ASANTE GOLD CORPORATION

CSE: ASE, FSE: 1A9, U.S. OTC: ASGOF

NI43-101 Technical Report
CHIRANO GOLD MINES LIMITED
Ghana, West Africa

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This report was prepared as a National Instrument 43-101 Standards of Disclosure for Mineral Projects Technical Report for Asante Gold Corporation (Asante). The quality of information, conclusions, and estimates contained herein are consistent with the quality of effort involved in all relevant Authors' services. The information, conclusions, and estimates contained herein are based on: (i) information available at the time of preparation; (ii) data supplied by outside sources; and (iii) the assumptions, conditions, and qualifications set forth in this Technical Report. This report is intended for use by Asante subject to the terms and conditions of its contract with the Authors and relevant securities legislation. The contract permits Asante to file this report as a Technical Report with Canadian Securities Administrators/regulatory authorities pursuant to National Instrument 43-101. Except for the purposes legislated under provincial securities law, any other uses of this Technical Report by any third party is at that party's sole risk. The responsibility for this disclosure remains with Asante. The user of this document should ensure that this is the most recent Technical Report for the property as it is not valid if a new Technical Report has been issued.

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DATE AND SIGNATURE PAGE

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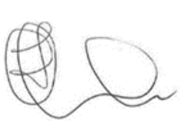

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1. EXECUTIVE SUMMARY

1.1 Terms of Reference

This Technical Report ("TR") on Chirano Gold Mines Limited ("CGML") which operates the Chirano Gold Mine ("Chirano" or the "Project") was sanctioned on behalf of Asante Gold Corporation ("Asante" or the "Company"), a gold exploration and development company with a high-quality portfolio of projects in Ghana, which include the neighbouring operating Bibiani Gold Mine and Kubi exploration project. The Company is listed on the Canadian Securities Exchange (CSE: ASE), Frankfurt Stock Exchange (FSE:1A9), United States over the counter (OTC: ASGOF) and has announced plans to co-list its shares on the Ghana Stock Exchange. The Ghanaian Government holds a 10% non-equity free carry interest.

On the 25th April 2022 Asante announced that it had entered into a share purchase agreement with Kinross Gold Corporation ("Kinross") to acquire Kinross' 90% interest in the Chirano Gold Mine Limited for a total consideration of US$225 million (the "Chirano Acquisition"). The Ghanaian government retains a 10% carried interest in Chirano. The upfront consideration for the Chirano Acquisition comprised US$115 million in cash and US$50 million in common shares of Asante based on the 30-day volume-weighted average price of the Asante Shares prior to closing of the Chirano Acquisition and provided the issuance of the Asante Shares will not result in Kinross exceeding a 9.9% share ownership in Asante. Kinross will also receive a total deferred payment of US$60 million in cash, with 50% payable on the first anniversary of closing and the balance payable on the second anniversary of closing. If the 9.9% share ownership limit is reached, the remainder of the US$50 million in share consideration will be paid by increasing the deferred cash payments in equal portions. Kinross has agreed that it will hold its Asante Shares for at least 12 months following the closing.

The Chirano Gold Mine has been in production since 2004. It has been under Kinross management since 2010, producing over 1.7Moz Au and has a current life-of-mine of 5 years. The Mine includes open pit operations at the Mamnao (North, Central, South) and six underground operations on the Akwaaba, Suraw, Akoti, Paboase, Tano and Obra Deposits. The operations are supported by extensive existing infrastructure, including 3.6Mtpa milling circuit, tailings storage facility and all other ancillary infrastructure which has been previously permitted. Chirano Gold Mine is fully permitted.

The TR has been prepared in accordance with the terminology, definitions and guidelines of CIM (2014) and the National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI43-101"). The Report has been prepared in support of Asante's news release, dated 25th April 2022, informing of the acquisition agreement as described above. The report is prepared, and is intended to be used, in connection with the proposed transaction and to support the first-time disclosure by Asante of material and scientific information on a property that will be material to Asante.

Kinross Gold Corporation (TSX: K; NYSE: KGC), a Canadian-based gold mining Company ("Kinross"), acquired Chirano Gold Mine in September 2010 from Red Back Mining Incorporated (TSX: RBI). Kinross acquired all of the issued and outstanding common shares of Red Back in a transaction valued at approximately US$7.1 billion.

Mensin Gold Bibiani Limited ("MGBL"), incorporated in Ghana, which owns and operates the neighbouring Bibiani Gold Mine, is also a wholly owned subsidiary of Asante.

This TR supersedes the following earlier technical report: "Redback Mining Incorporated, Technical Report on the Chirano Gold Mine, Republic of Ghana", 14th May, 2009, Hugh Stuart, BSc., MSc, MAusIMM.

The Authors and recognised Qualified Persons ("QPs") from dMb Management Services (Pty) Ltd (South Africa), BARA International (BVI), Snowden Optiro (South Africa) and GB Independent Consulting (Pty) Ltd (South Africa) were commissioned by Asante to compile the TR. All QPs are totally independent of the issuer and there is no circumstance that could interfere with any judgments made in this TR.

1.2 Location and Setting

Ghana is a West African country approximately 600km north of the equator on the Gulf of Guinea. It is bordered by Burkina Faso to the north, the Ivory Coast to the west and Togo to the east. Ghana has an area of approximately 239,000km^2 and an estimated population of 30.8 million people. English is both the official and commercial language while Twi is the most widely spoken language.

The Chirano concessions are situated in the Sefwi-Bibiani Belt which is host to over 30 million ounces of gold, which in turn is located in the Western North Region of Ghana approximately 250km from the capital Accra and 80km from the regional capital of Kumasi (**Error! Reference source not found.**). This prolific granite-greenstone terrane is the second-most significant gold-bearing belt in Ghana after the Ashanti Belt to the east.

The mine is 100km south-west of Kumasi and 15km south-southwest of Bibiani Town (37km by road). Access to the mine from the Capital Accra is via a sealed highway to Kumasi and then sealed highway running south-west to Bibiani and onwards to the town of Sefwi-Bekwai. The final approach is via a 13km road whose junction is approximately 9km beyond Sefwi-Bekwai.

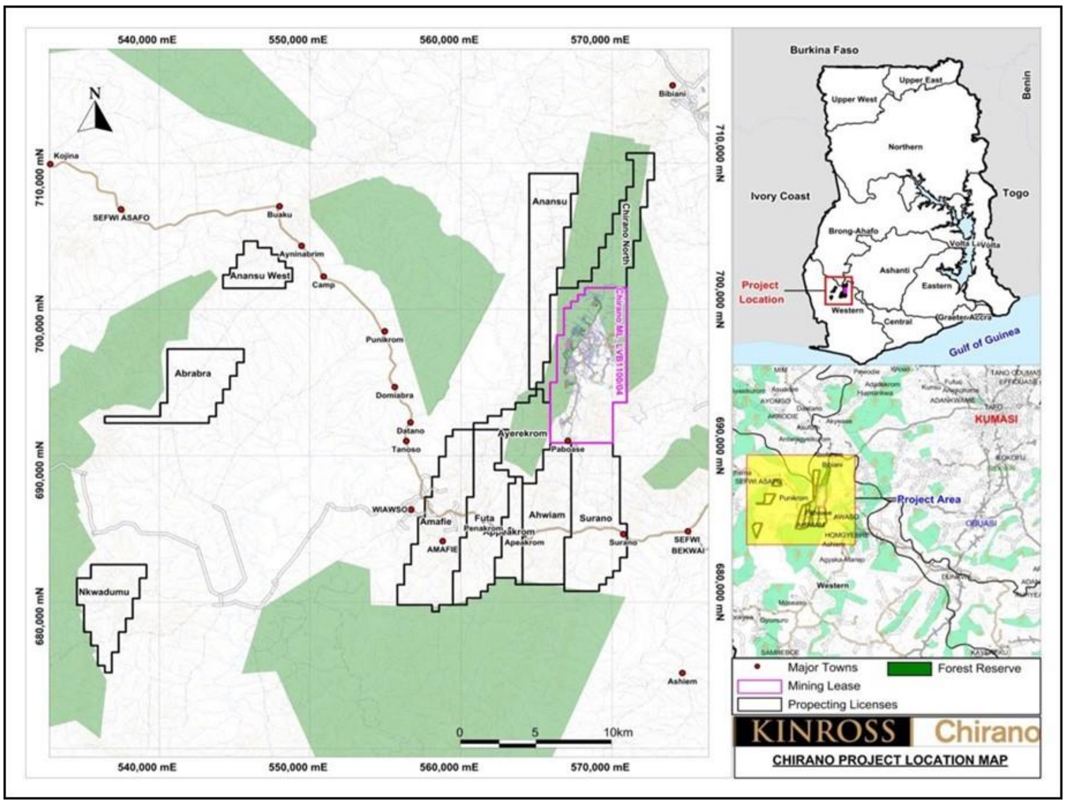


Figure 1-1: Location of Chirano Gold Mine, Western North Region of Ghana

(Source: Chirano, 2022)

1.3 Property Description and Ownership

The Chirano Mine comprises a granted mining lease in southwestern Ghana, within which 14 gold deposits have been identified, quantified and reserves estimated. The EPA permit has been granted and formal permission to mine is in place.

The Mine is based on a granted Mining Lease (PL2/56) which covers an area of 46km². The Mine is located at 697,000N, 568,000E (UTM, WGS84, Zone 30N).

1.4 History

A brief history of the development and ownership of the Chirano Gold Mine is given in the table below.

Table 1-1: History of Chirano Gold Mine development

Date	Interested Party	Activity
1930's	Two concessions held by Gold Coast Selection and Anglo-African Goldfields Limited	No reports of work
1980's	Billiton International Metals BV	Regional reconnaissance
1990's	Johnsons Limited (Private Ghanaian businessman) and Chirano Goldfields Company Limited	Current phase of exploration initiated
1993	Agreement with Placer Outokumpu Exploration (POE) Limited	Several phases of exploration
1997	Reunion Mining Company	Continues exploration after Government imposed moratorium on exploration
1998	Redback Mining formed Chirano Gold Mine Limited	Extensive exploration and drill programmes for open pit development. BFS completed in 2003.
2004	Redback Mining	Decision to develop Chirano Mine. First gold pour in October 2005. 2009 plant expanded to 3.5Mtpa. First underground deposit mined in 2008
2010	Kinross Gold Corporation	Buys out Redback Mining for ownership of CGML

1.5 Geology and Mineralisation

In Ghana, the Paleoproterozoic Birimian terrains consist of five linear northeast-trending volcanic belts with intervening sedimentary basins. The volcanic belts have been folded by multiple deformation events and are generally 15-40km wide and extend for several hundred kilometres laterally. The Kumasi Basin is 90km wide and lies between the Ashanti Belt to the south-east and the Sefwi Belt to the north-west. The combined Sefwi and Ashanti volcanic belts and intervening Kumasi Basin host most of the gold endowment in Ghana. Other world class deposits within the Belt include Ahafo (20Moz, Newmont) and Bibiani (2.3Moz, Asante).

On a regional scale, the Project is located on the eastern limb of the West African Precambrian Shield which is a cratonised complex of Archaean basement (Section 7). The main components are Proterozoic greenstone belts, granitoids and post-orogenic sediments that extend through Ghana, Burkina Faso, Guinea and the Ivory Coast. Most gold deposits in Ghana are located in or adjacent to the Ashanti Gold Belt, the Bibiani-Sefwi Belt and the Asankrangwa Belt.

The Chirano mines and associated mineralised deposits lie within the Proterozoic terrain of southwest Ghana along a major structure separating the Sefwi Belt to the west from the Kumasi Basin to the east known as the Bibiani Shear Zone ("BSZ"). The belt and basin architecture comprises rocks of Birimian age, with the belts being dominated by mafic volcanics and the basins typified by fine-grained, deep marine sediments. Both are intruded by granites. The Chirano deposits lie close to a splay off the BSZ known as the Chirano Shear Zone ("CSZ"). The deposits occur at regular intervals along a mineralised zone over 11km long. The mineralised zone is characterised by foliation, veining and brecciation, and is interpreted as a splay fault of the CSZ with mineralisation occurring within 200m to the west of the CSZ.

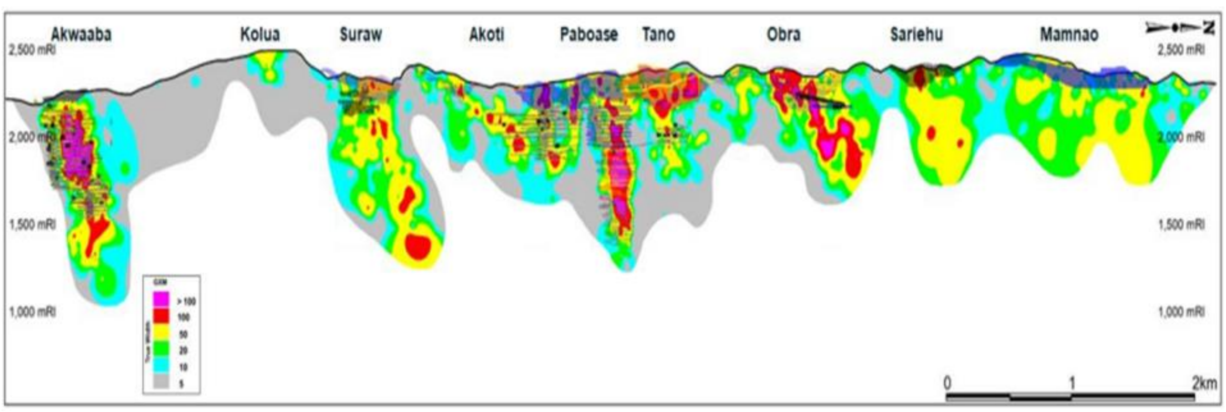


Figure 1-2: Long Section of Chirano Gold Mine Surface and Underground Gold Deposits

Note: Horizontal scale incorrect and vertical scale exaggerated.

The deposits are hosted by fractured and altered mafic volcanics and granite and include stacked arrays of parallel veinlets, veinlet stockworks and mineralised cataclasites. The geometry and shape of the deposits range from tabular (Obra), or pipe-like (Tano) to multiple parallel lodes (Paboase). The mineralised zone thickness ranges from a few meters to over 70m. Most deposits dip very steeply towards the west or southwest and plunge steeply. Generally, the tenor of mineralisation is related to intensity of hydrothermal alteration (silica, ankerite, albite, sericite, pyrite), veining and brecciation. The gold is fine-grained and is associated with 1% - 5% pyrite.

1.6 Status of Exploration, Development and Operations

Exploration in the early phases of the Project was largely empirical with 14 known deposits discovered through routine geochemistry followed by trenching and later drilling. Exploration is at a very advanced stage. The known open pit and underground resources have been fully defined by extensive drilling over many years. Geological mapping continues to advance knowledge of the mineralization and controls and more sophisticated ground geophysics has been utilized to probe deeper parts of the 11km strike length of the CSZ.

Chirano is a well-established, sizable mine in a mining-friendly jurisdiction. It maintains excellent infrastructure with access to power grid and highways. It is a combination of open pit and underground mines along structural splays related to the Chirano Shear Zone. It has existing high-quality infrastructure including a 3.6Mtpa CIL mill achieving >90% gold recovery. It is a producing asset with a strong operating track record which began in 2005. To date Chirano has produced approximately 3Moz Au.

The primary components of the overall operations and mineralised deposits of CGML include:

- Nine open pits (Mamnao, Sariehu, Obra, Paboase, Akoti, Akoti Extension, Suraw, Akwaaba, and Tano)
- Four underground mines (Akwaaba, Paboase extended to Akoti and Tano, and Suraw)
- Obra underground is currently a new underground project which commenced development in 2021

- Waste rock disposal facilities
- Run-of-Mine (ROM) pad
- Mill and Processing plant
- Water Storage Facility which is currently Sariehu pit lake to provide water for processing plant
- Tailings Storage Facility (dam / impoundment)
- Environmental Control Dams and other storm water and sediment control structures, and
- Ancillary facilities (resettlements sites, bypass roads, accommodation camps, and mine services).

CGML has a workforce of 907 directly under its employment for both underground and surface operations. Out of this number 9 are expatriate workers, 228 senior staff and Line Mangers, 626 junior staff, 3 casual workers and 41 Trainees as at end of October 2021.

There are 8 Ghanaians and 4 expatriates in management positions. In addition to this, various contract companies on the mine site on permanent and casual basis employ 1,152 workers. CGML also has a total of 41 trainees comprising 36 National Service Personnel, 15 Graduate Trainees, 1 Exchange Programme Trainee (Generation Gold) and 12 Industrial Trainees. Multiple deposits remain open along strike and at depth, including the currently active Akwaaba, Paboase and Akoti underground mines. It is managed by an experienced management team with strong links to the community. The operation benefits from strong exploration prospectivity and potential to convert existing resources.

1.7 Metallurgical Test Work and Mineral Processing

Metallurgical test work was undertaken by Kinross from 2010 to 2019 that pertained to cyanidation tests and flotation tests on the Chirano mine's ores. None of these test results influenced process design changes to the plant.

The process plant has been in commercial operation since 2005 and consistently achieves a mill throughput of 3.4Mtpa. For the past 6 operating months, the average monthly milled throughput has been 294,000t at a plant utilisation of 89.5%. For the same period, the average gold recovery was 87.1% at an average head grade of 1.36g/t Au. Lime and cyanide consumptions were 1.47kg/t and 0.21kg/t respectively.

The processing plant is a three-stage crushing circuit with a primary and secondary ball milling circuit (3C + 2BM) followed by a carbon in leach ("CIL") plant. A single-stage jaw crusher operates in an open circuit with two double-deck primary screens whilst the single secondary cone crusher and three tertiary cone crushers operate in closed with the same screens. The crushed product can be stored on a dead stockpile or fed directly to the primary ball mill via a surge bin. A single primary ball operates in an open circuit with two parallel secondary ball mills operating in a closed circuit with a common cyclone classification circuit. The milled product (cyclone overflow) at 106 microns gravitates to a pre-leach thickener via two trash removal screens. The pre-leach thickener underflow is pumped directly to a pre-leach stage followed by a nine-stage CIL plant. CIL tailings are pumped to the tailing's storage facility at the permissible CN wad level. The loaded carbon from the CIL plant is eluted in two parallel Zadra elution circuits and the stripped gold is recovered with dedicated electrowinning cells. There are two carbon regeneration kilns placed above the last stage of the CIL plant. The Gold room houses the electrowinning cells, drying oven, and smelting furnace. The plant further incorporates water services, reagent preparation, and compressed air.

The Chirano plant is a conventional gold operation that is typical of the West African gold industry except for not having a gravity concentration circuit for gold recovery.

1.8 Mineral Resource Estimates ("MRE's")

Chirano includes at least 8 deposits located along an 11km long N S trend. The deposits include Mamnao, Sariehu, Obra, Tano, Paboase, Akoti, Akoti South, Suraw, Kolua and Akwaaba.

The Chirano Mineral Resources comprise open pit and underground resources. The Chirano underground Mineral Resource include resources from the following deposits:

- Akwaaba – the first underground mine which came into production during the 2nd half of 2008;
- Paboase – started production in the first quarter of 2012;
- Akoti – started production in 2016;
- Tano – started production in the fourth quarter of 2020;
- Obra – which has become the sixth underground deposit for Chirano Gold Mines; and
- Suraw – started production in 2021 and currently development is ongoing

The open pit Mineral Resources include resources from the following operations:

- Mamnao – where production is currently underway:
- Akoti South pit – came to an end in Q4 2021 after pit re-optimisation;

- Sariehu pit – the open pit cutback is planned to resume production by Q4 2022;
- Obra pit – the open pit cutback is planned to commence by Q1 2023; and
- Kolua.

Both open pit and underground Mineral Resources have been prepared under the direction of Competent Persons (CPs) under the JORC Code (2012) using accepted industry practices and have been classified and reported in accordance with the JORC Code. There are no material differences between the definitions of Measured, Indicated and Inferred Mineral Resources under the CIM Definition Standards and the equivalent definitions in the JORC Code (2012). The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the pits and summaries quoted in this report are on a 100% basis.

The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The Audited Mineral Resources for the Chirano Underground and Chirano Open Pits (constrained by a Reasonable Prospects for Eventual Economic Extraction (RPEEE) US$1,600 Resource optimised pit shell), are reported at 31st December 2021 and are presented Table 1-2 and Table 1-3.

Table 1-2: Total Inclusive Chirano Underground Mineral Resource as at 31st December 2021

Underground Operation	Classification	Mt	Au	Moz
Obra	Measured	0.118	1.82	0.007
	Indicated	3.357	1.65	0.179
	Measured and Indicated	**3.476**	**1.66**	**0.186**
	Inferred	1.788	1.87	0.108
Akwaaba	Measured	1.478	2.06	0.098
	Indicated	0.818	1.86	0.049
	Measured and Indicated	**2.296**	**1.99**	**0.147**
	Inferred	0.223	2.48	0.018
Tano	Measured	1.016	1.83	0.060
	Indicated	1.056	1.71	0.058
	Measured and Indicated	**2.072**	**1.77**	**0.118**
	Inferred	0.646	2.24	0.047
Paboase	Measured	0.086	2.06	0.006
	Indicated	0.078	2.19	0.006
	Measured and Indicated	**0.164**	**2.13**	**0.011**
	Inferred	0.063	1.89	0.004
Akoti	Measured	1.827	2.05	0.120
	Indicated	0.294	2.01	0.019
	Measured and Indicated	**2.121**	**2.04**	**0.139**
	Inferred	0.514	1.89	0.031
Suraw	Measured	0.226	2.36	0.017
	Indicated	0.695	2.30	0.052
	Measured and Indicated	**0.922**	**2.32**	**0.069**
	Inferred	1.558	2.71	0.136
Total Measured Resources		**4.751**	**2.01**	**0.308**
Total Indicated resources		**6.299**	**1.79**	**0.362**
Total Measured and Indicated Resources		**11.050**	**1.88**	**0.669**
Total Inferred Resources		**4.791**	**2.22**	**0.343**

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *Akwaaba, Tano, Obra and Suraw were evaluated at resource cut-off grade of 1.14 g/t and Akoti and Paboase undergrounds were evaluated at 1.21 g/t and 1.34 g/t cut-off respectively.*
6. *A density of 2.75 t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
7. *Geological losses and depletions have been applied.*
8. *Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration*
9. *Akwaaba, Tano, Obra and Suraw were evaluated at resource cut-off grade of 1.14g/t*
10. *Akoti and Paboase undergrounds were evaluated at 1.21g/t and 1.34g/t cut-off*

Table 1-3: Total Inclusive Chirano Open Pit Mineral Resource as at 31st December 2021

Open Pit Operation	Classification	Mt	Au	Moz
Akoti South	Measured	0.16	0.75	0.004
	Indicated	3.02	0.89	0.087
	Measured and Indicated	**3.17**	**0.88**	**0.090**
	Inferred	0.01	1.32	0.000
Obra	Measured	3.46	0.81	0.090
	Indicated	3.24	0.77	0.080
	Measured and Indicated	**6.70**	**0.79**	**0.170**
	Inferred	0.90	0.67	0.019
Mamnao	Measured	0.42	0.97	0.013
	Indicated	4.41	0.90	0.127
	Measured and Indicated	**4.83**	**0.90**	**0.140**
	Inferred	0.32	0.86	0.009
Kolua	Measured	0.00	0.00	0.000
	Indicated	0.16	1.60	0.008
	Measured and Indicated	**0.16**	**1.60**	**0.008**
	Inferred	0.00	1.26	0.000
Sariehu	Measured	0.42	0.59	0.008
	Indicated	1.77	0.85	0.048
	Measured and Indicated	**2.18**	**0.80**	**0.056**
	Inferred	0.03	0.89	0.001
Total Measured Resources		**4.45**	**0.80**	**0.115**
Total Indicated Resources		**12.60**	**0.86**	**0.350**
Total Measured and Indicated Resources		**17.05**	**0.85**	**0.465**
Total Inferred Resources		**1.26**	**0.73**	**0.029**

Notes:
1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *Akoti South, Obra, Mamnao, Kolua, Sariehu open pits were evaluated at cut-off 0.24, 0.20, 0.31, 0.45 and 0.22 cut-offs respectively.*
6. *A density of 2.75 t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
7. *Geological losses and depletions have been applied.*
8. *Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*

1.9 Mineral Reserve Estimates (“MRev)

Based on the declared Mineral Resources (31st December, 2021), Mineral Reserves have been calculated considering all modifying factors. Life of Mine (“LoM”) plans and mining schedules have been completed for the underground and open pit operations, to determine the Mineral Reserves which are shown in Table 1-4.

Table 1-4: Chirano Gold Mine Mineral Reserves

Reserve Classification	Tonnes (000’s)	Au Grade (g/t)	Au Ounces (000’s)
Proven	4,777.20	1.63	250.5
Stockpile(s)	822.7	0.79	20.9
Subtotal	**5,600.00**	**1.51**	**271.4**
Probable	10,159.90	2.2	718.3
Total	**15,759.80**	**1.95**	**989.7**

(Source: Kinross Gold Annual Report 2021)

It is noted that 90% of mineral reserves are attributed to Asante and 10% to the Government of Ghana.

Following a full review of all available information, Bara Consulting is of the opinion that the declared Mineral Reserves are compliant with CIM reporting standards and can therefore be included into the NI43-101 Technical Report.

1.10 Mining

Open pit mining activities first commenced in 2004 when the project was operated by Red Back Mining. First gold from the project was poured in October 2005. Multiple pits were operated along the full strike length of the deposits, with the first underground operation, Akwaaba, commencing in 2008. The most recent mine, Obra was commenced in 2021.

There are currently six operating underground mines. From south to north these are Akwaaba, Suraw, Akoti, Paboase, Tano and Obra. There are currently three open pits operating at the northern portion of the mining lease, which are Mamnao South, Mamnao Central and Mamnao North. These three pits are undergoing cutbacks and will eventually form a single large open pit.

All underground mining operations are undertaken by CGML employees. The underground mining operations utilise trackless mobile fleet consisting primarily of Volvo, Caterpillar and Sandvik equipment. Depending on the geometry of the mineralised deposits the mining methods consist of Sub level caving (SLC) and Sub Level Open Stoping. Mineralised material from the underground operations is hauled to their respective portals or pit crests, where it is generally stockpiled for future delivery to the process plant ROM pad.

A Ghanian contract mining company (Maxmass) are used for open pit mining operations at CGML. The open pits are currently scheduled to be completed by 2024.

The six underground operations generate 2Mtpa, while the pits will average 1Mtpa over a three-year life. Mill feed is supplemented with surface stockpiles to ensure mill feed of approximately 3.5Mtpa is achieved. Mine production schedules are shown in Table 1-55.

Based on December 2021 Mineral Reserves, the mining operations will continue to 2026. However, there are substantial resources may be converted to mining reserves, potentially extending mine life.

Table 1-5: Chirano LoM Mining Schedule

		YEAR					
Source	**Unit**	**2022**	**2023**	**2024**	**2025**	**2026**	**Total**
Open Pits	t	880,436	1,001,126	1,370,741			3,252,303
	g/t Au	0.85	0.87	1.13			0.98
	oz Au	19,820	23,964	41,651			85,436
Akwaaba UG	t	243,068	281,464	480,887	37,116		1,042,535
	g/t Au	2.18	2.81	2.36	1.87		2.42
	oz Au	15,231	22,688	32,405	1,978		72,301
Akoti UG	t	483,510	230,549				714,059
	g/t Au	2.36	3.32				2.67
	oz Au	34,550	23,138				57,688
Tano UG	t	433,935	248,763	505,695	100,443		1,288,836
	g/t Au	2.21	1.81	2.29	2.48		2.18
	oz Au	27,240	12,790	32,919	7,111		80,059
Suraw UG	t	481,261	585,762	394,004	524,858	55,509	2,041,394
	g/t Au	3.06	2.94	3.08	2.78	3.07	2.96
	oz Au	42,748	49,927	35,222	42,267	4,969	175,133
Obra UG	t	70,256	546,980	606,365	1,099,924	799,604	3,123,128
	g/t Au	2.21	2.14	2.37	2.79	2.55	2.52
	oz Au	4,569	34,534	42,321	90,258	60,406	232,086
Stocks	t	707,534	505,356	42,308	1,637,659	1,745,566	4,638,423
	g/t Au	0.90	1.32	0.56	0.97	1.94	1.32
	oz Au	15,893	18,209	647	43,594	92,673	171,016
Total	**t**	**3,300,000**	**3,400,000**	**3,400,000**	**3,400,000**	**2,600,678**	**16,100,678**
	g/t Au	**1.17**	**1.90**	**1.92**	**1.89**	**2.15**	**1.90**
	oz Au	**160,050**	**185,250**	**185,165**	**185,208**	**158,048**	**873,720**

1.11 Diamond Drilling Exploration

The Chirano Gold Mine has been in operation for almost 20 years and in that period a large amount of drilling, both surface and underground, has been completed over a long strike length and on many individual target areas.

In 2021, exploration activities continued to advance the mine's potential for mine life extension and pipeline opportunities beyond the current LoM. A net total of 0.29Moz Au was added to the estimated 2P and Mineral Resources. Significant Mineral Resources were converted at Obra, Mamnao (potential open pit extension), Suraw, Tano and Akwaaba. Overall, within 2021, 143 holes totalling 40,634.95m (RC, RCDD and DD) were completed at Suraw UG, Akwaaba UG, Tano UG, Obra, Akoti, Mag Hinge, Aseda and Mamnao.

1.12 Infrastructure

CGML is a well-established project that has been producing gold since 2005. All infrastructure is in place to continue operations well into the next decade.

Ghana is serviced by international flights to the capital of Accra and to some regional airports within Ghana. The international airport at Kumasi is currently being upgraded to handle a higher capacity of flights from international destinations. Kumasi is approximately 133km by sealed road from the project.

Security checkpoints are operated at all entrances to the operational areas and to the camp facilities. The high value areas are fully fenced with electronic security passes required for entry. The processing plant is fully fenced, with electronic ID's required for entry. Eighteen full time security staff are employed by CGML in addition to the security contractors.

Power to the operation is supplied from the national grid, although the site also consists of 20 x 1.8MW diesel standby generators in case of power outages. Water supply is managed via large capacities stored within the old open pit operations. A bore field has been installed for potable water supplies.

All underground works are undertaken by CGML employees. A large fleet of mobile mining equipment is maintained on site by CGML maintenance personnel. There are two heavy machinery workshops dealing separately with surface and underground mining equipment and a third workshop for light vehicles and auxiliary machines. The open pit mining contractor has its own dedicated mining fleet and workshop.

The project hosts accommodation for staff members at three camps for a combined capacity of 480 rooms. Many of the local employees reside in the local communities which are proximal to the mine. A small shop, mess hall, bar facilities, pool, gymnasium and tennis courts are available for employees. A full medical clinic is available that is open 24hrs. Two full time doctors are employed. In addition, the project hosts a pathology laboratory, radiology unit, two ambulances and fire truck.

Full communications are available on surface and underground via IP telephony, 2-way radio systems, internet and standard mobile data systems. Satellite phones are available for emergencies.

All mines are operated with high levels of efficiency with modern planning, software and safety systems. All mines are equipped with mobile refuge chambers, dedicated escape routes and well-designed and good quality ventilation systems.

Offices are spacious and well maintained. Separate office complexes are in use for Administration, Technical Services, Environmental, Exploration, Health and Safety, Processing and Maintenance.

1.13 Environmental and Social Impact

CGML has acquired all the necessary permits to continue to operate the mine and its ancillary facilities. The Mine lease has been renewed and is valid till 2034. CGML is aware of all procedures required to renew permits, certificates and licences that will enable the mine to operate in compliance with all the requirements of the requisite Acts, legislative instruments and guidelines provided by the regulatory agencies.

CGML normally carries out formal stakeholder engagements through the preparations of EIAs for project expansions or special projects. It also engages its key stakeholders quarterly through the Community Consultative Committee (CCC). Out of these engagements, the ADR committee was formed for amicable dispute resolutions.

1.14 Capital Cost Estimate

The capital cost estimate for the Chirano Gold Mine is based on costs and information as of May 2022. All monetary values are presented United States Dollars (US$) and in real money terms, free of escalation or inflation. The Chirano Gold Mine is in an advanced mining operation with all the engineering work and mine infrastructure and development completed and the costs are therefore based on actual incurred costs.

A summary of the total Capital Cost is shown below.

Table 1-6: Summary of Capital Cost

Area	Non-Sustaining Capital Cost (US$)	Sustaining Capital Cost (US$)	Total (US$)
UG Mine Development	11 689 621	23 053 173	34 742 793
UG Mobile Equipment	4 230 702	-	4 230 702
UG Infrastructure	-	285 310	285 310
Process Plant Upgrades	-	3 255 062	3 255 062
Mine/Camp/Infrastructure Upgrades	-	154 500	154 500
Equipment Replacements	-	4 335 850	4 335 850
Capital Repairs	-	19 149 685	19 149 685
Total	**15 920 322**	**50 233 580**	**66 153 903**

1.15 Operating Cost Estimate

The operating cost estimate is presented in Table 1-7 The table presents the LoM total and the unit operating cost per tonne milled and per ounce of gold recovered, by activity.

Table 1-7: Summary of Operating Cost

Operating Cost	LoM Total (US$)	Cost/t RoM (US$)	Cost oz Au (US$)
Open Pit Mining	138 528 293	8.60	155
Underground Mining	306 117 011	19.01	343
Processing	247 066 778	15.35	277
Site Administration	111 699 484	6.94	125
Royalties	115 472 974	7.17	129
Cash Costs	**918 884 539**	**57.07**	**1 030**
Exploration	13 385 778	0.83	15
Stockpile Reclamation and Closure	39 881 036	2.48	45
Total Operating Costs	**972 151 353**	**60.38**	**1 090**

The operating costs have been derived from actual costs due to the advanced mining operations currently in existence at the Chirano Gold Mine.

1.16 Economic Analysis

The economic evaluation of Chirano Gold Mine was undertaken through a discount cashflow (DCF) modelling approach. This approach includes determining cashflows through deduction of capital and operating costs from operational revenues. The resulting cashflows are used to determine key financial metrics such as payback period, peak funding requirement, net present value (NPV) and internal rate of return (IRR).

A summary of the results of the discount cashflow analysis is presented in the table below which shows that the post-tax NPV is US$ 258 million at a discount rate of 5% Post-tax cashflow.

Table 1-8: Summary of Discount Cashflow Analysis

Metrics	Units	Value (LoM/Avg)
Physicals		
Tonnes Milled	t	16 100 678
Gold Produced	oz	985 221
Recovered Grade	g/t	1.90
Life of Mine (Incl. Closure)	years	7
Capital Cost		
Non-Sustaining Capital Cost	US$	15 920 322
Sustaining Capital Cost	US$	50 233 580
Total Capital Cost	**US$**	**66 153 903**
Operating Cost		
Total Operating Cost	US$	972 151 353
Cash Cost	US$/t ROM	57

Metrics	Units	Value (LoM/Avg)
AISC	US$/t ROM	62
AISC	US$/oz	1 112
Economics		
Gold Price	US$/oz	1 712.00
Revenue	US$	1 516 905 796
EBITDA	US$	584 635 479
Free Cashflow	US$	331 056 152
Post-Tax NPV_5	US$	258 270 316
Operating Margin	%	39

1.17 Conclusions and Recommendations

Chirano holds the relevant mining leases, surface rights, major approvals and permits required for ongoing mining operations and exploration.

The Chirano mineralisation is part of a regional structure and is not the only deposit of its type in the region. The nature of the mineralisation style and setting are well understood and can support a declared Mineral Resource and further exploration potential.

The QP's found that sampling methods, preparation, analyses and security are performed to Industry Standards and data is fit for use in MRE and MRev estimation. Appropriate QA/QC programs, to address precision and accuracy of information, are adhered to by the Company geologists and exploration teams.

Snowden has reviewed the Mineral Resources for the Chirano operations which are estimated by the company's employees. Snowden was afforded sufficient access to supporting data, block models and Chirano employees responsible for generating and reporting the Mineral Resource estimates to follow the process from exploratory data analysis, estimation, classification, and reporting. The site visit enabled Snowden to review and gain sufficient understanding of the on mine data collection and management processes, and the current geological interpretations.

Snowden did not identify any material issues with the Mineral Resource estimation and in general considers the standard procedures, and internal controls in place at Chirano to be transparent and robust. Snowden's validations of the Mineral Resources agree with those undertaken by Chirano; that the estimates are a reasonable representation of the grade distributions evident by the composite database informing the estimates. However, it is Snowden's opinion that generally there is room for some improvement with respect the classification of Chirano's Mineral Resource classification system.

The Chirano deposits relevant to this Technical Document are mined by active open pit and underground operations. Mineral Reserves are supported by a positive economic assessment having been calculated assuming a US$1,200/oz Au price. The average LoM selling price of gold used in the Discount Cashflow Analysis is US$1,712/oz. The cut-off grades selected for the various mineralised deposits were appropriate for the Company objectives.

Recovery methods in the processing plant facility and gold recovery are supported by over 10 years of consistent production and test work.

Chirano has received all necessary legal requirements and complies with environmental and social requirements. The TSF is managed under a current contract by Knight Piesold Ghana Limited.

The discounted cashflow model for the proposed operation demonstrates that the Project is robust under the current techno-economic assumptions described in the report. The analysis supports the declared Mineral Reserve and supports the Company's decision to progress with the acquisition.

Chirano has a long history of exploration and mining and as such is considered a well-developed, well maintained, brownfields mining project. At the effective date, processing plant, open pit and underground mining, infrastructure, environmental and social programs and other related Company processes are all active and will remain so.

The Project is considered by the QPs to be an advanced mining operation and therefore most engineering, mining and other technical studies, as well as cost associated estimates, have been completed and are in operation.

The QP's have not included recommendations into this TR as the company has only recently taken ownership and detailed analysis into the running of the current operations, efficiencies and requirements, the opportunities and future risk have not been carried out. The QP's therefore do not offer any recommendations for change or improvements at this time.

2. INTRODUCTION

2.1 Issuer – Asante Gold Corporation

Asante is a gold exploration and development company with a high-quality portfolio of projects in Ghana, Africa's largest and most reliable gold producer. Asante is focused on developing high margin gold projects which includes the neighbouring Bibiani Gold Mine and Kubi Gold Mine. Asante is listed on the Canadian Securities Exchange (CSX: ASE); Frankfurt Stock Exchange (FSE: 1A9) and the United States over the counter (OTC: ASGOF) with headquarters at 680-615-800 West Pender Street, Vancouver, British Columbia. Asante has announced plans to co-list its shares in Ghana. The Ghanaian Government carries a 10% non-equity free carry in the Chirano Gold Mine.

The neighbouring Bibiani Gold Mine, approximately 37km north-east from the Chirano Gold Mine, is managed and operated by Mensin Gold Bibiani Limited, a wholly owned Ghanaian subsidiary of Asante Gold Corporation. Bibiani is a historically significant Ghanaian gold mine situated in the western region of the country. The Project has a past production of circa 4Moz and is fully permitted with available open pit mining and processing infrastructure on site, consisting of a 3.0Mtpa mill and processing plant and extensive surface infrastructure and related services.

As at 31st May, 2022, the following is noted:

1. Asante issued share ownership comprises management (12.1%), strategic (39.6%), institutional (16.3%), retail (31.9%) with 315,007,462 shares issued (406,849,860 fully diluted).
2. The top twelve shareholders are: Ghanaian Retail (14.8%), Management and Insiders (12.1%) Emiral Resources (19.7%), Fujairah Holding LLC (15.8%), Jadacore Holdings (4.1%), MIA Investments Ltd. (4.4%), Goknet Mining Company (2.8%), EGH Arlep Anwia Bokazo Community (2.3%), Razak Awudulai (2.1%), Notre Dame Investments (2.1%), Delbrook Resources Opportunity Fund (2.0%) and Mohammad Aminu (1.7%). Total foreign holders make up 61.4% of shareholding. Ghanaian shareholders make up 38.6%.

Asante holds a strategic land position within the region surrounded by world class gold producers. It has interest in +90km² along strike of Anglogold's Obuasi Mine (Measured and Indicated Mineral Resource 22.37Moz, www.anglogoldashanti.com: R&R 2020, Mineral Resource and Ore Reserve Report as at 31st December, 2020) and Perseus' Edikan mine (Measured and Indicated Mineral Resource of 2.57Moz: www.perseusmining.com). It also has interest in +200km² along strike of Galiano Gold – Goldfields JV Asanko Mine; Esaase and Obotan operating mines.

The QP's have not attempted to assess or verify the information available in the public space regarding the properties that surround the land holding under licence to Asante and therefore this information is by no means indicative of the mineralisation on the properties mentioned or described in this Technical Report.

Figure 2-1 below illustrates the various interests that Asante is investigating at this current time. It must be noted that some prospecting licences are subject to final transfer, royalties and Governmental approvals. Also, to be noted, that the Kinross Chirano land package, shown in yellow below, now belongs to Asante subject to final closing.

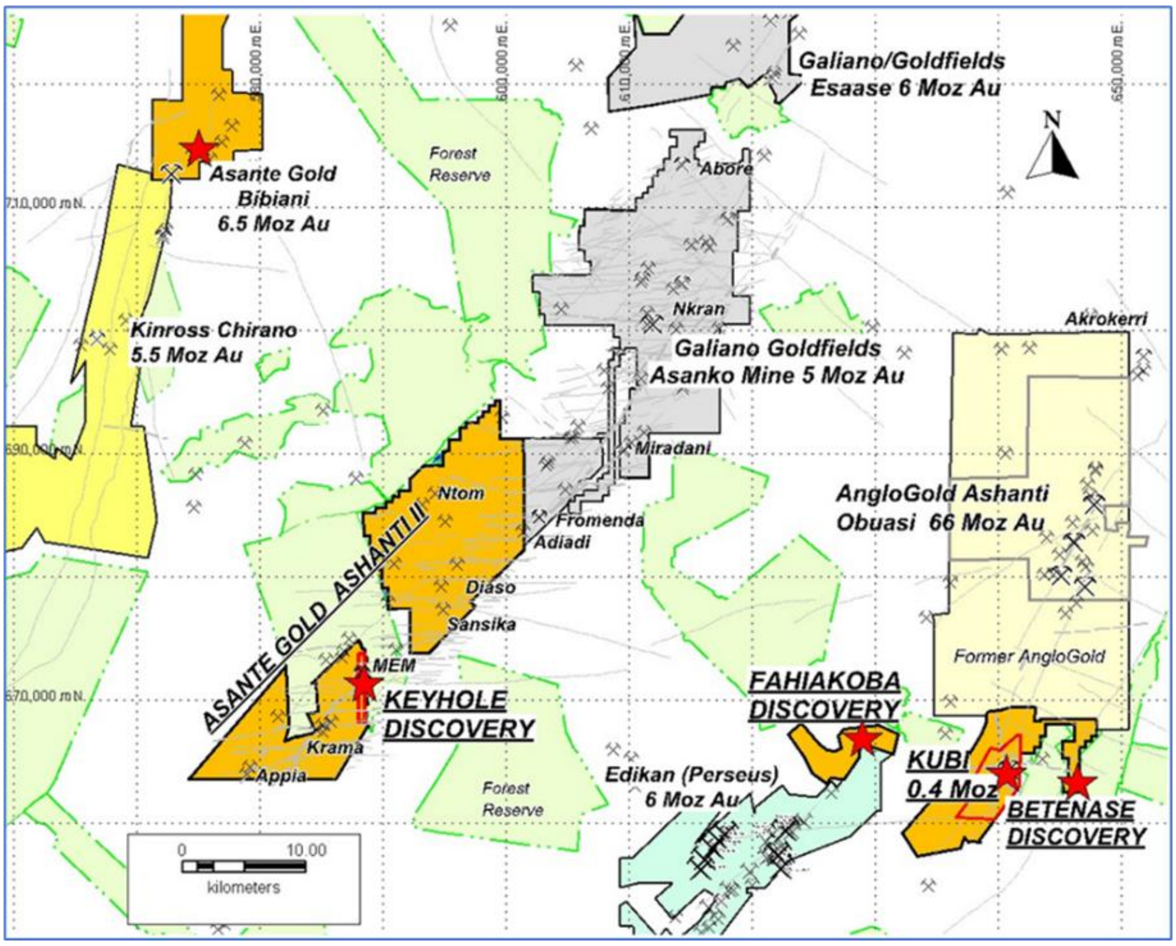


Figure 2-1: Asante Gold Corporation – Land Package Showing Mines and Current Exploration Concessions

(Source: Asante 2022)

Note: Some concessions await Ministerial Approval

2.2 Terms of Reference

This Technical Report ("TR") is a National Instrument 43-101 ("NI 43-101") compliant Technical Report on Chirano Gold Mine Limited ("Chirano" or "Project") recently acquired by Asante Gold Corporation ("Asante"), a gold exploration and development company with a high-quality portfolio of projects in Ghana. The Mine and adjacent exploration concessions, located in the prolific gold producing Ashanti Region of Ghana, are owned 100% by Asante. Asante also owns and operates the neighbouring Bibiani Gold Mine, managed by Mensin Gold Bibiani Limited, a wholly owned subsidiary of Asante.

This TR supersedes the following historic technical report: "Redback Mining Incorporated, Technical Report on the Chirano Gold Mine, Republic of Ghana", 14th May, 2009, Hugh Stuart, BSc., MSc, MAusIMM.

The Project consists of a multi-deposit complex with essentially fourteen mineralised deposits making up the updated Mineral Resources contained in this TR. The Chirano mineralised deposits have been historically mined from both open pit and underground operations over a long period of time.

2.3 Purpose of Report

The Project has extensive existing infrastructure, having both open pit and underground operations and including an operational carbon-in-leach ("CIL") processing plant with a capacity of 3.6Mtpa. This TR is focused on communicating the status of current mining and processing operations, a review of the mine plan, operating costs and capital economics and a review of the current Mineral Resources and Reserves and LoM plan with an effective date of 31st December 2021.

The Report has been prepared in support of Asante's news release, dated 25th April 2022, informing of the acquisition agreement as described above. The report is prepared, and is intended to be used, in connection with the proposed transaction and to support the first-time disclosure by Asante of material and scientific information on a property that will be material to Asante.

The TR has been prepared by recognized Qualified Persons ("QPs") from dMb Management Services Pty Ltd ("dMb"), BARA International (BVI), ("BARA"), Snowden Optiro and GB Independent Consulting (Pty) Ltd on behalf of the Company.

2.4 Authors & Qualified Persons

The principal authors and recognized Qualified Persons of the TR are:

- David Michael Begg of dMb Management Services Pty Ltd (South Africa)
- Dominic Claridge of BARA International (BVI)
- Glenn Bezuidenhout of GB Independent Consulting (South Africa)
- Senzeni Mandava of Snowden Optiro (South Africa)

Table 2-1: Qualified Persons – Showing Items and Site Visits Dates and Purpose

Qualified Person	Company	Site Visit Date(s)	Item/Section	Purpose of Site Visit
David Michael Begg	dMb Management Services Pty Ltd	02/05/2022	1-10; 20; 23-27	Principal Author Geology, Exploration and general overview of entire Project.
Dominic Claridge	BARA International	19/04/2022-21/04/2022 27/04/2022 – 02/05/2022	15-16; 18-19; 21-22; 25-27	Mining & MRev, Opex & Capex, Economic Analysis
Glenn Bezuidenhout	GB Independent Consulting	19/05/2022-24/05/2022	13 & 17	Metallurgical Test work and Processing Design
Senzeni Mandava	Snowden Optiro	03/05/2022-07/05/2022	11-12; 14	Sample Preparation, Data Verification & MRE

Messrs Clive Brown and Franco Labuschagne (BARA Consulting, South Africa), both of whom are qualified mining or mechanical engineers with extensive experience in open pit and underground mining operations and design, also visited the Project to assist with relevant Sections.

Additional information was compiled by relevant associated professionals from Bara Consulting in some subsections of the Report.

None of the Qualified Persons hold any interest in Asante, its associated parties, or in any of the mineral properties which are the subject of this TR.

2.5 References and Information Sources

Information used in compiling the TR was sourced and derived from the shared Chirano Gold Mine data room and collection of historical reports, feasibility studies and other specific technical documents relevant to the Chirano Gold Mine, the historical operations, investigations and exploration.

Current operations and LoM planning have been derived from updated mine site and corporate reports and personal communications with the Chirano and Kinross executive and senior management, mine site employees and associated consultants.

The authors, all of whom have visited the mine site and current operations in Ghana, have made all reasonable enquiries to relevant Company management and mine personnel to establish completeness and authenticity of the information provided.

The Authors are satisfied that Asante, its representatives and employees have disclosed all material information pertaining to its Chirano Gold Mine and related matters. Asante has agreed to indemnify the Authors from any liability arising from its reliance upon the information provided or from information not supplied. A draft version of this report was provided to the Directors of Asante for comment in respect of omission and factual accuracy.

2.6 Personal Inspections by QPs and Associates

Visits to site were made by all the QP's and some designated associates of BARA Consulting.

1. Mr Mike Begg (dMb Management Services) and Mr Clive Brown (BARA Consulting): Both visited the site together on the 2nd May, 2022. The core shed was visited to examine and review the core storage, geological and structural logging, core sampling and current QA/QC protocols. The open pits and underground portals were examined and proposed mine plans discussed. The tailings dams and other infrastructure were visited to validate the current status and plans with relevant mine personnel. The RoM pad, waste dumps and general mine infrastructure were visited and inspected. Other geotechnical aspects of the mine proposal were discussed on site with accompanying members of mine management and the exploration team. The

roads to and from the numerous mining sites to the processing plant and other relevant infrastructure were travelled. The nearby residential and community settlements were also observed.

2. Mr Dominic Claridge (BARA International (BVI) – from the 19th to 21st April, 2022 and from the 27th April to 2nd May, 2022. Inspected all operating mines and the surface infrastructure relating to mine operations. Discussions were held with the CGML Technical Services team, and all necessary technical information was provided as requested. Underground visits were made to the Paboase, Akwaaba, Akoti, Suraw, Obra and Tano mines. Inspections were made to several working development faces, Sub Level Caving (SLC) and Long Hole Open Stopes (LHOS). Surface mining operations were inspected for the Mamnao North, Central and South open pits. A general tour of other surface infrastructure sites was undertaken including tailings dams, mobile fleet workshops, primary ventilation infrastructure, medical clinic facilities. It is the opinion of Mr Claridge that sufficient information was provided, and the review of all data was sufficient for the compilation of chapters 15, 16 and 19 of the NI43-101 Technical Report.
3. Mr Labuschagne (BARA South Africa): met with various superintendents as well as senior personnel responsible for maintenance and engineering to discuss, amongst others, the infrastructure in their area of responsibility, the mine's planned maintenance practices, vehicle replacement strategies as well as the available mobile fleet and equipment. Verification visits were conducted to all the surface and underground infrastructure, including but not limited to workshops, stores, buildings, services facilities and reticulation, mobile equipment, underground pump stations and substations, accommodation units as well as potable and sewage water treatment plants. During these visits to the various infrastructure and mobile equipment the specifications, quantities and general condition of the equipment and facilities were verified according to the various documentation received from the mine. The site visit was ended by presentations from senior mine personnel on various topics.
4. Mrs Mandava (Snowden Optiro) – The Mineral Resource QP was on site from the 4th to 7th May 2022 and conducted pertinent audits which included:
    - Visual inspection of current and historical core
    - Observation of core logging, marking, cutting and sampling
    - Observation of density determination
    - Inspection of geological and geophysical plans and sections
    - Verifying and validation of geological, sample and assay logs with data entry
    - QAQC and data management standard operating procedures and protocols
    - Validation of Resource modelling processes and estimation methodologies.
5. Mr Bezuidenhout (GB Independent Consulting) – from the 20th to 24th May. During this time, he inspected the processing plant and interacted with the management of the processing plant operations. The site visit and the available technical information is deemed sufficient for the compilation of the metallurgical chapters in the technical report.

Members of dMb Management Services, BARA, Snowden Optiro, GB Independent Consulting or any other external sources involved in the preparation of this TR, have no material interest in Asante or the mineral assets considered in this report.

2.7 Effective Date and Declaration

The issue date of this report is 31st May, 2022. The effective date of the TR is 31st December, 2021.

As of the date of this report, the authors are not aware of any material fact or change with respect to the subject matter that is not presented herein, or which the omission to disclose could make this report misleading.

2.8 Units, Currency and Abbreviations

Unless otherwise stated, all currencies are expressed in US dollars (US$), with metric units applied throughout this Technical Report.

Section and Item have been used interchangeably in this ITR.

Table 2-2: Abbreviations and Units of Measurements

Abbreviation/Unit of Measurement	Description
%	percent
°	degrees
°C	degrees Celsius
3D	three-dimensional
AAS	Atomic Absorption Spectrometry
Ag	silver
AISC	all-in sustaining capital
As	arsenic
capex	capital expenditure

Abbreviation/Unit of Measurement	Description
CIL	carbon in leach
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
cm	centimetre(s)
CP	Competent Person
Cu	copper
DDH	diamond drill hole
EPA	Environmental Protection Agency
FEL	front end loader
FS	feasibility study
g	gram(s)
g/cm^3	grams(s) per cubic centimetre
g/t	grams per tonne
G&A	general and administration
GPS	global positioning system
hr	hour(s)
ha	hectare(s)
kg	kilogram
KNA	Kriging neighbourhood analysis
JORC	Joint Ore Reserves Committee
JORC Code, 2012	Current Australasian Code for the reporting of mineral resources and ore reserves
kg	kilogram(s)
kg/hr	kilograms per hour
km	kilometre(s)
koz	Kilo ounce/thousand ounce (troy)
kt	thousand tonnes
kW	kilowatt
ℓ	litre
kℓ	kilolitre
LOI	loss on ignition
LpM	life of mine
m	metre(s)
m^2	square metre(s)
m^3	cubic metres(s)
Ma	million years
MAMSL	metres above mean sea level
mm	millimetre(s)
MRE	Mineral Resource estimate
MRev	Mineral Reserve estimate
mRL	Reduced level/depth or height of a place (in m) above a reference datum or mean sea level
Mt	million tonnes
Mtpa	million tonnes per annum
NI 43-101	Canadian Securities Administrators National Instrument 43-101
NPV	net present value
opex	operating expenditure
oz	ounce (troy)
Pb	lead
PFS	prefeasibility study
pH	Activity of hydrogen ions
ppm	parts per million
QA	quality assurance
QA/QC	quality assurance/quality control
QC	quality control
QP(s)	Qualified Person(s)
RAP	resettlement action plan
RC	reverse circulation
Resolute	Resolute Mining Limited
RF	revenue factor
RoM	run of mine
SABC	Semi-autogenous and ball milling circuit
SAG	semi-autogenous grinding
SD	standard deviation(s)
SiO_2	silicon dioxide (silica)
SLC	sub level caving
SLOS	sub level open stoping
SMBS	Sodium meta-bisulphite
SMU	selective mining unit
t	tonne(s)
t/m^3	tonnes per cubic metre
tpa	tonnes per annum
TSF	tailings storage facility
TSX	Toronto Stock Exchange
µm	micron
US$	United States dollars
VTEM	versatile time-domain electromagnetic surveying
XRD	x-ray diffraction
XRF	x-ray fluorescence
WRD	waste rock dump
WRDF	waste rock dump facility
Zn	zinc

3. RELIANCE ON OTHER EXPERTS

The Qualified Persons have relied upon the legal, environmental and permitting information provided by management and employees of MGBL for inclusion in Section 4 (Property Description and Location).

The QPs have not researched property title or mineral rights for the Project and express no opinion as to the validity of ownership status of the property. The ITR has been prepared on the understanding that the property is, or will be lawfully accessible for evaluation, development, mining and processing.

Table 3-1: QP Reliance on Other Experts

Section	Subject	Company
4	Property Description and Location	Kinross Gold
4.1	Legal and Ownership	Kinross Gold
20	Environmental, Permitting & Social Impact	Geosystems

Chirano Management have provided information, reports and data to the Authors in preparing this document which, to the best of the Authors knowledge and understanding, is complete, accurate and true and Asante acknowledges that the Authors have relied on such information, reports and data in preparing this document. No warranty, or guarantee, be it express, or implied, is made by the authors with respect to the completeness, or accuracy of the legal aspects of this document.

Dr Charles Akayuli from Geosystems Consulting Pty Ltd, Ghana, visited the mine between 10th May and 13th May 22. The focus was on the original EIS, EMP and closure plans. Environmental monitoring and recent results were validated. Licenses and permits were collated and checked. Dr Akayuli has over 30 years' experience in research and consultancy, Project Management and environmental permitting of Mining and Construction projects, has written over 20 Environmental Impacts Assessments reports (EIS) for Gold Tailings storage facilities and mining projects in Ghana. He is currently a member of the National Technical Committee on Tailings Dams in Ghana and EPA and Mineral commissions recognised auditor of tailings dams in Ghana.

4. PROPERTY DESCRIPTION AND LOCATION

4.1 Regional Overview

Ghana is in West Africa, approximately 600km north of the Equator and sharing boundaries with Togo to the east, Cote d'Ivoire to the west, Burkina Faso to the north and the Gulf of Guinea to the south.

In 2018 Ghana was divided into sixteen distinct regions and the Chirano Project falls within the Western North Region, on the boundary of the Ashanti Region as shown in ***Figure 4-1***

Figure 4-1: The Sixteen Regions of Ghana

Gold represents Ghana's major export commodity, followed by crude oil and cocoa. Ghana is the world's sixth and Africa's largest producer of gold. Manganese, bauxite and diamonds are also mined. Tourism is also growing rapidly.

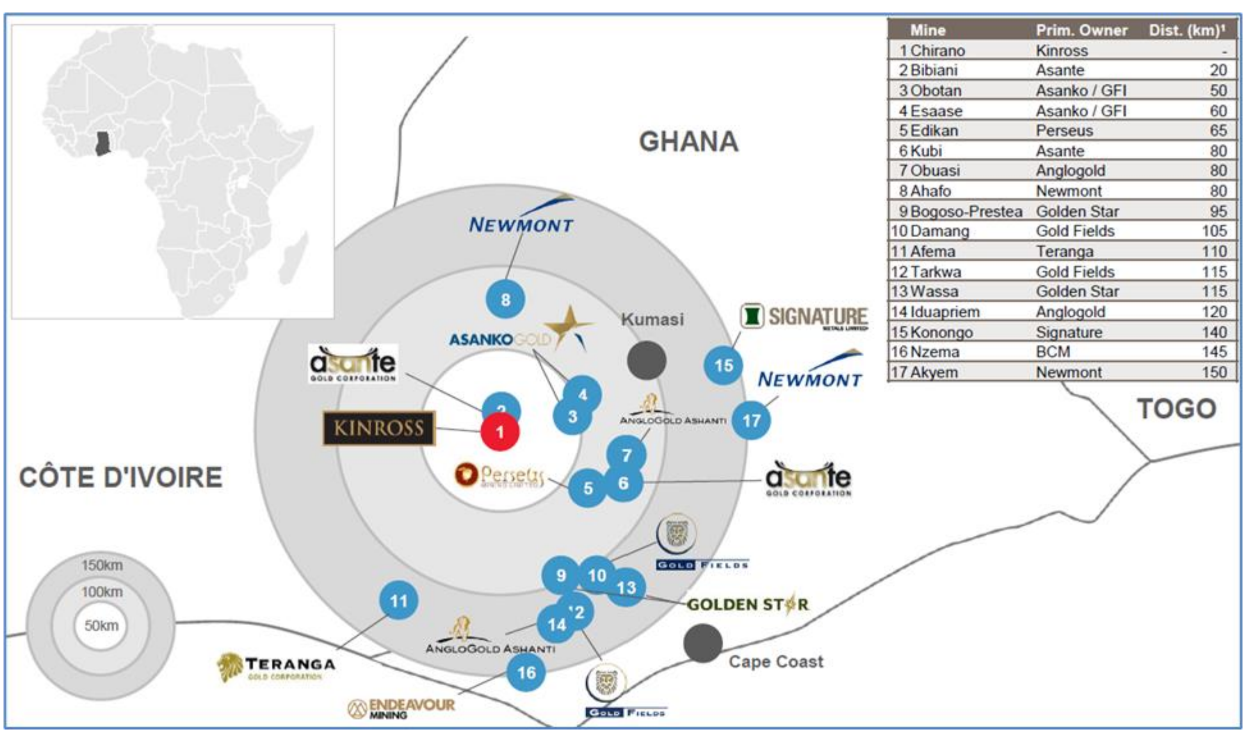


Figure 4-2: Chirano Gold Mine Location and Nearby Operations

(Source: Kinross, 2022)

4.2 Project Location and Area

The Chirano Gold Mine is located mostly in the Bibiani-Anhwiaso-Bekwai and partly in the Sefwi Wiawso Municipalities of the Western North Region of Ghana and lies between Latitude 6 00'00'' N and 6 24'75'' N and Longitude 2 21'33'' W and 2 24’33’’ W with a total Mine Lease of forty-five kilometres (45km²). The project in its entirety covers a footprint of approximately 190ha and it is about 100km south-west of the city of Kumasi and 15km south-southwest of the township of Bibiani.

Access to the mine from the capital Accra is via a sealed highway to Kumasi and then running south-west towards Bibiani and onwards to Sefwi-Bekwai. The final approach is either by turning off the highway at Tanoso or Subri (15km and 17km south of Bibiani respectively) and traveling west for approximately 22km on a gravel feeder road or by a 13km northward gravel road whose junction is approximately 9km beyond Sefwi-Bekwai.

4.3 Licences and Mineral Tenure

4.3.1 Mining Leases

The Chirano Mining Lease, PL 2/56 was granted on the 23rd December 2019 for a further 15 years and covers an area of 46km². The Mining Lease area contains all reported Mineral Reserves and Mineral Resources. Figure 4-3 below shows the total property holding under Mining Lease of Chirano Gold Mine.

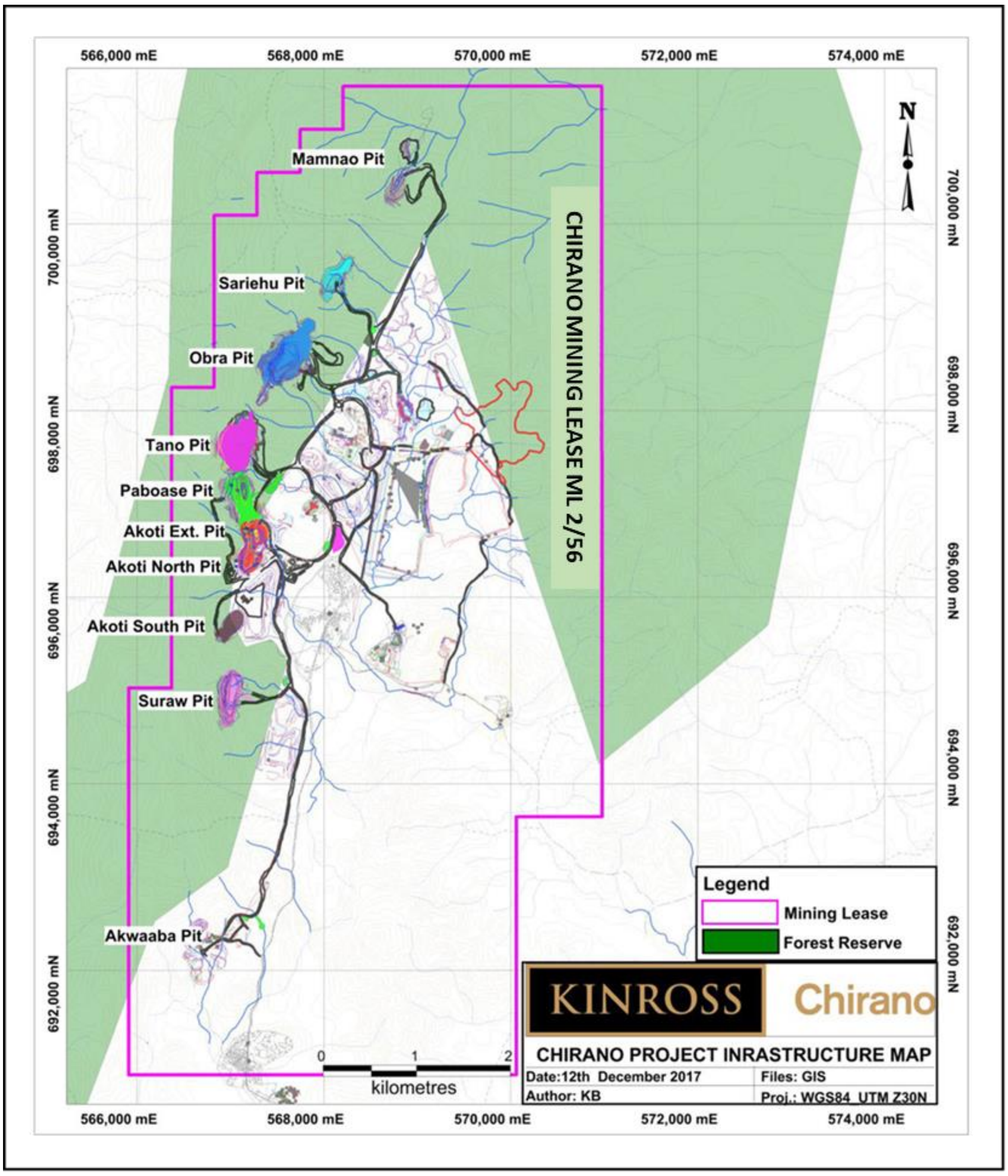


Figure 4-3: Chirano Gold Mine - Property Holdings

4.3.2 Prospecting Licences

Chirano holds the following Prospecting Licences (Table 4-1):

Table 4-1: Chirano Gold Mine – Current Prospecting Licenses

Tenement Number	Type	Name	Status/ Validity	Area (km²)	Comments
PL 2/74	Prospecting License	Ahwiam	Renewal Applied Valid 2/12/21	26.117	Updated 3-yr work program TR sent to MinCom on 27/9/2021
PL 2/115	Prospecting License	Anansu	Renewal Applied Valid 27/10/23	28.45	Updated 3-yr work program TR sent to MinCom on 01/10/2019
PL 2/415	Prospecting License	Amafie	Renewal Applied Valid 3/03/23	34.18	Extension granted for 3 years
PL 3/92	Prospecting License	Chirano North	Renewal Applied Valid 10/08/23	24.1991	Updated 3-yr work program TR sent to MinCom on 13/5/2019
			TOTAL	**112.95**	

In addition, Chirano also has the rights to the following Prospecting Licenses that are currently under application, resulting from the shedding-off of previously expired licenses.

Table 4-2: Prospecting Licences Under Application

Tenement Number	Type	Name	Status	Area (km²)
PL 2/438	Prospecting License	Surano	Application (21/1/2009)	33.76
PL 2/473	Prospecting License	Apeakrom	Application (28/1/2014)	8.82
PL 2/474	Prospecting License	Futa	Application (23/1/2014	27.09
PL 2/475	Prospecting License	Abrabra	Application 28/1/2014)	22.47
PL 2/476	Prospecting License	Nkwadumu	Application 28/1/2014)	19.53
PL 2/477	Prospecting License	Anansu West	Application 28/1/2014)	9.87
PL 2/485	Prospecting License	Ayerekurom	Application (15/5/2015)	16
			TOTAL	**137.54**

Figure 4-4 below illustrates the prospecting License areas currently held by Chirano Gold Mine.

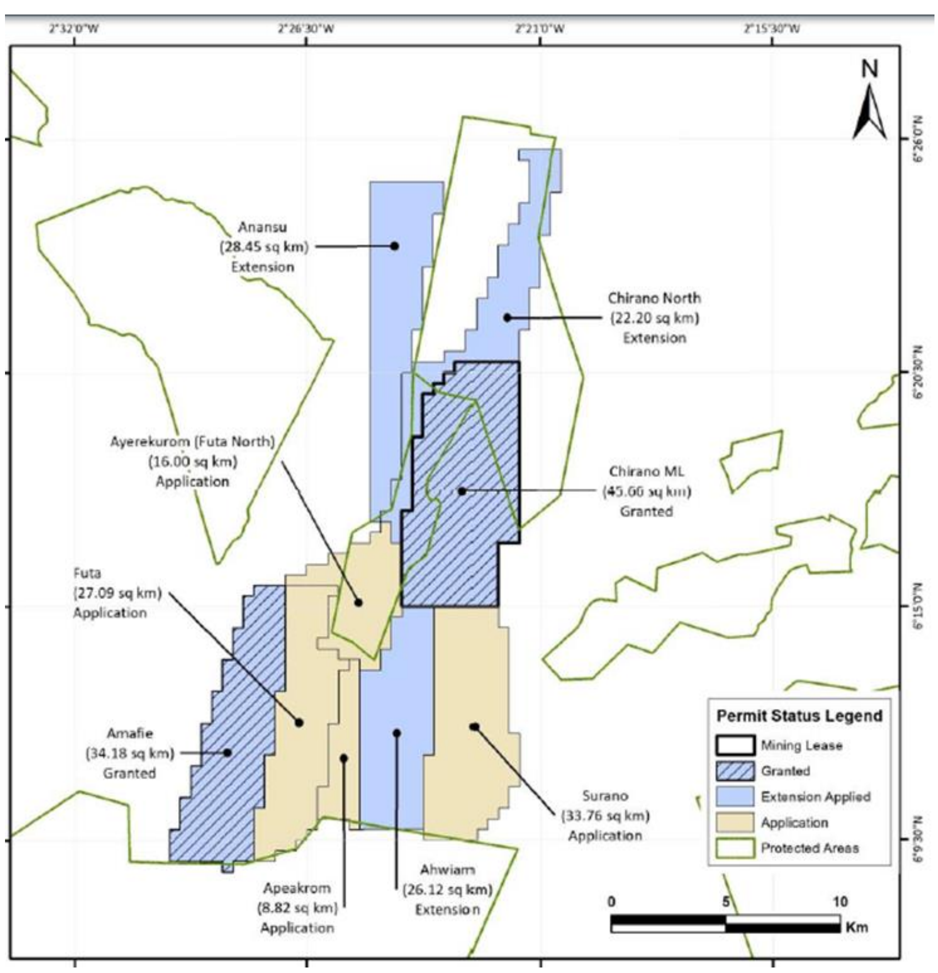


Figure 4-4: Permit and License Status

(Source: Kinross, 2022)

4.3.3 Mining Legislation

STATE LANDS ACT (1963)

Section 6(1) provides that any person whose property is affected by a public project is entitled to compensation and provides mechanisms through which people not satisfied with compensation may seek redress. Dissatisfied compensation claimants may seek redress by first notifying the minister, who refers the case to a tribunal consisting of three persons appointed by the President.

Notwithstanding existence of these legal safeguards, and according to the World Bank, the records indicate that in the past the Ghanaian Government has defaulted in most cases and has failed to pay full compensation or help with the relocation of displaced persons.

MINERALS AND MINING ACT 703

The Minerals and Mining Act, 2006 (Act 703) (as amended by the Minerals and Mining (Amendment) Act, 2015 (Act 900) and the Minerals Commission Act, 1993 (Act 450) are the principal enactments setting out the framework of Ghanaian mining law. These acts express the basic position that minerals in their natural state are owned by the state; they also outline the licensing scheme for mineral operations, the incidents of the various mineral rights and the powers of the principal regulatory institutions. The following pieces of subordinate legislation add detail in specific areas to the regime set out in the principal legislation:

a) Minerals and Mining (General) Regulations, 2012
b) Minerals and Mining (Support Services) Regulations, 2012
c) Minerals and Mining (Compensation and Settlement) Regulations
d) Minerals and Mining (Licensing) Regulations, 2012
e) Minerals and Mining (Explosives) Regulations, 2012
f) Minerals and Mining (Health, Safety and Technical) Regulations, 2012.

The mining law divides the various licences that can be granted for a mineral right into three sequential categories, Reconnaissance Licence, Prospecting Licence and a Mining Lease, defined under the Minerals and Mining Act, 2006 (Act 703). These licences are discussed below.

RECONNAISSANCE LICENCE (SECTIONS 31-33)

A reconnaissance licence entitles the holder to search for specified minerals by geochemical, geophysical and geological means. It does not generally permit drilling, excavation, or other physical activities on the land, except where such activity is specifically permitted by the licence. It is normally granted for 12 months and may be renewed for a period not exceeding 12 months, if it is in the public interest. The area extent is negotiable, related to the proposed reconnaissance program.

PROSPECTING LICENCE (SECTIONS 34-38)

A prospecting licence entitles the holder to search for the stipulated minerals and to determine their extent and economic value. This licence is granted initially for a period of up to three years covering a maximum area of 150km^2. This may be renewed for an additional period of two years, but with a 50% reduction in the size of the licence area if requested. A prospecting licence will only be granted if the applicant shows adequate financial resources, technical competence and experience and shows an adequate prospecting program. It enables the holder to carry out drilling, excavation and other physical activities on the ground.

MINING LEASE (SECTIONS 39-46)

When the holder of a prospecting licence establishes that the mineral to which the licence relates is present in commercial quantities, notice of this must be given to the Minister of Lands, Forestry and Mines and if the holder wishes to proceed towards mining, an application for a mining lease must be made to the Minister within three months of the date of the notice.

SURFACE RIGHTS

The laws regarding surface rights are captured in the Mineral and Mining Act 206, Act 703 subsection 72. This section gives rights to the owners of land (i.e.: Chiefs, families, individuals, etc) to be compensated by Mineral Right holders. In the case of MGBL all concessions belong to the Ashanti Kingdom who has in turn given same right to the relevant Divisional Chiefs to exercise that right in terms of compensation. Compensation with regards to surface rights comes in the form of:

- Crop compensation
- Deprivation of land use compensation
- Compensation of immovable properties (shrines, ponds, etc)
- Royalty payments through the Stool lands.

4.4 Agreements, Royalties and Encumbrances

Mining Lease PL2/56 is wholly owned by Chirano, without any option or joint venture arrangement. The Ghana Government retains a 10% free carried interest. No back-in rights are held by any other party.

A 5% Mining Lease royalty is payable to the government. An additional 0.6% gross revenue royalty is payable to the EPA in relation to minerals extracted from Ghana's productive forest reserves. Production from most of the proposed Chirano pits is subject to this additional royalty. Akwaaba lies outside of the forest reserve.

4.5 Other Significant Factors and Risks

Environmental, permitting, legal title, taxation, socio-economic and political or other relevant issues could potentially materially affect access, title or the right or ability to perform planned operations. However, as of the Effective Date of this Report the QP and other Authors are unaware of any such potential issues that may hinder Chirano’s ability to continue to perform operations.

5. ACCESSIBILITY AND CLIMATE, LOCAL RESOURCES AND INFRASTRUCTURE, PHYSIOGRAPHY

5.1 Accessibility

The Chirano Gold Mine is situated 100km southwest of Kumasi. The town of Bibiani lies 15km north-northeast of the mine area (37km by road). Access to the mine from the Capital Accra is via a sealed highway to Kumasi and then sealed highway running south-west to Bibiani and onwards to the town of Sefwi-Bekwai. The final approach is via a 13km road whose junction is approximately 9km beyond Sefwi-Bekwai.

Accra has daily international flights to and from Europe and South Africa. Domestic flight services between Accra and Kumasi are daily and frequent.

Most of the major international airlines fly into and from the newly refurbished international airport in Ghana's capital city, Accra. Accra is a modern coastal city with a total population of approximately 4 million people (2021 census). Domestic air travel has increased significantly, and the country has a vibrant telecommunications sector, with six cellular phone operators and several internet service providers. The nearest city to the mine is Kumasi situated 92km east of Bibiani town and about 250km to the north-west of Accra. Kumasi is a fast growing metropolitan and is the commercial, industrial and cultural capital of the Ashanti region with a population of circa 3.4 million residents (2020). Kumasi is served by the Kumasi Airport with two domestic airlines operating regular flights from Accra. This airport has been approved for expansion into an international facility, with an estimated completion date of October 2022.

5.2 Climate

Ghana has a predominantly tropical climate and consists mostly of low savannah regions with a central, hilled forest belt. Ghana's one dominant geographic feature is the Volta River, upon which the Akosombo Dam was built in 1964. The damming of the Volta created the enormous Lake Volta, which occupies a sizeable portion of Ghana's south-eastern territory.

The Project falls within the semi-equatorial climatic zone which is characterised by two rainy seasons in a year cycle; April to July and September to November. The dry season which occurs between December and March is generally named "Harmattan". Rainfall data collated at the Sefwi Bekwai synoptic station from 1996 to 2015 indicates a mean annual rainfall of 1.42m. For the same period the mean monthly temperature ranges between 21.4˚C and 34.3˚C. Relative humidity for the area is generally high and moist all year round with the lowest mean relative humidity of 73% recorded in February whilst the most humid month is June with an average of 84%. Records at Ghana Meteorological Agency indicate the municipality within the project area experiences NE dry harmattan winds during the dry season.

The Western Region of Ghana, out of which the Western North region was recently created, has an average daily temperature of 31ºC, with average humidity above 80%. There are typically two seasons in Ghana: the dry and wet seasons. The wet season extends from May to October. Annual rainfall is depicted for the Western Region of Ghana in Figure 5-1.

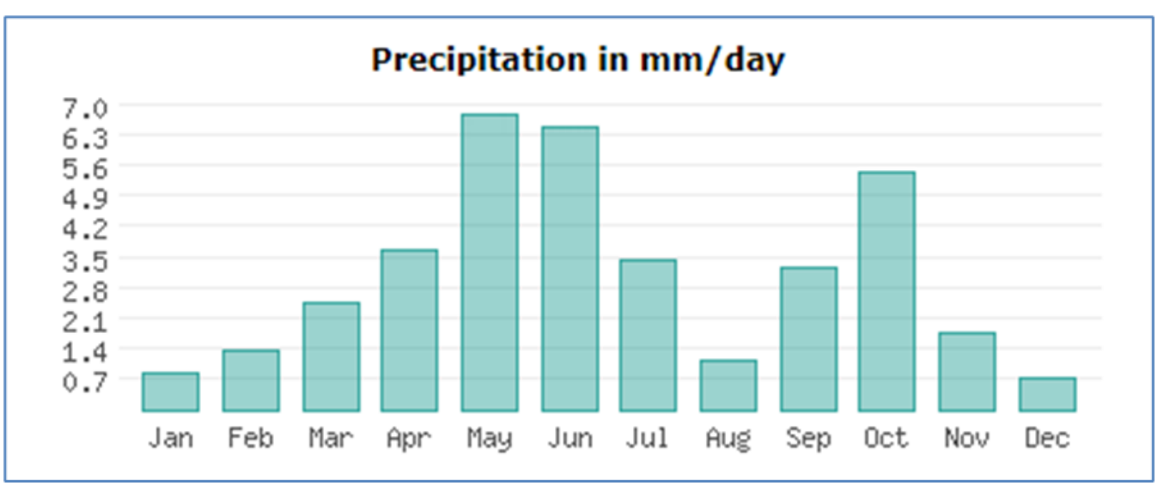


Figure 5-1: Average Monthly Rainfall

(Source: worlddata.info/Africa/Ghana/climate-western)

5.3 Local Resources

Chirano has been in full operations since 2004 and subsequently currently has a full complement (employees and contractors) on site to carry out the duties required for the open pit and underground mining operations and the processing plant operations. The team includes senior and executive management, project management and personnel, accounting and procurement staff, open pit and underground mining personnel, environmental officer and community liaison personnel, maintenance personnel, geological and technical personnel, plant operations personnel, human resources, medical clinic personnel and full camp catering and management. A full contracted security complement is also present.

5.3.1 Primary Cultural Features in the Vicinity of the Chirano Mines

The Project Area consists of parts of two neighbouring Municipal Administrative areas, mostly in the Bibiani-Anhwiaso-Bekwai (BAB), and partly in the Sefwi Wiawso Municipalities of the Western North Region. Both Municipalities are almost entirely based on a "rural" cultural and economic way of life. The predominant economic activity in these areas is farming.

The main communities occurring within the project area are the twin villages of Etwebo-Akoti, Kwaokrom and the village of Paboase located on the southern boundary. In addition to these villages, there is a preponderance of scattered hamlets. Chirano identified 21 settlements occurring within the boundary of its Mining Lease.

5.3.2 Population and Culture

Ghana has a population of 30.8 million (2021 census) and covers an area of approximately 239,000 km^2. Ghana has a large variety of African tribal or sub-ethnic units. English is the official language, a legacy of British colonial rule. Twi is the most widely spoken local African language. Much of the population are Christian (71%) whilst the northern ethnic groups are largely Muslim (20%) and indigenous beliefs (9%) are also practiced throughout the country, (2021 Population and Housing Census data).

The population in the Project area is predominantly rural with Bibiani and Sefwi Wiawso forming the only significant townships. Within the BAB, Bibiani has been the centre of economic activity for quite some time. Mining, logging and milling are the main industrial activities in the BAB. These activities with its associated employment have attracted influx of people from other regions of Ghana.

5.3.3 Economic Activity

Ghana has a market-based economy with relatively few policy barriers to trade and investment in comparison with other countries in the region. It has substantial natural resources and a much higher per capita output than many other countries in West Africa.

The agricultural sector is dominated by crop farming and forms the economic base of the District. The main type of farming is small-scale subsistence farming using a slash and burn method. Farm sizes are usually small and mainly rain-fed. Income of farmers is quite low. Most of the road networks in the district are feeder roads that are mostly in extremely poor condition, especially during the rainy season. Consequently, transportation of food crops to the market centres is very difficult and expensive. These conditions, coupled with an inadequate number of suitable storage and preservation facilities, are a major impediment to increased agricultural production. Farmers thus sell their produce at relatively low prices.

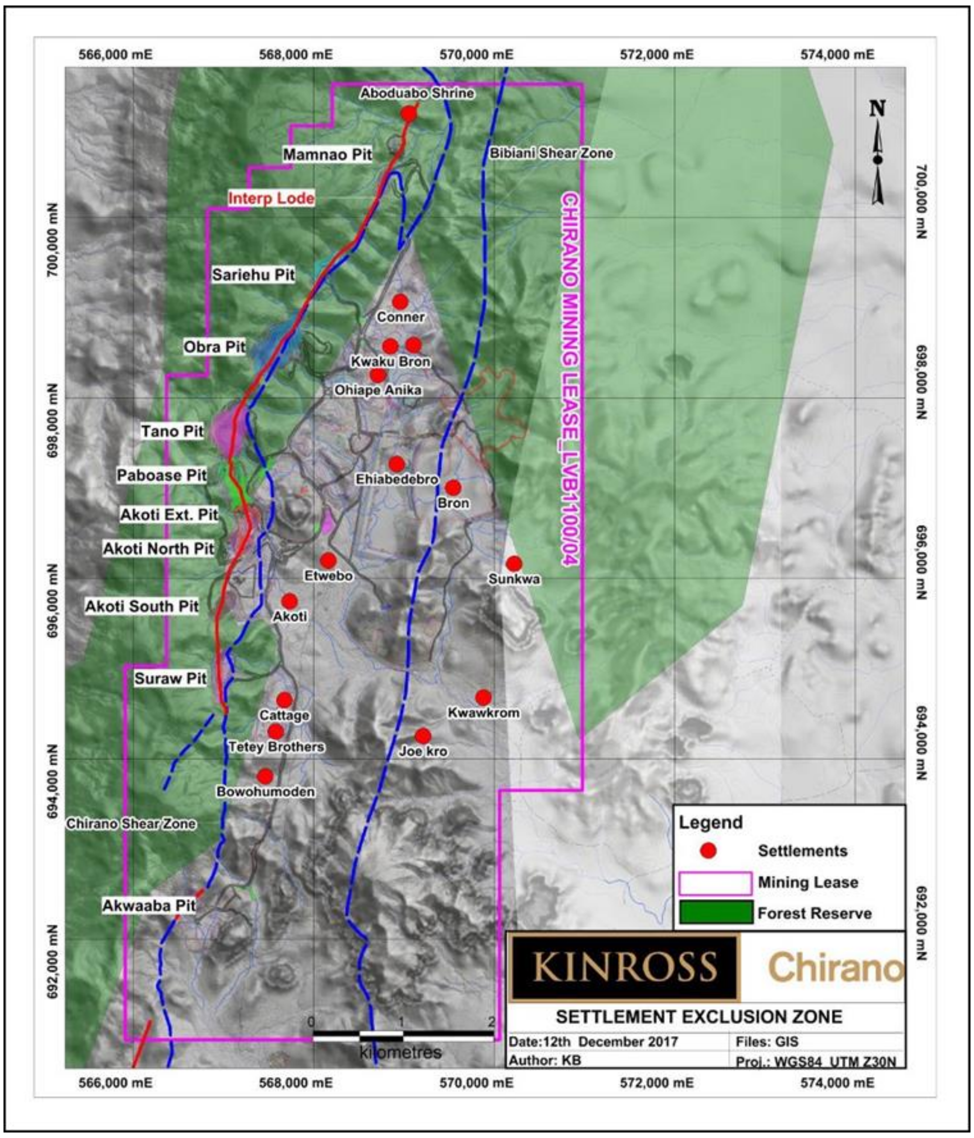


Figure 5-2: Initial Settlements of the Project Area

(Source: Chirano MOP 2022)

5.4 Infrastructure

5.4.1 General Comment

The mine currently operates three surface mining pits at Mamnao. These are cut-back pits at the Mamnao North, Mamnao Central and Mamnao South pits. There are six underground operations namely Akwaaba, Suraw, Paboase, Akoti, Tano and Obra underground operations. Obra underground is currently a new underground project which commenced development in 2021. Ore is processed at the Chirano CIL plant. The capacity of the mill is approximately 3.6Mtpa. Beneficiation of ore is accomplished through crushing, grinding, flotation and carbon-in-leach processing. Ore processing and associated facilities are, however, located within a relatively small area outside the Forest Reserves in line with the Guidelines for Mining in Production Forest Reserves. Project development commenced in 2004 and was commissioned in October 2005.

Chirano Gold Mine has a workforce of 907 directly under its employment for both underground and surface operations. In all, there are 2,059 workers employed on the Mine as at the end of October 2021.

The mining operations are scheduled to work 365 days a year, less unscheduled delays such as high rainfall events or significant high potential incident that may cause mining operations to be suspended. The mine workforce operates on a two shift, three panel roster, seven days a week, in two 12-hour working shifts with the equipment services scheduled as required.

The mine and adjacent residential township have excellent infrastructure and services necessary for successful operations of the mine. The mine site infrastructure includes ample administration and operational offices, well established residential areas and canteens, large engineering workshops, mine laboratory, well-constructed mine roads, explosives magazine, fuel storage tanks and a medical clinic managed by a qualified doctor.

The mine already had a 3.6Mtpa processing plant, tailings storage facility and workshops. All mine related areas are fully secured with a contract Security Company deployed in all areas. Senior staff are housed in existing well established residential camps and other mine labour is bussed to site from the surrounding towns and villages.

The Chirano Gold Mine receives electrical power from the national grid. However, the mine also owns and maintains several generators to supplement grid power when required.

The primary source of raw water is the Water Storage Facility (WSF) which has been designed to store approximately 400,000m³. The water storage facility is in a natural river valley approximately 2km east of the treatment plant site.

Potable water is used for drinking, ablutions, laboratory, buildings and safety showers, and is sourced from boreholes to minimize the risk of disease from surface sources. The borehole water is treated by chlorination and ultraviolet sterilization before being distributed by pump to the plant, mine services area and the staff village. Potable borehole water is not required for any process purpose.

The supply of power in this region is controlled by the Electricity Commission of Ghana (ECG) in an arrangement whereby power is purchased from the 161kV national grid, controlled by the VRA (Volta River Authority), stepped down at ECG owned substations and reticulated as required to consumers. The power supply from the VRA grid is subject to spasmodic outages, typically resulting in milling utilization reductions in the order of 1% to 2.5%. The electrical power supply to the mine area is provided by a switching arrangement at the Asawinso main substation from the existing transformer feeding the Bibiani plant. A 33kV switching bay has been extended from the Bibiani bay at the Asawinso substation and a 33kV overhead power line has been constructed from Asawinso to the plant site at Chirano. The overhead 33kV power line distributes 33kV power directly to the plant switchyard where it is distributed via 33kV reclosers to the plant. To provide additional power for the expansion of the mill and the Akwaaba underground a 5MW HFO set is installed on the site and operated by a third party. In addition, 6 diesel generation sets exist to provide standby power in the case of ECG supply problems. Installed power is estimated to be 17MW, with a peak continuous power demand of 13.5MW.

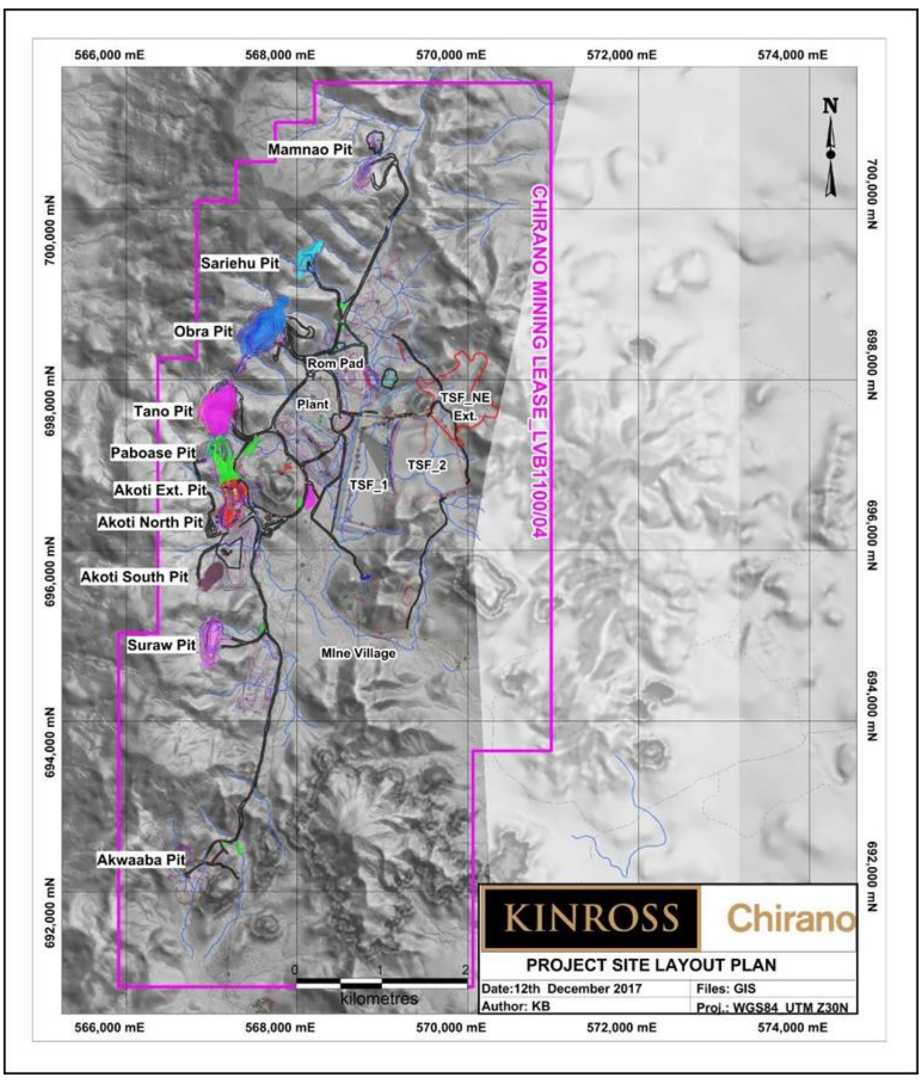


Figure 5-3: Overall Project Site Layout Plan

(Source: Chirano MOP 2022)

5.4.2 Tailings Storage Facility

Knights Piesold Ghana Limited (KP) were commissioned by CGML to carry out detailed design and provide construction management and to provide operational supervision for the current TSF at Chirano Gold Mine (Knights Piesold: Tailings Storage facility 1 South Extension, Detailed Design Report; April 21, 2021).

