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Sabodala-Massawa Project, Senegal
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NI 43-101 Technical Report

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who are the qualified persons and with the exception of Mr Bryan Pullman, Mr Chris Lane, Mr David Gordon, Mr Graham Trusler and Mr Michael Davis, are not independent of the Issuer. The quality of information, conclusions, and estimates contained herein are based on:

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

1.0 SUMMARY

1.1 Introduction

The Issuer, Endeavour Mining plc or 'Endeavour', is an established gold producer and the largest in West Africa, with operating assets across Senegal, Cote d'Ivoire and Burkina Faso and a strong portfolio of advanced development projects and exploration assets in the highly prospective West Africa, Birimian Greenstone Belt.

This 'Technical Report Update' pertains to; the Issuer's ownership interests in Sabodala Gold Operations SA (SGO) and Massawa SA (Refer to Section 4.0), who respectively hold exploitation permits for the Sabodala Concession and the Massawa Mining License, in the southeast of Senegal.

Massawa SA is to be merged into SGO by the end of 2022, with the merger expected to be retroactive January 2022, and thus thereafter, the Issuer's ownership interests will reside solely with SGO.

As part of the acquisition/migration of the Massawa Project from Barrick, Teranga, and more recently Massawa SA (March 2020), the Issuer via Massawa SA, now holds the exploitation rights for the Massawa Mining License.

Whilst the ore on the Sabodala property is free milling, the ore on the Massawa property; is a mix of free and non-free milling ores, with a high gravity recoverable gold component.

The Issuer now has the opportunity to leverage the existing mine, process and waste management infrastructure at Sabodala (operational since 2009) and expand upon it, to process free and non-free milling ores from both the Sabodala and Massawa properties. The integration of mining and the processing of ores from the Sabodala and Massawa Properties, is referred to herein as the 'Sabodala-Massawa Project', or 'Project'.

Whilst historical studies considered building a process plant on the Massawa License, the trucking and processing of ore at the existing/expanded Sabodala facilities, enables significant synergies and economies of scale that would not otherwise be realised with two independent processing facilities, on two different properties.

The Project is being tackled in two phases (Phase 1 (P1) and Phase 2 (P2). The details of each phase are summarised below.

- Phase 1 (P1) the upgrade of the Sabodala Whole Ore Leach Plant (SWOLP) to process free milling and higher gravity recoverable gold ores (complete 2021), and the development of the requisite mine infrastructure on the Massawa property, to facilitate the mining of the free milling component of the Massawa ores (already commenced at Sofia).
- Phase 2 (P2)
  - the construction of the Sabodala Sulphide Treatment Plant (SSTP) to process the non-free milling component of the Massawa Ores (first gold Q1 2024);
  - construction/upgrade of key infrastructures facilities, including but not limited to the Sabodala Power Station (SPS) and the Tailings Storage Facilities (TSFs); and,
  - the development of three underground mines on the Sabodala property, two of which will operate concurrently.

The two adjacent (SWOLP and SSTP) process plants at Sabodala are collectively referred to herein, as the Sabodala Central Processing Facility (SCPF).

The costs for the Phase 1 infrastructure that is complete as of the 'Effective Date' is considered sunk and is not included in the cost estimates presented herein. For the remaining P1 and P2 infrastructure to be built, these costs have been developed and reported to a PFS or DFS level of accuracy.

The project cash flow as presented, is based on a mixture of Project and current and projected costs for the existing operations.

Based on the gold prospectivity of the area covered by the Issuer's interests as outlined herein, there is potential for the LoM to be extended beyond 2035. Certainly the inclusion of the SSTP at Sabodala, provides the optionality of processing a wider range of gold ores.

1.2 Reliance on Other Experts

The various Qualified Persons' (QPs) who have authored this report have in some cases relied on 'Other Experts', both internal and external to the Issuer. The extent of the reliance is discussed in Section 3.0.

1.3 Property, Description and Location

1.3.1 Mineral Property and Title

The Sabodala-Massawa Project Area encompasses some 1527 km^2. It is composed of the Sabodala Property covering 291 km^2, the Bransan Property 338 km^2, the Sounkounkou Property 292 km^2, the Massawa Property 320 km^2 and the Kanoumba Property 286 km^2. Sabodala and Massawa are a Mining Concession and Licence respectively, whereas Bransan, Sounkounkou and Kanoumba are Exploration Permits.

The Exploration Permit ('Permis de Recherche') allows for exploration work to be undertaken for an initial period of up to four years, renewable twice for up to three years per renewal.

In the event of competitive requests, priority is given to the tender offering the best conditions and guarantees for the State.

The Exploitation Permit ('Permis d'Exploitation' or Mining Permit), of which two types exist depending on the size and scale of the project, allows for mining activities to be carried out for durations of up to five years (three years under the 2003 Mining Code) for smaller scale projects and between five years and twenty years (twenty-five years under the 2003 Mining Code) for larger scale projects. A mining permit has no limitations on the scale of its operations and is renewable as many times as is necessary until the resource is exhausted.

1.3.2 Project Ownership

The Sabodala Mining Concession is held under the Sabodala Mining Convention dated 2007 by Sabodala Gold Operations SA (SGO). SGO is 90% is owned by Sabodala Gold (Mauritius) Limited (SGM) and 10% by the Republic of Senegal (RoS). SGM is ultimately owned 100% by Endeavour Mining plc (Endeavour).

The Massawa Mining Permit is held under the Kanoumba Mining Convention dated 2010 and amended in 2020 by Massawa SA. Massawa SA is 90% owned by Massawa (Jersey) Limited (MAJ) and 10% by the RoS. MJA is ultimately owned 100% by Endeavour.

The Bransan Exploration Permit is held under the Bransan Mining Convention dated 2018 by the Sabodala Mining Company SARL (SMC), 70% and 30% Senegal Nominees SURL. SMC is owned by SGM which is ultimately owned by Endeavour.

The Sounkounkou Exploration Permit is held under the Sounkounkou Mining Convention dated 2018 held by SMC.

The Kanoumba Exploration Permit is held under the Kanoumba Mining Convention dated 2020 by MAJ.

1.3.3 Agreements and Encumbrances

All concessions carry a 10% free carried interest in favour of the GoS and, as a result, the Senegalese Government holds a 10% interest in SGO and Massawa. The State will keep a 10% interest in the merged SGO.

The concessions are also subject to a local mortgage in favour of Franco Nevada (Barbados) Corporation as security for the obligations of SGO in connection with the FN Stream, as part of a general collateral package which also includes security over the various holding companies in the structure which have an interest in the project.

1.3.4 Payments

Royalty payment terms are based upon a mix of the 2003 Mining Code and the 2016 Mining Code. The royalty payable to the GoS is 5% of the mine tile value ('Valeur carreau mine') associated with the sale of the gold and related substances.

After the deduction of this royalty, an additional 1% royalty is granted to the GoS in relation to waivers granted by the GoS, specifically with respect to its right to acquire an additional equity interest in certain deposits on the Sabodala Concession (Maki Medina, Massato, Gouloumba West, Goumbati West and Kerekounda) and the deposits on the Massawa License. With respect to the 1% royalty, down payments as noted below were made, with the 1% royalty due, only after the cumulative royalties paid, exceed the quantity deposited.

- For the Sabodala Concession an upfront payment of USD 10 M was made to the GoS. The royalties payable have now exceeded this value, and the 1% is due in full.
- For the Massawa License, an upfront payment of USD 15 M was made in 2020.

A technology licensing fee/royalty will be payable to the MO Group for use of the BIOX® technology employed at the proposed Sabodala Sulphide Treatment Plant (STP). The terms of this royalty are still to be agreed.

Payments are incurred to various social development programs, for training and logistics support payable to the Ministry of Mines, District support administration fees payable to the Governor of Kédougou and/or an ad valorem or proportional contribution of 0.5% of gross revenue after deductions for transport (FOB) and refining and/or smelting costs.

Finally, certain amounts of the SGO refined gold are delivered to Franco Nevada (FN) (Barbados) Corporation under a 2014 streaming arrangement relating to the mine. SGO will deliver 783 ounces per month beginning 1 September 2020 until 105,750 ounces have been delivered to Franco-Nevada (the 'Fixed Delivery Period'). At the end of the Fixed Delivery Period SGO is required to deliver six per cent of production from the concession. The FN Stream does not extend to ore from the Massawa project area.

1.3.5 Legal and Permitting

Legal and permitting issues are discussed more fully in Sections 4.0 and 20.0 of this Technical Report. In summary, the Issuer's subsidiaries have the requisite rights to develop mining operations on the Exploitation Permits which it holds.

Given the Sabodala Mining Convention was executed on 7 April 2015 and its provisions extend to the SMC Exploration Permits, it is anticipated that if and when they move into production utilising the Sabodala Plant, they will be considered as 'satellite deposits' and as such incorporated into it. As a result, the fiscal terms included under the Sabodala Mining Convention, including royalty and taxation rates as well as other fiscal incentives, are anticipated to be applied to these future operations.

1.4 Accessibility, Climate, Local Resources, Infrastructure and Physiography

Endeavour's exploration and mining activities in southeast Senegal are well supported by a world-class port and international airport in Dakar. For the movement of people and goods to Site, SGO utilise a paved airstrip on the Sabodala property and the in-country road network. The 790 km road journey to Site is largely on sealed national roads (N1 and N7), with the final 96 km from Kédougou to Sabodala via Bembou (sealed to Bembou), a mix of sealed and laterite roads.

Whilst there are plans of extending the national power transmission grid to the southeast and establishing a rail service to Kédougou and Falémé, it is unlikely to happen until the requisite enablers are in place, namely the development of; the Sambangalou dam, and Miferso's iron ore project. Thus for the immediate future, SGO will continue to generate its own power and transport goods by road.

Senegal has an established cellular and fibre network which ultimately connects up with the Atlantis 2 undersea cable, connecting Europe, Africa and South America. The excellent communications infrastructure allows the operation to be supported by Endeavour offices in Dakar, *Abidjan* (Côte d'Ivoire) and London (United Kingdom).

The climate is hot and dry for a large part of the year, with predictable monsoon rains falling largely between July and September. Whilst a water pipeline from the Falémé River to site was established when the Sabodala plant was first built in 2009, this has since been decommissioned. The operations currently use a series of water harvest dams to provide water for the facilities and even though the mean annual evaporation (MAE) is twice that of the mean annual precipitation rate (MAP), the catchment area for the water harvest dams and boreholes are sufficient to meet all of the operational water make-up requirements. Annual rainfall variability is relatively low, suggesting that water will never have to be abstracted from the Falémé River.

The southeast of Senegal is in an area of low seismicity and is not subject to extreme weather events. Thus, there are no perceived operability or facility design risks.

The southeast of Senegal is relatively undeveloped with respect to the facilities and services required to develop people and support a mining operation. Hence, a large percentage of the raw materials required to support the mine are either sourced from Dakar or abroad. Skilled artisans and professional staff are largely sourced from Dakar, complemented with expatriate staff where required.

In line with global best practise, significant attention is being given to local/regional procurement and the development of people in the surrounding villages and towns.

Endeavour and its subsidiaries have the requisite surface rights to develop and operate mines on the exploitation permits. In the development of the mine and attendant infrastructure, due regard and appropriate systems/procedures are in place to manage the relocation of people and protect demarcated conservation areas.

1.5 History

The Sabodala-Massawa Project has a comprehensive, well documented twenty year history of well-funded systematic and extensive exploration undertaken to industry best practice. It has been subjected to a number of comprehensive technical studies compiled to international standards. Commercial gold production has been active for 12 years with 2.8 Moz gold produced to date.

The evolutional milestones of the Sabodala-Massawa Project are summarised below:

- Sabodala modern exploration commences in 2004 and in Massawa in 2000.
- Sabodala commences commercial gold mining in 2009.
- May 2017, Randgold compile a PFS for the Massawa Project, focusing on the free-milling material at Massawa and Sofia Main with a standalone, new plant.
- Randgold and Barrick merger.
- September 2019, Barrick complete a FS for the Massawa Project to include non-free milling material to be treated through a new standalone plant (refractory ores were proven to be highly recoverable through a BIOX process).
- March 2020, Teranga acquire the Massawa Project and start commercial gold production through the existing SWOLP.
- Teranga undertake a PFS for the combined Massawa-Sabodala Project to include changes and additions to the existing SWOLP and a new sulphide treatment plant to treat the refractory Massawa ores.
- As of the end of 2021, 2.8 Moz of gold has been produced by the Sabodala-Massawa Project.

The historical exploration drill hole database is substantial and significant, containing over 16,000 holes for some 1,676 km of drilling which represents a major asset of the Project.

Table 1.5.1 Sabodala-Massawa Historical Exploration Drill Hole Summary

Property	Period	Company	No. Holes	Metres
Sabodala	2005 to 2011	MDL	6418	390 061
	2011 to 2019	Teranga	5298	862 914
Massawa	2004 to 2018	Randgold	3667	398 508
	2019	Barrick	920	24 790
Total			**16 303**	**1 676 273**

1.6 Geological Setting and Mineralisation

The Sabodala-Massawa Project is located in the West African Craton, within the 2 213 Ma to 2 198 Ma age Kédougou-Kenieba Inlier. The Sabodala Mining Concession, Massawa Mining License and the Bransan (Lot A, B and C), Sounkounkou and Kanoumba exploration permits straddle two major divisions of the Inlier; the volcanic-dominated Mako Supergroup to the west, and the sediment-dominated Diale-Dalema Supergroup to the east.

The Kédougou-Kenieba Inlier lies in the West African (Birimian) Paleoproterozoic metallogenic province, which extends from Senegal and Mali through north-eastern Guinea, Cote d'Ivoire, Ghana, Burkina Faso and as far east as Niger. The region includes several world-class gold deposits, including Loulo and Sadiola in Mali and Ashanti (Obuasi) in Ghana.

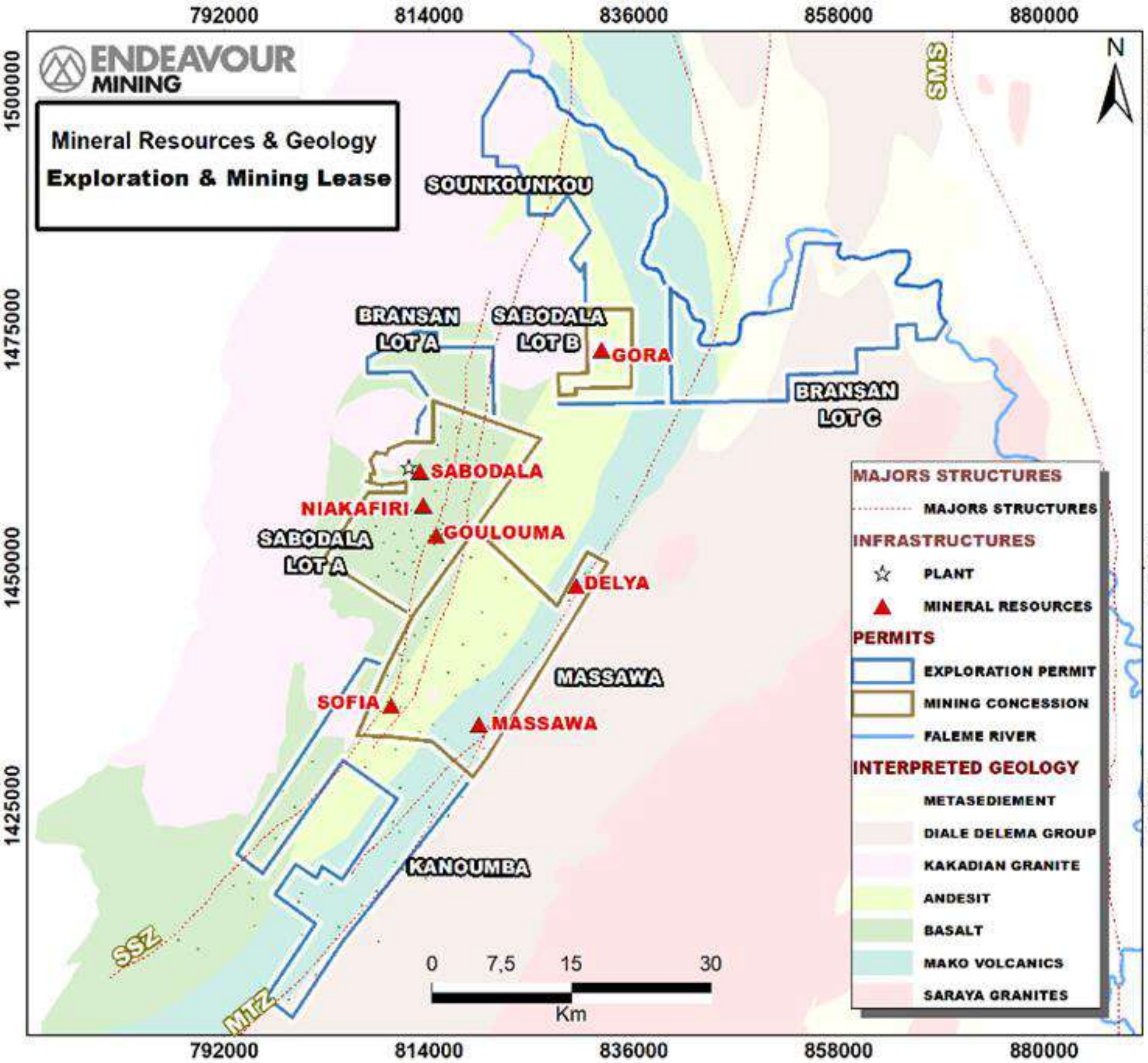
Birimian rocks of the Kédougou-Kenieba Inlier show a polycyclic deformation and metamorphic history. The first phase of deformation was compressive followed by a later transcurrent movement and deformation. Major crustal shear zones regionally bound and influence the overall north-northeast lithological grain in the region. These include a north-northeast trending shear zone forming a boundary between the Mako and Diale-Dalema groups, locally referred to as the Main Transcurrent Shear (MTS) Zone. The MTS converges with the major northerly trending Senegal-Mali Shear Zone, which is spatially associated with several major gold deposits (including Sadiola and Loulo). Intense zones of high strain are also present in the eastern portions of the Mako Supergroup, confirming the presence of a major structural corridor referred to as the Sabodala Structural Corridor (SSC) or Sabodala Shear Zone (SSZ).

The Sabodala-Massawa Project gold deposits show many characteristics consistent with their classification as orogenic (mesothermal) gold deposits. Orogenic gold systems are structurally controlled deposits formed during regional deformation (orogenic) events. Orogenic deposits are typically localised adjacent to major faults (shear zones) in second and third order shear zones within volcano-sedimentary (greenstone and sedimentary) belts between granitic domains (commonly for Precambrian deposits such as the West African Birimian, Abitibi Greenstone Belt of Canada, and Yilgarn region of Western Australia) or in slate belt turbidite sequences (many Phanerozoic deposits). Fluid source for these systems remains controversial: they generally involve a dominant metamorphic fluid component, consistent with their setting and relative timing; however, in many districts, there is evidence for a contributing magmatic fluid inducing early oxide-rich alteration assemblages, as is seen in the Sabodala-Massawa Project.

The Sabodala-Massawa Project hosts 26 deposits with Mineral Resources and over 40 known gold prospects and anomalous areas, see Figure 1.6.1 and Table 1.6.1. The MTS hosts the Massawa and Delya deposits and the SSZ hosts the Sofia and Sabodala deposits.

The gold prospectivity of the Project Area continues to be considerable in the Qualified Person's opinion.

Figure 1.6.1 Property Geology and Permit



Source: Endeavour, March 2022.

Table 1.6.1 Summary of the Sabodala-Massawa Licences/Permits, Deposits and Prospects

Licence/Permit	Deposits and Prospects		
Sabodala Lot A Mining Licence	Sabodala Deposit		
	Mamasato Deposit		
	Niakafiri Area	Niakafiri East Deposit	Niakafiri Main
			Dinkokono
			Niakafiri Southeast
		Niakafiri West Deposit	
	Maki Medina Deposit		
	Goumbati West – Kobokoto (GKK) Deposit		
	Masato Deposit		
	Kinemba Deposit		
	Kouroundi Deposit		
	Kerekounda Deposit		
	Kourouloulou Deposit		
	Golouma Area	Golouma West Deposit	
		Golouma South Deposit	
		Golouma South Deposit	
		Golouma Northwest Deposit	
	Koulouqwinde Deposit		
	Koutouniokollo Deposit		
	Soukhoto and Faloumbo Area		
	Goumbati East Prospect		
	Malekoto Prospect		
	Sekoto Prospect		
Sabodala Lot B Mining Licence	Gora Deposit		
Massawa Mining Licence	Massawa Deposit	Central Zone (CZ1 & CZ2)	
		Northern Zone (NZ1 & NZ2)	
	Delya Deposit		
	Tina Deposit		
	Bambaraya Deposit		
	Sofia Deposit	Sofia Main Zone	
		Sofia North Zone	
	Samina Deposit		
	Tiwana Prospect		
	Makana Prospect		
Kanoumba Exploration Permit	KB Main ('Kaviar') Prospect		
	KC ('Kawsara') Prospect		
	Sofia South Prospect		
	Sira and Galama Prospects		
	Bareyna Prospect		
	Tiguida Prospect		
Bransan Lot A Exploration Permit	Goumbou Gamba		
	Diadiako		
Bransan Lot B Exploration Permit	-		

Table 1.6.1 Summary of the Sabodala-Massawa Licences/Permits, Deposits and Prospects

Licence/Permit	Deposits and Prospects	
Bransan Lot C Exploration Permit	Marougou Deposit Tourokhoto Prospect Goundameko Prospect Dembela Hill Prospect Saiansountou Prospect	
Sounkounkou Exploration Permit	Soreto-Diabougou	Soreto Prospect Soreto North Prospect Diabougou Prospect
	Nienienko Prospect Cinnamon Prospect Honey Prospect Jam Prospect KA Prospect KB Prospect KC Prospect KD Prospect	

1.7 Deposit Type

Gold deposits in the West African metallogenic district, including those of the Sabodala-Massawa Project, show many characteristics consistent with their classification as orogenic (mesothermal) gold deposits and prospects. Orogenic gold systems are structurally controlled deposits formed during regional deformation (orogenic) events.

Orogenic deposits are typically found adjacent to major faults (shear zones) in second and third order shear zones within volcano-sedimentary (greenstone and sedimentary) belts between granitic domains (commonly for Precambrian deposits such as the West African Birimian, Abitibi Greenstone Belt of Canada, and Yilgarn region of Western Australia) or in slate belt turbidite sequences (many Phanerozoic deposits). Fluid source for these systems remains controversial: they generally involve a dominant metamorphic fluid component, consistent with their setting and relative timing; however, in many districts, there is evidence for a contributing magmatic fluid inducing early oxide-rich alteration assemblages, as is seen in the Sabodala-Massawa Project.

1.8 Exploration

The Sabodala-Massawa Project hosts a significant proportion of a relatively underexplored, regional-scale gold system. There is excellent potential to increase Mineral Resources, particularly where existing mineralisation identified prospects and targets that are, open along strike and at depth along the two major regional structures, corresponding structural corridors, and the vast area between the two major regional structures.

Approximately 38 km of the SSZ and 40 km of the MTZ are located within the Project Area. In addition, the structural corridors between and adjacent to the two regional structures have good potential to host additional mineralisation where early stage exploration programs have returned favourable results in numerous prospects and targets in adjacent parallel, and second and third order structural zones. These structural zones consist of northwest trending linking structures between major shear zones, as well as structures wrapping around major intrusions, all of which form prospective sites for gold deposit formation.

The Project has a significant dataset to assist with target generation including exploration drilling, regional soil samples, rock-chip samples and geophysics (electro-magnetics, radiometrics, aeromagnetics and local induced polarisation (IP)).

Endeavour uses a phased approach to the property wide exploration programme. Endeavour has completed a review of the existing data, evaluated the results, and has prioritised drill targets and further soil sampling programmes.

Exploration in 2020 and 2021 was dominated by resource definition drilling, only limited reconnaissance work was undertaken. Thus, the significant exploration potential of the Project remains, including 70 known prospects to be further tested and evaluated.

1.9 Drilling

The drilling prior to 2020, is considered historical and summarised in Section 6.0, 'History'.

Since January 2020, a total of 1831 reverse circulation (RC) drill holes for 131 965 m and 596 diamond drill (DD) holes for 81 539 have been drilled on the different targets across the Sabodala Mining Project by Teranga (January 2020 to February 2021) and Endeavour (February to December 2021), including:

- The near mine targets at Sofia and Massawa CZ and NZ to upgrade and increase Mineral Resources, both along strike and at depth.
- The high priority satellite deposits and prospects of Bambaraya, Goumbatie SE, Makana 1 and 2, Sofia North Extension, Tiwana, Tina and Soma to further define and increase Mineral Resources.

1.10 Sample Preparation, Analyses and Security

Sample preparation, analysis and security follow international best practice under the supervision of a Qualified Person and are documented in comprehensive standard operating procedures (SOP). A robust and actively monitored Quality Assurance/Quality Control (QA/QC) system is in place. The in-house Database Management System (DBMS) securely hosts the exploration results.

In the QP's opinion, the sample preparation, analysis, and security procedures at the Sabodala-Massawa Project are adequate. The QA/QC programmes as designed and implemented by Endeavour, Teranga, Randgold, and Barrick are also considered to be adequate.

In 2020 and 2021, nearly 169 000 RC chip and DD core samples including QA/QC samples (approximately 8%) were submitted for gold analysis at independent, accredited laboratories. In the 2020 to 2021 QA/QC programme, there was an overall certified reference material (CRM) failure rate of 1.4%, a blank failure rate of 0.6% and a 0.8% duplicate pair failure rate.

It is in the opinion of the Qualified Person for Section 11, that the failure rates quoted are acceptable, especially in light of the remedial and re-assay requests actioned; and the assay results within the secure DBMS are suitable for use in a Mineral Resource estimate.

1.11 Data Verification

All QPs are expected to verify the data that they base their design and cost estimates on. The extent to which the various QPs have verified the data and any limitations with respect to achieving the technical report update objectives, is discussed more fully in Section 12.0.

1.12 Mineral Processing and Metallurgical Testing

The current SGS Lakefield metallurgical testwork programme combined with all the previous historical testwork programmes conducted for Massawa deposits, provides a sufficient representative and complete database to support a Feasibility Study. The summary process design criteria presented in Section 17, reflects a reasonable interpretation of the testwork results and is appropriate for use in this study's process design and for the Project's economic analysis.

Extensive past and current metallurgical testwork campaigns, demonstrate three distinct behaviours:

- 'Free-milling' ores are characterised by high (>85%) gold extraction by conventional cyanidation as is used in the SWOLP.
- Semi-refractory' ores are characterised by moderate (50% to 75%) gold extraction by conventional cyanidation process and generally lower (40% to 65%) gold extraction by flotation and oxidation of the gold-bearing sulphides prior to conventional cyanidation.
- 'Highly refractory' ores are characterised by very low (<25%) gold extraction through a conventional cyanidation process, but achieve high (>85%) gold extraction by flotation and oxidation of the gold-bearing sulphides prior to conventional cyanidation.

'The testwork programs have comprehensively demonstrate the refractoriness classification of the oxide, transitional and fresh ore types in the various Massawa deposits as summarised in Table 1.12.1.

Table 1.12.1 Refractoriness Classification by Deposit and Ore Type

Deposit	Oxide	Oxidised Transition	Reductive Transition	Fresh
Sofia Main	Free Milling	Free Milling		Free Milling
Sofia North	Free Milling	Free Milling		Free Milling
Massawa CZ	Free Milling	Free Milling	Semi-Refractory	Semi-Refractory Highly Refractory
Massawa NZ	Free Milling	Free Milling	Semi-Refractory	Highly Refractory
Delya	Free Milling	Free Milling	Semi-Refractory	Highly Refractory

Endeavour proposes to treat the; free milling ores through the SWOLP, and the highly refractory ores through the SSTP (BIOX® circuit). The semi-refractory reductive transitional ores and potentially some of the Massawa CZ semi-refractory fresh ore will be treated firstly through the SSTP (BIOX® circuit) followed by the re-processing of the flotation tailings through the SWOLP. This material will be additional to the 'free milling' ore currently scheduled for the SWOLP.

Using the optimal processing route for each ore type, gold recovery was estimated based on testwork results to date. The predicted LOM average recoveries for each ore type are summarized in Table 1.12.2.

Table 1.12.2 Gold Recovery Summary by Ore Type

Deposit	Free Milling (%)	Semi-Refractory (%)	Highly Refractory (%)
Sofia Main	90	-	-
Sofia North	90	-	-
Massawa CZ	92	90	88.3
Massawa NZ	85	90	88.3
Delya	92	90	88.3

1.13 Mineral Resource Estimates

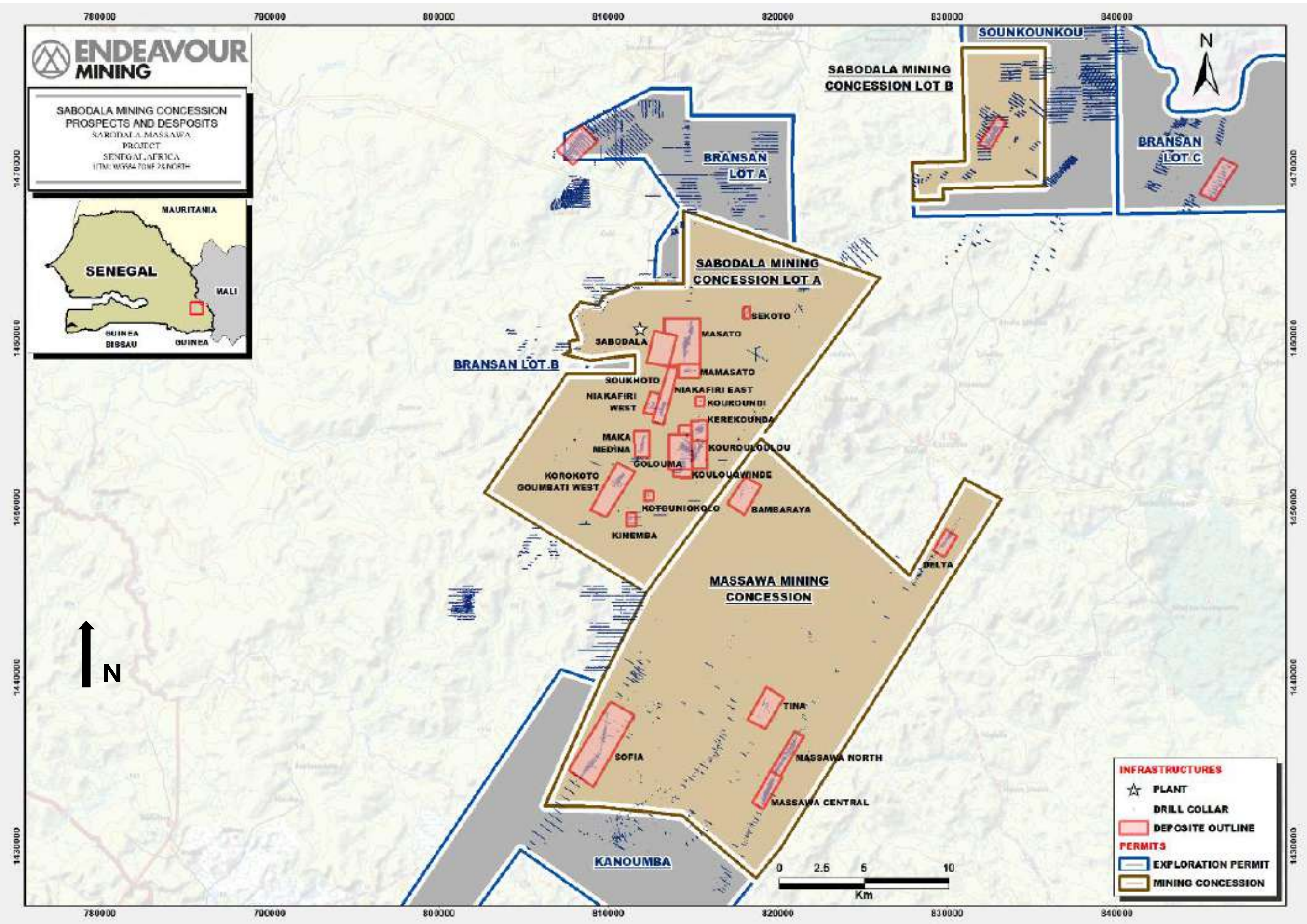
Mineral Resources for the Sabodala-Massawa Project have been estimated for 26 gold deposits located on the Sabodala and Massawa Mining Licenses and the exploration permits.

The Sabodala-Massawa Project, as of 31 December 2021, contains an open pit Measured Mineral Resource of 21.2 Mt at a grade of 1.32 g/t Au containing 0.9 Moz Au, an open pit and underground Indicated Mineral Resource of 88.9 Mt at a grade of 2.09 g/t Au containing 6.0 Moz Au and an open pit and underground Inferred Mineral Resource of 24.3 Mt at a grade of 2.16 g/t Au containing 1.7 Moz Au.

The open pit Mineral Resources are reported at cut-off grades between (0.33 and 1.09) g/t Au, and the underground Mineral Resources at 2.00 g/t Au (Sabodala) or 2.84 g/t Au (Massawa). The open pit Mineral Reources are reported above a Whittle shell. A gold price of USD 1500/oz Au has been used for open pit and underground Mineral Resources. Mineral Resources are reported inclusive of Mineral Reserves, see Table 1.13.1.

Figure 1.13.1 following, illustrates the gold deposits on the Sabodala Mining Concession, the Massawa Mining License and Branson exploration permits.

Figure 1.13.1 Location of Deposits with Mineral Resources



Source: Endeavour, March 2022.

Table 1.13.1 Open Pit/Underground Mineral Resource Summary, as of 31 December 2021

Category/Property/Mining Method	Tonnage (kt)	Grade (g/t Au)	Contained Metal (koz Au)
Measured Resources			
• Sabodala OP	9 151	1.57	462
• Sabodala UG	0	0	0
• Massawa OP	1 030	3.50	116
• Massawa UG	0	0	0
• Stockpile	11 037	0.91	323
Total Measured Resources	**21 217**	**1.32**	**900**
Indicated Resources			
• Sabodala OP	48 091	1.19	1 844
• Sabodala UG	6 411	4.09	843
• Massawa OP	34 381	2.98	3 290
• Massawa UG	0	0	0
Total Indicated Resources	**88 883**	**2.09**	**5 977**
Measured + Indicated Resources			
• Sabodala OP	57 242	1.25	2 306
• Sabodala UG	6 411	4.09	843
• Massawa OP	35 411	2.99	3 406
• Massawa UG	0	0	0
• Stockpile	11 037	0.91	323
Total Measured + Indicated Resources	**110 100**	**1.94**	**6 878**
Inferred Resources			
• Sabodala OP	9 926	1.09	347
• Sabodala UG	4 376	3.46	487
• Massawa OP	7 547	2.03	491
• Massawa UG	2 411	4.59	356
Total Inferred Resources	**24 260**	**2.16**	**1 682**

Notes:

1. CIM definitions were followed for Mineral Resources.
2. Open pit oxide Mineral Resources are estimated at cut-off grades ranging from 0.33 g/t Au to 0.50 g/t Au.
3. Open pit transition and fresh rock Mineral Resources are estimated at cut-off grades ranging from 0.37 g/t Au to 1.09 g/t Au.
4. Underground Mineral Resources are estimated at a cut-off grade of 2.00 g/t Au at Sabodala, and at 2.84 g/t Au at Massawa.
5. High grade assays were capped at grades ranging from 1.5 g/t Au to 340 g/t Au.
6. Mineral Resources are inclusive of Mineral Reserves.
7. Open pit shells were used to constrain open pit resources.
8. Mineral Resources are estimated using a gold price of USD 1500/oz.
9. Sum of individual amounts may not equal due to rounding.

The Massawa Central Zone (CZ), Massawa North Zone (NZ) and Delya resource models have been updated to support decisions related to the processing of reductive transitional and sulphide ore. Improvements included detailed interpretations of lithology, weathering layering, redox surfaces and the additional of certain elements and attributes related to the planned BIOX® plant (including sulphide sulphur, arsenic, antimony and iron).

The same general approach has been taken for all deposits with Mineral Resources whereby block grade and density estimates are constrained by domains representing the mineralisation, lithology and weathering surfaces. Open pit resources are reported within pit shells generated in Whittle software using the Lerchs-Grossman algorithm. Underground resources are reported within preliminary stope shapes generated using Deswik software or by visually inspection and manual selection of areas of good gold grade continuity and thickness on longitudinal section.

The Qualified Person (QP) for the Mineral Resource estimate is Kevin Harris CPG (VP Resources), who is a full-time employee of Endeavour Mining, not independent and is a Qualified Person in accordance with NI 43-101. Mr Harris is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, or political issues that would materially affect the Mineral Resource estimates.

1.14 Mineral Reserve Estimates

The Mineral Reserves Statement (effective 31 December 2021) for the Project, is stated in accordance with the CIM Standard and Definitions. The Mineral Reserve Statement has been developed with due consideration of all the necessary multi-disciplinary technical inputs required to ensure CIM compliance.

The Mineral Reserve Statement includes 66.4 Mt grading 2.08 g/t Au for total contained metal of 4 440 koz Au comprising:

- Proven Mineral Reserves of 19.8 Mt grading 1.36 g/t Au, with contained metal of 866 koz Au.
- Probable Mineral Reserves of 46.5 Mt grading 2.39 g/t Au, with contained metal of 3 574 koz Au.

Table 15.9.1 in Section 15.0, presents the detailed subdivision of Mineral Reserves as of 31 December 2021, inclusive of subdivisions for the; oxide, transitional and fresh ore types.

A significant portion of the key supporting technical assumptions are derived from the recent operational experience which has advanced significantly since commencement of mining and processing operations in 2009.

The gold price assumption for Mineral Reserves estimation was USD 1300/oz.

All inferred material is treated as waste, and as such; no revenue is assigned to the metal contained within the inferred classification.

1.15 Mining Methods

1.15.1 Mine Production

In the mine plan, a total of 66.4 Mt of ore at an average grade of 2.08 g/t gold containing 4440 koz gold will be processed over the LoM, resulting in an expected gold production of 3945 koz at an overall average recovery of 88.8%.

It was assumed that the SSTP can be ready by the end of February 2024, with first gold production in March 2024. For 2024, total gold production reaches 403 koz, with 179 koz gold attributable to the SSTP. In 2025, the SSTP gold production reaches 290 koz, then gradually drops to 105 koz in 2030 and 18 koz in the first quarter of its final production year (2033).

The expected total gold production from the SWOLP in 2022 is around 360 koz, due to the availability of relatively high grade ore and achieving an average gold grade of 3.00 g/t on total throughput 4 247 kt. This high grade mill feed resulted in around 360 koz gold production with 87.9% average recovery from the SWOLP.

The planned gold production from SWOLP reduces to 300 koz in 2023 and 256 koz in 2024. It reaches a low production of around 145 koz in 2025 before jumping up to 206 koz in 2026. Then the SWOLP gold production fluctuates between the (132 to 238) koz/a range until 2031, tailing down to around 69 koz during the second quarter of its final planned production year (2035).

The production schedule provided is achievable and the operating costs, and the capital and sustaining costs presented for open pit mining, are in alignment with the requirements of a feasibility study and CIM requirements. Furthermore, there are no perceived open pit mining risks that are not manageable, and would materially impact the results presented herein.

1.15.2 Underground Mining

The 2021 Mineral Reserve estimate assumed that underground mining would be undertaken at the Golouma and Kerekounda deposits below the already mined out open pits. The underground mine design has been developed from inputs provided by Endeavour, other reports, or determined by SLR. The model of operation for the underground mining is owner-operated supported by Endeavour/SGO staff. The mining method is mechanised cut and fill (MCAF) (cemented and uncemented). This method was chosen based on its ability to achieve low capital and operating costs from mining through to finished metal. This mining method maintains a safe working environment and manageable operational and cost risk.

Underground mining is supported by the necessary infrastructure and equipment to sustain target production levels. Existing surface infrastructure will continue to be used, and new underground infrastructure will be developed. New infrastructure includes ventilation, a mine backfill plant, mine dewatering pumps and piping, refuge chambers and an electrical distribution system. The infrastructure was included in the mine design and scheduled with the mine development. Mine production was then scheduled based on the availability of the infrastructure and access to the orebodies. The design nominal underground production rate is 1000 t/d, requiring an average of two active areas running concurrently.

The three deposits require a total of 18.3 km of capital development, 53.1 km of operating development and 1249 m of vertical development.

Underground operations will be self-performed, with the mining workforce hired once the start of underground mining operations has been determined. Endeavour/SGO will; purchase the mining fleet, hire the workforce and manage all aspects of underground mining.

SLR identified the following risks to the design and cost estimates for the Golouma and Kerekounda deposits:

- The geotechnical and hydrogeological information related to the three deposits is preliminary. Further investigative work and analyses is required to confirm the opening size, ground support design, and dilution and recovery factors.
- The suitability of the mining method is determined by the geotechnical inputs to mine design. The mining method may change, should the assumed geotechnical conditions not be realised after additional study and analysis of geological and geotechnical data.
- The mine production rate is constrained by the mining method used in the study. Changes to the mining method(s) will also affect the mine production rate, metal production and cashflow.
- Mining contractor budgetary estimates used to estimate the underground labour rates have a limited shelf-life. The estimates provided by the mining contractors will need to be redone with updated cost inputs and assumptions. The estimated mining costs may increase as a result, decreasing the cashflow.

- Based on open pit mining schedules, underground mining is projected to start one year after this study and cost estimates have been completed. The design assumptions and all price and cost inputs need to be updated periodically to ensure that the Golouma and Kerekounda deposits remain economically viable between the time of this cashflow estimate (Q4 2021) and actual production.

SLR identified the following opportunities during the preparation of the Mineral Reserve estimates for the Golouma and Kerekounda deposits:

- Further geotechnical investigation may determine that the ground conditions are better than those assumed in this analysis. A more productive mining method will increase mine output and reduce the unit mining costs.
- Additional drilling and exploration work may expand the mineral resource base and, by extension, the reserves for the three deposits.
- Commodity prices are forecast to increase over the longer term. The price assumption used in the analysis (cut-off grade and cashflow model) was USD 1300/oz. This is below the price current at the time of the analysis.
- Underground mining is expected to start once surface mining has been wound down or ceased. Depending on process plant capacity, starting underground mining sooner rather than later, will increase the net present value and maximize plant utilisation.
- Concurrent operation of the three deposits, at a higher combined production rate may increase the net present value of the deposits as they will be mined over a shorter time period.

The QP recommends that the following be undertaken in relation to the Golouma and Kerekounda deposits:

- Complete further geotechnical investigations and analyses of the underground mining areas. This will confirm the geotechnical conditions in the mining areas which is a key driver of mine design.
- Remain in communication with mining contractors operating in the region. This will enable Endeavour's site staff to stay informed of trends in contract mining, equipment, and labour costs in West Africa.
- Assess the feasibility of concurrent open pit and underground mining operations.
- Investigate alternative mining methods to increase productivity and decrease the mining unit costs.
- Complete periodic trade-off studies examining owner operation versus contractor operation.

1.15.3 Labour Numbers

1.15.3.1 Open Pit Mining

As of 31 December 2021, some 717 (35%) of the 2067 persons employed by SGO were engaged in mining activities (Table 16.3.2) and of the 717 persons, 60% are directly employed by SGO.

1.15.3.2 Underground Mining

Two underground mines operating concurrently, are expected to utilise an additional 12 day workers, and 169 shift workers (4 panel shift system, with 42 workers per shift).

1.15.4 Waste Management

Waste dumping strategy and capacities are discussed in Section 16.0 and 18.0, as per NI 43-101 requirements.

The waste dumps are located/designed to minimise environmental impact, footprint and haulage costs. All the deposits were planned with sufficient waste dump capacities, for the current LoM plans.

1.15.5 Water Management

Water associated with the mining of pits along the Sabodala Structural Corridor (SSC) is largely clean and can be discharged to the environment after settling and monitoring.

Water associated with the pits and waste rock dumps along the Massawa Transcurrent Zone (MTZ) needs some form of treatment before releasing to the environment. Further detail is provided in Sections 18.0 and 20.0.

Clean water diversions are minimal, with no major stream or river diversions required.

Ground water inflow to the pits are largely low to moderate along the MTZ, with Massawa CZ having the highest potential inflows at <96 L/s (<350 m^3/h).

No issues are foreseen with respect to water management and mining.

1.15.6 Ore Haulage

Ore mined from the pits near the processing plants (Sabodala and Masato pits), is directly transported to the SWOLP RoM pad by the mining fleet. The ore mined from the other pits is first stored at a temporary stockpile (OFF RoM) near the pits. When the ore needs to be processed, it is transported to the SWOLP and SSTP RoM pads by the haulage contractor (Transport Dieye). Further discussion on ore transportation is included in Section 18.0.

1.15.7 Mine Scheduling

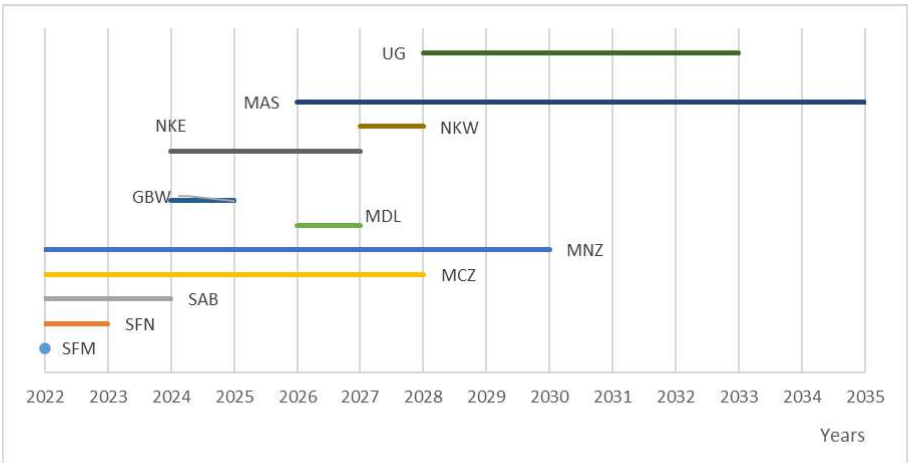
From the proposed production schedule, it is planned to move between (50.3 and 52.5) Mt of total rock (ore and waste) per year through 2022 to the end of 2025. The mining requirement reduces to 40 Mt in 2026, and gradually reduces down to 12.5 Mt in 2034, finishing early 2035.

Sabodala open pit mining was planned to be completed in 2024, and potentially can be used as an in-pit TSF, thereby minimising the size of TSF 2, with potential savings of over USD 31 M.

Sofia Main pit is expected to be completely mined out during 2022, and Sofia North during 2023.

Active periods of the mining by source are shown in Figure 1.15.1 following.

Figure 1.15.1 Active Periods of Mining by Source (Endeavour, 2022)



1.16 Recovery Methods

Sections 1.16.1 and 1.16.2 following, summarise the key processing aspects of the SWOLP and the proposed Sabodala SSTP. Further supporting detail is provided in Section 17. The two plants are adjacent to each other and share a number of common services and facilities.

1.16.1 Sabodala Whole Ore Leach Plant (SWOLP)

The existing SWOLP will continue to process free milling gold ores from the Sabodala concession and Massawa mining licenses.

The SWOLP has been upgraded and optimised in capacity over successive plant expansions and reliably:

- Processes (4.0 to 4.5) Mt/a (db) of free-milling oxide and fresh ores at the target grind size.
- Processes gold grades of between (0.88 and 3.0)[1] g/t.
- Achieves approximately 94% plant operating time.

For the current LoM plan the SWOLP will process between (4.0 and 4.5) Mt/a (db) of ore to produce between (101 and 359) koz/a of gold. The average LoM feed grade and recovery from 2022 to 2035 is 1.62 g/t Au and 89.4% respectively. The SWOLP will operate for 5 months in 2035.

The SWOLP comprises:

- RoM pad and direct tip and FEL RoM bins for two parallel primary (jaw) crushing and double deck screening trains.
- Partial secondary crushing.
- Two coarse ore stockpiles with reclaim facilities.
- SABC circuit (one SAG, two ball mill in parallel) with recycle pebble crusher, hydrocyclones and a gravity recovery and intensive cyanide leach circuit.
- Leach and CIL circuit with tails thickening prior to pumping to final tails storage.
- 8 t elution and carbon regeneration circuit and goldroom.
- General dedicated plant and reagent services.

1.16.2 Sabodala Sulphide Treatment Plant (SSTP)

A new standalone sulphide ore treatment plant is to be built at Sabodala, hereafter referred to as the Sabodala Sulphide Treatment Plant or SSTP. This new plant will operate adjacent to the existing SWOLP with some common shared services and facilities. The SSTP will process non-free milling reductive transitional and fresh sulphide ores from the Massawa Mining License, with first production expected in Q1 2024.

The SSTP design is based on a plant throughput of 1.2 Mt/a (db) of fresh and reductive transitional sulphide ores, with a RoM gold grade of between (1.24 to 7.98) g/t (design 7.00 g/t).

The actual mine plan and production schedule that the financial model is based upon has been developed and reported on a quarterly basis through to 2027 and summarised by year thereafter (S. Ramazan, March-2022). Details are provided in Table 1.16.1 following. For the schedule provided, the weighted average RoM gold grade and recovery

[1] Based on annual weighted averages.

are 4.43 g/t and 87.7% respectively. The LoM weighted average RoM sulphur, iron, arsenic and antimony grades and iron to arsenic ratio are 1.12 % w/w, 5.27 % w/w, 0.50 % w/w, 440 ppm and 10.5:1 respectively.

Table 1.16.1 SSTP Production Schedule (S. Ramazan, March-2022)

Description	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
RoM (t/a db)	0.87	1.20	1.21	1.20	1.20	1.20	1.14	1.20	1.21	0.36
Au (g/t)	6.37	7.50	5.69	5.49	5.37	4.32	2.87	2.03	1.55	1.55
Au Recovery (%)	81.81	88.64	88.62	88.55	88.46	88.45	88.48	88.3	88.3	88.30
Au Produced (koz/a)	146	257	195	188	184	148	93	69	53	16
S (% w/w)	1.27	1.27	1.24	1.09	1.03	1.00	1.05	1.07	1.07	1.07
Fe (% w/w)	5.53	5.48	5.51	5.58	5.43	5.46	5.11	4.93	4.64	4.64
As (% w/w)	0.52	0.52	0.53	0.56	0.53	0.51	0.48	0.48	0.44	0.44
Fe:As	10.70	10.61	10.41	10.05	10.33	10.79	10.70	10.33	10.56	10.56
Sb (ppm)	563	775	676	413	302	192	365	341	379	379

Notes:

1. Tonnes and % are on a dry and mass/weight basis respectively.

Sulphur grades largely drive the design of the flotation and BIOX® circuits, the associated cooling requirements and reagent/consumable usage. The iron to arsenic ratio drives the long-term stability of the ferri-arsenate product produced in the neutralisation circuit. The levels of arsenic in the ore are relatively high, approximately (0.44 to 0.7)[1] % with a LoM average of 0.5 %. It is the arsenic and antimony in the orebody that drives the need for a dedicated lined TSF compartment (TSF1B) and the water treatment plant to recover arsenic and antimony from the return decant water.

The BIOX® plant is designed and operated under license from the Metso Outotec (the 'MO Group') and has been designed to dissolve >95% of the sulphide minerals, thereby liberating the associated gold.

The proposed SSTP comprises:

- RoM bad with stockpiles for blending and a FEL fed feed bin.
- Primary crushing circuit (Jaw).
- Surge bin feed conveyor with discharge into the crushed ore surge bin.
- SABC circuit with recycle pebble crusher, hydrocyclones and a gravity recovery and intensive cyanide leach circuit.
- Flotation circuit with fine grinding of the concentrate prior to BIOX® treatment.
- BIOX® circuit for oxidation of the sulphide concentrate.
- Counter current decantation (CCD) and neutralisation circuit to recover and wash the oxidised product and neutralise and stabilise the acidic BIOX liquors.
- A dedicated lined tailings compartment (TSF1B) within TSF1 for the neutralisation product and CIL tails (described more fully in Section 18).

[1] Annual weighted averages across pits (Delya has the highest arsenic grades)

- Carbon in leach (CIL) circuit to leach the oxidised product of the BIOX circuit.
- A 6 t (carbon) acid wash and elution circuit.
- A carbon regeneration circuit (electrically heated).
- A goldroom.
- Upgrades/expansion of the Sabodala HFO power station (described more fully in Section 18).
- New buildings, workshops and stores to support plant operations (described more fully in Section 18).

1.17 Project Infrastructure

1.17.1 Geotechnical

The scope of work for the geotechnical investigations prepared by Lycopodium is more than appropriate for the proposed SSTP, particularly given the extensive investigations that have been executed for the existing process plant and the satisfactory structural performance of the existing structures.

The ground conditions exposed at site, as described in this Report, the geotechnical parameters for foundations, expected settlements evaluated utilising the commercial ground settlement analysis software Rocscience Settle3 and construction considerations are consistent with previous work and appropriate for the DFS, structural design and civil construction purposes.

The geotechnical investigations and data analysis demonstrate that the ground conditions are suitable for shallow foundations, provided the construction of the bulk earthworks is executed as recommended.

1.17.2 Transport and Logistics

The Sabodala-Massawa Properties are adequately serviced by the port and international airport in Dakar. With the exception of the last 60 km from Bembou to Sabodala, the road from Dakar is paved and non-seasonal. During the wet season, SGO maintains the Bembou-Sabodala laterite road at its own cost.

Whilst the paved airstrip at Sabodala was not built or owned by SGO, there are no perceived issues with its continued use by SGO.

The new business model of transporting ore from satellite pits (up to 5.7 Mt/a (arb[1])) to the Sabodala Central Processing facility (SCPF) results in a significant volume of 'long-haul' truck traffic, with nominally one truck arriving every 4.6 minutes at Sabodala in year 2028 (reporting to one of two RoM pads, thereby reducing the trucking frequency to each pad). Ore is currently being transported in horse/single trailer rear tippers with 60 t payloads. Given that the haulage roads are private, payloads could be increased above 60 t.

Dust and traffic safety associated with 'long-haul' ore haulage and logistics in general, will require ongoing management.

[1] As received basis

1.17.3 Power and Lighting

Until such time as the 128 MW hydropower dam in Sambangalou, 17 km south of Kédougou is constructed, operations on the Sabodala-Massawa Properties will need to be self-sufficient with respect to power.

This Technical Report is premised on the expansion of the current Heavy Fuel Oil (HFO) generation capacity at the Sabodala Power Station (SPS), albeit the design as currently proposed, can accommodate a large photovoltaic (41 MWp) and battery storage (20 MWh) solution. The techno-economics of alternate energy solutions will continue to be investigated and developed.

The existing approximately 36 MWe (installed capacity) SPS can meet the Phase 1 project requirements, with an increase in generator utilisation from approximately (69 to 81)% (on an average load as a percentage of installed generation basis) with two generators out of service at any one time, for maintenance or servicing requirements. For Phase 2, an expansion of the SPS is required to meet the additional nominal and peak loads of 14.2 MWe and 16.7 MWe respectively. The combined nominal and peak loads for the existing operation and the Phase 1 and Phase 2 expansion, are approximately 33.6 MWe and 40.2 MWe respectively.

The plant expansion will require three new 5.8 MWe HFO gensets to provide additional base load, and two new 1.6 MWe diesel gensets to provide immediate back up power for critical BIOX® loads respectively. The combined plant will have a total of nine generators, an installed nameplate generation capacity of approximately 53.4 MWe and an overall utilisation of approximately 81% (on an average load as a percentage of installed generation basis) with two generators out of service at any one time, for maintenance or servicing requirement.

Approximate power demand and energy consumption by Project phase are summarised in Table 18.5.1.

1.17.4 Water Management

1.17.4.1 Background

Water management studies and investigations were conducted by Digby Wells Environmental (Digby Wells or DWE) and Artois Consulting (Artois). Digby Wells concentrated on the environmental aspects regarding general water management and geochemistry while Artois dealt with the dewatering of the open pits. The combined scope included stormwater management plans (SWMP), water and salt balances, environmental geochemistry assessments and hydrogeological investigations.

1.17.4.2 Sabodala Property

The environmental monitoring system at Sabodala consists of 13 nested monitoring wells, each one completed as a deep well into the Sabodala Shear Zone and a shallower well in the near surface saprolite. To date, the routine quarterly water quality sampling confirms compliance with the relevant environmental standards. The groundwater level fluctuates in response to the seasonal recharge. Near the TSF1 spillway, a rise in groundwater level has occurred which is related to the volume, elevation, and location of the supernatant pond as well as the impact this has on the local water levels due to the TSF being unlined. Since 2016, when the supernatant pond was significantly reduced in volume, a decline in water levels has been observed in the near-by boreholes.

1.17.4.3 Massawa Property

At Sofia and Massawa, the pit and waste rock areas are monitored using four and nine environmental monitoring wells respectively. Pit dewatering will likely lower groundwater levels in those monitoring wells positioned within a 500 m radius of the Massawa excavations. At Sofia, the drawdown impact will likely not develop beyond a 100 m radius around each pit.

Flow (quantity) and chemistry (quality) monitoring will be conducted at surface water monitoring points within and around the Project Area. A total of 15 monitoring points have been established to monitor surface water quality. Physical parameters will be measured at each point, in addition to water and sediment sampling for laboratory analysis.

Given that rivers in the area are seasonal, monitoring will be done monthly during the rainy season. The recommendations of the CCME (1999) in addition to those of the EPA (2009) are applied as a reference following their guide values.

The most recent mine water plans were used in developing a site water and salt balance, as well as a SWMP. This was done to ensure all dirty and clean water is separated, managed and monitored before discharge. Completing the water and salt balance also ensures that the site has a good understanding of the expected water volumes and chemistry for the Project. The following recommendations and mitigations were proposed and are to be implemented:

- All dewatering and contact stormwater that is captured on-site will require storage in settling and holding ponds to allow settling and monitoring to take place before discharge. Any water not in compliance will be directed to the Massawa Water Treatment Plant (MWTP). The MWTP will be designed to process 600 m^3/h of dirty water containing up to 0.89 mg/L of arsenic and 1.2 mg/L of antimony.
- All perimeter boreholes dewatering around the open pits can be discharged directly to the environment once settling of solids has been allowed. The water quality will be monitored. If the quality deteriorates to above surface water background levels, then the water should be diverted to the MWTP.
- Only the pit sump water from the various pits will likely require treatment. Water management will be dynamic, and plans are in place to store, pump and discharge/treat water depending on monitoring results.

1.17.4.4 Water Use

The Sabodala-Massawa operations will continue to use the rainwater harvest dams at Sabodala and ground water subject to application and location. Even with the increased water requirements associated with the SSTP, no raw water supply issues are foreseen over the LoM.

1.17.5 Tailings Storage Facility

Based on the current mine plan, from 2024 till the end of mine life (2035), an additional 67.1 Mt (db) of tailings will be stored at Sabodala. The 67.1 Mt derives from three tails stream, one from the existing SWOLP and two from the new SSTP.

The new SSTP plant in combination with the SWOLP’s longer life, mean that additional tailings storage capacity is required at Sabodala and a new double lined impoundment facility is required for the approximate 1.0 Mt (db) of ferri-arsenate/neutralisation residue emanating from the BIOX® Plant (CIL/BIOX® Neutralisation Tails).

The 11.1 Mt (db) of flotation tails from the SSTP are relatively benign from an environmental perspective and will be pumped to the unlined TSF1 and/or the new lined TSF2. TSF1 and TSF2 will accommodate up to 66.1 Mt (db) of material.

Whilst TSF2 has been permitted, the design has changed (to be larger, lined and a change in the drainage system) and thus, needs to be re-permitted.

Whilst not forming part of this Technical Report, the option of in-pit tailings disposal (SIPTSF) as an alternative to TSF2 shows significant promise and should be pursued.

In accordance with the Global Industry Standard on Tailings Management; TSF1, TSF2 and TSF1B have a Dam Failure Consequence Classification of 'High'.

1.17.6 Waste Rock

In accordance with the LoM plan, there is 372 Mt of waste rock (historical and new) to be stored, with a corresponding loose volume of 201 Mlcm. The compares to a WRD capacity of 256 Mm^3.

WRD contact water from the Sabodala Shear Zone is largely benign and after monitoring, can be released to the environment after passing through silt traps. Contact water associated with the WRDs associated with the Massawa Shear/transcurrent Zone will require capture, monitoring and treatment before release to the environment. Treatment may take the form of dilution with clean water, or in the worst case scenario a portion of the water may be treated in the MWTP.

The availability of land for WRDs is not a constraint on the Sabodala-Massawa Properties for the current LoM plan. Furthermore, there is sufficient land for additional resources to be brought into an extended LoM plan.

1.17.7 Site Services

Site services provided over the Massawa-Sabodala Properties is briefly described below:

- Water Supply and Treatment.

  In all cases, the water available for use at the Sabodala-Massawa Properties over the LoM is sufficient in quality and quantity for the Phase 1 and Phase 2 expansion programme. Additional detail for Sabodala and Massawa is provided below.

  - Sabodala.

    Sabodala's make-up water requirements are met by the supply of water from the existing rainwater harvest dams and ground water. Water subject to its use, may be used directly or treated before use.

    A new water treatment plant will be built as part of the Phase 2 SSTP expansion to remove arsenic and antimony from the TSF decant water, before subsequent reuse of the water.

  - Massawa Water Supply and Treatment.

    Massawa water make-up requirements will be met by a mixture of ground water and dirty/contact water maintained in the three reservoirs at Massawa. Potable water will be treated before use.

    Pit water and possibly contact water in the dirty water reservoirs will be treated to remove arsenic, antimony and any other elements of environmental concern either before being used or released to the environment.

- Sewerage and Sewage Treatment.
  - Sewage treatment capacity at the Sabodala facilities are sufficient for the Phase 1 and Phase 2 expansion.
  - New sewage management facilities will be provided in the MSA area at Massawa. Treatment will be at the Massawa Camp.
- Fuel.

  HFO and LFO are supplied by Vivo Energy Sénégal on a consignment basis. In general, SGO aims to maintain 15 to 18 days of fuel storage capacity on the Sabodala-Massawa Properties to cover disruptions in supply. In total, after the Phase 1 and Phase 2 expansion, SGO will have 3000 m^3 and 2565 m^3 of fixed storage capacity for HFO and LFO respectively. As part of Phase 1 Mining Activities, the Sofia fuel farm will be moved to the MSA area at Massawa.
- Communications.

  The Phase 1 /2 programmes will require an expansion of the existing communications infrastructure, and no issues are foreseen. The internal and external information technology infrastructure is excellent and satellite communications are not required.
- Fire Detection and Protection.

  With the exception of the Sabodala Power Station tank farm, the facilities at Sabodala and Massawa, have/will have, the requisite fire detection and protection systems in place. Issues associated with the SPS tank farms will be addressed as part of the Phase 2 programme.
- Non-Production Waste Management.

  The requisite infrastructure, policies and procedures and contracts are in place over the Sabodala-Massawa properties for non-production waste management.

1.17.8 Buildings, Stores, Workshops and Ancillaries

The facilities required for the Phase 1/2 expansion and the Sabodala -Massawa Properties are briefly described below.

- Sabodala Property.

  Process related buildings to support the construction and operation of the SSTP; including but not limited to stores (reagent and general), mess, offices, laboratory, ablutions, control room, and electrical buildings.

  The extent of the facilities required is limited, because of the synergies realised by combining the SSTP with the SWOLP, and the attendant shared historical infrastructure.
- Massawa Property.

  A new Mine Services Area (MSA) will be built close to the new Massawa RoM pad, (1 to 2) km from Massawa CZ.

  The MSA area will include a fuel farm (relocated from Sofia), HME/LV/drill rig workshop, mess, offices and a clinic.

1.17.9 Site Accommodation

SGO is well serviced with accommodation on the Sabodala Mining Concession, the Massawa Mining License and the Branson Lot C Permit. The Sabodala and Massawa (including Boart Longyear) camps combined, offer accommodation for close to 1946 personnel (SGO and contractors), whilst the Bransan camp is leased to the 'long-haul' contractor. This compares to the 2144 persons employed in total (31 December 2021), including 200 persons employed by the long-haul contractor, some of whom stay at the Bransan Camp.

It is relevant to note that approximately 90% of the staff at artisan level and above reside in Dakar. With time, this percentage will reduce, reducing the requirement for onsite accommodation. All persons are employed on single status, non-residential basis.

1.18 Market Studies and Contracts

1.18.1 Marketing

1.18.1.1 Commodity Pricing

The forecast commodity prices and macro-economic assumptions within this Technical Report were compiled from Endeavour's determinations, with reference to Consensus Market Forecasts (CMF). The forecasts are not directly supported by detailed analysis undertaken by recognised commodity market specialists, who typically use short/medium/long-term demand-supply-price analysis to support their determinations.

As such, all forecasts should be considered on a relative basis and compared to that reflected by the CMF. Where possible, historical data has been aggregated and reported through to 31 December 2021 and CMF were sourced from consensus data obtained in February 2022. All historical real terms data has been dated to 31 December 2021.

Table 1.18.1 following, outlines gold and silver commodity prices over the LoM, constrained to the depletion of Mineral Reserves. Based on this table and Table 19.2.3, it is noted that there is upside price potential for the current Mineral Reserves (USD 1300/ozt) and Mineral Resources (USD 1500/ozt) pricing basis. The LTP consensus price for gold is USD 1765/ozt and based on Table 19.2.2, it can be seen that a gold price of USD 1850/ozt is a reasonable 'high' assumption. The three-year moving daily average is USD 1675/ozt, which is higher than the USD 1500/ozt used in the financial model.

Table 1.18.1 Summary Assumptions - Commodity Prices and Macro-Economics (Consensus Market Data, 2022)

Commodity	Source	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030	LTP
Real[1]												
Gold	Endeavour	USD/ozt	1500	1500	1500	1500	1500	1500	1500	1500	1500	**1500**
	CMF	USD/ozt	1765	1737	1716	1698	1765	1765	1765	1765	1765	**1765**
Silver	Endeavour	USD/ozt	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	**15.00**
	CMF	USD/ozt	21.67	20.10	19.61	20.37	19.26	20.81	20.81	20.81	20.81	**20.81**
Nominal[2]												
Gold	Endeavour	USD/ozt	1530	1530	1530	1530	1530	1530	1530	1530	1530	**1530**
	CMF	USD/ozt	1800	1772	1750	1732	1800	1800	1800	1800	1800	**1800**
Silver	Endeavour	USD/ozt	15.30	15.30	15.30	15.30	15.30	15.30	15.30	15.30	15.30	**15.30**
	CMF	USD/ozt	22.10	20.50	20.00	20.78	19.64	21.23	21.23	21.23	21.23	**21.23**

1.18.1.2 Fuel Pricing

The price paid by Endeavour in Senegal is based on the prevailing market Platts European Mediterranean Index, plus custom, local and governmental taxes.

Whilst Endeavour's Q4 2021 budget HFO and LFO price of USD 0.54/L and USD 0.88/L respectively is reasonable, the Russia-Ukraine war is significantly impacting hydrocarbon prices. Based on an analysis of historical disruptive events, it is believed that this surge in price is temporary and will revert to current forecasts in the medium-term.

1.18.1.3 Steel Pricing

While Endeavour does not budget for the price of steel in its financial models, steel is considered a key commodity given its use in plant construction (stainless/structural steel and platework) and equipment supply (yellow kit and plant machinery).

As outlined within Section 19.2.3, forecasted steel/stainless steel prices currently indicate that any escalation in prices will not continue over an extended period (less than one year) and in all likelihood, should start to decrease by up to 30% over the longer-term.

However, the impact of the Russian-Ukraine war may disrupt this forecast; and longer-term, the potential impact of CO_2 taxes on steel prices is not clear (Organisation for Economic Development (OECD)).

1.18.2 Contracts

Until such time as Massawa SA is merged into SGO, there will be agreements for the sale of ore and services between the two parties. Once merged, all operational contracts will be with SGO.

SGO is an operating mine, with a number of existing primary and secondary service level agreements in place to support its operations in southeast Senegal. It is well supported technically and operationally by Endeavour offices in Dakar, Abidjan (Côte d'Ivoire) and London (United Kingdom).

Over the coming years there will be increased focus on developing local communities, and by association local procurement.

[1] Real term prices as of 1 January 2022
[2] Nominal prices assuming annual USD CPI of 2.00%

For the sulphide treatment plant project a technology licensing agreement will be set up between SGO and the MO Group for the use of BIOX® technology. This agreement has not yet been finalised, but is discussed in Section 4.

1.19 Environmental Studies, Permitting, and Social or Community Impact

The Sabodala-Massawa Project is located in the southeast of Senegal within the Kédougou Region. Dakar, the capital of Senegal, is approximately (600 to 620) km northwest of the Project area. The Project consists of SGO's existing mining operations, and the integration of the Massawa Project, the latter of which is located between the villages of Kédougou and Bembou, Mako and Khossanto.

The Falémé River marks the international border with Mali and is located 75 km to the east. Downstream of the Project, the Niokolo-Koba River flows through the Niokolo-Koba National Park (NKNP), a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site (at its closest, approximately 15 km west of the Massawa Mining License area). The Project catchments are tributaries of the Niokolo-Koba River (Massawa) and the Falémé River (Sabodala).

Endeavour/SGO has ensured that all proposed activities and required actions are covered through impact assessments and detailed studies to ensure risks and impacts are identified, managed and mitigated. The studies cover all mining and related activities on the Sabodala Concession and Massawa Mining License.

Since the beginning of the Project in 2006, multiple ESIAs have been completed, all involving environmental and social baseline data collection, and impact assessments. Recently, SGO completed two validated ESIAs for its Niakafiri and Goumbati-Kobokoto extension projects, which are located in the south of the Sabodala Mining Concession, near the Massawa's Mining License. These are discussed more fully below:

- Niakafiri Project:
  - Located 1 km south of the Sabodala pits and approximately 2.5 km northeast of the Goulouma pit. The ore extracted from the Niakafiri and Maki Medina pits will be processed through the existing SWOLP.
  - To transport ore to the SWOLP, a haul road was built between the Niakafiri pit area and the Sabodala RoM pad.
  - As the explosive magazine at SGO had reached its capacity, it was relocated and upgraded for the Niakafiri project.
  - The ESIA was validated in 2019. Focus areas included identifying the potential direct impacts, such as; noise, vibration, air and water quality; as well as identifying potential induced impacts, often of a socio-economic nature, such as on economic growth, employment, migration, etc.
  - An Environmental and Social Management Plan (ESMP) was also developed to manage identified potential direct and indirect impacts, specifically potential degradation of the groundwater quality. On the social side, most of the identified impacts were classified as minor, however, a comprehensive Resettlement Action Plan (RAP) was developed for the 650 identified households impacted physically and economically. Two resettlement villages are under construction and the RAP and livelihood restoration programmes are currently ongoing.

- Goumbati West-Kobokoto (GKK) Project:
  - Located approximately 10 km south of the SWOLP.
  - A 3 km haul road was built to join GKK's pits to the Niakafiri area and transport the mined ore to the SWOLP RoM pad.
  - A comprehensive ESIA was validated in March 2020.
  - The study area was delineated to include all environmental and social elements that could be affected by project activities. The baseline studies highlighted that the closest communities, being 2 km from the project area, were unlikely to suffer from project impacts, such as noise or dust.
  - SGO's ESMP was reviewed again to properly cover all GKK project elements. All impacted households were identified, and the RAP process was completed with 34 of the 37 persons identified, and economically compensated. The validation of the livelihood restoration programme proposals was completed as well as the identification of potential areas for the restoration of agricultural activities.

Massawa's ESIA was validated in 2019, prior to Teranga's acquisition. The Massawa property is in a largely undeveloped rural area surrounded by informal (artisanal) mining activities. The Project will impact two villages, Bambaraya in Bambaraya commune (3000 inhabitants), and Tinkoto in Sabodala commune (7641 inhabitants). These villages were founded on the mining legacy of the area and its substantial livelihood. Beyond artisanal mining, other common land uses on the Massawa property and surroundings are subsistence agriculture, animal rearing and vegetable gardening.

There were two artisanal mining corridors officially recognised by the State in the Project area. The first is the Tinkoto corridor, which is located outside the Massawa License and is still an active corridor. The second, the Makhana corridor was located inside the Massawa License, but had to be relocated outside the Massawa License perimeter. A corridor located within a mining permit area, by law, loses its official status. A new corridor has been proposed, but still needs to be ratified by government.

The Project's area of impact (AoI) includes those communities that are directly affected by its activities, as noted below for the Sabodala Concession and the Massawa Mining License:

- Sabodala Concession

  Eight communities are considered to be within Sabodala's AoI: Bransan, Madina Bransan, Makana, Bambaraya, Sabodala, Faloumbo (including Dambankoto), Madina Sabodala, Mamakhono. The latter four communities are within the Sabodala Permit Area.

- Massawa Mining License

  Twelve villages are considered to be within Massawa's AoI: Tinkoto, Thiankoum Bassadie, Mandankholi, Kanoumering, Kabateguinda, Khossanto Koulountou, Brandoufary, Bransan, Bambarayading, Bambarayaba, and Marougounding.

SGO is committed to making a positive difference in the communities in which SGO's personnel live and work. The aim is to share the benefits of the mining operation and to leave a lasting, positive legacy that will continue to be enjoyed for generations to come. Through SGO's community development work, the host communities will benefit from new job opportunities, education, and training opportunities, expanded health care services, more secure sources of potable water, improved roads, and infrastructure, etc.

A Preliminary Risk Analysis (PRA) was conducted to assess the environmental risks of the Project. Like any other heavy industrial activities, the Project may unintentionally experience critical issues like spills, emissions and fires that could have a direct negative impact on the surrounding environment. The causes and consequences of each of these situations were determined, and detailed preventive and emergency implementation measures were identified to be integrated in the effective SGO's Emergency and Response Plan (ERP). The criteria considered for this risk assessment consider the severity of events, the consequences, and the likelihood of an occurrence. An analysis of the Project's facilities and consumables to be used on the mine site revealed several involving risks. The main environmental risks associated with the Project are as follows:

- Fire.
- Explosion.
- Degradation of walls and ramps in the pits and waste dump areas, berms and retention structures.
- Spills or leaks of hazardous materials.
- Toxic emissions.
  - Natural disasters.
  - Insurrection or social unrest of the population.

To minimise the level of risk related to both personnel and the environment, health and safety and security measures have been identified. In addition, SGO's ERP will be implemented at the earliest stages of the operational phase of the Project.

Key Environmental and Social Management Plans in place are:

- Waste Management and Monitoring Plans.
- Water Management and Monitoring Plans.
- Air Quality Management and Monitoring Plans.
- Closure and Rehabilitation Plans.

To ensure environmental and social impacts are prevented, managed and mitigated various mechanisms are in place that include:

- Sustainability Reporting.
- Management Systems.
- Environmental Monitoring.
- Carbon Emissions.
- TSF Audits.
- Cyanide Management Plans and Audits.
- Stakeholder Engagement Plans, Management and Grievance Mechanisms.
- Health and Safety Protocols and Processes.
- Local Procurement and Employment Plans.
- Closure Planning.

The current closure costs estimate for the Project is USD 79 M.

1.20 Capital and Operating Costs

1.20.1 Estimate Basis

Subject to Work Breakdown Structure (WBS) element, the CAPEX and OPEX estimate as presented herein, has been reported to a PFS or DFS level of accuracy. The accuracy provision for each type of study are as noted below.

- PFS ±(15 to 30)[1]%.
- DFS ±(10 to 15)%.

The base date for the CAPEX and OPEX estimate is Q4 2021.

The basis for the presentation of OPEX and CAPEX costs, and the associated responsible entities for the Sabodala-Massawa Project ((Phase 1/Phase 2 and (LoM)), are as noted below.

- Capital and Operating Costs (Phase 1/Phase 2 and LoM):
  - Surface Mining and Surface Mine Infrastructure- Endeavour/SGO (PFS/DFS)
  - Underground Mining - SLR (PFS)
  - Existing Infrastructure - Endeavour/SGO
  - Labour - Endeavour/SGO/Lycopodium/SLR (PFS/DFS)
  - General and Administration. - Endeavour/SGO/Lycopodium (DFS)
  - Sabodala Whole of Ore Leach Plant (SWOLP) - Endeavour/SGO (DFS)
  - Sabodala Sulphide Treatment Plant (SSTP) - Lycopodium/Endeavour/SGO (DFS)
  - Sabodala Power Stations (SPS) - QGE Engineering/Endeavour (DFS)
  - TSFs - L&MGSPL[2]/Lycopodium/Endeavour/SGO (DFS)

Sustaining Capital Cost estimates for existing and new facilities across the LoM were developed by the aforementioned respective parties.

1.20.2 Summary Presentation of LoM OPEX and CAPEX

LoM operating cost are summarised in Table 1.20.1, whilst capital phasing, and the LoM total capital cost, including sustaining capital, are summarised in Table 1.20.2 following.

Not included in these tables, is the closure cost (USD 79 M), which is discussed in Section 4.0, reported in Section 20.0, and accounted for separately in the financial model (Section 22.0).

[1] Typically, ± (15 to25) at a P10/P90 confidence level.
[2] Bulk Quantities Only

Table 1.20.1 LOM Operating Cost Summary (2022 to 2035) (Page, 2022)

Operating Costs	LoM Total Cost	LoM (Unit Rates)
OP Mining	USD 1 033 M	USD 2.43/t mined
UG Mining	USD 154 M	USD 76.99/t mined
Rehandling and Ore Haulage to SCPF	USD 80 M	USD 1.21/t milled
Processing (SWOLP)	USD 691 M	USD 12.43/t milled
Processing (SSTP)	USD 357 M	USD 33.06/t milled
General & Admin	USD 369 M	USD 5.57/t milled
Total Operating Costs	**USD 2 685 M**	

Table 1.20.2 Capital Phasing and LOM Summary (2022 to 2035) (Page, 2022)

Cost Area	LoM Cost, USD (M)
Development Capital	
• UG Development	101
• SSTP Development	290
• Delya Access Road	5
• 2022 Spend	34
Total Development Capital	**431**
Sustaining Capital	
• 2022 Spend	26
• Mining Equipment	49
• General Mine Sustaining	6
• Other Mine Development (CTR)	13
• Massawa - Dewatering	4
• Processing Sustaining (SWOLP)	34
• Process Sustaining (SSTP)	16
• G&A and Other Sustaining	5
• TSF1 (Lifts)	12
• TSF2 (Construction and Lifts)	59
Total LoM Sustaining Capital	**223**
Total	**654**

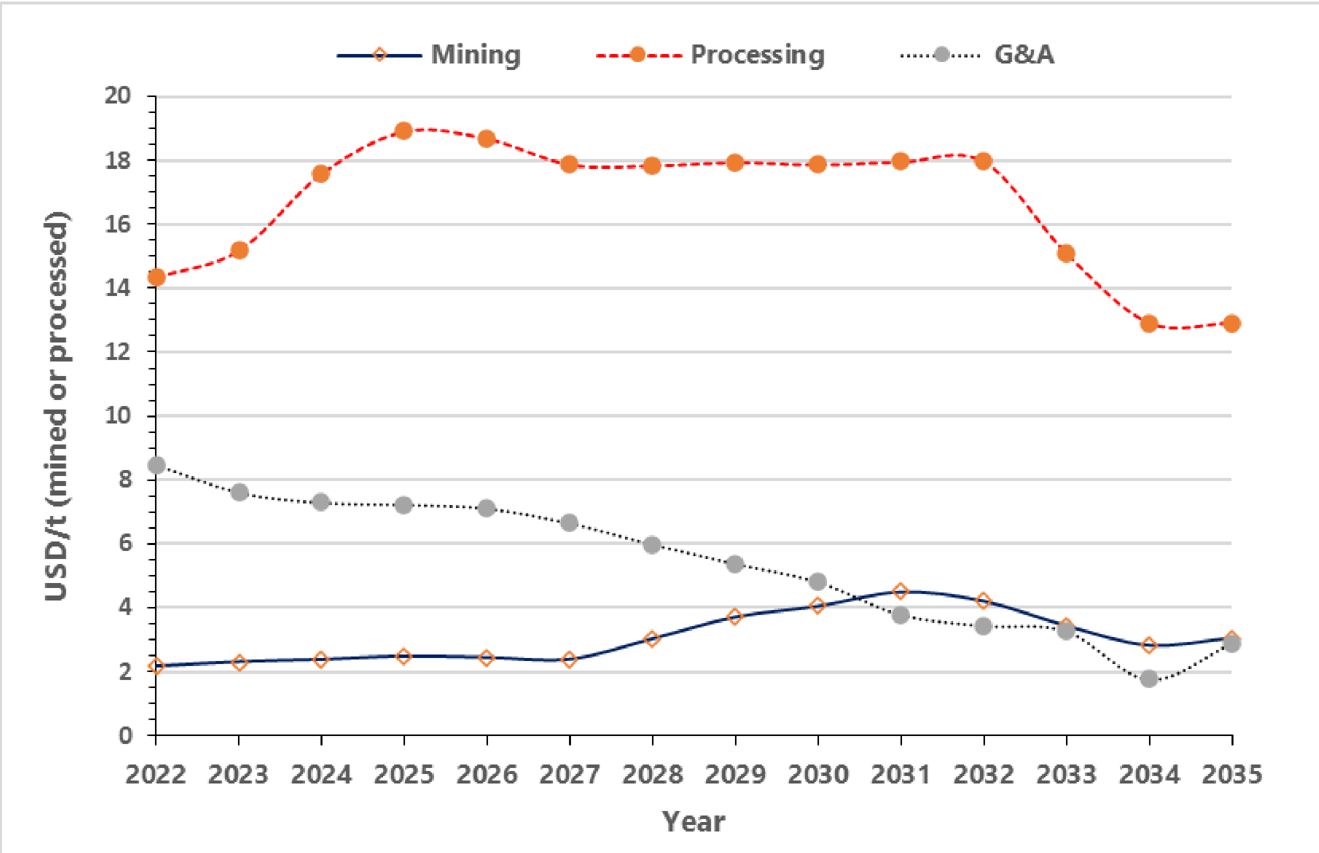
1.20.3 Combined OPEX Unit Cost Summary

Combined Project/operations unit operating costs for mining, processing and G&A, are illustrated in Figure 1.20.1 following. Further:

- The unit cost for mining is reported in USD/t mined (ore + waste), all other costs are on a USD/t milled basis.
- The step increase in processing unit costs are as a result of the inclusion of the SSTP and the associated drop off in 2032, is a result of the SSTP being put on a care and maintenance basis.
- G&A costs decline towards the end of the LoM, largely because of the drop off in mining labour in the later years, and the associated drop in labour overhead charges. It is notable that in 2034, the quantity of ore mined drops by 80% over 2024 mined volumes, whilst still maintaining a processing rate of 4 Mt/a of ore through the SWOLP.

- Life of Mine weighted averaged levelised costs are as noted below:
  - Mining: USD 2.78/t mined
  - Processing: USD 17.00/t processed
  - G&A: USD 5.57/t processed

Figure 1.20.1 Unit Costs by Business Area



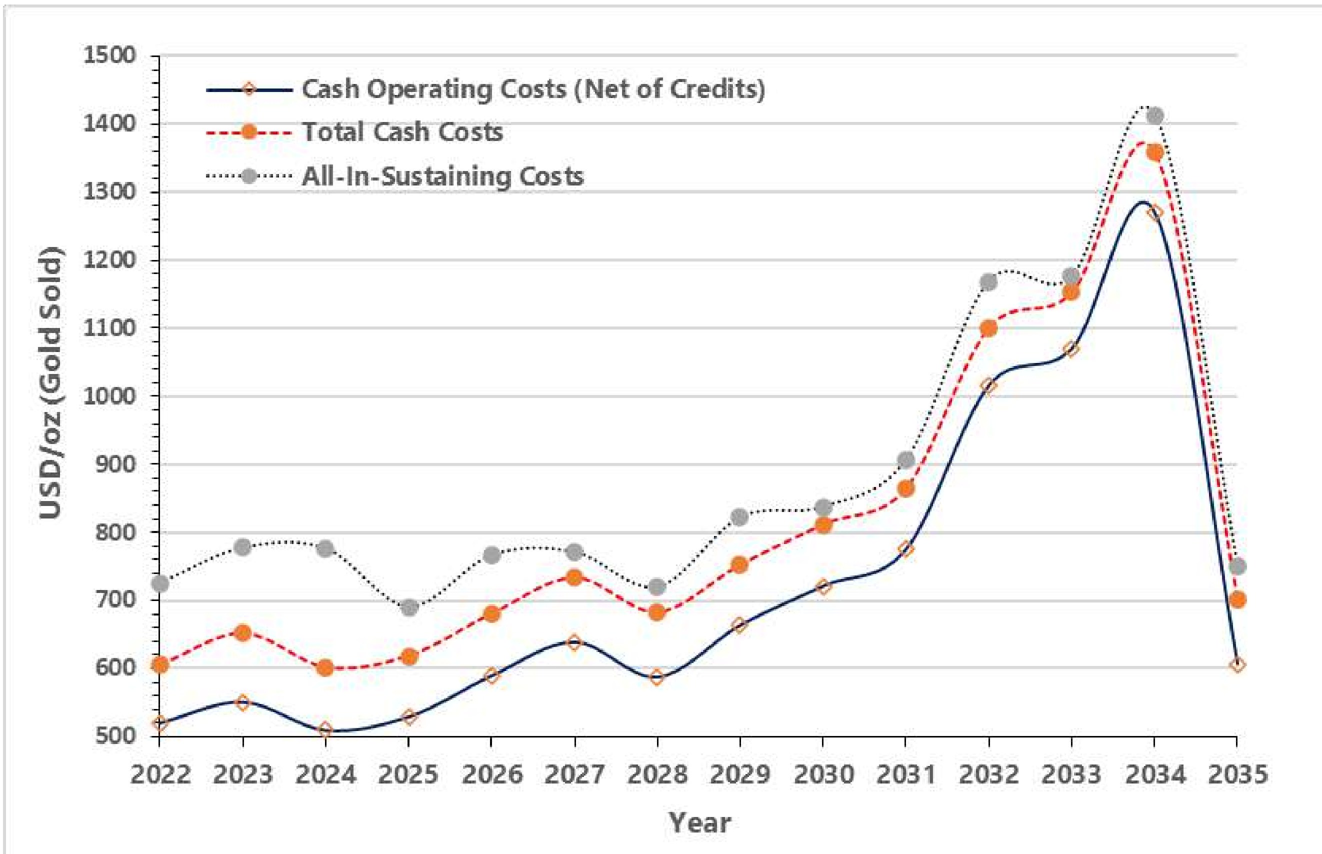
1.20.4 Cash Operating Costs

Cash operating costs (net of credits), total cash costs and 'All in Sustaining Costs' (AISC) per ounce of gold produced, are presented in Figure 1.20.2. Points to note for Figure 1.20.2, are as outlined below.

- The increase in unit costs in the latter years, is a result of the drop in annual gold production, which is largely a function of falling gold grade (3.29 g/t in 2023 and 1.16 g/t in 2034). Gold production peaks in 2024 (463 koz/a)[1], falling to 114 koz/a in 2034.
- Life of Mine weighted averaged levelised costs for gold sales are as noted below:
  - Cash operating cost net of credits: USD 652/oz of gold sold
  - Total Cash Costs: USD 747/oz of gold sold
  - AISC: USD 825/oz of gold sold

[1] SSTP plant coming on line Q1/Q2 2024.

Figure 1.20.2 Costs Per Ounce of Gold Sold



There is still significant gold prospectivity on the Issuer's exploitation and exploration permits, and thus to address the rise in cash costs per ounce of gold from 2031 onwards, there must be a continued focus on securing additional high grade reserves.

1.21 Economic Analysis

The results of the economic model show robust results. Applying a long term gold price of USD 1500/oz on a flat line basis from the Base Date, the after-tax NPV5% is USD 1129 M on a 100% basis. Gold production averages 298 koz/a from 2022 to 2034, with a LoM AISC of USD 825/oz. The Project has low sensitivity to capital and operating costs, but is typically sensitive to price and grade.

Endeavours uses conservative, values for gold pricing and as can be seen in Section 22.4, there is significant NPV upside if, gold prices remain high.

The overall IRR and project payback period for the property/project has not been included, as this is a 'Technical Report Update' for Issuer's interest in the Sabodala Mining Concession and Massawa Mining License, and given that there is an existing operation at Sabodala, the capital outlays presented herein, pertain to multiple on-going stay in business projects, and general sustaining capital outlays covering the period from 2022 to 2035.

Not withstanding this, in order to assess whether the non-free milling ores on the Massawa mining license should be processed, the incremental benefit of including the STP and attendant infrastructure (TSF1 B and SPS) at Sabodala was assessed.

Based on the assumptions outlined in Section 22.3.3.1, the economic model developed indicates that the standalone SSTP business case for the processing of the Massawa non-free milling ores delivers robust results. Applying a long-term gold price of USD 1500/oz on a flat line basis from first gold pour at the SSTP, the undiscounted LoM cash flow on a 100% basis comes to USD 742 M, generating an after-tax NPV5% of USD 538 M. Furthermore;

- the SSTP project is expected to produce an additional 1.35 Moz of gold for SGO, at a low AISC of USD 576/oz over the facility life; and,
- the project is expected to deliver a robust after-tax IRR of 51% and have a project pay back period of approximately 1.7-years.

Based on this techno-economic analysis of the SSTP project, it is recommended that the mining of the non-free milling ores on the Massawa Mining License be pursued.

1.22 Adjacent Properties

Adjacent properties to the Sabodala-Massawa Project within the Kédougou-Kenieba Inlier with the MTS and SSC highlight the gold prospectivity of the region.

Adjacent properties include the:

- Makabingui gold exploration project, owned by Bassari Resources Limited, approximately 28 km northeast of Massawa or 25 km south-southeast of the SCPF with a JORC-compliant Inferred Resource.
- Douta gold project less than five kilometres northeast of Massawa owned by Thors Explorations Ltd. with a NI 43-101-compliant Inferred Resource.
- Mako Gold Mine owned by Resolute Mining Limited (operated by Petowal) with a JORC-compliant Mineral Resource and Ore Reserve, located approximately 35 km west-southwest of Massawa or 50 km southwest of the SCPF.

1.23 Other Relevant Data and Information

1.23.1 Project Execution Plan

Key dates for the Project are shown in Table 1.23.1, whilst the integrated Project Implementation Summary, is shown in Figure 1.23.1.

Table 1.23.1 Key Date Schedule

Area	Start	Finish
Massawa Mine Infrastructure	Q1 2022	Q3 2023
Mining of Massawa Oxides	Q1 2022	2030
Mining of SSTP feed (Fresh)	Q2 2022	Q1 2030
Sabodala Sulphide Treatment Plant (SSTP) (Construction)	Q1 2022	Q1 2024
Power Plant (Construction)	Q1 2022	Q3 2023
TSF 1B (Construction only)	Q3 2022	Q2 2023
TSF 2 (Construction only)	Q3 2022	Q2 2024
SSTP gold production (first gold pour)	Q1 2024	Q1 2033

For the SSTP plant schedule, actual dates were confirmed with suppliers and contractors. Lycopodium believes that the implementation schedule is realistic and aligns with other recent and current West African Projects. The implementation model is based on an EPCM model, which is typical for West African Gold plants currently being constructed. BIOX Plants have a significantly longer commissioning ramp compared to conventional Gold Plant, which has been accounted for the implementation schedule as well as the financial model.

Figure 1.23.1 Implementation Summary

1.23.2 Human Resources

The Issuer's operations on the Sabodala and Massawa properties, currently employ some 1736 persons directly, and another 408 through contractors engaged in support of mining operations on the Properties. Of the approximately 2144 persons engaged, more than 96% are Senegalese nationals.

Whilst the mine employs some 2144 persons (owner's team and contractor's personnel), there are also indirect (off-site contractors and supporting industries)[1] and induced (increased spending and consumption) employment opportunities created from the longer life of mine and the additional people employed. In addition, employees support their families and extended families, thereby socially and economically uplifting communities.

In a 2012 report by PWC for Mines in British Columbia, it was noted that for every person employed at a mine (owner's team and contractors) a further 0.8 indirect and 0.4 induced jobs were created. Thus, in a western country, a multiplier of 2.1 could be used to determine the total number of jobs created per mine (PWC, 2012). Cordes (Cordes, 2016) noted that Rio Tinto for their Simandou iron ore project (Guinea), assumed a multiplier of 6.3 to calculate the total number of jobs created (direct, indirect and induced). Other studies have noted a much higher level of induced employment in developing countries (Cordes, 2016)

Whilst SGO is not bound by legislative targets in Senegal with respect to; the employment of local tribal/religious/ethnic groups; nationals; expatriates; woman and disabled persons, SGO is committed to supporting and developing local communities and Senegal as a whole. Thus, there will be over the coming years, a drive to reduce the number of expatriates employed, empower woman, upskill and employ local persons and grow local/regional procurement and by association, businesses.

1.24 Interpretations and Conclusions

Where applicable, interpretations, conclusions and risks by section, are summarised within each section of the executive summary, and further detailed in Section 25.0.

1.25 Recommendations

Where applicable, recommendations are summarised within each section of the executive summary, and further detailed in Section 26.0.

[1] Off license

2.0 INTRODUCTION

2.1 Issuer

The Issuer, Endeavour Mining plc or 'Endeavour', is an established gold producer and the largest in West Africa, with operating assets across Senegal, Cote d'Ivoire and Burkina Faso and a strong portfolio of advanced development projects and exploration assets in the highly prospective West African, Birimian Greenstone Belt.

As a member of the World Gold Council, Endeavour is committed to the principles of responsible mining and delivering sustainable value to its employees, stakeholders and the communities where it operates. Endeavour is listed on the London Stock Exchange and the Toronto Stock Exchange, under the symbol EDV (www.endeavourmining.com).

This Technical Report update pertains to; the Issuer's ownership interests in Sabodala Gold Operations SA (SGO) and Massawa SA (Section 4), who respectively hold exploitation permits for the Sabodala Concession and the Massawa Mining License in southeast Senegal.

Massawa SA is expected to be merged into SGO by the end of 2022, and the merger is expected to be retroactive January 2022, and thus thereafter, the Issuer's ownership interests will be solely with SGO.

2.2 Terms of Reference

2.2.1 Overview

This NI 43-101 Technical Report Update (the 'Report') has been prepared as a Technical Report Update for the Issuer's interests in the Sabodala Concession and the Massawa Mining License, as per the effective date (Section 2.6), and incorporates, the 'Sabodala-Massawa Project' (the 'Project'), as defined in Section 2.2.2 following.

This Report is not independent of the Issuer, and has been prepared in accordance with; Canadian National Instrument (NI) 43-101 Standards of Disclosure for Mineral Projects and the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Standards, and Best Practice Guidelines (BPG).

2.2.2 Sabodala-Massawa Project

As part of the acquisition of the Massawa Project from Barrick, Teranga and more recently Massawa SA (March 2020), the Issuer now holds the exploitation rights for the Massawa Mining License.

Whilst the ore on the Sabodala property is free milling, the ore on the Massawa property; is a mix of free and non-free milling ores, with a higher gravity recoverable gold component.

The Issuer now has the opportunity to leverage the existing mine and process and waste management infrastructure at Sabodala (operational since 2009) and expand upon it, to process free and non-free milling ores from both the Sabodala and Massawa properties. The integration of mining and the processing of ores from the Sabodala and Massawa Properties is referred to herein referred to as the 'Sabodala-Massawa Project', or 'Project'.

Whilst historical studies considered building a process plant on the Massawa License, the trucking and processing of ore at Sabodala, enables significant synergies and economies of scale, that would not otherwise be realised with two independent processing facilities.

The Project and the associated infrastructure is being tackled in two phases (Phase 1 (P1) and Phase 2 (P2)). The details of each phase are outlined in the bullet points following.

Phase 1 (P1)

- Upgrade of the Sabodala Whole Ore Leach Plant (SWOLP) to process free milling ores, of higher gold grade and a higher gravity gold component.
- Construction of a 33 kV overhead line between the Sabodala Power Plant (SPS) and the mine.
- Development of 'long-haul' roads for the movement of ore from the Pits on the Massawa property to the Sabodala RoM pads.
- Establishment of water management infrastructure at Massawa, including; three water reservoirs for the management of water before discharge to the environment, and the Massawa Water Treatment Plant (MWTP).
- Establishment of the requisite mining infrastructure at Massawa, including stockpile areas (RoM and Waste), haul roads and 'long-haul' roads between Sabodala and the deposits on the Massawa property and a fully functional Mine Services Area adjacent to the Massawa Central Zone (CZ) deposit.

Phase 2 (P2)

- Construction of a new process plant to treat non-free milling ores at Sabodala, herein referred to as the Sabodala Sulphide Treatment Plant (SSTP).
- Construction of a lined compartment (TSF1B) within TSF1 to hold an arsenic and antimony rich, stabilised residue.
- Construction of TSF2, for the LoM containment of free milling ores (Commissioned Q3 2024).
- Rehabilitation and expansion of the existing Sabodala Power Station (SPS).
- Three underground mines, with two operating concurrently.

2.3 Contributing Authors

In addition to Endeavour staff, consultants who contributed to this Technical Report Update are as noted below. Personnel engaged as Qualified Persons, are as noted in Section 2.4.

- Lycopodium Ltd (Lycopodium) (www.lycpodium.com)

  Lycopodium has provided engineering and project management services to the international mining industry for over 20 years, has extensive experience in West Africa, and was the lead consultant for the Technical Report.
- Land & Marine Geological Services Pty Ltd (L&MGSPL) (www.lmgspl.com.au).

  L&MGSPL specialises in the execution of high-level geotechnical work associated with tailings storage facilities (TSFs) and other mine infrastructure from initial site reconnaissance and assessment during exploration through study phases for development of mining projects. Experience across various commodities, and multiple climatic regimes and geographic areas.

- Digby Wells Environmental (DWE) (www.digbywells.com).

  Digby Wells is an international company providing environmental and social expertise focused on the power generation and natural resources sectors. Digby Wells was established in Johannesburg, South Africa, in 1995 and has expanded to establish six offices (South Africa, Mali, Botswana, Tanzania, London and Jersey (Channel Islands)). Furthermore, Digby Wells has numerous in-country partners to ensure compliance to local standards and requirements.

  Digby Wells employs a large team of professional, committed and specialised environmental and social consultants covering 15 specialist fields and have completed projects in 52 countries across Asia, Africa, Europe and North and South America. In house specialist divisions and services include Environmental, Compliance, Social and Heritage, Water Geosciences, Rehabilitation, Closure, Soils, GIS and Remote Sensing, Ecology, Atmospheric Sciences and ESG Reporting and Strategy.

- Mine Scope Services Pty Ltd (MineScope) (www.minescopeservices.com.au).

  MineScope is a specialised consulting company formed and managed by a group of experienced mining professionals who have extensive and successful backgrounds across a wide range of mineral commodities and global locations. MineScope provides expertise across a range of fields including owner's representative, project development, metallurgy, process engineering and geoscience.

  MineScope has experience in over 30 countries and is currently active in regions of Africa, Australasia and the Americas.

- QGE Group (QGE) (www.qge.com.au).

  QGE Pty Ltd is an Australia based engineering consultancy company who provide specialised electrical engineering services, particularly, in the minerals and resources and utility scale power generation industries. QGE possess technical expertise in the full life cycle of power generation and plant assets from concept and feasibility through design and construction to operations and maintenance. Additionally, QGE have in-depth knowledge of the Sabodala-Massawa Mine Site itself, having previously conducted the Sabodala Power Station Expansion Feasibility Study in 2020/21, the Massawa OHL Feasibility Study in 2020/21, the electrical design for Massawa Camp in 2020/21, the Sabodala PS voltage raising project in 2017, the process plant debottlenecking in 2017, as well as the parallel crushing project in 2015.

- SLR Consulting (SLR) (www.slrconsulting.com).

  The SLR Mining Advisory group (formerly Roscoe Postle Associates Inc) is a world-leading mining advisory business, with teams in Toronto, Denver, and London. SLR's core Mining Advisory services team comprise; geological, mining, metallurgical, tailings, and environment consultants who have provided expertise and advice to clients around the world for more than 35 years.

  The services provided, extend through the lifecycle of projects commencing with value creation in exploration programmes, resource estimation, and preliminary environment/social assessments to value recognition through reserve development, including transactional support and decision making. A key aspect of SLR's services is tailings, environmental and social risk/liability assessment and management, including ESG and climate change challenges.

2.4 Qualified Persons

Table 2.4.1 following, provides a list of Qualified Persons (QPs), and the respective sections/subsections which they take responsibility for. If a QP takes responsibly for an entire section, it is given that they also take responsibility for the associated subsections. Further definition is provided in the 'Certificates of Qualified Persons' (Section 29.0). All consultants contributed to Section 27.0

Table 2.4.1 Qualified Persons and QP Section/Subsection Responsibilities

Name	Position	Company	Sections/Subsections
Bryan Pullman (PEng)	Principal Mining Engineer	SLR	1.15.2, 1.15.3, 12.8.2, 15.8, 16.2.5, 16.4, 16.6.2, 16.6.3, 16.9.2, 21.2.3.2, 25.11.5, 25.11.6, 25.12.2, 26.11.2 and 26.12.3
Chris Lane (CGeo 14006 - UK, RPGeo 10009 - AIG, MAusIMM CP 109219 - AusIMM, RPEQ 13083 - QLD)	Principal Consultant	L&MGSPL	1.17.1, 1.17.5, 12.10.2, 18.3.1, 18.10.1, 18.12.1, 18.12.8, 21.3.3.7, 24.1.5, 25.14.1, 25.14.8, 26.14.1, and 26.14.8
Clinton Bennet (FAusIMM)	Vice President Metallurgy and Process Improvement	Endeavour	1.16.1, 12.6.1, 12.9.1, 13.2.1, 3.3.1, 13.7.1, 13.9.1, 17.1.2, 17.2.1, 17.3.1, 17.4.1, 17.5, 17.6.1, 17.7.1, 17.9.1, 18.7.8.1, 21.2.5.1, 21.8.2, 25.9.1, 25.13.1, 26.9.1, and 26.13.1
David Gordon (FAusIMM)	General Manager	Lycopodium	3.5, 18.3.2, 18.7.8.2, 18.8.2, 21.1.5, 21.1.6.1, 21.1.6.3, 21.1.6.7, 21.1.6.8, 21.1.6.14, 21.1.6.17, 21.1.6.18, 21.2.5.2, 21.3.2.2, 21.8.3, and 24.1.3
Graham Trusler (MSc, Pr Eng, MIChE, MSAIChE)	CEO	DWE	1.17.4, 1.19, 18.6, 18.12.4, 20, 21.5, 25.14.4, 25.16, 26.14.7, and 26.16
Kevin Harris (CPG)	Vice President Resources	Endeavour	1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.13, 1.22, 6, 7, 8, 9, 10, 11, 12.2, 12.3, 12.14, 14, 23, 25.3, 25.4, 25.5, 25.6, 25.7, 25.8, 25.10, 25.19, 26.3, 26.4, 26.5, 26.6, 26.7, 26.8, 26.10, and 26.19
Michael Davis (FAusIMM)	Principal Consultant	MineScope	1.12, 1.16.2, 12.6.2, 12.9.2, 13.1, 13.2.2, 13.3.2, 13.4, 13.5, 13.6, 13.7, 13.7.2, 13.8, 13.9.2, 17.1.3, 17.2.2, 17.3.2, 17.4.2, 17.5.2, 17.6.2, 17.7.2, 17.9.2, 25.9.2, 25.9.3, 26.9.2, 25.13.2, and 26.13.2
Royce McAuslane (FAusIMM)	Director	MineScope	1.17.2, 1.17.7, 1.17.8, 1.17.9, 1.20, 1.21, 1.23, 1.24, 1.25, 12.1, 12.10.1, 12.11, 12.12, 17.1.1, 18.1, 18.2, 18.3.3, 18.3.4, 18.4, 18.7.1, 18.7.2, 18.7.3, 18.7.4, 18.7.5, 18.7.6, 18.7.7, 18.8.1, 18.8.3, 18.9, 18.12.2, 18.12.5, 18.12.6, 18.12.7, 21.1, 21.1.1, 21.1.2, 21.1.3, 21.1.4, 21.1.6.2, 21.1.6.4, 21.1.6.5, 21.1.6.6, 21.1.6.9, 21.1.6.10, 21.1.6.11, 21.1.6.12, 21.1.6.13, 21.1.6.15, 21.1.6.16, 21.1.6.19, 21.1.7, 21.2.1, 21.2.2, 21.2.6, 21.2.7, 21.3.1, 21.3.3.3, 21.3.3.5, 21.3.3.6, 21.3.3.8, 21.4, 21.6, 22, 24.1.1, 24.1.2, 24.2, 25.14.2, 25.14.5, 25.14.6, 25.14.7, 25.17, 25.18, 25.20, 26.14.2, 26.14.4, 26.14.5, 26.14.6, 26.17, 26.18, 26.20.1, and 26.20.2
Salih Ramazan (FAusIMM)	Vice President - Mine Planning	Endeavour	1.14, 1.15.1, 1.15.4, 1.15.5, 1.15.6, 1.15.7, 1.17.6, 12.7, 12.8.1, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.9, 15.11, 15.12, 16.1, 16.2.1, 16.2.2, 16.2.3, 16.2.4, 16.2.6, 16.2.7, 16.3, 16.5, 16.6.1, 16.6.4, 16.6.5, 16.8, 16.9.1, 18.10.2, 18.12.9, 21.2.3.1, 21.2.4, 21.3.2.1, 21.3.2.3, 21.3.2.4, 21.3.3.1, 21.3.3.2, 21.3.3.4, 21.8.1, 25.11.1, 25.11.2, 25.11.3, 25.11.4, 25.11.7, 25.12.1, 25.14.9, 26.11.1, 26.11.3, 6.12.1, 26.12.2, 26.12.4, 26.12.5 and 26.14.9
Stuart Thomson (FSAIMM)	Group Studies Manager	Endeavour	1.1, 1.2, 1.3, 1.4, 1.11, 1.18, 2, 3.1, 3.2, 3.3, 3.4, 4, 5, 12.4, 12.5, 12.13, 19, 25.1, 25.2, 25.15, 26.1, 26.2, and 26.15.
Terry Ozanne (CPEng, RPEQ, NER, APEC Engineer, IntPE(Aus))	Lead Electrical Engineer and Manager	QGE	1.17.3, 18.5, 18.7.8.3, 18.12.3, 24.1.4, 25.14.3 and 26.14.3

2.5 Site Visits and Scope of Personal Inspection

The date of QP visits to the Sabodala and/or Massawa Properties (the 'Site') and the associated purpose, is presented in Table 2.5.1 following.

Table 2.5.1 QP Site Visit Summary

Qualified Person	Date of Visit(s)	Purpose of Visit
Bryan Pullman	Not been to site	Not Applicable
Chris Lane (CGeo 14006 - UK, RPGeo 10009 - AIG, MAusIMM CP 109219 - AusIMM, RPEQ 13083 - QLD)	17/10/2021 to 27/10/2021 29/05/2019 to 1/06/2019 29/04/2018 to 2/05/2018 29/03/2017 to 1/04/2017 03/04/2016 to 5/04/2016 18/07/2015 to 20/07/2015 03/08/2014 to 04/08/2014 09/11/2013 to 11/09/2013 12/01/2013 to 15/01/2013 10/11/2012 to 12/11/2012 23/01/2010 to 26/01/2010	Annual Geotechnical Review of TSFs discussions regarding future storage strategy
	28/02/2015 to 3/03/2015	Heap Leach Project
	20/01/2012 to 24/01/2012	Airstrip Geotechnical Work
Clinton Bennet (FAusIMM)	3/03/2021 to 10/03/2021	Process Reviews
David Gordon (FAusIMM)	Not been to Site	Not applicable
Graham Trusler ((MSc, Pr Eng, MIChE, MSAIChE))	07/02/2021 to 14/02/2021	Water Management
	19/09/2018 to 22/02/018	DFS (ESIA and EMP)
Kevin Harris (CPG)	30/09/2021 to 6/10/2021 07/04/2021 to 14/04/2021	Review exploration activities and resource evaluation
Michael Davis (FAusIMM)	16/09/2020 to 18/09/2021	Technical Consulting
Royce McAuslane (FAusIMM)	16/05/2021 to 30/05/2021 23/01/2022 to 13/02/2022	DFS Management and co-ordination.
Salih Ramazan (FAusIMM)	03/02/2021 to 07/02/2021	General Mine Planning Discussions
Stuart Thomson (FSAIMM)	30/10/2021 to 3/11/2021	General orientation of SGO's activities
Terry Ozanne (CPEng, RPEQ, NER, APEC Engineer, IntPE(Aus)))	10 days in November 2016 7 days in February 2017	Power Station investigations

2.6 Effective Dates

The effective dates of this NI 43-101 technical report are:

- Mineral Resources, 31 December 2021
- Mineral Reserves, 31 December 2021
- Financial Model, 31 December 2021

2.7 Information Sources and References

This Report relies on historical and recent data generated by the Issuer, including public filings. Endeavour has engaged several specialist consultants and information from reports prepared by previous independent consultants have been utilised in the compilation of this Report. Information sources and references relied upon, are discussed in the relevant sections, and defined in Section 27.0 (References).

2.8 Conventions and Abbreviations

2.8.1 Units and Currency

Unless stated otherwise, Le Système International d'Unités (SI) units have been used throughout the reports. One notable exception is the occasional use of a ‘comma’, as a thousands separator (i.e. 10,000) instead of a space for numbers greater than 10 000.

Currencies are reported in accordance with ISO 4217, with the most commonly used currencies being; the United States Dollar (USD), the West African Franc (XOF), the Australian Dollar (AUD), the South African Rand (ZAR), the Euro (EUR) and the Chinese Yuan (CNY). Conversion rates from other currencies to the reporting currency (USD), is detailed in Section 21.

2.8.2 Abbreviations and Acronyms

Abbreviations and Acronyms used in this study are presented in Table 2.7.1 following

Table 2.8.1 Abbreviations and Acronyms

Abbreviation	Definition/Meaning
#	Number (quantity)
%	Per cent
% w/w	Per cent weight by weight
% wt.	Weight percentage
/	per
€	European Union Currency (Euro)
°	Degree (angle)
°C	Degree Celsius
µm	Micrometre (micron)
000 t	Thousand tonnes
2QXX	Second quarter of year XXXX
a	Annum (year)
AAS	Atomic Absorption Spectrometry
ABC	Autogenous milling, ball milling and crushing circuit
Ai	Abrasion index (bond)
AISC	All in sustaining costs
ALK.	Alkalinity
ALS	ALS Limited
ALSKU	ALS Kédougou
AMD	Acid mine Drainage
arb	As received basis
ARD	Acid rock drainage
As	Arsenic
As 0000	Australian standard
AU	Australia or African Union
Au	Gold
AUD	Australian Dollar
Axb	JKMRC determined ore impact parameter
BDE	Blaise Diagne International Airport

Table 2.8.1 Abbreviations and Acronyms

Abbreviation	Definition/Meaning
BEAC	Banque des États de l'Afrique Centrale ('BEAC')
BESS	Battery Emergency Storage System
BFA	Bench Face Angle
BFD	Block flow diagram
BH	Berm Height
BIOX®	Biological oxidation
BPG	Best Practice Guidelines
BW	Berm Width
BWI	Ball Mill Work Index
$CaCO_3$	Limestone
CaO	Burnt lime or quick lime
Calc.	Calculated
CAPEX	Capital Expenditure
CBR	California Bearing Ratio
CCD	Counter current decantation
CFA	Coopération financière en Afrique centrale
CIL	Conveyor no. 1 (consecutive numbers for conveyors in plant)
CIM	Canadian Institute of Mining and Metallurgy
CMD	Consensus Market Data
CMF	Consensus Market Forecast
CN	Cyanide
COG	Cut-off Grade
CPI	Consumer Price Inflation
CRF	Cemented Rock Fill
CRM	Certified Reference Materials
CSR	Corporate Social Responsibility
CV1	Carbon in leach circuit
d	Day or days
dB	Decibels (noise level)
db.	Dry basis
DBMS	Database Management Systems
DCF	Discounted Cash Flows
DD	Diamond Drilling
DDP	Delivered duty paid
DFS	Definitive Feasibility Study
Dia.	Diameter
DIF	Diffuse Horizontal Irradiation
DNI	Direct Normal Irradiation
DSO	Deswik Stope Optimizer
ECOWAS	Economic Community of West African States
EGL:	Effective grinding length (SAG or ball mill)
Endeavour	Endeavour Mining plc
EPCM	Engineer, Procure and Construction Management
EPPG	Exploration Best Practice Guidelines (EPPG)

Table 2.8.1 Abbreviations and Acronyms

Abbreviation	Definition/Meaning
ESG	Environmental, Social and Corporate Governance
EUR	Euro
EZ	Eurozone
F_{80}	80% feed passing size (in micrometres)
FEL	Front end loader
FW	Footwall
G	Gram (except in reference to seismicity where g represents acceleration due to gravity)
G&A	General and Administrative
g/L	Grams per litre
g/t	Grams per tonne
Ga	Giga annum (one billion years)
GA	General arrangement (drawing)
GB	Great Britain
GBP	British Pound Sterling
GBW	Goumbati West Pit
GHI	Global Horizontal Irradiation
GTIopta	Global tilted irradiation at optimum angle
GW	Ground Water
GWh	Gigawatt-hour
h	Hour or hours
H_2so_4	Sulphuric acid
HFO	Heavy Fuel Oil
HG	High Grade Ore
HME	Heavy Mining Equipment
HQ	Size of drill core (63.5 mm diameter)
HRT	High rate thickener
HSE	Health And Safety, and Environmental
HW	Hanging wall
Hz	Hertz
I/O	Input-output
ICT	Information and Communications Technology
ID	Identification
IRA	Inter-Ramp Slope Angle
ISO	International organisation for standardisation (Switzerland)
ITCZ	Inter Tropical Convergence Zone
IUCN	International Union for Conservation of Nature
IWI	Impact work index
J	Joules
k	Thousands (kilo)
kcal	Kilocalorie
kg	Kilogram
kJ	Kilojoule
kL	Kilolitre
km	Kilometre

Table 2.8.1 Abbreviations and Acronyms

Abbreviation	Definition/Meaning
kW	Kilowatt
kWh	Kilowatt Hour
kWh/t	Kilowatt hours per tonne
L	Litre
L/min	Litres per minute
L/s	Litres per second
LCOE	Levelised Cost of Electricity
LFO	Light Fuel Oil (Diesel)
LG	Low Grade Ore
LHD	Load Haul Dump
LME	London Metal Exchange
LoM	Life of Mine
LoMp	Life of Mine Plan
LSTK	Lump sum turn key
LTP	Long-term Price
LV	Low voltage
Lyco	Lycopodium
m	Metre
M	Millions (mega)
m/h	Metres per hour
m/s	Metres per second
m^2	Square metre
m^3	Cubic metre
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
MAS	Masato Pit
max	Maximum
MCAF	Mining Cost Adjustment Factor
MCC	Motor control centre
MCZ	Massawa Central Zone Pit (Massawa CZ)
MDL	Massawa Delya Pit
MDS	Massawa-Delya Structure
MG	Medium Grade Ore
min	Minimum
MKM	Maki Medina Pit
ml	Millilitre
mm	Millimetre
MMDD	Maximum Modified Dry Density
MMW	Minimum Mining Width
MNZ	Massawa North Zone Pit (Massawa NZ)
MO	Marginal Ore above the processing economic cut-off grade
MOD-SCN	Moderate scenario
MPa	Megapascal
MSMDS	Material safety data sheet

Table 2.8.1 Abbreviations and Acronyms

Abbreviation	Definition/Meaning
MSZ	Massawa Shear Zone
Mt	Million tonnes
Mt	Million tonnes
Mt/a	Million tonnes per annum
MTS	Main Transcurrent Shear
MW	Megawatt
MWe	Mega Watt Electrical
MWh	Megawatt-hour
MWp	Mega Watt peak
MWTP	Massawa water treatment plant
NAF	Non-acid forming
NB	Nominal bore
NKE	Niakifiri East Pit
NKW	Niakifiri West Pit
No.	Number
NPC	Normal Portland Cement
NPV	Net Present Value, or Discounted Value
OBE	Operating Base Earthquake
OEM	Original Equipment Manufacturer
OPEX	Operating Expenditure
OPT-SCN	Optimistic scenario
OSA	On stream analysis
OSS	Open side setting
oz or ozt	Troy ounce (ounce (troy) = 31.10348 grams)
P&ID	Piping and instrumentation diagram
P1	Phase 1
P2	Phase 2
P_{80}	80% product passing size (in microns)
Pa	Pascal (pressure = 1 newton per square metre)
PAD	Port Autonome de Dakar
PAF	Potentially acid forming
Pax	Potassium amyl xanthate
PBS	Performance Based Standards
PFD	Process flow diagram
PFS	Pre-feasibility study
PGA	Peak Ground Acceleration
pH	Hydrogen ion exponent (measure of acidity of alkalinity)
PLC	Programmable logic controller
PNNK	Niokolo-Koba National Park
ppb	Parts per billion
PPE	Personal protective equipment
ppm	Parts per million
PQ	Size of drill core (85 mm diameter)
PSI	Particle size indicator

Table 2.8.1 Abbreviations and Acronyms

Abbreviation	Definition/Meaning
PVOut (Specific)	Specific photovoltaic power output
Q	Quarter (of year)
QA/QC	Quality Assurance/Quality Control
QEM-SCAN	Qualitative electron microscopy - scanning analysis technique
QFP	Quartz Feldspar Porphyry
QRA	Quantitative risk assessment
RC	Reverse circulation (drilling)
RedTRN	Reductive Transitional ore, which is semi-refractory and processed at Sulphide Leach Plant
Red-trsn	Reductive transitional
Ref	Indicates the reference document
RL	Reduced level (study datum is '0' mamsl)
RMWI	Rod mill work index
RO	Reverse osmosis
RoM	Run of mine
RoS	Republic of Senegal
rpm	Revolutions per minute
s	Second
S	Sulphur
SAB	Sabodala Pit
SABC	Semi-autogenous mill/ ball mill/ pebble crusher circuit configuration
SAG	Semi-autogenous grinding
SANAS	South African National Accreditation System
SCC	Standards Council of Canada
SCPF	Sabodala Central Processing facility
SEE	Safety Evaluation Earthquake
SENELEC	Société National d'Électricité du Sénégal
SFM	Sofia Main Pit
SFN	Sofia North Pit
SG	Specific gravity (density)
SGO	Sabodala Gold Operations
SGS	Société Générale de Surveillance SA
SGSSD	SGS Sabodala
SI	International system of units
SIPSTF	Sabodala In-pit Tailings Storage Facility
SM	Particle size monitor
SMU	Selective Mining Unit
SO	Site Offices/Facilities
SOP	Standard Operating Procedures
SPS	Sabodala Power Station
SQL	Microsoft® Database formerly
SSC	Species of Special Concern
SSC	Sabodala Structural Corridor
SSTP	Sabodala sulphide treatment plant
SSTP	Sabodala Sulphide Treatment Plant

Table 2.8.1 Abbreviations and Acronyms

Abbreviation	Definition/Meaning
SSZ	Sabodala Shear Zone
SV	Pressure safety valve
SWMP	Storm Water Management Plan
SWOLP	Sabodala Whole Ore Leach Plant
SWTP	Sabodala water treatment plant
t	Tonne
$t.m^{-2}.h^{-1}$	Tonnes per metres squared per hour
t/a	Tonnes per annum
t/d	Tonnes per day
t/h	Tonnes per hour
t/m^3	Tonnes per cubic metre
t/mo.	Tonnes per month
tpa	Tonne Per Annum
tpd	Tonne Per Day
tpm	Tonne Per Month
TSF	Tailings storage facility
TSS	Total suspended solids
UCF	Undiscounted Cash Flows
UCS	Unconfined compressive strength
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPS	Uninterruptible power supply
URF	Unconsolidated Rock Fill
USD	United States Dollar
V	Volt
VAC	Volt alternating current
VFR	Visual Flight rules
VSD	Variable speed drive
VVVF	Variable voltage variable frequency
W	Watt (power)
w/v	Weight by volume
w/w	Weight by weight
WAAS	West African Accreditation System
Weath.	Weathered
WI	Work index (bond)
WORST-SCN	Worst case scenario
WRD, WD	Waste Rock Dump
XRD	X-ray diffraction analysis
y	Year
YoY	Year-on-Year
ZAR	South African Rand

3.0 RELIANCE ON OTHER EXPERTS

3.1 Introduction

The following sections outline the areas in the Technical Report, where various Qualified Persons QP's have relied on information provided by other experts, either within or outside of Endeavour.

3.2 Project Ownership, Mineral Tenure, Permits and Agreements

QPs, namely Kevin Harris, Stuart Thomson, Royce McAuslane and Salih Ramazan have relied on information provided by Ms Julie Blot [Secretary General West Africa] of Endeavour, relating to: '*Property ownership', 'mineral tenure', 'permits (exploitation and exploration)'* and the Issuers interests in '*agreements'* between the Government of Senegal (GoS) and other parties (Endeavour Mining Plc, 2022). The relevant information is presented in Section 4.0, and used in the respective sections that the aforementioned QP's are signing off on. The information has not been independently verified and no opinion is offered in this area.

3.3 Taxes, Royalties and other Statutory Payments

QPs, namely Kevin Harris, Stuart Thomson, Royce McAuslane and Salih Ramazan have relied on information provided by Mr Mathieu Calame [Group Tax Director], Mr Aissatou Fall [Country Tax Manager - Senegal], Mr Charles Mendy [Treasury Director] and Ms Julie Blot [Secretary General West Africa] of Endeavour, relating to '*Taxes*, *Royalties and other 'Statutory 'Payments'* (Endeavour Mining Plc, 2022). The contribution of each expert is as noted below.

- Taxes - Mr Mathieu Calame and Mr Aissatou Fall.
- Royalties and Statutory License and Agreement Payments - Ms Julie Blot.
- Statutory and other payments related to foreign exchange conversion – Mr Charles Mendy.

The relevant information is largely presented in Section 4.0, and used in Sections 14.0, 15.0, 16.0, 21.0 and 22.0. The information has not been independently verified and no opinion is offered in this area.

3.4 Revenue and Cost of Sales

QPs, namely Kevin Harris, Stuart Thomson, Royce McAuslane and Salih Ramazan have relied on information provided by Mr Michael Sumares [VP Finance] and Ms Veronique Jallabert [Corporate Treasury Manager], relating to: *'Sales Agreements', 'Gold pricing' and 'Costs of Sales'* Information' (Endeavour Mining Plc, 2022).

The relevant information is presented in Section 4.0, and used in the respective sections that the aforementioned QP's are signing off. The information has not been independently verified and no opinion is offered in this area.

3.5 Recovery Methods

Lycopodium's SSTP plant design relied on the following experts, namely:

- Endeavour for metallurgical testwork.
- The MO Group for BIOX® design specifications and parameters.
- OMC for comminution modelling.

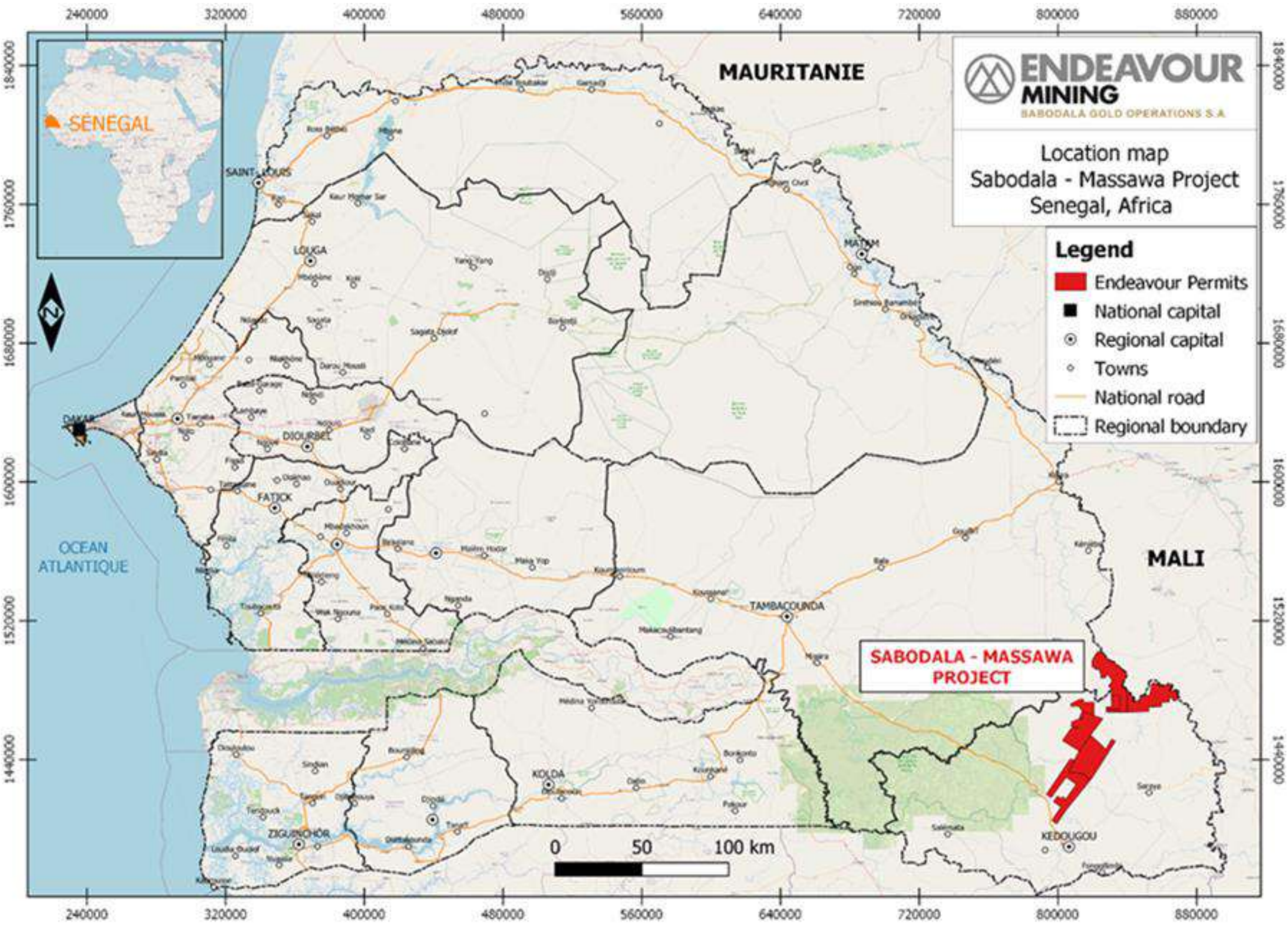
Whilst Lycopodium believes the parameters provided are reasonable, Lycopodium has assumed that the data provided is correct and no other opinions are offered in this regard.

4.0 PROPERTY, DESCRIPTION AND LOCATION

4.1 Introduction

The extent of the Issuer's (Endeavour's) exploration and mining activities in Senegal are graphically presented in Figure 4.1.1. The properties held by Endeavour are located approximately (600 to 660) km east-southeast (Google Earth®) of Senegal's capital, Dakar. With the exception of the Sounkounkou Permit, which is in the Tambacounda Region, all of the other properties are located in the Saraya Department (district) within the Kédougou Region. The administrative centre for the Saraya Department is the town of Saraya, whilst the administrative centre for the Kédougou Region is the city of Kédougou.

Figure 4.1.1 Endeavour's Senegalese Interests



Source: Endeavour, November 2021.

4.2 Mineral Property and Title in Senegal

4.2.1 Introduction

The following Section outlines the general regulatory principles regarding exploration and mining in Senegal and the key stakeholders. In addition, Section 4.2.3 summarises key changes between the 2003 and 2016 Mining Codes, and any further changes that are foreseeable.

4.2.2 Mineral Property Title

The following summary on mineral property title is adapted from the mining law review of Geni & Kebe, 2021.

A new Mining Code is applicable since the adoption of Act No. 27/2016 on the Mining Code on 30 October 2016. It is referred to as the 2016 Mining Code. It applies to new applications while the provisions of the 2003 Mining Code continues to apply to existing permits, as stated by Article 141 of the 2016 Mining Code, which specifies that:

'Mining titles granted before the date of entry into force of this code remain subject, for the remaining duration and for the substances for which they were issued, to the law and regulations applicable to them on the date of entry into force of this code. (...) Holders of mining conventions linked to a mining title signed prior to the date of entry into force of the present code remain subject to the stipulations contained in the said conventions for the entire duration of their validity'.

According to the applicable regulations, all mineral substances contained in the ground and underground within the territory of the Republic of Senegal (RoS), its territorial waters and continental plateau are the property of the State. Mining title holders acquire possession of the mineral substances that they extract.

The State will grant to one or several legal entities, the right to undertake or conduct one or several mining operations relating to mineral substances contained in the ground or underground, based on their technical and financial capacities to carry out said mining operations. Applicants must follow the application procedures stated in the 2016 Mining Code.

No one can undertake or conduct a mining activity within Senegal without holding a mining title according to the terms of the mining legislation. The different sort of titles include:

- Mining research permit or exploration permit (as detailed in Section 4.2.4).
- Mining permit (large-scale mining) or exploitation permit (as detailed in Section 4.2.5).
- Small-scale mining permit.
- A semi mechanised mining permit.
- Artisanal mining permit.

The concept of 'Concession Miniere', referred to into the 2003 Mining Code, has been abandoned by the 2016 Mining Code.

In each case, a 'Mining Convention' or 'Mining Agreement' is the initial contractual agreement between the investor and the State represented by the Minister of Mines and Geology. Such contract sets out the legal, fiscal, administrative and specific corporate conditions under which the permit holder shall undertake its operations.

Titles are transferable and transmittable subject to the prior approval of the Minister of Mines.

The main competent authorities in the Senegalese mining sector are:

- The Presidency of the Republic.
- The Ministry of Mines and Geology who is in charge of drafting and enforcing laws for developing the mining sector, signing mining conventions and promoting and controlling mining activities.
- The General Directorate of Mines.
- The Directorate of Geology.

- The Directorate of Control and Supervision of Mining Operations who is responsible for controlling and monitoring the execution of research and exploitation operations, and for collecting related data throughout the territory.
- The Directorate of General Administration and Equipment.
- The District Mine Departments (each of the 14 administrative districts in the country has a mining office).
- The Extractive Industries Transparency Initiative National Committee.
- The Directorate of the Environment and Classified Establishments, whose mission is to prevent and control pollution and nuisances.
- The Environmental Impact Assessment Division, whose role is to validate the terms of reference for environmental impact assessments of mining projects and to monitor the implementation of environmental management plans drawn up by mining companies.

4.2.3 Mining Rights - Historical, Current and Future

The following summary on mineral rights is adapted from the mining law review of Norton Rose Fulbright (Mr. Christophe ASSELINEAU), May 2017.

The process of modernising the Senegalese mining sector, was finalised with the signature, on 20 March 2017, of a decree supplementing the new Mining Code that had been published on 24 November 2016 (the '2016 Mining Code').

A combined reading of the new Mining Code and the decree reveals a reform of the mining sector in line with the trends generally observed in the West-African region, i.e., an increase in transparency and control by the State, increased taxes versus reduced scope of exemption and advantages for investors.

Putting aside the differences between 2003 and 2016 Mining Codes in relation to exploration and exploitations permits (detailed in Sections 4.2.4 and 4.2.5), some of the main differences include:

- Publication and compliance with the mining convention.
- The mining convention must now be negotiated within three months. Failing which, the application for the underlying mining permit is automatically deemed rejected. Once executed, all mining conventions must be published in the Official Journal.
- Prior authorisation.
- Prior authorisation from the Minister of Mines is now required for:
  - Any merger, demerger, placement under management or winding-up of a mining company.
  - Transfer by a mining company of more than 10% of its assets (pertaining to its mining operations in Senegal).
  - Any relevant transaction with respect to the share capital of the mining company (including the acquiring or transfer of a blocking minority or majority of voting rights.

- Increased taxation and payments.

  The 2016 Mining Code now distinguishes various royalty rates depending on the ore (e.g., 5% for raw/offshore-refined gold and concentrated iron, 3.5% for onshore-refined gold and concentrated base metals other than iron) instead of a single 3% rate applicable to any product. The Basis for royalties has also changed, now being the market value for locally traded products on the Free on Board (FOB) value of the exported product (as opposed to the pithead value (valeur carreau mine) under the 2003 Mining Code). Fixed feeds also increased, and a new surface rent has been introduced, as noted in Section 4.6.4.

- Production sharing agreements.

  Mining companies and the State may now enter into a production sharing agreement giving the mining company the exclusive right to research and mine a particular area and then recover the costs from the sale of any product. Profits from the sale of the product are split with the State as specified in the agreement but, as an incentive, such sales are not subject to the quarterly mining tax.

- Reduced scope for stabilisation.

  Stabilisation is now limited to the tax and customs regime during the exploitation phase (if negotiated and included in the mining convention only) and no longer covers the legal, administrative, financial and tax conditions (as was the case under the 2003 Mining Code).

- No corporate tax exemption.

  The 2003 Mining Code was amended in 2012 with the repeal of the seven year corporate tax exemption for concession holders. The absence of exemption from, or reduction of, corporate tax in the 2016 Mining Code is inconsistent with the UEMOA Mining Code, which provides a full corporate tax exemption during the exploration phase and the first three years of the exploitation phase.

- Local development funds.

  As seen in other African jurisdictions (e.g., Cote d'Ivoire, Burkina Faso), the 2016 Code introduces an obligation for mining title-holders to contribute annually to a local development fund dedicated to support projects for the benefit of local communities and contribute:

  - An amount to be negotiated with the State for the exploration/development phase.
  - 0.5% of the annual turnover (excluding taxes) for the exploitation phase.

  The fund will promote the economic and social development of local communities residing near mining areas and must include women's empowerment projects.

In accordance with the Senegalese Governments' guidelines for the mining sector (the 'mining sectorial politic 2017 to 2023)', Senegal benefits from many advantages that contribute to its attractiveness. Examples are as noted below:

- The political and social stability of the country, which is one of the most stable democracies in Africa.
- The great diversity of mineral resources, located in several regions of the country.
- The dynamism of the phosphate processing sector.
- The existence of an efficient human resources training network, particularly universities.
- Privileged access to regional and international markets.

4.2.4 Exploration Permits

In Senegal, an Exploration Permit confers on the holder the exclusive right to explore for the mineral substances for which it is issued. An Exploration Permit can cover any type of mineral, with the exception of minerals found in quarries, which are subject to separate authorisation and not subject to, location restrictions, unless it is granted within a promotional zone following a tender launched by the State. A company cannot hold more than two Exploration Permits for the same mineral.

The Exploration Permit ('Permis de Recherche' in French) allows for exploration work to be undertaken for an initial period of up to four years, renewable twice for up to three years per renewal.

In the event of renewal, the Exploration Permit holder must relinquish part of the perimeter granted (generally 25%) and gain approval of the programme and the budget for the renewal requested. In the event of competitive requests, priority is given to the tender offering the best conditions and guarantees for the State.

The holder is further subject to the following obligations:

- To commence the exploration works within six months of notification of grant of the Exploration Permit to the applicant.
- To collect samples, subject to a prior declaration to the mining administration and to the extent that the works do not lead to exploitation works.
- To spend the approved minimum amount.
- To submit notification of the works performed and the results obtained to the mining administration.
- To apply for an Exploitation Permit, subject to confirmation of the existence of a commercially viable deposit and compliance with the work obligations. In this case, the holder of the Exploration Permit has priority when applying for the mining right.
- To apply, with priority, for the issuance of an Exploration Permit in relation to other minerals discovered within the mining area covered by the existing Exploration Permit, subject to the declaration of such discovery to the Ministry of Mines within ten days.
- To undertake assessment works within one year of the discovery of commercially viable deposits, and provide evidence of whether the deposit is commercially viable.
- To take all necessary measures to protect the environment.
- To open an account to be held in escrow with a public entity duly designed by the State for the rehabilitation of the mining site.
- To carry out an environmental study.
- To comply with the Forestry Code if the Exploration Permit is issued within a protected area.

The mining convention entered into with the Ministry of Mines, will set out more detailed obligations.

4.2.5 Exploitation Permits

The Exploitation Permit ('Permis d'Exploitation' in French), of which two types exist depending on the size and scale of the project, allows for mining activities to be carried out for durations of up to five years (three years under the 2003 Mining Code) for smaller scale projects and between five years and twenty years (twenty-five years under the 2003 Mining Code) for larger scale projects. A mining permit has no limitations on the scale of its operations.

Exploitation Permits for larger scale projects are renewable as many times as is necessary until the resource is exhausted.

With regard to Exploitation Permits, applicants must have sufficient technical and financial capacity to carry out the works and must also pay the following fees:

- Entry fees amounting to XOF 10 million (up from XOF 7 500 000 in the 2003 Mining Code).
- A surface royalty amounting to XOF 250 000 (USD~420)[1] per square kilometre per year (non-existent under the 2003 Mining Code).
- Reimbursement of the historical costs to the State or the concerned public owned entity.

An exploitation company must be set up under the provisions of the OHADA Uniform Act relating to commercial companies and economic interest groups, between the company with the Exploration Permit, or its designated subsidiary and the state of Senegal. The parties will sign a shareholders' agreement to set out the terms and conditions for the establishment and management of the company.

The Government takes its free carried stake during the exploitation phase, which represents 10% of the mining company shares and may negotiate up to 25% for itself or local applicants. In exceptional cases, the State may sell its right to acquire an additional interest in the mining company in exchange for an agreed sum of money.

The company is managed by a board of directors, the composition of which depends on the proportion of the shares in the exploitation company.

In relation to the start of operations, the mining permit holders must commence operations 'as soon as possible' and, if operations have not commenced within one year from the date of the grant, the permit holder will be liable to penalties of:

- XOF 50 000 000 (USD 84 000)[2] per month for the first three months.
- An amount increasing by 15% on the previous month's penalty for each month from the fourth month until the twelfth month of delay.

The State may revoke the permit if the holder has not commenced work within 24 months.

The holders of operating permits may waive their permits by providing the Minister of Mines with at least one month's prior notice, subject to the provisions of the Mining Convention. The waiver does not discharge the holder from its environmental and rehabilitation obligations, and any obligations under the 2016 Mining Code and the Mining Convention. The mine and the real estate assets are transferred to the State free of charge, unless otherwise provided in the Mining Convention. A decree shall be issued within one year to confirm the waiver.

[1] As per the exchange rate on 25/03/2022
[2] Exchange rate as of 25/03/2022

4.2.6 Surface Rights

An Exploitation Permit confers on the holder the right to occupy land located inside or outside the area covered by the permit which is necessary for the mining works.

For land located outside the mining area, the occupation is subject to prior authorisation by the Ministry of Mines or/and the Ministry of Land, depending on the duration of the occupation.

This authorisation is issued by decree if the occupation lasts more than one year, or by order if the occupation lasts less than one year.

For land located inside the mining area, occupation is subject to a prior declaration to the Ministry of Mines.

The occupation of lands by the holder of a mining title, within or outside the perimeters granted, gives the owners or occupants of the land, the right to compensation for any losses suffered. The expenses, compensation and, in general, all charges relating to the application of land occupation clauses are borne by the mining title-holder. For titled land, the compensation is agreed between the landowner and the permit holder. If the parties fail to reach agreement, the compensation is set by the competent court in accordance with the law on expropriation.

After compensation, the mining title-holder can perform the following works:

- Occupy the site necessary for the performance of exploration and production work, the carrying out of related activities and the construction of the accommodation for the personnel assigned to the site.
- Carry out or have carried out, the infrastructure works necessary for the performance, under normal economic conditions and in accordance with the rules of the trade, of operations related to exploration and production, in particular the transport of supplies, materials, equipment and products extracted.
- Carry out drilling and other work required to supply water to personnel, works and installations.
- Find and extract construction and grading materials or road materials required for the operations.
- Cut timber required for the work.
- Use waters for its work.

4.2.7 Environmental Requirements

4.2.7.1 Overview

Each applicant for an Exploitation Permit must prepare, at its own expense, an environmental assessment and plan for the rehabilitation of the mining (quarry) site in accordance with the 2016 Mining Code, the Environment Code and the implementing decrees. All mining operations located in classified forest areas, have to be performed in accordance with the Forestry Code.

Health and safety rules apply to prospecting, exploration and exploitation work, most notably in quarries, plants and laboratories, as well as the security rules relating to transport, stockpiling and use of explosives and dangerous products summarised by the Mining Code, the Labour Code and by decree.

Any accidents that occur during a mining operation, as well as any identified dangers, should be brought to the attention of the Ministry of Mines and Geology, the competent administrative authority.

All mining title-holders should abide by the preventive measures prescribed by the administration in charge of public security, hygiene and employee security, for preservation of their deposits, expanses of underground water, buildings and public roads.

Environmental and Social Impact Assessments' (ESIA) are required prior to commencing mining, and updated ESIA's are required for significant changes to the issuing basis. ESIAs are required for the following titles:

- Mining licenses.
- Small-mine permits.
- Quarry exploitation permits.

Other mining operators will be limited to the submission of a summary environmental assessment of their mining site, before starting the works.

As previously noted, each applicant for these permits must prepare at its own expense, an ESIA to assist in this purpose.

The procedure for environmental compliance is the following:

- Notice of project and compliance with terms of reference.
- Realisation of an ESIA.
- Examination of the ESIA report by the technical committee.
- If the ESIA report is in good standing, a public hearing will be done with populations located in and around the mining site.
- Issuance of environmental certificate and implementation of environmental management plan of the project.
- If the application of environmental authorisation is in good standing, the time frame cannot exceed four months.

Operators must comply with the environmental management plan (where applicable). The mining convention entered into with the Minister of Mines will specify further obligations of the permit holder in this regard.

The potential consequences of breach of the environmental requirements are as follows:

- Suspension of mining activities for a period determined by the authority.
- Withdrawal of the mining permit.
- A prohibition on obtaining an exploitation permit for at least five years.

Imprisonment and/or payment of fines may apply to managers and employees of the operators in case of complicity.

4.2.7.2 Closure

Any holder of a mining title has an obligation to rehabilitate sites when each mining title expires, except for the perimeters that are still covered by an exploitation mining title. To this end, the holder of a mining title must open an account in a specialised public institution in Senegal into which funds are paid to cover the cost of the implementation of the restoration programme (Geni & Kebe , 2021).

Operators must carry out the necessary rehabilitation works on the mining site and repair any environmental damage caused by the mining activities. The rehabilitation funds will be used to cover the rehabilitation costs.

As the rehabilitation fund for Sabodala is not fully operational yet, a transitional protocol was entered into between Sabodala Gold Operation (SGO) and the State, whereby SGO agreed to pay an amount of USD 560,000 (one-time refundable payment) on the basis of the 2015 Mine Rehabilitation and Closure Plan and paid in November 2021. It will be renegotiated to include Massawa, on the basis of the 2022 Mine Rehabilitation and Closure Plan that will be submitted for approval mid-April 2022.

4.3 Project Ownership

The ownership/shareholding structure of the Issuer's interests in the southeast of Senegal are summarised in Table 4.3.1. Additional detail on the historical development of property ownership is discussed herein, whilst property details and location are summarised in Section 4.4. The terms of the shareholding agreement are discussed in Section 4.6.

Table 4.3.1 Property Ownership Structure and Issuer's Interest (Endeavour, 2002)

Property Name	Sabodala Mining Concession
Governing Agreement	Sabodala Mining Convention
Property Held By	Sabodala Gold Operations SA (SGO), 90% held by SGM and 10% by the Republic of Senegal (RoS)
Holding Company Ownership	Sabodala Gold (Mauritius) Ltd (SGM), 90% holding in SGO
Parent Company Ownership	Endeavour Canada Holdings (Canada) (ECH) (100% of SGM) and ultimately Endeavour Mining plc
Property Name	Massawa Mining Permit
Governing Agreement	Kanoumba Mining Convention dated 2010 and amended in 2020.
Property Held By	Massawa SA (MASA), 90% held by MAJ and 10% by the RoS
Holding Company Ownership	Massawa (Jersey) Ltd (MAJ), 90% holding of MASA
Parent Company Ownership	Endeavour Canada Holdings (Canada) (100% MAJ) and ultimately Endeavour Mining plc
Property/Permit Name	Bransan Exploration Permit
Governing Agreement	Bransan Mining Convention
Property Held By	Sabodala Mining Company Sarl (SMC) (70%) and Senegal Nominees SURL (SN) (30%), Constituted 4 June 2007
Holding Company Ownership	Sabodala Gold (Mauritius) Ltd (SGM) (100% of SMC)
Parent Company Ownership	Endeavour Canada Holdings (Canada) (100% of SGM) and ultimately Endeavour Mining plc
Property/Permit Name	Sounkounkou Exploration Permit
Governing Agreement	Sounkounkou Mining Convention
Property Held By	Sabodala Mining Company Sarl (SMC) (100%)
Holding Company Ownership	Sabodala Gold (Mauritius) Ltd (100% of SMC)
Parent Company Ownership	Endeavour Canada Holdings (Canada) (ECH) (100% of SGM) and ultimately Endeavour Mining plc
Property/Permit Name	Kanoumba Exploration Permit
Governing Agreement	Kanoumba Mining Convention dated 2020
Property Held By	Massawa (Jersey) Ltd (MAJ)
Holding Company Ownership	Teranga Gold (Senegal) Corporation (TGSC) (100% of MAJ)
Parent Company Ownership	Endeavour Canada Holdings (Canada) (100% of TGSC) and ultimately Endeavour Mining plc

4.4 Land and Mineral Tenure

In accordance with the property ownership structure detailed in Table 4.3.1 and Table 4.4.1, Figure 4.4.1 illustrates the:

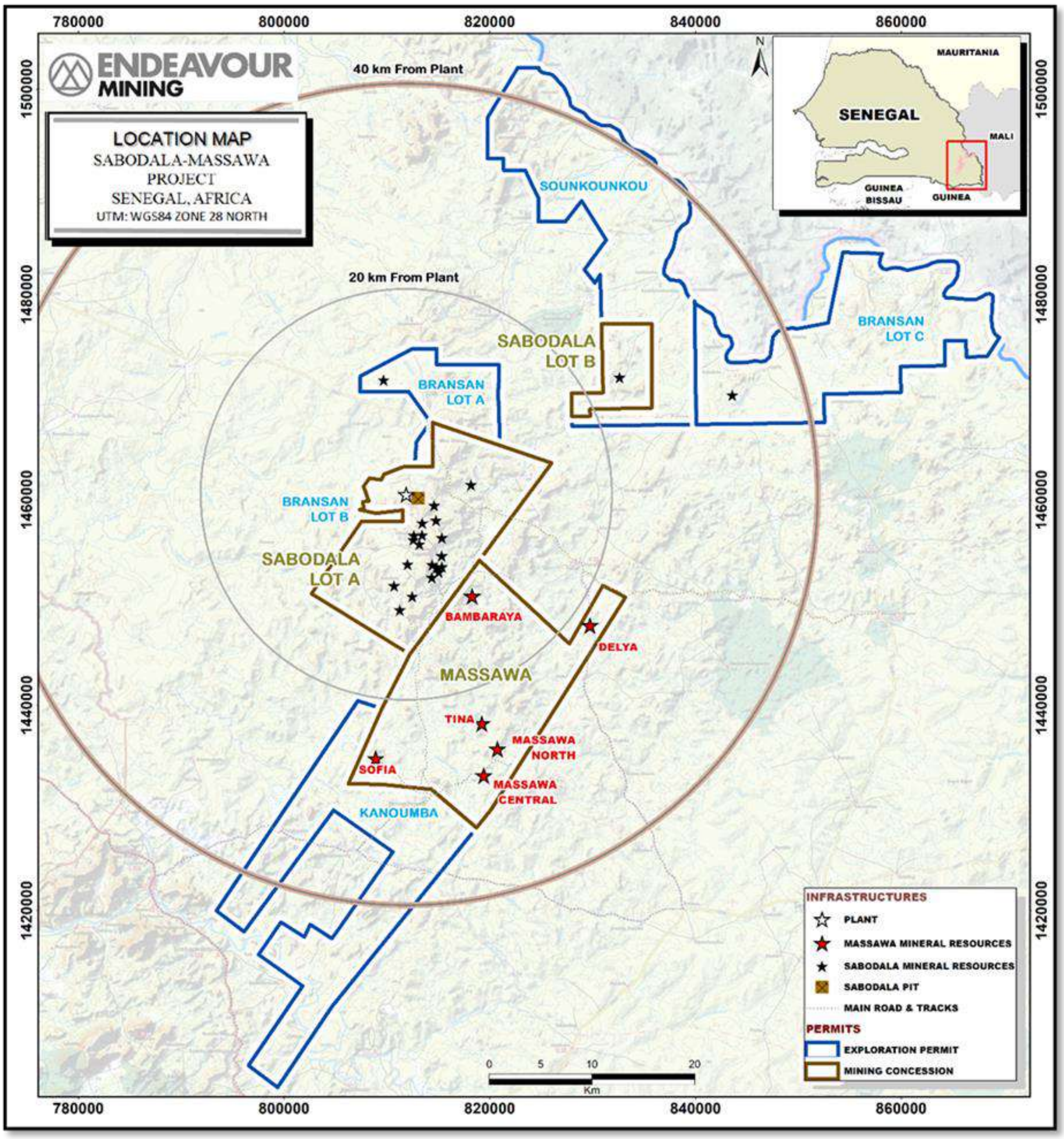
- Property location and property area (km^2).
- Permit name or number.
- The type of permit held (Exploration or Exploitation (Mining)).
- Permit issue and expiry date and the associated renewal status.
- The permit holders' interest, with the balance being held by the Government of Senegal.

Surface right payments related to Exploration Permits (Section 4.6.4) are due by end of March each year. The QP of this Section is satisfied that all statutory payments are up to date.

Table 4.4.1 Property Summary and Issuer's (Endeavour's) Interest

Property	Type	PE (No. or Name)	Area (km^2)	Date Issued	Expiry Date	Renewal Status	Permit Holder	Interest (%)
Sabodala			**291.2**					
Sabodala Lot-A	Mining	Sabodala	245.6	09/06/2005 (mining license) 30/04/2007 (mining concession)	26/01/2025	Initial Granting	SGO	90
Sabodala Lot-B			45.6			(extended)		
Bransan			**337.87**					
Bransan Lot-A	Exploration	Bransan	75.59	20/04/2018	20/04/2022	Initial Granting	SMC	70 (Lot A)
Bransan Lot-B			2.58					100 (Lots B & C)
Bransan Lot-C			259.7					
Sounkounkou	Exploration	Sounkounkou	**291.7**	20/04/2018	20/04/2022	Initial Granting	SMC	100
Massawa	Mining	Massawa	**320.2**	21/02/2020	21/02/2040	Initial Granting	MASA	90
Kanoumba	Exploration	Kanoumba	**286.1**	25/02/202	25/02/2024	Initial Granting	MAJ	100
Total			**1,527.07**					

Figure 4.4.1 Property Boundaries



Source: Endeavour, 2022.

4.5 Surface Rights

Land access for the exploration programmes completed to date has been negotiated without problems and, where required, compensation for exploration activities has followed Senegalese laws and regulations.

Any occupation of land that deprives the beneficiaries of land use and any modification rendering the land unfit for cultivation entails the mining right holder the obligation to pay a fair compensation (the rates of which are based on existing regulations).

Finally, in the event of displacement of populations, the holder of the mining right must enact the compensation and resettlement of the concerned populations.

In the specific case of the Sabodala-Massawa Project (the 'Project') it was noted that development/mining activities are likely to generate impacts (loss of agricultural land, loss of crops, structures and equipment, etc.). These impacts would be compensated through in-kind compensation (e.g., provision of replacement land) and/or financial compensation.

All losses have been evaluated and the beneficiaries have received compensation and signed agreements.

This participatory process brings together several actors within the Departmental Commission for the Census and Evaluation of Expenses (CDREI), which includes in particular the administrative authority, technical services, the impacted population and the village chiefs whose villages are affected.

Following the compensation, a Resettlement Action Plan (RAP) was drawn up. The fundamental objective of a RAP is to avoid damaging the property and rights of people in the project intervention areas.

Therefore, any negative impact caused by the project must be addressed so that the affected people are put in equivalent or better conditions than before the project. The RAP will thus enable SGO to comply with the International Finance Corporation (IFC) guidelines on involuntary resettlement and land acquisition.

The RAP will also include an analysis of the economic and social consequences of the project implementation that may result in the removal of land from the population, or a deterioration of their living conditions, and will announce guidelines for socio-economic restoration, i.e., the Livelihood Restoration Programme (LRP) Agreements and Encumbrances.

4.5.1 Sabodala Regional Land Package

The Regional Land Package (RLP) refers to a collection of Exploration Permits that surround or are otherwise within close proximity to the Sabodala Mining License. Until 2016, the RLP was comprised of eight separate permits covering a total surface area of 967 km^2. Of the eight Exploration Permits that comprised Teranga's RLP, five are or were held solely by SMC, a wholly owned indirect subsidiary of Teranga, and three are held by joint venture partners, with SMC holding a majority interest in each permit.

Working with the Senegalese Ministry of Mines, Teranga filed applications in the autumn of 2016 for the re-issuance of new Exploration Permits that would comprise approximately two-thirds of the 967 km^2 RLP pursuant to the terms of Senegal's new and current 2016 Mining Code. On 20 April 2018, Teranga was granted two new Exploration Permits, Sounkounkou and Bransan Lot A, Lot B and Lot C, comprising a combined area of 629 km^2. The initial validity period of both Permits expire in March 2022. Based on the existing drilling results, Endeavour has decided to relinquish the 292 km^2 Sounkounkou Permit and to submit a renewal application for the 337 km^2 Bransan Exploration permit.

All Exploration Permits are granted by Ministerial Decree and are subject to a Mining Convention signed with the State of Senegal. The gold exploration permits are held in a combination of full SMC ownership and earn-in joint ventures where SMC is the funding and managing party.

All Permits (Exploration or Exploitation/Mining) are linked to an executed Mining Convention with the Government of Senegal, which governs the mineral rights of the permit holder, and typically contain the following key terms:

- Exclusive right to apply for an Exploitation Permit provided a Feasibility Study is completed.
- The Senegalese Government will be entitled to a 10% free carried interest in the mining operation.
- Senegalese import duty exemption on mining equipment, fuel, explosives, and chemicals.

Given the Sabodala Mining Convention was executed on 7 April 2015 and its provisions extend to the SMC Exploration Permits, it is anticipated that if and when they move into production utilising the Sabodala Plant, they will be considered as 'satellite deposits' and as such incorporated into it. As a result, the fiscal terms included under the Sabodala Mining Convention, including royalty and taxation rates as well as other fiscal incentives, are anticipated to be applied to these future operations.

4.5.2 Massawa Regional Land Package

The Kanoumba Exploration Permit extends to the southwest of the Massawa Mining License and covers 286 km^2. This Permit was granted on 25 February 2020 as a component of the granting of the Massawa Mining License.

4.5.3 Exploitation Agreements

4.5.3.1 Kanoumba Mining Convention

On 4 March 2020, Teranga completed its acquisition of a 90% interest in the Massawa Gold Project from a wholly-owned subsidiary of Barrick Gold Corporation (Barrick) and its partner Compagnie Sénégalaise de Transports Transatlantiques Afrique de l'Ouest SA (CSTTAO). The Government of Senegal continues to hold the remaining 10% non-contributory interest in Massawa.

The Massawa Mining License includes the majority of the gold deposits acquired from Barrick (and its predecessor Randgold) and is contiguous with the Sabodala Lot-A Mining Concession. The Massawa Mining License was granted to Randgold on 21 February 2020 (and subsequently transferred to Massawa SA on 3 March 2020) and is governed by the Kanoumba Mining Convention and amendment No. 1 thereto, dated 14 April 2010 and 13 February 2020, respectively (collectively referred to herein as the Kanoumba Mining Convention).

Massawa SA and all related agreements will terminate and/or disappear once the merger to Massawa SA into SGO is finalised. This legal integration should be finalised in 2022 and effective as from 1 January 2022.

Until such time as the merger takes place, the following operational agreements are in place:

- The Sale of Ore agreement between SGO and Massawa SA, whereby Massawa sells its ore to SGO (dated 24 August 2020, and amended 15 December 2021).
- The Services Agreement between SGO and Massawa SA, whereby SGO invoices Massawa SA for the services provided (mining, exploration, advances of expenses including administrative expenses, etc.) dated 21 August 2020 and amended 15 December 2021.

The main implications of the merger are the following:

- Massawa SA will be merged into SGO (procedure contemplated under OHADA law), leaving only one single legal entity.
- Massawa Mining license perimeter will be included into SGO mining concession perimeter.
- Tax regime applicable will be the SGO tax regime.
- The applicable mining code will remain, by principle, the 2003 Mining Code subject to concessions being made by the Issuer, during the course of the ongoing negotiation of the consolidated mining convention. One concession already made by Teranga (and confirmed by Endeavour), is related to the community contribution. SGO agreed to start paying a similar community contribution to Massawa (i.e., 0.5% of its revenues)[1].

[1] Gross sales revenue minus cost of sales (freight, storage, refining and payabilitie)

4.5.3.2 Sabodala Mining Convention

The Sabodala Mining Convention was originally granted on 30 April 2007, pursuant to a Mining Agreement (the 'Sabodala Mining Agreement') which was executed on 23 March 2005.

On 7 April 2015, the Sabodala Mining Agreement was amended and restated to reflect the incorporation of a larger mining concession area. This included the adjacent and former Golouma Mining Concession and the Gora Project Area that had been elevated from an Exploration Permit into a Mining Concession. On 29 July 2015, a Presidential Decree was issued confirming the perimeters for the new Sabodala Mining Concession comprising a total area of 245.6 km^2 (the Sabodala Perimeter - Lot A) and 45.6 km^2 (the Gora Perimeter - Lot B), to be collectively referred to as the Sabodala Mining License. The dimensions of the current mining concession are approximately 23 km north-south by 11 km east-west within the Sabodala Perimeter and approximately 5 km by 10 km within the Gora Perimeter.

Pursuant to the terms of a shareholders' agreement between the State of Senegal and a subsidiary of the previous owner, Mineral Deposit Limited, which established Sabodala Gold Operations SA (SGO) in November 2007, the Senegalese Government retains a 10% free carry interest in SGO. Dividend rights of the State are triggered only after repayment of the initial capital investment in the Project and all other third-party debt owed by SGO.

On 2 May 2015, the eight-year tax holiday granted to SGO under its Mining Agreement and Mining License expired. SGO's fiscal framework is stabilised under the conditions provided for in its initial Mining Agreement and throughout the exploitation phase, subject to mutual agreement otherwise. For example, SGO has agreed with the RoS, to pay a 5% net smelter royalty (NSR) as part of an investment agreement executed with the State in 2013.

In February 2016, Teranga received an exemption of Value Added Tax (VAT) on its local and foreign purchase of goods and services. This VAT exemption is governed by an amendment to the existing mining convention and is enforceable up until 2 May 2022. Furthermore, SGO applied for and was approved for qualification, for a free export enterprise (EFE) investment programme in Senegal. SGO was granted EFE status on 16 November 2018, which guarantees SGO an exemption from customs duties (including parafiscal levies, business tax, and registration fees) and a 3% employer payroll tax until 31 December 2024. After the expiry of these exonerations, VAT and employer payroll tax is payable.

Pursuant to the decision to include the Massawa Mining License into the Sabodala Mining Concession, Massawa SA will be merged into SGO. The inclusion justifies Sabodala Mining Convention to be updated accordingly. Endeavour is currently negotiating the terms of the amendment with the Government of Senegal (GoS).

4.5.4 Exploration Agreement

A JV between Axmin Ltd. (AXM) and SMC was signed on 30 September 2008 (the Axmin JV) and will fall away on the expiry of the Sounkouko Permit in April 2022 (as the Issuer does not intend to renew the said Sounkouko Permit). There are no encumbrances/liabilities associated with the termination of this agreement.

4.5.5 Encumbrances

All concessions carry a 10% free carried interest in favour of the GoS and, as a result, the Senegalese Government holds a 10% interest in SGO and Massawa SA. The State will keep a 10% interest in the merged company (SGO).

The concessions are also subject to a local mortgage in favour of Franco Nevada (Barbados) Corporation as security for the obligations of SGO in connection with the FN Stream (as defined in Royalties) as part of a general collateral package which also includes security over the various holding companies in the structure which have an interest in the project.

4.6 Payments

Section 4.6.1 to 4.6.4 following outlines the basis for payments to third parties, including to the GoS and its representatives.

4.6.1 Royalties

The royalty payable to the GoS is 5% of the mine tile value ('Valeur carreau mine') associated with the sale of the gold and related substances. This royalty is payable within the month following each production quarter.

Unlike SGO, the mining royalty of 5% stated in the 2016 Mining Code is applicable on the market value of the product traded. The market value is calculated on the basis of the price of gold determined in London (London Gold Fix).

The mining royalty is payable quarterly, within 45 days following receipt of the settlement statement duly drawn up by the mining administration.

After the deduction of the 5% royalty, an additional 1% royalty is granted to the GoS in relation to waivers granted by the GoS, specifically with respect to its right to acquire an additional equity interest in certain deposits on the Sabodala Concession (Maki Medina, Massato, Gouloumba West, Goumbati West and kerekounda) and the deposits on the Massawa License. With respect to the 1% royalty, down payments as noted below were made, with the 1% royalty due, only after the cumulative royalties paid, exceed the quantity deposited.

- For the Sabodala Concession an upfront payment of USD 10 M was made to the GoS. The royalties payable have now exceeded this value, and the 1% is due in full.
- For the Massawa License, an upfront payment of USD 15 M was made in 2020.

A technology licensing fee/royalty will be payable to the MO Group for use of the BIOX® technology employed at the proposed Sabodala Sulphide Treatment Plant (STP). The terms of this royalty are still to be agreed.

Finally, certain amounts of the SGO refined gold are delivered to Franco Nevada (Barbados) Corporation under a 2014 streaming arrangement relating to the mine. The streaming agreement (the 'FN Stream') was amended in 2020 to allow commingling of ore from the Massawa Mining License, by converting a portion of the FN Stream to a fixed delivery basis. Under this amendment SGO will deliver 783 ounces per month beginning 1 September 2020 until 105,750 ounces have been delivered to Franco-Nevada (the 'Fixed Delivery Period'). At the end of the Fixed Delivery Period SGO is required to deliver 6 per cent of production from the concession (excluding Massawa). The FN Stream does not extend to ore from the Massawa project area.

4.6.2 Taxes

The basis for the provision of taxes in Senegal is summarised in Table 4.6.1.

Table 4.6.1 Taxes Payable in Senegal (Endeavour, 2002)

Tax Type	Application/Basis
Taxes – Construction	SGO is fully exempt from customs duties/tariffs payable in Senegal, except for a regional ECOWAS levy of up to 2.7% of the CIF value on imported items, see 'Taxes - Production' below.
Tax Exoneration Cost	None
Taxes – Production	Taxes payable are as defined below: • Customs duties (CIF Port) - SGO is exempt under EFE regime until end on 31 December 2024. After this and if no renewal of EFE, standard rates will apply. • Country/regional levy for imported goods, potentially up to 2.7% CIF (Port), comprising of: a statistical import charge (1%); a Community solidarity levy (0.8%); an ECOWAS levy (0.5%) for goods imported from outside of ECOWAS; and a COSEC Royalty (0.4%) for goods imported through ports.
Carbon Taxes	None payable
Export Taxes	Exempt
Valued Added Taxes (VAT)	18% - SGO benefits from a VAT exemption until 2 May 2022. Thereafter, 18% VAT shall apply. Returns filed monthly (by the 15th of the month following the transaction). Where VAT is applicable, VAT refunds take between three and six months.[1]
Stamp/Registration Duties	Exemption
Corporate Income Tax	25%
Labour Taxes	Per cent employer payroll tax. Under the free export enterprise (EFE) investment programme, this tax was to be waived for SGO until 31 December 2021 but was renewed in January 2022 for another three years (end on 31 December 2024). Thereafter the employer payroll tax is due.

4.6.3 Regional/Local Payments

Regional/local payments applicable to the Sabodala and Kanoumba Mining Conventions as of 31 December 2021, are as summarised below:

- Sabodala Mining Convention.
  - Social development programmes: USD 1.225 M/a.
  - Training and logistics support: USD 0.35 M/a payable to the Ministry of Mines.
  - District support administration fee: USD 0.030 M/a, payable to the Governor of Kédougou.
- Kanoumba Mining Convention.
  - An ad valorem or proportional contribution of 0.5% of gross revenue after deductions for transport (FOB) and refining and/or smelting costs.
  - Training and logistics support: USD 0.25 M/a payable to the Ministry of Mines.

With the proposed merger of Massawa SA into Sabodala Gold Operations SA in 2022, the following payments will be applicable:

- An ad valorem or proportional contribution of 0.5% of gross revenue after deductions for transport (FOB) and refining and/or smelting costs.

[1] VAT payments and refund periods are not considered in the financial model.

- Training and logistics support: USD 0.6 M/a, payable to the Ministry of Mines.[1]
- District support administration fee: USD 0.030 M/a, payable to the Governor of Kédougou.

4.6.4 Permit and Surface Right Payments

Subject to the prevailing Mining Code in force at the time of signing the Exploration/Exploitation Permits, surficial fees may or not be payable to the GoS. Where surficial fees are payable, they are based on a unit rate per square km.

Both the Sabodala and Kanoumba Mining Conventions relating to the Sabodala and Massawa Properties respectively, were granted under the 2003 Mining Code, and thus no surficial fees are payable. The Branson, Kanoumba and Sounkounkou Exploration Permits were granted under the 2016 Mining Code, and thus the fees payable are as outlined below.

With the proposed merger of Massawa SA into Sabodala Gold Operations SA in 2022, it has been assumed that no surficial fees are payable. At the time of this Report, negotiations pertaining to the consolidated Sabodala mining convention are ongoing. The GoS is negotiating with SGO to move the company to the 2016 Mining Code while Endeavour, referring to legal arguments, confirm the applicability of 2003 Mining Code.

On the exploration side, all exploration permits have been attributed under the 2016 Mining Code and are consequently subject to surficial fees.

The 2003 Mining Code (Law No 2003-36, gazetted end February 2004) does not include any surficial fees while the 2016 Mining Code (No. 27/2016, passed on 30 October 2016) includes the following fees:

- Operating licenses: (XOF 250 000/km²).
- Exploration licenses:
  - First validity period (XOF 5000/km²).
  - First renewal period (XOF 6500/km²).
  - For the second renewal period (XOF 8000/km²).

4.7 Legal and Permitting

4.7.1 Conventions and Guidelines

Regulatory and voluntary conventions and guidelines applicable to the development and operation of the Issuer's properties in Senegal are defined in Section 20 of this Technical Report.

4.7.2 Permitting

Permits required to support mine development and operations are fully defined in Section 20 of this Technical Report.

[1] [1] Once the fixed fee falls away, a joint committee will be set up comprising of representatives of the Ministry of Mines, Ministry of Finance, Ministry of Local Development, Mayors and SGO, whom will be responsible for apportioning the proceeds from the Advalorem fee.
[1] Falls away when Massawa SA is integrated into Sabodala Gold Operations SA.
[1] USD 0.15 M/a during the construction phase.

4.7.3 Liabilities/Claims

4.7.3.1 Artisanal Mining

There has been no significant artisanal mining within the Sabodala Perimeter apart from sporadic hard rock working at Faloumbo, a small mechanically excavated open cut at Kerekounda, and minor alluvials at Sutuba.

There has been no significant artisanal mining within the Sabodala regional Exploration Permits and the Kanoumba Exploration Permit. These areas have not been contaminated by these workings, such that it could reasonably stand out as a liability or obligation for remediation.

Artisanal workings within the Gora Perimeter have ceased with the commencement of mining operations at Sabodala and their workings have either been remediated through the progression of mining or otherwise incorporated within the overall mine closure plan for the Gora deposit.

The Massawa deposits have not been exploited by artisanal mining, possibly due to their relatively low grade surface expression; as such, no liabilities are foreseen.

4.7.3.2 Historical Plant and Infrastructure

With USD (18 to 25) M of African Development Bank and Government funding, but without proper title or having completed a Feasibility Study, Eximcor commissioned the construction of a 0.25 Mt/a mill, CIP plant and associated infrastructure near to the current Sabodala pit, including a 1200 m paved runway approximately 3 km northeast of the Sabodala mill. Eximcor's oxide Mining Permit at Kerekunda was terminated late 1997 and in 1998, the Government forcibly removed Eximcor personnel from the site and placed it under military/police protection.

Following the eviction of Eximcor, the company was put under legal liquidation. A 'syndic' was appointed to sell the assets and pay the liabilities. The plant and equipment was dismantled and sold out by the 'syndic' (progressively from early 2000's to the effective date of this Report, liquidation is ongoing).

In 2004, the Government announced that the Sabodala area was available for international open tender. Mineral Deposits Limited (MDL), an Australian based publicly traded mining company, was awarded the Sabodala Project. In late 2010, Teranga completed the acquisition of the Sabodala Gold Mine by way of a restructuring and demerger from MDL, and shortly thereafter completed its initial public offering (IPO).

MDL officially sanctioned the airstrip with the Civil Aviation Authority (CAA) in 2008, with SGO recognised by the CAA as the official operator.

Both the 'syndic' and M. AHNE (Eximcor) claim ownership of the airport albeit no formal claims have been registered and no request for payment for the purchase/use of the airport has been made by either parties.

The historical operator of Sabodala reported that the historical tailings were moved to the current tailings storage facility. In 2015, SGO estimated that site environmental rehabilitation costs associated with the Eximcor plant was USD 1.4 M

4.8 Data Verification

The data verification process followed is discussed more fully in Section 12.0.

4.9 Comments on Section 4.0

The QP of this Section is not aware of any environmental or other liabilities on the Properties associated with this Report. The companies holding the mineral and surface rights have all of the required permits to conduct the proposed work on the Properties. The QP is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work programme on the Properties held by the Issuer.

4.10 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 4.0 are presented in Section 25.0.

4.11 Recommendations

Recommendations pertaining to Section 4.0, are presented in Section 26.0.

4.12 References

References cited in Section 4.0 are presented in Section 27.0.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Introduction

This section outlines the geophysical environment that the Mine/Project operates in; the enabling infrastructure and services available to it; and, the rights of the Issuer and its subsidiaries, to develop mine infrastructure on the Sabodala Concession and the Massawa License in the southeast of Senegal.

5.2 Location

Endeavour's Sabodala-Massawa mining operations/properties are located in southeast Senegal; Sabodala is approximately 600 km and Massawa approximately 620 km (Google Earth®) east-southeast of the Senegalese capital, Dakar. The Sabodala open pit is approximately 33 km from the Malian border to the east and 85 km from the Guinean border to the south.

Sabodala Gold Operations SA's (SGO's) operations are supported by a regional office in Dakar and Endeavour's head office support functions in London, United Kingdom and Abidjan, Côte d'Ivoire. Some of Endeavour's exploration permits run alongside the Falémé River, which starts in northern Guinea and ultimately joins the Senegal River before discharging into the sea. The Falémé River forms a natural border between Senegal and Mali.

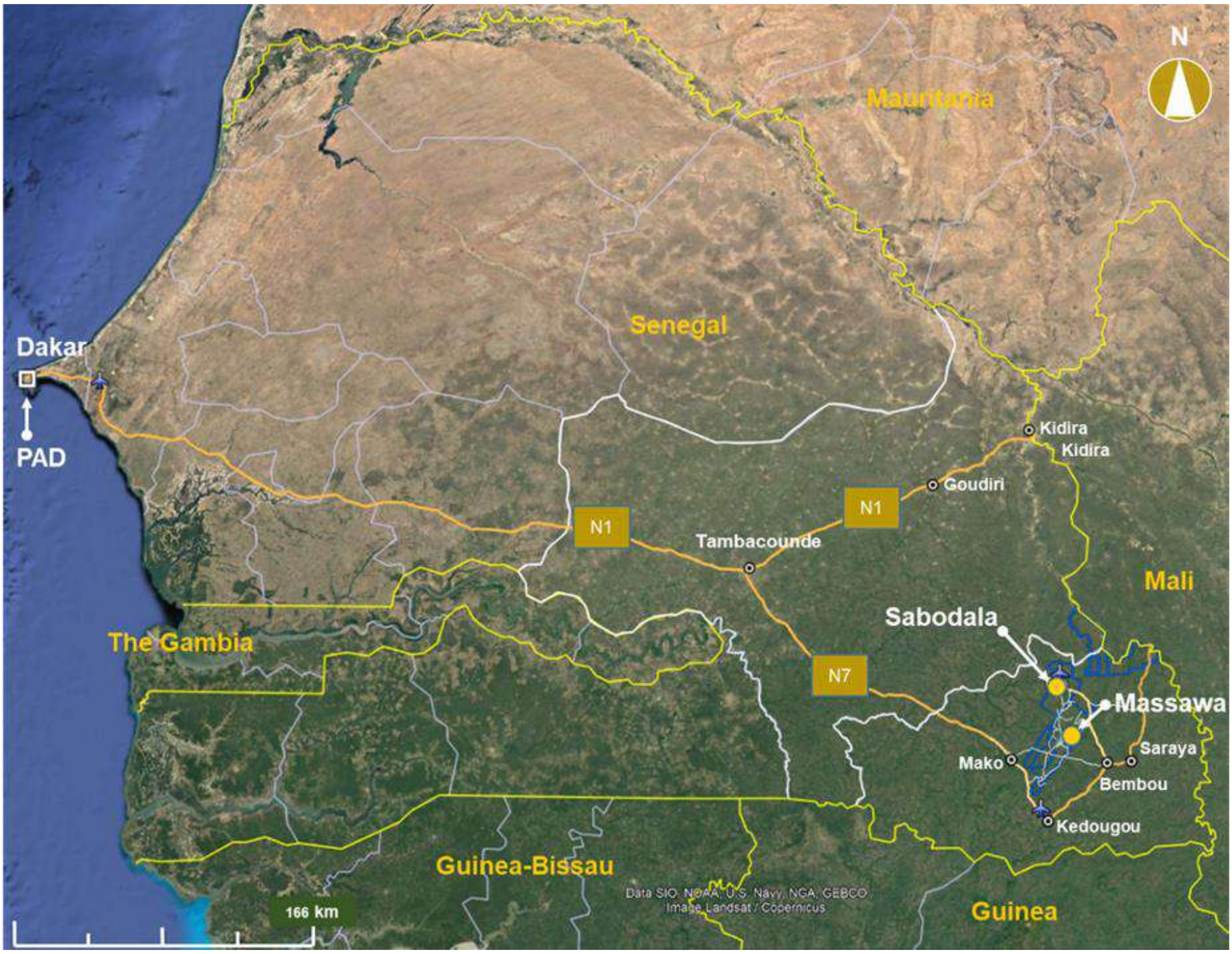
The Sabodala Concession and Massawa License are contiguous to each other and lie within the Kédougou region, one of fourteen regions in Senegal. The Kédougou region is subdivided into three departments (provinces) - Kédougou, Salémata and Saraya, with SGO's exploration/mining activities falling within the Saraya department.

The largest town in the region is Kédougou (population 18 860 (2007)) (Wikipedia, 2022), whilst the largest town in the southeast of Senegal is Tambacounda (population 78 800 (2007)) (Wikipedia, 2022). Dakar, the capital of Senegal, has a population of 1.15 M (2013)[1]. All three conurbations support SGO's operations in some form or another.

Key features relevant to the Mine/Project are illustrated in Figure 5.2.1.

[1] (Wikipedia, 2022)

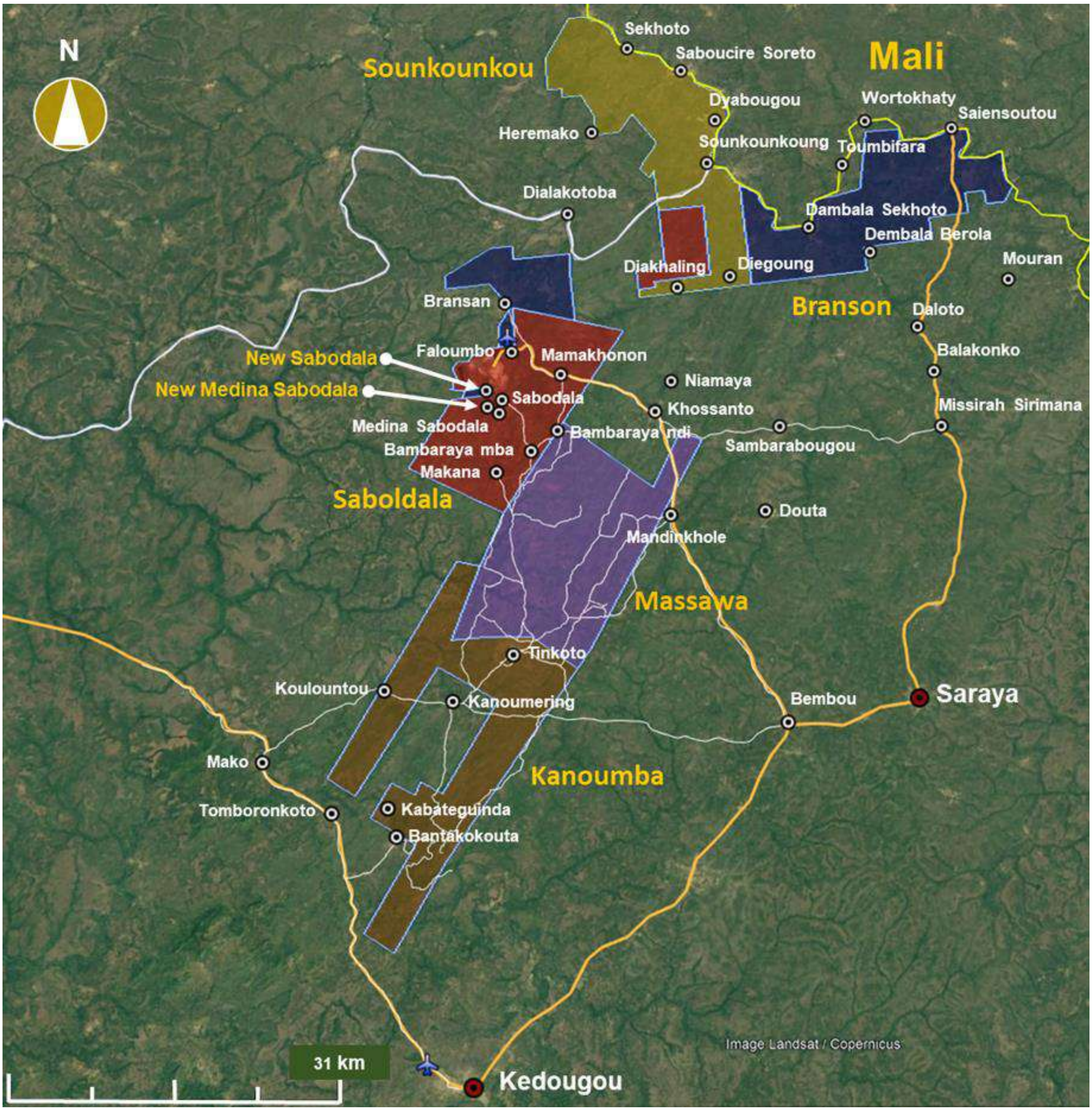
Figure 5.2.1 Key Mine/Project Features



Source: (Endeavour, Google Earth, 2022)

The villages and towns local and/or on Endeavour's exploration/exploitation permits are illustrated in Figure 5.2.2 following.

Figure 5.2.2 Permits and Local Villages/Towns



Source: (Endeavour, Google Earth, 2022)

The villages on or near the properties, typically have a few hundred to a few thousand inhabitants, with the largest local village being the Tinkoto artisanal mining village on the Kanoumba exploration permit (circa 10 000 persons). A socioeconomic reference study of the SGO area, confirmed an estimated population of 46 291 (2020)[1].

A summary of the number of villages by License/Concession/Permit are summarised below:

- Sabodala Mining Concession - seven villages, one of which is new ('New Medina Sabodala' - not yet inhabited). New Medina Sabodala is being built by Endeavour, to house the people being relocated from Medina Sabodala.

[1] Detailed more fully in Section 20

The Sabodala village is approximately 2 km south of the Sabodala pit and is in part, located above the Niakafiri deposit. The Faloumbo village is to the north-northeast of Sabodala pit, whilst Medina Sabodala, is located less than 1 km south of the Sabodala village.

- Massawa Mining License - one village (Bambaraya ndi), which borders the Sabodala property. This village is approximately 13 km northwest of the Delya deposit and 2.5 km north-northwest of the Bambaraya deposit. Whilst not on the Massawa Mining License, Mandinkhole Village is relatively close to the Delya deposit (<5 km)
- Branson Exploration Permits - three villages, including 'New Sabodala' on Branson Lot-B. New Sabodala (not yet inhabited) is being built by Endeavour, to house the people being relocated from the Sabodala Village.
- Sounkounkou Exploration Permits - six villages (permit will be released upon its expiry).

Just beyond the eastern boundary of the Sabodala Lot-A Mining Concession, and to the northeast of the Massawa Mining License, is the Khossanto village, a regional centre which has a telephone service, a government office, mosque, schools, and a medical centre.

5.3 Infrastructure

5.3.1 Ports

SGO is serviced by the Autonomous Port of Dakar ('Port Autonome de Dakar' or PAD). PAD is the third largest port in West Africa, after Abidjan and Lagos. It is also the ninth-largest port on the African continent. Société Nationale du Port Autonome de Dakar (SN-PAD), the port owner, operates the port through a number of concessions (DP World Dubai (the Container Terminal), Bolloré Ports (the Roll-on Roll-off Terminal) and Necotrans (the Bulk Terminal).

PAD is a modern international port and no issues are foreseen for either project construction or operations.

5.3.2 Road Access

By road, SGO's Sabodala operations are approximately 790 km from the PAD/city of Dakar. The route follows the N1 toll road to the regional centre of Tambacounda (approximately 460 km) and then southeast on the N7 to Kédougou (approximately 230 km). Both the N1 and N7 are sealed all-weather roads, whilst the final 96 km from Kédougou to Sabodala via Bembou (sealed to Bembou), is a mix of sealed and laterite roads.

5.3.3 Air Transport

Blaise Diagne International Airport ('Aéroport International Blaise Diagne' or BDIA) is an international airport near the town of Diass, 43 km east of downtown Dakar. It serves as the main international airport for Dakar and Senegal, replacing Léopold Sédar Senghor International Airport in December of 2017. The airport is serviced by a number of international carriers and Air Senegal for international/domestic flights.

There is a regional public airport at Kédougou. The airport has an 1800 m asphalt pavement and is serviced by Air Senegal. This airport is also the location of the Kédougou weather station, referenced herein.

SGO licenses[1] and maintains (but does not own)[2] a 1250 m sealed airstrip at Sabodala capable of handling light to medium sized aircraft. The airstrip is located approximately three kilometres to the northeast of the Sabodala plant and 560 km from BDIA.

SGO operates a biweekly charter (fulfilled by Transair) flight from Sabodala to BDIA. These flights are largely used by Senegalese employees above a certain grade, who live in Dakar and international employees and visitors. The airstrip is also used for gold shipments (Brinks) and MEDEVACs.

5.3.4 Rail

Whilst Senegal has an established rail system, with a 1287 km (1000 mm gauge) rail link between Dakar and Niger via Mali, it needs to be upgraded/refurbished for use. The rail line at its closest point in a straight line, is approximately 125 km north of Sabodala. The transnational rail line starts at Dakar, goes due southeast to Tambacounda, and then follows a northeast path, crossing into Mali at the border town of Kidira.

A branch line between Tambacounda and Kédougou is being discussed as part of broader initiative to upgrade Senegal's rail infrastructure (African Logistics Magazine, 2020). The development of this line is very much dependant on Société des Mines de Fer du Sénégal Oriental (MIFERSO) iron ore project in Falémé (Miferso, 2022).

5.3.5 Towns and Supporting Service Centres

Whilst there are two regional centres in close proximity to SGO's operations, Kédougou some 96 km by road and Tambacounda 230 km by road, they are largely administrative/agricultural/transport towns and do not have all the necessary businesses/educational entities required to support a mining company.

There are also a number of villages on or in close proximity to the Sabodala and Massawa properties. Each village typically contains a few hundred to a few thousand people, some of which have essential public infrastructure such as elementary schools, health posts, water supply, and in some instances Government offices. Local villagers typically engage in agricultural work (subsistence gardens or small fields (growing sorghum and maize)) and artisanal mining.

SGO largely utilises the local villages and supporting regional towns for the sourcing of un/semi-skilled labour, agricultural products and medical services. Qualified artisans and professionals are typically sourced from Dakar and to a lesser degree, from outside Senegal. Mine construction and operational support contractors are typically sourced from Dakar.

In terms of wage employment, Endeavour's Sabodala mine is now after the State, the largest employer in the Kédougou region, with over 1000 workers.

In accordance with global best practice, SGO is committed to supporting and developing local communities and Senegal as a whole. Thus, there will be over the coming years, a drive to empower woman, upskill locals and grow local procurement. An approximate split of how the various regional centres[3] are used, is summarised below (Sabodala OHS Manager, 2022):

- Food sourcing by value: 10% Kédougou[4] and 90% Dakar.
- Medical treatment of employees/dependants: ~85% Kédougou,~10% Tambacounda and 5% Dakar.
- Skilled nationals - artisans/technicians/engineers/professional staff: ~20% Kédougou and 80% Dakar.

[1] License maintained with the RoS Civil Aviation Authority.
[2] Discussed more fully in Section 4
[3] 'Kédougou' means, the town of Kédougou and villages on Endeavor properties
[4] Possibly growing to 30 % in the coming years (includes local villages)

- By value, approximately 15% of the reagents and consumables used are sourced from Senegal, with the remainder (85%)[1] sourced from abroad.
- By value, approximately 70% of equipment maintenance/refurbishment is done in-country, with approximately 30% undertaken abroad.

The company operates a contracted daily/weekly bus/shuttle service facilitating the movement of employees between their place of residence and the mine site.

5.4 Topography, Elevation and Vegetation

The topography of the Project area can be described as undulating, with prominent hills rising in the north-eastern part of the licence area. The elevation increases from a minimum of 96 m above mean sea level (mamsl) in the south to over 280 mamsl on the higher-lying hills in the north. The higher lying areas in the north and northeast, and extending towards the centre of the licence area, form a catchment draining towards the northwest. Two distinct valleys are present, with a higher lying area in the centre of the licence area separating them.

A mixture of low shrub land/savannah is found in the flatter, low-lying areas, while the savannah class dominates the hillier areas in the northeast, as well as in the far south of the licence area. Woodlands are mainly confined to drainage lines and are also present on the higher-lying hills. Shallow rooting open grassland areas are common where laterite occurs.

5.5 Climate

5.5.1 Introduction/Overview

The Project is located approximately midway between the Equator and the Tropic of Cancer, in the sub-tropical transitional band of the Sahel. The movement of the tropical rain belt known as the Inter Tropical Convergence Zone (ITCZ) controls seasonal rainfall. The variation in the latitudinal movements of the ITCZ from one year to another causes the large inter-annual variability in the wet season.

The climate is strongly influenced by the West African Monsoon. When the ITCZ is in this northern position, the dominant wind direction in regions south of the ITCZ is south westerly, blowing moist air from the Atlantic Ocean onto the continent. This pattern is referred to as the West African Monsoon, and accounts for 60% to 80% of the annual precipitation in the wet season (June to September). In the dry season (October to May), the dominant wind direction is reversed; the dry and dusty 'Harmattan' winds blow from the Sahara Desert (Digby Wells, 2017).

Climatic data has been sourced from weather stations at Sabodala, Massawa and Kédougou. The Sabodala and Massawa weather stations are 27 km apart, and 69 km and 47 km from the Kédougou weather station respectively. The elevation of the Sabodala (180 m) and Kédougou (170 m) weather stations are largely the same, whilst the Massawa weather station is approximately 60 m higher, at an elevation of 230 m. It is notable that the weather data from the three stations is incomplete/inaccurate for some of the periods which they have been active, 1918 to present (Kédougou), 2008 to present (Sabodala), and 2008 to Present (Massawa) (AQ2, 2020).

[1] Excludes caustic soda and sulphuric acid

5.5.2 Temperature and Humidity

In Kédougou, the highest monthly average dry bulb temperatures are between March and May (typically ranging from 31 ºC to 40 ºC), whilst the lowest monthly average temperatures are between December and January (typically ranging from 17 ºC to 26 ºC).

At Sabodala, temperatures are high throughout the year with an annual average of 30 °C. Average maximum monthly temperatures can go over 50 °C in April, May and June, whilst in winter, average monthly minimum temperatures seldom go below 17 °C (Synergie Environnement, 2022).

Whilst temperatures are hot, the impact of ambient temperature (wet and dry bulb) on equipment specification and on the operating environment has been considered for both design and operations.

5.5.3 Rainfall and Evaporation

There is a distinct tropical wet season from May to October, with most rain falling from storms between July and September, and a dry season from November to April. Mean annual rainfall at Sabodala mine from 2008 to 2019 was approximately 1130 mm. It is noteworthy that for Kédougou (with about 100 years of data), the mean annual rainfall was 1248 mm, with lower and upper bounds of 792 mm and 2160 mm (AQ2, 2020).

As noted in Table 5.5.1, the annual evaporation rate for Sabodala and Massawa (approximately 2000 mm) is twice that of the annual precipitation rate (approximately 1000 mm). Albeit during three months of the wet season, the precipitation rate is twice that of the evaporation rate.

Table 5.5.1 Average Evaporation and Rainfall Data (Digby Wells)

Month	Sabodala		Massawa	
	Evaporation (mm)	Rainfall (mm)	Evaporation (mm)	Rainfall (mm)
January	165	0.2	126	0
February	177	0.2	143	0.2
March	201	0.2	195	0
April	174	2.5	211	0.8
May	198	16.7	209	23.6
June	157	112.3	186	105.1
July	139	204.9	163	173.3
August	144	267	138	326.8
September	149	227.9	147	310.4
October	160	74.6	183	74.8
November	145	4.6	163	1.3
December	148	0	138	0.1
Total	**1958**	**911**	**2002**	**1016**

5.5.4 Wind

There are three distinct seasonal wind directions, namely (Synergie Environnement, 2022) (Souleymane Fall, 2006):

- The annual Harmattan - a dry wind that blows from the north and northeast, usually from December to February, resulting in dusty (0.5 to 10 μm particles) and hazy skies.
- The monsoon season, where winds are primarily from the west and southwest (July to October).
- The maritime trade winds from the west and northwest (May and June).

There are some concerns with the weather station wind speed data and thus no wind run speeds are included herein. Notwithstanding this, local wind speed is sufficient to contribute to the suspension of fine particles in the air, but are not high enough for the installation of wind turbines or to cause any safety or facility integrity/operability concerns.

5.5.5 Extreme Weather Events

The Sabodala region is not subject to extreme weather events that would likely stop production or cause physical damage to infrastructure.

Lightning intensity during the wet season is moderate, likely to be of the order of 18 to 32 strikes.$km^{-2}.y^{-1}$ (African Centres for Lightning and Electromagnetics Network, 2022).

5.5.6 Solar Radiation and Sunshine Hours

The Sabodala area is subject to high levels of solar insolation as noted in Table 5.5.2. Subject to permitting and techno-economic considerations, solar energy could be used in heat and power applications. In installing photovoltaic cells, consideration will need to be given to ambient dust fall out and high ambient temperatures.

Table 5.5.2 Solar Insolation (World Bank & International Finance Corporation, 2022)

Description	Abbreviation	Value
Specific photovoltaic power output	PVOut (Specific)	4.550 kWh/kWp per day
Direct normal irradiation	DNI	4.150 kWh/m^2 per day
Global horizontal irradiation	GHI	5.751 kWh/m^2 per day
Diffuse horizontal irradiation	DIF	2.722 kWh/m^2 per day
Global tilted irradiation at optimum angle	GTIopta	5.934 kWh/m^2 per day

The region typically has eight to nine hours of sunshine per day from January to May and November to December, and between 5.5 and 7.5 hours per day between June and October (WorldData.Info, 2022). Over the year, sunrise varies between 0620 and 0720 hours, whilst sunset varies between 1820 and 1918 hours (Redwoods, 2022).

5.5.7 Climate Impact - Design, Construction and Operations

It is possible to operate the mine all year-round; however, the mine schedule allows for a reduced mining rate and for predominantly fresh rock ore to be processed in the wet season. During the wet season, SGO maintains when required, the laterite road between Bembou and Sabodala.

5.6 Dust

Ambient dust levels and dust from operations requires on going mitigation/management to meet IFC (5 $g.m^{-2}.month^{-1}$) and Senegalese (20 $mg.m^{-2}.d^{-1}$) standards. Notwithstanding this, as long as appropriate attention is given to this area, no legal or social license to operate issues are foreseen.

5.7 Noise

Noise generation from mining activities is not considered an issue for the receiving environment and no special engineered solutions are required.

5.8 Seismicity

Sabodala is located in West Africa, in what is considered a stable continental area consisting predominantly of a very ancient plateau which displays a few, clearly recognised, active tectonic features. Seismicity is not well known in the area due to a lack of historical records, thus making it difficult to estimate the peak ground acceleration (PGA).

In the absence of a probabilistic seismic hazard assessment (PSHA) for the site, Advisian recommended a PGA of 0.03 m/s^2 for the operating base earthquake (OBE) and 0.05 m/s^2 for the safety evaluation earthquake (SEE). These values are indicative off a low-risk seismic area.

In summary, the risk of earthquakes is low and manageable through engineering design.

5.9 Water

Water make-up for the Sabodala and Massawa operations is largely sourced from the freshwater harvest dams on the properties, supplemented with ground water for certain applications. During the construction of the Sabodala mine, a 42 km water pipeline connecting the Falémé River1 to the Sabodala Plant was installed. It was never used, and has since been decommissioned. Under the terms of the 'Sabodala Convention', no seasonal or volumetric flow rate conditions were imposed on abstracting water from this river and if required, the pipeline could be re-instated.

Whilst the annual evaporation rate is twice that of the annual precipitation rate (Table 5.5.1) SGO's water harvest dams at Sabodala and Massawa are sufficiently sized to ensure that no make-up water is required from the Falémé River, both for current and future operations.

5.10 Power

As of April 2020, the energy sector in Senegal had an installed capacity of 1431 MW. Energy is produced by private operators and sold to Société National d'Électricité du Sénégal (SENELEC) (National Electricity Company of Senegal) (Wikipedia, 2022).

Most of Senegal's energy production is from fossil fuels (coal, diesel and gas), however an increasing amount of the energy production is coming from sustainable sources, such as Manantali Dam in Mali (200 MW, 740 GWh/a[2], 180 km east of Sabodala)[3], a new wind farm (158 MW) in Thiès, and a number of solar farms (20 to 30 MW) (U.S Aid, 2022).

Senegal's grid transmission infrastructure is largely to the north and west of the country, leaving the southeast operating independently from the grid. The closest tie in point to SENELEC's 225 kV grid infrastructure is in Kidira (86 km from Sabodala) (EnergyPedia, 2020); this is the transnational line connecting Mali to Senegal. A proposed 128 MW dam (2025) in Sambangalou, 17 km south of Kédougou is likely to expand the transmission network to the southeast of Senegal (Wikipedia, 2022); however, given that the damming of this river impacts an important UNESCO conservation area, it is unclear when this project will proceed.

[1] The river forms the boundary between Senegal and Mali
[2] At USD 0.07 kW/h (U.S International Trade Administration, 2020)
[3] (Wikipedia, 2022)

As with Rail, the Republic of Senegal has the goal of electrifying the southeast of the country to facilitate the expansion of the mining sector (gold and iron ore) (United Nations Industrial Development Organisation (UNIDO), 2022); however, without the Sambangalou dam as the key enabler, it is unclear when this will happen.

In the absence of grid infrastructure, SGOs current and future operations are premised on the running of Heavy Fuel Oil (HFO) gensets, as more fully described in Section 18. Notwithstanding this, the solar power potential in the region is comparatively high (Table 5.5.2) and offers a likely business opportunity.

5.11 Communications

Since the liberalisation of the Information and Communications Technology (ICT) sector in the 1990s, Senegal has transformed into a leader in West Africa for developed and modern telecommunications infrastructure. The country ranks 14th in Africa for Network Readiness. In 2016, the Government of Senegal took steps to advance the sector by adopting the National Digital Economy Strategy 2025 which aims to make the country a hub for digital transformation in the region and beyond. The targets include increasing digital services, to make-up 10 per cent of Senegal's GDP by 2025, and creating 54 000 direct and 162 000 indirect jobs. The ICT sector in Senegal accounted for five per cent of GDP in 2017 (U.S International Trade Administration, 2020).

For connection to the outside world, SGO uses cellular, radio and microwave/fibre connections as described in more detail below.

5.11.1 Microwave/Fibre

A microwave link from site connects to two service providers (Orange SN and Free SN) in Mako/Tenkoto. Both companies operate independent fibre lines (WAN1/WAN2) which connect with the Atlantis 2 undersea cable connecting Europe, Africa and South America. Both lines operate with a reliability factor of about 95% each (the annual overall availability increases to 99.98% together). The line speed for both service providers is 50/50 Mbs up/down for Sabodala, 20/20 Mbs up/down for Massawa and 10/10 Mbs up/down for the Dakar office.

Over the life of SGO's operations, there has been only two events where WAN1 and WAN2 were down simultaneously (maximum downtime 5 h 17 min).

5.11.2 Cellular

Mobile voice communication (3G/4G) is provided mainly by Orange SN, with coverage over a large part of the Sabodala and Massawa Properties.

5.11.3 Radio

A VHF radio system covers the three production areas, namely Massawa, Sofia and Sabodala. The system used supports production activities, safety and security in addition to providing a connection to the charter aircraft.

5.12 Land Use and Conditions

In terms of terrestrial biodiversity, the Project is located in a largely natural, undisturbed environment. Latest field investigations have confirmed that the area is currently under pressure from existing anthropogenic land-use, including; grazing; wood collection; palm oil tree exploitation; and artisanal mining. The general health of the natural habitat is diverse and of high value, and therefore should be conserved. Several protected plant and animal species and Species of Special Concern (SSC) have been identified within the Project area, including the endangered Western Chimpanzee. Separate exclusion areas have been created on the properties to protect these sensitive ecosystems; hereafter referred to as 'Conservation Areas'.

The Sabodala and Kanoumba Mining Conventions, grant full surface rights to conduct exploration and mining activities on the Sabodala and Massawa properties. These conventions also confer the right to build the necessary mine enabling infrastructure on the properties, including but not limited to roads, general mine infrastructure, process plants, tailings facilities, run-of-mine (ROM) pads and waste rock dumps. Where communities are impacted by mine infrastructure, they are either relocated and/or compensated.

5.13 Data Verification

Information relating to the accuracy of the information discussed herein, is detailed in Section 12.0.

5.14 Comments on Section 5.0

Whilst there are concerns with the collection/validity of climatic data sets, there is nothing to suggest that the climate, land use permits and in-country infrastructure and resources that support the mine will negatively impact Endeavour's current and future operations in this region. Furthermore, the mine has been operating successfully at Sabodala since 2009.

5.15 Interpretations and Conclusions

Interpretations, conclusions and risks pertaining to Section 5.0 are presented in Section 25.0.

5.16 Recommendations

Recommendations pertaining to Section 5.0 are presented in Section 26.0

5.17 References

References cited in Section 5.0, are presented in Section 27.0

6.0 HISTORY

The Sabodala-Massawa Project is composed of two principal entities, Sabodala Gold Operations SA (SGO) and Massawa SA. Endeavour Mining plc acquired Teranga Gold Corporation on 3 February 2021 and became the owner-operator of the Sabodala-Massawa Project. Teranga published a NI 43-101 Technical Report on the Sabodala-Massawa Pre-feasibility Study in August 2020 with an effective date of 31 December 2019; hence anything before 2020 is considered as historical for the purpose of this Report.

6.1 Historical Ownership

Artisanal mining has long been one of the primary activities of the Malinke people in the region and there are some active artisanal mining areas in the Project Area. Sabodala was discovered in 1961 by a soil sampling programme carried out by Bureau de Recherches Géologiques et Minières (BRGM). Gold on the Massawa property was discovered by Randgold Resources Limited (Randgold) in 2004 using soil geochemistry.

The Sabodala-Massawa Project came into being on 4 March 2020 after Teranga completed the acquisition of a 90% interest in the Massawa Project from a wholly-owned subsidiary of Barrick Gold Corporation (Barrick) and its joint venture partner with Compagnie Sénégalaise de Transports Transatlantiques Afrique de l'Ouest SA (CSTTAO), with the Government of Senegal holding the remaining 10% interest.

6.1.1 Sabodala Property

A Soviet-Senegalese joint venture (JV) company held the Sabodala property between 1971 and 1973, and it was held between 1984 and 1994 by Société Minière de Sabodala-Paget Mining Ltd. JV Eximcor Afrique SA (Eximcor) held the Sabodala permit between 1997 and 1998.

Following Parliamentary approval of the new Senegal Mining Code on 24 November 2003, the Government of Senegal decided to accelerate development of the country's mineral resources. As part of this plan, a consortium of international companies, including Mineral Deposits Limited (MDL), were invited to tender for the exploration and exploitation of the Sabodala deposit.

MDL lodged a bid for Sabodala on 7 June 2004 and was advised by the Government of its selection on 25 October 2004. The bid was a joint venture between MDL's subsidiary Sabodala Mining Company SARL (SMC) (70%) and private Senegalese interests (30%). Exploration drilling began in June 2005. SMC subsequently exercised its option to acquire the remaining 30% minority interest for a mixture of cash and shares.

On 2 May 2007, MDL received Mining Concession status for Sabodala by decree of the President of Senegal. On 23 November 2010, Teranga completed the indirect acquisition of the Sabodala Mining Concession and a regional exploration package by way of a restructuring and demerger from MDL.

On 4 October 2013, Teranga completed the acquisition of Oromin Explorations Ltd. (Oromin) which held a 43.5% participating interest in a joint venture, the Oromin Joint Venture Group (OJVG). The OJVG held a 90% interest, along with 10% held by the Government of Senegal, in a 212.6 km^2 mining concession contiguous with the Sabodala Mining Concession awarded to the OJVG through the same bid process announced in October 2004.

On 15 January 2014, Teranga completed a USD 135 M gold stream transaction with Franco-Nevada Corporation (Franco Nevada) to fund its acquisition of the balance of the OJVG that it did not already own and retire half of Teranga's outstanding USD 60 M loan facility (the Gold Stream Transaction). Pursuant to the Gold Stream Transaction, Franco Nevada purchased a fixed annual amount of gold in the amount of 22 500 oz from SGO for the first six years of the agreement, and thereafter a right to 6% of future gold production.

Subsequent to its acquisition of the OJVG, Teranga executed the new Sabodala Mining Convention with the Government of Senegal which further expanded the Sabodala Mining Concession to 291.2 km^2 with the inclusion of the Gora gold project.

On 29 January 2016, a Presidential Decree extended the term of the Sabodala Mining Concession to 26 January 2025.

A summary of the Sabodala properties historical ownership is presented in Table 6.1.1.

Table 6.1.1 Sabodala Historical Ownership

Year	Company
1971 to 1973	Soviet-Senegal JV
1984 to 1994	Société Minière de Sabodala-Paget Mining Ltd.
1997 to 1998	JV Eximcor-Afrique SA
2004 to 2010	Mineral Deposits Limited (MDL)
2010 to 2021	Teranga

6.1.2 Massawa Property

AngloGold Ashanti Limited (AngloGold Ashanti) previously held the Kanoumering Permit (which covered part of the current Massawa property) and conducted exploration on the permit between December 1996 and January 2000.

Randgold, in a JV with Compagnie Sénégalaise de Transports Transatlantiques Afrique de l'Ouest SA (CSTTAO), held the Massawa property from 2002 until 2018.

Randgold and Barrick merged in 2018, with the new entity retaining the Barrick name.

On 4 March 2020, Teranga completed the acquisition of a 90% interest in the Massawa Project from a wholly-owned subsidiary of Barrick and its joint venture partner CSTTAO, with the Government of Senegal holding the remaining 10% interest.

A summary of the Massawa ownership is presented in Table 6.1.2.

Table 6.1.2 Massawa Historical Ownership

Year	Company
1996 to 2000	AngloGold Ashanti
2002 to 2018	Randgold Resources JV with CSTTAO
2019 to 2020	Barrick JV with CSTTAO
2020 to 2021	Teranga

6.2 Historical Exploration and Development

The following sections outline the exploration history of the Sabodala and Massawa Properties.

6.2.1 Sabodala

A soil sampling programme carried out by BRGM in 1961 resulted in the discovery of the Sabodala deposit, which had not been recognised by the local artisanal miners (probably due to the fine grained nature of the gold). A summary of the historical exploration and development of the Property is presented in Table 6.2.1.

Table 6.2.1 Sabodala Historical Exploration and Development Summary

Year	Company	Work Completed
1961	BRGM	Regional geology, soil sampling, pitting, and trenching in regional areas of artisanal mining.
1971 to 1973	Soviet-Senegal JV	513 m diamond drilling in 19 holes in quartz vein style mineralisation.
1973 to 1983	BRGM	5,856 m diamond drilling in 53 holes, 263 m in 30 percussion holes.
1984 to 1994	Société Minière de Sabodala-Paget Mining Ltd. JV	4,705 m reverse circulation drilling in 61 holes, 192 m diamond drilling in 4 holes. Constructed airstrip and exploration camp. Resource estimate by Continental Resource Management Pty Ltd. Metallurgical studies by ALS Ammtec. Rock mechanics studies by Barrett Fuller and Partners. Feasibility Study by Lycopodium.
1997 to 1998	Eximcor-Afrique SA	Granted exploitation permit. Constructed 200,000 t/a processing plant.
2004 to 2010	Mineral Deposits Limited (MDL)/OJVG	Geophysical airborne survey and IP ground survey. 188,580 m reverse circulation drilling in 1,439 holes, 245,959 m diamond drilling in 705 holes.
2010 to 2019	Teranga Gold/OJVG	Expanded exploitation permit. 117,099 m reverse circulation drilling in 953 holes, 301,034 m diamond drilling in 1,638 holes. Sabodala-Massawa Pre-feasibility study by Lycopodium.

6.2.1.1 Geophysical Surveys

In 2005, an airborne survey covering the area encompassing the Sabodala deposit was conducted by Worley Parsons GPX. In 2008, a dipole-dipole IP survey was completed over the property.

6.2.1.2 Soil, Termite Mound, Rock Chip and Bulk Leach Extractable Gold Geochemistry

A total of 3,689 soil samples were collected from a variety of prospects between 2005 and 2019 within the Sabodala MC. Results were contoured and the geochemical anomalies identified were followed up with prospecting, rock chip sampling and trenching. During this period, 405 rock chip samples were taken for analysis, both from within the soil geochemical anomalies and from additional prospecting beyond soil anomalies. Favourable results were followed-up with further detailed prospecting and trenching. In addition, 56 Bulk Leach Extractable Gold (BLEG) samples were collected from the Mining Concession as part of a broader regional scale BLEG programme.

6.2.1.3 Trenching and Geological Mapping

As surficial exposures are quite limited throughout much of the Mining Concession, Teranga and its predecessors utilised mechanised trenching as a method of extracting both geological and structural information prior to drilling programmes. Trenches were designed to cross regional and local structural trends that display any, or a combination of, soil, termite mound and rock chip geochemical anomalies. Trenches were mapped in detail and sampled at the base of each trench using a standard one metre sample interval. Between 2005 and 2019, 95 trenches covering 11,605 m of exposure were excavated, mapped and sampled.

6.2.1.4 Drilling

Historical Sabodala drilling is described in detail by AMC 2012, AMC 2013, RPA 2017 and Teranga 2020.

Historical exploration drilling in the Sabodala MC was a combination of diamond drill (DD) core, reverse circulation (RC), RC with DD tails (RC-DD, and rotary air blast (RAB) holes.

Between 2005 and 2011, MDL (and Teranga between October 2010 and December 2011) carried out a total of 1622 holes for 280 978 m, including 155 815 m of RC drilling and 125 163 m of DD drilling in the Sabodala MC, see Table 6.2.2 (AMC, 2012). The initial drilling between 2005 and 2007 was contracted out to RSG Global and thereafter in-house by SGO.

Table 6.2.2 Sabodala Drilling Programme by Deposit, 2005 to 2011

Deposit	Year	No. Holes	RC Metres	DD Metres	Total Metres
Sabodala	2005	165	11 760	5725	17 485
	2006	228	20 251	20 567	40 818
	2007	289	24 457	29 601	54 058
	2008	82	6258	8 562	14 820
	2011	26	4300	1 108	5408
	Sub-Total	*790*	*67 026*	*65 563*	*132 589*
Flat Extension (Sabodala)	2010	13	2542	4039	6581
	2011	50	8817	13 157	21 974
	Sub-Total	*63*	*11 359*	*17 196*	*28 555*
Niakafiri	2005	45	3646	1149	4795
	2006	69	6268	3912	10 180
	2007	46	3420	2786	6206
	Sub-Total	*160*	*13 334*	*7847*	*21 181*
Niakafiri West	2007	22	1385	-	1385
	2008	40	5380	740	6120
	Sub-Total	*62*	*6765*	*740*	*7505*
Dinkokhono	2007	43	3540	-	3540
	2008	26	2847	2142	4989
	Sub-Total	*62*	*6387*	*2142*	*8529*
Masato	2007	5	495	711	1206
	2009	2	-	363	363
	2010	1	-	188	188
	2011	87	15731	19 768	35499
	Sub-Total	*95*	*16226*	*21 030*	*37256*
Sutuba	2006	39	2959	1013	3972
	207	33	2580	18	2598
	2008	50	3976	1101	5077
	2009	1	-	100	100
	2010	48	3001	392	3393
	Sub-Total	*171*	*12 516*	*2624*	*15 140*
Falombu	2009	4	638	-	638
Dambakhoto Sterilisation	2009	2	270	-	270
	2010	2	300	-	300
	2010	1	300	-	300
	Sub-Total	*5*	*870*	-	*870*
Soukhoto	2007	32	2859	327	3186
	2010	8	-	951	951
	Sub-Total	*62*	*2859*	*1278*	*4137*

Deposit	Year	No. Holes	RC	DD	Total
			Metres	Metres	Metres
Ayoub's Extension	2010	11	1098	-	1098
	2011	92	10 453	5543	15 996
	Sub-Total	*103*	*11 551*	*5543*	*17 094*
Sambaya Hill	2007	42	5 885	-	5885
	2010	1	399	-	399
	2011	2	-	1200	1200
	Sub-Total	*45*	*6 284*	*1200*	*7484*
TOTAL		**1622**	**155 815**	**125 163**	**280 978**

In addition, MDL drilled 4796 RAB holes for 109 083 m, 119 RC holes for 13 982 m, one RC-DD hole for 123 m and 45 DD holes for 5130 m in the regional land package (AMC, 2012).

Between 2011 and 2016, Teranga drilled some 4591 DD, RC-DD and RC holes for 807 635 m in Sabodala, of which the large majority were conducted on the deposits of Sabodala, Gora, Niakafiri East, Masato and Golouma, see Table 6.2.3.

Table 6.2.3 Sabodala Drilling Programme by Deposit, 2011 to 2016

Deposit	Date Of last holes drilled	RC		RC-DDH		DDH		Total	
		Holes (No)	Metres	Holes (No)	Metres	Holes (No)	Metres	Holes (No)	Metres
Sabodala	30 Apr 2013	658	66 401	579	170 900	191	42 997	1428	280 298
Gora	21 Jul 2012	75	8844	149	27 719	35	3 685	259	40 248
Niakafiri East	19 Apr 2017	195	19 755	69	14 568	150	24 286	414	58 609
Masato	6 Nov 2014	355	49 607	19	5614	214	42 674	588	97 895
Golouma	16 Sept 2013	239	39 274	13	4897	354	87 463	606	131 634
Kerekounda	16 Sept 2013	105	18 746			89	25 786	194	44 532
Niakafiri West	28 Apr 2017	80	10 727	5	1933	64	8135	149	20 795
Soukhoto	June 2010	8	834	1	221	4	532	13	1587
Diadiako	31 Dec 2011	32	4624	5	1564	9	1973	46	8161
Kinemba	17 Apr 2012	25	4 141			8	1536	33	5677
Goumbati West Kobokoto	27 Mar 2017	52	7272	5	571	211	21 773	268	29 616
Golouma North	17 Aug 2016					66	8045	66	8045
Kourouloulou	17 Apr 2012	51	7442	13	3767	108	16 989	172	28 198
Kouroundi	17 Apr 2012					14	2005	14	2005
Koutouniokollo	17 Apr 2012	9	1255			28	4423	37	5678
Maki Medina	5 Aug 2015	73	9665			75	10 507	148	20 172
Mamasato	17 Apr 2012	8	1446			42	7587	50	9033
Marougou	9 Jul 2016	61	12 191			19	2202	80	14 393
Sekoto	17 Apr 2012	14	1761			12	1303	26	3064

Between 2016 and 2019, Teranga completed 707 DD, RC, and RAB holes for a total of 55,279 m on the Sabodala property, with a focus on the Niakafiri and Kobokoto/Goumbati West deposits (Table 6.2.4). Step-out and infill diamond drilling was undertaken to further delineate and confirm resources, as well as attain better structural information for each deposit. Additional diamond drilling was conducted at Golouma North to enable a maiden resource estimation and at Maleko, to test mineralisation extents at this previously undrilled prospect. A RAB sterilisation programme was conducted over the planned dump and stockpile footprint areas at Golouma West and Golouma South. A separate RAB exploration evaluation programme was undertaken at Goumbati West (Zone C) and Niakafiri.

DD, RC, RAB, soil and grab samples were sent for gold analysis to the on-site laboratory operated by SGS Minerals as its primary laboratory for atomic absorption analyses (AAS).

Table 6.2.4 Sabodala Drilling Programme by Deposit, 2016 to 2019

Deposit	Date of last hole drilled	RC		RC-DD		DD		RAB		Total	
		Holes (No.)	Metres	Holes (No.)	Metres	Holes (No.)	Metres	Holes (No.)	Metres	Holes (No.)	Metres
Dendifa	27 Oct 2017	-	-	-	-	2	126	-	-	2	126
Golouma	16 Nov 2016	-	-	-	-	42	5019	-	-	42	5019
Goumbati East	8 Mar 2016	-	-	-	-	10	900	-	-	10	900
Kobokoto / Goumbati West	14 Dec 2019	82	2778	5	571	187	17 357	204	5964	291	27 200
Maki Medina	20 May 2019	17	612	-	-	-	-	-	-	17	612
Maleko	28 Jun 2016	-	-	-	-	8	1200	-	-	8	1200
Niakafiri Main/ Dinkonkono	6 July 2017	-	-	5	995	73	11 554	-	-	78	9635
Niakafiri West	19 Dec 2017	5	342	-	-	67	7861	-	-	72	8116
Total		**104**	**3732**	**10**	**1566**	**389**	**44 017**	**204**	**5964**	**1712**	**52 808**

6.2.2 Massawa

AngloGold Ashanti Limited (AngloGold Ashanti) held the Kanoumering Permit (a precursor to a portion of the Kanoumba Permit) and conducted exploration between December 1996 and January 2000. They undertook a multiphase research programme involving regional geochemistry, detailed box media sampling and mapping, airborne survey and multipurpose drilling over selected targets. Results of soil sampling showed that 37% of the samples collected returned grades greater than 500 ppb Au and most of the anomalous samples were located in the vicinity of the Tinkoto pluton. Numerous other gold anomalies were found within tuffs and andesites occasionally associated with the linear trends identified by Landsat imagery. Detailed soil sampling was carried out over 12 identified targets, of which four were selected for more focussed work where detailed soil sampling revealed some encouraging gold-in-soil anomalies over areas KA, KB, KC, and KO. These areas were followed up with RAB and DD. A total of 21 DD holes for 3,451 m were drilled, results from which included 10.9 m at 1.96 g.t Au from 0 m in KB99004D, 18 m at 1.23 g/t Au from 56 m in KA98001D, and 51.4 m at 0.7 g/t Au from 40 m in KA98003D.

Randgold discovered the Massawa gold deposit on the Kounemba Permit in early 2004 utilising soil surveying methods. The ground was selected based on a mineralised structure that was interpreted from Landsat imagery to extend south from the Sabodala gold deposit and Niamia Permit in the north, where thick sequences of deformed volcaniclastics including andesitic lithic tuff were found. The regional soil sampling programme at 1,000 m by 100 m spacing took place between late 2003 and early 2004. A total of eleven targets were identified, among which seven were ranked as a priority for detailed work.

Due to the low tenor of the Massawa anomaly, it was originally selected as a secondary target. A soil grid at Massawa was completed in mid-2005, which identified a 3.5 km long, 100 m to 400 m wide gold-in-soil anomaly at greater than 50 ppb Au. Subsequent soil sampling in 2008 extended the anomaly to the south and north by a further 3.4 km for a total strike length of 6.2 km.

The first Massawa trench was positioned over the anomaly in November 2006. MWTR001 was located on the southwest part of the soil anomaly and returned an encouraging result of 10.9 m at 2.03 g/t Au which was followed up by exploratory RAB drilling. Positive results from the RAB holes resulted in further diamond drilling campaigns.

The southern portion of the Massawa target is within the original Kanoumering Permit, which was taken over from AngloGold Ashanti in 2002. This area had been subject to a considerable amount of exploration work involving reconnaissance and soil sampling and mapping, airborne survey and drilling over selected targets, but no drilling over the Massawa anomaly.

In 2010, the Kounemba and Kanoumering exploration permits were merged to form the new Kanoumba Permit which covers the Massawa deposits.

Massawa exploration was predominately undertaken by Randgold, see Table 6.2.5. Barrick undertook some limited drilling and trenching in Massawa in the first half of 2019.

Table 6.2.5 Massawa Project Drilling and Trenching Summary, Randgold 2004 to 2018

Deposit	RC		DD		Trenches	
	Holes(No.)	Metres	Holes (No.)	Metres	Holes (No.)	Metres
Massawa CZ	2205	199 308	198	43 537	22	2133
Massawa NZ1	139	14 842	85	18 093	8	751
Massawa NZ2	383	22 655	169	37 936	5	208
Sofia Main	126	17 308	44	11 049	49	4626
Sofia North	141	15 838	11	2354	19	1711
Delya Main	111	9589	21	2205	28	1414
Bambarya	7	588	9	1766	11	1008
Tina	18	1470	-	-	5	447
Total	**3130**	**281 568**	**537**	**116 940**	**147**	**12 298**

The following tables summarise the historical exploration undertaken on the Massawa Properties major deposits; namely Massawa Central Zone (CZ), Massawa Northern Zone (NZ), Sophia, Delya, Tina and Bambaraya by Randgold.

6.2.2.1 Massawa CZ and NZ

The exploration history of Massawa CZ and NZ is summarised in Table 6.2.6 following.

Table 6.2.6 Massawa CZ and NZ Historical Exploration and Development Summary

Year	Work Programme
2004	Regional soil programme returned anomalous results.
2005	Soil sampling 200 m by 50 m returned a 3.5 km long, 0.1 km to 0.4 km wide anomaly at >50 ppb Au.
2006	Field validation of soil anomalies and rock chip sampling. The first trench MWTR001 returned 10.9 m at 2.03 g/t Au.
2007	Geological mapping and litho-sampling over entire Massawa target. RAB Phase 1: 400 m spaced lines, 95 holes for 3291 m confirmed bedrock mineralisation over 2.8 km. Second phase of trenching (three trenches completed). DD Phase 1: 400 m spaced lines, seven holes (MWDDH001 to MWDDH 007) for 1645 m. Results included: MWDDH002 – 12.16 m at 2.93 g/t Au from 135.94 m; MWDDH003 – 9.3 m at 3.79 g/t Au from 78 m, 5.96 m at 5.08 g/t Au from 94.04 m; MWDDH006 – 16.13 m at 4.15 g/t Au from 132.45 m; MWDDH007- 10.75 m at 9.08 g/t Au from 159 m.
2008	Extended soil grid to south and north, mapping, and litho-sampling: • Southern extension: 379 soil samples. • Northern extension: 293 soil samples extended the soil anomaly from 3.5 km to 6.2 km long. Infill RAB: line spacing closed to 200 m, 65 holes for 2399 m (MWRAB096 to MWRAB160). Southern extension: 146 holes for 5,175 m (MWRAB160 to MWRAB306). Northern extension: 67 holes for 2,583 m (MWRAB307 to MWRAB373). DD Phase 2: 36 holes (MWDDH008 to 043) for 6,395 m, completed over 7.7 km comprising deep and shallow drill holes.
2009	DD Phase 3: 51 holes (MWDDH044 to MWDDH094) for 9,844 m. 100 m by 50 m DDH spacing and exploration drilling to the north, update of Mineral Resource estimates using MWDDH001 to MWDDH081. DD: 193 holes for 48,624 m at 50 m by 50 m spacing completed into two phases: • Phase 1 testing the geological continuity. • Phase 2 investigating at deeper mineralisation from first phase and comprising exploration geotechnical and density drill holes. RC drilling Phase 1: 84 holes for 6272 m (MWRC001 to MWRC090) testing oxide material at shallower depth.
2010	Deep DD Phase 1: Eight holes (MWDHH452 to MWDDH455 and MWDDH459 to MWDDH462) for 6,099 m at 300 m by 700 m spacing, testing underground potential. Step-out drilling includes four holes for 1605 m testing the mineralisation continuity along strike in north of and at Massawa South. Infill deep DD Phase 2: Six holes totalling 3,615 m to confirm Phase 1 drill programme. Twin DD: Six DD twin holes for 1,369 m, to test the mineralisation variability in the CZ. RC drilling Phase 2: 104 holes for 7,169 m subdivided in two phases. • 78 holes (5,096 m) to confirm mineralisation continuity at surface. • 26 holes (2,073 m) twinning drill holes that displayed poor recovery in oxide material.
2013	Pre-feasibility: RC grade control (GC) drilling: 640 holes for 34,542 m at 5 m by 5 m spacing, testing continuity of high-grade quartz-stibnite-Au veins in the CZ. Pre-feasibility: PQ (85 mm) DD twin drilling: Five representative RCGC holes in the CZ were twinned by five PQ holes (MWDDH510 to MWDDH514) to investigate sample size bias. Pre-feasibility RC: RC GC drilling - 217 holes totalling 8,370 m in NZ2 (10 m by 10 m spacing).
2014	A CZ trenching programme aimed to better understand the orientation of the high-grade quartz-stibnite-Au veins and improve geological model across the mineralisation. 16 trenches totalling 1,131 m. CZ Twin Holes: Six RC holes were twinned with six DD holes to investigate sample size bias and assay techniques (fire assay vs LeachWELL vs screen fire).
2015	Pre-feasibility RC drilling in CZ: Drill orientation drilling (10 m by 15 m spacing) over 60 m strike of CZ and down to a vertical depth of 100 m, to determine optimum drill spacing for drill out of the CZ. NZ2 Sulphide RC Drilling: 14 holes for 1,495 m drilled over two fences at 10 m by 15 m spacing to test down-dip continuity of high-grade mineralisation. CZ Remodel: Remodel of CZ separating phase 1 and phase 2 domains.
2016	Pre-feasibility RC GC Drilling in the CZ: Four GC grids (Blocks A to D) were completed along the strike of the CZ. Grid spacing of 10 m by 15 m, testing mineralisation down to a vertical depth of 100 m, and included 128 holes for 11 583 m. Aims of the programme: • To test the 2015 geological model. • Provide material for metallurgical and geochemical testwork.

Table 6.2.6 Massawa CZ and NZ Historical Exploration and Development Summary

Year	Work Programme
	Trench Programme: 10 trenches (817.5 m) excavated across the strike length of the deposit to trace the surface expression of the mineralisation and to test the revised structural model. NZ Oxide RC Drilling: 61 holes for 2,619 m across the NZ to test oxide mineralisation in zones not tested by trenches (>4 m thick laterite cover).
2017	CZ Pre-feasibility: Trench programme at CZ: Five trenches (290.75 m) excavated at CZ across the strike length of the deposit to trace the surface expression of the mineralisation and to test the revised structural model. CZ Pre-feasibility: RC drilling at CZ: 1 GC grid (Block G); 86 holes completed for 8,648 m and spacing 15 m by 10 m. NZ Pre-feasibility: RC drilling at NZ1: Two GC grids (Block F and H) were completed along the strike of NZ1. Grid spacing of 15 m by 10 m and included 138 holes for 14,706 m. Randgold reported results of a Pre-feasibility study in an NI 43-101 report dated 12 May 2017 (Randgold, 2017). CZ Feasibility: RC drilling at CZ: Four GC grid for pilot plant (PP1, PP2, PP3, PP4) completed along the strike of CZ within USD 1,000 pit shell. Grid spacing of 15 m x 10 m, testing mineralisation down to a vertical depth of 100 m. The aims were: • To test the geological and mineralisation model. • Provide material for metallurgical and geochemical testwork. This programme included 293 holes for 40,303 m. Trench Programme at NZ1: one trench excavated along the strike at Block H, NZ1 to better understand the control and orientations of the high grade intersected during the RC drilling at Block H. NZ Pre-feasibility: RC GC drilling at NZ2: 64 holes completed totalling 7,224 m at 10 m by 5 m spacing for two blocks (Block I and Block J), testing continuity of high grade and mineralisation variability in NZ2. NZ Pre-feasibility: Phase 2 metallurgical test DD holes at NZ2: six holes completed for 942 m. CZ Feasibility: DD Phase 1 Camp 20: Metallurgical test + Twins Holes: six DD completed for 942 m over block G. NZ Pre-feasibility: Camp 27-29: Two DD holes completed totalling 111 m for metallurgical test work. CZ Feasibility: RC Drilling at CZ: Two GC grids (Block K, Block L) completed along the strike of CZ within USD 1,000 pit shell. Grid spacing of 15 m by 10 m, to a vertical depth of 100 m, and included 59 holes for 7,735 m.
2018	CZ Feasibility: RC GC drilling: 749 holes totalling 75,538 m completed along the strike of CZ within USD 1,000 pit shell with different grid spacing from south to the north: 30 m x 10 m; 15 m by 10 m; 20 m by 10 m; 30 m by 20 m. The aims were: • To test and confirm the geology and ore model. • Provide material for metallurgical and geochemical test work. CZ Feasibility: DD Phase 2 Camp 20: Metallurgical test: four DD holes completed for 679 m over Block A, Block C, and PP3. Trench Programme at CZ: Three trenches excavated at CZ across the strike length of the deposit to trace the surface expression of the mineralisation and to confirm the revised model. CZ Feasibility: RC GC drilling: CZFW Phase 1 drilling to test the potential in the eastern part (FW mineralised zones); 25 holes spacing 45 m by 10 m for a total depth of 1,789 m. CZ Feasibility: RC GC drilling: CZFW Phase 2 drilling to confirm the potential in the eastern part (FW mineralised zones); 50 holes spacing 15 m by 10 m over 240 m strike for a total depth of 2,986 m. RC Deep Drilling Programme over CZ: To test potential (over 8 g/t Au) at 20 m RL, beyond the USD 1,000 pit shell. seven holes completed for 2,017.5 m Sterilization: Waste Dump: Air core programme: 25 holes for 757 m completed to sterilise the eastern part of the USD 1,000 pit shell.

6.2.2.2 Sophia

Other than the regional soil geochemistry from AngloGold Ashanti, all of the work at Sofia was completed by Randgold over several years of exploration, as summarised in Table 6.2.7. Exploration between 2004 and 2015 is described for both Sofia Main and Sofia North.

Table 6.2.7 Sophia Historical Exploration and Development Summary

Year	Work Programme
2004	A soil survey programme was undertaken by Randgold resulting in anomalous zones defined by background of 30 ppb Au. A total of 25 pits and eight trenches were completed over this target with encouraging results.
2005	Results of the five trenches and eight DD holes performed over the target at a 400 m space lines outlined a low-grade heterogeneous mineralisation varying between 44 m at 2.0 g/t Au from 51 m in SFDDH002 and 5 m at 0.4 g/t Au from 64.42 m in SFDDH007. Two phases of DD were completed during this field campaign of five holes each (SFDDH001 to SFDDH005 totalling 1,007.4 m and SFDDH006 to SFDDH008 totalling 895.5 m).
2006	During the Phase 2 DD programme, a total of three DD holes under trenches were completed: SFDDH006 to SFT014, SFDDH007 to SFT011, and SFDDH008 to SFT013.
2010	An intensive RC exploration drilling programme with 4,900 m drilled at 100 m by 200 m drill spacing. Drilling included infill lines and drilling underneath previous RAB holes or trenches.
Sofia Main	
2015	Sofia Main RC drill programme: Five holes totalling 884 m, targeting the high-grade mineralisation in sulphide material. The high-grade zone was extended to a 350 m strike length at Sofia Main. Sofia Main Trenching Programme: Aimed to express the mineralisation at surface and to understand structural control of the high-grade gold. A total of four trenches for 561.7 m were excavated. Sofia Main RC drilling: Eight holes drilled to extend the high-grade panel at 80 RL up to 650 m strike.
2016	Trenching Programme: Aimed to better express the mineralisation at surface and to understand structural control of the high-grade gold. A total of 30 trenches, at 50 m by 50 m spacing, for 2529.25 m were excavated. Seven DD holes to test the high-grade mineralisation at depth (0 RL). No success and model review for additional drilling. Exploration DD: 18 holes (SFDDH016 to SFDDH033) totalling 4,500 m to investigate revised geological model of flat high-grade mineralisation at 80 RL. Infill RC drilling: 53 holes for 8,062 m at 40 m by 40 m spacing for Indicated Mineral Resource estimation.
2017	Exploration DD: Eight holes (SFDDH034 to SFDDH041) totalling 2,191 m to test high-grade mineralisation at depth and extension. Step-out and Infill RC Drilling: 25 holes totalling 3508 m divided into step-out drilling at 40 m by 40 m spacing for testing the extension north and south of the Indicated Mineral Resource and 20 m by 20 m infill drilling (three holes for 1,369 m). Metallurgical Programme: 19 DD holes (SFMET005 to SFMET023) totalling 1,952 m. Provide material for metallurgical testwork. Re-drilling RC holes: Seven holes for 1016 m after survey programme. Resource and Infill DD: Seven DD holes (SFDDH042 to SFDDH047 and SFDDH051) totalling 1538 m. Provide material for metallurgical testwork: Two DD holes for 65 m and 40 m.
2018	Provide material for metallurgical test work: One DD hole for 45 m. Resource Drilling: One DD hole for 130 m.
Sofia North	
2015	Trenching Programme: Aimed to express the mineralisation at surface of the north-south branch of the Sofia structure. A total of two trenches for 385.08 m were excavated.
2016	Trenching Programme: Aimed to test the continuity of the mineralisation at surface. A total of three trenches for 153.8 m were excavated.
2017	Infill Trenching Programme: Aimed to express the continuity of the mineralisation at surface and to understand structural control. A total of eight trenches for 667.5 m were excavated. RC drilling: 95 holes totalling 1148 m comprising: • A grid spacing of 30 m by 30 m infill drilling designed over 600 m on the +2 g/t Au to 5 g/t Au area, testing mineralisation down to a vertical depth of 100 m, and included 50 holes totalling 6508 m for potential conversion to Indicated Mineral Resources. • Step-out drilling at the northern and southern parts of 30 m by 30 m grid to test continuity of the mineralisation with 45 holes for 5,360 m. DD Programme: Six holes totalling 1,154 m comprising: • Two twin holes (SFDDH048 and SFDDH049) for 310 m to characterise the mineralisation and provide material for metallurgical testwork. • One exploration hole for 230 m to test the mineralisation at depth. • Three resource holes for 614 m.

Table 6.2.7 Sophia Historical Exploration and Development Summary

Year	Work Programme
	Infill RC Drilling: two holes for 210 m for testing mineralisation under SFTR021. Metallurgical Programme: eight holes totalling 515.5 m to provide material for metallurgical testwork.
2018	Fourteen RC holes for 1048 m completed targeting potential additional indicated resources. Over 2 g/t Au mineralisation confirmed within the 600 m Indicated Resource area. Mineralisation confirmed in the north for 3 koz potential. Lower grade than expected intersected in the south.

6.2.2.3 Delya

Delya was discovered in early 2004 by a regional soil survey. Exploration carried out at Delya is summarised in Table 6.2.8.

Table 6.2.8 Delya Historical Exploration and Development Summary

Year	Work Programme
2004	Kounemba Regional Soil Programme: Discovery of the Delya soil anomaly, anomalous points >100 ppb Au on regional lines (100 m by 100 m) over 4 km.
2005	Soil sampling 200 m by 50 m. Defined a +1.8 km long, 0.1 km wide anomaly at >100 ppb Au trending N030°.
2006	Mapping and litho-sampling. Pitting (26) and first trenching (2) completed. Follow-up trenching (eight trenches) delineated two parallel bedrock mineralised zones over at least 1,000 m. Additional soil grid to south with mapping and litho-sampling extended the soil anomaly from 3 km to 6 km long. DD Phase1: Five holes (DLDDH001 to DLDDH 005) completed at 100 m to 200 m spacing for 966.84 m over 1 km strike length. Results included: DLDH001 - 9.83 m at 1.80 g/t Au, DLDH002 - 12.44 m at 5.07 g/t Au, including 7.00 m at 8.19 g/t Au; DLDH003 - 3.00 m at 1.80 g/t Au, and DLDH004 - 3.8 m at 4.80 g/t Au. First trench (DLTR011) testing strong soil anomalous values to the south.
2007	RAB Phase 1: Two heel to toe RAB lines, 35 holes (DLRAB001 to DLRAB035) for 959 m allowed extending to the north and south the above-mentioned 1 km zone of mineralisation within the + 6 km soil anomaly. DD Phase 2: DLDDH006 completed underneath the DLRAB030 (21 m at 4.87 g/t Au) to the southern extension. RAB Phase 2: Four heel to toe RAB lines at 400 m to 600 m spacing, 35 holes (DLRAB36 to DLRAB070) for 1,401 m completed to test the southern soil anomaly.
2010	Phase 1 Exploration RC Drilling Programme: 32 holes (DLRC001 to DLRC032) completed at 100 m drill spacing for 2,671 m.
2017	Phase 2 Infill RC Drilling Programme: 27 holes (DLRC033 to DLRC059) drilled at 50 m by 50 m spacing for 2,822 m over a 1 km strike length of the main Delya system to understand the potential and increase the resolution of the geologic model. Twin Holes: One RC hole DLRC013 was twinned with one DDH (DLDDH007) with the aim to ascertain the geology and the controls of the high-grade mineralisation. Metallurgical Drilling: One DD hole (DLDDH008) drilled for bacterial oxidation batch amenability tests (BIOX BAT). Phase 1 Scout Step-Out RC Drilling Programme: Aimed at testing southern strike extension of the Delya Main mineralised system. 17 RC holes (DLRC059 to DLRC090) for 2011 m completed at Delya South for strike extension of the Delya Main system. Shallow Oxide DD Programme: Ten shallow DD holes for 418.5 m at 100 m spacing completed in the main zone for oxide density measurements. RC Conversion Drilling Programme: 57 holes (DLRC091 to DLRC148) drilled at 25 m by 20 m spacing for 4,714 m over a 1 km strike length for Indicated Mineral Resource estimation. Delya Main Trenching Programme: aimed to confirm both the grade and geometry of the geology at surface of the Main Ore Zone (MOZ) and Hanging wall Ore Zone (HWOZ) mineralisation. A total of 22 trenches for 917.10 m were excavated at 50 m spacing.
2018	Phased Step-out Trenching Programme: Aimed at testing strike extension of the Delya Main mineralised system toward the south and north: • Delya South: 13 trenches for 928.10 m at 100 m spacing brought the surface resolution of the Delya shear extension to 100 m spacing over an 800 m strike length. • Delya North: 12 trenches for 897.8 m at 100 m to 200 m spacing over 1.4 km long soil anomaly +50 ppb Au. Trenching confirmed the northern continuity of the Delya HW lode and defined the locality of the sub-parallel NE striking main Delya shear located further east.

