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SILVER MINES INC.

Fortuna Silver Mines Inc: Yaramoko Gold Mine, Burkina Faso

TECHNICAL REPORT

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1 Summary

1.1 Introduction

The Yaramoko gold mine (Yaramoko Gold Mine or Yaramoko) is a mining operation that commenced production in 2016 and, as of the effective date of this Report, consists of the operating 55 Zone underground mine, the Bagassi South underground mine (which includes the QV' lode, consisting of QV QV' and QV1), and planned open pit mining operations at the 109 Zone and the 55 Zone.

Recent exploration drilling and a review of mine engineering designs supports an updated 55 Zone open pit mining inventory and the development of an open pit deposit at the 109 Zone. In addition, a technical review of mining methods for Bagassi South QV' lode identified a preferred underground mining method and the ongoing underground mining of 55 Zone deposit.

The 55 Zone open pit is to be mined at the completion of the 55 Zone underground mine, which includes the mining of near surface mineralization remaining in the crown pillar and remnant mineralization from underground. The 109 Zone open pit mine, located 1.2 km north of the current Yaramoko processing plant, is to be mined concurrently with the 55 Zone and Bagassi South underground with production planned to commence in the first quarter of 2024 with mine development works to be completed throughout 2023. Mining of the 55 Zone open pit will only commence at the conclusion of underground mining due to the need to remove certain key surface infrastructure associated with the underground mine.

Bagassi South QV' lode is a parallel splay 200 m north of the QV1 lode, with QV1 mined as part of the Bagassi South underground mine. Previous technical reports contemplated extraction of the QV' lode utilising conventional longhole open stoping methods under the African Underground Mining Services (AUMS) mining contract. Outcomes of a recent mining method technical review reconsidered mining options and selected handheld shrinkage stoping as the preferred mining method for the Bagassi South QV' lode.

This updated technical report (Technical Report or Report) discloses the methodology for estimating the Mineral Resources and Mineral Reserves reported as of December 31, 2022 and summarizes the scientific and technical information that supports the current underground mine and proposed open pit operations. 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 underground and open pit mining of the Yaramoko Gold Mine. The opinions contained herein and effective as of December 31, 2022, are based on information collected by the company throughout the course of its investigations.

1.2 Property Description, Location and Access

The Yaramoko Gold Mine is located approximately 200 kilometers (km) southwest of Ouagadougou in the Balé Province in western Burkina Faso. The centre of the 55 Zone gold deposit in the Yaramoko Gold Mine 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 underground mine with the QV' deposit being 200 m north of QV1 and accessed from the same capital infrastructure, is geologically similar to the 55 Zone and is located about 1.8 km south of the 55 Zone.

The 109 Zone deposit is a satellite deposit located approximately 1.2 km from the Yaramoko processing plant and also hosted in similar geology.

The Yaramoko Gold Mine is operated by Roxgold Sanu S.A. (Roxgold Sanu), a company incorporated, registered and subsisting in accordance with the laws of Burkina Faso and which is a 90 percent directly owned subsidiary of Roxgold Inc. (Roxgold) with the remaining 10 percent interest held by the State of Burkina Faso. Roxgold was a Canadian public company listed on the Toronto Stock Exchange until July 2, 2021, when Fortuna Silver Mines Inc. (Fortuna or the Company) acquired all of the issued and outstanding shares of Roxgold resulting in Roxgold becoming a wholly-owned subsidiary of Fortuna. Fortuna is a Canadian public company with its shares listed on the Toronto Stock Exchange under the symbol FVI and on the New York Stock Exchange under the symbol FSM.

The Government of Burkina Faso receives a 3 percent royalty on the revenues from mineral production if the gold price is lower than US$1,000 per ounce, 4 percent if the gold price is between US$1,000 and US$1,300 per ounce and 5 percent if the gold price is higher than US$1,300 per ounce. The Government also collects various taxes and duties on the imports of fuels, supplies, equipment and outside services, as specified by the Burkina Faso Mining Code.

Roxgold Sanu 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 January 30, 2015. This was followed by the approval of the National Mines Commission meeting held on May 24, 2015.

An extension to the Mining Permit to incorporate the Bagassi South project into the Mining Permit was awarded through Decree 2018-0656/PRES/PM/MMC/MINEFID/MEEVCC for Yaramoko dated July 30, 2018. This extension (Bagassi South Zone) adds 7.2 square kilometers (km^2) to the permit, for a total of 22.9 km^2. 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.

No geographical extension of the Mining Permit is required to accommodate the Zone 109 open pit project, as it fits entirely within the existing permit boundaries.

1.3 History

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, with significant results 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 per tonne of gold (g/t Au) over a core length interval of 1.45 meters (m), and 6.36 g/t Au over a core length interval of 0.30 m.

In 1995, Placer Outokumpu Exploration Limited conducted soil sampling in the area of Bagassi-Yaramoko returning 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 with a few anomalous points returned; however, no follow-up work was conducted (Riverstone, 2008).

Other than small scale *orpaillage* (artisanal mining) conducted on a few areas of the property there has not been any known production from the Yaramoko Gold Mine prior to the start of operations in 2016. Gold production since 2016 to the end of December 2022 is 0.84 million ounces (Moz).

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

The closest major town to the Yaramoko Gold Mine 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. Yaramoko can be reached via the highway system by traveling west from Ouagadougou on paved highway for approximately 200 km, or alternatively traveling east from Bobo-Dioulasso for approximately 150 km to the village of Ouahabou, and then north-northwest by laterite road for approximately 20 km to the village of Bagassi.

Roxgold's Sabarya camp is a purpose built 306-person accommodation camp built in 2015 with associated recreational and messing facilities. Adjacent to the accommodation camp are the exploration offices and associated secure area for logging and processing drill core and for storing exploration equipment. The milling complex, administrative and mining contractor offices, warehouses and associated maintenance and back-up power facilities, are accessed by a 1 km laterite road constructed by Roxgold. The 55 Zone mine portal is also located in this complex, the Bagassi South mine portal is located 1.8 km to the south, while the 109 Zone open pit access will be located 1.2 km north of the processing plant facility.

The closest village is Bagassi which has a population of approximately 3,000 people. Agriculture is the main industry in the region with production of millet, groundnut, and cotton.

The climate is semi-arid with a rainy season from April to October and a warm dry season from November to February and hot from March to June. Temperatures range from a night-time low of about 15 degrees Celsius (°C) in December to day-time highs of about 45 °C in March and April. Annual total rainfall in the area averages 800 millimeters (mm).

1.5 Geology and Mineralization

The north-northeast-trending Boni shear zone divides the Yaramoko Gold Mine between the predominantly Houndé volcanic and volcaniclastic 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, Bagassi South and 109 Zone gold deposits. Each deposit is set on the eastern margin of the intrusive in the footwall of the Yaramoko shear along conjugate 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 deposit is located 1.8 km south of the 55 Zone and the surface definition of the veins can be traced over a strike length of some 800 m and dips to the northeast. The 109 Zone deposit is located 900 m to the north of the 55 Zone and is traceable at surface over 1 km; dipping steeply to the north-northeast. Gold typically occurs as coarse free grain in quartz and is associated with pyrite.

1.6 Exploration Drilling and Sampling

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

Rotary air blast drilling was used to follow up soil anomalies in 2011 and 2012 (1,887 rotary air blast boreholes) while auger drilling was used for collecting soil samples under the transported cover in 2012 and 2013 (2,669 auger boreholes totalling 13,480 m). 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.

From 2015 to 2021, Roxgold drilled a total of 417 core holes (77,964 m) from surface and underground at Bagassi South on the QV1 and QV’ structures to infill and extend mineralization up and down dip, with increasing focus on resource conversion and infill. In 2020-21 a final stage of extension drilling was completed.

A deep drilling program from surface was carried out at the 55 Zone during 2018-2019, following on from an earlier 2017 surface drilling program. This program was designed to infill mineralization previously intersected during the 2017 surface drilling campaigns between 700 m and 1,000 m below surface. A second phase of this program in 2019 saw additional drilling from surface testing further down-plunge extensions to approximately 1,300 m below surface. In 2021 and 2022, additional diamond drilling from dedicated underground platforms was carried out at the 55 Zone, focusing on infilling and mineral resource conversion, and testing for strike and down-plunge extensions. A total of 127 diamond drill holes totalling 72,503 m was drilled during the 2021-2022 campaigns.

Core drilling from surface typically utilized HQ sized core (63.5 mm diameter) from the top of the borehole to the point where the rock showed no signs of oxidation; typically, 20 to 30 m in depth. At that point, the core size was reduced to NQ (47.6 mm diameter). Down-hole deviation was monitored using a Reflex Instruments device at 15, 25, and 50 m intervals, and then approximately every 50 m thereafter. Core drilling from underground stations utilized NQ core. Core recoveries are high, averaging 99 percent, reflecting the competent nature of the host lithologies.

Surface drill collar surveys were carried out using a site based Differential Global Positioning System (DGPS) which has been calibrated with the regional geodesic system. Underground drill collar surveys were carried out using a total station operated and managed by the mining contractor surveyors AUMS.

Downhole surveys generally used Reflex cameras, either single-shot or multi-shot provided by the drilling contractor and calibrated prior to use on site.

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

Standardized sampling protocols were used for core sampling by Riverstone in 2011 and by Roxgold between 2011 and 2021. Sample preparation and analyses were conducted by Activation Laboratories Ltd. (Actlabs), ALS Chemex (ALS), BIGS Global S.A.R.L. (BIGS), and SGS Laboratories (SGS) located in Ouagadougou, as well as by SGS in Tarkwa and TSL Laboratories (TSL) in Saskatoon. Seventy one percent of the core samples informing the mineral resource (49,675 out of 69,548 samples) were prepared and assayed by Actlabs in Ouagadougou at 55 Zone, and ninety two percent of the core samples informing the mineral resource (23,368 out of 25,419 samples) were prepared and assayed by Actlabs in Ouagadougou for Bagassi South.

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. The SGS Ouagadougou, Yaramoko 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.

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 m above and below the 55 Zone in boreholes drilled prior to 2014, and thereafter were generally sampled starting from approximately 20 m above the main mineralized zone.

Waste intervals were sampled at 2.0 m intervals, except where a significant geological change occurred and/or in mineralized zones where the sampling intervals averaged between 1.0 m to 1.5 m. 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.

Roxgold implemented logging onto Maxwell LogChief data capture software in 2019, enabling the direct capture and traceability of logging data via dropdown menus and pre-set codes to promote data hygiene. Prior to 2019, all logging was onto pre-set excel spreadsheets before importation into the database. Reviews of the logging data and associated model interpretation are carried out on a regular basis by the site senior geological team and on each site visit by the qualified person (QP).

Assay data are electronically reported from the laboratory in Microsoft Excel and pdf format and imported into the database after validation, along with the corresponding assay certificates.

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

All samples grading over 5.0 g/t Au were re-assayed with a gravimetric finish. Selected samples within the mineralized zones were re-assayed using a 1,000 g screen metallic fire assay procedure with gravimetric finish (procedure code 1A4-1000). With this procedure, a representative 500 g or 1,000 g sample spilt is sieved at 100 mesh (150 micrometers) 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 99,683 samples have been analyzed using fire assay at the 55 Zone and Bagassi South Zone, including 1,174 via screen fire assay methods.

Implementation of a quality assurance/quality control (QAQC) program is current industry best practice and involves establishing appropriate procedures and the routine insertion of certified reference material (CRMs), blanks, and duplicates to monitor the sampling, sample preparation and analytical process. Roxgold implemented a full QAQC program to monitor the sampling, sample preparation and analytical process for all drilling campaigns in accordance with its companywide procedures. The program involved the routine insertion of CRMs, blanks, and duplicates. Evaluation of the QAQC data indicates that it is sufficiently accurate and precise to support Mineral Resource estimation.

1.7 Data Verification

Prior to March 2019, the database was managed by an external consultancy, Taiga Consultants Ltd. (Taiga) of Calgary, Alberta. Exploration data was recorded digitally to minimize data entry errors. Core logging, surveying, and sampling was monitored by qualified geologists and routinely verified for consistency. Electronic data was captured and managed using an electronic database.

Assay results were delivered by the primary laboratories electronically to Roxgold and Taiga. Analytical data was 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.

In March 2019, Roxgold transitioned to Maxwell Geoservice Datashed SQL database system. The database has been set up with a series of automated import, export and validation processes to minimize potential errors and inconsistencies.

Data verification by the QP was conducted through the inspection of selected drill core to assess the nature of the mineralization and to confirm geological descriptions as well as the inspection of geology and mineralization in underground workings of the Zone 55 and Bagassi South veins in addition to reviews of production data.

A series of plan and cross sections were generated displaying the lithologic and mineralization interpretation by the Roxgold geology and exploration departments and reviewed by the QP, while three-dimensional viewing for data interpretation consistency was carried out on screen.

The QP is of the opinion that the data verification programs performed on the data collected by Roxgold are adequate to support the geological interpretations, the analytical and database quality, and Mineral Resource estimation at the Yaramoko Gold Mine.

1.8 Mineral Processing and Metallurgical Testing

In June 2013, Roxgold commissioned SRK Consulting (Canada) Inc. (SRK) to provide certain technical engineering services and to prepare a feasibility study in accordance with the disclosure requirements of Canadian Securities Administrators' National Instrument 43-101 (NI 43-101) for the gold mineralization contained in the 55 Zone of the Yaramoko Gold Mine. 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 testwork conducted on the 55 Zone samples are considered to be representative of the material intended to be processed from the 55 Zone open pit, given it is the extension of the same deposit.

Additional testwork carried out in support of the processing plant expansion and development of the Bagassi South mine was performed in September 2015, for the 109 Zone deposit testwork was carried out in September 2022, with both testwork program completed at the ALS metallurgy assay laboratory in Perth, Western Australia, Australia under the supervision of Roxgold and demonstrated very similar characteristics.

It is the opinion of the QP that operational experience since 2016 has demonstrated a consistent metallurgical performance with recoveries between 98 to 99.3 percent supporting the historical test work and is representative of the material remaining to be processed in the life of mine plan (LOMP), including material expected to be sourced from the 109 Zone and 55 Zone open pit mining operations.

1.9 Mineral Resource and Reserve Estimates

Since 2014, Roxgold has completed numerous near-mine exploration and resource definition drilling campaigns, both from surface and underground and on a near continual basis, to support the extension of the Yaramoko Gold Mine life at the 55 Zone and Bagassi South. Between June 30, 2021 and June 30, 2022, Roxgold continued exploration and resource definition drilling campaigns and internally prepared updated resource models for the Yaramoko Gold Mine using drilling information to June 30, 2022. The

Mineral Resources reported herein have been estimated using a geostatistical block modelling approach informed from gold assay data collected in core boreholes. This updated resource model formed the basis of the 2022 year-end Mineral Resources and Mineral Reserves of the Yaramoko Gold Mine. The consolidated Mineral Resources (excluding the Mineral Reserves) for the 55 Zone underground and open pit, Bagassi South underground and 109 Zone open pit are presented in Table 1.

Table 1: Mineral Resources for the Yaramoko Gold Mine, as of December 31, 2022

Classification	Tonnes (000)	Grade Au (g/t)	Contained Gold (000' oz)
Measured	86	6.41	18
Indicated	374	5.97	71
Measured & Indicated	**460**	**6.05**	**89**
Inferred	141	5.51	25

Notes:

- *Mineral Resources are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves.*
- *Mineral Resources are exclusive of Mineral Reserves.*
- *Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.*
- *Factors that could materially affect the reported Mineral Resources include; changes in metal price and exchange rate assumptions; changes in local interpretations of mineralization; changes to assumed metallurgical recoveries, mining dilution and recovery; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environmental and other regulatory permits, and maintain the social license to operate.*
- *Mineral Resources for the Yaramoko Gold Mine are estimated as of June 30, 2022, for underground and open pit, and reported as of December 31, 2022, taking into account production related depletion for the period through December 31, 2022 for the underground mine as no open pit mining was active in 2022.*
- *Yaramoko Mineral Resources are reported in situ at a gold grade cut-off grade of 0.9 g/t Au for the 55 Zone open pit, 0.5 g/t Au for the 109 Zone open pit, and 2.9 g/t Au for underground (Zone 55 and Bagassi South), based on an assumed gold price of US$1,700/oz and the same costs, metallurgical recovery and constrained within an optimized pit shell. The Yaramoko Mine is subject to a 10% carried interest held by the government of Burkina Faso.*
- *Dr. Matthew Cobb is the Qualified Person responsible for Mineral Resources, and is an employee of Roxgold (a wholly-owned subsidiary of Fortuna).*
- *Totals may not add due to rounding procedures.*

The 55 Zone and Bagassi South Mineral Resource block models was used to estimate underground 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 4.1 g/t Au for 55 Zone and Bagassi South (QV), and 3.1 g/t Au for Bagassi South (QV') based on a gold price of $1,600 per ounce (oz), an estimated site operating cost of $194 per tonne (t) for 55 Zone and Bagassi South (QV), and $145 per tonne for Bagassi South (QV'), and a metallurgical gold recovery of 98.0 percent.

The mining shapes follow the mineralization 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 applied to the mining shapes, with grades from wall rock dilution directly extracted from the block model and null grade from backfill, with dilution defined as waste/ore tonnes.

Development dilution factor of 10 percent was included in the selected development drive profiles with reported physicals being the diluted tonnes and grades. Mining recoveries vary from 86 to 92 percent, dependent on stope type, category and mining method.

The 55 Zone and 109 Zone open pit mineral reserve was estimated using a marginal cut-off grade of 1.26 g/t Au and 0.74 g/t Au respectively, with a gold price of US$1,600/oz, and a combination of existing relevant operating costs and recoveries, as well as mining contractor rates provided by a reputable and experienced mining contractor operating within the region. Probable Mineral Reserves were estimated from the Indicated Mineral Resource, for both 55 Zone and 109 Zone open pits within the ultimate pit design based on optimisation pit shell run with an SMU block model re-blocked to 5m x 5m x5m.

The Mineral Reserves for the Yaramoko Gold Mine are presented in Table 2.

Table 2: Mineral Reserves for the Yaramoko Gold Mine, as of December 31, 2022

Classification	Tonnes (000)	Grade Au (g/t)	Contained Gold (000' oz)
Proven	123	3.42	13
Probable	1,039	6.19	207
Proven & Probable	**1,161**	**5.89**	**220**

Notes:

- *Mineral Reserves are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves.*
- *Factors that could materially affect the reported Mineral Reserves include: changes in metal price and exchange rate assumptions; changes in local interpretations of mineralization; changes to assumed metallurgical recoveries, mining dilution and recovery; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environmental and other regulatory permits, and maintain the social license to operate.*
- *Mineral Reserves for the Yaramoko Gold Mine are estimated as of June 30, 2022 for underground, and reported as of December 31, 2022, taking into account production related depletion for the period through December 31, 2022.*
- *Mineral Reserves for the Yaramoko open pit are estimated as of December 31, 2022, no production related depletion was applied as there were no active open pit mining in 2022.*
- *Mineral Reserves for Yaramoko are reported at a cut-off grade of 1.26 g/t Au and 0.74 g/t Au for the 55 Zone and 109 Zone open pit respectively based on an assumed gold price of US$1,600/oz, 4.1 g/t Au for 55 Zone and Bagassi South (QV) underground and 3.1 g/t Au for Bagassi South (QV') underground, based on an assumed gold price of US$1,600/oz, metallurgical recovery rates of 98.0%, Surface mining costs of US$3.49/t, Processing costs of US$27/t, and G&A cost of US$25/t for 55 Zone, surface mining costs of US$3.66/t and processing cost of US$27/t for 109 Zone. 55 Zone and Bagassi South (QV) underground mining costs of US$135/t, G&A costs of US$28/t, and processing cost of US$31/t and Bagassi South (QV') underground mining costs of US$115/t, and processing cost of US$30/t. Underground mining recovery is estimated at 86% (QV) and 90% (QV') for Bagassi South, 92% for 55 Zone stopes, and 100% for sill drifts.*
- *A mining dilution factor of 10% has been applied for sill drifts, 0.6m dilution skin has been applied for 55 Zone and Bagassi South (QV) stopes and 0.4m dilution skin has been applied for Bagassi South (QV') stopes. Surface Mineral Reserves are reported with modifying factors of mining dilution and mining recovery represented by regularizing the block models to an appropriate selective mining unit (SMU) block size Each open pit deposit has undergone pit optimization, detailed mine design, mine scheduling, and cashflow analysis, demonstrating a technically achievable and economic viable mine plan supporting this Mineral Reserve. Reported proven reserves includes surface stockpile material.*
- *Raul Espinoza is the Qualified Person responsible for the underground and open pit Mineral Reserves reported for the Yaramoko Gold Mine, being an employee of Fortuna.*
- *Totals may not add due to rounding procedures.*

1.10 Mining Methods

Planned mining operations for the Yaramoko Gold Mine are comprised of the existing 55 Zone and Bagassi South underground mines, and the 55 Zone and 109 Zone open pit mines.

55 Zone and Bagassi South underground mines are a combined 1,280 tonne-per-day (tpd) underground operation which utilizes longhole stoping with cemented rock fill as its primary mining method. As of the second quarter of 2022, mining of the QV1 lode at the Bagassi South underground mine ceased with only remnant stopes remaining to be mined at the end of mine life and the 55 Zone became the main source of ore for the operation.

Following completion of mining at the QV1 lode, activities at the Bagassi South underground mine were limited to capital infrastructure development in preparation for mining the QV' lode based on the handheld shrinkage stoping mining method with unconsolidated waste rockfill. As of the effective date of the Report no production activities have occurred for the QV' lode.

Stoping at 55 Zone and for the remnant stopes of Bagassi South QV1 utilize 20 m and 17 m sublevel spacing respectively, with longitudinal stope sequencing, retreating towards centralized access declines. Mine development and stoping operations are conducted for Roxgold by AUMS under a mining services agreement which extends through to the end of 2023, with negotiations to be made on whether an extension will be provided through to the end of the first quarter 2025, the completion of the 55 Zone underground mine. The 55 Zone and Bagassi South operations benefit from shared infrastructure, management, and support services.

Stoping at Bagassi South QV' is proposed to utilize a transverse handheld stope sequencing, providing production flexibility and selectivity to preserve ground conditions with 25 m sublevel spacing. Mineralized material reports to multiple draw points along the drives and is mucked to dedicated level ore passes prior to being hauled out of the mine from the extraction level. Mine capital development for QV' is conducted for Roxgold by AUMS, with operating development and stoping activities completed through a combination of Paramina (mining supervision and operators labour hire) and DeSimone for haulage activities (trucks) under a mining services agreement. Roxgold will provide equipment and consumables for Bagassi South QV' production activities.

The 55 Zone underground mine has Proven and Probable Mineral Reserves to a depth of 1,100 m below surface with 0.60 million tonnes (Mt) grading 7.42 g/t Au. Mine life for underground mining of the 55 Zone at the planned production rate is currently to the end of the first quarter 2025.

The Bagassi South mine has Proven and Probable Mineral Reserves to a depth of 235 m below surface with 0.15 Mt grading 6.62 g/t Au comprising of the Bagassi South QV1 and QV' deposits. The QV' deposit is parallel to the main QV1, accessed through the same decline utilizing the AUMS underground mining contractors for capital development and production activities completed by Paramina and Desimone for stoping and haulage respectively. Baggasi South main QV1 deposit mining activities have ceased with remaining remnant stopes to be mined following completion of the Bagassi South QV' deposit during the first quarter of 2025.

As of December 31, 2022, the 55 Zone underground mine sublevels have been developed in advance of stoping to the 4,410 level, 900 m below surface and the access decline has reached a depth of 940 m. All development for the QV1 deposit at the Bagassi South underground mine has been completed with the QV' capital development planned completion at the end of the first quarter 2023 with remaining development at the end of the first quarter 2024. Development for the 55 Zone and Bagassi South underground mines are well-advanced ahead of production to support the required mine plan.

As of the effective date of the Report, there has been no open pit mining or underground handheld shrinkage stoping mining at the Yaramoko Gold Mine.

In September 2020, a geotechnical study was completed for the 55 Zone open pit by geotechnical consultancy MineGeoTech Pty Ltd (MineGeoTech). The outcome of the geotechnical study (MineGeoTech, 2020) was a technically justifiable pit design for the 55 Zone appropriate to support Mineral Reserves. In June 2022, a geotechnical study was completed for the 109 Zone open pit by MineGeoTech. The outcome of the geotechnical study (MineGeoTech, 2022) was a technically justifiable pit design for the 109 Zone appropriate to support the Mineral Reserves. In February 2021, a mining study of the 55 Zone open pit was completed by independent international mining consultancy Entech Pty Ltd. (Entech). The Entech (2021) mining study consisted of pit optimization guiding a detailed pit design, mining schedule, and cashflow assessment.

In 2022, the Mineral Resource estimate was reviewed and updated, following an update of the open pit mining study for the 55 Zone to maximise cashflow and reduce project risk. The 2022 mining study also included a mining study of the 109 Zone. The 2022 mining study demonstrates a technically achievable and economically viable open pit mining operation and is used to justify the Mineral Reserve estimate shown in this report. The QP regards the study work completed on the 55 Zone open pit and the 109 Zone open pit to be at a preliminary feasibility study (PFS) level of confidence and of sufficient accuracy to support the 55 Zone open pit Mineral Reserve estimate.

The 55 Zone open pit optimization work and 109 Zone mining study supports mining the 55 Zone and 109 Zone open pits via conventional drill, blast, load and haul open pit mining methods. Mining is proposed to be via a contract miner, with mining costs estimated from rates received from an experienced mining contractor operating within the region. Open pit mining of the 55 Zone deposit is proposed to commence upon completion of underground mining operations of the 55 Zone deposit and 109 Zone.

Run of mine (ROM) ore for the 55 Zone open pit will be extracted from the pit via a 14.5 m wide dual lane haul road from the surface down to approximately 30 vertical meters to the 5,270 m reduced level (RL), then a 10 m wide single lane haul road down to approximately 20 vertical meters to the final truck floor at the 5,250 mRL. The ultimate pit is approximately 655 m long, 115 m wide, and 50 m in depth. All pit haul road gradients have been designed at a 1:9 slope. All pit stage designs utilize a minimum mining width of 15 m and 5 m goodbye cuts.

ROM ore for the 109 Zone comprising the north and south pits will be extracted from the pit via a 9.3 m wide haul road from the surface down to approximately 60 vertical meters for both pits. The southern ultimate pit is approximately 285 m long, 140 m wide, and 60 m in depth and the northern ultimate pit is approximately 190 m long, 100 m wide, and 60 m in depth. All pit haul road gradients have been designed at a 1:9 slope. The 109 Zone pits contain a 5 m goodbye cut.

1.11 Recovery Methods

The mineral processing and metallurgical test work conducted on the Yaramoko gold deposits by ALS Metallurgy confirmed the coarse free gold nature of the deposit. Gold extraction using gravity and leaching processes yields excellent gold recoveries for both deposits. As a result, the Yaramoko gold processing plant has exhibited high rates of metallurgical performance in treating the 55 Zone and Bagassi South ore since commencing operations in 2016.

In 2019, an expansion of the plant was undertaken to increase the nameplate capacity of the project from 270,000 tonnes per annum to 400,000 tonnes per annum (1,100 tpd) and was designed and constructed by DRA (Pty.) Ltd in Johannesburg, South Africa.

The design of the Yaramoko plant is a simplistic flowsheet that incorporates secondary crushing, single stage SAG milling, carbon in leach (CIL) and gravity recovery circuits, elution and smelting circuits to produce gold doré.

Water is sourced primarily from the water storage facility and supplemented from the underground mining dewatering activities and a bore field network. The water storage dam is located approximately 2 km from the plant, adjacent to the tailings storage facility.

1.12 Project Infrastructure

The infrastructure and services at the Yaramoko Gold Mine adequately support the current operations being the 55 Zone and Bagassi South underground mines, the proposed 109 Zone open pit, as well as the processing plant. This infrastructure consists of a process plant, a mine service area (offices, workshops, and a warehouse), mine refrigeration and ventilation facilities, 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. The site is also serviced by a laterite airstrip, utilized to transport the operations personnel to and from the mine site, via contract aircraft services.

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 (MVA). 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).

For the development of the 55 Zone open pit phase of the mine, some key underground mine infrastructure associated with the 55 Zone will need to be decommissioned as it will fall within the blast radius of the open pit plan. The underground operations workshop and offices, ventilation and refrigeration facilities as well as above ground power reticulation in that area, would need to be decommissioned and removed before the ultimate pit outline is developed.

For the development of the 109 Zone open pit mine, additional infrastructure is required to accommodate mining of the deposit including; road deviation of the current national highway, haul road to access the deposit, extension of perimeter fencing and additional security personnel, systems and posts.

The entire Yaramoko Gold Mine, with the exception of the 109 Zone open pit, is contained within a security fence, with key infrastructures secured with double fences.

1.13 Market Studies

Gold is a freely traded commodity on the world market for which there is a steady demand from numerous buyers. The Fortuna financial department provides the Yaramoko Gold Mine with gold price projections for inclusion in budget and business plan preparations. Pricing is based on long-term analyst and bank forecasts for gold.

For the current Yaramoko Gold Mine, 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.

The QP has reviewed the information provided by Fortuna on metal price projections and exchange rate forecasts and note that the information provided is consistent with what is publicly available for industry norms.

1.14 Environmental Studies, Permitting, and Social or Community Impact

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 outline the legal framework for social and environmental impacts from mining activities in Burkina Faso. The primary environmental approval required by Roxgold Sanu to develop a mining project is an Avis de Conformité et de Faisabilité Environmentale, which is issued by the Ministry of Environment and Sustainable Development (MEDD) through its environmental agency named Agence National des Evaluations Environnementales (ANEVE, ex BUNEE). The ANEVE has the mandate to promote, monitor and manage all the environmental assessment process in the country. Such an Avis de Conformité et de Faisabilité Environmentale indicates a positive decision of the Minister of Environment on the submitted ESIA.

Avis de Conformité et de Faisabilité Environmentale were received in 2014 for the first phase of the Yaramoko Gold Mine (55 Zone mine) and in 2017 for the expansion (Bagassi South mine). The respective Avis are: (1) Decree N°2014-155/MEDD/CAB and (2) Decree n°2017-431/MEEVCC/CAB. An ESIA for Zone 109 project has been submitted in August 2022, with validation and Avis de Conformité et de Faisabilité Environmentale expected on track for finalization in the first quarter of 2023. Any further development of the Yaramoko Gold Mine will follow the same process.

This framework will guide the requirements for future permit modifications to support the 55 Zone open pit development, in a similar way to which the Bagassi South extension was granted in 2017. The Zone 109 open pit project is undergoing permitting.

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 concern livelihood changes due to the loss of farmland and loss of income from artisanal mining. Roxgold has been able to manage these aspects through a comprehensive ESMS based on ISO 14001 and International Financial Corporation (IFC) Performance Standards.

Since 2014, Roxgold Sanu has engaged with its local stakeholders through a stakeholder engagement management plan. A specific stakeholder engagement strategy and plan based on the community analysis (stakeholder mapping), the existing tools and the experience of the community relations team, including presentations of the expansion projects, community representatives' meetings, special committee, public enquiries, billboard and/or broadcasting is in place.

The closure plan for the Yaramoko Gold Mine will be updated to incorporate plans for the development of the 109 Zone open pit project once its ESIA is formally validated, and eventually for the 55 Zone open pit at the appropriate time. 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 LOMP.

1.15 Capital and Operating Costs

Cost estimates are derived from activity-based life of mine scheduling. Underground mining costs are estimated using the schedule of rates within the existing mining contract with AUMS and contracts for mining and haulage activities of the Bagassi South QV' deposit with Paramina and DeSimone respectively. Open pit mining costs are based on estimated mining rates provided by a reputable and experienced mining contractor operating within the region.

Processing, sustaining capital, general and administrative, and selling cost estimates are prepared using realized costs from recent operating years, with forecast labour and consumables from activity-based scheduling aligned with the LOMP schedule.

The QP considers the capital and operating costs estimated for the operation as reasonable based on industry-standard practices and actual costs observed for 2022.

1.16 Economic Analysis

Fortuna is using the provision for producing issuers, whereby producing issuers may exclude the information required under Item 22 of Form 43-101F1 -*Technical Reports* for technical reports on properties currently in production and where no material production expansion is planned.

The Mineral Reserve declaration in this Report is supported by a positive cashflow for the period set out in the LOMP.

1.17 Conclusions, Risks, and Opportunities

This Report represents the most accurate interpretation of the Mineral Reserve and Mineral Resource available as of the effective date of this Report. The conversion of Mineral Resources to Mineral Reserves was undertaken using industry-recognized methods, and estimated operational costs, capital costs, and plant performance data. This Report also supports the development of the 55 Zone open pit at the completion of the 55 Zone underground mine, the 109 Zone open pit mine and the Bagassi South QV' handheld shrinkage stoping mining methodology. Thus, it is considered to be representative of future operational plans. This Report has been prepared with the latest information regarding environmental and closure cost requirements.

A number of opportunities and risks were identified by the QPs during the evaluation of the Yaramoko Gold Mine.

Opportunities include:

- Exploration potential to increase the Mineral Resources of the Yaramoko Gold Mine deposits.
- Upside potential in the QV' deposit upon realisation of actual operating costs.
- 55 Zone and 109 Zone open pit design and scheduling optimization for contract negotiations.
- Further optimized mining methods resulting in operating cost savings and lower total mining dilution, thus increased head grade.
- Further optimize mine scheduling.

Risks include:

- Ground conditions at depth for the 55 Zone underground mine resulting in delayed extraction of stopes due to increased re-work requirements.
- Operating conditions associated with mining the Bagassi South QV' deposit.
- Change of management with the adoption of a new mining method with alternative contractors.
- Unforeseen increases in costs due to inflation could impact the outcome of the mining study as well as future open pit to underground transition studies. Contractor costs will need to be revalidated during development plans.
- Further geotechnical work prior to the commencement of mining will be required to further assess the impact of underground voids on pit wall stability.
- Open pit mining will occur adjacent to the processing facility and key project infrastructure. Drill and blast designs and processes will need to ensure vibration and fly rock is controlled such that any impact to key project infrastructure is minimized.
- Unmet community expectations leading to potential for loss of social license to operate. Roxgold Sanu expects to minimize this risk with its experience, positive reputation, and social management plans relating to community development, stakeholder engagement and artisanal miners.
- Preparation for open pit mining activities delayed due to schedule extension of the 55 Zone underground mine, contract negotiations for preferred contractor and mine development preparations. These are mitigated through optimisation of the underground mine plan, negotiations for preferred contractor and project planning for mine development commencing in the first half of 2023.
- Long term impact of groundwater movement away from mine workings after closure.

1.18 Recommendations

Recommendations for the next phase of work have been broken down into those related to ongoing exploration activities at the Yaramoko Gold Mine; underground mining activities and studies related to operational improvements; exploration activities and development studies related to the development of the 55 Zone and 109 Zone open pits at Yaramoko; processing and infrastructure improvements; and environmental, permitting and social activities as set out below.

Underground Mining:

- Continued monitoring of ground conditions along with the implementation of a recommended ground support regime in line with the increase in depth at the 55 Zone underground mine. Costs are included in the operating costs for the mine.
- Infill and step out drilling program. Expenditure of US$ 2.8 million is budgeted in 2023 for this program.
- Further review of the mining contract and its cost reduction opportunity through contract negotiations during the fourth quarter of 2023, cost is included in the operating costs for the mine.
- Review of actual productivity and realised cost with mining of the Bagassi QV' mineralization and update the mining inventory inline with the realised parameters. Costs are included in operating costs of the mine.
- Continued monitoring and operational improvements for safety and productivity in mining the Bagassi South QV' lode. Costs are included in operating costs of the mine.

Open Pit Mining:

- Prior to mining 55 Zone Open Pit commencing, a void management plan will be prepared to define the mining methods to safely mine mineralization adjacent to underground workings while minimizing mining dilution and maximizing mining recovery. The void management plan will be undertaken predominantly with Roxgold technical staff, with such costs included in the operating costs for the mine. An external geotechnical consultants will be utilised to assist with this study with costs included as part of the budgeted geotechnical site support.
- Prior to mining 55 Zone Open Pit commencing, a drill and blast study will be completed to define the drill and blast designs that protect key project infrastructure from ground vibrations and fly rock within the blast perimeter. Drill and blast studies will be undertaken by Roxgold technical staff, with such costs included in the operating costs for the mine.
- Evaluate and choose a preferred mining contract for the open pit scope of work. Prepare a workable mining contract for the open pit mining scope of work. Contractor evaluation and preparation of the mining contract will be undertaken by Roxgold technical staff, with such costs included in the operating costs for the mine.
- Data gap existing in the north-eastern wall of the northern pit for 109 Zone to be assessed and altered as required prior to mining of the sector commencing. Such costs will be included in the operating cost of the mine.

Processing and Infrastructure:

- As processing feed begins to reduce over the next couple of years, there is the potential at times for the mill load to fluctuate and potentially run low. The lifter angle of the SAG mill should be reviewed to ensure that it is not overly aggressive with the reduced total load. The cost of such a review will be assessed internally by Roxgold technical staff.
- Metallurgical behavior should continue to be monitored especially when there are major changes to the proposed mine plan and mine development. Additional on-site testing should be completed from time to time in accordance with an updated mine plan during production, to identify any potential issues, especially in the comminution circuit. This testwork should be completed during operations. Such costs will be included in the operating costs for the mine.

Environmental, Permitting, and Social:

- Continue the implementation of the environmental management plan as required under applicable environmental regulations and according to the Company's ESIA, internal standards and applicable international best practices. This includes the implementation of the monitoring and prevention programs to avoid or mitigate our impacts, the regular update of the closure plan and the continuous improvement of the Company's environmental management system. Such costs will be included in the operating costs for the mine.
- Ensure the performance of the stakeholders' engagement plan and continue to support the local stakeholders in their social and economic development as part of the social corporate responsibility and license to operate. Such costs will be included in the operating costs for the mine.
- Continue the implementation of a rigorous health and safety management system to protect employees from injury and health issues, including preventative activities such as risk assessments, inspections, audits, employee safety and competences training, leadership programs and the continuous improvement of the health and safety management system. Such costs will be included in the operating costs for the mine.

2 Introduction and Terms of Reference

The Yaramoko Gold Mine (Yaramoko Gold Mine or Yaramoko) is an underground mine operated by Roxgold Sanu S.A. (Roxgold Sanu), a company incorporated, registered and operating in accordance with the laws of Burkina Faso which is a 90 percent indirectly owned subsidiary of Roxgold Inc. (Roxgold) with the remaining 10 percent interest held by the State of Burkina Faso. Roxgold was a Canadian public company listed on the Toronto Stock Exchange until July 2, 2021, when Fortuna Silver Mines Inc. (Fortuna or the Company) acquired all the issued and outstanding shares of Roxgold, resulting in Roxgold becoming a wholly-owned subsidiary of Fortuna. Fortuna is a Canadian public company with its shares listed on the Toronto Stock Exchange under the symbol FVI and on the New York Stock Exchange under the symbol FSM.

The Yaramoko Gold Mine is an operating underground gold mine located approximately 200 kilometers (km) southwest of Ouagadougou, the capital city of Burkina Faso. The mine primarily targets high tenor gold mineralization in the 55 Zone and Bagassi South underground mines associated with quartz veining. In 2014, SRK was the lead author of a feasibility study that examined the viability of the proposed mine and mill complex.

Construction of the 55 Zone underground mine and associated mill began during the third quarter of 2015 and the mine poured its first gold in May 2016.

Since the feasibility study, further infill and extension drilling has been completed at 55 Zone and Bagassi South. In February 2017, Roxgold commissioned SRK to visit the property and to prepare a revised Mineral Resource model for the 55 Zone and support Roxgold to prepare an updated Mineral Reserve estimate and accompanying life of mine plan (LOMP). SRK also supported Roxgold undertaking a feasibility study for the Bagassi South leading to the maiden Mineral Reserve statement for the Bagassi South accompanied by a LOMP. Production from Bagassi South commenced in September 2019 and has continued to date.

SRK's services between March and December 2017 led to the preparation of updated Mineral Resource estimates for the 55 Zone and Bagassi South Zone, an updated 55 Zone Mineral Reserve estimate and the maiden Mineral Reserve estimate for the Bagassi South that was disclosed publicly by Roxgold in a news release on November 6, 2017.

Subsequent to the acquisition of Roxgold by Fortuna, an updated technical report documenting the current status of the Yaramoko Gold Mine and incorporating additional operational data, further infill and extension drilling, and the successful expansion of the mine has been prepared. It was prepared for Fortuna following the guidelines of the Canadian Securities Administrators' National Instrument 43-101 (NI 43-101) and Form 43-101F1. The Mineral Resources and Mineral Reserves reported herein were prepared in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (2019).

2.1 Terms of Reference

This Technical Report (the Report or the Technical Report) on the Yaramoko Gold Mine in Burkina Faso, has been prepared by Mr. Paul Criddle, FAUSIMM, Mr. Paul Weedon, MAIG, Dr. Matthew Cobb, MAIG and Mr. Raul Espinoza, FAUSIMM, for Fortuna in accordance with the disclosure requirements of Canadian National Instrument 43-101 (NI 43-101) and Form 43-101F1. The Report discloses updated Mineral Resource and Mineral Reserve estimates for the mine and includes the proposed development of the open pit mine at 55 Zone and 109 Zone for Yaramoko Gold Mine. The Report will be used to support the Annual Information Form (AIF) for Fortuna for its fiscal year ended December 31, 2022.

The primary purpose of this Report is to describe:

- Exploration and infill drilling activities conducted since December 31, 2021 (data cut-off date of previous Technical Report).
- Mineral Resources and Mineral Reserves as of December 31, 2022 taking into account all new relevant information as of December 31, 2022 and production related depletion.
- The Mineral Resource and Mineral Reserve updates for the 55 Zone open pit mine.
- The proposed development of the 109 Zone open pit mine.
- The proposed shrinkage stoping mining methodology for Bagassi South QV'.
- The mineral resource and reserve estimates reported herein were prepared in accordance with the generally accepted *CIM Exploration Best Practices Guidelines and CIM Estimation of Mineral Resource and Mineral Reserves Best Practices Guidelines (2019)*.

2.2 Sources of Information

This Report is based on information collected by the qualified persons (QP) as defined under NI 43-101, including their site visits. The QPs have no reason to doubt the reliability of the information provided. This Report is based on the following sources of information:

- Discussions with Roxgold Sanu operational and technical personnel.
- Technical Report for the Yaramoko Gold Project, Burkina Faso, prepared by Roxgold dated December 31, 2021 (Fortuna Silver Mines Inc: Yaramoko Gold Mine, Burkina Faso)
- Technical Report for the Yaramoko Gold Project, Burkina Faso, prepared for Roxgold by SRK Consulting (Canada) Inc. (SRK) dated December 20, 2017.
- Technical Report for the Yaramoko Gold Project, Burkina Faso, prepared for Roxgold by SRK dated June 4, 2014 (the Feasibility Study Technical Report).
- Internal reports relating to various aspects of the 55 Zone and the Bagassi South underground mines.
- Information obtained on current operational activities at the Yaramoko Gold Mine.
- Operational information including owners team mine manpower, labor rates, gold price, exchange rates, site layout, and site operating costs.

2.3 Effective Dates

This Report has a number of effective dates, as follows:

- June 30, 2022: date of database cut-off for assays used in the estimation of Mineral Resource and Mineral Reserves.
- December 31, 2022: date of production-related depletion.

The overall effective date of the Report is the date of the most recent supply of information, being December 31, 2022.

2.4 Authors

This Technical Report was prepared by:

1. Mr. Paul Criddle, FAUSIMM (#309804), Technical Consultant; Mr. Criddle was formally employed as Fortuna's Chief Operating Officer, West Africa, between July 2021 and September 2022. Prior to this time, Mr. Criddle held the position of Chief Operating Officer for Roxgold. He has visited the mine on numerous occasions, the most recent being from May 13-18, 2022. During these visits, Mr. Criddle reviewed all aspects of operational performance and development activities.

2. Mr. Paul Weedon, MAIG (#6001), Senior Vice President – Exploration and an employee of Fortuna; Mr. Weedon has been employed with Fortuna since July 2021 and as Fortuna's Senior Vice President of Exploration since October 2021 and prior to that as Vice President of Exploration for Roxgold. He has visited the mine on multiple occasions, the most recent being May 13-18, 2022. During these visits Mr. Weedon has reviewed drilling performance, sample and data collection, site QAQC records and geological model development for the Yaramoko property across all surface and underground projects.
3. Dr. Matthew Cobb, MAIG (#5486), Senior Resource Geologist and an employee of Roxgold (a wholly-owned subsidiary of Fortuna); Dr. Cobb has been employed as Roxgold's Senior Resource Geologist – West Africa since September 2021. Dr Cobb visited the mine most recently during August 2022. Dr. Cobb is satisfied that data collection procedures, including QAQC protocols conform to industry best-practice are being adhered to adequately.
4. Mr. Raul Espinoza: FAUSIMM (CP) (#309581), Director of Technical Serives and an employee of Fortuna; Mr. Espinoza has been employed Fortuna since June 2022. Prior to this time, Mr. Espinoza held the position of Principal Mining Consultant for Mining Plus. He has visited the site, with the most recent visit being December 3-5, 2022 during which time he reviewed the site mining, scheduling, and planning activities.

By virtue of their education, membership to a recognized professional association and relevant work experience, the aforementioned are Qualified Persons as this term is defined in NI 43-101.

2.5 Acknowledgement

The QPs would like to acknowledge the support and collaboration provided by Yaramoko site personnel during the preparation of this Report.

2.6 Terminology

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

Referenced mine grid elevations are reported in meters (m) above sea level (masl) plus 5,000 and reported at this relative or reduced level (RL). The terms levels, sublevels and elevations are used interchangeably to describe underground mining levels.

3 Reliance on Other Experts

The QPs have not independently reviewed ownership of the Yaramoko Gold Mine and any underlying agreements, mineral tenure, surface rights or royalties. The QPs have fully relied upon, and disclaim responsibility for, information derived from Roxgold Sanu, Fortuna and legal experts retained by Roxgold Sanu and Fortuna for this information through the following documents:

- Yanogo Bobson Avocats, 2022. Title Opinion – prepared for Fortuna and Roxgold Sanu dated January 28th, 2022. The reliance applies solely to the legal status of the rights disclosed in Sections 4.1 and 4.2 below. The information is also used in support of the Mineral Resource estimate in Section 14 and the Mineral Reserve estimate in Section 15.

As at the effective date of this Technical Report, there is no known litigation affecting the Yaramoko Gold Mine.

4 Property Description and Location

4.1 Project Location

The Yaramoko Gold Mine is located approximately 200 kilometers (km) southwest of Ouagadougou in the Balé Province in western Burkina Faso (Figure 1). The property consists of one exploration permit of 170.13 square kilometers (km^2) and one exploitation permit of 22.89 km^2. Exploration permits are granted by order of the Ministère des Mines, des Carrières et de l'Ènergie of Burkino Faso. The State of Burkina Faso retains a 10 percent carried interest in Roxgold Sanu 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 center of the 55 Zone gold deposit on the Yaramoko Gold Mine is located at 11.75 degrees latitude north and 3.28 degrees longitude west.

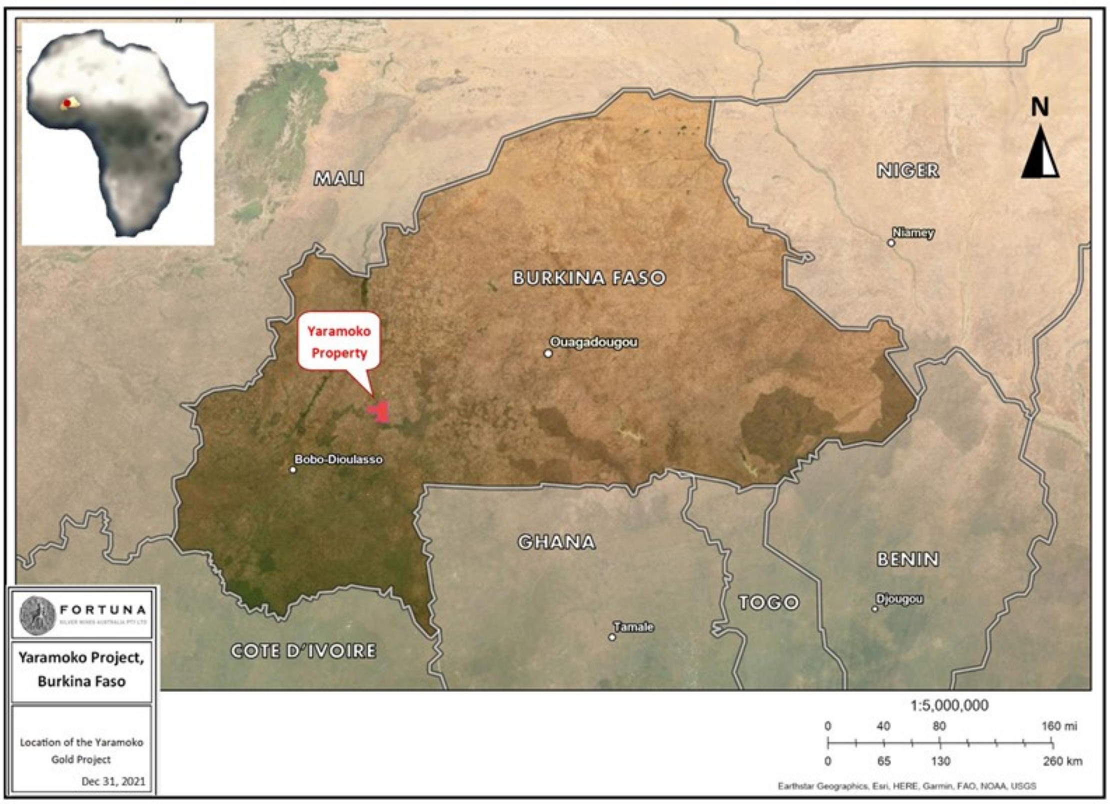

Figure 1: Location of the Yaramoko Gold Mine

4.2 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'Ènergie 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 Mine operates under a separate mining lease, the Yaramoko exploitation permit. The permit is situated in the Province of Balé and covers an area of 22.89 km^2. 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 (Figure 2).

Contiguous to the east and to the south are two additional exploration properties controlled by Roxgold BF, Bagassi East and Houko (Figure 2).

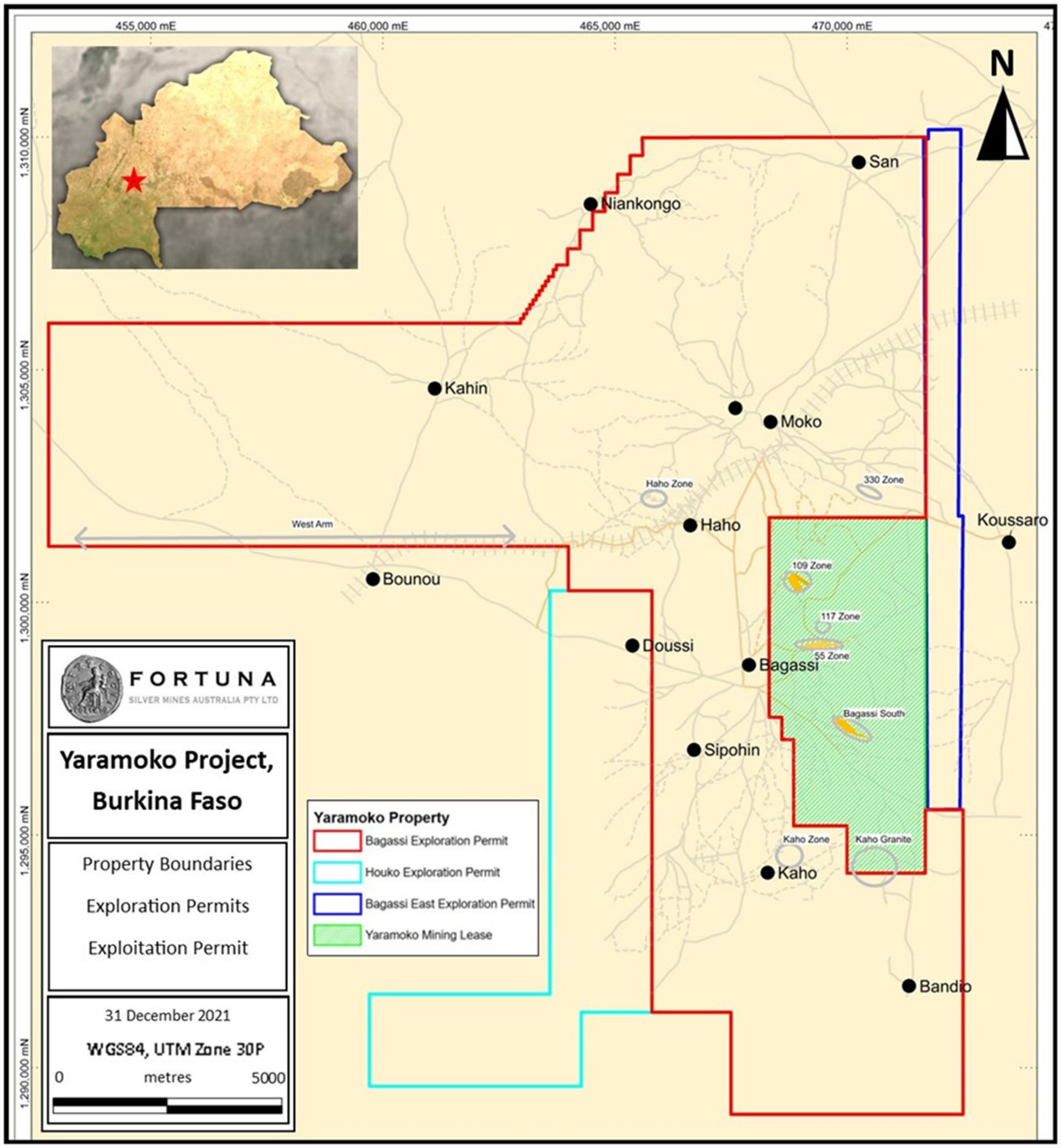

Figure 2: Land Tenure Map

Roxgold Sanu 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 Sanu is the sole owner of the property, subject to a 10 percent carried interest in the company held by the State 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 30P).

An extension to the Yaramoko Mining Permit to incorporate the Bagassi South Bagassi South project into the Yaramoko Mining Permit was awarded through *Decree 2018-0656/PRES/PM/MMC/MINEFID/MEEVCC* for Yaramoko dated July 30, 2018. This extension adds 7.2 square kilometers (km^2) to the permit, for a total of 22.89 km^2.

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

Table 3: Coordinates of the Exploitation Permit

UTM Projection – Clarke 1880 Adindan Datum, Zone 30P	
Roxgold Sanu Exploitation Permit	
Easting (mE)	**Northing (mN)**
468327	1301823
471689	1301823
471389	1294180
470000	1294180
470000	1295200
468850	1295200
468850	1297050
468600	1297050
468600	1297530
468327	1297530

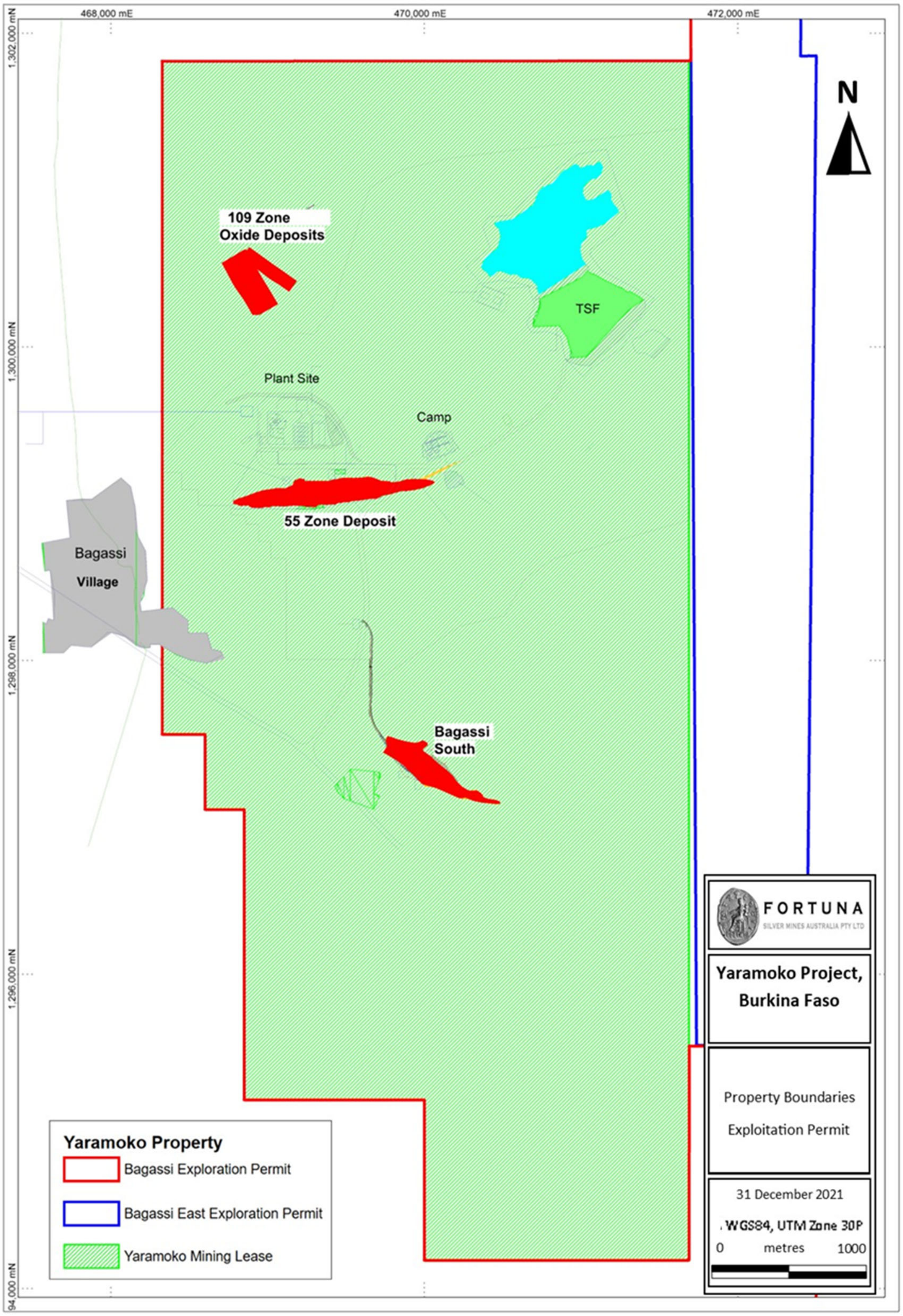

Figure 3: Exploitation Permit

4.3 Permits and Authorization

Roxgold Sanu 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 Environmentale*, 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.