The Mine has been to date operating two TSF dams, namely, TSF 1 and its northern extension TSF 1 NE, and TSF 2. TSF 2 is now closed and rehabilitated. Active deposition into TSF 1 ceased in June 2020 and tailings are now being deposited into the TSF 1 NE extension (Figure 5-4)

The QP did not engage with Knights Piesold directly and has relied on the report mentioned earlier for certain relevant information used in this Report. Geoservices was however involved in the submission of the final EIS for TSF 1 SE and additional information below has been summarised from this source.

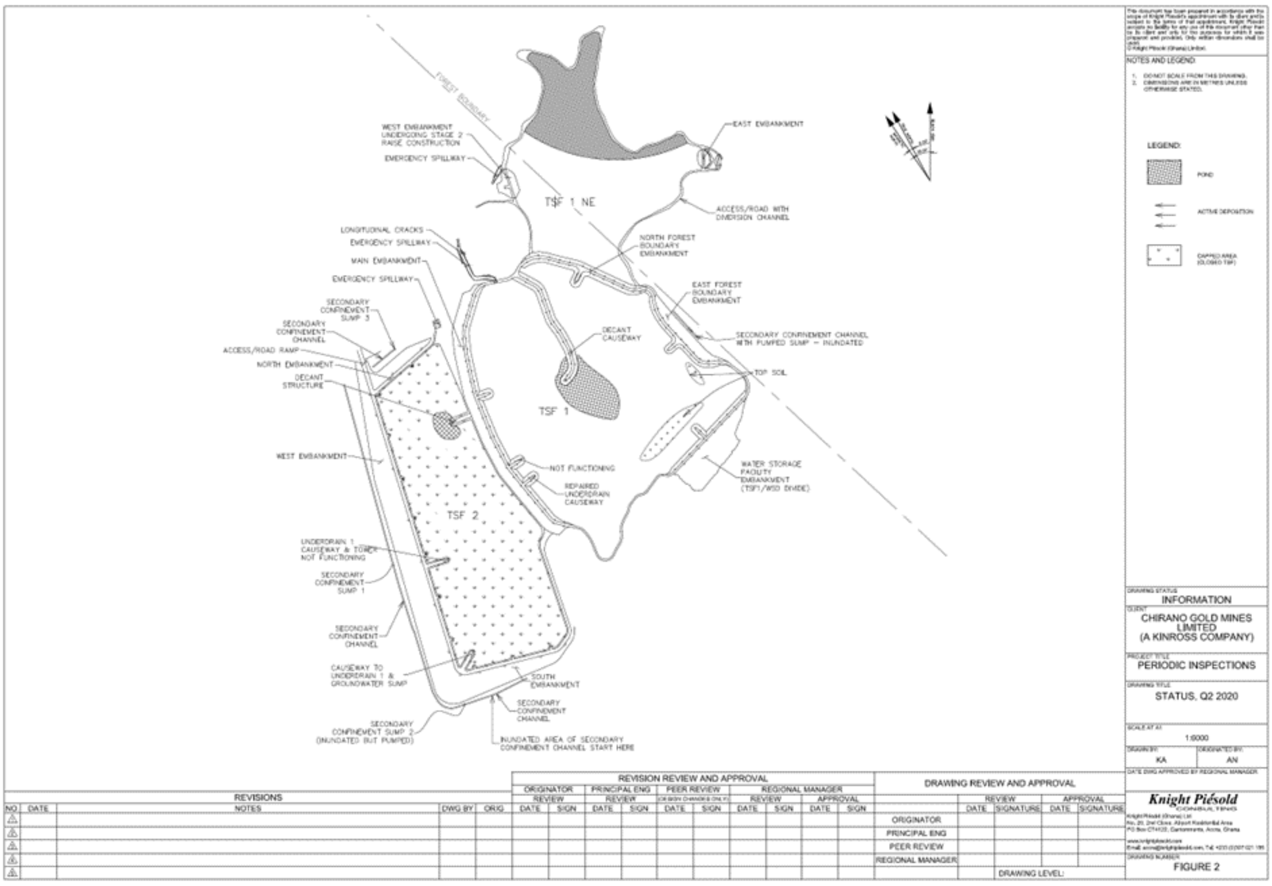


Figure 5-4: Schematic of CGML Tailing Storage Facilities

(Source: KP 2020)

5.5 Physiography

The Project Area lies partly within the Suraw sub-basin of the Tano river basin and partly in the main Ankobra basin. These two major rivers drain the south-western parts of Ghana into the Atlantic Ocean.

The Project Area is drained principally by the main Suraw River and its tributaries. Smaller catchments include the Mamnao stream in the north and the Paboase stream to the south. The Mamnao stream joins the upper part of the Ankobra River within the boundary of the Tano Suraw Extension Forest Reserve, while the Paboase stream empties into the Suraw River south of the Project Area. The Suraw River flows southward for approximately 70km before joining the Tano River.

The streams and rivers draining the Project Area receive flow contributions, which originate from an area where most of the deposits are located or from sites where future Project facilities will be developed. Therefore, the main mining area is comprised of headwaters for these tributaries.

Within the Project Area, most of these water bodies are devoid of major pollution problems. They are used, mainly during the rainy season, as sources of potable water by the inhabitants of the settlements located near their banks. These streams are very seasonal, and dry completely except during exceptionally wet years. Most of these settlements have access to an alternative source of water.

Together with lease boundaries, location of existing settlements and features such as forested areas with high conservation value, the topography of the project site has had a significant influence on the location of project infrastructure. An overall site layout is provided in Figure 5-3. Overall Project Site Layout Plan.

The western side of the area is dominated by the south Bibiani range which forms a major range of hills. The hills run roughly north-south and the Chirano gold deposits lie halfway up its steep (15˚-25˚) eastern slope, such that the open pits will have high western walls and low eastern walls. The range rises from a height of about 250m above mean sea level (AMSL) near the river to about 550m AMSL at the crest.

Part of the Mining Lease (42%) lies within forest reserves and is covered by tall semi-deciduous rain forest. Most of the area is reserved for commercial timber production. Parts of the reserves have been degraded by illegal farming activities.

The Project has been developed on a land area of approximately 6.2km² within a Project Area of 45km² (Figure 5-5). The topography of the site consists of moderately to very steep sided hills exceeding 250m above the surrounding terrain. The valleys are drained by various seasonal streams and their tributaries which take their sources from relatively well vegetated hills located in the Tano, Suraw and Tano Suraw Extension Forest Reserves. In the triangle outside the Forest Reserves, the Project Area contains a number of small settlements (villages and hamlets) supported by cocoa and subsistence farming.

The Project Area is not located within or near a site with significant tourism potential.

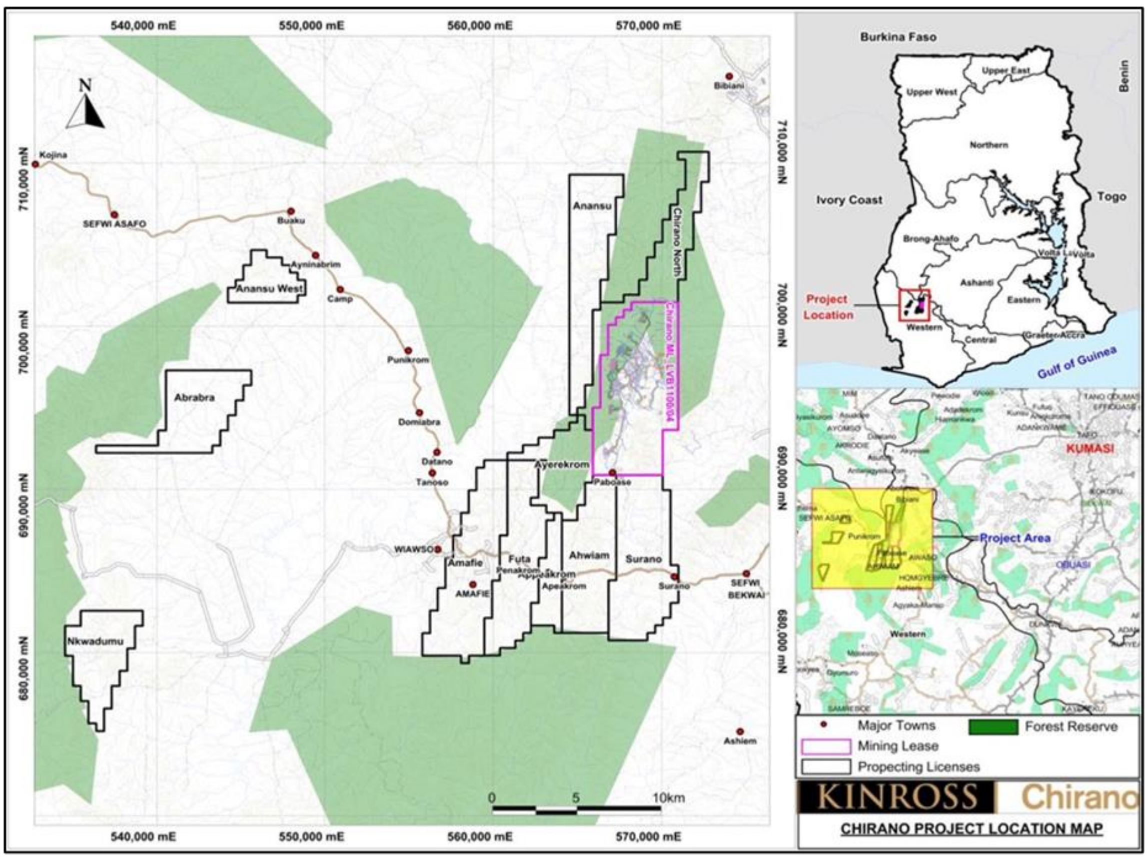


Figure 5-5: Location Map of the Chirano Gold Project

(Source: CGML MOP, 2022)

6. HISTORY

6.1 Prior Ownership and Ownership Changes

In the mid-1930s two concessions covered the Chirano area; one held by Gold Coast Selection Trust and one by Anglo-African Goldfields Ltd. No reports of work at this time survive, but some small pits have been found which may date from this period.

Billiton International Metals BV held the area in the late 1980s, possibly undertaking regional reconnaissance for gold-bearing laterite deposits.

The current phase of exploration began in early 1990s when Mr Johnson Gyamfi, a prominent Ghanaian businessman, applied for two prospecting concessions at Chirano in the names of Johnsons Limited and Chirano Goldfields Company Limited ("CGML"). In November 1993 an agreement was reached with Placer Outokumpu Exploration Ltd (POE). However, after several phases of exploration, POE judged that the area was unlikely to deliver its minimum target of one million ounces, and they joint ventured the project to the British company Reunion Mining Plc (Reunion) in May 1995.

Work was halted in March 1996 by a government-imposed moratorium on exploration work in Forest Reserves. In November 1997 Reunion was given permission to resume exploration under strict environmental constraints and temporary permits however the company eventually chose to farm-out the property to concentrate on another project in Namibia.

Red Back negotiated an option agreement with Reunion in mid-1998. By April 1999, Red Back's subsidiary company CGML had acquired 95% interest in the project. The remaining 5% held by the estate of Mr Gyamfi was purchased by Red Back in November 2005. Redback carried out extensive drill programmes over the top 100-200 meters of the mineralised deposits with the view of developing open pit mines.

By mid-2004 all of the deposits had been drilled sufficiently to define their gold resources. The company had collected 15,000 soil samples, dug 81 trenches with a total length of 4,063 meters, and completed 605 drill holes totalling 60,489 meters. A prefeasibility study for establishing a mining operation was completed by CGML in 2000, and a Bankable Feasibility Study was completed in early 2003. Predevelopment exploration expenditure totalled US$17.5 million.

In October 2004, Redback Mining announced its decision to develop the Chirano deposits, when proven and probable reserves were estimated at 17.8Mt grading 1.9g/t Au for 1.09Moz. The mine construction was completed in September 2005. The final development capital cost was US$73.4 million. Red Back commissioned the gold plant in September 2005 with the first gold was poured on October 10, 2005. The plant was expanded by 2009 to enable treatment of 3.5Mtpa to accommodate the Akwaaba underground mineralised material.

Conventional open pit mining methods were used to mine the mineralised material and waste. All primary fresh material was drilled and blasted.

Redback Mining continued to explore around and below the deposits, which resulted in the discoveries of three high grade mineralised shoots below two of the Akwaaba and Paboase pits. The first underground deposit (Akwaaba) came into production during the 2nd half of 2008 and was mined utilising sub-level cave mining methods. The second deposit (Paboase) started production in the first quarter of 2012, the third is Akoti which started in 2016, the fourth is Tano which started production in the fourth quarter of 2020, the fifth is Suraw which started production in 2021 and currently development is ongoing at Obra underground mine which has become the sixth underground deposit for Chirano Gold Mines.

Kinross Gold Corporation obtained the Red Back part of the ownership of CGML in September 2010.

Table 6-1: Summary of Chirano Gold Mine Development

Date	Owner/Activity
1995	Reunion Mining completes the first drilling on the Chirano property
1998	Chirano acquired by Redback Mining
2004	Redback Mining announces decision to develop Chirano
2005	First gold poured
2008	First underground mine, Akwaaba, starts production
2009	Mill expanded to 3.6million tonnes per annum capacity
2010	Redback Mining acquired by Kinross Gold
2012	Second underground mine, Paboase, starts production

Date	Owner/Activity
2016	Third underground mine, Akoti, starts production
2020	Fourth underground mine, Tano starts production
2021	Fifth underground mine, Suraw starts production
2021	Sixth underground mine, Obra commenced development

6.2 Historical Mineral Resources and Reserves

A number of Mineral Resource and Mineral Reserve estimations were done in the early years by Red Back Mining prior to the operations being purchased by Kinross in 2010.

The historically declared Mineral resources have not been verified by the QPs of this Technical Report. It is accepted that the Mineral resources were estimated in accordance with the best practice guidelines and international mineral reporting codes by suitably qualified persons.

The current Mineral Resources are not based on the historical estimates. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

6.2.1 Historical Mineral Resources and Ore Reserves (Pre-2010)

Table 6-2: Mineral Resource Estimate

	Tonnes (kt)	Gold Grade (g/t)	Gold Ounces (koz)
Measured	8285	1.4	380
Indicated	17,005	1.2	641
M&I Total	**25,291**	**1.3**	**1,021**
Inferred	5,443	1.9	335

Several mineral Resource Estimates were compiled by Red Back Mining before the mine was purchased by Kinross. The 2009 Resource Estimate was classified and reported in compliance with the requirements of both Canadian National Instrument 43-101 and the Australasian JORC Code.

Table 6-3: Historic Mineral Resources

Date	Source	COG	Measured and Indicated			Inferred		
		(OP/UG)	(Mt)	(g/t Au)	(Moz)	(Mt)	(g/t Au)	(Moz)
2004	Red Back PFS	1.0	28.82	1.99	1.84	7.94	1.99	0.51
2007	Red Back Dec 2007	1.0/2.5	40.86	2.44	3.20	6.88	1.99	0.44
2009	Red Back Technical Report 2009	1.0/2.5	38.56	2.44	3.03	9.8	2.64	0.83

6.2.2 Historical Mineral Reserve Estimates (Pre 2010)

The historic Ore Reserves in Table 6-4 below were estimated by Red Back Mining in 2008 and published in the Technical Report dated May 14, 2009.

Table 6-4: Reserve Estimate 31st December, 2008

Source	Tonnes (Mt)	Au (g/t)	Au (Moz)
Red Back Technical Report 2009			
Total (Proven and Probable)	**32.3**	**2.24**	**2.30**

6.2.3 Historical Mineral Resources and Ore Reserves (2010-2020)

Kinross Mining did not publish Mineral Resources and Ore Reserves other than in Annual Reports. A summary of the Mineral Resource and Ore Reserves published in the Kinross Annual reports is given in the table below. Note that the totals exclude the 10% Ghana Government ownership.

Table 6-5: Summary of Kinross Annual Reports 2010-2020 – Historical Measured and Indicated Mineral Resources

Kinross 90% Stake	Reserves Proven & Probable			Measured and Indicated Resources (Excluding Reserves)			Measured and Indicated Resources (Including Reserves)		
Year	(kt)	(g/t)	(koz)	(kt)	(g/t)	(koz)	(kt)	(g/t)	(koz)
2010	30 661	2.48	2 434	4 058	1.46	191	34 719	2.36	2 625
2011	22 640	2.72	1 980	3 307	2.04	216	25 947	2.63	2 196
2012	20 217	2.65	1 722	7 036	1.76	398	27 253	2.42	2 120
2013	15 253	2.89	1 415	7 990	2.42	622	23 243	2.73	2 037
2014	12 055	2.38	924	15 356	2.46	1 214	27 411	2.42	2 138
2015	14 669	2.40	1 135	10 963	2.10	739	25 632	2.27	1 874
2016	11 193	2.40	872	11 471	2.20	798	22 664	2.30	1 670
2017	8 301	2.10	567	10 975	2.10	746	19 276	2.10	1 313
2018	6 053	2.10	415	10 498	2.30	765	16 551	2.23	1 180
2019	7 428	2.20	528	13 047	2.20	924	20 475	2.20	1 452
2020	15 701	1.90	974	11 383	1.70	628	27 539	1.81	1 602

The table below summarises the Inferred Mineral Resources declared in the Kinross Annual Reports

Table 6-6: Summary of Kinross Annual Reports 2010-2020 – Historical Inferred Mineral Resources

Kinross 90% Stake	Reserves Proven & Probable		
Year	(kt)	(g/t)	(koz)
2010	2 468	2.33	185
2011	1 508	1.75	85
2012	4 624	1.97	293
2013	1 611	3.06	158
2014	1 204	3.43	133
2015	1 602	2.90	149
2016	1 590	3.00	152
2017	1 590	3.00	152
2018	3 690	2.70	325
2019	6 165	2.20	443
2020	5 695	2.10	376

These Mineral Resources and Reserves Estimates, published by Kinross in the respective Annual Reports and posted on the Kinross Mine website (Kinross.com), are classified in accordance with the CIM Definition Standards for Mineral Resources and Mineral reserves adopted by the CIM Council in accordance with the requirements of the NI43-101 Standards of disclosure for Mineral Projects.

These historically declared Mineral Resources and Mineral Reserves have not been verified by the Qualified Person. It is accepted that the Resource and reserve Estimates were completed in accordance with the best practice guidelines and international mineral reporting codes by suitable qualified persons of Kinross Mining.

Section 14 has been completed by the QP from Snowden Optiro where the detailed review and validation of the Kinross' December 31st, 2021, Mineral Resources and Mineral Reserves, Annual Report publication has been reported.

6.3 Historical Production

There has been no significant historical gold production at Chirano prior to 2004, however the surrounding region includes numerous gold deposits and significant historic and recent production is attributed to the Bibiani Mine, lying 20 kilometres north of Chirano. There are minor artisanal workings at Chirano, generally concentrated along streams. Some of these may be very old, as the nearby Bibiani area has been a centre of artisanal mining activity for many generations. The earliest European workings date back to the gold rush of the late 1890s to early 1900s and comprise four small adits and a decline shaft at Sariehu. Only one small concession was held at Chirano at that time. CGML poured the first gold at Chirano on 10th October 2005.

Production since the operations were developed by Red Back Mining between 2004 to 2010 followed by Kinross to 2021 is summarised in the table below.

Table 6-7: Chirano Gold Mine - Historic Production

Year	Milled (Mt)	Grade (g/t)	Recovery (%)	Gold Produced (koz)
2005	0.51	1.84	93.7	30
2006	2.31	1.88	90.7	127
2007	1.98	2.17	90.3	127
2008	2.21	1.90	91.8	121
2009	2.72	2.33	90.4	183
2010	3.48	2.37	90.7	240
2011	3.57	2.47	91.9	262
2012	3.38	2.91	92.9	293
2013	3.36	2.71	93.8	275
2014	3.14	3.12	92	280
2015	3.49	2.51	91	260
2016	3.46	2.10	91	206
2017	3.44	2.43	92	251
2018	3.51	2.12	92	225
2019	3.46	1.99	92	202
2020	2.97	1.81	88	155
2021	3.43	1.59	87	148

6.4 Asante Gold Corporation

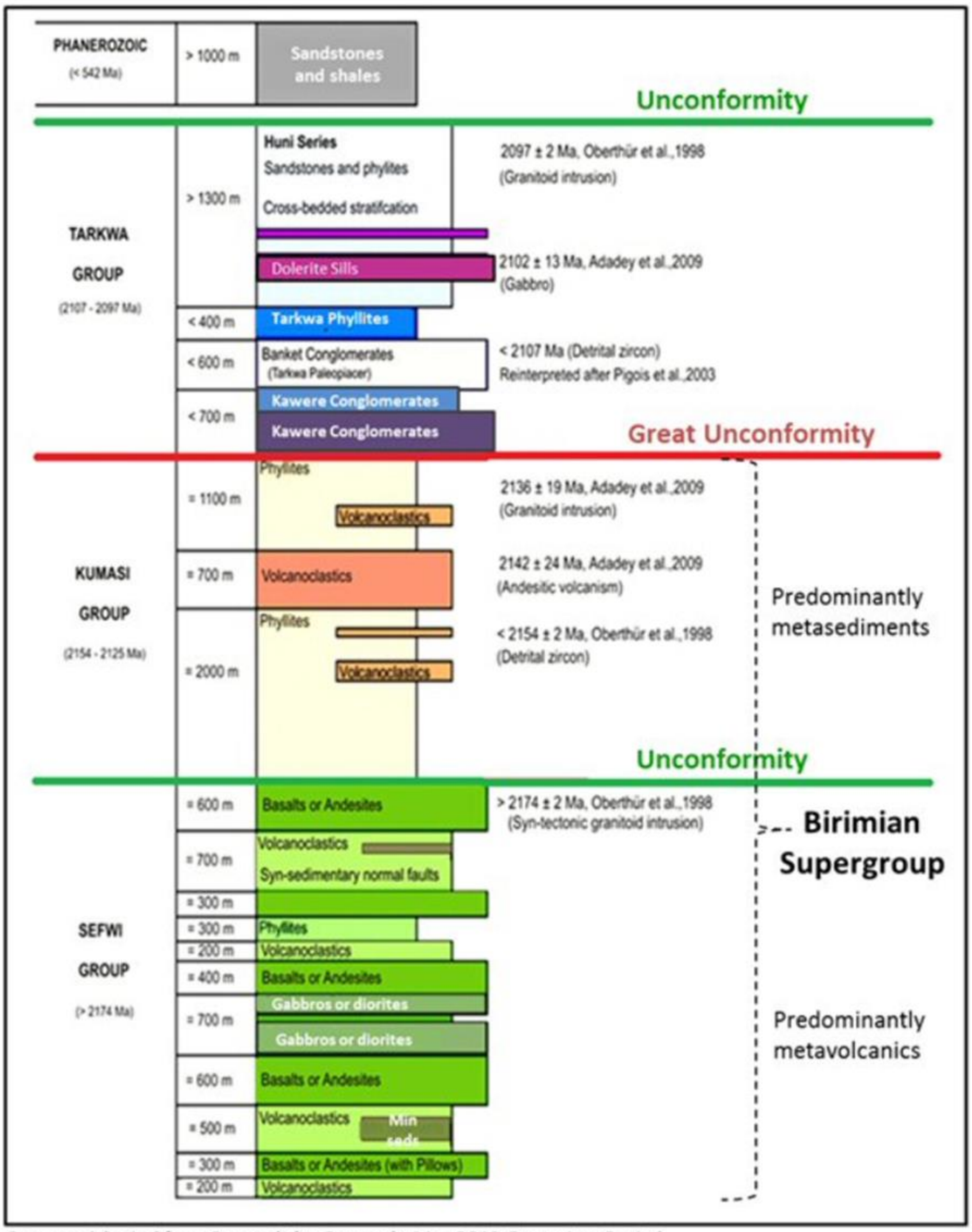
On the 25th April 2022 Asante announced that it had entered into a share purchase agreement with Kinross Gold Corporation to acquire Kinross' 90% interest in the Chirano Gold Mine ("Chirano") for a total consideration of US$225 million (the "Chirano Acquisition"). The Ghanaian government retains a 10% free carried interest in Chirano. The upfront consideration for the Chirano Acquisition will be comprised of US$115 million in cash and US$50 million in common shares of Asante based on the 30-day volume-weighted average price of the Asante Shares prior to closing of the Chirano Acquisition and provided the issuance of the Asante Shares will not result in Kinross exceeding a 9.9% share ownership in Asante. Kinross will also receive a total deferred payment of US$60 million in cash, with 50% payable on the first anniversary of Closing and the balance payable on the second anniversary of Closing. If the 9.9% share ownership limit is reached, the remainder of the US$50 million in share consideration will be paid by increasing the deferred cash payments in equal portions. Kinross has agreed that it will hold its Asante Shares for at least 12 months following the Closing.

7. GEOLOGICAL SETTING AND MINERALISATION

7.1 Regional Geology

On a regional scale, the Project is located on the eastern margin of the West African Precambrian Shield, which is a cratonised complex of Archaean basement. The main components are Proterozoic greenstone belts, granitoids and post-orogenic sediments that extend through Ghana, Burkina Faso, Mali, Guinea and the Ivory Coast.

The Upper Birimian Formation is dominantly volcanic in origin, although the sequence starts with conglomerates, grits, quartzites and tuffaceous wackes. The dominant components of the Upper Birimian are basaltic and andesitic lavas, tuffs and tuffaceous sediments with subordinate rhyolite, quartz-feldspar porphyry and felsite. The Birimian Formation rocks are unconformably overlain by the Tarkwaian, which is composed of dominant coarse-grained sediments (Figure 7-1).



Scource: Adapted from Precambrian Research, May 2012, Perroutya, S. et al.

Figure 7-1: Generalised Stratigraphy of Southwest Ghana

Primary gold mineralisation in the region is predominantly associated with northeast-southwest trending Proterozoic greenstone belts separated by basins, which together form part of the West African Craton. This craton is believed to have remained geologically stable for the last 1.7 billion years. The greenstone belts represent Proterozoic island arc volcanism which has been mildly metamorphosed to lower greenschist facies.

The Birimian geology throughout West Africa contains several significant gold deposits, including Obuasi, Tarkwa, Bibiani and Konongo. The Chirano deposit is located in the Sefwi-Bibiani belt which is host to over 30Moz Au (Figure 7-2).

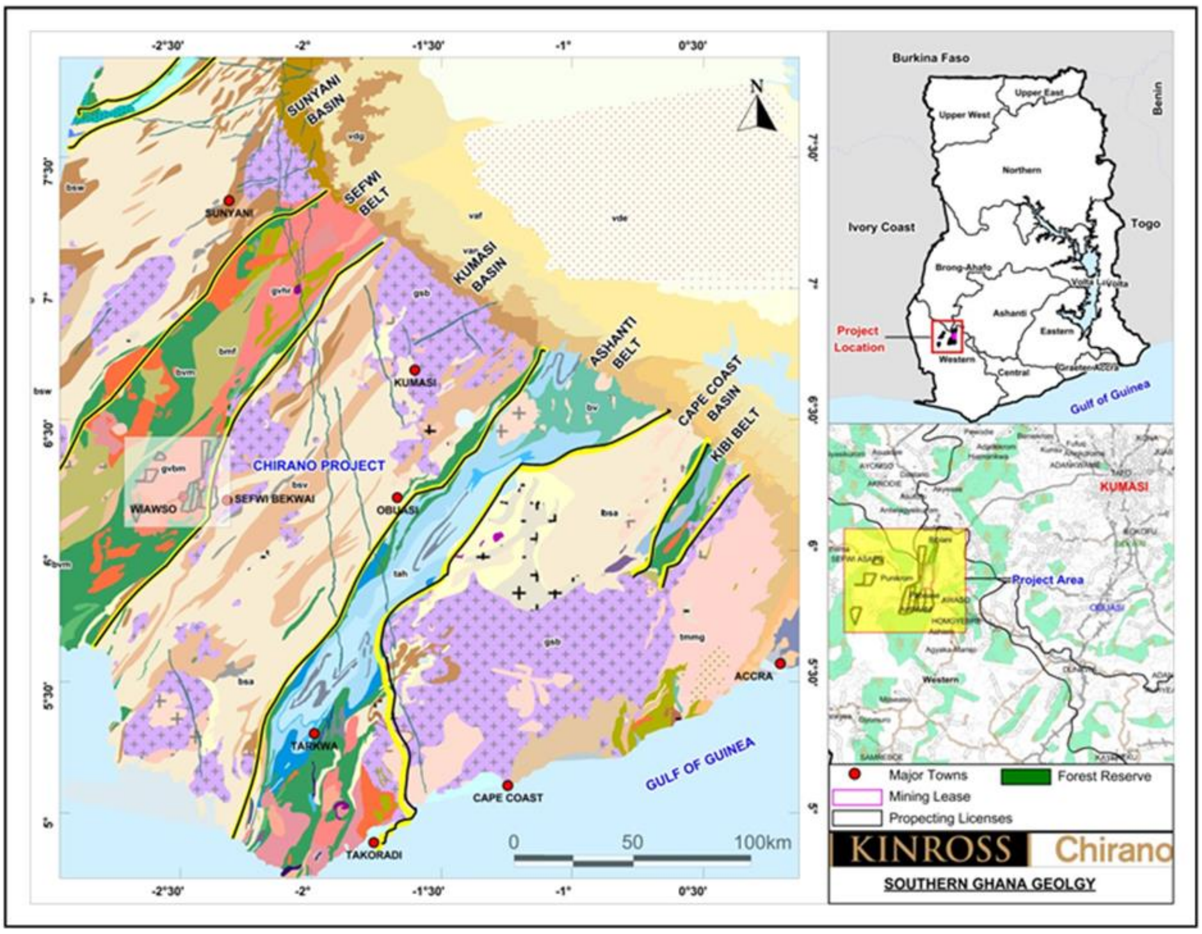


Figure 7-2: Chirano Project - Regional Geological Setting Within Southwest Ghana and Relation to Bibiani

(Source: Chirano, 2022)

7.2 Local Geology

The Chirano gold deposits can be described as epigenetic, mesothermal gold deposits, demonstrating a strong structural control and a brittle structural style. They are hosted by mafic volcanics and granite, ranging from stacked parallel veinlet systems to vein stockworks, breccias and cataclasites. The veinlets are dominated by quartz, with lesser ankerite, calcite, albite and traces of pyrite and hematite. The deposits show varying degrees of ankerite-albite-muscovite-pyrite alteration superimposed on earlier hematite alteration.

The deposits occur close to a major fault, the Chirano Shear Zone ("CSZ"), and is considered likely that any new deposits found will also be closely associated with faulting. Individual deposits are often closely associated with small dextral jogs in the host structure. Although the currently known gold deposits are in granite, there are also strong gold anomalies in Birimian metasediments elsewhere within the mine area, which require concerted follow-up exploration. The Bibiani Shear Zone ("BSZ") is the fault contact between the Tarkwaian sediments and the Kumasi Basin sediments.

The deposits range in strike length from 150m to 700m, and range in thickness from a few meters to over 70m. They vary from rather tabular (Obra, Sariehu, Suraw) to more pipe-like (Tano and Akoti North) morphologies. The longer, the more tabular bodies generally comprise at least two shorter lenticular shoots, such as the Obra main and north lenses. These lenses may be separated by a small dextral jog such as those at Obra and Sariehu. Within the Paboase Bulge there are several parallel lodes, whereas elsewhere along the mineralized horizon there is commonly only a single zone is evident.

Most of the deposits dip steeply to the west, however shallow west, vertical and steep east dips occur locally. The mineralization plunges either directly down dip or steeply northwards. The mineralization demonstrates excellent continuity, there being no known gaps due to oblique faults or dykes.

Unusually flat dips have been noted in short sections of the lode horizon at Mamnao Central (39,850 N to 39,975 N), Obra South (36,850 N to 36,950 N), Sariehu (38,400 N), and Akoti South (34,635 N), however these areas do not demonstrate any spatial relationship with thicker or higher-grade mineralized intervals.

In some of the deposits, thicker zones of gold mineralization appear to have formed where nearby parallel lodes have coalesced. Such deposits have a single thick zone in the core of the deposit, which splits into two or three thinner zones along strike. Tano is the best example of this type of deposit geometry.

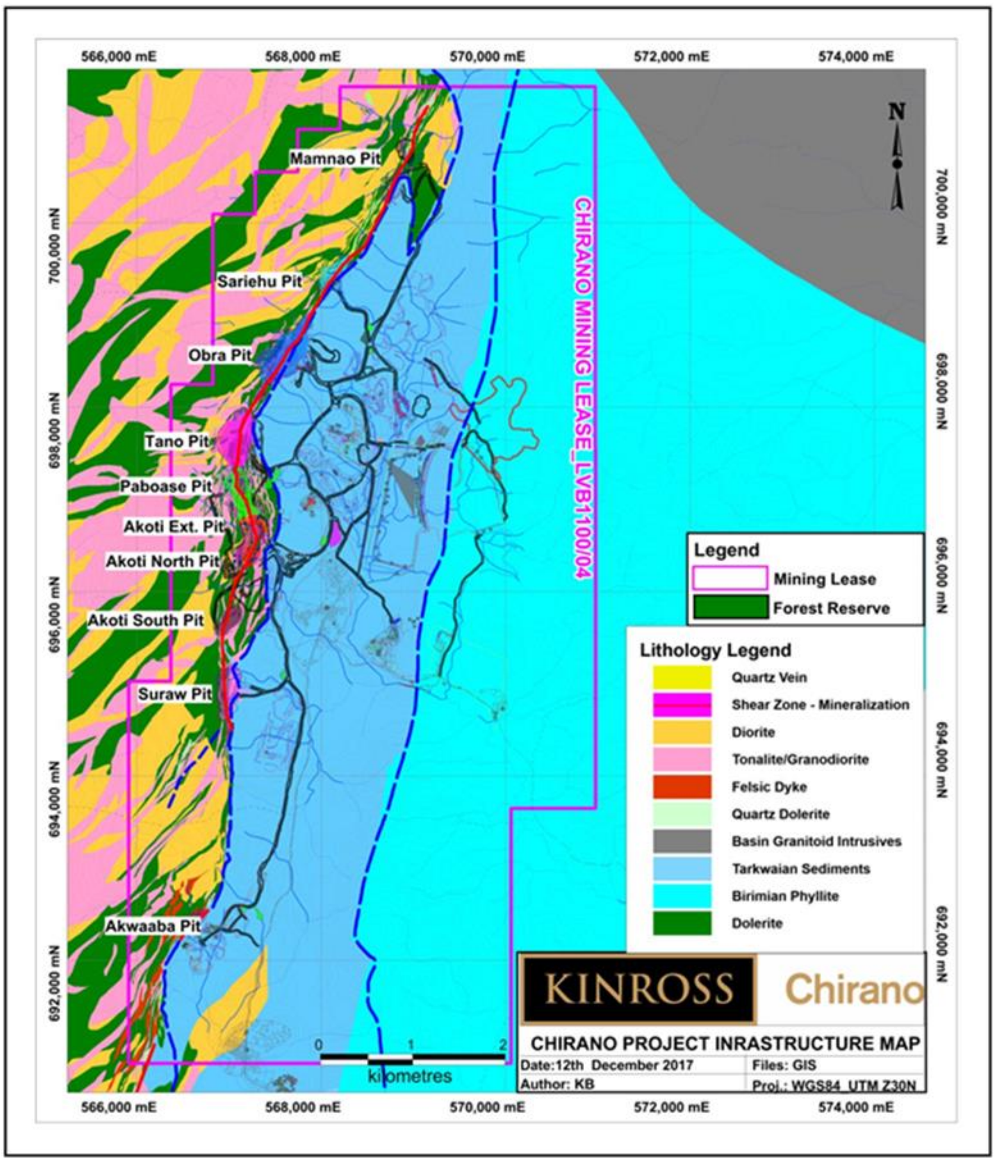


Figure 7-3: Chirano Project Area – Local Geology

7.3 Property Geology and Mineralisation

The deposits have been drilled to depths ranging from 50m to 700m. Many of the deposits show a consistent asymmetry, which is characterised by the following observations:

- There is commonly an abrupt change from elevated gold grade to barren assays at the eastern margin of the lode, but a more gradual transition on the western side, with patches of low-grade material or thin mineralised veins
- Unusually high gold grades are often concentrated near the eastern margin
- Strong quartz veining often occurs on the eastern side of the lode
- Close spaced drilling has indicated that quartz veins on the eastern limb dip steeply west as opposed to those on the west that dip more flatly towards the west and are discordant with the lode envelope.

The Akwaaba deposit is hosted in quartz dolerite and mineralisation is associated with fractionated quartz (feldspar) porphyry. The mineralisation is comprised of both a main and foot wall lode and a hanging wall zone. The Paboase mineral deposit lies in the centre of the Chirano mineralised zone and is related to a sinistral jog in the Chirano shear. It is the deepest part of the mineralised trend to the 1400mrl. Both deposits remain open in depth.

Obra deposit is developed almost exclusively in tonalitic rocks and is unique in that it has a very large shear on its western margin (the Obra Shear) as well as on the eastern side (the Chirano Shear) and as such is less asymmetric. It is also unusually wide and low grade probably because the entire volume of rock between the two shears has been fractured and mineralised. Mineralisation is associated with overprinting of breccia fabric and exhibits strong carbonate-silica-pyrite alteration. Obra currently has both open pit and underground reserves reported.

Underground operations at Tano are the depth extension of a previously mined open pit. The workings are currently accessed via an underground drift from Paboase in addition toits own portal that is near completion.

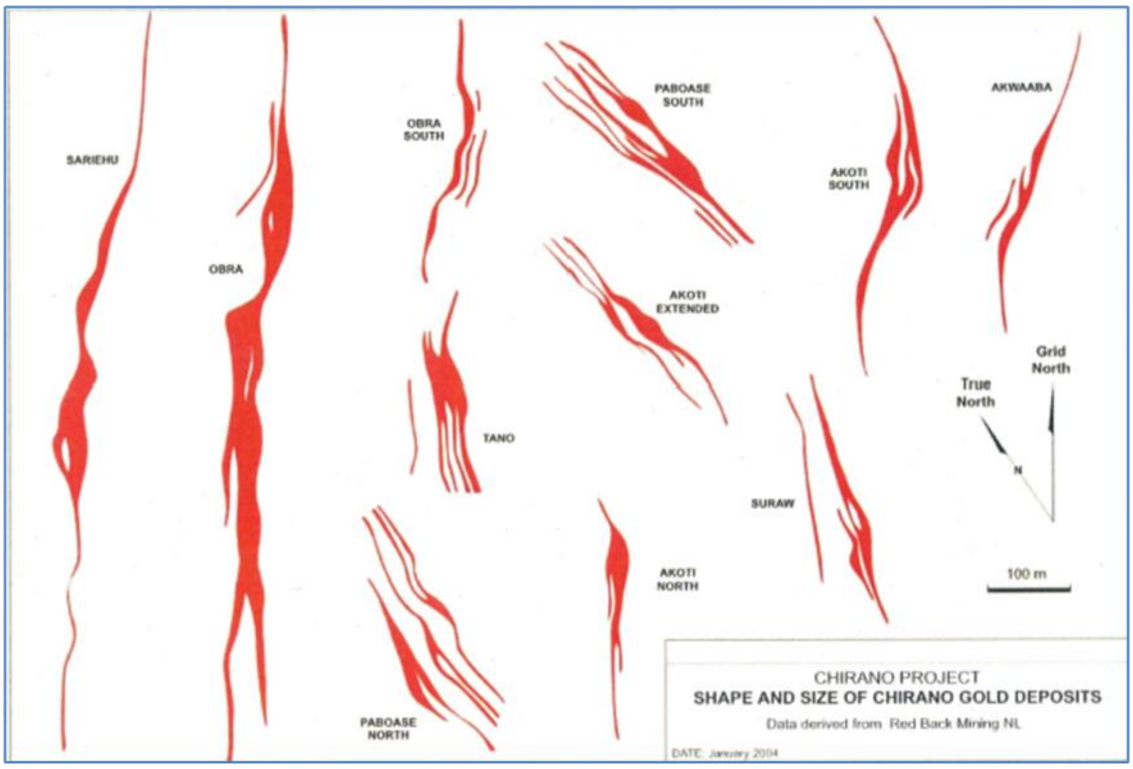


Figure 7-4: Shape and Size of Chirano Gold Deposits

7.3.1 Deformation

The deposits comprise fractured, veined, altered and slightly pyritic mafic volcanics and granite. Within each deposit there is generally a positive correlation between the intensity of fracturing and brecciation and intensity of gold mineralization, however the degree of fracturing varies greatly between the deposits.

The gold mineralization at Obra is generally hosted in severely deformed and brecciated granite (cataclasite), whereas much of the Tano lode is less fractured and can be considered more of a stockwork or vein swarm.

At Obra there is clear evidence that brecciation, veining and alteration have been prolonged, or the result of repeated episodes of deformation, and diamond drill core shows a complex array of small-scale structures that often appear ambiguous or contradictory. For example, some rock fragments in the Obra cataclasite contain veins that predate the brecciation and later veins cut through the breccia. Fragments of altered and unaltered rock are juxtaposed in some parts of the breccia, implying alteration before deformation, however adjacent fragments show alteration that overprints the brecciation. In addition, stylolites have been observed to cut across the breccia and early veins but are cut by later veining.

7.3.2 Veining

All the gold deposits at Chirano contain quartz and ankerite veinlets and there is generally a positive correlation between intensity of veining and elevated tenor of gold mineralization. Most of the observed veining is oriented parallel to the dip of the overall mineralized zone; however, veins have also been noted to dip more shallowly to the west, and some deposits have a sub-horizontal vein set in addition to the dominant west-dipping vein set.

The shallowly west-dipping veins have been interpreted to result from 'west-block-up' shearing in the mineralized zone. The veinlets are mostly a few millimetres to a few centimetres thick. More massive vein quartz (sometimes meters thick) occurs locally, usually on the eastern side of a deposit close to a footwall shear and usually carries only low gold grades. This feature has been observed at Sariehu and Tano.

The quartz veins vary in style from early veins (which may be recrystallized, folded, boudinaged, corroded by pressure solution, offset by micro faults or truncated at the edges of clasts) to late quartz veins (which may be undeformed and exhibit evidence of internal zonation such as carbonate crystals lining the vein selvedge). Some veins contain pyrite replacing hematite in the adjacent rock (sulphidation). At Obra the ankerite veins tend to comprise irregular networks and may have formed early in the paragenetic history.

7.3.3 Sulphide Development

The deposits contain trace amounts of pyrite, typically 1% or 2% by volume, rarely exceeding 5% by volume. It is noted that the surrounding barren rocks contain lower levels of disseminated sulphides than the mineralized horizon. Mineralogical studies indicate that the pyrite has a very high gold content.

The pyrite may be very fine grained and disseminated throughout the rock mass, as at Obra, or occur as cubic euhedra a millimetre or two in diameter (and rarely larger at Tano and Sariehu). Pyrite may also occur as rare aggregates to a centimetre in size and has also been observed to form concentrations along stylolites. The quartz-carbonate veins can also contain pyrite, and pyrite has also been noted as an alteration selvedge to the quartz-carbonate veins. Pyrite also occurs disseminated through the altered host adjacent to veining.

7.3.4 Structural Interpretation

Mr Kwamina Ackun-Wood was the senior geologist at Chirano Gold Mine in the employ of Kinross in 2016 and who now works for Asante and is based at the neighbouring Bibiani Mine. In a paper, in which he was a co-author, submitted in conjunction with the University of Mines and Technology in Ghana, it was concluded that the Chirano Mining Lease area has undergone prolonged structural deformation especially along the Chirano Shear Zone corridor. Strike slip sinistral movement was one of the events that took place syn-mineralisation, and another contiguous event was the faulting from the Birimian Basin through the Chirano Shear. Mineralisation is centred along this strong structural corridor, and this gives a very positive correlation between the shear geometry and mineralisation characteristics.

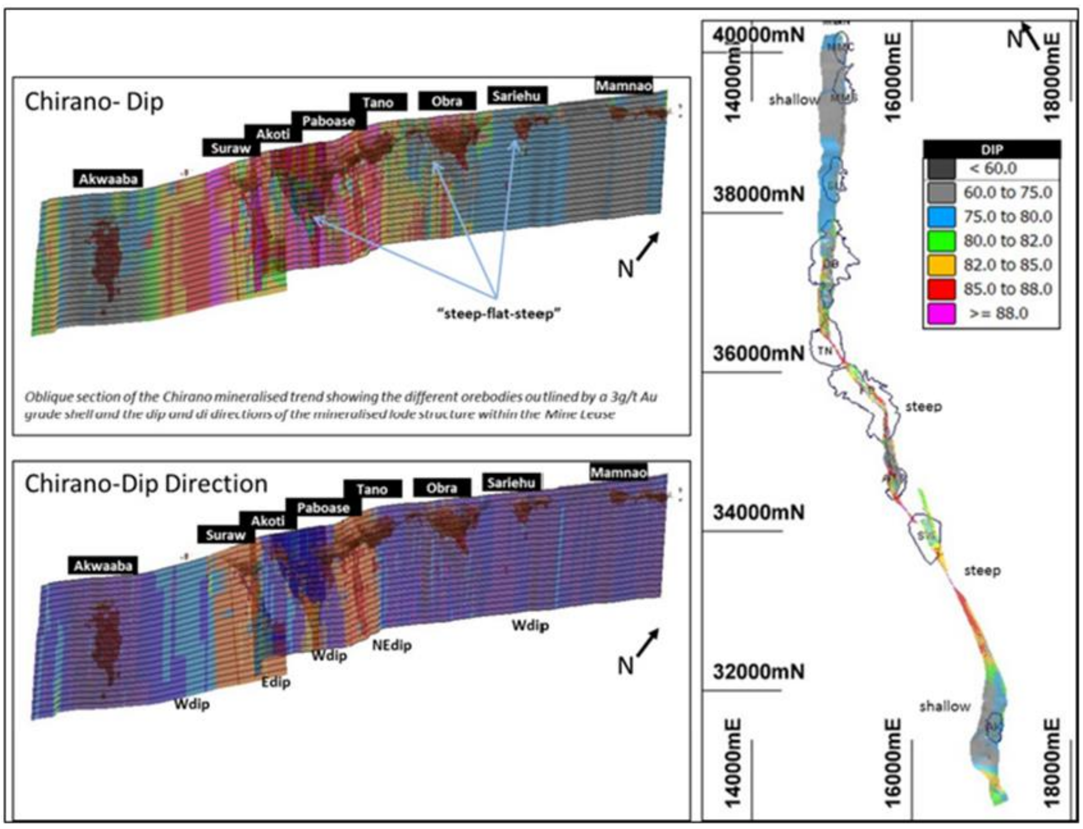


Figure 7-5: Chirano Gold Mine - Typical Structure Long Section

(Source: Chirano, 2022)

Exploration efforts should be guided by the shear geometry to target mineralisation extensions at depth and along strike.

7.3.5 Gold Particle Size

There are several lines of evidence suggesting that the gold is very fine grained, including the following:

- Visible gold is not common in RC or diamond drill holes at Chirano
- Relatively few gold grains have been seen in polished sections
- Dissolution of gold during cyanide leaching is very rapid
- Knelson gravity concentration recovers less than 30% of the gold
- Gold is associated with pyrite and is sub-microscopic.

7.3.6 Supergene Effects

Elevated gold grades derived from surface trenching suggest an absence of severe near surface depletion. In general, the width and tenor of trenched intersections provide a good guide for width and grade estimations. Consistent with many deposits within the Birimian of West Africa, most of the Chirano deposits have shown little evidence of either depletion or enrichment in the saprolite profile.

7.4 Akwaaba Deposit

Akwaaba is the southernmost deposit in the Chirano mine lease to date and is the first to have underground resources exploited. It is a tabular zone of mineralization hosted within a north-northeast striking, steeply west dipping portion of the CSZ. The Chirano Shear is 20cm to 50cm wide, grey to black fault gouge and marks the contact between the Sefwi-Bibiani belt volcanics and the younger Birimian Tarkwaian sediments.

The hanging wall Birimian mafic sequence is approximately 150m thick and composed mostly of fine-grained, dark greenish grey, chloritic basalts and fine to medium grained doleritic intrusions which generally lack any mineralization. Veining occurs throughout the hanging wall mafics and consists predominantly of early epidote veinlets that are barren of gold and appear to be lithologically controlled. Calcite/quartz and pure quartz veins are also extremely common especially within the dolerites.

Mineralization is hosted within hydrothermally altered dolerite that is variably foliated. The deposit contains high-grade mineralised shoots which occur at subtle dip-changes in the CSZ that plunge towards the north and contain hydrothermally brecciated basalt and cataclasis. Locally, the shear zone is intruded by tonalite, which is strained, altered, and mineralized. The mineral deposit, which is 20-50m wide and strongly altered, has gold grades which correlate well with intensity of alteration, veining, brecciation and 1 to 5% pyrite. As the main alteration zone is approached the intensity of albite – ankerite veins increases until their associated haloes coalesce to pervasively alter the host rock whilst conversely the calcite and epidote vein intensity dramatically decreases.

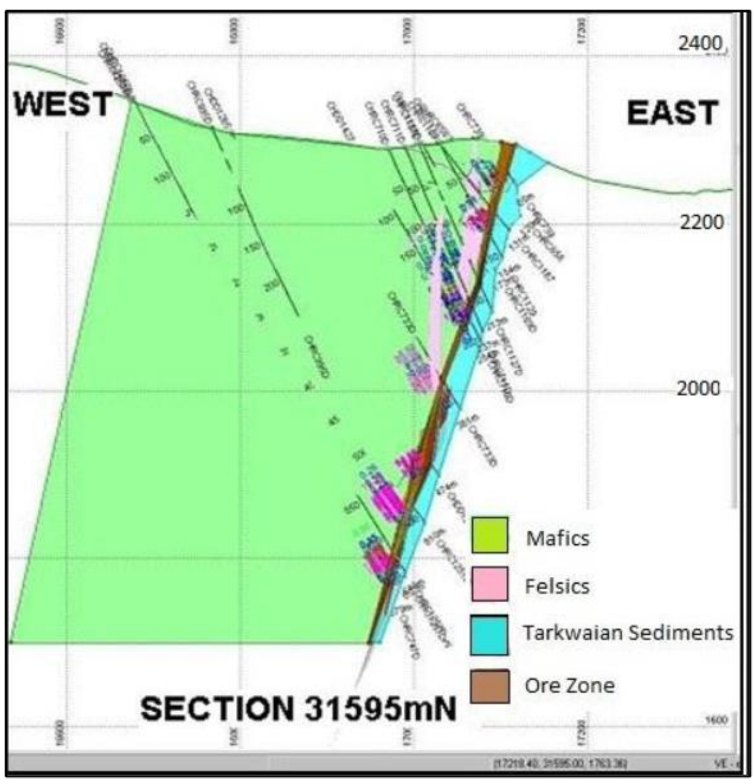


Figure 7-6: Vertical Section through 31595 mN at Akwaaba (Chirano Local Grid)

Towards the base of mineralization brecciation increases substantially and takes on two distinct forms consisting of what is locally referred to as the 'Black Breccia' and immediately below that is the brown breccia, which is the last mineralized rock before the CSZ. The eastern domain which is Tarkwaian in composition can be categorised mainly as polymictic conglomerate and Arenite sub-arkose. The conglomerate constitutes only a minor component of the Tarkwaian sediments intersected and is interspersed with sub-arkosic units.

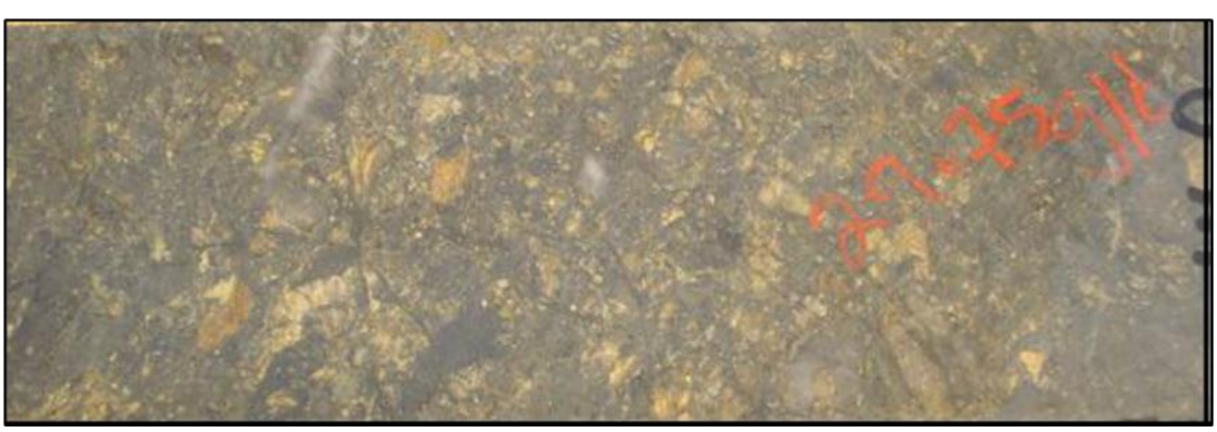


Figure 7-7: Black Breccia at Akwaaba with Gold grade of 29.75g/t

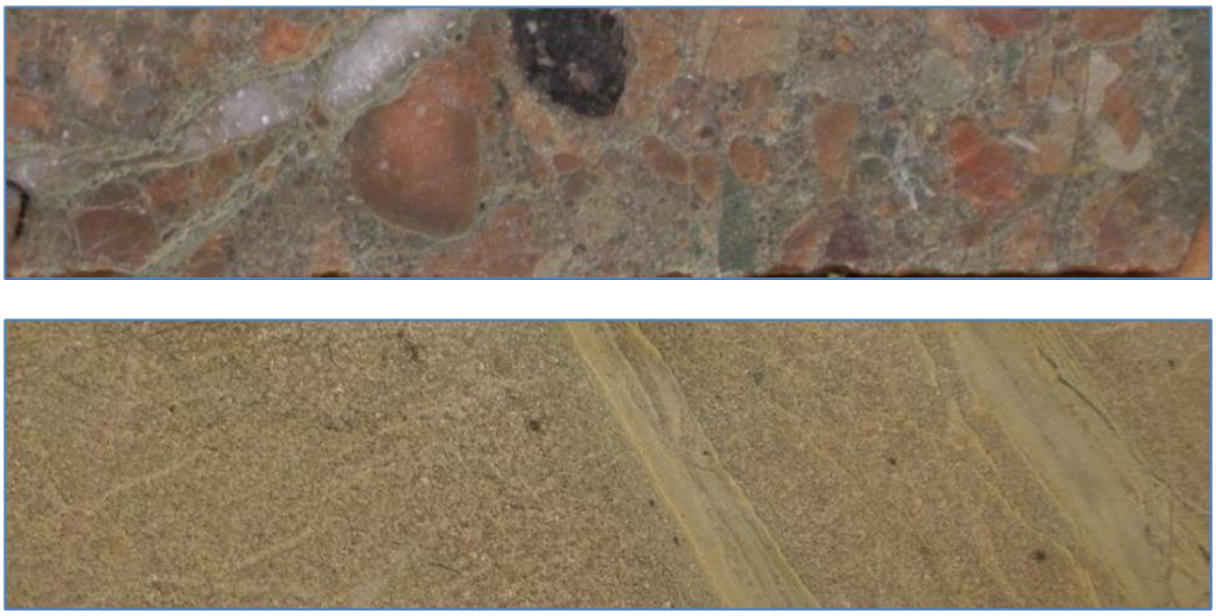


Figure 7-8: (A) Polymictic conglomerate with clasts of granitoid. (B) Takwaian arenite sub-arkose

Three separate types of tuffs have been logged in the hanging wall in Akwaaba. The first type is interpreted as a basal fragmented rock after analysis in thin section. It is fine grained, grey green in colour and varies from being massive to well bedded. The second tuffaceous lithology is described as lithic and quartz crystal rich tuff. It is poorly sorted, clast poor, matrix supported and quartz crystal rich. The third type is interpreted as a possible felsic tuff. It is quartz rich crystal tuff containing blue grey quartz crystals up to 3mm in diameter set in a fine-grained groundmass. It is generally massive with no sign of bedding and contains sparse fine-grained sedimentary clasts (Woolford, 2007).

7.5 Suraw Deposit

Suraw deposit is about 300m from the Akoti south deposit. The rock sequence hosting the Suraw deposits represents the strike extension of the sequence from Akoti South.

Dolerite is evident in both the footwall (west) and to a lesser extent in the hanging wall (east) of the Suraw mineralised zone. The dolerite comprises a fine to medium grained rock that hosts a variable percentage of leucoxene (after titano-magnetite). Tonalite is the dominant rock type in the immediate hanging wall to the mineralised zone and is also a significant component of the footwall sequence. The tonalite shows the typical equigranular, granitic texture that is the hallmark of this suite of intrusions within the Chirano host sequence. Locally, the tonalite forms a magmatic breccia texture with angular fragments of dolerite suspended in tonalite near intrusive contacts.

Overall, the proportion of tonalite versus dolerite is greater at Suraw compared to Paboase and the Akoti deposits. Numerous small veins and dykes of glassy felsic rock and locally quartz porphyritic rocks are well represented in and around the mineralized zone.

The Suraw deposit is approximately 400m long steeply ENE dipping, thin tabular mineral deposit, hosted in a strongly sheared, quartz veined and replaced, altered mafic domain that contains a significant amount of leucoxene. The Suraw mineralised zone is hosted in a shear-breccia zone where a strong, relatively early brittle-ductile fabric has been overprinted by multi-phase brecciation and a quartz-sulphide fracture mesh. In localized areas ductile deformation of early-formed brittle structures (quartz veins) indicates that the deformation style evident in the mineralised zone most likely reflects switching between brittle and ductile deformation, possibly in response to cyclic switching between fluid overpressure and ductile creep during ore-stage deformation. The mineralization is bounded on the hanging wall side, especially at depth, by a large mass of highly competent albite altered tonalite (Figure 7-9).

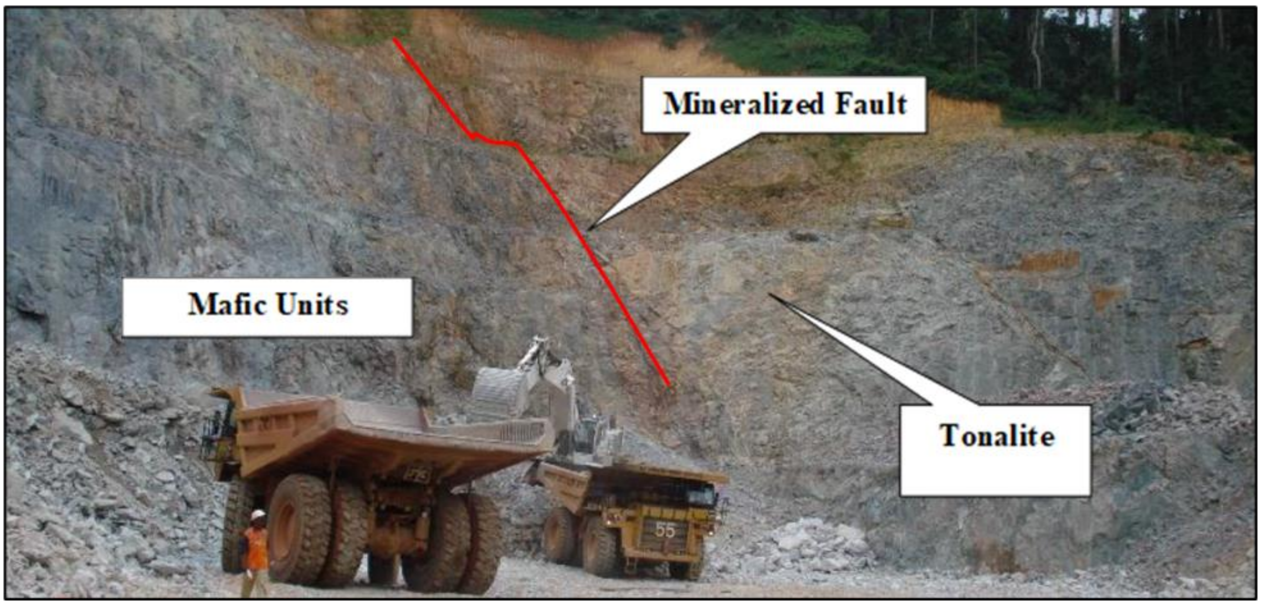


Figure 7-9: Image of Suraw Pit Looking North

In the most strongly deformed zones veining and brecciation have formed grey siliceous breccia zones reminiscent of the Akoti North and Paboase mineralised zones. Ankerite-albite-pyrite alteration characterizes proximal, ore-related alteration, with pyrite percentage and brecciation/veining intensity showing a correlation with gold grade. From drill sections it is noticed that, as the dip of the shear-breccia structure steepens the grade and width of the Suraw mineralised zone appears to improve. A similar relationship between metal content, width and dip is evident at Akwaaba.

Tarkwaian sedimentary rocks dominate the eastern portion of the footwall sequence and have been extensively drilled by deeper-drill holes. The Tarkwaian sequence comprises a mixture of poorly bedded lithic-arkosic wacke intermixed with polymictic pebble to boulder conglomerate with an arkosic matrix. The contact between the Tarkwaian and Birimian sequence is not noticeably deformed in the drill holes with most of the strain instead being localized within the mineralised zone.

It appears to be made up of at least one major intrusion and multiple smaller intrusions and is thin towards the surface in the north and south but increases in thickness with depth throughout the central part of the deposit.

7.6 Akoti Deposits

The Akoti North and Extended deposits are sub-vertical tabular zones of mineralization hosted within two differently striking portions of the Lode horizon. The fault zone strikes about 035º at the south and about 005º at the north of the deposit and is hosted within quartz dolerite. At both ends of the deposit, the main fault surface within the lode horizon is sub-vertical and extremely planar. A minor volume of the fault zone is intruded by tonalite that locally forms an intrusive breccia with dolerite. Mineralization is hosted within hydrothermally altered basalt and tonalite, which are commonly foliated. High grade zones contain hydrothermally brecciated rocks and cataclasis.

The Akoti South deposit is about 500m south from the Akoti North pit. Mineralization within the Akoti South pit dips steeply westwards in multiple small lodes. The main zone of mineralization is associated with a grey/black smoky pyritised quartz vein which sits in a zone of strong shearing, brecciation and alteration – the Akoti South Main Shear.

A second zone of mineralization is associated with the quartz replaced shear that contacts the western mafics with the slightly more tonalite rich felsic and mafic package which makes up the central portion of the Akoti South pit – The Western shear. This shear can be traced striking northwest towards the western side of Akoti North pit.

The western part of the south wall of the Akoti South pit is predominantly made up of strongly weathered fine to medium grained mafics. The bulk of the lithologies found in the Akoti South pit consist of a typical mixture of predominantly strongly altered and deformed mafics, which are distinct from the sequence in the western part of the pit, intruded by lesser strongly altered tonalites. The altered tonalite is a blocky, medium-grained grey/green granitoid that has partially re-silicified quartz/feldspar. The mafics are strongly altered to quartz – sericite – ankerite – pyrite generally with occasional albite alteration especially immediately to the west of the Akoti South Main shear.

They vary locally from strongly oxidized and partially weathered to fresh rock with an apparent quartz stock working. These mafics are distinct from the strongly weathered and generally unaltered sequence in the western part of the pit. The southern wall of the Akoti South pit is a unit that appears to be strongly altered and deformed Tarkwaian boulder conglomerate alongside strongly altered fine grained Tarkwaian sediments, enclosed within Birimian volcanics. The boulders appear to be boudinaged and closer to the Akoti Main shear are very strongly deformed in a high strain zone towards the contact with the Birimian mafic and tonalite mineralized package. These units have been a subject of contention as consensus is lacking with respect to its classification and it is preferred to be called 'contentious unit'.

7.7 Paboase Deposit

The Paboase mineral deposit lies along a planar segment of the main mineralized shear zone between Akoti and Tano; this is intersected at a high angle by numerous faults mapped in the open pit. The geology within the open pit is a mixture of mafics (basalts and dolerites) intruded by a more significant quantity of tonalite, with quartz vein stock-working, than is seen at all other Chirano deposits apart from Tano. Where tonalite intrudes the Paboase main fault it seems to be more mineralized than intrusions further away from the fault.

The mineralization is hosted to the western side of the steeply Northeast dipping main mineralized shear zone locally referred to as the Paboase fault. Within the pit confines the mineralization is mainly hosted in a strongly silica– albite ± hematite altered quartz stock worked tonalite but at depth the best mineralised zones occur within a wide zone of strongly sheared, tectonically and hydrothermally brecciated, predominantly mafic (quartz dolerite) package. Gold grades at depth are highest where carbonate – sericite - silica ± albite ± chlorite alteration has been most intense, bleaching the rocks to a pale greyish-brown, although tonalite rocks also carry high grades locally where intensely sheared and altered.

There is a high level of structural complexity throughout the Paboase deposit with at least three main fault orientations (Figure 7-10). These include the northwest striking Paboase main fault and western fault, large east-west striking structures and a number of oblique faults, with the latter two orientations appearing to intersect but not cross the main mineralized shear zone.

The Paboase fault may be the main conduit along which numerous structural, magmatic and metamorphic processes occurred. The main mineralised zone at Paboase appears to be sandwiched between two northwest striking shear zones and has cataclastic textures similar to the Obra deposit. Grade tends to increase west in a rapid fashion from the Paboase fault into the most strongly altered and deformed host rocks. It however decreases rather gradually again towards the western bounding fault.

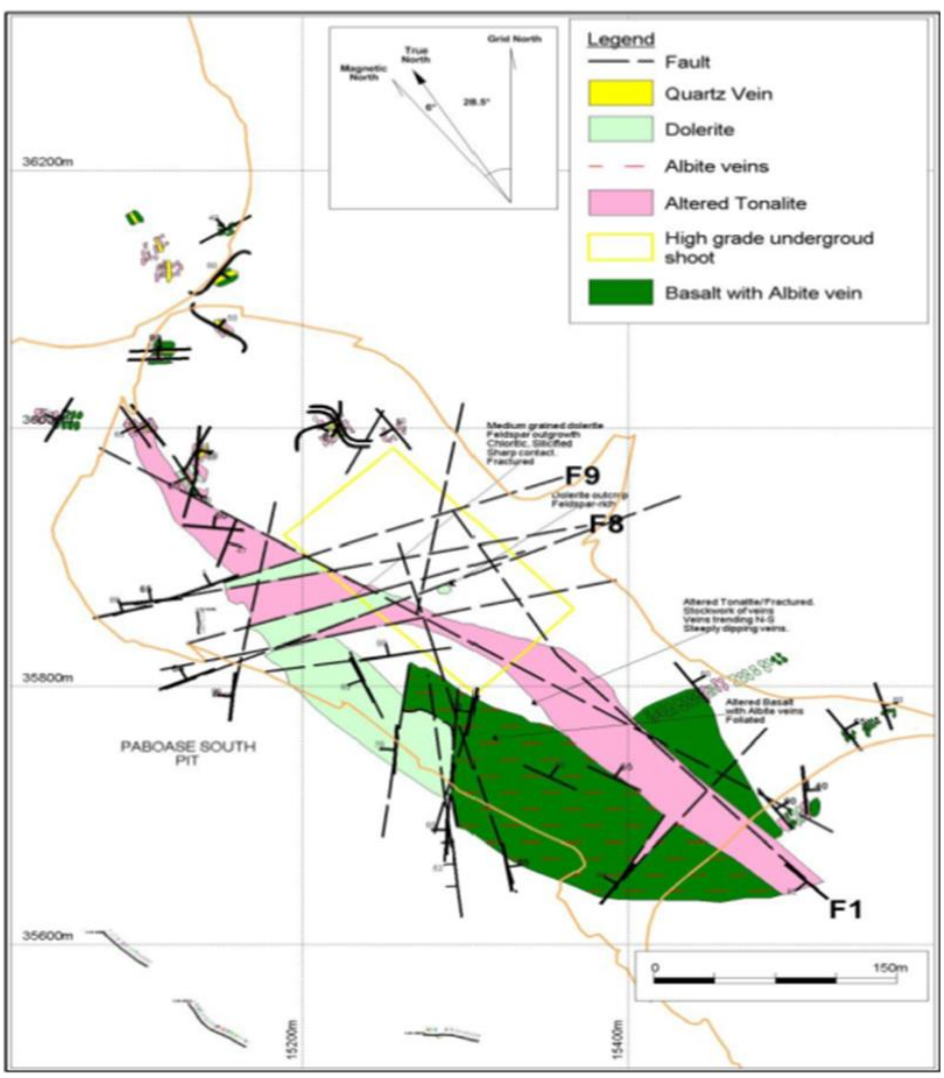


Figure 7-10: Paboase Pit Map showing Structural Complexity

(Source: Kinross, 2022)

7.8 Tano Deposit

Tano is a large and relatively high-grade open pit deposit at Chirano that sits between Paboase and Obra towards the northern end of the Paboase Jog or Bulge. The deposit is hosted, unusually for Chirano, within a hydrothermally altered and brecciated tonalite in the hanging wall of a steeply west-dipping portion of the main mineralized shear zone, which varies in strike from northwest in the south to north south in the north along the deposit. The Tarkwaian sediments, visible in the upper pit walls, are a strongly foliated, folded, deformed and altered sequence of arkosic/argillaceous sediments with polymictic conglomerates. Contacting the Tarkwaian to the west and separating it from the main mineralised shear zone is a sequence of unmineralized Birimian mafic volcanics and felsic – intermediate intrusives. Mineralisation is mostly hosted within a domain of unfoliated, hydrothermally altered and crushed tonalite that locally has a high density of quartz ± carbonate veins. The high-grade mineralisation at Tano occurs within a hydrothermally quartz – albite – sericite altered hematite dusted pyritic tonalite with a high density of quartz veining.

Pit mapping has shown that the Chirano Shear is not present within the Tano pit but occurs to the east of the deposit. The shear within the Tano deposit (Tano Shear) is sub-parallel to the main shear and may represent a splay off the parent Chirano Shear. The Tano Shear is characterized by chloritic ductile fabric in contrast to most of the mineralization which is brittle in character. Where the ductile shearing and mineralization are in contact, they are separated by a brittle fault. The brittle faults in some places separate lithologies with gold content below detection (and commonly ductile fabrics) from rocks with high grades (over 10g/t) (and generally brittle fabrics). The lack of incipient mineralization adjacent to such high grades suggests that the rocks have been juxtaposed after mineralization.

7.9 Obra Deposits

The Obra deposit is a tabular zone of mineralization hosted within a northeast striking fault (Obra fault-OF) and sub vertical dipping of the Chirano shear zone (CSZ). Mineralization occurs in strongly hydrothermally altered, brecciated qtz-co3 and stockwork veined rocks of mafic(dolerite) + tonalite mixed fabric comprising of about 60% mafic + 40% tonalite combined host.

The volume of tonalite rocks highly influences the dilatancy-fracturing, brecciation, fluid transport and deposition, hydrothermal alteration and most importantly the distribution of grades within the mineral deposit.

Locally the Obra mineralization has a grid N-S trend following the regional structural trend of the Sefwi Belt.

The margins of this domain are bounded by shears and zones of intense foliation. Bedding within folded Tarkwaian sedimentary rocks to the east of the CSZ is steepened and drag folded adjacent to the CSZ. Important controls on mineralization at this deposit appear to be the closely spaced CSZ and hanging wall faults, which were intruded by tonalite early during deformation. The Obra deposit is bounded by two main structures. On the west is the Obra fault and on the east is the CSZ. A mylonitised zone of about 10-15m is evident on both ends of the pit. The mylonite is a very fine grained strongly re-silicified, foliated, and altered rock, with a yellow to grey or green colour. Alteration in the mylonite consists primarily of silica-ankerite-sericite-chlorite and is generally pervasive, overprinting any remnant textures.

7.10 Sariehu

The mineral deposit is broadly massive, but rather sinuous, with a major thickening between 38 300 and 38 400 N, and a lesser thickening between 38 500 and 38 600 N and has a strike length of about 500m. The mineralization at Sariehu has a vertical plunge and it is hosted mainly in altered Birimian mafics with the following characteristics:

- First phase of hydrothermal alteration appears to have been albitization and ankeritization of the Birimian Mafics most certainly during prograde (greenschist) metamorphism and regional deformation
- Alteration zones up to several hundred meters long were then followed by silica flooding, and carbonate veins and breccias (albite and ankerite)
- These siliceous alteration packages stiffened the hydrothermal-metamorphic alteration package allowing further brittle deformation, and the gold episode arrived along with sulphidization and the infilling of fissures by chlorite, carbonate and silica, with pyrite
- During the waning phases of hydrothermal activity, narrow quartz veins cut the alteration packages, and gold can be found along the margins of some quartz veins and pyrite but contained no significant gold mineralization
- Mineralisation tends to pinch at both the south and north of the deposit and it is the most pyrite rich deposit of all the deposits in Chirano hence, it has a higher bulk density.

This is depicted by different mineral assemblages showing a spatial variation with regard to original lithology and proximity to the footwall structure (West). Proximal to the mineralised zone is the ankerite – quartz – pyrite – sericite

– albite which is the normal alteration style associated with mineralization at Chirano. Away from the footwall structure, alteration tends to change from moderate propylitic alteration of calcite – chlorite - pyrite - sericite to weak propylitic alteration of calcite - chlorite + epidote + albite.

Pit mapping has shown a predominance of mafic rocks to the west and east of the mineralised zones. West of the lodes are mafic rocks, with minor included pegmatite, and a couple of thin gold lodes. On the eastern side there is generally a thin sliver of mafic rock (up to 15 metres thick), then the Tarkwaian arkose.

The mineralised zone is hosted in stock work of veins in mainly fine-grained mafic rocks (Quartz Dolerite) intruded by diorite and dolerite and the level of silica flooding is very massive hence destroying the original fabrics of the rocks making the zone medium to coarse grained. The doleritic rocks is partially overprinted by carbonate-rich alteration, some relic textures/mineralogy is preserved.

The zone is crushed, veined; quartz vein is unusually abundant at Sariehu. Locally there are thick massive quartz veins (this quartz does not always carry good gold grades). Mineralisation tends to pinch at both the south and north of the deposit.

Assay drop off from mineralization to barren rock is generally sharper on the eastern (footwall) side where there is intense quartz veining, than it tends to be on the eastern side of the lode.

Thin lodes parallel to the main lode are locally developed on the western (hanging wall) side, but not on the east. There is a major shear close to the western (footwall) margin of the lode, but little evidence on shearing on the other side.

8. DEPOSIT TYPES

Gold plays an important role in the economy of Ghana, with up to 1,500t of gold produced throughout its history. From the late 15th century until the mid-19th century, two-thirds of Africa's gold production was estimated to have originated from the Gold Coast. Annual production in the early 1980s was 12,000kg-15,000kg. The major primary gold lodes are found in the shear zone between the Lower Birimian phyllites and Upper Birimian greenstones and consist of quartz veins and lenticular reefs. The gold is usually accompanied with arsenopyrite.

- Gold deposits in Ghana can be broadly categorised into:
- Tourmalinised turbidite-hosted disseminated gold sulphides
- Tarkwaian paleo-placer
- Mesothermal auriferous arsenopyrite and quartz vein mineralisation
- Mesothermal gold-quartz vein deposits.

The Sefwi belt-type volcanic orogenic gold belt is most likely to succeed the prolific Ashanti gold belt which has produced over 100Moz Au in its history. The lode deposits found in both types have broad similarities in relation to structure, mineralogy, alteration, geochemistry and regional setting.

The vein systems cover a very broad category and include a close association with disseminated sulphides. Sefwi-Bibiani belt is a typical Birimian volcanic belt of considerable width (40-60km) and lateral extent. It is predominantly of extensive belt-type diorite intrusive complexes, mafic volcanics and metasedimentary rocks. Newmont's Ahafo Mine is a large, mineralised deposit along the north-western corridor.

The gold deposits at Bibiani are structurally controlled mesothermal lode-type deposits which are similar to the lode deposits in the Konongo-Axim belt hosting the significant Obuasi deposit (Anglogold Ashanti). The mineralisation is associated with quartz veins and quartz stockworks which are hosted within a thick sequence of fine-grained graded turbidites with localised thin interbeds of fine to medium-grained turbiditic sandstones. Figure 8-1 illustrates the generic hydrothermal environments in which the styles of mineralisation seen at Bibiani and Chirano occur.

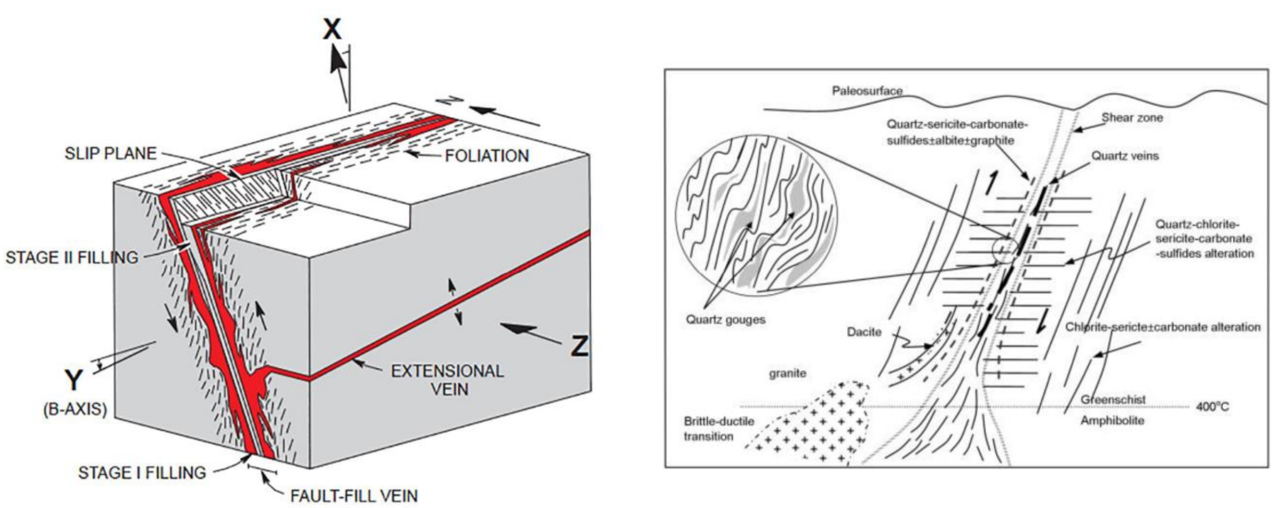


Figure 8-1: Schematic Illustration of Geologic Environments in Which Hydrothermal Gold Deposits Form

(Source: KAAH, 2022)

Several significant gold deposit styles are evident on the Chirano project area. The two best documented mineralisation styles (Akwaaba style and Obra style) have been the focus of exploration and mining activity, with the Akwaaba style being the most economically significant. The Bibiani style of mineralisation (high-grade quartz reefs with bounding low to moderate grade graphitic shear zones) is well known from the Bibiani mine. The Bibiani mineralisation style has not yet proven to be economically significant at Chirano, although this mineralisation style has been relatively under-explored at Chirano.

Many large gold deposits in Ghana show similarities to the Bibiani mineralisation suggesting that despite previous exploration results and refractory (graphitic) risk this style of mineralisation still represents a key target style that should be further considered.

In February 2015 Kinross carried out an Exploration Targeting Review assisted by Geoscience Now Pty Ltd. The work program included a complete review of all drilling to date and surface and underground mapping. The final report summarised the results of the targeting review and delivered a number of useful outcomes:

- Geological model characterisations were constructed for four major greenstone gold deposit styles relevant to exploration of the Sefwi belt (Akwaaba style, Obra style, Bibiani style and Futa-Kenyase style)

- A targeting scheme was utilised to rank existing and prospective targets
- Sixteen new target areas were identified for further exploration.

Recent exploration strategy is mainly focussed to advance the potential for a significant mine life extension on the known lode horizon and other promising west splay structures and on several district targets. The program outline is to drill test pipeline opportunities, test depth and lateral extensions, confirm and upgrade continuity outside reserve shells

The above geological mineralisation environment and characteristics of the mineralised deposits formed within these structural domains has guided all the exploration carried out historically and more recently by Chirano. The en-echelon pinch and swell characteristics that accompany these steeply dipping shear zone hosted gold deposits, common in the greenstone terrains within the Ghana gold belts, are extensive in strike and are known to extend to depth. The drilling programs adopted by Chirano take cognisance of this experience and are designed to investigate these deposits accordingly.

9. EXPLORATION

Exploration at Chirano is at a very advanced stage and has been ongoing since the late 1990’s. It has culminated in the discovery of 14 surface gold deposits and one underground deposit. Significant potential remains to increase the known Mineral Resources and Mineral Reserves, and exploration will continue during the life of the mining operation.

9.1 Historical Exploration

Placer Outokumpu Exploration (POE) carried out the first systematic reconnaissance exploration of the area, via stream sediment sampling, widely spaced soil geochemical traversing, rock chip sampling, then trenching and pitting of the more promising soil anomalies. This work defined several gold prospects, however POE judged that the area was unlikely to deliver the company's minimum target object of one million ounces and the project was joint ventured to Reunion Mining Plc in May 1995.

Reunion carried out the first detailed exploration work. They extended and in-filled the soil sampling grid and excavated trenches across the better soil anomalies. Many of the trenches defined wide zones of potentially economic grade gold mineralization and several prospects worthy of drilling were defined. Twenty-five short diamond drill holes were completed, testing the Obra and Paboase Prospects. These holes confirmed that the mineralized widths and grades encountered in trenches persisted deep into the bedrock. The exploration program undertaken by Reunion focused on shallow oxide mineralization. A modest oxide gold resource was defined, and preliminary metallurgical testing was completed.

Work was halted in March 1996 by a government-imposed moratorium on exploration work in Forest Reserves, but in November 1997 Reunion was given permission to resume exploration under strict environmental constraints and temporary permits. Eventually they chose to farm out the project so that they could concentrate on a project in Namibia. Total expenditure by POE and Reunion from 1993 to 1998 is estimated at approximately US$2.35 million.

After technical and legal due diligence studies, CGML as a subsidiary of Red Back, proceeded with intensive exploration of the project area. Between 1998 and 2004 CGML's work included very extensive and detailed soil geochemistry, geological and regolith mapping, trenching, ground geophysics (magnetics and induced polarization), and RC and diamond core drilling. As well as routine field exploration, CGML studied the petrography of the mineralization and associated alteration, the trace element signature of the gold deposits, the metallurgy of the lode material, local hydrology, and the geotechnical characteristics of the host rocks.

By mid-2004 all the deposits had been drilled sufficiently to define their gold resources. The company had collected 15,000 soil samples, dug 81 trenches with a total length of 4,063 meters, and completed 605 drill holes totalling 60,489 meters. A prefeasibility study for establishing a mining operation was completed by CGML in 2000, and a Bankable Feasibility Study was completed in early 2003. Pre- development exploration expenditure totalled US$17.5 million.

Stream sediment sampling detected gold in catchments at Chirano. Soil geochemistry produced many anomalies, which proved to be directly related to underlying gold mineralization. Exploration to date has shown that all gold soil anomalies within the Chirano granite that cover a significant area and generate anomalies above 500ppb gold, reflect a gold deposit directly beneath. Rock chip and channel sampling have also been routinely employed. Trenches across the core of the soil anomalies yielded widths and grades of gold comparable to those seen in later drilling beneath the trenches. Geological mapping has been undertaken over the entire Chirano mine area. Ground geophysics has also been used (magnetics and induced polarization) and many of the known deposits have a specific geophysical signature that are being used in exploring for repetitions and extensions. Both reverse circulation (RC) and diamond drilling have been employed for exploration and resource definition purposes.

The mine comprises the Akwaaba, Paboase, Akoti, Tano, Suraw and Obra underground operations and Akoti South and Mamnao cut-back pits.

9.2 Kinross Exploration

Kinross acquired its ownership in the Chirano Gold Mines Limited on 17th September, 2010 upon completing its acquisition of Red Back Mining Inc.

Several significant gold deposit styles are evident in the Chirano Project and mines. The two best documented mineralised styles (Akwaaba and Obra) have been the focus of exploration and mining activities, with the Akwaaba being the most economically significant.

New discoveries by CGML have brought the number of known Chirano gold deposits to fourteen (eight open pits and six undergrounds), distributed along a strike length of ten kilometres.

Exploration has continued both during and after the development of the mine. Most significantly, drilling below Akwaaba, Paboase, Akoti, Tano, Suraw and Obra open pits has delineated higher grade underground resources. Further drilling below the pits has also identified underground targets at Sariehu and Mamnao. Other open pit has been discovered on a parallel western splay structure at Mamnao and currently being mined as part of the Mamnao enclave open pit complex.

In February 2015 Kinross carried out an Exploration Targeting Review assisted by Geoscience Now Pty Ltd. The work program included a complete review of all drilling to date and surface and underground mapping. The final report summarised the results of the targeting review and delivered several useful outcomes:

- Geological model characterisations were constructed for four major greenstone gold deposit styles relevant to exploration of the Sefwi belt (Akwaaba style, Obra style, Bibiani style and Futa-Kenyase style)
- A targeting scheme was utilised to rank existing and prospective targets
- Sixteen new target areas were identified for further exploration.

Recent exploration strategy is mainly focussed to advance the potential for a significant mine life extension on the known lode horizon and other promising west splay structures and on several district targets. The program outline is to drill test pipeline opportunities, test depth and lateral extensions, confirm and upgrade continuity outside reserve shells.

During 2021, exploration activities continued to focus on resource conversion and mine life extensions both on the main lode horizon and other promising west splay structures. A total of 40,635 metres of drilling was completed in 143 drill holes resulting in mine life extension to 2026.

9.2.1 SOIL SAMPLING

Soil geochemistry has produced many anomalies, which proved to be directly related to underlying gold mineralization. Exploration to date has shown that all gold soil anomalies within the Chirano granite that cover a significant area and generate anomalies above 500ppb Au, reflect a mineral deposit directly beneath.

Geochemical data derived from soil sampling has generally produced clearly delineated anomalies (Figure 9-1). All 14 surface gold deposits identified to date underlie coherent areas of anomalous gold soil geochemistry. Based on statistical analysis, zones at Chirano with a significant area returning greater than 500ppb Au directly overlie a significant deposit. On very steep slopes, the anomalies show some asymmetry due to down-slope dispersion, however the core of these anomalies are not significantly displaced downhill from the source. Regolith development in most of the Chirano area is favourable for soil sampling. The regolith profiles, for the most part, are simple with limited distribution of ferricrete lateritic gravels.

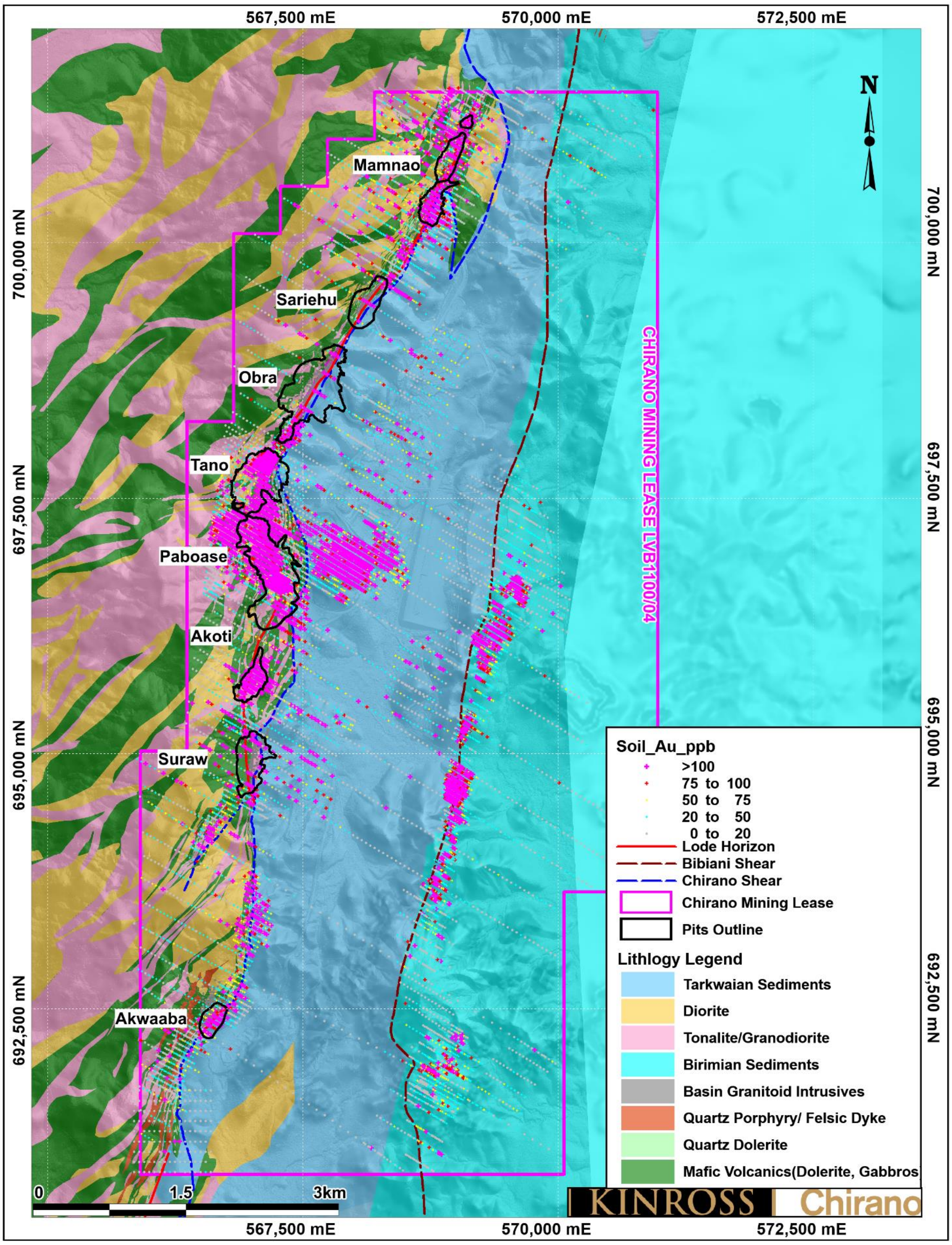


Figure 9-1: Extent of Soil Sampling Anomalies over Chirano Mining lease Area

(Source: Chirano 2022)

Multi-element analysis of soil geochemistry introduced later provided useful and additional information for pathfinder identification where gold in soil anomaly was subtle. Adding the multi-element package has helped to map the footprint size of the alteration system. This helps to initially map the footprint of the hydrothermal system, recognize the areas that have potentials and discard the areas that do not. It also gives a clue about the nature and geological style of the underlying mineralization. The Au analysed by aqua regia method has a lower detection limit and low-grade anomalous haloes were reliably detected which apparently increased the width of the anomalies significantly.