6.2.2.4 *Tina*

Tina is located in the Bakan Corridor. Exploration carried out at Tina is summarised in Table 6.2.9.

Table 6.2.9 Tina Historical Exploration and Development Summary

Year	Work Programme
2007	Geological mapping. Soil sampling with 1219 samples collected. Extensive litho-sampling and follow-up trenches (TNTR001, TNTR002, TNTR003, and TNTR004) for 336.7 m revealed mineralisation associated with deformed (semi-ductile to brittle) and altered felsic intrusive: TNTR002: 32 m at 1.15 g/t Au, and TNTR003: 32 m at 1.22 g/t Au. Additional three trenches (TNTR005, TNTR006, and TNTR007) completed for 235 m to identify the shape of the mineralised felsic intrusive defined from litho-sampling and previous trenching.
2008	Soil sampling extension of the Tina soil anomaly to the south: 265 samples collected.
2011	Exploration RC Drilling: Eighteen RC holes (TNRC001 to TNRC018) for 1470 m completed over a 700 m strike length at 100 m to 200 m spacing to test underneath a shear hosted gold mineralisation associated with a felsic intrusive.
2018	Thirty-four trenches for 534.2 m testing over 275 m NE strike of outcropping mineralisation and potential eastern branch. Results confirm NNE orientation. Litho-sampling and mapping confirm geological setting. Eight RC holes for 1,204 m completed testing over a 275 m NE potential. Results include: 52 m at 2.23 g/t Au from 68 m (TNRC023A) and 43 m at 2.02 g/t Au from 84 m (TNRC020). Confirms NNE orientation. Two trenches for 300 m completed to gain structural measurements and observations to the geological setting to mineralisation. NNE and NNW orientations to mineralisation observed – controls relating to vein intensity, disseminated sulphides, proximity, and location of granodiorite intrusive rocks.

6.2.2.5 *Bambaraya*

The Bambaraya deposit is located in the north corner of the Massawa Mining License proximal to the north-south Sabodala Shear Corridor approximately 18 km to the north of the Sofia deposit. Exploration carried out at Bambaraya is summarised in Table 6.2.10.

Table 6.2.10 Bambaraya Historical Exploration Summary

Year	Work Programme
2004	Soil sampling on a 200 m by 50 m grid (837 samples) defined three anomalous areas (> 100 ppb Au) zone east, zone south, and zone west (QT zone). Three historical trenches (BBTR001, BBTR002, and BBTR003) for 64 m previously dug in the early 1970s across the vein-ridge, were re-opened, deepened, and re-sampled. DD: Five holes (BBDDH001 to BBDDH005) for 1,001 m drilled across the +1,800 m long +100 ppb Au soil anomaly and anomalous trenches.
2005	Mapping and target assessment: Selective sampling carried out over old trenches aimed to differentiate gold distribution from ferruginous and fresh QT. Three trenches: BBTR004 to BBTR006 for 282.2 m completed throughout the target with the aim to assist in geological mapping and assess the QT zone and grade continuity. Soil was extended to the south of the target with 129 samples collected. Two trenches: BBTR007 and BBTR008 completed for 199.5 m each: BBTR007 100 m north of Trench BBT004 (6 m at 1.76 g/t Au, 4 m at 5.48 g/t Au, and 12 m at 4.06 g/t Au) and BBTR008 100 m south of Trench BBT006.
2006	Trenching: BBTR009, 150 m in length. Pitting: 14 pits. Infill Trenching: Four trenches (BBTR010, BBTR011, BBTR012, BBTR013) for 542 m aimed at accurately defining the geometry of the different mineralisation sets and investigating for lateral extension of the mineralisation. Validation of anomalous soils undertaken in the NE part of the grid.

Table 6.2.10 Bambaraya Historical Exploration Summary

Year	Work Programme
	Intensive litho-sampling from the few outcrops confirms the latest values in a N140° massive quartz vein (250 m by 5 m) with anomalous values ranging from 0.69 g/t Au up to 105 g/t Au. Further to the north, a stream bed saprolite of felsic intrusive with N130° quartz veins assayed 38.6 g/t Au.
2007	Two trenches (BBNTR001 and BBNTR002) for 99 m to the NE of the target completed over a N130° oriented and mineralised felsic intrusive and over N350° quartz vein bearing visible gold. Four DD holes (BBDDH006 to BBDDH009) totalling 761.93 m were completed, aiming to investigate the defined three to four sub-parallel zones of mineralisation at surface, over a strike length of 800 m.
2010	Seven RC drill holes (BBRC003 to BBRC005, BBRC007 to BBRC010) for 588 m were drilled under or between existing DD holes in an attempt to confirm the main mineralised zone.

In the first half of 2019, Barrick excavated seven trenches for 883 m at Bakan and two trenches for 188 m at Thianga. They also drilled 920 AC and RC holes for 24 790 m in the Massawa Licence, see Table 6.2.11. The majority of the work was in the Sofia South deposit for resource delineation purposes.

Table 6.2.11 Barrick 2019 Drilling Summary

Deposit/Prospect	AC		RC	
	No. Holes	Metres	No. Holes	Metres
Makana 2	181	4107	29	1653
Matiba	111	2626	4	162
Nyna	-	-	3	456
Sofia South	445	10 544	-	-
Thianga	56	1598	1	30
Tiguda	-	-	85	2976
Tiwana	-	-	5	638
Total	**793**	**18 875**	**127**	**5915**

6.3 Historical Drilling and Sampling

6.3.1 Teranga (Sabodala Mining Company)

Teranga/Sabodala Mining Company (SMC) developed and documented an in-house Exploration Standard Operating Procedure (SOP) to standardise work practices. They incorporated and referred to other SOPs for safety, environment and community relations. The Exploration SOP was regularly reviewed and updated to accommodate changes in best practices, new techniques and/or legislation changed.

The SOP covered mapping; soil sampling; pit excavation, mapping and sampling; trench excavation, mapping and sampling; drill programme planning, naming conventions, drill pad establishment, drilling (RAB, AC, RC and DD), sampling, logging and site rehabilitation. Sample preparation methodologies were also set out. Sample security measures, chain of custody controls, QA/QC insertion rates, and data recording and management were also stipulated.

Further details of the exploration procedures can be found in the Teranga 2020 NI 43-101 Technical Report.

6.3.2 Randgold

Randgold conducted the exploration on the Massawa property in-house, under the supervision of geologists. Trenching, drilling (RC and DD) and sampling procedures followed Randgold standard operating procedures (SOP). Details of the exploration methodologies (i.e., drilling, surveying, sampling, logging, etc) can be found in the Barrick 2019 NI 43-101 Technical Report.

A full external audit of the sampling methods and procedures was undertaken by Roscoe Postle Associates Inc. (RPA) in 2017. RPA did not identify any material issues. Two high priority issues were identified; the collection of bulk densities which did not follow Randgold standard operating procedures (SOP) from other sites, and laboratory certification and selection with regard to LeachWELL analysis. Remedial actions were taken.

6.3.3 Barrick

The relatively limited work conducted by Barrick in the first half of 2019 on the Massawa property was conducted following the previously established Randgold procedures. Please see above for further details.

6.4 Past Production

6.4.1 Sabodala

Historical mining within the Sabodala Mining Licence was undertaken by Eximcor in 1997 and 1998. They mined and stockpiled 80 000 t from the Kereounda deposit, of which 38 000 t at a grade of 4.4 g/t Au were processed, producing approximately 4400 oz of Au (Fall, 2002).

Open pit mining commenced in the Sabodala pit in 2009. Multiple open pits have been mined subsequently, as presented in Table 6.4.1. Open pit mining is currently active at Sabodala with Maki Medina currently suspended due to production issues.

Table 6.4.1 Sabodala MC Open Pit

Start Mining	End Mining	Open Pit
Phase 1 2009 Phase 2 2018	Phase 1 June 2015 Ongoing	Sabodala
2014	Phase 1 March 2016 Phase 2 January 2016	Masato
2015	2018	Gora
2016	2018	Golouma South
2016	2019	Kerekounda
2017	February 2021	Golouma West
2018	2019	Koulouqwinde
2019	Currently Suspended	Maki Medina

Open pit production in the Sabodala MC to date is summarised in Table 6.4.2 following.

Table 6.4.2 Sabodala Gold Production

Year	Tonnes Milled (kt)	Head Grade (Au g/t)	Recovery (%)	Gold Produced (koz)
2009	1 806	3.12	92%	167
2010	2 285	2.12	91%	141
2011	2 444	1.87	90%	131
2012	2 439	3.08	89%	214
2013	3 152	2.24	91%	207
2014	3 622	2.03	90%	212
2015	3 421	1.79	92%	182
2016	4 025	1.81	93%	217
2017	4 221	1.87	92%	233
2018	4 069	2.03	92%	245
2019	4 161	1.98	91%	241
2020	3 340	1.55	89%	166
2021	255	2.03	90%	17

6.4.2 Massawa

Open pit mining commenced on the Massawa ML in 2020 and in the Sofia Main/North pits in 2021. Open pit production to date is summarised in Table 6.4.3.

Table 6.4.3 Massawa Gold Production

Year	Tonnes Milled (kt)	Head Grade (Au g/t)	Recovery (%)	Gold Produced (koz)
2020	783	2.51	89%	62
2021	4 000	2.83	89%	364

6.5 Project Milestones and Development Status

The evolution milestones of the Sabodala-Massawa Project is summarised below:

- May 2017 Randgold compile a PFS for the Massawa Project, focusing on the free-milling material at Massawa and Sofia Main with a standalone, new plant.
- Randgold and Barrick merger.
- September 2019, Barrick complete a FS for the Massawa Project to include non-free milling material to be treated in a new, standalone plant (refractory ores were proven to be highly recoverable through a BIOX process).
- March 2020, Teranga acquire the Massawa Project.
- Teranga undertake a PFS for the combined Massawa-Sabodala Project to include changes and additions to the existing Sabodala Plant to treat free milling Massawa ores and a new plant to treat refractory ores.

Randgold reported results of a Pre-feasibility study for the Massawa Gold Project in an NI 43-101 Technical Report dated 12 May 2017 (Randgold, 2017). The Project comprised of the Massawa, Sofia Main, Sofia North, Delya, Tina and Bambaraya gold deposits. Mineral Resource and Mineral Reserves were estimated (Section 6.6). The technical and financial study was conducted by Randgold to support the disclosure of updated Mineral Reserves. The Pre-Feasibility Study was based on an open pit mining project, whereby the ore would be mined and fed through an onsite metallurgical plant to produce gold in doré. The strategic focus for Massawa Gold Project was to prioritise the Sofia and Massawa CZ ore over the refractory ores of Massawa NZ.

In essence, the Pre-feasibility Study incorporated open pit mining operations at Massawa and Sofia consisting of multiple open pits, i.e. Massawa CZ, Massawa NZ and Sofia Main. The open pits were planned to be mined by a mining contractor and a down-the-hole blasting service was to be provided by a blasting contractor. The proposed mining method of open pit mining using conventional 90 t trucks and excavators was considered to be appropriate for the orebody and suitable dilution and ore loss factors were applied.

Significant testwork had already been undertaken on the various ore types from the oxide and free leaching ores of Sofia to the high gravity and partially refractory ores of Massawa CZ, and the highly refractory ores of the Massawa NZ. Based on testwork completed, the overall recoveries of 85% for the project were considered to be realistic. The processing feed plan extended over a ten year period where the plant had a nameplate capacity of 2.4 Mt/a (db.) of fresh ore. This could be increased to 3.0 Mt/a (db.) when treating the softer oxides. The plant was divided into two streams, with two parallel grinding ball mills forming the hub of the processing plant. Each subsequent process route was implemented sequentially from a single stream. This meant that the flotation and BIOX circuit was erected well into the mine life, which matched the phased capital expenditure approach.

The Randgold Pre-feasibility Study recommended that; additional drilling be conducted; full pilot plant scale tests be completed; various mining trade-off studies be undertaken and a fully updated ESIA be developed. The budget for this feasibility programme was USD 36.5 M.

Barrick issued a NI 43-101 Technical Report for the Massawa Gold Project, Senegal, dated 23 September 2019 with an effective date of 31 December 2018. The Report was a Feasibility Study based on the mining and processing open pit material from four pits (Massawa CZ, Massawa NZ, Sofia and Delya), with free milling ore from the oxide contribution of the pits, fresh material from Sofia and the bulk of the Massawa CZ pits, and refractory fresh material sourced from the northern part of the Massawa CZ, Massawa NZ and Delya pits.

The refractory ores were proven to be highly recoverable through a bio- (bacterial) oxidation (BIOX) process. Subsequent to the completion of the Feasibility Study, a successful application was lodged with the Senegalese Government to convert the Kanoumba Permit into the Massawa Mining Licence under the 2003 Mining Code of Senegal.

The Barrick Feasibility Study was based on contract-mining rates and an on-site metallurgical plant with two distinct processing circuits to run sequentially:

- For the first seven years, the free-milling ore sources would run through a conventional gravity and carbon-in-leach (CIL) circuit, which would include an arsenic and antimony precipitation processing plant before tailing storage facility (TSF) release to environment.
- From year 7 onwards, the refractory ore sources would be processed through a flotation circuit with a concentrate fine grinding step to $P80 = 45\ \mu m$, followed by a BIOX step and CIL.

The Study recommended that additional exploration be conducted to expand the non-refractory ore resource, so as to extend the life of mine and improve the economics and pay back of the Project. It recommended that the entire Massawa, Sofia and Delya Mineral Resources be drilled to an advanced grade control spacing suitable to the variography for each of the pit's ore types prior to commencement of mining. Process operating costs were estimated based on specialist studies on the variable ore types and it recommended that optimisation studies be undertaken on the Massawa CZ and BIOX amenable ore types to further optimise the process recoveries and costs. Mining costs were developed from the first round of mining tenders and it recommended that the final mine plan be submitted to the short list of tenderers to obtain the most efficient cost, and a trade-off be done against an owner mining option.

Upon completion of the acquisition of the Massawa Gold Project on 4 March 2020, Teranga commenced internal work and engaged a number of external consultants to undertake a Pre-feasibility Study with engineering and design for the amalgamation of the Sabodala and Massawa properties and mining operations. On behalf of Teranga, Lycopodium (Canada) compiled an NI 43-101 Technical Report on the Pre-feasibility Study for the combined Sabodala-Massawa Project, in August of 2020 (with an effective date of December 2019). The purpose of the Study was to evaluate the possibility of mining the gold deposits on the Massawa property and treat the ore through the existing Sabodala whole ore leach plant (SWOLP) (with some modifications) and a new sulphide treatment plant at Sabodala (SSTP) to be constructed adjacent to the SWOL. The Report concluded the Project should be advanced.

6.6 Historical Mineral Resource and Reserve Estimates

The following section present the most recent historical Mineral Resources and Reserves estimates published by the Project's historical owners, namely:

- Randgold's Massawa Project, December 2016.
- Teranga's Sabodala Project, June 2017.
- Barrick's Massawa Project, December 2018.
- Teranga's Sabodala-Massawa Project, December 2019.

The Mineral Resources and Reserves Estimates are NI 43-101 Compliant and further details can be found in their associated Technical Reports as referenced. The Estimates are included herein for information proposes only and to illustrate the evolution of the Project's Mineral Resources and Reserves.

These estimates are considered historical in nature and should not be relied upon. A Qualified Person has not completed sufficient work to classify the historical estimate as a current Mineral Resource or Mineral Reserve and Endeavour is not treating the historical estimates as such. These estimates have been superseded by the current estimates in Section 14.0 and Section 15.0, as applicable.

Randgold reported a Mineral Resource for Massawa and Sofia as of December 2016, prepared according to the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves standards and guidelines published and maintained by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (the JORC (2012) Code). Randgold reconciled the Mineral Resources to Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated 10 May 2014 and there were no material differences.

A Mineral Resource update for Massawa and Sofia was completed in December 2016 using updated geological interpretations based upon recent drilling, and updated costs and recovery from the Pre-feasibility work completed in 2016. As of the end of 2016, Randgold estimated a total in-pit Mineral Resource of 40 Mt at an average grade of 3.3 g/t Au containing 4.2 Moz of gold and an Inferred underground Mineral Resource of 1.1 Mt at an average grade of 4.9 g/t Au for 0.2 Moz Au as reported in Table 6.6.1 (Randgold, 2017).

Table 6.6.1 Mineral Resource Statement for the Massawa Gold Project as of 31 December 2016 (Randgold)

Mineral Resource	Tonnes (Mt)	Grade (g/t Au)	Contained Gold (Moz)	Attributable Contained Gold (Moz)*
OP Measured	0.5	5.5	0.1	0.08
OP Indicated	19	4.0	2.5	2.0
Total Measured & Indicated	20	4.0	2.6	2.1
OP Inferred	20	2.6	1.6	1.4
UG Inferred	1.1	4.9	0.2	0.1

Notes:

1. Attributable gold (Moz) refers to the quantity attributable to Randgold based on Randgold' s 83.25% interest in the Massawa Project.
2. Open pit Mineral Resources are reported as the insitu Mineral Resources falling within the USD 1,500/oz pit shell reported at an average cut-off grade of 0.84 g/t Au.
3. Underground Mineral Resources are those insitu Mineral Resources below the USD 1,500/oz pit shell of the North Zone 2 deposit reported at a 2.3 g/t Au cut-off grade.
4. Mineral resources for Massawa were generated by Simon Bottoms and Rodney Quick both officers of the company and competent persons.
5. All Mineral Resource tabulations are reported inclusive of that material which is then modified to form Ore Reserves.

The Ore Reserve estimate was prepared according to the JORC (2012) Code. Randgold reconciled the Ore Reserves to CIM Definition Standards for Mineral Resources and Mineral Reserves dated 10 May 2014 and there were no material differences.

As of the end of 2016, Randgold estimated an open-pit Probable Ore Reserve of 8.2 Mt at 4.39 g/t Au for 1.16 Moz Au from Massawa CZ, 7.1 Mt at 4.46 g/t Au for 1.02 Moz Au from Massawa NZ and 3.6 Mt at 3.73 g/t Au for 426 koz Au from Sofia Main as tabulated below. The open-pit (OP) Ore Reserves are those Ore Reserves occurring within a USD 1,000/oz Whittle optimisation pit-designs and consist only of the conversion of the Measured and Indicated Mineral Resources. Total Massawa and Sofia Ore Reserves, as of 31 December 2016, are presented in Table 6.6.2.

Table 6.6.2 Ore Reserve Statement for the Massawa Deposit as of 31 December 2016 (Randgold)

Ore Reserve	Tonnes (Mt)	Grade (g/t Au)	Contained Gold (Moz)	Attributable Contained Gold (Moz)*
Massawa CZ Probable	8.2	4.4	1.2	1.0
Massawa NZ Probable	7.1	4.5	1.0	0.9
Sofia Main Probable	3.6	3.7	0.4	0.4
Total OP Probable	**19**	**4.3**	**2.6**	**2.2**

Notes:

1. * Attributable gold (Moz) refers to the quantity attributable to Randgold based on Randgold' s 83.25% interest in the Massawa Project.
2. Open pit Ore Reserves are reported at a gold price of USD 1,000/oz and 1.13 g/t Au cut-off and include dilution and ore loss factors.
3. Open pit Ore Reserves were generated by Shaun Gillespie, an officer of the company, under the supervision of Rodney Quick, an officer of the company and competent person.

In June 2007, Teranga estimated NI-43-101 compliant Mineral Resources for the Sabodala Project, including the Sabodala Mining Concession, which consists of the operating Sabodala Gold Mine and mill, the adjacent Golouma Project, the Gora Project, and a group of nearby exploration prospects at different stages of advancement.

The Measured and Indicated Mineral Resources as of 30 June 2017 are estimated to be 86.6 Mt grading 1.59 g/t Au for 4.4 Moz of gold. This estimate includes both the open pit and underground Mineral Resources for the Sabodala Mining Concession. In addition, a total of 17.2 Mt of Inferred Resources are estimated at a grade of 1.81 g/t Au for 1.0 Moz of gold. The Proven and Probable Mineral Reserves as of 30 June 2017 are 61.6 Mt grading 1.37 g/t Au for 2.70 Moz of gold, see Table 6.6.3 and Table 6.6.4.

Table 6.6.3 Sabodala Project NI 43-101 Summary Open Pit and Underground Mineral Resources as of 30 June 2017 (Teranga)

Category	Tonnes (000 t)	Grade (g/t Au)	Contained Gold (000 oz)
Measured - Open Pit	21 174	1.15	783
Measured - Underground	-	-	-
Total Measured	21 174	1.15	783
Indicated - Open Pit	59 091	1.52	2 882
Indicated - Underground	6 354	3.78	773
Total Indicated	65 444	1.74	3 655
Total Measured & Indicated	86 618	1.59	4 438
Inferred - Open Pit	11 933	1.13	434
Inferred - Underground	5 315	3.34	570
Total Inferred	17 247	1.81	1 004

Notes:

1. CIM definitions were followed for Mineral Resources.
2. Open pit oxide Mineral Resources are estimated at a cut-off grade of 0.35 g/t Au, except for Gora and Marougou at 0.48 g/t Au.
3. Open pit transition and fresh rock Mineral Resources are estimated at a cut-off grade of 0.40 g/t Au, except for Gora and Marougou at 0.55 g/t Au.
4. Underground Mineral Resources are estimated at a cut-off grade of 2.00 g/t Au.
5. Measured Resources at Sabodala include stockpiles which total 7.2 Mt at 0.75 g/t Au for 174 000 oz.
6. Measured Resources at Masato include stockpiles which total 4.2 Mt at 0.68 g/t Au for 92 000 oz.
7. Measured Resources at Gora include stockpiles which total 0.4 Mt at 1.28 g/t Au for 15 000 oz.
8. Measured Resources at Golouma include stockpiles which total 0.04 Mt at 1.38 g/t Au for 2000 oz.
9. Measured Resources at Kerekounda include stockpiles which total 0.03 Mt at 3.30 g/t Au for 3000 oz.
10. High grade assays were capped at grades ranging from 1.5 g/t Au to 110 g/t Au.
11. Mineral Resources are inclusive of Mineral Reserves.
12. Open pit shells were used to constrain open pit resources.
13. Mineral Resources are estimated using a gold price of USD 1450 per ounce.
14. Sum of individual amounts may not equal due to rounding.

Teranga (and RPA) were not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, or political issues that would materially affect the Mineral Resource estimates.

Table 6.6.4 Sabodala Project NI 43-101 Summary Mineral Reserve Estimate as of 30 June 2017 (Teranga)

Category	Tonnes (Mt)	Grade (g/t Au)	Contained Gold (Moz)
Open Pit			
Proven	6.65	1.39	0.30
Probable	41.02	1.35	1.78
Total Open Pit	47.66	1.35	2.07
Underground			
Proven	-	-	-
Probable	2.15	5.01	0.35
Total Underground	2.15	5.01	0.35
Stockpiles			
Proven	11.80	0.75	0.28
Total Mineral Reserves			
Proven	18.45	0.98	0.58
Probable	43.17	1.53	2.12
Proven & Probable	61.62	1.37	2.70

Notes:

1. CIM definitions were followed for Mineral Reserves.
2. Mineral Reserve cut-off grades range from 0.38 g/t to 0.57 g/t Au for oxide and 0.44 g/t to 0.63 g/t Au for fresh rock based on a USD 1200/oz gold price.
3. Underground Mineral Reserve cut-off grades range from 2.3 g/t to 2.6 g/t Au based on a USD 1200/oz gold price.
4. Mineral Reserves account for mining dilution and mining ore loss.
5. Proven Mineral Reserves are based on Measured Mineral Resources only.
6. Probable Mineral Reserves are based on Indicated Mineral Resources only.
7. Sum of individual amounts may not equal due to rounding.
8. The Niakafiri East and West deposit is adjacent to the Sabodala village and relocation of at least some portion of the village will be required which will necessitate a negotiated resettlement programme with the affected community members.

Teranga (and) RPA were not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate

Barrick reported a NI 43-101 compliant Mineral Resource Estimate for the Massawa Project as of 31 December 2018, with an open pit Indicated Mineral Resource of 23 Mt at an average grade of 4.00 g/t Au containing 2.97 Moz of gold and an open pit Inferred Mineral Resource of 3.7 Mt at an average grade of 2.2 g/t Au for 0.26 Moz of gold. An underground Inferred Mineral Resource, situated below the NZ1 and NZ2 open pit was estimated to be 2.6 Mt at an average grade of 4.1 g/t Au, containing 0.35 Moz gold, see Table 6.6.5 (Barrick 2019).

Table 6.6.5 Massawa Project NI 43-101 Mineral Resource Statement as of 31 December 2018 (Barrick)

Mineral Resource	Tonnes (Mt)	Grade (g/t Au)	Contained Gold (Moz)	Attributable Contained Gold (Moz)*
OP Measured	-	-	-	-
OP Indicated	23	4.00	3.0	2.5
Total Measured & Indicated	**23**	**4.00**	**3.0**	**2.5**
OP Inferred	3.7	2.2	0.26	0.22
UG Inferred	2.6	4.1	0.35	0.29
Total Inferred	**6.3**	**3.0**	**0.61**	**0.51**

Notes:

1. *Attributable gold (Moz) refers to the quantity attributable to Barrick based on Barrick's 83.25% interest in the Massawa Project.
2. Open pit Mineral Resources are reported as the insitu mineral resources falling within the USD 1,500/oz pit shell reported at an average cut-off grade of 0.8 g/t Au.
3. Underground Mineral Resources are those insitu mineral resources below the USD 1,500/oz pit shell of the North Zone 2 deposit reported at a 2.5 g/t Au cut-off grade.
4. Mineral Resources are reported inclusive of Ore Reserves.
5. Mineral Resources for Massawa were generated by Simon Bottoms, MGeol, FGS, CGeol, FAusIMM, an employee of Barrick and Qualified Person.

Note: The Barrick 2018 Mineral Resource estimate was prepared according to the JORC (2012) Code. Barrick reconciled the Mineral Resources to CIM Definition Standards for Mineral Resources, Mineral Reserves dated 10 May 2014 as incorporated into NI 43-101, and there were no material differences.

Barrick further reported an Ore Reserve Estimate for the Massawa Project with an OP Probable Ore Reserve of 7.1 Mt at 4.69 g/t Au for 1.1 Moz Au from the Massawa CZ; 4.6 Mt at 4.9 g/t Au for 0.72 Moz Au from the Massawa NZ; 5.7 Mt at 2.9 g/t Au for 0.54 Moz Au for Sofia; and 0.7 Mt at 4.4 g/t Au for 0.92 Moz for Delya. The OP Ore Reserves are those reserves occurring within a USD 1,000/oz pit design, see Table 6.6.6 (Barrick, 2019).

Table 6.6.6 Massawa, Sofia and Delya Ore Reserves Statement as of 31 December 2018 (Barrick)

Ore Reserve	Tonnes (Mt)	Grad (g/t Au)	Contained Gold (Moz)	Attributable Contained Gold (Moz)*
CZ Probable	7.1	4.69	1.1	0.89
NZ Probable	4.6	4.89	0.72	0.60
Sofia Probable	5.7	2.91	0.54	0.45
Delya Probable	0.66	4.40	0.092	0.077
Total OP Probable	**18.06**	**4.17**	**2.4**	**2.0**

Notes:

1. *Attributable gold (Moz) refers to the quantity attributable to Barrick based on Barrick's 83.25% interest in the Massawa Project.
2. Open pit Ore Reserves are reported at a gold price of USD 1000/oz and include dilution and ore loss factors.
3. Open pit Ore Reserves were generated by Shaun Gillespie, an employee of the company, under the supervision of Rodney Quick, MSc, Pr Sci Nat. an officer of the company and Qualified Person.

Teranga estimated NI-43-101 compliant Mineral Resources for the Sabodala-Massawa Project with 25 gold deposits and prospects located on the Sabodala and Massawa mine licenses and the Bransan exploration permit with an effective date of 31 December 2019, see Table 6.6.4.

The Sabodala Mineral Reserve estimate was composed of open pit and underground deposits. The Golouma West, Sabodala, Goumbati West/Kobokoto and Maki Medina open pit deposits were currently being mined by conventional open pit methods. With the acquisition of Barrick's Massawa Project, the following deposits were added to SGO's reserves: Sofia Main, Sofia North, Central Zone, North Zone and Delya. The Proven and Probable Mineral Reserves for the deposits were based on only that part of the Measured and Indicated Resources that fell within the designed final pit limits. Mineral Reserve cut-off grades were based on current operating practice and 2019 costs projected to the LOM. The Reserves were based on a gold price of USD 1250/oz. The Mineral Reserve estimate as of 31 December 2019, is presented in Table 6.6.7 and Table 6.6.8 following:

Table 6.6.7 Sabodala-Massawa Open Pit and Underground Mineral Resources Summary as of 31 December 2019 (Teranga)

Category/Property/Mining Method	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
Measured Resources			
Sabodala OP	16 367	1.23	645
Sabodala UG	0	0	0
Massawa OP	494	4.57	73
Massawa UG	0	0	0
Total Measured Resources	**16 860**	**1.32**	**717**
Indicated Resources			
Sabodala OP	53 535	1.34	2,314
Sabodala UG	6 384	3.75	771
Massawa OP	28 043	3.43	3,095
Massawa UG	0	0	0
Total Indicated Resources	**87 962**	**2.19**	**6 180**
Measured + Indicated Resources			
Sabodala OP	69 901	1.32	2,959
Sabodala UG	6 384	3.75	771
Massawa OP	28 537	3.45	3,168
Massawa UG	0	0	0
Total Measured + Indicated Resources	**104 823**	**2.05**	**6 897**
Inferred Resources			
Sabodala OP	11 489	1.11	411
Sabodala UG	5 254	3.34	565
Massawa OP	6 796	2.25	491
Massawa UG	2 582	4.50	373
Total Inferred Resources	**26 120**	**2.19**	**1 840**

Notes:

1. CIM definitions were followed for Mineral Resources.
2. Open pit oxide Mineral Resources are estimated at cut-off grades ranging from 0.35 g/t Au to 0.50 g/t Au.
3. Open pit transition and fresh rock Mineral Resources are estimated at cut-off grades ranging from 0.40 g/t Au to 1.20 g/t Au.
4. Underground Mineral Resources are estimated at a cut-off grade of 2.00 g/t Au at Sabodala and at 2.84 g/t Au at Massawa.
5. Measured Resources at Sabodala include stockpiles, which total 4.3Mt at 0.75 g/t Au for 104 000 oz.
6. Measured Resources at Masato include stockpiles, which total 2.5 Mt at 0.69 g/t Au for 55 000 oz.
7. Measured Resources at Maki Medina include stockpiles, which total 0.1 Mt at 0.78 g/t Au for 3000 oz.
8. Measured Resources at Golouma include stockpiles, which total 0.4 Mt at 0.75 g/t Au for 9000 oz.
9. High grade assays were capped at grades ranging from 1.5 g/t Au to 340 g/t Au.
10. Mineral Resources are inclusive of Mineral Reserves.
11. Open pit shells were used to constrain open pit resources.
12. Mineral Resources are estimated using a gold price of USD 1450/oz.
13. Sum of individual amounts may not equal due to rounding.

Table 6.6.8 Sabodala-Massawa Mineral Reserve Estimate as of December 31, 2019 (Teranga)

Deposits	Proven			Probable			Proven and Probable		
	Tonnes (Mt)	Grade (g/t)	Au (Moz)	Tonnes (Mt)	Grade (g/t)	Au (Moz)	Tonnes (Mt)	Grade (g/t)	Au (Moz)
Sabodala	1.88	1.64	0.10	2.75	1.41	0.12	4.63	1.50	0.22
Masato				17.77	1.13	0.64	17.77	1.13	0.64
Golouma West				2.10	2.01	0.14	2.10	2.01	0.14
Maki Medina				0.84	1.19	003	0.84	1.19	0.03
Niakafiri East	4.49	1.34	0.19	9.43	1.14	0.34	13.92	1.20	0.54
Niakafiri West				1.13	1.10	004	1.13	1.10	0.04
Goumbati West and Kobokoto				1.39	1.33	006	1.39	1.33	0.06
Stockpiles	7.22	0.73	0.17				7.22	0.73	0.17
Subtotal Open Pit with Stockpiles	13.59	1.06	0.46	35.40	1.21	1.38	48.99	1.17	1.84
Golouma West 1 Underground				0.62	6.07	0.12	0.62	6.07	0.12
Golouma West 2 Underground				0.45	4.39	0.06	0.45	4.39	0.06
Golouma South Underground				0.47	4.28	0.06	0.47	4.28	0.06
Kerekounda Under round				0.61	4.95	0.10	0.61	4.95	0.10
Subtotal Underground				2.15	5.01	0.35	2.15	5.01	0.35
Total Sabodala Mine Lease	**13.59**	**1.06**	**0.46**	**37.55**	**1.43**	**1.73**	**51.14**	**1.33**	**2.19**
Sofia Main				5.47	2.66	0.47	5.47	2.66	0.47
Sofia North				2.76	1.87	0.17	2.76	1.87	0.17
Central Zone	0.54	3.94	0.07	9.40	3.52	1.03	9.94	3.54	1.13
North Zone				5.60	4.23	0.76	5.60	4.23	0.76
Delya				0.88	3.56	0.10	0.88	3.56	0.10
Total Massawa Mine Lease	**0.54**	**3.94**	**0.07**	**24.11**	**3.30**	**2.56**	**24.65**	**3.32**	**2.63**
Total Reserves	**14.13**	**1.17**	**0.53**	**61.67**	**2.16**	**4.29**	**75.79**	**1.98**	**4.82**

6.7 Comments on Section 6.0

The QP is satisfied that the historical data has been collected, collated and managed in an appropriate manner, is not biased or unreliable, and is suitable for Mineral Resource estimation.

6.8 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 6.0 are presented in Section 25.0.

6.9 Recommendations

Recommendations pertaining to Section 6.0 are presented in Section 26.0.

6.10 References

References cited in Section 6.0 are presented in Section 27.0.

7.0 GEOLOGICAL SETTING AND MINERALISATION

7.1 Regional Geology

The West African Craton can be divided into three main regions exposed beneath Phanerozoic cover. In the north, the Reguibat Rise extends over Mauritania and western Algeria and consists of an Archaean terrane in the west and Paleoproterozoic (Birimian) terrane in the east. The southern Leo Rise covers a large area over southern Mali, Côte d'Ivoire, Burkina Faso, Niger, Ghana, and Guinea. It is separated from the Reguibat Rise by the Late Proterozoic to Phanerozoic sedimentary Taoudeni Basin. The western Archaean portion, known as the Man Shield, is separated from the eastern Birimian Supergroup of the Baoule Mossi domain by the Sassandra fault. Two Birimian inliers, the Kayes and Kédougou-Kenieba, suggest the continuity of the Proterozoic basement underneath the Taoudeni intra-cratonic basin. The Sabodala-Massawa Project is located within the 2213 Ma to 2198 Ma age Kédougou-Kenieba Inlier (Figure 7.1.1).

The Sabodala and Massawa Mining Licences and exploration permits straddle two major divisions of the Kédougou-Kenieba Inlier; the volcanic-dominated Mako Supergroup to the west and the sediment-dominated Diale-Dalema Supergroup to the east. The Mako Supergroup consists mainly of tholeiitic basalts and andesitic lavas (massive and pillowed flows) with minor komatiitic units interbedded with volcanoclastic sediments (pyroclastic banded tuffs and agglomerates), quartzite and chert as well as ultramafics, dolerites and gabbros. The Diale-Dalema Supergroup are characterised by folded sandstones and siltstones interbedded with calc-alkaline ash and lapilli tuffs that are more pelitic and siliceous in the Diale Supergroup and more calcareous in the Dalema Supergroup (Figure 7.1.2).

The Mako and Diale-Dalema supracrustal sequences are intruded by a series of variably deformed granitoid intrusions that range in age from 2160 Ma to 2000 Ma. These include the Karkadian Batholith that bounds the Mako Belt to the west and several major large stocks in the central Mako Belt in the project areas. Northeast trending intermediate to felsic and later, post-tectonic mafic dykes are present throughout the region, the latter forming prominent linear magnetic features. Felsic and intermediate composition dykes are often spatially associated with shear zones hosting gold mineralisation, and locally are host to significant gold mineralisation themselves. Lithologies in the region are affected mainly by lower greenschist grade metamorphism.

7.1.1 Regional Surficial Geology

Lateritic weathering combined with duricrust formation is still active in the region. Apart from local hills and resistant lithologies, much of the terrain is covered by laterite and ferricrete resulting in limited rock outcrop. Hills in the eastern and south-eastern portions of the Sabodala Mining Concession and in the western portion of the Sounkounkou Exploration Permit form some of the best exposed outcrop areas in the Project Area. Oxidation depth in the region is highly variable but is generally several tens of metres. Towards the northwest, thick soils and colluvial materials cover large tracts of land. Close to the Falémé River, small lenses of lateralised alluvial deposits can be found.

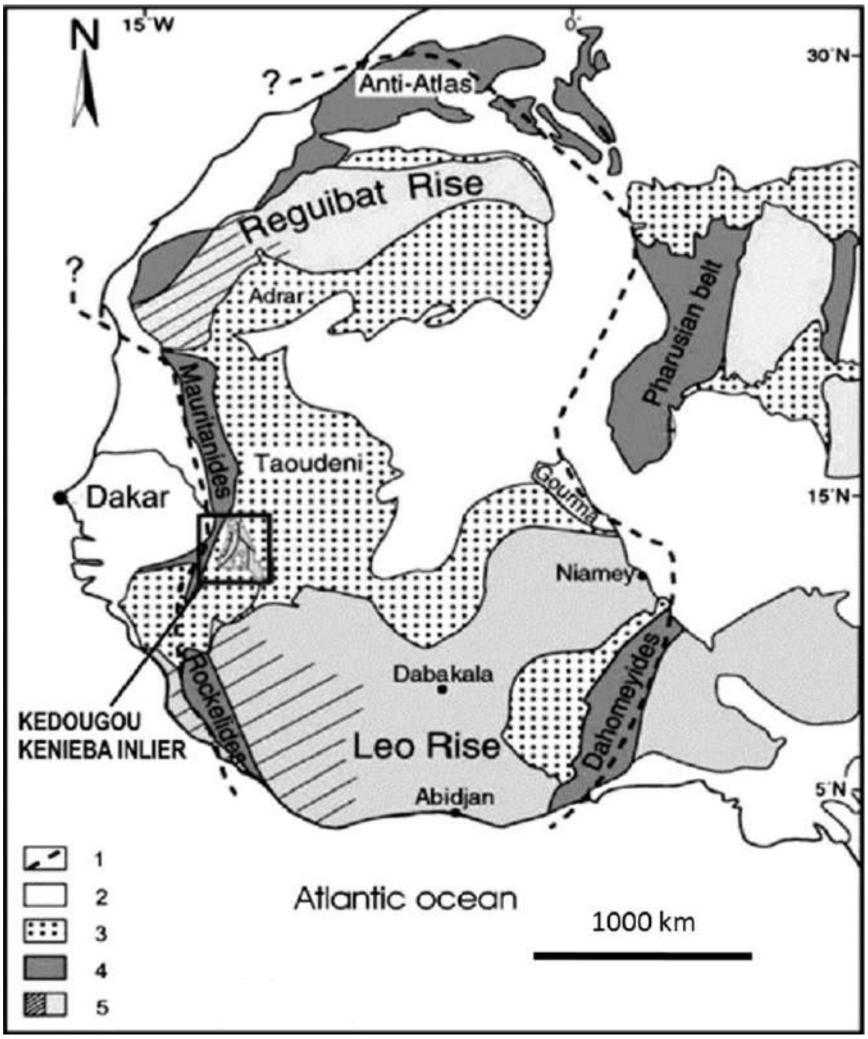
7.1.2 Regional Structural Setting

Birimian rocks of the Kédougou-Kenieba Inlier show a polycyclic deformation and metamorphic history. The first phase of deformation was compressive, followed by a later transcurrent movement and deformation. Major crustal shear zones regionally bound and influence the overall north-northeast lithological grain in the region. These include a north-northeast trending shear zone which is interpreted to form a boundary between the Mako and Diale-Dalema groups which is termed the Senegal-Tombo Shear Zone or Main Transcurrent Shear Zone (MTS) by different authors. The MTS hosts the Massawa and Delya deposits.

The MTS converges with (and may join to the north in Mali) the major northerly trending Senegal-Mali Shear Zone, which is spatially associated with several major gold deposits, including Sadiola and Loulo in Mali. Intense zones of high strain are also present in the eastern portions of the Mako Supergroup, confirming the presence on the property of a major structural corridor referred to as the Sabodala Structural Corridor (SSC).

High strain zones and apparent truncations of lithological features on the Sabodala Mining Licence and Sounkounkou Permit suggest the presence of second and third order shear zones at the property scale, which may control gold mineralisation. The structures wrap around major intrusions, and northwest trending linking structures between major shear zones are also present - all of which form potentially prospective sites for gold deposit formation. The transcurrent deformation has been interpreted as being synchronous with gold mineralisation and the emplacement of several calc-alkaline granites. Field relationships suggest that gold mineralisation on the property and other deposits in the region are probably coeval with latter stages of shear zone development. Regional greenschist metamorphism has also been interpreted as being associated with both compressive and transcurrent phases of deformation.

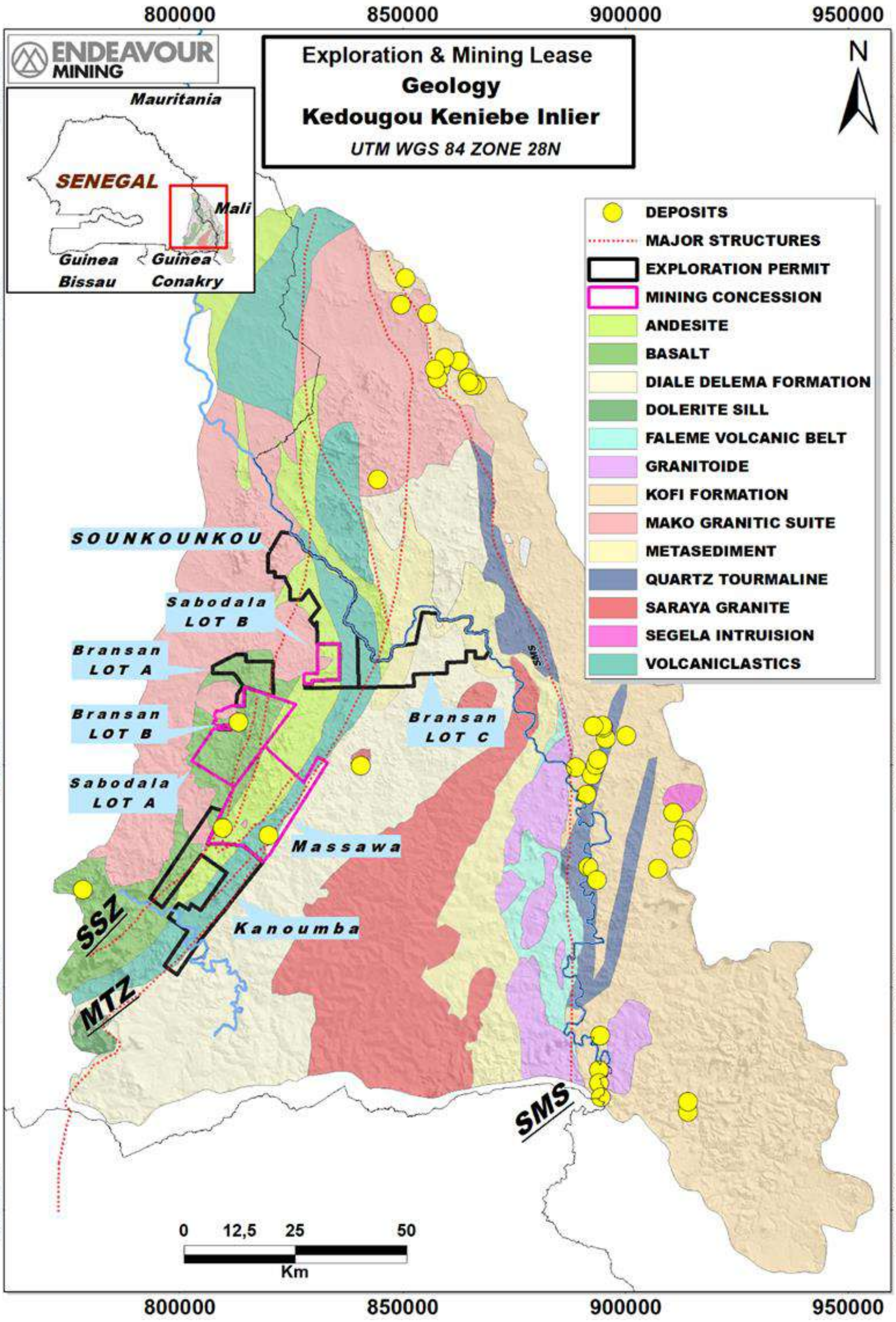
Figure 7.1.1 Location of the Kédougou-Kenieba-Inlier in the West African Craton



Note: 1 - Limits of West African Craton; 2 & 3 - Taoudeni Basin; 4 – Pan African Belts; 5 - Archean (stripes) and Birimian terranes.

Source: Gueye et al., 2008.

Figure 7.1.2 Schematic Geology and Endowment of the Kédougou-Kenieba Inlier



Source: Endeavour, March 2022.

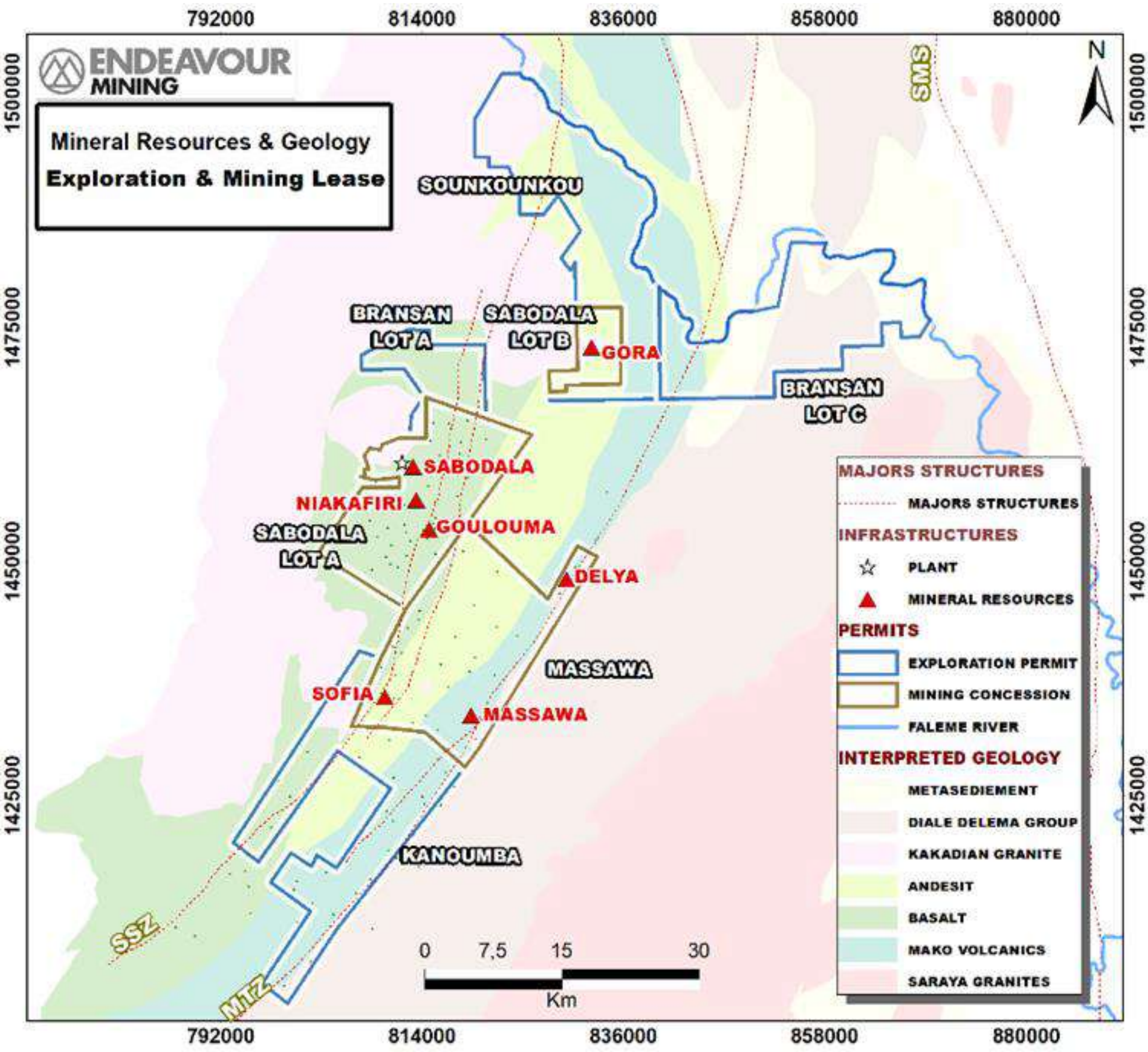
7.2 Property Geology

The properties comprising the Sabodala-Massawa Project can be subdivided into three project areas:

- The Sabodala Mining Concession (also referred to herein as the Sabodala Mining Licence (ML)) comprising the original Sabodala mining concession (Sabodala Lot A), the additional Gora ML Expansion area (Sabodala Lot B) and the former SOMIGOL Mining Concession.
- The Massawa Exploitation Permit (referred to herein as the Massawa Mining Licence).
- The Sabodala-Massawa Project regional exploration permits comprising Kanoumba, Bransan (Bransan Lots A, B and C) and Sounkounkou.

Individual permit areas are listed in Section 4.0 of this Technical Report, whilst the licence and permit areas are illustrated in Figure 7.2.1.

Figure 7.2.1 Property Geology and Permits



Source: Endeavour, March 2022.

The following sections have been largely taken from AMC (2014), Barrick (2019), Teranga (2020) and updated where necessary.

7.2.1 Sabodala Lot A Mining Licence

The Sabodala Lot A Mining Licence geology, deposit and prospect locations are shown in Figure 7.2.2.

Lithologies generally trend north-northeast to northeast with steep dips, although local variations are apparent. Lower greenschist grade metamorphic assemblages affect lithologies. Mafic volcanic rocks dominate in the sequence and interflow sediment horizons occur locally in the mafic volcanic sequence, with the most prominent being a cherty horizon referred to as mylonite by Painter, 2005. Other interflow units comprise narrow carbonaceous (graphitic) mudstone-siltstone horizons, which locally are often exploited by shear zones.

Ultramafic rocks are present throughout the stratigraphy and are variably and often intensely affected by alteration and high strain zone development. Fresher varieties, which retain primary textures, are mottled with relict igneous texture suggesting that they mainly comprise intrusive sills and dykes.

Dykes of several varieties intrude both the volcanic sequence and the ultramafic sills. These include at least two phases of porphyritic dykes of probable intermediate to felsic composition that preferentially intrude along shear zones in altered ultramafic units and mineralised shear zones. These are typically one metre to 10 m thick. Later, post-mineralisation, fresh mafic dykes that are up to several tens of metres in thickness trend north-northeast generally sub-parallel to the lithologic sequence. The late mafic dykes are not associated with and crosscut the mineralisation and its hosting structures.

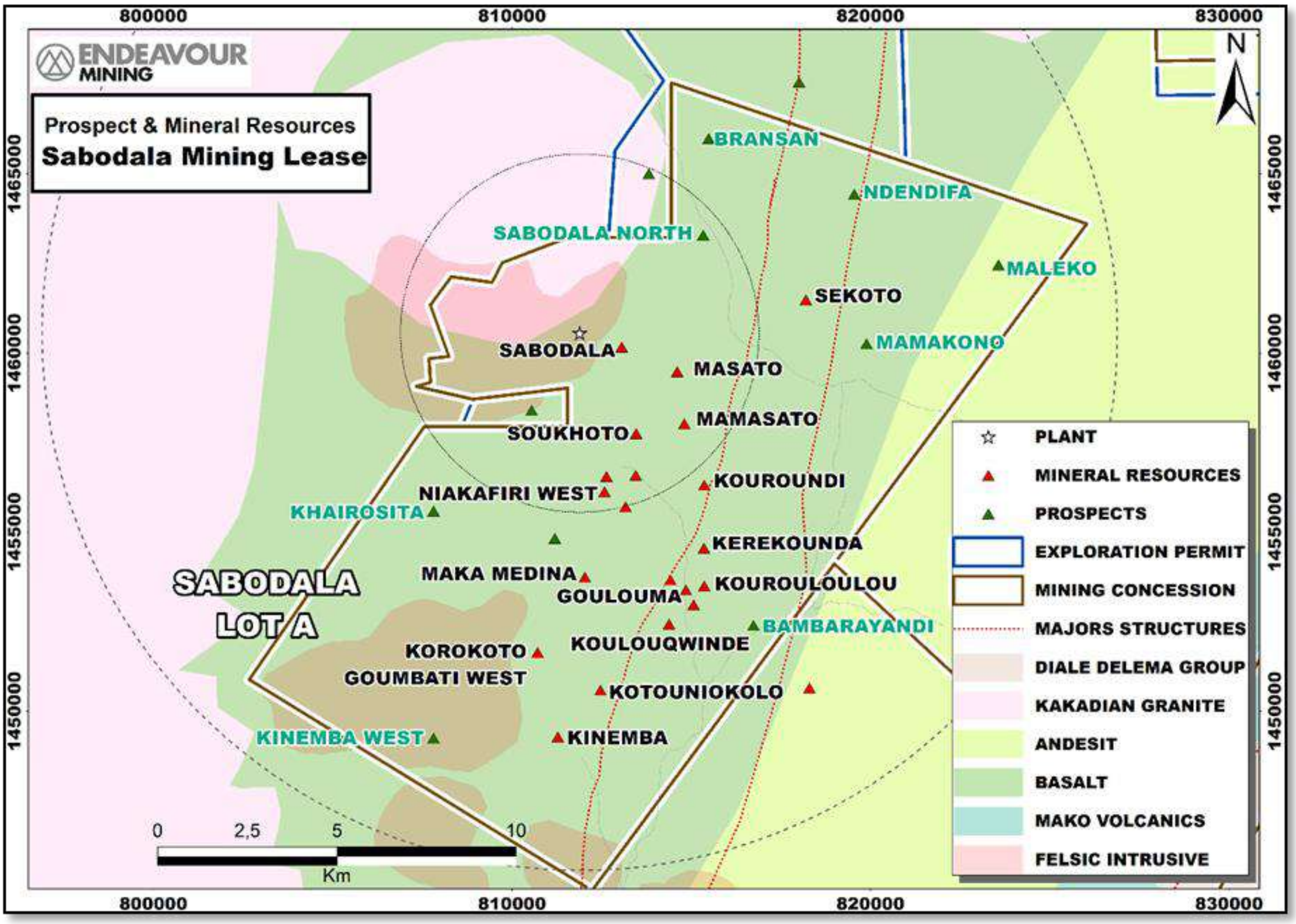
Principal structures on the Sabodala Mining Licence form a steeply west-northwest dipping, north-northeast trending shear zone network, which has previously been referred to as the Sabodala Shear Zone (SSZ). The north-northeast trending shear zones at Sabodala likely represent first and second order structures of regional scale to first order features such as the Main Transcurrent Shear Zone (MTS), while the northwest trending shear zones may be third order features that accommodate strain between these higher order features (Rhys, 2009).

Two dominant foliations have been recognised: a locally intense (S1) foliation that trends east-west to northeast, and a north-northeast trending steep northwest dipping foliation (S2). The foliation is inhomogeneous and large areas in the massive mafic volcanics, gabbro and felsic intrusions often lack foliation or are only weakly foliated. Field relationships indicate that the gold mineralisation at Sabodala and other deposits in the region is likely to be coeval with later stages of shear zone development.

Regionally the most common alteration assemblage is chlorite-calcite (epidote). Gold is not associated with this alteration style.

There are several alteration assemblages spatially associated with gold mineralisation. The principal alteration assemblages are silica-hematite alteration, albite-quartz alteration, and sericite-carbonate-quartz alteration. Alteration style varies with proximity to the mineralisation. The silica-hematite alteration assemblage is commonly fairly restricted with alteration of particular units or pre-existing structures, whereas the albite-quartz alteration assemblage is the most widely distributed alteration style. Overprinting both of these is the proximal sericite-carbonate-quartz alteration assemblage.

Figure 7.2.2 Sabodala Lot A Mining Licence Geology



Source: Endeavour, March 2022.

7.2.2 Sabodala Lot B Mining Licence

The Sabodala Lot B Mining Licence lies approximately 25 km northeast of the Sabodala processing plant along the transition between the Mako and Diale-Dalema Belts. It was originally part of the Sonkounkou Exploration Permit.

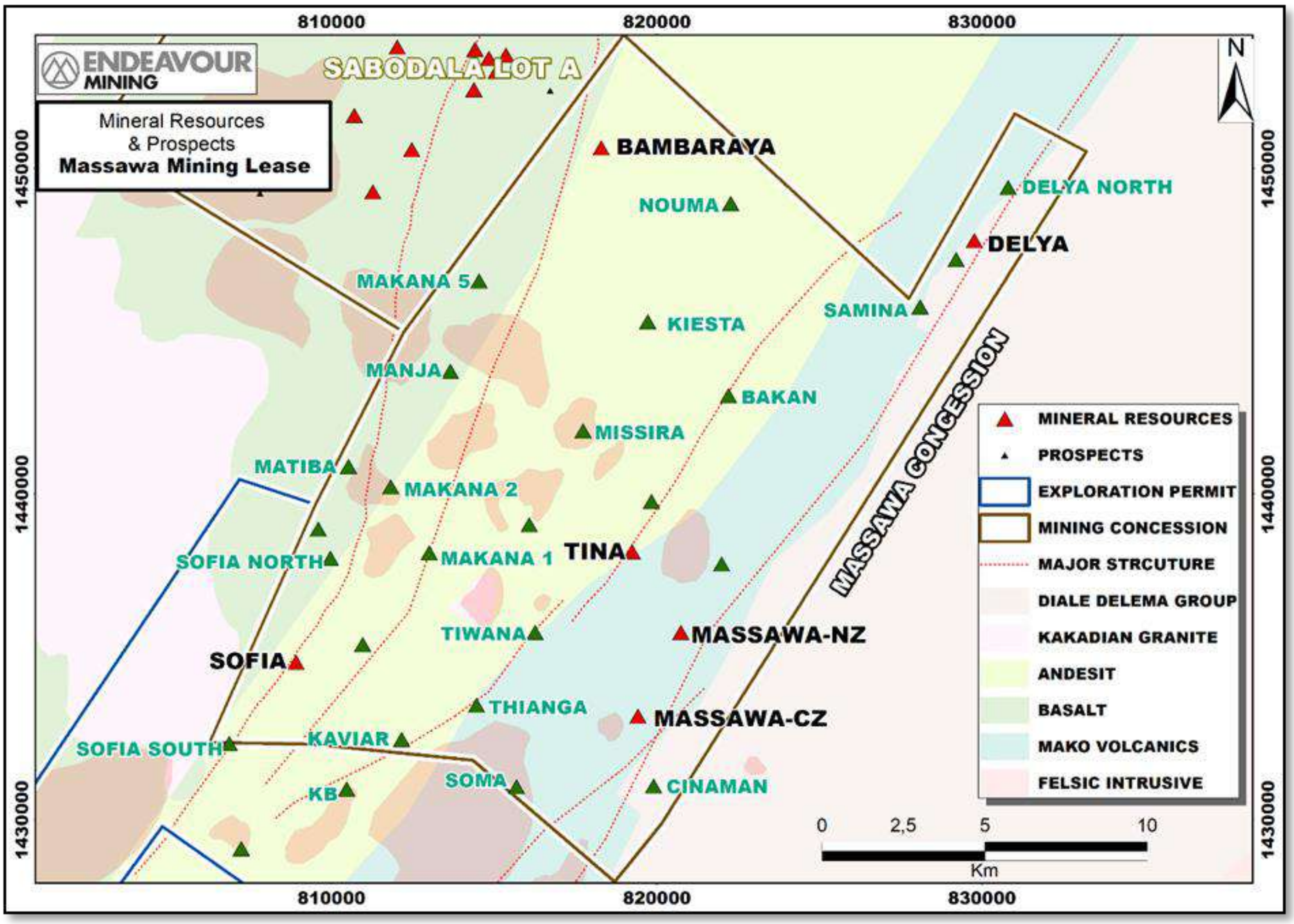
The Sabodala Lot B Mining Licence is dominated by a moderate to steep, southeast dipping, northeast trending sequence of turbiditic sandstone, siltstone and mudstone which is locally overturned and southeast-facing. The sedimentary package hosts veins of undetermined thickness and is intruded or bound by various sill-like intrusions to the east and west, including granodiorite. The mineralisation hosting sediments have been affected by upper greenschist grade metamorphic conditions, defined by aluminosilicate porphyroblasts and biotite, probably in the thermal aureole of the surrounding intrusions. The host rocks contain a slaty foliation which strikes parallel, but which dips variably with respect to bedding.

The main gold mineralisation deposit is Gora deposit with quartz shear veins which trend north-northeast with moderate to steep east-southeast dips. The two principal veins are 50 m to 100 m apart, defining a veining corridor at least 100 m wide. Veining extends for at least 700 m along strike.

7.2.3 Massawa Mining Licence

The Massawa Mining Licence geology, deposits and prospects are shown in Figure 7.2.3.

Figure 7.2.3 Massawa Mining Licence Geology



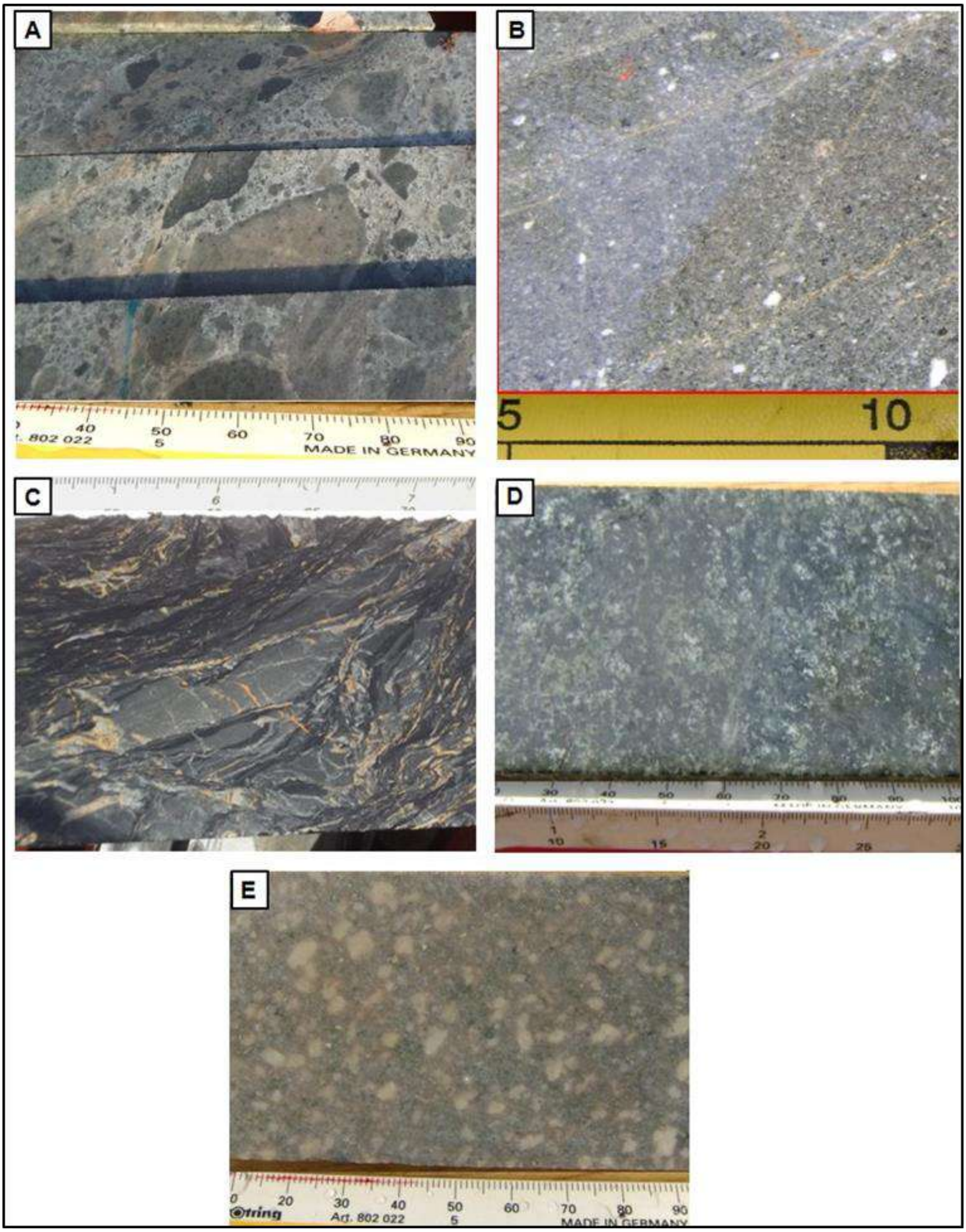
Source: Endeavour, March 2022.

The Massawa lithologic stratigraphy is dominated by a western package of volcaniclastic rocks and an eastern package of greywackes, with bedding striking at 210° ± 10° and dipping steeply (75 to 80)° toward the west. Several igneous rocks including sills of gabbro, felsic intrusions and feldspar (and/or quartz-feldspar) porphyries intrude this dominantly clastic sequence. The sequence has been subjected to low-grade regional metamorphism to greenschist facies (chlorite, carbonate and sericite). Core photographs of the main lithologies are shown in Figure 7.2.4.

The volcaniclastic rocks have a bimodal mineralogy with both mafic and felsic variants. They consist of a package of agglomerates, lapilli tuffs, tuffs, ash-tuffs, and fine-grained carbonaceous ash-tuffs and include both purple and green variants. The purple colouration probably indicates deposition in an arid to semi-arid terrestrial environment. Laminated, fine-grained, volcaniclastic material is often green and could represent ash fall into standing water. The coarser volcaniclastic rocks are matrix supported and include elongated and sub-rounded felsic lithic clasts (up to five centimetres in size) with glassy textures and rounded mafic clasts (up to 10 cm in size). Locally, the volcaniclastic rocks have gone through various degrees of grading, layering and bedding which suggest a later sedimentary reworking (greywacke, lithic quartz wacke, carbonaceous shale, lithic grit). These more sedimentary members often show a higher epiclastic matrix.

Felsic and lithic wackes, which underlie the volcaniclastic rocks to the east, are composed of fine-grained layers at the top of the sequence with coarser units at the base. Graded bedding is common within these rocks and shows a downward younging direction, implying that the steeply west dipping volcano-sedimentary package is overturned, with the volcaniclastic rocks being older than the greywackes.

Figure 7.2.4 Core Photographs of Dominant Lithologies at Massawa



Source: Endeavour, March 2022.

The volcaniclastic and greywacke units are intruded by various sills of gabbro (with a concordant relationship to the 025° striking host sequence) and felsic intrusive rocks. The gabbro is composed of equant, elongated or tabular plagioclase laths (110 µm to 310 µm), well twinned and randomly oriented. Associated with the plagioclases are irregular shaped and large crystals (480 µm to 710 µm) of clinopyroxene, which show sub perpendicular cleavages and lamellar textures and biotite. When altered and deformed, the gabbro contains uniformly (and in some places completely) altered plagioclases and pyroxenes, replaced by sericite and carbonate. Plagioclase crystals also show a preferred orientation which defines linear flow fabrics often accompanied by scattered elongated and skeletal grains of leucoxene. Opaque minerals (pyrite and arsenopyrite) are commonly altered to leucoxene and in many places to ilmenite.

A Quartz Feldspar Porphyry (QFP) is the most abundant intrusive in the system and also forms the largest body. It is mostly silica and sericite altered, locally stibnite veined and carries spiky gold mineralisation. The QFP is formed of plagioclase phenocrysts (50 %), quartz (45 %) and mica (5 %), disseminated in a poorly crystallised groundmass composed of plagioclase and small amounts of quartz. Plagioclase phenocrysts are roughly equant and tabular, subhedral crystals 106 µm to 455 µm in size. They show a slightly preferred orientation and are strongly altered to sericite, which partly masks the internal structure although polysynthetic twinning can often still be seen. The quartz crystals are sub-rounded and vary in size with an average of 200 µm. A strong component of recrystallisation is noted among these clasts and is probably hydrothermally related. The quartz clasts occur as isolated grains or aggregates of recrystallised quartz. Erratic tabular muscovite minerals (60 µm to 138 µm in size) are scattered through the rock where they are often accompanied by dark material which is probably rutile and sparse sulphides. Veins in this rock are late-stage milky quartz veins which show evidence for later recrystallisation. Thin section data confirm that the QFP is sericitised with fine grained quartz recrystallisation probably due to hydrothermal processes and is weakly sulphidised.

An intermediate feldspar porphyry is observed, which is massive and coarse grained. It often carries a weak K-feldspar alteration (pinkish in colour) and occurs at the footwall of the mineralisation in the Central Zone. Very weak mineralisation is associated with this type of porphyry which seems to be late. It is predominantly constituted of randomly oriented phenocrysts of plagioclase, muscovite and sericite porphyroblasts. The matrix is of fine grained, poorly crystallised plagioclase and minor quartz and sericite. Plagioclase phenocrysts are 260 µm to 2.1 millimetre in size, equant, locally elongated and show deep twinning. The plagioclase crystals have undergone a strong alteration and some clasts are entirely replaced by sericite and are difficult to identify through the groundmass. A secondary sericite phase also occurs as irregular large patches invading the plagioclase and defining weak open foliation fabrics. Muscovite occurs either as rims to plagioclase phenocrysts or as discrete crystals. Opaque minerals are associated with sericite and muscovite strips. Veins are relatively narrow (380 µm wide) and are essentially composed of quartz with weak sulphides and locally overprinted by sericite patches. This porphyry type is interpreted to be a porphyritic microdiorite, with strong sericite alteration and weak sulphidisation.

The felsic intrusive is a very fine grained, strongly K-feldspar altered, pink-coloured rock often intersected in the footwall within the greywacke where it alternates with the intermediate porphyry. This unit exhibits porphyrytic texture and shows a composition similar to the intermediate feldspar porphyry, although it is weakly plagioclase-phyric with most of the plagioclase phenocrysts completely replaced by sericite and other clay minerals. A few skeletal plagioclases are randomly oriented with poorly developed twinning. Very fine grained poorly crystallised plagioclases and quartz form the matrix of the rare phenocryst. In many places the felsic intrusive is seen to intrude the gabbro.

Younger mafic dykes are observed. They vary between less than 1 m to 15 m wide and appear fresh, unaltered, undeformed and always barren.

The Massawa Mining Licence is affected by intense hydrothermal activity and alteration, with the appearance of secondary silicate minerals including chlorite, sericite, silica, potassium feldspar, carbonate, epidote and hornblende and non-silicate minerals including graphite, limonite, hematite, leucoxene, pyrite, arsenopyrite, chalcopyrite. The gold-alteration package consists of sericite and carbonate, (2 to 4)% sulphides pyrite and arsenopyrite, in the ratio of about two-thirds to one-third, irregularly disseminated in the rock, groundmass or within the fragments of brecciated rock, and late quartz veins (mainly affecting the intrusive units).

The most continuous structures identified within the Licence are the Massawa-Delya Structure (MDS, also referred to as the MTS) and the Sofia-Sabodala Structure (SSZ, also referred to as the Sabodala Shear Zone). The MDS is consistently northeast-striking while the SSZ varies from northeast-striking in the south to north-striking in the north. Both structures vary along-strike from lithology-parallel to lithology-oblique and locally have minor splays, stepovers and bends, particularly the SSZ. Interpreted second order structures include the:

- Makana-Bambaraya Structure.
- Missira Structure.
- Fatima-Sira Structure.
- Kaviar-Tiwana Corridor.
- KB Trend.

These structures vary from NNE to ENE striking and several appear to have pronounced bends e.g., the KB Trend. Some third order splays and north-south striking structures have also been identified; however, the interpretation of third order and higher syn-mineralisation structures is incomplete and associated with increased uncertainty.

Intense brecciation is intersected in both the Central Zone (CZ) and Northern Zone (NZ) of the Massawa deposit and also at Samina. In the CZ, hydrothermal breccias occur at the edges of a gabbro which had earlier intruded the system. Local occurrences of this facies are also seen in the footwall, within the greywacke and related to brittle-ductile shear zones. These rocks are associated with strong brittle-ductile fabrics (fracture stockworks), an intense silica-sericite-carbonate alteration and quartz veins and abundant sulphides hosting high-grade mineralisation.

In the CZ, the brecciation is essentially tectonic, although it is locally reinforced by the hydrothermal brecciation. The silicified host rocks are fractured with isolated large clasts that were subsequently cemented by sericite-carbonate and minor fine-grained quartz. Wide quartz veins recrystallised at their margins are located between the clasts. Opaque minerals are aggregated on clasts, at the edges of the clasts and along thin early veins and fractures; however, they are not abundant and this facies is less mineralised compared to the hydrothermal breccias identified towards Massawa North. In the north, the increasing ductile component, in combination with the brittle deformation, strongly breaks up the early veins. This process isolated large clasts of quartz and carbonate and boudinage (up to 340 µm wide) in these primary veins.

Gold mineralisation is found in various lithologies but is structurally controlled with anastomosing graphitic structures in the North1 and North2 domains. There are varying degrees of intensity of the silica-carbonate-sericite-pyrite-arsenopyrite alteration and locally brecciation and brittle fracturing are associated with the gold mineralisation.

Two phases of mineralisation are noted at the Massawa deposits:

- Early disseminated pyrite and arsenopyrite-rich mineralisation in which gold generally occurs as inclusions and solid solution within arsenopyrite and arsenian pyrite. Mineralised Phase 1 arsenopyrite and pyrite are accompanied by minor stibnite, tetrahedrite, galena, and cobaltite, generally as inclusions in pyrite, indicating an overall Phase 1 metal association of As, Au, Pb, Ni, Co, Sb, Cu, and Sn. Metallogenic test work indicates gold associated with Phase 1 mineralisation is refractory.
- Later gold mineralisation associated with quartz-stibnite veins that locally host free gold. Other Phase 2 sulphide minerals include relatively small amounts of arsenopyrite compared with that present in the Phase 1 assemblage, traces of tetrahedrite, aurostibite, and a variety of secondary Pb, Sb, ±Ag minerals, indicating an overall Phase 2 metal association of Sb, Au, As, Pb, Ag, ±Cu, ±Sn. The disseminated pyrite is commonly found along the SSC and is non-refractory.

The Bakana Corridor hosts gold that is transitional between non-refractory and refractory. The MTS which hosts the Massawa, Samina and Delya deposits commonly host refractory styles of mineralisation.

7.2.4 Kanoumba Exploration Permit

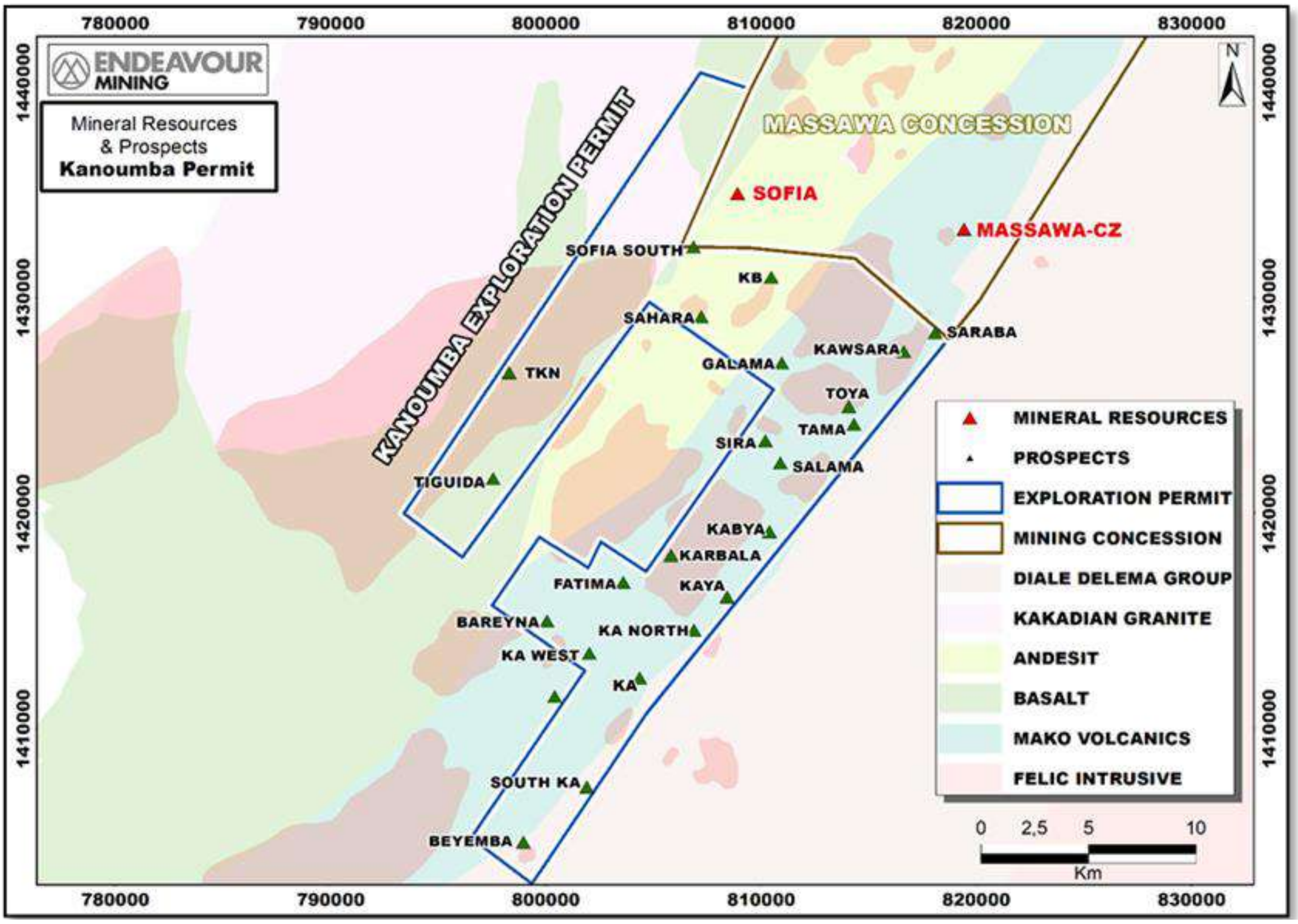
The Kanoumba Permit is geologically composed of:

- A sequence of northeast trending meta-sediments in the eastern part - schists and phyllites of the Diale-Dalema Supergroup.
- Gabbro and volcano-sedimentary rocks (mainly felsic tuffs) in the centre.
- An andesitic sequence with chert and intercalated sediments in the west.
- The Tinkoto pluton (quartz-diorite to tonalitic) occurs in the central-north part.

The two Supergroups are separated by a regional (dextral?) fault, the Main Transcurrent Shear Zone (MTS, Ledru & al, 1991). Several intrusives, from mafic to quartz–feldspar porphyry, occur in the Licence. The geology has been regionally metamorphosed to greenschist facies and the packages in general display a prominent foliation.

The Kanoumba Exploration Permit geology, deposit and prospect locations are shown in Figure 7.2.5.

Figure 7.2.5 Kanoumba Exploration Permit Geology



Source: Endeavour, March 2022.

On a regional scale, it is interpreted that the lithologic units in the Kanoumba Permit are part of a large fold closure which contains several smaller recumbent and isoclinal folds. The fold closure extends into the Mako Licence to the west. In places, the recumbent and isoclinal folds have been affected by shearing and thrusting, forming prime targets for exploration. The meta-sediments in the east appear to be steeply dipping and highly sheared. The homogeneous nature of this unit leaves little opportunity for structural dilation and hence decreases the potential for gold mineralisation. Flat dipping units derived from drill hole sections in the south could be related to thrusting or folding.

Interpretation of previous drilling and remote data suggest east verging recumbent folds that may have developed in the hanging wall of thrusts/reverse faults. Mineralisation has possibly been focused in flat structures or stockworks that developed in the hanging wall settings.

Mineralisation is interpreted to be hosted within fold closures or associated with thrusting or shearing occurring subparallel to, or along limbs to fold closures. At the Kanoumba KB deposit, a regional scale northeast trending thrust set occurs along the limb of the major fold closure, explaining the northeast orientated soil anomaly. A similar but smaller scale setting occurs to the southwest. At the Kanoumba KC deposit and to the northwest of Kanoumba KA deposit, thrusting and shearing occurs in the vicinity of a fold nose. In the eastern section of Kanoumba KA deposit, the major fold limb proximal to the fold nose is sheared.

Gold has been recovered by numerous small scale orpailleurs in the vicinity of the Tinkoto pluton where gold bearing quartz veins are found along the western margin of the pluton within the felsic to intermediate volcanic unit. Gold mineralisation is associated with silica, carbonate, pyrite, and locally tourmaline. At the Kanoumba KA and KC deposits, arsenopyrite is noted. Deformation is brittle with fractures and quartz veins (stockwork like). The Kanoumba KA and KC deposits are hosted mainly in the volcano-sediments, while the Kanoumba KB deposit is hosted in the intrusive.

7.2.5 Bransan Lot A Exploration Permit

The Bransan Lot A Exploration Permit geology, deposit and prospect locations are shown in Figure 7.2.6.

The eastern and western parts of the Permit are covered by a lateritic plateau, comprising iron cemented transported materials and ferricrete, which generally covers areas inferred from aeromagnetic data to be a syn-tectonic granite.

In the southern-central part of the Permit, the topography is higher and there are relatively fresh outcrops of greenstone terrain. This central area of greenstones is the principal target for gold exploration and is identified in aeromagnetic data as a major pressure shadow area in the northern part of the late-stage circular Faloumbo Granite.

Basalt, tuffaceous basalt, basaltic tuffs and gabbroic rocks are exposed within the southern central part of the Permit. They represent approximately 90% of the outcrop. Metamorphic grade is greenschist and the basalts tend to be porphyritic in texture.

Quartzite or cherty mylonite is common within the area and this rock type may represent interflow sediments which have subsequently focused most of the regional strain. They are concordant with metabasalt forming bands and lenses. The quartzites are white, yellow, pink, or red to dark black in colour. These rocks have similar characteristics to the so-called mylonite within the Sabodala Mine sequence. The quartzites are strongly affected by regional tectonics and red and black samples are generally very rich in sulphides (pyrite and chalcopyrite). Field observations have identified sedimentary characteristics (epiclastic).

Meta-andesite form concordant bodies within the metabasites. They are recognised by their more massive texture and the specific porphyritic structure related to the abundance of feldspar crystals. Felsic porphyry and porphyritic rhyolites form apparently concordant bodies within the basalts. Albite alteration is common but no sulphides are visible.

A large tongue of granodiorite occupies the southern central part of the Bransan Lot A Permit, intruding the basaltic terrain. Distinctly discordant, the granodiorite probably represents a late-stage intrusion.

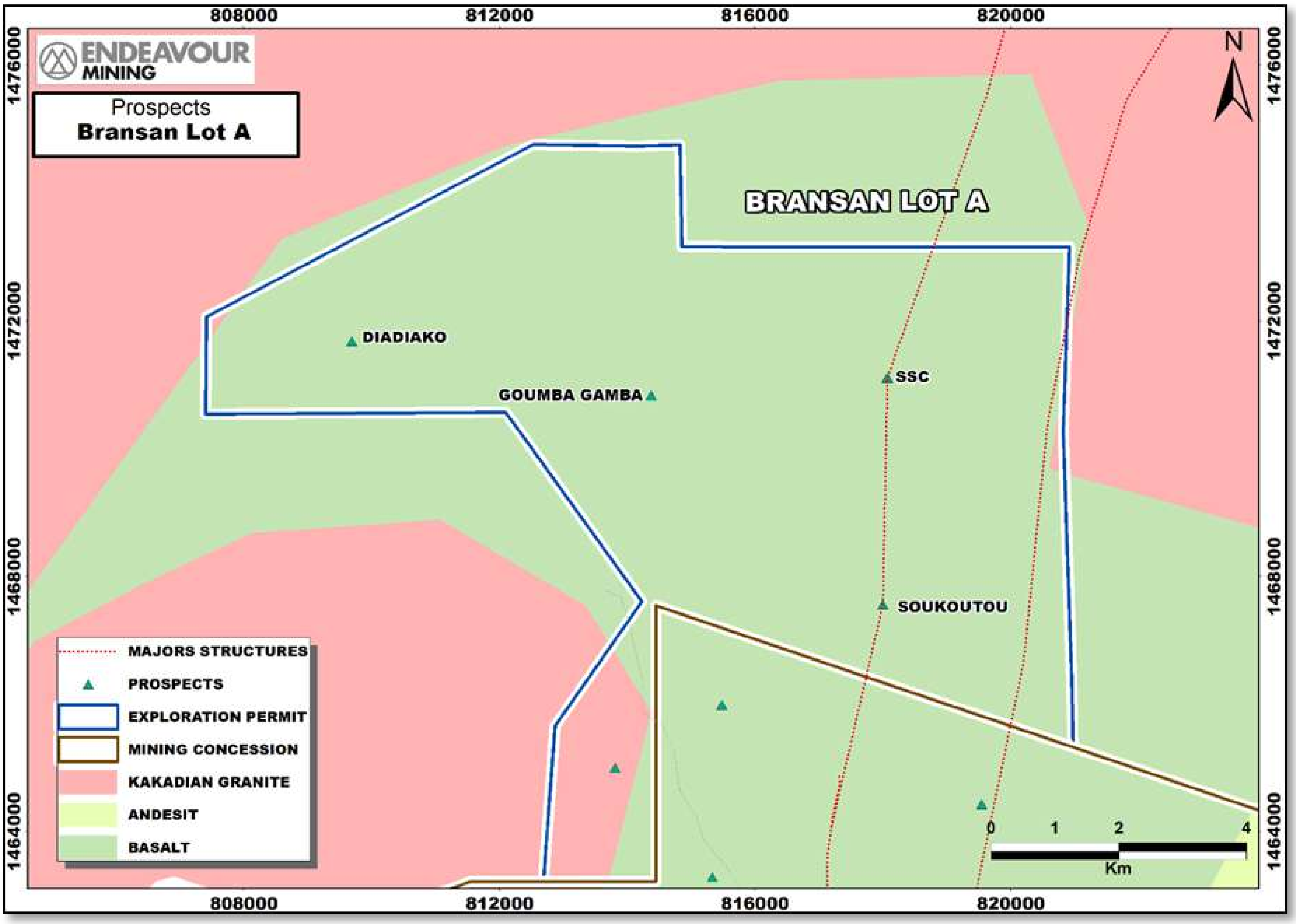
The Bransan Lot A Permit covers the northern pressure shadow area of a major north trending structural zone, which includes the Sabodala Shear Zone. The pressure shadow effect is the result of the structure paralleling a gneissic basement zone to the west and the influence of two syntectonic granites, one to the southeast (the Faloumbo Granite) and the second (unnamed) located some 10 km to the northeast of Bransan village. A key structure which can be interpreted from the magnetic data and seen on the satellite image, is a major discontinuity trending N10-N15° which crosses the central area from south to north. This structure could represent an extension of the Sabodala Shear Zone.

Schistose rocks have a foliation trending N350° to N20° and dipping (40 to 90)° W. Disseminated sulphides occur mainly as pyrite (5%).

Bransan Lot A gold mineralisation occurs within a sequence of multiply deformed mafic to ultramafic rocks. The metamorphic grade is approximately middle greenschist facies. Gold mineralisation is associated with quartz, sericite, ankerite/siderite veining and orange coloured silica-albite-carbonate-pyrite alteration.

Hydrothermal quartz stockworks containing sulphides have been identified on two basalt hills and beside the contact meta-basalts/meta-andesites. The hill stockworks are linked to the intersection of east-west and north-south structures. Several quartz veins have been identified in the central area, some of which are in excess of 300 m long. Generally strongly fractured, they contain secondary manganese oxides. It is considered that low tenor disseminated pyrite within the meta-basalts is metamorphically derived. Significant quantities of pyrite (up to 15%) and chalcopyrite found in the black quartzites and minor pyrrhotite found in metabasalt, could be result of hydrothermal alteration.

Figure 7.2.6 Bransan Lot A Geology



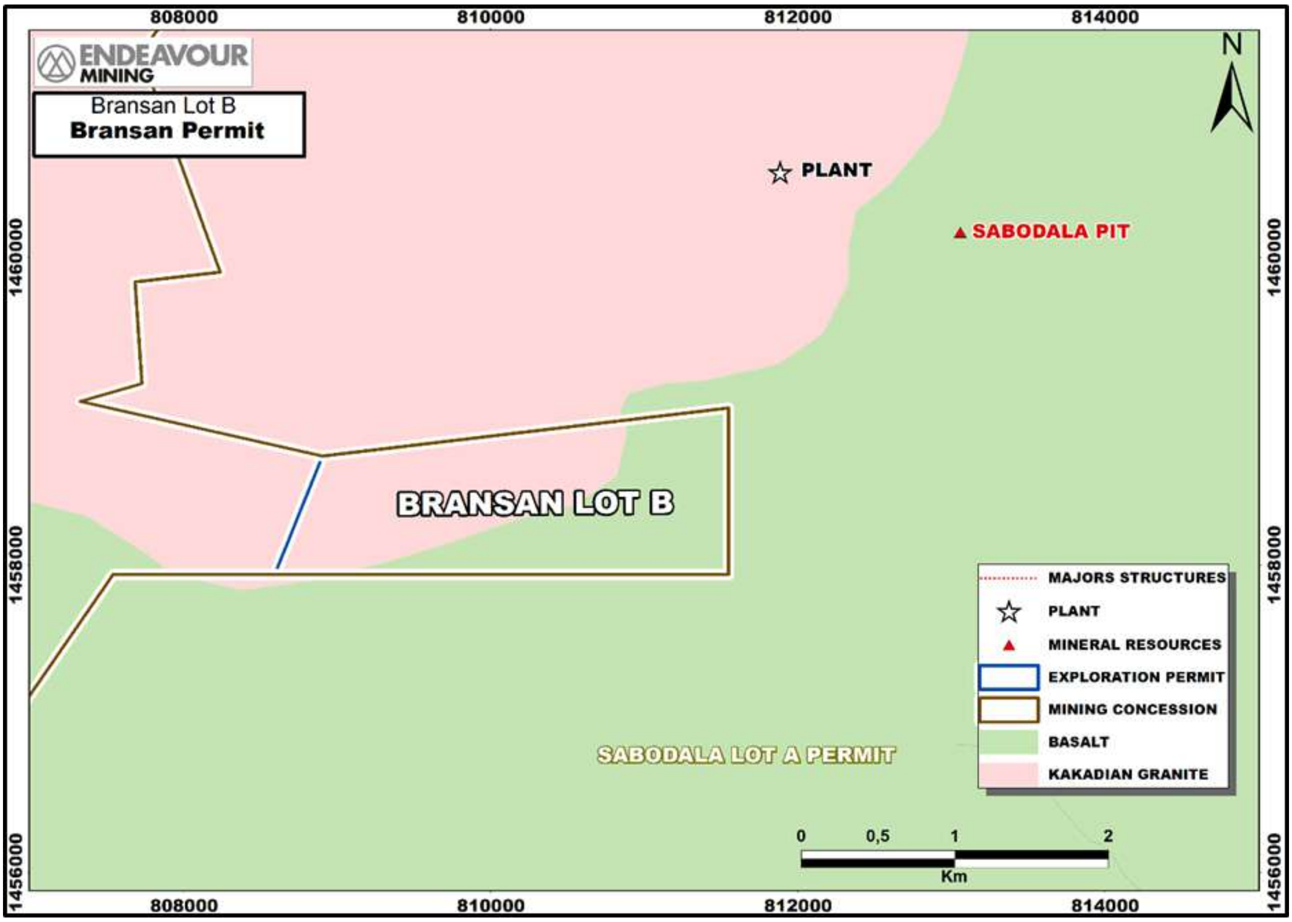
Source: Endeavour, March 2022.

7.2.6 Bransan Lot B Exploration Permit

The Bransan Lot B Exploration Permit geology, deposit and prospect locations are shown in Figure 7.2.7.

The Permit area is small and hosts lithological units similar to those on the Sabodala Mining Licence.

Figure 7.2.7 Bransan Lot B Geology



Source: Endeavour, March 2022.

7.2.7 Bransan Lot C Exploration Permit

The Bransan Lot C Exploration Permit geology, deposit and prospect locations are shown in Figure 7.2.8.

The Bransan Lot C Permit is interpreted to be underlain mainly by the turbiditic sedimentary rocks of the Diale-Delama Supergroup. Principal lithologies in this area comprise a thick sequence of bedded turbiditic sandstone, siltstone and mudstone. Bedding in most areas dips west-northwest moderately to steeply, although variations to shallow and moderate east-southeast dips occur locally. Bedding in trenches within prospects and isolated outcrop exposures observed throughout the area is generally upright and faces west toward the Mako Belt, based on facing indicators such as common graded bedding and local load casts and scours.

The Diale-Delama sequence is intruded by several phases of intrusions having differing ages and a range of compositions. Most are small stocks and dykes, the former which generally are less than two kilometres in length and a few hundred metres wide. They are often preferential hosts to gold-bearing quartz veins, generally as sets of extension veins and associated with minor shear zones which cross them. Common varieties include gabbro, quartz-feldspar porphyritic felsic intrusions, and medium to fine-grained probable granodiorite. Thermal aureoles around some form hornfels zones, or are spatially associated with areas of higher, upper greenschist, metamorphic grade. The intrusions become more abundant westward toward the transition to the Mako Supergroup where some tectonic interleaving of the intrusions and sediments may occur, and in the transition area larger granitoids intrusions are also present. Dykes of the different intrusive types typically trend northeast, shallowly oblique to the strike of bedding, with steep dips.

Three main geological units within a section of the Dalema Supergroup have been recognised:

Volcanogenic Units

These are in the western part of the Permit. Ground reconnaissance mapping has revealed various lithologies, including; ash-fall tuffs, ignimbrite units, minor mafic volcanics and intrusive and an interpreted flat lying ultramafic sill.

Sedimentary Units.

Constituted of greywackes, siltstones, and shales and occurring in the eastern portion of the Permit.

Felsic Tuffs

Located in the northern part of the Permit. This unit is oriented N340 to N360° and is often massive and laminated in the eastern portion where a superposition of magnetic and radiometric anomalies occurs.

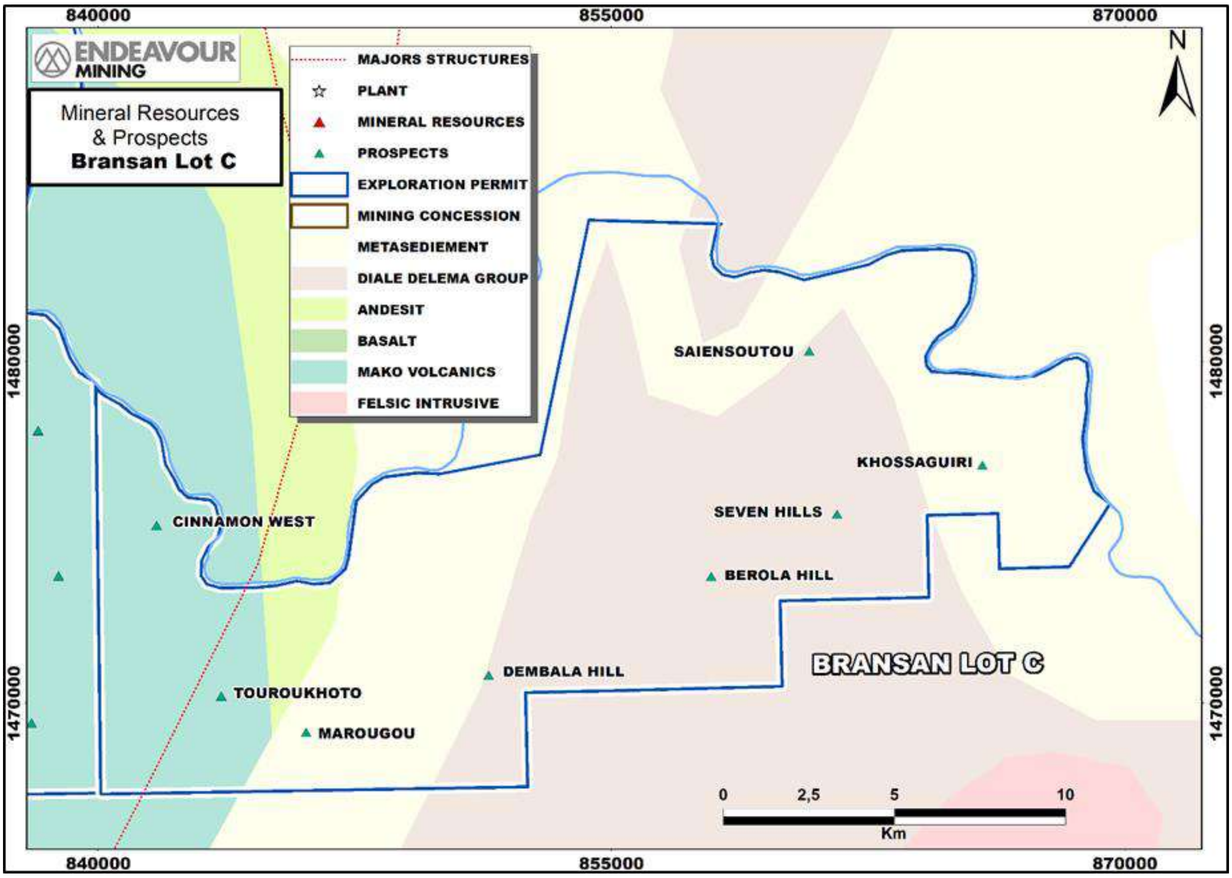
Younger basic dykes have been identified within the sedimentary and felsic units trending northeast and northwest.

North-northeast striking faults are highlighted in the western volcanic sequence of the Permit and in the suture one between the western volcanogenic sequence and the eastern sedimentary sequence. These may represent a possible thrust feature occurring at the contact between Mako Volcanics and the Dialé Sediment package. Northeast striking cross faults are generally limited in nature and are more prevalent in the eastern sedimentary sequence. An exception is the large scale Goundemekho Fault that appears to truncate and offset all north-northeast striking units in a dextral sense.

Localised shear zones and ladder veining are noted in various positions throughout the Permit. East-west trending ladder veins of quartz are noted throughout the Permit and are interpreted to have developed in response to north-northeast oriented shearing of sedimentary units. These ladder veins host most of the gold mineralisation in the Goundemekho Central Area.

Field mapping in zones of historical and current artisanal gold production has revealed that mineralised units are generally hosted within hematite ± pyrite altered sedimentary (psammitic) rocks that have been subjected to sinistral shearing with some compressional component. Gold mineralisation preferentially appears focused within large scale (over 50 m in length), ladder quartz veins which often strike approximately at right angles to both bedding and layer parallel shearing.

Figure 7.2.8 Bransan Lot C Geology



Source: Endeavour, March 2022.

7.2.8 Sounkounkou Exploration Permit

The Sounkounkou Exploration Permit geology and prospect locations are shown in Figure 7.2.9.

The Permit follows the Senegal-Mali border to the north and spans the entire Mako Group of mafics and sediments, bound to the west by the Kakadian Batholith at Massakounda and by the MTS Zone to the east.

The principal lithologies in this area comprise a thick sequence of bedded turbiditic sandstone, siltstone and mudstone. Bedding dips at a moderate to steep angle towards the west-northwest, although variations to shallow and moderate east-southeast dips occur locally. Bedding in trenches within prospects and isolated outcrop exposures observed throughout the area is generally upright and faces west toward the Mako Belt, based on facing indicators such as common graded bedding and local load casts and scours.

The Diale-Delama sequence is intruded by several phases of intrusions having differing ages and a range of compositions. Most are small stocks and dykes, the former which generally are less than two kilometres in length and a few hundred metres wide. There are often preferential hosts to gold-bearing quartz veins, generally as sets of extension veins and associated with minor shear zones which cross them. Common varieties include gabbro, quartz feldspar porphyritic felsic intrusions, and medium to fine-grained probable granodiorite. Thermal aureoles around some form hornfels zones, or are spatially associated with areas of higher, upper greenschist, metamorphic grade. The intrusions become more abundant westward toward the transition to the Mako Supergroup where some tectonic interleaving of the intrusions and sediments may occur, and in the transition area larger granitoids intrusions are also present. Dykes of the different intrusive types typically trend northeast shallowly oblique to the strike of bedding, with steep dips.

Bedding changes in the Diale-Dalema turbidite sequence records an early phase of probably tight folding which has no associated foliation. The significance of this event is unclear due to limited exposure, but it is sufficiently widespread that regional associated fold patterns are likely developed. A dominant, northwest trending and northwest dipping foliation is superimposed on the early folds and obliquely crosses fold limbs. The foliation is penetrative and defined by alignment of phyllosilicate minerals in fine grained silty and muddy beds, and by a spaced cleavage in sandstone. Minor folds to which the foliation is axial planar are locally present and may reflect the presence of larger folds which could form interference patterns with the older folds.

Three general orientations are noted in the Sounkounkou Permit, namely:

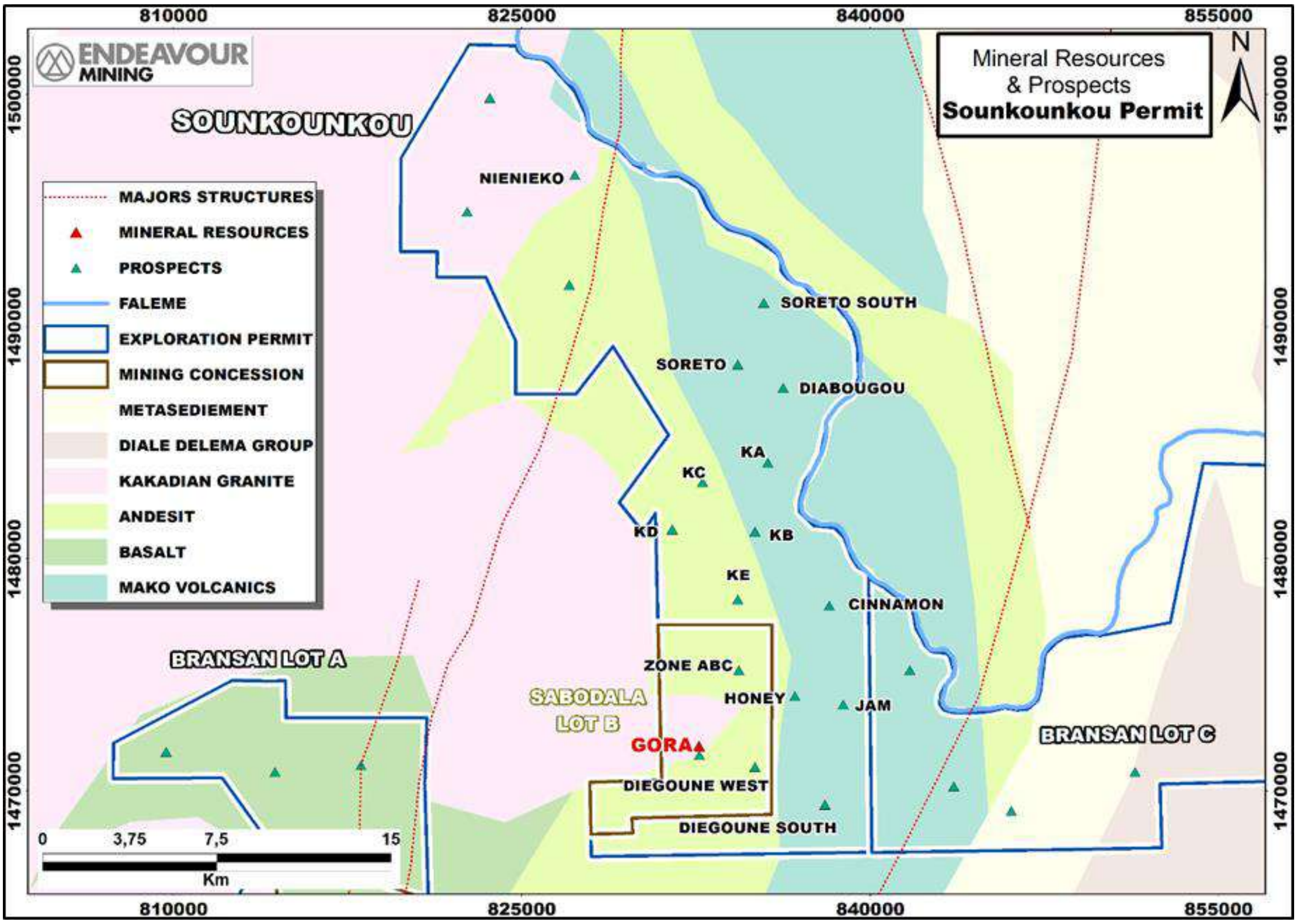
- The north-northeast – south-southwest direction is dominant and affects the entire Permit, visible on the aeromagnetic images and manifests itself on the ground by planes of stratification N20°30°E to N30°, with a weak to sub-horizontal dip (20°E) schistosity planes oriented N15°50°E, N20°20°E and N20°40°E.
- The northeast-southwest direction is present throughout the Permit and highlights the general orientation of granodiorites and meta-basalts. The orientation is observable on the pelitic shales which give stratification planes and schistosity plane oriented respectively N 30°45°E and N30°60°W.
- East-west to northwest-southeast orientations are noted at the Diabougou, Sounkounkou KA and Sounkounkou KB targets and correspond to the orientation of certain elongated dolerite N090°25°S and quartz veins oriented N250° 30°S.

Several types of alteration have been described in the area including carbonisation linked to albitisation, chloritisation, sericitisation in the deep parts of boreholes and finally silicification.

Metallogenic studies carried out in this part of the Mako Supergroup indicate the presence of sulphide mineralisation represented by pyrite, arsenopyrite and chalcopyrite within which gold is generally disseminated. Pyrite is prevalent in the area and reveals two different forms:

- Type 1 Pyrite (I) presents as an irregular shape due to the process of dissolution.
- Type 2 Pyrite (II) is characterised by a euhedral form.

Figure 7.2.9 Sounkounkou Permit Geology



Source: Endeavour, March 2022.

7.3 Deposit Geology and Mineralisation

The Sabodala-Massawa Project hosts a multitude of known deposits and prospects as presented in Table 7.3.1. There is significant exploration potential still to be followed-up on the tenements which may lead to the identification of additional prospects and deposits. Each of these deposits is discussed in further detail in Sections 7.3.2 to 7.3.8.

Table 7.3.1 Summary of the Sabodala-Massawa Deposits and Prospects

<table>
<tr><th>Licence/Permit</th><th colspan="3">Deposits and Prospects</th></tr>
<tr><td rowspan="23">Sabodala Lot A Mining Licence</td><td colspan="3">Sabodala Deposit</td></tr>
<tr><td colspan="3">Mamasato Deposit</td></tr>
<tr><td rowspan="4">Niakafiri Area</td><td rowspan="3">Niakafiri East Deposit</td><td>Niakafiri Main</td></tr>
<tr><td>Dinkokono</td></tr>
<tr><td>Niakafiri Southeast</td></tr>
<tr><td colspan="2">Niakafiri West Deposit</td></tr>
<tr><td colspan="3">Maki Medina Deposit</td></tr>
<tr><td colspan="3">Goumbati West – Kobokoto (GKK) Deposit</td></tr>
<tr><td colspan="3">Masato Deposit</td></tr>
<tr><td colspan="3">Kinemba Deposit</td></tr>
<tr><td colspan="3">Kouroundi Deposit</td></tr>
<tr><td colspan="3">Kerekounda Deposit</td></tr>
<tr><td colspan="3">Kourouloulou Deposit</td></tr>
<tr><td rowspan="4">Golouma Area</td><td colspan="2">Golouma West Deposit</td></tr>
<tr><td colspan="2">Golouma South Deposit</td></tr>
<tr><td colspan="2">Golouma South Deposit</td></tr>
<tr><td colspan="2">Golouma Northwest Deposit</td></tr>
<tr><td colspan="3">Koulouqwinde Deposit</td></tr>
<tr><td colspan="3">Koutouniokollo Deposit</td></tr>
<tr><td colspan="3">Soukhoto and Faloumbo Area</td></tr>
<tr><td colspan="3">Goumbati East Prospect</td></tr>
<tr><td colspan="3">Malekoto Prospect</td></tr>
<tr><td colspan="3">Sekoto Prospect</td></tr>
<tr><td>Sabodala Lot B Mining Licence</td><td colspan="3">Gora Deposit</td></tr>
<tr><td rowspan="10">Massawa Mining Licence</td><td rowspan="2">Massawa Deposit</td><td colspan="2">Central Zone (CZ1 & CZ2)</td></tr>
<tr><td colspan="2">Northern Zone (NZ1 & NZ2)</td></tr>
<tr><td colspan="3">Delya Deposit</td></tr>
<tr><td colspan="3">Tina Deposit</td></tr>
<tr><td colspan="3">Bambaraya Deposit</td></tr>
<tr><td rowspan="2">Sofia Deposit</td><td colspan="2">Sofia Main Zone</td></tr>
<tr><td colspan="2">Sofia North Zone</td></tr>
<tr><td colspan="3">Samina Deposit</td></tr>
<tr><td colspan="3">Tiwana Prospect</td></tr>
<tr><td colspan="3">Makana Prospect</td></tr>
<tr><td rowspan="6">Kanoumba Exploration Permit</td><td colspan="3">KB Main (‘Kaviar’) Prospect</td></tr>
<tr><td colspan="3">KC (‘Kawsara’) Prospect</td></tr>
<tr><td colspan="3">Sofia South Prospect</td></tr>
<tr><td colspan="3">Sira and Galama Prospects</td></tr>
<tr><td colspan="3">Bareyna Prospect</td></tr>
<tr><td colspan="3">Tiguida Prospect</td></tr>
<tr><td rowspan="2">Bransan Lot A Exploration Permit</td><td colspan="3">Goumbou Gamba</td></tr>
<tr><td colspan="3">Diadiako</td></tr>
</table>

Table 7.3.1 Summary of the Sabodala-Massawa Deposits and Prospects

<table>
<tr><th>Licence/Permit</th><th colspan="2">Deposits and Prospects</th></tr>
<tr><td>Bransan Lot B Exploration Permit</td><td colspan="2">-</td></tr>
<tr><td>Bransan Lot C Exploration Permit</td><td colspan="2">Marougou Deposit
Tourokhoto Prospect
Goundameko Prospect
Dembela Hill Prospect
Saiansountou Prospect</td></tr>
<tr><td rowspan="2">Sounkounkou Exploration Permit</td><td>Soreto-Diabougou</td><td>Soreto Prospect
Soreto North Prospect
Diabougou Prospect</td></tr>
<tr><td colspan="2">Nienienko Prospect
Cinnamon Prospect
Honey Prospect
Jam Prospect
KA Prospect
KB Prospect
KC Prospect
KD Prospect</td></tr>
</table>

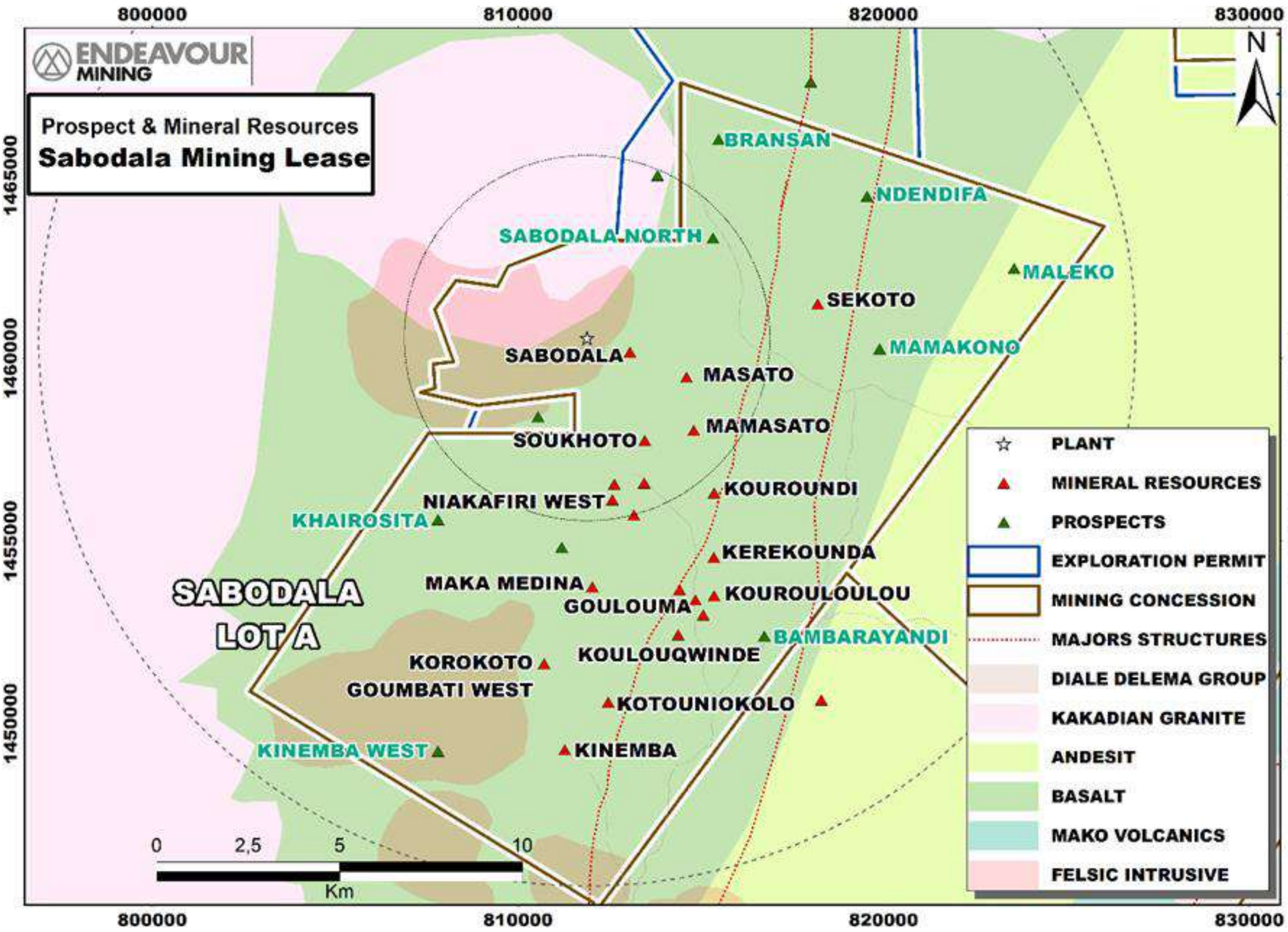
7.3.1 Sabodala Lot A Mining Licence

The Sabodala Mining Licence geology, deposits and prospects are shown in Figure 7.3.1 and listed below:

- Sabodala Deposit.
- Mamasato Deposit.
- Niakafiri Area, comprising:
  - Niakafiri East Deposits (made up of Niakafiri Main, Dinkokono and Niakafiri Southeast).
  - Niakafiri West Deposit.
- Maki Medina Deposit
- Goumbati West – Kobokoto (GKK) Deposit.
- Masato Deposit.
- Kinemba Deposit.
- Kouroundi Deposit.
- Kerekounda Deposit.
- Kourouloulou Deposit.
- Golouma Area, comprising:
  - Golouma West Deposit.
  - Golouma South Deposit.
  - Golouma Northwest Deposit.
- Koulouqwinde Deposit.

- Koutouniokollo Deposit.
- Soukhoto and Faloumbo Area.
- Goumbati East Prospect.
- Malekoto Prospect.
- Sekoto Prospect.

Figure 7.3.1 Sabodala Lot A Mining Licence Geology with Deposits and Prospects



Source: Endeavour, March 2022.

7.3.1.1 Sabodala Deposit

A sequence of mafic to ultramafic rocks has been multiply deformed and mineralised at Sabodala. The metamorphic grade is approximately middle greenschist facies.

The best-developed mineralisation extends from a chert unit westward to the ultramafic-hosted Ayoub's Thrust, in the steeply west-northwest dipping host sequence comprising the volcaniclastic unit, mafic volcanic units and gabbro that lie between the chert and the shear zone.

The Sabodala deposit comprises a network of mineralised shear zones and associated surrounding sets of quartz breccia veins and vein arrays that are discordant to, and cut across the hosting volcanic stratigraphy.

The deposit is developed over a strike length of at least 600 m from the Sutuba deposit southwest of the current open pit, northward to several hundred metres north of the open pit, where it is open at depth. Within and northward from the current open pit, the deposit plunges moderately to the north; at the south end of the deposit, the plunge is shallow to the south. The mineralisation plunge varies with the orientation of the principal mineralised structures and the intersections thereof.

Mineralisation is controlled by several structures at high angles to one another. The feeder zone is the ductile Northwest Shear (average 70°/065°) that is strongly altered and mineralised which cross-cuts, and offsets stratigraphy and older structures. For the bulk of mineralisation intersected, a brittle style of deformation predominates. Intense veining and brecciation are very common which overprint the moderately west-dipping Sabodala Shear. The only structure to exhibit ductile deformation characteristics and be strongly altered and mineralised is the Northwest Shear, with shear foliation defined by alteration minerals anastomose around boudinaged quartz veins.

Three phases of alteration (paragenetically silica-hematite, albite-quartz, and sericite-silica-carbonate) overprint the host rocks, with the bulk of gold mineralisation interpreted as being associated with the third phase. The intersection of the Northwest Shear and the mylonite-controlled brittle alteration zones creates a moderate northerly plunge to the mineralisation.

Gold mineralisation at the Sabodala deposit occurs in a combination of occurrences including:

- Continuous grey quartz shear veins along shear zone surfaces in the Main Flat and Northwest shear zones.
- In sets of quartz-carbonate-albite-pyrite extension veins.
- In coalescing extension and shear vein domains forming zones of quartz-carbonate matrix breccia.
- In areas of pervasive tan to pink coloured carbonate-albite-sericite-pyrite alteration which surrounds and links between veins, shear zones and breccia.

Gold mineralisation of all styles is associated with pyrite in association with extension and shear veins as clots, grains and along slips surfaces within veins, as pervasively disseminated envelopes around veins, and disseminated in broad zones of carbonate-albite alteration surrounding shear veins. Locally pyrite forms veinlets, which both cut across, and in other areas are cut by, quartz-carbonate albite veins, suggesting multiple pyrite generations, occurring within both pyrite veinlets and quartz-carbonate veinlets. Pyrite is variable in grain size and ranges from cubic to anhedral. Pyrite of all grain sizes from mineralised zones is spatially associated with grains of native gold along crystal margins, in fractures within pyrite, or encapsulated in pyrite grains. Coarse gold is absent (Ross and Rhys, 2009).

7.3.1.2 Mamasato Deposit

The Mamasato deposit is located approximately three kilometres southeast of Sabodala. Geologically, it consists of mafic metavolcanics that have been strongly deformed and sheared by an east-west striking, moderately north dipping, 30 m to 50 m wide shear zone. Several prominent, narrow, fine-grained, pink, felsic dykes occur proximal to the gold mineralisation. Minor intermediate dykes occur in both the hanging wall and footwall of the main shear. Oxidation at Mamasato extends to depths of (30 to 50) m.

Gold mineralisation at Mamasato consists of three narrow (2 to 10) m thick, sub-parallel zones that strike to the west and dip moderately to the north. These three narrow, sub-parallel mineralised zones are characterised by weak to moderate intensity, carbonate-dolomite-sericite-silica-pyrite alteration, with localised quartz veining hosted within strongly sheared mafic metavolcanics. Barren felsic dykes commonly intrude one of the three main gold zones, bisecting it into footwall and hanging wall components. Gold assay values are low to medium grade (0.5 to 3.0) g/t Au, with locally elevated values (5.0 to 14.0) g/t Au. Gold values show good continuity along a 650 m strike length and approximately 250 m down-dip within the central and western portions of the shear system.

7.3.1.3 Niakafiri Area

The Niakafiri Area is composed of two deposits, namely:

- Niakafiri East.
- Niakafiri West.

The Niakafiri deposits occur within a zone of highly magnetic mafic and ultramafic metavolcanics. The geology is dominated by a north-northeast trending, west dipping ductile shear zone, several tens of metres wide. The structural zone appears to continue from Masato southwards through Niakafiri, Maki Medina and Kobokoto to Kinemba. In both deposits, the carbonate dominated hydrothermal alteration is relatively widespread and fuchsite (Cr-mica) is present in addition to the carbonate-silica-sericite alteration assemblage, particularly within ultramafic units. Fine-grained pink coloured felsic dykes occur in close proximity to the mineralised shears. Deep oxidation has affected the mineralised zones.

7.3.1.4 Niakafiri East Deposit

The Niakafiri East deposit area consists of the former Niakafiri Main, Dinkokono, and Niakafiri Southeast deposits, which are located adjacent to and along strike from each other. Gold mineralisation is located within the north-northeast trending Niakafiri Shear Zone. Gold mineralisation comprises sets of quartz veins, shear veins and disseminated pyrite developed in the ultramafic-hosted carbonate altered ductile Niakafiri Shear Zone. Mineralisation is generally concentrated in areas of both most intense strain and is associated with pervasive dolomite-sericite alteration where networks of quartz extension and shear veins are developed, often spatially associated felsic dykes. The intersection of north-northeast and north-northwest trending shear vein sets and associated fringing sets of steeply dipping, east-west trending extension veins defines steep northerly plunging shoots.

7.3.1.5 Niakafiri West Deposit

The Niakafiri West deposit is located in a north-northeast trending shear zone that extends through the Sutuba and Soukhoto areas and is possibly associated with the Ayoub's Thrust at the Sabodala deposit. As at Niakafiri East, Niakafiri West area is characterised by north-northeast trending, steeply west dipping, strongly sheared, and altered mafic and ultramafic volcanic rocks.

Mineralisation is similar to the Niakafiri East deposit, comprising sets of variably deformed quartz extension veins and quartz-carbonate-sericite-tourmaline-pyrite shear veins developed in tan to pale green carbonate alteration zones in areas of high strain.

7.3.1.6 Maki Medina Deposit

The Maki Medina deposit extends across an approximately one kilometre strike length and is situated along the same steeply west dipping, north-northeast trending structural zone that hosts Masato and Niakafiri to the north and Kinemba to the south. At Maki Medina, the host mafic metavolcanics and tuffaceous volcanoclastic sediments are strongly sheared, carbonate dominated alteration is widespread. The main mineralised zone consists of several west dipping, variably sheared zones of quartz-carbonate alteration and quartz-carbonate-tourmaline veining. Several shear parallel, fine-grained, pink felsic dykes occur in close proximity to the mineralised shears. Deep oxidation has affected the mineral zones at Maki Medina. The deposit is divided into a larger northern zone and a smaller southern zone.

7.3.1.7 Goumbati West-Kobokoto (GKK) Deposit

The Goumbati West-Kobokoto deposit (GKK) is located southwest of the Maki Medina gold deposit and is hosted in an extension of the Niakafiri West Shear, the same steeply west dipping north-northeast trending structural zone that hosts Masato. The host mafic metavolcanics and tuffaceous volcanoclastic sediments are strongly sheared, carbonate dominated alteration is widespread. Deep oxidation has affected the mineralised zone.

The gold mineralisation occurs in a quartz vein system comprised of several zones occurring in a sequence of epiclastics and basalt. The main mineralised zone consists of a shallow west dipping, variably sheared zone of quartz-carbonate alteration and quartz-carbonate-tourmaline veining. The GKK deposit has a strike of over one kilometre.

7.3.1.8 Masato Deposit

The Masato deposit is located several kilometres to the north of Golouma West, within a zone of highly magnetic mafic and ultramafic volcanics. Masato is dominated by a north-northeast-south-southwest (approximately 020°) trending ductile shear zone, several tens of metres in width. The mineralisation is hosted in multiple shear fabric-parallel zones within the broader shear zone. This shear zone is traceable to the north and particularly to the south, where it appears to host further mineralisation at Niakafiri East.

The shear zone fabric dips approximately 70° west with local areas of intense metre-scale folding. Some ultramafic rocks are affected by the shearing and commonly appear 'greasy', possibly resulting from alteration by talc and serpentine. Carbonate dominated alteration is relatively widespread; however, fuchsite is present in addition to the carbonate-quartz-sericite assemblage, particularly within ultramafic units. Pink felsic dykes occur in close proximity to the mineralised shear zone.

In total, ten brittle fault zones and one discrete high strain shear zone have been modelled at the Masato deposit. The interpreted faults fall into two orientation trends; eight faults are oriented east-northeast - west-southwest and follow prominent linear magnetic breaks. Except for one subvertical fault, these faults dip moderately or steeply towards the northwest. Two other faults have been modelled broadly paralleling the axis of the deposit, striking north to south and north-northeast to south-southwest, dipping steeply towards the west.

Gold is hosted by a complex, north-northeast oriented shear zone which trends along the axis of the MTS Zone. The host rocks consist of strongly ductile-deformed greenschist facies (chlorite-epidote-carbonate) meta-basalts and meta-ultramafic (talc-serpentine) units. They have been hydrothermally altered by an iron-carbonate-silica-sericite-fuchsite and pyrite mineral assemblage. The presence of fuchsite is seen in the mafic to ultramafic units at Masato, where it imparts a bright green colouration. The most intensely altered zones are usually carbonate-silica-sericite-pyrite dominated and appear pale pink (salmon) to cream in colour and fuchsite is less significant. The most intense alteration is often associated with the presence of an intense crenulation cleavage.

Gold values are associated with intensely altered zones dominated by the presence of carbonate, silica and pyrite. Some textural evidence suggests that mineralisation is associated with a relatively late stage of the overall deformation framework. Gold distribution within the shear zones at Masato show a systematic northwest trending higher-grade shoot control.

The Masato deposit hosts multiple generations of mineralised veins. Early white-grey coloured quartz- feldspar veins are commonly highly deformed and do not contain anomalous gold values. Quartz-carbonate veins up to 0.5 mm thick are relatively common in the highly altered areas of the Masato deposit. The veins dip to the west and strike broadly parallel to the main trace of the deposit. Numerous felsic dykes occur in proximity with mineralisation at Masato.

The deposit has been defined over a strike length of 2.1 km. Mineralisation has been systematically drilled to a depth of approximately 250 m below surface and remains open at depth along most of its strike length.

7.3.1.9 Kinemba Deposit

The geology of the Kinemba deposit consists of massive to locally strongly sheared mafic metavolcanics intruded by a prominent magnetic mafic (gabbro) dyke and minor intermediate to felsic dykes. The shear zones and dykes commonly strike towards the northeast and dip moderately to steeply westward, parallel to the regional trend. Oxidation at Kinemba can reach depths of up to 70 m. Gold mineralisation at Kinemba is found in multiple zones of weak to moderate carbonate-albite-silica-sericite-pyrite alteration, varying in width from five metres to 30 m, which are hosted by strongly sheared mafic metavolcanic rocks. Mineralisation trends approximately north-northeast, dipping steeply westward (approximately 80°), and have been traced over a strike length of approximately 600 m to a depth of 200 m.

A prominent north-northeast trending, (20 to 40) m thick, massive mafic dyke intrudes and subdivides the zones of shearing and alteration into East and West parts. Zones of shearing and alteration on the west side of the dyke (hangingwall) exhibit stronger gold values and better continuity along strike and down-dip, versus the alteration and shearing observed on the east side (footwall) of the dyke

7.3.1.10 Kouroundi Deposit

The geology of the Kouroundi deposit consists of mafic metavolcanics which have been locally strongly deformed by two major shear zones. The main gold bearing shear zone strikes to the northwest and dips approximately 40° to the southwest and is generally (10 to 40) m wide. The second major shear zone is located at the southern end of the deposit and is perpendicular to the main gold bearing shear zone. The second shear zone strikes westerly, dips steeply to the north, is approximately (25 to 35) m in width and appears to cut off gold mineralisation where it intersects the main gold bearing shear. Prominent and minor intermediate dykes intrude both shear zones and are oriented generally sub-parallel to the strike of both shears. The most prominent intermediate dyke is located in the footwall of the gold bearing shear and is approximately 10 m in width and strikes towards the north.

Oxidation at Kouroundi is quite variable with oxidation in the hanging wall commonly extending down (30 to 50) m. Oxidation within the footwall is more intermittent with oxidation locally extending to depths of over 100 m, especially towards the north where the mineralised zone extends beneath a very thick laterite plateau.

At Kouroundi, the main gold zone has been traced by trenching and drilling for approximately 100 m along strike and approximately 150 m down-dip. It strikes to the northwest and dips shallowly to moderately (approximately 40°) to the southwest.

Gold mineralisation at Kouroundi is characterised by strong to intense carbonate-sericite-silica-albite-pyrite alteration with local quartz-tourmaline veining hosted in strongly sheared mafic metavolcanics.

7.3.1.11 Kerekounda Deposit

The Kerekounda deposit is located approximately 1.5 km to the north of the Golouma South deposit within the same east-northeast-west-southwest structural trend that hosts the mineralisation of the Golouma area. Kerekounda is hosted by weakly to moderately deformed mafic volcanics, similar to the host rocks at Golouma. The main ductile foliation orientation is 060°/240°, consistent with the east-northeast trending regional structure.

A relatively thick, un-mineralised north-northeast trending mafic dyke cuts the deposit and several smaller mafic dykes crosscut the mineralisation. Additionally, felsic dykes occur in the hanging wall and along the contact between the mafic volcanics and tuffaceous sediments within the footwall to the mineralisation.

Three distinct shear zones host the mineralisation at Kerekounda. Each zone typically ranges from one metre to 10 m wide and high-grade shoots plunge steeply toward the west-northwest. The plunging shoots appear to be controlled by the intersection of the regional north-northeast trending shear zone fabric (which controls the location of mineralisation in the Golouma-Kerekounda area) with the discrete north-northwest trending shear zones that host the mineralisation. Of the three mineralised shears, it is the eastern most shear which is most prevalent. It comprises a quartz-carbonate vein and multiple veins and/or vein breccias within a broader zone of carbonate dominated alteration. The highest gold grades occur with the quartz veins, especially those containing tourmaline while lower grades are generally found in the adjacent altered rock.

7.3.1.12 Kourouloulou Deposit

The Kouroulouloou deposit is situated directly west of the northern continuation of the Golouma South shear zone. Gold mineralisation is associated with areas of highly ductile deformed mafic metavolcanics. The deposit consists of four broadly east-southeast striking mineralised veins arranged parallel to each other, within a zone that dips steeply towards the south. A number of the veins are high grade in nature with native gold, similar in style to that observed at Golouma.

Four parallel, east-southeast striking mineralised quartz-carbonate veins occur within a zone that dips steeply towards the south. Its proximity, structural setting, similar mineral characteristics and abundant high-grade native gold indicate it is a Golouma-type deposit.

7.3.1.13 Golouma Area Deposits

The Golouma Area includes:

- Golouma West.
- Golouma South.
- The Golouma Northwest deposits.

The geology of the Golouma area is dominated by moderately deformed massive flows and pillowed basaltic rocks. The rocks are moderately chloritised, which in some instances is accompanied by the development of epidote replacement. Hydrothermal carbonate-dominated alteration overprints the rocks, which were deformed by ductile shearing. In areas of low strain, the alteration yields a wispy appearance, but in more highly deformed zones, it imparts a buff or salmon-pink colouration and is associated with anomalous gold concentrations. Several felsic dykes, up to five metres in width, occur throughout the Golouma Area and appear to be intimately associated with the gold mineralisation, particularly in Golouma South. A small number of mafic dykes have been recognised in drill core, including one larger gabbroic dyke approximately 12 m in width.

The Golouma Area is bound by two north-northeast trending zones of ductile shear which dip steeply to sub-vertically towards the west-northwest. The western shear zone is continuous to the north and south for several kilometres and hosts part of the Golouma West mineralisation (referred to as Golouma Northwest), as well as a thick gabbroic dyke. The eastern shear zone appears to converge with the western shear zone towards the south and hosts the Golouma South deposit within northeast trending anastomosing shear zones. The two northeast trending shear zones are linked by an east-west trending belt of intensely sheared and altered mafic volcanic rocks, approximately one kilometre in length. This zone dips steeply towards the south and hosts the main mineralised bodies of the Golouma West deposit.

7.3.1.14 Golouma West Deposit

The geometry of the Golouma West deposit consists of two broadly east-west trending shear zone-hosted, sheet-like bodies, which together have a total strike length of approximately 900 m and a north-northeast trending appendage, referred to as the West Limb. In plan, the east-west trending bodies are offset by approximately 140 m in a dextral sense along the east-northeast striking Golouma West Fault. As such, it appears these bodies were originally emplaced along a single east-west structure. The West Limb is approximately 200 m in length and dips moderately too steeply towards the west-northwest.

The principal zone of mineralisation at Golouma West changes orientation from east-west to north-northeast where it intersects a strong north-northeast oriented shear zone of the Sabodala Structural Corridor. In section, the main mineralised zone dips (75 to 80)° south, broadly parallel to the main east-west ductile cleavage.

Golouma West has been drilled to a depth of 350 m below surface, with widely distributed deep, step-out drilling intercepting mineralisation down to a depth of about 900 m. The West Limb dips at -65° west transitioning to approximately -45° at depths of 200 m. A series of thick northeast oriented quartz-carbonate veins define the trace of the sheet-like body, which has similar mineralogical and alteration characteristics to Golouma West. Mineralisation is open both to the east and west of the main east-west body although it appears to weaken to the east. High-grade shoot-controlled mineralisation remains open at depth in several areas of the deposit.

7.3.1.15 Golouma South Deposit

Golouma South occupies a north-northeast oriented ductile shear zone with mineralisation in a sheet-like body, dipping 50° to 65° west. Mineralisation has been defined over a strike length of approximately 640 m and down to 560 m below surface.

The deposit consists of sub-parallel mineralised zones coinciding with higher strain zones within the northeast oriented shear zone. Alteration consists of the same carbonate-silica-sericite-feldspar-pyrite mineral assemblage as at Golouma West. Like Golouma West, gold is associated with the highest strain parts of the shear zone, corresponding to areas of intense alteration and the presence of quartz veins. The veins are predominantly oriented parallel to the shear fabric and tend to be localised on the margins between high and low strain domains. The true thickness of the mineralised zones varies from two metres to 20 m but is typically five metres to 12 m thick. Gold distribution is more uniform than at Golouma West, but higher-grade shoots have been noted; these shoots plunge steeply toward the west-southwest and are thought to occur at the intersection between the northeast oriented shear zone and zones of intense east-west shearing.

7.3.1.16 Golouma Northwest Deposit

The Golouma Northwest deposit is located approximately one kilometre north-northeast of the Golouma West pit and 0.5 km northwest of the Kerekounda deposit. The main mineralised zone trends west-northwest, sub-parallel to the main Golouma West Zone. A fairly continuous zone of gold mineralisation has been defined and traced for approximately 400 m along strike and 120 m down-dip.

A barren mafic dyke is located at the eastern edge of the mineralised zone and has been interpreted to be the north-eastern extension of the mafic dyke that separates the Main Golouma West and Golouma West-West Zones. It is approximately (10 to 20) m in width, strikes to the north-northeast, dips steeply westward and crosscuts the main gold zone. The dyke appears to occupy a brittle fault with an apparent dextral offset of the main gold zone by approximately (10 to 20) m.

A felsic dyke intrudes the central portion of the mineralised zone and is interpreted to be the same felsic dyke that is present in the Kerekounda deposit. This dyke is approximately five metres to 10 m in width, strikes to the northeast, dips moderately northwest and crosscuts the main gold zone. The dyke appears to occupy a brittle fault with an apparent dextral offset of the main gold zone by approximately (15 to 20) m.

Alteration, characterised by a moderate to strong carbonate-sericite-silica-pyrite mineral assemblage, is accompanied locally by quartz-tourmaline veining. Gold values are generally moderate to high grade and generally range from (1.5 to 10) g/t Au, with local one metre intervals with up to 40 g/t Au.

The gold mineralisation at Golouma North is associated with three spatially close shear directions. Most of the gold intersections are associated with a north-northeast shear that is up to 20 m wide and extends at least 250 m along strike, while two other gold bearing shears trending east-northeast and northwest, cross into the main north-northeast shear.

7.3.1.17 Koulouqwinde Deposit

The Koulouqwinde deposit is situated within the southwest extension of the main structure that hosts the Golouma South deposit. The principal rock type is massive to sheared mafic metavolcanic with minor felsic and mafic dykes. The felsic dykes are massive, fine grained, pink/carbonate altered, approximately five metres to 10 m in width, and are hosted within north-easterly trending shear zones. The south-eastern most felsic dyke is interpreted to be an extension of the main felsic dyke (northeast trending) located in the hanging wall of the Golouma South deposit. A narrow mafic dyke, interpreted to be the south extension of the Kerekounda mafic dyke, crosscuts the northeast trending felsic dykes and shear zones, near the eastern end of the deposit.

Low-grade gold mineralisation at Koulouqwinde is hosted primarily within several sub-parallel northeast trending shear zones. The shears are generally (10 to 20) m in width and dip steeply to the northwest. Alteration within the shears is comprised of moderate to locally intense, patchy to pervasive silica-albite-carbonate-sericite-iron carbonate with traces of pyrite and minor quartz-tourmaline veining.

Narrow (about one metre wide) high grade quartz-tourmaline veining has been observed on surface as well as in drill-core. The veining is hosted within massive mafic volcanic units that are intercalated with sub-parallel, northeast trending shear zones. Due to the limited distance between the bounding shear zones, the strike length and plunge of the veins is interpreted as being limited to approximately (50 to 75) m. The veins generally strike east-northeast and dip steeply towards the southeast.

7.3.1.18 Koutouniokollo Deposit

The geology at the Koutouniokollo deposit consists of strongly deformed mafic metavolcanics and minor volcanoclastic sediments which are locally intruded by fine-grained pink felsic dykes. The mafic metavolcanics have been strongly deformed by two separate shear zones, with shearing oriented either west-northwest or north-northeast.

Gold mineralisation at Koutouniokollo is located in two structural/alteration zones and in northwest trending brittle veins. The first structural trend strikes to the north-northeast and dips steeply west-northwest. Two separate, parallel zones of mineralisation have been encountered along this trend for approximately 230 m along strike and 150 m down-dip. Mineralisation is characterised by strong to intense carbonate-silica-albite-sericite alteration, with local silicification and carbonate-quartz-tourmaline veining hosted in strongly sheared to locally brecciated mafic metavolcanics over widths of 10 m to 30 m. The second zone of mineralisation is hosted by a west-northwest striking moderately to steeply southwest dipping shear zone. Gold mineralisation along this structure is more sporadic, except in the vicinity of the intersection with the north-northeast structure. Anomalous gold mineralisation is associated with quartz-tourmaline veining and pervasive silicification.

Gold values at Koutouniokolla can be highly variable. In the north-northeast structure, gold values are generally continuous down-dip and along strike to the southwest of the intersecting west-northwest structure. Gold assay values can span from moderate (2.0 g/t Au) to high (20 g/t Au) over significant widths. To the north of the intersection, alteration and shearing continues in strength, but gold values drop off dramatically.

Gold values in the west-northwest trending structure are generally insignificant except those within 50 m to 75 m of the structural intersection with the north-northeast trending structure. In this area, higher grade gold mineralisation (5.0 to 100) g/t Au, over widths of three to five metres have been encountered in several holes. The differences in grade between the two zones can be explained by the quantity of quartz-tourmaline veining, with higher grades following higher percent veining. The exact controls of favourable alteration and veining are currently poorly understood.

7.3.1.19 Soukhoto and Faloumbo Area Prospects

The Soukhoto and Faloumbo areas contain widely spaced east-northeast trending and steeply dipping quartz veins that vary from five centimetres to 50 cm thick, with strike lengths of at least several tens of metres. The veins occur in foliated mafic volcanic rocks and comprise white quartz with local prismatic fill and have thin foliated envelopes. These veins occur in areas of high strain between the more intense shear zones and associated subsidiary structures, potentially linking between the larger shear zones or occurring in areas of strain accommodation at bends and terminations of individual shear zone strands.

Gold particles vary in size from very fine to approximately one millimetre in dimension. Chlorite-calcite alteration is locally present, as is silicification. Both styles of alteration have disseminated pyrite throughout; fine-grained pyrite is also evident around vein selvedges.

7.3.1.20 Goumbati East Prospect

The Goumbati East Prospect is located three kilometres southwest of the Golouma West deposit and is hosted within the same north-northeast trending regional structure. This prospect has been outlined by soil geochemistry over a strike length of approximately 400 m and drilled along a 200 m strike length. A narrow, altered, shear hosted quartz vein system with local widening, within hosting mafic volcanic and intrusives has been partially delineated by drilling but the strike length appears limited.

7.3.1.21 Malekoto Prospect

Malekoto mineralisation is hosted within a broad north-northwest oriented granitic body intruding mafic volcanics and tuffaceous sediments within the regional north-northeast trending structural corridor. An oblong, 600 m by 300 m gold geochemical anomaly was evaluated with mechanised trenching and later drilling. Malekoto comprises a series of both north-northwest and north-northeast trending, moderately dipping, silicified shear zones predominantly hosted by the granitic intrusive body.

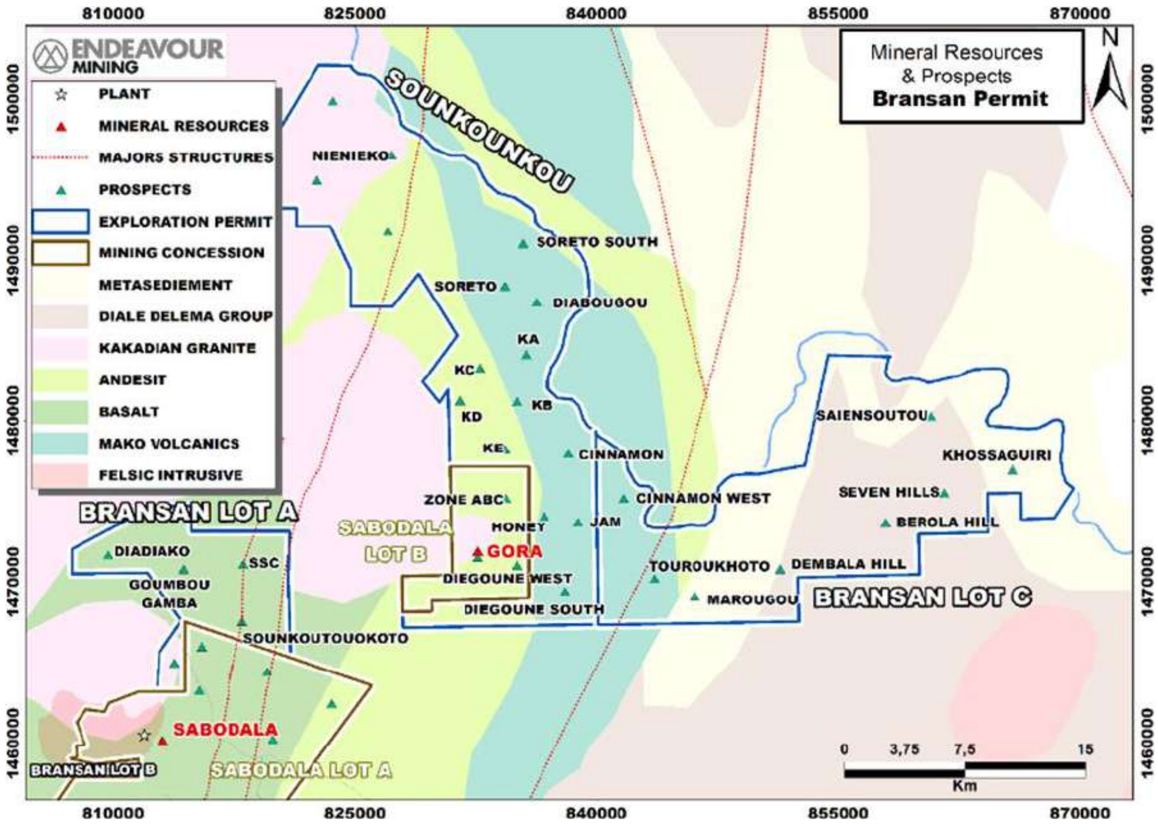
7.3.1.22 Sekoto Prospect

The Sekoto Prospect consists of a central granodiorite stock which has intruded adjacent, deformed to highly strained, mafic metavolcanics and sediments. Late, massive, fine grained, narrow, intermediate-mafic dykes intrude all of the units. Oxidation at Sekoto commonly extends (30 to 40) m below surface and to greater depth along structures and under laterite cover. Gold mineralisation at Sekoto is hosted within and along the margins of the variably altered, massive to weakly deformed, medium grained, granodioritic intrusive, associated with multiple sub-parallel zones of replacement-style pink carbonate-silica-pyrite alteration that range in thickness from three metres to 30 m. The zones strike towards the north or northeast and dip moderate-steeply towards the west. A relatively continuous body of low-grade gold mineralisation has been defined and traced on strike for approximately 350 m and down-dip for approximately 150 m. This zone remains open to the northeast and down-dip.

7.3.2 Sabodala Lot B Mining Licence

The Sabodala Lot B Mining Licence geology, deposit and prospect locations are shown in Figure 7.3.2. The principal deposit of interest on this Licence is the Gora deposit.

Figure 7.3.2 Sabodala Lot B Permit Geology with Deposits and Prospects



Source: Endeavour, March 2022.

7.3.2.1 Gora Deposit

The Gora deposit lies approximately 22 km northeast of the Sabodala processing plant, along the transition between the Mako and Diale-Dalema Belts.

Gora is hosted by a moderate to steep southeast dipping, northeast trending sequence of turbiditic sandstone, siltstone and mudstone which is at least locally overturned by tight to isoclinal folding which are consistently down facing towards the west. The sedimentary package hosting the veins is of undetermined thickness but is estimated to be in the order of (500 to 600) m thick.

At Gora, the sedimentary package is intruded and probably bounded by various sill-like intrusions to the east and west including gabbro, felsic porphyries, minor granitic dykes and large amounts of quartz-monodiorite plugs and dykes. The hosting sediments have been affected by upper greenschist grade metamorphic conditions, defined by aluminosilicate porphyroblasts and biotite, probably in the thermal aureole of the surrounding intrusions. Hosting lithologies contain a slaty foliation which strikes parallel but which dips variably with respect to bedding.

The Gora deposit is defined by a series of northeast trending, (45 to 55)° southeast dipping quartz veins. Two types of quartz are present - a white, unmineralised variety and a smoky, auriferous variety. Pyrite and trace amounts of chalcopyrite are present in both mineralised and unmineralised samples. Pyrrhotite is present in mineralised samples, intergrown in some cases with chalcopyrite. Veining extends for at least 700 m along strike, where in outcrop the veins form ridges resistant to weathering.

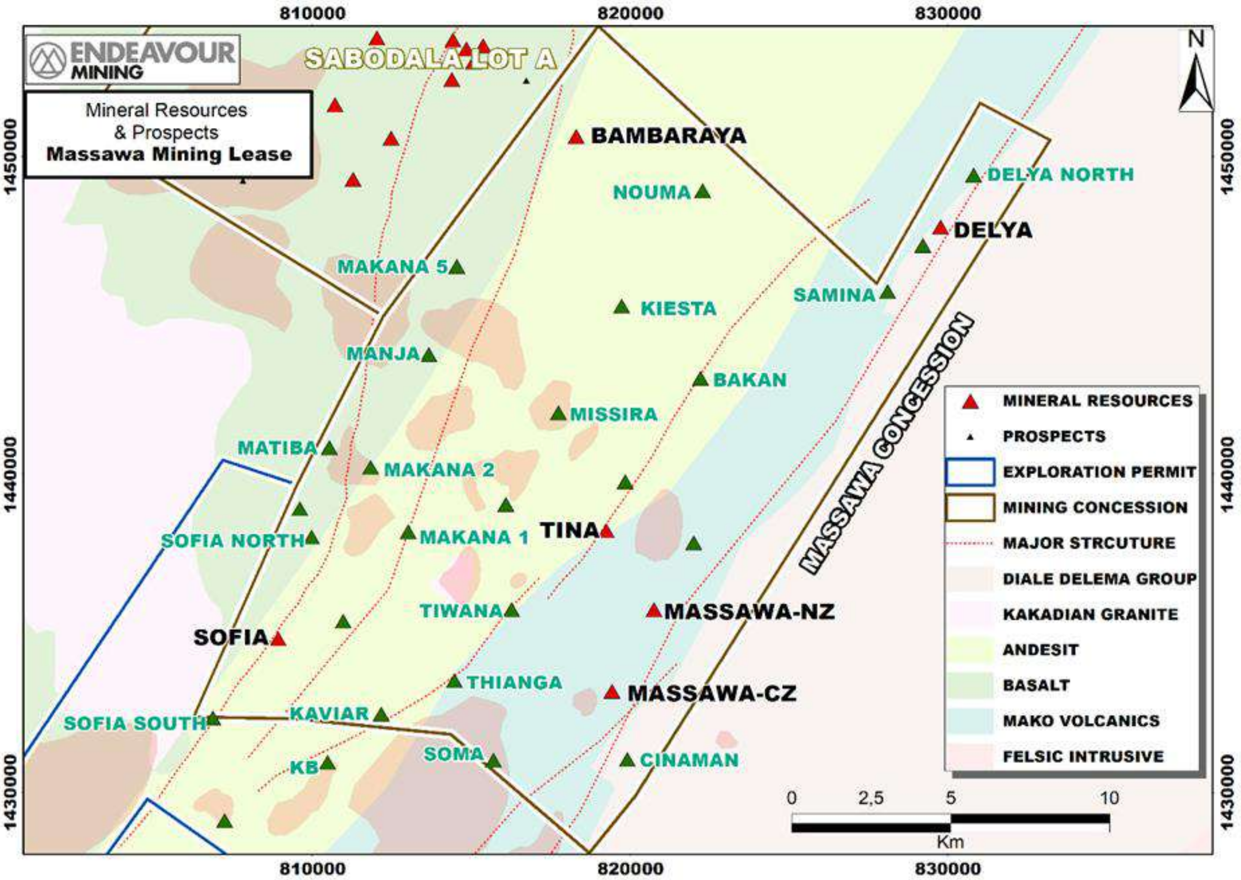
The gold is fine grained, with the largest particles observed measuring up to 120 µm, but mostly less than 50 µm. Visible gold has been observed in drill core. The gold occurs as free gold grains on the boundaries of quartz crystals. A very small proportion of gold is encapsulated or attached to pyrite.

7.3.3 Massawa Mining License

The Massawa Mining Licence geology, deposits and prospects are shown in Figure 7.3.3, and presented below:

- Massawa Deposit, comprising:
  - Central Zone (CZ1 and CZ2).
  - Northern Zone (NZ1 and NZ2).
- Delya Deposit.
- Tina Deposit.
- Bambaraya Deposit.
- Sofia Deposit, comprising:
  - Sofia Main Zone.
  - Sofia North Zone.
- Samina Deposit.
- Tiwana Prospect.
- Markana Prospect.

Figure 7.3.3 Massawa Permit Geology with Deposits and Prospects



Source: Endeavour, March 2022.

7.3.3.1 Massawa Deposit (North Zone and Central Zone)

At its northern end, the Massawa deposit is bounded by two prominent carbonaceous shale layers which act as the hangingwall and footwall of the mineralisation. The carbonaceous shale is very fine grained, well laminated and is inter-bedded with the coarser-grained greywackes. Layers are variable in thickness, on a millimetre scale, and form discontinuous lenses. Graphitic bands are common where the rock is more deformed and these units are referred to as graphitic schists. The greywacke and shale package displays soft sediment deformation fabrics typical of turbidite systems including load casts, slump and flame structures and intra-sedimentary faults.

Two main concordant gabbroic bodies are present at Massawa. They are interpreted as sills and are up to 30 m in thickness, although towards the north they occur as narrow bands ranging from (0.5 to 18) m in thickness. The gabbro units predate shearing and host gold when intersected by the mineralised structures. Outside of the mineralised system, gabbro sills are massive and coarse grained.

Quartz porphyry and fine-grained felsic sills, forming sheets two metres to 60 m thick, occur throughout the deposit but are generally thicker and more abundant in the southern portion of the deposit. The porphyries are intrusive into the volcano-sedimentary sequence and show contacts against greywacke, volcaniclastic rock and carbonaceous shale. The quartz-feldspar porphyry has a tonalitic mineralogy, comprising phenocrysts of oligoclase/andesine (altered to sericite) and quartz (50:50 ratio), and a groundmass composed of fine-grained plagioclase, albite and small amounts of quartz. The earliest sills display a weak foliation and weak to strong alteration. Younger intrusive units are unaltered, undeformed and crosscut the sheared rocks, thus the emplacement of the porphyries spans the shearing event.

Late stage (post-mineralisation) mafic dykes (less than 15 m thick) crop out in the southern part of the mineralised body where they intrude both the volcaniclastic rocks and the greywackes.

Massawa lies on a northeast trending (030° to 035°) sinistral structure, likely a second order splay off the neighbouring MTS. To the south and north of Massawa, the northeast trending shears are dextrally offset by discordant north-south structures, resulting in dilation and mineralisation. The mineralisation is associated with anastomosing brittle-ductile shearing commonly localised at intrusive contacts.

The Massawa deposit occurs over a strike length of 4.5 km and is divided into two zones – Massawa CZ and Massawa NZ that differ in terms of host rock geology, mineralogy, structural controls, and metallurgy. The CZ and NZ are separated by a 0.3 km gap where less intense deformation is observed.

7.3.3.2 Massawa Central Zone Deposit

Mineralisation in the Massawa CZ is mainly located in the western volcaniclastic package and associated felsic porphyries and gabbroic intrusions. The CZ is further divided into two sub-zones:

- Central Zone 1 (CZ1) encompasses the southerly one kilometre of the Massawa Central deposit and comprises the bulk of the tonnage. Mineralisation is hosted in volcaniclastic and intrusive units.
- Central Zone 2 (CZ2) represents the northern 0.5 km of the Massawa Central deposit and marks the transition to the Massawa NZ. Here multiple mineralised lodes converge and step to the east and transect the easterly meta-sedimentary package. The gold mineralisation has a higher arsenopyrite content and becomes more refractory to direct cyanide leaching.

CZ1 is defined by an envelope of altered rock containing up to eight, thin, northeast trending, sub-vertical lodes. Six lodes identified as OS1, OS2, OS3, OS4, OS5 and OS6 (the latter four are more continuous) are hosted in the western volcaniclastic package, and two footwall lodes occur in the eastern sedimentary package (FWOS1 and FWOS2). Mineralised lodes anastomose horizontally and vertically along strike and show ductile to brittle characteristics, often with brittle textures reworking earlier ductile fabrics. Individual lodes vary from one metre to 25 m thick, with average thicknesses between 6 m and 10 m.

There is a deposit scale correlation between increasing brittle-ductile strain and increasing gold grade, with the grade of mineralisation variable along strike and down-dip related to the variable strain associated with the structural framework. The continuity of mineralisation is localised along gabbro and felsic porphyry intrusive contacts with high-grade mineralisation associated with high strain and arsenopyrite.

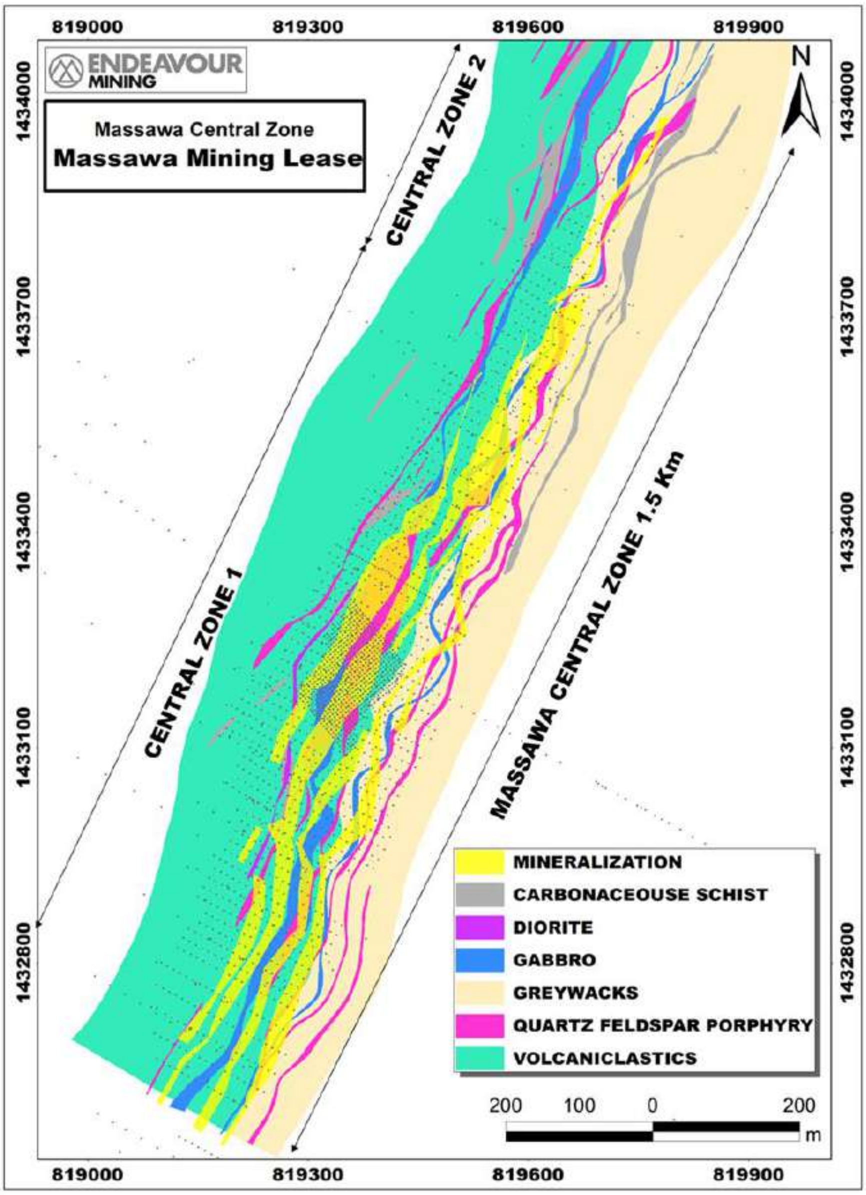
Veins identified by trenching and diamond drilling vary in style and include extensional, sheared and boudinage veins. Veining associated with over 1 g/t Au mineralisation is sub-parallel in orientation to primary strain (shearing) highlighting the genetic link between deformation and mineralisation. Gold grade and continuity is characterised by alteration style, deformation intensity and intrusive contacts.

Alteration in CZ1 is characterised by pervasive early (pre-mineralisation) silica alteration that is largely texture destructive. Later sericite-chlorite-carbonate alteration overprints the silica alteration and is associated with ductile deformation temporally linked to gold mineralisation. The carbonate is intermixed with sericite and is dominantly ankerite, grading in places into dolomite, giving a distinct pale to green bleaching of the rock. Wide altered zones commonly occur spatially along the margins of the gabbro (which form a rheological and chemical trap), next to the felsic intrusive rocks and along sericitic shears within the easterly greywacke.

Mineralisation is vein hosted with associated sulphide disseminations in the wallrock and is spatially associated to bodies of strongly altered felsic porphyries and gabbroic intrusions. The mineralised zones are slightly wider and more intensely mineralised along margins of the felsic porphyry, especially on the north-western side of a wide (up to 50 m) porphyry plug. A lower tenor of mineralisation is present in the core of the felsic porphyry plug unlike the grade distribution within some narrower mineralised granitoid sills/dykes which tend to be pervasively fractured and mineralised. Brittle-ductile overprinting as veins on the main intrusive bodies (rheological contrast) are often associated with a complex fault network with stockworks.

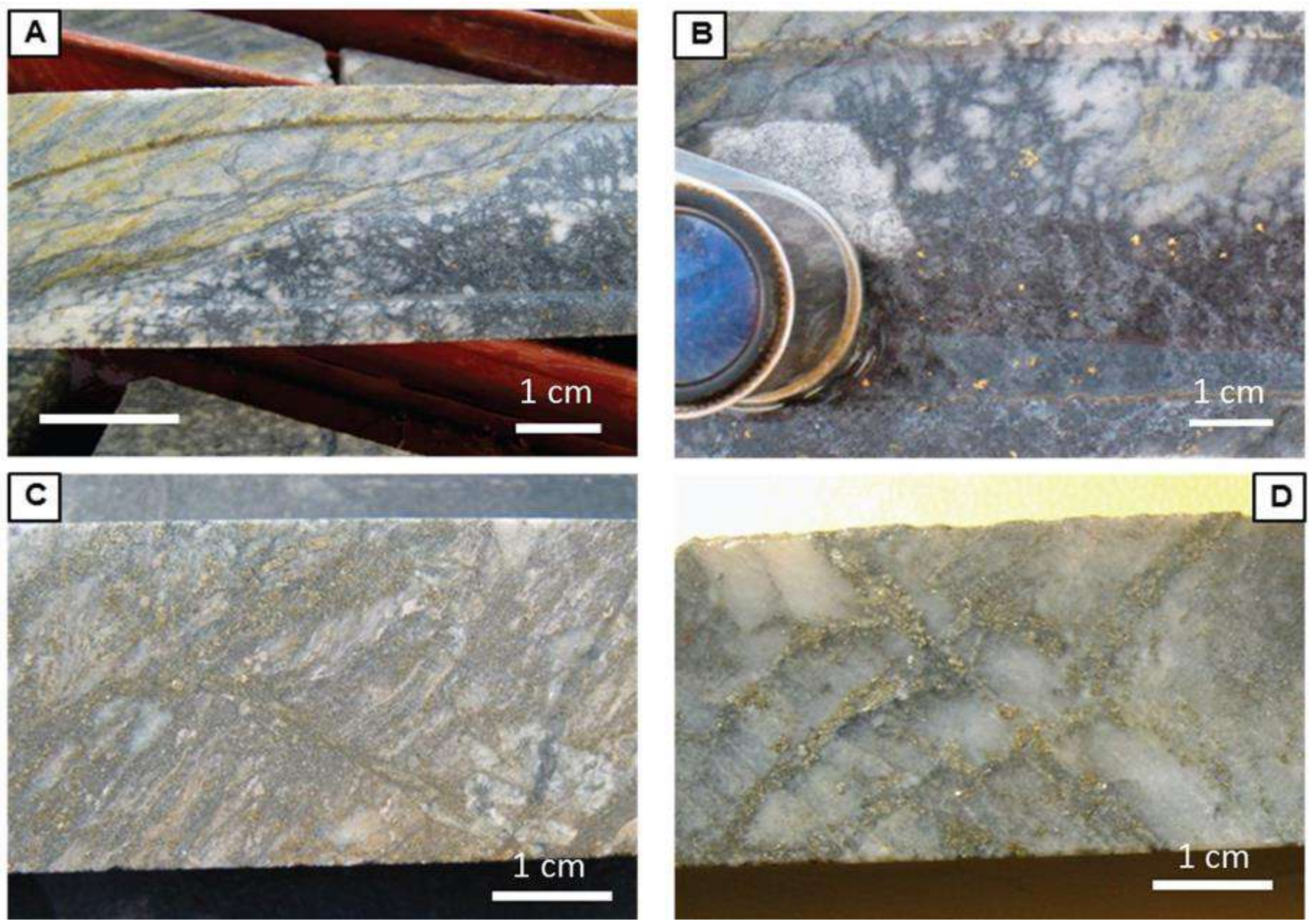
Low grade (over 1 g/t Au) mineralisation is associated with weak to moderate shearing with silica-carbonate alteration and disseminated sulphides with weak strain. Arsenopyrite is rare. High-grade (over 3 g/t Au) mineralisation is associated with high strain including brecciation, extensional and shear veins, with moderate to strong silica-carbonate alteration and sulphides. Arsenopyrite is the dominant sulphide associated with gold, with arsenopyrite and pyrite also observed as vein selvedges with possible visible gold.

Figure 7.3.4 Geological Map of the Massawa CZ Showing Geometry of the Mineralised Zones



Source: Endeavour, March 2022.

Figure 7.3.5 Core Photos Showing Massawa CZ Alteration and Mineralisation Styles



A - Quartz-Stibnite-Au Vein with Proximal Sericite-Carbonate Alteration of Volcaniclastic Host with Disseminated Arsenopyrite and Pyrite in the Wallrock.
B- Coarse Visible Gold Associated with Stibnite Veins.
C and D- Silicified Rock with Fine Disseminated and Stringer Distal Pyrite and Lesser Amounts of Arsenopyrite.

Source: Endeavour, March 2022.

7.3.3.3 Massawa Northern Zone Deposit

The Massawa Northern Zone (NZ) has a strike length of 2.6 km and consists of a main north-northeast trending mineralised structure with discontinuous footwall (FW) and hangingwall (HW) lodes (Figure 7.3.6). Mineralisation is localised in a zone adjacent to highly strained bands of fine- to medium-grained felsic and lithic wacke, wacke with subordinate carbonaceous shales and gabbros. The Northern Zone is sub-divided into two further zones based on structure:

- Northern Zone 1 (NZ1).
- Northern Zone 2 (NZ2).

The southern 1.1 km of the NZ1 hosts discontinuous, weaker gold mineralisation (average grade of 1 g/t Au to 1.5 g/t Au). The weakly silicified, brittle-ductile, mineralised shear is less than 10 m in thickness and is sub-vertical to steeply dipping to the east-southeast. The higher-grade but narrow mineralisation is focused at the margins of a medium-grained greywacke and lithological contacts with contrasting grain size.

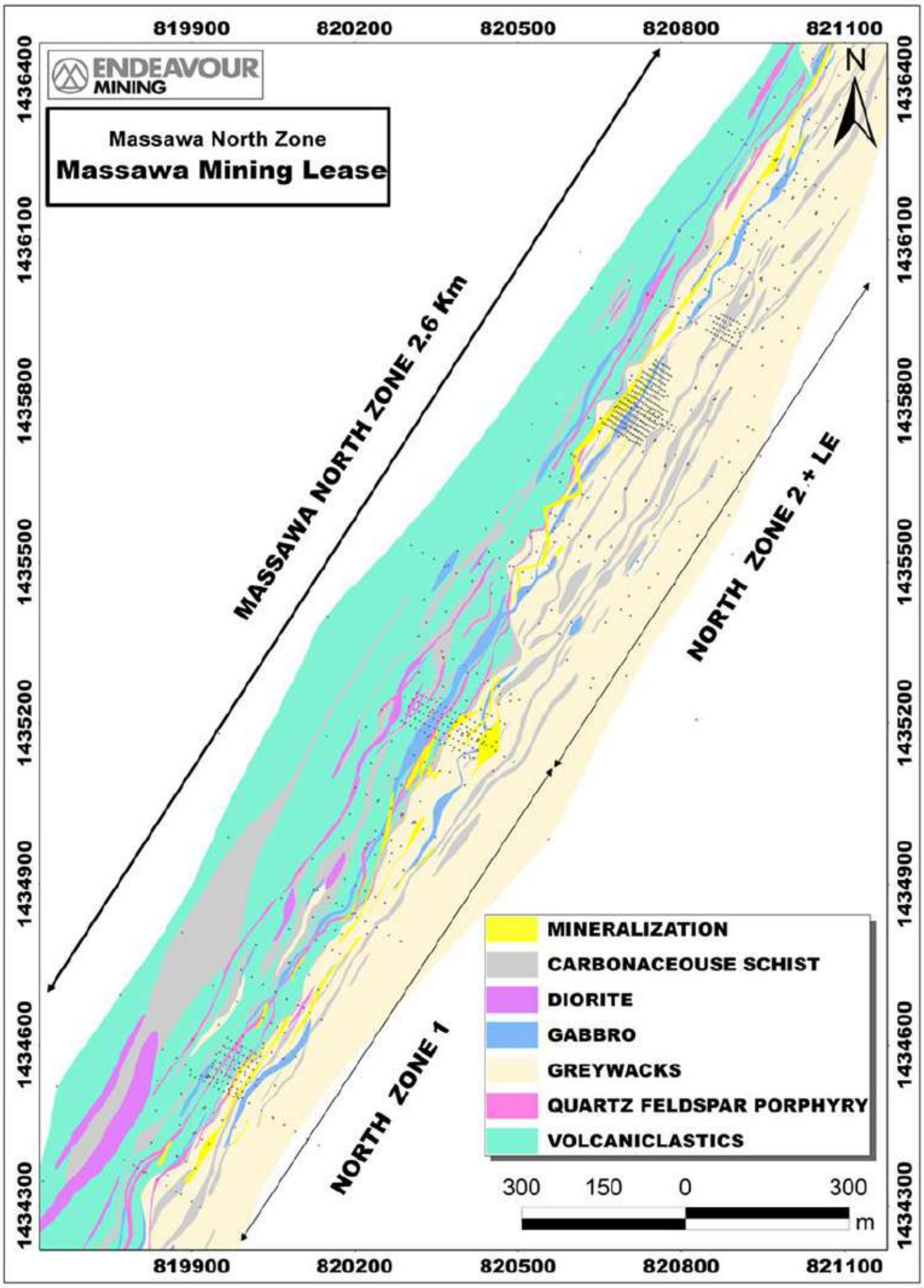
The NZ2 represents the northern and highest grade (over 4 g/t Au) portion of the deposit. Mineralisation is predominately confined to a single, continuous, narrow zone (10 m to 15 m average width), which is sub-vertical to steeply dipping (over 70°) to the west-northwest. The mineralisation is bounded by two prominent carbonaceous shale horizons within the sedimentary sequence.

Mineralisation in the Massawa NZ is characterised by disseminated arsenopyrite and arsenian pyrite. No quartz-stibnite veins with visible gold are seen in the northern parts of the deposit. High grade is associated with crack seal carbonate veining where arsenopyrite intensifies at the margins. Early silicification is less significant in the NZ, where the alteration is mainly composed of sericite, carbonate, and chlorite alteration affecting both sedimentary rocks and the gabbro unit. Primary and tectonic rock fabrics are often still clearly visible.

Two mineralised domains are modelled in the NZ, a higher-grade domain (average 5 g/t Au) consists of 7% to 10% disseminated sulphides (arsenopyrite>pyrite) associated with ductile shearing with extensional quartz-carbonate veins. A lower-grade domain (average 1.5 g/t Au) consisting of (1 to 3)% disseminated sulphides (pyrite>arsenopyrite) associated with brecciation and extensional quartz-carbonate veins.

Compared to the Massawa Central Zone, the Northern Zone has higher total sulphide contents (averaging 3% to 5%); higher average arsenopyrite-pyrite ratios (0.5 to 1); and higher arsenic levels. Gold is largely refractory to direct cyanide leaching developed within the crystal lattice of arsenopyrite and, to a lesser extent, arsenic-bearing pyrite (also known as arsenian pyrite).

Figure 7.3.6 Geological Map of the Massawa NZ Showing Geometry of the Mineralised Zones



Source: Endeavour, March 2022.

7.3.3.4 Delya

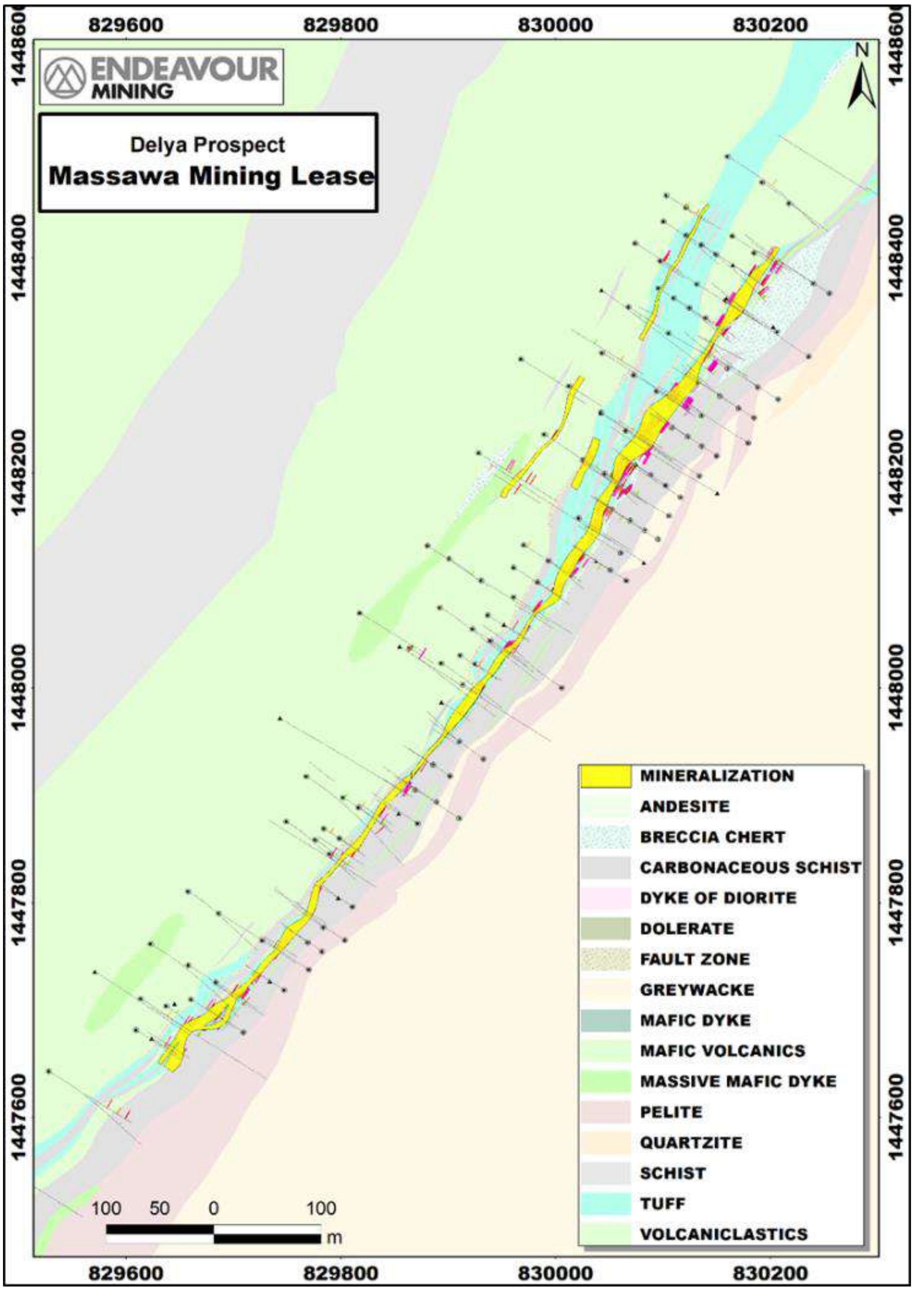
The Delya deposit is located along the MTS Zone, approximately 10 km north of Massawa. Detailed soil sampling has defined a linear six kilometre long, 100 m wide, 030° trending, greater than 100 ppb gold-in-soil anomaly. The lithological sequence is composed of massive and foliated andesite to the west and an eastern sedimentary package consisting of shales, carbonaceous shales, lithic and feldspar-wacke. These units are intruded by wide gabbro units (Figure 7.3.7). These lithologies have undergone strong ductile deformation, with structures trending northeast (030° to 040°) and steeply dipping to the east. The main Delya mineralised structure is located at the contact between the gabbro and the sedimentary package and is bounded by two carbonaceous shale units.

Three parallel zones of mineralisation have been defined at Delya over a one kilometre strike length. The main zone of mineralisation is hosted at the lower margin of the gabbro within highly sheared and silicified and sericitised schist, near the contact between the gabbro and the sedimentary package. The main mineralised structure is bounded by two carbonaceous shale units.

The mineralised zone varies in thickness from three metres to 10 m (with an average of five metres), contains higher grades (up to 5 g/t Au), and dips to the east at 85°. The other branches are located to the west and have an average dip of 84° to the west. Mineralisation has been drill tested to a depth of 150 m.

The mineralisation and alteration assemblage consists of sericite-silica-carbonate and chlorite alteration, associated with strong disseminated fine arsenopyrite and pyrite. Arsenopyrite is dominant over pyrite (with similar ratios to the Massawa Northern Zone). Gold is largely refractory in nature and locked up in the crystal lattice of arsenopyrite.

Figure 7.3.7 Geological Map of Delya



Source: Endeavour, March 2022.

7.3.3.5 Tina

The Tina deposit is located along the Bakan Corridor that groups together a number of anomalous gold-in-soil and rock anomalies, namely the:

- Tiwana anomaly.
- Tisia anomaly.
- Tina anomaly.
- Bakan anomaly.
- Khosa anomaly.

Mineralisation along this corridor is controlled by the over 10 km long Kossanto Shear. This belt parallel structure is reactivated at Tina by a north-south discordant dextral fault that runs from Goulouma to the north down to Massawa in the south. The Tina deposit is defined by a 1.5 km long and up to 20 ppb northeast trending gold-in-soil anomaly.

The geology of the Tina region comprises of a northeast trending sequence of felsic and intermediate volcanic rocks (andesite, dacites and rhyodacites), tuff, cherts and felsic intrusive suites ranging from diorite to monzonites. Field structural studies show a dominant northeast trending foliation, discrete north-south trending foliation and three main directions of quartz vein, northeast, north-south and east-southeast.

Disseminated pyrite-gold mineralisation has so far been intersected in drill core over a 700 m strike length, with an average width of 15 m and remains open in all directions and at depth. Two mineralised branches have been identified in strongly sheared and altered (silica, sericite and K-feldspar) felsic intrusive and gossanous tuffs. A main western branch which is steeply dipping, occurs on several sub-parallel sets (although two are more continuous), and is hosted by a felsic intrusion. An eastern lower grade mineralised branch that also forms several narrow sets, dips 75° to the west and is related to shear tuffs and gossanous rocks.

7.3.3.6 Bambaraya

The Bambaraya deposit is located in the northwest corner of the Massawa Mining Licence along the Sabodala Shear Corridor, approximately 18 m north of the Sofia deposit. The northeast trending (approximately 032°) shear zone marks the brecciated contact between pillowed basalts and massive and foliated andesites. These volcanic rocks have been intruded by gabbro, dolerite and felsic plutonic rocks near the deposit.

Bambaraya is distinguished by a (50 to 150) m wide, 2.2 km long gold-in-soil anomaly (> 50 ppb Au). It is characterised by Loulo-style mineralisation, with gold linked to quartz-tourmaline veins. These veins run oblique (010°) to the main shear geometry. The geological and structural model distinguishes two mineralised bands; a thicker western branch with more consistent grades which dips steeply to the west (approximately 70°), and an eastern branch which moderately dips to the east (approximately 60°). The eastern mineralisation is in a potential dilatational zone where northeast trending structures were dextrally reactivated by two north-south structures. Within this corridor, the mineralisation is east dipping whereas it dips towards the west outside the reactivated corridor.

The Bambaraya mineralisation assemblages are dominated by pyrite with gold mineralisation located within the quartz-tourmaline veins (with visible gold) and/or in the alteration selvages around these veins. Alteration consists of silica-tourmaline-iron carbonate-sericite.

7.3.3.7 Sofia

The Sofia deposit is located approximately 10 km to the west of Massawa. It is positioned on the over 30 km long, 010° trending, Sabodala-Sofia Shear Zone which hosts the Sabodala gold deposit 27 km to the north and a series of interstitial deposits along the Sabodala Structural Corridor. The northeast trending Sabodala-Sofia structure defines a major terrane boundary that separates a continuous unit of predominantly mafic-ultramafic rocks (dunite, gabbro, basalts, and dacitic lavas) to the west and andesitic lavas and tuffs to the east (Figure 7.3.8). The country rocks are intruded by gabbros, diorites and narrow quartz-feldspar porphyries (QFP). The diorites are spatially related to the mineralisation and commonly altered to silica-albite. The QFP have a tonalitic mineralogy comprising of distinctive rounded quartz and plagioclase

The eastern footwall units consist of a package of chlorite altered equigranular gabbro with subordinate basaltic-andesite lavas and tuffs. The gabbro package is up to 60 m thick thinning toward the north-east ranging from 10 m to 20 m in thickness. The gabbro predates shearing and hosts gold when intersected by the mineralised structures. Here it is commonly altered and strained with strong silica-albite-chlorite-sericite on the western margin of the package. Underlying the gabbro are lithic-wacke, lapilli and ash tuffs, and occasional carbonaceous shales and siltstones. All intrusive rocks have a weak foliation and weak to strong alteration with strain developed at the lithological contacts. Late dolerite dykes cross-cut all units described above and post-date mineralisation.

Gold mineralisation has been delineated over a four kilometre strike length and is controlled by both the host lithology and geometry of strong brittle-ductile structures. The mineralised shear has been differentiated into two zones based on different structural trends along the tectono-stratigraphic boundary, namely Sofia Main and Sofia North.

Sofia Main

The structures are modelled to be inter-connecting listric, (20 to 80)° dipping thrusts with zones of high strain and alteration developed in the footwall. Mineralised brittle-ductile structures strike 040°.

Sofia North

Lies on a northeast trending (015 to 040)° structure which is likely a second or third order splay coming off the main Sabodala-Sofia Shear. Mineralised structures strike 010°.

To the north of Sofia Main, the structures rotate to the north-northeast with the steep west dipping mineralisation developed at the eastern contact of the western hangingwall mafic-ultramafic units.

7.3.3.8 Sofia Main Zone

Mineralisation in the Sofia Main Zone has a strike length of 1.4 km and is predominantly hosted in a quartz-diorite intrusive that has been strongly altered by albite-silica and overprinted by late silica-carbonate-sericite-pyrite mineralisation. The silica-carbonate bleaching is distinct and can pervasively alter the dark magnetite rich 'Fe–stones' directly implicated at the hangingwall of the high-grade mineralisation. High grade mineralisation is generally developed within stockworks and brecciated zones in the quartz diorite host, with the ductile strained zones characterised by high sericite content with lower gold content.

In the hangingwall adjacent to the mineralised zone, strained tuffs and a re-crystallised and highly altered and magnetised rock of ultra-basic origin are spatially associated to the high-grade mineralisation. This dyke or 'Fe-stone' unit is continuous along strike and is parallel to the 'hangingwall shear'. At surface, the 'Fe-stone' is a distinctively highly weathered, iron oxidised, silicified rock that retains its magnetic qualities.

The steeply west dipping (65° to 80°) immediate footwall geology is commonly composed of a northeast (035° to 045°) striking continuous mafic sequence (gabbro with subordinate basalts and tuffs) that is sub-parallel to the main mineralised lode. Discontinuous zones of high-grade mineralisation are commonly hosted in silica-albite-chlorite veins.

The mineralogy is dominated by pyrite with trace copper sulphides. Gold is predominately free milling, associated with pyrite and silicate gangue. Average gold grain compositions are 93% Au with 7% Ag.

In the south of the Sofia Main, a lode of high grade (above 3 g/t Au) mineralisation, referred to as the Footwall Ore Zone (FWOS) is developed in the footwall gabbro immediately east of the bounding footwall shear of the Sofia Main Zone. Over 300 m in strike, the mineralisation is modelled to be related to lower angle splays coming of the steeper footwall shear. From the south, the splays open out to the east with a higher tenor of gold where the structures close at the angle of the footwall shear down-dip. Along strike to the north, these secondary structures begin to merge with the footwall shear, again increasing the tenor of gold - this suggests that there is strong structural control on the mineralisation in the south, with strain and grade increasing at structural intersections.

Two styles of mineralisation are evident in the FWOS, namely:

- Silica-albite-chlorite-pyrite alteration which commonly forms at the sheared western margin of the footwall gabbro. The silica-albite alteration is less intense than the Sofia Main Zone whereas chlorite is more abundant. The alteration typically displays a banded appearance and is not completely textually destructive.
- A silica-carbonate±albite veining characterised by typically weakly foliated rocks with high-grade intercepts associated with localised higher strain zones. The wallrocks appear to display chlorite-magnetite alteration typically developed within fine-grained contact of the gabbro. This mineralisation style tends to occur at the intersection between the footwall shear and the secondary lower angle splay.

The structural model prescribes the fault linkage and shear geometry in the hangingwall as the likely primary structural control of the mineralisation. This suggests that the mineralisation can develop where these high strain jogs occur with relative low fluid pressures (extension) facilitating fluid influx and slip along the shear associated with brittle deformation. In addition, the interaction of the intra-shear faults in the hangingwall are likely implicated. Fluid interactions with rock within the footwall gabbro and the 'Fe-stone' may localise mineralisation at the contact. The lithological variations also may have a rheological control.

7.3.3.9 Sofia North Zone

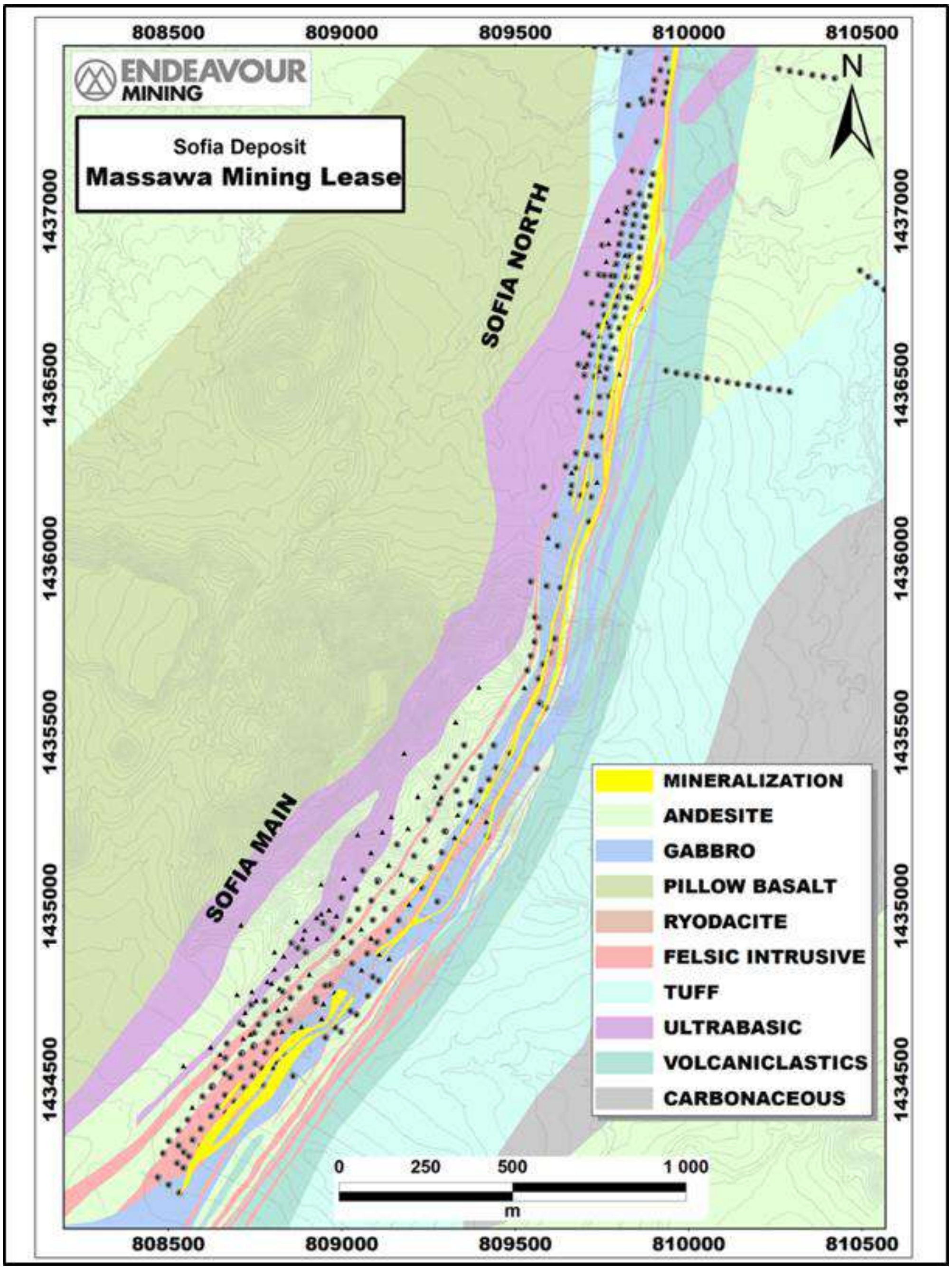
At Sofia North, drilling has confirmed a thick laterite cover (over five metres) that extends for over one kilometre where it is overlain by alluvial and colluvium sediments deposited by a major east to west flowing river. This thick, consolidated transported material may explain the low gold response of the soils along this area of the Sofia-Sabodala Structure.

Sofia North has a strike length of 2.3 km and consists of one main north-northeast trending mineralised structure and a discontinuous footwall lode. The main mineralised structure that controls the strain and alteration is developed at the major eastern contact of the western hangingwall mafics that turns in strike from $(040\text{ to }010)^0$ and has been delineated over more than two kilometres by 200 m spaced trenching and drilling. The Sofia North mineralised structure is strike continuous with Sofia Main, steep to west dipping and planar with the western mafic stratigraphy.

Mineralisation is mainly hosted in moderately altered quartz diorites, andesitic ash tuffs and gabbros (western hangingwall mafics). The diorite is narrower compared to Sofia Main with elevated grades above the redox boundary suggesting a supergene influence. A second, high-grade (> 5 g/t Au) but narrow mineralised zone is hosted in silica carbonate veins commonly developed within the hangingwall stratigraphy lithological contacts (gabbros/lavas), suggesting that the strain has transferred from the footwall (Sofia Main) to the hangingwall.

The mineralisation is defined by a strong occurrence of fine disseminated pyrite (1%) accompanied by strong quartz, albite and carbonate alteration. Mineralisation occurs in quartz-albite altered intermediate intrusives as at Sofia Main, with quartz ± magnetite ± chlorite. Vein hosted mineralisation in the mafic host is spatially associated with chlorite-rich shears with silica carbonate veining.

Figure 7.3.8 Geological Map of Sofia



Source: Endeavour, March 2022.

7.3.3.10 Samina Prospect

Samina is located along the MTS corridor, three kilometres south-southwest of the Delya deposit. It is defined by an 800 m long, > 150 ppb gold-in-soil anomaly over an erosional surface and topographic high with rock chip samples retuning grades of up to 7.61 g/t Au.

Based on observations from mapping and drilling, Samina has been modelled to comprise of five northeast striking, sub-parallel mineralised zones - four sub-parallel mineralised zones (namely HW1, HW2, HW3 and MS) associated with the gabbro intrusion and volcanics to the west, and a subparallel footwall zone within the sediment to the east. The MS Zone appears as a potential high-grade structure and is the most continuous mineralised zone that has developed at the eastern margin of the competent gabbro intrusion and the ferruginous silica-breccia fault marking the volcanic/sediment contact. This MS Zone structure is brittle-ductile deformed and characterised by haematite-sericite-silica alteration and quartz veining ± disseminated pyrite/arsenopyrite in fresh rock.

7.3.3.11 Tiwana Prospect

The Tiwana Prospect is located four kilometres immediately west of the Massawa deposit, lying at the south-western end of the Bakan Shear Corridor. Tiwana is defined by a strong and linear north-northeast trending gold-in-soil anomaly (over three kilometres, > 50 ppb Au) over a residual cuirassic plateau. Tiwana consists of mafic volcanic, volcaniclastics and sediments intruded by mafic intrusive units reactivated by north-south to northwest trending faults. Two northeast trending sub-parallel mineralised structures (eastern and western branches) have been identified with a cumulative strike length of over one kilometre.

The eastern mineralised structure is developed at the hanging wall contact and within a gabbro intrusion associated with silica-carbonate and sericite–pyrite and arsenopyrite alteration assemblage. It has a known strike length of 600 m, extends 60 m vertically and is open along strike and at depth.

7.3.3.12 Makana Prospect

The Makana Prospect is found proximal to the Sabodala-Sofia Structure and is interpreted to be at the southern margin of the east-northeast striking Makana splay. Makana is situated on a topographic high and characterised by high gold-in-soil geochemical anomalies but has had little exploration work and has been worked extensively over ten years by artisanal miners.

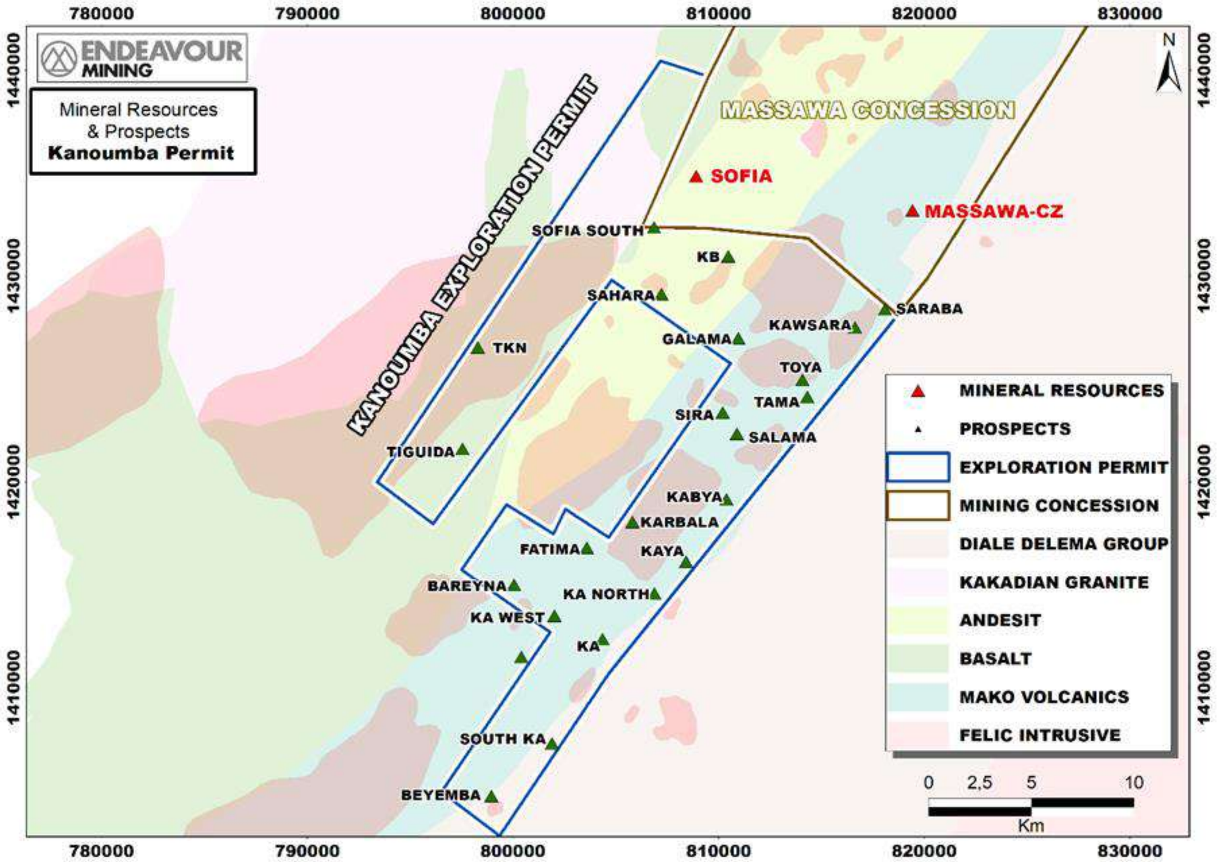
Key field observations and remote sensing interpretation have identified two key structural trends; east-northeast trend associated with steep north dipping silica carbonate veining with visible gold and a northeast trend modelled to be concordant to the local stratigraphy. Both are modelled to be semi-continuous for more than 300 m in places. Weak mineralisation is observed at northwest-dipping geological contacts with associated shear-veining as well as an area of weak ductile deformation.

7.3.4 Kanoumba Exploration Permit

The Kanoumba Exploration Permit interpretative geology and prospects are shown in Figure 7.3.9 and include:

- Kanoumba B (KB) Main ('Kaviar').
- Kanoumba C (KC) ('Kawasara').
- Sofia South.
- Sira and Galama.
- Bareyna.
- Tiguida.

Figure 7.3.9 Kanoumba Permit Geology with Deposits and Prospects



Source: Endeavour, March 2022.

7.3.4.1 Kanoumba B (KB) Main ('Kaviar') Prospect

The KB Main Prospect is located one kilometre to the north and 1.5 km to the northwest of Tinkoto village. It forms part of a highly prospective artisanal mining corridor that has been the subject of extensive mining activity. Part of this corridor has been officially assigned for local exploitation. A gold-in-soil anomaly associated with KB Main is one of the largest in the immediate region and covers an area of 15 km^2. Artisanal workings generally comprise large surface panning operations and numerous deep shafts.

Regional targeting has identified potential prospective relationships between modelled regional east-northeast trending structures and a kilometre scale topographic high that surrounds the Tinkoto granite, thought to be the source of the gold anomaly in the area.

Positive results from field observations and grab sampling have confirmed the potential for significant gold mineralisation at KB Main. All mineralised grab samples over 2 g/t Au are associated with exposed areas of significant carbonate and ±silica alteration with visible sulphides and ±quartz-carbonate veining. Mineralised grab samples have been taken proximal to mapped east-northeast and north-northeast trending structures intrusive rocks and geological contacts. Structural and petrographic reviews of samples have indicated that mineralisation is set within an intrusive-related vein hosted gold system.

7.3.4.2 Kanoumba C (KC) ('Kawsara) Prospect

The KC or Kawsara Prospect is defined by a three kilometre long by one kilometre wide northeast trending gold-in-soil anomaly located 5.5 km south of the Massawa CZ. The regolith map shows erosional windows with cuirasses in the east and western boundaries of the grid. Kawsara is composed of a central zone of volcano-sedimentary rocks (felsic and andesitic tuffs) with a significant tonalite and gabbro intrusive component. Mineralisation is controlled by zones of fractures and veins in chloritic and brecciated felsic lapilli tuff, andesitic tuffs and tuff breccia. It is interpreted to be along flat west dipping zones and favours the intercalated contact of the felsic tuffs and quartz feldspar porphyry to the other lithologies.

7.3.4.3 Sofia South Prospect

Located within the Sabodala Corridor and 10 km west of the Massawa deposit, Sofia South is a southern extension of the Sofia Prospect. It is defined by an over 3.5 km long discontinuous northeast trending (locally NS to N015°) gold-in-soil anomaly with values up to 1000 ppb Au. This anomaly mostly lies on laterite and depositional material. The geology is composed of andesitic tuff, volcano-sediments and felsic intrusives, and deformed and altered gabbro with disseminated pyrite. An unaltered gabbro related to the plutonic complex of the Kakadian batholith is also present.

7.3.4.4 Sira and Galama Prospects

The Sira and Galama Prospects are located on the southwestern margins of the Tinkoto Pluton. Sira is defined by a 3.4 km northeast trending gold-in-soil anomaly lying on cuirass plateaus. Local geology includes strongly oxidised volcaniclastics and gabbro intruded by sericite-silica altered diorite with local quartz veins.

7.3.4.5 Bareyna Prospect

Reconnaissance mapping has highlighted depositional (60%) regolith material with laterite plateaus (30%) as the dominant units at Bareyna. Small erosional windows have exposed gabbro, mafic volcanic (andesite), gossans and volcaniclastic units. Silica carbonate alteration has been observed in local grab samples. Bareyna is characterised by a northeast trending 1.6 km long, (100 to 250) m wide (> 20 ppb) gold-in-soil anomaly in the southeast and a north-south trending one kilometre long, (100 to 300) m (> 20 ppb) gold-in-soil anomaly to the west.

7.3.4.6 Tiguida Prospect

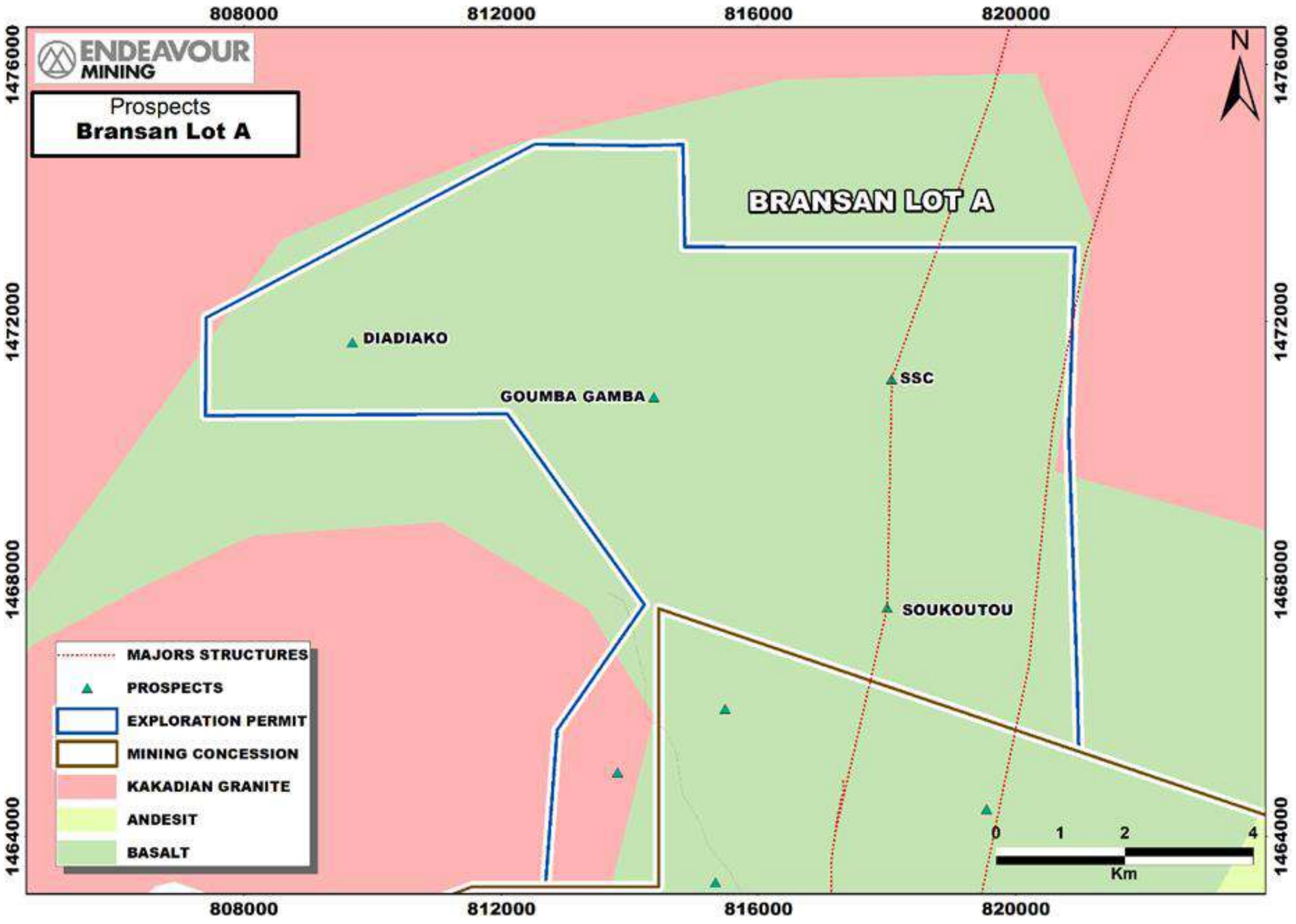
Tiguida is located on the Sabodala-Sofia at the western contact with a felsic intrusion. Reconnaissance drilling has intersected mineralisation in intermediate volcanic and intrusive rocks.

7.3.5 Bransan Lot A Exploration Permit

The Bransan Lot A Exploration Permit geology and prospects are shown in Figure 7.3.10 and include:

- Goumbou Gamba.
- Diadiako.

Figure 7.3.10 Bransan Lot A Permit Geology with Deposits and Prospects



Source: Endeavour, March 2022.

The western portion of Bransan Lot A Permit is underlain by the Kakadian Batholith, largely covered by laterite plateaus. The Sabodala Structural Corridor can be traced through the Sabodala Mine Licence into Bransan Permit. At Bransan, the aeromagnetic data interpretation is that the structure cuts through and breaks up the Dialakotoba Granitoid at depth. Three large granitoid intrusions have been interpreted to occur within the Permit. Outcrops of these granites are relatively small in extent with most of the intrusions covered by laterite; however, high resolution aeromagnetics highlight their boundaries.

7.3.5.1 Goumbou Gamba Prospect

Goumbou Gamba is hosted by a north trending granitic sill that is localised in alternating mafic volcanic rocks and highly strained talc-chlorite altered ultramafic rocks. Areas of high strain locally wrap around granite intrusions to the east, forming bends and steps, and locally penetrating into and offsetting margins of these intrusions. Continuations of potentially the same chert-mudstone horizon that occurs in the Sabodala open-pit are present on the Bransan Lot A Permit, west of the Goumbou Gamba Prospect. Mature trough cross-bedded quartzite and black shale also outcrop west of the Goumbou Gamba Prospect. Mineralisation occurs as narrow discontinuous quartz veins with disseminated pyrite which dip at (40 to 85)° east.

7.3.5.2 Diadiako Prospect

The Diadiako Prospect occurs in a northwest trending shear zone located in a crustal-scale shear system on a major regional scale geological contact between the basement Kakadian granite-gneiss and Mako Supergroup basalts and metavolcanics. The mineralised host rocks at Diadiako are well-foliated mafic volcanics and basalts.

Alteration is a characteristic upper greenschist facies mineral assemblage containing carbonate, silica, albite, hematite, muscovite and chlorite. Alteration can be patchy to pervasively developed and range in colour between brown, orange and green dependent on the relative proportion of constituent minerals.

Mineralisation occurs as auriferous pyrite occurring in quartz veins and breccia systems hosted within orange/pink albite-hematite altered metavolcanics. Mineralised quartz veins commonly contain laminated and brecciated internal textures and are generally mottled grey in colour. Vein margins commonly host displacement surfaces that are lineated and mantled with dark grey to black cataclastite composed of finely comminuted vein, wallrock and sulphide (pyrite). Vein quartz is characteristically opaque, suggesting that recrystallisation is pervasive and caused by ongoing deformation of the vein breccia system or by an overprinting metamorphic event.

7.3.6 Bransan Lot B Exploration Permit

No significant prospects have been identified within the Bransan Lot B Exploration Permit to date.

7.3.7 Bransan Lot C Exploration Permit

The Bransan Lot C Exploration Permit geology, deposit and prospects are shown in Figure 7.3.11 and listed below:

- Marougou Deposit.
- Tourokhoto Prospect.
- Goundameko Prospect.
- Dembela Hill Prospect.
- Saiansountou Prospect.

7.3.7.1 Marougou Deposit

The Marougou Deposit is located three kilometres southwest of the Tourokhoto Prospect and within the broad MTS structure. The turbiditic sedimentary rocks (greywacke, siltstone and shale units) of the Diale-Dalema Supergroup predominantly underlie Marougou and are intruded by a felsic porphyry. Bedding appears to dip moderately to steeply west-northwest. Argillic alteration is pervasive throughout the sequences in the area.

Sericite-carbonate-quartz-chlorite-sulphide alteration is synchronous with the development of a foliation fabric in the greywacke/mudstone sequence. The strain is preferentially partitioned into mudstone layers which are pervasively altered to sericite. Strain in the greywacke beds is less pronounced.

The surface gold anomaly at the Marougou Prospect was originally defined by termite mound geochemistry. The anomaly was further defined by subsequent rotary air blast (RAB) drilling. Reverse circulation (RC) and percussion drilling programs identified a series of north-northeast trending northwest dipping (25 to 45)° auriferous quartz vein lenses, with disseminated pyrite developed over a 1200 m strike length, down to depths of 170 m below surface. Other sulphide species include pyrrhotite, arsenopyrite, chalcopyrite and sphalerite. Recent diamond drilling (DD) and mechanised trenching indicates that gold mineralisation occurs in quartz veins, stringers and stockworks developed in medium to coarse-grained immature sandstones.

7.3.7.2 Tourokhoto Prospect

The Tourokhoto Prospect is located within the MTS and the Mako volcanic group is represented by sedimentary formations with major, fine pelitic sediments locally with some basaltic lava flows. The centre of the Prospect contains a large, sheared gabbro/gabbro-diorite, surrounded by a black shale series intercalated with basaltic pillow lava units which can be up to several tens of metres in width. The gabbro is sub-vertical, sheared and locally mineralised. Some porphyroblastic dolerite dykes with larger feldspar crystals also intrude the sequence. The Diale Group is found in the east of the Prospect.

7.3.7.3 Goundameko Prospect

The turbiditic sedimentary rocks of the Diale-Dalema Supergroup underlie the Goundameko Prospect. It is located on major 070° trending structures, with some local north-northeast trending structural elements also visible. The main surface gold anomaly consists of three sub-parallel north-northeast trending anomalies about 2.5 km long by two kilometres wide. Trenching has intersected quartz-sulphide stockworks in greywacke, with short strike lengths, one to two metres wide quartz veins and stringer zones of quartz over widths of two to three metres. RC drilling indicates that felsic intrusive units may be present at depth.

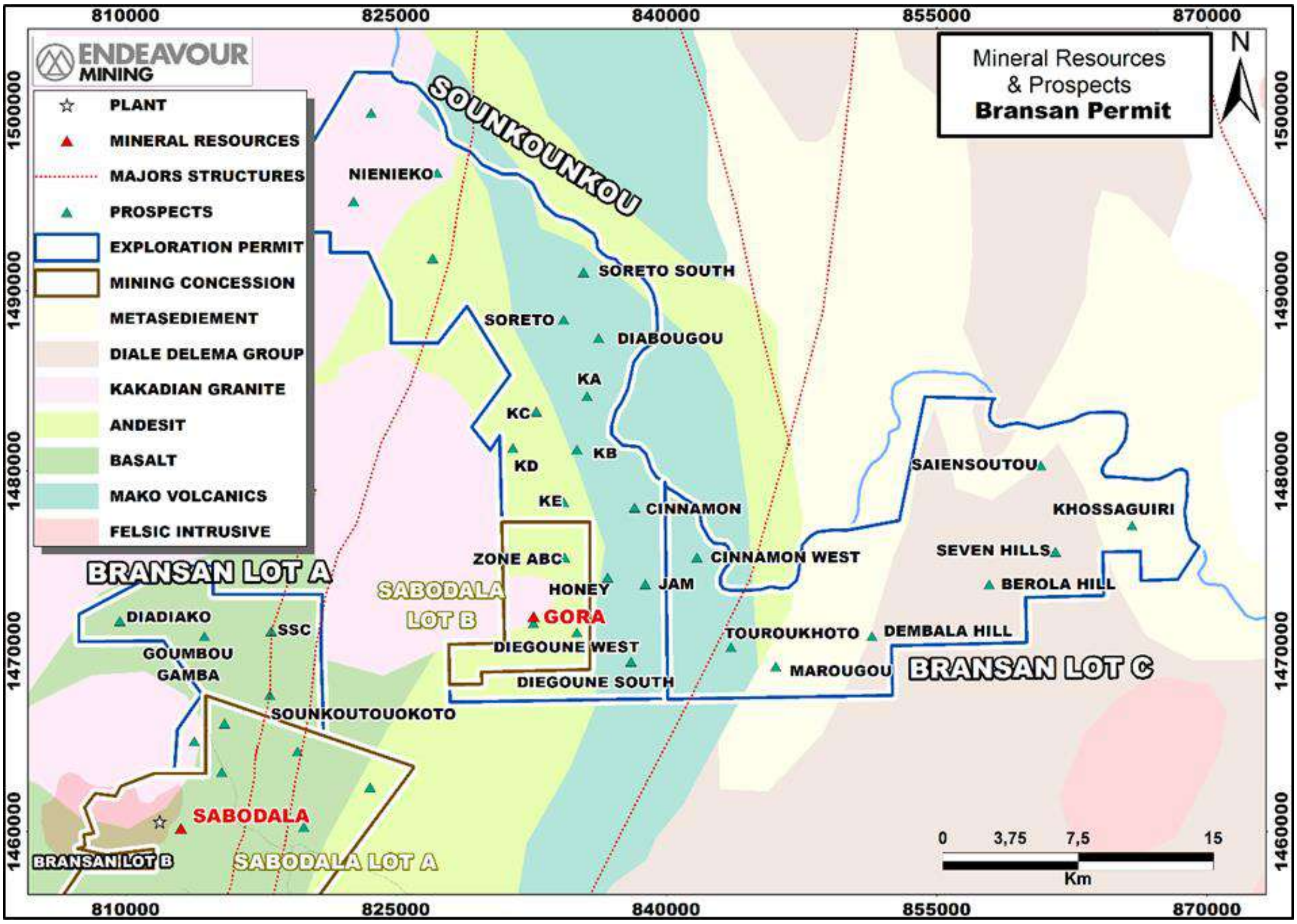
7.3.7.4 Dembala Hill Prospect

The Dembala Hill Prospect contains gold mineralisation associated with a gabbro-diorite intrusion occurring within turbiditic sedimentary rocks of the Diale-Dalema Supergroup. The Prospect has been extended to include a four kilometre long buried intrusive body interpreted from the aeromagnetic data set, sitting along a gold bearing structure that parallels the MTS Zone.

7.3.7.5 Saiansoutou Prospect

The Saiansoutou Prospect is defined by a 2.8 km long north-south trending surface gold anomaly defined from analysis of termite mound samples. The anomaly is associated with a strong arsenic response and a buried intrusive is indicated by an aeromagnetic response. The turbiditic sedimentary rocks of the Diale-Dalema Supergroup underly the Prospect.

Figure 7.3.11 Bransan Lot C and Sounkounkou Permits Geology with Deposits and Prospects



Source: Endeavour, March 2022.

7.3.8 Sounkounkou Exploration Permit

The Sounkounkou Exploration Permit geology and prospects are shown in Figure 7.3.11 and listed below:

- Soreto-Diabougou.
- Nienienko.
- Cinnamon.
- Honey.
- Jam.
- Sounkounkou KA.
- Sounkounkou KB.
- Sounkounkou KC.
- Sounkounkou KD.

7.3.8.1 Soreto-Diabougou Prospect

The Soreto-Diabougou Prospect includes three target areas, namely:

- Soreto North.
- Soreto.
- Diabougou.

Folded northeast and east-northeast trending sequences of Mako volcano-sedimentary schistose turbiditic sandstone, siltstone, greywacke, and mudstone units underlie the Prospect. Gabbro, granodiorite, felsic porphyries, minor granitic dykes and large quartz-monzodiorite plugs and dykes intrude the sedimentary package. The hosting sediments have also been affected by upper greenschist grade metamorphic conditions.

The gold mineralisation, which is often visible, occurs in smoky and white quartz veins developed in sheared and brecciated intrusives and sediments that have undergone intense albite-sericite alteration and micro-fracturing developed over widths of two metres to 15 m. The quartz veins and gold mineralisation appear to be controlled by north and north-northeast trending structures, dipping both moderately and steeply to the southeast (50° to 70°). Conjugate northwest southeast trending structures with associated gold mineralisation have also been observed. These structures are interpreted as being related to regional shear and thrust zones. Pyrite and trace amounts of chalcopyrite are present in both mineralised and un-mineralised samples. Gold mineralisation also appears to be closely associated with the presence of quartz-feldspar porphyry dykes. Surface exposures of the quartz veining and coincident surface geochemical anomalies extend more than three kilometres along strike.

7.3.8.2 Nienienko Main Prospect

The Nienienko Main Prospect is underlain mainly by andesitic lavas with associated sub-volcanic mafic intrusions, inter-layered with variably altered sedimentary horizons of the Mako volcano-sedimentary supergroup. A large granitic intrusion occupies the northwestern portions of the Prospect, with several gabbroic and doleritic to felsic dykes intruding the sequence. Lithologies generally trend north-northeast to northeast with steep dips, although local variations are apparent.

Gold mineralisation is mainly associated with flat lying and locally folded white and smoky quartz veins developed within granodiorite, granite and andesitic units that are brecciated in places. The gold mineralisation has been traced in trench excavations over a distance of 1.2 km and coincide with a termite geochemical soil anomaly extending over a 2.5 km strike length. The mineralisation appears to be controlled by regional scale north-northeast trending decollement and imbricate thrust systems.

Detailed geochemical soil sampling programmes testing co-incident gold-molybdenum-copper and potassium anomalies identified by earlier regional termite mound sampling programmes in areas adjacent to the Nienienko area have identified several separate gold mineralised shear zones which trend north-northeast or west-northwest regional structural trends which commonly host other gold deposits in the region. The shear zones frequently have quartz-carbonate alteration with quartz-carbonate-tourmaline veining and are sometimes gossanous.

7.3.8.3 Cinnamon Prospect

The Cinnamon group of prospects are underlain by Mako volcano-sedimentary units comprised predominantly of fine-grained siltstone, shale and tuffaceous units intruded by felsic and multiple gabbroic dykes and sills. Numerous narrow and discontinuous shear hosted quartz veins were identified by soil and termite mound geochemistry, prospecting and trenching. Gold mineralisation has been identified locally in both the quartz veining and altered host wall rock units; however, continuity along strike has not yet been demonstrated.

7.3.8.4 Honey Prospect

The Honey group of prospects are also underlain by Mako volcano-sedimentary units comprised of fine-grained siltstone, shale and tuffaceous units intruded by felsic and multiple gabbroic dykes and sills. Many of the soil geochemical anomalies at Honey mimic the regional north-northeast structural overprint common throughout the Sabodala Mine Licence. A continuous zone of gold mineralisation has been identified.

7.3.8.5 Jam Prospect

The Jam Prospect is underlain by Mako volcano-sedimentary units comprised of fine-grained siltstone, shale and tuffaceous units intruded by felsic and multiple gabbroic dykes and sills. The primary exploration target identified to-date at Jam is comprised of altered and quartz veined metasediments adjacent to a silicified and altered felsic sill-like body traceable in trenching for approximately 300 m in lateral extent. Gold mineralisation at Jam is quite similar in nature to that observed at both the Cinnamon and Honey Prospects.

7.3.8.6 Sounkounkou KA Prospect

The Sounkounkou KA prospect is hosted by Mako volcano-sedimentary units comprised mainly of fine-grained siltstone, shale and tuffaceous units intruded by felsic and gabbroic dykes. Gold mineralisation occurs at the contact between a quartz-feldspar porphyry intrusive and siltstone-shale unit. The contact zone is often brecciated with multiple, variably orientated, quartz vein stringers and sulphide box works following bedding and fold axial planer cleavages.

7.3.8.7 Sounkounkou KB Prospect

The Sounkounkou KB prospect is underlain by Mako volcano-sedimentary units comprised of fine-grained siltstone, shale, and tuffaceous units intruded by felsic and multiple gabbroic dykes and sills. The hosting geology displays a series of tight antiformal and synformal folds that suggest a shallow plunge to mineralisation within host shear structures. Continuity of mineralisation has not been established.

7.3.8.8 Sounkounkou KC Prospect

The Sounkounkou KC prospect overlies Mako volcano-sedimentary units comprised of fine-grained siltstone, shale, and tuffaceous units intruded by felsic and gabbroic dykes and sills. Gold mineralisation occurs within a north-northeast trending shear structure with narrow discontinuous quartz veins and brecciated felsic intrusives, as well as alluvial gold in transported overburden ranging in thickness from (0.4 to 0.6) m.

7.3.8.9 Sounkounkou KD Prospect

Mako volcano-sedimentary units comprised mainly of fine-grained siltstone, shale and tuffaceous units intruded by felsic and gabbroic dykes and Bouroumbourou granite host the Sounkounkou KD prospect. Gold soil anomalies coincide with northeast and northwest trending regional scale structures. Trenching and diamond drilling confirm that the gold mineralisation is associated with narrow, discontinuous layer parallel quartz veins developed within sheared and sometimes brecciated fine grained, silicified, tourmalinised and sometimes hematised sediments.

7.4 Comments on Section 7.0

The Qualified Person considers the geological knowledge and understanding of the Kédougou-Kenieba Inlier hosting the Main Transcurrent Shear and the Sabodala Structural Zone to be robust and comprehensive. The gold prospectivity of the Sabodala-Massawa Project Area is regarded as world-class by the Qualified Person.

7.5 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 7.0, are presented in Section 25.0.

7.6 Recommendations

Recommendations pertaining to Section 7.0, are presented in Section 26.0.

7.7 References

References cited in pertaining to Section 7.0, are presented in Section 27.0.

8.0 DEPOSIT TYPE

8.1 Overview

The Sabodala-Massawa Project occurs in the West African (Birimian) Paleoproterozoic metallogenic province, which extends from Senegal and Mali through northeastern Guinea, Cote d'Ivoire, Ghana, Burkina Faso and as far east as Niger, see Figure 8.1.1.

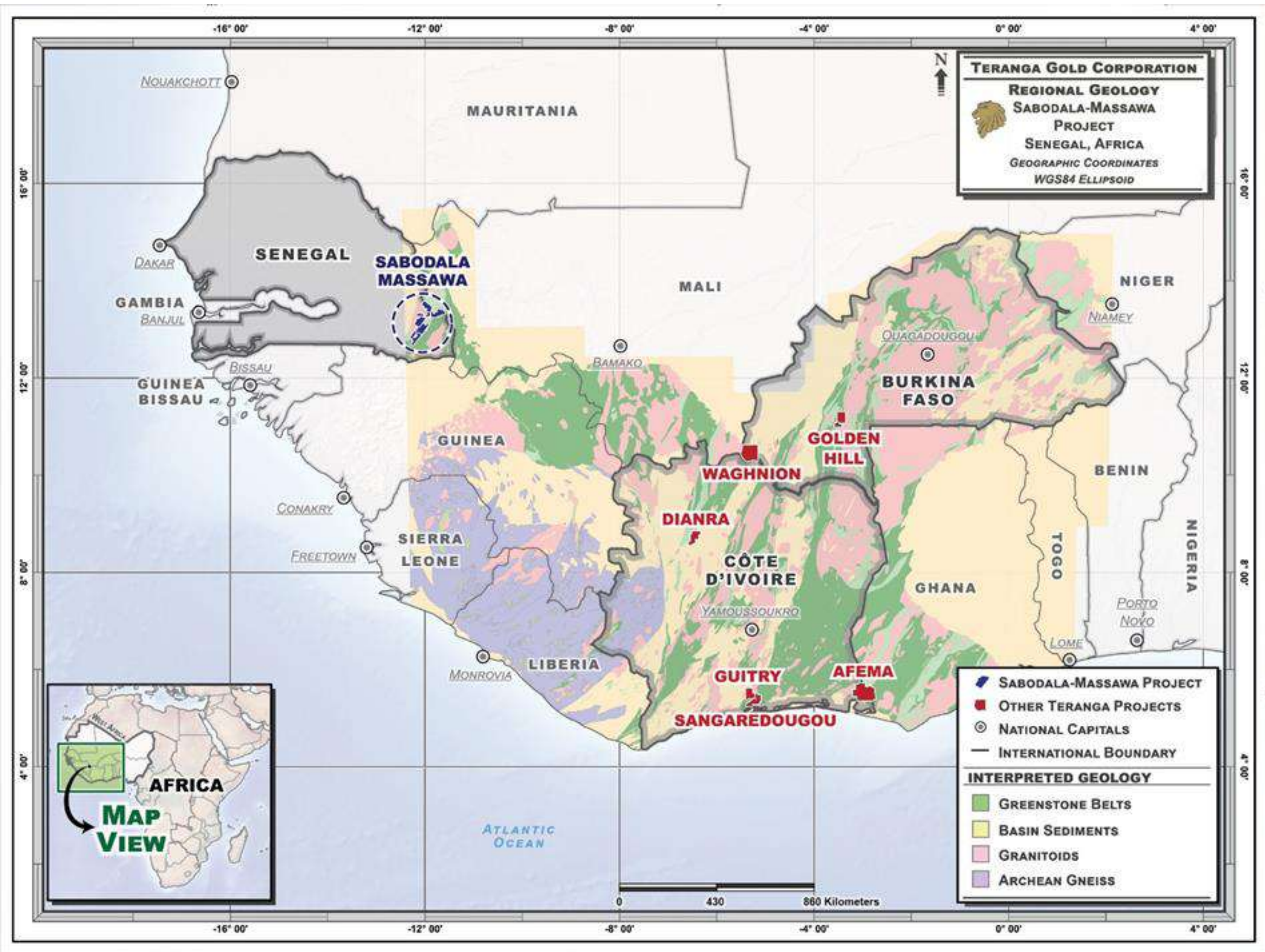
West Africa includes several world-class gold deposits including Loulo and Sadiola in Mali, and Ashanti (Obuasi) in Ghana. The metallogenic district is associated with Paleoproterozoic epigenetic gold deposits which occur in 2.25 Ga to 1.90 Ga granite-greenstone belts of the Birimian and Tarkwaian cycles, which were deformed and metamorphosed during the Paleoproterozoic Eburnean orogeny adjacent to the Archean Sao Luis Craton in Guinea, Sierra Leone and Liberia. Despite the abundance of known deposits, much of the region remains poorly explored.

Gold deposits in the West African metallogenic district, including those on the Sabodala-Massawa Project, show many characteristics consistent with their classification as orogenic (mesothermal) gold deposits and prospects. In addition to the deposits in western Africa, these include some of the largest gold deposits globally of variable age, such as the Archean Hollinger and Red Lake deposits in Canada and Kalgoorlie in Australia. Orogenic gold systems are structurally controlled deposits formed during regional deformation (orogenic) events. The term orogenic refers to deposits sharing common origin in metamorphic belts that have undergone regional compressional to transpressional deformation (orogenesis), often in response to terrane accretion or continent-continent collisional events.

Orogenic gold deposits exhibit a range of styles dependent on metamorphic grade, setting, fluid type, and fluid/confining pressure. They often include spatially associated quartz shear veins, extension vein arrays, shear zone and disseminated sulphide styles. Greenschist metamorphic grade, vein dominated styles such as those developed in the Sabodala district contain quartz-carbonate ± albite ± K-feldspar veins with up to 10% (pyrite ± arsenopyrite ± base metals) sulphides and associated Fe-carbonate albite, chlorite, scheelite, fuchsite and tourmaline as associated vein and hydrothermal alteration assemblages. Vein systems and shear zones are often semi-brittle in style, including both brittle veining styles (extension veins and fault hosted brecciated shear veins), which alternate with periods of ductile deformation, producing sequences of early folded and younger less strained vein systems during latter periods of regional deformation at peak to immediate post-peak metamorphic timing. Sigmoidal extension vein arrays are often present and are typical of the deposit style. This deposit type often also has great vertical extent providing potential for discovery of significant down-dip and down-plunge continuations of mineralised zones.

Orogenic deposits are typically localised adjacent to major faults (shear zones) in second and third order shear zones within volcano-sedimentary (greenstone and sedimentary) belts between granitic domains (commonly for Precambrian deposits such as the West African Birimian, Abitibi Greenstone Belt of Canada, and Yilgarn region of Western Australia), or in slate belt turbidite sequences (many Phanerozoic deposits). The fluid source for these systems remains controversial: they generally involve a dominant metamorphic fluid component, consistent with their setting and relative timing; however, in many districts, there is evidence for a contributing magmatic fluid inducing early oxide-rich alteration assemblages, as is seen at Sabodala-Massawa.

Figure 8.1.1 Regional Geology West Africa



Source: Teranga Gold Corporation, 2020

8.2 Comments on Section 8.0

The QP is satisfied that the regional geological model and deposit type targeted by exploration to discover gold-bearing targets within the Sabodala-Massawa Project is correct and valid.

8.3 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 8.0 are presented in Section 25.0

8.4 Recommendations

Recommendations for Section 8.0 are presented in Section 26.0.

8.5 References

References cited in Section 8.0, are presented in Section 27.0

9.0 EXPLORATION

9.1 Introduction

This Section covers the exploration work conducted within the Sabodala-Massawa Project by Teranga from January 2020 until February 2021, and by Endeavour from February 2021 to December 2021.

Exploration activities were limited, with both companies prioritising drilling. No geophysical surveys were carried out.

Historical exploration activities and results are described in Teranga (2020), Teranga (2017) and Teranga (2016) and summarised in Section 6.

9.2 Exploration Approach

An exploration phased approach is used by Endeavour, as presented below.

9.2.1 Phase 1: Target Generation

The following data types are collected and compiled:

- Airborne geophysics are interpreted and integrated with field geology (regolith and outcrop mapping) to identify major prospective structures, lithologies and alteration zones that will provide a project-scale regolith framework in which the context of any surface geochemistry can be evaluated.
- Geological mapping.
- Surface geochemistry to delineate gold-bearing corridors and targets.
- RAB drilling and trenching of prospective structures where extensive transported materials render surface sampling of low effectiveness.

Phase 1 of the exploration process is nearly completed in the Sabodala-Massawa Project area; however, after an on-going review, or if additional permits are added to the Project, further targets may be identified for further work. Future exploration programs will primarily be focused on Phase 2 and Phase 3 as outlined below, although, some aspects of Phase 1 continue as in the case of detailed soil grid coverage and trenching activities.

9.2.2 Phase 2: Prioritisation and Ranking

Based on the compiled data from Phase 1 and the knowledge base of the Exploration Team, targets are prioritised by 'highest probability' of hosting economic mineralisation.

9.2.3 Phase 3: Target Evaluation

Trenching is carried out in areas of shallow soil cover to map and sample the gold bearing zones, provide initial third dimension observations of geology and structure, and provide a first pass evaluation of their potential.

Reverse circulation (RC) and diamond drilling (DD) are used to systematically test the defined targets towards understanding mineralisation continuity. Diamond drilling has an added benefit of enabling the development of structural models and understanding the controls on the mineralisation.

Where significant mineralisation has been identified, systematic RC and DD is employed to ascertain overall dimension and quality of the target area.

9.3 Teranga Exploration, January 2020 to February 2021

Between January 2020 to February 2021, no exploration work was carried out by Teranga in the Project area.

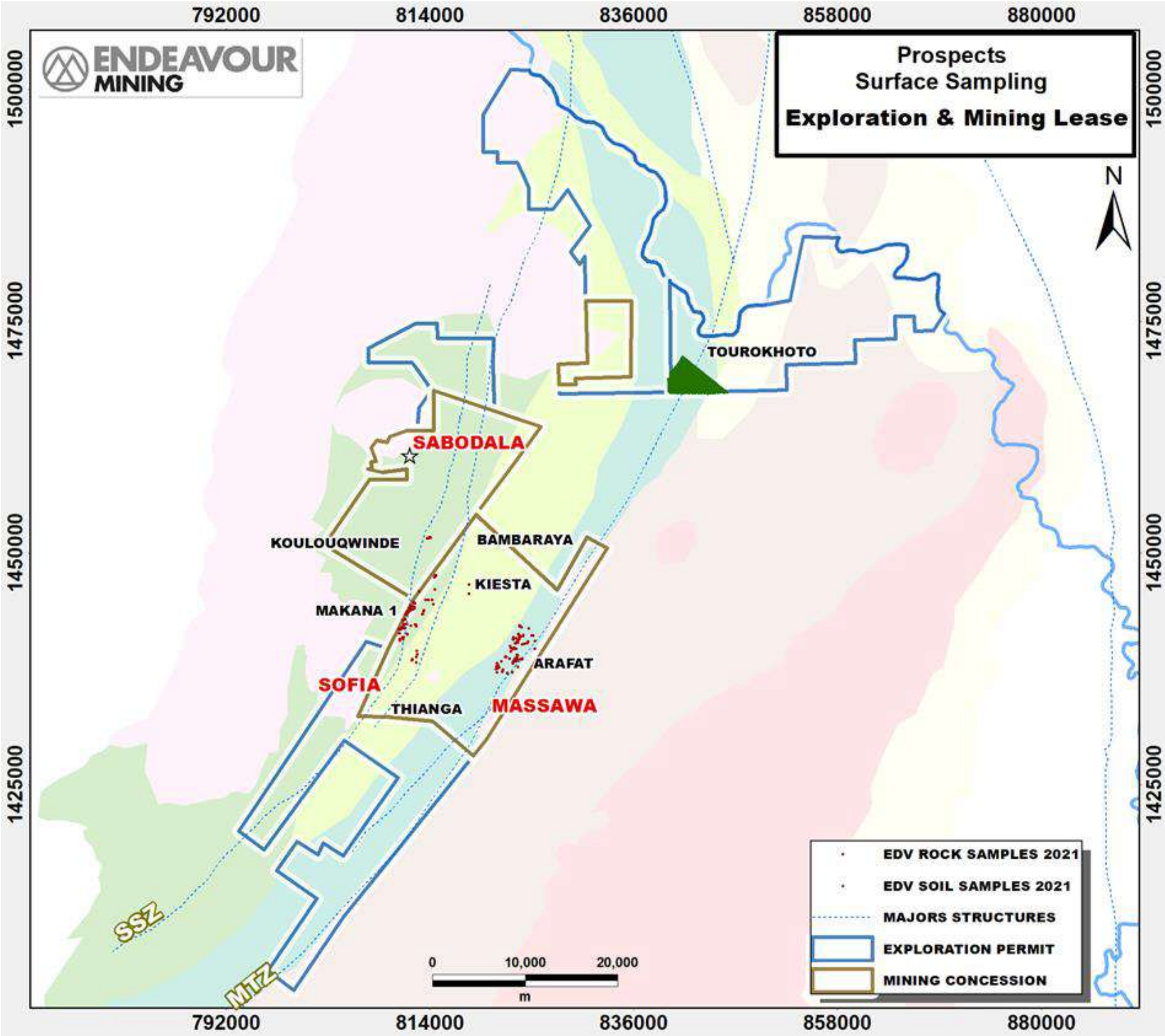
9.4 Endeavour, February to December 2021

Endeavour undertook limited exploration work between February and December 2021 within the Project area (Figure 9.4.1). Only one soil sampling grid (on the Tourokhoto prospect in Bransan Lot C Permit) and a number of surface mapping with grab rock sample campaigns (predominately on the Massawa ML) were executed, see Table 9.4.1.