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 and 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 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. In accordance with this process, an extension to the Yaramoko Mining Permit to incorporate the Bagassi South project into the Yaramoko Mining Permit was awarded through *Decree 2018-0656/PRES/PM/MMC/MINEFID/ MEEVCC* for Yaramoko dated July 30, 2018. Pending validation of its ESIA expected in the first quarter of 2023, Zone 109 project will undertake in 2023 a analogous mining permitting procedure to that of Bagassi South extension.

4.4 Environmental Considerations

The Yaramoko Gold Mine is situated in a rural part of Burkina Faso characterized by no industrial activities. Environmental liabilities on the mine site are currently limited to minor land disturbance and the use of mercury for gold extraction by historical artisanal miners. The presence of these artisanal miners is a social risk to the mine, and Roxgold Sanu is undertaking the necessary steps to manage this risk. The environmental and social aspects are discussed in greater detail in Section 20.

4.5 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'Ènergie. 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'Ènergie. The State of Burkina Faso retains 10 percent free equity in all mining ventures. The Yaramoko Gold Mine 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 in Burkina Faso, of which two are relevant to Yaramoko:

1. Exploration Permit (*Permis de recherche*)
2. Industrial Operating Permit (*Permis d'exploitation industrielle*)

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 km^2 and the application document must include payment of the application fee of

2,000,000 West African 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 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 km^2. 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 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 follow 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. The exploitation permit for the Yaramoko Gold Mine was issued on January 20, 2015 and expires on January 30, 2035.

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. Surface rights in the area of the exploitation permit for the Yaramoko Gold Mine belong to the State of Burkina Faso. Utilization of the surface rights is granted by the exploitation permit for the Yaramoko Gold Mine. All the taxes related to Roxgold Sanu's mining rights are confirmed to have been paid to date and the permit is in good standing.

Roxgold Sanu is a Burkinabe company created for the purpose of developing and operating the Yaramoko Gold Mine. Fortuna owns a 90 percent interest in Roxgold Sanu, while the State of Burkina Faso has a 10 percent free-carried interest. In addition, the Government receives a 3 percent royalty on the revenues from mineral production if the gold price is lower than US$ 1,000 per ounce, 4 percent if the gold price is between US$ 1,000 and US$ 1,300 per ounce and 5 percent if the gold price is higher than US$ 1,300 per ounce. The government also collects various taxes and duties on the imports of fuels, supplies, equipment and outside services, as specified by the Burkina Faso Mining Code.

4.6 Comments on Section 4

In the opinion of the QP's:

- Fortuna has been provided with a legal opinion supporting the validity of the *permis d'exploitation* issued by the Government of Burkina Faso, and which confirms that these rights are in good standing. The validity of the *permis d'exploitation* is reviewed regularly with the relevant authorities and all appropriate annual reports and fees have been submitted.
- The information discussed in this section supports the declaration of Mineral Resources, Mineral Reserves and the development of a mine plan.
- The process and timeframe to modify the existing *permis d'exploitation* to accommodate a future open pit mining operation at the 55 Zone and 109 Zone is clearly understood and the QP's are satisfied there are no significant factors that may affect the process.

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

5.1 Accessibility

The Yaramoko Gold Mine is located approximately 200 km 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 km to the village of Ouahabou, then north-northwest by laterite road for approximately 20 km to the village of Bagassi, located at the center of the property. The second route is accessed via the city of Boromo, approximately 180 km southwest of Ouagadougou, then west on laterite road for approximately 50 km.

In addition to road access, a gravel airstrip has been completed at Yaramoko where the Company operates a regular passenger service to and from Ouagadougou.

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 neighboring 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 Mine.

5.2 Local Resources and Infrastructure

Roxgold constructed a secure 306-person accommodation camp in 2015, which includes sporting facilities, a gymnasium, messing facilities and a social club, for its senior and management staff. The local workforce commutes daily from Bagassi and other nearby local communities. Adjacent to the accommodation camp a secure area housing the exploration offices, a protected area for drill core logging and processing, storing exploration equipment has been established. From the accommodation camp, the mine is accessed by a 2 km laterite road constructed by Roxgold. The perimeter of the operating mine site is enclosed by chain-link fencing, with additional fencing surrounding the mine administration and accommodation areas, as well as the milling complex.

The mine site is connected to the national power grid which sources the majority of its electricity from the Lake Volta hydroelectricity scheme in neighbouring Ghana. Four 1 megawatt (MW) emergency standby generators are also installed onsite in the event of power disruption from the national grid.

The village of Bagassi is located on the on the property, outside of the enclosed mine site, and has a population of approximately 3,000 people. Bagassi houses the majority of the local workforce.

The closest city is Boromo, located approximately 50 km 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.

Agriculture is the main industry in the region supporting millet, groundnut, and cotton crops. Local small scale artisanal miners, known as *orpailleurs*, are active at certain locations across the exploration permit, but outside of the active mining areas.

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* (artisanal miners). Security measures are in place to monitor the situation.

5.3 Climate

The climate is semi-arid, with a rainy season from April to October and a dry season that is 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 (°C) in December to highs of approximately 45 °C in March and April.

Annual total rainfall in the area averages 800 millimeters (mm). Burkina Faso's climate allows for year-round exploration.

5.4 Physiography

The Yaramoko Gold Mine is covered by hills rising to a maximum of 450 m above sea level and surrounded by laterite dominated plains extending below the hills. A network of ephemeral streams and rivers, flowing generally to the northeast-southwest and north-south toward the 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 Mine 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.

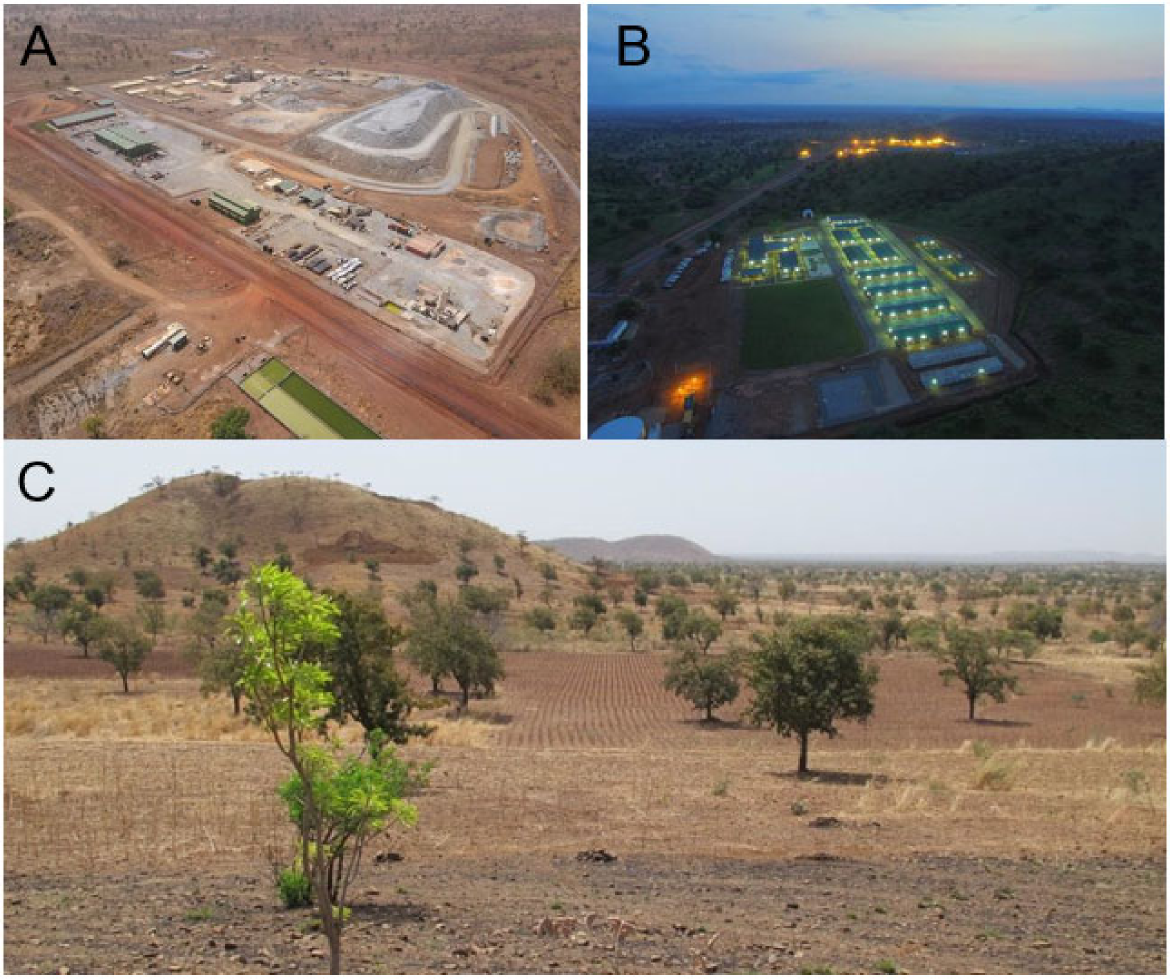

Figure 4: Infrastructure and Landscape in the Project Area

Notes:
A: Aerial view of the Yaramoko Gold Mine – Processing and Mining Facilities
B: Aerial view of the Yaramoko Gold Mine – Accommodation Camp
C: Typical landscape in the project area

6 History

6.1 Historical Property Ownership

Ownership of the property has changed twice; the Yaramoko Exploration Permit was initially granted to Riverstone Resources Inc. (Riverstone) in 2006 and was transferred to Roxgold in September 2012. On July 2, 2021 Fortuna completed the corporate acquisition of Roxgold and its assets, which include the Yaramoko Gold Mine.

The Yaramoko Gold Mine area has been explored since 1974. 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 Au) over a core length interval of 1.45 m, and 6.g/t Au over a core length interval of 0.30 m.

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 artisanal mining conducted on a few areas of the property, and Roxgold Sanu's recent Yaramoko underground mining and processing operation, there has not been any known production from the Yaramoko Gold Mine.

6.2 Previous Mineral Resource Estimates

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

In 2017, SRK was the lead author of an updated technical report in support of the Bagassi South underground mine and an associated expansion of the processing plant and support infrastructure, which was filed on December 20, 2017.

Fortuna filed an updated technical report in support of the 55 Zone open pit mine on March 30, 2022.

All previously reported Mineral Resource and Mineral Reserve estimates are regarded as prior estimates and are superseded by the current Mineral Resource and Mineral Reserve estimates presented in this Report.

6.3 Production History

First gold pour for the Yaramoko Gold Mine under the management of Roxgold was completed in May 2016. A summary of total production figures since May 2016 through December 31, 2022 is detailed in Table 4.

Table 4: Production figures of Yaramoko Gold Mine

Production	Unit	2016*	2017	2018	2019	2020	2021	2022	Total
Ore Milled	(t)	162,480	266,600	307,591	466,157	512,276	515,495	546,651	2,277,250
Head grade Au	(g/t)	15.52	15.31	13.45	9.46	8.49	7.02	6.37	9.36
Gold Poured	(oz)	77,149	126,990	132,656	142,204	133,940	116,589	106,108	835,636

Note:

- **First gold poured May 2016.*

7 Geological Setting and Mineralization

7.1 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 in Morocco and Mauritania and the southern Archean core underlies Liberia, Guinea and Sierra Leone. The southern Archean core 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 km and host numerous gold and base metal deposits (Huot et al., 1987). The Yaramoko Gold Mine 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 km thick basal sequence of tholeiitic basalts, gabbros, and related volcaniclastic 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 (D1 to D3; Metelka, 2012). D1 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 D1 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 D2 deformation is marked by steep dipping brittle-ductile to brittle shear zones and locally anastomosing faults. D1 fabrics, such as penetrative foliation and high strain zones, are crosscut at low angles by D2 structures. East-northeast trending dextral and northwest to north-northeast trending sinistral D2 shear zones in granitoid domains crosscut the foliation associated with D1. The age of the D2 deformation is based on the ages of syn- to late tectonic granites and is circa 2.11 to 2.10 billion years.

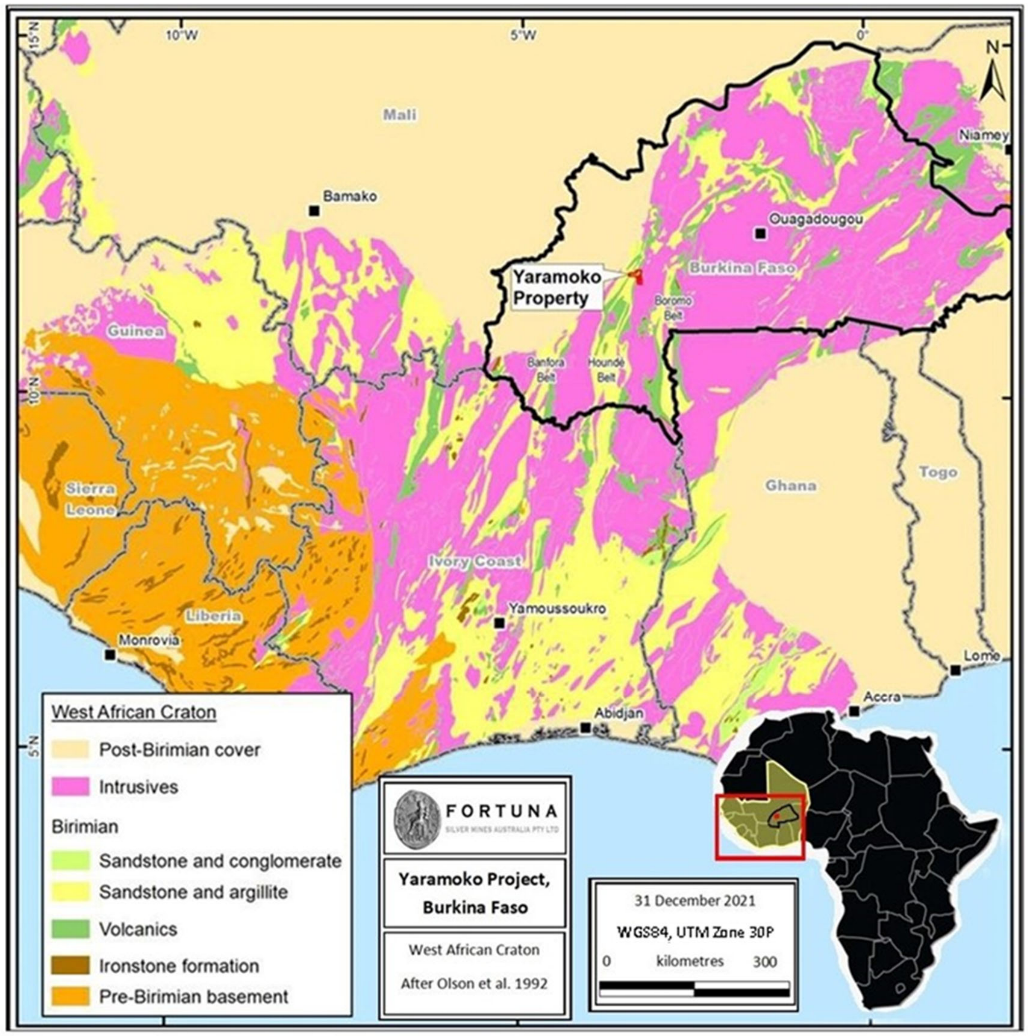

Figure 5: Regional Geology Setting (modified from After Olson et a., 1992)

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.

7.2 Local and Property Geology

The north-northeast trending Boni shear zone divides the Yaramoko Gold Mine between predominantly Houndé volcanic and volcaniclastic 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.

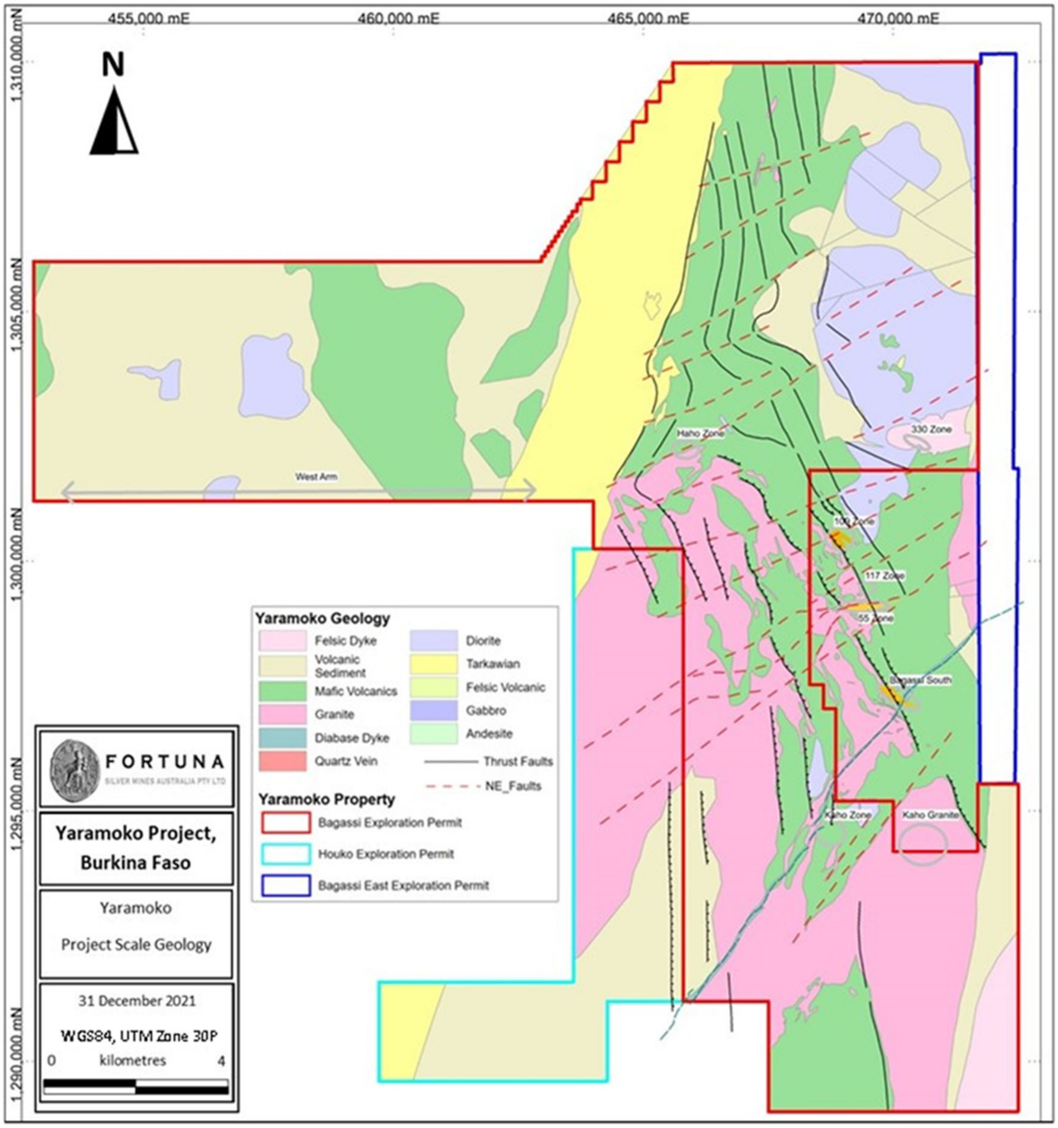

Figure 6: Local Geology Setting of the Yaramoko Gold Mine

Outcrop and core observations document the main lithological units present on the Yaramoko Gold Mine 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.

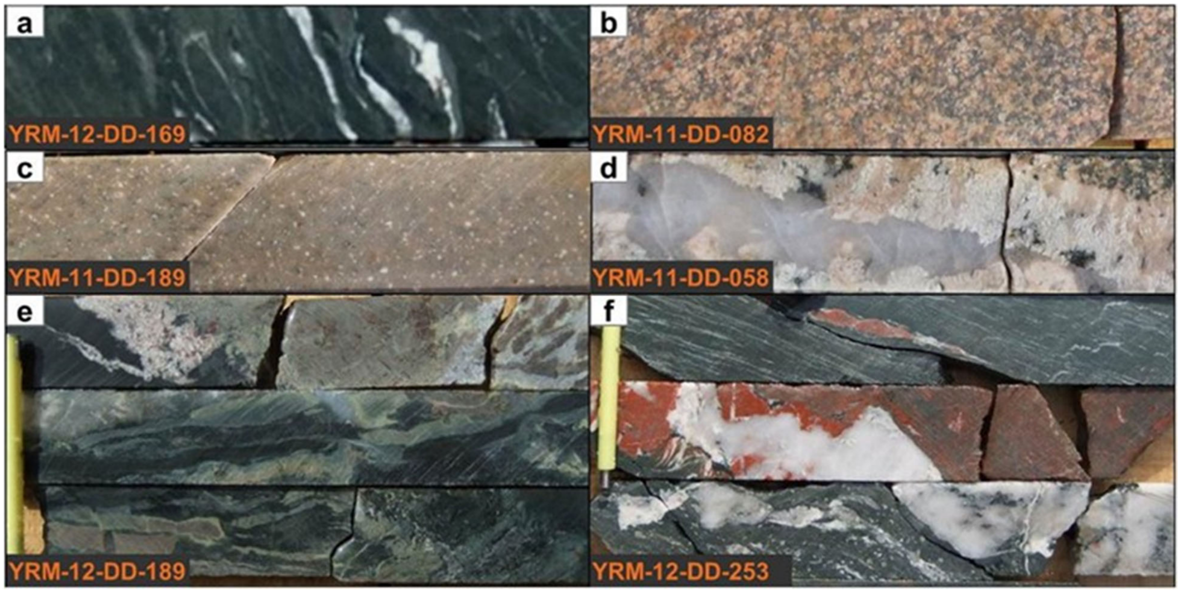

Figure 7: Overview of the Main Lithologies and Alteration on the Yaramoko Gold Mine

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

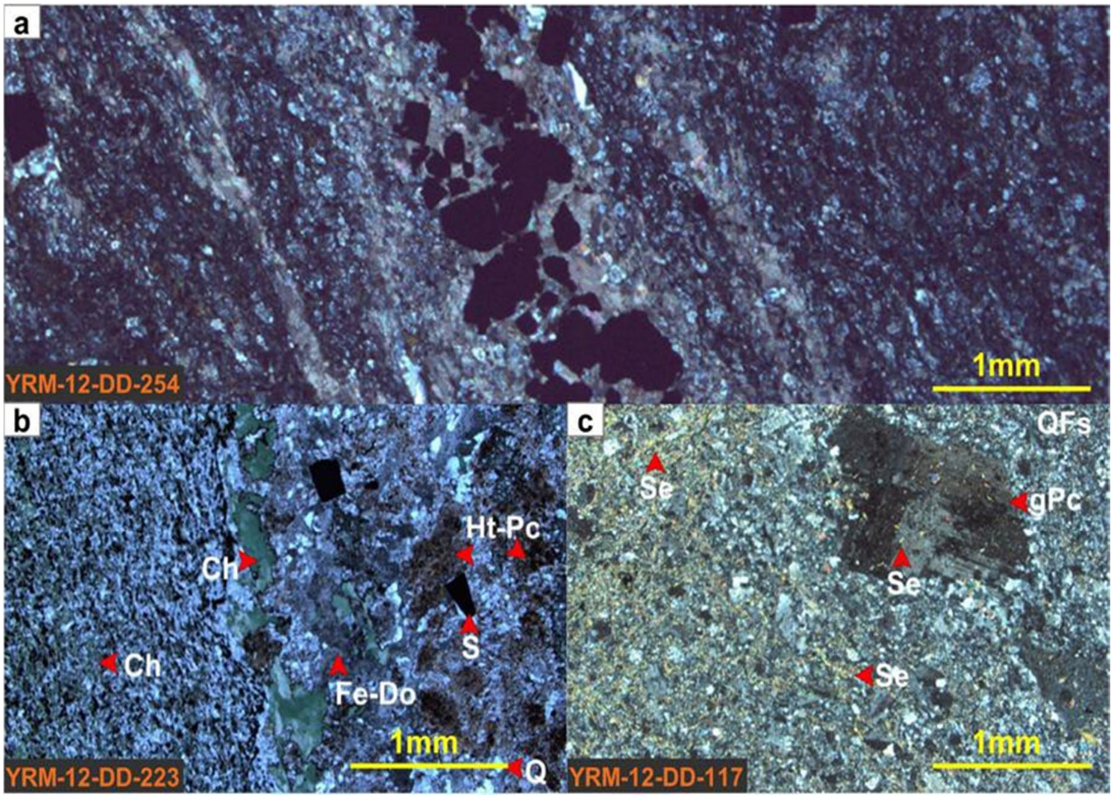

Figure 8: Main Lithologies on the Yaramoko Gold Mine in thin section

Notes:
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. Glomeroporphyritc texture of plagioclase (Pc) in fine-grained quartzofeldspathic (QFs) groundmass. Sericite (Se) replacement after plagioclase in the groundmass. Images from GeoMinEx (2013)

7.3 Structural Geology

The regional fabric at the Yaramoko Gold Mine 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 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 Bagassi South deposits, marked by a strongly foliated high strain zone dipping moderately to the east and northeast. The 55 Zone, Bagassi South and the 109 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 and 109 Zone structures). These deposits are in the footwall of the Yaramoko Shear Zone and hosted in granitic intrusions.

7.4 Mineralization

Gold is the main mineralization of economic interest found on the Yaramoko Gold Mine with the main areas of gold mineralization the 55 Zone, Bagassi South, and the 109 Zone, along with several smaller scale areas. The 55 Zone and Bagassi South host the current mining operations, with advanced exploration underway on the 109 Zone.

Both the 55 Zone and Bagassi South deposits occur along dextral shear zones with gold 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 centimeters to over 5 m 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. 109 Zone mineralization is considered generally analogous to both the 55 Zone and Bagassi South.

At the Bagassi South, 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 meter to over 18 m and extends from the surface to over 300 m depth; gold mineralization remains open along strike and at depth. Gold mineralization at Bagassi South is associated with quartz and pyrite alteration in similar structural settings to the 55 Zone.

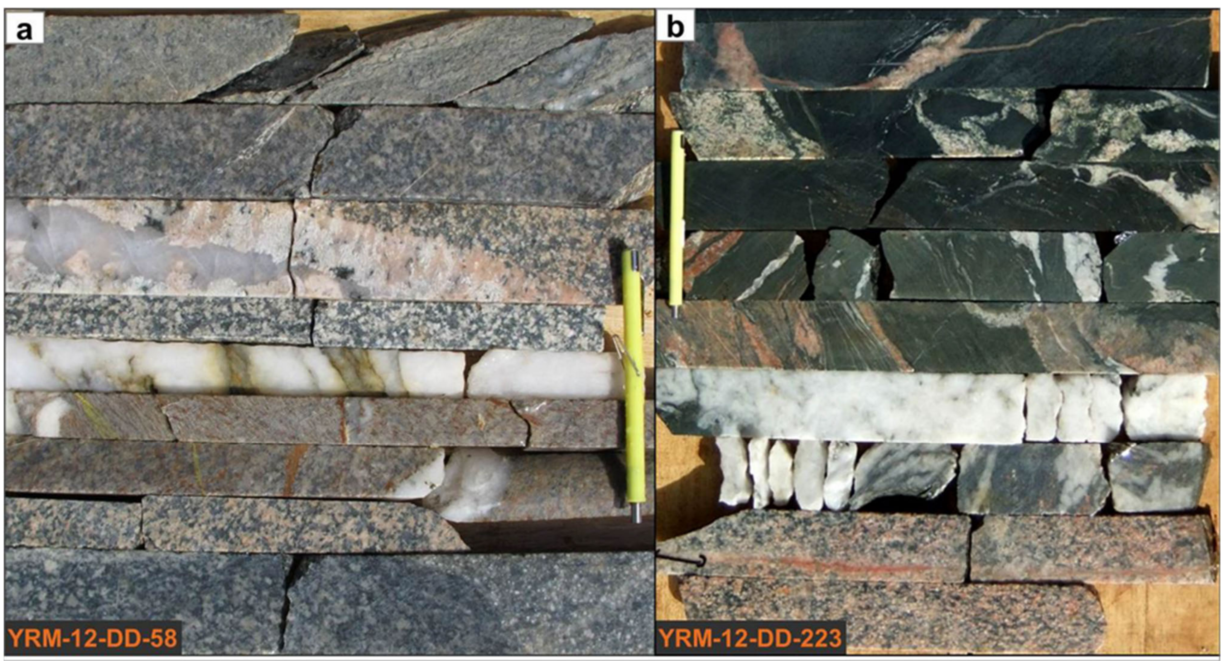

Figure 9: Mineralization on the Yaramoko Gold Mine

Notes: 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 micrometers (Figure 10, GeoMinEx 2013).

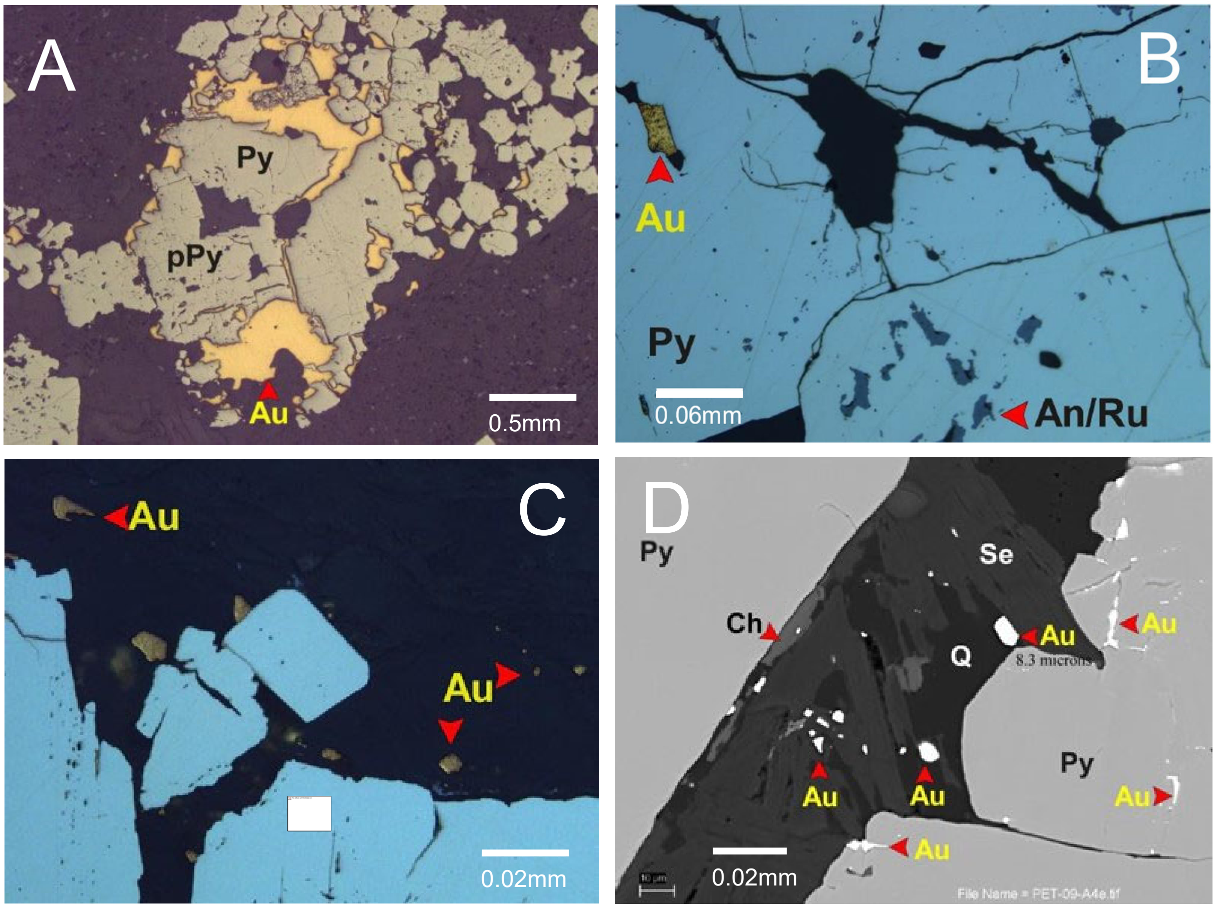

Figure 10: Photomicrograph of Gold Mineralization from the 55 Zone

Notes: 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.

7.5 Comments on Section 7

In the opinion of the QP's the knowledge of the Yaramoko deposits, including the geological settings, host lithologies, structural characteristics and alteration controls on mineralization is sufficient to support Mineral Resource and Mineral Reserve estimation.

8 Deposit Types

Primary gold deposits in Burkina Faso occur within the Paleoproterozoic Birimian terrain. 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.

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 gold mineralization are structural and lithological.

In Burkina Faso, the weathering profile is commonly well developed with oxidation extending to depths of 100 m, although surface topography and erosional history may result in shallower oxidation profiles. Gold deposits hosted within these terrains typically comprise a surface oxide zone, an intermediate transition zone, and a deeper fresh rock zone.

The gold mineralization found at the 55 Zone and Bagassi South deposits is associated with shear hosted low sulphide quartz veins typically associated with the contact between local volcanic and granitic intrusive units and is free milling in both the oxidized and fresh rock zones. The weathering profile over the deposit is shallow and ranges from approximately 10 m to 40 m.

9 Exploration

Exploration activities on the Yaramoko Gold Mine 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 Mine are summarized in Figure 11 and Table 5.

Drilling activities are further detailed in Section 10.

9.1 Exploration by Riverstone 2005-2011

9.1.1 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 orpaillage workings.

In 2007, a further 196 rock samples were collected from outcrop and orpaillage 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 Au.

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 m intervals along 200 m 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 m along 100 m spaced infill lines. The survey at the West Arm involved the collection of samples every 100 m along 400 m spaced lines. The objective of the survey was to identify if gold bearing structures similar to those occurring on the SEMAFO Inc. (SEMAFO) 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.

9.1.2 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.

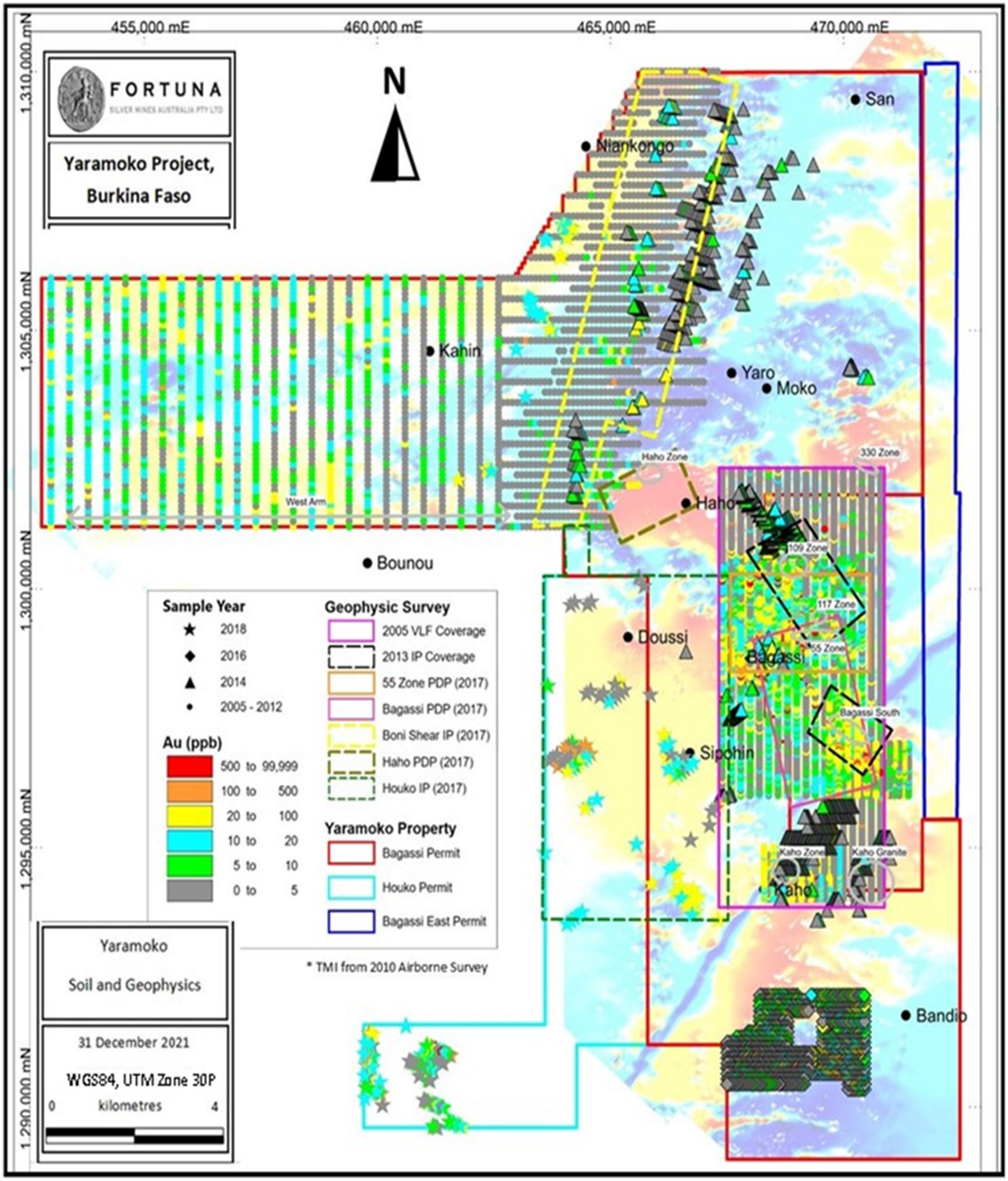

Figure 11: Summary of Soil Sampling and Geophysical Surveys undertaken on the Yaramoko Gold Mine

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

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 totaling 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 totaling 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 totaling 5,558 m following up soil sample anomalies at Bagassi Central, Bagassi South, and Haho
		44 core boreholes totaling 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 totaling 5,297 m at 55 Zone
		19 RC boreholes totaling 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 totaling 1,143 m
		1,535 RAB boreholes totaling 34,122 m at Bagassi Central, Bagassi South, and West Arm areas
		136 RC boreholes totaling 22,883 m at Bagassi Central, Bagassi South, and southern extremity of permit area
		199 core boreholes totaling 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 totaling 12,337 m drilled from January to April at Bagassi Central, Bagassi South, 300 Zone, Haho Zone and Boni Shear Zone
		42 RC boreholes totaling 12,981 m at Bagassi Central
		138 core boreholes totaling 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 totaling 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 totaling 5,414 m at Boni Shear, Haho and Yaro areas
		94 core boreholes totaling 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 totaling 2,389.3 m at QV1

Year	Company	Exploration Activity*
		106 core boreholes totaling 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 totaling 22,377 m drilled at 55 Zone
		15 core boreholes totaling 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 totaling 481 km of IP lines and 108 km of pole Dipole lines
		147 core boreholes totaling 33,250 m drilled at Bagassi South of which 117 holes targeted the QV1 structure and 30 holes the QV' structure
		8 core boreholes totaling 9,214 m drilled at the 55 Zone targeting extension at depth
2018	Roxgold	59 grab samples collected along the Tarkwaian West Contact
		179 soil samples collected on the auger grids
		1992 auger boreholes totaling 15,196 m drilled at Kaho, Houko and along the Tarkwaian West contact
		62 core boreholes totaling 38,600 m drilled at 55 Zone
		85 core boreholes totaling 10,211 m drilled along the QV1 structure at Bagassi South
		5 core boreholes totaling 612 m completed at the 109 Zone
		190 core boreholes totaling 20,374 m completed at Boni Shear, Haho, 55 Zone FW and Bagassi Regional prospects
2019	Roxgold	1,344 auger samples collected for ICP analysis
		21 pits and trenches totaling 190 m dug at the regional front
		3,791 auger boreholes totaling 32,945 m drilled at Kaho, 300 Zone and San
		236 RC boreholes totaling 24,409 m drilled at Boni Shear, Kaho, Tarkwaian West Contact and Bagassi Regional.
		81 RC boreholes totaling 3,636 m completed for crown pillar drilling along the 55 Zone structure
		13 core boreholes totaling 7,841 m drilled at 55 Zone
		9 core boreholes totaling 4,168 m drilled at Bagassi South with 7 holes targeting the QV1 structure and 2 holes the QV' structure
		3 core bore holes totaling 449 m drilled at 109 Zone
		39 core bore holes totaling 5,167 m completed at Haho and Kaho
2020	Roxgold	1,780 samples collected for ICP analysis; including 328 core samples at 55 Zone, 288 core samples at Bagassi South and 1,164 auger samples
		1,972 auger boreholes totaling 19,415 m drilled at West Arm and Yaramoko East
		13 RC boreholes totaling 614 m drilled along the QV2 structure at Bagassi South
		38 RC boreholes totaling 2,035 m drilled at 109 Zone
		11 RC boreholes totaling 751 m completed at 300 Zone
		7 RC boreholes totaling 738 m completed for regional exploration
		18 core boreholes totaling 8,890 m drilled at 55 Zone form underground
		3 core boreholes for 911 m drilled along QV1 at Bagassi South
		8 core boreholes for 1,929 m drilled to test 55 Zone extension
2021	Roxgold	1,135 auger boreholes totaling 15,102 m at the Bagassi East permit and to infill the West Arm grid
		52 AC boreholes totaling 2,619 m drilled at West Arm
		34 RC boreholes totaling 2,034 m drilled along QV2 at Bagassi South
		103 RC boreholes totaling 8,529 m for infill drilling at 109 Zone
		32 RC boreholes for 3,244 m completed for regional exploration at east of 55 Zone, Bagassi South and at San

Year	Company	Exploration Activity*
		12 core boreholes totaling 6,046 m drilled at 55 Zone from underground
		18 core boreholes totaling 5,388 m drilled at Bagassi South along QV1 and QV'
		6 core boreholes for 421 m completed at 109 Zone
2022	Roxgold	12 core boreholes totaling 1,490.3 m from underground targeting the western splay
		31 core boreholes totaling 1,113.5 m from underground for grade control infill
		18 core boreholes totaling 5,150.1 m from underground targeting resource extension along the western margin
		5 core boreholes toaling 1,598.4 m from underground targeting resource extension along strike to the east
		5 core boreholes totaling 2,357.5 m from underground targeting down dip extensions
		4 core boreholes totaling 1,490.3 m from surface targeting shallow splay lodes to the north of the main 55 Zone lode
		1179 auger boreholes totaling 15,964m to infill auger anomaly areas along the Z55 NE Corridor, at San, West Arm and the Bagassi East Permit
		140 AC boreholes totaling 6,365 m drilled at Houko, Sipohin, San, Z300, West Arm and Bagassi East Permit
		24 RC boreholes totaling 2,117 m drilled for regional exploration along the Yaramoko Shear, at Bagassi and Houko
		5 RC boreholes totaling 358 m drilled along the QV3 structure at Bagassi South
		37 RC boreholes totaling 2,654 m for infill drilling at 109 Zone
		21 RD boreholes totaling 2,276.5 m for infill drilling at 109 Zone
		12 DD boreholes totaling 975.1 m for infill drilling at 109 Zone
		13 DD boreholes totaling 838.4 m for Geotech drilling at 109 Zone
		4 DD boreholes totaling 1490.3 m for resources drilling at 55 Zone

* RAB = Rotary air blast, RC = Reverse circulation, AC = Air Core

9.1.3 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 m apart, at a ground clearance of 40 m.

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 7.2). The survey assisted in identifying potential exploration targets based on known gold mineralization identified on the property.

9.2 Exploration by Roxgold 2011-2022

9.2.1 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 m by 25 m and taken at a depth of 50 centimeters (cm). In the Bagassi South and Kaho areas, samples were collected every 50 m along 100 m 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 m by 50 m and 100 m by 25 m.

In May 2018, a total of 179 soil samples were collected to fill the gaps along the auger lines at Houko and Sipohin. The gaps were mainly related to inability of the auger rigs to get access to some areas (mainly hills). The results were combined with the auger first samples results for interpretation.

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 parts per million (ppm) were identified.

9.2.2 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 m. 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 km of gradient array induced polarization surveys, 2.0 line km of pole-dipole array surveys, and 11.0 line km 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 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 Mine. 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 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 km of IP and 108 line km of pole-dipole were surveyed over the four grids.

9.2.3 Planned Exploration

Exploration will continue across the concession, reflecting the increasing understanding of the mineralization controls and evolving exploration models locally and more regionally. Detailed structural studies coupled with increasing amounts of multi-element geochemistry, drilling results and field mapping continues to identify prospective areas, with follow-up routine exploration continually underway.

In addition to surface exploration drilling from underground platforms will continue to test for depth and strike extensions to the 55 Zone. The timing of these programs is designed to align with the development of appropriate underground infrastructure such as drill stations and supporting services. The next phase of underground exploration at 55 Zone is scheduled throughout 2023.

9.3 Comments on Section 9

In the opinion of the QP's:

- The mineralization style and host setting of the Yaramoko area is sufficiently well understood to support the Mineral Resource and Mineral Reserve estimations.
- Exploration methods are consistent with industry style and practice for these deposit types and regional context to support continuing exploration and Mineral Resource estimation.
- Exploration results have supported Roxgold Sanu's interpretation of the geological setting and mineralization, and continuing exploration may identify additional mineralization.

10 Drilling

Auger, rotary air blast, air core drilling, reverse circulation, and core drilling have been completed at the Yaramoko Gold Mine (Table 5; Figure 12 and Figure 13) and continue to be the main means for exploration activities. Auger drilling is used for the collection of soil samples under the transported cover, rotary air blast and air core drilling are used to follow up soil anomalies, and reverse circulation drilling is used as a deeper, more comprehensive exploration probe to test anomalies to approximately 150 m depth. Diamond drilling may also be used from surface to help improve the understanding of key structural relationships and if excessive groundwater is encountered.

In addition to surface diamond drilling, specialized underground diamond drill rigs are used to test for depth and strike extensions at Zone 55 and Bagassi South.

The Mineral Resources are informed by a combination of diamond core (DD), reverse circulation drilling (RC) and where appropriate – underground face sampling. Core drilling was also used for metallurgical and geotechnical engineering studies, but assay results from these boreholes were not considered for mineral resource evaluation.

10.1 Drilling by Riverstone 2007-2011

10.1.1 Reverse Circulation Drilling

In 2007, Riverstone drilled 22 reverse circulation boreholes totaling 1,974 m at the Yaramoko property, testing targets at Haho, Bagassi East, and *orpaillage* workings at Bagassi.

10.1.2 Rotary Air Blast Drilling

Between April and May 2011, Riverstone conducted a rotary air blast program under an option agreement with Roxgold with 352 boreholes totaling 5,558 m drilled to test results obtained during soil sampling programs. Borehole depths ranged from 1 m to 35 m 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 to 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 m spacing along 200 m 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 m spacing along 400 m spaced lines.

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

10.1.3 Core Drilling

Core drilling was conducted by Riverstone from August to November 2011 under an option agreement with Roxgold. During the program, 44 boreholes totaling 6,186 m 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.

10.2 Drilling by Roxgold 2011-2022

10.2.1 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 totaling 31,759 m 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 m intervals on northwest-southeast lines spaced at 50 m to 200 m 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 m apart with boreholes 50 m or 25 m apart 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 m with drill stations every 50 m. A total of 7,690 m 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.

10.2.2 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 m to 4 m thick, and thicker in places of laterite occurrence. The program consisted of 131 short boreholes totaling 1,143 m.

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 totaling 12,337 m 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 totaling 44,682 m. 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 m by 50 m, 100 m by 25 m, and 50 m by 50 m was used.

In late 2017 and into 2018, the auger drilling resumed to extend the geochemistry sampling cover and help with the regional targeting. Four grids were tested; Houko Main, Houko SW, Tarkwaian West Contact and the Kaho infill grids with a spacing of 200 m by 50 m. A total of 2,475 auger holes totaling 18,110 m was drilled during the year and 16,578 samples collected.

In 2019, two additional grids at Kaho South, 300 Zone and San areas with 400 m by 50 m and 200 m by 50 m were completed with a total of 3,791 auger boreholes for 32,945 m drilled and 9,066 samples collected.

In 2020, two grids were over the eastern portion of the West Arm area and at east of the Yaramoko Shear corridor were completed with a spacing of 400 m by 50 m at West Arm and 100 m by 50 m at Yaramoko East. 1,972 drill holes were completed for 19,415 m and 5,902 samples collected.

In 2021, auger drilling was focused on the Bagassi East permit and infilling the West Arm grid to reduce the spacing. 1,135 auger boreholes totaling 15,102 m were drilled and 3,329 samples collected.

In 2022, 1,179 auger holes for a combined total of 15,964 meters was carried out across the Zone 55 NE corridor, San, West Arm, Sipohin, Z300 and Bagassi East with 3,991 samples collected.

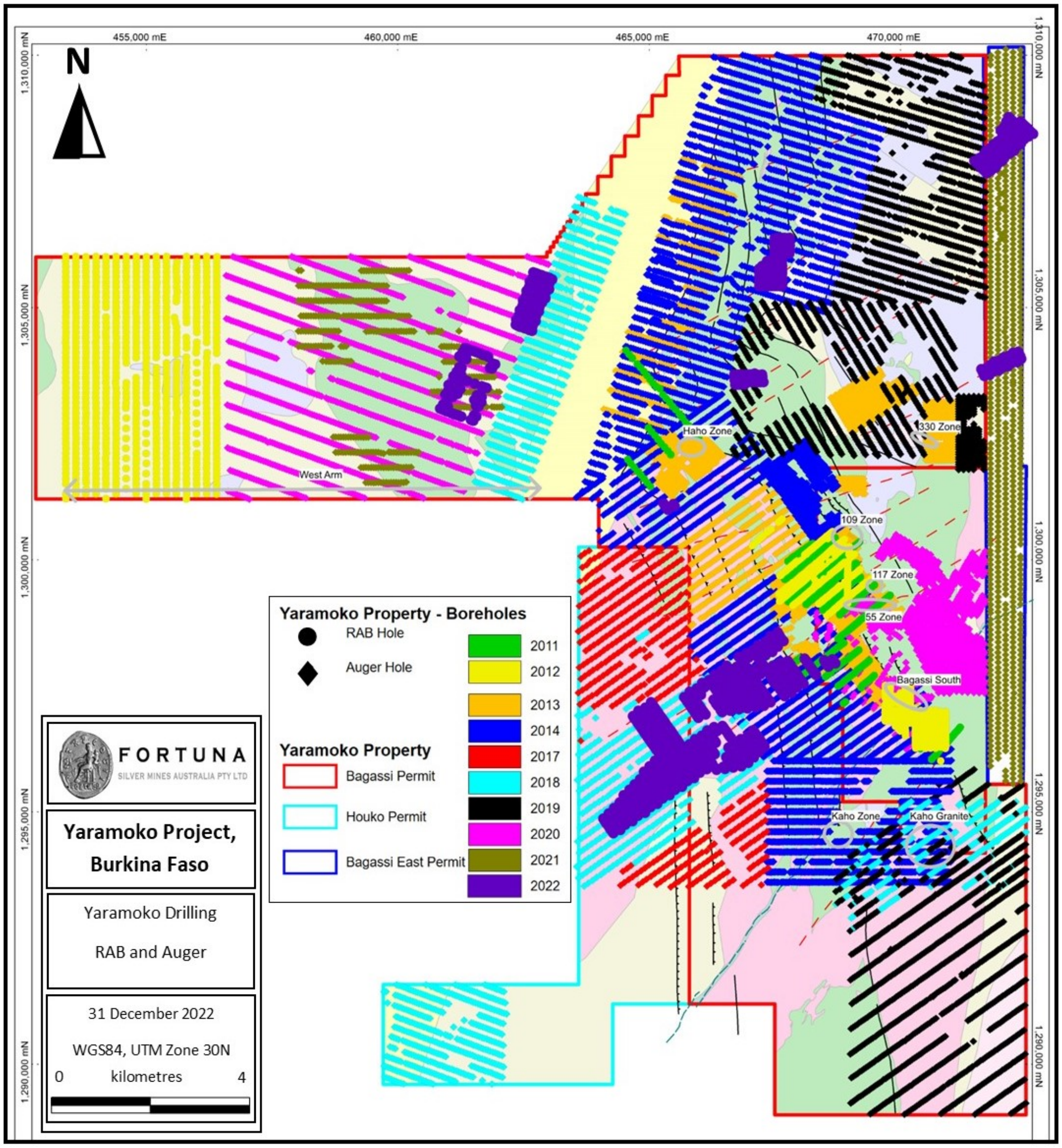

Figure 12: Distribution of Rotary Air Blast and Auger Drilling on the Yaramoko Gold Mine

10.2.3 Reverse Circulation Drilling

Between November 2010 and January 2011, Roxgold completed a reverse circulation drill program that consisted of 33 boreholes totaling 2,724 m 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 (artisanal) site and to follow up on encouraging intersections obtained during reverse circulation drilling conducted by Riverstone in 2007. A total of 17 boreholes were drilled totaling 1,565 m. Most boreholes were drilled in a northeast or southwest direction with dips of 55 degrees from the horizontal. Although the boreholes were drilled nearly perpendicular to the interpreted strike of the gold mineralization, the true width of the reported intervals remained unknown.

The drilling program completed 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 totaling 1,159 m were drilled. Significant results from the 55 Zone included 24.62 g/t Au over 6.0 m (from 80 m to 86 m) in borehole YRM-10-RC036, and 85.53 g/t Au over 6.0 m (from 16 m to 22 m) in YRM-11- RC055 drilled in the footwall of the 55 Zone.

In 2012, Roxgold completed 136 boreholes totaling 22,883 m at Bagassi Central, Bagassi South and the Kaho Zone.

At Bagassi Central, the boreholes tested soil and rotary air blast drilling anomalies established from the earlier exploration programs, primarily outside of the 55 Zone. 97 boreholes were drilled totaling 16,373 m. The most significant intercept occurred in the 109 Zone, where borehole YRM-12-RC-109 intersected an 8.0 m interval (from 118 m to 126 m) with a grade of 9.96 g/t Au. Another interval of interest was identified in the 117 Zone, where a 2.0 m sample in borehole YRM-12-RC-117 returned 14.97 g/t Au.

At Bagassi South, drilling was designed to further test the depth and strike extension of the large orpaillage (artisanal) site and to follow up on encouraging intersections obtained from previous drilling results. During the program, 32 boreholes totaling 5,364 m were drilled.

In the Kaho Zone, seven boreholes totaling 1,146 m were drilled in 2012. The boreholes tested positive soil sampling results conducted by Roxgold in 2012.

In 2013, Roxgold completed 42 boreholes totaling 6,763 m, primarily at Bagassi Central. In the 117 Zone, eight boreholes totaling 1,601 m were drilled.

In 2014, Roxgold completed 67 boreholes totaling 5,414 m at the Boni Shear, Haho and Yaro zones.

In 2015, Roxgold drilled 11 reverse circulation pre-collars at the Bagassi South for 2,389 m on the QV1 structure with the boreholes completed with diamond core 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 was conducted targeting the down dip extension of the QV' structure. In addition to these 6 boreholes, 5 boreholes were drilled in the first quarter of 2017 as part of the same drilling program at the Bagassi South. In total for the 2016/2017 program, 2,630 m of RC pre-collars were drilled at the Bagassi South Zone.

In 2019, Roxgold initiated a large program of RC drilling aimed at testing major regional geochemistry, structural and geophysical targets. The drilling program covered the Boni Shear corridor, the Kaho Granite, the Tarkwaian West Contact and the Bagassi Central area. A total of 113 drill holes (11,518 m) was drilled along the Boni Shear, 10 drill holes (1,048 m) at Kaho, 76 drill holes (8,102 m) along the Tarkwaian West Contact and 37 drill holes (3,741 m) at Bagassi Central. At Boni Shear the program highlighted a gold low grade distribution along the structure.

An RC drilling program was also carried out during 2019 to infill the near surface environment and surface projection of the 55 Zone. This program was designed to target the near-surface extensions, splays and margins of the 55 Zone oxide and transitional zones and the areas historically mined by the orpailleurs (artisanal miners) above the Crown Pillar, as well evaluating the remnant mineralization remaining after the 2016/17 underground mining of the near-surface high-grade zones. The results of this drilling have been used to support investigations into the viability of mining remnant mineralization via open pit methods once underground mining of 55 Zone is completed. A total of 81 RC boreholes totaling 3,636 m was drilled to complete the program.

In 2020, Roxgold completed a RC drilling program to assess the mineralization potential of the oxide (near-surface) material over the Yaramoko mine. Several areas including 109 Zone, Bagassi South, 300 Zone, 117 Zone, Haho and 55 Zone were identified after data compilation and interpretation. 62 drill holes were drilled for 3,400 m.

A total of 7 RC boreholes totaling 738 m was also drilled in 2020 to test auger anomalies at east of 55 Zone targeting 55 Zone repeats.

In 2021, the oxide (near-surface) drilling program continued at 109 Zone and Bagassi South to infill the previous drilling and track the continuity of the mineralization in extension. The aim of the program was to upgrade the structures to inferred status. 137 RC drill holes totaling 10,563 m were drilled, including 103 drill holes (8,529 m) at 109 Zone.

Regional targeting continued also during the year with a total of 32 RC drill holes for 3,244 m completed at Yaramoko East, 109 Zone and the San area.

During 2022, 87 RC holes were completed at Bagassi, Houko, QV3 and the 109 Zone for a total of 7,405 meters, testing various anomalies and providing support for the 109 Zone infill program.