The multi-element result indicates that in the mining lease environment, including adjacent prospecting licenses, the footprint of the system is best mapped by Au, W, As and Sb. Mo, Bi, and Te which may also form discrete zones deeper in the system but are not anomalous in every gold system. The footprint of gold extends from Mamnao to Akwaaba and onto the adjacent segment of the Bibiani shear. There is anomalous antimony along the 30km length of the Bibiani Shear, however it is strongest in a 12km segment that sits outboard from Mamnao to just south of Akwaaba. There is a similar antimony signature towards the southern end of the area mapped.

Arsenic occurrence is very similar to the antimony pattern. The strongest and most coherent arsenic anomaly is from east of Paboase to just south-east of Akwaaba. The northern end is in Birimian phyllites, but the southern end is in the mafic volcanics.

The multi-element geochemistry (Figure 9-2) indicates a large hydrothermal cell to the south and east of Akwaaba. This cell shows a very distinct metal zonation, from south in the mafic rocks, across to the mafic-phyllite contact, then north into the phyllites along the Bibiani shear. The metal zonation is from Bi - Te - Mo - Sb - As. This is a classic temperature zonation pattern. Gold in the system should be around the transition from Bi-Te-Mo to As-Sb. Geologically and chemically, the best target zone appears to be along the Bibiani Shear. In this location, the shear is Birimian phyllites faulted against the Chirano mafic sequence.

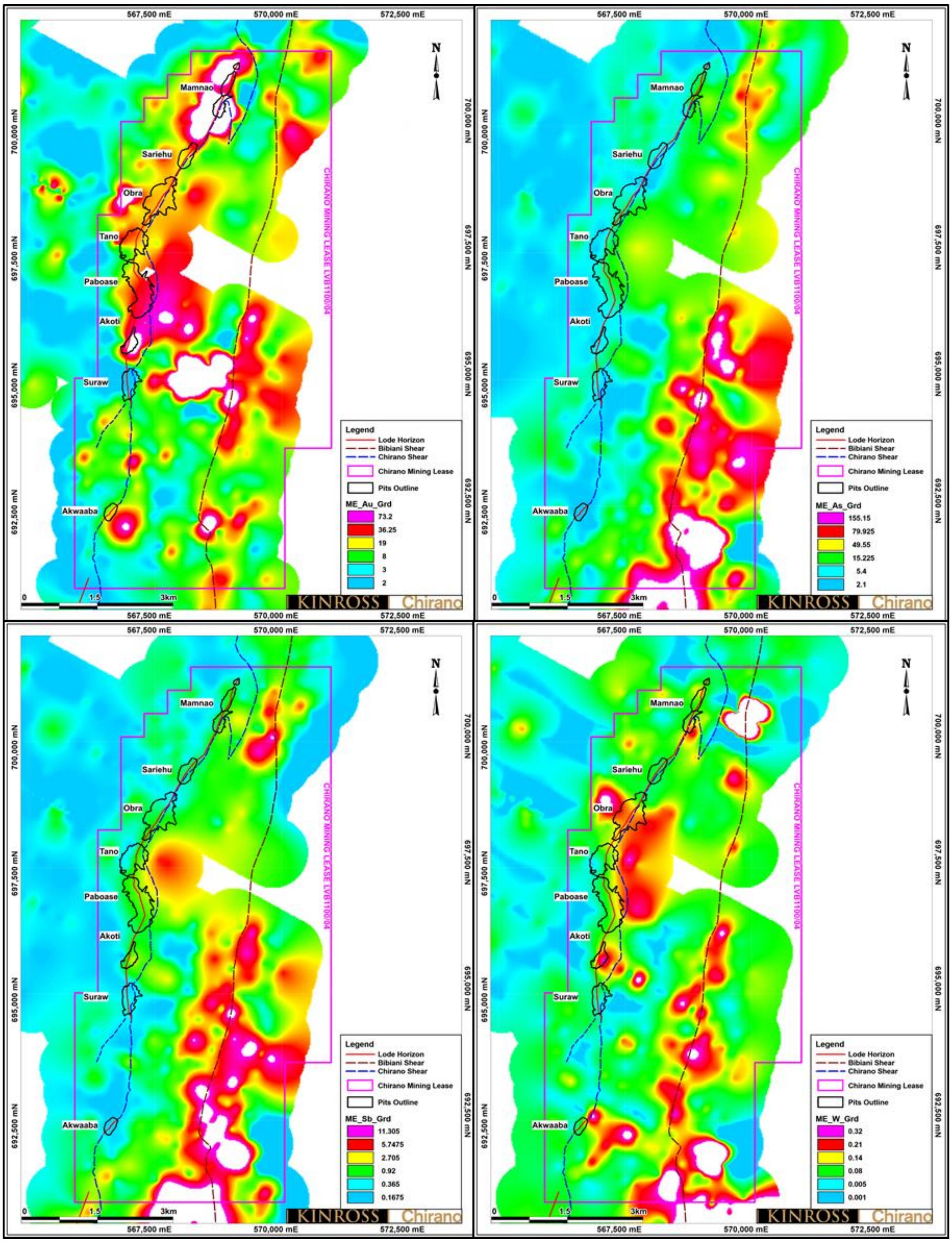


Figure 9-2: Multi element analysis – Au, As, Sb and W Signature over the Chirano Mining Lease

(Source: Chirano 2022)

9.2.2 GEOLOGICAL MAPPING

Geological mapping in the Chirano area is generally difficult due to the rugged topography and thick vegetation cover. However, it has been possible to identify most of the gold deposits in outcrop. The mineralization can usually be seen at the surface as trains of boulders and rubble comprising of grey, 'cherty' looking, altered granite with quartz-carbonate veinlets and minor pyrite staining.

Mapping has been useful in defining the extent and morphology of the granite that hosts the mineralization, and the proximity of the mineralization to the Chirano Shear. One deposit (Akwaaba) was found after mapping had drawn attention to a prospective dextral jog in the Chirano Shear.

To date, mapping continues to produce useful information for generating many more targets along the mine trend (Lode Horizon) and on some of its splay shears. Some of these targets have been drill tested, economically evaluated and approved for further work, especially in the northern part of the Mining Lease.

9.2.3 ROCK CHIP SAMPLING

Rock chip samples have been useful in confirming the position of the lode horizon. Rock chip samples assaying above 1g/t Au generally define the exposed lodes. Ongoing rock sampling complements the gains made from mapping. Rock results have continued to serve as powerful tool for delineating mineralized structures along the mine trend and elsewhere, whilst indicating potential zones for further work such as trenching.

9.2.4 TRENCHES

Excavation of trenches as an exploration technique has been very successful. Significant gold intersections in trenches typically overlie sub-surface zones of similar grade and width, as defined by subsequent drilling. Vein orientations in the trenches are usually indicative of the strike and dip of the mineralized zone beneath. Generally, trench excavation over surface anomaly paved the way and provide the confidence to drill test the various targets resulting into the mineable resources discovered at Chirano.

9.2.5 GEOPHYSICS

Geophysical surveys at Chirano confirmed both structures already mapped and those unmapped where surface information was not available during mapping, rock chip sampling or trenching.

A series of Induced polarization (IP) surveys were carried out at Chirano between 1999 and 2011. Gradient IP/ resistivity was first acquired in 1999 (with ground magnetics and dipole-dipole IP/res). Campaigns of acquisition and reprocessing followed in 2006, 2007, 2008, 2009, 2010 and 2011. These data were compiled in 2011 and is the best summary of the gradient data for the entire License.

The IP data identified the location of the mineralized horizon (Figure 9-3). Interpretation shows that the mineralized horizon is 'visible' in the IP results as a moderately resistive, moderately chargeable horizon. Within the mineralized horizon some of the gold deposits are easily discernible as specific anomalies whilst others are not. Drilling of IP targets has intersected mineralization in about 50% of cases, however these targets were also identified by soil sampling and geological mapping. The pole-dipole method used appears to be able to detect some Chirano mineralization up to 200 meters below surface. Following the discovery and delineation of the Akwaaba Underground resource further pole-dipole surveys were undertaken.

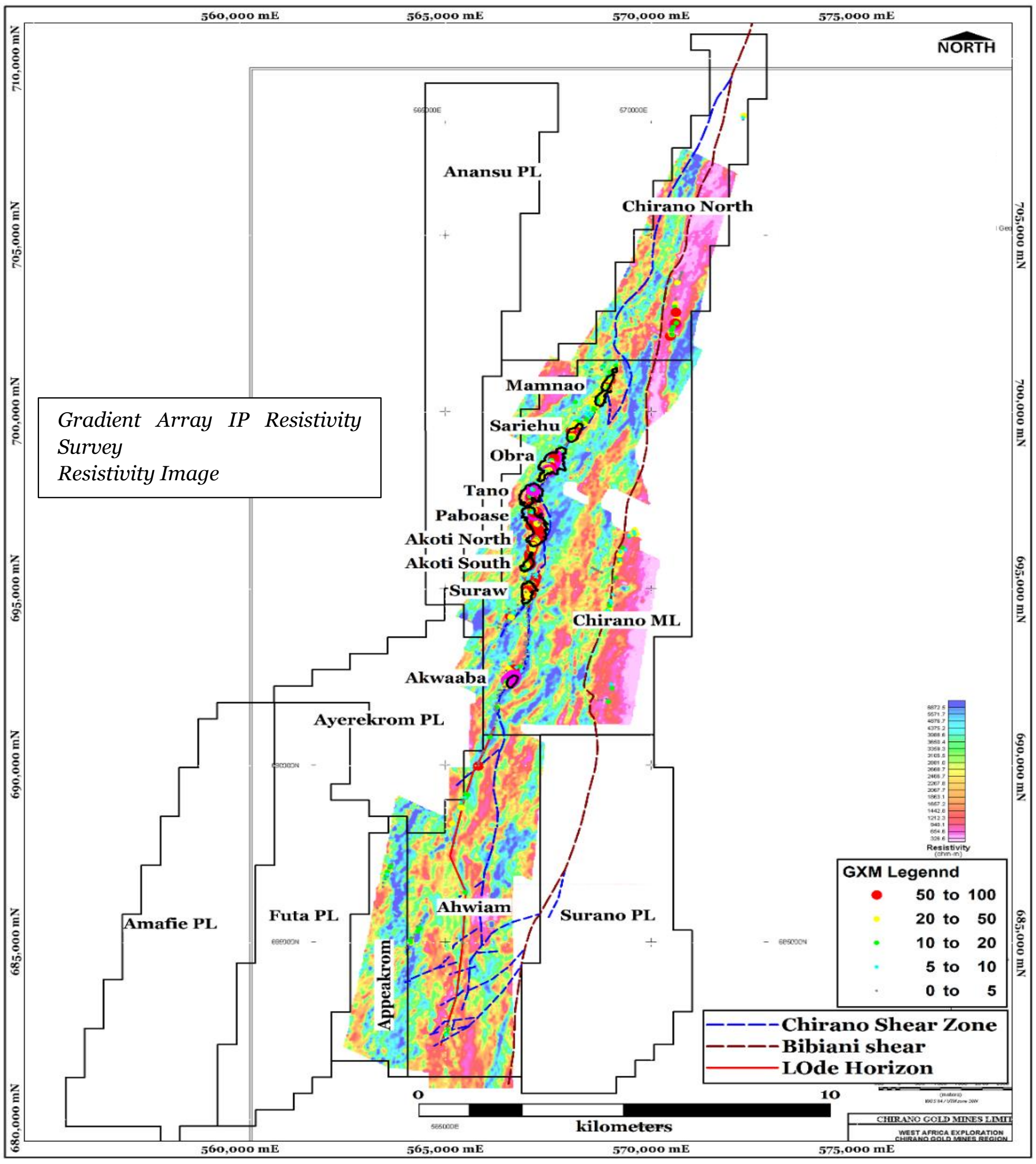


Figure 9-3: Gradient Array IP Resistivity Survey – Chirano Mining Lease Area

(Source: Chirano 2022)

Gravity data was collected in two phases; Historic (2008 - 2009) gravity data suffered resolution problem at the mine scale hence did not contribute meaningfully to the exploration process. However, high-density mafic volcanics to the west and low-density sedimentary basin to the east were indicated on the regional scale. Gravity data captured in 2015 - 2016, at a grid spacing of 100m x 100m, over the southern parts of the mine trend aimed at probing deep seated massive felsic intrusives (gravity low) associated with mineralization in wide gaps between certain existing mineral deposits (e.g., Akwaaba–Suraw gap). The gravity data confirmed the two main shears, namely Chirano and Bibiani, bounding a sedimentary basin on both sides and mafic volcanics on the western margin but failed to identify any massive anomalous intrusions within the gap.

Between 2004 and 2005, Airborne Geophysical surveys were carried out at Chirano. The data has been useful in confirming the mineralized horizon identified by soils and supports the relationship between the three major geological environments at Chirano. Fugro completed a detailed survey utilising a Midas system on a helicopter platform with multiple magnetic sensors and captured 9,616 km TMI/Grad magnetic and radiometric data on 100m line spacing with 3m sampling interval. This data was merged with a Regional Mag and Radiometric data captured on 400m line spacing earlier in 2014.

Airborne magnetic data reveals an abundance of structural information. Interpretation at both regional and prospect scale was not problematic. The data was processed by several consultants in the various forms with different techniques to derive the most information out of it. Generally, the airborne magnetic data contributed to the accurate determination of major structural setting of the mineralized shear (Lode horizon), Chirano shear and the Bibiani shear. Several splay shears and x-faults relating to mineralization at Chirano were also interpreted.

Chirano airborne radiometric data includes gamma counts for Potassium (K), Uranium (U) and Thorium (Th) (Figure 9-4). Data quality was deemed satisfactory by all processing consultants. U and Th are generally low in the drainages, although this can vary. The potassium is often high in the drainages and along topography. In addition, the known mineralization appears to follow a narrow curving high in the potassium data. However, the radiometric data represents lithology, alteration and regolith well and major structural differences were also identified.

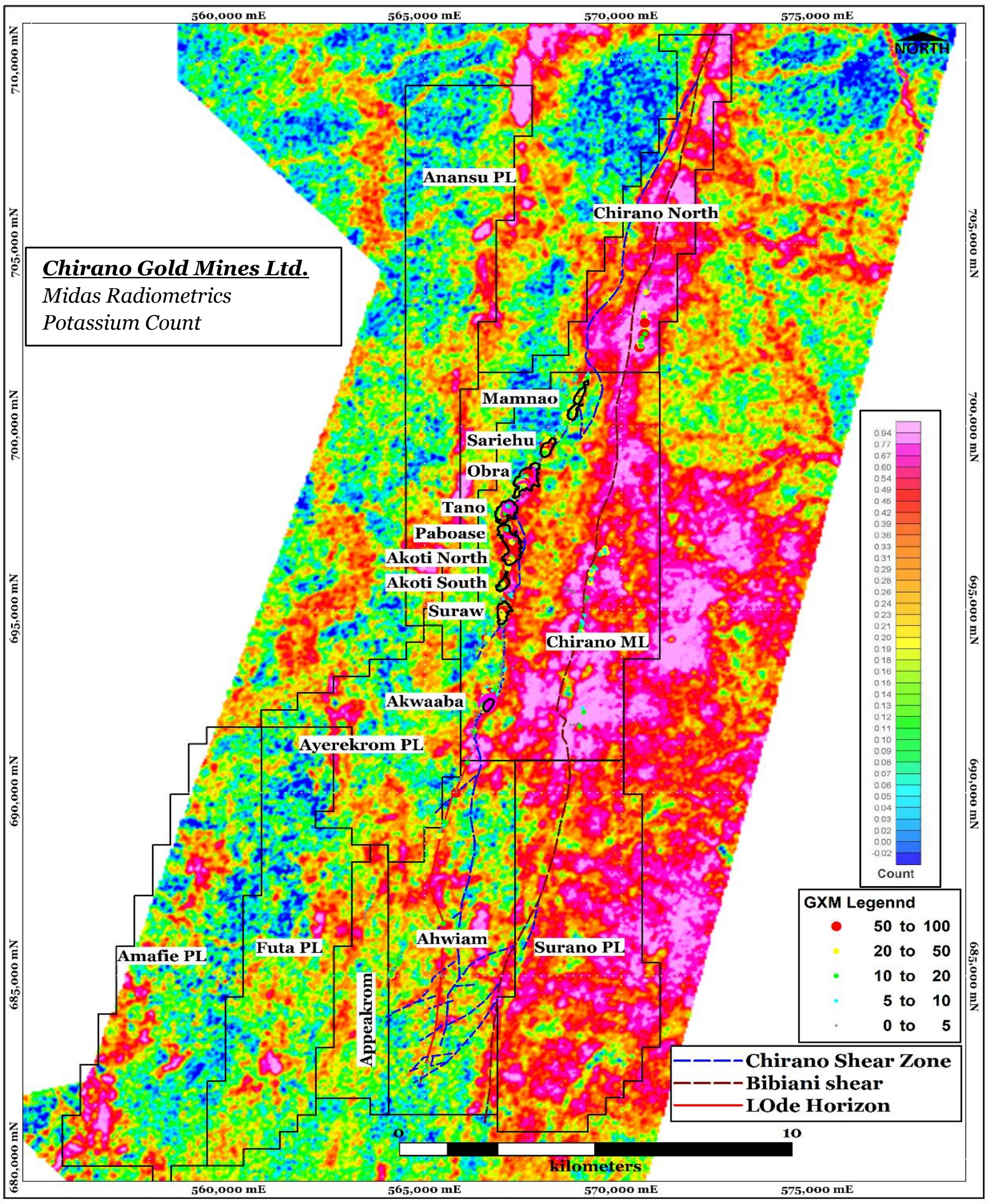


Figure 9-4: Midas Radiometric Potassium Count over Chirano Mining Lease Area

(Source: Chirano 2022)

9.2.6 Diamond Drilling

In 2021, Kinross diamond drilling focused both on mine exploration and brownfields targets. In total 143 holes were completed for 40,635m of core recovered. The detail of the drilling programs and significant intercepts per mineral deposit are covered in Section 10.

9.2.7 Exploration Planning - 2022

In 2022, planned exploration activities by the Chirano team, as shared with the QPs, include approximately 42,000 metres of drilling to continue testing and upgrading resources on the mining lease and adjacent prospecting licenses with key focus on depth extensions at Akwaaba, Tano, Suraw and Akoti South; upgrading open pit resources at Kolua, Mamnao and Mag Hinge and confirming high grade continuity at Obra to the north (Figure 9-6)

ORION SWATH 3D ground geophysical survey system has been deployed on the Chirano property in 2022, surveying from Suraw pit to the base of Mag Hinge which is within the Anhwiam PL for subsurface geophysical property information from surface to depths of up to 800m with IP chargeability and DC resistivity. This geophysical approach is aimed at detecting and discriminating targets related to potential mineralization, alteration, lithology and structures and also to compliment near surface information for integrated drill targeting.

9.2.8 Data Reliability

Data acquired during exploration at Chirano is considered to be very reliable. All work has been carried out by technically qualified personnel and has been planned and supervised by highly trained and experienced geoscientists. The location of all exploration data is known with adequate accuracy. The quality of geochemical analysis has been monitored using blanks, standards, field duplicates, and check analysis via primary and umpire laboratories. The quality of all geophysical data has been monitored by a consultant independent of the field contractor. Some RC drill intersections have been verified by adjacent diamond core twin hole drilling.

Chirano is committed to best practice standards for all exploration, sampling and drilling activities. Drilling was completed by an independent drilling firm using industry standard RC and Diamond Drill equipment. Analytical quality assurance and quality control procedures include the systematic insertion of blanks, standards and duplicates into the sample. Drill spacing reflect the nature of mineralization and the geologic settings. Bulk density determination of samples was conducted historically using appropriate method and was deemed appropriate reflecting the various weathering profiles. (SG) of 1.56 g/cm³ was applied to oxide ore, and 2.3 g/cm³ to transition and 2.75 g/cm³ to fresh. These values have on historical analysis of density measurements were undertaken by Chirano Mines. The method used was the standard wet-dry method, and samples are considered highly representative.

9.2.9 Conclusions

The QP is of the opinion that the exploration results from the underground and surface drilling programs and other exploration methods applied, completed on the existing mineral deposits and in the brownfields target, indicate positive extension potential to the existing mineral deposits on the Chirano Shear trend in strike and especially to depth. The exploration activities have allowed Chirano to develop a ranked system (Figure 9-5) to guide further exploration focus.

Asante intends to further explore all these possibilities.

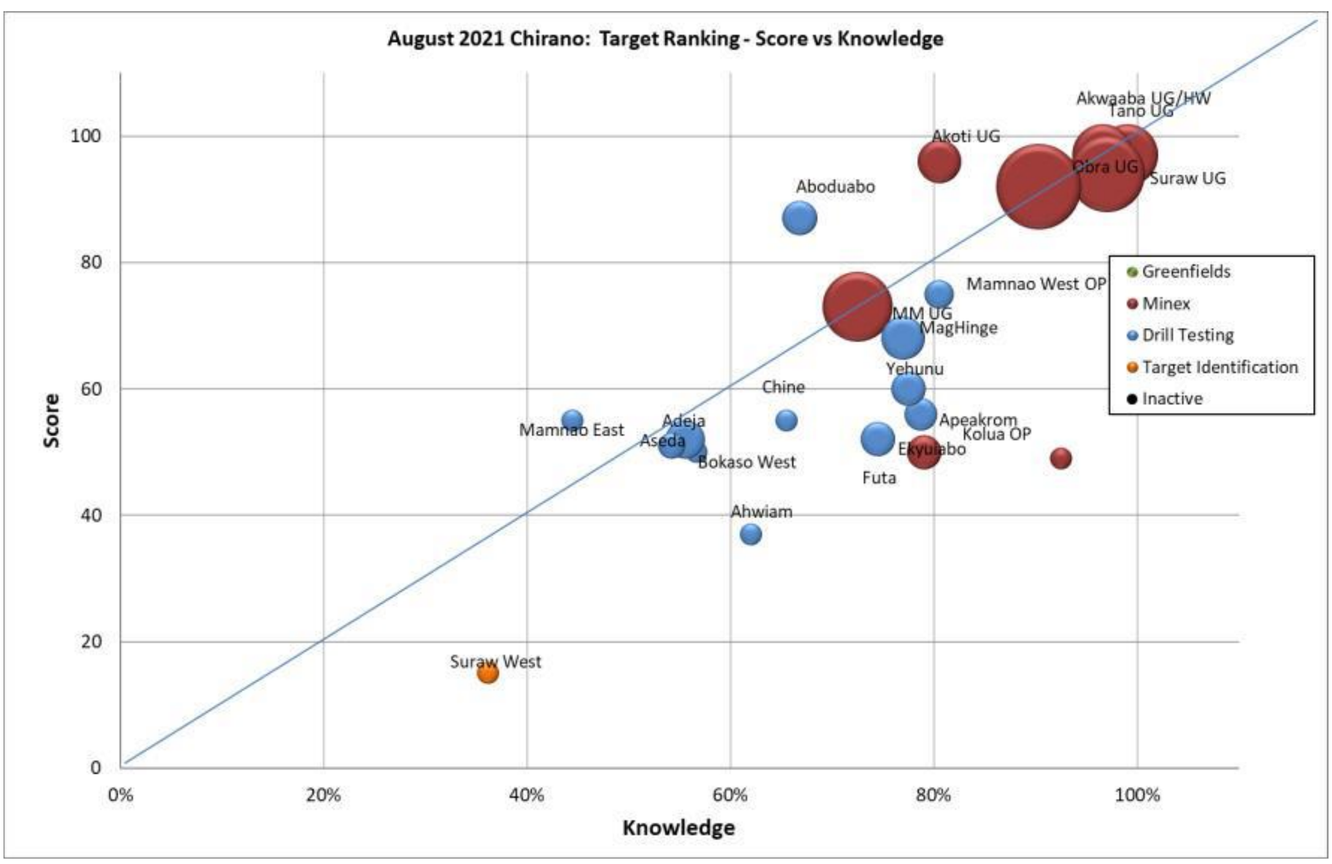


Figure 9-5: Chirano Exploration Ranking indicating Knowledge Level per Target Deposit

(Source: Chirano 2022)

Figure 9-6 below indicates the numerous targets for further exploration and investigation.

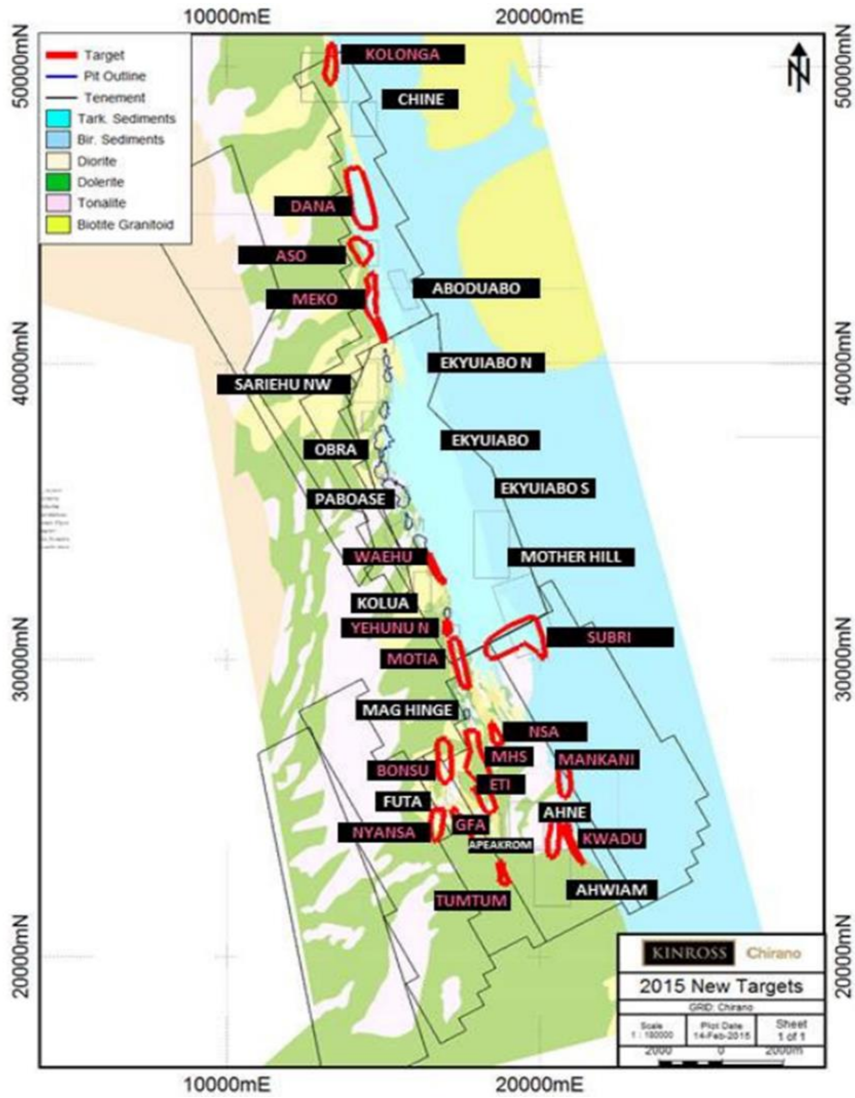


Figure 9-6: Regional Geology Interpretation Showing New Exploration Targets

(Source: Geoscience Now, 2015)

10. DRILLING

Chirano's drilling activities are undertaken by independent drilling contractors (Geodrill Limited) and supervised by a qualified team geologists employed on a fulltime basis by Chirano.

10.1 Historical Drilling

The Chirano Gold Mine has been in operation for almost 20 years and in that period a large amount of drilling, both surface and underground, has been completed over a long strike length and on many individual target areas.

Table 10-1: Chirano Gold Mine - Project to Date Summary of Drilling at Chirano Gold Mine

Prospect Code	Description	DD Holes No	Drill Core (m)	RC Holes no	RC Drill (m)
ABO	Aboduabo	2	205.00	54	7 280.00
AH	Ahwiam	13	2 709.90	40	4 949.00
AK	Akwaaba	363	104 289.50	89	25 065.60
AKN	Akwaaba North	13	5 605.40	20	2 207.00
AP	Appeakrom	0	0.00	23	3 523.00
AT	Akoti	150	47 767.39	224	49 638.50
CN	Chine	1	228.50	17	1 755.00
EK	Ekyuiabo	3	338.00	60	6 772.70
FT	Futa	5	443.40	37	5 636.00
KL	Kolua	12	2 150.80	50	7 910.00
MG	Magnetic Hinge	5	613.10	36	6 325.00
MH	Mother Hill	0	0.00	13	1 363.00
MM	Mamnao	50	9 788.06	235	34 486.50
MN	Mamnao North	6	510.66	68	9 933.60
OB	Obra	169	49 067.29	217	52 777.60
PB	Paboase	223	72 525.49	142	28 895.30
PBW	Paboase West	0	0.00	8	757.00
PLANT	Plant	10	387.70	6	490.00
SU	Sariehu	27	6 462.75	115	19 064.40
SW	Suraw	156	46 647.24	179	46 553.10
TAIL	Tailings	5	105.50	12	600.00
TN	Tano	196	53 191.89	164	35 075.30
TT	Tetteh	2	745.04	21	1 355.00
WDC	Wast Dump Central	0	0.00	3	280.00
WDN	Wast Dump North	0	0.00	6	394.00
YN	Yehunu	12	2 016.20	33	7 177.60
Project to Date		**1 423**	**405 798.81**	**1 872**	**360 264.20**

10.2 Kinross 2021 Minex Drilling Program

In 2021, exploration activities continued to advance the mine's potential for mine life extension and pipeline opportunities beyond the current LoM. Significant Mineral Resources were converted at Obra, Mamnao (potential open pit extension), Suraw, Tano and Akwaaba. Overall, within 2021, 112 underground drill holes totalling approximately 33,700m m (RC, RCDD and DD) were completed at Suraw UG, Akwaaba UG, Tano UG, and Obra.

The drilling was made up of 11RC, 15RC pre-collar with diamond tails (RCDD) and 86 diamond core from the six Chirano targets. The detail of the results is illustrated in the following sub-sections.

Collar locations are reported in the local Chirano Mine Grid. For surface drilling, surveyors physically mark the drill pad using pegs and reflective tapes to help the drillers positioning the rig correctly. The pegs and tapes are aligned according to the proposed orientation using a Sokkia Total Station and the coordinates and azimuth are written on the reflective tape for verification. For underground platforms, the rig is aligned using True North seeking Gyro azimuth aligner after development of the drill chamber using Survey Leica instruments to set out the holes. Final survey pickups are done using same survey instruments after anchorage. Down hole surveys are captured using Reflex NQ2 Ori tool. Drill hole trend is monitored using Reflex EZ-Trac, and Site geologists monitor it in Micromine. The Reflex data can be accessed through the HUB, which is downloaded, saved in the server and imported to Fusion.

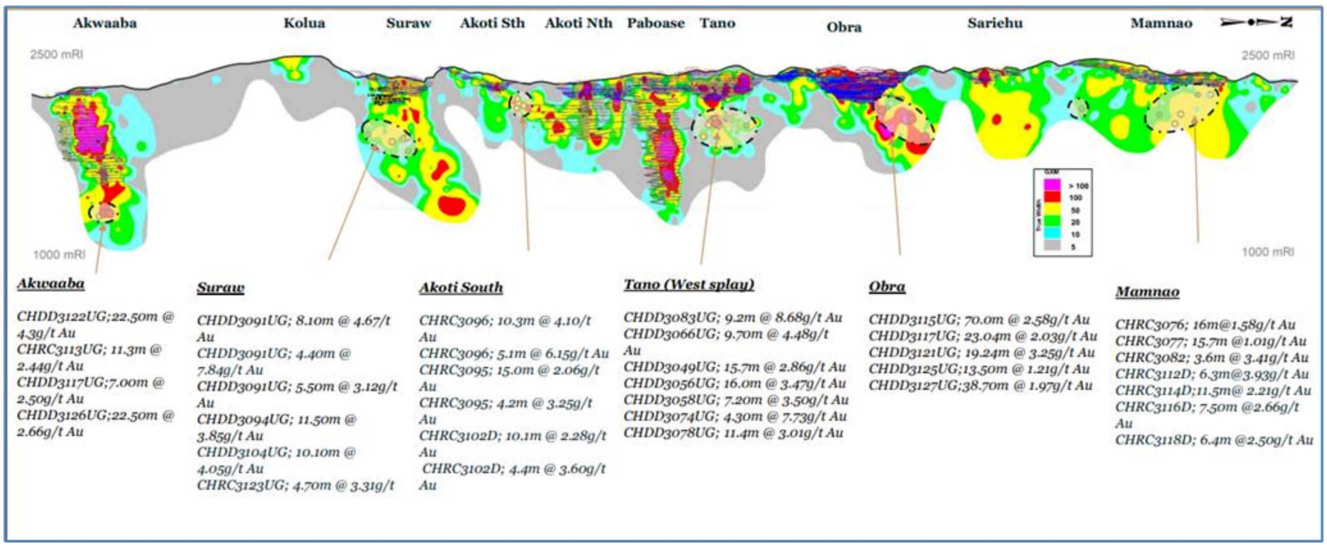


Figure 10-1: Chirano Gold Mine Drilling Focus 2021 and Growth Targets

The table below lists the hole locations for the mine-site related drilling described in this section.

Table 10-2: Drill Hole Locations – Chirano 2021 Minex Drilling Program

Chirano Drill Hole Locations							
Hole ID	**North**	**East**	**Elevation (m)**	**Depth (m)**	**Azimuth**	**Dip**	**Target**
CHDD3046UG	36326	14956	2047	212.2	208.4	-6.4	Tano
CHDD3047UG	36327	14955	2047	125.6	249.9	-6.1	Tano
CHDD3048UG	36329	14954	2047	146.3	281.7	-3.1	Tano
CHDD3049UG	36329	14954	2046	170.2	288.0	-18.9	Tano
CHDD3050UG	36327	14956	2046	167.6	235.5	-36.1	Tano
CHDD3053UG	36326	14956	2046	185.7	224.0	-29.0	Tano
CHDD3054UG	36326	14956	2047	200.6	208.0	-18.5	Tano
CHDD3056UG	36327	14955	2049	131.2	243.0	25.1	Tano
CHDD3058UG	36328	14955	2050	110.0	259.0	36.0	Tano
CHDD3062UG	36325	14957	2048	170.4	202.0	8.8	Tano
CHDD3063UG	36325	14957	2046	191.6	202.5	-29.0	Tano
CHDD3066UG	36325	14957	2047	164.4	196.5	-5.9	Tano
CHDD3068UG	36327	14955	2046	164.5	254.4	-37.8	Tano
CHDD3070UG	36329	14955	2046	230.5	285.5	-35.0	Tano
CHDD3073UG	36330	14954	2046	220.5	299.0	-26.5	Tano
CHDD3074UG	36326	14956	2046	224.6	224.0	-41.1	Tano
CHDD3078UG	36326	14955	2047	113.7	235.3	-12.9	Tano
CHDD3080UG	36328	14955	2046	203.6	272.0	-36.4	Tano
CHDD3083UG	36328	14955	2047	107.4	271.0	-10.6	Tano
CHDD3085UG	36330	14955	2046	254.0	301.3	-32.1	Tano
CHDD3087UG	36327	14955	2046	197.1	252.4	-46.0	Tano
CHDD3088UG	36326	14956	2046	198.0	212.5	-32.5	Tano
CHRC3075	40103	14810	2377	200.0	92.4	-59.5	Mamnao
CHRC3076	40075	14793	2375	199.0	90.0	-52.3	Mamnao
CHRC3077	39975	14763	2399	230.0	90.8	-47.0	Mamnao
CHRC3079	39978	14761	2399	314.0	90.0	-68.0	Mamnao
CHRC3081	39998	14736	2403	240.0	89.0	-47.0	Mamnao
CHRC3082	40052	14763	2387	220.0	90.0	-49.5	Mamnao
CHRC3112D	39840	14897	2422	368.2	85.8	-67.1	Mamnao
CHRC3114D	39781	14817	2412	445.1	81.8	-64.2	Mamnao
CHRC3116D	39658	14806	2455	444.2	85.9	54.6	Mamnao
CHRC3118D	39100	14845	2510	438.2	88.5	-65.0	Mamnao

Chirano Drill Hole Locations							
Hole ID	North	East	Elevation (m)	Depth (m)	Azimuth	Dip	Target
CHRC3084D	34681	15583	2356	339.1	89.0	-53.0	Akoti
CHRC3086D	34681	15582	2356	390.5	87.0	-62.5	Akoti
CHRC3090D	34849	15511	2335	353.9	90.0	-49.0	Akoti
CHRC3092D	34848	15512	2335	377.5	87.0	-57.0	Akoti
CHRC3093	34858	15653	2327	195.0	96.6	-55.8	Akoti
CHRC3095	34838	15644	2329	210.0	96.4	-44.5	Akoti
CHRC3096	34838	15642	2329	248.0	98.3	-59.5	Akoti
CHRC3097	34872	15660	2327	200.0	87.2	-54.8	Akoti
CHRC3099	34872	15658	2327	326.0	87.7	-74.6	Akoti
CHRC3100D	34755	15537	2350	377.7	89.0	-55.0	Akoti
CHRC3102D	34873	15658	2327	237.6	85.3	-65.3	Akoti
CHDD3091UG	33767	16151	2163	356.8	25.1	-45.9	Suraw
CHDD3094UG	33768	16151	2163	377.6	20.2	-42.9	Suraw
CHDD3098UG	33764	16153	2163	236.2	107.7	-31.4	Suraw
CHDD3101UG	33765	16152	2163	302.6	107.1	-46.7	Suraw
CHDD3103UG	33765	16152	2163	251.1	99.6	-41.9	Suraw
CHDD3104UG	33767	16151	2163	341.7	47.1	-55.0	Suraw
CHDD3107UG	33766	16152	2163	305.6	65.7	-55.0	Suraw
CHDD3120UG	33940	16095	2186	377.3	51.0	-60.6	Suraw
CHDD3123UG	33940	16096	2186	417.7	67.2	-65.3	Suraw
CHDD3128UG	33940	16095	2186	410.8	42.0	-60.6	Suraw
CHDD3134UG	33939	16096	2186	419.1	86.6	-64.3	Suraw
CHDD3136UG	33766	16151	2163	372.8	64.1	-60.3	Suraw
CHDD3142UG	33940	16096	2186	399.1	58.5	-64.0	Suraw
CHDD3150UG	33939	16096	2186	460.9	103.1	-61.2	Suraw
CHDD3153UG	33764	16152	2163	348.4	110.4	-53.4	Suraw
CHDD3157UG	33940	16095	2186	412.9	43.6	-63.6	Suraw
CHDD3164UG	33766	16152	2163	360.0	70.7	-59.6	Suraw
CHRC3124D	34205	16369	2289	503.3	274.1	-67.7	Suraw
CHRC3131D	34247	16358	2301	579.7	271.3	-67.4	Suraw
CHRC3139D	34247	16357	2301	572.1	278.0	-65.0	Suraw
CHRC3145D	34176	16419	2279	438.3	270.7	-53.5	Suraw
CHRC3147D	34276	16367	2306	580.4	278.0	-68.5	Suraw
CHDD3115UG	37698	15068	2200	264.9	302.6	-40.2	Obra
CHDD3117UG	37698	15068	2200	296.0	312.4	-37.7	Obra
CHDD3121UG	37698	15069	2200	419.5	316.7	-43.3	Obra
CHDD3125UG	37695	15068	2201	170.9	232.6	-20.8	Obra
CHDD3127UG	37694	15068	2201	224.3	225.3	-21.4	Obra
CHDD3129UG	37697	15068	2201	210.9	272.5	-39.3	Obra
CHDD3132UG	37696	15068	2201	209.8	253.5	-39.0	Obra
CHDD3135UG	37696	15069	2200	152.6	283.5	-16.7	Obra
CHDD3138UG	37699	15068	2201	221.0	320.3	-11.4	Obra
CHDD3140UG	37699	15069	2202	258.9	331.0	-9.0	Obra
CHDD3143UG	37694	15069	2201	223.8	223.2	-34.4	Obra
CHDD3149UG	37813	14833	2204	302.8	79.0	-67.6	Obra
HDD3152UG	37813	14833	2204	198.8	79.3	-41.9	Obra
CHDD3156UG	37813	14833	2204	242.7	62.0	-54.0	Obra

Chirano Drill Hole Locations							
Hole ID	North	East	Elevation (m)	Depth (m)	Azimuth	Dip	Target
CHDD3161UG	37813	14833	2204	210.0	71.0	-28.0	Obra
CHDD3165UG	37813	14833	2204	336.0	76.2	-75.7	Obra
CHDD3168UG	37814	14832	2204	408.0	28.4	-70.8	Obra
CHDD3170UG	37813	14833	2204	335.7	56.4	-73.8	Obra
CHDD3171UG	37813	14833	2204	224.7	63.0	-47.0	Obra
CHDD3172UG	37814	14833	2204	299.6	48.5	-62.5	Obra
CHDD3174UG	37814	14832	2204	369.0	43.1	-75.0	Obra
CHDD3176UG	37814	14832	2204	372.1	50.3	-78.5	Obra
CHDD3178UG	37814	14833	2204	236.3	51.2	-43.5	Obra
CHDD3180UG	37814	14833	2204	200.8	58.6	-31.7	Obra
CHDD3181UG	37813	14833	2204	299.7	64.1	-69.3	Obra
CHDD3183UG	37813	14833	2204	396.0	76.2	-82.3	Obra
CHDD3184UG	37814	14832	2204	398.6	19.5	-62.0	Obra
CHDD3185UG	37814	14832	2204	320.5	26.1	-54.0	Obra
CHDD3186UG	37814	14833	2204	274.5	52.1	-54.9	Obra
CHDD3113UG	31662	17021	1564	350.6	272.9	-48.6	Akwaaba
CHDD3122UG	31663	17021	1564	335.8	282.5	-48.0	Akwaaba
CHDD3126UG	31663	17021	1564	312.5	295.7	-46.0	Akwaaba
CHDD3133UG	31664	17021	1564	314.9	309.5	-42.0	Akwaaba
CHDD3137UG	31664	17021	1564	381.1	307.6	-45.6	Akwaaba
CHDD3141UG	31664	17021	1564	345.7	254.1	-44.0	Akwaaba
CHDD3144UG	31662	17020	1564	281.8	265.4	-43.2	Akwaaba
CHDD3146UG	31663	17021	1564	318.0	286.6	-46.8	Akwaaba
CHDD3148UG	31661	17021	1564	366.5	239.5	-41.5	Akwaaba
CHDD3151UG	31661	17020	1564	364.6	237.6	-36.0	Akwaaba
CHDD3154UG	31663	17021	1564	413.6	279.0	-51.5	Akwaaba
CHDD3162UG	31661	17020	1564	377.1	247.1	-46.0	Akwaaba
CHDD3167UG	31663	17021	1564	365.8	286.4	-50.5	Akwaaba
CHDD3169UG	31664	17021	1564	392.8	299.9	-50.5	Akwaaba
CHDD3173UG	31662	17020	1564	398.7	263.0	-51.5	Akwaaba
CHDD3177UG	31661	17020	1564	401.2	244.4	-44.1	Akwaaba
CHDD3179UG	31663	17021	1564	389.8	295.4	-48.7	Akwaaba
CHDD3182UG	31664	17021	1564	446.3	311.4	-47.6	Akwaaba

(Source: Kinross, 2022)

10.2.1 Akwaaba

The 2021 drilling exercise was planned to target the depth extensions of the main mineralised zone down to 1300mrl. The aim to convert Mineral resources to Ore reserves. The results indicate that potential exists below this level. Further exploration is planned to investigate the hanging wall mineralisation potential.

Significant intercept in 2021 from CHDD3122UG which reported 22.5m @ 4.3g/t Au including 10.68m @ 7.08g/t Au. This drilling from 1350m level demonstrating down dip continuity at depth.

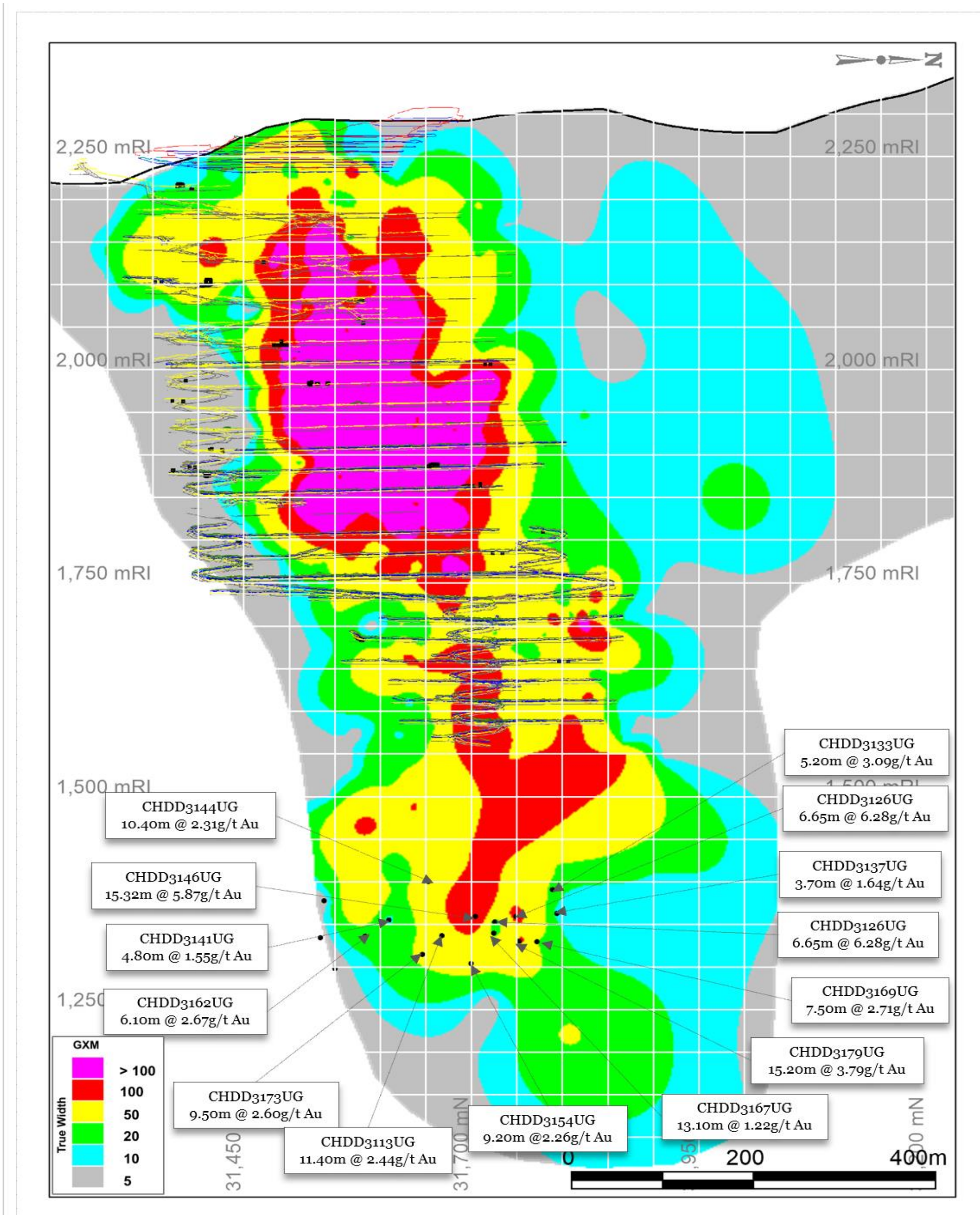


Figure 10-2: Akwaaba 2021 Drilling – Longs Section showing Significant Intersections

10.2.2 Suraw

Drilling in 2021 extended mineralisation immediately south of the current reserve area. The figure below shows some significant intercepts.

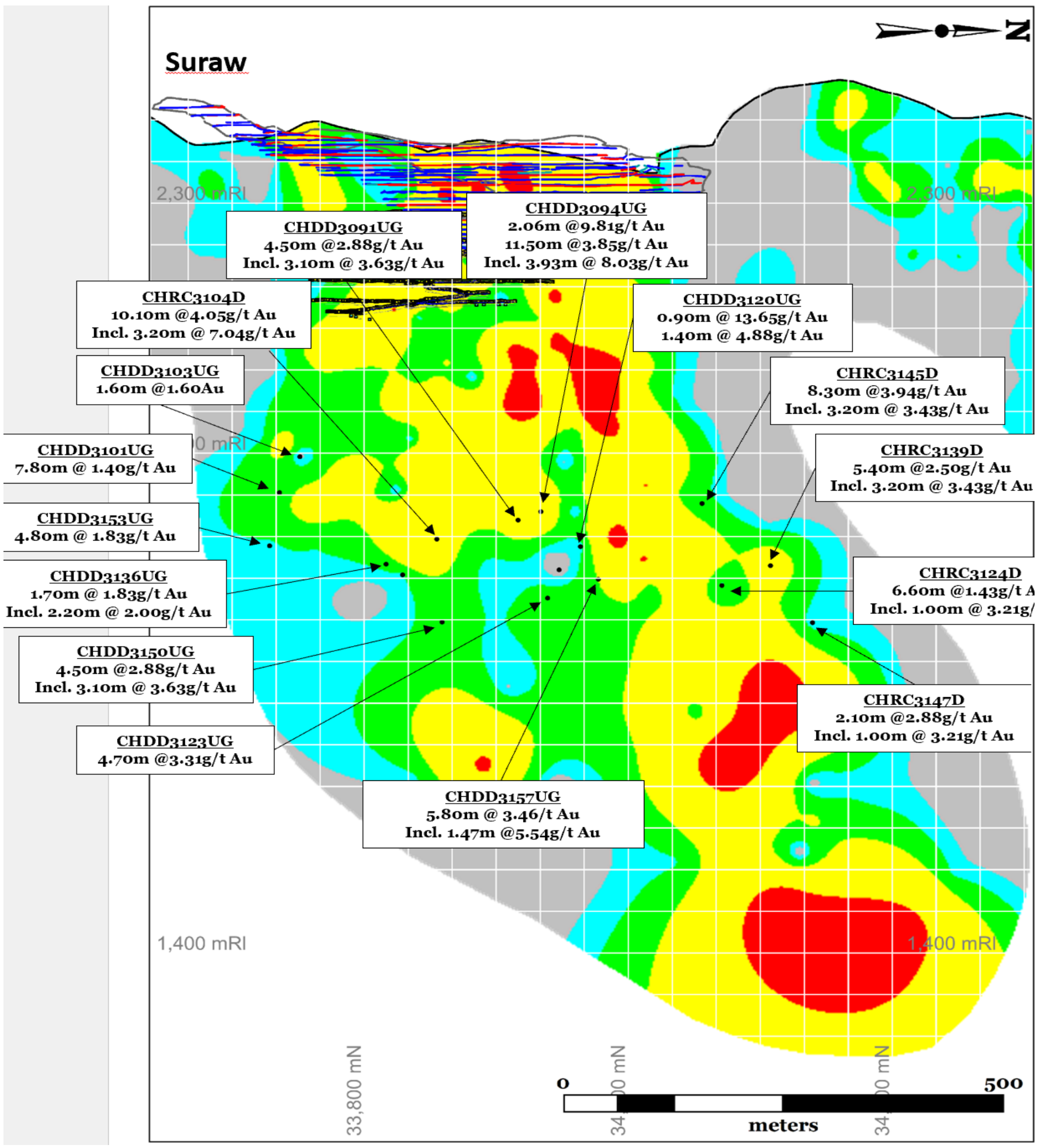


Figure 10-3: Suraw 2021 Drilling – Long Section showing Significant Intercepts

(Source: Kinross, 2022)

10.2.3 Akoti South

Drilling in 2021 extended mineralisation immediately south of the current reserve area between 2100mRl to 2200mRl. The figure below shows some significant intercepts.

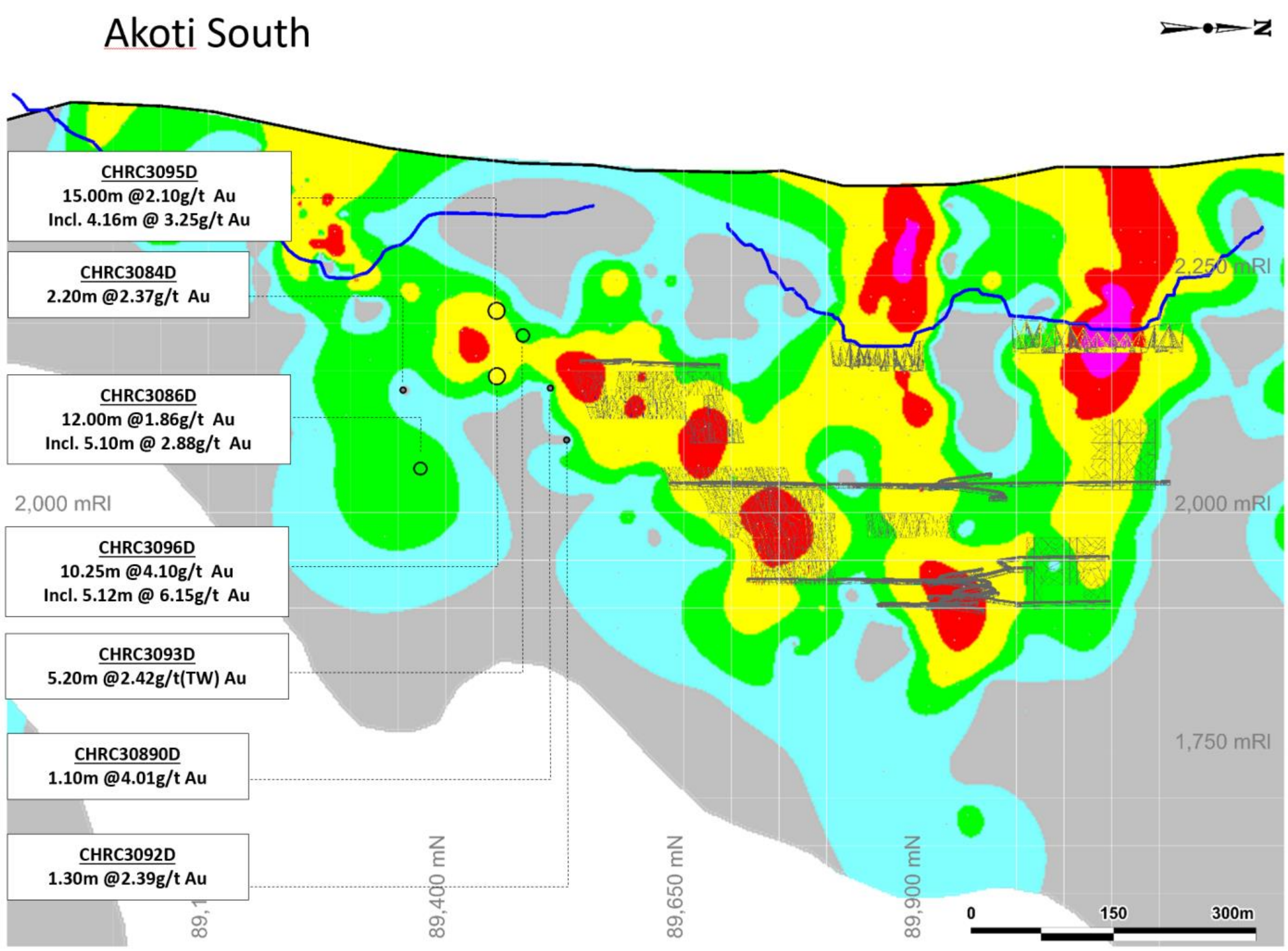


Figure 10-4: Akoti South 2021 Drilling – long section showing significant intercepts south of Main Akoti Zone

(Source: Kinross, 2022)

10.2.4 Paboase

The Paboase deposit is the deepest part of the trend down currently to 1400mrl. The last phase of recent exploration was in 2020 which resulted in a narrow mineralised zone, but indications are that further swelling of the mineralised zone is possible and further exploration is recommended.

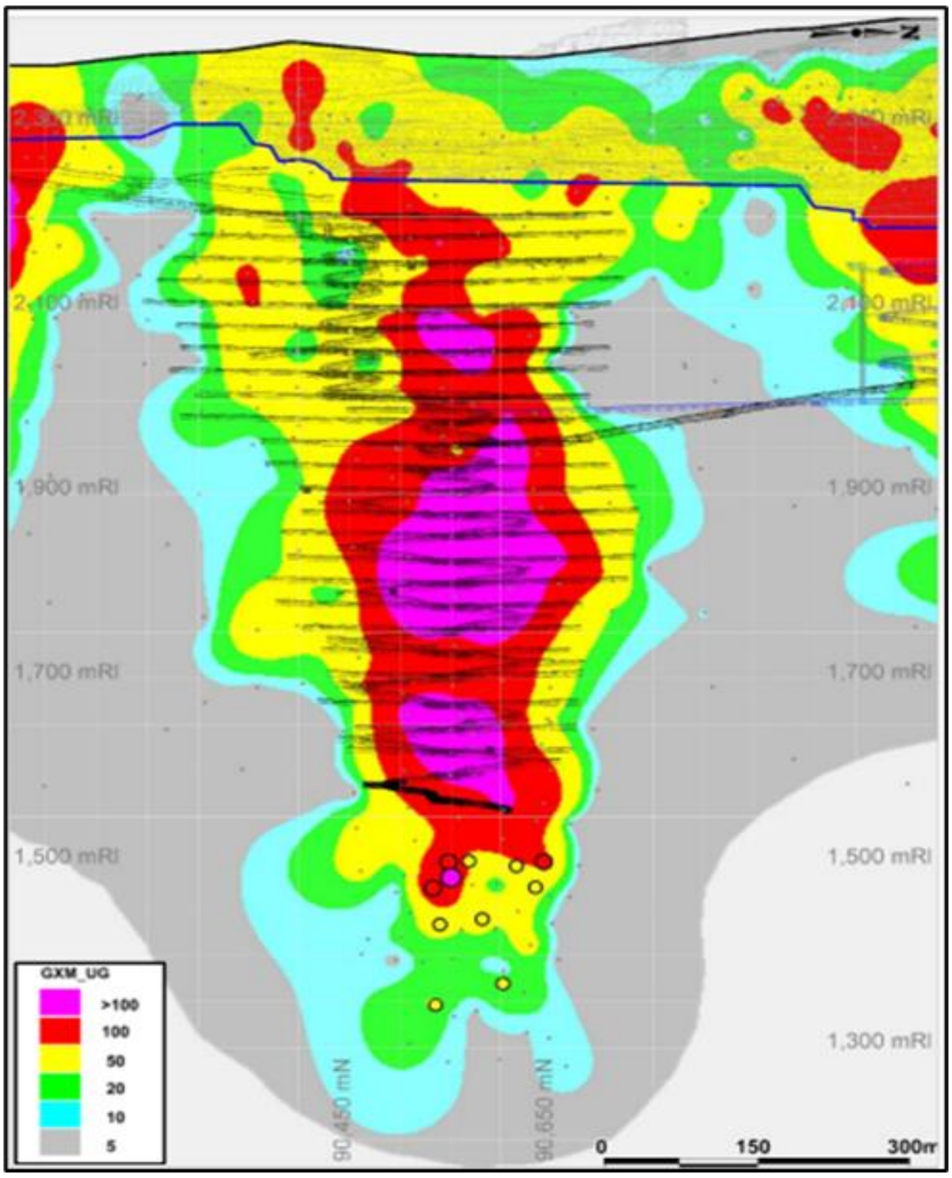


Figure 10-5: Paboase Drilling – Long Section Showing Extension Drilling Below Current Mining Operations

(Source: Kinross, 2022)

10.2.5 Tano

Underground operations at Tano are the depth extension of previously mined open pit resources. During 2021 the focus of exploration drilling was the west splay to the main mineralised zone which lies approximately 30m west. All the results received for the drilling are from this west shear zone. Further drilling is planned to extend the main mineralised zone below the current 1850mrl resource level.

During 2021 drilling a total of 16koz was converted into Ore Reserve improving the LoM scenario at Tano and indicating further down dip opportunity.

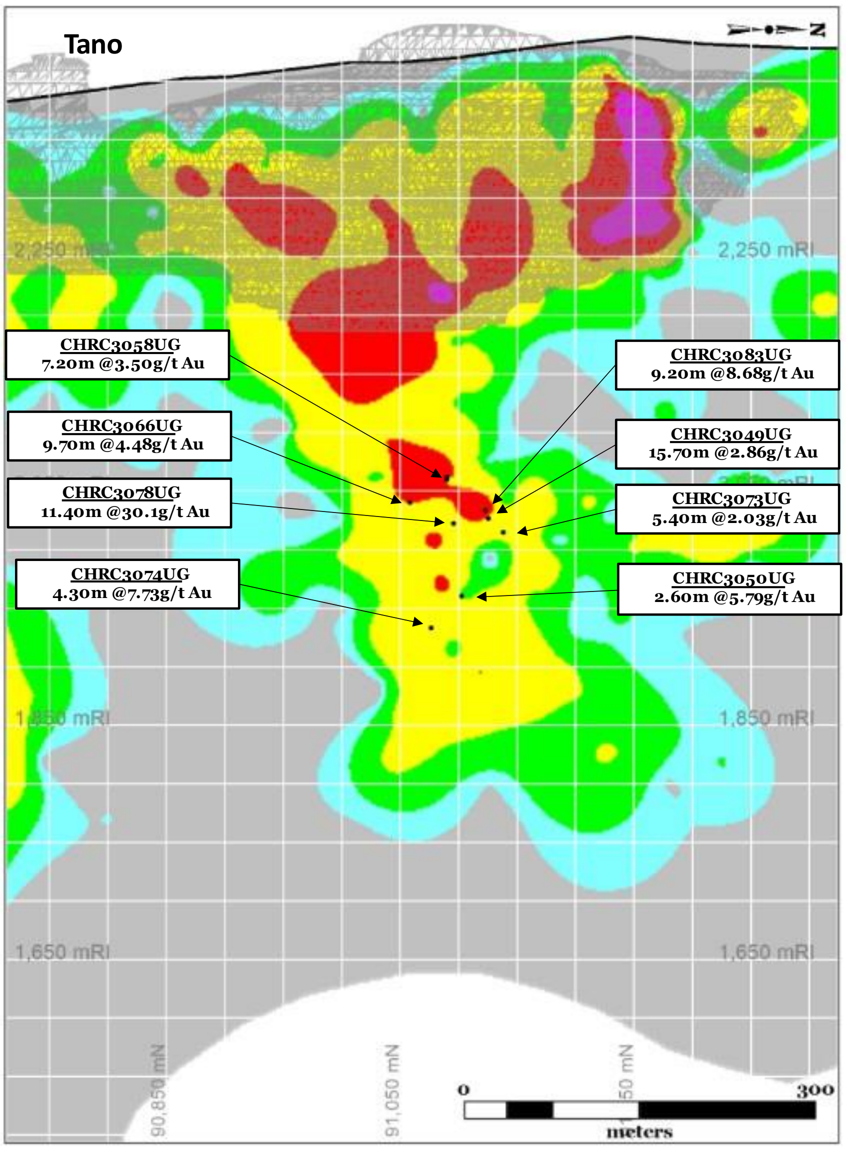


Figure 10-6: Tano Drilling – long section showing significant intercepts below Open Pit

(Source: Kinross, 2022)

10.2.6 Obra

The intercepts shown in the figures below (true widths) are those recorded from the 2021 drilling program completed by Chirano. The results confirmed the expected depth extension of the high-grade plunging shoot. All the 2021 drilling was carried out from underground in an exploration drive specifically developed for this purpose. Obra has both open pit and underground reserves reported.

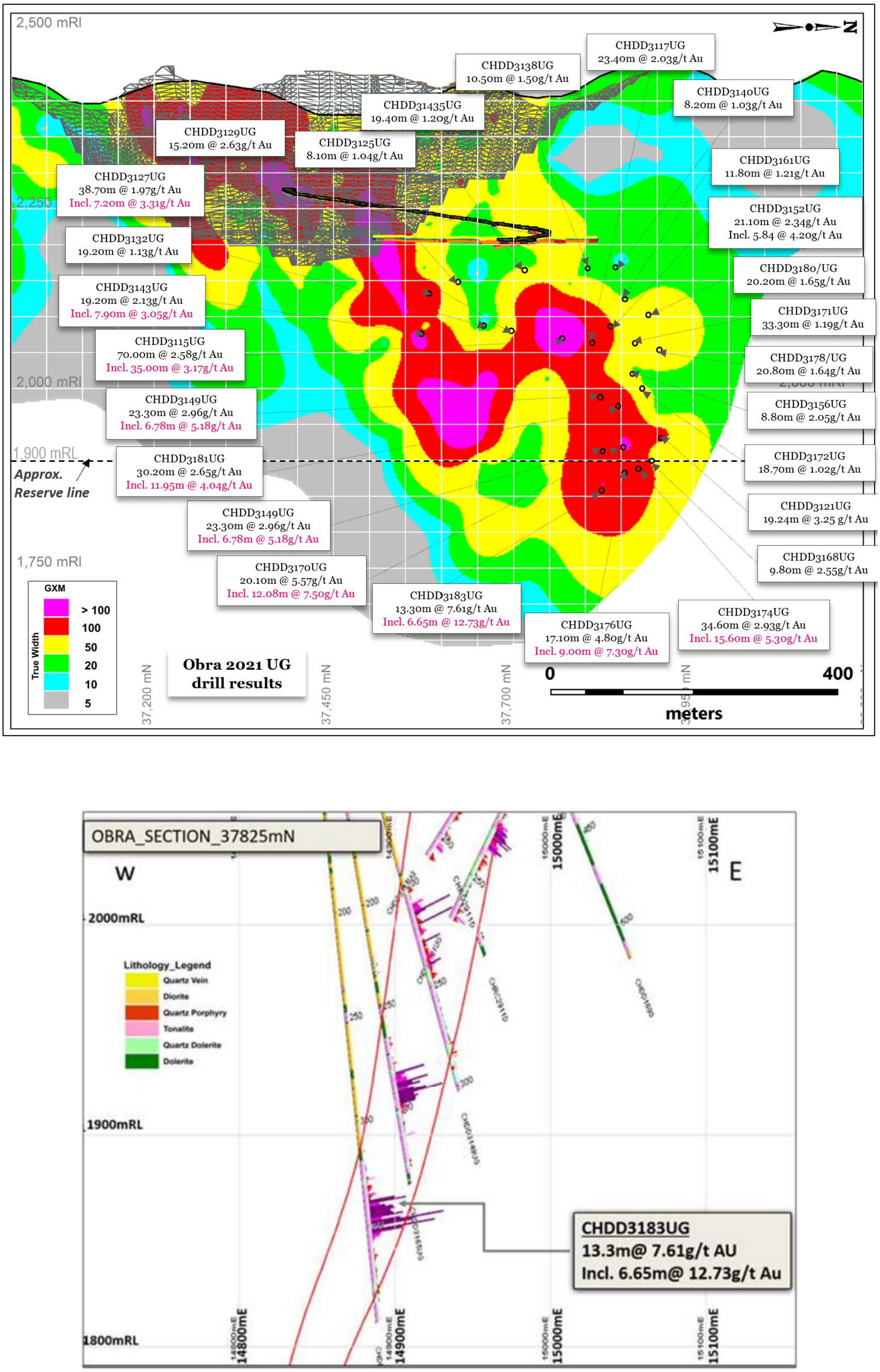


Figure 10-7: Obra 2021 Drilling Results – long section showing 37825mN recent drill intercept of high-grade mineralization below base of reserve

(Source: Kinross, 2022)

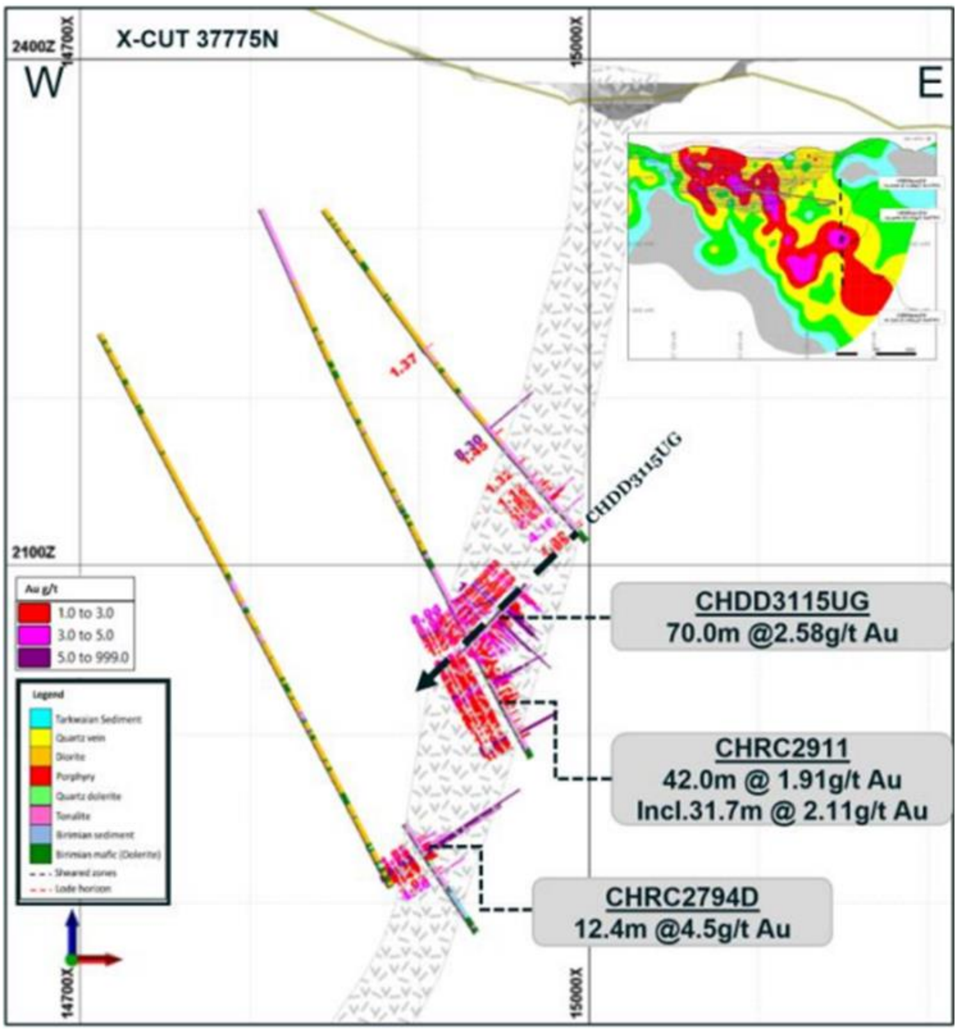


Figure 10-8: Obra 2021 Drilling Results – long section 37775mN showing recent drill intercepts

(Source: Kinross, 2022)

10.2.7 Mamnao

Mamnao is currently an active open pit operation supplying approximately 30% of mill feed. Four holes were drilled in 2021 to test down dip continuity of the mineralised structure. Significant results included:

- CHRC3076 – 16m @ 1.58g/t Au
- CHRC3077 – 15.7m @ 1.01g/t Au
- CHRC3079 – 7.1m @ 1.0g/t Au
- CHRC3082 – 3.6m @ 3.41g/t Au

Figure 10-9: Mamnao Open Pit looking North towards Bibiani Mine

10.3 Kinross 2021 Brownfields Drilling – South Mine Trend

Advanced exploration drilling was also carried out on selected targets south of Akwaaba within the Mining Lease area during 2021. Of particular interest was the Mag Hinge and Aseda targets.

Seventeen diamond drill holes were completed in 2021, made up of 10 RC and 7 RC pre-collar with diamond tails (RCDD) on four targets, 6 RC and 2 RC pre-collar with diamond tails were drilled into the Mag Hinge target, 1 RC and 4 pre-collar with diamond tails from Aseda, 1 RC pre-collar with diamond tail (RCDD) from Sariehu and 3 RC and 4 RC from Bokaso South targets respectively. Diamond drill holes are of NQ2 diameter.

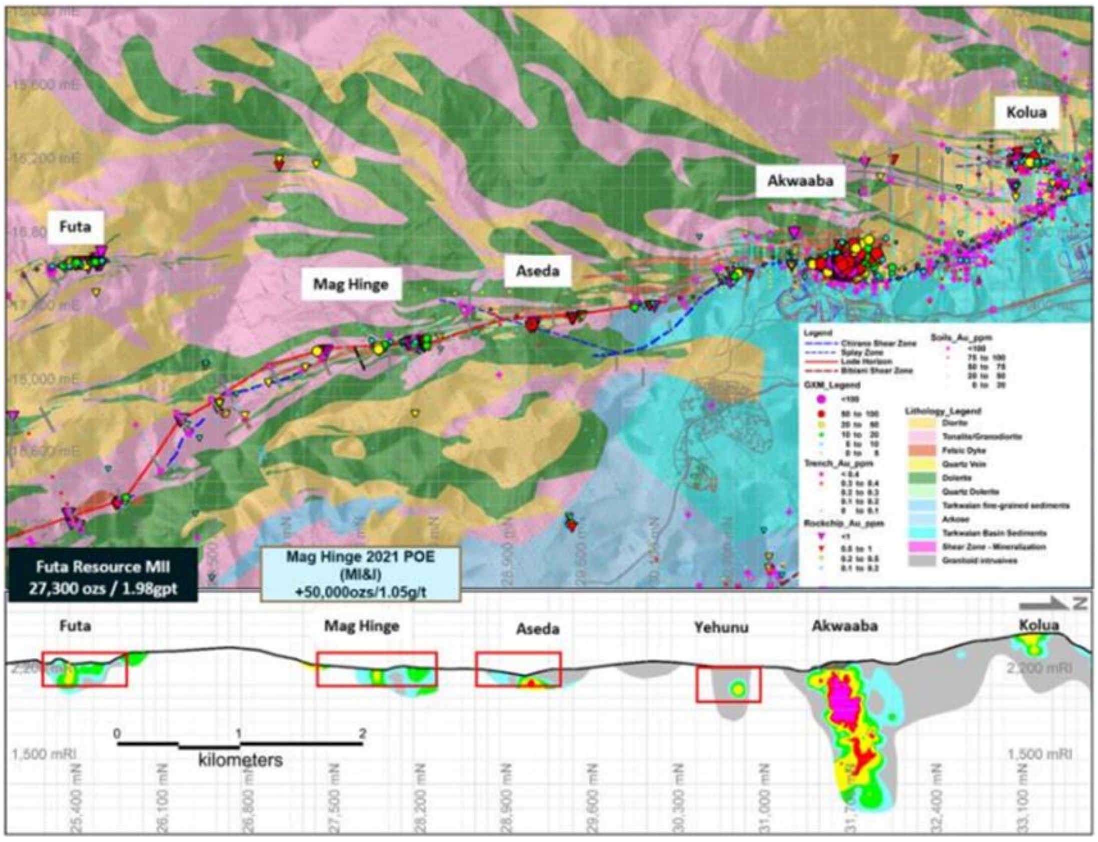


Figure 10-10: Chirano Identified Exploration Targets

(Source: CGML, 2022)

Collar locations are reported in the local Chirano Mine Grid. For surface drilling, surveyors physically mark the drill pad using pegs and reflective tapes to help the drillers positioning the rig correctly. The pegs and tapes are aligned according to the proposed orientation using a Sokkia Total Station and the coordinates and azimuth are written on the reflective tape for verification. For underground platforms, the rig is aligned using True North seeking Gyro azimuth aligner after development of the drill chamber using Survey Leica instruments to set out the holes. Final survey pickups are done using same survey instruments after anchorage. Drill hole trend is monitored using Reflex EZ-Trac, and Site geologists monitor it in Micromine. The Reflex data can be accessed through the HUB, which is downloaded, saved in the server and imported to Fusion. When the hole is finished the downhole deviation is measured with True North Gyro tools every 10 meters and then imported to Fusion. Diamond drill core is sampled according to lithological boundaries, alterations and vein widths, but the maximum sample interval does not exceed 1.50m in length. For RC, sampling is conducted at every 1.0m drilled interval, then the sample is weighed and split into 2 - 3kg batches from which sub-samples for analysis are taken. Composite assay intervals were calculated by taking a weighted average, and no more than 3m (consecutive) of internal waste was accepted. For open pit target drill holes, a cut-off of 0.5g/t was used to calculate intercepts, and for underground target drill holes, a 1g/t cut-off was used to calculate intercepts.

RC collars are spaced on 25m * 40m section spacing. The section spacing is appropriate to assess and interpret geology and mineralisation. Drilling azimuths are generally oriented perpendicular to the regional fabric and dipping at varying degrees.

Table 10-3: Brownfields Drill Program 2021 – Collar Positions

Chirano Drill Hole Locations							
Hole ID	North	East	Elevation (m)	Depth (m)	Azimuth	Dip	Target
CHRC3051	28122	17564	2230	151.0	88.0	-48.0	Mag Hinge
CHRC3057	28123	17561	2230	205.0	87.0	-68.0	Mag Hinge
CHRC3059	28050	17570	2226	184.0	90.0	-59.0	Mag Hinge
CHRC3060	27843	17600	2223	154.0	82.0	-66.0	Mag Hinge

Chirano Drill Hole Locations							
Hole ID	**North**	**East**	**Elevation (m)**	**Depth (m)**	**Azimuth**	**Dip**	**Target**
CHRC3061	27797	17607	2224	157.0	82.0	-65.0	Mag Hinge
CHRC3064	27738	17606	2226	157.0	80.0	-62.0	Mag Hinge
CHRC3071D	27656	17482	2242	270.1	79.0	-50.0	Mag Hinge
CHRC3072D	27914	17545	2222	216.1	80.0	-62.0	Mag Hinge
CHRC3158	40051	14727	2392	122.0	89.0	-52.0	Bokaso South
CHRC3159	39999	14716	2403	116.0	90.0	-58.0	Bokaso South
CHRC3160	39949	14740	2410	253.0	88.0	-45.0	Bokaso South
CHRC3119D	38481	14689	2520	642.0	87.0	-68.0	Sariehu
CHRC3105D	28986	17414	2214	152.8	82.0	-50.0	Aseda
CHRC3106D	29034	17397	2217	156.2	82.0	-50.0	Aseda
CHRC3108	29118	17555	2215	260.0	270.0	-48.0	Aseda
CHRC3109D	29116	17502	2214	126.4	191.0	-65.0	Aseda
CHRC3111D	28927	17328	2215	209.9	83.0	-45.0	Aseda

10.3.1 Magnetic (Mag) Hinge

The Mag Hinge deposit is situated about 3km south of Akwaaba. 13 diamond drill holes were completed in 2021. Intercepts continue to demonstrate mineralisation continuity both at depth and along strike in favourable quartz dolerite/tonalite host rocks within hydrothermal shear/breccia zones with pyrite-carbonate-silica alteration assemblages The figure below shows the significant intercepts.

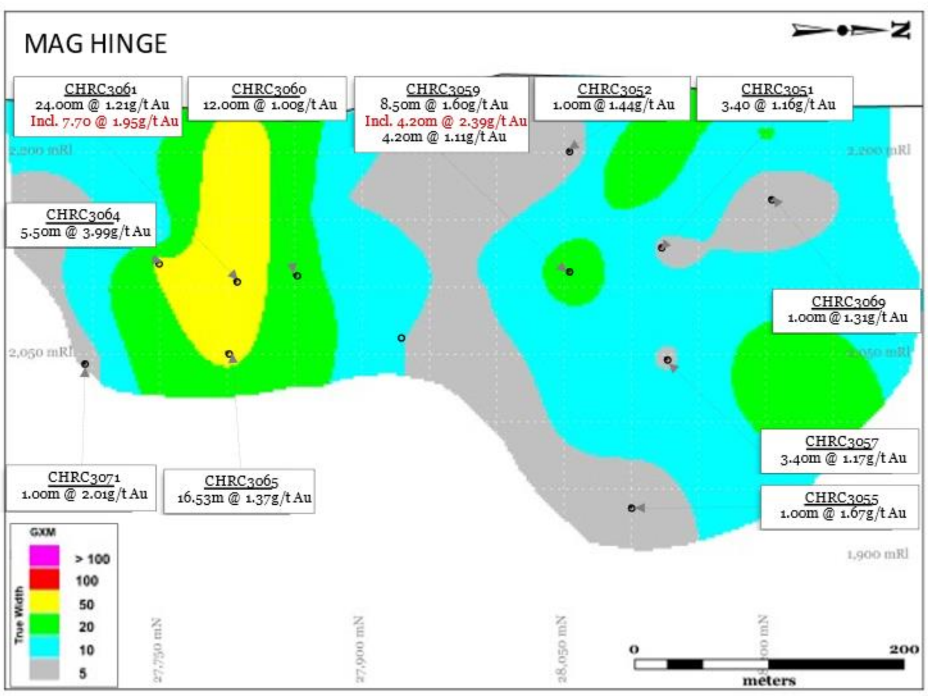


Figure 10-11: Max Hinge 2021 Drilling Results

(Source: Chirano, 2022)

10.3.2 Aseda

Six diamond drill holes were completed at the Aseda target which is situated between Akwaaba and Max Hinge. Results received indicated a shorter strike length of mineralisation than expected but good geological signatures.

10.3.3 Brownfields Drilling 2021 - Significant Intercepts

The table below lists some of the significant intercepts from the brownfields drilling exercise completed in 2021 by the Chirano team.

Table 10-4: Chirano Brownfields Drilling 2021 - Significant Intercepts

Chirano Drill Hole Results						
Hole ID	**From**	**To**	**Interval (m)**	**True Width (m)**	**Au (g/t)**	**Target**
CHRC3051	132.0	136.0	4.0	3.40	1.16	Mag Hinge
CHRC3057	193.0	199.0	6.0	3.40	1.17	Mag Hinge

Chirano Drill Hole Results						
Hole ID	From	To	Interval (m)	True Width (m)	Au (g/t)	Target
CHRC3059	126.0	138.0	12.0	8.50	1.60	Mag Hinge
Including	132.0	138.0	6.0	4.20	2.39	Mag Hinge
CHRC3059	151.0	157.0	6.0	4.20	1.11	Mag Hinge
CHRC3060	114.0	132.0	18.0	12.00	1.00	Mag Hinge
CHRC3061	114.0	145.0	31.0	24.00	1.21	Mag Hinge
Including	115.0	125.0	10.0	7.70	1.96	Mag Hinge
CHRC3064	116.0	123.0	7.0	5.50	3.99	Mag Hinge
CHRC3071D	153.0	156.0	3.0	2.00	2.45	Mag Hinge
CHRC3071D	253.8	255.3	1.5	1.00	2.01	Mag Hinge
CHRC3072D	166.8	169.0	2.2	1.60	1.05	Mag Hinge
CHRC3072D	179.9	184.0	4.1	3.00	1.67	Mag Hinge
CHRC3105D	65.3	68.4	3.1	2.80	0.96	Aseda
CHRC3106D	125.5	136.4	10.9	8.20	3.29	Aseda
Including	128.9	133.3	4.4	3.30	5.12	Aseda
CHRC3108	117.0	123.0	6.0	4.10	1.28	Aseda
CHRC3108	223.0	226.0	3.0	2.00	0.90	Aseda
CHRC3108	240.0	246.0	6.0	4.10	0.61	Aseda
CHRC3109D	25.0	35.0	10.0	2.00	1.43	Aseda
CHRC3109D	51.8	58.0	6.3	1.20	0.97	Aseda
CHRC3111D	97.0	103.0	6.0	5.00	2.27	Aseda
CHRC3111D	136.0	144.7	8.7	7.20	1.48	Aseda
CHRC3119D	554.2	563.8	9.7	6.50	1.12	Sariehu
CHRC3119D	590.0	628.0	38.0	25.80	1.64	Sariehu
Including	597.0	607.0	10.0	6.80	3.43	Sariehu
CHRC3158	116.0	117.0	1.0	1.00	3.71	Bokaso South
CHRC3159	5.0	11.0	6.0	4.80	0.90	Bokaso South
CHRC3159	65.0	67.0	2.0	1.80	2.94	Bokaso South
CHRC3160	12.0	18.0	6.0	5.60	2.37	Bokaso South
CHRC3160	47.0	48.0	1.0	1.00	1.79	Bokaso South
CHRC3160	61.0	62.0	1.0	1.00	3.62	Bokaso South
CHRC3160	68.0	70.0	2.0	1.80	1.40	Bokaso South

10.4 Drilling Procedures

The QP was able to investigate the various standard procedures present that document the logging and sampling protocols implemented by the site team and drilling contractors for both the diamond drilling and RC drilling activities. The procedures are designed to ensure that data is collected in a manner acceptable for feasibility level studies and to satisfy CIM NI43-101 regulations and standards. Some of these protocols are summarised below and additional information regarding sample preparation and analysis is covered in Section 11.

10.4.1 Drill Hole Location and Rig Setup

Micromine Software is used to plan required collar positions. Coordinates are and azimuths are given to the survey department. If impediments to the initial site exist, then alternative more suitable collar positions are created. The collar is pegged by the surveyor and the coordinates recorded using a survey Total Station theodolite.

Drill rigs are then aligned on the drill pad and azimuths checked using the Total Station or gyro azimuth aligner. The dip is carefully checked by the geologist and drill technician. The geologist then records the hole into the DHLogger software.

10.4.2 Drill Hole Logging and Core Recovery Measurement

Core from the field or from underground is transported to the core shed. Logging is started after the meter marks, drill run measurements and orientation has been completed by the relevant Geotechnicians. This information is loaded directly into DHLogger. The ideal order of logging is as follows:

- Lithology – major rock types
- Rock description – done as core arrives to feed directly into Micromine to ensure hole depths are maintained and no unnecessary overruns occur
- Rock quality -RQD and recovery data is recorded
- Structure – alteration, structural event and description, veining, magnetic susceptibility.

Markings for cutting and sampling are done by the logging geologist after all information has been input into DHLogger. The markings take into consideration the following:

- Lithological contacts – contacts not crossed for samples
- Alteration - separate altered from un-altered core samples
- Sample intervals – between 0.5m and 1.0m.

All samples, core and QC, are marked with unique sampling numbers captured directly in DHLogger.

Core recoveries are calculated at the drilling site by qualified technicians and recorded in the geological logs. The core is transferred from the trays and pieced together on a V-rail (angle iron) rack and the recoveries calculated. The recording of recoveries is the responsibility of the geologist. Core recoveries are typically more than 95%.

10.4.3 Geotechnical Logging

Data of the drilling blocks is recorded in the geotechnical logging form by the logging geologist. He then verifies that the blocks are marked in the box trays and checks the run length data. The geotechnical characteristics of the rock mass are recorded to provide all necessary data for rock mass classification schemes.

Logging records include:

- Depth from/to
- Core diameter
- Recovery
- Rock quality designation
- Lithology
- Alteration
- Defects
- Origin
- Alpha, beta
- Planarity, roughness
- Infill type and thickness
- Hardness
- Broken zone

10.5 Factors Influencing the Accuracy of Results

The Author is of the opinion that the drilling programmes have been undertaken by Kinross as previous owners and operators of Chirano Gold Mine have done so according to strict industry standard protocols and under the experienced supervision of qualified and experienced geological mine personnel and Senior Mining Executives.

Drilling is carried out currently by Geodrill Limited (a TSX listed company), a leading exploration drilling company with operations in two continents and vast experience in Africa, in particular Ghana. It has a fleet of 71 world class surface and underground drill rigs and is operated by experienced professional drill crews.

The data generated, historically and currently, is considered suitable for incorporation into currently utilised geological models and MREs. The drilling programmes have been and continue to be intelligently planned to be appropriate for the nature and style of mineralisation. No recovery factors are likely to impact the accuracy or reliability of reported results.

11. SAMPLE PREPARATION, ANALYSIS AND SECURITY

The QP from Snowden Optiro was introduced to all the sample preparation, analyses and security protocols during the site visit and these are discussed briefly in the section below.

***Note**: All Figures and Tables contained in this section have been created by Snowden Optiro in the process of the estimation of the Resources.*

11.1 Sampling Procedures

The markings for cutting and sampling are conducted by logging geologists after logging is completed. The markings take the following factors into consideration:

- Lithological contacts (there is no cross lithological sampling);
- Alterations (unaltered core is not sampled in the same interval with an altered core); and
- Sampling intervals are ≥0.5 m and ≤1 m.

11.1.1 Core Photography

All exploration core is photographed prior to cutting and sampling by a digital camera with high resolution to allow later review of core blocks, lithology, and structure. The photos are taken on each box (wet and dry). For efficiency and consistency, a standard setup that gives a consistent frame, camera mount is arranged. The captured photos include hole number, box number, approximate drilled interval and scale and are stored electronically in the exploration network drive. Once the photos for a particular hole are completed, the core shed supervisor/assistant downloads them immediately and conducts a quality control exercise to make sure that they are of good quality before cutting commences. An example of a photographed core is shown in Figure 11-1.