Table 9.4.1 2021 Exploration Summary

Licence	Prospect	No. Rock Grab Samples	No. Soil Samples
Massawa	Arafat	145	-
	Bambaraya	177	-
	Kiesta	3	-
	Makana North	197	-
	Thianga	8	-
Sabodala	Koulouqwinde	38	-
Bransan Lot C	Tourokhoto	-	943
Total		**568**	**943**

Figure 9.4.1 Location of 2020 to 2021 Exploration Activities



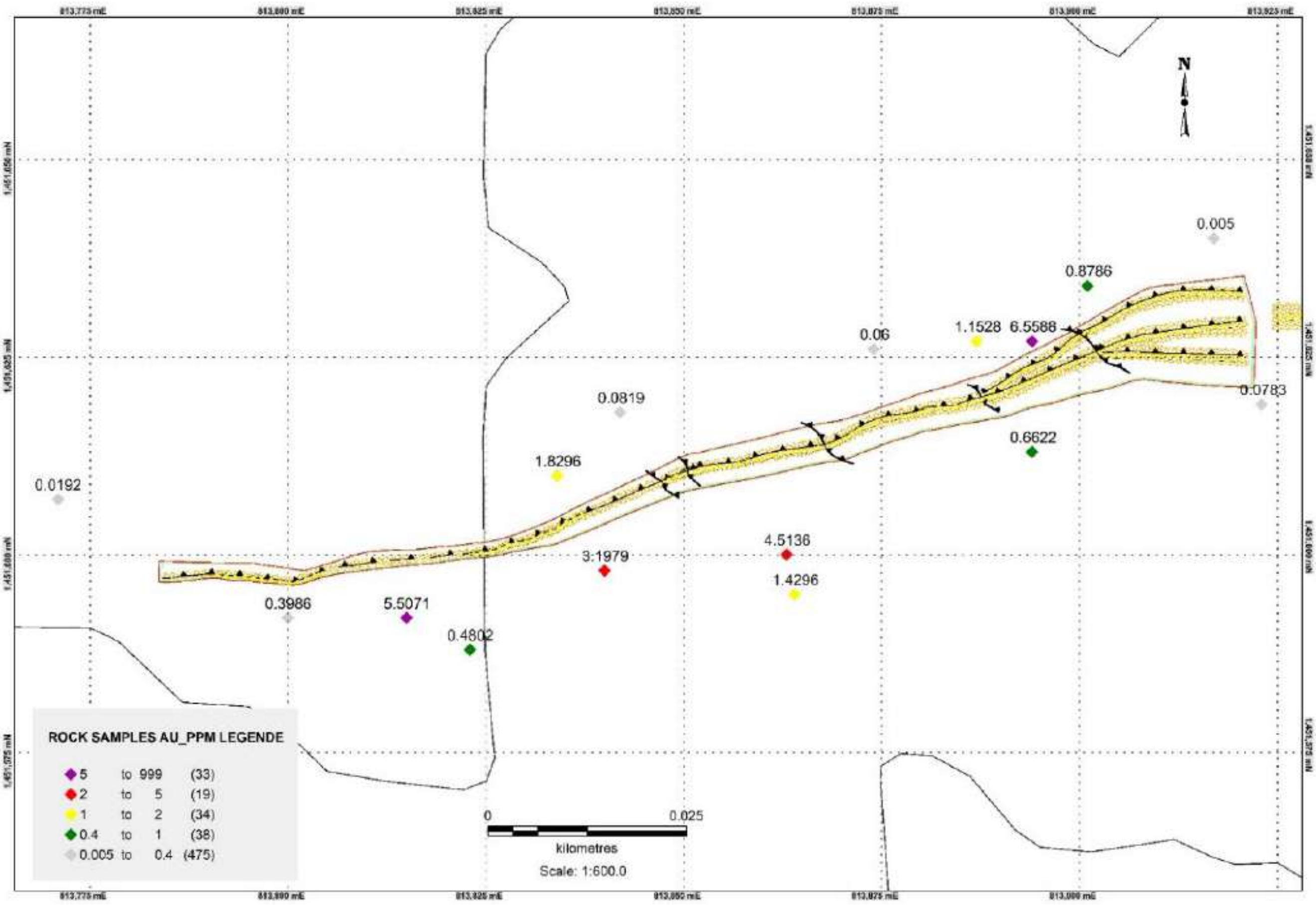
Source: Endeavour, March 2022.

9.4.1 Sabodala Mining Concession (MC)

In 2021, minimal exploration was undertaken on the Sabodala MC. Detailed geological mapping and rock grab sampling were carried out at Koulouqwinde Southwest located approximatively 0.8 km from Koulouqwinde open pit along the second order shear corridor controlling the Golouma and Kerekounda mineralised occurrences. It corresponds to an active artisanal mining zone with many small pits highlighting three subparallel, secondary ENE-WSW structural trends.

The Koulouqwinde Southwest field mapping was extended over 300 m along strike and resulted in a better understanding of the local structural setting and a detailed characterisation of the mineralised facies (typically of the Goulouma type). A total of 38 rock chips samples were tested with some significant gold values associated with altered volcanic wall-rocks identified, see Figure 9.4.2.

Figure 9.4.2 Koulouqwinde SW Sketch Map with Grab Rock Sample Results



Source: Endeavour, March 2022.

9.4.2 Massawa Mining License (ML)

Some exploration activities were undertaken on the Massawa ML in 2021, including detailed geological mapping, regolith mapping and rock grab sampling, predominately around the Bambaraya deposit but also in the vicinity of the Arafat and Makana North early stage prospects.

9.4.2.1 Arafat Prospect

The Arafat Prospect extends over an area of 20 km², approximately four kilometres southwest of Samina along the MTZ. The Arafat Prospect is widely covered by lateritic screens and depositional colluviums hiding the bedrock. A total of 145 grab rock samples were analysed without significant results.

9.4.2.2 Bambaraya

Prior to the 2021 drilling programme starting, a detailed geological mapping expedition combined with geochemical rock sampling was carried out by Endeavour around the main orpaillage pits and some newly opened drill pads in the Bambaraya deposit. A total of 177 grab rocks samples were collected, some returned noticeable gold values.

9.4.2.3 Makana North

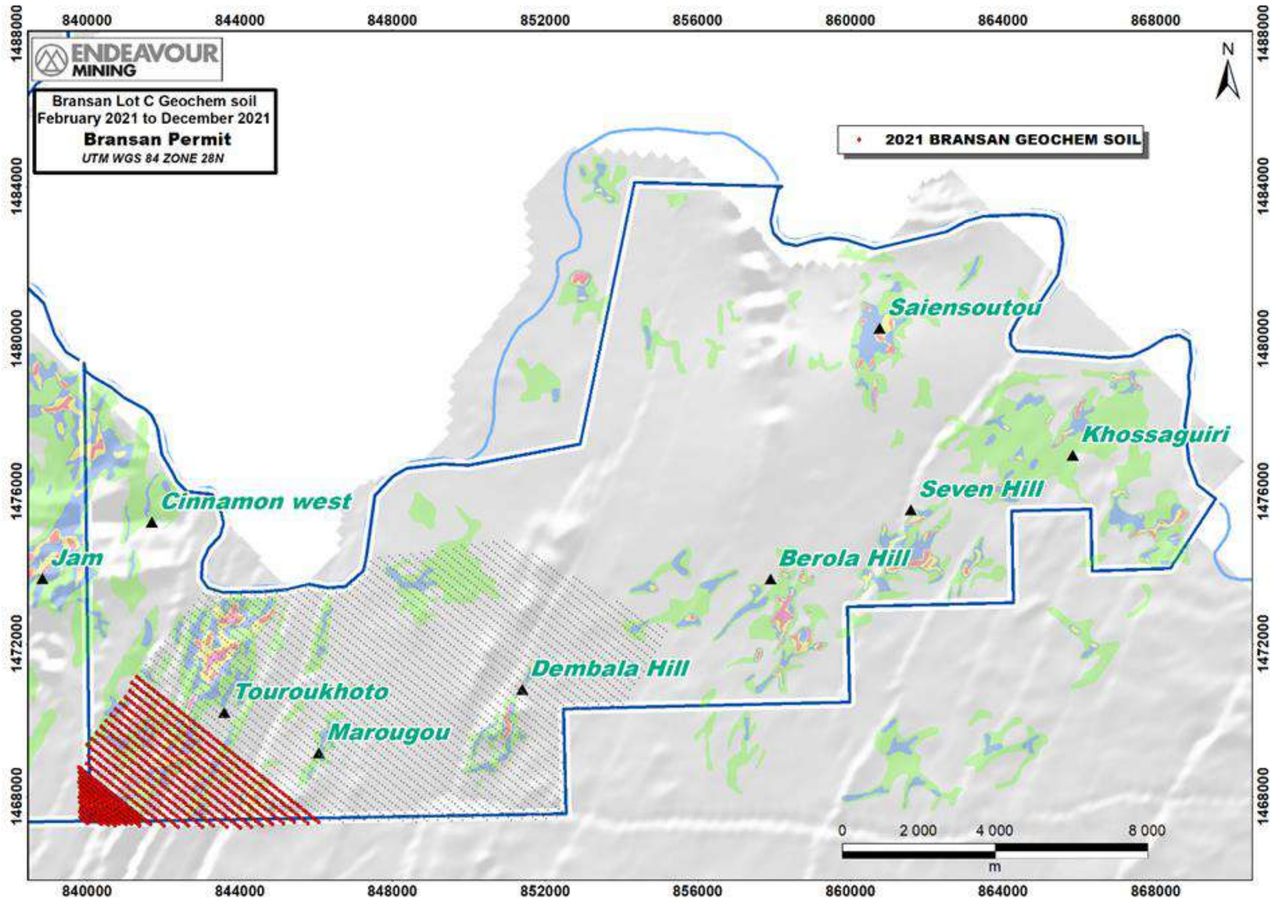
The Makana North Prospect extends over an area of 15 km², just north of Makana 1 along the SSZ, and is widely covered by alluvial and colluvial material. A total of 197 grab rock samples were collected. Some of the samples, mostly described as veined quartzite or altered sheared gabbro, returned significant gold values.

9.4.3 Bransan Lot C

In 2021 a systematic soil geochemistry programme was initiated within the western part of the Bransan Lot C Exploration Permit to generate new targets within the northeastern extension of the highly prospective MTZ structural corridor.

A total of 943 soil samples were collected on a 100 m by 200 m grid over approximately 6 km² within the southwestern-most Tourokhoto area (Figure 9.4.3). Assay results are currently outstanding. A detailed regolith mapping campaign was also conducted in the area of concern.

Figure 9.4.3 Bransan Lot C Soil Geochemical Sampling Map



Source: Endeavour 2022.

9.5 Additional Exploration Targets

The Sabodala-Massawa Project hosts a significant proportion of a relatively underexplored, regional-scale gold system. It has excellent potential to increase the Mineral Resources where existing mineralisation, identified prospects and targets are open along strike and at depth along the two major regional structures, corresponding structural corridors and the vast area between the two major regional structures.

Approximately 38 km of the SSZ and 40 km of the MTZ are located within the Project area. In addition, the structural corridors between and adjacent to the two regional structures have good potential to host additional mineralisation where early stage exploration programs have returned favourable results in numerous prospects and targets in adjacent parallel, and second and third order structural zones. These structural zones consist of northwest trending linking structures between major shear zones as well as structures wrapping around major intrusions, all of which form prospective sites for gold deposit formation.

Datasets available to assist with target generation include exploration drilling, regional soil samples, rock-chip samples and geophysics (electro-magnetics, radiometrics, aeromagnetics and local induced polarisation (IP)).

Outside the deposits hosting the currently defined Mineral Resources reported herein, more than 70 prospects have been identified and drill tested with almost 2000 holes (RC or DD), and 10 000 rotary air blast (RAB) holes. Endeavour (and its predecessors Teranga and Randgold) uses a phased approach to the property wide exploration programme. Endeavour has completed a review of the existing data, evaluation of results, and has prioritised drill targets and further soil sampling.

In the immediate to near future, to add medium to high-grade resources, the exploration plan is to focus on:

- Free sulphide and/or oxide mineralisation along the Sabodala Shear Zone (SSZ) and the Bakan Corridor (BSC).
- Deep oxide mineralisation along the Main Transcurrent Zone (MTZ).

9.6 Data Verification

Described fully in Section 12.0, 'Data Verification'.

9.7 Comments on Section 9.0

In the Qualified Person's opinion, the exploration methodology applied is suitable for the geological terrain and mineralisation style found within the Project Area. The phased approach has proven to be successful and is well-funded. The Qualified Person considers the gold prospectivity of the Sabodala-Massawa Project remains high and exploration activities should be continued following the same methodology with the experienced and competent exploration team on-site.

9.8 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 9.0 are presented in Section 25.0.

9.9 Recommendations

Recommendations pertaining to Section 9.0 are presented in Section 26.0

9.10 References

There are no references for Section 9.0.

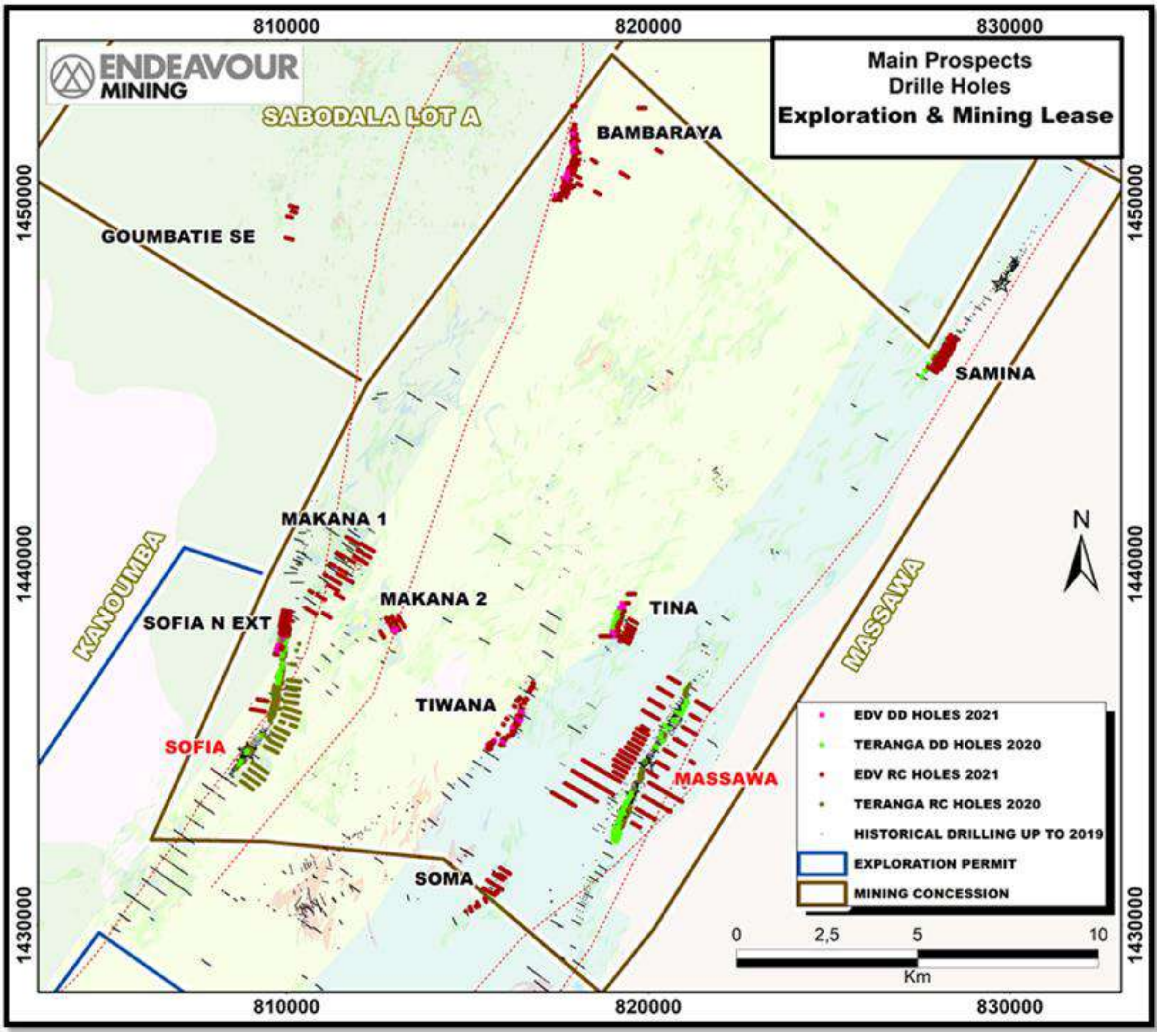
10.0 DRILLING

10.1 Introduction

The drilling referred to herein was undertaken after the issue of the 2017 Sabodala Technical Report issued by RPA on behalf of Teranga Gold Corporation, and the 2019 Massawa Technical Report issued by Barrick Gold Corporation. The drilling prior to 2020 is considered historical and summarised in Section 6 History. Best practice drilling procedures and protocols were developed and refined by Teranga and Barrick/Randgold, and subsequently amended by Endeavour. Hence, the 'historical' and 'current' drilling data has been collected with similar methods, supervision and overall quality; they are considered to be compatible, comparable and of equal stature by the Qualified Person.

Since January 2020, a total of 159 125 m have been drilled on the different targets across the Sabodala Mining Concession, the Massawa Mining License and the Kanoumba Exploration Permit, including near-mine and exploration targets, see Figure 10.1.1. Four drilling companies were contracted for the completion of the drilling programmes: Falcon Drilling LLC (Falcon) (2020 to 2021), FTE Drilling (FTE) (2020 to 2021), Boart Longyear (2021) and 'International Drilling Company' (IDC) (2021).

Figure 10.1.1 Drill Hole Locations in 2020 and 2021



Source: Endeavour, March 2022.

10.2 Procedures

Comprehensive Standard Operating Procedure (SOP) documents have been developed by the Exploration Team on the Sabodala-Massawa Project. The documents establish the standard procedures for both diamond drilling (DD) and reverse circulation (RC) drilling. The manuals propose site layout methodologies and set-out procedures and give examples for the handling of samples, marking of boxes, chip bags and boxes, etc. The drilling, sample preparation, sample security and analytical procedures used are consistent with generally accepted industry best practice. The general guidelines for DD and RC drilling are summarised below.

10.2.1 Diamond Drilling

Drilling and core logging procedures include:

- Downhole survey.
- Core orientation.
- Core photography.
- Geotechnical and structural logging.
- Lithological and weathering logging.
- Specific gravity measurements.

In essence, the DD core is measured and an orientation line marked on the fresh rock at the drill rig before it is transported to the Exploration Core Yard within the Massawa Camp for logging and sampling. Once in the core yard, the orientation line is checked by a geologist and a qualified technician and validated. After lithological, weathering, geotechnical and structural logging, digital photographs are taken and samples selected approximately every ten metres to measure specific gravity. The core is cut in half using a diamond saw along the orientation line. Samples are then bagged, weighed, placed into a large rice bag with other primary samples and Quality Control/Quality Assurance (QA/QC) and dispatched to the SGS laboratory in Sabodala or the ALS laboratory in Ouagadougou, Burkina Faso. Core samples are one metre down-the-hole (DTH) long.

All data is recorded, validated and entered into the Endeavour Mining proprietary electronic database management system (DMBS, 'DDHTools').

10.2.2 RC Drilling

At the RC drill rig, the RC chips are collected in one metre intervals from the cyclone in labelled rice bags. Information is collected including total sample weight, moisture or water content; any event is recorded in a field book for future reference. Upon arrival at the Exploration Core Yard, the RC samples are dried if required before being sampled. The (dried) material is split using a single chute riffle splitter to obtain a two to four kilogram primary sample. The complete reject is then split again using the same method to obtain a Witness Sample to be kept for future reference. Once every 17 samples, a sample is split a third time to generate a Field Duplicate for QA/QC purposes. After splitting, the primary sample is bagged, weighed, placed into a large rice bag with other primary samples and QA/QC samples and dispatched to the laboratory (SGS in Sabodala or ALS in Ouagadougou, Burkina Faso).

All RC drill material is sampled on a one metre interval except in case of poor recovery, near surface for example. All data is recorded, validated and entered into the DBMS.

10.3 Teranga Drilling, January 2020 to February 2021

The drilling activities carried out by Teranga in 2020 and early 2021 exclusively focused on development programmes within the newly acquired (from Barrick/Randgold) Massawa Mining Lease.

The aim of these drilling programmes was to:

- Expand and upgrade the Mineral Resources previously defined at the Massawa, Sofia and Tina deposits.
- Delineation of a deposit at Samina.
- Further characterise the metallurgy of the Massawa mineralised zones.

A total of 335 RC holes for 19 540 m and 258 DD holes for 34 840 m were drilled, as presented in Table 10.3.1.

Table 10.3.1 Teranga Drilling, January 2020 to February 2021

Permit	Prospect	Drilling Company	RC Drilling		Core Drilling	
			No. Holes	Total m	No. Holes	Total m
Massawa	Massawa	Falcon & FTE	-	-	104	13 392
		FTE	50	3790	-	-
Massawa	Samina	Falcon & FTE	-	-	51	7311
		FTE	21	3029	-	-
Massawa	Sofia	Falcon	-	-	58	5432
		FTE	258	12 146	-	-
Massawa	Tina	Falcon	-	-	45	8704
		FTE	6	575	-	-
Total			**335**	**19 540**	**258**	**34 839**

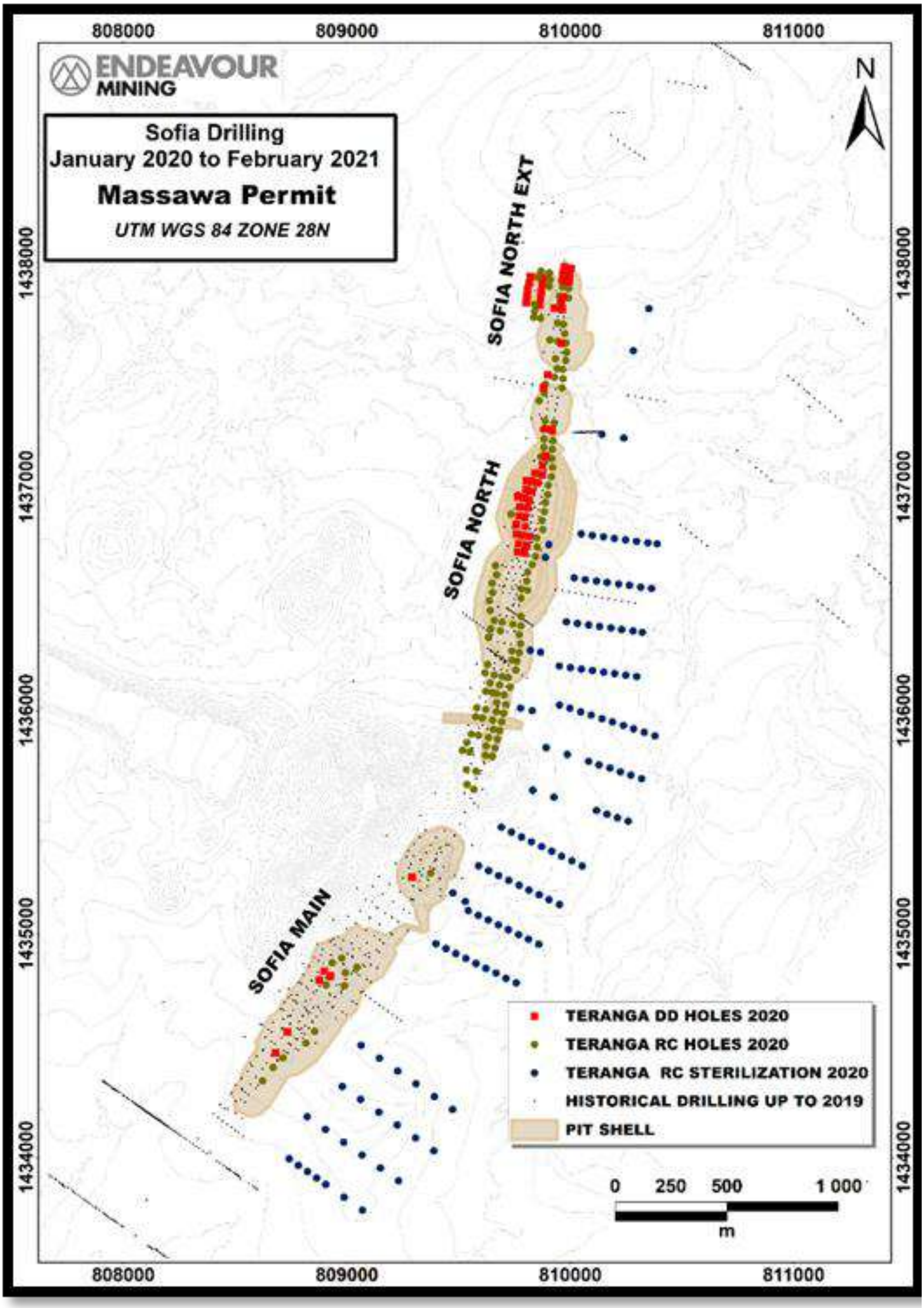
10.3.1 Sofia Main and Sofia North Areas

Successive infill and extension drilling programmes within the Sofia, Sofia North and Sofia North Extension Zones were undertaken with the goal of expanding and upgrading the previously defined Mineral Resources. A total of 78 RC holes for 3389 m and seven DD holes for 976 m were drilled in Sofia Main; and a total of 180 RC holes for 8757 m and 51 DD holes for 4457 m in Sofia North. Drill hole locations are presented in Figure 10.3.1, whilst Figure 10.3.2 and Figure 10.3.3 illustrate typical cross-sections across the deposits.

The drilling results confirmed the continuity of the mineralisation at Sofia Main and Sofia North and highlighted the strike extension of the main mineralised zones to the north (a mineralised western branch of the Sofia Shear Zone recognised within the Sofia North Extension target).

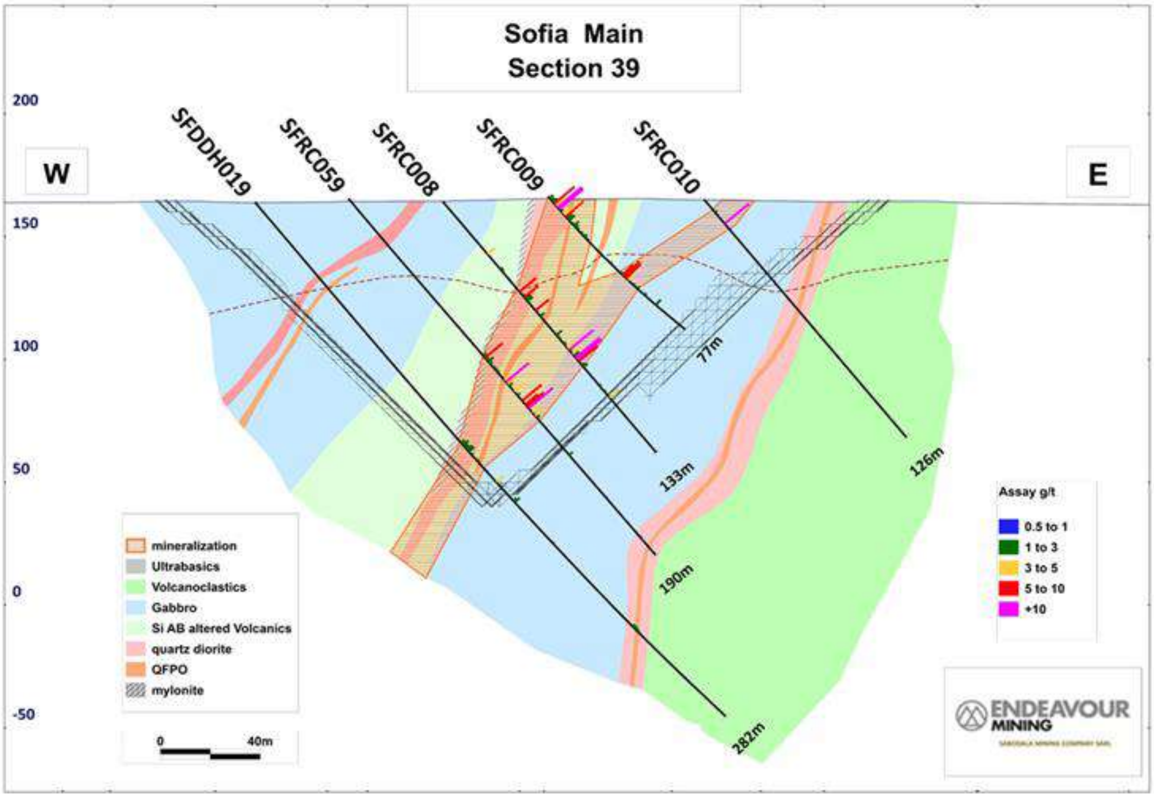
In addition, sterilisation drilling programmes were carried out southeast and east of the Sofia and Sofia North pits.

Figure 10.3.1 Sofia 2020 to 2021 Drill Hole Location Map



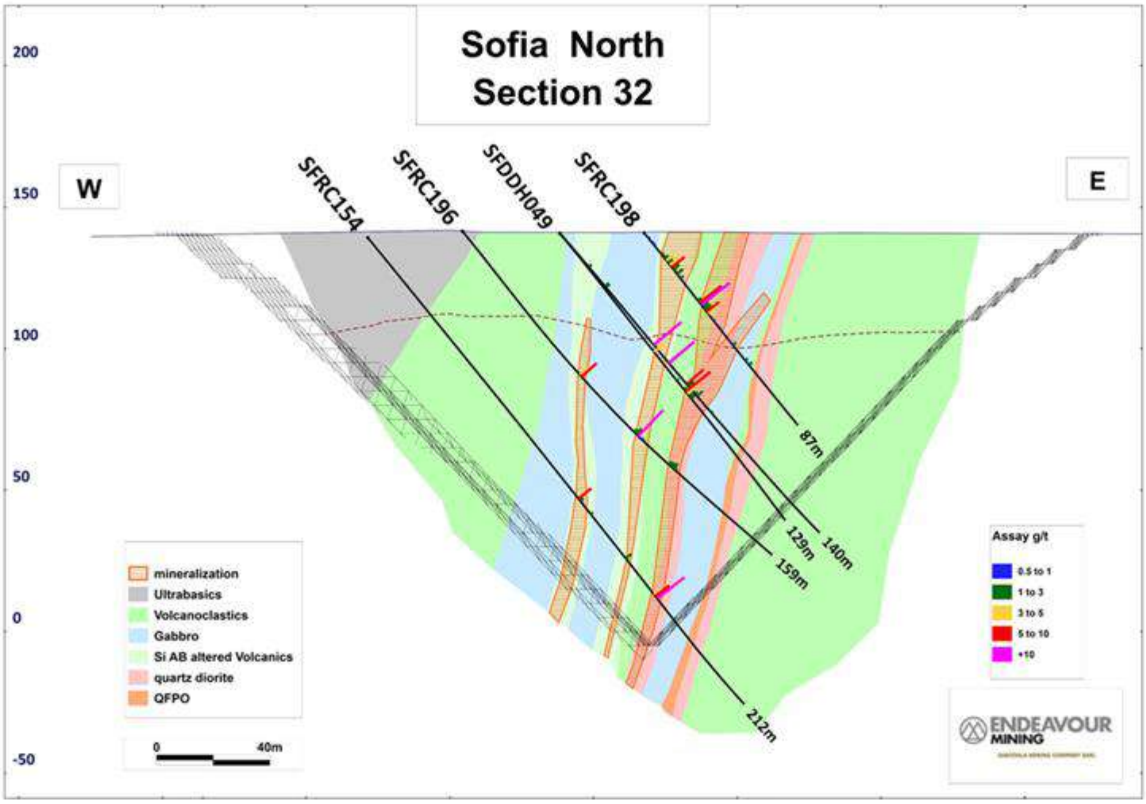
Source: Endeavour, March 2022.

Figure 10.3.2 Sofia Main Cross-Section Example



Source: Endeavour, March 2022.

Figure 10.3.3 Sofia North Cross-Section Example



Source: Endeavour, March 2022.

10.3.2 Massawa CZ and Massawa NZ

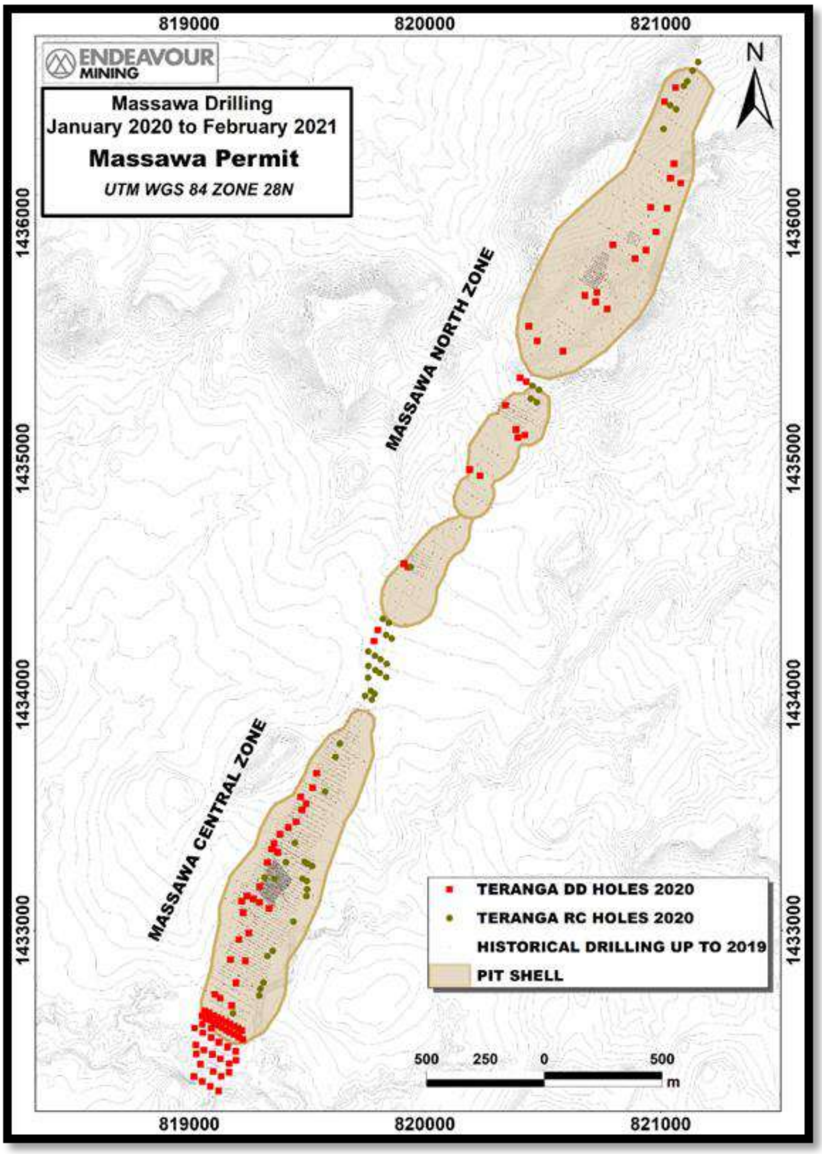
Between January 2020 and February 2021, Teranga conducted successive infill and extension drilling programmes at Massawa CZ and Massawa NZ with the aim of expanding and upgrading the Mineral Resources. A total of 50 RC holes for 3790 m and 104 holes for 13 392 m were drilled.

The drilling resulted in an improved delineation of the main mineralised zones, the confirmation in places of the mineralisation continuity and highlighted the proximal strike extension of the mineralised structures to south outside of the USD 1500 pit shell. The mineralised strike length at Massawa CZ was extended to more than 900 m; it remains largely open to south.

In addition, drilling programmes to collect metallurgical samples were carried out at both Massawa CZ and Massawa NZ.

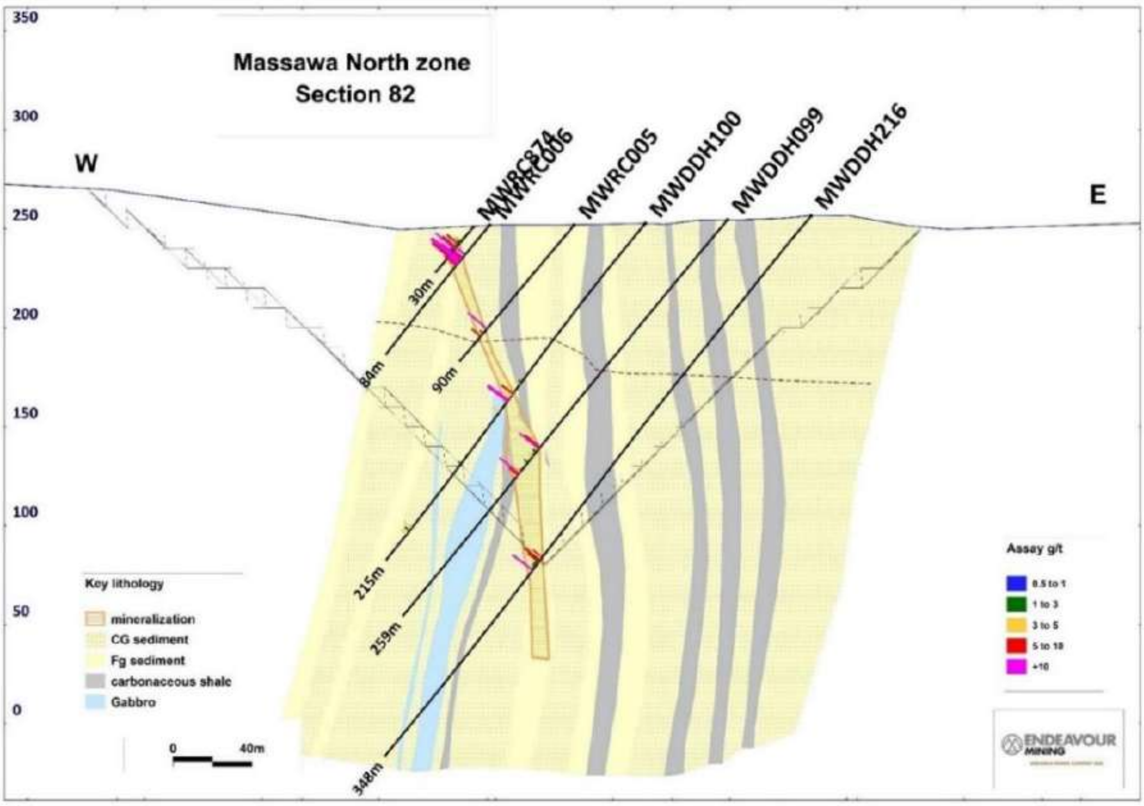
Massawa 2020 to 2021 drill hole collars are presented in Figure 10.3.4. Figure 10.3.5 and Figure 10.3.6 illustrate typical cross-sections across the deposits.

Figure 10.3.4 Massawa 2020 to 2021 Drill Hole Location Map



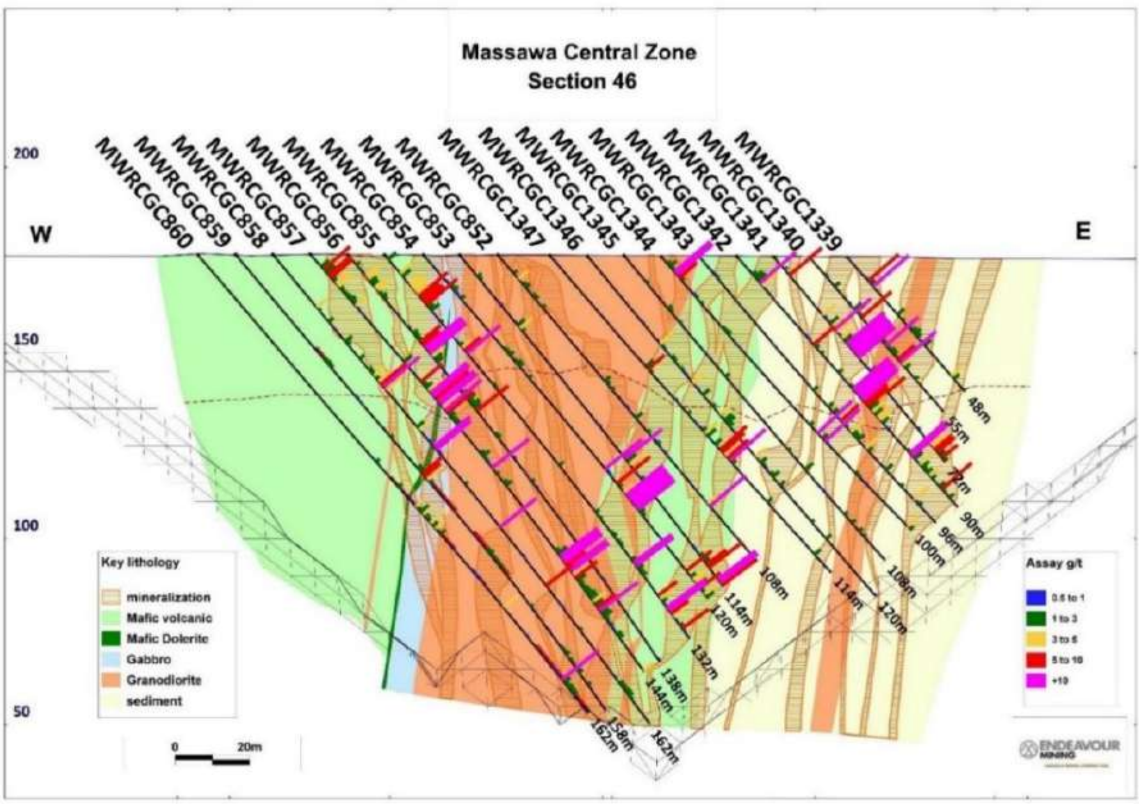
Source: Endeavour, March 2022.

Figure 10.3.5 Massawa NZ Cross-Section Example



Source: Endeavour, March 2022.

Figure 10.3.6 Massawa CZ Cross-Section Example



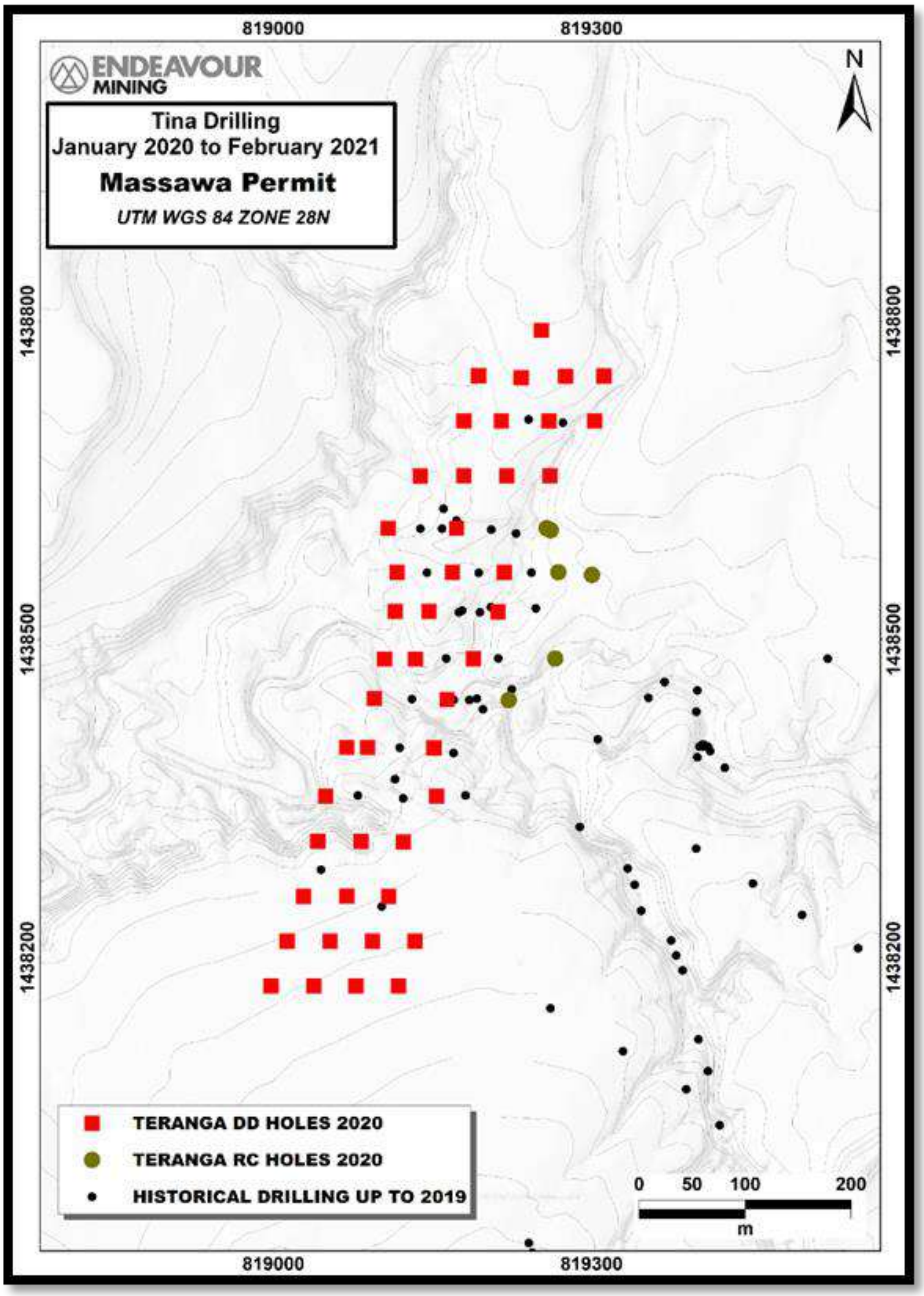
Source: Endeavour, March 2022.

10.3.3 Tina

Between January 2020 and February 2021, with the goal to expand and upgrade a previously defined Mineral Resource, Teranga conducted a combined infill and extension drilling programme at Tina. A total of six RC holes for 575 m and 45 holes DD for 8704 m were drilled.

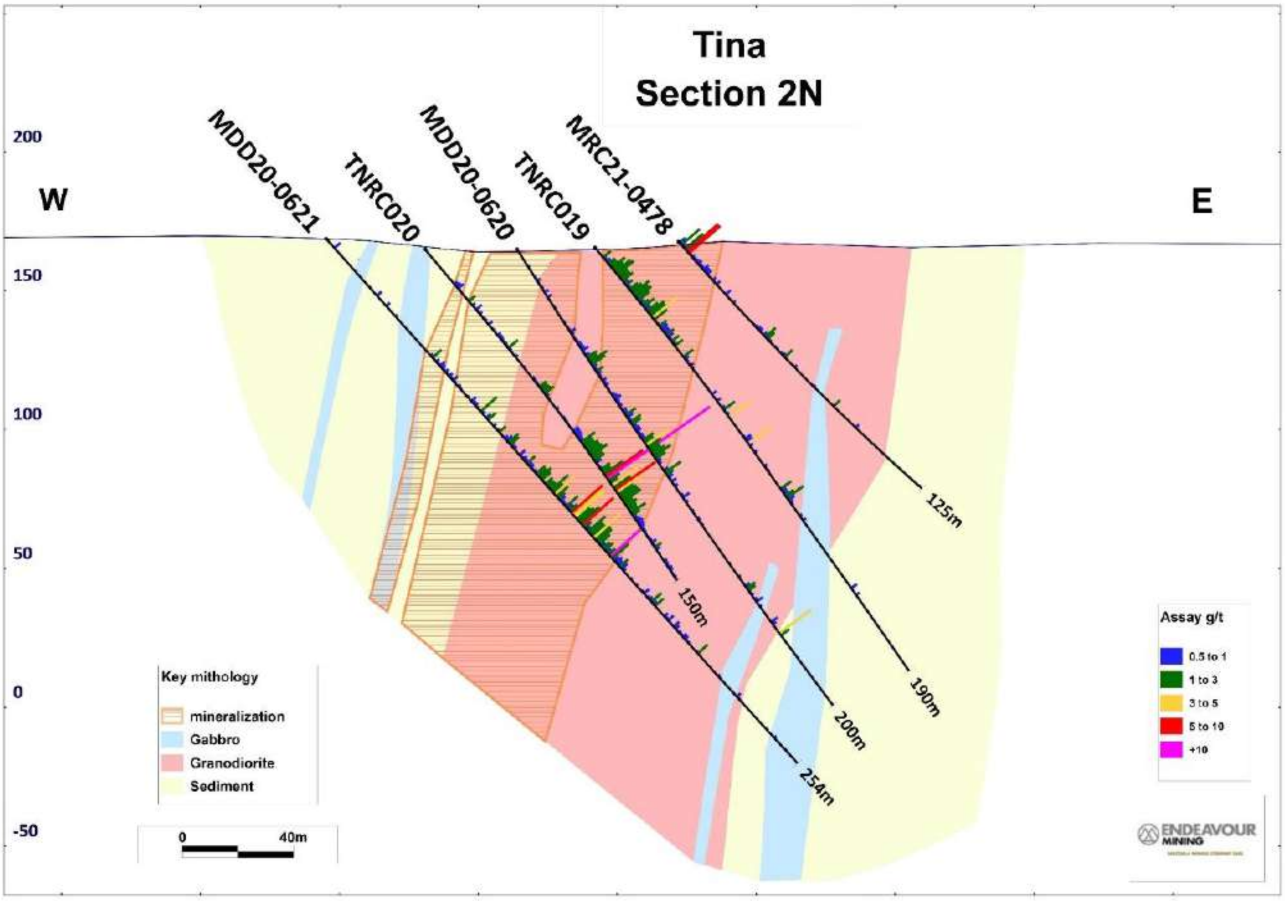
The drilling confirmed the mineralisation continuity and extended the main mineralised zones from 300 m to more than 600 m along strike length. The mineralised system remains largely open to the north and south. Tina's 2020 to 2021 drill hole locations are shown in Figure 10.3.7 and Figure 10.3.10 illustrates a typical cross-section across the deposit.

Figure 10.3.7 Tina 2020-21 Drill Hole Location Map



Source: Endeavour, March 2022.

Figure 10.3.8 Tina Cross-Section Example



Source: Endeavour, March 2022.

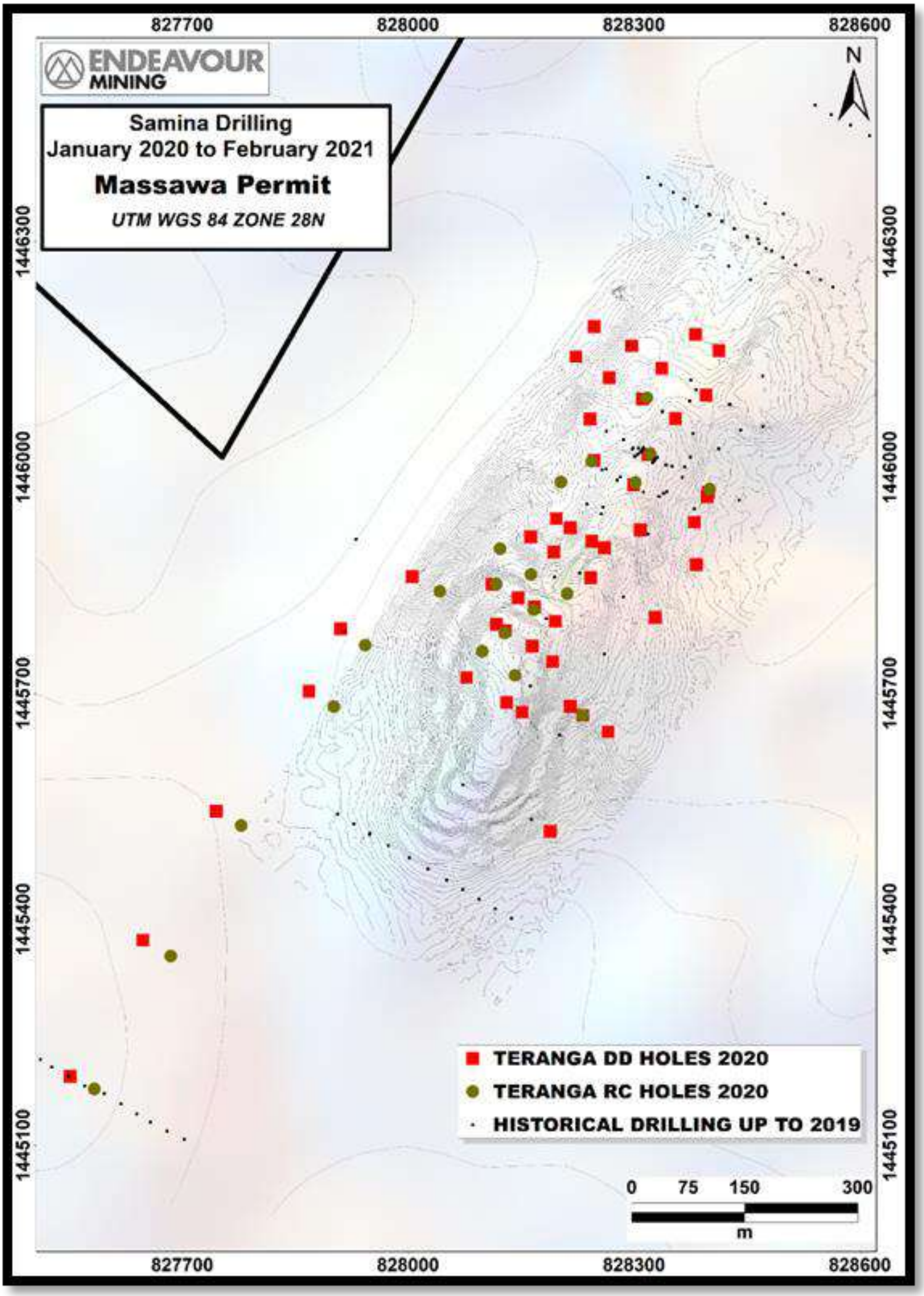
10.3.4 Samina

Between January 2020 and February 2021, Teranga conducted a combined infill and extension drilling programme at Samina along (40 to 75) m spaced drill fence lines to confirm mineralisation continuity and to assess down-dip potential. A total of 21 RC holes for 3029 m and 51 DD holes for 7311 m were drilled.

The programme resulted in tracing the oxide mineralisation over a 550 m strike length and to a 75 m vertical depth to the north of the known deposit.

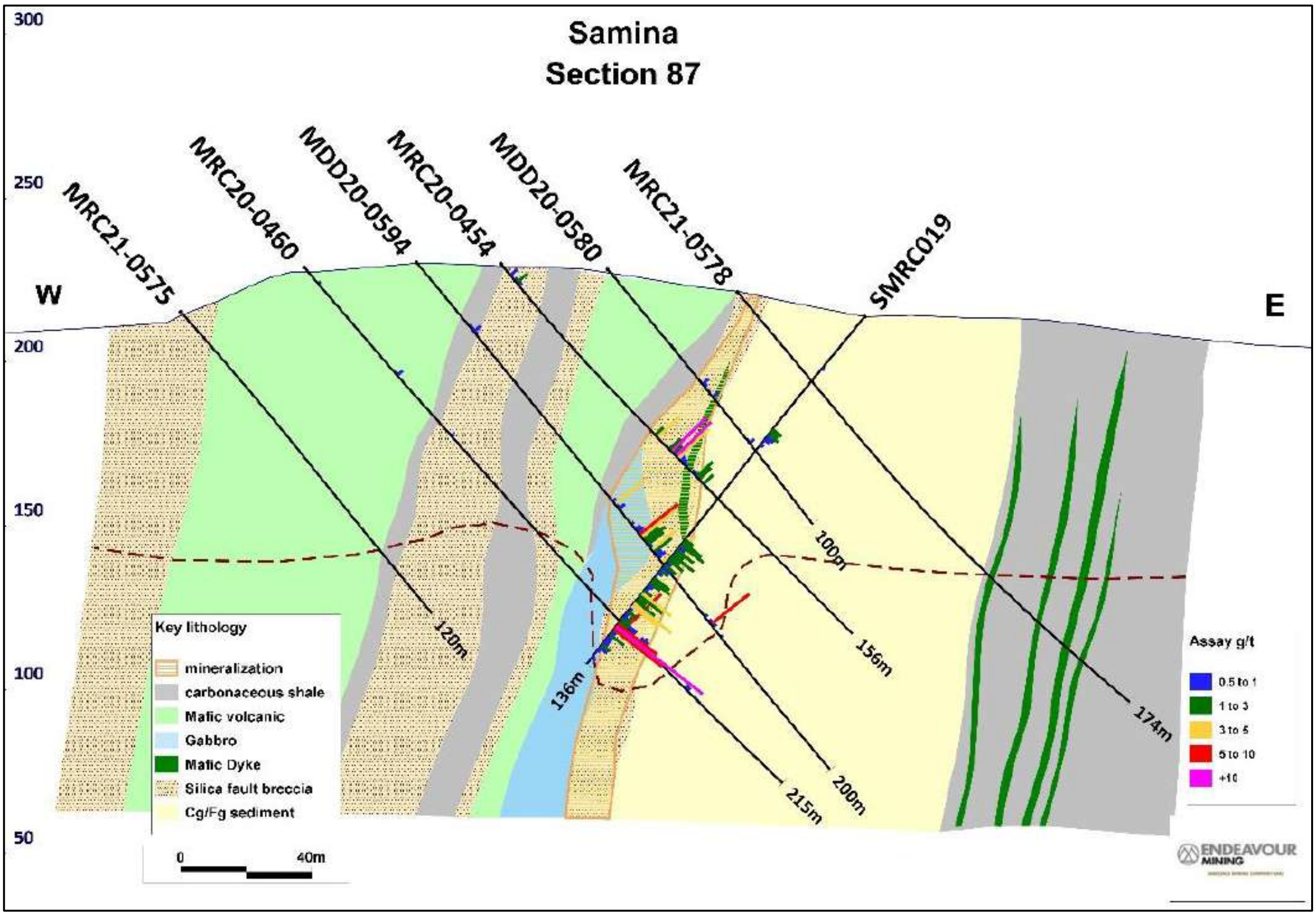
In parallel, a known western branch of the mineralised system was tested over 800 m without significant gold results. The 2020 to 2021 Samina drill hole collars are shown in Figure 10.3.9, whilst Figure 10.3.10 illustrates a typical cross-section across the deposit.

Figure 10.3.9 Samina 2020-21 Drill Hole Location Map



Source: Endeavour, March 2022.

Figure 10.3.10 Samina Cross-Section Example



Source: Endeavour, March 2022.

10.4 Endeavour Drilling, February to December 2021

The drilling activities carried out by Endeavour in 2021 mostly focused on exploration and development programmes within the Massawa Mining Lease.

The drilling programmes targeted:

- Expansion and upgrade of the Mineral Resources at Sofia, Tina and Bambaraya.
- Delineation of a deposit at Samina, Makana 1 and 2, Tiwana and Soma.

A total of 335 RC holes for 19 540 m and 258 DD holes for 34 840 m were drilled, as shown in Table 10.4.1.

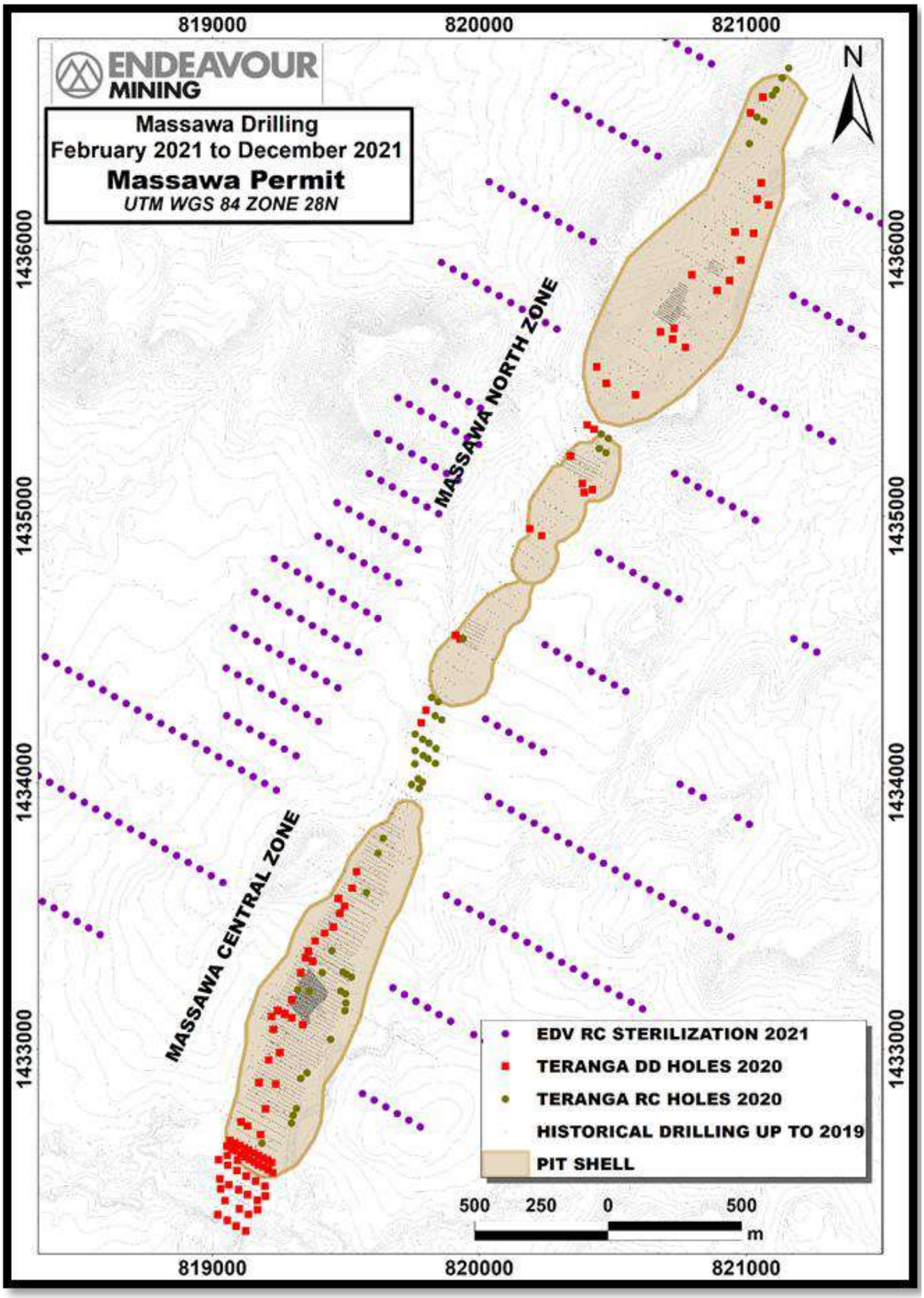
Table 10.4.1 Endeavour Drilling, 2021

Permit	Prospect	Drilling Company	RC Drilling		Core Drilling	
			No. Holes	Total m	No. Holes	Total m
Massawa	Bambaraya	Falcon	-	-	19	2875
		FTE & BLY	219	22 198	-	-
Massawa	Makana 1	Falcon	-	-	4	548
		FTE & BLY	50	4 745	-	-
Massawa	Makana 2	FTE	76	9 548	-	-
Massawa	Massawa	FTE & IDC	-	-	104	13 392
		FTE & IDC	391	14 020	-	-
Massawa	Samina	Falcon	-	-	59	9013
		FTE	146	17 005	-	-
Massawa	Sofia	Falcon & FTE	-	-	79	7634
		FTE	375	22 055	-	-
Kanoumba	Soma	FTE & IDC	59	5538	-	-
Massawa	Tina	Falcon	-	-	59	11 591
		FTE & IDC	76	6783	-	-
Massawa	Tiwana	Falcon	-	-	14	1648
		FTE & IDC	90	9084	-	-
Sabodala	Goumbati	IDC	14	1449	-	-
Total			**1496**	**112 425**	**338**	**46 700**

10.4.1 Massawa

Between February and December 2021, a sterilisation drilling programme totalling 501 RC holes for 14 020 m and 184 DD holes for 23 159 m was undertaken at Massawa CZ and Massawa NZ, as shown in Figure 10.4.1.

Figure 10.4.1 Massawa CZ and NZ 2021 Drill Hole Location Map



Source: Endeavour, March 2022.

10.4.2 Sofia North Extension

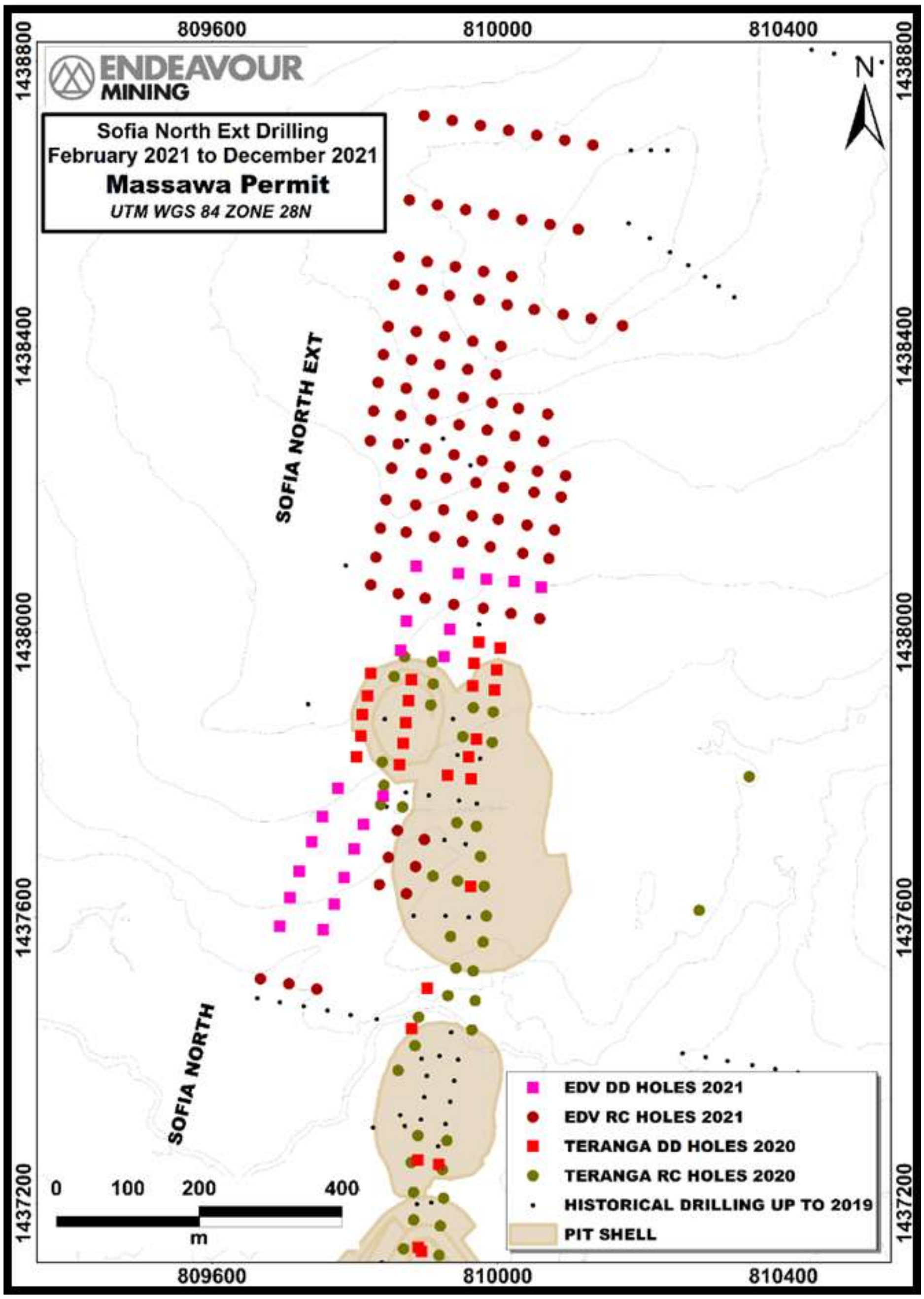
Between February and December 2021, a drilling programme composed of 98 RC holes for 8739 m and 21 DD holes for 2202 m was conducted at Sofia North.

This programme targeted the northwest and north extensions of the Sofia North deposit. It successfully discovered a new, mineralised zone extending 800 m along strike and is 150 m wide which remains open to the north towards Matiba prospect.

In parallel, a sterilisation drilling programme of 19 RC holes for 1170 m, was undertaken west of the Sofia North pit.

The drilling at Sofia North Extension in 2021 by Endeavour is shown in Figure 10.4.2.

Figure 10.4.2 Sofia North Extension 2021 Drill Hole Location Map



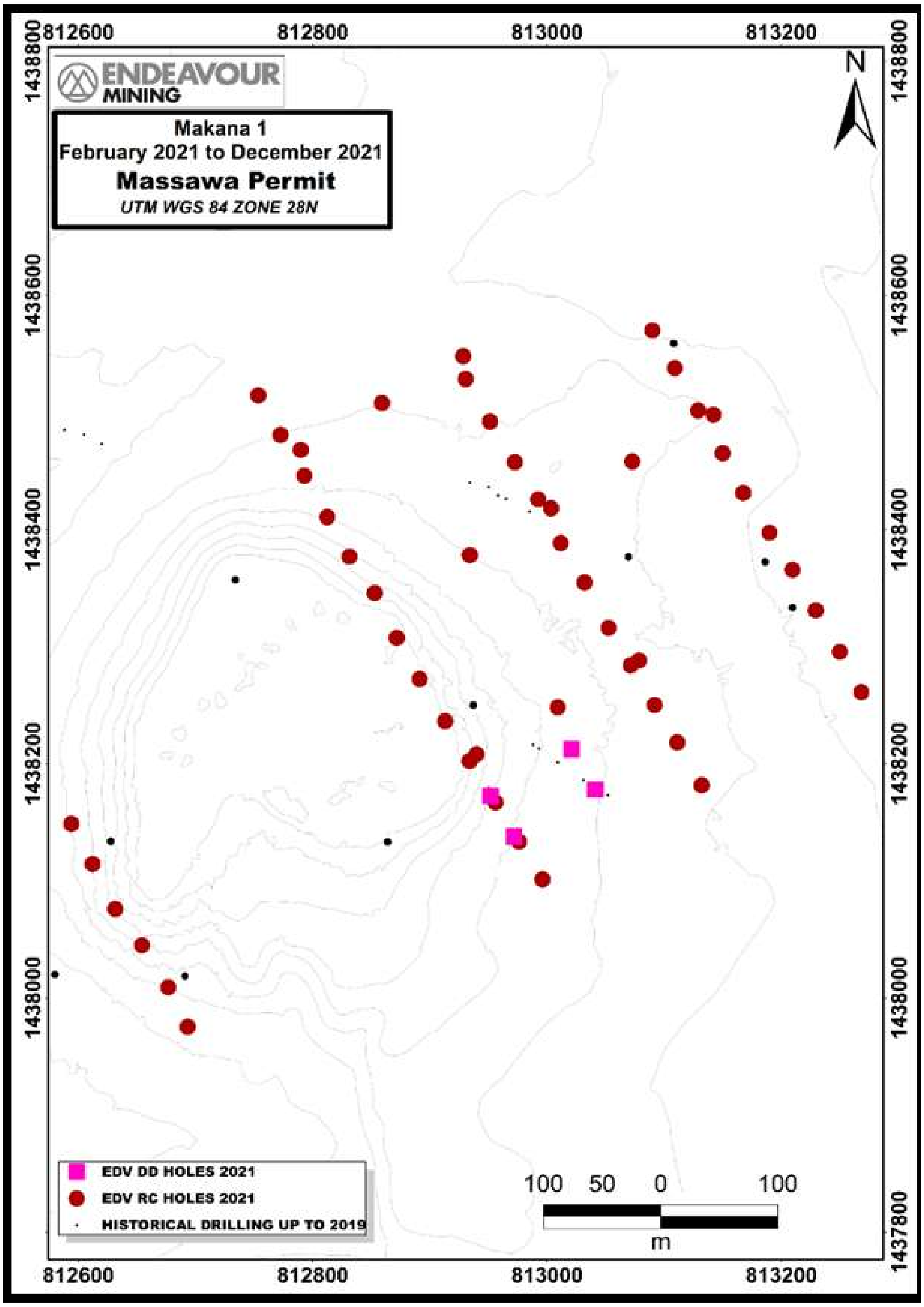
Source: Endeavour, March 2022.

10.4.3 Makana 1

The Makana 1 drilling programme aimed at testing an area 800 m by 600 m with high-grade scattered mineralised occurrences (multiple sets of veins controlled by a currently poorly understood complex structural setting), highlighted by widespread orpaillage pits (including a former, official orpaillage dedicated corridor).

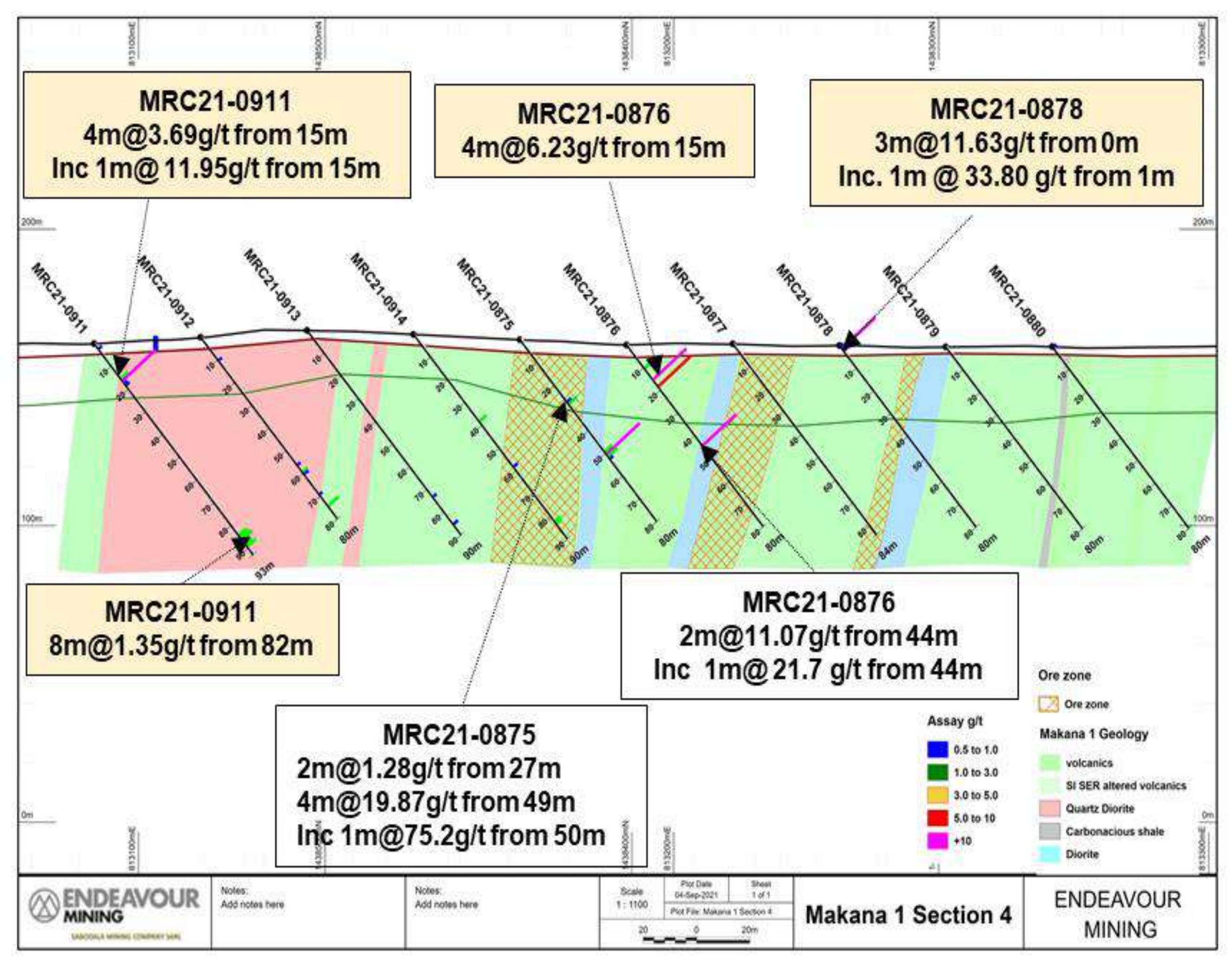
Some 50 RC holes for 4745 m and four DD holes for 548 m were drilled along four (200 to 350) m spaced reconnaissance and follow-up drilling fence lines, see Figure 10.4.3. Encouraging results were obtained with high-grade mineralisation identified open along strike. Figure 10.4.4 illustrates a typical cross-section across the deposit.

Figure 10.4.3 Makana 1 2021 Drill Hole Location Map



Source: Endeavour, March 2022.

Figure 10.4.4 Makana 1 Cross-Section Example



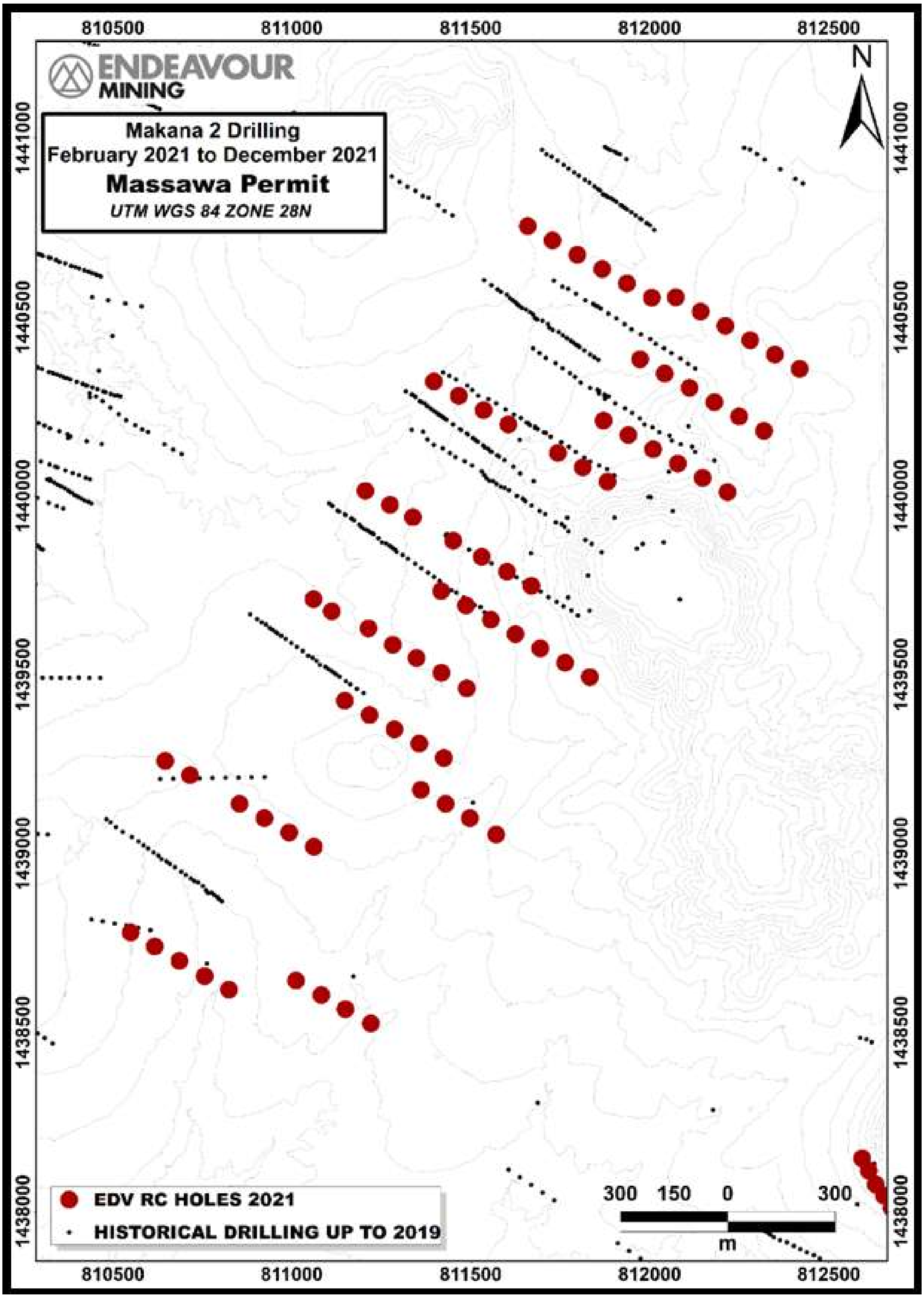
Source: Endeavour, March 2022.

10.4.4 Makana 2

The 2021 drilling programme at Makana 2 aimed at testing an over 2400 m long, northeast trending, structurally controlled trend previously identified by Barrick.

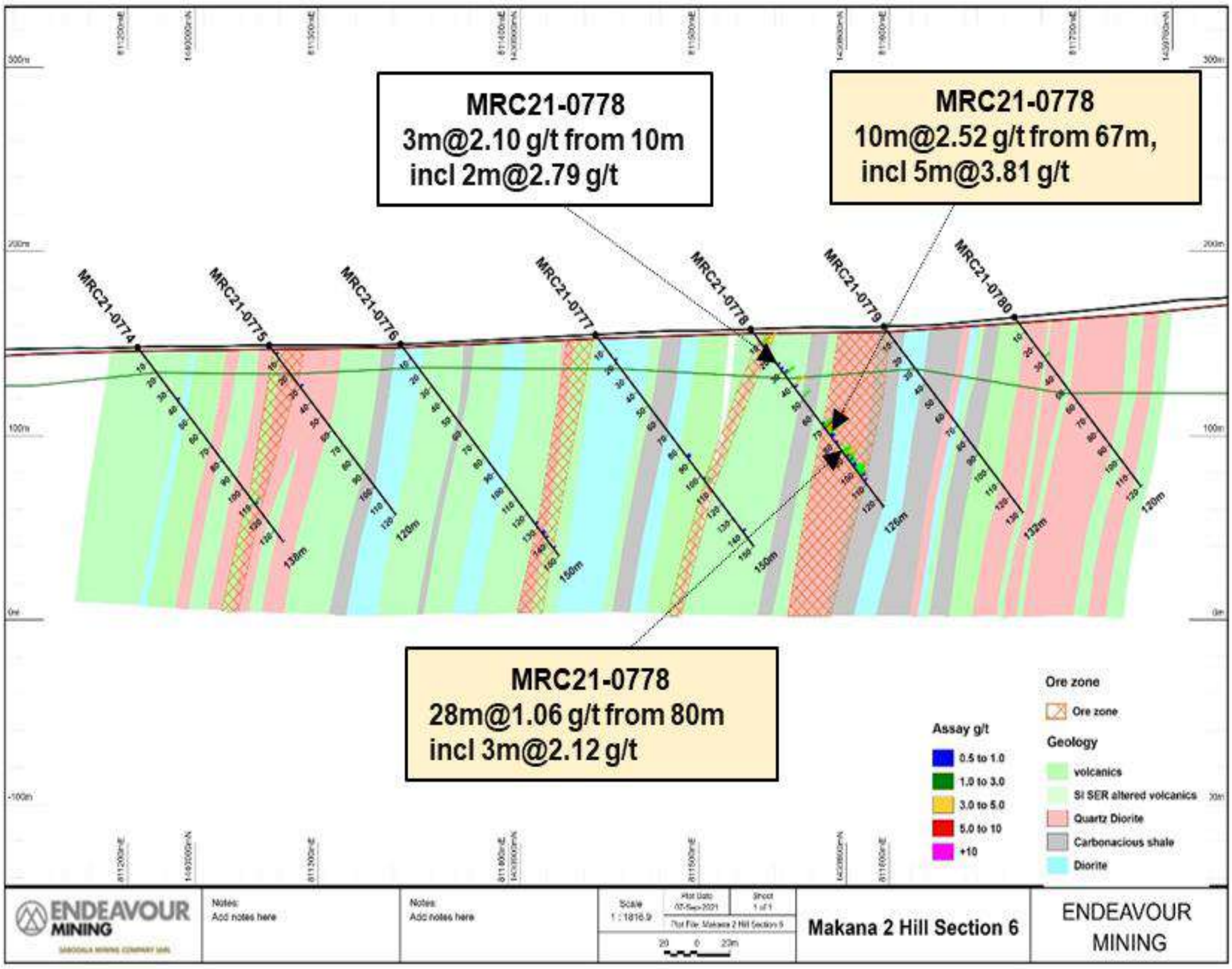
Seventy-six RC holes for 9548 m were drilled on a series of 200 m to 400 m spaced reconnaissance and follow-up drilling fences, see Figure 10.4.5. Encouraging results were obtained with high-grade mineralisation identified open along strike, see Figure 10.4.6.

Figure 10.4.5 Makana 2 2021 Drill Hole Location Map



Source: Endeavour, March 2022.

Figure 10.4.6 Makana 2 Cross-Section Example



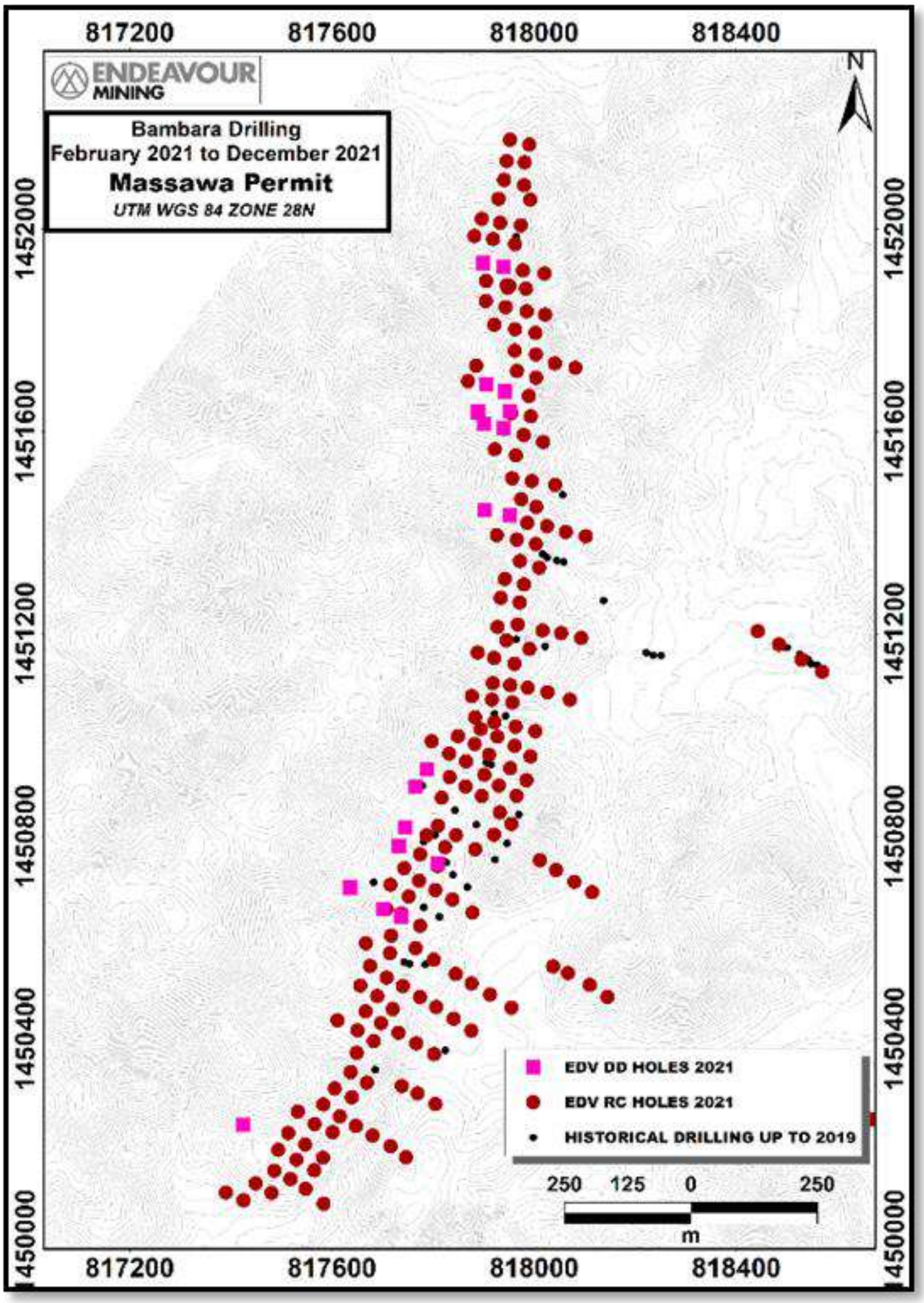
Source: Endeavour, March 2022.

10.4.5 Bambaraya

Between February and December 2021, with the goal of expanding and upgrading the Bambaraya Mineral Resource, a combined exploration and development drilling programme consisting of 219 RC holes for 22 198 m and 19 DD holes for 2875 m was undertaken. A systematic 40 m by 40 m drilling grid was developed in the north and south of the deposit which has a strike length of over two kilometres, see Figure 10.4.7 and Figure 10.4.8.

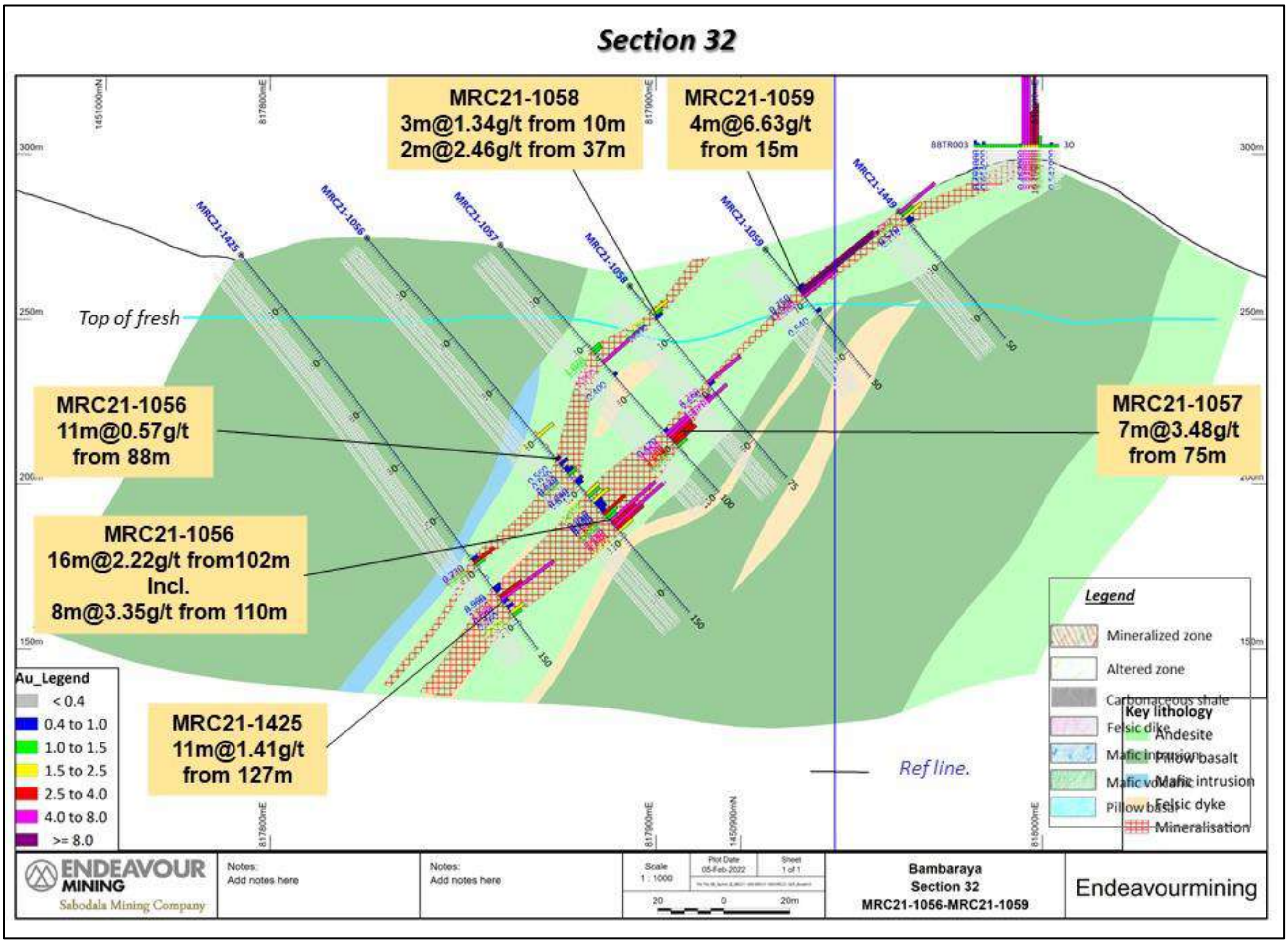
Medium to high grade mineralised structures were delineated over 1800 m along strike (and remain open to the north). An updated Mineral Resource Estimate is scheduled for 2022.

Figure 10.4.7 Bambaraya 2021 Drill Hole Location Map



Source: Endeavour, March 2022.

Figure 10.4.8 Bambaraya Cross-Section Example



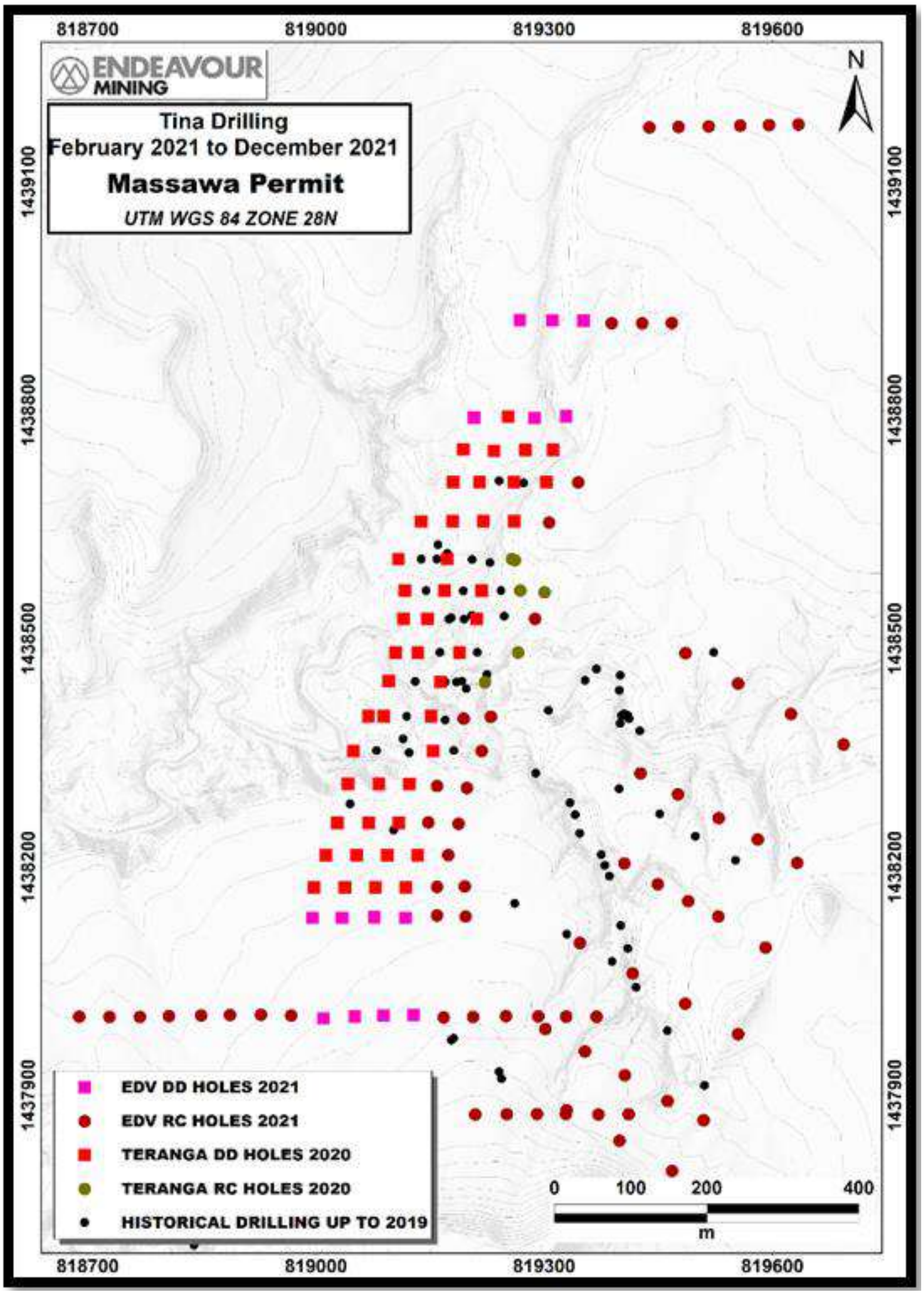
Source: Endeavour, March 2022.

10.4.6 Tina

Between February and December 2021, with the aim of expanding and upgrading the Mineral Resource, a combined exploration and development drilling programme consisting of 70 RC holes for 8307 m and 14 DD holes for 2887 m was conducted at Tina. Work was mainly focused on proximal extension to north and east of the 2019 Teranga systematic 40 m by 40 m drill grid, extending it to 800 m along strike. In addition, a series of (120 to 240) m exploration step-out drill fences along trend were made, see Figure 10.4.9.

Drilling results have facilitated better delineation of the mineralised trend, extending to more than 800 m extension of the central and footwall mineralised zones. Mineralisation remains open to the north and southeast.

Figure 10.4.9 Tina 2021 Drill Hole Location Map



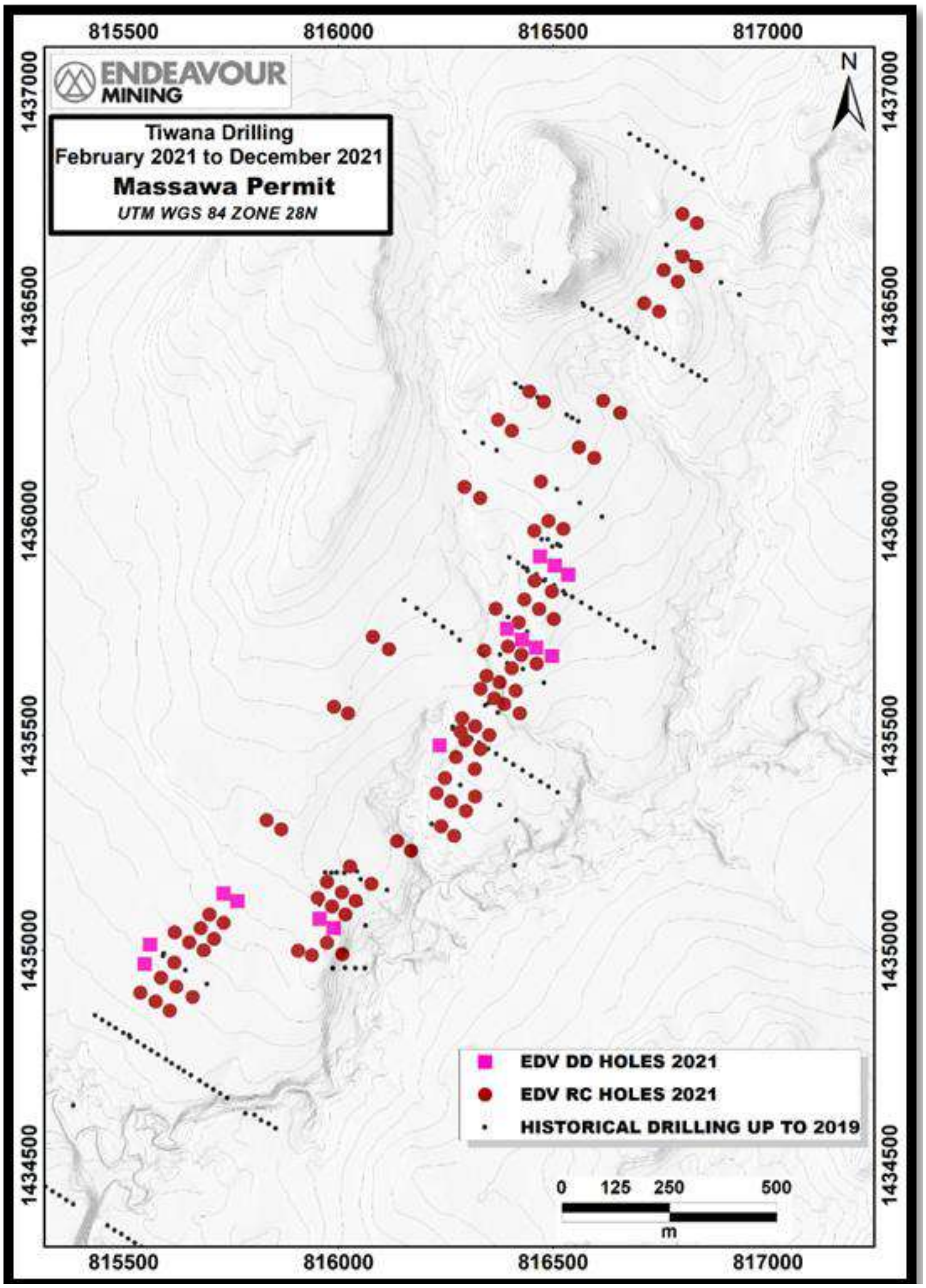
Source: Endeavour, March 2022.

10.4.7 Tiwana

In 2021, a combined infill and extension drilling programme to cover the most prospective targeted structures at Tiwana was undertaken, with a 40 m by 40 m drill grid while testing the less explored areas with (150 to 400) m spaced reconnaissance drill fences, see Figure 10.4.10. Figure 10.4.11 illustrates a typical cross-section through the deposit. A total of 90 RC holes for 9084 m and 14 DD holes for 1648 m were drilled.

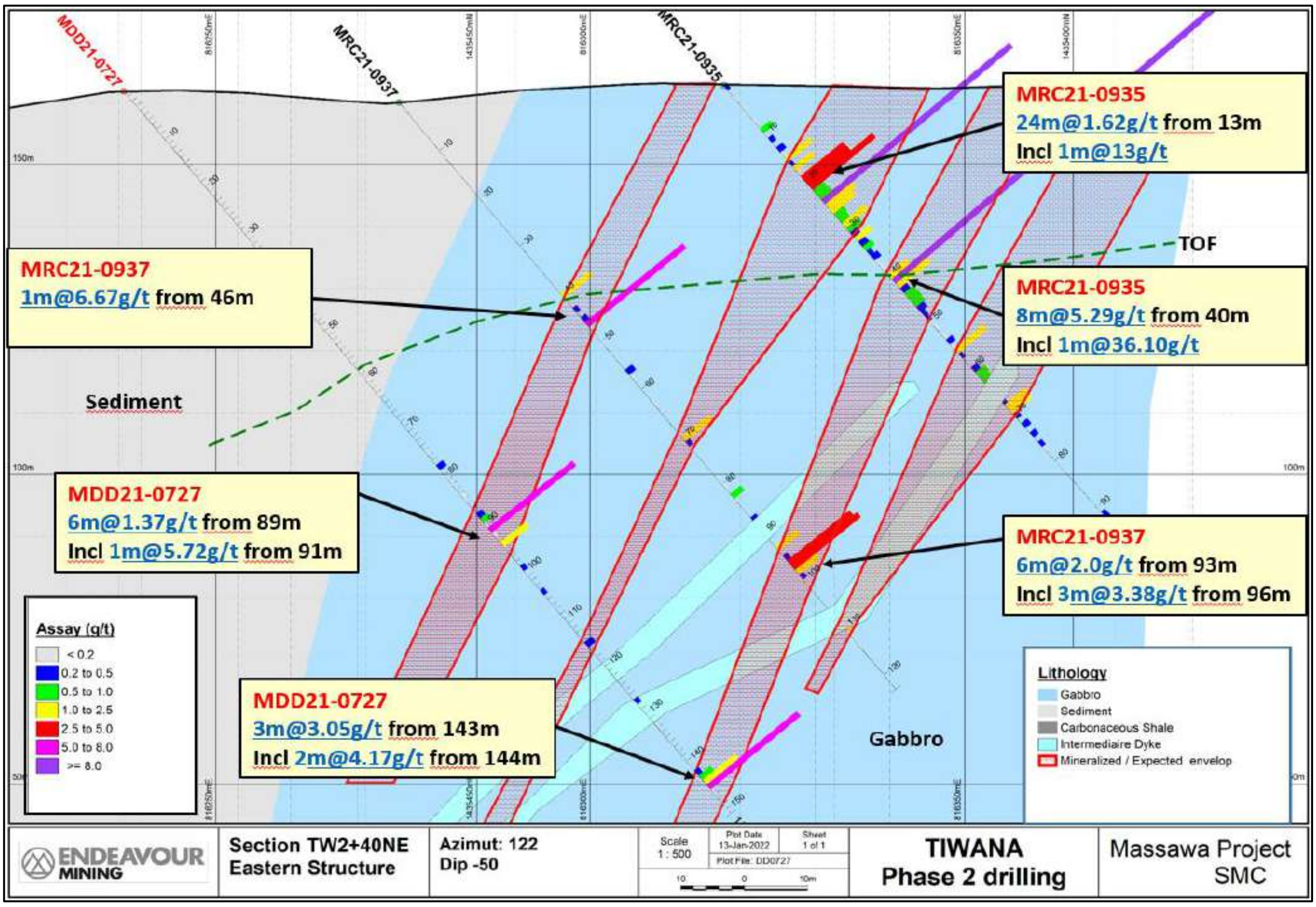
The drilling campaign resulted in the selection of five (100 to 300) m long, medium grade gold occurrences for follow-up infill drilling. In addition, the mineralisation appears locally still open along strike.

Figure 10.4.10 Tiwana 2021 Drill Hole Location Map



Source: Endeavour, March 2022.

Figure 10.4.11 Tiwana Cross-Section Example



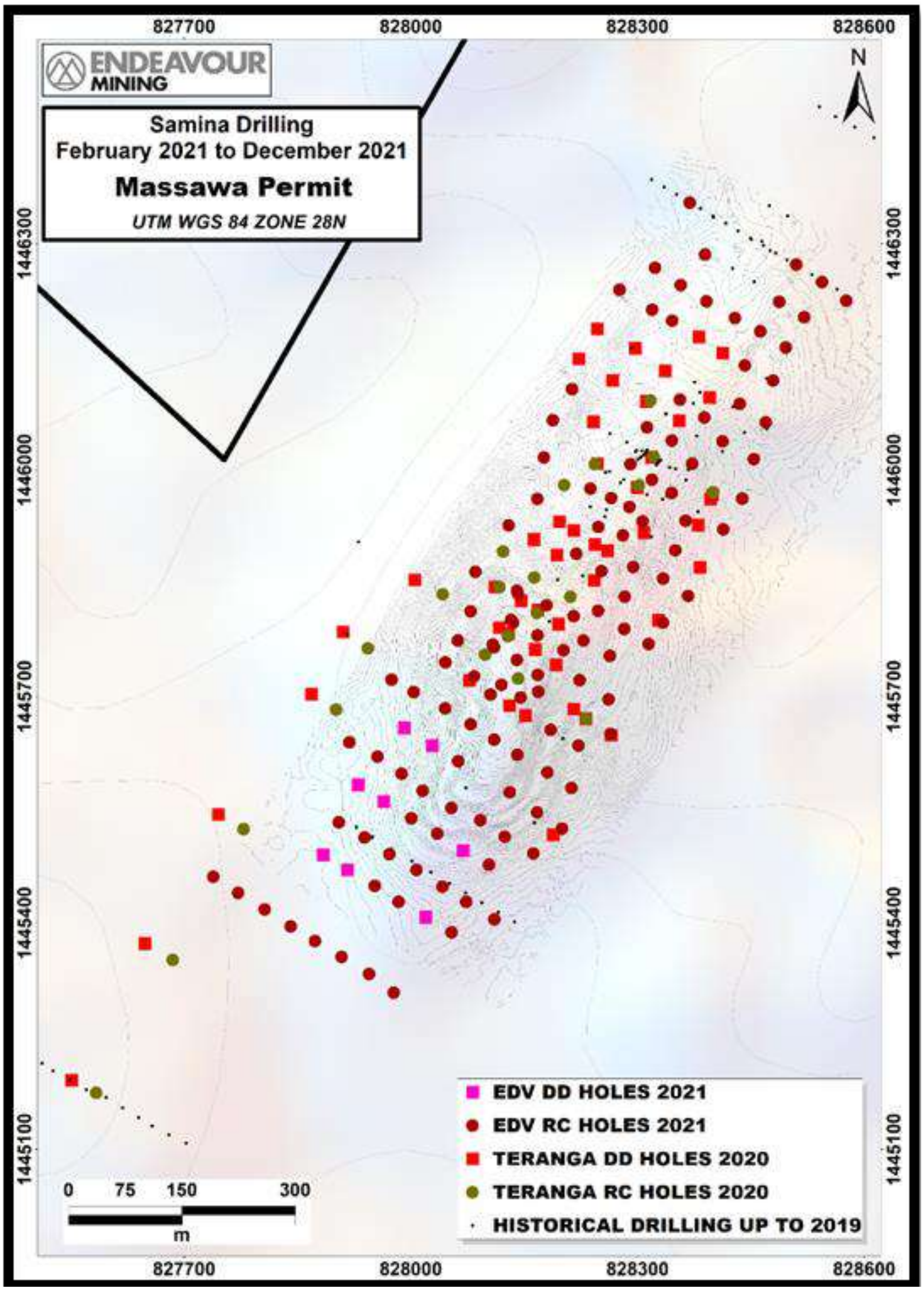
Source: Endeavour, March 2022.

10.4.8 Samina

Between February and December 2021, with the aim of expanding and upgrading the Mineral Resource, a follow-up exploration and development programme consisting of 125 RC holes for 13 976 m and eight DD holes for 1701 m was conducted by Endeavour at Samina. Efforts were mainly focused on systematic infill and extension to the southwest and east of the existing drilling grid to over 1100 m along strike, see Figure 10.4.12.

This drilling programme resulted in better delineation and continuity confirmation of the higher grade, central, main mineralised system. The mineralised strike length was extended to more than 1000 m and mineralisation remains open to the northeast and southwest, as well as at depth.

Figure 10.4.12 Samina 2021 Drill Hole Location Map

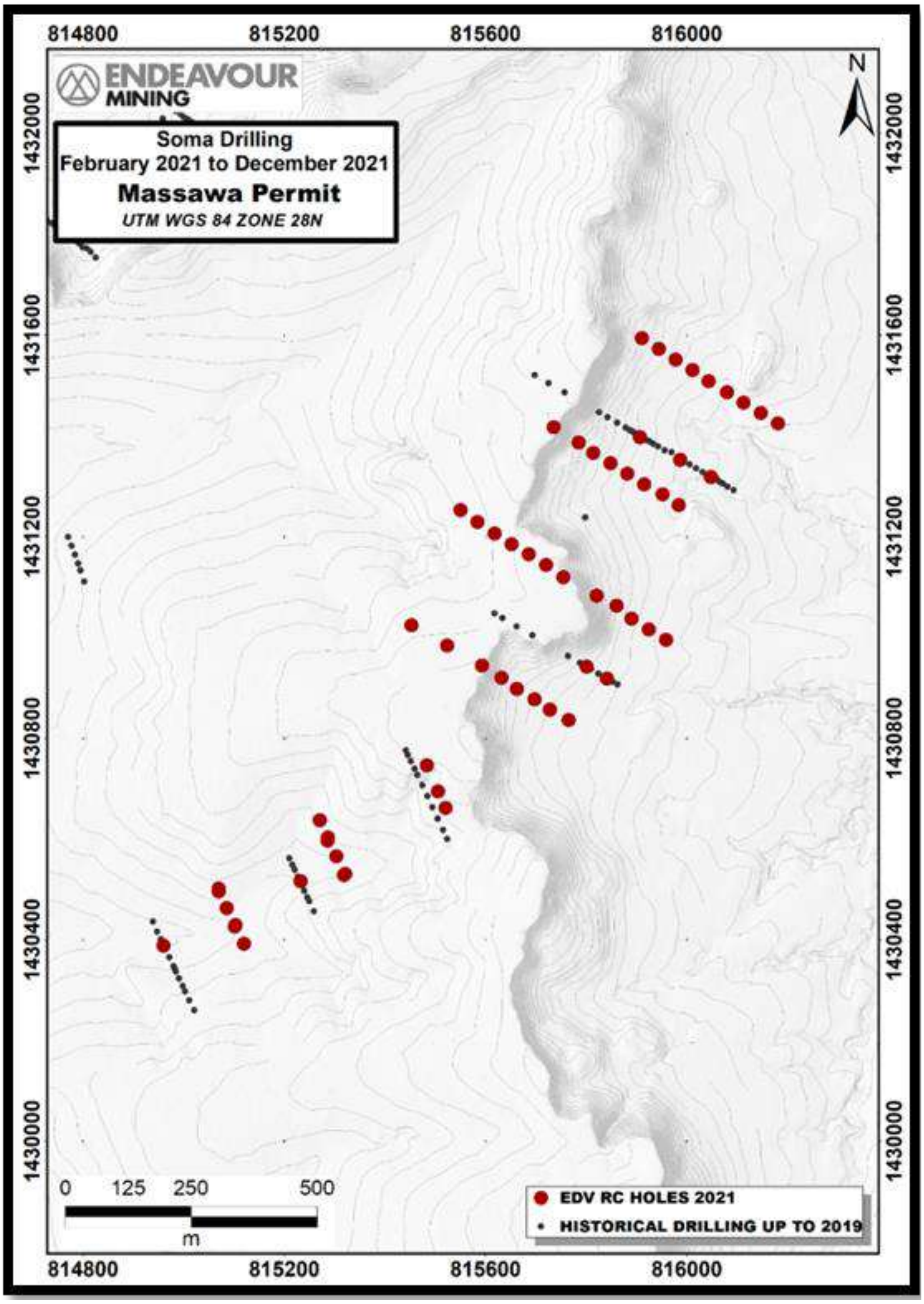


Source: Endeavour, March 2022.

10.4.9 Soma

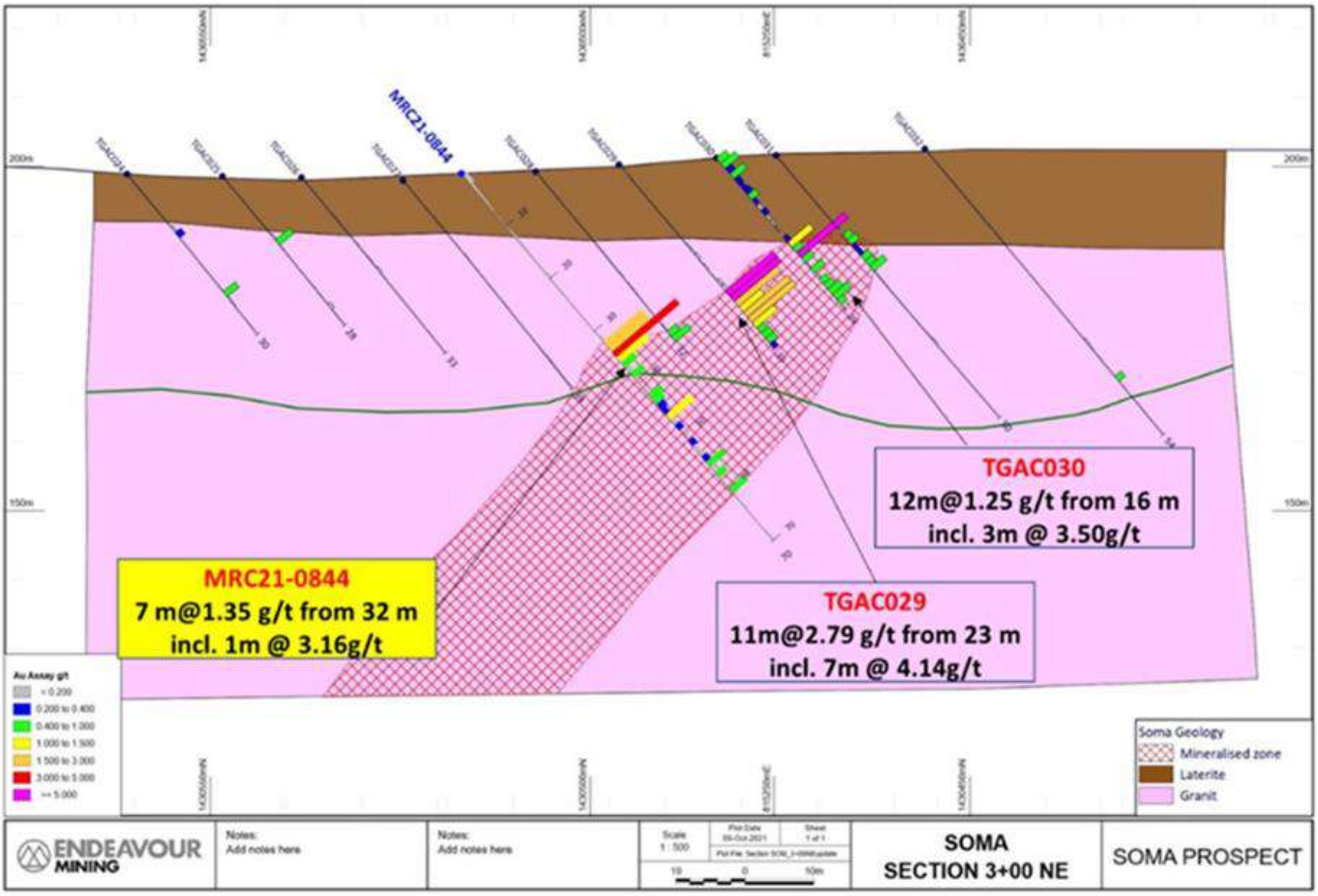
The Soma drilling programme conducted in 2021 aimed at testing over 1800 m of strike length the continuity and extension of two subparallel east-northeast striking and gently dipping medium to high grade mineralised structures. Fifty-nine RC holes for 5538 m were drilled along eleven (100 to 250) m spaced in-fill drilling fences, see Figure 10.4.13. Some positive results were obtained, especially within the south western part of the prospect.

Figure 10.4.13 Soma 2021 Drill Hole Location Map



Source: Endeavour, March 2022.

Figure 10.4.14 Soma Cross-Section Example



Source: Endeavour, March 2022.

10.5 Comments on Section 10.0

Best practice drilling procedures and protocols were developed and refined by Teranga and Barrick/Randgold, and subsequently amended by Endeavour. The pre-2020 'historical' and post 2020 'current' drilling data has been collected with similar methods, supervision and overall quality; they are considered to be compatible, comparable and of equal stature by the Qualified Person.

10.6 Interpretations and Conclusions

Interpretations, conclusions and risks associated with Section 10.0 are presented in Section 25.0.

10.7 Recommendations

Recommendations pertaining to Section 10.0 are presented in Section 26.0.

10.8 References

There are no references for Section 10.0.

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Introduction

The following Section discusses the sample preparation, analyses and security protocols used during the 2020 and 2021 drilling programmes. The activities were conducted under the supervision of Qualified Persons and according to industry standards, such as described in the CIM Mineral Exploration Best Practice Guidelines (EPPG) (2018).

The sample preparation, analyses and security protocols used by Teranga from January 2016 to December 2019 are presented in detail in Teranga (2020). The methodology followed by Teranga between January 2020 to May 2021 is the same as that followed pre-2020. The procedures and protocols followed by Teranga and Endeavour are very similar; the Endeavour sample preparation, analyses and security protocols are summarised below.

Teranga established standard operating procedures at Sabodala for sample preparation, analyses, and security. Sample preparation methodology and analyses conducted prior to 2014 are outlined in detail in AMC (2014). Sample preparation, methodology, and analyses conducted from 2014 to 2015 are outlined in detail in RPA (2016). Barrick/Randgold also applied industry standard practices at the Massawa Project as described in a series of reports including Randgold (2014), Randgold (2017) and Barrick (2019).

Gold assay values are reported in parts per million (ppm). If the gold result was less than the detection limit for the analytical method, then the result was set to half the detection limit.

11.2 Sample Preparation

The Project Geologist is responsible for the overall drilling and sampling programme. The Exploration Geologist is responsible for all sampling activities conducted by geological technicians and samplers, including sampling, sample bagging, numbering and tagging, sorting, transportation, security, completion of the analytical submission sheets, and the quality control/quality assurance (QA/QC) programme.

One sample is taken for each one metre interval drilled by reverse circulation (RC) drilling. Samples are collected and processed at the drill site. A cone splitter on the RC rig is used to obtain three representative sub-samples, one of which is sent for assay, one for retention, and one as a field duplicate if required.

Since May 2021, the three splits from the cone splitter are recombined and split using a one-tier Jones riffle splitter to obtain the samples required. In addition, the team replaced the cone splitting system with three-tier Jones riffle splitters at some of the drill rigs. A representative sample typically ranges from two to five kilograms in weight.

The Jones riffle splitters, plates, tubs and working areas are cleaned with compressed air after each sample is processed. The cone splitter is cleaned with compressed air after every six metre drill run.

Drill core sampling intervals are defined and then cut in half with a diamond saw along the core length. Half core is sampled over one metre lengths, adjusted based on lithology intervals. Field duplicates are created by cutting a half diameter core sample along its length to create two one quarter diameter samples.

All samples are placed into sample bags with assigned sample numbers, closed, and sealed. Control samples are inserted and then all samples are securely sealed into larger polyweave bags.

Sample intervals that are not assayed remain in storage at site.

11.3 Sample Security

Prior to shipment, drill core and RC chips are stored in tough cloth or polyweave bags under a hangar at the sample preparation facility, which is under 24-hour surveillance by security personnel.

Samples are shipped to the laboratories in the same tough cloth or polyweave bags.

Samples bound for the SGS Sabodala Mine laboratory are transported by Company personnel in Company trucks. The ALS or off-site SGS laboratories send their own or contracted trucks and personnel to collect the samples from the Exploration Camp. Samples destined for the ALS preparation facility or the SGS analytical laboratory in Bamako are trucked directly to Mali via the Senegalese border at Moussala. Samples are trucked to the ALS Kédougou preparation facility via the local roads. The prepared sample pulps are sent to ALS Burkina either via Mali (before the Community of West African States (ECOWAS) sanctions on the Malian government) or via Guinea Conakry.

All laboratory sample backlogs are actively monitored on a weekly basis and the number of samples dispatched is adjusted accordingly to ensure that the laboratory backlog does not become more than one month's sample processing capability. In the instance that the laboratory backlog exceeds that of one week's sample processing capability, all samples are retained onsite in a secured locked container until they can be dispatched.

The chain of custody is strictly maintained during transportation, sample collection, shipping and sample preparation to avoid tampering. No evidence of tampering had been identified.

11.4 Sample Analyses

During 2020 and 2021, some 168,975 RC chip and drill core samples, including control samples, were submitted to various laboratories for assay for gold, see Table 11.4.1. All laboratories are independent of Endeavour.

Samples submitted to ALS Kédougou, Senegal were prepared at ALS Kédougou or ALS Bamako, Mali and analysed at ALS Burkina, Ouagadougou, Burkina Faso. ALS Burkina is accredited by the West African Accreditation System (WAAS) with accreditation certificate number ES20005.

Samples submitted to the SGS laboratories were prepared and analysed at the laboratory to which they were submitted. The SGS Mali laboratory in Bamako, Mali is accredited by the South African National Accreditation System (SANAS) with facility accreditation number T0652. The SGS Burkina laboratory in Ouagadougou, Burkina Faso is accredited by SANAS with facility accreditation number T0653. The SGS laboratory at Sabodala Mine, Senegal is accredited by the Standards Council of Canada (SCC) with accredited laboratory number 812. (WAAS, SANAS and SCC accreditation conforms with international standard ISO/IEC 17025:2017).

Table 11.4.1 Summary of Samples by Laboratory

Lab Code	2020		2021		2020 & 2021	
	Count	%	Count	%	Count	%
ALSKU	2334	4.6	80 809	68.5	83 143	49.2
SGSBF	960	1.9	3 573	3	4 533	2.7
SGSBK	594	1.2	4 198	3.6	4 792	2.8
SGSSD	47 067	92.4	29 440	24.9	76 507	45.3
Total	**50 955**	**100.0**	**118 020**	**100.0**	**168 975**	**100.0**

ALSKU = ALS Kédougou (ALS Burkina); SGSBF = SGS Burkina; SGSBK = SGS Mali; SGSSD = Sabodala Mine

Samples received by the SGS laboratories were transferred into stainless steel trays, coded with sample system identification numbers, dried at 105ºC for eight hours, and crushed in a jaw crusher to minus 2.0 mm. Crushed samples were split using a Jones riffle to 200 g. The 200 g sample was pulverized with a ring and puck pulveriser to 85% minus 75 µm (200 mesh). Compressed air was used to clean the crusher and splitter between samples, with crushing of barren quartz for additional cleaning as required.

At SGS Sabodala Mine, 50 g sample pulps were analysed for gold using an aqua regia digestion followed by atomic absorption spectrometry (AAS) using SGS method ARE155. At SGS Burkina and SGS Mali, gold was determined by a 50 g fire assay with an AAS finish using SGS method FAA505.

At the ALS Kédougou and Bamako preparation facilities, dried samples were crushed to 70% minus 2.0 mm. Crushed samples were riffle split to 250 g, then pulverized to 85% minus 75 µm (200 mesh). Samples were assayed at ALS Burkina by fire assay with an AAS finish using ALS method Au-AA26. Results greater than the upper determination limit of 100 pm were re-assayed by fire assay with a gravimetric finish using ALS method Au-GRA22.

Table 11.4.2 is a summary of the samples by laboratory and analytical method.

Table 11.4.2 Summary of Samples by Laboratory and Method

Lab Code	Lab Method	2020		2021		2020 & 2021	
		Count	%	Count	%	Count	%
ALSKU	Au-AA26	2334	4.6	80 807	68.5	83 141	49.2
	Au-GRA22	0	0.0	2	0.0	2	0.0
SGSBF	FAA505	960	1.9	3573	3.0	4533	2.7
SGSBK	FAA505	594	1.2	4198	3.6	4792	2.8
SGSSD	ARE155	47 067	92.4	29 440	24.9	76 507	45.3
Total		**50 955**	**100.0**	**118 020**	**100.0**	**169 975**	**100.0**

ALSKU = ALS Kédougou (ALS Burkina); SGSBF = SGS Burkina; SGSBK = SGS Mali; SGSSD = Sabodala Mine

Pulps and rejects were held at the laboratories for three months, after which time Teranga/Endeavour choose to have all or a selection returned to site.

11.5 Quality Assurance and Quality Control (QA/QC)

In addition to the standard internal laboratory quality management measures, a blind QA/QC programme has been established consisting of Certified Reference Materials (CRMs or standards), blanks and duplicate samples inserted into the sample stream at regular intervals.

Table 11.5.1 is a summary of sample types. For the reporting period, eight percent of the samples submitted for assay were control samples.

Table 11.5.1 Summary of Sample Types

Sample Type	2020		2021		2020 & 2021	
	Count	%	Count	%	Count	%
Original	46 293	90.9	109 180	92.5	155 473	92.0
CRM	1554	3.0	2943	2.5	4497	2.7
Blank	1558	3.1	2953	2.5	4511	2.7
Duplicate	1550	3.0	2944	2.5	4494	2.7
Total	**50 955**	**100.0**	**118 020**	**100.0**	**168 975**	**100.0**

11.5.1 Certified Reference Materials (Standards)

Certified Reference Materials (CRMS) are used to monitor the accuracy of the analysis.

Within the 2020 to 2021 period, 29 different CRMs manufactured by Geostats Pty Ltd (Geostats) and Ore Research and Exploration Pty Ltd (OREAS) were used. The certified values of the CRMs cover the range of gold grades and oxidation states anticipated in the Project and are considered appropriate for use in the QA/QC programmes. Table 11.5.2 presents a list of the CRMS used with their expected values by analytical method.

Table 11.5.2 List of CRMs with Expected Values by Analytical Method

CRM Code	CRM Name	Manufacturer	Fire Assay (Au ppm)		Aqua Regia Digest (Au ppm)	
			Mean	SD	Mean	SD
Std-G302-10	G302-10	Geostats	0.18	0.02	0.18	0.02
Std-G303-4	G303-4	Geostats	2.43	0.09	2.43	0.13
Std-G308-6	G308-6	Geostats	1.28	0.04	1.28	0.06
Std-G310-9	G310-9	Geostats	3.29	0.14	3.29	0.18
Std-G311-8	G311-8	Geostats	1.57	0.08	1.57	0.11
Std-G313-2	G313-2	Geostats	2.04	0.07	2.04	0.09
Std-G314-2	G314-2	Geostats	0.99	0.04	0.99	0.07
Std-G314-3	G314-3	Geostats	6.7	0.21	6.7	0.32
Std-G314-8	G314-8	Geostats	1.03	0.04	1.03	0.06
Std-G315-2	G315-2	Geostats	0.98	0.04	0.98	0.04
Std-G901-2	G901-2	Geostats	1.76	0.14	1.7	0.13
Std-G904-7	G904-7	Geostats	1.58	0.09	1.58	0.1
Std-G907-4	G907-4	Geostats	3.84	0.15	3.85	0.14
Std-G908-4	G908-4	Geostats	0.96	0.05	0.96	0.06
Std-G908-8	G908-8	Geostats	9.65	0.38	9.41	0.45
Std-G910-10	G910-10	Geostats	0.97	0.04	0.97	0.06
Std-G910-2	G910-2	Geostats	0.9	0.05	0.9	0.07
Std-G910-8	G910-8	Geostats	0.63	0.04	0.63	0.04
Std-G910-9	G910-9	Geostats	1.51	0.06	1.51	0.08
Std-G911-3	G911-3	Geostats	1.37	0.06	1.37	0.12
Std-G911-5	G911-5	Geostats	0.2	0.02	0.2	0.03
Std-G914-10	G914-10	Geostats	10.26	0.38	10.26	0.56
Std-G914-3	G914-3	Geostats	1.24	0.04	1.24	0.07
Std-G916-10	G916-10	Geostats	2.81	0.14	2.81	0.16
Std-G917-10	G917-10	Geostats	3.33	0.13	3.33	0.14
Std-G918-4	G918-4	Geostats	1.24	0.05	1.23	0.06
Std-OREAS-501	OREAS-501	OREAS	0.204	0.011	0.192	0.016
Std-OREAS-503	OREAS-503	OREAS	0.69	0.02	0.69	0.02
Std-OREAS-504	OREAS-504	OREAS	1.48	0.04	1.48	0.04

Quality control is actively monitored. Charts and tables are created from the database and reviewed after new assay results are imported. A CRM is considered to have failed if the value is greater than three standard deviations from the expected value.

Every CRM failure is investigated. If the failure is the result of a sample mix-up, the database code is changed and the results re-vetted. For true analytical failure within gold mineralisation, a series of samples including the failed CRM are re-analysed. New results supersede the original if there are no new QC issues. No further action is taken if a CRM failure occurs within barren rock.

For 2020 and 2021, there were 61 failures from 4497 samples for an overall CRM failure rate of 1.4%. Twenty re-assay requests were required.

Table 11.5.3 is a summary of CRM performance by laboratory, whilst Table 11.5.4 shows CRM statistics and Figure 11.5.1 is an example of a CRM control chart.

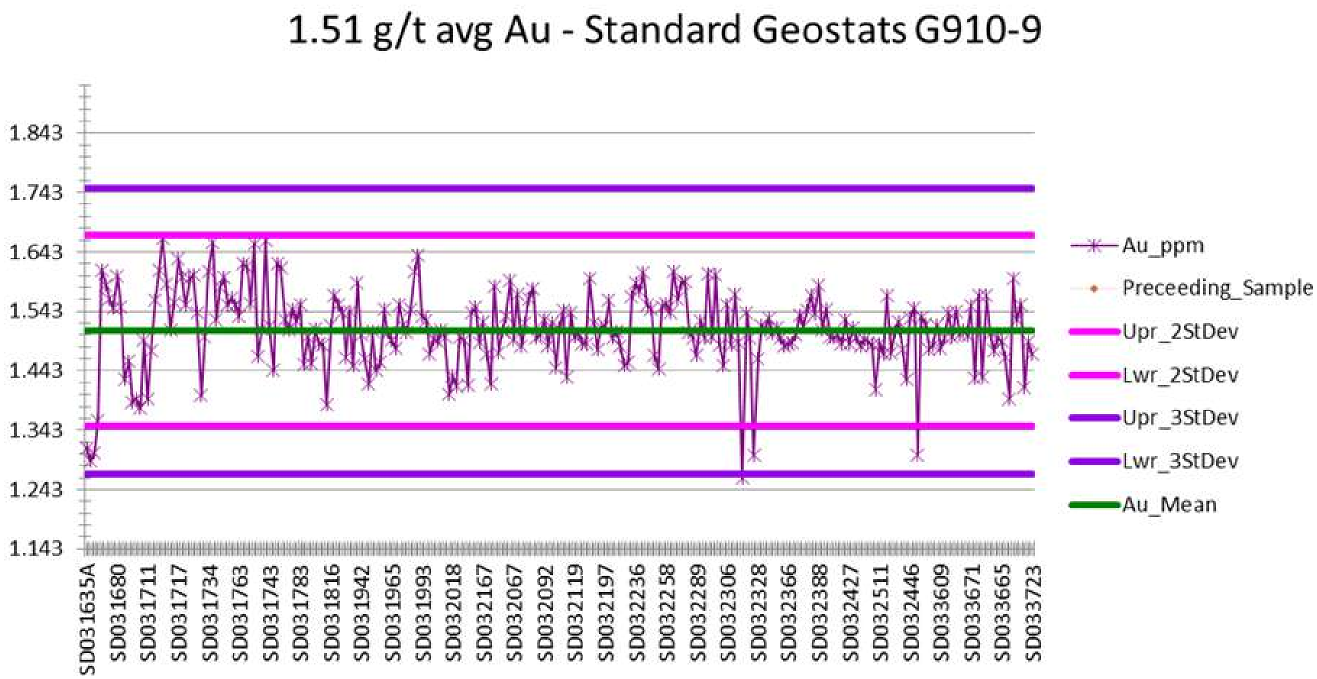
Table 11.5.3 Summary of CRM Performance by Laboratory

CRM Code	ALSKU			SGSBF			SGSBK			SGSSD		
	Count	Fail	Fail%	Count	Fail	Fail%	Count	Fail	Fail%	Count	Fail	Fail%
Std-G302-10	0	0	0.0	0	0	0.0	0	0	0.0	155	0	0.0
Std-G303-4	68	1	1.5	0	0	0.0	0	0	0.0	180	2	1.1
Std-G308-6	9	0	0.0	14	0	0.0	0	0	0.0	38	2	5.3
Std-G310-9	38	1	2.6	0	0	0.0	0	0	0.0	6	0	0.0
Std-G311-8	14	0	0.0	25	1	4.0	39	1	2.6	78	1	1.3
Std-G313-2	54	3	5.6	0	0	0.0	0	0	0.0	130	1	0.8
Std-G314-2	118	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
Std-G314-3	42	0	0.0	38	0	0.0	20	1	5.0	40	0	0.0
Std-G314-8	121	0	0.0	0	0	0.0	0	0	0.0	26	0	0.0
Std-G315-2	131	3	2.3	0	0	0.0	0	0	0.0	12	0	0.0
Std-G 901-2	14	1	7.1	0	0	0.0	0	0	0.0	0	0	0.0
Std-G904-7	69	1	1.4	0	0	0.0	0	0	0.0	0	0	0.0
Std-G907-4	18	3	16.7	0	0	0.0	0	0	0.0	0	0	0.0
Std-G908-4	0	0	0.0	24	2	8.3	40	1	2.5	452	4	0.9
Std-G908-8	43	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
Std-G910-10	104	3	2.9	12	0	0.0	0	0	0.0	31	0	0.0
Std-G910-2	49	0	0.0	0	0	0.0	0	0	0.0	146	0	0.0
Std-G910-8	45	0	0.0	0	0	0.0	0	0	0.0	16	1	6.3
Std-G910-9	28	1	3.6	0	0	0.0	0	0	0.0	249	1	0.4
Std-G911-3	73	1	1.4	0	0	0.0	0	0	0.0	152	1	0.7
Std-G911-5	47	0	0.0	0	0	0.0	0	0	0.0	49	0	0.0
Std-G914-10	129	0	0.0	0	0	0.0	0	0	0.0	33	0	0.0
Std-G914-3	51	2	3.9	0	0	0.0	0	0	0.0	148	0	0.0
Std-G916-10	135	1	0.7	0	0	0.0	20	0	0.0	132	0	0.0
Std-G917-10	29	1	3.4	0	0	0.0	0	0	0.0	18	0	0.0
Std-G918-4	28	1	3.6	0	0	0.0	0	0	0.0	0	0	0.0
Std-OREAS-501	270	4	1.5	0	0	0.0	0	0	0.0	0	0	0.0
Std-OREAS-503	178	6	3.4	0	0	0.0	0	0	0.0	41	5	12.2
Std-OREAS-504	172	4	2.3	0	0	0.0	0	0	0.0	56	1	1.8
Total	**2,077**	**37**	**1.8**	**113**	**3**	**2.7**	**119**	**3**	**2.5**	**2,188**	**19**	**0.9**

Table 11.5.4 CRM Results Statistics

CRM Code	Min Au (ppm)	Max Au (ppm)	Avg Au (ppm)	Count	%	Fail	Fail %
Std-G302-10	0.15	0.20	0.17	155	3.4	0	0.0
Std-G303-4	2.01	2.74	2.46	248	5.5	3	1.2
Std-G308-6	1.18	1.47	1.26	61	1.4	2	3.3
Std-G310-9	2.78	3.67	3.27	44	1	1	2.3
Std-G311-8	1.27	1.81	1.59	156	3.5	3	1.9
Std-G313-2	1.80	3.87	2.03	184	4.1	4	2.2
Std-G314-2	0.88	1.10	0.99	118	2.6	0	0.0
Std-G314-3	0.91	7.34	6.71	140	3.1	1	0.7
Std-G314-8	0.92	1.10	1.02	147	3.3	0	0.0
Std-G315-2	0.80	1.14	0.98	143	3.2	3	2.1
Std-G901-2	1.30	1.84	1.65	14	0.3	1	7.1
Std-G904-7	1.34	1.89	1.58	69	1.5	1	1.4
Std-G907-4	3.26	4.20	3.78	18	0.4	3	16.7
Std-G908-4	0.01	6.60	0.97	516	11.5	7	1.4
Std-G908-8	9.16	10.35	9.77	43	1	0	0.0
Std-G910-10	0.80	1.07	0.97	147	3.3	3	2.0
Std-G910-2	0.78	1.03	0.92	195	4.3	0	0.0
Std-G910-8	0.50	0.72	0.62	61	1.4	1	1.6
Std-G910-9	1.26	1.67	1.51	277	6.2	2	0.7
Std-G911-3	1.00	1.56	1.30	225	5	2	0.9
Std-G911-5	0.16	0.22	0.20	96	2.1	0	0.0
Std-G914-10	9.23	10.95	10.28	162	3.6	0	0.0
Std-G914-3	1.13	1.37	1.25	199	4.4	2	1.0
Std-G916-10	2.37	3.22	2.79	287	6.4	1	0.3
Std-G917-10	2.45	3.57	3.35	47	1	1	2.1
Std-G918-4	1.08	1.39	1.24	28	0.6	1	3.6
Std-OREAS-501	0.02	0.24	0.21	270	6	4	1.5
Std-OREAS-503	0.59	0.83	0.70	219	4.9	11	5.0
Std-OREAS-504	0.65	1.65	1.50	228	5.1	5	2.2
Total				**4497**	**100**	**62**	**1.4**

Figure 11.5.1 Example of a CRM Control Chart (SGSSD)



Source: Endeavour, March 2022.

11.5.2 Blanks

Blank samples are used to assess potential contamination during sample preparation and as an additional check on analytical accuracy.

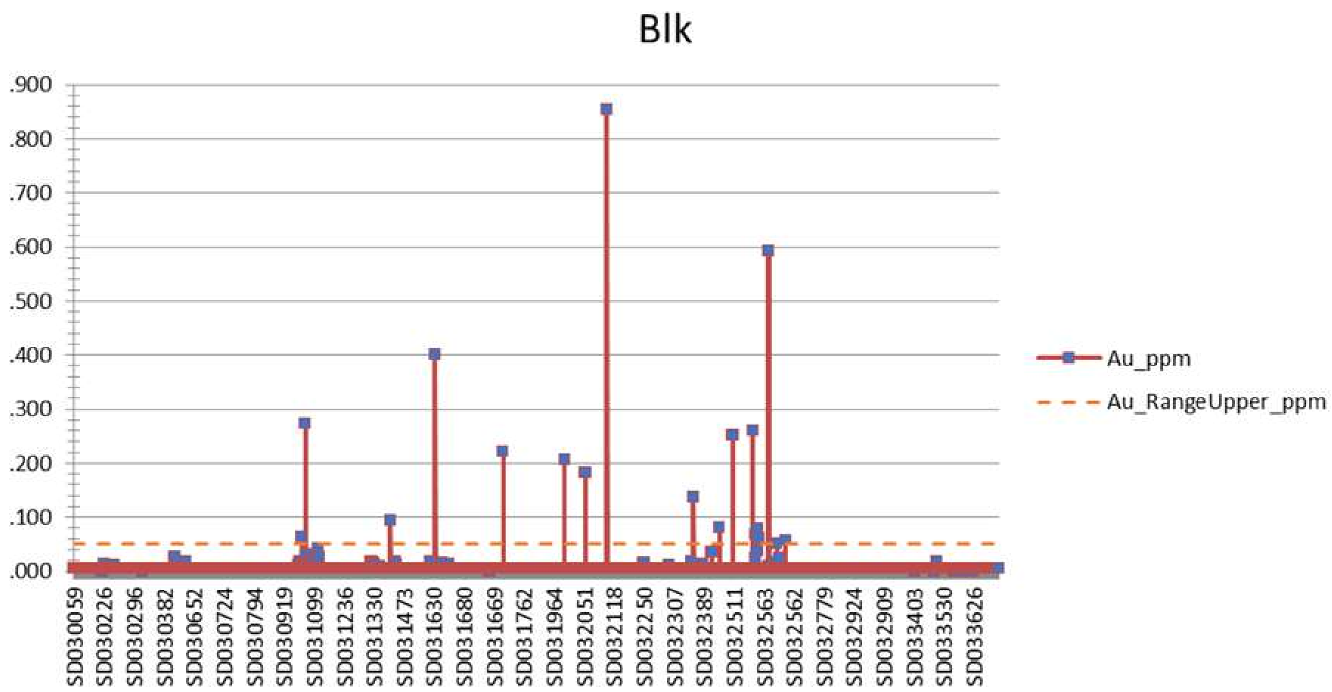
Teranga/Endeavour use barren granite collected from surface outcrops near Saraya as blank material. The granite has been assayed for gold at different laboratories by fire assay and atomic absorption to ensure its suitability for this purpose (i.e., the tests returned gold values below the detection limit).

A blank assay is considered a failure if it returned a value greater than five times the detection limit of the assay method. Every failure is investigated. All blanks with true analytical failures are re-assayed.

In 2020 and 2021, there were 25 failures from 4511 samples for an overall blank failure rate of 0.6%.

Figure 11.5.2 is an example of a blank control chart.

Figure 11.5.2 Example of Blank Control Chart (SGSSD)



Source: Endeavour, March 2022.

11.5.3 Duplicates

Duplicate samples are used to measure precision, which is the ability of a result to be reliably reproduced.

Field duplicates for RC chips were created by taking a split from the main sample. For core, a half core sample was split along its length into two one-quarter diameter samples.

The precision of sampling and analytical results can be measured by re-analysing a portion of the same sample using the same methodology. The variance between the results is a measure of their precision.

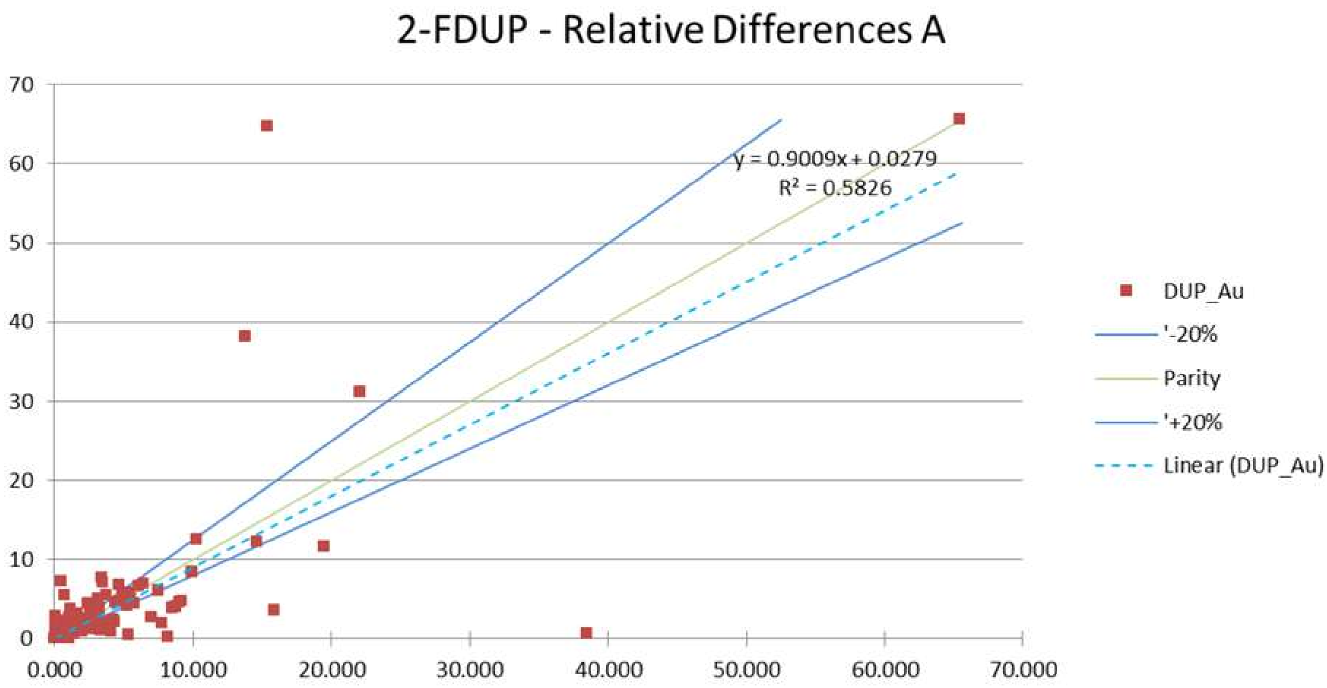
Precision is affected by mineralogical factors such as grain size and distribution and inconsistencies in the sample preparation and analysis processes.

Teranga/Endeavour has applied procedures for assessing the precision of field duplicates. A tolerance value is calculated for individual duplicate pairs based on the mean grade of each pair, the lower limit of detection for the analytical method used, and the method precision as determined by the laboratory. If the absolute relative difference for a duplicate pair exceeds the calculated tolerance, the duplicate pair is considered to have failed.

Of the 4494 duplicate pairs, 34 or 0.8% were investigated as failures. Of these, ten re-assay requests were required.

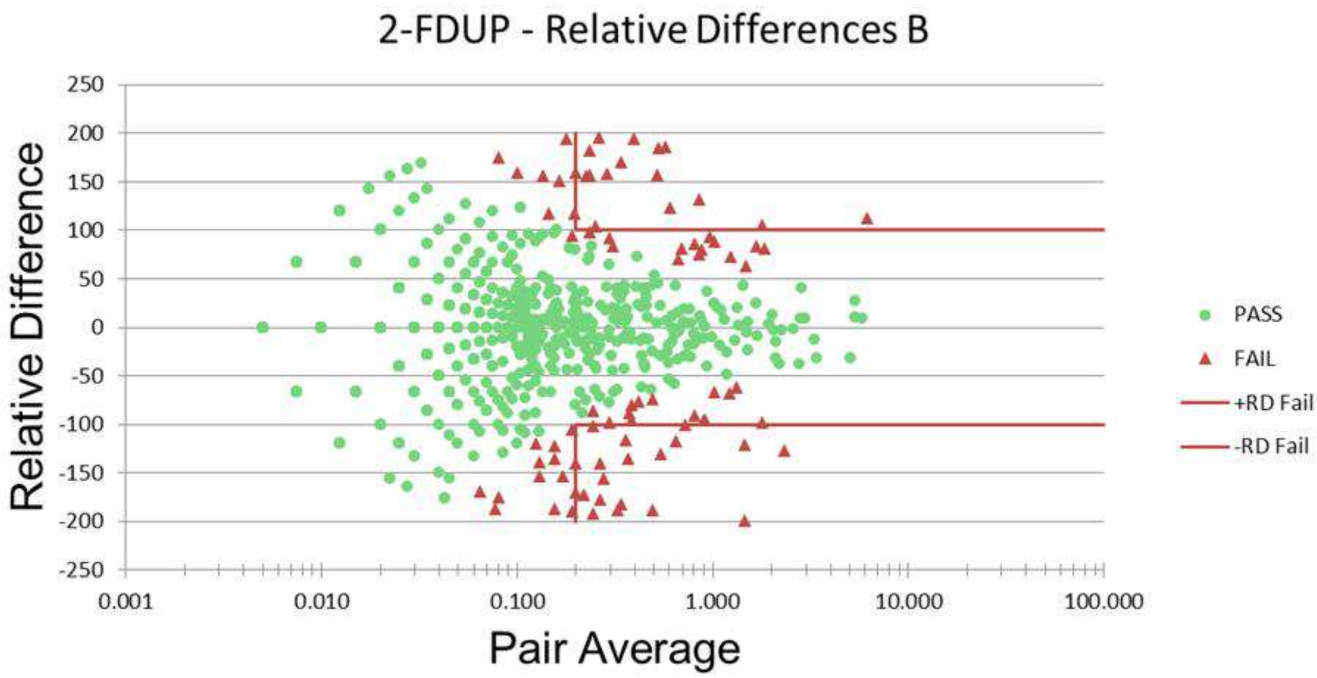
The degree of correspondence between duplicate sample pairs has been assessed graphically. Figure 11.5.3 is an example of an X-Y scatter plot showing the original versus the field duplicate gold grades for all samples analysed at Bureau Veritas with the ±30 % relative difference failure lines marked. Figure 11.5.4 is an example of a scatter plot showing the mean of the duplicate pair plotted against the relative difference of the duplicate pair.

Figure 11.5.3 Example of X-Y Scatterplot of Original v Field Duplicate (ALSKU)



Source: Endeavour, March 2022.

Figure 11.5.4 Sample Pair Average v Relative Difference (ALSKU)



Source: Endeavour, March 2022.

11.6 Data Management

Until November 2021, all drilling and surface data, including sampling and assay data were stored in an in-house Excel/Access database management system built by Teranga. The on-site database team imported all assays and generated QA/QC reports. These reports were transferred to the Senior Geologists for evaluation who issued final directives with respect to failures and associated re-assay requests.

Assay results datafiles and certificates from all laboratories were emailed to a project email address. Digital files are stored on the site database server.

Since November 2021, all data has been migrated, verified, validated and stored in a Maxwell DataShed SQL database. DataShed is a commercial geological data management application. A Central Database Manager, independent of the Project, imported the assay results, evaluated the quality control and made re-assay requests where applicable.

11.7 Comments on Section 11.0

It is in the opinion of the Qualified Person that the QA/QC failure rates quoted are acceptable, especially in light of the remedial and re-assay requests actioned.

In the Qualified Person's opinion, the sample preparation, analysis, and security procedures at the Sabodala-Massawa Project are adequate for use in the estimation of Mineral Resources. The QA/QC programmes as designed and implemented by Endeavour, Teranga, Randgold and Barrick are adequate and the assay results within the database are suitable for use in a Mineral Resource estimate and the assay results within the secure DBMS are suitable for use in a Mineral Resource estimate.

The Qualified Person has reviewed and confirms the adequacy of the samples taken, the security of the transportation procedures, the sample preparation and analytical procedures used and the established QA/QC programmes. In the QP's opinion, the procedures and results are adequate for use in the estimation of Mineral Resources.

11.8 Interpretation and Conclusions

Interpretations, conclusions and risks pertaining to Section 11.0, are presented in Section 25.0.

11.9 Recommendations

Recommendations pertaining to Section 11.0, are presented in Section 26.0.

11.10 References

References cited in Section 11.0, are presented in Section 27.0.

12.0 DATA VERIFICATION

12.1 Introduction

In accordance with 'Item 12 of NI Form 43-101F1 and the Qualified Persons' (QP) responsibilities defined in Table 2.4.1, the following subsections summarise where relevant:

- The data verification procedures applied by the Qualified Person(s).
- Any limitations on or failure to conduct such verification, and the reasons for any such limitations or failure.
- The Qualified Person's opinion on the adequacy of the data for the purposes used in the Technical Report.

12.2 Geological Data

12.2.1 Introduction

The following subsection includes discussion and comment on the data verification aspects relating to the underlying geological data utilised to support the geological model and ultimately the Mineral Resources as reported herein. The key areas addressed comprise:

- Verification of data from historical sources.
- Data verification processes applied specifically to the Bambaraya, Makana, Massawa, Samina, Sofia, Soma, Tina, and Tiwana deposits.
- Recommendations going forward.

Endeavour, under the direction and oversight of the QP, implements a comprehensive geological data management system to assure the appropriate level of quality control and data verification is undertaken to support the geological models and current Mineral Resources as reported herein.

The Sabodala-Massawa Project is the outcome of several different generations of data, site visits, data verification exercises and QP assessments.

12.2.2 Historical (Pre-2020) Data Validation

12.2.2.1 Randgold/Barrick Validation of the Massawa Project

In early 2017, Massawa drill and trench data were migrated and secured in a Maxwell DataShed SQL database for validation through constraints, library tables, triggers and stored procedures that collectively helped ensure data integrity. Assay data received prior to the migration were re-imported directly from laboratory assay certificates. Since the upgrade, all assay data were imported from the original laboratory certificates.

Randgold and Barrick periodically engaged third party consultants to independently review the data handling procedures and resultant database.

A full external audit of the sampling methods and procedures was undertaken by RPA in 2017. RPA did not identify any material issues, although two high priority issues were identified: the collection of bulk densities which did not follow Randgold Standard Operating Procedures (SOPs) from other sites; and laboratory certification and selection with regard to LeachWELL analysis. Bulk density sampling was subsequently updated to meet the same standard as at other Barrick properties. LeachWELL certification does not currently exist; however, Randgold undertook a programme of laboratory round robin assaying using its current assaying procedures and one kilogram custom OREAS CRM standards which indicated there were no issues with repeatability of the sample results. All other minor 'housekeeping' issues outlined in the RPA audit were resolved.

In 2019, Maxwell Geoscience (Maxgeo) completed a review of the Massawa SQL database to check for database integrity and conducted a data audit. Maxgeo identified a few minor issues, but did not identify any significant issues, and concluded that the database was acceptable.

12.2.2.2 Teranga Validation of the Massawa Project

In late 2019 (after the takeover of the Randgold/Barrick Massawa project by Teranga), the historical Massawa data was interrogated by the Teranga geological and database teams during the data integration process. A Teranga contracted database consultant (Ulysses Neri) further interrogated the data on behalf of the Teranga VP Exploration and Resource teams.

Teranga visually inspected the drill hole traces, performed basic database validation procedures and reviewed the drill hole traces in 3D, level plan and in vertical sections and found no unreasonable geometries. In addition, a number of standard data integrity checks were performed by various software programmes on the drill hole database including:

- Intervals exceeding the total hole length.
- Negative length intervals.
- Inconsistent downhole survey records.
- Out-of-sequence and overlapping intervals.
- Missing intervals defined within analysed sequences.
- Inconsistent drill hole labelling between tables.
- Invalid data formats and out-of-range values.
- Duplicate entries.

Although a few minor issues were identified, there were no significant discrepancies.

In March 2020, 54 drill hole collars at Sofia, Massawa Central Zone and Massawa North Zone were check surveyed by handheld GPS units to verify the original collar coordinates in the database. No significant discrepancies were identified.

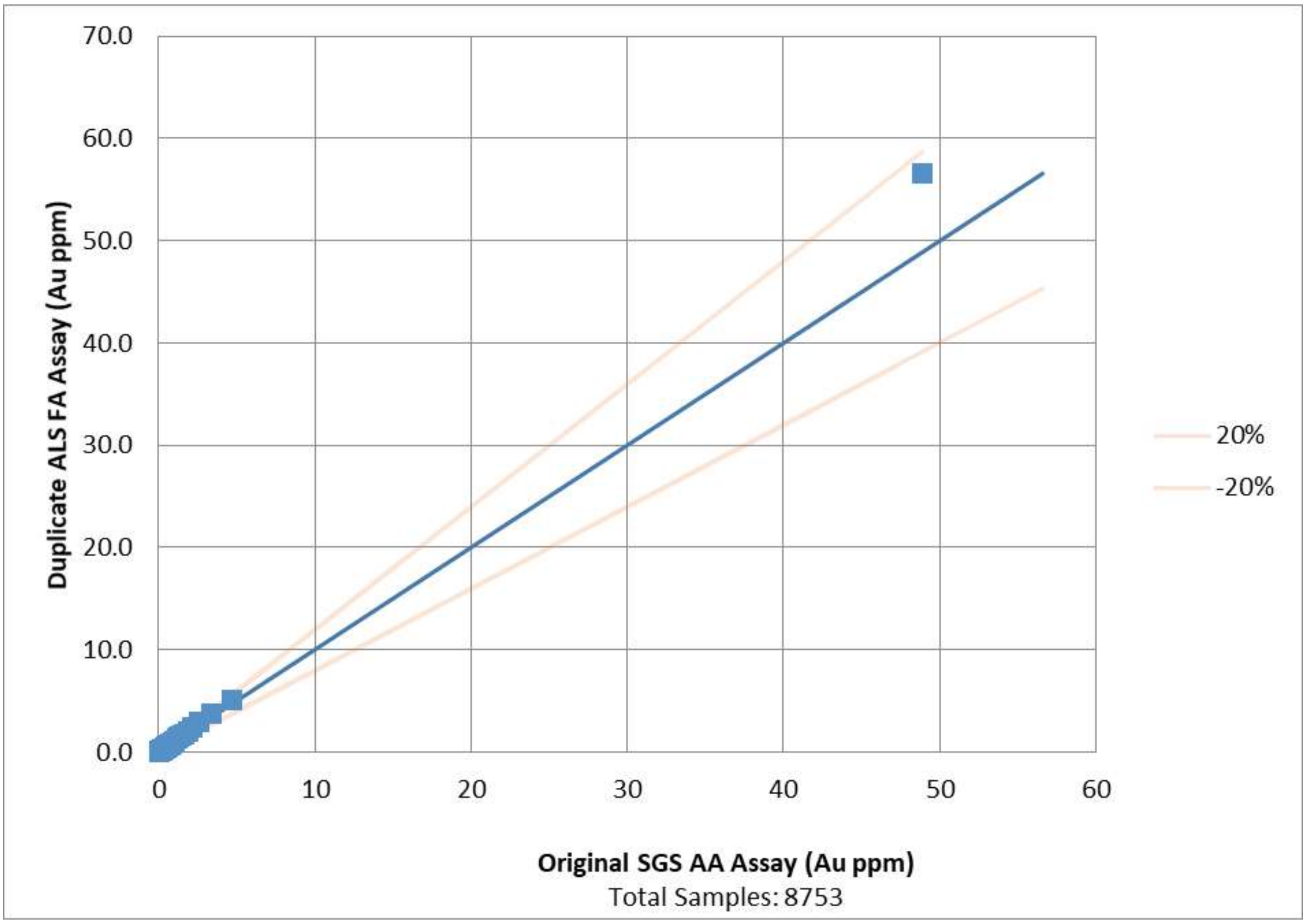
12.2.2.3 Teranga Validation of the Sabodala Project

Independent reviewers completed extensive reviews of procedures and data prior to 2016, which are documented in detail in previous NI 43-101 Technical Reports. This involved reviews of general knowledge and practices, the on-site laboratory facility, sample preparation, sample analysis, sample security and QA/QC procedures; drilling programmes including SOPs, collar and downhole surveys, logging and sampling; geological interpretation, assay verification, density determinations and data management. Standard industry practices were followed, with no significant discrepancies identified during the reviews.

Since 2016, Teranga exploration geologists have conducted regular in-house reviews involving SOPs and data verification during ongoing sampling, trenching and drilling programmes. SOPs are maintained and follow industry best practices, with no significant issues identified during the reviews.

From January 2016 to June 2017, a total of 8,753 duplicate pulp samples from drill core were submitted to ALS Johannesburg for fire assay checks on the original AAS assays. Dried samples were crushed to 70% minus 2 mm. Crushed samples were riffle split to 250 g, then pulverized to 85% minus 75 µm (200 mesh). Fifty gram sample pulps were analysed for gold using fire assay with an atomic absorption finish and a 5 ppb detection limit (Au-AA24). Samples that returned inconsistent assay results were re-assayed by fire assay with a gravimetric finish (Au-GRA22). Results indicate reasonable correlation of gold assay grades and are presented in Figure 12.2.1.

Figure 12.2.1 SGS AA versus ALS FA Quartile-Quartile Plot



Source: Teranga Gold Corporation

12.2.3 Database and Work Programme Verification, January 2020 – November 2021

From January 2020 to November 2021, manual audits of the data in Teranga generated database were undertaken at regular intervals by Teranga. All errors were corrected by the Sabodala-Massawa Exploration team.

In February 2021, when Endeavour took control of the Massawa Project, the Endeavour Exploration Central Database Team commenced integration of all data generated over the complete history of the Project, for all deposits and targets. Details for this process are outlined in the following sub-section. A key part of this integration involved the re-validation of pre-2020 data.

From September to November 2021, the Sabodala-Massawa Project database (Massawa as generated by Randgold (Barrick) and Sabodala as generated by Teranga) were compiled into a single Endeavour Exploration designed Maxwell DataShed-based database management system (DBMS). In the process of implementing this system, the pre-Endeavour data was subject to the strict integrity requirements built into DataShed. All errors identified were relayed to the Sabodala-Massawa Exploration database team for correction. All corrections were committed to the Teranga-built database and DataShed.

In November 2021, when the DataShed DBMS was made fully operational, deposit scale resource databases were extracted. These databases were audited by the Endeavour Exploration Central Database Team with software-based auditing tools provided in Geosoft Target, Leapfrog, Surpac and/or Micromine. These audits were run on both new active and historical data. Audit reports were submitted to the local database team and errors corrected. The clean database was then transferred to the Endeavour Exploration Resource Team; if they found further errors using commercially available resource modelling software programmes, the audit reports were transferred to the Central Database Team who, where possible, made the required corrections in the DBMS. Where needed, the audit reports were transferred from the Central Database Team to the Sabodala-Massawa database team and errors were corrected in the DBMS.

12.2.4 Database Management

From January 2020 to November 2021, data was managed in a Teranga in-house built Microsoft Excel/Access database. Since November 2021, data has been managed in a Maxwell DataShed based industry standard database management system (DBMS). This system has strict built-in data integrity requirements that control most data errors before they are committed to the database. Common database checks include identifying:

- Inconsistent collar co-ordinates.
- Incorrect or missing DTH survey records.
- Missing sample-assay records.
- Missing data or overlap errors in DTH interval data.
- Incorrect 3D plots of the drill hole traces.

All inconsistencies are reported to the database management team which are then actioned.

No independent Qualified Persons have evaluated the database management systems or procedures for data generated over the Sabodala-Massawa deposits during the reporting period. This is the responsibility of the QP.

12.2.5 QA/QC Procedures

From January 2020 to November 2021, data quality control was managed by the Teranga team. Geologists monitored and verified the field work to ensure that best practices were followed. This included drill rig setup, downhole survey procedures, sampling procedures next to the RC rig and in the core shack. Litho-structural data logging and collection procedures were (and continue to be) carefully monitored with all data generated by field geologists verified by senior, management level, geologists before the final logs were committed to the database. The Database team continued the data QA/QC process in the database.

In November 2021, the Endeavour Exploration Group Database/QA/QC Manager implemented the Endeavour Exploration designed data QA/QC procedures for the field and in the project office. The knowledge transferred to the Sabodala-Massawa team was immediately put into action.

12.2.6 Witness Samples

No witness (also known as referee and umpire) samples were analysed during the 2020 and 2021 drilling campaigns.

12.2.7 Independent Audits

No independent audits were undertaken during the 2020 and 2021 drilling campaigns.

12.2.8 Recommendations

The data at the Massawa project has been generated by several operators with different operating procedures and in several different DBMSs. Going forward, it is envisioned with Endeavour Exploration managing the project, normalised (i.e. company-wide) procedures will be enforced and all deficiencies will be addressed. In further adherence to Endeavour Exploration procedures, it is recommended that:

- An umpire sampling programme commences.
- An external third-party consultant be contracted to audit the ALS Kédougou laboratory.
- An external third-party consultant be contracted to visit the Sabodala-Massawa Project to audit all exploration field procedures and database management practices.
- Members of the Central Database/QA/QC management team will continue to make regular visits to the Massawa site to verify that adherence to all procedures continue.

12.2.9 QP Statement

Kevin Harris CPG (Endeavour VP Resources) is the geological data validation and verification QP. Mr Harris has reviewed and confirmed the adequacy of the geological and exploration data verification processes completed to date. Furthermore, the analyses completed to date have not identified any significant issues which would result in any inherent bias in the geological modelling and resources. In the QP's opinion, the procedures and results are adequate for use in the estimation of Mineral Resources.

12.3 Mineral Resources

The geological, weathering, lithological and block models supporting the Mineral Resource Estimates have been validated and checked by the responsible QP, Kevin Harris CPG (Endeavour VP Resources). The Mineral Resources are in his opinion, suitable to be used as the basis of Mineral Reserves.

The block models, and their subsequent Mineral Resource estimates, validation typically includes:

- Mineralised zone wireframes are 'snapped' to drill holes.
- Mineralised zone wireframes are not extrapolated beyond what is considered as reasonable.
- Valid DTMs and wireframes.
- Wireframe and block model volumes are comparative.
- Overall density values are within an expected range.
- Raw assay and capped composite statistics (exploration data analysis, EDA) are comparable and meaningful.
- Meaningful weathering-type grade estimates.
- Swath plots to compare average composite grades to average block grades along different directions.

- Visual interrogation in cross-section and level plans that the raw sample, capped composites and block model grades are comparable.
- If possible due to data constraints, an alternative, check estimation algorithm used to estimate the grade estimate (e.g., ID^2 to validate an OK estimate).
- The successful interrogation and use of the block model by a peer reviewer.

12.4 Property, Description and Location

The QP for Section 4.0 has worked with the respective 'Experts' as noted in Section 3.0, to ensure the validity of the information presented herein.

12.5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

The QP for Section 5.0, has reviewed the base technical data reported herein. Only that data that is considered reliable and/or if in error, is inconsequential is reported. The Sabodala and Massawa weather stations are not compliant with the standards of the World Meteorological Organisation (WMO) and there are concerns with respect to information completeness and accuracy. The Kédougou weather station has not been audited and no comment is offered with respect to data completeness or accuracy.

12.6 Mineral Processing and Metallurgical Testing

12.6.1 Free Milling Ores

The QP Section 13.0 ('Free Milling Ores' only)has reviewed the data presented for appropriateness and validity, and confirms that the data presented is suitable to be used for this Technical Report

12.6.2 Refractory Gold Ores

As part of the data verification and validation process, the QP for Section 13.0 ('Refractory Gold Ores' only) has reviewed the reported testwork results in the DFS and compared these to the final metallurgical testwork reports from SGS Lakefield, Canada and MO Group Canada and South Africa and confirms that the data is correct and suitable to be used for the purpose intended.

12.7 Mineral Reserve Estimates

The physical and financial parameters used in the estimation of Mineral Reserves as reported herein, have been checked and verified as far as practically possible, and the Qualified Person is of the opinion that all input parameters and assumptions are reasonable and they are not misleading based on the information available as of 31 December 2021.

Some of the verification steps included:

- Resource model checks including visual checks, random block value checks, extreme value searches through data filter, density checks, negative grade checks and others.
- Checking the 2021 actual costs (mining and processing) against the costs applied.
- Checking productivity assumptions against actual productivity and production for processing and the current mining fleet.

12.8 Mining Methods

12.8.1 Open Pit Mining

The QP for Open pit mining has reviewed the input data used in mine planning, mine design and mine cost development, and confirms that the data used and presented herein, is in alignment with the NI43-101 guidelines and there has not been any misleading aspect, based on the information available as of 31 December 2021.

12.8.2 Underground Mining

The data used/assumptions applied in the development of the underground mining PFS are in accordance with the level of technical and cost development expected of a PFS. Further, mining costs were derived from recent budgetary mining operating cost estimates provided by Endeavour/SGO and verified, using cost data provided by widely recognized underground mining contractors, with experience in West Africa.

12.9 Recovery Methods

12.9.1 Sabodala Whole Ore Leach Plant (SWOLP)

The SWOLP is an existing asset currently in operation, with robust operational and financial reporting systems in place. The QP has reviewed the data used in this Section and believes that the data presented is realistic of current and future performance, within the limitations of DFS level reporting.

12.9.2 Sabodala Sulphide Treatment Plant (SSTP)

The design data used by Lycopodium and supplied by the independent experts as noted in Section 3.0, has not been tested or verified.

This is a normal practice for all studies, the metallurgical testwork is conducted at an accredited laboratory and used by the engineering company at face value - any obvious errors would be picked up. The metallurgical testwork data is signed off by the QP as being appropriate.

12.10 Project Infrastructure

12.10.1 Existing Infrastructure

The QP involved in compiling the infrastructure section (specifically existing infrastructure and the proposed mining infrastructure at Massawa), worked with SGO's respective Heads of Department (HODs) to ensure the reliability/accuracy of the information presented.

12.10.2 Tailings

In so far as the TSFs are concerned, there have been multiple assessments of in-situ dry density of TSF1 and there are numerous published papers on this subject. Further, the modelling software Muk 3D, AutoCAD 12, seepage, and stability analysis programmes are tried, proven, and tested.

It is the QPs opinion that the data used in the analysis and design of the TSF is reasonable and in-line with the requirements of a DFS.

12.11 Capital and Operating Costs

The QP for Section 21.0 confirms that he has reviewed the data from each contributor and he believes it to be fair and accurate. Further, capital and operating costs are valid as of Q4 2021, based on vendor quotations, current cost performance, and Life of Mine Physicals.

12.12 Economic Analysis

The QP for Section 22.0, has reviewed the financial model input data, the associated output data, and confirms that the results presented are fair and accurate.

12.13 Market Studies and Contracts

The data validation process applied to Section 19.0 and the subsequent interpretation/use thereof, is discussed in Section 12.13.1 and 12.13.2 following.

12.13.1 Markets

Market data was obtained from reputable sources and is a fair and accurate representation of forecast and historical data. Forecast data is based on consensus market data and thus is a reasonable benchmark for commodity prices.

12.13.2 Contracts

Contract and annual spend information was sourced from Mr Troy Barclay, SGO’s commercial manager. This information has not been independently verified and no opinion is offered in this regard.

Information on the merger between Massawa SA and SGO was sourced from Ms Julie Blot, Endeavour’s ‘Secretary General West Africa’ (Blot., 2022).

12.14 Adjacent Properties

The information presented in Section 23.0, ‘Adjacent Properties’ is based on information in the public domain (i.e., press releases and SEDAR). The Qualified Person has been unable to verify the information and it is not necessarily indicative of the mineralisation in the Sabodala-Massawa Property that is the subject of this Technical Report.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Resource Characteristics

13.1.1 Project Summary

The Issuer's (Endeavour's) Sabodala–Massawa asset, comprises of a number of current and proposed pits and underground mines on the Sabodala Concession and Massawa Mining License. All deposits are within economical trucking distance of the existing Sabodala Whole Ore Leach Plant (SWOLP) and the proposed Sabodala Sulphide Treatment Plant (SSTP).

The SWOLP was commissioned in late 2009 and currently treats 'free-milling' gold ores at a nominal rate of 4.2 Mt/a (db) through a conventional SABC/CARBON-IN-LEACH (CIL) circuit. The previous owners of the Sabodala Operation, Teranga Gold Corporation (Teranga), acquired the Massawa concession from Barrick Gold Corporation (Barrick) in 2019. The acquired Massawa concession consisted of the Sofia Main and Sofia North deposits which are located on the Sabodala Shear Zone (SSZ) trend and the Massawa Central Zone (CZ), Northern Zone (NZ) and Delya deposits, which are located on the parallel Massawa Shear Zone (MSZ).

The oxide, transitional and fresh ores from the deposits located on the SSZ, including the Sabodala, Goumbati, Maki Medina, Niakafiri East, Niakafiri West, Masato, Sofia Main and Sofia North deposits, are 'free-milling' gold ores. However, only the oxide and oxidised transitional ores from the Massawa CZ/NZ and Delya deposits on the MSZ, are 'free-milling' gold ores, with the reductive transitional and fresh ores from these deposits being partial or fully 'refractory'.

13.1.2 Massawa License

Metallurgical testing of samples from the Massawa deposits by Randgold Resources (Randgold) commenced in 2008 and continued through to 2018 when Randgold was acquired by Barrick Gold Corporation (Barrick). The historical testwork confirmed the 'refractory' nature of the gold in the reductive transitional and fresh ore types in the Massawa CZ/NZ and Delya deposits (located on the MSZ). The gold in the Massawa 'refractory' ores is 'locked' in sulphide minerals which must be oxidised to liberate the sulphide 'locked' gold for recovery by cyanidation.

The historical testwork also highlighted the 'free milling' nature of the gold in the Sofia Main and Sofia North deposits (located on the SSZ) and the oxide and oxidised transitional ore types in the Massawa CZ/NZ, and Delya deposits.

This testwork culminated in; the preparation of a Feasibility Study (FS) for the stand alone Massawa asset, the Feasibility Study Report authored by Senet on behalf of Randgold in December 2018; and, a Technical Report issued by Barrick on 23 July 2019 (post acquisition of Randgold).

Post the acquisition of the Massawa assets from Barrick by Teranga in late 2019, Teranga conducted confirmatory testwork and completed a Pre-feasibility Study (PFS) in 2020 to re-evaluate the development of the Massawa project, based on the integration with the existing Sabodala Operation. For the integrated project, Teranga proposed to blend the Massawa 'free-milling' oxide ores with the existing Sabodala ores and process through the SWOLP. In parallel, Teranga proposed to process the Massawa fully 'refractory' gold ores using an oxidation technology to increase overall gold recovery. The PFS confirmed bio-oxidation as the preferred oxidation technology and indicated that the integration of the two assets, combined with a central processing facility at Sabodala (SCPF), improved and provided a good investment proposition.

With the successful outcome of the Teranga 2020 PFS, Endeavour (post acquisition of Teranga in January 2021) completed a Definitive Feasibility Study (DFS) for the treatment of the Massawa partial or fully 'refractory' gold ores using the bio-oxidation technology.

The discussion on mineral processing and metallurgical testing of Massawa ores in the following sub-sections has been split, to differentiate between the processing of 'free-milling' gold ores that will be processed through the existing SWOLP and the processing of 'refractory' gold ores that will be processed through the proposed Sabodala Sulphide Treatment Plant (SSTP). The two plants are co-located and share infrastructure/services. The SSTP will recover the refractory gold bearing sulphide minerals to a flotation concentrate which will then be oxidised in a bio-oxidation circuit to liberate the gold for recovery by cyanidation in a CIL circuit. Except for sharing of some the tailings facilities and some plant services/infrastructure, the two plants are fully independent.

13.2 Resource Processing Considerations

13.2.1 'Free Milling' Gold Ores

The 'free milling' gold ores will be processed through the existing SWOLP at a nominal rate of up to 4.5 Mt/a (db). The ores scheduled to be process through the Sabodala process plant are:

- Oxide, transitional and fresh ore types from the Sabodala, Goumbati, Maki Medina, Niakafiri East, Niakafiri West and Masato deposits (located on the SSZ) and approximately 4 to 11 km by road from the SWOLP.
- Oxide, transitional and fresh ore types from the Sofia Main and Sofia North deposits (located on the SSZ) and approximately 30 km by road from the SWOLP.
- Oxide and oxidised transitional ore types from the Massawa CZ, NZ and Delya deposits (located on the parallel MSZ) approximately 32 to 46 km by road from the existing Sabodala Operation.

The mining and processing of the oxide, transitional and fresh ore types from the Sofia Main and Sofia North deposits commenced in August 2020 and is due to be complete by 2Q22. The mining of the oxide and oxidised transitional ore types from the Massawa CZ/NZ deposits is due to commence in 2Q22. It is currently proposed that the mining of the Delya deposit will commence later in the mine schedule (Q4 2026).

Given that the metallurgical performance of the oxide, transitional and fresh ore types from the Sabodala, Goumbati, Maki Medina, Niakafiri East, Niakafiri West and Masato deposits is well understood after 13 years of operation and has been reported in previous technical reports, no additional metallurgical commentary is provided on the Sabodala ores in this technical report. Also, given the mining and processing of the oxide, transitional and fresh ore types from the Sofia Main and Sofia North deposits will be complete by 2Q22, no additional metallurgical commentary is provided on the Sofia ores in this technical report.

The mineral processing and metallurgical testing commentary on the 'free milling' gold ores will report on work undertaken for the oxide and oxidised transitional ore types from the Massawa CZ/NZ and Delya deposits that is yet to be mined and processed.

13.2.2 Massawa 'Refractory' Gold Ores

The reductive transitional and fresh ore types in the Massawa CZ/NZ and Delya deposits are dominated by arsenopyrite and the contained gold exhibits varying degrees of 'refractoriness'. To achieve acceptable gold recovery from much of the Massawa reductive transitional and fresh ore types requires treating these ores through an oxidative process to oxidise the sulphide minerals (predominantly arsenopyrite) and liberate the sulphide 'locked', refractory gold.

Endeavour has completed a Definitive Feasibility Study (DFS) for the treatment of the Massawa 'refractory' gold bearing reductive transitional and fresh ore types using the bio-oxidation technology. Extensive testwork has been undertaken on the Massawa refractory ores historically by Randgold and more recently by Teranga/Endeavour. The historical testwork has been reported previously by Randgold/Barrick in the 2019 Technical Report and is summarised in Section 13.3. The recent testwork undertaken by Teranga/Endeavour is discussed in more detail in Section 13.5.

The Delya reductive transitional and fresh ore types, makes up only 5% of the total ore feed to the refractory ore treatment process or SSTP. The Delya ores have similar strong refractory metallurgical characteristics to the Massawa NZ ores, due to the high arsenic grades. The Massawa CZ ores have lower arsenic levels and higher proportion of 'free' or gravity recoverable gold.

The STP design criteria outlined in Section 17, is based on an analysis of the Resource block model, given that the mine plan as presented below (Table 13.2.1) was not available during the engineering phase of the DFS. As the design moves forward, the current mine plan and the analysis thereof will be revised, and the process design criteria updated. Important the process design criteria is based on conservative LoM operating envelopes and not necessarily on the quarterly or annual mine plan data.

Table 13.2.1 Mine Plan Element Analysis (S. Ramazan, Endeavour, 2022)[1]

Element	Units	Average Annual RoM Variability			Quarterly Analysis (2024 to 2026)	
		Min.	Weighted Avg	Max.	Min.	Max.
Massawa CZ/NZ and Delya Combined						
Au	g/t	1.55	4.43	6.85		
S	% w/w	1.00	1.12	1.54	1.22	1.54
As	% w/w	0.44	0.50	0.62	0.48	0.62
Fe	% w/w	4.64	5.27	5.66	5.29	5.77
Sb	% w/w	193	440	776	478	818
Massawa CZ (59% of RoM Feed)						
Au	g/t	1.55	4.30	7.9		
S	% w/w	1.06	1.14	1.3	1.18	1.27
As	% w/w	0.42	0.47	0.5	0.44	0.52
Fe	% w/w	4.64	4.98	5.4	5.14	5.41
Sb	% w/w	356	462	591	542	659
Massawa NZ (36% of RoM Feed)						
Au	g/t	1.59	4.71	6.5		
S	% w/w	0.87	1.11	1.9	1.18	1.92
As	% w/w	0.43	0.54	0.9	0.53	0.87
Fe	% w/w	5.51	5.69	6.1	5.48	6.24
Sb	% w/w	117	456.20	1,237	350	1,747

[1] Elements other than gold only likely accurate to one decimal place

Table 13.2.1 Mine Plan Element Analysis (S. Ramazan, Endeavour, 2022)[1]

Element	Units	Average Annual RoM Variability			Quarterly Analysis (2024 to 2026)	
		Min.	Weighted Avg	Max.	Min.	Max.
Delya (5% of RoM Feed)						
Au	g/t	1.60	3.84	5.0		
S	% w/w	0.39	0.90	1.0	0.02	0.44
As	% w/w	0.38	0.65	0.8	0.78	0.78
Fe	% w/w	4.84	5.65	6.0	4.88	5.20
Sb	% w/w	37	47.17	63	56	64

In the current mine schedule, the Massawa refractory ore resource is overmined in the initial years to allow the stockpiling of the lower grade ores to bring forward higher gold grades in the production schedule. This results in the stockpiling of the lower grade ores for extended periods which increases the risk of reduced gold recoveries from the stockpiled material due to 'aging' or weathering resulting in the tarnishing of the sulphide mineral surfaces. The extent to which the stockpiled ores will 'age' and the potential impact on overall gold recovery has not yet been quantified with testwork and this work is highlighted in the Forward Work Plan.

13.3 Historical Metallurgical Testwork Programmes

13.3.1 'Free Milling' Gold Ores

Endeavour, and previously Teranga, conduct periodic bottle roll leach tests on samples from the Sabodala, Goumbati, Maki Medina, Niakafiri East, Niakafiri West and Masato deposits to compare these results to the plant operating performance when treating various ore blends. The results of this periodic testwork and ongoing plant performance monitoring are used to update grade/recovery relationships and cost models/budgets for the Sabodala ores.

With the acquisition of the Massawa Mining License from Barrick in 2019, additional high grade 'free milling' ores from the Sofia Main and Sofia North deposits (on the SSZ), the Massawa CZ/NZ and Delya deposits (on the MSZ) are available to blend with the remaining lower grade Sabodala ore, for treatment through the SWOLP.

The first metallurgical testing of samples of 'free-milling' gold ores from the Massawa deposits was conducted in 2008 by Randgold Resources (Randgold) which was followed by a number of testwork campaigns carried out during the scoping and pre-feasibility studies stages between 2008 and 2016 and during the Feasibility study stage between 2017 and 2018. Key results are summarised in Table 13.3.1.

Table 13.3.1 'Free Milling' Ore - Comminution and Cyanide Leach Results

Deposits	Ore Type	A x b	CWi kWh/t	BRWi kWh/t	BBWi kWh/t	Ai	Gold Extraction		
							Gravity% Au	Gravity + CIL % Au	CIL only % Au
Sofia Main	Oxide	37 to 61	7.2 to 18.9		16.4 to 19.8	0.10 to 0.20			92.3
	Transitional								91.7
	Fresh						6.1	88.2	89.5
Sofia North	Composite						6.2	88.7	91.4
	Composite						6.5	86.0	88.9
Massawa CZ	Oxide			12.5	13.6	0.10 to 0.25	48.5	97.1	94 to 97
	Transitional								92 to 96
Massawa NZ	Oxide			12.3	13.0	0.10 to 0.25	15.1	91.1	90.4
Delya	Oxide								96.5

The gravity recovery test results suggest that the Sofia Main and North deposits, like the other deposits on the SSZ, contain limited coarse 'free' or gravity recoverable gold. The whole-of-ore leach (CIL only) results suggest 'moderate' to 'high' gold extraction from the Sofia Main ore types and 'moderate' gold extraction from the Sofia North composite. The Sofia Main and North deposits have been mined and processed since August 2020 and are due to be complete by 2Q22. The Sabodala whole-of-ore leach plant performance when treating the Sofia Main and North ores aligned well with the testwork extraction results in Table 13.3.1.

The Massawa CZ oxide and oxidised transitional ore types achieved 'high' to 'very high' gold extractions from both Gravity + CIL and CIL only. The 'high' gravity recovery (48.5%) achieved from the Massawa CZ oxide ore type indicates the presents of moderately high levels of coarse 'free' gold. Based on these results, Teranga opted to retro-fit a gravity gold recovery circuit in the milling circuit of the SWOLP to minimise any potential coarse gold recovery losses when treating the Massawa CZ ores.

The oxide samples from the Massawa NZ and Delya deposits achieved 'high' to 'very high' gold extractions from CIL only tests. The Massawa NZ samples exhibited 'low' to 'moderate' gravity gold recovery.

13.3.2 Massawa 'Refractory' Gold Ores

The first metallurgical testing of Massawa refractory ore samples was conducted on Massawa CZ fresh ore type in 2008 (Testwork Campaign 1) which focussed on gravity recovery of 'free' gold and cyanidation of the gravity tails. Like the Massawa CZ oxide ore samples, the Massawa CZ fresh ore samples exhibited 'moderate' to 'high' (47% to 52%) gravity gold recoveries. However, the cyanidation of the gravity tails only achieved a minor improvement in overall gold recovery indicating that the Massawa CZ fresh ore samples were semi-refractory. Diagnostic leaches on the gravity tails samples confirmed that a high proportion of the contained gold was associated with sulphide minerals (predominantly arsenopyrite). Similar testwork campaigns conducted on Massawa NZ and Delya fresh ore samples indicated 'low' gravity recoverable gold and very 'low' overall gravity + CIL recoveries suggesting that the Massawa NZ and Delya fresh ore samples were metallurgically similarly and highly refractory.

The subsequent testwork campaigns undertaken on the Massawa CZ/NZ and Delya reductive transitional and fresh ores focused on developing optimal process flowsheets for the following:

- Selectively process the high grade, semi-refractory Massawa CZ reductive transitional and fresh ores with 'high' 'free' gold content and 'high' to 'very high' (+50%) gravity gold recoveries through a gravity + CIL circuit.

- Process the lower grade, more refractory Massawa CZ reductive transitional and fresh ores with 'low' gravity gold recoveries and the Massawa refractory NZ and Delya reductive transitional and fresh ores through a refractory ore treatment circuit. The 'refractory' gold flowsheets evaluated included ultrafine grinding (UFG) + CIL, Pressure Oxidation (POX) + CIL, Roasting + CIL, Bio-oxidation (BIOX®) + CIL and Aachen + CIL.

The results of the numerous testwork campaigns completed by Randgold between 2008 and 2018 (37 testwork campaigns in total) were used for scoping and pre-feasibility studies carried out between 2008 and 2016 and for the Feasibility study between 2017 and 2018. Key results are summarised in Table 13.3.2, Table 13.3.3 and Table 13.3.4.

Table 13.3.2 'Refractory' Ore - Summary of Comminution and Cyanide Leach Results

Deposits	Ore Type	A x b	BBWi kWh/t	Ai	Gold Extraction		
					Gravity % Au	Gravity + CIL % Au	CIL only % Au
Massawa CZ	Fresh Reductive Transitional	37	16.3 to 23.6	0.20 to 0.25	20 to 52	70 to 77	15.4 to 37.0 40.8
Massawa NZ	Fresh		18.6 to 21.4	0.20 to 0.25	14		16.2 to 29.9
Delya	Fresh		19.9				16.3

Table 13.3.3 'Refractory' Ore - Summary of Flotation Testwork Results

Deposits	Ore Type	Campaign No.	Sample	Grind Size P_{80} µm	Mass Pull %	Float Tails g/t Au	Gold Recoveries			
							Gravity % Au	Float % Au	Gravity + Float % Au	ROM Float % Au
Massawa CZ	Fresh	6		75	14	0.53				86.7
	Fresh	7		75						84.0
	Fresh	8		75			20.0	89.2	91.4	93.6
	Fresh	9	CZ1	75			31.5	92.8	95.1	94.7
	Fresh	9	CZ2	75			35.2	91.7	94.6	96.0
	Fresh	20	Block A	75			48.0	83.8	91.6	
	Fresh	20	Block B	75			40.0	89.0	93.4	
	Fresh	20	Block C	75			32.0	90.8	93.7	
	Fresh	20	Block D	75			8.0	92.1	92.7	
	Fresh	21	Block G	75			25.0	90.6	93.0	
Massawa NZ	Fresh	6		75	16	0.57				91.4
	Fresh	7		75						87.7
	Fresh	8		75			14.0	95.0	95.7	93.8
	Fresh	22	NZ1	75	7.9					91.2
	Fresh	22	NZ1	75	7.9					87.0
	Fresh	22	NZ1	75	7.9					90.8
Massawa CZ/NZ Composite	Fresh	2	CZ+NZ	75	20.5	0.14				96.2

Table 13.3.4 'Refractory' Ore - Summary of Oxidative Leach Results

Deposits	Ore Type	Campaign No.	Sample	Oxidative Tech.	Grind Size P_{80} µm	Gold Recoveries			
						Gravity + Float % Au	ROM Float % Au	Oxid. Leach % Au	Overall % Au
Massawa CZ	Fresh	6	Conc	CIL	75		86.7	6.1	5.3
	Fresh	6	Conc	Leach-Ox	10		86.7	28.6	24.8
	Fresh	7	Conc	CIL	75		84.0	12.9	10.8
	Fresh	7	Conc	POX	75		84.0	98.5	82.7
	Fresh	7	Conc	Roast	75		84.0	79.9	67.1
	Fresh	7	Conc	Aachen	10		84.0	23.0	19.3
	Fresh	8	Conc	POX	75	91.4		98.8	90.3
	Fresh	8	Conc	POX	75		93.6	99.0	92.7
	Fresh	8	Conc	BIOX®	45	91.4		94.1	86.0
	Fresh	8	Conc	BIOX®	45		93.6	94.0	88.0
	Fresh	8	Conc	Roast	75	91.4		67.0	61.2
	Fresh	8	Conc	Roast	75		93.6	72.0	67.4
	Fresh	9	CZ1 Conc	BIOX®	45	95.1		98.0	93.2
	Fresh	9	CZ1 Conc	BIOX®	45		94.7	99.0	93.8
	Fresh	9	CZ1 Conc	Roast	75	95.1		93.0	88.4
	Fresh	9	CZ1 Conc	Roast	75		94.7	89.0	84.3
	Fresh	9	CZ2 Conc	POX	75	94.6		98.0	92.7
	Fresh	9	CZ2 Conc	POX	75		96.0	97.0	93.1
	Fresh	9	CZ2 Conc	Roast	75	94.6		82.9	78.4
	Fresh	9	CZ2 Conc	Roast	75		96.0	85.2	81.8
	Fresh	23	Block D	BIOX®	45	92.7		94.4	87.5
Massawa NZ	Fresh	6		CIL	75		91.4	5.8	5.3
	Fresh	6		Leach-Ox	10		91.4	29.9	27.3
	Fresh	7	Conc	CIL	75		87.7	8.4	7.4
	Fresh	7	Conc	POX	75		87.7	92.6	81.2
	Fresh	7	Conc	Roast	75		87.7	80.6	70.7
	Fresh	7	Conc	Aachen	10		87.7	14.2	12.5
	Fresh	8	Conc	POX	75	95.7		98.8	94.6
	Fresh	8	Conc	POX	75		93.8	99.0	92.9
	Fresh	8	Conc	BIOX®	45	95.7		85.4	81.7
	Fresh	8	Conc	BIOX®	45		93.8	90.2	84.6
	Fresh	8	Conc	Roast	75	95.7		78.8	75.4
	Fresh	8	Conc	Roast	75		93.8	77.7	72.9
	Fresh	23	NZ1 Conc	BIOX®	45		90.8	97.6	88.6
	Fresh	23	NZLG Conc	BIOX®	45		91.0	97.0	88.3
	Fresh	23	NZHG Conc	BIOX®	45		91.2	96.5	88.0
	Fresh	33	NZ1 Conc	Albion	10		90.8	80.2	72.8
Massawa CZ+NZ Composite	Fresh	23	CZ+NZ	BIOX®	45		92.0	95.4	87.7

13.4 Historical Studies (2008 to 2020)

13.4.1 Historical Randgold Studies

Randgold conducted an initial PFS on the Massawa Project authored by; Senet in September 2010, second Pre-feasibility Study authored by Senet in January 2013; and a FS authored by Senet in December 2018.

The initial PFS evaluated the testwork results from Campaigns one to seven and concluded:

- The Sofia oxide, transitional and fresh ore types are 'free milling' and moderate to high gold recoveries in a conventional CIL circuit can be achieved.
- The Massawa CZ/NZ oxide and transitional ore type are 'free milling' and moderate to high (81% to 98%) gold recoveries in a conventional CIL circuit can be achieved.
- The Massawa CZ/NZ sulphide ores are semi to fully refractory and require an oxidative technology to liberate the sulphide locked gold. In comparing the testwork results from UFG + CIL, POX + CIL, Roasting + CIL and Aachen + CIL flowsheets treating Massawa CZ/NZ refractory flotation concentrates, POX + CIL achieved the highest gold recoveries however the capital and operating costs of a POX circuit are also higher than the other oxidative technologies. Senet recommended a more detail metallurgical assessment of the various oxidative technologies, including bio-oxidation.

Further testwork campaigns (Campaigns 8 to 19) were conducted to provide additional metallurgical assessment of treatment options for the Massawa 'free milling' and refractory ores culminating in the preparation of a second PFS Report authored by Senet in 2017.

The key assessment of the second PFS Report was comparing the testwork results from POX + CIL and BIOX® + CIL flowsheets for treating Massawa CZ/NZ and Delya refractory flotation concentrates. The PFS concluded that gravity + flotation followed by BIOX® of the concentrate + CIL of the BIOX® residue, was the preferred flowsheet for treating the Massawa CZ/NZ and Delya refractory ores. The second PFS Report also recommended pilot plant testing to provide key BIOX® data for detailed design. Campaigns 20 to 37 were conducted between 2016 and 2018 to provide additional metallurgical data for the FS and for detailed design.

This testwork culminated in the preparation of a FS Report authored by Senet in December 2018 and a Technical Report issued by Barrick Gold Corporation (Barrick) on 23 July 2019. During the Randgold Feasibility Study, a number of trade-off studies were competed including:

- PRESSURE OXIDATION VERSUS BACTERIAL OXIDATION - Memorandum dated 02 March 2017.
- POWER SUPPLY TRADE- OFF - Document Number SS 0655-0000-0W11-001 dated 21 April 2017.
- PROCESS ROUTE SELECTION TRADE-OFF STUDY - Document Number SS0672-0000-0W11-003 Rev 0B dated 25 June 2017.
- FLOWSHEET DEVELOPMENT AND VERIFICATION – EFFECT OF GRIND – MASSAWA CENTRAL ZONE - Memo dated 3 August 2017.
- MASSAWA SOFIA FLOWSHEET DEVELOPMENT - EFFECT OF CYANIDE ADDITION - Memo dated 08 August 2017.
- MASSAWA FLOWSHEET DEVELOPMENT – CONCENTRATE HANDLING (ALBION) - Memo dated 30 October 2017.

- CENTRAL ZONE PROCESS ROUTE TRADE-OFF STUDY PFS RECOVERIES - SS 0672- 0000-0W11-004 Rev C dated 12 February 2018

In summary:

- The historical testwork has shown that the Massawa CZ/NS and Delya sulphide mineralisation is refractory in nature, but amenable to an oxidative treatment prior to gold extraction, which significantly improves gold recovery.
- POX, roasting, BIOX®, Albion and UFG were considered for treating refractory mineralisation, however, based on the historical Study assessments, the preferred processing route adopted by Randgold/Barrick was the BIOX® technology.
- Historical testwork has also shown that the Massawa CZ/NZ and Delya oxidised mineralisation is 'free milling' and amenable to a direct cyanidation leach for moderate to high gold recovery.
- The recommended Project outcome from the Randgold Massawa FS was to initially construct a whole-of-ore leach plant to treat the 'free milling' ores (the Sofia Main and North oxide, transitional and fresh ores, the Massawa CZ/NZ and Delya oxide and transitional ores) and the Massawa CZ semi-refractory fresh ore. The Massawa CZ/NZ and Delya refractory ore would be stockpiled and treated through a BIOX® circuit retro-fitted to the SWOLP at the end of the mine life.

13.4.2 Teranga Pre-Feasibility Study (2020)

On acquiring the Massawa Concessions from Barrick in 2019, Teranga commenced a PFS on the integrated Sabodala-Massawa Project to highlight the significant synergies that could be realised by integrating the two assets. The 2020 PFS relied on the metallurgical testwork data, project approach and mine schedule adopted by Randgold for the 2018 FS with the following exceptions:

- The 'free-milling' ores (the Sofia Main and North oxide, transitional and fresh ores, the Massawa CZ/NZ and Delya oxide and transitional ores) and the Massawa CZ semi-refractory fresh ore will be blended with the existing Sabodala ores and process through the SWOLP.
- To minimise any potential coarse gold recovery losses when treating the Massawa CZ ores, Teranga opted to retro-fit a gravity gold recovery circuit in the milling circuit of the SWOLP.
- The Massawa CZ/NZ and Delya refractory ores would be treated in parallel through a BIOX® circuit adjacent to the existing SWOLP, with shared infrastructure.

In parallel to the PFS, Teranga commenced a comprehensive variability testwork programme to further define the Massawa ores, with a high focus on the Massawa CZ oxide ore and the Massawa CZ semi-refractory fresh ore. Testwork commenced late 2020 and was structured to provide additional metallurgical data for the proposed DFS. Only Phase 1 of the testwork programme was complete and reported at the time of the completion of the previous Sabodala-Massawa Technical Report in August 2020.

With the improved rates of return on investment demonstrated by the Teranga 2020 PFS, Endeavour (post acquisition of Teranga in January 2021) completed a DFS for the treatment of the Massawa partial or fully 'refractory' gold ores using the bio-oxidation technology.

13.5 Recent Metallurgical Testwork Programmes (2020/2021)

13.5.1 Introduction

SGS Canada Inc. was engaged by Teranga in December 2019 to perform metallurgical tests on a selection of available samples from the Massawa deposits with testwork commencing in early 2020. The testwork programme was undertaken in two phases. The objective of the first phase was 'refractoriness characterisation', namely; to classify the samples as refractory or non-refractory and, to confirm the suitability of the existing SWOLP for the processing of 'free-milling' ore from the Massawa deposits. The samples for the first phase testwork programme were selected from existing RC drill samples from the Massawa CZ/NZ deposits.

The second phase of testwork programme did not commence until late 2020, on completion of a targeted drilling programme comprising 35 drill holes across the Massawa CZ deposit and eight drill holes across the Massawa NZ deposit. The focus of 'Phase 2' was on flotation optimisation and the preparation of flotation tails and concentrate samples for additional BIOX® amenability testing (BAT), and ancillary testwork (specific settling and regrind energy tests).

To enhance and fill gaps in the comminution data base, a comprehensive comminution testing programme was conducted on selected sample intervals from the aforementioned 35 Massawa CZ drill cores and eight Massawa NZ drill core.

13.5.2 Sample Selection

Phase 1 Samples

The samples used in the Phase 1 testwork programme were selected from existing reverse circulation (RC) drilling samples from Barrick's core storage facility, which housed historical cores from Randgold's 2008 to 2018 drill programmes. A total of 34 samples were selected for the first phase of testing, including five fresh ore samples from the Sofia Main and Sofia North deposits and 21 oxide, transitional and fresh ore samples from the Massawa CZ deposit and eight oxide and fresh ore samples from the Massawa NZ deposit. The 34 interval samples were selected from 30 representative RC drill holes (refer to Table 13.5.1).

The 29 Massawa CZ/NZ interval samples were grouped by deposit (CZ and NZ), by ore type (oxide, transition and fresh) and by lithology (greywacke, gabbro, quartz feldspar porphyry etc.) and tested individually using standard gravity + cyanide leach conditions. From the 29 interval samples, seven Massawa CZ fresh ore composites and two Massawa NZ fresh composites were prepared for comparative flotation and gravity + cyanide leach testwork.

An additional four composites were prepared using samples of the Sofia and Massawa oxide ores, the non-refractory Massawa CZ fresh material and samples of Sabodala fresh (free milling) ores. This material represents the first four years of planned production at SGO (based on an early 2021 Life of Mine plan). A fifth composite was made based on Year four, without any Massawa CZ fresh material to simulate SGO feed, if all Massawa CZ fresh ore was processed in the SSTP.

It was understood by Teranga, that there was a risk that the older RC interval samples of the fresh ore types might be partially oxidised and that this might slightly skew the assessment of the refractory nature of these ore types in the Phase 1 testwork programme. For this reason, Teranga initiated a new diamond drill programme to collect fresh samples for the Phase 2 testwork programme.

Table 13.5.1 Summary of Phase 1 Samples by Deposit and Lithology

Deposits	Ore Type	Drill Hole No.	Interval from - to m	Interval Length m	Lithology	SGS Sample
Massawa CZ	Oxide	MWRCGC1940	30 to 48	18	Saprolite	CO-1
		MWRCGC839	34 to 48	14	Saprolite	CO-2
	Transitional	MWRCGC839	54 to 61	7	Sap-rock	CT-1
		MWRCGC856	45 to 53	8	Sap-rock	CT-2
	Fresh	MWRCGC1565	70 to 77	7	North Refractory	CF-1
		MWRCGC1548	62 to 74	12	Greywacke	CF-2
		MWRCGC1088	87 to 96	9	North Refractory	CF-3
		MWRCGC704	106 to 120	14	Gabbro	CF-4
		MWRCGC718	109 to 122	13	Gabbro	CF-5
		MWRCGC870	107 to 114	7	Volcanics	CF-6
		MWRCGC871	120 to 127	7	Volcanics	CF-7
		MWRCGC872	128 to 137	9	Volcanics	CF-8
		MWRCGC874	103 to 121	18	Quartz-Feldspar	CF-9
		MWRCGC877	83 to 90	7	Gabbro	CF-10
		MWRCGC888	113 to 125	12	Quartz-Feldspar	CF-11
		MWRCGC889	70 to 79	9	Quartz-Feldspar	CF-12
		MWRCGC889	79 to 94	15	Quartz-Feldspar	CF-13
		MWRCGC897	100 to 110	10	Gabbro	CF-14
		MWRCGC1207	82 to 87	5	Greywacke	CF-15
		MWRCGC1233	115 to 118	3	Gabbro - East	CF-16
		MWRCGC1256	80 to 88	8	Gabbro - East	CF-17
		MWRCGC1341	65 to 72	7	Greywacke	CF-18
Massawa NZ	Oxide	MWRCGC451	23 to 48	25	Saprolite	NO-1
		MWRCGC602	16 to 50	34	Saprolite	NO-2
	Fresh	MWRCGC1001	61 to 71	10	Greywacke	NF-1
		MWRCGC1013	115 to 128	13	Greywacke	NF-2
		MWRCGC1029	115 to 136	21	Greywacke	NF-3
		MWRCGC956	75 to 83	8	Greywacke	NF-4
		MWRCGC961	111 to 120	9	Greywacke	NF-5
		MWRCGC964	130 to 144	14	Greywacke	NF-6
Sofia Main	Fresh	SFRC101	132 to 151	19	Fresh	SF-1
		SFRC113	86 to 95	9	Fresh	SF-2
Sofia North	Fresh	SFRC216	47 to 77	30	Fresh	SF-3
		SFRC234	77 to 101	24	Fresh	SF-4

Phase 2 Samples

Later in 2020, to; better define the boundaries of the Massawa CZ/NZ refractory ores; collect samples for variability testwork for the DFS; and to provide parameters for the process plant design, new holes were drilled to acquire fresh metallurgical samples for the second phase of testing. The drill holes, 35 in Massawa CZ and eight in Massawa NZ, were selected to target specific lithological areas and, in some cases, to infill areas where previous drilling was widely spaced. Mineralised sections of the drill core were logged and 1 m intervals were assayed for gold content at the Sabodala Gold Mine laboratory, with the assay rejects sent to a commercial laboratory for multi-element analysis.

After a review of the logging and gold assays, 92 interval composites were selected for the second phase of metallurgical testing, each composite comprising typically (5 to 15) m of contiguous drill intervals. The samples, as separate 1.0 m intervals were placed in plastic bags, each marked with sample numbers and packed in drums, were airfreighted to SGS Lakefield (Canada), where composites were prepared for characterization tests.

For each drill hole interval, the samples were crushed and blended to make a composite named according to the drill hole number and interval, plus each composite was described according to the main lithological unit logged for that interval. The composites were later referred to as 'characterization composites' since they were used to better define the metallurgical response according to sample location, and to differentiate them from later lithological composites.

The 107 Phase 2 interval samples were tested individually and used to prepare nine Massawa CZ lithology composites and two NZ lithology composites as summarised in Table 13.5.2 and Table 13.5.3 following.

Table 13.5.2 Phase 2 Massawa CZ Lithology Composites

Deposit	Ore Type	Lithology	SGS Designation	No. of Samples
Massawa CZ	Transitional	Transitional	TRS-1	9
	Fresh	Gabbro-1	GAB-1	10
		Gabbro-2	GAB-2	7
		Greywacke - North	GWK-N	16
		Greywacke - South	GWK-S	14
		Quartz Feldspar Porphyry	QFP-1	9
		Volcanics - East	VOL-E	13
		Volcanics - North	VOL-N	8
		Volcanics - West	VOL-W	8
		Average – Massawa CZ		94

Table 13.5.3 Phase 2 Massawa NZ Lithology Composites

Deposit	Ore Type	Lithology	SGS Designation	No. of Samples
Massawa NZ	Fresh	Greywacke - North	NZ-1	6
		Greywacke - South	NZ-2	6
		Average – Massawa NZ		12
Overall				**106**

To generate flotation tails and concentrate samples for additional BIOX® amenability testing (BAT) and ancillary testwork (specific settling and regrind energy tests), the nine Massawa CZ and two Massawa NZ lithology composites were blended to produce four Master Composites, namely:

- Massawa CZ – high sulphide sulphur grade (CZ-HG).
- Massawa CZ – low sulphide sulphur grade (CZ-LG).
- Massawa NZ – high sulphide sulphur grade (NZ-HG).
- Massawa NZ – low sulphide sulphur grade (NZ-LG).

Two additional composites were produced, to represent a blend of Massawa CZ and Massawa NZ ores (CZ/NZ) in a ratio of 1:1 and 3:1. This was thought to cover the likely range in the Massawa CZ/NZ ore blends feeding the BIOX® circuit.

Comminution Samples

For the comminution testwork, 32 of the 107 Phase 2 interval samples were selected and submitted for grindability testing (ball mill work indices and semi-autogenous milling comminution tests) to augment the historic database. The comminution samples were taken after coarse crushing, to provide coarse particles for the autogenous (SMC test) testing, with the balance crushed finer to feed the Bond ball mill work index test. All autogenous test samples after use and the balance of the composites were returned for finer crushing to suit the metallurgical analysis and ensuing testwork programme.

13.5.3 Testwork Programme

The components of the 2020-2021 testwork programme are summarised below:

- **Phase 1** – Refractoriness Characterisation testwork was conducted by SGS Lakefield on interval samples selected from the Randgold historical RC drilling programmes from 2008 to 2018 to characterise refractory nature of the ore types and optimise conditions for the processing of the ‘free milling’ ores through the SWOLP.
- **Phase 2** – Flotation Optimisation testwork was conducted by SGS Lakefield on interval samples selected from fresh drill holes from the Teranga diamond drilling programme, completed in Q4 2020. The objective was to further characterise the refractory ore, optimise flotation performance and provide design parameters for the flotation circuit.
- The **Comminution** testwork conducted by SGS Lakefield on interval samples selected from fresh drill holes from the recent Teranga diamond drilling programme complete in 4Q20 to enhance the comminution data base and provide design data for the modelling of the comminution circuit.
- The **BIOX® amenability testing** (BAT) conducted by MO Group on concentrates produced from Master Composites prepared from the Phase 2 interval samples to provide a wider range of BAT data for the development of the design basis of the BIOX® circuit.
- The **Ancillary** testwork conducted by MO Group on flotation tails and concentrates produced from Master Composites prepared from the Phase 2 interval samples to provide specific settling data and regrind specific energy data for the specification of the thickeners and regrind mill.

Phase 1 - Refractoriness Characterisation

Before Teranga could start treating the higher grade Sofia Main and Sofia North ores and the oxidised Massawa CZ/NZ ores through the existing SWOLP, it was imperative to conduct additional metallurgical testing to determine which types of mineralisation could be processed. The historical SWOLP achieved a nominal P_{80} grind size of 90 µm and used a basic carbon-in-leach (CIL) gold circuit without gravity recovery and with CIL residence time of slightly less than 24 hours.

Testing of the Massawa CZ fresh mineralisation was also required to determine the extent to which this material was ‘free milling’ and to determine the boundaries for mining of the refractory material for which a dedicated process circuit would be required.

The objective of Phase 1 of the testwork was to classify the samples as refractory or non-refractory to gain a better knowledge of the refractory zone boundaries. The initial part of the Phase 1 programme included chemical analysis, gravity concentration and cyanide leaching on 34 samples representing fresh mineralisation from the two Sofia deposits and the oxide, transitional and fresh mineralisation from the Massawa CZ/NZ deposits.

Once the ore types were characterised into ‘free milling’ and refractory, the second part of the Phase 1 testwork programme was the optimisation of the leaching conditions of the ‘free milling’ samples for processing through the SWOLP.

Composites of the Sofia and Massawa oxide ores, the non-refractory Massawa CZ fresh material together with samples of SGO fresh (free milling) ores were prepared, representing four years of planned production at SGO (based on an early 2021 Life of Mine plan). A fifth composite was made based on Year four, but without any Massawa CZ fresh material to simulate SWOLP feed, if all Massawa CZ fresh ore is processed in the SSTP. The five composites were submitted to standard gravity plus CIL extraction, prior to the tailings being submitted for environmental analysis as part of the waste rock and tailings studies.

In addition, the second part of the Phase 1 testwork programme included initial work to optimise the flotation response of the samples determined to represent refractory mineralization. This work included preparation of 11 composite samples, chemical analysis, gravity separation, flotation, cyanide leaching of the gravity and flotation tailings and arsenic-antimony precipitation testing.

Phase 2 – Flotation Optimisation

Composites representing 92 intervals of Massawa CZ and 15 intervals of Massawa NZ were submitted for metallic screened gold analysis, principal elements of interest and whole rock analysis.

Initial metallurgical characterisation tests were conducted on all 107 interval samples at a nominal grind P_{80} of 90 µm, gravity concentration using a laboratory Knelson concentrator and 36 hours CIL extraction on the gravity tails.

Seven key interval samples were submitted for mineralogical examination using the TIMA method which allows the separate identification of pyrite, arsenopyrite and arsenian pyrite minerals.

A standard batch sulphide rougher flotation test was conducted on 70 interval composites at a nominal grind P_{80} of 90 µm, gravity concentration using a laboratory Knelson concentrator and 25 minute rougher flotation time, with the addition of; Potassium Amyl Xanthate (PAX) at 65 g/t and Methyl Iso-Butyl Carbinol (MIBC) at 50 g/t, with cyanidation of the flotation tails.

The Lithology Composites and various deposit Master Composites and Master Composite blends were subjected to parallel metallurgical characterisation tests and standard flotation tests to compare performance and to prepare samples for the BAT and Ancillary testwork.

Comminution Testwork

Comminution testing was conducted on 32 interval composites to augment the historic comminution database. The testwork was conducted at SGS Lakefield (Canada) and consisted of ball mill work index (BWi) determinations and semi-autogenous milling comminution (SMC) testing with the results being sent to JK Tech to determine A x b parameters.

BIOX® Amenability Testing

A total of 12 concentrate samples with varying sulphide sulphur grades produced from the flotation testwork undertaken on the four Master Composites and two Master Composite blends were sent to Metso Outotec (MO) Group in South Africa for BIOX® amenability testing. The BAT was conducted on the 12 concentrate samples to evaluate the variability in BIOX® performance at different sulphide sulphur grades and Massawa CZ:NZ blends. The BIOX® solutions from each BAT was neutralised to determine limestone and lime requirements and precipitate stability.

Ancillary Testwork

Samples of the flotation tails and concentrate produced from the flotation testwork undertaken on the Master Composite blend at a Massawa CZ:NZ ratio 1:1 were sent to MO Group in Canada for dynamic thickener testwork to determine specific settling rates of the two products. The concentrate sample was then used to determine specific grind energy for a VertiMill using the Jar test method.

13.5.4 Testwork Results

13.5.4.1 Phase 1 – 'Refractoriness Characterisation'

The initial part of the Phase 1 programme included refractoriness characterisation tests using gravity concentration and 'standardised cyanide leach tests on the 34 interval samples representing:

- five fresh ore samples from the Sofia Main and Sofia North deposits
- twenty one oxide, transitional and fresh ore samples from the Massawa CZ deposit
- eight oxide and fresh ore samples from the Massawa NZ deposit.

The results of these characterisation test on the aforementioned samples are summarised in Table 13.5.4, Table 13.5.5, and Table 13.5.6.

The second part of the Phase 1 programme included leach optimisation tests on the 'free-milling' ore samples to understand the likely leach performance of these ore types in the SWOLP and scoping flotation tests of the 'refractory' Massawa CZ/ NZ fresh ore samples. A total of; nine fresh ore composites; seven CZ fresh composites; and two NZ fresh composites, were prepared from the 29 Massawa CZ/NZ interval samples described above.

The nine fresh ore composites were subjected to comparative flotation and gravity + cyanide leach testwork. The results of this testwork is summarised in Table 13.5.7, Table 13.5.8 and Table 13.5.9.

Table 13.5.4 Summary Massawa CZ Characterisation Tests

Ore Type	Lithology	SGS Composite Name	Grind Size P80 µm	Reagents Consumed NaCN kg/t	Reagents Consumed CaO kg/t	Gold Extraction/Recovery, % Gravity % Au	CN Leach 24 h % Au	CN Leach 48 h % Au	Overall 48 h % Au	Leach Residue Grade g/t Au	Refractoriness Classification
Oxide	Saprolite	CO-1	45	0.42	1.45	0.3	90.0	94.4	94.4	0.36	Free Milling
			68	0.18	2.28	1.4	93.0	94.3	94.4	0.23	Free Milling
		Average	57	0.30	1.87	0.9	91.5	94.4	94.4	0.30	
Transition	Saprock	CT-1	70	0.67	2.31	27.2	92.0	91.7	94.0	0.60	Free Milling
		CT-2	79	0.80	1.03	9.8	53.0	53.5	58.1	0.84	Semi-Refractory
		Average	75	0.74	1.67	18.5	72.5	72.6	76.0	0.72	
Fresh	Gabbro	CF-4	87	1.56	0.84	41.5	33.0	39.3	64.5	1.53	Semi-Refractory
		CF-5	81	1.08	0.91	23.5	42.0	43.1	56.5	3.15	Semi-Refractory
		CF-10	80	0.97	1.15	2.6	22.0	22.3	24.3	2.34	Refractory
		CF-13	78	1.00	1.02	5.8	42.0	52.3	55.1	1.90	Semi-Refractory
		CF-16	67	0.94	0.91	5.0	7.0	7.5	12.1	3.80	Highly Refractory
		Average	79	1.11	0.97	15.7	29.2	32.9	42.5	2.54	
	Greywacke	CF-2	87	0.68	1.26	6.3	11.0	12.3	17.8	1.95	Refractory
		CF-14	58	1.20	0.88	37.9	19.0	21.3	51.1	1.44	Semi-Refractory
		CF-15	144	0.74	0.75	35.1	65.0	75.2	83.9	0.77	Partial Refractory
		CF-15	75	1.43	1.08	0.0	76.0	82.4	82.4	0.65	Partial Refractory
		CF-17	72	1.79	3.85	2.4	59.0	60.1	61.1	0.57	Semi-Refractory
		Average	87	1.17	1.56	16.3	46.0	50.3	59.3	1.08	
Fresh	QFP	**CF-9**	93	1.08	1.46	28.8	54.0	60.1	**71.6**	1.72	Semi-Refractory
		CF-11	96	1.22	0.88	70.6	53.0	59.7	**88.2**	1.79	Free Milling
		CF-18	98	1.04	2.97	1.4	37.0	43.1	**43.9**	1.92	Semi-Refractory
		Average	**96**	**1.11**	**1.77**	**33.6**	**48.0**	**54.3**	**67.9**	**1.81**	
	Volcanic / Shear	**CF-6**	67	3.27	1.79	3.6	51.0	57.1	**58.6**	1.53	Semi-Refractory
		CF-7	95	0.85	0.82	2.5	11.0	13.3	**15.5**	2.75	Refractory

Ore Type	Lithology	SGS Composite Name	Grind Size P_{80} µm	Reagents Consumed		Gold Extraction/Recovery, %				Leach Residue Grade	Refractoriness Classification
				NaCN	CaO	Gravity	CN Leach		Overall		
				kg/t	kg/t	% Au	24 h % Au	48 h % Au	48 h % Au	g/t Au	
		CF-8	93	1.10	0.98	11.4	15.0	17.0	**26.5**	3.41	Refractory
		CF-12	85	0.85	0.83	8.0	31.0	39.4	**44.2**	1.36	Semi-Refractory
		Average	**85**	**1.52**	**1.11**	**6.4**	**27.0**	**31.7**	**36.2**	**2.26**	
	North Refractory	**CF-1**	60	0.74	2.15	2.0	1.0	0.5	**2.5**	2.95	Highly Refractory
		CF-3	76	0.96	2.39	1.9	39.0	40.2	**41.3**	0.78	Semi-Refractory
		Average	**68**	**0.85**	**2.27**	**2.0**	**20.0**	**20.4**	**21.9**	**1.87**	

Table 13.5.5 Summary Massawa NZ Characterisation Tests

Ore Type	Lithology	SGS Composite Name	Grind Size P_{80} µm	Reagents Consumed		Gold Extraction/Recovery (%)				Leach Residue Grade g/t Au	Refractoriness Classification
						Gravity % Au	CN Leach		Overall Gravity + CN Leach		
				NaCN kg/t	CaO kg/t		24 h % Au	48 h % Au	48 h % Au		
Oxide		NO-1	58	0.38	2.20	35.1	82.0	83.5	89.3	1.15	Free Milling
		NO-2	91	0.45	1.19	5.0	78.0	80.3	81.3	1.16	Free Milling
		Average	75	0.42	1.70	20.1	80.0	81.9	85.3	1.16	
Fresh	Greywacke	NF-1	95	1.27	4.49	2.4	2.0	0.8	3.1	4.09	Highly Refractory
		NF-4	88	0.52	1.24	0.2	6.0	5.5	5.6	5.4	Highly Refractory
		Average	92	0.90	2.87	1.3	4.0	3.2	4.4	4.75	
Fresh	Greywacke	NF-2	64	1.51	2.79	1.4	22.0	19.2	20.4	4.29	Refractory
		NF-3	93	0.87	1.71	0.3	12.0	9.2	9.4	3.75	Highly Refractory
		NF-5	87	0.82	0.94	1.2	5.0	5.5	6.6	2.05	Highly Refractory
		NF-6	72	1.45	1.58	3.5	9.0	7.8	11.1	2.99	Highly Refractory
		Average	79	1.16	1.76	1.6	12.0	10.4	11.9	3.27	

Table 13.5.6 Summary Sofia Main and North Characterisation Tests

Ore Type	Lithology	SGS Composite Name	Grind Size P_{80} µm	Reagents Consumed		Gold Extraction/Recovery, %				Leach Residue Grade g/t Au	Refractoriness Classification
				NaCN kg/t	CaO kg/t	Gravity % Au	CN Leach 24 h % Au	CN Leach 48 h % Au	Overall Gravity + CN Leach 48 h % Au		
Sofia Main	Fresh	SF-1	93	0.81	0.64	5.4	82.0	85.2	86.0	0.88	Free Milling
		SF-2	88	1.06	0.60	3.9	81.0	82.9	83.6	1.36	Free Milling
		Average	91	0.94	0.62	4.7	81.5	84.1	84.8	1.12	
Sofia North	Fresh	SF-3	94	0.63	0.70	12.1	83.0	85.0	86.8	0.26	Free Milling
		SF-4	55	0.60	1.02	4.6	77.0	88.3	88.8	0.71	Free Milling
		Average	75	0.62	0.86	8.4	80.0	86.7	87.8	0.49	

Table 13.5.7 Summary Massawa CZ Fresh Composite Leach Tests

Ore Type	Lithology	SGS Composite Name	CIL or Direct Leach	Grind Size P_{80} µm	Reagents Consumed		Gold Extraction/Recovery, %					Leach Residue Grade g/t Au	Refractoriness Classification
					NaCN kg/t	CaO kg/t	Gravity % Au	CN Leach 24 h % Au	CN Leach 36 h % Au	CN Leach 48 h % Au	Overall Max % Au		
Fresh	Greywacke + Gabbro	CF-21	CN Leach	87	2.70	1.12	6.4			20.5	25.6	2.04	Refractory
	Gabbro	CF-22		85	0.77	0.90	62.3	36.5			76.1	1.75	Semi-Refractory
		CF-22		85	0.97	1.12	62.3		41.6		78.0	1.71	Semi-Refractory
		CF-22		91	1.26	1.18	11.8			46.2	52.5	1.83	Semi-Refractory
		CF-22		60	2.33	0.85	11.8		58.9		63.7	1.70	Semi-Refractory
		CF-22		~90	0.79	1.20	18.3	49.0	50.0	50.7	59.7	1.81	Semi-Refractory
	Volcanics	CF-23		94	2.03	2.02	31.1			52.5	67.3	3.44	Semi-Refractory
		CF-23		~90	2.16	1.99	31.1	36.0	44.0	50.1	65.6	2.13	Semi-Refractory
	Greywacke + Quartz Feldspar Porphyry	CF-24		80	1.07	1.17	53.6	47.1			75.5	3.11	Semi-Refractory
		CF-24		80	1.32	1.31	53.6		58.6		80.8	1.90	Semi-Refractory
		CF-24		89	1.57	1.26	30.8			64.8	75.6	1.66	Semi-Refractory
		CF-24		64	1.63	1.16	30.8		61.9		73.6	1.86	Semi-Refractory
		CF-24		~90	0.96	1.49	28.2	39.0	47.0	53.5	66.6	4.77	Semi-Refractory
	Gabbro + QFP	CF-25		89	1.44	1.31	15.6			57.6	64.2	3.08	Semi-Refractory
	Greywacke + Gabbro	CF-26		89	1.10	3.34	17.4	46.8			56.1	2.11	Semi-Refractory
		CF-26		89	1.41	3.51	17.4		47.3		56.5	2.00	Semi-Refractory
		CF-26		91	2.44	3.48	5.1			54.2	56.5	2.08	Semi-Refractory
		CF-26		65	2.73	2.99	5.1		54.8		57.1	2.05	Semi-Refractory

Table 13.5.8 Summary Massawa CZ Transitional Composite Leach Tests

Ore Type	SGS Composite Name	CIL or Direct Leach	Grind Size	Reagents Consumed		Gold Extraction/Recovery, %					Leach Residue Grade	Refractoriness Classification
						Gravity	CN or CIL Leach			Overall		
				NaCN	CaO		24 h	36 h	48 h	Max		
			P_{80} µm	kg/t	kg/t	% Au	% Au	% Au	% Au	% Au	g/t Au	
Transition		CN Leach	93	**	2.97	42.9	43.0		52.0	72.6	10.9	Semi-Refractory
		CIL	93	1.35	2.71	42.9	41.7			66.7	12.6	Semi-Refractory
		CN Leach	72	**	3.15	49.7	42.0		51.2	75.5	11.7	Semi-Refractory
		CIL	72	1.68	2.50	49.7	46.9			73.3	13.0	Semi-Refractory
		CIL	91	1.76	2.86	27.5	49.9			63.7	14.0	Semi-Refractory
		CIL	91	1.85	3.15	27.5		51.2		64.6	14.3	Semi-Refractory

Table 13.5.9 Summary Massawa CZ and NZ Fresh Composite Float Tests

Deposit	Ore Type	Lithology	SGS Composite Name	Grind Size P_{80} µm	Concentrate			Gold Extraction/Recovery, %				Leach Residue Grade
					Mass Pull	Sulphur Recovery	Sulphur Grade	Gravity	Rougher	Float Tails CIL	Overall	
					%	%	% S^{2-}	% Au	% Au	% Au	% Au	g/t Au
Massawa CZ	Fresh	North Refractory	CF-20	~90	16.5				75.7	8.2	83.9	0.50
			CF-20	~90	17.4				73.0		73.0	* 0.81
		Greywacke + Gabbro	CF-21	~90	18.9	92.8	7.22	2.7	82.7	13.0	96.2	0.19
		Gabbro	CF-22	~90	14.4	94.8	16.30	18.3	91.4	4.1	97.1	0.12
		Volcanics	CF-23	~90	11.5				92.2	3.8	96.0	0.38
			CF-23	~90	12.5				91.7		91.7	* 0.62
		Greywacke + QFP	CF-24	~90	12.8	87.9	6.91	28.2	84.8	7.8	96.9	0.32
		Gabbro + QFP	CF-25	~90	17.7	94.7	11.70	12.2	89.4	6.4	97.1	0.30
		Greywacke + Gabbro	CF-26	~90	10.0	85.1	12.90	4.8	67.9	3.4	72.8	1.05
Massawa NZ	Fresh		NF-8	~90	20.6				82.1	9.1	91.2	1.31
			NF-8	~90	19.7				82.2		82.2	* 1.72

The results of the characterisation tests on Massawa CZ samples as summarised in Table 13.5.4 indicate that:

- The Massawa CZ oxide samples exhibited very low gravity gold recovery (< 2%) and very high leached gold recovery (> 94%) after 48 hours. These samples are designated as 'free milling' and will achieve high recoveries in the SWOLP.
- One of the Massawa CZ transitional samples (CT-1) exhibited moderate gravity gold recovery (>25%) and high leached gold recovery (> 91%) after 48 hours. This sample is designated as 'free milling' and will achieve high recoveries in the SWOLP.
- The other Massawa CZ transitional sample (CT-2) is designated as 'semi-refractory' and exhibited low gravity gold recovery (< 10%) and low leached gold recovery (< 55%) after 48 hours. This sample is designated as 'semi-refractory' and will achieve low to moderate recoveries in the SWOLP. This would suggest that the CT-1 sample was an oxidised transitional ore sample while the CT-2 sample, was a reductive transitional ore sample.
- The Massawa CZ fresh samples all exhibited highly variable gravity recovery (2% to 70%), leach recovery (2% to 82%) at 48 hours and overall recovery (2% to 88%). The 'refractoriness' designation of these Massawa CZ fresh samples ranges from 'free milling' to 'highly refractory' and will achieve very low to high recoveries in the SWOLP.
- There was significant variation in gravity and leach recoveries within each lithology suggesting that any 'free milling' Massawa CZ fresh ore is spatially controlled and not controlled by lithology. This is very important when considering the possibility of separately mining any notional 'free milling' Massawa CZ fresh ore for treatment through the SWOLP.

The results of the characterisation tests on Massawa NZ and Sofia samples summarised in Table 13.5.5 and Table 13.5.6 indicate that:

- The Massawa NZ oxide samples exhibited variable gravity recovery (5% to 35%) with moderate to high leach recovery (80% to 83%) within 48 hours. These samples are designated as 'free milling' and can achieve high recoveries in the SWOLP.
- The Massawa NZ fresh samples exhibited variable gravity recovery (5% to 35%) with a very low to low leach recovery (1% to 20%), within 48 hours. These samples are designated as 'highly refractory' and will achieve very low recoveries in the SWOLP.
- The Sofia Main and Sofia North fresh samples exhibited low gravity recovery (4% to 12%) with a moderate to high leach recovery (83% to 88%) within 48 hours. These samples are designated as 'free milling' and can high recoveries the SWOLP.

The results of the optimisation leach tests on the 'free milling' samples were:

- The Sofia fresh samples achieved recoveries of 85% to 88% with a 24 hour leach time at a P_{80} grind size of 90 µm. Oxygen addition was not found to improve leach extraction. Gravity gold recovery was low at an average of 6%.
- Massawa CZ oxides yielded consistent gold recoveries in the 94% to 96% range with a 24 hour leach retention time. Increasing the retention time to 36 hours resulted in a 0.5% to 0.8% increase in gold recovery.

- Massawa NZ oxides recoveries ranged from 67% to 85% with a 24 hour leach retention time. Increasing the retention time to 36 hours, resulted in a 2.4% increase in gold recoveries. Some of the samples appeared to confirm the potential for 'gold-robbing' by potential carbonaceous material as CIL outperformed direct leaching without carbon by approximately 10%.
- Overall recoveries of 64% to 73% were achieved for the Massawa CZ transition samples indicating the samples were semi-refractory. Gravity recovery ranged from 28% to 50%. No evidence of 'gold-robbing' was observed. Leaching for 36 hours resulted in higher recoveries than for 24 hours.

The results of the characterisation leach tests on the Massawa CZ/ NZ fresh and transitional composites summarised in Table 13.5.8, indicate that:

- The Massawa CZ fresh composites were semi-refractory, comprising both non-refractory and refractory materials with a large variability in overall gold recovery ranging from 25% to 81%. Gravity gold recovery ranged from 5% to 53%. Using a CIL leach showed improvements in gold recovery in some samples, but not all. Some refractory behaviour was observed in most samples and all samples were classified as 'refractory' or 'semi-refractory'.
- Massawa NZ fresh composites showed low gravity gold recovery averaging ~3% and low average leach gold recovery ~11%. Using a CIL leach yielded an improvement in leach gold recovery, indicating a potential 'gold-robbing' behaviour.
- Testwork showed that minimal arsenic (0.1% to 0.2%) was mobilised in cyanide leaching in the samples that were tested. Antimony leached to a greater degree, ranging from 0.02% to 5.8%.

The results of the characterisation flotation tests on the Massawa CZ fresh samples summarised in Table 13.5.9 indicate that:

- Most Massawa CZ fresh composites responded well to the scoping flotation tests and achieved high to very high sulphide sulphur recoveries (> 90%) despite the potential 'aging' of the RC samples and partial oxidation and tarnishing of the sulphide mineral surfaces.
- Most Massawa CZ fresh composites achieved moderate to high gold recoveries (> 90%) to the flotation concentrate and, when combined with gravity concentrate and flotation tails leach, overall gold recoveries of > 95% were achieved.
- The cyanidation leach of the flotation tails can provide significant upside in recovery when treating semi-refractory partially oxidised material like the reductive transitional ores.

13.5.4.2 Phase 2 Testwork – Flotation Optimisation

The Phase 2 programme focused on the optimisation of flotation conditions for predominantly the semi-refractory Massawa CZ fresh ore. In historical testwork campaigns much of the flotation testwork was focused on the Massawa NZ refractory ores, as Randgold proposed to treat much of the semi-refractory Massawa CZ fresh ores through a WOLP.

At total of 107 drill hole interval samples (92 samples from Massawa CZ and 15 samples from Massawa NZ), were prepared from predominantly diamond drill core selected from the 2019 Teranga drill programme, with some additional intervals from older drill core to ensure spatial representative of the samples. Sub-samples of each interval sample were assayed for gold (Au), silver (Ag), arsenic (As), antimony (Sb), telluride (Te), copper (Cu), iron, (Fe), manganese (Mn), sulphide sulphur (S^{2-}), and graphitic carbon (C(g)).

Each of the 107 drill hole interval samples were subjected to a standard refractory characterisation test at a nominal grind P_{80} of 90 µm, gravity concentration using a laboratory Knelson concentrator and 36 hours CIL extraction on the gravity tails.

The head grades, standard refractory characterisation and standard flotation test results have been grouped into nine Massawa CZ and two Massawa NZ lithologies. The results are summarised in Table 13.5.10, Table 13.5.11 and Table 13.5.12 following.

Selected Massawa CZ/ NZ interval samples were composited into nine Massawa CZ and two NZ lithology composites. A total eight Massawa CZ and one Massawa NZ lithology composites were subjected to a refractory characterisation test (gravity + cyanide leach) and flotation test to determine the response and recoveries. These results are summarised in Table 13.5.13 and Table 13.5.14.