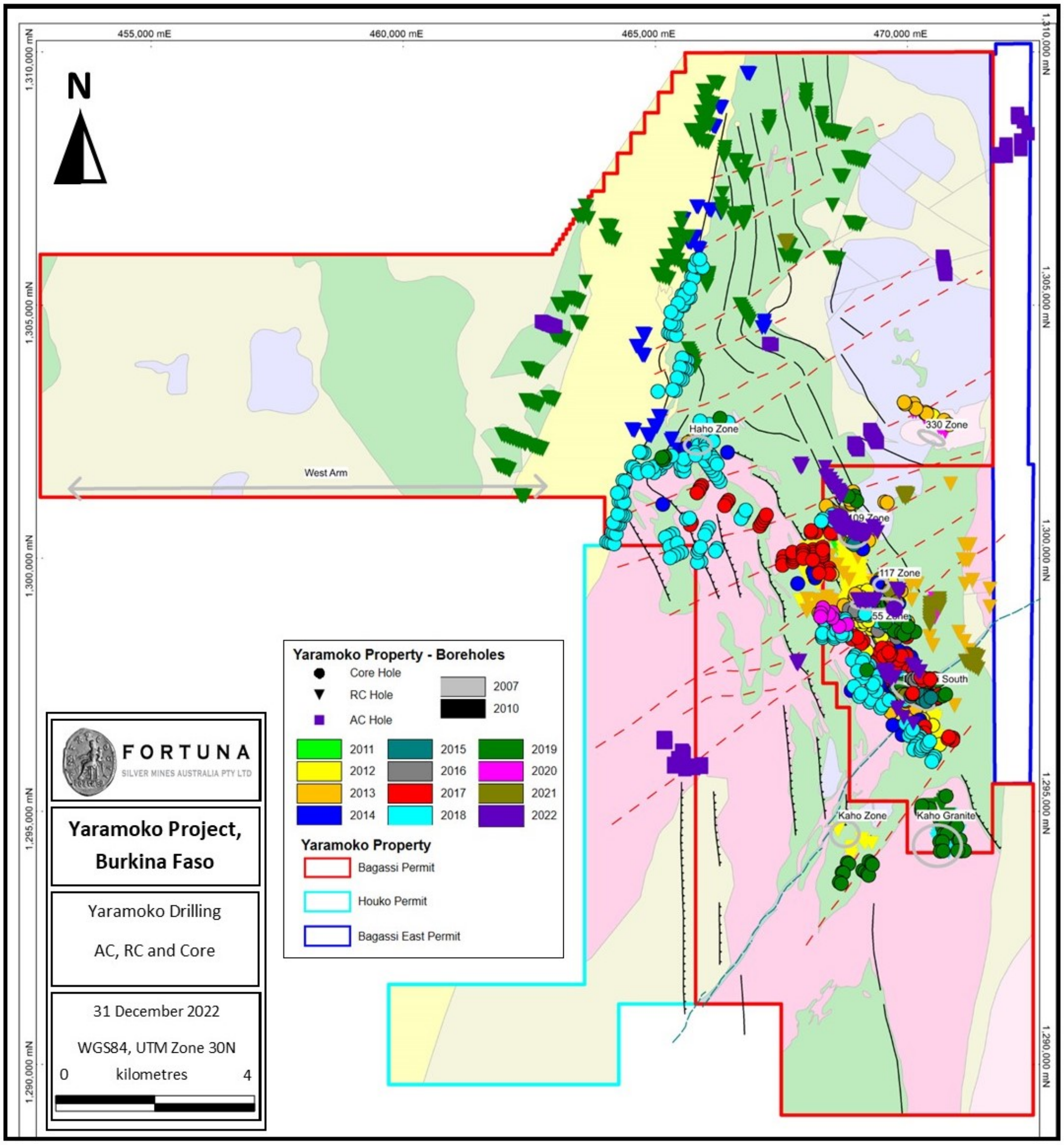

Figure 13: Distribution of Reverse Circulation and Core Drilling on the Yaramoko Gold Mine

10.2.4 Air Core Drilling

In 2021, Roxgold introduced the Air Core drilling method as a first pass testing method of the auger anomalies before scout drilling with RC. 52 boreholes totaling 2,619 m were drilled at West Arm during the year.

10.2.5 Core Drilling

Core drilling by Roxgold on the Yaramoko Gold Mine 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 at Bagassi South targeting the QV1 structure. From November 2011 to July 2016, Roxgold completed 627 boreholes totaling 169,544 m (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 m drilled. At the Bagassi South Zone, a total of 114 boreholes for 25,017 m were drilled, targeting the QV1 and QV' structures. Outside of the 55 Zone, and QV1 and QV' structures, regional targets on the Yaramoko Gold Mine were tested by core drilling.

Mineral resource delineation drilling at the 55 Zone had two main objectives: delineation and infilling drilling in the upper 700 m of the shear zone and testing the depth extensions of the gold mineralization to a depth of approximately 1,000 m. 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 on the QV1 structure involved multiple phases of drilling. The gold mineralization was infilled and delineated to a depth of approximately 350 m at the northwest end of the structure and to approximately 275 m at the southeast end of the plunging shoot.

Core drilling recovered HQ sized core (63.5 mm diameter) from the top of the borehole to the point where the rock showed no signs of oxidation; typically, 20 m to 30 m in depth. At that point, the core size was reduced to NQ (47.6 mm diameter). Down-hole deviation was monitored using a Reflex Instruments device at 15 m, 25 m, and 50 m, and then approximately every 50 m 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 m above the projected shear zone intercept. From 2015 to 2021, 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 exploration 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, or by the mine-based survey team if drilled from underground locations.

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 behavior of the surrounding rock for underground mining. 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, 2017, 2018/19 and 2020/21 core drilling programs from surface 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, targeting the extensions to the mineralized shoot between 700 m and 1,000 meters below the topographic surface with a second phase a deep drilling conducted in 2017 totaling 8 holes and targeting the down- plunge projection of the mineralized shoot below the 2016 drilling.

An additional deep core drilling campaign from surface was carried out in 2018/19 targeting extensions to the 55 Zone mineralization at depths between 900 m and1,300 m below surface, in addition to infilling select areas of the 2017 drilling campaign. Due to the expense and difficulty in keeping directional stability at depths below 1,000 m, in 2020/21 further infill and extension drilling was carried out from underground drilling platforms on the 4,734 m reduced level (RL), approximately 550 m below surface. This drill campaign targeted areas between 700 m and 1,100 meters below surface.

Drilling at the Bagassi South was undertaken in the fourth quarter of 2016 and continued in 2017, drilling mainly focused on mineral resource conversion, targeting Inferred Mineral Resources. Additional drilling was completed during 2020, targeting extensions along strike and at depth, as well as for linkages between the QV' and QV1 structures.

Surface drill collar surveys were carried out using a site based DGPS system which has been calibrated with the regional geodesic system. Underground drill collar surveys were carried out using a total station operated and managed by the mining contractor surveyors, African Underground Mining Services (AUMS).

Downhole surveys generally used Reflex cameras, either single-shot or multi-shot provided by the drilling contractor and calibrated prior to use on site.

Additional core drilling was completed during 2022, testing strike extensions to the west and east, and dip extensions below the previous resource limit. Underground core drilling at Zone 55 mainly focused on Mineral Resource conversion and extension along the main shear along a ~400m strike length and down to mine depth levels of 4330 (-670 Adindan_30 RL) ~1,000 meters vertical depth. Additional smaller programs were completed on the Western Splay in the upper levels of the mine between the 5100 to 5200 levels (100 to 200 Adindan_30 RL) ~100 to 200m vertical depth and broad spaced deeper Mineral Resource extension holes targeting the 4150 mine level (-850 Adindan_30 RL) ~1,150 meters vertical.

All holes were drilled by a Longyear LM90 drill, NQ2 in diameter (50.6mm) and ranged from 45 meters in depth up to 482.7 meters; between dips of -7.5 and -72 degrees on azimuths designed to avoid overly oblique intersections with the ore zones.

Underground drill collar surveys were carried out using a total station operated and managed by the mining contractor surveyors, African Underground Mining Services (AUMS).

Downhole surveys are captured with a single shot Reflex camera every 30m during drilling, with multishot surveys every 6 meters upon hole completion. Survey files are uploaded to the IMDEX downhole survey portal by the drilling contractor AUMS for review, before being downloaded by Roxgold geologists for uploading into the site Datashed database.

Core is transported by the drilling contractor in stacked core trays with an empty tray on the top and securely tied down with rachet straps to prevent movement and any potential core loss, or core moving from its original location. Rod runs, depth and any potential core loss are recorded on wooden core blocks.

The drillers transport the core to the secure core yard at Yaramoko, where Roxgold geologists receive it, check it for damage, mark up meterage marks, orientate the core, geologically and geotechnically log it, photograph it, before cutting zones of interest in half with a diamond saw. Cut pieces are placed back in the core boxes for sampling by the designated geologist once complete.

The right-hand half of the drill core is sampled, with sample intervals generally ranging between 0.3 meters up to 1.0 meter in length. Samples are placed within numbered and ticketed plastic sample bags, stapled closed and shipped direct in batches to ALS Laboratories, Ouagadougou along with the relevant paperwork of the samples list and sample submission using Roxgold transport to complete the chain of sample custody.

Analysis at ALS is FA50_AAS [code Au-AA24] and for samples returning results higher than 10,000ppb, the sample is rerun as FA50_GRAV [code Au-GRA22]. Results are emailed in multiple formats, including secure pdf and comma delimited for uploading into the Roxgold database.

10.3 Drilling Pattern and Density

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

10.4 Comments on Section 10

The QP is satisfied the drilling conducted at the property and used to support the Mineral Resource was:

- Collected using standard industry practices and the appropriate drilling techniques.
- Orientated appropriately to the strike of the mineralization and vein arrays.
- Logged and recorded appropriately using industry standard procedures, software and techniques.
- Appropriately surveyed and located, both at the collar and for downhole surveys.
- Drilling information is sufficient to support Mineral Resource and Mineral Reserve estimates.

11 Sample Preparation Analyses, and Security

Riverstone and Roxgold used various laboratories to prepare and assay samples collected on the Yaramoko Gold Mine. 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. The SGS Ouagadougou, Yaramoko 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.

11.1 Soil Samples

Soil samples weighing approximately 3.5 kilograms (kg) were collected by Riverstone and Roxgold using picks and shovels. Soil was collected to a depth of up to 50 centimeters (cm), 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 Au were re-assayed with a gravimetric finish.

11.2 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 3 m intervals. A 4 kg 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 Au were re-assayed with a gravimetric finish.

11.3 Auger Drilling Samples

Sahara Geoservices of Ouagadougou, MRS and GBT (local drilling companies) were 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 m long samples were collected. The average depth of successful auger boreholes was 5.5 m. 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 Au 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. An additional 2,508 samples were submitted to Actlabs in 2019-20 for 60 elements ICP-MS analysis.

11.4 Reverse Circulation Drilling Samples

Boart Longyear, Geodrill, Bonodon and JMS Drilling from Ouagadougou were contracted to carry out RC drilling on the Yaramoko Gold Project; Boart Longyear was contracted from 2007 to 2012, Geodrill was contracted since 2013, Bonodon was used for the 55 Zone Crown Pillar drilling in 2019 and JMS Drilling contracted in 2020 to 21. 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 one or two meter drill run, depending on the target zones, 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 kg 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 color 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, color, texture, alteration, veining, and estimated percentage of sulfide 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 Au were re-assayed with a gravimetric finish.

11.5 Core Drilling Samples

Standardized sampling protocols were used for core sampling by Riverstone in 2011 and by Roxgold between 2011 and 2022. 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). Fifty-seven percent of the core samples informing the mineral resource (72,968 out of 129,413 samples) were prepared and assayed by Actlabs in Ouagadougou at 55 Zone, and 92 percent of the core samples informing the mineral resource (23,368 out of 25,419 samples) were prepared and assayed by Actlabs in Ouagadougou for Bagassi South The use of BIGS, SGS Tarkwa, and TSL was discontinued in 2012.

Table 6: Laboratories Used to Assay Core Samples from the 55 Zone (2011-2021) and QV1 and QV' at Bagassi South Zone (2013-2022)

	Assay Laboratory	Samples from Date	Samples to Date	No of Samples	Percentage
55 Zone	Actlabs Ouagadougou	Jan-12	Dec-22	72,968	62%
	ALS Ouagadougou	Jan-10	Dec-22	28,804	25%
	SGS Ouagadougou	Feb-12	Sep-19	9,983	9%
	BIGS Ouagadougou	Dec-11	Jul-12	2,624	2%
	TSL Saskatoon	Oct-11	Oct-12	2,776	2%
Total				**117,155**	**100%**
QV1/QV'	Actlab Ouagadougou	May-13	Jul-19	23,368	92%
	ALS Ouagadougou	Sep-20	Dec-21	1,614	6%
	SGS Ouagadougou	Jun-14	May-17	437	2%
Total				**25,419**	**100%**

11.5.1 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 m above and below the 55 Zone in boreholes drilled prior to 2014, and thereafter were generally sampled starting from approximately 20 m above the main mineralized zone.

Exploration core boreholes outside of the 55 Zone and Bagassi South structures are typically sampled throughout the borehole. Waste intervals were sampled at 2.0 m intervals, except where a significant geological change occurred and/or in mineralized zones where the sampling intervals averaged between 1.0 m to 1.5 m. 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.

11.5.2 Sample Preparation at Actlabs Ouagadougou

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

All samples grading over 5.0 g/t Au were re-assayed with a gravimetric finish. Selected samples within the mineralized zones were re-assayed using a 1,000 g screen metallic fire assay procedure with gravimetric finish (procedure code 1A4-1000). With this procedure, a representative 500 g or 1,000 g sample spilt is sieved at 100 mesh (150 micrometers) 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 99,683 samples have been analyzed using fire assay at the 55 Zone and Bagassi South Zone, including 1,174 via screen fire assay methods.

11.5.3 Sample Preparation at ALS Ouagadougou

Samples processed at ALS Chemex in Ouagadougou were first crushed to 70 percent passing 2 mm or better (preparation code CRU-31). A 1.5 kg riffle split was pulverized to 85 percent passing 75 micrometers (preparation code PUL-36). All samples were then analyzed using a standard 30 g 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 Au were re-assayed using a 50 g fire assay procedure with gravimetric finish (procedure code Au-GRA22).

11.5.4 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 Au. 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 Au using atomic emission spectroscopy (AES).

11.5.5 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 Au.

11.5.6 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 g or 50 g lead fusion fire assay procedure (codes FPF300 and FPF500, Fusion Plombeuse), with AAS finish with a detection limit of 5 ppb gold.

11.5.7 Sample Preparation at TSL Sasksatoon

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 mm). Samples were riffle split; typically, a 250 g subsample was pulverized, and the remaining sample was stored as reject material. Ring mill pulverizers grinded samples to 95 percent, passing 150 mesh (106 micrometers). 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 g pulverized subsamples with AAS finish with a detection limit of 5 ppb gold. Samples grading over 3.0 g/t Au 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 kg subsample was collected using a splitter. The lower detection limit of the screen metallic assay procedure is 0.03 g/t Au. 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 and long turn-around times.

11.5.8 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.

11.6 Grade Control Sampling

Grade control sampling of the mining faces is carried out on a per shift basis with the mining cycle advancing the face approximately 3 m to 3.5 m for each blast. Samples are chipped from the face following a horizontal line set approximately 1.5 m from the floor. Sample lengths are to be between 0.1 m to 0.5 m, with recognition of geological boundaries. Sample sizes are on average 2.5 kg.

The geologist records all relevant information digitally using the Rock Mapper software via an iPad, including a face photograph of sample positions and geological features, and then downloaded into the database once back on surface.

All samples are processed at the site SGS laboratory, using standard 50 g fire assay with atomic absorption finish (SGS method FAA505). Any samples returning values greater than 10 ppm is repeat assayed using a gravimetric finish (SGS method FAG505).

At selected locations as determined by geological interpretation, sludge drilling (drilling using the production drill rigs, sampling the drill cutting stream) is carried out to test for mineralization interpreted to be potentially in the footwall or hangingwall of the drives. Sludge holes assays are not used for grade control estimation or included in the resource model process, and only carried out to check for the presence of mineralization in the footwall or hanging wall of the drives.

11.7 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.

Due to the very large volume of QC data, and consistent manner in which it has been collected over the life of the Yaramoko Gold Mine, this Technical Report focusses on the analytical quality control measures implemented by Roxgold during the 6-month period of January to June 2022 as a suitably representative sample of the complete quality control (QC) dataset.

Fifty-nine certified reference materials (CRM) sources from commercial suppliers were used by Roxgold during the aforementioned time period and include blanks. CRMs currently in use have been sourced from CDN Resource Laboratories Ltd - Canada (CDN Resource Labs), Ore Research Pty Ltd - Australia and Rocklabs - New Zealand (Rocklabs). Additionally, a non-certified coarse blank sourced from barren quartz material found close to Ouagadougou is used. Summary information for the CRMs used during the time period are presented in Table 7. Duplicate, repeat and umpire re-assays are also routinely employed, with a summary of the breakdown of each pair type in Table 8.

Table 7: Certified Reference Materials in Use, January-December 2022, Yaramoko Gold Mine

CRM ID	Number of Analyses	Expected Value (g/t Au)	St. Dev.
AMIS 0772	16	0.37	0.02
AMIS0792	37	3.55	0.125
AMISO490	134	18.1	0.85
CDN-GS-12A	1	12.31	0.27
CDN-GS-1P5T	132	1.75	0.085
CDN-GS-2U	168	2.12	0.065
CDN-GS-7J	128	7.34	0.145
CDN-GS-9D	15	9.43	0.22
CDN-GS-P4J	49	0.479	0.025
CDN-GS-P6D	138	0.769	0.0465
CDN-ME-1208	4	0.246	0.024
CDN-ME-1702	18	3.24	0.09
G916-6	36	30.94	0.87
HiSilK4	19	3.463	0.026
OREAS 200	7	0.34	0.012
OREAS 216b	61	6.66	0.158
OREAS 217	76	0.338	0.01
OREAS 220	113	0.866	0.02
OREAS 231	23	0.542	0.015
OREAS 232	35	0.902	0.023
OREAS 232b	10	0.946	0.037
OREAS 235	272	1.59	0.038
OREAS 238	165	3.03	0.08
OREAS 242	1	8.67	0.215
OREAS 243	10	12.39	0.306
OREAS 245	17	25.73	0.546
OREAS 247	31	42.96	0.9
OREAS 251	335	0.504	0.015
OREAS 62f	18	9.71	0.239
OXD151	86	0.43	0.003
OXE150	18	0.658	0.005
OXK 136	107	3.753	0.083
OXL118	262	5.828	0.149
OxL135	12	5.587	0.036
OxP133	13	15.14	0.08
OxQ115	7	25.22	0.18
SK78	65	4.134	0.138
Grand Total	**2,639**		

Table 8: Duplicate QC Samples by Type, Yaramoko Gold Mine

Duplicate Type	Pair Count
Field Duplicate	460
Lab Re-Assay	318
Lab Split Duplicate	297
Total	**1,075**

Roxgold sample dispatching included QC samples to monitor the accuracy of the laboratories' processes, field duplicates, second laboratory and third laboratory re-assays to monitor the precision of the lab's processes and both coarse and pulp blank samples for assessment of possible contamination of samples during sample preparation. In addition to this, the lab also inserts and reports their internal QC data including standards, laboratory duplicates and blanks. Results from these QC samples are assessed to ascertain accuracy, precision and contamination of the sampling and assaying process. The aim of these checks is to continue to track possible improvement and lapses in the laboratory assays.

Two protocols are followed by Roxgold for QAQC: one for soils, stream sediments, prospecting and auguring, and one for trenching and drilling.

- For soils, streams, prospecting and auguring, one oxide standard, one duplicate and one blank are inserted into the sample stream every 20 samples.
- For trenching and drill core, every 11th sample is a control (blank, sulfide standards and duplicate).

Every standard packet has a sticker with the standard name written on it. Every time a standard is inserted into the sample stream, this sticker should be removed from the packet and affixed to the corresponding sample tag in the sample booklet.

Blanks and standards should be from a laboratory. At least three standards should be used of differing grades, and they should be submitted randomly.

A blank should be inserted within every potentially mineralized interval, preferably after a sample that contains visible gold.

11.7.1 Contamination Monitoring

Blank samples are free media assayed to help ensure no false-positives are obtained from the laboratories and to check for sample cross-contamination during preparation. Contamination could also result in the fire assay procedure (contaminated reagents or crucibles) or sample solution carry-over during instrument finish. Roxgold internal standards require blank samples to return gold assay values below the analytical detection limit (i.e. <0.005ppm or 0.01g/t,). The blanks used from the Yaramoko Gold Mine were purchased from CDN Resource Labs (CDN-BL-10). Roxgold also includes its own blanks (YRM-CBL-01 and YRM-QBL-001) which are respectively derived from core massive dolerite and barren quartz ordered from Ouagadougou. The dolerite has already been assayed and has returned values less than the limit of detection.

To ensure that there is no contamination from the laboratory preparation processes, the YRM-CBL-01 or YRM-QBL-001 is placed into the sample stream after any sample that contains visible gold.

A failure is defined as a result outside the expected value of 10 times the limit of detection. Failures may be a result of sample swaps, sample mislabelling or contamination in the laboratory processes.

Graphs are utilised as visual aids in identifying the trends of the lab's performance in terms of contamination. Any value greater than 10 times the limit of detection will be considered unsatisfactory. This may indicate sample swapping or mislabelling or laboratory contamination.

11.7.2 Precision Monitoring

Four different methods were used to assess the precision of the drill samples from Yaramoko:

- Scatter plot (Normal and log scale)
  - Original analysis is plotted against the duplicate analysis. A 45-degree reference line is also plotted against which to compare the results. Y=X
  - A +/-20% allowable variation margins for field duplicates and a +/-10% allowable variation margins are plotted for pulp duplicates.
- Quantile-Quantile (Q-Q) plot normal and log scale
  - This is a graphical technique for determining if two data sets come from populations with a common distribution are visually and graphically identical.
  - A 45-degree reference line is also plotted. If the two sets come from a population with the same distribution, the points should fall approximately along this reference line. The greater the departure from this reference line, the greater the error in precision of assaying. This could as well be an indication of a possible coarse gold effect. The method also helps to physically look for the relationship between various grade ranges and precision.
- Relative Difference from the Average of the two samples
  - In this method, the percentage of population with absolute mean paired relative difference (AMPRD) greater than 20% is determined. For field duplicates, this value should not exceed 20%. For pulp duplicates, the value should not exceed 10%.
- And Paired Precision Plot
  - The paired precision plot is a variant of the relative difference plot. The half absolute relative difference (HARD) is used for the plotting. The HARD is a good measure of the paired data precision; the data will be ranged from high paired precision if their HARD is from 0 to 5% to poor paired precision if their HARD is greater than 20%.

11.7.3 Accuracy Monitoring

High, medium and low-grade pulps standard reference materials purchased from CDN Resource Labs and RockLabs were inserted in batches of primary samples at the ratio of approximately1:20 to monitor the level of accuracy of the labs' analytical processes. The standard reference materials are all sulphide standard for core/RC drilling and oxide standard for soil sampling and auger drilling.

To measure accuracy, the results from each standard reference material type is statistically analysed to find the minimum, maximum, mean, variance, standard deviation, co-efficient of variation and bias of its populations.

A failure is defined as results outside the expected value ±3 certified standard deviations. Failures may be as a result of sample swaps, sample mislabelling or inaccuracies in the laboratory processes. At least 80 percent of population of each standard reference material should pass for assay data to be considered to have a satisfactory accuracy level. Average bias between the mean of the returned data set and the certified mean is taken as a measure of the percentage error (PE). A PE not exceeding ±3.5% is considered an acceptable performance. The standard deviation of the population should be less or approximately equal to the certified standard deviation. A co-efficient of variation not exceeding 0.5 is also desirable.

Graphs are utilised as visual aids in identifying the trends of the laboratory's performance in terms of accuracy. Outliers (fliers) are identified and removed prior to running of statistics as they may be misleading in the assessment of the general sample population. They may also be indications of sample swapping or mislabelling.

Implementation and management of QAQC programs are consistent with industry standards and involves establishing the appropriate procedures and the routine insertion of standard reference material, blanks and duplicates to monitor the sampling, sample preparation and analytical process.

11.8 Quality Control Analyses

Exploration and resource definition work carried out over the Yaramoko Gold Mine has been, and continues to be, conducted by Roxgold Sanu personnel and qualified subcontractors. Roxgold implemented a series of routine verifications to ensure the collection of reliable exploration data. All work is conducted by appropriately qualified personnel under the supervision of qualified geologists.

The quality assurance and quality control program implemented by Roxgold Sanu is comprehensive and is supervised by adequately qualified personnel. Data are recorded digitally to minimize data entry errors. Core logging, surveying, and sampling are monitored by qualified geologists and verified routinely for consistency. Electronic data are captured and managed using an electronic database.

Assay results are delivered by the primary laboratories electronically to Roxgold. Analytical data are examined for consistency and completeness prior to being entered into the database. Sampling intervals that do not meet analytical quality control standards are re-assayed where necessary.

Laboratory audits have been completed in 2013 by Analytical Solutions Inc (Analytical Solutions Inc., 2014) and subsequently by CSA Global in 2016, and 2019. While minor CRM accuracy failures are recorded within the data reviewed at these times, root cause investigation concluded that the majority of these failures were the result of transcription errors and sample swaps within the sample stream.

Paired field duplicate data suggests that gold grades display a nugget effect. However, a scatter plot shows generally good correlation between duplicate pairs, with an R2 value of 0.9905 (Figure 14). 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 field duplicates is not unexpected for sampling mineralization characterized by coarse gold.

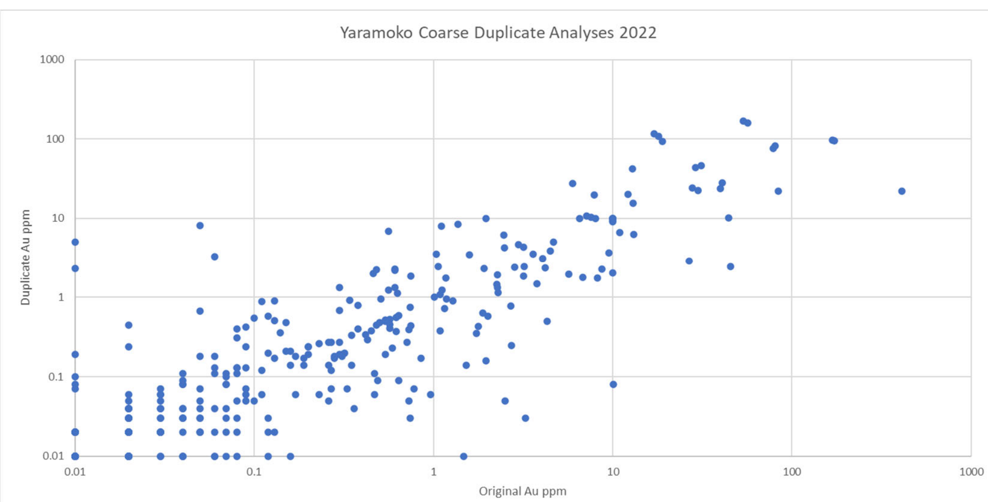

Figure 14: Field Duplicate Analyses Scatter Plot, Yaramoko Gold Mine

11.9 Comments on Section 11

The QAQC program is consistent with current industry practice and involves appropriate procedures and the routine insertion of CRMs, blanks, and duplicates to monitor the sampling, sample preparation and analytical process.

Evaluation of the QAQC data indicate that, considering the high-grade coarse nature of the gold mineralization, the data are sufficiently accurate and precise to support Mineral Resource estimation.

It is the opinion of the QPs that the sample preparation, security, and analytical procedures for samples taken at Yaramoko have been conducted in accordance with acceptable industry standards and that assay results generated following these procedures are adequately precise and accurate for use in Mineral Resource and Mineral Reserve estimation.

12 Data Verification

12.1 Introduction

Since taking ownership of the Yaramoko Gold Mine in 2011, Roxgold has followed and maintained an industry standard set of procedures for data collection and validation on a monthly and quarterly basis for data relating to drilling and face sample data. Historic reviews have also been conducted by SRK as part of their preparation of the 2014 and the 2017 technical reports.

In addition, in August 2016 Roxgold contracted CSA Global to review all analytical control data for the 55 Zone generated between January 1, 2010 and July 28, 2016. After review, CSA Global determined that there are multiple blank and 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.

12.2 Database

Prior to March 2019 the database was managed by an external consultancy, 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 routinely verified for consistency. Electronic data were captured and managed using an electronic database.

In March 2019, Roxgold transitioned to Maxwell Geoservice Datashed SQL database system with training provided by Maxwell Geoservice for the administration and management of the database by site-based staff, along with support from the Roxgold corporate technical services office. The database has been set up with a series of automated import, export and validation processes to minimize potential errors and inconsistencies.

A preliminary validation of the database was carried out by site-based geology and exploration staff in prior to extraction for resource updating.

The database was subject to further review and validated by Dr. Cobb, with the data verification procedure involving the following:

- Evaluation of maximum and minimum grade values.
- Investigation of minimum and maximum sample lengths.
- Validation against selected assay certificates.
- Validation of data entry criteria (collar, survey, lithology, and assay).
- Assessing for sample gaps or overlaps.

12.3 Collars and Downhole Assays

Downhole surveys are routinely collected using down-hole instruments from the Imdex range of Reflex tools during each drilling program. Results are validated by the site geologist prior to entry into the database with subsequent visual checks carried out by plotting drill traces once the hole is completed.

Collar surveys are carried out by AUMS survey crew for all underground positions using total stations, with collar positions surveyed into position prior to drilling with a second pick-up after the completion of the hole for the actual drill collar position.

All surface drilling hole positions are surveyed using handheld DGPS systems operated by the exploration team. The base stations have been referenced to the Burkina Faso national network. All downhole surveys are carried out in the same fashion as described above.

12.4 Geologic Logs and Assays

Yaramoko implemented logging onto Maxwell LogChief data capture software in 2019, enabling the direct capture and traceability of logging data via dropdown menus and pre-set codes to promote data hygiene. Prior to 2019, all logging was onto pre-set excel spreadsheets before importation into the database. Reviews of the logging data and associated model interpretation are carried out on each site visit by the QP.

Assay data are electronically reported from the laboratory in Microsoft Excel and pdf format and imported into the database after validation. Assay data are verified using the established QAQC program as set out in Section 11.

Visual checks of selected drill holes are carried out by the QP on each site visit.

12.5 Metallurgical Recoveries

Yaramoko has been an operating mine since 2016, with a full suite of data available from the processing plant on a daily basis. Across this period Yaramoko recoveries have been consistently between 98.0 and 99.3 percent, with these values used to support the assumptions set out in this Report.

12.6 Mine Reconciliation

Yaramoko performs a monthly reconciliation of the resource and reserve block model estimates against production plans and budget, with results reviewed on a monthly cycle as well as a three-month rolling average to allow for grade variability associated with the coarse gold and very high grades commonly seen. Historic reconciliation results indicate the estimation methodology is reasonable.

12.7 Site Visitation

The Qualified Persons have visited the site in December 2022 in support of the ongoing mining operations. During the visit, discussions were held with regards to data collection verification through quality control and modelling.

12.8 Comments on Section 12

The QPs are of the opinion that data verification programs from the mine site are adequate to support the geological interpretations, the analytical and database quality, and Mineral Resource and Reserve estimation at the Yaramoko Gold Mine. The QPs have verified data used in the Mineral Resource estimation, including the database, collars and down-hole surveys, geological logs and assays, metallurgical recoveries, estimation parameters, and mine reconciliation, and, to the knowledge of the QPs, there are no limitations on or failure to conduct such verification that would materially impact the results.

13 Mineral Processing and Metallurgical Testing

This section summarizes the metallurgical testing work completed on representative samples from the 55 Zone, the Bagassi South QV’ and QV1, and 109 Zone gold deposits.

In June 2013, Roxgold commissioned SRK to provide certain technical engineering services and to prepare a feasibility study technical report in accordance with Canadian Securities Administrators’ National Instrument 43-101 for the gold mineralization contained in the 55 Zone of the Yaramoko Gold Mine 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.

In 2015, a metallurgical testing program was completed on the Bagassi South QV1 and QV’ deposits, at the ALS metallurgy assay laboratory in Perth, Western Australia, Australia under the supervision of Roxogold. The QV1 and QV’ testing demonstrated a consistent metallurgical performance on recoveries, in line with historical test work and representative of material to be processed through the plant.

The testwork conducted on the 55 Zone samples are representative of the material intended to be processed from the 55 Zone open pit, given it is the extension of the same deposit.

The most recent testing campaign conducted on 109 Zone deposit was performed in September 2022 at the ALS Metallurgy assay laboratory in Perth, Western Australia, Australia under the supervision of Roxgold.

13.1 Bagassi South

13.1.1 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 mm, homogenized and split into 500 g charges. Details of these samples are summarized in Table 9.

The remaining samples were combined to generate three test work composites. Details of the three composites are summarized in Table 10.

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

Table 9: 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 10: Details of the Bagassi South Testwork 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

13.1.2 Bond Ball Mill Work Index Determination

Test work conducted to evaluate the hardness of the ore was performed on composites from the QV1 and QV1 Extension vein systems using the standardized procedure detailed by F.C. Bond to determine the Bond work index (BWi). A closing screen size of 106 micrometers was used with results outlined in Table 11.

Table 11: QV1 and QV1 Extension BWi

Composite ID	F_{80} (µm)	P_{80} (µm)	BBWi (kWh/t)
QV1	2,672	77	17.4
QV1 Ext	2,711	80	18.0

These results indicate the samples tested to be in the high hardness range for ores. In addition, the results obtained indicate the ore is similar in hardness to the Zone 55 ore body.

13.1.3 Head Assays

Detailed head assays were conducted on all the variability composites and a summary of critical elements as listed in Table 12.

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 (C) concentration is low which suggests that preg-robbing of the gold from solution is unlikely to occur.

Table 12: 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

13.1.4 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 g sub-sample to a target P80 of 75 micrometers using a laboratory rod mill. The results of this test work are summarized in Table 13.

Table 13: Summary of Bagassi South Grind Establishment Testwork

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''

13.1.5 Gravity/Cyanide Leach

Sub samples of each composite were submitted for gold extraction test work. A 500 g sub sample was ground to P80 75 micrometers and submitted for gravity gold recovery ahead of cyanide leach test work, whilst an additional 500 g sub-sample was submitted for direct cyanidation (i.e. no gravity recovery) at

P80 75 micrometers. The three samples tested individually were stage-ground to 100 percent passing 106 micrometers and submitted for gravity gold recovery ahead of cyanide leach test work.

A summary of gold and extraction results is presented in Table 14.

Cyanide consumption was low, ranging between 0.28 kg to 0.35 kg per tonne (kg/t) with no noticeable difference between composites. The target pH of 10.5, indicates lime consumption of around 0.35 kg/t 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 14: Summary of Bagassi South Gravity Gold and Cyanide Leach Recoveries

Sample ID	Gold Head Grade (g/t)		Overall Gold Extraction (%) at Hours					Gold Tail Grade	Reagents (kg/t)	
	Assay	Calculated	Gravity	2	4	24	48	(g/t)	NaCN	Lime
QV1	23.9/18.0	26.65	90.5	98.2	98.4	98.9	98.9	0.29	0.30	0.38
		27.72	-	46.6	63.2	96.9	99.6	0.11	0.35	0.38
QV1 Ext	28.0 / 22.1	11.42	85.7	96.6	98.2	99.6	99.7	0.04	0.28	0.30
		18.13	-	46.7	64.5	98.9	99.6	0.08	0.30	0.26
QV1 South Ext	3.19 / 4.24	5.27	86.0	96.7	97.4	99.8	99.8	<0.02	0.31	0.34
		5.17	-	48.1	67.3	98.1	99.8	<0.02	0.28	0.26
Master	15.0 / 15.1	12.67	87.4	95.8	96.6	97.7	98.2	0.23	0.31	0.36
		18.24	-	46.5	64.5	99.1	99.8	0.04	0.32	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
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

13.2 109 Zone

13.2.1 ALS Metallurgy 2022

Between August and September 2022, a metallurgical test work program was completed by ALS Metallurgy under the supervision of Roxgold (ALS Metallurgy, 2022).

Test work conducted between August and September 2022 included:

- Sample preparation.
- Bond ball mill work index (BWi) determination.
- Detailed head analysis.
- Grind establishment testwork.
- Gravity gold recovery and cyanide leach test work.

The samples were received at ALS Metallurgy on August 4, 2022, a mixture of RC chips and ¼ core for a total of 141kg in total mass. Details of these samples are summarized in Table 15.

The composite sample preparation procedures are described below:

(1) Each composite was control-crushed to <3.35 mm, homogenised by passing it three times through a rotary sample divider, and split into the following charges:

- 1 x 500 g, for head assay.
- 3 x 1 kg, for grind establishment testwork.
- 1 x 1 kg, for gravity/cyanide leach testwork.

(2) The leftover samples were kept in reserve.

(3) The remainder of Composite #1 and Composite #8 was combined to generate a Master Composite, which was submitted for Bond ball mill work index (BWi) determination.

Table 15: Details of Samples Received at ALS Metallurgy on 4 August 2022

Composite #	Poly Bag Cose	Total Mass (kg)	Description
Composite #1	MIN2_2137	6.48	¼ Drill Core
Composite #2	MIN1_21054	16.63	RC
Composite #3	MIN1_21062	19.33	RC (Lump Wet)
Composite #4	MIN1_21100	16.50	RC
Composite #5	MIN2_21108	13.65	RC
Composite #6	MIN2_21140	25.36	RC
Composite #7	MIN1_22048	8.03	RC (Wet)
Composite #8	MIN1_22167	12.71	¼ Drill Core
Composite #9	MIN1_22168	16.31	RC
Composite #10	MIN1_22181	5.66	RC

13.2.2 Bond Ball Mill Work Index Determination

Test work conducted to evaluate the hardness of the ore was performed on composites #1 and #8 from the 109 Zone system using the standardized procedure detailed by F.C. Bond to determine the Bond work index (BWi). A closing screen size of 150 micrometers was used with results outlined in Table 16.

Table 16: 109 Zone BWi

Composite ID	F_{80} (µm)	P_{80} (µm)	BBWi (kWh/t)
Master Comp (Comp #1 & Comp #8)	2,569	113	18.3

These results indicate the samples tested to be in the high hardness range for ores. In addition, the results obtained indicate the ore is similar in hardness to the 55 Zone ore body.

13.2.3 Head Assays

Detailed head assays were conducted on all the variability composites and a summary of critical elements as listed in Table 17.

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

Table 17: Summary of the 109 Zone Head Assays

Composite ID	Auave (g/t)	As (ppm)	Ag (g/t)	C-org (%)	Co (ppm)	Cu (ppm)	Ni (ppm)	S2- (%)	Te (ppm)	Zn (ppm)
Comp #1 (MIN2_21037)	9.23	<10	<2	0.09	55	88	70	1.42	0.4	94
Comp #2 (MIN1_21054)	3.2	<10	<2	0.06	75	74	140	0.10	0.6	158
Comp #3 (MIN1_21062)	3.85	<10	<2	0.09	45	142	40	0.92	0.2	100

Composite ID	Auave (g/t)	As (ppm)	Ag (g/t)	C-org (%)	Co (ppm)	Cu (ppm)	Ni (ppm)	S2- (%)	Te (ppm)	Zn (ppm)
Comp #4 (MIN2_21100)	3.83	<10	<2	0.09	45	86	230	0.84	0.8	96
Comp #5 (MIN2_21108)	0.77	<10	<2	0.24	60	106	175	<0.02	0.2	130
Comp #6 (MIN2_21140)	1.42	<10	<2	0.09	35	46	65	0.72	0.4	86
Comp #7 (MIN1_22048)	2.79	<10	<2	0.09	40	98	55	0.84	0.2	98
Comp #8 (MIN1_22167)	3.42	<10	<2	0.09	45	64	50	0.98	0.4	104
Comp #9 (MIN1_22168)	1.56	<10	<2	<0.03	50	130	95	<0.02	0.4	140
Comp #10 (MIN1_22118)	11.3	<10	<2	0.09	45	252	60	2.16	0.4	76

13.2.4 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 one-kilogram sub-sample to a target P80 of 106 micrometers. The results of this test work are summarized in Table 18.

Table 18: Summary of 109 Zone Grind Establishment Testwork

Composite #	Grind Time Required to Achieve P_{80} 106 µm (in'c”)
Composite #1	1’0”
Composite #2	3’2”
Composite #3	7’0”
Composite #4	6’6”
Composite #5	1’8”
Composite #6	5’9”
Composite #7	11’5”
Composite #8	11’6”
Composite #9	4’3”
Composite #10	7’5”

13.2.5 Gravity/Cyanide Leach

Gravity separation and subsequent direct cyanidation testwork on the gravity tailings were conducted on a sample of each composite at a grind size of P_{80}: 106 µm, to determine gold extraction characteristics.

A summary of gold and extraction results is presented in Table 19.

Cyanide consumption was low, ranging between 0.33 kg to 0.43 kg per tonne (kg/t) with no noticeable difference between composites. The target pH of 10.5, indicates lime consumption average of around 0.87kg/t.

Gravity separation indicated levels of gravity recoverable gold between 30.0 to 71.3 percent with an average pf 41.0%. Gold dissolution was substantially complete after 8 hours of leaching. Overall recoveries were in the 90.6 to 98.4 percent range with an average of 93.4 percent. These gravity and leach recovery levels are similar to those from test work on the Yaramoko project.

Table 19: Summary of 109 Zone Gravity Gold and Cyanide Leach Recoveries

[illegible]	[illegible]	[illegible]	[illegible]		[illegible]						[illegible]	[illegible]	
			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

13.3 Comments on Section 13

It is the opinion of the QP that operational experience since 2016 has demonstrated a consistent metallurgical performance with recoveries between 90.6 and 99.3 supporting the historical test work and is representative of the material remaining to be processed in the LOMP, including material expected to be sourced from the 55 Zone and 109 Zone open pit mining operation.

14 Mineral Resources

14.1 Background and Context

The mineral resource evaluation work discussed herein represents the seventh Mineral Resource estimate prepared for the Yaramoko Gold Mine. This report summarizes the work completed by Roxgold to prepare the Mineral Resource models and Mineral Resource estimates. The data cutoff date for this latest update is June 30, 2022 with Mineral Resources depleted for mining to December 31, 2022.

Geological and mineralization wireframes and estimation for the 55 Zone open-pit and 109 zone open-pit models were generated by Dr. Matthew Cobb. Geological and mineralization wireframes and estimation for the 55 Zone underground Mineral Resource model were prepared by Ms. Lisa Desmond.

Geological, mineralization modelling, geostatistical exploratory data analysis and Mineral Resource estimation and validation of the Bagassi South deposit were undertaken by Mr. Hans Andersen.

Dr. Matthew Cobb (MAIG #5486) has reviewed each estimate, has confirmed the validity of each approach, has depleted for mining where relevant and has reported each Mineral Resource. Dr. Cobb assumes responsibility for the Mineral Resource estimates disclosed in this Report.

14.2 Methods Summary

Mineral Resources reported herein have been estimated using a geostatistical block modelling approach, informed from gold assay data collected in core, reverse circulation drill chips and face channel sampling data. The geological wireframes consider structural and lithological interpretations of the gold mineralization.

The evaluation of the Mineral Resources involves the following procedures:

- Database compilation and verification.
- Generation and verification of three-dimensional geological models.
- Data conditioning (compositing and capping), statistical analysis, and variography.
- Selection of estimation strategy and estimation parameters.
- Block modelling, grade estimation and validation.
- Classification and depletion for mining.
- Preparation of the Mineral Resource estimate.

14.3 Resource Database

The Yaramoko Gold Mine database as of June 30, 2022, comprised a combination of data sourced from RC drilling, DD drilling, development face channel sampling (CH), and sludge hole sampling (SH) for a total of 348,345.44 m of sampling. Data is logged to handheld tablets by production and exploration geologists, and validated for referential integrity prior to being uploaded to a central database maintained within MaxGeo’s Datashed geological database management system.

The complete database is summarized in Table 20.

Table 20: Yaramoko Gold Mine Drilling Summary

Hole Type	Hole Count	Total Meters
Diamond	1,780	423,035.77
Reverse Circulation	937	91,950
RC / Diamond Tail	47	9,719.6
Face Sample	8,496	32,205.25
Sludge	1,437	9,607
Total	**12,697**	**566,517,62**

14.4 Data Used in Modelling

Subsets of data relevant to each of the Mineral Resource models were taken from the complete Yaramoko Gold Mine database. Summaries of the data used for each of the models are presented in Table 21. Sludge holes have been utilized only in guiding geological and mineralization interpretation, and were not used for grade estimation. Data subsets for each deposit are not necessarily mutually exclusive; each deposit subset may also contain holes relevant to the other deposits.

Table 21: Drilling Data Subsets, Per-Deposit, Yaramoko Gold Mine

Deposit	Hole Type	Hole Count	Total Meters
55 Zone (Open Pit and Underground)	Diamond	881	277,501.85
	Reverse Circulation	252	26,493
	Channel Samples	6,625	25,420.4
	Sludge Holes	1,000	5,394.5
	RC / Diamond Tail	1	738.3
	Total	**8,758**	**335,548.05**
Bagassi South	Diamond	416	90,320.5
	Reverse Circulation	6	1,077.0
	RC DD Tail	22	6,188.3
	Face Sample	1,356	5,020.2
	Sludge Hole	231	1,879.7
	Total	**2,031**	**104,485.6**
109 Zone	Diamond	64	8,073.7
	Reverse Circulation	187	15,832
	RC DD Tail	24	2,431.5
	Total	**275**	**26,337.2**

14.5 Mineralized Domain and Geological Modelling

14.5.1 55 Zone Open Pit

Wireframe solids defining the bulk of the waste lithologies present at the 55 Zone were created in Leapfrog in accordance with the available drillhole data. These lithologies comprised; granitoids, intercalated mafic volcanics and associated volcano sedimentary units, and mafic dykes. Solids were only generated for the granitoid (Figure 15) and mafic dyke (Figure 16) lithologies, as the remaining interstitial space was subsequently coded within the resultant block model as mafic volcanic/volcano sedimentary.

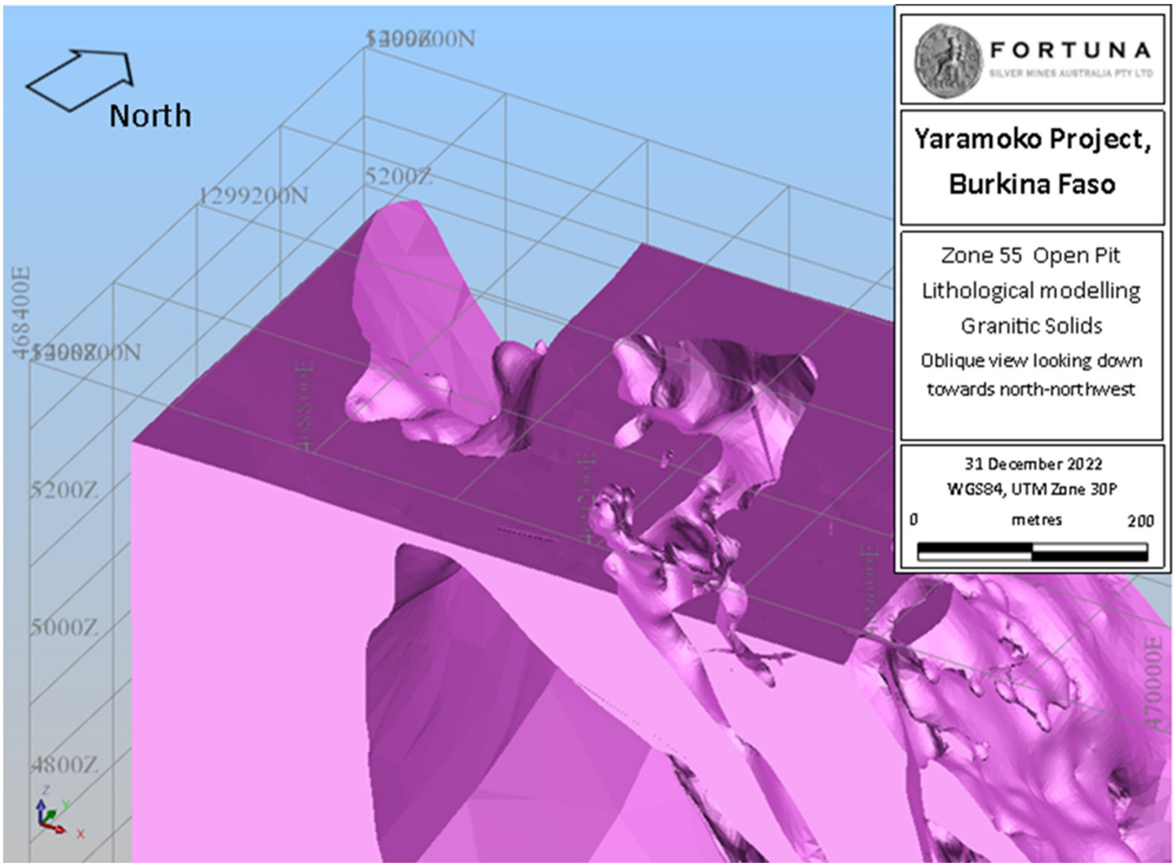


Figure 15: Lithological Modelling (Granitoids) for the 55 Zone Open Pit Model

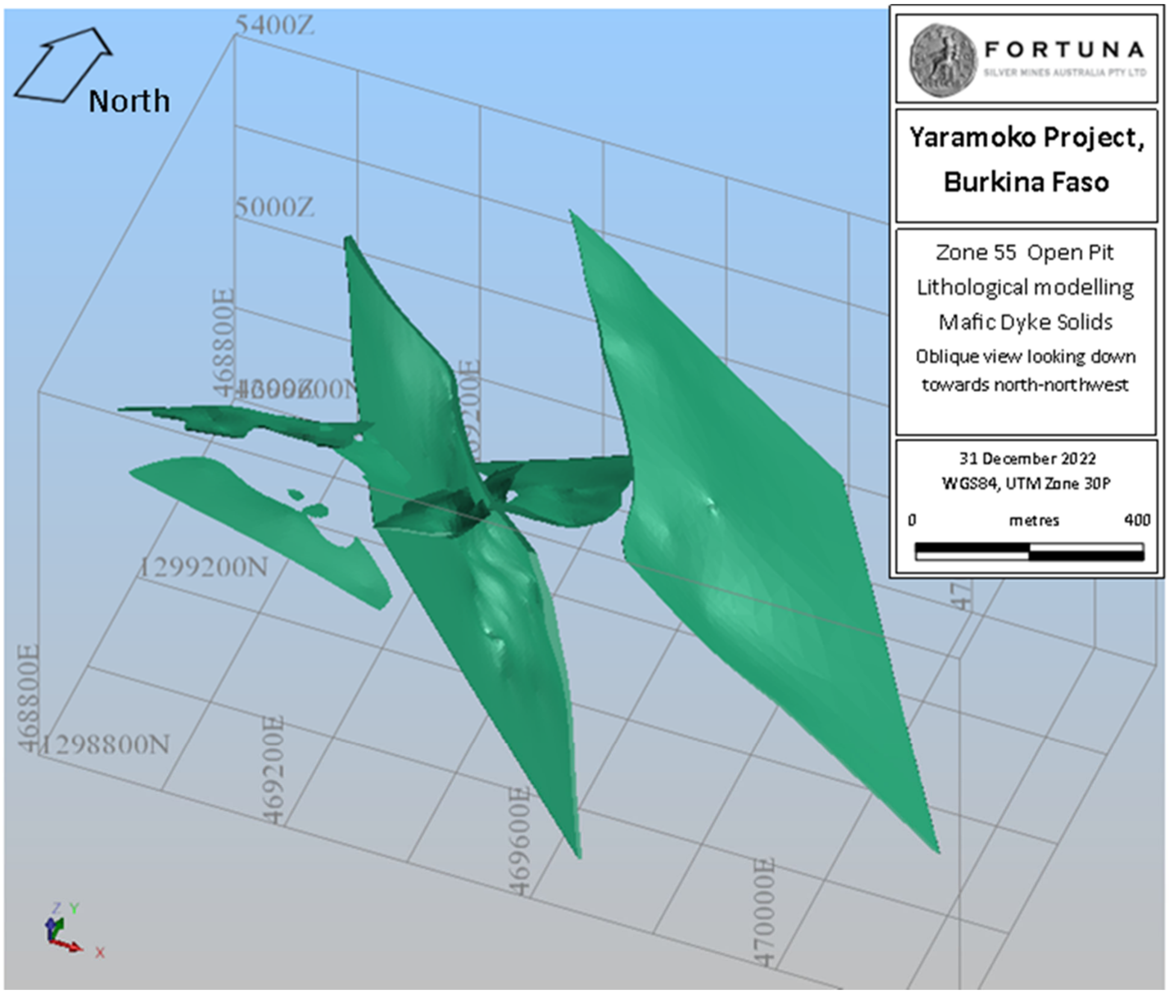


Figure 16: Lithological Modelling (Mafic Dykes) for the 55 Zone Open Pit Model

Mineralization was modelled via Seequent's Leapfrog™ vein modelling tool, with wireframes then imported into Geovia's Surpac™ software package for validation and further analysis. Interval selection in Leapfrog™ was based upon a combination of assay data and lithological logging of quartz/quartz-carbonate veining and intense localized shearing (granitic schists). The resulting model (Figure 17) shows the main vein dominant lodes (3010 and 3020) parallel to the main Yaramoko shear orientation; striking east-northeast with a steep south-southeast dip, and a number of smaller subsidiary lodes both sub-parallel to the main lodes, and also at high angles which may represent auxiliary reidel or other associated shear fabric orientations.

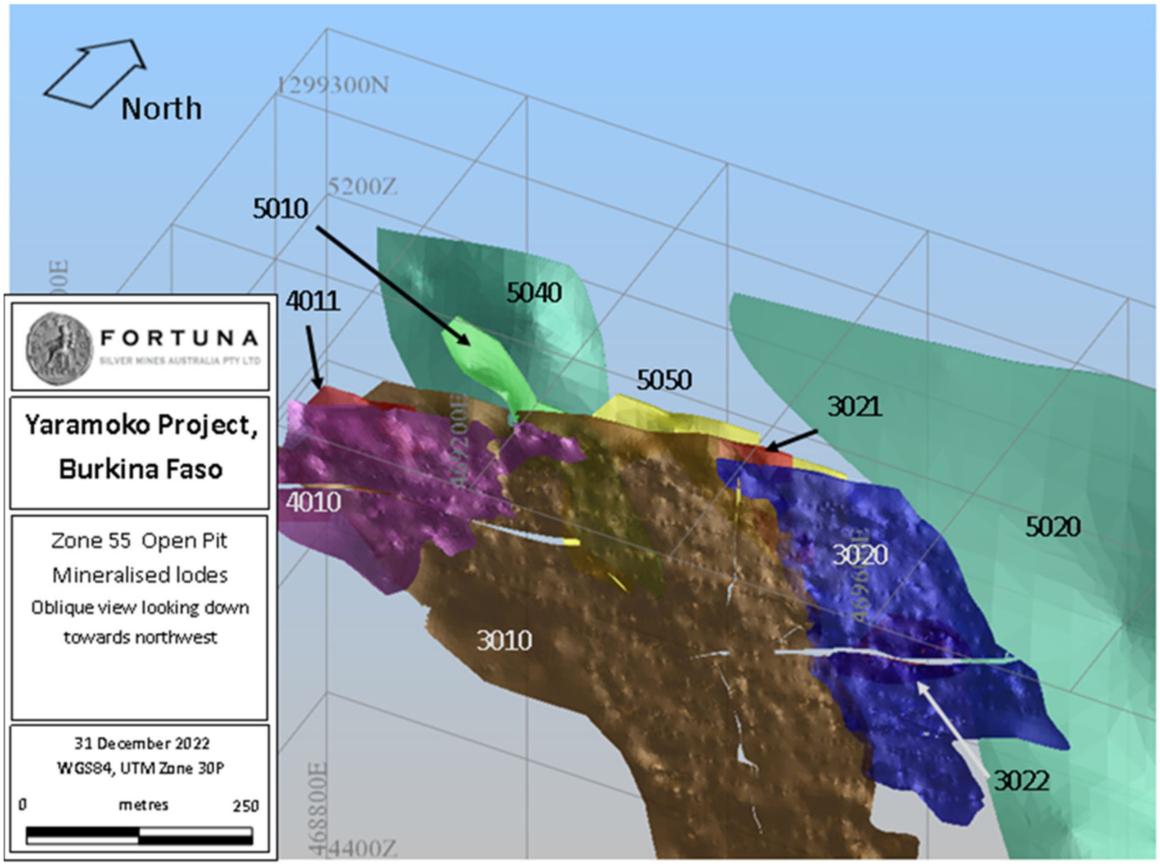


Figure 17: 55 Zone Open Pit Model Mineralization Lode Interpretation

Oxidation surfaces were also constructed in Leapfrog using logged lithological data from the available drillhole dataset (Figure 18). These represent top of fresh rock (base of transitional / saprock material) base of complete oxidation (base of saprolite) and the base of transported overburden.

