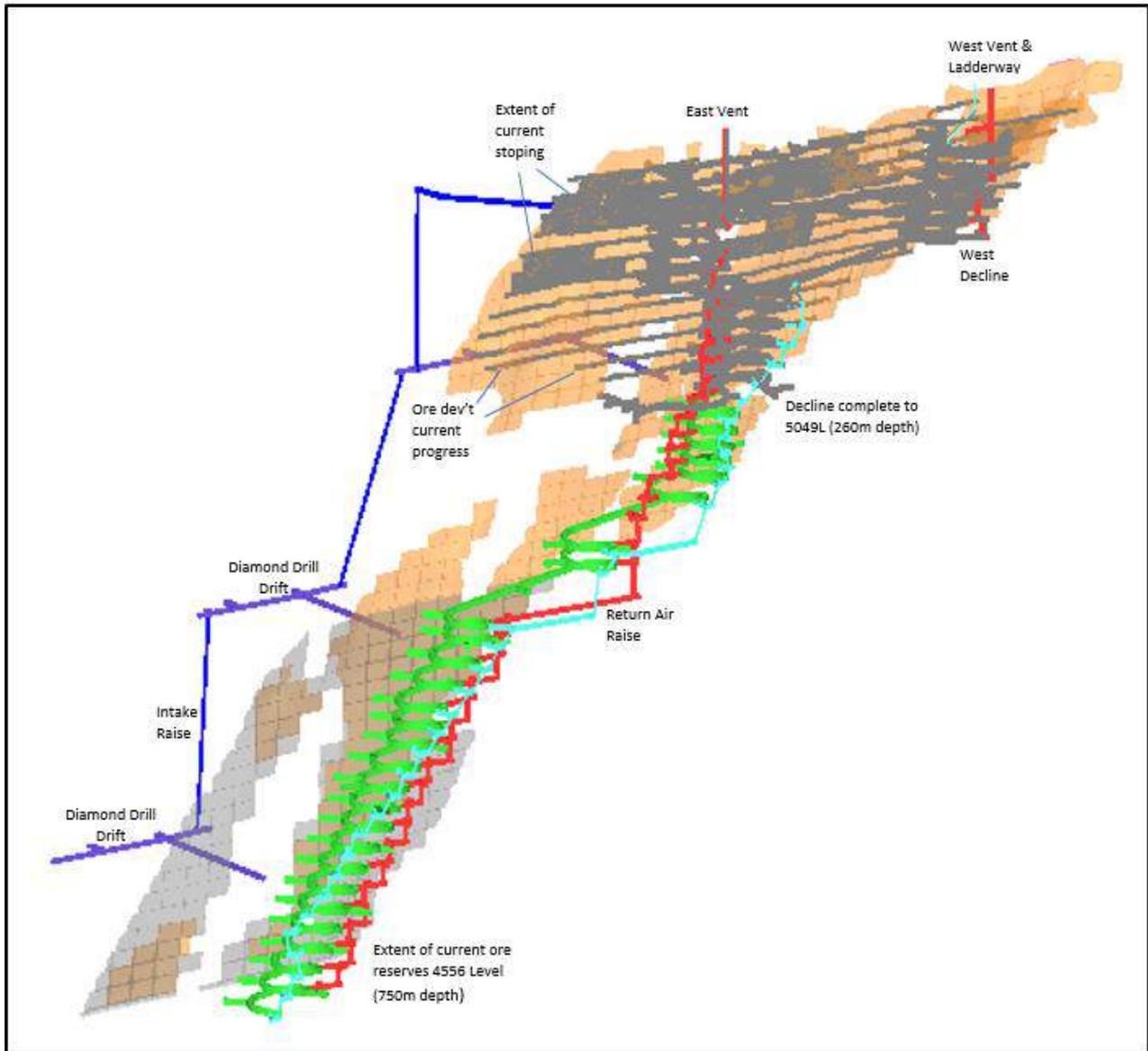


Figure 43: Isometric View Looking Southwest from the Footwall Side

Lateral Development

With lateral development requirements for 2017-2023 totaling 28,198 metres, the 55 Zone mine design achieves a development ratio of 65 ore tonnes per lateral development meter. Refer to Table 34 life-of-mine development requirements. Planned waste development tonnage during this same period (including raising) is estimated at 1,108,000 tonnes yielding a waste/ore ratio of 0.62.

Table 34: Life of Mine Development Requirements

Heading	Type	Length (m)
Capitalized		
Decline to 4556, 5.3 x 5.8 m	Waste	5,237
Level Accesses	Waste	2,074
Miscellaneous Crosscuts	Waste	2,118
Diamond Drill Drifts & Bays	Waste	1,148
Escapeway, Vent Raise Access	Waste	2,931
Infrastructure	Waste	87
Subtotal Capitalized (m)		13,594
Expensed		
On Vein Development, 3.8 x 3.8 m	Ore/Waste	14,604
Subtotal Expensed (m)		14,604
Total Lateral & Decline (m)		28,198

Raising Requirements

Table 35 is a summary of life-of-mine raising requirements from 2017 to 2023. Slot raising for stoping is excluded from the table.

Table 35: Life-of-Mine Vertical Development 2017-2023

Method	From	To	Length	Size	Manway
Drop Raise	5151	4556	475	4mx4m	N
Raisebored	5219	4641	591	3.5m dia	N
Conventional	5134	4556	576	1.5mx1.5m	Y
Subtotal			1642		

15.1.7 Development and Production Schedule

The 55 Zone mine entered commercial production in October 2016, following a 12-month pre-production period. The mine has since then consistently met the nameplate production rate of 750 ore tonnes per day. In October 2017, the mine achieved a stoping rate of 600 tonnes per day, above the design capacity. The life-of-mine plan calls for a planned mining rate of 750 tonnes per day through mid-2023. The planned ore production from 2017 to 2023 is 1.8 million tonnes grading 11.54 g/t gold, for a remaining reserve life of 6.7 years at current production rates from the end of 2016.

Development advance rates project to date have been ahead of expectation and the mine has almost two years of developed ore reserves currently. Development will continue to be undertaken by the mining contractor African Underground Mining Services (AUMS) through mid to late 2019, when the mine operations will be converted to owner mining. The life-of-mine development schedules have been prepared with consideration given to typical potential bottlenecks such as available ventilation, capacity to move muck, congestion in the main ramp, and the availability of trained operating and maintenance crews. Based on the mine layout, planned rates for generating development waste, and contractor involvement, Roxgold and SRK do not expect any of these aspects to be problematic.

Roxgold prepared a detailed Gantt chart schedule for the life-of-mine plan using EPS (Enhanced Production Scheduler, mining Gantt chart software), which was reviewed and accepted by SRK.

Table 36 shows the total lateral development advance schedule for the life of mine plan. The development requirements reach a peak of 5,942 metres in 2017 or 16 metres per day. Development is scheduled using three contractor crews, with each crew breaking slightly less than one round per shift.

The schedule in Table 36 also shows the total material broken each period, being the sum of ore and waste development tonnes and stope production tonnes. Truck haulage to surface reaches a peak annual requirement of 2.7 million tonne kilometers in 2022.

The overall waste rock balance for the project includes a surface waste rock stockpile that reaches a size of 563,000 tonnes by the end of the reserve mine life in mid-2023.

Table 36: Development and Production Schedule 2017-2023

	Unit	2017	2018	2019	2020	2021	2022	2023	Total
Production									
Daily Production	t/d	741	749	742	741	745	746	525	
Total Production	kt	267	270	267	267	268	268	189	1,796
Gold Grade	g/t	13.02	14.63	13.59	11.25	10.33	7.06	9.93	11.47
Contained Gold	koz	111.7	126.9	116.8	96.4	89.0	60.9	60.3	662
Development Ore	kt	153	74	99	74	41	27		467
Gold Grade	g/t	12.79	7.01	6.42	4.59	3.45	6.20		8.04
Stope Ore	kt	114	196	169	193	227	242	163	1,303
Gold Grade	g/t	13.35	17.48	17.78	13.80	11.58	7.15	9.41	12.66
Stockpile Ore	kt							26.00	26.00
Gold Grade	g/t							13.26	13.26
Lateral Development									
Capital Lateral Waste Development									
Decline (5.3mW x 5.8mH)	m	905	957	1,099	962	959	356		5,237
Lateral (5.0mW x 5.0mH)	m	441	461	623	537	684	304		3,049
Lateral (4.5mW x 4.5mH)	m	600	1,210	1,141	1,022	983	352		5,308
Total Capital Waste Development	m	1,945	2,627	2,864	2,520	2,626	1,012		13,594
Operating Lateral Development									
On vein waste drive (3.8mW x 4.0mH)		286	253	478	255	1,282	821		3,375
On Vein Ore Drive (3.8mW x 4.0mH)		3,711	1,750	2,353	1,763	1,003	648		11,228
Total On Vein Drive (3.8mW x 4.0mH)	m	3,997	2,003	2,830	2,019	2,285	1,470		14,604
Total Lateral Development	m	5,942	4,630	5,694	4,539	4,911	2,481	0	28,198
Vertical Development									
Vertical Waste Development									
RAR (4.0mW x 4.0mH)	m	80	85	102	79	90	38		475
2nd Egress/FAR (1.8mW x 1.8mH)	m	90	97	113	114	110	51		576
Raise Bore(FAR) (3.5m Diameter)	m	0	24	242	319	313	204		1,102
Total Waste Vertical Development		170	207	457	512	513	293	0	2,153
Vertical Ore Development									
Ore Raise	m	562	783	522	421	742	702	220	3,952
Total Vertical Development	m	732	991	979	933	1,255	995	220	6,105
Waste Rock/Backfill Handling									
Waste Rock Broken Underground	kt	155	193	219	189	233	111		1,101
CRF Backfill Placed	kt	112	157	115	116	149	179	59	888
Waste Truck to Surface Waste Pile	kt	43.2	35.3	104.3	72.8	84.3			340
Waste Backhauled to Backfill	kt						68	59	127
Surface Waste Pile at Beginning 2017	kt	350							
Surface Waste Pile Size	kt	393	429	533	606	690	622	563	

15.1.8 Mining Equipment

Table 37 shows the current mining fleet in use by AUMS. The number of units is shown for each equipment type. The overall requirements vary throughout the mine life.

As part of the 4-year mining contract, Roxgold pays a fixed monthly charge for each major piece of equipment equivalent to the amortization cost plus markup for the contractor’s equipment. At the end of the contract the remaining asset values will be the base for equipment buyout negotiations with the contractor.

It is planned that near the end of the mining contract in mid to late 2019, Roxgold will buy out the remaining equipment fleet and procure new units as determined in the end of contract negotiations. Capital cost allowances have been made for both the partial equipment buyout and the procurement of new units.

Table 37: Major Mining Equipment

Underground Equipment	Number of Units	Surface Equipment	Number of Units
2 Boom Face Jumbo	1	Dual Cab LV	1
1 Boom Face Jumbo	2	SUV Wagon - LV	2
Longhole Drill	1	Single Cab - LV	8
ITH Drill	1	Mini Bus	1
LHD 4.6 m ³	2	Telehandler	1
LHD 3 m ³	5	Service Truck	1
Truck 60t	2	Dozer (Sub Contractor)	1
IT Forklift	2	Cement Batch Plant	1
UG Transit Mixer	1	Air Compressor	1
Shotcrete Truck	1	Main Fans	2
Grader	1		
Total Underground	19	Total Surface	19

15.1.9 Mine Personnel

Contractor Involvement

The underground mine has been operated by AUMS, an experienced African mining contractor from 2015 to the present. The scope of work for the mining contractor includes mine decline and raise development, stope preparation development, stoping, backfilling, and all related services required for the operation of a 750-tonne-per-day narrow vein gold mine.

It is planned to continue to contract 55 Zone mine operations to AUMS until mid to late 2019. At that time, it is planned for Roxgold to take over and operate it as an owner operated mine. Periods of involvement for the mining contractor and the owner are as follows:

- The mining contractor will be employed until mid to late 2019.
- Roxgold will operate the mine for a nominal 4-year period from mid to late 2019 to early in Q2 2023 when mining will be completed.

Table 38 shows the current levels of contractor and owner personnel by section in the underground mining department.

Table 38: Mine Manpower

	Contractor				Owner				Total
	XO	XA	L	Total	XO	XA	L	Total	
Super & Admin	7	0	12	19	1		1	2	21
Safety & Training	3	0	1	4					4
Warehouse	1	0	9	10					10
Technical Services	8	0	5	13		6	12	18	31
Mining	16	10	56	82					82
UG Maintenance	8	0	28	36					36
UG Electrical	2	4	8	14					14
	45	14	119	178	1	6	13	20	198

XO: Expat Oversea; XA: Expat African; L: Local

Staff positions include mine supervision, safety, training, maintenance supervision, and technical services. Operations and maintenance hourly employees will form three crews working on a rotation on and off site. The planned operating schedule is two 11-hour shifts per day on a continuous basis.

The underground mining contractor is experienced in West Africa with an established workforce at other African operations. The mining contractor hires and trains as many local employees as possible. The mining contractor uses expatriate trainers and established training programs and standards.

During Q3 and Q4 2019 it is planned that the underground mine operations will transition from contractor operated to owner operated. At that time, Roxgold will assume responsibility for managing the mine workforce.

15.1.10 Mine Services and Infrastructure

Underground Diamond Drilling

An underground diamond drilling program has been included to infill around existing boreholes below 250 metres depth to eventually achieve an average spacing of 30 metres to upgrade areas of Inferred resources to the Indicated category and to provide additional definition of probable reserve areas.

Three dedicated drilling drifts are planned totaling 1,148 metres of waste development (4.5- by 4.5-metre size) to supplement the drill positions available within the planned 3D mine model.

Ore and Waste Handling

Declines are developed at a minus 12 to 15 percent gradient with dimensions of 5.3 metres width and 5.8 metres height to accommodate underground mine trucks, planned ventilation volumes and eventual mine deepening. Vehicle passing is done at level access crosscuts that are spaced every 120 metres along the ramp (17-metre vertical intervals).

The mine design includes dedicated truck loading and turn around areas on every level, located just off the main ramps. Remuck bays are included in the design on each level near the ramp. Ore and waste rock both have in situ densities of 2.7 tonnes per cubic metre. All truck loading is by 4.6 cubic-metre-7 cubic-metre LHDs.

All ore and 75 percent of development waste rock (2,671 kilotonnes total material) will be trucked to surface up the ramp system to ore and waste stockpiles. The waste rock stockpile will reach a size of 563,000 tonnes at the end of the mine life.

The peak trucking requirement occurs in 2022, with an annual haulage requirement of 2.7 million tonne-kilometers. This can be met by a fleet of 4 to 5 trucks. Trucking depths range from 45 to 750 metres below surface over the mine life.

Mine Ventilation

In mid-2017 Mine Ventilation Services (MVS), a business unit of SRK, developed ventilation models for the 55 Zone mine using the Ventsim Visual software package for a scoping level review of the life of mine ventilation requirements. Roxgold engineers provided drift dimensions, main raise sizing, and mine projection maps.

Airflow requirements for the mine are based on the vehicle motor power (kW), utilization, and recommended factor of 0.06 cubic metres per second per kilowatt of engine power to ensure safe working conditions in areas with diesel equipment. This results in a target airflow of 163 cubic metres per second for the working area of the mine and a total mine minimum airflow 190 cubic metres per second. The actual total mine airflow requirement may be higher due to leakage.

The mine currently has two Cogemacoustic 1800 C1 fans currently installed on the East ventilation shaft. The current total flow for the mine based on the fan information is 190 cubic metres per second with fan pressures near 2.5 kilopascals. The time phased modeling shows that, without any major changes to the ventilation design or infrastructure, the required fan operating points are within the performance curves until year 2022 or 2023 (depletion of current mineral reserves).

MVS also considered mine ventilation at depths below 750 metres, that could result if additional deeper mineral reserves are established in the future. Ventsim Visual ventilation models were developed to represent the end of year mining ventilation stages from 2018 to 2027 using the current ventilation design. Alternative models, assuming end of mining in the year 2027 were also developed, with a focus to reduce mine resistance. These models were used to provide recommendations based on the results.

Long-term ventilation concepts for deeper level mining (refer to Section 23) were reviewed. Several scenarios were modeled to allow increased airflow to the mine at depths below 750 metres. Based on initial modeling and discussions with Roxgold engineers, the options may include:

- A raisebored return raise system, like the intake raise system, to reduce leakage and shock losses.
- An additional Cogemacoustic 1800 C1 or similar fan. The design requires one fan on the west shaft and two operating in parallel on the east shaft.
- Extend the intake raise system to surface.
- Additional Cogemacoustic 1800 C1 fans in series to increase system pressure if needed.

A high-level review of potential mine cooling requirements was conducted. For areas of the mine below 750 metres depth, some degree of refrigeration may eventually be required. A basic climatic model was completed assuming the preferred ventilation alternative was used for year 2027. There are several unknowns with respect to virgin rock temperature, thermal gradient, and water intrusion that will need to be addressed in future ventilation studies for depths below 750 metres.

Backfill Methods

Cemented rock backfill (CRF) using mine development waste rock is used to fill mining voids. The voids created by mining over the mine life are to be treated as follows:

- 30 percent of voids not backfilled.
- 20 percent filled with unconsolidated waste rock.
- 40 percent filled with normal CRF with up to 4.0 percent cement binder.
- 10 percent filled with high strength CRF with up to 6.0 percent cement binder.

The voids not filled are in areas where sill pillar recovery is planned. These areas include mining up under previously placed high strength CRF, and crown pillar recovery.

A total of 888 kilotonnes of rock for backfill from 2017 to 2023 will be sourced from the available underground development waste (1,011 kilotonnes).

CRF is manually batched underground on the backfilling level in operation. A CRF mixing sump is excavated in the access of each sublevel. Waste rock from development (or hauled from the surface waste stockpile) is first dumped in the CRF mixing sump by LHD.

Cement slurry is then added to the mixing sump. It is mixed on surface at the cement batch plant and is transported underground using Jacon 5-cubic-metre transit mixer trucks. A 3-cubic-metre-LHD then mixes the rock and slurry and trams it for placement in the stope. Average one-way tram distances along vein are approximately 75 metres.

Where high strength CRF is needed at sill elevations, it is placed in a layer on the stope floor by an LHD working through the stope brow. Once the high strength layer has been placed, backfilling continues by dumping from the upper stope sublevel.

Mine Dewatering System

The 55 Zone mine dewatering system has been designed to handle an estimated peak rate of 50 litres per second. Operating costs have been estimated based on 20 litres per second. The current actual mine pumping requirements are much lower than the system design capacity. The October and November 2017 volumes pumped have averaged 6 liters per second over a 24-hour period. The mine is currently developed to the full design strike extent and to a depth of 260 metres.

Currently there are two main pump stations established at the 5219 and 5117 levels in the 55 Zone Mine. Each station utilizes 90-kilowatt Model 100 x 65 -315 centrifugal pumps manufactured by Stalker Pumps of Australia. The pumps have a head capability of 140 metres at 50 litres per second. The main pump stations will be installed in a staged system (series) as the mine deepens over time. Each pump station has one online pump and a backup. The dewatering rising mains are currently HDPE 110 millimetres lines installed in service holes.

The mine discharge water is collected in a concrete lined settling facility on surface and recycled as mine service water. Any excess water is pumped to the tailings storage facility and recycled as process water.

Maintenance Facilities

Maintenance facilities for the underground mobile fleet consists of a surface maintenance shop provided by the mining contractor. The workshop will be transferred to Roxgold at the end of the mine contract. Allowance has been made in the mine capital cost estimates for a small underground workshop at approximately 450 metres depth in 2020.

Electrical Power Distribution

Power to support the mine infrastructure is provided from the main site electrical substation via an overhead 11-kilovolt line. A site backup generation facility of 8-megavolt ampere capacity is located at the 55 Zone mine yard. High voltage (11-kilovolt) power to underground is routed through cables installed in service holes to underground substations. Underground substations (2-megavolt ampere) step the voltage down to 1,000 volts which is the mine working voltage. Presently 55 Zone mine power demand is 1.1 to 1.3 megawatts, or 1,000 megawatt hours per month.

15.2 Bagassi South Zone QV1 Deposit

This section summarizes the mine design and planning work that supports the initial Mineral Reserve Statement for the Bagassi South Zone QV1 deposit. The underground mine planning work was undertaken by Mr. Benny Zhang, PEng (PEO#100115459) of SRK, the Qualified Person taking professional responsibility. Mr. Craig Richards, PEng (APEGA#41653) of Roxgold and various Roxgold site personnel also contributed to the design and planning work.

15.2.1 Mine Geological Setting

There are four mineralized zones present in the Bagassi South Zone (QV', QV1, QV2 and QV3), with QV1 being of primary economic interest and the focus of the feasibility study (Figure 44). The QV1 mineralized zone is located 1.8 kilometres south of the 55-Zone mine on the Yaramoko concession, and is geologically similar to the 55-Zone mine shear zone hosted gold deposit.

Four main lithological units are present at the Bagassi South Zone:

- Mafic volcanic
- Granite
- Granodiorite
- Diabase dyke

Figure 45 illustrates the main lithologies encountered at the Bagassi South Zone.

The mafic volcanic unit is the dominant country rock. It is dark green, fine grained and typically massive (away from deformation zones). The granite unit is equigranular and homogeneous, with a distinctive pink colour. The distribution of the granite in three dimensions indicates that it forms a large tabular body trending to the northwest and dipping at approximately 65 degrees. It shows close spatial correlation with the QV1 mineralized zone. The granodiorite is equigranular to porphyritic with a dark grey colour and contains intervals of interlayered mafic volcanic rock. The distribution of the granodiorite in three dimensions indicates that it is structurally below the pink granite. The diabase dyke is a late dyke crosscutting all geological features.

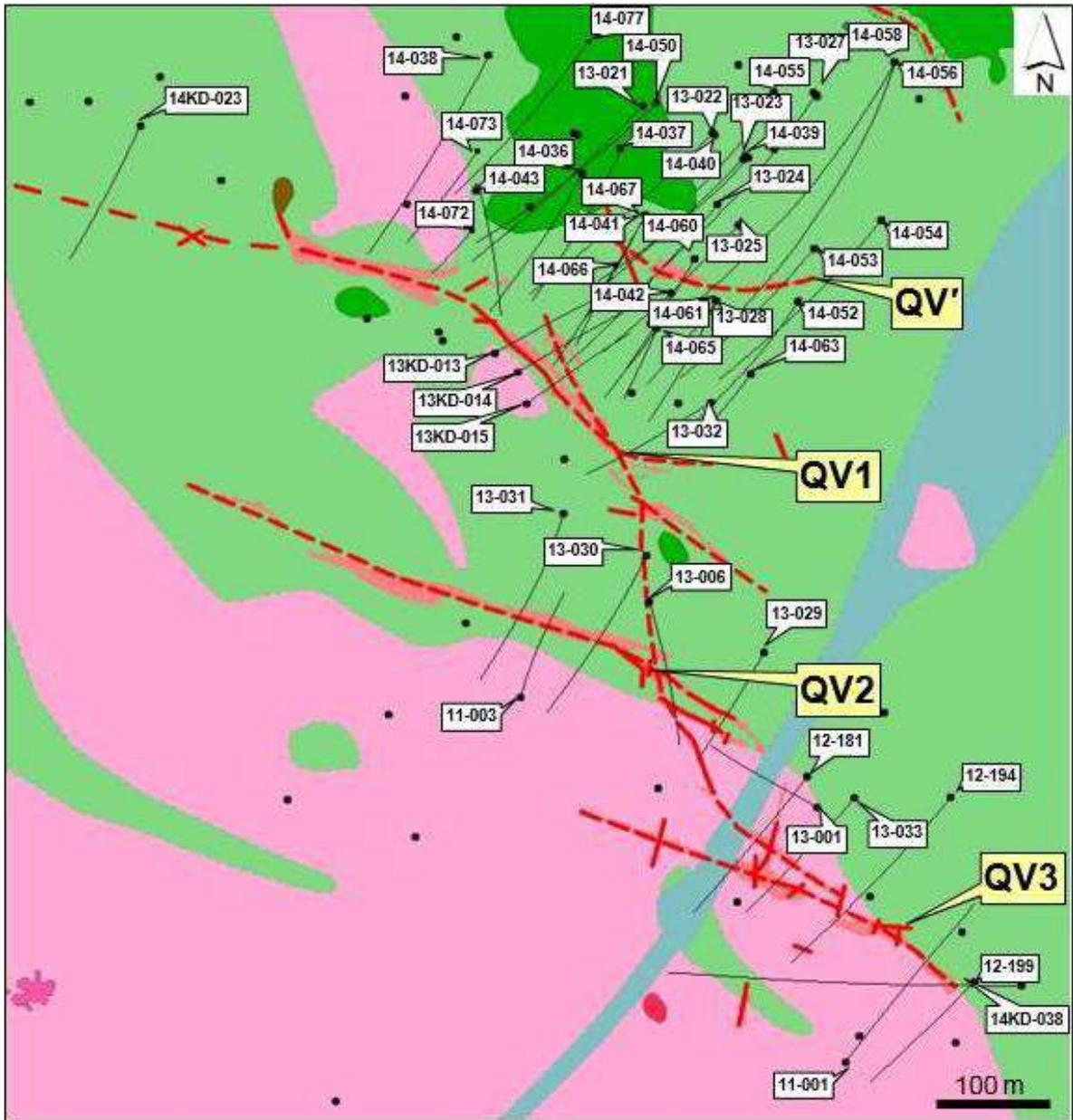


Figure 44: Bagassi South Zone Geology Plan

Legend: Light Green – Mafic Volcanic, Pink – Granite, Dark Green – Granodiorite, Cyan – Diabase Dyke



Figure 45: Bagassi South Zone - Lithological Units

The QV1 shear zone is located along the lithological contacts of the mafic volcanic rock and granodiorite or pink granite. Figure 46 illustrates the conceptual model developed by Roxgold of the QV', QV1 and QV2 mineralized zones and main lithological units.

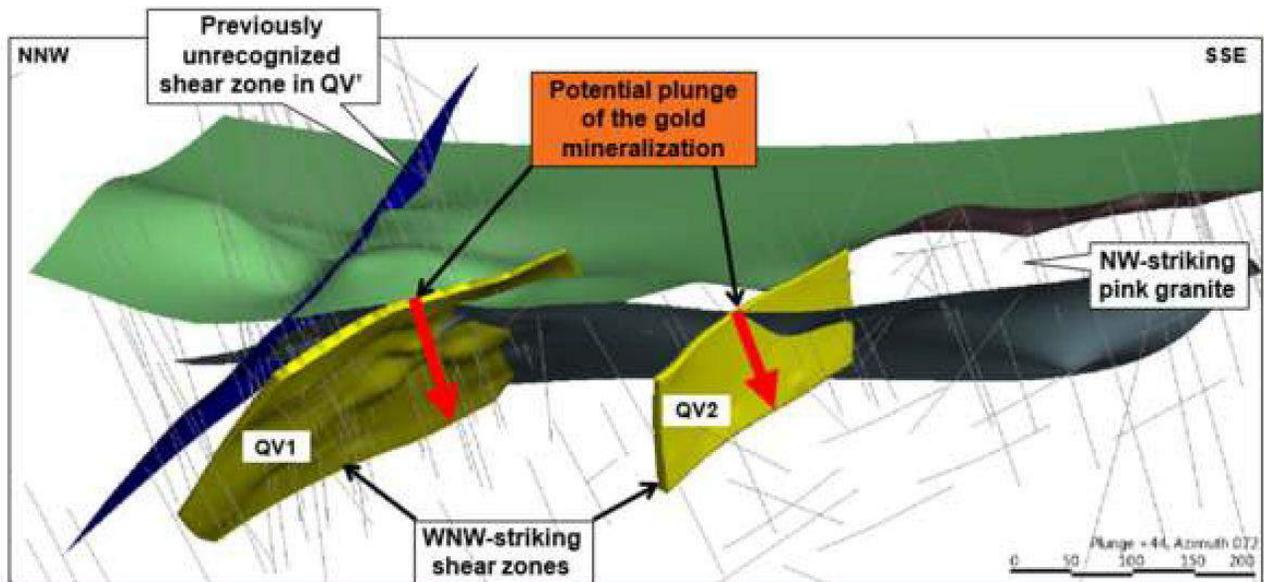


Figure 46: Conceptual Isometric Interpretation of QV', QV1 and QV2

Figure 47 illustrates how the QV1 shear zone (shown as yellow) is divided into the center-west and the east geological zones, with differing host rocks and styles of deformation.

The center-west zone is a brittle-ductile deformation zone, characterized by strong to intense foliation. It strikes west-northwest (295 to 315 degrees) and dips steeply to the north-northeast (60 to 70 degrees). The shear zone (and locally quartz veins) is typically focused along the contact of thin mafic volcanic rock intervals within or bounded by the granodiorite/granite. Gold in this zone occurs in narrow (0.5-1 metres typical) laminated quartz veins typically in the core of the shear zone. See the example core photographs shown below in Figure 48 illustrating the geology of the central-west zone.

The transition from the central-west zone to the east zone is marked by the contact with pink granite and is characterized by a transition in deformation styles from brittle-ductile to brittle. The east zone is contained within the pink granite. It is characterized by brittle faults, breccia, and intervals of fractured granite. The shear in the east zone strikes west-northwest (305 to 315 degrees) and dips steeply to the north-northeast (60 to 70 degrees). Gold in this zone occurs within centimetre-scale extensional quartz veins in brittle faults, and within mm-scale chlorite veinlets in the fractured granite. Refer to the Figure 49 example core photograph below for illustration.

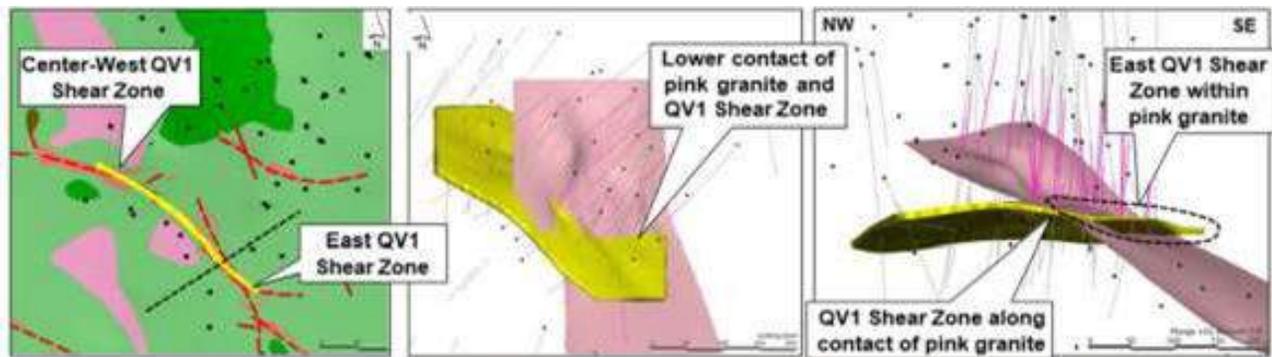


Figure 47: Central-West and East Geological Zones



Figure 48: Core Example Central-West

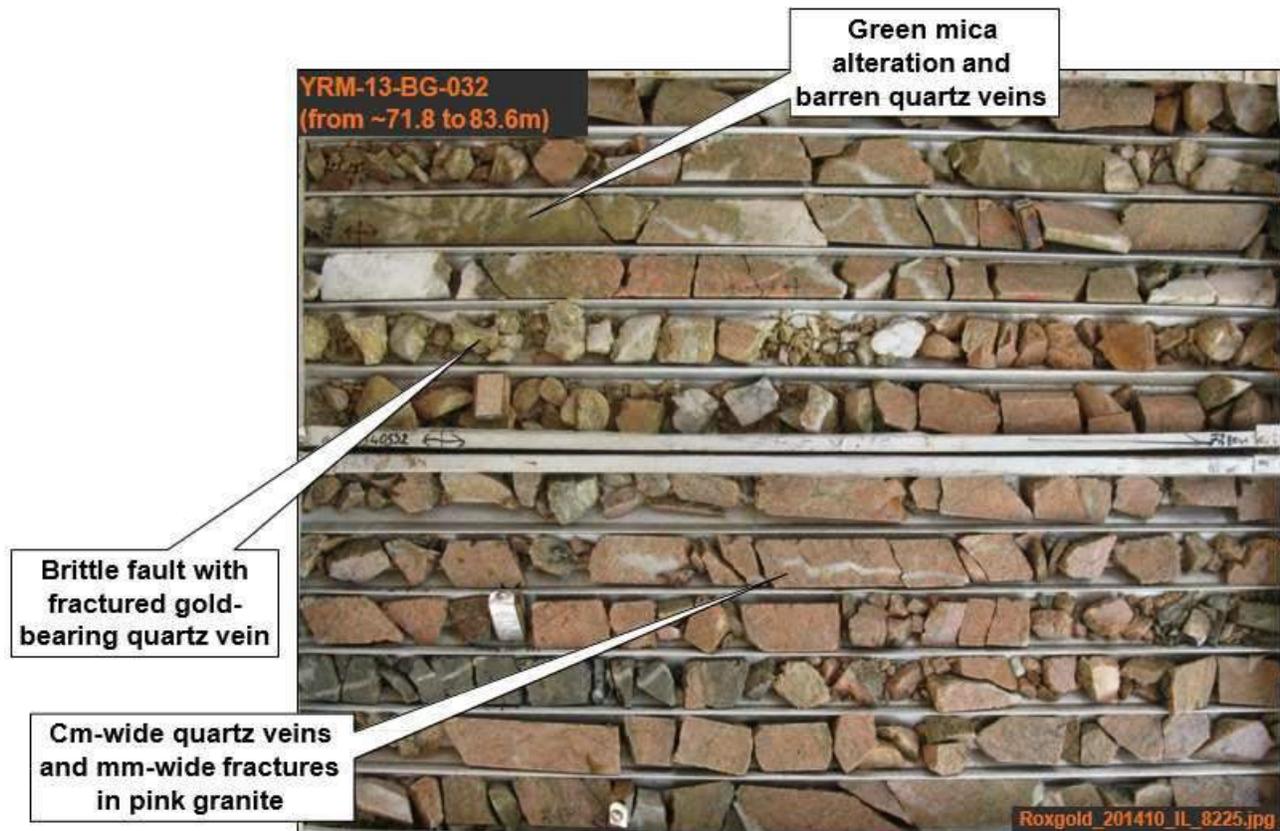


Figure 49: Core Example - East Geology

15.2.2 Hydrogeology

RPS Aquaterra (RPS) was subcontracted by AMC Consultants (UK) Ltd (AMC) to undertake a preliminary water management study for the Bagassi South feasibility study (RPS 2017). Their final report is the primary reference document for this sub-section.

A groundwater inflow assessment was completed using the hydrogeological data currently available for the Bagassi South project area. The existing groundwater levels were reviewed and the bulk hydraulic conductivity of the rock mass (of up to 0.03 metre per day) was determined from field tests and observations in the planned mine area. RPS estimated that total average groundwater inflows to the underground mine should be of the order 10 to 20 litres per second. The dolerite dyke which splits the Bagassi South QV1 orebody into two represents the most significant fracture zone in the project area. This feature has the potential to lead to localized groundwater inflows to the mine where intersected. Mine inflows at the Bagassi South Zone mine will be effectively managed by a dewatering system like that currently operating in the 55 Zone mine.

It should be noted that current 55 Zone mine water discharge flow meter readings from October-November 2017 (which were not available during the RPS study) averaged 6 liters per second over a 24-hour period. This is largely comprised of mine service water, ground water inflows to 55-Zone Mine appear to be negligible.

Locally there are three village water supply wells/boreholes near the planned Bagassi South Zone mine. Mine dewatering conceptually has the potential to reduce groundwater levels in surrounding village water supply wells/boreholes. The coordinates of the three wells and distance from the Bagassi South QV1 orebody are as follows:

- Bagassi South Borehole (469,615mE 1,297,363mN) – 150 metres from orebody
- Bagassi School Borehole (469,348mE 1,297,732mN) – 500 metres from orebody
- Bagassi South Village Well (469,520mE 1,296,736mN) – 600 metres from orebody

The RPS hydrogeology modelling suggests that 2 to 5 metres of water level drawdown may be observed in the Bagassi South Borehole, which is located only approximately 150 metres from the orebody. Less than 1 metre of water level drawdown is predicted at the other two sites (Bagassi School Borehole and Bagassi South Village Well both greater than 500 metres from the mine).

A pumping test completed on a test hole located on the dolerite dyke at Bagassi South Zone resulted in a flow rate of up to 1.67 litres per second (6 cubic metres per hour), and suggested that the dolerite dyke in the Bagassi South Zone area may be a suitable groundwater well supply option for the mine. In addition, dolerite dyke mine inflows pumped from the planned mine could provide the mine water supply. The opportunity will be further evaluated when mine construction commences.

15.2.3 Mine Geotechnical

AMC Consultants UK (AMC) completed the geotechnical study for the Bagassi South Zone feasibility study in August of 2017 (AMC 2017). The information presented in this section is from their final geotechnical report. The AMC scope of work included:

- Data review - structural model and new drilling data for the portal and dyke, and incorporate it into the global data set.
- Geotechnical model - develop a geotechnical model using all available data for use in the subsequent design tasks.
- Portal and development design review - examine the portal cost comparison and decline design in respect of the geotechnical model.
- Development ground support requirements - develop ground support standards for the identified geotechnical domains and for input to costing.
- Stope dimensions and sequencing - develop stable stope dimensions, suitable sub-level intervals, and pillar dimensions. Identify any ground-control requirements for stoping.
- Assessment of stability for the Bagassi South Zone ventilation shaft.

The main lithologies (outlined in Section 15.2.2) were used as the basis for QV1 geotechnical domains:

- 50 metres into the footwall from the QV1 shear zone
- 5 metres into the hanging wall
- 50 metres into the hanging wall

Figure 50 and Figure 51 show the major domains in cross-section and in plan view respectively.

AMC concluded that ground conditions for Bagassi South Zone QV1 are generally fair-to-good and that locally weaker conditions should be expected around major ductile and brittle structures and zones of intense foliation development.

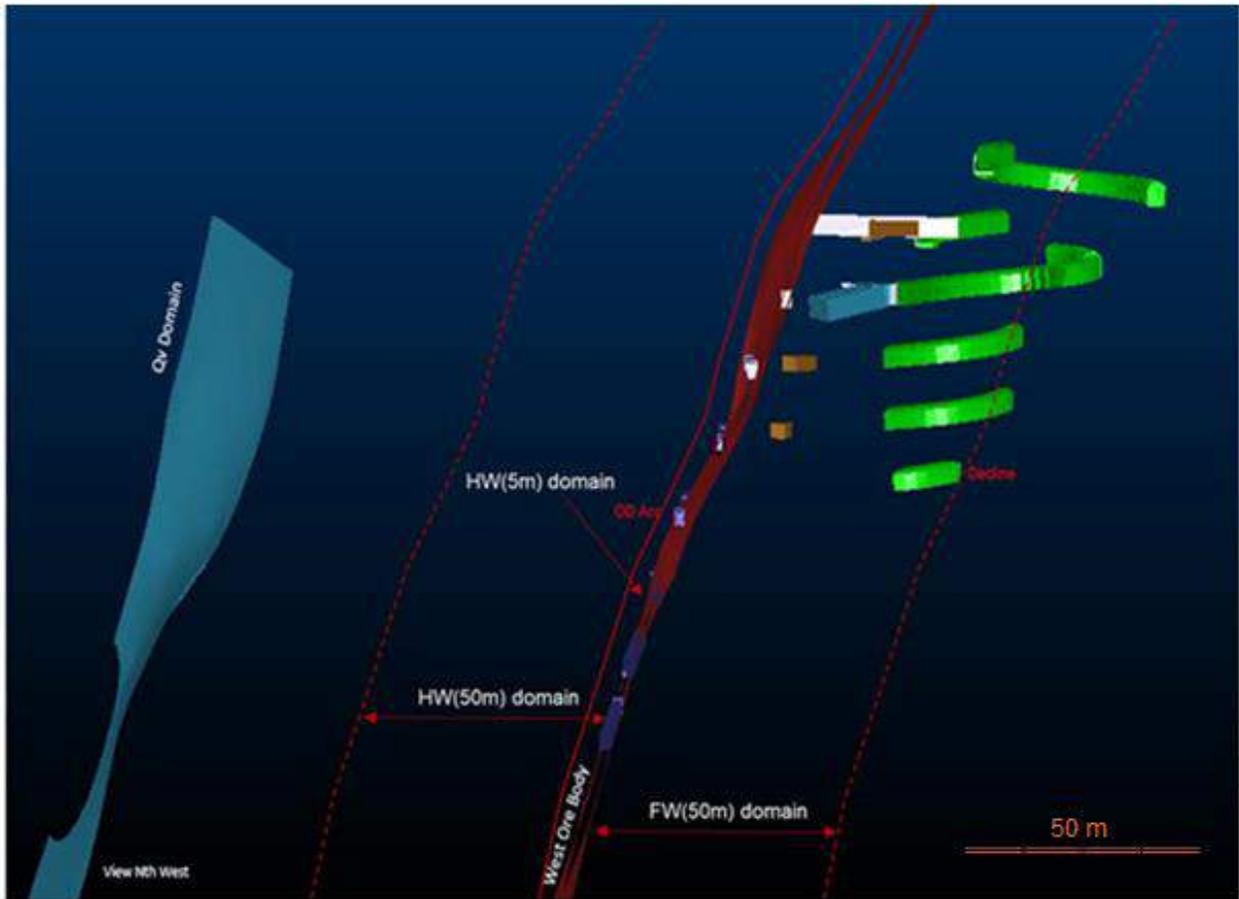


Figure 50: Bagassi South Cross-Section Geotechnical Domains (Looking East)

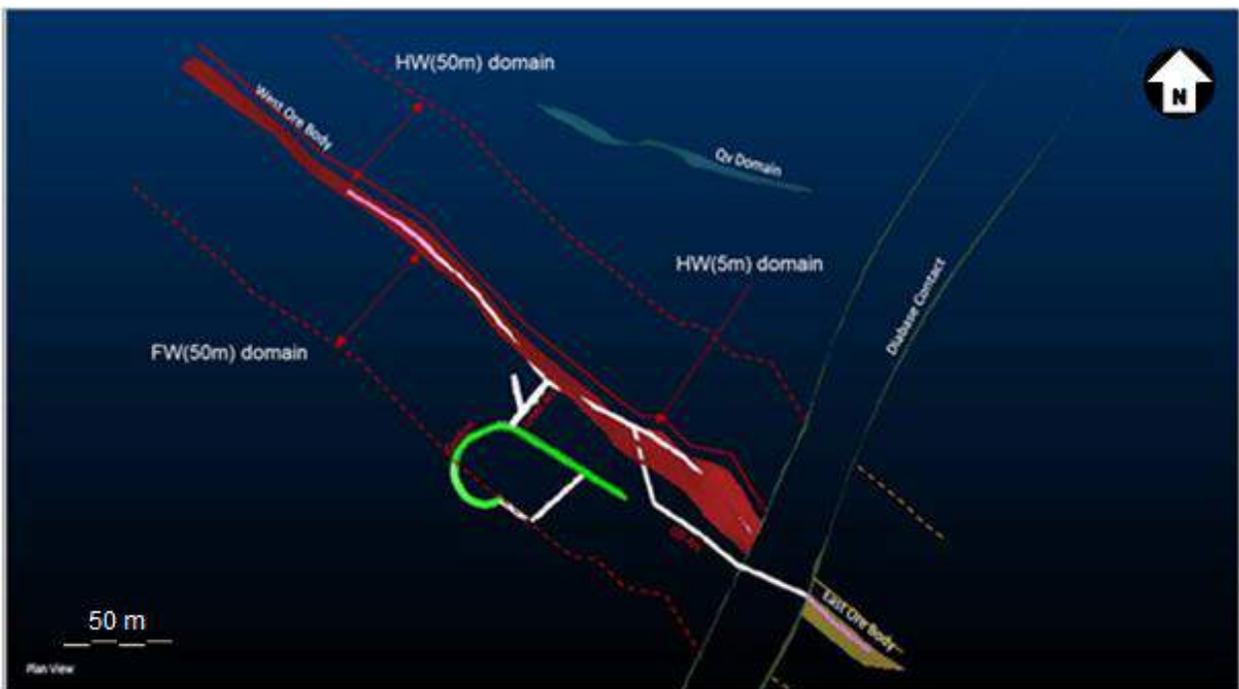


Figure 51: Bagassi South Plan View Location Geotechnical Domains

Findings from the AMC study include:

- Footwall, FW (50 metres), conditions are good-to-excellent.
- Conditions within the QV1 shear zone are fair-to-good.
- There is little difference west and east of the diabase.
- The first 5 metres of the hanging wall, HW (5 metres) suggests generally fair conditions with less variability than the shear zone.
- Conditions in the HW (50 metres) improve with distance away from the shear zone.
- The diabase dyke (diabase) has good-to-excellent ground conditions.