Table 13.5.10 Phase 2, Massawa CZ/NZ Interval Sample Assays by Lithology

Deposit	Ore Type	Lithology	SGS Designation	No. of Samples	Au g/t	Ag g/t	As %	Sb %	Te g/t	Cu %	Fe %	Mn %	S^{2-} %	$C_{(g)}$ %
Massawa CZ	Transitional	Transitional	TRS-1	9	5.95	1.70	0.21	0.17	<4	0.02	5.49	0.07	1.36	<0.05
	Fresh	Gabbro-1	GAB-1	10	21.47	4.43	0.33	0.05	<4	0.01	6.66	0.11	1.67	0.10
		Gabbro-2	GAB-2	7	12.27	2.30	0.32	0.07	<4	0.01	6.56	0.10	1.54	<0.05
		Greywacke - North	GWK-N	16	2.00	<0.6	0.45	0.04	<4	<0.01	4.77	0.08	1.27	0.08
		Greywacke - South	GWK-S	14	1.66	0.60	0.30	0.03	<4	0.02	4.99	0.09	1.23	0.07
		Quartz Feldspar Porphyry	QFP-1	9	3.80	0.66	0.42	0.07	<4	<0.01	2.64	0.05	1.19	<0.05
		Volcanics - East	VOL-E	13	3.74	1.03	0.43	0.05	<4	0.01	4.17	0.08	1.33	0.07
		Volcanics - North	VOL-N	8	6.56	1.73	0.53	0.02	<4	0.01	3.77	0.07	1.40	<0.05
		Volcanics - West	VOL-W	8	1.27	<0.6	0.33	0.02	<4	0.01	3.26	0.07	0.88	<0.05
		Average - Central Zone		94	5.90	1.25	0.37	0.06	<4	0.01	4.70	0.08	1.31	0.04
Massawa NZ	Fresh	Greywacke - North	NZ-1	6	4.04	<0.6	0.66	0.15	<4	0.01	5.81	0.12	1.67	<0.05
		Greywacke - South	NZ-2	6	3.40	<0.6	0.32	0.00	<4	0.01	5.63	0.10	1.01	<0.05
		Average - Northern Zone		12	3.72	0.60	0.49	0.08	<4	0.01	5.72	0.11	1.34	<0.05
Overall				**106**	**5.65**	**1.17**	**0.39**	**0.06**	**<4**	**0.01**	**4.82**	**0.08**	**1.32**	**<0.05**

Table 13.5.11 Phase 2, Massawa CZ/NZ Interval Refractories Characterisation by Lithology

Deposit	Ore Type	Lithology	SGS Composite Name	Number of Samples	Grind Size P80 µm	Reagents Consumed		Gold Extraction / Recovery, %			Leach Residue Grade g/t Au	Refractoriness Classification
						NaCN kg/t	CaO kg/t	Gravity % Au	CIL 36 h % Au	Overall 36 h % Au		
Massawa CZ	Transitional	Transitional	TRS-1	9	89	0.80	1.64	18.6	72.3	76.7	0.81	Partial Refractory
	Fresh	Gabbro-1	GAB-1	10	92	0.92	0.84	45.2	64.2	76.2	1.20	Partial Refractory
		Gabbro-2	GAB-2	7	93	0.97	0.85	49.6	70.6	84.3	1.29	Partial Refractory
		Greywacke - North	GWK-N	16	88	0.80	0.94	7.1	18.5	22.1	1.95	Highly Refractory
		Greywacke - South	GWK-S	14	87	0.86	0.78	11.1	26.9	33.3	1.03	Refractory
		Quartz Feldspar Porphyry	QFP-1	9	93	0.80	0.72	18.6	33.2	43.5	1.51	Refractory
		Volcanics - East	VOL-E	13	93	0.80	0.81	17.6	37.6	46.2	1.94	Refractory
		Volcanics - North	VOL-N	8	101	0.83	0.76	13.6	37.2	44.2	1.61	Refractory
		Volcanics - West	VOL-W	8	92	0.77	0.75	6.3	18.4	23.3	1.06	Highly Refractory
		Average - Central Zone		**94**	**91**	**0.83**	**0.90**	**19.1**	**39.3**	**46.8**	**1.43**	
Massawa NZ	Fresh	Greywacke - North	NZ-1	6	86	0.81	1.06	2.2	7.1	9.1	4.50	Highly Refractory
		Greywacke - South	NZ-2	6	83	0.60	1.05	3.8	5.5	9.0	4.92	Highly Refractory
		Average - Northern Zone		**12**	**85**	**0.60**	**1.05**	**3.0**	**6.3**	**9.1**	**4.71**	
Overall				**106**	**91**	**0.81**	**0.91**	**17.2**	**35.5**	**42.5**	**1.80**	

Table 13.5.12 Phase 2, Massawa CZ/NZ Interval Flotation Optimisation by Lithology

Deposit	Ore Type	Lithology	SGS Composite Name	Number of Samples	Grind Size	Concentrate		Gold Extraction / Recovery, %				Flotation Tails Grade	
						Mass	Grade	Gravity	Float 15 min	Overall			
					P_{80} µm	%	% S^{2-}	% Au	% Au	% Au	% S^{2-}	g/t Au	% S^{2-}
Massawa CZ	Transitional	Transitional	TRS-1	5	86	11.7	9.55	70.6	24.9	75.4	79.94	1.05	0.06
	Fresh	Gabbro-1	GAB-1	9	93	14.8	12.48	93.7	49.6	96.5	96.14	0.24	0.06
		Gabbro-2	GAB-2	7	93	13.4	13.22	94.1	49.6	97.1	96.16	0.23	0.06
		Greywacke - North	GWK-N	8	88	15.2	9.51	87.6	9.8	87.9	94.01	0.37	0.09
		Greywacke - South	GWK-S	6	88	13.6	11.60	92.2	12.8	93.1	96.28	0.16	0.06
		Quartz Feldspar Porphyry	QFP-1	7	92	16.9	7.83	93.0	21.5	94.3	96.13	0.18	0.05
		Volcanics - East	VOL-E	9	93	18.1	7.77	92.9	15.7	94.0	96.53	0.18	0.06
		Volcanics - North	VOL-N	6	107	18.3	9.23	89.9	14.0	91.0	95.82	0.29	0.07
		Volcanics - West	VOL-W	4	90	16.3	6.19	93.5	5.0	93.9	94.65	0.07	0.05
		Average - Central Zone		**61**	**92**	**15.5**	**9.89**	**90.3**	**24.1**	**92.0**	**94.48**	**0.29**	**0.06**
Massawa NZ	Fresh	Greywacke - North	NZ-1	6	86	12.9	13.08	2.2	94.0	95.0	94.2	0.30	0.09
		Greywacke - South	NZ-2	6	83	9.6	12.10	3.8	95.4	89.7	95.6	0.23	0.12
		Average - Northern Zone		**12**	**85**	**0.6**	**12.59**	**3.0**	**94.7**	**92.3**	**94.86**	**0.26**	**0.10**
Overall				**73**	**91**	**13.0**	**10.33**	**76.0**	**35.7**	**92.1**	**94.54**	**0.29**	**0.07**

Table 13.5.13 Phase 2 Massawa CZ/NZ Lithology Gravity + Cyanide Leach

Deposit	Ore Type	Lithology	SGS Composite Name	Grind Size	Gravity-CIL						Refractoriness Classification
					Reagents		Au Extraction / Recovery, %			Leach Residue Au, g/t	
				P_{80} µm	NaCN kg/t	CaO kg/t	Gravity (%)	CIL (%) 36 h	Gravity + CIL (%)		
Massawa CZ	Fresh	Gabbro	GAB-1	95	1.47	0.84	74.8	79.0	94.7	1.56	Partially Refractory
		Gabbro	GAB-2	95	0.70	1.04	58.0	71.0	87.8	1.48	Partially Refractory
		Quartz Feldspar Porphyry	QFP-1	92	1.14	0.75	44.8	36.2	64.8	1.55	Refractory
		Volcaniclastic East	VOL-E	87	0.92	0.89	44.3	56.6	75.8	1.64	Refractory
		Volcaniclastic West	VOL-W	95	1.27	0.70	3.7	14.8	18.0	1.08	Highly Refractory
		Volcaniclastic North	VOL-N	87	1.65	0.68	8.0	18.8	25.3	1.44	Refractory
		Greywacke South	GWK-S	90	1.19	0.89	20.6	28.6	43.3	1.33	Refractory
		Greywacke North	GWK-N	77	1.59	1.30	4.6	15.6	19.5	2.26	Highly Refractory
	Trans.	Transitional	TRS-1	96	0.65	1.77	49.8	77.9	88.9	0.69	Partially Refractory
Massawa NZ	Fresh	Greywacke North	NZ-1	86	1.42	1.42	3.1	6.0	8.9	4.81	Highly Refractory
		Greywacke South	NZ-2	121	0.40	1.42	4.5	5.6	9.8	3.39	Highly Refractory

Table 13.5.14 Phase 2, Massawa CZ/NZ Lithology Flotation

Deposit	Ore Type	Lithology	SGS Composite Name	Grind Size	Flotation-Rougher Concentrate							Float Tail
					Mass	Assays		Recovery				
					Pull	Au	S^{2-}	Au			S^{2-}	Au,
				P_{80} µm	%	g/t	%	Gravity (%)	Float (%)	Overall (%)	%	g/t
Massawa CZ	Fresh	Gabbro	GAB-1	95	18.7	42.1	9.5	74.8	94.1	98.5	96.0	0.61
		Gabbro	GAB-2	104	10.3	74.7	14.4	58.0	94.6	97.7	95.9	0.49
		Quartz Feldspar Porphyry	QFP-1	93	9.6	24.4	11.9	44.8	92.2	95.7	96.2	0.22
		Volcaniclastic East	VOL-E	90	9.1	35.9	14.9	44.3	90.7	94.8	96.8	0.37
		Volcaniclastic West	VOL-W	85	8.0	15.9	11.6	3.7	93.9	94.1	95.3	0.09
		Volcaniclastic North	VOL-N	94	9.5	17.6	14.0	8.0	91.8	92.5	96.7	0.17
		Greywacke South	GWK-S	90	9.3	13.7	13.5	20.6	93.3	94.7	96.5	0.10
		Greywacke North	GWK-N	77	11.2	18.7	11.6	4.6	91.3	91.7	96.7	0.23
	Trans.	Transitional	TRS-1	104	10.6	21.1	8.1	49.8	77.2	88.6	95.4	0.83
Massawa NZ	Fresh	Greywacke North	NZ-1	86	11.6	41.7	15.9	3.1	93.2	93.4	96.3	0.40
		Greywacke South	NZ-2	111	13.3	21.8	6.6	4.5	80.4	81.3	89.4	0.81

Table 13.5.15 Phase 2, Massawa CZ/NZ Kinetics Flotation Testwork on Gravity Tails

Composite	Feed Size, P_{80}, µm	Roughing Concentrate Flotation Time		Mass %	Assays				Distribution, %					Head Grade	
					Au g/t	S^{2-} %	As %	CO_3 %	Au		S^{2-}	As	CO_3	Au g/t	S^{2-} %
									Float Unit	Gravity + Float					
GAB-1	95	Rougher	15 min.	16.0	47.6	10.82	1.96	8.83	90.9	97.7	93.6	87.2	15.6	8.39	1.85
GAB-2	111	Rougher	15 min.	8.5	54.1	17.42	3.87	6.49	90.1	95.1	94.1	88.6	6.1	5.09	1.57
GAB-2	104	Rougher	15 min.	8.3	91.3	17.60	3.83	6.43	92.8	96.4	94.0	85.9	5.8	8.15	1.55
GWK-N	77	Rougher	15 min.	9.1	21.8	13.97	4.21	3.56	87.3	87.9	95.1	85.8	8.3	2.28	1.34
GWK-S	123	Rougher	15 min.	9.3	2.80	13.22	2.79	5.79	90.0	92.1	93.7	89.6	7.1	1.29	1.31
GWK-S	90	Rougher	15 min.	7.3	17.0	16.90	0.70	8.51	91.4	93.1	95.3	90.4	5.3	1.36	1.29
QFP-1	107	Rougher	15 min.	7.6	30.4	14.76	4.97	3.89	89.4	94.2	94.6	90.4	6.4	2.57	1.18
QFP-1	93	Rougher	15 min.	7.1	32.0	15.82	5.33	3.54	89.8	94.4	94.9	90.2	5.5	2.54	1.19
VOL-E	107	Rougher	15 min.	7.8	40.5	16.61	4.77	5.42	88.2	93.4	94.6	86.7	4.8	3.58	1.37
VOL-E	90	Rougher	15 min.	7.4	42.9	18.03	5.19	5.34	87.6	93.1	95.0	87.7	4.3	3.61	1.40
VOL-N	105	Rougher	15 min.	9.9	17.2	13.30	4.53	5.09	89.9	90.8	94.6	90.5	7.4	1.88	1.39
VOL-N	94	Rougher	15 min.	7.6	21.1	17.08	5.75	4.18	88.7	89.6	95.0	89.9	4.7	1.81	1.37
VOL-W	104	Rougher	15 min.	6.4	19.8	13.84	4.80	3.46	91.6	91.9	93.1	89.8	4.5	1.39	0.96
VOL-W	85	Rougher	15 min.	6.0	20.7	15.23	5.15	3.28	91.6	92.0	93.8	90.5	3.9	1.36	0.97
TRS-1	104	Rougher	15 min.	6.3	8.70	0.92	0.35	3.48	68.7	84.0	94.0	47.2	6.9	3.01	0.90
TRS-1	95	Rougher	15 min.	11.4	4.59	0.41	0.22	2.85	71.6	85.5	94.5	50.2	10.6	2.99	0.89
NZ-1	86	Rougher	15 min.	8.4	56.3	21.63	7.36	3.58	91.1	91.4	94.8	90.2	3.0	3.59	1.96
NZ-2	111	Rougher	15 min.	8.0	33.5	10.53	3.03	4.23	74.6	75.7	85.4	73.2	4.3	5.30	0.99

The conclusions from the refractory and flotation characterization tests are that:

- Only the gabbro mineralisation from the south-central area of the CZ deposit yields high gold recovery by gravity plus cyanide leaching (CIL) and these results were heavily influenced by high gravity recovery in several samples, with corresponding high gold head grades. Several lower grade samples yielded less than 89% gold recovery.
- All the other fresh rock mineralisation groups show poor gold recovery by gravity plus CIL, except some of the reductive transitional samples.
- All fresh lithology composites exhibited similar grade/recovery profiles except for composites NZ-2 which had a lower sulphur grade or recovery (refer to Table 13.5.15) mostly due to partial oxidation of the NZ-2 material (i.e., most likely reductive transitional ore). A grind size of close to P_{80} of 90 µm appeared to provide a small recovery improvement, when compared to a coarser grind size. The transition composite produced a very low sulphur recovery and concentrate grade as expected.
- In all groups except transitional samples, gravity plus flotation produced higher gold recoveries than gravity plus CIL. This is particularly important in the cases of the gabbro and QFP groups which historically have been considered as 'free milling' mineralisation not requiring refractory ore treatment. However, the improved gold recovery by flotation for these groups in the range of 95%, indicates refractory ore treatment would be of benefit.
- Not shown in the table are results for cyanide leaching of a number of the flotation tailings samples which typically resulted in additional gold extraction up to 50% of the gold in the flotation tailing.

Based on the results presented, it is recommended that all refractory fresh ores above the cut-off-grade should be processed through the SSTP. This will achieve a better overall recovery at a lower cost per ounce, than treating the refractory fresh material through the SWOLP.

After a review of the open circuit roughing tests and, in view of the lower sulphide sulphur grade of the concentrates produced, additional locked cycle tests (LCT) were conducted on a master composite of the Massawa CZ lithology composites to assess three cleaner circuit flowsheet configurations.

All three cleaner circuit flowsheet configurations produced similar results and were successful in upgrading the rougher/scavenger concentrates from 10% S^{2-} to 18% S^{2-} without significant gold loss. On this basis, a cleaner flotation circuit has been included in the flotation circuit flowsheet to better cater for lower sulphide sulphur grade ores and reduce carbonate gangue entrainment in final concentrates feeding the BIOX® circuit.

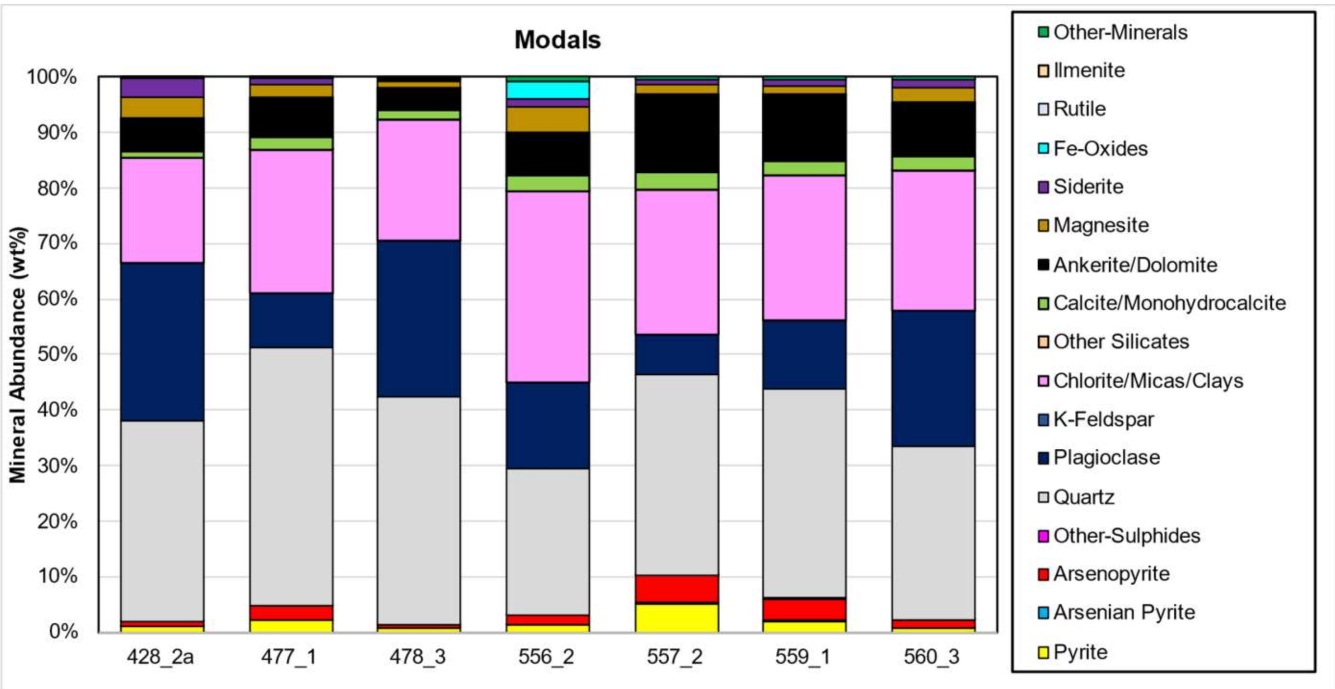
After initial test results of gravity plus CIL were received and varying results were seen between the samples from the north area of Massawa CZ and the NZ samples, seven interval samples were selected for mineralogical testing using the TIMA method which allows pyrite, arsenopyrite and arsenian pyrite to be identified separately. In Table 13.5.16 and Figure 13.5.1 the samples from holes 448, 477 and 478 are from the greywacke zone in the north end of Central Zone. The samples from holes 556, 557, 559 and 560 are from Northern Zone. Interval 477-1 showed very poor gold recovery by gravity plus CIL, similar to all of the Northern Zone samples, whereas 448-2a and 478-3 had higher recoveries.

Table 13.5.16 Modal Occurrence Results by TIMA

Survey: 17780-02 Project: Teranga Gold								
	Sample	**448_2a**	**477_1**	**478_3**	**556_2**	**557_2**	**559_1**	**560_3**
Mineral Mass (%)	Pyrite	0.90	2.08	0.88	1.19	5.20	1.95	0.63
	Arsenian Pyrite	0.01	0.09	0.01	0.12	0.15	0.23	0.23
	Arsenopyrite	0.85	2.46	0.42	1.79	4.93	3.83	1.32
	Other-Sulphides	0.03	0.04	0.02	0.03	0.07	0.05	0.04
	Quartz	36.32	46.49	40.92	26.46	36.02	37.87	31.31
	Plagioclase	28.48	10.00	28.17	15.49	7.25	12.30	24.28
	K-Feldspar	0.01	0.00	0.00	0.01	0.00	0.00	0.00
	Chlorite/Micas/Clays	18.70	25.68	22.04	34.27	25.96	25.98	25.42
	Other Silicates	0.02	0.07	0.02	0.01	0.03	0.04	0.02
	Calcite/Monohydrocalcite	1.38	2.19	1.57	2.87	3.10	2.71	2.52
	Ankerite/Dolomite	5.96	7.23	4.02	7.66	14.12	11.93	9.72
	Magnesite	3.66	2.34	1.13	4.63	1.93	1.56	2.47
	Siderite	3.34	1.01	0.37	1.44	0.74	1.07	1.44
	Fe-Oxides	0.04	0.02	0.07	3.31	0.06	0.02	0.02
	Rutile	0.05	0.02	0.07	0.04	0.04	0.02	0.03
	Ilmenite	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	Other-Minerals	0.24	0.29	0.30	0.69	0.40	0.44	0.56

The lowest gold recovery is associated with those intervals having the highest combined amount of pyrite, arsenopyrite and arsenian pyrite content, rather than one of these minerals. Also, arsenical pyrite is not a major component leading to refractory performance. Refer to the modal proportions for each sample summarised in Figure 13.5.1.

Figure 13.5.1 Modal Proportions



Comminution Testwork

The distribution of the ball mill work index tests and the modelled semi-autogenous milling comminution (SMC) JK parameters conducted on 32 Massawa CZ/NZ interval composites are summarised by lithology and deposit in Table 13.5.17.

Table 13.5.17 Comminution Testwork Results on Massawa CZ/NZ Fresh Ores

Lithology	No. of	Minimum		Maximum		75th Percentile		85th Percentile	
	Samples	BWi	A x b	BWi	A x b	BWi	A x b	BWi	A x b
Gabbro	4	21.0	27.2	24.3	23.0	23.9	23.4	24.0	23.2
Greywacke	6	17.0	31.5	23.4	23.9	20.5	26.7	21.3	25.9
Greywacke Blends	4	10.2	39.6	22.7	23.1	22.3	24.1	22.5	23.7
Quartz Feldspar Porphyry	3	16.9	35.1	18.6	24.0	18.6	28.7	18.6	26.8
Quartz Feldspar Porphyry Blends	2	16.0	31.0	20.9	24.3	19.7	26.0	20.2	25.3
Volcanics	6	18.3	28.4	24.7	25.5	23.6	26.0	24.0	25.9
Volcanics Blends	6	14.2	40.2	22.0	30.2	20.3	31.0	20.8	30.6
Massawa CZ	**27**	**14.2**	**40.2**	**24.7**	**23.0**	**23.1**	**25.2**	**23.4**	**24.3**
Massawa NZ	**5**	**10.2**	**39.6**	**18.0**	**23.1**	**18.0**	**23.9**	**18.0**	**23.6**

The comminution testing indicated much less variability across the Massawa CZ/NZ deposits than had been indicated by the limited historical comminution testing, with values indicating that the Massawa fresh ore is, on average, slightly harder than the Sabodala fresh ore currently being processed at the SWOLP. Orway Mineral Consultants (OMC) has reviewed the comminution results and has recommended, in a separate report, the design values to be used for a typical life-of-mine (LOM) feed blend.

BIOX® Amenability Testwork

A total of 18 BIOX® amenability tests were undertaken on the 12 concentrate samples (6 duplicate and 6 single tests) to compare the performance against BIOX® amenability tests undertaken on the 2018 Pilot Plant composites and inform the BIOX® design basis. A summary of the 2021 BAT + CIL results are shown in Table 13.5.18.

Table 13.5.18 2021 BIOX® Amenability Testing Results

Concentrate Samples	BIOX Leach	Sulphur Oxidation	Arsenic Solubilisation	CIL Reagent Consumption		Gold Leach Performance	
	days	%	%	NaCN kg/t	CaO kg/t	Extraction %	Accountability %
CZ Blend 1A	10	96.1%	92.7%	8.2	4.97	97.7	86.4
CZ Blend 1B	10	98.1%	96.1%	8.3	3.43	98.5	92.6
CZ Blend 2A	16	99.0%	96.4%	7.6	2.80	98.8	95.7
CZ Blend 2B	16	99.4%	96.2%	7.5	2.05	98.7	91.6
CZ Blend 3A	18	99.3%	96.7%	7.8	2.24	98.7	86.5
CZ Blend 3B	22	99.6%	97.3%	7.8	2.72	98.7	97.1
NZ Blend 1A	8	97.2%	96.9%	10.6	6.01	97.5	86.7
NZ Blend 1B	8	96.4%	97.0%	11.2	3.47	97.2	88.8
NZ Blend 2A	9	94.0%	95.3%	15.5	6.78	96.6	89.7
NZ Blend 2B	9	96.4%	97.8%	14.6	3.79	98.1	86.9
NZ Blend 3A	13	98.7%	97.5%	12.1	3.30	97.7	94.4
NZ Blend 3B	13	96.2%	99.9%	12.8	3.88	96.4	90.7
CZ-HG & Blend 4	20	99.7%	98.0%	7.5	3.30	98.6	95.3
NZ-LG & Blend 4	12	96.4%	97.3%	16.4	3.71	96.7	94.7
CZ/NZ (1:1) & Blend 4	12	93.8%	95.8%	14.5	5.34	97.0	97.4
CZ-LG & Blend 4	22	99.7%	98.1%	7.5	2.03	98.7	92.6
NZ-HG & Blend 4	14	98.9%	98.0%	15.1	3.81	98.0	96.8
CZ-NZ (3:1) & Blend 4	12	98.2%	98.5%	14.2	3.24	98.4	91.8

The results of the 2021 BIOX® amenability testing aligned well with the historical BIOX® amenability testing on the concentrates used in the 2018 BIOX® Pilot Programme and provide an expanded design basis for the BIOX® plant. There is a strong relationship between sulphur oxidation and arsenic dissolution and the gold cyanide leach extraction from the BIOX® residue.

Ancillary Testwork

The ancillary testwork included the dynamic thickener testwork of samples of flotation tailings and flotation concentrate and specific grinding energy determination for the concentrate regrind mill. The recommended specific settling rates by MO Group determined from the dynamic thickener testwork were 1.0 t/m^2h for the flotation tailings at an underflow density of 55% w/w solids and 0.25 t/m^2h for the flotation tailings at an underflow density of +60% w/w solids.

The Jar testwork used to determine specific grinding energy for the concentrate regrind returned a value of 5.55 kWh/t.

13.6 Summary of Metallurgical Testing

The current SGS Lakefield (Canada) metallurgical testwork programme for the Massawa CZ/NZ provides valuable additional information to the metallurgical testwork results database supporting the DFS.

The extensive historical and current metallurgical testwork campaigns demonstrate distinct behaviours:

- The CZ gabbro (GAB) and quartz feldspar porphyry (QFP) lithologies contain high 'free' gold lenses which lead to significant gravity recoverable gold, mainly in the fresh rock but potentially in the transitional zone as well. The greywacke (GWK) lithology in both the Massawa CZ/NZ deposits typically contains relatively low gravity recoverable gold.
- The majority of the Massawa CZ and all of the Massawa NZ fresh lithology composites achieved low overall gold recoveries in the whole-of-ore leach (gravity + CIL) characterisation testwork. Only the Massawa CZ gabbro lithology yielded moderately acceptable overall gold recoveries, and this was due to the higher 'free' gold content and resultant gravity gold recovery; however, the CIL tails still contained material gold values due to sulphide locked (refractory) gold.
- All Massawa CZ/NZ fresh lithology composites achieved significantly higher overall gold recoveries in the refractory (gravity + flotation) characterisation testwork (based on the assumption of a 95% gold extraction from the bio-oxidised residues in the BIOX® CIL circuit). This supports the proposed used of bio-oxidation for the treatment of the refractory Massawa CZ/NZ fresh ores.
- The Delya deposit is to the north of the Massawa NZ deposit, and the Delya ores has similar strong refractory characteristics as the Massawa NZ ores.
- Most of the flotation testwork was conducted at a target grind size P_{80} of 90 µm, the optimum grind size for mineral liberation as determined from previous testwork programmes. Fast initial flotation kinetics to a high sulphide sulphur grade rougher concentrate suggests that most of the sulphide minerals are well liberated at the target grind size. In addition, high overall sulphide sulphur recoveries (typically in the range of 93% to 97%) to a moderate sulphide sulphur grade concentrate suggests well liberated sulphide minerals plus gangue entrainment. This assessment is supported by the results of the Cleaner tests. The limited flotation testwork conducted at a coarser grind size P_{80} of 115 µm indicated some drop off in flotation performance.
- Comparing the flotation mass-pull results from the recent testwork with the historical results indicated that the overall mass pull from the flotation circuit has been reduced by as much as 50% as a result of the change in sulphide sulphur grades and the addition of a single cleaner flotation circuit. The reduction in mass pull also resulted in approximately 30% reduction in concentrate carbonate grades, whilst maintaining overall gold recovery and achieving average concentrate grades of 16% to 20% sulphide sulphur. The lithology locked-cycle test (including concentrate 'cleaning') achieved concentrate carbonate grades in the range of 2.6% to 4.2% CO_3^{2-} which is well below the projected BIOX® acid producer/consumer cross-over carbonate grade of 5.2% CO_3^{2-}.
- Optimum flotation conditions vary by deposit, domain (lithology) and sulphide sulphur head grade (extent of dilution); however, the inclusion of the Cleaner stage in the flotation flowsheet will provide an additional control to manage the concentrate quality (sulphide sulphur and carbonate grades) ahead of the BIOX® circuit.

- The typical expected sulphide sulphur content of the final (BIOX® feed) concentrate is in the range of 16% to 20% S^{2-} while maximising both sulphide sulphur and gold recovery to concentrate. Concentrate grade can be adjusted as required by flotation control and circuit configuration.
- A key variance between the historical flotation test programme and the recent 2020 to 2021 flotation test programme is the sulphide sulphur head grades of the composites used in the testwork. Sulphide sulphur head grades ranged from 2.5% to 3.0% S^{2-} for the Massawa NZ composites used to produce the concentrates for the 2018 BIOX pilot testing which was more than double the sulphide sulphur head grades of the Massawa NZ composites used in the recent testwork and the expected sulphide sulphur head grades of the Massawa NZ ore (0.9% to 1.9%)[1]. This variance between the sulphide sulphur head grades has had a significant impact on the design basis for the BIOX® circuit.
- When treating the Massawa CZ/NZ fresh ores through the proposed SSTP, these fresh ores should achieve typical gold recoveries of 88% to 97% to combined gravity and flotation concentrates and achieve gold extractions of 93% to 97% to carbon in the BIOX® CIL circuit, post bio-oxidation, resulting in overall gold recoveries of 86% to 92%, averaging 88%.
- The Massawa CZ transitional ore samples (CT-1 and TRS-1) and the Massawa NZ fresh ore sample (NZ-2), suspected of containing some transitional ore, achieved low to moderate gold recoveries of 58% to 75% in a combined gravity and CIL test and achieved similarly poor recoveries of 75% to 85% in a combined gravity and flotation test. CIL testwork conducted on several flotation tails samples indicates recoveries in the range of 11% to 78% depending on the gold head grade and extent of oxidation with the transitional samples achieving a higher gold recovery.
- Flotation tailings and concentrate thickening tests indicate no unusual requirements for flocculant selection or thickener dimensions.

13.7 Process Selection

13.7.1 'Free Milling' Gold Ores

The Sabodala ores are free milling and have been successfully processed through the SWOLP for the last 12 years and these ores will be blended with the Massawa free milling ores. Modifications were made to the SWOLP in 2020 to include the installation of a gravity gold concentrator, additional leach residence time (2 additional leach tanks) and a larger elution circuit to cater for the higher gold grade and 'free' gold content of the Sofia and Massawa free milling ores.

The free milling oxide, transitional and fresh ores from the Sofia Main and Sofia North deposits have been blended with the Sabodala ores and processed through the SWOLP from Q3 2020 and the mining of the Sofia deposits is due to finish in Q2 2022.

The free milling oxide and oxidised transitional ores from the Massawa (CZ, NZ and Delya) deposits will be blended with the Sabodala ores and processed through the SWOLP from Q2 2022. No additional circuit modifications are needed to enable the SWOLP to treat a blended feed of Massawa oxidised ores and the existing Sabodala ores.

[1] Annual or quarterly basis. LoM weighted average circa 1.1% w/w

13.7.2 'Refractory' Gold Ores

Flowsheet

The fresh ores from the Massawa NZ and Delya deposits and some zones in the Massawa CZ deposits are considered highly refractory and, to achieve acceptable gold recovery, the sulphide mineral lattice must be broken down so that cyanide can leach the sub-micron gold particles. The reductive transitional ores from the Massawa CZ/NZ and Delya deposits and some fresh zones in the Massawa CZ deposit are less refractory (semi-refractory) and contain both refractory and 'free milling' gold in varying proportions.

Randgold evaluated multiple oxidation technologies including roasting, pressure oxidation (POX), bio-oxidation (BIOX®), Albion™ and Aachen processes between 2008 and 2018 and concluded in the 2018 Feasibility Study, that the bio-oxidation (BIOX®) process was best suited for the treatment of the Massawa refractory Resource. Endeavour adopted the BIOX® technology for the 2021 DFS and the associated 2021 BIOX® amenability testing programme has confirmed the feasibility and viability of BIOX® technology for the processing of the Massawa refractory ores.

The basis of the 2021 DFS is that the Massawa refractory ores will be processed through a parallel sulphide treatment plant at Sabodala (SSTP) incorporating the BIOX® technology. The plant will be located adjacent to the existing SWOLP. Endeavour propose to treat the refractory and 'free milling' ores concurrently through the two circuits.

The modelling of various circuit configurations to process 1.2 Mt/a (db) of refractory ore through a standalone processing facility at a target final grind size (P_{80}) of 90 µm concluded that a two stage SAG mill and Ball mill circuit with recycle crushing would provide the most robust milling option.

The SSTP will comprise the following unit operations:

- Run-of-Mine (RoM) plan and primary Jaw crusher with a product P_{80} of 120 mm.
- Two stage SAG mill and Ball mill circuit with recycle crushing (SABC) with a product P_{80} of 90 µm.
- Gravity gold recovery circuit with allowance for a future installation of a flash flotation cell.
- Rougher-scavenger circuit with five tanks cells, a cleaner flotation circuit with three trough cells and concentrate and flotation tails thickening.
- Concentrate regrind mill with a product P_{80} of 45 µm.
- BIOX® circuit consisting of feed stock tanks and seven BIOX® reactors (four primary reactors in parallel and three secondary reactors in series).
- BIOX® residue three stage counter current decantation (CCD) circuit.
- BIOX® liquor neutralisation circuit with six tanks in series with water recovery thickener.
- BIOX® residue CIL circuit with two pH adjustments tanks and six CIL tanks in series.
- SO_2/Air cyanide detoxification circuit with two tanks in series.
- AARL elution circuit, regeneration kiln and goldroom.

Ore Blending

Steady operation of the SSTP and specifically the BIOX® circuit is important for consistent bacterial oxidation performance and gold recovery. To achieve stead state operation, ore feed with consistent sulphide sulphur, arsenic, antimony and iron grades and consistent arsenopyrite to pyrite, sulphur to carbonate ratios. The DFS design includes a large Run-of-Mine (RoM) pad at Sabodala and large intermediate stockpiles at Massawa to provide a minimum of three months (300,000 tonnes) ore stockpiles for adequate blending of the SSTP feed. The stockpiles will provide high and low 'grade bins' for gold, sulphide sulphur, arsenic and antimony as well as providing appropriate blending of Massawa CZ/NZ ores to maintain the Massawa CZ:NZ ore blend between 40:60 to 70:30.

Key Metallurgical Design Parameters

The recommended comminution, metallurgical design and operating parameters from the 2020-2021 testwork used in the DFS report for developing the Process Design Criteria and Operating Cost Estimates are summarised in Table 13.7.1, Table 13.7.2, Table 13.7.3 and Table 13.7.4.

For the comminution circuit design, the key comminution parameters for the CZ and NZ have been extracted from the recent 2020-2021 testwork programme are summarised in Table 13.7.1. Due to the uncertainty around the original location of many of the samples used in previous communication testwork programmes, OMC has relied heavily on the more recent testwork results. A comparison of recent and historical results does not indicate a significant variation.

Table 13.7.1 SSTP Comminution Design Parameters

Parameters	Units	Design	CZ Fresh	NZ Fresh
Ball Work Index (BWi)				
• Maximum	kWh/t		24.9	18.0
• Minimum	kWh/t		14.2	10.2
• Average	kWh/t		20.9	15.5
• 75th percentile	kWh/t	22.8	23.1	18.0
SAG Mill A x b				
• Maximum			40.2	39.6
• Minimum			23.0	23.0
• Average			28.7	28.4
• 85th percentile		24.7	25.1	23.9
Abrasion Index (Ai)				
• Maximum	g			
• Minimum	g			
• Average	g	0.275	0.280	0.246
Ore SG				
• Maximum	t/m^3		2.87	2.89
• Minimum	t/m^3		2.63	2.79
• Average	t/m^3	2.78	2.77	2.83
Grind Size				
• Target (P_{80}) Size	µm	90	90	90

Note: The historical comminution data has been used to define the parameters for the Delya ores.

The metallurgical design parameters outlined in Table 13.7.2 and Table 13.7.3 are based on results from the 2020 to 2021 metallurgical testwork programmes.

Table 13.7.2 SSTP Metallurgical Design Parameters

Parameters	Units	Massawa CZ Fresh	Massawa NZ Fresh	Massawa CZ:NZ Blends
Gold Head Grade				
• Range*	g/t Au	4.9 to 9.8	5.5 to 6.0	5.6 to 6.9
• Average*	g/t Au	6.1	5.8	6.4
• Design	g/t Au			7.0
Concentrate Sulphide Sulphur Grade				
• Range*	% S^{2-}	1.1 to 1.9	1.4 to 2.2	1.5 to 1.7
• Average*	% S^{2-}	1.5	1.8	1.6
• Design - Maximum	% S^{2-}			1.8
• Design - Nominal	% S^{2-}			1.4
Gravity Gold Recovery				
• Range	%	1 to 60	1 to10	15 to 30
• Average*	%	53	2	20
• Design	%			25
Flotation Sulphide Sulphur Recovery				
• Range*	%	92.2 to 96.4	93.1 to 96.7	94.8 to 96.8
• Average*	%	94.4	95.4	95.5
• Design	%			96.0
Gold Gravity + Flotation Recovery				
• Range*	%	94.4 to 96.1	93.5 to 95.5	94.2 to 95.6
• Average*	%	95.3	94.3	94.8
• Design	%			93.1
Concentrate Sulphide Sulphur Grade				
• Range*	% S^{2-}	19.6 to 22.7	22.3 to 27.0	21.3 to 24.3
• Average*	% S^{2-}	20.8	24.0	23.1
• Design	% S^{2-}			22.0
Concentrate Carbonate Grade				
• Range*	% CO_3^{2-}	4.1 to 4.6	2.6 to 4.4	3.3 to 4.5
• Average*	% CO_3^{2-}	4.4	3.2	3.8
• Design	% CO_3^{2-}			4.96
Mass Pull to Concentrate				
• Range*	%	5.0 to 7.9	5.6 to 8.1	6.1 to 7.5
• Average*	%	6.6	7.2	6.7
• Design	%			7.9

Note: The metallurgical Design parameters are used for plant design and are not an indication of predicted metallurgical performance.
* Derived from the average results of the locked-cycle flotation testwork.

Table 13.7.3 SSTP Additional Metallurgical Design Parameters

Parameters	Units	Testwork	Design
Laboratory Flotation Times*			
• Rougher	mins	15	10
• Rougher/Scavenger	mins	25	25
• Cleaner	mins		10
Flotation Pulp Density			
• Rougher/Scavenger	% w/w	30	30
• Cleaner	% w/w		20

Note: * Derived from the average results of the locked-cycle flotation testwork recirculating the scavenger concentrate to the head of the rougher circuit.

The following comment pertain to the 2020 to 2021 metallurgical testwork results and how they relate to the key metallurgical design parameters:

- The average gold head grade of the Massawa CZ and Massawa NZ and Blend composite samples (≈6 g/t Au), match closely the value used for design basis in this Study (7 g/t Au), but both are significantly higher than the LoM average gold grade in the diluted mine schedule (4.3 g/t Au). This is not expected to cause any issues with the design of the SSTP as gold grades have minimal impact on the SSTP operation.
- The average sulphide sulphur head grade of the Massawa CZ and Massawa NZ and Blend composite samples (≈1.6% S^{2-}) closely match the nominal value used for design basis in the DFS (1.4% S^{2-}). However, the final LoM average sulphide sulphur grade in the diluted DFS mine schedule is only 1.07% S^{2-}, with a likely RoM blended range of 0.9% to 1.5% S^{2-}.
- The gravity recoverable gold is highly variable in the Massawa CZ, with gabbro (GAB) and quartz/feldspar/porphyry (QFP) lithologies generally containing the bulk of the 'free' gravity recoverable gold. The Massawa NZ has consistently low gravity recoverable gold content. The SSTP will treat a blended feed of Massawa CZ/NZ ores and the gravity recoverable gold will vary with the ratio of Massawa CZ in the feed.
- The locked-cycle testwork has demonstrated that the inclusion of the cleaner stage in the flotation circuit will significantly improve the ability to reject carbonates from the rougher/scavenger concentrates and allow more control over the acid production/consumption balance in the BIOX® circuit. This is demonstrated by the low average carbonate levels in the concentrates produced in the locked-cycle tests (3.8% CO_3^{2-}).
- The concentrate sulphide sulphur grades produced in the locked-cycle tests (21% to 24% S^{2-}), were typically higher than the design basis for the BIOX® circuit (16% to 20%S^{2-}). The main reason for the higher sulphide sulphur grades was the lower overall mass pull to concentrate, due to the recirculation of the rougher/scavenger concentrates to the head of the circuit. The proposed flotation circuit flowsheet in the Study includes a separate cleaner stage, which reduces the impact of recirculating loads. It is expected that the sulphide sulphur grades will reduce slightly, and the overall sulphide sulphur (and gold) recovery will increase with the implementation of the separate cleaner stage.

The reagent consumptions outlined in Table 13.7.4 have been determined from the 2020 to 2021 metallurgical testwork programmes and used to specify the key operating parameters.

Table 13.7.4 SSTP Flotation Reagent Consumption Rates

Parameters	Units	Type	Testwork	Design
Flotation Reagents				
Collector	g/t ore	PAX	50 to 75	65
Frother	g/t ore	MIBC	40 to 50	50

13.7.2.1 BIOX® Circuit Design Basis

The different approaches adopted for the treatment of the refractory ore in the two Feasibility Studies (2018 Barrick Feasibility and 2021 Endeavour Definitive Feasibility Study) has resulted in significant differences in mine inventories for the SSTP. The approach adopted in the previous 2018 Barrick Feasibility Study was to maximise the ore treated through the SWLOP plant and to stockpile and only treat the highly refractory ore through the STP at the end of the mine life.

The Randgold/Barrick approach resulted in a smaller inventory of only highly refractory ore with higher sulphide sulphur and gold grade feeding the SSTP. The approach adopted for the 2021 Endeavour DFS is to treat only the Massawa oxide and oxidised transitional ores through the SWOLP and treat all reductive transitional (semi-refractory) and fresh (refractory) ores through the SSTP. This approach has resulted in a significantly higher inventory of refractory and semi-refractory ore with a lower sulphide sulphur and gold grade feeding the SSTP.

The concentrates produced for the 2018 BIOX® pilot testing were generated from Massawa NZ/CZ Master composites with sulphide sulphur head grades in the range of 1.8% to 3.0% S^{2-} which were reasonably representative of the highly refractory ores proposed as the feed to the BIOX® circuit in the 2018 Feasibility Study. The historical flotation testing did not incorporate a cleaner stage and produced concentrates with very high mass pulls (typically 10% to 15%) and relatively high concentrate sulphide sulphur grades (18% to 25% S^{2-}).

With the change in approach for the 2021 Endeavour DFS, the new mine schedule indicates much lower sulphide sulphur feed grades, typically between (1.0 to 1.5)% w/w S^{2-} on an annual average basis over the LoM, with a LoM average S^{-2} grade of 1.1 % w/w feeding the SSTP. The Massawa NZ and Massawa CZ Master composites used in the 2020 to 2021 Phase 2 testwork programme had sulphide sulphur head grades ranging from (1.1 to 2.2)% w/w, which are more representative of the proposed DFS feed grades, than the samples used in the previous testwork programmes for the 2018 FS.

The 2018 BIOX® Design Basis was based on a maximum BIOX® sulphide sulphur feed capacity of 103 t/day based on an ore feed of 1.2 Mt/a (db) at a sulphide sulphur grade of 3.3% S^{2-}. For the 2021 DFS, the BIOX® Design Basis was adjusted to a maximum BIOX® sulphide sulphur feed capacity of 60 t/day based on an ore feed of 1.2 Mt/a (db) at a sulphide sulphur grade of 1.8% S^{2-}. Based on the diluted DFS mine schedule, the maximum BIOX® sulphide sulphur feed capacity adopted for the DFS is conservative and further assessment of the BIOX® Design Basis will be undertaken as part of the front end engineering design (FEED) phase of the project implementation. However, the BIOX® circuit, as designed and costed in the DFS provides a material design margin to cater for moderate variations in BIOX feed parameters.

13.8 Independent Audits

The testwork data and process design has been reviewed by the following groups:

- Randgold between 2008 and 2018.
- Senet as part of the 2018 Feasibility Study.
- Barrick for the 2019 Technical Report.
- Teranga for the 2019 acquisition of the Massawa assets.
- MineScope Service Pty Ltd in 2020 during the Merger of Endeavour and Teranga.
- SRK Consulting in 2021 as part of the Competent Persons reporting for the listing on the Financial Times Stock Exchange (FTSE).
- Endeavour 2020 to 2021 for the DFS.

13.9 Comments on Section 13.0

13.9.1 Free Milling Ores

There has been sufficient metallurgical work done on the free milling ores on the Sabodala and Massawa properties that form part of the mine plan reported on herein, to support the recovery and cost assumptions made in this Technical Report, for the processing of these ores through the SWOLP.

13.9.2 Refractory Gold Ores

The extensive historical drilling campaigns undertaken by Randgold and the infill drilling campaigns on the Massawa CZ and Massawa NZ deposits conducted by Teranga has provided representative samples for metallurgical testwork. The combination of the 37 historical testwork campaigns from 2008 through to 2018 undertaken by Randgold and the recent 2020 to 2022 testwork programme undertaken by Teranga and Endeavour, provides a detailed database of metallurgical data sufficient for the DFS and project design.

The metallurgical testwork undertaken is sufficient to support the design of the SSTP plant, the development of operating costs, and the use of the recovery data presented.

13.10 Data Verification

The data verification approach applied to Metallurgical Processing and Metallurgical Testing is summarised in Section 12.0.

13.11 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 13.0 are presented in Section 25.0.

13.12 Recommendations

Recommendations pertaining to Section 13.0 are presented in Section 26.0.

13.13 References

References cited in Section 13.0 are presented in Section 27.0.

14.0 MINERAL RESOURCE ESTIMATES

14.1 Project Summary

Mineral Resources for the Sabodala-Massawa Project have been estimated for 26 gold deposits located on the Sabodala Mining Concession, Massawa Mining License and the Bransan exploration permits (Figure 14.1.1). Mineral Resources are reported inclusive of Mineral Reserves with an effective date of 31 December 2021 (Table 14.1.1).

The Sabodala-Massawa Project, as of 31 December 2021, contains an open pit Measured Mineral Resource of 21.2 Mt at a grade of 1.32 g/t Au containing 0.9 Moz Au, an open pit and underground Indicated Mineral Resource of 88.9 Mt at a grade of 2.09 g/t Au containing 6.0 Moz Au, and an open pit and underground Inferred Mineral Resource of 21.9 Mt at a grade of 1.89 g/t Au containing 1.3 Moz Au. The open pit Mineral Resources are reported at cut-off grades between 0.33 g/t Au and 1.09 g/t Au, and the underground Mineral Resources at 2.00 g/t Au (Sabodala) and 2.84 g/t Au (Massawa). The open pit Mineral Resources are reported above a Whittle shell. A gold price of USD 1,500/oz Au has been used for open pit and underground Mineral Resources.

The methods, parameters, assumptions and supporting data used for the 26 block models (some of which date back to 2011) have been reviewed to ensure they remain current. The block models were updated as required; such as when new information became available, mine depletion took place and/or metal price or operation cost assumptions changed.

The Massawa Central Zone (CZ), Massawa North Zone (NZ) and Delya resource models have been updated to support decisions related to the processing of sulphide ore. Improvements included detailed interpretations of lithology, weathering layering, redox surfaces and the addition of certain elements and attributes related to the planned BIOX® plant (including sulphide sulphur, arsenic, antimony and iron).

The same general approach has been taken for all deposits with Mineral Resources, whereby block grade and density estimates are constrained by domains representing the mineralisation, lithology and weathering surfaces. Open pit resources are reported within pit shells generated in Whittle software using the Lerchs-Grossman algorithm. Underground resources are reported within preliminary stope shapes generated using Deswik software or by visual inspection and manual selection of areas of good gold grade continuity and thickness on longitudinal section.

The Qualified Person (QP) for the Mineral Resource is Kevin Harris CPG, who is a full-time employee of Endeavour Mining, not independent and is a Qualified Persons in accordance with NI 43-101. Mr. Harris is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, or political issues that would materially affect the Mineral Resource estimates.

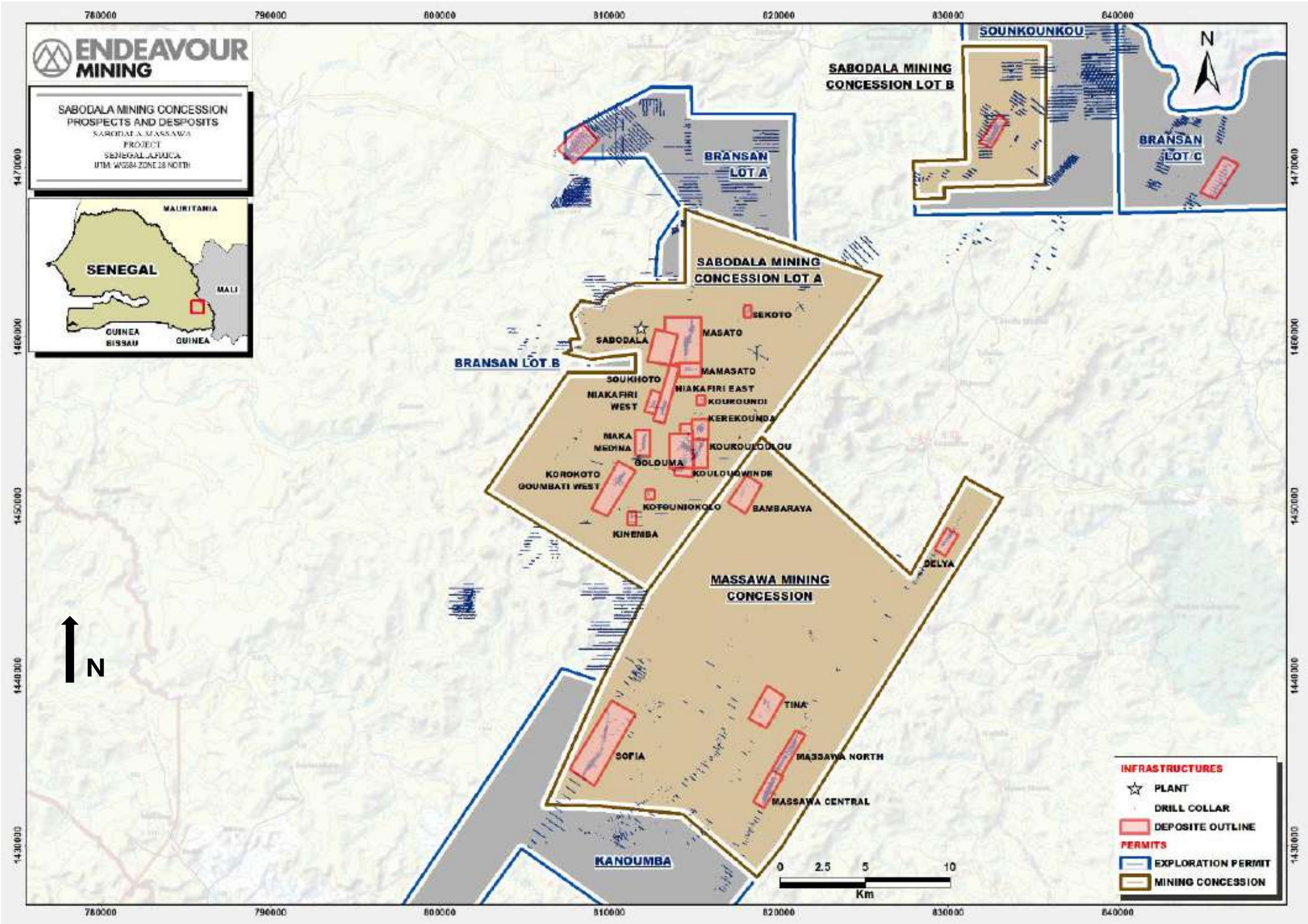
Table 14.1.1 Open Pit and Underground Mineral Resource Summary as of 31 December 2021

Category/Property/Mining Method	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
Measured Resources			
• Sabodala OP	9151	1.57	462
• Sabodala UG	0	0	0
• Massawa OP	1030	3.50	116
• Massawa UG	0	0	0
• Stockpile	11 037	0.91	323
Total Measured Resources	**21 217**	**1.32**	**900**
Indicated Resources			
• Sabodala OP	48 091	1.19	1844
• Sabodala UG	6411	4.09	843
• Massawa OP	34 381	2.98	3290
• Massawa UG	0	0	0
Total Indicated Resources	**88 883**	**2.09**	**5977**
Measured + Indicated Resources			
• Sabodala OP	57 242	1.25	2306
• Sabodala UG	6411	4.09	843
• Massawa OP	35 411	2.99	3406
• Massawa UG	0	0	0
• Stockpile	11 037	0.91	323
Total Measured + Indicated Resources	**110 100**	**1.94**	**6878**
Inferred Resources			
• Sabodala OP	9926	1.09	347
• Sabodala UG	4376	3.46	487
• Massawa OP	7547	2.03	491
• Massawa UG	2411	4.59	356
Total Inferred Resources	**24 260**	**2.16**	**1682**

Notes:

1. CIM definitions were followed for Mineral Resources.
2. Open pit oxide Mineral Resources are estimated at cut-off grades ranging from 0.33 g/t Au to 0.50 g/t Au.
3. Open pit transition and fresh rock Mineral Resources are estimated at cut-off grades ranging from 0.37 g/t Au to 1.09 g/t Au.
4. Underground Mineral Resources are estimated at a cut-off grade of 2.00 g/t Au at Sabodala, and at 2.84 g/t Au at Massawa.
5. High grade assays were capped at grades ranging from 1.5 g/t Au to 340 g/t Au.
6. Mineral Resources are inclusive of Mineral Reserves.
7. Open pit shells were used to constrain open pit resources.
8. Mineral Resources are estimated using a gold price of USD 1500/oz.
9. Sum of individual amounts may not equal due to rounding.

Figure 14.1.1 Location of Deposits with Mineral Resources



Source: Endeavour, March 2022.

14.2 Resource Database

For each deposit, a sub-set of the aster drill hole database was created including tables for: collar coordinates, downhole azimuth and dip direction, lithology, alteration, structure, weathering, vein descriptions, assays and density data. Table 14.2.1 summarises the total drilling in individual resource databases by drill hole type. The effective dates for the individual deposit databases range from 2010 to 2021.

The majority of the block models used diamond drill core and reverse circulation drill samples to estimate block grades. For Massawa NZ, Sofia, Delya, Tina and Bambaraya, trench data was also included and used for resource estimation.

Table 14.2.1 Mineral Resource Databases by Deposit and Hole Type

Deposit	Date of Database	RC		RC-DDH		DDH		Total	
		Holes (No.)	Metres	Holes (No.)	Metres	Holes (No.)	Metres	Holes (No.)	Metres
Sabodala	30 Apr 2013	658	66 401	579	170 900	191	42 997	1428	280 298
Gora	21 Jul 2012	75	8844	149	27 719	35	3685	259	40 248
Niakafiri East	19 Apr 2017	195	19 755	69	14 568	150	24 286	414	58 609
Masato	6 Nov 2014	355	49 607	19	5614	214	42 674	588	97 895
Golouma	16 Sept 2013	239	39 274	13	4897	354	87 463	606	131 634
Kerekounda	16 Sept 2013	105	18 746	-	-	89	25 786	194	44 532
Niakafiri West	28 Apr 2017	80	10 727	5	1933	64	8135	149	20 795
Soukhoto	Jun-10	8	834	1	221	4	532	13	1587
Diadiako	31 Dec 2011	32	4624	5	1564	9	1973	46	8161
Kinemba	17 Apr 2012	25	4141	-	-	8	1536	33	5677
Goumbati West - Kobokoto	27 Mar 2017	52	7272	5	571	211	21 773	268	29 616
Golouma North	17 Aug 2016	-	-	-	-	66	8045	66	8 045
Kouroulouolou	17 Apr, 2012	51	7442	13	3767	108	16 989	172	28 198
Kouroundi	17 Apr 2012	-	-	-	-	14	2005	14	2005
Koutouniokollo	17 Apr 2012	9	1255	-	-	28	4423	37	5678
Maki Medina	5 Aug 2015	73	9665	-	-	75	10 507	148	20 172
Mamasato	17 Apr 2012	8	1446	-	-	42	7587	50	9033
Marougou	9 Jul 2016	61	12191	-	-	19	2202	80	14393
Sekoto	17 Apr 2012	14	1761	-	-	12	1303	26	3064
Massawa NZ	1 May 2021	626	44 734	-	-	294	63 702	920	108 436
Massawa CZ	1 May 2021	2281	207 111	1	272	285	56 570	2567	263 953
Sofia	30 Sept 2021	1611	93 572	-	-	132	20 647	1743	114 219
Delya	1 May 2021	144	12 812	-	-	18	1927	162	14 739
Tina	30 Nov 2021	100	9 159	-	-	59	11 591	159	20 750
Bambaraya	30 Nov 2010	7	888	-	-	10	1941	17	2 829
Samina	31 Dec 2021	177	20 328			59	9012	236	29 340
Total		**6986**	**652 589**	**859**	**232 026**	**2550**	**479 291**	**10 395**	**1 363 906**

14.3 Bulk Density Measurements

Bulk density values were measured by applying the Archimedean principles (density = weight (in air) ÷ (weight (in air) – weight (in water)) for drill core and a weight by measured volume for surface samples. Porous or absorbent samples are coated with wax after obtaining an initial weight in air, then immersed in water and weighed again.

All results are grouped by weathering profile and lithology. The density measurement procedure differed slightly for saprolite, transition, and fresh material:

- Saprolitic density measurements were primarily obtained from trenches, although some drill hole core was used. For trench samples, cubes of approximately 25 cm x 25 cm x 25 cm were excavated and the in-situ weight measured to estimate the moisture content. The sample is then dried out and wrapped in a waterproof membrane.

- Fresh and transition density measurements were primarily obtained from drill core. The procedure followed involved the selection of 10 cm to 15 cm pieces using the water immersion method, taken at an approximate 10 m minimum spacing.

Data distributions were checked to remove both lower and upper outliers before the mean density value was calculated for each lithology split into weathering groups (densities for deposits located on the Massawa properties were assigned by deposit, lithology, and weathering layer (Table 14.3.1)).

Density values are hard coded into all block models based on the lithology and weathering. Where density data does not exist for the satellite deposits, the density from the nearest deposit on the same shear zone with the same weathering and lithology combination was applied.

The number of bulk density determinations are listed by deposit in Table 14.3.1. Averaged bulk densities applied to the Sabodala resource models are presented in Table 14.9.1 and Table 14.9.2. Averaged bulk densities applied to the Massawa resource models are presented in Table 14.9.3.

Table 14.3.1 Bulk Density Tests

Deposit	Number of Bulk Density Tests
Golouma/Golouma North	4759
Gora	1469
Goumbati West - Kobokoto	1560
Kerekounda	1596
Kinemba	126
Kourouloulou	1117
Kouroundi	305
Koutouniokollo	233
Maki Medina	788
Mamasato	645
Masato	3326
Niakafiri East/Niakafiri West	9853
Sabodala	38 761
Sekoto	138
Soukhoto	32
Sofia	2665
Massawa CZ	4310
Massawa NZ	4293
Delya	1252
Tina	789
Bambaraya	0
Samina	332

14.4 Geological and Mineralisation Models

Mineralisation wireframes were interpreted and generated in either Vulcan, Surpac, Leapfrog, or Micromine. The geological models, including the mineralisation wireframes, were generated by Endeavour, Teranga, Barrick/Randgold, or RPA. In many cases, the wireframes extended five metres above the topography surface to ensure capture of at- or near-surface samples with small topographic survey inconsistencies. All interpretations were either built by or reviewed and adopted by the relevant QP.

14.4.1 Sabodala

Lithology models were generated for the basalt, mylonite, east volcaniclastic, gabbro, ultramafic and west volcaniclastic units. An oxidation surface was constructed from points representing the base of the weathered rock profile in each drill hole. Oxide and 'fresh' (unoxidised) rock solids were generated. Twenty-four mineralisation zones were interpreted and modelled based on lithology, alteration, structure, a minimum two metre true width and a 0.2 g/t Au threshold grade (Figure 14.4.1).

The structural study undertaken by Panterra Geoservices (Rhys, 2009) indicates that the Main Flat Zone (MFZ) is the dominant mineralisation-controlling structure based on field and core observations and is associated with quartz veining, intense brecciation, shearing and carbonate-albite-pyrite-sericite alteration.

The Upper Flat Zones (UF) splay off steeper trending structures (NWS and the original East Thrust zone) with variable widths and primarily located above the MFZ in the hangingwall volcaniclastics and footwall mafic basalts. UF mineralisation is not as continuous from hole to hole as in the MFZ. These exhibit a general shallow trend similar to the MFZ and are associated with variable carbonate-albite-siliceous alteration.

The Ultramafic Flat Zone (UM Flat) is located above the MFZ primarily in the ultramafic unit, trending parallel to the MFZ and UF Zones, and is associated with quartz veining and variable carbonate-albite alteration.

The Footwall Flat Zone (FW Flat) splays off the eastern footwall of the MFZ. This zone has similar alteration and structural characteristics to the MFZ but follows a southeast-northwest trend with a shallow dip to the northeast. A 10 m wide steeply dipping barren mafic dyke trends 10° to the northeast and crosscuts the FW Flat zone.

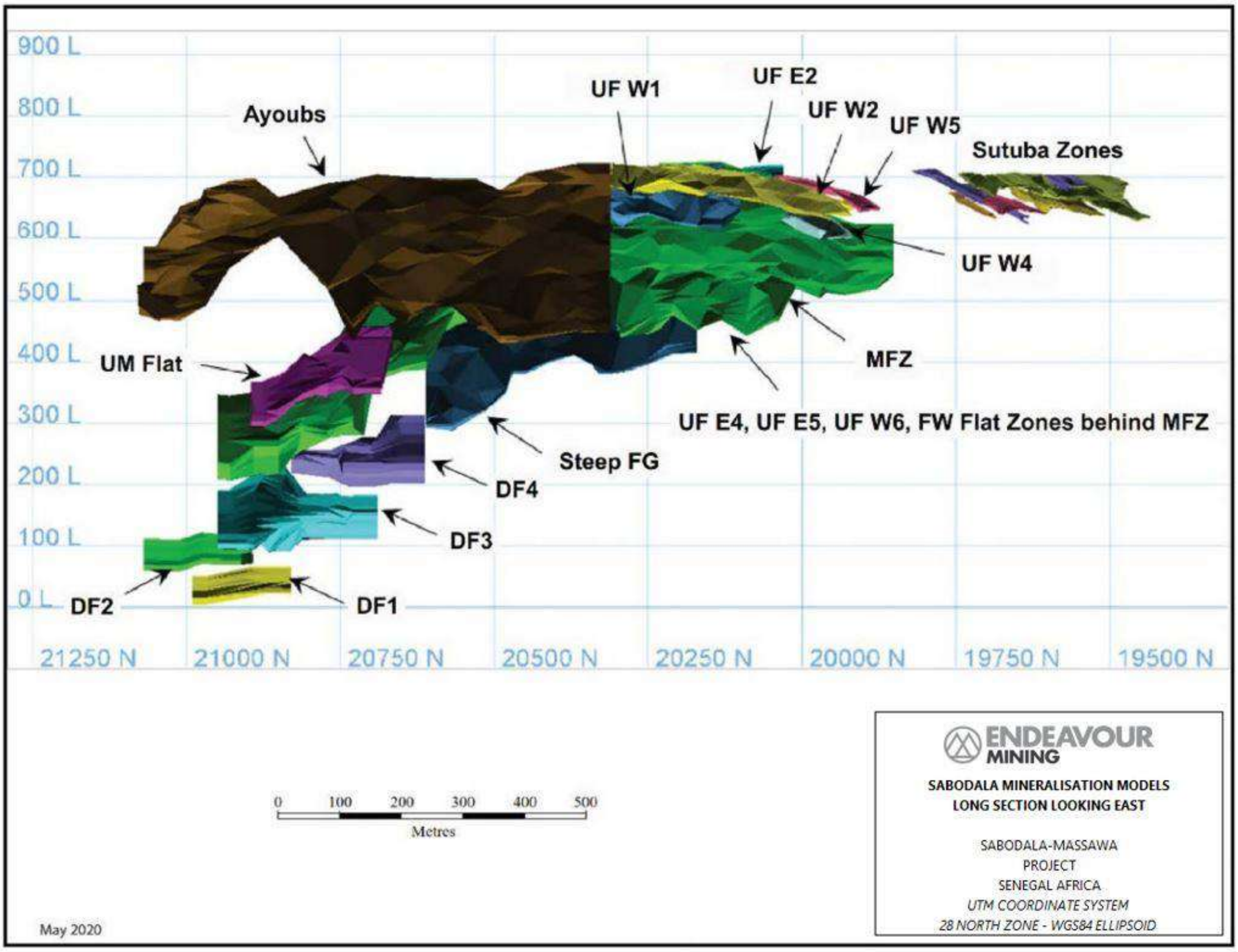
The Steep FG Zone corresponds to the steep-dipping portion of the mylonite at depth and includes high gold grades associated with variable shearing at the contacts. The steep Ayoub Thrust Zone generally aligns parallel to the gabbro/mafic volcanic contact and includes quartz veining with weak carbonate-albite alteration.

Four Deep Flat Zones (DF) were modelled at depth. These are associated with flat breccia zones with associated albite and siliceous alteration, and narrow felsic intrusions.

Six Sutuba zones were modelled as northwest trending shallow southwest dipping narrow structures, as interpreted from drill hole logs and field observation. These follow similar trends as the Upper Flat zones but are located further south and away from other identified steep structures.

A global mineralisation envelope (EDA) was generated that includes all mineralisation domains as well as mineralisation located in closely-spaced and widely-spaced holes that have not been domained. Mineralisation inside the EDA but located outside of other modelled domains has been treated as a separate domain with a unique composite and domain flag.

Figure 14.4.1 Sabodala Mineralisation Models – Long Section Looking East

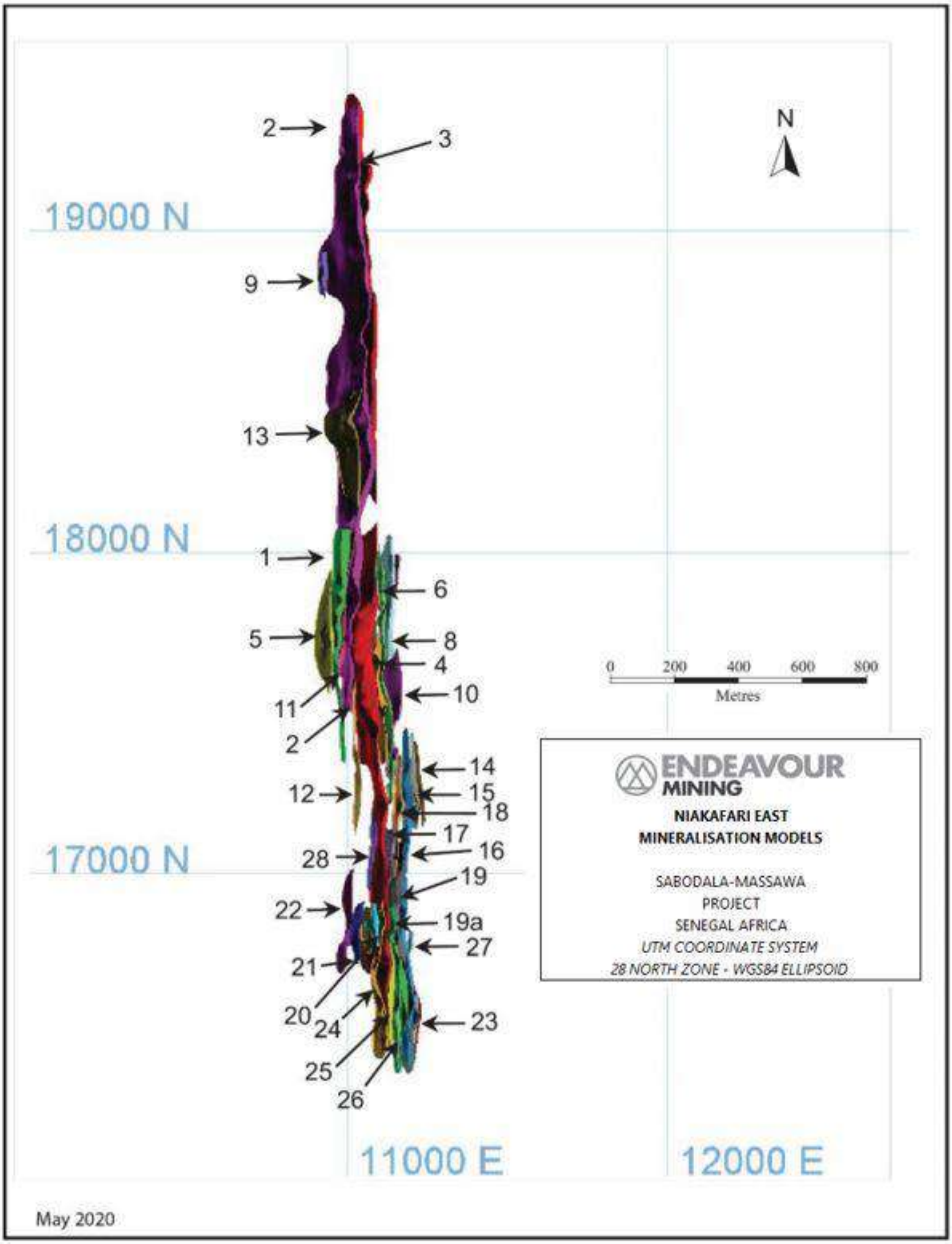


Source: Teranga, May 2020.

14.4.2 Niakafiri East and Niakafiri West

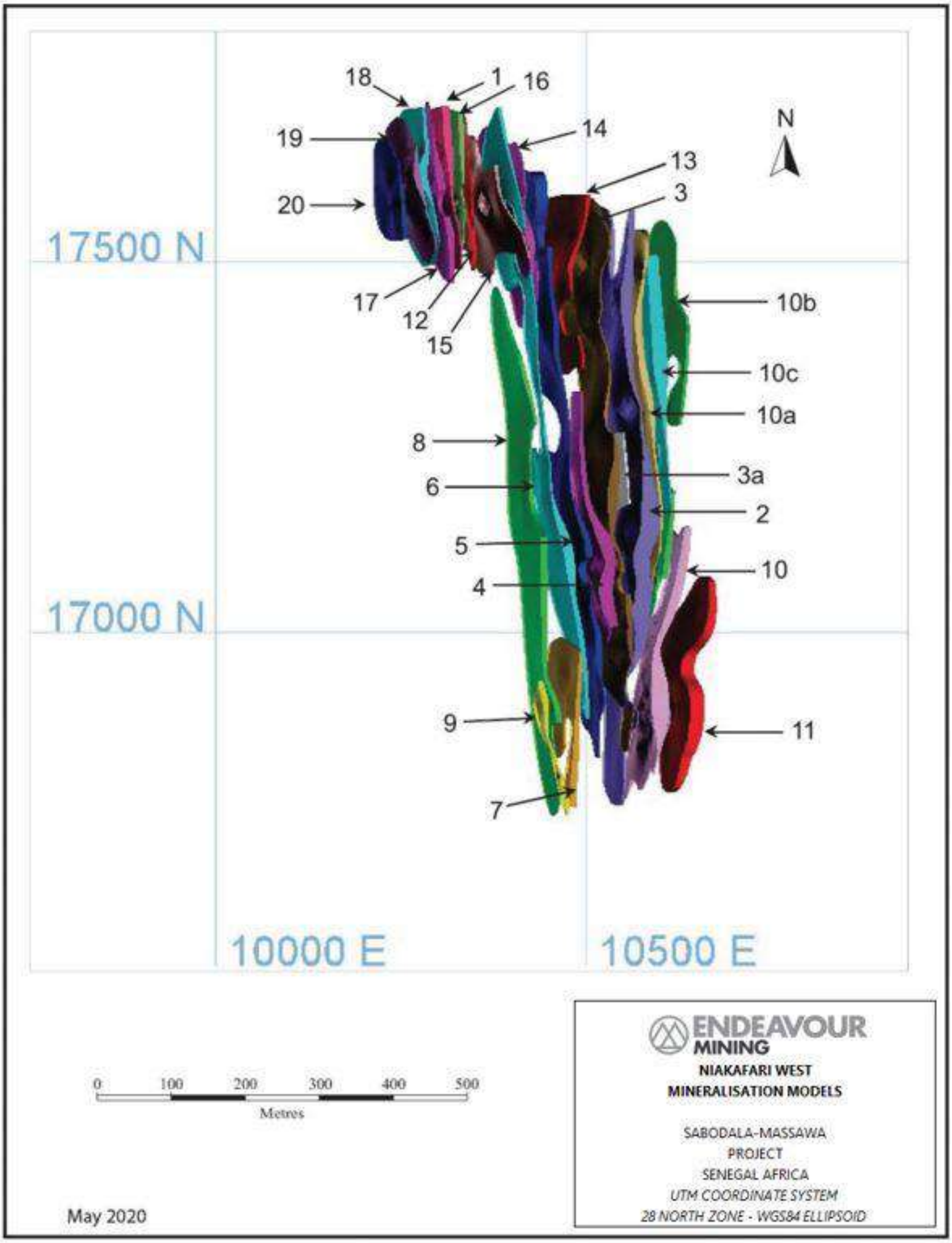
A topographic surface was generated based on drill hole collars. The oxide horizon was segregated into saprolite and transition zones based on core photos, drill hole logs and density determinations. A total of 28 wireframes were modelled at Niakafiri East and twenty-four wireframes at Niakafiri West in Leapfrog at a 0.2 g/t Au threshold grade. All wireframes were modelled as steeply dipping zones that trend northeast-southwest and range in thickness between two metres and 65 m. Wireframe models extend from surface to a maximum of 390 m vertically and up to three kilometres along strike. Niakafiri East mineralisation model is presented in Figure 14.4.2 and Niakafiri West in Figure 14.4.3.

Figure 14.4.2 Niakafiri East Mineralisation Model



Source: Teranga, May 2020.

Figure 14.4.3 Niakafiri West Mineralisation Model



Source: Teranga, May 2020.

14.4.3 Masato

A topographic surface was generated by combining a digital terrain model (DTM) generated from satellite stereo pair images covering the eastern portion of the deposit, and a surface generated from drill hole collar elevations covering the western portion. An oxidation surface was modelled based on logged lithological data representing the base of the weathered rock profile.

Seventeen mineralisation models were generated in Leapfrog Geo following local lithological, alteration and structural trends logged from drill holes using a minimum two metre true width and a 0.2 g/t Au threshold grade. Masato mineralisation solids are illustrated in Figure 14.4.4.

14.4.4 Golouma

The Golouma topographic surface was generated using satellite stereo pair images revised locally to correspond with the surveyed drill hole collar elevations. The oxidation surface was modelled based on logged lithological data representing the base of the weathered rock profile.

Mafic dykes intersect Golouma West and Golouma Northwest mineralisation and were modelled based on logged lithology and magnetic data in Leapfrog Geo. Six felsic dykes intersect Golouma South mineralisation and were modelled based on logged lithological data.

Twenty-four mineralisation models were generated at a 0.2 g/t Au threshold grade across a minimum true width of two metres following logged geology and structural data. Mineralisation models were clipped to the crosscutting dykes with the unmineralised intersecting volumes removed from the final mineralisation wireframes. Mineralisation models are illustrated in Figure 14.4.5.

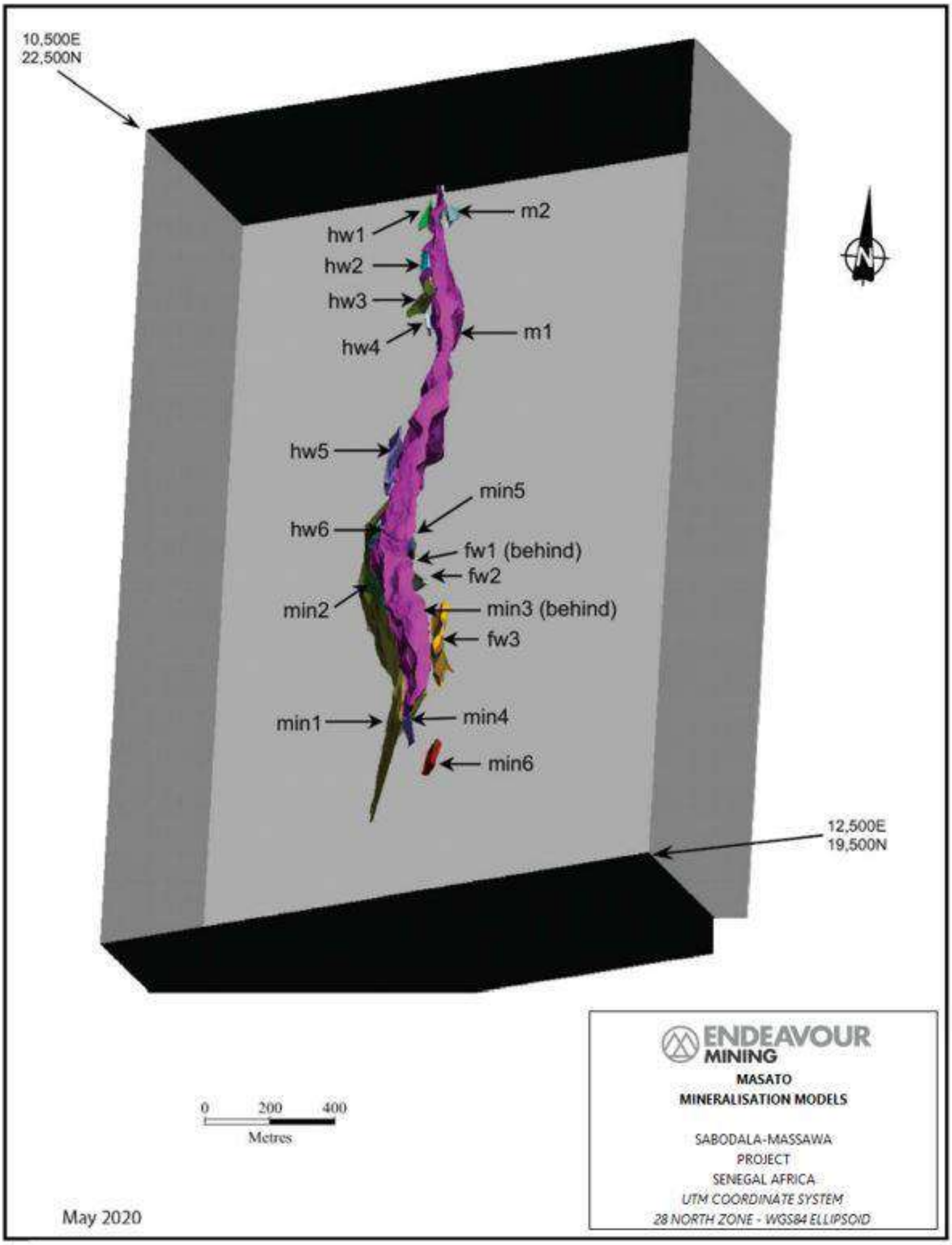
14.4.5 Maki Medina

Maki Medina topographic and oxide surfaces and mineralisation models were revised in Vulcan to incorporate additional drill data collected in 2015. The oxide model was segregated into three distinct weathering domains (laterite, saprolite and transition) based on core photos, drill hole logs, and density determinations.

An intermediate dyke and gabbro domain were modelled separately as they appear to control the location of mineralisation.

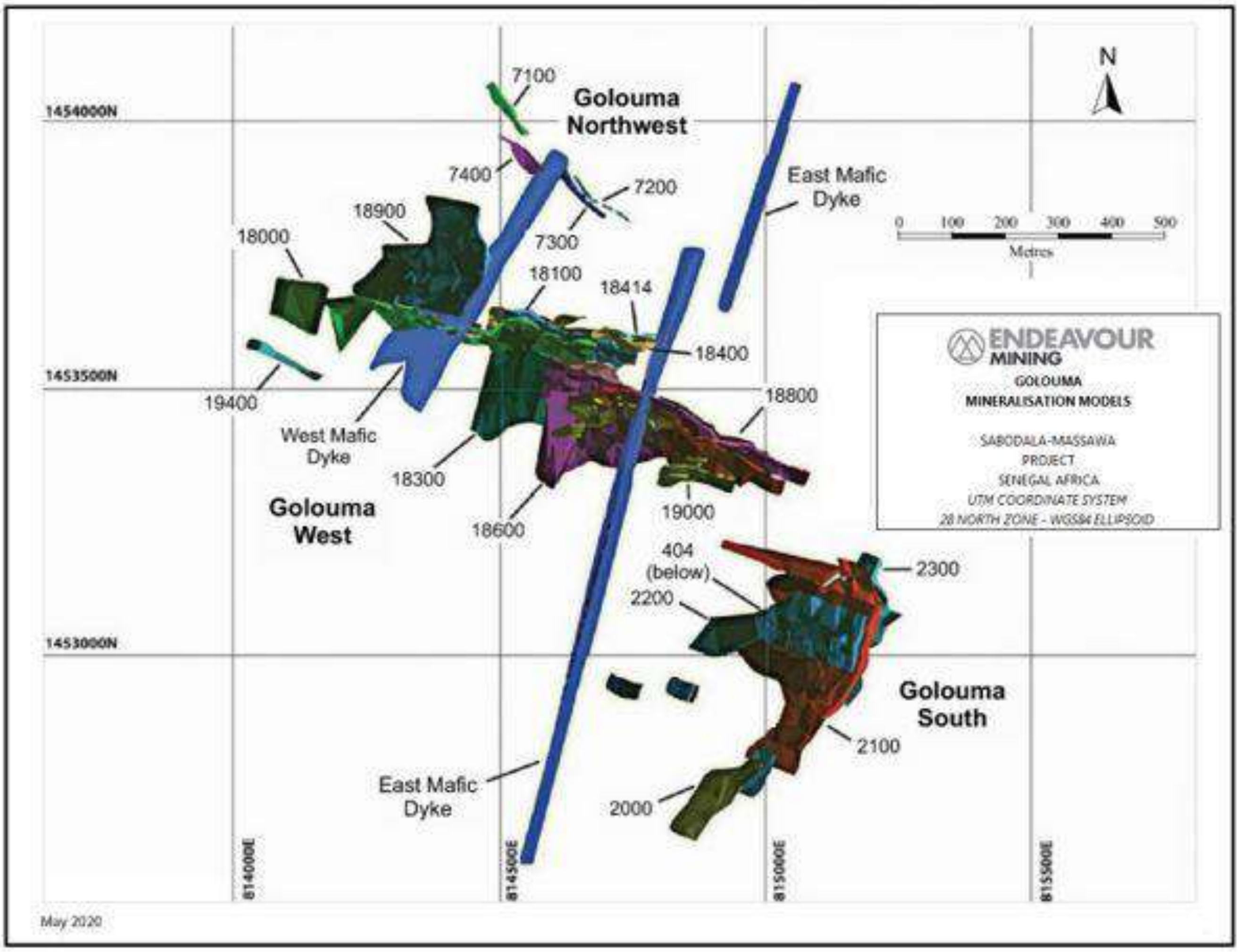
Fifteen mineralisation models were generated following local lithological, alteration and structural trends logged from drill holes using a minimum two metre true width and a 0.2 g/t Au threshold grade. Maki Medina mineralisaton models are illustrated in Figure 14.4.6.

Figure 14.4.4 Masato Mineralisation Model



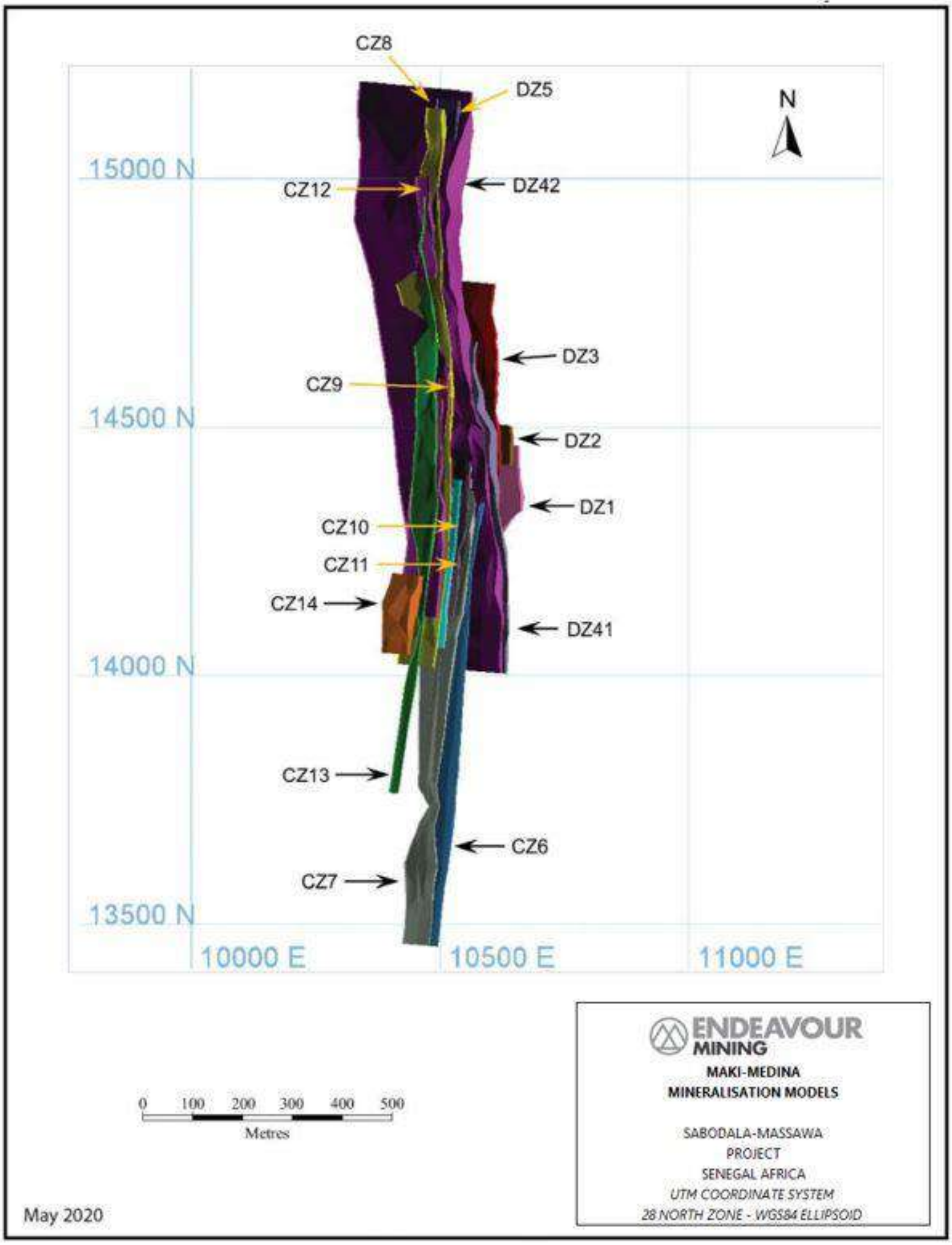
Source: Teranga, May 2020.

Figure 14.4.5 Golouma Mineralisation Model



Source: Teranga, May 2020.

Figure 14.4.6 Maki Medina Mineralisation Model



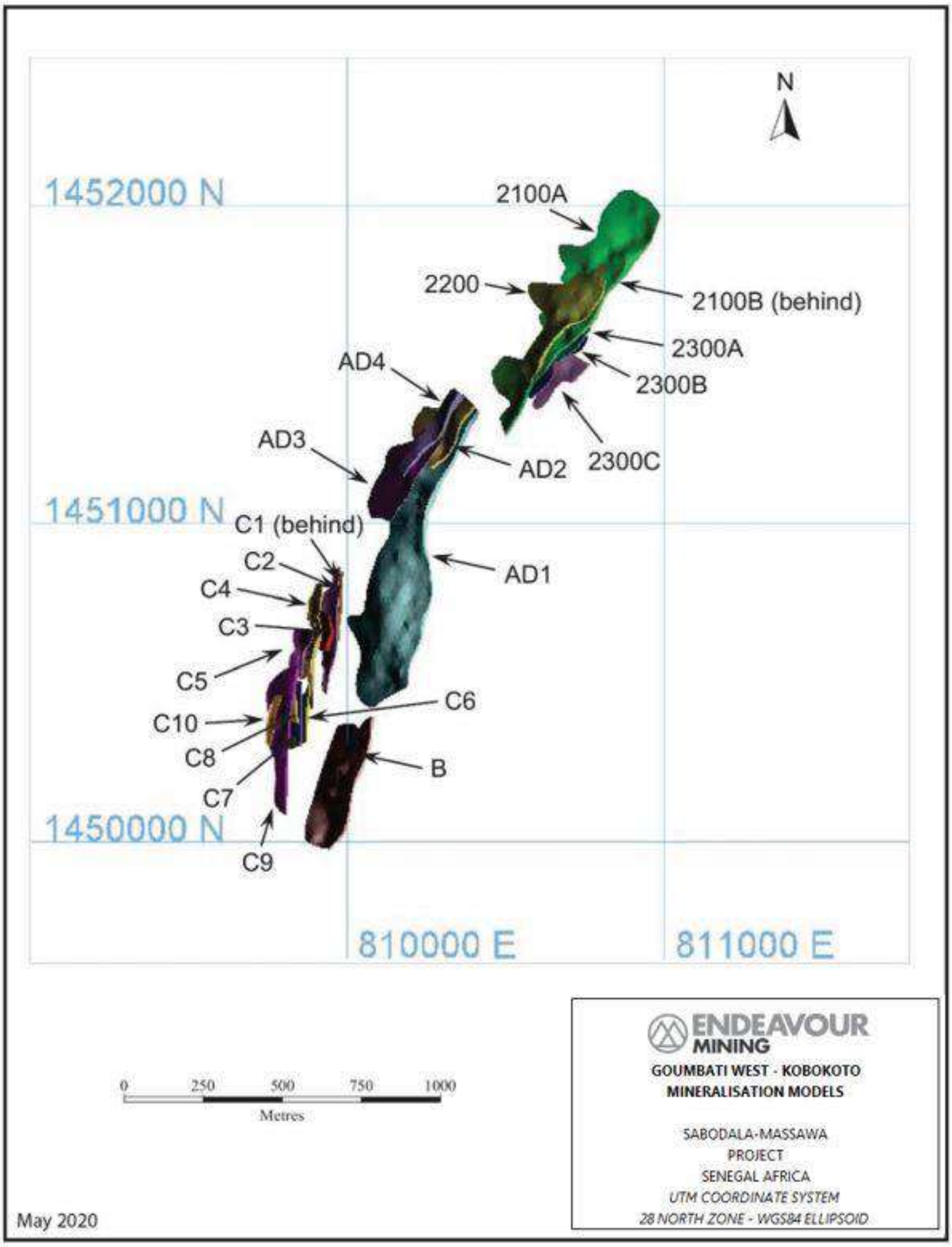
Source: Teranga, May 2020.

14.4.6 Goumbati West - Kobokoto

A topographic surface based on drill hole collars was generated over the combined Goumbati West and Kobokoto deposits using Leapfrog. The oxide horizon was segregated into two distinct weathering domains (saprolite and transition) based on core photos, drill hole logs and density determinations.

Infill drilling confirmed the continuity of mineralisation between deposits along a north-northeast to south-southwest trend. Twenty-one steeply dipping mineralisation wireframes were generated at a 0.2 g/t Au threshold grade and a minimum two metre true width in Figure 14.4.7. Three EDA envelopes were also modelled. Wireframe models extend from surface to a maximum of 180 m vertically and up to 1.5 km along strike.

Figure 14.4.7 Goumbati West - Kobokoto Mineralisation Model

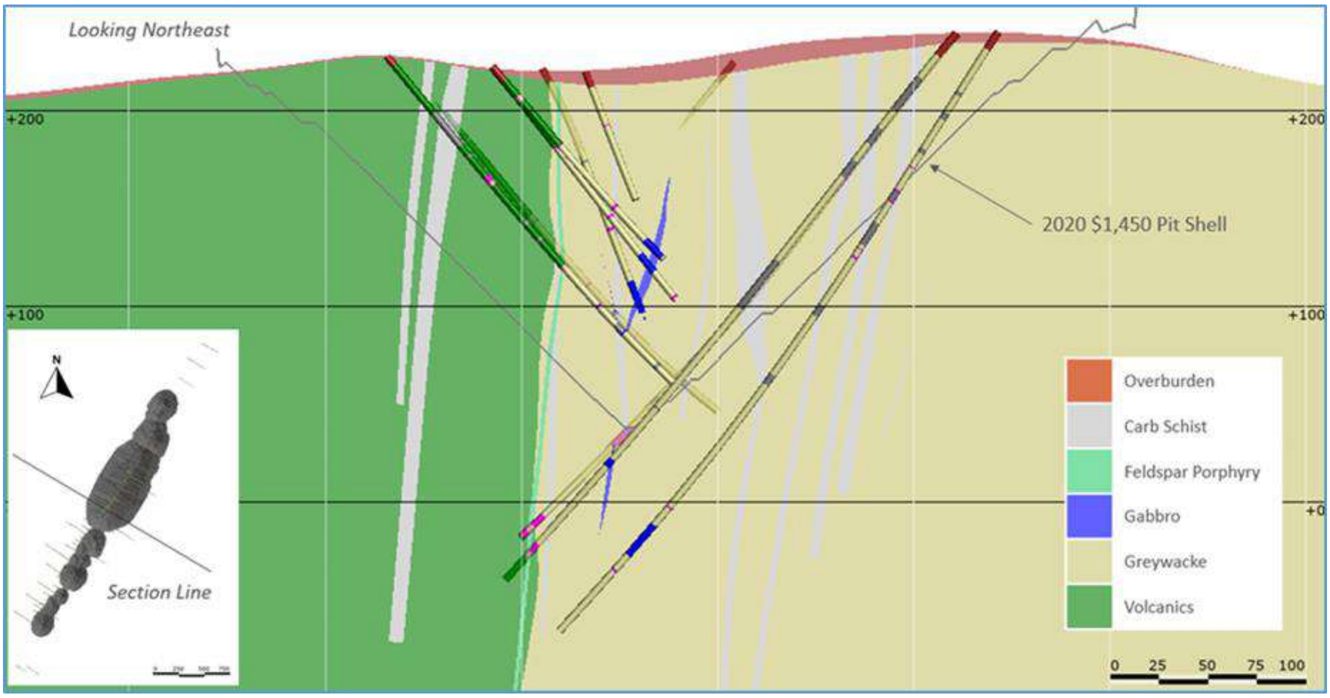


Source: Teranga, May 2020.

14.4.7 Massawa Northern Zone

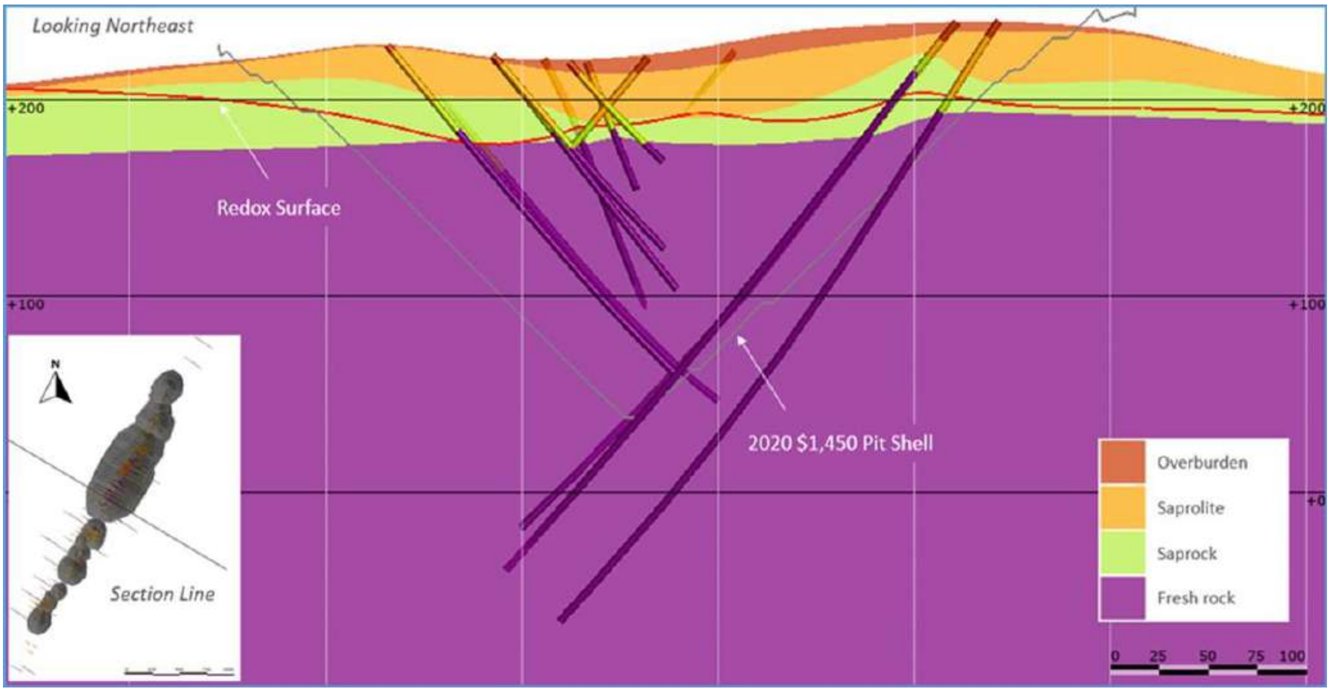
Wireframe solids and surfaces representing lithology, weathering and oxidation (redox) were constructed from logged data in Leapfrog Geo software in Figure 14.4.8 and Figure 14.4.9. Volcanic rocks, greywacke, gabbro, feldspar porphyry, carbonaceous schist and overburden were all modelled.

Figure 14.4.8 Cross Section at Massawa North Zone Showing Lithology Wireframes



Source: Endeavour, March 2022.

Figure 14.4.9 Cross Section at Massawa North Zone Showing Weathering and Redox Model



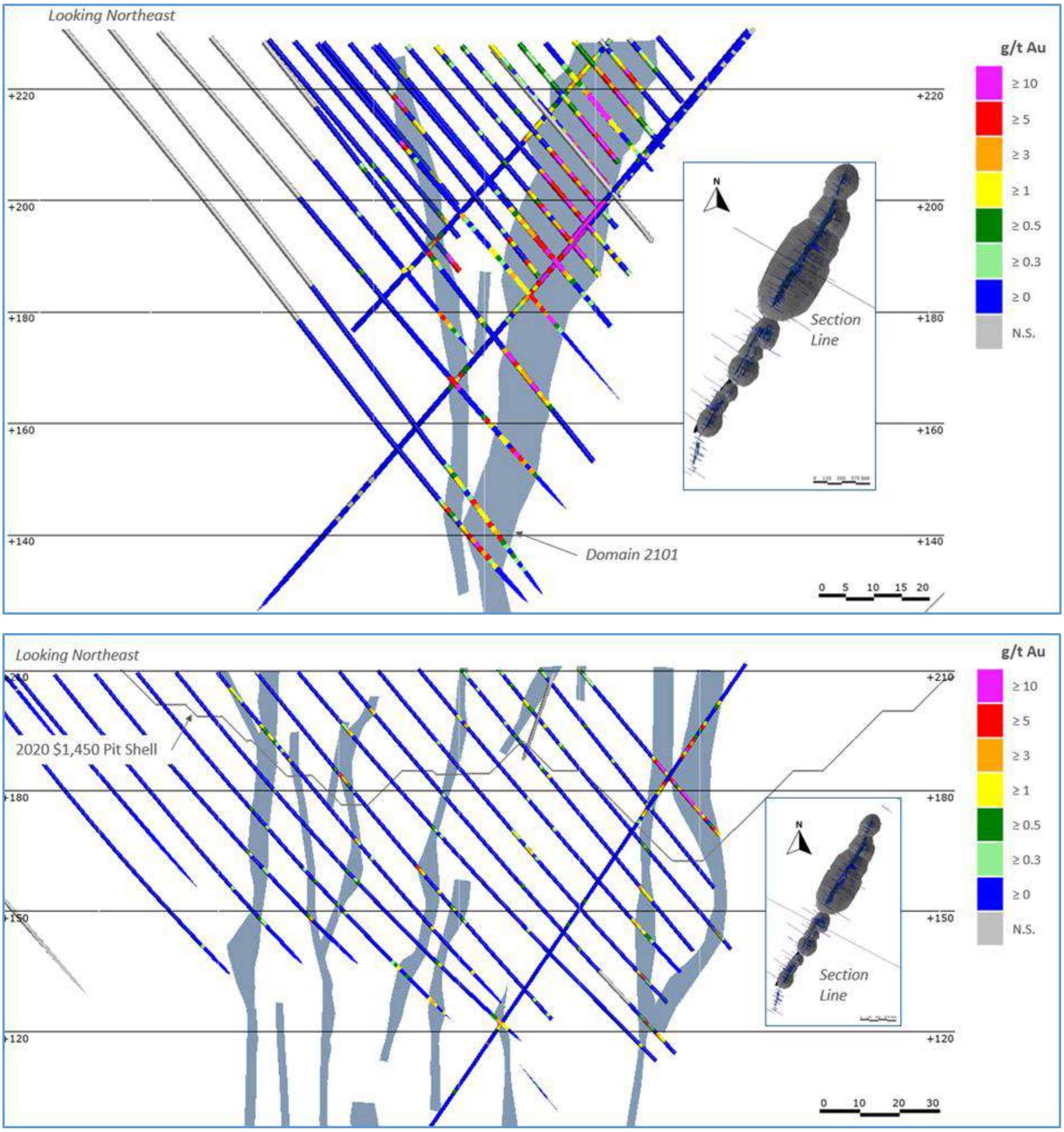
Source: Endeavour, March 2022.

Mineralisation wireframes were constructed using a nominal threshold grade of 0.3 g/t Au and a minimum true thickness of two metres, incorporating low grade material where necessary to maintain geometric continuity. Mineralisation was extended beyond drilling to a distance equal to the smallest of one half the local drill hole spacing or one half the distance to a barren drill hole.

Mineralisation was observed to follow the gabbro unit, and where proximal to gabbro contacts, the relationship was honoured. Within the northern and central areas of Massawa NZ, veins were modelled as steeply dipping and striking northeast. A new series of domains modelled between the Massawa CZ, referred to as the Massawa CZ Connector, trend northward.

A total of 50 domains were modelled across the Massawa NZ, grouped into the northern (15), central (30) and Massawa CZ Connector (5) groups. Mineralisation domains are modelled along strike over a distance from 100 m to 1,450 m and down dip over a distance from 100 m to 600 m, ranging in thickness from two metres to 20 m. Domain 2101 is by far the largest of the mineralisation currently modelled at Massawa NZ in Figure 14.4.10.

Figure 14.4.10 Example Cross Sections at Massawa North Zone Showing Mineralisation Wireframes



Source: Endeavour, March 2022.

14.4.8 Massawa Central Zone

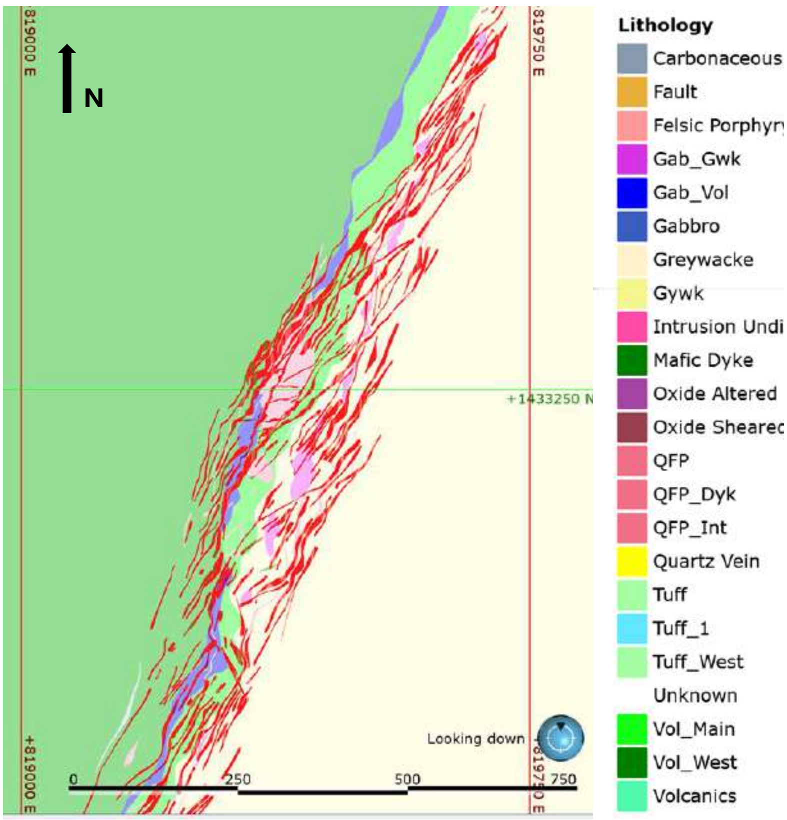
Massawa CZ is a belt of altered rock interpreted to include 172, northeast trending, sub-vertical to moderately dipping mineralised lenses in Figure 14.4.11, modelled in Leapfrog Geo. Wireframes were mostly snapped to the assay intervals. In low grade areas, holes were included in the wireframe models to preserve the geometric continuity of the zone but the wireframes in these areas may or may not have been snapped to the assay intervals.

Surfaces representing the hanging wall and footwall of the zones were generated as input to the dynamic anisotropic grade interpolation.

Individual lenses range from two metres to 25 m thick but are more commonly between five metres and 10 m thick. Visual correlations indicated that a suitable geologically-related threshold grade was approximately 0.5 g/t Au for the low-grade Massawa CZ resource wireframes. Overall, the deposit is 1,965 m long and is modelled to a depth of 100 m to 300 m below current topography dependant on drill hole support. Individual domains range in strike length from 50 m to 750 m, but a strike length of 200 m to 400 m is more common.

The previous interpretation (Teranga, 2020) modelled 17 broad mineralised corridors and relied on the grade interpolation parameters, dynamic anisotropy and restricted search strategies to manage the grade estimates. Given the nature of the mineralisation and closely spaced drill data, the 2020 approach was suitable for estimating gold; however, the focus of the current study is to investigate feasibility of a BIOX® plant which requires the estimation of sulphide sulphur, arsenic, antimony and degree of weathering. Since the spacing of the analytical results for the other elements is wider spaced than available for gold, a more robust and comprehensive geological model was required to better understand the spatial distribution of the different types of mineralisation and ultimately permit the grade interpolation of those other elements.

Figure 14.4.11 Massawa CZ Mineralisation Model



Source: Endeavour, March 2022.

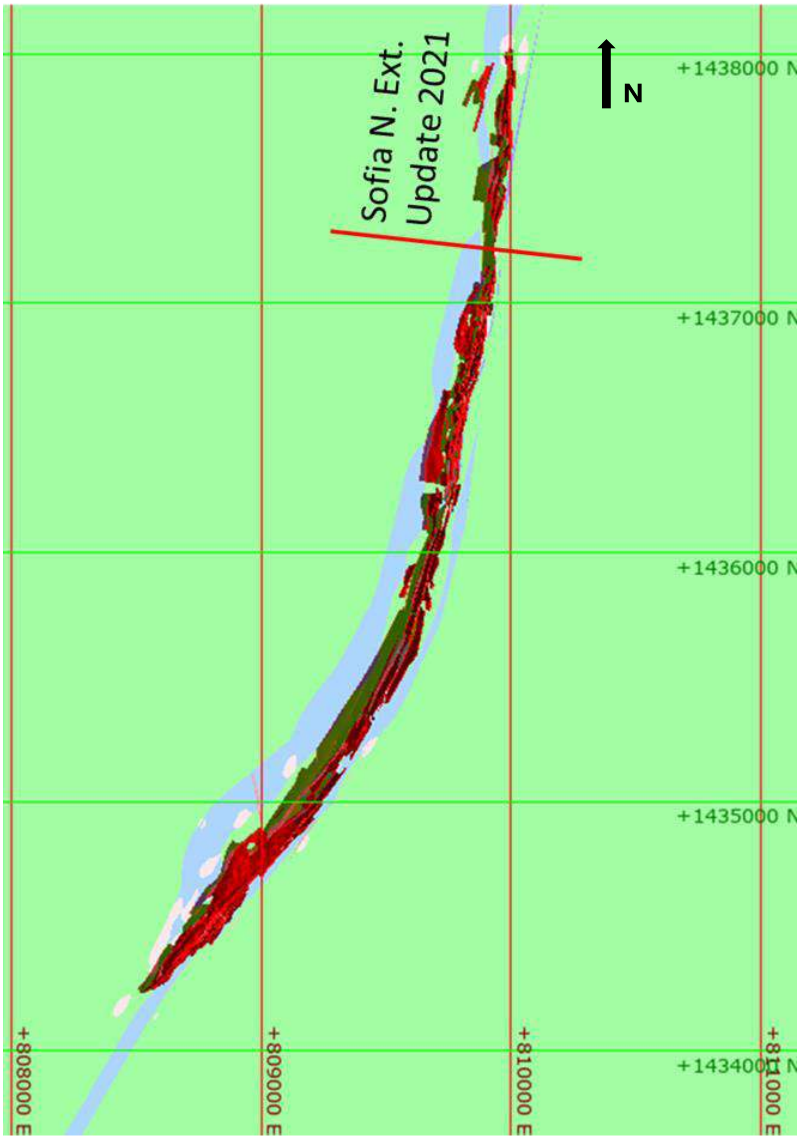
14.4.9 Sofia

Sofia mineralisation is hosted in structurally controlled shear zone within a variety of host rocks including quartz diorite, granodiorite, gabbro and volcanics in Figure 14.4.12 and Figure 14.4.13. Sofia Main strikes 040° whereas Sofia North strikes at 012°. Both segments of Sofia dip moderately (65°) to the northwest. Several small footwall zones dip shallow to the northwest. Infill drilling in 2020 confirmed mineralisation in the gap between Sofia Main and Sofia North which are now modelled as a four kilometres long continuous series of mineralised lenses forming an arcuate-shape. The Sofia North Extension area in Figure 14.4.14 was updated due to new drilling in 2021.

Sectional interpretation in Leapfrog Geo confirm that a suitable geological threshold grade is approximately 0.5 g/t Au for the Sofia resource wireframes. During interpretation, efforts were made to minimise the amount of low grade material included within each of the mineralised lode wireframes.

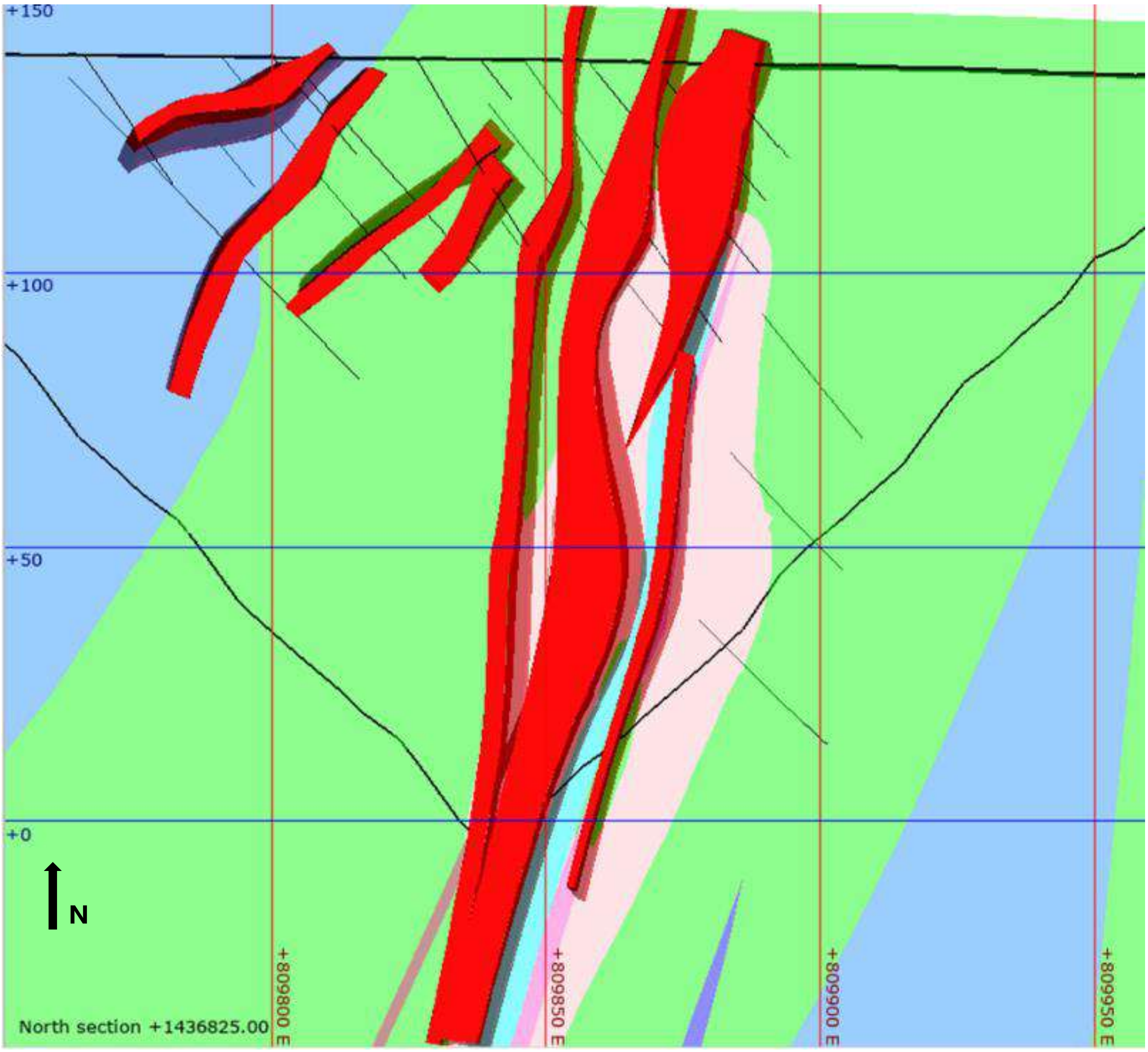
The mineralised envelope contacts at Sofia are well defined by a strong correlation between grade and alteration, meaning that the mineralisation intersections can be defined by both the geological logging as well as the gold assay values.

Figure 14.4.12 Level Plan of the Sofia Mineralisation Model



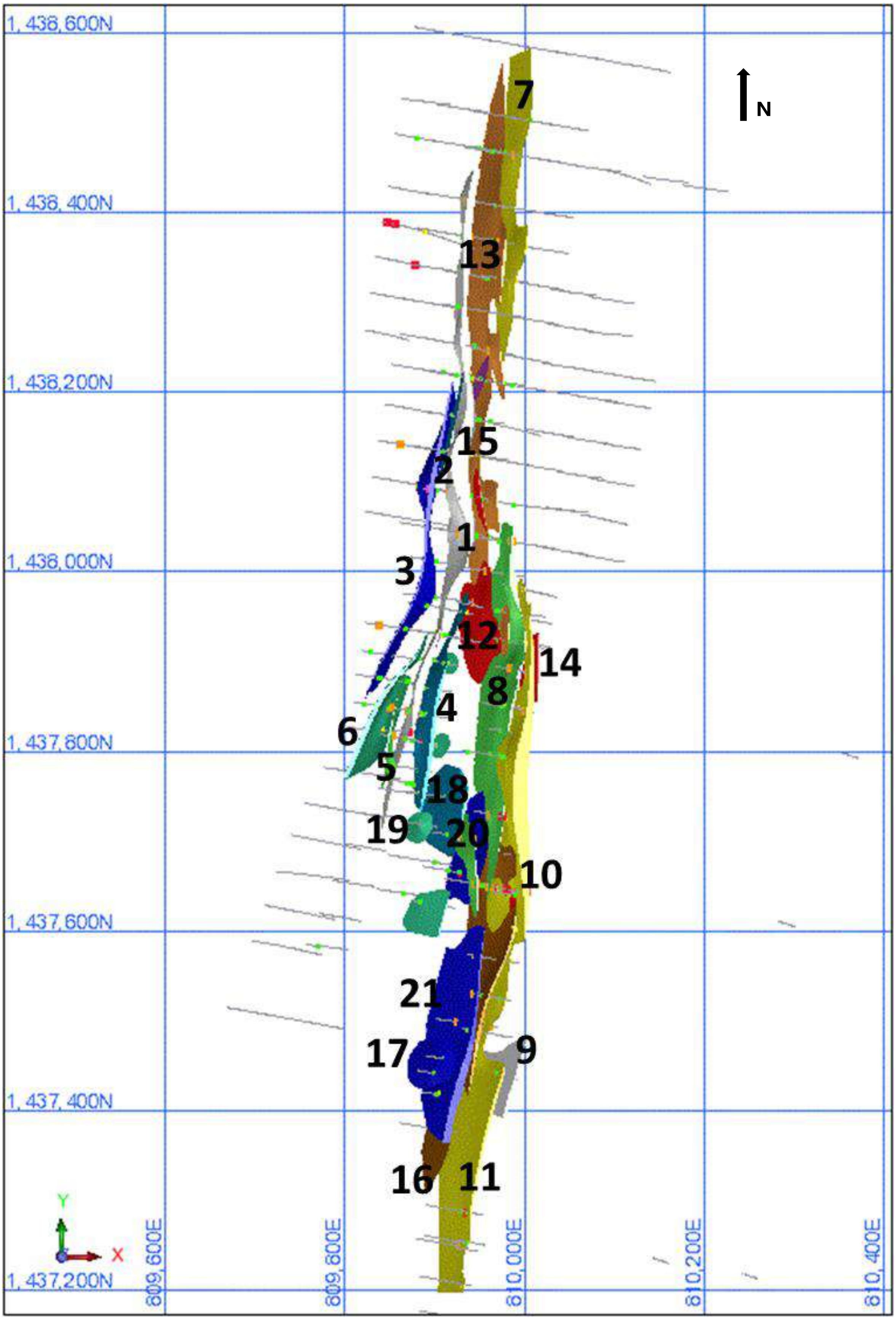
Source: Endeavour, March 2022.

Figure 14.4.13 Example Vertical Cross Section of the Sofia Mineralisation Model



Source: Endeavour, March 2022.

Figure 14.4.14 Level Plan of the Sofia North Extension Mineralisation Model



Source: Endeavour, March 2022.

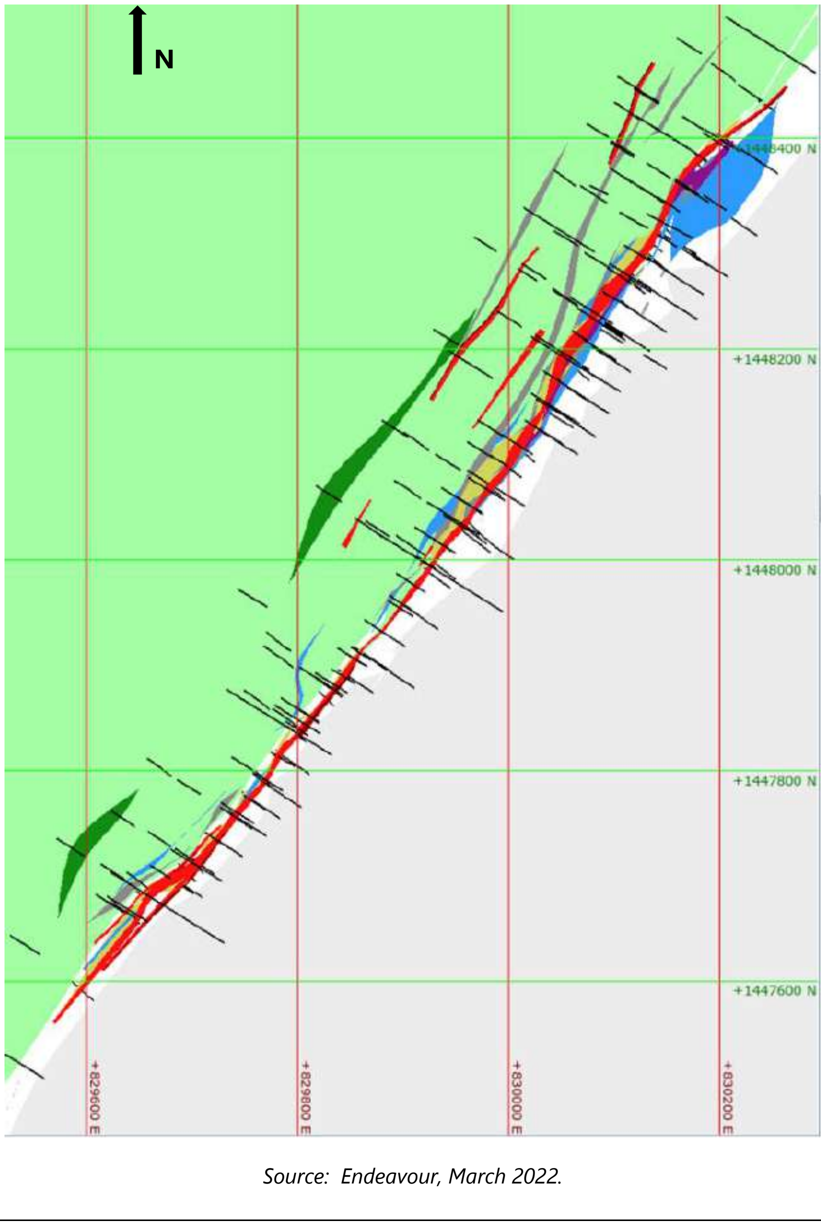
14.4.10 Delya

Delya is located along the MTZ and is defined by several steeply dipping, parallel zones of mineralisation, striking 038°, hosted primarily within the lower margins of a series of gabbros within a highly sheared and silicified sericitized schist. The mineralised zones are defined by an alteration assemblage of sericite-silica-carbonate and chlorite with fine disseminated pyrite and arsenopyrite. This altered unit contains grades up to 5 g/t Au and dips to the southeast at 85°. The other lodes are located to the west and have an average dip of 70° to the northwest in Figure 14.4.15.

Mineralisation wireframes were updated in 2021 and follow historic naming conventions: Main Zone 1 to 4 (MOZ_1 to 4) and Hanging Wall Zones 1 and 2 (HWOZ_1, HWOZ_2) in Leapfrog Geo.

Sectional interpretation correlations confirm that a suitable threshold grade was approximately 0.5 g/t Au for the Delya resource wireframes. A minimum downhole thickness of three meters was applied. During interpretation, efforts were made to minimise the amount of low grade material included within each of the mineralised lode wireframes. The wireframes were checked against the hardcopy hand-drawn sections and clipped to the 10 m resolution topographic surface generated from the DGPS points.

Figure 14.4.15 Delya Mineralisation Model



Source: Endeavour, March 2022.

14.4.11 Bambaraya

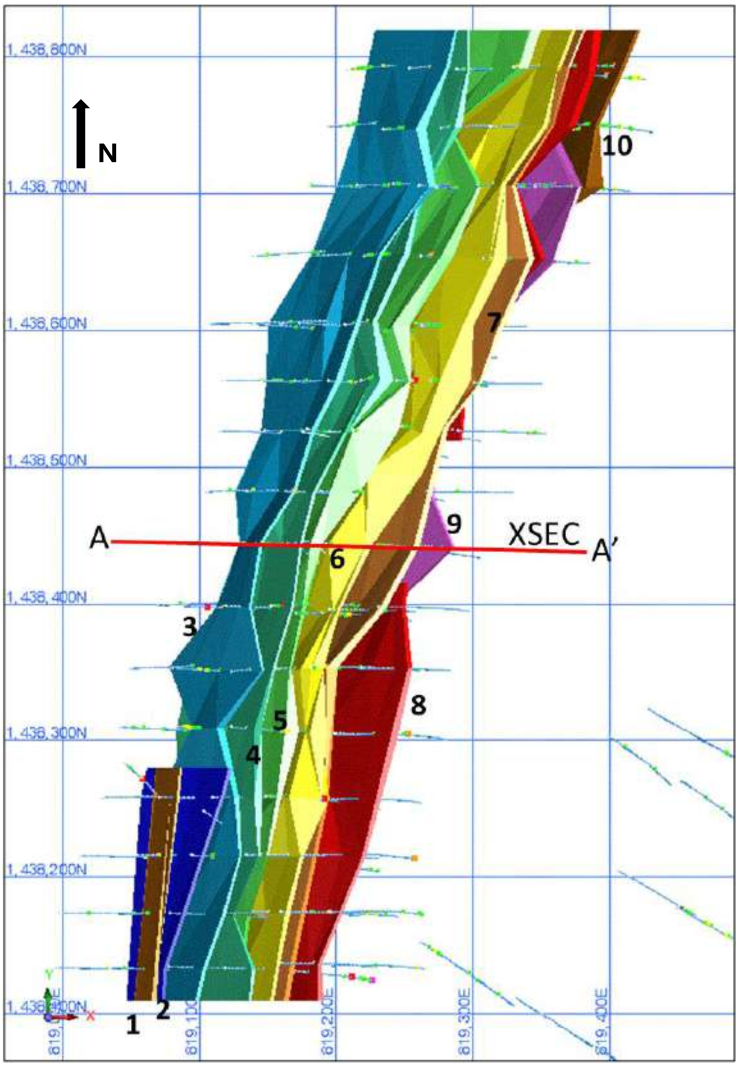
The Bambaraya deposit was interpreted on vertical cross sections from logged data using a combination of grade, alteration and sulphide observations. The distance between the sections is dependent upon the data spacing, typically 50 m to 100 m. Where a mineralised zone terminates, the wireframe is projected along strike by 50% of the drill spacing up to a maximum of 25 m.

14.4.12 Tina

The main gold mineralisation system is centred on a deformed granodiorite body, up to 120 m wide, that intrudes metasedimentary units. The felsic intrusion has been deformed by a series of subparallel brittle ductile shears that are up to 60 m thick and steeply dipping to the east. The weathering profile does not exceed 30 m depth at Tina; hence, mineralisation is predominantly made up of fresh ore. The dominant low-grade mineralisation, associated with moderate to strong pervasive sericite-silica alteration and dense quartz-carbonate veining, is marked by pyrite-arsenopyrite ± stibnite stringer veins and disseminations.

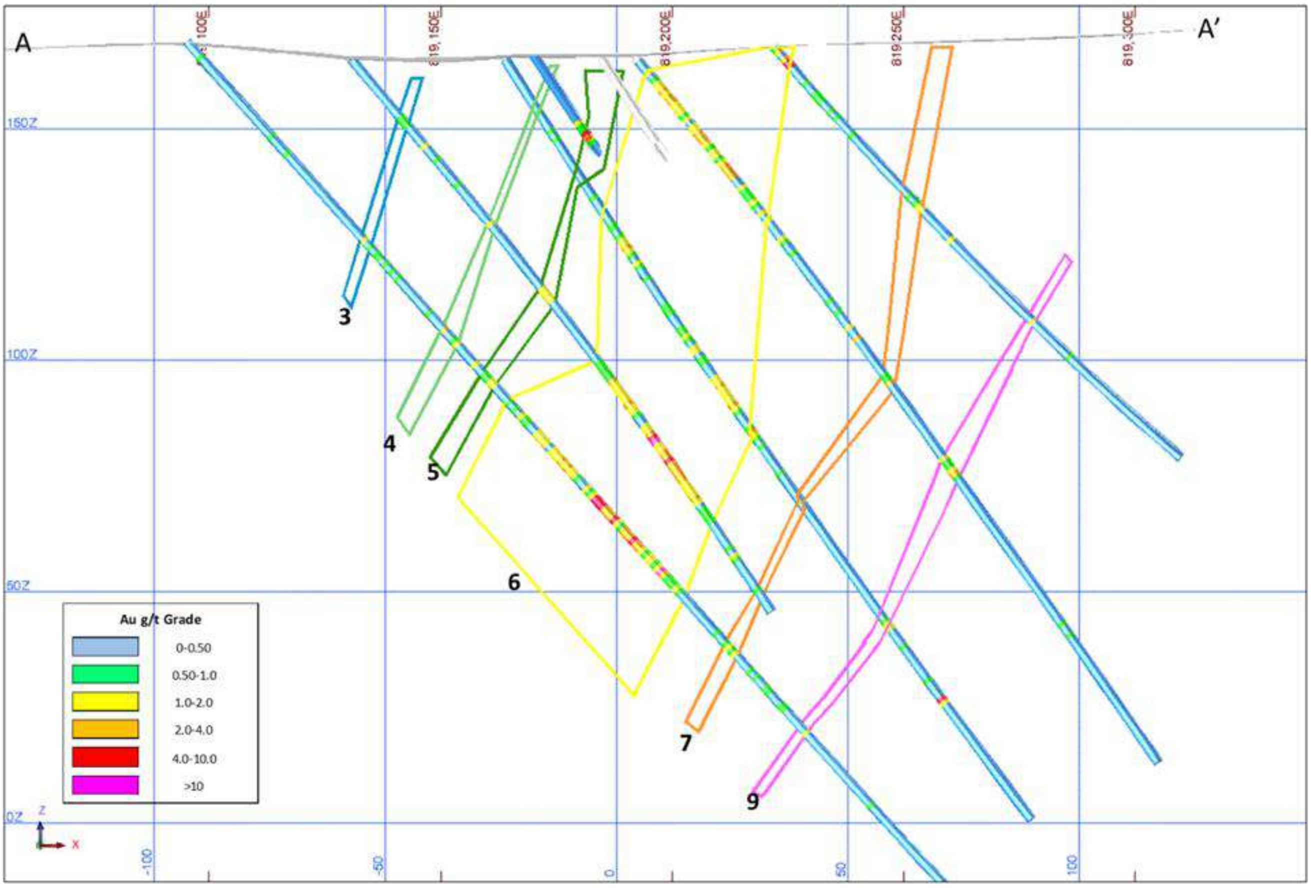
Ten mineralisation domains were modelled in Surpac from interpreted cross sections using a threshold grade of approximately 0.40 Au g/t and a minimum width of two metres in Figure 14.4.16 and Figure 14.4.17.

Figure 14.4.16 Tina Mineralisation Model



Source: Endeavour, March 2022.

Figure 14.4.17 Example Vertical Cross Section of the Tina Mineralisation Model



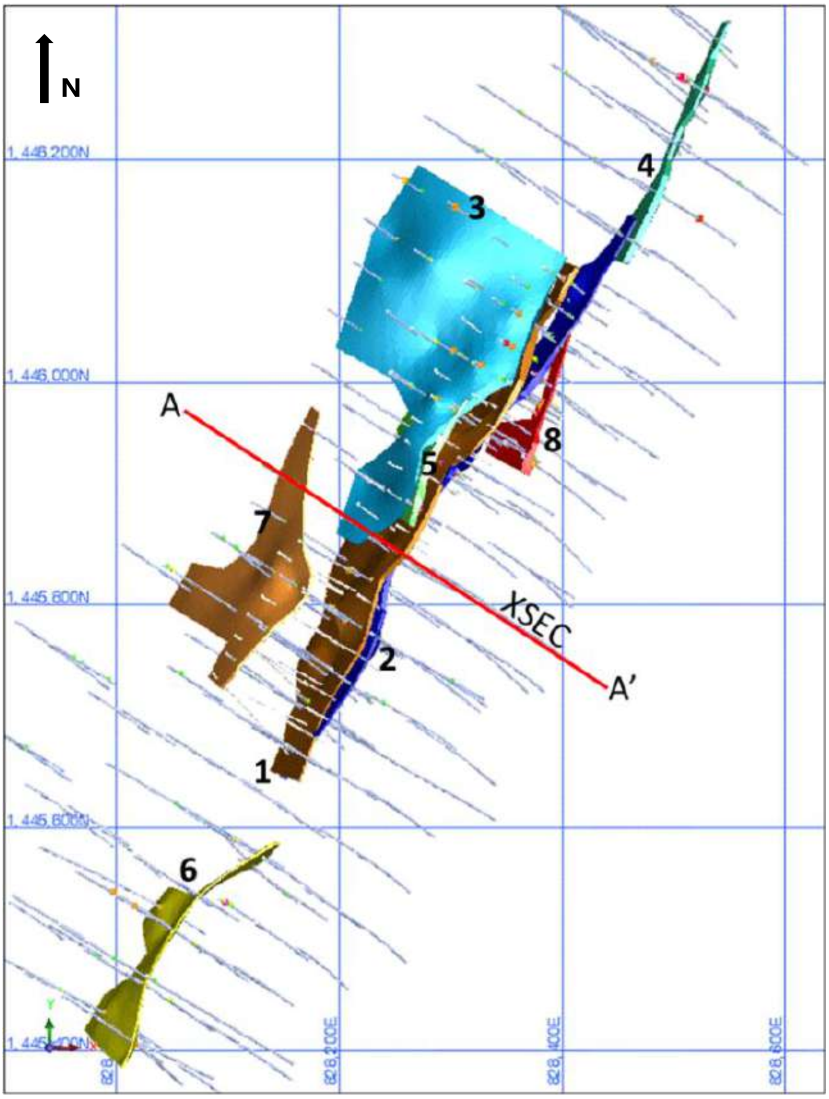
Source: Endeavour, March 2022.

14.4.13 Samina

The main gold mineralisation system at Samina is centred on an up to 20 m thick silica fault-breccia developed east of the contact zone between a gabbro intrusive and a metasedimentary unit. The contact zone is steeply dipping to the northwest. Oxide ore potential is related to the weathering profile and has been observed to over 100 m depth along the fault-breccia. In relation to this main structure, five northeast striking and sub-parallel mineralised zones have been identified within both hanging wall and footwall of the lithostructural corridor. The mineralisation at Samina is associated with strong pervasive haematite-sericite-silica alteration and dense quartz veining. Mineralisation is also associated with boxwork of disseminated pyrite and arsenopyrite.

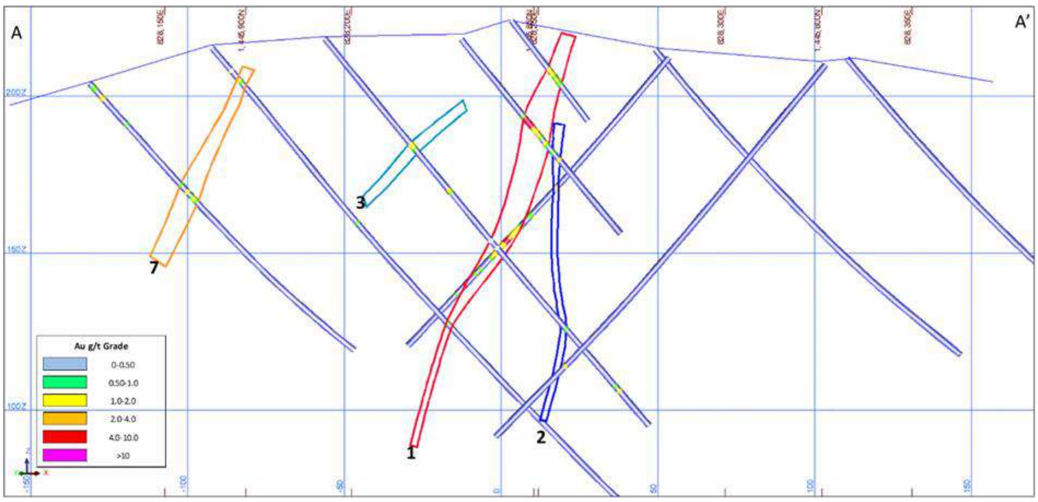
Eight mineralisation domains were modelled in Leapfrog Geo using the vein tools and cross-section interpretations in Figure 14.4.18 and Figure 14.4.19 at a threshold grade of 0.5 g/t Au.

Figure 14.4.18 Samina Mineralisation Model



Source: Endeavour, March 2022.

Figure 14.4.19 Example Vertical Cross Section of the Samina Mineralisation Model

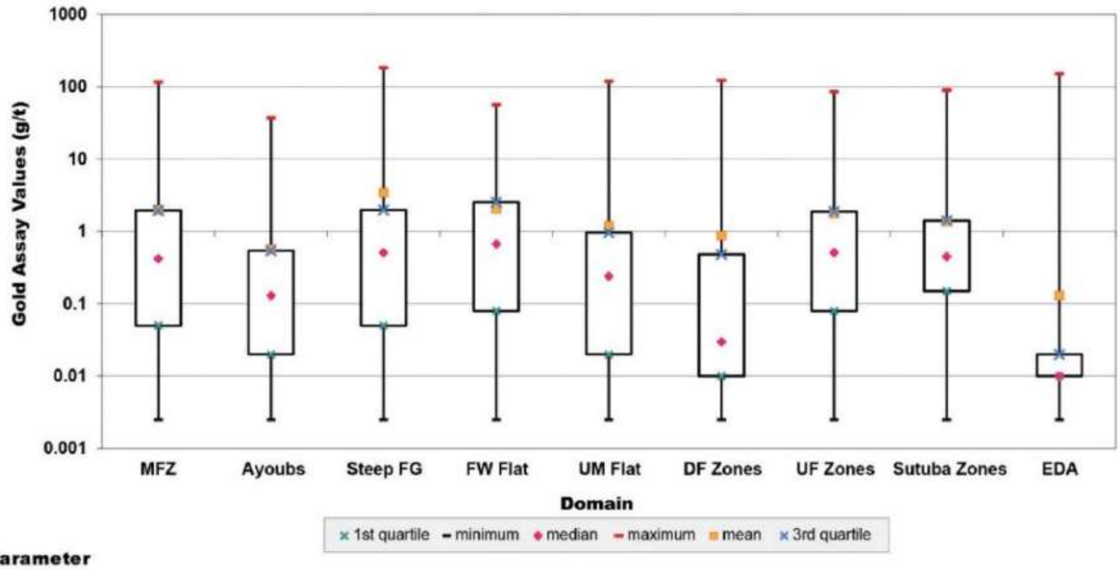


Source: Endeavour, March 2022.

14.5 Assay Statistics

Descriptive statistics for the raw gold assays within the mineralisation domains were generated for each deposit. The assay statistical analysis for the Sabodala and Massawa NZ deposits are presented in Figure 14.5.1 and Figure 14.5.2 as an example.

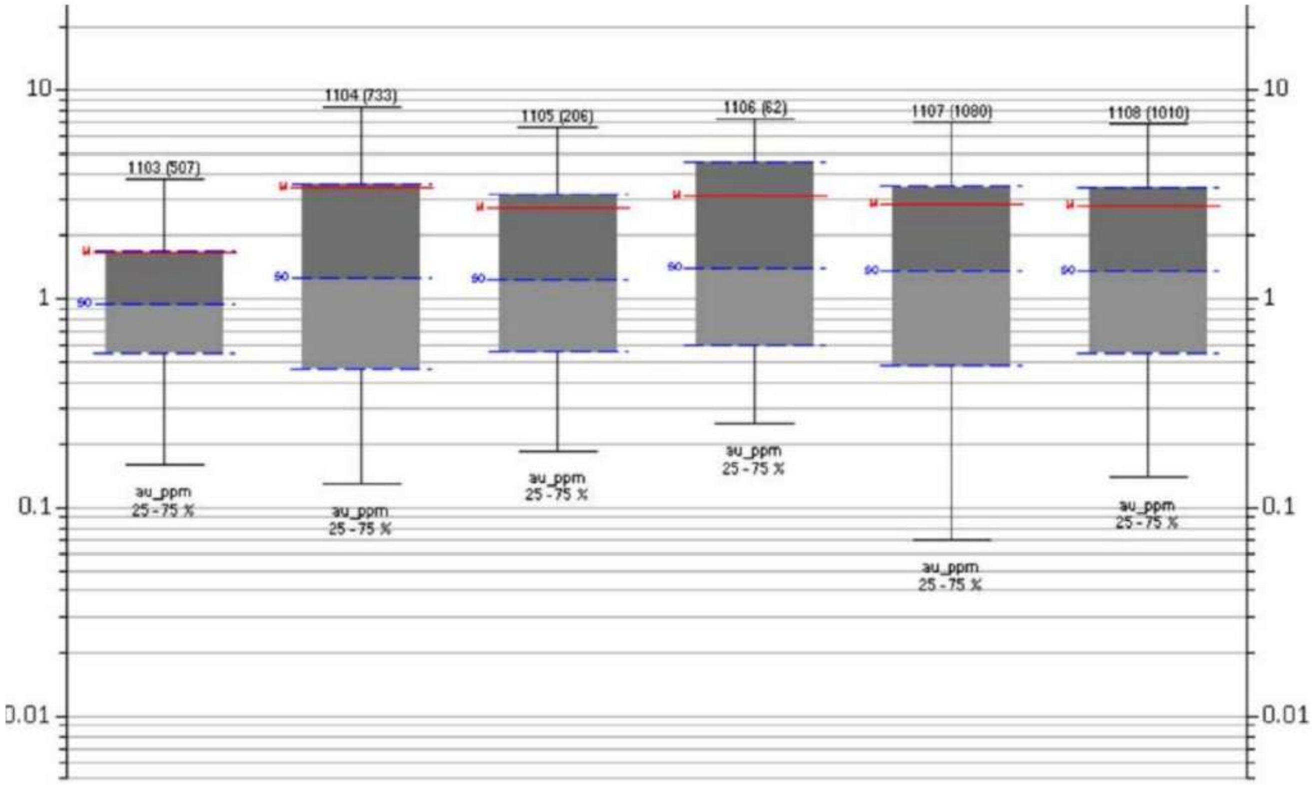
Figure 14.5.1 Sabodala Assay Statistics



Parameter	MFZ	Ayoubs	Steep FG	FW Flat	UM Flat	DF Zones	UF Zones	Sutuba Zones	EDA
Minimum Grade (g/t Au)	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
25th percentile (g/t Au)	0.05	0.02	0.05	0.08	0.02	0.01	0.08	0.15	0.01
Median Grade (g/t Au)	0.42	0.13	0.51	0.67	0.24	0.03	0.51	0.45	0.01
75th percentile (g/t Au)	1.95	0.54	1.99	2.55	0.96	0.48	1.89	1.42	0.02
Maximum Grade (g/t Au)	117.0	37.0	184.0	56.5	119.0	123.4	85.4	90.4	152.0
Mean Grade (g/t Au)	2.01	0.57	3.46	2.04	1.21	0.88	1.76	1.36	0.13
Standard Deviation	4.86	1.49	12.73	3.68	7.21	3.48	3.7	3.57	0.93
Coefficient of Variation	2.42	2.62	3.68	1.8	5.94	3.95	2.11	2.62	7.05
Number of Samples	15,441	3,853	576	2,812	530	4,185	5,604	949	148,323

Source: Teranga, July 2020.

Figure 14.5.2 Massawa North Zone 1 Box and Whisker Plot



Source: Teranga, July 2020.

14.5.1 Managing High Grade Samples (Top-cut/Cap)

Where the distribution of assay grades is skewed positively or approaches log-normal, erratic high-grade assay values can have a disproportionate effect on the average grade of a deposit. Two methods were used to treat these outliers in order to reduce their influence on the average grade:

- Samples were cut or capped at a specific grade level.
- High grade samples were spatially restricted during the grade estimation process.

Capping was used for most domains whereas spatial restriction was used as required, using the capped samples as a starting point.

For most deposits, capping levels were determined and applied to each mineralisation domain prior to compositing. Composites were capped, instead of raw assays, at Massawa NZ, Sofia, Delya, Tina, and Bambaraya. Since these deposits were composited at one metre lengths, there is no significant difference in their population statistics between capping before or after compositing.

Samples located inside each mineralisation wireframe were combined to determine an appropriate capping level for each mineralised zone or zone group. Capping levels were established using a combination of histograms, probability plots decile plots and cutting curves.

To further reduce the influence of high grade composites for some domains, grades greater than a designated grade threshold were spatially restricted to a smaller search ellipse dimension (high yield restriction). The threshold grade levels were chosen from the basic statistics and from visual inspection of the apparent continuity of very high grades within each domain, which in some cases indicated the need to limit their influence to approximately half the distance of the main search.

Capping levels for the deposits which include Mineral Reserves, are listed in Table 14.5.1.

Table 14.5.1 Capping Levels by Deposit and Domain

Deposit/Domain	Total No. Assays	Max. Grade (g/t Au)	Capping Level (g/t Au)	No. Capped Assays	% Capped Assays
Sabodala					
MFZ	15 441	117.00	30	73	0.5
Ayoubs	3853	37.00	15	6	0.2
Steep FG	576	184.00	20	21	3.6
FW Flat	2812	56.50	20	13	0.5
UM Flat	530	119.00	10	3	0.6
DF Zones	4185	123.40	20	10	0.2
UF Zones	5604	85.40	20	31	0.6
Sutuba Zones	949	90.40	20	1	0.1
EDA	148 323	152.00	10	186	0.1
Niakafiri East					
101	506	6.40	-	-	-
102	1851	37.50	10	4	0.2
103	5689	18.90	10	22	0.4
104	521	8.39	-	-	-
105	102	2.82	-	-	-
106	485	16.20	10	2	0.4
107	92	3.74	-	-	-
108	245	8.67	-	-	-
109	110	4.84	-	-	-
110	268	10.80	10	1	0.4
111	237	22.40	10	2	0.8
112	80	3.11	-	-	-
113	68	3.01	-	-	-
114	95	3.25	-	-	-
115	287	45.50	10	1	0.3
116	1264	13.99	10	2	0.2
117	106	2.87	-	-	-
118	259	4.63	-	-	-
119	1068	8.26	-	-	-
120	67	7.54	-	-	-
121	27	14.13	10	1	3.7
122	18	0.55	-	-	-
123	114	5.08	-	-	-
124	218	17.39	10	1	0.5
125	244	64.99	10	6	2.5
126	109	3.81	-	-	-
127	193	2.27	-	-	-
128	41	4.39	-	-	-
129	28	1.39	-	-	-
130	23	4.29	-	-	-
131	414	8.20	-	-	-
301	40 439	12.30	5	6	0.01
Niakafiri West					
201	107	7.55	-	-	-
202	975	22.00	10	4	0.4
203	555	53.40	10	4	0.7
204	186	10.79	10	1	0.5
205	282	8.23	-	-	-
206	213	13.00	10	1	0.5
207	29	4.46	-	-	-
208	109	4.00	-	-	-
209	33	3.81	-	-	-
210	589	11.57	10	2	0.3
211	85	3.85	-	-	-
212	48	2.11	-	-	-
213	162	4.83	-	-	-
214	206	5.48	-	-	-

Table 14.5.1 Capping Levels by Deposit and Domain

Deposit/Domain	Total No. Assays	Max. Grade (g/t Au)	Capping Level (g/t Au)	No. Capped Assays	% Capped Assays
215	125	5.95	-	-	-
216	174	5.13	-	-	-
217	105	6.60	-	-	-
218	71	6.13	-	-	-
219	87	10.10	10	1	1.1
220	34	9.67	-	-	-
221	27	0.75	-	-	-
222	269	13.90	10	1	0.4
223	130	3.29	-	-	-
224	68	3.75	-	-	-
302	14 561	12.10	5	10	0.07
Masato					
M1	33 781	3,977	25	50	0.1
M2	62	2.14	-	-	-
HW1	23	2.27	-	-	-
HW2	35	4.08	-	-	-
HW3	151	4.53	-	-	-
HW4	29	29.94	5	2	6.9
HW5	257	4.25	-	-	-
HW6	85	12.69	5	1	1.2
FW1	54	1.51	-	-	-
FW2	107	55.21	7	1	0.9
FW3	502	9.02	4	2	0.4
Min1	1889	66.4	20	5	0.3
Min2	305	6.57	-	-	-
Min3	1246	18.70	-	-	-
Min4	60	2.75	-	-	-
Min5	88	7.44	-	-	-
Min6	76	10.50	-	-	-
Golouma West					
18000	1464	80.73	30	4	0.3
18100	832	26.54	20	3	0.4
18300	71	146.80	12	4	5.6
18400	1050	128.10	20	9	0.9
18414	374	145.20	30	4	1.1
18600	1208	434.60	70	10	0.8
18700	336	262.00	35	5	1.5
18800	503	58.57	10	10	2
18900	520	55.23	40	3	0.6
19000	206	16.15	10	1	0.5
19400	40	731.30	3	8	20
Maki Medina					
DZ1	88	3.07	-	-	-
DZ2	28	8.23	6	1	3.6
DZ3	156	5.64	-	-	-
DZ41	396	17.35	8	9	2.3
DZ42	1028	9.59	6	8	0.8
DZ5	11	0.93	-	-	-
CZ6	55	4.36	-	-	-
CZ7	133	3.86	-	-	-
CZ8	162	1.56	-	-	-
CZ9	16	0.84	-	-	-
CZ10	33	2.95	-	-	-
CZ11	40	2.04	-	-	-
CZ12	146	4.25	-	-	-
CZ13	122	14.51	6	1	0.8
CZ14	157	10.32	6	3	1.9

Table 14.5.1 Capping Levels by Deposit and Domain

Deposit/Domain	Total No. Assays	Max. Grade (g/t Au)	Capping Level (g/t Au)	No. Capped Assays	% Capped Assays
Goumbati West - Kobokoto					
AD1	455	56.60	15	7	1.5
AD2	80	3.52	-	-	-
AD3	26	13.15	5	1	3.8
AD4	47	2.29	-	-	-
B	153	42.20	15	3	2
C1	42	4.96	-	-	-
C2	62	3.92	-	-	-
C3	34	11.85	5	1	2.9
C4	102	4.24	-	-	-
C5	37	4.94	-	-	-
C6	18	3.35	-	-	-
C7	58	4.20	-	-	-
C8	16	3.68	-	-	-
C9	69	10.45	5	1	1.4
C10	18	16.10	5	1	5.6
2100A	391	11.52	5	6	1.5
2100B	20	3.03	-	-	-
2200	198	23.66	10	4	2
2300A	31	1.66	-	-	-
2300B	41	2.75	-	-	-
2300C	39	1.61	-	-	-
3001	2426	15.25	5	1	0.04
3002	6397	31.21	5	3	0.05
3003	7452	8.02	5	2	0.03
Massawa NZ					
Group 0 (outside domains)	67 499	40.00	10.00	51	0.08
Group 1	3430	27.40	20.00	4	0.12
Group 2	3854	44.80		0	0.00
Group 3	402	39.70		0	0.00
Group 4	6145	76.00	55.00	4	0.06
Group 5	864	86.00	45.00	3	0.35
Massawa CZ					
G1	356	1413.00	200	9	2.5
G2	4943	1636.50	250	13	0.3
G3	2637	1200.00	300	7	0.3
G4	7219	1586.59	300	36	0.5
G5	1198	702.95	150	22	1.8
G6	939	392.80	60	5	0.5
G6a	1374	291.00	100	17	1.2
G7	4411	488.00	240	4	0.1
G8	1653	296.50	130	9	0.5
G9	1893	272.70	60	22	1
G10	5065	143.90	60	26	0.5
G10a	752	102.45	60	26	3.3
G10b	1350	205.70	60	24	1.7
G11	3009	54.14	30	6	0.2
G11a	5736	186.20	30	6	0.1
G12	490	163.79	20	6	1.2
1024	692	242.80	55	6	0.9
1027	568	79.10	30	7	1.1
1028	482	203.83	35	3	0.6
2002	3359	268.00	65	11	0.3
2016	1101	71.80	30	2	0.2
4004	2145	305.46	50	5	0.2
4009	967	181.00	80	6	0.6
4017	1188	174.35	60	10	0.8
4018	470	105.00	30	1	0.2
4026	1202	153.00	45	4	0.3

Table 14.5.1 Capping Levels by Deposit and Domain

Deposit/Domain	Total No. Assays	Max. Grade (g/t Au)	Capping Level (g/t Au)	No. Capped Assays	% Capped Assays
4027	712	269.27	35	5	0.7
5004	720	27.11	20	4	0.5
5008	590	46.00	25	2	0.3
5012	640	44.58	35	1	0.2
5014	543	49.83	35	1	0.2
Sofia					
1010, 1020, 1120, 1130, 1510, 2010, 2011 & 2030.	14 325	190.00	20	125	0.9
1030	132	11.20	8	1	0.8
1110, 1140, 1150, 2250 & 2270.	1743	177.00	10	27	1.5
1115, 1125, 1126, 1141, 2210, 2220, 2260, 2280 & 2320.	1189	71.60	15	23	1.9
Sofia North Extension					
3, 11, 13, 16 & 21	440	22.40	15		
Delya					
MOZ_1	1077	33.50	30	2	0.2
HWOZ_1	63	14.00	8	5	8
Tina					
1, 2, 3, 4 & 5	979	90.20	6	16	2
6	1358	73.44	12	10	1
7, 8, 9 & 10	995	204.00	10	11	1
Samina					
1	534	57.27	25	6	1
2 & 3	483	22.60	15	1	2
4, 5 & 8	169	19.20	10	6	7
6 & 7	86	9.53	6	4	5

Massawa CZ and NZ each include numerous mineralisation domains. Where appropriate, domains of similar grade distribution were grouped for capping analyses. Larger domains containing a sufficient number of samples were not grouped. Grouping criteria included number of samples, average grade, coefficient of variation, maximum values and other multi-element data. Table 14.5.2 summarises the groupings and Figure 14.5.1 and Figure 14.5.2 provides examples of tools to assist in the grouping selections at CZ.

Table 14.5.2 Summary of Capping Groups used at Massawa CZ

Group	Domains Included	Characteristic
G1	2101 & 2104.	High average grade, high CV, significant difference between average and median.
G2	1009, 2010, 4010.	Grade is low relative to very high CV.
G3	4007, 1101a.	Grade is low relative to very high CV.
G4	1003, 2007, 2018.	Grade is low relative to very high CV.
G5	1038, 2005, 1024a.	High average grade and CV of approximately 4.
G6	1054, 1105.	Au grade is low relative to very high CV.
G6a	2013, 3018, 3019, 3032, 4008.	High Sb.
G7	1004, 2004.	High average grade and moderate CV.
G8	1016, 1023, 1040, 1101, 1103.	High As and high sulphide S.
G9	1044, 1046, 2008, 2019, 2026, 3002, 3010, 3027	Low average grade and moderate CV.
G10	1032, 1033, 1034, 1036, 2011, 2012, 2028, 2103, 3003, 3005, 3013, 3014, 3015, 3020, 3023, 3024, 3026, 3033, 3034, 4005, 4019, 4020, 4021, 4023, 5019, 5020, 1028b, 1032b, 1044b.	Low average grade and moderate CV.
G10a	1051, 5005, 5029, 1101b.	High As and high sulphide S.
G10b	1001, 1025, 1056, 1102, 2017, 2029, 3009, 3012	High Sb.
G11	1030, 1066, 1070, 3004, 3021, 3022, 3030, 4002, 4028, 4040, 5003, 5006, 5010, 5023, 5001 2.	Low average grade and moderate CV.
G11a	1007, 1011, 1029, 1031, 1047, 1048, 1049, 1050, 1052, 1053, 1055, 1106, 1301, 2001, 2030, 2100, 3008, 3011, 3016, 3017, 3028, 3031, 3035, 4001, 4013, 4015, 4025, 4029, 4030, 4032, 5013, 5016, 5017, 5018, 5021, 5022, 5024, 5026, 5027, 5030, 2017b, 4017b, 4026a, 5025 2.	CV less than 1.5 and low maximum Au.
G12	2003, 3025, 5025, 4031.	
Treated individually	1024, 1027, 1028, 2002, 2016, 4004, 4009, 4017, 4018, 4026, 4027, 5004, 5008, 5012, 5014, 999.	More than 500 samples per domain.
Uncapped	1061, 1062, 1063, 1064, 1065, 1067, 1068, 1069, 1071, 1072, 2105, 3001, 3037, 3040, 3050, 4041, 4042.	Low maximum Au and low CV.

14.6 Composite Samples

Composites were generated inside the mineralisation wireframes and flagged by mineralisation domains using either Vulcan, Surpac, Datamine, GEMS or Leapfrog. Gold assay results reported below the detection limit were assigned half the detection limit. For most mineralisation wireframes, non-logged and unsampled intervals were assigned a grade of 0.0 g/t Au prior to compositing.

For most deposits, one metre composites were generated within the grade estimation domains. Composites less than either 0.25 m or 0.5 m in length were removed from the final composite database. This accounted for a small percentage of data with no demonstrated grade bias. Two metre long composites were generated for the deeper mineralised zones at Masato. Full width composites across the mineralised zones were generated for Diadiako and Marougou. Straight assays were used at CZ and Delya.

Composite statistics for the deposits which contain Mineral Reserves and the new resource deposits of Tina and Samina are listed in Table 14.6.1. Given the large number of mineralisation wireframes at CZ, reported composite statistics are by grouped domains.

Table 14.6.1 Composite Statistics by Deposit and Domain

Deposit/Domain	Min. (g/t Au)	Median (g/t Au)	Max. (g/t Au)	Mean (g/t Au)	Standard Deviation	Coefficient of Variation	No. Samples
Sabodala							
MFZ	0.000	0.43	30.00	1.84	3.66	1.99	15 597
Ayoubs	0.000	0.13	15.00	0.54	1.21	2.24	3884
Steep FG	0.000	0.55	20.00	2.27	4.16	1.84	553
FW Flat	0.000	0.75	20.00	1.94	2.96	1.52	2703
UM Flat	0.000	0.19	10.00	0.71	1.31	1.84	590
DF Zones	0.000	0.03	20.00	0.80	2.15	2.69	4303
UF Zones	0.000	0.55	20.00	1.68	2.92	1.74	5577
Sutuba Zones	0.000	0.47	19.00	1.28	2.09	1.64	952
EDA	0.000	0.01	10.00	0.08	0.45	5.57	172 544
Niakafiri East							
101	0.000	0.30	6.40	0.53	0.71	1.34	506
102	0.000	0.39	10.00	0.78	1.12	1.44	1821
103	0.000	0.51	10.00	1.07	1.48	1.38	5539
104	0.003	0.36	8.39	0.64	0.92	1.44	518
105	0.005	0.28	2.82	0.41	0.49	1.20	102
106	0.003	0.29	10.00	0.59	0.94	1.59	483
107	0.010	0.59	3.74	0.96	0.85	0.89	92
108	0.030	0.42	8.67	0.74	1.02	1.38	242
109	0.005	0.76	4.84	0.83	0.73	0.88	123
110	0.005	0.31	10.00	0.55	0.90	1.64	259
111	0.005	0.37	10.00	0.71	1.28	1.80	235
112	0.005	0.40	3.11	0.63	0.73	1.16	79
113	0.003	0.29	3.01	0.37	0.41	1.11	68
114	0.005	0.32	3.25	0.46	0.50	1.09	95
115	0.005	0.32	10.00	0.69	1.12	1.62	287
116	0.000	0.36	10.00	0.74	1.09	1.47	1272
Niakafiri West							
117	0.007	0.28	2.87	0.47	0.54	1.15	107
118	0.003	0.37	4.63	0.55	0.66	1.20	260
119	0.000	0.38	8.26	0.73	0.98	1.34	1075
120	0.020	0.35	7.54	0.82	1.20	1.46	67
121	0.010	0.22	10.00	0.67	1.89	2.82	27
122	0.120	0.26	0.55	0.28	0.12	0.43	18
123	0.000	0.23	5.08	0.39	0.60	1.54	119
124	0.005	0.29	10.00	0.44	0.75	1.70	218
125	0.005	0.34	10.00	0.95	1.85	1.95	246
126	0.003	0.27	3.81	0.44	0.59	1.34	109
127	0.000	0.25	2.27	0.37	0.43	1.16	201
128	0.040	0.48	4.39	0.67	0.83	1.24	41
129	0.020	0.30	1.39	0.38	0.36	0.95	28
130	0.020	0.24	4.29	0.68	1.06	1.56	23
131	0.003	0.32	8.20	0.64	0.94	1.47	414
301	0.000	0.02	5.00	0.06	0.16	2.67	41 238
201	0.005	0.26	7.53	0.55	0.93	1.69	107
202	0.003	0.30	10.00	0.52	0.87	1.67	974
203	0.003	0.32	9.98	0.65	1.17	1.80	554
204	0.007	0.32	10.00	0.58	0.97	1.67	186
205	0.005	0.23	7.90	0.44	0.78	1.77	282
206	0.000	0.26	9.72	0.59	1.03	1.75	214
207	0.020	0.51	4.43	0.74	0.86	1.16	29
208	0.000	0.28	3.78	0.55	0.76	1.38	111
209	0.010	0.29	3.77	0.59	0.77	1.31	33
210	0.003	0.27	10.00	0.68	1.14	1.68	589
211	0.003	0.21	3.85	0.31	0.51	1.65	85
212	0.003	0.24	2.09	0.46	0.47	1.02	48
213	0.003	0.25	4.80	0.46	0.70	1.52	160

Table 14.6.1 Composite Statistics by Deposit and Domain

Deposit/Domain	Min. (g/t Au)	Median (g/t Au)	Max. (g/t Au)	Mean (g/t Au)	Standard Deviation	Coefficient of Variation	No. Samples
214	0.005	0.41	4.37	0.66	0.71	1.08	205
215	0.003	0.32	5.92	0.72	0.99	1.38	119
216	0.005	0.34	5.10	0.75	1.00	1.33	174
217	0.010	0.39	6.56	0.78	1.00	1.28	105
218	0.005	0.32	6.03	0.80	1.16	1.45	72
219	0.005	0.22	9.68	0.74	1.42	1.92	87
220	0.021	0.46	9.67	1.19	1.79	1.50	34
221	0.005	0.21	0.72	0.24	0.18	0.75	27
222	0.003	0.35	9.93	0.59	0.85	1.44	269
223	0.009	0.30	3.29	0.52	0.58	1.12	130
224	0.003	0.23	3.75	0.58	0.89	1.53	68
302	0.000	0.03	5.00	0.08	0.24	3.00	12 757
Masato							
M1	0.000	0.25	25.00	0.82	1.79	2.19	34 031
M2	0.010	0.27	2.14	0.41	0.39	0.96	62
All HW	0.000	0.36	5.00	0.65	0.83	1.28	586
FW1/FW2	0.010	0.33	7.00	0.65	1.06	1.63	161
FW3	0.000	0.16	4.00	0.39	0.58	1.50	536
Min1	0.000	0.64	20.00	1.26	1.82	1.44	962
Min2	0.000	0.36	6.57	0.63	0.80	1.26	173
MIn3	0.005	0.16	13.13	0.44	0.93	2.08	628
MIn4	0.110	0.62	1.75	0.71	0.47	0.67	31
Min5	0.030	0.88	5.02	1.20	1.08	0.91	44
Min6	0.020	0.91	5.62	1.54	1.54	1.00	39
Golouma West							
18000	0.000	0.77	29.58	2.29	3.77	1.64	1411
18100	0.002	0.77	19.80	1.63	2.45	1.50	807
18300	0.000	0.77	12.00	2.43	3.25	1.34	78
18400	0.000	0.77	20.00	1.85	2.90	1.57	1023
18414	0.002	0.54	30.00	2.16	4.48	2.07	368
18600	0.000	1.03	69.58	4.04	9.38	2.32	1186
18700	0.000	0.39	40.00	2.42	6.17	2.55	316
18800	0.000	0.18	10.00	0.92	1.84	2.00	497
18900	0.002	0.83	39.80	2.94	5.46	1.85	512
19000	0.000	0.09	9.14	0.58	1.29	2.23	220
19400	0.003	0.42	6.00	1.60	2.17	1.36	35
Maki Medina							
DZ1	0.003	0.30	3.04	0.47	0.51	1.09	49
DZ2	0.010	0.30	6.00	0.86	1.51	1.76	17
DZ3	0.003	0.33	4.22	0.60	0.75	1.25	89
DZ41	0.006	0.57	8.00	1.23	1.57	1.28	211
DZ42	0.000	0.37	6.00	0.70	0.90	1.28	541
DZ5	0.120	0.21	0.93	0.35	0.29	0.83	6
CZ6	0.000	0.20	2.19	0.31	0.38	1.25	32
CZ7	0.004	0.30	3.71	0.49	0.62	1.25	73
CZ8	0.020	0.22	1.46	0.30	0.25	0.83	89
CZ9	0.150	0.30	0.69	0.38	0.20	0.54	9
CZ10	0.030	0.36	1.62	0.49	0.45	0.92	18
CZ11	0.010	0.25	1.24	0.33	0.27	0.82	22
CZ12	0.005	0.34	3.43	0.56	0.61	1.11	79
CZ13	0.025	0.23	5.09	0.44	0.84	1.92	68
CZ14	0.004	0.30	5.44	0.73	0.97	1.33	83

Table 14.6.1 Composite Statistics by Deposit and Domain

Deposit/Domain	Min. (g/t Au)	Median (g/t Au)	Max. (g/t Au)	Mean (g/t Au)	Standard Deviation	Coefficient of Variation	No. Samples
Goumbati West - Kobokoto							
AD1	0.003	0.47	15.00	1.26	2.29	1.82	456
AD2	0.006	0.40	3.51	0.56	0.62	1.10	80
AD3	0.005	0.22	4.99	0.63	1.31	2.08	26
AD4	0.005	0.56	2.29	0.62	0.51	0.82	49
B	0.021	0.89	15.00	1.79	2.63	1.47	153
C1	0.006	0.49	4.96	0.75	0.97	1.29	42
C2	0.006	0.39	3.92	0.57	0.72	1.26	62
C3	0.010	0.29	5.00	0.59	0.92	1.56	34
C4	0.005	0.33	4.24	0.58	0.79	1.37	102
C5	0.020	0.51	4.93	0.89	1.12	1.26	37
C6	0.020	0.30	3.35	0.63	0.77	1.23	18
C7	0.005	0.37	4.20	0.57	0.69	1.21	58
C8	0.018	0.40	3.68	1.01	1.16	1.15	16
C9	0.012	0.41	5.00	0.88	1.16	1.32	69
C10	0.005	0.50	5.00	0.77	1.16	1.50	18
2100A	0.005	0.44	5.00	0.80	0.97	1.21	391
2100B	0.076	0.65	3.02	0.95	0.79	0.83	20
2200	0.000	0.46	10.00	1.00	1.72	1.72	202
2300A	0.055	0.37	1.66	0.55	0.48	0.87	31
2300B	0.010	0.29	2.75	0.40	0.47	1.17	41
2300C	0.016	0.31	1.61	0.47	0.41	0.89	38
3001	0.003	0.01	5.00	7.31	0.25	0.03	2424
3002	0.000	0.01	4.98	3.70	0.17	0.05	6503
3003	0.000	0.01	4.99	3.99	0.14	0.03	7585
Massawa NZ							
Group 1	0	0.48	20	1.18	2.12	1.79	2902
Group 2	0.01	0.68	44.8	2.27	4.23	1.87	3351
Group 3	0.01	1.32	39.7	4.38	6.96	1.59	385
Group 4	0.01	1.8	55	4.85	7.16	1.48	5437
Group 5	0.01	0.47	45	2.2	5.07	2.31	714
Massawa CZ							
G1	0.01	0.85	200.00	9.43	34.40	3.65	356
G2	0.01	0.81	250.00	3.25	15.62	4.81	4943
G3	0.01	0.93	300.00	5.34	23.19	4.35	2637
G4	0.00	1.11	300.00	7.15	28.54	3.99	7219
G5	0.01	0.85	150.00	8.06	24.52	3.04	1198
G6	0.01	1.02	60.00	2.69	6.96	2.59	939
G6a	0.01	0.82	100.00	3.57	11.93	3.34	1374
G7	0.00	1.01	240.00	4.31	16.47	3.82	4459
G8	0.01	0.88	130.00	4.25	14.47	3.40	1653
G9	0.01	0.64	60.00	2.04	6.21	3.05	2240
G10	0.00	0.80	60.00	2.28	5.88	2.58	5065
G10a	0.01	0.97	60.00	3.00	7.07	2.35	752
G10b	0.01	1.02	60.00	3.85	9.44	2.46	1384
G11	0.00	0.79	30.00	1.98	3.65	1.84	3009
G11a	0.01	0.75	30.00	1.56	2.51	1.61	5736
1024	0.01	1.03	55.00	2.94	7.24	2.46	692
1027	0.01	1.01	30.00	2.42	4.53	1.88	568
1028	0.01	0.84	35.00	2.27	4.78	2.11	482
2002	0.01	1.18	65.00	2.87	6.18	2.15	3359
2016	0.01	1.14	30.00	2.06	2.98	1.45	1101
4004	0.01	1.14	50.00	2.08	4.00	1.92	2145
4009	0.01	0.83	80.00	3.04	9.50	3.13	967
4017	0.01	1.18	60.00	3.15	6.77	2.15	1188
4018	0.01	0.70	30.00	1.71	3.18	1.87	470
4026	0.01	0.76	45.00	1.60	3.58	2.25	1202

Table 14.6.1 Composite Statistics by Deposit and Domain

Deposit/Domain	Min. (g/t Au)	Median (g/t Au)	Max. (g/t Au)	Mean (g/t Au)	Standard Deviation	Coefficient of Variation	No. Samples
4027	0.01	1.10	35.00	2.55	4.71	1.84	712
5004	0.01	1.04	20.00	2.61	3.78	1.45	720
5008	0.01	1.13	25.00	2.39	3.52	1.47	590
5012	0.01	1.01	35.00	2.62	4.60	1.76	640
5014	0.01	1.23	35.00	2.79	4.32	1.55	543
Uncapped	0.00	0.63	82.40	1.31	2.74	2.10	1911
Sofia							
1010	0.005	1.52	20	3.01	3.86	1.28	3628
1011	0.01	0.67	8.11	1.20	1.72	1.43	25
1012	0.35	0.84	3.98	1.89	1.43	0.76	12
1013	0.24	0.74	9.38	2.02	2.82	1.40	21
1020	0.005	1.04	20	2.12	3.16	1.49	2136
1030	0.005	0.38	8	0.93	1.63	1.76	135
1110	0.005	0.65	10	1.27	1.87	1.47	548
1115	0.005	0.21	15	1.74	3.79	2.18	15
1120	0	0.94	20	2.07	3.17	1.53	1400
1125	0.01	0.87	15	1.69	2.53	1.49	178
1126	0.005	0.81	15	1.64	2.69	1.64	61
1130	0.005	0.64	20	1.24	2.20	1.77	1050
1140	0.005	0.66	10	1.33	1.96	1.47	399
1141	0.04	0.75	15	1.43	3.16	2.21	21
1142	0.01	0.41	2.84	0.69	0.74	1.08	34
1143	0.03	0.79	3.29	0.99	0.78	0.78	20
1150	0.005	0.90	10	1.43	1.79	1.25	196
1210	0.005	0.79	10.16	1.08	1.06	0.98	660
1220	0.06	0.60	3.4	0.91	0.78	0.85	27
1230	0.3	0.56	2.8	1.07	0.99	0.93	9
1510	0.005	1.89	20	2.93	3.27	1.11	928
1511	0.005	0.41	4.84	0.59	0.81	1.36	57
1520	0.005	0.60	11.9	1.08	1.48	1.37	139
1530	0.2	0.72	5.95	1.43	1.72	1.20	14
1540	0.005	0.71	7.29	1.34	1.49	1.11	84
1541	0.005	0.37	2.18	0.51	0.51	1.01	71
1550	0.02	0.60	3.56	0.80	0.76	0.95	49
1560	0.03	0.63	12.1	0.96	1.49	1.55	86
2010	0	1.52	20	2.45	2.74	1.12	3159
2011	0.02	2.01	20	3.51	4.05	1.15	919
2020	0.005	1.09	21.95	2.01	2.49	1.24	1406
2021	0.005	0.87	17.9	1.47	2.00	1.36	215
2030	0.005	0.90	20	1.61	2.17	1.34	1171
2031	0.27	0.83	11.3	1.58	2.74	1.73	15
2032	0.32	0.73	3.55	0.98	0.83	0.84	17
2033	0.21	1.53	4.88	1.94	1.60	0.83	11
2210	0.005	0.45	15	1.47	3.32	2.26	43
2220	0.005	0.62	15	1.88	3.11	1.65	58
2221	0.03	0.51	10.6	1.40	2.34	1.67	22
2230	0.01	0.63	10.6	1.27	2.03	1.60	35
2240	0.06	0.95	13.6	2.26	2.95	1.31	48
2250	0.005	0.68	10	1.31	1.85	1.41	394
2260	0	0.52	15	1.42	2.56	1.80	241
2261	0.02	0.83	3.52	1.23	1.10	0.90	30
2310	0.005	0.39	16.3	1.00	1.81	1.81	301
2320	0	0.99	15	2.28	3.28	1.44	548
2330	0.005	0.73	8.1	1.21	1.42	1.17	132
2340	0.01	1.03	12.3	2.05	2.58	1.26	106

Table 14.6.1 Composite Statistics by Deposit and Domain

Deposit/Domain	Min. (g/t Au)	Median (g/t Au)	Max. (g/t Au)	Mean (g/t Au)	Standard Deviation	Coefficient of Variation	No. Samples
Sofia North Ext.							
1	0.03	0.69	8.43	0.99	363	1	0.03
2	0.41	0.52	0.71	0.53	9	2	0.41
3	0.01	0.41	20.20	0.96	68	3	0.01
4	0.01	0.52	8.87	1.03	72	4	0.01
5	0.01	0.26	6.12	0.73	29	5	0.01
6	0.01	0.29	5.24	0.69	45	6	0.01
7	0.11	0.53	2.26	0.69	41	7	0.11
8	0.02	0.70	10.60	1.18	128	8	0.02
9	0.01	0.40	3.48	0.87	10	9	0.01
10	0.07	0.68	1.85	0.91	12	10	0.07
11	0.01	1.11	16.80	2.23	181	11	0.01
12	0.40	0.82	4.01	1.27	9	12	0.40
13	0.02	0.61	16.40	1.14	83	13	0.02
14	0.06	0.80	1.85	1.04	12	14	0.06
15	0.53	0.75	1.25	0.79	4	15	0.53
16	0.07	0.84	18.90	1.56	48	16	0.07
17	0.02	0.36	2.57	0.78	16	17	0.02
18	0.18	0.71	1.92	0.88	8	18	0.18
19	0.25	1.02	2.41	1.22	13	19	0.25
20	0.12	1.14	5.65	2.29	6	20	0.12
21	0.01	0.80	22.40	1.72	60	21	0.01
Tina							
1	0.02	0.13	2.59	0.81	0.89	1.10	13
2	0.02	0.11	5.29	0.51	0.96	1.90	41
3	0.04	0.65	21.70	1.13	1.95	1.73	199
4	0.03	0.73	90.20	1.64	7.38	4.50	278
5	0.03	0.80	34.70	1.30	2.21	1.71	448
6	0.01	0.93	73.44	1.60	3.78	2.36	1358
7	0.01	0.71	36.50	1.44	3.52	2.44	415
8	0.01	0.60	10.70	0.96	1.31	1.36	323
9	0.01	0.70	16.10	1.07	1.48	1.38	198
10	0.03	1.43	204.00	5.36	26.13	4.87	59
Samina							
1	0.01	0.75	57.27	2.07	4.80	2.32	534
2	0.01	0.49	10.60	0.90	1.45	1.60	483
3	0.01	0.84	22.60	1.78	2.81	1.58	152
4	0.01	0.22	16.45	1.10	2.61	2.38	64
5	0.01	1.07	19.20	2.44	3.89	1.59	43
6	0.01	0.86	9.53	1.72	2.30	1.34	35
7	0.01	0.38	8.36	0.60	1.20	1.98	51
8	0.01	0.31	15.10	1.63	2.77	1.70	62

14.7 Block Model Parameters

Mineral Resources for the Sabodala-Massawa Project are reported from 26 block models built using various software packages and block formats dating from 2012 to 2021 (Table 14.7.1). Massawa CZ and NZ, Delya, Sofia North Extension, Tina and Samina models were updated in 2021. The approaches followed are similar in that block grade and density estimates are constrained using domains representing the mineralisation, lithology and weathering surfaces. Sub-blocking was used for most models.

All block models on the Sabodala property were constructed along an east-west orientation. All block models on the Massawa property are rotated to better align with the general mineralisation trend directions.

Table 14.7.1 Summary of Block Models

Deposit	Year Updated	Company	Software	Block Model Type/Format
Sabodala	2016	Teranga	Vulcan	Sub-blocked
Masato	2016	Teranga	Vulcan	Sub-blocked
Golouma	2016	Teranga	Surpac	Sub-blocked
Kerekounda	2016	Teranga	Surpac	Sub-blocked
Maki Medina	2019	Teranga	Vulcan	Sub-blocked
Niakafiri East	2017	Teranga	Vulcan	Sub-blocked
Niakafiri West	2017	Teranga	Vulcan	Sub-blocked
Goumbati West-Kobokoto	2017	Teranga	Vulcan	Sub-blocked
Golouma North	2017	Teranga	Vulcan	Sub-blocked
Diadiako	2016	Teranga	Vulcan	Sub-blocked
Kinemba	2012	SRK	GEMS	Partial Percentage
Kourouloulou	2012	SRK	GEMS	Partial Percentage
Kouroundi	2012	SRK	GEMS	Partial Percentage
Koutouniokolla	2012	SRK	GEMS	Partial Percentage
Mamasato	2012	SRK	GEMS	Partial Percentage
Marougou	2017	Teranga	Vulcan	Regular
Sekoto	2016	Teranga	Vulcan	Regular
Soukhoto	2016	Teranga	Vulcan	Regular
Massawa NZ	2021	SLR	Vulcan	Sub-blocked/rotated
Massawa CZ	2021	Endeavour	Vulcan	Sub-blocked/rotated
Sofia	2020	Teranga	Vulcan	Sub-blocked/rotated
Delya	2021	Endeavour	Vulcan	Sub-blocked/rotated
Tina	2021	Endeavour	Surpac	Sub-blocked
Bambaraya	2013	Randgold	Vulcan	Regular/rotated
Sofia North Extension	2021	Endeavour	Datamine	Sub-blocked/rotated
Samina	2021	Endeavour	Surpac	Sub-blocked/rotated

Block model parameters are listed in Table 14.7.2. It is important to note that the Massawa CZ and NZ block models overlap; infill drilling has extended the two zones to connect the two deposits and results from the 2021 pit optimisations also overlap. It is therefore important to spatially limit the resource report to avoid double counting resource tonnage.

Grid transformation equations for Sabodala are available to convert from local grid coordinates to WGS 84 UTM Zone 28N and WGS 84 UTM Zone 29N, respectfully. These are based on common points for each deposit and result in a translation and clockwise rotation of approximately 14° for Sabodala.

Table 14.7.2 Block Model Parameters

Deposit	Coordinate System	Block Model Extents (m)						Block Size (m)								
		Minimum			Maximum			Parent Block			Sub-block			Max. Size		
		X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Sabodala	Sabodala Local	9,500	19,300	20	10,800	21,300	800	10	10	10	1.25	1.25	1.25	2.5	2.5	2.5
Niakafiri East	Sabodala Local	10,750	15,900	350	11,350	19,500	810	20	20	20	1.25	1.25	1.25	2.5	2.5	2.5
Niakafiri West	Sabodala Local	10,000	16,300	350	10,860	17,800	810	20	20	20	1.25	1.25	1.25	2.5	2.5	2.5
Masato	Sabodala Local	10,880	19,900	-55	12,000	22,260	1,025	20	20	20	1.25	1.25	1.25	5	5	5
Golouma	WGM 84 UTM Zone 28N	813,600	1,452,300	-800	815,840	1,454,300	360	20	20	20	1.25	1.25	1.25	5	5	5
Kerekounda	WGM 84 UTM Zone 28N	814,900	1,454,000	-395	815,900	1,455,100	400	5	5	5	1.25	1.25	1.25	-	-	-
Goumbati West – Kobokoto	WGM 84 UTM Zone 28N	809,650	1,449,700	-50	811,150	1,452,200	250	20	20	20	1.25	1.25	1.25	-	-	-
Golouma North	WGM 84 UTM Zone 28N	814,250	1,453,750	90	815,050	1,455,050	300	5	5	5	1.25	1.25	1.25	2.5	5	5
Kinemba	WGM 84 UTM Zone 28N	811,150	1,448,900	-25	811,600	1,449,700	300	5	5	5	-	-	-	-	-	-
Kourouloulou	WGM 84 UTM Zone 28N	814,949	1,453,175	-105	815,801	1,454,051	270	3	3	3	-	-	-	-	-	-
Kouroundi	WGM 84 UTM Zone 28N	815,200	1,456,000	110	815,600	1,456,550	335	5	5	5	-	-	-	-	-	-
Koutouniokollo	WGM 84 UTM Zone 28N	812,150	1,450,450	0	812,650	1,450,950	300	5	5	5	-	-	-	-	-	-
Maki Medina	Sabodala Local	10,100	13,395	422	11,100	15,255	782	20	20	20	1.25	1.25	1.25	2.5	5	5
Mamasato	WGM 84 UTM Zone 28N	814,200	1,457,700	50	815,400	1,458,400	400	5	5	5	-	-	-	-	-	-
Marougou	WGM 84 UTM Zone 28N	845,000	1,468,000	-100	847,000	1,470,500	140	5	5	5	-	-	-	-	-	-
Sekoto	WGM 84 UTM Zone 28N	818,000	1,461,200	-90	818,400	1,461,850	260	5	5	5	-	-	-	-	-	-
Soukhoto	Sabodala Local	10,000	18,360	540	10,350	18,480	740	5	5	2.5	-	-	-	-	-	-
Diadiako	Sabodala Local	807,640	1,470,700	-100	808,740	1,471,840	200	5	5	5	0.5	0.5	0.5	-	-	-
Massawa NZ	WGM 84 UTM Zone 28N	819,395	1,434,254	-450	820,295	1,437,334	265	5	5	5	1.25	2.5	2.5	-	-	-
Massawa CZ	WGM 84 UTM Zone 28N	818,390	1,432,425	-140	819,305	1,434,820	250	5	5	5	1.25	2.5	2.5	-	-	-
Sofia	WGM 84 UTM Zone 28N	807,701	1,434,400	-200	809,351	1,439,200	340	3	15	12	0.5	1.5	1.2	-	-	-
Delya	WGM 84 UTM Zone 28N	830,775	1,448,512	-35	831,695	1,450,232	235	2	10	5	0.5	2.5	2.5	-	-	-
Tina	WGM 84 UTM Zone 28N	818,900	1,437,900	-50	819,500	1,439,000	200	10	10	5	1.25	1.25	2.5	-	-	-
Bambaraya	WGM 84 UTM Zone 28N	816,983	1,450,227	-300	818,207	1,452,177	300	8	50	25				-	-	-

Table 14.7.2 Block Model Parameters

Deposit	Coordinate System	Block Model Extents (m)						Block Size (m)								
		Minimum			Maximum			Parent Block			Sub-block			Max. Size		
		X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Samina	WGM 84 UTM Zone 28N	827,580	1,445,490	-25	828,230	1,446,790	250	10	10	5	1.25	1.25	2.5	-	-	-
Sofia North Ext.	WGM 84 UTM Zone 28N	809,230	1,437,475	-80	810,080	1,438,925	190	5	5	5	1.25	1.25	1.25	-	-	-

14.8 Grade Estimation

Block grade estimation methods and parameters are summarised in Table 14.8.1. Most estimates used a three-pass approach. A fourth and fifth pass were added to a few domains to ensure all blocks within the domains were estimated with gold grades. Most block models used diamond core and reverse circulation drilling to estimate block grades. Trench data was included in the resource databases and used for estimation at Massawa NZ, Sofia, Delya and Bambaraya. Spatial restrictions of high grade samples were applied when required in Table 14.8.2. Variogram models were generated for use in domains estimated using the Ordinary Kriging method (OK). Variogram model parameters are summarised in Table 14.8.3.

Table 14.8.1 Grade Estimation Methods and Parameters

Deposit/Zone	Method	Search Orientation	Min. No. Samples	Max. No. Samples	Max. Samples per Hole	Pass 1			Pass 2			Pass 3		
						Major (m)	Semi-major (m)	Minor (m)	Major (m)	Semi-major (m)	Minor (m)	Major (m)	Semi-major (m)	Minor (m)
Sabodala														
MFZ	OK	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	3	65	40	35	98	60	53
Ayoubs	OK	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	3	80	40	20	120	60	30
Steep FG	OK	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	3	40	40	30	60	60	45
FW Flat	OK	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	3	40	30	25	60	45	38
UM Flat	ID^2	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	3	50	50	50	75	75	75
DF Zones	ID^2	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	3	50	50	50	75	75	75
UF Zones	OK	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	3	75	50	35	112	75	53
Sutuba Zones	ID^2	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	3	50	50	50	75	75	75
EDA	OK	In plane of mineralisation	3,6,2,3	12,12,12	3,3,-	10	10	5	60	40	10	90	60	60
Niakafiri E	ID^3	Dynamic anisotropy	4,4,4	12,12,12	3,3,3	50	50	5	75	75	10	100	100	10
Niakafiri W														
201 to 209	ID^3	Dynamic anisotropy	4,4,4	12,12,12	3,3,3	50	50	5	75	75	10	100	100	10
210 to 224	ID^3	Dynamic anisotropy	4,4,4	12,12,12	3,3,3	50	50	5	75	75	10	100	100	10
EDA Zones	ID^3	Dynamic anisotropy	3,2,-	8,12,-	2,2,-	40	40	2.5	40	40	2.5	-	-	-
Masato														
M-1	OK	Dynamic anisotropy	5,3,-	16	4,4	225	50	10	450	100	20	-	-	-
M2, HWs & FWs	ID^2	Dynamic anisotropy	5,3,-	16	4,4	50	50	0.5	75	75	0.5	-	-	-
Min1 to Min6	ID^2	In plane of mineralisation	3,6,3	12	3,3,-	5	5	5	40	40	40	60	60	60
Golouma														
404, 2000, 18300, 18414, 18700, 18800, 19000 & 19400.	ID^2	In plane of mineralisation	8,6	24	5,5	50	50	20	75	75	30	-	-	-
7000 series	ID^2	In plane of mineralisation	4	24	5,5	50	50	20	75	75	30	-	-	-
BS1, RS12, RS2N & RS2S.	ID^3	In plane of mineralisation	4,3,1	10,8,6	3,2,-	50	50	30	75	75	30	100	100	30
2100	OK	In plane of mineralisation	8,6	24	5,5	60	40	40	90	60	60	-	-	-

Table 14.8.1 Grade Estimation Methods and Parameters

Deposit/Zone	Method	Search Orientation	Min. No. Samples	Max. No. Samples	Max. Samples per Hole	Pass 1			Pass 2			Pass 3		
						Major (m)	Semi-major (m)	Minor (m)	Major (m)	Semi-major (m)	Minor (m)	Major (m)	Semi-major (m)	Minor (m)
2200	OK	In plane of mineralisation	8,6	24	5,5	30	30	30	45	45	45	-	-	-
2300	OK	In plane of mineralisation	8,6	24	5,5	40	40	20	60	60	30	-	-	-
18000	OK	In plane of mineralisation	8,6	24	5,5	50	35	20	75	53	30	-	-	-
18100	OK	In plane of mineralisation	8,6	24	5,5	45	40	20	70	60	30	-	-	-
18400	OK	In plane of mineralisation	8,6	24	5,5	80	50	20	120	75	30	-	-	-
18600	OK	In plane of mineralisation	8,6	24	5,5	50	40	20	75	60	30	-	-	-
18900	OK	In plane of mineralisation	8,6	24	5,5	60	40	20	90	60	30	-	-	-
Goumbati West – Kobokoto														
All Min. Zones	ID^2	Dynamic anisotropy	4,4,4	12,12,12	3,3,3	50	50	30	75	75	40	100	100	50
EDA Zones	ID^2	Dynamic anisotropy	3,2,-	12,12,-	2,2,-	40	40	2.5	75	75	30	-	-	-
Maki Medina														
1, 2, 3, 5, 8 to 14	ID^3	In plane of mineralisation	3,2,1	6	2,2,2	50	30	10	75	45	15	150	90	30
6,7	ID^3	In plane of mineralisation	3,2,1	6	2,2,2	50	30	10	75	45	15	175	105	35
14	ID^3	Dynamic anisotropy	3,2,1	6	2,2,2	40	30	10	60	45	15	120	90	30
41	ID^3	Dynamic anisotropy	3,2,1	6	2,2,2	60	35	15	90	55	25	180	105	45
42	ID^3	Dynamic anisotropy	3,2,1	6	2,2,2	50	30	10	75	45	15	150	90	30
Massawa NZ (All domains)	OK	Dynamic anisotropy	4,4,1	12,12,12	3,3,3	60	40	6	120	80	8	240	160	20
Massawa CZ (All domains)	OK	Dynamic anisotropy	6,6,1	18,18,18	5,5,5	25	25	5	50	50	10	150	150	30
Sofia (All domains)	ID^3	Dynamic anisotropy	9,6,4	12	3	15	15	5	45	14	10	90	90	20
Delya	OK	Dynamic anisotropy	5,5,1	20,20,20	4,4,1	20	20	5	40	40	10	100	100	20
Tina	ID^2	Dynamic anisotropy	5,3	20,20	3,3	50	50	12.5	75	75	18.75	-	-	-
Samina	ID^2	Dynamic anisotropy	7,3	20,20	3,3	50	50	12.5	75	75	18.75	-	-	-
Sofia North Extension	ID^2	Dynamic anisotropy	7,6,3	21,18,9	3,3	50	50	10	75	75	10	-	-	-

Table 14.8.2 High Grade Spatial Restrictions

Deposit/Zone	Threshold Grade (g/t Au)	Major Axis (m)	Semi-major Axis (m)	Minor Axis (m)
Niakafiri E	8	10	10	5
Niakafiri W				
• 201 to 209	8	10	10	5
• 210 to 224	8	10	10	5
• EDA Zones	2	10	10	2.5
Massawa CZ	100	25	25	25

For Massawa NZ, geostatistical analyses were conducted using Leapfrog Geo software to evaluate the spatial continuity of the gold grades in Domain 2101. Experimental semi-variograms were calculated from transformed (normal score) one metre capped composites. The major and semi-major directions were taken in the plane of the mineralisation. The transformed experimental semi-variogram was modelled using a two-structure spherical algorithm. The downhole variogram was used to model the nugget effect and to fit the across-strike variogram models. Back transformed model parameters are listed in Table 14.8.3. The same modelled parameters were applied to other Massawa NZ domains.

Table 14.8.3 Variogram Models

Deposit/Zone	C_0	C_1	Major (m)	Semi-major (m)	Minor (m)	C_2	Major (m)	Semi-major (m)	Minor (m)	C_3	Major (m)	Semi-major (m)	Minor (m)
Sabodala													
MFZ	0.1	0.6	40	20	10	0.3	65	40	35	-	-	-	-
Ayoubs	0.2	0.622	40	20	10	0.178	80	40	20	-	-	-	-
Steep FG	0.2	0.622	10	10	10	0.178	40	40	30	-	-	-	-
FW Flat	0.13	0.709	15	15	8	0.161	40	30	25	-	-	-	-
UF Zones	0.27	0.584	20	20	7	0.146	75	50	35	-	-	-	-
EDA	0.4	0.3	30	20	20	0.3	60	40	40	-	-	-	-
M1	0.2	0.8	225	50	10					-	-	-	-
Golouma													
2100	19	21	60	40	3	-	-	-	-	-	-	-	-
2200	28	32	30	30	5	-	-	-	-	-	-	-	-
2300	7	10	40	40	5	-	-	-	-	-	-	-	-
18000	5	10	50	35	5	-	-	-	-	-	-	-	-
18100	2.5	5.5	45	40	6	-	-	-	-	-	-	-	-
18400	5	5	80	50	12	-	-	-	-	-	-	-	-
18600	42	63	50	40	4	-	-	-	-	-	-	-	-
18900	10	27	60	40	7	-	-	-	-	-	-	-	-
Massawa CZ													
1003	0.3	0.8	15	9	3	0.2	54	28	6	1003	0.3	0.8	15
1004	0.4	0.45	62	52	3	0.15	77	75	6	1004	0.4	0.45	62
1008	0.41	0.2	14	20	2	0.39	24	28	4	1008	0.41	0.2	14
1009	0.2	0.55	21	10	3	0.35	75	31	11	1009	0.2	0.55	21
1105	0.4	0.25	19	38	3	0.45	48	40	6	1105	0.4	0.25	19
2002	0.43	0.26	11	10	5	0.31	40	23	7	2002	0.43	0.26	11
2004	0.5	0.5	13	10	4	0.2	75	31	18	2004	0.5	0.5	13
2007	0.7	0.35	6	10	8	0.1	21	23	9	2007	0.7	0.35	6

Table 14.8.3 Variogram Models

Deposit/Zone	**C_0**	**C_1**	**Major (m)**	**Semi-major (m)**	**Minor (m)**	**C_2**	**Major (m)**	**Semi-major (m)**	**Minor (m)**	**C_3**	**Major (m)**	**Semi-major (m)**	**Minor (m)**
2010	0.25	0.5	16	16	2	0.25	86	50	7	2010	0.25	0.5	16
2016	0.4	0.4	3	12	2	0.2	40	40	8	2016	0.4	0.4	3
4004	0.25	0.6	24	9	11	0.15	54	37	11	4004	0.25	0.6	24
4009	0.4	0.2	35	47	3	0.55	81	47	8	4009	0.4	0.2	35
4017	0.2	0.6	21	9	3	0.2	58	32	13	4017	0.2	0.6	21
4026	0.24	0.21	29	8	5	0.55	39	38	10	4026	0.24	0.21	29
5004	0.2	0.5	30	15	2	0.3	80	39	6	5004	0.2	0.5	30
Others	0.25	0.4	20	10	5	0.35	50	50	10	selected	0.25	0.4	20
Massawa NZ (All domains)	0.13	0.60	15	5	5	0.27	120	80	15	-	-	-	-
Delya (All zones)	0.25	0.55	22.5	34.5	5	0.25	55	44.3	5.8	-	-	-	-

14.8.1 Sabodala

Sabodala block gold grades were estimated using the Ordinary Kriging (OK) method for the MFZ, Ayoubs, Steep FG, FW Flat, UF Zones and the EDA. Downhole and directional correlograms were constructed for mineralisation domains containing a sufficient number of composites to generate suitable variograms.

The first estimation pass used small, limited searches to estimate blocks located close to composites. The second estimation pass used larger search radii based on the second variogram structure with composites from a minimum of two drill holes that connect the majority of the blocks estimated during the first pass. The third estimation pass uses 1.5 times the second variogram structure with no minimum drill hole restriction. The minor search range for the second and third estimation passes for the EDA was determined visually and were more restrictive in order to prevent extrapolation of grades beyond reasonable limits in the absence of a hard boundary.

The Inverse Distance Squared method (ID2) was used to estimate block gold grades for the UM Flat, Deep Flat Zones and Sutuba Zones due to the small number of contained sample composites or the presence of multiple trends. Search directions were determined visually for each domain. Isotropic search ranges were applied for grade estimation.

Three estimation runs were applied, each with increasing search distances.

14.8.2 Niakafiri East and Niakafiri West

Niakafiri East and Niakafiri West block grades were estimated using the Inverse Distance Cubed method (ID3). Domain models were used as hard boundaries to limit the extent of influence of composite grades within the domains. Two separate EDA envelopes were generated around the domain models as well as mineralisation located in closely-spaced and widely-spaced holes that were not domained. Mineralisation inside the EDA but located outside of other modelled domains was treated as separate domains with a unique composite and domain flag. Search ranges were determined visually based on continuity of mineralisation and drill hole spacing.

Grade estimation was completed in Vulcan using dynamic anisotropy where the search ellipse for each domain was locally re-oriented to the local directions of continuity, calculated at the centres of the blocks. Three estimation passes were run with increasing major, semi-major, and minor search ranges applied to successive passes. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.8.3 Masato

Masato block grades for the M1 domain were estimated using OK and dynamic anisotropy, where the search ellipse was locally re-oriented to the local directions of continuity which were calculated at the centres of the blocks, with high anisotropy in the strike direction compared to the across-structure direction.

Masato block grades for the M2, FW1 to FW3, and HW1 to HW6 domains were estimated in Vulcan using ID2 and dynamic anisotropy.

Masato block grades for the Min1 to Min6 domains, located at depth in the deposit, were estimated in Vulcan using the ID2 method as suitable variograms could not be generated due to the small number of contained sample composites or the presence of multiple trends.

Multiple estimation passes were run with increased search ranges applied to consecutive passes. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.8.4 Golouma

Downhole and directional variograms were generated for the Golouma South 2100, 2200, 2300 domains and the Golouma West 18000, 18100, 18400, 18600, and 18900 domains. Suitable variograms could not be generated for the other domains due to the small number of contained sample composites or the presence of multiple trends.

Golouma block grades were estimated using OK for the 2100, 2200, 2300, 18000, 18100, 18400, 18600 and 18900 domains. ID2 was used to estimate block grades for the 2000, 404, 7100, 7200, 7300, 7400, 18300, 18414, 18700, 18800, 19000 and 19400 domains.

Two estimation passes were run with increased search ranges applied to the second pass. Search ranges for the first pass ID2 estimation runs were determined visually based on continuity of mineralisation and drill hole spacing. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.8.5 Maki Medina

Maki Medina block grades were estimated using ID3. In addition, block grades for domains 41, 42 and 14 were estimated using dynamic anisotropy. Correlograms were run for domains 41, 42 and 14 to confirm first pass search ranges. Search ranges for the first pass ID3 estimation runs for the other domains were determined visually based on continuity of mineralisation and drill hole spacing.

Three estimation passes were run with increasing major, semi-major and minor search ranges applied to successive passes. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.8.6 Goumbati West - Kobokoto

Goumbati West block grades were estimated using ID2. Domain models were used as hard boundaries to limit the extent of influence of composite grades within the domains. Three separate EDA envelopes were generated around the domain models as well as mineralisation located in closely-spaced and widely-spaced holes that were not domained. Mineralisation inside the EDA but located outside of other modelled domains was treated as separate domains with a unique composite and domain flag. Search ranges were determined visually based on continuity of mineralisation and drill hole spacing.

Grade estimation was completed in Vulcan using dynamic anisotropy. Three estimation passes were run with increasing major, semi-major and minor search ranges applied to successive passes. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.8.7 Massawa CZ, NZ and Delya

The Massawa CZ, NZ and Delya deposits are hosted by the MTZ and are refractory within fresh rock. All three models were updated in 2021. Mineral Resources were estimated using OK and dynamic anisotropy to align the estimation trend with the anastomosing nature of the mineralisation and local changes in orientation across the deposit. Hangingwall and footwall surfaces were generated using Leapfrog’s vein modelling tool for each domain. These reference surfaces were then flagged to the empty block models by providing a reference azimuth to provide the strike, dip and plunge for both the search ellipse and variogram model. Three estimation passes were run with increasing major, semi-major and minor search ranges applied to successive passes. The number of samples and holes were stored in separate block variables for use in assigning resource classification.

QKNA was used to help select the block size, minimum number of samples, search radius and block discretization for each pass by evaluating the kriging efficiency (KE) and slope of regression (SR) across multiple block centroid locations to ensure that the selected parameters were appropriate.

Additionally, the estimation search strategy took into consideration the data distribution for both the geological and the data spacing sub-domains. The resultant search ellipsoid orientations were verified visually against the mineralisation wireframes and, where appropriate, the search ellipse and associated variogram directions were locally re-orientated to reflect bifurcation and local changes in the strike and dip of the mineralisation wireframes.

Sulphide sulphur, arsenic, antimony and iron were also estimated to assist with mine planning decisions for the Massawa CZ, NZ and Delya. The BIOX® plant requires steady sulphur feed grade and throughput and therefore ore blending for sulphur grade will be necessary. Arsenic and antimony grades are monitored to ensure that these will be stable after BIOX® processing.

Sulphide sulphur, arsenic, and antimony have moderate to strong correlations with gold inside the grade estimation domains. Sulphide sulphur and antimony are also controlled by weathering and the degree of oxidation. Based on these relationships, these elements were estimated using parameters similar to the gold. Capping analyses for arsenic, sulphur and iron showed that no capping was required.

To reduce the influence of high-grade Sb composites, grades at CZ were capped to 10,000 ppm Sb and spatially restricted to 30 m by 30 m by 10 m for grades between 7500 ppm Sb and 10,000 pm Sb. At NZ, grades greater than 7,500 ppm Sb were restricted to a search ellipse dimension of 30 m by 30 m by 5 m. The threshold grade levels were selected from the basic statistics and visual inspection of the apparent continuity of very high grades within each domain, which indicated the need to limit their influence to approximately half the distance of the main search.

Grades were estimated from the analytical values in a two-pass approach using ID3 weighting and dynamic anisotropy. The first pass required two holes within 50 m of block for block grade estimation. The second pass required only one hole within a 100 m by 100 m by 10 m search. The remaining blocks beyond 100 m, and with estimated gold grades, were assigned a default value based on assay statistics in Table 14.8.4. Descriptive statistics, contact analyses and visual review on vertical sections confirmed the following boundary types:

- Sulphide sulphur and arsenic: hard boundaries were used between the mineralisation wireframes and at the oxidised to reduced surface.
- Antimony: The same approach as above except the boundary between redox surfaces was soft.
- Iron: Estimated within each lithology. No boundaries at mineralisation wireframes or the redox layers. Only blocks with an estimated gold grade were estimated for iron. Blocks without gold grade estimates were assigned the default values.

Table 14.8.4 Multi-Element Grade Estimation Methods and Parameters

Element	Arsenic	Sulphide Sulphur	Antimony	Iron
Domaining	**Mineralisation and REDOX layer**	**Mineralisation and REDOX layer**	**Mineralisation**	**Lithology**
Method	ID^3	ID^3	ID^3	ID^3
PASS 1 Sample Limits (CZ and Delya)				
Min. No.	2	2	2	2
Max. No.	15	15	15	15
Max. per Hole	5	5	5	5
Min. No. Holes	2	2	2	2
Sample Limits (NZ)				
Min. No.	4	4	4	4
Max. No.	12	12	12	12
Max. per Hole	3	3	3	3
Min. No. Holes	2	2	2	2
Search Ellipse				
Orientation	Dynamic Anisotropy	Dynamic Anisotropy	Dynamic Anisotropy	Dynamic Anisotropy
Major (m)	50	50	50	50
Semi-major (m)	50	50	50	50
Minor (m)	10	10	10	10
PASS 2 Sample Limits (CZ and Delya)				
Min. No.	1	1	1	1
Max. No.	15	15	15	15
Max. per Hole	5	5	5	5
Min. No. Holes	1	1	1	1
Sample Limits (NZ)				
Min. No.	1	1	1	1
Max. No.	12	12	12	12
Max. per Hole	3	3	3	3
Min. No. Holes	1	1	1	1
Search Ellipse				
Orientation	Dynamic Anisotropy	Dynamic Anisotropy	Dynamic Anisotropy	Dynamic Anisotropy
Major (m)	100	100	100	100
Semi-major (m)	100	100	100	100
Minor (m)	10	10	10	10
Notes	Laterite assigned by default. Applied 3:3:1 weighting at CZ, 5:5:1 at NZ.	Laterite assigned by default. Applied 3:3:1 weighting at CZ, 5:5:1 at NZ.	Applied 3:3:1 weighting at CZ, 5:5:1 at NZ.	Estimation limited to blocks with gold grades.

Table 14.8.5, Table 14.8.6 and Table 14.8.7 summarise the statistics for the multi-element values for Massawa CZ, NZ and Delya respectively.

Table 14.8.5 Massawa CZ (Multi-Element Sample Statistics and Default Values)

Layer	Domain	Sulphide Sulphur (%)		Arsenic (%)	
		Count	Average	Count	Average
Laterite	Inside Min. Zone	13	0.02	74	0.14
	Outside			187	0.07
Oxidised	Inside Min. Zone	899	0.05	2448	0.16
	Outside			2102	0.09
Reduced	Inside Min. Zone	3287	1.13	3943	0.43
	Outside	2781	0.77	3951	0.11

Lithology Domain	Iron (%)		Antimony (ppm)		
	Count	Average	Domain	Count	Average
Volcanics Main	5601	4.7	Inside Min. Zone	3728	401
Volcanics West	2775	3.8	Outside Min. Zone	6346	111
Greywacke	2395	5.2			
Gabbro in Greywacke	1522	8.7			
Gabbro in Volcanics	69	6.6			
Mafic Dyke	276	6.1			
Quartz Feldspar Porphyry	2857	3.4			
Carbonaceous Sediments	88	5.6			
Laterite	261	15.4			

Table 14.8.6 Massawa NZ (Multi-Element Sample Statistics and Default Values)

Layer	Domain	Sulphide Sulphur (%)		Arsenic (%)	
		Count	Average	Count	Average
Laterite	Inside Min. Zone	21	0.01	21	0.23
	Outside Min. Zone	15	0.01	13	0.16
Oxidised	Inside Min. Zone	527	0.05	540	0.16
	Outside Min. Zone	514	0.01	518	0.08
Reduced	Inside Min. Zone	1,575	0.97	1,583	0.43
	Outside Min. Zone	1,341	0.33	1,432	0.10

Lithology Domain	Iron (%)		Antimony (ppm)		
	Count	Average	Domain	Count	Average
Volcanic Rocks	279	4.43	Inside Min. Zone	2,115	391
Greywacke	2,592	5.85	Outside Min. Zone	2,000	57
Gabbro	204	9.11			
Quartz Feldspar Porphyry	249	4.45			
Carbonaceous Sediments	784	5.62			
Laterite	32	12.83			

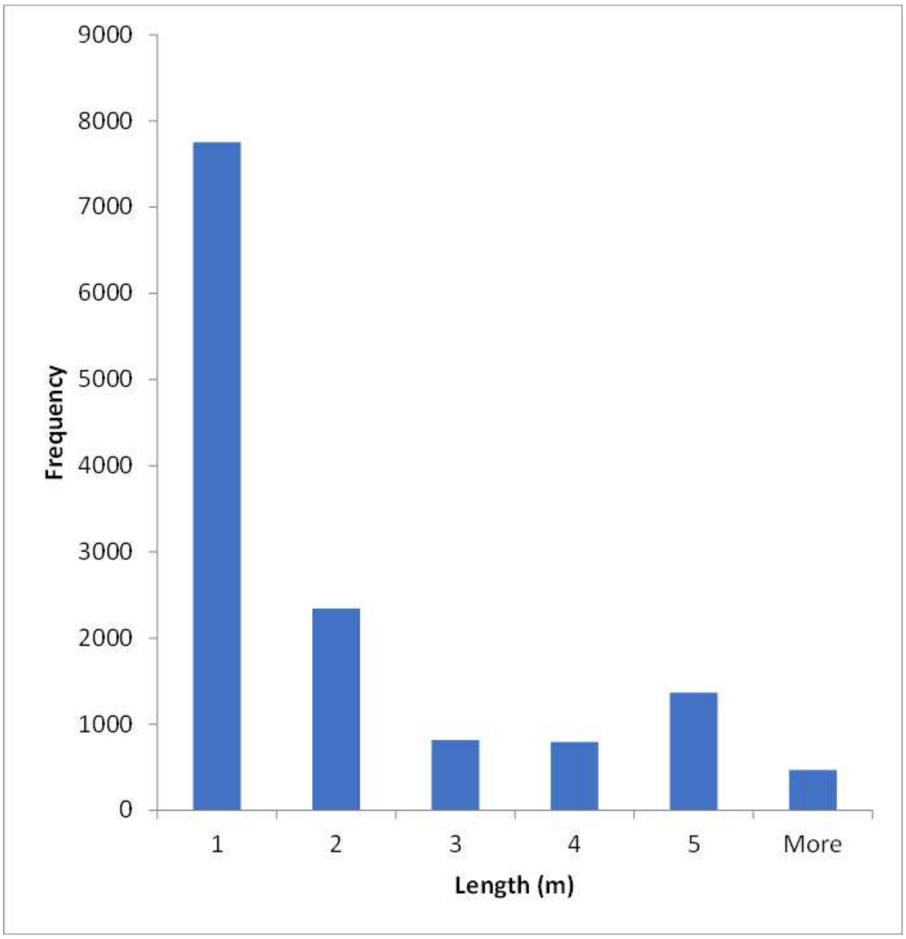
Table 14.8.7 Delya (Multi-Element Sample Statistics and Default Values)

Layer	Domain	Sulphide Sulphur (%)		Arsenic (%)		Antimony (ppm)	
		Count	Average	Count	Average	Count	Average
Oxidised	Min. Zone	15	0.20	102	0.72	102	57
Reduced	Min. Zone	87	1.14				

Lithology Domain	Iron (%) Average (from NZ)
Volcanic Rocks	4.43
Greywacke	5.85
Mafic Dyke	9.11
Dolerite	9.11
Quartz Feldspar Porphyry	4.45
Carbonaceous Sediments	5.62
Laterite	12.83

As discussed in Section 11, Sampling Preparation, Analyses and Security, the multi-element database was compiled from several sources. Some analyses were based on the same assay interval as gold, whereas other samples were composites of up to five one metre assay intervals. Given the distribution (see Figure 14.8.1) of these lengths and composited samples, Endeavour selected to use the original sample intervals in the grade estimates.

Figure 14.8.1 Histogram of Sample Lengths of Multi-Element Analyses at Massawa CZ



Source: Endeavour, March 2022.

14.8.8 Sofia

Sofia block grades were estimated using ID3 and dynamic anisotropy in Vulcan. Domain models were used as hard boundaries to limit the extent of influence of composite grades within the domains. Search ranges were determined visually based on continuity of mineralisation and drill hole spacing. Three estimation passes were run with increasing major, semi-major and minor search ranges applied to successive passes. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.8.9 Bambaraya

Bambaraya have been estimated using ID2 using one pass of the search ellipse.

14.8.10 Tina

Tina block grades were estimated using ID2 and dynamic anisotropy in Surpac. Domain models were used as hard boundaries to limit the extent of influence of composite grades within the domains. Search ranges were determined visually based on continuity of mineralisation and drill hole spacing. Two estimation passes were run with increasing major, semi-major and minor search ranges applied to successive passes. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.8.11 Samina

Samina block grades were also estimated using ID2 and dynamic anisotropy in Surpac. Domain models were used as hard boundaries to limit the extent of influence of composite grades within the domains. Search ranges were determined visually based on continuity of mineralisation and drill hole spacing. Two estimation passes were run with increasing major, semi-major and minor search ranges applied to successive passes. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.8.12 Sofia North Extension

Sofia North Extension block grades were estimated using ID2 and dynamic anisotropy in Datamine. Domain models were used as hard boundaries to limit the extent of influence of composite grades within the domains. Search ranges were determined visually based on continuity of mineralisation and drill hole spacing. Two estimation passes were run with increasing major, semi-major and minor search ranges applied to successive passes. The number of samples and holes were stored in separate block variables for use in determining resource classification.

14.9 Bulk Density Models

14.9.1 Sabodala Properties

Oxidation surfaces were constructed for each deposit by modelling individual points representing the base of the weathered rock profiles in each drill hole. Oxidation surfaces were used as hard boundaries with respect to density assignments. Summaries by deposit are provided below:

- For Goumbati West – Kobokoto, Niakafiri East and Niakafiri West oxide domains were subdivided into laterite, saprolite and transition sub-domains based on core photos, density determinations and logged lithology.
- Average bulk densities for Maki Medina were applied separately to mineralised and unmineralised portions of the oxide and fresh rock sub-domains.

- The average bulk density for oxide for Gora was estimated as density determinations were not taken. Average bulk densities were applied separately to mineralised and unmineralised portions of the fresh rock sub-domains.
- Bulk density determinations for Sabodala were flagged with lithology and oxide models then averaged by lithology type.
- A range of bulk densities were applied to the oxide domain for Masato. Average bulk densities were applied separately to mineralised and unmineralised portions of the fresh rock sub-domains.
- Bulk densities were averaged for oxide and fresh rock for Golouma, Kerekounda, Kouroulouolou, Kouroundi and Diadiako.
- For Kinemba, Koutouniokollo, Mamasato and Sekoto bulk densities were estimated using the inverse distance squared method. Un-interpolated blocks were assigned the average bulk densities for the oxide and fresh rocks.
- As the majority of drilling at Soukhoto was RC, sufficient representative core was not available for bulk density determinations. Average bulk densities for Soukhoto and Marougou were determined from existing data in similar lithologies.

Average bulk densities are presented in Table 14.9.1.

Table 14.9.1 Sabodala Average Bulk Densities

Deposit	Oxide				Fresh Rock (t/m^3)
	Average (t/m^3)	Laterite (t/m^3)	Saprolite (t/m^3)	Transition (t/m^3)	
Diadiako	2.70	-	-	-	2.70
Golouma	2.19	-	-	-	2.82
Golouma North	-	-	2.03	2.40	2.83
Gora	2.53	-	-	-	2.72 (veins) 2.77 (waste)
Goumbati West - Kobokoto	-	1.86	1.86	2.34	2.72
Kerekounda	2.00	-	-	-	2.80
Kinemba	1.75	-	-	-	2.84
Kouroulouolou	2.11	-	-	-	2.74
Kouroundi	2.64	-	-	-	2.90
Koutouniokollo	2.14	-	-	-	2.78
Maki Medina Mineralisation	-	1.83	1.83	2.29	2.71
Maki Medina Waste		1.92	1.92	2.36	2.76
Mamasato	2.46	-	-	-	2.81
Marougou	2.00	-	-	-	2.75
Masato Mineralisation	1.87 to 2.22	-	-	-	2.84
Masato Waste	1.87 to 2.22	-	-	-	2.80
Niakafiri East	-	1.75	1.75	1.91	2.85
Niakafiri West	-	1.67	1.67	1.86	2.76
Sekoto	1.83	-	-	-	2.44
Soukhoto	2.20	-	-	-	2.75

14.9.1.1 Sabodala

Bulk density determinations were flagged with lithology and oxide models, and then averaged by lithology type. Although local variances are not preserved, calculated averages are within reasonable limits for each lithology and were used in the final block model.

There were no bulk density determinations located in the oxide portion of the porphyry and therefore the average bulk density was determined from the original lithology flagging of a previous oxide model. Adjusted bulk densities were calculated to account for partial rock blocks adjacent to the topographical surface. Table 14.9.2 lists the average bulk densities assigned to the Sabodala block model.

Table 14.9.2 Sabodala Deposit Bulk Density by Lithology

Lithology	Fresh		Oxide	
	Samples (No.)	Average (t/m^3)	Samples (No.)	Average (t/m^3)
Volcaniclastics West	1626	2.84	17	2.76
Ultramafics	2166	2.85	40	2.52
Gabbro	7878	2.85	90	2.17
Volcaniclastics East	9960	2.82	261	2.34
Mylonite	1884	2.73	7	2.14
Basalt	12 976	2.87	82	2.38
Felsic Porphyry	459	2.75	assigned	2.68

14.9.1.2 Masato

Based on 1,091 density measurements performed on diamond drill core in oxides, dry bulk density was determined to be related to the height above the base of oxide surface, where the highest densities occur in the first 10 m immediately above the base of oxide and the lowest occur higher up at 50 m or more above the base of oxide (Srivastava, 2014). A regression curve was generated to predict average dry bulk density as a function of the height above the base of oxide. Immediately above the base of oxide surface, the regression curve predicts an average density of 2.22 t/m^3; 50 m above the base of oxide, it predicts an average density of 1.87 t/m^3.

Of the density measurements taken in fresh rock, approximately half were taken in mineralisation domains. The average density is 2.84 t/m^3 in mineralised fresh rock and is 2.80 t/m^3 in unmineralised fresh rock. Masato bulk densities are included in Table 14.9.3.

14.9.2 Massawa Properties

Densities for deposits located on the Massawa properties were assigned by deposit, lithology and weathering layer (see Table 14.9.3). Density values are hard coded into all block models based on the lithology and weathering. Where density data does not exist for the satellite deposits, the density from the nearest deposit on the same shear zone with the same weathering and lithology combination was applied.

Table 14.9.3 Massawa Bulk Densities by Deposit, Lithology and Weathering Zone

Deposit	Lithology	Saprolite (t/m³)	Saprock (t/m³)	Fresh Rock (t/m³)
CZ	Cover/Laterite	1.87		
	Quartz-Feldspar Porphyry	1.88	2.45	2.73
	Gabbro	1.88	2.45	2.85
	Mafic Dyke	1.88	2.45	2.85
	Volcanic Rocks	1.88	2.45	2.77
	Greywacke	1.88	2.45	2.78
	Mineralisation	1.90	2.42	2.81
NZ	Cover/Laterite	1.87		
	Greywacke	1.90	2.24	2.75
	Carbonaceous schist	1.90	2.26	2.72
	Quartz-Feldspar Porphyry	1.90	2.29	2.72
	Gabbro	1.90	2.33	2.85
	Volcanic Rocks	1.90	2.31	2.74
	Mineralisation	1.66 to 2.21	2.25 to 2.35	2.72 to 2.83
Sofia	Laterite	1.94		
	Volcanics	1.87	2.43	2.79
	Gabbro	1.83	2.40	2.83
	QFP	1.66	2.36	2.73
	QD	1.66	2.36	1.79
	Iron Stone	1.87	2.40	2.87
	Dolerite	1.83	2.40	2.87
	Mineralisation	1.77	2.28	2.79
Delya	Dolerite			2.88
	Mafic Dyke	1.87	2.38	2.82
	Carbonaceous Shale	2.02	2.46	2.81
	Chert	2.04	2.69	2.81
	Andesite	2.20	2.76	2.87
	Greywacke	1.78	2.54	2.71
	Schist	2.02	2.58	2.84
	Mineralisation	2.09	2.40	2.83
Tina	Laterite	2.00		
	Bedrock	1.80	2.25	2.77
Samina	Laterite	2.00		
	Country rock	1.90	2.30	2.77

14.10 Block Grade Validation

Block model grade validation includes a visual validation, as well as a comparison of the average block grade to the average composite grade by domain. In some domains, average block grades were higher than average composite grades due to widely spaced high grade composites influencing a larger number of blocks. Visual validation comparing assay and composite grades to block grade estimates showed reasonable correlation with no significant overestimation or overextended influence of high grades.

Swath plots were generated for most deposits to compare average composite grades to average block grades along different directions. Local average composites may be more variable than average block grades; however, the swath plots demonstrate a reasonable correlation between the composite grades and block grade estimates.

Significant differences in average block grades to average sample grades were investigated on a domain by domain basis both visually and statistically. In all cases, the differences are attributable to clustering of samples such as in areas drilled at grade-control spacing, or in areas of wider spaced such as at depth.

14.11 Resource Classification

Definitions for Mineral Resource categories used in this Technical Report are consistent with those defined by CIM (2014) and adopted by NI 43-101. In the CIM classification, a Mineral Resource is defined as 'a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction'. Mineral Resources are classified into Measured, Indicated and Inferred categories. A Mineral Reserve is defined as the 'economically mineable part of a Measured and/or Indicated Mineral Resource' demonstrated by studies at Pre-feasibility or Feasibility level as appropriate. Mineral Reserves are classified into Proven and Probable categories.

Resource classification is primarily based on drill hole spacing and continuity of grade and is manually assigned using resource classification wireframes. The classification criteria differ slightly depending on the deposit and supporting drill data. Each of the significant deposits are described below.

14.11.1 Sabodala

Resource classification is primarily based on drill hole spacing and continuity of grade and was manually assigned using resource classification wireframes.

Additional estimation runs were completed for classification of Measured Resources. Blocks estimated by OK, using search ranges corresponding to the first variogram structures with a minimum of two drill holes, and well established geological and grade continuity were classified as Measured Resources. Blocks estimated by ID2, using a 20 m by 20 m by 20 m search range with a minimum of two drill holes, were also classified as Measured Resources.

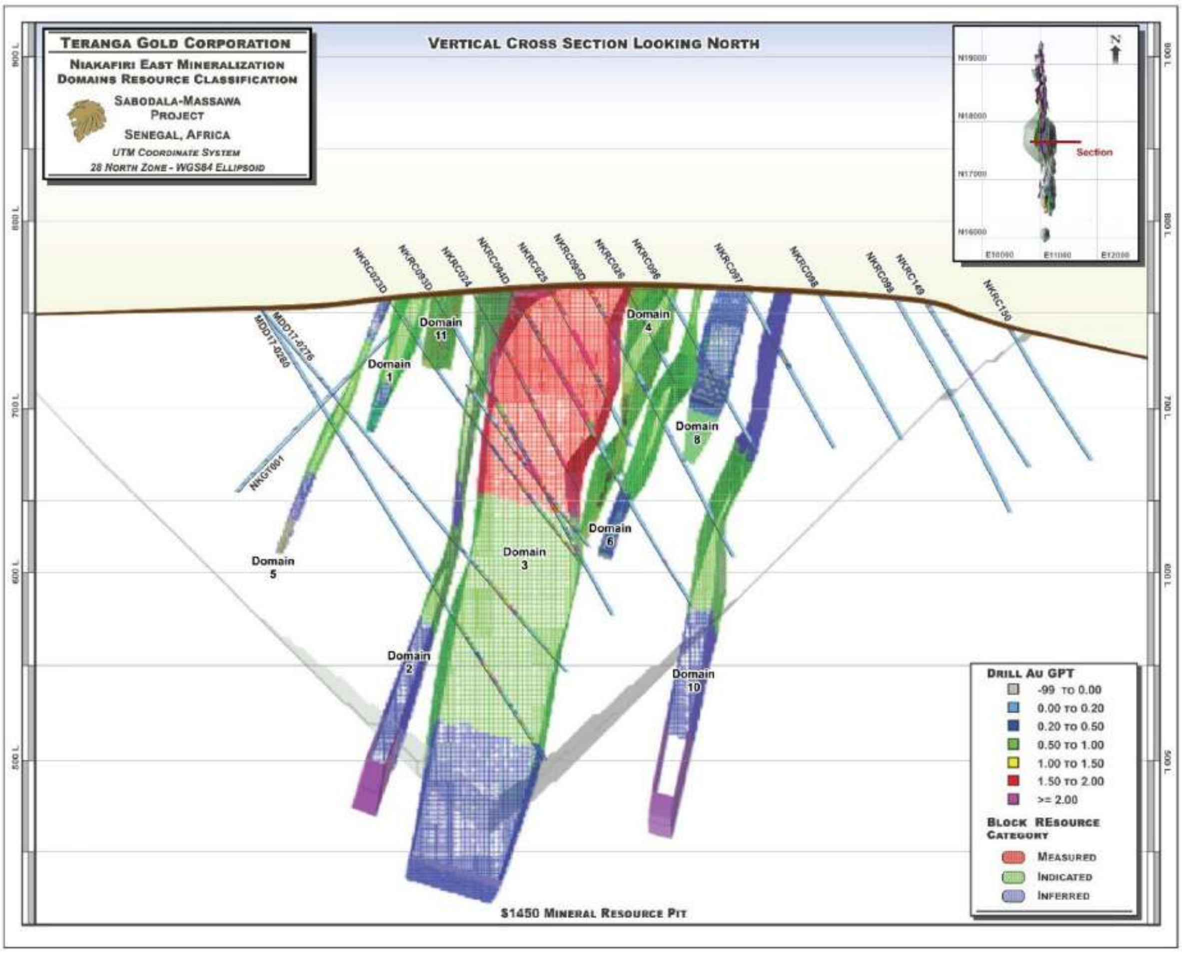
Blocks estimated during the second estimation run with a minimum of two holes were classified as Indicated Resources where geological and grade continuity has been sufficiently established.

Inferred Resources were defined with the third estimation run based on the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

14.11.2 Niakafiri East

Niakafiri East resource classification within gold mineralisation domains is primarily based on drill hole spacing and continuity of gold grade and was manually completed. Blocks estimated in the first estimation pass with a maximum spacing of 30 m were classified as Measured Resources. All other blocks estimated in the first pass with a minimum of two holes were classified as Indicated Resources. Inferred Resources were assigned to blocks estimated in the second and third estimation passes. Blocks estimated outside of the domains and inside the buffer zones in the first and second estimation passes were classified as Inferred Resources. Niakafiri East resource classification is presented in Figure 14.11.1.

Figure 14.11.1 Example Vertical Cross Section of the Resource Classification at Niakafiri East



Source: Teranga, July 2020.

14.11.3 Niakafiri West

Resource classification at Niakafiri West is primarily based on drill hole spacing and continuity of grade and was manually assigned using resource classification wireframes.

Blocks in the domain wireframes estimated in the first estimation pass with a minimum of two holes were classified as Indicated Resources. Inferred Resources were defined within the second and third estimation passes, based on the wide spacing of drill holes and resultant uncertainty in geological and grade continuity. Blocks estimated outside of the domains and inside the buffer zones in the first and second estimation passes were classified as Inferred Resources.

14.11.4 Masato

Mineral Resource classification of the M1, M2, FW1 to FW3 and HW1 to HW6 domains is primarily based on drill hole spacing and continuity of grade and was manually assigned using resource classification wireframes. In general, blocks estimated in the first estimation pass with a minimum of two holes were classified as Indicated Resources. Inferred Resources were defined within the second estimation pass, based on the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

The Min1 to Min6 domains located at depth were classified as Inferred Resources due to the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

14.11.5 Golouma

Resource classification is primarily based on drill hole spacing and continuity of grade and was manually assigned using resource classification wireframes.

Blocks estimated by OK, using search ranges corresponding to the first estimation pass with a minimum of two drill holes, and sufficiently established geological and grade continuity were classified as Indicated Resources. Blocks estimated by ID2, using search ranges corresponding to the first estimation pass with a minimum of two drill holes, were also classified as Indicated Resources.

Inferred Resources were defined within the second estimation pass, based on the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

14.11.6 Maki Medina

Mineral Resource classification is primarily based on drill hole spacing and continuity of grade and was manually assigned using resource classification wireframes. In general, blocks estimated in the first estimation pass with a minimum of two holes were classified as Indicated Resources. An Inferred Resource limit was defined by the extent of the second estimation pass, with all blocks estimated in the second and third passes inside this limit classified as Inferred Resources. The Inferred Resource classification was based on the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

14.11.7 Goumbati West - Kobokoto

Resource classification is primarily based on drill hole spacing and continuity of grade and was manually assigned using resource classification wireframes.

Blocks in the domain wireframes estimated in the first estimation pass with a minimum of two holes were classified as Indicated Resources. Inferred Resources were defined with the second and third estimation passes in the domain wireframes, based on the wide spacing of drill holes and resultant uncertainty in geological and grade continuity. Blocks estimated outside of the domains and inside the buffer zones in the first and second estimation passes were classified as Inferred Resources.

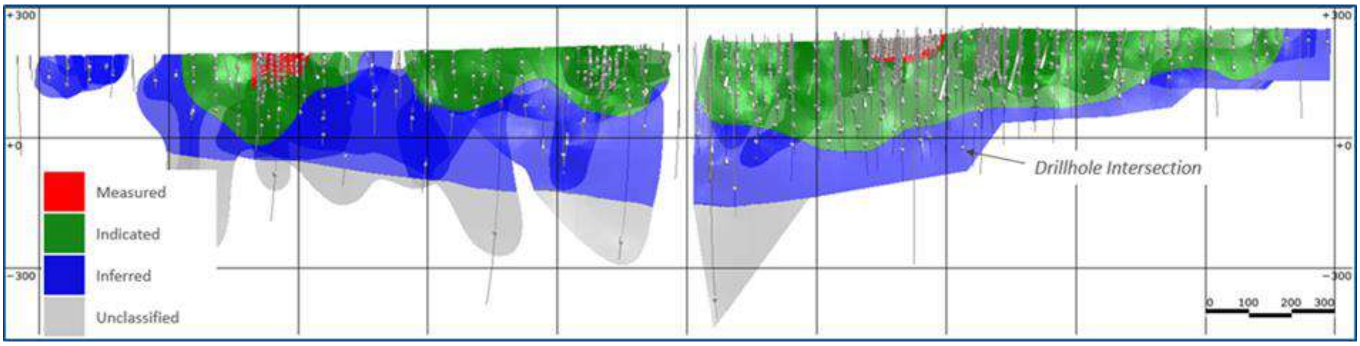
14.11.8 Sofia

Mineral Resource classification is primarily based on drill hole spacing and continuity of grade and was manually assigned using resource classification wireframes. In general, blocks estimated in the first estimation pass with a minimum of three holes were classified as Measured Resources. Blocks estimated in the second estimation pass with a minimum of two holes were classified as indicated Resources. Inferred Resources were defined with the second and third estimation passes in the domain wireframes, based on the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

14.11.9 Massawa NZ

Measured, Indicated and Inferred Mineral Resources were assigned where drill hole spacings of 20 m, 50 m and 100 m were achieved, respectively, and modified to consider geological understanding and grade continuity. Measured and Indicated drill hole spacings in turn reference the modelled variogram ranges at 85% and 95% of the modelled variogram range. Inferred drill hole spacing represents approximately 100% of the variogram range. The modelled variogram has a long rise to the sill and the classification criteria considers this observation (see Figure 14.11.2).

Figure 14.11.2 Longitudinal Section of Massawa North Zone Classification

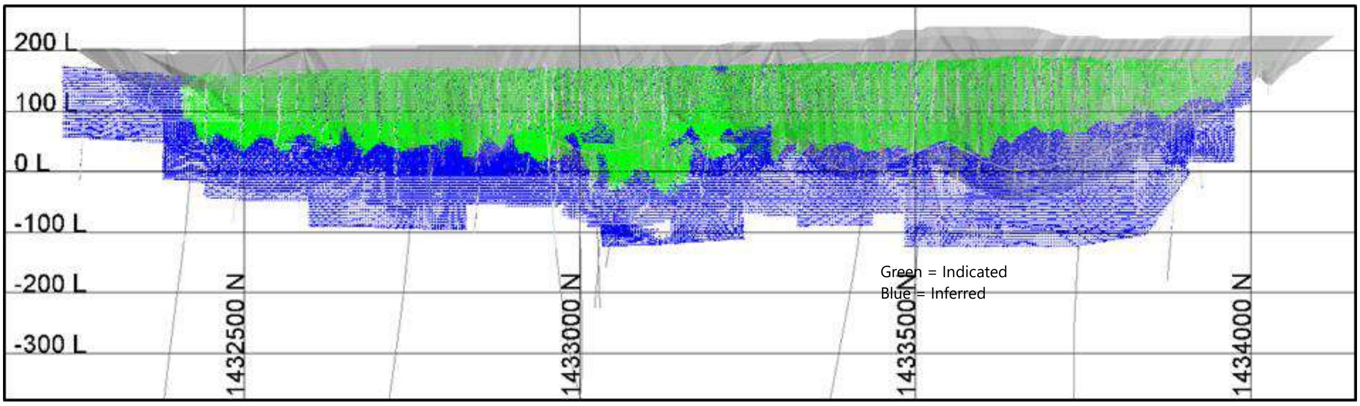


Source: Endeavour, March 2022.

14.11.10 Massawa CZ

Massawa CZ blocks were classified using manually generated wireframes. Blocks were assigned to the Measured Mineral Resource category in areas with 10 m drill hole spacing. Indicated Mineral Resources required a drill hole spacing of approximately 30 m. Inferred Mineral Resources required an approximate 60 m drill hole spacing. Massawa CZ resource classification is presented in Figure 14.11.3.

Figure 14.11.3 Longitudinal Section of Massawa Central Zone Classification

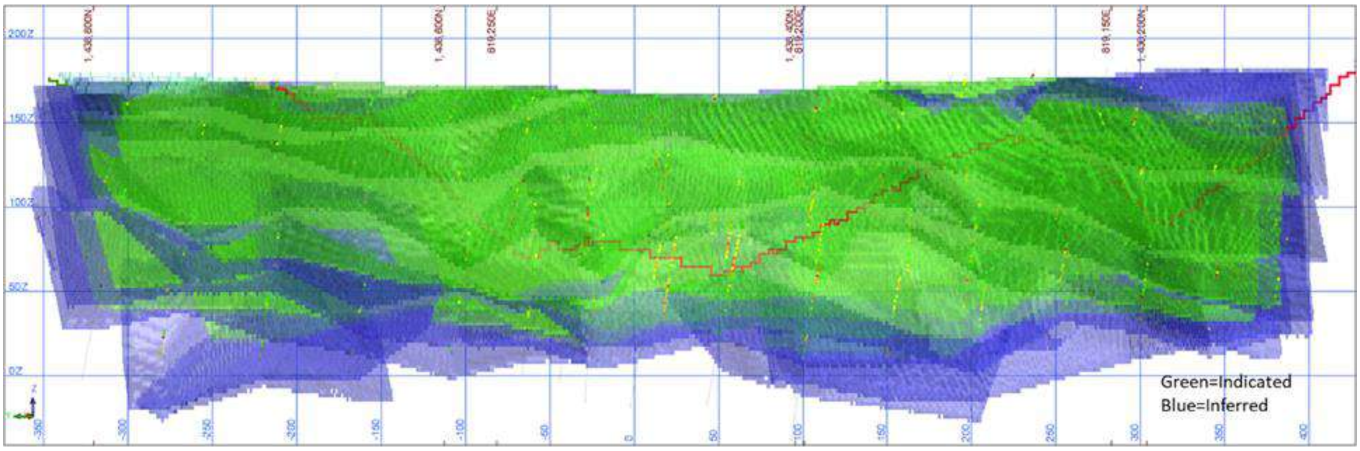


Source: Endeavour, March 2022.

14.11.11 Tina

Tina blocks were classified using manually generated wireframes. Indicated Mineral Resources were typically defined in areas with a drill hole spacing of 25 m along sections, and 40 m to 50 m between sections where there was a reasonable level of confidence in geological and grade continuity. Inferred Mineral Resources were typically defined in areas with a drill hole spacing of 50 m to 75 m, and where the controls on mineralisation are less well understood, or the continuity is much reduced. Tina Mineral Resource classification is presented in Figure 14.11.4

Figure 14.11.4 Longitudinal Section of Tina Classification

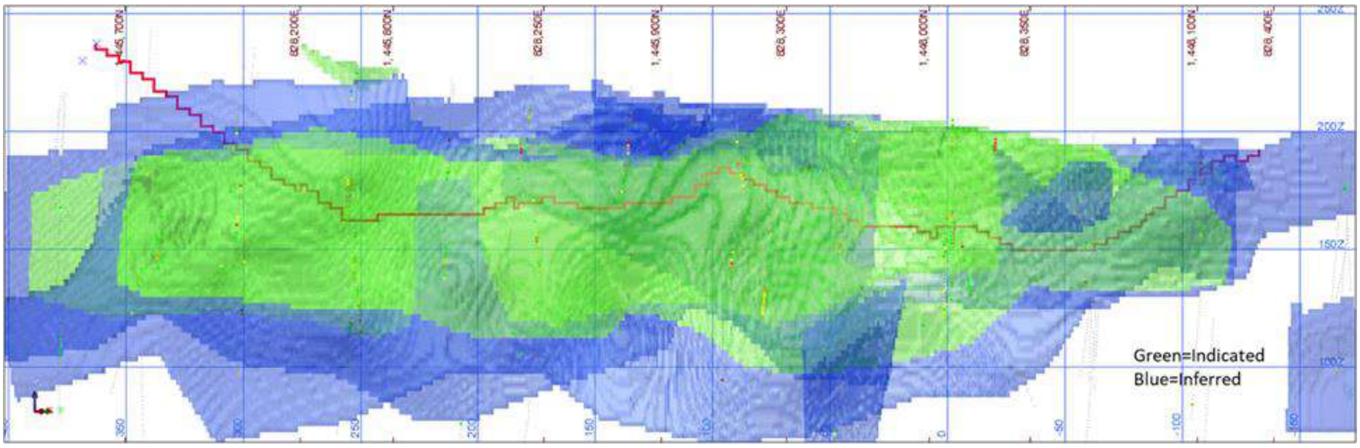


Source: Endeavour, March 2022.

14.11.12 Samina

Samina blocks were classified using manually generated wireframes. Indicated Mineral Resources were typically defined in areas with a drill hole spacing of 20 m to 30 m along sections, and 40 m to 50 m between sections, where there is a reasonable level of confidence in geological and grade continuity. Inferred Mineral Resources were typically defined in areas with a drill hole spacing of 50 m to 75 m, and where the controls on mineralisation are less well understood, or the continuity is much reduced. Samina Minera Resource classification is presented in Figure 14.11.5

Figure 14.11.5 Longitudinal Section of Samina Classification

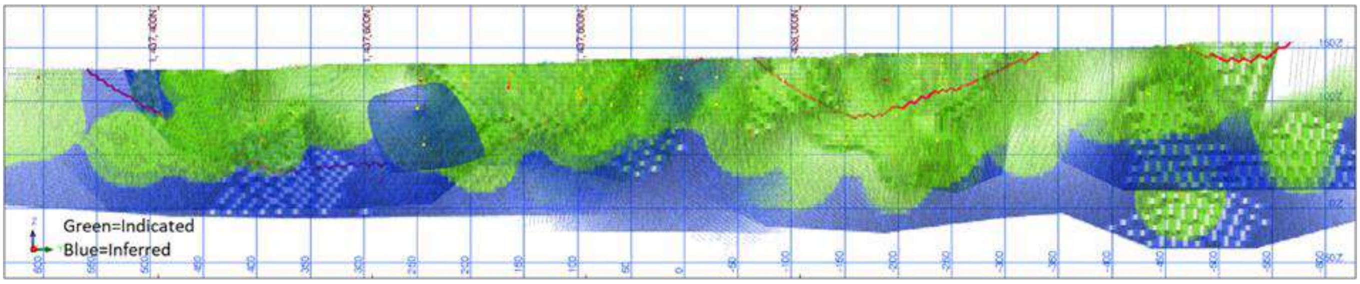


Source: Endeavour, March 2022.

14.11.13 Sofia North Extension

Indicated Mineral Resources were typically defined in areas with a drill hole spacing of 20 m to 40 m along sections, and 40 m to 50 m between sections, with multiple pierce points per individual structure both along strike and down dip where there is a reasonable level of confidence in geological and grade continuity. Inferred Mineral Resources were typically defined in areas with a drill hole spacing of 50 m to 75 m, and where the controls on mineralisation are less well understood, or the continuity is much reduced. Sofia North Extension Mineral Resource classification is presented in Figure 14.11.6

Figure 14.11.6 Longitudinal Section of Sofia North Extension Classification



Source: Endeavour, March 2022.

14.11.14 Other Deposits and Prospects

Kerekounda classification was primarily based on drill hole spacing and continuity of grade and was manually completed. Blocks estimated by OK, using search ranges corresponding to the first estimation pass with a minimum of two drill holes, with sufficiently established geological and grade continuity were classified as Indicated Resources. A small proportion of blocks were classified as Measured Mineral Resources where sufficient support data was available.

Golouma North classification was based on drill hole spacing and continuity of grade. Blocks estimated in the first estimation pass with a minimum of two holes and a maximum spacing of 30 m were classified as Indicated Mineral Resources. Inferred Mineral Resources were assigned to all other blocks estimated in the first, second and third estimation passes based on the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

Diadiako, Koutouniokolla, Marougou, Sekoto and Soukhoto Mineral Resources were classified as Inferred Resources due to the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

Kinemba and Kouroundi Mineral Resources were classified as Indicated and Inferred Resources based on the variogram ranges and OK estimation passes. Additional broad wireframe envelopes were generated to reclassify small discontinuous clusters of estimated blocks to correspond to the resource category of the surrounding blocks.

Kourouloulou and Mamasato Mineral Resources have been classified as Indicated and Inferred Resources based on the ID2 estimation passes. Additional broad wireframe envelopes were generated to reclassify small discontinuous clusters of estimated blocks to correspond to the resource category of the surrounding blocks.

Bambaraya Mineral Resources were classified as Inferred Resources due to the wide spacing of drill holes and resultant uncertainty in geological and grade continuity.