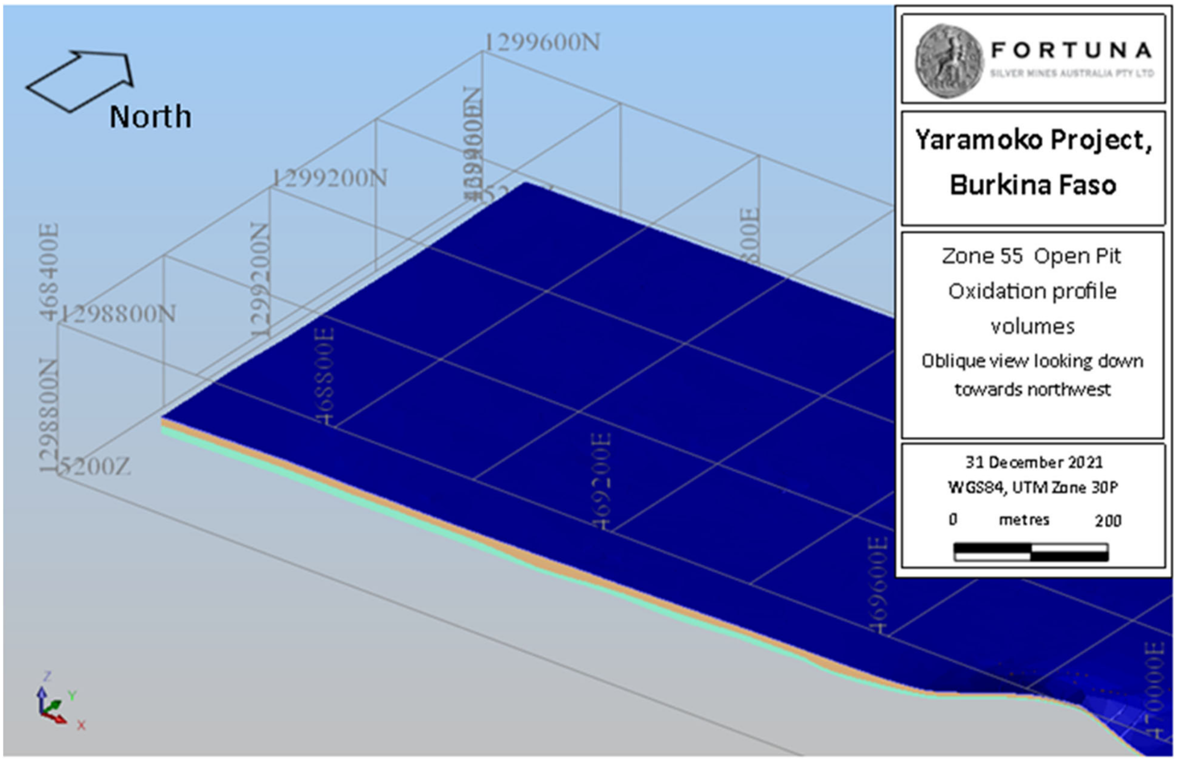


Figure 18: 55 Zone Oxidation volumes; blue – overburden, brown – saprolite, green – transitional (saprock). Oblique View Looking Down Towards Northwest

14.5.2 55 Zone Underground

Gold mineralization is associated with low-sulfide quartz veins and attendant altered schists forming multiple, generally tabular, sometimes braided lodes inside a narrow shear zone. Two distinct geological features are modelled by Roxgold; the shear zone and the quartz rich lode structures containing the bulk of the gold mineralization.

Similar to the open pit interpretation, the 55 Zone underground comprised modeling of coherent zones of significant vein-hosted mineralization, producing generally tabular, steeply south dipping to sub-vertical lodes striking east-northeast, and concordant with the broader shear envelope in which they are wholly constrained. Minor oblique lodes, potentially representing reidel or other associated shear orientations are also modelled (Figure 19). A listing of the resulting lodes is presented in Table 22. The main 55 Zone lode is dissected in the underground relevant portions by identifiable faults that result in five discrete lodes, slightly offset, that would otherwise constitute a single coherent lode: domains 3010, 3020, 3030, 3040 and 3050.

Table 22: 55 Zone Underground Mineral Resource Model Domains

Lode ID	Lode Description
3000	Main Yaramoko shear zone
4000	Oblique auxiliary shear zone
3010	Main lode part 1
3011	Minor parallel lode
3020	Main lode part 2
3030	Main lode part 3
3031	Minor parallel lode

Lode ID	Lode Description
3040	Main lode part 4
3041	Minor parallel lode
3042	Minor parallel lode
3044	Minor parallel lode
3050	Main lode part 5
3051	Minor parallel lode
3055	Minor parallel lode
3060	Minor parallel lode
3065	Minor parallel lode
3070	Minor parallel lode
4010	Oblique lode from Main shear

Core photographs and face mapping photogrammetry have been routinely reviewed by the QP 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 1 m to more than 17 m (inclusive of the broader mineralized shear).

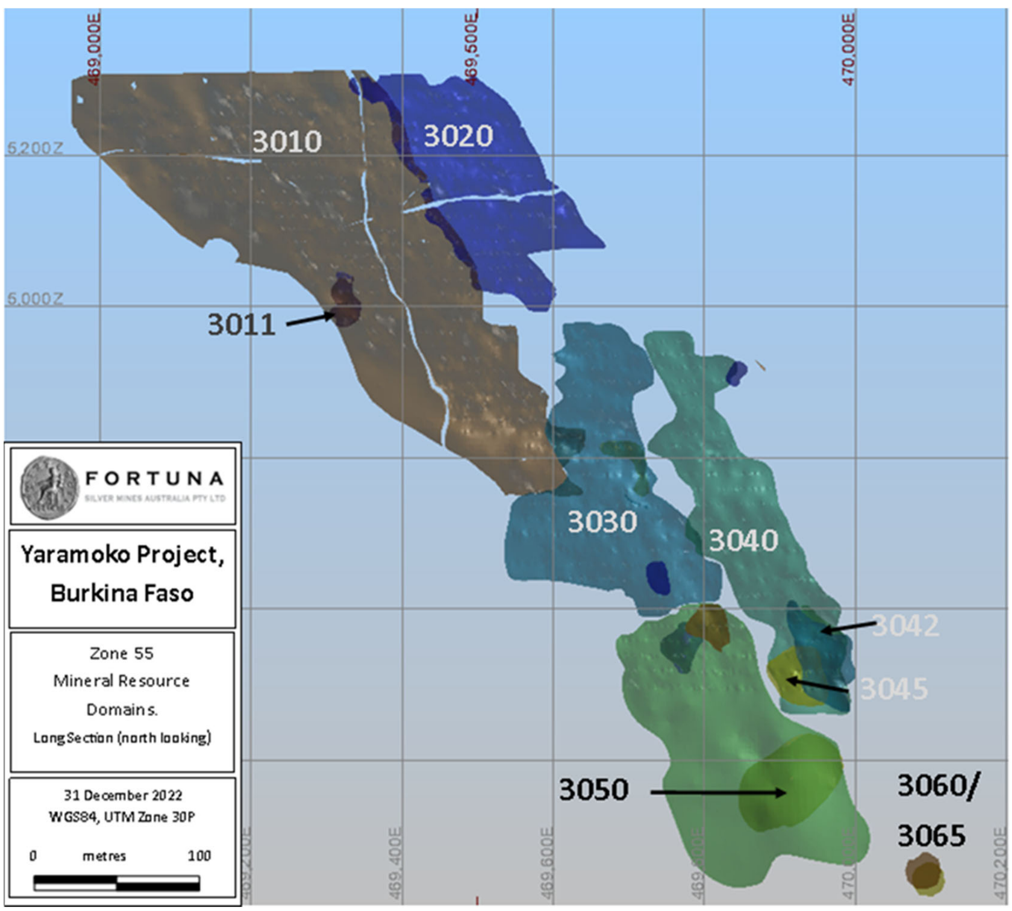


Figure 19: 55 Zone Underground Mineral Resource Model Domains (Long Section)

14.5.3 Bagassi South

Bagassi South deposit geology comprises four principal lithologies: mafic volcanic flows, granitic intrusion, granodiorite, and diabase. The dominant country rock is 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 color due to hematite and potassic hydrothermal alterations. The granodiorite is equigranular to porphyritic with a dark grey color. All geological units, including the QV1 shear zone, are cross-cut by a late approximately 50 m wide diabase dyke at high angle to the main shear zone hosting the gold mineralization.

Similar to the adjacent 55 Zone, gold mineralization is associated with laminated quartz-carbonate veins developed in shear zones. The shear zone and mineralized structures/quartz veins domains were constructed with Leapfrog Geo using interval selection and the vein modelling tool. Two shear zones were modelled: QV1 and QV'. Fourteen mineralized lodes were modelled within the QV1 shear zone (Domains 1010 to 1065) as detailed in Table 23 and Figure 20. The average thickness of the gold mineralization at QV1 Main varies from less than 1 m to more than 18 m. The Mineral Resources extend from the surface to a depth of approximately 300 m. The QV' shear is host to two modelled lodes; 2010 and 2020 (Table 23).

Table 23: Bagassi South Lode Descriptions

Lode ID	Lode Description
1000	QV1 Shear Zone (Dilution domain)
1010	QV1 Main Lode
1011	QV1 Main Lode
1015	QV1 Minor Lode
1016	QV1 Minor Lode
1020	QV1 Minor Lode
1025	QV1 Minor Lode
1030	QV1 Minor Lode
1035	QV1 Minor Lode
1040	QV1 Minor Lode
1050	QV1 Main Lode
1060	QV1 Minor Lode
1065	QV1 Minor Lode
2000	QV' Shear Zone (Dilution domain)
2010	QV' Main Lode
2020	QV' Minor Lode

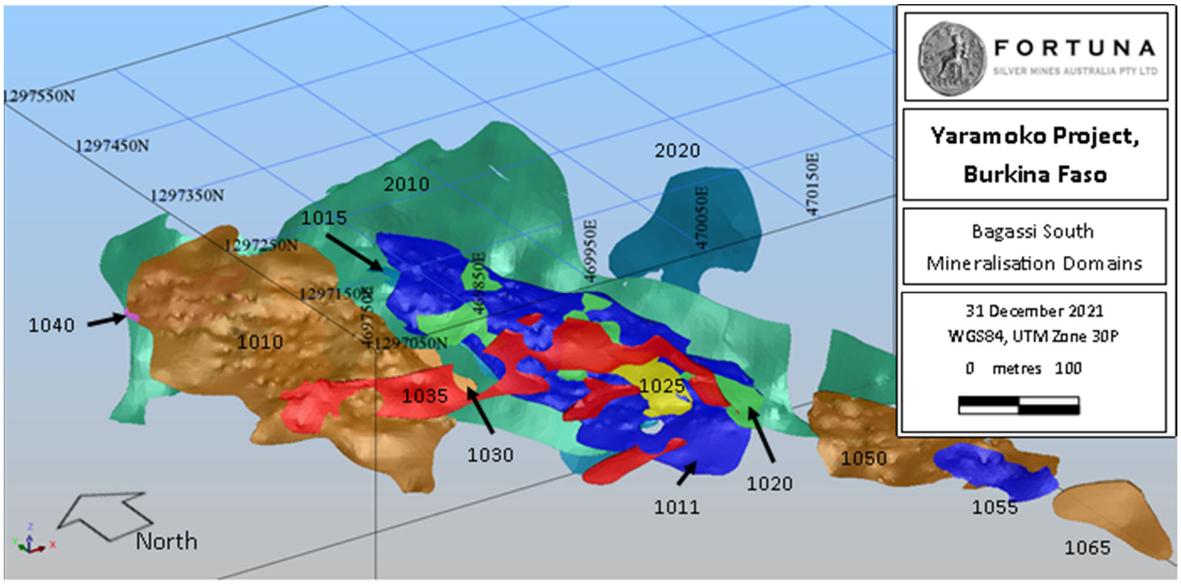


Figure 20: Bagassi South Mineralization Domains

14.5.4 109 Zone

Deposit geology for the 109 Zone comprises granitic and mafic (basaltic) / volcano sedimentary lithologies. These are direct strike continuations of the same units which host the 55 Zone deposit. Deposit geology was modelled via definition of the granitic body, with intervening space within the model coded as mafic (Figure 21).

Similar to the other deposits of the area, mineralisation is hosted in laminated quartz-carbonate veins. These occur at the 109 Zone at the contact between the Granitic footwall, and mafic hangingwall lithologies and are interpretated as resulting from competency contrast strain partitioning within the granite. Mineralisation strikes predominantly northwest, paralleling the granite contact, and dips steeply north. Subsidiary lodes north of the main body of mineralization strike west-northwesterly, again with a steep northerly dip (Figure 22).

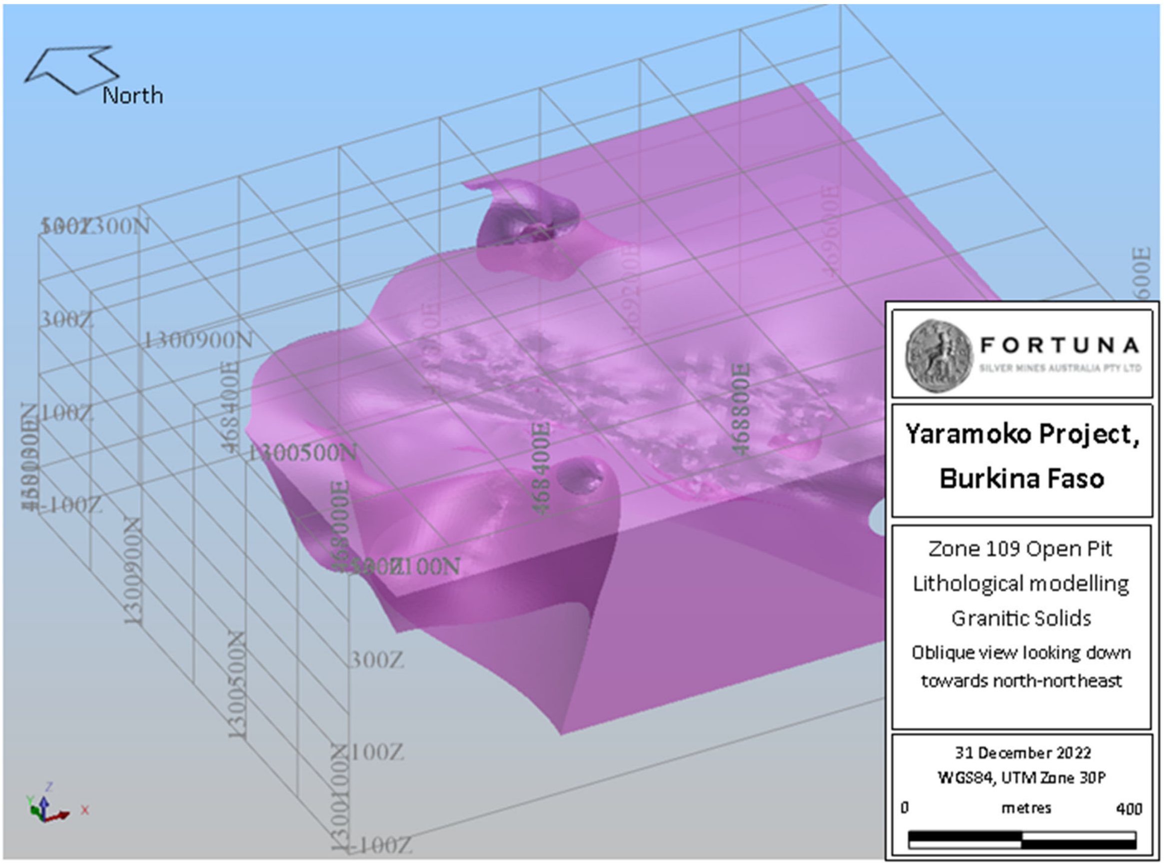


Figure 21: Granitic lithology modelling of the 109 Zone

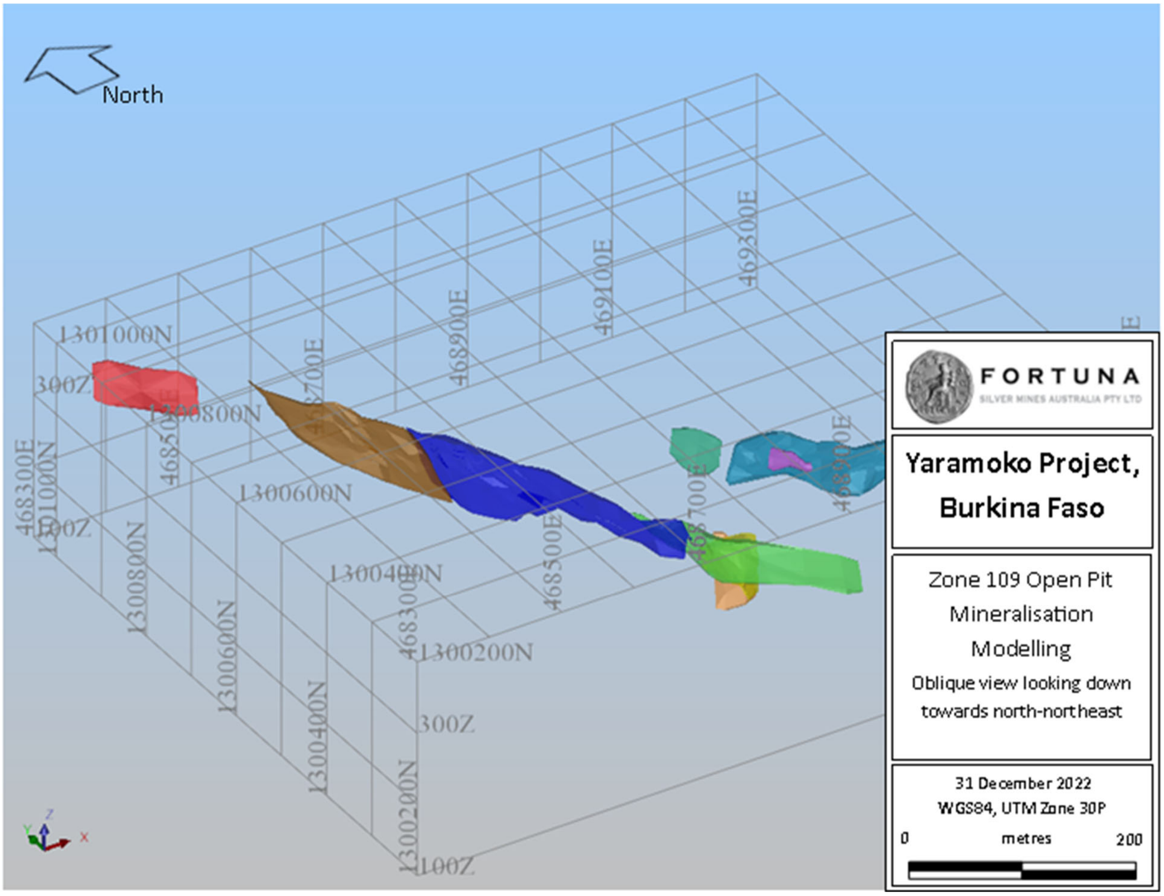


Figure 22: 109 Zone Mineralization modelling

14.6 Bulk Density

Roxgold measured bulk density from representative core samples from selected assay intervals using a water displacement technique. A total of 6,867 measurements were taken, of which 3,959 samples were used in the determination of bulk density values for the current Mineral Resource model. These measurements were grouped by lithology with the results tabulated in Table 24.

Table 24: Applied Density Values, Yaramoko Gold Mine

Lithology	Bulk Density (g/cm^3)
Mineralization	2.7
Mafic Volcanics	2.8
Granite	2.7

14.7 Compositing and Grade Capping

14.7.1 55 Zone Open Pit

Data for modelling of the 55 Zone underground was composited to nominal one-meter intervals within Surpac™ to honor geological boundaries. Minimum acceptable samples lengths were 0.5 m, with maximum allowable lengths of 1.5 m.

Composites were assessed for outliers, and the need for grade caps on a per-domain basis through Snowden's Supervisor software package. Grade caps applied are presented in Table 25 while summary statistics for capped and uncapped composites are presented in Table 26.

Table 25: Grade Caps Applied to the 55 Zone Open Pit Input Data

Zone Code	Cut Value (Au g/t)
3010	300
3020	400
3021	50
3022	15
4010	175
4011	Uncut
5010	Uncut
5020	Uncut
5040	Uncut
5050	Uncut

Table 26: Summary Statistics 55 Zone Open Pit Model Input Data (Principal Domains)

Domain	Count	Uncapped					Capped			Number Cut
		Mean (Au g/tm or g/t as relevant)	SD	CV	Max (Au g/t)	Min (Au g/t)	Mean (Au g/t)	SD	CV	
3010	6710	14.33	88.04	6.14	4822.1	0.00	12.02	29.39	3.08	27
3020	2829	22.22	64.99	2.92	1581.5	0.003	20.58	43.75	2.13	14
3021	95	9.32	23.09	2.47	116.5	0.008	9.32	23.09	2.47	4
3022	67	2.39	5.33	2.23	39.15	0.019	2.03	3.24	1.59	1
4010	894	8.45	28.84	2.94	238.69	0.001	8.18	22.78	2.78	7
4011	81	1.67	6.87	4.11	61.57	0.003	-	-	-	-
5010	88	6.49	14.76	2.28	88.03	0.005	-	-	-	-
5020	42	1.58	3.36	2.12	15.5	0.003	-	-	-	-
5040	18	2.61	3.39	1.30	9.29	0.003	-	-	-	-
5050	66	3.68	13.82	3.75	80.40	0.003	-	-	-	-

Notes:
SD: Standard Deviation
CV: Coefficient of Variation

14.7.2 55 Zone Underground

Data for modelling of the 55 Zone underground was composited to nominal one-meter intervals using a best fit algorithm within Leapfrog to honor geological boundaries. Minimum acceptable samples lengths were 0.5 m, with maximum allowable lengths of 1.5 m.

Composites were assessed for outliers, and the need for grade caps on a per-domain basis through Snowden's Supervisor software package. Grade caps applied are presented in Table 27 while summary statistics for capped and uncapped composites are presented in Table 28.

Table 27: 55 Zone Underground, Topcuts (Grade Caps)

Domain	Topcut (Au g/t)
3000	5
4000	5
3010	150
3011	30
3020	300
3030	130
3040	150
3050	100
3055	60
4010	130
5010	50
5020	10
5030	20

Table 28: 55 Zone Underground Input Data Summary Statistics

Domain	Count	Uncapped							Capped			Number cut
		Mean (Au g/t)	SD	CV	Skewness	Kurtosis	Max (Au g/t)	Min (Au g/t)	Mean (Au g/t)	SD	CV	
3000	15813	0.59	2.26	3.82	41.30	2,688.11	179.00	0.00	0.59	0.8	1.37	72
3010	5792	18.20	102.23	5.62	35.77	1,614.35	5,143.18	0.00	13.18	24.64	1.87	79
3011	76	8.45	11.01	1.30	2.50	7.75	61.70	0.11	5.74	7.44	1.3	3
3020	2341	28.84	80.43	2.79	12.26	213.31	1,778.00	0.00	24.57	43.32	1.76	18
3030	2784	13.50	58.35	4.32	17.13	364.48	1,643.60	0.00	9.94	18.09	1.82	25
3040	1258	22.99	124.76	5.43	22.20	617.52	3,715.29	0.01	13.66	25.06	1.83	22
3050	137	11.18	23.14	2.07	4.82	29.33	190.91	0.00	9.82	18.11	1.84	2
3055	35	9.39	19.07	2.03	3.57	14.19	103.50	0.01	9.08	15.41	1.7	1
4000	686	0.58	0.94	1.62	3.08	13.75	8.44	0.00	0.62	0.91	1.47	4
4010	515	15.75	36.53	2.32	4.60	25.73	344.96	0.00	13.94	26.69	1.91	12
5010	93	6.70	16.94	2.53	3.44	11.91	90.30	0.00	7.92	15.06	1.9	4
5030	42	14.47	61.28	4.23	5.86	33.56	398.00	0.01	4.52	5.91	1.31	2
5040	16	2.80	3.57	1.27	0.96	-0.83	9.29	0.00	-	-	-	-

14.7.3 Bagassi South

Similar to the 55 Zone Underground data, Bagassi South data were composited to nominal one-meter lengths using Leapfrog's best-fit algorithm with minimum and maximum allowable composite lengths of 0.5 m and 1.0 m respectively. Composites were assessed for the need of grade caps on a per-domain basis. Grade caps applied are presented in Table 29. Summary statistics for capped and uncapped composites are presented in Table 30.

Table 29: Bagassi South Input Data Topcut (Grade Capping)

Lode ID	Topcut (Au g/t)
1000	2
1010	100
1011	100
1015	50
1016	-
1020	30
1025	20
1030	20
1035	40
1040	-
1050	100
1060	20
1065	-
2000	2
2010	60
2020	40
2010	60
2020	40

Table 30: Bagassi South Summary Statistics by Domain

Domain	Count	Uncapped							Capped			Number cut
		Mean (Au g/t)	SD	CV	Skewness	Kurtosis	Max (Au g/t)	Min (Au g/t)	Mean (Au g/t)	SD	CV	
1000	9929	0.35	4.25	12.227	34.624	1346.44	186	0	0.18	0.32	1.83	123
1010	1153	14.92	76.41	5.122	13.425	227.74	1063	0.003	9.03	19.95	2.21	28
1011	1660	15.29	109.22	6.988	24.243	787.25	4,007.83	0.005	9.78	18.93	1.94	31
1015	204	8.97	27.48	3.063	9.225	99.436	321.28	0.015	7.01	11.47	1.64	7
1016	29	7.63	23.92	3.135	3.38	9.466	95.3	0.06	3.12	7.44	2.39	1
1020	64	4.27	7.45	1.743	6.047	48.683	69.9	0.02	3.93	4.94	1.26	1
1025	18	6.99	10.63	1.522	2.397	5.049	41.9	0.06	5.5	6.28	1.14	1
1030	171	2.88	5.86	2.03	3.384	12.343	34.6	0.005	2.6	4.61	1.77	6
1035	117	5.58	10.683	1.914	3.355	13.992	76.2	0.003	5.32	9.31	1.75	2
1040	29	1.79	2.282	1.277	1.241	0.331	7.705	0.1	-	-	-	-
1050	740	17.26	89.645	5.194	18.131	439.536	2,499.04	0.005	10.45	20.15	1.93	17
1055	52	3.04	4.812	1.584	1.909	2.656	18.2	0.02	-	-	-	-
1060	130	6.93	1.844	3.346	12.795	19.58	79.58	0.022	5.08	6.47	1.27	11
1065	9	8.65	19.151	2.214	2.473	4.919	70,659	0.073	-	-	-	-
2000	2031	0.14	0.333	2.388	7.324	79.721	5.487	0.003	0.13	0.26	2	10
2010	247	8.62	27.971	3.245	7.21	62.996	290	0.003	6.29	12.95	2.06	6
2020	35	10.43	25.957	2.488	4.043	17.319	144	0.108	8.53	13.24	1.55	3

14.7.4 109 Zone

Data for modelling of the 109 Zone were composited to nominal one-meter intervals using a Surpac™ to honor geological boundaries. Minimum acceptable samples lengths were 0.5 m, with maximum allowable lengths of 1.5 m.

Composites were assessed for outliers, and the need for grade caps on a per-domain basis through Snowden's Supervisor software package. Grade caps applied are presented in Table 31 while summary statistics for capped and uncapped composites are presented in Table 32.

Table 31: Grade Caps Applied to the 55 Zone Open Pit Input Data

Zone Code	Cut Value (Au g/t)
1	10
2	20
3	25
4	8
5	4
6	Uncut
7	Uncut
8	Uncut
9	12

Table 32: Summary Statistics 55 Zone Open Pit Model Input Data (Principal Domains)

Domain	Count	Uncapped					Capped			Number Cut
		Mean (Au g/tm or g/t as relevant)	SD	CV	Max (Au g/t)	Min (Au g/t)	Mean (Au g/t)	SD	CV	
1	229	1.36	2.06	1.51	12.4	0.003	1.56	2.06	1.51	3
2	488	1.66	3.07	1.85	33.2	0.007	1.66	3.07	1.85	3
3	293	2.25	4.28	1.89	46.1	0.003	2.18	3.67	1.68	1
4	53	1.55	2.62	1.69	15.1	0.003	1.39	1.97	1.41	2
5	116	0.94	1.18	1.25	5.67	0.005	0.89	1.02	1.14	4
6	52	2.81	4.58	1.63	18.5	0.01	-	-	-	-
7	14	1.53	1.26	0.82	4.75	0.137	-	-	-	-
8	17	0.41	0.38	0.92	1.6	0.02	-	-	-	-
9	25	2.61	4.55	1.74	20.58	0.01	2.26	3.35	1.48	1

Notes:
SD: Standard Deviation
CV: Coefficient of Variation

14.8 Variography

Spatial continuity, including anisotropy, was assessed through the generation of experimental semivariograms where possible, for each of the domains identified within each of the three models. This was conducted in the context of the main directions of continuity observed within the geometry of the modelled mineralization based on available drillhole and face sampling data, and underground development face mapping.

Variography for the 55 Zone open pit and 109 Zone open pit was conducted within Datamine's Supervisor^{TM} exploratory data analysis package, with variography for the 55 Zone Underground, and Bagassi South conducted within Leapfrog's Edge software module.

Model semivariograms were fitted to the experimental results to be used in estimation. Generally, spatial continuity across all three models is adequately described by a nugget component and one or two spherical structures. Summaries of the model semivariogram parameters for relevant domains in each of the models are given in Table 33, Table 34, Table 35 and Table 36 .

Table 33: Model Semivariogram Parameters, 55 Zone Open Pit

Domain	Rotations (degrees)			nugget	Spherical Structure 1				Spherical Structure 2			
	Dip	Dip Dir	Plunge		sill	Range (meters)			sill	Range (meters)		
						U	V	W		U	V	W
3010	43.97	48.27	-54.04	0.653	0.287	10	10	1	0.059	131	65	5
3020	43.97	48.27	-54.04	0.653	0.287	10	10	1	0.059	131	65	5
3021	43.97	48.27	-54.04	0.653	0.287	10	10	1	0.059	131	65	5
3022	43.97	48.27	-54.04	0.653	0.287	10	10	1	0.059	131	65	5
4010	-41.64	93.88	-62.76	0.592	0.336	10	10	1	0.072	28	28	5
4011	-41.64	93.88	-62.76	0.592	0.336	10	10	1	0.072	28	28	5
5010	43.97	48.27	-54.04	0.653	0.287	10	10	1	0.059	131	65	5
5020	43.97	48.27	-54.04	0.653	0.287	10	10	1	0.059	131	65	5
5040	43.97	48.27	-54.04	0.653	0.287	10	10	1	0.059	131	65	5
5050	43.97	48.27	-54.04	0.653	0.287	10	10	1	0.059	131	65	5

Table 34: Model Semivariogram Parameters, 55 Zone Underground

Domain	Rotations (degrees)			nugget	Spherical Structure 1				Spherical Structure 2			
	Dip	Dip Dir	Pitch		sill	Range (meters)			sill	Range (meters)		
						U	V	W		U	V	W
3000	77	164	56	0.5124	0.4493	25	15	7	0.0383	300	200	35
3010	70	164	45	0.5282	0.4333	25	15	5	0.0385	90	50	20
3020	77	164	58	0.3986	0.5449	35	25	7	0.0564	150	120	20
3030	77	160	60	0.4759	0.4971	25	20	6	0.0271	90	70	15
3040	77	164	67	0.4889	0.473	25	15	7	0.038	90	50	20
3050	89	158	37	0.317	0.5026	75	45	15	0.1804	220	120	30
3055	89	158	50	0.3111	0.4882	60	50	15	0.1978	220	120	30
4000	77	164	45	0.263	0.5233	25	20	7	0.2141	125	70	20
4010	77	164	51	0.4354	0.5022	20	20	6	0.0626	90	70	15
5010	88	203	51	0.2604	0.5489	35	35	7	0.1895	110	70	25

Table 35: Model Semivariogram Parameters, Bagassi South

Domain	Rotations (degrees)			nugget	Spherical Structure 1				Spherical Structure 2			
	Dip	Dip Dir	Pitch		sill	Range (meters)			sill	Range (meters)		
						U	V	W		U	V	W
1000	65	42	105	0.7145	0.2414	10	10	7	0.0441	95	75	20
1010	60	35	88	0.4287	0.5132	10	7	5	0.0581	60	35	15
1011	60	35	111	0.6098	0.3605	9	7	6	0.0297	60	40	15
1015	55	40	154	0.4235	0.5497	11	9	7	0.0268	55	30	15
1020	55	38	113	0.3842	0.3536	30	20	7	0.2622	50	35	15
1030	70	30	123	0.2196	0.6047	10	7	7	0.1757	50	35	15
1050	60	30	110	0.5778	0.363	6	5	4	0.0592	40	20	12
1060	55	41	105	0.3205	0.5718	10	7	5	0.1087	50	35	15
2000	75	9	115	0.5483	0.4499	95	65	15	0.0017	120	80	25
2010	75	15	115	0.3443	0.5951	50	40	15	0.0606	120	80	25
2020	75	25	112	0.231	0.4108	70	70	15	0.3582	180	120	35

Table 36: Model Semivariogram Parameters, 109 Zone

Domain	Rotations (degrees)			nugget	Spherical Structure 1				Spherical Structure 2			
	Dip	Dip Dir	Pitch		sill	Range (meters)			sill	Range (meters)		
						U	V	W		U	V	W
1	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10
2	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10
3	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10
4	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10
5	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10
6	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10
7	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10
8	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10
9	-59.13	52.37	-12.95	0.0.344	0.428	25	25	2.5	0.228	95	52	10

14.9 Block Modelling

Four individual block models have been constructed for the four deposits relevant to this Report.

All block models are built within the mine grid coordinate system of the Yaramoko Gold Mine, which is a UTM system based on WGS84 Zone 30P. Elevation data is increased by 5,000 m RL within the mine grid, in order to prevent negative elevation values for underground mine planning.

The parameters for each of the block models are given in Table 37, Table 38, Table 39, Table 40 and Table 41. The Bagassi South model was rotated to better align with the orientation of the generally narrow, moderately dipping, mineralized lodes in order to provide better volume resolution. Rotation parameters are given in Table 40.

Table 37: 55 Zone Open Pit Block Model Specifications

Domain	Axis	Block Size (m)		Origin*	Number of Cells
		Parent	Subcell		
All	X	12	0.001	468,600	100
	Y	12	0.001	1,298,860	45 – 3D 1 – 2D
	Z	12	0.001	4,996	32

**Mine Grid Coordinates*

Table 38: 55 Zone Underground Block Model Specifications

Domain	Axis	Block Size (m)		Origin*	Number of Cells
		Parent	Subcell		
All	X	5	2.5	468,315	362
	Y	10	2	1,297,860	92
	Z	5	0.5	3,620	178

**Mine Grid Coordinates*

Table 39: Bagassi South Block Model Specifications

Domain	Axis	Block Size (m)		Origin*	Number of Cells
		Parent	Subcell		
All	X	5	2.5	469,579	362
	Y	10	2	1,297,481	92
	Z	5	0.5	5,312	178

**Mine Grid Coordinates*

Table 40: Bagassi South Block Model Rotation Parameters

Rotation angles			Rotation axes		
1	2	3	1	2	3
40	71	0	Z	X	Y

Table 41: 109 Zone Open Pit Block Model Specifications

Domain	Axis	Block Size (m)		Origin*	Number of Cells
		Parent	Subcell		
All	X	5	0.625	468,110	166
	Y	10	1.25	1,300,130	120
	Z	5	0.625	100	70

**Mine Grid Coordinates*

14.10 Estimation

For each of the four models, a combination of ordinary Kriging (OK) and Inverse Distance Weighting (IDW) methods were used to estimate gold grades. Hard boundaries were used for estimation of all domains in all models. Estimates were performed on a per-domain basis, over parent cell support.

Oriented search ellipsoids were used to define the local input data for estimation at each block. Search ellipsoid dimensions and anisotropy were based on orientations derived from semivariogram analysis. All models employed dynamic anisotropy; aligning the rotation of the search ellipsoid to the local dip and dip direction of the mineralized lode for each block. Estimation and search parameters for each domain in each model are provided in Table 42, Table 43, Table 44 and Table 45. A multiple pass strategy has been employed in each model with increasingly relaxed and expanded search parameters to ensure the majority of blocks within each domain were estimated.

Table 42: 55 Zone Open Pit, Search and Estimation Parameters

Domain	Rotations (degrees)			Max. samps. per hole	Ellipsoid Dimensions (meters)			Min. samps.	Max. samps.	Method	Pass
	Dip	Dip Dir	Pitch		U	V	W				
3010	Dynamic			3	86.5	45	3	4	16	OK	1
3020	Dynamic			3	86.5	45	3	4	16	OK	1
3021	Dynamic			3	86.5	45	3	4	16	OK	1
3022	Dynamic			3	86.5	45	3	4	16	OK	1
4010	Dynamic			3	86.5	86.5	10	4	16	OK	1
4011	Dynamic			3	86.5	86.5	10	4	16	OK	1
5010	Dynamic			3	86.5	45	3	4	16	OK	1
5020	Dynamic			3	86.5	45	3	4	16	OK	1
5040	Dynamic			3	86.5	45	3	4	16	OK	1
5050	Dynamic			3	86.5	45	3	4	16	OK	1
3010	Dynamic			3	175	90	6	4	16	OK	2
3020	Dynamic			3	175	90	6	4	16	OK	2
3021	Dynamic			3	175	90	6	4	16	OK	2
3022	Dynamic			3	175	90	6	4	16	OK	2
4010	Dynamic			3	175	175	20	4	16	OK	2
4011	Dynamic			3	175	175	20	4	16	OK	2
5010	Dynamic			3	175	90	6	4	16	OK	2
5020	Dynamic			3	175	90	6	4	16	OK	2
5040	Dynamic			3	175	90	6	4	16	OK	2
5050	Dynamic			3	175	90	6	4	16	OK	2

Table 43: 55 Zone Underground, Search and Estimation Parameters

Domain	Rotations (degrees)			Max. samps. per hole	Ellipsoid Dimensions (meters)			Min. samps.	Max. samps.	Method	Power	Pass
	Dip	Dip Dir	Pitch		U	V	W					
3000	Dynamic			4	35	25	10	12	22	OK		1
3010	Dynamic			4	25	15	10	12	32	OK		1
3011	Dynamic			4	25	25	10	10	18	IDW	3	1
3020	Dynamic			4	25	25	10	12	32	OK		1
3030	Dynamic			8	25	20	10	12	40	OK		1
3040	Dynamic			6	25	20	10	12	40	OK		1
3050	Dynamic			8	60	50	10	8	24	OK		1
3055	Dynamic			6	60	50	10	8	24	OK		1
4000	Dynamic			4	35	25	10	12	32	OK		1
4010	Dynamic			4	20	20	10	12	32	OK		1
5010	88	203	51	-	35	35	7	8	24	OK		1
5030	84	164	52	-	80	50	15	4	12	IDW	3	1
5040	82	176	55	-	190	110	30	4	12	IDW	3	1
3000	Dynamic			4	150	100	30	12	20	OK		2
3010	Dynamic			4	90	50	20	12	24	OK		2
3011	Dynamic			4	50	50	15	4	16	IDW	3	2
3020	Dynamic			4	150	120	20	12	24	OK		2
3030	Dynamic			8	90	70	20	8	24	OK		2
3040	Dynamic			6	120	90	20	8	24	OK		2
3050	Dynamic			8	220	120	25	4	16	OK		2
3055	Dynamic			6	220	120	25	4	16	OK		2
4000	Dynamic			4	150	100	10	12	24	OK		2
4010	Dynamic			4	90	70	15	12	24	OK		2
5010	88	203	51	-	110	70	25	6	14	OK		2

Table 44: Bagassi South, Search and Estimation Parameters

Domain	Rotations (degrees)			Max. samps. per hole	Ellipsoid Dimensions (meters)			Min. samps.	Max. samps.	Method	Power	Pass
	Dip	Dip Dir	Pitch		U	V	W					
1000	Dynamic			6	50	35	10	12	24	OK		1
1010	Dynamic			8	25	15	7	12	40	OK		1
1011	Dynamic			8	25	15	7	12	40	OK		1
1015	Dynamic			6	55	30	15	12	24	OK		1
1016	62	33	163	3	45	25	15	3	10	IDW	3	1
1020	Dynamic			6	50	35	15	12	24	OK		1
1025	55	38	113	4	50	35	15	8	16	IDW	3	1
1030	Dynamic			4	50	35	15	8	16	OK		1
1035	68	20	151	4	75	45	15	8	16	IDW	3	1
1040	55	38	113	3	50	35	15	4	12	IDW	3	1
1050	Dynamic			8	40	20	12	12	40	OK		1
1055	68	20	151	4	40	24	10	4	12	IDW	3	1
1060	Dynamic			4	50	35	15	4	16	OK		1
1065	70	30	140	6	45	25	10	2	12	IDW	3	1
2000	Dynamic			6	95	65	15	12	24	OK		1
2010	Dynamic			6	95	65	15	14	24	OK		1
2020	Dynamic			6	70	70	15	12	24	OK		1
1000	Dynamic			4	95	75	20	4	16	OK		2
1010	Dynamic			8	65	35	15	4	24	OK		2
1011	Dynamic			8	60	40	15	4	24	OK		2
1015	Dynamic			4	110	60	30	4	16	OK		2
1020	Dynamic			4	50	35	15	4	14	OK		2
1025	55	38	113	4	50	35	15	4	8	IDW	3	2
1030	Dynamic			4	50	35	15	4	8	OK		2
1035	68	20	151	4	75	45	15	4	8	IDW	3	2
1050	Dynamic			8	80	40	24	4	24	OK		2
2000	Dynamic			4	130	80	25	4	14	OK		2
2010	Dynamic			4	120	80	35	4	14	OK		2
2020	Dynamic			4	180	120	35	4	14	OK		2

Table 45: 109 Zone Open Pit, Search and Estimation Parameters

Domain	Rotations (degrees)			Max. samps. per hole	Ellipsoid Dimensions (meters)			Min. samps.	Max. samps.	Method	Pass
	Dip	Dip Dir	Pitch		U	V	W				
1	Dynamic			3	63	35	6	4	24	OK	1
2	Dynamic			3	63	35	6	4	24	OK	1
3	Dynamic			3	63	35	6	4	24	OK	1
4	Dynamic			3	63	35	6	4	24	OK	1

Domain	Rotations (degrees)			Max. samps. per hole	Ellipsoid Dimensions (meters)			Min. samps.	Max. samps.	Method	Pass
	Dip	Dip Dir	Pitch		U	V	W				
5	Dynamic			3	63	35	6	4	24	OK	1
6	Dynamic			3	63	35	6	4	24	OK	1
7	Dynamic			3	63	35	6	4	24	OK	1
8	Dynamic			3	63	35	6	4	24	OK	1
9	Dynamic			3	63	35	6	4	24	OK	1
1	Dynamic			3	95	52.5	9	4	24	OK	2
2	Dynamic			3	95	52.5	9	4	24	OK	2
3	Dynamic			3	95	52.5	9	4	24	OK	2
4	Dynamic			3	95	52.5	9	4	24	OK	2
5	Dynamic			3	95	52.5	9	4	24	OK	2
6	Dynamic			3	95	52.5	9	4	24	OK	2
7	Dynamic			3	95	52.5	9	4	24	OK	2
8	Dynamic			3	95	52.5	9	4	24	OK	2
9	Dynamic			3	95	52.5	9	4	24	OK	2

14.11 Validation

Initial validation of the Yaramoko model estimates were undertaken using a variety of methods including: checks for un-estimated mineralization blocks, incorrect or absent assignation of density values, and mineralized blocks or blocks with density values above topography.

Following these checks, swath plots were generated along the relevant principal axes on a per-domain basis to assess the representativity of estimated grade profiles in comparison to the input composite grades. In all cases, Swath plots indicate a suitable level of adherence of the estimated grades to the expected values observed within the input composite data. Example swath plots for each of the models are given in Figure 23, Figure 24, Figure 25 and Figure 26.

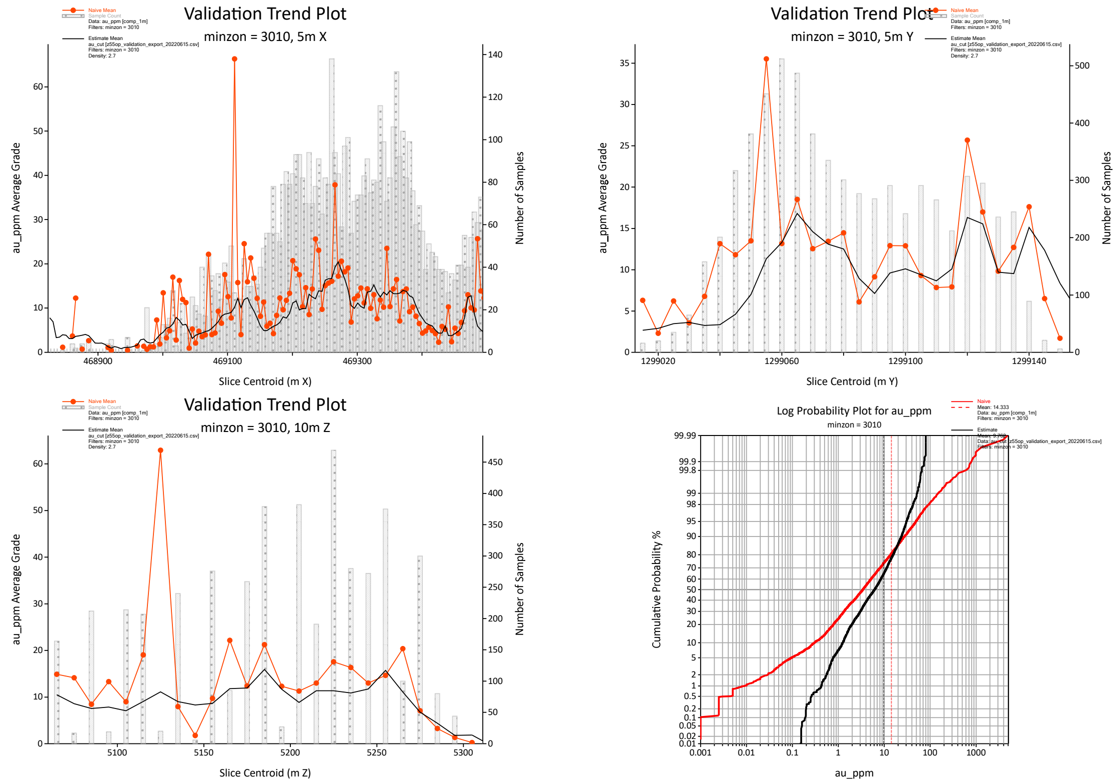


Figure 23: 55 Zone Open Pit Domain

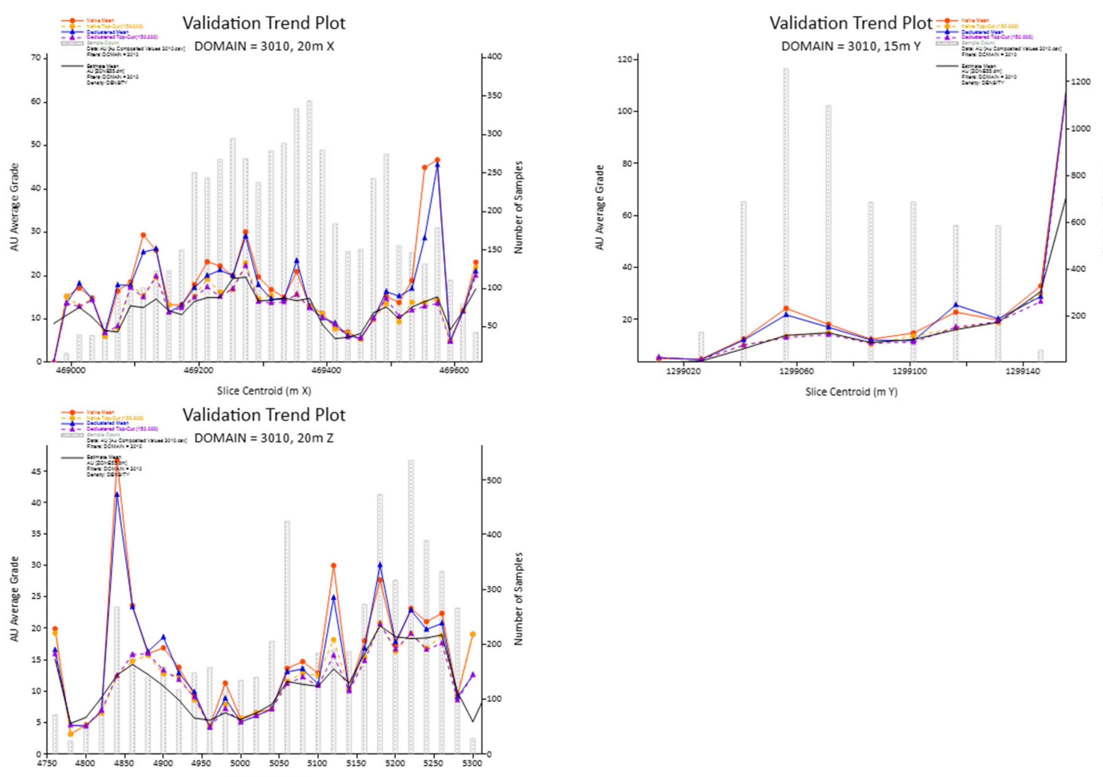


Figure 24: 55 Zone Underground Domain 3010 Swath Plots

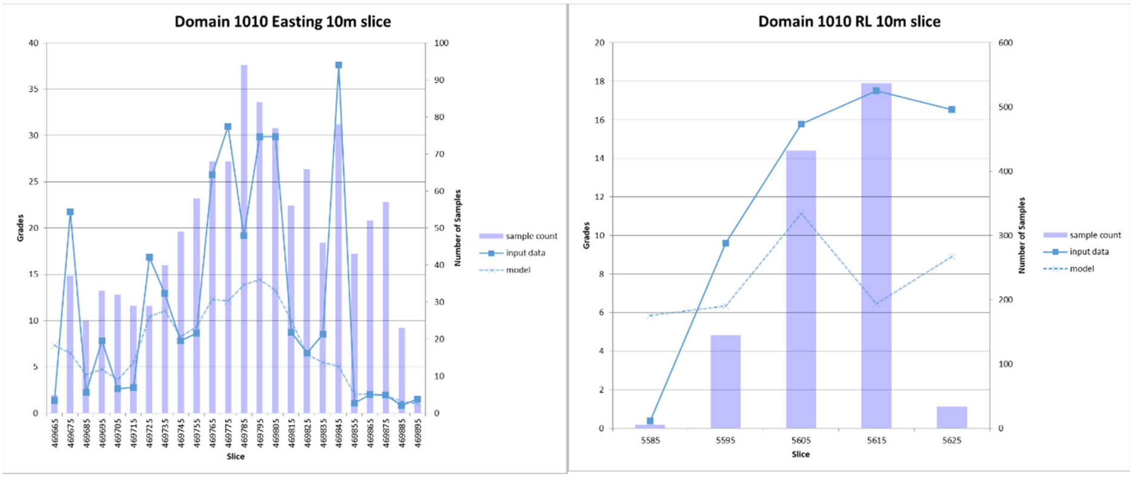


Figure 25: Bagassi South, Domain 1010 Swath Plots (QV1)

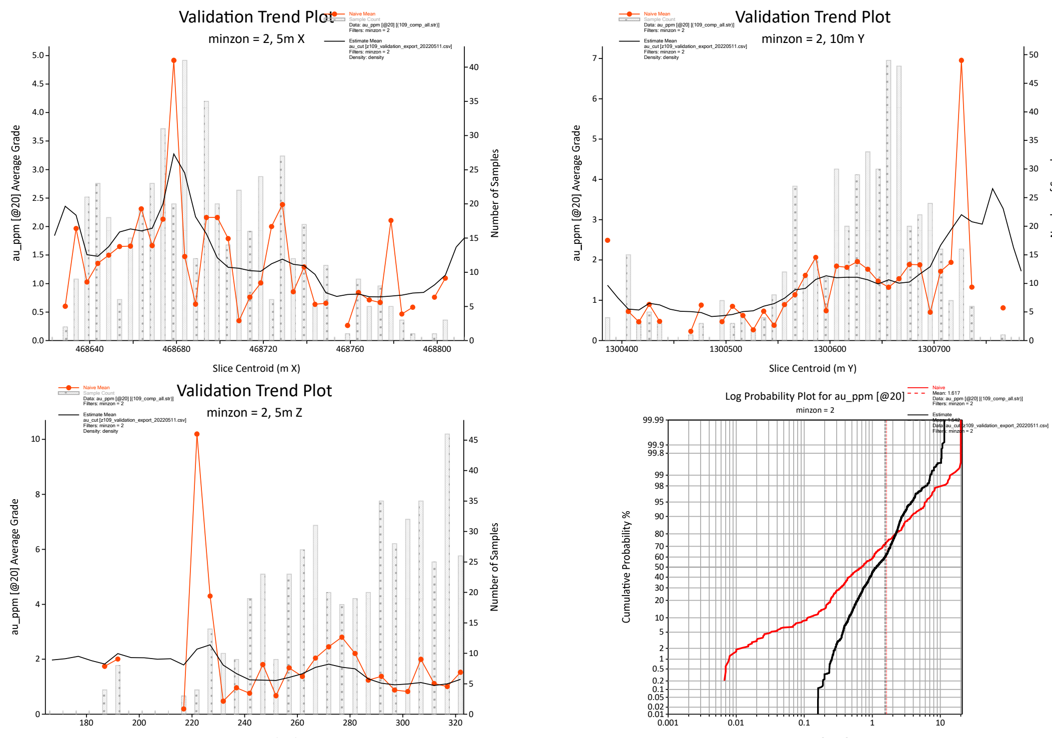


Figure 26: 109 Zone, Domain 2 Swath Plots

14.12 Mineral Resource Reporting

14.12.1 Mineral Resource Classification

Block model tonnages and grade estimates for the 55 Zone, open pit and underground, and the Bagassi South deposits have been classified in accordance with the CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014) by Mr. Hans Andersen (MAIG) and Mr. John Tyrrell, and reviewed by Dr. Matthew Cobb (MAIG).

Mineral Resources have been classified as Measured, Indicated, and Inferred via semi qualitative methods, after consideration of:

- Quality control and data collection procedures in place during collection of the input data used for estimation.
- Current geological understanding of the deposit.
- Volume of available input data.
- Search pass in which a block was estimated.
- Average distances from informing data to block estimates.

14.12.2 Reasonable Prospects for Eventual Economic Extraction

Mineral Resources are reported for both the 55 Zone open pit and the 109 Zone open-pit within theoretically optimized pit-shells, at cut-off grades of 0.9 g/t Au and 0.5 g/t Au respectively. The parameters used to derive these optimized shells are summarized in Table 46.

Table 46: 55 Zone Open Pit Reporting Shell Optimization Parameters

Item	Unit	Value
Gold Price	US$ / oz.	1,700
Metallurgical Recovery	Percent (%)	98
Mining Cost	US$ / tonne	3.5
Processing Cost	US$ / tonne ore	26.87
G&A	US$ / tonne ore	24.76

55 Zone underground Mineral Resources are reported beneath the optimized shell defined for the open-pit Mineral Resource, using a cut-off grade of 2.9 g/t Au, processing cost of US$ 31/t, general and administrative cost of US$ 28/t, and the same metallurgical recoveries. Bagassi South Mineral Resources have been reported using the same parameters as those for the 55 Zone underground.

14.12.3 Depletion for Mining

Each model is depleted for previous artisanal and commercial mining through the definition of boundary solids and strings defining the depleted areas based on survey data. Mineral Resources are depleted to December 31, 2022 (Figure 27, Figure 28 and Figure 29). In the case of the 55 Zone open pit model, where depleted regions have been backfilled – the resulting change in lithology shows as complete removal of depleted area from the mineralisation. In other models, depletion is marked through the coding of the "mined" field within each model.