AMC further concluded that mining conditions should be similar to those observed at the 55 Zone mine and that ground support standards currently in use are expected to be suitable for implementation at Bagassi South Zone QV1.

Ground support standards in waste development headings would call for 3.0 m and 2.4 m in lengths of SS-47 galvanized split sets and galvanized welded wire mesh, installed to the face each round. Walls would be bolted and meshed to 2.6 m above floor level. Intersections would be cable bolted with 6 m double strand bulbed cable bolts on 2 m centers. Ground support for on vein development would consist of galvanized 2.4 m and 1.8 m in lengths of SS-39 split sets with galvanized welded wire mesh to 2.6m above floor level. Ground support would be installed to the face each round.

The Stability Graph Method (Hutchison and Diederichs, 1996) was used to assess stope stability for QV1. Design assumptions on sublevel interval and stope length have been applied largely based on the current operating practices at 55 Zone.

Stope stability is expected to be very similar to 55 Zone mine. Single-lift, 25-metre strike length stopes have been planned to minimize wall dilution. As with the 55 Zone mine, locally poorer performance may be expected adjacent to major brittle structures or zones of intense foliation development which are associated with the main shear zone. Cable bolt support has also been included in the Bagassi South Zone stope design and unit costs, and will improve hangingwall performance. Stope crowns are generally expected to be stable without support.

15.2.4 Mining Method

The Bagassi South Zone QV1 deposit will be developed as a high-grade underground gold mine, and accordingly the mine design is intended to achieve a high degree of mineral resource extraction. Longhole open stoping with delayed cemented backfill is the selected mining method. It is the same mining method successfully being used in the operating 55 Zone mine.

The mineralized blocks in the QV1 deposit exhibit regular geometry at stope scale, and along with the steep dip and rock mass conditions, will permit longitudinal longhole open stoping with cemented rock backfill. The narrow nature of the upper levels indicates the use of small diameter blasts holes (51-64-millimetre diameter). The sublevel spacing planned is 15 metres floor to floor, to limit the potential impact of external dilution due to hole deviation, local ground conditions and orebody dip. The anticipated rock mass strength and structure guide the stope size selection of 25-metre strike length and one sublevel in height (total 19 metres floor to roof).

A longitudinal stope mining sequence, along strike from vein extremities to decline access points is planned. The mine layout includes one decline system following the plunge of the mineralization to a planned depth of approximately 260 metres.

Figure 52 shows a cross-section through a typical longhole stope. Figure 53 shows a long section (vertical projection) of a typical longhole stope.

On vein development will be limited to a maximum width of 5.0 metres. Blast holes will consist of parallel down holes 11 to 14 metres in length. Some drill holes will be fanned out where vein widths exceed 5.0 metres. Drill factors range from 2.9 tonnes/metre for narrow sections to 4.3 tonnes per metre in wider areas, averaging 4.0 tonnes per metre.

Blast holes will be loaded with ANFO at an average powder factor of 0.50 kilograms per tonne. Where local water conditions dictate, wet holes will be charged with packaged emulsion explosives. Explosives will be supplied to the Bagassi South Zone from the existing surface magazine for 55 Zone which will be enlarged to handle the increased volume requirements.

Slot raises will be opened by modified drop raising against the cemented rock fill and conventional raises at stope block ends.

Standard stope dimensions have been planned at 25 metres on strike, 18 to 19 metres height, and vein width. At an average in situ true vein width of 4.1 metres, a standard stope will yield 4,000 tonnes including the development tonnes.

Production mucking will be undertaken by 1.5- to 3-cubic-metre capacity LHDs for the planned stope tonnage.

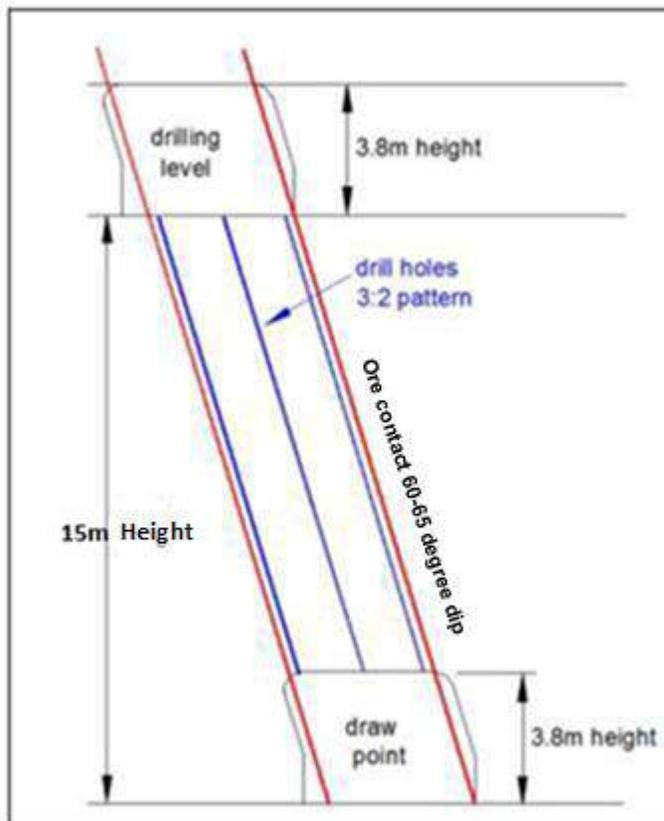


Figure 52: Typical Stope - Cross Section

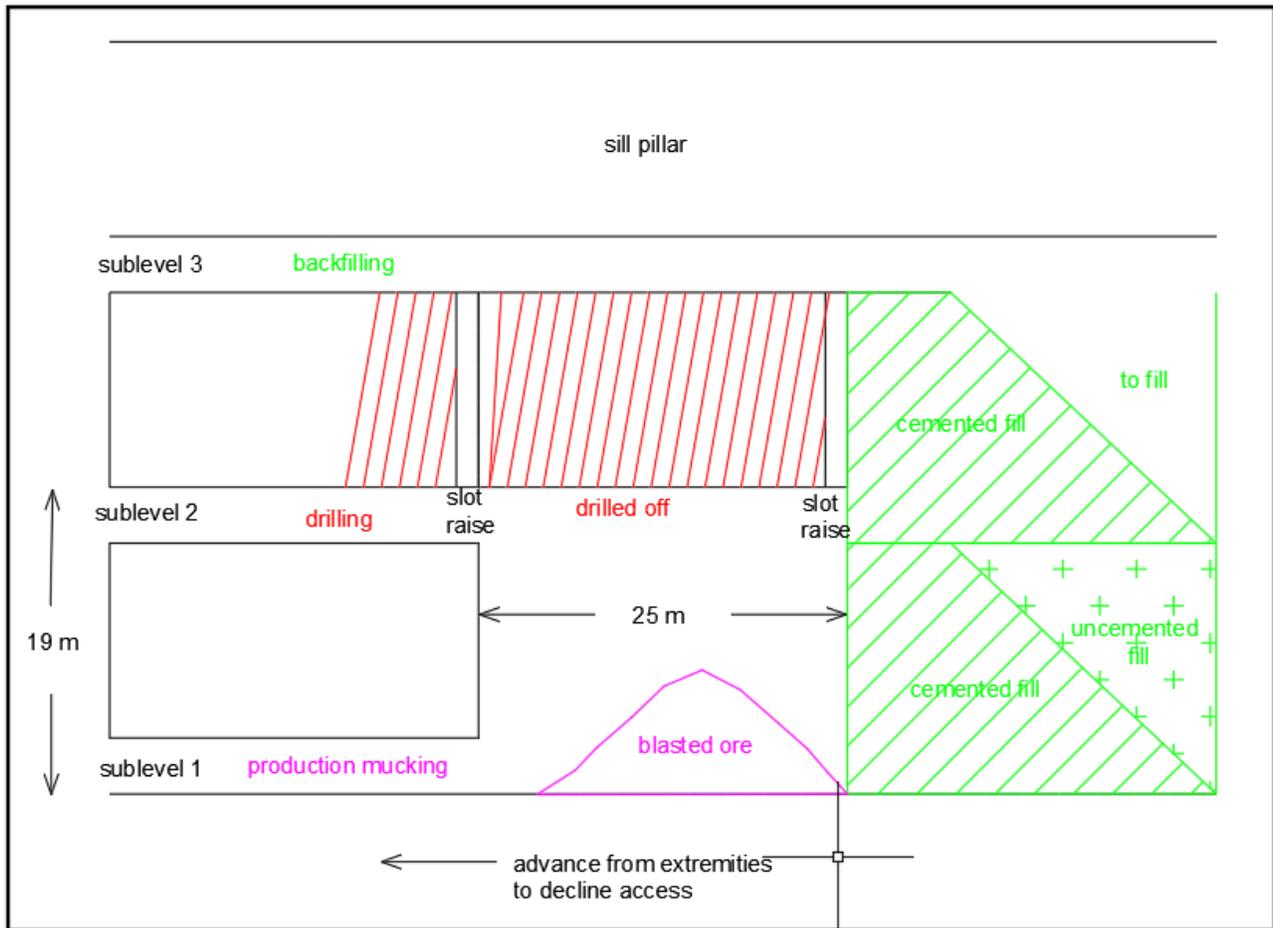


Figure 53: Long-Section - Typical Stope

Stopes in Zone 1 and Zone 2 footwall will be mucked using 1.5-cubic-metre capacity LHDs, while Zone 2 Main and Zone 3 will be mucked using 3-cubic-metre capacity LHDs. Ore mucked from stope brows will be trammed to remuck bays located on each level close to the main decline.

Stopes will be backfilled with 4.0 percent cemented development waste rock (CRF) for the first 7 metres of strike length and with dry waste rock beyond that point. Waste rock will be mixed with cement slurry at a backfill mixing sump on each backfill level. Cement slurry will be batched using the AUMS surface batch plant at 55 Zone and trammed to QV1 with an underground Jacon transit mixer truck. CRF will be mixed with LHDs at the backfill mixing sump and trammed along the vein to the stope dumping point on the upper drilling level (Figure 53). Waste rock from mine development is adequate to meet the life-of-mine backfilling requirements for QV1.

The mine design and schedule completed by SRK specifies stope panel starting sills at the 5235, 5190, 5145, 5100 and 5055 elevations. Within each mining panel, mining will progress along strike and up dip from these elevations. The mine plan includes sill pillar recovery that will mine up underneath previously placed CRF in the up-dip mining panel. A cement content of 6 percent has been planned for CRF that is placed on the stope panel starting sill elevations. This will produce self-supporting backfill that would remain stable when mining takes place below.

Uphole stoping for sill pillar recovery will progress in a retreating sequence along strike, matching the timing of the stope block below. The sill pillar recovery stopes will not be backfilled. The sublevel spacing was selected to achieve highly reliable uphole ore recovery (short blast holes), and to meet the geotechnical requirement for hanging wall stability. Slot raising to initiate ring blasting will consist of inverse drop raises.

15.2.5 Stope Design

Bagassi South Zone QV1 stope design process for ore reserves estimation generally followed these steps:

- Designing the practical mining shapes (stope wireframes) using selected cut-off grades as a guide.
- Applying a minimum in situ true width criteria of 1.2 metres in some narrow areas.
- Reporting of in situ quantities inside the mining shapes using block modelling software.
- Application of estimates for external dilution, dilution grade, and mining losses.

Longhole stopes have been planned at 25 metres strike length and a height of 19 metres over the full vein width. Mining shape true widths before dilution vary from 1.2 to 10.4 metres with an average of 4.1 metres.

The final mining shapes target economic mineralization within the overall geological shear zone structure. Uneconomic sheared mafic volcanic, granite and granodiorite within the QV1 shear were excluded from the mining shapes and would form part of hanging and footwall rock masses.

External dilution included in the estimated ore reserves averages 27 percent at a grade averaging 1.2 g/t gold. Dilution is defined as waste/ore tonnes (W/O).

External dilution for longhole stopes was estimated by assuming that an additional 1.0 metre of wall rock would be mined with each mining shape. An additional 3 percent was added for backfill dilution. Total external dilution values for mining shapes of all types ranges from 10 to 85 percent and averages 27 percent.

SRK estimated an overall external dilution gold grade of 1.2 g/t by using Studio 5 mining software to incrementally expand mining shapes while reconciling grade changes. Mining recovery for longhole stopes is planned at 95 percent, while 100 percent recovery is planned for the associated sublevel development. Mining recovery for sill pillar extraction is planned at 85 percent.

Table 39 shows the conversion of in-situ mineral resources contained inside mining shapes to ore reserves. A gold price of \$1,250 per ounce was used. The Bagassi South Zone QV1 ore reserve blocks are distributed as shown below in Figure 54.

Table 39: QV1 Ore Reserves

	In-situ		Dilution		Recovery	Probable Reserve	
	t	g/t	t	g/t		t	g/t
Development	92,800	10.07	-	-	100%	92,800	10.07
Stopes	312,900	14.82	83,700	1.19	92%	365,600	11.92
Total	405,700	13.74	83,700	1.19		458,400	11.54

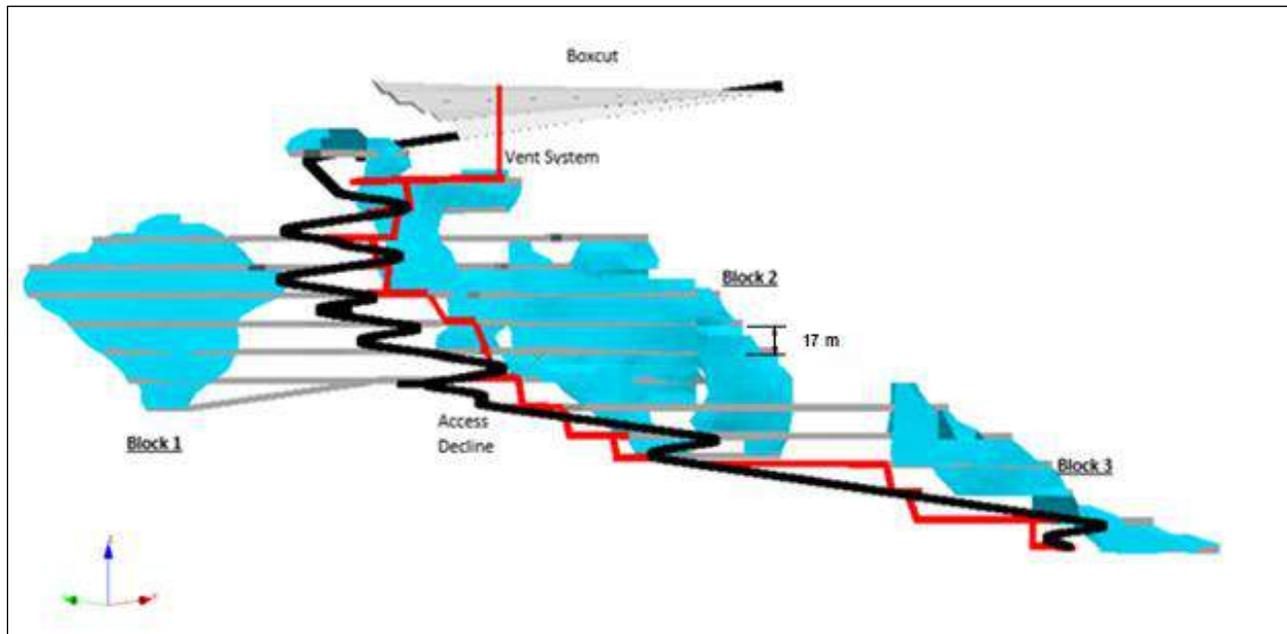


Figure 54: QV1 Long-Section – Ore Reserve Mining Blocks

Table 40 shows the ore reserve tonnages and grades by mining block. Initial production is scheduled from Block 2 in the East Zone, followed by Blocks 1 and 3.

Table 40: Ore Reserves by Mining Block

Name	Units	Block 1	Block 2	Block 3	Total
Total Tonnes	t	53,600	305,600	99,300	458,400
Grade	Gold g/t	16.70	11.80	7.90	11.50
Contained Gold	oz	28,700	116,100	25,300	170,100
Sublevel Dev't Tonnes	t	14,320	61,460	17,023	92,803
Grade	Gold g/t	14.70	10.10	6.20	10.10
Stope Tonnes	t	39,300	244,100	82,200	365,600
Grade	Gold g/t	17.40	12.30	8.30	11.90

15.2.6 Underground Mine Layout

Figure 54 above shows the 3D mine model in a vertical projection looking north-east. Figure 55 below shows the mine model in plan view. The extremities of the planned stoping (cyan colour) cover a strike length of 750 metres.

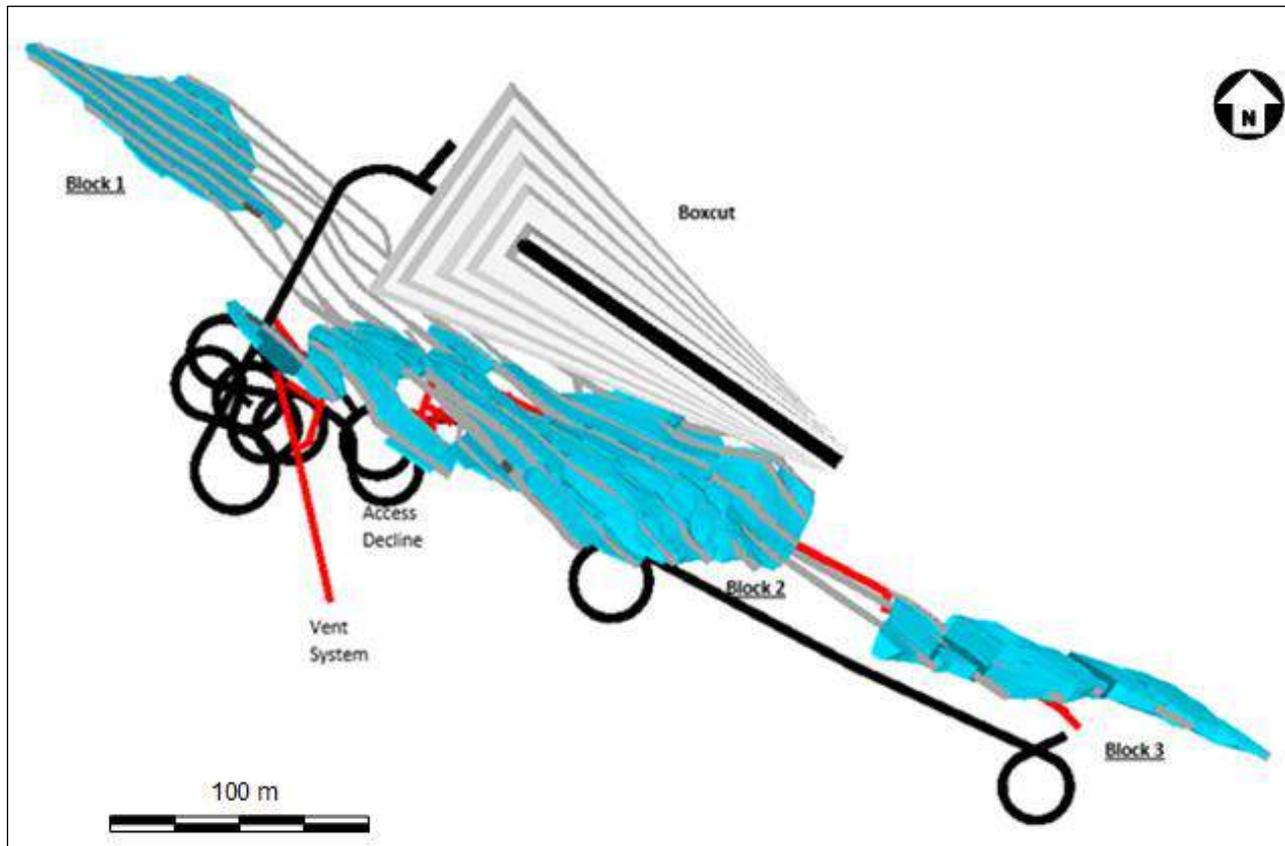


Figure 55: 3D Mine Model - Plan View

Figure 56 is an isometric view looking northwest from the footwall side of the deposit. Most of the development infrastructure is on the footwall side. Colours in the view represent the following:

- Green – main ramps
- Dark Green/Red – waste crosscuts and on vein development
- Blue – Escapeway
- Red – exhaust ventilation raises
- Stope shapes are shown in gold

Access to the underground mine will be by trackless decline, with a portal located in fresh rock at the bottom of a planned box cut. The box cut is planned approximately 33 metres deep at the portal location, and located at the base of the hill immediately on the hangingwall side of the deposit. The planned length on the long axis, crest to crest, is 175 metres. The final location of the portal has been confirmed by engineering analysis and geotechnical investigation, with consideration of proximity to current residents.

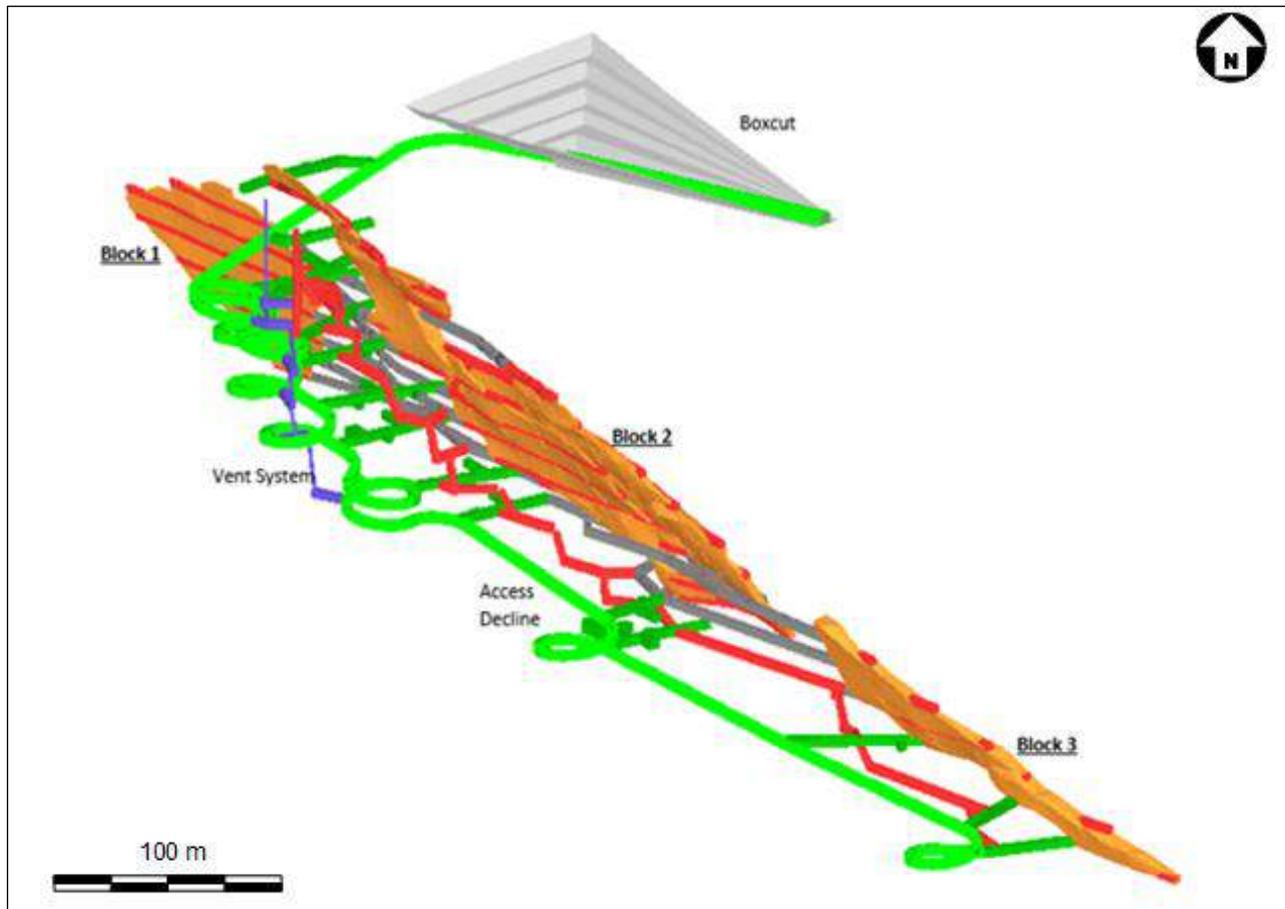


Figure 56: QV1 Isometric View Looking Northwest

The decline from the portal has been designed at minus 12 to 15 percent gradient and is designed at 4.5 metres width by 4.5 metres height, based on an economic analysis of the development cost versus the ore and waste haulage costs. This is a smaller design size compared to 55 Zone decline and will require that a smaller truck fleet and development equipment to be procured.

A single central decline layout has been designed for the QV1 deposit due to the short strike length and limited ore reserve tonnage. An exhaust ventilation air raise and escape ladder raise will be advanced with the decline as it is developed.

On vein development to support longhole stoping has been planned on 15 m sublevels. This is closer than the 55 Zone 17-metre spacing, due to slightly weaker rock mass conditions and slightly flatter hangingwall dip angles.

The planned exhaust ventilation raise will extend from surface to the bottom of the mine. It is comprised of a raisebored section 3.5 metres in diameter from surface to 52 metres depth, and continued to depth with drop raised sections where levels can be accessed. The planned system includes ventilation drifts at the 5100 and 5070 levels.

A small dimension, separate raise system in fresh air will be developed from surface to the bottom of the mine for secondary egress.

Both raises must pass through the weathered layer at surface and require special excavation methods and lining. The weathered layer thickness is estimated to be 20m in depth. It is planned to be completed by the same method successfully applied at 55 Zone. The foundations will be constructed by a secant concrete piling perimeter wall and the shaft completed by surface raiseboring.

Lateral Development

The mine design for the Bagassi South feasibility study has been completed by Mr. Benny Zhang of SRK under the guidance of Craig Richards of Roxgold. The development design was completed in the Studio 5 mining software package. Table 41 is a summary of life-of-mine development requirements.

A development size trade off study was completed by Roxgold for the feasibility study to compare the cost of the access development versus the cost of haulage over the project life. The study concluded that due to the limited nature of the deposit and production rate, the development should be as small as practical. A decline size of 4.5 by 4.5 metres suitable for 20-tonne underground haulage trucks was selected with 3-cubic-metre LHDs for development and truck loading. All other development sizes selected were based this principle. Refer to Table 41 for the heading sizes and quantities required.

Total lateral development requirements in the access decline and associated crosscuts totals 3,800 m and has been scheduled to commence in 2018 and be completed by the end of 2019. With lateral development totaling 7,975-metres, the project has a development ratio of 58 tonnes of ore per metre of development. Waste development tonnage (including raising) has been estimated at 254,000 tonnes yielding a waste/ore ratio of 0.55.

Table 41: QV1 Development Requirements by Year

Capital Lateral Waste Development	Unit	2018	2019	2020	2021	2022	2023	Total
Ramp Dev't Metres (4.5x4.5)	m	721	832					1,554
Level Dev't Metres (4.2x4.2)	m	266	429	16				711
Remuck Dev't Metres (3.5x4.0)	m	123	347	18				488
Cut-out Dev't Metres (3.5x4.0)	m	22	60	7				88
Escapeway Dev't Metres (3.5x4.0)	m	79	34					114
Vent ACC Dev't Metres (3.5x4.0)	m	236	294	9				539
Vent Drift Dev't Metres (3.8x3.8)	m		21	100				121
Pump stn-sump dev't metres (5.0x5.5)	m	27	130					158
Substation Dev't Metres (6x5)	m	10	20					30
Total Capital Lateral Waste Dev't	m	1,486	2,167	149				3,803
Operating Development								
Wider Vein Sill-Wst (3.8x3.8)	m		266	325				591
Wider Vein Sill-Ore 3.8x3.8)	m	247	927	641				1,815
Narrow Vein Sill-Wst (2.5x3.5)	m		780	2				782
Narrow Vein Sill-Ore (2.5x3.5)	m		896	89				985
Total Operating Development	m	247	2,868	1,057				4,172
Capital Vertical Development								
Vent Shaft (3.5m dia)	m	52						52
Vent Raise Dev't (3.0x3.0)	m	50	155					205
Escape Raise Dev't (1.5x1.5)	m	110	54					164
Total Capital Vertical Waste Dev't	m	212	209					422

Raising Requirements

Table 42 is a summary of life-of-mine raising requirements. There will be one ventilation exhaust raise and one dedicated intake escape ladderway. The project does not require any ore/waste passes. Slot raising for stoping is excluded from the table below.

Table 42: Vertical Development Requirements

Exhaust Ventilation Raise		Metres
Surface-5250 Level	3.5-m dia Raisebored	52
5250-5055 Level	3.0-m sq. Drop Raised	205
Escape Ladderway		
Surface-5270 Level	1.5-m dia Cased	30
5270-5150 Level	1.5-m sq. Conv. Raise	134
Total		421

15.2.7 Mine Scheduling

The Bagassi South Zone QV1 project pre-production period has been defined as a 6-month period from Q3 2018 (start of decline) to end of Q4 2018, which is dependent on Roxgold securing the necessary approvals to develop the project. In 2019, an average production rate of 285 tonnes per day has been planned, which is 82 percent of the designed underground mine capacity. The mining production period will extend from January 2019 to early April 2023 for 4.3 years. At full production, the planned mining rate will be 350 tonnes per day (128,000 tonnes per year). Planned life-of-mine ore reserves are 458 kilotonnes at a gold grade of 11.5 g/t (Table 43).

The mine will operate on two 11-hour shifts per day, 7 days per week.

SRK prepared a detailed Gantt chart schedule using Studio 5 and EPS (Enhanced Production Scheduler, mining Gantt chart software). The early scheduling priorities during the start-up period include:

- Advancing the main decline from the portal to the vein on the 5265-5145 elevations, the levels needed for commencement of production from Block 2.
- Accessing the bottom of return air raise bore hole and escape ladderway on the 5250 level and commencing work on the bored raise from surface. Raise collar preparation and raising machine can be set up on surface ahead of time – off critical path.
- Raise boring return raise (52 metres) and setting up the main fan and escape ladderway.
- Commencing production activities in Blocks 1 and 2 from 5190 level and 5235.

The mine development schedule (Table 41) illustrates that the total lateral development advance rate would reach a peak of 15 metres per day by Q1 2019. This will be achieved by two contractor crews, with each crew breaking 1-1.5 rounds per shift.

Table 43 shows the total material broken each period. Truck haulage to surface will reach a peak rate of 600 tonnes per day during Q4 2019.

Table 43: Ore and Waste Tonnes Mined

Name	Unit	2018	2019	2020	2021	2022	2023	Total
Tonnes Ore Mined	kt	10	105	140	123	67	14	458
Grade Gold	g/t	8.97	12.93	12.16	11.40	9.61	7.21	11.54
Contained Gold	koz	3	43	55	45	21	3	170
Waste Rock Broken Underground	kt	83	151	19				254
CRF Backfill Placed	kt		43	69	61	42	12	226
Waste Truck to Surface Waste Pile	kt	83	109					192
Waste Backhauled to Backfill	kt			50	61	42	12	165
Surface Waste Pile at Beginning 2017	kt							
Surface Waste Pile Size	kt	83	192	142	81	39	27	

The total waste development tonnage for the life-of-mine is estimated at 254,000 tonnes, with 226,000 tonnes required for stope backfilling. The balance of 27,000 tonnes will be available as backfill for the 55-Zone mine or contained in a permanent waste dump on surface. The surface waste stockpile will reach 192,000 tonnes by the end of 2019 when development of the decline is complete and stoping will be just ramping up to full production.

15.2.8 Mining Equipment

Table 44 shows the estimate of the mining fleet required to execute the mine plan.

The equipment requirements to execute the life-of-mine development and stoping plan were estimated based on current operating productivity experienced with the underground mining fleet at 55 Zone mine. The development and stoping drills, forklifts and trucks will be smaller than in use at 55 Zone, to allow waste development headings to be developed smaller.

A suite of smaller ore drifting equipment is planned for use in Block 1 and Block 2 footwall, with minimum drift sizes planned at 2.5 metres width and minimum stope widths of 1.2 metres. This equipment could also potentially be used to mine narrower width orebodies at Yaramoko elsewhere. This represents an opportunity for future resources on the property.

The Bagassi South Zone mining equipment will be procured and mobilized by AUMS. The maximum number of units required is shown in Table 44 for each equipment type, while these numbers will vary over time throughout the mine life.

Table 44: QV1 Equipment Requirements

Description	Manuf	Model	No.
2-Boom Jumbo	Sandvik	DD320	1
1-Boom Jumbo	Sandvik	DD210	1
Longhole Drill	Boart	StopeMaster	1
LHD 1.5m ³	Sandvik	LH203	1
LHD 3.5m ³	Sandvik	LH307	3
Truck 20t	Sandvik	TH320	3
UG Forklift	CAT	914	1
Grader	Volvo	Volvo G930	1
Transmixer	Jacon	Jacon X5	1
Shotcrete Unit	Jacon	Jacon Maxijet	1
Diamond Drill	Boart	LM-75	1
Light Vehicles	Toyota	Trayback	5

Some equipment types will be available from and shared with the 55 Zone mine such as the grader, transit mixer and shotcrete rig, fuel truck, and other surface equipment not listed.

In Q4 2019, it is planned that Roxgold will buy the mining equipment from AUMS at the residual value of the equipment estimated to be \$3.1 million. This coincides with the buy out date for the 55 Zone mine fleet, such that both mines will make the transition from contractor mining to owner mining as of January 1, 2020.

15.2.9 Mining Personnel

Mining personnel for Bagassi South Zone QV1 has been estimated in detail based on the labour structure in place for the mining contractor at 55 Zone mine. During 2018 and 2019 it is planned that the Bagassi South Zone QV1 mine will be operated by AUMS under the mining services agreement, following a possible contract update negotiation process in early 2018.

Labour costing for the 2018 and 2019 periods has been based on the incremental positions required by the mining contractor to undertake the planned Bagassi South mining schedule. AUMS provided a detailed list by position of the additional employees that will be required. For the peak development and production period in 2019, 25 additional expatriate employees will be required to execute the planned mining schedule. After 2019, the requirement will diminish significantly as nearly all the mine development will be completed.

For labour costing after 2019, Roxgold developed an owner’s mining cost and productivity model by position for the period 2020-2023. This model assumes the same mining department structure as that used by AUMS. Table 45 shows the estimated owner’s mine operations personnel by year for 2020 through 2023 for QV1 mine operations, incremental to the requirements for the 55 Zone mine.

Table 45: QV1 - Owners Mine Operations Labour

	2020	2021	2022	2023
Expat-Overseas	9	6	4	4
Expat-African	7	5	3	3
Local -Staff	7	7	4	4
Local - Hourly	40	37	20	20
Total	63	55	31	31

15.2.10 Mine Services and Infrastructure

Underground Diamond Drilling

The QV1 deposit has been well diamond drilled from surface to approximately 25 by 25 metre centres, suitable for delineation as an indicated resource. An allowance has been made in the operating cost models for expenditures of \$500,000 per year in 2019 to 2021 for addition underground definition drilling to support detailed stope design.

Ore and Waste Handling

The planned QV1 decline has been designed at a minus 15 percent gradient with planned dimensions of 4.5 metres width and 4.5 metres height based upon a trade-off analysis of development cost versus truck capital and operating costs. The study concluded that the Bagassi South Zone QV1 deposit should be developed with a small decline size and 20-tonne underground haulage trucks.

Vehicle passing in the decline will be done at level access crosscuts that are spaced every 120 metres along the ramp (15-metre vertical intervals). Remuck bays have been included in the design on each level near the ramp. All truck loading will be by one 3-cubic-metre capacity LHD.

All ore will be trucked directly to the ROM pad at the Yaramoko process plant. Waste rock from development will be used directly underground as backfill or temporarily stockpiled near the mine portal. Waste rock will be stored temporarily in 2018 and 2019 in a waste stockpile reaching 192,000 tonnes. The stockpiled waste rock will be used as backfill in years 2020-2023 and be largely depleted at the end of planned mine operations. A surplus of development waste of 27,000 tonnes from QV1 could be used for backfill in the 55 Zone mine and/or for general construction use as required.

The peak trucking requirement would occur in Q4 2019 at 600 tonnes per day. Trucking depths will range from 30 to 260 metres below surface. Three 20-tonne capacity underground trucks will meet the ore and waste haulage requirements for the life of the mine.

Grade Control

Grade control requirements will be undertaken by the Roxgold mine geology department. Standard grade control activities will include underground vein mapping, face mark ups on vein, maintaining a grade control resource model, programs for underground sampling of development and stope muck, and monthly reconciliations of planned mine grade versus mill head grade.

Mine Ventilation

In September 2017, Mine Ventilation Services (MVS) completed a design report for the ventilation system for the Bagassi South feasibility study. Ventsim Visual ventilation simulation software was used to generate the ventilation model of the Bagassi South mine. Flow requirements were estimated based upon 0.06 cubic metres per second per kilowatt of engine diesel power used. Based on the required mining fleet, MVS estimated ventilation requirements would be 87 cubic metres per second at 350 tonnes per day.

The planned air flows for the underground mine are shown in Table 46. Air intake will be through the main access decline and escape raise. Exhaust will be through one return raise, sized at a 3.5-metre diameter. Total fan pressure has been estimated at 960 pascals. Surface exhaust fan power draw is estimated at 150 kilowatts.

The QV1 mine will be a shallow mine and this mitigates concerns about heat. The peak ventilation requirement will occur in Q3-Q4 2019, when stope production activities will be in Blocks 1 and 2. The mining will be 60 metres below surface while the bottom mucking level will be 125 metres below surface. At this time, the deepest point in the mine will be a development heading at a depth of 260 metres.

The main fan will be identical to the main fans installed on the 55 Zone east and west ventilation shafts. The selected fan is a Cogemacoustic model T2.180.315, 315-kilowatt, 1.8-metre diameter fan, which will deliver 80 to 90 cubic metres per second. The fan curve for this fan is shown below in Figure 57.

Mine sublevels every 15 metres will be ventilated with auxiliary ventilation fans and ducting. Ventilation regulators will be installed at the return air raises on each level. Auxiliary fans will draw fresh air from the decline, with ducting along the level access crosscut and along the vein to active work areas. In general, 1000 millimetres diameter ducting will be used, with 55-kilowatt auxiliary fans, based on duct lengths and planned equipment on the mining levels.

Table 46: Ventilation Flow Requirements

Equipment Type	Required No. of Units	Power (kW)	Utilization Factor (%)	Airflow per kW (m³/sec/kW)	Airflow (m³/sec)
Loaders					
LH203 (LHD 3.5t)	1	71	85	0.063	3.8
LH307 (LHD 6.7t)	3	150	85	0.063	24.2
Trucks					
TH320 (20t Truck)	3	240	70	0.063	31.9
Shotcrete/ Cemented Fill					
Jacon X5 (Transmixer)	1	164	25	0.063	2.6
Jacon Maxijet	1	134	0	0.063	0.0
Drills					
DD320 (2-Boom Jumbo)	1	74	20	0.063	0.9
DD210 (1-Boom Jumbo)	1	31	20	0.063	0.4
StopeMaster (Longhole Drill 2.5"	1	0	0	0.063	0.0
Diamond Drill	1	0	0	0.063	0.0
Cubex Orion (ITH Drill)	1	0	0	0.063	0.0
Service Vehicles					
Volvo G930 (Grader)	1	82	25	0.063	1.3
CAT 914 loader (UG Forklift)	1	75	50	0.063	2.4
Site Light Vehicles					
Fuel Truck	1	96	0	0.063	0.0
Telehandler	1	75	0	0.063	0.0
Toyota Land Cruiser	5	151	25	0.063	11.9
Minimum Total Airflow					79
10% Increase (leakage)					8
Total					87

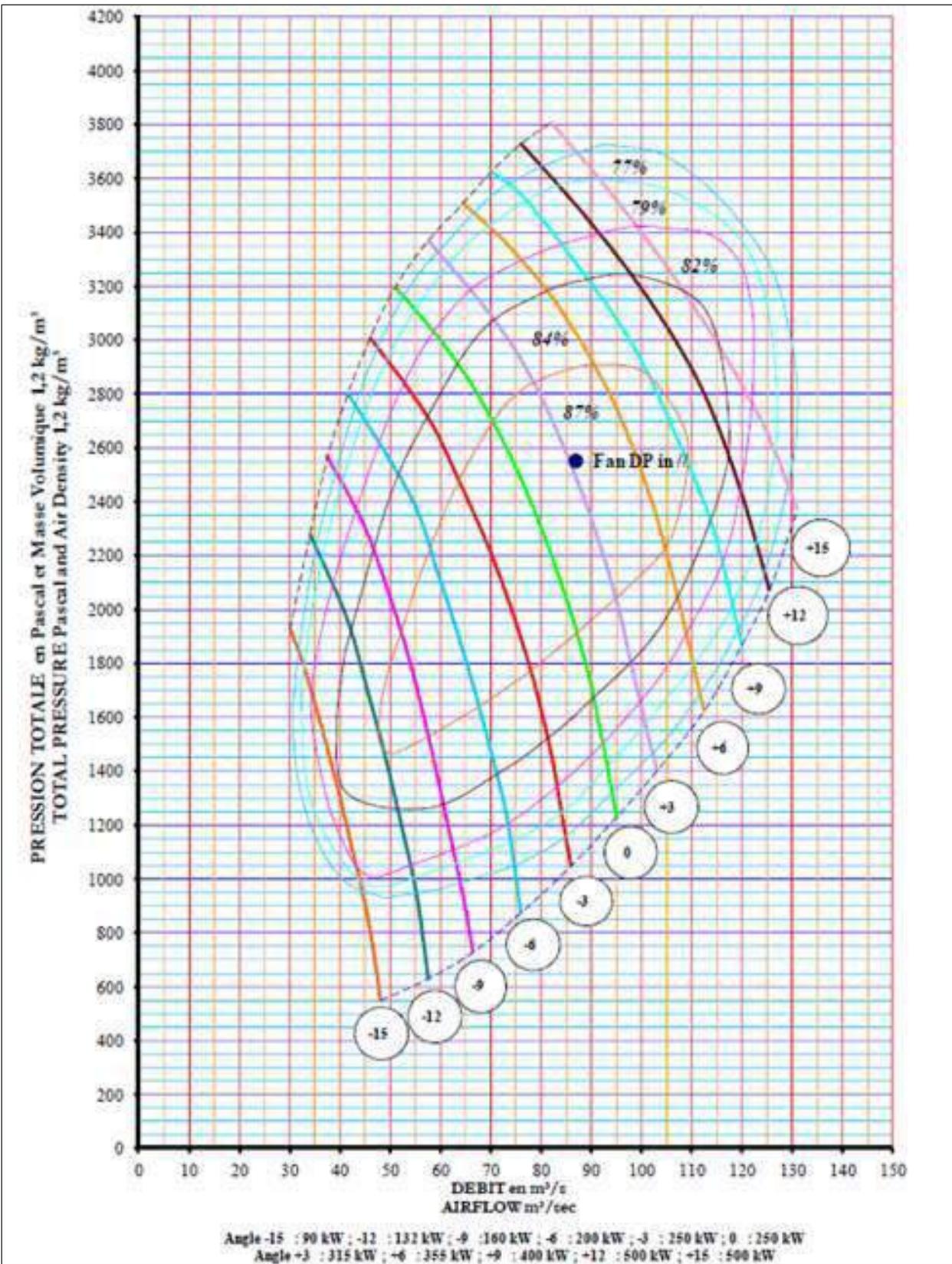


Figure 57: Main Fan Curve

Mine Rescue

In addition to a fresh air escape ladderway, the mine will be equipped with both permanent and portable underground refuge stations. A stench gas warning system is included in costs. The 55 Zone mine rescue equipment and personnel are adequate for both mines, however additional mine rescue personnel from QV1 mine will be trained.