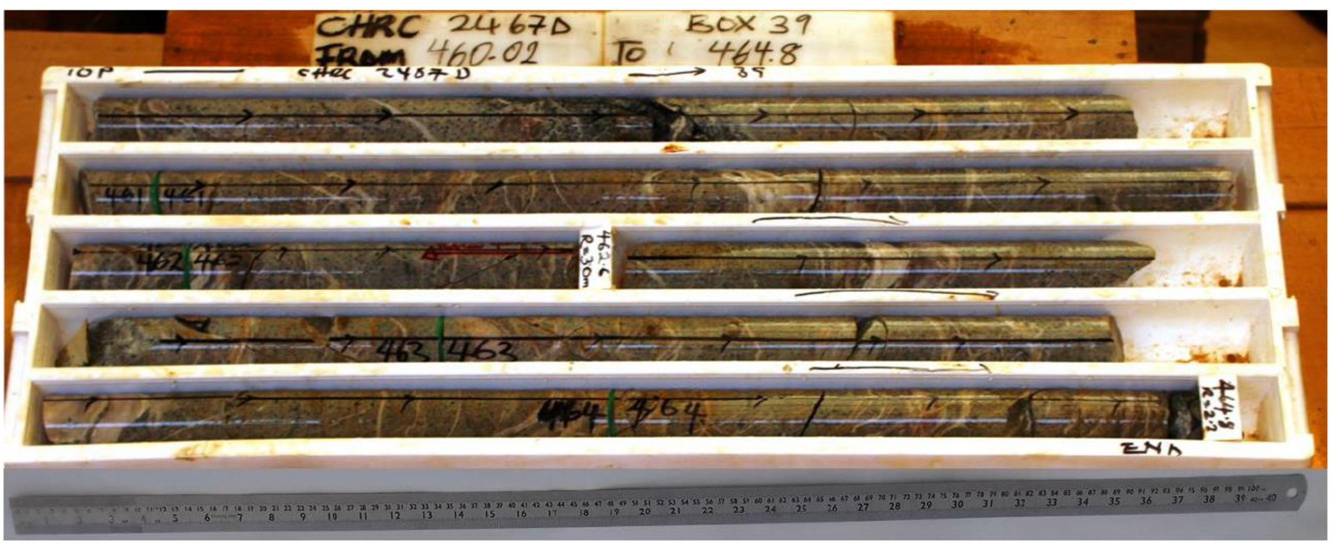


Figure 11-1: Example of Photographed Core

11.1.2 Core Cutting and Core Sampling

Core cutting is carried out along the temporal cutting line which is parallel to the orientation line on the core. The core is then split into two equal halves.

Sampling is carried out by the logging geologist on the marked intervals on the half core that does not contain the orientation line and broken into the sample bag. The sample bag is labelled with a unique sample number and one of the two paper sample tickets containing the sample number placed in it, whilst the other is stapled onto the sample bag. The drillhole ID, interval, sample type and requested analyses are then recorded on the sampling sheet. The other half core is retained for future reference. In the case of a duplicate interval, the other half core is sent for sampling and no core for that interval is left in the box.

The marked intervals including QC samples are assigned unique sample numbers, captured directly in DHLogger and printed for the cutting crew to guide in cutting and sampling.

11.1.3 Quality Control Insertion

Insertion of QC samples is carried out by either the core shed supervising geologist or the logging geologist who ensure that any samples submission to the laboratory contain control samples i.e., standards, duplicates and blanks. Sampling sheets include the names of the Geologist and Senior Technician supervising the sampling and the sample bags are clearly labelled with the sample numbers and the duplicate sample numbers with a ticket from the ticket book placed in them. Serial numbers of standards inserted are attached to the corresponding ticket stub in the ticket book to provide a record of the inserted standard. Bulk sample bags are clearly labelled with the hole number and sample interval.

The standard identification sticker is removed before insertion and its ID written on the sample sheet. The records of submission are kept on the exploration network drive as soon as the samples are dispatched to the laboratory.

Standards reference material (SRM) samples and blanks are added to all sample batches for both RC and DD according to the following procedure:

- RC drilling standards are inserted at every 60th sample and blanks at every 40th sample; and
- DD drilling standards and blanks are inserted within every 40 samples;

Aside accuracy, consistency check on sample assay is achieved via field duplicates and is taken as follows;

- RC drilling field duplicates are taken every 25th sample where duplicates comprise splits of the same sampling interval. The splits are bagged separately with separate sample numbers so as to be blind to the laboratory; and
- DD field duplicates are taken every 20th sample and are based on half core.

11.1.4 RC Splitting, Sampling & QAQC

The RC chip samples are homogenized, prior to final splitting, by passing them through the splitter and then recombined into a large bag. This helps reduce sampling error and improve precision. After splitting with a riffle splitter, each sample is then collected from the cyclone using a large plastic bag marked with hole ID and sample interval where it is the weighed and the sample bag sealed. The riffler splitter is cleaned thoroughly after each sample.

The preferred method of splitting and original/duplicate sampling is as shown in Figure 11-2.

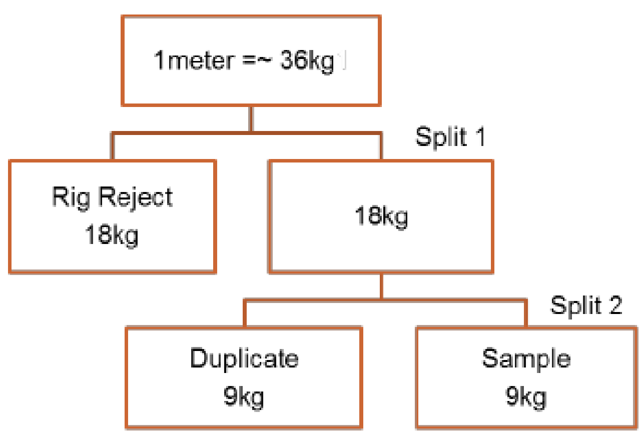


Figure 11-2: Preferred Method of Splitting and Original/Duplicate Sampling

In the event of wet samples, two splitters are used, and one splitter rinsed with fresh water while the other is in use. Each sample alternates the splitter used and is split with a clean splitter to prevent contamination.

For bulk sampling (coarse rejects), the remaining bulk samples are organised neatly and in order near the drill rig with the open top turned down to prevent contamination. Once QAQC has passed, the bulk samples are disposed of with bags brought to the waste dump under the instruction of the supervising geologists.

11.2 Sample Preparation and Analysis

The primary laboratory used to analyse Chirano samples is ALS Chemex (ALS) located in Kumasi some 120km from Chirano Mine Site whilst Intertek laboratory serves as the secondary laboratory, located in Tarkwa. Snowden understands that for 5-6 years SGS was the primary laboratory whilst Analabs Laboratory was used as the secondary, “check” laboratory. Both are independent laboratories located in Tarkwa.

Registration and accreditation of the laboratories are as follows:

- ALS is currently accredited with SANAS for ISO17025. Accreditation No. T0747
- Intertek is currently accredited with SANAS for ISO17025. Accreditation No. T0796
- SGS is currently accredited with SANAS for ISO/IEC17025. Accreditation No. T0638
- Analabs is currently accredited with accredited with ISO/IEC17025

RC samples are collected in pre-numbered bags at the drill rig and checked at the core shed. Locations for standard and blanks are pre-marked and standards and blanks are added to each batch prior to submitting at the core shed. DD core samples are logged and bagged at the core shed. The laboratory collects the samples, and the laboratory personnel checks the samples, reconciles with site personnel and then signs as received. Digital copies of the assay certificates received from ALS laboratory are stored in the Fusion database on a main server and backed up on portable drives. Hard copies of original assay certificates are stored at the mine. All RC and DD core samples submitted to the laboratory for analyses weigh about 2 to 3 kilograms on submission. The entire sample is oven dried then pulverized to P90 -75µm with 50-gram charge Fire Assay and AAS (atomic absorption spectroscopy) finish. The Chirano team visited the primary laboratory, ALS twice in 2021. The team visited Intertek Laboratory; the secondary laboratory used for umpire check analysis in 2021.

11.3 Quality Analysis and Quality Control Procedures

Chirano Exploration routinely submits pulp samples called from ALS to Intertek laboratory in Tarkwa. SRM to monitor ALS laboratory were obtained from Rocklabs Ltd of New Zealand and Geostats Pty Ltd in Australia while, blanks are in house prepared from barren Kumasi basin granites.

Snowden conducted spot checks on the QAQC data and will provide general comments on the efficacy of the Chirano QAQC system as it relates to the quality of the information with the projects areas under review. Snowden reviewed the data provided, an agglomeration of all the QAQC data from project areas, Akoti, Akwaaba, Obra, Paboase, Suraw, Sariehu, Mamnao and Tano:

- The results of the analyses of duplicates compared to original assays;
- The analyses of blanks; and
- The reproducibility of the values of the SRMs.

11.3.1 Standard Reference Material Analysis – Period 2013-2021

Snowden was provided with QAQC data for the period 2013-2021. During this period SRMs were included in the Chirano drilling campaigns at regular intervals as discussed in Section 11.1.3. Up to 78 different SRMs were used in the drilling campaigns to analyse 3,949 samples.

The SRMs, with expected gold values ranging from 0.077g/t to 18.17g/t, were used during the programme and were included in each dispatch to the laboratory. The SRMs provide a good indication of the overall accuracy and precision of each batch of analytical results.

Snowden also monitored the bias of the sample set relative to the SRM average value, by taking the difference between the SRM value and assay mean values over the SRM value and expressed as a percentage.

Snowden has conducted spot checks and analysed the overall performance of some of the SRMs, illustrated in **Error! Reference source not found. Error! Reference source not found.**. The summary table (Table 11-1) shows the Rocklabs certified value versus the calculated mean, standard deviation and bias for the data.

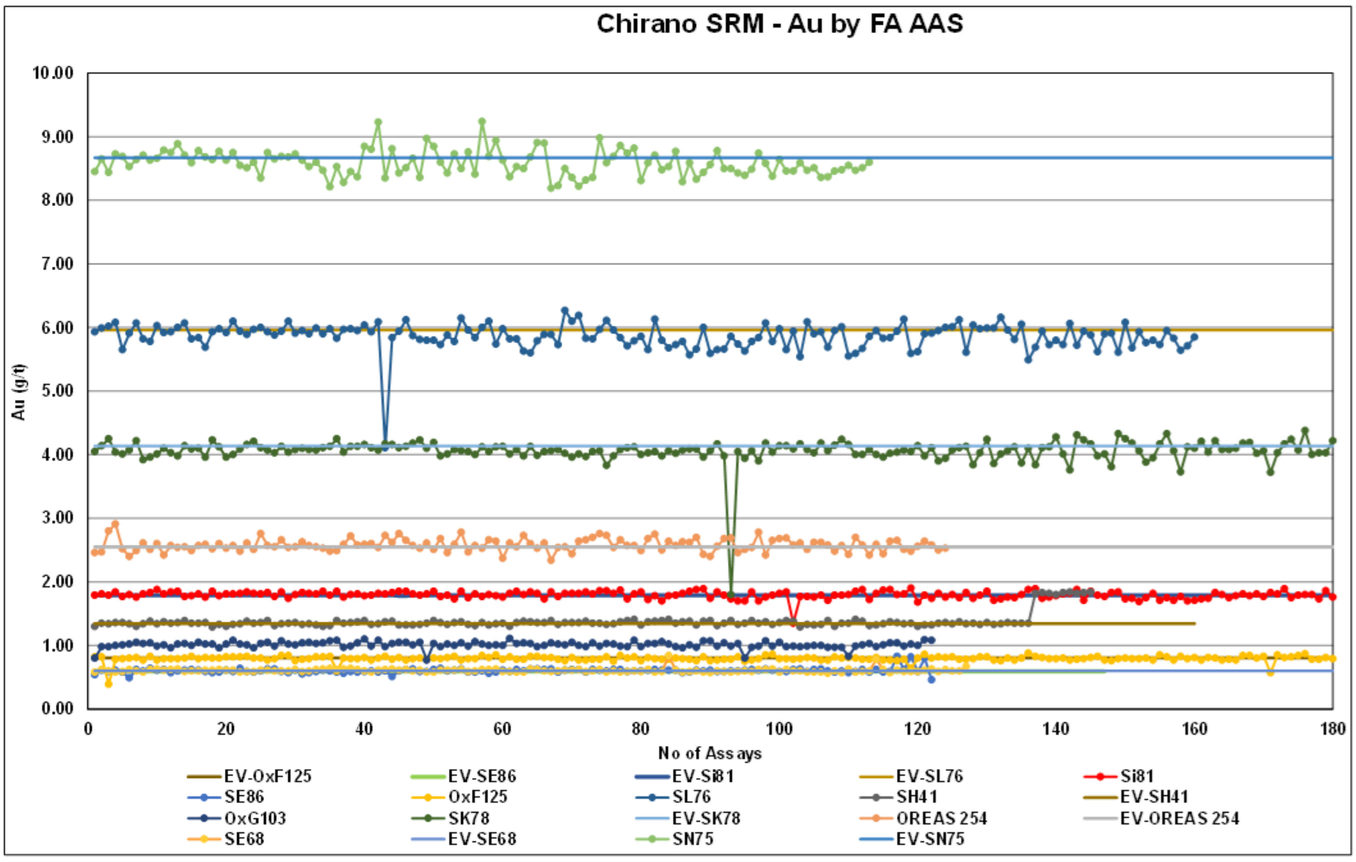


Figure 11-3: SRM Analyses

Table 11-1 Chirano CRM performance summary

Standard ID	Expected Au	Expected SD	No. of Samples	Mean Au	SD	CV	Mean Bias
Si81	1.79	0.030	400	1.78	0.113	0.064	-1%
SE86	0.60	0.015	147	0.60	0.040	0.066	1%
OxF125	0.81	0.020	245	0.79	0.045	0.056	-1%
SL76	5.96	0.192	160	5.86	0.209	0.036	-10%
SH41	1.34	0.041	145	1.38	0.118	0.086	4%
OxG103	1.02	0.028	145	1.01	0.048	0.048	-1%
SK78	4.13	0.138	215	4.06	0.191	0.047	-7%
OREAS 254	2.55	0.076	124	2.58	0.098	0.038	3%
SE68	0.60	0.013	127	0.61	0.032	0.053	1%
SN75	8.67	0.199	113	8.59	0.197	0.023	0%

Observations from Table 11-1 show a low bias of the sample set relative to the SRM average values indicating a good overall accuracy and precision of each batch of analytical results with the exception of SRM SL76 and SK78 that have outliers.

11.3.2 Blanks Analyses

As the blanks were prepared in-house there is no expected value or SD for analyses of the blank sample results, Snowden has assumed the detection limit of 0.001% and an acceptable maximum value, at 0.01%, a factor 10 times (10x) the detection limit for the AuAA26 analytical methods for the analyses of blank samples for Au. Although, Snowden is of the opinion that a 20-x multiplier for the upper detection limit is high, Snowden has also included a comparison of the results at an upper limit of 0.01%, which is 10 x the detection limit.

The results of the blank analyses for DD, RC and RC/DD sample analysis are reviewed through a series of plots presented for Au. Comparisons of the actual returned values for blank samples against the upper limits of 0.01% and 0.02% are in Figure 11-4 to Figure 11-6.

The observations from review of the analyses of blanks, Figure 11-4 to Figure 11-6 are:

- For DD blank sample analysis, approximately 7% of 1,341 samples are above the upper limit of 0.02%, while at an upper limit of 0.01%, the percentage increases to 16%;
- For RC blank sample analysis, approximately 3% of 1,230 samples are above the upper limit of 0.02%, while at an upper limit of 0.01%, the percentage increases to 9%; and

- For RC/DD blank sample analysis, approximately 5% of 1.169 samples are above the upper limit of 0.02%, while at an upper limit of 0.01%, the percentage increases to 10%.

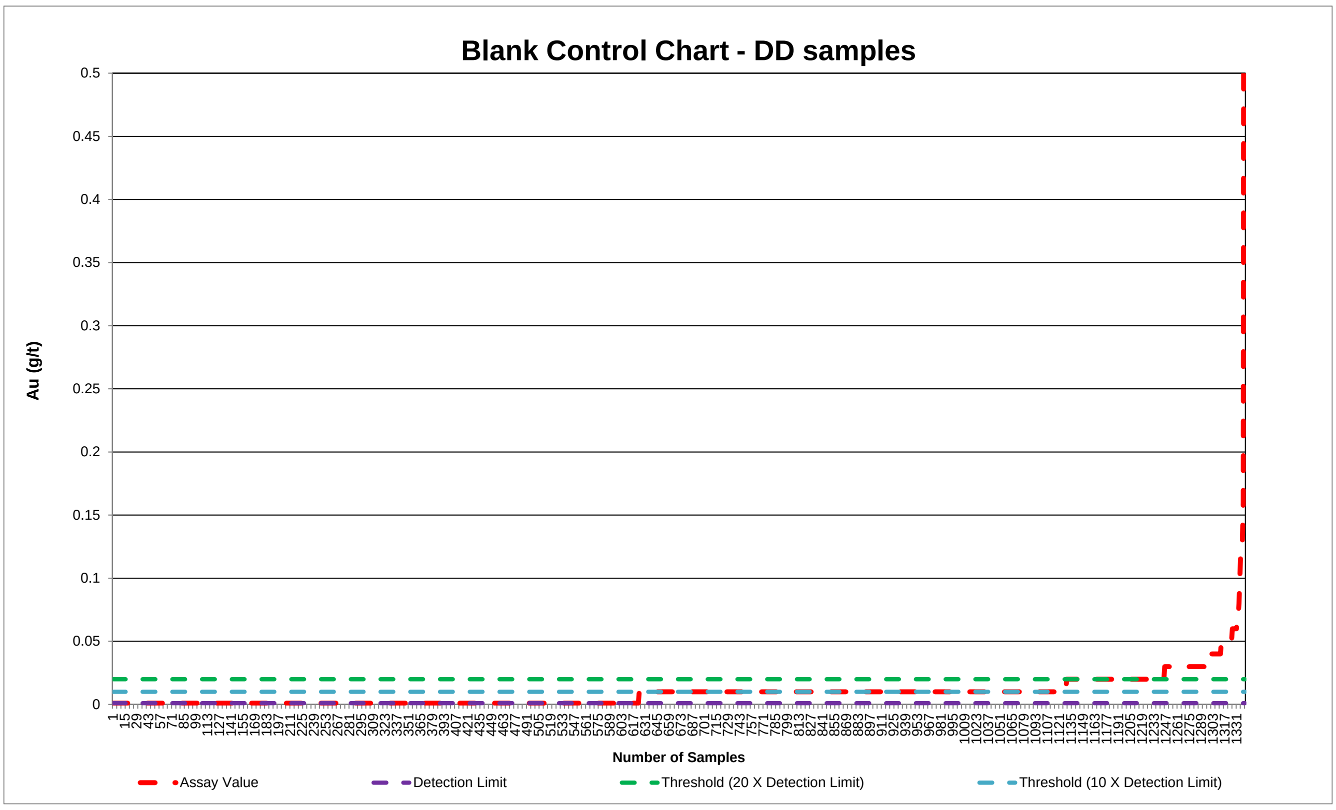


Figure 11-4: Blank Control Chart for DD Samples

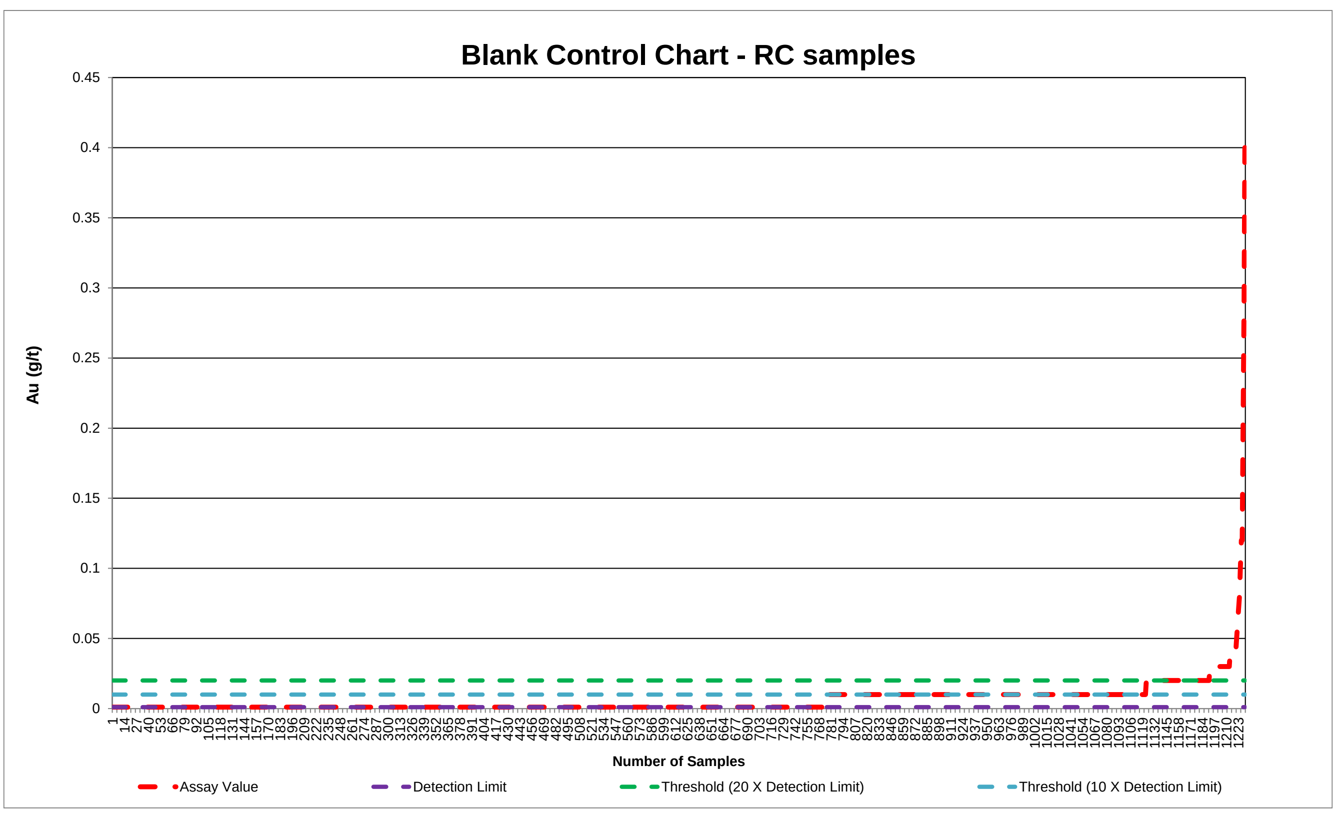


Figure 11-5: Blank Control Chart for RC Samples

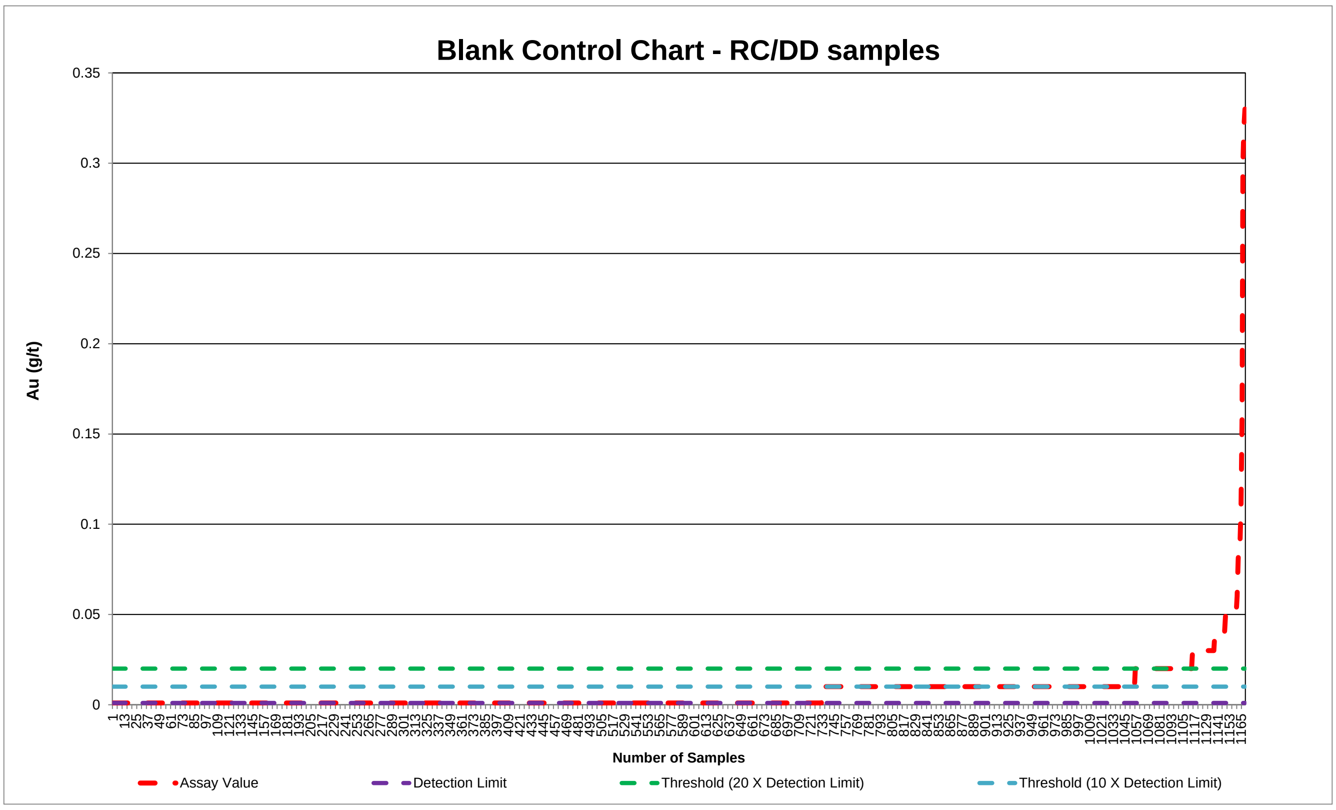


Figure 11-6: Blank Control Chart for RC/DD samples

11.3.3 Duplicate Analyses

For the duplicates, Snowden used scatter plots and Half Absolute Relative Difference (HARD) plots. In each scatter plot the original value is plotted along the X-axis, and the duplicate along the Y-axis. Included is the 45° line and +/-10% error lines around it. A Reduced Major Axis (RMA) linear trend line is also fitted to the data which checks for possible bias.

The HARD plots are based on the comparison of the absolute difference between the original and duplicate assay results divided by the sum of the sample pairs and expressed as a percentage.

According to industry best practices, QA/QC for a gold grade control sampling programme for sound resource estimation are summarised in Table 11-2.

Table 11-2: Best practice QA/QC for a Gold grade control sampling programme for sound resource estimation

QA/QC Action	Rate[k]	Instigator	Key Performance Indicators (KPI) Fine Gold / [Coarse Gold]	
Field Duplicates[a]	1 in 20	Operator	90% ± 10-25% HARD[j] [90% ± 25-50% HARD]	90% ± 13-35% RSV [90% ± 35-70% RSV]
Sample Quality Index[b]	All	Operator	Depends upon sample type; for saw-cut channels >80% For diamond drill core >85% recovery	
Coarse Reject Duplicates[c]	1 in 20	Laboratory	90% ± 10-20% HARD [90% ± 20-50% HARD]	90% ± 13-28% RSV [90% ± 26-70% RSV]
Pulp Duplicates[d]	1 in 20	Laboratory	90% ± 10% HARD [90% ± 10-20% HARD]	90% ± 13% RSV [90% ± 13-28% RSV]
Certified Reference Materials	10in 20	Operator and Laboratory	<2δ ("safe zone") no action required 2δ ("warning") investigate (re-assay 25% of batch if required) 3δ ("action") re-assay 100% of batch	
Blanks[f]	1 in 20	Operator and Laboratory	Less than 0.05g/t Au	
Pulp Quality[g]	1 in 20	Laboratory	95% to be P95 75µm	
Barren Flush[h]	1 in 20-50	Laboratory	<<0.5% Gold Loss	
Umpire Assays[i]	1 in 20	Operator	90% ± 10% HARD	90% ± 13% RSV
Laboratory Audit	Quarterly	Operator	Full adherence to agreed practices and performance levels	
QAQC Review	Monthly	Operator and Laboratory	Compliance across all metrics	

The Snowden review in this report, is based on using all the samples available irrespective of the project.

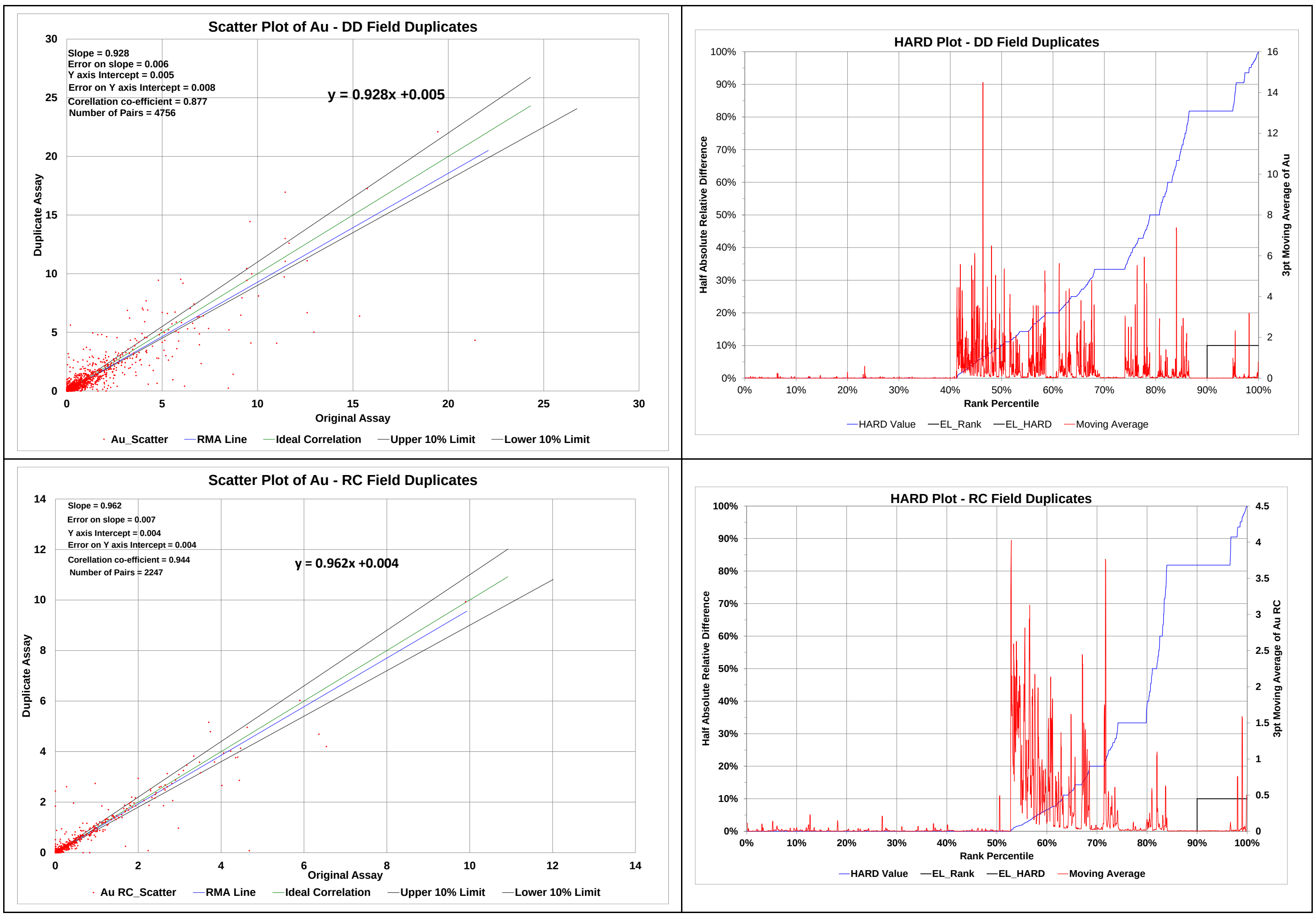


Figure 11-7: Field Duplicate Scatter and Hard Plots for DD (above) and RC (below)

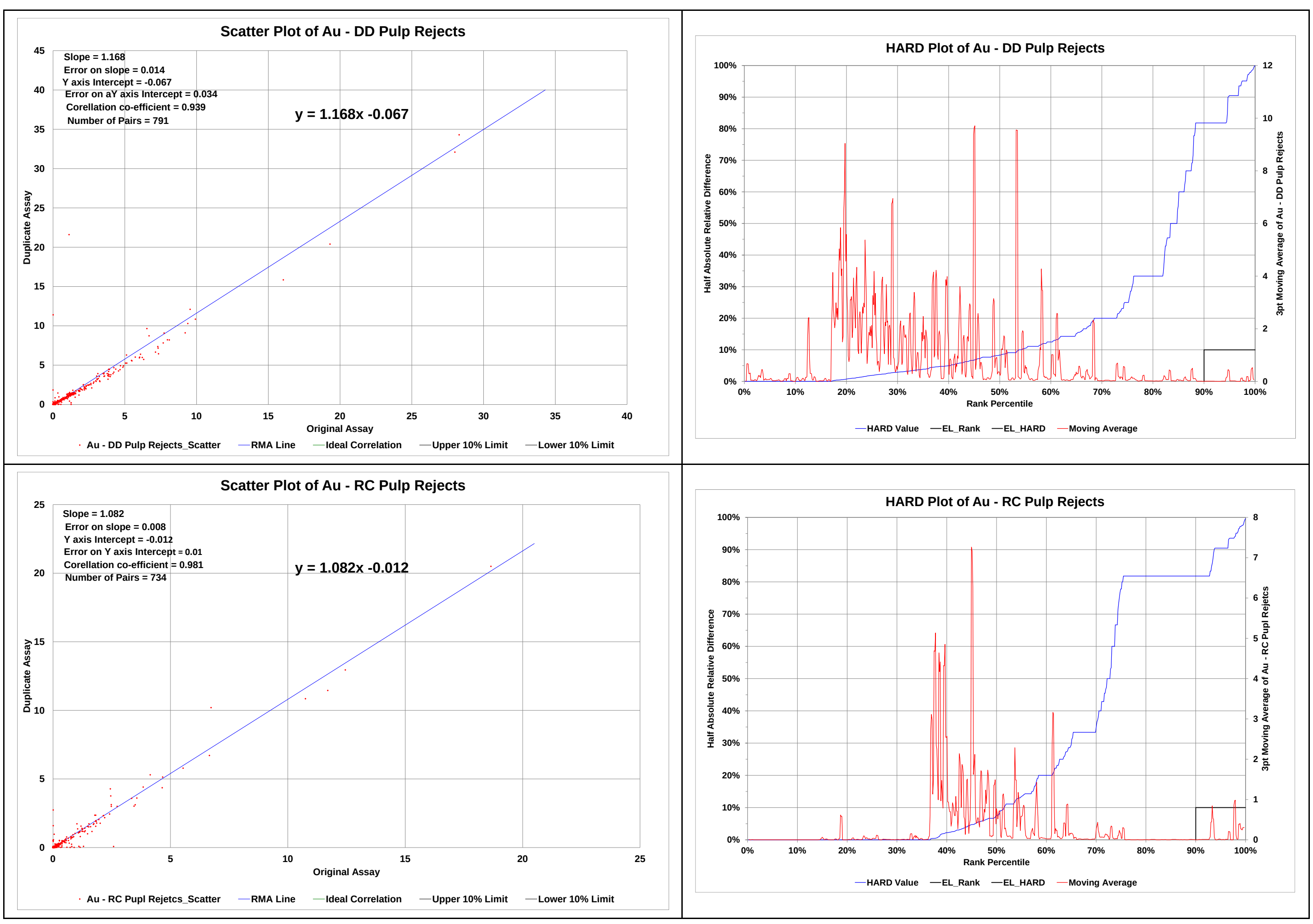


Figure 11-8: Pulp Rejects Scatter and Hard Plots for DD (above) and RC (below)

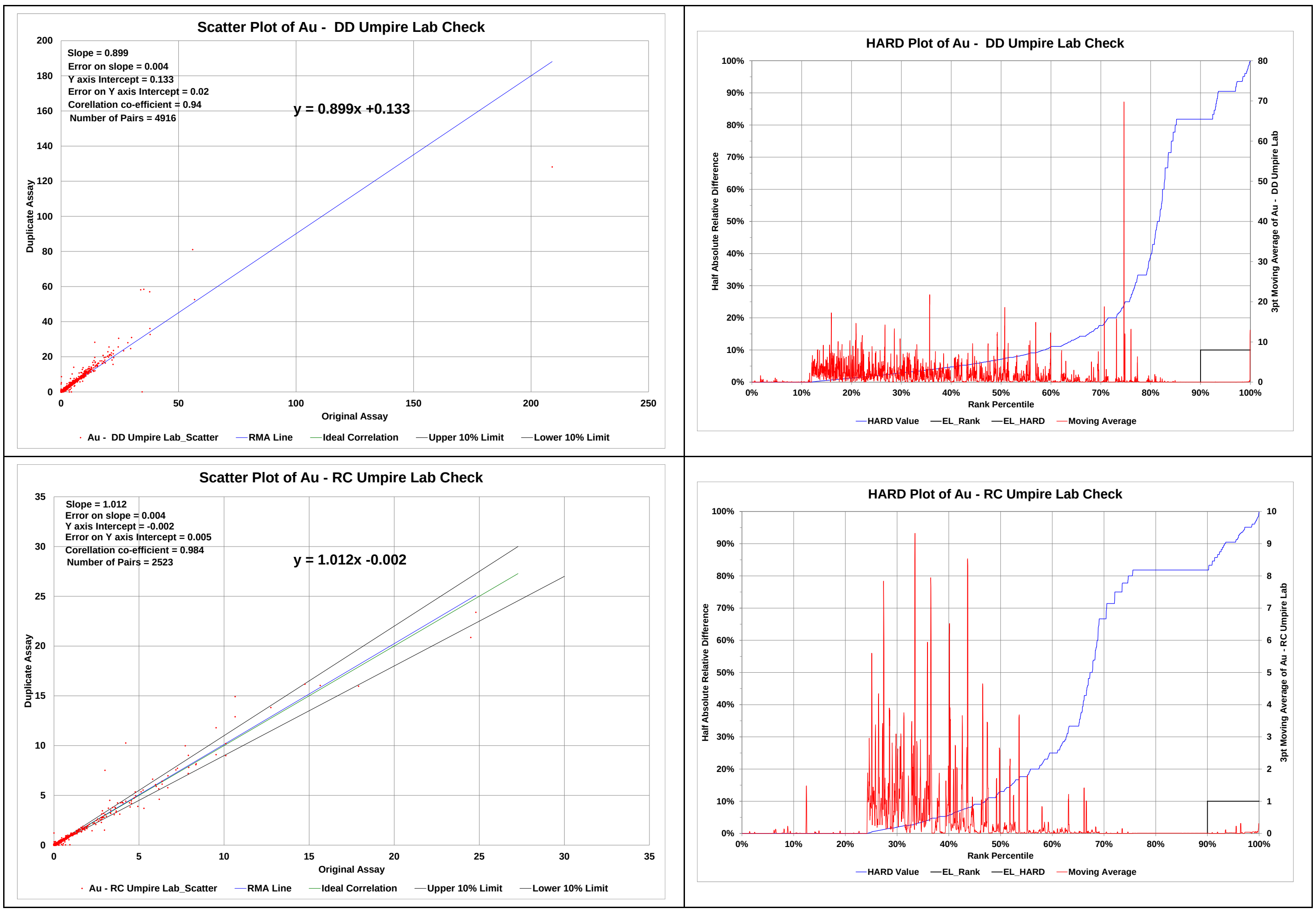


Figure 11-9: Umpire Laboratory Checks Scatter and Hard Plots for DD (above) and RC (below)

From Figure 11-7, the following summary of observations on the duplicate analyses are made:

- Overall, for all the assays, the field, pulp rejects and umpire laboratory duplicate analysis, shows that there is positive and strong correspondence between the original and duplicate assays for Au;
- Overall, the correlation coefficients are close to 1, and the slope is close to 1, indicating good repeatability of the laboratory performances;
- The HARD plots for the field duplicates show that for DD about 60% of the sample pairs have deviations of 20% or less, while for RC, approximately 70% of the sample pairs have deviations of 20% or less;
- The HARD plots for the pulp rejects indicate that for DD about 70% of the sample pairs have deviations of 20% or less, while for RC, approximately 60% of the sample pairs have deviations of 20% or less; and
- The HARD plots for the umpire laboratory checks indicate that for DD approximately 73% of the sample pairs have deviations of 20% or less, while for RC, about 56% of the sample pairs have deviations of 20% or less.

The performance of the SRMs, blanks, and duplicates have all been evaluated. It is the opinion of the QP that the overall assessment of the quality control data is positive and provides confidence in the veracity of the gold assays used in the Mineral Resource estimate.

11.4 Data Management

All data and interpretative inputs to the Chirano Mineral Resource estimates have been checked and verified in accordance with a range of SoPs. Core is logged directly in DHLogger using motion tablets or laptops. This is done as soon as the core becomes available, in this way the data can be immediately exported from DHLogger and imported into Micromine to be able to create sections. DD core is then marked up, and photographed with geology, bulk density, and geotechnical information. All logging and assay data is stored in a Fusion database, to which login and access permissions are limited to control access and to maintain integrity of the resource data. Data access is generally limited to the geologists and database administrators.

The Fusion database management system has several inbuilt data validation checks that run when data is imported. Any discrepancies in the data return an error and must be corrected before the database will accept the new information into the system.

11.5 Bulk Density

It is stated in the 2021 Year End Mineral Resource and Mineral Reserve Report which was compiled by the Company that a total of 277 bulk density measurements were done to calculate mean density values for resource tonnage reporting for the feasibility study in Year 2003. These density determinations were carried out using Weight and Calliper Method (154 measurements) and Water Immersion Method (123 measurements). Snowden understands that the density data were reviewed by RSG Global and mean values of 1.56t/m^3 for completely oxidised rock, 2.30t/m^3 for partially oxidised rock and 2.75t/m^3 for fresh rock were considered appropriate for all the Chirano prospect areas. Densities of the transition can be difficult to assess as the transition is often characterized by boulders of fresh in partially to fully oxidized surroundings. Another 80 samples were tested for the Paboase underground on both footwall and hanging wall samples using the water immersion method. Snowden understands that an outside laboratory (KONAMA CONSULT) in Bibiani carried out the analyses. Tests indicated an average of 2.75t/m^3 for the Paboase mineralised material. For Paboase all blocks were assigned a default in situ bulk density of 2.75t/m^3. Density values in the updated resource models were assigned 1.56 t/m^3 for oxide and 2.75t/m^3 for fresh rock including mineralised material and waste. The oxidation surface represents the bottom of complete oxidation (BOCO). A transition zone between the two surfaces was assigned a density of 2.3t/m^3. Snowden understands that Chirano's site management team believes the density data and surfaces used to define density in the block models for Chirano to be of acceptable quality for resource estimation.

Snowden was supplied with the historical density database which is summarised in Table 11-3.

Table 11-3: Historical Density Database

Weathering	Oxidation	No. of Samples	Density (t/m^3)
Fresh	Partial	11	2.72
		2477	2.74
Total/Average		**2488**	**2.74**
Highly Oxidised	Oxidised	143	1.56
		143	1.56
Moderately Transition	Oxidised	6	1.54
	Transition	49	2.32
Total/Average		**55**	**2.19**
Slightly Primary	Partial	11	2.73
	Transition	30	2.54
Total/Average		**41**	**2.59**

Snowden can confirm that the density determination process that was conducted is appropriate for the deposit type and is consistent with industry best-practice.

11.6 Security Sampling Governance

All samples are sealed after bagging and delivered to the laboratory as soon as practically possible. The Company's sampling governance and chain of custody requires that each sample to be submitted to the laboratories is accompanied by a sample submission list that also serves as a sample advice sheet with instructions for analysis. The laboratory is notified of samples that are ready for delivery. Upon receipt of the samples, the laboratory representative cross-checks all samples against the submission list to confirm the names and number of samples they are receiving. All submission lists are managed in duplicates with signed copies scanned and saved electronically.

11.7 Author's Opinion

The QP from Snowden was introduced to all the sample preparation, analyses and security protocols during the site visit and these have been discussed in the section above.

It is the opinion of the QP that the adequacy of the sample preparation, security, analytical procedures for the Chirano Gold Mine deposits under investigation are acceptable for use in Mineral Resource estimation.

12. DATA VERIFICATION

The QP from Snowden Optiro, responsible for the audit and validation of the Mineral Resources, conducted a site visit to Chirano mine during the period 4th – 6th May 2022 and as part of the site visit carried out the following:

- Drillhole site inspection where drilling was currently underway in one of the pits where Resource definition drilling was being conducted;
- Visual inspection of historical and new drillholes at the core shed/yard;
- Observed the logging, marking, photography, cutting and sampling of core;
- Inspected geophysical plans on site;
- Inspected laboratory assay certificates as received from the laboratory and performed spot checks to compare with captured assay results in the database provided in the data room;
- Drove around the pits which are currently being mined.

With a printed version of the geological, sample and assay logs, the QP was able to assess the correspondence in lithological/stratigraphic depths between the electronic version and the physical core, also confirming that the mineralised intervals according to assays correspond with visual and geological indications of mineralisation. It is the QP's opinion that the logging/capturing of the details of these variables is generally consistent with the company's protocols.

Lengths of RC holes range from less than 50m to more than 300m while core hole depths range from 180m to 1 480m. Drilling has been carried out using industry standard equipment and procedures. Drillhole collar locations were marked by a surveyor in the field and picked up after drilling. Sampling length for both RC is 1 meter and diamond core is between 0.5 and 1.5 meters based on the alteration, mineralisation and geology contacts, with RC recoveries and core recoveries recorded.

Data validation includes drilling, logging, sampling, assaying, QAQC and database management. Century Systems (Fusion) is the database management system that is used to store all exploration data which includes, drilling, logging, sampling information etc. Snowden understands that the system was setup in 2006. Data imported electronically from the Core Logger software undergoes built-in validations to check for logging continuity, missing information and other basic checks. The QP found the SoPs to be robust and appropriate for sample storage and security.

Snowden has reviewed a random selection of original borehole logs, sampling records and analytical results and compared them to the corresponding data contained within the geological database (GDE) as well as the geological model. Snowden is satisfied that the original data has been adequately transferred to the electronic database and that the processes and techniques used to validate the geological data prior to constructing the geological model are appropriate and have been correctly applied.

Snowden reviewed the Company's SoPs and it is in the QP's opinion that the Company has produced comprehensive procedure manuals, including SoPs for all activities. Snowden also reviewed previous audits undertaken by the Company both internal and external audits with respect to drilling, and sampling to verify that the data being used in modelling and MRE is of sufficient quality and has been collected with due diligence and have found these all to be of a satisfactory quality to provide confidence in the resulting data.

12.1 Opinion of Qualified Persons

The Company's internal protocols governing drilling, logging, sample preparation, sample analysis, sample security, QAQC, data collection and database management measures applied by the Company and by previous owners of Chirano mine are consistent with industry norms.

It is the QP's opinion that the sampling methods and recoveries are acceptable, meet industry-standard practice, and are therefore adequate for use in the Mineral Resource estimation (MRE) process.

The QP notes that no deficiencies (be it material or immaterial) have been identified specific to the sampling governance system in place and the QP's own review of the SoPs indicates reliability in the governance system. The QP is of the opinion that the Company's data is appropriately captured and stored and that adequate checks are done to verify the accuracy of the data used for Mineral Resource estimation and mine planning and are thus adequate and sufficient to allow the estimation of a Mineral Resource.

13. MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

Under the origination of Redback Mining the Chirano plant has been in commercial production since 2005. Test work would have been done in the original feasibility studies to establish the process design parameters for the engineering of the process plant. The feasibility study test work does not require assessment.

13.2 Historical Summary of Test Work

Post commercial production in 2005 some additional test work had been initiated by Redback Mining. After the acquisition of Chirano Gold Mines Limited (CMGL) by Kinross in 2010 numerous test work programs were undertaken on the ore resources within the Chirano mine. These test reports have been reviewed. The gold recoveries and associated gold head grades from these test reports have not to been used for the declaration of the existing Chirano plant's performance.

A historical summary of this test work will be covered under comminution, mineralogy and metallurgical.

13.3 Comminution

The results of the comminution test work from 2010 to 2017 have been summarised from the reports.

SMC Test Report, JKTech Job No. 15001/P4 – December 2014
Samples tested were Akoti Comp and Paboase Comp. The test results showed A x b values ranging from 28.9 to 39.2 averaging 34 and classified the ores as hard to moderately hard.

SMC Test Report, JKTech Job No. 16001/P8 – February 2016
Five samples were tested from the Suraw Project, namely Deep Comp, Lower Comp, Middle North, Middle South and Upper Comp. The results showed A x b values ranging from 32 to 36 and classified the ores as predominantly hard.

SMC Test Report, JKTech Job No. 16001/P9 – February 2016
Three samples were tested from the Mamnao Project, namely MAM 01, MAM 02, and MAM 03, with A x b values of 65, 80 and 40 respectively and classified the ores as moderately hard to soft.

Philips Enterprises Report, Project 12306– October 2012
Samples tested for crushing and ball work indices were Akwaaba, Paboase, and Obra.

Table 13-1: Philips Enterprises, Project 12306, October 2012

Deposit	CWi (kWh/t)	BMWi (kWh/t)	Abr. Index
Akwaaba	8.01	16.28	0.4295
Paboase	8.63	14.95	0.4913
Obra	11.39	14.81	0.4096

Metcom Technologies Grinding Survey Report – February 2017

Main points from the grinding survey:

- Short-circuiting in the primary mill can be prevented by blocking the outer rows of the grates or by the conversion to an overflow discharge
- The primary mill has sufficient motor power to increase the charge level but the load on the mill shell and drive gear could be the limitation
- 100mm media is sufficient for the primary mill but 90mm and 80mm ball sizes should be tested
- Lowering the cyclone feed density will improve the classification
- Both secondary mills should operate will smaller media at a 50/50 mix of 60mm/40mm steel balls to improve grinding performance
- Pebble crushing in a ball mill circuit is not common practice. The primary mill is grinding the coarse particles efficiently.

AMMTEC Report A10652 – 2007, Metallurgical Testwork, Primary Ore from the Akwaaba Deposit,
Bond ball mill BWi 17.7kWh/t and SMC test A x b 40.36.

AMMTEC Report A12367 – 2010, Metallurgical Testwork, Composites from the Paboase Project,

Table 13-2: AMMTEC Test Work, Composites from Paboase, A123676

Deposit	RWi (kWh/t)	BMWi (kWh/t)	Abr Index
Paboase	22.25	16.33	0.7234

ALS Report A16203 – 2015, Composites from Paboase and Akoti

Table 13-3: Metallurgical Test Work, Composites from the Paboase Project

Deposit	RWi (kWh/t)	BMWi (kWh/t)	Abr Index	A x b
Akoti	22.1	15.8	0.3057	28.9
Paboase	20.2	18.1	0.5123	39.2

13.4 Mineralogy

13.4.1 Quantitative Mineralogical Analysis on Composites, ALS Reports A16829 and A16913 – May 2016

Bulk mineralogy and gold mineralisation was done on composites from Mamnao, Suraw and on an Additional composite.

Mamnao Composite Bulk Mineralogy
Samples MAM01 and MAM02 contain 1% pyrite and 5.6% pyrite in sample MAM03. The pyrite is fine-grained at P80 36µm and poorly liberated (50% classified as well liberated) in MAM01, it is coarser at P80 70µm and reasonably liberated (75% classified as well liberated) in MAM02 and MAM03.

Mamnao Composite Gold Mineralisation
One native gold grain in MAM01, 3µm in size enclosed in pyrite. No gold grains were detected in MAM02, and one gold grain and four gold tellurides were detected in MAM03, finer than 10µm in size locked in pyrite.

Suraw Composite Bulk Mineralogy
Pyrite is about 4% of the mass of each composite. It has a P80 80µm and is reasonably liberated (70% classified as well liberated).

Suraw Composite Gold Mineralisation
Native gold is the main gold phase detected. A variable number of gold grains were detected between 3 and 38 across the composites. Most of the gold grains were between 1µm and 10µm in size and occur in pyrite. Larger gold grains detected between 15µm to 25µm in size can account for 50% of the total gold mass.

Additional Composite Bulk Mineralogy
Pyrite is highly variable across the composites ranging from 0.8% by mass in Phengite to 13.6% in Black Breccia. The P80 of pyrite is also variable in the composites, it is about 100µm in Dolomite, Siderite, Black Breccia and Ankerite, 80 µm in Silver, 65µm in Muscovite and 38µm in Phengite. Pyrite abundance is not directly proportional to the gold grade but is indicative of the gold grade. Pyrite liberation is similar across the composites and classified at 70% well liberated.

Additional Composite Gold Mineralisation
Native gold is the main mineral detected, traces of tellurides and electrum were also detected. 125 grains were detected in Black Breccia composite and a 38µm free gold grain accounted for 15% of the gold mass. 5 grains are about 25µm and another 5 grains are about 15µm, these grains are in pyrite and account for 40% of the gold. The remaining gold grains are 10µm and occur in pyrite particles.

Significantly fewer gold grains ranging from 1 grain in the Ankerite composite to 25 grains in Dolomite. In the remaining composites, gold grains were less than 10µm and occur in pyrite.

13.4.2 Quantitative Mineralogical Analysis on MAM03 Residue, ALS Report A16913 – December 2016.

One cyanidation sample from the MAM03 project was submitted for quantitative mineralogical analysis. The sample was separated into gravity concentrate and gravity tails with a Knelson concentrator.

Bulk Mineralogy
Pyrite is the dominant sulphide and 31% is contained in the gravity concentrate and 4% in the gravity tail. Pyrite in the gravity concentrate has P80 108µm and is well liberated and classified at 89.7% liberation.

Gold Mineralogy in Gravity Concentrate

Nine native gold/electrum grains and 23 gold/silver telluride grains were detected. They are fine, smaller than 10µm in size with most of them smaller than 5µm in size and are exclusively encapsulated in pyrite.

13.5 Metallurgical

13.5.1 Primary Crusher Discharge Ore from the Tano Project, AMMTEC Report A11240 – 2008

Head Grade Analysis

The primary crusher discharge (oxide + primary ore blend) was assayed for the following elements.

Sample	Au (g/t)	Ag (g/t)	As (ppm)	Sb (ppm)	Te (ppm)	S_{total} (%)	$S_{sulphide}$ (%)
Oxide + Primary ore blend	1.78, 1.99	0.8	<10	<5	0.4	0.46	0.42

Test Work Results – AMMTEC REPORT A11240

Gold extraction increased with the fineness of the grind.

Sample	Test	Grind Size	% Gold Extraction @24 hours	NaCN Consumption (kg/t)	Lime Consumption (kg/t)
Oxide + Primary ore blend	HS16299	150 µm	87.79	0.55	0.33
	HS16300	125 µm	89.71	0.65	0.36
	HS163011	106 µm	98.82	0.59	0.38
	HS16302	75 µm	92.54	0.69	0.38

Size by size gold data from the leach residues showed a reduction of gold content in the coarse fraction of the 75µm residue.

13.5.2 Preliminary Heap Leach Amenability Test Work, AMMTEC Report A11885 – April 2009

Test work was done on a bulk sample of fresh low grade open pit ore.

Head Grade Analysis

The composite low grade ore head sample was assayed for the following elements.

Sample	Au (g/t)	Cu (ppm)	As (ppm)	C_{total} (%)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
Low Grade Stockpile Ore	0.89, 0.89	24	<10	2.23	0.12	0.45	0.35

Test Work Results – AMMTEC Report A1185

- Direct cyanidation at 24 hours was done at a grind size of P80 106µm resulting in a gold dissolution of 90.1%
- Comparably a 7-day coarse size crush bottle roll test was done. The best result was a 38.75% gold dissolution with <6.3mm crushed size at a 0.89g/t gold head grade
- The heap leach amenability test work was discontinued.

13.5.3 Metallurgical Testwork, Primary Ore from the Akwaaba Deposit, AMMTEC Report A10652 – 2007

Primary gold ore samples associated with the Akwaaba deposit. Drill core ($^1/_4$ NQ core) intervals (~60 kilograms) were received in January 2007 and the sample intercept details appear in Appendix 1 of the AMMTEC Report A10652. Drill holes CHRC709D, CHRC733D, CHRC722D and CHRC774D were represented.

Head Grade Analysis

The Akwaaba composite head sample was assayed for the following elements.

Sample	Au (g/t)	Ag (g/t)	As (ppm)	C_{total} (%)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
Akwaaba Composite	13.9, 13.2	1.5, 1.6	<10	1.54	<0.03	1.33, 1,35	1.16,1.18

Test Work Results – AMMTEC Report A10562

Direct cyanidation at P80 106µm.

Sample	% Gold Extraction @ hours			Leach Residue (g/t Au)	Calc. Head (g/t Au)	Consumption (kg/t)	
	8	12	24			NaCN	Lime
Akwaaba Composite	90.98	92.58	92.58	0.833	11.2	0.36	0.36

- Flotation at P80 106µm.

Sample	Product	Wt (%)	Gold		Silver		Sulphur	
			Assay (g/t)	Distn (%)	Assay (g/t)	Distn (%)	Assay (%)	Distn (%)
Akwaaba Test HS14592	Concentrate	6.38	210	97.81	19.5	72.68	20.2	97.86
	Tails	96.62	0.833	2.19	0.5	27.32	0.03	2.14
	Calc Head		13.7		1.7		1.31	

Intensive cyanidation of the flotation concentrates at an ultrafine grind (UFG) P80 10µm and 24 hours leach, recovery 99.31%.

Sample	% Gold Extraction @ hours			Leach Residue (g/t Au)	Calc. Head (g/t Au)	Consumption (kg/t)	
	8	12	24			NaCN	Lime
Flotation conc Test HS14984 P_{80} 10 µm	97.19	98.84	99.31	1.45	211	13.51	1.82

- Direct cyanidation of flotation tail.

Sample	% Gold Extraction @ hours			Leach Residue (g/t Au)	Calc. Head (g/t Au)	Consumption (kg/t)	
	8	12	24			NaCN	Lime
Flotation Tail Test HS14987	78.86	82.32	82.32	0.060	0.39	0.25	0.27

- Flotation concentrate UFG intensive leach (Test HS14984) + flotation tail leach (Test 14987), overall gold recovery 98.92%.
- Combined leach UFG concentrate P_{80} 10 µm + flotation tail, gold recovery 98.79%.
- Combined leach "as is" concentrate P_{80} 106 µm + flotation tail, gold recovery 92.96%.

13.5.4 Metallurgical Testwork, Bulk Composite from the Akwaaba UG ore, AMMTEC Report A12304 – 2010

Bulk ore samples from the Akwaaba underground deposit.

Head Grade Analysis

The head sample of the Akwaaba underground ore was assayed for the following elements.

Sample	Au (g/t)	Ag (g/t)	As (ppm)	C_{total} (%)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
Akwaaba U/G ore	10.2, 10.3	1.7	31	3.03	0.07	1.76	1.47

Test Work Results – AMMTEC Report 12304

- Grind optimisation versus direct cyanidation leach time.

Sample	Test #	Grind Size	% Gold Extraction @24 hours	NaCN Consumption (kg/t)	Lime Consumption (kg/t)
Master Composite Akwaaba U/G ore	HS20271	150 µm	79.86	0.64	0.14
	HS20272	125 µm	83.05	0.54	0.14
	HS20273	106 µm	85.64	0.65	0.14

- The bulk of the gold in the diagnostic leach analysis on the Master Composite leach residue was associated with 53% Arsenical and 42% Sulphide, with 95% located with these mineral types.
- The Master Composite was subjected to Flash flotation and gravity concentration upgrade test work. The test result for the Flash concentrate UFG leach + leach tail was a gold recovery of 96.33%. The test result of the Gravity concentrate UFG leach + leach tail produced a lower gold recovery of 83.61%.

13.5.5 Metallurgical Test Work, Composites from the Paboase Project, AMMTEC Report A12367 – 2010

Several samples of half and quarter NQ core and RC chip was supplied from the Paboase Project in Ghana. The samples were combined to produce composites for leach test work, namely L1, L2, L3 and L4. At the end of the leach test work sub-samples from L1 to L4 were combined to produce the Overall composite.

Head Grade Analysis

The head sample of the Akwaaba underground ore was assayed for the following elements.

Sample	Au (g/t)	Ag (g/t)	Sb (ppm)	C_{total} (%)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
L1	6.58, 6.17	0.4	<5	1.82	0.03	1.15	0.99
L2	6.06, 6.00	0.4	<5	2.87	0.03	1.03	0.99
L3	6.16, 6.47	0.6	<5	2.67	0.03	1.10	1.10
L4	6.57, 6.31	0.5	<5	2.50	0.03	1.51	1.46

Test Work Results – AMMTEC Report 12367

- Direct cyanidation leach test work for Composites L1 to L4 at 106µm, leach time at 24 hours and at 48 hours, average gold recovery 87.58% and 88.35% respectively.
- Flotation upgrade cyanidation test work on the Overall Composite. Flash concentrate UFG leach + leach tail, gold recovery 91.88%.

13.5.6 Metallurgical Test Work, Akwaaba Gold Ore Samples, ALS AMMTEC Report A13056 – January 2012.

Three samples from Akwaaba Project were labelled CV14, Akwaaba CV1 and Akwaaba ROM.Akwaaba open pit/UG was composited from CV1 and CV14

Head Grade Analysis

The Akwaaba composite samples were assayed for the following elements.

Sample	Au (g/t)	Ag (g/t)	Cu (ppm)	C_{total} (%)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
Akwaaba ROM	6.36, 5.81	1.0	34	2.55	<0.03	0.96	0.56
Open pit/UG	2.52, 2.51	0.7	28	2.13	<.03	0.92	0.52

Test Work Results – AMMTEC Report A13056

Cyanidation leach time	24 hours	48 hours
• Akwaaba ROM gold recovery	85.74%	86.87%
• Open pit/UG composite gold recovery	90.28%	91.97%

- Gold recovery by leaching was moderate at 24 hours and increased after 48 hours of leaching. Reagent consumptions for lime were in the range of 0.52 to 0.63kg/t and cyanide consumptions were in the range 0.09 to 0.14kg/t.

Flash flotation at P80 250µm

- Akwaaba ROM natural pH gold recovery 95.17%
- Open pit/UG composite natural pH gold recovery 96.47%
- Gold recovery by flash flotation was at the highest at pH10.

Rougher/scavenger flotation at P80 106µm

- Akwaaba ROM natural pH gold recovery 99.83%
- Open pit/UG composite natural pH gold recovery 98.41%
- Rougher/Scavenger gold recovery performance was at natural pH.

Effect of grind on leach of flotation concentrate

- Akwaaba ROM 30µm, best gold recovery 96.50%
- Open pit/UG composite 30µm, best gold recovery 95.74%

- The highest gold recoveries were achieved at 30µm grind size after 24 hours of leaching.

Effect of oxygen and air on the leach of flotation concentrate

- Akwaaba ROM with oxygen, gold recovery 96.14%
- Akwaaba ROM with air, gold recovery 95.84%
- There were minor differences in the recoveries between the oxygen and air sparging test results.

13.5.7 University of Mines and Technology Tarkwa, Diagnostic Leach of Chirano CIL Feed and CIL Tails Sample – 2015

The gold assays of the CIL feed were 1.69g/t and the CIL tails 0.27g/t. Diagnostic leach showed about 90% of the gold in the CIL feed could be recovered, major minerals that held the gold were sulphides, 5% and quartz 3%. The presence of sulphides and quartz was confirmed by the diagnostic results of the tailings with 65.4% and 19.2% respectively, associated with these minerals.

13.5.8 AfriChem, Plant Tails Flotation Test Report, 2016

The sample received was 5kgs of Chirano CIL tails.

Flotation of plant tails at 0.38g/t Au resulted in an average gold recovery of 73.9% at a 1.5% mass pull and an 18g/t Au concentrate grade. The test showed that flotation recovered gold in the sulphide sulphur matrix present in the CIL tails.

13.5.9 Metallurgical Test Work, Mamnao Drill Core Samples, ALS Report A16913 – 2016

101 kilograms of core samples were received from various drill holes and were composited into three composites.

Head Grade Analysis

The head sample of the Mamnao composites was assayed for the following elements.

Sample	Au 1 (g/t)	Au 2 (g/t)	Ag (g/t)	C_{total} (%)	$C_{organic}$ (%)	Hg (ppm)	SG
Mam 01 Comp	0.88	0.48	1.5	1.05	0.03	0.2	2.73
Mam 02 Comp	0.58	0.52	1.5	0.06	0.03	0.1	2.67
Mam 03 Comp	1.40	1.47	3.0	2.58	0.03	0.1	2.78
Mamnao Comp	0.89	n/a	2.0	1.23	0.03	0.1	2.73

Test Work Results – ALS Report A16913

The tests results showed a finer grind of P_{90} 106µm improved the gold recovery by 10% on Mam 01 Comp and Mam 02 Comp, on Mam 3 Comp by 4% after 48 hours.

The low gold recovery of <75% from the cyanide leach tests indicates that finer grinding could liberate 10µm gold from the pyrite as identified in the mineralogy. The diagnostic test work shows that 70% of the gold is free cyanidable and 23-25% of the unrecoverable gold is in the sulphide minerals.

Separate leaching of the flotation concentrates and flotation tails improved the gold recovery by 10% compared to whole ore leaching.

13.5.10 Metallurgical Test Work, Suraw Drill Core Samples, ALS Report A16829 – 2016

The samples were received as 421kgs of NQ core. The quarter core intervals were composited as per instruction.

Head Grade Analysis

The head sample of the Suraw composites was assayed for the following elements.

Sample	Au 1 (g/t)	Au 2 (g/t)	Ag (g/t)	C_{total} (%)	$C_{organic}$ (%)	Hg (ppm)	SG
Upper Comp	3.68	3.67	0.9	3.33	0.03	<0.1	2.81
Middle North Comp	2.46	2.84	1.5	2.40	0.03	0.2	2.79
Middle South Comp	4.14	4.09	0.9	2.43	0.03	<0.1	2.82
Lower Comp	5.61	5.15	1.8	2.97	0.03	0.1	2.85
Deep Comp	3.91	5.86	1.2	2.52	0.03	<0.1	2.82
Deep South Comp	6.15	5.39	1.5	4.83	0.03	<0.1	2.88

Sample	Au 1 (g/t)	Au 2 (g/t)	Ag (g/t)	C_{total} (%)	$C_{organic}$ (%)	Hg (ppm)	SG
Deep Deep Comp	5.20	4.33	1.2	1.62	0.03	<0.1	2.80

Test Work Results – ALS Report A16829

Cyanidation leach time results showed a gold recovery for the composites at 24hrs leach between 85.2% and 93.2%. Leaching kinetics were fast with most of the gold recovered within the first 2hrs of leaching. The results show that varying the grind from P85 106µm to P90 106µm had little effect on the overall gold recovery.

From the diagnostic tests on the composite >89% of the gold is free cyanidable but 5% to 10% of the gold is contained within the pyrite minerals.

13.5.11 University of Mines and Technology Tarkwa, Cyanide Amenability and Size by Size Deportment on Tano Samples – 2018

Four samples were investigated for cyanide amenability. Cyanidation in the absence of carbon resulted in gold extraction in the range of 73-78%. Carbon addition to the cyanidation increased the gold extraction from 86% to 94% with an average of 90%.

Size by size analysis of the residue showed the finer size fractions below 106 µm had a gold distribution in the range of 50-60% while size fractions greater than 106µm had 20-45%. The majority of gold reporting to the tails is in the finer fractions. Significant gold in the coarser fractions has lower amenability to leaching and could contain coarse gold.

13.5.12 Metallurgical Assessment of Chirano Gold Mine Samples, ALS Report KM5800 – 2018

The samples were received as 39 kilograms of quarter core intervals predesignated into seven composites. The Master Composite was prepared from the seven composites.

Head Grade Analysis

The head sample of the Chirano Mine composites was assayed for the following elements.

Sample	Au (g/t)	Ag (g/t)	Sb (ppm)	C_{total} (%)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
Composite 1	6.66	0.8	<5	1.58	0.03	0.34	0.32
Composite 2	2.66	0.4	<5	1.28	0.02	0.54	0.54
Composite 3	2.65	0.6	<5	0.58	0.05	1.11	1.11
Composite 4	3.75	1.2	<5	2.10	0.03	0.99	0.97
Composite 5	4.95	1.0	<5	2.76	0.06	0.79	0.79
Composite 6	2.18	0.6	<5	1.26	0.03	0.91	0.88
Composite 7	4.19	0.9	<5	2.44	0.04	0.98	0.96
Master Composite 1	2.19	0.7	<5	1.75	0.06	0.81	0.79

Test Work Results – ALS Report KM5800

Cyanidation leach tests were done on individual composites samples at P80 106 µm grinds. Overall gold extractions ranged from 87-94% and were complete within 24hrs. The Master Composite had a gold extraction of 90% after 24 hours. Cyanide consumption was 0.4 to 0.5kg/t. Lime consumption was 0.3 to 0.4kg/t.

Addendum ALS KM5800

Bottle roll tests were completed on three composites and two blended composites. The three composites were Master Composite, Composite 4 and Composite 7. The blended composites were Composites 2 and 3 and Composites 5 and 6.

The effect of lower dissolved oxygen was tested which slowed the leaching kinetics. After 48hrs the measured gold extraction was 86-90% with air sparging and with oxygen sparging. Cyanide consumptions increased 0.7 to 1.0kg/t without oxygen sparging compared to 0.4 to 0.9kg/t with oxygen sparging.

13.5.13 Pre-oxidation and Aachen Assisted Leach, Maelgwyn Prop 18/007 – 2018

Chirano supplied Maelgwyn Mineral Services Africa with samples for pre-oxidation test work.

Head Grade Analysis

The head sample of the Akwaaba underground ore was assayed for the following elements.

Sample	Calc Au (g/t)	Measured Au (g/t)	C_{total} (%)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
Akwaaba	6.72	5.72	1.89	0.05	0.27	0.25
Akoti	1.30	1.19	2.14	0.05	0.95	0.88
Mamnao	2.74	2.69	2.25	0.05	1.86	1.69
Paboase	5.87	5.55	2.41	0.05	1.04	0.99
Rehandu	1.11	1.06	0.06	0.05	0.06	0.06
Composite	3.12	3.23				

Test Work Results – Maelgwyn Prop 18/007

The base case leach test results (without shear reactor) versus Aachen pre-oxidation provided the following gold recoveries.

Base Case	**Aachen Pre-Oxidation**
Composite = 85.8% Au dissolution	91.0% Au dissolution
Akwaaba = 89.3% Au dissolution	90.0% Au dissolution
Akoti = 86.3% Au dissolution	93.8% Au dissolution
Mamnao = 66.2% Au dissolution	78.4% Au dissolution
Paboase = 87.7% Au dissolution	94.8% Au dissolution
Rehandu = 86.8% Au dissolution	95.1% Au dissolution

At the cyanide additions for the base case tests and grind size P_{80} 106 µm and 24 hours CIL the Aachen pre-oxidation with 5 passes increased the leaching kinetics and the final gold recovery by an average of 5.3%.

13.5.14 Recovery of gold from two Mamnao Samples, SGS Lakefield Report 16006/001 – 2018

The samples were received as 52 kilograms and composited separately as Fresh and Transition for the test work.

Head Grade Analysis

The head sample of the Mamnao samples was assayed for the following elements.

Sample	Au (g/t)	Ag (g/t)	Te (ppm)	C_{total} (%)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
Composite Fresh	3.42, 3.58	0.7	<4	0.75	0.05	1.07	1.02
Comp. Transition	1.41, 1,47	2.1	<4	0.90	0.05	0.56	0.54

Test Work Results – SGS Lakefield Report 16006/001

Extraction of gold from the Fresh composite ranged from 89.1% at P_{80} 97µm to 91.7% at P_{80} 101µm. In contrast, the gold recovery from the Transition composite ranged from 77.3% P_{80} 114µm to 82.6% at P_{80} 102µm. The cyanide consumption for the Fresh composite tests was triple times higher than the Transition composite test consumption.

Diagnostic leach tests on tailings from the Fresh composite and Transition composite indicated that a portion of gold lost from the initial leach was recoverable by further intensive cyanide leaching conditions. Intensive cyanidation extracted 19.6% of the Fresh composite tailings losses and 17.2% from the Transition tailings losses, equivalent to 2.7% and 1.7% additional gold recovery, respectively. Overall, 5.4% and 13.1% of the gold contained in the Fresh composite and Transition composite respectively was in refractory association with the sulphides

13.5.15 Cyanide Leach Testing of the Obra Underground Deposit, ALS Report KM5916 – 2019

239 samples were received weighing 258 kilograms designated into six composites. 10 kilograms of each of the designated composites were composited into a Master Composite 1.

Head Grade Analysis

The head sample of the Akwaaba underground ore was assayed for the following elements.

Sample	Au (g/t)	Ag (g/t)	Sb (ppm)	$C_{organic}$ (%)	S_{total} (%)	$S_{sulphide}$ (%)
Comp 1	3.07, 2.80	<1	0.001	0.05	0.44	0.40
Comp 2	3.25, 3.23	<1	0.001	0.05	1.40	1.38
Comp 3	3.31, 3.53	<1	0.001	0.05	1.23	1.20
Comp 4	3.21, 3.57	<1	0.001	0.05	1.63	1.60
Comp 5	3.78, 3.60	<1	0.001	0.05	2.03	1.99
Comp 6	3.40, 3.65	<1	0.001	0.05	1.91	1.88
Master Comp 1	3.52, 3.38	<1	0.001	0.05	1.45	1.43

Test Work Results – ALS Report KM5916

At standard leach conditions, gold extractions done in duplicate on the Master Composite at P_{80} 106µm without carbon were 88% and 90% after 48 hours. Triplicated carbon in leach tests at the same conditions on the Master Composite measured gold extractions ranging from 87-89%.

A grind series of cyanidation tests on the Master Composite with carbon at P_{80} 72µm and P_{80} 88µm recorded the same gold extraction at 91% indicating the finer grind had no impact on gold recovery and at P_{80} 125 µm the gold extraction was 86% after 48 hours.

Carbon in leach tests were done on Composites 1 to 7 at a P_{80} 106 µm recording gold extractions of 86% to 94% after 48 hours. A diagnostic leach was done on the residue of the Master Composite. About 17% of the gold was extractable from intensive cyanide conditions, 29% was contained in carbonate minerals, 45% contained in sulphide minerals and 9% encased in non-sulphide gangue minerals.

13.6 Discussion of Test Results

13.6.1 Comminution

The low SMC values A x b <40 rate the Chirano mill feed as hard to moderately hard with high resistance to impact breakage. In contrast, the BWi values are relatively low ranging from 15-18kWh/t requiring lower energy for ball milling. The existing three stage crush and two-stage ball milling circuit are more efficient in energy utilisation. An external assessment by a comminution consultancy with further comminution test work would optimise the milling performance according to the characteristics of the current mill feed and future ore reserves.

13.6.2 Mineralogy

The bulk mineralogy reports a pyrite content in all the ore samples ranging from 1-13%. The gold mineralisation detected grains of native gold with tellurides and electrum present in some of the ore samples. Gold grains are less than 25µm and occur in pyrite. The Black Breccia composite had a 38µm free gold grain accounting for 15% of the gold mass. Further mineralogy will establish the extent of the sulphide mineral content and sulphide mineral species of the Fresh ore at the deeper levels of the open pits.

13.6.3 Gravity Concentration

The gravity concentrator circuit was decommissioned in 2008. Gravity gold recovery test work on the current ore feedstocks and future ore reserves will ascertain if there is potential for incremental gold extraction.

13.6.4 Flotation

Flotation test work has shown the Chirano ores are responsive to a flotation gold recovery of >90% but the concentrates require fine grinding and intensive leaching to achieve a >95% gold extraction. The flotation extraction route for the Mamnao ore produced a 10% higher gold extraction than the conventional whole ore leach treatment.

13.6.5 Pre-Oxidation and Leaching

The Maelgwyn test work demonstrated that high shear pre-oxidation with oxygen improved the leaching kinetics and increased the gold extraction by an average of 5.3% on samples tested from Akwaaba, Akoti, Mamnao, Paboase, Rahandu and the composite sample.

Previous test work had shown there was no difference between sparging with air or oxygen and a 7ppm dissolved oxygen level was sufficient for leaching.

At a P80 106 µm grind the gold extraction test results on the ore samples from Akwaaba, Paboase, Mamnao, Suraw and Obra were variable.

Akwaaba test work had measured gold extractions of 92.6% at 13g/t Au head grade, which lowered to 84.8% at 10 g/t Au head grade with 50% arsenical and sulphide content. Further tests reported 85% gold recoveries on ROM samples at 6.0g/t Au head grade but 90% gold extraction on open pit/underground samples at 2.0g/t Au head grade.

Paboase test work gold extractions were 87.5% at 6.0g/t Au head grade.

Mamnao gold extractions were <75% as tested at ALS. A Fresh composite sample and Transition composite sample tested at SGS produced an 89-92% gold extraction for the Fresh and 77-83% gold extraction for the Transition.

Obra gold extractions ranged from 88-90%.

13.7 Chirano Plant Operation Gold Recovery

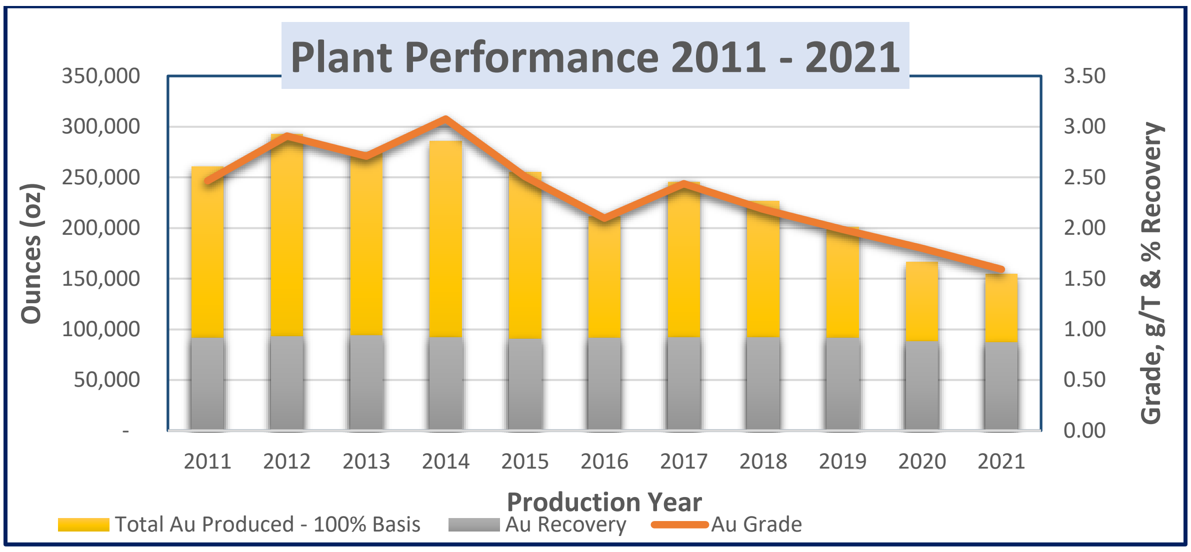


Figure 13-1: The Last Decade Plant Performance Trend

(Source: Chirano, 2022)

Figure 13-1 shows that the drop in gold production from 2019 coincides with a lower head grade of <2.00 g/t Au

- The plant Recovery has been consistent, averating 92% until 2019
- The Plant reconciled grade has been consistent, averaging 2.4g/t until 2019
- The Mill throughput has been consistent, averaging 3.4Mtpa
- Average gold production over the last 11 years was 234,023oz.

14. MINERAL RESOURCE ESTIMATES

14.1 Introduction

Chirano includes at least 8 deposits located along an 11km long N S trend. The deposits include Mamnao, Sariehu, Obra, Tano, Paboase, Akoti, Akoti South, Suraw, Kolua and Akwaaba.

The Chirano Mineral Resources comprise open pit and underground resources. The Chirano underground Mineral Resource include resources from the following deposits:

- Akwaaba – the first underground mine which came into production during the 2nd half of 2008;
- Paboase – started production in the first quarter of 2012;
- Akoti – started production in 2016;
- Tano – started production in the fourth quarter of 2020;
- Obra – which has become the sixth underground deposit for Chirano Gold Mines; and
- Suraw – started production in 2021 and currently development is ongoing

The open pit Mineral Resources include resources from the following operations:

- Mamnao – where production is currently underway:
- Akoti South pit – came to an end in Q4 2021 after pit re-optimisation;
- Sariehu pit – the open pit cutback is planned to resume production by Q4 2022;
- Obra pit – the open pit cutback is planned to commence by Q1 2023; and
- Kolua.

Both open pit and underground Mineral Resources have been prepared under the direction of Competent Persons (CPs) under the JORC Code (2012) using accepted industry practices and have been classified and reported in accordance with the JORC Code. There are no material differences between the definitions of Measured, Indicated and Inferred Mineral Resources under the CIM Definition Standards and the equivalent definitions in the JORC Code (2012).

Snowden has reviewed the Mineral Resources for the Chirano operations which are estimated by the company's employees. Snowden was afforded sufficient access to supporting data, block models and Chirano employees responsible for generating and reporting the Mineral Resource estimates to follow the process from exploratory data analysis, estimation, classification, and reporting. The site visit enabled Snowden to review and gain sufficient understanding of the on mine data collection and management processes, and the current geological interpretations.

Snowden did not identify any material issues with the Mineral Resource estimation and in general considers the standard procedures, and internal controls in place at Chirano to be transparent and robust. Snowden's validations of the Mineral Resources agree with those undertaken by Chirano; that the estimates are a reasonable representation of the grade distributions evident by the composite database informing the estimates. However, it is Snowden's opinion that generally there is room for some improvement with respect the classification of Chirano's Mineral Resource classification system.

Note: All Figures and Tables contained in this section have been created by Snowden Optiro in the process of the estimation of the Resources.

14.2 Mineral Resource Tabulation

The Chirano Mineral Resources have been reported according to the guidelines of the JORC Code (2012). The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the pits and summaries quoted in this report are on a 100% basis. The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The audited Mineral Resources for the Chirano Underground and Chirano Open Pits (constrained by a Reasonable Prospects for Eventual Economic Extraction (RPEEE) US$1,600 Resource optimised pit shell), as reported at 31st December 2021, are presented Table 14-1 and Table 14-2.

Table 14-1: Total Inclusive Chirano Underground Mineral Resource as at 31st December 2021

Underground Operation	Classification	Mt	Au	Moz
Obra	Measured	0.118	1.82	0.007
	Indicated	3.357	1.65	0.179
	Measured and Indicated	**3.476**	**1.66**	**0.186**
	Inferred	1.788	1.87	0.108
Akwaaba	Measured	1.478	2.06	0.098

Underground Operation	Classification	Mt	Au	Moz
	Indicated	0.818	1.86	0.049
	Measured and Indicated	**2.296**	**1.99**	**0.147**
	Inferred	0.223	2.48	0.018
Tano	Measured	1.016	1.83	0.060
	Indicated	1.056	1.71	0.058
	Measured and Indicated	**2.072**	**1.77**	**0.118**
	Inferred	0.646	2.24	0.047
Paboase	Measured	0.086	2.06	0.006
	Indicated	0.078	2.19	0.006
	Measured and Indicated	**0.164**	**2.13**	**0.011**
	Inferred	0.063	1.89	0.004
Akoti	Measured	1.827	2.05	0.120
	Indicated	0.294	2.01	0.019
	Measured and Indicated	**2.121**	**2.04**	**0.139**
	Inferred	0.514	1.89	0.031
Suraw	Measured	0.226	2.36	0.017
	Indicated	0.695	2.30	0.052
	Measured and Indicated	**0.922**	**2.32**	**0.069**
	Inferred	1.558	2.71	0.136
Total Measured Resources		**4.751**	**2.01**	**0.308**
Total Indicated Resources		**6.299**	**1.79**	**0.362**
Total Measured and Indicated Resources		**11.050**	**1.88**	**0.669**
Total Inferred Resources		**4.791**	**2.22**	**0.343**

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *Akwaaba, Tano, Obra and Suraw were evaluated at resource cut-off grade of 1.14 g/t and Akoti and Paboase undergrounds were evaluated at 1.21 g/t and 1.34 g/t cut-off respectively.*
6. *A density of 2.75 t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
7. *Geological losses and depletions have been applied.*
8. *Inferred Mineral Resources have a great amount of uncertainty as to their existence and as to whether they can be mined economically. It cannot be assumed that all or part of the Inferred Mineral Resource will ever be upgraded to a higher category.*

Table 14-2: Total Inclusive Chirano Open Pit Mineral Resource as at 31st December 2021

Open Pit Operation	Classification	Mt	Au	Moz
Akoti South	Measured	0.16	0.75	0.004
	Indicated	3.02	0.89	0.087
	Measured and Indicated	**3.17**	**0.88**	**0.090**
	Inferred	0.01	1.32	0.000
Obra	Measured	3.46	0.81	0.090
	Indicated	3.24	0.77	0.080
	Measured and Indicated	**6.70**	**0.79**	**0.170**
	Inferred	0.90	0.67	0.019
Mamnao	Measured	0.42	0.97	0.013
	Indicated	4.41	0.90	0.127
	Measured and Indicated	**4.83**	**0.90**	**0.140**
	Inferred	0.32	0.86	0.009
Kolua	Measured	0.00	0.00	0.000
	Indicated	0.16	1.60	0.008
	Measured and Indicated	**0.16**	**1.60**	**0.008**
	Inferred	0.00	1.26	0.000
Sariehu	Measured	0.42	0.59	0.008
	Indicated	1.77	0.85	0.048
	Measured and Indicated	**2.18**	**0.80**	**0.056**
	Inferred	0.03	0.89	0.001

Open Pit Operation	Classification	Mt	Au	Moz
Total Measured Resources		4.45	0.80	0.115
Total Indicated Resources		12.60	0.86	0.350
Total Measured and Indicated Resources		17.05	0.85	0.465
Total Inferred		1.26	0.73	0.029

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *Akoti South, Obra, Mamnao, Kolua, Sariehu open pits were evaluated at cut-off 0.24, 0.20, 0.31, 0.45 and 0.22 cut-offs respectively.*
6. *Geological losses and depletions have been applied.*
7. *Inferred Mineral Resources have a great amount of uncertainty as to their existence and as to whether they can be mined economically. It cannot be assumed that all or part of the Inferred Mineral Resource will ever be upgraded to a higher category.*

14.3 Geological and Mineralisation Modelling

The Chirano deposits occur within 100m to the west of the Chirano shear and are associated with brittle deformation of the granite in the form of vein swarms, brecciation and cataclasis parallel to the Chirano shear. The geometry of the deposits ranges from tabular (Obra), to pipe like (Tano), to several parallel lodes separated by weakly mineralised rock and generally dips steeply towards the west or southwest. Unusually, the grade of the mineralisation is correlated with the intensity of fracturing, alteration and brecciation.

The Akwaaba deposit is located immediately to the west of the Chirano Shear and dips approximately 750 to the west. Based on lithological similarities with the Paboase deposit it has been postulated that the Chirano Shear has cut-off the eastern half of the mineralised zone. The top of the underground mineralised body shows a thin high-grade ore-shoot directly against the Chirano shear with one or more moderately mineralized splays to the west. The eastern high grade mineralised zone widens with depth and some of the splays merge with the main mineral deposit. The highest-grade mineralisation also migrates from the contact with the Chirano shear more to the centre of the mineralised zone.

The Paboase mineral deposit lies more or less in the centre of the Chirano mineralised shear alignment and is related to a distinct sinistral jog. It strikes roughly NW-SE and dips steeply to the west (80°). It forms a tabular body varying in thickness from only a few meters to more than 25m. To the east it is cut-off by a well-defined post-mineralisation fault –commonly referred to as the Eastern fault or the Eastern Shear. To the west there are several thin sub-parallel mineralised shoots – some up to 60m away from the main zone- considered to be splays from the main shear.

Continuation of these zones is generally poorly defined by current drilling but is expected that some of these zones could be mined economically.

The Akoti, Tano and Suraw underground deposits are depth extensions of surface mineralisation along the main Chirano Shear that have or are still being mined as open pits. They generally form high-grade (>2g/t Au) narrow lenses within a wider package of >0.1g/t Au mineralisation Akwaaba Underground Operation. Figure 14-1 and Figure 14-2 shows the Chirano mineralised trend (plan and cross section).

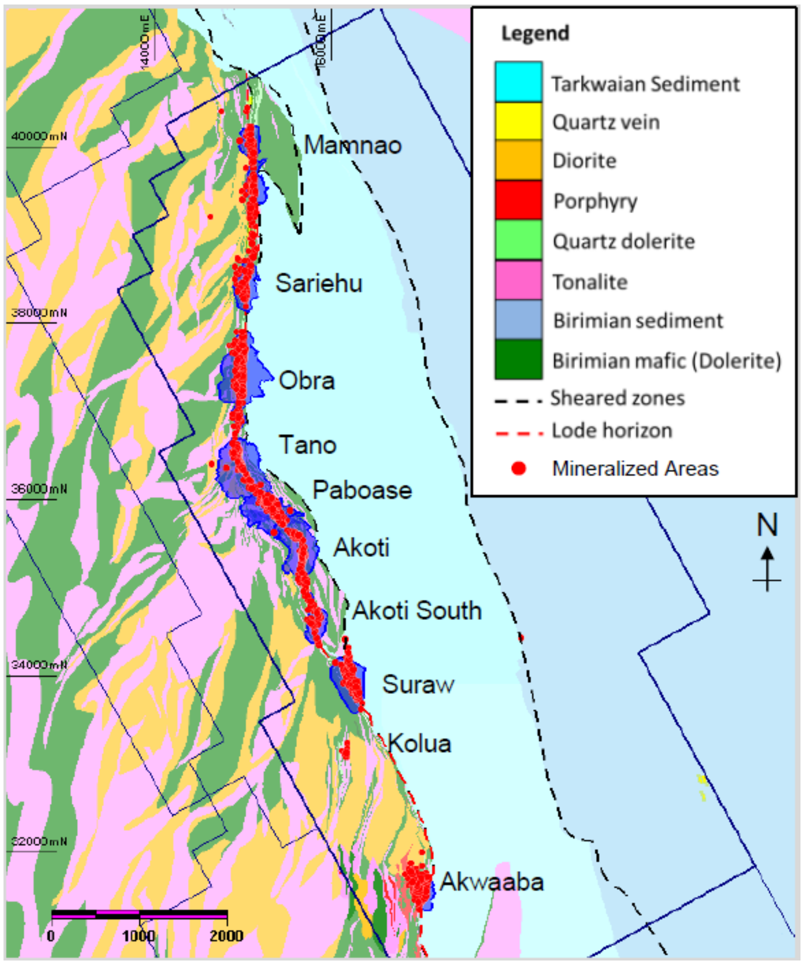


Figure 14-1: Chirano Mineralised Trend – Plan View Showing Deposit locations

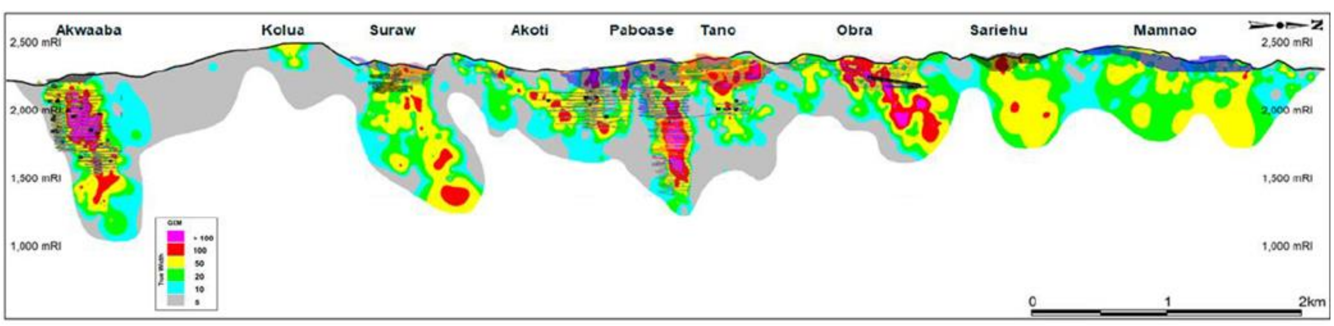


Figure 14-2: Chirano Mineralised Trend

14.3.1 Weathering

Significant weathering of the mineralised zones and surrounding rocks at Chirano is generally restricted to within 20 to 40 meters from the surface, with saprolite zones commonly developed. Transitional zones tend to be narrow and areas with saprolite grading into fresh rock are quite common.