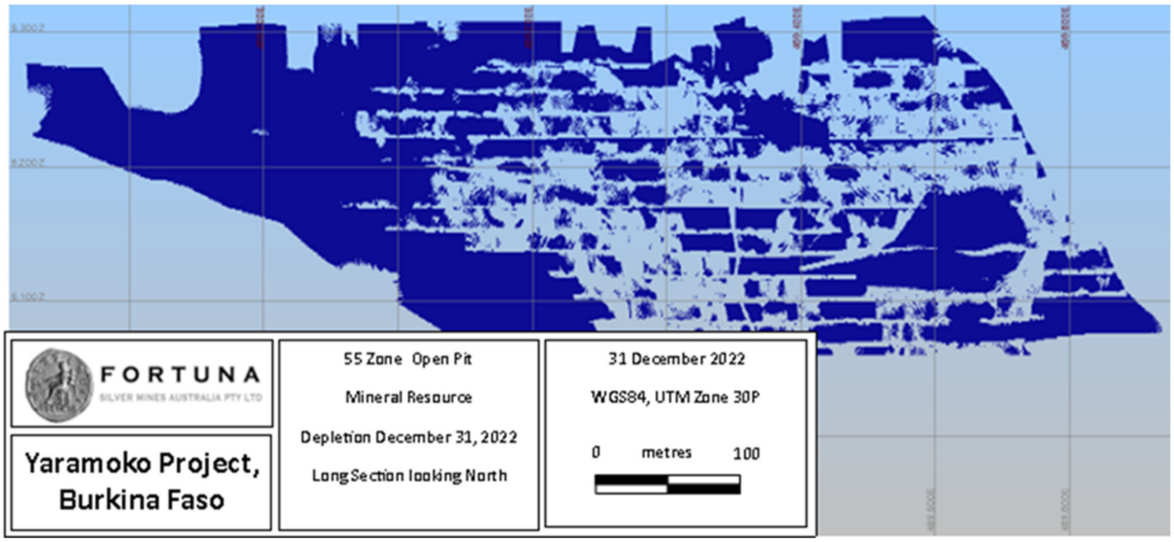


Figure 27: 55 Zone Open Pit Mineral Resource Model – Depletion for Mining to December 31, 2022

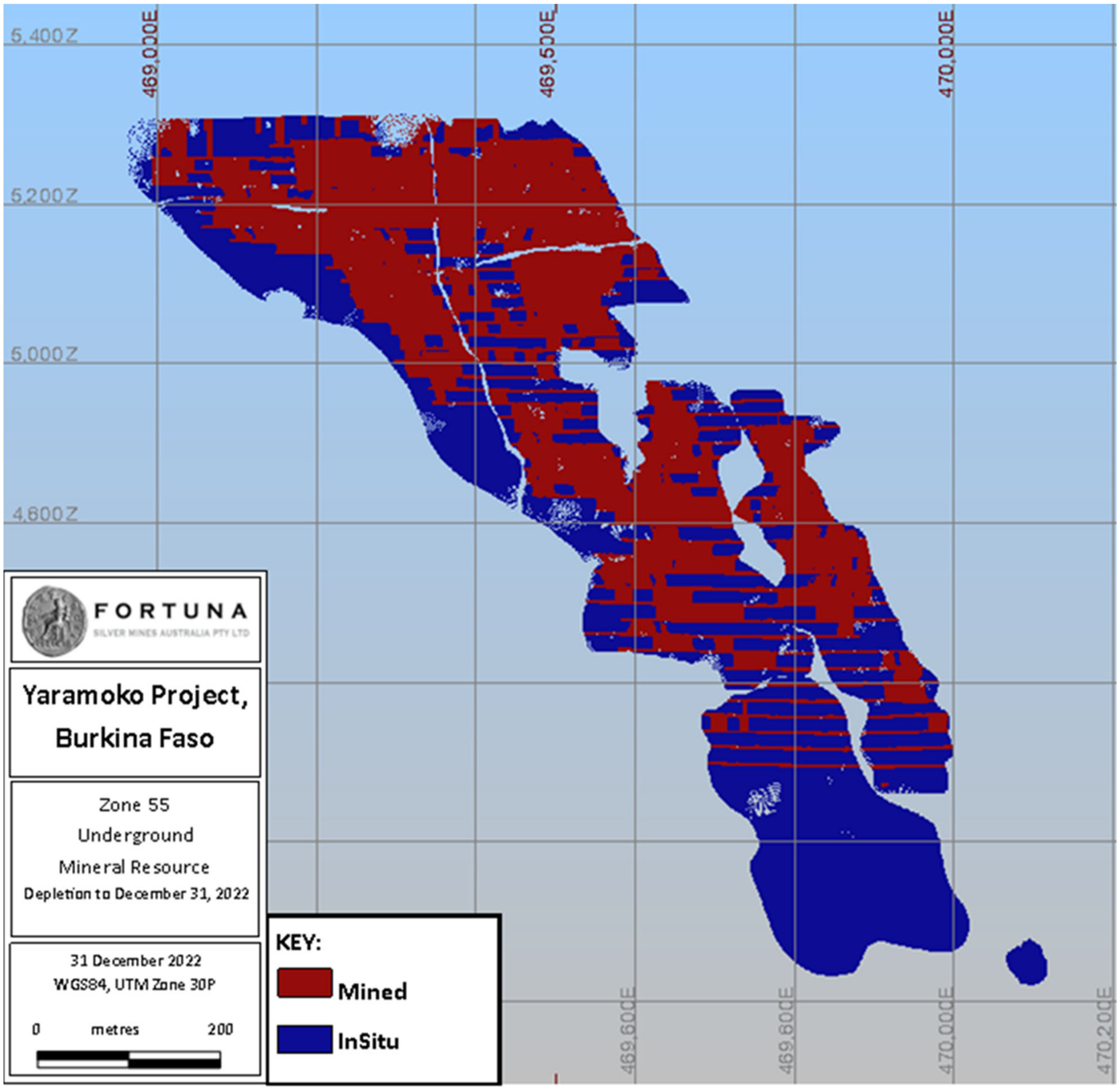


Figure 28: 55 Zone Mineral Resource Depletion to December 31, 2022

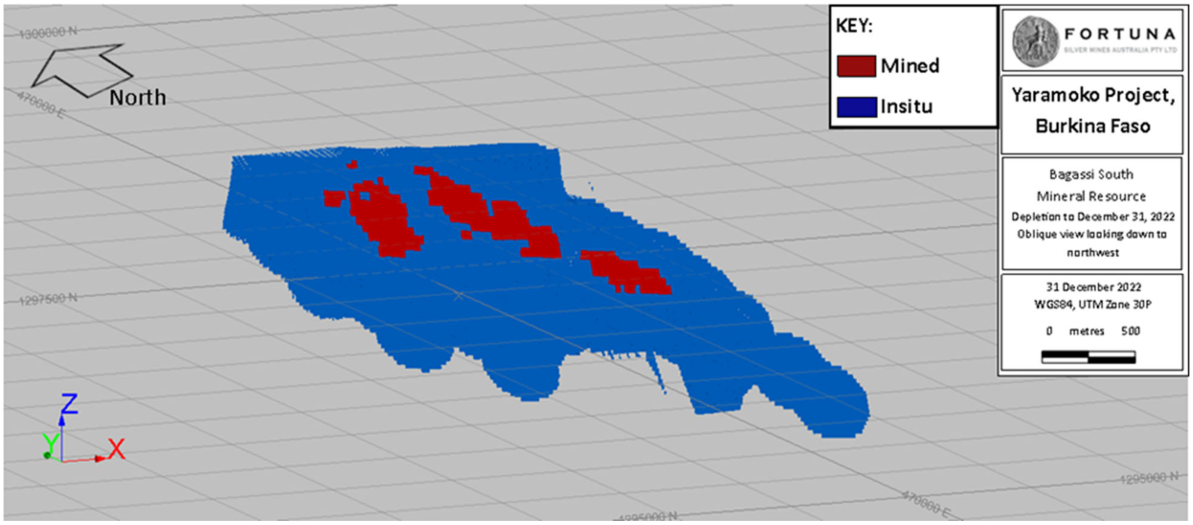


Figure 29: Bagassi South Depletion for Mining

14.12.4 Statement of Mineral Resources

The Yaramoko Gold Mine comprises Mineral Resources from four sources; 55 Zone open-pit, 55 Zone underground Bagassi South (underground) and 109 Zone open-pit. The consolidated statement of Mineral Resources for the mine is presented in Table 47 and Table 48. Underground Mineral Resources are reported at a 2.9 g/t Au cut-off grade. Open-pit Mineral Resources are reported for the 55 Zone open-pit at a 0.9 g/t Au cut-off grade, and the 109 Zone open-pit at a 0.5 g/t Au cut-off grade. Mineral Resources are reported exclusive of Mineral Reserves. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted to Mineral Reserves.

Table 47: Measured and Indicated Mineral Resources, Yaramoko Gold Mine, as of December 31, 2022

Location	Classification	Tonnes (000)	Au (g/t)	Au (koz)
55 Zone Underground	Measured	86	6.41	18
	Indicated	196	6.05	38
	Measured + Indicated	**282**	**6.15**	**56**
55 Zone Open Pit	Measured	0	0.00	0
	Indicated	18	4.14	2
	Measured + Indicated	**18**	**4.14**	**2**
Bagassi South Underground QV1	Measured	0	0.00	0
	Indicated	54	7.07	12
	Measured + Indicated	**54**	**7.07**	**12**
Bagassi South Underground QV'	Measured	0	0	0
	Indicated	74	7.27	17
	Measured + Indicated	**74**	**7.27**	**17**
Zone 109 Open Pit	Measured	0	0.00	0
	Indicated	32	1.63	2
	Measured + Indicated	**32**	**1.63**	**2**
Combined	Measured	86	6.41	18
	Indicated	374	5.97	71
	Measured + Indicated	**460**	**6.05**	**89**

Please refer to notes below Table 48.

Table 48: Inferred Mineral Resources, Yaramoko Gold Mine, as of December 31, 2022

Location	Classification	Tonnes (000)	Au (g/t)	Au (koz)
55 Zone Underground	Inferred	26	6.74	6
55 Zone Open Pit	Inferred	41	3.62	5
Bagassi South Underground QV1	Inferred	49	6.07	10
Bagassi South Underground QV'	Inferred	22	6.12	4
109 Zone Open Pit	Inferred	3	1.35	0
Combined	**Inferred**	**141**	**5.51**	**25**

Notes:

- *Mineral Resources are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves*
- *Mineral Resources are exclusive of Mineral Reserves*
- *Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability*
- *Factors that could materially affect the reported Mineral Resources include; changes in metal price and exchange rate assumptions; changes in local interpretations of mineralization; changes to assumed metallurgical recoveries, mining dilution and recovery; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environmental and other regulatory permits, and maintain the social license to operate*
- *Mineral Resources are estimated as of June 30, 2022 and reported as of December 31, 2022, taking into account depletion for mining where appropriate*
- *Yaramoko Mineral Resources are reported in situ at a gold grade cut-off grade of 0.9 g/t Au for the 55 Zone open pit, 0.5 g/t Au for the 109 Zone open pit and 2.9 g/t Au for all underground, based on an assumed gold price of US$1,700/oz and the same costs and metallurgical recovery. Open pit Mineral Resources are constrained within optimized pit shells. The Yaramoko Gold Mine, through Roxgold Sanu, is subject to a 10% carried interest held by the State of Burkina Faso*
- *Dr. Matthew Cobb is the Qualified Person responsible for Mineral Resources, and is an employee of Roxgold (a wholly-owned subsidiary of Fortuna)*
- *Totals may not add due to rounding procedures*

14.12.5 Comparison to Previous Estimates

Mineral Resources for the Yaramoko Gold Mine were previously reported as of December 31, 2021. Since that time, additional Mineral Resources have been identified and declared at 109 Zone, and mining had continued at 55 Zone underground. Additionally, the 55 Zone open pit Mineral Resource has been remodelled in response to issues relating to identification of remnant material from previous underground mining. Each of these activities has impacted upon the comparison of previous to current statements of Mineral Resources, and changes are considered by the Qualified Person to be within expectations for such changes.

Changes in Mineral Resources between the current and previous statements are therefore attributed primarily to:

- Geological reinterpretation updates resulting from increased development and infill drilling data.
- Depletion from ongoing mining activity.
- Re-interpretation and depletion for previous mining activity within the 55 Zone open-pit Mineral Resources.
- Addition of the 109 Zone Mineral Resources.

14.12.6 Reconciliation to Production

The 55 Zone open-pit has not been mined, and so no reconciliation data are available. 55 Zone and Bagassi South mined material is blended through the Yaramoko processing plant, and reconciliation figures for individual deposits are not available. Declared ore mined (DOM) is reported as a total on a per-month basis. From January 1, 2022 to December 31, 2022; the relevant time period in which the current Mineral Resource estimates for both Bagassi South and 55 Zone underground have been in use, DOM has averaged 112 percent of mine call (MC).

Table 49 presents reconciliation figures for the relevant months, showing that in general, the Mineral Resource models underestimate compared to the DOM.

Table 49: Reconciliation of Mineral Resources Against Production, Yaramoko Gold Mine

Month (2022)	MC (Au oz)	DOM (Au oz)	% Difference
January	9,272	9,578	103%
February	9,929	10,641	107%
March	8,096	9,214	113%
April	7,716	7,973	103%
May	7,728	7,766	100%
June	5,600	6,655	118%
July	8,761	9,326	106%
August	7,508	8,280	110%
September	5,289	6,697	126%
October	6,424	6,358	98%
November	6,614	8,066	121%
December	7,055	10,345	146%
Total	**89,992**	**100,899**	**112%**

14.13 Comments on Section 14

It is the opinion of the QP that Mineral Resources for 55 Zone (underground and open pit), Bagassi South and 109 Zone have been estimated using data of suitable reliability and with techniques in accordance with industry standard practices. The QP considers that the estimates therefore conform to the requirements of CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014), and where appropriate are suitable for supporting the declaration of Mineral Reserves.

15 Mineral Reserve Estimates

This section presents a summary of the methodologies used to prepare Mineral Reserve estimates for the Yaramoko Gold Mine, converting the Mineral Resources into Mineral Reserves.

15.1 Yaramoko Underground Mineral Reserves

The Yaramoko Mineral Reserve estimates resulted from work completed by Roxgold. Roxgold performed the detailed mine design, planning work, cut-off grade, assessments of economic mine bottom and mine infrastructure requirements. As of the effective date of this report no operating activities have commenced for Bagassi South QV' with work limited to capital development to access the lode.

The following methodology was used to estimate Mineral Reserves.

A breakeven cut-off grade of 4.10 g/t Au for 55 Zone and Bagassi South QV1, and 3.10 g/t Au for Bagassi South QV' was applied to generate mining shapes in the resource block model utilizing Datamine's Mineable Shape Optimizer. Mining recovery estimates based on operational performance were applied to stopes, ranging from 86 to 92 percent dependent on stope type, location of extraction and mining method. The cut-off grades are based on a gold price of US$ 1,600/oz and actual 2021 to 2022 operating costs derived from the assumption of contractor mining to the end of mine life, as shown in Mining recovery estimates based on operational performance were applied to stopes, ranging from 86 to 92 percent dependent on stope type, location of extraction and mining method.

Table 50 and Table 51 and include:

- Estimates of site operating costs totaling US$ 194/t for 55 Zone and Bagassi South QV1, and US$ 145/t for QV' deposits.
- Estimated process recovery of 98 percent.
- The stope designs targeted only Measured and Indicated Mineral Resources, but where Inferred Mineral Resources were unavoidably included within mining shapes the weighted average was utilized.
- Geometry of stope designs based on historical operational performance.
- Sublevel spacings of 20 m and 17 m for 55 Zone and Bagassi South QV1 respectively and 25 m for QV', with sublevel elevations selected based on current mining method selection.
- An excavated (including internal and external dilution) ore development drive profile of 3.8 m in width by 3.8 m in height is excavated at 55 Zone and Bagassi South QV1, and ore development profile of 2.0 m in width by 2.5m in height is to be adopted for Bagassi South QV' by means of handheld airleg mining.
- A maximum stope strike length of 25 m for 55 Zone and Bagassi South QV' respectively and 10 m strike length for Bagassi South QV1 was selected.
- 55 Zone economic mining depth limit at an elevation of 4,230 m or 4,230 RL, which is equivalent to a vertical depth of 1,100 m below surface.
- Bagassi South economic mining depth limit at an elevation of 5,044 m or 5,044 RL, which is equivalent to a vertical depth of 235 m below surface.
- Estimates for external dilution, dilution grade, and mining losses were applied.
- Practical mining shapes were generated using Datamine software's Minable Shape Optimizer (MSO) with a dilution factor of 0.60 m (0.20 m FW and 0.40 m HW) for 55 Zone and Bagassi South QV1 respectively, and 0.40 m for Bagassi South QV' distributed evenly on the hangingwall and footwall.

- Stope minimum mining width of 1.8 m with minimum final diluted stope shape width of 2.4 m for 55 Zone and Bagassi South QV1, and 1.0 m minimum mining width with minimum final diluted stope shape width of 1.4 m Bagassi South QV'. Final stopes shape width varies as mineralization pinches and swells along strike.
- An additional 3 percent of external dilution from backfill material at nil grade was applied for 55 zone and Bagassi South QV1 lodes.

Mining recovery estimates based on operational performance were applied to stopes, ranging from 86 to 92 percent dependent on stope type, location of extraction and mining method.

Table 50: Estimation of Breakeven Cut-off Grade – 55 Zone and Bagassi South QV1

Parameter	Units	Value
Metal Price	US$/oz	1,600
Plant Recovery	%	98.0
Royalty	%	6.0
Gold Payability	%	99.2
Selling Cost	US$/oz	8.50
Mining Cost	US$/t	135.2
Plant Cost	US$/t	30.5
G&A Cost	US$/t	28.1
Breakeven Cut-Off Grade	**g/t**	**4.1**

Table 51: Estimation of Breakeven Cut-off Grade – Bagassi South QV'

Parameter	Units	Value
Metal Price	US$/oz	1,600
Plant Recovery	%	98.0
Royalty	%	6.0
Gold Payability	%	99.2
Selling Cost	US$/oz	8.50
Mining Cost	US$/t	115.1
Plant Cost	US$/t	29.7
G&A Cost*	US$/t	0.0
Breakeven Cut-Off Grade	**g/t**	**3.1**

**Assumption G&A costs will be carried by 55 Zone underground as both deposits are mined concurrently*

Grades accounting for wall rock dilution were directly extracted from the block model and null grade from backfill with dilution. Development ore dilution was included in the selected ore drive profiles and mining software directly reported diluted tonnes and grades.

Table 52 summarizes external dilution and mining recovery applied in the Mineral Resource to Mineral Reserve conversion. The Mineral Reserves for the underground mines are presented in Table 53.

Table 52: Dilution and Recovery Factors for Yaramoko Underground Mineral Resource to Mineral Reserve Conversion

Source	External Dilution	Mining Recovery
Development	10% overbreak	100%
Stoping 55 Zone:		
Long Hole Stope	0.60 m total (0.40 m on hangingwall and 0.20 m on footwall), plus 3% backfill dilution	92%
Sill Stope		88%
Stoping Bagassi South QV1:		

Source	External Dilution	Mining Recovery
Long Hole Stope	0.60 m total (0.40 m on hangingwall and 0.20 m on footwall), plus 3% backfill dilution	86%
Sill Stope		82%
Stoping Bagassi South QV':		
Shrinkage Stoping	0.40 m total (0.20 m on hangingwall and 0.20 m on footwall), 2.0m rib pillar in place for each stope panel	90%

Table 53: Mineral Reserves, Yaramoko Underground Mines as of December 31, 2022

Location	Classification	Tonnes (000)	Grade Gold (g/t)	Contained Gold (000' oz)
Stockpiles	Proven	102	3.12	10
	Probable	-	-	-
55 Zone Underground	Proven	21	4.88	3
	Probable	584	7.51	141
Bagassi South Underground QV1	Proven	-	-	-
	Probable	8	4.41	1
Bagassi South Underground QV'	Proven	-	-	-
	Probable	142	6.75	31
Yaramoko Underground Mines	**Proven + Probable**	**857**	**6.77**	**187**

Notes:

- *Mineral Reserves are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves.*
- *Factors that could materially affect the reported Mineral Reserves include: changes in metal price and exchange rate assumptions; changes in local interpretations of mineralization; changes to assumed metallurgical recoveries, mining dilution and recovery; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environmental and other regulatory permits, and maintain the social license to operate.*
- *Mineral Reserves for the Yaramoko Gold Mine are estimated as of June 30, 2022 for underground, and reported as of December 31, 2022, taking into account production related depletion for the period through December 31, 2022.*
- *Mineral Reserves for Yaramoko are reported at a cut-off grade of 4.1 g/t Au for 55 Zone and Bagassi South (QV) underground and 3.1 g/t Au for Bagassi South (QV') underground, based on an assumed gold price of US$1,600/oz, metallurgical recovery rates of 98.0%, 55 Zone and Bagassi South (QV) underground mining costs of US$135/t, G&A costs of US$28/t, and processing cost of US$31/t and Bagassi South (QV') underground mining costs of US$115/t, and processing cost of US$30/t. Underground mining recovery is estimated at 86% (QV) and 90% (QV') for Bagassi South, 92% for 55 Zone stopes, and 100% for sill drifts.*
- *A mining dilution factor of 10% has been applied for sill drifts, 0.6m dilution skin has been applied for 55 Zone and Bagassi South (QV) stopes and 0.4m dilution skin has been applied for Bagassi South (QV') stopes.*
- *Mr. Raul Espinoza, Director of Technical Services, is a full-time employee of Fortuna Silver Mines and takes responsibility of the Séguéla Mineral Reserve estimate as Qualified Person, as defined in NI 43-101.*
- *Totals may not add due to rounding procedures*

15.2 Open Pit Mineral Reserves

This section outlines the Mineral Reserve estimate for the 55 Zone open pit and the 109 Zone open pit, and discusses the key assumptions, parameters, and methods used to convert the Mineral Resources into Mineral Reserves.

A marginal cut-off grade of 1.26 g/t Au was estimated for the 55 Zone open pit and a marginal cut-off grade of 0.74 g/t Au was estimated for the 109 Zone open pit. These cut-offs were estimated using a gold price of US$1,600/oz and a combination of existing relevant operating costs and recoveries, as well as mining contractor rates provided by a reputable and experienced mining contractors operating within the region. Table 54 shows the parameters used to estimate the cut-off grades for the 55 Zone and the 109

Zone open pits. The 109 Zone open pit will be mined while existing underground operations continue at the Yaramoko Gold Mine and therefore general and administrative costs have been assumed to be sunk.

Table 54: Cut-off Grade Parameters

Factor	Unit	55 Zone Value	109 Zone Value
Gold Price	$US / oz	1,600	1,600
Royalty	%	6.0	6.0
Gold Payability	%	99.0	99.0
Refining Cost	$US / oz	7.64	7.64
Mill Recovery	%	98.0	98.0
Milling Cost	$US / t ore	26.87	26.87
G&A Cost	$US / t ore	24.76	0.00
Sustaining Capital Cost	$US / t ore	2.34	2.34
ROM Loader Cost	$US / t ore	0.20	0.20
Grade Control Cost	$US / t ore	2.16	1.21

As of the effective date of this Report, there has been no open pit mining of the 55 Zone deposit or the 109 Zone deposit.

In September 2020, a geotechnical study was completed for the 55 Zone open pit by geotechnical consultancy MineGeoTech Pty Ltd (MineGeoTech). The outcome of the geotechnical study (MineGeoTech, 2020) was a technically justifiable pit design for the 55 Zone appropriate to support Mineral Reserves. In June 2022, a geotechnical study was completed for the 109 Zone open pit by MineGeoTech. The outcome of the geotechnical study (MineGeoTech, 2022) was a technically justifiable pit design for the 109 Zone appropriate to support the Mineral Reserves.

In February 2021, a mining study of the 55 Zone open pit was completed by independent international mining consultancy Entech Pty Ltd. (Entech). The Entech (2021) mining study consisted of pit optimization guiding a detailed pit design, mining schedule, and cashflow assessment. In 2022, the Mineral Resource estimate was reviewed and updated, following an update of the open pit mining study for the 55 Zone to maximise cashflow and reduce project risk. The 2022 mining study also included a mining study of the 109 Zone. The 2022 mining study demonstrates a technically achievable and economically viable open pit mining operation and is used to justify the Mineral Reserve estimate shown in this Report.

A process has been followed to convert the Mineral Resources to Mineral Reserves which is underpinned by a design, schedule, and economic evaluation. The process to convert Mineral Resources to Mineral Reserves is described in the following points below, with further detail provided in chapter 16 of this Report:

- Pit optimizations were run on the Mineral Resource models, using Deswik software's Pseudoflow algorithm. The nested pit shells resulting from the Pseudoflow algorithm were assessed, with deposit specific pits staging shells selected as the basis for detailed designs with consideration for economic and operational risks on potential net present value ("NPV").
- Mineral Resource block models for each deposit included gold grade, oxidation state, rock type, density values and confidence category classification complying with CIM definition standards for Mineral Resources and Mineral Reserves.
- Modifying factors were applied to the mined physicals; including dilution and recovery factors based on typical mining factors by regularising the block models to a typical selective mining unit ("SMU") block size.
- Open pit mine designs were produced to align with the preferred ultimate pit shells.

- Technically justifiable open pit mine designs incorporate appropriate geotechnical batter and berm parameters, appropriate ramp widths, and minimum mining widths to access all Mineral Reserves.
- Open pit stage designs were designed to prioritise the lowest cash cost, highest grade, and lowest waste stripping ratio material.
- The open pit mine designs were scheduled in Deswik's Sched and Blend modules to produce a mine plan, using proposed productivity rates and following an appropriate mining sequence to maintain mill feed and prioritise discounted cashflow.
- The resulting mining schedule was evaluated in a financial model. Mining costs are derived from a request-for-quotation ("RFQ") process of available mining contractors. Processing, general administration, and selling costs are based on the 2023 life of mine budget estimate and are derived from a combination of actual costs where available, existing contracts, first principles-based forecasts and estimates, and a small percentage of factored estimates. Further details about cost estimates are described in chapter 21 of this Report.

The following block model constraints are used to convert Indicated Mineral Resources into Probable Reserves:

- Use the SMU regularised block models.
- Within the ultimate pit designs.
- Below the site topography surface.
- Above the marginal cut-off grade.
- Existing underground workings have been depleted with zero grade.
- Future underground workings within the LOMP of the 55 Zone underground mine have been depleted with zero grade.

All Inferred Resources within the pit design have been treated as waste rock for mine scheduling and economic assessment.

Other than discussed herein, there are no known mining, metallurgical, infrastructure, environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially impact the Mineral Reserve estimate.

Mineral Reserves for the 55 Zone open pit and the 109 Zone open pit are presented in Table 55.

Table 55: Mineral Reserves, Yaramoko Open Pit Mine as of December 31, 2022

Location	**Classification**	**Tonnes (000)**	**Grade Gold (g/t)**	**Contained Gold (000' oz)**
55 Zone Open Pit	Proven	-	-	-
	Probable	144	5.25	24
109 Zone Open Pit	Proven	-	-	-
	Probable	160	1.78	9
Yaramoko Open Pit Mine	**Proven + Probable**	**304**	**3.43**	**34**

Notes:

- *Mineral Reserves are as defined by the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves.*
- *Factors that could materially affect the reported Mineral Reserves include: changes in metal price and exchange rate assumptions; changes in local interpretations of mineralization; changes to assumed metallurgical recoveries, mining dilution and recovery; and assumptions as to the continued ability to access the site, retain mineral and surface rights titles, maintain environmental and other regulatory permits, and maintain the social license to operate.*
- *Mineral Reserves for the Yaramoko open pit are estimated as of December 31, 2022, no production related depletion was applied as there were no active open pit mining in 2022.*

- *Mineral Reserves are reported at a cut-off grade of 1.26 g/t gold for the 55 Zone open pit and 0.74 g/t gold for the 109 Zone open pit, based on an assumed gold price of US$1,600/oz. Surface mining costs of US$3.49/t, Processing costs of US$27/t, and G&A cost of US$25/t for 55 Zone, surface mining costs of US$3.66/t, and processing cost of US$27/t for 109 Zone. The Mineral Reserves are reported with modifying factors of mining dilution and mining recovery represented by regularizing the block models to an appropriate selective mining unit (SMU) block size. Existing and future underground workings within the 55 Zone life of mine plan have been depleted.*
- *Mr. Raul Espinoza, Director of Technical Services, is a full-time employee of Fortuna Silver Mines and takes responsibility of the Séguéla Mineral Reserve estimate as Qualified Person, as defined in NI 43-101.*
- *Totals may not add due to rounding procedures.*

15.3 Comments on Section 15

Mineral Reserves are to be extracted using underground and open pit mining methods, and in the opinion of the QP, are reported appropriately with the application of reasonable mining recovery and dilution factors based on operational experience and a transparent breakeven cut-off grade based on actual mining (projected in the case of open pit), processing and smelting costs; actual metallurgical recoveries achieved in the plant; and reasonable long-term metal prices based on market consensus.

The QP is of the opinion that the Proven and Probable Mineral Reserve estimate has been undertaken with reasonable care and has been classified using the 2014 CIM Definition Standards. Furthermore, it is the QP’s opinion that Mineral Reserves are unlikely to be materially affected by mining, metallurgical, infrastructure, permitting or other factors, as these have all been well established over the last seven years of mining.

16 Mining Methods

This section describes the operating characteristics of the 55 Zone and Bagassi South underground mines, as well as the proposed 55 Zone and 109 Zone open pit operations.

16.1 Yaramoko Gold Mine – Underground Mines

This section summarizes the mine design and planning work that supports the updated Mineral Reserve estimate for the Yaramoko underground mines that have been in operation since 2016. The underground mine planning work was undertaken by Roxgold.

16.1.1 Hydrogeology

55 Zone and Bagassi South mines are operating underground mines and have been since 2016 and 2019 respectively. Dewatering rates for both underground mines are recorded operating performance over the past 60 months.

Total mine pumping for 2020 and 2022 for 55 Zone and Bagassi South has been 7.0 liters (l) per second (s) and 2.0 l/s on a 24-hour basis respectively. The developed mines are observed to be dry, with nearly all water recycled for use as mine service water.

The mine dewatering system for the 55 Zone and Bagassi South underground mines are described in Section 17.

16.1.2 Mine Geotechnical

Since 2020, stoping practices at the 55 Zone mine and Bagassi South underground mines have been adapted accounting for historical operational performances, updated geological understanding and application of geotechnical recommendations from an external consultant MineGeoTech Pty Ltd (MineGeotech). Geotechnical reviews in the form of a site visit are conducted on a quarterly basis and ongoing external support is provided to the mine all year round as required.

55 Zone underground mine applies a standard single panel sublevel stope height with 20 m sublevel spacing and a strike length range of between 17 m to a maximum of 30 m. The selection of different strike lengths is based on stope operational performance basis. 55 Zone mine stope sequencing is a four-level bottom up panel sequence with the final sill pillar panel remaining an open void with no fill. The four-panel sequence commenced from a three-level sequence from the 4,574 mRL and continues to the lowest level of the mine currently at 4,230 mRL. The four-panel sequence and different strike lengths approach has been adopted through geotechnical recommendation to reduce the number of sill pillar stopes across the life of mine and increasing stopes that are filled, improving ground stability and reducing the likelihood of unplanned dilution. The final sill pillar panel of the four-level panel strike lengths are adjusted or rib pillars put in place as required when mining of the stopes are taking place.

Bagassi South QV1 applies a standard single panel sublevel stope height with 17 m sublevel spacing and 10 m stope strike length and has been since 2020 from stope strike lengths of 25 m due to stope performances of unplanned dilution. As of Q1 of 2022 mining of QV1 lode at Bagassi South have ceased with remaining remnant stopes to be mined following completion of Bagassi South QV' lode.

In 2022, approval was given to utilise an alternative mining method to extract Bagassi South QV' lode utilising handheld shrinkage stoping method. Stope panels are designed at 25 m strike length and 25 m sub-levels with a 1.4 m minimum mining width (including planned dilution) extracted in a bottom-up sequence with loose rock fill as means of backfill support. 2 m rib pillars are put in place to segregate each stope panel.

In-situ stresses at 55-Zone and Bagassi South are not expected to impact mine production based on experience to date. Ground support standards and requirements for 55 Zone and Bagassi South have been updated and 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 on a 12 month interval, with the next update scheduled to be completed in the second quarter of 2023.

Ongoing geotechnical reviews of 55 Zone highlights sill stopes and close out stopes as areas of risk where potential additional unplanned dilution are more likely to occur, these are the lowest level stopes of each four level mining block to be mined without backfill. Adjustments to the sill stope strike lengths or rib pillar placement is done on a required basis dependent on stope performances. This approach is applied across the Bagassi South mine as well.

To mitigate stope instability and reduce unplanned dilution, the application of cable bolt ground support regimes at the 55 Zone and Bagassi South mines is in place, with additional measures of utilizing higher capacity rockbolts to provide additional support to the stope brow. In 2021, an adjustment of cable bolt patterns was made by reducing toe and ring spacing, cable orientation, placement of cables from stope extents and an ideal embedment length of at least 2.0 m beyond the shear zone. Ring and toe spacing of cable bolts has seen an adjustment from 3.5 m x 3.5 m to 2.5 m x 2.5 m. The orientation which these cables have been drilled have been adjusted from a standard 45-degree, 15 degree and -15 degree pattern to a range of between 30 to 90 degree from horizontal dependent on geometry and placement of stopes along the ore drive.

Ground support standards in waste development headings are designed for 3.0 m and 2.4 m in lengths of SS-47 galvanized split sets and galvanized welded wire mesh, installed to each development round fired. Walls are bolted and meshed to 2.6 m above floor level. Development intersections or breakaways are cable bolted with 6.0 m or 9.0 m double strand bulbed cable bolts on 2.0 m centers. Ground support for ore drive 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 should be installed to the face each round. This ground support standard for development is applied across both underground mines. Higher capacity rockbolts are also part of the ground support regime for waste and ore development headings and available in 1.8 m, 2.4 m and 3.0 m lengths. The use of these higher capacity rockbolts is on a required basis based on ground conditions with the increase in depth, part of the support standard on decline capital infrastructure breakaways and areas where know faults exists.

With the increasing depth of 55 Zone mine, unknown structures are being encountered during development advance of the decline. A review of the decline design was completed in 2022 and adopting a figure eight decline configuration from spiral since the third quarter of 2022 to ensure that infrastructure development is perpendicular or away from known structures, improving ground stability.

For the Bagassi South QV' lode, a geotechnical desktop study was conducted by MineGeotech in 2022 to support justification of handheld shrinkage stoping as the preferred mining method. The scope of work of the study included review of available geotechnical data and assessing rock mass quality, to provide guidance of ground support requirements, stope geometry and sizing, and review of the shrinkage stoping design available to date.

Base data for the study was thirty-six holes that intersected the proposed QV' mining area and provided designs with the assumption that the shapes will be the actual stope widths to be mined. Rock mass quality of QV' was determined to be of fair quality or higher with the footwall conditions being slightly poorer than the ore and hangingwall conditions. It should be noted that assessment on rock mass quality was made only with the data provided.

In relation to ground support requirements for Bagassi South QV', it was found that development profiles of 2.0 m in width and 2.5 m in height only require pattern bolting without surface support, anything less than 2.5 m in width, cement encapsulated bolts in rings of 3 bolts (1 in backs) every 1.6m is recommended and more than 2.5 m in width, cement encapsulated bolts in rings of 4 bolts (2 in backs) every 1.6m is recommended. Weldmesh should also be readily available and used as required.

Stope sidewall support for QV' should be at the discretion of the operators and adjusted as required by the operators based on the minimum standard's geotechnical recommendation on Bartons empirical support chart.

The QV' geotechnical study concluded that the rock mass conditions is appropriate for the mine design and that the rock mass should be stable with an unsupported hydraulic radius (HR) of 6.2 but with potential local variations in rock mass quality where additional support or pillars are required to be in place.

Since the 55 Zone mine was commissioned in 2016 and Bagassi South mine in 2019, independent quarterly and annual geotechnical reviews and site support have been conducted by AMC (UK) Consultants, and since 2020 MineGeoTech have been the consultants providing support to Roxgold on rock mechanics related matters.

16.1.3 Mining Method

The relevant characteristics of 55 Zone and Bagassi South QV1 and QV' from a mining method selection perspective are provided below.

- The mineralization is hosted within a steeply dipping shear-hosted quartz vein, at depth it comprises a broader shear zone hosting quartz veining of variable continuity along strike. Mineralization dip for the 55 Zone is in the range of 70 to 85 degrees with Bagassi South (QV1 and QV') in the range of 60 to 75 degrees.
- The quartz veining of both deposits tends to pinch and swell to the extremities in the east and west direction with evidence of splay and parallel veins. Vein thickness vary between 1.0 m to 6.0 m at 55 Zone and 0.5 m to 7.0 m at Bagassi South.
- The steeply dipping nature and rock strengths of the mineralization has permitted the adaptation of a longhole open stoping mining method with cemented backfill, which has been in place since production commenced for the 55 Zone mine and Bagassi South mines QV1 lode and suitable for shrinkage stoping mining method for the Bagassi South QV' lode.
- The narrow nature of the vein dictates small hole size for production blasting (64 mm diameter) to maintain burden and spacing requirements and a close sublevel spacing (20 meters and 17 m respectively for 55 Zone and Bagassi South QV1) to limit the impact of hole deviation on external dilution and equipment capabilities, and the narrow vein of Bagassi South QV' justifies the use of handheld mining method with production blastholes in the range of 32mm to 42mm.
- Cemented rockfill is used to backfill open voids after mining to help preserve ground conditions of remaining in-situ stopes. Cemented rockfill is used for both 55 Zone mine and Bagassi South QV1.
- Waste rock fill is used to back fill open voids for Bagassi South QV' lode.

Mining Method – 55 Zone and Bagassi South QV1

Longitudinal longhole stoping with delayed cemented rockfill is the primary mining method adopted for both 55 Zone mine and Bagassi South QV1. A longitudinal stope mining sequence, along strike from vein extremities retreating to a central access in an east and west direction. Other than sill pillar stopes, up holes are drilled to breakthrough and surveyed to ensure drilling accuracy prior to production blasting.

Sill pillar stopes are drilled as blind up hole stopes as these are the final level to be mined in a panel of four or three for the 55 Zone and Bagassi South respectively. Sill pillar recovery progresses in a retreating sequence along strike, matching the timing of the stope block below.

Figure 30 and Figure 31 shows a typical cross-section through multiple sublevels of a longhole stope for 55 zone and Bagassi South QV1, showing the pinching and swelling nature and orientation of the mineralization, sub-level height and profile of the drill drives. Each stope is mined in this fashion over a 17 m to 30 m strike length for 55 zone and 10 m strike length for Bagassi South QV1.

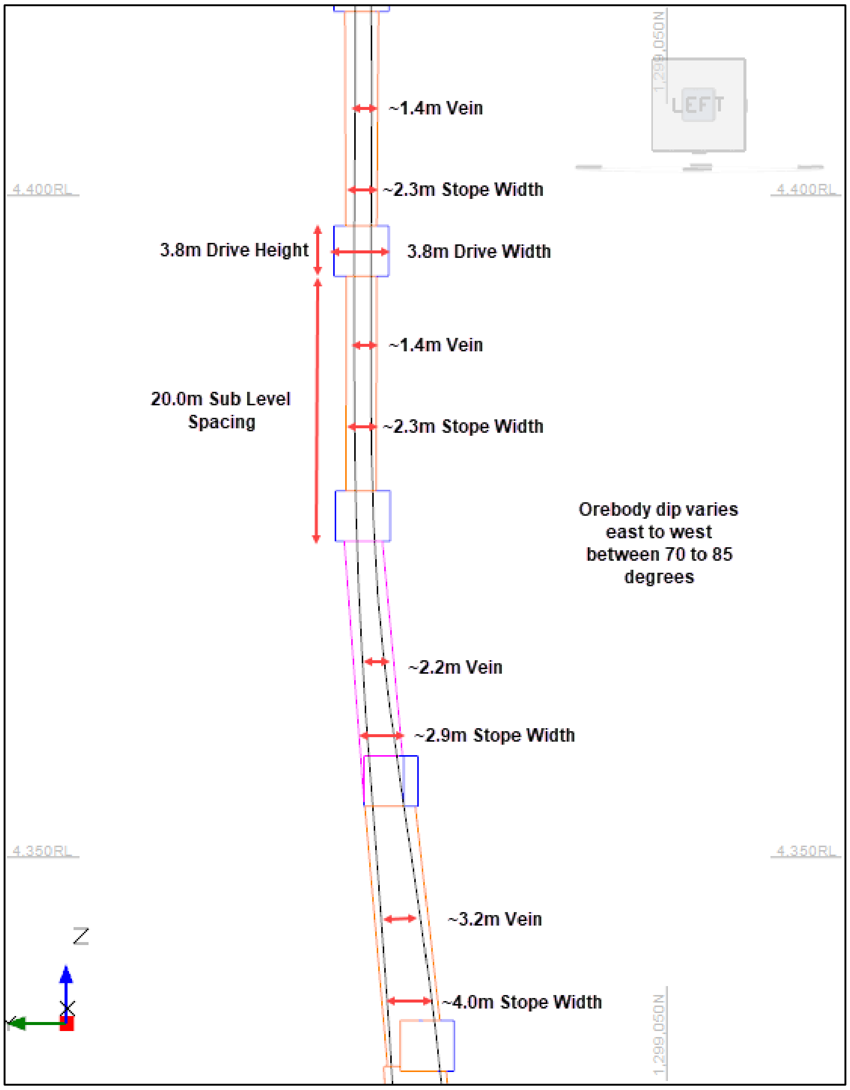


Figure 30: Typical Cross Section 55 Zone – Stoping Layout and Mineralization

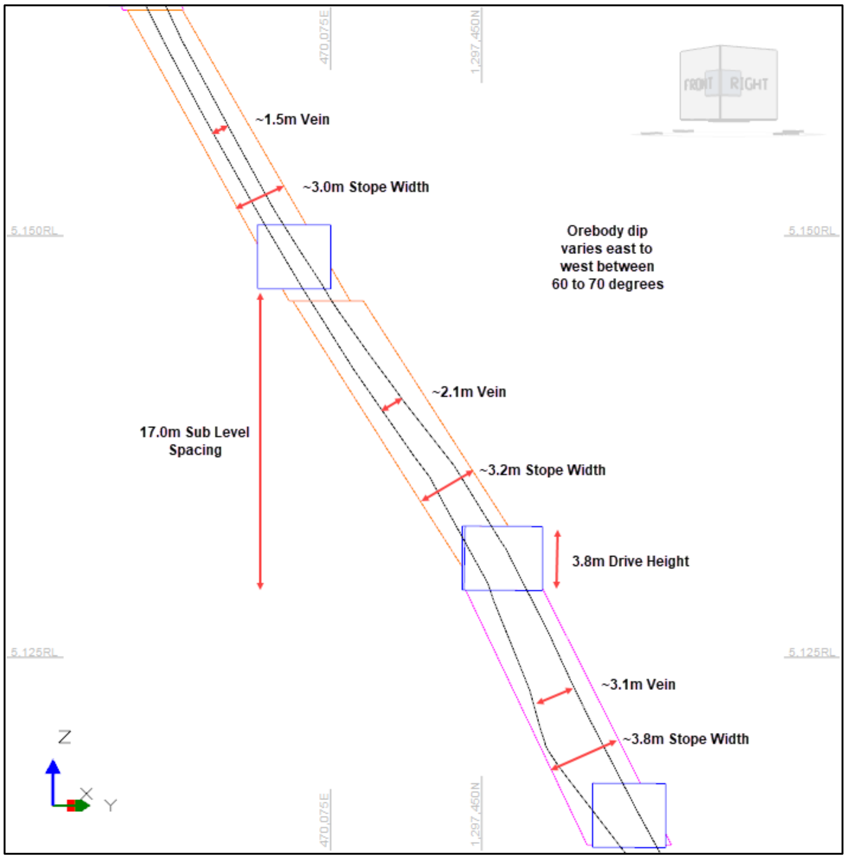


Figure 31: Typical Cross Section Bagassi South QV1 – Stoping Layout and Mineralization

Blast holes generally consist of parallel up holes utilizing a dice five or zipper drilling pattern due to the narrow nature of the mineralization. Holes range from 12 m to 17 m in length, with some drillholes fanned out where vein widths exceed 5.0 m. Drill factors average 2.5 t to 3.5 t per drill meter, common factor for narrow vein ore bodies. Blast holes are loaded with ammonium nitrate fuel oil (ANFO) and low-density ANFO for perimeter control to a powder factor ranging from 1.00 to 1.50 kg per tonne for the initial void firings and 0.50 to 1.00 kg/t for ring firings. Any wet holes are charged with in-hole liners due to sensitivity of ANFO to water. Stope slots are opened by multiple methods depending on location and stope type. Stopes at the extremities utilize airleg rising or downhole longhole drilling with vertical retreat firings, whereas adjacent stopes utilize airleg rising or firing against cemented rock backfill.

Standard stope dimensions for 55 Zone are 17 m up to 30 m on strike, 20 m height based on sub-level heights, and vein width with the inclusion of planned dilution. A standard stope at 55 Zone yields on average 3,000 to 3,500 t. Production loading is undertaken via 3.1 cubic meter (m^3) bucket load, haul, dump loaders (LHD)s, with tele remote loading for final stope cleanup. Mineralized material mucked from stopes brows is trammed along the vein by the LHD to stockpiles located on each level close to the main decline and re-handled by LHD's with 5.7 m^3 bucket onto truck for hauling to the ROM pad.

Standard stope dimensions for Bagassi South QV1 are 10 m on strike, 17 m height based on sub-level heights, and vein width with the inclusion of planned dilution. A standard stope at Bagassi South QV1 yields on average 1,000 t to 1,500 t. Production loading is undertaken by 3.1 m^3 bucket LHDs, with tele remote loading for final stope cleanup. Mineralized material mucked from stope brows is trammed along the vein by the LHD to stockpiles located on each level close to the main decline and re-handled by LHD's with 5.7 m^3 buckets onto truck for hauling to the ROM pad.

Longhole stopes are backfilled with 6.0 percent cemented development waste rock for the first 4 m to 5 m, followed by 4.0 percent cemented development waste rock for the next 10 m and then filled with uncemented waste rock for the remainder of void, the higher strength fill at the bottom to ensure minimal overbreak occurs from firing sill panels from below. The current LOMP indicates that waste generated from development can supply all the backfill needs of the 55 Zone mine and Bagassi South but in instances where there is insufficient waste generation from development for filling stopes, waste is backhauled from the waste dumps for filling activities.

The process of backfilling involves mixing waste rock 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 where a physical bund or rolling bund is located on the upper drilling level by 3 m^3 LHDs.

Mining Method – Bagassi South QV'

Transverse handheld shrinkage stoping with unconsolidated waste rockfill is the primary mining method planned for Bagassi South QV'. Standard stope dimensions for Bagassi South QV' are 25 m on strike, 25 m height based on sub-level heights, and vein width with the inclusion of planned dilution (Figure 32). A standard stope at Bagassi South QV' yields an average of 1,250 to 1,350 t.

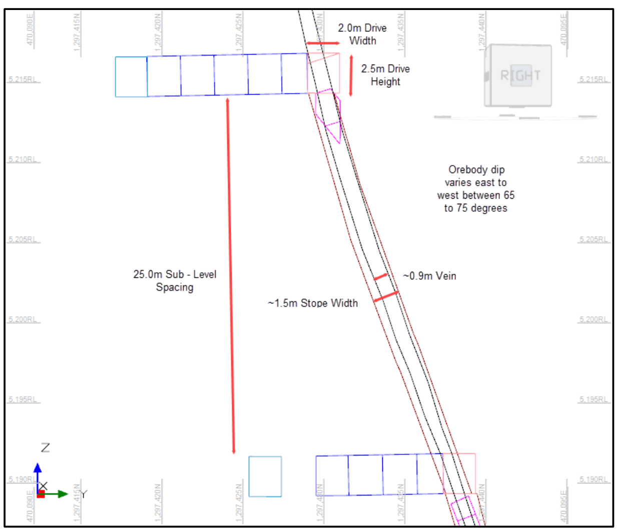


Figure 32: Typical Cross Section Bagassi South QV' – Stoping Layout and Mineralization

Bagassi South QV' will be accessed on six levels with level spacing set at 25.0 m, the top, seventh level, providing ventilation and fill access. A waste drive parallel to the mineralization (average standoff of 8 m, a 4:1 safety factor) is developed and from this, draw-points will be developed perpendicular to strike and mining bottom up will ensure that stability is maintained while increasing recovery.

Level accesses and required infrastructure is initially set at 4.5 mW x 4.5 mH with footwall drive access set at 2.0mW x 2.5mH. Ore drive development is set at 2.0 mW x 2.5 mH, to maintain dilution and undercutting of both the footwall and hanging wall to a minimum.

Stope panel access is provided by three draw points, developed by airleg at 2.0 mW x 2.5 mH, spaced on an 8.0 m centre to centre spacing leaving a 6.0m pillar between drives. Stopes will be mined on a primary/secondary approach thereby ensuring that no two adjacent stopes are being mined concurrently and reducing the risk of stope instability.

The stope lengths are planned at 25.0 m and sub-level height of 25.0 m, with a raise at each end with mining initiated from the lower-level progress vertically to generate a rill with through flow ventilation. With each cut taken, the swell is drawn, allowing top-down re-entry. A 2 m minimum rib pillar remains between stope panels to ensure stability and retain fill from adjacent stopes entering and diluting the active stope. The shrinkage mining method allows for stopes to remain full for most of the cycle, supporting the stope walls, only being completely empty once the stope is complete.

The production sequence is a bottom-up method, stope cleaning access from the footwall drives and mined in a primary/secondary sequence. Each stope panel has two raises from level to level to allow a secondary means of egress, improve ventilation and re-entry periods. The two raises are mined to breakthrough prior to any stoping occurring at an angle of 70 degrees for safety reasons, with the footwall drive allowing access to the ore drives every 8.0 m these raises can be developed ahead of schedule and allow multiple headings to be operated in parallel.

The stope panels are mined using the rill stope method, breasted out from one raise to another working off the rill until the bottom eventually closes and access is only available through the two access raises. Multiple accesses are maintained for the stope for the longest possible time frame. Stope drawdown during mining phase is controlled by the miner operating the stope panel from the rill end of the panel, eliminating personnel entry into the block during the cleaning phase. Once the mining phase is completed, approximately one fifth to one quarter of the mineralized material has been extracted, and the cleaning and loading phase begins utilising battery-operated loaders L140b (Figure 33).

From the stope panel draw points along the ore drives, mineralized material is mucked by battery operated loaders L140b provided by Aramine to dedicated level ore passes prior to being hauled out of the mine from the extraction level. All operating development and stoping activities are completed through a combination of Paramina (mining supervision and operators labour hire) and DeSimone for haulage activities (trucks) under a mining services agreement, Roxgold will provide equipment and consumables for QV' production activities.

Paramina have been selected for operating development and shrinkage stoping activities due to their access to experienced and competent personnel for the mining method. Roxgold management has first-hand experience of Paramina's competency in the mining method selection.

Backfilling for Bagassi South QV' is done utilising loose rockfill from waste material generated through development, which is transported using LHDs. Rib pillars are in place between each stope panel to retain waste in the stope as support to the mined void. Backfilling starts once each stope panel is completed.

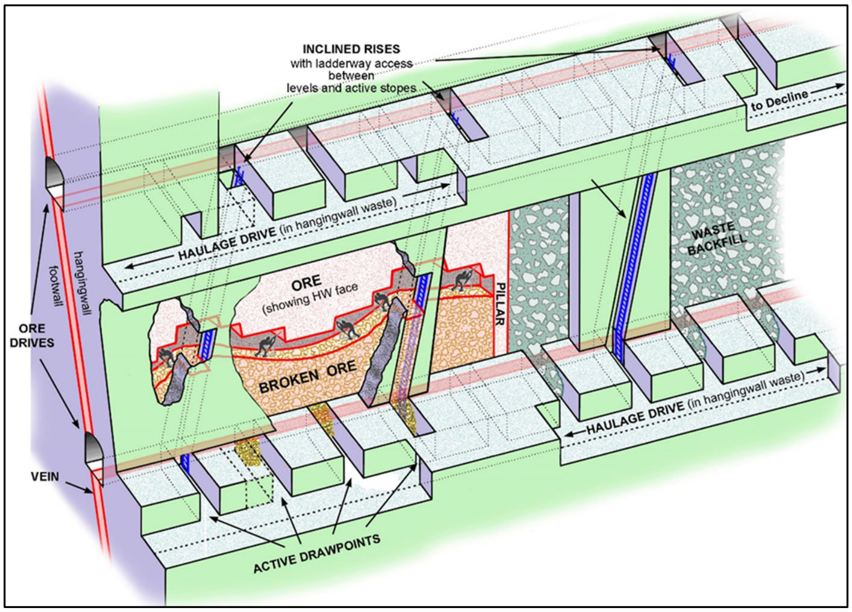


Figure 33: Typical shrinkage stoping configuration (source, unknown)

16.1.4 Stope Design

55 Zone and Bagassi South mines stope design and reserve estimation is done utilizing Datamine's MSO module and available short term stope designs. Input parameters into the software for stope generation include:

- Selection of block model and boundary are of interest for stope generation.
- Applicable cut-off grades for each deposit.
- Vein wireframes to control stope generation orientation.
- Level control string to determine stope height.
- Direction, orientation and starting point of stope creation.
- Applicable stope strike lengths.
- Minimum mining width of 1.8 m for 55 Zone and Bagassi South QV1, and 1.0 m for Bagassi South QV'.
- Applicable planned dilution.

External dilution is estimated by assuming that an additional 0.6 m (sum of hangingwall and footwall) of wall rock will be mined with each mining shape for 55 Zone and Bagassi South QV1 and 0.4 m (sum of hangingwall and footwall) for Bagassi South QV'. Additional dilution of 3 percent is added assuming backfill dilution for 55 Zone and Bagassi South QV' deposits.

Stope optimizer generated shapes are replaced with actual design stope shapes as these are planned to be mined in the short-term interval.

Figure 34, Figure 35 and Figure 36 shows a vertical projection view of the 55 Zone mine and Bagassi South mine including the QV1 and QV' veins.

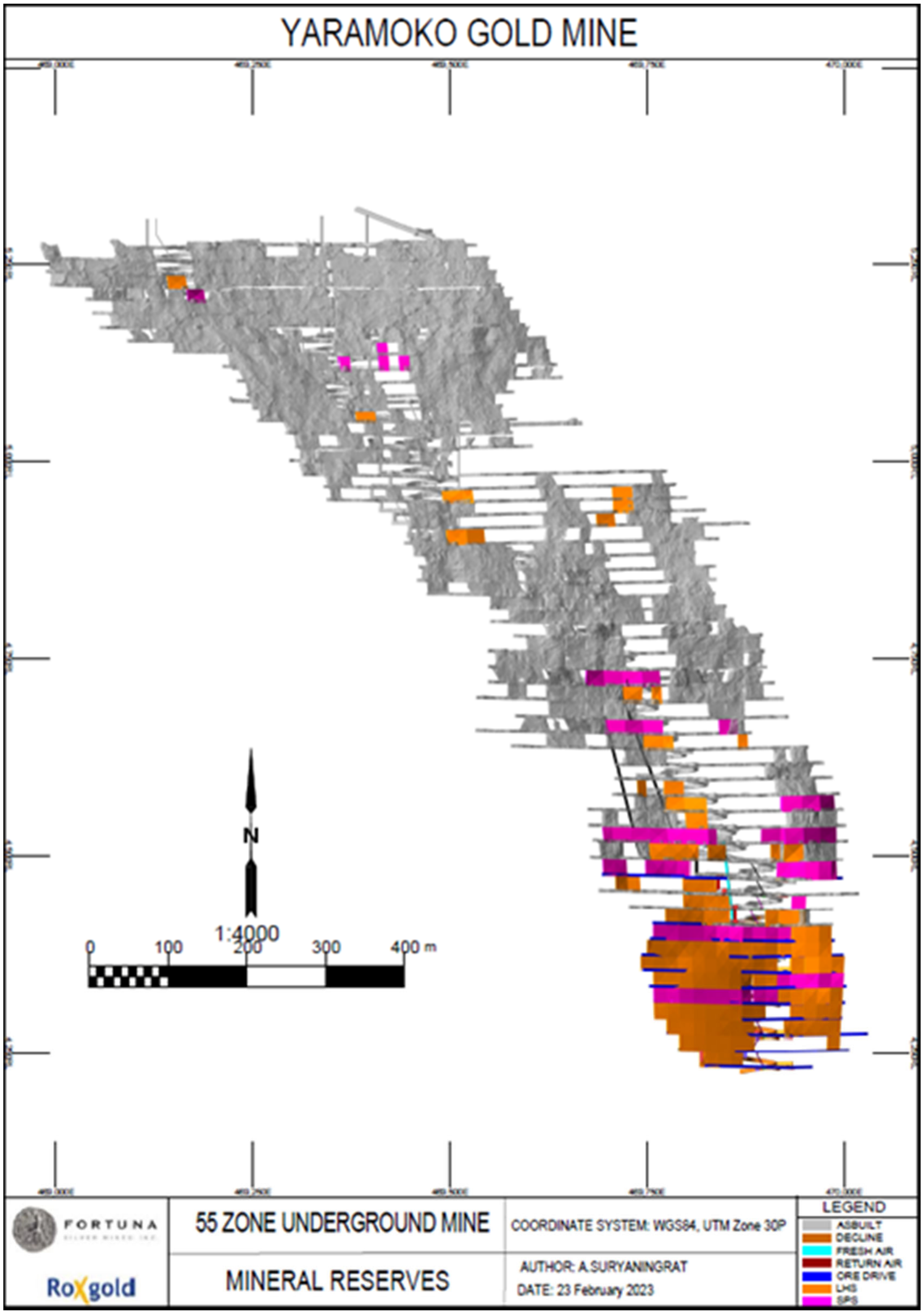


Figure 34: 55 Zone Mine – Vertical Projection Looking North – Reserve Based Mine Design

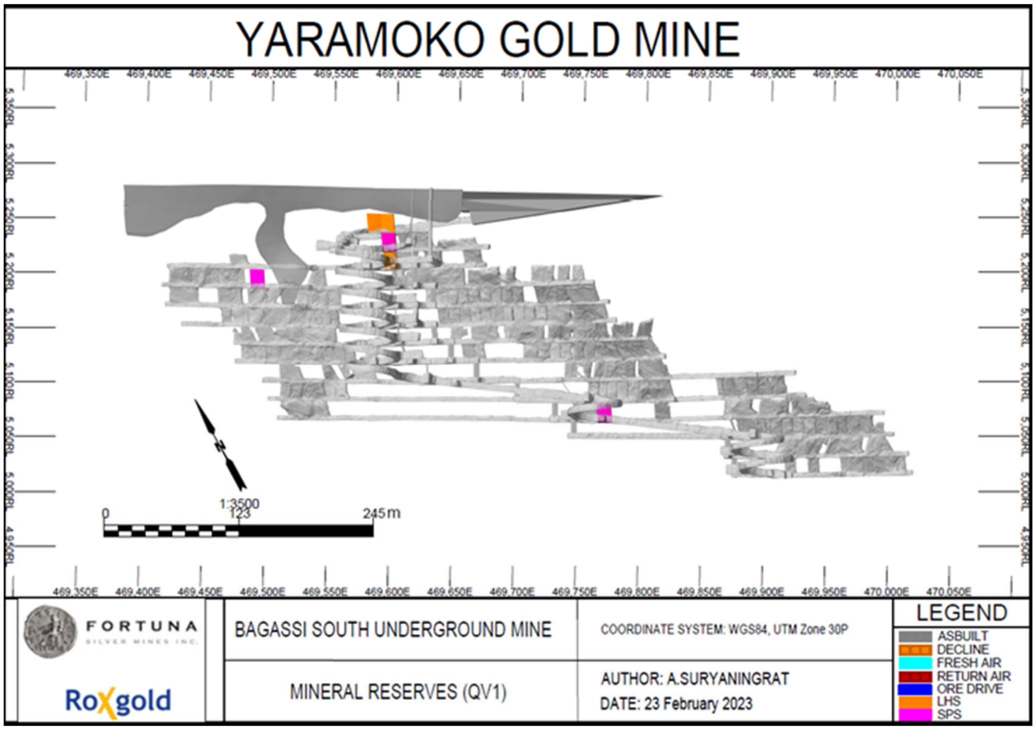


Figure 35: Bagassi South Mine QV1 – Vertical Projection Oblique View – Reserve Based Mine Design

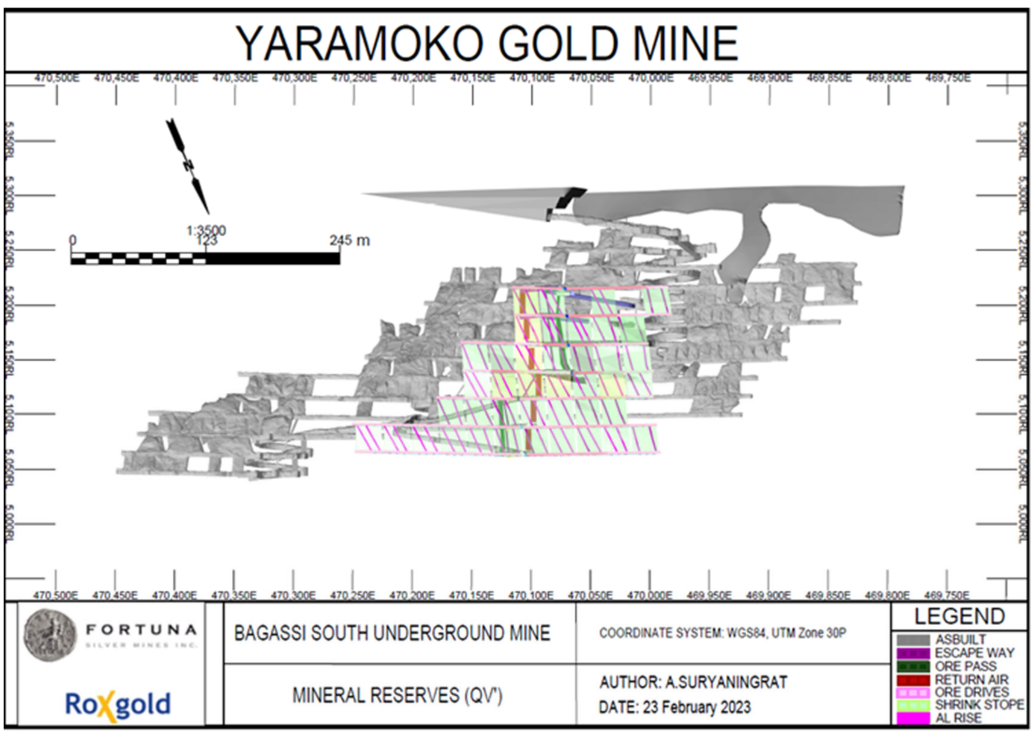


Figure 36: Bagassi South Mine QV' – Vertical Projection Oblique View – Reserve Based Mine Design

16.1.5 Status of Development and Production

The 55 Zone and Bagassi South underground mines and the processing plant have been continuously operating in 2022. The mill has processed 569,987 t in 2022 with an operating time of 66 tonnes per hour (tph). Mine lateral and decline development in 2022 totaled 7,224 m with 1,266 m and 3,389 m of capital development at the Bagassi South mine for the QV' and 55 Zone deposits respectively. The mine produced 467,362 t of ore at a grade of 6.88 g/t in 2022. See Table 56 for mine key performance indicators by quarter in 2022.