Backfill Methods

Cemented rock fill (CRF) will be used to fill mining voids. The voids created by mining over the mine life will be treated as follows:

- 25 percent of voids not backfilled
- 10 percent filled with unconsolidated waste rock
- 30 percent filled with normal CRF with up to 4.0 percent cement binder
- 35 percent filled with high strength CRF with up to 6.0 percent cement binder

The voids will not be filled in areas where sill pillar recovery is planned. Sill pillar recovery will utilize uppers retreat mining under previously placed high strength CRF. A total of 226 kilotonnes of rock for backfill will be sourced from underground development waste.

Cemented rock fill will be manually batched underground on the backfilling level in operation. A CRF mixing sump is planned to be mined in the access of each level requiring backfill. Waste rock from development or hauled from the surface waste stockpile will be dumped in the CRF mixing sump by LHD. Cement slurry batched in the surface batch plant at the 55 Zone Mine will be transported underground at QV1 using a Jacon underground transit mixer and be added to the mixing sump. The LHD will then mix the rock and slurry in the mixing sump and tram the mixed backfill for placement in the void being filled. Prior to starting to backfill from the upper sublevel, waste rock will be pushed up by LHD into the draw point to block any possible flow of CRF out of the stope. This is the backfilling method currently in use in the operating 55 Zone Mine at Yaramoko.

The surface concrete batch plant and Jacon transit mixer are part of the 55 Zone fleet and have adequate un-utilized capacity to meet the needs of the planned backfilling for the QV1 mine.

Mine Dewatering System

The QV1 underground mine dewatering system is planned with a peak capacity of 50 litres per second. The estimate is comprised of 45 litres per second of ground water and 5 litres per second of underground process water. Operating costs have been estimated based on a nominal 20-litre-per-second pumping rate.

The main dewatering system will utilize pumps manufactured by Stalker Pumps of Australia. A 90-kilowatt model 100 x 65 -315 is recommended by the mining contractor. The pump has a head capability of 140 metres at 50 litres per second. The main pumps will be installed as a staged system as the mine deepens over time. Each pump station will have one online pump and a backup unit. Refer to the pump curve for the planned main pumps in Figure 58 below. These are the same pumps in use currently by AUMS in the 55 Zone mine. Water will be pumped to a new concrete lined mine water settling pond on surface.

The mine water settling pond planned for QV1 is the same design as the one in use for the 55 Zone Mine and will consist of two cells each roughly 8 metres wide and 50 metres long. Mine water will be recycled for use underground. Excess water will be pumped from the settling ponds at QV1 to the tailings storage facility where it will be recycled for use in the Yaramoko process plant.

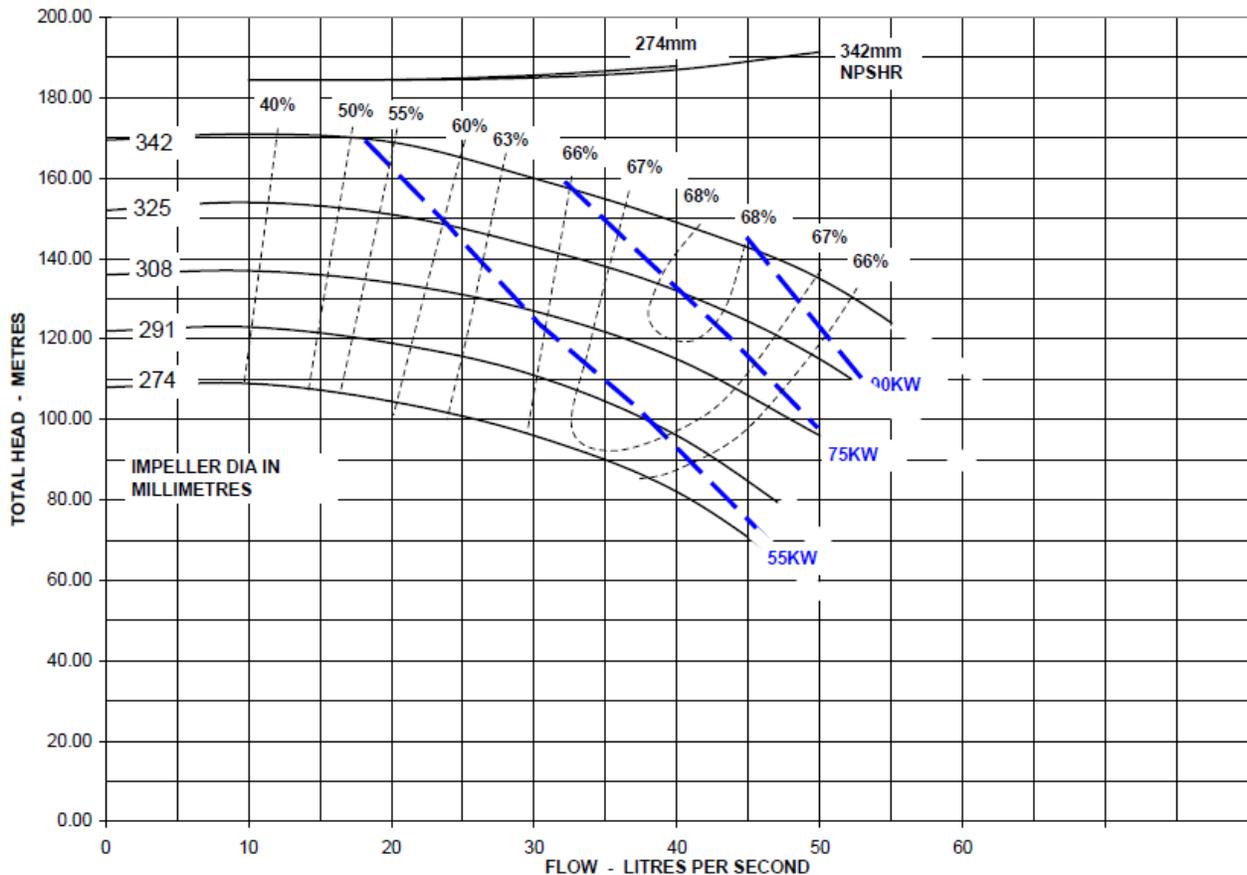


Figure 58: Main Pump Curve

Maintenance Facilities

Maintenance facilities for the QV1 equipment will be the workshops already in place at the AUMS yard at the 55 Zone Mine. No additional maintenance facilities for the Bagassi South Zone mine will be required over the reserve mine life to 2023.

Electrical Power Distribution

Electrical power to support the QV1 mine plan will be provided from the main Yaramoko site substation via an overhead 11-kilovolt line. A small surface substation at QV1 will be required to step down the electrical power at to 415 volts for the main fan and any other surface needs such as lighting.

For start-up of the QV1 underground operations, a temporary surface transformer will be needed to step down power from 11 kilovolts to 1,000 volts. As decline development reaches the 5,175-metre level in Q2 2019, one 2-megavolt ampere, 11-kilovolt to 1,000-volt underground substation will be installed to supply power to the underground mining equipment. The mining contractor will supply all underground electrical distribution equipment as part of the Mining Services Agreement until the end of 2019.

The power requirement for the underground mine has been estimated based on the planned mining fleet and required main fans and pumping equipment. Power draw for QV1 mining operations has been estimated to be 450 megawatt hours per month including all underground and surface loads.

Electrical power supply will be from the national power utility SONABEL. Backup power supply will be from the existing facilities at the Yaramoko backup power generation plant.

15.3 Yaramoko Combined Project Life of Mine Plan

The overall production plan for the combined Yaramoko mining and processing operations is shown below in Table 47. The proposed construction of the Bagassi South mine and the Yaramoko process plant expansion results in the annual production rate for the property increasing from 270,000 to 400,000 tonnes per year commencing in 2019. The combined ore reserves from for the Yaramoko project are 2.25 million tonnes of ore at 11.48 g/t, providing a mine life through 2023. The Bagassi South Zone mine contribution averages 128,000 tonnes per year from 2019 through 2021 based on current mineral reserve estimates.

Table 47: Yaramoko Combined Project Life of Mine Plan

Name	Unit	2017	2018	2019	2020	2021	2022	2023	Total
55 Zone Production									
Daily Production	t/d	741	749	742	741	745	746	525	
Total Production	kt	267	270	267	267	268	268	189	1,796
Gold Grade	g/t	13.02	14.63	13.59	11.25	10.33	7.06	9.93	11.47
Contained Gold	koz	112	127	117	96	89	61	60	662
Development Ore	kt	153	74	99	74	41	27		467
Gold Grade	g/t	12.79	7.01	6.42	4.59	3.45	6.20		8.04
Stope Ore	kt	114	196	169	193	227	242	163	1,303
Gold Grade	g/t	13.35	17.48	17.78	13.80	11.58	7.15	9.41	12.66
Stockpile Ore	kt							26	26
Gold Grade	g/t							13.26	13.26
Bagassi South Production									
Daily Production	t/d		26	286	383	338	184	38	
Total Production	kt		10	105	140	123	67	14	458
Gold Grade	g/t		8.97	12.93	12.16	11.40	9.61	7.21	11.54
Contained Gold	koz		3	43	55	45	21	3	170
Development Ore	kt		10	56	27				93
Gold Grade	g/t		8.97	12.25	5.92				10.07
Stope Ore	kt			48	113	123	67	14	366
Gold Grade	g/t			13.71	13.65	11.40	9.61	7.21	11.91
Stockpile Ore	kt								
Gold Grade	g/t								
Days		360	365	365	365	365	365	365	
Total daily production	t/d	741	766	1,018	1,113	1,072	920	556	
Total Production	kt	267	279	372	406	391	336	203	2,254
Gold Grade	g/t	13.02	14.43	13.40	11.56	10.67	7.57	9.74	11.48
Contained Gold	koz	112	130	160	151	134	82	64	832

16 Recovery Methods

In June 2013, Roxgold commissioned SRK to provide certain technical engineering services and to prepare a feasibility study technical report pursuant to Canadian Securities Administrators' National Instrument 43-101 for the gold mineralization contained in the 55 Zone of the Yaramoko Gold Project in Burkina Faso. The study was documented in a technical report published on June 4, 2014 and summarizes the design of the currently operating Yaramoko Gold Project gold processing plant.

This section summarizes the operating processing plant design and performance after 18-months of production, as well as the proposed plant expansion as part of the incorporation of the Bagassi South Zone.

The recovery methods discussed herein presents the performance of the operating process plant and proposed expansion work necessary to facilitate additional throughput as generated by the Bagassi South Zone.

On the basis of his education, relevant project experience, and affiliation to a recognized professional association, Mr. Criddle, FAusIMM (#309804), Chief Operating Officer for Roxgold is the Qualified Person for this report section for the purposes of National Instrument 43-101.

16.1 Yaramoko Operating Process Plant

The Yaramoko gold processing plant was designed for a throughput of 270,000 tonnes per year. The plant site is located at 315 metres above sea level and adjacent to the 55 Zone underground portal. The process circuit is simple and robust and comprises the following components:

- A crushing circuit with a throughput of 50 tonnes per hour and availability of 70 percent, on a 24-hour-per-day operation.
- An open stockpile receiving crushed product, which has a live capacity of 810 tonnes. An underlying apron feeder and emergency vibrating feeder provides ore feed directly to the milling circuit.
- A milling circuit with a throughput of 33.75 tonnes per hour, operating at 91 percent availability, with a design grind of 80 percent passing 90 micrometres.
- A gravity circuit on cyclone underflow consisting of two centrifugal concentrators and an intensive leach reactor for treatment of the gravity concentrate, treating 70 percent of the cyclone underflow.
- A carbon-in-leach (CIL) circuit consisting of one leach tank and five adsorption tanks, treating the cyclone overflow.
- A metal recovery and refining circuit consisting of an elution circuit, electrowinning cells, and smelting.
- A tailings storage facility for tailings disposal.

Water is sourced primarily from a water storage dam and supplemented from groundwater bore holes. The water storage dam is located approximately 2 kilometres from the plant, adjacent to the tailings storage facility.

16.1.1 Operational Performance

The Yaramoko gold processing plant has been in operation since May 2016. The plant’s performance in terms of availability, throughput, and recovery has achieved or exceeded its design parameters as reported in the 2014 technical report. A summary of the plant’s key performance indicators is presented in Table 48. The mill maintains a high availability and routinely averages more than 95 percent operating time with the average monthly rate from 2016 to the present being 95.7 percent.

A monthly breakdown of the ore processed, and gold recovered is illustrated in Figure 59 and Figure 60, respectively.

Table 48: Process Plant Performance Summary

		2016			2017*		
		2014 TR	Actual	Variance	2014 TR	Actual	Variance
Ore Processed	(t)	165,270	162,480	98%	224,860	219,625	98%
Availability	%	91.3	93.3	102%	91.3	95.8	105%
Grade Processed	Gold (g/t)	14.1	15.5	110%	11.0	14.7	134%
Metallurgical Recovery	(%)	95.8	98.5	03%	97.0	98.9	102%
Gold Recovered - Gravity	%	50.0	58.9	118%	50.0	64.2	128%
Gold Recovered - Leach	%	50.0	41.1	82%	50.0	35.8	72%
Gold Recovered	(oz)	66,474	79,907	120%	77,034	102,794	133%

TR = technical report

* As of October 31, 2017

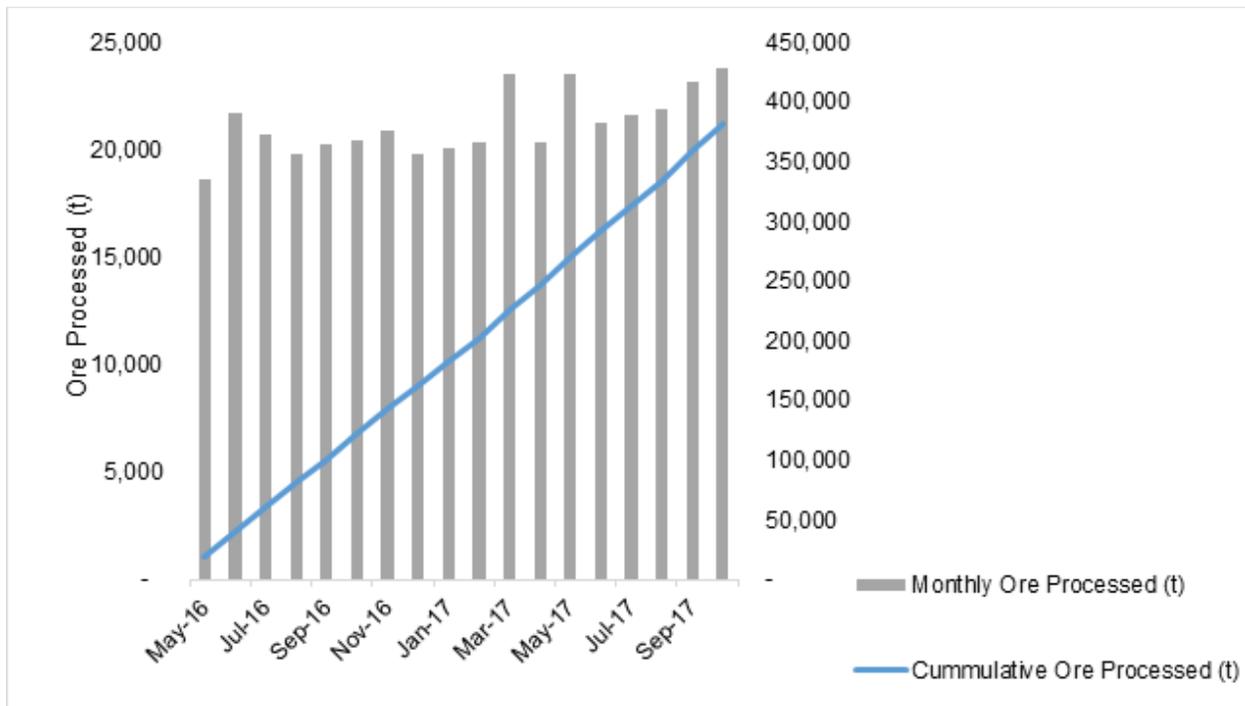


Figure 59: Ore Processed (t) by the Yaramoko Gold Processing Plant

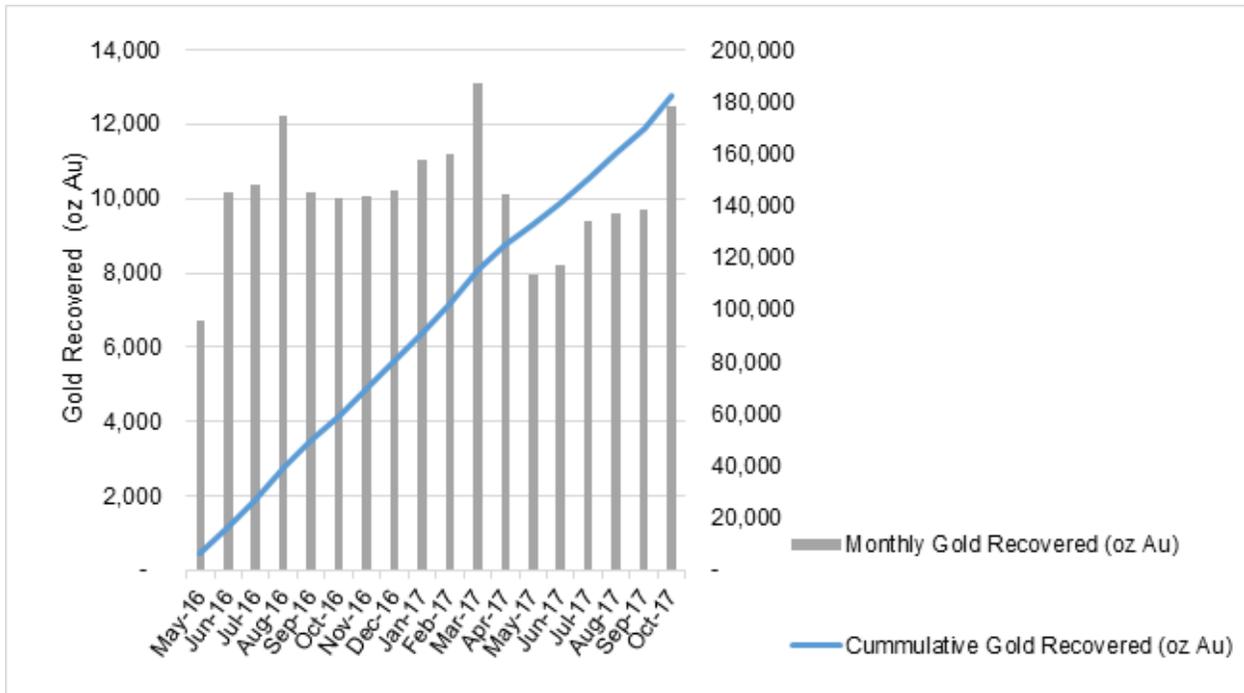


Figure 60: Gold Recovered (oz) by the Yaramoko Gold Processing Plant

Table 49 shows the major consumables in the Yaramoko mill from monthly operational records.

The mineral processing and metallurgical test work conducted on the Bagassi South Zone QV1 gold deposit by ALS Metallurgy confirms the coarse free gold nature of the deposit. Gold extraction using gravity and leaching processes yields high gold recoveries very similar to those obtained from the 55 Zone ore body. As a result, the operational Yaramoko gold processing plant is expected to continue its performance in treating the Bagassi South Zone ore. Expansion works will be necessary to increase its throughput capacity. These expansion components are described in more detail in the following sub-sections.

Table 49: Major Consumables

Materials	Kilograms per Tonne	
	2016	2017*
SAG Mill Balls	1.28	1.34
Cyanide	0.46	0.29
Lime	0.81	0.84
Carbon	0.05	0.01
Sodium Hydroxide	0.16	0.13
Hydrochloric Acid	0.13	0.07
Flocculant	0.07	0.02
Anti-scalant	0.04	0.04

* As of October 31, 2017

16.2 Bagassi South Zone Plant Expansion

The following represents a summary of the process plant expansion designs conducted by DRA (Pty.) Ltd.

The existing process plant for the Yaramoko Gold Project was designed for a throughput of 270,000 tonnes per year and comprises of the following:

- Primary crushing
- Grinding – single-stage SAG mill
- Classification
- Gravity concentration and intensive leach reactor
- Leaching and adsorption – carbon in leach (CIL)
- Tailing thickening
- Electro-winning
- Smelting

The Yaramoko Gold Project expansion will increase the process plant throughput to 401,500 tonnes per year (1,100 tonnes per day). The circuit upgrade, to facilitate the additional throughput, consists of mill feed top size reduction, increasing the gravity circuit and CIL capacity, extension of the gold room, and additional raw water and power reticulation infrastructure. It is anticipated that a 5-day shutdown of the dry plant and a 6-day shutdown of the wet plant will be required to tie-in the respective circuit upgrades.

DRA's design of the comminution circuit was reviewed by Orway Minerals Consultants (WA) Pty Ltd (OMC) in Perth, Australia. OMC was commissioned by Roxgold to verify the proposed recommendations and ensure that the existing mill could achieve the expansion throughput.

OMC confirmed the necessity of a secondary crushing circuit, increasing the mill ball charge to 20 to 27 percent volume/volume. Furthermore, it was recommended that the secondary crushing circuit be designed to produce a product of P₈₀ under 20 millimetres and that pebble crushing would be impractical although could be considered in a later subsequent expansion.

The tailings storage facility is located approximately 2.4 kilometres east-northeast along the access road from the process plant. It comprises a valley storage formed by two multi-zoned earth fill embankments, with a total footprint area (including the basin area) of approximately 17 hectares for Stage 1. Knight Piésold conducted a review of the tailings storage facility life of mine capacity given the increased throughput to be experienced at the processing plant. This determined the requirement for a tailings storage facility capacity of 2.74 million tonnes with embankments at an elevation of 319.1 mRL.

16.2.1 Process Plant Design Criteria

The original design of the existing plant considered a future expansion and the necessary allowances were made in the layout and mechanical equipment selection to facilitate a modular type expansion. The expansion maintains the simple and robust design philosophy that was implemented originally. The following upgrades are anticipated:

- A two-stage crushing circuit with a throughput of 100 tonnes per hour, operating at 70 percent availability, and aiming to achieve a design crush of 80 percent passing 20 millimetres.

- A milling circuit with a throughput of 50.2 tonnes per hour, a 20 to 27 percent volume ball charge (24 to 35 percent volume total load), operating at 91.3 percent availability, and aiming to achieve a design grind of 80 percent passing 90 micrometres.
- A carbon-in-leach (CIL) circuit consisting of an additional two adsorption tanks and 8-metre diameter high rate thickener.
- A gravity circuit designed to recover 70 percent of head grade consisting of an additional Acacia leach reactor and two electrowinning cells.
- Additional raw water storage and power reticulation infrastructure.

The most pertinent design criteria to the plant expansion are summarized in Table 50.

Table 50: Summary of the Plant Expansion Design Criteria

Process Design Criteria	Unit	Current	Upgrade
Annual throughput	tpa	270,000	401,600
Plant utilization	%	91.3	91.3
Daily production at stated utilization	tpd	740	1,100
Crushing circuit		One Stage Crushing	Two Stage Crushing
Crushing circuit product, P ₈₀	mm	80	<20
Required grinding throughput	tph	33.8	50.2
Mill motor power draw	kW	530**	994*
Mill % critical speed	%	75	73*
Mill maximum ball charge	% v/v	15	27
Mill discharge density	% w/w	65	65-69
Cyclones operating	No.	2	3
Design gravity gold to concentrate	%	50	50-70
Leach feed rate solids	tph	33.8	50.2
CIL number of tanks	No.	6	8
CIL type of tanks		1 Leach, 5 Adsorption	1 Leach, 7 Adsorption
CIL residence time target	hours	24	24
CIL residence time actual	hours	29.3	26.5
Thickener design feed - solids	tph	33.8	50.2
Thickener diameter design	m	8.0	8.0
Number of thickeners installed	No.	1	2
Required elutions per week	No.	4	8
Number of elutions per week – max.	No.	5	10
Elution solution electrowinning:			
Total number of cells	No	1	2
Electrowinning current required	A	601	800
Gravity solution electrowinning:			
Total number of cells	No	1	2
Electrowinning current required	A	568	792

* OMC recommendations

** Operating data

The flowsheets for the proposed process plant expansion are presented in Figure 61 and Figure 62. Dotted lines indicate existing equipment and solid lines indicate new equipment.

Water, which will be used in a wide range of services, will be sourced primarily from a water storage dam and supplemented from the underground mine dewatering system, and a bore field network. The water storage dam is located approximately 2 kilometres from the plant, adjacent to the tailings storage facility.

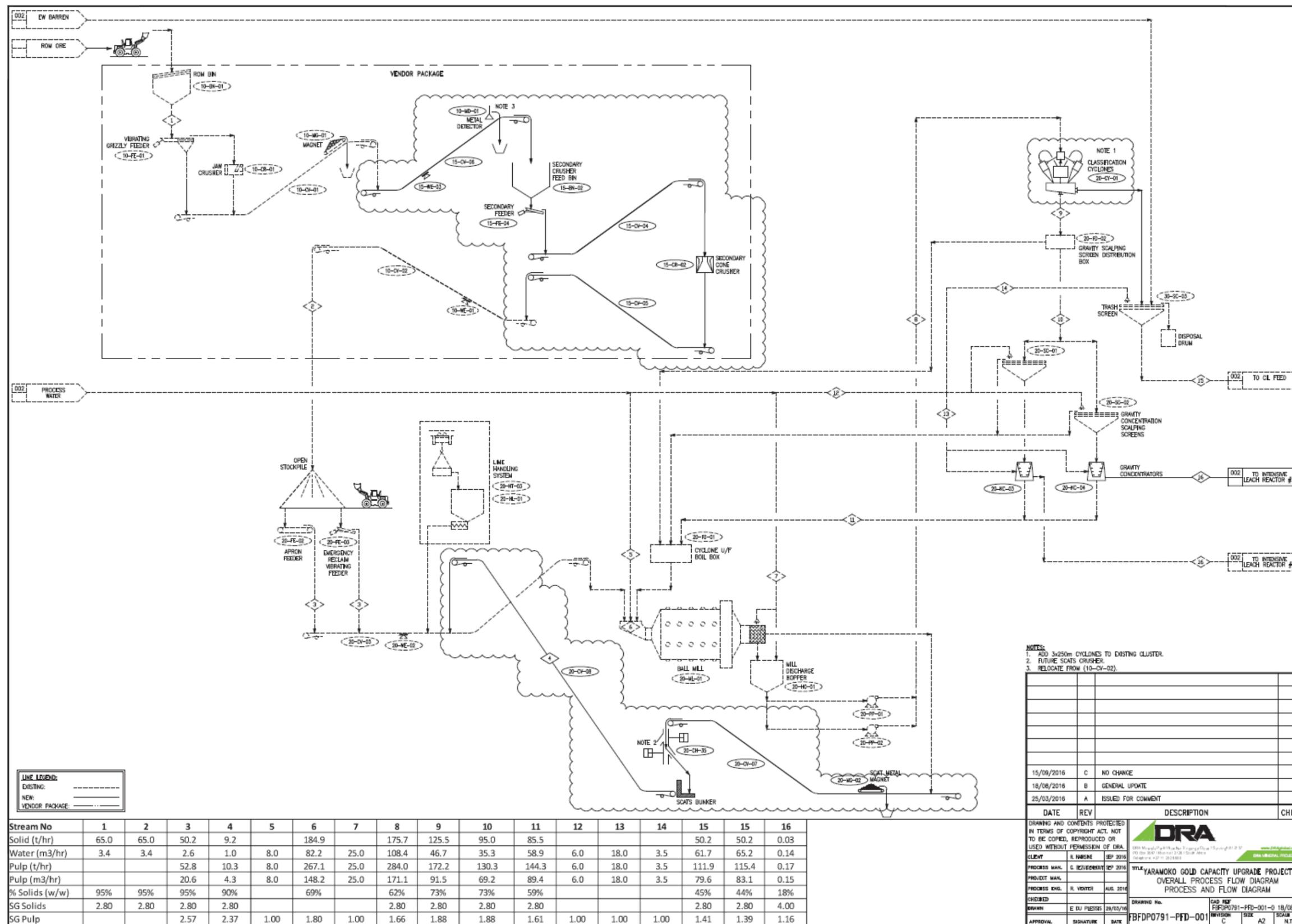


Figure 61: Yaramoko Gold Process Plant Expansion Flowsheet (Part 1 of 2). Dotted lines indicating existing equipment and solid lines indicating new equipment.

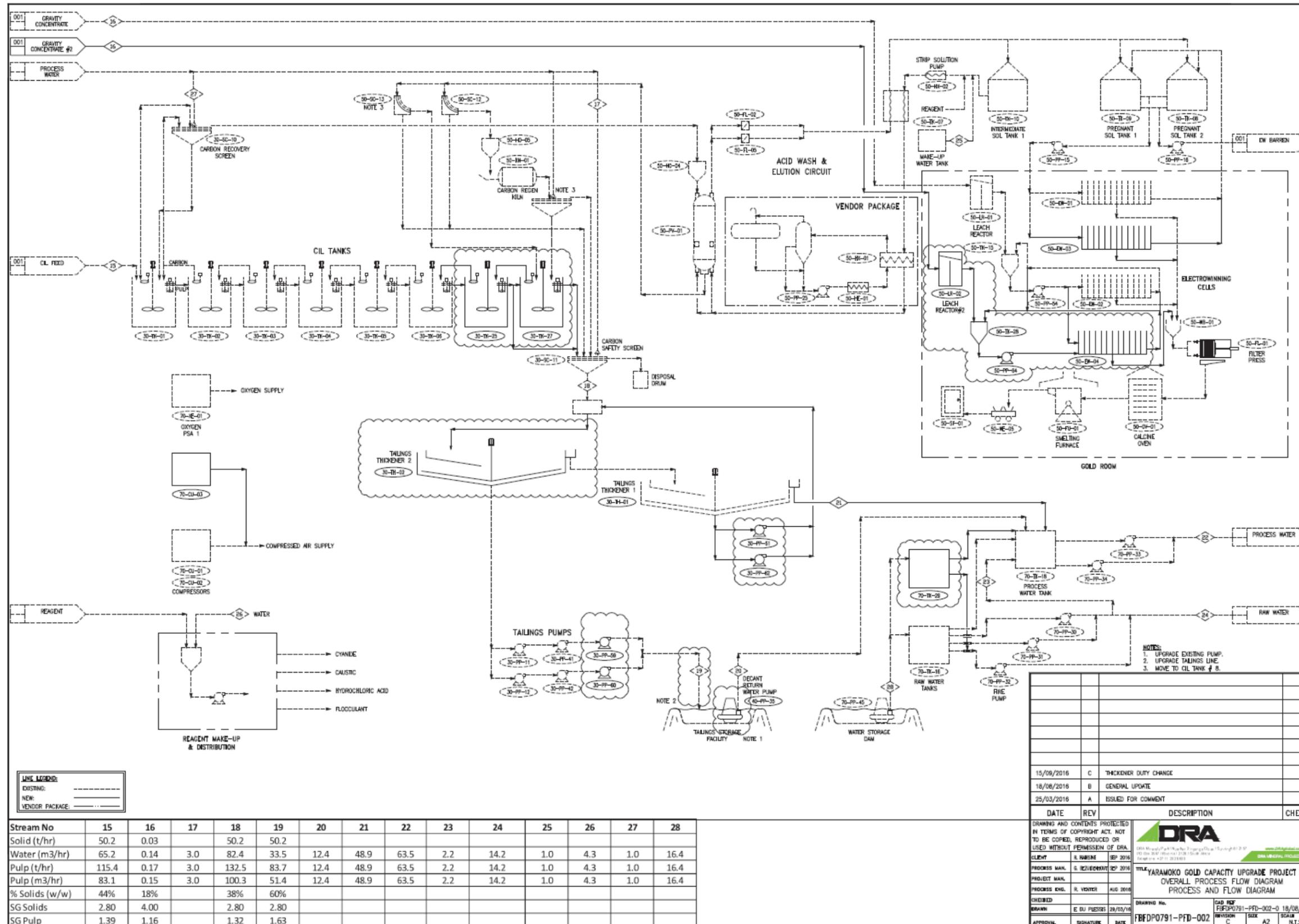


Figure 62: Yaramoko Gold Process Plant Expansion Flowsheet (Part 2 of 2). Dotted lines indicating existing equipment and solid lines indicating new equipment.

16.2.2 Process Plant Description

General arrangement drawings and conceptual 3D models were produced, illustrating the layout and positioning of the plant expansion equipment, structures, and infrastructure.

The following sections describe the intended plant operation where modifications / expansion to the existing processing plant are required.

Crushing Circuit

To facilitate the milling throughput, increase to 1,100 tonnes per day, a secondary crushing circuit will be introduced into the crushing circuit. The secondary crusher will be operated in open circuit at a design feed rate of 100 tonnes per hour, depositing material back onto the shortened stockpile feed conveyor (10-CV-02). The secondary cone crusher will produce a product particle size of P₈₀ (under 20 millimetres). Targeting this fine crushed product size eliminates the need for pebble crushing and is beneficial in maintaining efficient grinding conditions.

Currently, front-end loaders tip the ROM ore into the crushing circuit comprising of an existing ROM bin (10-BN-01), vibrating feeder (10-FE-01), primary jaw crusher (10-CR-01), and stockpile feed conveyor (10-CV-02). The primary crusher produces a product particle size of P₈₀ (80 millimetres).

Primary crushed material will then be conveyed (15-CV-06) to a new secondary crusher feed bin (15-BN-02) after passing over a weightometer for control and accounting purposes. The material will then be fed via vibrating feeder (15-FE-04) onto the secondary crusher feed conveyor (15-CV-04) which feeds the secondary cone crusher (15-CR-02).

When conveyed to the mill feed stockpile the material passes over a weightometer for control and accounting purposes. The crusher feed can also bypass the secondary cone crusher to feed the stockpile feed conveyor (10-CV-02) directly.

Reclaim, Grinding and Classification Circuit

The existing comminution circuit remains largely unchanged with only the adjustment of processing parameters. Table 51 highlights the main processing changes.

Table 51: Main Comminution Circuit Parameters

Parameter	Unit	Current	Upgrade
Annual throughput	tpa	270,000	401,600
Daily production at stated utilization	tpd	740	1,100
Required grinding throughput	tph	33.8	50.2
Mill Feed, F ₈₀	mm	80	<20
Mill motor power draw	kW	530**	994*
Mill % critical speed	%	75	73*
Mill maximum ball charge	% v/v	15	27
Mill discharge density	% w/w	65	65-69
Cyclones operating	No.	2	3
Design gravity gold to concentrate	%	50	50-70

* OMC recommendations

** Operating data

The existing apron feeder (20-FE02) inside the stockpile tunnel reclaims crushed ore from under the stockpile and discharges onto the mill feed conveyor (20-CV-03), which feeds the (4.2-metre diameter by 4.8-metre effective grinding length) SAG mill (20-ML-01) at the new designed feed rate of 50.2 tonnes per hour. The mill feed conveyor is fitted with a weightometer (20-WE-02) for control and accounting purposes. The quicklime handling system (20-HL-01) fitted next to the conveyor will continue to dose quicklime on the mill feed conveyor to control the process pH. The total mill feed consists of crushed ore (fresh feed), cyclone underflow (recirculating load), scats recycle and dilution water.

The vibrating reclaim feeder (20-FE-03) will continue to be used as an emergency feeder loaded by a front-end loader in situations where the main reclaim apron feeder is under maintenance. This feeder is used for the addition of grinding media to the SAG mill, also.

For the increased throughput, the SAG mill will operate with a ball charge of between 20 to 27 percent volume/volume and a maximum total load of 35 percent volume/volume with an expected pinion power draw of 994 kilowatts. A variable speed drive is installed on the mill to vary the mill speed, so that it caters for changes in ore characteristics.

The mill product passes through a trommel screen, from which the oversize can be fed directly into the existing scats bunker. Consideration has been given to a new mill scats recycle system via conveyor. The installation of this system would automate the recycling of scats (as opposed to the current practice of manual handling via front-end loader). This scats recycle system would comprise of a new transfer conveyor (20-CV-07), transfer tower, and mill scats recycle conveyor (20-CV-08). The transfer conveyor would have a self-cleaning metal removal magnetic belt (20-MG-02) installed over it to remove the steel ball scats from the recycle stream. The transfer tower would either feed onto the mill scats recycle conveyor (20-CV-08), or into a scats bunker. Although the scats production rate is likely to increase with the increased throughput, the current practice of manual handling via front-end loader remains the preferred method of scats recycling. As such, a scats recycle system is not part of the proposed expansion scope.

Trommel screen undersize discharges into the existing mill discharge hopper (20-HO-01) before being pumped to the classification cyclone cluster (20-CY-01). An additional cyclone will need to become operational (3 duty, 3 standby) to cater for the increased throughput. Dilution water is added to the hopper for cyclone feed density control. The cyclones will classify the slurry feed into two products: underflow and overflow. The classification cyclone cluster produces a P₈₀ (90 micrometres) product in the overflow that reports to the existing trash removal vibrating screen (30-SC-03) before being fed to the leaching circuit. The coarse material remaining will constitute the cyclone underflow product, which feeds the existing gravity scalping screens (20-SC-01 and 20-SC-02). Underflow from the gravity scalping screens passes through the semi-continuous centrifugal gravity concentrators (20-KC-03 and 20 –KC-04) from which the tails and gravity screen overflow recombines to feed back into the mill. Each gravity screen treats 38 percent of the recycling load while the remaining slurry is directed to the cyclone underflow boil box 20-FD-01. The boil box then directs the product back to the SAG mill feed spout 20-CH-11.

Gravity Recovery Circuit

Two additional electrowinning cells (50-EW-03 and 50-EW-04) and an intensive leach reactor (50-LR-02) with dedicated electrowinning tanks (50-TK-28) are required in the gold room. The gravity recovery circuit will then consist of two dedicated intensive leach reactors each with a dedicated electrowinning tank and interchangeable single electrowinning cells operated in parallel.

The new equipment will be identical to the existing and will be sourced from the same suppliers. The additional equipment will require an extension of both the ground and upper floor of the gold room by 5400mm to the east.

The concentrate removed from the cyclone underflow slurry is sent to the intensive leach reactors in the gold room where the process extracts the gold into a pregnant liquor. The pregnant liquor will be pumped to a storage tank for electrowinning in the dedicated electrowinning cell. Barren solution from the electrowinning cell is sent back to the leach reactor for further leaching. The gold sludge collected from the electrowinning cell is refined to produce the final gold product.

Leaching and Adsorption Circuit

Classified slurry from the cyclone overflow is directed to trash screen 30-SC-03, which has two outlets for the oversized material. One of the outlets allows the material to be returned to the cyclone underflow boil box 20-FD-01, while the other outlet allows periodic dumping of trash to a bin at ground level. Trash screen underflow is collected into distribution box 30-FD-03 that allows the slurry to be directed to either the first or the second CIL tank 30-TK-01/02 (in case one of the tanks requires maintenance).

The existing carbon-in-leach (CIL) circuit consists of a pre-oxidation leach tank and five adsorption tanks in series, which can be converted to six adsorption tanks if required. Two new CIL tanks are being added in the upgrade to achieve a 26.5-hour leach residence time with a slurry density of 45.3 percent by weight. They will be of the same capacity and dimensions as the existing tanks.

Similar to the existing installation, each additional tank will be fitted with an agitator, pumping interstage screen and carbon transfer pump with oxygen or air sparging done through the agitator shaft. The first three tanks utilize oxygen to increase the leach kinetics while the remainder of the tanks use air to sustain the reactions. pH correction is done by adding quicklime to the mill feed conveyor, while a caustic dosing point is provided for pH correction in the pre-oxidation tank to comply with the cyanide code.

Carbon is held in all tanks except the first tank where the carbon retention screen will act as a safety screen to prevent oversize material entering the carbon tanks in the event of cyclone roping or a trash screen overflow or failure. Carbon is transferred counter current to the slurry flow to achieve the highest possible gold on carbon loadings. The carbon is transferred from either CIL tank 1 or 2 to the existing loaded carbon recovery screen (30-SC-10) for elution purposes. The carbon recovery screen oversize reports to the existing acid wash hopper (50-HO-04) while the undersize returns to the harvesting CIL tank.

Tails from the last tank report to the existing carbon safety vibrating screen (30-SC-11). This screen will collect any carbon that escapes the leaching circuit in a disposal drum for reintroduction to the circuit manually. The undersized product from the carbon safety screen will be gravity fed to a new 8-metre diameter high rate thickener (30-TH-02) from which the underflow is pumped to the lined tailings storage facility. To achieve the additional throughput, a third stage tailings pump will be added to each of the existing pump trains (30-PP-59 and 30-PP-60). 30-TH-02 overflow feeds the existing 8-metre diameter high rate thickener (30-TH-01). The existing thickener underflow will be circulated via new pumps (30-PP-61 and 30-PP-62; one duty, and one standby) back into the new thickener feed to recover all solids for tailings disposal while the overflow is gravity fed to the existing process water tank (70-TK-18).

HCN gas detection is installed together with cyanide and pH control equipment. A spillage pump is provided in the area and pumps into the carbon safety screen feed box.

The existing tower crane, 30-CN-01, will have its reach extended by 6m to facilitate the removal of the newly installed screens, 30-SC-14 and 15, for maintenance and cleaning.

The new tanks will be constructed on concrete ring beams and the concrete banded containment structure will be extended to facilitate the new tanks. To comply with this aspect of the cyanide code, the banded structure around the tanks will be increased to contain at least 110 percent of the CIL tank volume (285 cubic metres). Very large spills, in the highly unlikely event that they should occur will be contained within the confined drainage system of the plant and contaminated water will be collected in a containment dam adjacent to the plant. Solids will be recovered by mechanical means such as a front-end loader.

Elution Circuit and Gold Room Operations

Other than increasing the number of elutions per week from 4 to 8, no changes to the elution circuit are necessary to accommodate the increased throughput.

CIL carbon is batch treated in a 1.5-tonne split AARL elution circuit. Loaded carbon is collected in the acid wash hopper (50-HO-04). A 3 percent v/v hydrochloric acid solution is pumped into the 4.4-cubic-metre rubber lined acid wash hopper located beneath the carbon recovery screen to remove chemically bounded impurities. Hydrogen cyanide gas detection is provided at the acid wash hopper. After soaking the carbon in the acid solution, the carbon is rinsed by passing water through the hopper while the hopper overflows to the tails thickener.

Acid washed carbon is then loaded into the 3.85-cubic-metre elution column (50-PV-01) by gravity. The column is pre-heated with intermediate solution via primary and secondary (heat recovery) heat exchangers, with the primary heat exchanger being heated by a diesel oil heater. After pre-heating, 3 percent w/w caustic soda and optionally 1 percent w/w cyanide is dosed into fresh water and introduced into the bottom of the elution column at a temperature of 130 degrees Celsius to soak the carbon. After soaking, four bed volumes of intermediate solution are used to elute the carbon into one of the duty/standby pregnant solution tanks. On completion of the elution cycle two bed volumes of fresh water are passed through the column into the intermediate solution tank to rinse the carbon as well as two bed volumes of cooling with fresh water. The solution in the intermediate tank is stored to be used for the next elution cycle.