14.12 Open Pit Constraints and Cut-Off Grade

For reporting of open pit Mineral Resources, open pit shells were produced for each of the resource models using Whittle open pit optimisation software. Only classified blocks greater than or equal to the open pit cut-off grades and within the open pit shells were reported as Mineral Resources in compliance with the CIM (2014) resource definition requirement of 'reasonable prospects for eventual economic extraction'.

Operating parameters for the optimisations and cut-off grade estimates were based on geotechnical recommendations, site operating experience, production data and life-of-mine planning. The open pit operating parameters for the Sabodala deposits and prospects are summarised in Table 14.12.1. The open pit operating parameters for the Massawa deposits are summarised in Table 14.12.2. A range is provided as appropriate to cover all deposits, along with the estimated cut-off grades, for each rock type.

Table 14.12.1 Summary of Sabodala Open Pit Operating Parameters

Parameter	Weathering Type	Value
Gold Price		USD 1500/oz
Pit Slope	Oxide	(30.5 to 36.7)°
	Transition	40°
	Fresh	(44 to 56)°
Mining Dilution		0%
Mining Recovery		95%
Base Mining Cost		USD (2.09 to 2.71)/t mined
Ore Transport Cost to Mill		USD (0.00 to 4.17)/t milled
Ore Re-Handling Cost		USD 0.50/t milled
CIL Process Recovery	Oxide	(85.2 to 91.2)%
	Transition & Fresh	(85.8 to 91.2)%
CIL Process Cost	Oxide	USD (9.31 to 9.65)/t milled
	Transition & Fresh	USD (10.84 to 11.43)/t milled
G&A Cost	Oxide	USD (3.87 to 5.05)/t milled
	Transition & Fresh	USD (4.19 to 5.58)/t milled
Gold Transp./Refining Less Ag Revenue		USD 2.35/oz Au
Metal Payable at Refinery		99.92%
Royalty		5%
Cut-Off Grade	Oxide	(0.33 to 0.48) g/t Au
	Transition & Fresh	(0.37 to 0.54) g/t Au

Note:
No additional mining dilution or recovery factors have been applied in excess of standard SMU sizes in the process of defining limits of pit boundaries.

Table 14.12.2 Summary of Massawa Open Pit Operating Parameters

Parameter	Weathering Type	Value
Gold Price		USD 1,500/oz
Pit Slope	Oxide	(33.8 to 40.3)°
	Transition	(43.2 to 49)°
	Fresh	(52.5 to 58.9)°
Mining Dilution		0%
Mining Recovery		95%
Reference Mining Cost		USD (2.28 to 2.52)/t mined
Ore Transport Cost to Mill		USD (3.57 to 4.17)/t milled
SWOLP Process Recovery	Oxide	(85 to 93)%
	Transition & Fresh	(79.6 to 86.0)%
SSTP Process Recovery		88.30%
SWOLP Process Cost	Oxide	USD (9.17 to 9.63)/t milled
	Transition & Fresh	USD (11.08 to 13.36)/t milled
SSTP Process Cost	Transition & Fresh	USD 36.07/t milled
G&A Cost	Oxide	USD (3.65 to 5.20)/t milled
	Transition & Fresh	USD (3.65 to 5.53)/t milled
Gold Transp./Refining Less Ag Revenue		USD 2.35/oz Au
Metal Payable at Refinery		100.00%
Royalty		5%
Cut-Off Grade	Oxide	(0.44 to 0.50) g/t Au
	Transition & Fresh	(0.50 to 1.09) g/t Au

Note:
No additional mining dilution or recovery factors have been applied in excess of standard SMU sizes in the process of defining limits of pit boundaries

The site discard cost, along with consideration of the gold price and gold processing recovery, were used to estimate the cut-off grades for reporting Mineral Resources. The estimated cut-off grades at Sabodala range from (0.33 to 0.48) g/t Au for oxide mineralisation and from (0.37 to 0.54) g/t Au for transition and fresh rock mineralisation. The estimated cut-off grades at Massawa range from 0.44 g/t Au to 0.50 g/t Au for oxide mineralisation and from 0.50 g/t Au to 1.09 g/t Au for transition and fresh rock mineralisation.

Tina, Samina and Sofia North Extension pit optimisation parameters are shown in Table 14.12.3.

Table 14.12.3 Summary of Tina, Samina and Sofia N. Ext. Open Pit Optimisation Parameters

Parameter	Units	Tina	Samina	Sofia N. Ext.
Mining Ore Loss	%	95	95	95
Mining Dilution	%	0	0	0
Pit Slope	degrees	42	40	40
Base mining Cost	USD/t	2.35	2.35	2.00
Oxide Mining Cost + Haulage	USD/t	7.00	8.12	4.00
Transition Mining Cost + Haulage	USD/t	7.20	8.35	na
Fresh Mining Cost + Haulage	USD/t	7.50	8.64	5.00
Oxide Processing Cost	USD/t	14.00	14.00	12.00
Transition Processing Cost	USD/t	40.32	40.32	14.00
Fresh Processing Cost	USD/t	40.40	40.40	18.00
Oxide Process Recoveries	%	92.0	92.0	90.0
Transition Process Recoveries	%	85.0	85.0	90.0
Fresh Process Recoveries	%	85.0	85.0	90.0
Gold Selling Cost (royalties + refining + selling)	USD/oz	80	80	80

14.13 Underground Constraint and Cut-Off Grade

For reporting of underground Mineral Resources, only classified blocks greater than or equal to the underground cut-off grade outside of the open pit shells were reported. For the underground resource estimates at Sabodala and Massawa, it was determined by visual examination that sufficient mining width and continuity existed within the resource wireframes at the estimated cut-off grades for the purpose of estimating underground resources. This is in compliance with CIM (2014) resource definition requirements. In addition, Deswik Stope Optimiser software was used to generate wireframe models to constrain blocks satisfying minimum size and continuity criteria, which were used for reporting Sabodala underground Mineral Resources. Underground G&A costs are higher than for the open pits as they are considered as a standalone cost versus incremental to the operation. The underground operating parameters for the Sabodala deposits and Massawa NZ are summarised in Table 14.13.1 and Table 14.13.2 respectively, along with the estimated cut-off grades.

Table 14.13.1 Summary of Sabodala UG Operating Parameters

Parameter	Value
Gold Price	USD 1450/oz
Underground Mining Cost	USD 65.00/t mined
CIL Process Recovery - Fresh	92%
CIL Process Cost - Fresh	USD 15.50/t milled
Underground G&A Cost	USD 3.50/t milled
Gold Transp./Refining Less Ag Revenue	USD 2.35/oz Au
Metal Payable at Refinery	99.92%
Royalty	5%
Underground Cut-Off Grade – Fresh	2.0 g/t Au

Note:
Process cost includes transportation of mineralisation from the underground mine to the processing facilities.

Table 14.13.2 Summary of Massawa NZ UG Operating Parameters

Parameter	Value
Gold Price	USD 1450/oz
Underground Mining Cost	USD 65.00/t mined
BIOX Process Recovery - Fresh	88.3%
BIOX Process Cost - Fresh	USD 36.68/t milled
Underground G&A Cost	USD 3.72/t milled
Long Haul/Additional Haul	USD 5.39/oz Au
Refining and Transport	USD 3.00/oz Au
Metal Payable at Refinery	100.00%
Royalty	5%
Underground Cut-Off Grade – Fresh	2.84 g/t Au

14.14 Mineral Resource Estimate

The Mineral Resource estimates, inclusive of Mineral Reserves, as of 31 December 2021 are summarised by deposit in Table 14.14.1.

Table 14.14.1 Open Pit and Underground Mineral Resource Summary as of 31 December 2021

Deposit	Domain	Measured			Indicated			Measured & Indicated			Inferred		
		Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)
Sabodala	Open Pit	4 296	1.82	251	6 051	1.52	295	10 347	1.64	546	2 602	1.17	98
	Underground	-	-	-	1 715	3.62	200	1 715	3.62	200	464	3.60	54
	Combined	4 296	1.82	251	7 766	1.98	495	12 062	1.92	746	3 066	1.54	152
Masato	Open Pit	-	-	-	23 365	1.14	860	23 365	1.14	860	2	0.63	0
	Underground	-	-	-	855	2.70	74	855	2.70	74	1 759	2.88	163
	Combined	-	-	-	24 220	1.20	934	24 220	1.20	934	1 761	2.88	163
Golouma	Open Pit	-	-	-	-	-	-	-	-	-	26	2.62	2
	Underground	-	-	-	2 293	11.28	351	2 293	11.28	351	654	2.70	84
	Combined	-	-	-	2 293	4.76	351	2 293	4.76	351	680	3.93	86
Kerekounda	Open Pit	-	-	-	-	-	-	-	-	-	-	-	-
	Underground	-	-	-	790	5.24	133	790	5.24	133	205	5.97	39
	Combined	-	-	-	790	5.24	133	790	5.24	133	205	5.97	39
Maki Medina	Open Pit	-	-	-	710	1.23	28	710	1.23	28	42	1.08	1
	Underground	-	-	-	121	2.71	11	121	2.71	11	52	2.57	4
	Combined	-	-	-	831	1.45	39	831	1.45	39	95	1.90	6
Niakafiri East	Open Pit	4 855	1.35	211	13 258	1.11	471	18 113	1.17	682	3 749	0.86	104
	Underground	-	-	-	337	2.83	31	337	2.83	31	464	2.65	40
	Combined	4 855	1.35	211	13 595	1.15	502	18 449	1.20	713	4 213	1.06	143
Niakafiri West	Open Pit				2 311	1.02	76	2 311	1.02	76	561	0.87	16
	Underground	-	-	-	78	2.74	7	78	2.74	7	50	2.62	4
	Combined	-	-	-	2 389	1.08	83	2 389	1.08	83	611	1.01	20
Goumbati West - Kobokoto	Open Pit	-	-	-	1 675	1.36	73	1 675	1.36	73	79	1.06	3
	Underground	-	-	-	159	3.51	18	159	3.51	18	42	3.94	5

Table 14.14.1 Open Pit and Underground Mineral Resource Summary as of 31 December 2021

Deposit	Domain	Measured			Indicated			Measured & Indicated			Inferred		
		Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)
	Combined	-	-	-	1 834	1.55	91	1 834	1.55	91	121	2.06	8
Golouma North	Open Pit	-	-	-	158	1.35	7	158	1.35	7	278	1.46	13
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	-	-	-	158	1.35	7	158	1.35	7	278	1.46	13
Diadiako	Open Pit	-	-	-	-	-	-	-	-	-	139	1.50	7
	Underground	-	-	-	-	-	-	-	-	-	543	2.99	52
	Combined	-	-	-	-	-	-	-	-	-	682	2.69	59
Kinemba	Open Pit	-	-	-	18	1.04	1	18	1.04	1	79	0.97	2
	Underground	-	-	-	-	-	-	-	-	-	53	2.54	4
	Combined	-	-	-	18	1.04	1	18	1.04	1	132	1.60	7
Kourouloulou	Open Pit	-	-	-	29	10.10	9	29	10.10	9	7	6.45	1
	Underground	-	-	-	64	9.15	19	64	9.15	19	81	14.53	38
	Combined	-	-	-	93	0.91	28	93	0.91	28	88	1.27	39
Kouroundi	Open Pit	-	-	-	10	0.76	0	10	0.76	0	13	0.79	0
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	-	-	-	10	0.75	0	10	0.75	0	13	0.79	0
Koutouniokolla	Open Pit	-	-	-	-	-	-	-	-	-	70	1.70	4
	Underground	-	-	-	-	-	-	-	-	-	23	2.60	2
	Combined	-	-	-	-	-	-	-	-	-	93	1.92	6
Mamasato	Open Pit	-	-	-	506	1.48	24	506	1.48	24	218	1.23	9
	Underground	-	-	-							34	2.38	3
	Combined	-	-	-	506	1.48	24	506	1.48	24	252	1.39	11
Marougou	Open Pit	-	-	-	-	-	-	-	-	-	1 018	1.41	46

Table 14.14.1 Open Pit and Underground Mineral Resource Summary as of 31 December 2021

Deposit	Domain	Measured			Indicated			Measured & Indicated			Inferred		
		Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	-	-	-	-	-	-	-	-	-	1 018	1.41	46
Sekoto	Open Pit	-	-	-	-	-	-	-	-	-	479	0.87	13
	Underground	-	-	-	-	-	-	-	-	-	0	0.00	0
	Combined	-	-	-	-	-	-	-	-	-	479	0.87	13
Soukhoto	Open Pit	-	-	-	-	-	-	-	-	-	543	1.45	25
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	-	-	-	-	-	-	-	-	-	543	1.45	25
Sofia	Open Pit	108	1.99	7	5 438	2.37	414	5 546	2.36	421	1 141	2.47	91
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	108	1.99	7	5 438	2.37	414	5 546	2.36	421	1 141	2.47	91
Massawa CZ	OP Oxide	384	4.07	50	3 931	2.45	310	4 315	2.59	360	1 351	0.78	34
	OP Fresh CIL	13	0.81	0	2 810	0.80	72	2 823	0.80	72	1 168	0.72	27
	OP Fresh BIOX	51	5.35	9	9 851	3.86	1 222	9 902	3.86	1 230	2 016	2.90	188
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	448	4.12	59	16 593	3.01	1 603	17 040	3.03	1 662	4 535	1.70	248
Massawa NZ	OP Oxide	304	3.53	35	1 912	3.30	202	2 217	3.33	238	180	2.08	12
	OP Fresh CIL	38	0.76	1	649	0.74	15	687	0.74	16	28	0.74	1
	OP Fresh BIOX	132	3.28	14	4 782	4.64	713	4 915	4.60	727	260	4.80	40
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	476	3.24	50	7 343	3.95	932	7 818	3.90	981	468	3.51	53
Delya	OP Oxide	-	-	-	428	4.30	59	428	4.30	59	174	1.86	10
	OP Fresh CIL	-	-	-	32	0.75	1	32	0.75	1	15	0.70	0.3

Table 14.14.1 Open Pit and Underground Mineral Resource Summary as of 31 December 2021

Deposit	Domain	Measured			Indicated			Measured & Indicated			Inferred		
		Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)	Tonnes ('000s)	Grade (g/t Au)	Au ('000s oz)
	OP Fresh BIOX	-	-	-	675	4.05	88	675	4.05	88	265	3.32	28
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	-	-	-	1 135	4.05	148	1 135	4.05	148	453	2.68	39
Tina	Open Pit	-	-	-	3 587	1.49	172	3 587	1.49	172	194	1.29	8
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	-	-	-	3 587	1.49	172	3 587	1.49	172	194	1.29	8
Bambaraya	Open Pit	-	-	-	-	-	-	-	-	-	573	2.09	39
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	-	-	-	-	-	-	-	-	-	573	2	39
Samina	Open Pit	-	-	-	287	2.40	22	287	2.40	22	181	2.35	14
	Underground	-	-	-	-	-	-	-	-	-	-	-	-
	Combined	-	-	-	287	2.40	22	287	2.40	22	181	2.35	14
Total	**Open Pit**	**10 181**	**1.77**	**578**	**82 473**	**1.94**	**5 134**	**92 656**	**1.92**	**5 712**	**17 451**	**1.49**	**836**
	Underground	**-**	**-**	**-**	**6 412**	**4.09**	**844**	**6 412**	**4.09**	**844**	**4 424**	**3.46**	**492**
	Stockpile	**11 037**	**0.91**	**323**	**-**	**-**	**-**	**8 217**	**0.79**	**210**	**-**	**-**	**-**
	Combined	**21 218**	**1.32**	**901**	**88 885**	**2.09**	**5 978**	**107 285**	**1.96**	**6 766**	**21 875**	**1.89**	**1 328**

14.15 Reconciliation

Reconciliation of Mineral Reserves, production grade control and mill feed is conducted monthly, quarterly, and annually. Monthly reconciliation procedures have been established in-house and are recorded in an internal company document. Significant discrepancies identified in the monthly reconciliation are immediately investigated, to identify the source of the discrepancies and determine remediation procedures as quickly as possible.

Mineral Reserve and mill feed cut-off grades as well as stockpile practices at Sabodala have changed over time since commencement of production; however, during the period from January 2020 to October 2021 inclusive, a consistent cut-off grade of 1.0 g/t Au has been applied to mill feed.

For the purpose of reconciliation, the actual mined material is defined as the tonnage which is reported on a shift-by-shift basis combined with the grades estimated within the grade control model. Daily actual mined material is generated by the Endeavour production geology team. Daily mill feed tonnes and grades are generated by the Endeavour process team.

Two separate comparisons are utilised for monthly reconciliation. The first is a comparison of the actual mined (based on grade control models and include dilution and stockpile movements) against mill feed, and the second; is a comparison of the Mineral Reserve to actual mined. Grade control models are derived through RC drilling on a nominally 10 m grid and are intended to provide guidance for short term planning and ore recovery. The Mineral Reserve models are derived by applying dilution and recovery factors and are used for the LOM long term planning.

With respect to the placement of ore in marginal grade stockpiles for later processing, the following approach has been applied by deposit:

- Fresh rock ore mined in the (0.5 to 1.0) g/t Au grade range for Golouma West and Maki Medina is placed into marginal grade stockpiles to be processed at the end of the mine life.
- Fresh rock ore mined in the (0.6 to 1.0) g/t Au grade range for Sofia Main and Sofia North, and in the (0.45 to 1.0) g/t Au grade range for Sabodala is placed into marginal grade stockpiles to be processed at the end of the mine life.
- Oxide ore mined in the following grade ranges is placed into marginal grade oxide stockpiles for processing at a later date: from (0.55 to 1.0) g/t Au for Sofia Main and Sofia North; and from (0.45 to 1.0) g/t Au for Maki Medina.

A comparison of the actual mined to mill feed from 1 January 2020 to 31 October 2021 inclusive, is shown in Table 14.15.1. Results indicate that above a 1.0 g/t Au cut-off grade, the actual mined report 3% higher tonnes, 1% higher grade and 4% higher ounces.

Table 14.15.1 Grade Control to Mill Feed Reconciliation January 2020 to October 2021

Month-Year	Actual Mined			Mill Feed			Variance		
	Tonnes (kt)	Grade (Au g/t)	Au (koz)	Tonnes (kt)	Grade (Au g/t)	Au (koz)	Tonnes (%)	Grade (%)	Ounces (%)
Jan-20	330.2	1.29	13.7	317.4	1.30	13.3	-4%	1%	-3%
Feb-20	366.1	1.40	16.5	318.5	1.29	13.2	-13%	-7%	-20%
Mar-20	365.0	1.76	20.7	355.0	1.68	19.2	-3%	-5%	-7%
Apr-20	350.9	1.10	12.4	344.6	1.02	11.2	-2%	-8%	-10%
May-20	361.6	1.72	19.9	353.8	1.59	18.1	-2%	-7%	-9%
Jun-20	347.9	2.05	23.0	350.0	1.98	22.3	1%	-3%	-3%
Jul-20	309.7	2.05	20.4	297.1	2.08	19.9	-4%	1%	-3%
Aug-20	359.4	2.18	25.1	351.6	2.14	24.2	-2%	-2%	-4%
Sep-20	365.6	2.55	30.0	335.3	2.50	26.9	-8%	-2%	-10%
Oct-20	380.2	2.44	29.8	366.2	2.30	27.1	-4%	-6%	-9%
Nov-20	366.4	2.33	27.4	351.6	2.27	25.7	-4%	-3%	-6%
Dec-20	381.4	3.17	38.9	382.2	2.92	35.9	0%	-8%	-8%
Jan-21	363.0	2.51	29.3	353.7	2.47	28.1	-3%	-2%	-4%
Feb-21	325.3	2.65	27.7	316.3	2.51	25.5	-3%	-5%	-8%
Mar-21	377.2	2.50	30.3	357.5	2.47	28.4	-5%	-1%	-6%
Apr-21	340.0	3.10	33.9	341.5	3.03	33.3	0%	-2%	-2%
May-21	353.2	3.02	34.2	365.3	2.93	34.5	3%	-3%	1%
Jun-21	377.1	3.78	45.8	360.3	3.62	41.9	-4%	-4%	-8%
Jul-21	384.5	3.55	43.9	378.4	3.80	46.2	-2%	7%	5%
Aug-21	354.4	3.37	38.4	367.9	3.62	42.8	4%	8%	12%
Sep-21	353.1	2.27	25.8	332.8	2.44	26.1	-6%	7%	1%
Oct-21	391.8	3.63	45.7	362.6	3.93	45.9	-7%	8%	0%
Total	**7 903.8**	**2.49**	**633.0**	**7 659.7**	**2.48**	**609.7**	**-3%**	**-1%**	**-4%**

Comparisons of the Proven and Probable Reserves to actual mined from 1 January 2020 to 31 October 2021 inclusive, are presented by deposit at a cut-off grade of 1.0 g/t Au in Table 14.15.2.

Open pit mining was completed at Golouma West in February 2021. Open pit mining was temporarily halted in June 2020 at Maki Medina and in August 2020 at Goumbati West - Kobokoto, to focus on mining at the higher-grade Sofia Main deposit. Results indicate that above the reported Mineral Reserve cut-off grade of 1.0 g/t Au, the actual mined reports 37% higher tonnes, 15% lower grade and 16% higher ounces. This overall positive correlation can be attributed to additional mineralised zones delineated with closer spaced grade control drilling in addition to mining larger benches.

Table 14.15.2 Sabodala–Massawa Pit Mineral Reserves to Actual Mined Reconciliation January 2020 to October 2021

Deposit	Proven and Probable Reserves			Actual Mined			Variance		
	Tonnes (kt)	Grade (Au g/t)	Au (koz)	Tonnes (kt)	Grade (Au g/t)	Au (koz)	Tonnes (%)	Grade (%)	Au (%)
Golouma	1 444.6	2.56	118.9	1 958.4	2.27	142.6	36%	-12%	20%
Goumbati West - Kobokoto	69.3	1.71	3.8	130.0	1.22	5.1	88%	-29%	33%
Maki Medina	238.0	1.72	13.1	428.6	1.40	19.3	80%	-18%	47%
Sabodala	117.8	1.83	6.9	106.5	1.44	4.9	-10%	-21%	-29%
Sofia Main	3 531.4	3.26	370.0	4 531.8	2.87	417.5	28%	-12%	13%
Sofia North	1 038.1	2.63	87.7	1 658.0	2.03	108.4	60%	-23%	24%
Total	**6 439.1**	**2.90**	**600.5**	**8 813.2**	**2.46**	**697.9**	**37%**	**-15%**	**16%**

Prior to mining, only Indicated and Inferred Resources were estimated at Kourouloulou with no Mineral Reserves calculated. Due to the delayed mining at Golouma West, Kourouloulou was mined ahead of schedule from April 2020 to February 2021. Based on grade control drilling, a total of 147.9 kt at 5.28 g/t Au totalling 25.1 koz Au was mined at Kourouloulou, which is not included in the comparison of Mineral Reserves to actual mined summary.

14.16 Comments on Section 14.0

The Qualified Person (QP) for the Mineral Resource estimate is Kevin Harris CPG (VP Resources), who is a full-time employee of Endeavour Mining, not independent and is a Qualified Person in accordance with NI 43-101. Mr Harris is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, or political issues that would materially affect the Mineral Resource estimates.

The Sabodala-Massawa Mineral Resources have been estimated with due recognition of all the necessary multi-disciplinary, technical inputs required to ensure compliance with the Requirements as defined herein and are considered to be both reasonable and unbiased estimates at the time of reporting. The estimation methods used are considered to be appropriate and suitable for the use of reporting Mineral Resources. The accuracy of the Mineral Resource estimates are reflected in their classification which is based on geological data, confidence and experience.

14.17 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 14.0 are presented in Section 25.0.

14.18 Recommendations

Recommendations pertaining to Section 14.0, are presented in Section 26.0.

14.19 References

References cited in Section 14.0 are presented in Section 27.0.

15.0 MINERAL RESERVE ESTIMATES

15.1 Introduction

Section 15 as outlined herein, includes discussion and comment on the basis for the determination of the Mineral Reserves Statement, for the Sabodala-Massawa Project (the 'Project'). The Project's Mineral Reserves Statement is dated 31 December 2021, for ore deposits on the Sabodala Concession and the Massawa Mining License. The Issuer's interest in Sabodala Gold Operations SA (SGO) and Massawa SA, the respective holder's of the exploitation permits, is defined more fully in Section 4.0.

Specific focus areas of this section include, but are not limited to:

- Mineral Reserve estimation approach and methodology.
- Mining Geotechnics.
- Pit Optimisation and Mine Designs.
- Stope optimisation and designs for Underground Mining.
- Waste Rock Dump Design.
- Historical Mineral Reserve statements and Mineral Reserve Statement as of 31 December 2021.
- Risks and Opportunities.

15.2 Mineral Reserve Estimation Approach

The Mineral Reserve Statement, dated 31 December 2021, is supported by the relevant engineering designs, equipment capability, geohydrology, geotechnical, processing, environmental and financial assumptions utilised in the Life of Mine planning (LoMp) process. A site layout in Figure 15.2.1 shows the location of the deposits/pits.

The LoMp incorporates Mineral Reserves reported for the following open pits:

- Sabodala (SAB) and Masato (MAS) located near the Sabodala Central Processing Facility (SCPF).
- Maki Medina (MKM) located approximately 9 km from the SCPF.
- Niakifiri East (NKE) and Niakifiri West (NKW) pits located approximately 4 km from the SCPF.
- Goumbati West (GBW) located approximately 11 km from the SCPF.
- The Sofia Group, comprising Sofia Main (SFM) and Sofia North (SFN), located approximately 30 km from the SCPF.
- The Massawa Group, comprising Massawa Central Zone (CZ) , Massawa Northern Zone (NZ) and Delya pits:
  - Massawa CZ (MCZ), located approximately 32 km from the SCPF.
  - Massawa NZ (MNZ) located approximately 32 km from the SCPF.
  - Massawa Delya (MDL), located approximately 46 km from the SCPF.

LoMp incorporates Mineral Reserves reported for the following underground mines:

- Golouma West (GW).
- Golouma South (GS).
- Kerekounda (KK).

The underground mines are located approximately eight kilometres southeast of the SCPF. All the ore from the underground mine can be processed in the Sabodala Whole Ore Leach Plant (SWOLP), one of the two process plants that form part of the SCPF.

The pits that are not part of the Massawa Group are considered part of the Sabodala Group (also known as the Sabodala Complex).

The free milling (largely oxide) ore from the Massawa pit groups are processed at SWOLP, whilst refractory fresh ore will be processed at the new Sabodala Sulphide Treatment Plant (SSTP), which is immediately adjacent to the SWOLP. The transitional ore from the Massawa NZ and Delya pits is also refractory, and will be processed at the SSTP.

A portion of the transitional ore at MCZ, which is referred to as 'Reduced Transitional ore' in this Report, is also refractory and needs to be processed at the SSTP; the remaining portion of the transitional ore within the MCZ pit can be processed at the SWOLP.

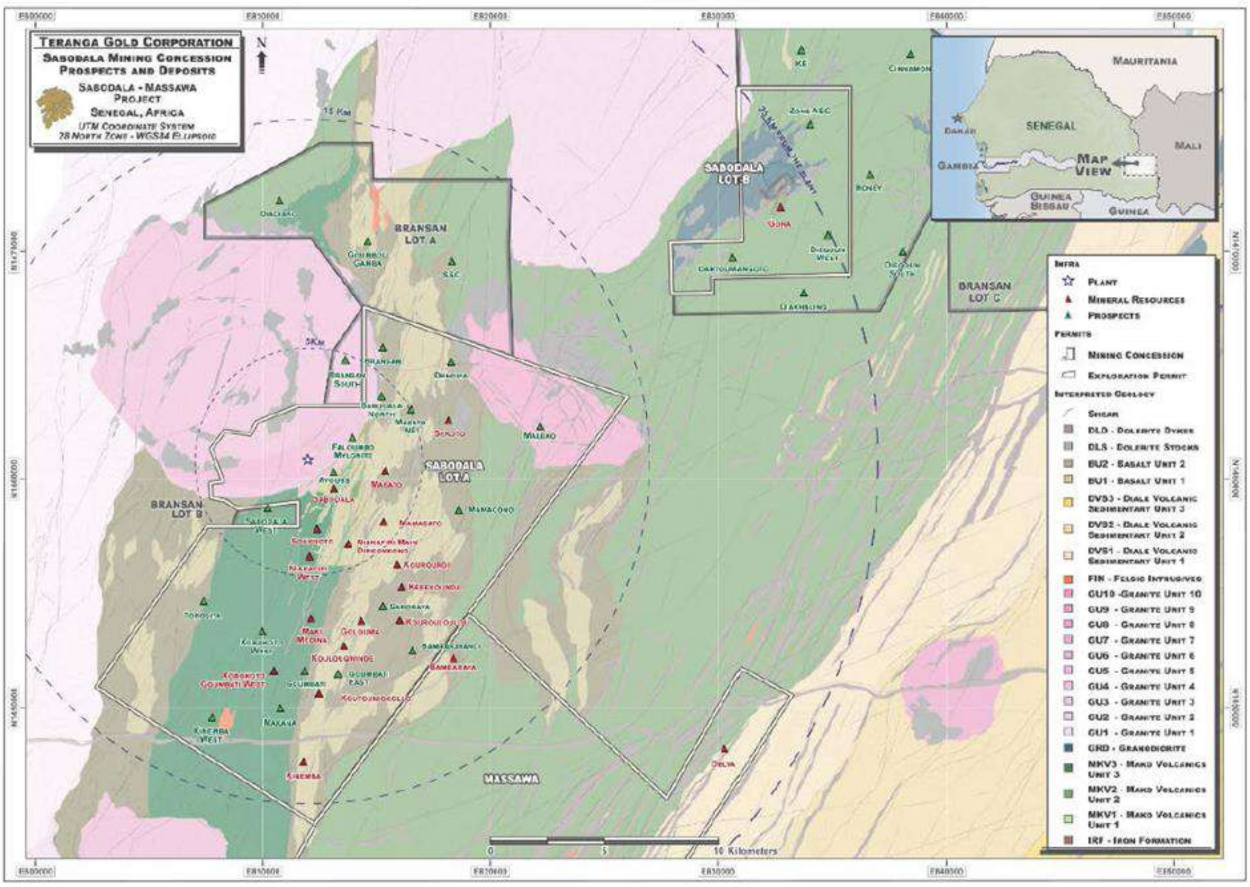
The open pits are designed with various staged pushbacks. Current mining activities comprise of Sabodala (South and North stages), Sofia Main and Sofia North. The annual strategic LoMp process for the Project, typically includes the following key data inputs and activities:

- Exploration block models which may be modified (i.e., re-blocked) to generate mining block models which introduces a degree of dilution.
- The topographic surface reflecting the year end survey position as of 31 December 2021.
- Open pit optimisation analysis to include:
  - Derivation of pit optimisation parameters, inter alia: dilution, diluting grades and losses, metallurgical recovery and refining factors, commodity price and operating expenditure assumptions.
  - For unit mining operating expenditures, mining costs are derived from detailed first principal equipment productivity calculations, detailed haulage analysis of each bench elevation, and Original Equipment Manufacturers' (OEM) equipment life cycle cost per operating hour. These costs are then used to derive both waste and ore mining costs relationships with reduced level (RL) elevations and coded into the block models as a specific attribute.
  - Derivation of marginal economic ore cut-off grades (COG) as appropriate.
  - Ultimate pit and staged pit selections.
- Engineering pit design assumptions inclusive of:
  - Open pit access including haul road designs.
  - Geotechnical design considerations for pit slopes (inter ramp angles, overall slope angles, batter angles, stacked berm configurations and berm widths), which vary as appropriate with azimuth and depth to reflect the geotechnical domains as established for each deposit.
- Mine planning and production scheduling (as referenced in Section 16) inclusive of production rates; stockpiling strategies; grade bin selection criteria; production capacities for mining and processing activities; exploration models and grade control models.
- Mineral Reserve reporting based on aggregation of all Measured and Indicated Mineral Resource blocks incorporated within the LoMp and reported inclusive of all relevant dilution, diluted grade and losses to enable reporting of Mineral Reserves.

- Underground mine planning and stope optimisation (carried out by an independent third party consultancy, SLR Consulting Limited (SLR) (Canada)).
- Underground Mineral Reserves estimation is discussed at the end of the open pit mining sections.

Notwithstanding the above, the process followed for Mineral Reserve reporting, incorporated updated pit optimisations for the Massawa Pit Group (MCZ, MNZ, MDL, SFM and SFN), but not pits falling within the Sabodala Pit Group, which did not need to be updated.

Figure 15.2.1 Sabodala-Massawa Gold Mine Site Layout Map



Source: Endeavour, 2021.

15.3 Key Assumptions/Basis of Estimates

15.3.1 Block Models and Surfaces

The block models incorporate all typical attributes inclusive of gold grades, rock type (facies), weathering (oxidation) status, Mineral Resource confidence categories (Measured, Indicated and Inferred) and density values. All block models are also depleted with the end of period surface topography reported as of 31 December 2021. This is applied as the starting surface in the pit optimisations and volume/tonnage calculations for the Mineral Reserves.

In line with CIM Definitions and Standards, only the Measured and Indicated Mineral Resources are included in the pit optimisations and the resultant Mineral Reserve estimates in the pit designs. In addition, all ultimate pit designs are based on historical and current pit optimisation analysis which effectively treat all Inferred Mineral Resources as waste. For the subsequent production scheduling, Inferred Mineral Resources continue to be treated as waste and are not assumed to be separately stockpiled for future processing.

15.3.2 Re-blocking, Dilution and Ore Loss

Table 15.3.1 provides a summary of the effective ore dilution and metal losses resulting from the re-blocking of the Mineral Resource block models to generate the mining block models used to support the mine planning and scheduling process, as well as the reporting of Mineral Reserves. The estimates as reported are derived by application of the relevant deposit specific cut-off grades within the final pit designs. Due to ore losses during the conversion process, the planning models for Sofia North, Sofia Main and Maki Medina have lower tonnes and gold than the Mineral Resource models have.

The Mineral Resource block models were sub-celled with the smallest sub-block sizes and parent block sizes shown in Table 15.3.2. In mine planning, the optimisation process assumes that the smallest size sub-blocks can be selectively mined and processed; however, it is not possible to mine small sub-blocks selectively without causing dilution in mining ore blocks with the large excavators used at Sabodala (PC1250, PC450 or PC3000 shovels), whose bucket widths vary from (1.27 to 2.5) m.

All of the Mineral Resource models containing sub-blocks for open pit mines were re-blocked to the selective mining unit (SMU) size shown in Table 15.3.2 as 'Planning Models' to create regularised models with dilution incorporated.

During the re-blocking process, smaller size blocks were added together to form a SMU size block. If some of these small blocks are ore and others are waste containing no gold, the resultant block would have lower grade than the grade of the smaller ore blocks, due to addition of the waste. Similarly, if higher grade blocks are merged with neighbouring lower grade blocks, the overall grade of the block would be the same as average grade of the blocks merged, if they all had the same density.

As the size of the sub-blocks gets smaller in a model, the re-blocking process results in higher dilution. If the orebody mineralisation is thicker, the blocks located at the central part of the orebody are merged with neighbouring ore blocks, and as ore blocks merge together, the effective dilution becomes lower compared to thinner veins.

The same re-blocking process may also cause some losses in the ore recovered through mining from the pits. When ore blocks are merged with waste blocks, the overall gold grade of some blocks may become lower than the gold cut-off grade. The regularised block is treated as waste, thereby losing the ore and the gold within the smaller sub-blocks.

Underground mining models were used with of sub-block of 1.25 m.

Table 15.3.1 Effective Modifying Factors Applied to Convert Mineral Resource Block Models to Mining Block Models

Pit	Mineral Resource Model			Mining Block Model			Change			Effective Factors (Change)		
	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (%)	Grade (%)	Gold (%)
SFN	1 956	2.36	148	1 816	2.03	119	-140	-0.33	-30	-7%	-14%	-20%
SFM	528	3.29	56	561	3.18	57	33	-0.11	2	6%	-3%	3%
SAB	3 690	1.98	238	3 984	1.78	228	295	-0.21	-10	8%	-10%	-4%
GBW	741	1.76	42	774	1.56	39	33	-0.20	-3	4%	-11%	-7%
MKM	335	1.34	14	259	1.48	12	-77	0.14	-2	-23%	10%	-15%
NKE	12 207	1.34	552	12 249	1.37	538	42	0.02	-14	0%	2%	-3%
NKW	955	1.34	41	970	1.26	39	16	-0.08	-2	2%	-6%	-4%
MAS	14 568	1.40	654	15 400	1.26	626	832	-0.13	-28	6%	-9%	-4%
MCZ	10 899	3.98	1 393	10 080	3.64	1 180	-819	-0.34	-213	-8%	-8%	-15%
MNZ	5 588	4.70	844	6 265	4.05	816	678	-0.65	-29	12%	-14%	-3%
MDL	881	4.50	127	987	3.82	121	106	-0.68	-6	12%	-15%	-5%
Total	**52 347**	**2.44**	**4 110**	**53 346**	**2.20**	**3 775**	**998**	**-0.24**	**-336**	**2%**	**-10%**	**-8%**

Table 15.3.2 Mineral Resource Model Parent and Minimum Sub-Block Size, and Planning Model Regularised Block Size

Deposit	Mineral Resource Model						Planning Model Block Size		
	Parent Block Size			Sub-block Size					
	X (m)	Y (m)	Z (m)	X (m)	Y (m)	Z (m)	X (m)	Y (m)	Z (m)
Sabodala (SAB)	5	5	5	1.25	2.5	2.5	5	5	5
Masato (MAS)	5	5	5	5	5	5	5	5	5
Maki Medina (MKM)	2.5	2.5	2.5	1.25	1.25	1.25	2.5	2.5	2.5
Niakafiri East (NKE)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Niakafiri West (NKW)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Goumbati West (GBW)	2.5	2.5	2.5	1.25	1.25	1.25	2.5	2.5	2.5
Sofia Main (SFM)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Sofia North (SFN)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Central Zone (MCZ)	5	5	5	1.25	2.5	2.5	2.5	2.5	2.5
North Zone (MNZ)	5	2.5	5	1.25	2.5	2.5	2.5	2.5	2.5
Delya (MDL)	2	10	5	0.5	2.5	2.5	2.5	2.5	2.5
Golouma West 1 UG	20	20	20	1.25	1.25	1.25	1.25	1.25	1.25
Golouma West 2 UG	20	20	20	1.25	1.25	1.25	1.25	1.25	1.25
Golouma West UG	20	20	20	1.25	1.25	1.25	1.25	1.25	1.25
Golouma South UG	20	20	20	1.25	1.25	1.25	1.25	1.25	1.25
Kerekounda UG	20	20	20	1.25	1.25	1.25	1.25	1.25	1.25

In addition to re-blocking of the Sabodala models, dilution was added in the form of a grade factor (5 to 20)% and therefore some of the ore blocks (5 to 10)% became waste due to a drop in grade. The dilution varied depending on the mineralisation orientation and geometry.

Sofia Main and Sofia North block models were analysed by simulating the mining polygons with a 2.5 m bucket excavator. Based on the result of the dilution study, the blocks located at the edge of the mineralised domains were merged with the neighbouring blocks with the width varying between (30 and 50) cm. This means that an SMU size block of 2.5 m located at the edge gets mixed with the neighbouring blocks by (12 to 20)% of their volume.

The Massawa orebodies are generally sub-vertical in nature and vary up to 10 m in width, often separated by narrow waste zones. As such, the models were regularised to a SMU size of (2.5 x 2.5 x 2.5) m, based on mining with the PC1250 on a 2.5 m bench height. The regularisation takes account of any internal waste and allows the grades of some non-minable small cells to blend with their neighbouring cells within the proposed SMU size.

The quantity of material transferred in this process was defined using a skin width of 0.5 m, representing the selectivity that was considered to be achievable by the excavator. The dilution skin was applied to identified edge blocks assuming a zero-diluent grade (i.e., diluting material contributed no metal content).

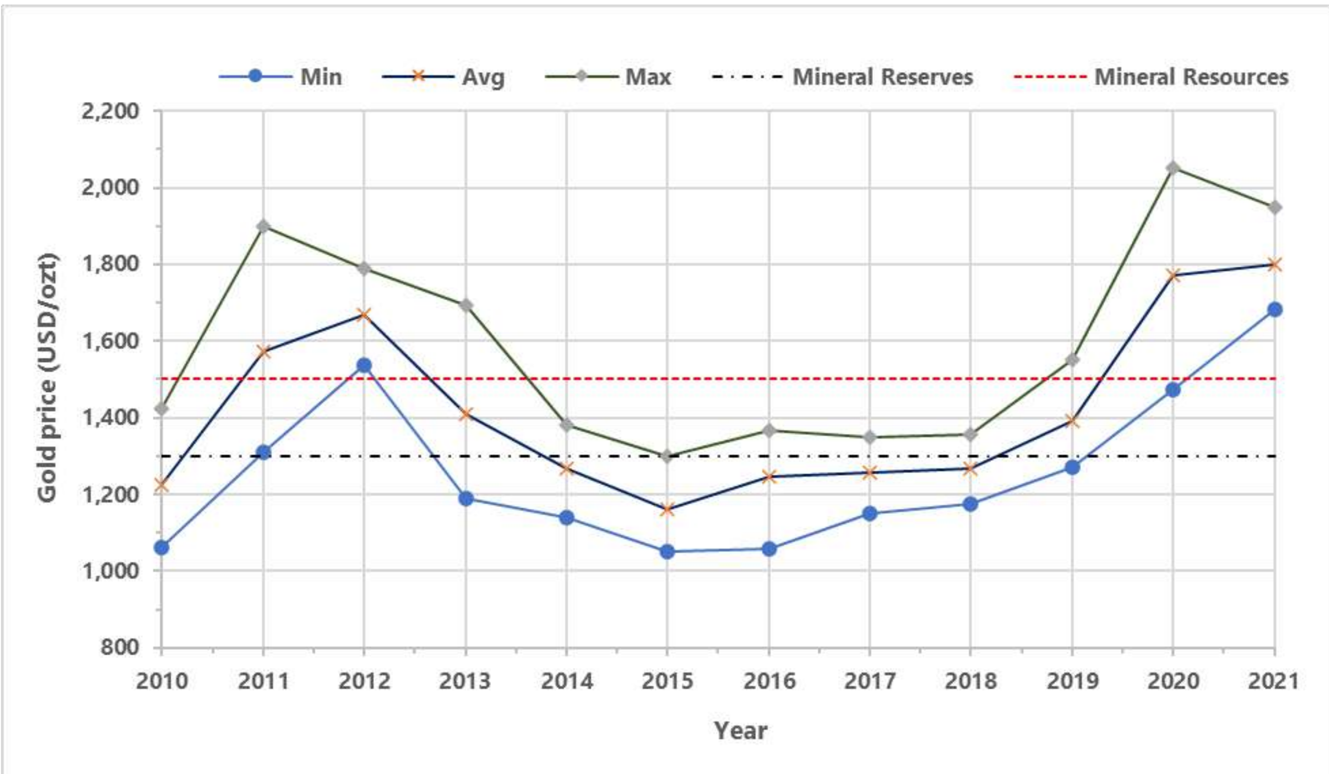
15.3.3 Gold Price and Revenue Related Assumptions

For the derivation of cut-off grades in support of the Mineral Reserves Statement, a gold price of USD 1,300/oz has been used, which is in accordance with the Issuer's standard for reporting Mineral Reserves (defined more fully in Section 19.0). Figure 15.3.1 shows the gold price over the last ten years (Consensus Market Data, 2022). From this data, it can be seen that the Mineral Reserve gold price used by the Issuer, is reasonable.

The only other factors considered to derive the net sales revenue are the Government royalties which total 5.00%, refinery payability of 99.92%, and an assumed refining cost of USD 2.35/oz payable. This results in a net gold price of USD 1231.66/oz payable (USD 39.60/g).

The gold market and gold prices are discussed in further detail in Section 19.0.

Figure 15.3.1 Historical Annual Gold Prices (2010 to 2021)



Source: Consensus Market Data (2022))

15.3.4 Mine Operating Costs

The mining costs were derived assuming first principal owner mining determinations which was subsequently incorporated into the block model as a cost versus depth (reduced level (RL) metres) relationship to derive unit mining costs for both ore and waste. The aggregation of these costs is reported in summary form in Table 15.3.3 and Table 15.3.4which include the sustaining cost for each material type within each open pit. The resulting mining costs address all key mining related activities including drilling and blasting, excavation, load and haul, ancillary support, dewatering, grade control, stockpile re-handling and ore over-haul costs.

SWOLP Processing costs and other costs that are used in cut-off grade calculations are given in Table 15.3.5. The costs are reported by oxide and fresh material types. The transitional ore is assumed to have similar costs and processing characteristics at the SWOLP as the fresh ore. Other costs that were applied to the cut-off grade calculations are shown in Table 15.3.6. In addition to the costs reported in these tables, the Government royalty fee of 5% ('Valeur carreau mine') and a USD 2.36/oz fee (doré freight, vaulting, security and refining), was included in the cut-off grade calculations.

SSTP costs are provided in Table 15.3.7. The processing cost for the SSTP was established as fixed and variable cost, where sulphur (% m/m) is the variable cost. The linear cost relationship developed is as shown below.

- Processing Cost (USD/t of RoM) = 17.738 + 13.717 x S (% m/m).
- The details of the metallurgical and processing parameters are discussed in Section 13.0.

Table 15.3.3 Sabodala Pits - Waste and Ore Mining Cost Summary

Ore/Waste	Weathering	Unit	GBW	MKM	MAS	NKE	NKF	SAB	SFM	SFN	Total
Waste	Oxide	(USD/t)	2.03	-	2.00	2.15	2.26	-	-	-	2.14
	Fresh	(USD/t)	2.10	2.39	2.57	2.50	2.30	2.54	2.74	2.43	2.53
	Total	(USD/t)	2.09	2.39	2.56	2.43	2.29	2.54	2.74	2.43	2.50
Ore	Oxide	(USD/t)	2.11	-	2.39	2.47	2.52	-	-	-	2.42
	Fresh	(USD/t)	2.37	2.57	2.86	3.06	2.69	2.67	2.77	2.41	2.86
	Total	(USD/t)	2.21	2.57	2.84	2.95	2.62	2.67	2.77	2.41	2.81
Total	Oxide	(USD/t)	2.07	-	2.05	2.21	2.29	-	-	-	2.19
	Fresh	(USD/t)	2.11	2.43	2.61	2.60	2.35	2.56	2.75	2.42	2.57
	Total	(USD/t)	2.11	2.43	2.59	2.53	2.32	2.56	2.75	2.42	2.54

In addition to the above costs, a cost of USD 2.35/oz gold produced was included for doré freight, security and refining and a 5.0% Government royalty fee are added in cut-off grade calculations.

Table 15.3.4 Massawa Pits - Waste and Ore Mining Cost Summary

Ore/Waste	Weathering	Unit	MCZ	MNZ	MDL	Total
Waste	Oxide	(USD/t)	2.11	2.07	2.00	2.08
	Fresh	(USD/t)	2.63	2.53	2.41	2.56
	Total	(USD/t)	2.44	2.35	2.32	2.39
Ore	Oxide	(USD/t)	2.60	2.57	2.42	2.58
	Fresh	(USD/t)	2.74	2.74	2.52	2.73
	Total	(USD/t)	2.70	2.70	2.50	2.69
Total	Oxide	(USD/t)	2.17	2.09	2.04	2.13
	Fresh	(USD/t)	2.64	2.55	2.42	2.58
	Total	(USD/t)	2.48	2.38	2.34	2.42

Table 15.3.5 By Pit, SWLOP Processing and Other Costs used in Cut-off Grade Calculations

SWOLP Costs	Weathering	Unit	GBW	MKM	MAS	NKE	NKW	SAB	SFM	SFN	MCZ	MNZ	MDL	Total
Processing	Oxide	(USD/t)	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05	12.05
	Fresh	(USD/t)	12.93	12.93	12.93	12.93	12.93	12.93	12.93	12.93	12.93	12.93	12.93	12.93
Ore-Waste Differential	Oxide	(USD/t)	0.43	-	0.76	0.84	0.84	0.45	0.60	0.54	0.49	0.50	0.43	0.64
	Fresh	(USD/t)	0.13	-	0.76	0.56	0.56	0.13	0.31	0.24	0.11	0.21	0.11	0.39
Rehandling	All	(USD/t)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Other Plant	All	(USD/t)	6.48	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54
Ore Haulage	All	(USD/t)	2.08	-	-	-	1.36	-	3.74	3.74	3.74	3.74	4.17	1.99
Total	Oxide	(USD/t)	20.76	18.74	18.74	18.74	20.10	18.74	22.48	22.48	22.48	22.48	22.91	20.84
	Fresh	(USD/t)	21.78	19.62	20.38	20.19	21.55	19.76	23.67	23.61	23.48	23.58	23.90	21.98
	All	(USD/t)	21.17	19.62	20.25	19.92	21.02	19.76	23.65	23.29	23.18	23.51	23.68	21.83

Table 15.3.6 SWOLP Other Cost Items Attributed to Processing for Cut-off Grade Calculations

Other Costs	Unit	Value
Grade Control	(USD/t)	0.35
Plant Sustaining	(USD/t)	0.79
General & Administrative	(USD/t)	5.34
Sum	(USD/t)	6.48
Freight, Vaulting Security & Refinery	(USD/oz sold)	2.35
Government Royalty (Valeur carreau mine)	%	5.00

Table 15.3.7 SSTP Processing and Other Costs Used in the Cut-off Grade Calculation

SSTP	Weathering	Unit	MCZ	MNZ	MDL	Total
Processing	Reduced Transition	(USD/t)	32.66	-	-	32.66
	Fresh	(USD/t)	32.66	32.79	29.82	29.82
Ore-Waste Differential	Reduced Transition	(USD/t)	0.11	-	-	0.11
	Fresh	(USD/t)	0.11	0.21	0.11	0.19
Re-handling	All	(USD/t)	0.15	0.15	0.15	0.15
Other Plant Costs	All	(USD/t)	6.48	6.48	6.48	6.48
Ore Haulage	All	(USD/t)	3.74	3.74	4.17	3.75
Total cost used for cut-off grade calculation	Reduced Transition	(USD/t)	43.14	-	-	43.14
	Fresh	(USD/t)	43.14	43.38	40.73	43.26
Overall Average	**All**	**(USD/t)**	**43.14**	**43.38**	**40.73**	**43.25**

Table 15.3.8 SSTP Processing Cost and Other Costs Applied to the Cut-off Grade Calculations.

Sulphur/Zone	Processing Cost (USD/t Ore)	Cut-off Grade (g/t Au)
Sulphur		
• 0.80 %	28.71	1.1
• 0.90 %	30.08	1.2
• 1.00 %	31.46	1.2
• 1.10	32.83	1.2
• 1.20	34.20	1.3
MCZ	10.49	Other Costs*
MNZ	10.59	
MDL	10.91	
MCZ	1.1	Average S%
MNZ	1.1	
MDL	0.9	
MCZ	1.2	Cut-off Applied
MNZ	1.2	
MDL	1.2	

* Other cost is composed of rehandling, grade control, ore – waste differential and ore haulage costs

The overall average sulphur content of the refractory ores is 1.1% m/m (MCZ), 1.1% m/m (MNZ) and 0.9% m/m (MDL). Table 15.3.8 shows that the variability in the cut-off grade is minimal given the low overall variability in sulphur grade over the deposits. The overall average sulphur grade for the SSTP feed, is around 1.1%.

The gold cut-off grade selected for the MCZ, MNZ and MDL is at the overall deposit average sulphur grade. The weighted average annual sulphur RoM grade varies from (1.24 and to 1.27)% from 2024 to 2027, thereafter the annual weighted average sulphur grade varies from (1.05 to 1.09)% for the remainder of the LoMp.

15.3.4.1 SWOLP Process Recoveries

In order to develop the LoMp and estimate annual gold production, process recoveries are applied as a regression function of the gold grade (Table 15.3.9). The average gold grade in the pit by weathering profile, was used to determine the average process recoveries by ore type, which were then used in the cut-off grade calculations.

Table 15.3.9 SWOLP Processing Recovery Functions

Deposit	Function
Sabodala Fresh	=Au x 0.0155 + 0.8674
Sabodala Oxide	=Au x 0.0155 + 0.8674
Masato Fresh	=Au x 0.0155 + 0.8674
Masato Oxide	=Au x 0.0155 + 0.9
Niakafiri Fresh	=Au x 0.0155 + 0.8674
Niakafiri Oxide	=Au x 0.0155 + 0.895
Maki Medina Fresh	=Au x 0.0155 + 0.8674
Maki Medina Oxide	=Au x 0.015 + 0.835
Goumbati Fresh	=Au x 0.0154 + 0.835
Goumbati Oxide	=Au x 0.0155 + 0.8674
Golouma Fresh	=Au x 0.0155 + 0.850
Kerekounda Fresh	=Au x 0.012 + 0.8674
Sofia Main Oxide	=Au x 0.0154 + 0.8674
Sofia Main Fresh	=Au x 0.0154 + 0.835
Sofia North Oxide	=Au x 0.0154 + 0.8456
Sofia North Fresh	=Au x 0.0123 + 0.837
Massawa CZ CIL Oxide	=Au x 0.012 + 0.78
Massawa NZ CIL Oxide	=Au x 0.0154 + 0.835
Massawa Delya CIL Oxide	=Au x 0.0154 + 0.835

In alignment with the McNulty production ramp-up curve (Section 17) for the SSTP, gold process recoveries increased from 72% at the end of week one, up to an asymptotic limit of 88.3% in week 76. Importantly, whilst a recovery of 72% is assigned to the block of ore entering in week one, the associated gold does not come out as doré for a number of weeks. For the SSTP, gold recovery as a function of time and ore type is presented in Table 15.3.10 following:

Table 15.3.10 SSTP Process Recovery as a Function of Time and Ore Type

Ramp up Period	Reductive Transition (%)	Fresh (%)
Q1 2024	73.43	73.43
Q2 2024	76.37	76.37
Q3 2024	80.77	80.77
Q4 2024	87.35	87.35
2025+	90.0	88.3

Process recoveries by pit and ore type, as defined in the current cut-off grade determinations for the SWOLP are as reported in Table 15.3.11 following.

Table 15.3.11 SWOLP Gold Recoveries Based on Average Gold Grade

Deposit	Oxide Recovery (%)	Fresh Recovery (%)
GBW	88.7%	85.8%
MKM	85.2%	88.6%
MAS	91.2%	88.5%
NKE	91.2%	88.6%
NKW	91.2%	88.6%
SAB	88.2%	89.1%
SFM	92.0%	86.0%
SFN	91.0%	86.0%
MCZ*	93.0%	-
MNZ	91.2%	-
MDL	91.2%	-

15.3.5 Mine Cut-off Grade Analysis

The cut-off grades for the economic ore by deposit and weathering types are given in Table 15.3.12. The cut-off grade analysis completed to support the Mineral Reserve statements incorporated the various assumptions reported above inclusive of:

- Processing operating expenditures.
- General and administration operating expenditures.
- Deposit specific metallurgical recovery assumptions distinguishing between oxide and fresh ore.
- All transitional ore processed at the SWOLP plant are assumed to have the same recovery as fresh ore.
- Transportation and refining charges expressed in USD 2.35/oz.
- Long term gold price assumption of USD 1300/oz.
- Government and private royalty assumptions of 5%.

Table 15.3.12 Cut-off Grades for Low Grade Ore by Pit/Weathering Type

Plant	Deposit	Oxide (Au g/t)	Fresh (Au g/t)
SWOLP	GBW	0.6	0.6
	MKM	0.6	0.6
	MAS	0.6	0.6
	NKE	0.5	0.6
	NKW	0.5	0.6
	SAB	0.5	0.6
	SFM	0.6	0.7
	SFN	0.6	0.7
	MCZ*	0.6	0.8
	MNZ	0.6	
	MDL	0.6	
Plant	**Deposit**	**Reduced Transitional (%)**	**Fresh (%)**
SSTP	MCZ	1.2	1.2
	MNZ	1.2	1.2
	MDL	1.2	1.2

* Note that MCZ recovery under fresh for SWOLP plant is for transitional ore and all fresh ore are processed at BIOX.

15.3.6 Mine Pit Slope Analysis

The inter ramp angles (IRA) as incorporated into the current geotechnical designs are applied to the individual rock mass domains (weathering type) for each open pit. The results of the optimisation work did not require any pit design changes for the Sabodala complex.

The geotechnical slope parameters used to produce the pit designs and optimisations are provided in Section 15.5. For optimisation work, additional tolerance angles are applied depending on the section of the pit and ramp positions, to ensure that the pit optimisation shells can be used as a guide to design the pit.

15.4 Pit Optimisation

Pit optimisations have been carried out for all the deposits with the updated financial parameters. All the pit designs were within acceptable limits of the USD 1300/oz pit shells, except Sofia Main.

Sofia Main pit has approximately three months of mine life left, with the pit shell larger than the original pit design.

The deposit's pit design physicals on total mass, ore mass and gold are within the ±15% range, and none of the Sabodala pits required a design update.

Table 15.4.1 Comparison of the Pit Optimisation Results versus the Pit Designs

Physicals	Unit	Pit Shell USD 1300/oz	Pit Design	Variance (%)
Sofia North				
Ore + Waste	kt	13 407	12 899	-3.8%
• Waste	kt	11 389	11 084	-2.7%
• Ore	kt	2 018	1 816	-10.0%
Grade	g/t	2.1	2.0	-1.0%
Gold	koz	133	119	-10.5%
Sofia Main				
Ore + Waste	kt	1 306	1 318	1.0%
• Waste	kt	899	757	-15.7%
• Ore	kt	407	561	37.8%
Grade	g/t	3.4	3.2	-5.3%
Gold	koz	44	57	29.7%
Sabodala				
Ore + Waste	kt	33 165	34 949	5.4%
• Waste	kt	28 912	30 964	7.1%
• Ore	kt	4 253	3 984	-6.3%
Grade	g/t	1.79	1.78	-0.7%
Gold	koz	245	228	-7.0%
Niakifiri East				
Ore + Waste	kt	70 269	66 581	-5.2%
• Waste	kt	59 222	54 331	-8.3%
• Ore	kt	11 047	12 249	10.9%
Grade	g/t	1.40	1.37	-1.8%
Gold	koz	496	538	8.5%
Niakifiri West				
Ore + Waste	kt	8 700	8 392	-3.5%
• Waste	kt	7 670	7 422	-3.2%
• Ore	kt	1 030	970	-5.8%
Grade	g/t	1.23	1.26	3.0%
Gold	koz	41	39	-3.0%
Goumbati West				
Ore + Waste	kt	7 755	7 382	-4.8%
• Waste	kt	6 840	6 608	-3.4%
• Ore	kt	916	774	-15.5%
Grade	g/t	1.41	1.56	10.9%
Gold	koz	41	39	-5.8%
Masato				
Ore + Waste	kt	117 996	131 868	11.8%
• Waste	kt	103 069	116 468	13.0%
• Ore	kt	14 926	15 400	3.2%
Grade	g/t	1.27	1.26	-0.5%
Gold	koz	609	626	2.7%

Table 15.4.1 Comparison of the Pit Optimisation Results versus the Pit Designs

Physicals	Unit	Pit Shell USD 1300/oz	Pit Design	Variance (%)
Maki Medina				
Ore + Waste	kt	1 333	1 303	-2.2%
• Waste	kt	1 051	1 044	-0.7%
• Ore	kt	281	259	-8.0%
Grade	g/t	1.44	1.48	3.0%
Gold	koz	13	12	-7.7%
Massawa Central Zone				
Ore + Waste	Kt	66 464	70 107	5.5%
• Waste	Kt	56 091	59 532	6.1%
• Ore	Kt	10 373	10 575	1.9%
Grade	g/t	3.54	3.50	-1.1%
Gold	koz	1 181	1 190	0.8%
Massawa North Zone				
Ore + Waste	kt	80 063	79 552	-0.6%
• Waste	kt	74 058	73 423	-0.9%
• Ore	kt	6 005	6 129	2.1%
Grade	g/t	4.17	4.12	-1.2%
Gold	koz	805	812	0.8%
Delya				
Ore + Waste	kt	11 320	10 678	-5.7%
• Waste	kt	10 227	9 602	-6.1%
• Ore	kt	1 093	1 076	-1.6%
Grade	g/t	3.54	3.56	0.6%
Gold	koz	124	123	-1.0%

Pit optimisation results, showing the pit physicals of waste, ore, undiscounted cash flow (UCF) and discounted cash flows (DCF) for individual pit stages are provided in Figure 15.4.1 to Figure 15.4.8 following. All UCF/DCF calculations are based on a USD 1300/oz Mineral Reserve Pit Shell Price.

Figure 15.4.1 Sofia North Optimisation Results

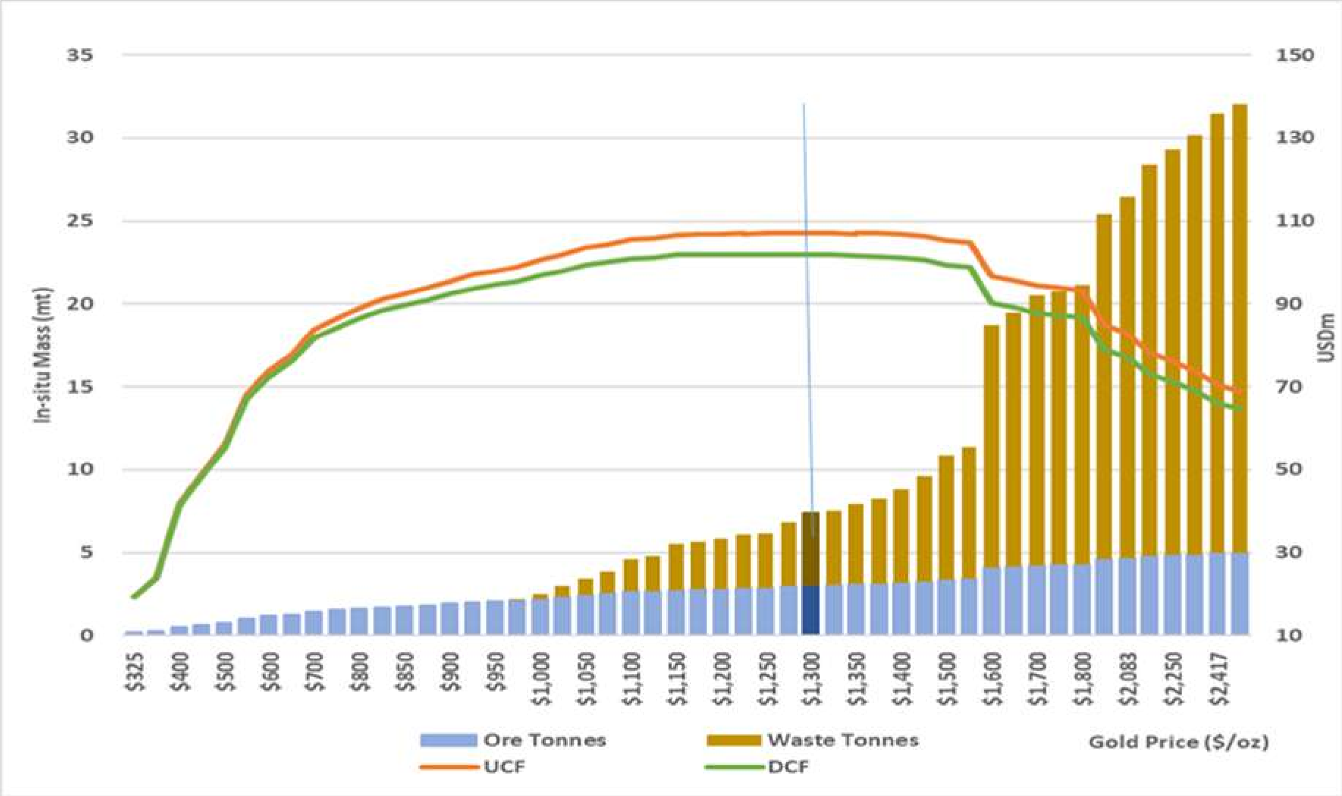


Figure 15.4.2 Sofia Main Optimisation Results

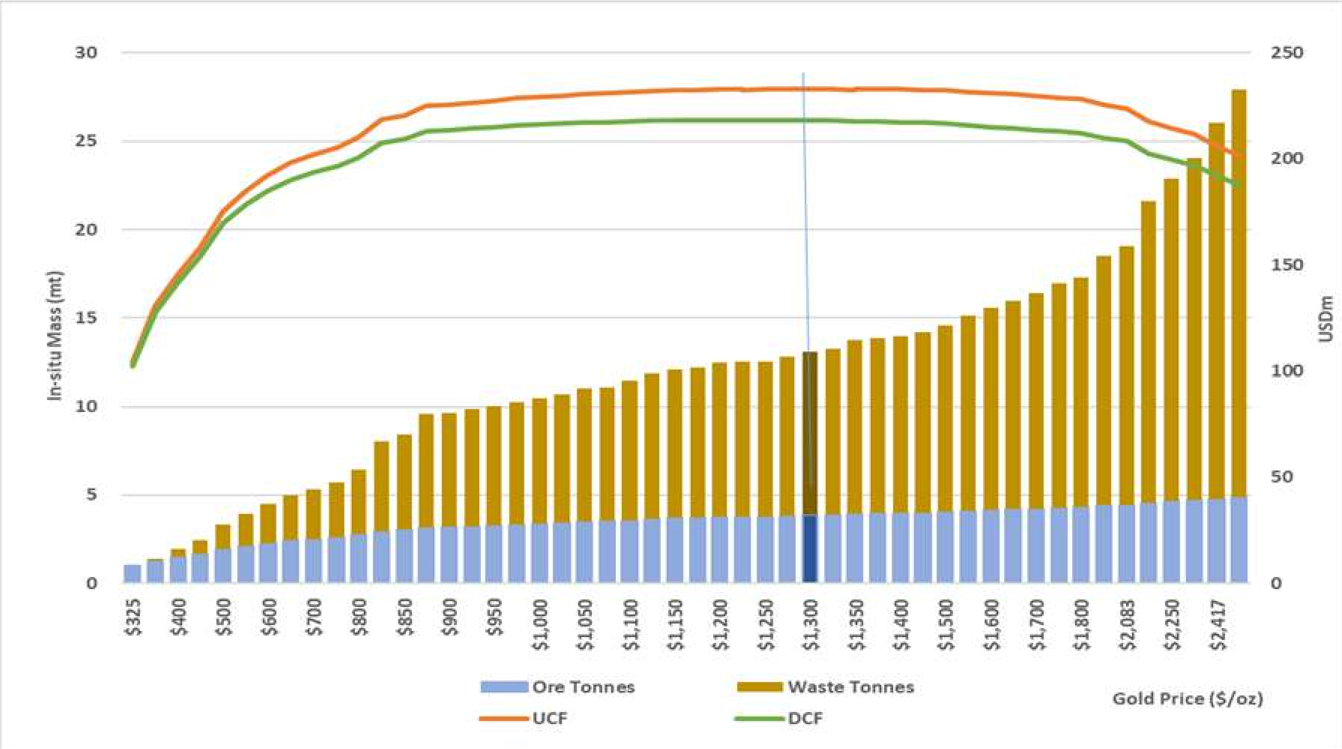


Figure 15.4.3 Goumbati West Optimisation Results

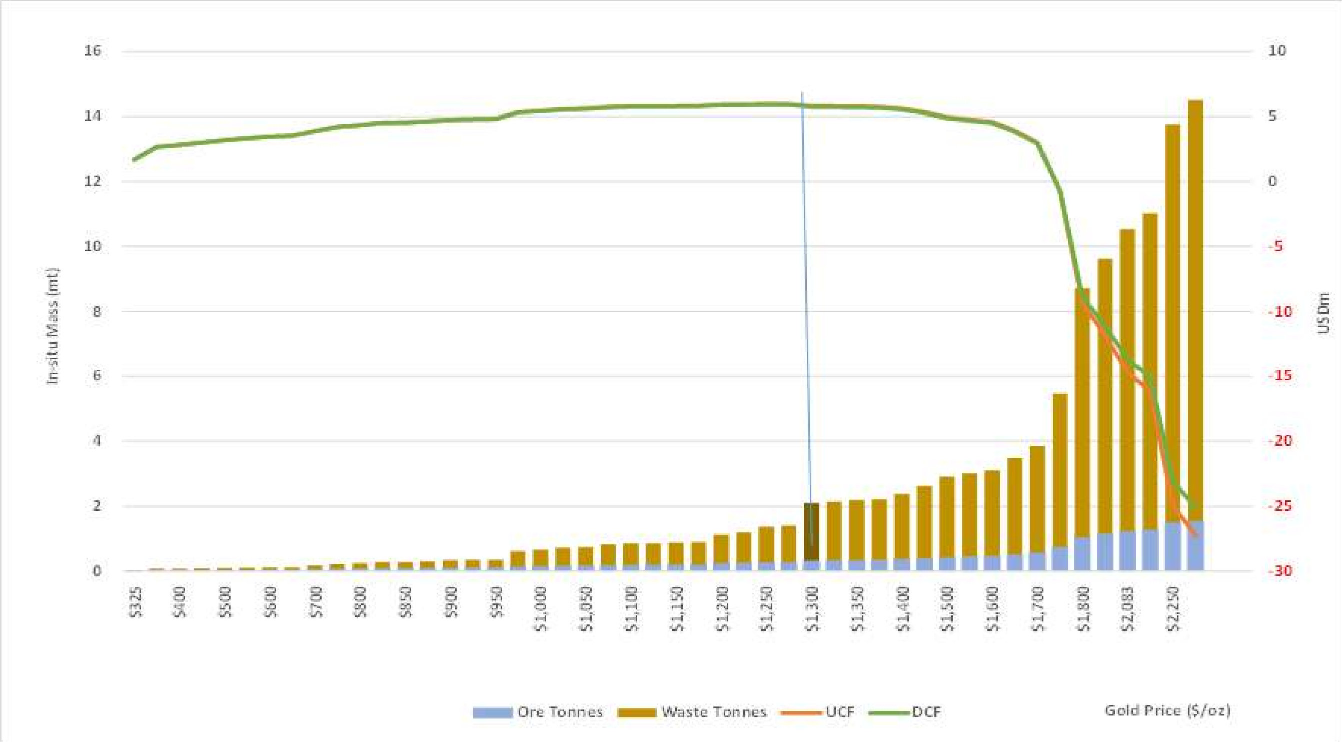


Figure 15.4.4 Niakifiri East Optimisation Results

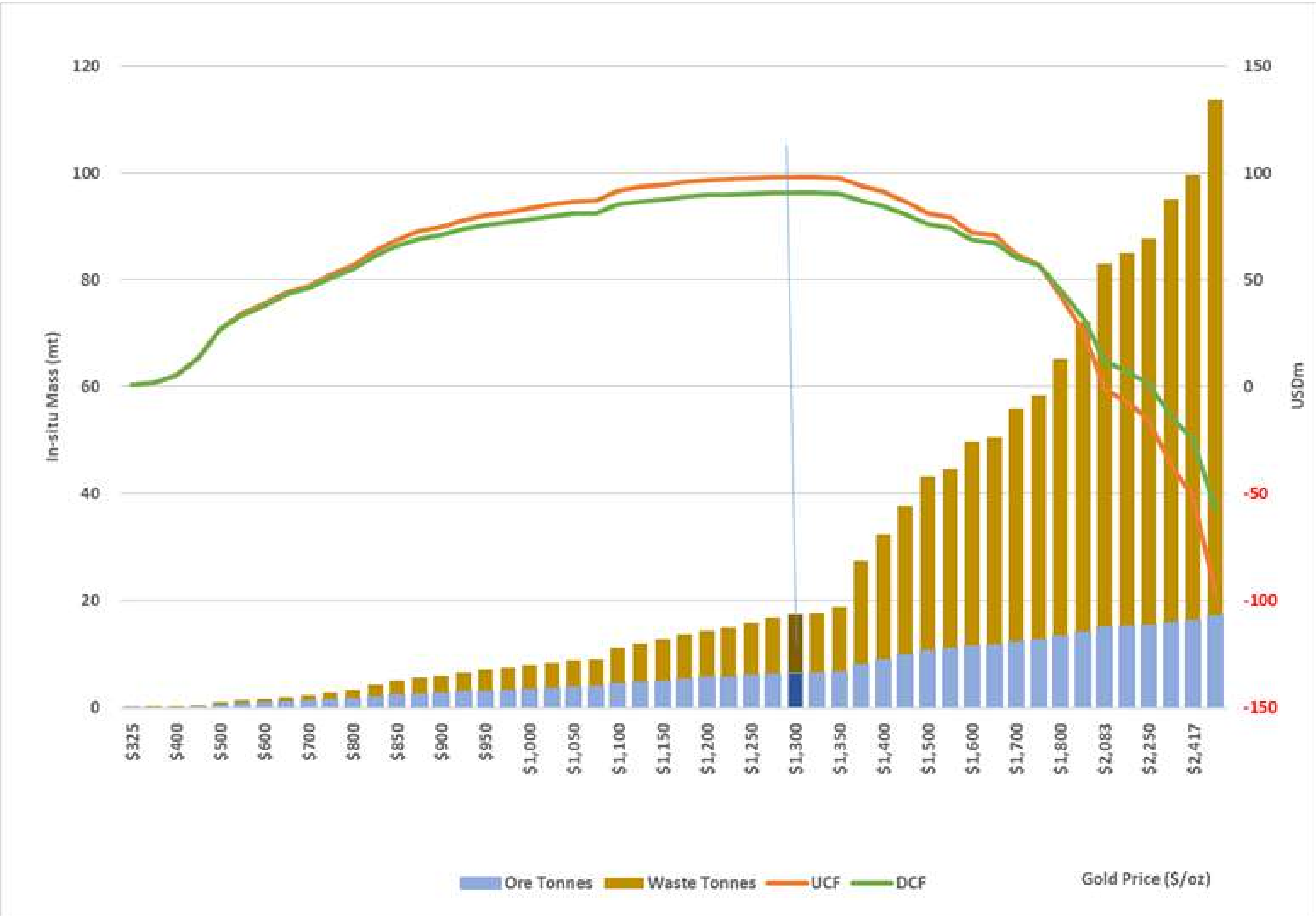


Figure 15.4.5 Niakifiri West Optimisation Results

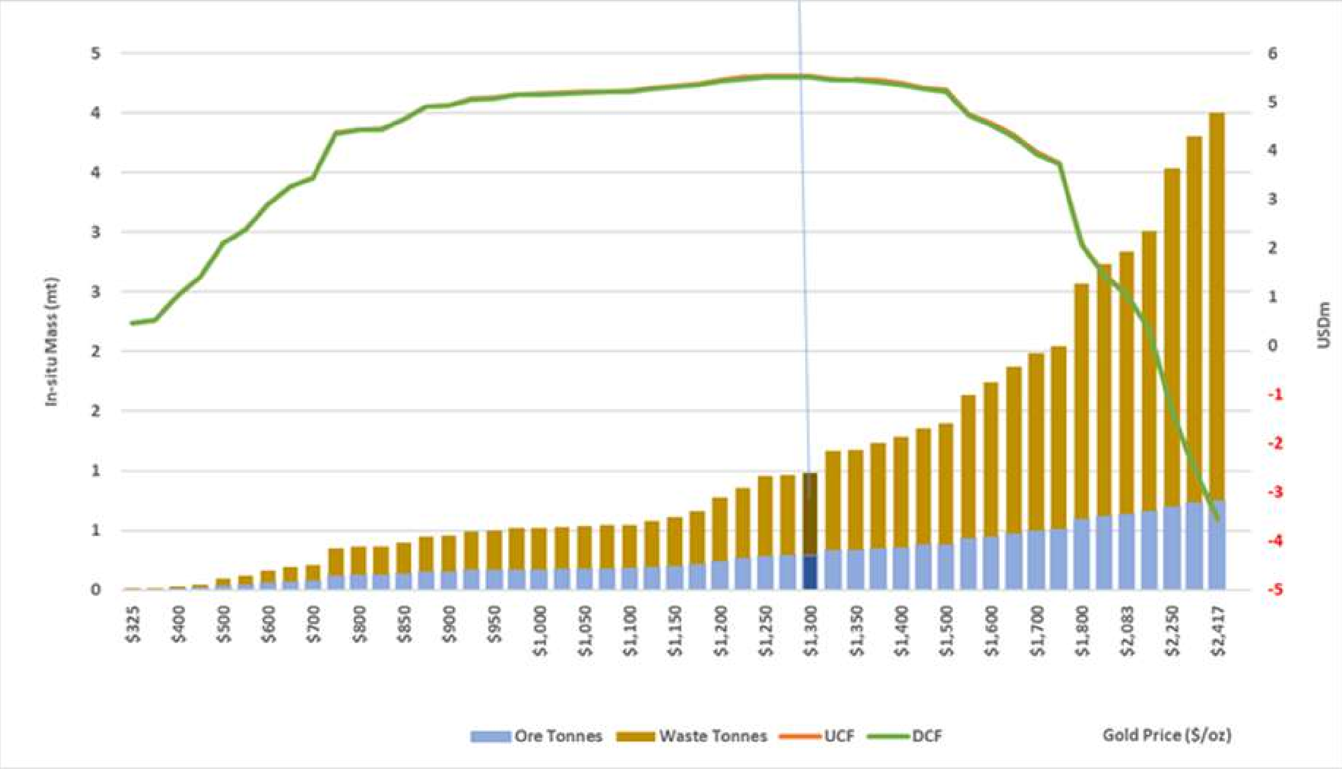


Figure 15.4.6 Sabodala Optimisation Results

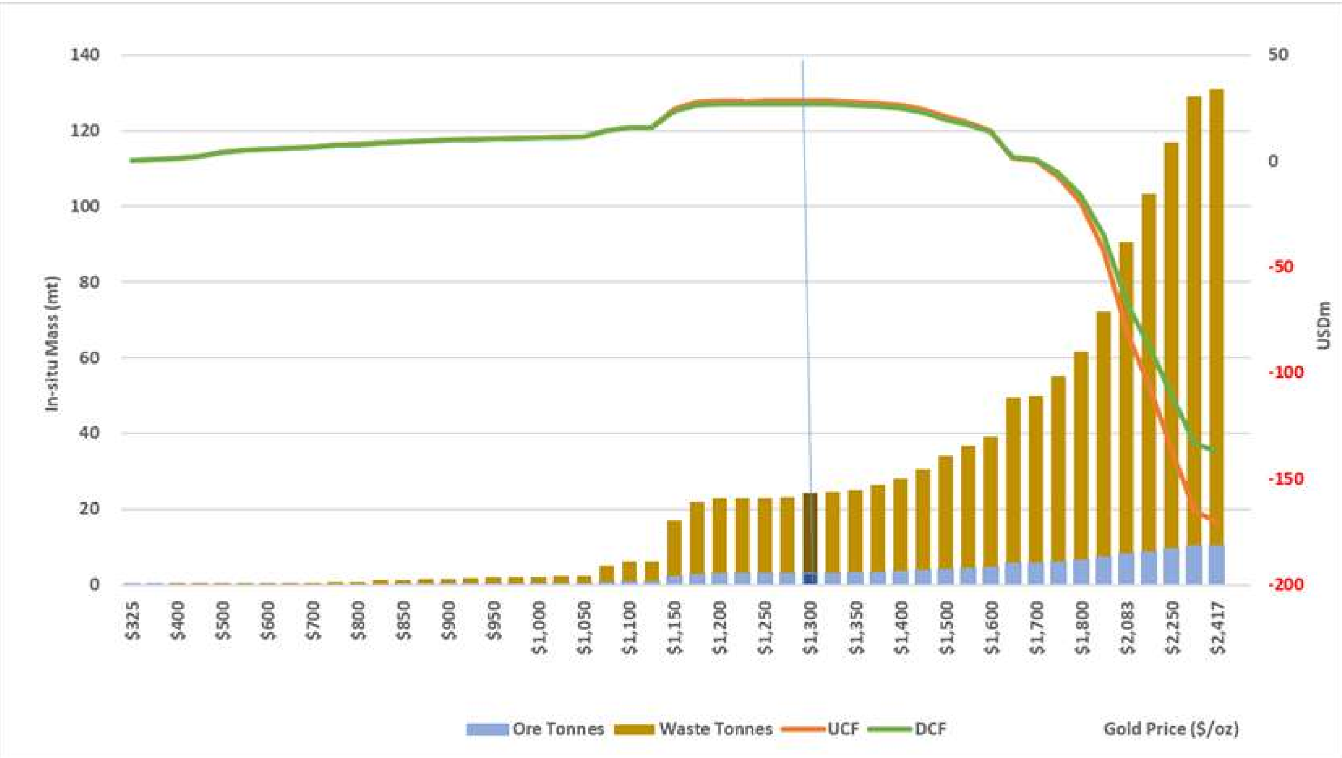


Figure 15.4.7 Massawa CZ Optimisation Results

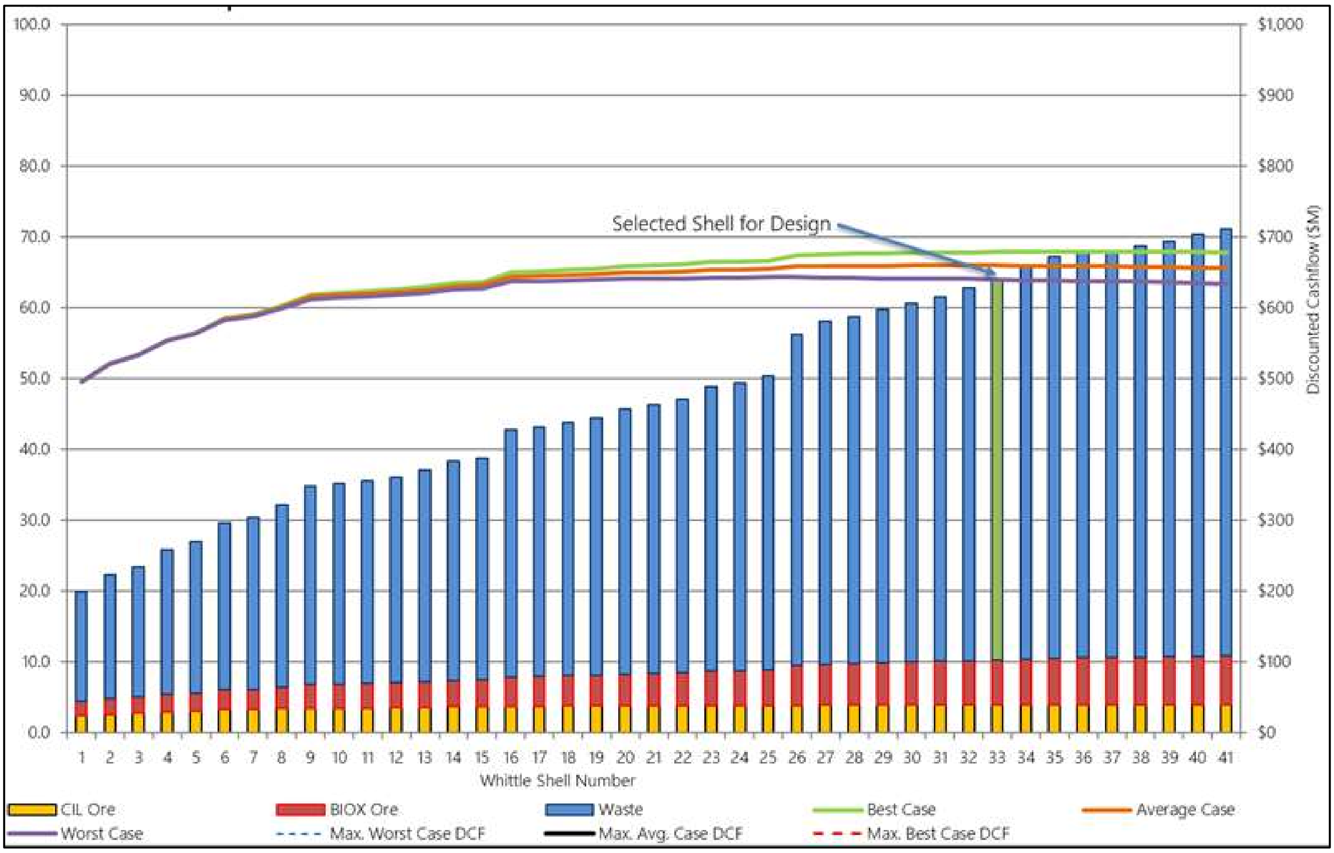
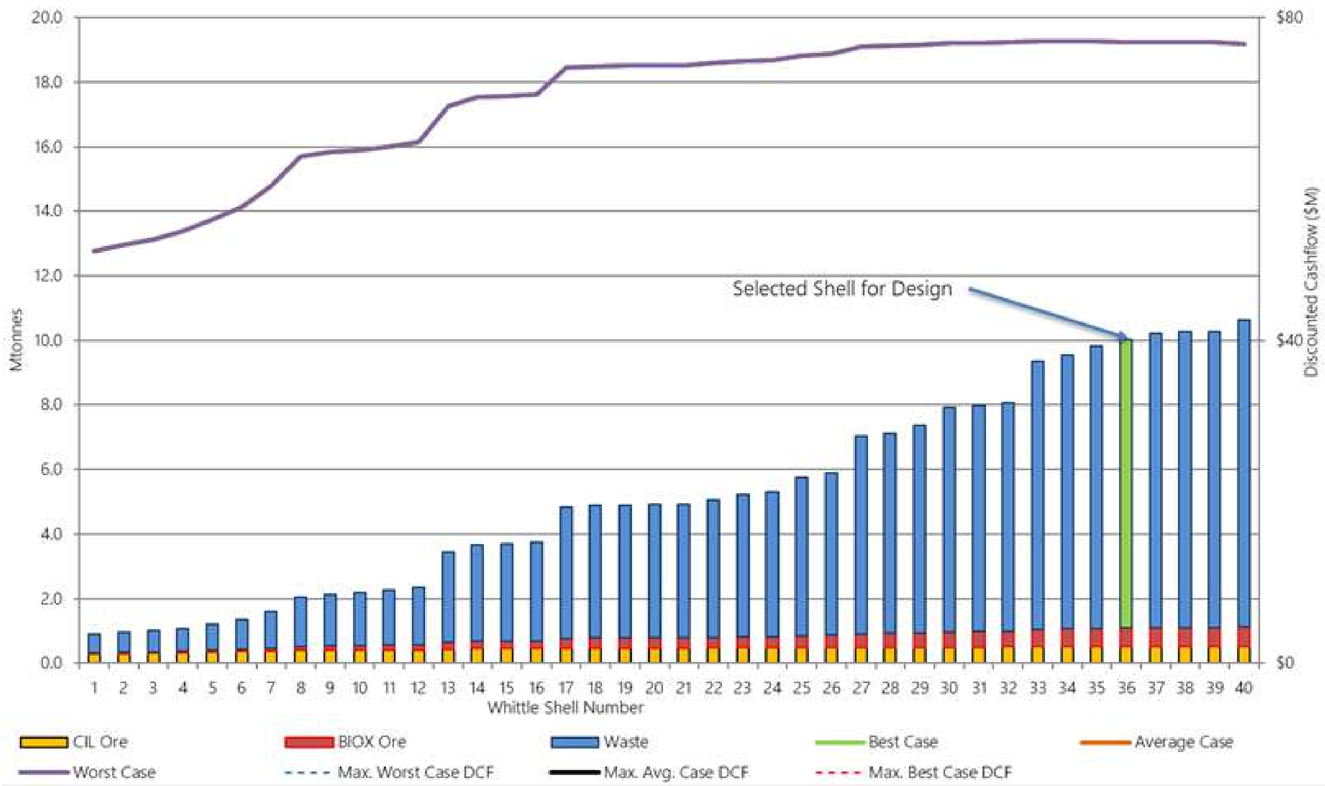


Figure 15.4.8 Delya Optimisation Results (2020 EOY Reserve (MI))[27]



[27] Option II, (2.5 x 2.5 x 2.5) m dilution

15.5 Mine Design

The engineering pit designs are based on specific design criteria applicable to each open pit as described below:

- Ramp gradients of 1 in 10.
- Ramp widths for ridged body dump trucks (Komatsu HD785) of 25.0 m and 16.0 m for dual and single lane traffic respectively.
- Overall pit slope design consideration as reported in Section 15.3.6.
- Minimum mining widths of 30 m and turning radius of 10.1 m to accommodate Komatsu 785 trucks.
- Waste rock dump slope designs to achieve overall slopes of 20°.

The dual ramp width of 25 m is standard in the majority of the designs and is reduced to 16 m for single lane operations on reaching the ultimate pit depth limits. The ramp widths for the dual and single lane haul roads are depicted in Figure 15.5.1 and Figure 15.5.2 respectively.

Figure 15.5.1 Dual Lane Haul Road Width

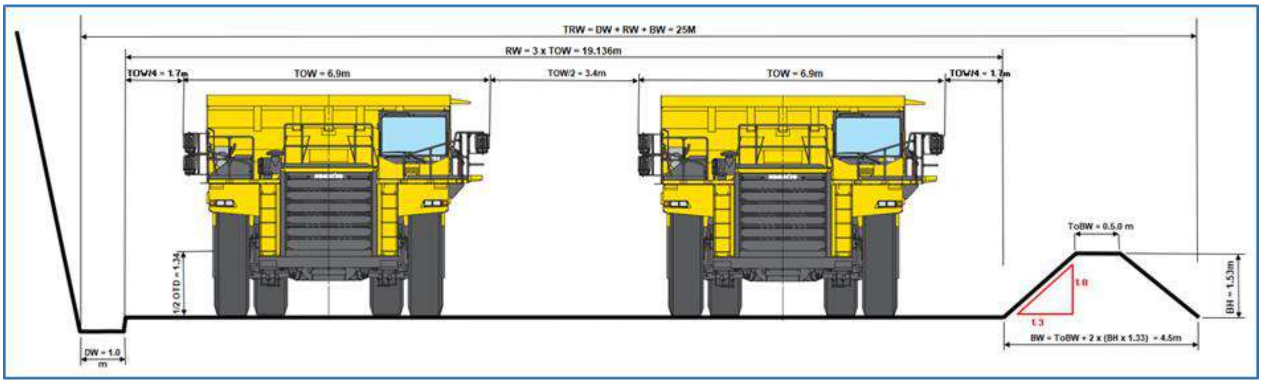
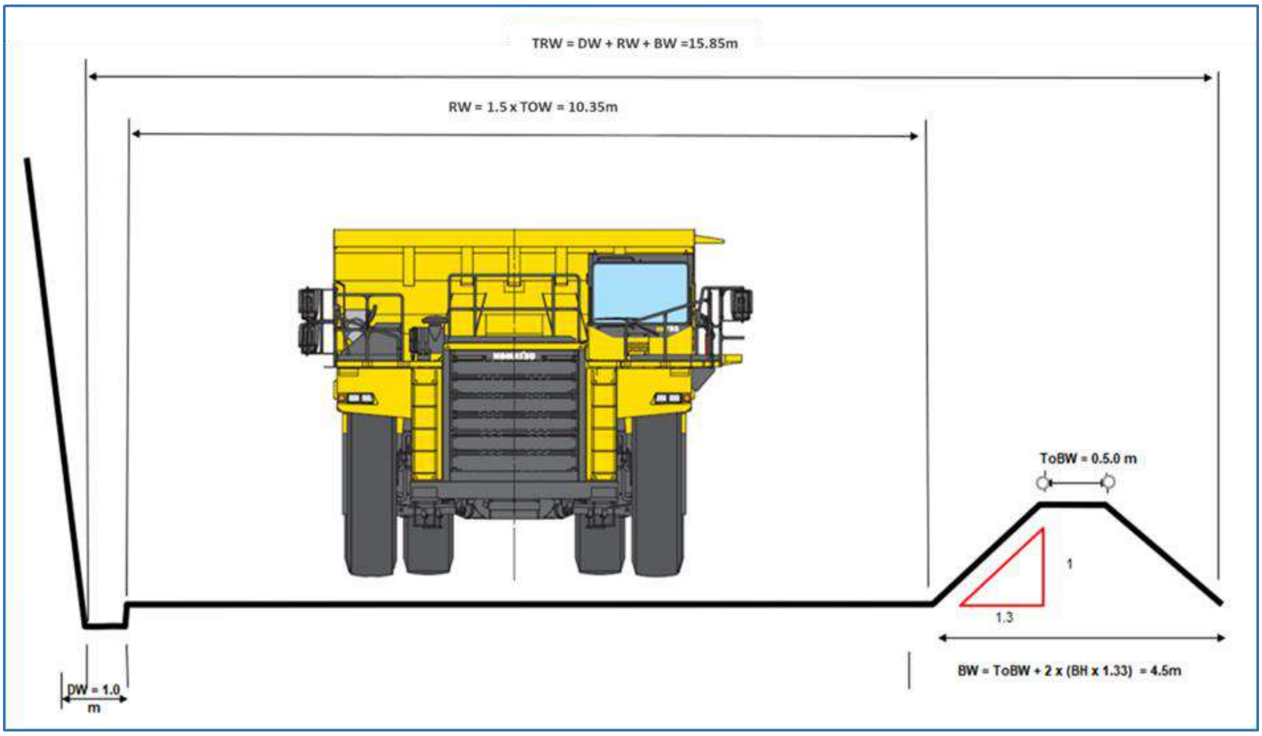


Figure 15.5.2 Single Lane Haul Road Width



15.5.1 Sabodala Group Pit Designs

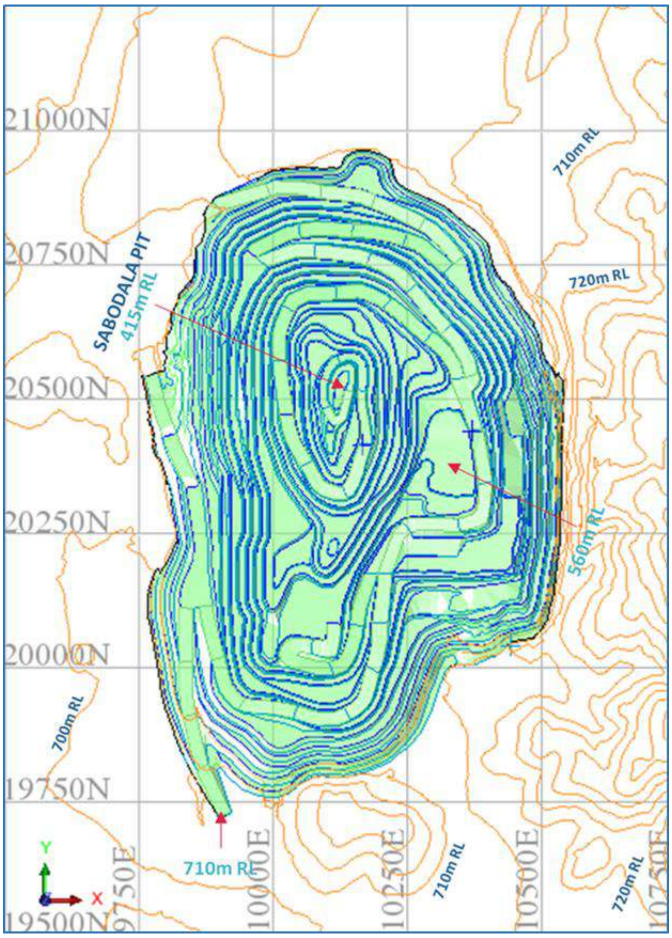
15.5.1.1 Sabodala Pit Design

Sabodala pit design is planned to be mined as a single pushback as shown in Figure 15.5.3. The ramp is designed as dual lane access until towards the last 30 m from the base of the pit. The pit has a second access from the southern end designed as single lane mainly on the oxide and transitional zones, to minimise any potential geotechnical risks on the pit access. Sabodala pit is located within two kilometres of the SWOLP RoM pad and mined ore, is directly transported to the RoM stockpile.

The geotechnical parameters used for the Sabodala pit design are presented in Table 15.5.1.

The Sabodala pit ramp entrance on the northeastern side, is located at around 700 mRL and 710 mRL at the southeastern side entry. The pit bottom reaches an average depth of 290 mRL depth, bottoming at 415 mRL.

Figure 15.5.3 Sabodala Pit Design



Source: Endeavour Mining 2021.

Table 15.5.1 Sabodala Pit Geotechnical Design Parameters

Parameter	Laterite	Oxide	Transitional	Fresh FW	Fresh HW
Bench Face Angle (º)	45	45	54	75	75
Bench Height (m)	10	10	10	20	20
Berm Width (m)	5	5	5	10	8.5
Inter-Ramp Angle (º)	33.7	33.7	39.2	52.5	55.3

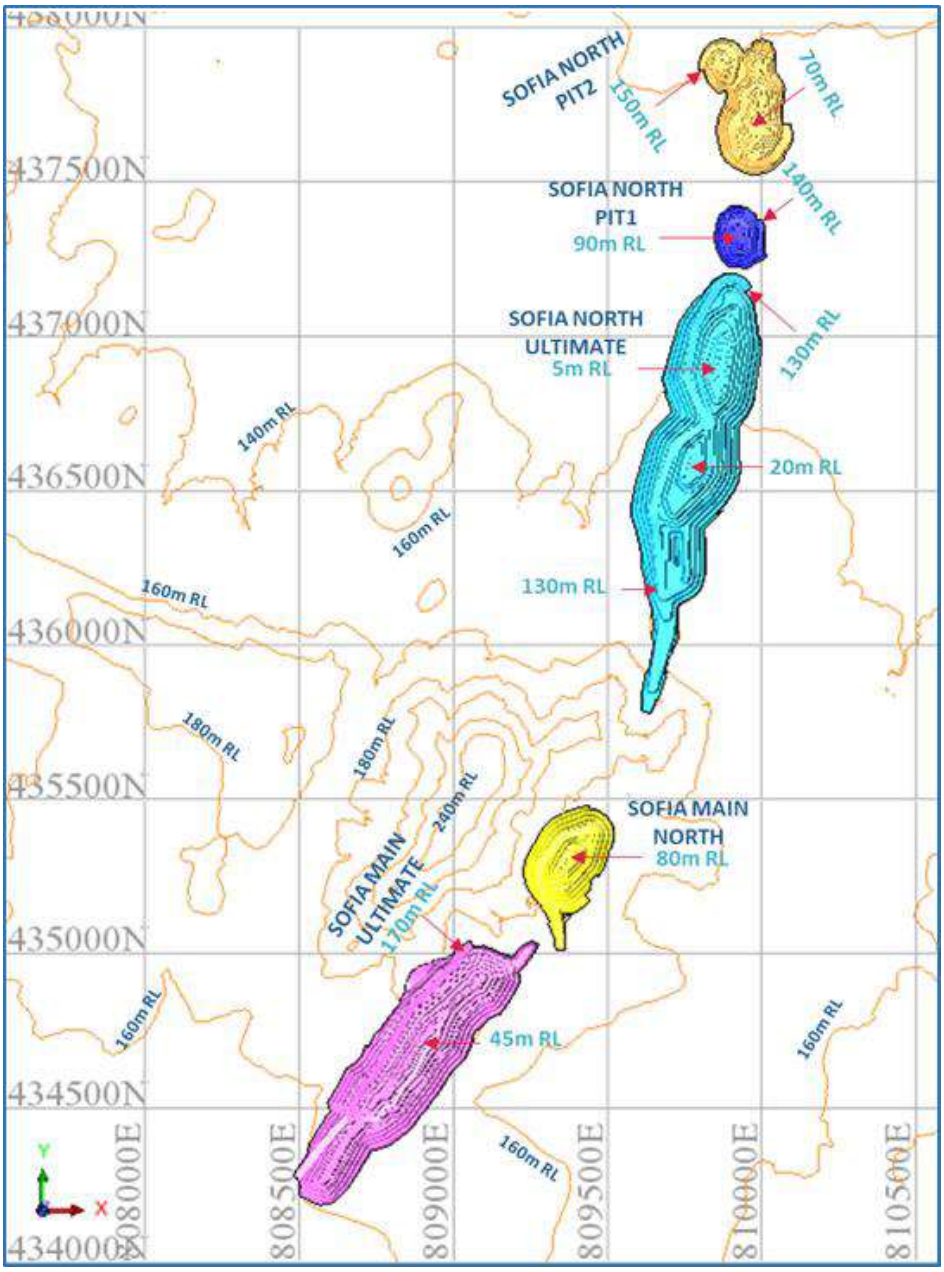
15.5.1.2 Sofia Pit Design

The Sofia pit design group comprises Sofia Main, and Sofia North pit designs, as illustrated in Figure 15.5.4. The Sofia North pit was designed as three pits and Sofia Main, as two pits. The pits are separate from each other, and can be mined independently. The Sofia North ramp is designed as dual lane access until the last 30 m from the base of the pit, then changing to single lane access.

Sofia Main pit has only the northern small pit remaining, which is planned to be mined during 2022. The top oxide part of the ramp is designed with dual access lane and the remaining single lane access.

Geotechnical pit design parameters used for the Sofia pits are provided in Table 15.5.2. The pit depth varies from 155 m on the ultimate pit's northern end to 55 m in the small pit to 80 m at the North pit. Sofia is located 30 km from the SWOLP.

Figure 15.5.4 Sofia Pit Designs



Source: Endeavour Mining 2021

Table 15.5.2 Sofia Main and Sofia North Pits Geotechnical Design Parameters

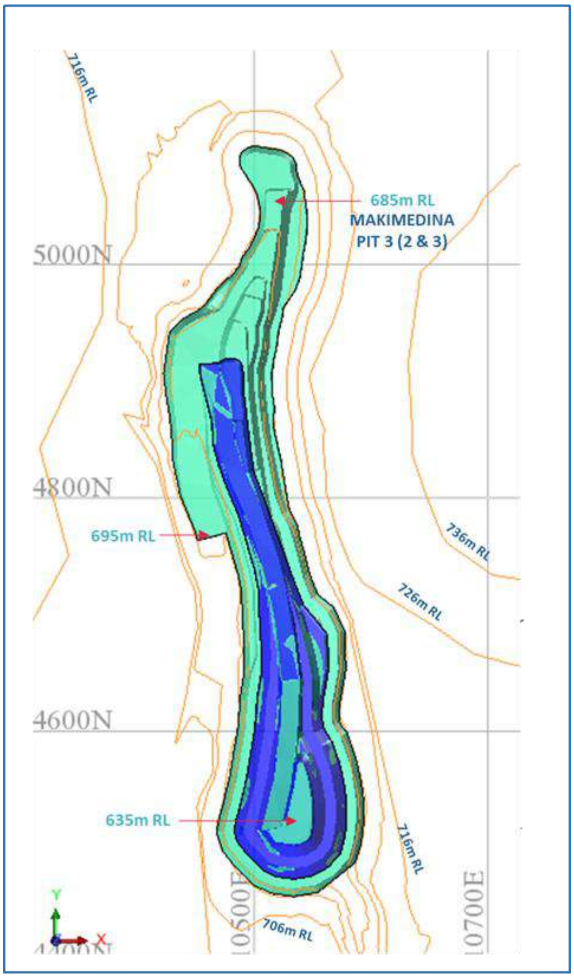
Parameter	Laterite	Oxide	Transitional	Fresh FW	Fresh HW
Sofia Main					
Bench Face Angle (°)	60	60	75	80	75
Bench Height (m)	10	10	10	20	20
Berm Width (m)	6.0	6.0	6.5	10.5	10.5
Inter-Ramp Angle (°)	40.3	40.3	47.4	55.0	51.6
Sofia North					
Bench Face Angle (°)	50	50	60	75	75
Bench Height (m)	10	10	10	20	20
Berm Width (m)	6.0	6.0	6.5	9.0	9.0
Inter-Ramp Angle (°)	34.8	34.8	39.2	54.3	54.3

15.5.2 Maki Medina Pit Design

Maki Medina pit is located approximately nine kilometres from the plant and is planned to be mined in two stages, as shown in Figure 15.5.5. The pit extends in a north–south direction, is 640 m long and has a relatively narrow width averaging around 50 m. At the southern end, the pit varies from (40 to 100) m in width.

Geotechnical parameters applied in developing the engineered pit design are provided in in Table 15.5.3. The pit has a depth of 65 m at the deepest part at the southern end, and gradually shallows towards the north.

Figure 15.5.5 Maki Medina Pit Design



Source: Endeavour Mining 2021.

Table 15.5.3 Maki Medina Pit Geotechnical Design Parameters

Parameter	Laterite	Oxide	Transitional	40 to 60 m	>60 m
Bench Face Angle (º)	50	50	50	60	70
Bench Height (m)	10	10	20	20	20
Berm Width (m)	5.0	5.0	7.0	9.0	9.0
Inter-Ramp Angle (º)	36.8	36.8	40.1	44.2	50.9

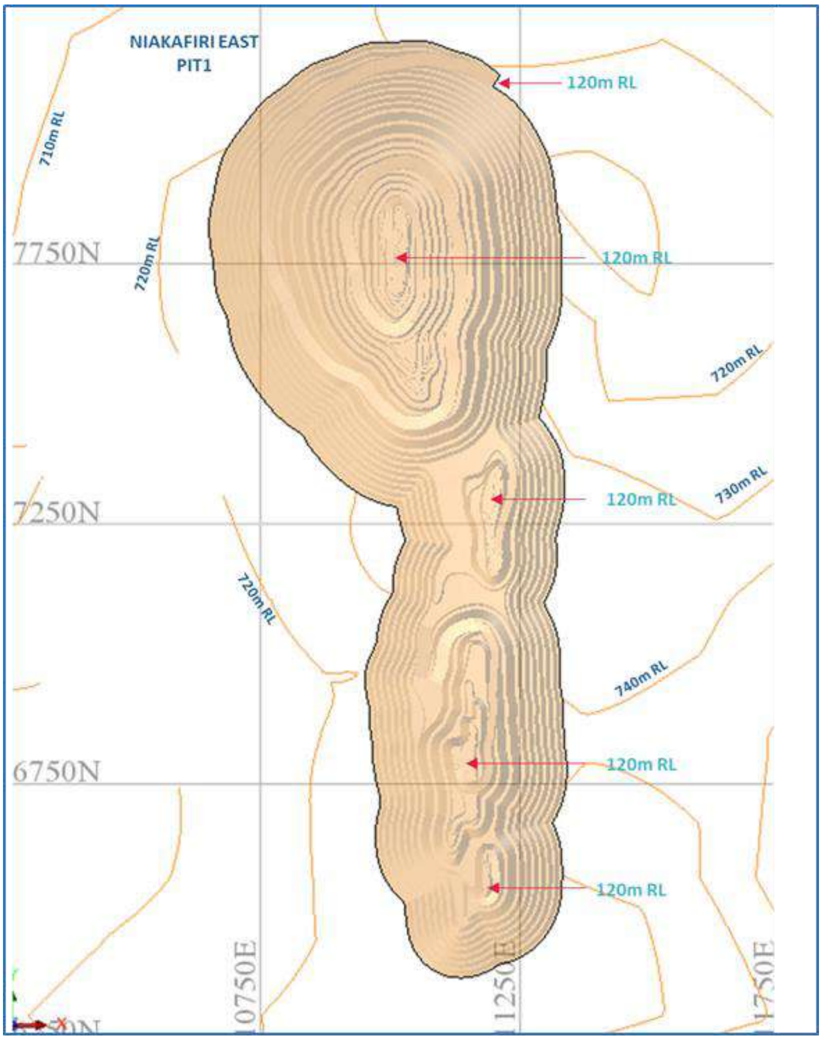
15.5.2.1 Niakifiri Pit Design

The Niakifiri pit group comprises the Niakifiri East (Figure 15.5.6) and Niakifiri West pits (Figure 15.5.7), which are located four kilometres southeast of the SWOLP. It is planned to mine the Niakifiri East pit, in two dependant push backs. The Phase 4 pit has to be mined, before mining the deeper part of the final pit design of Niakifiri East pit.

Niakifiri West pit is designed as two independent pit stages, with a tiny intersection between them. The main Niakifiri East pit stage at the southern side has a depth of approximately 125 m and the northern stage is approximately 85 m deep.

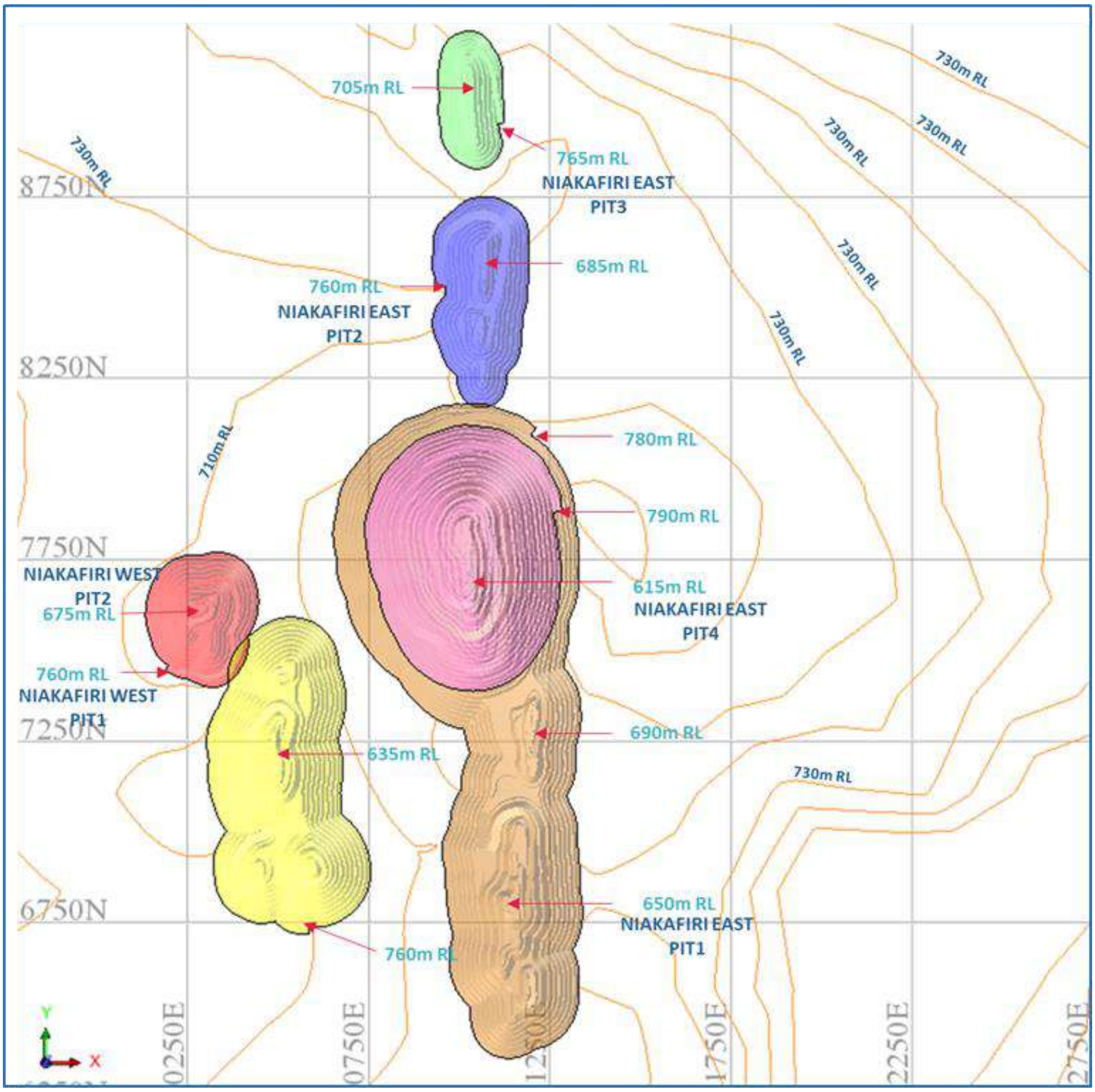
Geotechnical parameters applied in developing the engineered pit design, are provided in Table 15.5.4.

Figure 15.5.6 Niakifiri East Final Pit Design



Source: Endeavour Mining 2021.

Figure 15.5.7 Niakifiri East and Niakifiri West Pit Designs with Multiple Stages



Source: Endeavour Mining 2021.

Table 15.5.4 Niakifiri Pit Geotechnical Design Parameters

Parameter	Laterite	Oxide	Transitional	Fresh (075 to 135)		Fresh Others	
				(100 to120) m	>120 m	(100 to 120) m	>120 m
Niakifiri East							
Bench Face Angle (°)	50	50	50	60	65	70	75
Bench Height (m)	10	10	20	20	20	20	20
Berm Width (m)	5	5	7	9	9	9	9
Inter-Ramp Angle (°)	36.8	36.8	40.1	44.2	47.5	50.9	54.3
Niakifiri West							
Bench Face Angle (°)	50	50	50	60	65	70	75
Bench Height (m)	10	10	20	20	20	20	20
Berm Width (m)	5	5	7	9	9	9	9
Inter-Ramp Angle (°)	36.8	36.8	40.1	44.2	47.5	50.9	54.3

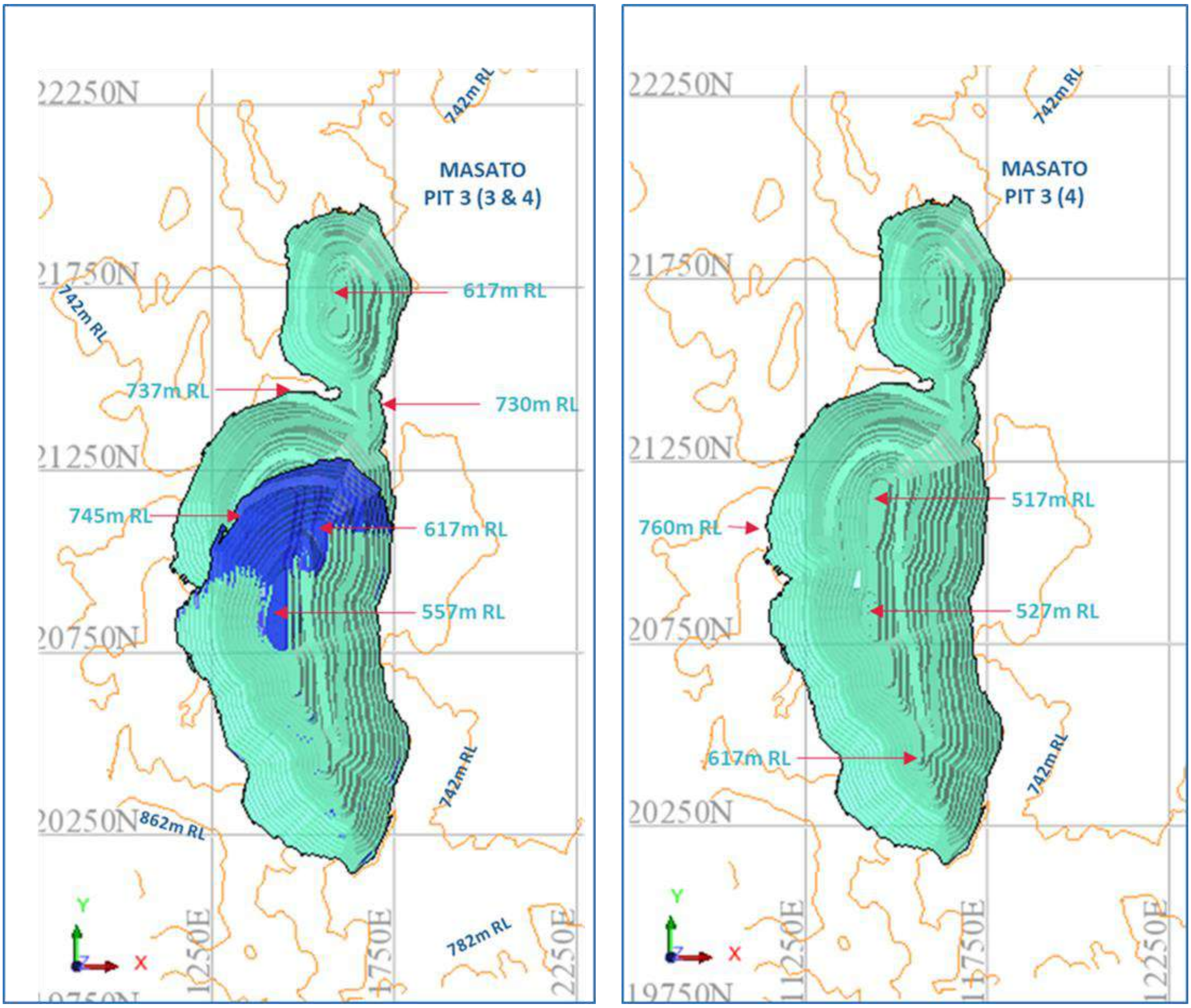
15.5.2.2 Masato Pit Design

The Masato pit is located approximately 800 m east of the Sabodala pit and approximately three kilometres from the SWOLP. The ore mined from the pit is hauled directly to the SWOLP RoM pad by the mining trucks. The pit is planned to be mined in two stages, as shown in Figure 15.5.8.

The first stage pit is on the southern end, and goes down to a depth of approximately 180 m, reaching to 557 mRL. The final pit base of the Masato pits reaches 517 mRL at the southern end and 617 mRL at the northern pit. The overall depth of the final pit design varies from (220 to 240) m.

Geotechnical parameters applied in developing the engineered pit design, are provided in Table 15.5.5.

Figure 15.5.8 Masato Pit Design in Two Stages



Source: Endeavour Mining 2021.

Table 15.5.5 Masato Pit Geotechnical Design Parameters

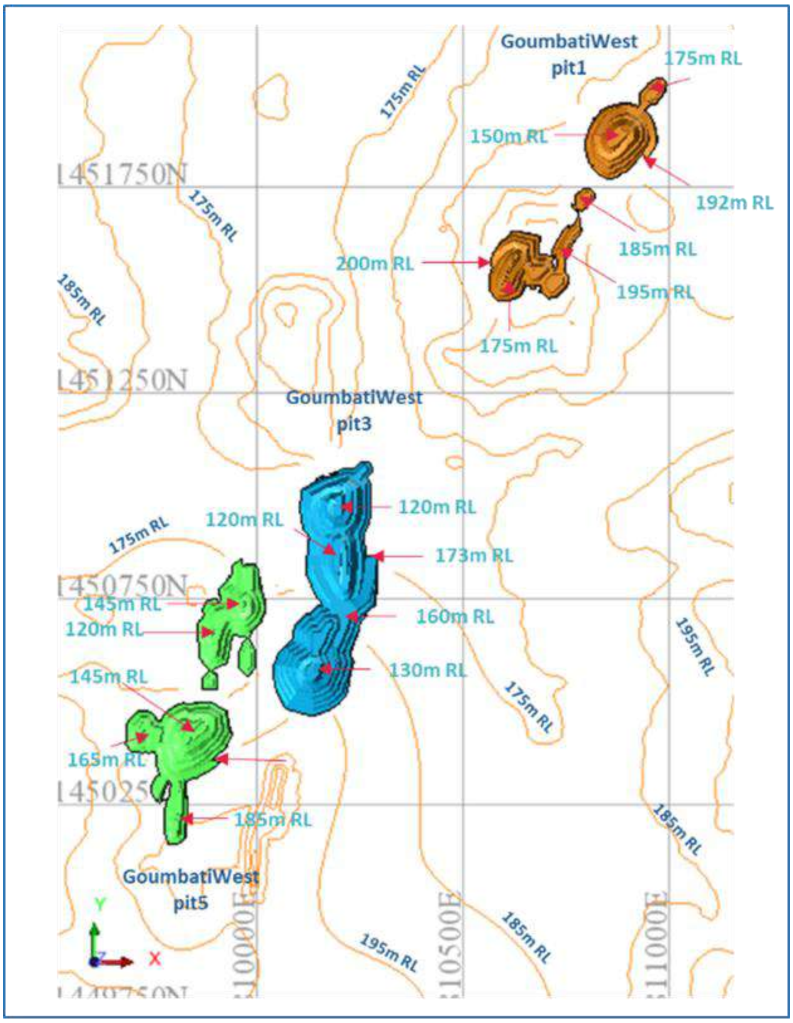
Parameter	Laterite	Oxide	Transitional	Fresh		
				(40 to 60) m	Azimuth 015-195 >60 m	Azimuth 195-015 >60 m
Bench Face Angle (°)	50	50	50	60	75	65
Bench Height (m)	10	10	20	20	20	20
Berm Width (m)	5.0	5.0	7.0	9.0	9.0	9.0
Inter-Ramp Angle (°)	36.8	36.8	40.1	44.2	54.3	47.5

15.5.2.3 Goumbati West Pit Design

Goumbati West pit is located approximately 11 km from the SWOLP. The ore mined from the pit is stored near the pit and then transported to the SWOLP RoM pad when it gets fed into the plant. The pit is formed of several small satellite pits as shown in Figure 15.5.9. A closer view of the northern and southern group of satellite pits are depicted in Figure 15.5.10. The satellite pits are mostly small and shallow compared to the other Project deposits, with depths typically varying from (20 to 55) m.

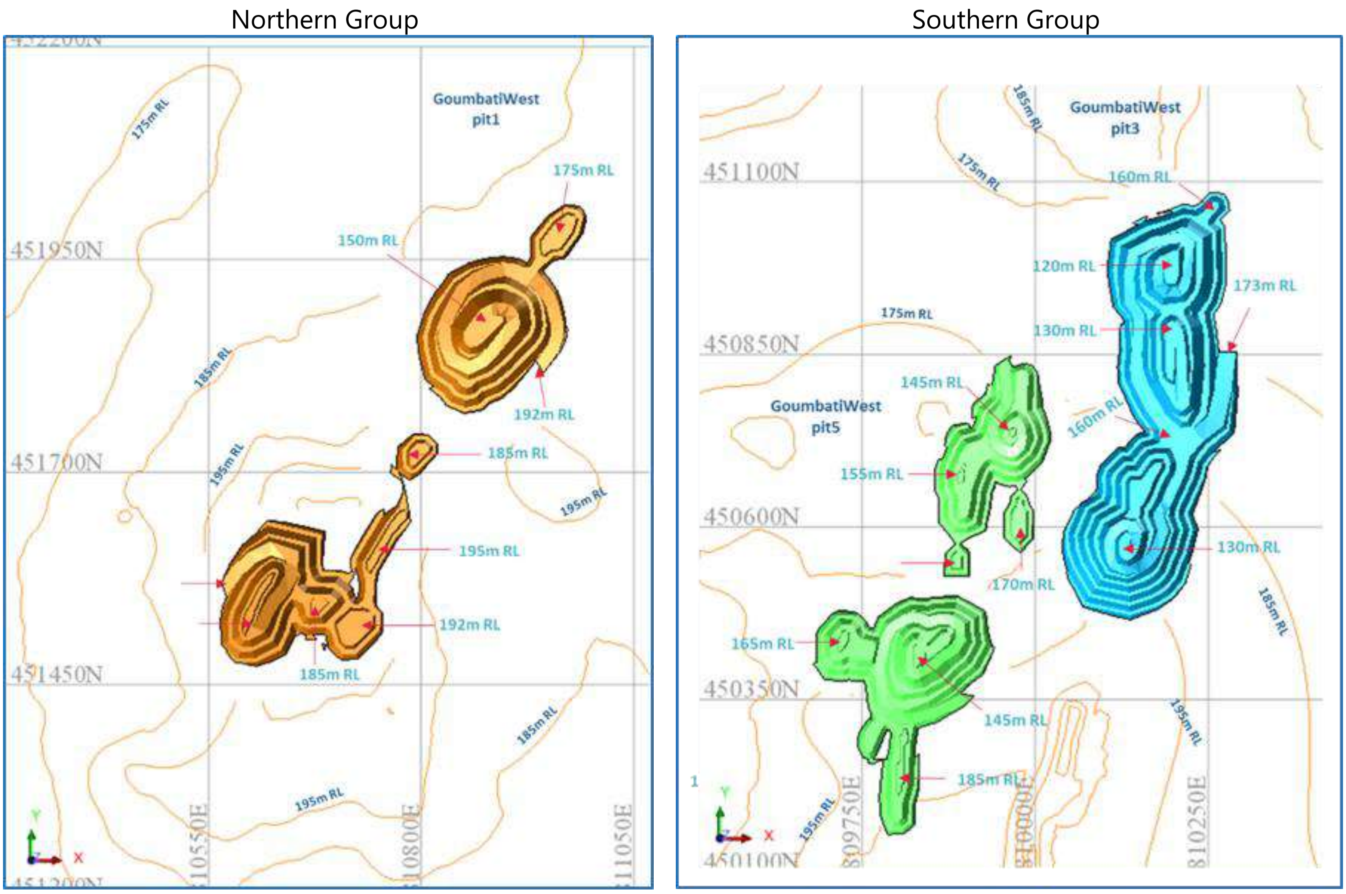
Geotechnical parameters applied in developing the engineered pit design, are provided in Table 15.5.5.

Figure 15.5.9 Goumbati West Pit Designs - Overall



Source: Endeavour Mining 2021.

Figure 15.5.10 Goumbati West Pit Designs – Detail



Source: Endeavour Mining 2021

Table 15.5.6 Goumbati West Pits Geotechnical Parameters to Design

Goumbati West	Laterite	Oxide	Transitional	(40 to 60) m	>60 m
Bench Face Angle (BFA) (°)	50	50	50	60	75
Bench Height (BH) (m)	10	10	20	20	20
Berm Width (BW) (m)	5	5	7	9	9
Inter-Ramp Angle (IRA) (°)	36.8	36.8	40.1	44.2	54.3

15.5.3 Massawa Group Pit Designs

The open pits will be developed with internal stages to improve timing and continuity of ore supply. The staging logic was guided by selected Whittle™ pit shells constrained by operability, safety, minimum mining width for cutbacks, ramp logic, bench turnover limits and equipment productivities.

15.5.3.1 Massawa Central Zone Pit Design

The Massawa CZ pit is located approximately 32 km from the SCPF. Oxide and some transitional ore and reduced transitional/fresh ore from the Massawa CZ pit will be processed at the SWOLP and SSTP respectively.

Five internal pit stages were incorporated into the Massawa CZ pit design, as noted below:

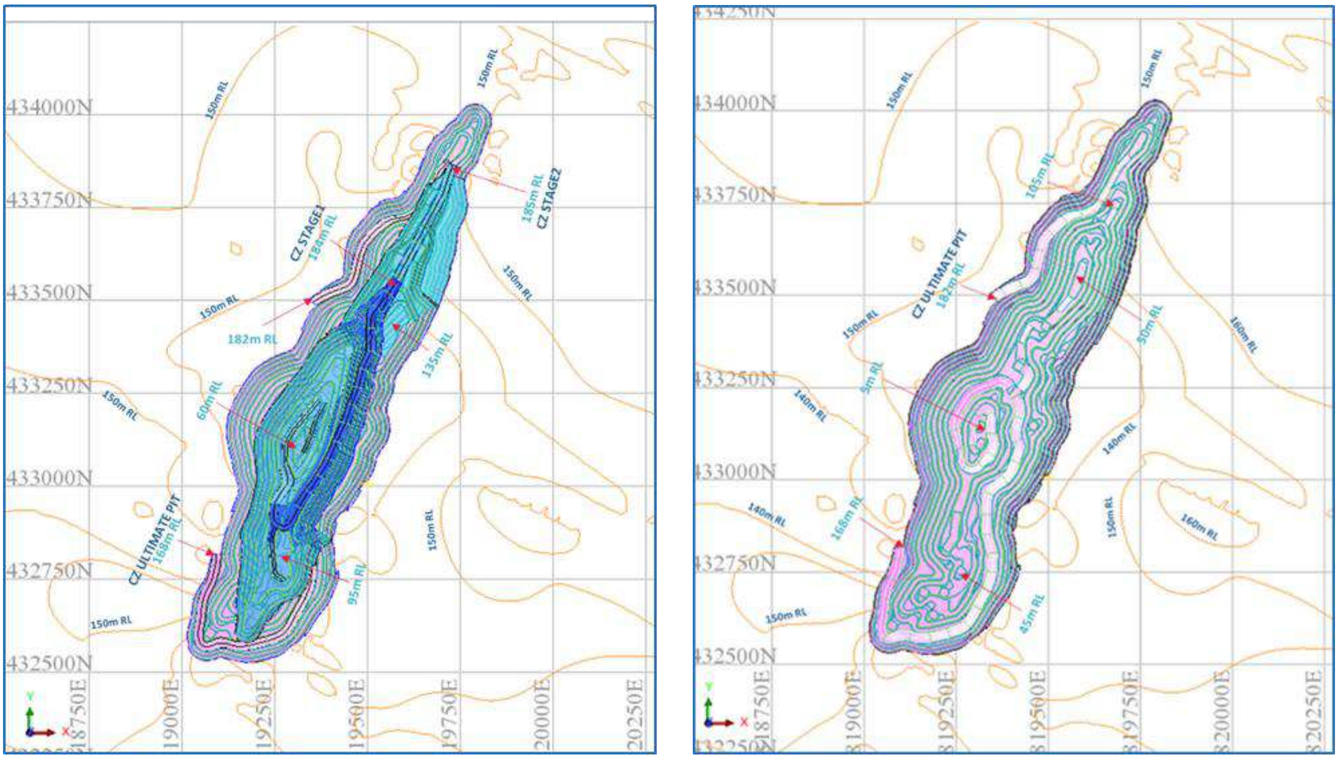
- Stage 1 - focused on the high value Shell 1.
- Stage 2 - focussed on mining the southeastern footwall and a northern extension.

- Stage 3 - due to the length of the final stage 2 cutback, a spilt shell method was used to define Stage 3, which extends deeper below Stage 2 and out to the final wall limits to the north.
- Stage 4 - encompasses the final cut-back to the south and joins with Stage 3 at 135 mRL.
- Stage 5 – is defined as the combined stages below Stage 4.

Final pit design of the Massawa CZ pit is illustrated in Figure 15.5.11 following. The Massawa CZ Ultimate pit trends in a northeasterly direction and is approximately 1700 m in length and 180 m deep at its maximum point.

Geotechnical parameters applied in developing the engineered pit design, are provided in Table 15.5.7.

Figure 15.5.11 Massawa CZ Pit Design Stages



Source: Endeavour Mining 2021.

Table 15.5.7 Massawa CZ Pit Geotechnical Design Parameters

Parameter	Laterite	Oxide	Transitional	FW SE	HW NW
Bench Face Angle (°)	55	55	75	75	75
Bench Height (m)	10	10	10	20	20
Berm Width (m)	5.5	5.5	7	9	10
Inter-Ramp Angle (°)	38.7	38.7	58.3	54.3	52.5

15.5.3.2 Massawa North Zone Pit Design

The Massawa NZ pit is located approximately 32 km from the SCPF. Oxide and some transitional ore and reduced transitional/fresh ore from the Massawa NZ pit will be processed at the SWOLP and SSTP respectively.

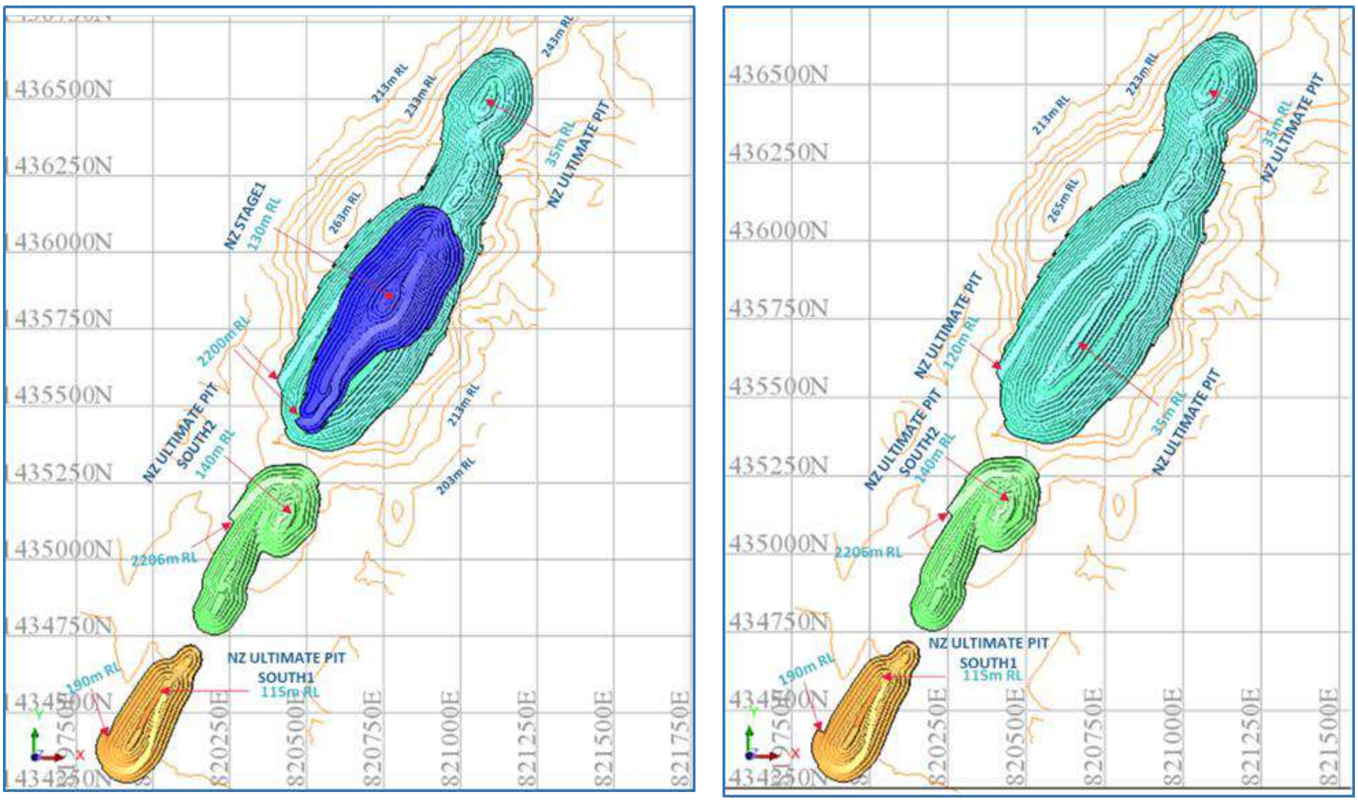
Massawa NZ is made up of two zones designated as Zone A and B, as noted below:

- Zone A focuses on the northern section which is made up of a single internal stage and cutback to the final pit walls.
- Zone B focuses on two southern independent stages.

The final length of the two zones is approximately 2700 m in length, with a maximum width of 440 m. The Massawa NZ pit design is shown in Figure 15.5.12 following.

Geotechnical parameters applied in developing the engineered pit designs, are provided in Table 15.5.8 following.

Figure 15.5.12 Massawa NZ Pit Design



Source: Endeavour Mining 2021.

Table 15.5.8 Massawa NZ Pit Geotechnical Design Parameters

Parameter	Laterite	Oxide	Transitional	FW SE	HW NW
Bench Face Angle (°)	55	55	75	80	80
Bench Height (m)	10	10	20	20	20
Berm Width (m)	7	7	7	11	10
Inter-Ramp Angle (°)	35.5	35.5	58.3	54.0	55.9

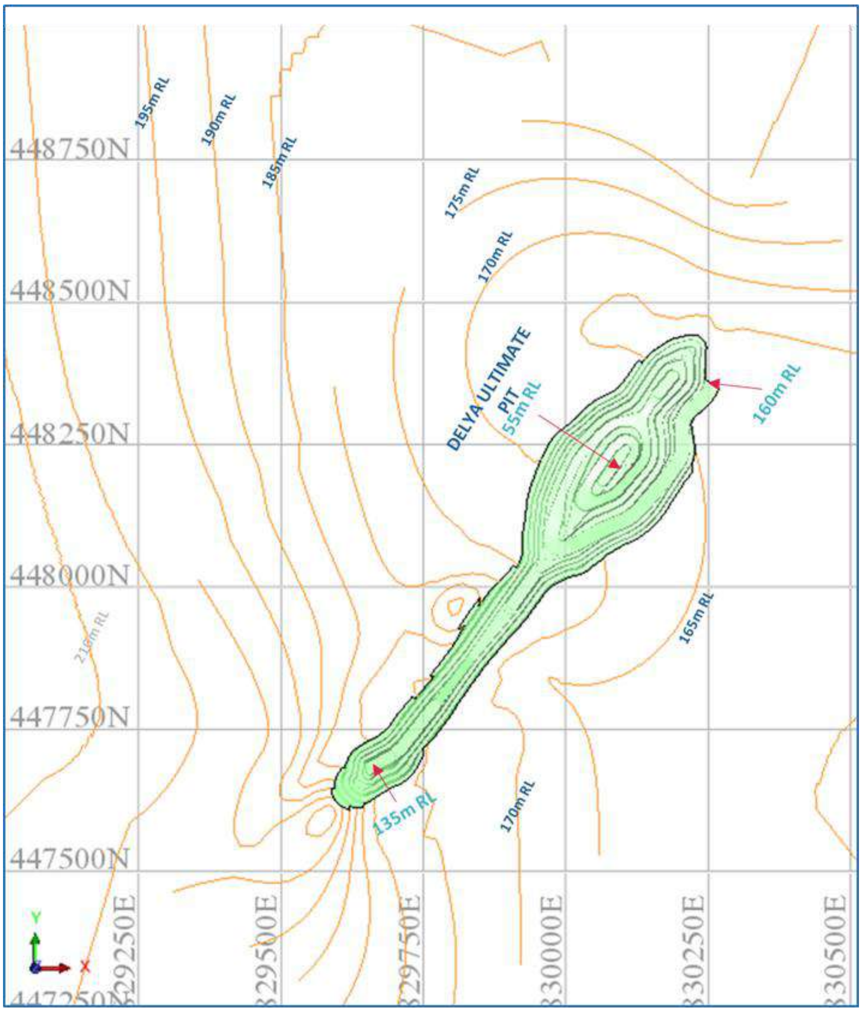
15.5.3.3 Delya Pit Design

The Delya pit (MDL) is located approximately 46 km by road from the SCPF. Oxide ore and transitional/fresh ore from Delya, will be processed at the SWOLP and SSTP respectively.

Delya is made up of single pit with the final length and width of ~1000 m and ~230 m respectively. The ramp system has been designed on the northeastern wall, with ore being hauled directly to a small RoM pad next to the open pit and from there, to the respective SCPF RoM pads. Waste is planned to be sent to a waste dump located east of the open pit. There may be the potential to backfill the shallower southern part. The Delya pit design is shown in Figure 15.5.13.

Geotechnical parameters applied in producing the engineering design are provided in Table 15.5.9 following:

Figure 15.5.13 Delya Pit Design



Source: Endeavour Mining 2021.

Table 15.5.9 Delya Pit Geotechnical Design Parameters

Parameter	Laterite	Oxide	Transitional	FW SE	HW NW
Bench Face Angle (°)	60	60	75	80	80
Bench Height (m)	10	10	10	20	20
Berm Width (°)	6	6	6	11	10
Inter-Ramp Angle (m)	40.3	40.3	49.0	54.0	55.9

15.6 Considerations in Mineral Reserve Estimation

Factors that may influence Mineral Reserve Estimation, including, but not limited to: Geotechnical parameters, hydrology and dewatering, safety. health, environment and community, processing and waste management are discussed in Section 16.0.

15.7 Historical Mineral Reserve Estimates

A selection of the previous Mineral Reserve Estimates for Project over the past three years is presented Table 15.7.1[28]. All historical Mineral Reserves were reported in accordance with the guidelines and terminology provided in the CIM Standards and the relevant Qualifying Persons for each statement, are defined in each AIF.

From December 2018 to December 2019, the Mineral Reserves increased 36% by tonnes and the gold content increased 100% following the amalgamation of the Massawa deposits (MCZ, MNZ and MDL). From December 2019 to December 2020, the depleted Mineral Reserves were offset by the conversion of Mineral Resources to Mineral Reserves following additional drilling and studies in 2020. From December 2020 to December 2021, the Mineral Reserves reported decreased by 7% mainly due to the depletion. Drilling has continued to identify potential new Mineral Resources and Mineral Reserves.

Table 15.7.1 Previous Mineral Reserves for 31 December 2018, 2019, and 2020

Deposit	31 December 2018			31 December 2019			31 December 2020		
	Ore (kt)	Grade (g/t)	Gold (koz)	Ore (kt)	Grade (g/t)	Gold (koz)	Ore (kt)	Grade (g/t)	Gold (koz)
Open Pits									
• Sabodala	5 029	1.46	236	4 627	1.50	224	4 667	1.46	218
• Masato	18 476	1.10	654	17 767	1.13	644	18 436	1.10	653
• Golouma	3 525	2.01	228	2 103	2.01	136	74	2.16	5
• Golouma	1 544	5.03	250	1 544	5.03	250	1 544	5.03	250
• Kerekounda	148	4.41	21	-	-	-	-	-	-
• Maki	874	1.30	37	835	1.19	32	270	1.40	12
• Niakafiri	14 304	1.18	544	13 922	1.20	538	14 927	1.15	552
• Niakafiri	1 173	1.07	41	1 131	1.10	40	1 249	1.03	42
• Goumbati	1 423	1.31	60	1 390	1.33	60	883	1.37	39
• Sofia	-	-	-	8 231	2.40	634	9 016	2.39	693
• Massawa CZ	-	-	-	9 943	3.54	1,133	10 629	3.37	1 151
• Massawa NZ	-	-	-	5 600	4.23	760	5 920	4.06	773
• Massawa Delya	-	-	-	880	3.56	100	926	3.43	102
Total OP	**46 496**	**1.38**	**2 070**	**67 974**	**2.08**	**4 551**	**68 543**	**2.04**	**4 491**
Kerekounda UG	**605**	**4.95**	**96**	**605**	**4.95**	**96**	**605**	**4.95**	**96**
Stockpile	**8 559**	**0.88**	**242**	**7 218**	**0.73**	**170**	**8 217**	**0.79**	**210**
Total	**55 660**	**1.35**	**2 409**	**75 797**	**1.98**	**4 817**	**77 365**	**1.93**	**4 796**

[28] As reported by in the Issuers' public domain statements (Annual Information Form – "AIF") for 31 December (2018, 2019 and 2020)

Table 15.7.2 Summary of Parameters used in Historical Mineral Reserve Estimates

Parameters	Unit	2018	2019	2020
Gold Price	USD/oz	1250	1250	1300
Dilution	%	5 to 20	5 to 20	5 to 20
Cut-off Grades (SWOLP)	g/t Au	0.4 to 0.5	0.4 to 0.7	0.4 to 0.7
Cut-off Grad (SSTP)	g/t AUY		1.40	1.25

15.8 Underground Mineral Reserves

Previous work by SRK (2010) determined that mechanised cut and fill (MCAF) is the most suitable mining method for use at the underground Golouma West, Golouma South, and Kerekounda deposits. RPA (2015) concurred with the selection for the following reasons:

- The irregular nature of the three deposits.
- The selectivity of the mining method.
- MCAF enables the maximum recovery of ore.
- Minimal amount of mining equipment.
- With a low production rate, MCAF allows for sustainable mining.

It is proposed that two deposits will be mined concurrently. A nominal mining rate of 500 t/d per deposit, providing 1,000 t/d total, was determined as the required extraction rate to supplement the open pit mining schedule.

Underground Mineral Reserves as of 31 December 2021, are presented in Table 15.8.1 following:

Table 15.8.1 Underground Mineral Reserves, as of 31 December 2021

Deposit	Probable Mineral Reserves		
	Tonnes (k)	**Grade (g/t Au)**	**Contained Gold (koz)**
Golouma West 1 (GOLW 1)	622	6.6	123
Golouma West 2 (GOLW 2)	55	3.3	59
Golouma West 3 (GOLW 3)	403	4.7	60
Golouma South (GOLS)	329	4.9	52
Kerekounda (KRKD)	594	5.3	102
Total	**2 003**	**5.3**	**343**

Notes:
1. CIM (2014) definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated at a cut-off grade of 2.82 g/t Au.
3. Mineral Reserves are estimated using an average long-term gold price of USD 1,300 per ounce.
4. A minimum mining width of 2.5 m was used.
5. Numbers may not add due to rounding.

15.8.1 Mineral Resource Block Model

SLR used the following Mineral Resource models provided by Endeavour to estimate the Project's Underground Mineral Reserves:

- 'golouma_tg_jan2014.dm'. Converted from the Vulcan file 'Golouma_tg_jan2014.bmf'.
- 'kerekounda_rpa_jan2014.dm'. Converted from the Vulcan file 'kerekounda_rpa_jan2014.bmf'.

15.8.2 Cut-Off Grade

Table 15.8.2 following, presents the development of the COG basis, for each underground deposit. The basis for the Underground Mineral Reserve estimate is as defined below:

- Gold price USD 1,300oz (defined by Endeavour).
- Mill recovery was provided as a formula by SGO.
- Payabilities, refining and transport costs were provided by SGO.
- G&A and processing costs were provided by SGO.
- Mining costs used in the Deswik Stope Optimizer (DSO) analysis were derived from comparable projects in Africa. A lower mining cost was used in determining the COG to account for incremental stopes.

Table 15.8.2 Cut-Off Grade (COG) Estimate

Parameter	Units	Deposit		
		Kerekounda	Golouma South	Golouma North
Gold Price	USD/oz Au	1,300		
Payable Gold	%	99.5		
Refining Costs	USD/oz	3.00		
Royalties	USD/oz	65.00		
Mill Recovery	%	92.7	92.8	92.8
Underground Mining	USD/t	80.00	80.00	80.00
Processing	USD/t	14.70	14.70	14.70
G&A	USD/t	8.95	8.95	8.95
Total	**USD/t**	**103.65**	**103.65**	**103.65**
Cut-Off Grade	g/t Au	2.82	2.82	2.82

Note: Gold price, Payable Gold, Refining Costs and Royalties are values common to all three deposits.

15.8.3 Deswik Stope Optimiser Inputs

The following inputs were used to produce stope shapes for each of the deposits for the Deswik Stope Optimiser software (DSO):

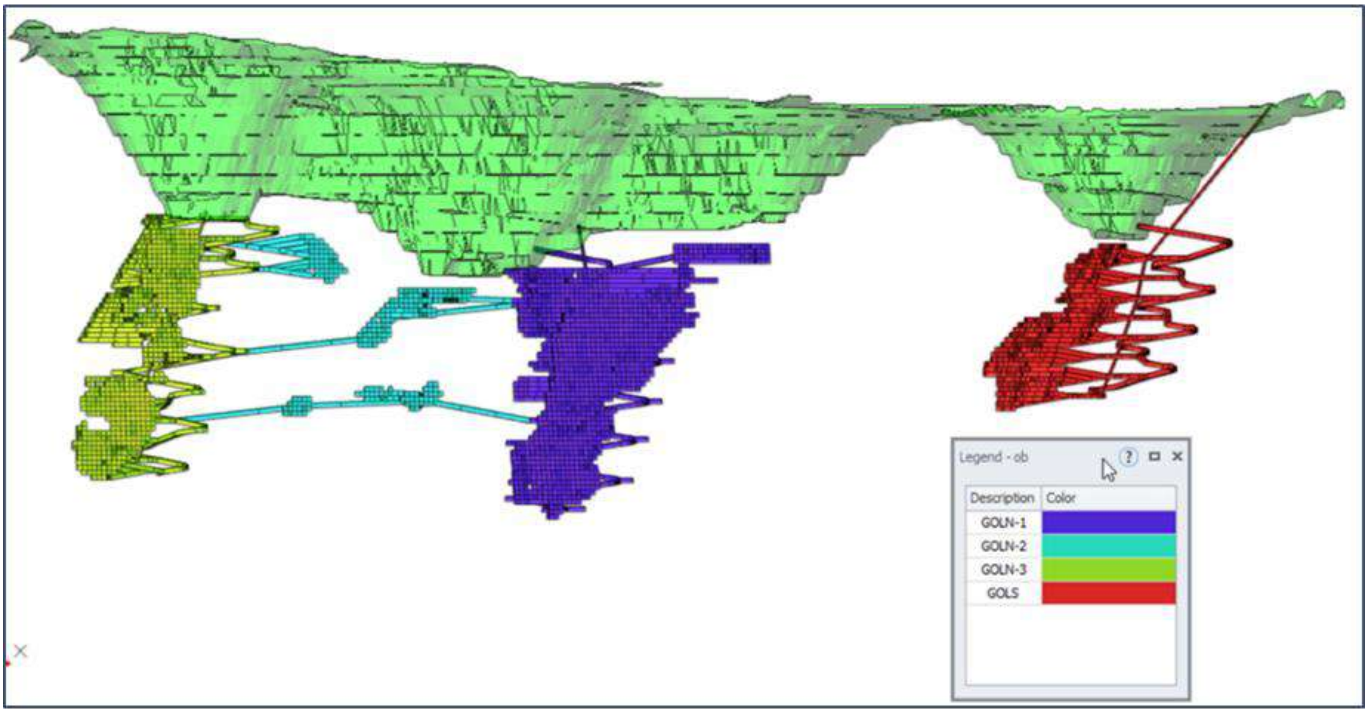
- Length (strike) 5 m.
- Height 5 m.
- Minimum Mining Width (MMW) 2.5 m.
- Stope Pillar (5 m).
- Dilution was 0 (development rounds – dilution was subsequently added in the Scheduler).
- Default dip 90º.
- Strike oriented parallel to the deposit.
- Optimized for Narrow Ore.
- The grade value optimized was gold.
- The COG input was 2.82 g/t Au using the DSO Combination evaluation method.

The strike length and height were fixed to 5 m, allowing the stope optimizer to create shapes with a MMW of 2.5m from hanging wall to footwall.

The results of the DSO created stope shapes that are representative of cut and fill mining lifts. Stopes that were too far away from existing infrastructure or singular stopes, were removed from consideration.

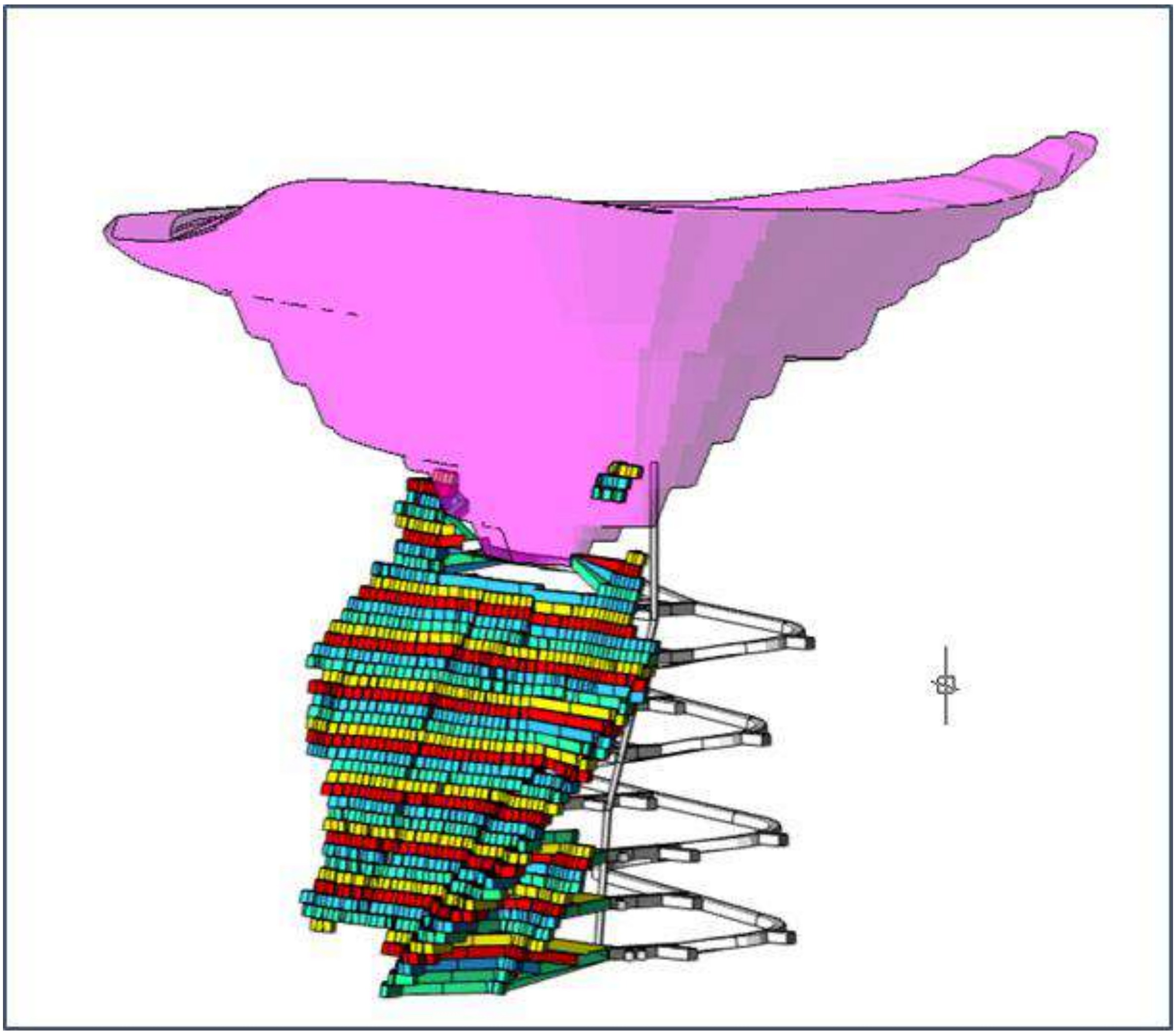
The results of the design for Golouma West 1, Golouma West 2, Golouma South and Kerekounda underground design can be seen in Figure 15.8.1 and Figure 15.8.2.

Figure 15.8.1 Golouma DSO Design in 3D View



Source: SLR, 2022.

Figure 15.8.2 Kerekounda DSO Design in 3D View



Source: SLR, 2022.

15.8.4 Underground Dilution and Extraction Factors

Dilution is applied to all development to account for overbreak and tonnage hauled. Table 15.8.3 lists the dilution for the various size drift headings.

Table 15.8.3 Underground Dilution Parameters

Development	Width (m)	Height (m)	Dilution Width (m)	Dilution Height (m)	% Dilution
Ramp/Level Access/Remuck	5	5	0.3	0.15	8
Operating Waste Development	2.5	5	0.15	0.15	8
Ore Development (lifts 1,3)	4	5	0.075	0.15	5
Ore Development (lifts 2,4)	4	5	0.075	0.3	7
Attack Ramps	4	5	0.3	0.15	10
Vent Access/Sumps	4	4	0.3	0.15	10

The extraction factor used is 95%. MCAF is a selective mining method and when coupled with suitably sized mining equipment, can efficiently extract most of the Reserves. The five percent in losses are attributed to broken muck that is left behind in the lifts due to blast under-break and the limitations of the load-haul-dump (LHD) fleet to access and remove all blasted material in the cuts.

15.8.5 Underground Design Results

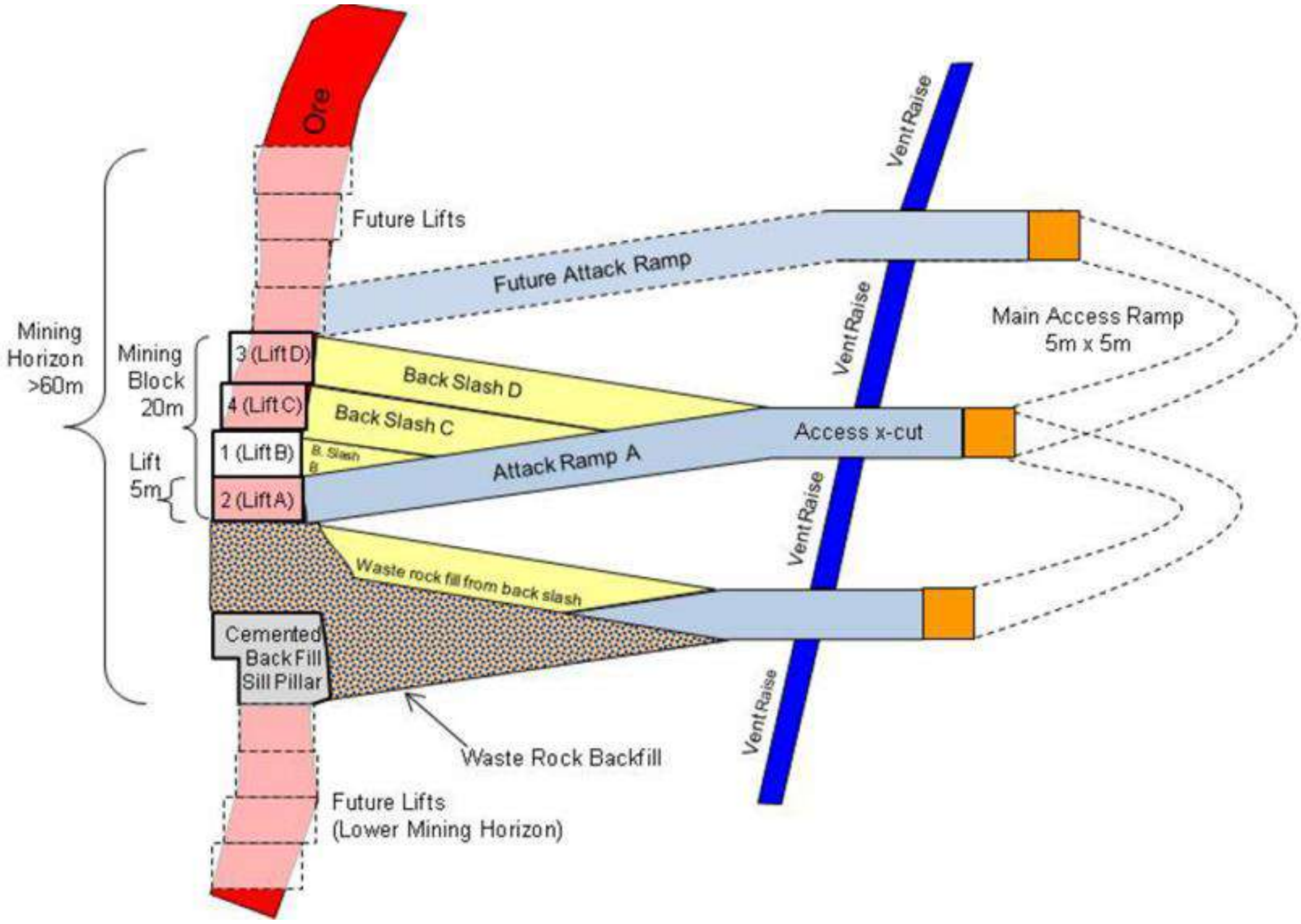
The cut and fill mining involves mining the deposits in a series of horizontal slices five metres high progressing from the bottom up. In typical cut and fill mining practices, a slice of ore is removed from the back of the stope and the new, exposed back is supported with rockbolts. Once a slice ('lift') is taken for the entire stope length, the remaining broken ore is removed and backfill is brought in to fill the mined-out void. The backfill acts to provide ground support for the hangingwall and footwall and also acts as the floor for the next lift.

At Golouma and Kerekounda, the MCAF mining method will employ a 'double-lift' methodology in which two lifts will be removed before backfill is placed. The first drift will be mined ('1' in Table 15.8.3) and then a bench ('2' in Table 15.8.3) will be mined underneath. Both lifts will then be filled with cemented rock fill (CRF). This sequence reduces the ground support required in the backs of every second lift. This method maintains safety while maintaining productivity and reducing the mining operating cost.

A total of four lifts will be mined from each attack ramp. Once mining from an attack ramp is complete, the ramp above will then be used to access the deposit. A nominal mining rate of 500 t/d per deposit, providing 1,000 t/d total, was determined as the required extraction rate to supplement the open pit mining schedule.

Deposit access cross-cuts and attack ramps will be driven from the main ramps every 20 vertical metres. Ore and waste re-muck bays will be sized to accept the equivalent of two rounds of muck and will be located off, of the access cross-cut.

Figure 15.8.3 Section View of Cut and Fill Mining Sequence



Source: SRK, 2010.

From the attack ramps, ore mining will advance in both the left and right directions along strike with a full vein width face of up to 10 m wide. In general, the height of the ore drift will be 5 m. For wider areas, such as the western-most deposit of Golouma, the mining sequence will have to be adjusted such that the lifts are mined from the bottom-up with no benching. The wider lifts will be mined by multiple passes, advancing to the stope boundaries, and then retreating from the hangingwall to the footwall. Each of the passes in the lift will be filled with CRF to minimise the open span. In narrower zones, the lift width and/or height will decrease accordingly. A minimum mining width of 2.5 m is used in ore development.

Upon reaching the stope boundary, mining of the first cut will cease and then a bench will be excavated, retreating from boundary back to the attack ramp. The second, lower cut will be mined by slashing the floor ('benching') of the first cut. The benching cycle will create an opportunity for the jumbo to drill long (4 m plus) holes and to be very productive as no burn-cut holes are be drilled. A lower powder factor is also possible using this technique.

Once the second cut (Lift A on Figure 15.8.3) is completely blasted, all the broken ore in the stope will be mucked out. Mining will then stop, and the stope will be filled close to the back with CRF (to within approximately 0.3 m of the back). The mining cycle will begin again on the third cut followed by benching the fourth cut. At sill level, when mining is planned to advance up from below, the amount of cement in the CRF is increased to increase its strength and allow the floor underneath the fill to be extracted.

15.9 Mineral Reserves Statement

The Mineral Reserve Statement for the Project, is reported as of 31 December 2021 (the 'Effective Date') and has been developed and reported in accordance with the guidelines and terminology provided in the CIM Standards. The Mineral Reserves reports a total of 66.4 Mt grading 2.08 g/t Au containing 4 440 koz of Au, comprising:

- Proven Mineral Reserves of 19.9 Mt grading 1.36 g/t Au containing 866 koz Au.
- Probable Mineral Reserves of 46.5 Mt grading 2.39 g/t Au containing of 3 574 koz Au.

Table 15.9.1 following presents the detailed subdivision of Mineral Reserves as of 31 December 2021, inclusive of subdivisions for oxide, transitional and fresh ore types. Furthermore, in reviewing the Mineral Reserve statements as reported herein, the following notes should also be considered:

- The Qualified Person responsible for the reporting of the open pit Mineral Reserves as of 31 December 2021 is Mr Salih Ramazan (FAusIMM), Vice President Mine Planning, Endeavour.
- The Qualified Person responsible for the reporting of the underground mine Mineral Reserves as of 31 December 2021 is Mr Bryan Pullman (P.Eng). He is independent of Endeavour and an employee of SLR.
- All Mineral Reserves are reported assuming a long-term gold price assumption of USD 1,300/oz.
- Details relating to the various modifying factors and deposit specific cut-off grades are reported in Section 15.3.2 of this Technical Report.

Table 15.9.1 Mineral Reserve Statement for the Project (by Material Type) as of 31 December 2021

Deposit	Oxide			Transitional			Fresh			TOTAL		
	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (kt)	Grade (g/t Au)	Gold (koz)
Proven Mineral Reserves												
• Sofia North	7	0.86	0	68	1.98	4	1 348	1.80	78	1 423	1.80	83
• Sofia Main	0	0.00	0	0	0.00	0	561	3.18	57	561	3.18	57
• Sabodala	22	1.10	1	0	0.00	0	1 682	1.86	101	1 704	1.85	101
• Goumbati West	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0
• Maki Medina	0	0.00	0	5	1.46	0	254	1.48	12	259	1.48	12
• Niakafiri East	672	1.64	35	537	1.57	27	2 900	1.44	134	4 110	1.49	197
• Niakafiri West	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0
• Masato	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0
• Massawa CZ	282	4.01	36	106	4.58	16	1	5.33	0	389	4.17	52
• Massawa NZ	227	3.62	26	134	3.17	14	11	2.52	1	372	3.42	41
• Delya	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0
Total Proven Mineral Reserves	**1 211**	**2.55**	**99**	**850**	**2.23**	**61**	**6 758**	**1.77**	**384**	**8 818**	**1.92**	**544**
Probable Mineral Reserves												
• Sofia North	2	1.14	0	7	2.04	0	384	2.89	36	393	2.87	36
• Sofia Main	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0
• Sabodala	1	0.61	0	0	0.00	0	2 279	1.72	126	2 280	1.72	126
• Goumbati West	446	1.46	21	280	1.69	15	48	1.78	3	774	1.56	39
• Maki Medina	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0
• Niakafiri East	1 671	1.08	58	1 684	1.24	67	4 785	1.40	216	8 140	1.30	341
• Niakafiri West	337	1.29	14	374	1.24	15	259	1.26	11	970	1.26	39
• Masato	1 136	0.91	33	0	0.00	0	14 264	1.29	593	15 400	1.26	626
• Massawa CZ	2 533	2.32	189	1 271	2.86	117	5 886	4.34	822	9 690	3.62	1 128
• Massawa NZ	1 413	3.15	143	1 583	3.62	184	2 897	4.80	447	5 893	4.09	775

Table 15.9.1 Mineral Reserve Statement for the Project (by Material Type) as of 31 December 2021

Deposit	Oxide			Transitional			Fresh			TOTAL		
	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Tonnes (kt)	Grade (g/t Au)	Gold (koz)
• Delya	248	3.78	30	282	3.90	35	457	3.79	56	987	3.82	121
Total Probable Mineral Reserves	**7 787**	**1.95**	**488**	**5 481**	**2.46**	**434**	**31 259**	**2.30**	**2 308**	**44 527**	**2.26**	**3 231**
Proven + Probable Mineral Reserves												
• Sofia North	9	0.91	0	75	1.98	5	1 732	2.04	114	1 816	2.03	119
• Sofia Main	0	0.00	0	0	0.00	0	561	3.18	57	561	3.18	57
• Sabodala	24	1.07	1	0	0.00	0	3 961	1.78	227	3 984	1.78	228
• Goumbati West	446	1.46	21	280	1.69	15	48	1.78	3	774	1.56	39
• Maki Medina	0	0.00	0	5	1.46	0	254	1.48	12	259	1.48	12
• Niakafiri East	2 343	1.24	94	2 221	1.32	94	7 685	1.42	350	12 249	1.37	538
• Niakafiri West	337	1.29	14	374	1.24	15	259	1.26	11	970	1.26	39
• Masato	1 136	0.91	33	0	0.00	0	14 264	1.29	593	15 400	1.26	626
• Massawa CZ	2 815	2.49	225	1 377	2.99	133	5 887	4.34	822	10 080	3.64	1 180
• Massawa NZ	1 640	3.22	170	1 717	3.58	198	2 909	4.79	448	6 265	4.05	816
• Delya	248	3.78	30	282	3.90	35	457	3.79	56	987	3.82	121
Total In-pit	**8 998**	**2.03**	**588**	**6 332**	**2.43**	**495**	**38 016**	**2.20**	**2 692**	**53 346**	**2.20**	**3 775**
Stockpile - Proven	4 428	0.87	124				6 608	0.93	198	11 037	0.91	323
Total Open Pit	**13 426**	**1.65**	**712**	**6 332**	**2.43**	**495**	**44 625**	**2.01**	**2 890**	**64 382**	**1.98**	**4 097**
Underground Mine (UG) Mineral Reserves – Probable												
• Goulouma	-	-	-	-	-	-	1 409	5.33	242	1 409	5.33	242
• Kerekounda UG	-	-	-		-	-	594	5.33	102	594	5.33	102
Total UG	**-**	**-**	**-**	**-**	**-**	**-**	**2 003**	**5.33**	**343**	**2 003**	**5.33**	**343**
Total Mineral Reserves	**13 426**	**1.65**	**712**	**6 332**	**2.43**	**495**	**46 628**	**2.16**	**3 233**	**66 386**	**2.08**	**4 440**

Changes in the reported Mineral Reserves from 31 December 2020 to 31 December 2021 are as illustrated in Table 15.9.2.

Table 15.9.2 Changes to the Mineral Reserves Reported (31 December 2020 to 31 December 2021)

Reserve Reconciliation	Tonnes (kt)	Grade (g/t Au)	Gold (koz)	Description
Total Reserves 31 December 2020	**77 365**	**1.93**	**4 796**	
Reserve Depletion	-(4 254)	3.07	-(425)	Processed since 1 Jan 2021
Goumbati West ~ model change	-(108)	(1.15)	4	
CZ ~ Model change & re-optimisation	-(549)	(1.64)	29	Block model change
NZ ~ Model change & re-optimisation	345	3.81	42	
Delya ~ Model change & re-optimisation	61	9.77	19	
UG ~ Re-optimisation	-(146)	0.59	-(3)	Re-optimisation
Sabodala ~ Cut-off change	-(682)		9	
Masato ~ Cut-off change	-(3 036)		-(28)	Cut-off grade change
Niakafiri East ~ Cut-off change	-(2 678)		-(14)	(from 0.4 to 0.6)
Niakafiri West ~ Cut-off change	-(279)		-(2)	
Total Model Change	-(252)	(11.65)	94	Model change & re-optimisation
UG Change	-(146)		-(3)	UG optimisation & design update
Total Cut-off Change	-(6 675)		-(35)	Total design change
Total Change Excluding Plant Depletion	-(7 073)		56	Total change excluding plant depletion
Total Change Including Plant Depletion	-(11 327)		-(369)	Total Change with the depletion
Sum of the Reserve 2020 and Changes	66 038		4 428	Theoretical Ore Reserve based on the above numbers
Unreconciled Variance	348		13	Unreconciled variance
Variance	0.52%		0.29%	
Total Reserves 31December 2021	**66 386**	**2.08**	**4 440**	

As of the 'effective date', the market spot price for gold was USD 1820/oz[1], significantly higher than the gold price assumption of USD 1300/oz used in the determination of Mineral Reserves.

Further for 2021, the gold price varied between USD (1682 and 1947)/oz, averaging USD 1799/oz for the year (Section 19.0).

Hence, gold price sensitivities have been carried out for the open pit resources at USD (1400 and 1500)/oz.

The open pit optimisation shells at USD 1400/oz price for the Sofia North, Massawa CZ, Massawa NZ and Delya pits increased and the reported figures included the ore within the expanded shell together with the cut-off grade change effect. At USD 1500/oz price, there was no pit expansion further than the USD 1400/oz gold price shells, and only the cut-off grade change impacted the results slightly as illustrated in Table 15.9.3.

[1] https://www.banque-france.fr/en/statistics/gold-prices-31-dec-2021

Table 15.9.3 Open Pit Mineral Reserve's Sensitivity to Higher Gold Prices

Gold Price (USD/oz)	Total Tones (Mt)	Waste Tonnes (Mt)	Strip Ratio (Wt:Ot)	Ore Tonnes (Mt)	Grade (g/t Au)	Gold (koz)
1300	423	372	5.8	64.4	1.98	4 097
1400	542	470	6.5	71.9	1.88	4 359
1500	559	486	6.6	73.1	1.88	4 423
Variance from USD 1300/oz case						
1400	119	98	13.0	8	1.08	262
1500	136	115	13.1	9	1.16	326

The gold price sensitivity for the underground mines is provided in Table 15.9.4 following. The change in reserves is not significant based on the cut-off grade change, which are 2.62 g/t Au at USD 1400/oz, and 2.45 g/t Au at USD 1500/oz. The Mineral Reserves at USD 1300/oz gold price were estimated based on 2.82 g/t Au cut-off grade.

Table 15.9.4 Underground Mineral Reserve's Sensitivity to Higher Gold Prices

Gold Price (USD/oz)	Tonnes (Mt)	Grade (g/t Au)	Gold (koz)
1300	2.0	5.30	346
1400	2.3	5.03	367
1500	2.5	4.83	383
Variance from USD 1300/oz Base Case			
1400	0.3	2.72	21
1500	0.4	2.64	37

15.10 Data Verification

In presenting the Mineral Reserves Statement, the data verification process applied in Section 15.0, is discussed in Section 12.0.

15.11 Independent Audits/Reviews

There has not been an independent review of the Mineral Reserve estimation process and outputs for the open pit mines.

Underground mine planning work and associated Mineral Reserve estimation has been carried out by SLR (UK) an independent consultancy. Mr. Bryan Pullman (P.Eng, MIMMM) takes all responsibility for the underground mineral estimation, and it was integrated with the open pit planning without changing the Underground plans.

15.12 Comments on Section 15.0

The open pit Mineral Reserve estimation and planning of open pit mining integrated with the underground plans has been supervised by the Qualified Person, Dr. Salih Ramazan (PhD, Mine Planning and Operations Research). It is in the opinion of the Qualified Person that the work has been done in accordance with the NI 43-101 guidelines and there has not been any misleading aspect based on the information available as of 31 December 2021.

15.13 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 15.0 are presented in Section 25.0.

15.14 Recommendations

Recommendations for Section 15.0 are presented in Section 26.0.

15.15 References

References cited in Section 15.0 are presented in Section 27.0.

16.0 MINING METHODS

16.1 Introduction

The following section focuses on the general mine planning criteria, mining engineering and associated assumptions, as incorporated into the current Life of Mine Plan (LoMp) with specific comment on mining methods; mining equipment; historical performance; mining LoMp and associated assumptions; risks and opportunities.

The mining objective is to economically mine and deliver ore from pits on the Sabodala Concession and Massawa Mining License to the existing Sabodala Whole Ore Leach Plant (SWOLP) and the new, yet to be constructed Sabodala Sulphide Treatment Plant (SSTP), collectively this is referred to as the Sabodala-Massawa Project (or the 'Project'); and the two plants combined, the Sabodala Central Processing Facility (SCPF).

16.2 General Mine Planning Criteria

16.2.1 General Site Considerations

The climatic conditions do not play a significant role in mining. However, provision is made for a reduced mining rate in the wet season.

16.2.2 Geotechnical Considerations

The Geotechnical Design Criteria (GDC) for the Sabodala-Massawa open pits is based on a number of internal and external historical studies and reviews, as noted in Sections 16.2.2.1 to 16.2.2.4 following.

16.2.2.1 Minenet, South Africa (Minenet)

Reports prepared by Minenet Geotechnical Consultants, including:

- Geotechnical Site Investigation and Open Pit Slope Design for Sofia Main, Status Report, June 2017 report by Dr. Peter JS Gash of Minenet (file ref. Sofia-Main-June2017-PG1-CVE-F.pdf).
- Geotechnical Site Investigation and Open Pit Slope Design for Sofia North, February2018 report by Dr. Peter JS Gash of Minenet (file ref. Sofia-North-Feb2018.pdf).
- Slope Design Parameters for the PEA - Sofia Project, January 2017 memorandum by Dr. Peter JS Gash of Minenet (file ref. Sofia-PEA-Slopes.pdf).
- Geotechnical Site Investigation and Open Pit Slope Design of Delya Open Pit Mine, June 2018, memorandum by Dr. Peter Gash of Minenet.
- Geotechnical Investigations and Mine Design Specifications, January 2019 memorandum by Dr. Peter JS Gash of Minenet (file ref. Geotechnical Investigations and Mine Design-PG1-CVE1.pdf).

16.2.2.2 Xstract Mining Consultants Pty Ltd, Australia (Xstract)

Reports prepared by Xstract, including:

- In 2015, Teranga Gold engaged Xstract to conduct the geotechnical analysis and design of the Niakifiri Open Pit.
- Sabodala Phase 4 Pit Cutback, December 2016, memorandum by Will Sarunic of Xstract.

- Massawa Combined Geotechnical Design Review, December 2020 memorandum by Will Sarunic of Xstract. Xstract provided Geotechnical Design Criteria for Massawa North and South Pits, Sofia Main North and South Pits and Delya Open Pit.

16.2.2.3 Endeavour

In June 2021, Endeavour's Group Geotechnical Engineer reviewed the geotechnical parameters and open pit slope design done by Minenet and Xstract for Massawa Open Pits at a DFS level.

16.2.2.4 Artois Hydrogeological Consultants

Massawa Mining Feasibility Study - Hydrogeological Assessment for pit dewatering, Technical Report, December 2018 report by Artois Consulting (file ref. Massawa-dec18-FSreport-version0.pdf)

16.2.2.5 Open Pit Slope Design

Table 16.2.1 following, presents the slope design criteria for each of the Sabodala-Massawa open pits. Structural and rock mass characterisation for all the Project pits, were carried out by competent personnel in the field of geotechnical engineering. Dedicated geotechnical drilling was conducted at each deposit area. Geotechnical core logging was carried out by either the mine or the consultant's geologists to collect both geotechnical structural and rock mass data.

Laboratory tests for rock strength and structural defect shear strength were carried out by Rocklab, South Africa, a division of Soillab (Pty) Ltd.

Table 16.2.1 Sabodala-Massawa Open Pit Geotechnical Design Criteria

Deposit	Weathering	Bench Height (m)	Bench Face Angle (°)	Berm Width (m)	Inter-Ramp Angle (°)	Comments
MCZ	Laterite/Saprolite	10	55	5.5	38.7	Shallow Saprolite Profile (30 to 40 m)
	Saprock/Transitional	10	75	7	46.1	
	Fresh FW (south-east)	20	75	9	54.3	With 2 m offset between 2 lifts
	Fresh HW (north-west)	20	75	10	52.5	With 2 m offset between 2 lifts
MNZ	Laterite/Saprolite	10	55	7	35.5	Deep Saprolite profile (>70 m)
	Saprock/Transitional	10	75	7	46.1	
	Fresh FW (south-east)	20	75	9	54.3	With 2 m offset between 2 lifts
	Fresh HW (north-west)	20	75	10	52.5	With 2 m offset between 2 lifts
SFM	Laterite/Saprolite	10	50	6.5	33.8	
	Saprock/Transitional	10	70	7	43.2	
	Fresh FW	20	75	8.5	55.2	With 2 m offset between 2 lifts
	Fresh HW	20	80	8.8	58.9	With 2 m offset between 2 lifts
SFN	Laterite/Saprolite	10	60	6.5	40.3	
	Saprock/Transitional	10	75	7	45.9	
	Fresh FW	20	75	7	58.2	With 2 m offset between 2 lifts
	Fresh HW	20	80	10	55.9	With 2 m offset between 2 lifts

Table 16.2.1 Sabodala-Massawa Open Pit Geotechnical Design Criteria

Deposit	Weathering	Bench Height (m)	Bench Face Angle (°)	Berm Width (m)	Inter-Ramp Angle (°)	Comments
SAB*	Laterite/Saprolite	10	45/54	5	33.6/39.1	33.6 if NW domain/39.1 if East domain*
	Saprock/Transitional	10	45/54	5	33.6/39.1	33.6 if NW domain/39.1 if East domain*
	Fresh down to 630m RL	20	75	10	52.5	
	Fresh below 630m RL	20	75	8	55.3	
NKE	Laterite/Saprolite	10	50	5	36.7/33	36.7 if 0 to 40 mRL/33 if 40 to 60 mRL
	Saprock/Transitional	20	50	7	40	
	Fresh 75 to 135 slope dip-dir	20	60/65	9	44.2/47.5	44.2 if 100 to 120 mRL/47.5 if > 120 mRL
	Fresh all other slopes dip-dir	20	70/75	9	50.8/54.3	50.8 if 100 to 120mRl/54.3 if > 120 mRL
NKW	Laterite/Saprolite	10	50	5	36.7	
	Saprock/Transitional	20	50	7	40	
	Fresh 75 to 135 slope dip-dir	20	60/65	9	44.2/47.5	44.2 if 80 to 100 mRL/47.5 if > 100 mRL
	Fresh all other slopes dip-dir	20	70/75	9	50.8/54.3	50.8 if 80 to120mRl/54.3 if > 100 mRL
MDL	Laterite/Saprolite	10	60	6	40.3	
	Saprock/Transitional	10	75	6	49	
	Fresh FW	20	80	11	54	With 2 m offset between 2 lifts
	Fresh HW	20	80	10	55.9	With 2 m offset between 2 lifts
GBW	Laterite/Saprolite	10	50	5	36.7	
	Saprock/Transitional	20	50	7	40	
	Fresh 40-60mRl	20	60	9	44.2	With 2 m offset between 2 lifts
	Fresh > 60mRl	20	70	9	50.8	With 2 m offset between 2 lifts
MKM	Laterite/Saprolite	10	50	5	36.7	
	Saprock/Transitional	20	50	7	40	
	Fresh 000 to 225° slope dip-dir	20	60/70	9	44.2/50.8	44.2 if 40 to 60 mRL/50.8 if > 60 mRL
	Fresh all other slope dip-dir	20	60/65	9	44.2/47.5	44.2 if 40 to 60mRl/47.5 if > 60 mRL
MAS	Laterite/Saprolite	10	40	5	30.5	0 to 10 m Weathered
	oxide>10m thickness	20	40	7	32.9	0 to 20 m Weathered
	Saprock/Transitional	20	50	7	40	
	Fresh FW	20	60	8	45.6	With 2 m offset between 2 lifts
	Fresh HW	20	75	8	56.2	With 2 m offset between 2 lifts

*At Sabodala Pit: NW Domain is the area to the west of Ayoub's Thrust and for all wall orientations. East Domain is all areas east of Ayoub's Thrust and for all wall orientations.

16.2.2.6 Slope Monitoring

Slope monitoring ensures that any slope instability, is detected prior to possible failure. Both maximum ground displacement and ground displacement velocity, is measured or estimated to predict failure time and volume. SGO's slope monitoring strategy comprises the following three systems:

- Daily Physical Inspections.

  This involves physical observation of slope conditions on a daily basis by the site Geotechnical Team. Physical inspection of pit highwalls, berms, ramps, waste dumps and stockpiles are performed to identify all potential hazards in the operational areas.

- Survey Prism Monitoring.

  Every pit is installed with survey prisms as mining progresses. The prisms are measured either weekly or fortnightly, depending on the slope condition using manual or robotic Total Stations.

- Critical Monitoring.

  Critical monitoring using slope stability radars.

16.2.2.7 External Geotechnical/Hydrogeological Reviews and Audits

An external geotechnical/hydrogeological Review and Audit was carried out in November 2021. The next review is expected in Q3/Q4 2022. No major design flaws were highlighted during the 2021 Audit. However, allowing an adequate dewatering period prior to commencement of mining at Massawa Central Zone (CZ) was noted as a concern.

16.2.3 Hydrology/Hydrogeological Considerations

A hydrogeological study for the Massawa Pits was conducted by Artois Hydrogeological Consultants for Barrick Gold in late 2018. Findings are as noted herein.

Due to the naturally shallow groundwater levels across the Sabodala-Massawa Properties (typically 10 m to 30 m below surface), groundwater inflow to the excavations will occur throughout mining. The groundwater inflow horizons are associated with the near surface weathered horizons, and the NNE-SSW fracture zones and lithological contacts at depth. In general, the sedimentary units are more permeable than the igneous units.

The inflows depend on the hydraulic characteristics of the units, the pit size, and the mining advance rate. Due to the accelerated mining rate of each pit, high groundwater drawdown rates need to be achieved to keep pace with the operation. The likely range of pumping rates per pit during their LoM are as follows:

- Massawa CZ: Average 70 L/s (range: 19 to 96 L/s).
- Massawa NZ: Average 18 L/s (range: 7 to 21 L/s).
- Sofia Main: Average 10 L/s (range: 1 to 14 L/s).
- Sofia North: Average 17 L/s (range: 12 to 22 L/s).
- Delya: Average 3 L/s (range 1 to 3 L/s).

The hydrogeological conditions at the Sofia and Sabodala Pits seem to be similar based on seepage observations in the pits. Two modes of seepage are typically evident:

- relatively higher inflow seepage at pit bottom, and
- low inflow seepage at higher levels.

Slopes in saprolite material tend to have localised seepage; however, in most pits, the flows are not high enough to trigger visible seepage. The walls are generally damp and prone to transient pore pressures during the wet season. Any relict structures in the saprolite should be mapped and marked as potential seepage flow and failure zones.

According to the geophysical surveys, the monitoring data, the in-situ hydraulic testing and the calibrated numerical forecast models, most of the groundwater can be intercepted by perimeter and in-pit dewatering wells (approximately 80% of groundwater inflow). The remaining water will be drained using sub-horizontal drains drilled into the pit wall. This groundwater seepage will collect in the in-pit sumps.

It is important to note that all analysis undertaken to define appropriate pit slope design criteria has assumed that the slopes are depressurised, and that successful slope depressurisation will be required to achieve the proposed slope designs. This is especially relevant for the saprolite and upper sections of slopes.

The pit water from the Massawa CZ/NZ and Delya pits is considered dirty and is either treated by dilution or by physical treatment before discharge to the environment. The management of clean and contact water is defined more fully in Section 18.0 and 20.0.

16.2.4 Environmental, Social and Cultural Considerations

The information in this section is adopted from SRK's Competent Person's Report (June 2021).

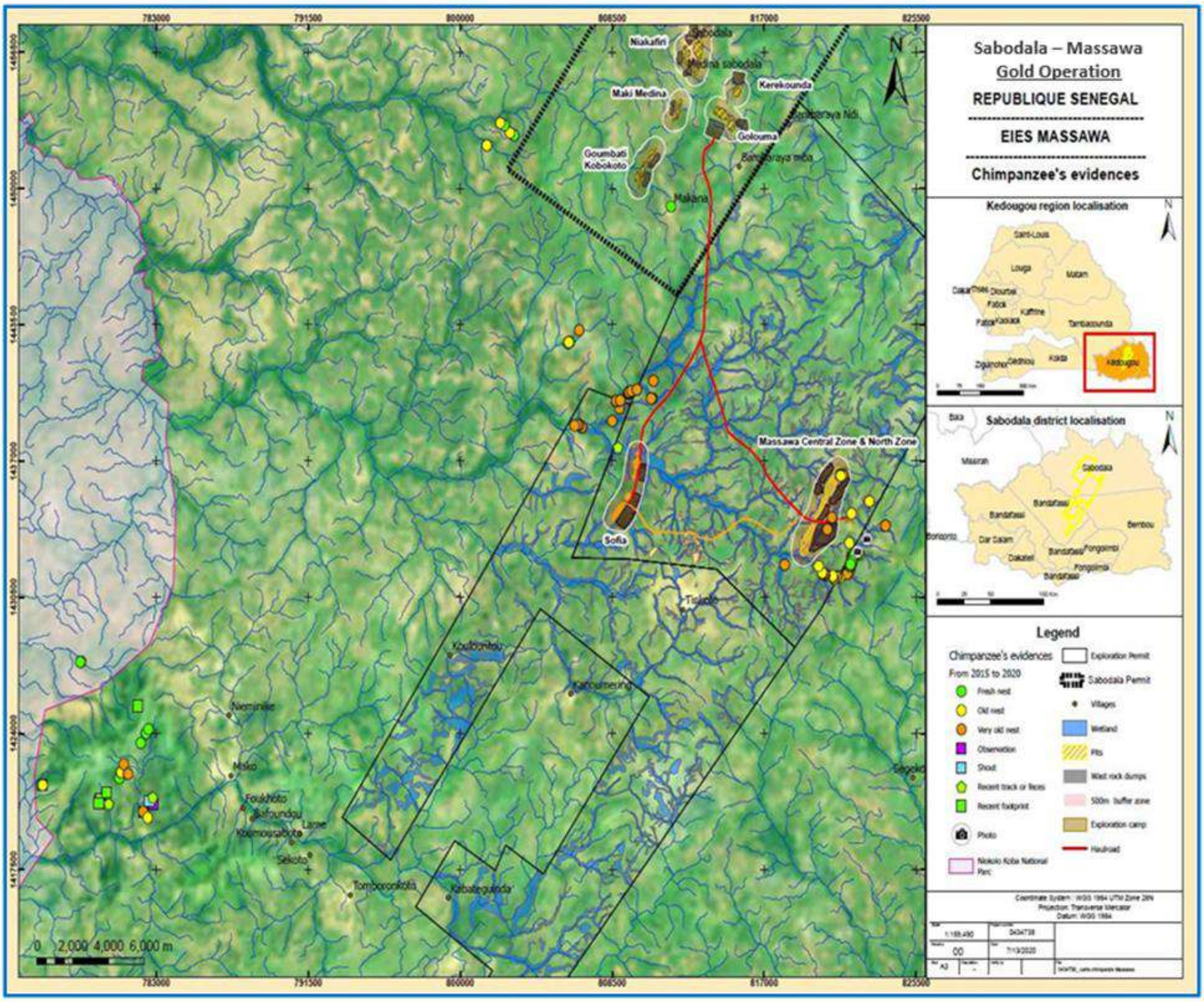
The topography of the Project area is generally undulating with surface elevations between (100 and 350) mamsl, with a gentle downward gradient towards the west and north. The Project area is located across a regional watershed divide between the Gambia River Basin to the west and the Senegal River Basin to the east and north. As a result of being in the headwaters of these catchments, the surface water courses within the Project area are limited to small streams or gullies. This consequently means, that any river/stream diversions are minimal.

Most of the Sabodala deposits, processing plant and TSF are in the catchment of the Farako River (a tributary of the Niokolo-Koba River in the Gambia River basin) flowing westwards; however, the Masato and Kerekounda mining areas are in the Falémé River catchment (Senegal River basin) located to the east of the site, flowing northwards.

The Massawa deposits are situated entirely in the catchment of the Niokolo-Koba River, except for the Delya deposit to the northeast, and includes wetland areas mainly composed of ephemeral streams fed by surface water runoff. Some of these wetland areas are considered pristine with important functions for watershed performance.

Downstream of the Project area, the Niokolo-Koba River flows through the Niokolo-Koba National Park (PNNK), recognised by the UNESCO as a World Heritage Site. The PNNK is also defined as a Biosphere Reserve by UNESCO and a key biodiversity area by IUCN. It includes catchments of the Gambia, Sereko, Niokolo and Koulountou Rivers and comprises gallery forests, savannah grass floodplains, ponds, dry forests rocky slopes and hills. The PNNK has high plant diversity and rich fauna characterised by the Derby Eland (the largest of African antelopes), chimpanzees, lions, leopards, elephants as well as many species of birds, reptiles and amphibians. The Park is approximately 20 km west from the boundaries of both Sabodala Lot-A Concession and the Massawa Mining License area, and approximately 40 km downstream of the TSF. Chimpanzee evidence has been logged in and around the Project Area, see Figure 16.2.1.

Figure 16.2.1 Chimpanzee Evidence



Source: Endeavour Mining 2021

SGO has an occupational health and safety, and environmental (HSE) management system in place, which Endeavour/SGO plan to align with ISO 14001:2015 and ISO 45001:2018 requirements. The Environmental and Social Management and Monitoring Plan (ESMMP) that forms part of the planning component of the system is regularly updated to incorporate active mining areas, with the next update to include the expanded Massawa Mining operations (scheduled for the start of 2022). Annual reports are submitted to authorities to present key environmental and social activities and environmental monitoring results.

The approach to stakeholder and environmental management is defined more fully in Section 20.0

16.2.5 Ventilation/Air Quality

There are three deposits which are to be subject to underground mining methods. The underground mining areas of the Kerekounda, Golouma South, Golouma North zones will be ventilated sufficiently to ensure the workplace is safe and comfortable for the underground workforce.

The ventilation airflows have been designed to maintain a minimum oxygen content of 19.5% by volume and dilute or remove any airborne contaminants in the mine atmosphere. The reference document for the ventilation design was the Ontario Occupational Health and Safety Act Revised Royal Order 1990, Regulation 854 Mines and Mining Plants.

A total airflow of 185 m^3/s was determined to be sufficient to achieve the required ventilation for the three mines when operating concurrently.

16.2.6 Process

For the Sabodala Concession, all of the open pit ore is free milling and can be processed in the SWOLP at high recoveries. On the Massawa Mining License however, there are two different ore body types, one being associated with the Sabodala Shear Zone (SSZ), which is also free-milling and the other associated with the Massawa Transcurrent Zone (MTZ), which is a mix of free and non-free milling ores. Subject to the model attributes (processing characteristics) assigned to each pit model block, the ore will be treated in either the SWOLP or the SSTP plant. For both the SSZ and MTZ, overall gold recoveries are expected to be over 88%.

The basis for cut-off grades, recoveries and processing costs are defined more fully in Sections 15.0 and 17.0. Sulphur by far, has the greatest impact on plant design and operating costs, and the ratio of pyrite, arsenopyrite, and carbonates (acid consumers), define the acid balance in the BIOX® circuit, and the down-stream neutralisation requirements. The iron to arsenic ratio in the RoM feed, also plays a role, in the stability of the ferri-arsenate precipitate.

ROM stockpiles at both Massawa CZ and at the SSTP, are used for achieving the desired RoM blend, namely:

- Gold, ≤ 7.5 g/t.
- Sulphur, circa (1 to 1.27) %m/m, average 1.12 % m/m.
- Fe:As, circa > 7:1 (m/m).

16.2.7 Waste Management

16.2.7.1 Top soil Management

Adherence to top soil management procedures are critical, to ensure that any top soil removed can be reutilised for rehabilitation and closure. To ensure that the organic carbon content and the associated microbiome is maintained, top soil stockpiles are free draining, and stacked to not more than (1 to 1.5) m in height.

16.2.7.2 Waste Rock Management

The waste dump design dimensions are a function of the operability and the method statement for how the rehabilitation will be carried out and what equipment will be utilised. There is no environmental constraint on the lifts and offsets, only the battering angle. The battering of the slopes will be performed by bulldozers working on the end-tipped slope gradient from top to bottom. There is a limiting vertical lift over which this can be safely and efficiently performed. The size of bulldozer is taken as D9 which has a footprint of about three metres wide (Gash, June 2017).

The dimensions of the finished rehabilitated dumps should be:

- Dumping operating vertical lift - 20 m.
- Minimum offset (construction berm) - 5 m, with the finished slope profiled and battered to 30º.

16.3 Open Pit Mining

16.3.1 Operational Overview

The mining method currently employed across the Project Area is conventional open pit, excavator and truck operation, with the production unit operations (drilling, blasting, loading, hauling and dumping) carried out by mixed owner-contractor mining personnel and equipment. Load and haul activities are owner operated; ore is/will be transported from the various pits to the SCPF RoM pads, by Transport Dieye; blasting is carried out by Orica; production drilling is carried out by SGO; grade control drilling activities are performed by FTE.

A brief history of mining activities across the Project area, is summarised below:

- Mining on the Sabodala Concession commenced in March 2009.
- In 2019, mining activities were focused on Golouma West, Kerekounda, Koulouqwinde, and Maki Medina open pits, with Kerekounda pit mining completed in 2019.
- In 2020, Sabodala, Maki Medina, Kouroulouloulou, Sofia Main were mined. Koulouqwinde pit was mined to completion in 2020.
- Mining activities at Kouroulouloulou and Golouma West pits were completed in 2021. The total tonnes mined has increased from around 34 Mt in 2020 to 46 Mt in 2021.

The capacity of the mining fleet owned by SGO and other service providers meets the earthmoving requirements of the mining schedule, as per the LoM plan and budget plan for 2022. The in-pit material excavation is conducted by a fleet of twelve Komatsu excavators (consisting of five 250 t PC3000, four 100 t PC1250 and four PC450).

Material haulage from the pits is undertaken by twenty-four Komatsu HD785-7 rear dump trucks, and nine Caterpillar 777E rear dump trucks. Key items of the ancillary fleet are the eleven Komatsu D375A track dozers, two Komatsu WD600 wheel dozers, one Komatsu D155AX track dozer, five Caterpillar D10T2 dozers, seven GD825A motor graders, and four Komatsu HD265 water trucks.

Ore mined is hauled to the RoM pad and near RoM stockpiles. Waste mined from the pits is hauled to the waste rock dumps and other projects requiring waste material for construction (i.e. tailing storage facility, haul roads etc.).

The ore control strategy, targeting delineation of ore and waste, uses RC holes piercing multiple benches. The geological and assay information, (obtained from (30 to 40) m vertical length inclined holes), are sampled and assayed every one metre, to generate wireframes from sectional interpretation for grade control block modelling and ore outlines generation. The ore outlines are then used by geologists and surveyors for final ore/waste discrimination and in-pit mark-up.

Production drilling is performed by SGO, and blasting is performed by Orica at 10 m benches. The supply of explosives and blasting accessories are contracted out directly to the approved explosives supplier Orica. The explosives contractor provides in addition to the supply of primary explosives and blasting accessories, mixing equipment and technical blasting advice when needed. Blasted material is excavated in 5 m high flitches to ensure selectivity.

Waste rock dumps associated with mining operations are constructed to meet the stipulated guidelines of the Senegal Legal Regulations. All areas earmarked for waste dumps are sterilized before dumping commences.

16.3.2 Open Pit Mining Equipment

As of 31 December 2021, Project mobile mining equipment, comprises both primary earthmoving equipment (large excavators and 100 t trucks) which are supported by secondary equipment, as defined more fully in Table 16.3.1 following:

Table 16.3.1 Heavy Mining Equipment Fleet

Activity	Equipment Specification	Equipment Model	Count
Excavators			**12**
Excavating	100 t Hydraulic Backhoe Excavator	Komatsu PC1250 Excavator	4
Excavating	100 t Hydraulic Backhoe Excavator	Komatsu PC450 Excavator	3
Excavating	250 t Hydraulic Backhoe Excavator	Komatsu PC3000 Shovel	5
Trucks			**33**
Rigid Trucks	Rigid chassis Dump Truck-95 t payload	Komatsu HD785	24
Rigid Trucks	Rigid chassis Dump Truck-84 t payload	Caterpillar 777E	9
Dozer			**19**
Track Dozer	Operating weight track type tractor	Komatsu D155AX	1
Track Dozer	Operating weight track type tractor	Komatsu D375A	11
Track Dozer	Operating weight track type tractor	Caterpillar D10T2	5
Wheel Dozer	Operating weight wheel dozer	Komatsu WD600	2
Grader			**7**
Graders	Motor Grader	Komatsu GD825	7
Water Truck			**4**
Water Cart	Rigid chassis dump truck fitted with 20 kL capacity water body	Komatsu HD465	4
Total Earthmoving Equipment			**75**
Drill Rigs			
Drill Rigs	Terex Drill Rigs-Down hole hammer	Reedrill SKF12Drill	2
Drill Rigs	Sandvik Drill Rigs-Down hole hammer	DI550 Drill	3
Drill Rigs	Sandvik Drill Rigs-Down hole hammer	D25KS Drill	6
Drill Rigs	Sandvik Drill Rigs-Down hole hammer	Pantera DP1500i Drill	3
Total Drill Rigs			**14**

Targeted equipment effective utilisation is determined assuming an availability of 80.9% and utilisation of 91.0%, equating to an effective utilisation of 73.6%. This effective utilisation is applied to all primary and secondary Heavy Mining Equipment ('HME'). The effective annual utilization translates to 6,449 operating hours per annum.

Historic annual equipment effective utilisation for the years 2020 and 2021 compared to target is represented in Figure 16.3.1 and Figure 16.3.2 following.

Figure 16.3.1 shows the cumulative effective utilisation of the primary production excavators for the last two years against target. Current data show that the excavators were below target in H1-2020 due to maintenance and equipment age, however in 2021 utilisations above the 80.0% target were achieved with an average effective utilisation of 81.0% between October 2020 and December 2021.

Figure 16.3.1 Excavator Effective Utilisation - Planned (Orange) vs Actual (Blue)

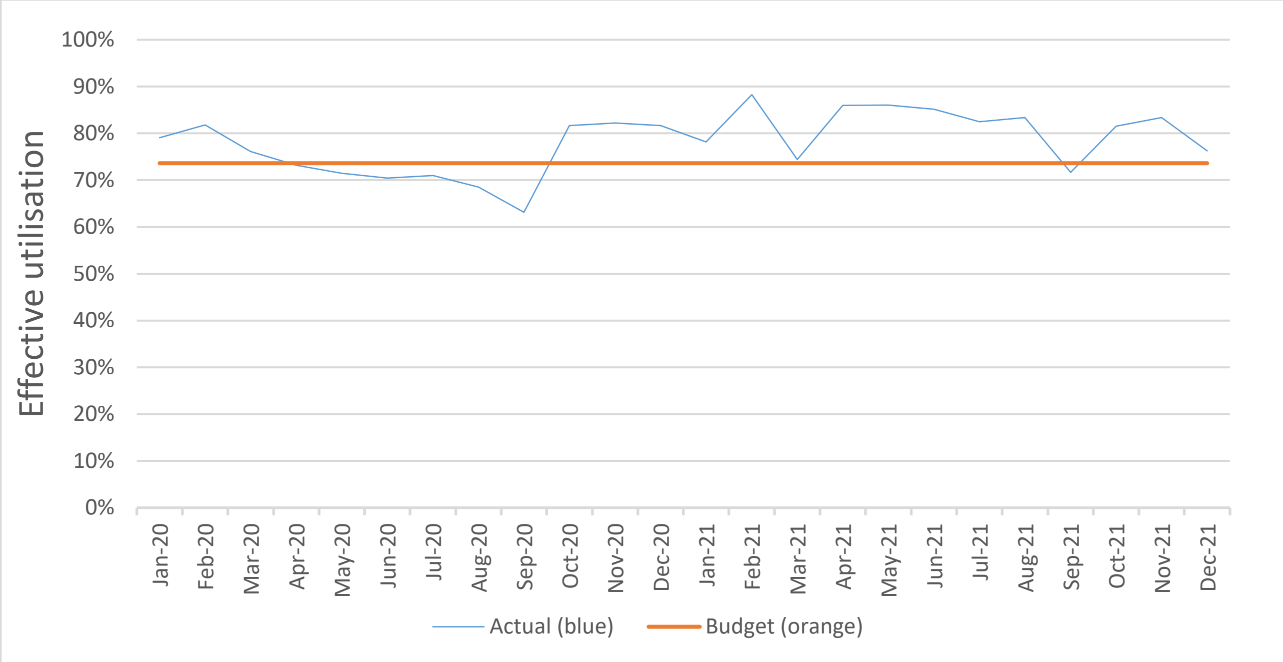
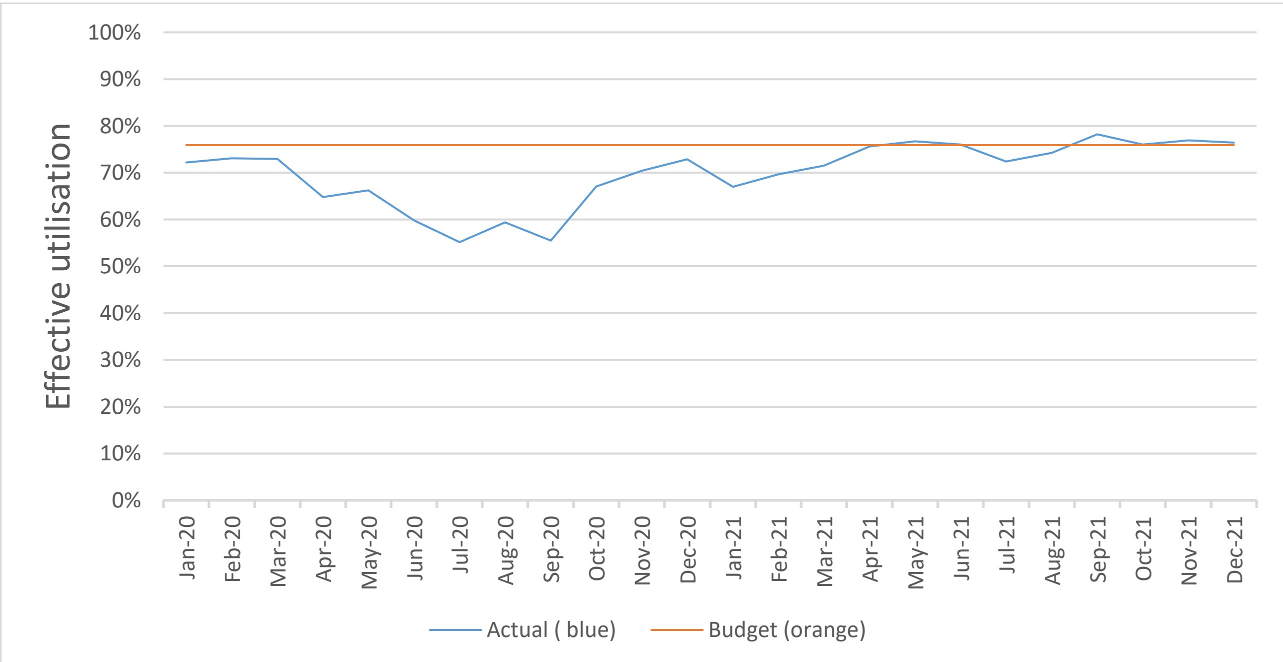


Figure 16.3.2 shows the truck effective utilisation for the years 2020 and 2021. The effective utilisation is consistently in line with the target, with an average of 74.0% between December 2020 and December 2021. The decrease from January 2020 to November 2020 is a result of a combination of shorter haulage distances (in pit dumping in Golouma West pit) and additional Haul Truck capacity. The additional trucks were acquired to sustain production when long haul operations started from Sabodala Phase 4 Pit in Q4 2021.

Truck demand is shown to maintain additional capacity for increasing pit depths and haulage profiles. The utilisation assumption takes into consideration, seasonal variations and the rainy season. Assumptions for budget and forecast are reviewed regularly and are updated as required.

Figure 16.3.2 Truck Effective Utilisation: Planned (Orange) vs Actual (Blue)



16.3.3 Blasting

The production drilling and blasting operations are carried out in 10 m benches and are double battered to 20 m (double benches) in fresh rock. Each 10 m bench is then excavated in 5 m flitches to ensure maximum selectivity and equipment productivity. The average blasting powder factor varies by pit, depending on the hardness of the material, usually from (0.25 to 0.35) kg/bcm. Fortis Extra 70 (a sensitised pumped emulsion blend) is used in both wet and dry blasting, with electronic detonators on all production shots. The highly weathered zone (clays and laterites) and transitional zone with a density below 2.0 t/m^3 is classed as free dig as per the current mining practice.

The supply of explosives and blasting accessories are contracted out directly to the approved explosives supplier Orica. The explosives contractor provides, in addition to the supply of primary explosives and blasting accessories, mixing equipment and technical blasting advice when needed.

16.3.4 Dust Suppression

Dust suppression is undertaken using four Komatsu-465 water carts, fitted with spray bars. Water for dust suppression is available from sumps in the pits in the first instance, and from the Turkeys Nest located around the pit perimeter (on the surface) if the pit sumps run dry and are used as pit dewatering stages.

16.3.5 Grade Control

The deposits at Sabodala-Massawa Gold Mine are systematically infilled by RC grade control drilling on a 10 m-by-10 m fence grid with holes inclined between (-45 to -65)° (according to the respective orebodies strike and dip). The drill holes' targeted depths are between (30 and 40) m total vertical length.

Samples are collected in 1 m sample lengths, from an automatic double dump sample outlet for approximately (2.5 to 3) kg mass.

The QAQC protocol used is Geostats CRM's, blank in every 20 samples and a duplicate in every 15 samples.

Samples are analysed for gold by fire assay at an external laboratory run by ALS (for the Massawa refractory ores) and Aqua Regia at an internal laboratory run by SGS (for the Sabodala and Sofia deposits). Grade Control (GC) models are updated after each drill programme, applying interpolation by inverse distance.

16.3.6 Human Resource

As of 31 December 2021, some 717 (35%) of the 2,067 persons employed by SGO were engaged in mining activities (Table 16.3.2) and of the 717 persons, 60% are directly employed by SGO.

Table 16.3.2 Mining Labour Numbers

Business Area/Company	Business Model	SGO Existing Operations (2021/2022)		
		Locals	Expats	Total
FTE	Contractor (drilling)	47	9	56
Mining	Owner's team	436	3	439
Transport Dieye	Contractor (Ore Haulage)	199	1	200
Orica	Contractor (Explosives)	29	4	33
BIA Group	Contractor (HME)	6	1	7
Total		**717**	**18**	**735**

A full break down of labour numbers involved in the Project are defined in Section 24.2.

16.3.7 Mine Infrastructure

Mine infrastructure that supports open pit mining on the Sabodala Concession and Massawa Mining License is discussed in Section 18.0.

16.3.8 Water Management

For the Sabodala Concession and Massawa Mining License, the approach and attendant infrastructure for clean and contact water management for the mining operations is discussed in Section 18.0. Potential water quality associated with the waste rock dumps, is discussed in Section 20.0.

16.3.9 Waste Rock Management

16.3.9.1 Overview

The in-pit waste rock volumetric quantities, and the loose volume, assuming a 30% average swell factor are shown in Table 16.3.3. From the table, it can be seen that there is sufficient Waste Rock Dump (WRD, capacity available for the Projects pits. Further, the Project area has sufficient space around the pits to allow for the construction of new waste dumps, if the existing pits get larger or new Mineral Resources are identified across the Project area.

Table 16.3.3 In-Pit Waste Volumes, WRD Dump Capacity and Design Basis

Pit	Waste Volume (Mbcm)	In pit Waste (Mt)	Swell @ 30% (Mlcm)	Density (t/m^3)	Waste Dump Capacity (Mm^3)	Bench Height (m)	Berm Width (m)	Overall Slope (°)
SAB	10.9	31.0	14.2	2.84	18.3	20	30	18.8
MKM	0.4	1.0	0.5	2.75	2.6	20	30	18.8
NKE	29.1	61.8	37.8	2.12	40.1	20	30	18.8
GBW	3.6	6.6	4.6	1.86	11.3	20	30	18.8
MAS	43.7	116.5	56.9	2.66	62.5	20	30	18.8
SFM+SFN	4.3	11.8	5.6	2.74	7.1	10	13	20
MCZ	25.9	60.3	33.7	2.33	46.5	20	30	18.8
MNZ	32.9	73.5	42.7	2.24	61.8	20	30	18.8
MDL	3.9	9.7	5.0	2.51	6.1	20	30	18.8
Total	**155**	**372**	**201**	**2.41**	**256**			

The waste dump designs for each pit are shown in Figure 16.3.3 to Figure 16.3.11. Waste rock from the open pits is planned to be hauled to the waste rock dumps (WRDs), and placed using haul trucks end-tipping in lifts with standard dozing management practice. In calculating waste dump capacity requirements, it was assumed that the blasted volume of the material would swell by 30% overall, when compared to the in-situ volume of the material.

All waste dumps are located with the goal to minimise, haulage distance, overall haulage cost and footprint.

16.3.9.2 Sabodala Concession

The Sabodala waste dump is located close to the pit (Figure 16.3.3)). The Sabodala pit requires a 70 m high waste dump to the north of the open pit. The remaining waste dump capacity is 18.3 Mm^3, which is sufficient for the defined waste from the open pit, using a 30% swell factor assumption.

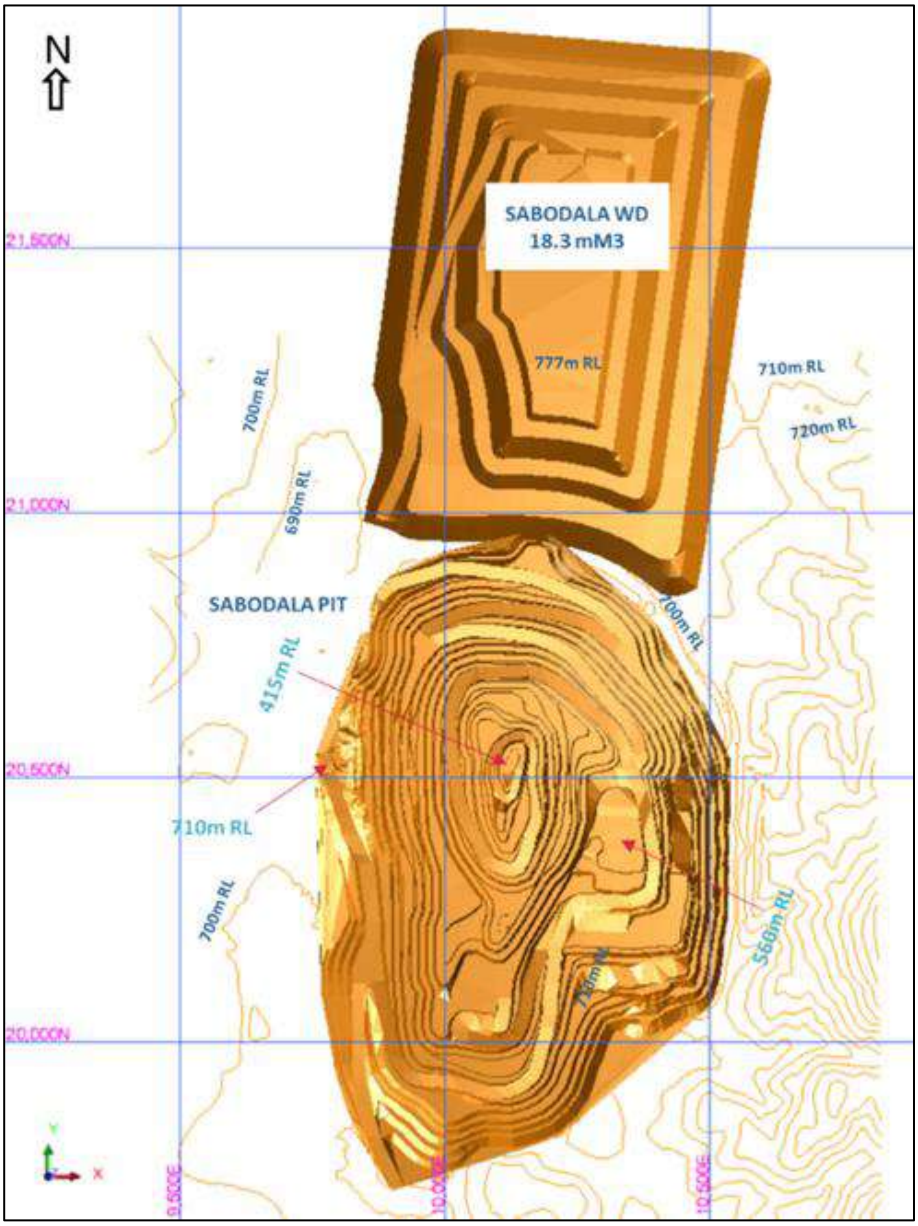
The Niakafiri waste dumps are located at an average distance of approximately 100 m from the pits. The Niakafiri pits require (40 to 90) m high waste dumps on both sides of the pits, as shown in Figure 16.3.4. The total waste dump capacity is 40.1 Mm^3, which is sufficient for the defined waste from the open pits using a 30% swell factor.

The Maki Medina waste dump is located 150 m from the existing pit (Figure 16.3.5). The Maki Medina pit requires a 20 m high waste dump to the west of the open pit. The remaining waste dump capacity is 0.6 Mm^3, which is sufficient for the remaining pit waste rock.

The Masato waste dump is located 150 m from the existing pit (Figure 16.3.6). The Masato pit requires a 90 m high waste dump containing 62.5 Mm^3, to the east of the open pit.

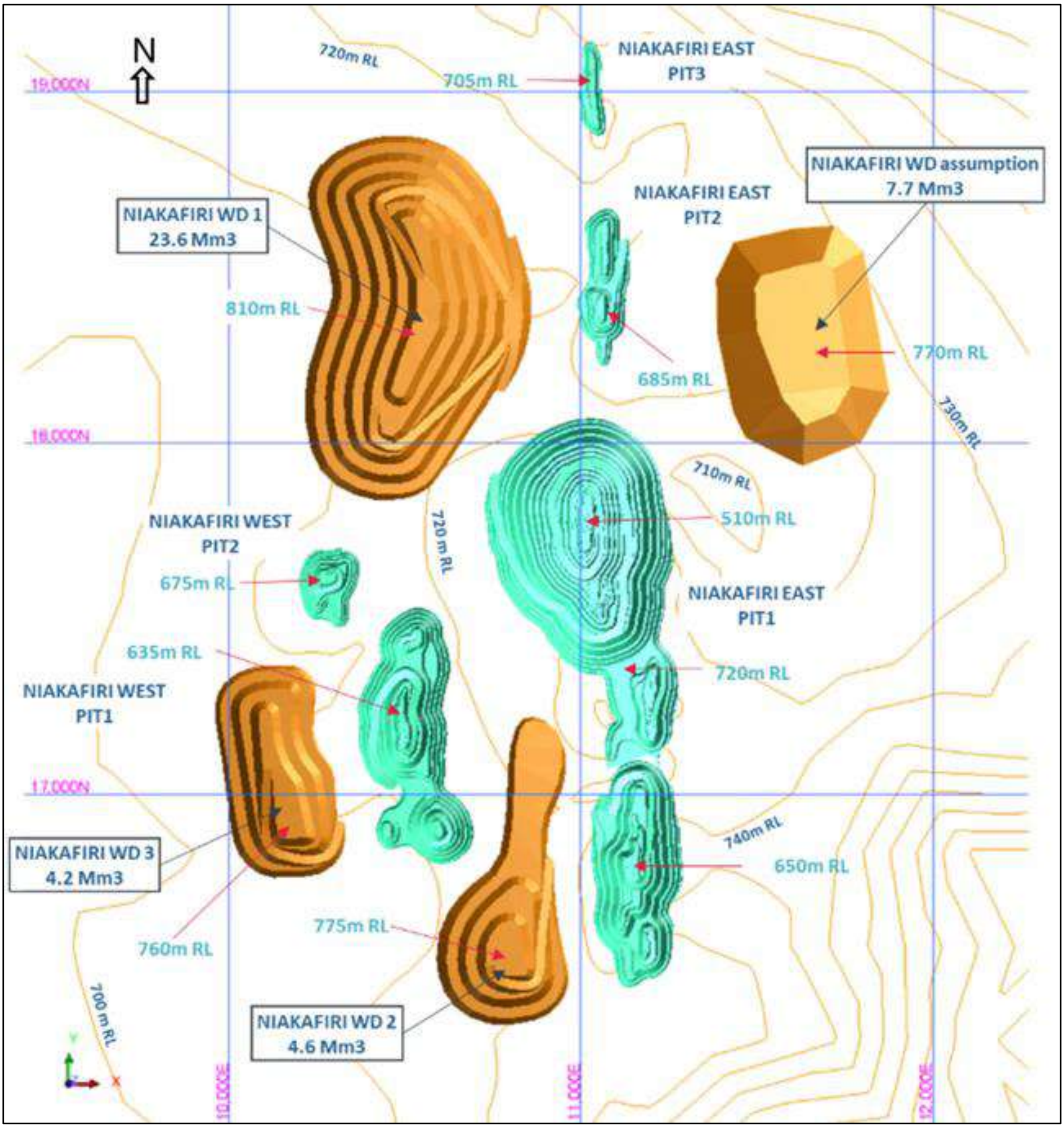
The Goumbati West waste dumps are located at a distance of approximately 200 m from the pit. The Goumbati West pits requires two waste dumps 90 m high east of the pits as shown in Figure 16.3.7. The total waste dump remaining capacity is 11.3 Mm^3 which is sufficient for the waste from theses pits.

Figure 16.3.3 Sabodala Waste Dump Design



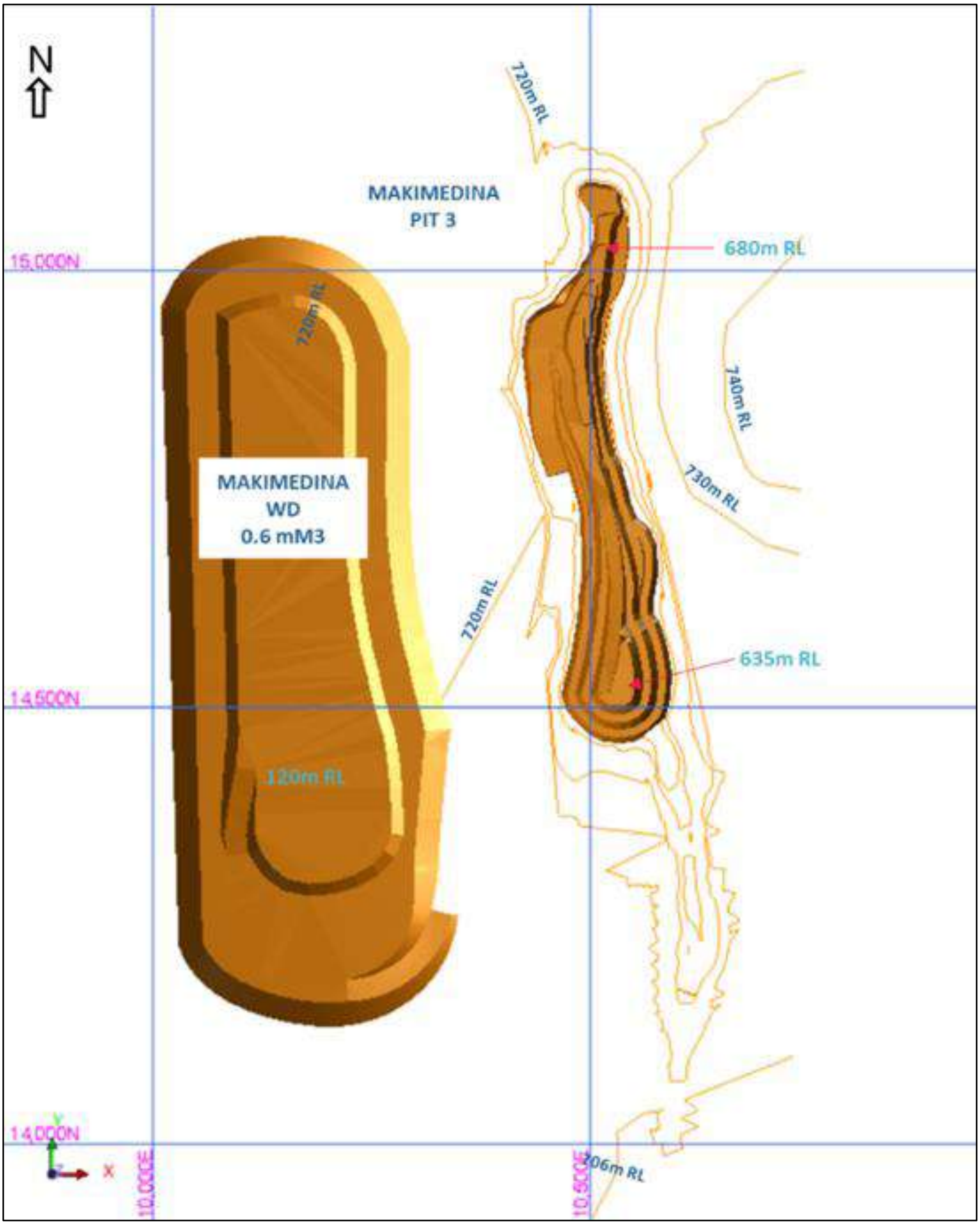
Source: Endeavour Mining 2021.

Figure 16.3.4 Niakifiri Waste Dumps Design



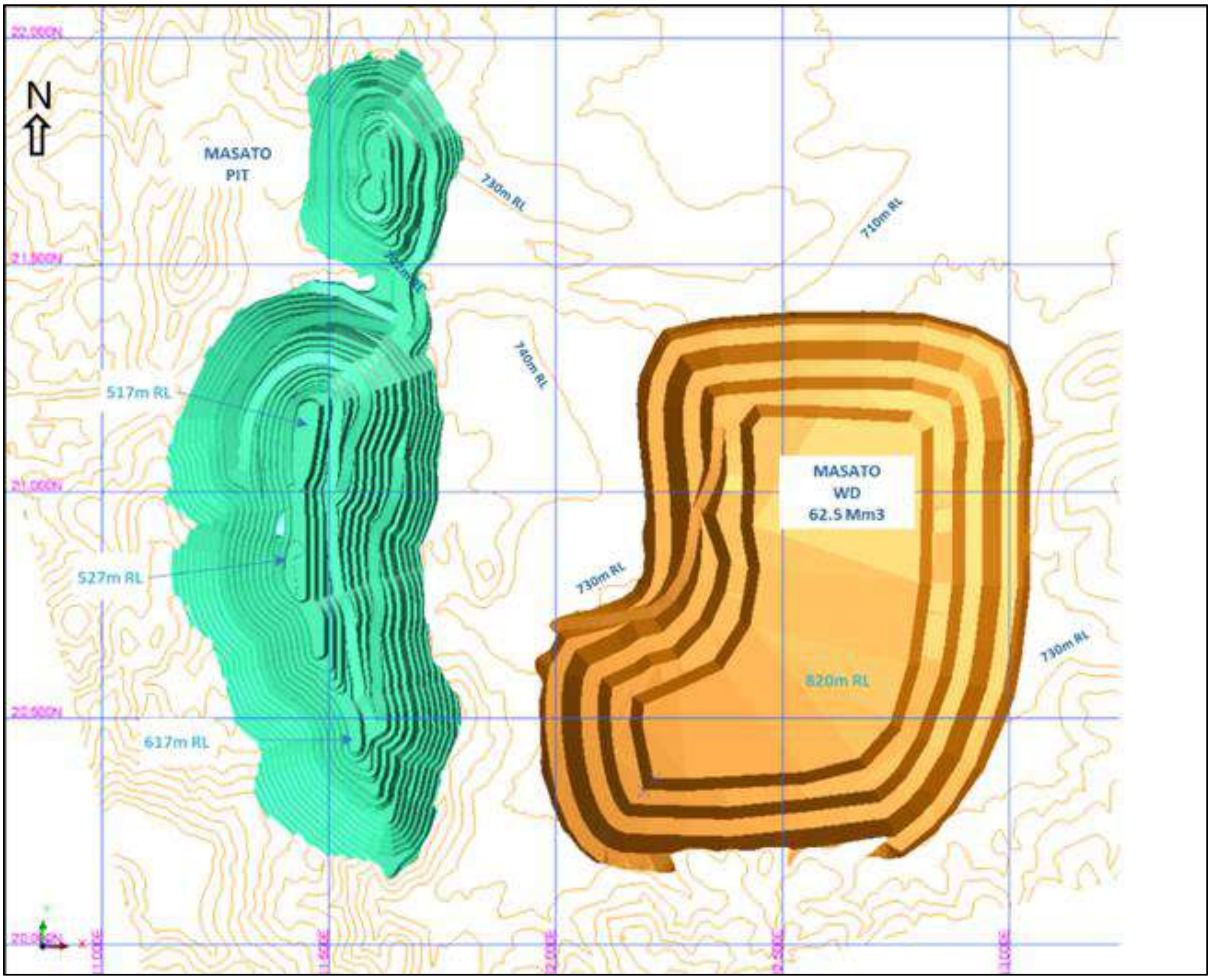
Source: Endeavour Mining 2021.

Figure 16.3.5 Maki Medina Waste Dump Design



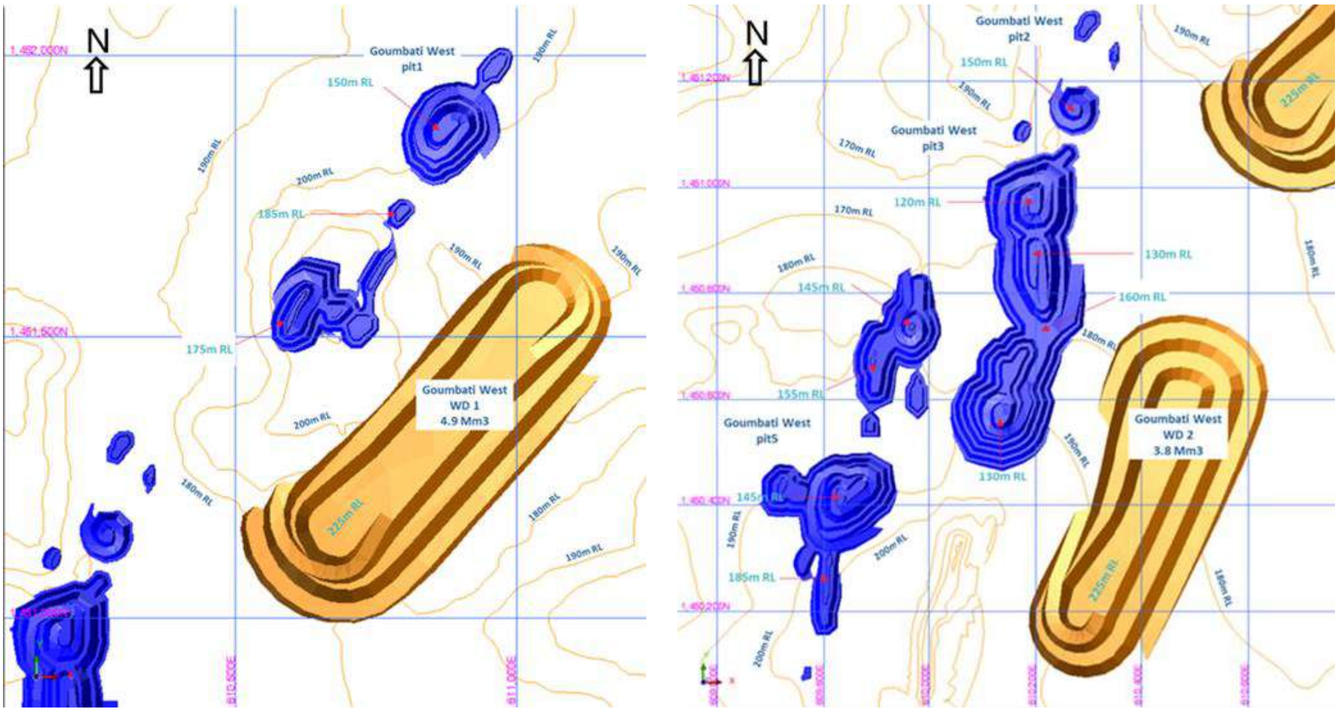
Source: Endeavour Mining 2021.

Figure 16.3.6 Masato Waste Dump Design



Source: Endeavour Mining 2021

Figure 16.3.7 Goumbati West Waste Dump Design



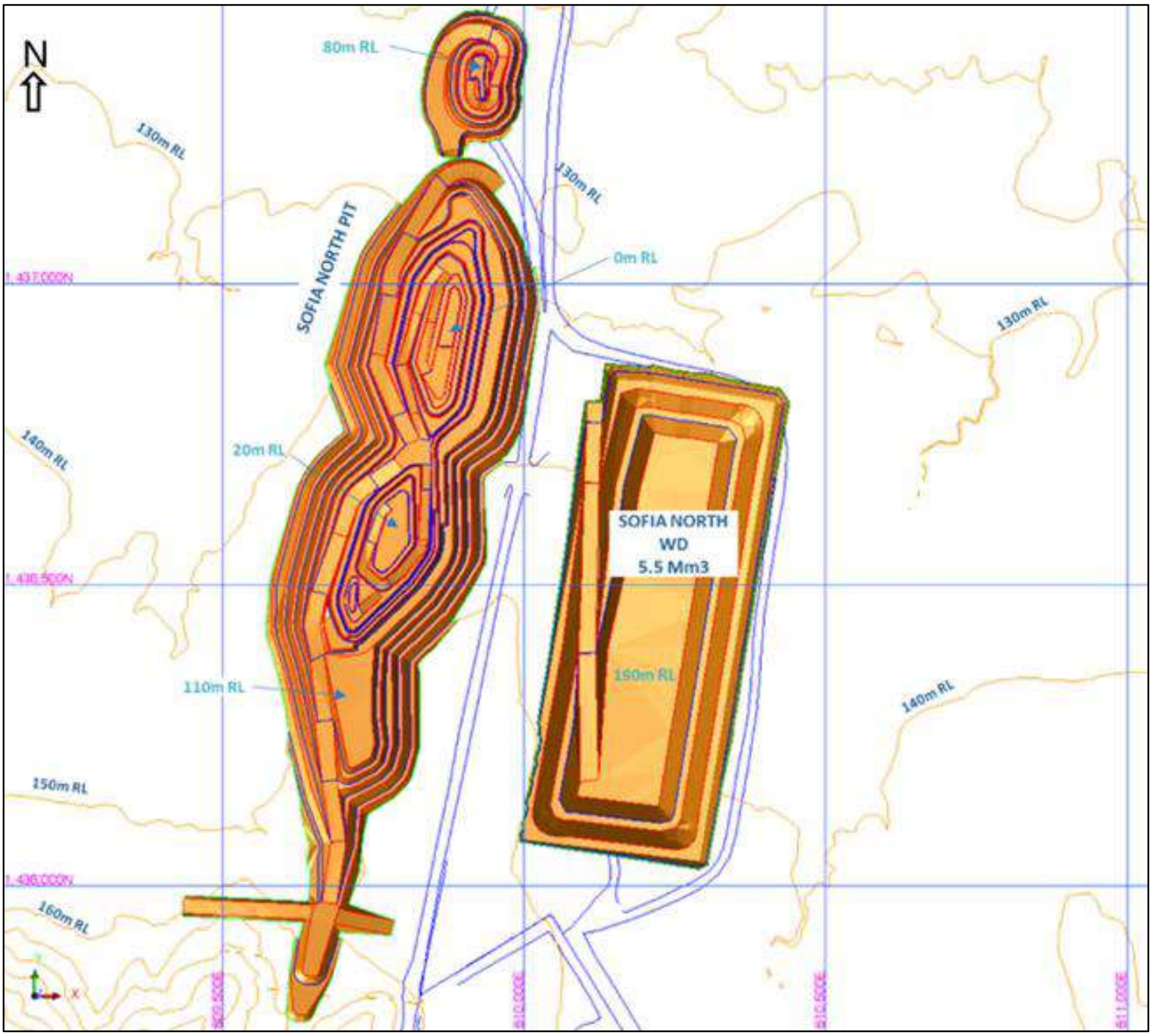
Source: Endeavour Mining 2021.

16.3.9.3 Massawa Mining License

The Sofia North waste dump is located 100 m from the existing pit (Figure 16.3.8). The Sofia North pit requires a 60 m high waste dump to the east of the open pit. The remaining waste dump capacity is 5.5 Mm^3, which is not sufficient to store the waste rock from this pit. The remaining waste is planned to be hauled to the Sofia Main waste dump using the south exit of the pit which has capacity for the additional material.

The Sofia Main waste dumps are located 50 m from the existing pit (Figure 16.3.9). The Sofia Main pit requires two waste dumps 50 m high to the east of the open pit. The total remaining waste dump capacity is 1.6 Mm^3 and is sufficient for the remaining pit waste rock.

Figure 16.3.8 Sofia North Waste Dump Design



Source: Endeavour Mining 2021.

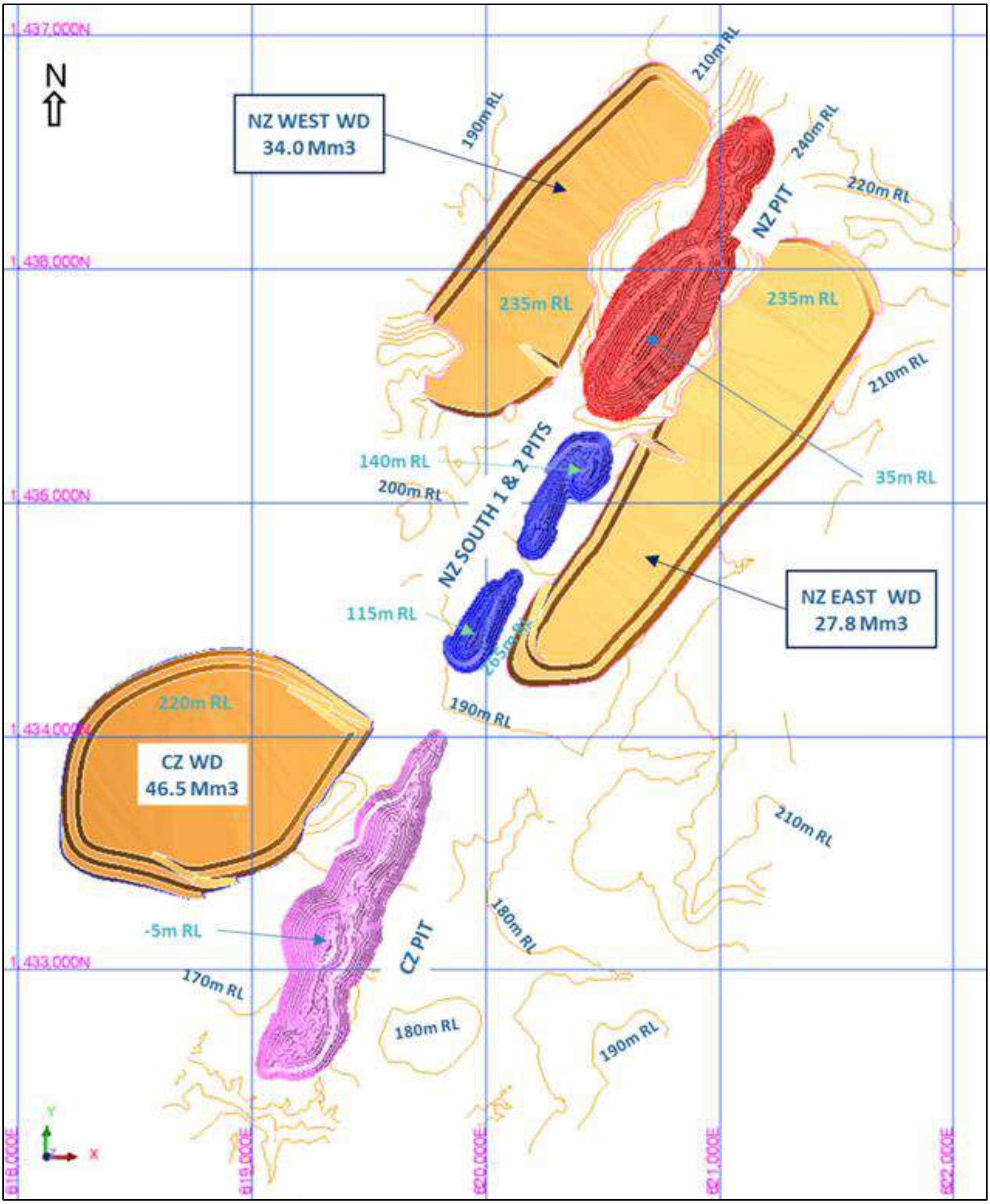
Figure 16.3.9 Sofia Main Waste Dump Design

Source: Endeavour Mining 2021.