14.3.2 Geological Modelling

Historically, the Chirano Au mineralisation zones were defined for resource purposes using a lower cut-off grade in the region of 0.2g/t gold. This produced relatively simple volumes suitable for block modelling ensuring that all minable mineralisation would be captured. The wireframed surfaces included mineralised envelopes, weathering and oxidation surfaces and the topographic surface.

Currently, lithological boundaries in drillhole logs are used as the main determinant in the geological modelling process. These are later modified by considering the spread of mineralisation especially along lithological contacts/zones. Geological models (wireframes) are then adjusted to capture and constrain both lithology and mineralisation. The final geological model is checked against the previous model to look for volume changes or difference.

The overall geologic model concept, as advanced by the Chirano Exploration team over the last couple of years, suggests Au mineralisation is closely associated with Fe-sulphides disseminated in albite-carbonate altered felsic and siliceous mafic/tonalites lithologies. Destructive alteration overprinting includes the following geologic domains in proximal to distal relation to mineralisation:

- RIX – comprising the high grade black/grey siliceous breccia and stock-work veining, considering also the narrow high grade upper and lower west splays
- RBX – comprising high grade domain, mainly brown-black breccia; and
- RSZ – shear zone and is the main mineralised envelope (penetrative fabric formation).

The proximal vectors to mineralisation include increasing sulphide content, increasing shearing shifting to breccia formation, and a shift from sericitic alteration to more carbonate-dominant alteration.

The Chirano Exploration team has been using Leapfrog™ software to generate litho-structural 3D model interpretations since 2011. This software has also been used to generate new comprehensive geologic solids for the 2021 estimation.

14.3.3 Litho-Structural Domaining

Leapfrog™ Geo 2021 software includes numerous updated manual and selective processes to augment historic modelling products. For the updated 2021 model, "vein modelling" functions were used to build tabular "grade shear-controlled" domains. The "vein-modelling" function allows for modelling continuity at depth and along strike where typical Leapfrog™ implicit functions would create discontinuities. The vein models used for estimation were modified manually with strings and verified section-to-section against historic grade-based and litho-structural domains. Datasets were filtered, small internal intervals were excluded and ignored by selecting primary intervals and allowing the software to prioritize and assign hanging wall and footwall surfaces to generate a vein-form solid. These datasets are the most consistently and thoroughly logged at Chirano and most recently updated on the mine-trend re-logging campaign aligning with the work of consultants and the Exploration team. Figure 14-3 shows the Litho-Structural model of Chirano.

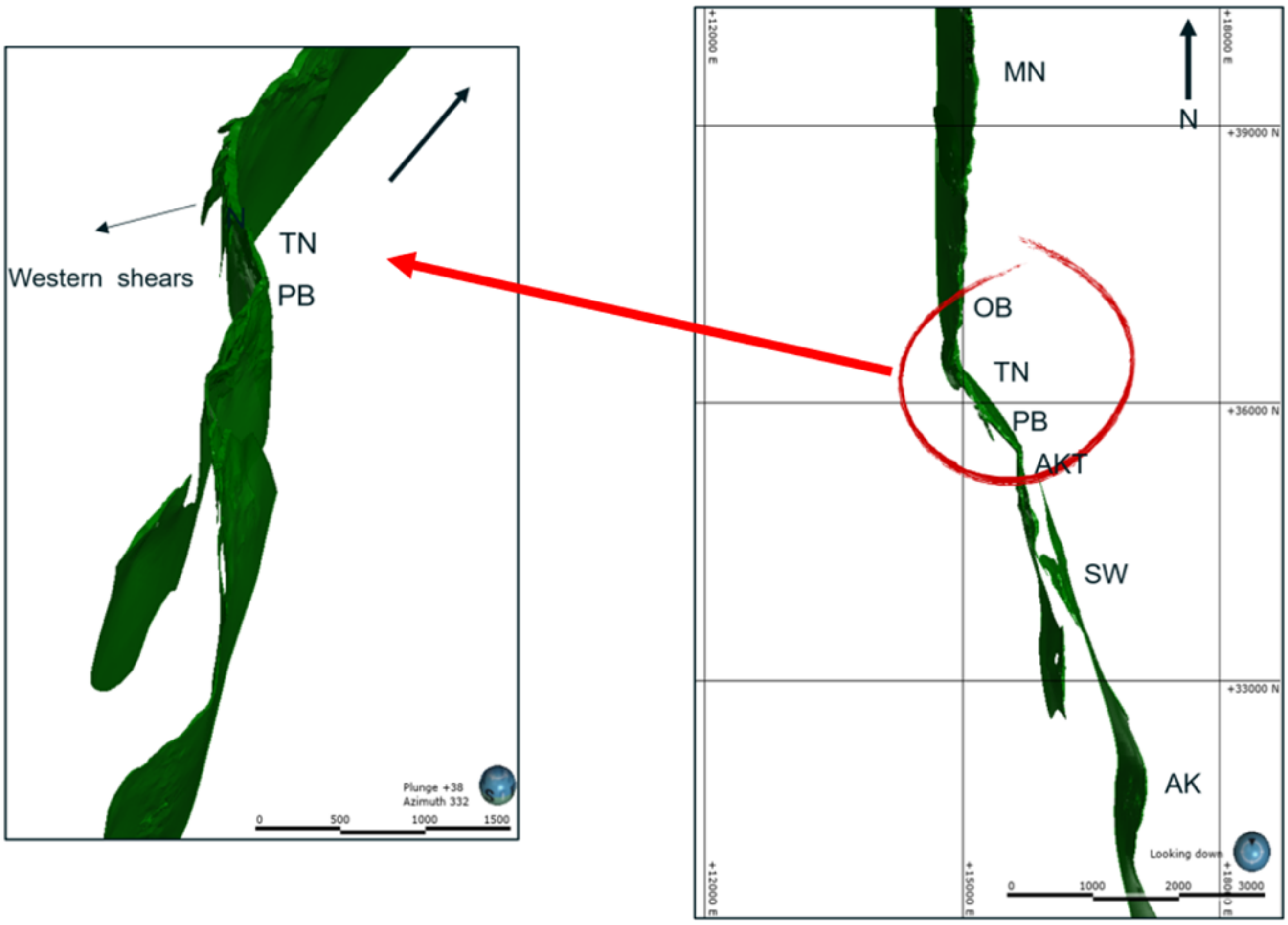


Figure 14-3: Litho-Structural Model of Chirano

Note:
MN – Manoa, OB – Obra, TN – Tano, Pb – Paboase, AKT – Akoti, Saw – Saraw, AK - Akwaaba

14.4 Akwaaba Underground

The Akwaaba deposit is located immediately to the west of the Chirano Shear and dips approximately 75° to the west. Based on lithological similarities with the Paboase deposit it has been postulated that the Chirano Shear has actually cut-off the eastern half of the mineralised zone. The top of the underground mineral deposit shows a thin high-grade mineralised zone directly against the Chirano shear with one or more moderately mineralized splays to the west. The eastern high grade mineralised zone widens with depth and some of the splays merge with the main mineralised zone. The highest-grade mineralisation also migrates from the contact with the Chirano shear to the centre of the mineralised deposit.

14.4.1 Drilling Database

A database extraction for the Akwaaba deposit was completed on the Chirano local grid on 9th September, 2021. The database includes all exploration (DD and RC) drilling and grade control (GC) drillholes within the project extent. Prior to the database extraction a thorough data validation was conducted including post survey collar locations, downhole survey validations and assay validations. The data extraction includes csv files for collar, survey, assay, geology and alteration.

All surface RC, DD, underground drilling, GC drilling was used to build the domain wireframes. However, the surface GC drilling was excluded prior to resource estimation.

14.4.2 Data Verification

A quality assurance (QA) process consisting of checks on the following was completed:

- Collar coordinates (eastings, northings, elevation and length);
- Survey (azimuth, dip, depth);
- Lithology (rock code, interval), and
- Assay (Au values, sample number, sample interval) was done.

No significant errors were noted that would be detrimental to the resource estimate updates.

14.4.3 Estimation Domains

Estimation litho-structural domains were generated following an extensive review of some of the Akwaaba recent drillholes to support geological and structural interpretations using Leapfrog™ software. The modelled estimation domain was completed and found to be consistent with the methodology applied in previous models. The domains used in the estimation are in Table 14-3.

Table 14-3: Akwaaba Estimation Domains

Domain Name	Domain Code
rbx	100
rbx_splay	101
rbx_splay2	102
rix	110
rsz	200

Notes:
rsz – Shear zone, including data from carbonates and quartz dolerites domains.
rbx - High grade, intense brown breccia with high density of silica-albite-ankerite alteration with pyrite.
rix- High grade black siliceous breccia and intense quartz veining.

14.4.4 Compositing

The database csv files including all surface RC, DD, underground drilling and GC drilling comprising collar, survey, lithology and assay data were imported into Datamine software, where the de-surveying process in Datamine was run to create 3D drillholes. Using the same software, one metre composites with a minimum length of 0.5m were then generated. The composite length size of 1.0m was chosen due to the (narrow) size of the high-grade mineralization, 1.0m would be more representative and reduce any smoothing/dilution.

14.4.5 Exploratory Data Analysis and Capping

The composite files for the various domains were loaded into Supervisor software where descriptive statistics and capping analysis were conducted on each domain. Capping levels were evaluated after compositing using the global Top-Cut Analysis tool in Supervisor. Top-Cut Analysis was completed using a combination of approaches, including examination of the grade distributions (histograms and probability plots etc) and domain statistics. Although many of the statistical measures of outlier grade distribution were not extreme, most domains contained some outlier values when compared with the overall domain population. As such, top-cutting (or capping) of these identified outliers was completed to minimise the local impact of these samples on the estimate. The top-cuts selected, and the impact on the domain statistics for all composites, are presented in Table 14-4.

Table 14-4: Capping Applied on Akwaaba Domains

Domain	Capping Grade (g/t)
rbx (100)	30
splay (101)	30
splay2 (102)	20
rix (110)	50
rsz (200)	7

14.4.6 Variography

Using the composited data, variography for the mineralised domains was completed in Supervisor. The downhole variogram was used to define the nugget component of the modelled variogram and the spatial variograms were modelled using spherical structures. The variogram models are presented in Figure 14-4 to Figure 14-6.

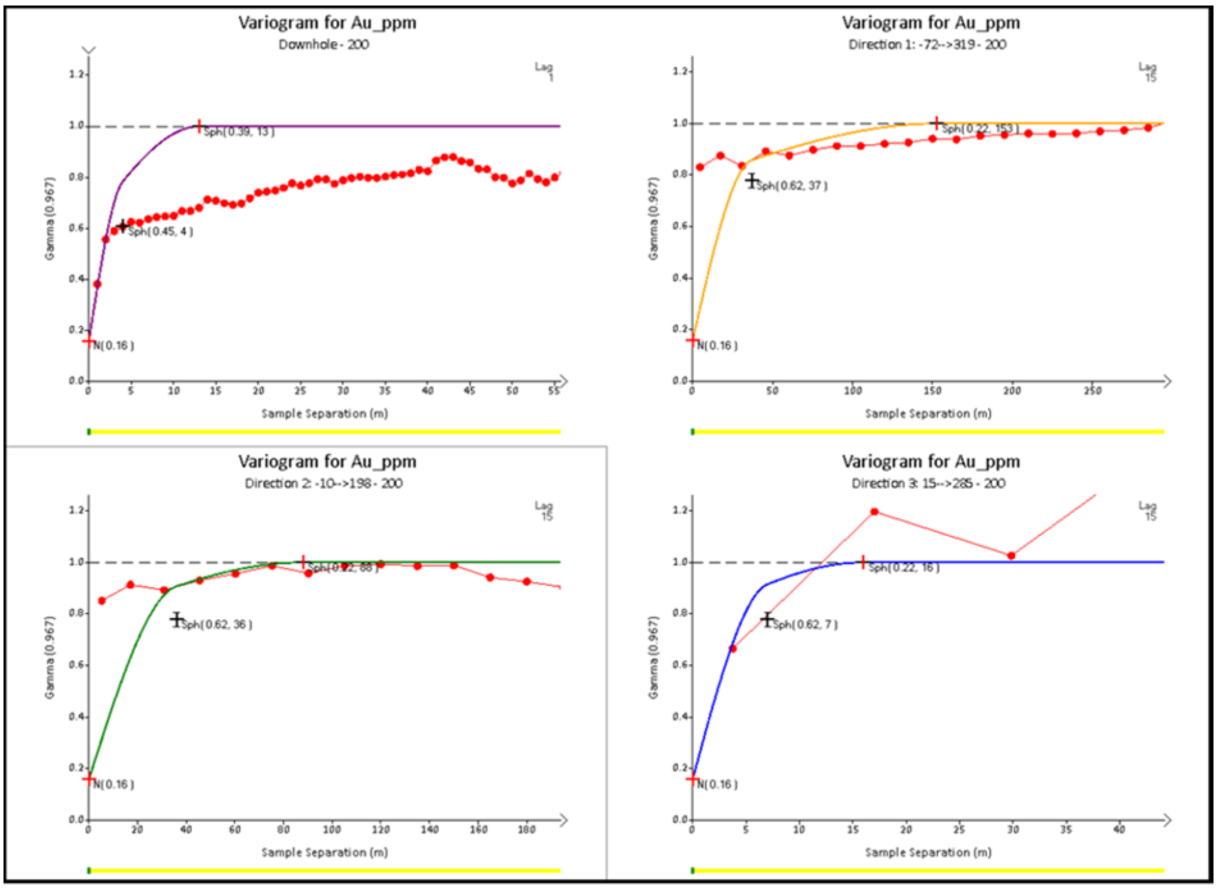


Figure 14-4: RSZ (200) Directional Variograms

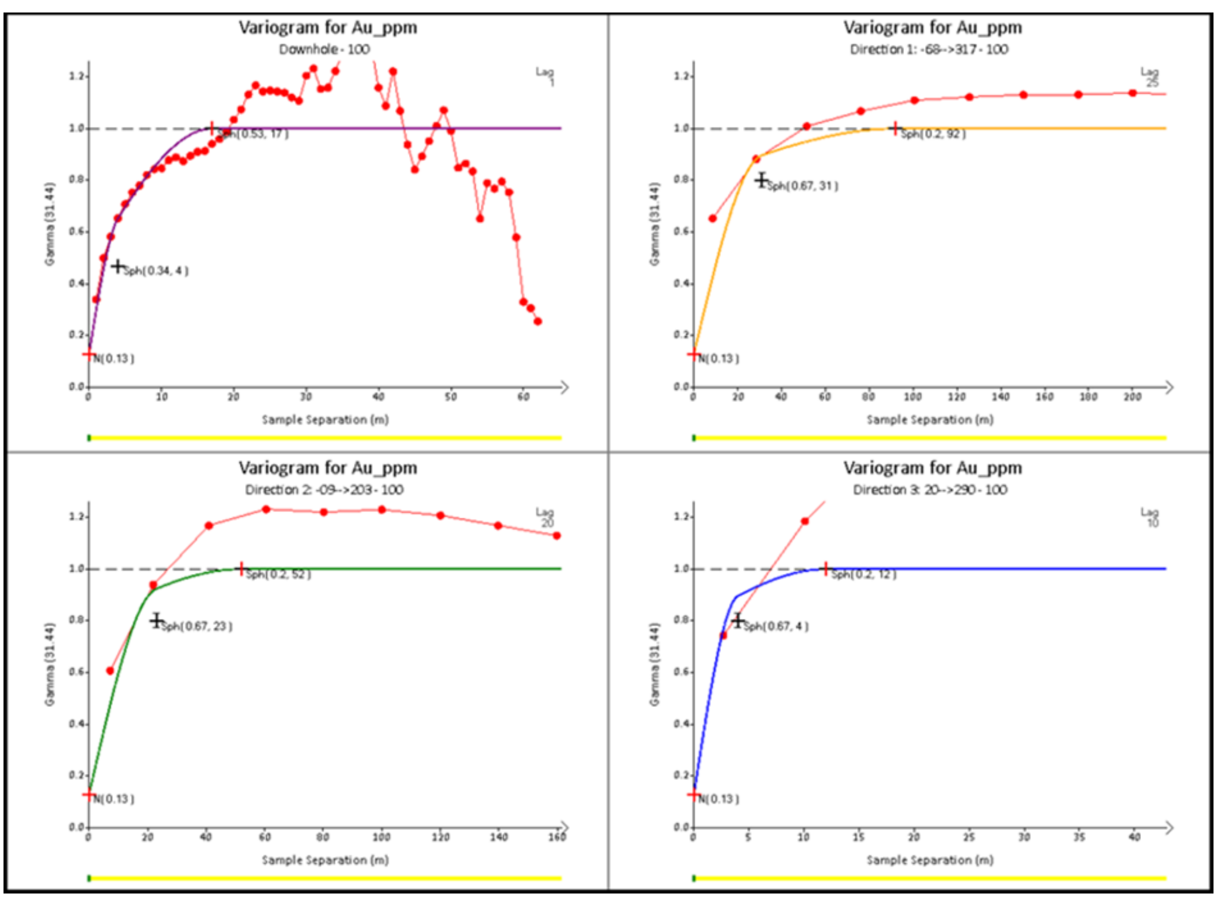


Figure 14-5: RBX (100) Directional Variograms

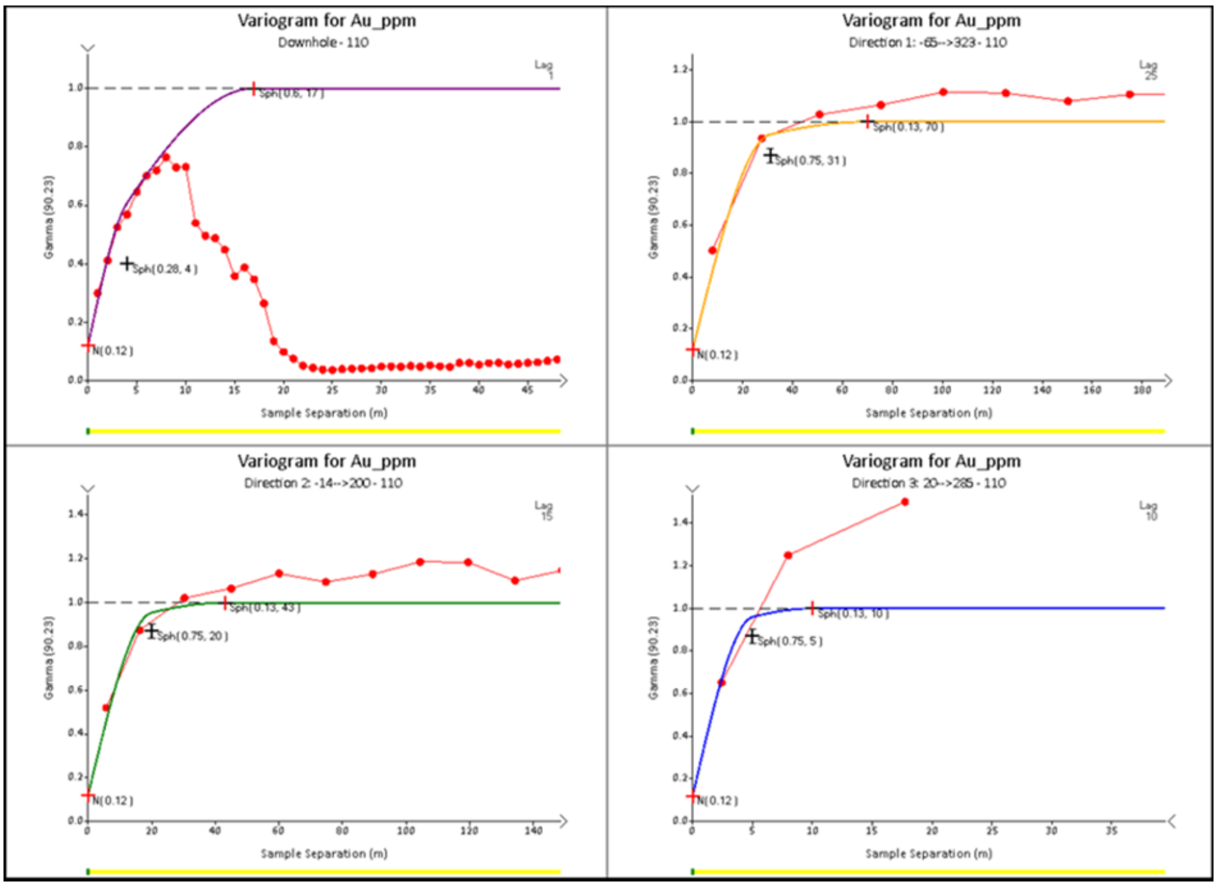


Figure 14-6: RIX (100) Directional Variograms

Snowden has reviewed the robustness and structure of the experimental and modelled variograms and though most are robust and are well structured, some of the directional variograms are moderately to poorly structured and will need to be recalculated.

The Akwaaba estimation parameters per domain utilised in MRE process are listed in Table 14-5.

Table 14-5: Estimation Parameters by Domain

	rix 110	rbx 100	splay 101	splay2 102	rsz 200
Composite length (m)	1	1	1	1	1
Capping limit (Au g/t)	50	30	30	20	10
Sub-blocking (y/n)	N	N	N	N	N
X,Y,Z, block size (m)			1.25 x 1.25 x 5		
Grade interpolation method			Dynamic Anisotropy with OK		
X axis search range (m)	60	50	65	50	70
Y axis search range (m)	40	35	45	45	55
Z axis search range (m)	5	7.5	5	5	10

14.4.7 Block Model

The block model was created in Leapfrog™ Geo software utilising the block model parameters presented in Table 14-6. The block model is not rotated and was created using the local Chirano mine grid. A 1.25m by 1.25m by 5.00m (X, Y, Z) block size was used for Akwaaba modelling work. The block model variable 'domain' was flagged with litho-structural and mineralization wireframes. The 'redox' variable was coded as fresh= 3 or oxide =1 based on the oxide surface. This was then used to also code the density; Fresh=2.75, transition= 2.30, and Oxide =1.56. The Akwaaba block model was finalized in October 2021.

Table 14-6: Akwaaba Block Model Parameters

	Easting (mE)	Northing (mN)	Elevation (mRL)
Origin	16,760.771	31,248.00	1,050.00
No. of Blocks	350	723	280
Block Size	1.25	1.25	5

The block model variables are listed in Table 14-7.

Table 14-7: Block Model Dimensions

Variable	Variable
AU_NN	Gold grade interpolated by Nearest Neighbour
AU_OK	Gold grade interpolated using capped composite, by Ordinary Kriging
AU_UNCAP	Gold grade using uncapped composite, interpolated by Ordinary Kriging
Class	Classification of block based on shapes. Measured=1, Indicated=2, Inferred=3 & Others=4
SG	Density flagged from REDOX variable
Domain	Unfolding domain based on mineralized shape and unfold surface
Redox	Oxidation shape based on surface. Oxide=1, Transition=2 fresh=3.
TRDIPDIR	TRDIPDIR The local varying true dip direction.
TRDIP	TRDIP The local varying dip
Plunge	Plunge The local varying plunge

A parallel model was created in Leapfrog Edge™ to establish any variability between the two packages and the resultant model compares well.

14.4.8 Grade Estimation

The block model was exported into Datamine Studio RM for estimation of Au using Ordinary Kriging (OK). No other elements have been estimated. Due to the arcuate overall geometry of the mineralisation, Dynamic Anisotropy (DA) was adopted for grade estimation. DA uses local orientation information to transform the search and variogram ellipses for estimation for each block, optimising the estimation for domains with varying geometry like that at Akwaaba. Reference surfaces were generated for each domain in Leapfrog™, which approximate the trend of the central point of a full width intercept. These surfaces were then imported into Studio RM and the dip and dip direction of each individual wireframe triangles was extracted and then coded to the block model using Nearest Neighbour (NN) search for each domain independently. The plunge was then coded into the block model using the plunge from the variograms generated in Supervisor.

Search and estimation parameters are presented in Table 14-8.

Table 14-8: Akwaaba Search and Estimation Parameters

Domain	Pass	X Axis Search Range (m)	Y Axis Search Range (m)	Z Axis Search Range (m)	Composite	
					Min	Max
rix (110)	1	60	40	5	7	15
	2	90	60	7.5	4	15
	3	120	80	10	4	15
splay (101)	1	65	45	5	7	15
	2	97.5	67.5	7.5	4	15
	3	130	90	10	4	15
splay 2 (102)	1	50	45	5	7	15
	2	75	67.5	7.5	4	15
	3	100	90	10	4	15
rbx (100)	1	50	35	7.5	7	15
	2	75	52.5	11.25	4	15
	3	100	70	15	4	15
rsz (200)	1	70	55	10	7	15
	2	105	82.5	15	4	15
	3	140	110	20	4	15

Snowden stepped through the Akwaaba model and confirm the results and observed that there are no material issues or fatal flaws in the modelling and estimation approaches employed by the Company.

14.4.9 Block Model Validations

The techniques adopted for the validation of the block estimates range from global mean comparison of estimates and composites using classical statistics, visual comparisons and swath analyses between the block model estimates and the composite data used to inform them.

VISUAL CHECKS

Initial validation consisted of a visual comparison of the input samples and the estimated block grade in cross section and plan view. The block estimates and sample composites were superimposed on each other, and colour coded with the same legend for Au for comparison purposes. Visual checks of the model against the sample data used to inform the estimates shows that the estimated blocks reasonably match the sample data used to inform them particularly in areas that have significant data to inform the estimates. All the visual checks confirm that the block estimates are a reasonable representation of the informing data considering the current level of geological and geostatistical understanding of areas within the reach of the definition drilling as shown in Figure 14-7 and Figure 14-8.

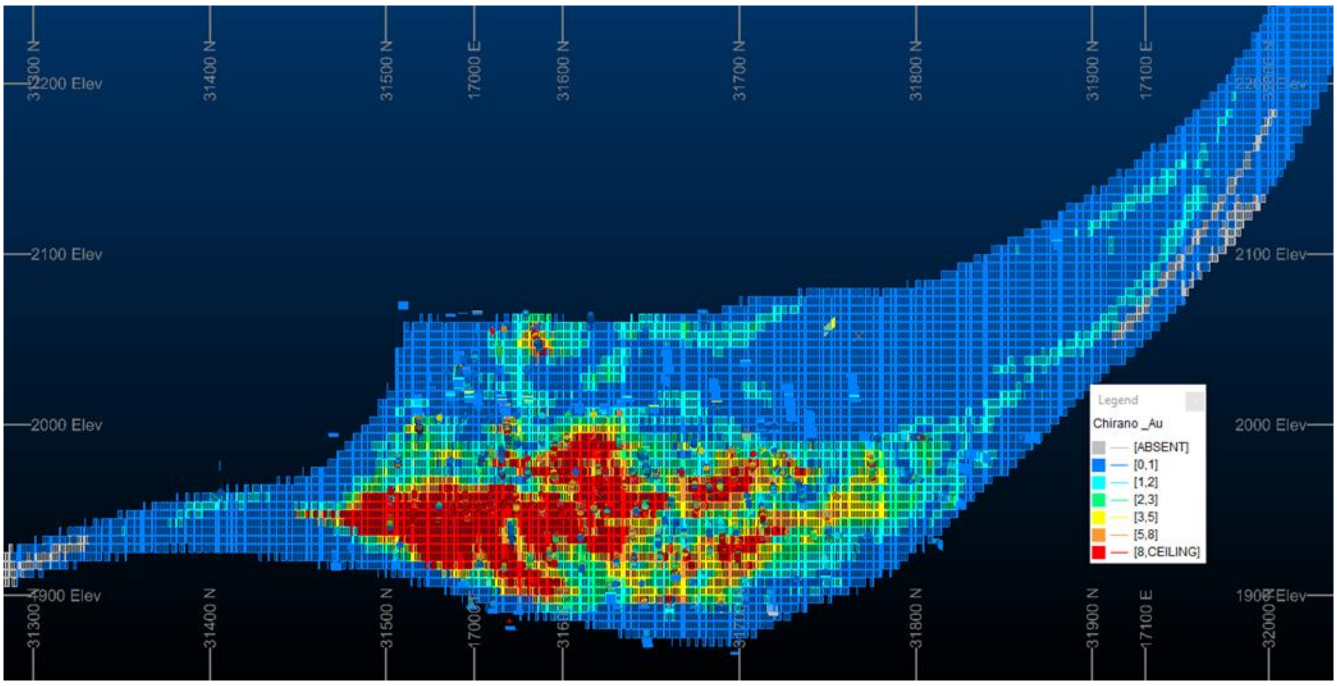


Figure 14-7: Comparison between composites and block grades in cross section along the strike (long section) of the mineralisation trend (NNE)

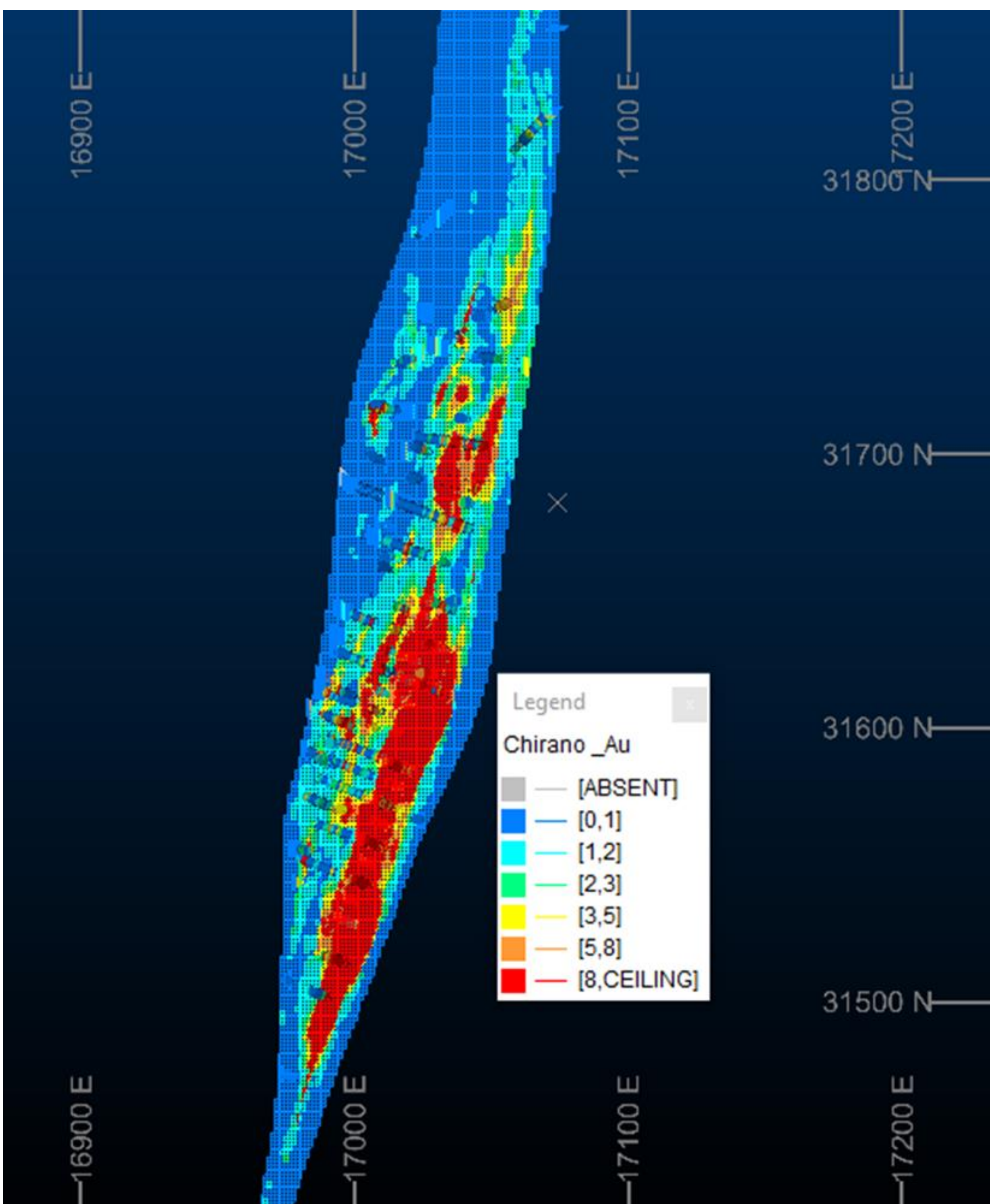


Figure 14-8: Visual Comparison of Samples and Block Model in Plan View (1955 Rl)

SWATH ANALYSIS

Swath plots for local scale comparison i.e., validation between the averages of the estimated block contents with the averages of the clustered samples were generated. This validation was performed for each domain along easting, northing and elevation dimensions. An example from Domain 100 is presented in Figure 14-9.

The results of the swath validation for sample data and block model estimates exhibited an expected degree of smoothing due to kriging. The estimated values tend to follow the sample values reasonably well, particularly in well sampled areas. But as you move further away from the well sampled areas and into areas that are poorly sampled (low drilling density) and towards the peripheries of the deposit of the deposit, the estimates are poorly informed.

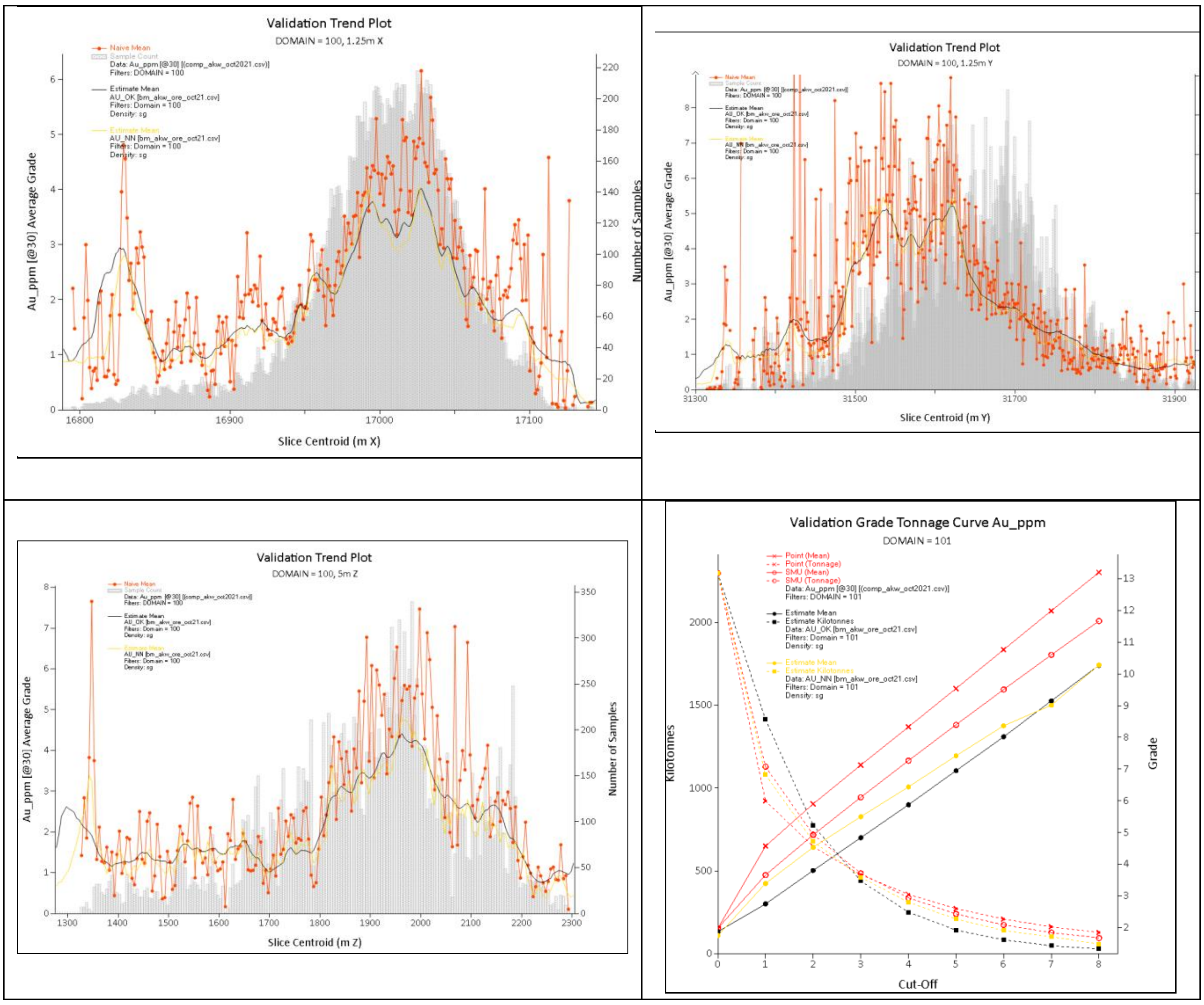


Figure 14-9: Swath plots for Domain 100; easting (top left), northing (top right) and elevation (bottom)

14.4.10 Depletion

The 2021 Mineral Resource has been depleted for both the open pit and underground workings.

14.4.11 Mineral Resource Classification

The 2021 Akwaaba underground Mineral Resource has been classified into Measured, Indicated and Inferred categories in accordance with the JORC Code (2012). There are no material differences between the definitions of Indicated and Inferred Mineral Resources under the CIM Definition Standards and the equivalent definitions in the JORC Code (2012).

The criteria for classification at Akwaaba are as follows:

- Geological confidence of the deposit and style of mineralisation;
- Measured category is where the nominal drillhole centres is less than 25 m and covered by grade control;
- Indicated category is where the drillhole spacing is greater than 25 but less than 35 meters;
- Inferred category is where the spacing is greater than 35 but less than 50 meters; and
- Where there are blocks estimated greater than 50 meters, this would be considered “potential”
- Figure 14-10 and Figure 14-11 show the classification first as a long section and then as a cross section.

Snowden has reviewed and verified the approach to classifying Akwaaba Mineral Resources and found it to be sound, clear and auditable. It is Snowden’s opinion that there is room for some improvement with respect to the application of geostatistical analysis in the classification process e.g., Kriging efficiency (KE) and slope of regression (SoR) which indicate how good an estimate is.

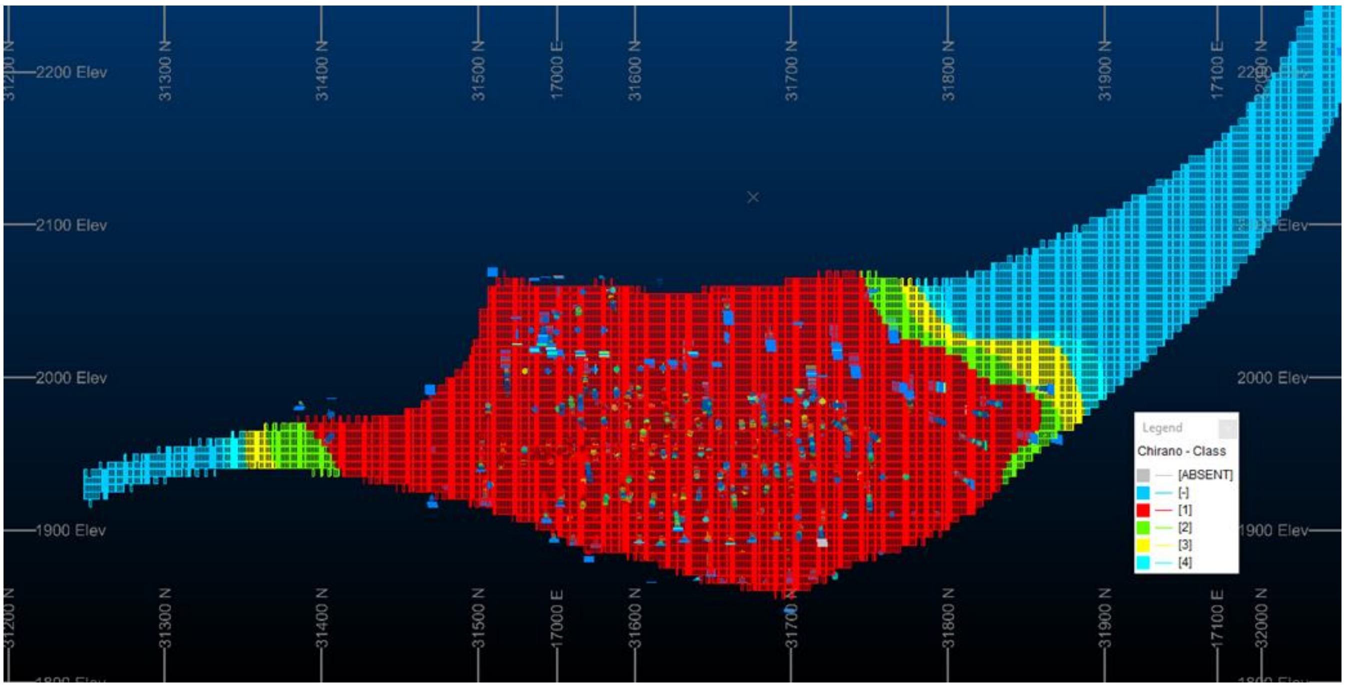


Figure 14-10: Long section of applied Mineral Resource classification (red – measured, green – Indicated and yellow – Inferred)

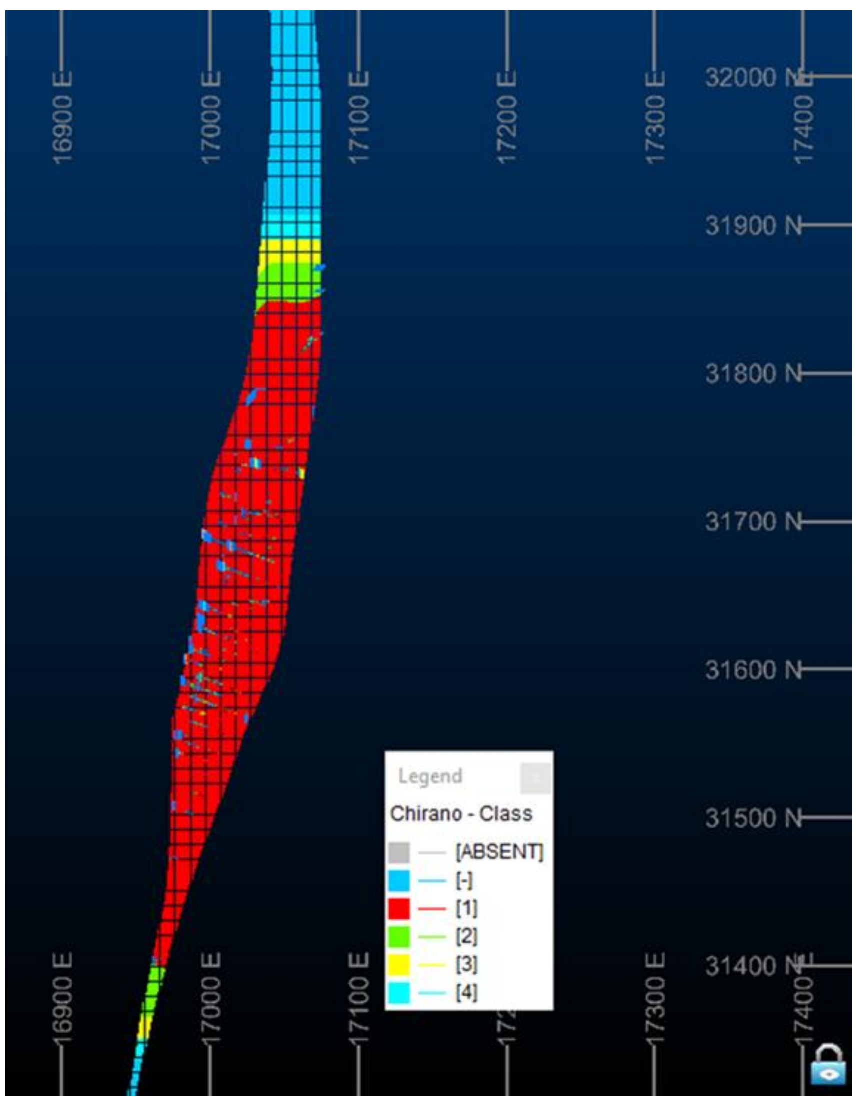


Figure 14-11: Cross section (5525 m N) of resource classification (red – measured, green – Indicated and yellow – Inferred)

14.4.12 Mineral Resource Reporting

ASSUMPTIONS AND PARAMETERS

It has increasingly become a stringent requirement from reputable Investors, Stock Exchanges and reporting guidelines to enforce the application of a cut-off grade and also outline the parameters considered in determining the cut-off grade.

To assess the RPEEE, the QP reviewed the Company's cut-off grade calculations based on the economics, mining and processing assumptions supplied by the company. The parameters considered in the calculations used are based on outputs from the financial model. The cut-off grade calculations are shown in Table 14-9.

Table 14-9: Cut-off Calculation Parameters for Akwaaba Underground Mineral Resources

Parameter	Units	Long Term 2021
Mining cost	(US$/t ore)	26.60
G&A	(US$/t ore)	7.23
Sustaining Capital	(US$/t ore)	2.15
Process costs	(US$/t ore)	15.06
Total $/ore tonne	**(US$/t ore)**	**51.05**
Gold recovery	(%)	88.5
Total Dilution	(%)	12.5
Gold price	(US$/oz)	1,600
Cut-off grade	g/t	1.14

Using the parameters stated in Table 14.10, the QP has checked and confirmed that the application of a cut-off grade of 1.14g/t for the reporting of Akwaaba underground Mineral Resources is appropriate.

REPORTING

The Akwaaba underground Mineral Resource estimates are reported according to the guidelines of the JORC Code (2012) and according to the CIM Definition Standards. The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the operations and summaries quoted in this report are on a 100% basis. The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The Mineral Resource for the Akwaaba underground deposit, as reported at 31st December 2021, is presented in Table 14-10. The Mineral Resource has been depleted for both open pit and underground development and has been reported above a 1.14g/t Au cut-off and a gold price of US$1 600/oz.

Table 14-10: Audited Total Inclusive Akwaaba Underground Mineral Resource as at 31st December 2021 at 1.14g/t Au cut-off

Classification	Tonnage (Mt)	Au Grade (g/t)	Metal Au Content (Moz)
Measured	0.12	1.82	0.007
Indicated	3.36	1.65	0.179
Measured + Indicated	**3.48**	**1.66**	**0.186**
Inferred	1.79	1.87	0.108

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *A density of 2.75t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
6. *Geological losses and depletions have been applied.*
7. *Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration*

14.5 Akoti Underground

14.5.1 Drilling Database

A database extraction for the Akoti deposit was completed on 8th June, 2021. The database includes all exploration (DD and RC) drilling and grade control (GC) drillholes within the project extent. Prior to the database extraction a thorough data validation was conducted including post survey collar locations, downhole survey validations and assay results validation. The data extraction includes csv files for collar, survey, assay, geology and alteration.

All surface RC, DD, underground drilling, GC drilling was used to build the domain wireframes. However, the surface GC drilling was excluded prior to the resource estimation.

14.5.2 Data Verification

A QA process consisting of checks on the following was completed:

- Collar coordinates (eastings, northings, elevation and length);
- Survey (azimuth, dip, depth);
- Lithology (rock code, interval), and
- Assay (Au values, sample number, sample interval) was done.

No significant errors were noted that would be detrimental to the resource estimate updates.

14.5.3 Estimation Domains

Estimation litho-structural domains were generated following an extensive review of some of the Akoti recent drillholes to support geological and structural interpretations using Leapfrog™ software. The shapes were used as the estimation domains. There are 14 domains in total (Akoti Extended; 121, 124, 126 & Akoti north; 101, 102, 103, 104, 106, 131, 132, 133, 134, 136 and Dilution halo 150).

The hanging wall (HW) and footwall (FW) surfaces for each domain were merged into a single surface for the coding of the dip and dip direction into the block model. The plunge of the various domains were derived from the variogram model in Supervisor and coded into the block model.

14.5.4 Compositing

The database csv files including all surface RC, DD, underground drilling and GC drilling comprising collar, survey, lithology and assay data were imported into Datamine software, where the de-surveying process in Datamine was run to create 3D drillholes. Using the same software, one metre composites with a minimum length of 0.5m were then generated. The composite length size of 1.0m was chosen due to the (narrow) size of the high-grade mineralization, 1.0m would be more representative and reduce any smoothing/dilution.

14.5.5 Exploratory Data Analysis and Capping

The composite files for the various domains were loaded into Supervisor software where descriptive statistics and capping analysis were conducted on each domain. Capping levels were evaluated after compositing using the global Top-Cut Analysis tool in Supervisor. Top-Cut Analysis was completed using a combination of approaches, including examination of the grade distributions (histograms and probability plots etc) and domain statistics for all domains. The Global Top Cut Analysis for Domains 101 and 131 are shown in Figure 14-12 and Figure 14-13 respectively. Although many of the statistical measures of outlier grade distribution were not extreme, most domains contained some outlier values when compared with the overall domain population. As such, top-cutting (or capping) of these identified outliers was completed to minimise the local impact of these samples on the estimate. The top-cuts selected, and the impact on the domain statistics for all composites, are presented in Table 14-11.

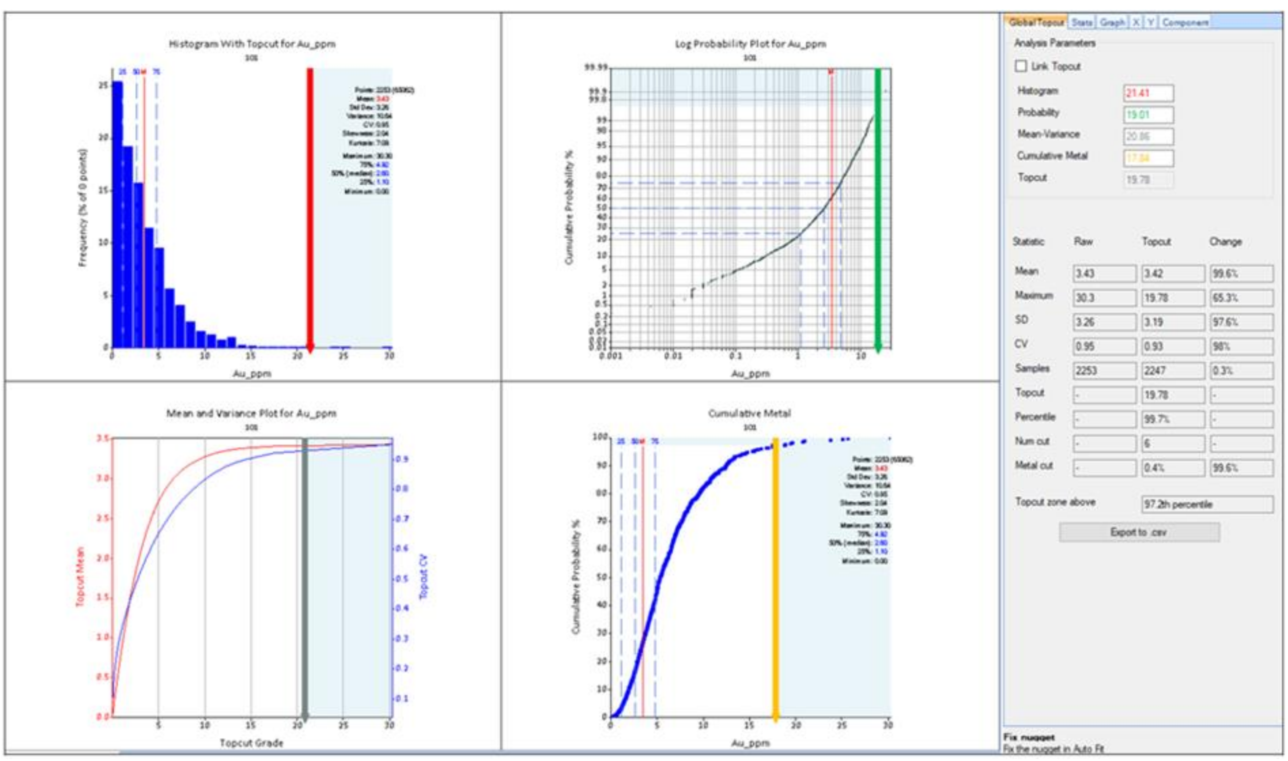


Figure 14-12: Global Topcut Analysis for Domain 101

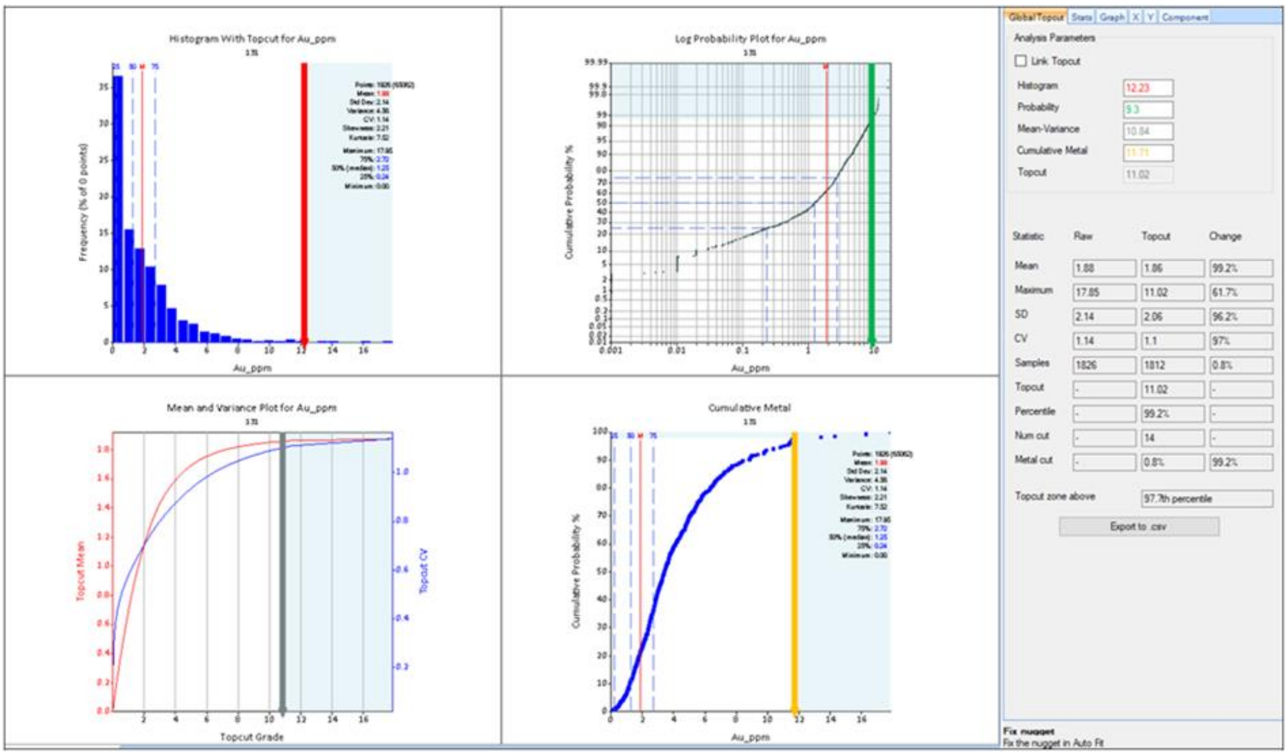


Figure 14-13: Global Topcut Analysis for Domain 131

Table 14-11: Capping Applied on Akoti Domains

Domain	Capping Grade (g/t)
101	20
102	4.5
103	5
104	11
106	5
121	23
124	8.5
126	13
131	11
132	11.5
133	11
134	9.5
136	2.9
150	1

14.5.6 Variography

Using the composited data, variography for the mineralised domains was completed in Supervisor. The downhole variogram was used to define the nugget component of the modelled variogram and the spatial variograms were modelled using spherical structures. The variogram models are presented in Figure 14-14 and Figure 14-15.

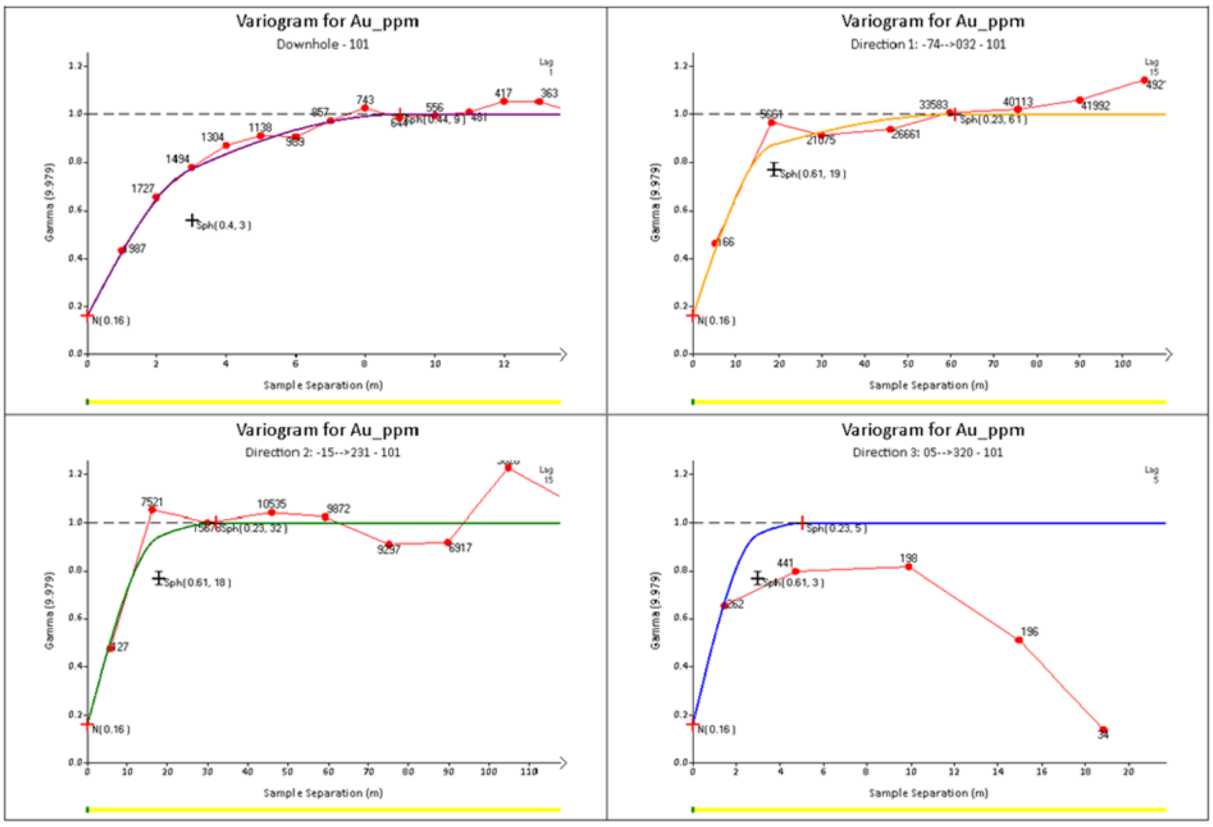


Figure 14-14: Directional Variograms for Domain 101

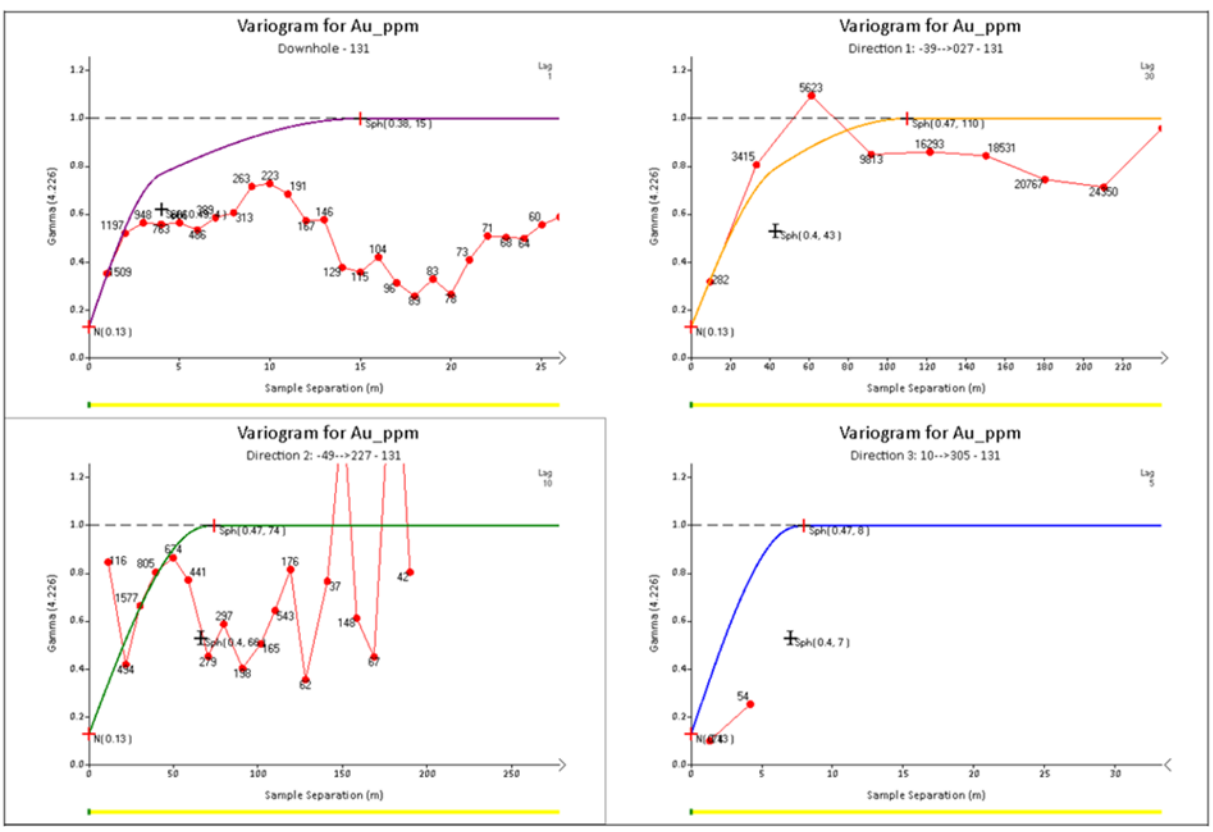


Figure 14-15: Directional Variograms for Domain 131

Snowden has reviewed the robustness and structure of all the experimental and modelled variograms for all the domains and though some are robust and well structured, the majority of the directional variograms are moderately to poorly structured. Some have no structures at all and will thus need to be recalculated.

14.5.7 Block Model

The block model was created in Leapfrog™ Geo software utilising the block model parameters presented in Table 14-12. The block model is not rotated and was created using the local Chirano mine grid. A 1.25m by 1.25m by 5.00m (X, Y, Z) block size with no sub blocks was used for Akoti modelling work. The block model variable 'domain' was flagged with litho-structural and mineralization wireframes. The 'redox' variable was coded as fresh= 3 or oxide =1 based on the oxide surface. This was then used to also code the density; Fresh=2.75, transition= 2.30, and Oxide =1.56. The Akoti block model was finalized in October 2021.

Table 14-12: Akoti Block Model Parameters

	Easting (mE)	Northing (mN)	Elevation (mRL)
Origin	49,152.500	8,8871.334	1,470.00
No. of blocks	773	1,098	195
Block Size	1.25	1.25	5

14.5.8 Grade Estimation

The block model was exported into Datamine Studio RM for estimation of Au using OK. No other elements have been estimated. Due to the arcuate overall geometry of the mineralisation, DA was adopted for grade estimation. The estimation was run in three passes for the Au grade attribute with the highest confidence blocks estimated in pass 1 and the lowest confidence blocks in pass 3. Reference surfaces were generated for each domain in Leapfrog™, which approximate the trend of the central point of a full width intercept. These surfaces were then imported into Studio RM and the dip and dip direction of each individual wireframe triangles was extracted and then coded to the block model using Nearest Neighbour (NN) search for each domain independently. The plunge was then coded into the block model using the plunge from the variograms generated in Supervisor. The mineralised wireframes were used to estimate the true dip and true dip direction for each domain.

Search and estimation parameters are presented in Table 14-13.

Table 14-13: Akoti Search and Estimation Parameters

Domain	Pass	X axis search range (m)	Y axis search range (m)	Z axis search range (m)	Composite	
					Min	Max
	1	50	35	7	7	15
101	2	75	52.5	10.5	3	15
	3	100	70	14	3	15
	1	50	25	7	7	15
102	2	75	37.5	10.5	3	15
	3	100	50	14	3	15
	1	50	25	5	7	15
103	2	75	37.5	7.5	3	15
	3	100	50	10	3	15
	1	50	20	5	7	15
104	2	75	30	7.5	7	15
	3	100	40	10	3	15
	1	40	20	7	7	15
106	2	60	30	10.5	3	15
	3	80	40	14	3	15
	1	30	20	7	7	15
121	2	45	30	10.5	3	15
	3	60	40	14	3	15
	1	50	25	7	7	15
124	2	75	37.5	10.5	7	15
	3	100	50	14	3	15
	1	50	30	7	7	15
126	2	75	45	10.5	7	15
	3	100	60	14	3	15
	1	50	35	7	7	15
131	2	75	52.5	10.5	7	15
	3	100	70	14	3	15
	1	50	30	7	7	15
132	2	75	45	10.5	3	15
	3	100	60	14	3	15
	1	45	25	7	7	15
133	2	67.5	37.5	10.5	3	15
	3	90	50	14	3	15
	1	45	20	7	7	15
134	2	67.5	30	10.5	7	15
	3	90	40	14	3	15

Domain	Pass	X axis search range (m)	Y axis search range (m)	Z axis search range (m)	Composite	
					Min	Max
	1	40	25	7	7	15
136	2	60	37.5	10.5	7	15
	3	80	50	14	3	15
	1	50	25	10	7	15
150	2	75	37.5	15	3	15
	3	100	50	20	3	15

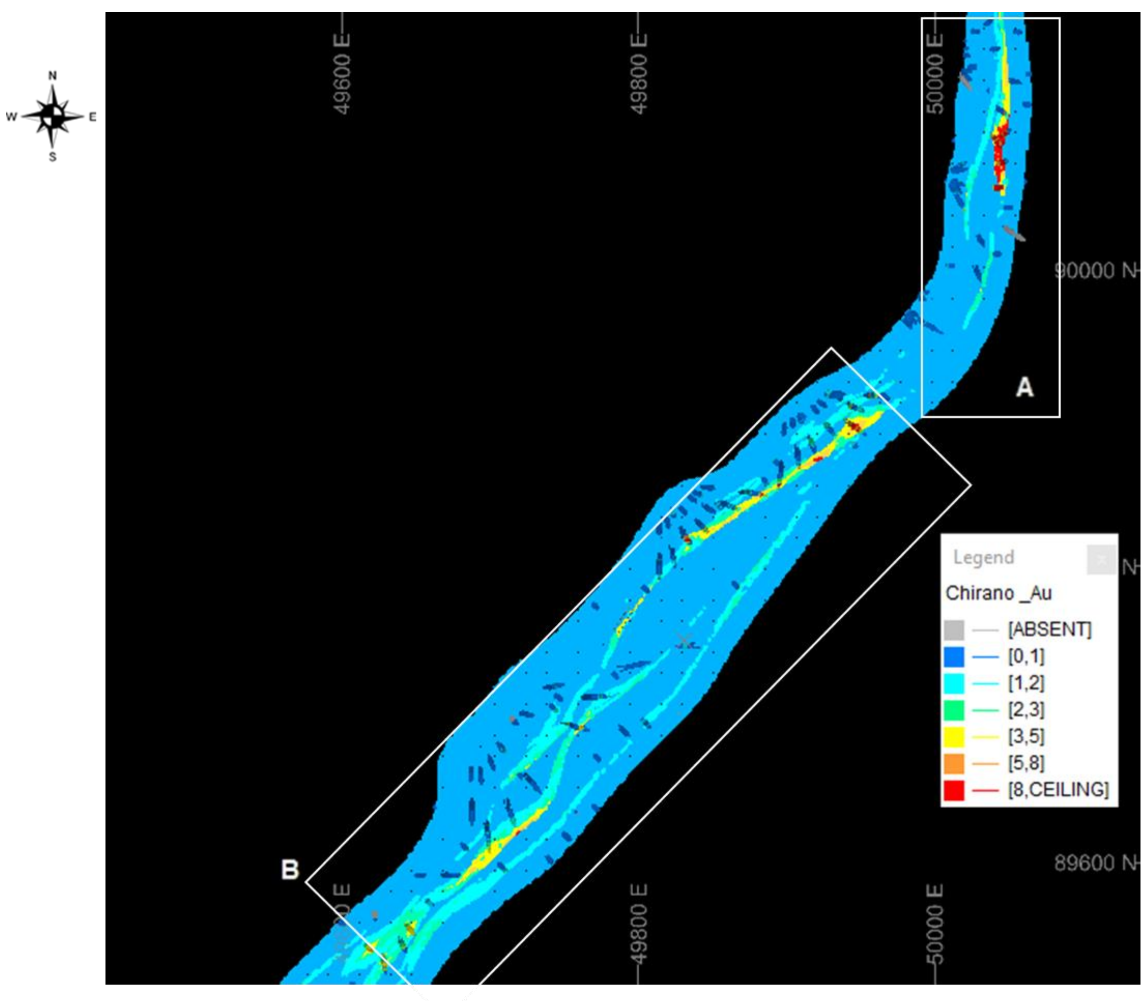
Snowden has stepped through the Akoti model and confirm the results and observed that there are no material issues or fatal flaws in the modelling and estimation approaches employed by the Company.

14.5.9 Block Model Validations

The techniques adopted for the validation of the block estimates range from global mean comparison of estimates and composites using classical statistics, visual comparisons and swath analyses between the block model estimates and the composite data used to inform them.

VISUAL CHECKS

Initial validation consisted of a visual comparison of the input samples and the estimated block grade in cross section and plan view. The block estimates and sample composites data were superimposed on each other, and colour coded with the same legend for Au for comparison purposes. Visual checks of the model against the sample data used to inform the estimates shows that the estimated blocks reasonably match the sample data used to inform them particularly in areas that have significant data to inform the estimates. All the visual checks confirm that the block estimates are a reasonable representation of the informing data considering the current level of geological and geostatistical understanding of areas within the reach of the definition drilling as shown in Figure 14-16.



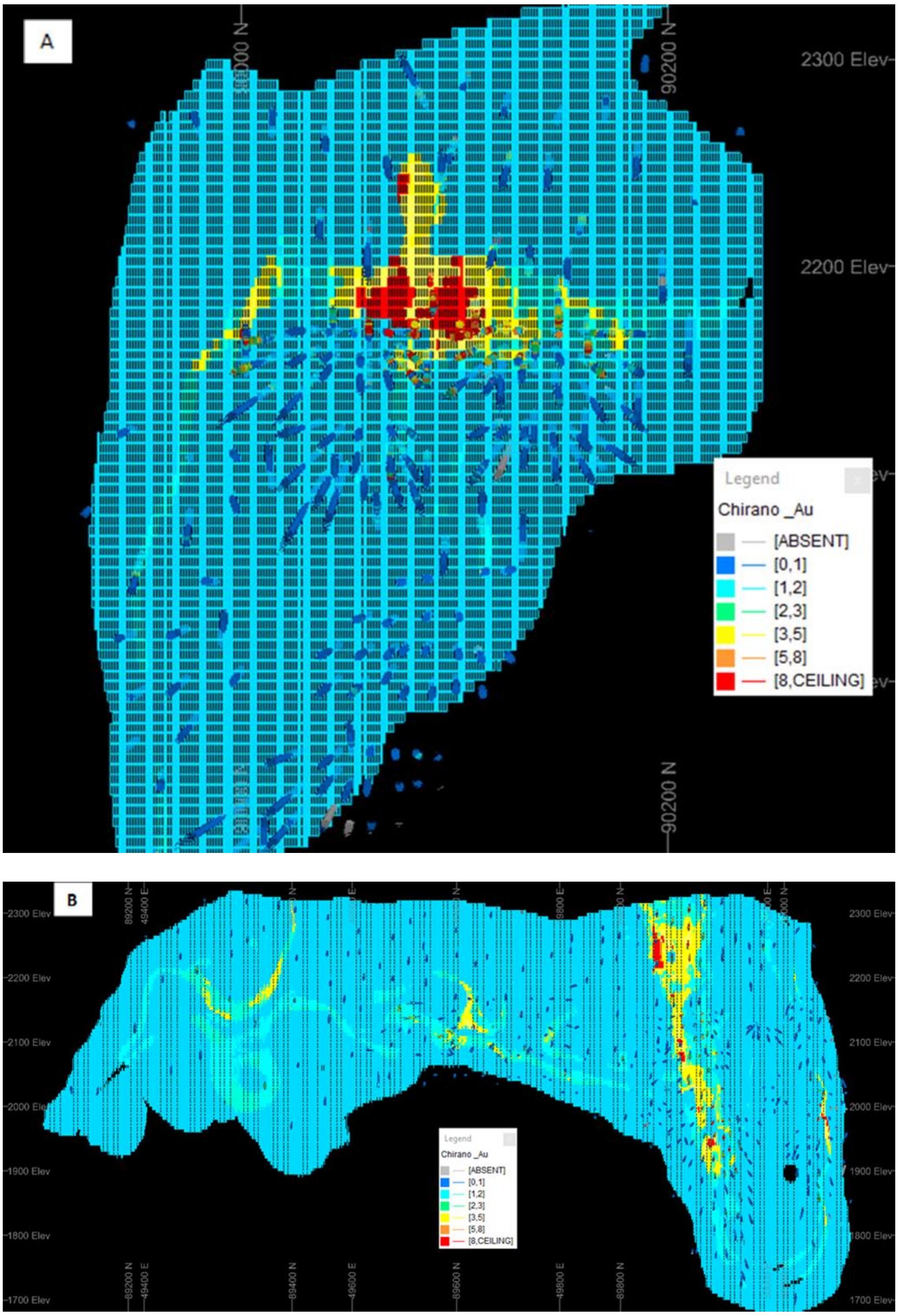


Figure 14-16: Comparison between composites and block grades in plan view (2100 Rl) above and cross section along the strike (long section) of the mineralisation trend (NS – Block A) and (NNE, Block B)

SWATH ANALYSIS

Swath plots for local scale comparison i.e., validation between the averages of the estimated block contents with the averages of the clustered samples were generated. This validation was performed for each domain along easting, northing and elevation dimensions.

The results of the swath validation for sample data and block model estimates exhibited an expected degree of smoothing due to kriging. The estimated values tend to follow the sample values reasonably well, particularly in well sampled areas. But as you move further away from the well sampled areas and into areas that are poorly sampled (low drilling density) and towards deeper portions of the deposit, the estimates are poorly informed.

14.5.10 Depletion

The 2021 Mineral Resource has been depleted for both the open pit and underground workings.

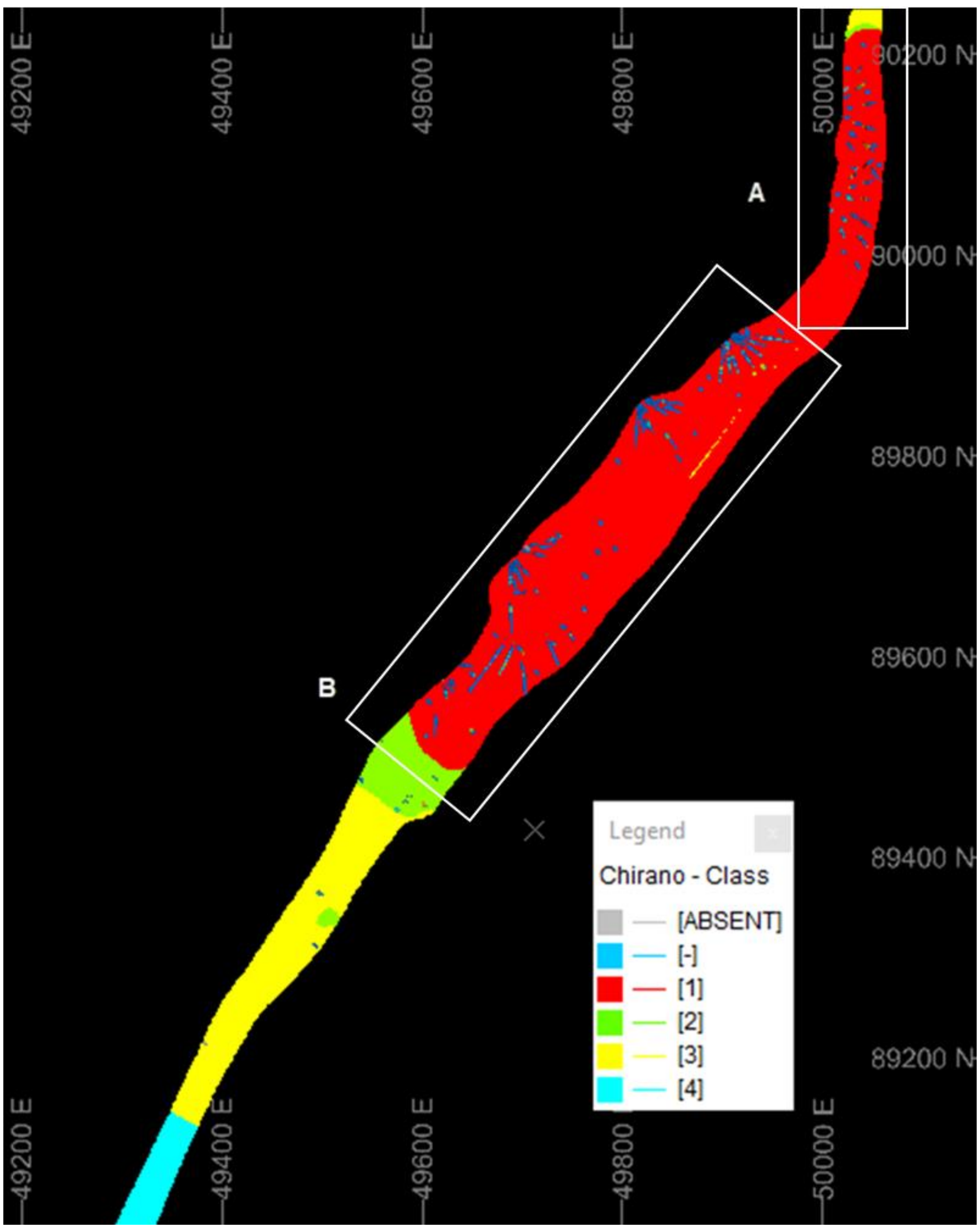
14.5.11 Mineral Resource Classification

The 2021 Akoti underground Mineral Resource has been classified into Measured, Indicated and Inferred categories in accordance with the JORC Code (2012). There are no material differences between the definitions of Indicated and Inferred Mineral Resources under the CIM Definition Standards and the equivalent definitions in the JORC Code (2012).

The criteria for classification at Akoti is as follows:

- Geological confidence of the deposit and style of mineralisation;
- Measured category is where the nominal drillhole centres is less than 25m and covered by grade control;
- Indicated category is where the drillhole spacing is greater than 25 but less than 35 meters;
- Inferred category is where the spacing is greater than 35 but less than 50 meters; and
- Where there are blocks estimated greater than 50 meters, this would be considered “potential”

Figure 14-17 shows the classification first as a long section and then as a cross section.



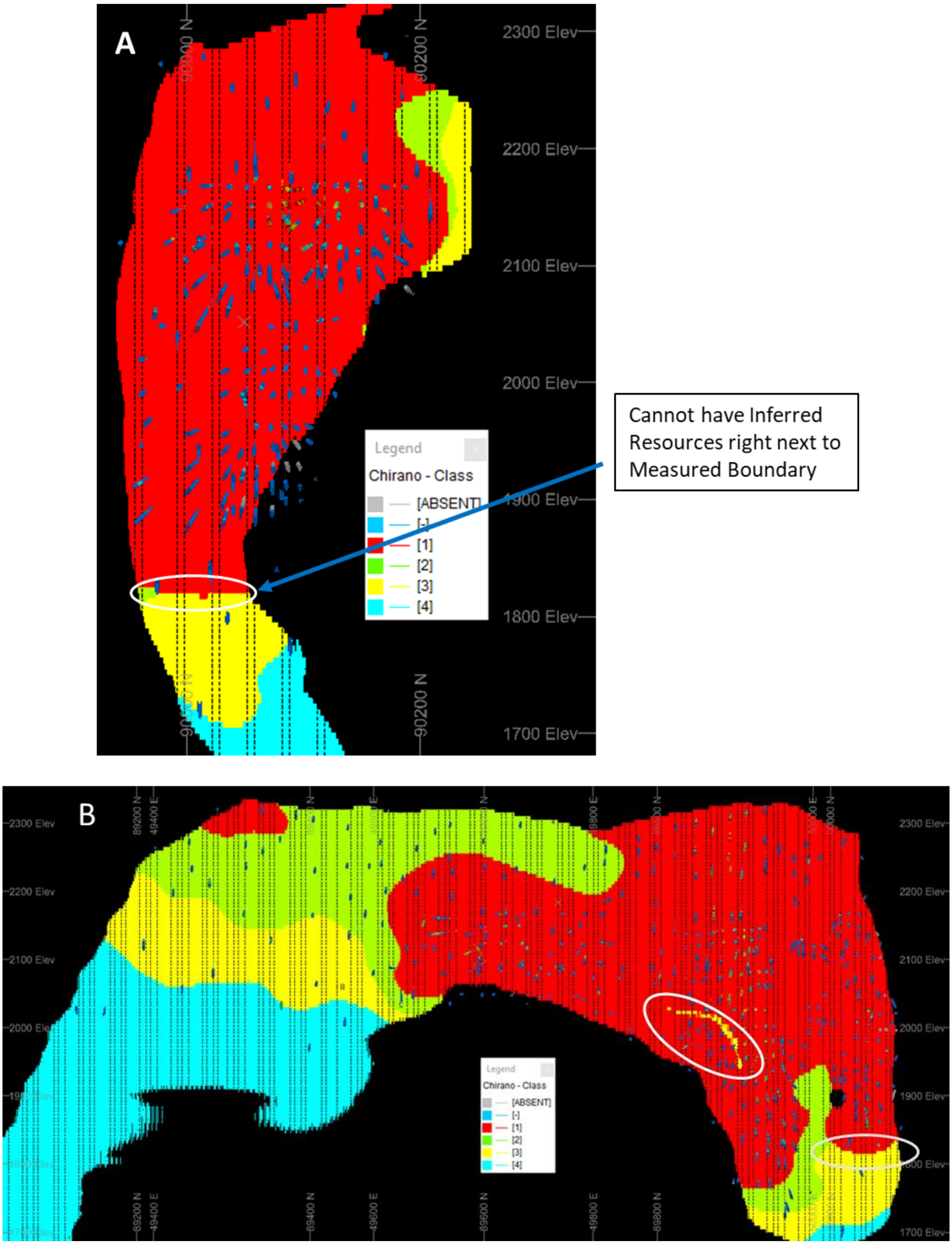


Figure 14-17: Plan view (2100 Rl),
above and below cross section along the strike (long section) of the mineralisation trend (NS – Block A) and (NNE, Block B) Long section of applied Mineral Resource classification (red – measured, green – Indicated and yellow – Inferred)

Snowden has reviewed the Akoti Mineral Resources classification and makes the following observations from Figure 14-17:

- There are Inferred resources adjacent to Measured resources (circled areas);
- There is room for some improvement with respect to the application of geostatistical analysis in the classification process e.g., Kriging efficiency (KE) and slope of regression (SoR) which indicate how good an estimate is.

14.5.12 Mineral Resource Reporting

ASSUMPTIONS AND PARAMETERS

The cut-off grade calculations are shown in Table 14-14.

Table 14-14: Cut-off Calculation Parameters for Akoti Underground Mineral Resources

Parameter	Units	Long Term 2021
Mining cost	(US$/t ore)	29.94
G&A	(US$/t ore)	7.23
Sustaining Capital	(US$/t ore)	2.15
Process costs	(US$/t ore)	15.06
Total US$/ore tonne	**(US$/t ore)**	**54.39**
Gold recovery	(%)	88.5
Total Dilution	(%)	12.5
Gold price	(US$/oz)	1,600
Cut-off grade	g/t	1.21

Using the parameters stated in Table 14-14, the QP has checked and confirmed that the application of a cut-off grade of 1.21g/t g/t for the reporting of Akoti underground Mineral Resources is appropriate.

REPORTING

The Akoti underground Mineral Resource estimates are reported according to the guidelines of the JORC Code (2012) and according to the CIM Definition Standards. The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the operations and summaries quoted in this report are on a 100% basis. The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The Mineral Resource for the Akoti underground deposit, as reported at 31st December. 2021, is presented in Table 14-15. The Mineral Resource has been depleted for both open pit and underground development and has been reported above a 1.21g/t Au cut-off.

Table 14-15: Total Inclusive Audited Akoti Underground Mineral Resource as at 31st December 2021 at 1.21 g/t Au cut-off

Classification	Tonnage (Mt)	Au Grade (g/t)	Metal Au Content (Moz)
Measured	1.83	2.05	0.120
Indicated	0.29	2.01	0.019
Measured + Indicated	**2.12**	**2.04**	**0.139**
Inferred	0.51	1.89	0.031

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *A density of 2.75t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
6. *Geological losses and depletions have been applied.*
7. *Inferred Mineral Resources have a great amount of uncertainty as to their existence and as to whether they can be mined economically. It cannot be assumed that all or part of the Inferred Mineral Resource will ever be upgraded to a higher category.*

14.6 Obra Underground

14.6.1 Drilling Database

A database extraction for the Obra deposit was completed in Chirano local grid on 2nd November, 2021. The database includes all exploration (DD and RC) drilling and grade control (GC) drillholes within the project extent. Prior to the database extraction a thorough data validation was conducted including post survey collar locations, downhole survey validations and assay validations. The data extraction includes csv files for collar, survey, assay, geology and alteration.

All surface RC, DD, underground drilling, GC drilling was used to build the domain wireframes. However, the surface GC drilling was excluded prior to resource estimation.

14.6.2 Data Verification

A QA process consisting of checks on the following was completed:

- Collar coordinates (eastings, northings, elevation and length);
- Survey (azimuth, dip, depth);
- Lithology (rock code, interval), and
- Assay (Au values, sample number, sample interval) was done.

No significant errors were noted that would be detrimental to the resource estimate updates.

14.6.3 Estimation Domains

Estimation litho-structural domains were generated following an extensive review of some of the Obra recent drillholes to support geological and structural interpretations using Leapfrog™ software. The modelled estimation domain was completed and found to be consistent with the methodology applied in previous models. The domains used in the estimation are captured in Table 14-16.

Table 14-16: Obra Estimation Domains

Domain Name	Domain Code
ob_rbxrix_nsz	100
ob_rbxrix_obeast	101
ob_rsz_nsz	200

Notes:
rsz – Shear zone, including data from carbonates and quartz dolerites domains.
rbx - High grade, intense brown breccia with high density of silica-albite-ankerite alteration with pyrite.
rix- High grade black siliceous breccia and intense quartz veining.

14.6.4 Compositing

The database csv files including all surface RC, DD, underground drilling and GC drilling comprising collar, survey, lithology and assay data were imported into Datamine software, where the de-surveying process in Datamine was run to create 3D drillholes. Using the same software, one metre composites with a minimum length of 0.5m were then generated. The composite length size of 1.0m was chosen due to the (narrow) size of the high-grade mineralization, 1.0m would be more representative and reduce any smoothing/dilution.

14.6.5 Exploratory Data Analysis and Capping

The composite files for the various domains were loaded into Supervisor software where descriptive statistics and capping analysis were conducted on each domain. Capping levels were evaluated after compositing using the global Top-Cut Analysis tool in Supervisor. Top-Cut Analysis was completed using a combination of approaches, including examination of the grade distributions (histograms and probability plots etc) and domain statistics for all domains. Although many of the statistical measures of outlier grade distribution were not extreme, most domains contained some outlier values when compared with the overall domain population. As such, top-cutting (or capping) of these identified outliers was completed to minimise the local impact of these samples on the estimate. The top-cuts selected, and the impact on the domain statistics for all composites, are presented in Table 14-17.

Table 14-17: Capping applied on Obra Domains

Domain	Capping Grade (g/t)
100	12
101	12
200	6

14.6.6 Variography

Using the composited data, variography for the mineralised domains was completed in Supervisor. The downhole variogram was used to define the nugget component of the modelled variogram and the spatial variograms were modelled using spherical structures. The variogram models are presented in Figure 14-18 to Figure 14-20.