Eluted carbon is educted from the column using the raw water header and reports either to the last CIL tank or carbon regeneration kiln via sieve bends positioned above CIL tank 6. Any residual and interstitial water from the carbon is drained prior to it entering the kiln. The carbon is reactivated by the diesel fired regeneration kiln (50-KN-01) and discharges into a quench box feeding the carbon sizing vibrating screen. The screen overflow reports to the carbon safety screen and the underflow is discharged into the last CIL tank.

Elution pregnant solution is received in either of the pregnant solution tanks (50-TK-08 and 50-TK-09). Caustic solution is dosed into the pregnant solution tanks aimed at creating elevated conductivity levels necessary for electrowinning as well as to prevent and minimize anode corrosion. Manual conductivity analysis dictates the addition of caustic. Pregnant solution is circulated through the electrowinning circuit with barren solution transferred back to the CIL.

To facilitate the increased number of elution cycles an additional elution circuit electrowinning cell is required. The elution electrowinning circuit will then consist of two cells operated in parallel (existing cell 50-EW-01, and new cell 50-EW-03). The electrowinning circulation continues for 18 hours, or until gold in solution value drops below a pre-set value measured by manual sampling, after which time the liquid is deemed barren.

Cathodes are removed from the electrowinning cells by hand and transferred to a single cathode wash pan. The cathodes are washed with a high-pressure washer and the washed off sludge drains from the washing pan into the sludge settling tank where the solids settle to the bottom. Liquid overflowing from sludge settling tank overflows to the floor, where a spillage pump is then used to transfer the spillage to the CIL circuit.

Sludge from the sludge settling tank is dewatered in the filter press (50-FL-01) and transferred to the calcining oven (50-OV-01) to remove impurities by oxidation. Product from the calcining oven is moved by hand to the smelting furnace (50-FU-01). Borax, silica, and sodium carbonate are added to the furnace as flux chemicals to collect impurities in the melt and form a slag that will float on top of the molten gold. Gold and slag from the furnace are decanted into the mould trolley where Doré gold is recovered as the final product. These are weighed using a Sartorius Balance, 50-WE-05, and stored in the gold safe, 50-SF-01, located inside a concrete vault. The gold sludge from the gravity circuit is refined separately from that of the elution circuit to allow for separate accurate metallurgical accounting of the gravity circuit.

Within the gold room hydrogen cyanide gas detection is installed together with various extraction systems, safes, scales and security systems.

Tailings Disposal

Underflow from the newly installed 8m diameter high rate thickener (30-TH-02) will be pumped to the lined tailings storage facility. To achieve the additional throughput, a third stage tailings pump will be added to each of the existing pump trains (30-PP-59 and 30-PP-60). Each pump will be equipped with dump valves on the pump inlets and pneumatically controlled inlet and discharge knife gate valves.

Leaks in the tailings line are identified by two flow meters, one located at the plant, and the other located at the tailings storage facility. This allows for the monitoring of any variation in flows.

Reagents

The reagents consumption and costs are based upon the rates that have been realized during the first 18 months of operations. A summary of the reagents unit rates is presented in Table 52.

Table 52: Process Plant Reagent Unit Costs

Reagent	Unit Cost (\$/tonne)
Lime (CaO)	0.26
Cyanide (NaCN)	1.20
Caustic Soda (NaOH)	0.07
Hydrochloric Acid (HCl)	0.17
Activated Carbon	0.13
Flocculant	0.33

Lime

Quicklime is delivered to site in 1,000-kilogram bags. The existing lime handling system consists of a bag splitter, bag splitter vibrator, lime bag hoist, hopper, hopper vibrator, hopper agitator, screw conveyor, variable speed drive (VSD), dust control unit, and control system including programmable logic controllers programming.

Quicklime is dosed onto the mill feed conveyor to control the process pH.

Cyanide

Sodium cyanide briquettes are delivered to site in 1-tonne bags. Cyanide is mixed with raw water to create a 30.5 percent w/w solution in the cyanide mixing system, which consists of hoist, bag splitter, mixing tank, agitator, transfer pump, storage tank, and recirculating pumps.

Sodium cyanide is supplied to all main plant dosage points via a ring main supply system using a running / standby pumping configuration. Cyanide flow is monitored by manual rotameters and controlled by manual needle valves in either CIL tank 1 or 2 with a constant pressure bypass return to the tank. In addition, a cyanide dosing pump, 60-PP-20, delivers cyanide from the ring main to the elution circuit in a controlled manner.

The cyanide mixing and storage tanks are contained within a concrete bund with a collection sump to recover spillage.

Emergency supplies of cyanide are held on site in 1-tonne bulk bags in the event of transport interruption to the site.

Caustic Soda

Caustic soda pearls are mixed with raw water to produce batches of caustic soda solution at a concentration of 25 percent w/w. The caustic soda make-up circuit caters for a single batch make-up every three days and consist of a combined mixing and dosing tank. Caustic is supplied to all main plant dosage points using a running/ standby pumping configuration.

Caustic soda is delivered in 25-kilogram bags. The caustic mixing system consists of a hoist, bag splitter, mixing tank, agitator, and two dosing pumps. It is located in the same bunded containment as the cyanide mixing and storage tanks.

Hydrochloric Acid

Concentrated hydrochloric acid is delivered to site in liquid form, in 1,000-litre intermediate bulk containers. The acid is transferred from the intermediate bulk containers by an acid dosing pump to the acid wash hopper for a carbon acid wash cycle, after combining with the water pumped from the water tank to create a 3 percent w/w hydrochloric acid solution.

The concrete containment bund that surrounding both tanks complies with the dangerous goods statutory requirements.

Activated Carbon

Activated carbon is delivered to site in 500-kilogram bulk bags and stored in the reagents store to protect it from the weather. When required, it is hoisted up to the top of the last CIL tank (tank 8) and broken directly into the tank.

Oxygen

Oxygen gas is manufactured on site using a pressure swing adsorption plant.

Flocculant

A new dry flocculant plant will be supplied as part of the Bagassi South Zone plant expansion to replace the existing liquid flocculant plant to cater for the new process requirements.

16.2.3 Control Systems and Instrumentation

The existing control system and design philosophy will be adopted for the Bagassi South Zone plant expansion.

The plant control system is a network of programmable logic controllers sitting beneath a supervisory control and data acquisition (SCADA) network layer. The programmable logic controllers perform the necessary controls and interlocking while the SCADA terminals will monitor the PLC's and provide an interface for operator interaction.

Communication of the programmable logic controllers and SCADA terminals is achieved via a plant wide Ethernet network, the backbone of which consists of dedicated, single mode, fibre optic cables. For short distances, Cat 6 Ethernet cable is used.

Field instrumentation and drive status signals are interfaced to the plant control system by hard-wired signals. Vendor packages may be connected to the SCADA network via a communications link, where appropriate.

The control philosophy of the plant provides a level of automatic start up and shut down of various plant areas. Automatic interlocking, sequence control, and analogue control are implemented by the plant control system equipment. Safety interlocks are hard-wired.

The plant control system provides detailed information including:

- Plant status monitoring.
- Fault annunciation and logging.
- Drive and systems diagnostics.
- Trending for all analogue process parameters.

The plant control system is powered by uninterruptable power supply equipment, providing bumpless, fully synchronised power for thirty minutes after total power failure.

Instruments are connected to junction boxes in the field and from there to the remote input output panels in the motor control centres. Two new remote input output panels will be added for the upgrade: one positioned at the crusher and one in the new motor control centre, catering for the new instruments required. The new motor control centre structure/platform will be connected and tied-in to the existing motor control centre structure/platform.

Vendor panels may contain programmable logic controllers depending on the complexity of the control provided. Where possible, vendors will be asked to comply with the site standard programmable logic controllers to minimize spare parts holdings.

SCADA terminals are installed in the following locations:

- Main control room (above CIL deck).
- Crusher control room.
- Desorption control panel.
- Electrical supervisor's office.

The SCADA system is configured so that only wet plant drives can be controlled from the main control room, only crusher drives from the crusher control room, and only the desorption sequence

from the desorption control panel. In situations when SCADA terminals have failed, it is possible to bypass this by the user access level.

Two SCADA terminals are placed in the main control room providing redundancy so that should one terminal fail, then the wet plant can still be operated from the other terminal.

16.2.4 Electrical Reticulation

Power distribution within the plant area and vicinity is three-phase, 50 hertz at 11 kilovolts and 415 volts.

Power consumption for each general plant area is metered.

The 11-kilovolt power distribution cables are generally underground within the plant area, while all other plant cabling is in above-ground cable ladders attached to buildings and structural steelwork. Additional cable routing to the respective drives within the plant will follow the existing route with additional racks added where required.

Overhead power lines are only installed where no interference may be caused to mobile equipment, e.g., cranes. Overhead power lines are installed to the following remote locations outside the plant area:

- Tailings storage facility
- Water storage dam
- Accommodation camp
- Underground mine

A Fox ACSR overhead line conductor has been specified for the extension of the overhead power line to the Bagassi South Zone. The line capacity is based on an 1,850-kilovolt ampere load.

Power supply to the bores is provided by either diesel generators, solar photovoltaics (PV), or the site's power distribution network.

All pad transformers are installed complete with compound fencing and underground earthing. Due to the relatively small sizes, transformers (other than the SAG mill transformer) with conservators will not be required. The following transformers are required:

- Crushing area transformer (kiosk mount).
- Wet plant area transformer (pad mount).
- SAG mill transformer (pad mount).
- Decant transformer (pole mount).
- Seepage transformer (pole mount).
- Toe drain transformer (pole mount).
- Water storage dam transformer (pole mount).
- Plant buildings transformer (kiosk).
- Camp transformer (kiosk).
- Ventilation fans transformer x2 (pad mounted).

An additional 500-kilovolt-ampere pad mounted transformer is required to accommodate the additional electrically powered equipment in the wet plant expansion. The 500-kilovolt-ampere transformer has been sized with a 35 percent spare capacity and will be positioned next to the SAG mill transformer compound.

The dry plant (crushing circuit) is currently being fed from a 500-kilovolt-ampere kiosk substation. The current crusher loading is ± 225 kilovolt amperes, which leaves sufficient capacity to accommodate the new secondary crushing load of ± 140 kilovolt amperes. An additional 400 Amp MCCB will be installed to supply power to the new secondary crushing circuit.

No allowance has been made for additional switchgear. The current MV board has two (2) spare feeders, which can accommodate the additional 500-kilovolt-ampere transformer and the overhead power line extension, respectively.

The following motor control centres are within the plant site:

- Crushing area motor control centre
- Wet plant motor control centre x 2
- Decant motor control centre
- Toe drain motor control centre
- Seepage pumps motor control centre
- Water storage dam motor control centre

Spare motor starters were provided in each motor control centre as well as 20 percent spare space; however, the current wet plant motor control centre is too small to accommodate the required changes and the spare buckets within this motor control centre would not be sufficient for the planned expansion. A new 12-metre containerised motor control centre will be installed next to the current motor control centre with spare space to allow for future growth if required.

The motor control centre designs are traditional, incorporating hard-wired signals to PLCs mounted within cubicles installed at the end of each main motor control centre. The new motor control centre will be wired in accordance with the original standard wiring diagrams. The PLC's monitor the status of each drive and provide full diagnostics at the control room as well as allow remote and local control.

Thermistor protection is incorporated in motor starters for drives above 110 kilowatts, or for variable speed drives. Electronic motor protection is incorporated in motor starters for drives 110 kilowatts and above. Motor starters for motors rated 220 kilowatts and above have a 230-volt anti-condensation heater on the associated motor.

Motor current indication are provided where specified, either as a panel mounted ammeter on the motor starter door, or as a current input to the plant control system.

All variable speed drives can have their speed regulated by the plant control system. However, when the associated drive control is selected to "local" mode, it will be possible for local speed setting to take place at the variable speed drives.

16.2.5 Services

Compressed Air

Plant air and instrument air is supplied by duty and stand-by compressors located north of the leaching area. An additional compressor, identical to those existing, will be required to cater for the new CIL tank air requirements.

The instrument air is dried and filtered, but the plant air is only filtered. Air receivers on both lines, fitted with drain valves, collect the water from the air and provide surge capacity in the system.

Process Water

Water will continue to be delivered to the 100-cubic-metre process water tank from:

- Tailings thickener overflow.
- Raw water tank.
- Tailings storage facility decant return water tower.

In the case where the raw water tank is filled beyond its capacity, the excess water is fed into the process water tank, but not vice versa. Process water will continue to be delivered by duty and standby pumps to the plant.

Raw Water

Raw water from the water storage dam is delivered to a 600-cubic-metre raw water tank, 70-TK-16, and supplemented by production bore water. When there is excess capacity, overflow from the raw water tank is gravity fed to the process water tank. Raw water is delivered by duty and standby pumps to the process plant, reagents mixing systems, stripping circuit, and fire hydrants. A diesel-powered fire pump acts as a backup in the case of a fire outbreak in the plant.

A new raw water tank (70-TK-19) is required for redundancy. An 800-cubic-metre Braithwaite tank is being proposed instead of a replica of the existing tank, because it provides a footprint that does not clash with the buried services on site. It will be positioned next to the existing raw water tank. The two tanks will share a discharge manifold and the existing raw water pumps.

Potable Water

The existing infrastructure has sufficient capacity to handle the additional potable water requirements as part of the Bagassi South project.

Raw water is treated to provide potable water. The water is bled from the camp's raw water storage tank into the water treatment plant located at the camp site. The treated water is stored in the camp potable water tank and is delivered by the duty and standby pumps to the camp buildings and the potable water tank at the process plant site. A pump provides water for the site infrastructure buildings and the process plant. To prevent back contamination of the drinking water supply, there are no potable service points, or direct connection of this water to process equipment. The only other potable water used in the plant is for drinking and safety showers.

Sewage

The existing infrastructure has sufficient capacity to handle the additional sewage requirements as part of the Bagassi South Zone.

Sewage from the process plant is delivered by the sewage pumping system to the camp sewage treatment plant where it is treated along with the camp site sewage. The treated water is then used as irrigation water for the camp's vegetation and gardens.

17 Project Infrastructure

This section summarizes the current Yaramoko Gold Project infrastructure along with the additional needs to support the Bagassi South Zone.

In June 2013, Roxgold commissioned SRK to provide certain technical engineering services and to prepare a feasibility study technical report pursuant to Canadian Securities Administrators' National Instrument 43-101 for the gold mineralization contained in 55 Zone of the Yaramoko Gold Project in Burkina Faso. The study was documented in a technical report published on June 4, 2014 and summarizes the proposed project infrastructure.

The infrastructure discussed herein represents the installed infrastructure to support the operating Yaramoko Gold Project and the proposed additional infrastructure necessary to facilitate the Bagassi South Zone.

Mr. Craig Richards, PEng of Roxgold, is the Qualified Person for the purposes of National Instrument 43-101 with support from Mr. Ryan Hairsine of Roxgold, Manager of Projects.

17.1 Existing Infrastructure

17.1.1 Process Plant

Ore is transported from the 55 Zone underground orebody via the decline and placed in stockpiles on the run-of-mine (ROM) pad located east of the process plant. Ore is fed by front-end loader from the ROM stockpiles to the primary crusher. The crushed ore is conveyed to the crushed ore stockpile where it is then reclaimed and conveyed to a single stage SAG mill for grinding. Gold is recovery by either the gravity or carbon-in-leach (CIL) circuit, and refined via electrowinning and smelting.

17.1.2 Mine Service Area

The mine services area is adjacent to 55 Zone within a general security perimeter fence. In this area, the following contractor functions/items are included:

- Change room
- Workshops
- Warehouse
- Offices

17.1.3 Tailings Storage Facility

The tailings storage facility is located approximately 2.4 kilometres east-northeast along the access road from the process plant. It comprises a valley storage facility formed by two multi-zoned earthfill embankments, with a total footprint area (including the basin area) of approximately 17 hectares for Stage 1.

Embankment raises will be constructed annually to suit storage requirements using a downstream raise construction method to facilitate the installation of the high-density polyethylene geomembrane.

The downstream seepage collection system is installed within and downstream of the embankment. The tailings storage facility incorporates an underdrainage system to reduce pressure head acting on the soil liner, reduce seepage, increase tailings densities, and improve the geotechnical stability of the embankments. The underdrainage system drains by gravity to a collection tower located at the lowest point in the basin. In addition, a leakage collection and recovery system is installed beneath the low permeability soil liner.

Supernatant water is removed via submersible pump located within the decant tower, which is raised during operation. Solution recovered from the decant system will be pumped back to the plant for re-use in the process circuit.

An operational emergency spillway was constructed in the embankment abutment to protect the integrity of the constructed embankments in the event of emergency overflow in extreme rainfall events.

Tailings are discharged by sub-aerial deposition, using spigots at regularly spaced intervals from the embankments and the eastern perimeter of the tailings storage facility. A high-density polyethylene lined pipeline containment trench was constructed to contain both the tailings delivery pipeline and decant return pipeline to the plant site.

A groundwater monitoring station was installed downstream of the tailings storage facility southern embankment to facilitate early detection of changes in groundwater level and/or quality, both during operation and following decommissioning. The monitoring station will consist of one shallow bore, extending to a depth of 10 metres in the deep surface horizon, and one deep bore terminating at approximately 60 metres depth in fresh rock.

Standpipe piezometers were installed on both embankments to monitor the pore water pressures and embankment stability. Settlement pins were installed at regular intervals along the tailings storage facility embankment crests to monitor embankment stability.

A 300-millimetre depth low permeability soil liner, of permeability less than 1×10^{-8} m/s, was constructed over the entire basin area, using imported low permeability material. To further protect the local environment from any seepage the entire basin was lined with a 1.5-millimetre-thick high-density polyethylene geomembrane.

At the end of the operation, the downstream profile will be inherently stable under both normal and seismic loading conditions. The embankment downstream faces will be re-vegetated once the final downstream profile is achieved. The closure spillway will be excavated along the western perimeter of the facility, running north and discharging into the water storage dam reservoir upstream of the facility. Rehabilitation of the tailings surface will commence upon the termination of deposition into the facility. The closure spillway will be constructed in such a manner as to allow rainfall runoff from the surface of the rehabilitated facility to flow into the surrounding natural drainage system.

The final soil cover for the tailings surface after decommissioning will be confirmed during operation based on ongoing operational tailings geochemistry test results. The finished surface will be shallow ripped and seeded with shrubs and grasses.

17.1.4 Water Storage Dam

The water storage dam is the main collection and storage pond for clean raw water on site, and was originally constructed to store up to 200,000 cubic metres of water at the maximum operating level at Stage 1.

The water storage dam is recharged through rainfall runoff from the catchment and ground water supply on site. The water collected in the water storage dam is pumped back to the process plant to supply plant raw water and process make-up water requirements.

17.1.5 Mine Access

The site is accessed via a single access road with additional roads on site connecting the underground mine, processing plant, camp, exploration core yard, water storage dam, tailings storage facility, gendarmerie, and explosives magazine.

The following design criteria has been implemented in the design and construction of the access roads:

- Design speed: – 60 kilometres per hour on the process plant and camp access road and on the approach curves to the junction; 80 kilometres per hour on the road back to Bagassi.
- 3 percent crowned road on straights.
- Super-elevation on curves – 4 percent maximum.
- Formation width: 8 metres with table drains (0.7 metres deep by 2.1 metres wide).
- Cut and fill batter slopes 1 in 3.
- Intersections designed to accommodate semi-trailer type vehicles.

The 55 Zone underground mine is accessed via a portal located to the east of the process plant. A haul road connects the underground to the ROM pad where ore is stockpiled ready to be fed by front-end loader into the ROM bin. Adjacent to the ROM pad is a storage area for mine waste rock that may be hauled underground as backfill.

17.1.6 Administration and Plant Buildings

The Yaramoko Gold Project consists of the following administration and plant buildings, which support the 55 Zone underground mine and the expansion of the processing plant:

- Administration building
- Security/first aid building
- High security/change rooms/laundry building
- Plant workshop
- Plant warehouse
- Reagents store
- Laboratory
- Control rooms
- Plant office
- Mess halls

17.1.7 Water Supply and Sewage

Raw Water

The plant's raw water is supplied from the water storage dam located northeast of the process plant. The pipe route from the water storage dam is adjacent to the access road constructed to the processing plant. The 125-millimetre high-density polyethylene pipeline has an approximate length of 3,700 metres and is connected to the raw water tank within the process plant. A 600-cubic-metre capacity tank situated west of the leaching circuit supplies the process plant with raw and fire water. The bottom half of this tank is dedicated for the fire water and connected to the emergency diesel fire pump.

A bore field is located to the northwest of the processing plant. These bores will be used to supplement the water storage dam flows and meet the extra demand arising from the process plant expansion.

Potable Water

Water supplied from a production bore is pumped to a 150-cubic-metre per day water treatment plant located at the camp for purification. Potable water is stored in a potable water tank and then pumped to the process plant potable water tank adjacent to the plant offices, the camp, and the mining contractor's area.

Water Management

The process plant and mine operators monitor and record water production rates, storage volumes, and usage rates to ensure an adequate delivery of water can be sustained for processing activities.

Sewage

There is a sewage treatment plant with a capacity to treat 120 cubic metres per day, located at the camp site. It services the plant buildings and the accommodation camp. Sewage from the plant is pumped to the treatment facility via a pump station fitted with macerating sewage pumps.

All sewage water is treated before the treated effluent is used for irrigation purposes throughout the camp (e.g. gardens, soccer field).

17.1.8 Power

The site has been connected to the Burkina Faso electricity grid by teeing into the 90-kilovolt powerline from the Burkina Faso Pa substation to the SEMAFO Mana mine site. The capacity of the 90/11-kilovolt substation is 13 MVA, which has sufficient spare capacity for the Bagassi South Zone mine and expansion works. In the event of a power outage, there is an emergency diesel generator power station which is sized to power the entire site operations (except the accommodation camp which has a dedicated emergency generator). Availability of electricity from the national grid has been 95 percent on average since inception at the Yaramoko Gold Project. A bus VT/synchronization panel is installed in the plant's MV switch room to automatically switch between grid and power station in the event of a grid power failure.

Power factor correction equipment is installed to ensure a load power factor of 0.95 lagging. The SAG mill motor is the largest motor on the project. It is a wound rotor type with secondary resistance starter rated at 1,500 kilowatts.

Table 53: Site Power Consumption Since Connecting to the Burkina Faso Electrical Grid (February 2017)

	Unit	2017									
		January	February	March	April	May	June	July	August	September	October
Process Plant incl Process Plant Buildings	(kWh)	N/A	811,000	874,418	894,259	917,125	832,379	942,185	799,697	813,910	848,756
Camp incl Exploration and Gendarme Camp	(kWh)	N/A	337,800	361,158	336,353	319,845	365,647	263,285	352,436	203,020	248,600
Mining/Underground	(kWh)	N/A	771,500	976,480	919,520	990,810	917,920	1,003,290	1,107,160	1,156,676	1,059,298
Admin Buildings	(kWh)	N/A	71,816	40,920	39,600	65,220	39,600	59,463	40,920	25,449	21,923
Total	(kWh)	N/A	1,992,116	2,252,976	2,189,732	2,293,000	2,155,546	2,268,223	2,300,213	2,199,055	2,178,577

17.1.9 Underground Mining Infrastructure

The mining contractor's (AUMS) area is south of the processing plant. The mining contractor has provided its own workshop, store facilities, offices, equipment wash down area, and waste oil management facility.

Explosive materials are stored in a surface magazine located in a remote area northeast of the plant and well away (at least 750 metres) from people. The magazine is secured within a fenced compound and surrounded by embankments. The magazine is continuously manned by security personnel.

17.1.10 Communications

A base transceiver station was installed adjacent to the camp by the local telecommunications provider Orange (formerly Airtel), which provides mobile phone coverage around the plant site area. A very small aperture terminal was established on site, which provides VoIP, email, and internet for the site's offices and camp accommodation buildings. In addition, an E1 point-to-point link between the site and Roxgold office in Ouagadougou was established to enhance communications.

A VHF radio system with hand held radios is used for site communications, with separate channels for mining, process plant, and security. The underground mine has established a leaky feeder communications system. There is also a separate, dedicated emergency channel.

17.1.11 Site Security

Vehicle travel to and from the site is accompanied by Gendarme escort. The current security measures at the site consist of:

- Access control to the mine lease at several locations (including mine, plant and camp).
- Read in/read out access control.
- Two-stage gates for vehicle access.
- Electronic surveillance including closed-circuit television (CCTV) within the plant area and at several key locations around the property.
- Physical and visual barriers.
- Fencing (double, single and cattle).
- Lighting.
- Security patrols.

The process plant and specific infrastructure are enclosed within a high security area protected by double security fencing 4 metres apart and 2.4 metres high. This high security area includes electronic surveillance by CCTV cameras.

Electronic security has been provided by a reputable security system provider (IDtek/Afrifron) and audited by an independent security consultant experienced in security installations in Africa. The security system consists of a combination of various access control points, coupled with intruder detection devices, supported by CCTV consisting of 20 static Internet Protocol cameras and three Pan Tilt Zoom cameras located across the site.

General site infrastructure buildings are situated outside the high security area bounded by a single perimeter security fence. The camp, tailings storage facility, and water storage dam are located outside the process plant security fence but contained within their own fences. Entry to the main administration area is via the main access security building with access to the process plant high

security area via an additional security building that incorporates turnstiles, change room, and laundry.

A single security fence encloses the mining contractor's area, main administration building area, laboratory, camp, magazine, and tailings storage facility. The security fence consists of a 2.0-metre-high fence with razor wire at the top of the support posts.

A cattle fence is installed around the water storage dam.

17.1.12 Accommodation Camp

The existing accommodation camp and facilities has the capacity to house 260 staff. It is located approximately 1.2 kilometres east of the process plant and consists of the following major components:

- 3 x 4-man manager style self-contained units complete with bedroom, en suite bathroom and toilet.
- 6 x 12-man single room units complete with bedroom, en suite bathroom and toilet.
- 4 x 36-man double room units with central ablutions.
- 16 x 2-man double room 6 metre containerized units with central ablutions.
- Kitchen, dining, dry storage, and wet mess facility.
- Laundry facilities.
- Water treatment plant.
- Sewage treatment plant.
- Basketball court and soccer field.
- Recreation facilities.
- Security fencing and security gate.

Roxgold has contracted the management of the camp and its facilities to All Terrain Services (ATS) Group.

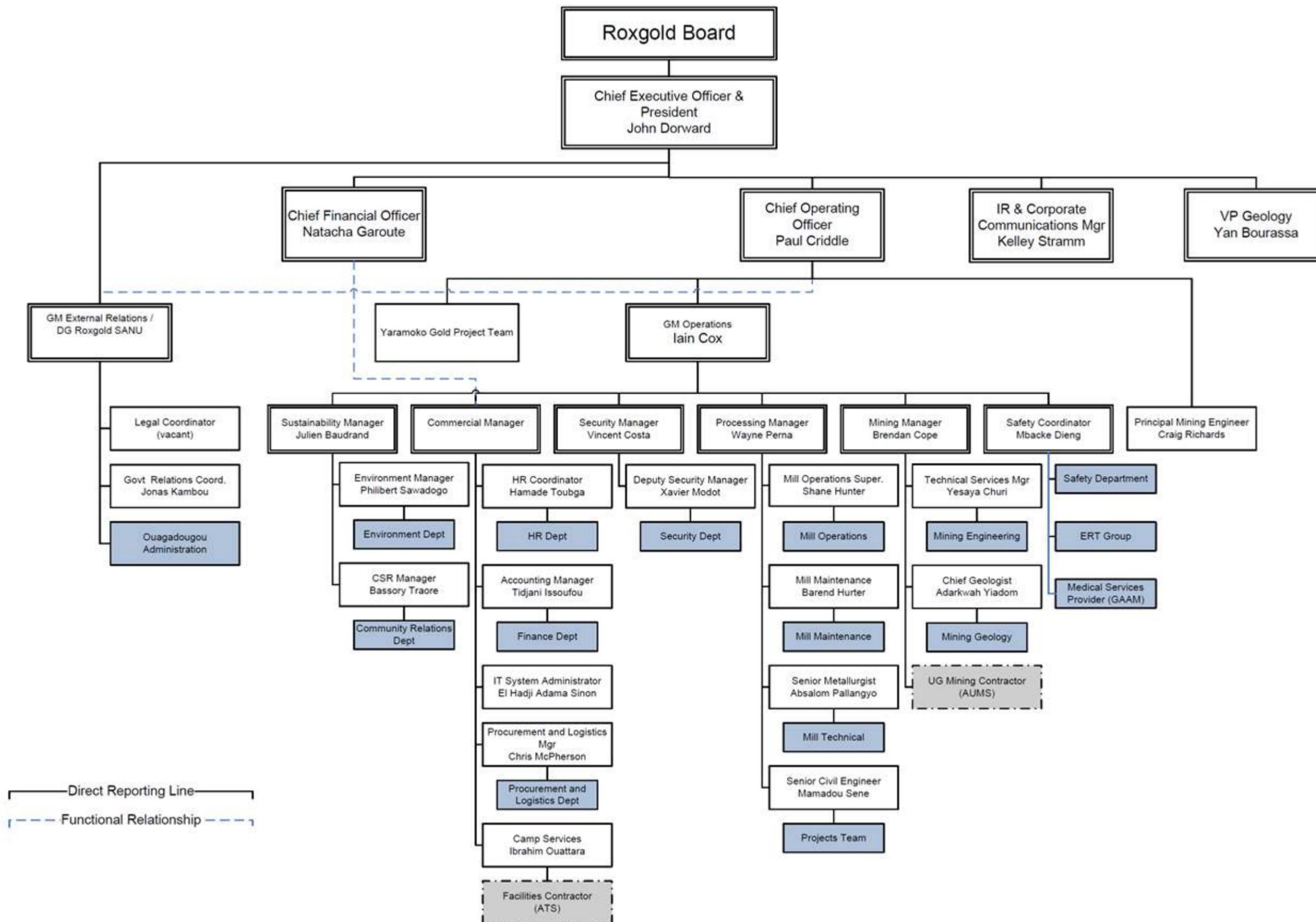
17.1.13 Mine Organization

The Roxgold organizational chart is illustrated in Figure 63.

17.2 Bagassi South Zone Infrastructure

The planned Bagassi South Zone infrastructure was developed by Roxgold in conjunction with various consultants. The surface electrical and power systems were designed by DRA. The life of mine tailings storage facility and water storage dam were reviewed by Knight Piésold. The Bagassi South Zone underground mine infrastructure was developed and reviewed by SRK. The following section presents a summary of the planned infrastructure for the Bagassi South Zone.

There are considerable existing infrastructure and services to support the Bagassi South Zone. The existing infrastructure supports Yaramoko and the 55 Zone underground mine currently in operation (Figure 64).



— Direct Reporting Line —
 - - - Functional Relationship - - -

Figure 63: Roxgold Organizational Chart

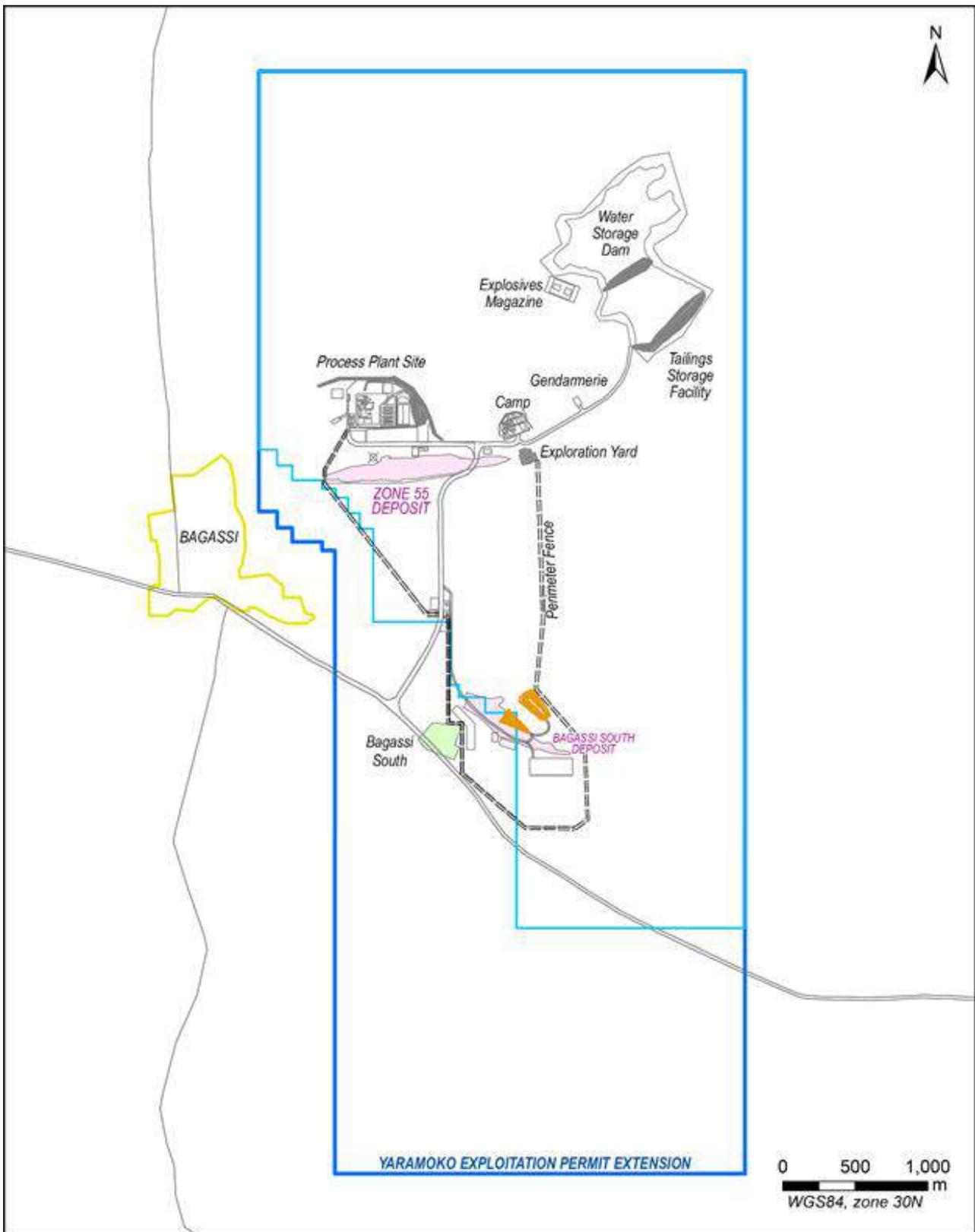


Figure 64: Layout of the Bagassi South Zone Mine in Relation to the Existing Site Infrastructure

17.2.1 Process Plant

The existing processing plant will be expanded as described in Section 16.

17.2.2 Mine Services Area

The mine services area will remain adjacent to 55 Zone within the general security perimeter fence. Allowance will be made for a small (containerized) office and laydown area next to the Bagassi South Zone within a fenced perimeter.

17.2.3 Tailings Storage Facility

Knight Piésold conducted a review of the tailings storage facility life of mine capacity given the increased throughput to be processed at the processing plant. The outcome of this review was that the final embankment heights would need to be approximately 2.3 metres higher than originally envisaged. A stability analysis of the final embankment was not conducted as part of Knight Piésold’s review; however, the additional height is considered minor and not expected to be a material issue. More specifically, before the high-density polyethylene liner was made a requirement by *Bureau Nationale des Evaluations Environnementales* (BUNEE), the tailings storage facility embankments were to be upstream constructed with a final height of 321.2 mRL. The stability of this final stage embankment height was assessed under static and seismic loading conditions using limit equilibrium methods and found to have adequate stability. With the current design (downstream embankment construction) the final height of the tailings storage facility embankment including the extra tonnage will only be 319.1 mRL. The extra capacity is gained predominately from changing the embankment construction methodology from upstream to downstream, which minimizes the incremental embankment height increase required.

Staged tailings storage facility capacities and crest elevations are summarised in Table 54.

Table 54: Life of Mine Staged Tailings Storage Facility Capacities and Embankment Crest Elevations

Date	Stage	TSF Cumulative Storage (Mt)	TSF Embankment Crest Elevation (mRL)	WSD Embankment Crest Elevation (mRL)
-	1	0.55	312.6	315.6
April 2018	2/3	1.21	314.2	315.6
April 2020	4	1.59	315.6	315.6
April 2021	5	1.98	316.8	316.8
April 2022	6	2.37	318.0	318.0
April 2023	7	2.74	319.1	319.1

Key design parameters maintained for the LOM review are listed below:

- Embankment freeboard - Greater of:
 - 0.5 metres above maximum tailings elevation.
 - 0.5 metres above maximum design storm elevation.
- Design storm water capacity - Greater of:
 - 1 in 100-year recurrence interval, 72-hour duration storm event superimposed over average conditions operating pond volume.

- 1 in 100-year recurrence interval, wet annual rainfall sequence.
- All embankment fill material sourced from local borrow by civil contractor.
- Tailings percent solids – 60 percent.
- Tailings beach slope – 80H:1V.

No changes to the tailings storage facility decommissioning and closure plan are resultant from the expansion.

17.2.4 Water Storage Dam

An additional 3.6 cubic metres per hour (total 16.4 cubic metres per hour) of raw water is required at the processing plant due to the expansion. As part of the Bagassi South Zone feasibility study, the water balance was reviewed in detail to assess if further water storage or harvesting is required to comfortably meet the needs of the site.

The water storage dam will continue to be the main collection and storage pond for clean raw water on site, and has been expanded to be able to store up to 299,000 cubic metres of water at the maximum operating level at Stage 1.

Water balance modelling indicates that the water storage dam stored volume will be cyclical, potentially returning to empty during each dry season. The site's water bore network will also be expanded as part of the Bagassi South Zone to initially meet the construction water needs and thereafter reduce operational risks associated with water supply; during periods when prolonged dry conditions are experienced.

17.2.5 Mine Access and Haulage Roads

The expansion includes a haulage road intersecting the existing access road from the Bagassi South Zone underground mine to the processing plant.

The same design criteria will be used for the construction of the new access roads.

The Bagassi South Zone underground mine will be accessed via a portal located to the east of the main access road. A haul road will connect the underground to the existing access road where trucks will transport ore for stockpiling on the existing ROM pad east of the processing plant. Adjacent to the Bagassi South Zone will be a storage area for mine waste rock that may be hauled underground as fill.

17.2.6 Administration and Plant Buildings

The following sub-sections summarize the modifications or additional buildings required for the expanded processing plant.

Motor Control Centre Building (Switch Room Buildings)

The current wet plant motor control centre is too small to accommodate the required upgrades and the spare buckets within this motor control centre would not be sufficient for the planned expansion. A new 12-metre containerized motor control centre with an additional 500-kilovolt-ampere transformer will be part of the plant expansion works. Additional space within this container will allow for future growth of an additional motor control centre if so required. The 500-kilovolt-ampere transformer is sized to accommodate the current expansion with a 35 percent spare capacity. The motor control centre will be wired according to the original typical wiring diagrams.

No additional switchgear is required. The current MV board has two (2) spare feeders that can accommodate the additional 500-kilovolt-ampere transformer for the plant power and the overhead power line extension, respectively.

Gold Room Building

The gold room is a steel-clad building and houses the leach reactor, calcine oven, electrowinning cells, smelting furnace, safe (enclosed within a concrete vault), and associated equipment. The electrowinning cells are located on a mezzanine floor so that the liquor can gravitate from the cells back to the barren or intermediate liquor tanks.

The building will be extended to the east by one bay (including the mezzanine level) to cater for the additional leach reactor and electrowinning cells.

17.2.7 Water Supply and Sewage

Process Water

The expanded processing plant will require process water at a rate of 63.5 cubic metres per hour (increased from 47.5 cubic metres per). Process water will be delivered to the 100-cubic metre process water tank adjacent to the process plant via the following sources:

- Overflow from the raw water tank (nominally 0 cubic metres per).
- Tailings storage facility decant return water (12.4 cubic metres per).
- Clarified thickener overflow (48.9 cubic metres per).
- Water from underground following removal of sediment and any hydrocarbon contamination (which is first pumped to the tailings storage facility and then pumped to the plant via the tailings storage facility decant return pumps).
- Raw water make-up (2.2 cubic metres per).

Water from the current underground mining activities is pumped to a settling pond on surface just north of the 55 Zone deposit. Water that reaches the final chamber of the settling pond is pumped to the tailings storage facility to be recycled as processed water within the process plant. A similar system will be developed for the Bagassi South Zone, which increases the quantity of process water available for use and, consequently, reduces the demand on raw water make-up for processing needs.

Raw Water

The plant's raw water will continue to be supplied from the water storage dam located northeast of the process plant. A new raw water tank is required for redundancy and to strictly comply with international standards applicable to fire water systems. An 800-cubic-metre water tank will be sourced and positioned next to the existing raw water tank. The two tanks will share a discharge manifold and the existing raw water pumps.

The new raw water tank provides a footprint that does not clash with the existing buried services on site and maintains good access for mobile equipment around the plant.

Potable Water

The currently installed water treatment plant has enough spare capacity to handle the increased demand associated with the extra manning levels required to operate both underground mines.

Pump Stations

Additional pumping stations will be in the following areas:

- Underground dewatering pump stations will deliver water to the settling pond on surface.
- Settled water from the Bagassi South Zone settling pond will be pumped to the tailings storage facility.

Sewage

The currently installed sewage treatment plant and pump stations have enough spare capacity to handle the increased demand associated with the extra manning levels required to operate both underground mines.

17.2.8 Power Supply

For cash flow modelling purposes, it is assumed that power supply from the grid is 100 percent reliable.

A Fox ACSR overhead line conductor has been specified for the extension of the overhead power line to the Bagassi South Zone mining operations. The line capacity is based on an 1,850-kilovolt-ampere load.

The additional loading figure estimates are shown in Table 55. The maximum demand is defined as the maximum average load over any 30-minute period.

Table 55: Loading Figures for the Bagassi South Zone Project

Bagassi South Gold Project	Maximum Demand	Energy Consumption / Year
Plant	633 kW	5.55 GWhr / year
Underground	908 kW	7.96 GWhr / year
Total	1,541 kW	13.51 GWhr / year

17.2.9 Mining Contractor’s Infrastructure

The mining contractor’s (AUMS) area will adequately serve the increase in manpower and equipment necessary to mine the Bagassi South Zone concurrently with the 55 Zone.

The explosives magazine will be expanded to increase its storage capacity to cater for the additional explosives required to mine the Bagassi South Zone.

17.2.10 Communications

The communications systems established on the site currently are expected to adequately support the expansion works and the Bagassi South Zone.

17.2.11 Site Security

The development of the Bagassi South Zone will require approximately nine additional patrol staff to monitor and control access to the area.

The expansion works at the processing plant will be constructed within the existing high security area.

A 2.0-metre-high security fence with razor wire at the top of the support posts will enclose the Bagassi South Zone mining area.

17.2.12 Accommodation Camp

For the additional personnel to operate the Bagassi South Zone an 18-person single room and a 14-person double room building will be constructed within the footprint of the current accommodation camp. The existing facilities will be able to support the addition occupancy numbers.

17.2.13 Project Organization and Implementation

This section presents a high-level implementation plan for the design, engineering, construction, and commissioning of the Bagassi South Zone.

The project organization, design, construction, and operation will conform to the requirements of the various regulations in Burkina Faso, requirements within Australian standards, ISO standards, European standards, and Roxgold's internal standards.

Project Organization

The project delivery will be overseen by Roxgold's Chief Operating Officer (COO) in the role of project sponsor. The project delivery will be managed across the following areas:

- Environmental and Social Impact Assessment (ESIA) / Resettlement Action Plan (RAP)
- Bagassi South Zone mine development
- Process plant expansion
- Site infrastructure
- Consultancies

Roxgold's General Manager – External Relations will be responsible for managing the mining permitting process and report directly to Roxgold's COO. Roxgold appointed client representatives for each part will report to and be managed by Roxgold's appointed project manager.