All Massawa dumps are to be located outside of wetland areas and not on sloping hillsides as shown in Figure 16.3.10 and Figure 16.3.11.

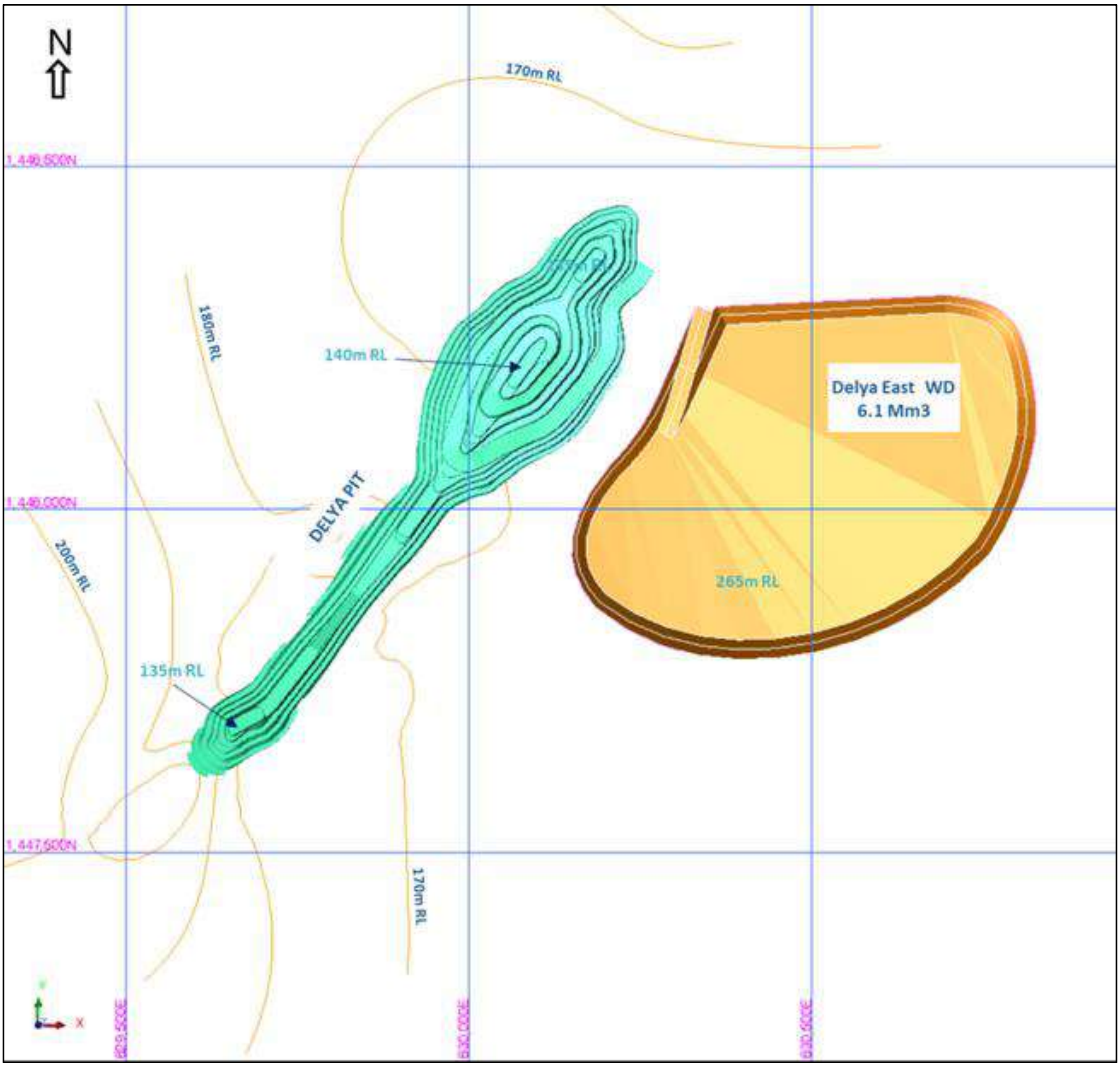
A total of four waste rock dumps are planned for the development of the Massawa pits. The Massawa CZ pit requires a 40 m high waste dump to the west of the open pit, whereas the Massawa NZ pits are planned to utilise two waste dumps, with one on both the eastern and western sides of the open pits at an approximate height of 40 m. The waste dump located at Delya is approximately 20 m high.

Figure 16.3.10 Massawa CZ and NZ Waste Dump Designs



Source: Endeavour Mining 2021.

Figure 16.3.11 Massawa Dela Waste Dump Design



Source: Endeavour Mining 2021.

16.4 Underground Mining

The 2021 Mineral Reserve estimate assumes that underground mining would be undertaken to extract ore from the Golouma and Kerekounda deposits. The mode of operation for the underground mining is owner operated. The choice of a mining method is mechanized cut and fill. This method was selected based on this mining method's ability, to achieve low capital and operating costs from mining through to finished metal. This mining method maintains a safe working environment and manages operational and cost risk.

Underground mining is supported by the necessary infrastructure and equipment to sustain target production levels. Infrastructure will be constructed underground and will also use existing facilities on surface, such as the open pit water management system, power supply, offices, and accommodation. The infrastructure includes ventilation, a mine backfill plant, mine dewatering pumps and piping, refuge chambers and an electrical distribution system. The infrastructure was included in the mine design and scheduled with mine development. Mine production was then scheduled based on the availability of the infrastructure and access to the orebody. The designed nominal production rate is 1000 t/d of ore, from two working areas running concurrently.

16.4.1 Operating Strategy

The underground mining operations will function as an owner-operated mine, managed by Endeavour technical services and other Endeavour/SGO personnel including accounting, procurement, and site management. The underground mine will operate 24 h/d, with two twelve-hour shifts, 365 days per year. It is assumed that there will be two shifts per day, resulting in a four-crew roster, with one crew working days, another working nights, and two crews on rest.

The underground mining personnel will be trained to ensure they possess the necessary experience, and expertise to achieve the objectives of the mine plans. The workforce will have experience working in the West Africa region and be familiar with the West African underground working environment.

SGO will acquire a suitable mining fleet and engage the personnel necessary to achieve the mine plans. The mining fleet will be selected to provide a safe, practical, efficient, and economic means of extracting the Mineral Reserves from the underground zones that comprise the two deposits. The underground mining workforce will be accommodated in the existing facilities located at, or near the underground workings. Equipment maintenance will also be the responsibility of SGO personnel. Limited maintenance capacity is included in the underground design. Larger maintenance tasks such as re-builds and reconditioning will use SGOs infrastructure on surface.

The mines will be accessed by a decline driven from a bench established in the Golouma open pit. The decline will provide all access for personnel and materials in and out of the mine. The Golouma and Kerekounda deposits will be connected by a network of ramps and lateral development. This will facilitate ventilation and personnel and materials movement between the four zones included in the underground Mineral Reserve estimate.

The mine development design and production schedule will be executed in its entirety by the SGO's workforce.

16.4.2 Geotechnical

The basis of the underground mine design was taken from 'Technical Document 7 Mine Geotechnical (Pit and Underground) Report' (TD7 Report) prepared by SRK for geotechnical and geomechanical recommendations (SRK, 2010).

For the purposes of the mine design and scheduling, the QP has assumed that a ground support standard will have been designed to enable safe operation in the workplaces and will support the mining method. Due to the uncertainty of the geotechnical conditions in the underground mining areas, a typical ground support design was selected to inform the mining schedule and development unit costs. These assumptions were:

- All permanent development backs and walls will be supported using pattern bolting, mesh, and plastic fibre-reinforced shotcrete. The shotcrete will be sprayed off-cycle.
- Temporary development, such as attack ramps and the MCAF lifts will be supported using splits sets installed on a pattern with mesh.

- Extension bolts, cable bolts or other ground reinforcement methods may be required once mine production has started.

Assuming a ‘fair’ rock mass category using the Norwegian Geotechnical Institute (NGI) Q-system, the bolting pattern for permanent headings is:

- 1.8 m long bolts on a 1.8 m spacing pattern in the backs and walls. Mesh installed from 1.5 m above the floor. Shotcrete approximately 6 cm thick sprayed the perimeter of the heading from floor to floor.

The bolting pattern for temporary headings is the same.

The ground support design and management plan will be developed as more geological and geotechnical information is collected from the underground mining areas.

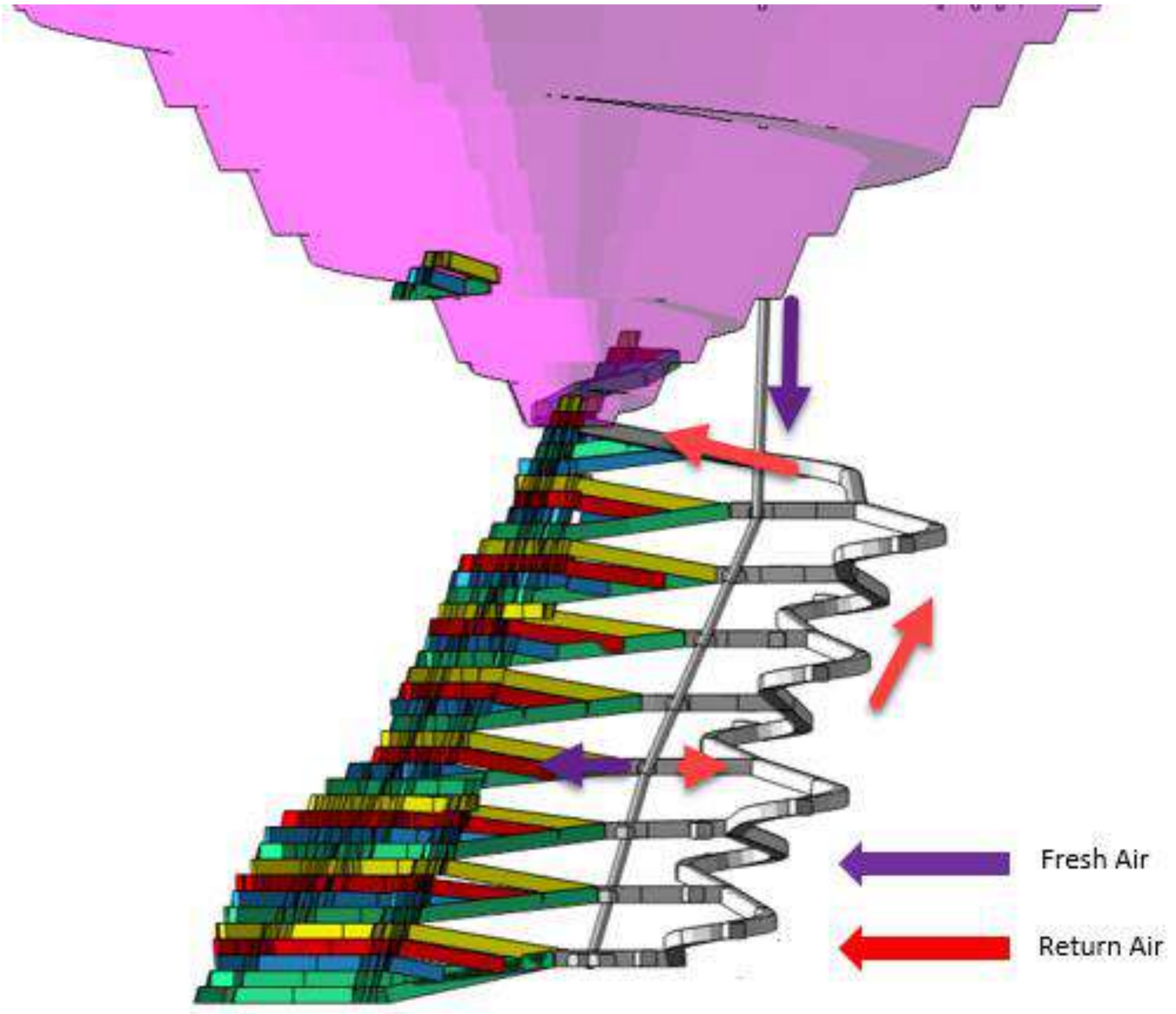
Mining faces will be routinely scanline mapped, surveyed, and monitored to ensure that the ground support system is working as designed in all headings.

16.4.3 Ventilation

The ventilation system implemented will be a push system, with air being directed down the ventilation raise, with exhausting at the portal. This will provide a separation between the stopes and ramp. In the event of a fire, the workers will have a safe place to gather at the fresh air raise. The ventilation raise will also be the second means of egress with a ladder system installed in the raise. Services such as compressed air and water can also be installed in the ventilation raise. Electrical cabling will be installed either via bore holes or in the ramp system.

Approximately 185 m^3/s of air is required for the mines, based on the diesel equipment fleet requirements for the mine. A schematic depicting the typical ventilation airflow through the mine is in illustrated in Figure 16.4.1.

Figure 16.4.1 Ventilation Circuit Schematic



Source SLR, 2020

The two main fans are 115 kW axial fans, forcing fresh air into the mine from the collar of the ventilation raise. The fresh air is directed and managed in the mine using 55 kW booster fans. Auxiliary ventilation is provided by 10 kW fans located as required to support operations. Flexible ducting is used to circulate the air into headings and other workplaces as required.

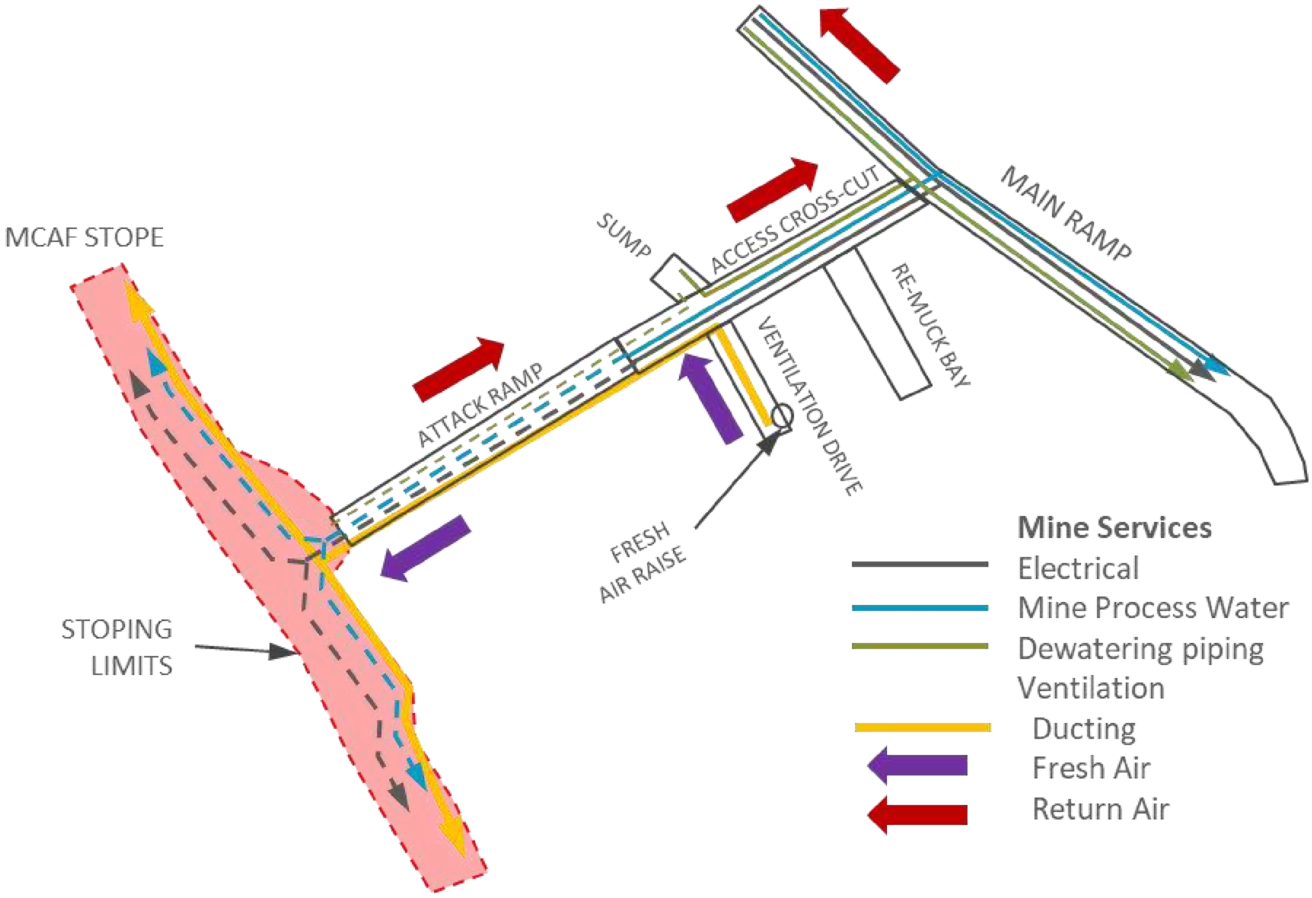
16.4.4 Underground Infrastructure

The underground infrastructure is designed to support on-going mining operations for the life of each of the four deposits being considered. The infrastructure installed underground includes the following:

- Mine access.
- Refuge stations.
- Electrical power.
- Mine process water.
- Sumps and dewatering.
- Light maintenance facilities for fuelling, lubrication, and filter change-outs.

A typical level access cross-cut with the mine services and infrastructure is Figure 16.4.2. A description of the mine services and underground infrastructure follows.

Figure 16.4.2 Typical MCAF Stope Infrastructure



Source SLR, 2021

16.4.5 Underground Mine Access

Each of the principal mining areas is accessed by a 5 m wide by 5 m high decline. Declines are collared on benches in the Golouma and Kerekounda open pits. The declines are driven using two-boom jumbos and a development fleet of LHDs and trucks. The maximum gradient is 15% and all declines are positioned in the footwall of the deposits. Golouma West 2 has no decline access but is accessed from lateral drives from Golouma West 1 and Golouma West 3 on two elevations.

The declines serve as the mine return air, or exhaust air, conduits. They also host mine services including electrical cabling and mine process water and mine dewatering piping. The main mine sumps and main ventilation fans are located near the collar of the declines. There are electrical cut-outs near the attack ramps as well as refuge chambers.

Travel on the declines will be controlled by radio communications between the production and service fleet, operated by a mining contractor, and light vehicles. A procedure and operations manual for decline travel will be developed by the SGO technical services and operations personnel.

There are four separate declines for Golouma West 1 and 3 and for Golouma South and Kerekounda.

16.4.6 Refuge Chambers

Portable refuge chambers will be positioned in the fresh-air stream near the main ramp on the active mining levels. The portable refuge chambers will be equipped with a fresh air supply, independent of the mine ventilation system, bottled water, battery back-up power, and a means of communication with surface. Each of the four refuge chambers will accommodate up to eight people.

The refuge chambers will be sourced from a globally recognised vendor. The refuge chambers will be fitted into a 5 m wide by 5 m high by 7 m or longer excavation.

16.4.7 Electrical Stations and Reticulation

Power is provided from the Phase 2, SPS upgrade and fed to each portal from a 33 kV overhead line. A stepdown transformer will be provided at each mine. Power will be distributed to the mine working areas by shielded cabling hung in the ramp and by a network of boreholes connecting the levels. The 440 V cabling will be distributed using mine power centres located on the levels. Starters will be positioned on the access crosscuts to power auxiliary ventilation fans, sump pumps, and electric powered equipment operating in the stoping area.

The installed load is of the order of 2.6 MW, whilst annual power consumption is of the order of 12.5 GWh/a. The load list developed is at a PFS level of accuracy and is subject to change.

Table 16.4.1 UG Fixed Power Demand (2 Mines-Concurrent Operation)

Underground Mine	Size (Drawn) kW	Quantity #	Power (Drawn) kW	Utilisation %	Power (Drawn) kW	Daily Power Demand kWh/d	Annual Power Demand kWh/a
Primary Ventilation System	110	2	220	100%	220	5 280	1 927 200
Secondary Ventilation System	50	9	450	80%	360	8 640	3 153 600
Miscellaneous Fans	10	4	40	80%	32	768	280 320
Underground Service Bay	20	2	40	70%	28	672	245 280
Refuge Stations	5	4	20	100%	20	480	175 200
Definition diamond drill	60	2	120	50%	60	1 440	525 600
Underground lighting	10	2	20	80%	16	384	140 160
Portable welder	20	2	40	20%	8	192	70 080
Backfill Plant	10	1	10	50%	5	120	43 800
Main dewatering pumps	100	3	300	100%	300	7 200	2 628 000
Total Load and Power Consumed	**395**		**1 260**		**1 049**	**25 176**	**9 189 240**
Installed capacity (0.75 factor)			**1 680**				

Table 16.4.2 UG Variable Power Demand (2 Mines-Concurrent Operation)

Underground Mine	Size (Drawn) kW	Quantity #	Power (Drawn) kW	Utilisation %	Power (Drawn) kW	Daily Power Demand kWh/d	Annual Power Demand kWh/a
Elec-hydraulic drill jumbo	100	5	500	73%	365	8 760	3 197 400
Rock Bolter	40	5	200	87%	174	4 176	63 510
Total Load and Power Consumed			**700**		**541**	**12 936**	**3 260 910**
Installed capacity (0.75 factor)			**933**				

16.4.8 Underground Mine Process Water

Mine process water is the water required to operate the underground mining equipment, particularly drills and bolters. The estimated mine process water requirement is 3,300 m^3/d of clean water. The mine process water will be drawn from the site fresh-water storage dams, filtered on surface, and piped to the decline portal areas. The water will be distributed through the underground workings via a network of pipes in the ramp and connected to the access crosscut on each of the attack ramps.

The mine process water supply will be sufficient to operate the following:

- 2-boom drill jumbos
- rock bolters
- exploration drills
- mining faces for development wash-down
- underground maintenance workplaces.

16.4.9 Mine Sumps and Mine Dewatering

Each of the mining areas will be fitted with a main sump located near the top of the main ramp accessing the deposit. The main sumps will be fitted with pumps, a clarification and settling tank, and pipeline to surface.

Mine contact water and groundwater will be collected and pumped to surface for settling, clarification, and subsequent treatment following current site water management practices. Each attack ramp sump will be equipped with a small (5 kW) pump. The contact water will be pumped to the main mine sumps situated near the top of each decline. The 110 kW pumps will then transfer the water to the main dewatering sumps.

16.4.10 Maintenance Facilities

Underground service bays for mining equipment can be established in re-mucks in the access crosscuts on the mined-out levels. These will be light maintenance duty stations designed to mend hoses and to fuel and lube equipment. Equipment that requires major repairs will be serviced at the surface facilities.

The maintenance bays will be fitted with small tool storage, a portable welding unit, and air compressors. Fuel and lube bays will be fitted with fuel and lubricating oil cell storage, fuel and oil pumps, and spill collection kerbing.

16.4.11 Mine Backfill System

Two types of backfill material are proposed at Golouma and Kerekounda; cemented rock fill (CRF) and unconsolidated rock fill (URF), as described in the TD7 Report (SRK, 2010).

16.4.11.1 Cemented Rock Fill

CRF is proposed to fill the initial one or two lifts of each MCAF mining horizon, to eliminate the need to leave a sill pillar, sterilizing reserves, when mining approaches from beneath.

The rock will be sourced from run-of-mine (RoM) open pit waste rock. The rock will be crushed and sized to approximately 25% passing 10 mm, with the remainder sizing between 10 mm and 200 mm. Only fresh rock will be used, as saprolitic material would be detrimental to the final strength of the CRF.

The crushed rock will be mixed on surface with Normal Portland Cement (NPC). A cement content of 5% by weight will provide sufficient strength, however, this should be confirmed by testing. Production of cement slurry can be accomplished using a skid-mounted cement slurry batch mixer. The cement slurry will be mixed with the crushed rock on surface and then transported underground.

CRF should be placed to a height of at least 10 m (two lifts). Where spans exceed 7 m, wire mesh reinforcement, keyed to the excavation wall, will be used at the base of the initial lift.

16.4.11.2 Unconsolidated Rock Fill

URF is proposed to fill the remainder of the stopes above the CRF. URF is a suitable working surface for personnel and equipment and provides support to the walls.

URF can be RoM open pit or underground waste rock, where sizing is not as important as it is for CRF. Open pit waste rock will be crushed so that most of it passes 100 mm, whereas underground waste rock does not require further crushing. It is expected that most URF will be sourced from underground.

16.4.11.3 Emplacement

CRF and URF coming from surface will be hauled underground using the underground haul trucks. Haulage from the waste rock pile to a portal area stockpile will be done using surface trucks. If the stope dimensions permit, the haul truck will dump the fill directly in the stope. If the stope is too narrow for the haul truck, the fill will be dumped into a nearby re-muck and rehandled into the stope using a load-haul-dump units (LHD). URF coming from underground can be transported and placed using a LHD if the fill source is relatively near to the stope being filled.

The fill does not need to be tight to the back, but it must be filled to within a metre of the back. In combination with wall markers, this will prevent excessive ramping down upon benching the subsequent lift and will also limit the height of the back from the working floor.

The total backfill requirement for the LoM is approximately 875 200 m^3 of fill. The distribution of CRF and URF is 29.6% CRF and 70.4% URF.

16.4.12 Groundwater Management

The underground operations are below water tables as described in the TD7 Report (SRK, 2010). The QP concurs with the recommendations in the TD7 Report for dewatering in the upper levels of the underground mines.

The underground operations are all located in fresh rock with a hydraulic conductivity of 1.5E-08 m/s, with potential for increased conductivity near faults. For the most part, the underground operations at Golouma will be dry. Kerekounda might be the exception, as it is located near surface. According to the TD7 Report, the bottom of the pit is near the base of the weathered domain and therefore may allow water inflow to near-surface mine openings. Grouting and shotcreting in this transition zone may reduce water inflows in such areas.

Methods for reducing surface water inflow into the underground include the following:

- Start the underground ramp 0.5 m to 1.0 m above the surface haulage ramp of the pit.
- Incline the first two rounds to prevent surface water from running down the ramp.
- Install a metal culvert at the entrance to direct surface water from the pit away from the portal entrance.

Groundwater and mine water will be collected in sumps and pumped to surface discharging into the pits. The pit sumps can be used as a clean water source for underground equipment use.

Pumping from underground can be done using a central pumping station located in the mine or a series of pump stations pumping the water to surface. Due to the size and short mine life of the operations, the preferred method is the use of a series of small pumps and pump boxes or sumps to pump the water to surface.

16.4.13 Underground Mining Operations

Mine development and production are undertaken as a set of activities that form part of the development cycle. The cycle is comprised of the following operations:

- Mucking out the broken rock blasted during the previous shift.
- Installing ground support, including bolts, mesh, shotcrete, and any secondary ground support included in the design.
- Drilling the blastholes.
- Charging the blastholes and blasting the round.

Each of the unit operations requires time to complete and each task requires that the previous task is completed before starting the next.

The working roster assumed for scheduling and planning purposes, was two 12-hour shifts. The working day includes allowance for non-productive activities including pre-shift meetings, travel to the workplace, inspections, and workplace preparation. The nominal productive time per shift was estimated to be just over eight hours or 68% use of time.

The key inputs to the development productivity analyses were:

- Mucking: 4.8 m^3 (10 t) LHD, tramming to a truck. The average LHD travel distance was 75 m. One-way truck haulage was assumed to be 1000 m for waste and 1250 m for ore.
- Support: Described previously. Support installed with a split-boom, 2-boom jumbo.
- Drill-blast: 5 m wide by 5 m high drift cross-section with an arched back. The blast design includes the items listed in Table 16.4.3.

Table 16.4.3 Blast Design Parameters

Hole Type	Units	Waste Development	Ore Drives
Hole Depth	m	3.8	3.8
Advance	m	3.5	3.5
Cross Section Area	m^2	24.1	24.1
Design Tonnes	t	228.8	228.8
Powder Factor	kg/kg	1.3	1.2
Specific Charge	kg/m^3	3.5	3.2
Specific Drilling	m/m^3	1.7	1.7
Average Charge Length	m	3.15	3.15
Total Charged Holes	#	40	40
Relief Holes	#	2	2
Total Number of Holes	**#**	**42**	**42**

The QP determined that each development crew can advance 3.5 m/d per crew in waste development headings and in the MCAF stopes. The 12-hour shift is summarised by the tasks and estimated average durations in Table 16.4.4.

The equipment required to complete the mining activities will be acquired and maintained by SGO. The equipment to be used by the mining workforce is assumed to be modern, fit for purpose and well maintained to ensure that SGO's objectives and production targets are achieved.

Table 16.4.4 Mining Activity Cycle Times

Activity	Waste Development (mins/shift)	Ore Drive (mins/shift)
Inspect/Mark-Up	25	25
Clean/Muck	120	100
Drill-Install Support	180	190
Shotcrete	70	0
Mine Services	60	60
Blast Drilling	120	120
Charge-Blast	90	90
Total	**665**	**585**
Travel Time /Slack	**55**	**135**

The travel and slack time in each 12-hour shift is attributed to miscellaneous delays and travel time to and from the workplace. Estimated delays, set-up and preparation time is accounted for in each of the activities. The time allocation to each activity also accounts for re-positioning the equipment, maintenance, and other routine functions.

16.5 Historical Performance

Mining operations on the Sabodala Concession commenced in March 2009. However, only the last three years of production performance is discussed in this Section (2019 to 2022).

During 2021, the operational focus was Sofia Main, Sofia North, Sabodala, Golouma West and Kourouloulou pits. Golouma West and Kourouloulou pits were completely mined out during 2021.

For the period from 2019 to 2022 (Table 16.5.1), 114.4 Mt of material was mined, of which 99.0 Mt was waste, and 15.4 Mt was ore. Mined ore for this period had an average grade of 1.87 g/t Au for total contained gold of 1,058 koz. The average strip ratio for this period was 6.4:1 (t_{waste}:t_{ore}).

From 2020 to 2021, the volume of material mined increased by 11.5 Mt and for the 12-month period ending 31 December 2021, a total of 45.8 Mt was mined. Monthly production averages 3.8 Mt per month for the same period.

For the period ending 31 December 2021, the unit operating cost for mining was USD 3.44/t mined, which includes drill and blast, excavation and loading, hauling (waste and ore), grade control, camp expenses (USD 0.23/t) and other support ancillary services.

The camp cost has been removed from the mining and processing operating expenditures and added to the General and Administration cost for the Ore Reserve estimation at 31 December 2021. If the camp cost is excluded, the actual mining OPEX in 2021, is USD 3.21 per tonne mined.

The mine plan supporting the Ore Reserve estimation as of 31 December 2021, reported USD 3.07 per tonne mined. The cost variation is only 4.4%, indicating that the LoMp was developed with achievable cost estimation basis.

All in sustaining costs (AISC) for the operation decreased significantly from USD 915/oz in 2019, down to USD 615/oz in 2021. The main reason for this change is the increase in the gold production from 239 koz in 2019 to 382 koz in 2021. This increase in gold production also reflects the increase in Gold sold from 234 koz in 2019 to 391 koz in 2021. This increase in production has also increased mine's net cash flow from USD 88.7 M in 2019 to USD 395.4 M in 2021.

The processing plant CIL recoveries from the year 2019 to 2021 showed only a small fluctuation around 89% to 90%, which is similar to the recovery assumptions applied in the Ore Reserve estimation process. The estimation applied recoveries as a function of gold grade by deposit and weathering type (see Section 15.3.4 for further details).

Table 16.5.1 The Last Three Years of Operations Mining Physical Performance

Mining Physicals	Total (kt)	Waste (kt)	Ore (kt)	Gold Grade (g/t)	Gold (koz)	Strip Ratio (t_{waste}:t_{ore})
2019						
• Golouma West	18 227	16 349	1 878	2.24	135	8.7
• Sabodala	11 730	11 392	338	0.99	11	33.7
• Maki Medina	2 743	2 357	386	1.22	15	6.1
• Kerekounda	1 220	933	287	4.11	38	3.3
• Koulouqwinde	395	328	67	1.94	4	4.9
Total Mined in 2019	**34 315**	**31 359**	**2 956**	**2.14**	**203**	**10.6**
2020						
• Golouma West	10 586	8 444	2 142	2.09	144	3.9
• Goumbati	960	830	130	1.22	5	6.4
• Sabodala	3 119	2 920	199	1.05	7	14.7
• Maki Medina	3 623	2 991	632	1.17	24	4.7
• Kourouloulou	3 714	3 589	125	4.43	18	28.7
• Sofia Main	12 276	10 216	2 060	1.82	121	5.0
Total Mined in 2020	**34 278**	**20 546**	**5 288**	**2.14**	**318**	**3.9**
2021						
• Golouma West	143	72	71	1.89	4	1.0
• Sabodala	2 922	2 830	92	1.12	3	30.8
• Kourouloulou	131	99	32	6.93	7	3.1
• Sofia Main	23 127	19 028	4 099	2.85	375	4.6
• Sofia North	19 493	16 618	2 875	1.59	147	5.8
Total Mined in 2021	**45 816**	**38 647**	**7 169**	**1.87**	**537**	**5.4**
Total Mined in 3 years	**114 409**	**98 996**	**15 413**	**1.87**	**1 058**	**6.4**

Table 16.5.2 Stockpile Year Ending Balances for the Past Three Years (2019 to 2021)

Stockpile Balances	Ore (kt)	Gold Grade (g/t)	Gold (koz)
31 December 2019	7 218	0.73	170
31 December 2020	8 217	0.79	210
31 December 2021	11 037	0.91	322

Table 16.5.3 Processing Physicals for the Past Three Years (2019 to end 2021)

Item	Unit	2019	2020	2021
Ore Feed	(kt)	4 161	4 123	4 254
Grade Feed	(g/t)	1.98	1.94	3.11
Gold Feed	(koz)	265	257	425
Recovery	(%)	90.9%	89.2%	89.6%
Gold Recovered	(koz)	241	229	381
Gold Poured	(koz)	239	227	382

Table 16.5.4 Historic Financial

Financials	Unit	2019	2020	2021
Gold Sold	(koz)	234	226	391
Gold Price	USD/oz	1368	1781	1795
Operating Costs				
Mining OPEX	USD (M)	97.8	101.5	118.0
Processing OPEX	USD (M)	46.7	43.1	49.0
Site G&A	USD (M)	19.3	24.3	29.0
Corporate G&A	USD (M)			6.4
Trans & Refinery	USD (M)	1.0	1.9	0.8
Royalties	USD (M)	19.3	23.0	35.3
Sustaining CAPEX				
Mining	USD (M)	20.6	16.7	28.2
Processing	USD (M)			2.3
TSF	USD (M)			6.8
Non-sustaining capex	USD (M)			
Waste Capitalisation	USD (M)	29.6	7.7	20.6
Working Capital	USD (M)			12.6
Others	USD (M)	8.8	5.0	67.7
AISC	USD/oz sold	915.0	908.0	672.0
Revenues				
Gold	USD (M)	313.9	403.0	702.0
Silver	USD (M)	0.3	0.3	0.8
Total Revenues	USD (M)	**314.2**	**403.3**	**702.8**
Net Cash Flows	USD (M)	**88.7**	**190.1**	**395.4**

16.6 Life of Mine Plans and Associated Assumptions

16.6.1 Open Pit Mine Scheduling

The LoMp production scheduling process for the Project was undertaken using MineSched® software. An integrated multi-pit mining schedule was developed and includes, mined volumes, stockpile movements, WRD deposition and process plant feed and incorporated the following design basis and constraints: final planning block models for each deposit.

Final pit designs with incremental pit stage designs and the survey topography as at December 31 2021 for the following pits:

- Sabodala and Masato Open Pits.
- Maki Medina Open Pit.
- Niakifiri East and Niakifiri West Open Pit.
- Goumbati West Open Pit.
- Sofia Main and Sofia North Open Pits.
- Massawa Central Zone, North Zone and Delya Open Pits.

Mining inventories for both ore and waste are reported by pit, by weathering ore type and by grade categories as reported in Table 16.6.2 and stockpile balance in Table 16.5.2.

The final pit designs also capture Inferred Mineral Resources, totalling 3.4 Mt of ore at 1.90 g/t Au. The 209 koz of contained gold, is currently considered as waste in the current LoMp schedule.

Stockpile opening balances as of 31 December 2021 are presented in Table 16.5.2. Said stockpiles contain 11.0 Mt of ore at 0.91 g/t Au, and contain 323 koz of gold. The majority of this ore (4 Mt at 0.75 g/t Au) is apportioned to Sabodala open pit (99 koz of gold).

- Final waste rock dump designs and ex-pit haul road designs to establish travelled distances for both ore and waste.
- Mining geometry constraints which cumulatively inform the overall sink rates for the individual pits comprising:
  - A lag of 100 m, which controls the minimum distances between faces and adjacent benches mined.
  - In any given pit stage, mining is not allowed to progress the bench below before finishing the active bench.
- SWOLP throughput capacity varies in accordance with the ratio of oxide to fresh ore in the RoM feed. Subject to feed ration, plant capacity can vary from (4.2 to 4.5) Mt/a (db).
- The SSTP has a nameplate capacity of 1.2 Mt/a (db) after it reaches its name plate capacity at the end of the ramp up period.
- The two plants combined, have a total processing capacity of 5.4 Mt/a (db).
- A set of grade bins were defined as marginal grade ore ('MO'), low grade ore ('LG'), medium grade ore ('MG'), and high-grade ore ('HG') to manage grade blending and allow the scheduler to optimise the ore feed to the plant by selecting higher grade ore over the lower grade ore. These grade bin categories are

defined by the cut-off grades given in Table 16.6.1. For the SWOLP, the lower grade ore is divided as Low Grade 1 (LG1) and Low Grade 2 (LG2) grade bins to allow the scheduler tool to better optimise the production schedule.

- All ore is delivered to a RoM pad stockpile near to the pits, for subsequent rehandling and haulage to the SPCF RoM pads. Re-handling is set at 100%, with no direct feed.

In-pit Ore Reserve inventory for the open pits are summarised by deposit in Table 16.6.2 and by weathering type and by grade bin in Table 16.6.3.

The production schedule was developed on a monthly basis for 2022 and 2023, quarterly for 2024, 2025 and 2026, and annually thereafter. The resulting open-pit mining and processing schedule physicals are included in Table 16.6.5.

Key characteristics of the schedule developed are as noted below:

- The LoMp for the SWOLP contains.
  - 21.2%, 11.2% and 67.6%, oxide, transitional and fresh ore respectively.
  - 16.0%, 11.2% and 62.5% of the gold is contained in the oxide, transitional and fresh ore respectively.
- The LoMp for the SSTP contains:
  - 14.4% and 85.6% reductive transitional and fresh ore respectively.
  - 13.8% and 86.2% of the gold is contained in the reductive transitional and fresh ore respectively.
- Of the Mineral Reserves reported, 67.5% and 32.5% is from the Sabodala and Massawa Pit groups respectively.
- SSTP feed (10.8 Mt) is supplied entirely from the Massawa pit group (MCZ, MNZ and MDL). This 10.8 Mt represents 16.3% of the ore processed at the SPCF over the LoMp, 34.6% of the RoM gold, and 34.1%[1] of the gold produced.
- Total volumes mined stay in the (50 to 52.7) Mt range until 2026, dropping to 40 Mt (2026 and 2027) and then gradually decreasing to around 16 Mt in 2031. Based on the current Mineral Reserves Statement, mining activities cease mid-2035.
- Total ore mined reaches its peak at 8.6 Mt/a by the end of 2024 and then declines thereafter.
- Average gold grade of ore mined varies between (1.2 and 3.9) g/t.
- The average annual sulphur content of ore processed at SSTP varies between a range of (1.21 and 1.33)% during 2024, 2025 and 2026. Then the range of variations drops between (1.00 to 1.09)% for the remaining years of the LoM, which is within the design criteria limits of the processing plant.
- Average sink rates mostly trend around 60 m as shown in Figure 16.6.1 (displays the maximum sink rates per pit), and occasionally increase above 80 m per annum when stripping of waste and when there are only small volumes of material left at the benches. These sink rates are achievable as volumes tend to reduce in alignment with reduced stripping ratios.

[1] SSTP has a slightly lower recovery than the SWOLP

Table 16.6.1 Cut-off Grade Bins Applied for Stockpiling Strategy

Grade Bins	Weath.	Unit	GBW	MKM	MAS	NKE	NKW	SAB	SFM	SFN	MCZ*	MNZ	MDL
Sabodala Whole Ore Leach Plant													
Marginal Grade	Oxide	g/t	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
	Fresh	g/t	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7			
Low Grade1	Oxide	g/t	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9
	Fresh	g/t	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9			
Low Grade2	Oxide	g/t	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Fresh	g/t	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1			
Medium Grade	Oxide	g/t	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Fresh	g/t	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5			
High Grade	Oxide	g/t	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Fresh	g/t	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
Sulphide Treatment Plant													
Marginal Grade	All	g/t	Not Applicable								1.2	1.2	1.2
Low Grade	All	g/t									2.0	2.0	2.0
Medium Grade	All	g/t									3.0	3.0	3.0
High Grade	All	g/t									5.0	5.0	5.0

Table 16.6.2 Open Pit Mineral Reserve Inventory by pit as of 31 December 2021

Pit	Total (kt)	Waste (kt)	Ore (kt)	grade (g/t)	Gold (koz)	Strip Ratio (t_{waste}:t_{ore})
Sofia North	12 899	11 084	1 816	2.03	119	6.1
Sofia Main	1 318	757	561	3.18	57	1.3
Sabodala	34 949	30 964	3 984	1.78	228	7.8
Goumbati	7 382	6 608	774	1.56	39	8.5
Maki Medina	1 303	1 044	259	1.48	12	4.0
Niakafiri East	66 581	54 331	12 249	1.37	538	4.4
Niakafiri West	8 392	7 422	970	1.26	39	7.6
Masato	131 868	116 468	15 400	1.26	626	7.6
Sabodala Total	**264 692**	**228 678**	**36 014**	**1.43**	**1 658**	**6.3**
Massawa CZ	70 069	59 990	10 080	3.64	1 180	6.0
Massawa NZ	79 554	73 289	6 265	4.05	816	11.7
Delya	10 684	9 697	987	3.82	121	9.8
Massawa Total	**160 307**	**142 975**	**17 332**	**3.80**	**2 117**	**8.2**
Total Open Pits	**424 999**	**371 653**	**53 346**	**2.20**	**3 775**	**7.0**

Table 16.6.3 Open Pit Mineral Reserve inventory by processing plant facility, by weathering and by grade bins as of 31 December 2021.

Table 16.6.3 Open Pit Mineral Reserve Inventory by Weathering and by Grade Bins as of 31 December 2021

	SWOLP			SSTP			Total		
	ore (kt)	Grade (g/t)	Gold (koz)	ore (kt)	Grade (g/t)	Gold (koz)	ore (kt)	grade (g/t)	Gold (koz)
Weathering									
Oxide	8 998	2.03	588				8 998	2.03	588
Transitional	4 779	1.84	283	1 553	4.25	212	6 332	2.43	495
Fresh	28 764	1.48	1 366	9 252	4.46	1 326	38 016	2.20	2 692
Total Open Pit	**42 541**	**1.64**	**2 236**	**10 805**	**4.43**	**1 538**	**53 346**	**2.20**	**3 775**
Grade Bins									
High Grade (HG)	9 141	3.67	1 079	2 882	9.73	901	12 023	5.12	1 980
Medium Grade (MG)	5 574	1.72	309	2 344	3.87	292	7 918	2.36	600
Low Grade2 (LG2)	7 729	1.29	320	2 295	2.45	181	10 023	1.55	500
Low Grade1 (LG1)	9 474	0.95	290				9 474	0.95	290
Marginal (MO)	10 623	0.70	238	3 284	1.56	165	13 907	0.90	403
Total Open Pit	**42 541**	**1.64**	**2 236**	**10 805**	**4.43**	**1 538**	**53 346**	**2.20**	**3 775**

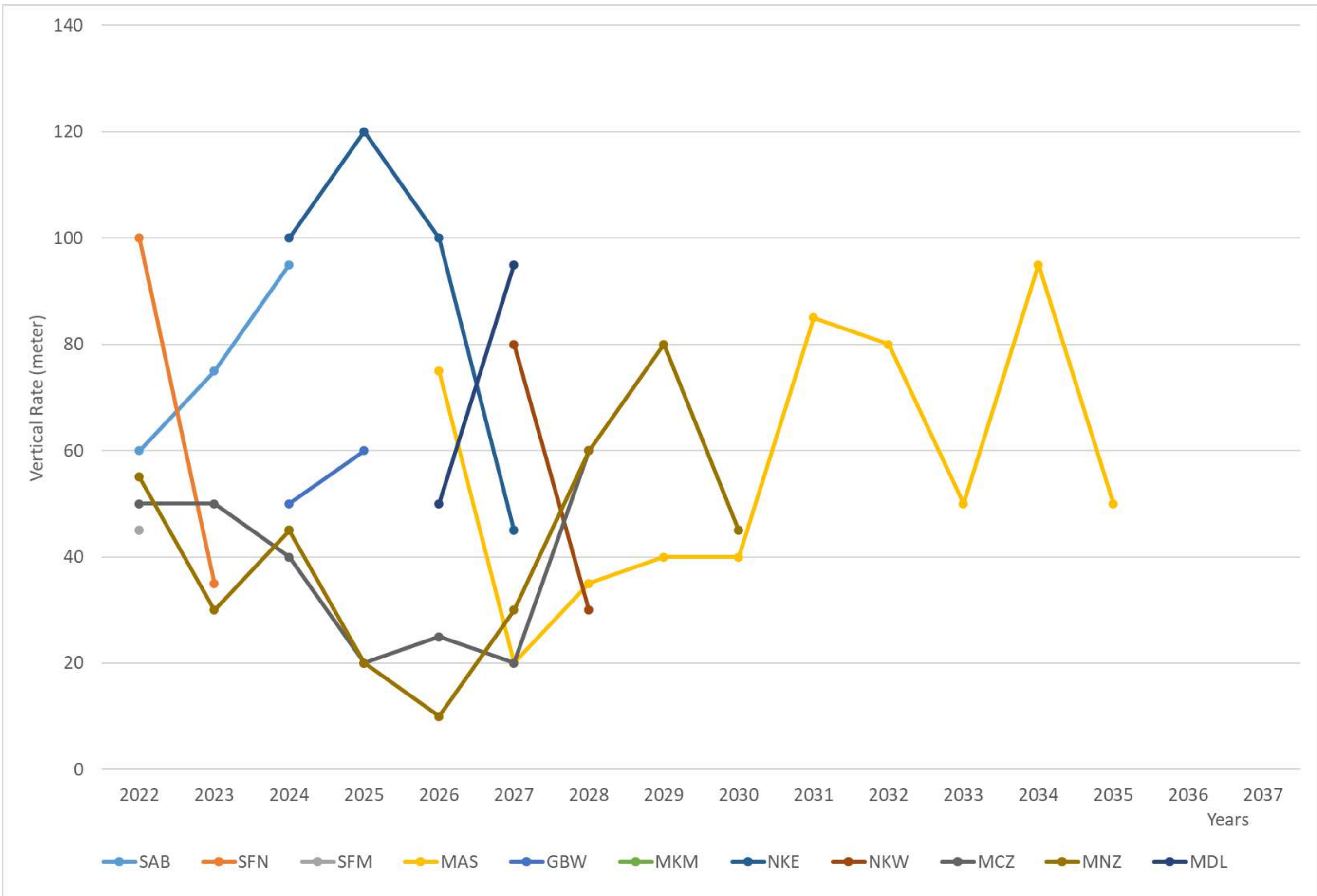
Table 16.6.4 Stockpile Inventory as of 31 December 2021

Deposit	Grade Bin	Tonnes (kt)	Oxide Grade (g/t)	Gold (koz)	Tonnes (kt)	Fresh Grade (g/t)	Gold (koz)	Tonnes (kt)	Total Grade (g/t)	Gold (koz)
Sofia Main	HG	0	0.00	0	309	4.24	42	309	4.24	42
Sofia Main	MG	0	0.00	0	6	1.71	0	6	1.71	0
Sofia Main	LG2	545	1.21	21	367	1.19	14	912	1.21	35
Sofia Main	MO	483	0.66	10	728	0.71	17	1 210	0.69	27
Sofia North	HG	69	2.52	6	4	2.16	0	73	2.50	6
Sofia North	MG	110	1.73	6	3	1.62	0	114	1.73	6
Sofia North	LG2	563	1.19	22	77	1.22	3	640	1.20	25
Sofia North	MO	874	0.72	20	0	0.00	0	874	0.72	20
Golouma	MO	371	0.69	8	0	0.00	0	371	0.69	8
Sabodala	LG2	0	0.00	0	1	1.33	0	1	1.33	0
Sabodala	MO	0	0.00	0	4 048	0.75	98	4 048	0.75	98
Maki Medina	MO	72	0.69	2	54	0.69	1	125	0.69	3
Masato	MO	1 713	0.69	38	641	0.70	14	2 354	0.69	52
Grade Bins										
ALL	HG	69	2.52	6	313	4.21	42	382	3.91	48
	MG	110	1.73	6	9	1.68	1	120	1.73	7
	LG2	1 108	1.20	43	445	1.20	17	1 553	1.20	60
	MO	3 512	0.69	78	5 470	0.74	130	8 982	0.72	208
Total		**4 799**	**0.86**	**133**	**6 238**	**0.95**	**190**	**11 037**	**0.91**	**323**

Table 16.6.5 Open-pit Mining and Total Processing Schedule

Years	Mined				Processed				
	Total (kt)	Ore (kt)	Grade (g/t)	Gold (koz)	Ore (kt)	Grade g/t	Gold (koz)	Recovery %	Recov. Gold (koz)
2022	52 498	5 684	2.55	465	4 247	3.00	409	89.6	360
2023	51 350	4 905	3.29	519	4 499	2.37	343	89.6	299
2024	50 304	8 566	2.18	600	4 971	2.90	463	89.6	403
2025	50 723	4 912	1.98	313	5 259	2.69	454	89.6	402
2026	40 432	6 834	2.17	477	5 348	2.61	448	89.6	401
2027	39 381	4 234	2.70	367	5 431	2.13	372	89.6	332
2028	32 584	2 861	3.93	362	5 459	2.01	354	89.6	316
2029	29 930	3 357	2.32	250	5 362	2.28	394	89.6	352
2030	24 240	5 343	1.75	301	5 172	2.21	367	89.6	332
2031	15 548	3 821	1.80	221	5 260	1.82	308	89.6	278
2032	12 667	1 488	1.72	82	5 235	1.21	204	89.6	182
2033	12 498	402	2.58	33	4 365	0.95	133	89.6	118
2034	12 346	1 623	1.16	60	4 000	0.88	114	89.6	101
2035	2 502	1 319	1.58	67	1 777	1.35	77	89.6	69
SUM	**427 003**	**55 349**	**2.31**	**4 118**	**66 386**	**2.08**	**4 440**	**88.8**	**3 943**

Figure 16.6.1 Maximum Vertical Advance Rates by Pit



The annual quantities of material (kbcm), waste (kt) and ore (kt) quantities mined and the required number of trucks are depicted in Figure 16.6.2.

There are currently 33 trucks available on site, comprising twenty-four Komatsu 785 and nine Komatsu 777E. For the first 4 years from 2022 to 2025, the mining production is around 50 Mt/a and drops to around 40 Mt/a in 2026 and 2027 requiring 25 trucks. Thereafter, mining rates gradually reduce down to 5 Mt/a in 2032, requiring only around 8 trucks, with mining activities ceasing in early 2035.

Figure 16.6.3 shows the annual mined and processed ore quantities and their respective gold grade. Where the ore mined annually is greater than the ore processed, the difference is stockpiled (Table 16.5.2).

The quantity of ore mined by pit is depicted in Figure 16.6.4.

Expected annual gold production by pit, and each pit's contribution to the overall gold production are depicted in Figure 16.6.7 and Figure 16.6.8 respectively. The pits contributing most to total LoM gold production are Massawa CZ (1 022 koz), Massawa NZ (718 koz) and Masato (607 koz).

Expected annual total gold production by plant and plant recoveries are depicted in Figure 16.6.9.

Figure 16.6.2 Annual Material Movement and Trucks Requirement

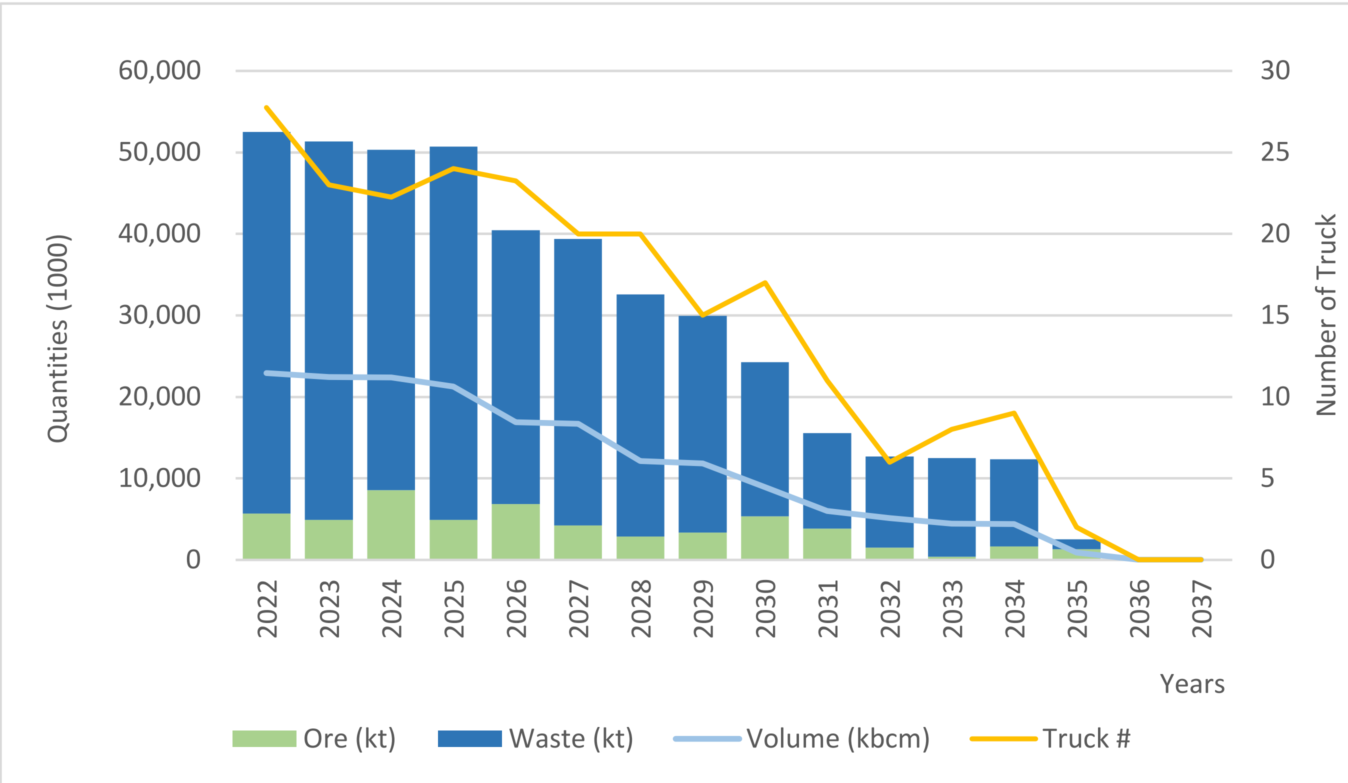


Figure 16.6.3 Annual Mined and Processed Ore Tonnage and Grade

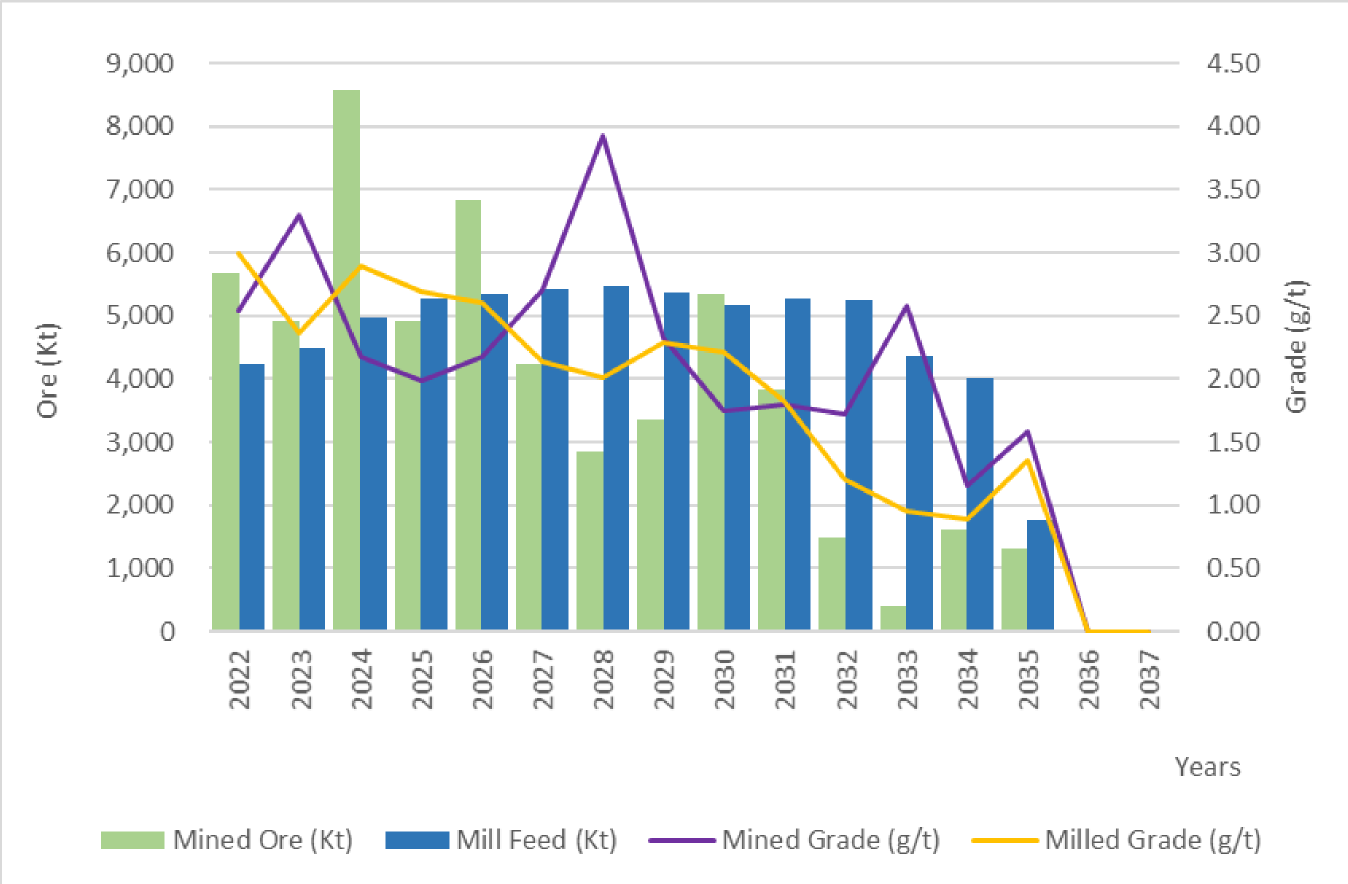


Figure 16.6.4 Annual Ore Mined by Source

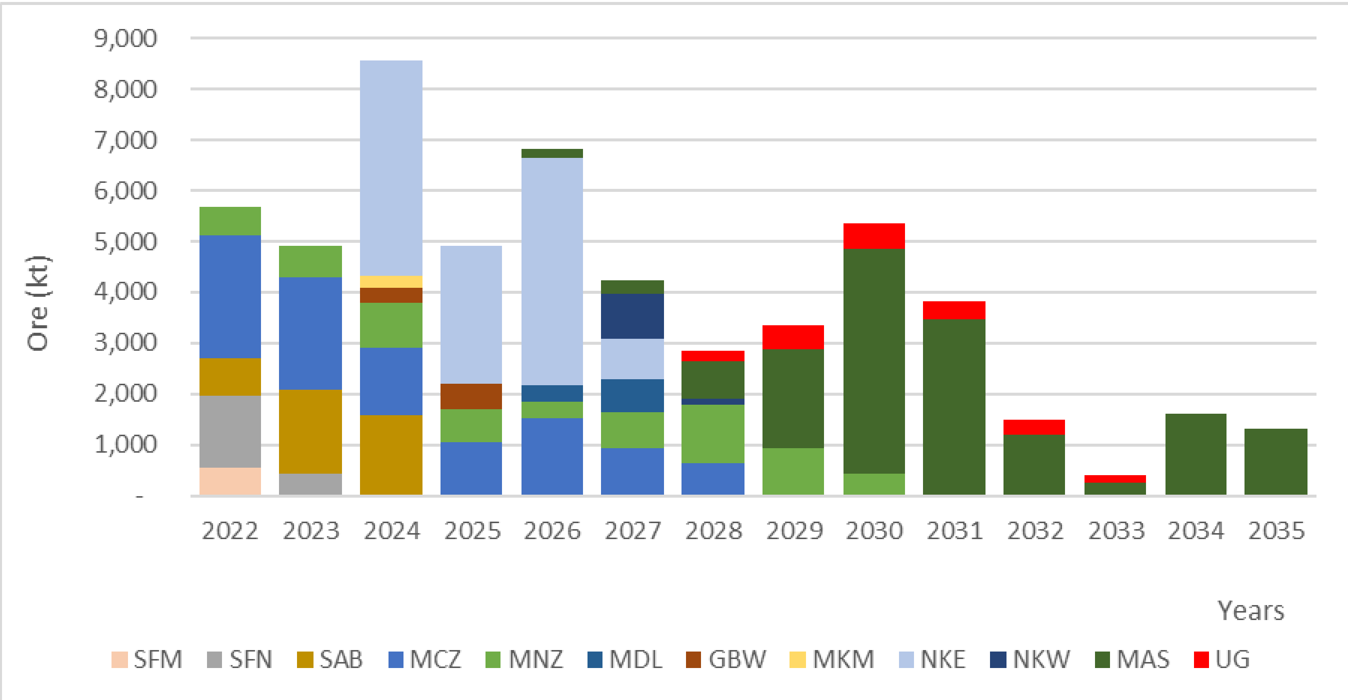


Figure 16.6.5 Closing Stockpile Balances by Processing Facilities

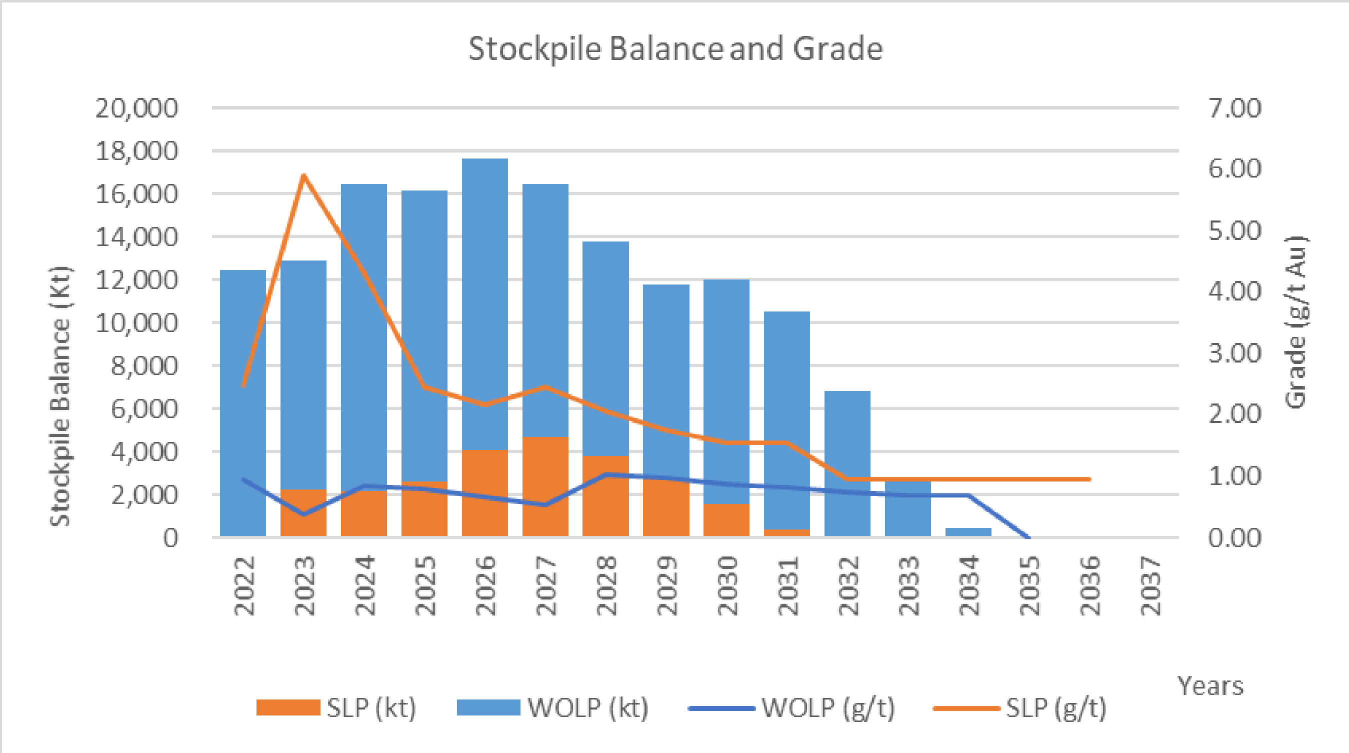


Figure 16.6.6 Annual Processed Ore by Weathering and by Processing Type, and the Total In-Situ Gold Processed

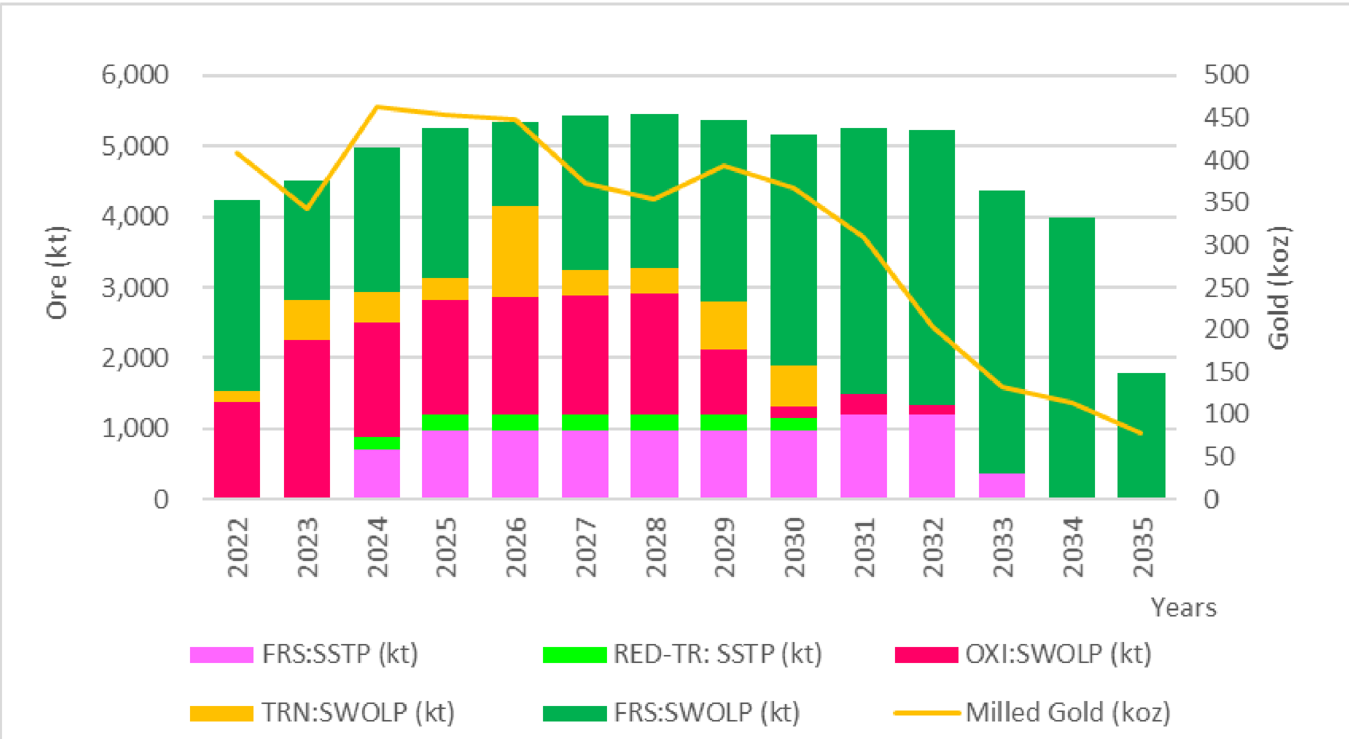


Figure 16.6.7 Annual Gold Production by Sources

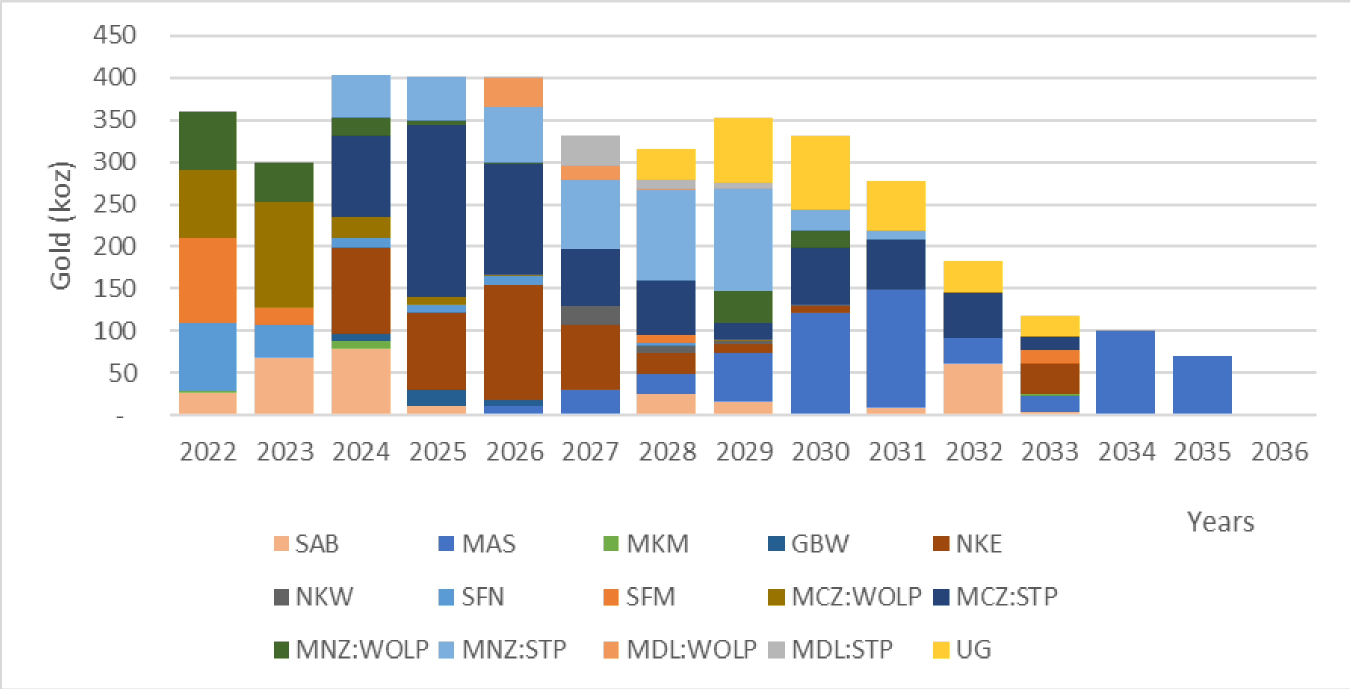


Figure 16.6.8 Contribution (%) of Sources to Annual Gold Production

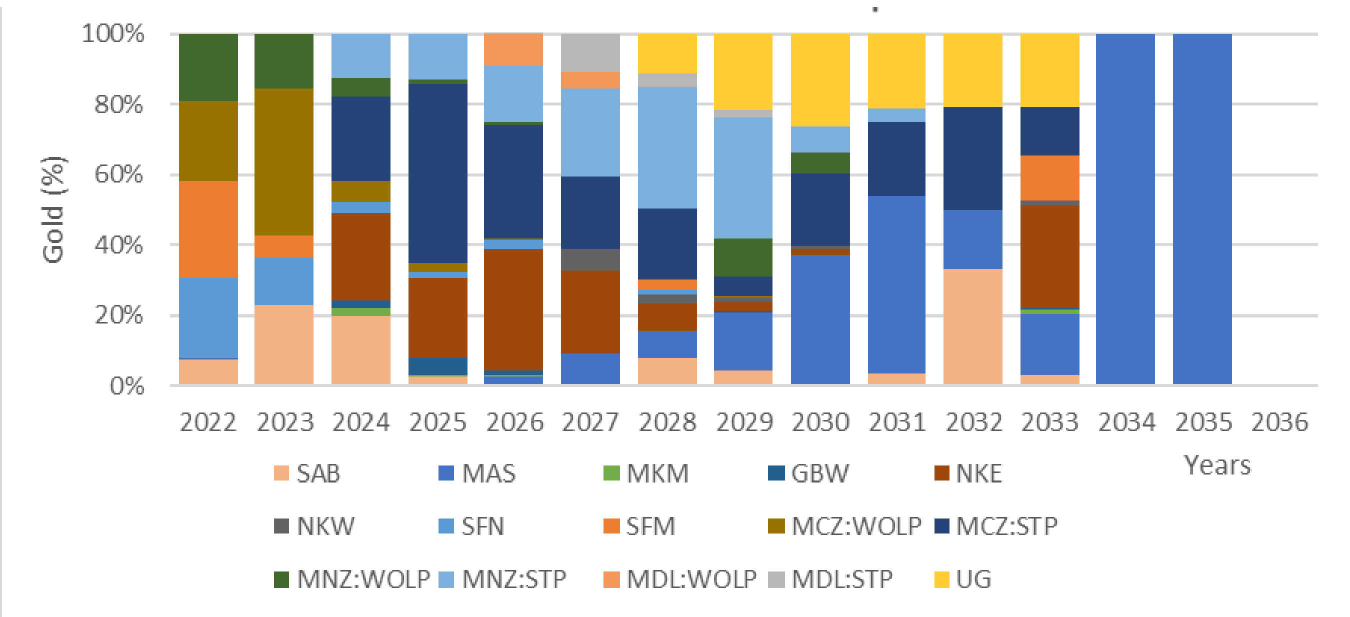
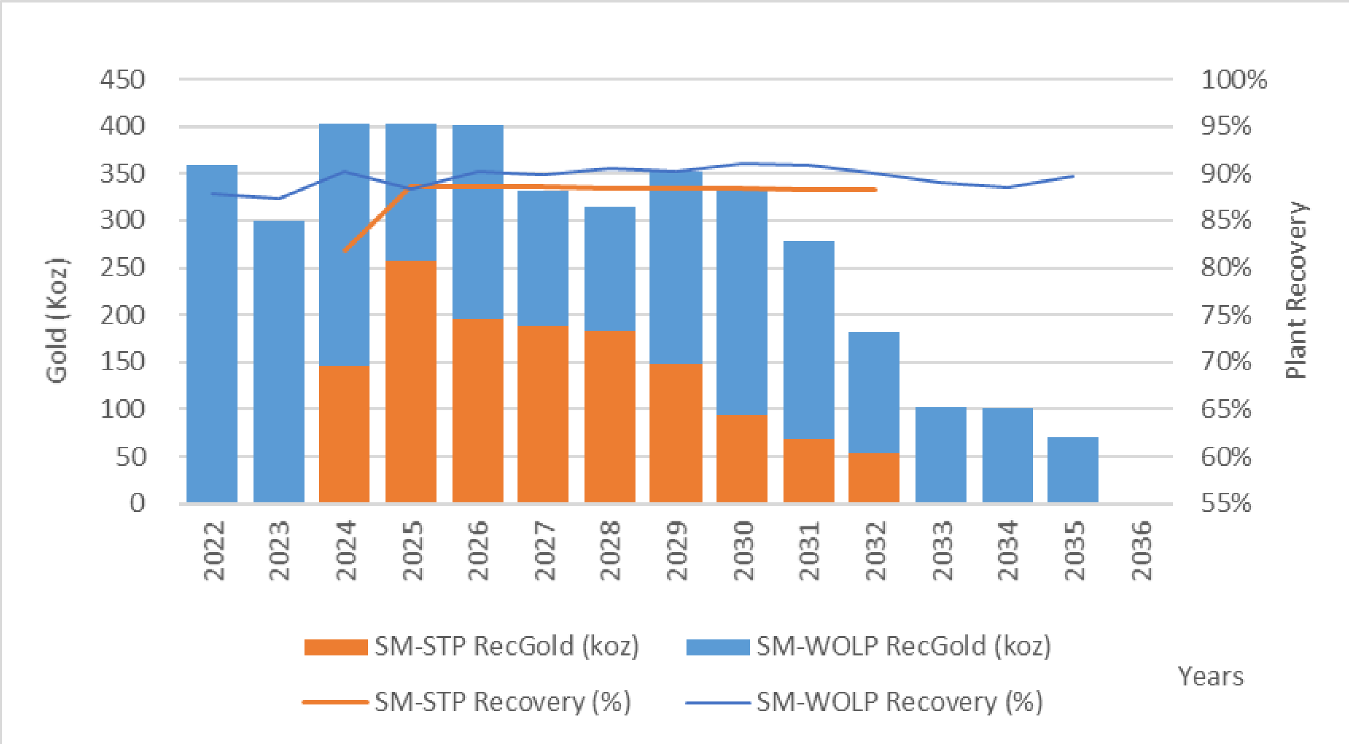


Figure 16.6.9 Annual Total Gold Production and Plant Recovery



The main factors that drive the design, operation and cost (CAPEX and OPEX) of the SSTP for the LoMp are shown in Table 16.6.6:

- Sulphur - feed tonnes in concentrate dictates design capacity of the SSTP circuit and sulphur significantly impacts operating costs. The variability in S (%) in the LoMp is within reasonable level and it is within plant design criteria limits.
- Iron - as ratio in concentrate (dictates ferric arsenate stability and the need to add ferric sulphate).
- The arsenic and pyrite ratio in the concentrate and carry over of carbonates (influences the acid balance in the BIOX circuit) and the associated neutralisation requirements.
- Antimony's influence on processing cost and recovery is relatively low. During day-to-day operation, ore blending is expected delivery RoM antimony concentrations below 10 000 ppm.

Gold grade does not significantly impact SSTP design or operation, but it has been capped at 6.85 g/t for the planning purposes. The plant can process up to 8.0 g/t grade of Au in the RoM feed.

Table 16.6.6 SSTP Schedule and RoM Feed Composition

	RoM Feed (total and weighted annual averages)							Production	
SSTP Years	Ore (kt)	Au (g/t)	Gold (koz)	Sulphur (S) (%)	Arsenic (As) (%)	Iron (Fe) (%)	Antimony (Sb) (ppm)	Recovery (%)	Recovered Gold (koz)
2022									
2023									
2024	873	6.37	179	1.3	0.5	5.5	563	81.8%	146
2025	1 202	7.50	290	1.3	0.5	5.5	775	88.6%	257
2026	1 206	5.69	221	1.2	0.5	5.5	676	88.6%	195
2027	1 205	5.49	212	1.1	0.6	5.6	413	88.6%	188
2028	1 204	5.37	208	1.0	0.5	5.4	302	88.5%	184
2029	1 202	4.32	167	1.0	0.5	5.5	192	88.5%	148
2030	1 140	2.87	105	1.1	0.5	5.1	365	88.5%	93
2031	1 201	2.03	78	1.1	0.5	4.9	341	88.3%	69
2032	1 207	1.55	60	1.1	0.4	4.6	379	88.3%	53
2033	365	1.55	18	1.1	0.4	4.6	379	88.3%	16
2034									
2035									
2036									
Total	**10 805**	**4.43**	**1 538**	**1.1**	**0.5**	**5.3**	**439.9**	**87.7**	**1 350**

The production schedule for the SWOLP is shown in Table 16.6.7.

Table 16.6.7 SWOLP Schedule

SWOLP Years	Ore (kt)	Grade (g/t)	Gold (koz)	Recovery (%)	Recovered Gold (koz)
2022	4 247	3.00	409	87.9	360
2023	4 499	2.37	343	87.3	299
2024	4 098	2.16	284	90.3	256
2025	4 057	1.26	164	88.4	145
2026	4 142	1.71	228	90.2	206
2027	4 227	1.18	160	89.8	144
2028	4 255	1.06	146	90.6	132
2029	4 160	1.70	227	90.2	205
2030	4 032	2.02	262	91.0	238
2031	4 059	1.76	230	91.0	209
2032	4 028	1.11	143	90.1	129
2033	4 000	0.89	115	89.0	102
2034	4 000	0.88	114	88.5	101
2035	1 777	1.35	77	89.6	69
SUM	**55 581**	**1.62**	**2 902**	**89.5**	**2 596**

16.6.2 Underground Mining Schedule

A development schedule for the underground mine was prepared and is presented in and Table 16.6.8, showing both the horizontal and vertical capital development and operating development by mine. A development rate of 3.5 m/d per heading was used and restricted to a maximum of three rounds a day.

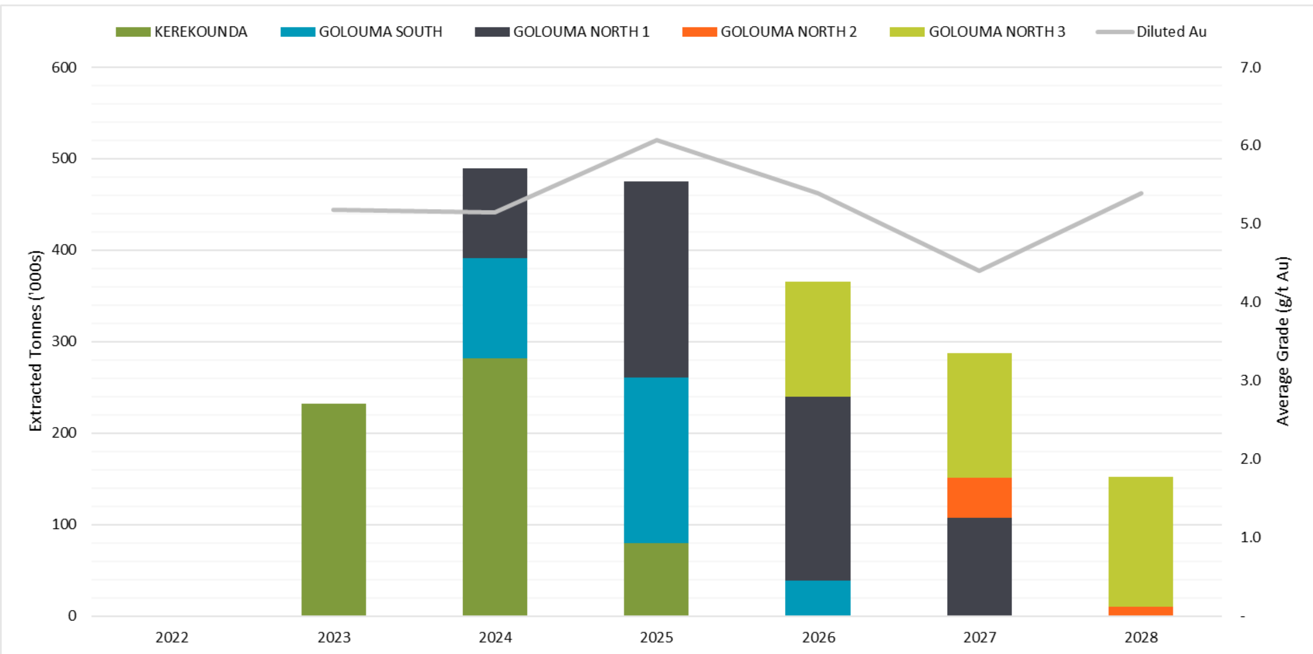
The underground deposits will be mined two at a time, to achieve the life-of-mine (LoM) schedule. The objective of scheduling the deposits to be mined in this sequence is to have eight years of continuous production from underground, with some lag in the schedule to allow infrastructure to be moved from the first set of deposits to the second set.

Table 16.6.8 UG Development Schedule

Mine	Development	Unit	Total	2023	2024	2025	2026	2027	2028
Kerekounda	Capital - Horizontal	m	3514	2220	1164	130	-	-	-
	Capital - Vertical	m	207.664	145	62	-	-	-	-
	Operating - Horizontal	m	11 782	4526	5678	1578	-	-	-
Golouma South	Capital - Horizontal	m	3108	-	1898	1197	13	-	-
	Capital - Vertical	m	346	-	287	59	-	-	-
	Operating - Horizontal	m	10 524	-	3746	5726	1052	-	-
Golouma West - P1	Capital - Horizontal	m	5464	-	1793	1418	1764	490	-
	Capital - Vertical	m	294.012	-	110	58	104	22	-
	Operating - Horizontal	m	17 517	-	3 116	5974	5567	2861	-
Golouma West - P2 & P3	Capital - Horizontal	m	6 262	-	-	-	1979	3033	1250
	Capital - Vertical	m	401	-	-	-	241	120	40
	Operating - Horizontal	m	13 361	-	-	-	3791	5509	4061
Annual Total		**m**	**72 782**	**6892**	**17 854**	**16 139**	**14 512**	**12 034**	**5 352**

Figure 16.6.10 following, illustrates the underground mine production schedule. Each deposit is scheduled on a 500 t/d production target, providing up to 1000 t/d of combined production.

Figure 16.6.10 UG Production Schedule



16.6.2.1 Open Pit Mobile Equipment Schedule

The resulting open pit production schedules are exported to Excel and are then analysed with respect to equipment requirements based on various Original Equipment Manufacturer ('OEM') specifications and where appropriate, adjusted for site specific conditions and operating experience. The determinations for primary (excavators and trucks) mobile mining equipment requirements incorporated:

- Loading unit productivity rates in line with industry standards, based on equipment specifications, adjusted to site operating factors, including weather and skill levels.
- Truck productivity rates by pit and bench is based on pre-determined haulage profiles, assigned truck speeds for various segments at target payloads. Overall truck productivity rates based on truck and excavator matching with an allowance for load and dump static times; and ancillary equipment (dozers, graders, watercarts) based on allocated proportions of the loading units.

In addition to the above, the mining fleet productivity was developed based on the various loading equipment matched to the truck fleet specification referenced in Table 16.6.9. The primary excavator productivity and truck payloads assumptions are as reflected in the table. The resulting equipment profiles for the LoMp schedules are provided in Table 16.6.10.

For 2022 and 2023, these determinations were made on a monthly basis, whilst for 2024, 2025 and 2026, determinations were on a quarterly basis. As such the totals reflect the average number of pieces of equipment. After 2029, truck numbers gradually drop from 15 down to 2 (2035).

Table 16.6.9 Mining Excavator Productivity Assumptions

Excavators Dump Truck	**Units**	**PC1250 HD785**			**PC3000 HD785**		
Assumptions		Oxide	Trans.	Fresh	Oxide	Trans.	Fresh
Rated Truck Load	(%)	100	100	100	100	100	100
Dry In-Situ Density	(t/m^3)	1.80	2.10	2.90	1.80	2.10	2.90
Avg. Moisture Content	(%)	20.0	15	5	20	15	5
Swell Factor		1.20	1.30	1.40	1.20	1.30	1.40
Truck Density	(t/m^3)	1.80	1.86	2.18	1.80	1.86	2.18
Actual Truck Volume	(m^3)	51.3	46.8	41.3	51.3	46.8	41.3
Excavator Bucket Volume	(m^3)	7.0	6.7	5.5	15.0	12.0	12.0
Bucket Fill Factor	(%)	0.85	0.85	0.75	0.85	0.85	0.75
Rated Bucket Load	(t)	9.0	9.0	9.0	26.7	26.7	26.7
No. of Buckets per Truck	(no)	9.0	10.0	10.0	4.0	5.0	5.0
Slew Time	(sec)	24.0	24.0	24.0	31.0	31.0	31.0
Load Time	(min)	3.6	3.6	4.4	2.1	2.6	2.6
Production per 50 min hr	(BCM/h)	587.0	467.5	380.8	933.0	744.3	606.2
Production per 50 min hr	(t/h db.)	1057	982	1104	1,679	1563	1758

Table 16.6.10 Primary Earthmoving Equipment Numbers

Equipment	2022	2023	2022	2023	2024	2025	2026	2027	2028	2029
Number of Trucks										
Sofia North	8	2	0	0	0	0	0	0	0	0
Sofia Main	6	0	0	0	0	0	0	0	0	0
Sabodala	10	9	9	0	0	0	0	0	0	0
Central Zone	9	10	11	11	0	0	0	0	0	0
North Zone	6	7	12	13	10	0	0	0	0	0
Delya	0	0	0	0	2	3	0	0	0	0
Goumbati West	0	0	2	3	0	0	0	0	0	0
Maki Medina	0	0	1	0	0	0	0	0	0	0
Niakifiri East	0	0	0	7	11	7	10	3	0	0
Niakifiri West	0	0	0	0	0	0	0	1	2	0
Masato	0	0	0	0	4	10	11	12	13	12
TOTAL	**28**	**25**	**29**	**30**	**21**	**20**	**21**	**16**	**15**	**12**
Number of Excavators										
Sofia North	3	1	0	0	0	0	0	0	0	0
Sofia Main	0	0	0	0	0	0	0	0	0	0
Sabodala	2	2	2	1	0	0	0	0	0	0
Central Zone	3	3	3	3	2	0	0	0	0	0
North Zone	2	2	3	3	3	0	0	0	0	0
Delya	0	0	0	0	0	1	0	0	0	0
Goumbati West	0	0	0	1	1	0	0	0	0	0
Maki Medina	0	0	0	0	0	0	0	0	0	0
Niakifiri East	0	0	0	1	2	2	3	1	0	0
Niakifiri West	0	0	0	0	0	0	0	2	2	0
Masato	0	0	0	0	0	3	3	3	3	3
TOTAL	**9**	**8**	**8**	**9**	**8**	**6**	**6**	**6**	**5**	**3**

Notes:
1 Excavator numbers in the pits may not add up to totals due to rounding, and/or the same excavator may be used in multiple pits.
2 Truck numbers in years 2022 through 2026 are not addable since the schedule was produced in monthly periods in 2022 and 2023, and in quarters for 2024, 2025 and 2026 and the same trucks were used in different pits. Total truck numbers are the hour weighted average truck numbers.

16.6.3 Underground Mining Fleet and Workforce

The specification and size of the mining fleet will be determined by SGO. The QP produced a preliminary fleet list at a PFS level to drive the mine development and production schedules. The proposed underground mining production and support fleet is listed in Table 16.6.11.

Table 16.6.11 Estimated UG Mining Fleet (2-Concurrent Operations)

U/G Mobile Equipment	Number of Units
2 Boom Jumbo	5
3 yd LHD	1
6 yd LHD	3
32t Haul Truck	4
Rock Bolter	5
Flat Deck Truck w. Crane	2
Personnel Carrier	4
Scissor Lift	2
Grader	1

The underground and surface (technical, supervisory, and health and safety) workforce will be SGO employees.

The mine labour costs were developed using budgetary rates from reputable mine contracting firms and Endeavour/SGO data. The labour rates include a base salary, bonus allowance, and burden for statutory deductions.

Base salaries for SGO staff salaries were estimated using comparable projects in West Africa. Factors were included for annual bonuses, mandatory contributions, and transportation premiums. Total SGO staff requirements were based on standard numbers for a typical 1000 t/d underground mine and account for cross shift where needed. Table 16.6.12 illustrates the SGO labour sources and number of personnel.

Table 16.6.12 Estimated UG Manpower Breakdown

Owner Mine Management & Technical Staff	Source	Total Personnel
UG Mine General Foreman	Western - Expat	2
Senior UG Engineer	Western - Expat	1
Mine Engineer	African - Expat	2
UG Surveyor	African - Expat	2
Senior UG Mine Geologist	Western - Expat	1
Geologist	African - Expat	2
Geological Technician	African - Expat	2
Total		**12**
Underground Mining Workforce		Personnel per Shift (4 shifts)
• Mining Production		28
• Backfill Labour		2
• Maintenance Labour		8
• Underground Supervision		4
Total		**42 (169)[1]**

16.6.4 LoMp Mining Operating Expenditures

LoMp open pit and underground mining costs are presented in Section 21.0.

16.6.5 LoMp Capital Expenditures

The LoMp development capital and sustaining capital expenditure for underground and open pit mining is described in Section 21.0.

16.7 Data Verification

The data verification process applicable to the development of Section 16.0 is detailed in Section 12.0

[1] Four shifts

16.8 Independent Audits/Reviews

There has not been an independent review for the Mineral Reserve estimation process for open pit mines. Underground mine planning work and the Mineral Reserve estimation has been carried out by SLR, an independent consultancy. Mr. Bryan Pullman (P.Eng, MIMMM) takes all responsibility for the underground mineral estimation as the QP. The Underground mine planning was integrated with the Open pit planning to produce the LoMp. The open pit Mineral Reserve estimation and planning of open pit mining integrated to the UG plans has been supervised by the Qualified Person, Dr. Salih Ramazan (PhD, Mine Planning and Operations Research). It is the opinion of the qualified person that the work has been done in accordance with the NI43-101 guidelines and there has not been any misleading aspect, based on the information available as of 31 December 2021.

16.9 Comments on Section 16.0

16.9.1 Open Pit Mining

The Mineral Reserves as reported for the 31 December 2021 for the Sabodala-Massawa Gold Mine are stated in accordance with the guidelines and terminology provided in the CIM Standards. The physical and financial parameters used in the estimation of the Mineral Reserves herein are checked and verified as much as practically possible, and the qualified person is convinced that all input parameters and assumptions as reasonable and they are not misleading based on the information available as of 31 December 2021. It is in the opinion of the qualified person that there has not been any misleading aspect in the reporting of Mineral Reserves based on the information available on 31 December 2021.

16.9.2 Underground Mining

The QP for underground mining confirms that the work (engineering and cost estimation) undertaken for underground mining, is at a PFS level of development and is suitable for declaring underground reserves.

16.10 Interpretations and Conclusions

Interpretations, conclusions and risk for Section 16.0, are presented in Section 25.0.

16.11 Recommendations

Recommendations for Section 16.0, are presented in Section 26.0.

16.12 References

Referenced cited in Section 16.0 are presented in Section 27.0

17.0 RECOVERY METHODS

17.1 Introduction

17.1.1 Background

The process plant at Sabodala has been operating since 2009. More recently, with Endeavour's acquisition of the Massawa property from Barrick, a strategic decision was made by Sabodala Gold Operations SA (SGO), to leverage the established facilities/infrastructure at Sabodala for the processing of free and non-free milling (reductive transitional and sulphide) ores from the Massawa Mining License.

Based on testwork programmes, presented fully in Section 13.0, updates to the LoM mine production schedule with time, and the final mine schedule for this Report (S. Ramazan, March-2022), a number of changes to the existing Sabodala Whole Ore Leach Plant (SWOLP) were made; and a new plant to treat non-free milling transitional and sulphide fresh ores is required (the 'Sabodala Sulphide Treatment Plant' or 'SSTP'). Collectively these two plants are referred to herein, as the Sabodala Central Processing Facility (SCPF).

By placing the SSTP adjacent to the existing SWOLP, the new SSTP can share existing SWOLP services/utilities, the tailings storage facilities and general supporting mine infrastructure. Where existing plant services/utilities and infrastructure are not sufficient for the new production schedule and the operation of the SSTP, new expanded facilities and services are to be provided. The changes required to the tailings storage facilities (TSF) and Sabodala Power Station (SPS) are detailed more fully in Section 18.0.

Ore from the Massawa ML will be transported up to 46 km (Delya) by road to the existing and new SWOLP and SSTP RoM pads respectively, in standard 60 t (net payload) rear tipper trucks for processing. Ore haulage is detailed in Section 18.0.

Based on the initial mining of the higher grade free milling oxide ores from the Massawa property followed by the subsequent mining of reduction transitional zone and fresh ores, the Sabodala-Massawa Project will be developed in two chronological phases, hereafter referred to as Phase 1 (P1) (Section 17.1.2) and Phase 2 (P2) (Section 17.1.3).

17.1.2 Sabodala Whole Ore Leach Plant Upgrades (Phase 1)

The SWOLP modifications and design are based on a plant throughput of (4.0 to 4.5) Mt/a (db) of free-milling ore per year and the production of up to 360 koz/a of gold. The SWOLP's design/operation is based on annual weighted average RoM feed grades of between (0.88 and 3.00) g/t Au and a weighted average LoM gold head grade and gold recovery of 1.62 g/t Au and 89.4%. The plant design allows for gold RoM grades outside of these stated annual gold grade averages.

The first phase of the Project involved upgrading the SWOLP to treat the higher grade Massawa ores (complete Q4 2021). The upgrades implemented are summarised below and illustrated in Figure 17.1.1 flowsheet:

- Installation of a gravity circuit.
- Addition of two leach tanks.
- Installation of an 8 t (carbon) acid wash and elution circuit.
- Installation of a larger carbon regeneration circuit (electric) to match the increased elution capacity.
- The addition of additional electrowinning capacity in the existing goldroom.

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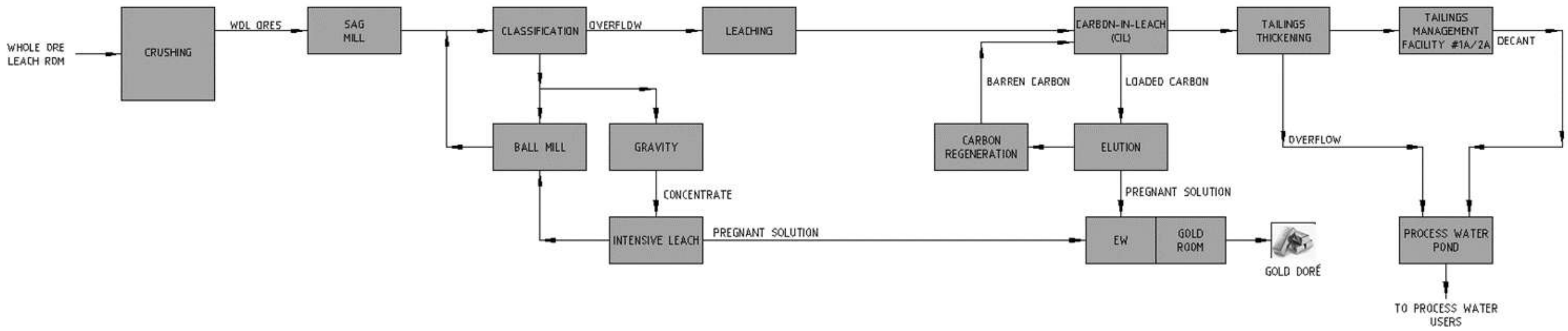
Figure 17.1.1 SWOLP Block Flow Diagram (BFD, Lycopodium 2021)



17.1.3 New Sabodala Sulphide Treatment Plant (Phase 2)

A new dedicated 1.2 Mt/a (db) plant to treat non-free, milling reductive transitional and fresh sulphide ores from the Massawa property is to be built, with first gold expected Q1 2024. The SSTP's design is based on RoM gold feed grades of between 1.24 and 7.98 g/t and a weighted average LoM gold head grade and design gold recovery of 4.3 g/t and 92.8% respectively. Actual weighted average annual gold grade and gold recovery over the LoM is 4.43 g/t and 87.74% respectively, for the current LoM plan (S. Ramazan, March-2022).

The proposed process flow sheet and plant layout are illustrated in Figure 17.1.2 and Figure 17.1.3 and plant areas/unit operations are summarised below:

- RoM tip and blending stockpiles.
- Primary crushing (jaw) with a crushed ore storage bin and overflow stockpile.
- A SABC/pebble crushing circuit, with a final P_{80} of 90 µm.
- A gravity concentration circuit, with a dedicated intensive cyanide leach reactor (ICLR) and gold electrowinning/smelting for gold recovery to a doré product.
- A flotation circuit with fine grinding of the concentrate prior to biological oxidation (BIOX®).
- A BIOX® circuit for oxidation of the sulphide concentrate.
- A CCD and neutralisation circuit to recover and wash the oxidised product and neutralise and stabilise the acidic BIOX liquors.
- A CIL circuit to leach the oxidised product of the BIOX circuit.
- An SO_2/air cyanide destruction circuit to stabilise weak acid dissociable cyanide in the CIL tails.
- Installation of a 6 t (carbon) acid wash and elution circuit.
- Installation of a carbon regeneration circuit.
- Installation of a goldroom.
- A dedicated lined TSF compartment within TSF1 for the storage of the BIOX® neutralisation product (TSF1B) and CIL tailings.
- A dedicated water treatment plant at Sabodala for the removal or arsenic and antimony from TSF1B decant return. (Namely, the Sabodala Water Treatment Plant (SWTP).)

Figure 17.1.2 SSTP BFD (Lycopodium, 2021)

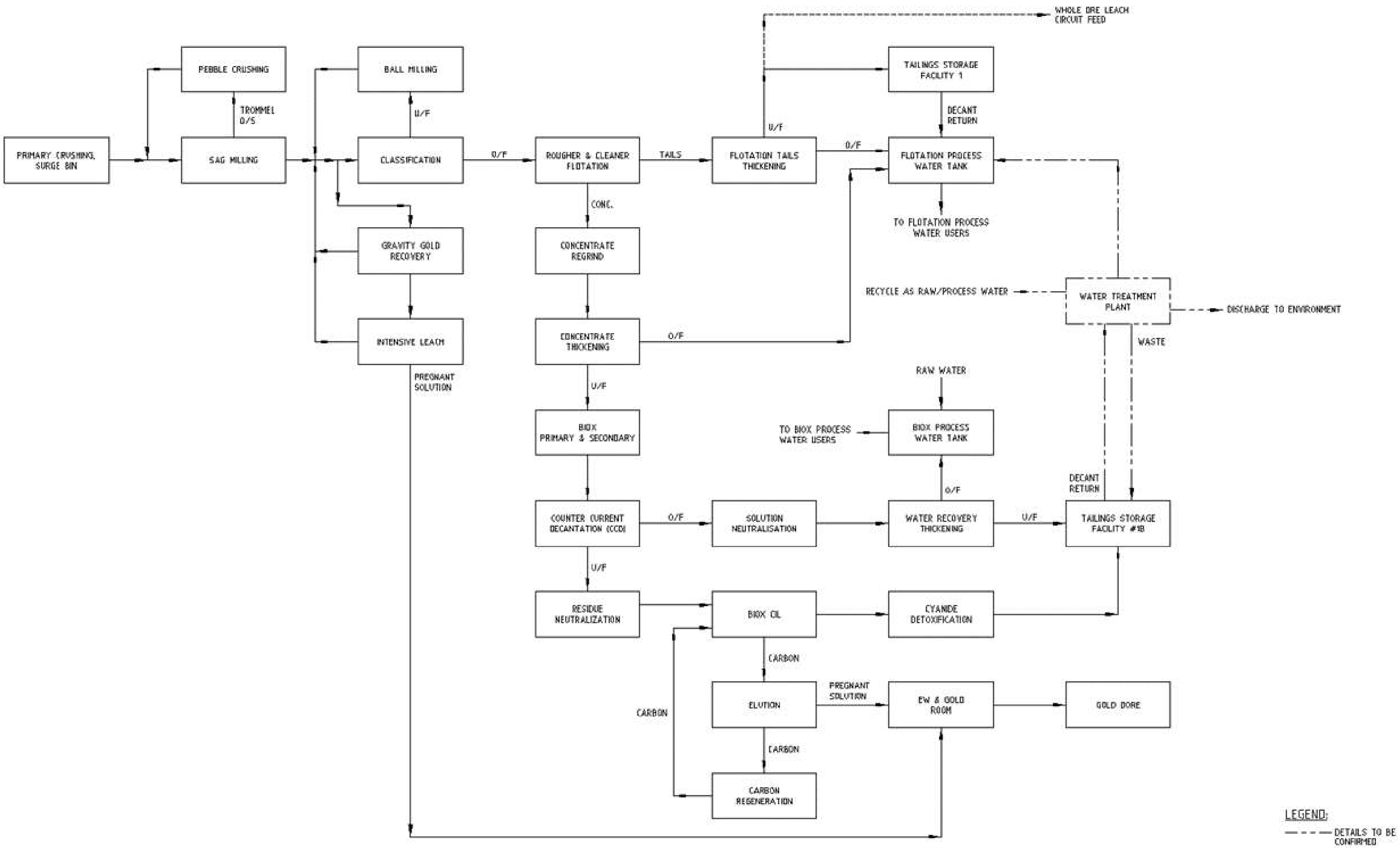


Figure 17.1.3 SSTP Process Plant General Arrangement (Lycopodium,2021)

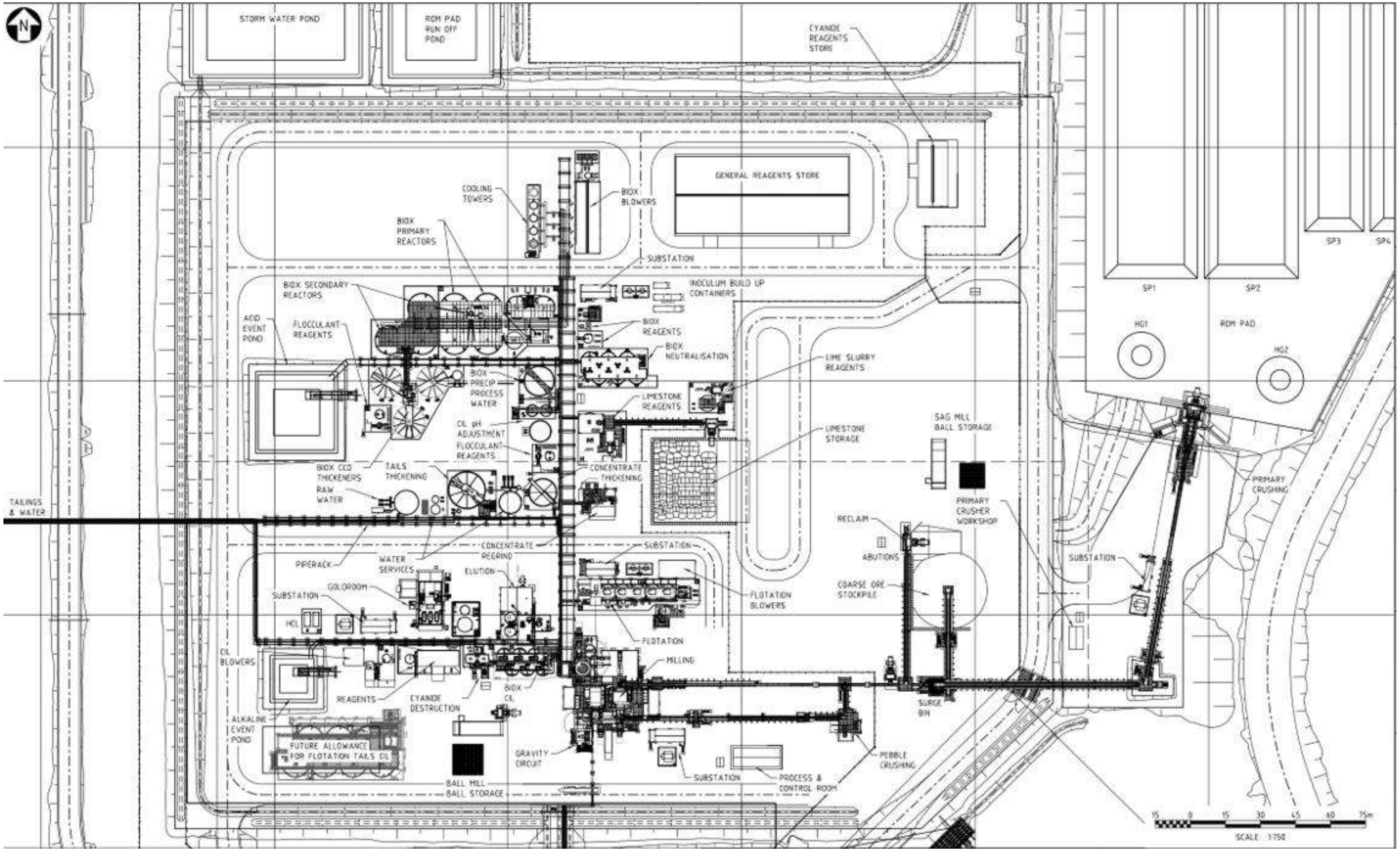
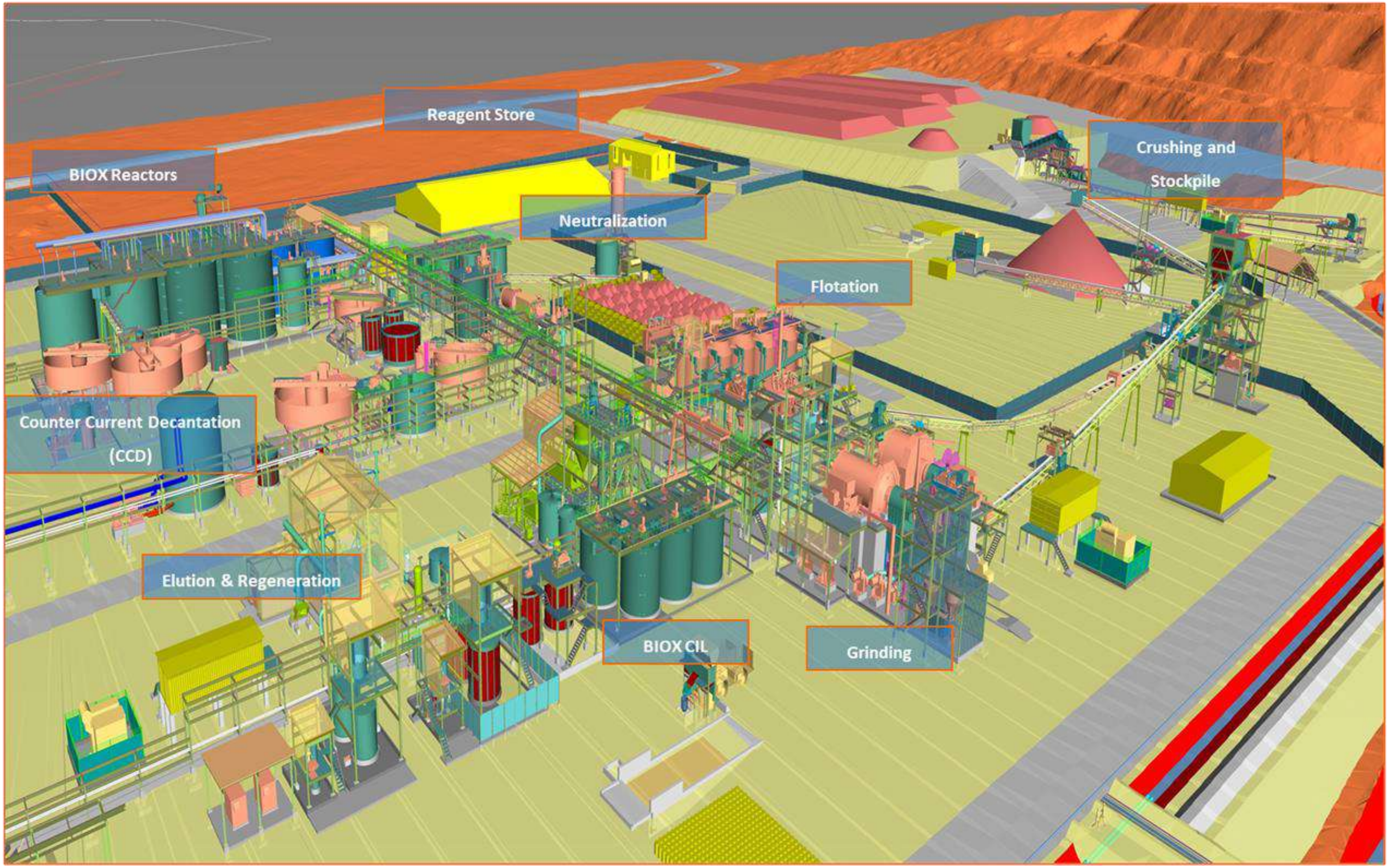


Figure 17.1.4 SSTP 3D Model (Lycopodium, 2021)



17.2 Facility Design/Operating basis

The design and operating basis for the SWOLP and SSTP is summarised in Section 17.2.1 and 17.2.2 following.

17.2.1 Sabodala Whole Ore Leach Project (SWOLP)

The upgraded SWOLP will processes free-milling fresh and oxide ores, of variable feed grade and mineralogy from the Sabodala Mining Concession and Massawa Mine License. As defined in Section 17.1.1 the required upgrades were completed in 2021.

As per the current mine plan (S. Ramazan, March-2022), between 2022 and 2035[1] the plant will process some 55.6 Mt (db) of ore. In addition:

- Plant throughput capacity will vary between (4.0 and 4.5) Mt/a (db). The plant has sufficient in-built flexibility to meet this variable throughput criteria.
- The SWOLP production schedule presented in Table 17.2.1 shows that on an annual basis, the gold grade will vary from (0.88 to 3.00) g/t, with a calculated LoM weighted average gold grade and recovery of 1.62 g/t and 89.44% respectively. Gold variability on a weekly, monthly basis will be higher than that indicated. Annual gold production will vary between (101 and 360) koz.
- Crushing plant mechanical availability of 94.1% (8200 h/a).
- Mechanical availability for the comminution, CIL and thickening circuits of 96.2% (8400 h/a), supported by crushed ore storage and standby equipment in critical areas.

The mine/plan production schedule from 2022 to 2035 has been developed quarter by quarter till 2027 and thereafter by year (Table 17.2.1).

Table 17.2.1 SWOLP Production Schedule (S. Ramazan, March-2022)

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
RoM (Mt/a)	4.25	4.50	4.10	4.06	4.14	4.23	4.26	4.16	4.03	4.06	4.03	4.00	4.00	1.78
Gold (g/t)	3.00	2.37	2.16	1.26	1.71	1.18	1.06	1.70	2.02	1.76	1.11	0.89	0.88	1.35
Gold rec (%)	87.9	87.3	90.3	88.4	90.2	89.8	90.6	90.2	91.0	91.0	90.1	89.0	88.5	89.6
Gold (koz/a)	360	299	256	145	206	144	132	205	238	209	129	102	101	69

17.2.2 Sabodala Sulphide Treatment Plant (SSTP)

The SSTP will process non-free milling fresh and reductive transitional ores, with variable feed grades and sulphide mineralogy from Massawa Central Zone (CZ), Massawa Northern Zone (NZ) and the Delya deposits.

[1] 5 months of operation

Key mine plan, project and ore specific design parameters that the SSTP was designed to meet are detailed below and in Table 17.2.2:

- A nominal name plate plant capacity of 1.2 Mt/a (db).
- The mine plan/production schedule presented in Table 17.3.1:
  - Gold RoM feed grades of between (1.24 to 7.98) g/t; and a nominal LoM weighted average of 4.5 g/t.
  - Sulphur RoM feed grade of (1.00 to 1.80) % w/w; and a nominal LoM weighted average of 1.29 % w/w.
  - Arsenic RoM feed grade of (0.3 to 0.42) % w/w.
- Crushing plant mechanical availability of 74.2% (6500 h/a).
- Mechanical availability for the comminution and flotation circuits of 92% (8060 h/a), supported by crushed ore storage and standby equipment in critical areas.
- Mechanical availability for the BIOX®, CCD, neutralisation, CIL and detoxification circuits of 95% (8320 h/a) supported by flotation concentrate surge capacity, standby equipment in critical areas and emergency power where required.

Consideration was also given to feed variability and blending at a more granular scale.

Table 17.2.2 SSTP Production Schedule (Original Plant Design Basis)

	Units	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Massawa CZ	**t/a**	**0.98**	**1.20**	**0.84**	**0.00**	**0.00**	**0.53**	**0.84**	**1.15**	**0.00**	**5.52**
• Au	g/t	6.75	7.44	7.34	-	-	1.73	1.47	1.24	-	-
• S	%	1.16	1.17	1.12	-	-	1.10	1.07	1.04	-	-
Massawa NZ	**t/a**	**0.00**	**0.00**	**0.36**	**1.20**	**1.20**	**0.57**	**0.30**	**0.05**	**0.39**	**4.08**
• Au	g/t	-	-	5.80	5.14	5.20	4.84	1.73	1.31	1.31	-
• S	%	-	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	-
Delya	**t/a**	**0.22**	**0.00**	**0.00**	**0.00**	**0.00**	**0.10**	**0.06**	**0.00**	**0.06**	**0.45**
• Au	g/t	4.39	-	-	-	-	4.09	1.74	-	1.29	-
• S	%	1.50	-	-	-	-	1.50	1.50	-	1.50	-
Total	**t/a**	**1.20**	**1.20**	**1.20**	**1.20**	**1.20**	**1.20**	**1.20**	**1.20**	**0.45**	**10.05**
• Au	g/t	6.31	7.44	6.87	5.14	5.20	3.41	1.55	1.24	1.31	**4.50**
• S	%	1.22	1.17	1.24	1.50	1.50	1.32	1.20	1.06	1.50	**1.29**

NOTE: Tonnes and % are on a dry and mass/weight basis respectively.

The actual mine plan/production schedule that the financial model is based upon has been developed and reported on a quarterly basis through to 2027 and summarised by year thereafter (S. Ramazan, March-2022). For the schedule provided, see Table 17.2.3 and Table 17.2.4, the weighted average RoM gold grade and recovery are 4.43 g/t and 87.7% respectively. The LoM weighted average RoM sulphur, iron, arsenic and antimony grades and iron to arsenic ratio are 1.12% w/w, 5.27% w/w, 0.50% w/w, 440 ppm and 10.5:1 respectively.

Table 17.2.3 SSTP Production Schedule (S. Ramazan, March-2022)

Description	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
RoM (Mt/a db.)	0.87	1.20	1.21	1.20	1.20	1.20	1.14	1.20	1.21	0.36
Au (g/t)	6.37	7.50	5.69	5.49	5.37	4.32	2.87	2.03	1.55	1.55
Au Recovery (%)	81.81	88.64	88.62	88.55	88.46	88.45	88.48	88.3	88.3	88.30
Au Produced (koz/a)	146	257	195	188	184	148	93	69	53	16
S (% w/w)	1.27	1.27	1.24	1.09	1.03	1.00	1.05	1.07	1.07	1.07
Fe (% w/w)	5.53	5.48	5.51	5.58	5.43	5.46	5.11	4.93	4.64	4.64
As (% w/w)	0.52	0.52	0.53	0.56	0.53	0.51	0.48	0.48	0.44	0.44
Fe:As	10.70	10.61	10.41	10.05	10.33	10.79	10.70	10.33	10.56	10.56
Sb (ppm)	563	775	676	413	302	192	365	341	379	379

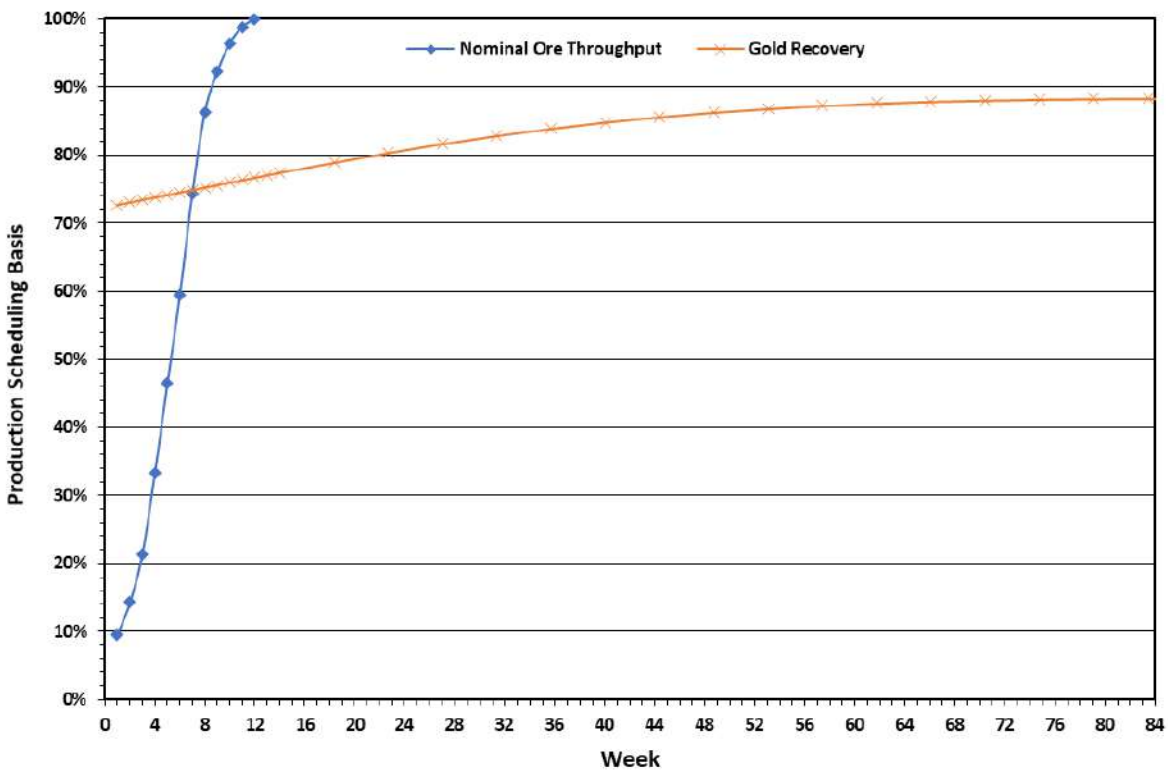
Note:
1. Tonnes and % are on a dry and mass/weight basis respectively.

Table 17.2.4 SSTP Annual Ore Distribution by Source (S. Ramazan, March-2022)

Description	Units	2024	2025	2026	2027	2029	2030	2031	2032	2033
Massawa CZ	%	65.3	70.6	57.2	29.8	31.0	19.5	70.0	80.4	100.0
Massawa NZ	%	34.7	29.4	42.1	48.2	56.3	72.4	29.9	19.6	0.0
Delya	%	0.0	0.0	0.7	22.0	12.7	8.1	0.0	0.0	0.0

The McNulty type ramp-up curves applied to plant name plate capacity and gold recovery are illustrated in Figure 17.2.1. This ramp-up schedule is carried through to the financial model and it can be seen that the plant reaches its name plate capacity in week eight and the design gold recovery of 88.4% ((88.3 to 88.6)% based on the current mine plan) in week 84. Importantly, this schedule does not illustrate the lag between gold into and out of the plant. This is more fully represented in Section 24.1 of this Report.

Figure 17.2.1 SSTP Ramp-up Schedule (MineScope, 2022)



17.3 Process Design/Operating Basis

Process design/operating basis information used in the design of the SWOLP and SSTP and in the formulation of the associated operating cost estimates are summarised in Sections 17.3.1 and 17.3.2 respectively.

17.3.1 Sabodala Whole Ore Leach Plant (SWOLP)

Operating/design parameters for the SWOP are presented in Table 17.3.1 to Table 17.3.4.

Table 17.3.1 SWOLP Summary of Key Process Design Parameters (Lycopodium PDC, May 2020)

Criteria	Unit	SWOLP (2020)	SWOLP (2021)
Plant feed rate	Mt/a (db)	4.0	4.0 to 4.5
LoM weighted average head grade	g/t au	1.5	1.62
Design head grade	g/t au	2.8	>3.5
Operating schedule	d/a	365	365
Milling circuit utilization	%	91.3	91.3
Bond ball mill work index	kWh/t	20.3	20.3
SMC - axb	-	35.3	35.3
Mill feed specific gravity	-	2.8	2.8
Mill feed moisture	%	4	4
Mill feed size (P_{80})	mm	150	150
Milling circuit throughput	t/h (db)	500	560
Mill circuit product size (P_{80})	µm	90	90
Leach/CIL retention time	h	32	
Elution plant capacity (per batch)	t	8	8
Predicted gold recovery (design)	%	91.2	89.5

Table 17.3.2 SWOLP Reagent and Consumable Requirements

Description	Units	Value
General		
• Antiscalant	kg/t of RoM	0.013
• Freshwater make-up - plant	t/t of RoM	0.3
• Freshwater make-up - power station	kg/kWh	Minimal
Comminution		
• Liners	kg/t of RoM	0.062
• Balls (125 and 80 mm)	kg/t of RoM	0.4 to 0.55
CIL leach, elution & smelting		
• Lime (CaO)	kg/t of RoM	1.2 to 3.0
• Sodium cyanide (100% NaCN)	kg/t of RoM	0.27 to 0.3
• Flocculant	kg/t of RoM	0.014
• HCL	kg/t of RoM	0.075
• Caustic	kg/t of RoM	0.19
• Carbon	kg/t of RoM	0.35

Table 17.3.3 SWOLP Diesel Requirements

Description	Units	Value
Plant mobile equipment	kL/a	36
Elution heater	kL/a	365
Total	kL/a	401

Table 17.3.4 SWOLP and Infrastructure Power Consumption

Description	Units	Value
Crushing	GWh/a	~4.0
Comminution	GWh/a	~95.3
Wet plant	GWh/a	~36.4
Ancillary (including outside process)	GWh/a	~39.0
Total	**GWh/a**	**174.6**

17.3.2 Sabodala Sulphide Treatment Plant (SSTP)

Key process design, operating parameters, issues considered in process and equipment selection and the basis for operating consumable and reagent consumption rates applied in the operating cost estimate are summarised in the following sections.

17.3.2.1 SSTP Summary

The plant design has been based on a nominal capacity of 1.2 Mt/a (db) of reductive transitional and fresh sulphide ores. These ores have been proven to be highly recoverable through flotation followed by BIOX® as an oxidative step before a conventional CIL circuit.

The BIOX® technology, which is licenced by Metso Outotec (the MO Group) and, under the existing licence agreement, the MO Group provided a process design basis for the previous Barrick feasibility study based on the 2018 BIOX® pilot plant testwork results. This previous BIOX® technology process design basis has been adopted for the DFS, with some modifications as outlined in the BIOX® design basis discussions in Section 17.4.2.9. Table 17.3.5 following, summarises the key process design parameters for the SSTP, as illustrated in Figure 17.1.2.

Table 17.3.5 SSTP Key Process Design Parameters

Parameters	Units	Design	Source
Plant Throughput	Mt/a (db)	1.2	Endeavour
RoM Feed Parameters			
• RoM ore moisture content, range	% w/w	3.0 to 6.0	Endeavour
• Ore SG		2.60	Testwork/OMC
• Design RoM moisture content	% w/w	4.0	Endeavour
• LoM gold head grade, range	g/t	1.24 to 7.98	Endeavour
• Design gold head grade	g/t	7.00	Endeavour
• Design sulphide sulphur head grade, range	%	1.00 to 1.80	Endeavour
• Design arsenic head grade, range	%	0.3 to 0.42	Endeavour

Table 17.3.5 SSTP Key Process Design Parameters

Parameters	Units	Design	Source
Gold Recovery Basis			
• Design gold recovery, gravity	%	25	Endeavour
• Design gold recovery, flotation	%	91	Endeavour
• Gold recovery, LoM average	%	90.3	Endeavour
Plant Utilisation			
• Crushing circuit	%	74.2	Endeavour
• Milling & flotation circuit	%	92.0	Endeavour
• BIOX®, CCD, neutralisation & CIL circuits	%	95.0	Metso Outotec
Comminution Circuit	Type	Primary crush/SABC	Endeavour/OMC
• Crusher feed (f_{100})	mm	700	
• Crusher feed (f_{80})	mm	433	
• Crusher circuit throughput	t/h (db)	149	
• Mill circuit feed size, P_{80}	mm	115	OMC
• Target grind size, P_{80}	µm	90	Testwork
• Crusher work index (design)	kWh/t	29.2	
• Bond Mill Work Index (design)	kWh/t	22.8	
• Axb (derived from 85th percentile)		24.7	
• Abrasion index (ai)	g	0.275	
• SAG milling specific energy	kWh/t	14.3	
• Ball mill specific energy	kWh/t	16.3	
• Pebble crusher specific energy	kWh/t	0.2	
• Total specific energy	kWh/t	30.8	
Flotation			
• Rougher flotation feed density	% w/w solids	30	Testwork
• Rougher residence time (tank cell)	min	25	Testwork
• Rougher-scavenger residence time (tank cell)		62.5	
• Cleaner residence time (trough cell)	min	25	Testwork
• Solids lip loading (all cells)	$t.m^{-1}.h^{-1}$	1.5	
• Froth carrying capacity (all cells)		2.0	
• Final concentrate mass pull, range	%	4 to 12	Testwork
• Final concentrate mass pull, design (nom.)	%	7.9	Endeavour
• Collector type		Potassium Amyl Xanthate (PAX)	
• Collector dosage rate	g/t	65	
• Frother type		Methy Isobutyl Carbinol (MIBC)	
• Frother dosage rate	g/t	50	
Concentrate Regrind			
• Design throughput	t/h (db)	18	
• Target feed size	µm	90	
• Target regrind size, P_{80}	µm	45	Metso Outotec
• Mill type		VTM-200-WB	
• Installed power	kW	150	

Table 17.3.5 SSTP Key Process Design Parameters

Parameters	Units	Design	Source
• Specific grinding energy	kWh/t	5.5	
• Grinding media type		Steel balls (20 mm)	
• Grinding media consumption	g/kWh	40	
Flotation Concentrate Thickening			
• Settling flux	$t.m^{-2}.h^{-1}$	0.20	Endeavour
• U/f solids	% w/w	55	
• Flocculant type		M405	
• Flocculant dosage	g/t of solids	50	
Flotation Concentrate Storage			
• Storage tanks	No.	2	
• Residence time	h	48	
• Volume/tank	m^3/tank	588	
Tails Thickening			
• Settling flux	$t.m^{-2}.h^{-1}$	0.910	Testwork
• U/f solids	% w/w	55	
• Flocculant type		SNF 923 VHM	
• Flocculant dosage	g/t of solids	50	
BIOX® Circuit			
• Maximum solids flow	t/h	17.1	Agreed
• Feed rate, nominal	t/h (db)	11.8	Metso Outotec
• Sulphide sulphur feed, maximum	ts^{2-}/d	57	Endeavour
• Sulphide sulphur feed, nominal	ts^{2-}/d	44	Endeavour
• Sulphide sulphur oxidation range	%	94.2 to 96.1%	Testwork
• Arsenic dissolution (design)	%	96	Metso Outotec
• Number of BIOX® trains	No.	1	Metso Outotec
• Number of reactors, primary reactors	No. Off	4 in parallel	Agreed
• Secondary reactors	No. Off	3 in series	Agreed
• Residence time, primary reactors		3.8	Testwork
• Residence time secondary reactors	d	3.0	Testwork
• Residence time total	d	6.7	Testwork
• Operating slurry pH, range	pH	1.30 to 1.40	Metso Outotec
• $CaCO_3$ consumption, design	kg/t conc	23	Testwork
• Operating temperature, range	°c	40 to 42	Metso Outotec
CCD Circuit			
• Wash efficiency, design	%	97	Metso Outotec
• Interstage mixing tank residence time, design	S	60	Metso Outotec
• Wash water ratio, design ratio to feed solids		8.5	Metso Outotec
• Solids loading, design	$t.m^{-2}.h^{-1}$	0.18	Testwork
• Thickener u/f density, design	% w/w	35	Testwork
• Flocculant addition rate (far)			
• Far CCD 1	g/t CCD feed	200	Testwork
• Far CCD 2	g/t CCD feed	100	Testwork
• Far CCD 3	g/t CCD feed	50	Testwork

Table 17.3.5 SSTP Key Process Design Parameters

Parameters	Units	Design	Source
BIOX Neutralisation			
• Number of stages, design	No. Off	6	Metso Outotec
• Residence time, design (total)	h	2	Metso Outotec
• Controlled pH,			
• Stage 3	pH	4.5	Metso Outotec
• Stage 6	pH	7.0	Metso Outotec
• $CaCO_3$ consumption, design (primary reagent)	kg/t conc	314	Testwork
• CaO consumption, design (secondary reagent)	kg/t conc	44	Testwork
BIOX Neutralisation Water Recovery Thickener			
• Solids loading, design	$t.m^{-2}.h^{-1}$	0.17	Testwork
• Thickener u/f density, design	% w/w	40	Testwork
• Flocculant addition rate, design	g/t of solids	150	Testwork
CIL Circuit			
• CIL residence time	H	36	Endeavour
• Number of CIL tanks		6	Lyco
• pH		10.5	
• Average cyanide consumption	kg/t of solids	20.8	Testwork
• Average quicklime consumption	kg/t of solids	20	Testwork
Elution			
• Circuit type		Split AARL	Lyco
• Gold loading on carbon =	g/t	4500	
• Elution circuit capacity		6	Lyco
• Frequency of elution	Strips/week	6	Lyco
Cyanide Destruction Method	-	SO_2/air	Endeavour
Raw Water Consumption, Average	t H_2O/t ore	1.3	Lyco

Notes:
1. 'testwork' refers to comminution and metallurgical testwork conducted on representative ore samples.
2. 'Endeavour' refers to advice / agreement from Endeavour Mining Ltd.
3. 'Metso Outotec' refers to the BIOX® circuit design from Metso Outotec.
4. Comminution parameters provided are based on 75th percentile data, weighted with the relative contributions of Massawa CZ, Massawa NZ and Delya.
5. 'OMC' refers to advice from Orway Mineral Consultants.

Additional supporting detail is provided in Sections 17.3.2.2 to 17.3.2.5.

17.3.2.2 SSTP Comminution Circuit Selection

Key design parameters for the comminution circuit are summarised in Table 17.3.5, whilst comminution equipment and operating consumables are summarised in Table 17.3.6 and Table 17.3.7 following.

Table 17.3.6 SSTP Summary of Selected Comminution Circuit

Description		Units	Parameters	
Comminution circuit			Primary crush, SABC	
LoM blend			55% CZ, 41% NZ, 4% Delya	
Primary crushing				
Type			Single toggle jaw	
Model			Metso C120 or similar	
Power -	Installed	kW	146	
-	Operating	kW	160	
Closed side setting		mm	100	
Milling				
Type			**SAG**	**Ball**
Mill dimension:	Diameter	mm	6.10	4.70
	EGL	mm	4.70	8.30
L:d		Ratio	0.77	1.77
Ball charge	Duty	%	11	31
	Maximum	%	14	35
Mill speed		%NC	75 (60 – 80)	75
Drive type			VVVF	Fixed
Mill pinion power	Duty	kW	2126	2428
	Maximum	kW	2619	2656
Installed power		kW	2800	2800
Grinding media		mm	125	50
Pebble crushing				
Type			Cone crusher	
Model			Metso HP100 or similar	
Configuration			Standard coarse	
Closed side setting		mm	13	

Table 17.3.7 SSTP Comminution Consumables by Ore Source

Parameters	Units	Design	CZ	NZ	Delya
Jaw crusher					
• Fixed jaw	h	1600	1600	1750	3270
• Moving jaw	h	2340	2340	2570	4790
• Gross power	kWh/t	0.29	0.29	0.30	0.23
SAG mill					
• Media consumption	kg/t milled	0.641	0.727	0.593	0.364
• Steel liner consumption	kg/t milled	0.112	0.119	0.108	0.068
• Gross power	kWh/t	15.4	16.2	15.3	13.1
Ball mill					
• Media consumption	kg/t milled	0.984	0.958	0.740	0.499
• Steel liner consumption	kg/t milled	0.128	0.125	0.097	0.068
• Gross power	kWh/t	17.6	17.1	13.8	13.1
Pebble crusher					
• Liners	h	4080	7000	3320	-
• Gross power	kWh/t	0.15	0.12	0.17	-

17.3.2.3 SSTP CIL Residue Treatment

Key design parameters for the CIL are summarised in Table 17.3.8.

Table 17.3.8 CIL Design Parameters

Parameters	Units	Design	Source
CIL circuit			
CIL residence time	h	36	Endeavour
Number of CIL tanks		6	Lyco
pH		10.5	
Average cyanide consumption	kg/t of solids	20.8	Testwork
Average quicklime consumption	kg/t of solids	20	Testwork
Elution			
Circuit type		Split AARL	Lyco
Gold loading on carbon	g/t	4500	
Elution circuit capacity	t	6	Lyco
Frequency of elution Strips/week	6	Lyco	
Cyanide destruction method		SO_2/air	Endeavour

17.3.2.4 SSTP Water Treatment Plant (SWTP) for TSF1B Decant Water

The CIL tails (post cyanide detoxification) and the thickened neutralisation circuit product will be pumped to the HDPE lined BIOX® CIL tailings storage facility (TSF1B). The supernatant water will have elevated wad cyanide (CN_{wad}) and thiocyanate (CNS) levels and must not be returned to the SSTP without extensive treatment. However, due to the very small volume of decant return water from TSF1B, it is feasible to direct this stream to the SWOLP process water circuit, where the contained cyanide and thiocyanate will have minimal impact. Note, the supernatant water will also have elevated arsenic (As) and antimony (Sb) levels and it is proposed that the decant water will be treated through a 'greensand' filtration treatment plant, similar to what is proposed for the treatment of water run-off water from ore stockpiles and mineralised waste dumps at Massawa.

17.3.2.5 SSTP Plant Services

The design/operating basis for plant services is as defined in the following sub-sections.

Power

Process power consumption by area for the SSTP is defined in Table 17.3.9 following.

Table 17.3.9 SSTP Power Requirements

Area installed	Demand at 1.2 Mt/a		
	Installed kW	Peak Drawn kW	GWh/a
120-MC-005 - Crushing MCC	320	222	2.0
133-ML-001 - SAG mill	2 800	2 785	18.8
133-ML-002 - Ball mill	2 800	2 785	18.7
198-BL-001 -MP BIOX® blower 1	1 120	821	0.0
198-BL-002 - MP BIOX® blower 2	1 120	821	13.8
198-BL-003 - MP BIOX® blower 3	1 120	821	0.0
198-BL-004 - MP BIOX® blower 4	0	0	0.0
130-MC-010 - Milling MCC	944	654	3.8
160-MC-015 - Flotation MCC	1 815	1 385	8.5
170-MC-020 - Goldroom & elution MCC	1 041	839	3.4
190-MC-025 - BIOX® reactors MCC	1 808	1 371	15.1
190-MC-030 - BIOX® MCC	1 534	1 144	16.6
210-MC-035 - Services and tailings MCC	501	436	1.4
Total	**16 602**	**13 926**	**102.2**

Plant fuel requirements

Fuel consumption diesel and heavy fuel oil (HFO) associated with the SSTP is defined in Table 17.3.10.

Table 17.3.10 SSTP Plant Fuel Requirements

Area	kL/a
Mobile equipment (diesel)	127
Elution system (diesel)	723
Power (heavy fuel oil)[1]	18 799[2]

Water Make-up

Raw water for the Project will be sourced from the existing large and small water dams and used for the process water shortfalls in the flotation area, BIOX® area process water make-up and feed to the raw water filtration plant.

A new reverse osmosis (RO) plant will be installed at the power plant to provide potable water to the SPS and the SSTP.

The flotation concentrate and tailings thickeners overflowing to the mill water tank will allow direct recycling of the majority of process water required for the milling and flotation circuits with make-up water pumped to the tank from the TSF1 decant return.

The water recovery thickener overflowing to the BIOX® water tank will allow direct recycling of the BIOX® process water required for the BIOX®, CCD and CIL circuits with make-up water pumped to the tank from the raw water supply as required.

The SSTP freshwater make-up requirements, as sourced from the raw water harvest dams is defined in Table 17.3.11.

[1] Assumes new HFO gensets
[2] Based on 0.184 L/kWh (QGE)

Table 17.3.11 SSTP Raw Water Requirements

Area	Units	Value
Reagent mixing and gland service water make-up	m^3/a	635 146
BIOX® process water make-up	m^3/a	900 873
Flotation process water make-up	m^3/a	81 716
Potable water	m^3/a	9 421
RO plant make-up	m^3/a	25 554
Total raw water make-up per annum	m^3/a	**1 591 173**
Total raw water make-up per tonne of RoM	**t/t of RoM**	**1.3**

Lime Consumption (CaO and $CaCO_3$)

Quicklime and limestone annual consumption on a nominal basis are presented in Table 17.3.12. The plants lime requirements are used in calculating CO_2 emissions.

Table 17.3.12 SSTP Lime/Limestone Requirements

Area	Consumption (t/a)
CaO (90% CaO)	
• BIOX® neutralisation	4 224
• CIL	2 400
• Cyanide destruction	614
CaO Total	**7 238**
$CaCO_3$ (95% $CaCo_3$)	
• BIOX® primary and secondary reactors	2 323
• BIOX® neutralisation	31 680
$CaCO_3$ Total	**34 003**

Air Requirements

Air usage by process area/purpose is defined in Table 17.3.13.

Table 17.3.13 SSTP Plant Air Supply

Area	Pressure	Nm^3/a
BIOX® blowers	159 kPa(g)	58 965
CIL blowers	81 kPa(g)	2390
Flotation blowers	86 kPa(g)	8600
Plant and instrument air compressors	800 kPa(g)	580

17.4 Process Description

Sections 17.4.1 and 17.4.2 following, provide a process description of the existing but modified SWOLP and the new SSTP respectively.

17.4.1 Sabodala Whole Ore Leach Plant (SWOLP)

The SWOLP has been designed/modified to process gold ores from the Sabodala MC and Massawa ML that are free-milling. The plant has been operating since 2009 and has expanded multiple times. The plant as is stands currently has a capacity of (4.0 to 4.5) Mt/a (db) and comprises; a conventional crusher/grind, gravity, CIL, thickening and split Anglo-American elution circuit. The SWOLP as installed, has achieved throughput rates, recoveries and costs profiles as scheduled and budgeted for.

17.4.1.1 Stockpiling, Crushing and Reclaim

The ore receiving and primary crushing circuit reduce the run of mine (RoM) ore from a nominal top of size of 800 mm to a product P_{80} of 150 mm.

When handling feed for the SWOLP, rear dump trucks deliver RoM ore to two identical primary crusher facilities operating in parallel. Ore delivery from the mine is on a 24 h/d x 365 d/a schedule. Front-end loaders (FEL) feed RoM ore to the RoM bins from where apron feeders transfer material to the vibrating grizzly feeders. Vibrating grizzly feeder oversize feeds the jaw crushers, whilst the undersize by-passes the jaw crushers.

Primary crushing is accomplished by two Metso C140 single toggle jaw crushers operating in parallel, with grizzly undersize and crusher product, feeding their respective triple deck screens. The circuit layout allows for one jaw crusher and double deck screen to operate whilst the other is undergoing maintenance.

The double deck screens separate the primary crushed product into two streams. A middling fraction (+25 to -142) mm is discharged by both double deck screens onto a shared conveyor feeding the secondary crusher feed bin. The other stream is the (-25 to +142) mm fraction, which is transported to the primary crushed ore stockpile.

Secondary crushing of the middlings fraction is via a Sandvik CH660 secondary crusher with an automatic gap adjustment that increases and decreases the closed side setting, depending on pressure and power. The product of the secondary crusher (-20 mm) is transported to the secondary crushed ore stockpile.

An apron feeder and two vibrating feeders located under each of the two stockpiles reclaim crushed ore to feed the SABC milling circuit.

17.4.1.2 Grinding and Classification

Free-milling ore from the coarse ore stockpile (COS) and secondary ore stockpile (SOS) is ground in the existing SWOLP SABC grinding circuit in two stages to produce a P_{80} of 90 µm product to feed the leach circuit. The first stage includes a SAG mill and the second stage, includes two ball mills operating in parallel. The SAG mill operates in closed circuit with a Metso HP200 cone crusher. All three mills are rated at 4 MW and utilise the same driveline components (the exception being the girth gear of the SAG mill).

Ore is conveyed from the COS and SOS to the SAG mill feed chute from where it is mixed with water to form a slurry. Lime is metered onto the SAG mill feed conveyor to control the pH of the slurry feeding the leach circuit. Slurry discharges from the SAG mill through a trommel screen and onto a vibrating screen. Screen oversize is transferred to the pebble crusher from which the crushed material is returned to the SAG mill feed conveyor. Screen undersize gravitates to the primary cyclone feed hopper where it is combined with Ball Mill No. 1 discharge.

The two ball mills operate in closed circuit with two cyclone clusters. Cyclone underflows reports back to the ball mills for further size reduction. Cyclone overflows are fed to two parallel trash screens for trash removal.

The SAG mill and one ball mill discharge to a common cyclone feed hopper which via duty/standby cyclone feed pumps feeds one cyclone bank. The underflow of which feeds a common splitter box feeding both ball mills. The other ball mill has a dedicated cyclone feed hopper, pumps and cyclone cluster, the underflow of which joins the previously mentioned common splitter box.

The plant is configured to allow for single ball mill operation which increases overall plant operating time by allowing for maintenance on either ball miss whilst the other ball mill and the SAG mill continue operation.

17.4.1.3 Gravity Concentration and Intensive Leach

Underflow from five cyclones of the primary cyclone cluster feed the new gravity circuit. Cyclone overflow from these cyclones gravitates back to the trash screen.

The gravity circuit consists of a gravity feed scalping screen and a gravity concentrator. Cyclone underflow discharges onto the vibrating gravity feed screen. Gravity screen oversize material is returned to the ball mills and gravity screen undersize material is fed to the gravity concentrator.

Concentrate from the gravity concentrator is sent to the intensive leach circuit (ILC) for gold recovery by intensive cyanidation. Tailings from the gravity concentrator gravitates to the cyclone feed hopper.

Gravity concentrate is leached with a solution made up of sodium cyanide, sodium hydroxide and leach-aid in an agitated reaction vessel. Once the leach cycle is complete, the pregnant solution is drained and stored in the ILC pregnant eluate tank. From the pregnant eluate tank, solubilised gold is recovered in a dedicated electrowinning circuit. The residue within the reaction vessel, is washed with the wash water recovered to the reaction vessel. The washed residue solids are pumped back to the cyclone feed hopper.

17.4.1.4 Leaching and Adsorption

The historical leach circuit comprised of three leach tanks (2000 m^3 each) and nine CIL tanks (1200 m^3 each), providing approximately 24 hours of residence time. As part of the Phase 1 modifications, two leach tanks and two CIL tanks have been added to the circuit to provide a total residence time of 32 hours, which based on the current testwork, appears to be beneficial for gold extraction from some of the Massawa ore types.

Sodium cyanide is added to the leach feed distribution box with provision for adding more along the leach tank train.

Each CIL tank is equipped with a mechanically swept vertical carbon retaining screen. Slurry flows by gravity from the first CIL tank to the last tank. Carbon in the slurry is advanced by pumping slurry from tank to tank on an intermittent basis counter-current to the slurry gravity flow.

All tanks are sparged with low-pressure air (600 kPa(g)) to ensure sufficient oxygen is available for gold dissolution. Carbon concentration in the slurry is maintained between (10 to 15) g/L in the CIL tanks.

17.4.1.5 Carbon Recovery and Acid wash

Loaded carbon is recovered from CIL Tank No.1 using the loaded carbon recovery pump. The loaded carbon can be directed to a new 10 t elution circuit as required. In either case, the carbon is screened and washed on a loaded carbon recovery screen prior to reporting to the acid wash column.

In the acid wash columns, the carbon is washed with diluted hydrochloric acid to remove inorganic contaminants. After acid wash, the carbon is rinsed with water and then transferred to the elution columns.

17.4.1.6 Carbon Elution, Electrowinning and Goldroom

The elution plant utilises the split Anglo-American Research Laboratories (AARL) elution process and is designed to treat carbon in 8 t batches, one batch a day, seven days a week although using the split AARL process more frequent elution cycles are possible if required.

Hot solution containing sodium cyanide and sodium hydroxide is used to strip gold from the loaded carbon in a high pressure and high temperature environment. The resultant gold-containing solution (pregnant solution) is then sent to electrowinning to recover the precious metal onto woven stainless steel wire cathodes. ILC pregnant solution also will be periodically discharged to the pregnant eluate tank for precious metal recovery.

The loaded cathodes are removed from the two electrowinning cells (one existing and one new) and are washed with pressurised water to remove the precious metal sludge. The sludge is dried in an oven, mixed with fluxes and smelted in a furnace to produce doré containing the recovered gold and silver.

The barren carbon in the elution column is then transferred to the carbon regeneration kiln to thermally reactivate the carbon by removing organic contaminants. Reactivated carbon is screened and returned to the CIL tanks as required to restore carbon concentration in the CIL circuit.

17.4.1.7 SWOLP Tailings Thickening

SWOLP CIL tailings slurry is dewatered in two existing tailings thickeners, prior to pumping to the existing TSF. Tailings thickener overflow solutions gravitate to the process water standpipe for reuse in the SWOLP. Tailings thickener underflow slurry, with solids content ranging from 60% to 65% solids by weight, is pumped by a two-stage pumping arrangement to the current TSF1 and will in the future, be pumped to the recently permitted TSF2.

17.4.2 Sabodala Sulphide Treatment Plant (SSTP)

17.4.2.1 Overview

The following Sections describe and summarise the key processes/unit operations employed. Unless necessary, these Sections do not detail the maintenance and spillage and/or dust/occupational health system (OHS) management approach. It is a given that these issues have been considered and incorporated in the design and capital and operating costs estimates.

17.4.2.2 Run-of Mine (RoM) Pad

Road trucks[1] will deliver RoM sulphide ore from the various deposits to the SSTP RoM pad and dump it in blending 'finger' stockpiles, based on material sulphide sulphur and gold grade and lithology. A Komatsu® WA 500-8 FEL will deliver feed from the various stockpiles to the primary crusher feed bin. The construction of the RoM pads and the reclaim thereof, will be the responsibility of mining.

The RoM stockpile pad will allow feed blending under the guidance of mine geologists and process personnel to maintain a relative constant feed grade and ore hardness to optimise the milling and flotation circuits and reduce/negate the acid requirement in the BIOX® leach circuit.

[1] Rear tippers with 60 t payloads

17.4.2.3 Plant Feed Storage and Reclaim

RoM ore will be drawn from the primary crusher feed bin with a live capacity of approximately 19 m^3, at a controlled rate by a variable speed apron feeder, which will discharge onto a vibrating grizzly feeder with an aperture of 90 mm. Fine particles passing through the apron feeder plates will be collected onto the dribble conveyor below the apron feeder and discharged onto the coarse ore surge bin feed conveyor. The vibrating grizzly feeder oversize will report to a Metso C120 single toggle jaw crusher or equivalent. The jaw crusher product and grizzly undersize will discharge onto the coarse ore surge bin feed conveyor.

A weightometer on the coarse ore surge bin feed conveyor will indicate the instantaneous and totalised primary crushing tonnage.

17.4.2.4 Plant Feed Storage and Reclaim

The surge bin feed conveyor will discharge into the crushed ore surge bin. Under normal operating conditions, the crushing rate into the surge bin will exceed the withdrawal rate of ore to the milling circuit. This allows for an accumulation of material on the dead stockpile for reclaim when RoM ore is not available or the primary crushing circuit is shut down.

SAG mill feed will be withdrawn from the surge bin at a controlled rate by a variable speed apron feeder and delivered to the milling circuit via the SAG mill feed conveyor. The FEL operating on the RoM pad will during crusher circuit stoppages, reclaim ore from the stockpile and feed it into the reclaim feed bin. SAG mill feed will then be withdrawn from the reclaim feed bin controlled by a variable speed belt feeder and delivered onto the SAG mill feed conveyor.

A weightometer after the surge bin reclaim feeder and emergency reclaim feeder discharge points will indicate the instantaneous and totalised mill feed tonnage.

SAG mill grinding media will be added via the SAG mill ball feeder. SAG mill grinding balls will be loaded from the SAG mill ball bunker into the SAG mill ball feeder hopper via a FEL. The SAG mill ball feeder will control the discharge of SAG mill grinding balls onto the SAG mill feed conveyor to maintain the desired SAG mill ball load.

17.4.2.5 Grinding and Classification Circuit

The crushed ore will be milled to achieve the required grind size for effective sulphide liberation and gold recovery in the flotation circuit. The grinding circuit will consist of a SABC circuit with hydrocyclones. The product from the grinding circuit (the primary cyclone overflow stream) will gravitate from the cyclone cluster to the trash screen ahead of the flotation feed surge tank.

A centrifugal gravity circuit will recover high specific gravity material (predominantly free gold) present in the mill discharge slurry. The gravity recovery circuit will be fed by a dedicated slurry pump from the cyclone feed hopper.

SAG Milling

A 2.8 MW variable speed drive will allow the 6.10 m diameter x 4.70 m EGL SAG mill to operate to a maximum of 14% volumetric ball load. Variable speed control of the mill, accomplished through a VVVF system, will allow the processing of ores with various competencies. A speed range of (60 to 80)% critical speed will be available through the variable speed drive.

The SAG mill feed conveyor will be fitted with a weightometer to control the new ore feed rate, water addition to the mill and metallurgical accounting.

Pebble Crushing

The SAG mill discharge slurry will discharge from the SAG mill through a trommel screen into the mill discharge hopper, with the oversize from the trommel screen discharging to the pebble transfer conveyor that discharges into the pebble crusher feed bin, ahead of a single 90 kW pebble crusher.

One stage of tramp metal removal via a self-cleaning belt magnet across the pebble transfer conveyor will be used to remove mill balls and any other magnetic steel debris discharged from the SAG mill. Metal detection will provide a final level of protection against metal entering the pebble crusher.

To improve the steady-state operation of the pebble crusher, the pebble crusher feed bin will hold approximately five minutes of surge capacity. As the competence of the ore is moderate, the nominal design allows for using a single pebble crusher to meet the expected pebble load.

A variable speed pebble crusher vibrating feeder will transfer the pebbles at a controlled rate from the surge bin into the pebble crusher. Pebbles will be crushed from a nominal top size (P_{100}) of 75 mm to a P_{80} of approximately 12 mm. The pebble crusher will operate at a closed side setting of 11 mm, depending on the ore competency, moisture content and crusher power draw. Product from the pebble crusher will be transferred to the SAG mill feed conveyor. An overhead hoist will be provided to facilitate crusher maintenance.

Ball Milling

A 4.70 m diameter x 8.3 m EGL overflow ball mill, driven by a 2.8 MW motor will operate with a volumetric ball load of up to 35%. The product size from the closed ball mill grinding circuit will be 80% passing 90 µm. The ball mill will be fixed speed, operating at 75% critical speed.

Ball mill grinding media will be 50 mm diameter balls and will be stored adjacent to the ball mill media loading hopper. Ball mill grinding media will be removed from the bulk storage bunker and transferred to a kibble. Grinding media will be loaded into the ball mill via the ball mill ball charging hoist. The ball charging hoist will be used to manoeuvre the ball charging kibble onto the ball mill feed box from where the grinding media will enter the ball mill.

Milling Area

A grinding area jib crane will be installed at the cyclone cluster to assist with cyclone maintenance activities. The jib crane will lift cyclone bodies, valves and parts from ground level into the cluster to replace worn equipment.

Bolt removal tools and a SAG mill liner handler will be provided to enable efficient SAG mill relining activities. Ball mill liners will typically be lighter and will be man-handled through the inlet opening of the ball mill. The bolt removal tools will be suspended from dedicated monorails and the liner handling machine will be parked on the mill floor. The SAG and ball mills will each have a retractable mill feed chute/spout allowing personnel access into the mills.

The mill floor slab will be sloped towards a large drive-in collection sump at the discharge end of the mills, from where a submersible pump will return spillage to the mill discharge hopper.

The slab below the SAG mill feed chute will incorporate a drive-in sump to allow a FEL to remove the coarse spillage which can occur in that area when the feed spout is removed. A sump pump will also be provided in this area. In addition, scats from the ball mill will be collected in a drive-in scats bunker to facilitate bulk scats removal via a FEL for disposal. The scats bunker will drain into the mill area drive-in sump.

Classification and Trash Screening

The SAG and ball mills discharge will be combined in a common mill discharge hopper and diluted with process water before classification. The combined mill discharge slurry will be pumped using duty/stand-by pumps to the classifying cyclones. The cyclone cluster will comprise five 380 mm diameter hydrocyclones operating at 90 kPa. The number of operating cyclones will depend on the operating conditions in the milling circuit and ore hardness.

Cyclone overflow will gravitate by pipe launder to the flotation feed surge tank via the trash screen. Trash screen oversize will gravitate to a trash collection bunker. The trash screen underflow will gravitate directly into the flotation feed surge tank.

Gravity Concentration

Mill discharge slurry will be pumped to the gravity circuit, with the remaining cyclone feed hopper slurry pumped to the primary cyclone cluster. The gravity circuit feed stream will be pumped to a single vibrating 'degritting' screen to remove coarse (+2 mm) material and fragments of broken mill balls. Oversize from the gravity scalping screen and the gravity concentrator tails will return to the mill discharge hopper. The screen undersize stream from the screen will gravitate to a 30-inch centrifugal concentrator. The concentrator will be operated on a semi-batch basis with a periodic discharge of the coarse, high SG material (gravity concentrate) to the concentrate storage hopper as part of the intensive cyanidation reactor.

The intensive cyanidation reactor (ICR) will process the concentrate once per day in a rotating drum leach vessel. Cyanide and caustic will be introduced into the slurry and the drum will be rotated for up to 20 hours to leach out the gold. The pregnant liquor will be separated from the solids and pumped to the dedicated pregnant liquor tank at the end of this time. Reactor tails will be pumped to the ball mill feed chute for additional milling to recover any remaining entrained gold.

A dedicated pregnant liquor pump will feed the gravity electrowinning cell in the goldroom, with gold recovered onto stainless steel cathodes and barren liquor returned to the pregnant liquor tank. The cathodes from the gravity electrowinning cell will be treated separately to assist in metallurgical accounting. The spent electrolyte will be recycled to the head of the CIL circuit.

17.4.2.6 Flotation and Regrind

The flotation circuit comprises rougher and cleaner flotation circuits, with the combined rougher and cleaner concentrate streams, reground to improve mineral liberation ahead of the BIOX® leach circuit.

Rougher and Rougher Scavenger Flotation

Primary cyclone overflow slurry will gravitate through the trash screen into the flotation feed surge tank. Slurry from the surge tank will be pumped to the flotation feed primary sampler feed box ahead of the flotation feed primary sampler. The sample stream from the flotation feed primary sampler will gravitate to the on-stream analyser. The remainder of the slurry will discharge from the flotation feed primary sampler into the flotation feed box ahead of the rougher flotation bank, where frother and collector reagents will be added to the slurry stream. The rougher flotation circuit will consist of two forced air mechanically agitated tank cells. The tails from the last rougher flotation cell will gravitate to three forced-air mechanically agitated rougher scavenger tank cells.

A higher grade concentrate stream from fast floating minerals will be collected from the first or second rougher flotation cells and pumped by the rougher concentrate pumps via the rougher concentrate sampler to the regrind cyclone feed hopper. The rougher scavenger concentrate pump will pump the concentrate produced from the rougher scavenger flotation cells via the rougher concentrate sampler to the cleaner flotation feed hopper.

Rougher scavenger flotation tails will gravitate to the flotation tailings hopper via the rougher tailings sampler and will be pumped to the tails thickener feed box.

Cleaner Flotation

The cleaner flotation bank comprises of three 4.3 m^3 forced air trough cells operating in series. Rougher scavenger concentrate will be pumped to the cleaner feed box. The cleaner bank's concentrate will be collected and pumped to the regrind cyclone feed hopper via the on-stream analyser. The option to add collector and frother to the cleaner feed or down the bank will be allowed.

Cleaner tailings slurry will gravitate to the rougher flotation feed box.

Concentrate Regrind

The combined rougher concentrate and cleaner concentrate will be pumped by the regrind cyclone feed pumps from the regrind cyclone feed hopper into the regrind cyclone cluster to separate coarse and fine material. The regrind cyclone overflow stream containing the fine material will bypass the regrind mill and report to the regrind mill product hopper. The cyclone underflow stream will gravitate into the regrind mill for further size reduction.

A Vertical Stirred Tower Mill, VTM-200 WB, fitted with a 150 kW variable speed motor, will be used to produce a concentrate regrind particle size of 100% passing 150 µm and 80% passing 45 µm. The stirred mill will be operated with 19 mm steel media.

The regrind mill can operate in an open or closed circuit with the regrind cyclones. In an open circuit, the regrind mill discharge slurry will combine with the regrind cyclone overflow slurry in the regrind product hopper. Alternatively, the regrind mill discharge slurry will combine with the rougher and cleaner concentrate in the regrind cyclone feed hopper to operate in a closed circuit.

The regrind mill product hopper slurry will be pumped to the concentrate thickener feed box via the regrind product sampler; or, if the concentrate thickener is offline, directly to the trash screen ahead of the BIOX® surge tanks.

Regrind mill grinding media will be loaded into the regrind mill as required using the regrind mill media kibble and the regrind area jib crane.

Concentrate Thickening

Regrind mill product will be pumped to the concentrate thickener feed box. Flocculant solution will be further diluted with process water in a static mixer and added to the concentrate slurry stream entering the thickener feed to assist with solids settling and maintaining overflow clarity.

A 12 m diameter high rate thickener will be used to dewater the flotation concentrate. The thickener will include an auto-dilution feed-well froth spray to break any froth build-up on the surface and a bridge supported drive mechanism. The thickener rakes can be raised using an automated lifting device should the torque exceed a pre-set value.

The concentrate thickener overflow stream will gravitate into a flotation process water standpipe between the process water tank and the flotation process water reticulation pumps. Concentrate solids will settle in the thickener's base for collection at the underflow cone before being transferred to the BIOX® trash screen.

Spillage and rainwater from the concentrate thickener area will be pumped to the concentrate thickener feed box by the concentrate thickener area sump pump. Alternatively, when the concentrate thickener is drained for maintenance, the spillage will be pumped to the BIOX® trash screen ahead of the BIOX® surge tanks.

Flotation Tailings Thickening

Rougher scavenger flotation tailings slurry will be pumped by the flotation tailings pumps to the tailings thickener feed box. Flotation tailings will combine with spillage from various plant areas in the tailings thickener feed box and then flow into the tailings thickener. Flocculant solution will be further diluted with process water in the static mixer and added to the slurry feed stream entering the thickener feed to assist with solids settling and maintaining overflow clarity.

The tailings thickener overflow stream will gravitate into the flotation process water tank for reuse in the milling and flotation circuits.

Tailings solids will settle in the base of the thickener for collection at the underflow cone. The thickened underflow slurry will be pumped to the tailings hopper from where it will be pumped to the TSF. The option of pumping tailings from the flotation tailings hopper to the existing SWOLP or the BIOX® neutralisation tanks will also be allowed.

17.4.2.7 Bio-oxidation BIOX®

Trash Screening and Surge

Thickened flotation concentrate will be pumped to the BIOX® trash screen to remove all wood chips and detritus. Trash will fall into a trash bunker via a chute, while the screen undersize will flow into either the high grade or low-grade BIOX® feed tanks.

Concentrate from the two BIOX® feed tanks will be pumped from the tanks to a feed splitter box above the primary BIOX® reactors using variable speed slurry pumps. Dilution water, controlled via automated control valves, will be injected into the pump suction line to control the concentrate slurry density feeding the primary BIOX® reactors. The dilution water will be sourced from the recycled BIOX® process water system.

Primary and Secondary BIOX® Reactors

Slurry from the BIOX® feed mixing box will gravitate into a five-way splitter box that will evenly distribute the diluted concentrate slurry to the four parallel, 1368 m^3 primary BIOX® reactors. In addition, pipework from the splitter box and launders will be installed to enable the first secondary reactor to be fed as a standby primary reactor, if required.

The primary BIOX® reactors will overflow into launders, which will deliver the semi-oxidised concentrate to the first of three 1368 m^3 secondary BIOX® reactors in series. In addition, bypass launders will enable any one of the reactors to be taken off-line for maintenance.

The BIOX® culture will be kept active in the reactors by controlling the slurry conditions, specifically the level of nutrients, temperature, oxygen level and pH, within specific ranges. The reactors will be equipped with cooling coil baffles through which cooling water will be circulated to control the slurry temperature at 42°C in each reactor. Oxygen requirements for sulphide oxidation are significant and medium pressure air will be injected into each reactor by sparge rings installed below the agitator impeller.

The oxidised product discharging from the final secondary BIOX® reactor will gravitate via a launder to the inter-stage mixing tank of the first counter current decantation (CCD) thickener.

Counter-Current Decantation (CCD) Thickeners

During the bio-oxidation of flotation concentrate, iron, sulphur and arsenic are solubilised. These will be washed from the oxidised residue in a series of three 13.5 m diameter CCD thickeners. The overflow solution from the first CCD thickener will gravitate to the neutralisation circuit. The underflow from the first CCD thickener will be pumped by the thickener underflow pumps to the agitated feed tank ahead of the second CCD thickener (i.e., counter-current flow of solids and solution).

Process water will be used as wash water in the CCD circuit and added to the feed tank ahead of the third (last) CCD thickener. Agitators will be installed in all thickener feed boxes to enhance wash efficiency by breaking large flocs and ensuring thorough mixing.

Neutralisation

The acidic solution overflow from the first CCD thickener will gravitate to the distribution box above the first and second neutralisation tanks. The neutralisation circuit will consist of six aerated and agitated 270 m^3 tanks in series and the solution will flow from tank to tank via overflow launders.

The BIOX® liquor will be neutralised in two stages. In the first stage, limestone slurry will be added to the first, second and third tanks to raise the pH of the solution to 4.5. In the second stage, the pH will be raised to 7 in the remaining tanks using limestone and milk of lime slurry.

The two-step process provides for:

- Optimisation of the use of limestone and the more expensive milk of lime.
- Minimising the formation of excessive jarosites and other undesirable precipitates that are hard to settle.
- Precipitation of 'basic ferric arsenate' under controlled pH conditions ensuring optimum arsenic stability in the effluent solids.

The neutralised effluent will report to the neutralised effluent hopper, from where it will be pumped to the water recovery thickener using the neutralisation tailings pumps.

Water Recovery Thickener

The BIOX® process utilises a relatively large amount of water. A water recovery thickener will recover a significant proportion of the process water from the neutralisation effluent stream before being pumped to the TSF. The underflow from the water recovery thickener will be pumped to the CIL tails hopper. The overflow from the thickener will report to the BIOX® process water tank.

Inoculum Build-up

The inoculum build-up process will commence approximately 20 weeks prior to the commissioning of the BIOX® plant. Ten litres of inoculum will be brought to the site in sealed containers. The bacteria will be re-activated in small inoculum build-up reactors and used to inoculate an acidified concentrate slurry that is nine times the volume of the inoculum. The inoculum volume is increased tenfold until sufficient inoculum has been produced to inoculate the first primary reactor.

17.4.2.8 Carbon in Leach (CIL) Circuit

The washed, oxidised pulp from the last CCD thickener will be pumped to the first of two parallel pH adjustment tanks ahead of the CIL circuit. The slurry from the first tank will overflow into the second tank. The pH of the thickened BIOX® slurry will be raised to a pH of 5 in the first tank to help stabilise and precipitate any residual arsenic in solution and then raised to a pH of 10.5 in the second tank to prevent volatilisation of cyanide in the CIL circuit. The pH adjustment tanks will also provide limited surge capacity between the BIOX® and CIL circuits.

The pre-conditioned pulp with a nominal pulp density of 32% w/w solids will be pumped to the distribution box above the first tank in the CIL circuit. The CIL circuit will comprise of six 160 m^3 adsorption tanks interconnected with launders in series, and slurry will flow by gravity through the tank train. Medium pressure blower air will be distributed to all the tanks and sparged down the agitator shafts to oxidise any cyanicides and provide oxygen to the leach.

Fresh and regenerated carbon will be returned to the circuit at CIL tank No. 6 and will be advanced counter-current to the slurry flow by pumping slurry and carbon, with a recessed impeller slurry pump from CIL tank No. 6 to CIL tank No. 5 and so forth. The intertank screen in CIL tank No. 5 will retain the carbon whilst allowing the slurry to flow by gravity back to tank No. 6. This counter-current process will be repeated until the carbon eventually reaches CIL tank No. 1. A recessed impeller pump will be used to transfer the slurry from CIL tank No. 1 to the loaded carbon recovery screen mounted above the acid wash column in the elution circuit. The carbon will be washed and dewatered on the recovery screen before reporting to the acid wash column. The associated slurry and wash water will return to CIL tank No. 1.

Barren carbon returning to the adsorption circuit from the carbon regeneration kiln will be screened across a vibrating screen with an inclined deck to remove fine carbon. The sized and regenerated carbon will report directly to tank No. 6.

Discharge slurry (leach tails) from the last CIL tank will gravitate to the vibrating carbon safety screen to recover any carbon leaking from worn screens or overflowing tanks. The carbon safety screen undersize will gravitate to the tailings detoxification circuit. Screen oversize (recovered carbon) will be collected in the fine carbon bin for potential return to the circuit.

17.4.2.9 Elution Circuit and Goldroom Operations

The following operations will be carried out in the elution and goldroom areas:

- Acid washing of the loaded carbon.
- Stripping of gold from the loaded carbon by the split AARL elution process.
- Recovery of gold from the pregnant solution by electrowinning.
- Smelting of electrowinning products.
- Reactivation of the barren carbon.

The split AARL elution circuit will be automated and equipped with separate acid wash and elution columns.

The total carbon movement around the elution circuit daily will be approximately 6 t, with a solution flow rate in the elution circuit of 2 BV/h that equates to 25.5 m^3/h.

17.4.2.10 Acid Wash

Loaded carbon will be recovered into the 6 t capacity acid wash column. Transfer and fill operations will be controlled manually, but all other aspects of the acid wash and the pumping sequence will be automated.

During acid washing, a dilute solution of hydrochloric acid (HCL) will be pumped into the bottom of the column to remove contaminants, predominantly carbonates, from the carbon. This process improves the elution efficiency and has the beneficial effect of reducing the risk of calcium-magnesium slagging within the carbon during the regeneration process.

The acid solution will be pumped through the columns back to the acid mixing storage tank for a predetermined time. After the recirculation period to remove contaminants, the loaded carbon will be rinsed with water. Dilute acid and rinse water will be pumped to the tailings hopper for disposal.

Washed carbon from the acid wash column will be hydraulically transferred from the acid wash column to the elution column and the water will be drained out.

17.4.2.11 Pre-soak and Elution

The split AARL elution process will recover gold adsorbed onto carbon recovered from the CIL circuit. The elution process will be carried out by pumping lean eluate from the lean eluate tank through the inline strip solution heater and into the base of the elution column. The strip solution will be heated to approximately 90°C. Sodium hydroxide (NaOH) and sodium cyanide (NaCN) will be pumped from the respective storage tanks and injected into the suction line of the strip solution pump. The loaded carbon will be pre-soaked in the cyanide/caustic solution for 30 minutes to elute gold.

The pregnant eluate will then be rinsed from the carbon by up to ten-bed volumes of water heated to approximately 130°C. The first five bed volumes of the elution will be drawn from the lean eluate tank and directed to the pregnant solution tank for recovery of gold by electrowinning. The last five bed volumes of the elution will be drawn from the filtered water tank and directed to the lean eluate tank for re-use during the next elution cycle.

The heating of the strip solution will be carried out indirectly by using a diesel-fired strip solution heater and a heat input heat exchanger. Heat recovered from the solution exiting the elution column will pre-heat the fresh solution prior to the heat input circuit.

Solution samplers will be provided to collect pregnant and stripped eluent for assay.

17.4.2.12 Electrowinning and Smelting

Electrowinning and smelting will take place in the secure goldroom facility.

The pregnant solution from either of the pregnant solution tanks will be circulated through the electrowinning cells for gold recovery. Electrowinning will take approximately 10 to 16 hours, with solution discharging from the electrowinning cells initially returning by gravity to the pregnant solution tank until the gold tenor has been reduced to the point where the solution exiting the cells is depleted of gold. Then, the barren solution will be pumped back to the CIL tanks.

An overhead crane will be provided to assist with the handling of cathodes and anodes. The cathodes will be washed with high-pressure spray water and the gold slime will be recovered in a vacuum pan filter. The gold sludge filter cake will be dried in an oven and direct smelted with fluxes in an electric induction furnace to produce doré bars.

Fume extraction systems will be provided to remove gases and dust from the electrowinning cells, the drying oven, the barring furnace and the flux mixing area. In addition, fresh air fans will be provided to ensure adequate ventilation inside the goldroom.

17.4.2.13 Goldroom Security

The goldroom design is based on full security surveillance by a security guard and a second level of surveillance by remote control CCTV cameras with remote viewing and recording facilities. Additional security methods and practices will be used.

Clean and dirty change rooms will be provided adjacent to the security office. In addition, a toilet will be provided within the secure area to minimise the need for entries and exits from the secure area.

Carbon Regeneration

Following elution, the barren carbon will be transferred from the elution column to the feed hopper of the horizontal carbon regeneration kiln. Any residual and interstitial water in the kiln feed hopper will be drained from the carbon before it enters the kiln.

The carbon will be heated to (650 to 750)°C in the kiln and held at this temperature for 15 minutes to allow regeneration to occur. Regenerated carbon from the kiln will be quenched and pumped to the carbon sizing screen. The screen oversize (regenerated sized carbon) will return to the CIL circuit, while the quench water and fine carbon will report to the carbon safety screen.

17.4.2.14 CIL Tailings Treatment

Endeavour and by association SGO, are committed to meeting or exceeding the international cyanide management code (ICMC) requirements. Pursuant to this, an SO_2/air cyanide destruction circuit has been incorporated into the design. The SO_2/air destruction circuit will reduce the weak acid dissociable cyanide (CN_{wad}) in the slurry discharged from the CIL circuit to less than 50 mg/L prior to pumping to the TSF.

The cyanide destruction circuit comprises of two agitated tanks, providing 1.5 hours of residence time. The tanks will be interconnected with launders to allow the circuit to be run in parallel or series.

Underflow from the CIL circuit carbon safety screen will gravitate to the cyanide destruction circuit. Copper sulphate and sodium metabisulphite (SMBS) solutions will be added to provide the required copper and sulphur dioxide for the cyanide destruction process. Air from the CIL blowers will be sparged down the shafts of the cyanide destruction agitators to provide oxygen to the slurry. Provision will be made for milk of lime slurry to be added to maintain a slurry pH of 8.0 to 9.0.

17.4.2.15 Tails Disposal

As defined below, there are two tailings waste streams and subject to origin, will be pumped to either TSF1 (unlined) or TSF1B (lined):

- Flotation tailings from the tailings thickener underflow and other miscellaneous waste streams from the process plant will be combined in the flotation tails hopper and pumped to the unlined TSF1.
- CIL tails after cyanide destruction, water recovery thickener underflow and other miscellaneous waste streams from the process plant will be combined in the tails hopper and pumped to the high density polyethylene (HDPE) lined TSF1B.

Tailings deposition into TSF1 will be via a peripheral discharge. In addition, cyclic spigot deposition at various locations will be used to allow consolidation and drying of deposited material into beaches to direct supernatant water towards the rock ring surrounding the decant pumping system.

Tailings deposition into TSF1B will also be via a peripheral discharge; however, cyclic spigot deposition at various locations will be used to maintain sub-aqueous deposition to minimise ongoing oxidation of the sulphide minerals with possible acid metalliferous drainage (AMD) and eliminate 'dusting'.

17.4.2.16 Decant Return

The supernatant water decanted from the unlined flotation TSF (TSF1) will be returned to the SSTP flotation process water tank for reuse in the milling and flotation circuits. Any decant return in excess to the SSTP requirements will be directed to the SWOLP process water system.

The supernatant water decanted from the HDPE lined BIOX® tailings storage facility (TSF1B) will be returned to the Sabodala Water Treatment Plant (SWTP) feed tank. The decant water will be treated through a 'greensand' filtration treatment plant, similar to what is proposed for the treatment of run-off water from ore stockpiles and mineralised waste dumps at the Massawa pits, hereafter referred to as the Massawa water treatment plant (MWTP). The greensand filtration treatment plant is designed to precipitate arsenic (As) and antimony (Sb) as stable products in a sludge, which is back-washed to the CIL tails hopper and disposed of in TSF1B.

Greensand is a natural glauconitic product capable of reducing ions through oxidation and filtration. Once the ions are oxidised and precipitated, they are removed by back-washing the media. When the media oxidation capacity is exhausted, the media is regenerated either using chlorine (Cl_2) or permanganate ($KMnO_4$) solution.

17.5 Plant Services Description

The following Section provides a summary description of the plant services provided to the SWOLP and SSTP.

17.5.1 Sabodala Whole Ore Leach Plant (SWOLP)

17.5.1.1 Power

Power is currently provided by the HFO SPS. The operation of the SPS is detailed more fully in Section 18.

17.5.1.2 Diesel

Diesel for power station and elution circuit use is received and stored in the power station fuel farm facility and reticulated to the power station and a day tank in the elution area for further distribution.

17.5.1.3 Air

The SWOLP will continue to use the existing plant air and instrument air systems. The systems include five air compressors (four duty and one standby), one plant air receiver, two air dryers (one duty and one standby) and one mill air receiver. Additional capacity has been allowed for the process air system (CIL air).

17.5.1.4 Water

Primary raw water supply to service the processing plant is comprised of two surface water storage dams fed from local catchment areas. These dams are designed to store adequate water from seasonal rainfall events to provide for all site uses. Currently the SWOLP plant obtains all its make-up water requirements from TSF1 decant with no raw water make-up from the storage dams required. It is anticipated that this practice will carry on with decant water from TSF1 and later TSF2 meeting all the SWOLP plant water requirements.

Two separate systems provide water to the processing plant. One is designated the raw water system although TSF1 water quality is such that raw water is not used. The other is the process water system. Both systems currently use decant water from TSF1.

The raw water system is used primarily for the following:

- Firewater for emergency use.
- Dust suppression.
- Gland water and cooling water services.
- Reagent preparation.
- Carbon desorption and intensive leach.

The process water system supplies the grinding, gravity, leach and adsorption circuits. Tailings thickener overflows report to the process water standpipe/pond for reuse.

17.5.2 Sabodala Sulphide Treatment Plant (SSTP)

17.5.2.1 Power

The SSTP power requirements (Table 17.3.9) necessitate an upgrade of the SPS. The details of the upgrade requirements and the new 11 kV supply are detailed in Section 18.

17.5.2.2 Diesel

Diesel will be pumped to the plant header tank from the existing fuel farm. Diesel will flow by gravity from the header tank to the elution heaters and the regeneration kiln.

17.5.2.3 Raw Water

Raw water for the project will be sourced from the existing large and small raw water dams and pumped by duty/standby submersible pumps to the plant raw water tank. The raw water tank will have sufficient capacity to minimise the impact of short term supply interruptions. Duty and standby raw water pumps will distribute raw water to the plant. Raw water will be used in the following areas:

- Dust suppression.
- Area clean-up water in the crushing, reclaim and reagents areas.
- Flotation process water tank make-up. BIOX® process water tank make-up.
- Regenerated carbon quench water.
- Reagent mixing

- Firewater.
- Filter water plant supply.

17.5.2.4 Firewater

Firewater for the new SSTP will be drawn from the reserve in the lower section of the raw water tank. The firewater pumping system will comprise: an electric jockey pump to maintain fire ring main pressure; an electric firewater delivery pump to supply firewater at the required pressure and flow rate; and a diesel-driven firewater pump will start automatically if power is not available for the electric firewater pump or if the electric pump fails to maintain pressure in the firewater system.

Fire hydrants and hose reels will be located throughout the process plant, fuel storage and plant offices at intervals that ensure complete coverage in areas where flammable materials are present.

17.5.2.5 Filtered Water

Filtered water from the raw water tank will be utilised for stripping water in the elution circuit. The raw water will be treated in a containerised water treatment package that will produce water suitable for the AARL carbon stripping process and then be stored in the filtered water storage tank for later use. Filtered water will also be used for gland water, cooling water make-up and on-stream analysers.

17.5.2.6 Gland Water

Gland water for gland sealed centrifugal pumps will be pumped from the filtered water storage tank. In addition, the gland water system includes a duty/standby set of gland water pumps that will supply gland water to a distribution network that services all centrifugal pumps requiring gland water.

17.5.2.7 Flotation Process Water

Concentrate and tailings thickener overflow solution will gravitate into the flotation process water tank. Additionally, recovered supernatant liquid from the settled flotation tailings slurry on TSF1 will also be pumped as decant water to the flotation process water tank. Finally, make-up water for the flotation process water tank will be pumped from the raw water tank into the flotation process water tank via the raw water reticulation system.

The design of the flotation process water storage system is such that if the concentrate thickener is sliming, process water with a high solid content does not report directly to the process water tank but is discharged into a standpipe. The standpipe will be positioned between the process water pump suction header and the process water tank. This arrangement will allow the dirty water to preferentially be pumped into the flotation process water reticulation system and not settle and build-up in the process water tank.

The flotation process water pumps will mainly supply process water for SAG, ball mill inlet and cyclone feed hopper dilution. In addition, process water will also be supplied for flotation surge tank dilution, regrind mill feed hopper dilution, screen and flotation launder sprays, flocculant dilution for the concentrate and tailings thickeners and service points in the milling, flotation, and regrind circuits.

17.5.2.8 BIOX® Process Water

Water recovery thickener overflow will gravitate to the BIOX® process water tank. Make-up water for the BIOX® process water tank will be pumped from the raw water tank into the BIOX® process water tank via the raw water reticulation system.

The BIOX® process water pumps will supply dilution water to the BIOX® high and low-grade feed pumps, spray water to the BIOX® trash screen, carbon recovery and safety screens and service points in the BIOX®, neutralisation, CCD and CIL areas. BIOX® process water will also be used for reagent mixing and dilution water for antifoam, limestone, quicklime and cyanide.

17.5.2.9 Potable Water

Potable water will be supplied from a new reverse osmosis (RO) water treatment plant at the SPS, to the potable water tank in the SSLP. Potable water will be distributed to the site facilities and process plant using pressure-controlled centrifugal pumps. In addition, potable water will be supplied to all safety showers within the process plant.

Potable water will not be pumped to the primary crushing area. Instead, bottled potable water will be used where required. In addition, portable safety showers will be located at the primary crushing areas.

17.5.2.10 Cooling Water

Dedicated closed-circuit cooling water systems will be provided for the BIOX® primary and secondary reactors, the neutralisation tanks, nutrient mixing tanks and the backup inoculum tank, the SAG and ball mill drive systems, the medium pressure (MP) air blower aftercoolers, and the SPS.

Each cooling water circuit will consist of an induced draft, cross-flow cooling tower vendor packages. The systems will include biocide, antiscalant and corrosion inhibitor dosing facilities, side stream filtration and UV sterilisation to maintain the cooling water quality and inhibit the growth of algae and bacteria in the cooling water circuit. The cooling water circuits will be charged and made up from the filtered water storage tank.

17.5.2.11 Plant and Instrumentation Air

High pressure dried compressed air (800 kPa(g)) will be generated for general use throughout the plant.

Two air compressors running in a lead/lag configuration will supply instrument and plant air to the process plant. All compressed air will be dried to ensure clean and low moisture air is delivered to all plant instruments and tools driven by compressed air. Dedicated plant and instrument air distribution circuits within the process plant, combined with strategically located air receivers, will ensure sufficient compressed air is available during a power failure.

17.5.2.12 Flotation Blower Air

Three (two duty/one standby) centrifugal blowers will supply low-pressure air (68 kPa(g)) to the flotation circuit.

17.5.2.13 CIL and Detox Blower Air

CIL and detoxification air (81 kPa(g)) will be supplied by two duty/one standby air blowers and will be reticulated to the CIL and detox tanks and injected into the slurry via the tank agitators.

17.5.2.14 BIOX® Blower Air

Air will be supplied to the BIOX® reactors by high-efficiency single-stage centrifugal blowers with variable diffuser vanes. Four blowers (three duty/one standby) will supply medium pressure (159 kPa(g)) air to the BIOX® and neutralisation tanks and inject medium-pressure air into the slurry via sparge rings.

Water-cooled aftercoolers will be installed on each air blower to reduce the discharge air temperature below 48°C, so as to minimise the heat load on the BIOX® circuit. Cooling water for the air blowers and aftercoolers will be supplied from the blower cooling tower by the blower cooling water pumps.

17.6 Metallurgical/Commercial Accounting

17.6.1 Sabodala Whole Ore Leach Plant (SWOLP)

The metal accounting equipment, procedures, personnel and training systems have been established and operational since the original Sabodala project commissioning. The metal accounting system utilises weightometers, flow meters and sampling on selected process streams. The assays are undertaken by third-party operated laboratory and all metal accounting physical and assay information is retained in a database. The addition of a gravity circuit as part of the 2021 upgrade necessitates modification of the process. This is facilitated by a dedicated electrowinning cell for the gold recovered from the gravity circuit.

The short-run measurement of metal flows is accomplished through assay grade calculation and financial metal account reporting based upon reconciled bullion and change in gold-in-circuit (GIC), plus assay estimate of tails. The two methods are systematically compared against each other and the mine call grade to identify inconsistencies requiring forensic examination.

Reagent consumption is tracked each reporting period via stores movements and over the short interval via flow meters and level sensors.

17.6.2 Sabodala Sulphide Treatment Plant (SSTP)

A metal accounting balance for the process plant can be generated with the information provided by weightometers, flowmeters, densitometers and samplers on selected process streams.

A dedicated electrowinning cell will be provided to recover the gold leached by intensive cyanidation of the gravity concentrate. The recovered gravity gold sludge can be smelted separately to assist with metal accounting and recovery calculations. The plant head grade can be back-calculated from gold recovered via the gravity and leach circuits and the final tails.

Regular GIC surveys will allow reconciliation of precious metals in feed compared to doré production.

Water supplied and used in the various areas will be continuously monitored.

Reconciliation of reagents usage over relatively long periods will be achieved by reconciling delivery receipts and stock takes. In addition, instantaneous reagent usage rates of the flotation reagents, BIOX® reagents, CIL and detoxification reagents to unit operations will be measured with flowmeters and recorded on the operator interface terminal (OIT), to provide accumulated usage rates.

17.7 Independent Audits/Reviews

17.7.1 Sabodala Whole Ore Leach Plant (SWOLP)

Whilst the process description and process parameters discussed herein have been subject to an internal review by Endeavour personnel, no external independent reviews have been undertaken.

17.7.2 Sabodala Sulphide Treatment Plant (SSTP)

Whilst the process description and process parameters discussed herein have been subject to an internal review process by Endeavour, no external independent reviews have been undertaken by industry experts.

17.8 Data Verification

The data verification process applied in the development of this Section is discussed in Section 12.

17.9 Comments on Section 17.0

17.9.1 Sabodala Whole Ore Leach Plant (SWOLP)

The SWOLP is an existing asset currently in operation that has reliably introduced a variety of free milling ores from new sources/pits without significant issues. The plant performance has reliably been predicted by the routine testwork programmes undertaken prior to new ore sources being introduced.

It is recommended that recovery and reagent information be updated on a regular basis.

17.9.2 Sabodala Sulphide Treatment Plant (SSTP)

Comments on the SSTP elements of Section 17.0, are fully defined in Section 25.0 Interpretations and Conclusions.

17.10 Interpretations and Conclusions

Interpretations, conclusions and risks pertaining to Section 17.0 are presented in Section 25.0.

17.11 Recommendations

Recommendations, including forward work programme activities and budgets pertaining to Section 17.0, are presented in Section 26.0.

17.12 References

References cited in Section 17.0 are presented in Section 27.0.

18.0 PROJECT INFRASTRUCTURE

18.1 Overview

18.1.1 Background

This Section presents the mine infrastructure that is either existing or planned on the Sabodala Mining Concession and the Massawa Mining License, as well as the regional and national infrastructure that supports Sabodala Gold Operations SA (SGO's) operations in southeast Senegal.

The existing Sabodala operation and the phased approach to the mining of ore on the Massawa License and its subsequent processing at Sabodala is described more fully in Section 2.

In summary, Phase 1 (P1) covers the development of the requisite mine infrastructure at Massawa and the upgrade of the Sabodala Whole Ore Leach Plant (SWOLP) in order to mine and process the free milling Massawa ores. Phase 2 (P2) covers the installation of the Sabodala Sulphide Treatment Plant (SSTP), which will enable the processing of the non-free milling fraction of the Massawa ores. The attendant infrastructure requirements for each phase are summarised in Section 2 and detailed herein.

18.1.2 Sabodala Mining Concession

The Sabodala mine has been in production since 2009 and has in place all the infrastructure required to support the open pit mining operation and the (4.2 to 4.5) Mt/a (db) SWOLP. This includes, but is not limited to:

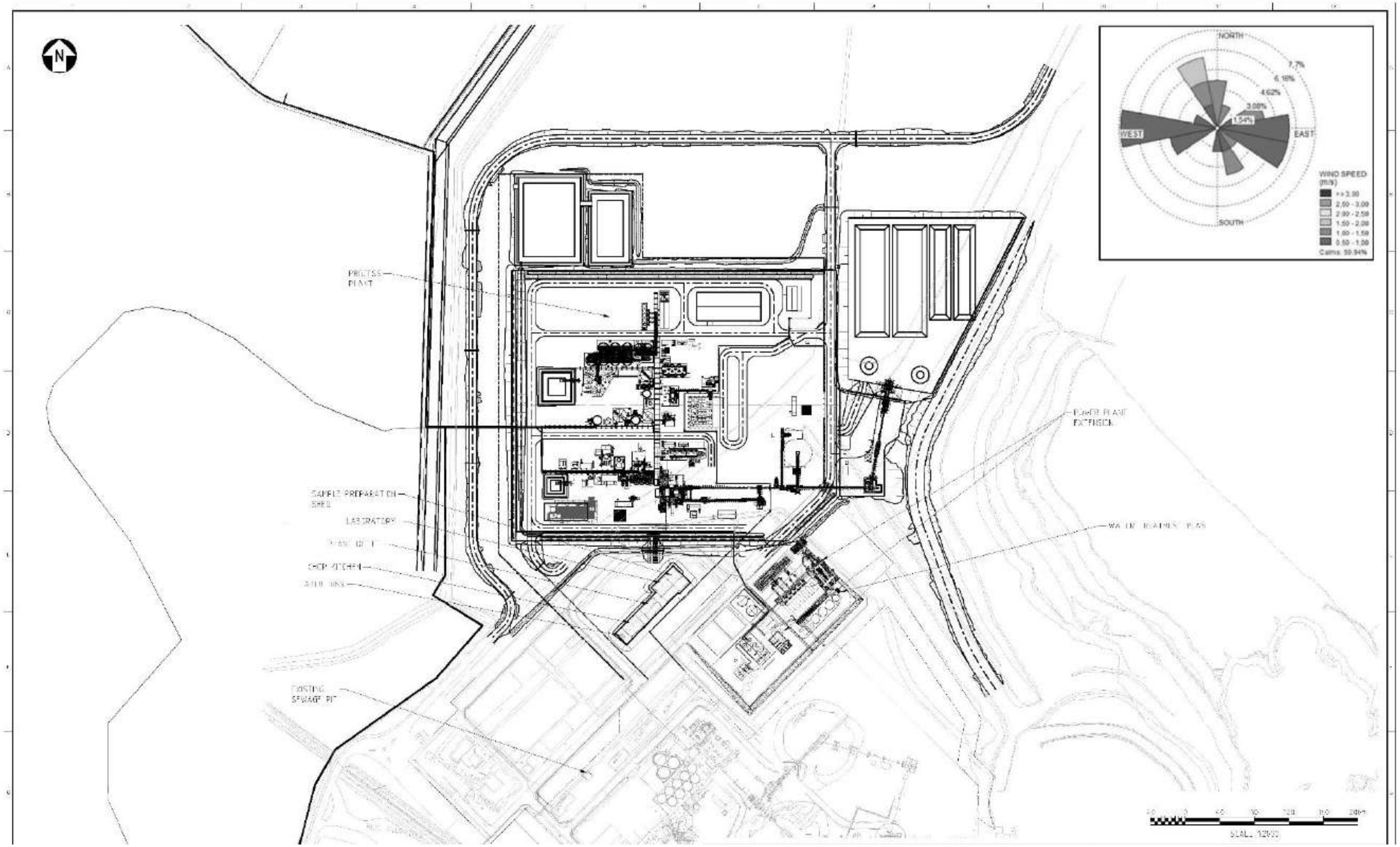
- A secure water harvesting and storage facility (the Large Raw Water Dam (LRWD) and the East Raw Water Dam (ERWD)).
- The heavy fuel oil (HFO) Sabodala power station (SPS).
- Accommodation and recreation facilities for non-local staff.
- An airstrip.
- An open pit mining fleet.
- A tailings storage facility (TSF).
- All the necessary offices, warehouses and workshops to sustain the operation.

Existing port facilities in Dakar and local logistics companies providing transport to and from site have supported the operation for over 12 years and are adequate to meet the needs of the expansion project.

SGO's operations are supported by a regional office in Dakar and Endeavour's head office support functions in London, United Kingdom and Abidjan, Côte d'Ivoire.

The transport of people and goods to SGO's operations are described more fully in Section 5. The layout of the new SSTP and its relationship to existing infrastructure is outlined in Figure 18.1.1.

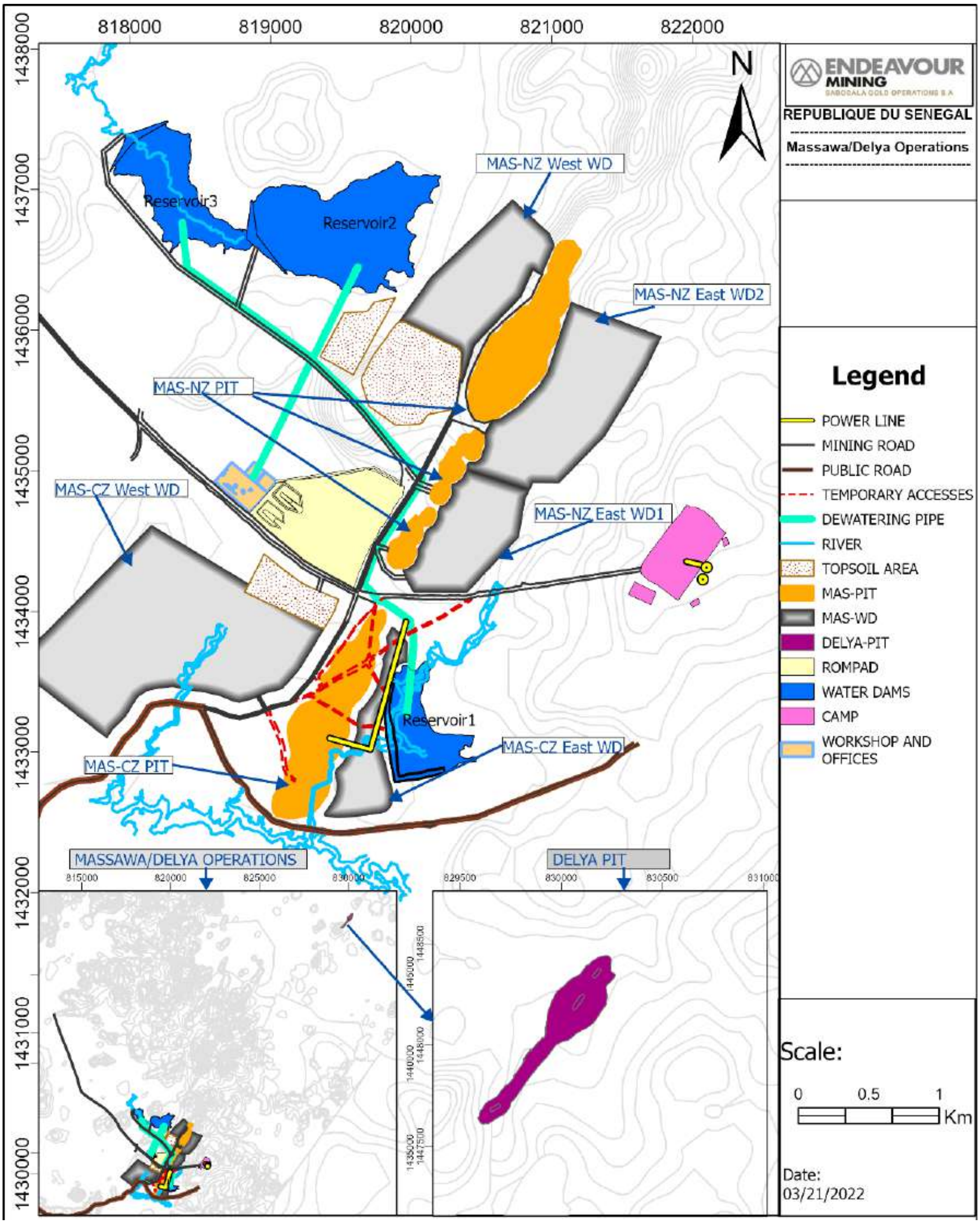
Figure 18.1.1 SWOLP/SSTP & Infrastructure Layout (Lycopodium, 2022)



18.1.3 Massawa Mining License

As part of the acquisition of the Massawa Project from Barrick, Teranga and more recently Massawa SA, took possession of four mining areas on the Massawa Mining License, namely Sofia, Massawa Central Zone (CZ), Massawa Northern Zone (NZ) and Delya. The layout of the Massawa and Delya pits, dumps and supporting infrastructure is illustrated in Figure 18.1.2. The Sofia pits are being mined and have the requisite infrastructure in place.

Figure 18.1.2 Massawa Infrastructure



Source: Endeavour, 2022.

Whilst operations on the Massawa License are run from SGO's operations hub at Sabodala, additional mine support infrastructure is still required on the Massawa Licence, specifically for the development of the Massawa CZ/NZ and Delya open pits.

On the Massawa License there is some existing infrastructure, but new infrastructure is required to support mining operations as noted in Figure 18.1.1 and includes:

- Exploration camp at Massawa (upgrade).
- Mine dewatering and storage (new).
- RoM pad (new).
- 'Long-haul' and haul roads (established and new).
- Power supply (new).
- Waste pads (new).
- Workshops, offices, mess and service bay (new).
- Ablutions and conservancy tanks (new).
- Water reservoirs x 3 (new).
- Dirty water management systems (new).
- Clean/dirty water pumping (new).
- Massawa dirty water treatment plant (MWTP) (new).

18.2 Basis of Design

18.2.1 Existing Infrastructure

The SWOLP and the attendant infrastructure is existing, fully operational and hence not discussed further in this sub-section.

18.2.2 New Infrastructure

The new SSTP and attendant infrastructure has been through a number of iterations with respect to layout, configuration and integration with the SWOLP, culminating with a memo being published that ranked the various options and sites considered on a semi-qualitative to quantitative basis (Harmsworth, 2021). In total, four alternate layouts were considered, which after analysis, were whittled down to two for detailed analysis. The two considered options are for the current position to the north of the SWOLP (51.3 ha of land) and the other option directly to the south of the SWOLP (27.6 ha of land).

The site selected and the configuration proposed in the PFS was discounted, as was the requirement to align the SWOLP haul truck access with the SSTP haul truck access.

In the analysis, the north and south options came out relatively equal, albeit on the basis of operability and preference, the northern site was preferred by the site operations team and subsequently selected for the Project. With the new site, the following issues were considered:

- Use of existing plant access infrastructure and change rooms (no expansion or changes required).
- Use of existing engineering workshops and general stores.

- Wind direction, specifically with respect the impact of dust and acid mist on the Sabodala Power Station (SPS) maintenance and operation.
- Integration with existing plant/site services, power water, fuel and sewerage systems.
- Fuel truck access to the SPS tank farm.
- Diversion of the main access road to the existing facilities.
- Logistics constraints as noted in Section 18.4.
- Ground founding conditions and topography.
- Proximity to TSFs.

Whilst the environment is hot, dry and dusty for large parts of the year, the ambient environment has been considered, specifically with respect to dry and wet bulb temperatures for equipment specification, dust management and water usage. The site is not subject to extreme weather or seismic events that would add cost and complexity to the Project.

18.3 Earthworks and Site Preparation

18.3.1 General Geotechnical and Seismic Considerations

18.3.1.1 Geology

The general geology of the Sabodala site typically comprises a laterite caprock, which varies from two to three metres in thickness, overlying clayey gravel/gravelly clay, which is the highly weathered surface of the underlying meta-basalts and sheared mafic and ultramafic volcanics. Locally, the volcanics are intruded by dolerite and gabbro sills and dykes, as well as quartz-feldspar porphyry and rhyolite dykes.

Based on a review of the available data, the surficial geology can be summarised as follows:

- The area comprises a series of plateaus of medium to high strength, well-cemented laterite, with colluvial/alluvial deposits common in the valleys.
- The colluvial/alluvial materials comprise sandy clays, clayey gravels, clayey silty gravel to a maximum depth of 3.4 m, overlying extremely weathered schist which excavates as clayey silt.

There is an abundance of clay material in the TSF areas and adjacent areas which is suitable for embankment construction. The upper parts of the valleys and tops of the hills, which are characterised by the laterite caprock which overlay the clay, are porous. This porosity limits the maximum volume which can be retained by water storage facilities at the site. The presence of this porous laterite caprock is also believed to limit the development of the phreatic surface within the existing TSF.

18.3.1.2 Seismicity

The Project site is located on the West African craton, which has been seismically stable for the last 1,700 million years (Ma) in what is considered a stable continental region (SCR), predominantly consisting of a very ancient plateau, which displays few clearly recognised, active tectonic features. The seismicity is not well known, due to the lack of historical records and modern seismic networks. West Africa is remote from any major active plate boundaries and deforms very slowly (<2 mm/year).

Recent probabilistic seismic hazard assessment (PSHA) studies for the Syama Mine site in Mali, approximately 700 km to the southeast of the Project, indicated that the peak ground acceleration (PGA) for a 475-year return period is

0.006 g (0.06 m/s^2). The impact of the lower coefficient of horizontal acceleration would be a slightly higher factor of safety for any TSF embankments than indicated in the designs which have been prepared.

A 2018 Optimisation Study Report indicates a horizontal PGA of between 0.2 to 0.4 m/s^2 for a 1/500-year annual recurrence interval (ARI), that is a 10% probability of exceedance in 50 years, based on the NEIC/USGS Seismic Hazard Map for Africa.

A more recent Global Earthquake Model (GEM) Global Seismic Hazard Map (Openquake, 2021) provides a smaller PGA (between (0.01 and 0.02) g or (0.1 to 0.2) m/s^2) for a 1 in 475 annual exceedance probability (AEP).

In the absence of a probabilistic seismic hazard assessment (PSHA) for the site, Advisian is recommending a PGA of 0.03 g (0.3 m/s^2) for the operating base earthquake (OBE) and 0.05 g (0.5 m/s^2) for the safety evaluation earthquake (SEE). Given the available knowledge of the seismicity of the area, these values are considered to be reasonable.

18.3.1.3 Geotechnical Standards Applied

In the absence of specific Senegalese Design Standards, Australian Standard (AS 1726 Geotechnical Site Investigations) have been adopted for the fieldwork. ASTM International Standards relevant to the tests undertaken were adopted for the geotechnical laboratory testing.

18.3.1.4 Historical Geotechnical Information

There have been a number of geotechnical investigations on the Sabodala property, during the original project development phase and again for the subsequent process and infrastructure expansion phases. Relevant studies have included:

- Sabodala Whole Ore Leach Plant (Mining One Pty Ltd, 2007).
- Sabodala Plant Expansion (Coffey Mining Pty Ltd., 2011).
- Heap Leach Project (Advisian/WorleyParsons, 2016).

18.3.1.5 Geotechnical Investigations

DFS Testwork Programme

Historical geotechnical information (Section 18.3.1.4) has been supplemented with a programme of site specific geotechnical investigations (including rotary cored boreholes and laboratory testing) for the SSTP (the results and findings of which have not been finalised at the time of writing this Report).

Test pits were excavated at the proposed heap leach site, which is adjacent to and north of the SSTP site. The excavator used to penetrate the caprock and dig the test pits was very large with a large bucket. The width of the test pits was the actual bucket width, estimated to be approximately 2.4 m.

Groundwater and Dewatering

Groundwater is not considered to be an issue at the proposed plant site, which is to the east of the diversion drain. The natural ground at the site ranges from RL 158 m in the southwest to RL 167 m in the northeast and is above the elevation of the decant pond for TSF1 (currently RL 147 m with a projected maximum elevation of 154 m).

Ground conditions and particularly groundwater levels may vary with the seasons. As such, site preparation procedures may differ from the above, particularly if development proceeds during the wet season.

Dewatering is unlikely to be required.

Aggregate Sourcing

Aggregates for concrete can be sourced locally. There is a crushing plant at Sabodala which can produce concrete aggregate from basalt mine waste. Sand suitable for concrete is imported from a local source and is available by ordering through the site warehouse. These local materials have been used in previous construction activities, although it is understood that some aggregates may have been imported from Dakar.

Concrete Attack

There is no evidence of deterioration of the existing concrete which is in contact with the structural fill. Given the geological origin of the materials, it is likely that the materials proposed for structural fill will be neutral, consistent with the testing executed in 2007 (Mining One Pty Ltd, 2007).

Suitability of Excavated Materials for use as Fill

The caprock materials and underlying clayey gravel from site may be used as structural fill. Material excavated from site, or adjacent borrow areas, may be used as fill, provided it is placed and compacted in layers not exceeding 0.3 m thickness. Topsoil may be used as fill in landscape areas but should not be used as structural fill.

Excavation Characteristics

Excavation characteristics have been assessed based on on-site observations during fieldwork/experience with similar materials and include:

- Laterite caprock will require the use of large excavators (>30 t) where excavation in virgin caprock is anticipated.
- Once the initial excavation has penetrated the caprock, further excavation using smaller equipment can be executed using the open face and breaking the caprock in tension.
- Ripping to excavate caprock, where dozers or similar try to break materials from the surface by compression, is not recommended. Excavation productivity is low and slabs of materials outside the designated excavation area can easily be disturbed and/or removed, creating additional work where reinstatement is then required.

No trafficking problems are anticipated for construction equipment provided adequate site drainage is provided for the construction and operation phases.

18.3.1.6 Geotechnical Design Parameters

Terraces and Foundations

As with the existing plant, it is recommended that the SSTP be constructed on a pad of compacted clayey gravel and laterite derived from caprock, which readily breaks up during compaction. The construction of a pad of compacted laterite is very useful in creating a relatively flat site, sitting above the natural ground level to minimise runoff into the proposed plant site area, particularly at the southern end, which would allow the plant site to be out of the natural drainage line and have the bulk of the plant on higher ground. The use of a compacted structural fill platform with a minimum thickness of not less than 0.75 m also ensures that services and shallow foundations can be installed without disturbing the underlying caprock.

For the compacted structural fill platform, comprising laterite clayey gravel and/or laterite caprock, which is easily crushed by traffic compaction, due to it low tensile strength, which is moisture cured and compacted to not less than 98% modified maximum dry density (Modified Proctor) allowable being capacities in the range of (175 to 250) kPa, which are typical values for process plant design, can be adopted. A minimum depth of embedment for all footings of not less than 0.5 m is recommended.

Settlement behaviour of shallow concrete foundations supporting various process plant structures, including the fill earthwork platform forming the primary crusher ROM pad and stockpile, has been evaluated utilising the commercial ground settlement analysis software Rocscience Settle[3]. The assessment has been undertaken on the following geotechnical design basis:

- Minimum foundation embedment depth of 500 mm.
- Engineered fill underlying foundation base shall not be thicker than 2500 mm (3000 mm if taken from finished ground surface).
- Engineered fill underlying foundation base shall be sufficiently compacted to achieve a nominal drained elastic Young's modulus of ≥ 50 MPa.

Outputs from the settlement assessment include the predicted settlement magnitude in the middle and along the edge of the foundation, settlement profile across a cut cross-section of the proposed ROM pad and stockpile, and modulus of subgrade reaction (k) profile across the foundation base surface.

Typical values (Gs) for low strain amplitude shear modulus for the design of structures and foundations for vibrating machines as recommended by Suesh Arya, O'Neill and Pincus would be in the range of (100 to 200) MPa for foundations placed into the compacted structural fill platform.

A design subgrade California Bearing Ratio (CBR) of 20 is recommended. The adoption of this design value is contingent upon strict compliance with the site preparation recommendations and the compaction of structural fill in trafficable areas to not less than 98% Maximum Modified Dry Density (MMDD)/Modified Proctor.

Earthwork Slopes

Excavated slopes should be designed and constructed not steeper than 3:1 (H:V) in soil and 1.5:1 (H:V) in rock. Fill slopes should not be steeper than 2:1 (H:V). For all slopes:

- Slope drainage should consist of catch drains located at centres of no more than 50 m and be lined with either stone pitching and mortar or stone pitching with a geotextile underlay which is fully concealed and not exposed to UV light.
- Erosion protection consisting of stone pitching and mortar is recommended on batter slopes which may be subjected to periodic flooding from adjacent drainage, such as drainage from the existing plant.

Support by retaining walls etc. will be required where the crusher is placed into the existing waste dump/RoM pad.

Structural Fill

For this assessment, structural fill has been defined as fill satisfying the following criteria:

- 100% passing 75 mm and less than 25%, by weight passing 0.075 mm.
- Having a liquid limit less than 50 and a plasticity index less than 20%.

The fill should be moisture conditioned within ±2% of the optimum moisture content as determined by laboratory test AS 1289.5.1.2 (or equivalent ASTM) and be placed in horizontal loose lifts of not greater than 300 mm thickness and compacted to 98% of its maximum dry density as determined by AS 1289 Test 5.1.2 (or equivalent ASTM).

18.3.2 General Site Earthworks, Terracing and Water Management

18.3.2.1 Sabodala Whole Ore Leach Plant and Infrastructure

The SWOLP terrace is established, with appropriate clean and contact water management systems in place. No operability or drainage issues are noted.

18.3.2.2 Sabodala Sulphide Treatment Plant

Sabodala RoM Pad

The SSTP RoM pad (with an area of 29 600 m^2) at an RL of 172.38 m will be constructed, to stockpile up to six weeks of ore in bulk, or four weeks in small to medium stockpiles to allow blending of the SSTP feed to meet optimal sulphide sulphur, arsenic, iron and gold content. The SSTP ROM pad will be constructed using mine waste from the ongoing Sabodala mining operations.

The SSTP RoM pad will drain to the north side, with drainage presenting via a surface drain to the RoM storm water pond. This pond is sized for a 1:50 year 24 hour rainfall event of 140 mm. The pond will be double lined with HDPE and will overflow to the plant storm water pond. Tubes will be provided between the liners to the lowest level, to facilitate leakage monitoring.

Sabodala Sulphide Treatment Plant

From previous geotechnical work (20210518 ROT Plant Sabodala - Technical Memorandum), a nominal 2 m thick laterite caprock layer, with minimum topsoil and vegetation outcrops in the plant area. To minimise disturbing the caprock layer, the majority of plant foundations will rest within structural fill forming an earthworks pad on the caprock. Process event and storm water ponds will involve local penetration of the caprock.

In the plant area the natural surface slopes approximately 3% down to the west. The plant earthworks feature a central ridge sloping down to the west with the northern half sloping 2% to the northwest and the southern half sloping 2% to the southwest. The pad structural fill depth ranges from 0.3 m at the northeast corner, to 4.2 m on the west side.

The plant storm water pond at the northwest corner of the plant will receive plant pad runoff via pad perimeter drains on the north, south and west. This pond is also sized for a 1:50 year 24 hour event of 140 mm rainfall. The pond will be double lined with HDPE and will overflow to the existing north–south drain. Tubes will be provided between the liners to the lowest level to facilitate leakage monitoring.

Storm water will be reclaimed from both ponds, by the use of temporary submersible duty pumps.

An allowance was made for partial lining of internal drain batters, with stone pitching and mortar.

18.3.2.3 Massawa Mine RoM Pad

A 55 000 m^2 RoM pad will be established in close proximity to the Massawa CZ pit, thereby creating a short travel distance for the mine haul trucks travelling from the mining areas to the northeast, southwest and the west. Access for the surface haulage contractor will be at the southeast of the RoM pad.

Around the RoM pad, drains and channels will be established to collect all contact water from RoM pad including stormwater and leachate from the ore stockpiles. This water will either be treated in the Massawa Water Treatment Plant (MWTP) or blended with cleaner water from the Massawa water reservoirs, before being discharged to the environment.

18.3.3 Berms

Earthwork berms to manage clean and contact water run-off are/or will be established on both the Sabodala and Massawa Properties, as part of the Phase 1/2 expansion programme. The requirements are outlined more fully in Section 18.6.

18.3.4 Demolition

The proposed area is free from any existing facilities and no demolition is required.

18.4 Transport and Logistics

The following sub-section covers the movement of people and goods on-site and between key national and international logistics hubs.

18.4.1 Logistics

18.4.1.1 Construction Logistics

Since the construction of SGO in 2008, infrastructure and equipment available with respect to moving conventional and abnormal loads at the port and on the roads to Sabodala has only improved. Thus, no issues are foreseen.

18.4.1.2 Operational Logistics

Given the relatively low volumes of goods and people transported to and from SGO's operations, there are no foreseen operational logistics constraints/bottlenecks between Dakar, the Autonomous Port of Dakar (PAD) and Sabodala. As with all mining operations, consideration is given to the transport of hazardous material and the impact that road logistics has on communities (physical and chemical hazards, noise and dust).

Given that SGO has created a central processing facility at Sabodala (SCPF) that can process free milling (SWOLP) and sulphide ores (SSTP), over the coming years up to 5.5 Mt/a (db)[1] of ore will be transported from satellite pits to either one of two RoM receiving areas at Sabodala. Whilst the haulage roads are private, they still interface with community roads and pointsman are placed at intersections to manage the flow of public traffic across these haul roads.

Whilst a weighbridge is employed for general cargo, a weighbridge system is not used for measuring ore transported.

[1] In 2028

18.4.2 Roads/Access

The following subsections provide a high level overview of the roads currently used and/or planned by SGO for the Sabodala and Massawa properties, as well as how materials and people are transported from Dakar to Sabodala

18.4.2.1 Public Roads (Off License)

By road, SGO's Sabodala operations are approximately 790 km from the PAD and Dakar. The route from PAD and Dakar follows the N1 (tolled) to the regional centre of Tambacounda (approximately 460 km), and then southeast on the N7 to Kédougou (approximately 230 km). Both the N1 and N7 are sealed all-weather roads, whilst the final 96 km from Kédougou to Sabodala via Bembou, is a mix of sealed and laterite roads. During the west season, SGO maintains at its cost, the laterite road between Bembou (at the end of the paved road) and Sabodala.

18.4.2.2 SSTP Site Access Road Modifications

The existing northern site access road will be re-aligned to provide access into the new SSTP and the SPS, with a separate branch around the west side of the plant to the existing SWOLP. The total length of the road re-alignment is 1.9 km. Road width will be 9 m, with a 150 mm laterite wear course to be placed over the subgrade/general fill. Minor associated drains and culverts will be provided as required. Where the slope exceeds 2:1, the access road batters will be supported with stone pitching and mortar (MineScope, SSTP-2021).

18.4.2.3 Haul Roads

For the Sabodala and Massawa properties, a series of haul roads facilitate the movement of rigid body dump trucks (Komatsu HD785) between the pits, local RoM storage pads, waste dumps and mine workshops. They have been designed with the following criteria:

- Ramp widths are 25.0 m and 16.0 m for dual lane and single lane traffic respectively.
- Minimum road widths of 30 m and turning radius of 10.1 m.
- Ramp gradients 1:10.

'Long-haul' roads have been developed between the various pits, the central RoM storage facilities at Massawa and the two RoM storage areas at SWOLP and the SSTP. These are private dual lane (25 m wide) laterite roads, designed for general bulk earth moving trucks (horse and single trailer) with a gross vehicle mass (GVM) of 86 t (net payload 60 t).

Road distances between the pits and the Sabodala Central Processing Facility (SCPF) are noted in Table 18.4.1. The volume of material moved between these pits, the SCPF, the SSTP and the SWOLP and the associated operating basis is provided in Table 18.4.2.

Table 18.4.1 Distances between Pits and SCPF

	Nikafiri	Maki Medina	Goumbi West	Sofia Main	Sofia North	Massawa CZ	Massawa NZ	Delya
Distance to SCPF (km)	4	9	11	30	30	32	32	46

Table 18.4.2 Nominal Ore Truck Movements

	RoM Max Mt/a (arb)[1]	Tonnes per Truck						
		h/d	d/a	h/a	t/h	(arb)	trucks/h	trucks/min
SSTP (2032)	1.26	20	365	7300	173	60	2.9	20.8
SWOLP (2023)	4.68	20	365	7300	641	60	10.7	5.6
Max (2028)	**5.69**	**20**	**365**	**7300**	**779**	**60**	**13.0**	**4.6**

18.4.2.4 SSTP Plant/Facility Roads

Allowance has been made for minor roads, tracks and hard stands around the process plant to facilitate operations and maintenance access:

- 0.15 km x 9 m wide dual carriage laterite road (plant entry road).
- On pad (laterite) roads, 2.1 km, 9 m wide (19 419 m^2).
- Concrete/blacktop hardstands, 0 m^2 (none).

With respect to roads and paved areas:

- Road drainage (1.8 km, with 7 800 m^2 of rip rap).
- No crushed stone wear course has been allowed for either roads, hard stands or terraces.

18.4.3 Airstrip

The airstrip on the Sabodala property is an all-weather, visual flight rules (VFR), sealed airstrip. Charter flights fly twice weekly to site with additional flights as required.

The personnel who do not utilise the charter flights commute to the mine site via bus, predominantly out of Dakar.

The airstrip and airports supporting mining operations at Sabodala and Massawa are defined more fully in Section 5 of this Technical Report.

18.4.4 Port

For goods and materials sourced from outside Senegal, SGO is serviced by the Autonomous Port of Dakar (Port Autonome de Dakar or PAD). The operation of the Port is defined more fully in Section 5 of this Technical Report.

[1] As received basis ((4 to 4.5)% m/m moisture)

18.5 Power and Lighting

18.5.1 Power Transmission

As defined more fully in Section 5, Société National d'Électricité du Sénégal's (SENELEC's) 225 kV grid infrastructure does not extend down to the southeast corner of Senegal. A proposed 128 MW dam in Sambangalou, 17 km south of Kédougou is likely to expand the transmission network to the southeast. However, given that the damming of this river impacts an important UNESCO conservation area, it is unclear when this project will proceed.

Until such time as SENELEC's transmission infrastructure is expanded to the southeast of Senegal, SGO will need to be self-sufficient with respect to power.

18.5.2 Power Generation and Power Management

18.5.2.1 Background

This sub-section is primarily based on information provided by the QGE Group. The QGE Group have undertaken a FS (QGE, March-2021) and DFS (QGE, November-2021) and have had extensive involvement with the Project and the Sabodala Power Station (SPS) over the past three years. This sub-section covers current operations, the additional power requirements for the Project (Phase 1 (P1) and Phase 2 (P2) as noted in Section 18.1.1, as well as investigations into hybrid HFO/battery/photovoltaic solutions. The P1 and P2 expansion requirements are described more fully below.

18.5.2.2 Power Demand

The Project's P1 (SWOLP upgrade + Massawa OHL) and P2 expansion (SSTP) will increase the SPS's peak load from approximately 20 MWe to approximately 40 MWe as summarised in Table 18.5.1 (QGE, September-2021).

Table 18.5.1 SPS Power Requirement/Consumption by Phase

Project Phases	Daily Average ~MWe	Daily Peak ~MWe	Annual Energy Consumption (GWh)
Existing Load	16.5	19.8	
P1 SWOLP upgrades	1.6	1.9	
P1 Massawa Mine Infrastructure	1.4	1.8	
Existing + P1 Load	**19.5**	**23.5**	**~170**[1]
P2 SSTP Load	14.2	16.7	
Total Load (P1 + P2)	**33.6**	**40.2**	**~316.8**[2]

The existing generators are sufficient for current operations and the new P1 requirements, with an anticipated nominal and peak load of 19.5 MWe and 23.5 MWe respectively. For P2, an expansion of the SPS is required to meet the additional nominal and peak loads of 14.2 MWe and 16.7 MWe respectively.

The status of the existing operations and the implications of the planned P1 and P2 expansions are summarised in Section 18.5.2.3 and 18.5.2.4 following.

[1] Estimated energy consumption based on a utilisation of 100% and 24 h/d x 365 d/a operation.
[2] Estimated total for SPS after the P2 expansion is, 316.8 GWh/a

18.5.2.3 Current SPS Operations

The existing SPS contains six second-hand, medium speed Wärtsilä 18V32 generators, four with a nameplate capacity of 6.1 MWe and two with a nameplate capacity of 6.52 MWe (Table 18.5.2). Additionally:

- The HFO generators are relatively old (1980s design) and are less fuel efficient than the newer Wärtsilä models on the market, and quoted as part of the expansion project (0.23 L/kWh[1] versus 0.184[2] L/kWh).
- The six gensets combined run on average for 26 500 h/a. This represents an overall utilisation of approximately 75.6% (on a run hours analysis basis) with two generators out of service at any one time, for maintenance or servicing requirements.
- Site audits by Wärtsilä and others have recommended that a number of plant issues be addressed prior to, or during, the P2 expansion. These are detailed more fully in a separate report (QGE, November-2021). These issues have either been incorporated into the SPS Expansion Scope of Work or are able to be addressed by the SPS site operations team.

18.5.2.4 SPS Expansion

The P2 expansion requires an additional 14.2 MWe of nominal and 16.7 MWe of peak load. This brings the total load requirements for the expanded SPS to 33.6 MWe nominal and 40.2 MWe peak.

The proposed configuration and capacity of the existing and upgraded SPS is illustrated in Table 18.5.2.

Whilst the existing generation operates at 6.6 kV, it is intended that new generation will operate at 11 kV, which is a more typical voltage for a power station of its capacity. A bus interconnector and 6.6/11 kV transformer will connect the existing 6.6 kV bus and the new 11 kV bus, to allow for the complete integration of all generation capacity, such that power generation and spinning reserve can be optimised.

[1] Calculated from total annual fuel consumption over the total kWh generated and averaged over four years.
[2] Calculated using information provided by Wärtsilä.

Table 18.5.2 Existing and Proposed SPS Configuration and Capacity

Generator	Status	Voltage	Run-hours (June 2020)[1][2]	MWe (Installed)	MVA (At 0.8 Power Factor)
Primary Generation					
• G1 (HFO)	Existing	6.6 kV	114 000	6.1	7.625
• G2 (HFO)	Existing	6.6 kV	112 000	6.1	7.625
• G3 (HFO)	Existing	6.6 kV	106 000	6.1	7.625
• G4 (HFO)	Existing	6.6 kV	108 000	6.1	7.625
• G5 (HFO)	Existing	11.0 kV	76 000	6.52	8.15
• G6 (HFO)	Existing	11.0 kV	66 000	6.52	8.15
• G7 (HFO)	New (P2)	11.0 kV	N/A	5.8	7.25
• G8 (HFO)	New (P2)	11.0 kV	N/A	5.8	7.25
• G9 (HFO)	New (P2)	11.0 kV	N/A	5.8	7.25
Installed Nameplate Primary Generation				**54.48**	**68.55**
Emergency					
• DG1	Existing	415 V	N/A	0.508	0.635
• DG2	Existing	415 V	N/A	0.508	0.635
• EG1	New (P2)	11.0 kV	N/A	1.6	2.0
• EG2	New (P2)	11.0 kV	N/A	1.6	2.0
Installed Nameplate Emergency Generation				**4.13**	**5.27**

With regard to the proposed SSP expansion, the following high-level items should be noted.

- Based on tenders and a techno-economic evaluation, three new 5.8 MWe (HFO) gensets from Wärtsilä (Model W12V32) have been put forward as the preferred solution for the SPS Expansion Project. With respect to the new gensets:
  - The engines are 20% more fuel efficient than the engines currently installed. The new levelized power cost for the nine installed generators is USD 0.1334 kW/h (HFO fuel price of USD 0.55/kg or 0.544 USD/L @ 0.989 kg/L).
  - Based on simulations conducted by Wärtsilä, for the power station with nine engines installed, in a N + 2 configuration (seven units available) and a peak demand of (35.5 to 41.5) MWe, power station availability figures of 91% to 98% are achievable.
- Short outages at the power station would quickly result in costly losses of production at the SSTP plant. An assessment of the BIOX® critical power supply reliability and the level of redundancy has been undertaken (QGE, November-2021). Emergency power needs to be available in under eight to ten minutes, to avoid delays in regaining full production. To avoid delays in regaining production after a power station outage, additional emergency rapid start-up generation has been included in the form of EG1 & EG2 (Table 18.5.2).
- There are significant plant facilities to be installed, as part of the P2 SPS expansion. These include but are not limited to:
  - Mechanical Auxiliary Systems (MAS) – light fuel oil (LFO or diesel) and HFO fuel, lubricating oil, compressed air, cooling, exhaust, oily water treatment, heat recovery, fire protection, etc.

[1] G1 to G4 were purchase second hand (November 2007 < 64 000 run-hours).
[2] G5 to G6 were purchased second hand (November 2007 < 25 500 run-hours).

- Electrical Systems - Expanded control and operating system, new 11 kV switchboard, interconnection between the existing 6.6 kV and new 11 kV busbars for an integrated power system, electrical auxiliary and monitoring systems for the new generators, provisions for possible future connection of renewable generation (photovoltaic or BESS).
- Civil and Structures - New standalone engine hall, medium voltage switchroom, workshop, warehouse, fuel treatment house and administration building (offices, change rooms, toilets and canteen space).

18.5.2.5 Alternative Power and Energy Storage

QGE issued a 'Solar & Battery Energy Storage System Options Memo' (1079-003-601-005-MEM-001) as part of the DFS. This memo indicated that it is technically feasible to connect the solar and BESS to the SPS utilising the proposed configuration. A variety of photovoltaic (6.4 MWp to 41 MWp) and battery energy storage (BEES) (10 to 20 MWh) solutions were considered.

18.5.3 Power Distribution/Reticulation

18.5.3.1 SWOLP

The existing power distribution infrastructure for the SWOLP and associated TSF and raw water dam will largely remain unchanged. It is expected that a select few loads for the SSTP and the complete Massawa infrastructure load will be supplied from the existing 6.6 kV power distribution infrastructure.

18.5.3.2 Massawa Infrastructure

Massawa infrastructure will be fed from a new approximately 35 km long, 33 kV overhead line supplied from the existing 6.6 kV switchboard, via a 6.6/33 kV step-up transformer.

18.5.3.3 SSTP

For the SSTP a high voltage (HV) containerised switchroom will be installed adjacent to the SSTP control room. The switchroom will house the SSTP main 11 kV switchboard which receives two incoming supplies from two 11 kV feeders in the SPS, a 'primary' supply and an 'alternative' supply. The primary supply will be rated for the expected full load of the SSTP, whilst the alternative supply will be limited to 8 MVA to allow for the repurposing of an existing 6.6/11 kV transformer. Subsequently, the alternative supply will only be utilised in emergency or contingency scenarios.

The SSTP main 11 kV switchboard will then distribute power to the switchrooms and transformer kiosks noted in Table 18.5.3

Table 18.5.3 Electrical Switch Rooms

Crushing switchroom.	Goldroom and elution switchroom.
Milling switchroom.	BIOX® reactor switchroom.
Floatation switchroom.	BIOX® switchroom.
Services and tailings switchroom.	

Estimated power demand by area is listed in Section 17.0, 'Recovery Methods'.

18.6 Water Management

18.6.1 Overview

Water management studies and investigations were conducted by Digby Wells Environmental (DWE or Digby Wells) and Artois Consulting (hereinafter Artois). The split of responsibilities in terms of the different water management areas and disciplines are as noted below.

- Digby Wells
  - Stormwater management plan (SWMP).
  - Water and salt balance for both Massawa – Sofia and Sabodala Gold Mine (SGO).
  - Environmental geochemistry assessment of the waste rock and tailings material.
  - Overall compilation of the water management plan (WMP).
- Artois
  - Hydrogeological investigations including pit dewatering (hydro geotechnical) and contaminant transport modelling of the potential sources of contamination that mainly includes the existing/new TSFs at Sabodala, as well as the various waste rock dumps (WRD) at the Massawa and Sofia operations and satellite pits.

The objectives of these studies were to:

- Effectively manage water qualities and quantities during the construction, operational, closure and post-closure phases of the project and prevent and/or mitigate environmental impacts and risks as far as possible.
- Ensure open pit operations can continue in a dry environment, with dewatering ensuring a geotechnically safe setting and Health and Safety (H&S), and issues associated with water management are eliminated and/or mitigated.

Existing conditions and hydrological/climatic data, serves as the basis of the rainfall runoff yield modelling, and informs the appropriate storm water management measures required.

18.6.2 Regional Surface Water Hydrology

Catchment areas, receiving river systems, surface hydrology, rainfall, and evaporation information, is summarised in Section 20.2.

18.6.3 Geohydrology/Geochemistry

The natural groundwater in the Sabodala catchment is characterised by a near neutral pH and a low total dissolved solids (TDS) (<66 mg/L). It has a dominant Ca-bicarbonate signature. Sulphate remains below the detection limit of 5 mg/L. The groundwater contains very low concentrations of metals and trace elements. Iron, manganese, and aluminium are the only constituents that regularly exceed the detection limit, and this is a common phenomenon in lateritic soils. Arsenic, mercury, and cyanide concentrations in the natural water are below the detection limit.

At Massawa, the groundwater has a similar Ca-bicarbonate composition but can be slightly more acidic (pH of 5.2) with higher TDS values (200 mg/L). Due to its interaction with the metalliferous orebody, the groundwater contains elements such as As, Cu, Ni and Pb. Fe and Al are present in concentrations of (1 to 3) mg/L which is above the IFC and WHO guidelines for mine effluent discharge and drinking water respectively.

18.6.4 Environmental Geochemistry

18.6.4.1 Background

Digby Wells characterised waste rock and tailings samples from Massawa CZ/NZ, Sofia, and Delya pits in 2018. The 2018 study indicated that Sofia is non-acid forming (NAF), has no acid rock drainage/metal leaching (ARD/ML) risks and therefore did not require further characterisation. Massawa CZ/NZ however required further characterisation to determine the long-term seepage quality.

Samples from both Massawa CZ and NZ were taken to ensure they are representative of the LoM mining plans and waste rock production. The following was considered during the sample selection process to ensure representativeness of samples:

- LoM pit shells and mine planning together with 3D resource models.
- Spatial and lithological distribution.
- Assay results with sulphur distribution considered.

Detailed testwork results are presented in Section 20.2 and summarised in Sections 18.6.4.2 and 18.6.4.3 for the Sabodala and Massawa Properties respectively.

18.6.4.2 Sabodala Property

SGO exploits both oxidised and fresh (non-oxidised) material from its existing deposits on the Sabodala property. Testwork and monitoring have shown low potential to generate AMD and leachable metals (LM). Risk of environmental pollution resulting from AMD and ML are related to the storage of tailings and waste rock. A monitoring programme is in place to test the collected run-off and seepage from the WRDs and TSF. If acidic effluents are observed, the following measures are taken:

- Mix the wastes with neutralizing materials such as lime and limestone; and,
- Use humus-containing soils to limit residual acidity.

For the Niakafiri project, 35 waste rock samples were taken from drill cores in the deposit area and sent for analysis to evaluate their potential to generate AMD. The results showed that only one sample showed AMD potential and that sample was part of the gold rich ore (2.94 g/t) that would be processed at the plant and its tailings neutralised with lime. The results also showed that the Niakafiri zone is rich in carbonate minerals, with a significant potential for acid neutralization which could come from the oxidation of sulphides which are present in small quantities.

For the Goumbati-Kobokoto pit area, two sampling campaigns were conducted to evaluate the potential of waste rock to generate AMD. For the first campaign, 92 samples were taken from drill cores in the project area and sent for analysis. The results showed that only one sample showed AMD potential. Similar to Niakafiri, the sample was part of the mineralisation that will be processed at the plant and its tailings neutralised with lime. For the second campaign, 30 samples were taken from drill cores in the project area and sent for analysis. The results showed that there was no AMD potential in those samples.

18.6.4.3 Massawa Property

For the Massawa deposits, a total of 89 waste rock samples were taken across all ore zones and pits, for subsequent geochemical tests to assess their potential to generate AMD and ML. For the tailings of Massawa deposits, a total of 99 tailings samples were tested. The results of these laboratory testwork programmes can be summarised as follows.

- Waste Rock
  - No AMD expected from the Sofia WRDs, but some potential water quality issues from Sofia WRDs including suspended solids and nitrates.
  - Potential water quality issues from the Massawa CZ, NZ and Delya WRDs seepage and run-off include suspended solids, nitrates, As, Sb, Fe, Ni, SO_4^{2}, F^- and Al.
- Open Pits
  - No AMD potential expected from any pits.
  - Potential water quality issues in the Sofia pits sumps including suspended solids and nitrates.
  - Potential water quality issues in the Massawa CZ, NZ and Delya pits sumps include suspended solids, nitrates, As, Sb, Fe, Ni, SO_4^{-2}, F^- and Al.
- Tailings
  - Overall, no AMD potential expected from all tailings streams; however, As and Sb levels from the CIL and SSTP streams may be a concern.
  - Seven samples (from a total of 99) showed a potential for AMD. Five of these samples were neutralised SSTP filtrate/product which are expected to have a high sulphide content. One sample was the SSTP CIL tailings, and one float tailings sample was shown to be an outlier, due to it being taken from a soft sulphide zone. The remaining 88 samples from all tailings streams were classified as potentially acid neutralizing and showed no significant risk for acid generation.