Table 56: 2022 Mining Summary Yaramoko Gold Mine

	Unit	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Total
Waste Development	(m)	962	1,030	1,323	1,340	**4,655**
Ore Development	(m)	695	618	598	658	**2,569**
Total Lateral & Decline	(m)	1,656	1,648	1,921	1,998	**7,224**
Vertical Development	(m)	101	88	97	57	**343**
Development Ore Mined	(t)	26,154	20,238	12,929	22,904	**82,225**
Stope Ore Mined	(t)	112,620	85,220	105,840	81,457	**385,137**
Ore Mined	(t)	138,774	105,458	118,769	104,361	**467,362**
Ore Grade	Gold (g/t)	6.65	6.11	6.14	8.80	**6.88**
Contained Gold	(oz)	29,659	20,729	23,441	29,535	**103,365**

16.1.6 Underground Mine Layout

The 55 Zone mineralized strike length ranges from 200 to 400 m on the lower level of the mine to 300 to 600 m on the upper levels of the mine, the strike length reduction is supported by ongoing yearly infill grade control program. 55 Zone Mineral Reserves extend down to 4,234 RL, at a depth of 1,100 m. The deposit is currently fully developed along strike to 4,430 RL, with the decline developed to a depth of 4,390 RL.

Bagassi South QV1 lode is separated into two different areas of mineralization sharing the same infrastructure with strike lengths ranging from 100 m to 200 m. Production from Bagassi South QV1 ceased in the first quarter of 2022 which was followed by QV' development in the third quarter of 2022. QV' is located north of QV1 with a strike length ranging from 100 m to 150 m and due to commence production activities in the first quarter of 2023 following completion of capital development. Access to the QV' lode will be from the existing QV1 development and utilizing the same infrastructure.

Development infrastructure is designed on the footwall side for 55 Zone and Bagassi South, offset approximately 50 m and 70 m to the south and north respectively from the mineralization to allow enough segregation distance for the required infrastructure development and preserve ground conditions. Infrastructure and development setup for both mines are identical with key development including:

- Decline.
- Level Access.
- Ore Drive.
- Stockpiles.
- Sumps.
- Fresh and return air.
- Escape way.
- Refuge chamber.
- Pump chamber.
- Sumps.
- Diamond drill drive.

Access to the underground mine is by decline development. 55 Zone and Bagassi South decline gradients are different due to level spacing differences in each mine. 55 Zone on an average is at a gradient of minus 1:7.25 to maintain a level spacing of 20 m floor to floor and Bagassi South on a gradient of minus 1:8.3 to maintain a level spacing of 17 m floor to floor. Development profile for decline has dimensions of 5.3 m width by 5.8 m height, optimized to the selected haul trucks.

Other infrastructure development has a gradient of positive 1:50 to allow for water drainage with dimensions that are fit for purpose for the equipment types. Second means of egress are in place for each level prior to production activities commencing and done utilizing handheld rising to a dimension of 1.2 m width x 1.2m height. Ore development is done on a gradient of positive 1:50 at a dimension of 3.8 m width x 3.8m height.

The underground mines are ventilated through a series of intake and exhaust raises with dimensions of either 3.5 m diameter raise bored holes, decline development profile for intake and 4 m by 4 m blasted longhole raise for exhaust. This configuration is designed from the surface to the lowest level of the mines.

Ventilation intake for the 55 Zone mine is supplied through the decline as the primary source, and 3.5 m raise bore holes to provide cooling air to the mine in line with increased temperatures and volume requirements as the depth of mine increases. Cooling air is provided through chiller plants located at the surface. Exhaust ventilation raise extends from surface to the bottom of the mine utilizing 3.5 m diameter raise bored holes and 4 m by 4 m blasted longhole raise. Exhaust raise bore holes are in place to accommodate volume generated by the additional fan requirements. Secondary ventilation is supplied to the working face with 55 kilowatt (kW) to 110 kW rated single or twin fans in a series configuration located in the primary ventilation system.

Ventilation intake for Bagassi South mine is supplied through the decline as the primary source and exhausted by 4 m by 4 m blasted longhole raises, with the configuration extending from surface to the bottom of the mine. Secondary ventilation is supplied to the working face with 55 kW to 110 kW rated single or twin fans in a series configuration located in the primary ventilation system. Ventilation for QV' vein will maintain the same configuration as the access points to the orebody is from the existing infrastructure for QV1.

16.1.7 Lateral Development

Life of mine lateral development requirements from 2023 to 2025 for 55 Zone and Bagassi South underground mines are 10,386 m, with 5,446 m in 55 Zone and 4,939 m in Bagassi South. Table 57 and

Table 58 presents life-of-mine development requirements for both underground mines.

Table 57: Life of Mine Development Requirements (55 Zone)

Heading	Type	Length (m)
Capitalized		
Decline	Waste	996
Level Accesses and Infrastructure Development	Waste	1,938
Subtotal Capitalized (m)		**2,934**
Expensed		
Ore Drives	Ore/Waste	2,512
Subtotal Expensed (m)		**2,512**
Total Lateral Development (m)		**5,446**

Table 58: Life of Mine Development Requirements (Bagassi South QV1 and QV')

Heading	Type	Length (m)
Capitalized		
Decline	Waste	12
Level Accesses and infrastructure Development	Waste	596
Subtotal Capitalized (m)		**608**
Expensed		
Ore Drives (2.0mW x 2.5mH)	Ore/Waste	4,331
Subtotal Expensed (m)		**4,331**
Total Lateral Development (m)		**4,939**

16.1.8 Raising Requirements

Table 59 and Table 60 are a summary of life-of-mine raising requirements from 2023 to 2025. Slot raising for stoping is excluded from the table.

Table 59: Life of Mine Vertical Development 2023-2025 (55 Zone)

Method	Length	Size	Manway
Longhole Raise	137	4.0mx4.0m	N
Raisebored	551	3.5m dia	N
Airleg Raise	173	1.2mx1.2m	Y
Subtotal	**861**		

Table 60: Life of Mine Vertical Development 2032-2025 (Bagassi South QV1 and QV')

Method	Length	Size	Manway
Longhole Raise	134	4.0mx4.0m	N
Raisebored	0	3.5m dia	N
Airleg Raise	374	1.2mx1.2m	Y
Subtotal	**508**		

16.1.9 Development and Production Schedule

The 55 Zone and Bagassi South underground mines achieved a combined stoping rate of 1,316 tpd and 1,055 tpd for 2021 and 2022 respectively with 55 Zone in full production and Bagassi South QV1 completing in the first quarter of 2022. The reduction in production from 2021 to 2022 was driven by completion of Bagassi South QV1 stoping in the first quarter meaning that the operation relied solely on the 55 Zone for production for the remainder of 2022.

The LOMP calls for average planned stoping rates of 792 tpd from 2023 to the end of the first quarter of 2025, a reflection of the 55 Zone increasing in depth, reduction in working areas nearing the end of mine life and the reduced productivity output with the shrinkage stoping handheld mining method. Cumulative planned production from 2023 to the first quarter of 2025 is 0.754 million tonnes averaging 7.27 g/t Au, for a remaining reserve life of 2.25 years at current production rates from the start of 2023.

Development advance rate, as of the effective date of this Report, has been ahead of expectation and the 55 Zone Mine is two levels ahead of the current production front which provides flexibility in the mining sequencing and scheduling to help reduce interactions between activities. Development will continue to be undertaken by the mining contractor AUMS.

Bagassi QV' development as of the effective date of this Report is still limited to capital development in preparation for operating development to be completed by Paramina. All capital development to date for Bagassi QV' has been completed by the mining contractor AUMS.

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 decline due to lack of passing bays, and the availability of trained operating and maintenance crews. Based on operating performance, the mine layout, planned rates for generating development waste, and contractor involvement, Roxgold does not expect any of these aspects to be problematic in being able to achieve the production requirements.

Design and scheduling for the LOMP was completed using the Datamine software's Mine Stope Optimizer, Studio UG and Enhance Production Scheduling.

Table 61 shows the Yaramoko life of mine underground development and production schedule. Capital development for 55 Zone and Bagassi South QV' is scheduled to be completed in 2023, with operating development completion of 55 Zone in 2023 and Bagassi South in 2024. Underground mining contractor, AUMS will complete all remaining capital and operating development for 55 Zone and capital development of Bagassi South, with Paramina completing all remaining operating development at Bagassi South.

The schedule in Table 61 shows key development and production remaining for the underground mines for the period 2023 to the first quarter of 2025 including, lateral and vertical development, total material broken each period for ore, waste and metal, production drilling, production charging, and back filling requirements.

Table 61: Yaramoko Underground Development and Production Schedule 2023-2025

	Unit	2023	2024	2025	Total
DEVELOPMENT					
Decline	m	1,008	-	-	1,008
Lateral	m	2,535	-	-	2,535
TOTAL CAPITAL LATERAL DEVELOPMENT METERS	m	3,542	-	-	3,542
Airleg Rise (1.2mW x 1.2mW)	m	548	-	-	548
RAR Rise (4.0mW x 4.0mW)	m	270	-	-	270
FAR Rise 3.5mØ	m	234	-	-	234
RAR Rise 3.5mØ	m	317	-	-	317
TOTAL CAPITAL VERTICAL DEVELOPMENT METERS	m	1,369	-	-	1,369
TOTAL OPERATING LATERAL DEVELOPMENT METERS	m	5,905	938	-	6,843
TOTAL OPERATING VERTICAL DEVELOPMENT METERS	m	1,196	1,317	18	2,531
TOTAL Lateral Development Meters	m	9,447	938	-	10,386
TOTAL Vertical Development Meters	m	2,565	1,317	18	3,900
DEVELOPMENT ORE TONNES					
Dev Ore tonnes	t	92,297	2,511	-	94,808
Dev Ore Au grade (g/t)	g/t	6.42	2.97	-	6.33
Dev Ore Au ounces (oz)	oz	19,046	240	-	19,286
STOPE ORE TONNES					
Stope tonnes	t	292,887	311,816	46,055	650,758
Stope Au grade (g/t)	g/t	7.08	7.62	7.90	7.40
Stope Au ounces (oz)	oz	66,682	76,385	11,704	154,771
TOTAL ORE TONNES					
Total ore tonnes	t	389,622	319,184	46,071	754,878
Total ore Au grade (g/t)	g/t	6.93	7.59	7.90	7.27
Total ore Au ounces (oz)	oz	86,785	77,890	11,706	176,381

	Unit	2023	2024	2025	Total
WASTE TONNES					
Total Waste Tonnes	t	344,728	21,936	57	366,721
Total Tonnes	t	642,414	336,083	46,055	1,024,609
TOTAL CAPITAL LONGHOLE DRILLING	m	6,587	6,490	1,031	14,108
TOTAL OPERATING LONGHOLE DRILLING	m	114,076	108,505	17,635	240,215
TOTAL LONGHOLE DRILLING	m	125,562	115,615	18,666	258,843
TOTAL STOPE CHARGING METERS	m	69,649	69,921	10,407	149.977
TOTAL BACKFILL TONNES	t	188,917	268,668	25,842	483,426

16.1.10 Mining Equipment and Personnel

Table 62 shows the current mining fleet in use by the contractor AUMS. The number of units is shown for each equipment type. The overall resource requirements are as of December 31, 2022 and will reduce as each component of mining activity is reduced or completed including the key milestone completion of Bagassi South QV' capital development and 55 Zone capital development.

Table 62: Major Mining Equipment Yaramoko Gold Mine (AUMS)

Underground Equipment	Number of Units	Surface Equipment	Number of Units
Twin Boom Face Jumbo	1	Dual Cab LV	5
Single Boom Face Jumbo	2	SUV Wagon - LV	3
Production Drills	2	Single Cab - LV	16
CAT 1700 Loader	4	Mini Bus	1
Sandvik LH307 Loader	6	Telehandler	1
Atlas MT6020 Trucks	6	Service Truck	1
IT	3	Diamond Drill Rig	1
UG Transit Mixer	2	Cement Batch Plant	1
Shotcrete Truck	1		
Grader	1		
Total Underground	**28**	**Total Surface**	**29**

The underground mine activities for 55 Zone and Bagassi South have been operated by AUMS, an experienced African mining contractor since 2015. The remaining scope of work for the mining contractor includes all development (capital and operating development) and production activities (stoping activities of drilling and firing, load and haul, and backfilling) for 55 Zone. For Bagassi South, AUMS's scope of works is limited to capital development which will then transition to Paramina for production related activities. AUMS also undertakes the technical services component for 55 Zone and Bagassi South capital development including weekly scheduling, and drill and blast designs.

Table 63 shows the current levels of AUMS contractor by section in the underground mining department.

Table 63: Yaramoko Mine Manpower AUMS

Expat Staff & Trades - AUMS	Number of Personnel
Operations Manager	1
Site Manager	1
Alternate Manager	1
Foreman	3
Safety and Environment Manager	2

Mine / Senior Engineer	2
Surveyor	1
Mine Supervisor	3
Batch Plant Surveyor	1
Diamond Drill Supervisor	1
Maintenance Foreman	2
Underground Fitter Supervisors	9
Electrical Foreman	2
African Expats - AUMS	
Mine Captain / Supervisor	3
Mining Engineer	3
Surveyor	2
Supply Supervisor	1
Electrician	4
Jumbo Operator	6
Longhole Operator	4
Loader Operator	9
Diamond Driller	2
National Workforce - AUMS	
A Crew (UG and Maintenance Operators)	71
B Crew (UG and Maintenance Operators)	65
C Crew (UG and Maintenance Operators)	69
Total	
YRM Project AUMS Workforce	**268**

AUMS staff positions include mine supervision, safety, training, maintenance supervision, and technical services. Operations and maintenance personnel will form three crews working on a rotation on and off site. On each crew, AUMS employs approximately 70 national employees. The operating schedule is two 12-hour shifts per day for everyday of the year.

Operating development and stoping activities for Bagassi South QV' are completed through a combination of Paramina (labour hire of mining supervision and operators) and DeSimone for haulage activities (trucks) under a mining services agreement. Roxgold will provide equipment and consumables for production activities at Bagassi South QV'. As of the effective date of this Report no production activities have commenced for Bagassi South QV'.

Table 64 and Table 65 show the required mining fleet and manning numbers to complete Bagassi South QV' production activities. As of the effective date of this Report no production activities have commenced for Bagassi South QV'.

Table 64: Equipment requirements for Bagassi South QV'

Underground Equipment	Number of Units	Surface Equipment	Number of Units
L140b Electrical Loader	3	Light Vehicles	7
6 Wheel Road Truck	4		
Handheld Airlegs	As required		
Total Underground	**7**	**Total Surface**	**7**

Mining workforce for Bagassi South QV' is planned to be a combination of Paramina labour hire teamed up with local workforce sourced within the region. Upskilling the local workforce is a key commitment from Roxgold for the proposed mining method. Training will be provided with the necessary skills to perform the mining method activities safely and efficiently. For every one of Paramina personnel there will be a corresponding employee recruited from the surrounding community. DeSimone will provide an already onsite established workforce for haulage activities.

Table 65: Bagassi South QV' Mine Manpower

Paramina	**Number of Personnel**
Team Leader	1
Shift Boss	3
Surveyor	1
Airleg Mechanic	1
LHD Mechanic	1
Airleg Miner	18
LHD operator	3
DeSimone	
Site Manager	1
Site Supervisor	2
Maintenance Foreman	1
Maintenance Team	4
National Workforce	
Surveyor	1
Airleg Mechanic	1
LHD Mechanic	1
Airleg Miner	18
LHD Operator	6
Total	
Bagassi South QV' Workforce	**63**

Roxgold staff positions include Mining Manager, Technical Services Manager, Senior Mining Engineers, Mining Engineers, Graduate Engineer, Chief Geologist, Senior Geologists, Resource Geologists, Grade Control Geologists, Junior Geologists and Grade Control Technicians. The technical team work on a rotation on and off site with six weeks on three weeks off or two weeks on and one week off roster. Roxgold will provide management of the mining contractors and required technical support for the 55 Zone and Bagassi South underground mines. Table 66 lists the number of Roxgold personnel.

Table 66: Yaramoko Mine Manpower – Roxgold

Expat Staff – Roxgold	**Number of Personnel**
Mining Manager	1
Technical Service Manager	1
Senior Mining Engineers	2
Mining Engineer	1
Chief Geologist	1
Senior Geologist	1
Resource Geologist	1

National Workforce - Roxgold	
Graduate Engineer	2
Grade Control Geologist	4
Junior Geologist	3
Grade Control Technician	5
Total	
Yaramoko Mine Roxgold Workforce	**22**

16.1.11 Mine Services and Infrastructure Underground Diamond Drilling

An underground diamond drilling program has been included to infill around existing boreholes in 2023, with a goal to eventually achieve an average spacing of 30 m, with the goal of increasing confidence in the Mineral Reserve. Total infill drilling of 9,100 m is planned for 2023.

A dedicated diamond drill drive is developed (5.0 m width by 5.0 m height drive profile) to supplement the drill positions and alternative drill positions are sourced as required should interaction with operations exist or proposed drilling angles are not favourable.

Mineralized Material and Waste Handling

Declines are developed at a minus 1:7.25 and 1:8.3 gradient for 55 Zone and Bagassi South respectively with dimensions of 5.3 m width and 5.8 m height to accommodate underground mine trucks, planned ventilation volumes and eventual mine deepening. Vehicle passing is done at level access crosscuts or stockpiles that are spaced every 120 m along the decline. Haulage trucks for Bagassi South QV' will haul through the same development infrastructure at Bagassi South mine with the addition of two dedicated haulage levels to allow haul trucks to reach the extents of the Bagassi South QV' mineralization. Mineralized material is mucked from draw points to an ore pass on each level with the material reporting to the haulage levels prior to being loaded onto a truck and hauled to the surface ROM.

The mine design includes dedicated truck loading and turn around areas on every level, located just off the main access levels. Stockpile bays are included in the design on each level above and below the accesses. Mineralized and waste rock both have in situ densities of 2.7 t/m3. All truck loading is done utilizing the CAT 1700 loader rehandling blasted material stockpiled by the LH307 loaders at 55 Zone and with the L140b loaders at Bagassi South QV'. All mineralized and development waste rock not required for backfilling will be trucked to surface up the ramp system to ore and waste stockpiles respectively.

Mine Ventilation

A life of mine ventilation engineering study was completed by Mine Ventilation Australia Pty. (MVA) in late 2019.

The study was conducted by MVA engineers using detailed Ventsim time phased ventilation and cooling models to estimate the life of mine ventilation requirements for the extraction of the 55 Zone Mineral Resources to a depth of 1,100 m below surface. The detailed Ventsim models were used to specify and schedule the planned ventilation and mine cooling infrastructure required to enable the execution of the life of mine development and production schedule through 2025.

The study was completed in late 2019 and construction commenced on the infrastructure in early 2020 with phase 1 of the planned infrastructure commissioned in the second quarter of 2021 at a cost of US$ 13.5 million. The infrastructure constructed consists of four components:

- Raiseboring of a new 3.5 m diameter exhaust raise system from surface to 4,674 level (EVS 2/RAS 2);
- Conversion of the West Vent Shaft (WVS) to a dedicated chilled air intake shaft and raise bore extensions to 4,774 RL;
- Installation of two additional exhaust fans (4 total) to increase mine ventilation capacity to from 190 m^3/second to 320 m^3/second, and;
- Construction of a surface bulk air cooler (SBAC) with an initial capacity of 5.3 Mega Watt Rating (MWR), expandable to 8 MWR.

The life of mine 55 Zone mine ventilation system has been engineered to provide the necessary air volumes for the mine diesel equipment fleet to be ventilated with a minimum of 0.05 m3/second per kW of rated engine power, factored for utilization and engine load factors.

The surface bulk air cooler (SBAC) was commissioned in June 2021 and is designed to provide wet bulb working temperatures of 28 degrees, based on a design surface wet bulb temperature of 25.8 degrees in the summer months. All anticipated heat loads were modelled by MVS engineers using VentSim software. The system was designed and built by Howden RSA and utilizes R-134 chilling machines manufactured by Carrier (USA). The installed system uses two 3.0 MWR chiller units, with provisions for adding a third unit as mining depth increases.

It is planned to continue the raise boring program in 2022 to 2024 to extend the exhaust and chilled air raise systems to depth as the decline advances to the planned mining depth of 1,100 m, to provide the deep mining workplaces with suitable intake and return air capacity.

The main ventilation (exhaust) fans are manufactured by Cogemacoustic and are 1.8 m diameter with 315 kW motors. The four surface exhaust fans have been upgraded with new higher pressure 12-blade impellors in March 2022 to increase the working range of the four main fans to a nominal capacity of 80 m^3/second each at a fan total pressure of 3,200 pascals (320 m^3/second total). This capacity upgrade will be sufficient for the ventilation of the intended mining schedules through 2024.

Like 55 Zone, Bagassi South flow requirements is based upon 0.05 m^3 per second per kW of engine diesel power used and based on the required mining fleet, 87 m^3 quantity of ventilation is required and something that has not changed throughout the operating life of Bagassi South.

Air intake is through the main access decline and leakage from the escape way raises. Exhaust system utilizes a series of 4 m by 4 m longhole raise in a series system. The primary fan utilized for the Bagassi South mine is a Cogemacoustic model T2.180.315, power of 315 kW, with a 1.8 m diameter fan, and capable of delivering 80 to 90 m^3 per second at a fan pressure of 960 pascals, with power draw of 150 kW.

Second Means of Egress

In addition to a fresh air escape ladderway, both underground mines are equipped with permanent and portable underground refuge chambers located in dedicated development drives. A stench gas warning system is in place to provide warning to personnel underground in case of emergency and extends to each active development and production heading. Mine rescue equipment and personnel are adequate for both mines.

The QV' design accounts for multiple access levels per working area with raises required to be developed at the extremities of each level to be used emergency egress and ventilation.

Backfill Method

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

- The first lift is filled with high strength CRF with up to 6.0 percent cement binder, this is to reduce overbreak when mining stopes below, which is estimated at 3 percent at zero grade for design and scheduling.
- The second lift is filled with normal CRF with up to 4.0 percent cement binder.
- The third and final lift is filled with unconsolidated waste rock.

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

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 transit mixer trucks. The 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 m.

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.

Backfilling for Bagassi South QV' is done utilising loose rockfill from waste material generated during development, which is done using LHD equipment. Rib pillars are in place between each stope panel to retain waste in the stope as support to the mined void, and the filling process starts at the completion of each stope panel.

Mine Dewatering System

The 55 Zone and Bagassi South mine dewatering system has been designed to handle an estimated peak rate of 50 l/s. The actual mine pumping requirements, the equipment generated inflow and ground water generation for 2022 were much lower than the system design capacity. 55 Zone and Bagassi South mine pumping for a two-year period averaged 7.0 l/s and 2.0 l/s respectively.

The current mine dewatering system utilizes pumps manufactured by Stalker Pumps of Australia. A 90-kW model 100 x 65 -315 as recommended and made available by the mining contractor. The pump has a head capability of 140 m at 50 l/s, installed as a daisy chain system to accommodate increased in depth over time. 55 Zone and Bagassi South have ten and three respectively of these pumping systems setups underground, daisy chaining from one sump to another where eventually water will be pumped to a concrete lined mine water settling pond on surface.

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.

The daisy chaining pumping system will remain until the end of mine life and it is envisaged that three more of the mono pump station setups will be required during the current life of mine at 55 Zone.

No further dewatering systems are required for Bagassi South as the current available one is sufficient for life of mine.

Maintenance Facilities

Maintenance facilities for the underground mobile fleet consists of a surface maintenance shop provided by the mining contractor and services both 55 Zone and Bagassi South underground mines.

Electrical Power Distribution

The power requirements for the underground mines have been estimated based on the planned mining fleet and required main fans and pumping equipment. Power to support the mine infrastructure is provided from the main site electrical substation via an overhead 11 kilovolt (kV) line. High voltage (11 kV) power to underground is routed through cables installed in service holes to underground substations. Underground substations step the voltage down to 1,000 volts which is the mine working voltage.

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

16.2 55 Zone and 109 Zone Open Pits

This section describes the 55 Zone and 109 Zone open pit mining operation and the methods used to support the estimate of the 55 Zone and 109 Zone open pit Mineral Reserve estimate.

As of the effective date of this Report, there has been no open pit mining of the 55 Zone deposit or the 109 Zone. In September 2020, a geotechnical study was completed for the 55 Zone open pit by geotechnical consultancy MineGeoTech Pty Ltd (MineGeoTech). The outcome of the geotechnical study (MineGeoTech, 2020) was a technically justifiable pit design for the 55 Zone appropriate to support Mineral Reserves. In June 2022, a geotechnical study was completed for the 109 Zone open pit by MineGeoTech. The outcome of the geotechnical study (MineGeoTech, 2022) was a technically justifiable pit design for the 109 Zone appropriate to support the Mineral Reserves. In February 2021, a mining study of the 55 Zone open pit was completed by independent international mining consultancy Entech Pty Ltd. (Entech). The Entech (2021) mining study consisted of pit optimization guiding a detailed pit design, mining schedule, and cashflow assessment. In 2022, the Mineral Resource estimate was reviewed and updated, following an update of the open pit mining study for the 55 Zone to maximise cashflow and reduce project risk. The 2022 mining study also included a mining study of the 109 Zone. The 2022 mining study demonstrates a technically achievable and economically viable open pit mining operation and is used to justify the Mineral Reserve estimate shown in this report. The QP regards the study work completed on the 55 Zone open pit and the 109 Zone open pit to be at a PFS level of confidence and accuracy, which is sufficient to support the 55 Zone open pit and 109 Zone open pit Mineral Reserve estimate.

The open pit mining study demonstrates mining the 55 Zone and the 109 Zone via conventional drill, blast, load and haul open pit mining methods. Open pit mining of the 109 Zone is proposed to commence as supplement feed during existing underground operations. Open pit mining of the 55 Zone is proposed to commence upon the completion of the underground mining operations of the 55 Zone deposit. Run-of-Mine (ROM) from the 55 Zone and 109 Zone open pits will be fed into the existing Yaramoko processing facility.

16.2.1 Hydrology and Hydrogeology

The hydrogeological parameters used for the MineGeoTech (2020) geotechnical investigation used the hydrogeological study completed by SRK (2014b) and groundwater level monitoring carried out on site. The SRK (2014b) hydrogeological field testwork program consisted of the following:

- Downhole spinner tests to identify inflow depths.
- Short duration pumping/recovery tests for rock mass permeability.
- Falling head tests for near-hole permeability.
- Surface infiltration tests for recharge rate.
- Laboratory permeability testing.

A monthly groundwater level monitoring program was also used to record baseline groundwater levels and potential seasonal fluctuations. The groundwater level monitoring data provided a pre-mining groundwater level of approximately 20 m below surface. The inflow within the existing underground operations within the 55 Zone are approximately 7 l/s.

Sufficient existing underground dewatering infrastructure will be maintained while the 55 Zone open pit is being mined.

109 Zone open pit dewatering infrastructure will include an in-pit sump which will pump water to a turkey's nest located between the two 109 Zone open pit stages, with excess water pumped from the turkey's nest to the processing plant. Figure 37 shows the proposed dewatering infrastructure within the 109 Zone open pit site layout.

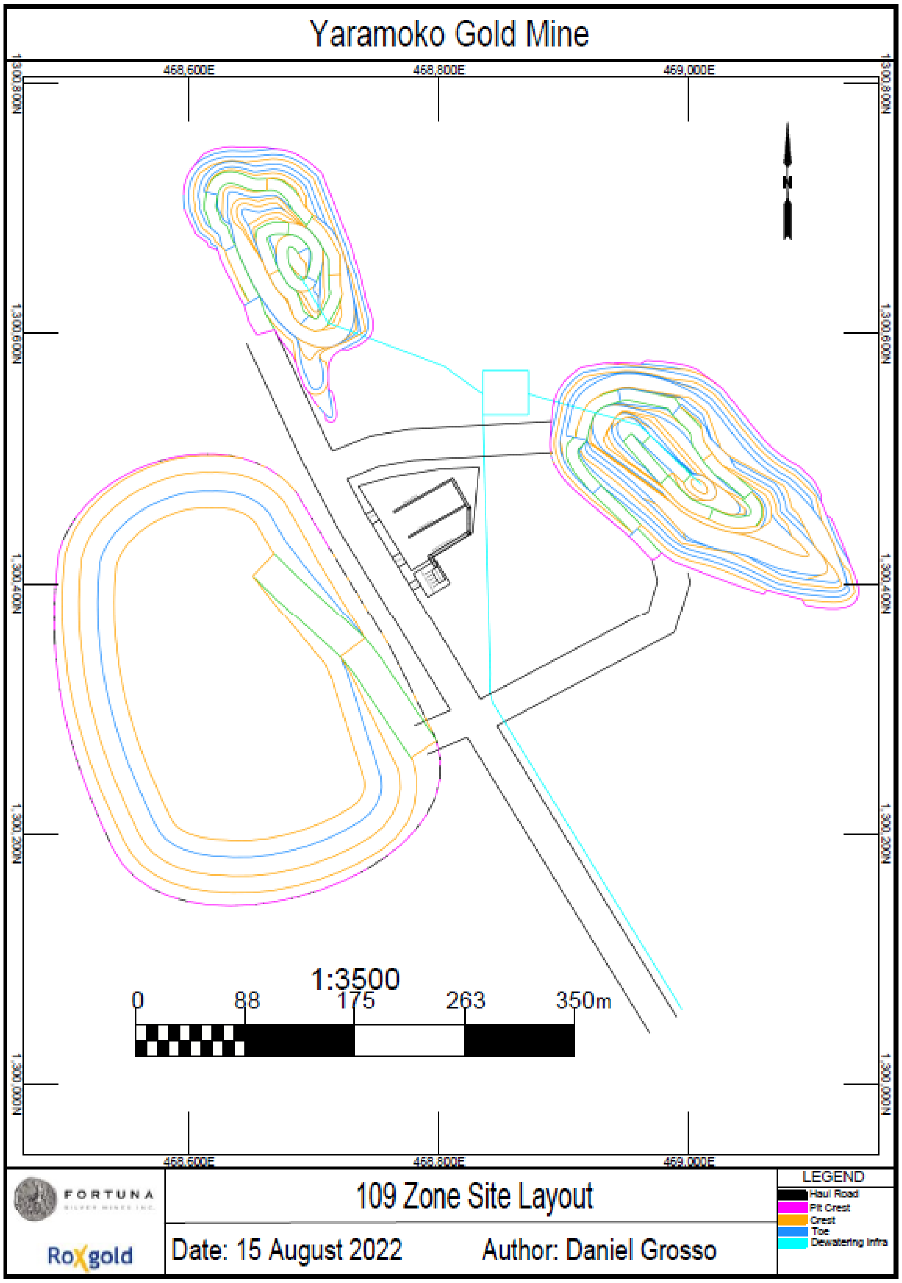


Figure 37: 109 Zone open pit site layout showing dewatering infrastructure locations

An appropriate surface water management plan will be prepared and implemented prior to commencement of mining operations at the 55 Zone and the 109 Zone open pits.

16.2.2 Geotechnical

55 Zone

The MineGeoTech (2020) geotechnical study for the 55 Zone open pit consisted of the following:

- Analysis of geotechnical core logging data.
- Rock mass classification and domaining of the rockmass.

- Laboratory strength testing.
- Laboratory strength data analysis.
- Definition of a ‘geotechnical’ weathering surface for design purposes.
- Analysis of structural data from core logging and underground mapping.
- Kinematic analysis of structural data for batter design purposes.
- Berm width analysis for rockfall protection.
- Overall slope stability analysis to determine a Factor of Safety (FoS) and Probability of Failure (PoF).

Table 67 and Figure 38 describe the open pit slope design parameters recommended by MineGeoTech (2020) for each kinematic design sector (MineGeotech, 2020). These open pit slope design parameters were used for pit optimization and pit design of the 55 Zone open pit. The QP regards the pit slope design parameters to have an appropriate FoS and PoF to support the 55 Zone open pit Mineral Reserve.

Existing underground voids were included in the MineGeoTech (2020) analysis to investigate localized stability and assess the impact of underground depressurization on overall stability. MineGeotech (2020) concluded that underground voids have a positive effect on the FoS and PoF, due to the depressurization effects of underground dewatering. MineGeoTech (2020) also conclude that the impact of earthquake loading is assessed to be negligible.

Table 67: 55 Zone Open Pit Slope Design Parameters

Design Sector	Orientation	Batter Face Angle (˚)	Berm Width (m)	Height (m)	IRA (˚)
A (Weathered)	090-160	85	8.0	10	48.4
A (Fresh)	090-160	90	8.5	10	49.6
B (Weathered)	160	86	8.0	10	49.0
B (Fresh)	160	90	8.5	10	49.6
C (Weathered)	180-270	84	7.5	10	49.5
C (Fresh)	180-270	76	11.5	20	50.5
D (Weathered)	270-000	90	8.5	10	49.6
D (Fresh)	270-000	90	15.5	20	52.2
E (Weathered)	350	90	8.5	10	49.6
E (Fresh)	350	90	15.5	20	52.2
F (Weathered)	320	90	8.5	10	49.6
F (Fresh)	320	90	15.5	20	52.2
G (Weathered)	320-090	76	10.5	10	37.6
G (Fresh)	320-090	76	10	10	38.7

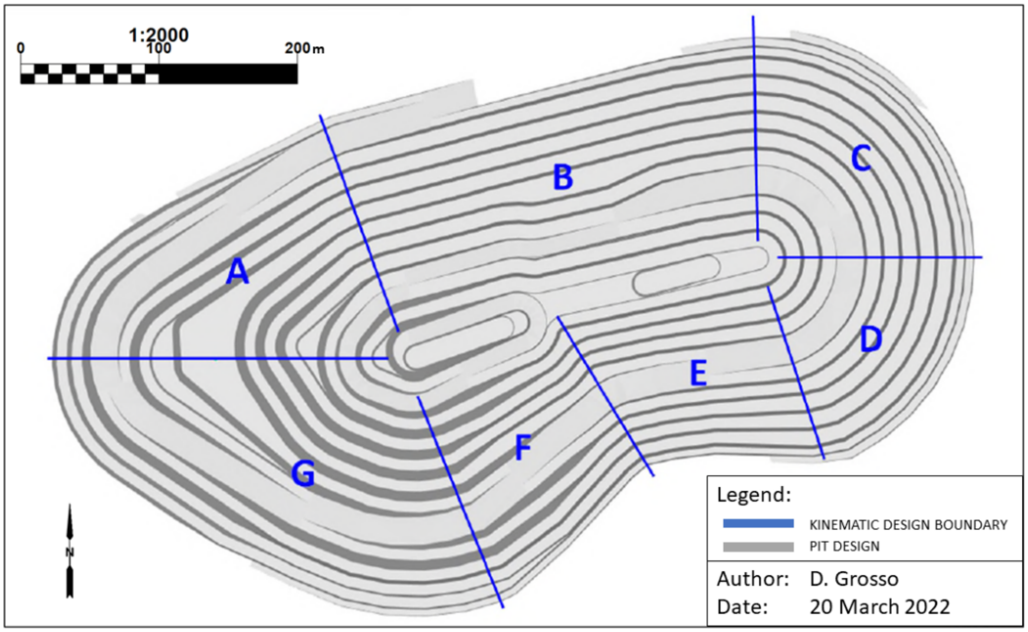


Figure 38: Kinematic Design Sectors for the 55 Zone Open Pit (see Table 67 for Design Sectors)

109 Zone

The MineGeoTech (2022) geotechnical study for the 109 Zone open pit consisted of the following:

- Design of geotechnical data collection program.
- Undertaking geotechnical logging of core.
- Analysis and rock mass classification and domaining of the geotechnical core.
- Laboratory strength testing and data analysis.
- Leapfrog lithology model from all available drilling data.
- Definition of a 'geotechnical' weathering surface for design purposes.
- Analysis of structural data from core logging and underground mapping.
- Kinematic analysis of structural data for batter design purposes.
- Berm width analysis for rockfall protection.
- Overall slope stability analysis to determine FoS and PoF.
- During the geotechnical assessment there was a data gap impacting the reliability of the recommendations for the north-eastern wall of the northern pit.

Table 68 describes the open pit slope design parameters recommended by MineGeoTech (2022) for each kinematic design sector. These open pit slope design parameters were used for pit optimisation and pit design of the 109 Zone open pit. The QP regards the pit slope design parameters to have an appropriate FoS and PoF to support the 55 Zone open pit Mineral Reserve, noting the following:

- MineGeoTech conducted the geotechnical investigation under the guidance from Roxgold that an overall slope factor-of-safety in excess of the industry standard of 1.2 was appropriate and acceptable for the short pit life of the 109 Zone open pit.
- MineGeoTech conducted the two probability of failure acceptance criteria of 30 % and 50 % for batter face angles, with Roxgold accepting the higher probability of failure due to the short pit life of the 109 Zone open pit.

- During the geotechnical assessment there was a data gap impacting the reliability of the recommendations for the north-eastern wall of the northern pit.

Table 68: 109 Zone Open Pit Slope Design Parameters

Design Sector	Orientation	Batter Face Angle (˚)	Berm Width (m)	Height (m)	IRA (˚)
Saprolite	000-360	50	3.5	10	37.8
Transitional	050-150	50	4.0	10	40.1
	150-230	55	3.5	10	42.3
	230-340	50	6.5	10	40.1
	340-050	55	4.0	10	42.3
Fresh	000-090	90	15.5	20	52.2
	090-150	90	14.0	20	55.0

16.2.3 Pit Optimization

Deswik software's Pseudoflow function has been used to generate a series of economic pit shells for each deposit using the Mineral Resource block models and input parameters described in Table 69 below.

Mining Block Model

The pit optimisations have been conducted using the following Mineral Resource block models:

- 109_engineers_reblock_20220511.dm
- Z55op_engineers_2_5_reblock_20220818.dm.

Both block models are in Datamine format. Both block models have been regularised to 5 x 2.5 x 5 m dimensions. The block model regularisation is used to represent mining dilution and mining recovery inherent within the block model tonnes and grade.

Prior to conducting the pit optimisations, the block models had the following modifications:

- Different rock type codes were added to distinguish ore from waste within the block model based on the cut-off grades for each deposit
- All operating costs including mining, processing, selling, and general and administrative costs were estimated for each block within the block model
- Revenue was estimated for each ore block within the block model based on the estimated metallurgical recoveries and the forecast long-term gold price
- Geotechnical domains were applied based on the material type and wall orientation as per the geotechnical recommendations.

Optimization Parameters

Pit optimization parameters were prepared using a combination of existing operating costs, as well as a Request for Quotation (RFQ) for mining rates from a reputable and experienced mining contractors operating within the region. Table 69 and Table 70 show the pit optimization parameters used in the pit optimisations, noting that the 109 Zone pit optimisations assumed that the General and Administrative costs were sunk, as the 109 Zone open pit will be mined during existing underground operations. All existing and future underground mining volumes were depleted from the block model prior to conducting the pit optimization.

Table 69: Pit Optimization Parameters

Parameter	Unit	Value
Gold Price	US$/oz	1,600
Refining Cost	US$/oz	7.50
Payability	%	99.0
Mine Owner Cost	US$/t ROM	4.07
General and Administration	US$/t ROM	24.76
Processing Cost	US$/t ROM	26.87
Sustaining Capital Costs	US$/t ROM	2.34
Metallurgical Recovery	%	98
Mining Dilution	%	Included in SMU
Mining Recovery	%	Included in SMU
Drill and Blast – Oxide/Transitional	US$/bcm	1.96
Drill and Blast – Fresh	US$/bcm	5.60
Mining Overheads	US$/bcm	1.94
Diesel	US$/bcm	1.36
Closure Cost	US$/t waste	0.20
Load and Haul	US$/bcm	Variable by bench, see Table 70

Table 70: Load and Haul Rates per Bench

Bench	Waste (US$/bcm)	ROM (US$/bcm)
1	$2.35	$2.38
2	$2.35	$2.38
3	$2.36	$2.39
4	$2.36	$2.39
5	$2.37	$2.40
6	$2.37	$2.40
7	$2.38	$2.40
8	$2.38	$2.41
9	$2.38	$2.41
10	$2.39	$2.41
11	$2.39	$2.42
12	$2.40	$2.42
13	$2.40	$2.42
14	$2.40	$2.43
15	$2.41	$2.43
16	$2.41	$2.44
17	$2.42	$2.44
18	$2.42	$2.44
19	$2.43	$2.45
20	$2.43	$2.45
21	$2.43	$2.46
22+	$2.44	$2.46

The overall slope angles applied within the Deswik pseudoflow incorporated the following:

- Geotechnical batter and berm parameters for each weathering and pit wall orientation domain, as outlined in section 16.1.2 of this report.
- Vertical depth of geotechnical domain

- Ramp width and number of passes within each geotechnical domain.

Table 71 shows the overall slope angles applied in the pit optimisation for each deposit.

Table 71: Overall slope angles in degrees applied in the pit optimizations

Weathering	55 Zone	109 Zone
Oxide	34.6	40.1
Transitional	43.1 – 49.6	40.1 – 43.9
Fresh	36.6 – 50.1	45.2 – 52.3

Optimization Results

- Using the parameters outlined in Table 67, During the geotechnical assessment there was a data gap impacting the reliability of the recommendations for the north-eastern wall of the northern pit.

Table 68, Table 69, Table 70 and Table 71, a set of nested pit shells were produced by the Deswik pseudoflow function. The nested shells were used to determine trends in mineralisation and higher-grade areas that would offer opportunities to stage pits to increase discounted cashflow ("DCF").

Table 72 shows the chosen pit shells used to guide the ultimate pit designs for each deposit. Revenue factor 1 pit shells were chosen for the ultimate pit extents due to the relatively short mine life for each pit individually. Figure 39, Figure 40, Figure 41, Figure 42, Figure 43, and Figure 44 show the tonnes, indicative discounted cashflow, stripping ratio, incremental stripping ratio, cash cost, and incremental cash cost for each nested pit shell within each deposit. Indicative discounted cashflow is shown on a 60/40 best-case, worst-case scheduling scenario where best-case sequences nested pit shell by nested pit shell, and worst-case schedules bench by bench. Neither best case or worst-case scheduling scenarios offer a representative scheduling scenario accounting for pit staging, whereas applying 60/40 split weighted towards the worst-case scenario offers a more representative estimate of discounted cashflow. Each set of nested pit shells informed pit stage designs. Trends in stripping ratio and cash costs were used to prioritise and sequence lowest stripping ratio and lowest cash cost ounces, while maintaining appropriate minimum mining widths.

Table 72: Optimization results

Final Pit Shell Deposit	Revenue Factor	Total Mined Mt	Waste Mined Mt	Strip Ratio t:t	ROM FeedMt	GradeAu g/t	Au Produced Moz
55 Zone	1.00	2.9	2.7	23.4	0.1	5.74	0.02
109 Zone	1.00	2.3	2.1	10.2	0.2	1.75	0.01

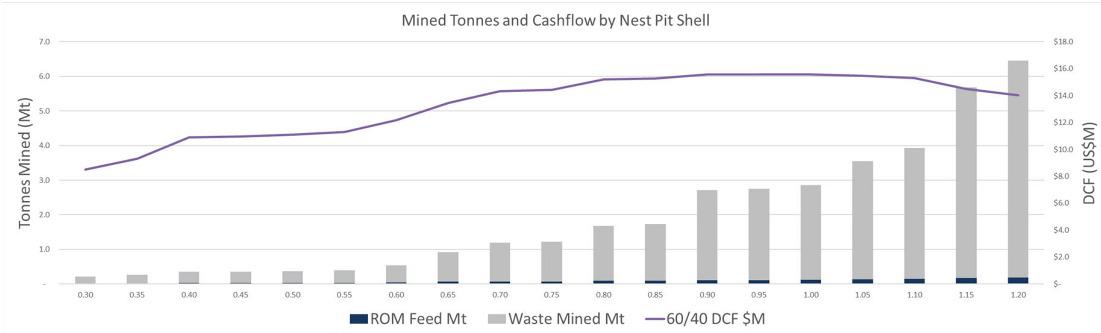


Figure 39: 55 Zone pit optimization results – tonnes and indicative discounted cashflow by nested pit shell

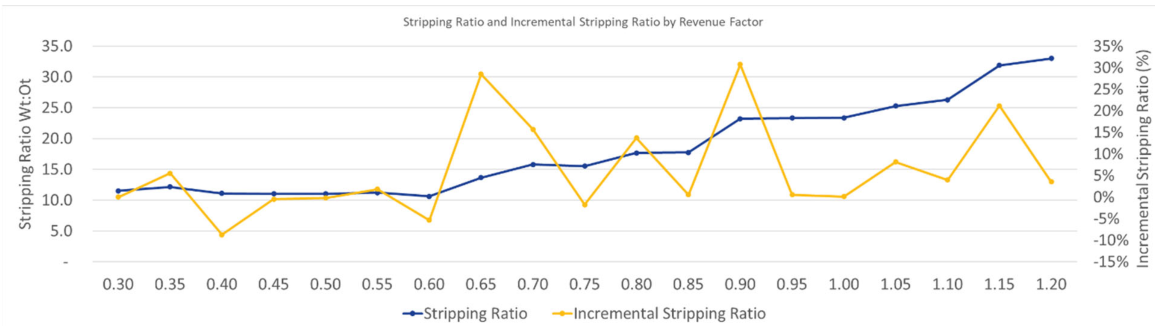


Figure 40: 55 Zone stripping ratio and incremental stripping ratio by nested pit shell

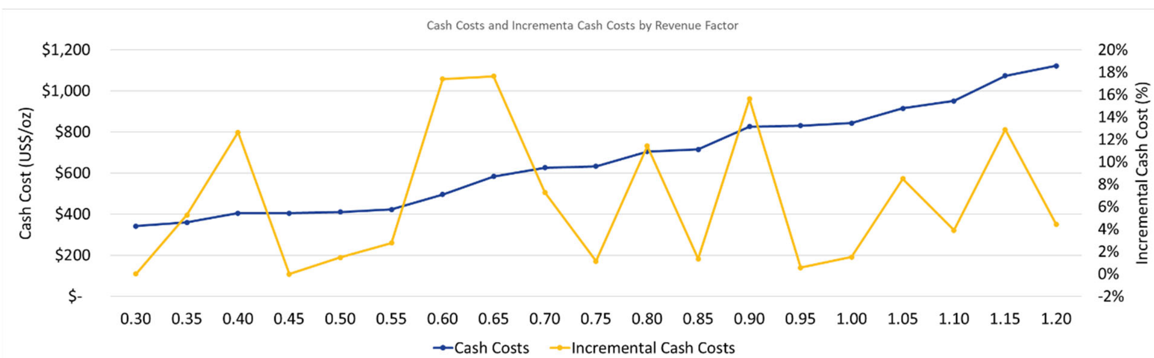


Figure 41: 55 Zone cash costs and incremental cash costs by nested pit shell

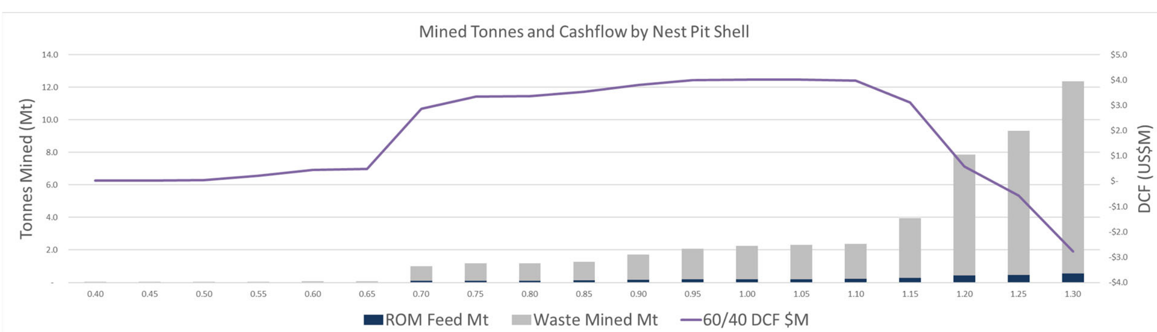


Figure 42: 109 Zone pit optimization results – tonnes and indicative discounted cashflow by nested pit shell

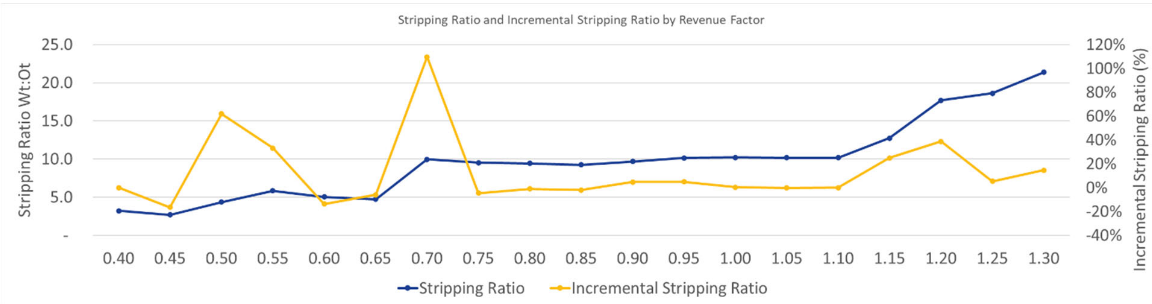


Figure 43: 109 Zone stripping ratio and incremental stripping ratio by nested pit shell

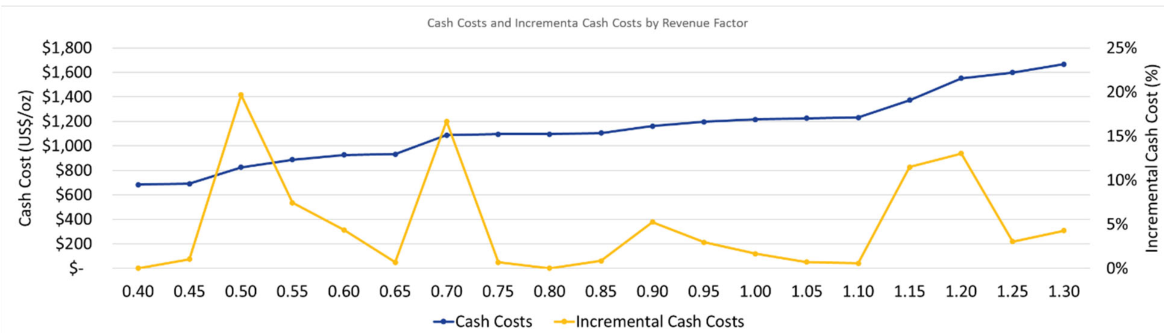


Figure 44: 109 Zone cash costs and incremental cash costs by nested pit shell

Cut-off Grade

A marginal cut-off grade of 1.26 g/t gold was estimated for the 55 Zone open pit and a marginal cut-off grade of 0.74 g/t gold was estimated for the 109 Zone open pit. These cut-offs were estimated using a gold price of US$ 1,600/oz and a combination of existing relevant operating costs and recoveries, as well as mining contractor rates provided by a reputable and experienced mining contractors operating within the region.

16.2.4 Mine Design

Pit Design

Detailed pit stage designs have been prepared based on the results of the pit optimisations and incorporating appropriate wall angles, geotechnical berms, minimum mining widths, and access ramps with sufficient width for the equipment selected.

The geotechnical parameters applied to the pit designs include batter face angles, berm widths, and overall slope angles (Figure 45) as described in section 16.2.2 of this Report.

Pit ramps have been designed with the following characteristics:

- Dual lane ramps are a total of 14.5 m wide, including 10.3 m distance for safe passing of two of the selected 40 t articulated haul truck, a 3.7 m wide bund, and a 0.5 m drain width.
- Single lane ramps are a total of 9.3 m wide, including 5.1 m distance for sufficient room for a single 40 t articulated haul truck, a 3.7 m wide bund, and a 0.5 m drain width.
- All ramps have been designed with a gradient of 1:9.
- The 109 Zone pits have been designed with only single lane access to the final truck floor, with overtaking lanes every 20 vertical meters.

- The 55 Zone pit has been designed with a single lane ramp for the final 20 vertical meters to the final truck floor, and dual lane ramp access to elevations above this.
- Ramps exit the pit in the direction of the waste rock dumps.

Pits have been designed to have a minimum mining width of 15 m and minimum cutback width of 20 m. All pits include a goodbye cut at a maximum depth of 5 m.

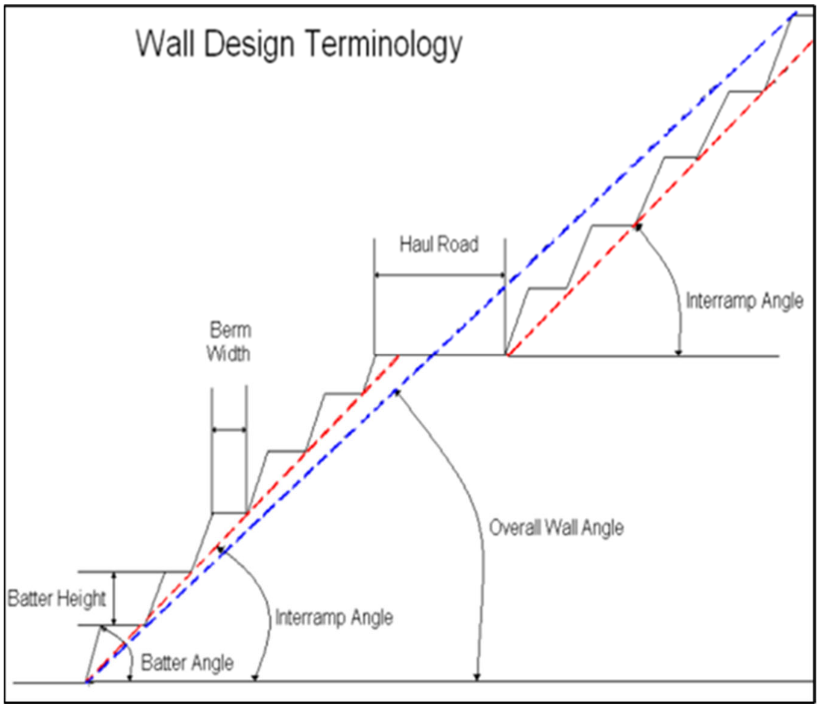


Figure 45: Pit wall design terminology

The 55 Zone open pit Mineral Reserves are mined in 3 pit stages. The first pit stage has been designed to avoid mining through existing underground mining infrastructure. The second pit stage prioritises the highest grade, lowest waste stripping ore. Figure 46 shows the 55 Zone pit stage designs and Figure 47 shows the ultimate pit stage for the 55 Zone open pit.

Figure 48 shows the 55 Zone open pit stages in relation to existing site infrastructure. The key infrastructure that will need to be relocated prior to the 55 Zone stage 1 pit being mined is the 11 kV OH powerline to camp. Prior to commencing mining in second pit stage, the settling ponds and east vent shaft will need to be removed or relocated. Prior to mining the final pit stage, the refrigeration plant and west vent shaft will need to be removed or relocated. Underground mining will be completed prior to open pit mining commencing. All unessential underground infrastructure will be removed or become inoperable once open pit mining commences. Sufficient underground pit dewatering infrastructure will be in place to facilitate dry mining conditions in the 55 Zone open pit.