The overall organization chart is shown in Figure 65.

Roxgold will utilize pre-existing project and operational administrative controls and develop new controls as needed. Reporting structures within the project will be established to inform managers and key stakeholders of project progress and enable responsive corrective and preventative actions to achieve the project charter should situations arise where such action is necessary.

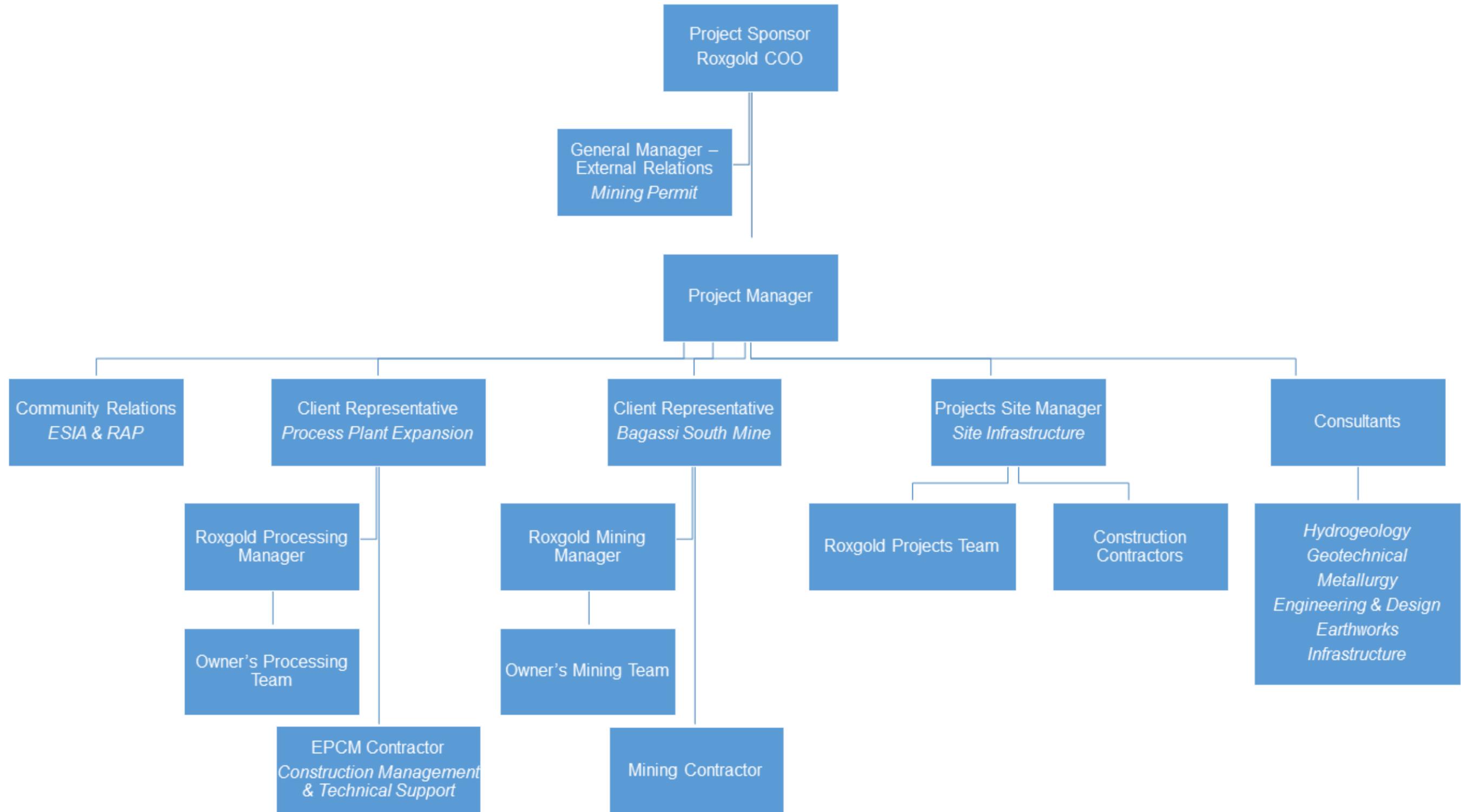


Figure 65: Bagassi South Zone Gold Project – Organizational Chart

Roxgold's Client Representative for the process plant expansion will be supported by Roxgold's Processing Manager and processing team. The EPC(M) consultant will undertake the design and documentation tasks for the process plant and directly associated infrastructure. They will manage the major equipment procurement from their home office. Procurement of major capital expenditure items will be based upon recommendations received from the EPC(M) consultant. They will prepare the documentation, call for prices and tenders, prepare tender evaluations, negotiate prices with contractors, and make recommendations to Roxgold in the form of drafted contracts and purchase requisitions. The EPC(M) consultant will undertake the basic project administrative and implementation tasks for the plant and infrastructure development. However, the overall project administration and control will be managed by Roxgold.

Roxgold's Client Representative for the Bagassi South Zone mine development will be supported by Roxgold's Mining Manager and mining team. The Mining Contractor will undertake the development of the Bagassi South Zone underground mine, and extract, haul and stockpile ore in accordance with the applicable laws/codes, safety and environmental regulations, and Roxgold's plans and schedules.

Roxgold's Community Relations department will manage the delivery of an updated ESIA and RAP necessary for the application of a mining permit and resettlement of artisanal miners.

Roxgold's Projects department will manage contractors and local labourers to construct site infrastructure not directly associated with the underground mine, or the processing plant. This infrastructure is mainly comprised of:

- Camp expansion
- Tailings storage facility embankment lifts
- Erecting fence
- Boxcut excavation
- Ventilation shaft construction
- Settling pond construction

Roxgold's Project Manager will also directly manage various consultants to support the project by outsourcing expertise that is not readily available within the organization.

Project Development Schedule

Contingent on permitting approvals to develop the Bagassi South Zone, the development milestone dates include:

- Q2 2017 – Hydrogeology and geotechnical investigations.
- Q3 2017 – Bagassi South infill drilling completed and start mineral resource and mineral reserve update.
- Q3 2017 – Resettlement action plan completed.
- Q3 2017 – Environmental and social impact assessment (ESIA) complete.
- Q4 2017 – Feasibility study complete.
- Q4 2017 – ESIA approved.
- Q4 2017 – Commence detailed design and procurement activities.
- Q2 2018 – Mining decree awarded.
- Q1 2018 – Execute major mining and construction contracts.
- Q1 2018 – Land access granted.
- Q1 2018 – Commence boxcut and surface infrastructure construction.

- Q2 2018 – Commence plant expansion construction.
- Q3 2018 – Commence Bagassi South Zone mine development.
- Q4 2018 – Plant expansion and infrastructure construction completed.
- Q4 2018 – First ore from the Bagassi South Zone.

18 Market Studies and Contracts

18.1 Market Studies

Roxgold has not conducted a market study in relation to the gold doré which may be produced by the Bagassi South gold project. Gold is a freely traded commodity on the world market for which there is a steady demand from numerous buyers.

18.2 Contracts

For the current Yaramoko operation, a contract is in place with METALOR Technologies S.A. for the receipt of gold doré from Roxgold SANU, to process/refine and either to buy or transfer the precious metal to a metal account designated by Roxgold SANU. This contract will also apply to the gold doré Roxgold produces from the Bagassi South mine.

A contract with AUMS for the provision of mining services including the development of the mine, extraction, haulage and stockpiling of ore and waste safely and efficiently within the production requirements range in accordance with the specifications, plans and schedules.

19 Environmental Studies, Permitting, and Social or Community Impact

This section of the report was compiled by Mr. Julien Baudrand, Sustainability Manager from Roxgold, under the supervision of Qualified Person Mr. Paul Criddle, FAUSIMM (#309804).

In 2014, a Notice on the environmental feasibility of the Yaramoko Gold Project was required from the Minister of Environment and Sustainability in order to obtain the authorization to develop the 55 Zone. Roxgold contracted *Bureau d'Etudes des Geosciences et de l'Environnement* (BEGE), a Burkina Faso private consultancy created in 2001, to undertake the original project baseline studies in 2012 and 2013 and compile an environmental and social impact assessment (ESIA) for Yaramoko. BEGE is considered to have prior experience in the requirements of nationally compliant mining project ESIAs. Roxgold required the studies be undertaken in accordance with Burkina Faso regulatory requirements, as well as take cognisance of good international industry practice, and in a way which would facilitate the project's acceptance by local residents.

The ESIA was submitted on May 2014 and the approval was received in August 2014 with the publication of Decree N°2014-155/MEDD/CAB. Because of the need of an economic resettlement (crops), the ESIA included a Resettlement Action Plan (RAP) negotiated with the impacted communities.

At this time, the main environmental issues identified concerned water quality due to seepage or runoff from mine infrastructure; reduced groundwater supply due to the impact of a drawdown cone around the mine; and dust from waste rock dumps and the tailings storage facility. The main social issues identified concerned livelihood changes due to the loss of farmland and income from artisanal mining. Roxgold has been able to manage these aspects through a comprehensive Environmental and Social Management system based on ISO 14001 and IFC Performance Standards. Since 2015 until the end of 2017, no major incident, grievance, or non-compliance has occurred regarding environmental or social impacts due to the Yaramoko mining activities. The environment and social management plan has been fully implemented as planned to undertake and mitigate the impacts. Internal inspections as well as government inspections and audits revealed no serious problems.

Considering the characteristic of the Bagassi South Zone and the expansion of the initial project, updates of the same governmental approval processes will be needed (i.e. ESIA and RAP) for the expansion project, as the same kind of social and environmental impacts can be expected although impacting a smaller area. Roxgold contracted the Burkinabè consulting firm EXPERIENS SARL to complete the initial baseline studies, compile the data, and prepare the ESIA and RAP for the impacted area. The management of the approbation process and the preparation of these documents will benefit from the previous permitting experience and from the established Environmental and Social Management system.

19.1 Environmental and Social Studies

This section provides a summary of the baseline environmental and social studies undertaken for the 2014 ESIA. Aside from the construction of the Yaramoko Gold Mine and artisanal mining activities taking place in Bagassi South, the environmental and social baseline in 2017 is mostly the same and is described in the subsections below.

19.1.1 Climate

Long term climate conditions were taken from the Boromo weather station (1971-2011, located 36.7 kilometres east of the Yaramoko Gold Project at an approximate elevation of 259 metres above sea level). The climate of the project area is typically Sudano-sahelian semi-arid with temperatures ranging from 15 degrees Celsius in December to 45 degrees Celsius in March and April. The rainy season extends from April to October followed by a dry season from November to February and a hot season from March to June. Annual rainfall averages 800 millimetres, with the heaviest rainfall occurring in August. Relative humidity is recorded as 80 percent to 95 percent in the rainy season and 10 percent to 35 percent in the dry period. Annual evaporation is high at approximately 2,000 millimeters. The dry season in Burkina Faso is characterized by hot dry winds of the Harmattan blowing from east to west particularly during the day. During the rainy season and usually at night, the wet monsoon blows from southwest to northeast. The project area is relatively calm with low (wet season) to moderate (dry season) winds (from 1 to 2 metres per second).

19.1.2 Air Quality

Existing sources of emissions in the vicinity of the project area include dust from the roads, dust from the Harmattan winds, limited levels of gases and dust caused by the burning of wood or coal for domestic use, and seasonal biomass burning. Dust fallout, particulate matter (PM10), sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) in ambient air are low in the project area. Low wind speed in the area contributes to relatively low dust concentration levels in the project area. No impact of the present mine in operation has been detected.

19.1.3 Noise and Vibration

The project area is situated in a rural environment with a few small villages. Existing sources of noise include local traffic (motorcycles, scooters and other light vehicles), use of small gasoline generators by the communities, and natural sounds of birds, insects, and frogs. There is a hill lying between Bagassi and the project site, which may serve the purpose of a noise buffer from future construction and operational activities. No impact of the present mine in operation has been detected nor any complaint received. Regarding the vibration, the monitoring shows that blasts don't generate 5-millimetre per second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10-millimetre per second peak particle velocity at any time during the daytime, complying with the standard (Australia 160122, EM2402, Version 3.00).

19.1.4 Soils and Land Use

Most soils within the project area are shallow, skeletal and not considered conducive to agricultural activities. However, due to the absence of arable land in the project area the soils are increasingly being exploited. The land is also sought after for livestock production. Furthermore, artisanal mining can also impact the soil and the availability of the land of agriculture or livestock. Analysis of heavy metal content indicates most soils are within the national pollution standards for arsenic, cadmium, mercury, lead, and zinc. However, a number of soils show above normal concentrations of copper and nickel and some pollution by mercury and cyanide from the artisanal mining can occur in some instances.

19.1.5 Hydrology

The Yaramoko concession area is located in the watershed of the Grand Balé River, which is a tributary of the Black Volta River. The Volta River flows to Lake Volta in Ghana, prior to discharge into the Atlantic Ocean. Within the wider concession area, surface drainage flows from north to south towards the large Basle River, though many of the drainages are seasonal, flowing during and shortly following rainfall events. Within the project area, a ridge of hills running north-south forms a watershed between sub-catchments.

19.1.6 Hydrogeology

A hydrogeological study was conducted to characterize mine hydrogeology and quantify groundwater ingress into the underground workings in the 55 Zone area. The groundwater system at Yaramoko appears to consist of two inter-connected flow systems: one hosted by the fissured weathered zone and one by permeable faults in the fresh bedrock. Overlying the fissured weathered zone is a weathering profile of generally unsaturated laterites and saprolites. Groundwater elevation in the vicinity of the project is approximately 20 to 30 metres below ground level. Ground water flow is generally in a south westerly direction (although regionally it flows south towards the Grand Balé). A ground water divide has been established that runs east to west south of the project area. Groundwater flow to the west of the hills is to the west and southwest, and groundwater flow to the east of the hills is to the east and southeast.

19.1.7 Water Quality

Surface water and groundwater quality samples were collected and analyzed for inorganic constituents, heavy metals, and metalloids since 2012. According to the analyses the pH of surface water samples was found to be approximately 6.0 with conductivity values suggesting low mineralization. Ion concentrations in surface water samples were generally below World Health Organization (WHO) drinking water quality guidelines. Turbidity was found to be high in surface water samples indicating naturally elevated sediment levels. Groundwater across the project area was found to be generally circum-neutral to mildly alkaline (pH 6.3 to pH 8.1), with generally little variation between wells. It can be classed as fresh (i.e., non-saline) based on EC values less than 1,900 microsiemens per centimetre ($\mu\text{S}/\text{cm}$). The solutes concentrations were found to be generally below WHO drinking water guidelines except for arsenic and chromium, which were found to slightly exceed the guidelines in all locations. Boron, manganese, and molybdenum were found to exceed the WHO guidelines in specific locations (WH02 for boron and molybdenum, and WH05 for manganese). Chromium is above the guideline for most sampling sites, while the other elements occasionally show up above the guidelines. The monitoring data to date has demonstrated the groundwater quality at Yaramoko is generally good with respect to chemical composition, with occasional occurrences of parameters elevated with respect to WHO guideline values, potentially associated with particulate matter. According to the data from the monitoring program, no issue was noted during the first months of operation.

19.1.8 Biodiversity

The vegetation of the project concession is typically savannah, comprising grassland, trees, and bushes. The hill slopes, which have historically not been used for agricultural activities, are more wooded than the denuded plains and function as reserves of plant biodiversity and refuges for any rare wild animals still occurring in the area. Of the 52-vegetation species identified in the project area, seven are classified as protected and three are endangered (*Anogeissus leiocarpus*, *Parkia biglobosa*, *Vitellaria paradoxa*). The project is surrounded by three classified forests: (i) Bonou,

which is a timber reserve with an area of 5,453 hectares, located approximately five kilometres from the study area; (ii) Pâ (timber reserve), with an area of 12,178 hectares, located approximately eight kilometres from the study site; (iii) and 2 Bale (61,665 hectares) wildlife reserve, located 22 kilometres from the project area.

At least eight plant species are used locally for food (mainly fruits but also small numbers of species for leaves, powder/pulp, nuts, blossoms, and seeds) and traditional medicines. Wood is the main source of domestic energy for households in the area. The wood and stems of a number of species are used for timber and contribute the greatest proportion (44 percent) of income from natural resources followed by fruits (22 percent). Shea nuts and locust bean are poorly marketed indicating a rarity of these two species in the area.

Fauna is sparse in the project area with no exotic or endangered species identified on the concession. Twenty-seven species of animals were recorded as potentially occurring in the project area of which 30 percent are still present. About 28 percent of potentially occurring species are rare or have disappeared including large animal species primarily due to hunting and clearing of natural vegetation. A few species such as squirrels, partridges, and snakes are still relatively abundant in the project area. Aquatic fauna is relatively abundant in the project area. 13 species were identified, with none classified as having significant conservation value.

19.1.9 Archaeology and Cultural Heritage

Research was undertaken in 11 villages and a total of 298 ethnographical and 34 archaeological sites were found. The 34 archaeological sites identified include anthropogenic mounds and ironworks. Of the 298 sites found, five ethnographic sites and one archaeological site were found within the overall Yaramoko exploration permit area. Two of the sites, a sacred site “Sinlé” and the artisanal miners’ cemetery, are located within 500 metres of the process plant site and have been protected (fenced), respecting the results of community consultations. Three sacred sites have been identified in the extension project area. They will be protected according to the agreement signed with the local communities.

19.1.10 Communities

The population of the rural municipality of Bagassi (*Commune de Bagassi*) in 2006 was 15,889. In 2017, this population is estimated at 19,846 inhabitants. The area is characterized by its youth population, estimated at over 55 percent under 20 years of age. Regarding ethnic groups, the communities consist essentially of the Bwaba and the Dafing (Marka). These two ethnic groups have long occupied their current villages. There is also a Fulani and Mossi presence in the area. The main religions identified are Animism, Catholicism, Protestantism and Islam, with Animism being the dominant cultural and spiritual belief system. The main rituals observed in the study area are periodic sacrificial rituals (especially before and after the rainy season), funeral rituals (a family, cultural and social event lasting 1 to 3 days), initiations (young people aged 16 to 20) and mask dances (to bless the village and celebrate the social order during the dry season). A multitude of sacred sites have been identified in the various villages, from which Roxgold has created a database in the interest of impact avoidance.

The *bwaba* land is an area where traditions are still deeply rooted in everyday practices. They are organized based on lineages whose members claim the fact they are all from a common ancestor. Traditional chieftaincy is an institution that is still very much respected in the bwaba villages. The Village Chief is the first center of village-level decision-making for matters concerning the village and power is usually patrilineal, transmitted among descendants. Besides this Chief, there is the Land Chief who is the custodian of the traditions. The President of the Village Development Council, an

official state-recognized and created administrative structure, is responsible for village relations with the outside world.

According to surveys carried out in the villages, the division of social roles is a function largely of age and gender. Older people are responsible for making sacrifices to the gods and ancestors for peace in the village, for good harvests and for the health of family members, as well as settling disputes between members of the lineage or the community. Initiated young men perform the necessary work during traditional and religious ceremonies and are messengers. Women are responsible for everyday chores like fetching water, cooking, transport, and being available for other tasks culturally considered 'feminine'. From an early age, children are also introduced to work. Girls help their mothers with housework while boys are entrusted the management of poultry and herds; at the age of 12 they are already involved in field work alongside their parents.

The people of Bagassi have long made their living off the land, growing a variety of crops and with a particular emphasis on cotton cultivation (about 65 percent). Second to agriculture, some engage in pastoralism and small commerce, but levels of unemployment are high. However, since the 1990s, there has been a steady increase in artisanal mining, which has brought substantial revenues to the zone. Though initially the activity was relegated to a migratory gold rush population, today local residents are engaged, either directly or indirectly, regardless of age or gender. A number of unemployed male youth partake year-round, but otherwise it is mostly a secondary household income source during the dry season, when there is no field activity.

Education levels in the commune are low and the primary education enrolment rate is estimated at only 49.4 percent. Educational institutions include both primary and secondary education, as well as three identified adult literacy centres and a skills training centre in Bagassi. However, there is no preschool or higher education facility and there are major deficits in infrastructure, teacher's housing, water access, teaching equipment and food.

Local access to healthcare is within state norms; however, services are underused due to poverty-related issues, low purchasing power of the general population, poor road access, and persistent faith in traditional/cultural health care (e.g. maraboutage). Major health problems faced in the zone are malaria, respiratory infections, diarrheal illnesses, skin infections, cuts/wounds, meningitis, rhinopharyngitis, intestinal parasites, and trauma. There is a chronic lack of equipment, midwives, and medicine stock. Commune suffers from a lack of sanitary infrastructure as well as hygiene education (e.g., cohabitation with animals is common, insufficient use of latrines, consumption of non-potable water).

For the 2014 initial project, 11 villages within the Yaramoko concession area have been identified to be potentially impacted by the proposed development of the project. But particularly the village of Bagassi was directly affected by the mine because of its proximity to the mine. The expansion will only affect a small additional territory of the same village. In addition, there are two artisanal mining settlements at the Bagassi South Zone (Bagassi Sanmatenga) and 109 Zone. While the former is in Roxgold's proposed expansion project site, the latter is about one kilometre north and is not likely to be affected. 107 ha of land will be directly impacted by the Bagassi South Project (32 ha of crop, 15 ha of degraded land, and 60 ha of fallow land).

In order to mitigate negative impacts and risks, while optimizing the positive impacts of the project, an environmental and social management plan has been developed. The main measures take into account protection and restoration of natural resources (soils, air, water), protection and preservation of human health, flora and fauna and preservation of the social and economic web. Road dust suppressor, noise cancelling berm, reforestation program, land and building compensation and livelihood restoration program are some of the measures to be implemented to mitigate the impacts.

19.1.11 Bagassi South Zone Artisanal Mining Community

The community's name is Bagassi Sanmatenga; Sanmatenga meaning "zone of gold" in Mooré, named after a major Mossi gold producing province in the region of Kaya. The community formed with the arrival of the first Mossi artisanal miners in Bagassi, in 2000. The original artisanal mining site was named "2000" and is still in operation, alongside "2004" and "2005"; subsequent sites named after the year they began. The citizens continue to frequent these sites, which border their community, but with the advent of the 55 Zone camp in 2010, these 'home sites' have become of secondary importance. A certain number of the residents also go to a site near Pâ called V3. Residents sometimes work individual holes in the area as well (i.e. not part of a full ASM 'site') to get the financing to continue at the 2000-sites. In addition, they sometimes travel to work other sites around the country for shorter periods.

19.2 Social and Environmental Permitting

This section summarizes the legal approvals and regulatory requirements from an environmental perspective. The Mining Code (Loi No. 036-2015/CNT du 16 juin 2015) and the Environmental Code (Loi N°006-2013/AN du 2 avril 2013) of Burkina Faso outlines the legal framework for social and environmental impacts from mining activities in Burkina Faso.

The 2015 Mining Code of Burkina Faso has the objective to preserve and promote provisions on mining activities as practiced in Burkina Faso, including the preservation of the environment, the human rights and the livelihood of the affected communities. It requires mining projects conducting an environmental and social impact assessment (ESIA) and the obligation to comply with the requirements of the Environmental Code.

The Environmental Code aims to protect living things against harmful effects or nuisances and risks that impede or jeopardize their existence because of the degradation of their environment and to improve their living conditions (Article 3). The fundamental principles governing the management of the environment are broken down in Articles 5 to 9.

Article 25 of this law provides that activities likely to have significant effects on the environment are subject to the prior notice of the Ministry of the Environment. This notice is based on the Strategic Environmental Assessment (SEA), an Environmental and Social Impact Assessment (ESIA), or an Environmental Impact Statement (EIS). The ESIA includes environmental analysis, a Monitoring Plan, Environmental and Social Management Plan, a Conceptual Closure Plan, a Resettlement Action Plan, which is subjected to a period of independent public consultation and report before the permit issuance through a multi-governmental agencies analysis (COTEVE commission). In addition, local communities, non-governmental organizations, associations, the civil society organizations and the private sector have the right to participate in the management of their environment (Article 8). As such, the ESIA must include a public enquiry aimed to collect the views of stakeholders in relation to the environmental impact assessment presented, and a mitigation and/or enhancement plan of negative or positive impact prior to the construction of a project likely to impact the environment.

The primary environmental approval required by Roxgold to develop the Bagassi South Zone is an *Avis de Conformité et de Faisabilité Environnementale*, which is issued by the Ministry of Environment and Sustainable Development (MEDD) through its branch *Bureau Nationale des Evaluations Environnementales* (BUNEE). The BUNEE has a mandate to promote, monitor and manage all the environmental assessment process in the country. Such an *Avis* indicates a positive decision of the Minister of Environment on the submitted ESIA.

The BUNEE holds sessions to review the Term of Reference prepared by the project sponsors and reviews environmental impact statements and assessments that are submitted to the MEDD for approval. It formulates an opinion on the acceptability of such studies following the review by the COTEVE and makes recommendations to the Minister of Environment and Sustainable Development on the environmental acceptability of projects for the issuance of environmental permits for the project implementation.

The process of obtaining approval is outlined below:

- Prepare and submit a Term of Reference for the ESIA to BUNEE.
- Approval of the Term of Reference by BUNEE.
- Scoping meeting for the ESIA preparation (BUNNE and Roxgold).
- ESIA prepared / updated and submitted to the Ministry of Environment who then forwards it to BUNEE.
- Once BUNEE has formally acknowledged receipt of the ESIA, public consultations will be organized in the mine area.
- Once the Public Survey is completed BUNEE creates a technical committee (*Comité Technique des Evaluations Environnementales*, COTEVE) to review the ESIA.
- If the ESIA is deemed satisfactory, BUNEE issues the *Avis de Conformité et de Faisabilité Environmental* (the positive decision of the Ministry of Environment).
- Once the *Avis* is issued by the Ministry of Environment, an application to extend the geographical scope of the exploitation permit must be filed with the National Commission of Mines to the Ministry of Mines and Energy (process detailed in Section 3).

Part of the ESIA process, the following plans have to be submitted:

- The Resettlement Action Plan.
- The Rehabilitation and Closure Plan (updated from Yaramoko).

For Roxgold, the ESIA is integral to meeting the Equator Principles and International Financial Corporation (IFC) environment and sustainability policy and guidelines, most notably the IFC's eight Performance Standards and the Environmental, Health, and Safety General Guidelines. In this particular case, the existing Environmental and Social Management system will benefit the expansion project to ensure a high level of performance from the beginning of this extension's project.

19.3 Stakeholder Engagement

Roxgold has engaged with the local stakeholders through a stakeholder engagement management plan since 2013. The main community engagement tools and activities are:

- Weekly meeting with the Mayor of Bagassi municipality and the Prefect of the Bagassi Department.
- Monthly meetings in every villages nearby the mine site.
- Quarterly Community Liaison Committee, with representatives of the communities and local authorities on topics concerning both the Company and local communities in relation to the project.
- Participation in the local, provincial and regional concertation framework (official governmental committees).
- Informal stakeholder interactions occur when Roxgold representatives undertake their daily tasks around the project area.

- Stakeholder mapping.
- Grievance mechanism.
- As needed, focus group discussions to better understand community preoccupations, particularity women and vulnerable groups.
- Formal and informal meetings with people affected by the project.

The main stakeholders identified by Roxgold for the development of the Yaramoko Gold Project include the following groups:

- National, provincial and local government authorities.
- Project affected communities and persons.
- Village Development Committees of the project area communities.
- Artisanal small-scale miners.
- Traditional authorities.
- Vulnerable groups.
- Media and other monitoring bodies.
- Canadian government representatives.
- Civil society and Non-Governmental Organisations (NGOs).
- Community based organisations.
- Commerce and industry.
- Employees and contractors of the Yaramoko Gold Project.
- Financiers (e.g. IFC) and Shareholders.

Regarding the extension project, a specific stakeholder engagement strategy and plan will be developed based on the community analysis (stakeholder mapping), the existing tools and the experience of the Community Relations (CR) team, including presentations of the expansion projects, community representatives' meetings, special committee, public enquiries, billboard and/or broadcasting. In the Bagassi South Zone, the stakeholders include mainly:

- Project Affected Persons (PAP), households and communities (Bagassi South).
- Relevant traditional and political authorities (from Bagassi).
- Responsible government agencies and technical services (BUNEE, COTEVE).
- Interested civil society organizations.

19.3.1 Land Acquisition

One of the main social aspects of this mine extension will be the interaction with the artisanal miners' community. Apart from the requirement of elaborating a Resettlement Action Plan, which addresses such interactions, included in the ESIA process, there is no specific regulation or guidelines in Burkina Faso on this matter. Therefore, the land acquisition and resettlement strategy will be based on the guidelines specified in IFC Performance Standard 5 (PS5).

The ESIA and the RAP including the agreement on land acquisition compensation with the landowners were submitted to the Government in November. The public hearings will occur on November 28 in Bagassi and the Government ESIA/RAP evaluation session beginning of December 2017.

19.4 Mine Closure

There are no specific references to rehabilitation or mine closure requirements in the Environmental Code (L005/97/ADP) or the Environmental and Social Impact Assessment (ESIA) Decree (D2001-342/PRES/PM/MEE). However, the ESIA guideline for mining (*Guide Sectorial D'Étude et de la*

Notice d'Impact Sur L'Environnement des Projets Miniers) refers to the need to develop a rehabilitation and closure plan as part of the ESMP for the project. The rehabilitation and closure plan should include a list of management measures, costs, responsibilities and schedule for implementation of the actions.

A closure plan for the Yaramoko Gold Project has been developed and updated to incorporate plans for the additional Bagassi South Zone mine and infrastructure. Using the existing plan as a reference, the estimated additional cost associated with the closure for the Bagassi South Zone would be \$ 0.34 million for a total of \$4.3 million. This includes an estimated 10 percent of the total for management overhead and 20 percent contingency. The cost estimate is summarized in Table 56.

At the time of final closure, the mine areas should be reclaimed to a safe and environmentally sound condition consistent with closure commitments developed during the life of the project. Specific closure objectives may be tied to the future land use and should be determined in collaboration with local communities and other stakeholders in the area. In the absence of stakeholder input, it has been assumed the preferred final post-closure land use will be a savannah landscape commensurate with the existing small-scale agriculture and livestock grazing land uses.

Table 56: Bagassi South Zone Closure Estimate Summary

Description	Cost
General Cleaning	\$100,000
Underground Infrastructure	\$30,760
Processing Facilities Area	No additional cost (included into the main closure plan)
Waste Dump Facility	\$78,075
Post Closure Monitoring (5 years)	\$50,000
Total Base Estimate	\$258,835
Project Management 10 %	\$25,884
Contingency 20%	\$51,768
Total Estimated Project Cost	\$336,487

During operations, Roxgold will continue to develop closure criteria in communication with the regulatory authority to define specific end-points that demonstrate the closure objectives have been met. A post closure monitoring program will be designed to track progress of the site rehabilitation activities to reach the defined closure criteria.

Seepage water quality from the tailings storage facility will be monitored for a minimum period of three years following closure. If water quality does not meet discharge regulations after this period, monitoring will continue for a further period until acceptable water quality is achieved. In the same way, embankments monitoring will continue after closure. The existing monitoring equipment installed during construction of the infrastructure will be used and maintained for a minimum period of three years following closure.

Re-vegetation success will be monitored to ensure viable, self-sustaining vegetation growth over the rehabilitated areas and to determine if further vegetation support activities are warranted.

20 Capital and Operating Costs

This section summarizes capital and operating cost estimates for two production scenarios:

- Bagassi South Zone feasibility study as a stand-alone project (base case).
- The Yaramoko combined project (55 Zone plus Bagassi South Zone).

The Qualified Person taking overall professional responsibility for this section are Mr. Craig Richards, PEng (APEGA#41653) from Roxgold supported by Mr. Ken Reipas, PEng (APEGA#41653). SRK reviewed the assumptions, parameters, and methods used to prepare the cost estimates and is of the opinion that they are sufficient for supporting the economic analyses of the two production scenarios.

Bagassi South Zone initial capital costs are based on a pre-production period from December 2017 through to December 2018. Also included is a small part of the project indirect costs incurred in 2017. Work on the box cut and underground portal will commence March 2018. Pre-production represents the period prior to first ore (i.e. development ore) being produced from the underground mine.

Bagassi South Zone sustaining capital costs and operating costs are for the period from January 2019 through to early April 2023 which is a 4.3-year production period.

55 Zone mine is in production and there are no initial capital costs defined going forward. 55 Zone sustaining capital costs are estimated for the period from January 2018 through to Q4 2023.

55 Zone operating costs are for the period from January 2017 through 2023.

Operating cost estimates for both Bagassi South Zone and 55 Zone mines are based on a transition from contractor mining (AUMS) to owner mining by Roxgold scheduled for January 1, 2020.

20.1 Capital Cost Estimates

Capital cost estimates were prepared to an accuracy level of +/- 15 % and are presented in US dollars as at the fourth quarter of 2017 (4Q17). Exchange rates used to develop the costs are as follows:

- South African Rand (ZAR) = \$0.069
- Canadian dollar (CAD) = \$0.81
- Australian dollar (AUD) = \$0.80
- Euro (EUR) = \$1.20
- West African Franc (XOF) = \$0.0018
- All other rates were provided in USD

The following items are specifically excluded from the capital cost estimate:

- Escalation of prices
- Financing costs or interest
- Currency exchange rate variations
- GST (it is expected not to apply)

The Bagassi South Zone project total capital cost estimate is \$60.4 million, comprised of \$29.6 million in pre-production capital and \$30.8 million in sustaining capital.

The Bagassi South Zone project cost estimates reflect the joint efforts of Knight Piésold, DRA, AUMS, SRK and Roxgold. Roxgold compiled the capital cost data into the overall cost estimate. Table 57 outlines the responsibilities of each contributor to the cost estimates.

The pre-production capital cost estimates for Bagassi South Zone include the following contingency rates:

- 11.1 percent contingency for supply of mechanical equipment, spares and first fill cost, supply of electrical equipment, supply of steelwork, and supply of plate work.
- 10.0 percent contingency for earthworks, and the supply and install of concrete.
- 10.0 percent contingency for EPCM and consultancy cost.
- 10 percent contingency for general and administration costs, owner’s costs, supply and install of site infrastructure (e.g. camp buildings, ventilation shaft and fan, etc.), freight, and permitting.
- 10 percent contingency for mining pre-production cost.

The overall contingency rate is 10.4 percent (\$2.8 million on pre-production capital). No contingency was applied to sustaining capital. No escalation has been applied to the capital costs.

Table 57: Bagassi South Zone Capital Cost Estimate Responsibility

Company	Responsibility
SRK / AUMS	Design and estimates for -pre-development and sustaining CAPEX and OPEX for the underground mine and its equipment.
DRA	Design and estimate for the processing plant expansion (civil, structural, mechanical, piping, electrical, instrumentation, and control), site and access infrastructure.
Knight Piésold	Design and estimate for the tailings storage facility and water storage dam embankment lifts and related earthworks.
Roxgold /SRK	Owner's costs and miscellaneous surface infrastructure not captured in the scope of work of the contractors.

20.1.1 Pre-Production Capital Costs

Table 58 provides an annual breakdown of the \$29.6 million pre-production capital cost estimate for the Bagassi South Zone project.

Table 58: Bagassi South Zone Pre-Production Capital Cost Estimate

Pre-Production Capital	Total \$M	2017	2018
Mine Development	\$7.93	\$0.00	\$7.93
Plant Expansion	\$7.14	\$0.00	\$7.14
Infrastructure	\$6.01	\$0.00	\$6.01
Environment	\$0.00	\$0.00	\$0.00
Indirects	\$5.72	\$0.59	\$5.14
Contingency	\$2.76	\$0.06	\$2.70
Total Pre-Production Capital	\$29.6	\$0.65	\$28.9

Details of the pre-production capital cost estimate are presented below.

The underground mine will be contractor operated from start up to Q4 2019, and owner operated from Q1 2020 to the end of mine life. This coincides with the contractor-to-owner transition of the 55 Zone mine.

Table 59 provides a breakdown on the underground mine pre-production capital cost estimate.

Table 59: Bagassi South Zone Underground Mine Pre-Production Capital Costs

Mine Capital Details	\$M
Mine Development	
Mine Overheads	\$1.17
Waste Development	\$4.50
Vertical Development	\$0.19
Mine General Services, Haulage & Utilities	\$1.36
Mine Technical Services	\$0.30
Mine Equipment	\$0.42
Contingency	\$0.79
Total Mining	\$8.72

Significant contributions to the Bagassi South Zone mining cost estimates were sourced from unit rates and costs from mining quotations received by Roxgold and SRK. The mining capital cost estimate is based on:

- Contractor (AUMS) quotations for underground mining (as per Section 15) and diamond drilling.
- Actual costs incurred for the construction of similar infrastructure for the development of Yaramoko.
- Actual fuel and electricity rates.
- Quotations for mining equipment and supplies.
- Owners staffing costs provided by Roxgold and fully loaded labour rates.
- A 7.5 percent import duty is added to supplies costs. No value added tax (VAT) is included (i.e. pre-tax capital costs).

Not included in Table 59 are the items listed below, provided by the mining contractor at no initial cost. The cost of these items has been included in the contractor's quoted unit rates.

- Generator (1 megavolt ampere) for initial power at the portal.
- Air compressor and portal water tanks, piping.
- Backfill plant (existing).
- Maintenance workshop and wash bay (existing).
- Offices, stores and change house (existing).
- All electrical distribution supplies and equipment.
- Refuge stations.
- Underground explosives storage (existing).
- Underground radio system.
- Central blasting system.

The construction of the Bagassi South Zone project process facilities and surface infrastructure is based upon an engineering, procurement and construction management (EPCM) approach where the owner assumes the builder’s risk.

Table 60 provides a breakdown of the process pre-production capital cost estimate.

Table 60: Bagassi South Zone Process Pre-Production Capital Costs

Process Capital Details	\$M
Preliminary & general	\$2.39
Civils and earthworks	\$0.40
Structural supply and erect	\$0.13
Plate work supply and erect	\$0.16
Mechanicals supply and install	\$1.66
Piping supply and install	\$0.14
E&I supply and install	\$1.58
Transport	\$0.14
Pre-production / commissioning	\$0.19
Other – fuel, power, water	\$0.36
Contingency	\$0.79
Total Process	\$7.94

The process capital estimate is based on:

- EPCM implementation strategy. It is assumed the EPCM engineer is based in South Africa for the engineering and procurement phase.
- Current wage rates and site safety regulations and work practices.
- Operating international air services with capacity to meet the program schedule.
- Availability of sufficient labour resources in Burkina Faso to undertake the project in a continuous fashion in the timescale envisaged.
- Availability of a construction camp that meets the requirements of the construction workforce.
- Vendor supplied non-binding budgetary quotes for major equipment and materials based on the specifications used for Yaramoko.
- Adequate soil conditions for foundation bearing pressures.
- Bulk materials such as rebar, structural steel and plate, electric cable and piping are all readily available in the scheduled timeframe.
- Capital equipment being available in the timeframes scheduled.
- The estimate of the plant and infrastructure costs are stated exclusive of all taxes, royalties, duties and levies which may be imposed resulting from the purchase and transportation of the materials and use of services. Including but not limited to customs duties, permitting costs, general sales tax, withholding tax, VAT, etc.
- Work visas being granted on a timely basis to key construction expatriates.

Table 61 provides a breakdown of the surface infrastructure and indirect pre-production capital cost estimate.

Table 61: Bagassi South Zone Surface Infrastructure and Owner’s Pre-Production Capital Costs

Infrastructure and Owner's	\$M
Infrastructure	
Boxcut	\$0.75
Settling Ponds	\$0.24
Vent fan and shaft	\$2.19
Mine substation	\$0.14
Mine services holes & rising mains	\$0.05
Offices	\$0.02
Additional Water Supply	\$0.15
Mine Dewatering System	\$0.15
Underground Electrical Distribution	\$0.61
Underground Construction	\$0.19
General Earthworks / Roads	\$0.08
Site Security / Fencing	\$0.40
TSF Embankment Raise	\$1.05
Owner's	
Resettlement Action Plan (RAP) Implementation	\$0.47
Mining permit	\$0.11
Mobile Equipment	\$1.02
Spares / Consumables / First Fills	\$0.38
Freight	\$0.13
Consultants / EPCM Contractors	\$2.66
General & Administrative	\$0.95
Contingency	\$1.17
Total Infrastructure & Owner's	\$12.9

The owner’s cost comprises:

- Construction insurance based on actuals incurred from AON during the construction of Yaramoko.
- Surface infrastructure estimates based on actual costs incurred to construction similar infrastructure for the development of Yaramoko.
- Permitting costs were developed by Roxgold based on Yaramoko experience and actual costs incurred in association with these tasks.
- The salaries are based on Roxgold’s salary grid and data provided by Global 24/7.
- The pre-production general and administration (G&A) costs were developed by Roxgold (factorized based on actuals incurred during the construction of Yaramoko, or operations).
- Owner’s general, training and business systems costs provided by Roxgold.
- Proposals provided by contractors and various consultants.
- Freight estimated at 5 percent of supply costs.
- Spares costs were factorized based on the supply costs of mechanical equipment, electrical and instrumentation, and piping.
- Consumables and first fills were estimated based on operational consumption data and rates.
- Mining and processing working capital costs provided by Roxgold.
- A 7.5 percent import duty is added to supply and equipment costs. No VAT is included (i.e. pre-tax capital costs).

20.1.2 Sustaining Capital Costs

Bagassi South Project

Sustaining capital costs of \$30.8 million for the Bagassi South Project are estimated for the period from January 2019 through to Q1 2023. No escalation has been applied to the capital costs.

Table 62 provides an annual breakdown of the sustaining capital cost estimate for the project. The underground mine sustaining capital cost estimate is shown in Table 63.

When Roxgold takes over the underground mine operations in Q1 2020, it is assumed that Roxgold will purchase the contractor’s mobile mining equipment and fixed plant at their depreciated values. These capital costs are shown in Table 63.

The major fixed plant units to be purchased by Roxgold include:

- A main surface ventilation fan
- Underground electrical power distribution system
- Auxiliary ventilation fans

The sustaining capital for the processing plant expansion was estimated at 1 percent of the initial capital. The tailings storage facility sustaining capital was estimated by Knight Piésold as part of reviewing the annual embankment lift schedule.

Reclamation costs for the Bagassi South Zone mine were estimated based on the existing mine closure cost estimate and unit rates for 55 Zone.

Table 62: Bagassi South Project Sustaining Capital Cost Estimate

Sustaining Capital	Total \$M	2019	2020	2021	2022	2023
Mine	\$25.0	\$17.91	\$6.90	\$0.00	\$0.16	\$0.00
Process	\$0.27	\$0.07	\$0.07	\$0.07	\$0.07	\$0.00
Infrastructure	\$5.14	\$3.65	\$0.28	\$0.12	\$1.09	\$0.00
Environment / Reclamation	\$0.36	\$0.07	\$0.07	\$0.07	\$0.07	\$0.07
Total	\$30.8	\$21.71	\$7.32	\$0.26	\$1.39	\$0.07

Table 63: Bagassi South Project Underground Mine Sustaining Capital Cost Estimate

Mine Sustaining Capital Details	\$M
Mine Overheads	\$3.62
Waste Development	\$6.37
Vertical Development	\$0.38
Mine General Services, Haulage & Utilities	\$4.24
Mine Technical Services	\$0.76
Vehicles and Equipment	
Equipment leases	\$3.34
Buyout - mobile / fixed plant	\$6.26
Total	\$25.0

55 Zone Mine

Sustaining capital costs of \$131 million for 55 Zone are estimated for the period from January 2017 through to Q4 2023. This includes ongoing replacement, rebuilds, improvements on the surface, and underground infrastructure, etc. It does not include exploration drilling. No escalation has been applied to the capital costs.