18.6.5 Clean and Dirty Water Management

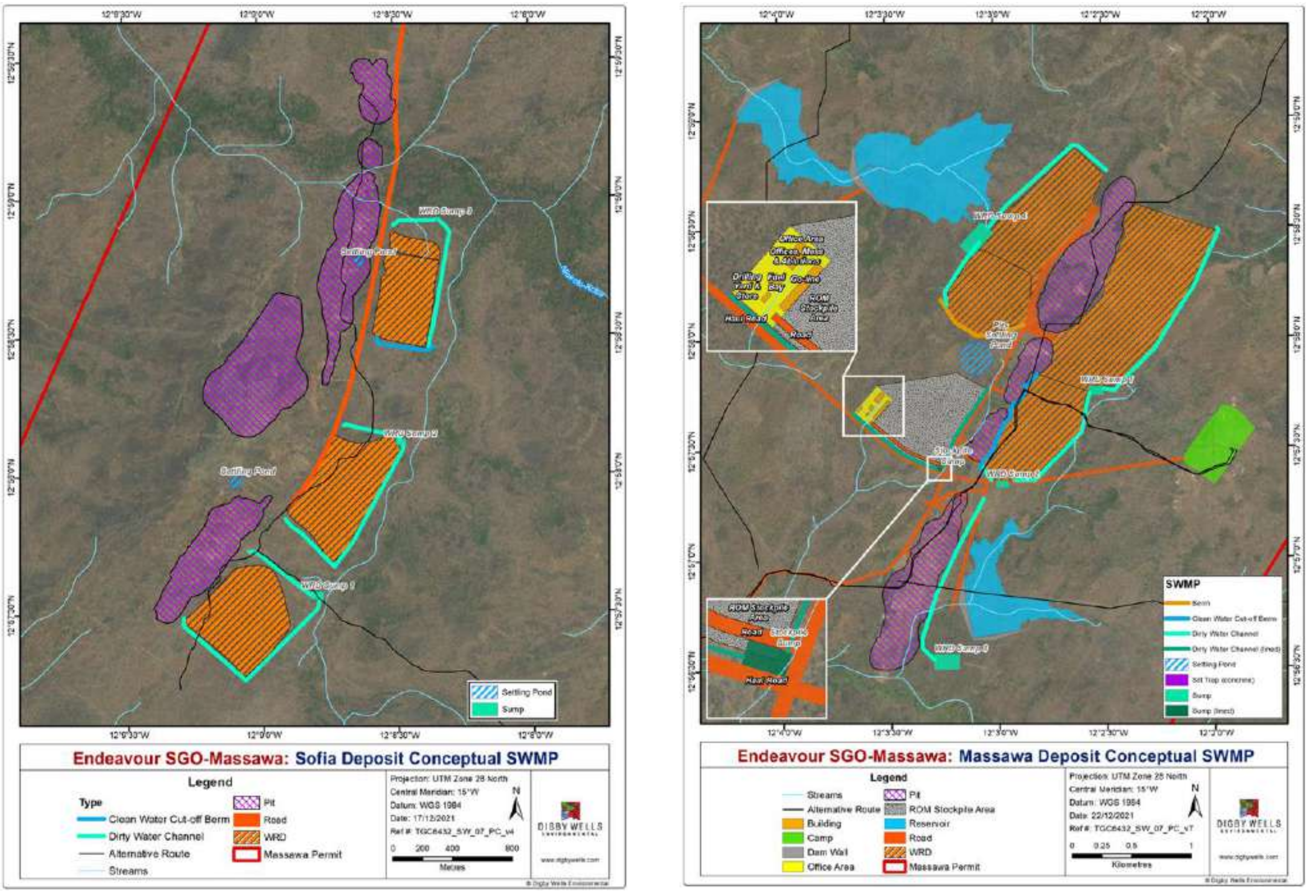
18.6.5.1 Massawa Property

Overview

The recommended Surface Water Management Practices for the Sofia and Massawa deposits have been updated based on the latest Sabodala-Massawa integrated LoM plan with consideration of the geochemistry and associated potential leachates from the WRDs and RoM stockpiles.

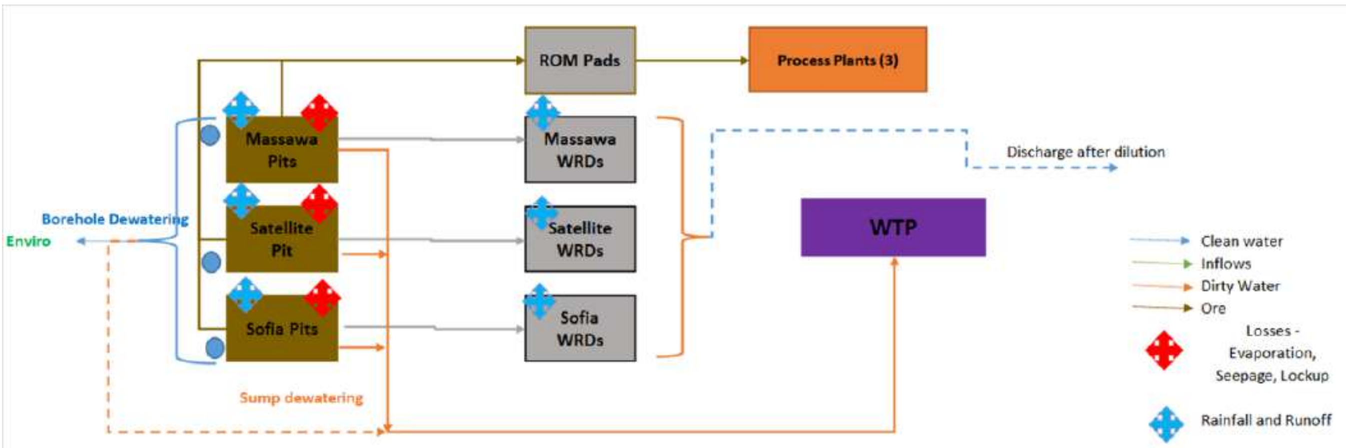
The conceptual Stormwater Management Plan (SWMP) and a high level water block flow diagram (BFD) for the Massawa property water inputs and outputs are illustrated in Figure 18.6.1 and Figure 18.6.2 respectively.

Figure 18.6.1 Water Management at Sofia and Massawa CZ and NZ



Source: DWE, 2021.

Figure 18.6.2 Massawa Water Management Block Flow Diagram



Source: DWE, 2021.

Sofia Deposits

Recommendations for water management around the pits and waste dumps at Sofia are summarised below.

- Open Pits
  - Pollution control dams (PCD) or settling ponds at the Sofia pits for pit dewatering will allow storage of water to settle the suspended solids, enable water re-use on the mine, quality analysis for when discharge may be required and treatment where this is needed prior to discharge, if necessary. The PCD or settling ponds should be clay or HDPE lined to avoid significant seepage and potential contamination of groundwater.
  - Berms should be placed around the pits to avoid inflow of any external runoff into the pit.
  - The northern boundary of Sofia North Pit encroaches on a drainage line which is a tributary to the Niokolo-Koba River; the immediate upstream origin of this tributary has also been cut-off by the WRD and now forms part of the WRD catchment, thereby reduced or limited runoff from the remaining portion of this tributary will be observed.
  - As per the mine plan, it is recommended that mining is prioritised in this area during the dry season to avoid runoff seeping into the pits. The recommended berms around the pit should be able to divert any surface runoff away from the pit.
- Waste Rock Dumps.
  - Installation of sumps at various WRDs to contain runoff generated from the WRD footprint and allow settling of solids, re-use where needed, evaporation, or discharge where qualities are within the required limits.
  - Dirty water channels around the WRDs to convey water into the sumps. This runoff can also be pumped to the settling ponds at the Sofia pits for dilution if required, or treatment.
  - A combination of channel and berms are recommended, to separate the clean water catchment and avoid spillages of contaminated runoff into the clean environment.

Massawa Deposits

Recommendations for water management around the pits and waste dumps and RoM pads for the Massawa deposits are summarised below.

- Open Pits.
  - PCD or settling ponds at the Massawa pits for pit dewatering will allow storage of water to settle the suspended solids, enable re-use on the mine, to be able to quality analysis for discharge and/or treatment, where this is required prior to discharge. The PCD or settling ponds should be clay or HDPE lined to avoid significant seepage to the groundwater.
  - Similarly, berms should be placed around the pits to avoid inflow of any external runoff into the pit.
- Waste Rock Dumps.
  - Sumps at the various WRDs to contain runoff generated from the WRD area and allow settling of solids, re-use where needed, evaporation, treatment, or discharge where qualities are within the required limits.

  - Dirty water channels around the WRDs to convey water into the sumps. This run-off can also be pumped to the settling ponds at the Massawa pits for dilution if required. Treatment channels and trenches are recommended in a combination of channels and berms to separate the clean water catchment and avoid spillages of contaminated runoff into the clean environment.
- RoM Stockpiles.
  - The RoM stockpiles (located near Massawa Pits) will contain gold-bearing sulphide rich ores (fresh and transitional zone) which can result in potential AMD formation. Based on the current infrastructure layout plan, the RoM stockpile area is designed alongside the drilling yards and store, including the offices. This area has been delineated as part of the RoM stockpile with potential to contaminate the natural runoff.
- Water Reservoirs.

  Three water reservoirs at Massawa will be required for capturing dirty/contact water and to allow water quality monitoring, prior to release. Water will only be released if the water quality is equal to, or better than background surface water quality. If this is not the case, further dilution of this contact water with dewatering or clean water runoff (non-contact water) can be done and/or this water can be directed to the planned MWTP before discharge. The size of these dams are provided below:
  - Reservoir 1 is 266 ha and 1.4 Mm^3.
  - Reservoir 2 is 267 ha and 2.7 Mm^3.
  - Reservoir 3 is 133 ha and 1.6 Mm^3.

Water Modelling on the Massawa Property

In alignment with the Massawa water BFD (Figure 18.6.2) and the mine plan, predictive water balances were set up for the Massawa property, covering all key modelling nodes.

For the water balance, the average, wet and dry scenarios were simulated as follows:

- Wet scenario - 50% more rainfall per month than the average rainfall year; and
- Dry scenario - 50% less rainfall than the average rainfall year.

The average MAP is 1016 mm/a, the wet scenario is 1524 mm/a, and the dry scenario is 508 mm/a. The rainfall data for 2019 and 2020 was incomplete and was therefore excluded from data used for this Study. Comparing the MAP for the wet and dry scenarios to a one-in twenty years flood and drought event shows that they plot higher and lower respectively, relative to the flood and drought levels. The rainfall scenario approach is therefore considered a conservative approach.

Four possible scenarios were simulated, and each scenario simulated under the three different rainfall conditions. The scenarios simulated for the Massawa-Sofia balance included the following.

- Base Case.
  - The base case model runs the three rainfall scenarios on all the infrastructure.
  - Sofia water is discharged directly to the environment.
  - Massawa WRD runoff and seepage, pit sump water, and RoM pad water are combined and treated as one.

  - Perimeter borehole dewatering is discharged directly to the environment at background quality.
- Separation of WRD water and treating pit sump water.
- Separation of WRD runoff and treating seepage and pit sump water only.
- Blending WRD and perimeter dewatering.

Based on the various simulations, it was concluded that:

- If all dirty water streams from the Massawa pits is treated together (WRD runoff, WRD seepage and pit sump water) the volumes that will require treatment will be high (under average rainfall, will peak at 5000 m^3/h) and the treatment costs excessive.
- The model is conservative and has assumed maximum concentrations as input into seepage from the WRDs, as well as groundwater seepage running into the pit sumps. This will likely not be the case and is a worst-case scenario.
- If 85th percentile concentrations are used as the input, then the WRD runoff and seepage waters are almost in compliance and will comply with the discharge limits if mixed with the perimeter dewatering water.
- Water at Sofia mining area can be discharged directly and will require no treatment; however, nitrate and TSS concentrations should be monitored and appropriate action taken if they exceed standards.
- All perimeter boreholes dewatering around the open pits can be discharged directly to the environment. The water quality should, however, be monitored. If the quality deteriorates to above surface water background levels, then the water should be diverted to the MWTP for treatment.
- Water captured on and around the WRD areas should be mixed with the perimeter boreholes dewatering before discharge to ensure the total discharge is within standards.
- Only the pit sump water from the various pits will require treatment.

Based on the modelling of the three rainfall scenarios considered, a 450 m^3/h water treatment plant (WTP) will be required at Massawa (MWTP) to remove arsenic and antimony and any other elements above the required discharge limits. DWE recommends that the MWTP design capacity be set at 600 m^3/h. This will allow for storm events and will also provide back-up treatment capacity for months where additional water from the WRD areas will potentially require treatment, if not in compliance. There needs to be appropriate storage capacity for the plant feed to cater for wet periods.

The WTP should be designed to treat a maximum arsenic and antimony concentration of 0.89 mg/L and 1.2 mg/L respectively.

Modelled Volumes and Pond Capacities for the Massawa Property

Simulated peak flows (1:50-year recurrence interval, 24-hour flood event) and runoff volumes for delineated storm water catchments on the Massawa property are summarised in Table 18.6.1.

Table 18.6.1 Modelled Peak Flows and Infiltration Depths for Stormwater Catchments

Description	Classification	Area (ha)	Infiltration (mm)	Peak Runoff (m^3/s)	Runoff Coefficient
Sofia Main Dump 1	Dirty	34.6	111.96	3.79	0.503
Sofia Main Dump 2	Dirty	28.0	110.67	3.47	0.552
Sofia North Dump	Dirty	26.7	110.27	3.38	0.566
Massawa CZ Dump	Dirty	136.1	117.13	6.53	0.248
Massawa NZ Dump1	Dirty	774.1	115.92	5.44	0.32
Massawa NZ Dump 2	Dirty	245.0	111.12	3.36	0.565
Massawa NZ Dump 3 & 4	Dirty	732.0	114.93	4.89	0.369
Massawa RoM Stockpile	Dirty	412.4	112.48	3.94	0.482

The dimensions and characteristics of proposed stormwater channels are presented in Table 18.6.2. All stormwater channels have been sized to prevent potential flooding resulting from the 1:50-year, 24-hour rainfall event. Various dimensions model scenarios were simulated, to determine the most conservative minimum dimensions as provided on Table 18.6.2.

Table 18.6.2 Proposed Stormwater Channel Characteristics

Name	Description	Cross-Section	Depth (m)	Bottom Width (m)	Left Slope	Right Slope	Max. Flow (m^3/s)	Max. Velocity (m/s)
Sofia Main Dump 1	Dirty Channel	Trapezoidal	1	1.5	2	2	3.76	9.56
Sofia Main Dump 2	Dirty Channel	Trapezoidal	1	1.5	2	2	3.41	4.34
Sofia North Dump/Green Dump	Dirty Channel	Trapezoidal	1	1.5	2	2	3.36	10.71
Massawa NZ Dump 1	Dirty Channel	Trapezoidal	1	1.5	2	2	5.40	11.5
Massawa Dump 2	Dirty Channel	Trapezoidal	1	1.5	2	2	3.34	10.83
Massawa NZ Dump (3 & 4)	Dirty Channel	Trapezoidal	1	1.5	2	2	4.86	11.7
Massawa RoM Stockpile	Dirty Channel	Trapezoidal	1	1.5	2	2	3.91	11.45

Water Management and Treatment for the Massawa Property

The recommended SWMP for Massawa has been updated based on the latest mine plan provided by the Site team. The SWMP ensures that all dirty water is contained on the site and clean water is diverted away from site, thereby reducing the risk of the proposed mining activities to negatively impact the natural water resources.

In addition.

- All pit water and contact stormwater that is captured on-site will require storage in settling and holding ponds, to allow for settling and monitoring to take place, before discharge. Only once the water complies with the required standard, can it be discharged. Any water not in compliance will be directed to the MWTP.
- All perimeter boreholes dewatering around the open pits can be discharged directly to the environment once settling of solids has been allowed. The water quality should, however, be monitored. If the quality deteriorates to above background levels, then the water should be diverted to the MWTP for treatment.
- Water captured on and around the WRD areas, should be blended/mixed with the perimeter dewatering flow before discharge.
- Only the pit sump water from the various pits will require treatment.

- A MWTP has been allowed for, to ensure that the water released meets the required discharge requirements (Section 18.6.4.3).

18.6.5.2 Sabodala Property

Clean and contact water management practices at Sabodala and Niakafiri are summarised below.

- Sabodala.
  - Erosion and dust control measures, outlined in a site-specific sediment and erosion control plan, will remain in effect until disturbed surfaces are stabilised.
  - Construction of runoff protection berms and trenches around mine infrastructure, open pits, tailings management facilities and waste rock piles.
  - Development of runoff pathways for watercourses crossed by the tracks (e.g., construction of submersible riffles at the intersections of Project roads with runoff streams).
  - Planting of riparian vegetation to reduce sediments runoff and control erosion.
- Niakafiri.

  Water management structures are being constructed to control surface water runoff and prevent contamination. To this end, a water management system has been developed that includes upstream diversion drains, wastewater collection and recycling facilities for both operational use and storm water management.

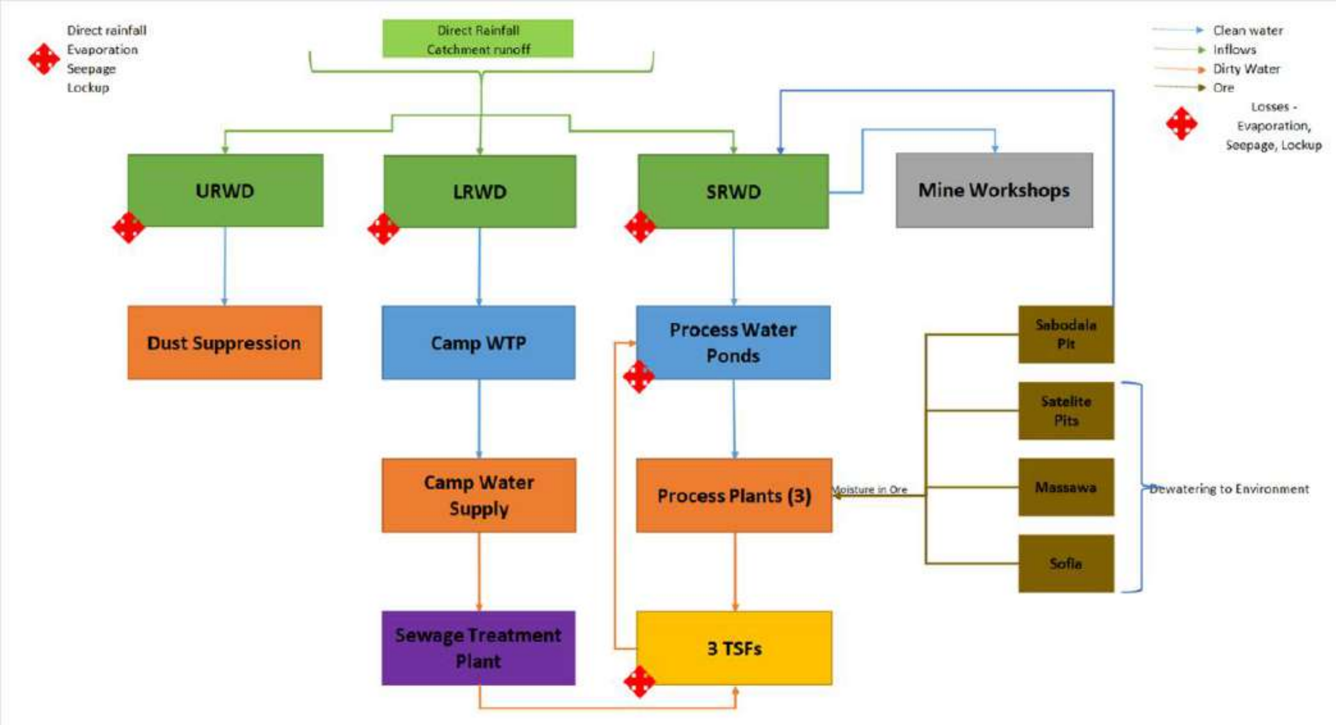
  Water management measures include the following:
  - Bunds and diversion drains are installed upstream and downstream of the project infrastructure to capture storm water and divert it to the water settling ponds.
  - Dewatering water, rainwater and groundwater collected at the bottom of the pits and the WRDs are pumped to water settling ponds or unexploited pits.
  - Pits are equipped with sumps that will collect the water and allow quality testing, if necessary, before the water is pumped into settling ponds.
  - WRDs are designed to capture run-off in drainage channels and direct it to settling ponds. The base of the slopes are constructed on consolidated layers of oxidised material. This oxidised material is covered with one to two metres of laterite to prevent erosion.
  - The pH of the water is monitored to detect the appearance of any AMD.
  - On-site reuse of collected water in settling ponds or directly from the pits (e.g., dust control, vehicle washing and other miscellaneous uses).

18.6.6 Water Supply and Use

18.6.6.1 Sabodala

In 2008, it was originally envisaged that water would be supplied via rainwater harvest dams and a pipeline from the Falémé River. However, sufficient water has always been sourced from the rainwater harvest dams and the pipeline from the Falémé River has since been decommissioned. The BFD for the Sabodala water balance is illustrated in Figure 18.6.3.

Figure 18.6.3 Sabodala Water Block Flow Diagram (DWE, 2021)



Source: DWE, 2021.

The main water loss from site is through natural evaporation.

SGO has built three dams to ensure the continuity of the Project's water supply, namely:

- Large raw water dam (LRWD). Maximum capacity below spillway of 7 446 000 m^3.
- Small raw water dam (SRWD). Maximum capacity below spillway of 994 000 m^3.
- Upper raw water dam (URWD). Maximum capacity below spillway of 5 203 574 m^3.

These various hydraulic structures constitute the Project's water sources. The average volume mobilised by these three structures varies between (8 506 027 and 12 996 567) m^3 per year with a total volume of 10 828 677 m^3 in 2021.

In addition to these dams, the water from the decantation of mine tailings constitutes a potential reuse by the project. The recycling rate from TSF1 water is approximatively 80% since 2021.

At SGO and its satellites pits, surface and groundwater are used for multiple purposes including drinking water, ore processing, dust control and for construction purposes. The total water consumption for 2021 was 3 936 690 m^3 of surface water and 71 095 m^3 of groundwater.

With the Project expansion and the addition of the SSTP, the water demand has been reassessed. To calculate the process plant water demand, the slurry water requirement for the tailing's material was increased by an additional 10% to be conservative and to cover other potential water losses in the process circuit. The total process plant water demand ranges between 350 709 m^3/month and 488 445 m^3/month. Most of the plant demand can be supplied by the return water from the TSFs (80 to 81)% on average; however, this leaves a process plant make-up water requirement of between 33 062 m^3/month and 158 556 m^3/month over the LoM.

The SRWD will be the first source of supply for the make-up water requirement as well as the mine workshop supply, after which, water will be abstracted from the LRWD. Only in the worst-case scenario will the URWD be used as a source, which based on the current scenarios simulated will not be required. It should be noted that either the LRWD or URWD can be used as secondary supply after the SRWD.

18.6.6.2 Massawa

Water supply for the workshops, wash bays, accommodation and workforce at Massawa will be mainly supplied from groundwater wells.

Human consumption will be supplied by dedicated water supply wells, and this water will undergo the required potable treatment before use. For potable water use, 100 L per person per day was assumed, and the camp and office supply will peak at approximately 75 m^3/d.

Wash bay and dust suppression water (haul roads, dumps, etc.) will mainly be sourced from dewatering wells.

In-pit dewatering will be done from water collected in sumps at the bottom of the pits. In the wet season, dust suppression will likely not be required. Dust suppression requirements during the dry season will peak at approximately 500 m^3/d.

18.7 Site Services

18.7.1 Safety/Security Infrastructure/Installations

18.7.1.1 Overview

Security for the SWOLP/SSTP has been (or will be) integrated with Endeavour security standards. Security features are summarised below.

- Shared Access Control SWOLP/SSTP.
- Perimeter monitoring of the plants.
- Targeted monitoring of high risk areas.
- Access control to high security areas for personnel and vehicles (manned and un-manned)
- Remote monitoring of operations (via CCTV).
- Plant security fencing.

18.7.1.2 Fencing/Gates

Security fencing is already established at the SWOLP and associated G&A facilities.

For the SSTP Project, 1.44 km of high security (2.4 m high, barb wire on top and razor wire on the bottom) fencing and 1.4 km of general (2.4 m high barb wire on top) security fencing will be installed.

A new pedestrian gate will be created for access from the SWOLP to the SSTP plant.

One 16 m truck access gate has been provided for controlled logistics movements.

18.7.2 Water Systems

18.7.2.1 Water Supply

Sabodala

Raw water make-up to the SSTP and the SWOLP will be sourced by pumping from both the large and small raw water dams. Duty and standby dam pumps will be submersibles, directly attached to floats similar to the arrangement used for the existing raw water pumps. Discharge lines from each pump to shore will also be supported on floats. Additionally, for the large raw water dam, inline duty and standby booster pumps on shore will provide the requisite head to discharge the water into the plants' raw water tank. Pumps will be fixed speed and selected for the full flow requirement from either raw water dam.

Massawa

Subject to use, water supply for the Massawa operations will be a mix of borehole water and water reclaimed from the MWTP and/or raw water reservoirs.

The quantity of water required is described in Section 18.6.

18.7.2.2 Water Treatment and Distribution

Potable Water Treatment

A water treatment plant will be required for Massawa Mines Services Area (MSA), see Section 18.8.3. The planned capacity of the potable water treatment plant is 20 kL/d, supplying some 100 persons per day.

Process Water Treatment

In addition to cyanide destruction, there are two process water treatment plants envisaged at the SSTP and the Massawa MSA area. Each plant is designed to remove arsenic and antimony using 'GreenSand Filtration Technology'. Greensand is manufactured by coating the mineral glauconite with manganese dioxide, while pyrolusite is a naturally mined ore composed of solid manganese dioxide. Greensand media is commercially available and has been shown to be capable of removing up to 80% of arsenic by oxidation/adsorption. The two plants are described more fully in Section 17 and Section 18.6 respectively.

Ultra-High Purity Water

A new Reverse Osmosis (RO) plant will be provided as part of the Phase 2 Expansion Project at Sabodala. The plant will provide high purity water to meet the needs of the SSTP plant and the expanded SPS.

18.7.3 Bulk Fuel Storage, Distribution and Dispensing

HFO and LFO are supplied by Vivo Energy Sénégal on a consignment basis. In general, SGO aims to maintain 15 to 18 days of fuel storage capacity on the Sabodala-Massawa Properties to cover disruptions in supply. No aviation fuel storage facilities are provided at the airstrip or site. For the Phase 1 and 2 expansion, additional fuel storage facilities are provided for the SPS with a new 1000 m^3 HFO tank; however, for the MSA area at Massawa, the diesel (LFO) tank farm at Sofia will be relocated to Massawa.

In total, after the Phase 1 and 2 expansions, SGO will have 3000 m^3 of fixed storage capacity for HFO and 2565 m^3 of fixed storage capacity for LFO on the Sabodala-Massawa Project. This typically represents around 15 to 21 days of storage capacity at normal consumption rates.

SGOs HFO/LFO storage capacity for the Sabodala and Massawa properties is summarised in Table 18.7.1, following.

Table 18.7.1 Sabodala-Massawa Fuel Storage Facilities (Existing and Proposed)

Area/Tanks	Capacity (L)	Product	Owner	Status	Residence Time
Sabodala					
• Tank 1	600 000	LFO	SGO	Currently used	21 days
• Tank 2	600 000	LFO	SGO	Currently used	21 days
• Day Tank	50 000	LFO	SGO	Currently used	7 days
• SSTP		LFO	SGO	New-Elution	
• **Total**	**1 250 000**				
Sofia Fuel Farm					
• Cuve 1	75 000	LFO	VIVO	Currently used	5 days
• Cuve 2	75 000	LFO	VIVO	Currently used	5 days
• TransTank 1 (40')	67 000	LFO	VIVO	Currently used	5 days
• TransTank 2 (40')	67 000	LFO	VIVO	Currently used	5 days
• **Total**	**284 000**				
Golouma Fuel Farm					
• TransTankG	67 000	LFO	VIVO	Not currently used	
• TransTank B	58 000	LFO	VIVO	Not currently used	
• **Total**	**125 000**				
Maki-Medina					
• TransTank1	58 000	LFO	VIVO	At power station - not used	
Massawa Camp					
• TankM	20 000	LFO	VIVO	Currently used	15 days
Sabodala Power Station					
• Tank 1	1 000 000	HFO	SGO	Currently used	15 days
• Tank 2	1 000 000	HFO	SGO	Currently used	15 days
• Tank 3 (P2)	1 000 000	HFO	SGO	To be built	
• **Total**	**3 000 000**	**HFO**			**15 to 18 days**
• Power House	200 000	LFO	SGO	Currently used	very low rate, 30% capacity in 5 months
• Process Plant	600 000	LFO	SGO	Currently used	very low rate, 25% capacity in 7 months
• **Total**	**800 000**	**LFO**			
Service Trucks					
• ST 212	7000	LFO	SGO	Currently used	2 times/day
• ST 208	7000	LFO	SGO	Currently used	2 times/day
• ST 215	7000	LFO	SGO	Currently used	2 times/day
• ST 217	7000	LFO	SGO	Currently used	2 times/day

18.7.4 Fire Protection and Detection

Where required, fire detection and protection systems are in place for the existing infrastructure and will be installed where applicable, on all new facilities that form part of the Phase 1 and Phase 2 expansion plans. A notable exception is the existing SPS HFO fuel farm. Fire detection and protection systems for this facility will be addressed a part of the Phase 2 programme.

18.7.5 Weigh Stations

A single weigh station is installed at the Sabodala Plant site. This weigh station will not be used for measuring the mass of ore transported from Massawa to Sabodala.

18.7.6 Non-Production Waste Management

18.7.6.1 General

SGO has in place the requisite infrastructure and policies and processes for managing non-mining waste including but not limited to rubber waste (e.g., tyres and conveyor belts), incinerators, recyclable waste, hazardous waste, petroleum waste, PPE waste, and general office and kitchen wastes.

The management of such wastes are discussed more fully in Section 20.

18.7.6.2 Sewerage Networks and Sewage Treatment

The approach for the management of sewage across the Project is as defined in Table 18.7.2 following. Subject to use, Honey Suckers collect sewage from the conservancy tanks approximately every two days, and transfer to the final treatment point.

Table 18.7.2 Sewage Treatment (Existing and Proposed)

Property	Status	Systems	Treatment Point
Sabodala			
• Sabodala Camp	Existing[1]	Treatment Plant	Final
• Min Services Area (MSA)	Existing	Conservancy tank	Main Camp
• General offices & facilities	Existing	Conservancy tank	Main Camo
• SWOLP	Existing	Conservancy tank	Main Camp
• SSTP	New (P2)	Conservancy tank	Main Camp
Massawa			
• Massawa Camp	Existing	Treatment Plant	Final
• Boart Long Year Camp	Existing	Conservancy tank	Massawa Camp
• Mine Services Area (MSA)	New (P1)	Conservancy tank	Massawa Camp
Bransan (Lot C)			
• Bransan Camp	Existing	Conservancy tank	Sabodala Camp

18.7.7 Communication Systems

Communication systems employed between Sabodala and the outside world are discussed more fully in Section 5.0 of this Technical Report. The system works well and no issues are foreseen.

For the existing and new plant and general offices, internal communications and IT services will be via a site-wide, high capacity, fibre optic network. The backbone of the system will be single mode, fibre optic and will be distributed throughout the site for the PCS Network via a 24-core fibre cable, and for the Corporate Network via a 12 core fibre cable.

[1] Capacity being doubled under current budgets

18.7.8 Control System

18.7.8.1 Sabodala Whole Ore Treatment Plant

The SWOLP control system is in place and working well. As the SSTP project progresses, information will be shared between the two plants.

18.7.8.2 Sabodala Sulphide Treatment Plant

The general control philosophy for the SSTP plant is one of high level automation and remote indication and control. Instrumentation will be provided within the plant to measure and provide variable data to enable automated control of key process parameters.

The main control room will host two operator interface terminals (OIT). Two servers in a redundant configuration will also be located here to provide the basis of the control system supervisory control and data acquisition (SCADA) servers. The control room will provide a central area from where the plant can be operated and monitored and from which the primary regulatory control loops can be monitored and adjusted to achieve the optimum process parameters. In addition, select process and maintenance parameters will be available for alarming, trending and event logging within the process control system (PCS). The PCS that will be used for the plant will be a programmable logic controller (PLC) and SCADA based system.

18.7.8.3 Sabodala Power Station

There is an existing power station control room at the SPS, which will be upgraded as part of the Phase 2 expansion programme.

18.8 Buildings, Stores, Workshops and Ancillary Infrastructure

18.8.1 Existing Facilities at Sabodala

Sabodala Gold Mine has been in operation since 2009 and has in place the requisite infrastructure including exploration, process, mining and general and administration buildings (offices, change rooms, restaurants, training and security), workshops, stores and laydown areas and camp to support the existing operation and the Phase 1 expansion.

The Sabodala Mine Services Area (MSA) is approximately 1.5 km from the SWOLP/SGO administration facilities. The MSA includes heavy and light vehicle workshops, tyre bays, wash bays, oil and lube bays, stores, fuel storage and dispensing, offices and a laydown area.

The SSTP will employ an additional 108 nationals and six expatriates. The new staff will utilise existing change rooms and gate house; no additional G&A infrastructure is required.

18.8.2 New Facilities at Sabodala

Buildings provided by Lycopodium as part of the Phase 2 SSTP scope are defined in Table 18.8.1. With respect to building 'Type', the following 'Type Codes' have been allowed for: Brick/Concrete (BCK); Modular/Prefabricated (MOD); Steel Portal Frame (SPF); and Container (CNT).

Table 18.8.1 SSTP New Facilities

Building	Location	Type	Qty	Size (m)	Area (m^2)
Laboratory	Between SSTP & SPS	MOD	1	16 x 16	256
Sample Prep Shed (Beside Laboratory)	Between SSTP & SPS	SPF	1	13.5 x 12.5	169
Plant Office	Between SSTP & SPS	MOD	1	21.5 x 14	301
Chop Kitchen	Between SSTP & SPS	MOD	1	21.5 x 14	301
Ablutions	Between SSTP & SPS	MOD	1	6 x 4	24
Cyanide Reagents Store	SSTP	SPF	1	28 x 13	364
General Reagents Store	SSTP	SPF	1	74 x 33	2442
Process and Control Room	SSTP	MOD	1	20 x 9	180
Ablutions	SSTP	MOD	5	6 x 4	24
Primary Crusher Workshop	Primary Crushing	SPF	1	10 x 7	700
Security Access Hut	SSTP	MOD	1	3 x 4	12
Goldroom (plus 3 annexes)	SSTP	SPF	1	16 x 6	96
Substation and MCC's	SSTP	CNT	5	Various	

In addition to the above, the SSTP includes storage areas for limestone and SAG balls.

18.8.3 New Facilities at Massawa

The new MSA facility at Massawa, which forms part of the Phase 1 expansion Project, is illustrated in Figure 18.1.2 and is described below.

- Mining and Geology offices - Prefabricated/modular building.
- Mess/Meeting Area - Prefabricated/modular building, 20' container for serving.
  - Food preparation at the Massawa Camp, serving capacity 250 people.
- Clinic (24 h/d x 365 d/a coverage).
  - First response and stabilisation clinic. Sabodala airstrip approximate 35 minutes travel time.
- Heavy and light vehicle and miscellaneous workshop/stores - container construction.
  - Three HME bays constructed, with doubled stacked 2 x 20' containers/layer, with domed roofs fixed to containers.
  - Containers will serve as offices, general stores and tool stores.
  - One light vehicle/drill rig bay (flat roof).
  - 12 m x 12 m concrete slab - tyre change-out bay for HME equipment.
- HME/light vehicle wash-bay (5000 L tank) – High pressure low volume system, with sludge separation and oil/water separator.
- Potable water and sewage management services.

Fuel storage/dispensing facilities are described in Section 18.7.3, water supply and treatment in sections 18.7.2.1 and 18.7.2.2 respectively, and sewage management in Section 18.7.6.2.

18.9 Accommodation Facilities

18.9.1 Operational Camps

SGO has four camps in total, three of which are operated by SGO. For the three SGO operated camps, there are 1946 beds in total, 1665 of which are used, and 281 are available. The associated water and sewage treatment facilities for each facility are described more fully in Section 18.7. Additionally:

- all persons accommodated are housed on single status, non-residential basis, and as indicated in Section 5.0, 90% of artisan level and above/professional staff are currently sourced from Dakar, or are expats;
- the camps are generally fully serviced, with kitchens, mess areas, laundries and recreational areas;
- the Massawa Camp kitchen will provide food to the Massawa MSA; and
- SGO leases the Bransan Camp to Transport Dieye.

Table 18.9.1 SGO Accommodation Facilities (31 December 2021)

Name	Property	User	Beds	Beds used	Beds available
Sabodala Camp	Sabodala	SGO	1519	1317	202
Massawa Camp	Massawa	SGO	384	310	74
Boart Longyear Camp	Massawa	FTE Drilling	43	38	5
Bransan Camp	Bansan Lot C	Transport Dieye (Leased from SGO)	N/A	N/A	N/A
Total			**1946**	**1665**	**281**

18.9.2 Construction Accommodation

Whilst certain contractors' personnel will reside in the SGO camp as part of the Phase 1/2 expansion programme, a number of the sub-contractors will establish their own facilities.

18.10 Mine and Production Wastes

18.10.1 Tailings Storage Facility

18.10.1.1 Design Basis

The design of the tailings storage facilities (TSF) as outlined herein is based on:

- DFS level engineering development and cost estimation.
- The LoMp and the associated waste production schedules ((MineScope, SSTP-2021) (MineScope, SWOLP-2021) and (MineScope, LoM-2021)).
- Historical and more recent geotechnical drilling programmes for TSF2.
- Regulatory[1] guidelines/international best practice, including:
  - Global Industry Standard on Tailings Management, August 2020.
  - Endeavour Mining - Group Standard Tailings Management (the current status of this document is Initial Draft for Internal Review).
  - International Cyanide Management Code.
  - ANCOLD 'Guidelines on Tailings Dams - Planning, Design, Construction, Operation and Closure', Revision 1 dated July 2019.
  - DMIRS (formerly DMPWA) Code of Practice 'Tailings storage facilities in Western Australia', dated 2013.
  - DMIRS (formerly DMPWA) 'Guide to the preparation of a design report for tailings storage facilities (TSFs)', dated August 2015.
  - ICOLD Bulletin 153 'Sustainable Design and Post-Closure Performance of Tailings Dams', dated 2013.
  - Canadian Dam Association, Dam Safety Guidelines (2013).
  - The Mining Association of Canada, Management of Tailings Facilities.

In addition to the DFS base case of expanding the capacity of TSF1 (in use since 2009) and constructing TSF2 (permitted in 2012, but not yet built), consideration has also been given to disposing of non-BIOX® tails into the Sabodala Pit (hereafter the Sabodala In-pit Tailings Storage Facility or 'SIPTSF') after the cessation of mining in the Sabodala Pit (Q3/Q4 2024).

Importantly, whilst the SIPTSF presents a significant techno-economic upside for the Project and SGO's operation, it does not form part of this Technical Report or the associated financial model.

[1] No regulatory guidelines for Senegal.

18.10.1.2 TSF1, TSF1B and TSF2 Storage Capacity

In accordance with the LoMp, 67.11 Mt (db)[1] of tailings is to be stored between 2022 and 2035 To meet this requirement, the following TSF scenarios are envisaged.

- TSF1, an unlined tailings facility which has been in operation at Sabodala since 2009, can be raised to accommodate additional tailings (Table 18.10.2).
- TSF2 (not yet built) was originally designed and approved in 2012 and has since been redesigned to incorporate a larger storage volume, an HDPE-liner and underdrainage system (Table 18.10.3). The updated new design still needs to be submitted to regulators for approval.
- TSF1B (not yet built) is a double HDPE-lined compartment within TSF1. This containment cell is designed to accommodate BIOX® neutralisation/CIL tailings from the new SSTP.

The storage volume, by source, for the 2024 to 2035 mine plan is illustrated in Table 18.10.1. The dam raises required and ultimate storage capacity for TSF1 and TSF2 are illustrated in Table 18.10.2 and Table 18.10.3 respectively.

A general layout of the aforementioned dams is presented in Figure 18.10.1, whilst the construction schedule for TSF1B and TSF2 is presented in Section 24.1.

As an alternative, the SIPTSF tailings deposition scenario has been assessed, with the available storage volume, as presented in Table 18.10.1.

Table 18.10.1 Tailings Storage Requirements from 2022 to 2035

Tailings Type and Liner (if required)	Average In-Situ Dry Density (t/m^3)	Tailings (Mt)	Total Volume (Mm^3)
SWOLP (HDPE Liner to TSF2)	1.35	55.00	40.74
SSTP Float tails to TSF1	1.55	11.10	7.16
SSTP BIOX/CIL tails (Double HDPE-Lined Cell) to TSF1B	1.2	1.01	0.84
Total		**67.11**	**48.74**
SIPTSF (alternative to TSF2)	1.65	72.6	44

Table 18.10.2 TSF1 Embankment Raises

RL Raise (m)	Embankment	Earthworks (approx. m^3)	Tailings Storage Mass (approx. Mt db)[2]	Tailing Storage Volume (approx. Mm^3)
156.5	Western & southwestern	250 000	7.49	4.8
158	Eastern	35 000	3.74	2.4
159	Western & southwestern	125 000	5.35	3.4
160	Western & southwestern	55 000	2.6	1.7
162	Southern	45 000	6.12	3.9
162	**Total**	**510 000**	**25.3**	**16.2**

[1] Latest Mine Plan, Table 16.6.5, 66.39 Mt from 2022 to 2035.
[2] Calculated at an in-situ dry density of 1.55 t/m^3.

Table 18.10.3 TSF2 Embankment Raises

Phase	RL Raise (m)	Tailings Storage Mass (approx. Mt db)	Tailing Storage Volume (approx. Mm^3)
Stage 1	140.5	9.4	6.98
Stage 2	145.5	20.19	14.96
Stage 3	150.5	27.6	20.4
Total	**150.5**	**57.19**	**42.34**

18.10.1.3 TSF Geotechnical Investigations

The geotechnical site investigation works to support the design of these facilities have been executed over the years. Additional geotechnical drilling has been undertaken for TSF2.

18.10.1.4 TSF Hazard Category

In terms of the Global Industry Standard on Tailings Management (GISTM), TSF1, TSF2 and TSF1B have a Dam Failure Consequence Classification of 'High', whilst the potential SIPTSF has a Dam Failure Consequence Classification of 'Low'.

18.10.1.5 TSF Construction

The design concept adopted for the starter embankment of TSF2 and all subsequent embankments for TSF1 and TSF2, have downstream slopes of 3.0:1 (H:V), upstream slopes of 2:1 (H:V) and embankment crest widths of 6 m. The embankment structures comprise a homogenous, compacted 'select' soil embankment with a cut-off trench, underdrainage within the impoundment upstream of the main embankments and finger drains in the downstream section of TSF2.

Materials for embankment construction are to be sourced within and adjacent to the impoundment areas. Dried tailings are not being used in the embankment construction. TSF1B (BIOX® Residues) is an HDPE lined facility on the eastern side of TSF1 adjacent to the decant accessway (Figure 18.10.1). Mine waste overburden materials sourced from existing waste dumps is available if required.

Construction of the TSF1, TSF2, TSF1B must be undertaken in accordance with the earthworks construction specification and the specifications for the installation of the geotextile and HDPE liners prepared for the Project.

18.10.1.6 TSF Operations, Tailings Deposition and Water Management

The existing operations manual (OM) which has been updated for TSF1, can be modified for TSF2. These manuals have extensive details on the operation of the spigots and return water pumping system. TSF1B will need to have an OM developed for the facility, with the appropriate details documented relevant to the specific operation of the spigots and return water pumping systems for these new facilities.

As water management is a key stability parameter, the concept design incorporates a decant rock ring filter to maximise the clarity and volume of the return water and minimise the lateral extent of the supernatant pond. Water removal from the TSF, which has been averaging 78% of the tailings slurry water over several years, is to be maintained. The design and operation of the TSF is to maximise water recovery and maximise the in-situ dry density of the deposited tailings, which for TSF1 has been averaging 1.55 t/m^3 over several years. It is expected that TSF2 can be managed and operated to achieve similar performance criteria.

A predictive water balance has been in place for several years for TSF1 and it has provision for data from the operation of TSF2 to be added.

Spillways have been designed for TSF1 and TSF2 based on a new assessment of the available climate data in 2020.

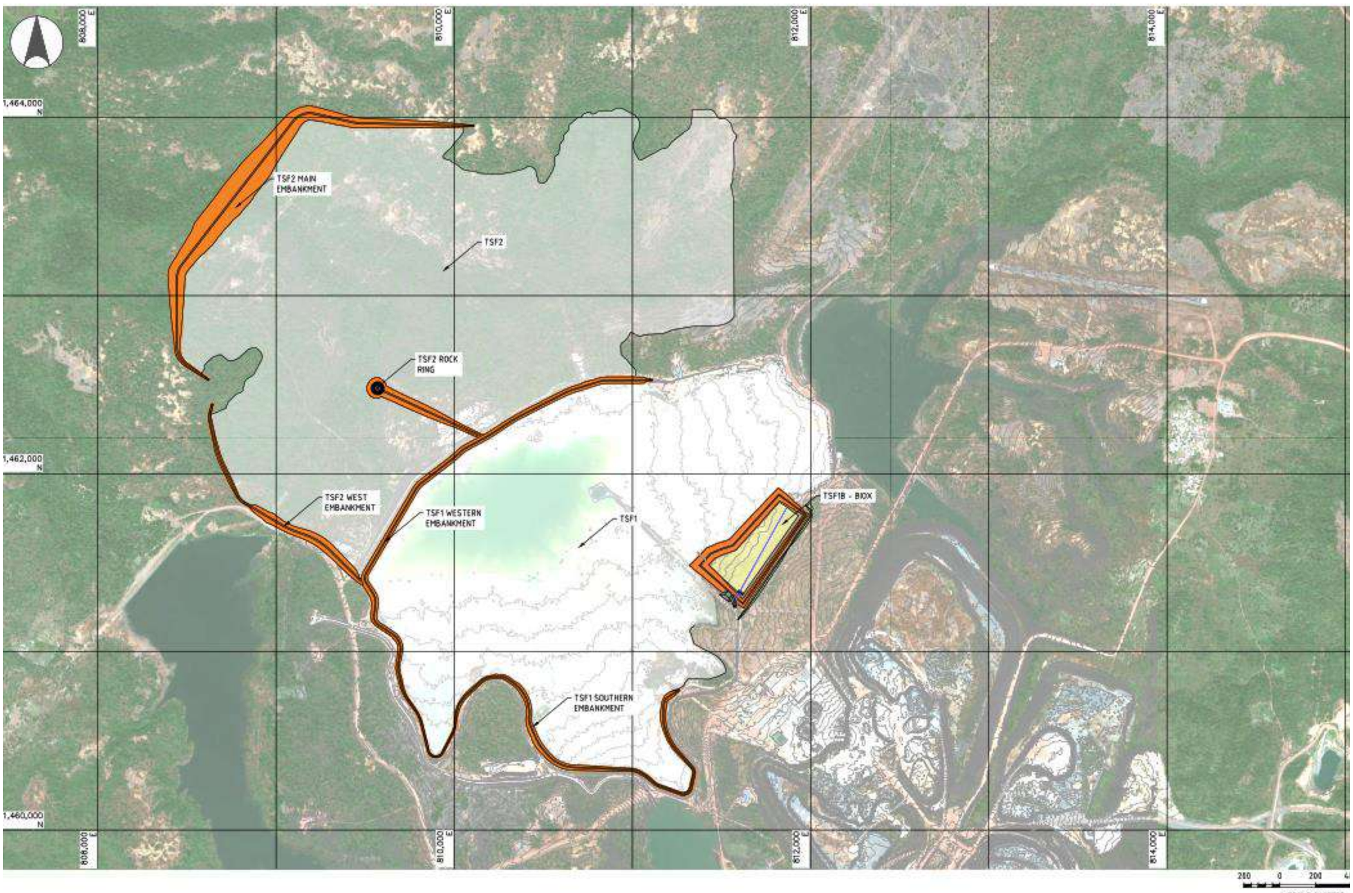
18.10.1.7 Monitoring and Instrumentation

The TSF will be instrumented with vibrating wire piezometers to facilitate the monitoring of pore pressures. Monitoring bores are located downstream of TSF1 to record standing water levels and facilitate sampling to allow groundwater quality to be analysed. The results show that groundwater monitoring meets regulatory compliance requirements. New groundwater monitoring bores are to be installed downstream of TSF2.

18.10.1.8 Rehabilitation and Closure

Progressive rehabilitation of the external slopes of TSF1 and TSF1B will be possible throughout the life of the operation. The outer slopes may need to be covered with nominally 500 mm of armor materials, normal to the slope, to provide protection against erosion due to rainfall runoff. Once a finer-grained growth medium, such as topsoil, is added to the rock armor, the development of vegetation can commence. As part of the topsoil/growth medium placement process, the outer slopes should be contour ripped. Timing of the rehabilitation works is to be confirmed during the operation of the facility.

Figure 18.10.1 Sabodala Tailings Storage Facilities



Source: Resource Engineering Consultants, 2022.

18.10.2 Waste Rock Facilities

The Waste Rock Dumps (WRDs) required on the Sabodala and Massawa properties are detailed in Section 15 of this Technical Report. Clean and dirty water management practices associated with the WRDs are described more fully in Section 18.6. The layout of the WRDs are detailed in Section 16, whilst the WRDs associated with the Massawa CZ and NZ deposits can be seen in the Massawa Infrastructure drawing (Figure 18.1.2).

WRD/pit water management practices are summarised below:

- Where appropriate, clean water diversion berms are placed around all waste rock dumps.
- For WRDs associated with the Sabodala Shear Zone (SSZ), the water is subject to monitoring and is suitable for discharge to the environment after passing through silt traps. Monitoring will focus on suspended solids and nitrates.
- For WRDs associated with Massawa Shear Zone (MSZ), contact water must be contained and analysed before being released to the environment. It is likely that this water will need to be diluted with cleaner water from either the Massawa water reservoirs or from pit sidewall dewatering boreholes. As a worst case scenario, a portion of this water may be treated in the MWTP, as described in Section 18.6.

Topsoil from the pit and/or WRDs will be removed before mining commences and will be stored in dedicated stockpiles or berms, not more than (1 to 1.5) m in height. To ensure that the integrity and effectiveness of the contained organic carbon is maintained, the top-soil must not be compacted. This top-soil will later be used as part of ongoing WRD rehabilitation work.

With respect to mining and WRD construction, management and closure, the following may be noted:

- All waste dumps were located with the goal of minimising haulage distances and overall haulage cost. Within the design criteria, techno-economic consideration was given to footprint minimisation.
- Waste rock from the open pits will be hauled to the WRD and placed using haul trucks (end-tipping) in lifts, with standard dozing management practice. In calculating waste dump capacity requirements, it was assumed that the blasted volume of the material would swell on average by 30% when compared to the in-situ volume.
- There is sufficient waste dumping capacity available for the pits on the Sabodala and Massawa Properties. There is further room to expand if the existing pits get larger, or new Mineral Resources are identified.
- Dust management of the dumps will be managed with water trucks.
- The dumps will be rehabilitated on an on-going basis and closed at the end of the LoM.

In accordance with the LoMp, there is 372 Mt (db) of waste rock to be stored, with a corresponding loose volume of 201 Mlcm (30% swell factor). This compares to a WRD capacity of 256 Mm^3.

The in-pit waste volumetric quantities, loose volumes and design basis for the nine different WRDs on the Sabodala and Massawa properties are illustrated in Table 18.10.4.

Table 18.10.4 In-Pit Waste Volumes, Dump Capacity and Design Criteria

Pit	Waste Volume (Mbcm)	In-pit Waste (Mt)	Swell @ 30% (Mlcm)	Density (t/m³)	Waste Dump Capacity (Mm³)	Bench Height (m)	Berm Width (m)	Overall Slope (°)
SAB	10.9	31.0	14.2	2.84	18.3	20	30	18.8
MKM	0.4	1.0	0.5	2.75	2.6	20	30	18.8
NKE	29.1	61.8	37.8	2.12	40.1	20	30	18.8
GBW	3.6	6.6	4.6	1.86	11.3	20	30	18.8
MAS	43.7	116.5	56.9	2.66	62.5	20	30	18.8
SFM+SFN	4.3	11.8	5.6	2.74	7.1	10	13	20
MAS CZ	25.9	60.3	33.7	2.33	46.5	20	30	18.8
MAS NZ	32.9	73.5	42.7	2.24	61.8	20	30	18.8
DEL	3.9	9.7	5.0	2.51	6.1	20	30	18.8
Total	**155**	**372**	**201**	**2.41**	**256**			

18.11 Data Verification

The data verification process involved in compiling Section 18.0 is discussed in Section 12.0.

18.12 Comments on Section 18.0

18.12.1 Geotechnical

The Qualified Person for Section 18.3.1 visited the site in February/March 2016 to inspect the test pits for the proposed heap leach project and again in October 2021. During the site visits the QP visually assessed the laterite caprock outcrops on the cleared surface of the SSTP site and the excavation through the caprock for the diversion channel (which is to the west of the SSTP). He has since viewed the borehole logs and core photographs from the recent geotechnical drilling. The QP is comfortable that the level of design engineering meets the DFS requirements and is satisfactory for structural design purposes.

18.12.2 Transport and Logistics

The QP considers that there are no transportation issues or concerns between the PAD, Dakar and the Sabodala-Massawa Properties. Long-haul road infrastructure on the Sabodala-Massawa Properties has been adequately covered from a technical and cost development and SHE perspective.

It is noted that the peak annual transportable volumes of ore are high, as are the frequency of vehicle movements (Table 18.4.2). Consequently, logistic management at key loading/off-loading points and gatehouses will need to be carefully managed.

Rear tipping trucks are hard to seal, with seals deteriorating with time. Thus, fully sealed side-tipping trucks would be preferred to ensure no loss of ore. Wagon coverings are optional and dependant on perceived issues of dust and ore loss.

18.12.3 Power and Lighting

A comprehensive technical investigation into the expansion of the Sabodala Power Station has been conducted through detailed feasibility studies and definitive feasibility studies. An early focus of identifying fatal flaws in various proposed solutions allowed for the prompt elimination of unfeasible designs and has subsequently allowed the proposed, feasible solution to be investigated in considerable depth prior to execution.

The engineering development and provision of deliverables is satisfactorily comprehensive so that it can be stated with confidence that the cost estimate for the Sabodala Power Station Expansion, developed from said deliverables, is Class 3 compliant under the AACE International Cost Estimate Classification System. In terms of the maturity level of the project definition deliverables, it can be confirmed that the Project is within the required 10% to 40% project definition deliverables completion range required for Class 3.

18.12.4 Water Management

The water management studies conducted for the purpose of input into the ESIA, ESMP, feasibility studies and this Technical Report, were done in line with national (Senegalese) and international (IFC) standards and requirements. The SWMP will ensure separation of clean (non-contact) and dirty (contact) water as well as monitoring of dirty water before discharge.

Infrastructure is either planned or in place and will ensure separation of water and the safe storage and discharge. Discharge of water will need to comply with background surface water qualities before discharge and the planned MWTP will ensure that any water not complying will be treated.

Dewatering plans in place will ensure safe operation of all open pit operations. Both surface water and groundwater qualities and quantities were well covered by the water and salt balance calculation which will ensure the mine water management plans in place can cope with any events above or below the average in terms of both chemistry and volumes. The studies completed, recommendations made, and mitigations implemented will ensure the mine operates at an acceptable standard and avoid impacts on the environment as far as possible.

18.12.5 Site Services

The QP considers that the existing 'Site Services' (Section 18.7) are appropriate to support the current mining and processing operations, and the expanded services to be provided, are sufficient to support the LoM plan. Further, 'Site Services' have been developed to the required standard/definition of a DFS.

Additionally:

- The SPS tank farm fire detection and protection issues will be addressed as part of the Phase 2 expansion plans.
- Whilst the sewage management system works, consideration could be given to installing a dedicated sewage treatment plant at the SCPF.

18.12.6 Buildings Stores, Workshops and Ancillaries

The QP considers that the buildings, stores, workshops and ancillary infrastructure noted in Section 18.8 that is either existing and/or to be built, is suitable for the LoM plan requirements. Furthermore, for new facilities, the level of technical and cost development is in accordance with the requirements of a DFS.

18.12.7 Accommodation Facilities

The QP for Section 18.9 believes that the accommodation facilities on the Sabodala and Massawa properties are of an appropriate standard and are sufficient to meet the housing requirements of non-resident staff for the Phase 1/2 expansion requirements.

No opinion is offered on the Bransan Camp that is currently leased by SGO to the long-haul contractor.

18.12.8 Tailing Storage Facilities

The QP for Section 18.10.1 is comfortable that the level of design engineering meets the ANCOLD Guidelines. The Muk 3D modelling for the TSF storage volumes and containment embankment details is appropriate for the proposed mine plan tonnes, with storage volume requirements determined from reconciled in-situ dry density measurements from the existing TSF. The materials take-off from the Muk 3D tailings modelling using AutoCAD 12 models is in accordance DFS level requirements. There are no material issues that would impact the tailings storage work.

18.12.9 Waste Rock Dumps (WRDs)

For the WRDs, the QP considers that the level of technical and cost development is in alignment with the requirements of a DFS. Furthermore, there are currently no WRD space constraints on the Sabodala and Massawa properties that would limit mining in accordance with the current mine plan.

18.13 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 18 are defined more fully in Section 25.0.

18.14 Recommendations

Recommendations with respect to Section 18, are presented in Section 26.0.

18.15 References

References cited in Section 18.0, are presented in Section 27.0

19.0 MARKET STUDIES AND CONTRACTS

19.1 Introduction

The marketing section (Section 19.2) herein, outlines current and future scenarios for commodity (gold and silver) market pricing, as well as the macroeconomic drivers for changing key raw material input costs.

Endeavour leverages consensus commodity price data in determining budget and LoM gold prices. This, in combination with benchmarking against peers, ensures that gold prices used for resource, reserve and financial modelling calculations, are reasonable and in alignment with industry peers. The data presented herein also provides guidance for the work carried out in Sections 14, 15 and 22

The contracts section (Section 19.3) presents those primary and secondary service level contracts that support Endeavour's mining operations on the Sabodala Mining Concession and the Massawa Mining License.

19.2 Market Studies

19.2.1 Gold Market

This section looks at historical gold pricing and analysts' projections, and then secondly, the resource and reserves gold pricing used by peer group companies.

Table 19.2.1 following, presents historical gold price statistics on an annual basis from 2000 through to 2021; and illustrates price volatility over this period.

Table 19.2.1 Annual Historical Gold Price Statistics (Consensus Market Data, 2022)

Period	Min USD/ozt	Max USD/ozt	Average USD/ozt	3YDMAV USD/ozt	Nominal Close USD/ozt	Real Close[1] USD/ozt	LTP Rea[l1,2] USD/ozt
2000	264	316	279	296	272	398	438
2001	255	293	271	281	279	401	432
2002	278	349	310	285	347	487	449
2003	323	416	364	306	415	572	479
2004	375	455	410	339	438	585	503
2005	412	528	445	382	517	668	517
2006	517	719	604	456	636	802	579
2007	607	839	697	539	833	1008	686
2008	710	1,002	871	654	878	1062	846
2009	810	1215	973	787	1096	1290	836
2010	1063	1423	1226	942	1419	1646	947
2011	1311	1899	1572	1160	1564	1761	1115
2012	1538	1789	1669	1360	1674	1854	1255
2013	1190	1692	1410	1469	1205	1314	1280
2014	1141	1382	1266	1479	1184	1281	1256
2015	1051	1301	1160	1376	1061	1140	1193
2016	1060	1366	1248	1271	1151	1212	1242
2017	1151	1349	1258	1233	1302	1343	1196
2018	1174	1358	1269	1234	1283	1298	1265
2019	1270	1552	1393	1292	1517	1501	1302
2020	1475	2053	1771	1375	1898	2031	1350
2021	1682	1947	1799	1675	1822	1822	1578

Endeavour has leveraged Consensus Market Forecasts (CMF) and historical prices for the purposes of determining gold price. Table 19.2.2 following, presents the analysis of gold CMF annually, from 2022 through to 2026 and long-term price ('LTP') assumptions in real terms (assumed 1 January 2022).

The CMF LTP derived from a December 2021 analyst poll (five analysts), indicates a median gold price of USD 1800/ozt, with a range of USD (1632 to 1900)/ozt. For the 12-month period ended 31 December 2021, the gold price ranged from a low of USD 1682/ozt to a high of USD 1947/ozt, with an average of USD 1799/ozt, and a three-year moving daily average of USD 1675/ozt.

[1] Real terms prices as of 1 January 2022 money terms
[2] Historical Long-Term Price derived from median of CMF

Table 19.2.2 Gold Consensus Market Forecast Analysis[1]

	Units	2022	2023	2024	2025	2026	LTP
High	(USD/ozt)	2000	1945	1900	1927	1927	1900
Median	(USD/ozt)	1800	1772	1750	1732	1800	1800
Average	(USD/ozt)	1808	1762	1743	1729	1724	1776
Low	(USD/ozt)	1688	1600	1500	1500	1500	1632
STDEV.S	(USD/ozt)	60	92	115	136	154	116
Analysts	(No.)	37	36	26	16	11	5

Table 19.2.3 following, illustrates peer group gold price assumptions (Price Waterhouse Coopers, 2020). For 2020, findings are as noted below:

- For reporting of Mineral Resources, 2020 gold price assumptions ranged from USD (1250 to 1750)/ozt, average USD 1459/ozt.
- For reporting of Mineral Reserves, 2020 gold price assumptions ranged from USD (1200 to 1750)/ozt , average USD 1383/ozt.

Table 19.2.3 Mining Company Gold Price Assumptions (Price Waterhouse Coopers, 2020)

Aspect	Range	Gold Price (USD/ozt)			
		2021	2022	2023	LTP
Impairment Testing	Low	1400	1385	1350	1200
	Average	1609	1540	1509	1454
	High	1900	1800	1700	1700
Period		**2017**	**2018**	**2019**	**2020**
Mineral Reserves	Low	1100	975	1200	1200
	Average	1226	1173	1291	1383
	High	1300	1250	1550	1750
Period		**2017**	**2018**	**2019**	**2020**
Mineral Resources	Low	1100	1200	1200	1250
	Average	1322	1300	1369	1459
	High	1500	1500	1550	1750

Based on this data, Endeavour's use of a USD 1500/ozt gold price for Mineral Resources and USD 1300/ozt for Mineral Reserves is largely aligned with the average values used by industry peers in 2020, if not likely a bit conservative in 2021 terms. The impairment testing figures in Table 19.2.4 are the gold prices used by peers when performing a LoM cash flow analysis for a mine site which has indicators of impairment.

19.2.2 Silver Market

This section looks at historical silver pricing and analysts' forward projections. Silver reserves and resources are not modelled by Endeavour and thus the silver prices presented herein are for reference and internal budgeting purposes only.

Table 19.2.4 following, presents the historical silver price statistics on an annual basis from 2000 through to 2021. For the 12-month period ended 31 December 2021, the silver price ranged from a low of USD 21.53/ozt to a high of USD 29.59/ozt, with an average of USD 25.15/ozt, and a three-year moving daily average of USD 20.90/ozt.

[1] Consensus Market Forecast as sourced from on-market data

Table 19.2.4 Historical Annual Silver Price Statistics (Consensus Market Data, 2022)

Period	Min (USD/ozt)	Max (USD/ozt)	Average (USD/ozt)	3YDMAV (USD/ozt)	Nominal Close (USD/ozt)	Real Close[1] (USD/ozt)	LTP Real[1,2] (USD/ozt)
2000	4.57	5.50	4.95	5.15	4.59	6.71	5.25
2001	4.05	4.80	4.37	5.02	4.61	6.63	5.00
2002	4.23	5.07	4.60	4.78	4.76	6.69	5.00
2003	4.34	5.96	4.88	4.70	5.93	8.18	5.00
2004	5.54	8.22	6.66	5.13	6.79	9.07	5.08
2005	6.41	8.98	7.31	5.86	8.81	11.38	5.17
2006	8.72	14.74	11.56	7.60	12.87	16.21	7.75
2007	11.54	15.48	13.37	9.73	14.77	17.88	9.33
2008	8.95	20.75	14.93	11.79	11.30	13.66	10.58
2009	10.53	19.20	14.67	13.63	16.83	19.81	11.25
2010	15.01	30.86	20.16	15.78	30.86	35.79	13.08
2011	26.82	48.41	35.27	21.26	27.69	31.19	16.17
2012	26.34	36.89	31.13	25.31	30.31	33.56	19.58
2013	18.45	32.24	23.79	27.59	19.41	21.17	19.58
2014	15.33	21.96	19.03	27.31	15.66	16.95	18.75
2015	13.70	18.29	15.69	22.41	13.83	14.86	18.33
2016	13.79	20.61	17.08	18.90	15.93	16.78	19.50
2017	15.58	18.52	17.04	17.21	16.95	17.47	19.00
2018	13.96	17.57	15.68	16.37	15.48	15.66	17.50
2019	14.35	19.57	16.19	16.50	17.93	17.64	17.58
2020	12.01	28.89	20.53	17.51	26.49	28.35	18.75
2021	21.53	29.59	25.15	20.90	23.09	23.09	21.23

Endeavour has leveraged CMF and historical prices for the purposes of determining silver price. Table 19.2.5 following, presents the analysis of silver CMF annually, for periods from 2022 through to 2026 and long-term price assumptions in real terms (assumed 1 January 2022). The CMF LTP derived from the December 2021 analyst poll (3 analysts), indicates a median silver price of USD 22.50/ozt and a range of USD (20.60 to 23.92)/ozt.

Table 19.2.5 Silver Consensus Market Forecast Analysis (Consensus Market Data, 2022)

Statistics	Units	2022	2023	2024	2025	2026	LTP
High	USD/ozt	28.00	26.00	28.00	27.18	23.92	23.92
Median	USD/ozt	24.00	23.25	22.75	22.13	20.40	22.50
Average	USD/ozt	24.07	23.48	22.99	22.09	20.67	22.34
Low	USD/ozt	21.82	18.00	18.40	18.40	18.20	20.60
STDEV	USD/ozt	1.29	1.54	2.23	2.32	1.85	1.36
Analysts	(No.)	33	30	24	16	8	3

19.2.3 Macro Economics

The Financial Model for the Issuer’s interest in the Sabodala Concession and the Massawa Mining License has been determined in real terms, and as such, does not explicitly model the impact of inflation and purchase price or

[1] Real terms prices as of 1 January 2022 money terms
[2] Historical Long-Term Price derived from median of Consensus Market Forecasts

non-purchase price parity determination of nominal exchange rates. Notwithstanding this, macro-economic drivers may be modelled in the sensitivity analysis.

The following discussion includes a summary of key macro-economic factors which impact the projection of capital and operating costs.

19.2.3.1 Exchange Rates

The budgeting process and LoM expenditure forecasts incorporate assumed long-term, and real exchange rates measured against the USD. Table 19.2.6 summarises exchange rates used for the development of capital and operating costs for the Issuer's operations and associated Financial Model (Q4 2021).

Table 19.2.6 Summary of Project FX Rates[1]

EUR:USD	GBP:USD	USD:CAD	USD:XOF	USD:AUD	USD:ZAR
1.19	1.43	1.23	555	1.45	14.93

Table 19.2.7 following, presents annual historical exchange rates from 2000 to 2021. The purpose of the table is to demonstrate trends in FX rate movements and to justify rates used for the project.

Table 19.2.7 Historical Exchange Rates (EUR,GBP,CAD,XOF, AUD, ZAR) to One USD[2]

Year	Annual Average						End of Period					
	EUR	GBP	CAD	XOF	AUD	ZAR	EUR	GBP	CAD	XOF	AUD	ZAR
2000	0.92	1.52	1.48	710	1.79	6.92	0.94	1.50	1.50	699	1.79	7.57
2001	0.90	1.44	1.55	731	1.96	8.44	0.89	1.45	0.16	735	1.96	12.00
2002	0.95	1.50	1.57	691	1.78	10.62	1.05	1.61	1.57	629	1.78	8.58
2003	1.13	1.64	1.40	579	1.33	7.62	1.26	1.79	1.30	520	1.33	6.68
2004	1.24	1.83	1.30	527	1.28	6.48	1.36	1.92	1.20	484	1.28	5.63
2005	1.24	1.82	1.21	527	1.36	6.35	1.18	1.72	1.16	554	1.36	6.34
2006	1.26	1.84	1.13	522	1.27	6.75	1.32	1.96	1.17	497	1.27	7.05
2007	1.37	2.00	1.07	478	1.14	7.05	1.46	1.98	1.00	449	1.14	6.83
2008	1.47	1.85	1.07	448	1.41	8.17	1.40	1.46	1.22	467	1.41	9.25
2009	1.39	1.57	1.14	471	1.11	8.48	1.43	1.62	1.05	457	1.11	7.36
2010	1.33	1.55	1.03	495	0.98	7.35	1.34	1.56	1.00	490	0.98	6.61
2011	1.39	1.60	0.99	471	0.98	7.21	1.29	1.55	1.02	507	0.98	8.08
2012	1.29	1.59	1.00	510	0.96	8.20	1.32	1.63	0.99	496	0.96	8.48
2013	1.33	1.56	1.03	494	1.12	9.58	1.37	1.66	1.06	476	1.12	10.49
2014	1.33	1.65	1.10	495	1.22	10.81	1.21	1.56	1.16	538	1.22	11.56
2015	1.11	1.53	1.28	591	1.37	12.65	1.09	1.47	1.38	603	1.37	15.48
2016	1.11	1.36	1.32	592	1.39	14.74	1.05	1.23	1.34	625	1.39	13.68
2017	1.13	1.29	1.30	583	1.28	13.35	1.20	1.35	1.26	561	1.25	12.37
2018	1.18	1.33	1.30	557	1.42	13.18	1.15	1.28	1.36	569	1.42	14.39
2019	1.12	1.28	1.33	582	1.42	14.46	1.15	1.33	1.30	582	1.42	13.99
2020	1.10	1.28	1.34	590	1.63	16.44	1.10	1.24	1.41	589	1.63	14.60
2021	1.18	1.38	1.25	555	1.33	14.75	1.14	1.35	1.27	577	1.38	15.96

[1] Summary of FX rates used on the project based on quarterly forecast assumptions.
[2] Historical Exchange Rates. (2022).

The FX rates presented in Table 19.2.6 are deemed reasonable based on historical FX rates illustrated in Table 19.2.7.

19.2.3.2 Consumer Price Inflation

Historical CPI statistics for the period 2000 through 31 December 2020 for the principal corresponding country currencies are reflected in Table 19.2.8 and summarised below:

- For the 12-month period ended 31 December 2020, the YoY CPI for Burkina Faso (BF) is 1.90%.
- For the 12-month period ended 31 December 2020, the YoY CPI for the United States (US) is 1.00%.
- For the 12-month period ended 31 December 2020, the YoY CPI for Australia (AU) is 0.80%.
- For the 12-month period ended 31 December 2020, the YoY CPI for Canada (CA) is 0.70%.
- For the 12-month period ended 31 December 2020, the YoY CPI for the Euro Zone (EZ) is 0.30%.
- For the 12-month period ended 31 December 2020, the YoY CPI for the United Kingdom (GB) is 1.00%.
- For the 12-month period ended 31 December 2020, the YoY CPI for South Africa (ZA) is 3.20%.

Table 19.2.8 provides context when determining Mineral Resource and Mineral Reserve gold prices as CPI provides a benchmark for variability in gold price due to inflation.

Table 19.2.8 Historical Consumer Price Inflation (World Bank, 2022)

Year	YoY 12-month CPI							Year Average CPI						
	BF (%)	US (%)	AU (%)	CA (%)	EZ (%)	GB (%)	ZA (%)	BF (%)	US (%)	AU (%)	CA (%)	EZ (%)	GB (%)	ZA (%)
2000	2.36	3.39	5.80	3.20	3.47	1.23	6.99	2.36	3.39	5.80	3.20	3.47	1.23	6.99
2001	1.01	1.55	3.12	0.72	3.12	1.35	4.59	1.01	1.55	3.12	0.72	3.12	1.35	4.59
2002	3.93	2.38	3.03	3.80	2.58	1.73	13.51	3.93	2.38	3.03	3.80	2.58	1.73	13.51
2003	3.16	1.88	2.37	2.08	2.31	1.31	-1.63	3.16	1.88	2.37	2.08	2.31	1.31	-1.63
2004	0.68	3.26	2.59	2.13	2.96	1.68	2.20	0.68	3.26	2.59	2.13	2.96	1.68	2.20
2005	4.48	3.42	2.80	2.09	2.65	2.16	2.02	4.48	3.42	2.80	2.09	2.65	2.16	2.02
2006	1.54	2.54	3.25	1.67	2.68	2.86	4.82	1.54	2.54	3.25	1.67	2.68	2.86	4.82
2007	2.23	4.08	2.96	2.38	4.42	2.30	7.57	2.23	4.08	2.96	2.38	4.42	2.30	7.57
2008	11.62	0.01	3.69	1.16	3.06	3.08	9.31	11.62	0.09	3.69	1.16	3.06	3.08	9.31
2009	-0.30	2.72	2.11	1.32	0.34	2.07	6.16	-0.30	2.72	2.11	1.32	0.34	2.07	6.16
2010	-0.30	1.50	2.68	2.35	2.63	3.15	3.34	-0.30	1.50	2.68	2.35	2.63	3.15	3.34
2011	5.08	2.96	2.99	2.30	3.17	3.60	6.32	5.08	2.93	2.99	2.30	3.17	3.60	6.32
2012	1.61	1.74	2.20	0.83	2.10	2.42	5.81	1.61	1.74	2.20	0.83	2.10	2.42	5.81
2013	0.16	1.50	2.75	1.24	0.56	1.95	5.24	0.16	1.50	2.75	1.24	0.56	1.95	5.24
2014	-0.16	0.76	1.72	1.47	-0.24	0.71	5.34	-0.16	0.76	1.72	1.47	-0.24	0.71	5.34
2015	1.31	0.73	1.69	1.61	0.17	0.50	5.18	1.31	0.73	1.69	1.61	0.17	0.50	5.18
2016	-1.66	2.07	1.48	1.50	1.04	1.79	7.07	-1.66	2.07	1.48	1.50	1.04	1.79	7.07
2017	1.98	2.11	1.91	1.87	1.50	2.74	4.50	1.98	2.11	1.91	1.87	1.50	2.74	4.50
2018	0.34	1.91	1.78	1.99	1.65	2.00	4.40	0.34	1.91	1.75	1.99	1.65	2.00	4.40
2019	-2.56	1.18	1.57	2.25	1.46	1.31	4.03	-2.56	1.18	1.57	2.25	1.46	1.31	4.03
2020	1.90	1.00	0.80	0.70	0.30	1.00	3.20	1.90	1.00	0.80	0.70	0.30	1.00	3.20

Uncertainty exists surrounding the forecasting of inflation rates as countries begin easing COVID-19 restrictions. Additionally, the ongoing Russia-Ukraine war creates further uncertainty, with increasing oil prices. Endeavour does not model inflation within financial models; therefore, the uncertainty of inflation forecasts does not impact budgeting or impairment.

Notwithstanding this, historical quantitative easing combined with regional/global conflicts, are likely to lead to higher inflation rates and by association, higher capital, sustaining capital and operating costs. Stating this, in a higher inflationary environment, gold is considered an inflationary hedge.

19.2.3.3 Consumable Commodity Input Costs

Fuels

Large volumes of Light Fuel Oil (LFO or diesel) and Heavy fuel Oil (HFO) are used at Endeavour's operations. Diesel is primarily used for powering the mining fleet, whilst HFO is solely used to generate base load power.

CMF for crude prices are presented in Table 19.2.9, dated February 2022. Data indicates a median LTP of USD 67/bbl. for West Texas Intermediate and USD 73/bbl. for Brent.

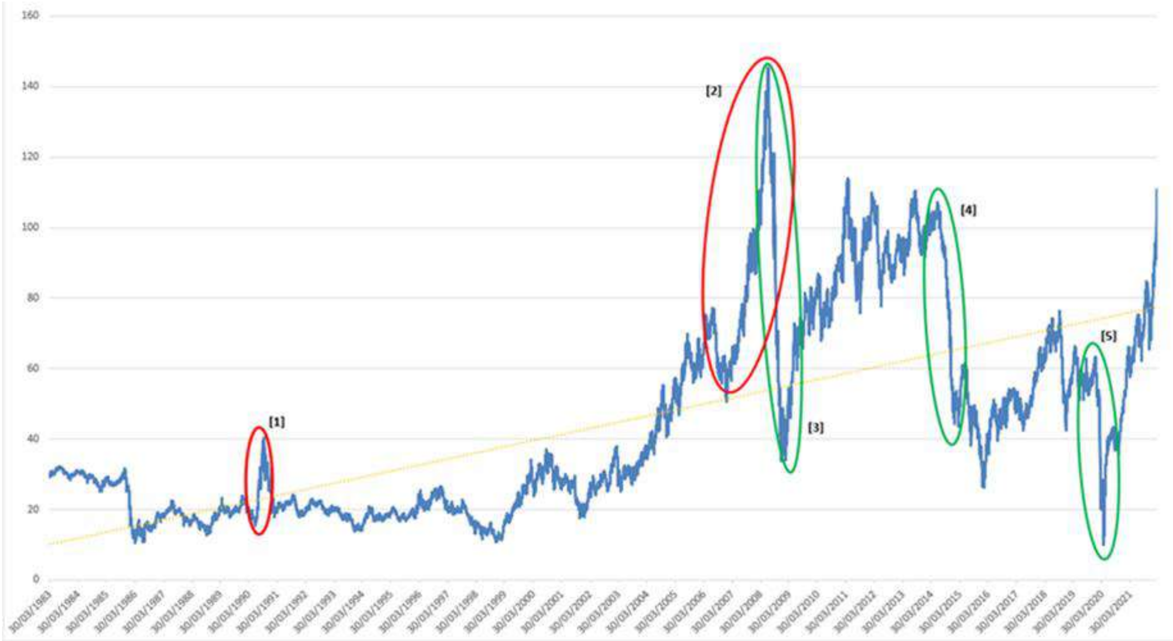
Typically pricing determinations are derived from consideration of a low sulphur gas oil ('LSGO') benchmarked by a commodity market specialist advisor (S&P Global Platts Energy Company); and determination of all related freight, wharfage, storage, local levies, VAT, exercised duties and fuel levies. Assumptions for the current financial model are USD 0.88/L and USD 0.54/L for LFO and HFO, respectively (Q4 2021).

Table 19.2.9 Consensus Market Forecast Crude Oil and Fuel Pricing

Statistics	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030	LTP
West Texas Intermediate											
High	(USD/bbl.)	86	94	86	75	75	78	78	78	78	78
Median	(USD/bbl.)	70	65	63	60	60	67	67	67	67	67
Average	(USD/bbl.)	69	68	63	60	63	66	66	66	66	66
Low	(USD/bbl.)	55	51	49	48	54	55	55	55	55	55
STDEV	(USD/bbl.)	8	11	9	7	7	8	8	8	8	8
Analysts	(No)	32	23	21	19	10	10	10	10	10	10
Brent Crude											
High	(USD/bbl.)	89	96	89	91	92	98	98	98	98	98
Median	(USD/bbl.)	75	71	66	65	64	73	73	73	73	73
Average	(USD/bbl.)	73	72	67	66	68	73	73	73	73	73
Low	(USD/bbl.)	58	54	52	51	54	60	60	60	60	60
STDEV	(USD/bbl.)	8	12	10	9	11	11	11	11	11	11
Analysts	(No)	30	22	20	19	11	10	10	10	10	10

Considering recent developments in Ukraine, historical WTI crude oil prices were reviewed to determine price impacts of historical events, to best forecast the potential fuel price and likely impacts (cost and duration) of similar events. Figure 18.10.1 following, illustrates the impact of a number of global and regional events on oil price over the past 40 some years.

Figure 19.2.1 WTI Crude Oil Historical Prices and Key Events (Bloomberg, 2022)



Key events associated with price volatility in Figure 18.10.1 are summarised below:

Point 1 - Gulf War (1990):

- The Gulf War restricted global supply, with available fuel prioritised for the war. As a result, the price of WTI crude oil rose 55% over a 6-month period from July 1990 to January 1991.

Point 2 – Decline in Oil Supply (2006):

- A global decrease in WTI crude oil supply, partially attributable to the war in Iraq led to a 130% increase in oil price over an approximate 2-year period.

Point 3 - Economic Recession (2008):

- The economic crisis of 2008 led to a 76% decrease in WTI crude oil prices from July 2008 to February 2009.

Point 4 - Global Over Supply (2014):

- WTI crude oil prices fell 60% from September 2013 to March 2015 as a result of increasing global supply, driven by the United States, coupled with an improving geopolitical environment.

Point 5 - COVID-19 (2020):

- WTI crude oil prices fell 77% over the 2-month period from February to April 2020 as a result of the emergence of COVID-19. Over this period global demand fell sharply, resulting in the price decrease.

As outlined throughout Section 19.2, commodity prices (gold, silver, crude oil) have historically been trending upward due to increasing global demand. While WTI prices appear to have gradually recovered after each of the five events illustrated in Figure 18.10.1, the trendline shows that prices have been increasing over time. While there has been an immediate impact on oil prices as a result of the ongoing Russia-Ukraine war, the extent (price) and duration of the impact is unknown. Figure 18.10.1 suggests that prices recover after each event within one to two years. Therefore, the current Russia-Ukraine war is unlikely to have a lasting impact on operations. In Table 18.4.1, it has been assumed that the short to medium term impact on fuel price could be between 35% and 100%.

19.2.3.4 Steel

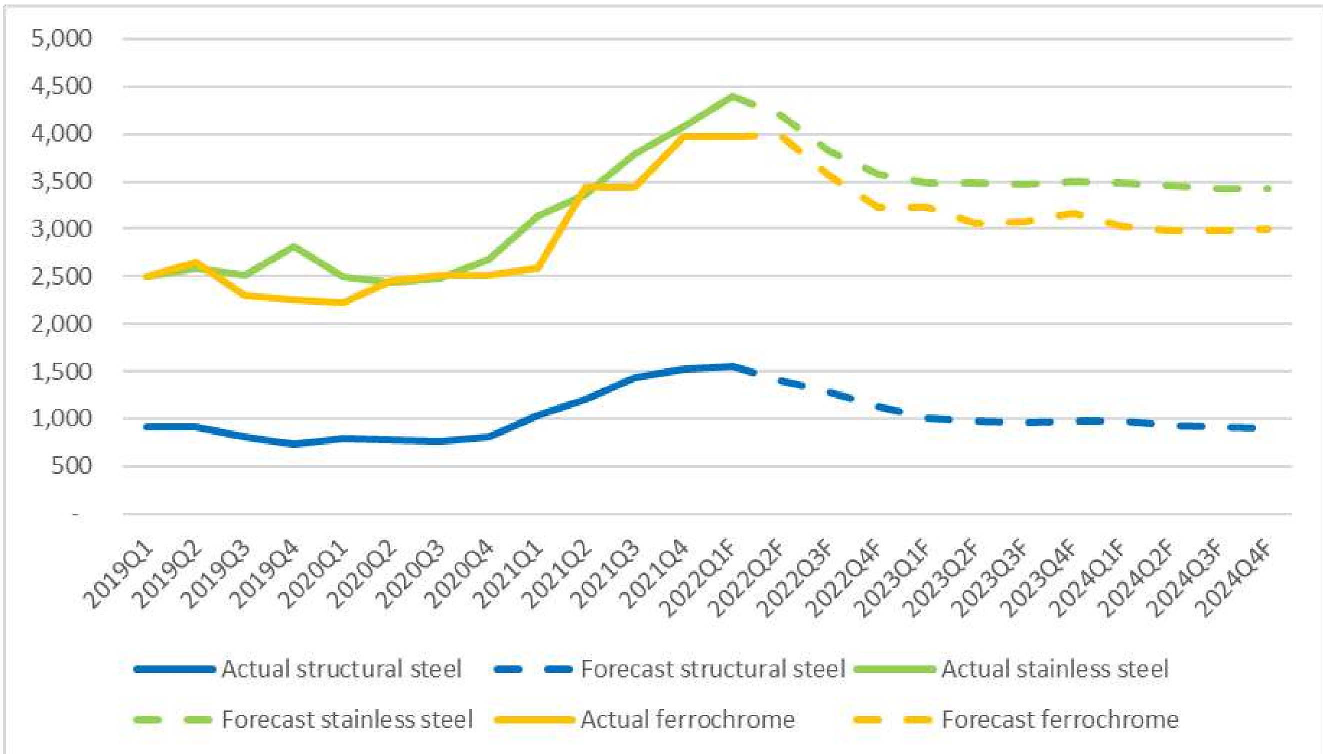
Steel is a key commodity used in the mining industry, specifically impacting CAPEX, sustaining CAPEX and OPEX (Grinding media).

Figure 19.2.2 following, outlines the price of structural and stainless steel from 2019 to 2021, with price forecasts from 2022 to 2024. The figure also includes ferrochrome which is a key element in the construction of stainless steel. Based on this figure, it can be seen that structural steel will likely recover to pre-pandemic prices and thus, subject to when orders are placed, escalations for steel pricing should not be required. Notwithstanding this, steel manufacture and transport is carbon/energy intensive, and rising secondary raw material input costs and global insecurity may keep prices high. Of secondary long-term concern, is the potential application of CO_2 taxes to steel production and the associated impact that this may have on pricing.

Stainless steel is extensively used in the mining industry (in corrosive environments), with the key stainless steel alloying elements being chrome and nickel. Whilst nickel price is increasing, largely being driven by battery demand (Ni price = LME + Premium), it is worth noting that the nickel in stainless steel is largely sourced from oxide ores (limonite and saprolite) and processed pyrometallurgically to produce nickel pig iron (NPI) and ferronickel (FeNi) and typically, the nickel sold into this industry is sold at a discount to LME. Whilst these iron nickel alloys can be processed to battery grade nickel products, it is expensive and not commonly done. Thus, increasing LME nickel price does not necessarily lead to an increase in stainless steel costs.

Figure 19.2.2 illustrates the stainless steel price forecast (304 grade). Whilst stainless steel is expected to recover to pre-COVID levels during the latter half of 2022, continued geopolitical uncertainty may potentially disrupt this forecast. Notwithstanding this, there has been considerable growth in NPI manufacture, and the nickel used in the stainless steel industry is likely to be in surplus for a while.

Figure 19.2.2 Stainless Steel, Structural Steel and Ferrochrome Prices, (Consensus Market Data, 2022)



19.3 Contracts

As detailed in Section 4, the Issuer has an ownership interest in both Sabodala Gold Operations SA (SGO) and Massawa SA, the respective parties holding exploitation rights on the Sabodala Concession and Massawa Mining License. Whilst it is the Issuer's intent to merge Massawa SA into SGO, the status of this merger is defined below.

Senegal's Ministry of Mines has been informed of the merger, with the process to be finalised 31 December 2022. The effective date of this merger is to be 1 January 2022 (retroactive effect).

Until such time as the merger takes place, the following operational agreements are in place:

- The Sale of ore agreement between SGO and Massawa SA, whereby Massawa sells its ore to SGO (dated 24 August 2020, and amended 15 December 2021).
- The Services agreement between SGO and Massawa SA, whereby SGO invoices Massawa SA for the services provided (mining, exploration, advances of expenses including administrative expenses, etc.) dated 21 August 2020 and amended 15 December 2021.

Whilst both companies operate under the 2003 Mining Code, the terms of the agreement between the respective companies and the state are different. The implications of the merger are discussed more fully in Section 4.

After the effective date of the merger, all contracts will be with SGO.

SGO has a number of key operational support contracts in place, including but not necessarily limited to: fuel supply (HFO/Diesel); ore haulage; mining explosives; supply logistics; reagents; people transport; laboratory operations; gold transport and refining and gold sales.

The commercial basis of each contract is outside the scope of this document, particularly with respect to contract duration, the scope of supply of services and facilities provided by the contractor and SGO, respectively, and the payment terms. Table 19.3.1 does however indicate whether or not SGO provides site offices/facilities (SO) for contractors' personnel on site (T. Barclay (SGO Commercial Manager), 2022).

A technology licensing contract will be set up between SGO and the Metso-Outotec Group (MO Group) for the use of the BIOX® technology. The terms of the agreement are defined in Section 4.

Gold Dore (~88.5% m/m Au) produced at the mine site, is transported by air (250 to 300 kg consignments by Brink's Inc.) to Switzerland (Zurich) for refining by Metalor Technologies SA (Metalor).

Gold sales are contracted though one of the three following entities:

- METALOR Technologies SA.
- StoneX Group Inc.
- Endeavour's Syndicate Banks.

Table 19.3.1 Mine Support Contracts (T. Barclay (SGO Commercial Manager), 2022)

Function	Company Name	SO
Fuel Supply	Vivo Energy Senegal	Yes
Ore Haulage	Transports Dieye	Yes
Mining - Explosives	Orica Senegal SARL	Yes
Drilling Contractor	FTE Drilling	Yes
Heavy Equipment Technical Services	BIA Group	Yes
Civils/Earthworks Services	Elmasa	Yes
Logistics	CSTT-AO	No
Bus Transport	Selov Suarls	No
Charter Flights-People	Transair	No
Laboratory	SGS Senegal SA	Yes
Communications	(Sonatel SN, Tigo, Spider, ACT)	No
Charter Flight-People	Arc en Ciel S.A	No
Medical on Site	Inhemaco S.A	Yes
Industrial Gases	Air Liquide	Yes
Local Support Contracts	Tenkhoto Transit Transport	No
Au/Ag Transport and Refining	Brinks/Metalor Technologies International SA	No

Whilst not part of operational mine services contracts, SGO currently indirectly employs over 2,000 persons in village relocation/construction activities (two new villages), through Matrix Senegal and Compagnie Sahélienne d'Entreprises (CSE), two Senegalese companies.

19.4 Independent Audits/Reviews

19.4.1 Marketing

The marketing review/assessment outlined herein has not been audited/reviewed by an independent third party.

19.4.2 Contracts

No independent third-party audits/reviews have been undertaken on the contract information presented herein.

19.5 Data Verification

The approach to the verification of data presented in this section is discussed in Section 12.0.

19.6 Comments on Section 19.0

19.6.1 Markets

Gold pricing used for resource modelling (reserves: USD 1300/ozt; resources: USD 1500/ozt) and for financial modelling (USD 1500/ozt) are in alignment with industry norms for 2020 and the marketing basis outlined in Section 19.2. They may be slightly conservative in 2021 terms. Fuel prices and exchange rates are considered reasonable, albeit there may be short-term misalignment between the rates used and actual 2022/2023 prices. Steel and stainless steel pricing are not currently considered a significant risk.

Importantly, macro-economic forecasts are seen as realistic, based on current knowledge. They cannot however take into effective consideration: war (physical and trade), economic recession, sudden legislative changes (national/transnational) and political instability.

19.6.2 Contracts

SGO has been operating successfully for a number of years using a variety of outsourced service providers. SGO will continue to follow global best practice, and increase local sourcing/procurement and uplift local communities.

SGO management believe that the contractual terms and pricing rates for the contracts in place, are competitive and in line with norms for operations in comparable locations.

Furthermore, there is no reason to believe that the prospective merger between SGO and Massawa SA will not occur before the end of 2022.

19.7 Interpretations and Conclusions

Interpretations, conclusions and risks pertaining to Section 19.0, are presented in in Section 25.0.

19.8 Recommendations

Recommendations pertaining to Section 19.0, are presented in Section 26.0.

19.9 References

References cited in Section 19.0, are presented in Section 27.0.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 Introduction

This section outlines the social, environment, legal and governance context in which the Mine/Project operates within, as well as the permitting process followed by Sabodala Gold Operations SA (SGO) and Massawa SA (MASA) for the Sabodala Concession and the Massawa Mining License. The Sabodala-Massawa Project (the Project), includes:

- All the pits/waste dumps and ancillary mine infrastructure associated with the Sabodala property and the Massawa property (Sofia, Delya and Massawa Central zone (CZ) and Massawa Northern Zone (NZ)).
- All processing facilities at Sabodala including, the existing Sabodala Whole Ore Leach Plant (SWOLP); the proposed Sabodala Sulphide Treatment Plant (SSTP) and the associated existing (TSF1) and new tailings facilities (TSF1B and TSF2).
- General infrastructure that that support mining and processing on the Sabodala Concession and the Massawa Mining License.

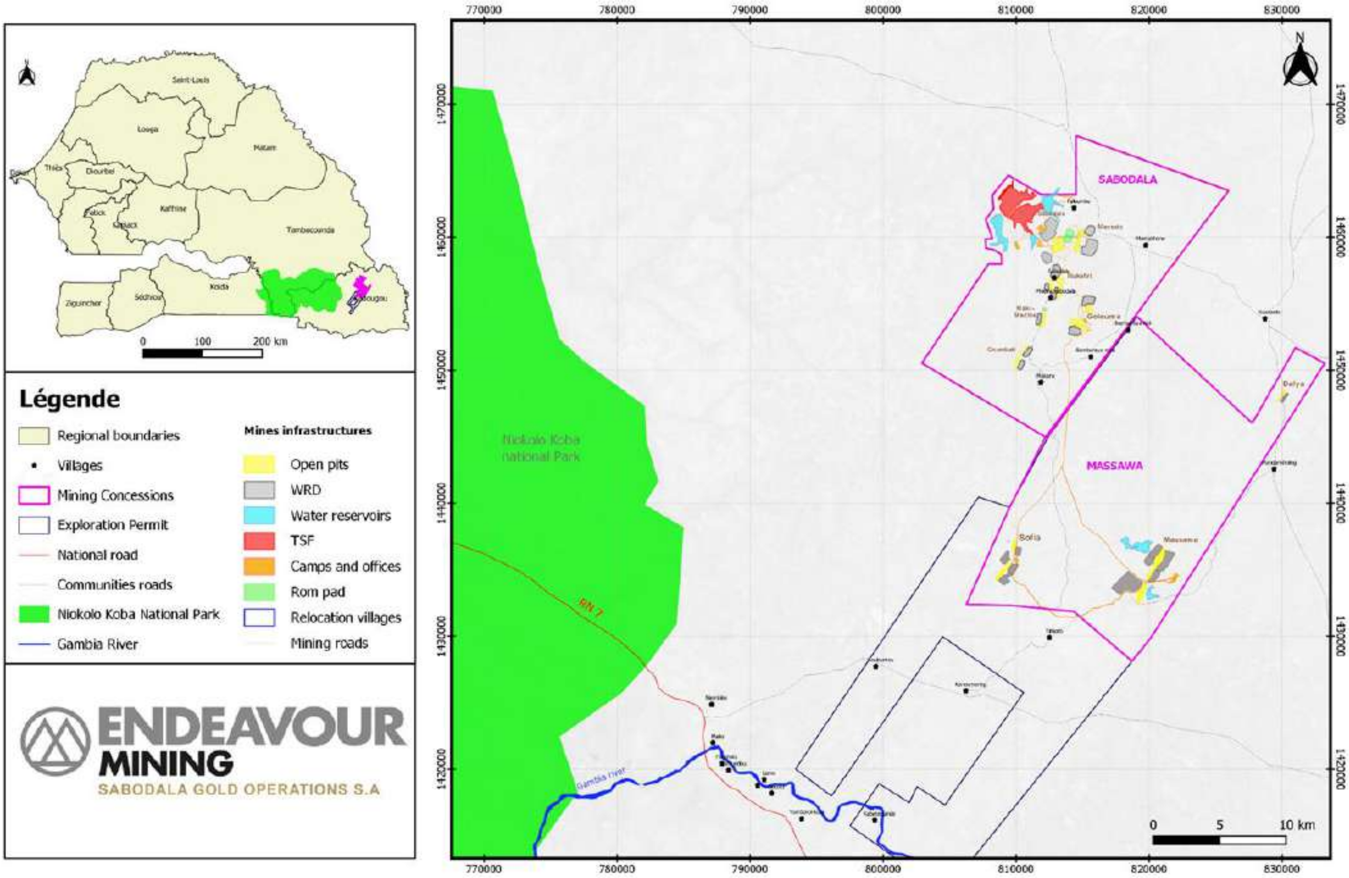
20.2 Environmental and Social Setting

20.2.1 Site location

The Sabodala-Massawa Project is located in southeast Senegal within the Kédougou Region. Dakar, the capital of Senegal, is approximately (600 to 620) km northwest of the Project area. The Project consists of SGO's existing mining operations, and the integration of the Massawa Project, the latter of which is located between the villages of Kédougou and Bembou, Mako and Khossanto.

The Falémé River marks the international border with Mali and is located 75 km to the east. Downstream of the Project, the Niokolo-Koba River flows through the Niokolo-Koba National Park (NKNP), a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site (closest proximity is approximately 15 km west of the Massawa Mining License area). The Project catchments are tributaries of the Niokolo-Koba River (Massawa) and the Falémé River (SGO).

Figure 20.2.1 Project Location and Infrastructure



Source: Endeavour, [March 2022] Atmospheric Environment

20.2.2 General Climate Characteristics

The Project is located in the Sudanese bioclimatic region and is classified as equatorial savannah with dry winters under the Köppen-Geiger climate classification. This region is a transition between the Sahel, a drier area of grassland and savannahs to the north and the Guinean forest to the south.

The movement of the tropical rain belt known as the Inter Tropical Convergence Zone (ITCZ) controls the seasonal rainfall. The variation in the latitudinal movements of the ITCZ from one year to another causes the large inter annual variability in the wet season. The climate is strongly influenced by the West African Monsoon. When the ITCZ is in this northern position, the dominant wind direction in regions south of the ITCZ is south-westerly, blowing moist air from the Atlantic Ocean on to the continent. This pattern is referred to as the West African Monsoon, and accounts for 60% to 80% of the annual precipitation in the wet season (June to September). In the dry season (October to May), the dominant wind direction is reversed; the dry and dusty 'Harmattan' winds blow from the Sahara Desert (Digby Wells, 2018a).

20.2.2.1 Temperature and Humidity

In Kédougou, the highest monthly average dry bulb temperatures are between March and May (typical range from 31°C to 40°C), whilst the lowest monthly average temperatures are between December and January (typically range from 17°C to 26°C). At Sabodala, temperatures are high throughout the year with an annual average of 30°C. Average maximum monthly temperatures can be ≥50°C in April, May and June, whilst in winter, average monthly minimum temperatures will seldom go below 17°C (Synergie Environnement, 2022).

At Massawa, maximum temperatures were observed in May and June (40°C). Monthly averages range from 24°C to 31°C. The average annual temperature is 29°C. The annual relative humidity - maximum and average - are 93% and 48% respectively. The monthly relative humidity reaches 100% between March and October and starts to decrease for the remaining months. Monthly averages ranged from 49% to 67% for the same period (Digby Wells, 2018a).

20.2.2.2 Wind

The annual Harmattan is a dry wind that blows from the north, usually from December to February, resulting in dusty and hazy skies.

Local wind speed is sufficient to contribute to the suspension of dust particles in the air, but not high enough for the installation of wind turbines. Appropriate dust management systems are being employed at the mine.

20.2.2.3 Rainfall and Evaporation

The evaporation and rainfall data available for Sabodala and Massawa are illustrated in Table 20.2.1. The data was sourced from the weather stations at each location. There is a distinct dry (November to May) and wet season influenced by the movement of the ITCZ. Rainfall in the Project area is in the form of convective thunderstorms.

A factor of 0.75 was used to convert the measured ‘A pan’ evaporation data to lake evaporation. The sets of data used for the water balance and Storm Water Management Plan (SWMP) development are explained further under the relevant sub-sections.

The available Sabodala rainfall and evaporation data was for the period from 2008 to 2020.

The available Massawa rainfall and evaporation data was for the 2009 to 2016 period with the rainfall data for 2017 to 2020 incomplete and therefore excluded from data used for the study. Sabodala data was used for the 2017 to 2020 period to fill this gap. The two catchments receive similar rainfall depths and as a result it has been deemed feasible to fill in the missing data with data from the neighbouring catchment.

Overall, the measured rainfall and evaporation data was filtered, and any errors/outliers removed. For water balance purposes, the data was deemed acceptable. Comparing the mean annual precipitation (MAP) for the wet and dry scenarios simulated in the water balance to a 1 in 20-year flood and draught event shows that they plot higher and lower respectively relative to the flood and drought levels. The rainfall scenario approach is therefore considered a conservative approach.

Table 20.2.1 Average Evaporation and Rainfall Data (DWE, 2021)

Month	Sabodala		Massawa	
	Evaporation (mm)	Rainfall (mm)	Evaporation (mm)	Rainfall (mm)
January	165	0.2	126	0
February	177	0.2	143	0.2
March	201	0.2	195	0
April	174	2.5	211	0.8
May	198	16.7	209	23.6
June	157	112.3	186	105.1
July	139	204.9	163	173.3
August	144	267	138	326.8
September	149	227.9	147	310.4
October	160	74.6	183	74.8
November	145	4.6	163	1.3
December	148	0	138	0.1
Total	**1958**	**911**	**2002**	**1016**

20.2.3 Site Baseline Environmental Conditions

20.2.3.1 Air Quality

Dust and particulate matter are the primary source of air pollutants in the Project area.

The Project site is located in a predominantly rural, sparsely populated area. The primary sources of air pollution are anthropogenic. These include traffic on the local road network, biomass burning by local people (cooking fires, field burning), and the Sabodala mining operation. The vehicles used by local people are primarily motorcycles, light vehicles, and trucks. They travel at high speeds, resulting in dust emissions near roads. Biomass burning for agricultural purposes takes place at the end of the dry season. The gases and particles emitted during this process have an impact on air quality, but to a lesser extent than the emissions from the mine. Bushfires are also used by gold miners to clear new sites.

During the dry season, the dust deposition rates are sometimes reported to exceed the applicable criteria for air quality. The most frequent exceedances are found in the village of Khossanto, in the area Sofia and at the Process Plant. The high levels of dust in Khossanto are mainly caused by the importance of road traffic on this public road (from SGO’s activities but also other users), and, in 2021 as a mitigation measure, SGO laid a single layer of asphalt on the roads that run through the villages of Khossanto, Mamakono and Faloumbou to control dust. This spreading of bitumen has reduced the amount of dust in these villages. Molasses is also regularly spread on the community roads as a dust control measure.

In the mine area, the Project generates dust emissions primarily from the localised influence of mining operations (including the use of explosives as part of the Sabodala and Massawa mining plan), vehicle traffic on the tracks connecting the mine pits to the plant, and the processing plant, emissions from the crushers and ore piles at the processing plant. To mitigate the dust around the Sofia area, an action plan to improve the availability of water trucks is being implemented, along with a tree planting programme along the haul roads. An intensive water sprayers system was implemented at the plant site to control the dust during the stockpiling and crushing activities mainly.

Local air quality is characterised by high levels of suspended particulate matter from the activities described above. Seasonal variations exist, particularly during the hot dry season, under the influence of the Harmattan (north wind) and during bush fires. Airborne concentrations increase significantly during these times of the year. During the Harmattan visibility is affected and a fine dust is prevalent.

20.2.3.2 Noise and Vibration

Noise, vibration, and air blast, particularly those associated with mine blasting, are being monitored in the villages closest to the mining operations, including the resettlement sites. Monitoring results are being compared to the ambient noise, vibration, and air blast standards of International Finance Corporation (IFC) and Senegal directive for noise. For vibration, in absence of national standard, the Canadian standard is applied (Synergie Environnement, 2022).

Visual monitoring is being undertaken to confirm that the 500 m blast safety exclusion zones adequately protect the community and worker safety.

Monitoring and control sites for noise and blasting were established prior to the start of mining operations. Noise, vibration, and air blasts are monitored at least once a month at six stations on the mine site and in the four nearest villages (Sabodala, Faloumbou, Dambankoto, Tinkoto).

In the residential areas, high levels of noise can be observed, mainly caused by spontaneous activities that are organised around the monitoring points in the villages (anthropogenic activities). There are also crushing units for artisanal mining, vehicles, and motorcycle traffic. At Massawa, the nearest village is more than 4 km from any mining activities.

Around the industrial zone, some exceedances are observed around the power station and the processing plant. Specific personal protective equipment for the workers is reinforced in these areas. Where community grievance is raised for a mine-related nuisance or health impact associated with ambient dust, noise, vibration or flying rocks, SGO conducts investigations to improve the mitigation measures to minimise these impacts (e.g., by increasing the frequency of watering to reduce dust, or by modifying blast management procedures; refer to grievance procedures in Section 20.4.7.

When ambient noise, vibration, and air blast standards are exceeded at the village level, then SGO takes all practical measures to ensure compliance with the standards. These measures may include reconfiguring blasting procedures, installation of noise control equipment on vehicles, or constructing noise absorption or dissipation berms.

20.2.3.3 Greenhouse Gases

Energy is a critical input for mining operations. It is also a significant business cost and a major source of Greenhouse Gases (GHG) emissions. Endeavour and by association SGO, are working on improving energy efficiency, reducing energy use, and lowering emissions and costs.

In 2020, Endeavour adopted the recommendations of the Task Force for Climate-related Financial Disclosures ('TCFD'), which was established by the Financial Stability Board (FSB)[1] with the aim of improving the reporting of climate-related risks and opportunities. Endeavour commenced reporting in accordance with TCFD in 2020 (2020 Sustainability Report).

[1] www.fsb.org

In 2021, Endeavour continued to work on better defining and calculating the Scope three emissions[1] associated with its operations. Using GHG protocol's Quantis software, the calculations of the baseline Scope three emissions was done on a spend basis. The total emissions of Scope 1 for Sabodala-Massawa in 2021 is 135,136 t CO_2e.

In future there are plans to continue working closely with suppliers to get more accurately calculated emissions, from those who couldn't provide the calculations themselves and to start identifying ways to set a Scope three emissions reduction target based on this work.

20.2.3.4 Flora and Fauna

The Project is part of the Western Sudanese Savanna Ecoregion (WSSE) and from a water catchment perspective, it falls within the Senegal-Gambia basin. The Niokolo-Koba National Park (NKNP), a UNESCO World Heritage Site, is located approximatively 21 km southwest of the Sabodala Concession and 15 km west of the Massawa Mining License.

Flora

The Project and surrounding area consist of natural vegetation that is largely undisturbed, except for areas where vegetation has been removed for prospecting activities as well as for settlements and villages. A mixture of low shrub land and savanna is found in the flatter, low-lying areas, while the savanna class dominates the hillier areas in the northeast, as well as in the far south of the licence area. Woodlands are mainly confined to drainage lines and are also present on the higher-lying hills. Shallow rooting open grassland areas are common where laterite occurs (Digby Wells, 2018b).

Generally, the plant formations in the study area are relatively degraded due to a range of threats, including particularly timber cutting, bush fires, agriculture, and livestock, but also the development of artisanal mining.

Fauna

Information on wildlife in the Project area is based primarily on the results of various wildlife surveys conducted in the vicinity of the Project area.

These inventories provide a precise knowledge of the fauna potentially present in the Project area and its surroundings. These inventories also include the results of studies conducted in the villages (direct observations).

There are over 50 species of plants and animals on the Mining concessions, all recognised as having a special concern at the national or international level. The most important of these species, the West African chimpanzee, is fully protected in Senegal, has International Union for Conservation of Nature (IUCN) Critically Endangered (CR) status; and is a flagship species for the protection of biodiversity (Oryx, 2021).

20.2.3.5 Critical Habitats and Ecosystems

The critical habitats analysis (CHA) conducted on the Project area showed that the only applicable criterion is 'Criterion 1' of the IFC PS6 and this is for the West African Chimpanzee. This means that all important habitats for this species are critical habitats. This applies to the following habitats:

- Gallery forests: necessary for nesting, feeding, movement.
- Watercourses and water points: used directly by chimpanzees and essential support of gallery forests.
- Other habitats with trees (including the wooded savannah): nesting and feeding on baobabs for example.

[1] https://www.carbontrust.com/resources/briefing-what-are-scope-3-emissions

Grassy habitat areas, including bowes, are not considered critical habitats according to the IFC PS6. Nevertheless, in view of the presence or potential of some species of plants with stakes associated with bowes, they were included in the Biodiversity Management plan (BMP).

20.2.4 Legacy Liabilities/Issues

For the Project no legacy liabilities nor concerns were identified related to the baseline conditions.

20.2.5 Terrestrial Environment

20.2.5.1 Topography

The topography of the Project area can be described as undulating, with prominent hills rising in the north-eastern part of the licence area. The elevation increases from a minimum of 96 m above mean sea level (mamsl) in the south, to over 280 mamsl on the higher-lying hills in the north. The higher-lying areas in the north and northeast, and extending towards the centre of the licence area, form a catchment draining towards the northwest. Two distinct valleys are present with a higher lying area in the centre of the licence area separating them (Digby Wells, 2021).

The Massawa deposit is located on a catchment divide where the NZ North Pits and surrounding dumps drain towards the northwest via small drainage lines leading to the Niokolo-Koba River, whilst the southern infrastructure (ROM stockpile, CZ pit, etc.) drain towards the south-western direction via the drainage lines joining the tributaries of the Niokolo-Koba River.

The Sofia deposit's topography follows the Niokolo-Koba River as well, and the site is drained through an unnamed tributary of the Niokolo-Koba River located on the eastern side of the pits and WRDs.

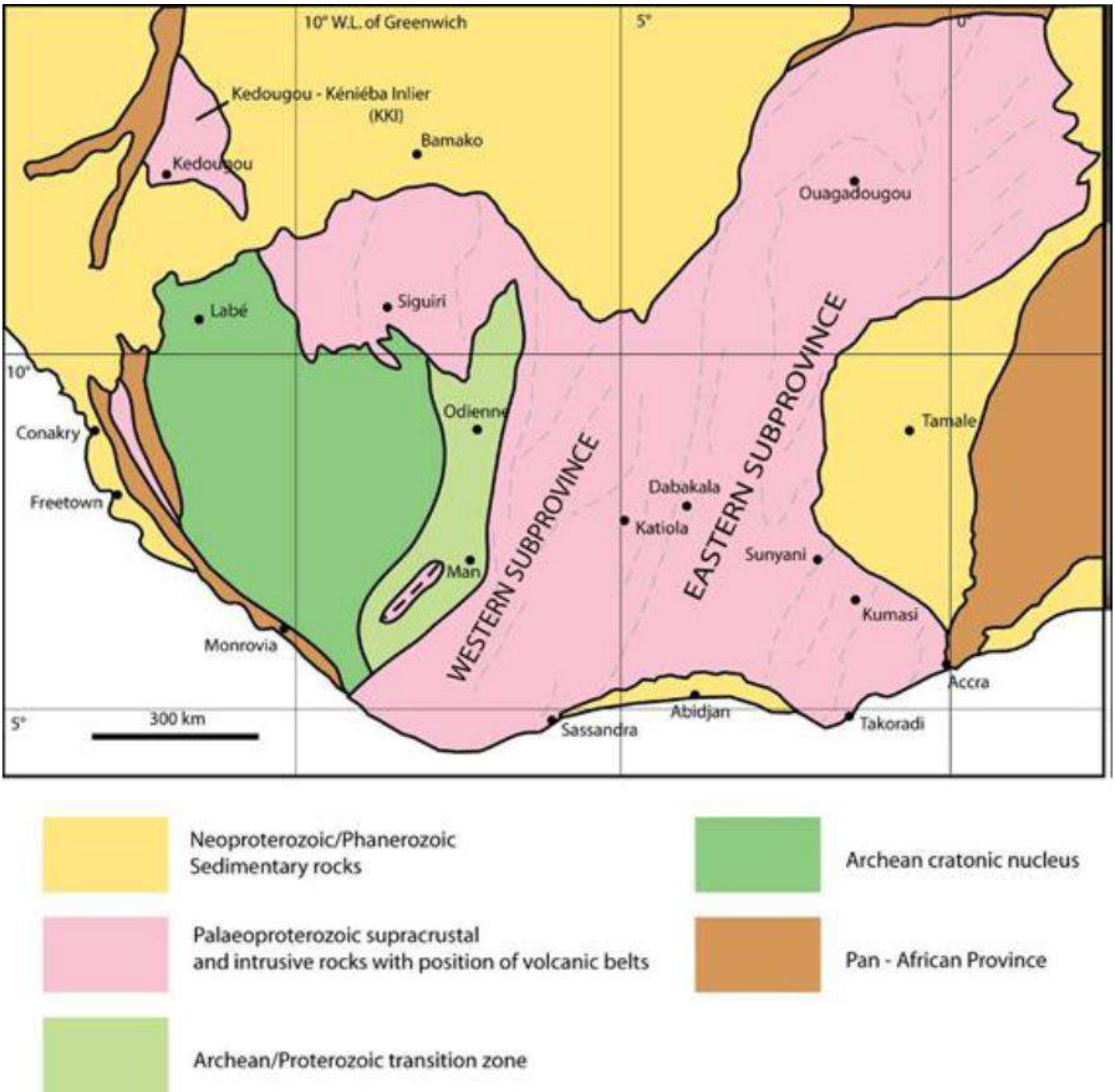
20.2.5.2 Geology

The West African Craton is a volcano-sedimentary succession constructed during the Archaean eon (Figure 20.2.2). The terrain was then affected by the Paleoproterozoic Eburnean orogeny two billion years ago (Ennih &Liegeois, 2008). The craton is sub-divided into three regions, namely:

- The Reguibat Rise to the north extending over Mauritania and western Algeria. Reguibat Rise consists of Archaean terrain in the west and Paleoproterozoic (Birimian) terrain in the east.
- The Leo Rise in the south covers southern Mali, Côte d'Ivoire, Burkina Faso, Niger, Ghana, and Guinea. Leo Rise is separated from the Reguibat Rise by Late Proterozoic to Phanerozoic sedimentary Taoudeni Basin.
- The Man Shield in the western Archaean portion is separated from the eastern Birimian Supergroup of the Baoule Mossi domain by the Sassandra fault.

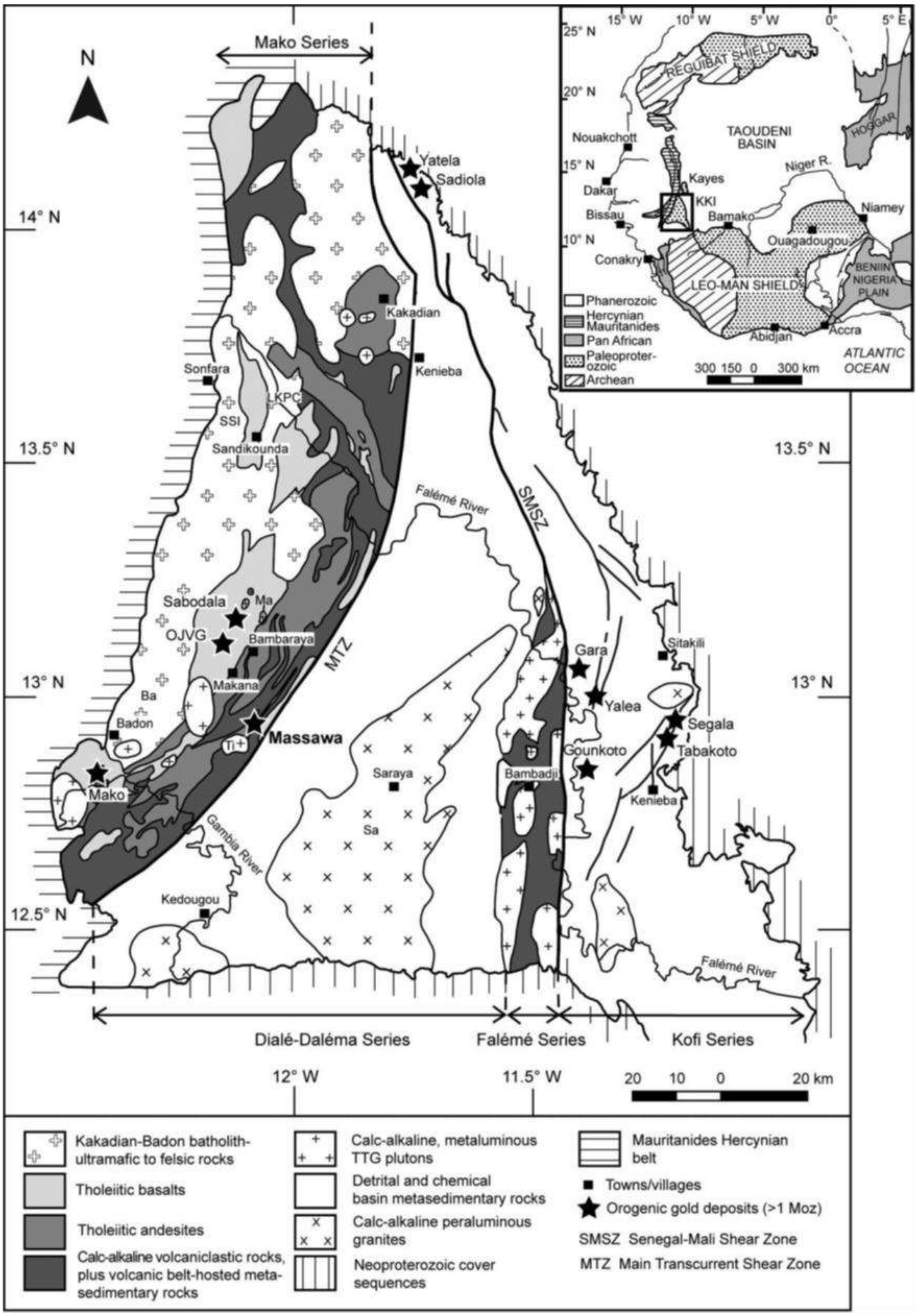
Two Birimian Inliers are associated with the Man Shield, the Kayes, and Kedougou-Kenieba (Ennih & Liegeois, 2008). The Massawa Project is in the Kedougou-Kenieba Inlier.

Figure 20.2.2 West African Craton



Source: Lawrence, D. et al.,, 2013

Figure 20.2.3 Geological Map of the Kédougou-Kéniéba Window



Source: Lawrence, D. et al.,, 2013

The Birimian domain of the Kedougou-Kenieba Inlier is sub-divided into the Western Mako Belt (WMB) and the overlying Dialé-Daléma Basin (DDB). The WMB, dated between 2160 and 2200 Ma, consists of basaltic flow rocks, minor intercalated volcaniclastics, and ultramafic sub-volcanic intrusions. The Mako belt consists of tholeiitic basalt and andesite lavas, with intercalated volcanic agglomerates and banded tuffs. Calc-alkaline volcaniclastic units and derived sedimentary rocks crop out along the eastern side of the Mako belt (Lawrence, et al., 2013).

The DDB consists of volcano-sedimentary and sedimentary rocks in the east separated by a regional-scale shear zone known as the Main Transcurrent zone. Dialé-Daléma basin comprises folded sandstones and siltstones, interbedded with calc-alkaline ash- and lapilli-tuffs (Lawrence., et al., 2013). The rocks, excluding post-Birimian dykes, metamorphosed to lower greenschist facies during the Eburnean orogeny. The Massawa Gold Project is 150 km along NE trending Main Transcurrent Shear Zone (MTZ). The MTZ is a significant trans crustal dislocation between the Mako Belt and the Dialé-Daléma Basin. A second first-order structure, referred to as the Sabodala Shear Zone, is located further to the west, within the Mako Belt. This structure hosts the Sofia deposit and Sabodala's deposits to the north.

20.2.5.3 Soils

Grassy areas indicate laterite and shallow soils, with quick run-off response to rainfall, once soils are saturated. Denser vegetation with tall trees indicates deeper soils, with higher infiltration rates and lower runoff rates.

The laterite is moderately to highly eroded and majority of ions have been washed out. However, the soil is iron rich (Ferricrete) and elevated iron concentrations can be expected. To establish baseline soil and land capability conditions, the following methods were used (Digby Wells, 2018a):

- Soil classification – soils surveyed and classified according to the Food and Agriculture Organization (FAO) standards (Global Reference for Soil Evaluation) (FAO, 2014).
- Soil analysis - soil sample collection and analysis at an accredited laboratory for acidity, fertility, and texture indicators.
- Land capability - defined as the most sustainable use of land under rain-fed conditions, determined by evaluating a combination of soil, landform, and climatic characteristics. The assessment was made in accordance with the U.S. Land Capability Method (1961), which is based on eight classes (I, II, III, IV, V, VI, VII, and VIII).
- Land use - Land use was mapped using aerial imagery and then verified during the site visit.

Table 20.2.2 Soil Type in the Project Area

Lease	Area	Soil type
Massawa	Sofia	Leached tropical ferruginous soils, with concretion and stains.
	Massawa	Lithosols on armour and regosols on gravelly material.
	Delya	Regosols on various basic rock debris and vertic soils on swelling clay material.
Sabodala	GKK Maki-Medina Niakafiri Sutuba	Lithosols on armour and regosols on gravelly material.
	Goulouma Kerekounda	Lithosols on various basic rocks and eutrophic brown regosols on debris of various basic rocks.
	Sabodala	Hydromorphic soils, on alluvial material. Lithosols on armour and Regosols on gravelly material.
	Masato	Lithosols on various basic rocks and eutrophic brown regosols on debris of various basic rocks. Lithosols on armour stone and Regosols on gravelly material.

20.2.6 Water, Wetlands and Aquatic Environment

20.2.6.1 Geohydrology

The Massawa operation is in the upper reaches of the catchment, at elevations between 220 and 275 mamsl. In this area, surface water drainage occurs along narrow, relatively straight channels cut into the strongly cemented regolith outcrop. The drainage network resembles a trellis pattern that coincides with the main structural orientation and the geological discontinuities. At lower elevations in the catchment, by the time water flows pass the Sofia operations, the tributaries have merged into a central stream channel that meanders across the lower-lying flood plains and seasonal wetland. The flow direction is from east to west.

Similarly, in the upper part of the catchment, the deep groundwater flow regime around Massawa is dependent on the N-S orientated structures around the orebody and the near vertical geological rock contacts. Further downstream, the groundwater gradually rises to surface where the weathering surface induces a more dominant east to west flow direction. Flow is limited to the more permeable lenses in an otherwise lower permeability saprolite layer and clayey gravels. The sub-catchment area covers approximately 133.8 km^2.

Sabodala is located further north and forms part of a separate sub-catchment of 76.3 km^2. Apart from the laterite ridge to the east, the catchment is mostly characterised by low-lying flood plains with a general southeast to northwest drainage direction. Groundwater flow is mostly concentrated along the Transition Zone which formed between the top of the bedrock and the near-surface, low permeability saprolite.

Smaller sub-catchments are delineated at each of the separate open pit sites.

20.2.6.2 Hydrology

Regional

Regionally, the Project is located within the Gambia River catchment which has a catchment area of 74064 km^2. The Gambia River is one of the major rivers in West Africa, with a total length of 1120 km, originating in northern Guinea on the wet Fouta Djallon highlands, where a MAP of 1500 mm is received. From Fouta Djallon, the river flows north-westerly for approximately 150 km where it enters south-eastern Senegal. It continues in a north-westerly direction, flowing past the towns of Kédougou and Mako, before entering the Niokolo-Koba National Park, a UNESCO World Heritage Site. From here, it continues in a north westerly direction, and is joined by the Niokolo-Koba River within the Park, before entering Gambia, where it flows westerly widening to 10 km near the mouth, before flowing into the Atlantic Ocean.

The Gambia River is one of the most navigable rivers in Africa, and is easily accessible to oceangoing shipping, and is therefore the principal means of transportation for passengers and freight within The Gambia. Currently, there are no obstructions in the Gambia River, and it is characterised by natural flow regimes; however, construction of a 128 MW hydropower plant dam is planned upstream of the Project area at Sambangalou, near the border of Senegal and Guinea.

Local

Locally, the Project is located in the headwaters of the Niokolo-Koba River catchment (4746 km^2), approximately 34 km upstream of the Niokolo-Koba National Park. From January to May, there is very little to no flow in the Niokolo-Koba River. Due to the long, hot, dry season, high evapotranspiration, and large areas covered by impermeable laterite, baseflows which are responsible for sustaining stream flows during the dry period are virtually non-existent. The streams within this catchment are largely intermittent, flowing only during the wet season, between the months of June to November.

The upper catchment of Niokolo-Koba River consists of small well-defined channels, while the middle to lower sections within the Park become more braided as the slope of the river is reduced. The above results in a number of floodplains and oxbow lakes that could potentially be inundated well into the dry season and would most likely provide an important source of water for wildlife within the Park. The high rainfall during August and September, combined with large areas of laterite in the upper catchment areas, is likely to be responsible for high runoff, where sheet flow is the dominant form of runoff. This was observed during the wet season site visit, where streams rose rapidly in response to storm events.

Figure 20.2.4 Regional Hydrological Setting (DWE, 2021)

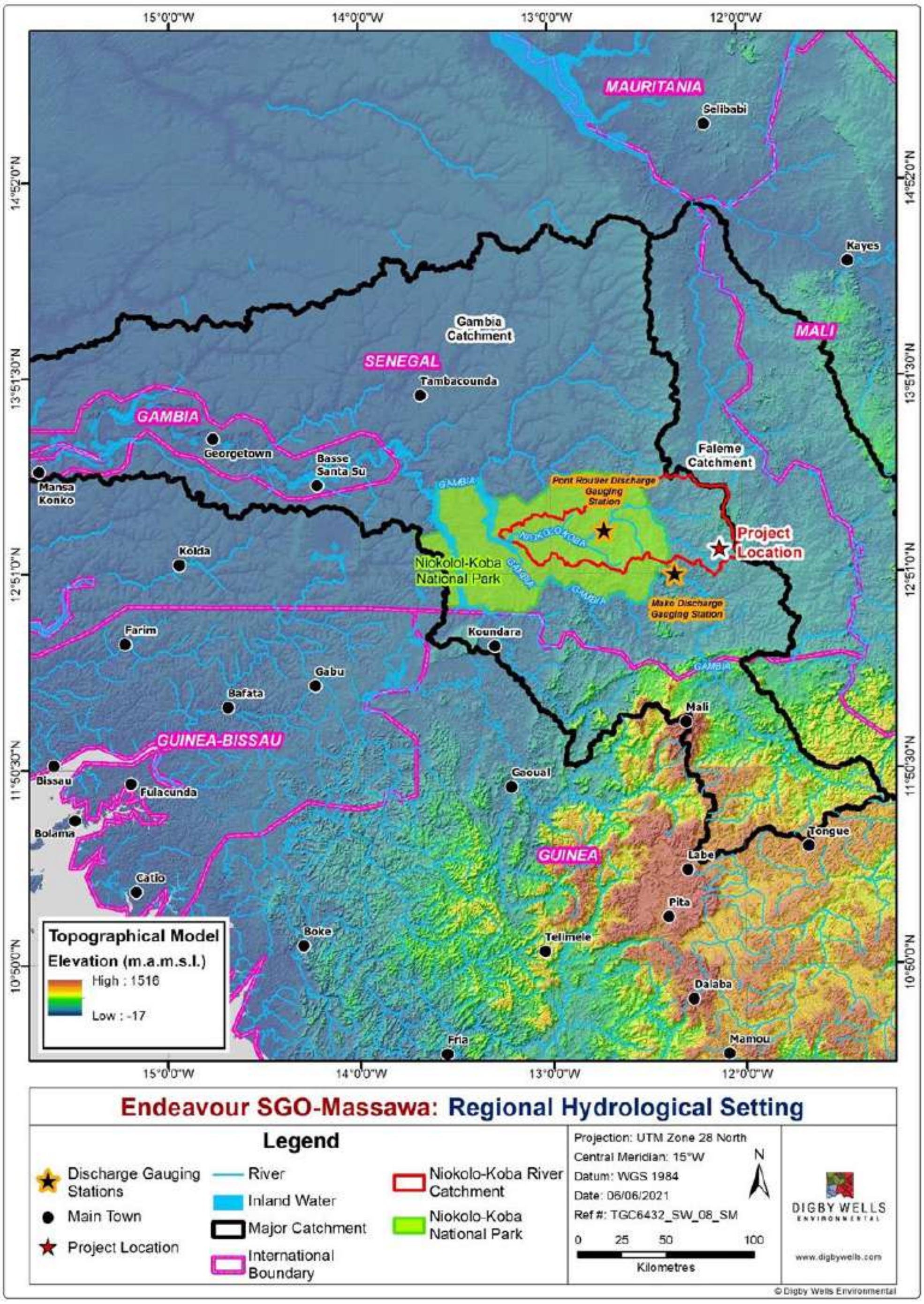
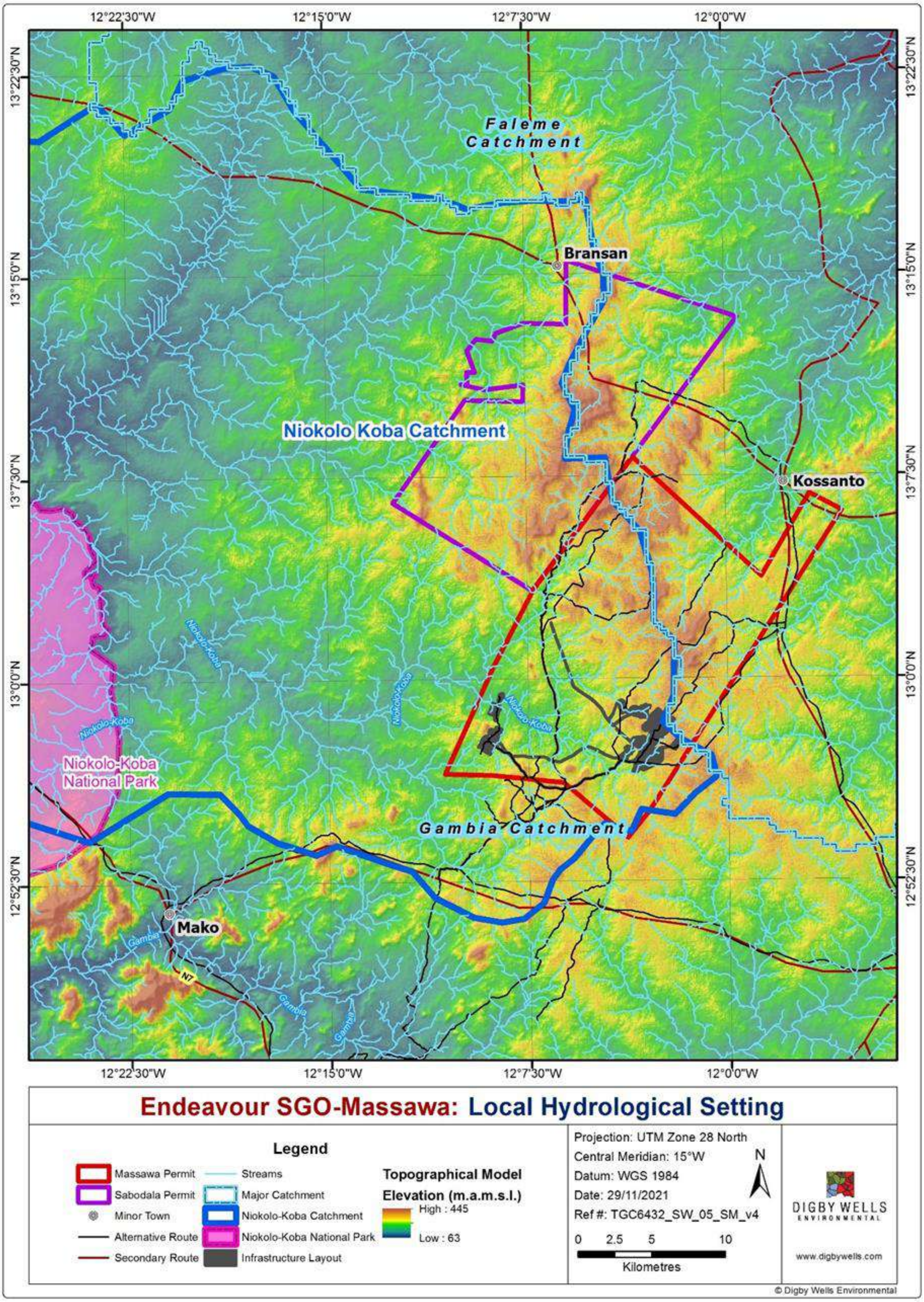


Figure 20.2.5 Local Hydrological Setting (DWE, 2021)



20.2.6.3 Water Use

SGO has built three dams to ensure the continuity of the Project's water supply:

- Large raw water dam (LRWD): Maximum Capacity/Volume below Spillway of 7 446 000 m^3.
- Small raw water dam (SRWD): Maximum Capacity/Volume below Spillway of 994 000 m^3.
- Upper raw water dam (URWD): Maximum Capacity/Volume below Spillway of 5 203 574 m^3.

These various hydraulic structures constitute the Project's water sources. The average volume mobilised by these three structures varies between (8 506 027 and 12 996 567) m^3 per year with a total volume of 10 828 677 m^3 in 2021.

In addition to these dams, the water from the decantation of mine tailings constitutes a potential reuse by the Project. The recycling rate from the TSF1 water is approximatively 80% since 2021.

At the SGO and its satellites pits, surface and groundwater are used for multiple purposes: drinking water, ore processing, dust control and for construction purposes. The total water consumption for 2021 was 3 936 690 m^3 of surface water and 71 095 m^3 of groundwater.

With the Project expansion and the addition of the Sabodala Sulphide Treatment Plant (SSTP) at SGO, the water demand was reassessed. To calculate the process plant water demand, the slurry water requirement for the tailing's material was increased by an additional 10% to be conservative and to cover other potential water losses in the process circuit. The total process plant water demand ranges between 350 709 m^3/month and 488 445 m^3/month. Most of the plant demand can be supplied by the return water from the TSFs ((80 to 81)% on average). However, this leaves a process plant make-up water requirement of between (33 062 and 158 556) m^3/month over the LoM. The SRWD will be the first source of supply for the make-up water requirement as well as the mine workshop supply, after which water will be abstracted from the LRWD.

Only in the worst-case scenario will the URWD be used as a source which based on the current scenarios simulated, will not be required. It should be noted that either the LRWD or URWD can be used as secondary supply after the SRWD.

20.2.6.4 Water Quality

The natural groundwater in the Sabodala catchment is characterised by a near neutral pH and a low total dissolved solids (TDS) (<66 mg/L). It has a dominant Ca- bicarbonate signature. Sulphate remains below the detection limit of 5 mg/L. The groundwater contains very low concentrations of metals and trace elements. Fe, Mn, and Al are the only constituents that regularly exceed the detection limit. This is a common phenomenon in lateritic soils. Arsenic, mercury and cyanide concentrations in the natural water are below the detection limit.

At Massawa, the groundwater has a similar Ca-bicarbonate composition but can be slightly more acidic (pH of 5.2) with higher TDS values (200 mg/L). Due to its interaction with the metalliferous orebody, the groundwater contains elements such as As, Cu, Ni and Pb. Fe and Al are present in concentrations of (1 to 3) mg/L which is above the IFC and WHO guidelines for mine effluent discharge and drinking water respectively.

Table 20.2.3 Water Quality Results of the Three Raw Water Dams and Surrounding Village Wells (Average Values in 2020)

Parameter	Unit	Dam LRWD	Dam SRWD	Dam URWD	GW DKT Moll	GW BRS1	GW BRS4	GW DKT Vill	GW FBO	GW MNA1	GW MNO2
Physical-Chemical Parameters											
pH	(units)	8.08	8.05	8.18	6.92	6.79	6.65	7.20	7.33	7.31	7.29
EC	(µS/cm)	232.14	337.45	322.77	51.00	336.00	726.00	55.00	98.00	1121.00	511.00
TDS-calc.	(mg/L)	153.09	222.55	212.86	37.78	231.31	457.66	40.89	68.48	760.84	376.96
Major Ions											
Ca	(mg/L)	22.88	34.03	29.23	5.92	36.80	68.00	7.28	8.16	26.48	19.28
Mg	(mg/L)	9.12	13.70	13.93	1.02	6.22	17.54	0.19	4.76	105.41	44.23
Na	(mg/L)	6.48	11.62	10.80	4.08	22.25	37.56	5.12	5.06	25.61	22.48
K	(mg/L)	5.77	1.72	6.03	0.63	7.49	18.36	0.72	0.76	16.78	5.36
Total Alk.	(mg/L)	124.26	94.08	153.63	36.60	158.60	97.60	36.60	61.00	317.20	305.00
Cl	(mg/L)	2.45	1.87	2.43	0.81	19.19	59.95	1.37	1.36	50.40	9.35
F	(mg/L)	0.00	0.12	0.00	0.30	0.44	0.26	0.42	0.66	0.46	0.33
SO_4	(mg/L)	10.37	83.25	30.80	0.18	3.18	1.55	1.57	3.42	25.61	6.42
Nutrients											
Nitrate (NO_3)	(mg/L)	0.00	2.84	0.00	0.08	12.33	230.20	0.03	1.21	223.32	7.07
Ammonia (NH_3)	(mg/L)	0.01	0.01	0.01	0.00	0.50	0.75	0.00	0.00	7.20	0.55
Phosphate (PO_4)	(mg/L)	0.00	0.00	0.00	0.08	12.33	230.20	0.03	1.21	223.32	7.07
Metals and Trace Elements											
Ag	(mg/L)	0.00	0.00	0.00							
Al	(mg/L)	0.00	0.00	0.00							
As	(mg/L)	0.00	0.00	0.00							
Cd	(mg/L)	0.00	0.00	0.00							
Cr	(mg/L)	0.00	0.00	0.00							
Cu	(mg/L)	0.00	0.00	0.00							
Fe	(mg/L)	0.00	0.00	0.00	0.02	0.08	0.12	0.03	0.01	0.14	0.10
Hg	(mg/L)	0.00	0.00	0.00							
Mn	(mg/L)	0.00	0.00	0.00							
Ni	(mg/L)	0.00	0.00	0.00							
Pb	(mg/L)	0.00	0.00	0.00							
Sb	(mg/L)	0.00	0.00	0.00							
Se	(mg/L)	0.00	0.00	0.00							
V	(mg/L)	0.00	0.00	0.00							
Zn	(mg/L)	0.00	0.00	0.00							
Cyanide Free	**(mg/L)**	**0.00**	**0.00**	**0.00**							
Cyanide WAD	**(mg/L)**	**0.00**	**0.00**	**0.00**							
Cyanide Total	**(mg/L)**	**0.00**	**0.00**	**0.00**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**0.10**	**0.10**

20.2.6.5 Geochemistry

SGO

SGO exploits both oxidised and fresh (non-oxidised) material from its existing deposits. Test work and monitoring have shown low potential to generate AMD and leachable metals (LM). Risks of environmental pollution resulting from AMD and ML are related to the storage of tailings and waste rock. A monitoring programme is in place to test the collected run-off and seepage from the WRDs and TSF.

For the Niakafiri project, 35 waste rock samples were taken from drill cores in the project area and sent for analysis to evaluate their potential to generate AMD. The results showed that only one sample (3%) showed AMD potential and that sample was part of the gold rich ore (2.94 g/t) that would be processed at the plant and its tailings neutralised with lime. The results also showed that the rock material of the Niakafiri zone is rich in carbonate minerals with a significant potential for acid neutralization which could come from the oxidation of sulphides which are present in small quantities.

For the Goumbati-Kobokoto pit area two sampling campaigns were conducted to evaluate the potential to generate AMD of the waste rocks. For the first campaign, 92 samples were taken from drill cores in the project area and sent for analysis. The results showed that only one sample (1%) showed AMD potential. Similar to Niakafiri, the sample was part of the mineralization that will be processed at the plant and its tailings neutralised with lime. For the second campaign, 30 samples were taken from drill cores in the project area and sent for analysis. The results showed that there was no AMD potential in those samples.

Massawa

For the Massawa deposits, a total of 89 waste rock samples were taken across all ore zones and pits and underwent laboratory geochemical test works to assess their potential to generate AMD and ML. For the tailings of Massawa deposits, a total of 99 tailings samples were tested. The results can be summarised as follows:

- Waste Rock:
  - No AMD expected from the Sofia WRDs but some potential water quality issues from Sofia WRDs including suspended solids and nitrates.
  - Potential water quality issues from the Massawa CZ/NZ and Delya WRDs seepage and run-off include suspended solids, nitrates, As, Sb, Fe, Ni, SO_4^{2-}, F^- and Al.
- Tailings:
  - Overall, no AMD potential expected from all tailings streams, however, As and Sb from CIL and SSTP streams may be a concern.
  - Seven samples (of a total of 99) showed a potential for AMD. Five of these samples were neutralised SSTP filtrate/product which are expected to be high in sulphides content, one sample was the SSTP CIL tailings and one float tailings sample that was shown to be an outlier due to it being taken from a soft sulphide zone. The remaining 88 samples from all tailing’s streams were classified as potentially acid neutralizing and showed no significant risk for acid generation.
- Open Pits:
  - No AMD potential expected from any pits.
  - Potential water quality issues in the Sofia pits sumps including suspended solids and nitrates.

– Potential water quality issues in the NZ, CZ and Delya pits sumps include suspended solids, nitrates, As, Sb, Fe, Ni, SO4, F and Al.

From the extensive investigations done on the Massawa area WRD constituents, lithological units and tailings streams, a number of recommendations have been made for management measures which are detailed in Table 20.2.4 following. These apply during operation and during closure.

Table 20.2.4 Geochemical Risks, Characteristics and Recommendations – Massawa CZ

Material		Waste Rock (n=44)	Tailings (n=5)
Geochemical Characteristics	Current pH	Neutral to alkaline (paste pH 6.9 – 9.3).	Alkaline (paste pH 8.8 to 9.1).
	Future pH	64% Non-Acid Forming (NAF), 32% Inconclusive, and 4% potentially acid forming (PAF) NAG pH - mildly acidic to alkaline (pH 5.7 – 11).	100% NAF NAG pH - alkaline (pH 9.4 to 9.8).
	Mineralogy	Acid forming - pyrite (0.36-2.9%), arsenopyrite (2.9%), and pyrrhotite (0.62%). Acid neutralising: • Carbonates - ankerite (0.13-14%), calcite (0.27-18%), dolomite (0.16-5.9%), magnesite (4.6-8.5%). • Aluminosilicates - actinolite, andesine, chlorite, muscovite, and paragonite.	Acid forming - pyrite (0.27 to 0.91%). Acid neutralising: • Carbonates - ankerite (3.2 to 5.4%), calcite (0.45 to-0.72%), and dolomite (2.5 to 5.2%). • Silicates (> 50%) - albite, chlorite, microcline, and muscovite.
	Non-Acid Forming (NAF) lithologies	Gabbro Unaltered, Gabbro Altered, Oxidised with Alteration, OXMAL, Oxidised Volcanic, Quartz Feldspar Porphyry, Sheared Veined Altered Sediment, Sediment Altered, Fracture Altered Sediment, SPMI, Fracture Altered Volcanic, Volcanic Altered, Sheared Altered Volcanic, and Sheared Veined Altered Sediment.	
	Potentially Acid Forming (PAF) lithologies	Saprolite / Volcanic (SPVO) and SPFI.	
	Inconclusive lith.	Saprolite with Alteration (SPAL) and Selenium Altered Oxide (OXAS).	
	Leachate (seepage) quality	Neutral to alkaline (pH 6.7 – 9.7).	
		Leachate pH - neutral to alkaline (pH 6.7 – 9,7) Potential constituents of concern - alkalinity (high pH), antimony (0.01 – 1.2 mg/L), and arsenic (0.001 – 0.89 mg/L).	Supernatant pH - alkaline (pH 10.6 to 10.8). Leachate pH - alkaline (pH 8.3 to 10). Potential constituents of concern - alkalinity (high pH), antimony (0.060 to 35 mg/L), arsenic (0.028 to 6.3 mg/L), and Cu (0.001 to 5,2 mg/L).

Table 20.2.4 Geochemical Risks, Characteristics and Recommendations – Massawa CZ

<table>
<tr><th>Material</th><th>Waste Rock (n=44)</th><th>Tailings (n=5)</th></tr>
<tr><td rowspan="2">Geochemical Risks</td><td>Seepage and runoff from the waste rock containing As and Sb poses a risk to surface and groundwater quality, especially if groundwater is a source of water supply or linked to surface water.</td><td>Alkaline seepage and runoff from the tailings containing antimony, arsenic, and copper poses a risk to surface and groundwater quality.</td></tr>
<tr><td>Generation of ARD/ML from the PAF lithologies if exposed to oxidising conditions.</td><td></td></tr>
<tr><td rowspan="9">Management (Operations to closure and aftercare)</td><td>Selective handling of the waste rock to identify and separate PAF and NAF material. The PAF waste can be enclosed within NAF waste or blended with NAF waste rock.</td><td>Lining the tailings storage facility (TSF) and return water dam (RWD).</td></tr>
<tr><td>Further assessment of the waste rock lithologies classified as inconclusive to clarify their ARD/ML potential. Inconclusive lithologies can be treated like the PAF lithologies.</td><td>Collecting percolation and runoff from the TSF in toe paddocks and channelling to the RWD for management (treatment of As, Sb & CN) and use in the plant (recycling).</td></tr>
<tr><td>Collecting percolation and runoff from the WRD in toe paddocks and channelling to the dirty water sumps for management (use in the plant - recycling).</td><td>Monitoring the quality of toe seepage collecting in toe paddocks, RWD, surface water, and groundwater for potential constituents of concern to include trends analysis.</td></tr>
<tr><td>Progressively rehabilitating the WRD by shaping, levelling, compacting, and re-vegetating with indigenous species to minimise seepage, control erosion, and runoff.</td><td>Diverting clean surface water away from the TSF using runoff control diversions.</td></tr>
<tr><td>Monitoring the quality of pit water, toe seepage collecting in toe paddocks, surface water, and groundwater for potential constituents of concern.</td><td>Progressively rehabilitating the TSF by shaping, levelling, and re-vegetating with indigenous species to minimise seepage, control erosion, and runoff.</td></tr>
<tr><td>Treating the pit water to remove antimony and arsenic before release into the environment or before use for other purposes.</td><td></td></tr>
<tr><td>Refilling of the pit with water at closure can help dilute the concentrations of constituents of concern and reduce the oxidation and weathering of the pit wall.</td><td></td></tr>
<tr><td>Diverting clean surface water away from the Pit and WRD using runoff control diversions.</td><td></td></tr>
<tr><td>The quality of water draining into the pit can be improved by erecting abandonment berms around the pit perimeters and grassing them to reduce surface runoff and associated solute loadings into the pit lake. The areas around the pit edges and the abandonment berms can be left to revegetate naturally.</td><td></td></tr>
</table>

Table 20.2.5 Geochemical Risks, Characteristics and Recommendations – Massawa NZ

Material	Waste rock (n=52)	
Geochemical Characteristics	Current pH	Neutral to alkaline (pH 6.9 to 9.7) except one stratified oxidised nodular-clay-zone sample and oxide mildly acidic (paste pH 6).
	Future pH	67% Non-Acid Forming (NAF), 23% potentially acid forming (PAF), and 10% inconclusive. NAG pH - mildly acidic to alkaline (pH 5.95 to 11.29) except for SDCM (X176427, pH 3.08) and IMFA (X192427, pH 3.95).
	Mineralogy	Acid forming - pyrite (0.19 to 5.26%). Acid neutralising. Carbonates - ankerite (0.02 to16.4%), calcite (0.14 to 12.49%), dolomite (0.001 to 9.49%), magnesite (1.23 to 12.31%). Aluminosilicates - mica, kaolinite, albite, montmorillonite, microcline, anorthite Aluminosilicates - mica, kaolinite, albite, montmorillonite, microcline, anorthite.
	NAF lithologies	Saprolite (INGV), oxidised (OXMAL, OXSD, SDAL, SDB and SDAQ) and fresh (VOAL, MVMX, INAL, SDFBBK, SDFM and SDCM).
	PAF lithologies	Saprolite (SPVO, SPSD and SPAL), fresh (SDCM and IMFA) and oxidised (OXVO, OXSDM, OXSDFB and SOX).
	Inconclusive lith.	saprolite (SPSD) and oxidised (OXSDM, OXVO, SOX and OXSDB).
	Leachate (seepage) quality	Acidic to alkaline (mildly acidic pH 5.4 to 9.4).
		DI Leachate pH - mildly acidic to alkaline (pH 6.3 to 9.8). Potential constituents of concern - alkalinity (high pH), arsenic (0.11 to 2.06 mg/L). SPLP pH - neutral to alkaline (pH 7.89 to 10.3). Potential constituents of concern - alkalinity (high pH), arsenic (0.11 to 2.84 mg/L), and aluminium (5.8 to 10.6 mg/L), chromium (0.11 mg/L), iron (2.7 to 22.4 mg/L).
Geochemical Risks	Seepage and runoff from the waste rock containing As, Sb, and NO_3^{2-} pose a risk to surface and groundwater quality, especially if groundwater is a source of water supply.	
	Generation of ARD/ML from the PAF lithologies if exposed to oxidising conditions.	
Management (Operations to closure and aftercare)	Selective handling of the waste rock to identify and separate PAF and NAF material. The PAF waste can be enclosed within NAF waste or blended with NAF waste rock.	
	Further assessment of the waste rock lithologies classified as inconclusive to clarify their ARD/ML potential. Inconclusive lithologies can be treated like the PAF lithologies.	
	Collecting percolation and runoff from the WRD in toe paddocks and channelling to the dirty water sumps for management (use in the plant - recycling).	
	Progressively rehabilitating the WRD by shaping, levelling, compacting, and re-vegetating with indigenous species to minimise seepage, control erosion, and runoff.	
	Monitoring the quality of pit water, toe seepage collecting in toe paddocks, surface water, and groundwater for potential constituents of concern to include analysis to include nitrates, nitrites, and ammonia.	
	Treating the pit water to remove antimony and arsenic before release into the environment or before use for other purposes.	
	Refilling of the pit with water at closure can help dilute the concentrations of constituents of concern and reduce the oxidation and weathering of the pit wall.	
	Diverting clean surface water away from the Pit and WRD using runoff control diversions.	
	The quality of water draining into the pit can be improved by erecting abandonment berms around the pit perimeters and grassing them to reduce surface runoff and associated solute loadings into the pit lake. The areas around the pit edges and the abandonment berms can be left to revegetate naturally.	

20.2.6.6 Aquatic and Wetland Environment

The forest galleries are very poorly developed in the SGO mining lease, due to the lack of a permanent watercourse, which helps explain the absence of species associated with this habitat. At the main water reservoir of the Sabodala mine, north of the Project area, 31 of the 45 aquatic bird species were observed (ERM & Tropica, 2019).

The absence of permanent watercourses in the SGO area (with the exception of mining reservoirs) and the presence of poorly diversified habitats dominated by savannah characterised by various types of pastures and woodlands explain the absence of rare species, as this is a widely distributed habitat in Africa.

However, the Massawa Mining License is regarded as largely natural with neutral, fast-flowing ephemeral streams, which are largely free of clear signs of contamination and/or notable anthropogenic impacts, which was believed to be driven by the limited surrounding land-use activities and the limited accessibility. Due to the highly dynamic flow regime observed within the area, the macroinvertebrate assemblages present within the study area were largely dominated by tolerant, pioneering taxa with a moderate tolerance to water quality impairment and a preference for submerged marginal vegetation habitats. On the other hand, representative fish species were collected across a variety of habitats during the wet season, which suggested favourable conditions and a potential underestimation of the fish assemblage diversity, as demonstrated by the low abundances observed over a high-density river network.

20.2.6.7 Legacy Liabilities/Concerns

There are no legacy liabilities nor concerns identified for the Project relating to the water, wetlands and aquatic environment if things are managed correctly and according to the recommendations in the environmental management plan. If leachates and surface runoff are not managed well during operation with a sustainable closure in mind, then there could be a long-term impact on downstream flora and fauna.

Secondary impacts could arise from the operations due to opening up previously inaccessible areas to anthropogenic influence and the consequent impact on critical habitats. The operations need to work together with NGOs and the Senegalese authorities to ensure that the influence of human impact is managed and minimised.

20.2.7 Human Environment

The Project is located in the Region of Kédougou, which is in the southeast corner of Senegal and shares a border with Mali to the east and Guinea to the south. The Project occupies land within the communes of Sabodala, Bembou, Khossanto (all in the Department of Saraya) and Tomboronkoto (in the Department of Kédougou). The Project falls under the same local authority.

The Project's area of impact (AoI) includes those communities that are directly affected by its activities. Eight communities are considered to be within Sabodala' s AoI: Bransan, Madina Bransan, Makana, Bambaraya, Sabodala, Faloumbo (including Dambankoto), Madina Sabodala, Mamakhono. The latter four communities are within the Sabodala Permit Area. On the Massawa area of impact, 12 villages were identified: Tinkoto, Thiankoum Bassadie, Mandankholi, Kanoumering, Kabateguinda, Khossanto Koulountou, Brandoufary, Bransan, Bambarayading, Bambarayaba, and Marougounding.

SGO is committed to making a positive difference in the communities in which SGO's personnel live and work. The aim is to share the benefits of the mining operation and to leave a lasting, positive legacy that will continue to be enjoyed for generations to come. Through SGO's community development work, the host communities will benefit from new job opportunities, education, and training opportunities, expanded health care services, more secure sources of potable water, improved roads, and infrastructure, etc.

20.2.7.1 Population Demographics and Labour

A study on the socioeconomic reference situation of the Project area was conducted in 2021 and confirmed an estimated population of 46,291 in 2020, which represent 88.1% of the population of the three affected communes according to projections by the National Statistics and Demography Agency (ANDS).

The distribution of the population by gender reveals that there are more men (50.6%) than women (49.4%). The overall sex ratio is 102.4%. This means that there are 102 men for every 100 women. This may be explained by the large influx of male workers to the artisanal gold mining sites.

The study area had approximately 12,260 inhabitants according to the 2002 General Population Census. After the erection of the region in 2008, and then the installation of the SGO mining company, the locality experienced an intense flow of immigrants and began a phase of population growth that reached 22,116 inhabitants, representing an average growth rate (2002/2013) of 5.5%. Although it is challenging to mitigate the influx of jobseekers and other outsiders, pro-active measures are being implemented to limit this influx in favour of using local labour.

The population in the impacted area is relatively young, with half of them under 18 years old. This situation will require greater efforts to mobilise financial and human resources for the proper management of health, education, and employment.

More than a dozen ethnic groups have been identified in the Project area. The distribution of the population by ethnicity shows that the Malinke/Mandingue constitute 60.2% of the population in the Project area. They are followed by the Peulh which represent 34.3% of the population. The Soninké, Wolof, Diola, Séré, and Bassari ethnic groups are very poorly represented. There are also other minorities represented, such as the Moors, but their numbers are not significant.

20.2.7.2 Labour

The study area includes several gold-mining sites frequented by the local population and foreigners. Seven gold-washing sites were identified within the Kanoumba permit. There is a workforce of more than 500 active people per day (Digby Wells, 2018a).

However, 48% of the population lives below the poverty line. Unemployment rate is 48%. (Macia et al. 2017).

Senegal's poverty rate has reached 46.7%, while the GDP growth rate is well below the level needed to reduce poverty. This is due to the growing weight of capital-intensive goods exports, to the detriment of labour-intensive sectors, limiting the creation of new jobs. In rural areas, 65.2% of individuals and 57.5% of households live below the poverty line (PRSP II, 2006 in Digby Wells, 2018a), i.e. living below the international poverty line of USD 1.25 per day (WHO, 2016).

The population of the Project area is relatively young, with the youth (<18 years old) representing more than 74% of the population. They are active in several areas of activity including agriculture, livestock, artisanal mining, masonry, wood and metal carpentry, driving, electricity, handicrafts, catering, hairdressing, and mechanics/motorcycle, etc.

However, these young people are poorly integrated into the job market with an unemployment rate estimated at 20% according to the International Labour Organisation (ILO) standards, due to their low level of professional qualification.

In terms of infrastructure, the sector is poorly equipped. There is no infrastructure (vocational training centre, craft centre, nor Departmental Centre for Popular and Sports Education (CDEPS)) in the study area.

As for youth associations and representative bodies (CCJ, ASC), the study area has several types of associations, most of which are not active due to a lack of training, the absence of regular renewal of leaders, and the non-existence of programmes.

In addition, there is a low level of development and promotion of local entrepreneurship, due to the difficulty of accessing financing and training.

Finally, a large number of children under the age of 10 were observed working in the project area, mostly in agriculture, artisanal mining, commerce, public administration, mechanics, etc.

20.2.7.3 Local and Regional Economy

The mainstay of the local economy in the Project area and, on a broader scale, in the Kédougou and Tambacounda regions, has long been subsistence farming and livestock raising. Commercial agriculture is less developed in this area than in other parts of Senegal. Cotton, introduced as a cash crop during the 1970s and 1980s by the government agency Sodefitex, remains the most important source of commercial agriculture.

In recent years, with the privatization of Sodefitex, the deregulation of the cotton industry, and the increasing appeal of artisanal mining as a source of cash income, cotton production has declined dramatically. It has now disappeared from the area near the mine and is being produced by only a small number of farmers in the rest of our focus area.

The net result of the lack of development of this sector is that, with the exception of the groundnut industry and despite the relatively high annual rainfall in the region, agricultural productivity in the region has fallen behind the national average.

Artisanal gold mining is also a traditional subsistence activity in the Project area and has been since before European colonization. The importance of artisanal mining has increased significantly in recent years, due to rising gold prices, the availability of cheaper and smaller machinery and the discovery of new deposits. The increase in artisanal mining activity has also led to a decrease in agricultural activity in many villages, as the former is considered potentially much more lucrative than the latter and absorbs much of the available labour.

This activity can no longer be called artisanal, due to the level of mechanisation and technology being applied. The miners target different deposit types such as gold in laterites, alluvial gold as well as hard rock mining. Many of the miners do not come from Senegal and their impact on the natural and human environment is substantial.

In terms of wage employment, Endeavour's Sabodala mine is now, after the State, the largest employer in the Kédougou region, with over 1,000 workers.

20.2.7.4 Community Health, Safety and Security

Road traffic associated with SGO’s activities will increase significantly over the life of the mine. However, interactions between Project vehicles and community members will be similar to those that currently exist, so no significant impact on community safety related to road traffic is anticipated.

The mine's operating activities, and in particular the use of explosives, are likely to present a risk to community safety, particularly due to the projection of rock fragments. This risk has been considered in the design of the mining pits, which will be surrounded by a 500 m safety buffer zone. Finally, the excavations conducted by the Project will represent a significant fall risk for local communities. The intensity of the impact can be considered low as berms are placed around the pits and the area is patrolled. All community roads encroaching on the Project footprint were diverted to limit any interaction between the mine activities and the surrounding communities.

The rate of water supply is the lowest in the country. In the target localities, the populations access water, but it is insufficient in quality and quantity (Digby Wells 2018). Most households use borehole water - quality and quantity is of concern. The Water Impact Assessment indicated that the water quality of the streams in the Project area were at times characterised by fairly high levels of aluminium (Al), antimony (Sb), arsenic (As), cadmium (Cd), chromium (Cr) and iron (Fe). The water was also slightly acidic (pH<7).

Arsenic is the main contaminant as it exceeds the WHO limit in 70% of the cases, at the level of the monitoring boreholes (i.e. 32 of the 45 boreholes). There is no clear correlation between artisanal mining and arsenic concentration, and it is believed that the presence of arsenic results from the natural dissolution of the host rocks (Digby Wells, 2018a).

Long-term exposure to arsenic from drinking water can cause cancer and skin dermatosis (WHO, 2017). Dermatosis is one of the top 10 diseases in the region and was ranked as the fourth most frequented disease at the Tinkoto health post in 2016. However, it is noted that dermatosis can be caused by a number of factors. The health report (Digby Wells, 2018a) attributes the dermatosis recorded in the Kédougou region primarily to poor hygiene, not arsenic in the groundwater. However, a continuous water quality monitoring of surface and groundwater – especially heavy metals (arsenic in wells on-site and surrounding site) is being implemented to ensure that water quality associated with the mine is acceptable. SGO will implement a mitigation strategy and health action plan that will include both a long-term community health monitoring (surveillance) and evaluation plan, as well as a verification programme.

Health facilities may not have the material and human resources to treat serious injuries related to accidents. SGO has developed an HSE plan for its Massawa operations, based on SGO's HSE management system currently implemented at Sabodala. As part of this plan, SGO is securing access to the mine site. SGO has marked hazardous areas and informed local communities of the presence of hazardous areas. Finally, SGO has implemented a grievance management mechanism and is addressing any complaints received in a timely manner.

20.2.7.5 Community Services and Infrastructure

The commune has 12 boreholes located in Sabodala and Bransan, two of which are motorised. Generally speaking, the Project intervention zone is characterised by poor drinking water coverage. The populations reported significant difficulties in accessing drinking water due to the recurrent drying up of wells in their villages. These difficulties in accessing water are linked to the geomorphological nature of the region, which is made up of bedrock as well as the distinct dry and wet seasons.

The lack of school facilities is one of the fundamental constraints in the rural community. Despite the efforts made in terms of building classrooms, the school enrolment rate of children is still very low, at 29% due to a lack of classrooms and teachers. The average illiteracy rate is also high, at 90%. There are also 13 schools in the entire rural community, with a relatively good geographical distribution. However, six of them are used as temporary shelters instead of as schools.

The health and school infrastructures in the Project area are currently completely saturated and undersized in relation to the constantly growing populations. SGO works with the education and health authorities to develop programmes to support educational and health infrastructure in the Project region. This consists of improving these infrastructures so that they are sized to the needs of the communities. In return, the education and health authorities will commit to providing the human resources needed to operate these facilities.

20.2.7.6 Land and Resource Use

Regime for Access to Land

In terms of access to land, the two modes ('traditional and customary' and 'institutional') exist side by side and complement each other.

The traditional and customary model is one in which village chiefs can allocate land to applicants based on availability. Even though this allocation is tolerated because of the availability of land, it has its limitations, as only the local authority is authorised to allocate land in the national domain.

Regime for Access to Artisanal Mining Sites

Artisanal mining, which was once a traditional mining activity, has over time become the main activity of indigenous populations. It is a means of subsistence for thousands of individuals and households, particularly in a context of declining agricultural productivity, and a means of combating and reducing unemployment for thousands of individuals and households directly or indirectly dependent on gold panning. The massive arrival of foreign populations has contributed greatly to this, with the use of modern techniques and chemical products.

It is an activity that requires a rather particular form of organization. The village chief, being the strongest customary personality, represents the highest hierarchical level. This is followed by the Dioura or Diouratiguis site chiefs, who are responsible for managing the site, particularly the mystical aspects, and the Tomboulmas chiefs and Tomboulmas, who act as security guards. The latter manage the charters and have absolute knowledge of the activity. They are followed by the owners of the pits or Damantiguis, who must normally be Senegalese and hold an artisanal miner's card, and at the end of the chain come the workers (Synergie Environnement, 2022).

20.2.7.7 Physical and Economic Displacement

Over time, the SGO will necessarily need access to land for exploration, development, and operation of its projects. These lands will often be occupied, either by people for residential purposes or for activities related to their subsistence. Therefore, the acquisition of land or land use rights for a particular project could result in:

- Physical displacement, which would result in the movement of people and their houses and facilities.
- Economic displacement, which could result in a loss of assets relative to livelihoods such as fields or roads.

Such displacements could be considered either temporary or permanent. It could also be complete in the case where all assets of a given individual, or household, are affected or partially affected in the case where only certain assets are affected.

SGO is committed to meeting international standards, as set by the IFC Performance Standards (PS) related to social and environmental sustainability. Therefore, under these PS, SGO is committed to carefully manage land acquisition that would involve any displacement by:

- A resettlement process if the acquisition results in physical displacement.
- An economic restoration process if the acquisition results in economic displacement but does not result in physical displacement.
- A large economic displacement may be considered as physical displacement and require a resettlement process.

These processes present high risks for both the Company and the communities involved. For the Company, such processes are often controversial and can be costly and time consuming. Their mismanagement can cause social disruption and delays in project implementation. These processes are demanding for the populations in the areas being relocated and poor management can lead to their long-term impoverishment.

20.2.7.8 Logistics and Traffic

The increase in road traffic related to mining operations in the area could lead to a general increase in dust levels, particularly due to the transport of ore on the mining roads, but also due to the increase in road traffic on the Bembou road, which is the principal access road for the supply delivery to site from the National Road.

20.2.7.9 Indigenous Communities

The IFC performance Standard 7 recognises that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalised and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases (IFC, 2012).

Although there is no group of indigenous people as per the IFC definition in Senegal, the Bassari and Bédik are of particular interest to this Project. The Project is located approximately 36 km from the Bédik-Bandafassi area of the Bassari cultural landscape, a UNESCO World Heritage Site.

The cultural landscape of Bassari Country was inscribed as a World Heritage Site in 2012. This area demonstrates the development of specific cultures and habitats in symbiosis with the environment. Groups associated with Bassari peoples are considered some of the most marginalised and threatened communities in modern Senegal (Digby Wells, 2018a).

SGO will engage with the Bassari people present in the Project area to develop mechanisms to preserve their culture and way of life during all phases of the Project; and develop and implement a Bassari protection and management plan that includes a strategy for the conservation of their properties and attributes.

20.2.7.10 Archaeology and Cultural Heritage

Heritage surveys and assessment are conducted on each new impacted area in the Project area. Several heritage resources were identified with a cultural significance range from negligible to very high during the Massawa Project development. These heritage resources consist of sacred sites; archaeological metalworking sites; archaeological sites and features; and isolated finds – ceramic and lithic scatters. On the Massawa Project footprint, there were no sacred sites or graves identified within the pit and WRD footprints, and the only identified heritage resources of significance that may be impacted were the two archaeological smelting sites.

To reduce the intensity of the identified impacted smelting site, they will be subject to mitigations undertaken by competent professionals with the objectives of:

- Systematically identify the extent of the metalworking site.
- Excavate through internationally recognised techniques to scientifically record spatial and stratigraphic information, as well as exposed material culture remains.
- Employ sound curation methodologies for the collection of field notes, sketches, plans, photographs, and material culture.
- Disseminate the results and findings, i.e., preserve the smelting site through record.

SGO has also implemented a procedure for the incidental discovery of archaeological artefacts and heritage sites during mine construction. In the event of an incidental discovery, the Senegalese regulations, and international best practices for the management of archaeological artefacts and sites are followed.

20.2.7.11 Legacy Liabilities/Concerns

For the Sabodala-Massawa Project, there are no legacy liabilities nor concerns identified related to the human environment.

20.2.8 Waste Management

The proposed mining and related activities will result in the generation of mineralised waste (TSF and WRD) as well as non-mineralised waste (general and hazardous waste) that will require effective management.

Solid waste generated at the mine plant site, including ancillary buildings, will be primarily non-hazardous domestic and industrial waste. A comprehensive waste management plan is already in place at SGO and was reviewed with the Massawa integration to include the additional areas and activity.

Solid wastes are managed by a contractor. Management includes transfer from the site by truck to an incinerator and treatment in a plant for recoverable waste. Brine from the water treatment plants will also be treated in a similar manner.

Storage, collection, and disposal of fuel sludge, used oil, used grease, oily rags, and empty drums will be handled by the oil and fuel suppliers in accordance with a waste management plan.

Table 20.2.6 Hazardous and General Waste Expected on the Site

Hazardous waste	General waste
• Hydrocarbon contaminated waste (e.g., rags, filters, oil cans). • Fluorescent tubes, batteries, printer cartridges and acids. • Aerosols and chemical waste. • Contaminated soil. • Asbestos. • Wastewater. • Medical waste. • Contaminated personal protective equipment (PPE). • Polychlorinated biphenyls (PCBs). • Pesticide, herbicide, insecticide, and fertilizer wastes. • Paint and cleaning fluids include leftover paint, paint from contaminated containers.	• Scrap metal. • Tire and rubber waste - generated by vehicles, machinery, and ore conveyor belt. • Uncontaminated plastic, wood, waste canteen waste, cardboard. • Cement. • Paper waste. • Grey water from human consumption. • Non-compactable waste including ash, wood, used sand, general garden waste such as trees and branches. • Cable material.

All waste produced is collected, sorted, and stored in suitable containers before being disposed of or recycled to avoid soil and water contamination.

Concerning the management of hazardous waste, additional preventive measures are taken which include the use of drip trays and the installation of a specific room in which any losses can be collected. Non-recyclable wastes are evacuated to an authorised landfill.

20.3 Legislation, Permitting and Project Development Framework

20.3.1.1 Mining Legislation

The key legal texts relevant to mining in Senegal are:

- The Constitution.
- Act No. 46-64 of 17 June 1964, on the National Domaine.
- Act No. 32-2016 of 8 November 2016, on the Mining Code its application decree number 2017-459 of 20 March 2017.
- Decree No. 1856-2019 of 7 November 2019, on the attributions of the Mine and Geology Minister.
- Decree No. 2020-2100 of 6 November 2020, on the distribution of State services and control of public establishments, national companies and companies with public participation between the Presidency of the Republic, the General Secretariat of the Government and the ministries.

20.3.1.2 Mining Permits and Agreements

Sabodala Concession

The following decrees are relevant to the Sabodala Concession:

- Decree No. 2005-520 of 9 June 2005, granting an exploitation permit for gold, silver, and related substances to Mineral Deposit Limited (MDL) Australie (surficial area of 20 km^2), in the department of Kédougou, Tambacounda Region (Sabodala Exploitation Permit)
- Decree No. 2007-564 of 30 April 2007, transforming into a mining concession the Sabodala Exploitation Permit (Sabodala Concession)
- Decree No 2010-408 of 30 March 2010, extending the perimeter of the Sabodala Concession.
- Mining Convention of 7 April 2015, for the mining of Gold, Silver and related substances, concluded in application of law No. 2003-36 of 24 November 2003 establishing the Mining Code, between the State of Senegal and SGO for the Sabodala perimeter, as amended by the 1st amendment dated 18 February 2016.
- Decree No 2015-1136, of 29 July 2015, merging the Sabodala and Goulouma mining concessions and including the Gora perimeter in the new mining concession called Sabodala (Kédougou Region) granted to the company Sabodala Gold Operations S.A.

Massawa Mining License

The following decrees are relevant to the Massawa Mining License:

- Decree No. 4638-2010 of 21 May 2010, merging the Kanouméring and Kounemba (Kédougou Region) gold and related substances exploration permits held by Randgold Resources Ltd into a single exploration permit named 'Kanoumba'.
- Mining Convention of 14 April 2010, for gold and related substances, concluded in application of law No. 2003-36 of 24 November 2003 establishing the Mining Code, between the State of Senegal and Randgold Resources Ltd, for the Kanoumba perimeter (2010 Kanoumba Mining Convention or Massawa Mining Convention).
- 13 February 2020, Amendment No. 1 to the 2010 Kanoumba Mining Convention.

In February 2020, prior to the acquisition by Teranga, an amendment to Massawa Mining Convention was signed between the State of Senegal and Randgold, granting the exploitation permit for Massawa, decree number 2020-495 of 21 February 2020.

Teranga's acquisition of the Massawa Project was then effective following the transfer of that exploitation permit through Decree No. 2020-697 of 3 March 2020.

On 16 November 2020, Teranga and Endeavour announced that they had entered into a definitive agreement whereby Endeavour would acquire all of the issued and outstanding securities of Teranga by way of a Plan of Arrangement under the Canada Business Corporations Act.

On 10 February 2021, Endeavour completed the official acquisition of Teranga, and SGO became a Senegalese subsidiary of Endeavour.

20.3.1.3 Environmental & Social Legislation

Mining in Senegal is governed by the following Environmental and Social Legislation:

- Act No. 2001-01 of 15 January 2001, on the Environment Code and its application decree number 2001-282 of 12 April 2001.
- Act No. 81-13 of 4 March 1981, on the Water Code.
- Act No. 2009-24 of 8 July 2009, on the Water Treatment Code.
- Act No. 1998-03 of 8 January 1998, on the Forestry Code and its application decree number 98-164 of 20 February 1998.
- Act No. 86-04 of 24 January 1986, on the Hunting and Protection of Fauna Code.
- Act No. 96-06 of 22 March 1996, on the Local Authorities (full jurisdiction in terms of waste management).
- Act No. 2009-24 of 8 July 2009, on the Sanitation Code.
- Decree No. 2004-647 of 17 May 2004, establishing the terms of application of Act No. 2003-36 of 24 November 2003, on the Mining Code.
- Act No. 97-17 of 1 December 1997, on the Labour Code.
- Act No. 64-46 of 17 June 1964, on the national domain.

- Wastewater discharge standard NS 05-061 of July 2001.
- Atmospheric Emissions standard NS 05-062 of December 2004.

20.3.1.4 Environmental and Social Permits and Agreements

In accordance with the Senegalese Environmental Code (2001) and the Mining Conventions, an Environmental and Social Impact Assessment (ESIA) has been completed for both the SGO mining lease and the Massawa Mining License. These ESIAs were prepared to meet national legal and regulatory requirements, including those of the Senegalese Environmental Code and related texts.

They were also aligned with the requirements of sectoral codes where applicable to the projects, in consideration of consultations carried out as part of the studies, including international good practice, such as the IFC Performance Standards and the World Gold Council (WGC) through the Council's Responsible Gold Mining Principles (RGMPs). The environmental permits were issued after the completion of the ESIA validation processes and are presented in Table 20.3.1 for the Sabodala Concession and Massawa Mining License.

Table 20.3.1 Historic Sabodala and Massawa Environmental Permits

Project	Beginning of Operations	End of Operations	Associated Environmental Permit
Sabodala Mining Concession			
Sabodala	2009		Sabodala permit N°264 MEPNBRLA/DEEC/m.s of 13 February 2008.
TSF 2	2022		TSF2 permit, N°028548, 30 December 2020
Masato	2014		Oromin Joint Venture Group (OJVG) permit N°03144 MEDD/DEEC/DEIE/mbf of 28 November 2013.
Gora	2015	2018	Gora permit N°0680 MEDD/DEEC/DEIE/ag/AD of 12 March 2015.
Golouma	2015		OJVG permit N°03144 MEDD/DEEC/DEIE/mbf of 28 November 2013.
Kerekounda	2016	2019	OJVG permit N°03144 MEDD/DEEC/DEIE/mbf of 28 November 2013.
Koulouqwindi	2018	2018	OJVG permit N°03144 MEDD/DEEC/DEIE/mbf of 28 November 2013.
Kourouloulou	2020		OJVG permit N°03144 MEDD/DEEC/DEIE/mbf of 28 November 2013.
Maki Medina	2020		Niakafiri permit N°04227 MEDD/DEEC/DEIE.nfn of 26 December 2019
Goumbati-Kobokoto	2020		Goumbati-Kobokoto permit N°007929 MEDD/DEEC/ DEIE of 17 March 17, 2020
Niakafiri	2021		Niakafiri permit N°04227 MEDD/DEEC/DEIE,nfn of 26 December 2019
Massawa Mining License			
Sofia complex	2020		Massawa permit N°024719 MEDD of 11 October 2019
NZ & CZ complex	2021		Massawa permit N°024719 MEDD of 11 October 2019
Delya	2022		Massawa permit N°024719 MEDD of 11 October 2019

20.3.1.5 Non-Legislative Project Development/Operating Framework

Furthermore, SGO aligns to international standards, including the IFC Performance Standards on Environmental and Social Sustainability and the Equator Principles. The Project also aims to demonstrate compliance with the World Gold Council through the RGMPs that address key environmental, social and governance issues and consolidate existing international standards for responsible mining under a single structure.

20.4 Stakeholder Engagement

One of the objectives of the Social Performance Management System is to minimise risks to Endeavour and its stakeholders, by building trusting relationships to prevent conflicts, sharing information, and addressing issues that arise through ongoing dialogue.

In order to achieve this objective, Endeavour:

- identifies and understand the views, influences, and interests of key stakeholder groups;
- ensures that stakeholders understand the activities and impacts of Endeavour's operations; and
- that Endeavour addresses and responds to stakeholder concerns and grievances and takes stakeholder perspectives into account when making decisions and designing plans that may affect them.

20.4.1 Guiding Principles of Stakeholder Engagement

The principles that guide community engagement for SGO are as noted below:

- Inclusion:
  - The community shall be engaged in the participatory process that promotes inclusion.
  - Ensure that dominant interest groups are not the only voices heard.
- Respect:
  - Respect the time and contribution (opinions, contributions, points of view) of the participants during the engagement process, while considering the needs of the community as a whole.
  - Be sincere and respect the commitments made to the communities.
  - Respect the culture of the host population and avoid any language, speech, discussion, or action that might offend their culture or beliefs.
- Transparency:
  - Promote open and honest communication when interacting with the community and/or stakeholders.
- Communication:
  - Ensure that communities have all the necessary information they need, as soon as possible, to provide informed feedback and recommendations.
  - Communicate openly, honestly, and responsibly with those with whom we seek to engage and create channels so that stakeholders can contact the mine based on their own needs.
  - Avoid creating false expectations about what community engagement can achieve.
  - Communicate well with peers and avoid duplication process.

20.4.2 Engagement with Communities

With respect to engagement with local communities, the following principles are applied.

- Ensure that vulnerable groups are identified and considered in all engagement activities and ensure that engagement is culturally appropriate and accessible to all stakeholders.
- Identify and analyse stakeholders and community dynamics and review at least once a year with key internal stakeholders.

- Assess the ability of stakeholders to engage significantly and work collaboratively to build this capacity over time.
- Establish a formal engagement mechanism for stakeholders to provide feedback and receive feedback on sustainable development and management issues.
- Ensure that this mechanism is shared between the Company and all stakeholders.
- Develop an annual stakeholder engagement plan with objectives, target groups and activities, based on operational activities, risks, impacts and opportunities, and stakeholder input.
- Consult with relevant departments to identify current and planned activities and potential issues.
- Ensure that community engagement activities are well planned, coordinated, accessible and inclusive and provide reasonable deadlines for contributing to all these activities.
- Clarify internal and external engagement objectives; how stakeholder contributions will be considered for relevant activities and decisions.
- Record the engagement activities as well as the issues/risks identified in these activities.
- Ensure that issues are monitored and addressed internally, and that feedback is provided to stakeholders.
- Conduct perception surveys at least every two years.
- Obtain and maintain broad support from the relevant stakeholder's community for major projects, based on the principles of free, prior, and informed consent.
- Produce internal reports on the implementation of the engagement plan, community perception, issues, and risks.
- Produce external reports and feedback on managing risks, impacts and opportunities, how their contribution was considered and how it influenced the outcome.

All engagement activities of stakeholders subject to payment of a per diem shall be in accordance with the procedure 'EDV-ABC Procedure – per diem Allowances_2021'.[1]

20.4.3 Engagement with Government

Any engagement with Government must be conducted through official channels and in accordance with the laws and regulations. All engagement activities of stakeholders subject to payment of a per diem shall be in accordance with the procedure EDV-ABC Procedure – per diem Allowances_2021.

20.4.4 Engagement with Entities Providing a Mine Support Services Function

The entities providing a mine support services function must be aligned with SGO's policies in terms of stakeholder engagement as well as SGO's 'ABC procedure'. Significant training is often required to align SGO's expectations with that of the service provider. Service level reviews with respect to quality and adherence to standards and KPIs are undertaken quarterly.

[1] Internal Endeavour Procedure

20.4.5 Other Interested and Affected Parties

Stakeholder mapping and analysis is carried out to establish stakeholders by category, interest, influence. Subsequently, a specific engagement plan dedicated to each identified group is elaborated and implemented, with relevant actions taken to make the process of engaging these stakeholders fluent and effective.

20.4.6 NGO's, Pressure Groups

Transparency is the key principle in SGO's relationship with NGO's and pressure groups. There are no issues to report.

20.4.7 Grievance Procedure

Addressing complaints is an integral part of the stakeholder dialogue. Even if impacts and mitigation measures have been identified during the ESIA process, unexpected impacts and complaints may arise. SGO has in place a known and accessible grievance mechanism for stakeholders to submit complaints in a manner that ensures that they are effectively addressed, thereby maintaining confidence in the process, and continuing effective dialogue toward amicable resolutions.

The livelihood restoration plan (LRP) project's complaint management system complies with SGO's Grievance Standard Operating Procedures.

In addition, an external resolution mechanism has been set up with the support of the administrative authorities to deal with complaints that are not resolved amicably (the 'Conciliation Commission').

20.5 Environmental and Social Impact Assessment

20.5.1 Physical Environment

Since the beginning of the Project in 2006, multiple ESIAs were completed, which all involved environmental and social baseline, data collection and impact assessment. Recently, SGO completed two validated ESIAs for its Niakafiri and Goumbati-Kobokoto extension projects which are located in the south of Sabodala Mining License, nearby Massawa's Mining License.

The Niakafiri project is located 1 km South of Sabodala pits and approximately 2.5 km northeast of Goulouma pits. The ore extracted from the Niakafiri and Maki Medina pits will be processed in the existing Sabodala plant. To convey the ore to the plant, a haul road was built between the Niakafiri pit area and Sabodala pit. As the explosive magazine of SGO had reached is capacity, it was relocated and upgraded for the Niakafiri project.

The ESIA, validated in 2019, covers all the Project components for which an Environmental and Social Baseline was completed to identify the potential direct impacts such as noise, vibrations, impact on air and water quality, as well as potential induced impacts, often of a socio-economic nature, such as on economic growth, employment, migration, etc. An Environmental and Social Management Plan (ESMP) was also developed to manage these identified potential direct and indirect impacts. The potential environmental impacts to monitor relate to potential degradation of the groundwater quality, but SGO's ESMP was reviewed to properly cover the Niakafiri project components. On the social side, most of the identified impacts were classified as minor, however, a comprehensive Resettlement Action Plan (RAP) was developed for the 650 identified households impacted physically and economically by the Niakafiri project. Two resettlement villages are under construction and the RAP and livelihood restoration programmes are currently ongoing.

The Goumbati West-Kobokoto (GKK) project is located 10 km south of the Sabodala plant. A 3 km haul road was built to join GKK's pits to the Niakafiri area and haul the extracted ore to the Sabodala plant. A comprehensive ESIA was validated in March 2020 and covered all the project components. The study area was delineated to include all environmental and social components that could be affected by project activities. The baseline studies highlighted that the closest communities being located at minimum 2 km from the project area were unlikely to suffer from the project impacts such as noise or dust. SGO's ESMP was reviewed again to properly cover the GKK project components. All the impacted households were identified, and the RAP process is completed with the economical compensation of 34 persons of the 37 identified. The validation of the livelihood restoration programme proposals was completed as well as the identification of potential areas for the restoration of agricultural activities.

Massawa's ESIA was validated in 2019, prior to Teranga's acquisition. The Massawa property is in a largely undeveloped rural area surrounded by informal (artisanal) mining activities. The Project will impact two villages, Bambaraya in Bambaraya commune (3000 inhabitants), and Tinkoto in Sabodala commune (7641 inhabitants). These villages were founded on the mining legacy of the area and its substantial livelihood. Beyond artisanal mining, other common land uses in Massawa's surroundings are subsistence agriculture, animal rearing and vegetable gardening. There were two artisanal mining corridors officially recognised by the State in the Project area, namely:

- the Tinkoto corridor, which is located outside the mine permit and is still an active corridor; and,
- the Makhana corridor, which was located inside the permit and had to be relocated outside the Massawa Mining License perimeter.

A corridor located within a mining permit area, by law, loses its official status. A relocation was proposed for this site that the government will validate and recognise as a new official corridor.

Water management studies and investigations were conducted by Digby Wells Environmental (Digby Wells) and Artois Consulting (hereinafter, Artois). Digby Wells concentrated on the environmental aspects regarding general water management and geochemistry, whilst Artois dealt with the dewatering of the open pits. The combined scope included stormwater management plans (SWMP), Water and salt balances, environmental geochemistry assessments and hydrogeological investigations.

The goals of the water studies are to:

- Effectively manage water qualities and quantities during the construction, operational, closure and post-closure phases of the Project and prevent and/or mitigate environmental impacts and risks as far as possible.
- Ensure open pit operations can continue in a dry environment with dewatering ensuring a geotechnically safe setting and Health and Safety (H&S) issues associated with water management are eliminated and/or mitigated.

The Massawa property is in the upper reaches of the Niokolo-Koba River catchment. The deep groundwater flow regime around Massawa is dependent on the north-south orientated structures around the orebody and the near vertical geological rock contacts. Further downstream, the groundwater gradually rises to surface where the weathering surface induces a more dominant east to west flow direction. Flow is limited to the more permeable lenses in an otherwise lower permeability saprolite layer and clayey gravels. The sub-catchment area covers approximately 133.8 km^2. Sabodala is located further north and forms part of a separate sub-catchment of 76.3 km^2. Apart from the laterite ridge to the east, the catchment is mostly characterised by low-lying flood plains with a general south-east to north-west drainage direction. Groundwater flow is mostly concentrated along the Transition Zone which formed between the top of the bedrock and the near-surface, low permeability saprolite.

The environmental monitoring system at Sabodala consists of 13 nested monitoring wells, each one completed as a deep well into the Transition Zone and a shallower well in the near surface saprolite. In the case of TSF1 impacts, the change in water quality would be characterised by a replacement of alkalinity by sulphate as the dominant anion in groundwater, and the occurrence of CN. To date, the routine quarterly water quality sampling confirms compliance with the relevant environmental standards. TSF2 will be lined. The groundwater level fluctuates in response to the seasonal recharge. Near the TSF1 spillway, a rise in groundwater level has occurred which is related to the volume, elevation, and location of the supernatant pond as well as the impact this has on the local water levels due to the TSF being unlined. Since 2016, when the supernatant pond was significantly reduced in volume, a decline in water levels has been observed in the near-by boreholes.

At Sofia and Massawa, the pit and waste rock areas are monitored using four and nine environmental monitoring wells respectively. Groundwater levels fluctuate in response to the seasonal recharge. Pit dewatering will likely lower groundwater levels in those monitoring wells positioned within a 500 m radius of the Massawa excavations. At Sofia, the drawdown impact will likely not develop beyond a 100 m radius around each pit.

Flow (quantity) and chemistry (quality) monitoring will be conducted at surface water monitoring points within and around the Project area. For the hydrometric monitoring, specific flow measurements will be carried out in addition to the installation of six hydrometric stations equipped with a limnometric scale and an Ecolog 800 equipped with automatic sensors for the daily taking of water heights in rainy season. A total of 15 monitoring points have been established to monitor surface water quality. Physical parameters will be measured at each point in addition to water and sediment sampling for laboratory analysis. Thus, the following will be analysed:

- The main ions and ligands (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, HCO_3^{2-}, Cl^{-}, F^{-}, NO^{3-}, NH_3, NO^{2-}, PO_4^{2-} , SO_4^{2-} etc.).
- Metals (Al, As, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, V, Zn, etc.).
- In addition, BOD and COD values are sometimes analysed.

In view of the seasonal nature of the rivers in the area, monitoring will be done monthly during the rainy season. The recommendations of the Canadian Council of Ministers of the Environment (CCME) (1999) in addition to those of the US Environmental Protection Agency (USEPA) (2009) are applied as a reference following their guide values.

The recommended SWMP for Massawa has been updated based on the latest mine plan provided by the site team. This is to ensure that all dirty water is contained on the site and clean water is diverted away from site, thereby reducing the risk of the proposed mining activities to negatively impact on the natural water resources. Therefore, implementation of the recommended SWMP is crucial together with a continuous assessment of the effectiveness, regular maintenance, and improvement as the mine progresses.

The SWMP will ensure that clean and dirty water catchments are separated, which will allow clean water to be diverted and dirty water to be captured. At all times the dirty water (contact water) should be kept at a minimum by ensuring trenches and a drainage system are in place.

All dewatering and stormwater that is captured on site will require storage in settling and holding ponds first to allow settling and monitoring to take place before discharge. Once the water complies to background surface water levels, then it can be discharged. Any water not in compliance should be directed to the Massawa Greensands Water Treatment Plant (MWTP).

- All perimeter boreholes dewatering around the open pits can be discharged directly to the environment, once settling of solids has been allowed. The water quality should, however, be monitored. If the quality deteriorates to above surface water background levels, then the water should be diverted to the MWTP.

- Water captured on and around the WRD areas should be blended/mixed with the perimeter boreholes dewatering before discharge.
- Only the pit sump water from the various pits will require treatment at the MWTP.
- The maximum treatment volume at the MWTP, based on three modelled rainfall scenarios is 450 m^3/h. However, a plant design of 600 m^3/h will account for storm events.
- The additional treatment capacity will also serve as backup for months where additional water from the WRD areas will potentially require treatment if not in compliance.
- The WTP should be designed to treat a maximum arsenic concentration of 0.89 mg/L and antimony concentration of 1.2 mg/L.

20.5.2 Biological Environment

In terms of terrestrial biodiversity, the Project is located in a largely natural undisturbed environment. The new field investigations confirmed that the area is currently under pressure from existing anthropogenic land use including grazing, wood collection, palm oil tree exploitation and artisanal mining from surrounding villages. The general health of the natural habitat, however, is diverse and of high value, and therefore should be conserved.

Several protected plant and animal species and Species of Special Concern (SSC) were identified within the Project area, including the endangered Western Chimpanzee. Further chimpanzee baseline studies were undertaken in the Project areas to determine the number of chimpanzee groups, the sizes of the chimpanzee groups, and their respective home and core ranges. The impacts on chimpanzee groups and the respective mitigation measures were identified through additional field studies and genetic analysis and were incorporated into a Biodiversity Management Plan (BMP).

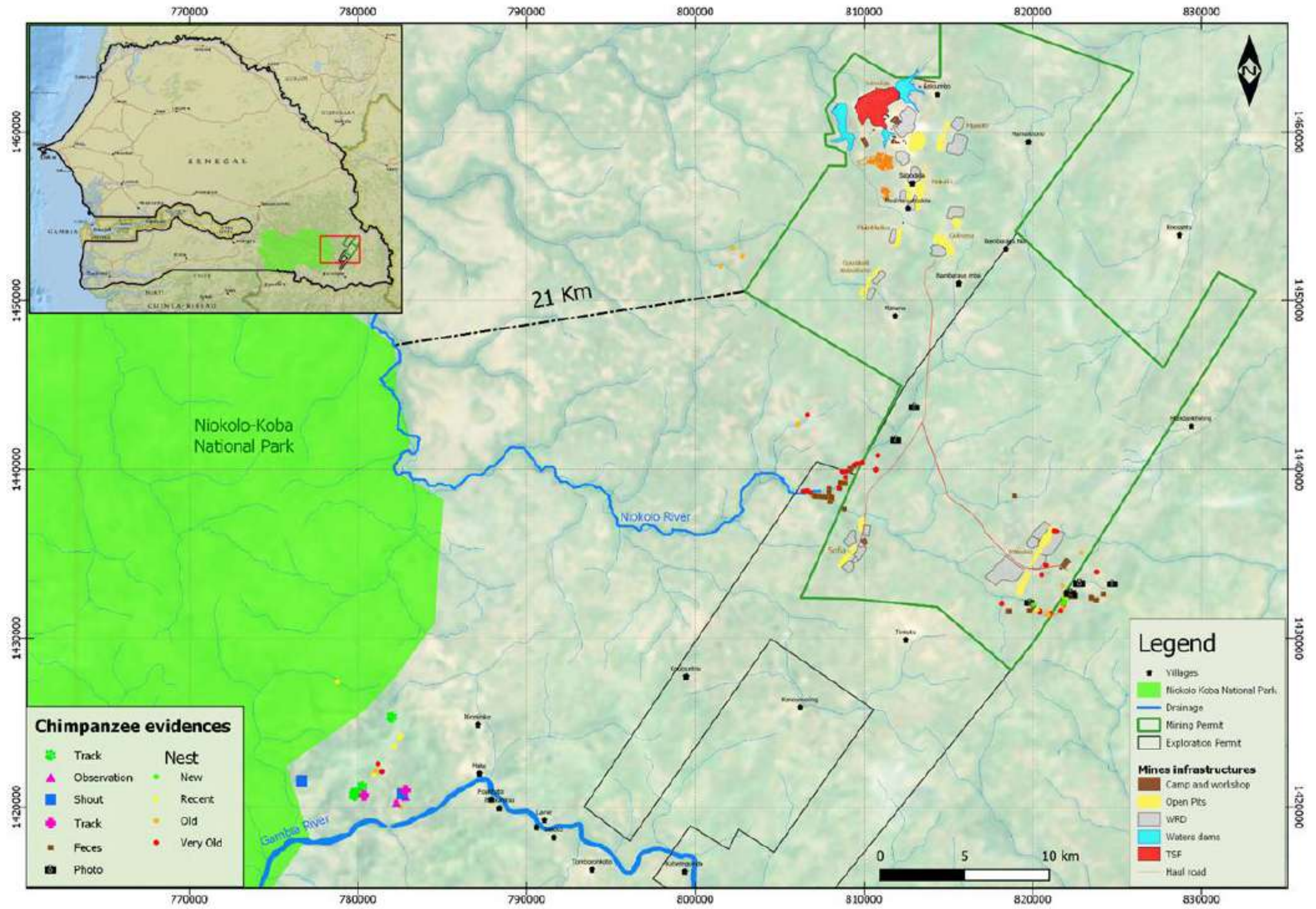
The following map (Figure 20.5.1) presents all the chimpanzee evidence from previous studies (2015 to 2022) and the ongoing monitoring results through the extensive camera trapping system in place in the area.

The preliminary conclusions of the current study are:

- The presence of chimpanzees is confirmed in the riparian forest and presence of a permanent water source named 'Yasse' located outside of the permit at the southeast corner of Massawa CZ/NZ complex. Yasse was also identified as a priority area for chimpanzee conservation in previous studies and its preservation is critical for chimpanzee conservation in the Project area. Conservation measures and access restriction were identified in a biodiversity action plan currently being implemented with authorities. Key monitoring indicators were developed to ensure a no net loss of the biodiversity.
- The importance of the role of the riparian forests in the Project area for feeding and supplying water to large wild mammals, particularly chimpanzees, imposes the need to avoid any disruption of water circulation at these levels, especially during the rainy season and to the water sources during the dry periods. Furthermore, these galleries are likely to be chimpanzee corridors between the Sofia complex; the Massawa CZ/NZ complex and the Sofia complex to Makhana. Thus, a specific action plan for the chimpanzees was developed as part of the Massawa BMP and is being implemented concurrently to the global biodiversity action plan.

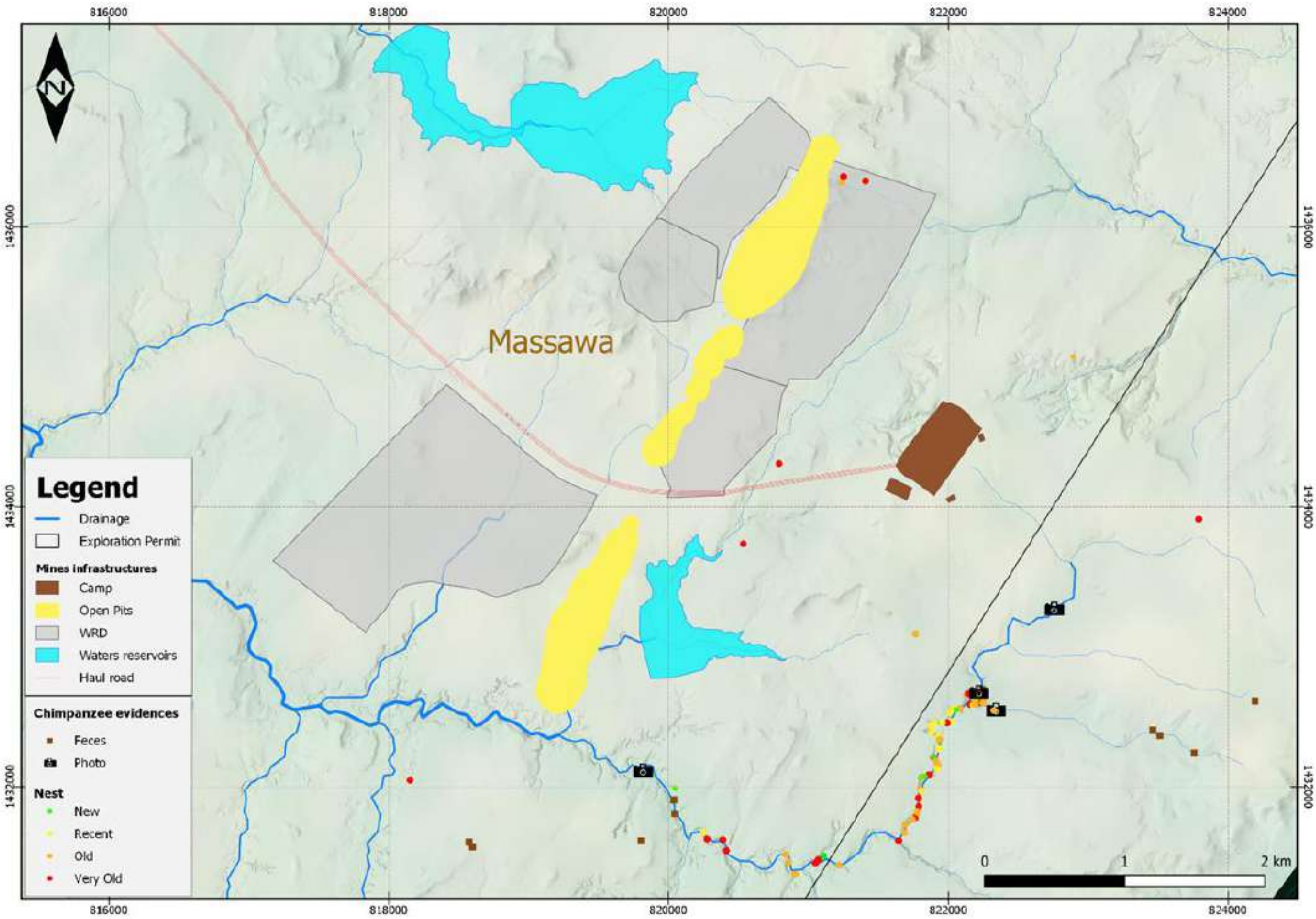
SGO is committed to effectively managing biodiversity risks in the development of its activities, whether at the construction, operation, or closure stage. This global approach is in alignment with national and international legislation applicable to SGO's projects. Avoidance, mitigation, or rehabilitation measures are thus considered, due to the presence of species and habitats important for conservation, in areas that can be potentially impacted by the Project. Avoidance is the preferred approach for mitigating potential impacts. This is achieved by using early planning decisions that consider biodiversity. SGO attempts to take avoidance measures as far as possible in the planning of mine infrastructures, and where it's not possible, mitigation and compensation actions are implemented.

Figure 20.5.1 Chimpanzee Evidence (2015 to Present)



Source: Endeavour, March 2022

Figure 20.5.2 Chimpanzee 'Evidence' on Massawa Property (2015 to Present)



Source: Endeavour, March 2022

20.5.3 Human Environment

The uncontrolled influx of mining workers and people attracted by indirect economic opportunities in the region could lead to an increase in the cost of living in the region with inflation in rents and basic commodities as well as increased competition for basic social services such as access to water or health facilities. This influx of internal migrants could also be accompanied, at the regional level, by an increase in social issues such as prostitution, insecurity, and the use of illicit substances. These social issues will be concentrated mainly in the region's larger urban centres and medium-sized cities. In the Project area, SGO manages these risks through its social policy, its community engagement and stakeholder consultation policy, its complaint resolution mechanism, and employee awareness of community relations and prevention of sexually transmitted infections.

20.5.3.1 Human Health

The health assessment aimed to evaluate the health conditions as well as the existing health services in the local area. The following methodologies were used for the assessment (Digby Wells, 2018a):

- Data assessment - a list and description of the targeted villages in the Kédougou area was developed from the 2009 health survey data for the study villages, as well as the socioeconomic data from the socioeconomic study.

- Health surveys - were conducted to collect additional information that was not available in the public domain at the time of the computer-based assessment. The health surveys included collecting information from health facilities, national health information management systems, and unpublished reports and documents. In addition, semi-structured focus groups were conducted to cover individual perceptions of health impacts, lifestyles of communities and all traditional and local knowledge related to health systems.
- Data Analysis - data obtained from the literature and health surveys was analysed to identify the major diseases and their characteristics in the targeted villages, highlighting the causes of each disease in the context of the region as well as how the establishment of the Massawa Gold Project might interfere with existing health systems.

The most frequent diseases are respiratory diseases (tuberculosis), STDs and malaria (Synergie Environnement, 2022).

20.5.3.2 Human Impact and Resettlement

In the Project area, SGO manages these risks through its social policy, its community engagement and stakeholder consultation policy, its complaint resolution mechanism, and employee awareness of community relations and prevention of sexually transmitted infections.

The development of the Sofia deposit resulted in the economic activity displacement of 14 households residing in two communities: Bambaraya (13 households) and Tinkoto (1 household). The development of Massawa CZ/NZ deposit also resulted in the economic activity displacement from the surrounding communities. A livelihood restoration plan (LRP) covering this area was conducted to identify the PAPs. A comprehensive livelihood restoration process was required to mitigate, manage, and compensate for these displacement impacts, and to ensure the safety and wellbeing of nearby residents during mine development and operation. Displacement impacts can generate budget, schedule, and relationship risks for a project when not managed effectively, as well as risks to the socio-economic stability of affected communities.

The economic displacement and livelihood restoration processes for Sofia and Massawa complexes were managed by experienced teams from Senegal (Synergie Environnement for Sofia, and Zoom Plan for Massawa). They both prepared a comprehensive Livelihood Restoration Plan (LRP), in accordance with SGO's Resettlement and Livelihood Restoration Policy and the IFC guidelines, the latter of which are widely recognised as setting international best practice in the management of resettlement and livelihood restoration processes. The LRPs defined how the affected households would be resettled and their livelihoods restored, based on the development schedule of the Project and the results of a comprehensive planning and negotiation process that led to the signature of the land compensation agreement for the Sofia haul road and its pits on 3 March 2020, and on 18 July 2020, for the Massawa haul road and its pits.

In addition, employment opportunities and sustainable development initiatives supported by Endeavour through its Social Fund will continue to provide significant support for broad-based socio-economic growth in the area.

20.5.3.3 Compensation and Livelihood Restoration

Agriculture is the primary source of household food in the Project area. The loss of access to agricultural land could lead to a decline in agricultural production that would threaten the ability of households to feed themselves. This factor in combination with a decline in household income could lead to an increase in food insecurity in the Project area.

As part of the LRPs, unused land parcels will be allocated by the communal authorities, in collaboration with SGO, to landowners whose land will be impacted by the Project. SGO will support those households in the development of these lands through a programme of support and assistance for agricultural productivity. In addition, SGO will provide financial compensation to the impacted households to enable them to compensate for the loss of crops until the new land reaches a productivity equivalent to the land lost to the Project. Large areas of potentially productive land are available in the vicinity of the relocation villages and no competition with other users is anticipated.

20.5.3.4 Indigenous Peoples

There is no group of indigenous people in Senegal as per the IFC definition (IFC, 2012).

20.5.3.5 Local Economy

The mine will largely have a positive effect on the local population, economy and the wider regional economy, in that it will:

- increase local spending and broaden the economic base of the region; and,
- provide direct and indirect local employment opportunities, with the resultant downstream impacts.

In order to ensure that the benefits are positive, development must be done in accordance with a community development programme

20.5.4 Greenhouse gases

Endeavour/SGO tracks energy usage to better understand energy consumption and source. The Project is not connected to the national grid and relies on energy produced by thermal generators burning largely Heavy Fuel Oil (HFO). Vehicle and mining fleets also use fuel (diesel), with the resultant carbon emissions.

With the integration of the Massawa asset, there will be an increase in emissions from the power station, as the capacity must nearly double to be able to sustain the power demand for the BIOX® plant and related components. This will lead to an increase in HFO consumption, which is already identified as SGO's main emission source.

By analysing SGO's energy mix and carbon emissions (Table 20.5.1, following), SGO can better understand its contribution to global emissions and identify potential opportunities to reduce said emissions. In an effort to reduce emissions, SGO is:

- Investigating renewable energy options (Section 18).
- Implementing energy efficiency standards for new plant and equipment (i.e. new HFO generators are 20% more efficient than old).
- Implementing a fuel management strategy for mine fleets.
- Optimizing land clearings.

Table 20.5.1 Total Emissions for SGO-Massawa for 2021

Emissions	Units	2021
Total Lime Consumption	(t CO_2e/a)	5590
From Natural Gas	(t CO_2e/a)	-
From Diesel	(t CO_2e/a)	444
From Diesel	(t CO_2e/a)	30 883
From Propane	(t CO_2e/a)	-
From HFO	(t CO_2e/a)	96 649
From Biodiesel	(t CO_2e/a)	-
From Info	(t CO_2e/a)	471
From Emulsion	(t CO_2e/a)	1099
From Gasoline	(t CO_2e/a)	-
Aviation Fuel Used	(t CO_2e/a)	-
Butane	(t CO_2e/a)	-
Total Scope 1 GHG Emission	(t CO_2e/a)	135 136
Total Scope 2 GHG Emissions - Location Based	(t CO_2e/a)	-
Total Scope 2 GHG Emissions - Market Based	(t CO_2e/a)	-
Total Greenhouse Gas Emissions - Location Based	(t CO_2e/a)	135 136
Total Greenhouse Gas Emissions - Market Based		
Emissions Intensity/ Ounce Produced, (Tonnes CO2e/oz)	(t CO2e/ozt)	0.354
Emissions Intensity/ Total Ore Processed, (Tonnes CO2e/T)	(t CO2e/t (db))	0.032
Emissions Intensity/ Total Tonnes Mined, (Tonnes CO2e/T)	(t CO2e/t (db))	0.003

20.6 Environmental and Social Management Plans

20.6.1 Key Management and Monitoring Plans

The Environmental and Social Management Plan (ESMP) presents all the environmental and social management measures to be implemented as part of the Project during all phases, with a focus on the operational aspects. The ESMP covers all Project phases and includes measures based on the mitigation hierarchy, namely measures to avoid, minimise, mitigate and enhance, or compensate the various anticipated impacts by reducing the significance to an acceptable level for all stakeholders.

The ESMP identifies the objectives to comply with the regulations in Senegal and international best practices in the mining sector. The ESMP also includes environmental monitoring programmes, and environmental and social follow-up and evaluation, providing the basis for assessing the effectiveness of management measures to be implemented by the Project. The ESMP includes several measures to strengthen the capacity of the stakeholders concerned by the application of environmental and social management measures.

Specific environmental monitoring Standard Operating Procedures (SOP) are developed to ensure regular and effective monitoring and measurement of SGO activities that may have an impact on the environment. They outline the resources, relevant standards, guidelines, and monitoring parameters for carrying out environmental monitoring to ensure compliance with regulatory and corporate requirements.

The results from the analysis are reported in the monthly and quarterly monitoring reports and in the annual environmental reports to senior management and government. SGO aims to provide relevant and easily understood information to stakeholders.

SGO has also developed and implemented a social management system to manage exploration, construction and operation activities at the Sabodala mine and satellite quarries since 2008. This system covers the management of all social aspects of the Project. SGO has a Social Performance Department with a staff of 28.

As part of the mining agreement between SGO and the State of Senegal, SGO has established a social fund to promote the development of local communities in the mining concession.

The Sabodala Social Fund provides a framework for supporting annual community investment plans that are consistent with the development plans of regional and local authorities and respond to community needs. Working directly with the communes and departmental councils, SGO participates in the annual Sabodala Social Fund budget guidance process. The selection and implementation of SGO-funded projects are based on community priorities in line with SGO's Corporate Social Responsibility (CSR) strategy and government policies. Once projects have been selected, SGO and the mayors sign an annual funding agreement detailing the projects funded by SGO and the amount allocated to each project. SGO assists in the implementation of these investments through technical facilitation and project assessments.

20.6.1.1 Waste Management and Monitoring Plans

The operations approach to waste management is underpinned by three goals; minimising the amount of waste produced, maximising the volume of waste recycled and safe disposal of any waste that cannot be reused or recycled. The operations generate and manage both hazardous and general waste. A waste management procedure was developed (SGO-HSE-V5.00-PRO307) to outline the relevant standards, guidelines and Key Performance Indicators (KPIs) for managing general waste in order to ensure compliance with regulatory and corporate requirements.

Hazardous waste includes fluorescent lights, waste oils, solvents, laboratory and assay wastes, medical waste, containers contaminated with hazardous substances and electronics. Management of these waste streams is guided by in-country legislation and international best practice, and, in compliance with the Basel Convention, no hazardous waste is exported, imported, treated, or internally shipped.

Our non-hazardous waste streams include organic wastes, scrap metals, wood, and tyres. For these waste streams we focus on minimising the amounts consumed and reusing or recycling what we can before considering disposal (landfill or incineration).

A waste inventory has been developed that includes the sources and quantities of all major waste types (including non-hazardous/hazardous solid and liquid wastes) and the relative proportions of each waste type that are recycled, reused, disposed, or temporarily stored on site.

The inventory is updated every three years so that trends in waste generation over time can be identified. The inventory is used to assess the suitability of waste management strategies and facilities.

The waste management procedure is reviewed every three years, immediately following the inventory review, to incorporate new waste streams, the development of new waste minimisation methods and recycling techniques, and waste audit findings.

20.6.1.2 Water Management and Monitoring Plans

SGO's water stewardship strategy aims to balance SGO's operational needs whilst at the same time protecting the quality and quantity of water available to host communities.

Mindful of the watershed SGO operates within, SGO focusses on minimising freshwater withdrawal, by maximising the amount of water reused and recycled.

Most of the water consumed is consumed in ore processing, with most of it circulating in a closed-circuit configuration, which helps to reduce overall consumption. In 2021, a total of 3 936 690 m^3 of surface water and 71 095 m^3 of groundwater was used for consumption, ore processing, dust suppression, and construction.

SGO tracks the volume of freshwater abstracted or withdrawn from the environment on a monthly basis, along with the volume of water consumed or used, and discharged. This helps to ensure that water usage remains within permitted limits, and delivers operational efficiencies by reducing raw water make-up and the associated pumping costs. The split of make-up and recycled water is monitored and reported on.

Water monitoring plans implemented by SGO are in alignment with Endeavour's global Environmental Monitoring Management procedure (EDV-ENV-V1.00-PRO01). Water monitoring and reporting (quality and quantity) covers all water resources affected by mining operations, including; potable water supply, surface and groundwater, discharged water (process and dewatering) and stream flows.

A geochemistry monitoring plan (ARD and metal leaching) is in place, and includes ARD Barrel leach test and kinetic tests, which are used to determine weathering characteristics and leachate chemistry of rocks that are exposed by mining under site specific conditions (rainfall and evaporation).

20.6.1.3 Air Quality Management and Monitoring Plans

Mining generates dust through drilling, blasting, crushing and vehicular movement. As part of Endeavour's Global Environment Monitoring Management procedure (EDV-ENV-V1.00-PRO01), an air quality monitoring programme has been implemented at SGO, to monitor three categories of air pollutants:

- fallout or depositional dust.
- small/fine particulate matter (PM_{10}).
- gases (SO_x, NO_x, CO_x).

The objective is to ensure that workers and surrounding communities are protected from adverse health effects and nuisances related to air pollutants emitted by mining operations. Sampling is done monthly for particulate matter (dust and PM_{10}) and quarterly for gases emitted from stacks.

Meteorological monitoring is undertaken for measurement and collection of climatic data to assist in the mine environmental management, particularly the design and sizing of water management structures. Data (rainfall, temperature, humidity, pression and wind) are collected continuously through the automatic weather stations; and manual rain gauges and evaporation pans are in use.

Measurement and monitoring of noise emissions and vibration from mine activities are carried out in the Sabodala-Massawa Project areas. The objective is to ensure that the local community is protected against any adverse health, safety or nuisance effects due to noise and blasting associated with project operations.

Noise measurements are made each month during the dry season, while vibration measurements are made twice a week for villages near mining operations.

20.7 Governance

20.7.1 Sustainability Reporting

Sustainability reporting is the disclosure and communication of Environmental, Social, and Governance (ESG) goals, as well as a company's progress towards them. Endeavour/SGO is aligned with the Global Reporting Initiative (GRI) principles and every year, all Endeavour's operations submit reports in compliance with the GRI reporting requirements.

20.7.2 Management Systems

SGO has developed an Environmental and Social Management Plan (ESMP) to address the requirements of all Environmental and Social Impact Assessments conducted over the years on both the Sabodala and Massawa properties. The ESMP is prepared in accordance with leading practices (ISO 14001:2015), but also all national regulatory requirements. The ESMP and its related documents apply to all aspects and all Project phases.

The purpose of this strategic document is for the facilitation of environmental management measures to minimise the environmental risks associated with projects and to protect the environment.

More specifically, the ESMP:

- Details environmental management designed to meet environmental objectives and outcomes.
- Provides a framework for effective implementation of environmental management.
- Defines roles and responsibilities for environmental management and compliance.
- Ensures ongoing review of site-specific environmental management and mitigation measures to affect continuous improvement in environmental management.

The EMP is reviewed every year or as required (if more frequent), e.g. if there were significant changes to activities and management plans.

20.7.3 Environmental Monitoring

SGO's monitoring programme is being updated concurrently with the overall EMP to better cover all Project extensions, including Nazaire, Goumbati-Kobokoto and the Sabodala-Massawa Project area.

The monitoring activities are conducted on a monthly basis, by following the relevant Standard Operating Procedure (SOP). Monitoring results are compared against trigger values to determine if any contingency measures are necessary. The programmes are conducted by SGO's Sustainability Department, which is responsible for ensuring compliance with the commitments agreed to as part of the various ESIA and environmental obligations.

SGO's environmental inspection and monitoring programmes/plans also apply to all contractors/sub-contractors employed by SGO. As such, the requirements of the programmes including associated reporting requirements, are built into all commercial contracts.

The main elements of the aforementioned programmes include:

- Surface and ground water quality.
- Ambient air quality.
- Ambient noise.
- Status of the flora and effectiveness of re-vegetation.

- Fauna with a special biodiversity monitoring focus on the Western Chimpanzee.
- The local and regional economy.
- Gender.
- Social cohesion.

20.7.4 Carbon Emissions

As a long-term driver for business sustainability, Endeavour and by association SGO are working on ways to improve the energy efficiency of its operations, adopt cleaner forms of energy, and lower emissions and costs in general.

In June 2021, the Endeavour Board approved carbon reduction targets of Net Zero by 2050 and a nearer-term target of a 30% reduction in emissions intensity by 2030 (Scope one and two), as well as the inclusion of a climate-related target, in the Endeavour executives executive long-term incentive plan.

During 2021, Endeavour undertook an assessment of climate risk management and TCFD to ensure that risks are appropriately identified, managed and monitored.

The assessment and management of climate-related matters is embedded across Endeavour's operations and delegated authority flows down from the Board. At a management-level the ESG Committee, which includes Endeavour's CEO and COO, provides internal oversight of strategy and progress, including climate-related aspects and targets.

In Q4 2021, Endeavour appointed a dedicated senior executive, reporting directly to the COO, who is responsible for managing and coordinating the Group's decarbonisation pathway, energy transition projects and hydrocarbon management policy across the Group.

Since 2019, Endeavour has disclosed emissions from its operations, and climate change work to CDP (formerly the Carbon Disclosure Project). In 2021, Endeavour maintained its C rating at the group level, which places Endeavour in the awareness band and the top 60% of respondents for climate change work.

As outlined in Section 20.5.4, the Project as outlined herein, has considered a number of options for reducing GHG.

20.7.5 Tailings Storage Facility Audits

With the view of creating zero harm, the management of tailings is a critical thematic area within Endeavour's corporate risk management and reporting system. As such, there is a strong, structured and robust approach, to the risk classification of existing and planned TSFs.

Endeavour and by association SGO, evaluate the consequence to human and environmental health in line with the classification systems of the Australian National Committee on Large Dams ('ANCOLD') and the Canadian Dam Association ('CDA'). Accordingly, Endeavour conducts regular internal and external audits to monitor, measure and evaluate the effectiveness and safety of the TSFs, across all its operations. The results of these audits are reported back to site, senior management, and the Board on a regular basis.

On the Endeavour website, as part of the 'Investor Mining and Tailings Safety Initiative', Endeavour publishes pertinent information on its TSFs annually. In 2021, Endeavour employed independent external reviewers to evaluate all of its tailing facilities, and no serious issues were identified.

For tailings at SGO the following may be noted:

- In 2020, the 'Global Industry Standard on Tailings Management' (GISTM) had not been released and as such, the development plans for TSF1B (BIOX® tails) and TSF2 (2012 design) had not been subject to a formal multi-criteria assessment during the early development phases of the Project.
- Whilst there is no techno-economic alternative to TSF1B, an option for depositing flotation tails from the SSTP plant, and CIL tails from the SWOLP into the Sabodala pit (Sabodala In-Pit Storage Facility or 'SIPTSF') is being considered, once mining activities at Sabodala cease. This offers both a cheaper and safer tailings storage solution than TSF2.
- Since the introduction of the GISTM, the SIPTSF has been developed as an option to TSF2, and this option is being followed through with the Senegalese regulators.
- With respect to GISTM, TSF1, TSF2 and TSF1B have a Dam Failure Consequence Classification of '**High**', whilst the potential SIPTSF has a Dam Failure Consequence Classification of '**Low'**.

20.7.6 Cyanide Management

Endeavour and by association SGO's approach to cyanide management is aligned to the International Cyanide Management Code ('ICMC'). Third party audits are undertaken by ICMC authorised auditors, which are completed to the ICMC standard. Endeavour/SGO provide training to employees and contractors on safe cyanide handling and management. On-site emergency response teams receive special training to manage incidents involving cyanide. In 2021, Endeavour/SGO recorded zero cyanide-related health or significant environmental issues.

20.7.7 Stakeholder Management

Endeavour's/SGO's stakeholder management plans are in line with the Responsible Gold Mining Principles (RGMPs) as part of the World Gold Council principles.

The principles that guide stakeholders engagement and management are outlined in Section 20.4.

20.7.8 Health and Safety

Endeavour's Health, Safety and Environmental (HSE) Polices, Management System and Standards, align with international best practice and are audited internally and externally on an annual basis against the ISO 45001 standards. Polices and standards are managed at a group level and rolled out to Endeavour's various business units, including SGO.

Relevant policies, procedures/standards and reporting requirements are incorporated into contracts between the 'Employer' and the contractors/subcontractors and as such, HSE is seen holistically across the group and in the areas impacted by Endeavour's operations.

Group wide and site specific; safety indicators are a metric in annual employee compensation and there are regular communications via toolbox meetings, safety briefings and visual communications between all stakeholders.

20.7.9 Local Procurement and Employment

Employment opportunities and sustainable development initiatives supported by SGO through its Corporate Social Responsibility (CSR) programme will continue to provide significant support for broad-based socio-economic growth in the area.

SGO's procurement and supply chain multiplies the positive impact on the local, regional, and national economy, strengthening local businesses and creating indirect and induced employment. SGO prioritises national and local suppliers of goods and services as well as the development of in-country manufacturing and supply chains.

Endeavour's/SGO's supplier database uses the IFC ownership categories, and priority is given to local and national suppliers from this list, provided that they are competitive and meet standards.

Endeavour/SGO has a 'Supplier Code of Conduct' (SCC) policy that sets out requirements for the supply of goods and services, which alongside the vendor due diligence programme, enables the Company to support national and local businesses, whilst maintaining standards and ensuring issues such as child labour or forced labour and bribery and corruption do not occur within the supply chain.

At site level, to assist with building strong community relations, as part of an onboarding process of new local suppliers, the supply chain team organises an introductory meeting with all stakeholders to sensitise them to the local operating environment.

Each year, the supply team meet with their key contractors and suppliers regularly to review performance and at the group level, senior management meets with strategic suppliers to discuss performance and broader topics, such as ESG efforts.

20.7.10 Closure Review

As closure activities progress, the Mine Closure and Rehabilitation Plan (MRCP) is regularly reviewed and updated to reflect any changes that have occurred. Where there is a substantial or material change to the closure strategy, Endeavour will prepare a revision. However, as a minimum, the MRCP will be updated every three years.

20.8 Closure and Rehabilitation Plan

20.8.1 Background

Mining activities in Senegal are subject to national legislation and permitting requirements, which include the requirement to develop a MRCP. The MRCP was prepared by Environmental Resources Management (ERM) and reflects the May 2021 LoM Plan that integrates mining and processing operations at Sabodala, with the development of the Massawa Project. The LoM mining and production schedule shows mining of the Sabodala-Massawa deposits to 2036.

The MRCP outlines how the Project will be closed, how affected lands will be rehabilitated, and the costs associated with doing so. The MRCP will be updated throughout the LoM to advance closure planning from a conceptual level to a final, executable plan. Closure planning, however, is not limited to the design of closure and rehabilitation activities to be undertaken only once mine operations cease.

A robust plan also provides:

- A mechanism to identify closure-related risks and opportunities.
- Objectives for the integration of closure considerations into engineering design and operational decisions throughout the life of mine.
- Opportunities for progressive rehabilitation of areas no longer required for ongoing mine operations.
- Support for stakeholder engagement on mine closure and future land use.

The overall objectives of the MRCP are to:

- Present a set of overarching principles and objectives that will guide the Project in its approach to closure and rehabilitation strategies, in alignment with the Endeavour Group Mine Closure Standard.
- Present a conceptual closure strategy for the Project components (Domains) that meets the applicable legal and regulatory requirements and addresses relevant commitments to stakeholders, considering the challenges and opportunities related to progressive rehabilitation, mining and operation plans, water quality, restoration of disturbed lands, decommissioning, strategies for socio-economic development, and security/closure safety.
- Provide a description of the implementation, management, maintenance and monitoring of rehabilitation and closure activities to be undertaken in case of a temporary or sudden shutdown and during closure and post closure.
- Provide updated data on Endeavour’s closure financial liabilities for the Project LoM Plan.

20.8.2 Closure

20.8.2.1 Legal requirements

The following Section summarises the national and international legal requirements applicable to the MRCP, in addition to Endeavour’s corporate policies, standards and commitments related to the rehabilitation and closure of the Project.

Key laws and policies that apply to mine rehabilitation and closure in Senegal include the following:

- The Environmental Code (Law 2001-01) and its decree number 2001-282.
- Mining Code (Law 2016-32) dated 8 November 2016.
- Decree number 2009-1335 on Rehabilitation Funds.
- Forest Code (Law 2018-25) and its decree number 2019-110.

The 2001 Environmental Code (Article L51) requires an analysis of the initial state of the site and the development of measures to eliminate, reduce or compensate for adverse impacts of the activity before, during and after the completion of the Project.

Management of wastewater and effluent is governed by Senegalese Standard NS 05-061 of July 2001 that sets the limits for the discharge of wastewater into the receiving environment. Limit values for Total Suspended Solids (TSS), Biological and Chemical Oxygen Demand (BOD and COD respectively), and total nitrogen and phosphorus are provided in Appendix 2 of the Standard.

Senegalese Standard NS 05-062 of December 2004 sets out pollutant concentration limit values in ambient air including carbon monoxide CO, nitrogen dioxide as NO_2, sulphur dioxide as SO_2 and dust.

ESIA and ESMP Commitments

In accordance with the Environmental Code (2001) and the Sabodala Mining Convention, an ESIA for the Sabodala Project was completed in April 2006. Since 2006, there have been several component specific projects, requiring an ESIA, for which closure concepts were developed:

- Golouma Project (Oromin Joint Venture Group Ltd. (OJVG) with SRK Consulting in 2010).
- The proposed Tailings Storage Facility 2 (Tropica, 2014).
- Niakifiri Project (ERM and Tropica, 2019).
- Goumbati-Kobokoto (GKK) Project (Synergie Environnement, 2020).
- SGO-Massawa Project (Synergie Environnement, 2021).

Digby Wells completed an ESIA for the Massawa Project in 2018 (Digby Wells, 2018a). The scope included the development of open pits, specifically Massawa Central Zone (CZ) and North Zone (NZ), Sofia and Delya, satellite pits and supporting infrastructure. Ore will continue to be processed at Sabodala, and WRDs developed adjacent to respective open pits.

SGO has an Environmental and Social Management Plan (ESMP) that provides a framework for mitigating and monitoring potential impacts and includes the closure phase. A register of potential impacts that includes those compiled from the Project ESIAs and stakeholder engagement is maintained and updated as needed. Applicable mitigations and monitoring for potential impacts relevant to the closure phase have been considered in the MRCP.

International Good Practice

In addition to adhering to Senegal legislation and guidelines, some of the practices considered in planning for rehabilitation and closure at the Project include:

- The International Finance Corporation (IFC) General Environmental, Health and Safety Guidelines (IFC, 2007a) present that the decommissioning of a project includes environmental considerations (noise, erosion, waste, and contamination), occupational health and safety, and community health and safety (site hazards, disease and traffic safety).
- The Environmental, Health and Safety Guidelines for Mining (IFC, 2007b) considers a mine closure plan that incorporates physical rehabilitation and socio-economic factors to be an integral part of the project life cycle. The guidelines recommend that the closure plan address beneficial future land use determined through multi-stakeholder engagement, and meet objectives for financial feasibility and physical, chemical and ecological habitat integrity.
- The Biodiversity Conservation and Sustainable Management of Living Natural Resources standard (IFC, 2012), The IFC Performance Standard 6 represents international best practice for biodiversity conservation and sustainable natural resource management. The standard addresses critical habitat assessment, mitigation and offset design, protected areas assessment, and monitoring and evaluation design.
- The Australian National Committee on Large Dams (ANCOLD) Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure (updated July 2019).
- The United States Environmental Protection Agency (USEPA, 2009 as amended) National Recommended Water Quality Criteria - Aquatic Life Criteria Table.

- The Australian and New Zealand Environment and Conservation Council (ANZECC, 2000 as amended) Guidelines for Fresh and Marine Water Quality.
- Previously, the World Health Organization (WHO) Guidelines for Drinking Water Quality (4th edition, 2017 as amended) have been compared to ambient water quality, to assess potential watershed impacts. This is not considered best practice and instead the MRCP considers the above USEPA and ANZECC limit values. However, in the absence of third-party raw data/review, previous references have been retained.

Internal Governance

Endeavour and by association SGO is committed in its Environmental Policy to sustainable development and the protection of the environment through the 'zero harm' environmental management performance values and business principles. Some of the aspects that are part of the Environmental Policy and relate to the rehabilitation and closure planning include the following:

- Comply with all applicable environmental laws, regulations and requirements.
- Comply with relevant industry standards relating to the management of environmental risks.
- Establish and maintain management systems to identify, monitor and control the environmental aspects of the activities.
- Ensure that resources are available to meet the reclamation, environmental and mine closure obligations, including progressive rehabilitation, and consult with the local communities and key stakeholders as part of mine closure planning.
- Commit to transparent communication and consulting with interested and affected parties.
- Work to continually improve the environmental performance over time.
- Develop management plans with the goal of minimizing deforestation and other biodiversity and land access impacts and ensuring no net loss of critical habitat.
- Need to participate in solutions that address the long-term impact of climate change, and continually improve the water management systems.

The Endeavour Group Standard for Mine Closure is applicable to all Endeavour managed operations and projects. The purpose of the standard is for all Endeavour's operations and projects to identify and manage current and future risks and liabilities associated with closure of their assets to deliver sustainable value to all stakeholders. Key expectations of the mine closure standard include the following:

- Plan and implement mine closure in accordance with all applicable legal obligations.
- A robust, risk assessed closure plan will be integrated into the relevant site plans.
- Clearly defined post closure vision for the site aligned with Endeavour's Closure Vision and supported by closure principles.
- Objectives and success criteria informed by risks and opportunities, the knowledge base, multiple internal disciplines and stakeholder input.
- Clear management accountability and operational ownership of closure activities.
- Robust and complete closure cost estimates that increase in confidence through the life of mine.
- Allocation of resources for progressive site reclamation and final closure.
- Proactive engagement with internal and external stakeholders.

- Plans for social closure and workforce retrenchment.
- Review and updates of the MRCP to ensure it remains relevant.
- Adaptive management systems for continuous improvement of outcomes.

20.8.2.2 Closure Cost Estimate

This Section presents the process and results associated with the update of mine closure costs for the Sabodala and Massawa properties. The costs were developed as part of the process of updating the Project MRCP. The mine closure costs were developed using 2021 as a baseline. The Project considers a two years' pre closure stage (2034 to 2036), followed by a closure stage (2037 to 2038). Post closure starts in 2039 and comprehends a period of 10 years' (2039 to 2048). The cost estimate was developed at a conceptual level.

The total updated closure cost of the site was USD 79.0 M. Table 20.8.1 presents the summary of the current conceptual mine closure cost estimate. Additional studies and characterization of the area will provide additional information that will allow the evaluation and detail of proposed closure actions, that should be incorporated in future MRCP updates.

Table 20.8.1 Summary of Mine Closure Cost Estimate

Area	Cost (USD)
Direct Costs	35 263 230
Pits	3 028 269
Waste Dumps, Stockpiles	5 262 951
Storage Facilities-Tailings, Rejects, Slimes	7 587 911
Water Management	205 460
Buildings and Infrastructure	4 097 356
Processing Plant	8 994 654
Roads and other disturbed areas	147 677
Site Wide	61 746
Contingency applied on direct costs	5 877 205
Indirect Costs	43 700 735
Studies and Research	2 008 928
Post Closure/Maintenance & Monitoring	6 450 461
Social Costs[1]	15 000 000
Retrenchment costs	11 762 827
Owner Costs	8 478 519
Total	**78 963 965**

[1] In addition to the environmental closure cost, there is an additional USD 15 M for social closure costs as prescribed under Section 22.6 of the Sabodala Mining Convention, and as agreed with the Government, SGO will pay the Government of Senegal to account for social development costs at the closure of the mine.

20.9 Comments on Section 20.0

The QP for Section 20.0 believes the environmental and social components are covered well and the report is on standard for a DFS.

20.10 Interpretations and Conclusions

Interpretations, conclusions and risks associated with Section 20.0 are presented in Section 25.0.

20.11 Recommendations

Recommendations pertaining to Section 20.0 are presented in Section 26.0.

20.12 References

References cited in Section 20.0 are presented in Section 27.0.

21.0 CAPITAL AND OPERATING COSTS

21.1 Basis of Estimate

21.1.1 Scope

The costs (capital, operating and sustaining) presented herein, cover two project phases (Phase 1 and Phase 2) and the Life of Mine (LoM) plan for the Sabodala-Massawa Mining/Processing Complex or the Project.

The status with respect to the various project phases, are as noted below and in the Project Execution Schedule (PES), Section 24.1.

- **Phase 1** - Started to Complete
  - Upgrades to Sabodala Whole Ore Leach Plant (SWOLP) - 'Complete', costs are considered sunk/historical, and are not reported on herein.
  - Massawa Mining Infrastructure - 'In progress' overhead line, long-haul roads, camp upgrades, mine facilities, RoM pads, drainage, piping, dams and earthworks.
- **Phase 2** - Not Started
  - Sabodala Sulphide Treatment Plant (SSTP) and attendant Infrastructure.
  - Sabodala Power Station (SPS) upgrade.
  - New containment Cells (TSF 1B) within TSF 1.
  - TSF 2.
  - Development of three underground mines (two operating concurrently).
- **LoM Plan (2022 to 2035)** - covers operating, capital and sustaining costs for surface and underground mining on the Sabodala and Massawa Properties and, ore processing and tailings management on the Sabodala property. Business areas reported on include:
  - mining (surface and underground);
  - infrastructure;
  - administration;
  - processing (SWOLP and SSTP); and,
  - tailings management (TSF 1 lifts, TSF 1B and the new TSF 2).

21.1.2 Study Contributors

Contributors to the CAPEX and OPEX estimate are as noted below.

- Lycopodium prepared the capital and operating costs for the SSTP and all associated infrastructure, with the Owner's costs being supplied by Endeavour/SGO.
- The capital costs for the TSFs are based on quantities prepared by L&MGSPL and rates/unit costs developed by Lycopodium/Endeavour.
- The capital and operating cost estimate for the expansion of the SPS was developed by QGE Engineering, with inputs from Endeavour.

- SLR prepared operating and capital costs at a PFS level of development, for the underground mining scope of work (Phase 2).
- Endeavour prepared capital and operating costs for surface mining and associated infrastructure, and utilised cost data from the existing operations.

21.1.3 Base Date

The estimate is expressed in USD and is based on prices and market conditions current as of the fourth quarter of 2021 (Q4 2021).

21.1.4 FOREX Rates

The FOREX Rates and Foreign currency exposure are as noted in Table 21.1.1 following.

Table 21.1.1 Foreign Currency Exposure

Currency	Exchange Rates	USD Portion (000)	Percentage of Capital Estimate
USD	1.000	240 209	81.05
AUD	0.692	35 729	12.06
EUR	1.190	17 005	5.74
GBP	1.428	725	0.24
ZAR	0.067	1779	0.56
CAD	0.813	138	0.05
PHP	0.020	56	0.02

21.1.5 Estimating Methodology, Accuracy and Contingency

21.1.5.1 Estimating Methodology

The operating cost estimate for the existing operation was developed based on historical performance and forecast unit costs and consumptions aligned with the LoM production plan.

Operating costs for the new SSTP and attendant infrastructure, were prepared utilising a combination of engineering design outputs, metallurgical testwork results, existing and forecast LoM pricing for reagents and consumables, detailed labour structure and the current labour cost basis.

The capital cost estimate was derived from a combination of:

- Budget Pricing - Market pricing solicited specifically for the project estimate.
- Database - Actual costs from similar projects that have recently been constructed, or were under construction at the time of the estimate, and are less than six months old.
- Estimated - Historical database pricing older than six months, escalated to the current estimate base date.
- Factored - Factors derived from percentages applied as a factor from previous estimates or projects.

Sustaining capital cost estimates were developed based on historical requirements and forward planning of capital works for existing and new plant and infrastructure.

21.1.5.2 Estimate Accuracy

Subject to Work Breakdown Structure (WBS) element, the CAPEX and OPEX estimate is deemed to be reported to a PFS or DFS level of accuracy at a P_{10} to P_{90} confidence level. The level of engineering/technical/cost development is in accordance with this estimating accuracy provision. The PFS and DFS level of reporting accuracy is as noted below.

- PFS ±(15 to 30)%[1].
- DFS ±(10 to 15)%.

Furthermore:

- No contingency has been applied to either the operating or sustaining capital cost estimates.
- An amount of contingency has been provided in the Capital Cost estimate to cover anticipated variances between the specific items allowed in the estimate and the final total installed project cost. The contingency does not cover scope changes, design growth, etc., or the listed qualifications and exclusions. A contingency analysis has been applied to the estimate that considers scope definition, materials/equipment pricing and installation costs. Contingency applicable to various Owner's inputs have been specified by Endeavour/SGO.

The resultant overall contingency for the capital cost estimate is 13.3%. There is no allowance for escalation in the capital estimate.

21.1.6 Cost Definitions and Basis

21.1.6.1 SSTP Plant & Associated Infrastructure

The basis for the derivation of capital and operating costs for the existing and new facilities are defined in Table 21.1.2 to Table 21.1.6 and Sections 21.1.6.2 to 21.1.6.19 following.

Table 21.1.2 Existing Facilities Cost Estimate Basis

Description	Basis
Geographical Location	Actual Site
Maps and Surveys	Topo and surveys provided by Endeavour
Geotechnical Data	Final
Process Definition	Fixed - Existing
Process Facilities Design	Fixed - Existing
Infrastructure Definition	Fixed - Existing
Mine Infrastructure Definition	Fixed - Existing

[1] The normal standard is ±(15 to 25)%, but given some uncertainty around underground mining and mine infrastructure, a broader range has been used.

Table 21.1.3 Existing Operations Methodology

Description	Basis
Sustaining Capital	Developed based on previous capital requirements, forward planning around infrastructure, mobile fleet, and Life of Mine performance requirements.
Operating Cost	
• Mining	Built up using a combination of historical performance, current and forecast consumables pricing, current and future labour forecasts, and Life of Mine performance requirements.
• Processing	Built up using a combination of historical performance, current and forecast reagents and consumables pricing, current and future labour forecasts, and Life of Mine performance requirements.
• General and Administration	Built up using a combination of historical performance, current and future labour requirements, and cost forecasts.