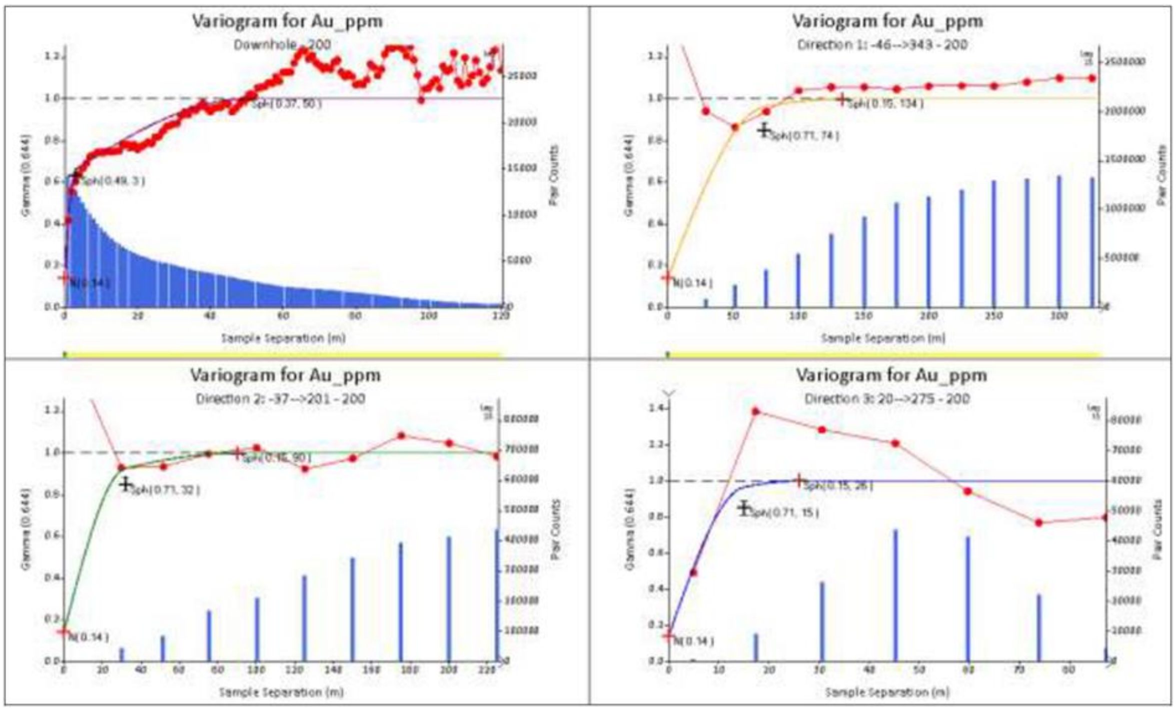


Figure 14-18: Directional Variograms for Domain 200

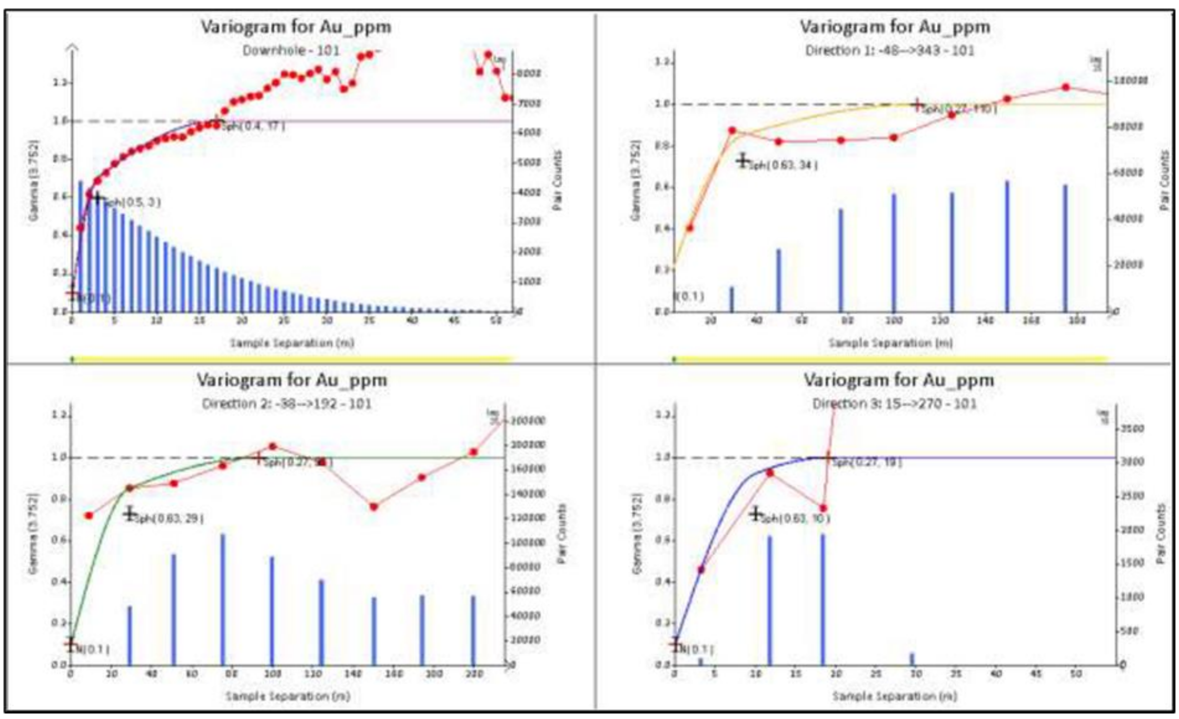


Figure 14-19: Directional Variograms for Domain 100

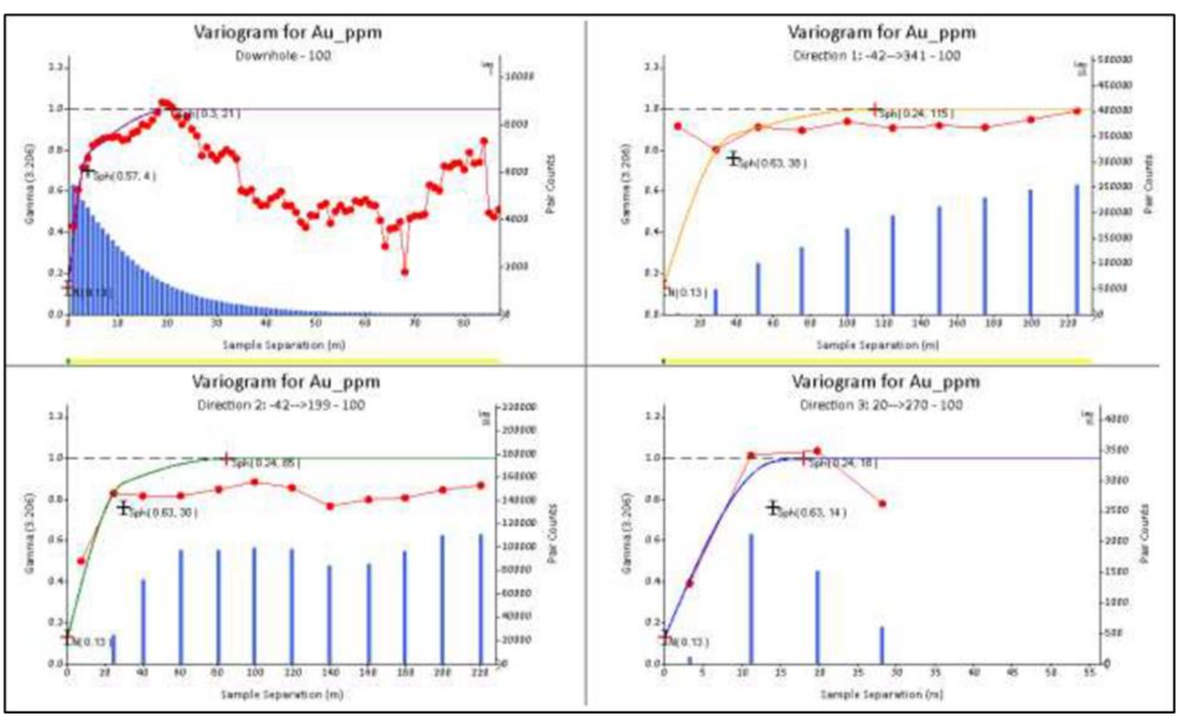


Figure 14-20: Directional Variograms for Domain 200

Snowden has reviewed the robustness and structure of all the experimental and modelled variograms for all the domains and though some are robust and well structured, the majority of the directional variograms are moderately to poorly structured. Some have no structures at all and will thus need to be recalculated.

14.6.7 Block Model

The block model was created in Leapfrog™ Geo software utilising the block model parameters presented in Table 14-18. The block model is not rotated and was created using the local Chirano mine grid. A 1.25m by 1.25m by 5.00m (X, Y, Z) block size with no sub blocks was used for Obra modelling work. The block model variable 'domain' was flagged with litho-structural and mineralization wireframes. The 'redox' variable was coded as fresh= 3 or oxide =1 based on the oxide surface. This was then used to also code the density; Fresh=2.75, transition= 2.30, and Oxide =1.56. The Obra block model was finalized in October 2021.

Table 14-18: Obra Block Model Parameters

	Easting (mE)	Northing (mN)	Elevation (mRL)
Origin	14,745.00	36,500.00	1,400.00
No. of blocks	248	1,400	209
Block Size	1.25	1.25	5

14.6.8 Grade Estimation

The block model was exported into Datamine Studio RM for estimation of Au using OK. No other elements have been estimated. Due to the arcuate overall geometry of the mineralisation, DA was adopted for grade estimation. The estimation was run in three passes for the Au grade attribute with the highest confidence blocks estimated in pass 1 and the lowest confidence blocks in pass 3. Reference surfaces were generated for each domain in Leapfrog™, which approximate the trend of the central point of a full width intercept. These surfaces were then imported into Studio RM and the dip and dip direction of each individual wireframe triangles was extracted and then coded to the block model using Nearest Neighbour (NN) search for each domain independently. The plunge was then coded into the block model using the plunge from the variograms generated in Supervisor. The mineralised wireframes were used to estimate the true dip and true dip direction for each domain.

Search and estimation parameters are presented in Table 14-19.

Table 14-19: Obra Search and Estimation Parameters

Domain	Pass	X Axis Search Range (m)	Y Axis Search Range (m)	Z Axis Search Range (m)	Composite	
					Min	Max
101	1	70	50	9	7	15
	2	105	75	13.5	4	15
	3	140	100	18	2	15
100	1	70	50	9	7	15
	2	105	75	13.5	4	15
	3	140	100	18	2	15
200	1	70	50	15	7	15
	2	105	75	22.5	4	15
	3	140	100	30	2	15

Snowden has stepped through the Obra model and confirm the results and observed that there are no material issues or fatal flaws in the modelling and estimation approaches employed by the Company.

14.6.9 Block Model Validations

The techniques adopted for the validation of the block estimates range from global mean comparison of estimates and composites using classical statistics, visual comparisons and swath analyses between the block model estimates and the composite data used to inform them.

VISUAL CHECKS

Initial validation consisted of a visual comparison of the input samples and the estimated block grade in cross section and plan view. The block estimates and sample composites data were superimposed on each other, and colour coded with the same legend for Au for comparison purposes. Visual checks of the model against the sample data used to inform the estimates shows that the estimated blocks reasonably match the sample data used to inform them particularly in areas that have significant data to inform the estimates. All the visual checks confirm that the block estimates are a reasonable representation of the informing data considering the current level of geological and geostatistical understanding of areas within the reach of the definition drilling as shown in Figure 14-21.

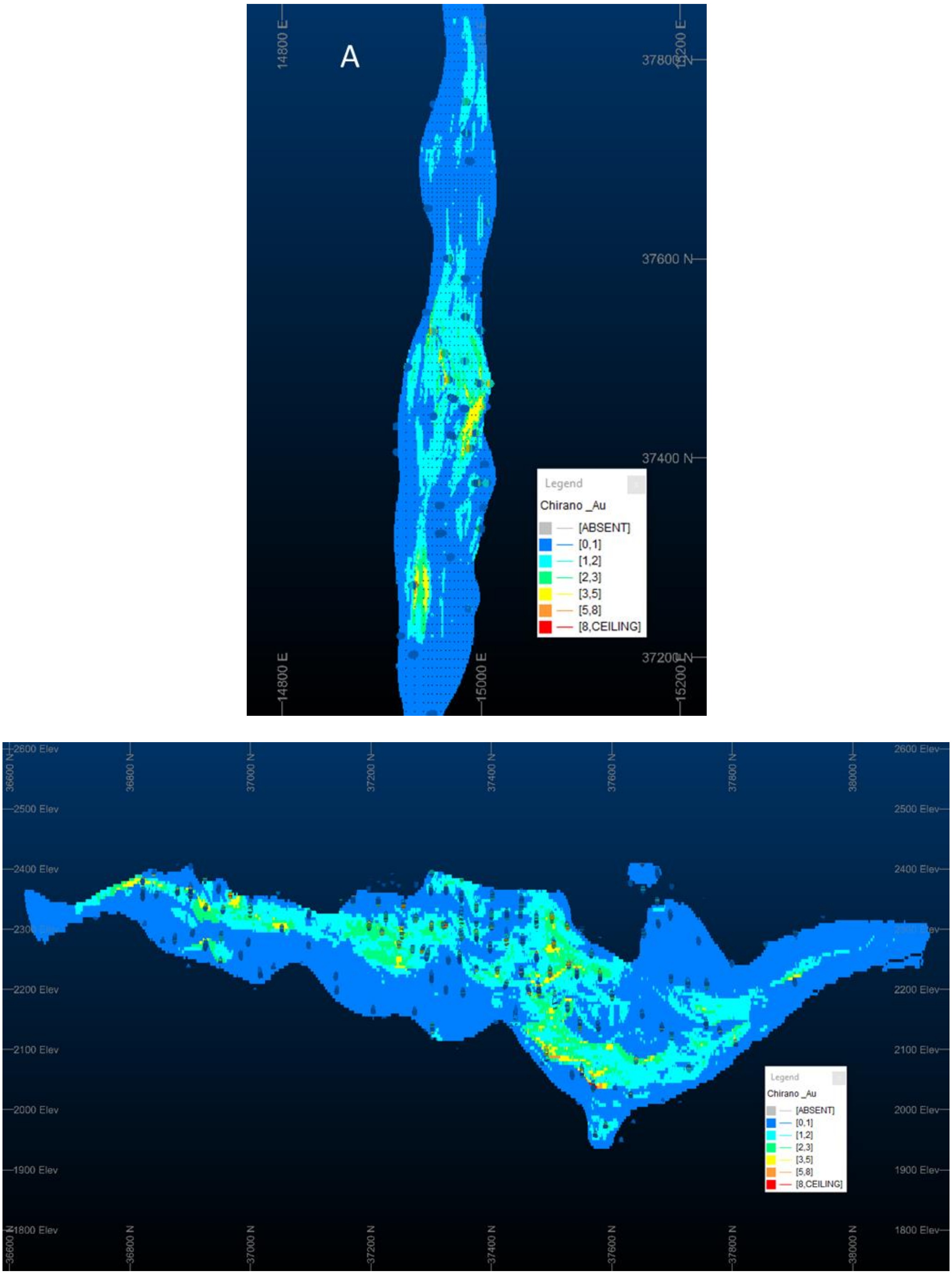


Figure 14-21: Comparison Between Composites and Block Grades in Plan view (2100 Rl) above and cross section along the strike (long section) of the mineralisation trend (NS)

SWATH ANALYSIS

Swath plots for local scale comparison i.e., validation between the averages of the estimated block contents with the averages of the clustered samples were generated. This validation was performed for each domain along easting, northing and elevation dimensions. An example from domain 101 is presented in Figure 14-22.

The results of the swath validation for sample data and block model estimates exhibited an expected degree of smoothing due to kriging. The estimated values tend to follow the sample values reasonably well, particularly in well sampled areas. But as you move further away from the well sampled areas and into areas that are poorly sampled (low drilling density) and towards peripheries of the deposit, the estimates are poorly informed.

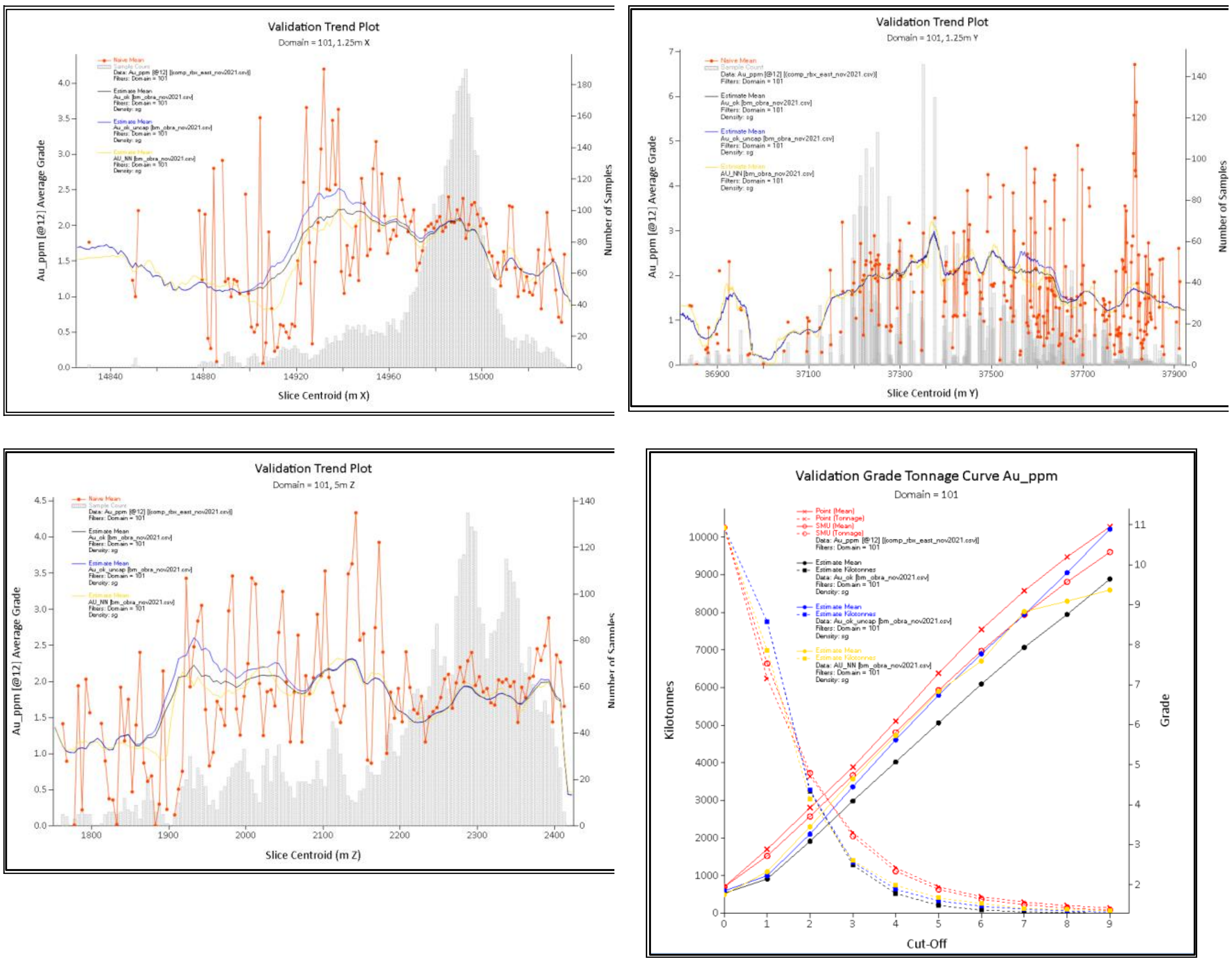


Figure 14-22:   Swath plots for domain 101; easting (top left), northing (top right) and elevation (bottom)

14.6.10 Depletion

The 2021 Mineral Resource has been depleted for both the open pit and underground workings.

14.6.11 Mineral Resource Classification

The 2021 Obra underground Mineral Resource has been classified into Measured, Indicated and Inferred categories in accordance with the JORC Code (2012). There are no material differences between the definitions of Indicated and Inferred Mineral Resources under the CIM Definition Standards and the equivalent definitions in the JORC Code (2012).

The criteria for classification at Obra is as follows:

- Geological confidence of the deposit and style of mineralisation;
- Measured category is where the nominal drillhole centres is less than 25 m and covered by grade control;
- Indicated category is where the drillhole spacing is greater than 25 but less than 35 meters;
- Inferred category is where the spacing is greater than 35 but less than 50 meters; and
- Where there are blocks estimated greater than 50 meters, this would be considered “potential”.

Figure 14-23 show the classification first as a long section and then as a cross section.

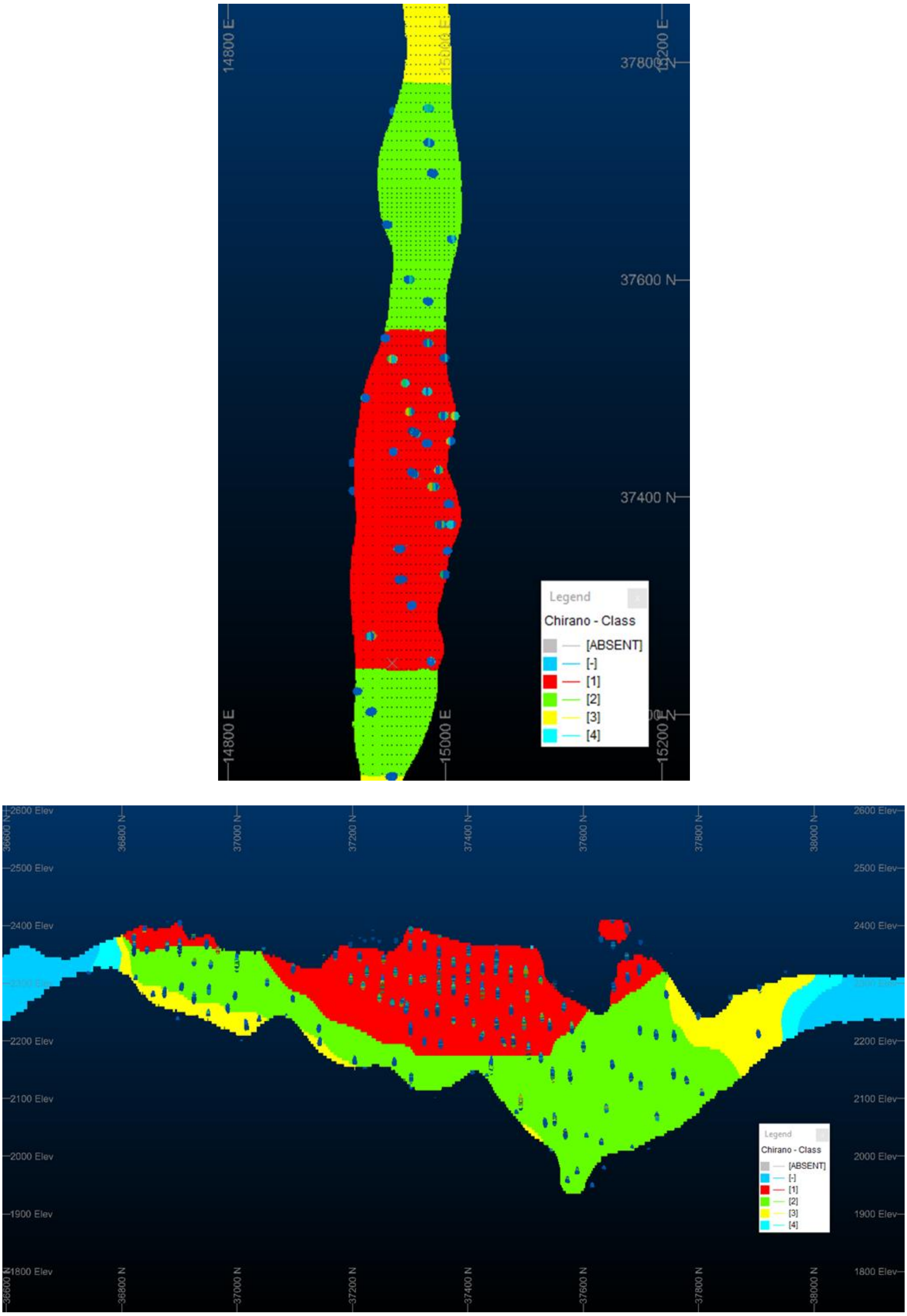


Figure 14-23: Plan view (2100 Rl)
above and below cross section along the strike (long section) of the mineralisation trend (NS) Long section of applied Mineral Resource classification (red – measured, green – Indicated and yellow – Inferred)

Snowden has reviewed the Obra Mineral Resources classification and makes the following observations from Figure 14-23:

- There is room for some improvement with respect to the application of geostatistical analysis in the classification process e.g., Kriging efficiency (KE) and slope of regression (SoR) which indicate how good an estimate is.

14.6.12 Mineral Resource Reporting

ASSUMPTIONS AND PARAMETERS

The cut-off grade calculations are shown in Table 14-20.

Table 14-20: Cut-off Calculation Parameters for Obra Underground Mineral Resources

Parameter	Units	Long Term 2021
Mining cost	(US$/t ore)	26.60
G&A	(US$/t ore)	7.23
Sustaining Capital	(US$/t ore)	2.15
Process costs	(US$/t ore)	15.06
Total $/ore tonne	(US$/t ore)	51.05
Gold recovery	(%)	88.5
Total Dilution	(%)	12.5
Gold price	(US$/oz)	1,600
Cut-off grade	g/t	1.14

Using the parameters stated in Table 14-20, the QP has checked and confirmed that the application of a cut-off grade of 1.14g/t for the reporting of Obra underground Mineral Resources is appropriate.

REPORTING

The Obra underground Mineral Resource estimates are reported according to the guidelines of the JORC Code (2012) and according to the CIM Definition Standards. The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the operations and summaries quoted in this report are on a 100% basis. The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The Mineral Resource for the Obra underground deposit, as reported at 31st December 2021, is presented in Table 14-21. The Mineral Resource has been depleted for both open pit and underground development and has been reported above a 1.14g/t Au cut-off.

Table 14-21: Total Inclusive Audited Obra Underground Mineral Resource as at 31st December 2021 at 1.14g/t Au cut-off

Classification	Tonnage (Mt)	Au Grade (g/t)	Metal Au Content (Moz)
Measured	0.12	1.82	0.007
Indicated	3.36	1.65	0.179
Measured + Indicated	**3.48**	**1.66**	**0.186**
Inferred	1.79	1.87	0.108

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *A density of 2.75t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
6. *Geological losses and depletions have been applied.*
7. *Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*

14.7 Paboase Underground

14.7.1 Drilling Database

A database extraction for the Paboase deposit was completed in Paboase local grid on the 16th of May, 2019. The database includes all exploration (DD and RC) drilling and grade control (GC) drillholes within the project extent. Prior to the database extraction a thorough data validation was conducted including post survey collar locations, downhole survey validations and assay validations. The data extraction includes csv files for collar, survey, assay, geology and alteration.

All surface RC, DD, underground drilling, GC drilling was used to build the domain wireframes. However, the surface GC drilling was excluded prior to the resource estimation.

14.7.2 Data Verification

A QA process consisting of checks on the following was completed:

- Collar coordinates (eastings, northings, elevation and length);
- Survey (azimuth, dip, depth);
- Lithology (rock code, interval), and
- Assay (Au values, sample number, sample interval) was done.

No significant errors were noted that would be detrimental to the resource estimate updates.

14.7.3 Estimation Domains

Estimation litho-structural domains were generated following an extensive review of some of the Paboase recent drillholes to support geological and structural interpretations using Leapfrog™ software. The modelled estimation domains were completed and found to be consistent with the methodology applied in previous models. The domains used in the estimation are captured in Table 14-22.

Table 14-22: Paboase Estimation Domains

Domain Name	Domain Code
rbx	101
rix	110
rsz	200

Notes:
rbx - High grade, intense brown breccia with high density of silica-albite-ankerite alteration with pyrite.
rix- High grade black siliceous breccia and intense quartz veining.
rsz – Shear zone, including data from carbonates and quartz dolerites domains.

14.7.4 Compositing

The database csv files including all surface RC, DD, underground drilling and GC drilling comprising collar, survey, lithology and assay data were imported into Datamine software, where the de-surveying process in Datamine was run to create 3D drillholes. Using the same software, one metre composites with a minimum length of 0.5m were then generated. The composite length size of 1.0m was chosen due to the (narrow) size of the high-grade mineralization, 1.0m would be more representative and reduce any smoothing/dilution.

14.7.5 Exploratory Data Analysis and Capping

The composite files for the various domains were loaded into Supervisor software where descriptive statistics and capping analysis were conducted on each domain. Capping levels were evaluated after compositing using the global Top-Cut Analysis tool in Supervisor. Top-Cut Analysis was completed using a combination of approaches, including examination of the grade distributions (histograms and probability plots etc) and domain statistics for all domains. Although many of the statistical measures of outlier grade distribution were not extreme, most domains contained some outlier values when compared with the overall domain population. As such, top-cutting (or capping) of these identified outliers was completed to minimise the local impact of these samples on the estimate. The top-cuts selected, and the impact on the domain statistics for all composites, are presented in Table 14-23.

Table 14-23: Capping Applied on Paboase Domains

Domain	Capping Grade (g/t)
100	20
101	20
200	10

14.7.6 Variography

Using the composited data, variography for the mineralised domains was completed in Supervisor. The downhole variogram was used to define the nugget component of the modelled variogram and the spatial variograms were modelled using spherical structures. The variogram models are presented in Figure 14-24 to Figure 14-26.

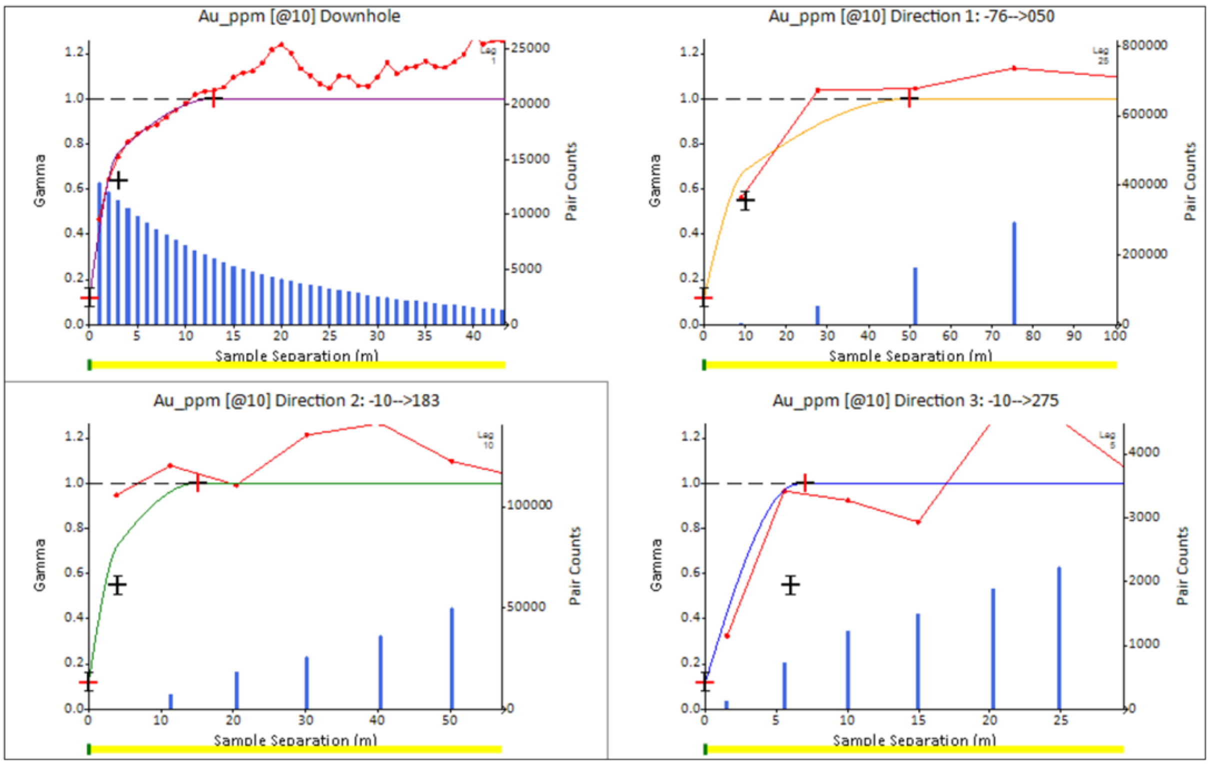


Figure 14-24: Directional Variograms for Domain rsz

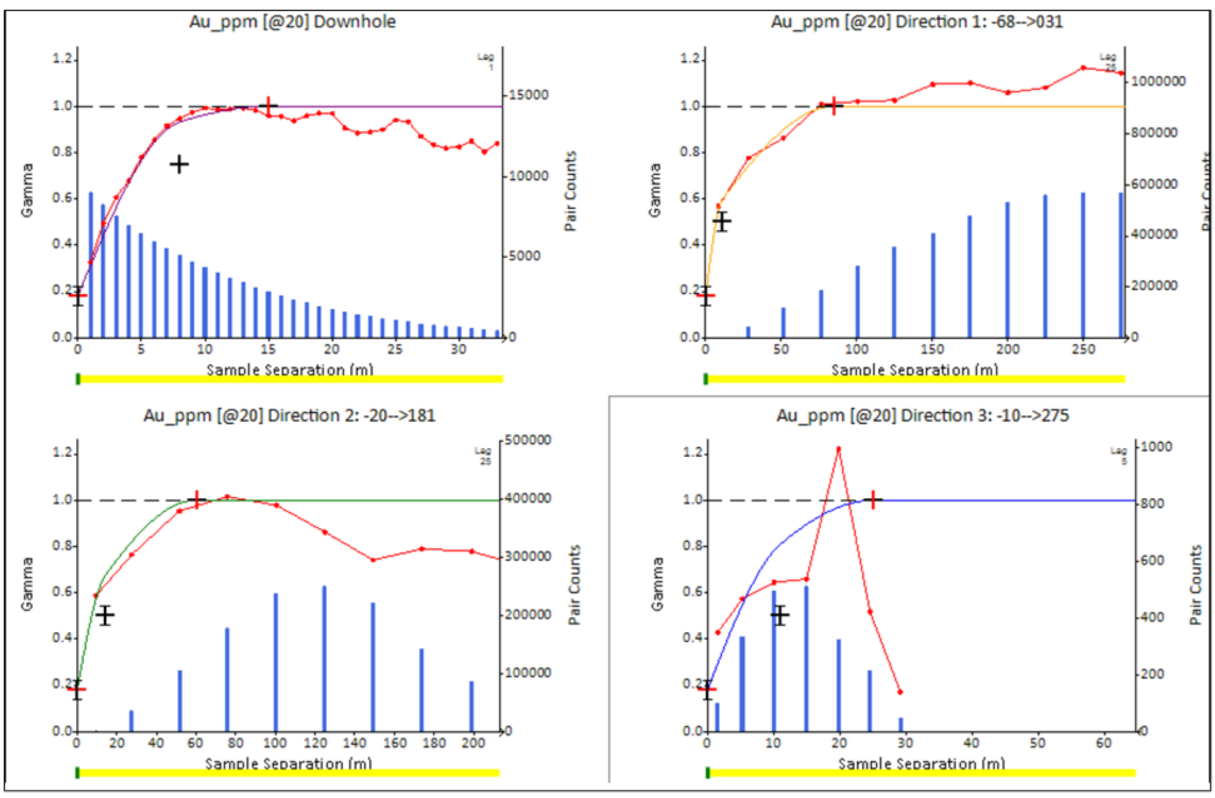


Figure 14-25: Directional Variograms for Domain rbx

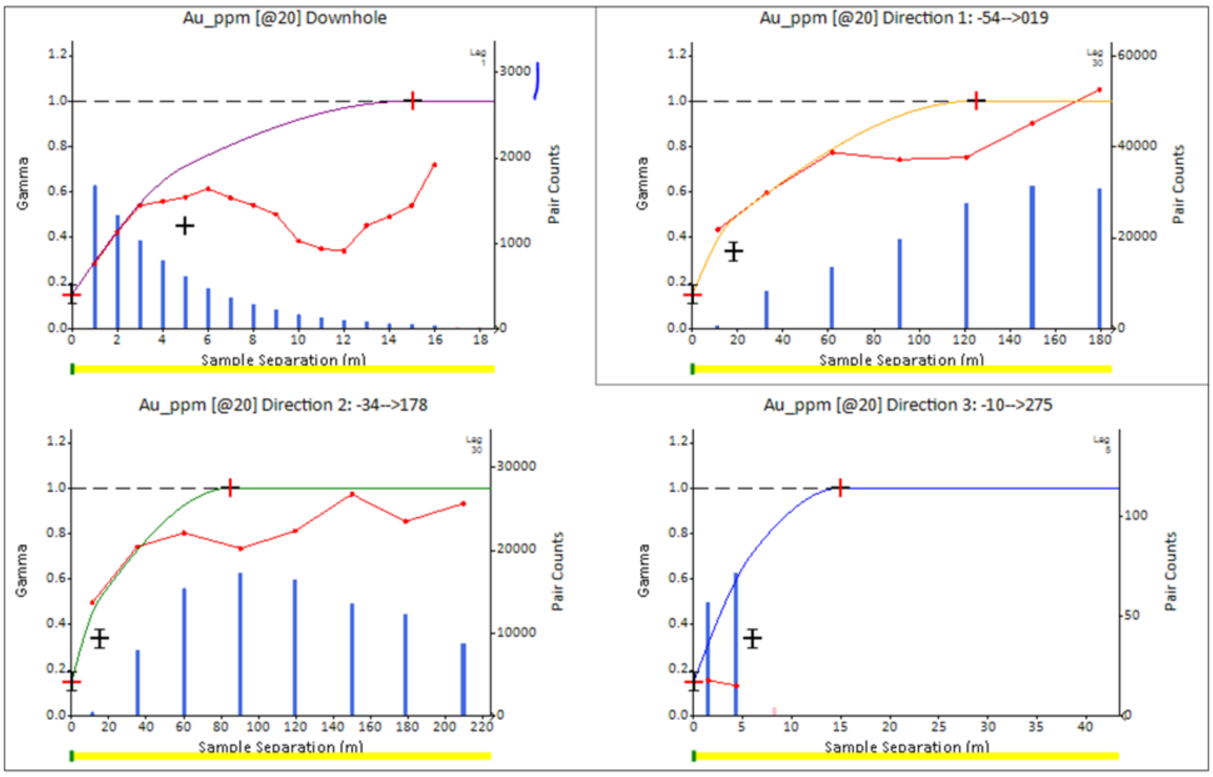


Figure 14-26: Directional Variograms for Domain rix

Snowden Optiro has reviewed the robustness and structure of the experimental and modelled variograms and though most are robust and are well structured, some of the directional variograms are moderately to poorly structured and will need to be recalculated.

14.7.7 Block Model

The block model was created in Leapfrog™ Geo software utilising the block model parameters presented in Table 14-24. The block model is not rotated and was created using the local Chirano mine grid. A 1.25m by 1.25m by 5.00m (X, Y, Z) block size with no sub blocks was used for Paboase modelling work. The block model variable 'domain' was flagged with litho-structural and mineralization wireframes. The 'redox' variable was coded as fresh= 3 or oxide =1 based on the oxide surface. This was then used to also code the density; Fresh=2.75, transition= 2.30, and Oxide =1.56. The Paboase block model was finalized in October 2021.

Table 14-24: Paboase Block Model Parameters

	Easting (mE)	Northing (mN)	Elevation (mRL)
Origin	49,990.00	90,160.00	1,095.00
No. of blocks	156	704	279
Block Size	1.25	1.25	5

14.7.8 Grade Estimation

The block model was exported into Datamine Studio RM for estimation of Au using OK. No other elements have been estimated. Due to the arcuate overall geometry of the mineralisation, DA was adopted for grade estimation. The estimation was run in three passes for the Au grade attribute with the highest confidence blocks estimated in pass 1 and the lowest confidence blocks in pass 3. Reference surfaces were generated for each domain in Leapfrog™, which approximate the trend of the central point of a full width intercept. These surfaces were then imported into Studio RM and the dip and dip direction of each individual wireframe triangles was extracted and then coded to the block model using NN search for each domain independently. The plunge was then coded into the block model using the plunge from the variograms generated in Supervisor. The mineralised wireframes were used to estimate the true dip and true dip direction for each domain.

Search and estimation parameters are presented in Table 14-25.

Table 14-25: Paboase Search and Estimation Parameters

Domain	Pass	X Axis Search Range (m)	Y Axis Search Range (m)	Z Axis Search Range (m)	Composite Min	Composite Max
101	1	70	50	9	7	15
	2	105	75	13.5	4	15
	3	140	100	18	2	15

Domain	Pass	X Axis Search Range (m)	Y Axis Search Range (m)	Z Axis Search Range (m)	Composite	
					Min	Max
100	1	70	50	9	7	15
	2	105	75	13.5	4	15
	3	140	100	18	2	15
200	1	70	50	15	7	15
	2	105	75	22.5	4	15
	3	140	100	30	2	15

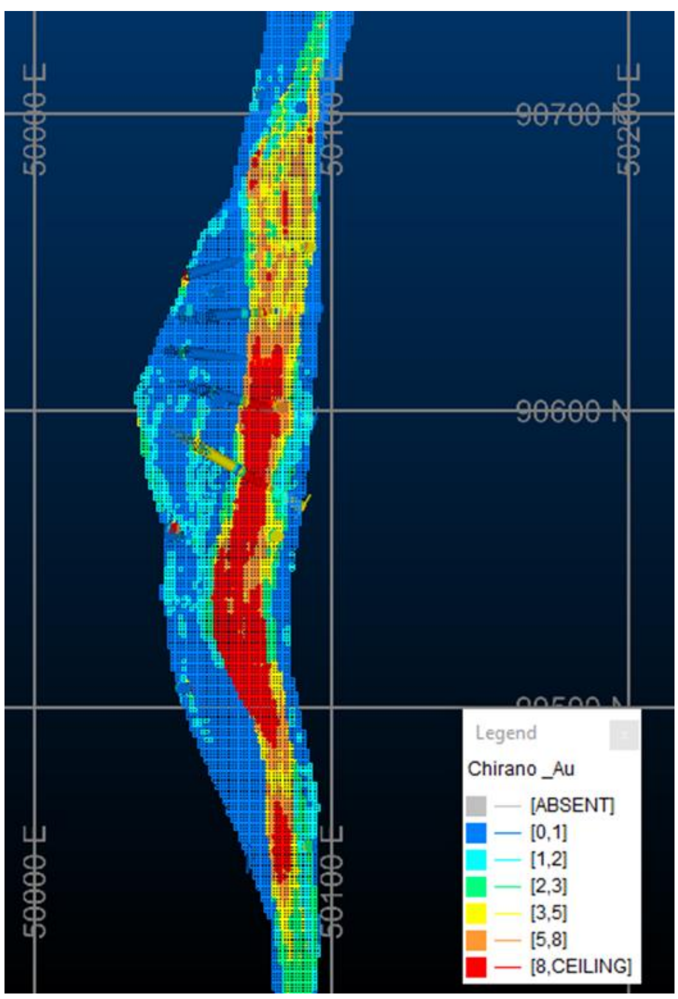
Snowden Optiro has stepped through the Paboase model and confirm the results and observed that there are no material issues or fatal flaws in the modelling and estimation approaches employed by the Company.

14.7.9 Block Model Validations

The techniques adopted for the validation of the block estimates range from global mean comparison of estimates and composites using classical statistics, visual comparisons and swath analyses between the block model estimates and the composite data used to inform them.

VISUAL CHECKS

Initial validation consisted of a visual comparison of the input samples and the estimated block grade in cross section and plan view. The block estimates and sample composites data were superimposed on each other, and colour coded with the same legend for Au for comparison purposes. Visual checks of the model against the sample data used to inform the estimates shows that the estimated blocks reasonably match the sample data used to inform them particularly in areas that have significant data to inform the estimates. All the visual checks confirm that the block estimates are a reasonable representation of the informing data considering the current level of geological and geostatistical understanding of areas within the reach of the definition drilling as shown in Figure 14-27.



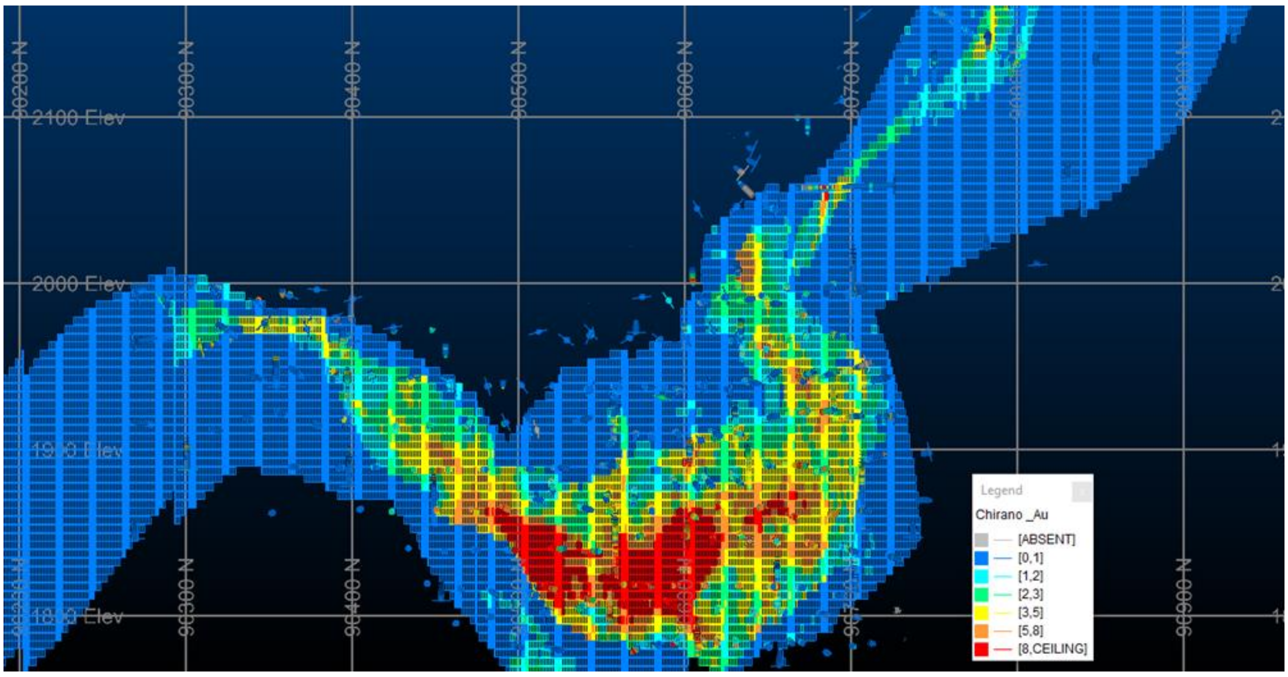


Figure 14-27: Comparison between composites and block grades in plan view (1850 Rl) above and cross section along the strike (long section) of the mineralisation trend (NS)

SWATH ANALYSIS

Swath plots for local scale comparison i.e., validation between the averages of the estimated block contents with the averages of the clustered samples were generated. This validation was performed for each domain along easting, northing and elevation dimensions. An example from domain 101 is presented in Figure 14-28.

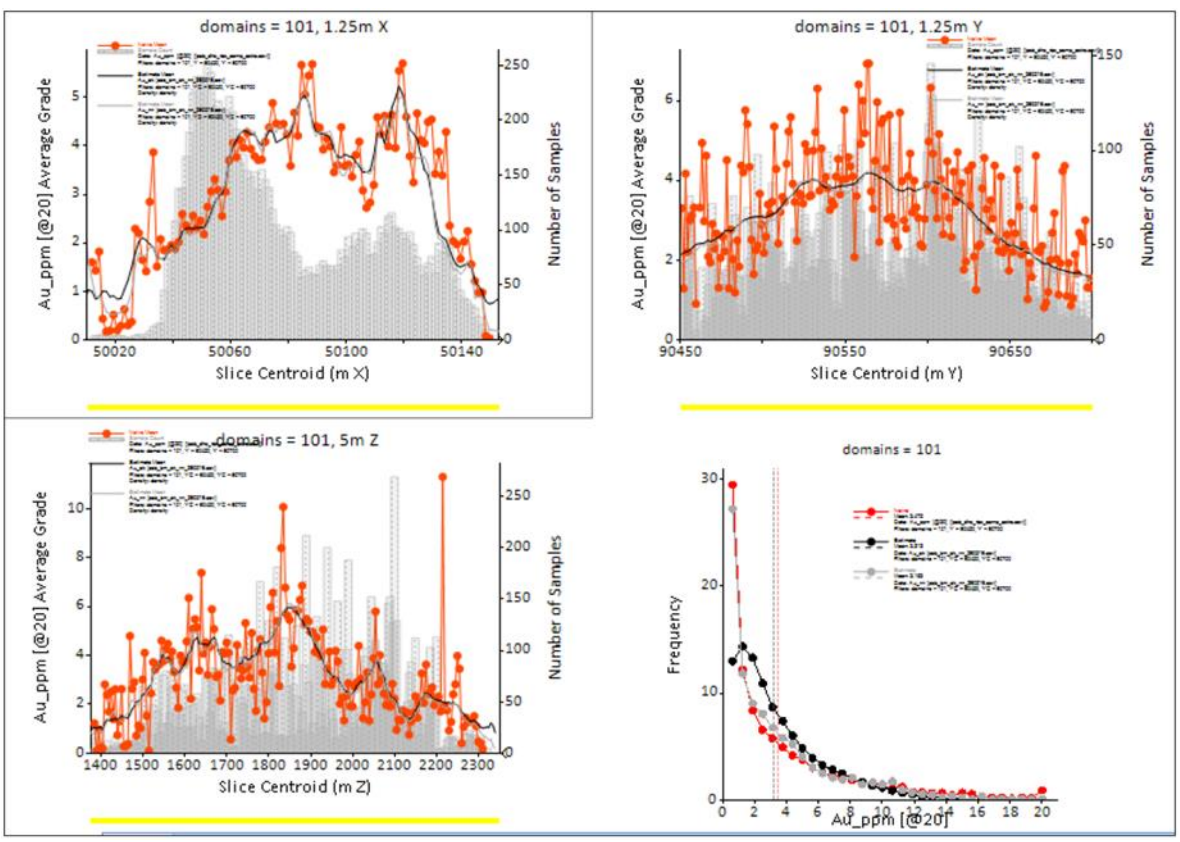


Figure 14-28: Swath plots for domain 101; easting (top left), northing (top right) and elevation (bottom)

The results of the swath validation for sample data and block model estimates exhibited an expected degree of smoothing due to kriging. The estimated values tend to follow the sample values reasonably well, particularly in well sampled areas. But as you move further away from the well sampled areas and into areas that are poorly sampled (low drilling density) and towards peripheries of the deposit, the estimates are poorly informed.

14.7.10 Depletion

The 2021 Mineral Resource has been depleted for both the open pit and underground workings.

14.7.11 Mineral Resource classification

The 2021 Paboase underground Mineral Resource has been classified into Measured, Indicated and Inferred categories in accordance with the JORC Code (2012). There are no material differences between the definitions of Indicated and Inferred Mineral Resources under the CIM Definition Standards and the equivalent definitions in the JORC Code (2012).

The criteria for classification at Paboase is as follows:

- Geological confidence of the deposit and style of mineralisation;
- Measured category is where the nominal drillhole centres is less than 25m and covered by grade control;
- Indicated category is where the drillhole spacing is greater than 25 but less than 35 meters;
- Inferred category is where the spacing is greater than 35 but less than 50 meters; and
- Where there are blocks estimated greater than 50 meters, this would be considered "potential".

Figure 14-29 shows the classification first as a long section and then as a cross section.

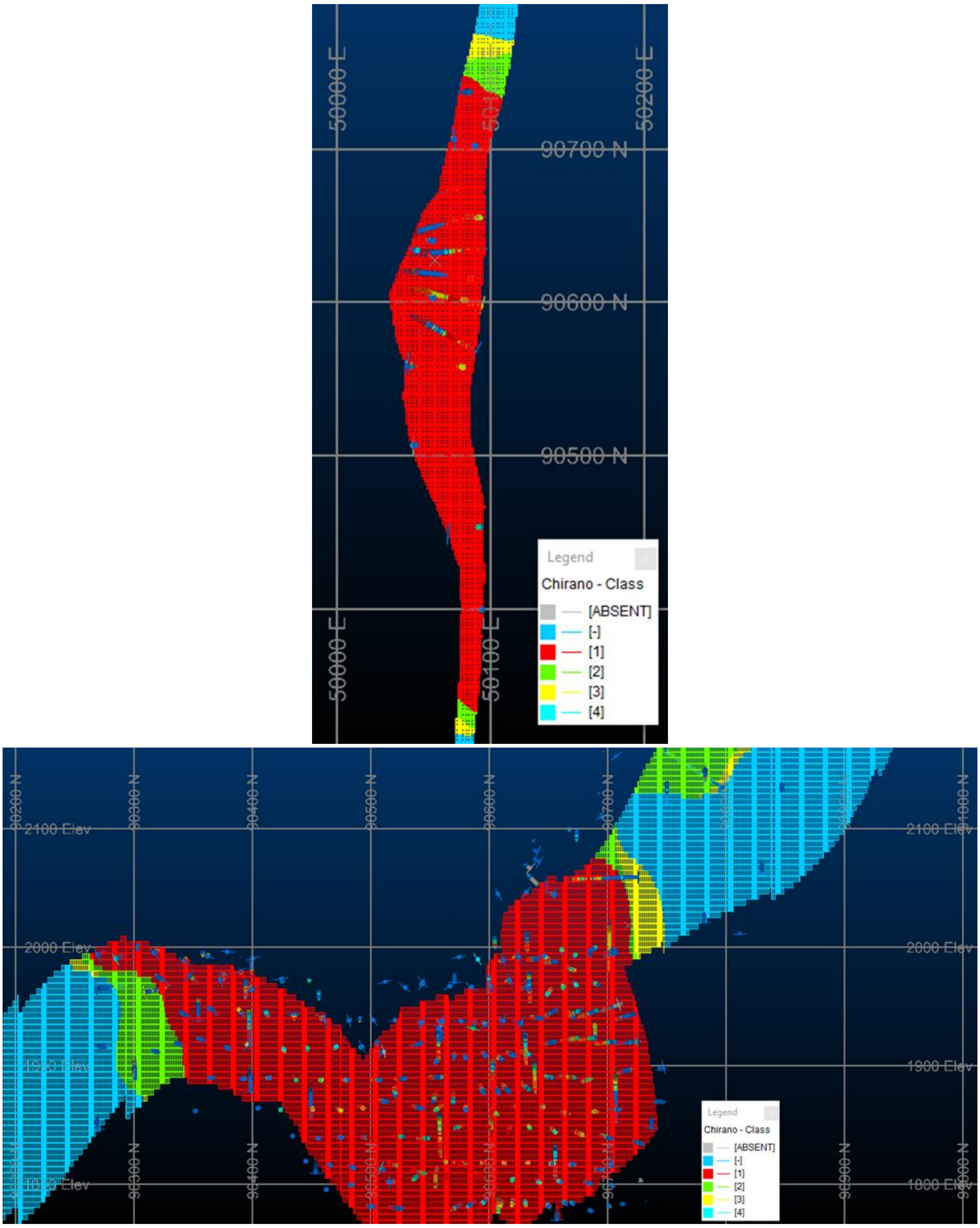


Figure 14-29: Plan view (1850 Rl),
above and below cross section along the strike (long section) of the mineralisation trend (NS)

Snowden Optiro has reviewed the Paboase Mineral Resources classification and makes the following observations from Figure 14-29:

- There is room for some improvement with respect to the application of geostatistical analysis in the classification process e.g., Kriging efficiency (KE) and slope of regression (SoR) which indicate how good an estimate is.

14.7.12 Mineral Resource Reporting

ASSUMPTIONS AND PARAMETERS

The cut-off grade calculation is shown in Table 14-26.

Table 14-26: Cut-off Grade Calculation Parameters for Paboase Underground Mineral Resources

Parameter	Units	Long Term 2021
Mining cost	(US$/t ore)	35.57
G&A	(US$/t ore)	7.23
Sustaining Capital	(US$/t ore)	2.15
Process costs	(US$/t ore)	15.06
Total $/ore tonne	**(US$/t ore)**	**60.02**
Gold recovery	(%)	88.5
Total Dilution	(%)	25.0
Gold price	(US$/oz)	1,600
Cut-off grade	g/t	1.34

Using the parameters stated in Table 14-26, the QP has checked and confirmed that the application of a cut-off grade of 1.34g/t for the reporting of Paboase underground Mineral Resources is appropriate.

REPORTING

The Paboase underground Mineral Resource estimates are reported according to the guidelines of the JORC Code (2012) and according to the CIM Definition Standards. The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the operations and summaries quoted in this report are on a 100% basis. The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The Mineral Resource for the Paboase underground deposit, as reported at 31st December 2021, is presented in Table 14-27. The Mineral Resource has been depleted for both open pit and underground development and has been reported above a 1.34g/t Au cut-off.

Table 14-27: Total Inclusive Audited Paboase Underground Mineral Resource as at 31st December 2021 at 1.34 g/t Au cut-off

Classification	Tonnage (Mt)	Au Grade (g/t)	Metal Au Content (Moz)
Measured	0.12	1.82	0.007
Indicated	3.36	1.65	0.179
Measured + Indicated	**3.48**	**1.66**	**0.186**
Inferred	1.79	1.87	0.108

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *A density of 2.75 t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
6. *Geological losses and depletions have been applied.*
7. *Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*

14.8 Tano Underground

14.8.1 Drilling Database

A database extraction for the Tano deposit was completed in Tano local grid on the 9th May, 2021. The database includes all exploration (DD and RC) drilling and grade control (GC) drillholes within the project extent. Prior to the database extraction a thorough data validation was conducted including post survey collar locations, downhole survey validations and assay results validation. The data extraction includes csv files for collar, survey, assay, geology and alteration.

All surface RC, DD, underground drilling, GC drilling was used to build the domain wireframes. However, the surface GC drilling was excluded prior to the resource estimation.

14.8.2 Data Verification

A QA process consisting of checks on the following was completed:

- Collar coordinates (eastings, northings, elevation and length);
- Survey (azimuth, dip, depth);
- Lithology (rock code, interval), and
- Assay (Au values, sample number, sample interval) was done.

No significant errors were noted that would be detrimental to the resource estimate updates.

14.8.3 Estimation Domains

Estimation litho-structural domains were generated following an extensive review of some of the Tano recent drillholes to support geological and structural interpretations using Leapfrog™ software. The modelled estimation domains were completed and found to be consistent with the methodology applied in previous models. The domains used in the estimation are captured in Table 14-28.

Table 14-28: Tano Estimation Domains

Domain Name	Domain Code
rbx_nsz	100
Tnmain	101
rbx_Tnoblique	103
TNsplay4	104
TNsplay6	106
rix_nszqr	110
rsz_all_nsz	200

14.8.4 Compositing

The database csv files including all surface RC, DD, underground drilling and GC drilling comprising collar, survey, lithology and assay data were imported into Datamine software, where the desurveying process in Datamine was run to create 3D drillholes. Using the same software, one metre composites with a minimum length of 0.5m were then generated. The composite length size of 1.0m was chosen due to the (narrow) size of the high-grade mineralization, 1.0m would be more representative and reduce any smoothing/dilution.

14.8.5 Exploratory Data Analysis and Capping

The composite files for the various domains were loaded into Supervisor software where descriptive statistics and capping analysis were conducted on each domain. Capping levels were evaluated after compositing using the global Top-Cut Analysis tool in Supervisor. Top-Cut Analysis was completed using a combination of approaches, including examination of the grade distributions (histograms and probability plots etc) and domain statistics for all domains. Although many of the statistical measures of outlier grade distribution were not extreme, most domains contained some outlier values when compared with the overall domain population. As such, top-cutting (or capping) of these identified outliers was completed to minimise the local impact of these samples on the estimate. The top-cuts selected, and the impact on the domain statistics for all composites, are presented in Table 14-29.

Table 14-29: Capping Applied on Tano Domains

Domain	Capping Grade (g/t)
100	21
101	13.5
103	19
104	12
106	10
110	6.5
200	8

14.8.6 Variography

Using the composited data, variography for the mineralised domains was completed in Supervisor. The downhole variogram was used to define the nugget component of the modelled variogram and the spatial variograms were modelled using spherical structures. The variogram models are presented in Figure 14-30 to Figure 14-32.

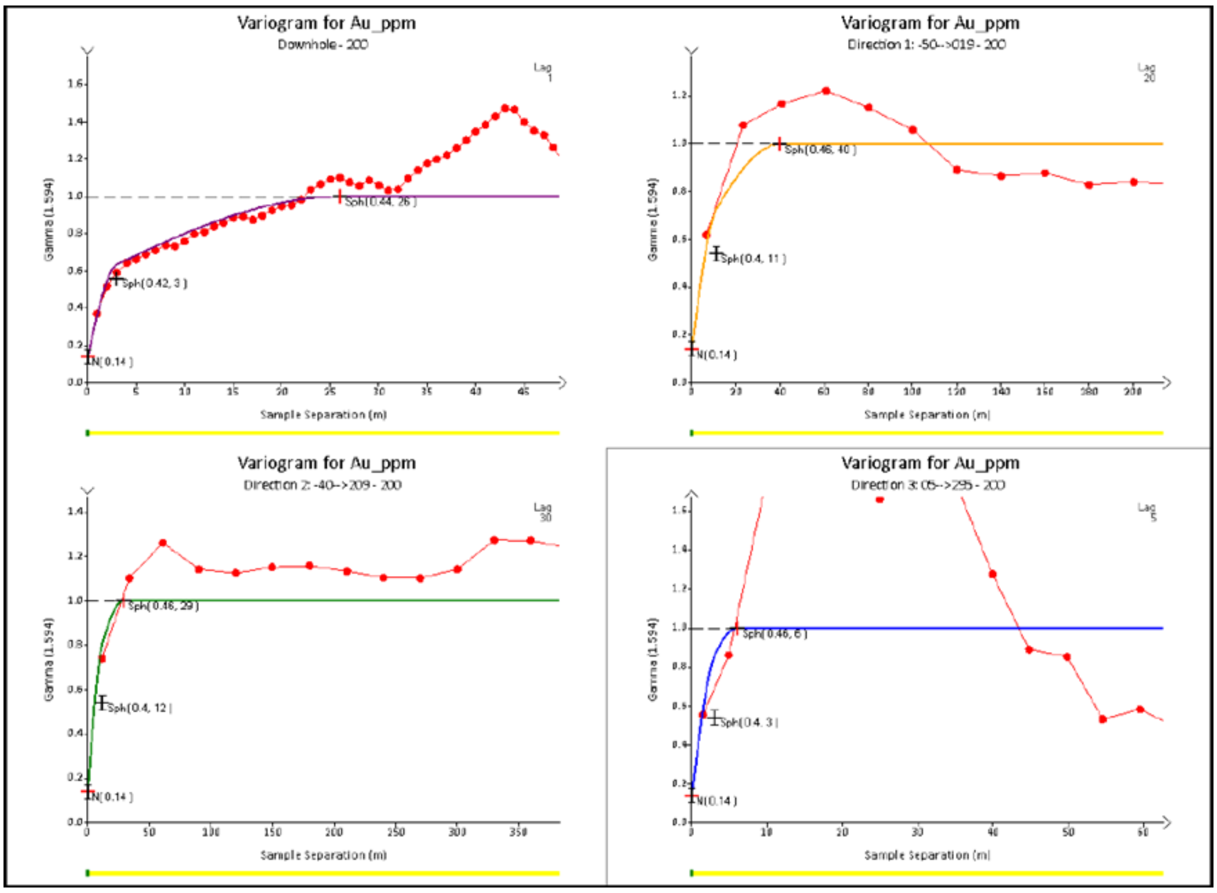


Figure 14-30: Directional Variograms for Domain rsz (200)

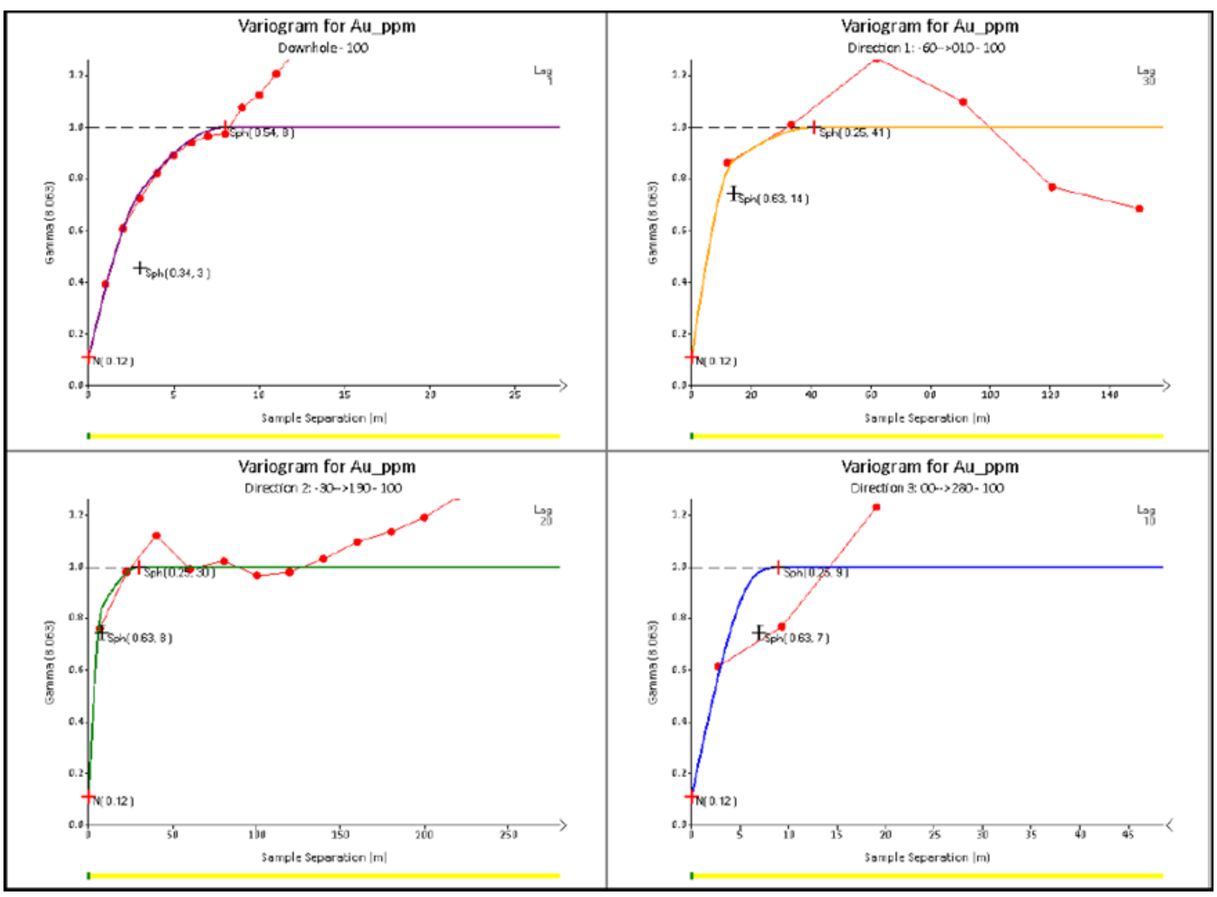


Figure 14-31: Directional Variogram for Domain rbx (100)

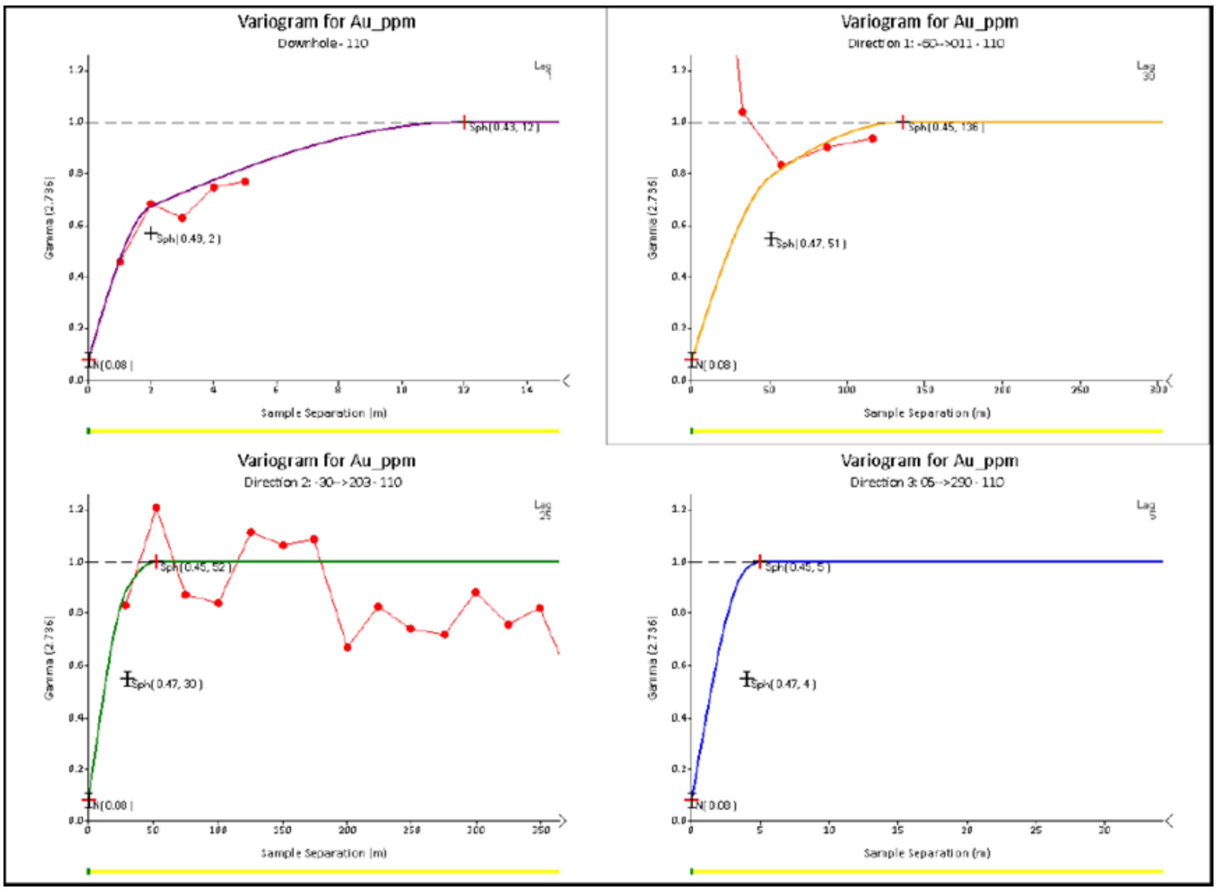


Figure 14-32: Directional Variograms for Domain rix (110)

Snowden Optiro has reviewed the robustness and structure of all the experimental and modelled variograms for all the domains and though some are robust and well structured, the majority of the directional variograms are moderately to poorly structured. Some have no structures at all and will thus need to be recalculated.

14.8.7 Block Model

The block model was created in Leapfrog™ Geo software utilising the block model parameters presented in Table 14-30. The block model is not rotated and was created using the local Chirano mine grid. A 1.25m by 1.25m by 5.00m (X, Y, Z) block size with no sub blocks was used for Tano modelling work. The block model variable 'domain' was flagged with litho-structural and mineralization wireframes. The 'redox' variable was coded as fresh= 3 or oxide =1 based on the oxide surface. This was then used to also code the density; Fresh=2.75, transition= 2.30, and Oxide =1.56. The Tano block model was finalized in October 2021.

Table 14-30: Tano Block Model Parameters

	Easting (mE)	Northing (mN)	Elevation (mRL)
Origin	49,842.24	90,623.864	1,100
No. of blocks	589	748	275
Block Size	1.25	1.25	5

14.8.8 Grade Estimation

The block model was exported into Datamine Studio RM for estimation of Au using OK. No other elements have been estimated. Due to the arcuate overall geometry of the mineralisation, DA was adopted for grade estimation. The estimation was run in three passes for the Au grade attribute with the highest confidence blocks estimated in pass 1 and the lowest confidence blocks in pass 3. Reference surfaces were generated for each domain in Leapfrog™, which approximate the trend of the central point of a full width intercept. These surfaces were then imported into Studio RM and the dip and dip direction of each individual wireframe triangles was extracted and then coded to the block model using NN search for each domain independently. The plunge was then coded into the block model using the plunge from the variograms generated in Supervisor. The mineralised wireframes were used to estimate the true dip and true dip direction for each domain.

Search and estimation parameters are presented in Table 14-31.

Table 14-31: Tano Search and Estimation Parameters

Domain	Pass	X Axis Search Rang (m)	Y Axis Search Range (m)	Z Axis Search Range (m)	Composite	
					Min	Max
110	1	35	25	5	3	15
	2	52.5	37.5	7.5	3	15
	3	70	50	10	3	15
103	1	50	40	8	3	15
	2	75	60	12	3	15
	3	100	80	16	3	15
101	1	55	40	8.5	3	15
	2	82.5	60	12.75	3	15
	3	110	80	17	3	15
104	1	50	35	6	3	15
	2	75	52.5	9	3	15
	3	100	70	12	3	15
100	1	70	50	8	3	15
	2	105	75	12	3	15
	3	140	100	16	3	15
106	1	50	25	5	3	15
	2	75	37.5	7.5	3	15
	3	100	50	10	3	15
200	1	70	50	11	3	15
	2	105	75	16.5	3	15
	3	140	100	22	3	15

Snowden Optiro has stepped through the Tano model and confirm the results and observed that there are no material issues or fatal flaws in the modelling and estimation approaches employed by the Company.

14.8.9 Block Model Validations

The techniques adopted for the validation of the block estimates range from global mean comparison of estimates and composites using classical statistics, visual comparisons and swath analyses between the block model estimates and the composite data used to inform them.

VISUAL CHECKS

Initial validation consisted of a visual comparison of the input samples and the estimated block grade in cross section and plan view. The block estimates and sample composites data were superimposed on each other, and colour coded with the same legend for Au for comparison purposes. Visual checks of the model against the sample data used to inform the estimates shows that the estimated blocks reasonably match the sample data used to inform them particularly in areas that have significant data to inform the estimates. All the visual checks confirm that the block estimates are a reasonable representation of the informing data considering the current level of geological and geostatistical understanding of areas within the reach of the definition drilling as shown in Figure 14-33.

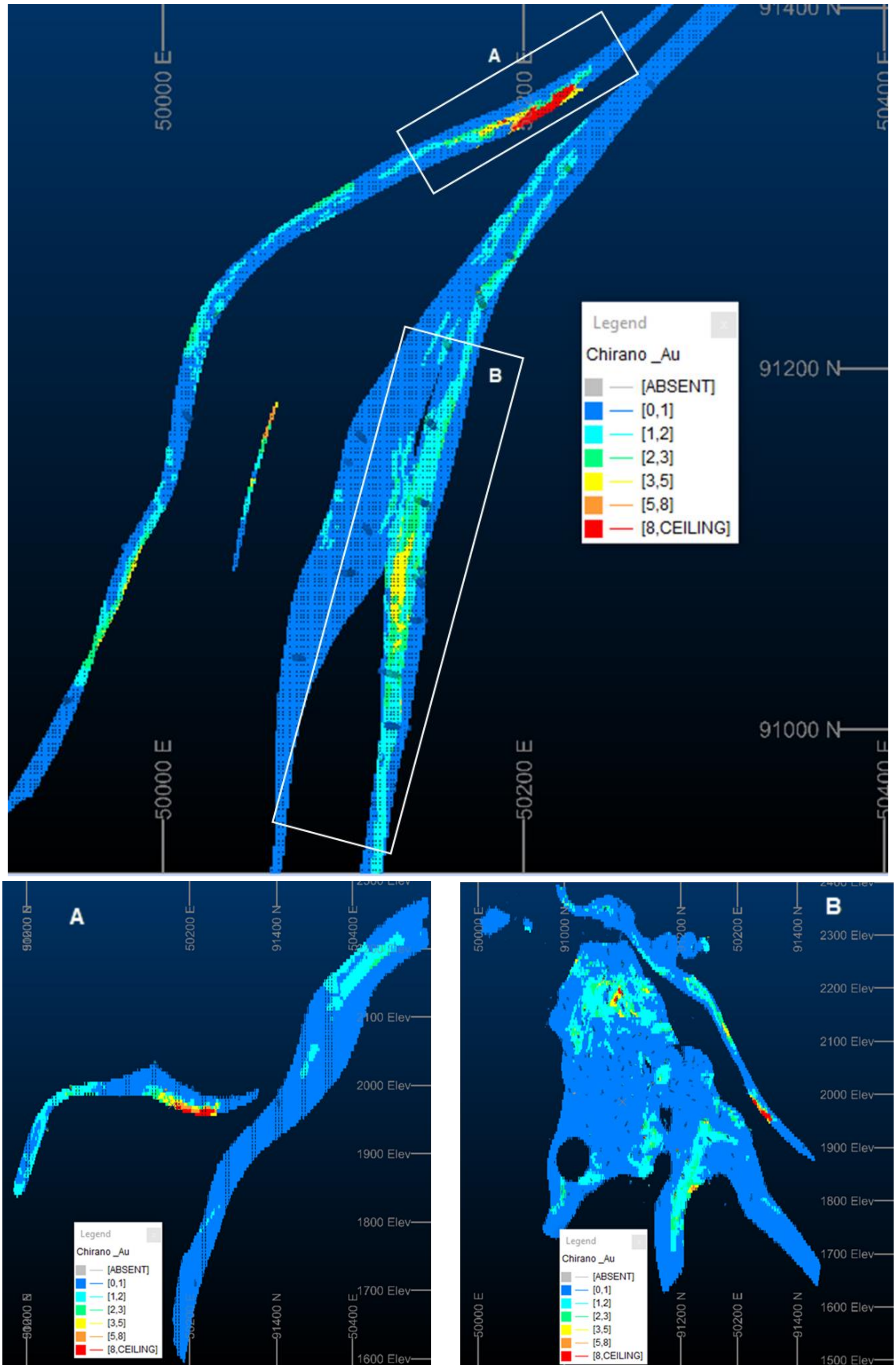


Figure 14-33: Comparison between composites and block grades in plan view (1950 Rl) above and cross section along the strike (long section) of the mineralisation trend (Block A) and (Block B)

SWATH ANALYSIS

Swath plots for local scale comparison i.e., validation between the averages of the estimated block contents with the averages of the clustered samples were generated. This validation was performed for each domain along easting, northing and elevation dimensions. An example from domain 100 is presented in Figure 14-34.

The results of the swath validation for sample data and block model estimates exhibited an expected degree of smoothing due to kriging. The estimated values tend to follow the sample values reasonably well, particularly in well sampled areas. But as you move further away from the well sampled areas and into areas that are poorly sampled (low drilling density) and towards peripheries of the deposit, the estimates are poorly informed.

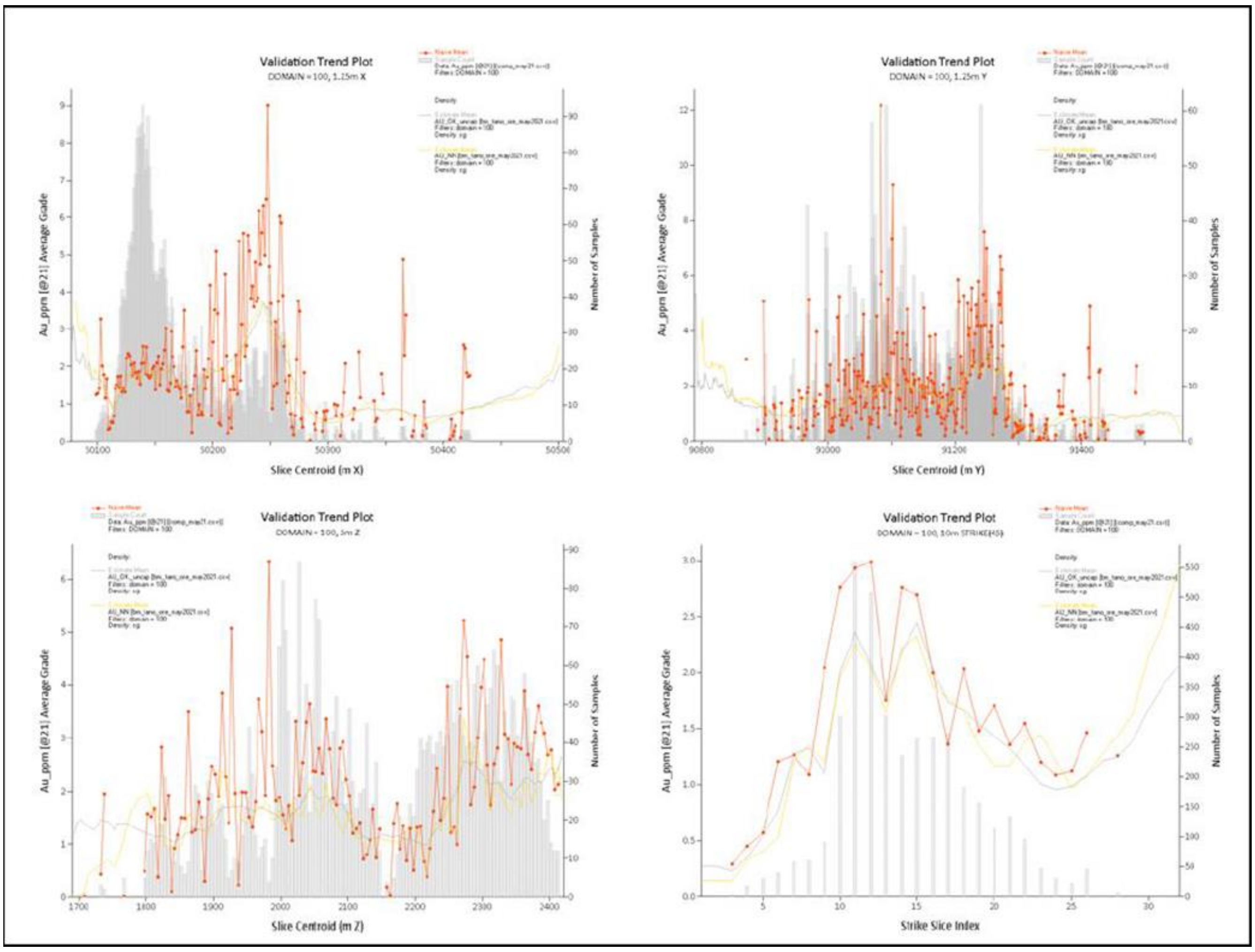


Figure 14-34: Swath plots for domain 100; easting (top left), northing (top right) and elevation (bottom)

14.8.10 Depletion

The 2021 Mineral Resource has been depleted for both the open pit and underground workings.

14.8.11 Mineral Resource Classification

The 2021 Tano underground Mineral Resource has been classified into Measured, Indicated and Inferred categories in accordance with the JORC Code (2012). There are no material differences between the definitions of Indicated and Inferred Mineral Resources under the CIM Definition Standards and the equivalent definitions in the JORC Code (2012).

The criteria for classification at Tano is as follows:

- Geological confidence of the deposit and style of mineralisation;
- Measured category is where the nominal drillhole centres is less than 25m and covered by grade control;
- Indicated category is where the drillhole spacing is greater than 25 but less than 35 meters;
- Inferred category is where the spacing is greater than 35 but less than 50 meters; and
- Where there are blocks estimated greater than 50 meters, this would be considered “potential”.

Figure 14-35 shows the classification first as a long section and then as a cross section.

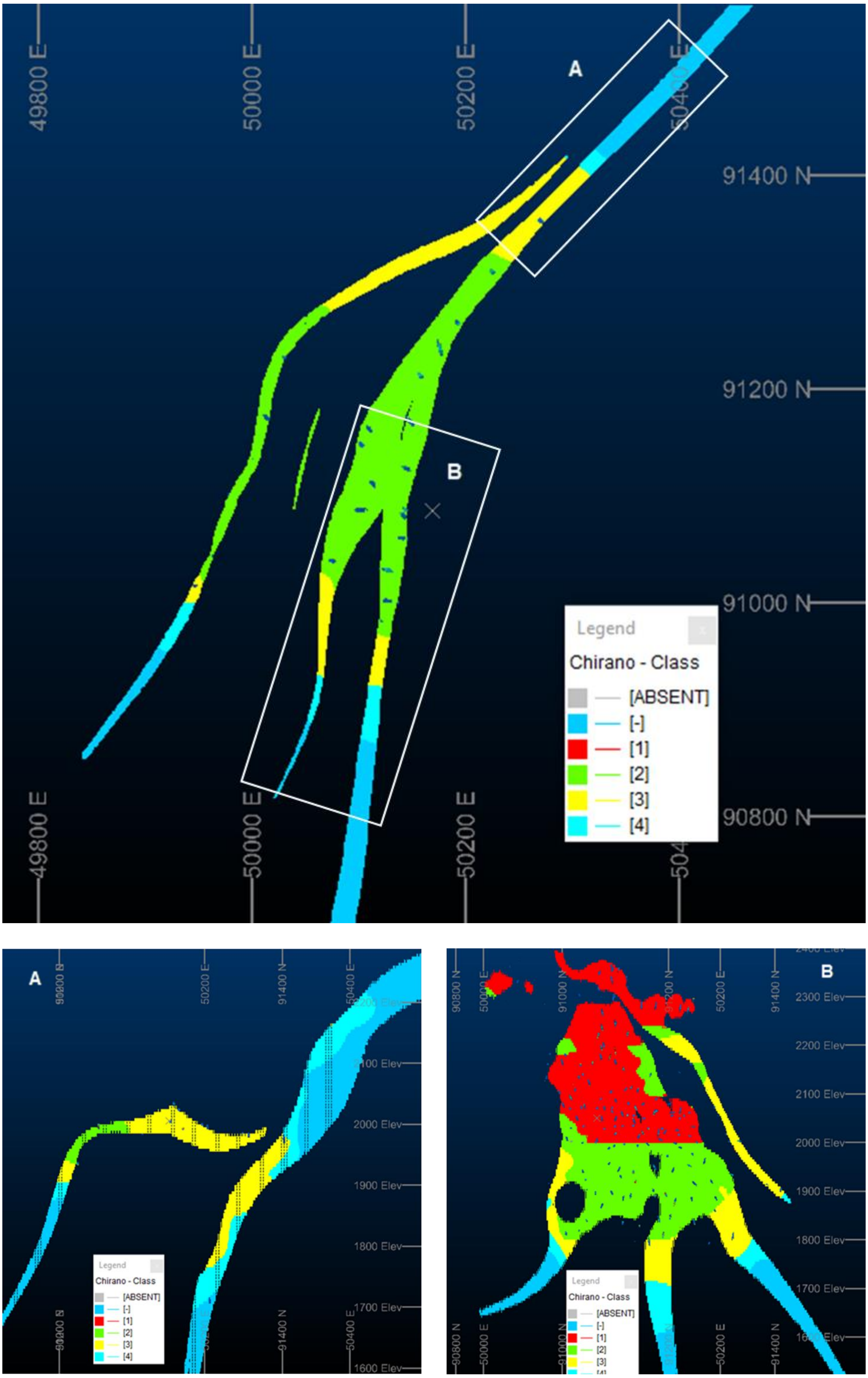


Figure 14-35: Plan view (1950 Rl)

above and below cross section along the strike (long section) of the mineralisation trend (Block A) and (Block B) Long section of applied Mineral Resource classification (red – measured, green – Indicated and yellow – Inferred)

Snowden Optiro has reviewed the Tano Mineral Resources classification and makes the following observations from Figure 14-35:

- There is room for some improvement with respect to the application of geostatistical analysis in the classification process e.g., Kriging efficiency (KE) and slope of regression (SoR) which indicate how good an estimate is.

14.8.12 Mineral Resource Reporting

ASSUMPTIONS AND PARAMETERS

The cut-off grade calculations are shown in Table 14-32.

Table 14-32: Cut-off Grade Calculation Parameters for Tano Underground Mineral Resources

Parameter	Units	Long Term 2021
Mining cost	(US$/t ore)	26.60
G&A	(US$/t ore)	7.23
Sustaining Capital	(US$/t ore)	2.15
Process costs	(US$/t ore)	15.06
Total $/ore tonne	**(US$/t ore)**	**51.05**
Gold recovery	(%)	88.5
Total Dilution	(%)	12.5
Gold price	(US$/oz)	1,600
Cut-off grade	g/t	1.14

Using the parameters stated in Table 14-32, the QP has checked and confirmed that the application of a cut-off grade of 1.14g/t for the reporting of Tano underground Mineral Resources is appropriate.

REPORTING

The Tano underground Mineral Resource estimates are reported according to the guidelines of the JORC Code (2012) and according to the CIM Definition Standards. The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the operations and summaries quoted in this report are on a 100% basis. The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The Mineral Resource for the Tano underground deposit, as reported at 31st December 2021, is presented in Table 14-33. The Mineral Resource has been depleted for both open pit and underground development and has been reported above a 1.14g/t Au cut-off.

Table 14-33: Total Inclusive Audited Tano Underground Mineral Resource as at 31st December 2021 at 1.14g/t Au cut-off

Classification	Tonnage (Mt)	Au Grade (g/t)	Metal Au Content (Moz)
Measured	1.02	1.83	0.060
Indicated	1.06	1.71	0.058
Measured + Indicated	2.07	1.77	0.118
Inferred	0.65	2.24	0.047

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *A density of 2.75 t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
6. *Geological losses and depletions have been applied.*
7. *Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*

14.9 Suraw Underground

14.9.1 Drilling Database

A database extraction for the Suraw deposit was completed in Suraw local grid on the 11th of October, 2021. The database includes all exploration (DD and RC) drilling and grade control (GC) drillholes within the project extent. Prior to the database extraction a thorough data validation was conducted including post survey collar locations, downhole survey validations and assay validations. The data extraction includes csv files for collar, survey, assay, geology and alteration.

All surface RC, DD, underground drilling, GC drilling was used to build the domain wireframes. However, the surface GC drilling was excluded from the resource estimation passes.

14.9.2 Data Verification

A QA process consisting of checks on the following was completed:

- Collar coordinates (eastings, northings, elevation and length);
- Survey (azimuth, dip, depth);
- Lithology (rock code, interval), and
- Assay (Au values, sample number, sample interval) was done.

No significant errors were noted that would be detrimental to the resource estimate updates.

14.9.3 Estimation Domains

Estimation litho-structural domains were generated following an extensive review of some of the Suraw recent drillholes to support geological and structural interpretations using Leapfrog™ software. The modelled estimation domains were completed and found to be consistent with the methodology applied in previous models. The domains used in the estimation are captured in Table 14-34.