20.2 Operating Cost Estimate

Operating cost estimates are presented in US dollars as at the first quarter of 2017 and are based on diesel fuel at \$1.06 per liter (\$4.01/US gallon) and electrical power at \$0.23 per kilowatt hour.

Mine operating costs include all direct mining costs and indirect mining costs for delivery of ore to the process plant ROM pad. Indirect mining costs for management, mine services, haulage, utilities, and technical services are partially capitalized based on the ratio of waste tonnes mined as a percentage of the total. Underground mine operations are currently conducted by AUMS with Roxgold providing mine management, mine engineering and geology support. Electrical power and diesel fuel are supplied by Roxgold to the mining contractor.

The existing 55 Zone mine operation has been assigned the full cost of mining overheads including mine management, maintenance, administration and supervision functions. Mining operating costs for the Bagassi South Zone QV1 operations have been estimated based on incremental additional costs that would need to be added if the project is brought into production. Indirect mining costs already included for the 55 Zone cost analysis are excluded from the incremental calculations for the Bagassi South Zone QV1 assessment.

20.2.1 Mine Operating Costs

Bagassi South Zone Feasibility Study Operating Costs

It is planned that the existing AUMS mining services contract will be amended in early 2018 to include the development and operation of the Bagassi South QV1 mine until the end of 2019. AUMS has provided Roxgold with an amended draft schedule of rates for Bagassi South which was used for this analysis.

Incremental increases in manpower and equipment required to operate the Bagassi South QV1 mine were used for the basis of the calculations. A new first principles owner mining cost model was developed based on 2017 budget labour and materials pricing, for the owner operated years of 2020-2023.

Table 64 shows the estimated life-of-mine total site operating costs for Bagassi South Zone as a stand-alone project with operating costs estimated on an incremental basis. Table 64 operating costs are used in Section 21 to demonstrate the economic viability of the Bagassi South Zone project.

Table 64: Bagassi South Zone Stand-Alone Project Operating Costs

Operating Costs	Total \$M	\$/tonne
Underground Mining	\$41.7	\$90.96
Processing	\$10.1	\$22.04
G&A	\$7.8	\$16.93
Site Operating Cost	\$59.6	\$129.93

55 Zone Mine Operating Costs

The 55 Zone mine commenced production in 2016, operated by AUMS under Roxgold management. In 2016, the mine was in a development intensive phase for much of the year to adequately advance development towards full stoping production levels. The actual 2016 mine operating cost for the 55 Zone mine was \$133 per tonne ore mined.

For the period 2017 through 2019, the 55 Zone mining unit costs have been estimated based upon the existing mining services contract with AUMS and the 2017 mine operating budget. The future operating cost estimates for 2017, 2018 and 2019 shown in Table 65 are \$136, \$137 and \$116 per tonne respectively.

For the period 2020-2023, the mining costs are based on conversion to an owner operated mine. Owner mining cost models from the 55 Zone feasibility study by SRK were updated and used for this analysis. A lower operating cost reflecting owner operation is shown in Table 65 beginning in 2020.

Yaramoko Combined Project Operating Costs

Operating costs over the life of the mine from 2017 to 2023 are estimated to total \$348 million. On site operating costs averaging \$154 per tonne processed are estimated for the period from January 1, 2017 through to mid-2023. Refer to Table 65.

Table 65: Yaramoko Combined Project Annual Operating Costs

Costs \$M	LoM \$M	2017	2018	2019	2020	2021	2022	2023
55 Zone	189.1	36.3	37.0	30.9	22.8	23.6	23.5	14.8
BGS	\$42	0	0	16	10	9	5	1
Process	\$65	10.3	10.4	11.5	10.8	9.4	7.7	4.8
G&A	\$53	7.8	7.9	8.4	8.2	7.6	7.0	5.6
Site Total \$M	348.2	54.5	55.4	67.0	52.1	49.5	43.3	26.4
Unit Costs \$/t	LoM\$/t	2017	2018	2019	2020	2021	2022	2023
55 Zone	\$105	\$136	\$137	\$116	\$85	\$88	\$88	\$79
BGS	\$91		\$0	\$155	\$74	\$73	\$75	\$80
Process	\$29	38.6	38.6	30.2	26.6	24.1	22.8	21.0
G&A	\$23	29.4	29.4	22.0	20.1	19.4	20.9	24.4
Site Total \$/t	\$154	\$204	\$198	\$180	\$128	\$127	\$129	\$130

20.2.2 Process Plant Operating Costs

The process plant commenced operation in June of 2016. During the 7-month period to the end of 2016, 162,480 tonnes of ore were processed. The actual operating cost was \$32 per tonne treated, including the cost of power. The 2017 operating budget for the process plant called for treatment of 266,002 tonnes at a total unit cost of \$28.8 per tonne.

Annual process plant operating unit costs will vary with process plant throughput over the life of mine. The input unit costs have been based on the 2017 Yaramoko operating budget. An analysis of the 2017 operating budget showed a 52 percent fixed and 48 percent variable cost split for process plant operating costs.

For the Yaramoko combined project, average annual process plant unit costs will decrease in 2019 and beyond as the Bagassi South QV1 feed is available for processing and the plant expansion is

completed, bringing planned throughput to 1,100 tonnes ore per day. This can be seen in the estimated unit process costs in Table 65.

20.2.3 General and Administrative Operating Costs

General and administrative costs were reviewed by department to examine the required changes to manpower to support the Yaramoko combined project and conversion to owner mining. Additional labour for each of the various support departments was included in the cost calculations. The overall effect of higher process plant throughput and annual gold production result in lower general and administrative unit costs over the life of mine from 2019 and beyond. Refer to Table 65.

21 Economic Analysis

This section summarizes the economic analyses completed demonstrating the viability of two production scenarios:

- Bagassi South feasibility study as an expansion project (base case) to the current in-production 55 Zone underground mine; and
- The Yaramoko combined project (55 Zone plus Bagassi South) that also supports the mineral reserve update for 55 Zone.

55 Zone has been in production since mid-2016 achieving good technical and economic results.

The Qualified Person taking overall professional responsibility for this section is Mr. Benny Zhang, MEng, PEng (PEO #100115459) of SRK. In addition, the following QPs have contributed to this section:

- Mr. Ken Reipas, PEng, SRK Associate, responsible for underground capital cost estimation;
- Mr. Paul Criddle, FAusIMM of Roxgold, responsible for mineral processing;
- Mr. Craig Richards, PEng of Roxgold, responsible for operating cost estimation and surface infrastructure cost estimation with support from Mr. Ryan Hairsine of Roxgold, manager of projects.

The following sections summarize the economic evaluation methodology and results for the Bagassi South feasibility study and the combined Yaramoko project.

21.1 Valuation Methodology

The Bagassi South and the combined Yaramoko project have been valued using a discounted cash flow (DCF) approach. This method of valuation requires projecting yearly cash inflows, or revenues, and subtracting yearly cash outflows such as operating costs, capital costs, royalties, value-added-tax (VAT), and federal taxes, etc. Cash flows are taken to occur at the beginning of each period. The resulting net annual cash flows are discounted back to the date of valuation, January 1, 2017, and totalled to determine net present values (NPVs) at the selected discount rates. The internal rate of return (IRR) is calculated as the discount rate that yields a zero NPV. The payback period is calculated as the time needed to recover the initial capital spent from initial investment start.

The results of the economic analysis represent forward-looking information that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

All monetary amounts are presented in US dollars (USD), unless otherwise specified, and financial results are reported on both post-tax and pre-tax basis.

21.2 Assumptions

The metal prices used in the economic analysis were provided by Roxgold. Price of gold is based on the consensus average long-term metal price.

Table 66 shows the key assumptions used in the economic analysis.

Table 66: Assumptions Used in Economic Analysis

Item	Unit	Value
Gold Price	\$/oz	1,300
Gold Payable	%	99.0
Mill Recovery	%	98.5
Base Case Discount Rate	%	5.0
Exchange Rate		
	CAD to USD	0.76
	AUD to USD	0.73
	EUR to USD	1.09
	XOR to USD	596.92
Royalty		
	1,100 \$/oz	% 3.0
	1,200 \$/oz	% 4.0
	1,300 \$/oz	% 5.0
Depreciation		
	Underground	% 30.0
	Facility	% 20.0
VAT Rate	%	18.0
Federal Tax Rate	%	17.5

The government of Burkina Faso is entitled to a 10% interest in the project. The project economic evaluation results presented in the following sections assume a 100% basis.

The cash flow analysis has been prepared on a constant 2017 US dollar basis. No inflation or escalation of revenue or costs has been incorporated.

21.3 Economics of Bagassi South Zone (Satellite Deposit)

21.3.1 Bagassi South Zone Production and Mill Feed

The quarterly underground mining schedule was condensed into an annual production and mill feed schedule shown in Table 67. Life of mine mill feed totals 458 kilotonnes at a grade of 11.54 g/t gold, containing 170 thousand ounces of gold. Underground ore feed commences in January 2019 and continues for 4.3 years until early April 2023.

It is assumed all underground ore will be stockpiled adjacent to the crusher and rehandled in a short time frame to the plant as required to meet the processing schedule. The stockpile will be comprised mainly from the 55 Zone production and equivalent to two to three months of production serving as a buffer between underground mining and process plant operation.

Table 67 includes annual estimates of recovered gold, based on the projected overall process recovery estimate of 98.5 percent presented in Section 16. A slightly lower recovery than the actual plant performance of 99 percent during 2016-2017 was selected. Recovered gold is estimated to total 168 thousand ounces of gold over the mine life, for an average of 37.3 thousand ounces per year over the 4.5-year underground ore processing period. Payable gold after refinery losses and deductions is estimated at 99 percent of recovered gold or 166 thousand ounces of gold over the mine life.

Table 67: Mine Production and Mill Feed Schedule

	Unit	Total	2018	2019	2020	2021	2022	2023
UG Ore Mined	kt	458	10	105	140	123	67	14
	g/t	11.54	8.97	12.93	12.16	11.40	9.61	7.21
	koz	170	3	43	55	45	21	3
Plant Feed	kt	458		114	140	123	67	14
	g/t	11.54		12.59	12.16	11.40	9.61	7.21
	koz	170		46	55	45	21	3
Recovered Gold	koz	168		46	54	45	20	3
Paid Gold	koz	166		45	53	44	20	3

21.3.2 Cost Estimates for Bagassi South Project

Capital and Operating Costs

Capital and operating cost estimates are presented in Section 20 of this report. Initial capital is estimated at \$29.6 million and sustaining capital is estimated at \$30.7 million.

As presented in Section 20, life of mine on-site operating costs average \$129.93/t milled. Off-site operating costs consisting of doré transport and refining are estimated at \$2/oz of recovered gold.

Capital and operating cost estimates are based on a diesel fuel price of \$1.06/L and an electricity cost of \$0.23/kWh. The electricity cost is based on utilizing grid power supplied by the Burkina Faso electricity utility. A power line connecting the mine to the utility is included within the initial project capital cost estimate.

All cost estimates are in US dollar currency as of the first quarter 2017.

Closure and Salvage Value

The mine closure cost as presented in Section 20 is estimated at \$0.4 million, assumed to be incurred in five years (to 2023).

No allowances for salvage value of equipment and facilities are included in the project economic evaluation.

Working Capital

It is estimated that approximately one week of gold production will be contained within mill circuits and between one to two weeks of gold production will be in doré inventory on site or in transit to the refinery. These delays in the receipt of gold revenue contribute to project working capital requirements. Working capital is also required to maintain an operating supplies inventory. It is planned that approximately three months of operating supplies will be purchased in advance and stored on site. Accounts payable, estimated at one month operating cost, partially offsets these working capital requirements.

All-in Unit Cost Estimates

Estimated unit costs, based on World Gold Council non-GAAP metrics, are summarized in Table 68 below. The project is expected to produce gold at an all-in sustaining cost (AISC) of \$630/oz of payable gold.

Table 68: All-in Sustaining Cost

	\$M	\$/payable oz	\$/t milled
Operating Cost			
Mining	42	251	91
Processing	10	61	22
G&A	8	47	17
Refining	0.3	2	0.7
Cash Operating Cost	60	361	131
Royalties	11	65	24
Total Cash Costs	71	426	154
Sustaining Capital	31	185	67
Corporate G&A	19	19	7
All-in Sustaining Cost	121	630	228

Taxes and Royalties

A number of taxes and royalties are included in the economic evaluation, as described below. Roxgold provided SRK with advice on Burkina Faso mining legislation and taxation and worked together with SRK in the modelling of the tax treatment.

Government Royalty

The government of Burkina Faso assesses a gross revenue royalty on gold projects, with the royalty rate varying according to the world gold price. For gold prices, less than \$1,100 per ounce, the rate currently is 3.0 percent. For gold prices, greater than or equal to \$1,100 per ounce and less than \$1,200 per ounce the rate rises to 4.0 percent. For \$1,300 per ounce and higher gold prices the rate is 5.0 percent.

Duties and Levies

The government of Burkina Faso assesses a customs duty of 5 percent and other levies totaling 2.5 percent on imported goods. During a project pre-production period, the company is exempt from the customs duty but the other levies are applicable. After start-up all imported goods are assessed a total of 7.5 percent duties and levies. Project capital and operating cost estimates include allowances for government duties and levies.

Value Added Tax

Burkina Faso has a VAT rate currently set at 18 percent. The VAT is refunded with the exception of VAT on fuel. In this study, the base case diesel fuel price of \$1.06 per litre includes non-refundable VAT.

A detailed estimation of VAT for each non-fuel item has not been completed for this study. For the purposes of cash flow forecasting it is assumed that VAT is applicable on 100 percent of the capital costs and 100 percent of the operating costs and is refunded ten months after it is charged.

Corporate Income Tax

A federal tax rate of 17.5 percent is applicable on income after deductions for gold mining projects in Burkina Faso. Deductions from income for the purpose of estimating income subject to tax include the following items:

Depreciation

SRK understands that there are a large number of asset classes with varying depreciation rates. Roxgold provided the following guidance as a conservative approximation of depreciation.

Underground development and facilities are depreciated using 30 percent declining balance method. All other facilities are depreciated using a 20 percent declining balance. Depreciation commences once the facilities are placed into service and the mine and mill are operating (i.e. 2016). Using the declining balance approach equipment and facilities are not fully depreciated over the mine life. Under base case assumptions un-depreciated assets at the end of the mine life total \$10 million.

Carry Forward Costs

SRK understands that sunk exploration and other eligible project costs can be carried forward and deducted from income. Roxgold estimates that its eligible sunk project costs total \$10 million.

Mine operating losses can also be carried forward and deducted from income in future years.

Other Deductions

Other deductions from income for the purposes of estimating income subject to tax include management fees and interest expenses.

Withholding Taxes

The government of Burkina Faso assesses withholding taxes of 6.25 percent on interest income and dividends.

21.3.3 Economic Results for Bagassi South Project

Base case economic results as summarized in Table 69 are favourable for the Yaramoko Bagassi South project. The project pre-tax NPV_{5%} is \$68 million at the base gold price of \$1,300 per ounce. Project post-tax NPV_{5%} at \$1,300 per ounce of gold is \$50 million. Internal rates of return (IRR) are respectively 75 percent pre-tax and 53 percent after-tax.

The government of Burkina Faso is entitled to a 10 percent interest in the project. Roxgold's 90 percent interest is expected to provide an NPV_{5%} of \$45 million and an IRR of 53 percent at a gold price of \$1,300 per ounce.

At a gold price of \$1,300 per ounce, the project payback period is expected to be less than two years.

The government of Burkina Faso is estimated to receive an undiscounted \$37 million from the Yaramoko Bagassi South project in the form of royalties, dividends, corporate taxes, and withholding taxes. This excludes VAT, duties and levies paid by Roxgold and by its suppliers and contractors.

Table 69: Base Case Economic Results Summary for the Bagassi South Project

	Units	LoM Total	2017	2018	2019	2020	2021	2022	2023	2024	2025
Gold Revenue											
Gold Price	\$/oz	1,300		1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Gold Sales	000 oz	166			45	53	44	20	3		
Gold Sales Gross Revenue	\$M	216			59	69	57	26	4		
Operating Costs											
Mining	\$M	-42			-16	-10	-9	-5	-1		
Processing	\$M	-10			-3	-3	-3	-2	0		
G&A	\$M	-8			-2	-2	-2	-1	-1		
Gold transport and refining	\$M	0			0	0	0	0	0		
Total Opex excluding royalty	\$M	-60			-21	-15	-13	-8	-2		
Royalty	\$M	-11			-3	-3	-3	-1	0		
Total Opex including Royalty	\$M	-71			-24	-19	-16	-10	-3		
EBITDA	\$M	145			35	51	41	17	2		
Capital and Closure Costs											
Development capital	\$M	-30	-1	-29							
Sustaining capital	\$M	-31			-22	-7	0	-1	0		
Closure	\$M	0			0	0	0	0	0		
Total capital and closure costs	\$M	-60	-1	-29	-22	-7	0	-1	0		
Working Capital	\$M	0	0	0	-2	-1	1	1	1	0	0
Total Taxes	\$M	-16	0	0	-8	-9	-2	0	2	1	0
Attributable FCF	\$M	69	-1	-29	4	33	40	16	4	1	0
Withholding Tax on Dividends to Parent Company	\$M	-4	0	0	0	0	-2	-1	0	0	0
Project Net Cash Flow, pre-tax	\$M	85	-1	-29	11	42	41	17	2	0	--
NPV _{5%}	\$M	68									
NPV _{7.5%}	\$M	61									
NPV _{10%}	\$M	55									
IRR	%	75									
Payback Period	years	1.4									
Project Net Cash Flow, after-tax all equity basis	\$M	64	-1	-29	4	33	37	15	4	1	0
NPV _{5%}	\$M	50									
NPV _{7.5%}	\$M	44									
NPV _{10%}	\$M	39									
IRR	%	53									
Payback Period, after-tax	years	1.8									

21.3.4 Sensitivity Analysis of Bagassi South Zone

The project’s NPV_{5%} and IRR sensitivity to changes in gold price is shown in Table 70 and Table 71. The base case price of \$1,300 per ounce provides a post-tax NPV_{5%} of \$50 million and a 53 percent IRR on a 100 percent project basis.

If the gold price rises 15 percent to \$1,500 per ounce the after-tax NPV_{5%} would rise 42 percent to \$71 million and the IRR would rise to 73 percent. Conversely, a 15 percent reduction in the gold price to \$1,100 per ounce results in a 38 percent drop to \$31 million and a reduction in IRR to 34 percent. At the lower price, the payback period rises from 1.8 years to 2.3 years.

Table 70: Project Economics Sensitivity to Gold Price and Discount Rate

NPV (Millions)	Pre-tax		
	5.0%	7.5%	10.0%
Discount Rate			
	1,000	31	27
	1,100	43	38
	1,200	57	50
	1,300	68	61
	1,400	82	74
	1,500	95	86
	1,600	108	98
Gold Price (\$/oz)	After-tax		
	5.0%	7.5%	10.0%
	1,000	21	17
	1,100	31	26
	1,200	41	36
	1,300	50	44
	1,400	61	54
	1,500	71	64
	1,600	82	73

Table 71: Project Pre-tax and After-tax NPV and IRR Sensitivity to Gold Price

Pre-tax	\$1,100/oz	\$1,200/oz	\$1,300/oz	\$1,400/oz	\$1,500/oz
NPV _{5%} (\$M)	43	57	68	82	95
IRR (%)	50%	63%	75%	88%	100%
Payback (Years)	1.8	1.6	1.4	1.3	1.2
After-tax	\$1,100/oz	\$1,200/oz	\$1,300/oz	\$1,400/oz	\$1,500/oz
NPV _{5%} (\$M)	31	41	50	61	71
IRR (%)	34%	44%	53%	63%	73%
Payback (Years)	2.3	2.0	1.8	1.7	1.6

Table 72 shows the project after-tax NPV_{5%} and IRR sensitivities to the gold price, project capital cost, project operating cost, and plant feed gold grade.

Figure 66 and Figure 67 show the visualized after-tax NPV_{5%} and IRR sensitivities, corresponding to Table 72 datasets.

Table 72: Project After-tax NPV and IRR Sensitivities

Variables	Range	After-Tax NPV (M\$)	Post-Tax IRR
Base Case Post Tax NPV and IRR at 5% Discount Rate:		50	53%
Gold Price	25%	84	86%
	15%	71	73%
	10%	64	66%
	0%	50	53%
	-10%	37	41%
	-15%	30	34%
	-25%	16	22%
Project Capital Cost	25%	39	35%
	15%	44	41%
	10%	46	45%
	0%	50	53%
	-10%	55	63%
	-15%	57	69%
	-25%	62	82%
Project Operating Cost	25%	40	42%
	15%	44	47%
	10%	46	49%
	0%	50	53%
	-10%	54	58%
	-15%	56	60%
	-25%	60	64%
Gold Grade	25%	84	86%
	15%	71	73%
	10%	64	66%
	0%	50	53%
	-10%	37	40%
	-15%	30	33%
	-25%	16	19%
Limits	Max Worse Case	16.0	19%
	Max Best Case	84.0	86%

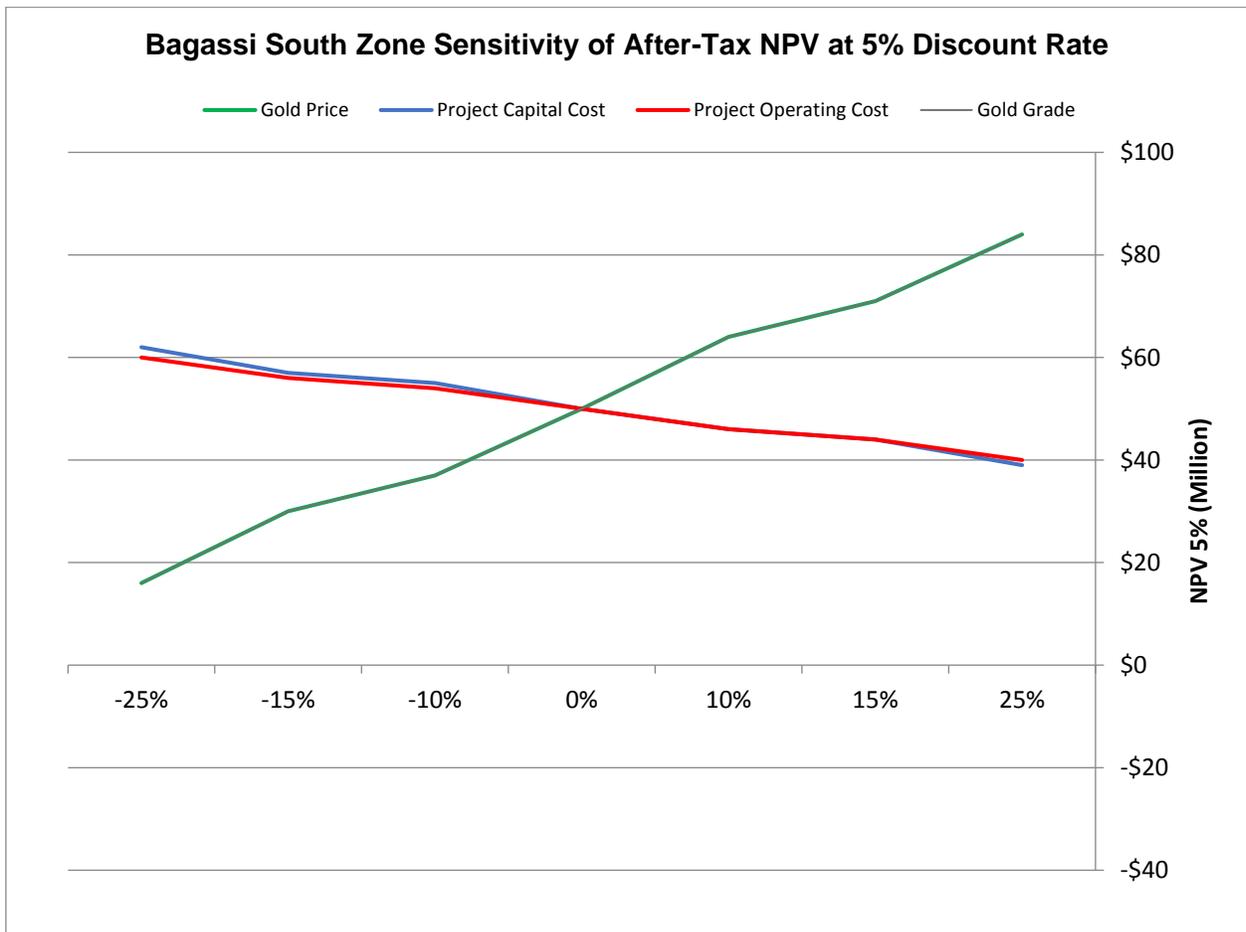


Figure 66: Bagassi South Zone After-tax NPV_{5%} Sensitivity

Note: Gold Price and Gold Grade sensitivity lines are overlapped

A review of Figure 66 and Figure 67 shows that, like most mining projects, the NPV_{5%} and IRR are most sensitive to changes in revenue parameters, which include gold price, process plant head grade.

The project NPV_{5%} sensitivity to changes in capital costs is nearly the same as sensitivity to operating costs. This is attributed to the fact that total base case capital costs are about the same as total operating costs excluding royalties.

The IRR is more sensitive to changes in project capital costs, which are weighted heavily at the front-end of the project, than to operating costs.

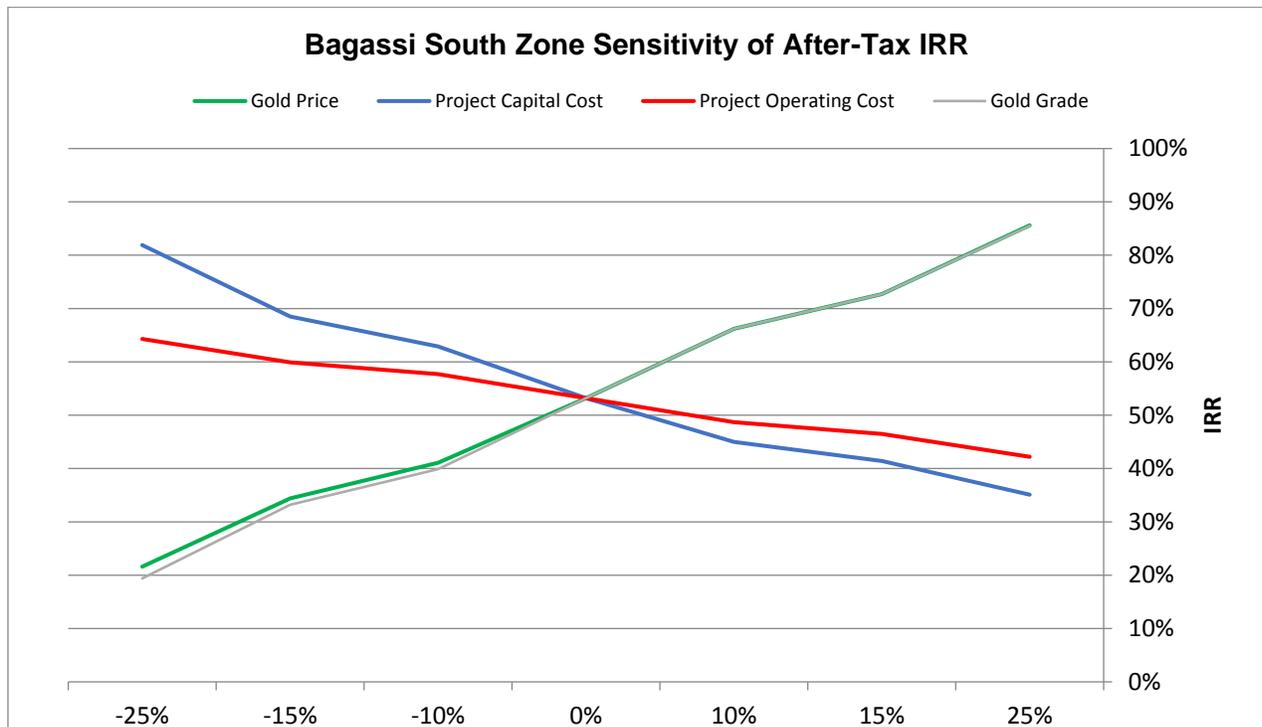


Figure 67: Bagassi South Zone IRR Sensitivity

21.4 Economics of Yaramoko Combined Project

21.4.1 Yaramoko Combined Project Production and Mill Feed

Both 55 Zone and Bagassi South quarterly underground mining schedules were condensed into an annual production and mill feed schedule shown in Table 73. Life of mine mill feed totals 2,280 kilotonnes at a grade of 11.50 g/t gold, containing 843 thousand ounces of gold. Underground ore feed commences in January 2017 and continues for 7 years until the end of 2023.

It is assumed all underground ore will be stockpiled adjacent to the crusher and rehandled to the plant as required to meet the processing schedule. The stockpile size is already established as of the beginning of 2017 and equivalent to two to three months of production serving as a buffer between underground mining and process plant operation.

Table 73 includes annual estimates of recovered gold, based on the projected overall process recovery estimate of 98.5 percent presented in Section A slightly lower recovery than the actual plant performance of 99 percent during 2016-2017 was selected. Recovered gold is estimated to total 831 thousand ounces over the mine life, for an average of 119 thousand ounces per year over the 7-year ore processing period. Payable gold after refinery losses and deductions is estimated at 99 percent of recovered gold or 822 thousand ounces of gold over the mine life.

Table 73: Mine Production and Mill Feed Schedule

	Unit	Total	2017	2018	2019	2020	2021	2022	2023
55 Zone UG Ore Mined									
	kt	1,796	267	270	267	267	268	268	189
	g/t	11.47	13.02	14.63	13.59	11.25	10.33	7.06	9.93
	koz	662	112	127	117	96	89	61	60
Bagassi South UG Ore Mined									
	kt	458		10	105	140	123	67	14
	g/t	11.54		8.97	12.93	12.16	11.40	9.61	7.21
	koz	170		3	43	55	45	21	3
Total Ore Mined									
	kt	2,254	267	279	372	406	391	336	203
	g/t	11.48	13.02	14.43	13.40	11.56	10.67	7.57	9.74
	koz	832	112	130	160	151	134	82	64
Stockpile									
	kt	26	26						
	g/t	13.26	13.26						
	koz	11.1	11.1						
Plant Feed									
	kt	2,280	267	270	381	406	391	336	229
	g/t	11.50	13.02	14.63	13.29	11.56	10.67	7.57	10.14
	koz	843	112	127	163	151	134	82	75
Recovered Gold	koz	831	110	125	161	149	132	80	74
Paid Gold	koz	822	109	124	159	147	131	80	73

21.4.2 Cost Estimates for Yaramoko Combined Project

Capital and Operating Costs

Capital and operating cost estimates are presented in Section 20 of this report. It is an operating mine, therefore, there is no initial capital defined. Sustaining capital for the combined project is estimated total of \$172 million (excluding the Bagassi South pre-production capital of \$29.6 million).

As presented in Section 20 life of mine on-site operating costs average \$154 per tonne milled. Off-site operating costs consisting of doré transport and refining are estimated at \$2 per ounce of recovered gold.

Capital and operating cost estimates are based on a diesel fuel price of \$1.06 per litre and an electricity cost of \$0.23 per kilowatt hour. The electricity cost is based on utilizing grid power supplied by the Burkina Faso electricity utility. A power line connecting the mine to the utility is included within the project capital cost estimate.

All cost estimates are in US dollar currency as of the first quarter 2017.

Working capital, taxes and royalties, duties and levies, VAT, corporate income tax, depreciation, etc. use the same rules as discussed in Section 21.3.2.

All-in Sustaining Cost Estimate

Estimated unit costs, based on World Gold Council non-GAAP metrics. The combined project is expected to produce gold at an all-in sustaining cost (AISC) of \$572 million or \$695 per ounce of payable gold, excluding corporate G&A and Bagassi South pre-production capital.

21.4.3 Economic Results for the Yaramoko Combined Project

Base case economic results as summarized in Table 74 are favourable for the Yaramoko combined project. The project pre-tax NPV_{5%} is \$380 million at the base gold price of \$1,300 per ounce. Internal rates of return (IRR) are not applicable because it is a production mine with no negative annual cash flow during the mine life.

The government of Burkina Faso is entitled to a 10 percent interest in the project. Roxgold's 90 percent interest is expected to provide an after-tax NPV_{5%} of \$272 million at a gold price of \$1,300 per ounce.

The combined project payback period is not applicable because it is in production with relatively minimal carry forward capital (\$10 million).

The government of Burkina Faso is estimated to receive an undiscounted \$121 million from the Yaramoko combined project in the form of royalties, dividends, corporate taxes, and withholding taxes. This excludes VAT, duties and levies paid by Roxgold and by its suppliers and contractors.

Table 74: Base Case Economic Results Summary for the Yaramoko Combined Project

	Units	LoM Total	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Gold Revenue													
Gold Price	\$/oz	1,293	1,250	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Gold Sales	000 oz	822	109	124	159	147	131	80	73				
Gold Sales Gross Revenue	\$M	1,063	136	161	207	192	170	104	95				
Operating Costs													
Mining	\$M	-231	-36	-37	-47	-33	-33	-29	-16				
Processing	\$M	-65	-10	-10	-12	-11	-9	-8	-5				
G&A	\$M	-53	-8	-8	-8	-8	-8	-7	-6				
Gold transport and refining	\$M	-2	0	0	0	0	0	0	0				
Total Opex excluding royalty	\$M	-350	-55	-56	-67	-52	-50	-43	-27				
Royalty	\$M	-52	-5	-8	-10	-10	-8	-5	-5				
Total Opex including Royalty	\$M	-402	-60	-64	-78	-62	-58	-49	-31				
EBITDA	\$M	662	76	97	129	130	112	55	63				
Capital and Closure Costs													
Mine capital	\$M	-179	-24	-44	-68	-22	-13	-9	-1				
55 Zone	\$M	-131	-24	-27	-44	-14	-13	-9	-1				
Bagassi South	\$M	-49	0	-17	-24	-8	0	0	0				
Processing capital	\$M	-10		-9	0	0	0	0	0				
Other (tailings pond, closure, etc)	\$M	-11	0	-2	0	-1	-1	-3	-3				
Total capital and closure costs	\$M	-201	-24	-54	-68	-24	-14	-13	-4				
Changes in Working Capital	\$M	-5	-1	1	2	0	-1	-3	1	-3			
VAT Paid (-) or Refund (+)	\$M	5	-6	-4	-5	9	1	1	3	4			
Other Cash Expenditures	\$M	-4	0	0	-1	-1	-1	-1	0	0	0	0	0
Project Net Cash Flow, pre-tax	\$M	467	49	38	53	114	99	46	62	7	0	0	0
NPV _{5%}	\$M	380											
NPV _{7.5%}	\$M	346											
NPV _{10%}	\$M	315											
IRR	%	N/A											
Payback Period	years	N/A											
Income Tax with Interest & mgmt Fee Deduction	\$M	-106	-48	-6	-26	-74	-5	26	-19	40	5	0	0
Withholding Tax on Interest and Dividends	\$M	-12	0	-1	0	-1	-4	-2	-3	0	0	0	0
Dividends to Burkina Faso Government	\$M	-17	0	0	0	0	-7	-4	-5	-1	0	0	0
Roxgold After-Tax Net Cash Flow	\$M	332		31	27	39	83	65	35	45	5	0	0
NPV _{5%}	\$M	272											
NPV _{7.5%}	\$M	245											
NPV _{10%}	\$M	223											
IRR	%	N/A											
Payback Period	years	N/A											

22 Adjacent Properties

While the Yaramoko Gold Project is located in an area of Burkina Faso that hosts several other gold deposits, there are no adjacent properties that are considered relevant to the purpose of this technical report.

23 Other Relevant Data and Information

The Yaramoko Gold Project has significant Inferred resources adjacent to current mineral reserves, which may contribute to a longer mine life and increased production rates at times for the property. Inferred resources have been delineated both at depth for 55 Zone and along strike at the Bagassi South Zone's key structures in QV1 and QV'. Roxgold anticipates establishing underground drilling programs in the future to specifically infill drill these Inferred resource blocks.

These Inferred resources have been incorporated into Roxgold's internal mine plans to generate an estimate of potential plant feed that incorporates estimates of external dilution and mining recovery's. Although not reported as reserves, the additional potential plant feed material estimated is indicative of mine life extensions considered possible at Yaramoko.

Most of the 55 Zone potential plant feed additional tonnes are located at depth below the mine bottom planned for extraction of Mineral Reserves, and represent an extension of the main vein structure currently being mined (see Figure 68).

Bagassi South potential plant feed additional tonnes are sourced from structures QV1 (56 percent) and QV' (44 percent). At QV1 the potential plant feed material is mainly located on extensions along strike of the mining levels planned for mining mineral reserves. The QV' vein is parallel to QV1 and offset horizontally 150 to 180 metres. Three additional, deeper mining levels are planned to access the deepest portion of the potential plant feed material sourced from QV1, and seven additional levels are planned to access the offset portion of the potential plant feed material sourced from QV'. Refer to Figure 69.

Planned mining methods for potential plant feed include continuation of the existing longhole method currently employed at the 55 Zone, and for the Bagassi South Zone, the same feasibility study longhole method planned for extraction of mineral reserves. For each of 55 Zone and Bagassi South Zone, underground infrastructure requirements to access potential plant feed are limited to deepening the main access ramp, level development, and extending ventilation and other services.

The 55 Zone potential plant feed is estimated to contain 342,000 additional ounces of gold at an estimated grade of 10.1 g/t gold. The Bagassi South Zone potential plant feed is estimated to contain 54,000 additional ounces of gold at an estimated grade of 11.1 g/t gold.

Table 75 below illustrates the potential production profile at Yaramoko when PPF material from both 55-Zone and Bagassi South is added to current Mineral Reserves to extend mine life from 2023 base case (Mineral Reserves only) to 2027.

The reader is cautioned that potential plant feed is mainly based on Inferred mineral resources, which are considered too speculative to have economic factors applied to them. As a result, there is no certainty that the potential plant feed may be realized. Inferred mineral resources are not mineral reserves and do not have demonstrated economic viability.

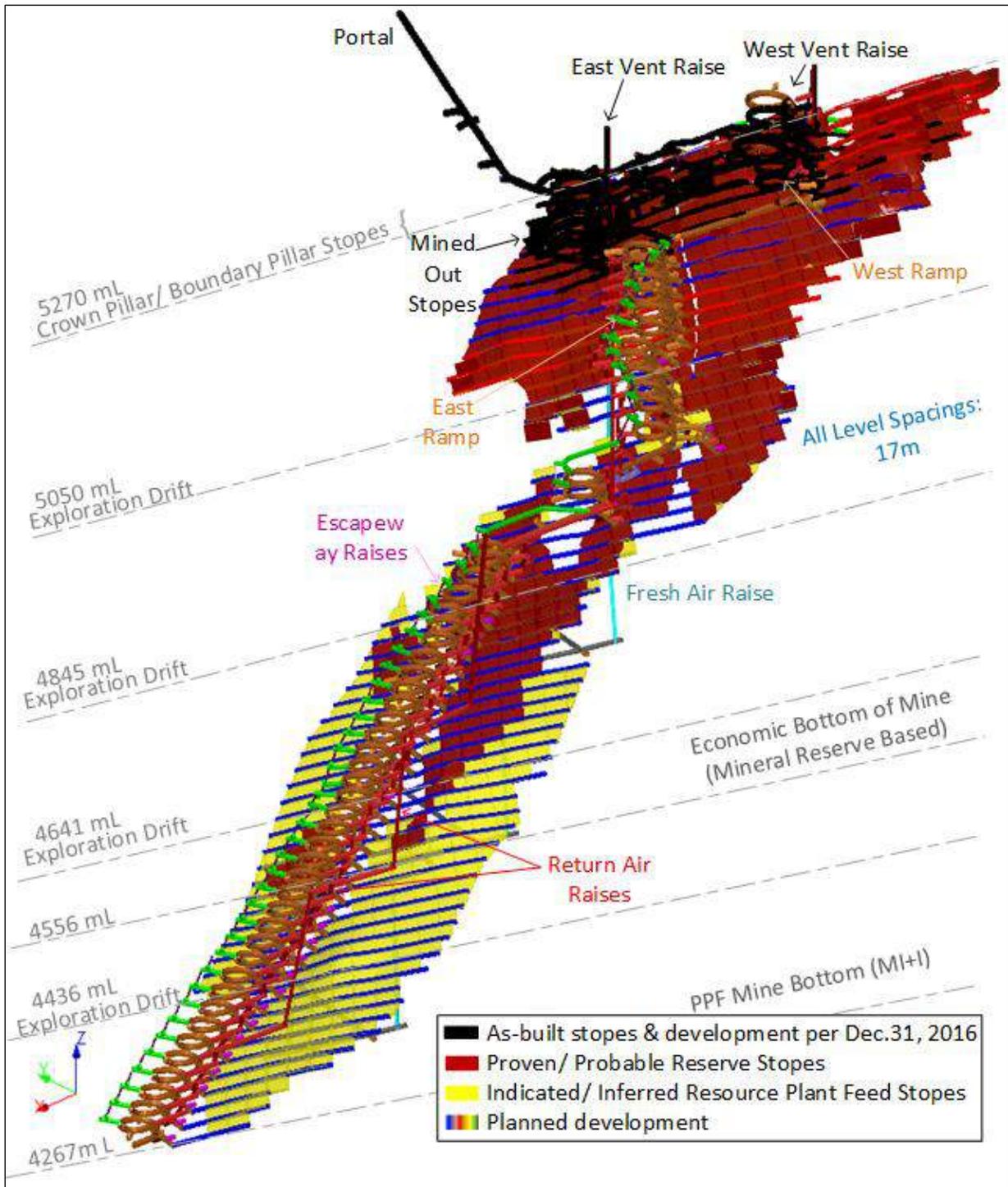


Figure 68: 55 Zone Isometric View - Location of Potential Plant Feed

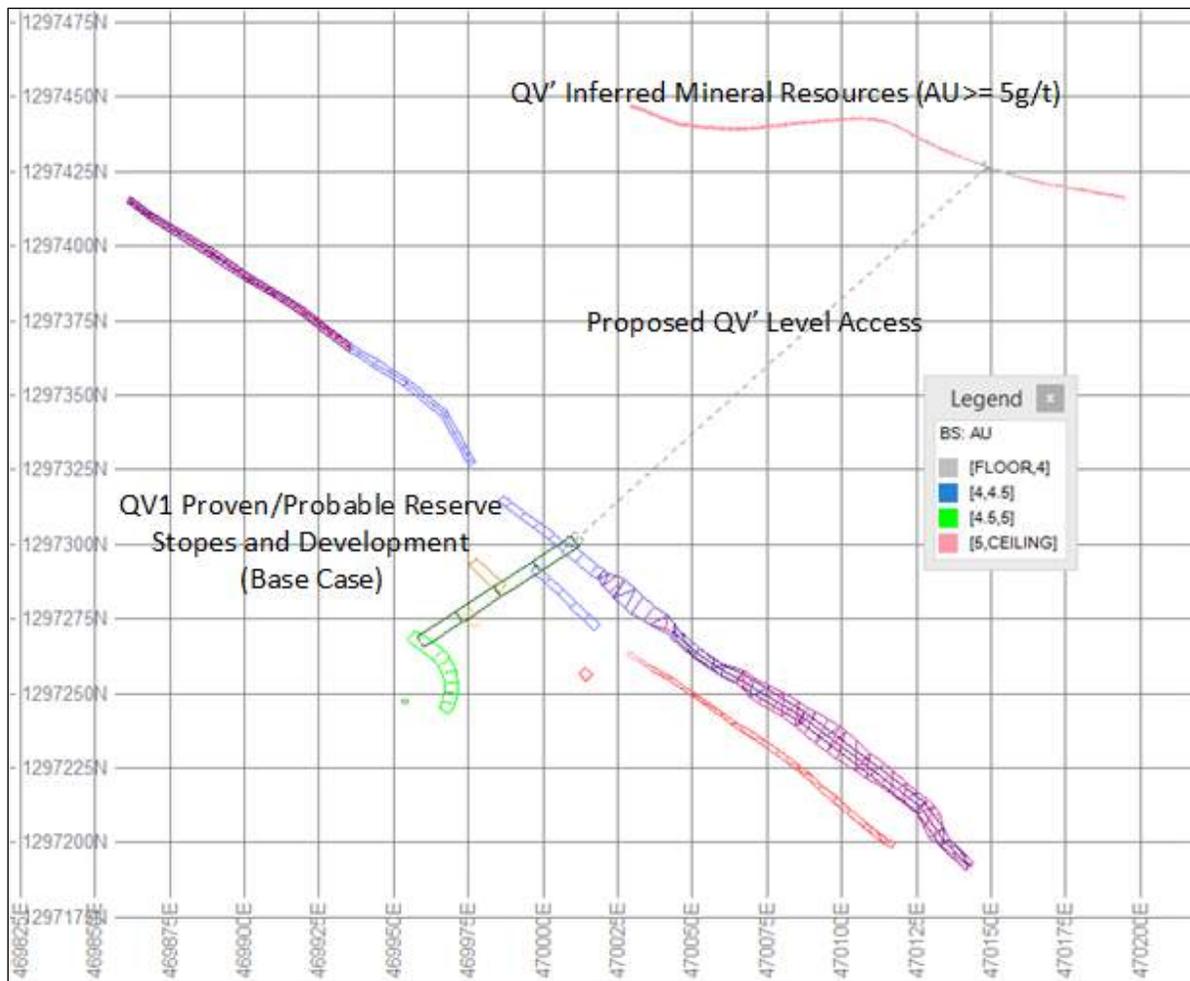


Figure 69: Conceptual Bagassi South Zone 5175 Level Plan View– Location of Potential Plant Feed (25 Metre Grids)

Table 75: Yaramoko Gold Project Production Profile – Including Potential Plant Feed

	Units	Total	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
55 Zone													
Tonnes Mined	kt	2,850	267	270	267	267	268	269	271	270	271	247	184
Grade Mined	Gold g/t	11.0	13.0	14.6	13.6	11.3	10.3	7.1	8.3	9.0	9.3	10.3	15.1
Contained Mined	000'oz	1,005	112	127	117	97	89	61	72	78	81	81	90
Bagassi South Zone													
Tonnes Mined	kt	608	-	10	105	140	151	143	61	-	-	-	-
Grade Mined	Gold g/t	11.4	-	9.0	12.9	12.2	11.5	10.5	9.7	-	-	-	-
Contained Mined	000'oz	224	-	2.8	43	55	56	48	19	-	-	-	-
Total with Potential Plant Feed													
Tonnes Mined	kt	3,458	267	279	372	406	419	412	331	270	271	247	184
Grade Mined	Gold g/t	11.0	13.0	14.4	13.4	11.6	10.8	8.2	8.6	9.0	9.3	10.3	15.1
Contained Mined	000'oz	1,228	112	130	160	151	145	109	91	78	81	81	90

24 Interpretation and Conclusions

24.1 Introduction

SRK was mandated by Roxgold to prepare a revised mineral resource model for the 55 Zone. This mandate also incorporated support to Roxgold to prepare an updated mineral reserve statement and accompanying life of mine plan. SRK has also supported Roxgold undertaking a feasibility study for the Bagassi South Zone leading to the maiden Mineral Reserve Statement for the Bagassi South Zone accompanied by a life of mine plan. SRK collaborated with Roxgold to demonstrate the economic viability of the Bagassi South Zone underground project and an expansion of the onsite process plant targeting the Indicated mineral resources defined in the Bagassi South Zone of the Yaramoko Gold Project.