Table 21.1.4 New Facilities – Level of Engineering Development

Description	Basis
Site	
• Maps and Surveys	Topo and surveys provided by Endeavour
• Geotechnical Data	Preliminary
Process Definition	
• Process Selection	Fixed
• Design Criteria	DFS Standard
• Plant Capacity	1.2 Mt/a (db) expandable
• Flowsheets	DFS Standard
• P&IDs	BIOX P&IDs developed, other areas not required as suitable reference projects available from the Lycopodium database
• Mass Balances	DFS Standard
• Equipment List	DFS Standard
Process Facilities Design	
• Equipment Selection	DFS Standard
• General Arrangement Drawings	DFS Standard
• 3D Model	Semi Detailed
• Piping Drawings	Not Required
• Electrical Drawings	Single Line Diagrams, electrical layouts
• Specifications/Data Sheets	Used for equipment pricing
Infrastructure Definition	
• Existing Services	Not relevant other than the use of Owner's camp for accommodation
• Power	Power Station Extension
• Water	Existing Supply
• Accommodation	Utilising current onsite accommodation
• Access and Site Roads	Site access road - unsealed
• TSF	Infrastructure Only
• Mine Services	Owner's Cost
• Security / Fencing	Plant Security fencing, stock fence to lease boundary
• Design Basis	Preliminary
• Layout	Defined

Table 21.1.5 New Facilities Capital Cost Estimate Methodology

Description	Basis
Plant	
• Bulk Earthworks	Volume for bulk earthworks provided by the preliminary project model.
• Detailed Excavation	Allowances for under pad excavation and backfill to prepare site for concrete works.
• Concrete Installation	Quantities based on study engineering, reference projects and estimated structures.
• Structural Steel	Quantities based on study engineering and reference projects.
• Platework & Small Tanks	Platework items as per the mechanical equipment list.
• Tankage Field Erect	Tanks as per the mechanical equipment list.
• Mechanical Equipment	Items as per the mechanical equipment list. Formal budget enquiries with datasheets and/or specifications for the major mechanical items. Costs for minor items taken from the Lycopodium (recent) database.
• Plant Piping General	Factored from mechanical costs.
• Overland Piping	Size and specification based on engineering selection. Quantity based on site layout. Rates taken from the Lycopodium database.
• Electrical General	Quantities derived from engineering design and site layout. Electrical equipment priced for the project. Bulks and installation costs drawn from a combination of recent database and budget pricing.
• Electrical HV	Quantities derived from engineering design and site layout. Electrical equipment priced for the project. Bulks and installation costs drawn from a combination of recent database and budget pricing.
• Commodity Rates – General	Based on specific contractor enquiries with indicative drawings.
• Installation Rates – General	Based on specific contractor enquiries with indicative drawings.
• Large Cranage	Client to free issue 250 t crawler crane for major lifts.
• Freight General	Combination of freight tonnes and percentages.
• Contractor Mobilisation & Demobilisation	Based on BQRs.
• EPCM	Resource based estimate for the EPCM controlled scope.
Owner's Costs	
• Owner's Project Costs	Endeavour estimate.
• Construction Accommodation	Owners team, EPCM personnel and contractors' seniors.
• TSF	Endeavour estimate based on recent expansions of the existing tailings storage facility plus company supply rates for HDPE.
• Mining Haul Road & ROM Pad	Excluded.
• Project Insurances and Permits	Part of Owner's Project Costs.
• Plant Pre-production Expenses	Estimated as part of operating cost estimate.
• Opening Stocks, First Fill Reagents and Consumables	Estimated from consumption rates and costs as part of operating cost estimate.
• Spares	Per cent allowance.
• Duties and Taxes	Tax exoneration, except for a regional ECOWAS levy and withholding taxes both figures supplied by Endeavour see Section 4)
• Escalation	Excluded.

21.1.6.2 Phase 2, Project Development Basis

The project development strategy is based around a number of key factors:

- Brownfields operating environment.
- Proven technology (but new to Endeavour/SGO - BIOX®).
- Location of Project.
- Existing infrastructure (type and supplier).

The project has four primary packages of work, each with a different risk profile and matching delivery strategy:

- **New** - Sulphide Treatment Plant (SSTP) - this new process plant incorporates the BIOX® technology to oxidise the refractory sulphide concentrate produced by flotation, prior to cyanide leaching of the insoluble residue. The new process plant will be delivered by an Engineering, Procurement and Construction Management ('EPCM') contract which allows Endeavour/SGO to access design and construction expertise of an external engineering company, whilst maintaining control over design decisions that impact the BIOX® technology.
- **Expansion** - Existing Sabodala HFO Power Station (SPS). The expanded power station needs to operate as an integrated power station. As such, the expansion will be delivered under a Lump Sum, Turn Key ('LSTK') delivery contract which includes scope for the supplier to integrate the controls and electrical reticulation of the power station into a single supply package. The power station will then be owner operated for the remaining life of mine (see Section 18).
- **New** - Tailings Storage Facility (TSF). A new facility will be required to store the leached, oxidised BIOX CIL and neutralisation tailings. The facility will be designed by the third party tailings engineers. Construction will be through directly managed contractors with suitable expertise under the direction of Endeavour/SGO tailings engineers and advisors.
- **New** - Underground Mining. Three underground mines that form part of the second project phase, have been developed to a PFS level of technical and cost development by SLR.

21.1.6.3 Project Schedule and Project Ramp Up

A Project Execution Plan (PEP) was prepared and contains the Project Implementation Schedule (PIS). The PEP and PIS are summarised in Section 24.1.

Project ramp-up, including putting ore through the SSTP and pouring first gold, is based on Lycopodium's recent experience on West African gold plants, combined with the McNulty type curve developed for the SSTP ramp-up (Section 17). The plant ramp-up for the BIOX® circuit is based on guidance from the Metso-Outotec Group, the technology suppliers of the BIOX® technology.

21.1.6.4 LoM Projects

Tailings Storage Facility 1 (TSF1) will be subject to a series of wall raises, up to the maximum permitted height. The costs of which are built into the ongoing sustaining capital expenditure programme.

Tailings Storage Facility 2 (TSF2) falls under the Phase 2 project programme, and is required to support the LoM plan. As, such the costs of TSF 2 have been phased into the sustaining capital budget, with consideration of when construction should commence and when the TSF2 will receive first tails. Capital scheduling will be as per the integrated schedule presented in Section 24.1 of this Technical Report.

21.1.6.5 Labour

All the site labour costs used in the operating cost estimate were based on current labour practises and rates.

21.1.6.6 Sunk Costs

No sunk costs have been included in the cost estimates.

21.1.6.7 Pre-Production Costs

The costs incurred by operations during the latter stages of construction and commissioning are included in the capital cost estimate, and are based on a period of six months preceding plant start-up.

21.1.6.8 Working Capital Start Up

Start-up working capital has been estimated based on the capitalisation of six weeks of fixed and variable costs, with the plant at 80% of design performance at week six.

21.1.6.9 Working Capital Operations

Forward looking working capital assumptions will remain in line with current assumptions, until working capital is returned to a nil balance at the end of the mine life (Table 21.1.6).

Table 21.1.6 Working Capital Assumptions

Line Item	Period
Receivables	10 days of Turnover
Prepaid Expenses	7 days of Operating Expenditure
Inventories	35 days of Operating Expenditure
Payables	100 days of Operating Expenditure
Value added taxes	Excluded

21.1.6.10 Sustaining Capital

Sustaining capital cost estimates for mining were prepared by Endeavour and Oreology, with Oreology, preparing the equipment replacement schedule.

Sustaining capital costs for Project infrastructure and the SWOLP were prepared by Endeavour/SGO, with Lycopodium providing the estimate for the SSTP. 2022 numbers were as per SGO budget figures.

21.1.6.11 Rehabilitation and Closure Costs

Project rehabilitation and closure costs were prepared by ERM consultants and have been built up from first principles. Closure costs are detailed in Section 20.0 and included in the cashflow model. The costs have currently been allocated evenly across the final four quarters of the mine life, 2036. Further discussion on how the closure costs may be managed in future, are presented in Section 4.0.

21.1.6.12 SGO/General and Administration Costs

General

The Owner's project management team for the SSTP will interact closely with operations management personnel, who are free issue to the Project.

The following allowances have been made in the estimate:

- Owner's Project expenses, including salaries.
- Tailings dams.
- Laboratory.
- TSF 1B.
- Security - CAPEX.
- EPCM - establishment.

First Fills and Opening Stocks

Lycopodium included all first fills and opening stocks in the capital cost estimate.

Spares

A value for Project spares has been estimated by Lycopodium and included in the estimate. Estimates for wear consumption rates for major equipment were derived from; vendor data, Lycopodium and OMC databases, and where applicable, are factored to account for differences in process variables.

21.1.6.13 Escalation and Growth Allowances

The estimate is based on prices and market conditions current as of quarter four 2021 (Q4 2021) and no escalation or growth allowances have been allowed for in the estimates.

21.1.6.14 Freight and Logistics Costs

Endeavour has logistics support functions in Abidjan in Cote d'Ivoire, Dakar and at Sabodala, and thus freight and logistics issues/costs are well understood. Lycopodium have leveraged this logistics knowledge to develop freight and logistics costs for the Phase 2 project.

21.1.6.15 Insurances - Construction and Operations

Insurances for both construction and operations have been priced by the current Endeavour insurance providers and included in the capital and operating cost respectively.

21.1.6.16 Taxes and Duties - Construction and Operations

There are existing tax exoneration agreements in place for the Operation/Project, for items of a capital nature and thus for CAPEX, taxes payable are restricted to:

- a regional Senegal/ECOWAS levy of 2.7% (Section 4)
- company withholding taxes for the provision of services (Section 4).

As with taxes and duties on capital items, there is a 2.7% ECOWAS levy on consumables, materials and reagents imported from outside the ECOWAS block of countries (Endeavour, 2022).

21.1.6.17 Construction Costs and Facilities

Project construction offices and establishment, construction services, power, water, PPE, communications, computers, IT services, servers and telephones are all included in the capital estimate under owner's costs.

21.1.6.18 Engineering and Construction Management Fees

The Project will be implemented using an EPCM approach, whereby the EPCM Engineer will provide design, procurement and construction management services on behalf of Endeavour. The EPCM services cost estimate includes head office support and site staffing, subconsultants, office consumables, equipment and associated project travel. The cost of a fully equipped home design office and all home office project computing requirements are included under Management costs.

21.1.6.19 Funding

Endeavour propose to fund the project through cash reserves and existing corporate facilities.

21.1.7 Key Input Costs

21.1.7.1 Fuel Basis

Endeavour supplied a fuel (diesel) price of USD 0.88/L that was used in the operating cost estimate.

21.1.7.2 Power Basis

HFO-generated power is available at a unit cost of USD 0.1334/kWh. This cost is based on an HFO price of USD 0.54/L (Section 18).

21.1.7.3 Labour Basis

Endeavour supplied all site labour costs (nationals and expatriates), that were used in the development of the operating cost estimate.

21.1.7.4 Reagents and Consumables

For all reagents and consumables that are common to both plants, Endeavour/SGO supplied Q4 2021 pricing. For all other reagents and consumable prices, these were obtained from vendors and are based on a DDP basis (Incoterms 2010).

21.2 OPEX Presentation

21.2.1 Summary

The operating costs have been compiled based on costs developed by:

- Mining and ore transport costs. - Endeavour/SLR.
- Process facilities and infrastructure (existing) – Endeavour/SGO.
- SSTP (new) - Lycopodium.
- Sabodala Power Station (SPS) (expanded) - QGE Engineering Pty Ltd.
- Labour, laboratory and general and administration costs. - Endeavour/SGO/Lycopodium.

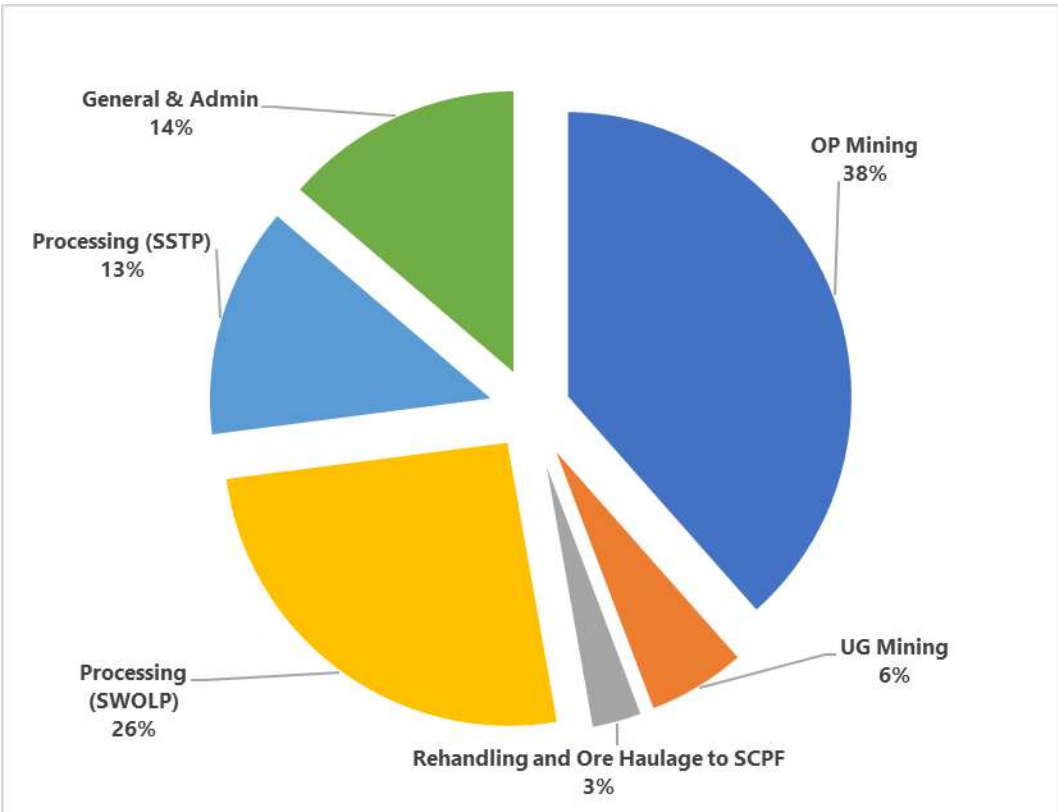
The estimate accuracy is as noted in Section 21.1.5 and is presented in United States dollars (USD). Costing is as per the 'Base Date', Section 21.1.2 and the foreign exchange (FOREX) rates noted in Section 21.1.4.

The total LoM operating costs are summarised in Table 21.2.1, and in Figure 21.2.1 following.

Table 21.2.1 LOM Operating Cost Summary (2022 to 2035) (Page, 2022)

Operating Costs	LoM Total Cost	LoM (Unit Rates)
OP Mining	USD 1033 M	USD 2.43/t mined
UG Mining	USD 154 M	USD 76.99/t mined
Rehandling and Ore Haulage to SCPF	USD 80 M	USD 1.21/t milled
Processing (SWOLP)	USD 691 M	USD 12.43/t milled
Processing (SSTP)	USD 357 M	USD 33.06/t milled
General & Admin	USD 369 M	USD 5.57/t milled
Total Operating Costs	**USD 2685 M**	

Figure 21.2.1 Apportionment of LoM Operating Costs (SGO, 2022)

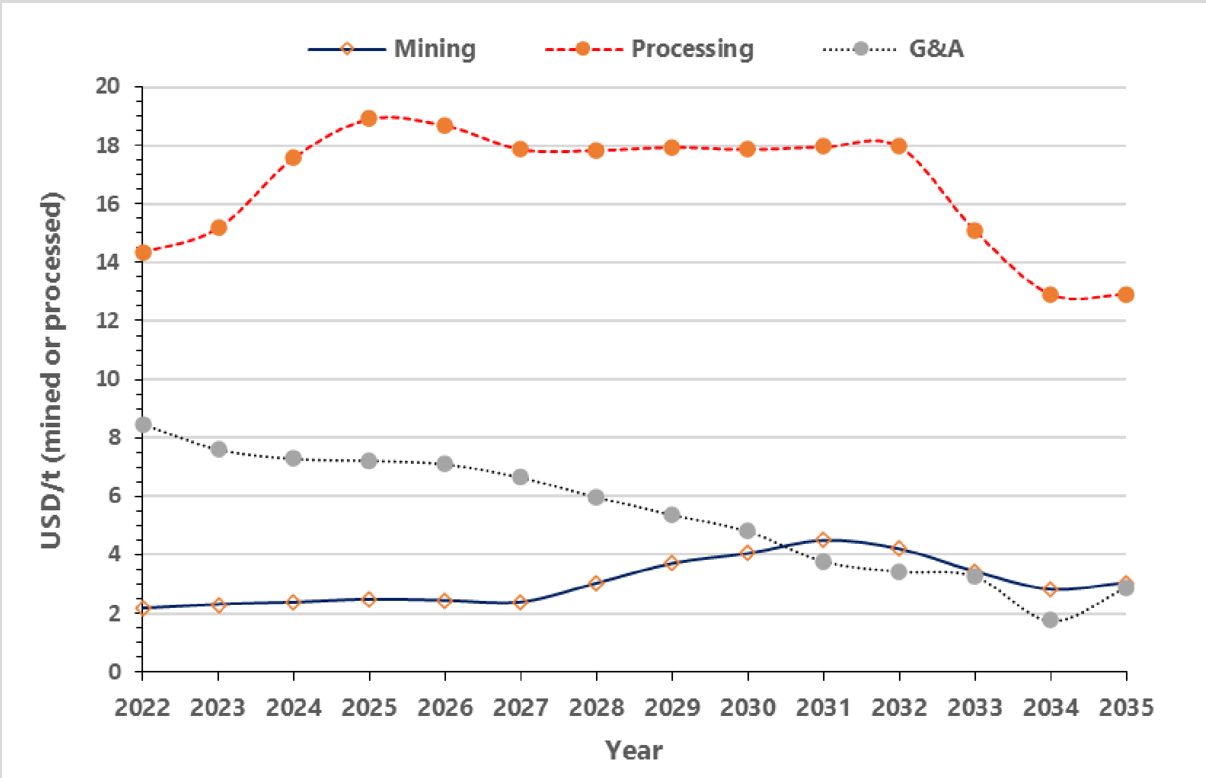


Combined Project/operations unit operating costs for mining, processing (includes rehandling and ore transport) and G&A, are illustrated in Figure 21.2.2 following. Point to note for Figure 21.2.2 are as outlined below.

- The unit cost for mining is reported in USD/t mined (ore + waste), all other costs are on a USD/t milled basis.
- The step increase in processing unit costs are as a result of the inclusion of the SSTP. The drop off in 2032, is a result of the SSTP being put on a care and maintenance basis.

- G&A costs decline towards the end of the LoM, largely because of the drop off in mining labour in the later years, and the associated drop in labour overhead charges. It is notable that in 2034, the quantity of ore mined drops by 80% over 2024 mined volumes, whilst still maintaining a processing rate of 4 Mt/a of ore through the SWOLP.
- Life of Mine weighted averaged levelised costs are as noted below:
  - Mining USD 2.78/t mined
  - Processing USD 17.00/t processed
  - G&A: USD 5.57/t processed

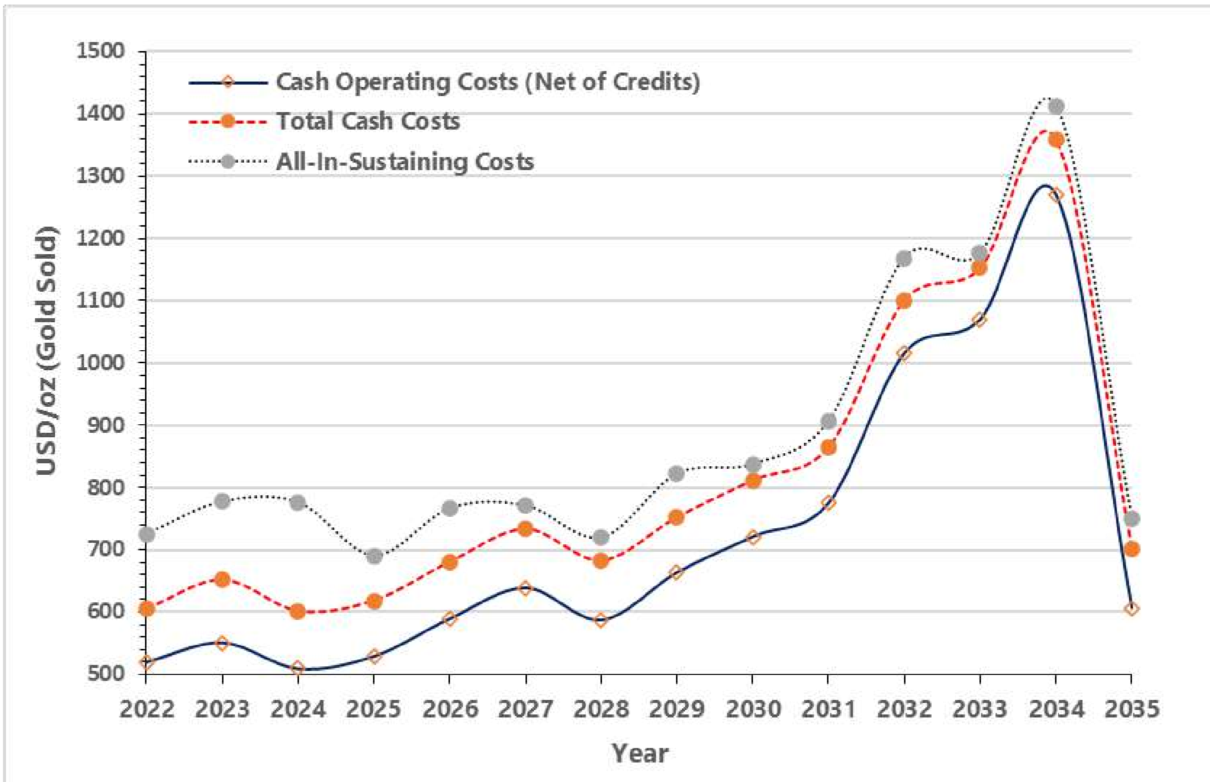
Figure 21.2.2 Unit Costs by Business Area



Cash operating costs (net of credits), total cash costs and All in Sustaining Costs (AISC) per ounce of gold produced are presented in Figure 21.2.3. Point to note for Figure 21.2.3, are as outlined below.

- The increase in unit costs in the latter years, is largely a result of dropping gold grade (3.29 g/t in 2023, and 1.16 g/t in 2034). Production peaks in 2024 at 463 koz/a, and falls to 114 koz/a in 2034.
- Life of Mine weighted averaged levelised costs per unit of gold sold, are as noted below:
  - Cash Operating Cost net of credits: USD 652/oz of gold sold
  - Total Cash Costs: USD 747/oz of gold sold
  - AISC: USD 825/oz of gold sold

Figure 21.2.3 Costs Per Ounce of Gold Sold



21.2.2 Geology

Exploration costs are excluded, whilst production geology costs have been included in the mining cost model.

21.2.3 Mining

21.2.3.1 Open Pit Mining

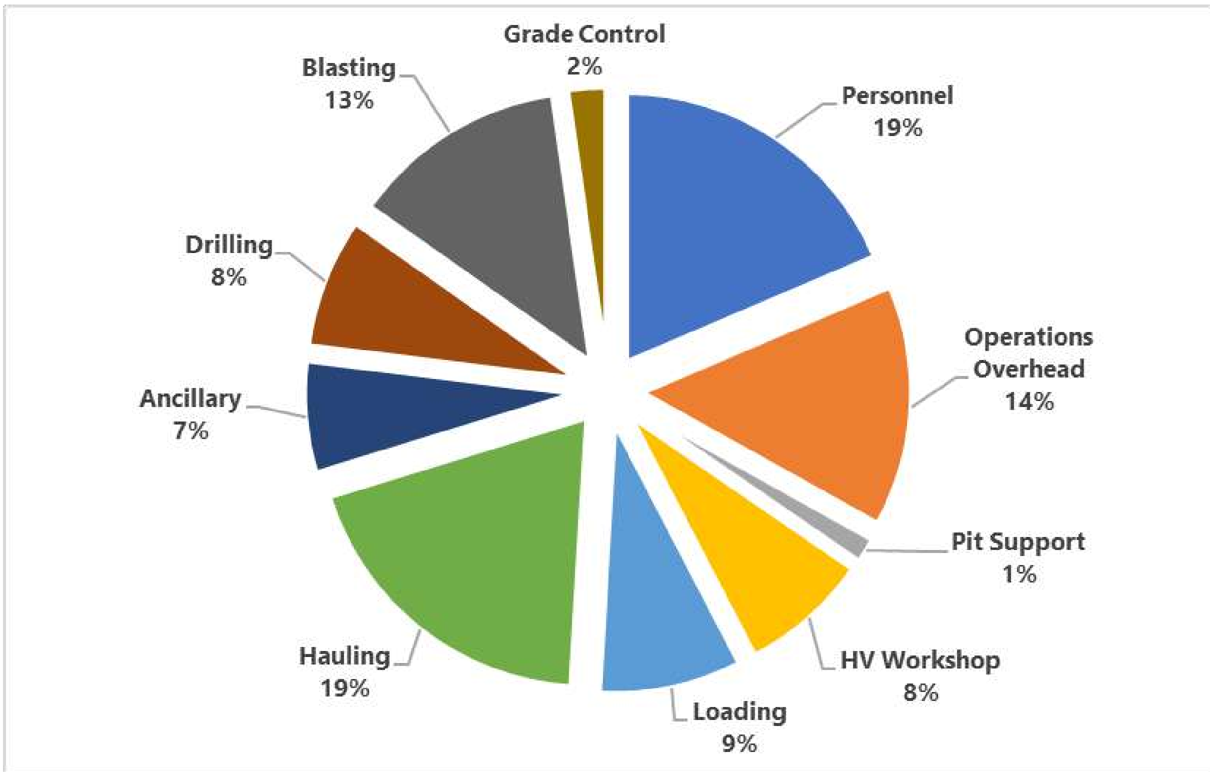
The derivation of the LoMp mining operating expenditures, relies on a number of assumptions which are essentially incorporated into the block model and then reported out as part of the Mine Schedule production outputs. The principal assumptions comprise:

- Unit waste and ore mining costs for excavation, load and haul activities derived from individual equipment operating cost models and applied with allowances for RL elevations in the block models.
- Fixed operating were obtained from SGO's 2021 to 2023 Budget Forecast, with annual averages for each of the primary cost centres used. To allow for variation as the mining operation ramps down over time, these annual totals were factored by period using the number of months, and an estimated manning level, relative to the average estimated manning level for 2022.
- Variable operating costs were calculated from engine hour rates for the heavy earthmoving equipment, and engine hours (tonnes/engine hour) varied by weathering type. The basis for the development of variable mining costs, are presented below:
  - Waste loading hours based on the PC3000 face shovel productivity.
  - Ore loading hours based on the PC1250 excavator productivity.

- Haulage hours using truck cycle times for the HD785-7 truck with delays for loading, queueing, intersections and dumping.
- Ancillary hours for dozers factored to loading hours, graders and watercarts factors to truck hours and wheel dozer hours factored to ore loading hours.
- Drilling hours based on penetration rates for each of the blast patterns.
- Blasting costs based on powder factors for bulk explosives with stemming and accessories calculated per hole.

Open pit mine operating costs for the LoMp at a DFS level of accuracy, averaged USD 2.43/t mined. The mine operating cost model includes the cost of mining, local stockpiling and short haulage. A breakdown of operating costs over the LoM are summarised in Figure 21.2.4 following. The cost of transporting ore from remote pits, is described in Section 21.2.4.

Figure 21.2.4 Apportionment of Open Pit Operating Costs (Endeavour, 2022)

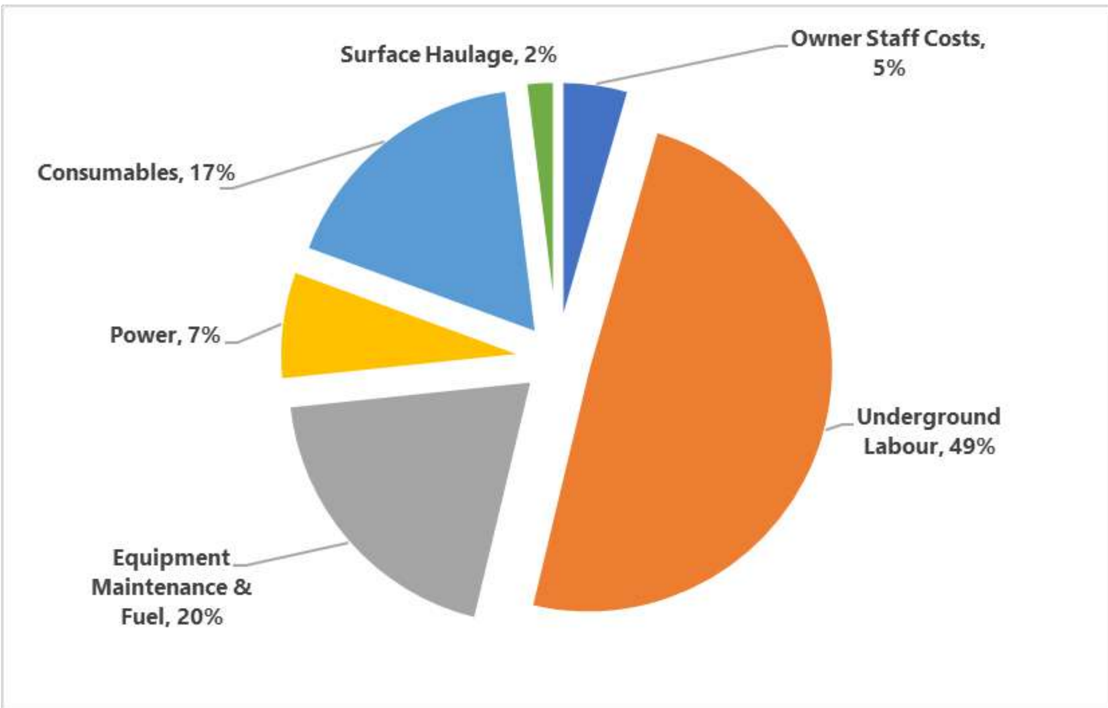


21.2.3.2 Underground Mining Costs

At a PFS level of accuracy, underground mining costs have been estimated at USD 76.99 USD/t mined (Table 21.2.1). Figure 21.2.5 following, presents a breakdown, of the Sabodala-Massawa underground mining operating costs by Level 3 area. Points to note:

- the cost model developed is based on owner mining;
- power and diesel rates applied, are as defined in Section 21.1;
- labour rates were provided by Endeavor/SGO; and
- the cement cost for the cemented rock fill (CRF) are based on USD 160/t of cement.

Figure 21.2.5 Apportionment of Underground Operating Costs (SLR, 2022)



21.2.4 Rehandling and Surface Haulage Costs

Rehandling costs at the RoM pit stockpiles and the subsequent transport of ore to the SCPF RoM pads (SWOLP and SSTP) has been estimated at USD 1.21/t hauled. Pits covered by this haulage cost are both on the Sabodala and Massawa Properties. Haulage distances on the Massawa Properties vary from (30 to 46[1]) km.

Whilst not forming part of the Mineral Reserve Estimate, there are ongoing negotiations with the 'long-haul' contractor with respect to reducing the haulage costs; and a new 26.5 km haulage road will be built from the Delya pit to the SCPF RoM pads.

21.2.5 Processing and Process Waste Management

21.2.5.1 Sabodala Whole Ore Leach Plant

Processing operating costs for the SWOLP have been developed by SGO and consider the blend of ore types (multiple pits) and the associated processing characteristics of each ore type over the LoM.

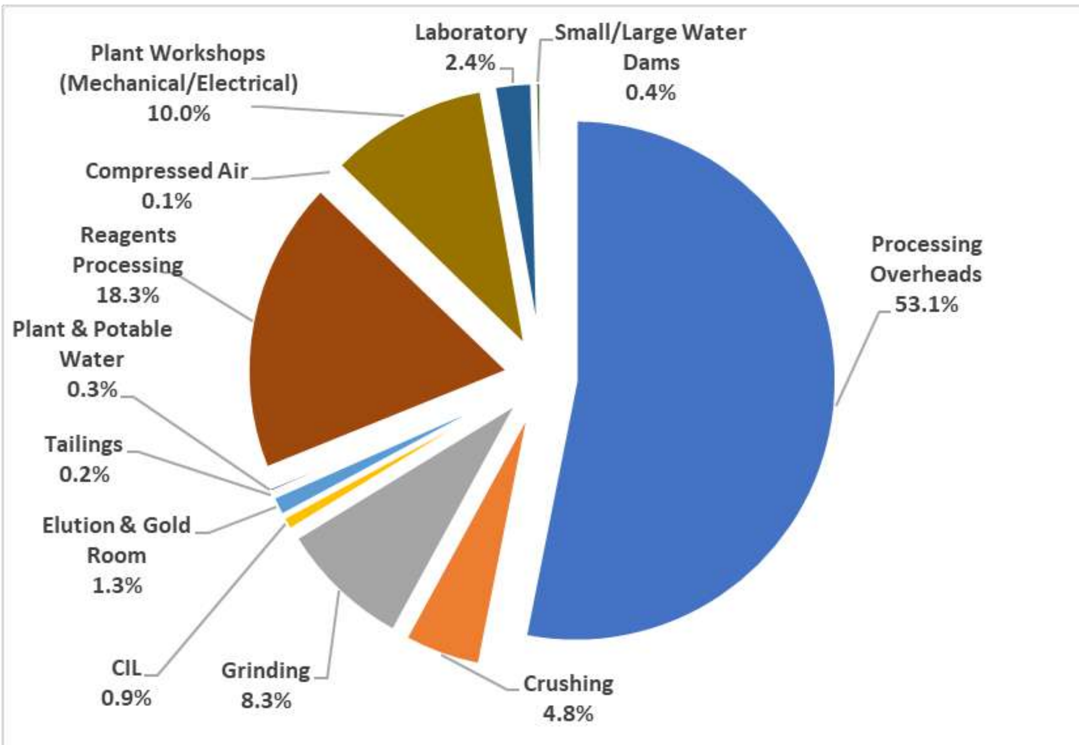
The operating costs have been compiled from a variety of sources at a DFS level of accuracy, and are based on:

- A feed blend of~80% fresh and~20 % oxide (+2022) (SGO, 2022).
- Current and future labour pay rates and manning.
- Heavy fuel oil (HFO) generated power costs based on historical performance and forecast future requirements.
- Consumable prices from existing suppliers.
- Reagent consumptions and gold extractions are based on historical performance and metallurgical testwork programmes.

[1] Delya

For the SWOLP, the process operating cost peaks at USD 13.46/t in 2023, reducing to USD 12.33/t from 2024 onwards. The LoM weighted average processing cost is USD 12.43/t processed (Table 21.2.1). A breakdown of costs by plant area/L3 cost codes, are presented in Figure 21.2.6 following.

Figure 21.2.6 Breakdown of SWOLP Costs (SGO, 2022)



21.2.5.2 Sabodala Sulphide Treatment Plant

Process operating costs for the SSTP have been developed by Lycopodium, and are based on; the processing of the three ore deposits (Massawa Central Zone (CZ), Massawa Northern Zone (NZ), and Delya). Operating costs as reported in the production schedule vary as a function of sulphur grade, whilst comminution costs are fixed, and are based on the comminution parameters associated with a LoM weighted average blend of; 55% CZ, 41% NZ, and 4% Delya.

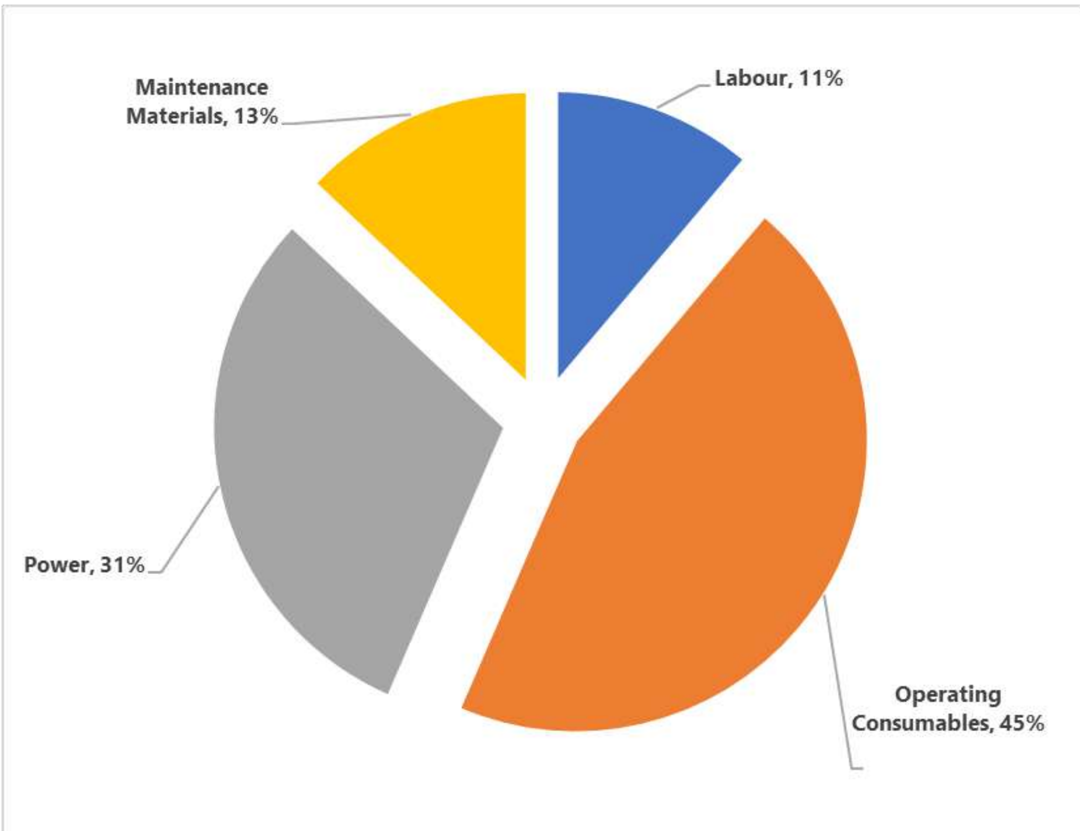
Process operating costs developed for the SSTP, are based on; an annual throughput of 1.2 Mt/a (db), a P_{80} grind size of 90 µm, and 24 hour per day operation, 365 days per year. Overall availability/utilisation varies on an area-by-areas basis, as noted in Section 17.0.

The operating costs have been compiled from a variety of sources, including:

- Labour pay rates and manning as advised by Endeavour.
- Heavy fuel oil (HFO) generated power costs as advised by Endeavour.
- Consumable prices from supplier budget quotations, Endeavour advice, and the Lycopodium database.
- Comminution modelling conducted by OMC for crushing and grinding energy, and consumable usage. Outputs are based on the physical ore characteristics determined from comminution testwork for the various deposits.
- Reagent consumptions and gold extractions are based on a metallurgical testwork programme conducted by Endeavour and the MO Group.
- First principal estimates, based on typical operational data/standard industry practice.

Whilst process costs vary over the LoM from (31.49 to 35.22) USD/t milled, the LoM weighted average cost is USD 33.06/t milled (Table 21.2.1). An approximate breakdown of the LoM weighted average costs for the SSTP are presented in Figure 21.2.7 following.

Figure 21.2.7 Breakdown of SSTP Costs (Endeavour, 2022)



21.2.6 Marketing/Costs of Sales

The cost of sales, including; metal transport, storage (vaulting), insurance, refining and payabilities are defined in Section 22.0, and are based on current contractual values (Endeavour, 2022).

21.2.7 Owner's - General and Administration Costs

The General and Administrative (G&A) costs prepared for the Project are based on current operational data, and adjusted for future capital impacts, reduced mining rates in the later years, and Life of Mine performance.

Table 21.2.2 following, summarises the LoM G&A costs by year. G&A costs comprise the following L3 code of accounts; Operations Management; Supply Chain, Security and Asset Protection, Clinic, Finance, Human Resources, IT and Telecommunications, Training, Sustainability, Camps, Workshops and site buildings.

Table 21.2.2 Sabodala-Massawa G& A Costs (Annual and LoM)

	LOM	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
USD (M)	369	36	34	36	38	38	36	33	29	25	20	18	14	7	5
USD/t milled	5.57	8.47	7.61	7.29	7.23	7.11	6.65	5.98	5.38	4.81	3.79	3.45	3.28	1.76	2.90

21.3 CAPEX Presentation

21.3.1 Summary

LoM development and sustaining capitals costs for the Project over the LoM, are USD 654 M. A breakdown of this cost is presented in Table 21.3.1 following, and discussed more fully in Sections 21.3.2 and 21.3.3 respectively.

Table 21.3.1 Capital Phasing and LOM Summary (Page, 2022)

Cost Area	LoM Cost, USD (M)
Development Capital	
• UG Development	101
• SSTP Development (includes TSF 1B, SPS and bypass road)	290
• Delya Access Road	5
• 2022 Spend	34
Total Development Capital	**431**
Sustaining Capital	
• 2022 Spend	26
• Mining Equipment	49
• General Mine Sustaining	6
• Other Mine Development (CTR)	13
• Massawa - Dewatering	4
• Processing Sustaining (SWOLP)	34
• Process Sustaining (SSTP)	16
• G&A and Other Sustaining	5
• TSF1 (Lifts)	12
• TSF2 (Construction and Lifts)	59
Total LoM Sustaining Capital	**223**

21.3.2 Development Capital

21.3.2.1 Underground Mining

Capital costs for the three proposed underground mines, have been estimated at a PFS level of development and are based on comparable projects, first principles, budgetary quotes from vendors and contractors.

Underground mining and sustaining capital costs have been estimated at USD 101 M. The capital and sustaining costs have not been split out, rather the LoM capital and sustaining capital costs have been grouped as a single development capital cost element and split out accordingly, over the development/mining period (2027 to 2035).

21.3.2.2 Process - (SSTP Capital Cost)

The capital cost estimate for the SSTP is summarised in Table 21.3.1 following. The estimate includes the 1.2 Mt/a SSTP, and;

- Sabodala Power Station Upgrades (Area 300): USD 42.3 M
- TSF 1B and Ancillaries (Area 300): USD 9.7 M
- Access Road Diversion(Area 100)[1]: USD 1.4 M

Table 21.3.2 SSTP Capital Cost Summary

Main Area	USD (M)
000 Construction Distributables	27.1
100 Treatment Plant Costs	105.9
200 Reagents and Plant Services	34.7
300 Infrastructure	55.2
500 Management Costs	32.9
600 Owner's Project Costs	34.1
Total	**290.0**

21.3.2.3 Delya

Delya Access Road - USD 5 M, based on 26.5 km of haul road, at a unit rate of USD 186 400/km.

21.3.2.4 2022 Spend

The forecast capital spend for 2022 is of the order of USD 34 M (Table 21.3.1). The spend at a L3 WBS reporting structure, comprises:

- USD 15.05 M - Continued construction of two villages and associated infrastructure (New Madina and New Sabodala), for the relocation of persons impacted by mining on the Sabodala Concession (location of new villages illustrated in Section 5.0).
- USD 7.61 M - Massawa Mine Infrastructure Development.
- USD 4.23 M - Massawa Grade Control (RC drilling 98 000 m).
- USD 3.92 M - CSR Studies and Livelihood Restoration Programmes for Niakafiri.
- USD 2.87 M - Bambaraya Development (Infrastructure and Mining Readiness)
- USD 0.65 M - SHEC Equipment and Environment Studies.

21.3.3 Sustaining Capital

Sustaining capital costs from 2022 to 2035 are summarised in Table 21.3.1, and presented in Sections 21.3.3.1 to 21.3.3.8 following.

[1] Detailed in Section 18.0

21.3.3.1 2022 Spend

The forecast sustaining capital spend for 2022 is of the order of USD 26 M (Table 21.3.1). The forecast spend at a L3 WBS reporting structure, comprises:

- USD 9.48 M - HME Budget.
- USD 6.02 M - Process Plant equipment (SWOLP).
- USD 3.71 M - Capital Spares Provision (HME and Process).
- USD 2.69 M - Massawa CZ/NZ and Sabodala dewatering.
- USD 1.34 M- Sabodala Camp Upgrades/Replacements (water and sewage treatment plants and buildings (gym, offices, restaurant, mosque)).
- USD 1.0 M - ESG Projects (waste plastic pyrolysis equipment, solar projects and other).
- USD 0.62 M - ICT System Upgrades.
- USD 0.52 M - Sabodala Building Upgrades.
- USD 0.23 M -Emergency Equipment.
- USD 0.21 M - Diesel to solar lighting conversions at remote locations.

21.3.3.2 Mining Equipment

Excluding the USD 9.8 M HME replacement costs allowed for in the 2022 budget, USD 48.8 M has been provisioned for HME equipment replacement from 2023 to 2035 (see Section 16.0).

Equipment engine hours were used to derive the equipment replacement schedule for the existing fleet, and due to the age of some of the fleet, capital was included in the 2022 sustaining capital budget.

The breakdown by year of HME sustaining capital costs from 2023 to 2035 are presented in Table 21.3.1.

21.3.3.3 General Mine Sustaining Costs

General Mine LoM sustaining costs have been estimated at USD 13.0 M (Table 21.3.3), and determined as a percentage (1%) of ongoing operational costs (Oreology, 2022)[1]. Operational costs include; load and haul, drill and blast, workshops, underground, grade control and fixed maintenance.

21.3.3.4 Other Mine Development CTR

The LoM sustaining capital cost for land clearing, road building and ongoing mine rehabilitation, has been estimated at USD 6.1 M (Table 21.3.3). The split is; 37%, 33% and 30% respectively (Oreology, 2022)[1].

[1] Modified by S. Ramazan

21.3.3.5 Process Sustaining

Over the LoM, USD 50 M has been allocated to sustaining capital for the SCPF (Table 21.3.4). The split between the SWOLP and SSTP is USD 34 M and USD 16 M respectively. Additional detail is provided below.

- Sustaining capital for the SWOLP, is USD 4 M/a though to 2026, thereafter reducing to USD 2.5 M.
- Sustaining capital for the SSTP, is USD 2.5 M/a after the first year of production, reducing to USD 1 M in the final year of operation.

21.3.3.6 G&A and Other Sustaining

The non-mining G&A sustaining spend for 2022 is covered in Section 21.3.3.1. From 2023 to 2031, the sustaining capital spend drops to USD 0.5 M/a, and then to USD 0.15 M/a from 2032 to the end of LoM (2035) (Table 21.3.4).

21.3.3.7 Tailings Storage Facilities

As described in Section 18.0, TSF1 can be raised further, before the construction of TSF2. To this end, USD 12 M of sustaining capital has been provided, with the capital expended in 2023 and 2024 (Table 21.3.4).

The upfront capital and sustaining capital costs for TSF2 are estimated to be USD 58.5 M. The capital and sustaining costs have not been split out, rather the upfront capital and sustaining capital costs have been grouped as a single sustaining cost element, and split out accordingly from 2024 to 2031 (Table 21.3.4).

The upfront capital cost for TSF2 is USD 36.2 M, which is currently incurred in year 2024. Whilst TSF2 will likely be required in some form, SGO will continue to pursue the option of in pit tailings disposal, which should result in significant capital saving.

21.3.3.8 Mining and Non-Mining Sustaining Cash Flow

In alignment with Table 21.3.2, the cashflow of mining and non-mining sustaining capital costs are presented in Table 21.3.3 and Table 21.3.4 respectively.

Table 21.3.3 Mining Sustaining CAPEX by Year and Total Over LoM (Page, 2022) (Page, 2022)

Total Cash Capital Costs	Units	LOM	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Mining Equipment	USD (M)	48.8	0.0	13.1	2.1	5.4	2.1	4.9	5.3	6.5	2.5	0.7	2.5	0.0	2.8	0.9
2022 Spend	USD (M)	25.8	25.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General Mine Sustaining	USD (M)	13.0	0.0	1.9	1.3	1.2	1.1	1.5	1.2	1.0	1.0	0.9	0.7	0.6	0.4	0.3
Other Mine Development (CTR)	USD (M)	6.1	0.0	1.2	2.4	0.3	0.0	0.1	0.2	0.0	0.0	0.3	1.6	0.0	0.0	0.0
Massawa - Dewatering	USD (M)	4.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Mining	**USD (M)**	**97.8**	**25.8**	**20.2**	**5.7**	**6.9**	**3.1**	**6.5**	**6.6**	**7.6**	**3.5**	**2.0**	**4.9**	**0.6**	**3.2**	**1.2**

Table 21.3.4 Non-Mining Sustaining CAPEX by Year and Total Over LoM (Page, 2022)will

Total Cash Capital Costs	Units	LOM	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Processing (SWOLP)	USD (M)	34.0	0.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Processing (SSTP)	USD (M)	16.0	0.0	0.0	0.0	2.5	2.5	2.5	2.5	2.5	2.5	1.0	0.0	0.0	0.0	0.0
G&A and Other Sustaining	USD (M)	5.1	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2
TSF1 (Lifts)	USD (M)	12.0	0.0	2.5	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TSF2 (Construction and Lifts)	USD (M)	58.5	0.0	0.0	36.2	0.0	16.1	0.0	0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0
Total Non-Mining Sustaining	USD (M)	**125.6**	**0.0**	**7.0**	**50.2**	**7.0**	**23.1**	**5.0**	**5.0**	**5.0**	**5.0**	**9.7**	**2.2**	**2.2**	**2.2**	**2.2**

21.4 Production and AISC Costs

Production and 'All in Sustaining Costs' (AISC) are summarised in Section 21.2.1.

21.5 Closure Costs

The Mine Closure and Rehabilitation Plan (MRCP), statutory obligations and closure costs are defined more fully in Section 4.0 and 20.0. In Summary, closure costs (physical and social) are estimated to be of the order of USD 79 M.

21.6 Cash Flow

Project cashflow, is presented in Section 22, 'Economic Analysis'.

21.7 Data Verification

The Data Verification (DV) process followed by the QP for Section 21.0, is as noted in Section 12.0.

21.8 Comments on Section 21.0

21.8.1 Mining CAPEX and OPEX

The QP for Section 16.0, is of the opinion that the mining capital and operating cost estimates are valid and the data used and subsequent outputs, are aligned with the requirements of this technical report update. Further, the estimates are within the limits of the PFS and DFS accuracy provisions stated, for underground and surface mining respectively.

21.8.2 LoM SWOLP CAPEX and OPEX

The QP for the SWOLP component of Section 17.0, is of the opinion that the annual process cost estimate for the SWOLP is valid and the data used and subsequent outputs, are aligned with the requirements of this Technical Report update and are within the limits of the DFS accuracy provision. Further, the ongoing sustaining capital costs are realistic.

21.8.3 LoM SSTP CAPEX and OPEX

The QP for the SSTP component of Section 17.0, is of the opinion that the annual process and capital cost estimates for the SSTP are valid and the data used and subsequent outputs, are aligned with the requirements of this Technical Report update, and are within the limits of the DFS accuracy provision.

21.9 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 21.0 and presented in Section 25.0.

21.10 Recommendations

Recommendations for Section 21.0 are presented in Section 26.0.

21.11 References

References cited in Section 21.0 are presented in Section 27.0.

22.0 ECONOMIC ANALYSIS

22.1 Introduction

The following economic analysis presents the business case for the Issuer's interests in the Sabodala-Massawa Project.

22.2 Economic Basis and Assumptions

Section 22.2.1 to 22.2.18 following outlines the inputs and associated basis of the financial model.

22.2.1 Base Date

The 'Base Date' for the Financial Model is 31 December 2022.

22.2.2 Exchange Rates

The exchange rates used in the Study are as defined in Section 21.0.

22.2.3 Metal Pricing

As per Section 19, a gold price of USD 1,500/oz has been used in the financial model. The price given is in accordance with Endeavour's internal standards for metal pricing (Endeavour, 2022). This data, in combination with information on the cost of transport and refining the product (Section 22.2.4), is used to calculate the royalties and levies payable to the Republic of Senegal (Section 4).

22.2.4 Freight and Product Treatment Charges

Gold product freight, vaulting, refining and metal pay abilities applied in the financial model are USD 4.33/oz and 99.96% (Endeavour, 2022). For the purpose of this Technical Report, it has been assumed that the commercial terms for the product originating from the new Sabodala Sulphide Treatment Plant (SSTP) will be the same as that for Sabodala Whole Ore Leach Plant (SWOLP).

22.2.5 Discount Rate

In accordance with Endeavour's internal standards, a 5% discount rate has been applied for the purpose of calculating the Net Present Value (NPV) of the Project.

22.2.6 Royalties and Levies

The royalties and levies payable on gold revenue, and as applied in this financial model, are as defined in Section 4 of this Technical Report.

22.2.7 Taxation

Taxes applied in the financial model are as defined in Section 4 of this Technical Report.

22.2.8 JV/Minority Share Holder Costs

Joint venture/minority shareholder costs, including the Republic of Senegal's 10% free carry interest, are incorporated in the financial model in accordance with the basis outlined in Section 4 of this Technical Report.

22.2.9 Escalation/Inflation

All capital and operating costs as reported herein are as per the Base Date. No escalation has been allowed for.

22.2.10 Sunk Costs

Historical study costs, including associated head office costs, are considered sunk and are not included in the financial model presented herein.

22.2.11 Hedging

Foreign currency is not hedged; hence no hedging charges are incorporated in the financial model.

22.2.12 Financing Charges

Working capital, sustaining capital and project capital (including Massawa Infrastructure, the SSTP and the Sabodala Power Station (SPS) and Tailings Storage Facility (TSF) expansions) are self-funded by Endeavour and thus no financing charges are included in the financial model.

22.2.13 Mine and Production Schedule

A full Life of Mine (LoM) summary comprising of the breakdown of the forecast mining and process schedules as applied in this financial model, is presented in Section 16 of this Technical Report.

22.2.14 OPEX Summary

A full Operating Expenditure (OPEX) Summary as applied in this financial model, is presented in Section 21 of this Technical Report.

22.2.15 CAPEX Summary

A full Capital Expenditure (CAPEX) Summary as applied in this financial model, is presented in Section 21 of this Technical Report.

22.2.16 Working Capital Costs

The current economic model considers in its cash flow estimates the opening balances for inventories, accounts payable and accounts receivable as they stood from the Base Date. Forward-looking working capital assumptions remain in line with existing assumptions until working capital is returned to a nil balance at the end of the mine life.

22.2.17 Sustaining Capital Costs

A full summary of sustaining capital costs, as applied in this financial model, are presented in Section 21.0.

22.2.18 Closure and Salvage Costs

A summary of the closure costs', as applied in this financial model, are presented in Section 20.0. The model assumes a 'salvage value' of zero at the end of the mine life.

22.3 Financial Results

22.3.1 Summary

The results of the economic model show robust results. Applying a long-term gold price of USD 1500/oz on a flat line basis from the Base Date, the undiscounted LoM cash flow on a 100% basis comes to USD 1 489 M, generating an after-tax NPV5% of USD 1 129 M.

The LoM average cash cost per ounce is USD 747, and with the addition of royalties and sustaining capital, the LoM average 'All In Sustaining Cost' per ounce (AISC/oz) is USD 825.

A summary from the economic model output is presented in Table 22.3.1 following, whilst various NPV scenarios; before and after tax; after minority shareholders are considered, and at zero and five per cent discount rates, are presented in Table 22.3.2 (Endeavour, 02-2022).

The overall IRR and project payback period has not been included, as this is a Technical Report Update for Issuer's interest in the Sabodala Mining Concession and Massawa Mining License, and given that there is an existing operation at Sabodala, the capital outlays presented herein, pertain to multiple on-going stay in business projects, and general sustaining capital outlays covering the period from 2022 to 2035.

Notwitstanding this, the business case for the mining of non free milling ores at Massawa has been assessed, as noted in Section 22.3.3 following.

Table 22.3.1 Economic Model Summary

LOM Cash Flow Summary	Unit	LOM	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Production	koz	3 945	360	299	403	402	401	332	316	352	332	278	182	118	101	69	0	0
Gold Price	USD/oz	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Revenue	USD M	5 915	539	449	604	603	601	498	474	528	497	417	273	177	151	104	0	0
Franco-Nevada Gold Stream	USD M	141	11	11	11	11	11	11	11	11	11	11	9	6	7	5	0	0
Total Cash Cost (Sold)	USD M	2 572	187	165	205	213	236	212	185	234	239	216	185	126	127	42	0	0
Sustaining Capex	USD M	308	43	38	70	29	35	13	12	25	9	12	12	3	5	3	0	0
All-in Sustaining Costs (AISC)	USD M	3 253	261	232	312	278	307	256	227	290	277	252	213	139	142	52	15	
All-in Sustaining Costs (AISC)	USD/oz	825	725	777	776	690	766	771	719	822	837	907	1169	1176	1413	750	0	0
Development Capex	USD M	648	165	187	15	32	8	38	60	9	2	1	9	44	10	68	0	0
Cash Flow Before Taxes, Mine Closure and Other	USD M	**1 733**	**91**	**6**	**254**	**271**	**263**	**181**	**164**	**207**	**195**	**142**	**33**	**-18**	**-16**	**-26**	**-15**	**0**
Taxes, Mine Closure, and Other	USD M	244	60	48	34	33	12	36	31	25	19	4	-2	-23	-35	-3	8	-4
Net Cash Flow	**USD M**	**1 489**	**30**	**-42**	**221**	**238**	**251**	**146**	**133**	**183**	**176**	**137**	**35**	**4**	**19**	**-22**	**-23**	**4**
Minority Interest	USD M	143	8	0	12	21	11	10	10	13	12	10	5	1	0	0	29	0
Cash Flow After Minority Interest	**USD M**	**1 346**	**23**	**-42**	**209**	**217**	**241**	**135**	**123**	**170**	**164**	**127**	**30**	**3**	**19**	**-23**	**-53**	**4**

Table 22.3.2 After-Tax NPVs at a Gold Price of USD 1500/oz

After-Tax NPV	USD (M)
After-tax NPV 0%	1 489
After-tax NPV 5%	1 129
After-tax after minority interest NPV 0%	1 346
After-tax after minority interest NPV 5%	1 027

22.3.2 All in Sustaining Costs (AISC)

The LoM All in Sustaining Costs (AISC) are forecast to come to USD 3 253 M in total, or USD 825/oz. When the Sabodala Sulphide Treatment Plant (SSTP) comes on-line in Q1 2024, and for the first years of operations, AISC are forecast to significantly improve to a range of USD (690 to 776)/oz.

22.3.3 Business Case for Mining and Processing Non-free Milling Massawa Ores

22.3.3.1 Basis

In order to assess whether the non-free milling ores on the Massawa mining license should be processed, the incremental benefit of including the STP and attendant infrastructure (TSF1 B and SPS) at Sabodala was assessed.

For the purpose of the assessment, the following points should be noted.

- Given the low incremental cost of moving a large portion of the mining operations from the Sabodala Concession to the Massawa Mining License, the mining and processing of free milling ores at Massawa is considered a given, and was not analysed as a standalone business case.
- The business case for the establishment of underground mines on the Sabodala Concession, has not been presented as an independent project, within this report.
- With respect to SSTP business case for the processing of the non-free milling ores from Massawa, and the USD 290 M upfront capital, the following should be noted.
  - The costs (capital and sustaining) for the infrastructure that supports mining on the Massawa mining license and the processing of free milling ore at the SWOLP has not been attributed to the SSTP standalone business case. Said infrastructure includes, but is not necessarily limited to: haulage roads; mining services area (MSA); waste rock dump preparation; clean and dirty water management infrastructure (including the MWTP); power distribution; and camp upgrades.
  - There is no incremental increase in mobile mining equipment associated with the mining of the non-free milling ores, and it has been assumed that all capital and sustaining capital allocated to mining is attributed to the ongoing SWOLP business case.
  - The USD 290 M includes the SPS upgrades and the installation of TSF 1B, both of which are solely required to support the new SSTP.
  - Sustaining capital costs for TSF1 raises and the capital cost for TSF2 have been attributed solely to the SWOLP. In context, over the LoM the non-free milling ores account for only 20% of the TSF feed.
- All OPEX assumptions were held equal, as per the combined cases.

- The economic analysis of the standalone SSTP project, was generated by subtracting the physicals and cash flows associated with the existing SWOLP from those of the SWOLP/SSTP business case presented in this report. Limitations of this approach include:
  - the existing CIL operations are as per the optimised SWOLP/SSTP business case, and were not re-optimised for a standalone CIL operation;
  - changes to the mine plan made during this study;
  - real life impacts on waste capital cost calculations; and
  - real life impacts on stockpile movements.

22.3.3.2 Financial Impact

Based on the assumptions outlined in Section 22.3.3.1, the economic model developed indicates that the standalone SSTP business case for the processing of the Massawa non-free milling ores delivers robust results. Applying a long-term gold price of USD 1500/oz on a flat line basis from first gold pour at the SSTP, the undiscounted LoM cash flow on a 100% basis comes to USD 742 M, generating an after-tax NPV5% of USD 538 M. Furthermore;

- the SSTP project is expected to produce an additional 1.35 Moz of gold for SGO, at a low AISC of USD 576/oz over the facility life; and,
- the project is expected to deliver a robust after-tax IRR of 51% and have a project pay back period of approximately 1.7-years.

A summary from the economic model output is presented in Table 22.3.3 following, whilst project analysis metrics are provided in Table 22.3.4 (Endeavour, 02-2022)

Table 22.3.3 Economic Model Summary

LOM Cash Flow Summary	**Unit**	**LOM**	**2022-2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Production	Koz	1350		146	257	195	188	184	148	93	69	53	16
Gold Price	USD/oz	1500	1500										
Revenue	USD M	2024		219	385	293	282	276	221	140	104	80	24
Sustaining Capex	USD M	31		7	8	6	3	3	1	3	1		
All-in Sustaining Costs	USD M	778		76	135	112	106	86	77	60	59	57	8
All-in Sustaining Costs	USD/oz	576		520	524	576	564	470	524	645	853	1072	511
Development Capex	USD M	323	276	15	8	3	5	18					
Cash Flow Before Taxes, Mine Closure and Other	USD M	891	-276	121	234	172	168	169	143	77	44	23	16
Taxes, Mine Closure, and Other	USD M	149		13	-5	29	42	42	30	8	-5	-10	5
Net Cash Flow	**USD M**	**742**	**-276**	**108**	**239**	**143**	**126**	**127**	**113**	**69**	**49**	**33**	**11**

Table 22.3.4 After-Tax NPV, IRRs and payback periods at a Gold Price of USD1500/oz

Project Analysis Metrics	Results
After-tax NPV 5%	USD 538 M
After-tax IRR	51%
Payback Period	1.7 years

22.4 Sensitivity Analysis

22.4.1 Overview

A sensitivity analysis was performed by flexing a number of key variables including gold price, head grade, CAPEX and OPEX to assess the impact to the after-tax NPV5% on a 100% basis. These were assessed independently whilst holding all other assumptions consistent to the base case presented.

The gold prices selected to conduct the sensitivity analysis are as per those defined in Section 19 for the Gold Revenue. Table 22.4.1 presents the gold price sensitivity analysis. For Table 22.4.1, LTP represents a realistic long term price scenario, whilst 'high' is considered a realistic, but high scenario.

Table 22.4.1 Gold Price Sensitivity

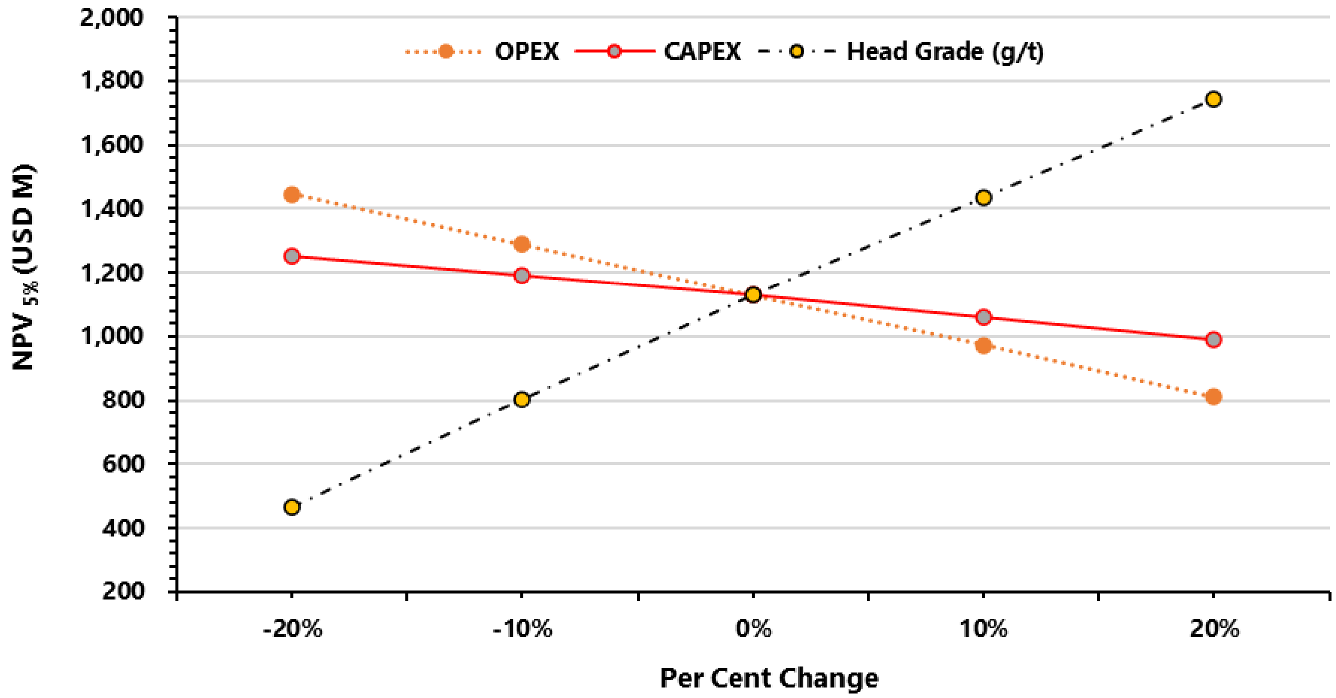
Parameter	0%	+20%	+23⅓ %
Gold Price USD/oz	**1500 (Low)**	1800 (LTP)	1850 (High)
NPV5% (USD M)	**1 129**	1 753	1 857

A 20% sensitivity has been applied independently to a number of key operating factors to assess the impact that changes in CAPEX, OPEX and gold grade, would have on the after-tax NPV5% on a 100% basis, see Table 22.4.2 and Figure 22.4.1 following.

Table 22.4.2 NPV5% Sensitivity Analysis (USD M) = After Tax

Change	-20%	-10%	0%	+10%	+20%
Head Grade	467	803	**1 129**	1 435	1 742
CAPEX	1 252	1 193	**1 129**	1 061	988
OPEX	1 444	1 288	**1 129**	971	811

Figure 22.4.1 Operating Sensitivity Analysis



The sensitivity analysis is in line with expectations, showing that the Project has low sensitivity to capital and operating costs, but is typically sensitive to movements in the gold price and LoM head grade. With respect to the latter, gold price and grade are largely correlated with respect to NPV impact.

22.5 Comparison with Historical Studies

The results of the economic analysis have not been compared with historical studies, because Sabodala-Massawa has continued to operate since the 2020 PFS was published under a significantly different assumed macroeconomic, political and social climate. As such, the owners of the asset have responded to the ever-changing situation of the past two years which has resulted in deviation from the plans proposed in the PFS. Hence, a like-for-like comparison as at the Base Date, would not give an accurate representation of how the integrated Sabodala-Massawa Complex, has progressed since the PFS.

22.6 Independent Audits/Reviews

No independent reviews/audits have been undertaken on the financial results presented herein and underlying financial model.

22.7 Data Verification

The data verification process applicable to the development of Section 22.0, is detailed in Section 12.0,

22.8 Comments on Section 22.0

The QP considers the economic data and model to be valid, the outputs to be aligned with the requirements of this Technical Report Update, and are within the limits of the DFS accuracy.

22.9 Interpretations and Conclusions

Interpretations, conclusions and risks for Section 22.0 are presented in Section 25.0.

22.10 Recommendations

Recommendations pertaining to Section 22.0 are presented in Section 26.0.

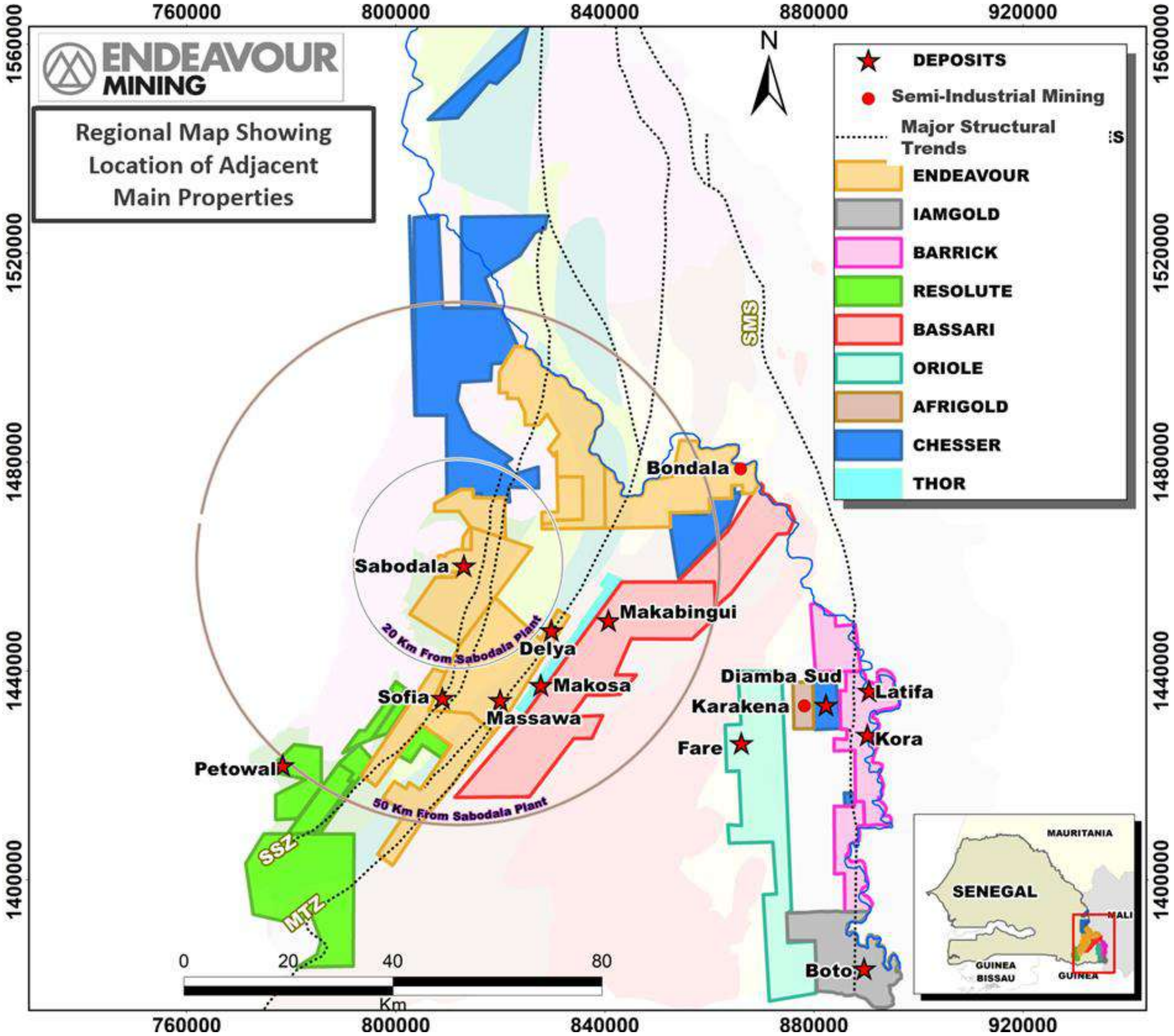
22.11 References

References cited in Section 22.0 are presented in Section 26.0.

23.0 ADJACENT PROPERTIES

Properties adjacent to the Sabodala-Massawa Project include, Makabingui held by Bassari Resources Limited, Douta by Thor Explorations Limited and Mako by Resolute Mining Limited (operated by Petowal) as illustrated in Figure 22.11.1 and detailed below.

Figure 22.11.1 Adjacent Properties



Source: Endeavour, 2022

23.1 Makabingui Gold Project

The Makabingui gold exploration project, owned by Bassari Resources Limited, is located approximately 28 km northeast of Massawa or 25 km south-southeast of the Sabodala plant.

Regionally, Makabingui is located in the Diale-Dalema sedimentary basin, to the east of the MTS zone which hosts Massawa. The deposit is hosted in gabbros in a pressure shadow along the southern margin of the Sambarabougou Granite. Exploration is also focussed on a northeast trending structural zone termed the Lafia Shear Zone, found to the northeast and southwest of Makabingui.

Makabingui has reported an Indicated Mineral Resource of 2.6 Mt at 4.0 g/t Au for 336 koz Au and an Inferred Mineral Resource of 9.3 Mt at 2.2 g/t Au for 669 koz (prepared under JORC 2004) (www.bassariresources.com/resources-reserves). It also has a Probable Ore Reserve of 860 kt at 5.7 g/t Au containing 158 koz Au (prepared and disclosed under JORC 2012).

23.2 Douta Gold Project

The Douta gold project, positioned along the southeastern margin of MTZ less than five kilometres northeast of the Massawa deposits, is owned by Thor Explorations Ltd. The Douta deposit is found in four parallel, steep north-westerly dipping, mineralised horizons that are discontinuously developed over a five-kilometre-long strike within a shale/greywacke sequence in contact with gabbro complex.

The NI 43-101 compliant Mineral Resource Estimate for the Douta Gold Project, Senegal, was prepared with an effective date of 21 December 2021 by Mr Babacar Diouf of Azimuth Consulting Senegal. Mr Diouf takes Qualified Person responsibility for the Mineral Resource Estimate (Thor, 2022).

The MRE is classified as an Inferred Resource and is constrained within optimised pit shells and comprises 15.3 Mt at 1.5 g/t Au for 730 000 oz Au, as detailed in Table 23.2.1.

Table 23.2.1 Douta Gold Project NI 43-101 Mineral Resource Estimate, November 2021 (Reported at Cut-off Grade of 0.3 g/t Au) (Thor, 2022)

Inferred Mineral Resource	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
Makosa	11 700	1.5	550
Makose Tail	3 600	1.6	180
Total Makosa	**15 300**	**1.5**	**730**

Notes:

1. Open Pit Mineral Resources are reported in situ at a cut-off grade of 0.30 g/t Au. An optimised Whittle shell (USD 2,200) was used to constrain the resources.
2. The Mineral Resource is considered to have reasonable prospects for economic extraction by open pit mining methods above a 0.30 g/t Au and within an optimised pit shell.
3. Metallurgical and mining recovery factors not applied.
4. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
5. Totals may not add exactly due to rounding.
6. The statement used the terminology, definitions and guidelines given in the CIM Standards on Mineral Resources and Mineral Reserves (May 2014) as required by NI 43-101.
7. Bulk density is assigned according to weathering profile with a weighted average of 2.78.
8. Mr B. Diouf (CP), Principal Geologist of Azimuth Consulting Senegal, is responsible for this Mineral Resource statement and is an 'Independent Qualified Person' as defined in NI 43-101.
9. Mr Diouf has undertaken several site visits during the course of the resource drilling and is satisfied that industry-standard sampling and QAQC procedures have been followed.

23.3 Mako Gold Mine

The Mako Mine is located approximately 35 km west-southwest of Massawa and 50 km southwest of the Sabodala plant. It has been owned since 2020 by Resolute Mining Limited (Resolute) and operated by their Senegalese's subsidiary Petowal Mining Company S.A. Gold production by open pit started in January 2018.

Resolute's Ore Resources and Mineral Resources (following JORC Code 2012) as of 31 December 2021 are presented in Table 23.3.1. A total of 126 600 oz of Au was produced at Mako Mine by Petowal in 2021 (Resolute, 2022).

Table 23.3.1 Mako JORC Mineral Resources and Ore Reserves, as of 31 December 2021 (Resolute, 2022)

	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
Ore Reserve			
• Proved	5 090	1.4	224
• Probable	7 100	1.9	437
Total	**12 200**	**1.7**	**661**
Mineral Resources			
• Measured	5 510	1.3	238
• Indicated	9 910	1.8	560
• Inferred	986	0.9	28

Notes:

1. Mineral Resources include Ore Reserves.
2. All tonnes and grade information have been rounded to reflect relative uncertainty of the estimate, small differences may be present in the totals.
3. Mako Reserves are reported above 0.6 g/t cut-off.
4. Resources are reported above 1.5 g/t cut-off for the Northern Pits.
5. Mako Resources are reported above a cut-off of 0.5g/t and within a USD 2,000 optimised shell.

23.4 Data Verification

The data verification process undertaken in reporting on Section 23.0, is discussed in Section 12.0.

23.5 Comments on Section 23.0

There are no QP comments for Section 23.0.

23.6 Interpretations and Conclusions

Interpretations, conclusions and risks pertaining to Section 23.0 are presented in Section 25.0.

23.7 Recommendations

Recommendations pertaining to Section 23.0 are presented in Section 26.0.

23.8 References

References cited in Section 23.0 are presented in Section 27.0.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 Project Execution Plans

24.1.1 Summary

The three 'Project Execution Plans' (PEPs) that form part of the Sabodala-Massawa Phase 2 expansion are provided in Sections 24.1.3 (Process Plant), 24.1.3.11 (Power Station Upgrades), 24.1.5 (Tailings Facilities) and Section 24.1.2 (Mining).

Key dates are summarised in Table 24.1.1 and detailed more fully in Figure 24.1.1 and Figure 24.1.2 (key milestone dates).

Table 24.1.1 Key Dates

Area	Start	Finish
Massawa Mine Infrastructure	Q1 2022	Q3 2023
Mining of Massawa Oxides	Q1 2022	2030
Mining of SSTP feed (Fresh)	Q2 2022	Q1 2030
Sabodala Sulphide Treatment Plant (SSTP) (Construction)	Q1 2022	Q1 2024
Power Plant (Construction)	Q1 2022	Q3 2023
TSF 1B (Construction only)	Q3 2022	Q2 2023
TSF 2 (Construction only)	Q3 2022	Q2 2024
SSTP gold production (first gold pour)	Q1 2024	Q1 2033

Figure 24.1.1 Combined Execution Schedule Summary (Lycopodium, 2021)

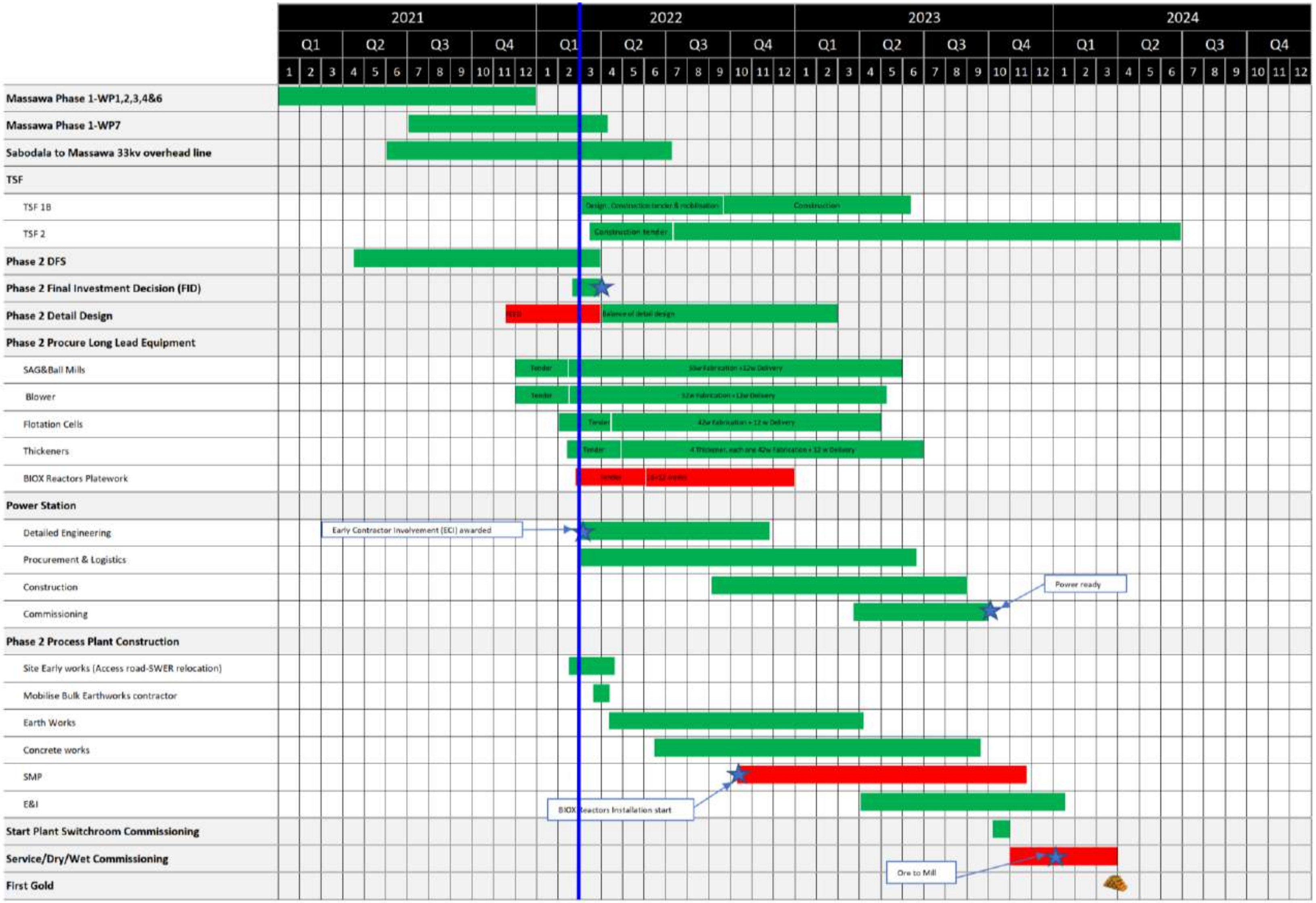


Figure 24.1.2 Implementation Schedule – Milestone Dates

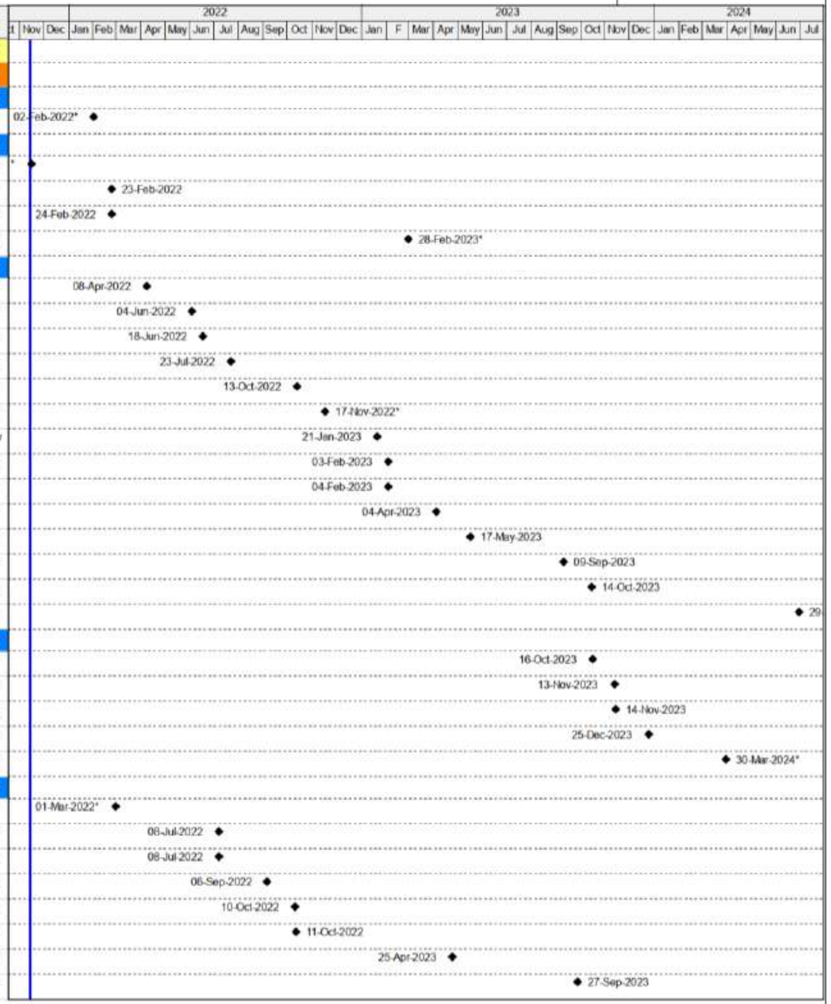
ENDEAVOUR MINING

Massawa Phase 2 Implementation Schedule

Milestones

Data Date: 15-Nov-2021
Print Date: 18-Mar-2022

#	Activity ID	Activity Name	At Completion Duration	Start	Finish	Total Float
1		*Sabodala-Massawa Exp Project Ph 2 - DFS Combined Execution Sch*	129.2w	16-Nov-2021	29-Jun-2024	0.2w
2		Milestones	129.2w	16-Nov-2021	29-Jun-2024	0.2w
3		Procurement & Contracts	0.0w	02-Feb-2022	02-Feb-2022	1.6w
4	SMGP-MS-1000	Approval To Proceed with Procurement Orders & Contracts	0.0w	02-Feb-2022*		1.6w
5		Engineering & Design	63.0w	16-Nov-2021	28-Feb-2023	0.0w
6	SMGP-MS-1010	Approval To Proceed with FEED	0.0w	16-Nov-2021*		0.0w
7	SMGP-MS-1020	FEED Complete	0.0w		23-Feb-2022	0.0w
8	SMGP-MS-1170	Approval to Proceed with Detailed Engineering & Drafting and Procurement	0.0w	24-Feb-2022		0.0w
9	SMGP-MS-1070	Detailed Engineering, Design & Drafting Complete	0.0w		28-Feb-2023*	0.0w
10		Construction	116.3w	08-Apr-2022	29-Jun-2024	0.2w
11	SMGP-MS-1030	Start Plant Bulk Earthworks (establish own facilities)	0.0w	08-Apr-2022		0.2w
12	SMGP-MS-1025	Site Construction Offices & Facilities Available (sufficient to start)	0.0w	04-Jun-2022		0.2w
13	SMGP-MS-1035	Start Plant Concrete Works (Establish Batchplant / Survey / Detailed Excavation)	0.0w	18-Jun-2022		0.2w
14	SMGP-MS-1040	Start Plant Structural Concrete Works	0.0w	23-Jul-2022		0.2w
15	SMGP-MS-1190	Start SS Tank Works	0.0w	13-Oct-2022		0.0w
16	SMGP-MS-1100	Plant Bulk Earthworks Complete (incl. event ponds; excl. crusher backfill / ROM Pad)	0.0w		17-Nov-2022*	3.2w
17	SMGP-MS-1060	Start Plant SMP Works (Contractor 1)	0.0w	21-Jan-2023		15.3w
18	SMGP-MS-1050	Start MS Tanks & Steel Frame Building Works	0.0w	03-Feb-2023		2.5w
19	SMGP-MS-1180	Start Plant SMP Works (Contractor 2)	0.0w	04-Feb-2023		2.8w
20	SMGP-MS-1080	Start Plant Electrical Works	0.0w	04-Apr-2023		3.0w
21	SMGP-MS-1115	BIOX Inoculum Build-Up Tank & Reagents + Admin Building Construction Complete	0.0w		17-May-2023	2.7w
22	SMGP-MS-1090	Security / Other Buildings Construction Complete	0.0w		09-Sep-2023	9.0w
23	SMGP-MS-1110	Plant Buildings Construction Complete	0.0w		14-Oct-2023	4.0w
24	SMGP-MS-1200	TSF2 Construction Complete	0.0w		29-Jun-2024	0.2w
25		Commissioning	24.0w	16-Oct-2023	30-Mar-2024	0.0w
26	SMGP-MS-1120	Permanent Power Supply Required (Start Plant Switchroom Commissioning)	0.0w	16-Oct-2023		0.0w
27	SMGP-MS-1130	Start Plant Dry Commissioning / Services	0.0w	13-Nov-2023		0.0w
28	SMGP-MS-1135	Mills Ready to Commission	0.0w		14-Nov-2023	2.7w
29	SMGP-MS-1140	Start Plant Wet Commissioning	0.0w	25-Dec-2023		0.0w
30	SMGP-MS-1150	First Gold Pour	0.0w		30-Mar-2024*	0.0w
31		Power Statoin	82.4w	01-Mar-2022	27-Sep-2023	2.4w
32	SMPP-WAR-0003	Project start date, NTP acceptance by Wartsila	0.0w	01-Mar-2022*		2.4w
33	SMPP-WAR-0005	LSTK review 30% Design start	0.0w	08-Jul-2022		2.4w
34	SMPP-WAR-0008	Detailed Design Start	0.0w	08-Jul-2022		2.4w
35	SMPP-WAR-0006	LSTK review 50% Design start	0.0w	06-Sep-2022		3.2w
36	SMPP-WAR-0010	Start of Construction	0.0w	10-Oct-2022		3.2w
37	SMPP-WAR-0007	LSTK review 80% Design complete	0.0w		11-Oct-2022	3.2w
38	SMPP-WAR-0011	Start of Testing and Commissioning	0.0w	25-Apr-2023		2.4w
39	SMPP-WAR-1246	Power station commissioned	0.0w		27-Sep-2023	2.4w



◆ Milestone

Page 1 of 1

TASK filter: Massawa Ph2 Milestones.

24.1.2 Massawa Mine Infrastructure

The mining schedule is presented in Section 16 'Mining Methods'. In support of the mining schedule developed, key dates for the supporting mine infrastructure are shown in Table 24.1.2 following.

Table 24.1.2 Mining Key Dates

Milestone	Start	Finish
Massawa Mine Infrastructure	Q1 2022	Q3 2023

24.1.3 Sabodala Sulphide Treatment Plant

24.1.3.1 Introduction

As part of the definitive feasibility study (DFS) scope of work for the Sabodala Sulphide Treatment Plant (SSTP), Lycopodium have developed a DFS execution plan and schedule (the Project Schedule) for the Lycopodium scope of work, namely the SSTP.

24.1.3.2 Purpose

The basis of schedule (BoS) establishes the Project schedule objectives:

- the Project data that forms inputs to the planning
- the planning basis assumptions
- the constraints to be included in planning.

24.1.3.3 Scope

The scope of work for the treatment plant, reagent plants and services and infrastructure is summarised in the bullet points following:

- Treatment Plant:
  - Treatment Plant (General, bulk site earthworks, detailed site earthworks, in-plant roads, site security fencing).
  - Feed Preparation (primary crushing, stockpiling).
  - Milling (reclaim and mill feed, grinding (SAG), grinding (ball), classification, gravity concentration, recycle crushing, flotation, regrind, flotation concentrate and tails thickening).
  - Leaching (CIL, BIOX, primary reactors, secondary reactors, neutralisation, CCD).
  - Elution and Goldroom (acid wash and elution, carbon regeneration, electrowinning, goldroom and smelting).
  - Tails Handling (carbon safety screening and thickening, cyanide destruction, tails pumping).
- Reagents and Plant Services:
  - Reagents (cyanide, flocculant, acid and caustic, lime slurry system).
  - Water Services (water services – general, raw water, process water, potable water, gland seal water, cooling water and firewater).
  - Plant Services (sewage collection and treatment, event pond).

  - Air Services (compressed air, blower air and BIOX blowers).
  - Electrical Services.
- Infrastructure:
  - Infrastructure - General.
  - Utilities and Services.
  - Plant Buildings.
  - General Infrastructure.

24.1.3.4 Exclusions

The following key elements have been assumed to be available as required to support the schedule:

- In-pit dewatering including installation of all related piping, supply and installation of pumps, bores and power – part of the mining scope.
- Accommodation Camp – the construction and owners team will utilise the existing camp.

24.1.3.5 Key Schedule Risks and Assumptions

The Lycopodium scope of services has been developed to identify the timing for a two-stage funding and execution strategy. The two separable portions are described as follows; Project Separable Portion 1 is an early works design and tendering phase prioritised to advance key activities prior to full award and Separable Portion 2 for the remainder of the EPCM scope. The following key assumptions have been made to build the schedule:

- General:
  - The current schedule assumes an EPCM method of execution.
  - Approval to proceed with FEED/Early Works mid November 2021.
  - Full EPCM award is received in March to April 2022.
  - The timing of the award of the separable portions is critical to ensure that tending and negotiations done during the early works phase is still valid after award and will not require re-validation.
  - The schedule assumes no constraints associated with access, approvals or accommodation for the bulk earthworks packages.
- Engineering/Design:
  - The schedule assumes that the earthworks design will be sufficient to issue for tender immediately upon award of the early works portion.

Similarly the schedule assumes that design will be sufficiently advanced during early works to develop and issue tender packages for the key long lead mechanical items:

- The schedule assumes that key vendor data will be procured during the early works phase where required to advance design.

24.1.3.6 Procurement and Contracts

- Full award of the mill contract has been assumed to occur during the FEED/Early Works phase of the contract.

- Award of all other POs and contracts has been assumed to occur after full funds and full award of the EPCM.

24.1.3.7 Construction

- The schedule assumes no access or accommodation restrictions for the site establishment and bulk earthworks.
- The schedule assumes that full unimpeded site access is available prior to the required site access dates.

24.1.3.8 Commissioning and Production Ramp-Up

- The schedule assumes availability of power, water and ore will be available as required to meet the commissioning schedule.

24.1.3.9 Schedule Opportunities

Further schedule improvement can be gained through award of more key packages during the Early Works phase or earlier award of the full EPCM. Further development of the schedule detail and resource and commodity loading will be carried out during the DFS phase to identify any further opportunities.

24.1.3.10 Process Plant Dates and Milestones

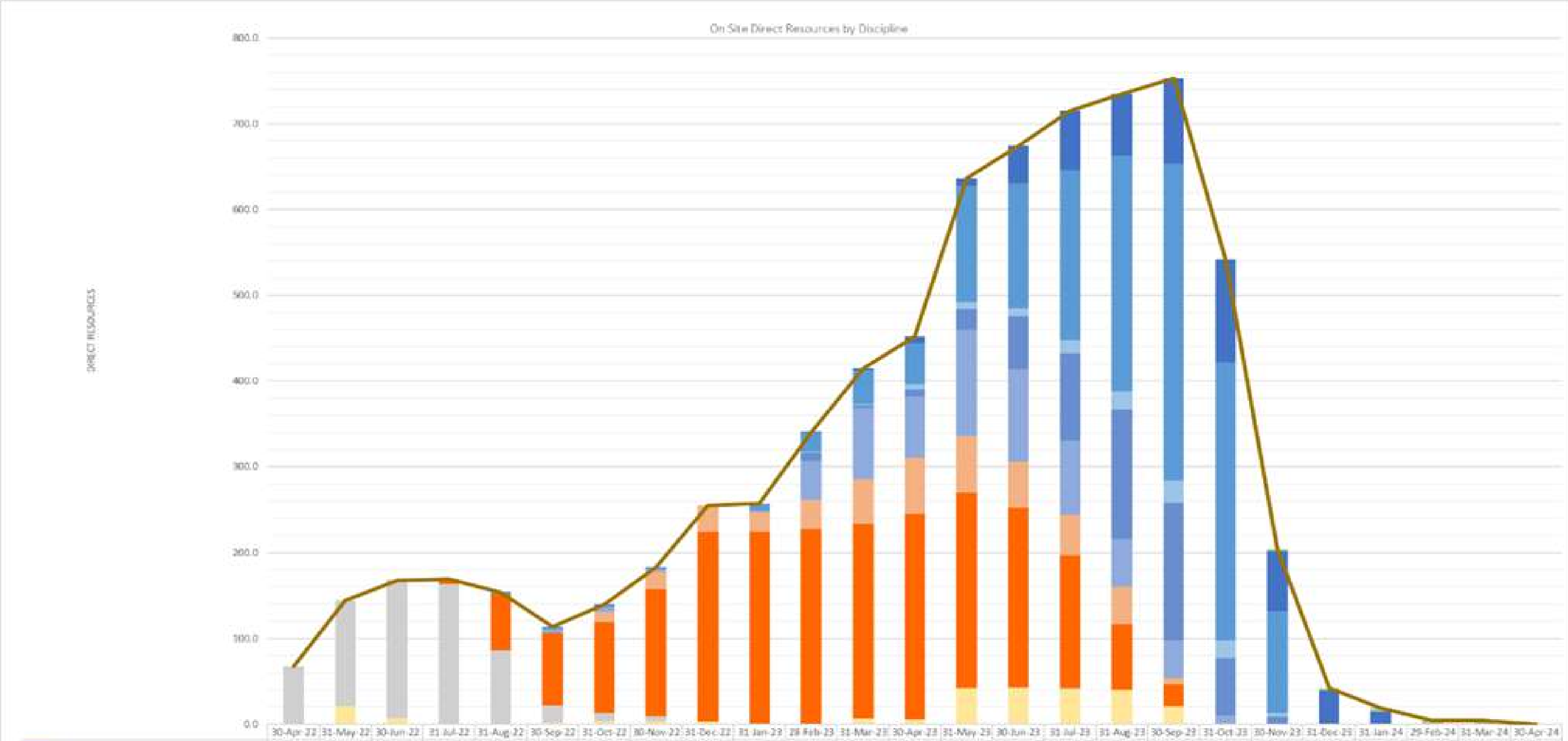
The key dates critical to the timely completion of the Project are listed in Table 24.1.3.

Table 24.1.3 Project Key Dates

Activity Name	Target	Duration (Weeks)	Duration (Months)
Approval to Proceed with FEED	16-Nov-21	–	–
Award Mill Vendor Data PO	12-Jan-22	8	3
Approval To Proceed with Procurement Orders & Contracts	02-Feb-22	11	4
Award Mill Supply Order	15-Feb-22	13	4
Award Blowers Supply Order	15-Feb-22	13	4
Award Bulk Earthworks Contract	23-Feb-22	14	4
Approval to Proceed with Detailed Engineering & Drafting and Procurement	24-Feb-22	14	4
Commence Plant Bulk Earthworks (Site Access Available)	08-Apr-22	20	6
Award Tank Platework Supply Contract	08-Jun-22	29	8
Commence Plant Concrete Works (Establish Batch plant/Survey)	18-Jun-22	30	8
Commence Stainless Steel Tank Installation Works (BIOX Reactors)	1-Sept-22	45	12
Complete BIOX Inoculum Build-Up Facilities Construction	17-May-23	78	19
Permanent Power Supply Required (Commence Commissioning)	16-Oct-23	100	24
Mills Ready to Commission	14-Nov-23	104	25
First Gold Pour (Q1/Q2 2024)	30-Mar-24	124	29

The direct resource hours and key quantities from the capital cost estimate (CCE) have been loaded into the DFS execution schedule. The graph below indicatively sets out the direct labour required to execute the project by discipline type. Further development of the schedule and resource and commodity loading will be carried out during the Early Works phase.

Figure 24.1.3 On Site Direct Labour by Discipline (Lycopodium, 2021)



	30-Apr-22	31-May-22	30-Jun-22	31-Jul-22	31-Aug-22	30-Sep-22	31-Oct-22	30-Nov-22	31-Dec-22	31-Jan-23	28-Feb-23	31-Mar-23
Commissioning Assistance - Pre/Dry/Wet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electrical Labour	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.3	0.0	0.0	0.4	2.2
Piping Labour (Incl OL)	0.0	0.0	0.0	0.0	2.0	2.3	2.3	1.3	0.0	7.3	22.5	39.4
Platework Labour	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.8	1.5
Mechanical Labour	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.9	9.2	3.1
Structural Labour	0.0	0.0	0.0	0.0	0.0	4.3	5.6	3.4	0.0	2.1	44.9	83.1
Tankage Labour	0.0	0.0	0.0	0.0	0.0	0.0	12.1	20.3	30.3	22.3	34.8	52.5
Concrete Labour	0.0	0.0	0.1	6.3	65.4	85.1	106.0	148.1	221.9	224.8	227.1	227.1
Earthworks Labour	67.9	123.3	160.1	163.1	85.9	19.1	9.9	5.9	0.0	0.0	0.0	0.0
General, Fencing and Architectural	0.0	21.3	7.4	0.0	0.0	2.4	3.2	3.3	2.9	0.0	0.1	6.1
Construction Support (Manual Indirect Labour)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Site Direct Resources	67.9	144.6	167.6	169.4	153.6	113.5	139.7	182.6	255.1	257.5	340.8	415.2

	30-Apr-23	31-May-23	30-Jun-23	31-Jul-23	31-Aug-23	30-Sep-23	31-Oct-23	30-Nov-23	31-Dec-23	31-Jan-24	29-Feb-24	31-Mar-24	30-Apr-24
Commissioning Assistance - Pre/Dry/Wet	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.4	2.8	4.4	4.4	4.2	0.0
Electrical Labour	8.6	8.1	43.8	69.7	72.6	100.1	119.1	69.7	39.5	14.8	0.0	0.0	0.0
Piping Labour (Incl OL)	47.3	136.3	146.4	197.9	274.6	369.0	325.0	118.9	0.0	0.0	0.0	0.0	0.0
Platework Labour	6.3	7.5	9.1	15.3	20.9	26.0	19.7	4.4	0.0	0.0	0.0	0.0	0.0
Mechanical Labour	7.8	23.9	61.6	101.3	151.1	160.9	67.2	8.6	0.0	0.0	0.0	0.0	0.0
Structural Labour	71.9	124.4	107.8	86.9	56.0	44.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0
Tankage Labour	65.4	66.1	54.1	47.3	43.5	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Concrete Labour	239.3	227.0	209.1	154.7	76.3	25.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Earthworks Labour	0.0	0.0	0.6	1.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General, Fencing and Architectural	5.7	42.4	42.2	40.6	40.1	20.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction Support (Manual Indirect Labour)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Site Direct Resources	452.3	636.2	674.7	715.4	735.1	753.5	542.6	203.9	42.3	19.1	4.4	4.2	0.0

24.1.3.11 Critical Path

Primary Critical Path – Process Plant

The primary critical path for the process plant runs through the BIOX reactor procurement, installation and commissioning:

- Development of design during the FEED and Early Works phase.
- Development, tender and award of reactor plate supply package.
- Negotiation and award of the EPCM.
- Manufacture and delivery of the reactor plate.
- Installation and testing of the reactors on site.
- Installation of structural steel, mechanical equipment, piping, electrical and instrumentation and associated services.
- System testing and commissioning.
- Load/ore and process commissioning.

Secondary Critical Path - Process Plant

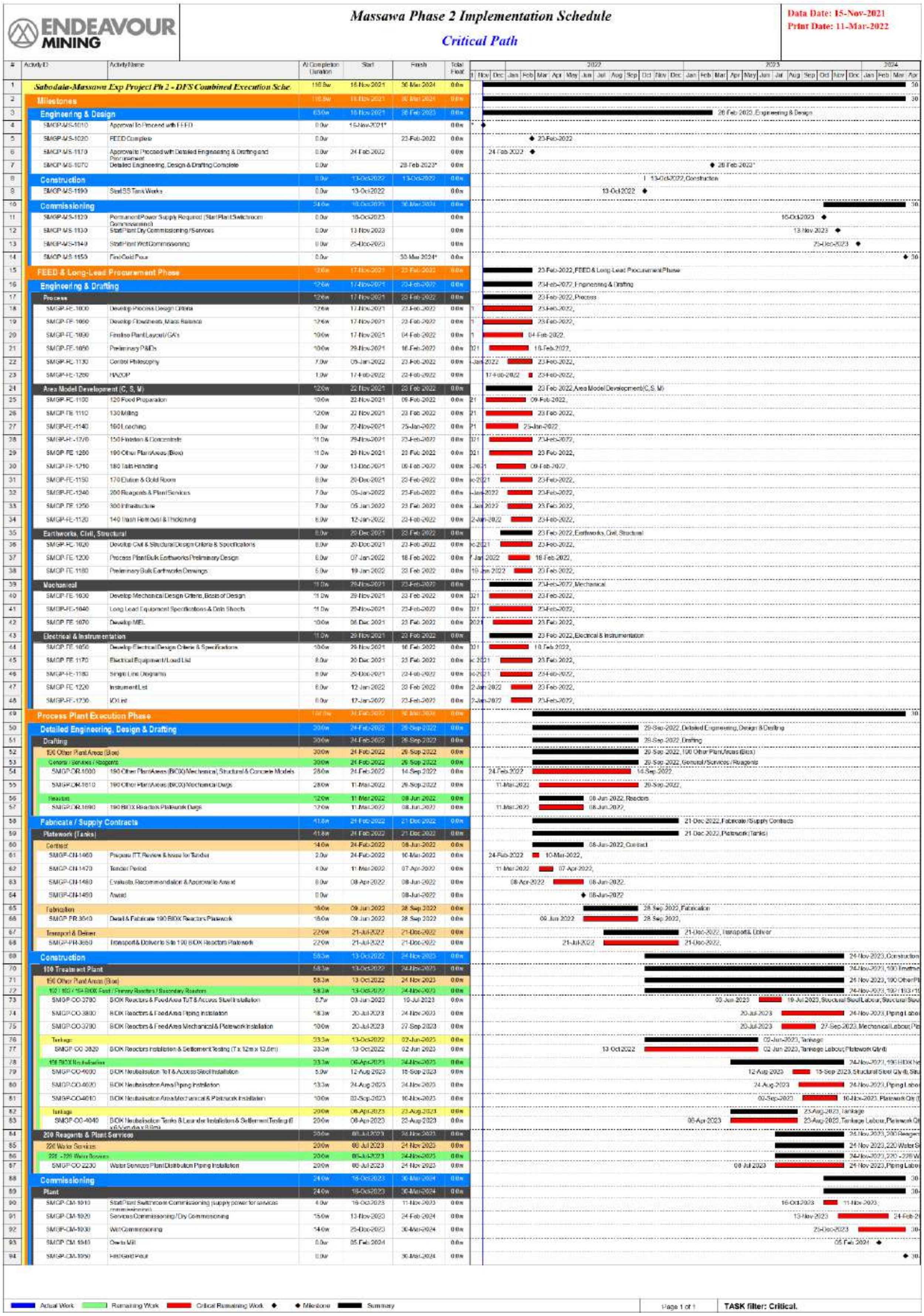
The secondary critical path for the process plant runs through the mills:

- Placement of the mill vendor data order for development of mill area design and foundation drawings.
- Placement of the mill manufacturing order.
- Procurement of the mills and delivery to site.
- Installation of the mills.
- Completion of associated mechanical equipment, piping, electrical and instrumentation and services.
- System testing and dry commissioning.
- Load/ore and process commissioning.

Combined Critical Path Schedule

The combined critical path execution schedule is illustrated in Figure 24.1.4 following.

Figure 24.1.4 Combined Execution Schedule – Critical Path



24.1.4 Power Station Upgrade Dates and Milestones

For clarity, the Power Station Upgrade has been split out into two consecutive phases, namely the FEED phase (Table 24.1.4) and LSTK execution phase (Table 24.1.5)

Table 24.1.4 FEED Stage Milestone Schedule

Milestone	FEED Schedule
FEED Commencement	Week 0
Preferred LSTK Contractor engaged for ECI	Week 5
SSTP Load List received	Week 6
FEED Completion	Week 15

Table 24.1.5 LSTK Execution Stage Milestone Schedule

Milestone	Execution Schedule
Award of Contract	Week 0
Project Kick-Off	Week 1
Start of Detailed Design	Week 18
Site Preparation and Earthworks	Week 32
Start of Construction	Week 32
Start of Commissioning and Testing	Week 62
Power On for SSTP Services	Week 77
Project Completion	Week 83

24.1.5 Tailings Storage Facility Dates and Milestones

The key dates for Tailings Storage Facilities (TSF 1B and TSF 2) are shown in Table 24.1.6 and Table 24.1.7 respectively.

Table 24.1.6 TSF 1B Key Dates

Milestone	Start	Finish
Design Finalisation	Q1 2022	Q2 2022
Tailings Dam Tender and Mobilisation	Q2 2022	Q3 2022
Liner Procurement and Delivery to site	Q3 2022	Q1 2023
Tailings Dam	Q3 2022	Q2 2023
Tailings Dam Overland Piping	Q1 2023	Q2 2023
Decant Return Overland Piping	Q1 2023	Q2 2023
Decant Return Area Piping, Mechanical, E&I	Q2 2023	Q2 2023

Table 24.1.7 TSF 2 Key Dates

Milestone	Start	Finish
Design start to commissioning	Q1 2022	Q2 2024

24.2 Human Resources

Given that Massawa SA will be merged into Sabodala Gold Operations SA (SGO) in 2022, the foregoing discussion will report only on the Human Resources (HR) basis of the integrated company, namely SGO.

SGO has been in operation since 2008 and has in place, established HR and Industrial Relations (IR) policies and procedures. In terms of employment, SGO is now after the State, the largest employer in the Kédougou region.

An approximate split of how the various regional centres support operations from an HR perspective are listed below (Section 5):

- Medical treatment of employees/dependants: ~85% Kédougou,~10% Tambacounda and 5% Dakar.
- Skilled nationals - artisans/technicians/engineers/professional staff: ~20% Kédougou and 80% Dakar.
- Skilled expatriates sourced globally.
- Tertiary education in Dakar.

The number of persons employed directly and indirectly, by SGO as of 2022 are noted in Table 24.2.1 and Table 24.2.2 respectively.

Table 24.2.1 Owner's Team Personnel

Business Area	SGO Existing Operations (2021/2022)		
	Locals	Expats	Total
Exploration			
Mining	436	3	439
Plant Operations	77	2	79
Plant Maintenance	78	7	85
Technical Services	316	21	337
Power Station	26	2	28
G&A	669	11	680
Projects	81	7	88
Total	**1683**	**53**	**1736**

Table 24.2.2 Contractor's Personnel

Business	SGO Existing Operations (2021/2022)		
	Locals	Expats	Total
FTE	47	9	56
Vivo	29		29
Elmasa	28	1	29
BIA	6	1	7
Transport Dieye	199	1	200
Orica	29	4	33
Enikon	29	8	37
Air Liquide	1		1
SGS	16		16
Total	**384**	**24**	**408**

From Table 24.2.1 and Table 24.2.2, it can be seen that as of 2022, SGO offers direct employment for approximately 2,144 people, of which approximately 2,067 are Senegalese nationals. Currently expatriates make-up less than 3.6% of the workforce.

In a 2012 report by PWC for Mines in British Columbia, it was noted that for every person employed at a mine (owner's team and contractors) a further 0.8 indirect and 0.4 induced jobs were created. Thus, in a western country, a multiplier of 2.1 could be used to determine the total number of jobs created per mine (PWC, 2012). Cordes (Cordes, 2016) noted that Rio Tinto for their Simandou iron ore project (Guinea), assumed a multiplier of 6.3 to calculate the total number of jobs created (direct, indirect and induced). Other studies have noted a much higher level of induced employment in developing countries (Cordes, 2016).

Whilst SGO is not bound by legislative targets in Senegal with respect to; the employment of local tribal/religious/ethnic groups; nationals; expatriates; woman and disabled persons, SGO is committed to supporting and developing local communities and Senegal as a whole. Thus, there will be over the coming years, a drive to reduce the number of expatriates employed, empower woman, upskill and employ local persons and grow local/regional procurement and by association, businesses.

24.3 Comment on Section 24.0

24.3.1 Project Execution Plan

The QP for this section believes that; the assumptions outlined in the PEP; the integrated execution schedule as proposed; and the date of first gold pour are realistic. Notwithstanding this, it is difficult to predict the implications of 'external factors', such as; war, disease/viruses and supply chain constraints, on the delivery and construction schedule. Currently, no allowance has been built into the schedule for 'external factors'.

24.3.2 Human Resources

The labour numbers presented ('Owner's Team' and 'Outsourced'), are based on the existing staff compliment (Q1 2022). Employee 'Total Cost to Company' (TCTC) numbers are defined and have been used in the labour cost build-up, as has the costs for outsourced labour, which is built into the service contract costs.

The QP considers the information presented and used in this Technical Report to be appropriate and in alignment with the requirements of this Technical Report update.

24.4 Interpretations and Conclusions

Interpretations, conclusions and risks pertaining to Section 24.0 are presented in Section 25.0.

24.5 Recommendations

Recommendations pertaining to Section 24.0 are presented in Section 26.0.

24.6 References

References cited in Section 24.0 are presented in Section 27.0.

25.0 INTERPRETATIONS AND CONCLUSIONS

25.1 Property, Description and Location

The companies holding the mineral and surface rights have all of the required permits to conduct the proposed work on the Properties. The QP is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work programme on the Properties held by the Issuer.

For this Technical Report, Endeavour has assumed that Sabodala Gold Operations' (SGO's) VAT and employer payroll tax exoneration will not be renewed after expiry, albeit VAT is not currently modelled in the financial analysis

Endeavour believes that once Massawa SA is merged into SGO, the amended Sabodala Convention will continue under the 2003 Mining code, albeit with some concessions. As of the 'effective date', this is still under negotiation.

25.2 Accessibility, Climate, Local Resources, Infrastructure and Physiography

Whilst infrastructure in the west of Senegal and in the Dakar region is well developed, the same cannot be said in the southeast of Senegal. Notwithstanding this, there are Government driven initiatives to tap into the hydropower potential of the southeast and thus, an expansion of the grid network is likely. Similarly, an upgrade of the historical rail infrastructure is likely to foster the development of the iron ore potential of the southeast. The timelines for the expansion of grid and rail infrastructure are far from clear. Until such time as this occurs, all goods will be transported by road and SGO's operations will need to be self-sufficient with respect to power.

Over the coming years, there will be a greater focus on in-country procurement and the upskilling of local communities which will be beneficial for all stakeholders.

Managing dust from mining activities is likely to consume water, and have some impact on capital and operating costs. Additional work is required in this area.

Given that weather station data is used for engineering design, equipment specification, dust/emission plume modelling and site water balances, there are some concerns with the validity and the subsequent interpretation of this data. Notwithstanding this, it is unlikely that the missing data and/or data inaccuracies are likely to materially affect operations.

Project/operational risks largely pertain to any misalignment in company and community expectations, and any spill over conflict from the Republic of Mali.

25.3 History

The Sabodala -Massawa Project is a well-established gold exploration and exploitation project with a long, well-documented and published history.

Whilst the QP cannot take responsibility for the historical exploration work undertaken by Teranga, Randgold and Barrick, data was compiled using documented, industry best practices at the time of compilation, and under the supervision of the historical QPs. The Project has been subject to a number of previous NI 43-101 Technical Reports which have been based on the historical data and therefore subjected to rigorous and comprehensive review, analysis and application. The historical data was subjected to verification, validation and independent audits by the previous owners (Section 12.2.2).

Endeavour has integrated the historical exploration data into their database management system and validated and verified the data as much as possible (Section 12.2.3). The QP is satisfied that the historical data has been collected, collated and managed in an appropriate manner, is not biased or unreliable, and is suitable for Mineral Resource estimation. Further, no risks are foreseen.

25.4 Geological Setting and Mineralisation

The Sabodala-Massawa Project is located in the West African Craton, within the 2,213 Ma to 2,198 Ma age Kédougou-Kenieba Inlier. The Sabodala-Massawa Project Area straddles two major divisions of the Inlier; the volcanic-dominated Mako Supergroup to the west, and the sediment-dominated Diale-Dalema Supergroup to the east.

Birimian rocks of the Kédougou-Kenieba Inlier show a polycyclic deformation and metamorphic history. The first phase of deformation was compressive followed by a later transcurrent movement and deformation. Major crustal shear zones regionally bound and influence the overall north-northeast lithological grain in the region. These include a north-northeast trending shear zone forming a boundary between the Mako and Diale-Dalema groups, locally referred to as the Main Transcurrent Shear (MTS) Zone. The MTS converges with the major northerly trending Senegal-Mali Shear Zone, which is spatially associated with several major gold deposits (including Sadiola and Loulo). Intense zones of high strain are also present in the eastern portions of the Mako Supergroup, confirming the presence of a major structural corridor referred to as the Sabodala Structural Corridor (SSC) or Sabodala Shear Zone (SSZ). The MTS hosts the Massawa and Delya deposits and the SSZ hosts the Sofia and Sabodala deposits.

The Sabodala-Massawa Project hosts 26 deposits with Mineral Resources and over 40 known gold prospects and anomalous areas. The gold prospectivity of the Project Area continues to be considerable in the Qualified Person's opinion.

25.5 Deposit Type

For Section 8.0, the QP has no further comments to make, outside of what is stated in Section 8.2.

25.6 Exploration

The Sabodala-Massawa Project Area covers a regional-scale gold system and hosts a number of significant deposits that have been identified and mined. It is comprised of two mining licenses totalling approximately 611 km^2 and a combined regional exploration land package of approximately 915 km^2, located within the highly prospective Mako Supergroup. Established deposits are located on the first order structural corridors, namely:

- The Sabodala and Sofia deposits located on the SSZ.
- The Massawa and Delya deposits located on the MTZ.

The significant exploration potential of the Project remains, including 70 known prospects to be further tested and evaluated. It is recommended that the exploration team continue to be highly active within the Project area and, the well-funded, systematic approach taken is continued.

25.7 Drilling

The QP does not believe that there is anything else to add that has not been disclosed in Section 10.5. Furthermore, the QP, does not believe there are any risks that should be reported on herein.

25.8 Sample Preparation, Analyses and Security

For Section 11.0, sample preparation, analysis and security follow international best practice under the supervision of a Qualified Person and are documented in comprehensive standard operating procedures (SOP). A robust and actively monitored Quality Assurance/Quality Control (QA/QC) system is in place. The in-house Database Management System (DBMS) securely hosts the exploration results and is suitable for the development of Mineral Resource estimates.

25.9 Mineral Processing and Metallurgical Testing

25.9.1 Free Milling Gold Ores

The oxide, transitional and fresh ores from Sofia Main and Sofia North deposits are 'free milling' and have been blended with the Sabodala ores and processed through the SWOLP from Q3 2020 with the mining of the Sofia deposits due to finish in Q2 2022.

The oxide and oxidised transitional ores from the Massawa (CZ, NZ and Delya) deposits are 'free milling' and will be blended with the Sabodala ores and processed through the SWOLP plant starting from Q2 2022. No additional circuit modifications are needed to enable the SWOLP to treat a blended feed of the Massawa oxidised ores and the existing Sabodala ores at the gold grades and throughputs indicated.

25.9.2 Refractory Gold Ores

The reductive transitional and fresh ores from the Massawa CZ/NZ and Delya deposits are 'refractory' with a high proportion of the gold 'locked' within arsenopyrite minerals (at sub-micron sizes). To achieve acceptable gold recoveries from these ores, the sulphide mineral lattice must be broken down so that cyanide can leach the sub-micron gold particles.

Randgold evaluated multiple oxidation technologies including roasting, pressure oxidation (POX), bio-oxidation (BIOX®), Albion™ and Aachen processes between 2008 and 2018 and concluded in the 2018 Feasibility Study that the bio-oxidation (BIOX®) process was best suited for the treatment of the Massawa refractory Resource. As part of the 2018 FS programme, Randgold through MO Group, conducted extensive BIOX® amenability testing and three BIOX® pilot programmes to develop the 2018 BIOX® Design Basis for the Project.

The selection of the BIOX technology has been carried forward by Teranga for the 2020 to 2022 metallurgical testwork programme and the 2020 PFS and by Endeavour, for the 2022 DFS.

The 2020 to 2021 SGS metallurgical testwork programme for the Massawa CZ/NZ deposits provides valuable additional information to complement and expand the metallurgical testwork database that supports the DFS. Historical and current metallurgical testwork campaigns have demonstrated distinct ore processing behaviours/characteristics, namely:

- Most of the Massawa CZ fresh and all the Massawa NZ fresh lithology composites achieved low overall gold recoveries in the refractory characterisation (gravity + CIL) testwork. Only the Massawa CZ fresh gabbro (GAB) and the quartz feldspar porphyry (QFP) lithology composites yielded moderately acceptable overall gold recoveries, however the CIL tails from these composites still contained material gold values due to sulphide locked (refractory) gold.

- The Massawa CZ gabbro and QFP lithologies are in the main Massawa shear zone and contain high 'free' gold lenses which lead to significant gravity recoverable gold, mainly in the fresh rock, but potentially in the transitional zone as well. The greywacke (GWK) lithology in both the CZ and NZ deposits typically contains relatively low gravity recoverable gold.
- All Massawa NZ/ CZ fresh lithology composites achieved significantly higher overall gold recoveries in the refractory characterisation (gravity + flotation + BIOX®) testwork. This supports the proposed use of bio-oxidation for the treatment of the refractory Massawa NZ/CZ fresh ores.
- Most of the flotation testwork was conducted at a target grind size P_{80} of 90 µm, the optimum grind size for mineral liberation as determined from previous testwork programmes. Fast initial flotation kinetics to a high sulphide sulphur grade rougher concentrate suggests that most of the sulphide minerals are well liberated at the target grind size. In addition, high overall sulphide sulphur recoveries (typically in the range of (93 to 97)%) to a moderate sulphide sulphur grade concentrate, suggests well liberated sulphide minerals plus some gangue entrainment. This assessment is supported by the results of the cleaner tests. The Phase 2 flotation testwork conducted at a coarser grind size P_{80} of 115 µm indicated some drop off in flotation performance.
- Comparing the flotation mass-pull results from the recent and historical testwork indicates that the overall mass pull from the flotation circuit has been reduced by as much as 50% with the change in ore sulphide sulphur grades and the addition of a single cleaner flotation circuit. The inclusion of a cleaner stage also resulted in approximately 30% reduction in concentrate carbonate grades, whilst maintaining overall gold recovery and achieving average concentrate grades of (16 to 20)% S^{2-}. The lithology locked-cycle tests (including concentrate 'cleaning') achieved concentrate carbonate grades in the range of (2.6 to 4.2)% CO_3^{2-}, which is well below the projected BIOX® acid producer/consumer cross-over carbonate grade of 5.2% CO_3^{2-}.
- Optimum flotation conditions vary by deposit, lithology and sulphide sulphur head grade (extent of dilution); however, the inclusion of the cleaner stage in the flotation flowsheet will provide an additional control to manage the concentrate quality (sulphide sulphur and carbonate grades) ahead of the BIOX® circuit.
- The typical expected sulphide sulphur content of the final (BIOX® feed) concentrate is in the range 16% to 20% S^{2-}, whilst also maximising both sulphide sulphur and gold recovery to concentrate. Concentrate grade can be adjusted as required by flotation control and circuit configuration.
- A key variance between the historical flotation test programme and the recent 2020 to 2021 flotation test programme is the sulphide sulphur head grades of the composites used in the testwork. Sulphide sulphur head grades ranged from (2.5 to 3.0)% S^{2-} for the Massawa NZ composites used to produce the feed concentrates for the 2018 BIOX® pilot plant testing. These grades are more than double the sulphide sulphur head grades of the Massawa NZ composites used in the recent testwork and nearly triple the expected LoM average sulphide sulphur head grade of Massawa refractory ore, circa 1.1% w/w. Whilst the LoM weighted average head grades for Massawa CZ/NZ are largely similar, it is notable that Massawa NZ, has greater sulphur variability, whilst Delya only makes up 5% of the resource, sulphur grades are somewhat lower (higher arsenic grades). The variance between the sulphide sulphur head grades has had a significant impact on the design basis for the BIOX® circuit.

- When treating the Massawa NZ/CZ fresh ores through the proposed SSTP, these fresh ores should achieve typical combined gravity and flotation gold recoveries to concentrates of 88% to 97% and achieve gold extractions of (93 to 97)% to carbon in the BIOX® CIL circuit, post bio-oxidation, resulting in overall gold recoveries of (86 to 92)%. For financial modelling in the DFS, a nominated average gold recovery of 88.3% has been adopted for the 'highly refractory' ores, based on an average gold recovery by flotation of 93% and BIOX® CIL of 95%. However, 'semi-refractory' Massawa CZ fresh ores with a high recoverable gravity gold content (particularly the gabbro and QFP lithologies) may achieve a slightly higher overall gold recovery.
- The Massawa CZ transitional ore samples (CT-1 and TRS-1) and the Massawa NZ ore sample (NZ-S) suspected of containing some transitional ore, achieved low to moderate gold recoveries of (58 to 75)% in a combined gravity and CIL test and achieved similarly poor recoveries of 75% to 85% in a combined gravity and flotation test. CIL testwork conducted on several fresh and transitional flotation tails samples indicates recoveries in the range of (11 to 78)% depending on the gold head grade and extent of oxidation, with the transitional samples achieving the highest gold recoveries. Although limited testwork has been conducted on the reductive transitional ores, the existing testwork results demonstrate that semi-refractory ores can achieve significantly higher overall recoveries by gravity + flotation + BIOX CIL + flotation tails CIL than by WOL only.
- Flotation tailings and concentrate thickening tests indicate no unusual requirements for flocculant selection or thickener dimensions.

25.9.3 Characterisation of Massawa Gold Ores

The results of the recent 2020 to 2022 testwork programme indicates that the fresh ores from the Massawa NZ and Delya deposits and some zones in the Massawa CZ deposit are considered highly refractory achieving less than 25% gold recovery through conventional cyanidation. In contrast, the reductive transitional material from the Massawa CZ/NZ and Delya deposits and the fresh gabbro and QFP lithology zones in the Massawa CZ deposit are considered semi-refractory achieving between (50 and 75)% gold recovery through conventional cyanidation.

In previous studies, the semi-refractory Massawa ores were scheduled for processing through a WOL plant at discounted gold recovery levels. This approach made some sense with the previous Randgold proposed project development plan to initially construct and operate a WOL Plant to treat the 'free milling' and semi-refractory ores and then retrofit a BIOX® circuit to treat the stockpiled highly refractory ores at the end of the mine life.

Based on the historical testwork results, Endeavour had concerns over the highly variable recoveries expected from processing this high-grade, semi-refractory reductive transitional and Massawa CZ fresh ores through a WOL plant and the high tailings grades that would likely result from the presence of sulphide locked, refractory gold in these ores.

In the semi-refractory ores, a portion of the gold is refractory and 'locked' within arsenopyrite minerals while the remaining gold is 'free milling' gold that has been either liberated by the natural oxidation of sulphide minerals (as is the case with the reductive transitional ores) or the gold has been deposited as 'free' gold during the mineralisation event (as is the case in the gabbro and QFP lithologies in the Massawa CZ fresh ores).

As part of the detailed Massawa drilling programmes conducted by Randgold between 2012 and 2018, a detailed and extensive LeachWell test programme was undertaken on the Massawa CZ transitional and fresh ores. The spread in LeachWell gold recoveries from the Massawa CZ reductive transitional and fresh Gabbro samples are shown in Figure 25.9.1 and Figure 25.9.2 respectively.

Figure 25.9.1 LeachWell Recoveries for Central Zone Transitional Ore

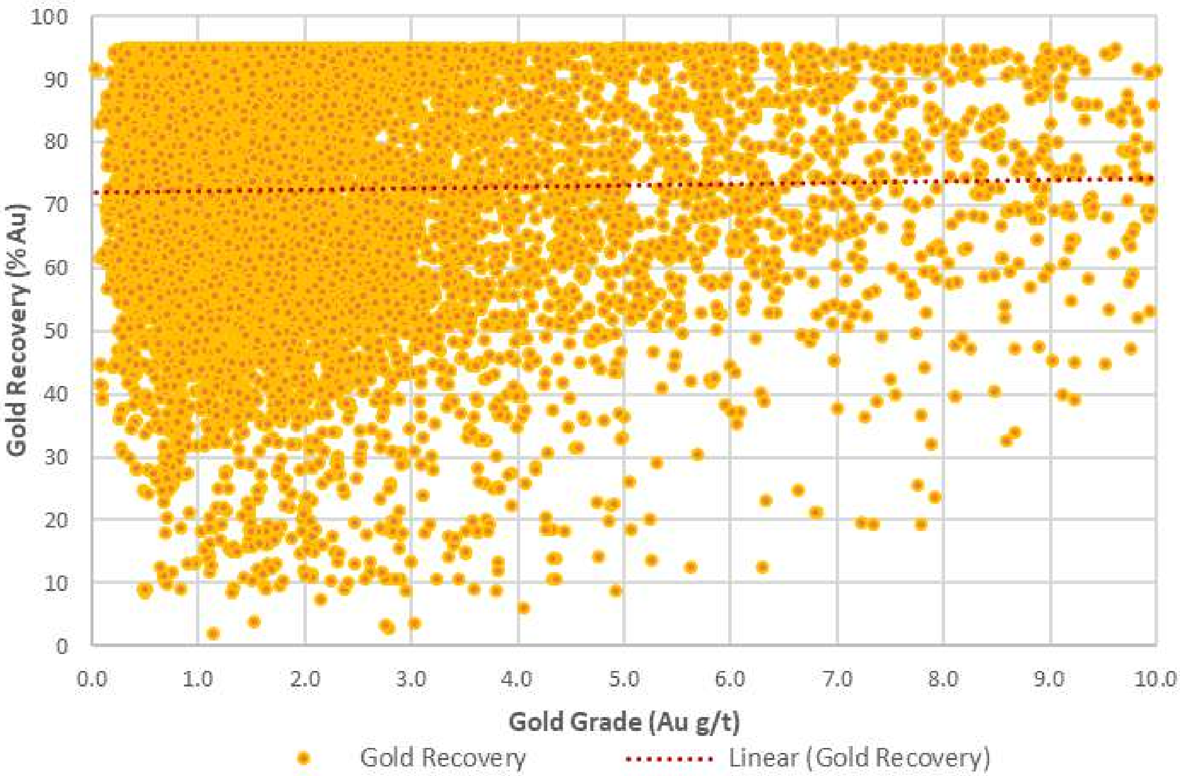
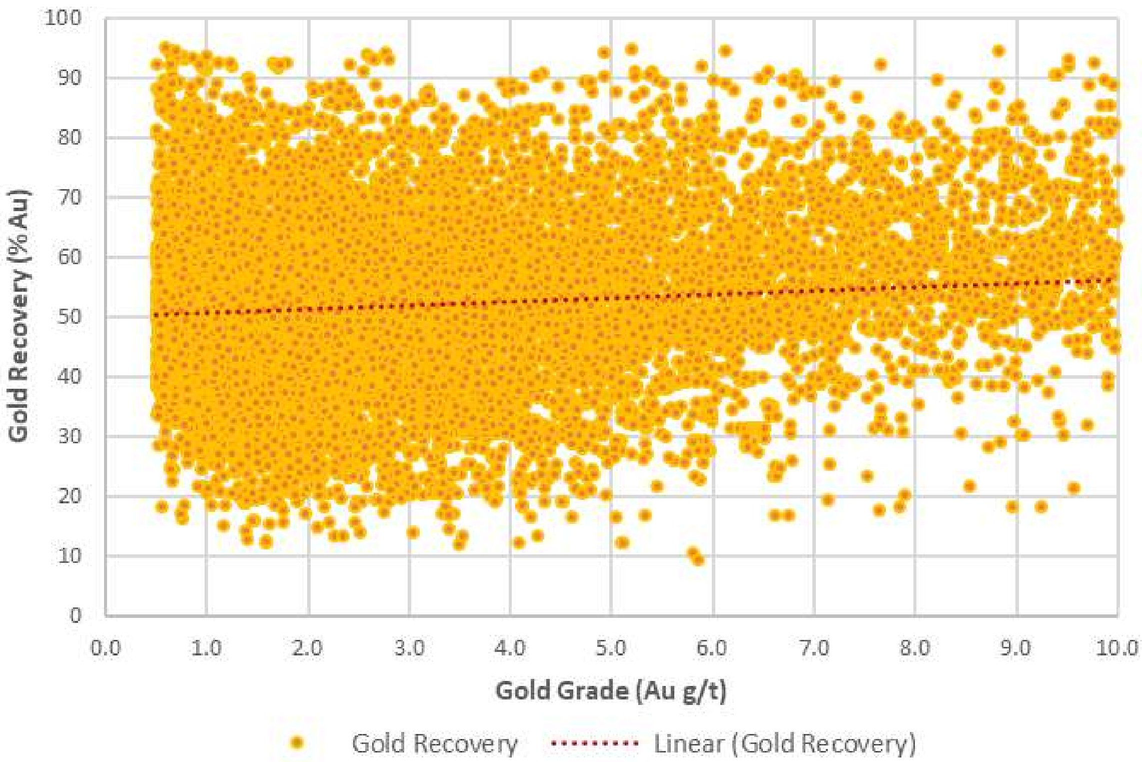


Figure 25.9.2 LeachWell Recoveries for Central Zone Fresh Gabbro Ore



As seen in Figure 25.9.1 and Figure 25.9.2, while the average gold recoveries at 4 g/t are approximately (55 and 75)% for the Massawa CZ reductive transitional and fresh gabbro ores respectively, there is a wide variance in the LeachWell gold recoveries from (20 to 95)%.

For the Massawa DFS, to reduce potential recovery risks and increase overall gold recovery, Endeavour has opted to only process 'free milling' oxide and oxidised transitional ores (above the 'redox line') from the Massawa CZ/NZ and Delya deposits through the existing SWOLP. All reductive transitional ores (below the 'redox line') and all fresh ores from the three deposits are scheduled for treatment through the SSTP. The semi-refractory ores will be campaigned through the SSTP so that the flotation tails stream can be treated through the SWOLP CIL circuit so that any residual 'free milling' gold not recovered in the gravity and flotation circuits of the SSTP can be leached and recovered in the SWOLP CIL circuit.

As part of the DFS, an assessment was conducted of the SWOLP and it was concluded the CIL circuit had sufficient volumetric throughput capacity to cater for short campaign treatment of semi-refractory flotation tails material, when the SWOLP milling circuit was treating predominantly fresh Sabodala ores.

25.10 Mineral Resource Estimates

Mineral Resources for the Sabodala-Massawa Project have been estimated for 26 gold deposits located on the Sabodala and Massawa Mining Licenses and the exploration permits.

The Sabodala-Massawa Project, as of 31 December 2021, contains an open pit Measured Mineral Resource of 21.2 Mt at a grade of 1.32 g/t Au containing 0.9 Moz Au, an open pit and underground Indicated Mineral Resource of 88.9 Mt at a grade of 2.09 g/t Au containing 6.0 Moz Au and an open pit and underground Inferred Mineral Resource of 24.3 Mt at a grade of 2.16 g/t Au containing 1.7 Moz Au.

The open pit Mineral Resources are reported at cut-off grades between 0.33 g/t Au and 1.09 g/t Au, and the underground Mineral Resources at 2.00 g/t Au (Sabodala) or 2.84 g/t Au (Massawa). The open pit Mineral Reources are reported above a Whittle shell. A gold price of USD 1500/oz Au has been used for open pit and underground Mineral Resources. Mineral Resources are reported inclusive of Mineral Reserves.

Notwithstanding the inherent risks of a Mineral Resource Estimate, there are number of generic and specific risks which apply, including:

- **Reasonable Prospects for Economic Extraction:** The current Mineral Resources are reported at a fixed in-situ cut-off grade within an optimised shell assuming a long-term gold price of USD 1,500/oz with generalised mining costs. Accordingly, there remains a risk that in the event that changed parameters are utilised which reflect current Life of Mine Plan assumptions, then the Mineral Resource as reported herein, may change under updated assumptions.
- **Mineral Resource Sensitivity:** No detailed sensitivity analysis has been undertaken at a range of gold prices; hence it is not possible to assess the impact of these changed assumptions on the Mineral Resource statement as reported herein.

The key opportunities relating to the Mineral Resources reported at Sabodala-Massawa are:

- **Exploration Targets:** The Sabodala-Massawa Project area hosts significant exploration potential, especially with the advent of the new sulphide processing plant. The area between the SSZ and the MTZ is of substantial interest with the transition between the different mineralisation styles.

25.11 Mineral Reserve Estimates

Interpretations, conclusions and risks are presented in Sections 25.11.1 to 25.11.7 following.

25.11.1 Geotechnical Risks

There was a pit failure at Sofia North on 14 December 2021 that effected about 30 m height bench, moving 27,000 m^3 of oxide and transitional material. The subsequent geotechnical investigation identified that the failure was triggered by water infiltration into the rock mass, and blast activities undercutting in some sections. This indicates there is a geotechnical risk that needs to be managed, specifically through;

- improved surface water control to avoid water ponding at the benches; and
- improved blasting practices.

25.11.2 Model Dilution

The Sabodala and Sofia North pits were problematic with respect to resource reconciliation in 2021 (discussed below), whilst the Sofia Main pit produced good reconciliation results.

Despite the issues being arguably not representative for the entire LoM models for Sofia North and Sabodala, and also having good reconciliation results at Sofia Main pit, there is a risk of not achieving plant grades with (5 to 20)% negative grade reconciliations, especially on the block models with a 2.5 m SMU size and a corresponding excavator mining bucket width of around 2.2 m to 2.4 m width. To address these issues

- The Sabodala model was reblocked to a (5 x 5 x 5) m SMU size, and the Masato resource model was produced as a regularized SMU size with the same dimensions. From the Sabodala pit, 91.9 kt of ore was mined in 2021, resulting in a -18% grade reconciliation and 20% less metal. Since this is a relatively small quantity of mined ore compared to the 3.9 Mt of pit inventory, it has been considered that the reconciliation is not representative of the entire deposit.
- Sofia resource model covering both the Sofia Main and Sofia North pits was reblocked to 2.5 m in size for along the easting, northing and depth. In addition to the reblocking, skin dilution was applied to the edge blocks as discussed in Section 15.3.2. The pit has been mined (2.8 Mt ore at 1.59 g/t Au average grade containing 147 koz Au), and the reconciliation shows the following variance:
  - Tonnes 145.9%
  - Grade 82.3%
  - Gold 120.1%
- Sofia North results indicate that there were significant quantities of ore mined outside the Mineral Resource model identified by GC.
- From the Sofia Main pit, 4 Mt of ore was mined at an average gold grade of 2.85 g/t, containing 375 koz Au with 111.6% tonnes, 98.7% grade and 110.1% metal reconciliation for the same Sofia model as Sofia North pit.

25.11.3 SSTP Process Recover

Approximately 1.9 Mt of refractory ore is to be mined and stockpiled (circa 20% of the ore to be processed over the LoM), prior to the start of the SSTP in March 2024. There are some concerns that the sulphide minerals which are associated with gold may oxidise with time, thereby reducing the overall gold recovery through the SSTP. However, the relationship between storage time and recovery change has not been established to date.

It has been assumed that if the ore is stockpiled over six months, it may lose 5% on recovery. Hence, any stockpiled ore may potentially recover 2% to 3% less than the assumed recovery properties and this is not incorporated into the planning model. If the plans change before the mining of Massawa pit, it may be necessary to reduce stockpiled quantities and stockpiling time.

25.11.4 Additional Extensional Drilling

There is 3.8 Mt of Inferred Mineral Resources at a grade of 1.90 g/t Au containing 233.5 koz gold within the pit designs. Additional drilling may present an opportunity to convert at least some of this material to Indicated Mineral Resources and increase the Mineral Reserve.

25.11.5 Underground Mine Design.

The Golouma and Kerekounda deposits are to be mined by underground mining methods. SLR determined that mechanised cut and fill is the most appropriate mining method for the deposits, based on information available/previous work. The resulting design using this method produced an underground Mineral Reserve estimate of 2.0 Mt at an average grade of 5.3 g/t Au. The two deposits require a total of 18.3 km of capital development, 53.1 km of operating development and 1249 m of vertical development.

25.11.6 Underground operations.

Underground mining will be owner mining, with the mining workforce hired once the start of underground mining operations has been determined. Endeavour is responsible for acquiring the mining fleet, and hiring the workforce, management, supervision, and managing health and safety.

25.11.7 Resource Conversion

Sabodala-Massawa Gold Mine has an open pit and underground Inferred Mineral Resource of 24.3 Mt at an average grade of 2.16 g/t Au containing 1.7 Moz Au. Further studies and drilling programmes may enable conversion of a significant portion of this Inferred Mineral Resource to the Mineral Reserve.

25.12 Mining Methods

Interpretations, conclusions and risk for Section 16.0, are presented in Sections 25.12.1 to 25.12.2 following.

25.12.1 Open Pit Mining and Scheduling

The Massawa group pits contains sulphide minerals (pyrite and arsenopyrite) in the refractory ore. In the LoM plan, the stockpiling of refractory ore reaches 4.7 Mt (db.) in 2028 (circa 4 years of production). Over the four year period, a portion of the sulphide minerals may oxidise, with a resultant drop in recovery. At the time of writing this report, no study work has been undertaken to determine the extent of oxidation and possible gold losses.

Further, if it is assumed that all the low-grade ore (1.93 g/t Au) is stockpiled (circa 5.5 Mt (db.)) a 5% loss in recovery would result in 17 koz of lower gold production in the LoMp.

Reductive transitional (RedTRN) ore can be fed to the SSTP processing facility without mixing with fresh ore during short term planning of day-to-day operations. By doing so, the tailings of this RedTRN ore can then be sent to SWOLP plant to recover further gold that would not otherwise be recovered in the SSTP. This optionality has not been considered/incorporated into the current LoMp.

There is around 1.5 Mt of RedTRN ore at 4.25 g/t average grade, containing 212 koz of gold. The assumed overall recovery is 88% in the LoMp. There may be an opportunity to recover as much as (4 to 10) koz more gold than the planned, if the flotation tails from the SSTP are pumped to, and processed in the SWOLP.

As a conservative approach for the LoM plan, the planned gold feed grade was capped at 6.85 g/t, which limits the plant feed grade in 2024. The plant design can handle 8 g/t of RoM gold and hence, there is an opportunity to increase gold production in 2024.

Whilst the annual volume of material to be transferred by road from the satellite pits to the SCPF RoM pads is high, the QP does not consider this to be a significant concern.

The LoMp developed and the supporting infrastructure is sufficient to support mining activities. Further, adequate systems and procedures are in place for dust management, contact water management and the protection of conservation areas.

The Project area is not space constrained, such that there will be any issues in meeting the LoMp objectives.

25.12.2 Underground Mining and Scheduling

The design and cost estimating is consistent with the level of detail and degree of confidence consistent with a prefeasibility study. This level of confidence enables Mineral Reserves to be declared for the Golouma and Kerekounda deposits.

The Golouma and Kerekounda deposits are proposed to be mined by underground mining methods. Based on the information available and previous work, SLR determined that mechanized cut and fill, is the most appropriate mining method for the deposits. The resulting design using this method produced a Mineral Reserve estimate of 2.0 Mt with an average gold grade of 5.3 g/t. The three deposits require a total of 18.3 km of capital development, 53.1 km of operating development and 1249 m of vertical development.

Underground operations will be self-performed, with the mining workforce hired once the start of underground mining operations has been determined. SGO is responsible for acquiring the mining fleet, and hiring the workforce, management, supervision, and managing health and safety.

The focus of the SLR work was on underground mining, using operating and capital cost inputs provided by Endeavour/SGO. The site costs were taken from Endeavour/SGO budget data. The mining costs were derived from recent budgetary mining operating cost estimates provided by Endeavour/SGO and verified, using cost data sourced from established and widely recognized underground mining contractors with experience in West Africa.

The QP identified the following key risks for the design and cost estimate presented, for the Golouma and Kerekounda deposits:

- The geotechnical and hydrogeological information related to the three deposits is preliminary. Further investigative work and analyses is required to confirm the opening size, ground support design, and dilution and recovery factors.

- The suitability of the mining method is determined by the limited geotechnical inputs to mine design. The mining method may have to change should the assumed geotechnical conditions not be realised after additional study and analysis of geological and geotechnical data.
- The mine production rate is constrained by the mining method used in the study. Changes to the mining method(s) will also affect the mine production rate, metal production and cashflow.
- The preliminary mine operating cost estimates have a limited shelf-life. The operating cost estimates provided by the mining contractors will need to be updated with cost inputs and assumptions current for the time of the estimates. The estimated mining costs may increase as a result, decreasing the cashflow.

Based on open pit mining schedules, underground mining is projected to start one year after this study and cost estimates have been completed. The design assumptions and all price and cost inputs need to be updated periodically to ensure that the Golouma and Kerekounda deposits remain economically viable between the time of this cashflow estimate (Q4 2021) and actual production.

The QP identified the following opportunities during the preparation of the Mineral Reserve estimates for the Golouma and Kerekounda deposits:

- Further geotechnical investigation may determine that the ground conditions are better than those assumed in this analysis. A more productive mining method will increase mine output and reduce the unit mining costs.
- There is potential for further conversion of underground Mineral Resources to Mineral Reserves.
- Additional drilling and exploration work may expand the mineral resource base and, by extension, the reserves for the three deposits.

25.13 Recovery Methods

25.13.1 Sabodala Whole Ore Leach Plant (SWOLP)

The SWOLP has been a reliable operation for an extended period of time and as long as care is taken to ensure non-free milling gold ores are not fed into the SWOLP in any significant quantity, performance will not be materially different to future projections.

The plant as designed and configured can accommodate varying throughputs and can handle ores with a high gravity recoverable gold content.

25.13.2 Sabodala Sulphide Treatment Plant (SSTP)

The SSTP will be constructed between 2022 and 2023, with commissioning in Q1 2024. The SSTP will treat the semi-refractory and highly refractory Massawa ores (reductive transitional and fresh ore types from the Massawa CZ, NZ and Delya deposits). The sulphide minerals within these ores must be oxidised to breakdown the mineral lattice to liberate the sulphide ‘locked’ gold for extraction by cyanidation. Bio-oxidation has been selected as the oxidative technology which is a commercialised and well understood process with eight currently operating BIOX® plants around the world (two currently operating in Africa), and two under design/construction (including the Massawa BIOX® plant). BIOX®, licenced by MO Group, is the most commercialised of the bio-oxidation technologies available.

Testwork on the Massawa refractory ores commenced in 2008 and after 37 historical test campaigns and the 2020 to 2021 DFS testwork programme, incorporating comprehensive flotation variability testing and extensive bio-oxidation amenability testing (BAT) and three bio-oxidation pilot programmes have provided a detailed data base for the DFS and detailed design. The design basis adopted for the DFS has been based on interpretations of the historical and 2020 to 2021 metallurgical data and sound engineering principles that are industry standard. The design allows for acceptable variations in ore feed competency and quality (i.e., sulphide sulphur grade and iron to arsenic [Fe:As] ratio).

The gravity + flotation (93%) and BIOX® CIL (95%) gold recoveries (culminating in an overall gold recovery of 88.3%) adopted for the semi-refractory and highly refractory Massawa ores in the DFS are considered by the QP reviewer, to be moderately conservative and achievable, based on the testwork completed and the performance of other BIOX® plants in Africa and around the world.

25.14 Project Infrastructure

25.14.1 Geotechnical

The geotechnical interpretation of the data available and the conclusions from that data in terms of geotechnical parameters for design, settlement estimates and construction considerations are appropriate for the DFS and structural design and civil construction purposes.

25.14.2 Transport and Logistics

There are no transportation issues or concerns between the PAD, Dakar and the Sabodala-Massawa Properties. Long-haul road infrastructure on the Sabodala-Massawa Properties has been adequately covered from a technical and cost development and SHE perspective.

It is noted that the peak annual transportable volume of ore is high (5.7 Mt/a arb 2028), as are the frequency of vehicle movements (Table 18.4.2). Consequently, logistics management at key loading/off-loading points and gatehouses will need to be carefully managed.

It is important to note that loading/off-loading points are often different and hence the nominal overall truck frequency must be viewed in light of this.

Whilst there have been discussions of extending the rail line to Kédougou to open up the Falémé iron ore deposits in southeast Senegal, this is unlikely to be realised in a time frame that will have a meaning full impact on SGO's operations.

25.14.3 Power and Lighting

The FS and DFS for the Sabodala Power Station (SPS) expansion carefully considered a variety of options and opportunities to ensure the expansion solution proposed in the SSP Expansion DFS Report (QGE, November-2021) represents a technically feasible and cost-effective solution. The following outcomes of the SPS DFS provide considerable confidence in the technical feasibility of the expansion project including:

- No identified fatal flaws in the conceptual design.
- The level of engineering and decisions (which have come out of the DFS) will allow the project to immediately move into FEED and detailed design.

- Two comprehensive technical proposals from Tier 1 Power Station Contractors were received as part of the DFS Tender process.
- The associated CAPEX estimates for the two technical proposals were within 8% of each other, demonstrating that both proposals represent fair market value and that the SPS Expansion LSTK Tender Package provided a comprehensive technical base with which the proposals were developed.

The SPS Expansion DFS also highlights the following risks associated with future stages of the Project:

- A 100% accurate load list for the SSTP is not likely to be available before the purchase of the additional generators for the SPS. This presents a minor risk to the Project - if the SSTP load increases considerably after the generation units have been purchased then the total generation capacity may end up being undersized for the load or additional generation would have to be purchased. The probability of this scenario eventuating is considered very unlikely due to the general expectation that the SSTP load will decrease as design progresses.
- A change in the load list will impact the per annum energy generation, consumption and levelized costs of electricity (LCOE) figures although this impact is expected to be negligible.

25.14.4 Water Management

The various environmental risks identified for the Project are summarised in Section 20 of this Technical Report. The proposed mitigation options for water management are well captured within the ESMP developed for the Project and the various studies conducted cover the required information and recommendations on how to deal with any potential risks or impact events. The main risks identified to water management (and for which mitigation measures are in place for) include:

- Degradation of walls and ramps in the pits and waste dump areas, berms and retention structures.
- Spills or leaks of hazardous materials.
- Toxic emissions.
- Natural disasters or extreme events (higher than normal rainfall).

Geochemical impacts on water quality as a result of mining will be dealt with by the lining of the TSF facilities, a SWMP that ensures separation and capture of clean and dirty water, monitoring of quality before discharge and the installation of WTPs to allow treatment if required.

Based on the various simulations carried out, the following can be concluded:

- Although the wet season is short and the dry season long, the high volumes of water received in a short period during the rainy season result in a positive water balance for four to five months of the year. During this period, the pool on all three TSFs will receive more water than is returned to the process plant. The balance is reversed in the dry season if the appropriate controls and water treatment are in place.
- Based on the water balance, the SRWD and LRWD will have sufficient water in storage throughout the LoM to supply the mine water demand.
- The SRWD on its own will not be able to carry the full water demand and as a result the LRWD will also be required as a source.

- There is enough fresh water supply to supply the process plant make-up water requirement as well as the various other mining activities. There will be a surplus volume of water on the TSFs that will need to be managed and discharges from the waste rock dumps and pit dewatering will be required.
- Maximising the use of return water will assist in reducing the volumes of the excess water; however, there will still be a need to treat and discharge.

Based on the various simulations undertaken for Massawa, it was concluded that:

- If all dirty water streams from the Massawa area are treated together (WRD runoff, WRD seepage and pit sump water), the volumes that will require treatment will be high (under average rainfall will peak at 5,000 m^3/h) and the treatment costs will be high.
- The model is conservative and has assumed maximum concentrations as input into seepage from the WRD as well as groundwater seepage running into the pit sumps. This will likely not be the case and as such, is a worst-case scenario.
- If 85^{th} percentile concentrations are used as the input, then the WRD runoff and seepage waters are almost in compliance and will comply with the discharge limits if mixed with the perimeter dewatering water.
- Settling ponds and pollution control facilities should be designed and sized in accordance with the SWMP developed by Digby Wells (DWE, 2021). Three reservoirs at Massawa will be required for dirty water capture and to allow monitoring of the water to be within the background surface water concentrations. If this is not the case, further dilution of this contact water with dewatering, or clean water runoff (non-contact water) can be done and/or this water can be directed to the planned MWTP before discharge. The size of the three reservoirs are provided below:
  - Reservoir 1 is 266 ha and 1.4 Mm^3.
  - Reservoir 2 is 267 ha and 2.7 Mm^3.
  - Reservoir 3 is 133 ha and 1.6 Mm^3.
- Water in the Sofia mining area can be discharged directly and will require no treatment; however, nitrate and TSS concentrations should be monitored.
- All perimeter boreholes dewatering around the open pits can be discharged directly to the environment. The water quality should, however, be monitored. If the quality deteriorates to above surface water background levels, then the water should be diverted to the water treatment plant (WTP) for treatment.
- Water captured on and around the WRD areas should be blended and/or mixed with the perimeter boreholes dewatering before discharge.
- Only the pit sump water from the various pits will likely require treatment.

25.14.5 Site Services

For Section 18.7, no further comments are required beyond what is stated in Section 18.12.5.

25.14.6 Buildings, Stores Workshops and Ancillaries

For Section 18.8, no further comments are required beyond what is stated in Section 18.12.6

25.14.7 Accommodation Facilities

For Section 18.9, no further comments are required beyond what is stated in Section 18.12.7.

25.14.8 Tailings Storage Facilities

Interpretations, conclusions, and risks pertaining to the Tailings Storage Facilities (TSFs) are as noted below.

- All TSFs are to be constructed by downstream raising which is a low risk option for these facilities.
- Existing water management practices have demonstrated that high rates of slurry water return, typically 75 to 80% of slurry water discharged to the TSFs, can be achieved. Managing the TSFs to maximise water recovery and therefore maximise the in-situ dry density of the deposited tailings presents a significant opportunity to defer capital for the construction of the future embankment raises, minimise operating costs and maximise the factors of safety and stability of each TSF containment embankment.
- The data that is available will need to be supplemented with local climatic data during the operation of the Project to check and, if required, fine tune spillway designs.
- Geotechnical site investigations to outline the locations of potential borrow materials required for construction of TSF2 will have to be executed based on the proposed staged construction. The geotechnical characteristics of these potential construction materials should be confirmed as being similar to the geotechnical characteristics for the materials used in the construction of TSF1. Given the large database for the construction of the embankments for TSF1, there is a low probability of significant differences in materials being encountered. Based on the previous geotechnical works at the site, this is not considered to be a significant risk.
- The implementation of the Sabodala In-pit Tailings Disposal (SIPTSF) presents a significant opportunity to enhance environmental outcomes, reduce overall tailings management risk, utilise an abandoned mine pit as a resource and make significant savings in capital and operating costs.

25.14.9 Waste Rock

In accordance with the LoMp, there is 372 Mt (db) of waste rock (new) to be stored, with a corresponding loose volume of 201 Mlcm (30% swell factor). This compares to a WRD capacity of 256 Mm^3.

In accordance with Section 18.6, it is noted that contact water management around the WRDs on the Sabodala Shear Zone (SSZ) which transverses both the Sabodala and Massawa properties is not likely to be an issue. After monitoring and sediment removal (silt traps), the water can be discharged directly to the environment.

For WRDs associated with the Massawa Shear Zone (MSZ), contact water management and monitoring is going to require ongoing operational and management focus.

The availability of land for WRDs is not a constraint on the Sabodala-Massawa Properties for the current LoMp. Furthermore, there is sufficient land for additional resources to be bought into an expanded LoMp.

25.15 Market Studies and Contracts

25.15.1 Market

The commodity prices detailed in the column titled 'Modelling' in Table 25.15.1 have been used for the modelling of resources, reserves, operating costs and revenue. Importantly, silver is not declared as a resource or reserve in Endeavour's current financial models and a silver price of USD 20/ozt is used for internal budgeting purposes only.

Based on the analysis outlined in Section 19.0, the gold pricing used for resources, reserves and financial modelling are seen as appropriate. Additionally, Table 25.15.1 illustrates a range of values that should be considered in any sensitivity analysis, namely, the long term price (LTP) worst case scenario (WORST-SCN), moderate scenario (MOD-SCN) and an optimistic scenario (OPT-SCN). Points to note:

- Silver is not currently modelled in any of the Issuer's NI 43-101 Technical Reports, for the properties that it holds exploitation rights for.
- The column titled 'Possible Duration' indicates the period/duration where the MOD-SCN and OPT-SCN may be applicable.

Importantly, market forecasts cannot adequately consider: the impact of disruptive technologies; war (physical and trade), economic recession, sudden legislative changes (national/transnational) and political instability.

Table 25.15.1 Endeavour Assumptions for Modelling and Sensitivity Analysis

Parameter	Units	Modelling	Sensitivity Analysis				
			LTP	WORST-SCN	MOD-SCN	OPT-SCN	Possible Duration
Gold Resources	USD/ozt	1500	1459	1300	1600	1700	N/A
Gold Reserves	USD/ozt	1300	1356	1300	1400	1500	N/A
Gold Revenue	USD/ozt	1500	1800	1500	1675	1850	1 year
Silver Revenue	USD/ozt	15	22.5	15	22	24	1 year
Diesel Price[1]	USD/L	0.88	0.86	1.8	1.215	0.86	2 years
HFO Price[1]	USD/L	0.54	0.6	1.14	0.7695	0.54	2 years
Steel Price	%	N/A	-30	10	-20	-30	1 year

25.15.2 Contracts

Whilst SGO utilises a number of Senegalese companies to support its operations, some of whom are headquartered outside of Senegal, it is believed that SGO will come under increasing pressure over the next few years to develop and foster local business that will support the mine. This is not seen as negative, and SGO is actively seeking to expand its local sourcing initiatives.

The merger of Massawa SA into SGO should be completed by 31 December 2022, with an effective date of 1 January 2022.

[1] Assumed – +35% (MOD-SCN) and +100% (WORST- SCN) – Historical data indicates worst case could be +130%

25.15.3 Risks

The principal risk relating to market studies and contracts applicable to the Sabodala-Massawa complex, pertains to the commodity and raw material input prices, which may impact operating and construction costs. Conversely, there may be opportunities, should the gold price increase above the current LTP forecast for a prolonged duration.

There are concerns around the current geopolitical conflicts, and the potential impact that this may have over the short-medium term. Furthermore, sanctions against Russia have reduced the global supply of oil, which has resulted in price increases and further general inflationary pressure. Further, the 2021 HFO/LFO price modelled is below Q1 2022 budgets (USD 0.57/L and 0.90 USD/L), and below current market pricing.

A short-term (one to two years) increase in fuel is expected, albeit this increase is not expected to continue over the LoM.

25.16 Environmental Studies, Permitting, and Social or Community Impact

The studies and data collected for the whole project have highlighted areas where particular focus is required to prevent significant impacts from occurring such as; dealing with impacts on the Western Chimpanzees, the gallery forests, ensuring that water resources are available for flora and fauna in the dry periods, preventing poor quality water leachates from occurring in the long-term, and dealing with the secondary impacts due to the in migration of people. It is possible to manage the identified impacts in a manner which ensures that the net overall impact of the project is positive

In general, environmental and social issues have been well covered through the various studies, audits and reviews carried out. Since the beginning of its activities, SGO has completed several ESIAs for each of its mine/infrastructure projects, all involving environmental and social baseline and impact assessments.

More recently, SGO validated the Niakafiri and Goumbati-Kobokoto ESIAs and their respective impacts were added to SGO's global impact assessment.

In addition, the baseline assessment carried out for the 2019 Massawa Project has been used and updated for the revised Sabodala-Massawa Project. For the Sabodala-Massawa ESIA update:

- Additional data was required for the reorientation of the Massawa 'long-haul' road to the SOWLP/SSTP, given that processing moved from Massawa to Sabodala.
- Field surveys were conducted to assess the new impacts and update the environmental and social baseline data. These impacts were also added to SGO's global impact assessment.
- Further studies were completed in 2021, covering; geochemistry, water management and dewatering.

25.16.1 Potential Impacts of the Project Due to the Combining of the two Mining Areas and Mitigation Measures

The impacts/risks specific to mining activities are noted below:

- Habitat and biodiversity loss (for both terrestrial and aquatic) and disruption of plant and wildlife habitats by construction activities and mining operations.
- Loss of wetland areas (total wetland loss of 112 ha, of which 10.4 ha is a direct loss associated with the mine pits) as well as fragmentation of riverine corridors, erosion, sedimentation, and altered wetland Present Ecological State.

- Loss of 31.1 ha of cropland to build infrastructure, and to establish a safety radius around certain mine elements.
- Mine infrastructure elements (drains, berms, water reservoirs and other) and dewatering will have some impact on geohydrology and surface hydrology, potentially affecting local users of the water (ground and surface) and the Niokolo-Koba National Park.
- Disruption of surface and ground water quality:
  - 928 ha of land to be deforested, exposing the land to erosion.
  - Potential contaminated runoff (waste dumps and stockpiles).
  - The risk of hazardous material or petroleum products spills and/or leaks into the environment, etc.
- Increased ambient noise level and dust emissions due to blasting, handling of the ore and waste, as well as the hauling of ore to the SSTP and SWOLP.
- Job and economic opportunities will be a positive impact, however the significance of these positive benefits are likely to be less, given the Project scope reduction (major infrastructure not required anymore at Massawa) as a result of the SSTP/SWOLP plant integration at Sabodala, and resultant economies of scale that a single facility confers over two independent facilities (fewer workers). Notwithstanding this, all Randgold employees wishing to join SGO after the take-over of the Massawa License by Teranga, and later by Endeavour, were offered employment.
- Potential influx into the local area as a result of the Project's presence, will likely intensify the existing artisanal mining operations, as well as any potential social ills associated with increased economic and social activity in the area.
- Pressure placed on the existing local socio-economic infrastructure which was found to be limited, as well as: degradation of local customs and mixing of cultures which may have negative influences; and health and safety related issues contributing to increased social ills.
- Economic activity displacement of 14 households and a loss of 33.1 ha of agricultural land.
- Based on geochemistry results, water treatment might be required for Massawa CZ/NZ and Delya WRDs seepage and runoff, as well as pit sump water, prior to any discharge to the environment.
- A sacred sites relocation plan, included in the RAP, will help reduce the impact on cultural heritage.
- Impacts on landscape and visual effects are reduced considering the fact that local population is used to a landscape altered by mining activities and that there will be continuous rapid rehabilitation of surfaces disturbed during operation.

There will also be specific impacts related to SGO's plant upgrade:

- Increased GHG emissions due to the increased haulage distances from Massawa to Sabodala (as opposed to a plant at Massawa), and emissions from the upgraded power plant.
- Air quality during operation will mainly be affected by wind erosion of the TSF and other stockpiles (Waste and RoM) that will increase in size and number.
- Tailing storage at the TSF1 and TSF 2 could potentially cause seepage and groundwater contamination. However, the integration of a HDPE liner in the design criteria, the presence of a water treatment plant to remove arsenic and antimony (SWTP) and the destruction of cyanide at the CIL plant, will mitigate any impacts on soil and groundwater.

- An increase in the reagents that will be used in the SWOLP and the new reagents required for the SSTP.
- The increased water required for the SSTP is not seen as an issue, given the capacity of the existing water harvest dams. However, the surface and groundwater monitoring requirements for the Project will increase.

25.16.2 Risk Analysis

A Preliminary Risk Analysis was conducted to assess the environmental risks of the Project. Like any other heavy industrial activities, the Project may unintentionally experience critical issues like spills, emissions and fires that could have a direct negative impact on the surrounding environment. The causes and consequences of each of these situations were determined, and detailed preventive and emergency implementation measures were identified to be integrated into SGO's Emergency and Response Plan (ERP). The criteria considered for this risk assessment consider the severity of events, the consequences, and the likelihood of an occurrence. An analysis of the Project's facilities and consumables to be used on the mine site revealed several involving risks. The main environmental risks associated with the Project are as follows:

- Fire.
- Explosion.
- Degradation of walls and ramps in the pits and waste dump areas, berms and retention structures.
- Spills or leaks of hazardous materials.
- Toxic emissions.
- Natural disasters.
- Insurrection or social unrest of the population.

To minimise the level of risk related to both personnel and the environment, health and safety and security measures have been identified. In addition, SGO's ERP is being implemented at the earliest stages of the operational phase of the Project

25.16.3 Environmental Social Management Plan (ESMP)

The Massawa Mining License was incorporated into the larger ESMP for the Sabodala-Massawa Complex, and the various plans in place, are described in Section 20.6.

The ESMP currently covers all necessary disciplines, including waste, water and air quality management and monitoring. Various social management mechanisms and programmes are also part of the mine's operations and management plans, and cover everything from grievance mechanisms to community development.

Biodiversity action and management plans are also in place and are being worked on continuously.

The mitigation plans in action are well planned and should minimise any impacts from the mining activities.

25.17 Capital and Operating Costs

The cost estimates developed for the existing facilities are based on historical performance adapted to align with the Life of Mine plan. Key risks associated with the cost estimates relate to escalation of underlying cost inputs (fuel, reagents, equipment supply), change in operating environment (physical environment, social and regulatory) and ongoing disruptions to the global supply chain resulting in delays and cost escalations. Where possible, this has been factored into the estimate.

25.18 Economic Analysis

The economic model represents the culmination of all the key input assumptions outlined in the respective sections of this Technical Report. Applying a long-term gold price of USD 1500/oz on a flat line basis to these assumptions, the Project delivers robust results over its 14 year mine life, delivering an after-tax NPV5% of USD 1129 M on a 100% basis at a LoM AISC of USD 825/oz.

The sensitivity analysis shows that there is significant upside to the Project if gold prices were to stay at, or above, the long term price identified in Section 19 (USD 1800/oz), which would deliver an after-tax NPV5% at least USD 624 M higher than the base case presented. Furthermore, the operational sensitivity of the Project is in line with expectations, with low sensitivity to capital and operating costs, but typically sensitive to movements in LoM head grade.

As the economic model relies on inputs from each of the disciplines outlined in the previous sections, there is a risk that each of the risks of the preceding sections could have a compounding impact on the results of the economic model.

25.19 Adjacent Properties

Adjacent properties to the Sabodala-Massawa Project hosting gold deposits with Mineral Resources include Makabingui held by Bassari Resources Ltd, Douta by Thor Exploration and an operational gold mine (Mako owned by Petowal/Resolute Mining). The adjacent properties are within the Kédougou-Kenieba Inlier with the MTS and SSC and highlight the prospectivity of the region.

25.20 Other Relevant Data and Information

25.20.1 Project Execution Plan

The process plant project implementation schedule was built with actual dates confirmed by suppliers and contractors. Lycopodium believes that the implementation schedule is realistic and aligns with other recent and current West African Projects. BIOX Plants have a significantly longer commissioning ramp compared to conventional Gold Plants, which has been accounted for in the implementation schedule, as well as in the financial model.

Risks pertaining to the execution schedule are as noted in Section 24.1.3.5 of this Technical Report.

25.20.2 Human Resources

The Human Resource numbers presented in Section 24.2 for December 2021/January 2022 are seen as realistic. The issue for SGO will be one of upskilling local persons and reducing the reliance of sourcing the relevant skills from Dakar. It is relevant to note, that it is unrealistic to expect that local people will be educated to a tertiary level and employed within the current mine lifespan and thus, there must be a focus on upskilling local persons for senior operator and artisan roles.

Moving forward, there will be increasing pressure to hire from local communities.

26.0 RECOMMENDATIONS

26.1 Property, Description and Location

Endeavour has decided to relinquish the 292 km² Sounkounkou Permit and to submit a renewal application for the 337 km² Bransan Exploration Permit. The costs of doing this fall under general corporate costs and are not reported on herein.

26.2 Accessibility, Climate, Local Resources, Infrastructure and Physiography

It is recommended that:

- The energy sector be monitored, particularly with respect to the expansion of the transmission network and the development of the proposed hydropower facility at Sambangalou. No budget is required for this activity.
- Rail infrastructure development in the southeast of the country be monitored, specifically with respect to the development of local iron ore deposits. No budget is required for this activity.
- SGO continue to develop/uplift local communities as part of broader local procurement/upskilling initiatives. These activities are already covered under existing operational budgets.

26.3 History

The QP for Section 6.0, considers that the historical data has been captured, is of a suitable standard and is being used appropriately. Thus, no further work is required in this area.

26.4 Geological Setting and Mineralisation

The geological knowledge and understanding of the Kédougou-Kenieba Inlier, its structural setting and gold deposits is comprehensive and robust; however, the Qualified Person recommends that alternative and new hypotheses, scientific advancements and new technology are considered (and applied if viable or suitable) to further knowledge of the area and to locate and identify additional gold deposits.

26.5 Deposit Type

For Section 8, the QP has no recommendations to make.

26.6 Exploration

Eight, early stage prospects, listed in Table 26.6.1, are considered first priority for further surface exploration activities in 2022 with the goal of identifying new prospective, non-free milling sulphide drilling targets. The costs as outlined are a corporate cost and borne by the Issuer, and not SGO and/or the Project

Table 26.6.1 Proposed Exploration Programme

Area/Anomaly	Description	Proposed Cost (USD)
Bambaraya/Makana	Ground Geophysics/Trenching	200 000
Kiesta	Ground Geophysics/Trenching	80 000
Tiwana/Thianga	Mapping/Trenching	50 000
Tinkoto SW	Geochemical soil sampling	50 000
Goulouma-Korolon	Mapping/Trenching	30 000
Kobokoto	Mapping/Trenching	30 000
Khayrosita	Mapping/Trenching	30 000
Bransan W area	Regional Geoch. soil sampling	100 000

26.7 Drilling

Seven advanced prospects listed in Table 26.7.1 (all within the Massawa Mining Lease and less than 35 km from the Sabodala processing plant), have been prioritised for exploration drilling in the immediate to short term with the aim to quickly define, grow or upgrade the non-free milling Mineral Resource. The costs as outlined are a corporate cost and are borne by the Issuer, and not SGO and/or the Project

Table 26.7.1 Drilling Recommendations

Target	What	Proposed Drilling			Cost USD (M)
		Type	No. Holes	Total (m)	
Sofia North/Matiba	Sofia North Strike extension.	RC/DD	135	15,000	1.350
Makana 1 & 2	Strike extension and splays.	RC/DD	200	24,000	2.160
Bambaraya	Strike extension and splays.	RC/DD	100	12,000	1.080
Delya South	Delya South to Samina gap.	RC/DD	120	15,000	1.350
Tiwana/Thianga	High grade mineralised shoots & strike extension.	RC/DD	150	15,000	1.350
Kaviar/KB	Evaluation & strike extension.	RC/DD	300	30,000	2.700
Soma/Kawsara	High grade mineralisation shoots & strike extension.	RC/DD	200	24,000	2.160

26.8 Sample Preparation, Analyses and Security

The Qualified Person for Section 11.0, believes that sample preparation, analysis and security, is to the required standard and as such, there are no recommendations to be implemented/undertaken.

26.9 Mineral Processing and Metallurgical Testing

26.9.1 Free Milling Ores

Routine laboratory testwork will continue on the Massawa and Sabodala free-milling ores. This forms part of current operating budgets and no special testwork is required.

26.9.2 Refractory Gold Ores

Overall, the extensive testwork completed to date for the Massawa deposits, provides a sufficient and representative database for the Project's process design and economic analysis.

The following recommendations are proposed for additional testwork:

- 'Aging' testwork on the fresh ores to determine the likely gold recovery losses due to the tarnishing of sulphide minerals' surfaces over time when fresh ores are stockpiled for extended time periods. The costs for the 'Aging' testing is approximately USD 75,000 and the testwork will take 6 months to complete.
- Additional flotation and leach testwork on the Massawa CZ/NZ, and Delya reductive transitional ores to improve the geo-metallurgical modelling of this material. No additional time or cost allowance as this work will be undertaken as part of planned infill and grade control drilling, assay and testing programmes.

26.10 Mineral Resource Estimates

There is significant potential to upgrade and increase Mineral Resources with additional drilling in the Sabodala-Massawa Project.

A portion of the Mineral Resources that are classified as Inferred, and therefore not eligible to be converted to Mineral Reserves, are located near the pit designs used to report Mineral Reserves both along strike and at depth. These Inferred Mineral Resources have been defined by widely spaced drilling; however, a significant component of these Mineral Resources have the potential to be upgraded to the Indicated category with additional closer spaced drilling.

In addition, other areas, although not included in declared Mineral Resources, show geological continuity between and along strike of existing deposits located along the trend of the two regional scale shear zones that host the main Sabodala and Massawa deposits. Although mineralisation has been intersected in the few widely spaced holes drilled to date, insufficient drilling has been completed to define geological and grade continuity.

In light of the new Sabodala processing plant, a review of sulphide targets and deposits should be undertaken.

All costs associated with the development of Mineral Resource Estimates, are a corporate cost and are borne by the Issuer, and not by SGO and/or the Project.

26.11 Mineral Reserve Estimates

26.11.1 Geotechnical

Based on the geotechnical characterisation and analyses done by various engineers, the following recommendations must be considered to maintain and improve slope stability for all the pits. The cost is estimated to be approximately USD 50 000.

- As the pit slopes are developed, systematic geotechnical data collection and analysis must be undertaken to define the suitability of the existing slope design criteria and where necessary, adjust the approved slope designs.
- Ensure implementation of appropriate depressurisation measures. These could be in the form of external boreholes, weep holes, trenches and/or sumps.

- Surface water control management plans must be implemented for all pits prior to onset of the wet seasons.

The identified potential risks for the Project relating to mining geotechnics are:

- Not achieving the proposed slope designs within the saprolite slopes (if sufficient slope depressurisation is not achieved).
- Not achieving the targeted pit depths as a result of not achieving the inter-ramp angles within the fresh rock. Poor drill and blast practices lead to unachieved toes and back breaks with crest loss. Such instability may result in step-outs and may reduce mining depth.

26.11.2 Underground Mining

SLR recommends that the following be undertaken in relation to the Golouma and Kerekounda underground mines. The cost is estimated to be around USD 250 000 per deposit.

- Complete further geotechnical investigations and analysis of the underground mining areas. This will confirm the geotechnical conditions in the mining areas, which is a key driver of mine design.
- Remain in communication with mining contractors operating in the region. This will enable Endeavour and Sabodala-Massawa staff to stay informed of trends in mining contractor, equipment and labour costs in West Africa.
- Assess the feasibility of concurrent open pit and underground mining operations.
- Investigate alternative mining methods to increase productivity and decrease the mining unit costs.
- Complete periodic trade-off studies examining owner operation versus contractor operation.

26.11.3 Other

As discussed in Section 15.15, some opportunities exist to increase the mine's Mineral Reserves, through further drilling and studies, including:

- Technical studies should be carried out to assess the economic viability of underground mining for all of the Sabodala pits with the exception of Sofia Main, Goumbati West and Massawa. The Mineral Resource models are open at depth. The cost is estimated to be around USD 200 000 per deposit.
- There is 3.8 Mt of Inferred Mineral Resources at a grade of 1.90 g/t Au containing 233.5 koz Au within the pit designs. Additional drilling may present an opportunity to convert at least some of this Inferred material to Indicated Mineral Resources and increase the Mineral Reserve estimate. The cost is estimated to be in the range of USD (1 to 2) M.

As of the 'Effective Date', there is no budget assigned for further exploration drilling around the planned pits.

26.12 Mining Methods

Recommendations pertaining to Section 16.0 are defined in Sections 26.12.1 to 26.12.4 following.

26.12.1 Metallurgical Testing and Processing

Further metallurgical work needs to be carried out to determine:

- The impact of long-term stockpiling of the SSTP ore on gold recovery needs to be better defined. Natural oxidation with time, may lead to the oxidation of the sulphide minerals and as a result, the associated gold will not be recovered in flotation. Leachate from stockpiles maybe acidic and contain elevated levels of arsenic and antimony. Dirty water management infrastructure is in place for the water emanating from the ore stockpiles at Massawa and Sabodala. The costs for this work are covered under the recommendations for Section 13.0.

  Assess and quantify the impact of the various elements and minerals in the RoM feed, specifically with respect to processing characteristics and blending requirements. Consideration needs to be given to the carbonates associated with calcium, magnesium and iron in the RoM feed and deportment/entrainment in the flotation concentrate. The costs for this work are covered under the recommendations for Section 13.0.

  Quantify the impact of processing selected flotation tailings (oxide gold) from the SSTP through SWOLP. No budget is required at this point of time.

26.12.2 Open Pit Mining

The QP considers that the open pit mines as reported herein, are at a DFS level of development and as such, no further work activities and/or budget are required, other than that discussed in Section 15.0.

26.12.3 Underground Mining

The QP for underground mining, recommends that for the Kerekounda and Golouma deposits, the following activities be undertaken in order to move the underground mines from a PFS level of development to the next stage gate, either a DFS or execution.

- Plan and undertake further hydrogeological and geotechnical investigations and analyses of the underground mining areas. This will confirm the geotechnical conditions in the mining areas which is a key driver of the mine design. Estimated cost to complete is USD 500,000.
- On the basis of the future geotechnical and hydrogeological data collection, re-examine the underground mining methods and design. The design update should address fill strength requirements and ground support requirements. To be completed by Endeavour/SGO personnel and covered within existing operational budgets.
- Remain in communication with mining contractors operating in the region. This will enable SOG staff to stay informed of trends in mining contractor equipment, and labour costs in West Africa. To be completed by Endeavour/SGO personnel and covered within existing operational budgets.
- Assess the feasibility of concurrent open pit and underground mining operations. To be completed by Endeavour/SGO personnel and covered within existing operational budgets.
- Investigate alternative mining methods to increase productivity and decrease the mining unit costs. To be completed by Endeavour/SGO personnel and covered within existing operational budgets.

- Complete periodic trade-off studies examining owner operation versus contractor operation. To be completed by Endeavour/SGO personnel and covered within existing operational budgets
- Complete trade-off studies comparing mining methods and their operating and capital costs. To be completed by Endeavour/SGO personnel and covered within existing operational budgets.
- Undertake a feasibility design of the underground mines. The feasibility study should include feasibility-level mine designs, first-principles mine productivity estimates, operating cost modelling, and capital cost estimates. Vendor quotations should be obtained for all major equipment. Estimated cost to complete is USD 400 000.Prepare a project execution plan for starting the underground mining operations. To be completed by Endeavour/SGO personnel and covered within existing operational budgets.

26.12.4 Ore Haulage

Recommendations with respect to 'Ore Haulage' are discussed in Section 18.0.

26.12.5 Conversion on Inferred Resources to Reserves

Recommendations with respect to converting inferred resources into reserves, are discussed in Section 15.0

26.13 Recovery Methods

26.13.1 Sabodala Whole Ore Leach Plant (SWOLP)

It is recommended that the site team continue with geometallurgy testwork on new ore sources to confirm and optimise process performance. The costs for this activity are covered by existing operational budgets.

26.13.2 Sabodala Sulphide Treatment Plant (SSTP)

Additional testwork required for the SSTP has been identified in Section 13 'Metallurgy' of this Technical Report.

26.14 Project Infrastructure

26.14.1 Geotechnical

No further geotechnical investigation work is recommended. It is, however, recommended that a geotechnical engineer be present during construction to supervise the bulk earthworks and inspect the foundation excavations for critical structures. The costs associated with the presence of the on-site geotechnical engineer and soils testing during construction have been included in the Project budgets.

26.14.2 Transport and Logistics

The QP for Section 18.4 notes that the mine is operating well from an internal and external logistics perspective and does not foresee any issues as long as the frequency of vehicle movements, traffic safety, and dust is managed appropriately. As noted in Section 20, the dust management issue is currently being addressed with costs covered under operating budgets.

When the existing road haulage contract expires or at the end of equipment life, consideration could be given to replacing the existing truck/trailer fleet with side tippers, in a horse and two or three trailer configuration. The truck design/configuration should be in accordance with 'Performance Based Standards' (PBS), rather using off-the-shelf traditional designs. These units offer lower axel loadings (reduced road wear/damage), higher payloads (+90 t) and improved stability. Increasing truck payloads will reduce the frequency of vehicle movements, improve safety and reduce carbon emissions. The existing haulage system is working and thus, this is an optional consideration. There are no costs associated with this activity.

26.14.3 Power and Lighting

The SPS Expansion DFS report (QGE, November-2021) provides a comprehensive list of recommendations and actions. It is intended that the preferred contractor be engaged in an Early Contractor Involvement (ECI) phase, such that the relevant listed actions can be completed prior to the full contract execution and ultimately de-risk the project.

26.14.4 Site Services

The QP considers that the existing site services are appropriate to support the current mining and processing operations, and the expanded Phase 1 and Phase 2 services to be provided are sufficient to support the LoMp and have been developed to the requirements of a DFS. Thus, no further budget is required.

The SPS tank farm fire detection and protection issues need to be addressed as soon as practical. The budget for this is covered within the existing P2 budget.

26.14.5 Buildings Stores and Workshops

The QP considers that the buildings, stores, workshops and ancillary infrastructure noted in Section 18.8 that is either existing and/or to be built is suitable for the LoM planning requirements. Furthermore, for new facilities, the cost development is in accordance with the requirements of a DFS. Thus, no further budget is required.

26.14.6 Accommodation Facilities

The accommodation facilities on the Sabodala-Massawa Properties are of an appropriate standard and are sufficient to meet the housing requirements of non-resident staff for the Phase 1 and Phase 2 expansion requirements. Upgrades are currently underway and are covered under existing operational budgets.

26.14.7 Water Management

The following recommendations are made with respect to water management on the Sabodala property:

- Water supply to the process plant will require a backup line from the LRWD due to the SRWD not having sufficient capacity to supply the make-up water volume throughout the LoM (currently being undertaken at time of Report issue).
- It is recommended that the return water rates from the various TSFs be increased, if possible, to lessen the demand and impact on fresh water sources in addition to helping manage the surplus water on top of the TSFs.
- An antimony and arsenic precipitation plant will be required to manage surplus tailings water to reduce the build-up of these metals over the long-term. The cost of this plant is included within the SSTP DFS scope.

- Any new facilities that will contain CIL tailings will require a liner. Costs for liners are included in the TSF1B and TSF2 DFS budgets.
- The main parameters of concern that should be monitored in the TSF water are arsenic and antimony with the potential of high soluble cyanide. This is covered under operational budgets.

The following recommendations are proposed for Massawa-Sofia Property, based on the water balance results:

- Based on the modelling of the three rainfall scenarios considered, a 450 m^3/h water treatment plant (WTP) will be required to remove arsenic and antimony and any other elements above the required discharge limits. DWE recommends that the MWTP (greensands) design capacity be set at 600 m^3/h given sufficient storage capacity ahead of the plant. This will allow for storm events and will also provide back-up treatment capacity for months where additional water from the WRD areas will potentially require treatment if not in compliance. The costs of this plant are included in the Phase 1 budget.

26.14.8 Tailing Storage Facility

In moving forward with respect to the design and operation of the TSF, the following activities are recommended.

- Laboratory testing of all the BIOX® tailings stream is recommended to confirm assumptions with respect to the geotechnical behaviour of these materials. For this activity, USD 2900 should be allowed for testing only. This cost excludes sample generation, sample freight, and customs clearance costs.
- Detailed design of the TSF2, including a breakdown of quantities by stage. A budget of USD 29 000 should be allowed for this activity.
- Borrow investigations for TSF2 to identify all the materials within the impoundment area which can be deployed in the construction and develop borrow management plans such that the construction materials for each stage of construction are located and confirmed in terms of quality and quantity. This is required as part of pre-construction activities and an allowance of USD 20,000 should be allowed for local geotechnical personnel.
- Updating the existing tailings management documents (operations manuals) specifically for the operation and management of TSF1B (BIOX® residue) to incorporate details specific to this facility. This will be met through Endeavour's existing operational budgets.
- Review and fine tuning of the instrumentation and monitoring details to allow the performance of the TSFs to be compared with the design expectations. This is primarily an Endeavour cost and will need to be covered within existing operational budgets.
- Preparation and fine tuning of the closure and rehabilitation details. This is primarily an internal Endeavour cost which will involve community consultation and possibly external consultants.
- The existing construction plans prepared in 2020 will need to be updated. This is an internal cost to Endeavour as such, the QP offers no further comment.

26.14.9 Waste Rock Management

The QP is of the opinion that the technical development basis for the WRDs on the Sabodala-Massawa Properties is commensurate with the requirements of a DFS and no further work is required.

26.15 Market Studies and Contracts

26.15.1 Marketing

Endeavour will continue to use consensus market data (CMD) for commodity price assumptions while benchmarking against peers. This data is largely sourced from subscription services, and no further work or costs are required in this area.

The HFO price is likely to be subject to future volatility and it is recommended that focus be given to the current solar photovoltaic/battery studies underway. No further budget is required for this activity.

26.15.2 Contracts

It is recommended that SGO continue to develop local sourcing initiatives, including the upliftment of local communities. The costs for this activity are included in current budgets.

The terms of the BIOX® licensing agreement with SGO should be finalised before the FEED phase commences. The costs for this activity are included in current project implementation budgets.

26.16 Environmental Studies, Permitting, and Social or Community Impact

26.16.1 Overview

Over the 12 months of 2021, work has focused on improving the understanding and management of the potential groundwater and surface water impacts of the Project. Although a lot of work has been completed, the following additional environmental geochemistry work is recommended (Section 26.16.2)

26.16.2 Environmental Geochemistry

Additional test work is required to get more confidence regarding the Sabodala and Massawa tailings streams and tailings mixing, as well as the waste rock geochemistry. Potential mitigation measures in terms of water quality impact are required. This will be done through further static test work programmes as well as some bulk samples for kinetic test work.

The geochemical study can be refined through further characterisation of the waste rock as recommended below:

- Kinetic test work can be undertaken on the waste rock lithologies classified as 'inconclusive' by static test and a mixture of waste rock lithologies at ratios representative of the material that will constitute the waste rock dump. The purpose of the kinetic test will be the following:
  - To determine long-term weathering rates (sulphide oxidation, dissolution of neutralizing minerals, trace metal release) under oxygenated conditions.
  - To evaluate the lag time to acid generation.
- Geochemical modelling to indicate the potential pit water quality.
- The characterisation of the waste rock is from the analysis of drill core samples. Testing of blasted waste rock, the ore, and the resultant tailings from the processing of Massawa CZ/NZ and Delya ore are recommended to update the results of the study.

The indicative cost of the above-mentioned additional work is USD 30 000 (excluding laboratory costs). The proposed timeline of the work is dependent on the length of the kinetic test work. The tests vary from a minimum of 20 weeks to a maximum of 40 weeks. An additional 8 weeks are required for planning, modelling, and reporting. The longer and more conservative timeline for the Project will thus be 12 months.

26.16.3 Executing the Environmental and Social Plan

It is recommended that best international practices are followed during operation to ensure that plans are correctly executed, and that regular external and independent checks and audits are conducted to ensure that the correct mitigation measures are being applied during the operational phase.

26.17 Capital and Operating Costs

The overarching QP for Section 21.0 believes that the capital and operating costs are fair and accurate and no further work is required in this area.

26.18 Economic Analysis

Noting the economic model is simply a snap-shot in time, as at the Base Date, it is recommended that the economic model be updated on a regular basis. The updates should consider any significant operational updates and/or market updates. This work would be considered under normal operating procedures for a mining company, and as such would not require any additional budget allocation.

26.19 Adjacent Properties

Any business joint venture/toll treatment potential with the adjacent properties is outside of the scope of this Technical Report.

26.20 Other Relevant Data and Information

26.20.1 Project Execution Plan

The QP for this section believes that; the assumptions outlined in the PEP; the integrated execution schedule as proposed; and the date of first gold pour are realistic. Notwithstanding this, it is difficult to predict the implications of 'external factors', such as; war, disease/viruses and supply chain constraints, on the delivery and construction schedule. Currently, no allowance has been built into the schedule for 'external factors'.

26.20.2 Human Resources

Given that Massawa SA will integrate into SGO, which as an operating mine has well-defined policies, procedures and budgets, no further costs/resources need to be allocated to this area, over and above what is currently allowed for in existing budgets.

27.0 REFERENCES

27.1 Reliance on Other Experts

Endeavour Mining Plc. (2022). 2022, EDV, Property, Royalty, Tax and Metal Pricing Information.

27.2 Property, Description and Location

Endeavour. (2002). EDV Property, Payment and Revenue Basis, Rev 0. Standard. Retrieved 03 24, 2022, from https://riverstonecloud.egnyte.com/navigate/file/3f837f09-db49-4a24-9e70-2cd453dabd2c

Geni & Kebe . (2021, 11 01). The Mining Law Review: Senegal. Retrieved from The Law Review: https://thelawreviews.co.uk/title/the-mining-law-review/senegal-mining-law

27.3 Accessibility, Climate, Local Resources, Infrastructure and Physiography

African Centres for Lightning and Electromagnetics Network. (2022, 02 06). Lightning Stroke Density Maps for Africa (Courtesy of Vaisala). Retrieved from ACELNet: https://aclenet.org/programs/detecting-lightning-strikes/worldwide-lightning-detection---gld360.html

African Logistics Magazine. (2020, 12 19). 10 billion CFA fort the renovation of the railway and railway stations. Retrieved from Africa Logistics Magazine: https://www.africalogisticsmagazine.com/?q=en/content/senegal-10-billion-cfa-francs-renovation-railway-and-railway-stations

AQ2. (2020, 08 25). Sabodala IFD and Spillway Capacity Review (Final). Perth, Australia: AQ2.

Diagne, Mohamed (Group IT Manager). (2022, 02 09). Email from Diagne Mohamed regarding Senegal ICT Infrastructure. Senegal.

EnergyPedia. (2020, 09 09). Senegal Energy Situation. Retrieved from energypedia UG: https://energypedia.info/wiki/Senegal_Energy_Situation#Electricty_Generation

Miferso. (2022, 02 28). Projet integré d'exploitation des mines de fer de la falémé. Retrieved from Miferso: https://www.miferso.sn/sites/default/files/presentation_projet_faleme_nouvelle_strategie_de_developpement.pdf

Redwoods. (2022, 02 06). Kédougou, Senegal. Retrieved from Meteogram.org: https://meteogram.org/sun/senegal/kedougou/

Sabodala OHS Manager. (2022, 02 06). Email from Mamodou Bocoum on Local Sourcing. Sabodala, Senegal.

Souleymane Fall, D. N. (2006). Analysis of Mean Climate Conditions in Senegal (1971–98). American Meteorological Society, Volume 10, Issue 5.

Synergie Environnement. (2022). SGO-Massawa ESIA. Kedougou, Senegal.

U.S Aid. (2022, 01 11). Senegal Power Africa Fcat Sheet. Retrieved from U.S AID: https://www.usaid.gov/powerafrica/senegal

U.S International Trade Administration. (2020, 10 08). Senegal - Country Commercial Guide. Retrieved from U.S International Trade Administration: https://www.trade.gov/country-commercial-guides/senegal-energy

United Nations Industrial Development Organisation (UNIDO). (2022, 11 22). Groupe Consultatif Senegal. Retrieved from http://www.unido.or.jp/files/1.-Mr.-Diop_APIX.pdf

Wikipedia. (2022, 02 05). Energy in Senegal. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Energy_in_Senegal

Wikipedia. (2022, 02 05). Manantali Dam. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Manantali_Dam

Wikipedia. (2022, 02 06). Kédougou. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/K%C3%A9dougou

Wikipedia. (2022, 02 06). Sambangalou Hydroelectric Power Station. Retrieved from https://en.wikipedia.org/wiki/Sambangalou_Hydroelectric_Power_Station

Wikipedia. (2022, 02 06). Tambacounda. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Tambacounda

Wikipedia. (2022, 02 07). Dakar. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Dakar

World Bank & International Finance Corporation. (2022, 02 06). Communate Rurale de Sabodala. Retrieved from Global Solar Atlas: https://globalsolaratlas.info/detail?s=13.163302,-12.112849&m=site&c=13.163302,-12.112849,11

WorldData.Info. (2022, 02 06). Climate in Kédougou (Senegal). Retrieved from WorldData.Info: https://www.worlddata.info/africa/senegal/climate-kedougou.php

27.4 History

AMC Mining Consultants (Canada) Ltd. Technical Report on the Sabodala Gold Project, Senegal, West Africa, Prepared for Teranga Gold Corporation, June 2012.

AMC Mining Consultants (Canada) Ltd. Technical Report on the Sabodala Gold Project, Senegal, West Africa, Prepared for Teranga Gold Corporation, October 2013.

Barrick Gold Corp. 2019, Technical Report on the Feasibility of the Massawa Gold Project, Senegal Report for NI 43-101 July 2019.

Fall, Elhadji Malik October 2002, Summary of Mintech DD Document – Audit of the Sabodala Gold Project Techno-Economic Due Diligence. (Unpublished).

Randgold Resources 2017, Technical Report on the Massawa Gold Project, Senegal Report for NI 43-101 May 2017.

RPA (on behalf of Teranga Gold Corp.) 2017, Technical Report on the Sabodala Gold Project, Senegal, West Africa, issued 30 August 2017.

RPA 2017 Randgold Massawa Letter Report, Massawa Gold Project – Drill Sampling, QA/QC Process, and Pilot Plant Block Model Review; 25 August 2017.

SMC Exploration SOP_2014.doc (unpublished).

27.5 Geological Setting and Mineralisation

AMC Mining Consultants (Canada) Ltd. (2014): Technical Report on the Sabodala Gold Project, Senegal, West Africa, for Teranga Gold Corporation, March 2014.

Barrick Gold Corporation (2019): Technical Report on the Feasibility Study of the Massawa Gold Project, Senegal; 23 July 2019.

Gueye & al. (2008). Intrusive rocks and tectono-metamorphic evolution of the Mako Paleoproterozoic belt (Eastern Senegal, West Africa). Journal of African Earth Sciences, 50, 88-110.

Ledru & al. (1991). Transcurrent tectonics and polycyclic evolution in the Lower Proterozoic of Senegal-Mali. Precambrian Research, 50, 337-354.

Painter, M. (2005): Structural Constraints on Gold Mineralization at Sabodala, Prepared by RSG Global on behalf of Mineral Deposits Limited, November 2005.

Rhys, D. (2009): Structural Setting and Controls on Gold Mineralization on the Sabodala property, Senegal, November 2009, Independent Report Prepared By Panterra Geoservices Inc. For Mineral Deposits Limited. 23 November 2009.

Ross, K.V., and Rhys, D.A., (2009) Petrographic study of a sample suite from the Sabodala Gold Deposit and surrounding areas, Senegal. Panterra Geoservices Inc., unpublished report to Mineral Deposits Limited.

27.6 Deposit Type

Teranga Gold Corporation, 2020 - Sabodola-Massawa Project Pre-feasibility Study National Instrument 43-10 Technical Report. Issued 21 August 2020.

2020 Sabodala-Massawa Pre-Feasibility Technical Report.

27.7 Sample Preparation, Analyses and Security

AMC Mining Consultants (Canada) Ltd. 2014 - Technical Report on the Sabodala Gold Project, Senegal, West Africa, for Teranga Gold Corporation, March 2014.

Barrick Gold Corporation 201 - Technical Report on the Feasibility Study of the Massawa Gold Project, Senegal. Issued 23 July 2019.

CIM 2018 - CIM Mineral Exploration Best Practice Guidelines.

Randgold Resources Limited, 2014 - Competent Persons Report on the Massawa Project, Senegal, December 2014.

Randgold Resources Limited, 2017 - Technical Report on the Massawa Gold Project, Senegal. Issued 12 May 2017.

RPA, 2016 - Technical Report on the Sabodala Gold Project, Senegal, West Africa. Issued 22 March 2016.

Teranga Gold Corporation, 2020 - Sabodala-Massawa Project Pre-feasibility Study National Instrument 43-10 Technical Report. Issued 21 August 2020.

27.8 Mineral Processing and Metallurgical Testing

CENTRAL ZONE PROCESS ROUTE TRADE-OFF STUDY PFS RECOVERIES - SS 0672- 0000-0W11-004 Rev C dated 12 February 2018.

FLOWSHEET DEVELOPMENT AND VERIFICATION – EFFECT OF GRIND – MASSAWA CENTRAL ZONE - Memo dated 3 August 2017.

Massawa 1.2 Mt/y SS SAG Milling Option, Report No. 7246-1 Rev 0, dated 25 February 2020.

Massawa Comminution Circuit Equipment, Single Stage versus Two Stage for 1.2 Mt/y, Report No. 5139-MEM-001 Rev 0, dated 13 April 2020.

MASSAWA FLOWSHEET DEVELOPMENT – CONCENTRATE HANDLING (ALBION) - Memo dated 30 October 2017.

MASSAWA SOFIA FLOWSHEET DEVELOPMENT - EFFECT OF CYANIDE ADDITION - Memo dated 08 August 2017.

POWER SUPPLY TRADE- OFF - Document Number SS 0655-0000-0W11-001 dated 21 April 2017.

PRESSURE OXIDATION VERSUS BACTERIAL OXIDATION - Memorandum dated 02 March 2017.

PROCESS ROUTE SELECTION TRADE-OFF STUDY - Document Number SS0672-0000-0W11-003 Rev 0B dated 25 June 2017.

S. Ramazan, Endeavour. (2022, 03 03). SGO_Reserve685_Schedule_2021_Tier1_20220303_V45.2.

Sabodala Project, 4 Mt/y Comminution Circuit Evaluation, Report No. 7246 Rev B, dated January 2020.

27.9 Mineral Resource Estimates

CIM (2014): CIM Definition Standards for Mineral Resources and Mineral Reserves; Prepared by the CIM Standing Committee on Reserve Definitions; Adopted by CIM Council on 10 May 2014.

Rhys, D. (2009): Structural Setting and Controls on Gold Mineralization on the Sabodala property, Senegal, November 2009, Independent Report Prepared By Panterra Geoservices Inc. For Mineral Deposits Limited. 23 November 2009.

Srivastava, R. M., (2014): Dry Bulk Density for the Masato Resource Block Model, Independent Memo Prepared by Benchmark Six for Teranga Gold Corp., 4 December 2014.

Teranga Gold Corporation (2020): Sabodala-Massawa Project Pre-feasibility Study National Instrument 43-101 Technical Report. Issued 21 August 2020. Compiled by Lycopodium.

27.10 Mineral Reserve Estimates

Artois Consulting (2018), Massawa Mining Feasibility Study – Hydrogeological Assessment for pit dewatering, Technical Report, December 2018 (File ref. Massawa-dec18-FSreport-version0.pdf).

W Sarunic, Xstract Geotechnical Division (2016), Sabodala Phase 4 Pit Cutback Memorandum.

W Sarunic, Xstract Geotechnical Division (2020), Massawa Combined Geotechnical Design Review, December 2020

SRK Consulting (UK) Limited (2021), Competent Persons' Report on the Mineral Assets of Endeavour Mining PLC, Report No. UK30841 June 2021.

SRK Consulting (UK) Limited Sabodala FS Technical Report 12 – UG Mining, SRK, 2010.

Consensus Market Data. (2022). Commodity Profile. Retrieved from S&P Capital IQ.

Dr. Peter JS Gash, MineNet (Jan 2017), Slope Design Parameters for the PEA - Sofia Project, January 2017 Memorandum (File ref. Sofia-PEA-Slopes.pdf).

Dr. Peter JS Gash, MineNet (June 2017), Geotechnical Site Investigation and Open Pit Slope Design for Sofia Main, Status Report, June 2017 (File ref. Sofia-Main-June2017-PG1-CVE-F.pdf).

Minenet Consulting Mining Engineers (June 2017), Geotechnical site investigation and open pit slope design for Sofia Main.

Dr. Peter JS Gash, MineNet, (Feb 2018), Geotechnical Site Investigation and Open Pit Slope Design for Sofia North, February 2018 , (File ref. Sofia-North-Feb2018.pdf).

Dr. Peter JS Gash, MineNet, (June 2018), Geotechnical Site Investigation and Open Pit Slope Design of Delya Open Pit Mine, June 2018, Memorandum.

Dr. Peter JS Gash, MineNet, (Jan 2019),Geotechnical Investigations and Mine Design Specifications, January 2019 Memorandum (File ref. Geotechnical Investigations and Mine Design-PG1-CVE1.pdf).

27.11 Mining Methods

Geotechnical Investigations and Mine Design Specifications, January 2019 memorandum by Dr. Peter JS Gash of Minenet (file ref. Geotechnical Investigations and Mine Design-PG1-CVE1.pdf).

Geotechnical Site Investigation and Open Pit Slope Design for Sofia Main, Status Report, June 2017 report by Dr. Peter JS Gash of Minenet (file ref. Sofia-Main-June2017-PG1-CVE-F.pdf).

Geotechnical Site Investigation and Open Pit Slope Design for Sofia North, February2018 report by Dr. Peter JS Gash of Minenet (file ref. Sofia-North-Feb2018.pdf).

Geotechnical Site Investigation and Open Pit Slope Design of Delya Open Pit Mine, June 2018, memorandum by Dr. Peter Gash of Minenet.

In 2015, Teranga Gold engaged Xstract to conduct the geotechnical analysis and design of the Niakifiri Open Pit.

Massawa Combined Geotechnical Design Review, December 2020 memorandum by Will Sarunic of Xstract. Xstract provided Geotechnical Design Criteria for Massawa North and South Pits, Sofia Main North and South Pits and Delya Open Pit.

Sabodala Feasibility Study Technical Report 12 – Underground Mining, 2010 by SRK.

Sabodala Phase 4 Pit Cutback, December 2016, memorandum by Will Sarunic of Xstract.

Slope Design Parameters for the PEA - Sofia Project, January 2017 memorandum by Dr. Peter JS Gash of Minenet (file ref. Sofia-PEA-Slopes.pdf).

27.12 Recovery Methods

Lycopodium document 2111-FPDC-001_C, Lycopodium Process Design Criteria and Balances.

S. Ramazan, E. (March-2022). SGO_Au8_Schedule_T1_20220306_V49.6_ox50.

27.13 Project Infrastructure

Advisian/WorleyParsons. (2016).

Coffey Mining Pty Ltd. (2011). Plant Expansion Site Preliminary Geotechnical Investigation Report. Retrieved 05 2011.

Harmsworth, I. (2021). ROT Plant Layout Considerations. Teranga Gold MCT. Retrieved 03 22, 2021.

MineScope. (LoM-2021, 02 24). 20210224 LOM Production Update (2020EOY_TGZ_2P_vc).

MineScope. (SSTP-2021, 11). 20211111 - ROT Plant Tailings Schedule.

MineScope. (SWOLP-2021). 20211111 - Sabodala WOL Mine Schedule.xls.

Mining One Pty Ltd. (2007, 07). ‘Plant Site Civil Geotechnical Investigation'.

QGE. (March-2021). Sabodala Power Station Upgrade Feasibility Study Report. Retrieved from Sabodala Power Station Upgrade Feasibility Study Report.

QGE. (November-2021). Sabodala Power Station Upgrade Definitive Feasibility Study Report, 1079 003 601 005 RPT-003.

QGE. (September-2021). Sabodala PS Expansion Load List Summary, 1079-003-601-005-SCH-002.

27.14 Market Studies and Contracts

Bloomberg. (2022).

Blot, J. (2022, 03 14). SGO and Massawa Contractual Relationship.

Consensus Market Data. (2022). Commodity Profile. Retrieved from S&P Capital IQ.

Consensus Market Data. (2022). Commodity Profile. Retrieved from S&P Capital IQ.

Endeavour. (2021). Appendix 1_2022 Assumptions Workbook Budget.v4.

Historical Exchange Rates. (2022). Currency Exchange Rates. Retrieved from S&P Capital IQ: https://www.capitaliq.spglobal.com/web/client?auth=inherit#markets/exchangeRates

Organisation for Economic Development (OECD). (n.d.). Environmental Policies in the Steel Industry. Retrieved 03 08, 2022, from https://www.oecd.org/env/tools-evaluation/2488478.doc

Price Waterhouse Coopers. (2020, 12). Gold and Copper Price Survey, December 2020.

T. Barclay (SGO Commercial Manager). (2022, 02 12). Email outlining operational contracts in place for SGO. Senegal.

World Bank. (2022). Inflation, consumer prices (annual %). Retrieved from The World Bank: https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=BF

27.15 Environmental Studies, Permitting, and Social or Community Impact

Digby Wells (2018a). Environmental and Social Impact Assessment Report. Prepared for Randgold Resources Limited, Senegal.

Digby Wells. (2018b). Fauna and Flora Impact Assessment Report, Environmental and Social Impact Assessment for the Massawa and Sofia Gold Project, Senegal: Unpublished specialist report.

Digby Wells. (2018c). Surface Water Impact Assessment Report, Environmental and Social Impact Assessment for the Massawa and Sofia Gold Project, Senegal: Unpublished specialist report.

Digby Wells. (2021). Water and Salt Balance Report, Environmental and Social Impact Assessment for SGO-Massawa Integrated project. Senegal: Unpublished specialist report.

Ennih, N. & Liegeois, J.-P. (2008). The boundaries of the West African craton, with special reference to the basement of the Moroccan metacratonic Anti-Atlas belt. Geological Society, London, Special Publications, pp. 1-17.

ERM & Tropica. (2019). Environmental and Social Impact Assessment for the Niakafiri Project, Senegal.

FAO. (2014). World Reference Base for Soil Resources. International Soil Classification for naming Soils and creating legends for soil maps. World Soil Resources Reports 106. Rome.

IFC. (2012). Performance Standards on Environmental and Social Sustainability and Guidance Notes. International Finance Corporation, Washington DC.

Lawrence, D. et al. (2013). Géologiques. The Geology and Mineralogy of the Loulo Mining District, Mali, West Africa: Evidence for Two Distinct Styles of Orogenic Gold Mineralization. Society of Economic Geologists Inc, pp. 199-227.

Oryx. (2021). Biodiversity Management Plan for the Massawa Mining Permit, Kedougou, Senegal.

Synergie Environnement (2022). Environmental and Social Impact Assessment Report for the SGO-Massawa Integrated Project. Senegal.

27.16 Capital and Operating Costs

Endeavour. (2022). 2022, EDV Property, Payment and Revenue Basis, Rev 0. Studies. Retrieved from https://riverstonecloud.egnyte.com/navigate/file/3f837f09-db49-4a24-9e70-2cd453dabd2c

Endeavour. (2022). 2022-04-26, SAB-MAS, CAPEX-OPEX, Pie Charts. Retrieved from https://riverstonecloud.egnyte.com/navigate/file/6648dbf4-3d8f-40b8-b083-dc770dd55e64

Oreology. (2022). Oreology, 0786_EDV_Massawa_FS_CostModel_monthly_V3.0_220125. Retrieved from https://riverstonecloud.egnyte.com/navigate/file/8758b2f1-e062-4c24-9e2d-c59b77b5075a

Page, M. (2022, 04 26). 220201 Sabodala-Massawa DFS - V21 (2022-04-26) v2. Retrieved from https://riverstonecloud.egnyte.com/navigate/file/2f98bb90-49c6-47c9-972a-04f75e96f582

SGO. (2022, 03 29). SGO_ InputCostModel_20220329_V34. Retrieved from https://riverstonecloud.egnyte.com/navigate/file/8d87b014-9bf9-4959-bde7-585f20a9258c

27.17 Economic Analysis

Endeavour. (02-2022, 02 01). 220201 Sabodala-Massawa DFS - V21. Retrieved from https://riverstonecloud.egnyte.com/navigate/file/e37a3860-1ac3-4885-bc6b-fbb3e617df97

Endeavour. (2021). Appendix 1_2022 assumptions workbook budget.v4.

Endeavour. (2022). 2022, EDV, Property, Royalty & Metal Pricing Information. Studies. Endeavour.

27.18 Adjacent Properties

Bassari Resources, https://www.bassariresources.com/resources-reserves.html

Resolute Mining, Press Release, Ore Reserves and Mineral Resource Statement at 31 December 2021. Dated 4 March 2022 (https://clients3.weblink.com.au/pdf/RSG/02495476.pdf)

Thor Explorations NI 43-101 Technical Report – Mineral Resource Estimate, Douta Gold Project, Senegal. January 2022A.

27.19 Other Relevant Data and Information

Cordes, K. e. (2016, 07). Employment from Mining and Agricultural. Columbia Center on Sustainable Investment. Retrieved from https://scholarship.law.columbia.edu/cgi/viewcontent.cgi?article=1087&context=sustainable_investment_staffpubs

PWC. (2012, 05 15). America's School of Mines, Economic Impact Analysis. Retrieved from https://www.pwc.com/gx/en/mining/school-of-mines/2012/pwc-realizing-the-value-of-your-project-economic-impact-analysis.pdf

28.0 DATE AND SIGNATURE PAGE

This 'NI 43-101 Technical Report Update', for the Issuer's 'Sabodala-Massawa Project, in southeast Senegal, with an issue date of 9 May, 2021, was prepared and signed by the following Authors.

Name: Degree and Professional Association: Company: Signature: Date:	Bryan Pullman PEng, Member of the 'Association of Professional Engineers and Geoscientists of Alberta (APEGA)' SLR Consulting (SLR) (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	Chris Lane Chartered Geologist with the 'Geological Society of London' Land & Marine Geological Services Pty Ltd (L&MGSPL) (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	Clinton Bennet Fellow of the 'Australian Institute of Mining and Metallurgy' Endeavour Mining plc (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	David Gordon Fellow of the 'Australian Institute of Mining and Metallurgy' Lycopodium Limited (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	Graham Trusler Chartered member of the 'Engineering Council of South African' Digby Wells Environmental (DWE) (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	Kevin Harris Chartered Professional Geologist, with the 'American Institute of Professional Geologists' Endeavour Mining plc (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	Michael Davis Fellow of the 'Australian Institute of Mining and Metallurgy' Mine Scope Services Pty Ltd (MineScope) (signed and sealed) 9 May 2022

Name: Degree and Professional Association: Company: Signature: Date:	Royce McAuslane Fellow of the 'Australian Institute of Mining and Metallurgy' Mine Scope Services Pty Ltd (MineScope) (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	Salih Ramazan Fellow of the 'Australian Institute of Mining and Metallurgy' Endeavour Mining plc (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	Stuart Thomson Fellow of the 'South African Institute of Mining and Metallurgy' Endeavour Mining plc (signed and sealed) 9 May 2022
Name: Degree and Professional Association: Company: Signature: Date:	Terry Ozanne Chartered Professional Engineer with 'The Institution of Engineers, Australia' QGE Group (signed and sealed) 9 May 2022

29.0 QP CERTIFICATES

CERTIFICATE OF QUALIFIED PERSON

I Bryan Pullman, B.Sc.(Eng.) (Mining) do hereby certify that:

1. I am a Principal Mining Engineer at SLR Consulting Ltd ('SLR')., 97 Tottenham Court Road, London, W1T 4TP United Kingdom.
2. I am a co-author of the Technical Report titled 'Sabodala-Massawa Technical Report Update', effective date of 31 December 2021.
3. I graduated with a degree from the Queen's University, Canada, with a Degree in Mining Engineering (2002).
4. I am a Professional Member of the Association of Professional Engineers and Geoscientists of Alberta (APEGA). My membership number is: 87807
5. I have worked as a mining engineer for a total of 20 years since graduation, 15 of which has been as a Professional Engineer. Relevant experience includes mine engineering at underground gold mining operations and projects in Canada, the United States of America, Mexico, the United Kingdom, Finland, Sweden, Spain, Ghana, Mali, Senegal, and Tanzania since graduation. Involved in mine engineering at underground operations and projects utilizing mining methods including mechanized cut and fill, longhole stoping (with and without fill) and sub-level caving.
6. I have read the definition of 'qualified person' as set out in National Instrument 43-101 ('NI 43-101') and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a 'qualified person' for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.15.2, 1.15.3, 12.8.2, 15.8, 16.2.5, 16.4, 16.6.2, 16.6.3, 16.9.2, 21.2.3.2, 25.11.5, 25.11.6, 25.12.2, 26.11.2 and 26.12.3].
8. I have not visited site.
9. I have not had prior involvement with the property that is the subject of this Technical Report.
10. I am independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated: 9 May 2020

Signed and Sealed

"Bryan Pullman"

Bryan Pullman, P.Eng.

B.Sc.(Eng.), Principal Mining Engineer, SLR

CERTIFICATE OF QUALIFIED PERSON

I James Christopher Lane (Chris Lane), Bachelor of Applied Science (Engineering and Environmental Geology) do hereby certify that:

1. I am the Principal Consultant with Land & Marine Geological Services Pty Ltd (L&MGSPL), 20 Daisy Rise, Cowaramup, Western Australia, 6284, Australia.
2. I am a co-author of the Technical Report titled ‘'Sabodala-Massawa Project, Senegal, Technical Report Update', effective date 31 December 2021.
3. I graduated with a degree from the Canberra College of Advanced Education, now known as Canberra University, Canberra Australia, with a Bachelor of Applied Science (Engineering and Environmental Geology) in 1975 and completed an MBA at the University of New South Wales, Sydney, Australia in 2002.
4. I am a Registered Professional Geoscientist (10009) with the Australian Institute of Geoscientists, and Registered Professional Engineer of Queensland (RPEQ 13083), a Chartered Member of the Australian Institute of Mining and Metallurgy, MAusIMM (CP Membership No. 109219), a Chartered Geologist with the Geological Society of London (Membership 14006).
5. I have worked as an Engineering Geologist for a total of 44 years since graduation, 33 of which covers aspects from project development to start-up through to closure including design, construction, auditing and tailings/residue management reviews for a large number of projects covering a range of commodities including: alumina residue, bauxite residue, base metals (copper, lead and zinc), coal, gold, graphite, iron ore, manganese, mineral sands, nickel (sulphide and laterite), phosphate residues, rare earth residues, uranium and vanadium. Relevant experience includes projects in the following countries:

   - Australia and New Zealand
   - Armenia
   - Middle East (Egypt, Iran and Saudi Arabia);
   - Pakistan;
   - Southeast Asia (Indonesia, Malaysia, Papua New Guinea, Philippines and Vietnam);
   - East Africa (Ethiopia, Mozambique, Tanzania);
   - Southern Africa (South Africa and the Democratic Republic of Congo);
   - West Africa (Burkina Faso, Cote D’Ivoire, Ghana, Mali, Senegal);
   - North Africa (Tunisia);
   - Central America (Mexico); and
   - South America (Brazil, Chile, Guyana and Uruguay).

   My experience covers work in the following climatic regimes:

   - Tropical (high rainfall).
   - Humid Savannah (high seasonal rainfall).
   - Temperate.
   - Semi-arid.
   - Arid.
   - Hyper Arid

In addition to conventional paddock and valley fill tailings storage facilities special interests are:

- Dry stacked tailings storage facilities (DSTSF).
- In-pit tailings.
- Integrated waste landforms (IWL), which is a TSF within a mine waste dump

6. I have read the definition of 'qualified person' as set out in National Instrument 43-101 ('NI 43-101') and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a 'qualified person' for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.17.1, 1.17.5, 12.10.2, 18.3.1, 18.10.1, 18.12.1, 18.12.8, 21.3.3.7, 24.1.5, 25.14.1, 25.14.8, 26.14.1, 26.14.8]
8. I have visited site at least once a year from 2010 to 2019 as part of the annual TSF Geotechnical Review with each site visit typically of 4 days duration. Details of site visits are listed below. My last site visit was 17 to 27 October 2021.
   - 23 to 26 January 2010
   - 20 to 24 January 2012 – Airstrip Geotechnical Work
   - 10 and 12 November 2012
   - 12 to 15 January 2013
   - 9 and 11 November 2013
   - 3 and 4 August 2014
   - 28 February 2015 to 3 March 2015 – Heap Leach Project
   - 18 and 20 July 2015
   - 3 and 5 April 2016
   - 29 March and 1 April 2017
   - 29 April and 2 May 2018
   - 29 May to 1 June 2019
   - 17 to 27 October 2021
9. I have had prior involvement with the property that is the subject of this Technical Report. Prior involvement includes the annual TSF Geotechnical Review includes involvement with the planned airstrip (yet to be constructed) and the Heap Leach Project.
10. I am independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated: 9 May 2022

Signed and Sealed

"Christopher Lane"

James Christopher Lane

CGeo, Managing Director/Principal Consultant, Land & Marine Geological Services pty Ltd

CERTIFICATE OF QUALIFIED PERSON

I Clinton Bennett, Associate Diploma of Science (Chemistry), Bachelor of Science (Hons) (Molecular Sciences), Postgraduate Diploma of Science (Extractive Metallurgy), Master of Science (Mineral Economics), Master of Law (Energy and Resource Law) do hereby certify that:

1. I am the General Manager for Société des Mines d'Ity (SMI) at Endeavour Mining, 5 Young Street, London, W8 5EH, United Kingdom.
2. I am a co-author of the Technical Report titled ‘'Sabodala-Massawa Project, Senegal, Technical Report Update' effective date 31 December 2021.
3. I graduated with a degree from the Curtain University, Australia, with a Post Graduate Diploma in Sicence in Extractive Metallurgy (2005). Relevant further qualifications include:
   Curtain University, Australia Master of Science (Mineral Economics) (2016);
   Australasian Institute of Mining and Metallurgy, Professional Certificate in JORC Code Reporting (2019)
4. I am a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM). My membership number is: 220932
5. I have worked as a [Process Engineer Metallurgist] for a total of [22] years since graduation, [15] of which has been with Senior Management roles (Process Manager, General Manager, Vice President Metallurgy and Process Improvement, Corporate Technical Roles). Relevant experience includes: (Australia, Saudia Arabia, Mali, Indonesia, Burkina Faso, Ivory Coast, Gold, Silver, Copper, Nickel, Cobalt, Lead, Zinc, Uranium, Metallurgical discipline, Crushing (Jaw and Gyratory) and Milling (SAG, Ball and Stirred), Gravity Separation (Centrifugal, Tabling, Jigs, Dense Media Separation) , Flotation (Flash and Conventional), Atmospheric and Pressure Leaching, Dewatering (Thickening, Filtration) Tailings Disposal).
6. I have read the definition of ‘qualified person’ as set out in National Instrument 43-101 (‘NI 43-101’) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a ‘qualified person’ for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.16.1, 12.6.1, 12.9.1, 13.2.1, 13.3.1, 13.7.1, 13.9.1, 17.1.2, 17.2.1, 17.3.1, 17.4.1, 17.5.1, 17.6.1, 17.7.1, 17.9.1, 18.7.8.1, 21.2.5.1, 21.8.2, 25.9.1, 25.13.1, 26.9.1 and 26.13.1]
8. I have visited site. Site visit dates are as indicated below:
   - [‘8’ days from 3 March 2021 to 10 March 2021]
9. I have not had prior involvement with the property that is the subject of this Technical Report.
10. I am not independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated: 9 May 2022

Signed and Sealed

"Clinton Bennett"

Clinton Bennett

FAusIMM, General Manager Société des Mines d'Ity (SMI), Endeavour

CERTIFICATE OF QUALIFIED PERSON

I David Gordon, B. App. Sc. Engineering Metallurgy do hereby certify that:

1. I am General Manger - Process at Lycopodium Minerals Pty Ltd, 1 Adelaide Terrace, East Perth, 6004, Western Australia, Australia.
2. I am a co-author of the Technical Report titled 'Sabodala-Massawa Technical Report Update', effective date 31 December 2021.
3. I graduated with a degree from the Western Australian Institute of Technology, with a B. App. Sc. (Bachelor of Applied Science) degree in Engineering Metallurgy (1983).
4. I am a fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM). My membership number is: 108413.
5. I have worked as a metallurgist/process engineer for a total of 39 years since graduation, over 15 of which has been as a metallurgist/process engineer in gold plant testwork, design and operations. Relevant experience includes:
   - Managed, interpreted and reported the results from numerous testwork programs on gold ores.
   - Involved in the detailed design of numerous gold processing plants.
   - Optimised and commissioned multiple gold plants.
6. I have read the definition of 'qualified person' as set out in National Instrument 43-101 ('NI 43-101') and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a 'qualified person' for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [3.5, 18.3.2, 18.7.8.2, 18.8.2, 21.1.5, 21.1.6.1, 21.1.6.3, 21.1.6.7, 21.1.6.8, 21.1.6.14, 21.1.6.17, 21.1.6.18, 21.2.5.2, 21.3.2.2, 21.8.3, and 24.1.3]
8. I have not visited site.
9. I have not had prior involvement with the property that is the subject of this Technical Report.
10. I am independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated 9 May 2022

Signed and Sealed

"David Gordon"

David Gordon

FAusIMM, General Manager - Process, Lycopodium Minerals Pty Ltd

CERTIFICATE OF QUALIFIED PERSON

I Graham Errol Trusler, MSc, Pr Eng, MIChE, MSAIChE do hereby certify that:

1. I am CEO of Digby Wells and Associates Pty Ltd (DWA), Turnberry Office Park, Digby Wells House, 48 Grosvenor Road, Bryanston, 2191, South Africa
2. I am a co-author of the Technical Report titled ‘'Sabodala-Massawa Project, Senegal, Technical Report Update' effective date 31 December 2021.
3. I graduated from the University of KwaZulu-Natal, South Africa in 1988, with a Masters Degree in Chemical Engineering Degree. Relevant further qualifications include:
   - B.Comm, Economics and Business Economics
4. I am registered as a Professional Engineer (920088) with the Engineering Council of South Africa. I am also registered as a Member of the Institution of Chemical Engineers (SAIChE) since1994. I am also registered as a Chartered Chemical Engineer with the Institution of Chemical Engineers, as a fellow of the Water Institute of South Africa, and a lifetime member of the American Society of Mining and Reclamation.
5. I have worked as an engineer for a total of 30 years since graduation, 29 of which has been as a consultant and expert within the mining industry in metallurgical production, research and environmental and social management. Relevant experience includes:
   - Overseeing numerous ESIA and EMP developments across Africa and in particular west-Africa. This also includes the Massawa 2018 ESIA.
   - Social and Environmental Management Plans and coordination of projects that includes the oversight of and leading teams involved in aquatic ecology, biodiversity, social, GIS, soils, wetlands, rehabilitation, environmental legal requirements, ESG, closure plans and cost assessments, surface and groundwater and serving on environmental oversight committees.
6. I have read the definition of ‘qualified person’ as set out in National Instrument 43-101 (‘NI 43-101’) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a ‘qualified person’ for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.17.4, 1.19, 18.6, 18.12.4, 20, 21.5, 25.14.4, 25.16, 26.14.7, and 26.16]
8. I and my specialist team have visited site. Site visit dates are as indicated below:
   - 19 to 22 February 2018 (self)
   - 07 to 14 February 2021 (last visit by specialist team)
9. I have had prior involvement with the property that is the subject of this Technical Report. Prior involvement includes:
   - Conducting the ESIA and ESMP for the Massawa and Sofia Project for Randgold Resources (now Barrick) for the period 2017 to 2019
10. I am independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated: 9 May 2020

Signed and Sealed

"Graham Trusler"

Graham Errol Trusler

MSc, Pr Eng, MIChE, MSAIChE, CEO, DWA

CERTIFICATE OF QUALIFIED PERSON

I Kevin Harris, BS/MS (Geological Engineering/Geology) do hereby certify that:

1. I am a Vice President Resources at Endeavour Mining Corporation located at 5 Young Street, London, England, United Kingdom of Great Britain and Northern Ireland.
2. I am a co-author of the Technical Report titled ''Sabodala-Massawa Project, Senegal, Technical Report Update', effective date of 31 December 2021.
3. I graduated with a Bachelor of Science in Geological Engineering (1980) and a Master of Science in Geology (1991) degree from the South Dakota School of Mines and Technology, Rapid City, South Dakota, United States of America.
4. I am a Certified Professional Geologist (CPG) of the American Institute of Professional Geologists (AIPG). My membership number is: CPG-11639
5. I have worked as a Resource Geologist/Engineer/Mining Manager for a total of 31 years since graduation, 20 of which has been as a [Resource Geologist]. Relevant experience includes:
   - Exploration Geologist
   - Mine Geologist
   - Mining Engineer
   - Mining Manager
   - Resource Geologist
   - West Africa gold exploration and resource geologist continually since 2010
6. I have read the definition of 'qualified person' as set out in National Instrument 43-101 ('NI 43-101') and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a 'qualified person' for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.13, 1.22, 6, 7, 8, 9, 10, 11, 12.2, 12.3, 12.14, 14, 23, 25.3, 25.4, 25.5, 25.6, 25.7, 25.8, 25.10, 25.19, 26.3, 26.4, 26.5, 26.6, 26.7, 26.8, 26.10, and 26.19].
8. I have visited site. Site visit dates are as indicated below:
   - 7 days in April 2021 and 7 days in September/October 2021
9. I have not had prior involvement with the property that is the subject of this Technical Report.
10. I am not independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the 31 December 2021, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated: 9 May 2022

Signed and Sealed

"Kevin Harris"

Kevin Harris

CPG, Vice President Resources, Endeavour Mining plc

CERTIFICATE OF QUALIFIED PERSON

I Michael Davis, Bachelor of Engineering (Chemical and Materials) do hereby certify that:

1. I am a Principal Consultant - Process at MineScope Services Pty Ltd, 77 Hay Street, Subiaco, WA, 6008, Australia.
2. I am a co-author of the Technical Report titled ''Sabodala-Massawa Project, Senegal, Technical Report Update', effective date 31 December 2021.
3. I graduated with a degree from the Auckland University, New Zealand, with a Bachelor of Engineering in Chemical and Materials (1989).
4. I am a fellow of the Australian Institute of Mining and Metallurgy (FAusIMM). My membership number is: 111242.
5. I have worked as a Process Engineer for a total of 33 years since graduation, 10 years of which has been as a Principal Consultant - Process. Relevant experience includes:
   - I have worked extensively in the gold industry, specifically refractory gold for the last 27 years.
   - I have worked extensively in West and East Africa for the last 10 years.
   - I have been involved in reviews, studies, designs, or operation of 8 Bio-oxidation plants located in Africa, Australia, Asia and Russia.
6. I have read the definition of 'qualified person' as set out in National Instrument 43-101 ('NI 43-101') and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a 'qualified person' for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.12, 1.16.2, 12.6.2, 12.9.2, 13.1, 13.2.2, 13.3.2, 13.4, 13.5, 13.6, 13.7, 13.7.2, 13.8, 13.9.2, 17.1.3, 17.2.2, 17.3.2, 17.4.2, 17.5.2, 17.6.2, 17.7.2, 17.9.2, 25.9.2, 25.9.3, 26.9.2, 25.13.2, and 26.13.2]
8. I have visited site. Site visit dates are as indicated below:
   - 3 days from 16 to 18 September 2020
9. I have had prior involvement with the property that is the subject of this Technical Report. Prior involvement includes:
   - DFS and Design of the Sabodala Whole-Ore-Leach Plant (SWOLP)
10. I am independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated 9 May 2022

Signed and Sealed

"Michael Davis"

Michael Davis

FAusIMM, Principal Consultant, MineScope Services Pty Ltd

CERTIFICATE OF QUALIFIED PERSON

I Royce McAuslane, BSc (Mineral Science) do hereby certify that:

1. I am a Director at MineScope Services Pty Ltd, Suite 2, 77 Hay Street, Subiaco, West Australia, 6008 Australia.
2. I am a co-author of the Technical Report titled ‘'Sabodala-Massawa Project, Senegal, Technical Report Update', effective date 31 December 2021.
3. I graduated with a degree from the Murdoch University, Australia, with a Bachelor Degree in Science (1999).
4. I am a Fellow of the Australasian Institute of Mining and Metallurgy (AusIMM). My membership number is 211257
5. I have worked as a Metallurgist and Study Manager for a total of 22 years since graduation, 12 of which has been as a Study Manager. Relevant experience includes: (8 years continuous experience on brownfields and greenfields studies in Africa, completion of multiple audits and studies of projects and operations containing refractory technology (BIOX® - Jinfeng Gold Project, Runruno Gold Project, Bogosu Gold Operations. Roasting – Syama Gold Operations, Tanjianshan Gold Operations, Ultra Fine Grind – Sukara Gold Mine).
6. I have read the definition of ‘qualified person’ as set out in National Instrument 43-101 (‘NI 43-101’) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a ‘qualified person’ for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.17.2, 1.17.7, 1.17.8, 1.17.9, 1.20, 1.21, 1.23, 1.24, 1.25, 12.1, 12.10.1, 12.11, 12.12, 17.1.1, 18.1, 18.2, 18.3.3, 18.3.4, 18.4, 18.7.1, 18.7.2, 18.7.3, 18.7.4, 18.7.5, 18.7.6, 18.7.7, 18.8.1, 18.8.3, 18.9, 18.12.2, 18.12.5, 18.12.6, 18.12.7, 21.1, 21.1.1, 21.1.2, 21.1.3, 21.1.4, 21.1.6.2, 21.1.6.4, 21.1.6.5, 21.1.6.6, 21.1.6.9, 21.1.6.10, 21.1.6.11, 21.1.6.12, 21.1.6.13, 21.1.6.15, 21.1.6.16, 21.1.6.19, 21.1.7, 21.2.1, 21.2.2, 21.2.6, 21.2.7, 21.3.1, 21.3.3.3, 21.3.3.5, 21.3.3.6, 21.3.3.8, 21.4, 21.6, 22, 24.1.1, 24.1.2, 24.2, 25.14.2, 25.14.5, 25.14.6, 25.14.7, 25.17, 25.18, 25.20, 26.14.2, 26.14.4, 26.14.5, 26.14.6, 26.17, 26.18, 26.20.1, and 26.20.2]
8. I have visited site. Site visit dates are as indicated below:
   - 22 days from 23 January to 13 February 2022
   - 15 days from 16 May to 30 May 2021
9. I have not had prior involvement with the property that is the subject of this Technical Report.
10. I am not independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated: 9 May 2022

Signed and Sealed

"Royce McAuslane"

Royce McAuslane

FAusIMM, Director, MineScope Services Pty Ltd

CERTIFICATE OF QUALIFIED PERSON

I Salih Ramazan, PhD, (Mining Engineering) do hereby certify that:

1. I am the Vice President of Mine Planning at Endeavour Mining plc, 5 Young Street, London, W8 5EH, United Kingdom.
2. I am a co-author of the Technical Report titled ‘'Sabodala-Massawa Project, Senegal, Technical Report Update', effective date of ‘31 December 2021’.
3. I graduated from the:
   - Middle East Technical University, Ankara, Turkey, with a Bachelors Degree in Mining Engineering (1992);
   - Colorado School of Mines, Golden, United States of America, with a Masters Degree in Mining Engineering (1996);
   - Ecole Nationale Supérieure Des Mines de Paris, France, with a Master of Engineering (Geostatistics) (1999);
   - Colorado School of Mines, Golden, United States of America, with a doctorate in Mining Engineering (2001); and,
   - Curtin University, Perth, Australia, with a Masters Degree in Finance (2014)
4. I am a Fellow of the Australian Institute of Mining and Metallurgy (FAusIMM). My membership number is: 222870.
5. I have worked as a Mining engineer for a total of 21 years since graduation (2001), Relevant experience includes: technical and operational aspects of mining, with the main focus on mine optimisation, mine design, planning and production scheduling in metalliferous mining including gold deposits.
6. I have read the definition of ‘qualified person’ as set out in National Instrument 43-101 (‘NI 43-101’) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a ‘qualified person’ for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.14, 1.15.1, 1.15.4, 1.15.5, 1.15.6, 1.15.7, 1.17.6, 12.7, 12.8.1, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.9, 15.11, 15.12, 16.1, 16.2.1, 16.2.2, 16.2.3, 16.2.4, 16.2.6, 16.2.7, 16.3, 16.5, 16.6.1, 16.6.4, 16.6.5, 16.8, 16.9.1, 18.10.2, 18.12.9, 21.2.3.1, 21.2.4, 21.3.2.1, 21.3.2.3, 21.3.2.4, 21.3.3.1, 21.3.3.2, 21.3.3.4, 21.8.1, 25.11.1, 25.11.2, 25.11.3, 25.11.4, 25.11.7, 25.12.1, 25.14.9, 26.11.1, 26.11.3, 26.12.1, 26.12.2, 26.12.4, 26.12.5, 26.14.9]
8. I have visited the site pertaining to this Technical Report. Site visit dates are as indicated below:
   - 3 to 7 February 2021
9. I have not had prior involvement with the property, that is the subject of this Technical Report.
10. I am not independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated: 9 May 2020

Signed and Sealed

"Salih Ramazan"

Salih Ramazan

FAusIMM, Vice President of Mine Planning , Endeavour Mining plc

CERTIFICATE OF QUALIFIED PERSON

I Stuart Thomson, MEng (Chemical & Materials Engineering) do hereby certify that:

1. I am the Group Studies Manager at Endeavour Mining plc, 5 Young Street, London, United Kingdom, W8 5EH.
2. I am a co-author of the Technical Report titled ‘'Sabodala-Massawa Project, Senegal, Technical Report Update', effective date of 31 December 2021.
3. I graduated from the University of Auckland, New Zealand, with a Masters Degree in Chemical and Materials Engineering (1991).
4. I am a Fellow of the South African Institute of Mining and Metallurgy (FAusIMM). My membership number is: 702632
5. I have worked as a process engineer/consultant, study manager, and project director for a total of 26 years since graduation, 14 of which has been as a study manager/project director and VP Operations, both for EPCM companies and the owner’s team. Experience covers; mineral processing and hydrometallurgical and pyrometallurgical applications, across a broad spectrum of commodities (base metals, precious metals, coal and industrial minerals). Relevant gold experience includes:
   - Anglo Gold, Sadiola PFS/DFS (Mali), refractory gold study - Study Manager.
   - Mwana Africa, Zani-Kodo CS (DRC), refractory gold study - Process Consultant/Study Manager.
   - Golden Star Resources, Bogoso DFS (Ghana), free milling ore plant upgrade - Study Manager.
   - Kilo Gold (DRC), refractory gold deposit - VP Operations.
6. I have read the definition of ‘qualified person’ as set out in National Instrument 43-101 (‘NI 43-101’) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a ‘qualified person’ for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.1, 1.2, 1.3, 1.4, 1.11, 1.18, 2, 3.1, 3.2, 3.3, 3.4, 4, 5, 12.4, 12.5, 12.13, 19, 25.1, 25.2, 25.15, 26.1, 26.2, and 26.15]
8. I have visited site. Site visit dates are as indicated below:
   - 30/10/2021 to 03/11/2021 - General orientation of SGO’s activities
9. I have not had prior involvement with the property that is the subject of this Technical Report.
10. I am not independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated: 9 May 2022

Signed and Sealed

"Stuart Thomson"

Stuart Thomson

FSAIMM, Group Studies Manager, Endeavour Mining plc

CERTIFICATE OF QUALIFIED PERSON

I Terry Ozanne, Bachelor of Electrical and Computer Engineering (CPEng, RPEQ, NER, APEC Engineer, IntPE(Aus)) do hereby certify that:

1. I am a Lead Electrical Engineer and Manager of Engineering at QGE, Level 1 99 Melbourne Street, South Brisbane, Queensland, 4101, Australia.
2. I am a co-author of the Technical Report titled ‘'Sabodala-Massawa Project, Senegal, Technical Report Update', effective date 31 December 2021.
3. I graduated with a degree from the Queensland University of Technology, Australia, with a Degree in Electrical and Computer Engineering (1996).
4. I am a Chartered Professional Engineer (CPEng) member of Engineers Australia (EA ID: 1250570). I am a Registered Professional Engineer, Queensland (RPEQ), registration number 09309. I am also on the National Engineering Register (NER) and recognized as a APEC Engineer and IntPE(Aus).
5. I have worked as an Electrical Engineer for a total of 25 years since graduation, 25 of which has been as an Electrical Engineer. Relevant experience includes electrical engineering for power generation, renewables and control systems in the mining, minerals processing, oil and gas, and power industries.
6. I have read the definition of ‘qualified person’ as set out in National Instrument 43-101 (‘NI 43-101’) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a ‘qualified person’ for the purposes of NI 43-101.
7. For this Technical Report, I am responsible for the preparation of Sections/Subsections: [1.17.3, 18.5, 18.7.8.3, 18.12.3, 24.1.4, 25.14.3 and 26.14.3]]
8. I have visited site. Site visit dates are as indicated below:
   - 10 days in November 2016
   - 7 days in February 2017
9. I have had prior involvement with the property that is the subject of this Technical Report. Prior involvement includes the electrical engineering for:
   - Sabodala Power Station voltage raising, November 2016
   - Sabodala Power Station control system upgrade investigations, February 2017
10. I am independent of the issuer applying all of the tests in Section 1.4 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date, to the best of my knowledge, information and belief, the Sections of the Technical Report that I am responsible for, contain all the scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

CERTIFICATE OF QUALIFIED PERSON

Dated 9 May 2022

Signed and Sealed

"Terry Ozanne"

Terry Ozanne

Bachelor of Electrical and Computer Engineering (CPEng, RPEQ, NER, APEC Engineer, IntPE(Aus)), Lead Electrical Engineer and Manager of Engineering, QGE