Table 14-34: Suraw Estimation Domains

Domain Name	Domain Code
rbxrix_SSZ	101
rszrbxrix_ALL_SWSeg2	102
rszrbxrix_ALL_SSZ	200

The domain 101 is the main mineralized domain, 102 is a splay to the west of the main mineralized domain and 200 is the low-grade shear zone.

14.9.4 Compositing

The database csv files including all surface RC, DD, underground drilling and GC drilling comprising collar, survey, lithology and assay data were imported into Datamine software, where the desurveying process in Datamine was run to create 3D drillholes. Using the same software, one metre composites with a minimum length of 0.5m were then generated. The composite length size of 1.0m was chosen due to the (narrow) size of the high-grade mineralization, 1.0m would be more representative and reduce any smoothing/dilution.

14.9.5 Exploratory Data Analysis and Capping

The composite files for the various domains were loaded into Supervisor software where descriptive statistics and capping analysis were conducted on each domain. Capping levels were evaluated after compositing using the global Top-Cut Analysis tool in Supervisor. Top-Cut Analysis was completed using a combination of approaches, including examination of the grade distributions (histograms and probability plots etc) and domain statistics for all domains. Although many of the statistical measures of outlier grade distribution were not extreme, most domains contained some outlier values when compared with the overall domain population. As such, top-cutting (or capping) of these identified outliers was completed to minimise the local impact of these samples on the estimate. The top-cuts selected, and the impact on the domain statistics for all composites, are presented in Table 14-35.

Table 14-35: Capping Applied on Suraw Domains

Domain	Capping Grade (g/t)
101	19
102	6
200	6

14.9.6 Variography

Using the composited data, variography for the mineralised domains was completed in Supervisor. The downhole variogram was used to define the nugget component of the modelled variogram and the spatial variograms were modelled using spherical structures. The variogram models are presented in Figure 14-36 to Figure 14-38.

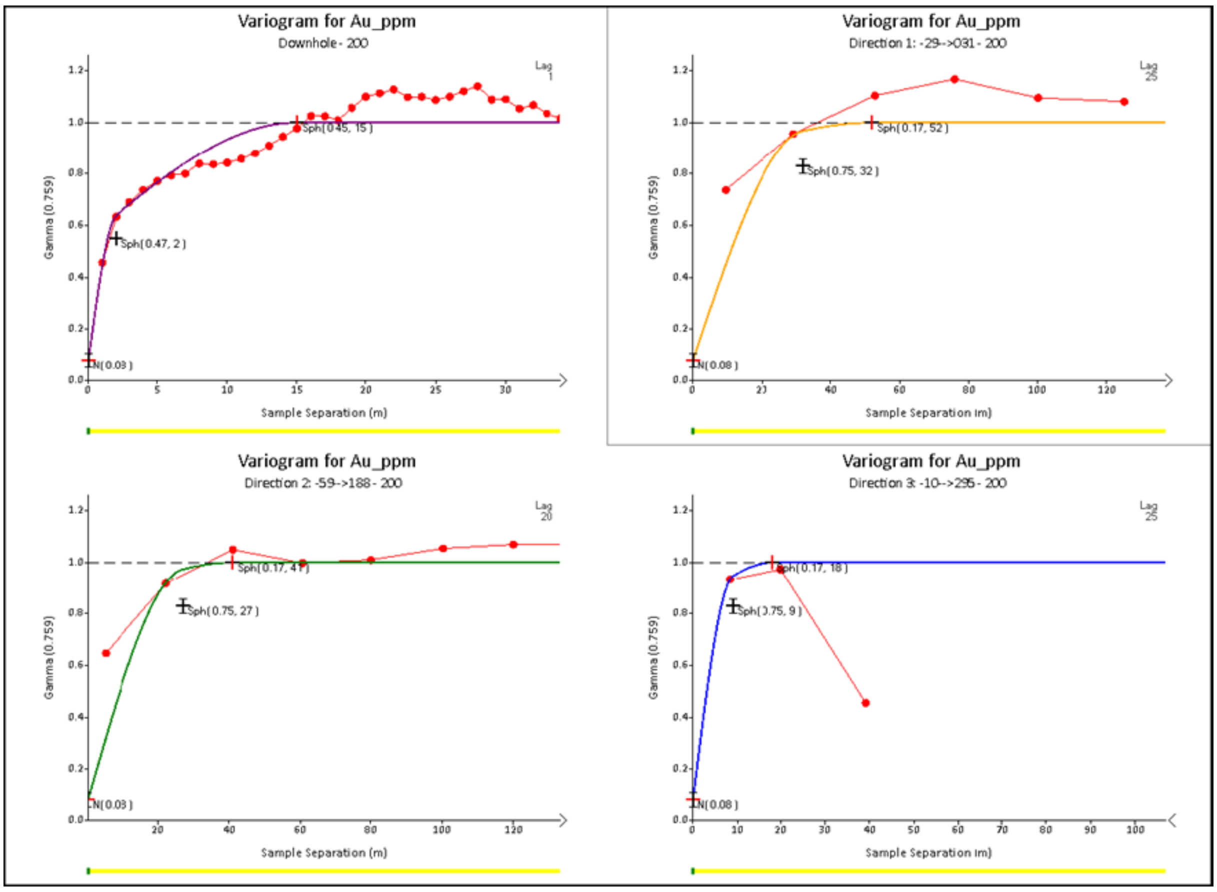


Figure 14-36: Directional Variograms for Domain rsz (200)

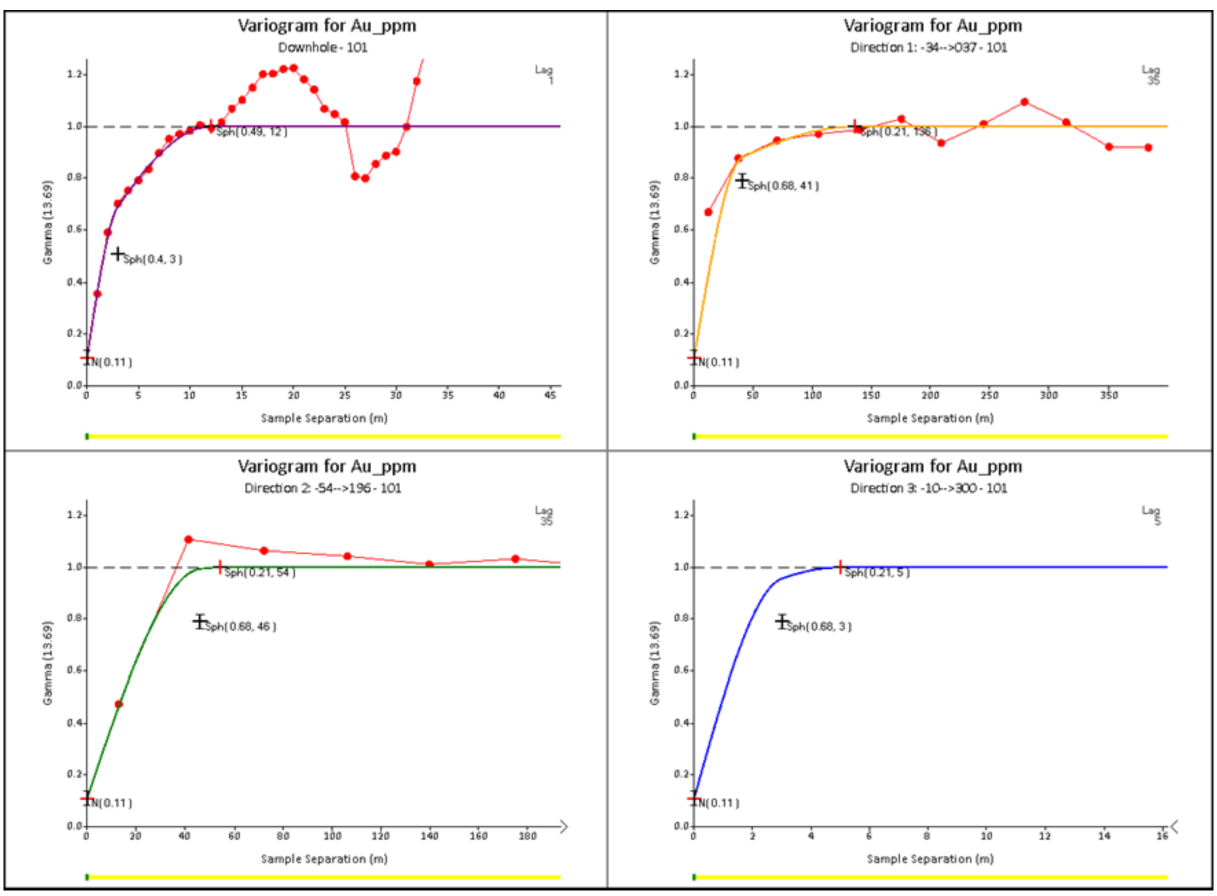


Figure 14-37: Directional Variogram for Domain rbx (101)

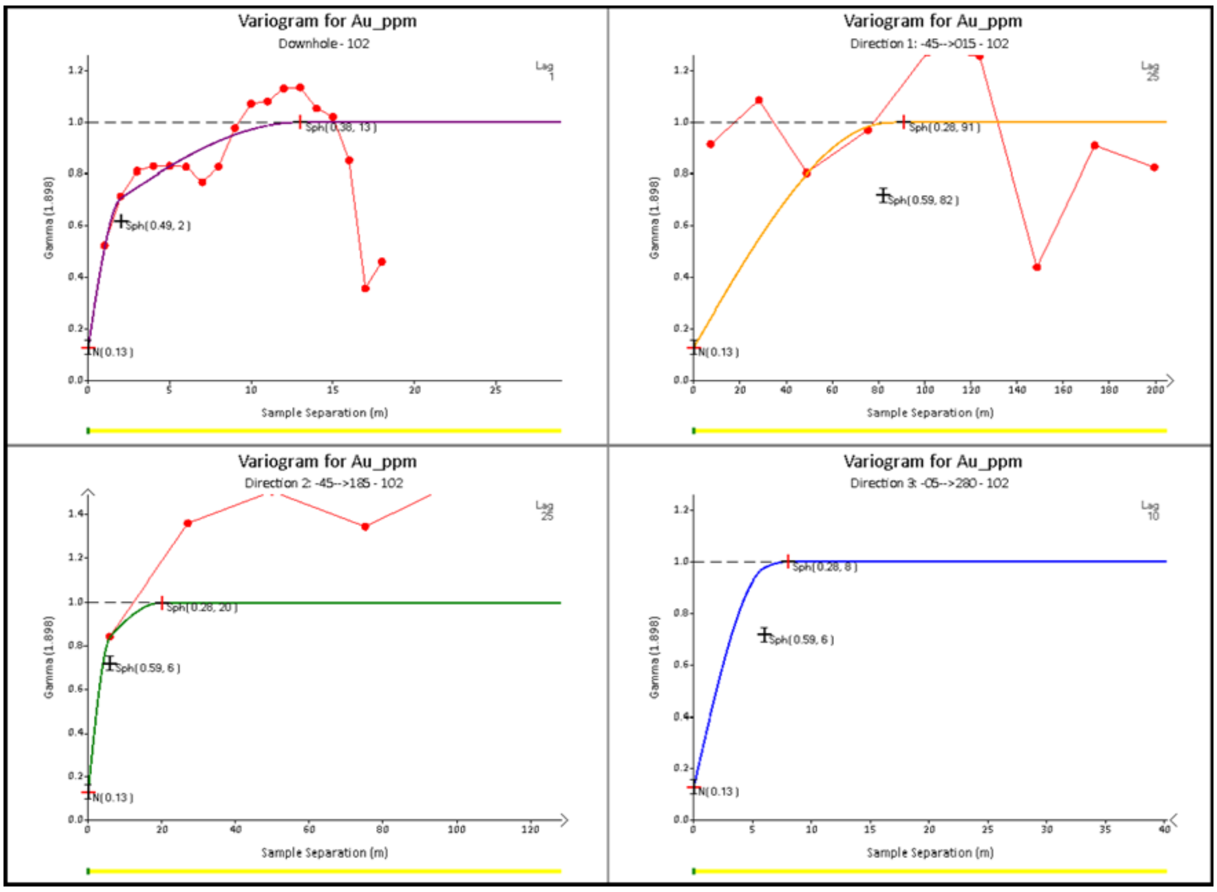


Figure 14-38: Directional Variograms for Domain rsz (102)

Snowden Optiro has reviewed the robustness and structure of all the experimental and modelled variograms for all the domains and though some are robust and well structured, the majority of the directional variograms are moderately to poorly structured. Some have no structures at all and will thus need to be recalculated.

14.9.7 Block Model

The block model was created in Leapfrog™ Geo software utilising the block model parameters presented in Table 14-36Table 14-36: Suraw Block Model Parameters. The block model is not rotated and was created using the local Chirano mine grid. A 1.25m by 1.25m by 5.00m (X, Y, Z) block size with no sub blocks was used for Suraw modelling work. The block model variable 'domain' was flagged with litho-structural and mineralization wireframes. The 'redox' variable was coded as fresh= 3 or oxide =1 based on the oxide surface. This was then used to also code the density; Fresh=2.75, transition= 2.30, and Oxide =1.56. The Suraw block model was finalized in October 2021.

Table 14-36: Suraw Block Model Parameters

	Easting (mE)	Northing (mN)	Elevation (mRL)
Origin	49,118.75	88,000.00	1,400,00
No. of blocks	473	872	220
Block Size	1.25	1.25	5

14.9.8 Grade Estimation

The block model was exported into Datamine Studio RM for estimation of Au using OK. No other elements have been estimated. Due to the arcuate overall geometry of the mineralisation, DA was adopted for grade estimation. The estimation was run in three passes for the Au grade attribute with the highest confidence blocks estimated in pass 1 and the lowest confidence blocks in pass 3. Reference surfaces were generated for each domain in Leapfrog™, which approximate the trend of the central point of a full width intercept. These surfaces were then imported into Studio RM and the dip and dip direction of each individual wireframe triangles was extracted and then coded to the block model using NN search for each domain independently. The plunge was then coded into the block model using the plunge from the variograms generated in Supervisor. The mineralised wireframes were used to estimate the true dip and true dip direction for each domain.

Search and estimation parameters are presented in Table 14-37.

Table 14-37: Suraw Search and Estimation Parameters

Domain	Pass	X Axis Search Range (m)	Y Axis Search Range (m)	Z Axis Search Range (m)	Composite	
					Min	Max
101	1	35	25	5	7	15
	2	52.5	37.5	7.5	4	15
	3	70	50	10	4	15
102	1	30	20	5	7	12
	2	45	30	7.5	4	12
	3	60	40	10	2	12
200	1	25	20	5	7	12
	2	37.5	30	7.5	4	12
	3	50	40	10	2	12

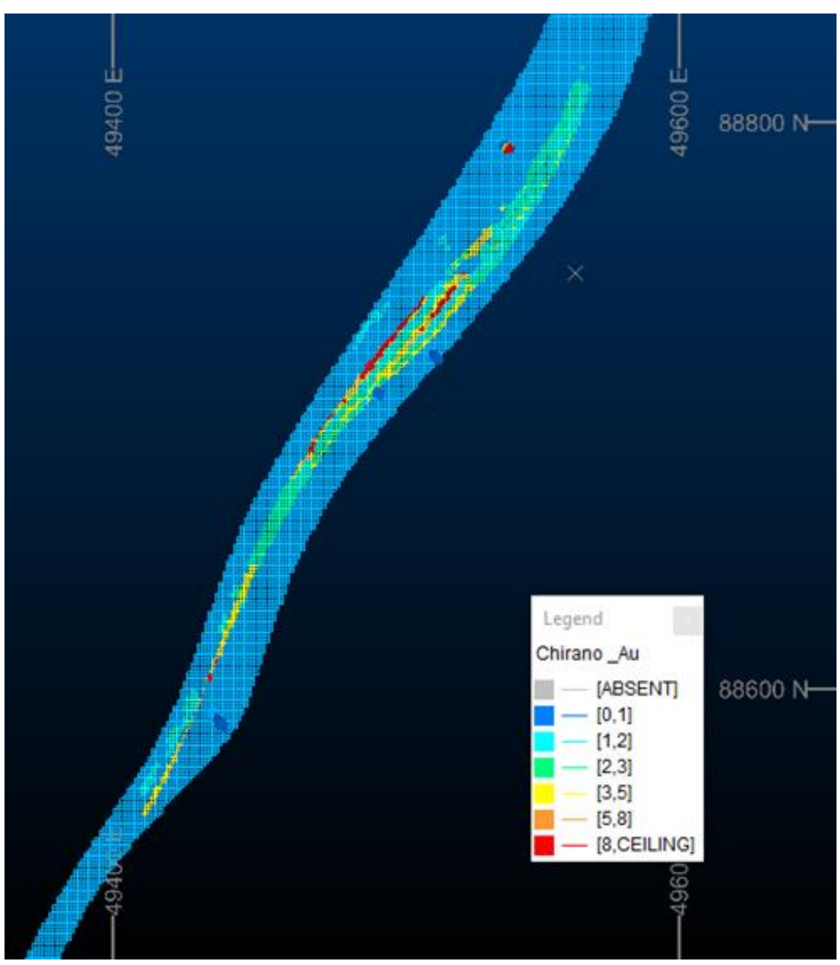
Snowden Optiro has stepped through the Suraw model and confirm the results and observed that there are no material issues or fatal flaws in the modelling and estimation approaches employed by the Company.

14.9.9 Block Model Validations

The techniques adopted for the validation of the block estimates range from global mean comparison of estimates and composites using classical statistics, visual comparisons and swath analyses between the block model estimates and the composite data used to inform them.

VISUAL CHECKS

Initial validation consisted of a visual comparison of the input samples and the estimated block grade in cross section and plan view. The block estimates and sample composites data were superimposed on each other, and colour coded with the same legend for Au for comparison purposes. Visual checks of the model against the sample data used to inform the estimates shows that the estimated blocks reasonably match the sample data used to inform them particularly in areas that have significant data to inform the estimates. All the visual checks confirm that the block estimates are a reasonable representation of the informing data considering the current level of geological and geostatistical understanding of areas within the reach of the definition drilling as shown in Figure 14-39.



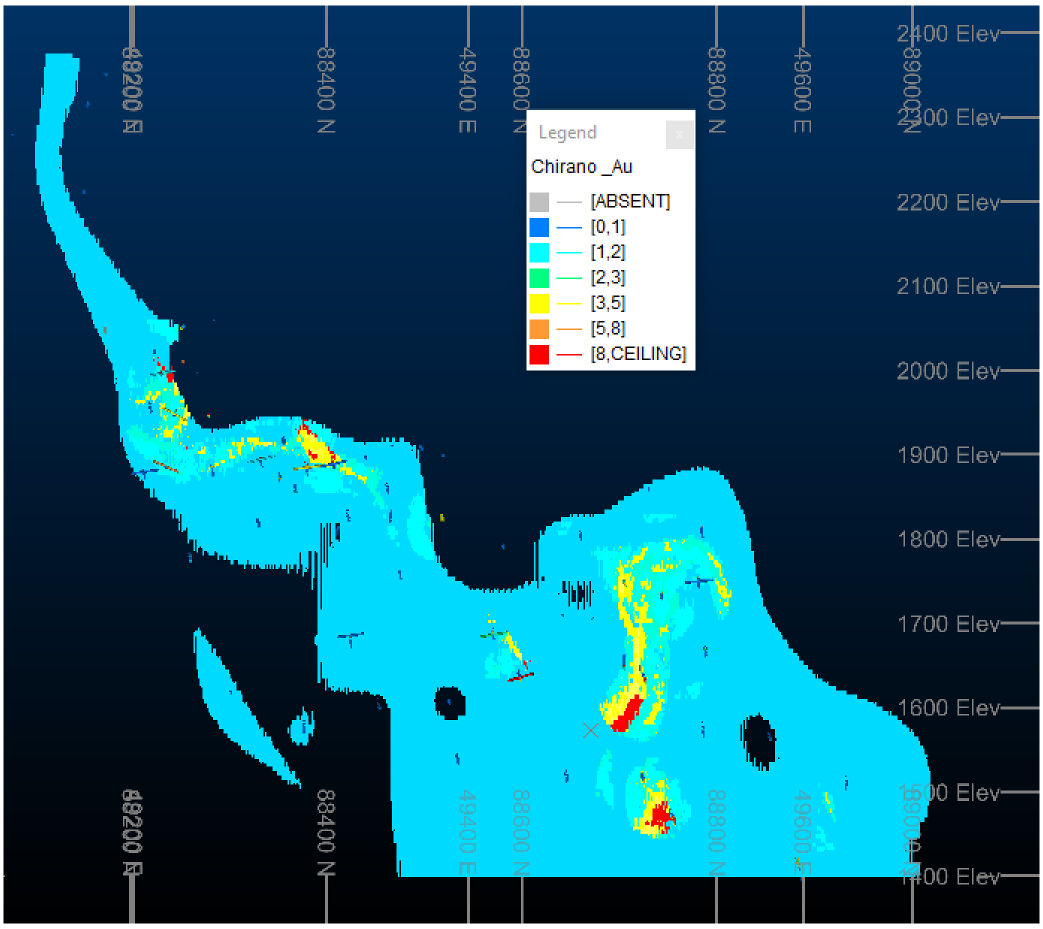


Figure 14-39: Comparison between composites and block grades in plan view (1650 Rl) above and cross section along the strike (long section) of the mineralisation trend (NNE)

SWATH ANALYSIS

Swath plots for local scale comparison i.e., validation between the averages of the estimated block contents with the averages of the clustered samples were generated. This validation was performed for each domain along easting, northing and elevation dimensions. An example from domain 101 is presented in Figure 14-40.

The results of the swath validation for sample data and block model estimates exhibited an expected degree of smoothing due to kriging. The estimated values tend to follow the sample values reasonably well, particularly in well sampled areas. But as you move further away from the well sampled areas and into areas that are poorly sampled (low drilling density) and towards the peripheries of the deposit, the estimates are poorly informed.

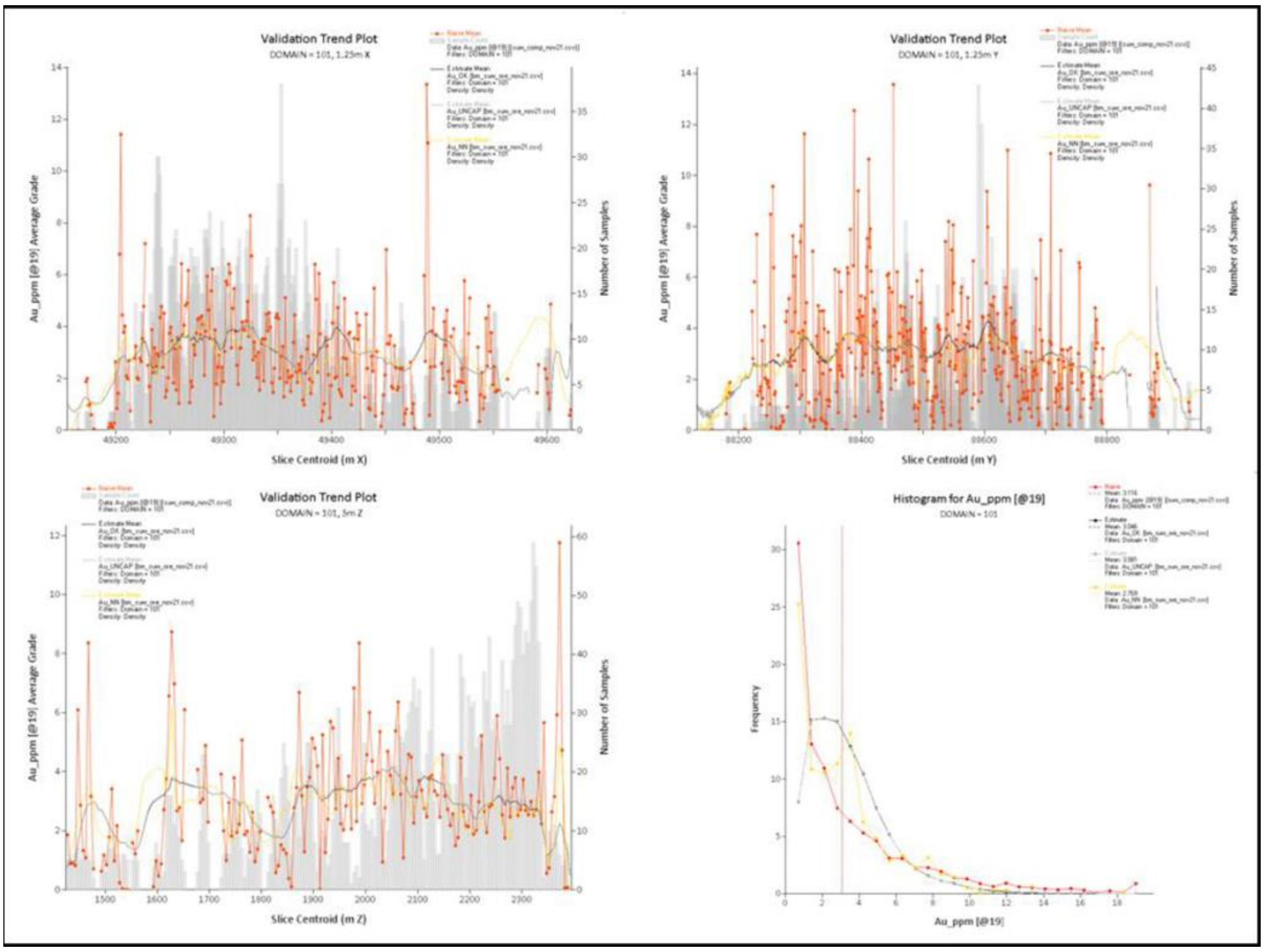


Figure 14-40: Swath plots for domain 101; easting (top left), northing (top right) and elevation (bottom)

14.9.10 Depletion

The 2021 Mineral Resource has been depleted for both the open pit and underground workings.

14.9.11 Mineral Resource Classification

The 2021 Suraw underground Mineral Resource has been classified into Measured, Indicated and Inferred categories in accordance with the JORC Code (2012). There are no material differences between the definitions of Indicated and Inferred Mineral Resources under the CIM Definition Standards and the equivalent definitions in the JORC Code (2012).

The criteria for classification at Suraw is as follows:

- Geological confidence of the deposit and style of mineralisation;
- Measured category is where the nominal drillhole centres is less than 25m and covered by grade control;
- Indicated category is where the drillhole spacing is greater than 25 but less than 35 meters;
- Inferred category is where the spacing is greater than 35 but less than 50 meters; and
- Where there are blocks estimated greater than 50 meters, this would be considered “potential”.

Figure 14-41 shows the classification first as a long section and then as a cross section.

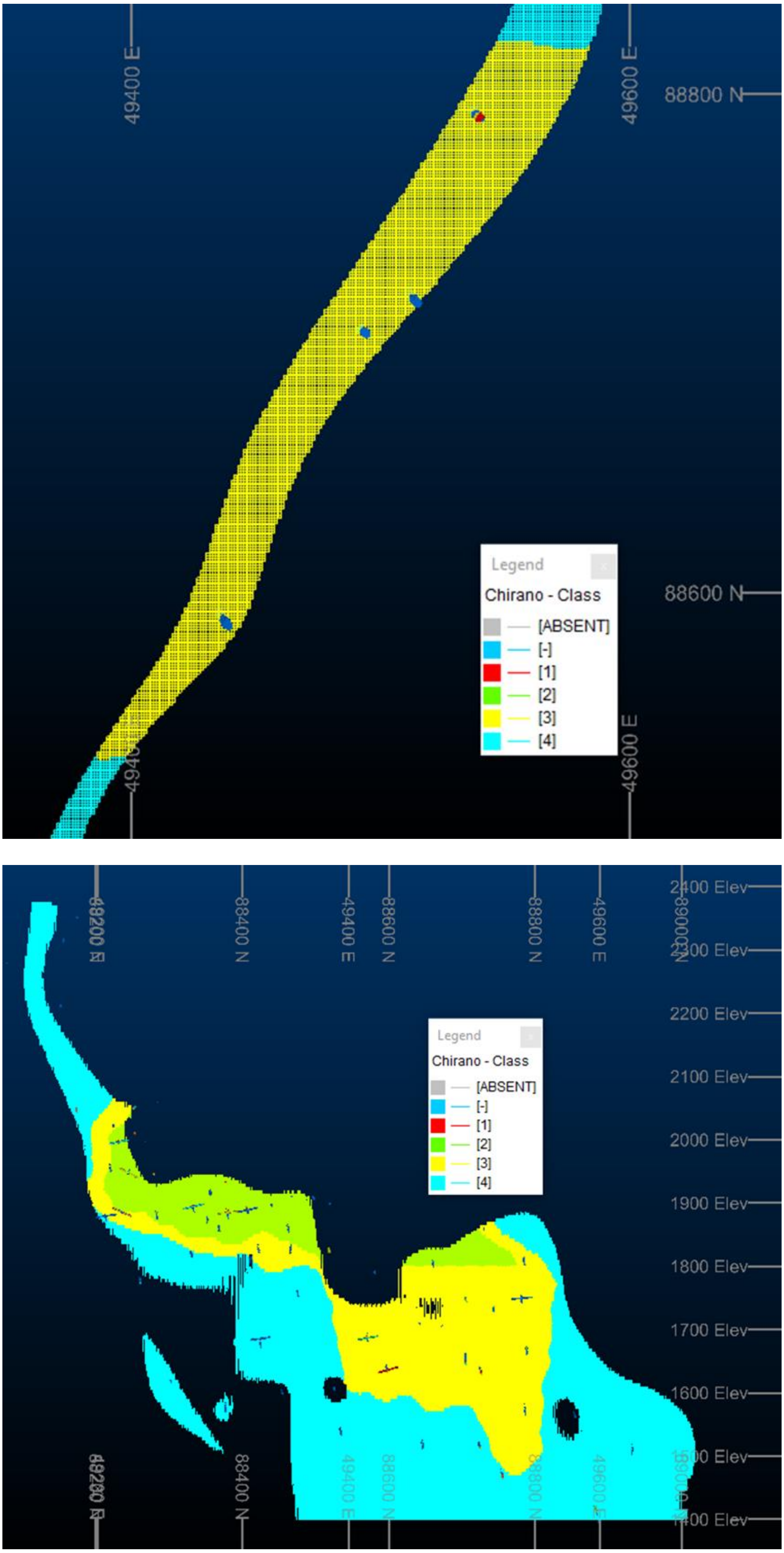


Figure 14-41: Plan view (1650 Rl),
above and below cross section along the strike (long section) of the mineralisation trend (NNE) Long section of applied Mineral Resource classification (red – measured, green – Indicated and yellow – Inferred)

Snowden Optiro has reviewed the Suraw Mineral Resources classification and makes the following observations from Figure 14-41:

- There is room for some improvement with respect to the application of geostatistical analysis in the classification process e.g., Kriging efficiency (KE) and slope of regression (SoR) which indicate how good an estimate is.

14.9.12 Mineral Resource Reporting

ASSUMPTIONS AND PARAMETERS

The cut-off grade calculations are shown in Table 14-38.

Table 14-38: Cut-off Grade Calculation Parameters for Suraw Underground Mineral Resources

Parameter	Units	Long Term 2021
Mining cost	(US$/t ore)	26.60
G&A	(US$/t ore)	7.23
Sustaining Capital	(US$/t ore)	2.15
Process costs	(US$/t ore)	15.06
Total $/ore tonne	**(US$/t ore)**	**51.05**
Gold recovery	(%)	88.5
Total Dilution	(%)	12.5
Gold price	(US$/oz)	1,600
Cut-off grade	g/t	1.14

Using the parameters stated in Table 14-38, the QP has checked and confirmed that the application of a cut-off grade of 1.14 g/t for the reporting of Suraw underground Mineral Resources is appropriate.

REPORTING

The Suraw underground Mineral Resource estimates are reported according to the guidelines of the JORC Code (2012) and according to the CIM Definition Standards. The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the operations and summaries quoted in this report are on a 100% basis. The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The Mineral Resource for the Suraw underground deposit, as reported at 31st December 2021, is presented in Table 14-39. The Mineral Resource has been depleted for both open pit and underground development and has been reported above a 1.14g/t Au cut-off.

Table 14-39: Total Inclusive Audited Suraw Underground Mineral Resource as at 31st December 2021 at 1.14 g/t Au cut-off

Classification	Tonnage (Mt)	Au Grade (g/t)	Metal Au Content (Moz)
Measured	0.23	2.36	0.017
Indicated	0.70	2.30	0.052
Measured + Indicated	**0.92**	**2.32**	**0.069**
Inferred	1.56	2.71	0.136

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *A density of 2.75 t/m³, 2.30 t/m³ and 1.56 t/m³ on fresh, transition and oxidised sediments have been applied respectively.*
6. *Geological losses and depletions have been applied.*
7. *Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*

14.10 Chirano Open Pit Resources

The Chirano open pit Mineral Resources included in the 2021 Mineral Resources include; Mamnao, Akoti South, Sariehu, Obra and Kolua pits. Due to open pit planning purposes, the open pit Mineral Resources were reported from different block models with different block dimensions to the underground models and composites with the exception of Kolua open pit. Snowden Optiro understands that though the models were developed using the same database, they have slightly different assumptions to reflect open pit mining (bulk mining). The block sizes are 5m x 5m x 3m.

OPEN PIT ASSUMPTIONS AND PARAMETERS

The open pit cut-off grade values calculation parameters are shown in Table 14-40.

Table 14-40: Cut-off grade Calculation Parameters for Open Pit Mineral Resources

Parameter	Units	Mamnao	Sariehu	Obra	Akoti South	Kolua
Gold Price	(US$/oz)	1,600	1,600	1,600	1,600	1,600
Mining Dilution	(%)	0	0	0	0	0
Mining Recovery	(%)	100	100	100	100	100
Mining Cost						
Oxide	(US$/t ore)	2.70				
Transition	(US$/t)					
Fresh	(US$/t)					
Recoveries						
Oxide	(%)	Coded in BM Zone 1 - 94% Oxide South of 39500 Zone 2 = 13.8*LN(Au)+73.006	92	90	87	90
Transition	(%)					
Fresh	(%)					
Processing Cost						
Oxide	(US$/t ore)	13.61				
Transition	(US$/t ore)					
Fresh	(US$/t ore)					
Other Operating Costs						
G&A	(US$/t ore)	6.35				
Calculated COGs						
Oxide South of 39500	(g/t)	0.44	0.45	0.46	0.48	0.46
Oxide North of 39500 (MN only)	(g/t)	0.63				
Transition	(g/t)	0.63	0.45	0.46	0.48	0.46
Fresh	(g/t)	0.63	0.45	0.46	0.48	0.46
If reporting with Rau	(g/t)	0.42				

Snowden Optiro has reviewed the data used to inform the Mineral Resource estimates and the methodology adopted in the block modelling and resource estimation processes to arrive at the tabulation of the Open Pit Mineral Resources. Snowden Optiro has also undertaken spot checks on the composite data, the block model and validations of the estimates against the distributions of the composites used in the estimations for the various domains and found consistency in the distributions of the block estimates compared with that of the composite data. Snowden Optiro has confirmed the quantum of the Mineral Resources as reported by Chirano employees with the exception of Mamnao Open Pit Mineral Resources.

REPORTING

The Chirano Open Pit Mineral Resource estimates are reported according to the guidelines of the JORC Code (2012) and according to the CIM Definition Standards. The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them. Estimates (tonnes and content) for the operations and summaries quoted in this report are on a 100% basis. The QP who has signed off on the Mineral Resource has the minimum requirements established by international mining codes. The Chirano Open Pit Mineral Resources, as reported at 31st December 2021, are presented in Table 14-41. The Mineral Resources have been reported above various gold cut-offs for each operation as presented in Table 14-41 and constrained by RPEEE USS$1,600 Resource optimised pit shell.

Table 14-41: Total Inclusive Chirano Open Pit Mineral Resource as at 31st December 2021

Open Pit Operation	Classification	Mt	Au	Moz
	Measured	0.16	0.75	0.004
Akoti South	Indicated	3.02	0.89	0.087
	Measured and Indicated	**3.17**	**0.88**	**0.090**
	Inferred	0.01	1.32	0.000
	Measured	3.46	0.81	0.090
Obra	Indicated	3.24	0.77	0.080
	Measured and Indicated	**6.70**	**0.79**	**0.170**

Open Pit Operation	Classification	Mt	Au	Moz
	Inferred	0.90	0.67	0.019
Mamnao	Measured	0.42	0.97	0.013
	Indicated	4.41	0.90	0.127
	Measured and Indicated	**4.83**	**0.90**	**0.140**
	Inferred	0.32	0.86	0.009
Kolua	Measured	0.00	0.00	0.000
	Indicated	0.16	1.60	0.008
	Measured and Indicated	**0.16**	**1.60**	**0.008**
	Inferred	0.00	1.26	0.000
Sariehu	Measured	0.42	0.59	0.008
	Indicated	1.77	0.85	0.048
	Measured and Indicated	**2.18**	**0.80**	**0.056**
	Inferred	0.03	0.89	0.001
Total Measured Resources		**4.45**	**0.80**	**0.115**
Total Indicated Resources		**12.60**	**0.86**	**0.350**
Measured and Indicated Resources		**17.05**	**0.85**	**0.465**
Total Inferred		**1.26**	**0.73**	**0.029**

Notes:

1. *Tonnes and ounces have been rounded and this may have resulted in minor discrepancies.*
2. *Mineral Resources are not Mineral Reserves.*
3. *The Mineral Resources are reported inclusive of any Mineral Reserves that may be derived from them.*
4. *1 troy ounce = 31.1034768g.*
5. *Akoti South, Obra, Mamnao, Kolua, Sariehu open pits were evaluated at cut-off 0.24, 0.20, 0.31, 0.45 and 0.22 cut-offs respectively.*
6. *Geological losses and depletions have been applied.*
7. *Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*

14.11 Disclosure

Mineral Resources reported in the above sections for each deposit have been thoroughly reviewed by Ms. S. Mandava, Principal Consultant and a full-time employee of Snowden Optiro.

The above is a Qualified Person as defined in NI43-101. Snowden Optiro is independent of MGBL.

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

14.12 Risks

As all Mineral Resources are estimates, they are not without inherent geological and grade risk. The Qualified Persons believe that these risks are generally low given that there are current mining operations at the investigated Chirano deposits.

Other risks do exist which do not relate to the Mineral Resources. Given that the project is fully permitted and that there has been previous mining, the Qualified Persons do not consider that environmental or permitting risks are likely to have a material impact on the declared LoM of the Chirano project. It is also unlikely that the Mineral Resource estimates as detailed in this section will be materially affected by legal, title, taxation, socio-economic, marketing or political factors. The greatest risk to the Mineral Resource estimate, which is not considered to be material, is the social impact of any open pit development or expansions that may be considered in the future.

15. MINERAL RESERVE ESTIMATES

The Mineral Reserve Estimates presented here are based on the Mineral Resource Estimates completed by Chirano Gold Mines Limited. Only Measured and Indicated Resources were used in the determination of the Mineral Reserves. The effective date of the Mineral Reserves is 31st December 2021.

Mineral Resources on which the Mineral Reserves are determined are shown in **Error! Reference source not found.**

Table 15-1: CGML Mineral Resources as at 31st December 2021

Classification	Tonnes (000's)	Au Grade (g/t)	Au Ounces (000's)
Measured	9,205.78	1.43	422.57
Indicated	18,894.95	1.17	711.95
Total	**28,100.73**	**1.26**	**1.134.52**
Inferred	6,047.67	1.91	371.93

(Source: MRMR_CGML_2021)

15.1 Modifying Factors

In determining the mineral reserves, modifying factors are used to determine the ore that can be extracted economically. Modifying factors are used in mine planning and economic analysis and incorporate technical, economic, financial, social and community parameters to convert mineral resources into mineral reserves.

15.1.1 Technical Modifying Factors

15.1.1.1 Dilution

For each mining operation dilution figures have been assumed based on historical mine to mill reconciliations, stope void surveys (which provide overbreak estimates) and proposed mining methods. A Sub level Cave mining method incurs greater dilution than open stoping. The dilution factors applied for mineral reserve estimates are shown in Table 15-2.

Table 15-2: Mine Dilution Factors

Mine	Akwaaba	Paboase	Akoti	Tano	Suraw	Obra	Open Pits
Dilution	12.5%	25%	12.5%	12.5%	12.5%	12.5%	5%

15.1.1.2 Mining Recovery

Not all mineral resources are recovered by mining operations. Mineralised material within the resources may be below the economic Cut-off Grade (CoG). Additionally, a small percentage of mineralised material is not recovered due to the irregularity of mineral deposit shapes which cannot be practically blasted. Some mineralised material is left behind as pillars which are necessary for mine stability, and some is not recovered during the load and haul process. The recovery figures have been calculated for each operation based on the above criteria and also based on the LoM design and schedule and are used in reserve calculations. The recovery factors used for the underground operations are shown in Table 15-3.

Table 15-3: Mine Recovery Factors

Mine Recovery	Pillar Recovery
95%	70%

15.1.1.3 Processing Recovery

Not all gold contained that is recovered from the mining operations is recovered during the mineral processing stage. Based on historical operating parameters for the Chirano processing plant and via extensive laboratory test work, gold recovery has been estimated to average 88.5%. Although the recovery can fluctuate over time, for the purposes for calculating mineral reserves, 88.5% mill recovery has been used.

15.1.1.4 Mine Planning

For the purposes of mine planning and scheduling, a variety of factors are used for estimating the availability of equipment and expected production targets. These factors are based on equipment lists, along with maintenance reports. The figures are used in determining the quantities and timing of ore extraction. This information feeds into the economic analysis and indirectly determines viability of mining operations, as that impacts mining costs and ultimately the CoG. Table 15-4 shows the mine planning assumptions used for mine scheduling.

Table 15-4: Mine Planning Assumptions

Key Planning Assumptions		**2021 SBP Agree to Use**
Lateral Development	**Units**	**Value**
Development round length per blast	m	3.5
Development rate in decline & extras	m/day	2.5
Development rate in high stress drives	m/day	1.1
Monthly capacity per Jumbo development crew	m/month	135
Drilling Productivity	**Bit Dia**	**m/dat**
Solo rigs drilling	102mm	161
ITH rigs drilling	152mm	35
Stope Mucking & Hauling	**Units**	**No.**
LD 2900 productivity – (Conventional)	t/day	1527
Truck productivity – (Conventional)	t/day	431
Backfilling	**Unit**	**0**
Backfilling rate-truck dumped	t/day/loader	1641
Primary Equipment Numbers	**Unit**	**No.**
Jumbo	#	9
Solo	#	6
2900 Loader	#	11
Trucks (UG Haulage)	#	25
Primary Equipment	**Availability (%)**	**No.**
Trucks	#	80
Solo Rigs	#	75
2900 Loaders	#	70
Primary Equipment	**Utilization (%)**	**No.**
Trucks	#	80
Solo Rigs	#	40
2900 Loaders	#	60

15.1.2 Gold Price

A significant factor in determining Mineral Reserves is the gold price. For Chirano Gold Mines Limited the Mineral Resources were calculated at a gold price of US$1,600/oz. However, CGML have used a gold price of US$1,200/oz for determining Mineral Reserves. As at the date of this report (May 2022), the 3-year trailing average for gold is US$1730/oz.

15.1.3 Mining Costs

CGML has a good cost capture process, enabling all costs associated with operations to be accurately determined. The mining costs that have been collected are used in conjunction with updated mine schedules to calculate ongoing mine operating and capital costs. Table 15-5 shows the LoM costs (US$/oz) used for generating Mineral Reserves.

Table 15-5: LoM Operating Costs

Cost Per Ore Ton						
Area	**Paboase US$/t**	**Akwaaba US$/t**	**Akoti US$/t**	**Tano US$/t**	**Obra US$/t**	**Suraw US$/t**
Mining Costs	35.57	26.60	29.94	26.60	26.60	26.60
Process Costs	15.06	15.06	15.06	15.06	15.06	15.06
G&A Costs	7.23	7.23	7.23	7.23	7.23	7.23
Sustaining Capital	2.15	2.15	2.15	2.15	2.15	2.15
Total US$/ore Ton	**59.90**	**51.05**	**54.39**	**51.05**	**51.05**	**51.05**

(Source: CGML 2021)

The open pit costs are based on a mining contract entered into with Maxmass, a Ghanaian mining contractor. The contract is for open pit mining services. Terms of the contact are based on full LoM pit schedules.

15.2 Cut Off Grades

Using the modifying factors above, Cut off Grades (COG) are calculated for each mining operation. The COG is the grade at which a block of ore will generate positive cash flow if mined, processed, and sold as gold. A summary of the COG's for each mine is shown in Table 15-6.

Table 15-6: Mine Cut Off Grades

Dilution Source		Akwaaba	Paboasee	Akoti	Tano	Obra	Suraw
Overbreak Dilution	%	1.25	10	12.5	12.5	12.5	12.5
Waste Fill Dilution	%	0	15	0	0	0	0
Total Dilution		**12.5**	**25**	**12.5**	**12.5**	**12.5**	**12.5**

Table 15-7: Cost and Revenue Factors used by Chirano in Cut-off Grade Calculations

Cost/Revenue			Akwaaba	Paboase	Akoti	Tano	Obra	Suraw
Operating Costs								
Mining cost		US$/t ore	26.6	35.57	29.94	26.6	26.6	26.6
Process cost		US$/t ore	15.06	15.06	15.06	15.06	15.06	15.06
G&A		US$/t ore	7.23	7.23	7.23	7.23	7.23	7.23
Sustaining Capital		US$/t ore	2.15	2.15	2.15	2.15	2.15	2.15
	Total	**US$/t ore**	**51.04**	**60.01**	**54.38**	**51.04**	**51.04**	**51.04**
Cost of Sales								
Refining / Sales		US$/oz	4.2	4.2	4.2	4.2	4.2	4.2
Reclamation		US$/oz	3.18	1.71	2.52	3.18	3.18	3.18
	Total	**US$/oz**	**7.38**	**5.91**	**6.72**	**7.38**	**7.38**	**7.38**
	Total	**US$/g**	**0.24**	**0.19**	**0.22**	**0.24**	**0.24**	**0.24**
Gold Price		US$/oz	1 200	1 200	1 200	1 200	1 200	1 200
		US$/g	38.58	38.58	38.58	38.58	38.58	38.58
Process Au Recovery		%	88.5	88.5	88.5	88.5	88.5	88.5
Gross Revenue		US$/g	34.14	34.14	34.14	34.14	34.14	34.14
Less Royalty (5%)		US$/g	-1.71	-1.71	-1.71	-1.71	-1.71	-1.71
Less Cost of Sales		US$/g	-0.24	-0.19	-0.22	-0.24	-0.24	-0.24
Net Revenue		**US$/g**	**32.20**	**32.24**	**32.22**	**32.20**	**32.20**	**32.20**
Production Cost		US$/t	51.04	60.01	54.38	51.04	51.04	51.04
Cut Off Grade		g/t	1.59	1.86	1.69	1.59	1.59	1.59
Overbreak Dilution		%	12.5%	10%	12%	12%	12%	12%
Reserve Cut Off Grade		**g/t**	**1.78**	**2.05**	**1.89**	**1.78**	**1.78**	**1.78**

MINE SCHEDULING

Each mine has been individually planned and scheduled considering all modifying factors. Mine plans are updated on a quarterly basis to consider any changes to mining operations.

A LoM plan has been generated for each of the mines (based on the 2021 Resources and modifying factors), including all aspects for development and production. Table 15-8 shows the consolidated production summary for all the underground mining operations.

Table 15-8: Total Underground Mine Plan 2022 – 2026

Total Underground Mine Plan	2022	2023	2024	2025	2026	LoM
Development Decline (m)	3,020	2,677	586			6,283
Development Decline Extras (m)	740	601	126			1,467
Development Access & Stocks (m)	1,261	1,505	1,544			4,310
Development Other Waste Opex (m)	320	1,331	956			2,607
Development Other Waste Capex (m)	498	715	143			1,356
Development Ore Drive (m)	3,668	4,242	1,749			9,659
Development Waste (m)	5,839	6,829	3,364			16,032
Development Ore (m)	3,668	4,242	1,749			9,659
Total Development (m)	**9,507**	**11,071**	**5,113**			**25,691**
Development Ore (t)	204,299	261,033	103,068			568,400
Development Ore Grade (g/t)	2.68	2.65	2.92			2.71
Development Ounce (Oz)	17,571	22,241	9,677			49,489
Stoping Ore (t)	1,748,783	1,916,537	2,803,510	1,929,668	855,113	9,253,611
Stoping Ore Grade (g/t)	2	3	3	3	3	2.59
Stoping Ounces (Oz)	138,260	161,401	228,721	171,409	70,991	770,782
Blasted Tonnes	1,663,744	1,707,185	2,609,458	1,774,128	770,543	8,525,058

Total Underground Mine Plan	2022	2023	2024	2025	2026	LoM
Total Ore (t)	**1,953,084**	**2,177,575**	**2,906,581**	**1,929,668**	**855,113**	**9,822,021**
Average Ore Grade (g/t)	**2.48**	**2.62**	**2.55**	**2.76**	**2.58**	**2.60**
Gold (Oz)	**155,609**	**183,642**	**238,400**	**171,409**	**70,991**	**820,051**
Solo Production Drilling (m)	182,169	195,719	205,493	129,644	71,474	784,499
Solo Production Drilling Slash (m)	22,100	24,451	24,662	15,614	9,211	96,038
Total Solo Meters	**204,271**	**220,164**	**230,150**	**145,259**	**80,685**	**880,529**
Service Holes - Drilling	2,237	2,447	657	-	-	5,341
Vent Raise - Drilling	8,703	7,959	3,052	-	-	19,714
Escapeways - Drilling	2,618	1,963	923	-	-	5,504
Slot Drilling	20,248	27,354	43,878	11,328	3,349	106,157
Total ITH Drilling	**37,970**	**45,543**	**58,592**	**14,608**	**3,349**	**160,062**
Escape Way - Raise	476	324	92			892
Vent Raise - Raise	322	305	92			719
Fresh Air Raise	296	90	351	119		856
Waste Pass Raise	454	226	71			751
Slot Raise	631	786	1,087	134	40	2,678
Total Raise Meters	**1,745**	**1,344**	**1,226**	**215**	**40**	**4,570**
Backfill	973,818	169,789	1,553,417	1,240,201	487,058	5,424,283
Capitalised Waste Tonnes	634,055	546,087	115,009	8,201		1,303,351
Operational Waste Tonnes	59,999	115,771	60,624			236,394
Total Tonnes (Ore + Waste)	**2,647,138**	**2,839,433**	**3,082,213**	**1,937,869**	**855,113**	**11,361,766**

A LoM plan was completed for the open pit operations in July 2021. The plan was submitted to several contracting firms for tender and was the basis for the contract awarded to Maxmass. The schedule is still valid and is progressing. The open pit operations are scheduled to be completed by the end of 2024 based on existing reserves. The combined open pits schedule is shown in Table 15-9.

Table 15-9: Chirano Open Pits Mining Schedule

	Year	2022	2023	2024	
	t	880,436	1,001,126	1,370,303	3,252,303
Open Pits	g/t	0.85	0.87	1.13	0.98
	Oz Au	19,820	23,964	41,651	85,436

Based on all modifying factors, calculated cut-off grades and LoM plans, the Mineral Reserves as calculated, are shown in Table 15-10.

Table 15-10: Chirano Gold Mine Mineral Reserves Dec 2021

Classification		Tonnes (000's)	Au Grade (g/t)	Au Ounces (000's)
Proven	OP	2,455.8	1.94	73.3
	UG	2,321.4	2.37	177.2
Stockpile(s)		822.7	0.79	20.9
Sub Total		**5,600.0**	**1.51**	**271.4**
Probable	OP	2,659.3	1.87	75.4
	UG	7500.6	2.67	642.9
Sub Total		**10,159.9**	**2.20**	**718.3**
TOTAL		**15,759.8**	**1.95**	**989.7**

The effective Date of the Reserves is 31st December 2021

The Mineral Reserves have been calculated on the existing operational parameters and modifying factors. Should there be any significant alteration to these inputs, the mineral reserves would require an update.

The most significant factor in determining mineral reserves is generally the commodity price. For the Chirano project the mineral reserves have been calculated at only $1,200/ ounce, which is well below the 3-year trailing average. No long-term consensus forecasts are currently indicating that gold would fall to that level during the Chirano operational life, currently ending in 2026.

Other factors that could materially affect the mineral reserves are processing recovery, accuracy of mineral resource modelling, mining and processing rates, taxes, royalties, mining permits and operational costs. As Chirano has been operating for almost two decades, all of these issues are well understood and incorporated into planning.

General operating costs (fuel, power, labour, consumables) are all variable costs and can change rapidly based on local and global events. As the Chirano project has long term contracts in place for these items, rapid price changes are generally mitigated and can be managed over time. In addition, Chirano has used a low commodity price for its reserve calculations. For 2021, the realized gold price was $1800/oz (CGML Dec Report 2021) which was 50% above the price used for reserve calculations. The conservative reserves gold price enables Chirano to accommodate fluctuations in operating costs, thus limiting the effect on reserve calculations.

15.3 Disclosure

Mineral Reserves reported have been thoroughly reviewed by Mr. D Claridge, Principal Consultant of Bara International. The above is a Qualified Person as defined in NI43-101. Bara International is independent of MGBL.

16. MINING METHODS

16.1 Mining Overview

Open pit mining activities first commenced in 2004 when the project was operated by Redback Mining. First gold from the project was poured in October 2005. Multiple pits were operated along the full strike length of the deposits, with the first underground operation, Akwaaba, commencing in 2008.

There are currently six operating underground mines. From south to north these are Akwaaba, Suraw, Akoti, Paboase, Tano and Obra. There are currently three open pits operating at the northern portion of the mining lease, which are Mamnao South, Mamnao Central and Mamnao North. These three pits are undergoing cutbacks and will eventually form a single large open pit. Figure 16-1shows a plan and long section view of mining operations.

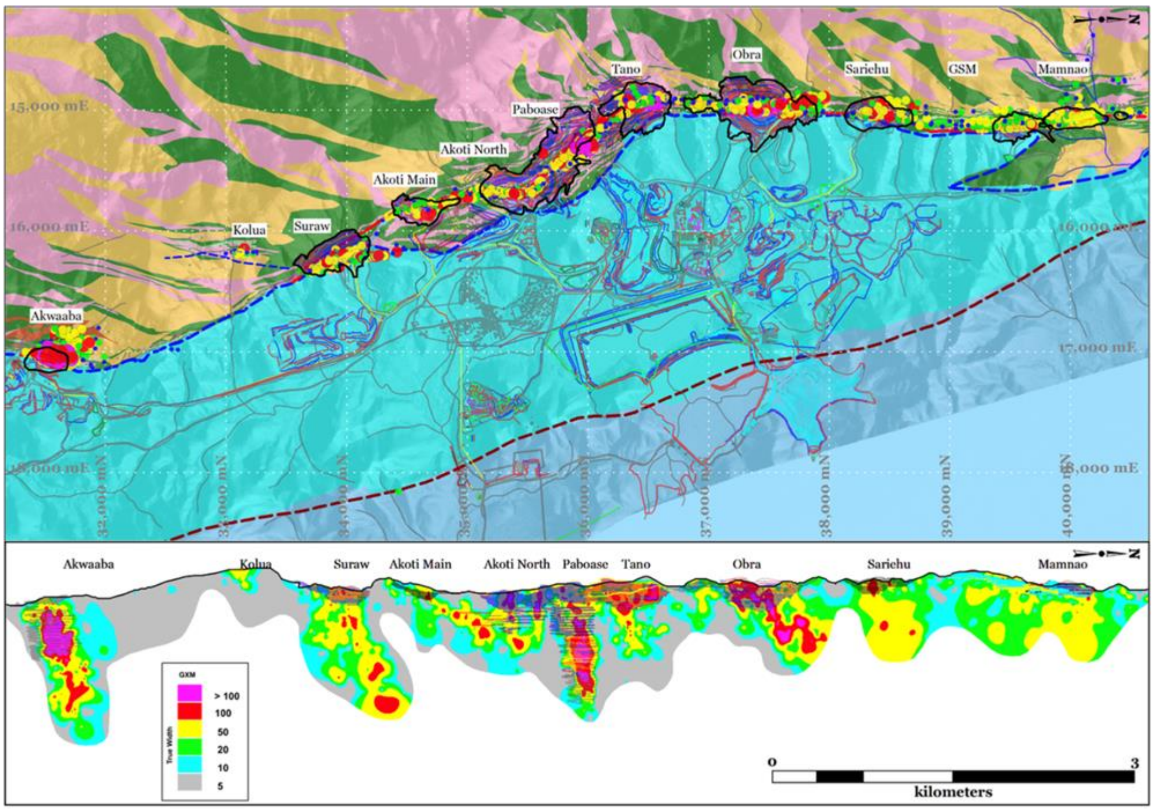


Figure 16-1: Chirano Operations

(Source: CGML 2022)

The average annual mine production rate of all mining for the years 2022 to 2026 is approximately 2Mtpa. Figure 16-2 indicates the LoM gold production based on December 2021 reserves.

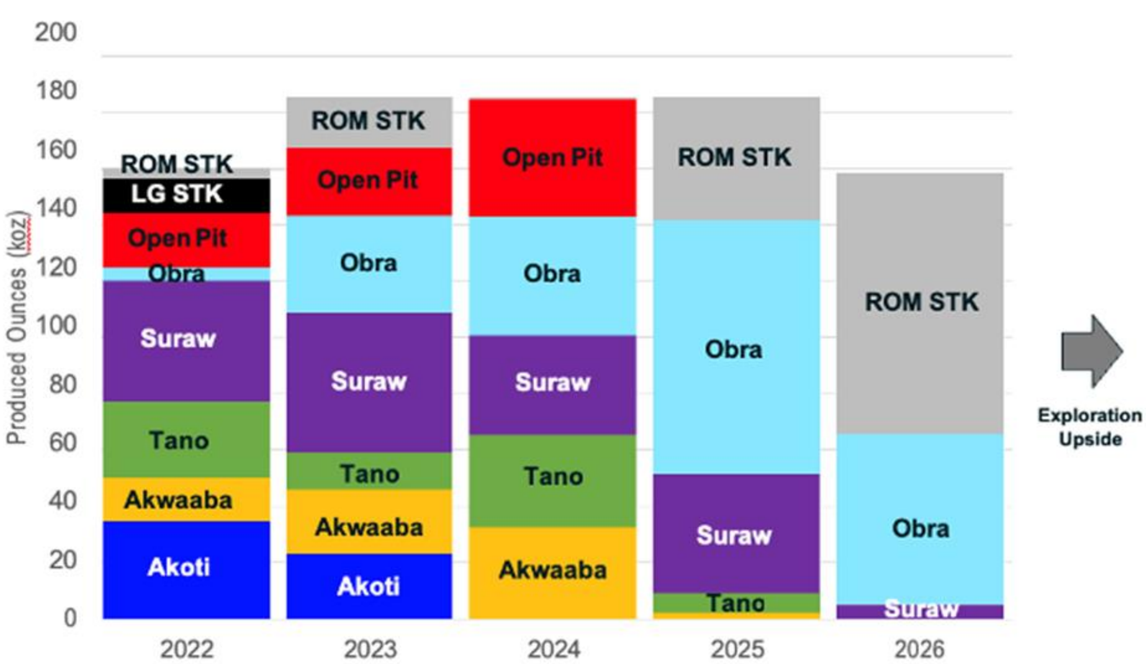


Figure 16-2: LoM Gold Production by Source

(Source: CGML 2022)

16.2 General Mine Design and Infrastructure

The six underground mines are designed similarly with the main access to each mine being a 5.5m wide x 6.0m high spiral decline descending at a gradient of 1:7. Access to the mineralised deposit is via lateral development extending from the decline at 25 metre vertical intervals.

At every sublevel, (25 metres vertically) a 5.5m wide x 6.0m high crosscut access is established. A stockpile, sump, escape way and ventilation accesses (fresh and return air) are developed on each level for the efficient management of development, load and haul systems, dewatering, emergency evacuation and ventilation respectively.

A typical level layout is shown in **Error! Reference source not found.**. Each level is connected to a Return Air Way (RAW) and escape way. The levels also consist of a stockpile, sump and services drive.

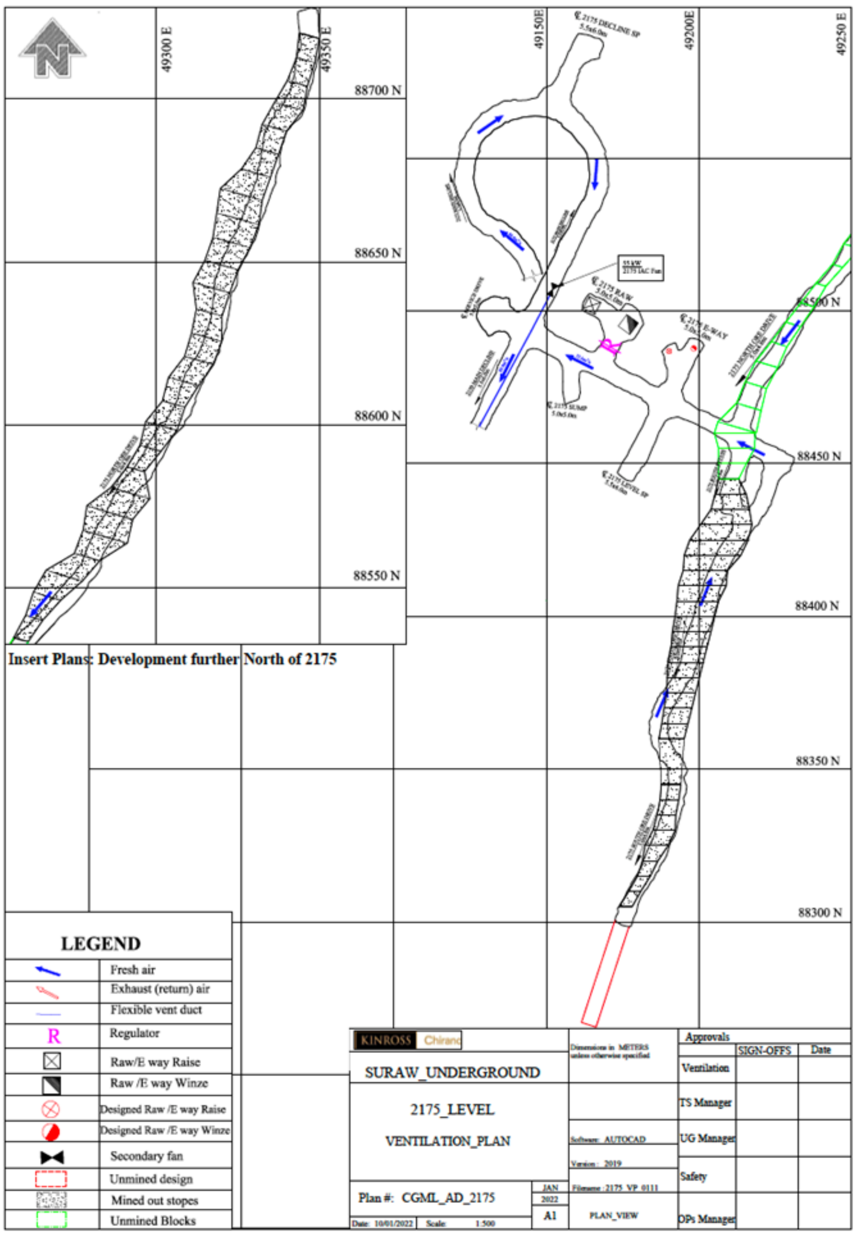


Figure 16-3: Standard Level Plan Design

Ore drives are established off the crosscut, with a nominal dimension of 5m wide x 4.8m high. These ore drives are driven the full strike length of the identified mineralised deposit which varies between the mines. Where the mineralised deposit is thicker multiple ore drives are established to facilitate total extraction.

Figure 16-4 illustrates the general design of the declines for the underground operations.

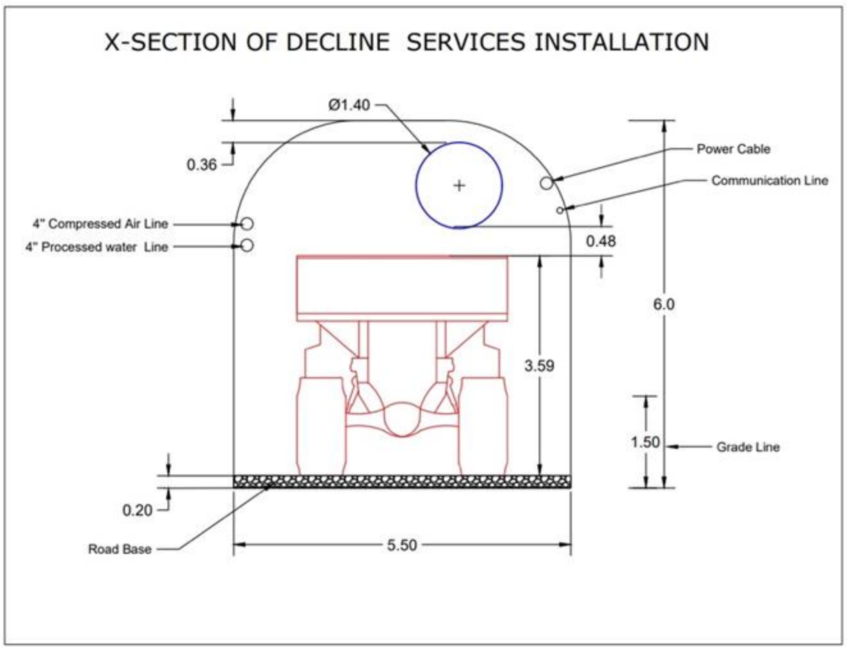


Figure 16-4: General Design of the Mine Decline

(Source: CGML 2022)

Power is supplied to each mine via a 11kV main feeder from surface. 2MVA stepdown transformers (11kV to 1kV) are installed on every 4th level (100m vertically). Power is then fed from these transformers to each intermediate level for distribution to the working headings via the Electrical Distribution Board (EDB).

Mine dewatering utilises mono pumps and flygt pumps. Water is collected in dedicated sumps on each level and fed via boreholes or polypipes into settling dams. Settled clear water is fed to the mono pumps for mine discharge to surface. Mine water is generally placed into large water catchments (old pits), where is then recycled into the mine for operational use. The typical power and dewatering systems are shown in Figure 16-5.

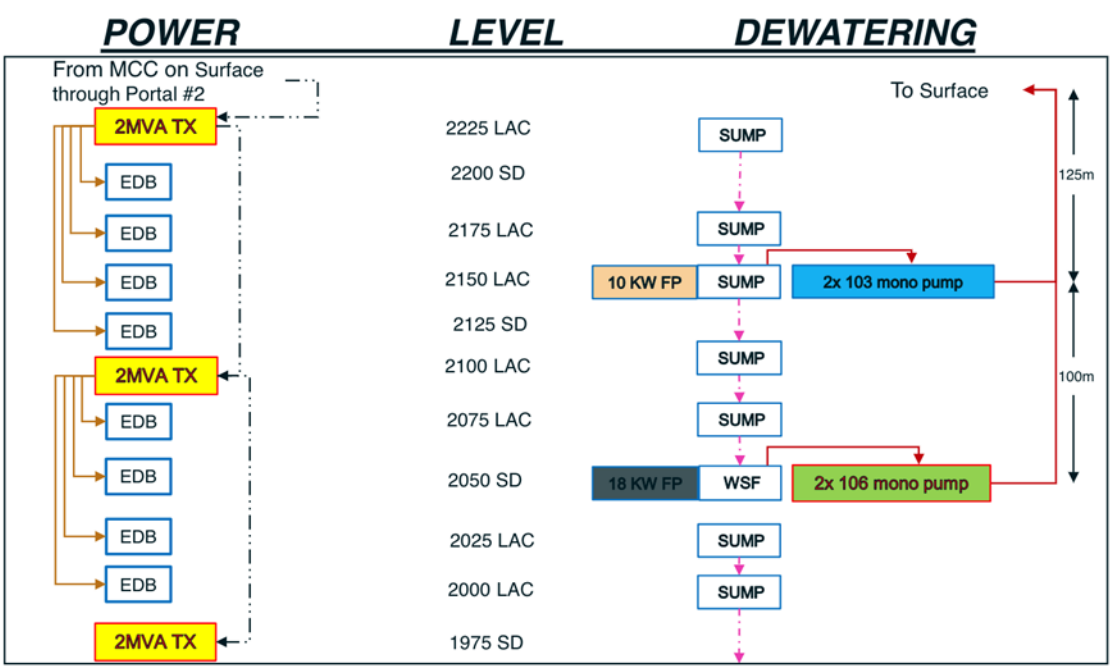


Figure 16-5: Mine Power and Dewatering

(Source: CGML 2022)

All mines are equipped with Leaky Feeder radio communication systems. Mobile equipment is fitted with fixed radios and management personnel are also equipped with handheld devices.

16.2.1 Mining Personnel & Systems

The mine Technical Services team is well established and equipped. As at the end of March 2022 the technical services department consisted of 79 personnel. This includes Survey, Ventilation, Geology, Geotechnical and Mine Planning for the underground and open pit operations. In addition, operations consist of 83 personnel in the surface mines and 246 personnel for underground.

Chirano is operating with modern systems and technologies. Software includes Datamine, Micromine, Leapfrog™, Surpac and Datamine Supervisor. Ventilation planning is managed with the use of Ventsim modelling software. Underground survey voids are measured using drone technology and a Cavity Monitoring System. All mine development is guided by fixed lasers for line and gradient.

Technical services personnel operate on a variety of rosters and is generally dependent on their home location. The standard for all personnel is for 2 days on, they get one day off. All personnel work a 12-hour shift. Underground personnel work a roster of 4 days, 4 nights and 4 off.

16.2.2 Geotechnical Considerations

Geotechnical studies have been ongoing from commencement of operations. Numerous companies including Coffey Mining, AMC Consulting, SRK Consulting and Maple GeoScience have been reviewing and reporting on geotechnical design parameters for Chirano.

More recently, numerical modelling and a full geotechnical review of each existing operation and proposed mine was undertaken by SRK Consulting (UK) Limited and a report titled "Chirano Geotechnical Assessments – 2019" was compiled and submitted to CGML. This work was based on the database of rock strength tests compiled for the geological units at Chirano, along with current mine voids and future designs. The 2019 report outlined the status of pillars and provided mine optimisation guidance and ground support guidelines.

In December 2021 Maple GeoScience conducted an audit of the Chirano operations including open pit and underground operations. A report titled "Geotechnical Audit of Chirano Gold Mine – Kinross Gold" was submitted to CGML in Dec 2021.

There is a full-time geotechnical department within the Mine Technical Services team at Chirano. Geotechnical parameters of the operations are understood and well managed. As the operations proceed to greater depths at Akwaaba and Paboase, high stress zones are being encountered. There have been infrequent, unplanned falls of ground. These incidents are thoroughly investigated, and measures put in place to ensure the safety of all personnel.

Overall, it has been stated that the hanging wall is "good quality" and is not expected to cave readily. **Error! Reference source not found.** and **Error! Reference source not found.** show ground support regimes in an ore drive and cross-cut at the Akwaaba mine.

Figure 16-6: Akwaaba 1600 N Ore Drive

Figure 16-7: Akwaaba 1550 Cross Cut

(Source: Maple Geoscience, 2021)

16.2.3 Hydrology

In 2015 African Environmental Research and Consulting Company (AERCC) was commissioned by Chirano Gold Mines Ltd to conduct profile sampling of some water impoundments and waterways. Independent testing was also conducted on the quality of underground dewatering at Akwaaba and Paboase. Generally, the report indicated high level of compliance to EPA and internationally set permissible standards of pH and dissolved constituent allowable to be discharged into the environment except slightly elevated levels of Ca and, faecal coliform that was attributed to human activities and are easily controllable.

Earlier in 2004, Knight Piesold (KP) undertook a study on potential Acid Mine Drain (AMD) by sampling all the open pit waste dumps and some tailings material for testing. The main conclusion of the geochemical characterisation of the waste rock from the Project was that all of the waste rock samples were classified as Non-Acid Forming. Indications are that there should be no risk of acid mine drainage from the various waste dumps, and it will be permissible to discharge runoff and percolation from the waste dump directly into the local waterways, via settlement ponds, without chemical treatment. Test work on tailings samples indicated that they would have moderate sulphide content (approximately 1%) with a high neutralising capacity and would be classified as non-acid forming.

Rain and ground water control and management in open pit is via pit-floor sumps from which water is pumped into silt traps and from there discharged into a natural drainage from where it flows into a second dammed off area (the Suraw

Pond). The mines only pump water from Suraw Pond for operational purposes when pit lakes and the underground recirculation water do not meet operational requirement for the mine. The water in the pond is sampled and analysed on a monthly basis for metals, hydrocarbons and microbial contamination.

Heavy rainfall may occasionally flood the working floors in some of the pits, but pumping capacity is generally sufficient to dry this within 24 hours. Drain sumps are regularly created in one-half of the pits to control such occurrence.

Underground water management system is made up of series of WT 103 Mono pumps that pump into successive levels before it reaches the surface. The main pumps deliver approximately 20 l/sec per pump. These pumps are set in series and deliver their contents through HDPE pipes via rising mains and into lined water storage facilities at the surface where hydrocarbons, potential heavy metals and other constituents are collected and removed in an oil trap and silt is precipitated using flocculants. Clean water is pumped back into storage tanks from which the underground water requirements are supplied.

The 2017 and 2018 integration of underground water reticulation with surface storage facilities created the opportunity for storage of excess water from underground operations. However due to the development of portals at Suraw and existing ones at Tano and Obra it meant that the water reservoirs in these inactive pits had to be phased out. Operational water quality is analysed monthly by the Environment and Community Relations Department to ensure that dissolved constituents in the water are not above the prescribed safe threshold by the Ghana Environmental Agency (EPA) before it is ever discharged into the natural environment.

A first hydrogeological study for the underground Akwaaba Mine was carried out by GCS of South Africa (2008-2009). A follow-up study was carried-out by SRK (UK) to include the Paboase Underground mine. Two reports were issued by SRK (Groundwater Inflow and Mine Water Inflow Management, Akwaaba and Paboase Underground Mines, Chirano Project, Ghana, August 2010 and Paboase Underground Project Hydrogeological Impact Assessment, June 2010).

The host rock of the Chirano mineralised zone is generally impermeable with water flow mainly controlled by penetrative joint systems. The Chirano Shear at Akwaaba did not show-up as a major water conduit. A conservative estimate gave a high of 16,000 litres per day at both Akwaaba and Paboase and dewatering infrastructure was designed to handle such amounts with ease. Historical and current data do not suggest any potential for underground flooding.

16.2.4 Underground Mine Development

The six underground projects are fully mechanized mines utilizing a fleet of nine Sandvik twin boom jumbos in conjunction with eight Caterpillar R2900 and three Sandvik loaders to facilitate high speed development. The loaders, in addition to mucking the face, are combined with a fleet of 27 Volvo (35t) trucks to transport the mineralised material and development waste. In addition to standard development equipment there is a large fleet of ancillary equipment available at the operation, including three graders, seven Integrated Tool Handlers (ITH), seven production drills. At the date of this report mining activities are currently active in all the underground operations.

Ground support is installed as part of the development cycle. Split sets of 2.4m x 47mm with 300 x 300mm combi plate with wire mesh/shotcrete are installed as primary support. 3m galvanised split sets are installed in permanent openings as secondary support in addition to the primary support. Large excavations (e.g., intersections) are supported with long cable tendons as additional reinforcement. Ground support layouts are issued for every mine development plan issued for construction. Geotechnical engineers are responsible to reviewing and designing ground support.

16.2.5 Underground Mine Production

Once ore drives are developed to both the northern and southern extent of the mineralised deposit, slot raises are created to allow production mining to commence. Slot raises are developed utilising a fleet of 3 Cubex ITH drills. After blasting the slots, long holes are drilled between sub-levels in a series of ring/fan patterns using Sandvik up hole production drill rigs.

The Chirano operations use Sub Level Caving (“SLC”) and Long Hole Open Stoping (“LHOS”) as their primary ore production methods. In both cases the voids created from ore extraction are filled using unconsolidated fill. The fill material is sourced from general mine development waste and when required the fill is sourced from surface mining activities and is back hauled underground or delivered underground via a series of interconnecting waste passes.

Upon completion of drilling several rings, each ring is blasted individually, and the broken ore is extracted in a retreat manner at the draw points using loaders before the next blast takes place. Where the SLC method is employed, the upper levels are mined ahead of lower levels. See Figure 16-8. Where 50m of vertical open stoping is being mined, the bottom ring is blasted, bogged out and the upper ring is blasted to report at the bottom sublevels for bogging. Concurrent introduction of unconsolidated waste rock is introduced into stope voids to prevent the stope walls spalling.

Bulk emulsion explosive is used in production rings, due to its capability for higher quality assurance and success in SLC and Sub-Level Open Stoping mining. Ring charging using bulk emulsion has a rapid turnaround time and it is unaffected by water in the ground. Drilling and blasting is carried out regularly as permitted by the Inspectorate Division of the Minerals Commission.

The quantity of ore extracted from draw points are closely monitored to ensure that dilution is minimized and also to avoid leaving voids above the production levels, which could lead to air blast in the SLC. The SLC allows multiple production levels to operate simultaneously. Production faces on each level are a minimum of 10 metres apart along the strike to ensure safe working conditions for operators and equipment as shown in Figure 16-9.

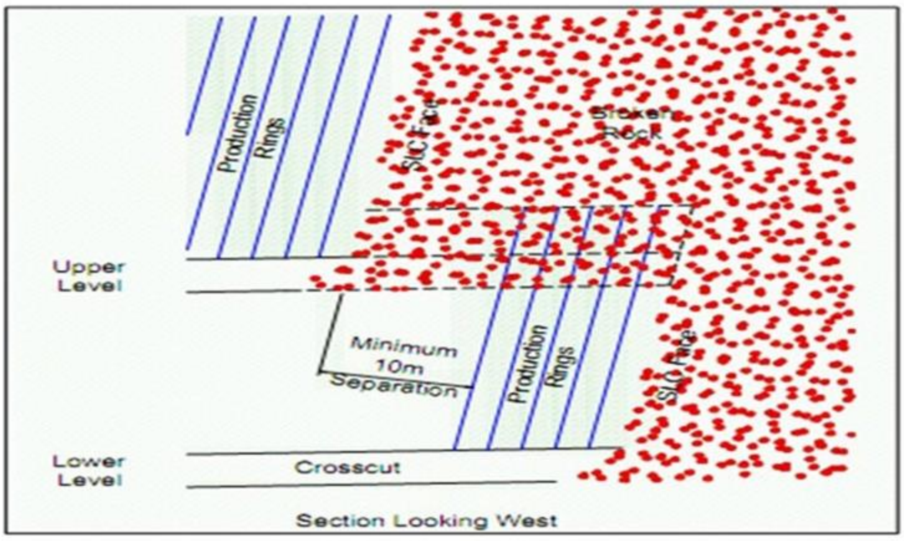


Figure 16-8: Section View – Cave Production Zone

(Source: CGML 2022)

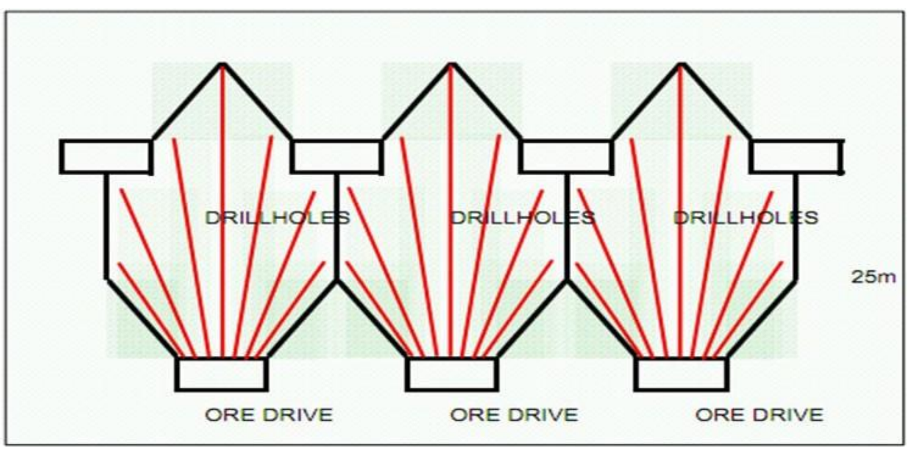


Figure 16-9: Section View – Production Ring Design

(Source: CGML 2022)

The second mining method utilised at Chirano, Sub Level Open Stoping ("SLOS"), reduces dilution as the stope voids are backfilled once mining of a mineralised block has been completed. The mining sequence is similar to the SCL method other than the continuous fill process used in the SLC. Ore drives are developed to the full extents of the mineralisation, with a vertical slot established at the ends using the Cubex drill. Ring drilling is completed with the long hole drills, and the rings are charged and blasted individually, retreating to the crosscut. At the crosscut a mass blast of multiple rings is fired. The mines are transitioning to a bottom up SLOS mining method and fully sequenced to maximise extraction. Figure 16-10 shows a schematic of the SLOS mining method.

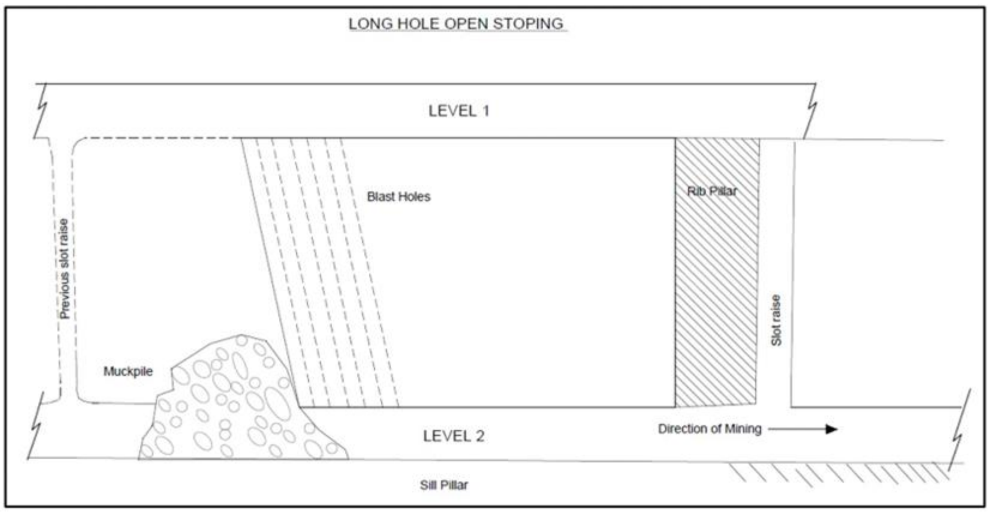


Figure 16-10: Typical sublevel open stoping arrangement

(Source: Internet, 2022)

In both mining methods, mineralised material is trammed along the ore drives to an underground stockpile where it is loaded onto 40 tonne Volvo trucks for haulage to the surface stockpiles. Mineralised material is stockpiled on surface either within the vicinity of the portal or at the top of the open pit ramps. It is then rehandled to the ROM pad for blending as mill feed. Distances from each mine to the process plant ROM pad are shown in **Error! Reference source not found.**

Table 16-1: Haulage Distances - Mines to ROM

Underground Mine	Distance (km)
Akwaaba	6.7
Paboase	1.3
Obra	0.7
Sariehu	1.7
Suraw	4.2
Tano	1.2

Open Pit Mine	Distance (km)
Mamnao Central	3.3
Mamnao South	3.6

16.3 Paboase Underground Mine

16.3.1 Paboase Mining Method

Paboase mine is almost fully depleted, however is being kept open as it serves as an access to the Tano mine and is also part of the primary ventilation circuit for the Paboase, Tano and Akoti operations. The main decline is currently completed to the 1400 elevation. The underground mining has been categorised into three zones; the upper, mid and lower zone. The level above 2100mRL is classified as the upper zone and was mined using long hole open stoping with rib pillars and unconsolidated backfill. The upper zone was categorised into north and south extent with the south mined top-down with delayed backfill whilst the north was bottom-up approach. The mid zone is the area between 2000mRL and 2075mRL which was initially mined using AVOCA mining method; however, due to operational challenges, the mining method was transitioned to SLC (mini SLC). The lower zone is the section below 2000mRL which has been mined using the modified SLC (MSLC) mining method. The major difference between modified and conventional SLC operations is the introduction of waste backfill into the cave to provide confinement to stope abutments in MSCL.

The mining method employed at the lower Paboase (below 2000 mRL) is modified longitudinal SLC, retreating from the north and south extents to the central pillar. A sill pillar is left at lower Paboase (i.e. 2000 to 1950mRL) to separate the mid-zone and the lower zone. Slot raises are drilled with Cubex V-30 drill head and the peripheral blast holes, drilled with a Sandvik solo. The slot raises are fired using vertical crater retreat (VCR) and backfilled as a safety precaution to enable smooth mining of the level above; the filled material is bogged out when stoping is to resume on that level. Backfill delivery into the SLC void is done via the Central Waste Pass (CWP), fill passes on the 2200mRL north central tipping point and the alternate fill passes, where the mineralised material extracted from the cave is replaced with unconsolidated rock fill (URF) by Load-haul-dump (LHD). However, due to ground instability the CWP and fill passes have been compromised rendering them useless for backfilling. Backfilling now takes place via the failed crown pillar from surface.

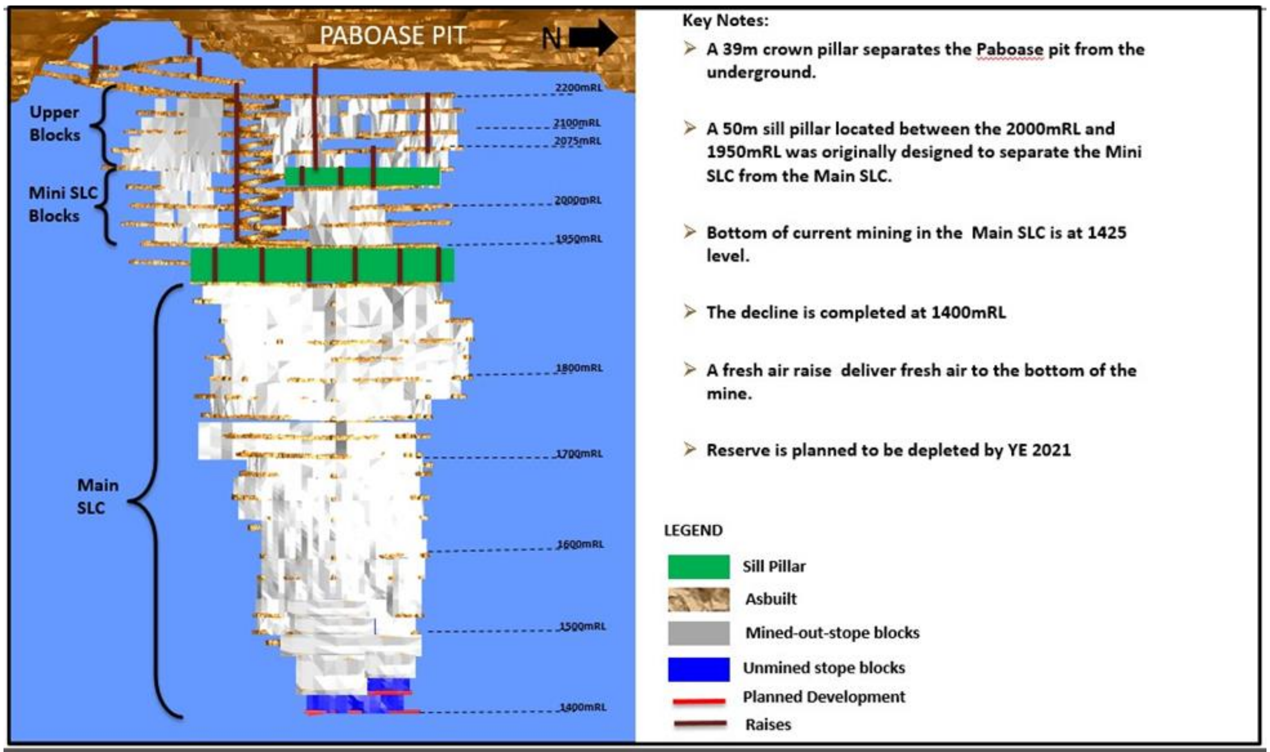


Figure 16-11: Long Sectional View of Paboase UG Mine

(Source: CGML 2022)

16.3.2 Paboase Ventilation

Paboase Underground mine ventilation network is designed to provide adequate fresh air to all of the active workplaces during mine development and the production phases. The system has been designed to be readily constructible and operable employing standard design and installation practices. Currently, the primary air intake is through two (2) 5.5m x 6.0m ramps connecting surface to the various underground workings. Also included in the mine design are escape way raises connecting surface to all levels. Fresh air raises have also been developed from stockpile 6 located near 2200 level to 1650 level. Plans are underway to extend the fresh air raises to the lowest level of the mine.

The ventilation network is an exhaust system which combines the twin Swedvent and twin Howden fans already installed on surface over the main Return Air Raise (RAR). The twin Howden fans are type MF107-0.74-38.5-13 Size 2625 fixed speed axial flow fans installed with an 880kW drive motor. The two Swedvent fans are a 2x 315kW axial flow fans installed on the 5.0 x 5.0m raise connecting from surface to 2225 level. A long section of the mine ventilation system is illustrated in **Error! Reference source not found.**.