This technical report summarizes the results and findings from each technical discipline, including exploration, geological modelling, mineral resource and mineral reserve estimation, mine design, process design, infrastructure design, environmental management, capital and operating costs and economic analyses. The level of investigation for each of these areas is consistent with industry best practice.

The financial analysis demonstrates the robust economics of the proposed Bagassi South Zone mine applying the base case assumptions.

The financial analysis performed from the results of the Yaramoko combined project also clearly demonstrates the robust economics of the proposed Bagassi South Zone mine applying the base case assumptions.

Mining activities to date have essentially confirmed that the actual results of mining within the 55 Zone adequately reconcile to that modeled and planned. The following summarize discipline status, risks and opportunities primarily associated with the feasibility study for the Bagassi South Zone and its contribution to the combined Yaramoko project.

24.2 Geology and Mineral Resources

24.2.1 General

During 2017, an updated mineral resource model for the 55 Zone was developed which incorporated all drilling completed in 2016. A total of 62 bore holes were drilled in 2016, of which 47 bore holes totalling 9,613 metres targeted the upper portion of the 55 Zone and mostly consisted of infill drilling. These bore holes were drilled to increase drilling resolution around areas within the current mine plan. The remaining 15 holes which totalled 13,658 metres focused on extending the zone at depth below the Inferred resource boundary. The two primary goals of the program were to convert a portion of the current Inferred Resource to Indicated Resource status and to test the 55 Zone extension down plunge below the Inferred Resource boundary.

The Company resumed drilling at 55 Zone in the second quarter of 2017 with an 8 bore holes drilling program following-up on the 2016 deep drilling program targeting the downhole extension to a depth of approximately 1,100 metres below the topographic surface.

At Bagassi South, the company resumed drilling in 2017 by undertaking an infill and extensional drilling program along the QV1 and QV' structures, a total of 33,658 meters of drilling were completed for this program as of the end of the third quarter. The program was primarily designed to infill the QV1 structure with sufficient additional intercepts to support the conversion of the existing inferred MRE to indicated status. A secondary goal of the program was to test the extent of the mineralized shoot along the QV' structure which is located along the contact between the basalt flows and the Bagassi granite and was initially outlined by the 2016 fourth quarter drilling program. The drilling program along the QV' structure will be on-going during the fourth quarter.

24.2.2 Risks

The robustness of the Bagassi South resource model was tested using various assumptions and parameters (compositing, capping, and boundary treatment). The results show that the block model is relatively insensitive to slight changes in the modelling assumptions considered. As the model is only based on surface drilling, there is a risk, however, that at the reporting cut-off grade, the Inferred tonnage and grade estimates are over or under estimated.

There is also the risk that the extent of the gold mineralization is different than the constraining domains used. There is a risk that the higher-grade zones may be less continuous than modelled. This risk is, however, considered low because the geometry of the modelled structure is based on structural geology investigations from oriented core.

24.2.3 Opportunities

There is a good opportunity to increase and upgrade mineral resources at Bagassi South. Exploration work completed by Roxgold elsewhere on the property also present an opportunity to define additional, near surface gold mineral resources at Yaramoko.

24.3 Underground Mining

Since construction, the 55 Mine has met design tonnage and gold production targets and has been developed ahead of schedule and is a reliable, yet flexible operation. The end of 2016 mineral reserve estimate for the 55 Zone deposit stated herein incorporates significant additional geological data and knowledge from production to date. The extended mineral reserves have been delineated to a depth of approximately 750 metres. Mine production rates can be sustained from these reserves until late 2023.

The longhole open stoping mining method in use at 55 Zone mine is well-suited to the extraction of the orebody its use should be continued. The mine infrastructure has been well constructed and meets the long-term needs of the continued mine operations.

The Bagassi South QV1 deposit has been studied to a feasibility study level of detail in 2017. From this work, the company has stated mineral reserves of 458,000 tonnes, grading 11.54 g/t for Bagassi South. The deposit is amenable to the same longhole stoping mining method in use at the 55 Zone mine.

The high-grade nature of the deposit and its proximity to the 55 Zone mine and Yaramoko processing facilities contribute to robust economic outcomes from a potential 350-tonne-per-day Bagassi South mine and expansion of the Yaramoko process plant to 1,100 tonnes per day.

Potential mine operations on the Bagassi South deposit should be integrated into the 55 Zone mine operations to provide synergy through sharing of mine equipment and personnel.

24.3.1 Risks

External Dilution

There is a risk of increased external dilution beyond the planned amount. Excessive gouging of wall rocks during development could lead to more wall rock dilution than planned, as could excessive deviation of blast holes. This would reduce the mill head grade and have a negative impact on revenue.

24.3.2 Opportunities

Additional Mineral Resources

Additional mineral reserves may be identified from future diamond drilling infill programs which could lead to a higher annual production rate to be targeted on an increased mine life.

Optimization of Mine Design and Contract

Preparing Life of Mine (LoM) plans that consider synergies in personnel and equipment requirements for both the 55 Zone and Bagassi South deposits, may lead to reduced manning and equipment levels.

24.4 Processing and Infrastructure

24.4.1 Risks

Processing Plant and Ancillary Facility Construction Costs and Schedule

The simplicity of the flow sheet, the modularity of the expansion, and the relatively small size of the proposed processing plant expansion and ancillary infrastructures help reduce the risks associated with the processing and infrastructure aspect. The main risks to the project are cost overrun and schedule of construction and commissioning.

It is anticipated that a 5-day shutdown of the dry plant and a 6-day shutdown of the wet plant would be required to tie-in the respective processing circuit upgrades. Delays in these activities will have impacts on the construction costs and schedule in addition to unplanned production losses.

Power Supply

Unreliable grid power supply presents a risk, which may force the generation of high cost diesel power.

24.4.2 Opportunities

Secondary Crushing

Early delivery of the secondary crushing circuit ahead of the rest of the plant expansion would provide an immediate opportunity to increase the plant's grinding capacity and throughput in its current configuration.

Power Supply

The early delivery of the overhead power line to Bagassi South would provide an opportunity to lower power costs.

24.5 Environmental, Permitting and Social

24.5.1 Risks

Delay in Obtaining Environmental and/or Project Approvals

Despite Roxgold's best efforts to ensure the ESIA and supporting documentation complies with Burkina Faso regulatory requirements, there is a risk that government expectations may change or not be fully met and additional supporting information may be required. The authorities may also take longer to approve the permit applications than currently envisaged. This could potentially delay construction.

Delay in Obtaining Access to Land

There is a risk of a delay in project start-up if the departure of the artisanal miners is delayed. During Yaramoko development, Roxgold gained valuable experience in the negotiation and process of acquiring land and any associated compensation for loss of livelihoods. Roxgold's experience and reputation will aid its efforts in further negotiations to access the land necessary to develop the Bagassi South project. Roxgold plans to minimize disruption to livelihoods in the area and optimize the positive communities observed benefits associated with the project.

Unmet Community Expectations

The nearby communities have expectations relating to job creation, community development and improvement in services and infrastructure. Meeting these expectations is a key requirement for Roxgold with the associated risks of community action against the project and loss of social license to operate. Roxgold expects to minimize this risk with its experience, positive reputation, and social management plans relating to community development, stakeholder engagement and artisanal miners.

Reputational Risks

Artisanal mining activities on the site present significant health and safety risks. Although unrelated to any project activities, there is a risk the project may be blamed for any future incidents associated with this activity on the Bagassi South site, potentially causing reputational harm to Roxgold through negative media or community relations.

Cyanide Concentration Levels in the Tailings Storage Facility

Cyanide destruction is not proposed in the waste management system. There is a risk however that cyanide levels in the tailings pond may pose a risk to birdlife in the area. The testing during the first 12 months of operations however estimate the concentration of available cyanide in the tailings pool to be below the regulatory requirement of 50 ppm and in the range of 5 to 10 ppm. Consequently, it is not expected to pose a risk to birdlife or livestock who may be attracted to the pool as a source of water. The HDPE lined tailings facility will minimize the risk to groundwater.

Impacts on Community Water Supply

This could arise from three potential sources:

- Drawdown around the mine workings as a result of mine dewatering. The exact extent of the drawdown cone cannot be confirmed at this stage. This risk can be mitigated by further hydrogeology investigations (currently planned for 2017), ongoing groundwater monitoring of community boreholes, and providing alternative water supplies, if required.
- A risk of acid rock drainage and metal leaching associated with elevated cyanide concentrations in the tailings pond. This risk is mitigated by an HDPE lined tailings facility as well as regular monitoring of the tailings pond, longer term geochemical test work, and a hydrogeological assessment of the tailings area.
- Long term water quality (adverse) impacts associated with the mine workings.

25 Recommendations

The results of the Bagassi South feasibility study demonstrate that the project has sound financial merit at the base case assumptions considered. The results are considered sufficiently reliable to guide Roxgold's management in the decision to develop the project and to integrate this with production from the 55 Zone.

This section summarizes the key discipline recommendations arising from this study. Each recommendation is not contingent on the results of other recommendations and can be completed concurrently. Where appropriate a cost for the recommended work is included, otherwise the cost is included in the capital and/or operating cost for the project

25.1 Geology and Mineral Resources

- Additional infill and step-out drilling is warranted to improve the delineation of the both the 55 Zone and Bagassi South Zone, targeting the areas of Inferred mineral resources with a potential to improve classification.
- Exploration drilling is also warranted to continue the investigation of other gold occurrences on the Yaramoko property with the objective of demonstrating their geological continuity to support mineral resource evaluation.
- Additional geology investigations should be carried out to further improve the geology model of the Bagassi South Zone.
- On completion of the recommended drilling programs, the geological and mineral resource models should be revised to consider the new drilling information on both deposits to determine how this impacts the economics of the combined Yaramoko project.

SRK understand that Yaramoko exploration budget for 2018 will be comparable to the 2017 budget at approximately US\$ 9 million and will comprise of approximately 70,000 metres of drilling. This drilling will include testing regional anomalies along the Boni Shear, at Haho and Kaho, A phase 3 drilling program will also be undertaken along the QV' structure at Bagassi South to drill the down plunge extension of the structure east of the late mafic dyke.

SRK support Roxgold management's view is that exploration programs for 2019 and beyond should be contingent on the exploration results of the 2018 proposed regional exploration program.

25.2 Underground Mining

- Potential mine operations on the Bagassi South deposit should be integrated into the 55 Zone mine operations to provide synergy through sharing of mine equipment and personnel.
- The 55 Zone mine will benefit from planned diamond drilling from underground diamond drill drifts, which will provide increased drill density below the 5049 level. Inferred mineral resources have been delineated down dip to a depth of 1,050 metres, which provide an opportunity for increased mine life if converted in mineral reserves through future drill programs and engineering studies.
- Roxgold should proceed with the development of the Bagassi South Project and construction of the expanded process plant in 2018, for production commencing in 2019, allowing maximum concurrent production from the 55 Zone and Bagassi South Zone deposits.

25.3 Processing and Infrastructure

- Metallurgical test work – Additional SAG breakage test work should be completed. It is essential that this breakage parameter is well understood for the expansion feed as it will dictate the need for secondary crushing the feed. This test work should be completed as part of the next phase (detailed engineering) of the project.
- The lifter angle of the SAG mill should be reviewed to ensure that it is not overly aggressive with the reduced total load.
- Ore variability test work should be completed to confirm metal recovery assumptions.
- Metallurgical behaviours should be monitored when there are major changes to the proposed mine plan and mine development (especially for changes to the mine plan). Additional on-site testing should be completed from time to time in accordance with an updated mine plan during production, to plan if issues are apparent especially in the comminution circuit. This test work should be completed during operations.

25.4 Environmental, Permitting and Social

The feasibility of any mining project is primarily determined by the financial aspects of the project and the necessary permitting requirements to obtain a mining license, related approvals and commence construction and operations.

Once Roxgold has obtained the Avis de Conformité et de Faisabilité Environmental, the construction of the Bagassi South underground mine can commence. However, several additional studies are recommended to understand better the possible environmental and social impacts caused by the proposed project. These studies include:

25.4.1 Climate

Continuing climate data collection on site to establish variation between project site and other long-term monitoring data sources. This is currently part of the routine monitoring work being undertaken during operation of Yaramoko.

25.4.2 Cemented Rock Fill

Geochemical characterisation of cemented rock backfill should be undertaken during mine operation to fully quantify the leaching characteristics of this material. The results of the geochemical characterisation should then be incorporated into mine pool water quality predictions and contaminate transport assessments for post-closure scenarios.

25.4.3 Water Quality Monitoring

Additional studies are required to investigate the impacts of the mineralized stockpile on water quality and the long-term leaching potential of the tailings storage facility on surface and ground water quality as follows:

- Characterization of leaching potential from ore stockpile.
- Further hydrogeological modelling should be undertaken for post closure to quantify the rebound of groundwater levels and movement away from the operations.

- Kinetic leaching (such as ASTM D 5744 – Humidity cell test) or alternative accelerated weathering tests should be undertaken to characterize the long-term leaching potential of tailings material under extended atmospheric weathering conditions.
- Using the results of kinetic leach testing, geochemical predictive modelling should be undertaken to predict water quality of seepage from tailings materials both during mine life and following closure.
- Prediction of contaminant fate and transport away from the underground workings and tailings storage facility sources should be made to predict water quality at receptor locations during the life of the mine and post closure.
- Baseline water quality and seepage monitoring should be continued to understand natural background exceedances with a frequency reduced to quarterly monitoring. This is currently part of the routine monitoring work being undertaken during operation of Yaramoko.

25.4.4 Air Quality

- Locate additional air quality and noise monitoring points at the boundary between the new project infrastructure and the closest villages (Bagassi, Haro and Banou) to provide a more robust baseline.
- Consider the cover designs or dust suppression systems for the waste rock dumps and tailings facilities to minimize the generation of windblown dust from the surface of these facilities.

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APPENDIX A

Mineral Tenure Information

December 15, 2017

Roxgold Sanu SA
01 BP 4861 Ouagadougou 01
BURKINA FASO

Re: Title opinion

Dear Sirs:

We have been requested to provide an opinion on the Yaramoko Exploitation Permit held by Roxgold Sanu SA ("**Roxgold Sanu**") in Burkina Faso. In my capacity as an independent lawyer duly qualified to practice law in Burkina Faso, I have examined copies of the following exploration permits held by Roxgold Sanu in Burkina Faso:

1. an exploitation permit (the "**Yaramoko Exploitation Permit**") in the name of Roxgold Sanu on the site identified as Yaramoko, represented by decree number 2015-074/PRES-TRANS/PM/MME/MEF/MERH of January 30, 2015, a copy of which is attached hereto as schedule "A";
2. the approval of the Ministry in charge of environment for the Yaramoko exploitation permit represented by arrêté n°2014-155/MEDD/CAB dated August 18, 2014 concerning issuance of a favorable opinion on the feasibility of the environment of the Yaramoko gold exploitation project in the municipality of Bagassi (Province of Bale) granted to Roxgold Sanu;
3. a certificate of registration of Roxgold Sanu dated December 14, 2017;
4. a Non-Pledge Certificate in the name of Roxgold Sanu dated December 14, 2017;
5. a Non-Bankruptcy Certificate in the name of Roxgold Sanu dated December 14, 2017;
6. a Non Lawsuit Certificate in the name of Roxgold Sanu dated December 14, 2017;
7. Proof that annual reports prepared by Roxgold Sanu for the Yaramoko Exploitation Permit were filed for years 2015 and 2016 (collectively, the "**Synthesis Reports**"); and

Proof that taxes were paid for years 2015, 2016 and 2017 by Roxgold Sanu on the Yaramoko Exploitation Permit (collectively, the "**Accounting of Expenses**").

As to questions of fact, I have relied upon the declarations of Roxgold Sanu and of certain public officials. I have also considered all questions of law as we have deemed relevant and necessary as a basis for the opinions hereinafter expressed.

I have assumed, with respect to all documents examined, the genuineness of all signatures, the legal capacity at all relevant times of any individual signing any of such documents, the authenticity and completeness of all documents submitted to me as originals, the conformity to authentic originals of all documents submitted to me as certified or true copies (including facsimiles), and the truthfulness and accuracy of all certificates and records of public officials.

I have not assisted in the preparation of the Synthesis Reports or the Accounting of Expenses and no opinion is expressed as to the accuracy or completeness of the information contained therein, and nothing herein shall be deemed to imply that I am generally familiar with the affairs of Roxgold Sanu.

I am duly qualified to practice law in Burkina Faso.

Based on and subject to the foregoing together with our comments and reserves below and not having independently made verification of the matters referred to herein, we are of the opinion that:

1. Roxgold Sanu is a company duly incorporated, registered and subsisting in Burkina Faso in accordance with the laws of Burkina Faso, has all corporate power and capacity to carry on business, own assets and lease property under the laws of its jurisdiction and as of the date hereof, is in compliance in all respects with all applicable laws and regulations relating to the filing of documents.
2. To our knowledge, there are no (i) lawsuits, legal proceedings or claims, (ii) arbitration or alternate dispute resolution processes or (iii) administrative or other proceedings by or before the Government of Burkina Faso or any national, provincial municipal or local legal department (collectively, a "**Government Entity**"), current or anticipated, which may negatively affect Roxgold Sanu or rights ensuing therefrom.
3. To our knowledge, Roxgold Sanu is not subject to any bankruptcy, insolvency or similar proceeding by or before any court or governmental agency or authority in Burkina Faso.
4. The information contained in schedule "B" hereto in relation to the Yaramoko Exploitation Permit is complete and accurate in all respects.
5. Roxgold Sanu is the 100% registered holder in Burkina Faso of the Yaramoko Exploitation Permit.

6. The application for the Yaramoko Exploitation Permit was accepted by the Mines Administration on July 18, 2014 and the Ministry of Environment of the Government of Burkina Faso after review of the resettlement plans, the Environmental and Social Impact Assessment (“ESIA”) report and the result of the public enquiry approved the issuance of the exploitation permit by order n°2014-155/MEDD/CAB dated August 18, 2014.
7. The application for the Yaramoko Exploitation Permit was approved by the National Mines Committee (“NMC”) on September 9, 2014 and approved by the Council of Ministers on October 15, 2014.
8. The Yaramoko Exploitation Permit constitutes good and valid title enforceable against third parties, has not been suspended and, to our knowledge, no lawsuit or legal actions have been filed for its suspension or modification.
9. All requisite statutory reports were filed with the Mines Administration for the Yaramoko Exploitation Permit.
10. All necessary fees related to the granting or renewal of the Yaramoko Exploitation Permit and the surface related fees have been fully paid.
11. Roxgold Sanu has the exclusive right to conduct mining operations on the areas covered by the Yaramoko Exploitation Permit for the duration of the term of the Exploitation Permit.

Yours truly,



Maitre Bobson COULIBALY
Attorney at Law

SCHEDULE A – YARAMOKO EXPLOITATION PERMIT

YANOGO BOBSON

Rue 30.81, ZAD, Ouagadougou Burkina Faso ☎ 01 BP.1889 Ouaga 01
tél: +226 25 40 92 76 ☎ email: info@yb-lawyers.com ☎ n° IFU 00086348P

BC

GK/HO
BURKINA FASO

Unité - Progrès - Justice

**DECRET N°2015- 074 /PRES-TRANS/PM/
MME/MEF/MERH portant octroi d'un permis
d'exploitation industrielle de grande mine d'or
à la société ROXGOLD SANU SA, dans la commune
de Bagassi, Province des Balés, Région de la
Boucle du Mouhoun.**

Texte N° 2015-074/PRES-TRANS/PM/MME/MERH

**LE PRESIDENT DE LA TRANSITION,
PRESIDENT DU FASO,
PRESIDENT DU CONSEIL DES MINISTRES,**

- Accord pour
Ogikoumout.
Mlle
17-02-15*
- VU la Constitution ;
 - VU la charte de Transition
 - VU le décret n°2014-001/PRES-TRANS du 18 novembre 2014 portant nomination du Premier Ministre;
 - VU le décret n°2014-004/PRES-TRANS/PM du 23 novembre 2014 portant composition du Gouvernement ;
 - VU la loi n°031-2003/AN du 8 mai 2003 portant code minier au Burkina Faso ;
 - VU la loi n°034-2012/AN du 02 juillet 2012 portant réorganisation agraire et foncière au Burkina Faso ;
 - VU la loi n°006/2013/AN du 02 avril 2013 portant code de l'environnement au Burkina Faso ;
 - VU le règlement n°R09/98/CM/UEMOA du 20 décembre 1998 relatif aux relations financières extérieures des Etats membres ;
 - VU le décret n°2005-046/PRES/PM/MCE du 03 février 2005 portant définition des niveaux de production des exploitations minières artisanales semi-mécanisées et des exploitations industrielles de petite mine ;
 - VU le décret n°2005-047/PRES/PM/MCE du 03 février 2005 portant gestion des autorisations et titres miniers ;
 - VU le décret n°2010-075/PRES/PM/MEF du 3 mars 2010 portant fixation des taxes et redevances minières, ensemble son modificatif n°2010-819/PRES/PM/MEF du 31 décembre 2010 ;
 - VU le décret n°2014-145/PRES/PM/MME/MFB du 10 mars 2014 portant création, attributions, composition et fonctionnement de la Commission nationale des mines ;
- Sur rapport du Ministre des Mines et de l'Energie ;
Le Conseil des Ministres de la transition entendu en sa séance du 14 janvier 2015 ;
- NSAF n°00060
29/01/2015*

DECRETE

ARTICLE 1: Il est accordé à la société *ROXGOLD SANU SA* dont l'Etat du Burkina Faso est actionnaire à dix pour cent (10%) non

contributifs et non diluables, ayant fait élection de domicile à Ouagadougou, 01 BP 4864 Ouagadougou 01, téléphone 50 36 13 57, un permis d'exploitation industrielle de grande mine d'or à Bagassi, dans la province des Balés, Région de la Boucle du Mouhoun dans les limites définies à l'article 2 du présent décret.

ARTICLE 2 : Le périmètre du permis octroyé pour l'exploitation industrielle du gisement de Yaramoko est défini par les sommets dont les coordonnées cartésiennes UTM (XY) sont reportées ci-dessous :

Ellipsoïde : Clarke 1880		
Datum : Adindan, Zone 30 N		
Point	Coordonnées X	Coordonnées Y
A	468 327	1 301 823
B	471 689	1 301 823
C	471 689	1 295 883
D	470 108	1 295 883
E	470 108	1 297 377
F	469 893	1 297 377
G	469 893	1 297 483
H	469 710	1 297 483
I	469 710	1 297 570
J	469 650	1 297 570
K	469 650	1 298 008
L	469 118	1 298 008
M	469 118	1 298 653
N	469 021	1 298 653
O	469 021	1 298 760
P	468 941	1 298 760
Q	468 941	1 298 870
R	468 859	1 298 870
S	468 859	1 298 930
T	468 765	1 298 930
U	468 765	1 298 990
V	468 555	1 298 990
W	468 555	1 299 090
X	468 450	1 299 090
Y	468 450	1 299 200
Z	4680327	1 299 200

ARTICLE 3 : La superficie accordée pour le permis d'exploitation industrielle est de 15,70 km² dans les limites du périmètre défini à l'article 2 ci-dessus.

ARTICLE 4 : Le présent permis est valable pour une durée de vingt (20) ans pour compter de la date de signature du présent décret. Il est renouvelable par périodes consécutives de cinq ans jusqu'à épuisement des gisements dans les limites de la superficie définie à l'article 3 ci-dessus.

Cette première durée de vingt (20) ans peut être écourtée à la demande de la société *ROXGOLD SANU SA* ou de l'Administration des mines, si les réserves venaient à s'épuiser avant terme ou si un arrêt de l'exploitation pendant deux (2) années consécutives est constaté.

ARTICLE 5 : La société *ROXGOLD SANU SA* est tenue d'adresser au ministre chargé des mines :

- un rapport d'activités au terme de chaque trimestre calendaire. Ce rapport indique particulièrement :
 - les quantités d'or produites, celles expédiées, les analyses finales du raffineur, les coûts d'expéditions et les recettes générées par la vente de l'or ;
 - la situation des emplois surtout ceux au niveau local ;
 - les réalisations au profit des populations et des collectivités locales ;
 - les comptes rendus des comités de concertation et de gestion des conflits ;
 - la mise en œuvre du plan de gestion environnementale et sociale (PGES) surtout la réhabilitation progressive du site d'exploitation ;
- un rapport d'activités global au terme de chaque année civile.

ARTICLE 6 : Les rapports indiqués à l'article 5 ci-dessus sont établis conformément aux dispositions réglementaires en vigueur.

ARTICLE 7 : Les travaux d'exploitation du gisement consistent essentiellement à :

- la construction d'une mine souterraine ;
- la construction d'un barrage d'une capacité de 3 millions de mètres cube d'eau ;
- la construction d'une usine de traitement ;
- la réalisation d'une centrale électrique ;

- la construction de routes internes ;
- la construction d'un dépôt de stockage des substances explosives ;
- la construction d'un entrepôt et d'une unité d'entreposage du carburant ;
- la construction d'un bâtiment administratif ;
- la construction d'un parc à résidus ;
- l'aménagement d'une aire de stockage du cyanure et de réactifs.

Toute extension ou modification du plan de développement et d'exploitation de la mine envisagée par la société, devra faire l'objet d'une nouvelle demande auprès de l'Administration des mines.

ARTICLE 8 : La société *ROXGOLD SANU SA* est tenue de protéger l'environnement au cours de la réalisation de son projet. Elle doit réhabiliter les sites avant leur abandon conformément à la réglementation minière et environnementale en vigueur.

ARTICLE 9 : La société *ROXGOLD SANU SA* bénéficie dans le cadre de l'exploitation du gisement de Yaramoko, des avantages fiscaux et douaniers prévus par le code minier, notamment pour l'importation des équipements, intrants et consommables dont la liste annexée au présent décret en fait partie intégrante.

ARTICLE 10 : Durant toute la phase de construction de la mine, *ROXGOLD SANU SA* bénéficie des avantages fiscaux et douaniers que lui confère le code minier.

ARTICLE 11 : Les sociétés, sous-traitants de *ROXGOLD SANU SA*, munis de contrats de services régulièrement conclus et enregistrés auprès de l'administration fiscale bénéficient dans le cadre de l'exploitation minière industrielle de grande mine, des avantages fiscaux et douaniers tels que prévus par le code minier et les textes réglementaires en la matière.

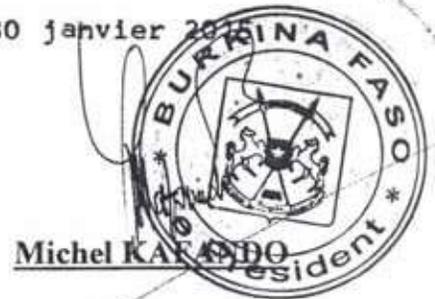
ARTICLE 12: La société *ROXGOLD SANU SA* est soumise à la réglementation des changes en vigueur au Burkina Faso.

ARTICLE 13 : Le permis d'exploitation industrielle de grande mine octroyé peut être retiré si la société *ROXGOLD SANU SA* n'exploite pas les gisements conformément à la réglementation en vigueur ou ne respecte pas les règles d'hygiène, de sécurité au travail et toutes autres dispositions législatives ou réglementaires,

notamment celles relevant du code minier, du code de l'environnement, du code forestier, du code civil, du code pénal, du code des impôts, du code des douanes, du code de la santé publique, du code du travail, du code des investissements, du code de l'enregistrement et du timbre, de la loi portant réorganisation agraire et foncière, la loi d'orientation relative à la gestion de l'eau, du revenu sur les valeurs mobilières, les textes d'orientation de la décentralisation.

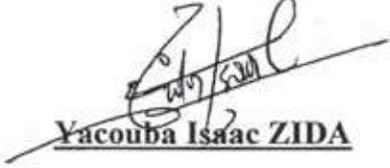
ARTICLE 14: Le Ministre des Mines et de l'Energie, le Ministre de l'Economie et des Finances et le Ministre de l'Environnement et des Ressources Halieutiques sont chargés, chacun en ce qui le concerne, de l'exécution du présent décret qui sera publié au Journal Officiel du Faso.

Ouagadougou, le 30 janvier 2015

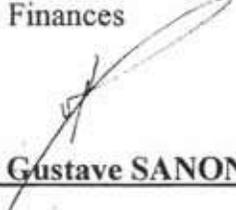


Michel KAFANDO

Le Premier Ministre


Yacouba Isaac ZIDA

Le Ministre de l'Economie
et des Finances


Jean Gustave SANON

Le Ministre des Mines et de l'Energie


Boubakar BA

Le Ministre de l'Environnement
et des Ressources Halieutiques


Saïdou MAIGA

SCHEDULE B – DESCRIPTION OF THE EXPLOITATION PERMIT IN BURKINA FASO

Permit Name	Decree Number	Mineral	Title Holder	Area Km ²	Initial Grant Date	Expiry Date	Province
Yaramoko	2015-074/PRES-TRANS/PM/MME/MEF/MER H	Gold	Roxgold Sanu SA	15,70	January 30, 2015	January 30, 2035	Bale

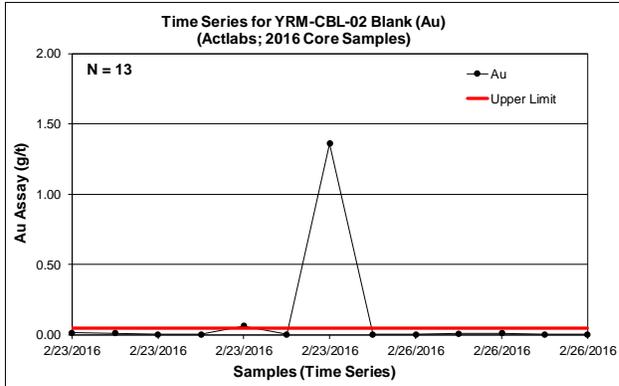
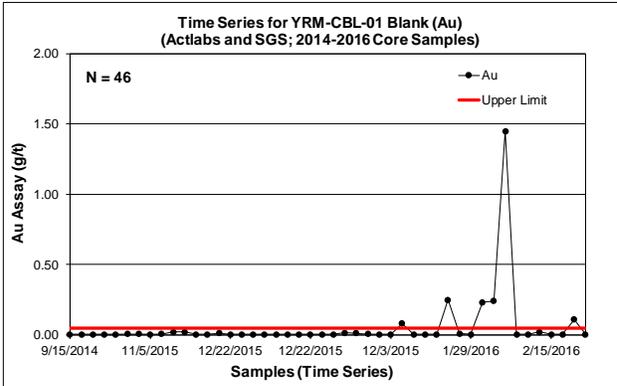
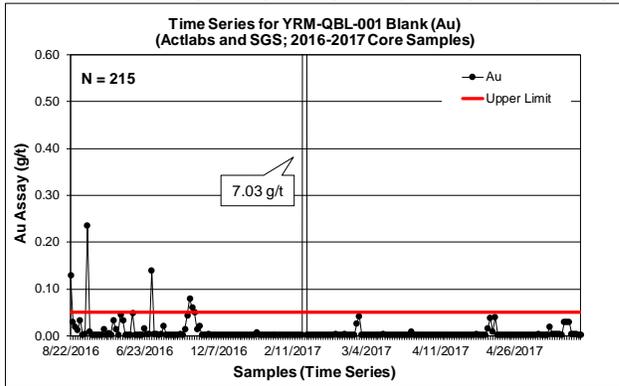
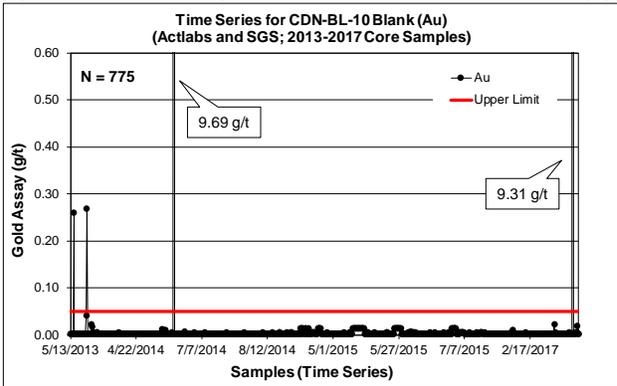
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APPENDIX B

Analytical Quality Control Data and Relative Precision Charts for the Yaramoko Gold Project

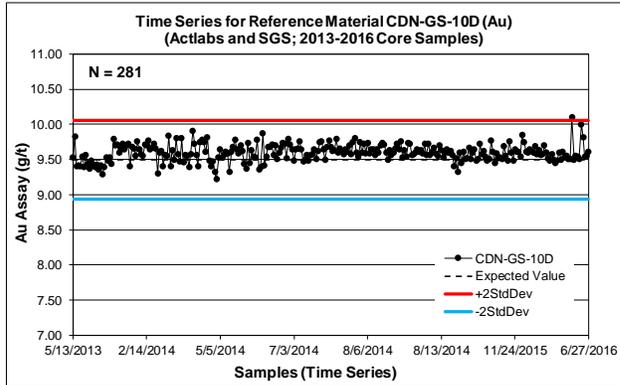
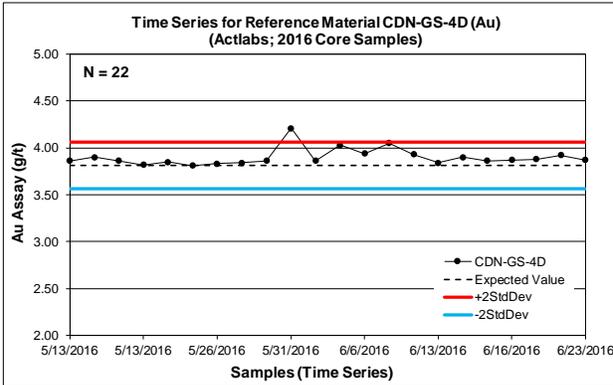
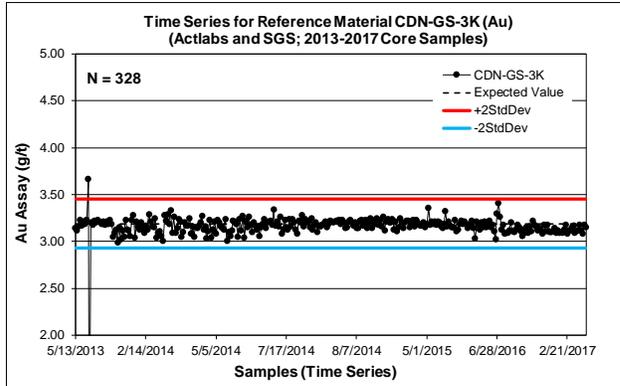
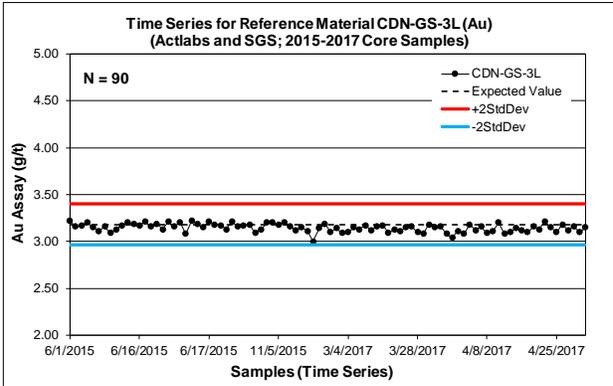
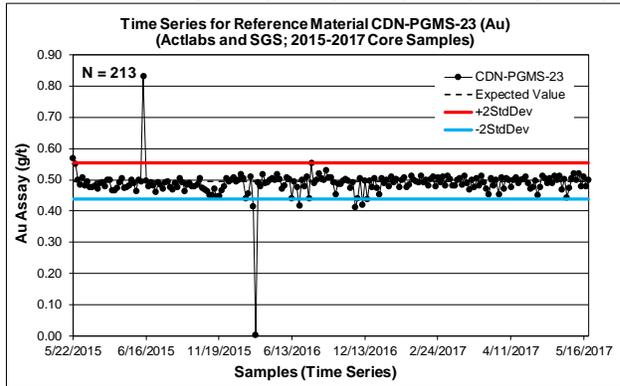
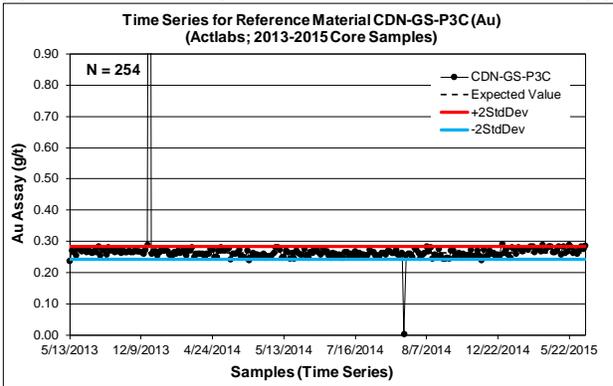
Time series plots for blank material CDN-BL-10, YRM-QBL-001, YRM-CBL-01 and YRM-CBL-02

		Statistics				
		CDN- BL-10	QBL- 001	CBL- 01	CBL- 02	
Project	Roxgold Yaramoko	Sample Count	775	215	46	13
Data Series	2013 - 2017 Blanks	Expected Value	0.005	0.005	0.005	0.005
Data Type	Core Samples	Standard Deviation	-	-	-	-
Commodity	Au	Data Mean	0.029	0.042	0.056	0.115
Laboratory	Actlabs and SGS	Upper Limit (10xDL)	1%	3%	13%	15%
Analytical Method	30 g fire assay - AAS finish					
Detection Limit	0.005 g/t					



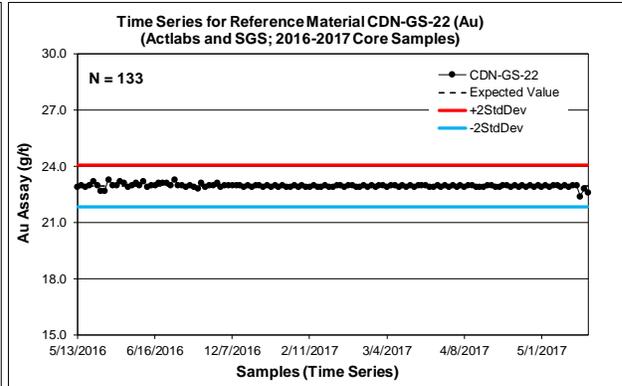
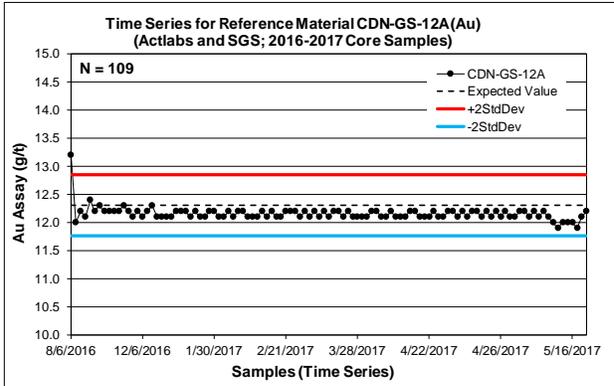
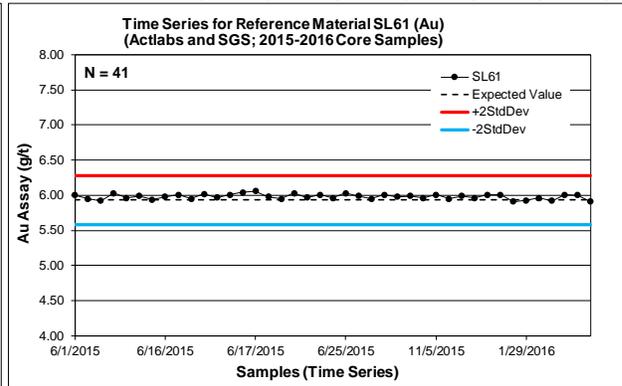
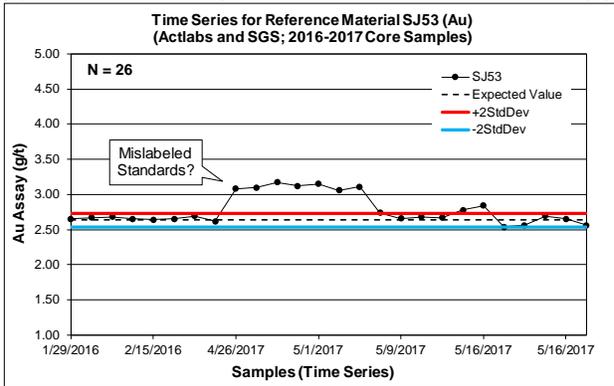
Time series plots for reference material (standards) CDN-GS-P3C, CDN-PGMS-23, CDN-GS-3L, CDN-GS-3K, CDN-GS-4D and CDN-GS-10D.