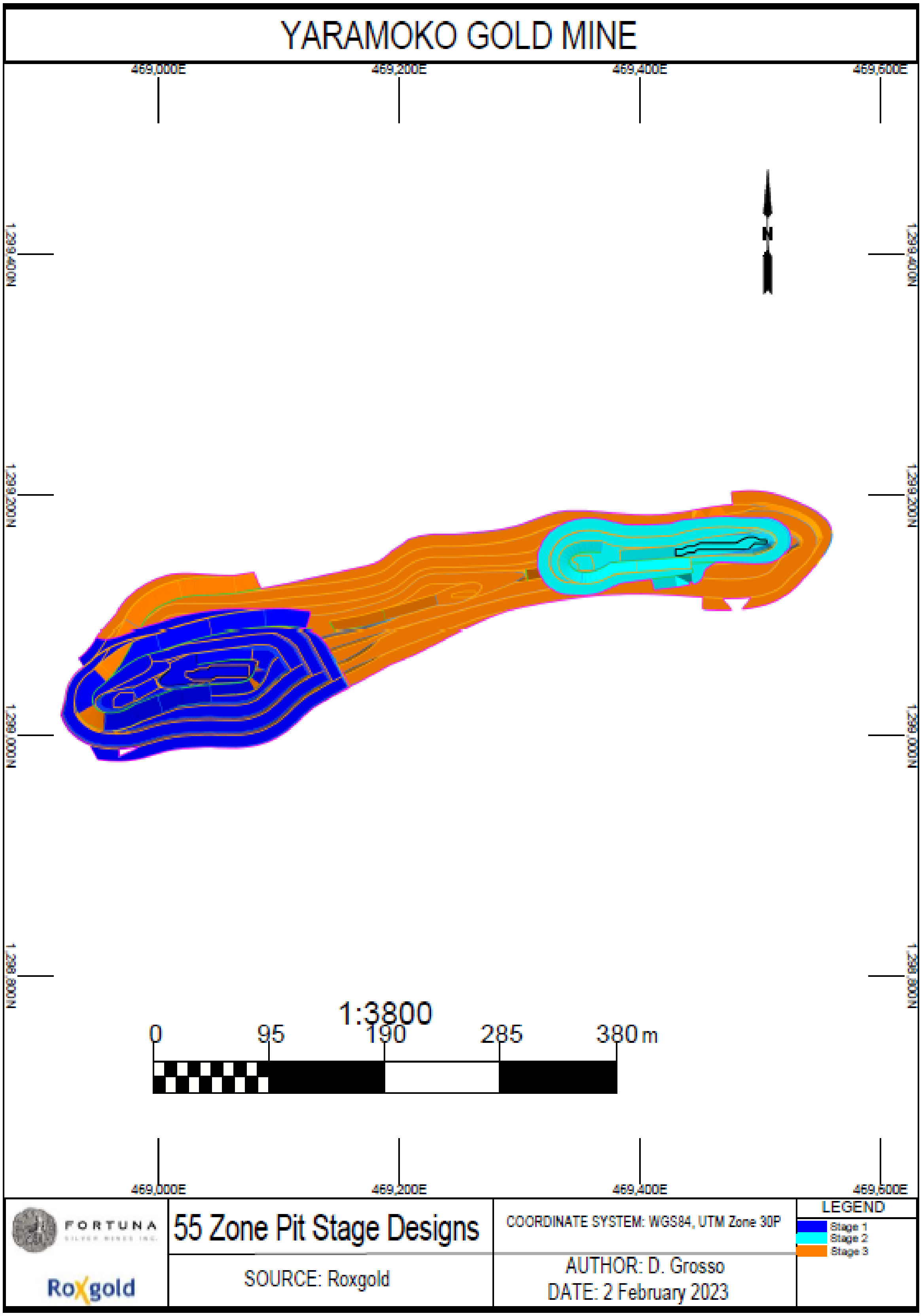


Figure 46: 55 Zone pit stage designs

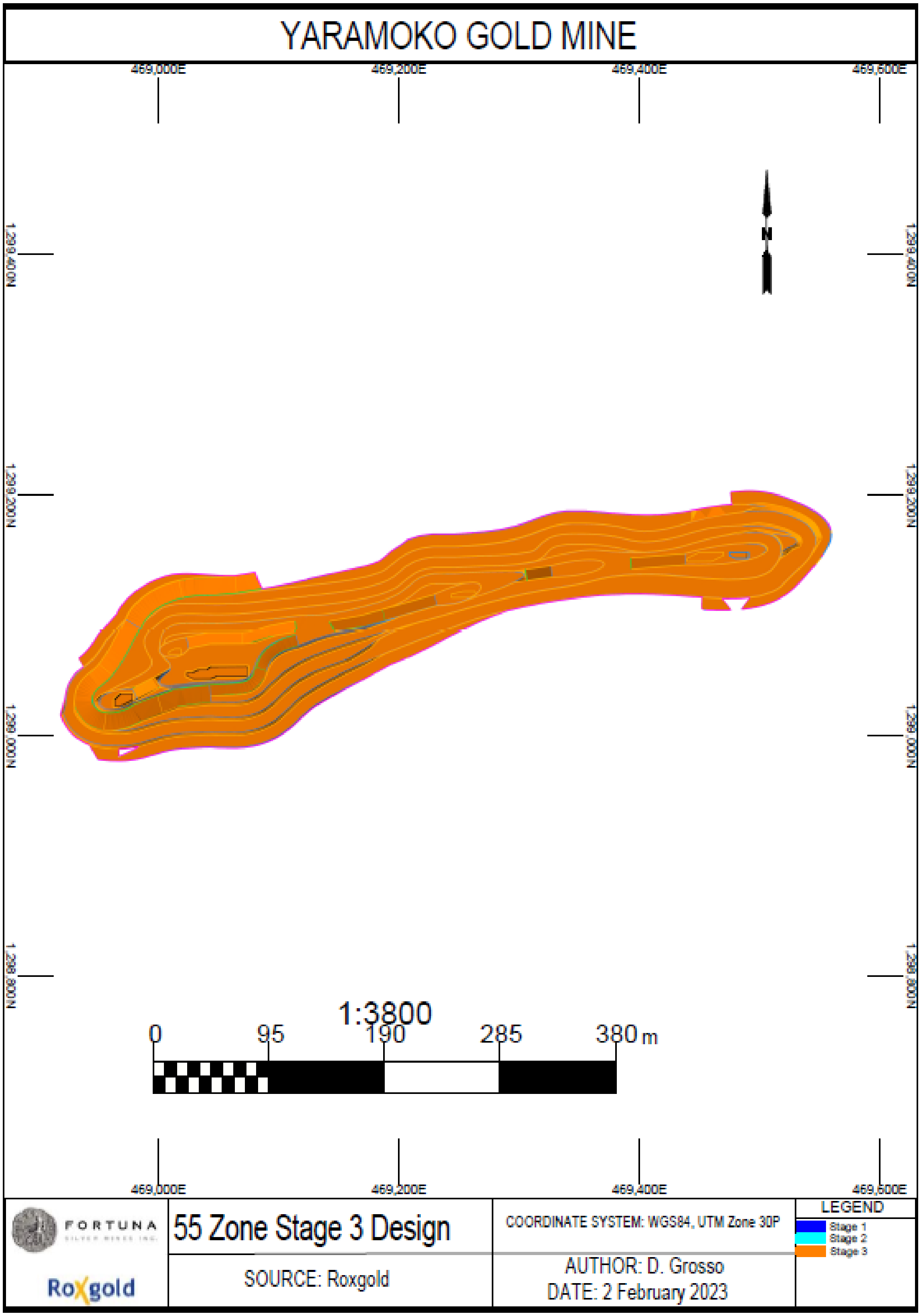


Figure 47: 55 Zone ultimate pit design

Figure 48: 55 Zone pit stage designs shown against existing site infrastructure

The 109 Zone open pit Mineral Reserve are mined in 2 pit stages. The pit stages have similar cash cost per ounce values, so the pits have been sequenced to enable pit backfilling of the 109 Zone stage 1 pit with the 109 Zone stage 2 waste rock. The 109 stage 2 pit has a potential future pit cutback if there is a significant increase in the gold price and/or a significant decrease in project operating costs, therefore no pit backfilling of waste rock has been allocated to this pit stage. Figure 49 shows the 109 Zone pit stages.

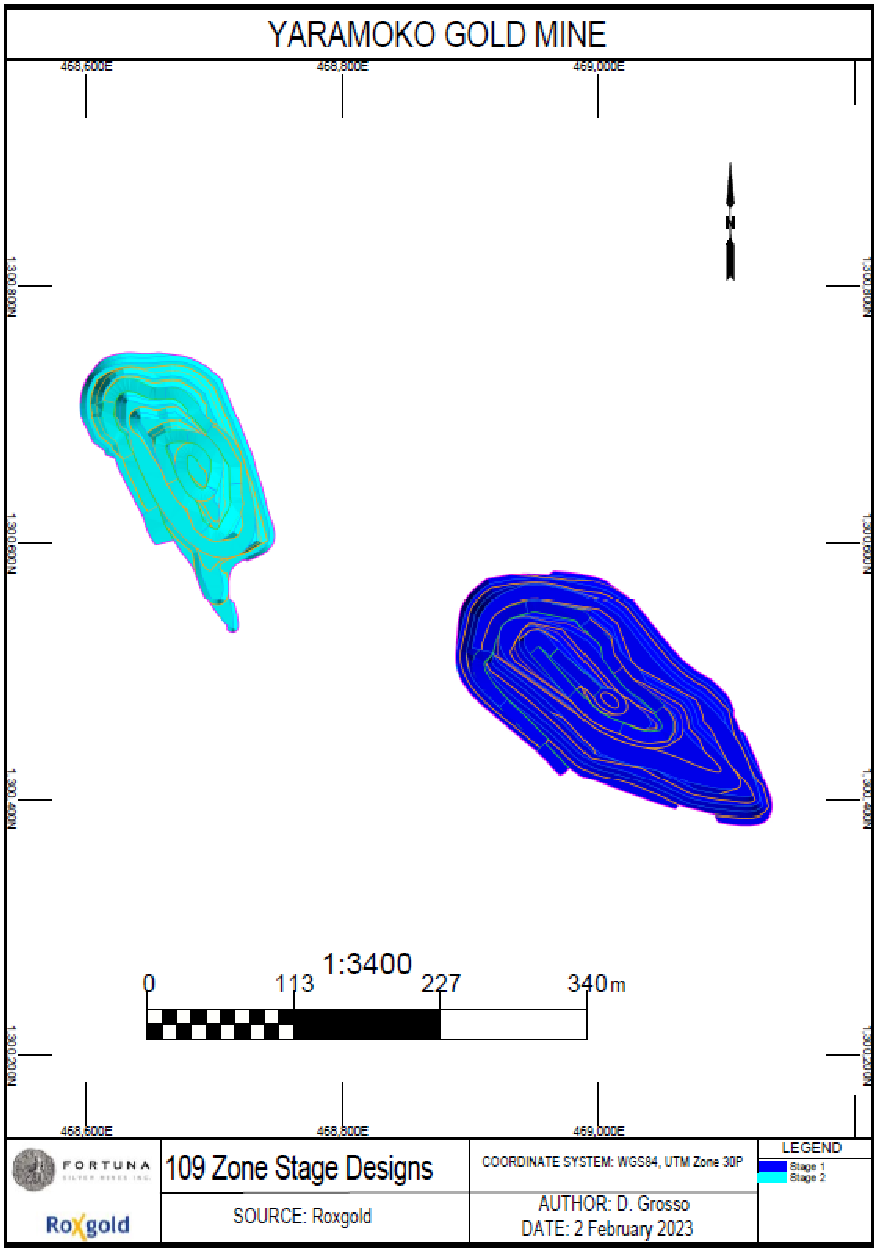


Figure 49: 109 Zone pit stage designs

Waste Rock Dump Design

Waste rock dumps were designed for each of the open pit deposits, with the intention of minimising haulage distance for the movement of waste material from the open pit to the adjacent surface waste rock dump, taking into consideration the following:

- Surface water drainage.
- Existing and planned infrastructure locations.
- Potential future pit cutbacks.

Table 73 describes the waste rock dump design parameters applied to achieve a waste rock footprint consistent with the requirements of rehabilitated waste rock dumps at closure. Figure 50 shows the location of each of the waste rock dumps in reference to existing site infrastructure and the open pit stages.

Both the 109 Zone stage 2 and the 55 Zone stage 3 pits have potential pit cutbacks if there is a significant change in project economics. Therefore, sufficient standoff distances have been applied to the waste rock dump locations such that future pit cutbacks will not require the rehandle of waste rock. No waste rock backfill has been allocated to the 109 Zone stage 2 or the 55 Zone open pits. Pit backfill has been allocated to the 109 Zone stage 1 pit given there is no known potential for a pit cutback on this pit even with a material change in project economics. The pit backfilling of the 109 Zone stage 1 pit with waste rock from the 109 Zone stage 2 pit facilitates a shorter waste rock haul route and a reduced waste rock dump rehabilitation footprint.

There is no known potentially acid forming waste rock at the Yaramoko Mine.

The waste rock dump designs have sufficient volume capacity for all waste rock produced from the ultimate pit design, accounting for an estimated 25 percent swell factor.

Table 73: Waste Rock Dump Design Parameters

Parameter	Units	Value
Batter Angle	°	37
Batter Height	m	10
Berm Width	m	15
Maximum Height	m	40
Ramp Width	m	25
Ramp Gradient	1:N	10
Overall Slope Angle	°	18

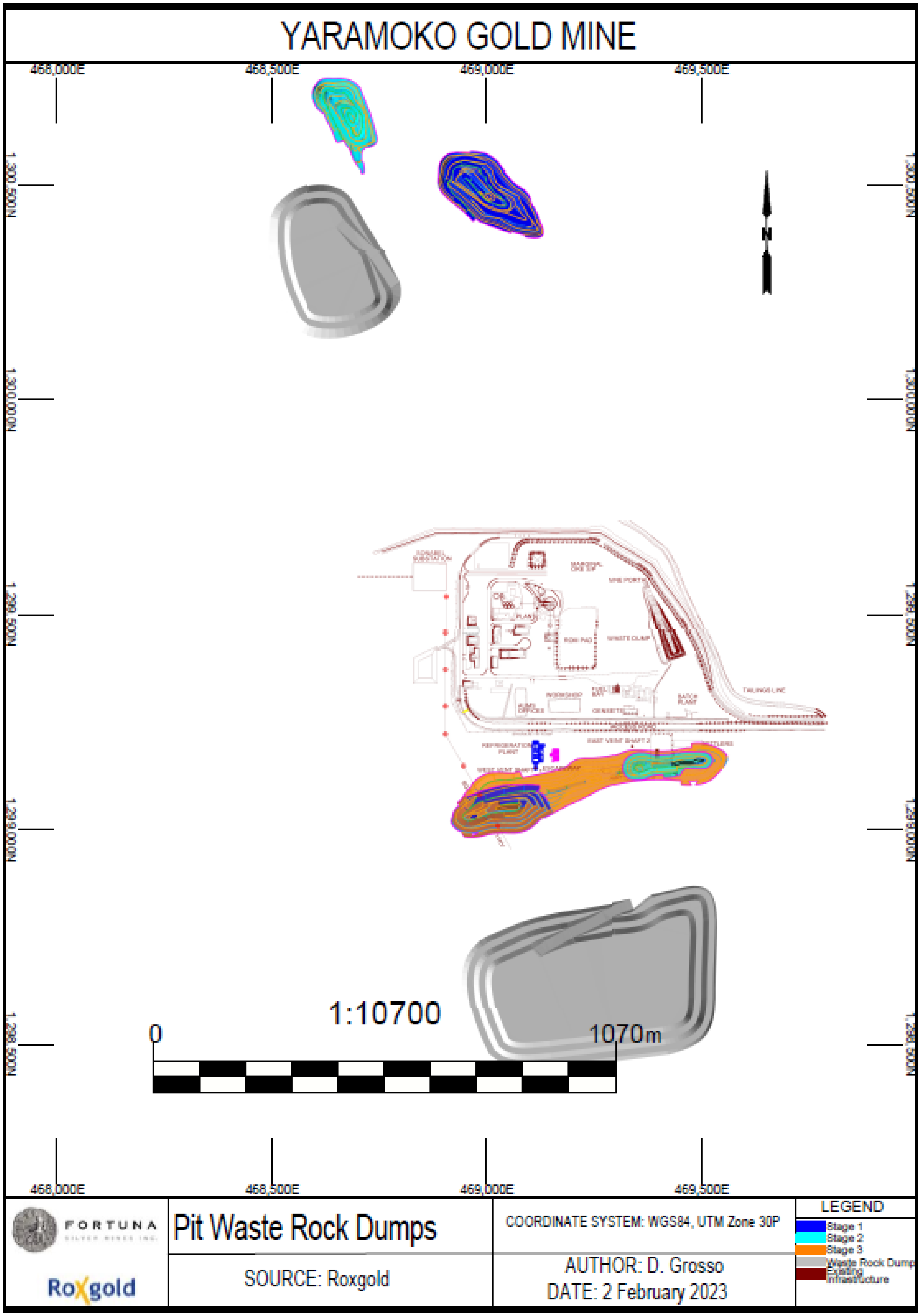


Figure 50: Yaramoko open pit waste rock dump locations

16.2.5 Mine Operations

Mining Philosophy

The 55 Zone open pit will be mined using conventional drill, blast, load, and haul mining methods. A bench height of 5 m will be used for drill and blast, which will be mined via 2 flitches of 2.5 m high. Drill and blast patterns with a burden range of 2.8 m to 3.6 m are proposed, utilizing small diameter blast holes (Entech, 2021). The proposed mining philosophy has been chosen to minimize planned mining dilution and maximize mining recovery due to the deposit orientation and width, as well as achieve an appropriate drill and blast fragmentation with limited oversize material (Entech, 2021). ROM will be hauled from the pit to the existing ROM Pad before being fed into the existing Processing Facility. Waste rock dump will be hauled from the pit to the designed waste rock dumps or pit backfilling locations.

Open pit mining at the Yaramoko Mine will utilise a mining contractor. The scope of the mining contractor will consist of the following:

- Clearing and grubbing.
- Grade control drilling.
- Haul road construction and maintenance.
- Drill and blast.
- Load and haul.
- Pit dewatering.
- Mobilise and demobilise all mining contractor equipment.
- Establish and fit-out the mining contractor’s offices.
- Establish and fit-out the heavy vehicle maintenance facility.
- Establish and fit-out the washdown facility.
- Establish and fit-out explosives storage facilities.

The mining schedule has mining of the 109 Zone commencing during existing underground 55 Zone and Bagassi South operations produce supplemental ore feed to the processing plant. The 55 Zone open pit will not commence until underground mining at the 55 Zone has been completed.

Interaction with Underground Voids

Existing underground workings are either filled with cement rock fill, loose rock fill, or remain open as underground voids. Prior to mining of the 55 Zone open pit, a void management plan will be prepared to define the methodology to safely mine above and through underground voids. The void management plan will consider the following methods to mine through previous underground workings:

- Probe drilling.
- Drill and blast to collapse voids from a safe standoff distance.
- Downhole cavity surveys and cavity scanning.
- Void backfilling.
- Displacement monitoring.
- Void demarcation.

Where possible, underground voids adjacent to mineralized material will be collapsed in a way to maximize mining recovery. The 55 Zone open pit Mineral Reserve applies a lower mining recovery factor to material directly adjacent to existing underground workings to represent the lower likelihood of recovering mineralized material due to collapsing voids during drill and blast. Displacement monitoring will be used when blasting mineralized material near underground workings to measure its movement and assess mining dilution and whether material heavily diluted within an underground void should be considered economic.

Prior to mining of the 55 Zone open pit commencing, additional geotechnical analysis will determine whether further geotechnical requirements will be required to achieve safe pit walls. Further geotechnical requirements may include the following:

- Adjusted pit ramp location due to underground voids.
- Pit wall bolting and/or meshing.
- Pit wall monitoring.

Proposed Mining Equipment Fleet

Table 74 shows the open pit mining equipment fleet proposed by the mining contractor during the RFQ process. All other equipment and facilities are already available at the operating Yaramoko Mine.

Table 74: Open Pit Mining Equipment Fleet

Equipment	Model	Quantity (Average)
Excavator – 80 t	Hitachi 870	1
Excavator – 80 t	Doosan 800	1
Excavator – 50 t	Doosan 420	1
Excavator – 30 t	JCB 305	1
Dump Truck – 30 t	DAF 15m^3 CF	4
Dump Truck – 30 t	SINO 15m^3 371	10
Dozer	CAT D9	2
Grade Control Drill Rig	TBA	1
Blast Hole Drill Rig	Atlas Copco F9	2
Grader	John Dear 670G	1
Water Cart	Astra 20 kL	1
Service Truck	Mercedes	1
Rockbreaker	JAB A1	1
Compactor	BOMAG BW218	1
Generator	100 kva	1
Generator	50 kva	1
Bus	Village Hire	3
Light Vehicle	Mitsubishi L200	11

16.2.6 Open Pit Mine Scheduling

A mining schedule was produced using Deswik software, the mining block models, and the pit stage designs.

Mine scheduling was completed using the following parameters:

- Monthly scheduling periods.
- 109 Zone mining rate of 6.6 kBCM/day.
- 55 Zone mining rate of 8.7 kBCM/day.
- 5-day bench turnaround delay.
- Inferred Mineral Resource has been treated as waste rock.

- Material within the underground life of mine has been depleted.

Deswik's Sched module was used to produce the mining schedules for the 109 Zone and 55 Zone open pit mining. Table 75, Figure 51, and Figure 52 show the schedule results for the 109 Zone open pits and Table 76, Figure 53, and Figure 54 show the schedule results for the 55 Zone open pits. The 109 Zone has a mine life of 9 months and the 55 Zone has a mine life of 11 months. Neither pit can be mined quick enough to meet the processing throughput rate. The mining schedule is limited by bench turnaround rate given the narrow nature and relatively small volume of each bench within the pit designs. There will be a gap between mining the 109 Zone and mining the 55 Zone. The 109 Zone will be mined during existing underground operations and the 55 Zone will be mined after underground operations have ceased.

Table 75: 109 Zone Mining Schedule Results

Schedule Item	Units	Value
Total ROM Processed	kt	159.7
Total ROM Grade	g/t	1.78
% of Inferred included in ROM	%	0
Total Waste Mined	kt	1,837
Stripping Ratio	Waste t: Ore t	11.5
Total Mine Life	Months	9

Table 76: 55 Zone Mining Schedule Results

Schedule Item	Units	Value
Total ROM Processed	kt	144.3
Total ROM Grade	g/t	5.25
% of Inferred included in ROM	%	0
Total Waste Mined	kt	3,180
Stripping Ratio	Waste t: Ore t	22.0
Total Mine Life	Months	11

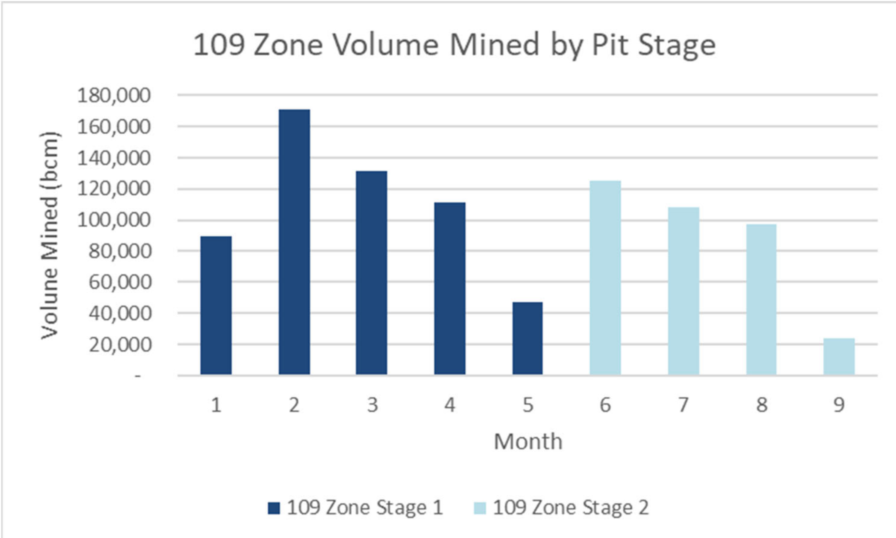


Figure 51: 109 Zone monthly volume mined by pit stage

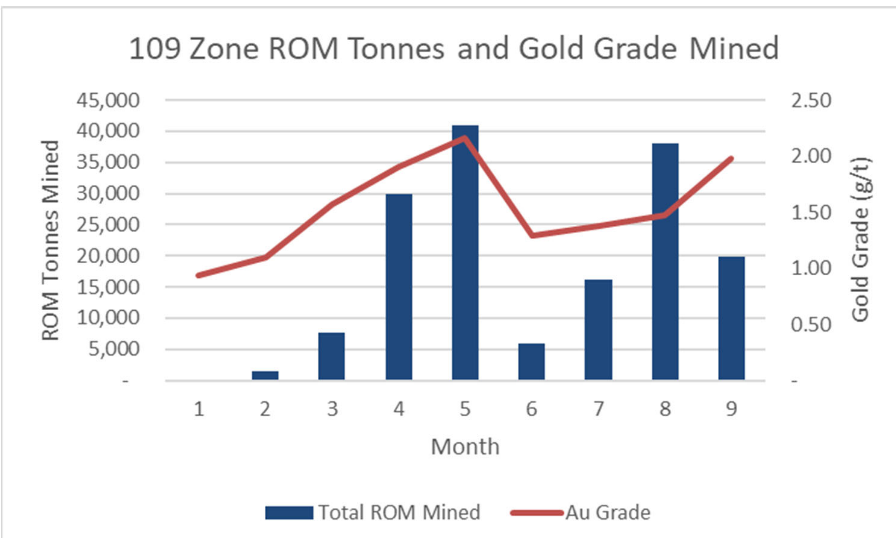


Figure 52: 109 Zone monthly ROM tonnes and gold grade mined

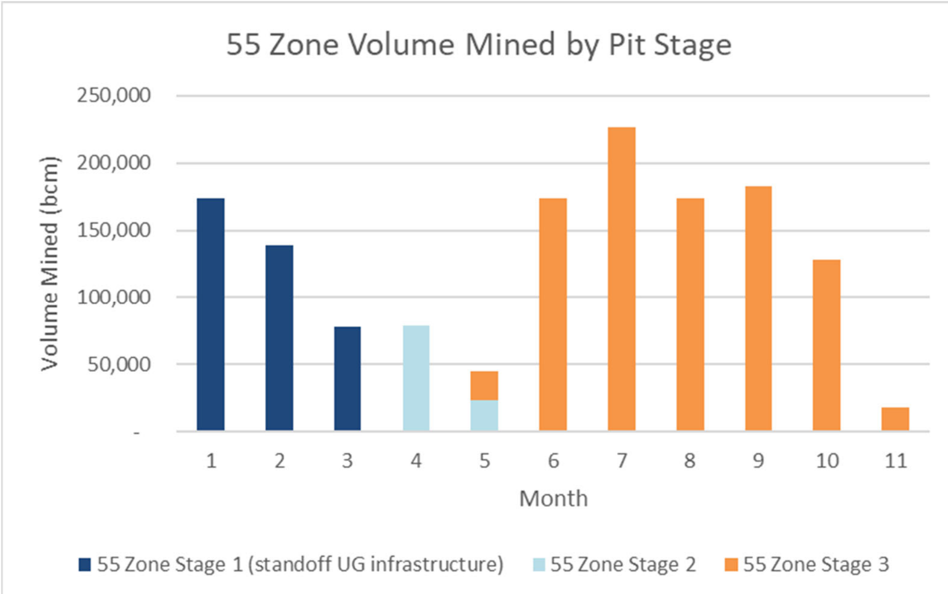


Figure 53: 55 Zone monthly volume mined by pit stage

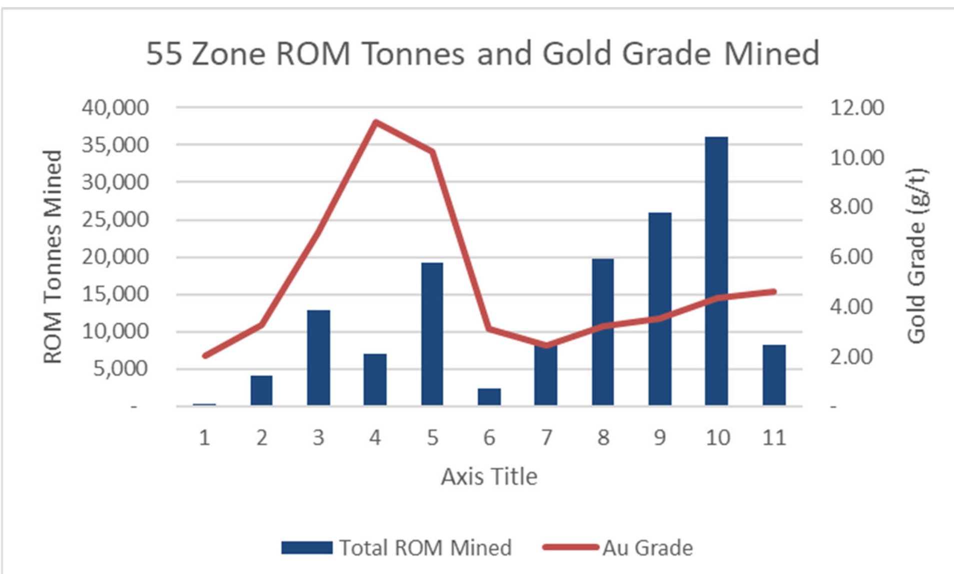


Figure 54: 55 Zone monthly ROM tonnes and gold grade mined

16.3 Yaramoko Gold Mine Life of Mine Plan

The overall production plan for the Yaramoko mining and processing operations is shown in Table 77. Underground mining continues from 2023 to 2024 and open pit mining commences in 2024 for 109 Zone and 2025 for 55 Zone. A ROM feed production rate of 390 kt, 479 kt and 190 kt is maintained over the remaining mine life. The schedule is based on the Mineral Reserve estimate and does not include Inferred Mineral Resources. The total Mineral Reserve within the three-year LOMP is 1,161 kt averaging 5.89 g/t Au. Open pit mining for 109 Zone is scheduled to commence in January 2024 and 55 Zone in February 2025. The open pits for 55 Zone and 109 Zone have an overall waste stripping ratio of 22:1 and 11.5:1, respectively.

Table 77: Yaramoko Life of Mine Plan

Item	Unit	2023	2024	2025	Total
Total Decline Meter	'000 m	1.0	-	-	1.0
Total Lateral Meter	'000 m	2.5	-	-	2.5
Total Meter of Development (Waste)	'000 m	3.5	-	-	3.5
Total Meter of Ore development	'000 m	5.9	0.9	-	6.8
Total Tonnes Waste Mined	'000 t	345	1,837	3,180	5,362
Total Ore Drive Tonnes Mined	'000 t	92.3	2.5	-	94.8
Total Stope / Open Pit Ore Tonnes Mined	'000 t	297.7	476.4	190.4	964.5
Total Ore Tonnes Mined	'000 t	390.0	478.9	190.4	1,059
Total Ore Grade Mined (g/t)	g/t	6.93	5.65	5.89	6.16
Total Ounces Mined	'000 oz	86.8	87.0	36.1	209.9
ORE MILLED	'000 t	491.7	478.9	190.4	1,161
GRADE ORE MILLED	g/t	6.14	5.65	5.89	5.89
RECOVERY RATE	%	97.7	97.7	97.9	97.8
GOLD POURED	'000 oz	94.8	87.2	37.3	219.4

Note: Differences may occur due to rounding

16.4 Comments on Section 16

The QP is of the opinion that:

- The mining method being used is appropriate for the 55 Zone, 109 Zone and Bagassi South deposits. The underground and open pit mine design, tailings facility design, and equipment fleet selection are appropriate to reach production targets.
- The mine life is estimated as 2-year for the underground operation and 2-year planned from open pit with an overlap in 2024 where 109 Zone open pit is mined.
- The mine plan is based on successful mining philosophy and planning and presents low risk.
- Inferred Mineral Resources are not included in the mine plan.
- Mining equipment requirements are based on actual operational conditions experienced at the Yaramoko Gold Mine processing 546,000 tonnes per annum, prior to an anticipated reduction in throughput as the mine transitions from underground to open pit.
- All mine infrastructure and supporting facilities meet the needs of the current mine plan and production rate.

17 Recovery Methods

This section summarizes the operating processing plant design and performance after seven years of production. The processing plant operated to its original design capacity until December 2018, when the completion of the Stage 2 Plant upgrade in January 2019 enabled an increase to the current throughput.

The recovery methods discussed herein presents the configuration and performance of the operating process plant.

17.1 Yaramoko Process Plant Performance

The Yaramoko Gold Mine processing plant was designed for an initial throughput of 270,000 tonnes per year which was increased to 401,600 tonnes per year in January 2019 as part of the Bagassi South project and in 2022 achieved throughput of 546,651 tonne. The plant site is located at 315 m above sea level and adjacent to the 55 Zone underground portal.

The process circuit is simple and robust and comprises the following components:

- A 2-stage crushing circuit with a throughput of 100 tph 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 t. An underlying apron feeder and emergency vibrating feeder provides ore feed directly to the milling circuit.
- A milling circuit with a throughput of 50.2 tph, operating at 91 percent availability, with a design grind of 80 percent passing 90 micrometers.
- A gravity circuit on cyclone underflow consisting of two centrifugal concentrators and two intensive leach reactors for treatment of the gravity concentrate, treating 68 percent of the cyclone underflow.
- A carbon-in-leach (CIL) circuit consisting of one leach tank and seven 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 decant return from the tailings storage facility, a water storage dam, supplemented by water recovered from the plant containment dam (in the rainy season) and mine dewatering. The water storage dam is located approximately 2 km from the plant, adjacent to the tailings storage facility.

17.1.1 Operational Performance

The Yaramoko Gold Mine processing plant has been in operation since May 2016 with annual throughput exceeding design throughput of 401,600 t since 2019. A summary of the plant's key performance indicators is presented in Table 78. The mill maintains a high availability and routinely averages more than 95 percent operating time.

An annual breakdown of the ore processed, and gold recovered is illustrated in Table 78.

Table 78: Process Plant Performance Summary

	Unit	2016	2017	2018	2019	2020	2021	2022
Ore Processed	(dmt)	162,480	266,599	307,591	466,157	512,276	515,495	546,651
Plant Runtime	(%)	93.3	96.1	95.4	96.2	96.3	95.0	97.0
Grade Processed	(g/t)	15.5	15.3	13.5	9.5	8.5	7.0	6.4
Gold Recovery - Total	(%)	98.5	99.0	98.6	98.2	98.1	97.8	97.5
Gold Recovery - Gravity	(%)	58.9	61.7	57.2	52.1	53.5	52.3	49.3
Gold Recovered	(oz)	77,157	126,990	132,656	142,204	133,940	116,589	109,167

Table 79 shows the usage of major consumables in the Yaramoko mill from annual operational records.

Table 79: Major Consumables

Materials	**Kilograms per tonne**						
Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Grinding Media	1.28	1.32	1.47	1.76	1.51	1.46	1.21
Cyanide	0.46	0.29	0.25	0.28	0.27	0.28	0.28
Lime	0.81	0.84	0.83	0.67	0.74	0.60	0.67
Carbon	0.05	0.01	0.07	0.02	0.03	0.02	0.03
Sodium Hydroxide	0.16	0.13	0.11	0.1	0.09	0.09	0.08
Hydrochloric Acid	0.13	0.07	0.05	0.05	0.04	0.04	0.04
Flocculant	0.07	0.02	0.02	0.01	0.01	0.01	0.01
Anti-scalant	0.04	0.04	0.04	0.05	0.06	0.07	0.03

17.2 Process Plant Description

The Yaramoko processing plant was upgraded in January 2019 and designed for a throughput of up to 401,600 t per year (1,100 tpd). The design was completed by DRA (Pty) Ltd with the comminution circuit being reviewed by Orway Minerals Consultants (WA) Pty Ltd (OMC) in Perth, Australia.

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 mm and that pebble crushing would be impractical although could be considered in a later subsequent expansion.

17.2.1 Process Plant Design Criteria

The Stage 2 Plant upgrade was completed in January 2019 and maintains the simple and robust design philosophy that was implemented originally.

The most pertinent design criteria to the plant are summarized in Table 80.

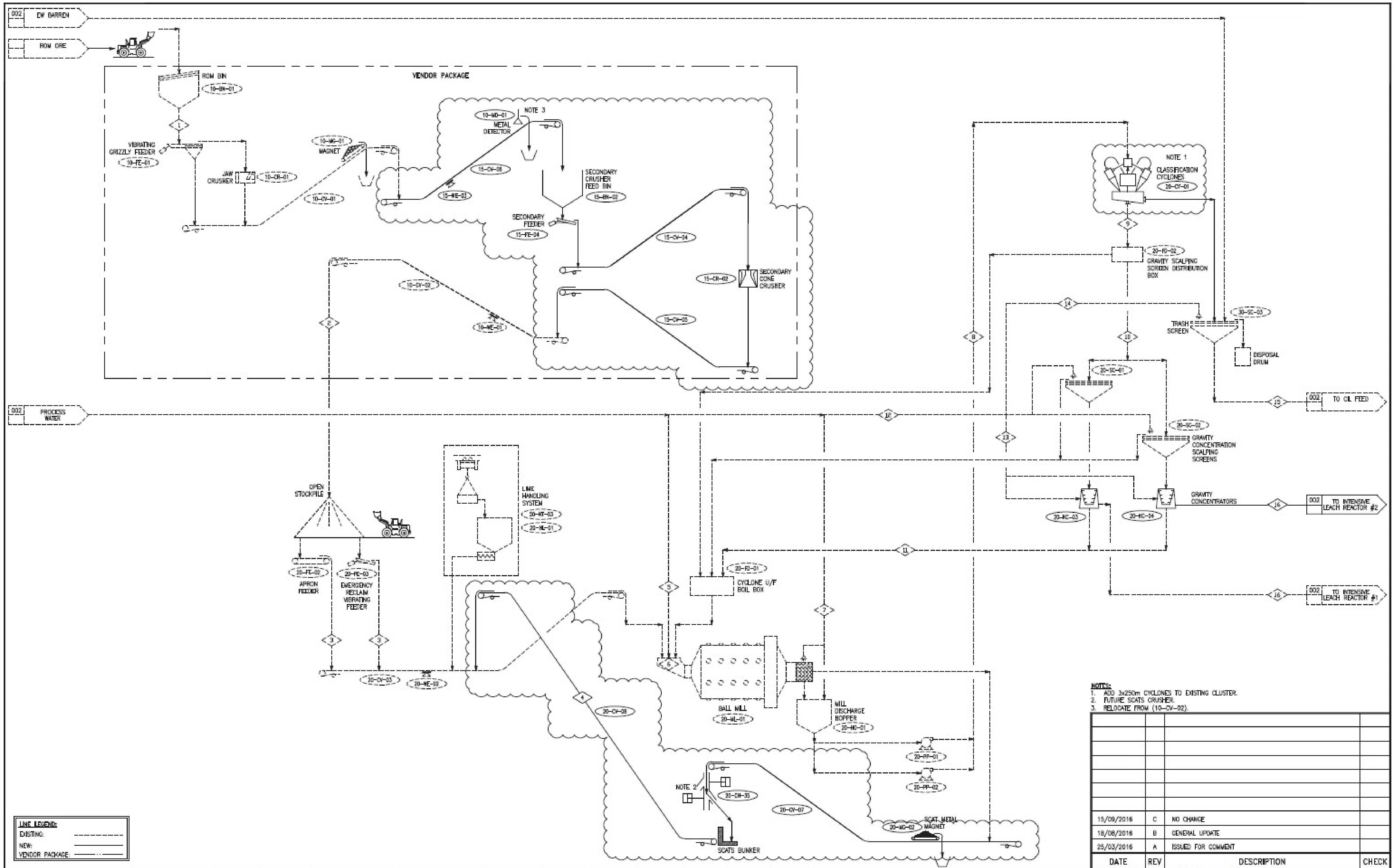
Table 80: Summary of the Plant Design Criteria

Process Design Criteria	**Unit**	
Annual throughput	tpa	401,600
Plant utilization	%	91.3
Daily production at stated utilization	tpd	1,100
Crushing circuit		Two Stage Crushing
Crushing circuit product, P_{80}	mm	<20
Required grinding throughput	tph	50.2

Process Design Criteria	**Unit**	
Mill motor power draw	kW	994
Mill % critical speed	%	73
Mill maximum ball charge	% v/v	27
Mill discharge density	% w/w	65-69
Cyclones operating	No.	3
Design gravity gold to concentrate	%	50-70
Leach feed rate solids	tph	50.2
CIL number of tanks	No.	8
CIL type of tanks		1 Leach, 7 Adsorption
CIL residence time target	hours	24
CIL residence time actual	hours	26.5
Thickener design feed - solids	tph	50.2
Thickener diameter design	m	8.0
Number of thickeners installed	No.	2
Required elutions per week	No.	8
Number of elutions per week – max.	No.	10
Elution solution electrowinning:		
Total number of cells	No	2
Electrowinning current required	A	800
Gravity solution electrowinning:		
Total number of cells	No	2
Electrowinning current required	A	792

The flowsheets for the process plant are presented in Figure 55 and Figure 56.

Water is sourced from a tailing storage facility decant return, water storage dam, supplemented from the underground mine dewatering system, and from the plant containment dam (wet season). The water storage dam is located approximately 2 km from the plant, adjacent to the tailings storage facility.



Stream No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	15	16
Solid (t/hr)	65.0	65.0	50.2	9.2		184.9		175.7	125.5	95.0	85.5				50.2	50.2	0.03
Water (m3/hr)	3.4	3.4	2.6	1.0	8.0	82.2	25.0	108.4	46.7	35.3	58.9	6.0	18.0	3.5	61.7	65.2	0.14
Pulp (t/hr)			52.8	10.3	8.0	267.1	25.0	284.0	172.2	130.3	144.3	6.0	18.0	3.5	111.9	115.4	0.17
Pulp (m3/hr)			20.6	4.3	8.0	148.2	25.0	171.1	91.5	69.2	89.4	6.0	18.0	3.5	79.6	83.1	0.15
% Solids (w/w)	95%	95%	95%	90%		69%		62%	73%	73%	59%				45%	44%	18%
SG Solids	2.80	2.80	2.80	2.80				2.80	2.80	2.80	2.80				2.80	2.80	4.00
SG Pulp			2.57	2.37	1.00	1.80	1.00	1.66	1.88	1.88	1.61	1.00	1.00	1.00	1.41	1.39	1.16

DATE	REV	DESCRIPTION	CHECK
15/09/2016	C	NO CHANGE	
18/08/2016	B	GENERAL UPDATE	
25/03/2016	A	ISSUED FOR COMMENT	

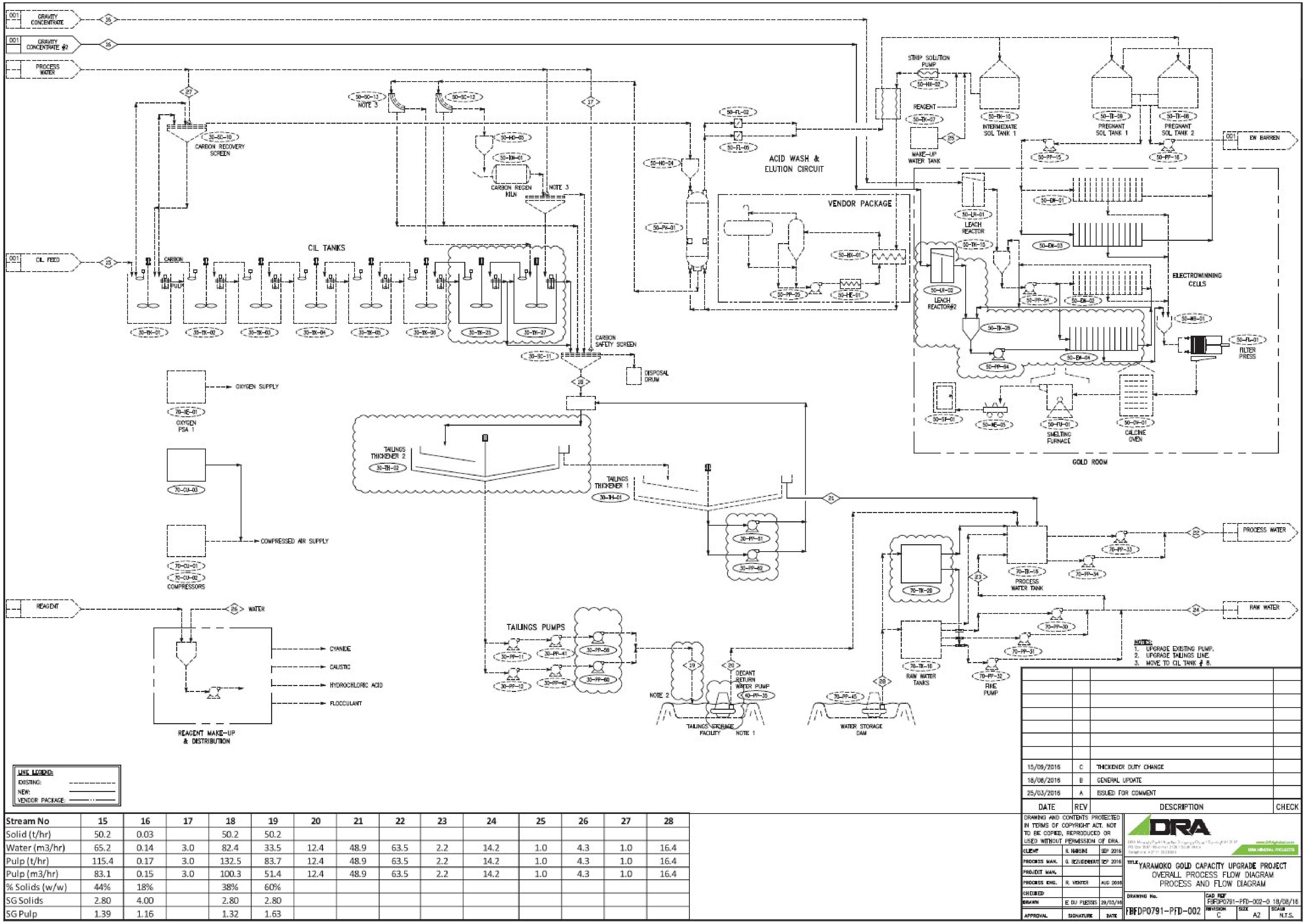
CLIENT	R. HARSINE	SEP 2016
PROCESS MAN.	G. BEZUIDENHOUT	SEP 2016
PROJECT MAN.		
PROCESS ENG.	R. VENTER	AUG. 2016
CHECKED		
DRAWN	E DU PLESSIS	29/03/16
APPROVAL	SIGNATURE	DATE

DRA MINERAL PROJECTS

TITLE YARAMOKO GOLD CAPACITY UPGRADE PROJECT
OVERALL PROCESS FLOW DIAGRAM
PROCESS AND FLOW DIAGRAM

DRAWING No. FBFDP0791-PFD-001
CAD REF FBFDP0791-PFD-001-0 18/08/16
REVISION C | SIZE A2 | SCALE N.T.S.

Figure 55: Yaramoko Gold Processing Plant Expansion Flowsheet (Part 1 of 2). Dotted Lines Indicating Existing Equipment and Solid Lines Indicating New Equipment.



Stream No	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Solid (t/hr)	50.2	0.03		50.2	50.2									
Water (m3/hr)	65.2	0.14	3.0	82.4	33.5	12.4	48.9	63.5	2.2	14.2	1.0	4.3	1.0	16.4
Pulp (t/hr)	115.4	0.17	3.0	132.5	83.7	12.4	48.9	63.5	2.2	14.2	1.0	4.3	1.0	16.4
Pulp (m3/hr)	83.1	0.15	3.0	100.3	51.4	12.4	48.9	63.5	2.2	14.2	1.0	4.3	1.0	16.4
% Solids (w/w)	44%	18%		38%	60%									
SG Solids	2.80	4.00		2.80	2.80									
SG Pulp	1.39	1.16		1.32	1.63									

Figure 56: Yaramoko Gold Processing Plant Expansion Flowsheet (Part 2 of 2). Dotted Lines Indicating Existing Equipment and Solid Lines Indicating New Equipment.

17.2.2 Process Plant Description

The following sections describe the plant operation.

Crushing Circuit

The crushing circuit is fed with a CAT966 front end loader via the ROM bin. The crushing circuit is based upon two-stage crushing (primary jaw and secondary cone) at 1,100 tpd, with secondary crushing operated in open circuit at a design feed rate of 100 tph. The crusher circuit produces a final product particle size of P80 of 20 mm. Feed control into the crushing circuit is via a variable speed feeder to a jaw crusher, with choke fed secondary crushing operations maintained by a surge bin and variable speed feeder prior to the secondary crusher.

The crushing circuit also includes a belt magnet for tramp steel removal, a metal detector prior to secondary crushing, and a weightometer.

Reclaim, Grinding, and Classification Circuit

An apron feeder inside the stockpile tunnel reclaims crushed ore from under the stockpile and discharges onto the mill feed conveyor, which feeds the (4.2-meter diameter by 4.8-meter effective grinding length) Ball mill at the designed feed rate of 50.2 tph. The mill feed conveyor is fitted with a weightometer for control and accounting purposes. The quicklime handling system located next to the mill feed conveyor doses 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.

A vibrating reclaim feeder can be used as an emergency feeder loaded by a front-end loader in situations where the main reclaim apron feeder is under maintenance.

The addition of grinding media into the ball mill is a manual process onto the mill feed conveyor.

The SAG mill operates with a ball charge of between 20 to 27 percent volume/volume and a maximum total load of 35 percent with pinion power draw of 996 kW. A variable speed drive is installed on the mill to vary the mill speed, so that it caters for changes in ore characteristics.

The ball mill discharge product passes through a trommel screen, with oversize (Scats) reporting to a bunker. Scats are recycled back into the mill feed with front-end loader via the emergency feeder.

Trommel screen undersize discharges into mill discharge hopper before being pumped to the classification cyclone cluster, six cyclones are installed on the cluster with four duty, and two on standby. The cyclones classify the slurry feed into two products: underflow and overflow. The overflow product size distribution is P80 passing 90 microns, the overflow product reports to the trash removal vibrating screen before being fed to the leaching circuit. The coarse material (cyclone underflow) feeds the two gravity scalping screens, the < 2mm material from the gravity scalping screens passes through the two semi-continuous centrifugal gravity concentrators from which the tails and gravity screen overflow recombine 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 which then directs the product back to the SAG mill feed spout for further grinding.

Grinding Recovery Circuit

The gold concentrates recovered from the gravity concentrators (from the screened cyclone underflow slurry) are sent to two intensive leach reactors within the gold room, where the process batch leaches the gold into pregnant liquors. The pregnant liquors are pumped to storage tanks for electrowinning in dedicated electrowinning cells. Barren solution from the electrowinning cells are sent to the CIL circuit. The gold sludge collected from the electrowinning cell is refined to produce the final gold product.

Leaching and Adsorption Circuit

The CIL circuit consists of a pre-oxidation leach tank and, seven adsorption tanks in series, which can be converted to eight adsorption tanks if required. Total leach residence time is 26.5 hours.

Each tank is fitted with an agitator, pumping interstage screen (except Tank 1) and carbon transfer pump (except Tank 1) with oxygen or air sparging 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 Tank 1. Cyanide addition is to CIL tank 1 to a set point of 200 ppm free cyanide in solution.

Carbon is held in all tanks except the first tank, carbon is batch transferred counter current to the slurry flow to achieve the highest possible gold loading on carbon. The carbon is transferred from CIL tank 2 (or 3) to the loaded carbon recovery screen for elution purposes. The carbon recovery screen oversize reports to the acid wash hopper, while the undersize returns to the CIL circuit.

Tails from CIL tank 8 report to the carbon safety screen, which will collect any carbon that escapes the leaching circuit. The undersized product from the carbon safety screen reports to an 8-meter diameter high-rate thickener from which the underflow is pumped (in 3 stages -1 pump train duty + 1 pump train stand by) to the lined tailings storage facility. Thickener overflow reports to a second 8 m diameter high-rate thickener which acts as a water clarifier, overflow is gravity fed to process water tank.

Hydrogen cyanide 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.

A tower crane, situated adjacent to CIL circuit, provides lifting services for CIL Tanks, thickeners and, the grinding circuit.

Elution Circuit and Gold Room Operations

CIL carbon is batch treated in a 1.5 t split Anglo-American Research Laboratory (AARL) elution circuit. Loaded carbon is collected in the acid wash hopper, dilute hydrochloric acid solution is pumped to acid wash hopper to remove chemically bounded impurities. After soaking the carbon in the acid solution, the carbon is rinsed by passing water through the hopper while the hopper overflows to the carbon safety screen.

Acid washed carbon is then loaded into the elution column 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 caustic soda and cyanide solutions is dosed into fresh water and introduced into the bottom of the elution column at a temperature of 130 °C to soak the carbon. After soaking, more intermediate solution is used to elute the carbon into one of the duty/standby pregnant solution tanks. On completion of the elution cycle raw water is passed through the column into the intermediate solution tank to rinse the carbon, and after to cool the carbon. The solution in the intermediate tank is stored to be used for the next elution cycle.

Eluted carbon is educted from the elution column using raw water and reports either to the CIL tank 8 or, the carbon regeneration kiln. The carbon is reactivated by a diesel fired regeneration kiln and discharges into a quench box reporting to Tank 8.

Elution pregnant solution is received in either of the pregnant solution tanks. Caustic solution is dosed into the pregnant solution tanks to give required elevated conductivity levels necessary for electrowinning. Pregnant solution is circulated through the electrowinning circuit with barren solution transferred back to the CIL after electrowinning has been completed.

Cathodes are removed from the electrowinning cells by hand, the cathodes are washed with a high-pressure water to recover the sludge. The sludge is dewatered and dried in an oven.

Fluxes are added to the dried sludge prior to smelting in the furnace. Gold and slag from the smelting process are decanted into the pouring molds where gold doré is recovered as the final product. The gold sludge from the gravity circuit is refined (by the same method) 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 fume extraction systems, safes, scales and security systems.

Tailings Disposal

Underflow from 8m diameter high-rate thickener is pumped to the lined tailings storage facility, at slurry density 57 percent solids.

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.

17.2.3 Reagents

The costs of reagents are based upon the rates that have been realized during the year 2022. A summary of the unit rates of the reagents is presented in Table 81.

Table 81: Process Plant Reagent Unit Costs

Reagent	Unit Cost ($/t)
Lime (CaO)	0.45
Cyanide (NaCN)	4.29
Caustic Soda (NaOH)	1.74
Hydrochloric Acid (HCl)	0.86
Activated Carbon	4.18
Flocculant	5.77

Lime

Quicklime is delivered to site in 1,200 kg bags. The 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 t bags stored within wooden boxes. 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. Cyanide solid storage onsite is within dedicated storage reagent shed with limited access.

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 kg bags. The caustic mixing system consists of a hoist, bag splitter, mixing tank, agitator, and two dosing pumps and 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 l 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 kg 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 fully automated dry powder flocculant mixing plant is used for preparation of the liquid flocculant required in the tailing thickener. Flocculant is delivered in 25 kg bags.

17.2.4 Control Systems and Instrumentation

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 (PLC) 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 synchronized 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 centers.

SCADA terminals are installed in the following locations:

- Main control room (above CIL deck).
- Crusher control room.
- Desorption control panel.
- Electrical supervisor's office.

17.2.5 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.

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.
- Bagassi South.

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 are not required. The following transformers are in place:

- Crushing area transformer (kiosk mount).
- Wet plant area transformer x 2 (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).

The following motor control centers are within the plant site:

- Crushing area motor control center.
- Wet plant motor control center x 2.
- Decant motor control center.
- Toe drain motor control center.
- Seepage pumps motor control center.
- Water storage dam motor control center.

The motor control center designs are traditional, incorporating hard-wired signals to programmable logic controllers (PLCs) mounted within cubicles installed at the end of each main motor control center. The new motor control center 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 kW, or for variable speed drives. Electronic motor protection is incorporated in motor starters for drives 110 kW and above. Motor starters for motors rated 220 kW 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.

17.2.6 Services

Compressed Air

Plant air and instrument air is supplied by two duty and one stand-by compressors located north of the leaching area.

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 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 stand- by pumps to the plant.

Raw Water

Raw water from the water storage dam is delivered to two raw water tanks and supplemented by water from plant containment pond in the wet season. When there is excess capacity, overflow from the raw water tank is gravity fed to the process water tank. Raw water is delivered in the process plant by duty and standby pumps to 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.

Potable Water

Bore 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

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.

17.3 Comments on Section 17

The QP considers process requirements to be well understood, and with seven years of operating history to support future assumptions. There is no indication that the characteristics of the material being mined will change and therefore the processing and recovery assumptions applied for future mining, including that mined from the open pits, are considered as reasonable for the LOMP. The plant is of a conventional design and uses conventional consumables.

18 Project Infrastructure

This section summarizes the current Yaramoko Gold Mine infrastructure (Figure 57) along with the additional needs to support the open pit plan.

The infrastructure discussed herein represents the installed infrastructure to support the operating Yaramoko Gold Mine and the proposed additional infrastructure necessary to facilitate open pit mining.