		Statistics						
		GS- P3C	PGMS -23	GS- 3L	GS- 3K	GS- 4D	GS- 10D	
Project	Roxgold Yaramoko	Sample Count	254	213	90	328	22	281
Data Series	2013-2017 Standards	Expected Value	0.263	0.496	3.180	3.190	3.810	9.500
Data Type	Core Samples	Standard Deviation	0.010	0.029	0.110	0.130	0.125	0.280
Commodity	Au	Data Mean	0.275	0.488	3.146	3.161	3.900	9.597
Laboratory	Actlabs and SGS	Outside 2StdDev	6%	3%	0%	1%	5%	0%
Analytical Method	30 g fire assay - AAS finish	Below 2StdDev	4	5	0	1	0	0
Detection Limit	0.005 g/t	Above 2StdDev	10	2	0	1	1	1



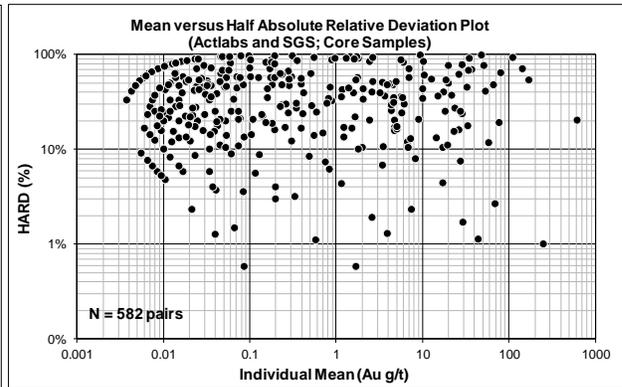
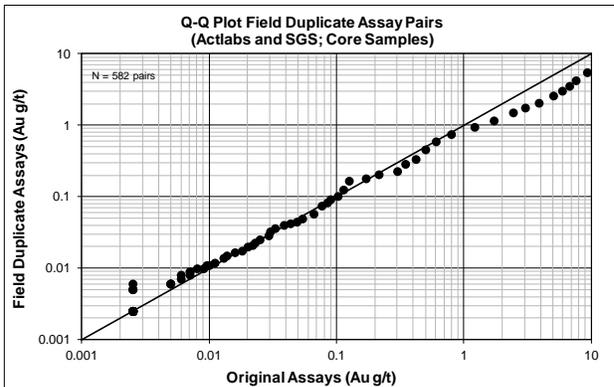
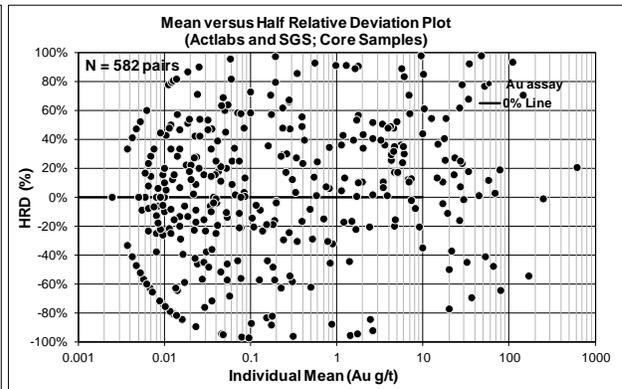
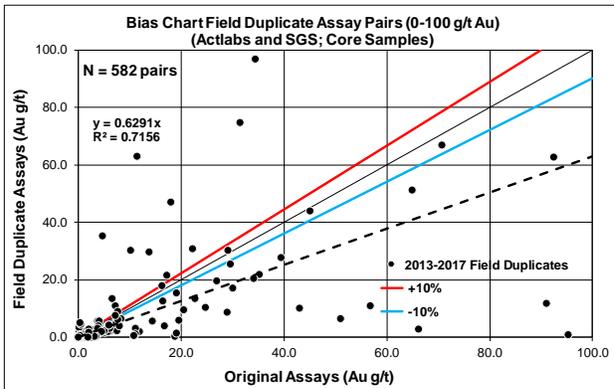
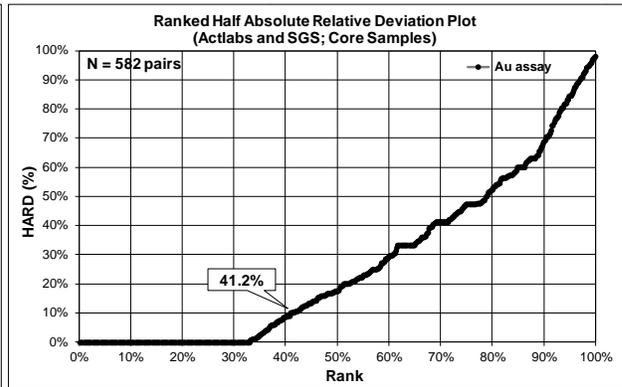
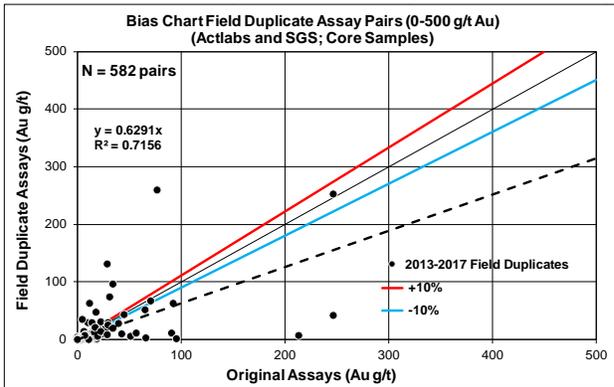
Time series plots for reference material (standards) SJ53, SL61, CDN-GS-12A and CDN-GS-22.

		Statistics				
		SJ53	SL61	GS-12A	GS-22	
Project	Roxgold Yaramoko	Sample Count	26	41	109	133
Data Series	2013-2017 Standards	Expected Value	2.637	5.931	12.31	22.94
Data Type	Core Samples	Standard Deviation	0.048	0.177	0.270	0.560
Commodity	Au	Data Mean	2.785	5.981	12.15	22.96
Laboratory	Actlabs and SGS	Outside 2StdDev	42%	0%	1%	0%
Analytical Method	30 g fire assay - AAS finish	Below 2StdDev	1	0	0	0
Detection Limit	0.005 g/t	Above 2StdDev	10	0	1	0



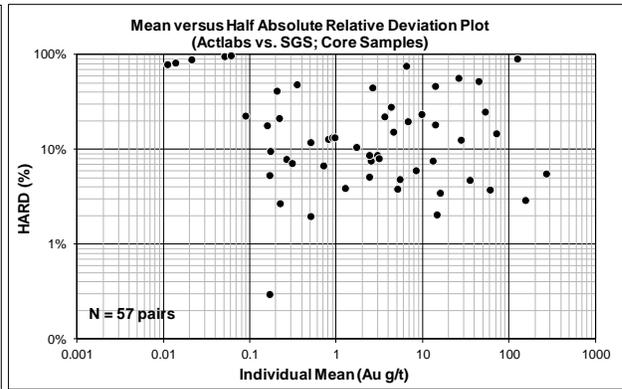
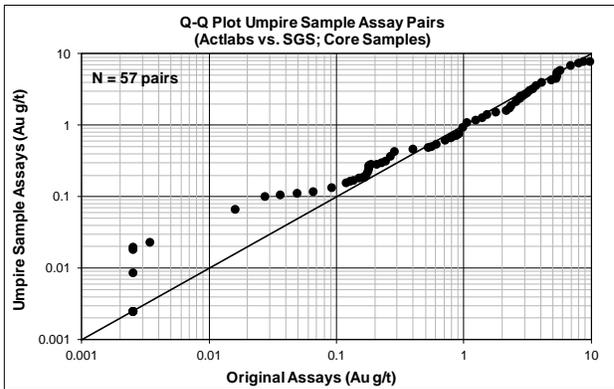
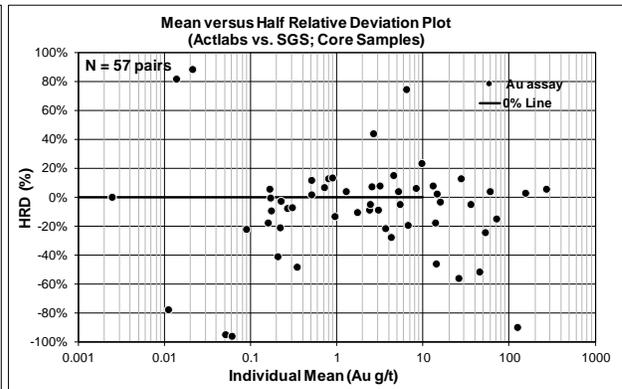
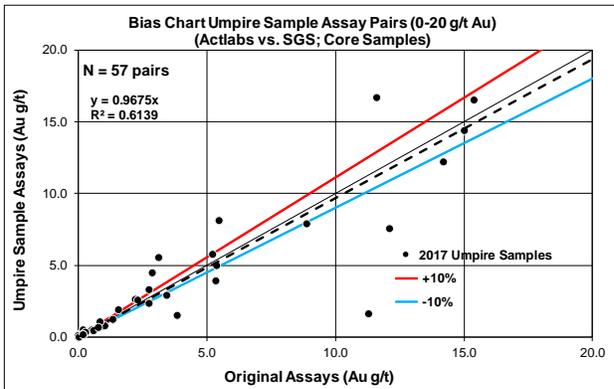
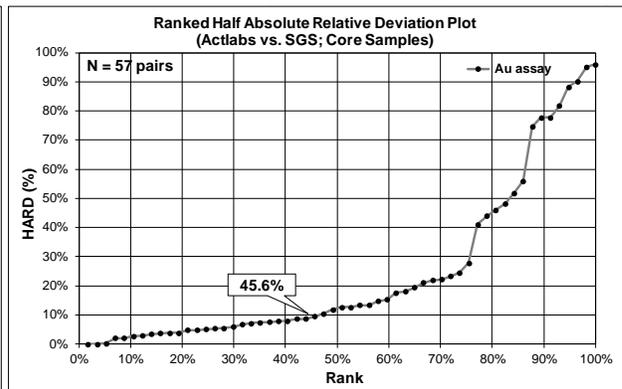
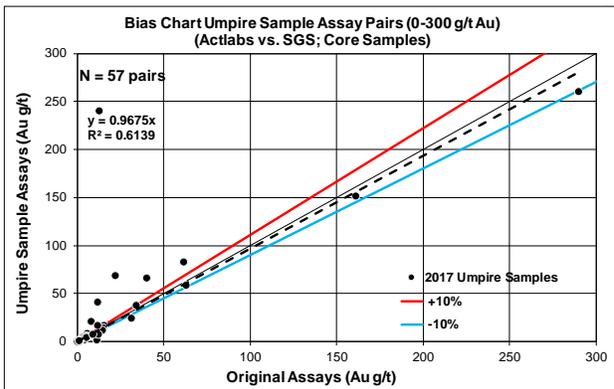
Bias charts and precision plots for 2013 to 2017 field duplicate assays of quarter core

		Statistics	
		Original	Field Duplicate
Project	Roxgold Yaramoko	Sample Count	582
Data Series	2013-2017 Field Duplicates	Minimum Value	0.003
Data Type	Core Samples	Maximum Value	750.00
Commodity	Au in g/t	Mean	5.448
Analytical Method	30 g fire assay - AAS finish	Median	0.010
Detection Limit	0.005 g/t Au	Standard Error	1.525
Original Dataset	Original Assays	Standard Deviation	36.787
Paired Dataset	Field Duplicate Assays	Correlation Coefficient	0.8463
		Pairs ≤ 10% HARD	41.2%



Bias charts and precision plots for 2017 umpire check assays conducted between Actlabs and SGS

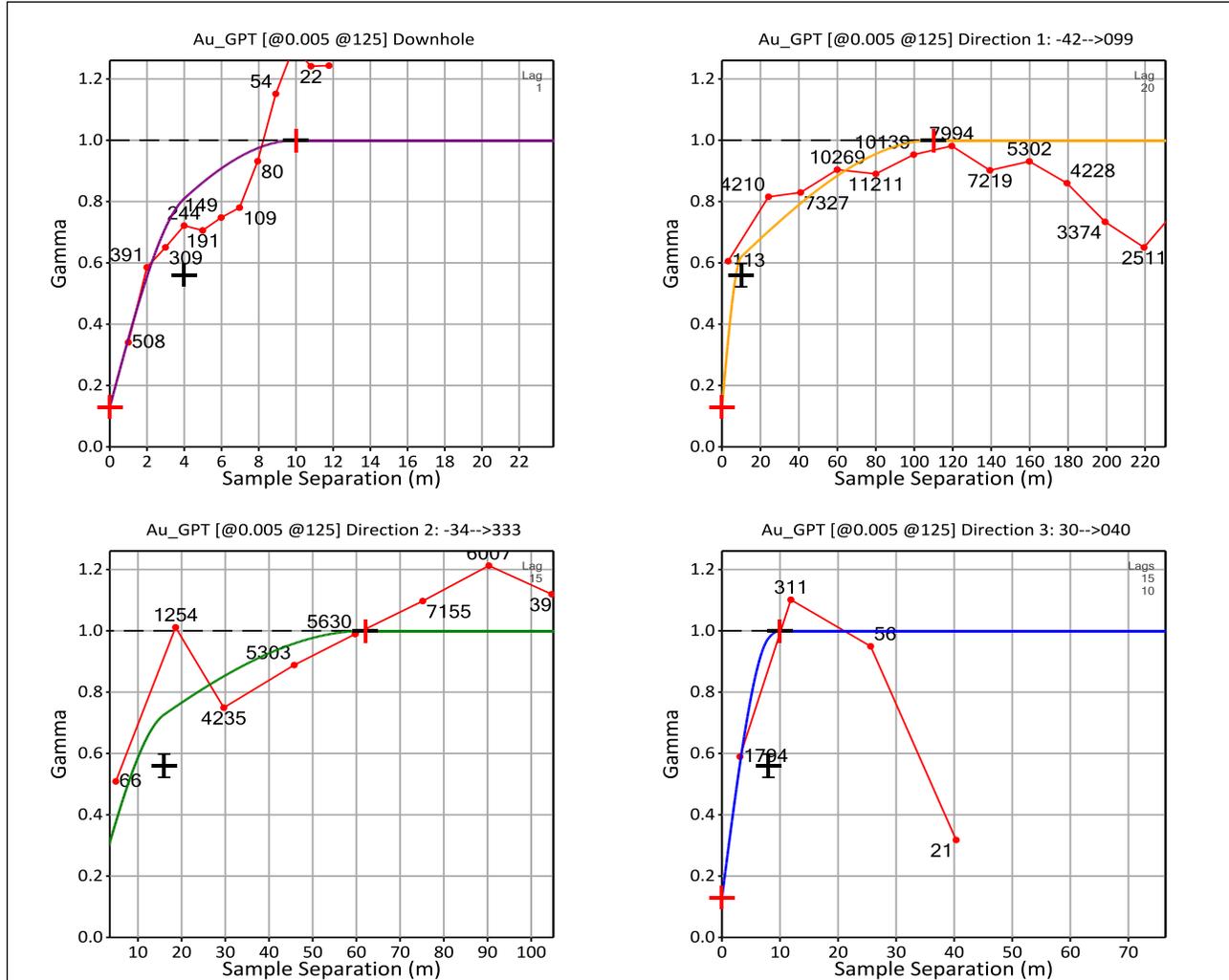
		Statistics	Original	Umpire Check
Project	Roxgold Yaramoko	Sample Count	57	57
Data Series	2017 Umpire Samples	Minimum Value	0.003	0.003
Data Type	Core Samples	Maximum Value	290.00	260.00
Commodity	Au in g/t	Mean	15.388	20.823
Analytical Method	Fire Assay	Median	2.320	1.910
Detection Limit	0.005 g/t Au	Standard Error	5.875	6.817
Original Dataset	Original Assays	Standard Deviation	44.355	51.466
Paired Dataset	Umpire Sample Assays	Correlation Coefficient	0.7931	
		Pairs ≤ 10% HARD	45.6%	



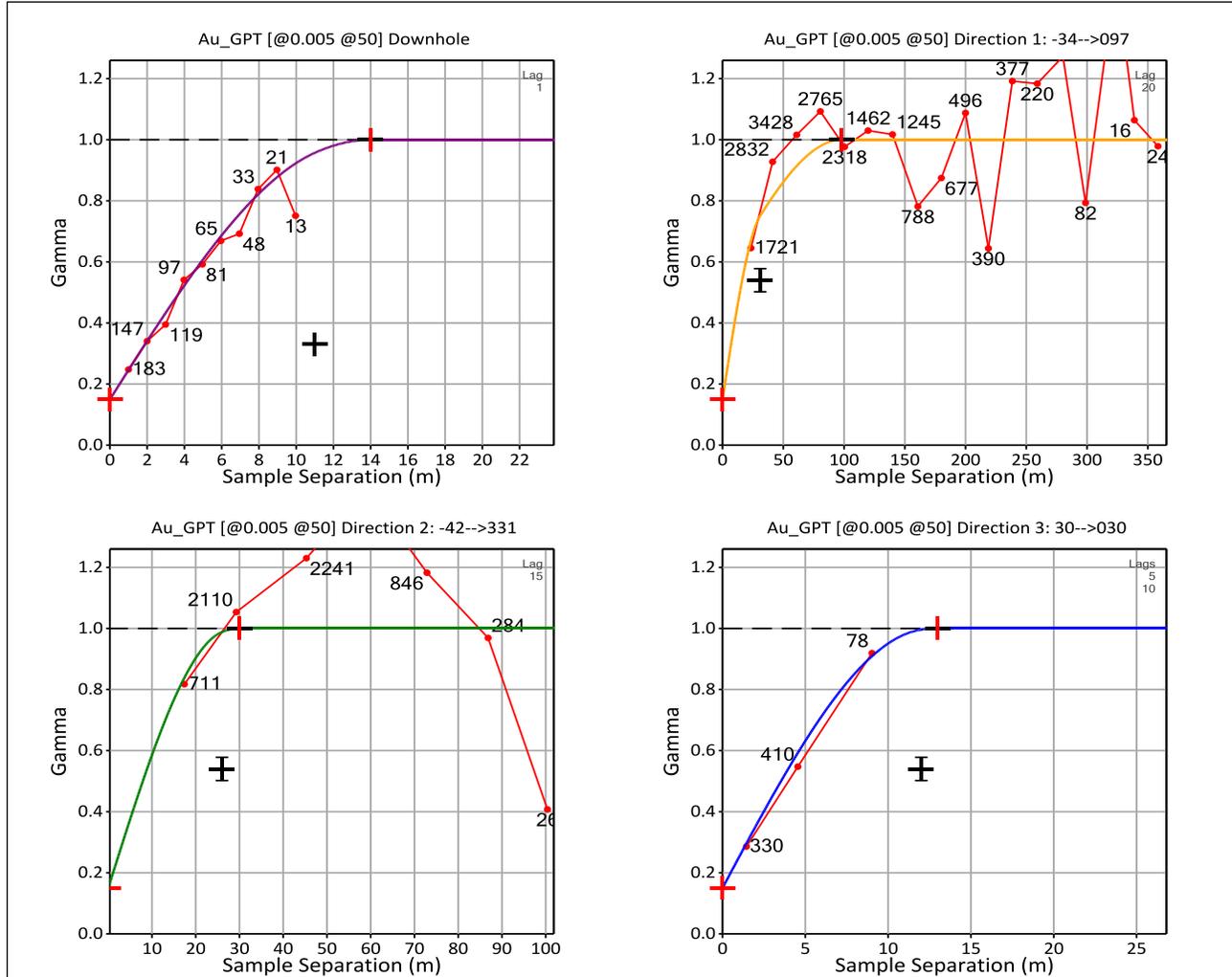
APPENDIX C

Variography: Bagassi South Zone

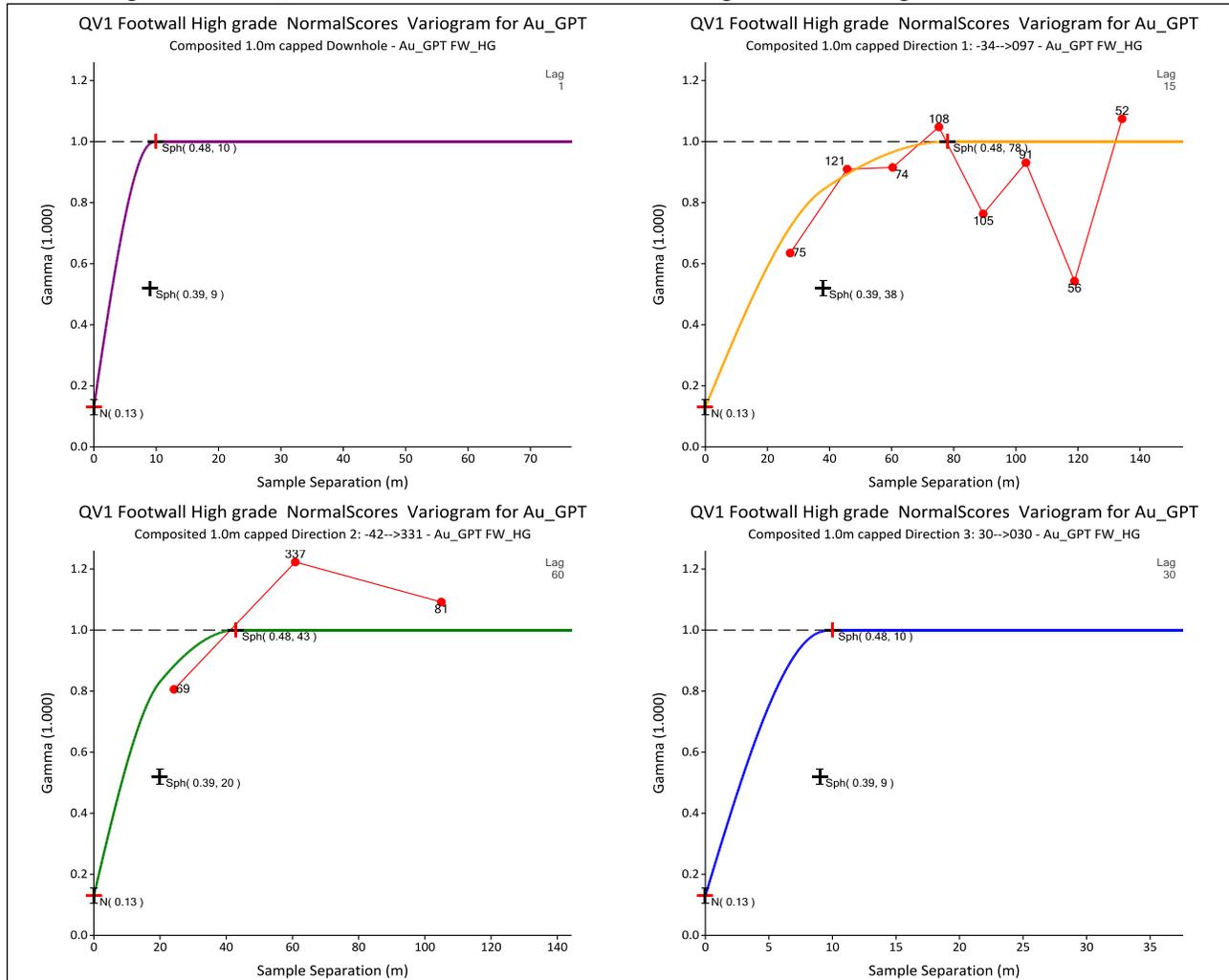
Bagassi South: QV1 Main West Dolerite HG Normal Scores Variograms for Gold g/t



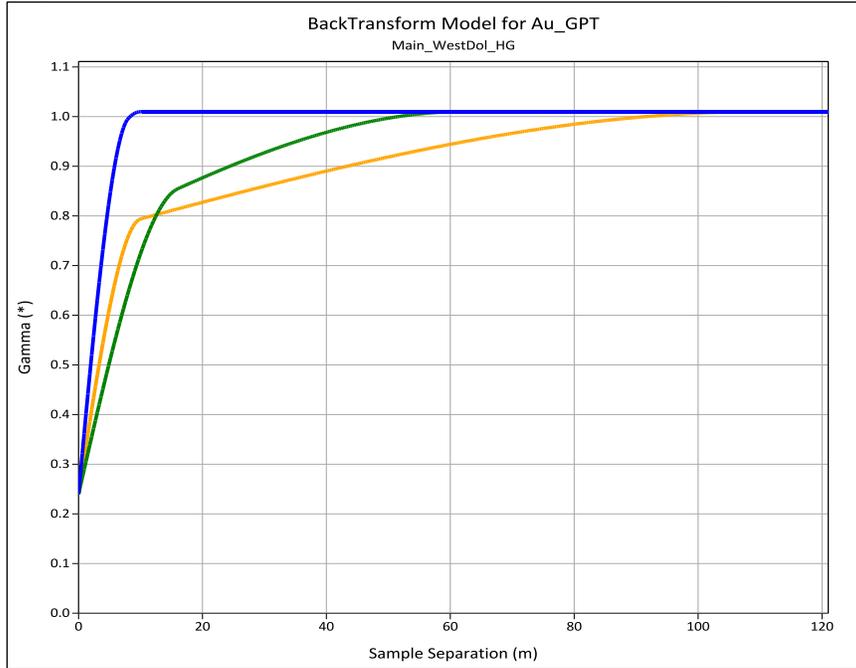
Bagassi South: QV1 Main East Dolerite HG Normal Scores Variograms for Gold g/t



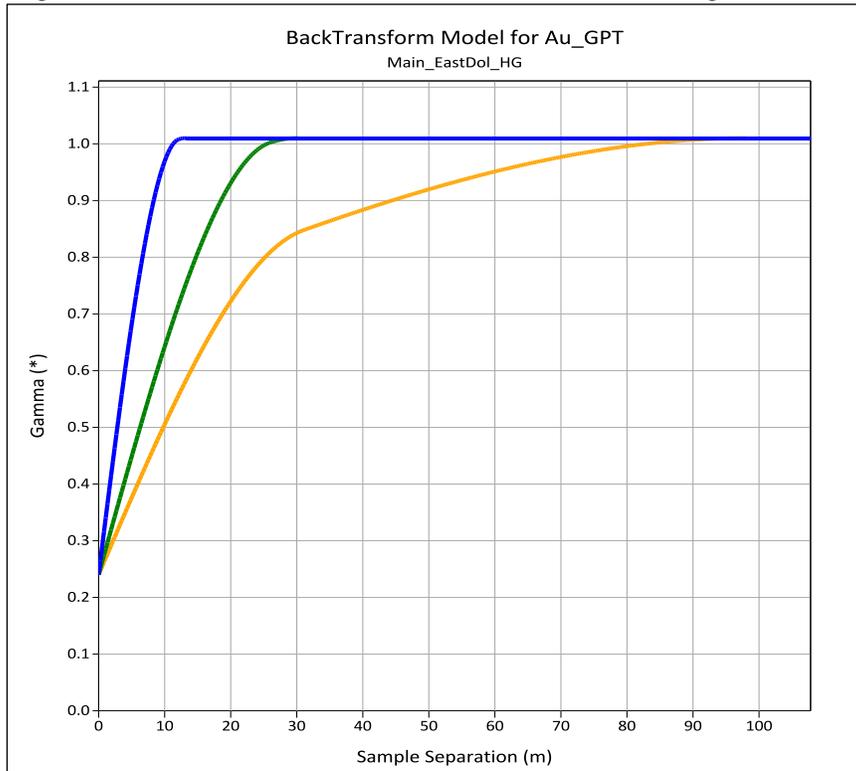
Bagassi South: QV1 Footwall HG Normal Scores Variograms for Gold g/t



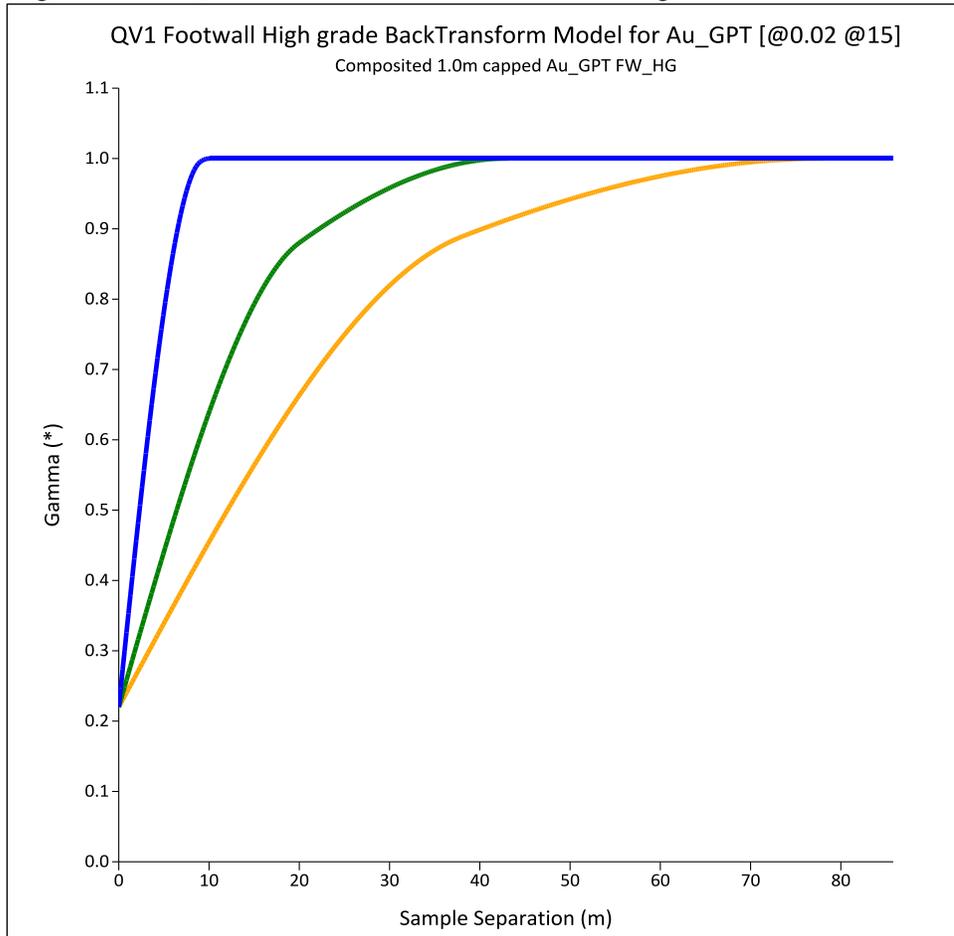
Bagassi South: QV1 West Dolerite HG Backtransform Variogram Model



Bagassi South: QV1 East Dolerite HG Backtransform Variogram Model



Bagassi South: QV1 Footwall HG Backtransform Variogram Model



CERTIFICATE OF QUALIFIED PERSON

To Accompany the report entitled: ***Technical Report for the Yaramoko Gold Mine, Burkina Faso, December 20, 2017.***

I, Sébastien Bernier, do hereby certify that:

- 1) I am a Principal Consultant (Resource Geology) with the firm of SRK Consulting (Canada) Inc. (SRK) with an office at Suite 101 – 1984 Regent Street South, Sudbury, Ontario, Canada;
- 2) I am a graduate of the University of Ottawa in 2001 with BSc (Honours) Geology and I obtained a MSc degree in Geology from Laurentian University in 2003. I have practiced my profession continuously since 2002. I worked in exploration and commercial production of base and precious metals mainly in Canada. I have been focussing my career on geostatistical studies, geological modelling and resource modelling of base and precious metals since 2004;
- 3) I am a professional Geologist registered with the Association of Professional Geoscientists of Ontario (APGO#1847) and with the with the Ordre des Géologues du Québec (OGQ# 1034). ;
- 4) I have personally inspected the subject project on December 13 to 15, 2016;
- 5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
- 6) I, as a Qualified Person, I am independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
- 7) I am the co-author of this report and share responsibility for Sections 1 to 11, 13, 26 and parts of the ES and sections 24 and 25 and accept professional responsibility for those sections of this technical report;
- 8) In 2014, I authored the Mineral Resource Estimates section of a technical report on a feasibility study for the Yaramoko Gold Project;
- 9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith;
- 10) SRK Consulting (Canada) Inc. was retained by Roxgold Inc. to prepare Yaramoko 55 Zone mineral resource and mineral reserve updates, Bagassi South feasibility study, and a combined life of mine plan, including mineral resource statements, for the Yaramoko project located in Burkina Faso, West Africa in accordance with National Instrument 43-101 and Form 43-101F1 guidelines. This assignment was completed using CIM *Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines* and Canadian Securities Administrators' National Instrument 43-101 guidelines;
- 11) I have not received, nor do I expect to receive, any interest, directly or indirectly, in the Yaramoko Gold Project or securities of Roxgold Inc., and
- 12) That, as of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Sudbury, Ontario, Canada
December 20, 2017

[“signed and sealed”]
Sébastien Bernier, PGeo (APGO#1487) (OGQ#1034)
Principal Consultant (Resource Geology)
SRK Consulting (Canada) Inc.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the report entitled: ***Technical Report for the Yaramoko Gold Mine, Burkina Faso, December 20, 2017.***

I, Glen Cole, do hereby certify that:

- 1) I am a Principal Consultant (Resource Geology) with the firm of SRK Consulting (Canada) Inc. (SRK) with an office at Suite 1500 – 155 University Avenue, Toronto, Ontario, Canada;
- 2) I am a graduate of the University of Cape Town in South Africa with a BSc (Hons) in Geology in 1983; I obtained a MSc (Geology) from the University of Johannesburg in South Africa in 1995 and a MEng in Mineral Economics from the University of the Witwatersrand in South Africa in 1999. I have practiced my profession continuously since 1986. Between 1986 and 1989 I worked as a production geologist on various gold mines in South Africa. Between 1989 and 2005 I worked at several exploration projects, underground and open pit mining operations in Africa and held various senior positions, with the responsibility for estimation of Mineral Resources and Mineral Reserves for development projects and operating mines. Since 2006, I have estimated and audited Mineral Resources as an independent consultant for a variety of early and advanced international base and precious metals projects;
- 3) I am a Professional Geoscientist registered with the Association of Professional Geoscientists of the Province of Ontario (APGO#1416), the Association of Professional Engineers and Geoscientists of the Province of Saskatchewan (PEGS#26003) and am also registered as a Professional Natural Scientist with the South African Council for Scientific Professions (Reg#400070/02);
- 4) I have not personally inspected the subject project, but have relied on a site visit conducted on December 5 and 7, 2016 by Benny Zhang, PEng (PEO#100115459) co-author of this technical report;
- 5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
- 6) I, as a Qualified Person, I am independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
- 7) I am the senior reviewer of the technical report and have reviewed all the sections of this technical report;
- 8) I have contributed to a previous technical report for this property in 2014;
- 9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith;
- 10) SRK Consulting (Canada) Inc. was retained by Roxgold Inc. to prepare Yaramoko 55 Zone mineral resource and mineral reserve updates, Bagassi South feasibility study, and a combined life of mine plan, including mineral resource statements, for the Yaramoko project located in Burkina Faso, West Africa in accordance with National Instrument 43-101 and Form 43-101F1 guidelines. This assignment was completed using CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and Canadian Securities Administrators' National Instrument 43-101 guidelines;
- 11) I have not received, nor do I expect to receive, any interest, directly or indirectly, in the Yaramoko Gold Project or securities of Roxgold Inc., and
- 12) That, as of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Toronto, Ontario, Canada
December 20, 2017

["signed and sealed"]
Glen Cole, PGeo (APGO#1416)
Principal Consultant (Resource Geology)
SRK Consulting (Canada) Inc.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the report entitled: ***Technical Report for the Yaramoko Gold Mine, Burkina Faso, December 20, 2017.***

I, Benny Zhang, do hereby certify that:

- 1) I am a Principal Consultant (Mining) with the firm of SRK Consulting (Canada) Inc. with an office at Suite 1500, 155 University Avenue, Toronto, Ontario, M5H 3B7;
- 2) I graduated with a Bachelor of Engineering degree in Mining Engineering from Central South University, China in 1984, and a Master of Engineering degree in Applied Rock Mechanics for Mine Planning from McGill University, Canada in 2006. I have practiced my profession for 33 years. I have been directly involved in mine operations, mine design and planning, technical review and audit, due diligence, mining project valuation, equipment selection, ventilation, rock mechanics and ground support, and providing various technical services for more than 50 base metal and precious metal mines / projects, including narrow vein gold deposit projects. Since 2000 I have been focusing my career on mining project related consulting services worldwide
- 3) I am a Professional Engineer registered with Professional Engineers Ontario (PEO#100115459);
- 4) I have personally inspected the Yaramoko project site between December 5 and 7, 2016;
- 5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
- 6) I, as a Qualified Person, am independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
- 7) I am the co-author of this report and share responsibility for Sections 1-2, 14, 15, 21, 23 and parts of the ES, 24 and 25 and accept professional responsibility for those sections of this technical report;
- 8) I have had prior exposure to the subject property during 2014 Yaramoko 55 Zone feasibility study on mine design and planning, mineral reserve estimates, and capital and operating cost estimates;
- 9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith;
- 10) SRK Consulting (Canada) Inc. was retained by Roxgold Inc. to prepare Yaramoko 55 Zone mineral resource and mineral reserve updates, Bagassi South feasibility study, and a combined life of mine plan, including mineral resource statements, for the Yaramoko project located in Burkina Faso, West Africa in accordance with National Instrument 43-101 and Form 43-101F1 guidelines. This assignment was completed using CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and Canadian Securities Administrators' National Instrument 43-101 guidelines;
- 11) I have not received, nor do I expect to receive, any interest, directly or indirectly, in the Yaramoko project or securities of Roxgold Inc.; and
- 12) That, as of the effective date of this technical report, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Toronto, Ontario, Canada
December 20, 2017

["signed and sealed"]
Benny Zhang, PEng (PEO#100115459)
Principal Consultant (Mining)
SRK Consulting (Canada) Inc.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the report entitled: *Technical Report for the Yaramoko Gold Mine, Burkina Faso, December 20, 2017.*

I, Yan Bourassa, do hereby certify that:

- 1) I am Vice President, Geology with the firm of Roxgold Inc. Inc. with an office at Suite 500, 360 Bay Street, Toronto, Ontario, Canada;
- 2) I graduated from the University of Quebec in Montreal in 1996 with a degree in geology, and subsequently a Masters in geology in 2002 at the same university. I have practiced my profession continuously since 1996, I have been an exploration and resource geologist in the gold and base metals industry on the North-American, South-American, and African continents since graduation. I have a very broad understanding of gold systems at all scales with direct hands-on skills linking field observations to modelling and resource estimation. As Vice-President Geology with Roxgold Inc., my main role is to establish the company's growth strategy through exploration, project generation and acquisitions. The role also includes technical responsibilities of operations in West-Africa regarding geology including geological risk analysis, resource estimation, feasibility studies, resource disclosures and reconciliation;
- 3) I am a professional Geologist registered with the Association of Professional Geoscientists of Ontario, APGO#1336;
- 4) I have been an employee of Roxgold Inc. since July 2016 and I have personally inspected the subject project nine times since my first visit in August 2017 with my last visit being December 2017;
- 5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
- 6) I am employed by the issuer, Roxgold Inc., and therefore am not independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
- 7) I am the co-author of this report and share responsibility for Sections 3 to 11, 13, 22 and parts of the ES and sections 24 and 25 and accept professional responsibility for those sections of this technical report;
- 8) I have had no involvement with the subject property prior to being an employee of Roxgold Inc.;
- 9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith; and
- 10) That, as of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Toronto, Ontario, Canada
December 20, 2017

["signed and sealed"]
Yan Bourassa, PGeo (APGO#1336)
Vice President, Geology
Roxgold Inc.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the report entitled: ***Technical Report for the Yaramoko Gold Mine, Burkina Faso, December 20, 2017.***

I, Paul Criddle, do hereby certify that:

- 1) I am Chief Operating Officer with the firm of Roxgold Inc. Inc. with an office at Suite 500, 360 Bay Street, Toronto, Ontario, Canada;
- 2) I graduated from the Murdoch University, Western Australia in January 2001 with a Bachelor of Science (Extractive Metallurgy). I have practiced my profession continuously since 1998, working full time as an undergraduate, prior to graduating in 2001. In the first stage of my career, I worked in gold projects for Placer Dome in Australia, Papua New Guinea and Tanzania. Initially my experience was focussed on operating and optimising processing plants and mines in these jurisdictions. In the last 12 years of my career, I have been focussed on development projects in Africa. In early 2013, I joined Roxgold Inc. as Chief Operating Officer. From 2013 to now, I have been the Chief Operating Officer of the company. I have been responsible for operations of the company's activities in Burkina Faso at the Yaramoko Gold Project. I have been responsible for the development of this project through the Preliminary Economic Assessment and Definitive Feasibility Studies. Then permitting and construction phases in Burkina Faso. I have overseen the commissioning, ramp up and operational phases at the project. I have been based in the company's Toronto headquarters where I have been part of the corporate executive team, managing financing and investor relations functions also;
- 3) I am a professional Metallurgist and a Fellow of the Australasian Institute of Mining and Metallurgy (FAUSIMM#309804);
- 4) I have been an employee of Roxgold Inc. since February 2013 and I have personally inspected the subject project regularly since this time.
- 5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
- 6) I am employed by the issuer, Roxgold Inc., and therefore am not independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
- 7) I am the co-author of this report and share responsibility for Sections 12, 16, 19 and 21 and parts of the ES and sections 24 and 25 and accept professional responsibility for those sections of this technical report;
- 8) I have had no involvement with the subject property prior to being an employee of Roxgold Inc.;
- 9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith;
- 10) That, as of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Toronto, Ontario, Canada
December 20, 2017

["signed and sealed"]
Paul Criddle (FAUSIMM#309804)
Chief Operating Officer
Roxgold Inc.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the report entitled: ***Technical Report for the Yaramoko Gold Mine, Burkina Faso, December 20, 2017.***

I, Craig Richards, do hereby certify that:

- 1) I am Principal Mining Engineer with the firm of Roxgold Inc. Inc. with an office at Suite 500, 360 Bay Street, Toronto, Ontario, Canada;
- 2) I am a graduate of the University of Alberta in 1984 I obtained a Bachelor of Science in Mining Engineering I have practiced my profession continuously since May 1984. I have worked in the mining industry for mining companies as a mining engineer in underground mine engineering and in the gold mining industry since that time.
- 3) I am a professional Engineer registered with Association of Professional Engineers and Geoscientists of Alberta (APEGA#41653)
- 4) I have been an employee of Roxgold Inc. since June 2013 and I have personally inspected the subject project regularly since June 2013.
- 5) I have read the definition of Qualified Person set out in National Instrument 43-101 and certify that by virtue of my education, affiliation to a professional association, and past relevant work experience, I fulfill the requirements to be a Qualified Person for the purposes of National Instrument 43-101 and this technical report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1;
- 6) I am employed by the issuer, Roxgold Inc., and therefore am not independent of the issuer as defined in Section 1.5 of National Instrument 43-101;
- 7) I am the co-author of this report and responsible for Section 14, 15, 17, 18, 20, 23 and parts the ES and sections 24 and 25 and accept professional responsibility for those sections of this technical report;
- 8) I have had no involvement with the subject property prior to being an employee of Roxgold Inc.;
- 9) I have read National Instrument 43-101 and confirm that this technical report has been prepared in compliance therewith; and
- 10) That, as of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Toronto, Ontario, Canada
December 20, 2017

["signed and sealed"]
Craig Richards, PEng(APEGA#41653)
Principal Mining Engineer
Roxgold Inc.