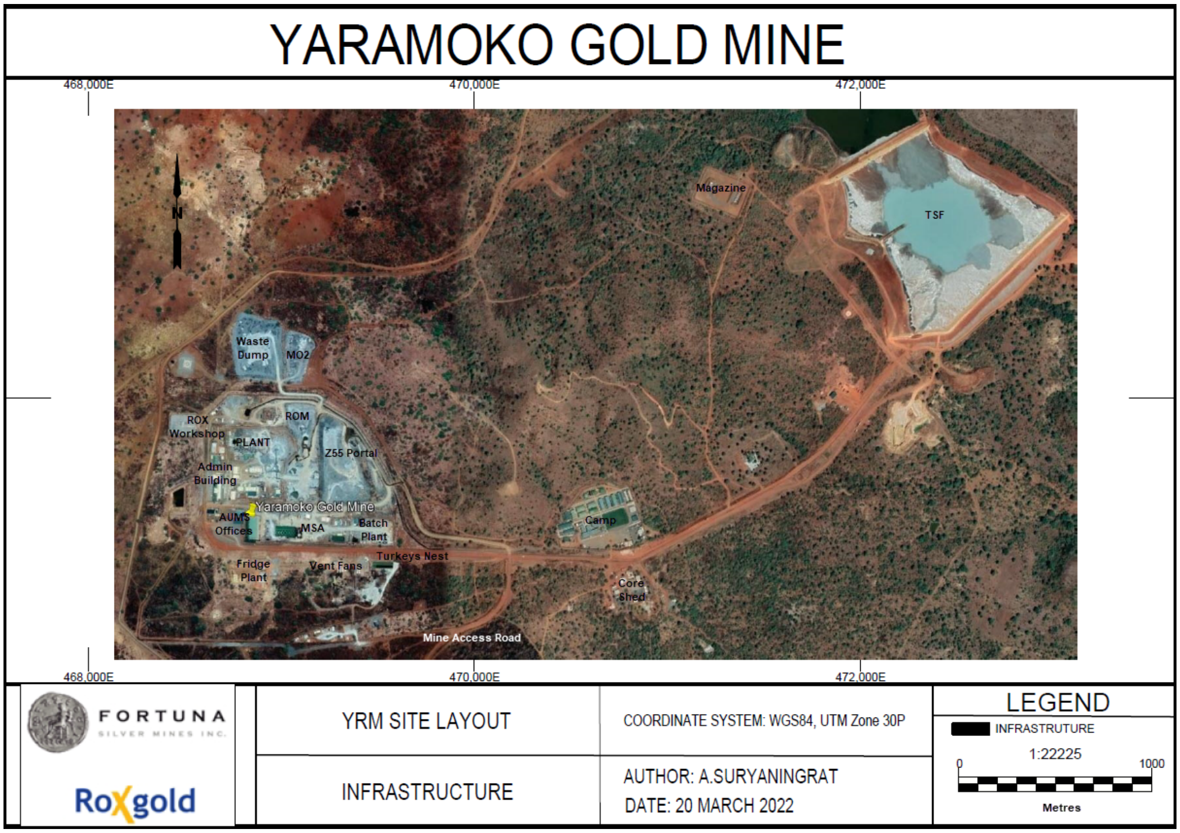


Figure 57: Yaramoko Gold Mine – Plan View

18.1 Process Plant

Mineralized material is transported from the 55 Zone and Bagassi South underground mines via the decline and placed in stockpiles on the ROM pad located east of the process plant. Ore is fed by front-end loader from the ROM stockpiles to the crushing circuit. The crushed ore is conveyed to the crushed ore stockpile where it is then reclaimed and conveyed to a single stage ball mill for grinding. Gold is recovered by either the gravity or CIL circuit and refined via electrowinning and smelting.

18.2 Mine Service Area

The mine services area is adjacent to 55 Zone within a general security perimeter fence. This infrastructure and services also support Bagassi South. In this area, the following contractor functions/items are included:

- Change room.
- Workshops.

- Warehouse.
- Offices.

Within a fenced perimeter adjacent to Bagassi South there is a small (containerized) office and laydown area. At Bagassi South the following mine infrastructure support the mine operations:

- Satellite containerized office and workshop.
- Water settling sumps and pumping.
- 3.5 m diameter. exhaust shaft and 315 kW return air fan.

18.3 Tailings Storage Facility

The tailings storage facility is located approximately 2.4 km east-northeast along the access road from the process plant. It comprises a valley storage facility formed by two multi-zoned earthfill embankments.

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 m in the deep surface horizon, and one deep bore terminating at approximately 60 m 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 mm depth low permeability soil liner of permeability less than 1 x 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 mm 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.

Staged tailings storage facility capacities and crest elevations are summarized in Table 82.

Table 82: Life of Mine Staged Tailings Storage Facility Capacities and Embankment Crest Elevations

Date Completed	Stage	TSF Cumulative Storage (Mt)	TSF Embankment Crest Elevation (mRL)
April 2016	1	0.55	312.6
July 2018	2	1.19	314.9
March 2020	3	2.29	320.0
December 2021	4	3.63	323.8
September 2024	5	4.37	326.0

Key design parameters maintained for the LOM review are listed below:

- Embankment freeboard - Greater of:
  - 0.5 m above maximum tailings elevation.
  - 0.5 m 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.

18.4 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 m^3 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.

18.5 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 kph on the process plant and camp access road and on the approach curves to the junction; 80 kph on the road back to Bagassi.
- 3 percent crowned road on straights.

- Super-elevation on curves – 4 percent maximum.
- Formation width: 8 m with table drains (0.7 m deep by 2.1 m wide).
- Cut and fill batter slopes 1 in 3.
- Intersections designed to accommodate semi-trailer type vehicles.

The 55 Zone and Bagassi South underground mines are accessed via a portal. A haul road connects the 55 Zone underground to the ROM pad where ore is stockpiled ready to be fed by front-end loader into the ROM bin. Similarly, a haul road connects the Bagassi South underground to the existing access road where trucks will transport ore for stockpiling on the ROM pad. Adjacent to the ROM pad is a storage area for mine waste rock that may be hauled underground as backfill.

18.6 Administration and Plant Buildings

The Yaramoko Gold Mine 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.

18.7 Water Supply and Sewage

18.7.1 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 high-density polyethylene pipeline has an approximate length of 3,700 m and is connected to the raw water tank within the process plant. This tank 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.

Water balance modelling indicates that the water storage dam stored volume will be cyclical, potentially returning to empty during each dry season. A bore field is located to the northwest of the processing plant and at Bagassi South. These bores will be used to supplement the water storage dam flows and meet the extra demand during periods of prolonged dry conditions.

18.7.2 Process Water

Process water will be delivered to the process water tank adjacent to the process plant via the following sources:

- Overflow from the raw water tank.
- Tailings storage facility decant return water.
- Clarified thickener overflow.
- Water from underground following removal of sediment and any hydrocarbon contamination.

- Raw water make-up.

18.7.3 Potable Water

Water supplied from a production bore is pumped to a 150 m3 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.

18.7.4 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.

18.7.5 Sewage

There is a sewage treatment plant with a capacity to treat 120 m3per 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 throughput the camp (e.g. gardens, soccer field).

18.8 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. 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 Mine. 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. Table 83 sets out site power consumption since 2017.

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 kW.

Table 83: Site Power Consumption Since Connecting to the Burkina Faso Electrical Grid (February 2017)

	Unit	2017	2018	2019	2020	2021	2022
Process Plant incl Process Plant Buildings	(Mhr)	9,779	10,839	15,136	16,014	16,188	16,562
Camp incl Exploration and Gendarme Camp	(Mhr)	2,379	1,109	1,567	1,530	1,549	1,272
Mining/Underground	(Mhr)	11,595	14,862	22,877	24,322	30,933	32,290
Admin Buildings	(Mhr)	398	266	251	253	302	323
Total	**(Mhr)**	**24,150**	**27,076**	**39,831**	**42,119**	**48,971**	**50,477**

18.9 Underground Mining Infrastructure

The mining contractor, AUMS has an area 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 m) from people. The magazine is secured within a fenced compound and surrounded by embankments. The magazine is continuously manned by security personnel.

18.10 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 handheld 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.

18.11 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 m apart and 2.4 m high. This high security area includes electronic surveillance by CCTV cameras.

Electronic security has been provided by a reputable security system provider (IDtek/Afritron) 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, Bagassi South and tailings storage facility. The security fence consists of a 2.0 m high fence with razor wire at the top of the support posts.

A cattle fence is installed around the water storage dam.

Additional fencing, security personnel, and electronic security is planned for mining the 109 Zone open pit which is located outside of the Yaramoko mine complex.

18.12 Accommodation Camp

The existing accommodation camp and facilities has the capacity to house 306 staff. It is located approximately 1.2 km east of the process plant and consists of the following major components:

- 3 x 4-person manager style self-contained units complete with bedroom, en suite bathroom and toilet.
- 6 x 12 person and 1 x 18-person single room units complete with bedroom, en suite bathroom and toilet.
- 4 x 36 person and 1 x 14-person double room units with central ablutions.
- 16 x 2-person double room 6 m 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.

18.13 Open Pit Mining

The development of the 55 Zone open pit is proposed to commence upon completion of the Zone 55 underground mine and would require existing infrastructure to be relocated or decommissioned in advance of it. The development of 109 Zone open pit is proposed to commence in Q2 of 2023 which includes extension of the current security fence line, deviation of existing road, and additional security system to cover the mining area.

The footprint of the 55 Zone open pit is directly where current underground infrastructure of vent fans, refrigeration plant and surface water settlers are located. To reduce the transition time between underground and open pit mining, pit design has been completed to be mined over three stages, with stage 1 commencing in the southwest, which provides the opportunity for decommission and relocation to be completed in parallel with mining.

Other works required to be completed during stage 1 mining of the 55 Zone open pit includes diversion of the access road that currently exists between the camp, processing and mining areas, and relocation of gensets and batch plant as the infrastructure are within the 55 Zone footprint.

Additional infrastructure required for both the 109 Zone and 55 Zone open pit mining includes haul roads constructed from the pit ramp crest to both the ROM pad and the waste rock dumps; and clearing and land compensation for all pit, haul road, and waste rock dump areas. The existing maintenance workshop and washdown bay may require upgrading to facilitate larger open pit mining equipment if the workshop located close to the TSF is deemed unsuitable. The existing emulsion facility and magazine may also need to be upgraded to facilitate the larger volume of explosive consumption required for open pit mining.

Details of the maintenance workshop, washdown bay, emulsion facility and magazine will be prepared in consultation with the open pit mining contractor prior to the mining contract being awarded.

Sufficient surface water diversion around pit and waste rock dump areas will be implemented using bunds and drains. It is not anticipated that additional culverts will be required.

Existing turkey's nests, or temporary small water dams, will be used to pump pit water, as well as draw water for dust suppression.

18.14 Comments on Section 18

The QP is of the opinion that the infrastructure required to support the underground LOMP is in place. Certain infrastructure components have been identified that will require relocation as part of the proposed 55 Zone and 109 Zone open pits development and sufficient landscape has been identified to accommodate these changes.

19 Market Studies and Contracts

19.1 Market Studies

Roxgold has not conducted a market study in relation to the gold doré which may be produced by the Yaramoko operation. Yaramoko has been a producing operation since 2016.

Gold is a freely traded commodity on the world market for which there is a steady demand from numerous buyers. The Fortuna financial department provides Yaramoko with gold price projections for inclusion in budget and business plan preparations. Pricing is based on long-term analyst and bank forecasts for gold.

19.2 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.

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.

A contract with Paramina for the provision of skilled labour hired to completed mining services at Bagassi South QV' including operating development and extraction of stopes safely and efficiently within the production requirements range in accordance with the specifications, plans and schedules.

A contract with DeSimone for the provision for haulage and stockpiling of ore and waste safely and efficiently within the production requirements range in accordance with the specifications, plans and schedules.

19.3 Comments on Section 19

The QP has reviewed the information provided by Fortuna on metal price projections and exchange rate forecasts and notes that the information provided is consistent with what is publicly available for industry norms.

Long-term metal price assumptions used in this Report are based on a consensus of price forecasts for those metals estimated by numerous analysts and major banks. Over a number of years, the actual metal prices can change, either positively or negatively from what was earlier predicted. If the assumed long-term metal prices are not realized, this could have a negative impact on the operation's financial outcome. At the same time, higher than predicted metal prices could have a positive impact.

20 Environmental Studies, Permitting and Social or Community Impact

This section of the Report was compiled by Mr. Julien Baudrand, Senior Vice-President Sustainability of Fortuna, under the supervision of the QP.

In 2014, a Study on the environmental feasibility of the Yaramoko Gold Mine 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'Environement (BEGE), a Burkina Faso private consultancy, 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 compliance with IFC Performance Standards.

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.

In 2017, the same approval processes (i.e. ESIA and RAP) were followed for the Bagassi South expansion project. Roxgold contracted the Burkinabè consulting firm EXPERIENS SARL to complete the initial baseline studies and prepare the ESIA and RAP for the impacted area. The corresponding ESIA and RAP were submitted on October 2017 and approved in December 2017 by Decree n°2017-431/MEEVCC/CAB.

In 2022, a third ESIA and its accompanying RAP were developed as part of the approval process for the Zone 109 Open Pit project. These documents were again entrusted to EXPERIENS SARL, with new ESIA and RAP submitted in August 2022. Formal approval is expected in the second quarter of 2023.

Zone 55 Open Pit project will be permitted using a similar process to Zone 109, with environmental and social studies to be undertaken in 2024.

Zone 55 Open Pit project will be permitted using a similar process to Zone 109, with environmental and social studies to be undertaken in 2024.

Based on these ESIAs, the main potential 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 potential 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 Plan and System based on ISO 14001 and IFC Performance Standards. No significant environmental or social incident, grievance, or non-compliance has been recorded due to the Yaramoko mining activities since the start of operations in 2015.

The environment and social management plans in the ESIAs have been fully implemented as planned to mitigate the impacts. Internal as well as government inspections and audits carried out since 2016 have not identified any serious issues.

20.1 Environmental and Social Studies

This section provides a summary of the baseline environmental and social studies undertaken for the 2014, 2017 and 2022 ESIAs and an update of data to December 31, 2022.

20.1.1 Climate

Long term climate conditions were taken from the Boromo weather station (1971-2011, located 36.7 km east of the Yaramoko Gold Mine at an approximate elevation of 259 m above sea level). The climate of the project area is typically Sudano-sahelian semi-arid with temperatures ranging from 15 degrees °C (nighttime) in December to 45 °C (daytime) 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 mm, 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 mm.

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 the wet monsoon blows from the west and southwest. The project area is relatively calm with low (wet season) to moderate (dry season) winds (from 1 to 2 m per second (m/s)). More than 72 percent of the winds were below 2.1m/s (of which more than 29 percent were calm) and only 0.1% of the winds were 5.7m/s or greater.

20.1.2 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 charcoal 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.

20.1.3 Noise and Vibration

The property 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 serves the purpose of a noise buffer from operational activities. No impact of the present mine in operation has been detected nor any complaint received. Blast monitoring shows that blasting vibration is low, with nine out of 10 consecutive blasts generating a maximum of 5 mm per second peak particle velocity and not greater than 10 mm per second peak particle velocity at any time during the daytime, complying with the standard (Australia 160122, EM2402, Version 3.00).

20.1.4 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.

20.1.5 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 property area, a ridge of hills running north-south forms a watershed between sub-catchments.

20.1.6 Hydrogeology

Hydrogeological studies were conducted to characterize mine hydrogeology and quantify groundwater ingress into the underground workings in the 55 Zone and Bagassi South areas, as well as assess groundwater impacts from the Zone 109 open pit project. 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 m below ground level. Ground water flow is generally in a south westerly direction (although regionally it flows south towards the Grand Balé). A groundwater 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.

20.1.7 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 centimeter (µS/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 since the start of mining activities.

20.1.8 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 property is surrounded by three classified forests: (i) Bonou, which is a forest reserve with an area of 5,453 hectares (ha), located approximately five km from the mining area; (ii) Pâ (forest reserve), with an area of 12,178 ha, located approximately eight km from the mining area; (iii) and 2 Bale (61,665 ha) wildlife reserve, located 22 km from the mining 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 mining 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.

Following enclosure of the mine site with fencing and the implementation of biodiversity conservation measures on the mine site, a significant improvement in the ecological diversity has been noted in the 2021 Fauna and Flora survey. The mean density of generating plant increased from 905 individuals per ha in 2018 to 1,972 individuals per ha in 2021, while the 2022 wildlife population survey recorded 91 species of birds and 15 species of mammalians versus 55 and 2 respectively compared to the 2014 survey.

20.1.9 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, eight ethnographic sites and two archaeological site were found within the overall Yaramoko mine permit area. Two of the sites, a sacred site “Sinlé” and an artisanal miners’ cemetery, are located within 500 m of the process plant site. Three sacred sites and one artisanal miners’ cemetery are also located within 500 m of the Bagassi South operation. All the archeology and cultural heritage site within the operating mine permit area have been protected (fenced), respecting the expectations of the communities consulted.

20.1.10 Communities

The population of the rural municipality of Bagassi (Commune de Bagassi) in 2006 was 33,309. In 2022, this population is estimated at 42,424 inhabitants. The area is characterized by its youth population, estimated at 54 percent under 20 years of age. Ethnic groups in the immediate communities consist mainly 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 center of village-level decision-making for matters concerning the village and power is usually patrilineal, transmitted among descendants. Besides the Village 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 49 percent. Educational institutions include both primary and secondary education, as well as three identified adult literacy centers and a skills training center 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, rhino- pharyngitis, intestinal parasites, and trauma. There is a chronic lack of equipment, midwives, and medicine stock. The community 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. A total of 815 ha of land and 450 ha of crop were subject to a Resettlement Action Plan (RAP) developed in two phases (Phase one in 2014 and Phase 2 in 2017). The 2022 Zone 109 project RAP in turn concerns 95 ha of land and 90 ha of crops.

In order to mitigate negative impacts and risks, while optimizing the positive impacts of the project, an environmental and social management plan is in place and takes 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 networks. Road dust suppressor, noise cancelling berm, reforestation program, land and building compensation and livelihood restoration program are some of the measures implemented.

20.1.11 Bagassi Artisanal Mining Activities

Before the arrival of the first Mossi artisanal miners in Bagassi, in 2000, the Bwaba of the Bagassi locality maintained a myth about gold that it was perceived as a divine gift and used in rituals as a newborn bath (gold added to the water). There was no particular exploitation of gold at that time. Since then, artisanal mining activity has developed very rapidly. Young Bwaba became more involved in this activity, which expanded over time, reaching all levels of Bwaba society leading in turn to the development of villages of artisanal miners, mainly with non-natives. The largest of which were those in Zone 55 and Bagassi South. The development of the Yaramoko mine resulted in closure of these two main illegal artisanal mining sites with people.

An artisanal mining site is present in and around the 109 Zone located 100 m north from the fence of the mine site (process plant area). This artisanal mining site is frequented by about 190 persons, though this number is variable given the fluctuating nature of their activities. The impacts of the Zone 109 project on these persons is addressed in the ESIA an RAP submitted in August 2022 and pending formal validation in the second quarter of 2023. This permitting process has included extensive consultation with affected stakeholders and local authorities, both traditional and administrative, and defines a consensual and mutually satisfactory process for Zone 109 project access to the area.

The artisanal mining activity around the Yaramoko permit is otherwise characterized by sporadic surface work practiced primarily by women and children from the villages around the mine, ranging from individuals up to groups of 100 people. There has been regular and ongoing dialogue with artisanal miners since 2016, and no significant incident has been recorded in this time.

20.2 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. This framework will guide the requirements for future permit modifications to support the 55 Zone Open Pit development, in a similar way to which the Bagassi South extension was granted in 2018. The Zone 109 project is undergoing permitting.

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 to apply for and obtain an 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 operate is an Avis de Conformité et de Faisabilité Environmentale, which is issued by the Ministry of Environment and Sustainable Development (MEDD through its environmental agency named Agence National des Evaluations Environnementales (ANEVE, ex BUNEE). The ANEVE has the mandate to promote, monitor and manage all the environmental assessment process in the country. Such an Avis de Conformité et de Faisabilité Environmentale has been provided by the Minister of Environment.

The ANEVE reviews 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 this approval is summarised in the steps below:

1. Prepare and submit a Term of Reference for the ESIA to ANEVE.
2. Approval of the Term of Reference by ANEVE.
3. Scoping meeting for the ESIA preparation (ANEVE and Roxgold).
4. ESIA prepared / updated and submitted to the Ministry of Environment who then forwards it to ANEVE.
5. Once ANEVE has formally acknowledged receipt of the ESIA, public consultations will be organized in the mine area.
6. Once the Public Survey is completed ANEVE creates a technical committee (Comité Technique des Evaluations Environnementales, COTEVE) to review the ESIA.
7. If the ESIA is deemed satisfactory, ANEVE issues the Avis de Conformité et de Faisabilité Environmental (the positive decision of the Ministry of Environment).
8. Once the Avis is issued by the Ministry of Environment, an application to extend/amend the exploitation permit in accordance with the updated ESIA, can be filed with the National Commission of Mines to the Ministry of Mines and Energy (process detailed in Section 3).

As part of the ESIA process, the following plans have to be submitted:

- The Resettlement Action Plan.
- The Rehabilitation and Closure Plan (updated from Yaramoko).

This approval process was applied for and followed the initial mine development and the expansion for Bagassi South. This process is ongoing for the 109 Zone open pit project and the same approach will be utilized for the Zone 55 open pit phase of the project once 55 Zone open pit project engineering is finalized and the ESIA is able to be updated accordingly.

As part of the permitting process, Roxgold is committed to the Equator Principles and International Financial Corporation (IFC) guidelines, most notably the IFC's Performance Standards and the Environmental, Health, and Safety General Guidelines.

20.3 Stakeholder Engagement

Roxgold Sanu 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 village 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).

- Mine site visits.
- 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 mine.

The main stakeholders identified by Roxgold for the development of the Yaramoko Gold Mine 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 Organizations (NGOs).
- Community based organizations.
- Commerce and industry.
- Employees and contractors of the Yaramoko Gold Project.
- Financiers (e.g. IFC) and Shareholders.

For any future extension project, such as the Zone 55 open pit 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 team, including presentations of the project, community representatives' meetings, special committee, public enquiries, billboard and/or broadcasting. The stakeholders include mainly:

- Project Affected Persons (PAP), households and communities.
- Relevant traditional and political authorities (from Bagassi).
- Responsible government agencies and technical services (ANEVE, COTEVE).
- Interested civil society organizations.

20.4 Mine Closure

There are no specific references to rehabilitation or mine closure requirements in the Environmental Code (L005/97/ADP) or the ESIA (ESIA) Decree (D2001- 342/PRES/PM/MEE). However, the ESIA guideline for mining (Guide Sectorial D'Étude et de laNotice 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 directive on the elaboration of rehabilitation and closure plans for mining sites in Burkina Faso defines guiding principles and main activities and techniques for mining sites rehabilitation and closure as well as the Modalities for developing and updating a Rehabilitation and Closure Plan (RCP). A technical committee named "Comité Technique interministériel d'examen des pals et programmes de réhabilitation et des fermeture des mines" is created for review and validation of the RCP according to the arrete interministeriel N°2019-554 MEEVCC/MMC/MINEFID/MATDCS. The rehabilitation and closure plan should include a list of management measures, costs, responsibilities and schedule for implementation of the actions.

An original closure plan for the Yaramoko Gold Mine originally approved by the Government was updated in 2017 to incorporate additional infrastructure related to the Bagassi South expansion. In 2021 this was further updated to include new infrastructures such as the refrigeration plant, the new maintenance workshop, the airstrip area, the TSF embankment raises, and laterite borrow pits. The closure plan was again updated for 2022 to reflect the evolution of existing structures and the creation of new structures (notably, an emergency spillway).

The cost of the present closure plan is summarized in Table 84. The table does not include the closure costs of the Zone 109 project as this project is still pending ESIA validation (due in Q2 2023). These costs are estimated in the ESIA at US$ 524,137. The mine closure plan will therefore require formal updating to include the Zone 109 project once its ESIA is validated. It will also be updated again, once the final technical definition for the 55 Zone open pit project is finalised and the ESIA updated and approved and the above-mentioned permit process advanced. The rehabilitation of waste dumps to conform with the baseline landscape and pit infrastructure will also need to be considered.

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 mine. 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 agriculture and livestock grazing land uses.

Table 84: Yaramoko Mine Closure Plan Cost Estimate (2022) (excluding Zone 109 and Zone 55 open pits)

Closure actions	**Cost (US$)**
General site cleaning	1,328,892
Access to underground mines and related infrastructure	157,615
Borrowing pits	126,893
Waste rock and ore storage areas	509,644
Ore processing plant	6,072,667
Piping	3,726
Support infrastructures for the mining operation	168,566
Diesel plant and fuel stations	15,718
Explosives magazines	40,659
Tailings management facility	1,111,258
Emergency spillway	51,748
Waste management facility	596
Social transition	243,703
Environmental monitoring	250,000
Subtotal	**10,081,682**
15 % Management fees	1,008,168
20 % Contingency	2,016,336
Total	**13,106,187**

During operations, Roxgold will continue to develop closure criteria in communication with the applicable regulatory authorities to define specific endpoints 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.

20.5 Comments on Section 20

It is the opinion of the QP that the appropriate environmental, social and community impact studies have been conducted to date at Yaramoko and that Roxgold has maintained all necessary environmental permits that are required for underground mining operations and the maintenance of mining activities. The process to obtain a modification to the current operating permit to accommodate the Zone 109 project and the proposed Zone 55 open pit is well understood.

21 Capital and Operating Costs

This section summarizes the capital and operating cost estimates for the existing underground and processing operations, as well as the future open pit operations.

Cost estimates are derived from activity-based life of mine scheduling. Underground mining costs are estimated using the schedule of rates within the existing mining contract with AUMS for 55 Zone underground, and Paramina Earth Technologies for Bagassi South QV' underground. Open pit mining costs are estimated using RFQ mining rates from a reputable and experienced mining contractor operating within the region. Processing, sustaining capital, general and administrative, and selling cost estimates are prepared using realized costs from recent operating years, with forecast labour and consumables from activity-based scheduling aligned with the life of mine schedule.

This cost estimate is prepared with a high proportion of actual costs and operating data since the operation commenced in 2016. Given the high proportion of actual costs and quoted rates, this cost estimate is of a sufficient level of accuracy to support the estimate of Mineral Reserves (Table 85).

All costs have been estimated in United States Dollars (US$) as of December 31, 2022. The following assumptions were used to develop costs including:

- Canadian dollar (CAD) = $0.77.
- Australian dollar (AUD) = $0.74.
- West African Franc (XOF) = $0.0017.
- Diesel Fuel Price = $1.52 per litre.
- Power cost of = $0.24 and $0.12 per kilowatt hour peak and off peak respectively.

The following items are specifically excluded from the capital costs estimate:

- Escalation of prices.
- Currency exchange rate variations.

Table 85: Yaramoko Gold Mine Cost Estimate

Item	Unit	2023	2024	2025	Total
Physicals					
ORE MILLED	'000 t	491.7	478.9	190.4	**1,161.1**
GRADE ORE MILLED	g/t	6.14	5.65	5.89	**5.89**
RECOVERY RATE	%	97.7	97.7	97.8	**97.8**
GOLD POURED	'000 oz	94.8	87.2	37.3	**219.4**
Costs					
Total Cost	US$M	157.0	129.0	60.9	**346.9**
All in sustaining cash costs	US$/oz	1,655	1,478	1,634	**1,607**

Note: Differences may occur due to rounding, Total Cost and AISC includes royalties, mining tax, and non-sustaining capital

21.1 Capital Costs

All major project infrastructure is in place for the operating mine site, capital included is for the extensions of the mine such as underground capital development, resource drilling, TSF expansion to accommodate for the open pit mine, extension of the ventilation system with increased depth of the underground mine and closure costs. Table 86 summarizes the capital cost estimate for remaining life of the Yaramoko Gold Mine.

Table 86: Capital Cost Estimate

Item	Unit	2023	2024	2025	2026	Total
Mine Development	US$M	32.9	2.9	4.3	-	40.0
Brownfields exploration	US$M	1.5	-	-	-	1.5
Equipment and Infrastructure	US$M	6.6	3.1	4.6	12.1	26.5
TSF Raise	US$M	0.2	0.6	0.8	-	1.5
Ventilation and Cooling	US$M	2.5	-	-	-	2.5
Finance lease	US$M	-	0.3	0.3	-	0.6
Processing - Other	US$M	-	0.3	0.2	-	0.5
Mining - Other	US$M	1.8	-	0.8	-	2.5
Permitting	US$M	0.4	0.4	0.4	-	1.2
Project Allocations	US$M	1.3	1.2	0.7	-	3.2
Other	US$M	0.5	0.5	0.5	-	1.5
Closure Plan	US$M	-	-	1.0	12.1	13.1
Total	**US$M**	**41.0**	**6.0**	**8.9**	**12.1**	**68.0**

Note: Differences may occur due to rounding and breakdown of equipment and infrastructure costs are shown on the lines below the heading.

21.2 Yaramoko Operating Costs

Mine operating costs include all direct mining costs and indirect mining costs for delivery of mineralized material to the process plant ROM pad. All estimates have been based on the 2023 operating budget parameters. Underground mine operations at the 55 Zone and Bagassi South QV' capital development is currently conducted by AUMS with production activities at Bagassi South QV' to be conducted by Paramina Earth Technologies due to commence in the first quarter of 2023. Roxgold provides mine management, mine engineering and geology support. Electrical power and diesel are supplied by Roxgold to the mining contractor.

Operating costs have been estimated based on remaining underground mine life mined by the underground contractors and for open pit mining to be via contract mining. At the time of preparing this Technical Report, there has been no open pit mining contract awarded. The open pit mining cost estimate has been prepared using a quoted schedule of rates provided by a reputable and experienced mining contractor operating within the region.

Process plant costs are based on operating data, labour, and consumable rates since processing commenced in 2016. The processing costs include cost forecasts based on the 2023 operating budget for the following components:

- Mill services.
- Crushing.
- Milling and classification.
- Leaching and adsorption.
- Tailings.
- Air and water services.
- Medium/heavy vehicles.
- Equipment and light vehicles.
- Power supply.

- Laboratory.
- Metallurgy.
- Maintenance.
- Infrastructure.
- Overheads.
- Metal recovery and refining.

General and administrative costs include the following:

- Indirect costs.
- Distribution.
- Community relations.

Operating costs over the life of the mine for Yaramoko Gold Mine from 2023 to 2025 are estimated to total $239.3 million with operating costs averaging $219.4/t are estimated for the period. Refer to Table 87.

Table 87: Yaramoko Annual Operating Costs

Costs $M	2023	2024	2025	Total
Mining	66.1	70.5	23.7	160.2
Process	14.8	14.4	6.4	35.6
G&A	16.4	15.8	11.3	43.5
Site Total $M	**97.3**	**100.7**	**41.3**	**239.3**
Unit Costs $/t	**2023**	**2024**	**2025**	**Average**
Mining	169.6	147.2	124.2	151.3
Process	30.1	30.0	33.5	30.6
G&A	33.3	33.1	59.3	34.4
Site Total $/t	**233.1**	**210.2**	**217.0**	**219.4**

21.3 Comments on Section 21

The capital and operating cost provisions for the LOMP that supports Mineral Reserves have been reviewed and the basis for the estimates is appropriate for the known mineralization, mining and production schedules, equipment replacement and maintenance requirements. The QP considers the capital and operating costs estimated for the operation as reasonable based on industry-standard practices and actual costs observed for 2022.

22 Economic Analysis

Roxgold is using the provision for producing issuers, whereby producing issuers may exclude the information required under Item 22 of Form 43-101 – *Technical Report,* for technical reports on properties currently in production and where no material production expansion is planned.

22.1 Comments on Section 22

The Mineral Reserve estimate is supported by a positive cashflow for the period set out in the LOMP using the assumptions detailed in this Report.

23 Adjacent Properties

While the Yaramoko Gold Mine is located in an area of Burkina Faso that hosts several other gold deposits, there are no adjacent properties that are considered relevant to this Technical Report.

24 Other Relevant Data and Information

This section is not relevant to this Report.

25 Interpretation and Conclusions

25.1 Introduction

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. The level of investigation for each of these areas is consistent with industry best practice.

Mining activities to date have essentially confirmed that the actual results of mining within the 55 Zone and Bagassi South deposits adequately reconcile to that modeled and planned. The following summarize discipline status, risks and opportunities associated with each of the key elements of the combined Yaramoko mine.

25.2 Geology and Mineral Resources

25.2.1 General

Since 2016, underground mining operations have continued at the Yaramoko mine on both the 55 Zone and Bagassi South deposits. Operations have been supported by grade control and extensional resource definition drilling, and through development face channel sampling. This additional input data has supported the successful operation of both underground mines, with reconciliation between mine call and declared ore mined typically within 5 percent. Further, the additional input data has also supported both the updating of the underground Mineral Resources, and the definition of an open-pit Mineral Resource incorporating the near surface portions of the 55 Zone. Continued exploration drilling has also identified the 109 Zone as a new Mineral Resource.

25.2.2 Risks

The robustness of the underground Mineral Resource models at the Yaramoko Gold Mine is routinely tested through the review of reconciliation data resulting from mining operations. The favorable reconciliation results support both Mineral Resource models in their grade and tonnage estimation.

However, risk remains that in less well drilled portions of the deposits, the current interpretations may not be as similarly representative of the actual geometry and continuity of the deposit. Further, as both the 55 Zone and 109 Zone open pits have yet to be mined, there is a paucity of reconciliation data against which to validate the models. Risk also exists in the certainty surrounding depletion due to artisanal mining of the upper portions of the 55 Zone, where surveying of mined voids may have been inaccurate due to location and accessibility.

Each of these risks are generally mitigated by the long history of geological modelling of the Yaramoko deposits, and the high level of understanding applied to their interpretation as a result of this history, coupled with the large volume of available input data. Depletion risks within the open pit are mitigated by assuming a conservative approach to generating depletion volumes, assuming complete depletion where uncertainty exists as to the in-situ status of potential mineralization.

25.2.3 Opportunities

Underground resource definition drilling at the Yaramoko Gold Mine offers ongoing opportunity to extend the Mineral Resources at depth, while ongoing exploration at the mine offers the opportunity to define new satellite deposits.

25.3 Underground Mining

The Yaramoko Gold Mine operation has consistently met design tonnage and gold production targets since commencing the operation in 2016 and, is a reliable and flexible operation. The Mineral Reserve estimate for the mine as of December 31, 2022 stated herein incorporates significant additional geological data and knowledge from production to such date. The extended Mineral Reserves have been delineated to a depth of approximately 1,100 m for 55 Zone and 325 m for Bagassi South. Production from the underground mines can be sustained from these Mineral Reserves until the first quarter of 2025.

The longhole open stoping and shrinkage stoping mining method in use at the underground mines is suited for the extraction of the orebody, but optimisation or alternatives should continue to be explored with operating knowledge and the now shorter underground mine life. Mine infrastructure has been well constructed and meets the long-term needs of the continued mine operations.

25.3.1 Risks

Unplanned Dilution

There is a risk of increased unplanned dilution beyond the planned amount. Excessive overbreak or unfavorable location of ore development could lead to more dilution than planned during production, as could excessive deviation of blast holes. Unplanned dilution would reduce the mill head grade and have a negative impact on revenue due to increased cost of load, hauling and processing diluted material.

Compliance to schedule

Compliance to schedule has increases in importance as the 55 Zone underground mine continues to increase in depth which increases mining cycle times and reduction in operating levels which increases interaction between activities. These factors increase the risk to meeting compliance to schedule. Operational issues could lead to delays in production outcomes and subsequently resulting in reduced output from the underground mine.

Shrinkage Stoping Mining Method

Inherent risks associated with shrinkage stoping when drawdown of ore material commences from the draw point. Voids can exist in the broken mineralization potentially causing unstable working floor in the working areas, strategies to mitigate this risk is required including the use of safety line and harnesses.

Blasting activities generate toxic fumes that can be harmful to personnel. As the mining method involves personnel working inside the stope following firing and throughout the cycle if ventilation is not adequately setup to remove the toxic fumes this increases exposure to personnel.

25.3.2 Opportunities

Additional Mineral Resources

Additional Mineral Reserves may be identified from future diamond drilling infill programs which, if the modifying factors are met result in the conversionto Mineral Reserves and could lead to an increased mine life.

Optimization of Contract

Negotiation of the mining contract utilising completion of capital development as the driver, may generate cost savings in production activities for the operation and maintain the same underground contractor from start to finish of the mine.

Alternative Mining Method

Review of alternative mining methods in line with reduced mine life. This would be an alternative method to extract narrow vein ore bodies to reduce dilution, increase grade, and reduce operating cost through less material movement and processing less diluted material.

Sequence optimisation

Optimization of the mining sequence to provide production flexibility and speed up production could benefit the underground mines with the potential of bringing in additional production at a higher grade up front.

25.4 Open Pit Mining

As of the effective date of this Report there has been no open pit mining at the Yaramoko Gold Mine. The 55 Zone open pit has been studied to a FS level, sufficient to support the 55 Zone open pit Mineral Reserve estimate. The 109 Zone open pit has been studied to a PFS level, sufficient to support the 109 Zone open pit Mineral Reserve estimate.

The following conclusions are drawn from the 55 Zone open pit mining study:

- A geotechnical study (MineGeoTech, 2020) concluded the pit design was technically justifiable and had an appropriate factor of safety and probability of failure to support the 55 Zone open pit Mineral Reserve.
- Sufficient underground dewatering infrastructure will be maintained for the duration of the 55 Zone open pit mining.
- A RFQ resulted in receiving mining cost rates from a reputable and experienced mining contractor operating within the region.
- Pit optimisations based on Mineral Resources using Deswik software's pseudoflow function, appropriate economic parameters, and the geotechnical investigation wall angles, resulting in a pit shell with a positive cashflow.
- Mining dilution and mining recovery have been represented by regularising the block model to an appropriate SMU block size.
- A marginal cut-off grade between ore and waste has been estimated as 1.26 g/t Au.
- Three pit stages have been designed based on the optimization results, ability to begin mining without disrupting existing underground infrastructure, the pit slope angles recommended by MineGeoTech, appropriate ramp access and minimum mining widths.
- Waste rock dumps have been designed to contain all pit waste and have appropriate final slope angles.
- All pit and infrastructure designs are within the current lease boundaries.
- Conventional open pit mining techniques for drill and blast followed by excavate, load and haul are suitable for the 55 Zone open pit. The proposed mining equipment will be two 80 t excavators, one

50 t excavator, fourteen 30 t dump trucks, and appropriate ancillary equipment to support mining activities.

- Prior to commencing mining, an appropriate void management plan will be implemented to define the methodology to safely mining above and through underground voids, while minimizing mining dilution and maximizing mining recovery.
- A production schedule based on Indicated Mineral Resources has been developed at a mining rate of approximately 8.7 kbcm/day, resulting in an open pit mine life of 11 months.
- An economic assessment of the 55 Zone open pit returns a positive cashflow.
- All major project infrastructure is in place at the operating Yaramoko Gold Mine. Ore from the 55 Zone open pit will be fed into the existing Yaramoko processing facility.
- A Mineral Reserve for the 55 Zone open pit has been estimated as 144.3 kt averaging 5.25 g/t Au. The Mineral Reserve consists of 71.5 kt averaging 5.83 g/t of Proven Mineral Reserve derived from Measured Mineral Resource, and 72.8 kt averaging 4.69 g/t of Probable Mineral Reserve derived from Indicated Mineral Resource. The Mineral Reserve has a cut-off grade of 1.26 g/t, is reported within the final pit design, with mining dilution and recovery represented by regularising the block model to an appropriate SMU block size.
- Existing underground workings and future underground workings within the 55 Zone LOMP have been depleted at a 0 g/t Au grade for all pit optimisation, design, and scheduling.

The following conclusions are drawn from the 109 Zone open pit mining study:

- A geotechnical study (MineGeoTech, 2022) concluded the pit design was technically justifiable and had an appropriate factor of safety and probability of failure to support the 109 Zone open pit Mineral Reserve.
- The 109 Zone open pit dewatering infrastructure will include an in-pit sump which will pump water to a turkey's nest located between the two 109 Zone open pit stages, with excess water pumped from the turkey's nest to the processing plant.
- A RFQ resulted in receiving mining cost rates from a reputable and experienced mining contractor operating within the region.
- Pit optimisations based on Mineral Resources using Deswik software's pseudoflow function, appropriate economic parameters, and the geotechnical investigation wall angles, resulting in a pit shell with a positive cashflow.
- Mining dilution and mining recovery have been represented by regularising the block model to an appropriate SMU block size.
- A marginal cut-off grade between ore and waste has been estimated as 0.74 g/t Au.
- Two pit stages have been designed based on the optimization results, the pit slope angles recommended by MineGeoTech, appropriate ramp access and minimum mining widths.
- Waste rock dumps have been designed to contain all pit waste and have appropriate final slope angles. It is planned to backfill waste rock from stage 2 into the stage 1 pit.
- All pit and infrastructure designs are within the current lease boundaries.
- Conventional open pit mining techniques for drill and blast followed by excavate, load and haul are suitable for the 109 Zone open pit. The proposed mining equipment will be two 80 t excavators, one 50 t excavator, fourteen 30 t dump trucks, and appropriate ancillary equipment to support mining activities.
- A production schedule based on Indicated Mineral Resources has been developed at a mining rate of approximately 6.6 kbcm/day, resulting in an open pit mine life of 9 months.

- A mining cost estimate has been prepared based on contract mining with a reputable and experienced mining contractor.
- An economic assessment of the 109 Zone open pit returns a positive cashflow.
- All major project infrastructure is in place at the operating Yaramoko Gold Mine. Ore from the 109 Zone open pit will be fed into the existing Yaramoko processing facility.
- A Probable Mineral Reserve for the 109 Zone open pit has been estimated as 159.7 kt averaging 1.78 g/t Au. The Probable Mineral Reserve is derived from Indicated Mineral Resource. The Mineral Reserve has a cut-off grade of 0.74 g/t, is reported within the final pit design, with mining dilution and recovery represented by regularising the block model to an appropriate SMU block size.

25.4.1 Risks

Existing Underground Workings

The Mineral Reserve estimated in this Technical Report is prepared under the assumption that material adjacent to existing underground workings is recoverable. However, compared to the previous Mineral Reserve announced estimate, the 55 Zone open pit discussed in this Report is shallower and has significantly less interaction with existing underground voids.

Prior to mining commencing, a void management plan will be prepared, detailing the mining methods and procedures to mine above and adjacent to existing underground workings both safely and to minimize mining dilution and maximize mining dilution.

Cost Inflation

The mining contractor RFQ and economic evaluation for 55 Zone open pit has been conducted relatively recently, however there is potential for cost inflation due to supply issues, as well as global uncertainty.

Geotechnical

Further geotechnical work is recommended prior to mining commencing to further assess the impact of underground voids on pit wall stability.

Blasting Near Infrastructure

The 55 Zone open pit is located adjacent to the processing facility and project infrastructure.

Drill and blast designs will need to ensure vibration and fly rock is controlled such that any impact to key project infrastructure is minimized. In addition, revised drill and blast designs may be required within the void management plan to ensure voids are collapsed prior to mining within a failure zone.

25.4.2 Opportunities

Additional Mineral Resources

Additional Mineral Reserves may be identified from future diamond drilling infill programs which, if the modifying factors are met may convert to Mineral Reserves and could lead to a higher annual production rate to be targeted on an increased mine life.

25.5 Processing and Infrastructure

25.5.1 Risks

Power Supply

Unreliable grid power supply presents an ongoing potential risk, which may force the inclusion of more high-cost diesel power in the energy mix.

25.5.2 Opportunities

The Yaramoko mill has operated very steadily since 2016, at or above nameplate levels. The opportunity to continue this performance remains as well as potential to further reduce operating cost through reducing expatriate manning levels over time.

25.6 Environmental, Permitting, and Social

25.6.1 Risks

Unmet Community Expectations

The nearby communities have expectations relating to ongoing job creation, community development and improvement in services and infrastructure. Meeting these expectations is a key requirement for Roxgold Sanu with the associated risks of community action against the project and loss of social license to operate. Roxgold Sanu 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 near to 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, potentially causing reputational harm to Fortuna through negative media or community relations.

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 at closure, 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 the use of a high density polyethylene (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.

26 Recommendations

Recommendations for the next phase of work have been broken down into those related to ongoing exploration activities at the Yaramoko Gold Mine; underground mining activities and studies related to operational improvements; exploration activities and development studies related to the development of the open pit at Yaramoko; processing and infrastructure improvements; and environmental, permitting and social activities as set out below.

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 mine.

26.1 Underground Mining

- Implement recommended cable bolt and higher capacity rockbolt regime and record dilution improvement outcomes in the reconciliation process. The cost is included in the operating costs for the mine. The cost is included in the operating costs for the mine.
- Complete 2023 infill program with step out drilling. Expenditure for 9,100 m of drilling at an estimated cost of US$ 2.8 million is budgeted in 2023 for this program.
- Continual review of mine design and sequence to ensure that production requirements are met, speeding up the process and extracting the highest value ore first. The cost is included in the operating costs for the mine.
- Continual monitoring and improvement on the proposed alternative mining methods for narrow veins of the Bagassi South deposit to reduce cost and dilution. The cost is included in the operating costs for the mine.
- Increased communication and control for the drawdown process for shrinkage stoping mining method, stopes remain relatively full does significantly reduce exposure of personnel. The cost is included in the operating costs for the mine.
- Additional support requirements should also be made available to reduce this drawdown risk, platforms available for installation when working inside a stope. The cost is included in the operating costs for the mine.
- Recommendation of two means of egress is always available within a shrinkage mining stope panel for egress and ventilation flowthrough. It is also recommended that air quality monitoring to be conducted following firing of stope panels to ensure that blasting fumes are at safe levels prior to re-entry and re-commencement of mining. The cost is included in the operating costs for the mine.
- Recommendation for the use of safety cables and harnesses when working inside a shrinkage stope to prevent personnel from potential falls where voids exist following drawdown process or uneven ground. The cost is included in the operating costs for the mine.
- Review and negotiation of the mining contract and its cost reduction opportunity following decline development completion. The cost is included in the operating costs for the mine.

26.2 Open Pit Mining

- Additional Mineral Resource drilling should provide further definition of mineralization directly adjacent to existing underground workings. It is anticipated this would be in the order of 8,500 m of drilling with a provisional budget estimate of US$ 1.06 million, which would be proposed for execution in 2024.

- Prior to commencement of mining at the 55 Zone Open Pit, a void management plan will be prepared to define the mining methods to safely mine mineralization adjacent to underground workings while minimizing mining dilution and maximizing mining recovery. The void management plan will be undertaken predominantly with Roxgold technical staff, with such costs included in the operating costs for the mine. An external geotechnical consultants will be utilised to assist with this study with costs included as part of the budgeted geotechnical site support.
- Prior to commencement of mining at the 55 Zone Open Pit, a drill and blast study will be completed to define the drill and blast designs that protect key project infrastructure from ground vibrations and fly rock within the blast perimeter. Drill and blast studies will be undertaken by Roxgold technical staff, with such costs included in the operating costs for the mine.
- Evaluate and choose a preferred mining contract for the open pit scope of work. Prepare a workable mining contract for the open pit mining scope of work. Contractor evaluation and preparation of the mining contract will be undertaken by Roxgold technical staff, with such costs included in the operating costs for the mine.
- Data gap existing in the north-eastern wall of the northern pit for 109 Zone to be assessed and altered as required prior to mining of the sector commencing. Such costs will be included in the operating cost of the mine.

26.3 Processing and Infrastructure

- As Bagassi South feed begins to reduce, there is the potential at times for the mill load to fluctuate and potentially run low. The lifter angle of the SAG mill should be reviewed to ensure that it is not overly aggressive with the reduced total load. The cost of such a review will be assessed internally by Roxgold technical staff.
- Metallurgical behavior should continue to be monitored especially when there are major changes to the proposed mine plan and mine development. Additional on-site testing should be completed from time to time in accordance with an updated mine plan during production, to identify any potential issues, especially in the comminution circuit. This testwork should be completed during operations. Such costs will be included in the operating costs for the mine.

26.4 Environmental, Permitting, and Social

The main recommendations in terms of environmental, social, and permitting are set out below.

- Follow up on the permitting process and complete the studies and information requested by the relevant environmental and social regulators, if necessary.
- Continue the implementation of the environmental management plan as required under applicable environmental regulations and according to the Company's ESAI, internal standards and applicable international best practices. This includes the implementation of the monitoring and prevention programs to avoid or mitigate our impacts, the regular update of the closure plan and the continuous improvement of the Company's environmental management system. Such costs will be included in the operating costs for the mine.
- Ensure the performance of the stakeholders' engagement plan and continue to support the local stakeholders in their social and economic development as part of our social corporate responsibility and license to operate. Such costs will be included in the operating costs for the mine.
- Continue the implementation of a rigorous health and safety management system to protect our employees from injury and health issues, including leading preventative activities such as risks assessments, inspections, audits, employee safety and competences training, leadership programs and the continuous improvement of the health and safety management system. Such costs will be included in the operating costs for the mine.

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28 Abbreviations and Units of Measurement

%	percent
°	degrees
°C	degrees Celsius
AAS	atomic absorption spectroscopy
AC	air-core
Apollo	Apollo Consolidated Ltd
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
cm	centimeter(s)
CRM	certified reference material
CSA Global	CSA Global Pty Ltd
DD	diamond core
g	gram(s)
g/cm^3	grams per cubic centimeter
g/t	grams per tonne
kg	kilogram(s)
km	kilometer(s)
m	meter(s)
mm	millimeter(s)
Mt	million tones
Newcrest	Newcrest Mining Ltd
NI 43-101	National Instrument 43 101 – Standards for Disclosure for Mineral Projects
OK	ordinary kriging
oz	troy ounces
QA	quality assurance
QC	quality control
Randgold	Randgold Resources
RC	reverse circulation
RCD	reverse circulation with diamond core tail
Roxgold	Roxgold Inc.
t	tonne(s)
t/m^3	tonnes per cubic meter
UTM	Universal Transverse Mercator

29 Certificates

Certificate of Qualified Person – Paul Criddle

I, Paul Criddle, Technical Consultant for Fortuna Silver Mines Inc. ("Fortuna"), 2 Doepel Street, North Fremantle, Western Australia do hereby certify that:

1. I am a co-author of the technical report entitled "Technical Report for the Yaramoko Gold Mine, Burkina Faso" which has an effective date of December 31, 2022 (the "Technical Report").
2. On July 2, 2021, Fortuna acquired Roxgold Inc. ("Roxgold") which owns the Yaramoko Gold Mine.
3. I graduated from 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 14 years of my career, I have been focussed on development projects in Africa. From 2013 to October 2022, I was the Chief Operating Officer of Roxgold and was responsible for operations of Roxgold's activities in Burkina Faso at the Yaramoko property. I was responsible for the development of this project through the Preliminary Economic Assessment and Definitive Feasibility Studies, and subsequent permitting and construction, commissioning, ramp up and operational phases at the project. I was based in Roxgold's Toronto and Perth headquarters where I was part of the corporate executive team. From October 2022, I have been consulting to Fortuna on a technical basis.
4. I am a professional Metallurgist and a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM #309804).
5. I have read the definition of Qualified Person set out in National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 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 NI 43-101.
6. I have personally inspected the Yaramoko Mine regularly since 2013, and my most recent inspection took place May 13-18, 2022.
7. I am a co-author of the Technical Report and am responsible for Sections 1-3, 13, 17-20, 24, sub-Sections 25.5-25.6 and 26.3-4, and parts of Section 21 of the Technical Report.
8. I was employed by Roxgold and am currently engaged by Fortuna as a technical consultant and therefore am not independent of Fortuna as defined in Section 1.5 of NI 43-101.
9. I have had no involvement with the Yaramoko Gold Mine prior to being an employee of Roxgold and Fortuna.
10. I have read NI 43-101, Form 43-101F1, and the Technical Report, and confirm that the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101 and Form 43-101F1.
11. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: December 31, 2022

Dated at Perth, Australia, March 24, 2023.

[*"Signed"*]

Mr. Paul Criddle FAusIMM (#309804)

Technical Consultant

Certificate of Qualified Person – Paul Weedon

I, Paul Weedon, Senior Vice President, Exploration of Fortuna Silver Mines Inc. ("Fortuna"), 200 Burrard Street, Suite 650, Vancouver, BC V6C 3L6, Canada, do hereby certify that:

1. I am a co-author of the technical report entitled "Technical Report for the Yaramoko Gold Mine, Burkina Faso" which has an effective date of December 31, 2022 (the "Technical Report").
2. On July 2, 2021, Fortuna acquired Roxgold Inc. ("Roxgold") which owns the Yaramoko Gold Mine.
3. I graduated from Curtin University, Western Australia in December 1991 with a Bachelor of Science (Geology), and a Post Graduate Diploma of Economic Geology (Distinction) and have practiced my profession continuously since 1991. I have worked across all roles of exploration and mining geology, covering open-pit and underground gold mining in production roles up to Technical Services Manager for large scale complex operations. My exploration experience extends from project generation through to project development and corporate roles, in addition to roles in Corporate Development. These roles have been conducted across Australasia, Africa and Latin America. Since 2018 I have been involved with Roxgold as Vice President Exploration, closely involved with the Yaramoko operation. I have held my current position of Senior Vice President – Exploration for Fortuna Silver Mines Inc since October 2021.
4. I am a professional Geologist and a Member of the Australian Institute of Geoscientists (MAIG #6001).
5. I have read the definition of Qualified Person set out in National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 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 NI 43-101.
6. I have personally inspected the Yaramoko Mine regularly since 2018, and my most recent inspection took place May 13-18, 2022.
7. I am a co-author of the Technical Report and am responsible for Sections 4-10, and 23, 27 and 28 of the Technical Report.
8. I was employed by Roxgold and am currently employed by Fortuna and therefore am not independent of Fortuna as defined in Section 1.5 of NI 43-101.
9. I have had no involvement with the Yaramoko Gold Mine prior to being an employee of Roxgold and Fortuna.
10. I have read NI 43-101, Form 43-101F1, and the Technical Report, and confirm that the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101 and Form 43-101F1.
11. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: December 31, 2022

Dated at Perth, Australia, March 24, 2023.

[*"Signed"*]

Mr. Paul Weedon MAIG (#6001)

Senior Vice President – Exploration

Fortuna Silver Mines, Inc.

Certificate of Qualified Person – Dr Matthew Cobb

I, Matthew Cobb, Senior Resource Geologist of Fortuna Silver Mines Inc. ("Fortuna"), 200 Burrard Street, Suite 650, Vancouver, BC V6C 3L6, Canada, do hereby certify that:

1. I am a co-author of the technical report entitled "Technical Report for the Yaramoko Gold Mine, Burkina Faso" which has an effective date of December 31, 2022 (the "Technical Report").
2. On July 2, 2021, Fortuna acquired Roxgold Inc. ("Roxgold") which owns the Yaramoko Gold Mine.
3. I graduated from Curtin University, Western Australia in January 2005 with a Doctor of Philosophy (Geology). In 2016, I also graduated from Edith Cowan University, Western Australia, with a Master of Science (Geostatistics). I have practiced my profession continuously since 2005. In the first stage of my career, I worked as an exploration geologist in Western Australia, Tanzania, Turkey and New Zealand, conducting exploration activities ranging from early-stage project evaluation, through to resource definition drilling. I then moved into a production focussed role, operating as a mine and modelling geologist. In the last 10 years of my career, I have been responsible for Mineral Resource modelling at all stages of a project lifecycle from maiden estimates, through to grade-control models for production planning, and have focussed on the application of geostatistical methods to risk quantification through the mining value chain, as both an employee and as an independent consultant.
4. I am a professional Geologist and a Member of the Australian Institute of Geoscientists (MAIG #5486).
5. I have read the definition of Qualified Person set out in National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 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 NI 43-101.
6. I have personally inspected the Yaramoko mine between August 13-17, 2022.
7. I am a co-author of the Technical Report and am responsible for Sections 11, 12 and 14, and sub-Section 25.2 of the Technical Report.
8. I am currently employed by Roxgold and therefore am not independent of Fortuna as defined in Section 1.5 of NI 43-101.
9. I have had no involvement with the Yaramoko Gold Mine prior to being an employee of Roxgold and Fortuna.
10. I have read NI 43-101, Form 43-101F1, and the Technical Report, and confirm that the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101 and Form 43-101F1.
11. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: December 31, 2022

Dated at Perth, Australia, March 24, 2023.

[*"Signed"*]

Dr Matthew Cobb MAIG (#5486)

Senior Resource Geologist

Roxgold Inc.

Certificate of Qualified Person – Raul Espinoza

I, Raul Espinoza, Technical Services Director of Fortuna Silver Mines Inc. ("Fortuna"), 200 Burrard Street, Suite 650, Vancouver, BC V6C 3L6, Canada, do hereby certify that:

1. I am a co-author of the technical report entitled "Technical Report for the Yaramoko Gold Mine, Burkina Faso" which has an effective date of December 31, 2022 (the "Technical Report").
2. On July 2, 2021, Fortuna acquired Roxgold Inc. ("Roxgold") which owns the Yaramoko Gold Mine.
3. I graduated with a Bachelor of Science Degree in Mining Engineering from Pontificia Universidad Catolica del Peru in 2001 and with a Master of Engineering Science in Mining from Curtin University, Australia, in 2015. I have practiced my profession for 22 years, that includes 11 years working in operations (open pit and underground) and 11 years as a consultant. My experience has covered various functions from operational, technical (in areas such as mine planning and design, mineral reserves estimates and due diligence) and management for open pit and underground mines in early-stage projects through to producing mines in Peru, Australia, Canada and Mexico.
4. I am a Fellow of the Australasian Institute of Mining and Metallurgy, registered as a Chartered Professional (FAusIMM (CP) #309581).
5. I have read the definition of Qualified Person set out in National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 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 NI 43-101.
6. I have personally inspected the Yaramoko Mine between December 3-5, 2022.
7. I am a co-author of the Technical Report and am responsible for Sections 15, 16 and 22 and parts of Section 21, and sub-Sections 25.1, 25.3, 25.4 and sub-Sections 26.1, 26.2 of the Technical Report.
8. I am currently employed by Fortuna and therefore am not independent of Fortuna as defined in Section 1.5 of NI 43-101.
9. I have had no involvement with the Yaramoko Gold Mine prior to being an employee of Fortuna.
10. I have read NI 43-101, Form 43-101F1, and the Technical Report, and confirm that the sections of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101 and Form 43-101F1.
11. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information required to be disclosed to make the Technical Report not misleading.

Effective Date: December 31, 2022

Dated at Vancouver, Canada, March 24, 2023.

[*"Signed"*]

Mr. Raul Espinoza FAusIMM (CP) (#309581)

Director of Technical Services

Fortuna Silver Mines Inc.