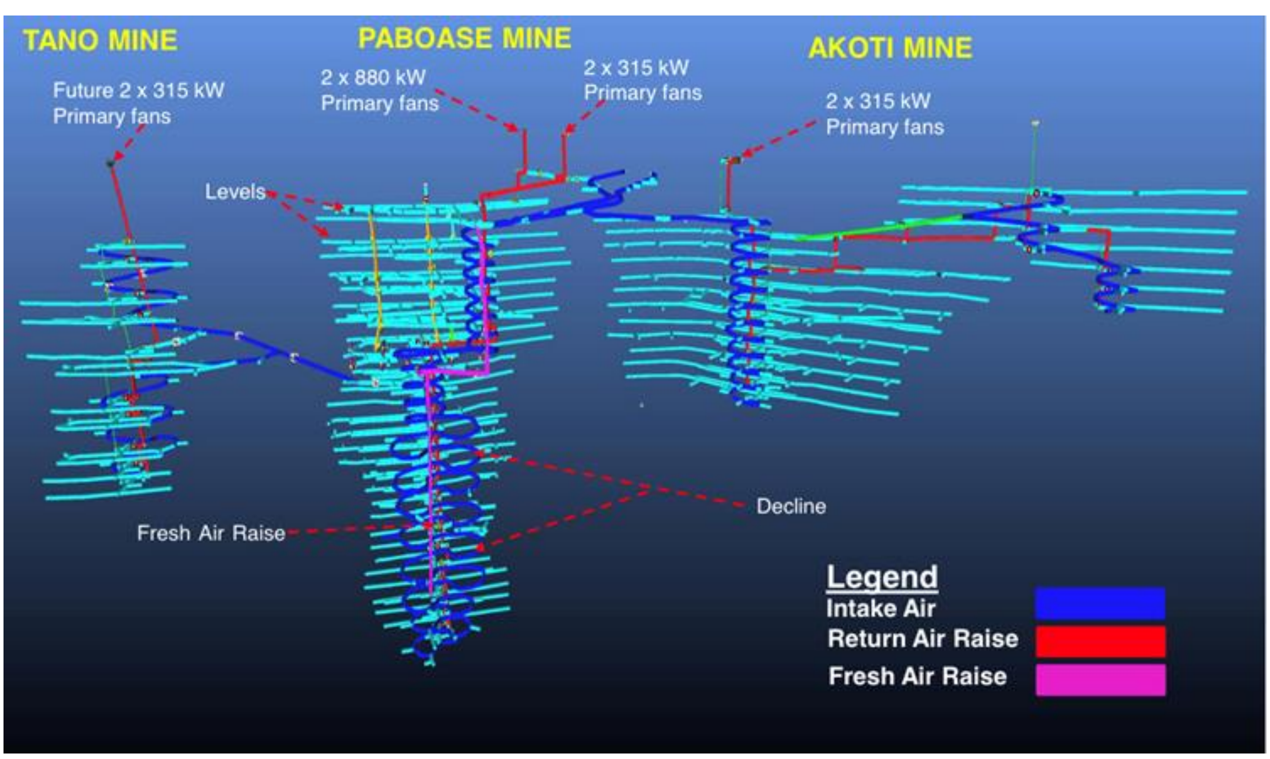


Figure 16-12: View of the Paboase Ventilation Plan

(Source: CGML 2022)

16.4 Akwaaba Underground Mine

16.4.1 Akwaaba Mining Method

The Akwaaba underground operation currently also employs a SLOS method. The upper part of the sublevel open stoping has been mined using sublevel cave separated by a sill pillar. Recent drilling confirmed the existence of a Hanging wall splay west of the Main mineral deposit. Further drilling is being carried out to determine the extent and continuity of the main body and hanging wall splay.

The open stope consists of 50m sublevels with bottom-up stoping approach whereby a mined-out level is backfilled before the next upper level is mined.

The Akwaaba mine is in the advanced stage of mining and currently host reserves up to the 1400 level. Potential for further mining activities below 1400 level is being assessed. Figure 16-3.

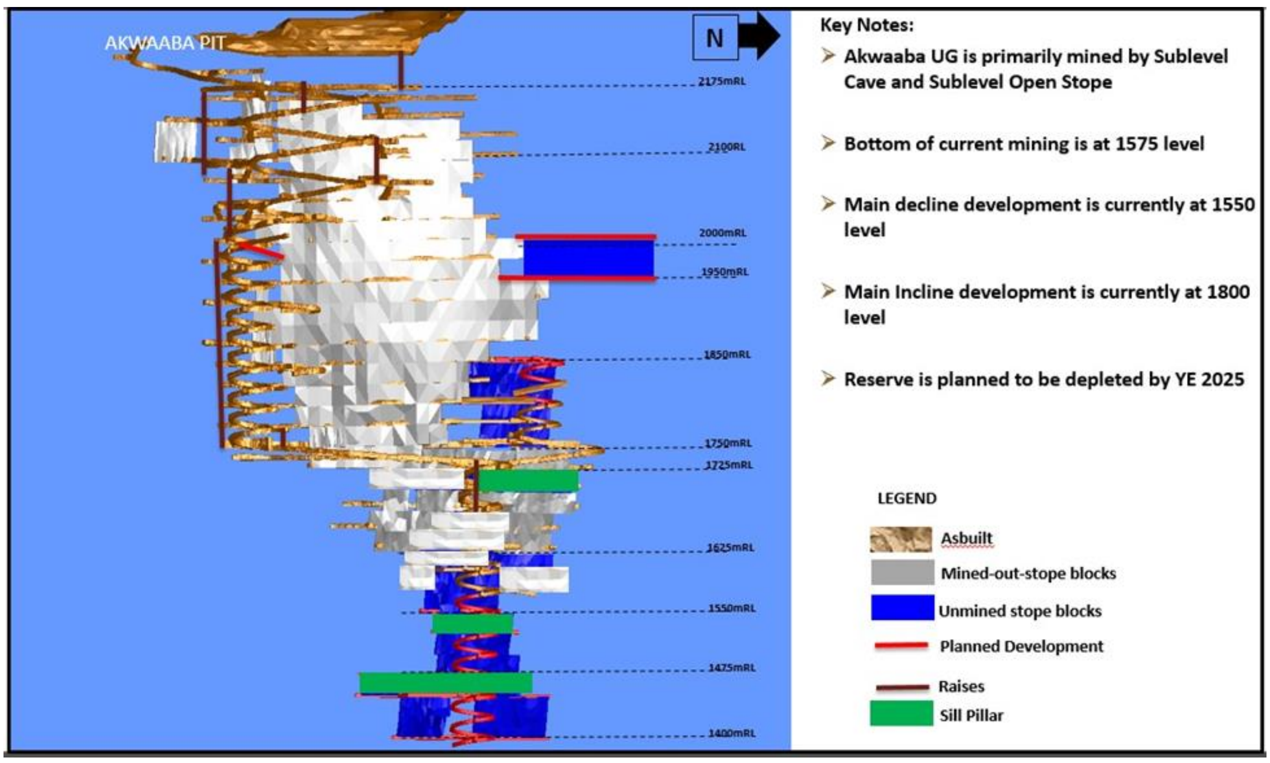


Figure 16-13: Long Section View of Akwaaba Underground Mine

(Source: CGML 2022)

16.4.2 Akwaaba Ventilation

The Underground mine utilises 2 x 550kW axial flow fans for its primary exhaust system. The fans are located at the top of the 5-metre return air raise. Fresh air enters the mine via the 5.5m x 6m decline and through the dedicated 5-metre fresh air raise, as shown in **Error! Reference source not found.**. Regulators and ventilation doors are used on the levels to ensure that adequate air flow is reaching production faces.

Primary ventilation is supported with secondary fans and ventilation bags on the production levels and at development faces. 2 x 110kW auxiliary fans located 20m to the level access forces fresh air through ventilation bags to the draw points and development ends to reduce waiting times after blasting and ensure safe working conditions for underground operations.

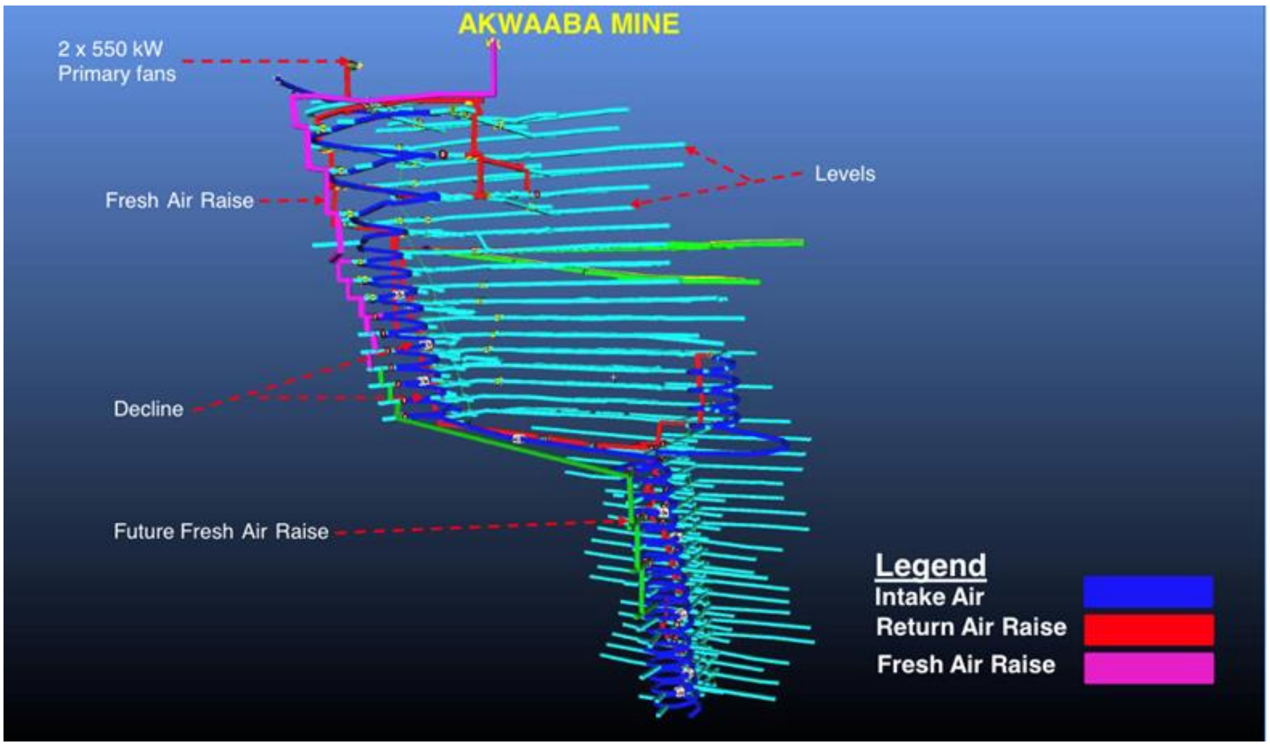


Figure 16-14: Isometric View of the Akwaaba Underground Ventilation Plan

(Source: CGML 2022)

16.5 Tano Underground Mine

16.5.1 Tano Mining Method

Tano underground project is progressively advancing from a developing project to a full operating mine. The main access ramp development is currently from Paboase 1950mRL towards surface. A portal may be developed from the surface to link to the incline ramp which has been driven from Paboase 1950 level. The mine is planned primarily to use the sublevel open stoping mining method. Tano underground consists of 50m sublevels with bottom-up stoping approach whereby a mined-out level is backfilled before the next upper level is mined similar to Akoti mining method.

Error! Reference source not found. is the current layout of the various phases to be mined in the Tano underground mine.

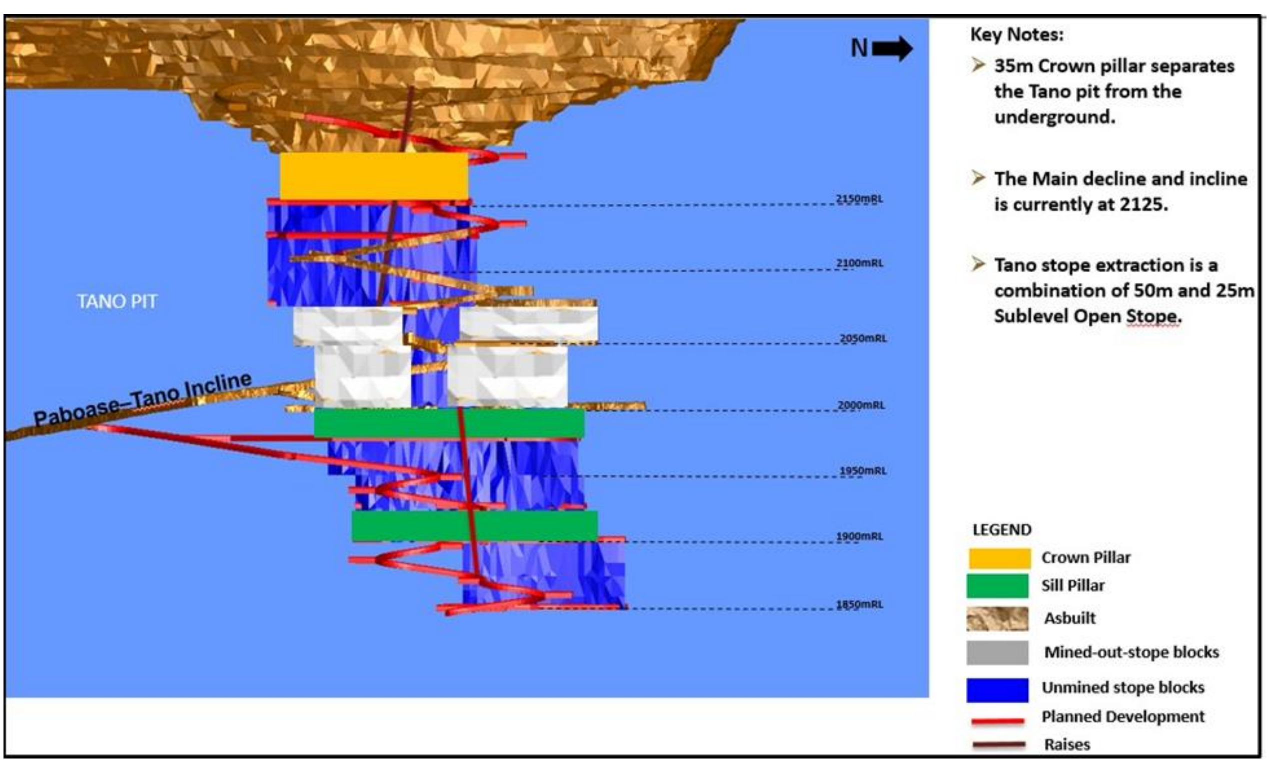


Figure 16-15: Long Section View of Tano Underground Mine

(Source: CGML 2022)

16.5.2 Tano Ventilation

Fresh air intake to Tano underground is via a 4.1 diameter raise from surface. 2 x 110kW force fans are installed at the level accesses to force fresh air through ventilation bags to the draw points and development ends to reduce waiting times after blasting and ensure safe working conditions for underground operations. Exhaust air is also upcasted via the Paboase 1950 RAR. Preparation is ongoing to install 2 x 315 kW Swedvent fans connected in parallel on top of the 4.1 diameter raise to serve as the main exhaust fans. **Error! Reference source not found.** shows current Tano ventilation plan.

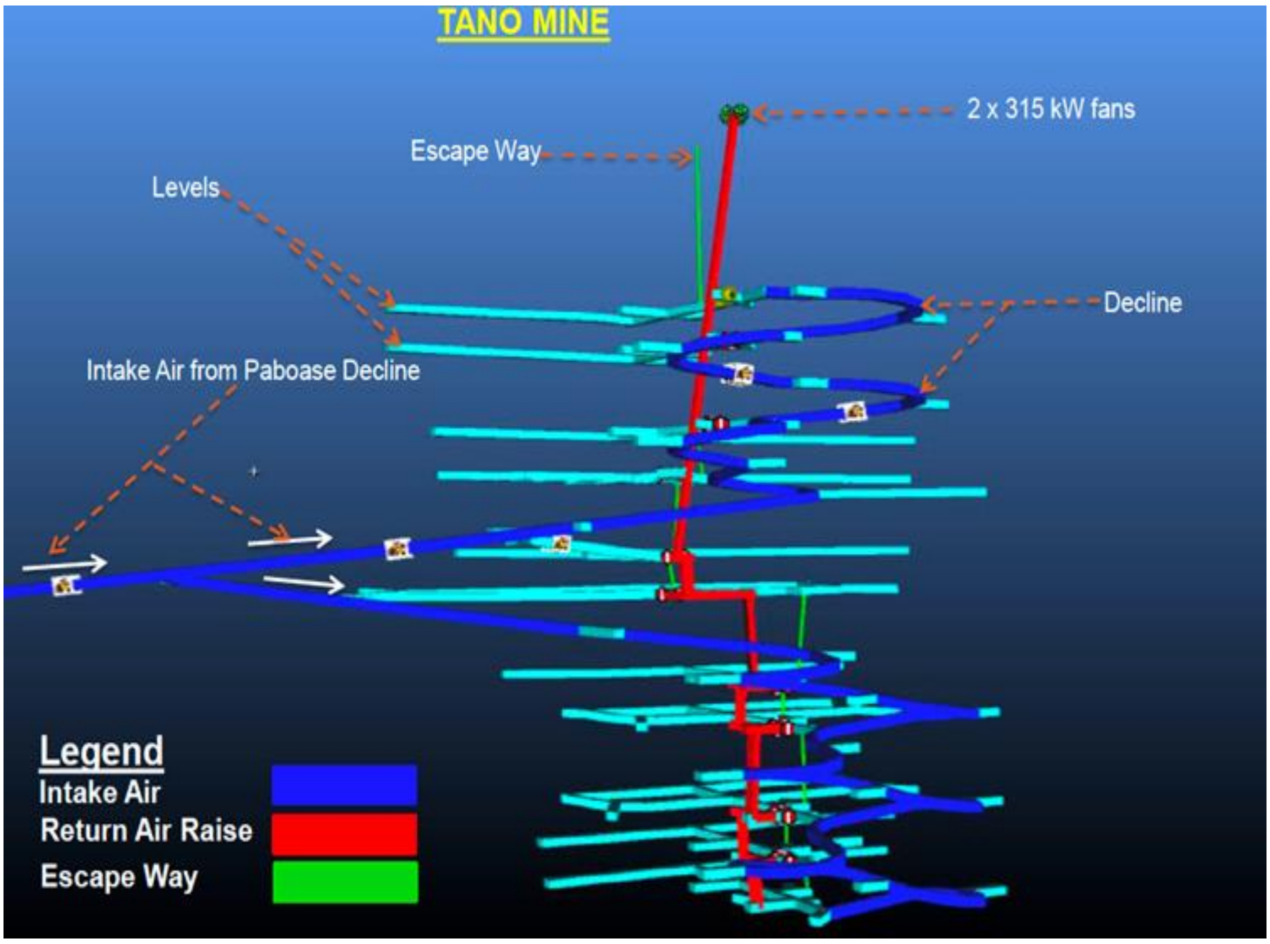


Figure 16-16: View of the Tano Ventilation Plan

(Source: CGML 2022)

16.6 Akoti Underground Mine

16.6.1 Akoti Mining Methods

The Akoti underground mine primarily uses the SLOS mining method. The stoping is undertaken in three distinct zones, north, central and south. The Akoti south consists of 50m sublevels with bottom-up stoping approach whereby a mined-out level is backfilled before the next upper level is mined. The same approach is used in the north section. The central part of Akoti underground however consists of 25m sublevels, with a top-down approach. To ensure the stability of the open voids, waste rock is used to tightly fill the mined-out stopes.

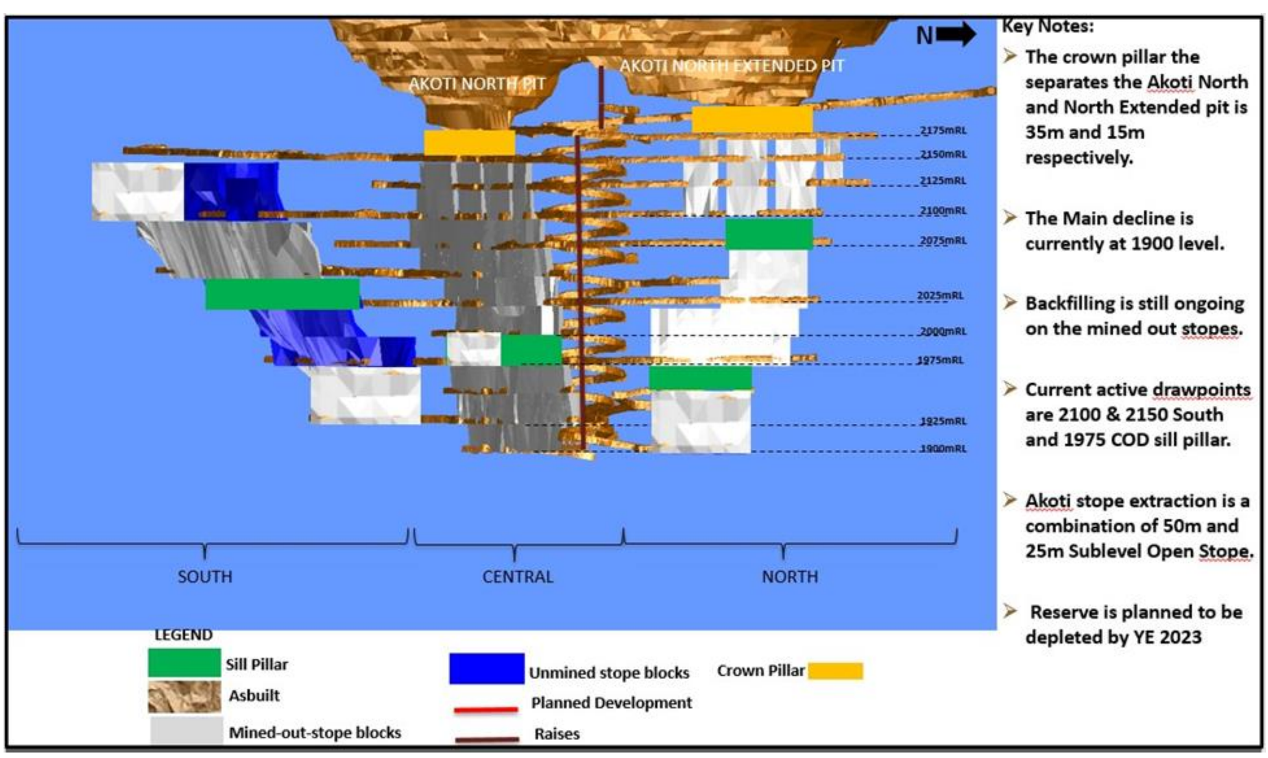


Figure 16-17: Long Section View of Akoti Underground Mine

(Source: CGML 2022)

16.6.2 Akoti Ventilation

The Akoti underground has a similar ventilation layout and network underground. The mine is ventilated by 2 x 315kw Swedvent fans installed on the Akoti portal.

Figure 16-18 shows the Akoti exhaust fans arrangement. Fresh air intake into the Akoti underground is via the two Paboase portals.

Figure 16-18: Akoti 2x315kw Exhaust Swedvent Fans

(Source: CGML 2022)

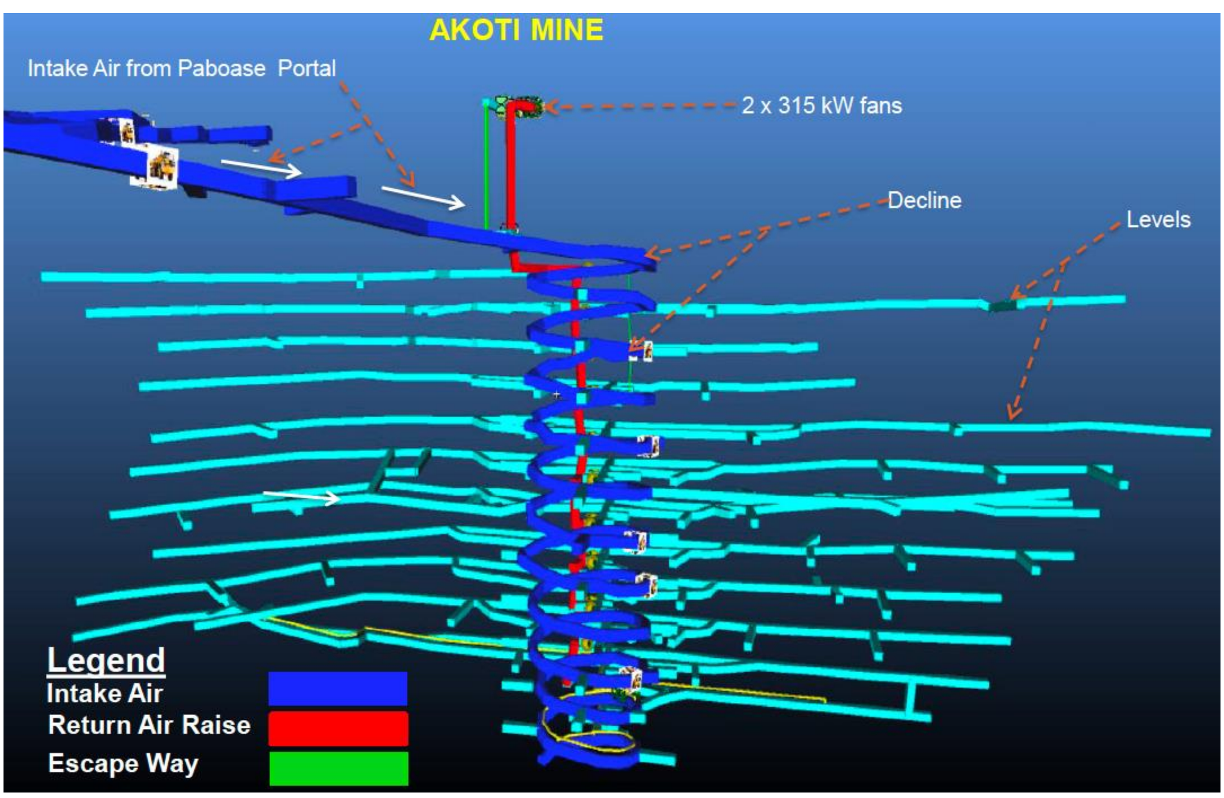


Figure 16-19: Akoti Ventilation Circuit

(Source: CGML 2022)

16.7 Suraw Underground Mine

16.7.1 Suraw Mining Method

Suraw underground project commenced stoping in 2021. It is progressively increasing its production rate to its annual target of approximately 70ktpm in 2023. The Suraw underground consists of 50m sublevels with bottom-up stoping approach whereby a mined- out level is backfilled before the next upper level is mined.

Two portals are developed at the surface. The main portal is used for the main travel access into the underground mine and the second portal (a short adit into the pit wall) hosts both the ventilation return air raise (RAW) and escape way used for emergency evacuation of personnel only, see Figure 16-20. A fresh air raise and waste pass is planned to be developed from the surface and linked to the underground workings.

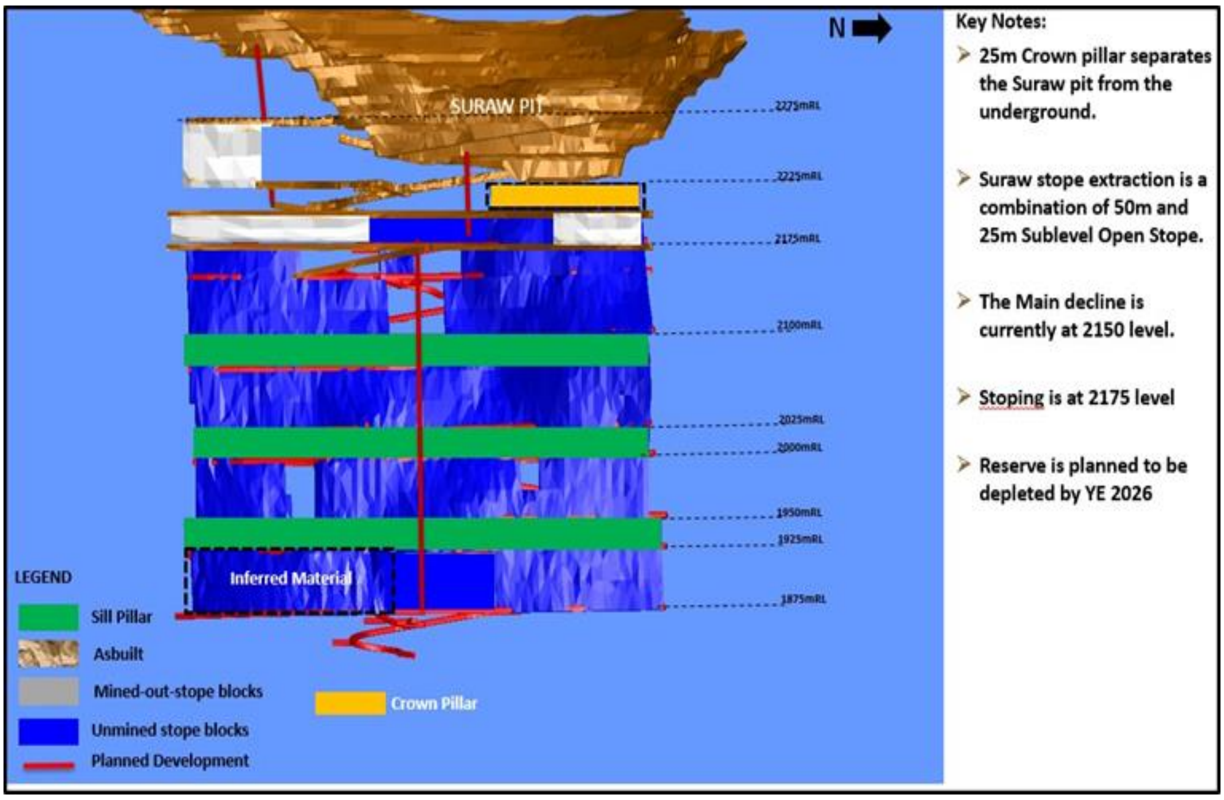


Figure 16-20: Long Section View of Suraw Underground Mine

(Source: CGML 2022)

16.7.2 Suraw Ventilation

Similarly, the Suraw underground mine employs the exhaust ventilation mechanism to exhaust contaminated air from the mine, 2 x 315kW axial flow fans of sufficient size and capacity are used to exhaust the contaminated air from the mine. The fans are located at the return air portal connecting to a 5-metre return air raise. Fresh air enters the mine via the 5.5m x 6.0m decline as shown in **Error! Reference source not found.**. Regulators and ventilation doors are used on the levels to ensure that adequate air flow is reaching production faces.

Primary ventilation is supported with secondary fans and ventilation bags on the production levels and at development faces. 2 x 110kW auxiliary fans located 20m to the level access forces fresh air through ventilation bags to the draw points and development ends to reduce waiting times after blasting and ensure safe working conditions for underground operations.

Figure 16-21: Suraw Portal Layout

(Source: CGML 2022)

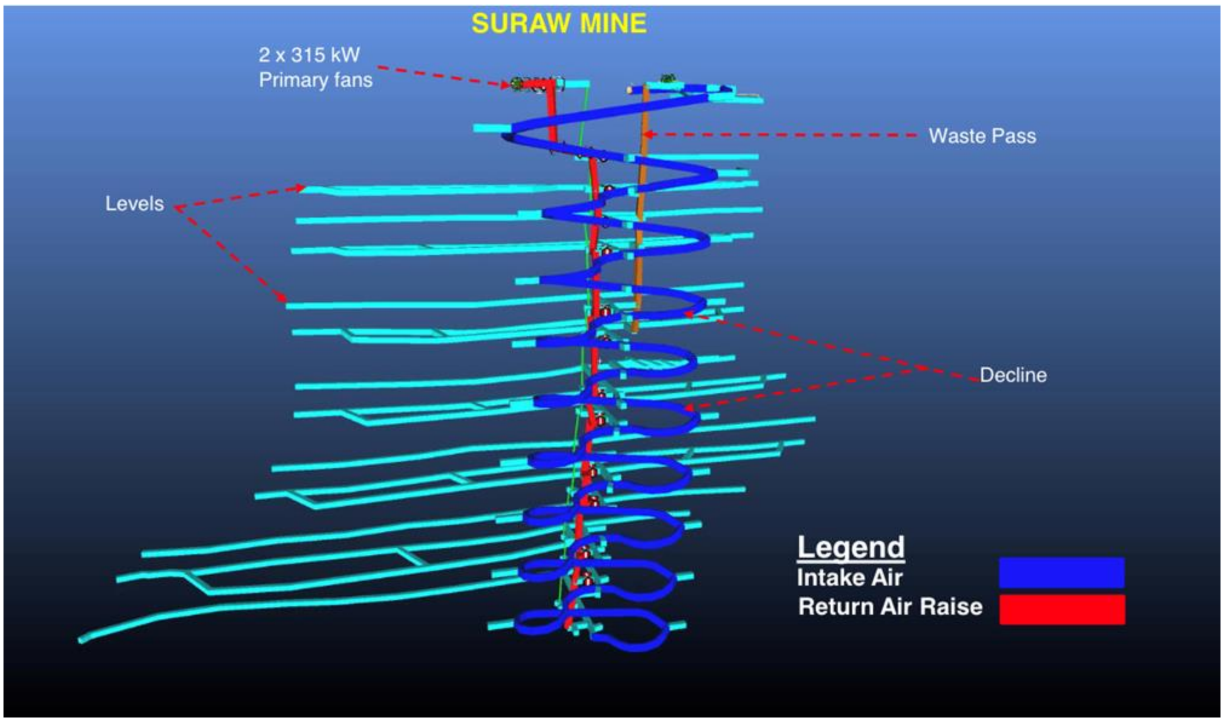


Figure 16-22: Suraw Ventilation System

(Source: CGML 2022)

16.8 Obra Underground Mine

16.8.1 Obra Mining Method

Obra underground is currently the newest underground project which commenced development in 2021. It will become a significant contributor to the main production stream in year 2023. Obra Underground will consist of 50m sublevels with bottom-up stoping approach whereby a mined-out level is backfilled before the next upper level is mined.

The portal serves as the primary access ramp for personnel and equipment and also doubles as the fresh air intake for the mine. Primary ventilation fans and an escape way is being established and connected to the various underground workings. A dedicated fresh air raise has been planned to connect from surface to the underground sublevels for future ventilation requirement. A backfill pass is also planned to connect from surface to the various sublevels for stope backfilling. **Error! Reference source not found.** shows the planned LoM mining sequence for Obra.

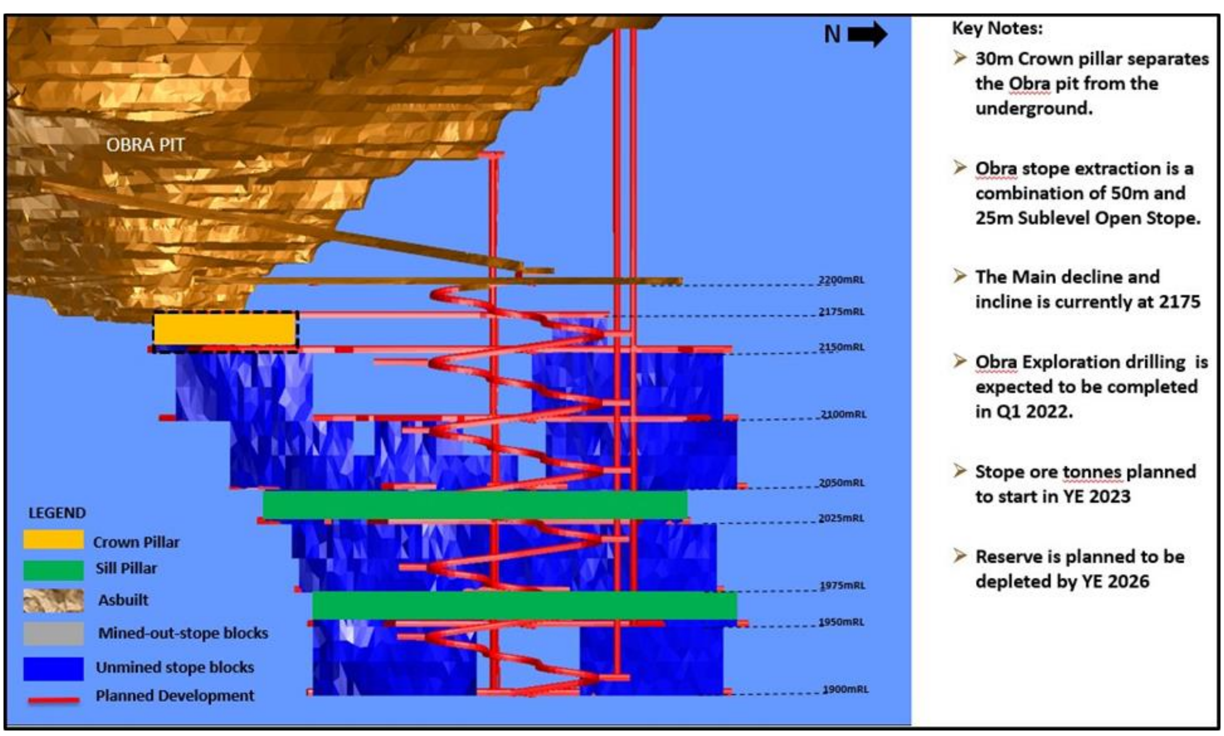


Figure 16-23: Long Section View of Obra Underground Mine

(Source: CGML 2022)

16.8.2 Obra Ventilation

The Obra underground mine is currently ventilated using 2 secondary ventilation fans in a force / exhaust configuration. Planning has been completed for the installation of a primary return air way and an escape way.

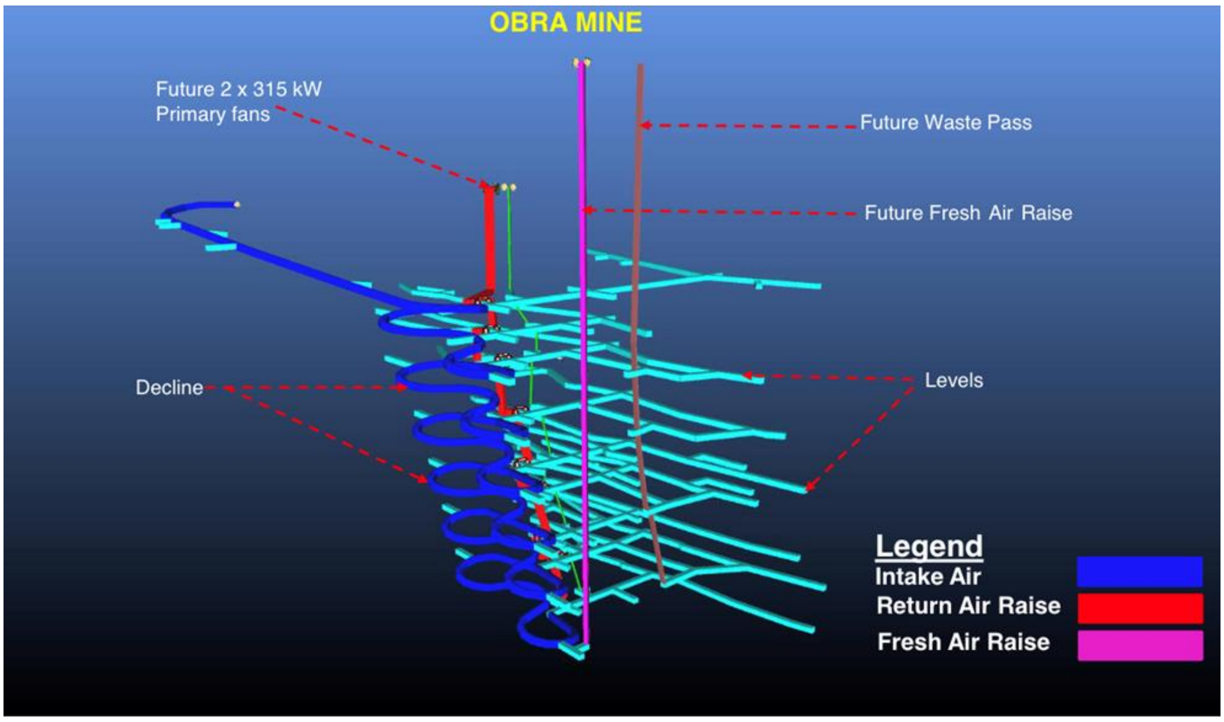


Figure 16-24: Obra Mine proposed Ventilation Network

(Source: CGML 2022)

16.9 Sariehu Underground Mine (Completing Studies)

Sariehu is a potential underground which is currently under feasibility study stage. Sariehu underground is located north of Obra underground. Sariehu underground studies started late October 2020. It is anticipated that the development of the Sariehu mine will increase the Chirano's operations beyond current known reserves. Sariehu Underground will consist of 50m sublevels with bottom-up stoping approach whereby a mined-out level is backfilled before the next upper level is mined.

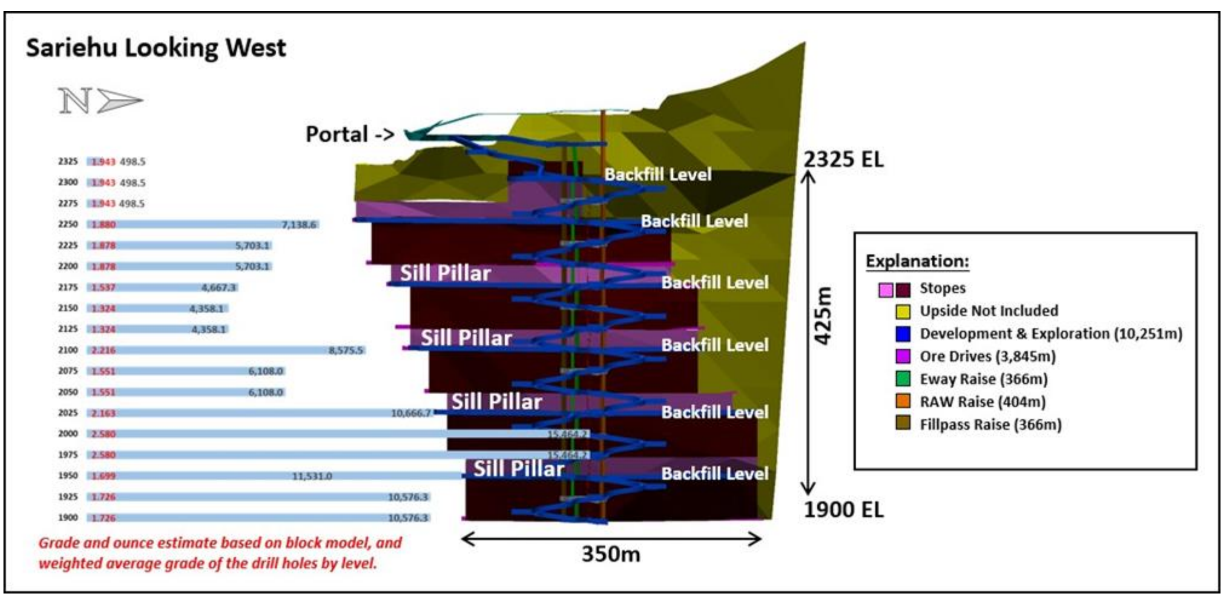


Figure 16-25: Long Section View of Sariehu Underground Mine

(Source: CGML 2022)

16.10 Mamnao Pit

16.10.1 Mamnao Mining Method

The Mamnao pit consists of three pits including Mamnao South, Mamnao Central and Mamnao North which are currently being mined to create a single larger pit. The pits are located in the northern part of the Chirano mine site.

Currently, the mining is carried out in Mamnao Central and Mamnao South. The design of the Central and South Mamnao pits indicates that together the pits are about 1.2km long, extended along the North-South direction. The width of the pits varies approximately between 200-300m and the depth ranges between 120-200m. The pit highwalls on the East and West walls consist of weathered material, mainly regolith because of tropical weathering (i.e., Laterite, Saprolite, and transition zone), in the upper benches and fresh rocks in the lower benches. The regolith is highly variable in thickness and degree of weathering ranging from extremely to slightly weathered.

Based on the proposed pit design the bench height is 9m and the bench width is 5m for all the benches in both weathered and fresh rocks. The designed bench face angles for benches in the weathered and fresh rocks are 52º and 75º, respectively. **Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.** illustrates the proposed pit designs for the Mamnao pits. This configuration has resulted in inter-ramp slope angles of 34º and 38º for West and East high walls in the weathered material and 45º and 47º for West and East high walls in the fresh rocks, respectively.

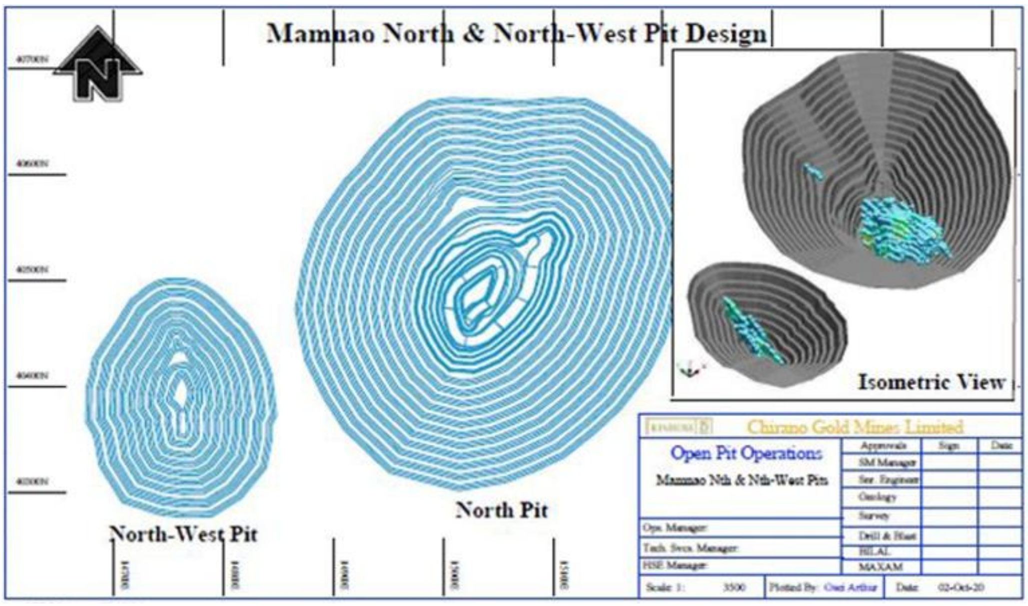


Figure 16-26: Mamnao North Pit Design

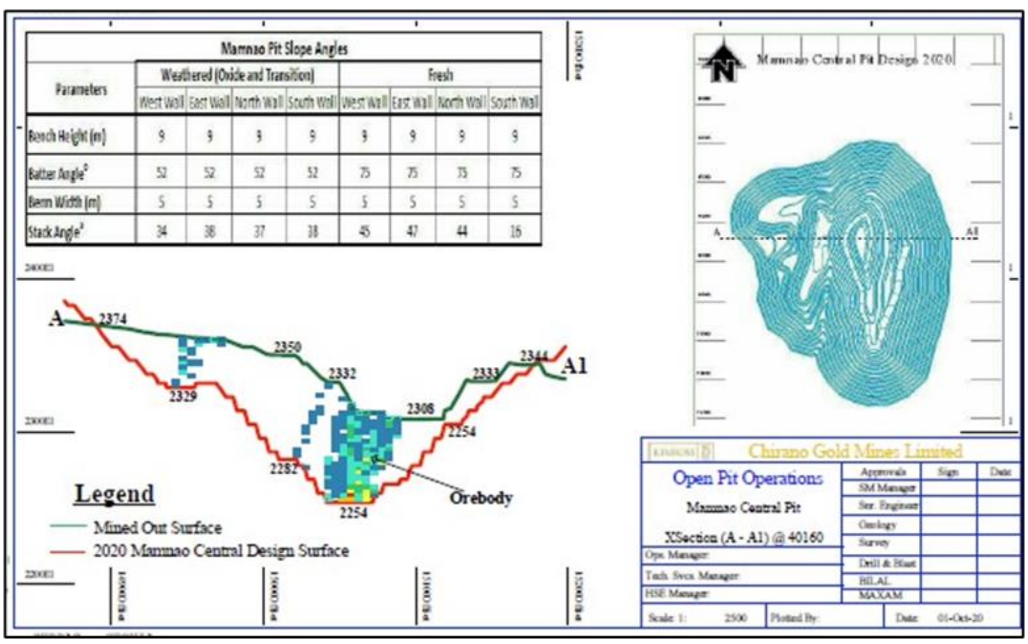


Figure 16-27: Mamnao Central Pit Design

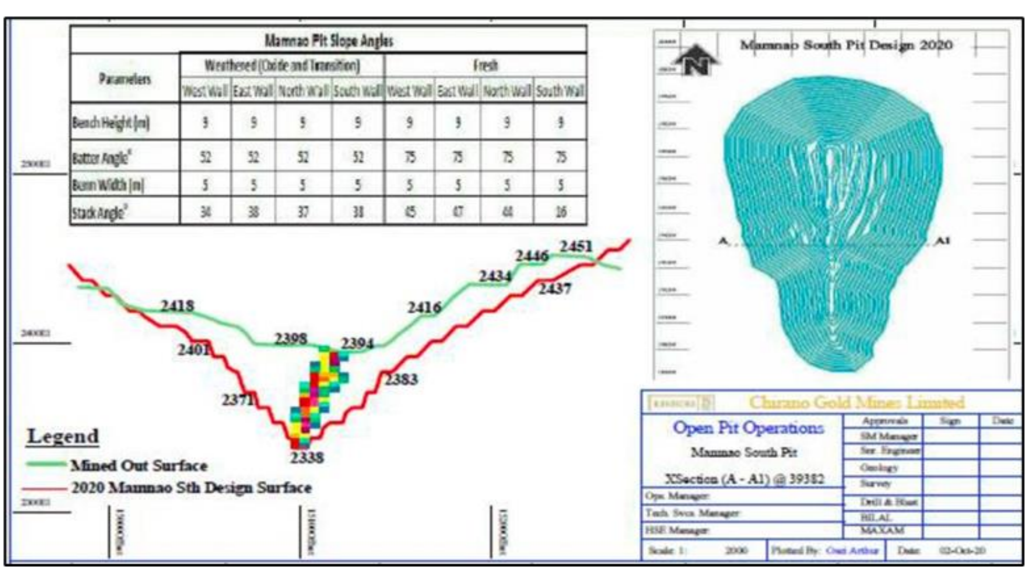


Figure 16-28: Mamnao South Pit Design

Chirano LoM plan waste generation is based on the 2020 Strategic Business Plan (SBP). Over the LoM, an estimated 24,462,748t of waste is expected to be generated from the open pit operations. This waste is expected to be reused for backfilling of some of the pits (to daylight) as defined in the EIS, and some for constructing tailings storage facility (TSF) as required. There will be progressive rehabilitation of some disturbed areas in the course of mining.

Mining of the open pits is being undertaken by Maxmass Limited, a Ghanian mining contractor. A contract was signed with Maxmass in May 2021 for the completion of open pit mining. The contact is for full services for Load & Haul and Drill & Blast services from the pits to the ROM pad. The contact term is for a period of 30 months.

16.11 Explosives Management

Explosives used by the mine are sourced from Maxam main Depot at Tarkwa. The transportation, storage and usage of explosives in Ghana are governed by the Mining and Minerals (Explosives) Regulations, 2012, LI 2177, and CGML comply with handling explosives for its operations. Asante is acutely aware of the recent explosives accident that occurred in January 2022 when the vehicle transporting explosives to Chirano collided with a motorbike. This occurred while the Chirano Mine was under Kinross control. Necessary improvements and steps to operations and procedures will be taken by Asante to ensure complete safety in the future.

Supply of explosives for the blasting activities is contracted to Maxam Ghana Limited, a licenced explosives company in the country. For the purpose of storing explosives on the mine, Chirano has constructed the required explosives magazine to keep detonators, blasting initiators and other blasting accessories. A 30T ISO tanker is installed for storage of bulk emulsion. The day-to-day running of the facility is managed by MAXAM with Chirano having oversight responsibility.

A nominal area of 1.3 hectares has been earmarked for the explosive's magazine. The magazine area is located away from the processing plant site and approximately 1km north of the mine services area. The site is fenced, wire meshed, lighted with 24-hour security together with CCTV camera system and operated in accordance with Minerals and Mining (Explosives) Regulations 2012, L.I.2177.

Mobile Mixing Units (MMU) trucks are used in the transportation of the emulsion-based product to the blast sites, while explosives and accessories are transported in approved light vehicles. The vehicles are lined with aluminium, and the box containing the explosives completely sealed and securely locked. Vehicles transporting explosives on site are under the supervision of a holder of certificate of competency according to the explosive's regulations, with two appropriate flags one at the front and one at back. High explosives and detonators are transported separately.

Transportation is also carried out with security escort vehicle to ensure that the correct routes are adhered to.

Charging of blast holes and blasting are carried out only during daytime by the open pit operations. Blasting notices are posted on appropriately located notice boards within the surrounding communities to warn the public of impending blasting operations.

Every blast is monitored to ensure that air overpressures and vibration levels measured at a structure in any community nearest to the blast site fall within the Inspectorate Division's recommended values of 117 dB (A) and 2 mm/sec respectively.

Underground operations conduct blasting at approximately 6:30am/pm for both shifts.

16.12 Waste Rock Disposal

Chirano LoM plan waste generation is based on the 2020 Strategic Business Plan (SBP). Over the LoM, an estimated 24,462,748t of waste is expected to be generated from the open pit operations. This waste is expected to be reused for backfilling of some of the pits (to daylight) as proposed in the Environmental Impact Statement (EIS) and some used for constructing tailings storage facilities (TSF). There will be progressive rehabilitation of disturbed areas in the course of mining.

Waste mined from Mamnao and Sariehu (proposed mining operation) will be dumped on the North Waste Dump and its extension towards the south. Waste rock from Akoti will be dumped on the existing Akoti Waste Dump while Obra waste rock will be used to backfill the Tano pit (Central Waste Pass area).

Most of the waste rock will be end dumped utilising a managed tip head. The top surfaces will be flat to gently sloping. Due to the mining schedule most of the waste at the end of mine life will be fresh rock and this fresh rock will comprise the final surface. Therefore, an adequate quantity of oxidized material (subsoil and/or laterite), which is generally obtained at the beginning of the mine life, will be segregated from the rest of the waste material for rehabilitation purposes. It is planned to spread a layer of approximately 50cm of topsoil and subsoil (and/or laterite) to cover the fresh rock forming the surface of the dumps in line with Chicano's commitment in the EIS (2004) and best practices.

The waste dump slopes will be up to 55m high and will require reshaping towards the end of waste dump life. During the last stages of the placement of waste into each dump, the outer edges will be constructed from the base face in up to 10m lifts with setbacks of 10m between lifts.

The waste dump batters are cut to slopes of 1V:3H and shaped to minimize concentration of surface runoff. Benches will be built at 10m wide and slope back into the waste dump at a minimum grade of 2% with a lateral grade of 1% to rock fill drains at 200m centres.

17. RECOVERY METHODS

17.1 Background

Redback Mining were the originators of CGML which started commercial production in October 2005 and was later acquired by Kinross in September 2010.

The mine comprises the Akwaaba, Suraw, Akoti South, Akoti North, Akoti Extended, Paboase, Tano, Obra South, Obra, Sariehu and Mamnao open pits and the Akwaaba and Paboase underground mines.

In 2008 the plant was expanded to a design throughput capacity of 3.5Mtpa by Lycopodium Engineering. The Chirano plant has been treating ore at approximately 3.4Mtpa from the various pits and underground as a blend comprised of both fresh and oxide ore.

17.2 Current Chirano Plant Performance

Table 17-1 shows the November 2021 to April 2022 monthly key performance areas of crushing and milling utilisation, milled tonnage, gold recovery at head grade, cyanide and lime consumptions and the blend of underground ore to open pit ore and reclaimed stockpile.

Table 17-1: Current Performance of the Chirano Process Plant (November 2021 to April 2022)

	Crushing Circuit		Milling Circuit							
Month	Availability %	Effective Utilisation %	Availability %	Effective Utilisation %	Tons Milled	Head Grade	Recovery %	Lime kg/t	Cyanide kg/t	Blend
Nov-21	83.24	72.8	93.7	89.6	291,216	1.42	85.75	1.21	0.16	48% Underground ore. 16% Open Pit ore and 36% Rehandled
Dec-21	87.53	76.41	96.1	92.1	309,627	1.51	84.77	1.51	0.22	49% Underground ore. 20% Oxide and 31% Rehandled
Jan-22	91.24	76.68	96.1	90.5	307,388	1.37	87.31	1.26	0.18	40% Underground ore. 16% Open Pit and 44% Rehandled
Feb-22	85.45	74.03	94.3	89.5	270,059	1.14	88.63	1.92	0.24	37% Underground ore. 13% Open Pit and 50% Rehandled
Mar-22	86.35	75.96	89.7	86.9	297,556	1.34	88.03	1.53	0.23	56.4% Underground ore. 13.3% Oxide and 30.3% Rehandled
Apr-22	91.16	77.91	91.4	88.1	290,023	1.4	88.00	1.36	0.22	49.0% Underground ore. 21.0% Oxide and 30.0% Rehandled

17.3 Plant Design

The Chirano process plant is comprised of the following circuits:

- Primary crushing of run-of-mine (ROM) material in open circuit
- Secondary and Tertiary crushing in closed circuit with screening
- Mill feed surge bin with an overflow feed to a dead stockpile for mechanical reclaim
- Open circuit primary ball mill operating with two parallel secondary ball mills in closed with cyclones
- In-circuit crushing of the primary mill scats
- Trash screening and thickening of cyclone overflow before leaching
- Gold leaching in a single pre-leach tank followed by nine CIL tanks
- Two Zadra elution circuits with dedicated acid wash columns and regeneration kilns
- Gold room house three electrowinning cells
- Carbon screening of the CIL tails followed by disposal of tailings to an unlined TSF.

Figure 17-1 shows the overall flow sheet of the Chirano process plant

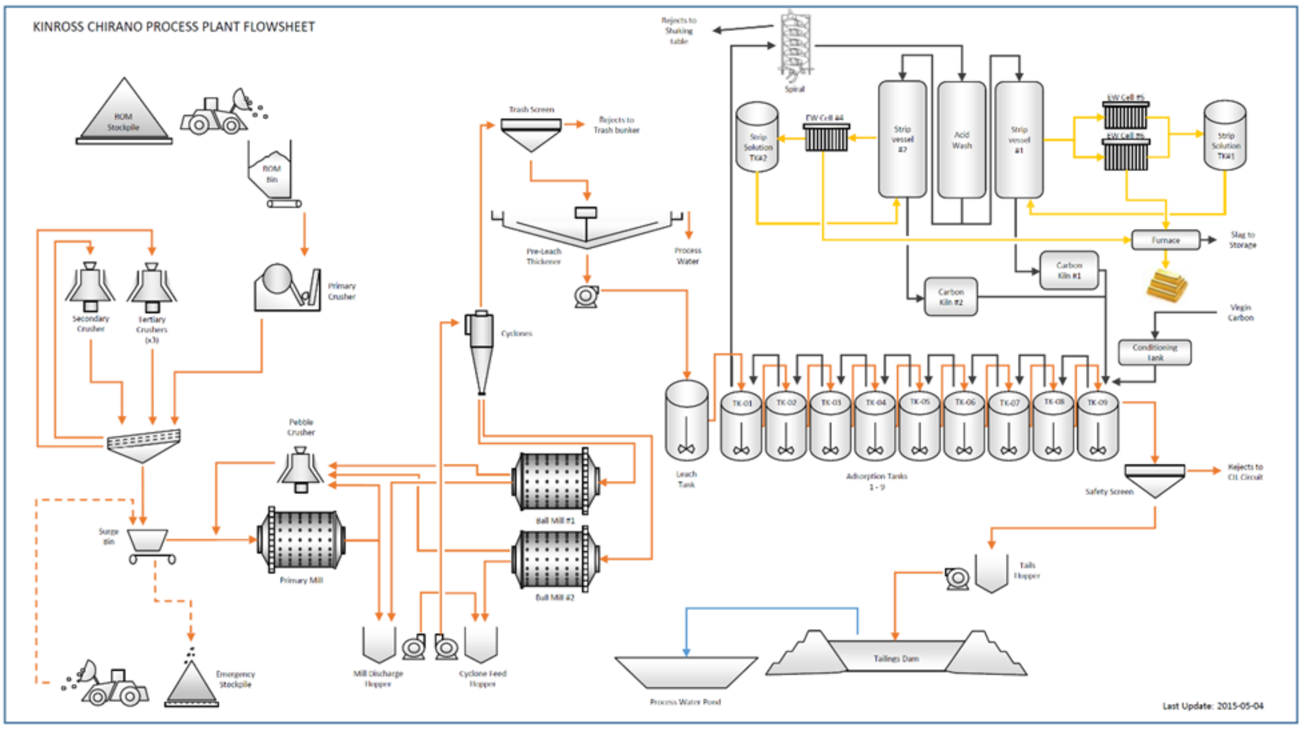


Figure 17-1: Chirano Process Plant Overall Flowsheet

Table 17-2 is a list of the major equipment in the Chirano process plant

Table 17-2: Chirano Process Plant Major Equipment

Equipment Description	No of Units	Specifications	Power (kW)
Primary jaw crusher	1	Metso C150	200
Secondary cone crusher	1	Sandvik S6800/C680 Hydrocone	315
Tertiary cone crushers	3	Sandvik H6800/CH680 Hydrocone	315
Crusher screens	2	Sandvik XS 144 Double deck	2x30 drives
SAG mill converted to Primary ball mill	1	Grate discharge; 6.00 m diameter; inside shell: 5.70m EGL	2,900
Secondary ball mill #1	1	Overflow; 4.88 diameter; inside shell; 6.83m EGL	2,500
SAG mill converted to Secondary ball mill #2	1	Converted to overflow; 6.10m diameter; inside shell: 7.00m EGL	2,500
Gravity circuit de-commissioned			
Pre-leach trash screen	2	Horizontal vibratory, 2.10m (width) x 4.88m (length); aperture 0.8mm x 8.8mm	2x8 drives/screen
Pre-leach thickener	1	18m diameter; high rate	11 (hydraulic)
CIL pre-leach tank	1	158 m diameter x 17.4m height; flat bottom; 3,200m3 live volume	
CIL pre-leach tank agitator	1	Lightning; dual hydrofoil impeller	132
CIL tanks	9	12m diameter x 12m height; flat bottom; 1300m^3 live volume	
CIL tank agitators	9	Lightning; dual hydrofoil impeller	55
Acid wash column	2	5t carbon capacity, 13m^3 total volume, mild steel butyl rubber lined	
Elution column	2	5t carbon capacity, 13m^3 total volume, 304 SS	
Regeneration kiln	1	Horizontal tube; tube 321SS, 250kg/h	Diesel
Regeneration kiln	1	Horizontal tube; tube 321SS, 250kg/h	Diesel
Elution electrowinning cells	2	13 cathode, 12 anode; 316 SS; 0.85m (width) x 0.85m (height) x 1.5m (length); cathode baskets; rectifier/cell 750 A	
Elution electrowinning cells	1	22 cathode, 21 anode; 316 SS; 1.00m (width) x 1.00m (height) x 1.5m (length); cathode baskets; rectifier 6,000 A	

17.4 Process Description

17.4.1 Crushing

Key operating parameters

- ROM Feed Size (F100) 600mm
- Crusher Product Size (P80) 14.5mm

Ore from the shafts and pits is transported with trucks to the ROM pad and tipped onto stockpiles. Front end loaders reclaim the material from the stockpiles which is tipped into a ROM bin with a live capacity of 176 tons. A static grizzly with 800mm slots covers the ROM bin to control the material top size to 600mm for jaw crushing.

Ore is drawn from the ROM bin at a controlled rate by a single inclined, 1,200mm wide variable speed apron feeder, and fed directly to the jaw crusher. The jaw crusher product reports to the primary crushing conveyor which transfers the crushed material onto the screen feed conveyor. There is a belt magnet on the primary crushing conveyor.

Material from the screen feed conveyor discharges into a splitter chute that feeds the two double deck primary screens. The oversize material from the top deck of primary screen #1 (80mm square aperture) discharges onto the secondary crusher feed conveyor which in turn feeds into the secondary crusher bin. Oversize material from the top deck of primary screen #2 reports to the oversize transfer conveyor which in turn discharges onto the secondary crusher feed conveyor. The secondary crusher feed conveyor has a weightometer and is fitted with a metal detector and a belt magnet. Feed to the secondary cone crusher is controlled by a variable speed vibratory feeder below the feed bin and the secondary crusher product discharges onto the screen feed conveyor.

The bottom decks of the primary screens operate with a split screen surface of 25 square aperture and 22mm square screen panels, 40% and 60% respectively. Oversize material reports to the "middlings" transfer conveyor which in turn discharges onto the tertiary crusher feed conveyor. The middling size material is conveyed to the tertiary crusher bin. Each of the three tertiary cone crushers has a dedicated variable speed belt feeder that withdraws material from the tertiary crusher bin. The crushed tertiary product discharges directly onto the tertiary crusher product conveyor which in turn transfers the material on to the screen feed conveyor.

The bottom deck undersize material from both primary screens reports to the screen transfer conveyor which discharges onto the screen product conveyor. Product material is conveyed to the mill feed surge bin with a live capacity of 80 tons. Overflow from the mill feed surge bin is conveyed to a dead stockpile with a 15,000-ton total capacity. Material from the stockpile is reclaimed intermittently with a frontend loader and tipped into the mill feed surge bin. There is a weightometer on the stockpile feed conveyor.

A wet dust extraction scrubber is used for dust control at the crushing circuit and the effluent is pumped to the mill discharge hopper. Crusher spillage handling is done manually.

17.4.2 Milling

Key operating parameters

- Mill Product Size (F80) — 106µm
- Cyclone underflow split — 45% to Secondary #1
- Ball Charge Volume - Primary Mill — 20% at 100mm ball size
- Ball Charge Volume – Secondary Mill #1 — 30% at 60mm ball size
- Ball Charge Volume – Secondary Mill #2 — 20% at 60mm ball size

The milling circuit is configured as an open circuit ball mill, with a scat crushing circuit, and two secondary ball mills operating in closed circuit. Ore is withdrawn from the mill feed surge bin with a 900mm wide variable speed apron feeder feeding onto the mill feed conveyor. A weightometer indicates the instantaneous tonnage rate and the totalised crushed ore mill feed tonnage and is used to control the primary ball mill feed rate via varying the speed of the apron feeder. The mill feed conveyor discharges directly into the primary ball mill feed hopper. The primary ball mill discharge is screened via a 12mm x 30mm aperture trommel screen before gravitating to the mill discharge sump. Trommel screen oversize is conveyed on the ball mill discharge conveyor to the pebble crusher feed conveyor where it is crushed with a single pebble crusher to below 12mm and recycles back on the mill feed conveyor via the pebble product conveyor. The ball mill discharge conveyor has a belt magnet at the head pulley and there is a cross belt magnet on the pebble crusher feed conveyor with a back-up metal detector and flopper gate to divert the non-metallics from the crusher. There is a weightometer on the pebble crusher feed conveyor.

The primary mill's discharge slurry gravitates directly into the mill discharge sump where it combines with the discharge slurry from the secondary ball #1. The slurry from the mill discharge sump is pumped to the cyclone feed sump where is combines with the discharge slurry from secondary ball mill #2 and is pumped to the cyclone classification circuit. The cyclone cluster consists of 20 x 375mm diameter cyclones operating with a split underflow launder configured as seven operating cyclones plus two spares and nine operating cyclones plus two spares. The smaller underflow stream gravitates to the feed hopper of the secondary ball #1. Cyclone overflow gravitates to the pre-leach thickening circuit.

Quicklime is stored in a 58t silo and is metered onto the mill feed conveyor using a rotary valve. A kibble ball loading system is used for the loading of grinding media into the ball mill feed hoppers.

The ball milling area is serviced with a tower crane and there is jib maintenance hoist at the cyclone cluster. A three-axis liner handler is used for mill relining.

17.4.3 Gravity Circuit

The gravity circuit has been decommissioned.

17.4.4 Pre-Leach Thickening

The secondary ball mill classification cyclone overflow stream gravitates to a trash screen distributor where the stream is split to the feed boxes of two horizontal vibrating trash removal screens. The trash screen oversize reports directly to a trash bin, whilst the underflow reports to the pre-leach thickener feed box.

The pre-leach thickener is a high-rate thickener producing an underflow product of between 45% to 50% solids (w/w). The thickened underflow slurry is pumped to the pre-leach tank ahead of the CIL circuit by means of an underflow pumping installation. Thickener underflow recycle to the thickener feed box is done with a separate single pump. The pre-leach thickener can be passed by diverting the thickener feed to a leach feed hopper with a separate pumping system delivering to the pre-leach tank.

The pre-leach thickener overflow gravitates to the process water pond. Flocculant and caustic soda spillage are added to the circuit. Thickener spillage is pumped with a vertical spindle pump.

17.4.5 Carbon in Leach

The CIL circuit comprises a single mechanically agitated, pre-oxidation tank, followed by nine carbon adsorption stages. The tailings slurry gravitates from stage 1 to 9 through inter-stage screening (vertical, mechanically swept woven wire screens) in each tank exiting from CIL tank 9 by gravity over a carbon safety screen, to recover any stray carbon particles. The screened tailings flow into the tailings hopper and are pumped to the tailings storage facility.

Carbon is transferred upstream by airlifts in each stage with the Stage 1 pump feeding the loaded carbon recovery screen. Each of the tanks contains a bypass facility which allows the removal of any tank from service for maintenance.

Blower air addition is via down the agitator shaft of the pre-leach and all the agitators in the CIL tanks. Spargers are used for air addition on CIL stages 1-7 to elevate dissolved oxygen levels to approximately 7 ppm.

Total slurry circuit residence time is approximately 22hrs without by-passing the pre-leach thickener. Carbon concentration per stage is 10g/ℓ with an anticipated loaded carbon value of 1,000g/t. CIL Au recovery is in the order of 88-90%. Daily loaded carbon recovery is approximately 10 tonnes.

A gantry crane services the leaching plant. Leach spillage and tailings spillage is pumped with dedicated vertical spindle pumps.

17.4.6 Tailings Disposal

As per EPA guidelines, the CIL tailings are discharged with a final cyanide concentration of less than 50g CNWAD/m^3 at the TSF spigot.

The current plant operating parameters result in no need for cyanide detoxification of the CIL tailings as the CNWAD values are generally below the 50ppm compliance standard.

Supernatant TSF water is recovered via a barge pump and recycled to the plant as process water.

17.4.7 Carbon Treatment

Carbon is received from the loaded carbon recovery screen and is passed through a spiral to remove trash before being loaded into the dedicated acid wash columns for each of the two carbon elution circuits. Each Zadra elution treatment circuit is designed to handle a batch size of 5t of loaded carbon per elution and both circuits complete two elutions per day. The Zadra elution process is operated at approximately 130°C without cyanide and 3% NaOH. Electric thermal oil heaters are used for heat generation.

There is separate spillage pumping for the acid wash spillage and elution spillage.

Regeneration of the eluted carbon is done with two rotary kilns located above the last CIL tank where the regenerated carbon is screened before being directly discharged into the slurry.

17.4.8 Electrowinning

Pregnant solution from the carbon elution circuit is collected in either one of the two eluate storage tanks. This solution is circulated through a dedicated electrowinning circuit for each eluate tank. The strip solution tank #1 has two electrowinning cells operating in parallel and the strip solution tank #2 has one electrowinning cell.

On completion of an electrowinning cycle, barren solution is sampled before being pumped to the CIL feed circuit for disposal.

Hydrogen cyanide, ammonia, and hydrogen gas detection equipment is installed in the electrowinning circuit, together with relevant extraction systems.

17.4.9 Gold Room

Electrowon gold is recovered from the electrowinning cells on the strip solution circuit #1 by removing the cathodes to the wash bay and using high pressure water jet sprays. The cathodes in the electrowinning cell of strip solution circuit #2 are washed in situ. Sludge from the cathode wash bay and washed sludge from the cathodes in the electrowinning cell are collected in separate sludge hoppers with dedicated filters.

The precious metal sludge is dried in a drying oven, fluxed and smelted with a diesel fired melting furnace. The molten bullion mixture is then poured in moulds, allowed to solidify cleaned and stamped with the mine name and sequential bar number. Gold content varies from 85%-90%, with approximately 10% silver and approximately 2%-5% base metal content. Slag remaining from the bars is collected and stored. Additional equipment in the gold room includes safes, scales and various security systems.

17.4.10 Reagents

FLOCCULANT
Flocculant is delivered to site dry in 25kg bags and is added manually to the flocculant hopper. The flocculant make-up system consists of surge hopper using a screw feeder for removal to be pneumatically transferred into a wetting head. The dry flocculant powder is mixed raw water and discharged into the 5m^3 flocculant mixing tank for a hydration period before the flocculant solution is pumped to the 15m^3 flocculant storage tank for dosage to the pre-leach thickener via a duty/standby variable speed pumping arrangement.

DIESEL
Diesel is delivered to the plant site by the fuel tanker and stored in a diesel storage tank for distribution to the fire water system, elution circuit and the gold room.

CAUSTIC SODA
Caustic is delivered to site in 1t bags of 'pearl' pellets. The bags are hoisted by a crane into the mixing tank via a bag breaker system. The caustic soda is diluted with raw water up to a final solution concentration of 20% (w/v) in the 12m^3 mixing tank, from where it is dosed to the respective areas (elution, and electrowinning) by means of a duty/standby dosing pumps. There is a dedicated caustic soda spillage pump.

SODIUM CYANIDE
Sodium cyanide is delivered as dry briquettes in 1t boxes and added manually via a hoist and bag breaking system into the mixing tank. Raw water is used to prepare a 20% (w/v) solution in the 35m^3 mixing tank. The diluted solution is pumped from the mixing tank to the 35m^3 storage tank, from where it is distributed by a dosing pump. Separate recirculation pumps are used to continually mix the cyanide solution in the storage tank. There is a dedicated cyanide spillage pump.

HYDROCHLORIC ACID
Hydrochloric acid is delivered in 1,000ℓ bulk containers at a solution strength of 33% w/v and made up to a 10% strength in an 16m^3 mixing tank and pumped to the acid wash column with duty/standby pumps. There is a dedicated acid spillage pump.

QUICKLIME
Quicklime is delivered in 36t bulk tankers and pneumatically off-loaded from the tanker into the lime silo. A dust extraction system is installed on the quicklime dosing system.

ACTIVATED CARBON
Fresh activated carbon is delivered in 500kg bulk bags. The fresh carbon is added to the carbon quench tank using a hoist, as required for carbon make-up to the CIL inventory.

GRINDING MEDIA
The forged steel (100mm diameter) grinding media is used in the primary mill, while 60mm grinding media is used in the secondary ball mills.

Grinding media is delivered in 200ℓ drums. SAG mill balls are added to the mill using a hydraulic ball feeder which discharges directly onto the mill feed conveyor. Secondary ball mill media is added to the ball mill feed box by use of a specially designed kibble and hoist, which safely transports the media from the loading area to the feed box.

17.4.11 Plant Process Services

FILTERED RAW WATER
Raw water is sourced from bore holes and the Suraw River and collected in an external water storage facility and is pumped to the plant 2000m^3 raw water storage pond.

The raw water pond has high pressure gland service pumps and low-pressure gland service pumps, raw water pumps for reagent make-up and cooling water and stripping water pumps for acid wash and carbon transfer duties.

The raw water storage pond has a reserve of water for fire-fighting purposes. This reserve is maintained by suitability positioned fire water and raw water pump suctions.

FIRE WATER
Firewater is drawn from the 2000m^3 raw water pond. The firewater pumping system contains:

- An electric jockey pump to maintain fire water ring main pressure
- A diesel driven fire water pump that automatically starts when the pressure in the ring main drops.

Fire hydrants and hose reels are placed throughout the process plant, fuel storage and plant offices at intervals that ensure coverage in areas where flammable materials are present.

POTABLE WATER
Potable water is stored in the plant is the 30m^3 potable water receival tank and the 60m^3 potable water storage tank.

PROCESS WATER AND PLANT RUN-OFF
CIL plant bund overflow and thickener bund overflow is contained in the 1200m^3 event pond, from where it is pumped to the plant process water dam.

The 4000m^3 process water dam collects decant return water, pre-leach thickener overflow water and the overflow from the raw dam. The process water reticulation is undertaken by means of a duty/standby pumping arrangement. There is a standby process water pond which is used alternatively when the operating process water pond is cleaner to remove the accumulated silt.

HIGH PRESSURE (COMPRESSED) AIR RETICULATION
Plant instrument and plant air at 7.0 bar pressure are supplied from three compressors. The compressed air is stored in the in the instrument air receiver and the plant air receiver.

Compressed air from the instrument air receiver is dried and filtered prior to storage in the two instrument air receivers at the milling plant. Plant air is reticulated throughout the plant and to the crusher air receiver.

LOW PRESSURE (BLOWER) AIR RETICULATION
Two low pressure blowers (225Kpa) supply 4200 m^3/h blower air to the spargers at the CIL leach tanks and to the carbon airlifts.

RETURN WATER AND RETURN WATER TREATMENT
Decant water from the tailings storage facility is pumped with a submersible pump to the plant process water pond.

18. PROJECT INFRASTRUCTURE

18.1 Introduction

The current CGML infrastructure is shown in Figure 18-1 and Figure 18-2. Most of the major components of the infrastructure were constructed at the start-up and early years of operations. Descriptions of the primary components of the infrastructure are presented below.

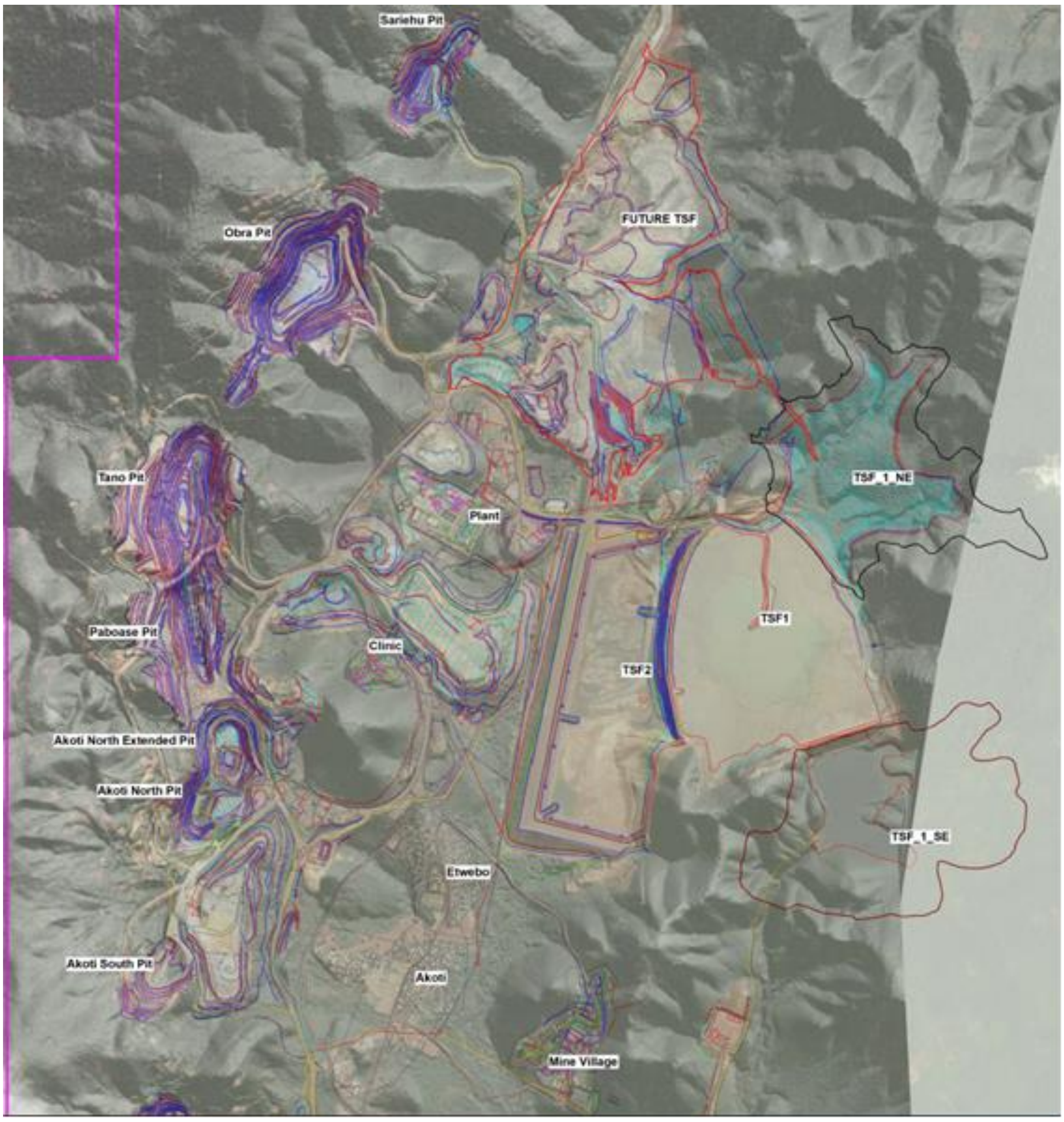


Figure 18-1: Chirano Gold Mines Infrastructure

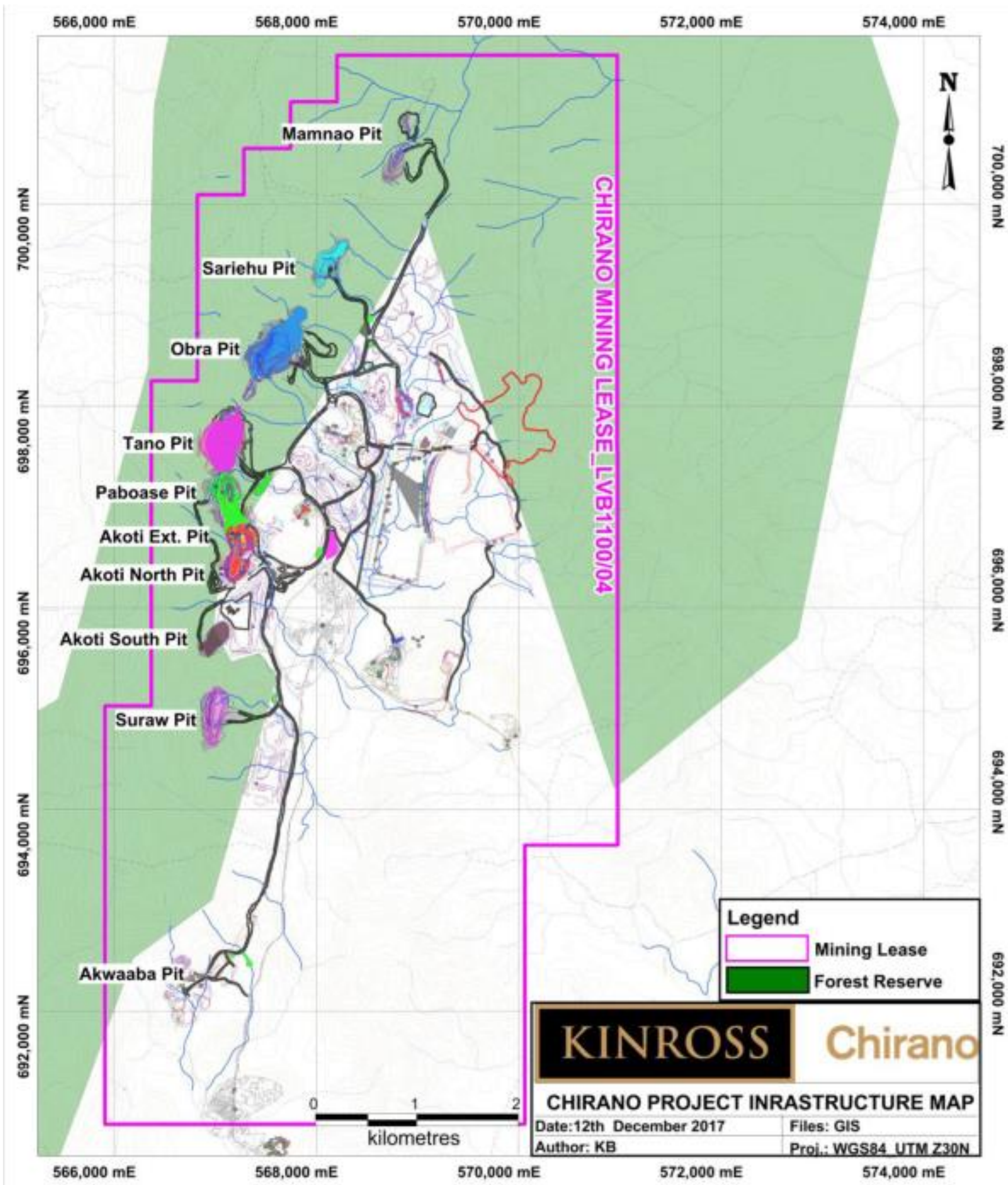


Figure 18-2: Chirano Gold Mines Infrastructure Map

18.2 Roads

18.2.1 Main Access to the CGML Area

The CGML area can be accessed from two directions by the following existing sealed public roads:

- Kumasi-Bibiani road to the northeast
- Kumasi-Obuasi road to the southeast

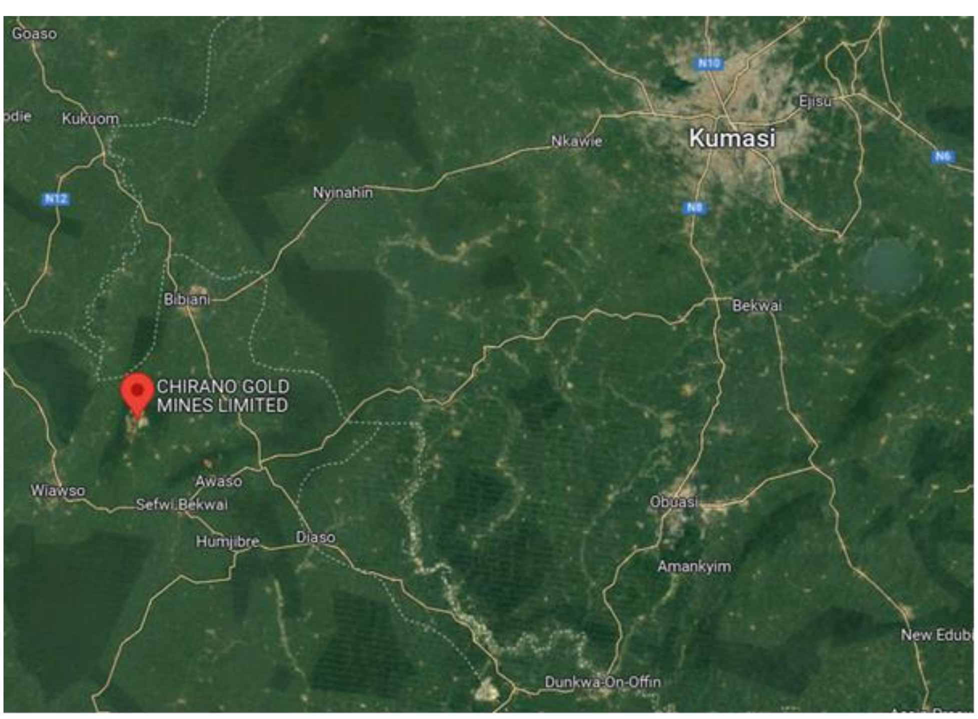


Figure 18-3: Access Roads to Chirano Gold Mines

Roads from both directions become gravel roads, in mostly good condition, before reaching the CGML area. Road upgrades and ongoing maintenance have been observed of these roads.

The existing gravel road from Ntrentrenso (otherwise known as Bedii Nkwanta) to the CGML has been widened over its entire length of 15 km, providing the main means of access to the mine site and associated infrastructure.

This road passes through the villages of Ntrentrenso, Paboase and Etwebo-Akoti. Consultation with the inhabitants of Ntrentrenso and Paboase has resulted in the road alignment remaining as original. Although bypass routes for these two villages were considered and designed, the preference by the inhabitants is not to have the road bypass their villages.

The access road is 6 metres wide, sheeted with laterite and has 2 metre shoulders. Approximately 16 minor creek crossings and 3 major ones occur along the length of this road, and upstream drains and culverts have been provided on cross slopes and are extended as required.

Access roads within the mining area were constructed to an average width of 6-metres using in-situ material and waste rock similar to haul roads.

18.2.2 Haul Roads

The haul roads have been designed for the use of Articulated Dump Trucks (ADT) and light vehicle traffic associated with the mining operations. The design of the haul roads was constrained by the steep topography within the CGML area, and the maximum allowable haul road grade was fixed at 10%. In addition, the design remained cognizant of the Forest Reserve boundaries and routes have been designed to minimise the disruption to the forested areas and the streams (tributaries of the Suraw River).

The haul roads developed in the CGML area are 30 metres wide (running width) to safely accommodate haul trucks traffic with a maximum grade of 10% and have been constructed using in-situ material. The haul roads are maintained on a continuous basis to ensure safe, efficient haulage operations and to minimize fugitive dust emissions.

All roads have been constructed with adequate drainage controls and best management practices to minimize sediment impacts to the local environment. Mine roads are private with restricted access enforced through mine security.

The haul road lengths from the various pits or underground mine portals are given in Table 18-1.

Table 18-1: Length of Haul Roads

Chirano Pits / Portals	Distance (km)
Akoti North	2.9
Akoti North Extended	2.3
Akoti South	3.1
Akwaaba	6.7
Mamnao Central	3.3
Mamnao South	3.6
Paboase	1.3
Obra	0.7
Sariehu	1.7
Suraw	4.2
Tano	1.2

18.3 Mobile Equipment

Sufficient mobile equipment for the efficient running of the operations is in place comprising of heavy mining equipment, light vehicles, light trucks, cranes, forklifts, buses and generators. Currently 110 light vehicles are allocated to specific users within each department as required.

The current underground heavy mobile equipment fleet is summarised in Table 18-2. In addition to this equipment, there are thirteen ancillary mobile machines that also forms part of the underground fleet. This equipment comprises of Agi trucks, personnel carriers, charge trucks, compactor, shotcrete machines, scaling machine, backhoe loader, telehandler and a forklift.

Table 18-2: Underground Heavy Mobile Equipment

Type	Quality	Manufacturer
Development Jumbo's	9	Sandvik
Production Drill Rigs	7	Sandvik
ITH Drills	3	Cubex
Loaders	11	Sandvik (3) CAT (8)
IT Loaders	9	Volvo
Graders	3	CAT
ADT’s	27	Volvo

The replacement strategy followed by CGML on their ADT’s includes a transfer of the ADT from the underground mining operations to the surface mining operations when an ADT is deemed no longer suitable or effective for underground use.

The heavy mining equipment utilised for the open pit mining operations, performed by the mining contractor, are supplied and maintained by the mining contractor (Maxmass). The current CGML surface heavy mining equipment is summarised in Table 18-3.

Table 18-3: Surface Heavy Mining Equipment

Type	Quantity	Manufacturer
Excavators	5	CAT
Loaders	2	CAT
Graders	3	CAT
Dozers	3	CAT
Compactor	2	CAT
ADT's	6	Volvo
Loaders (Plant)	6	CAT (5)
		Volvo (1)
Cranes	5	Terex (3)
		Grove (1)
		Zoomlion (1)
Dozer (Exploration)	1	CAT

The surface ancillary mobile equipment is summarised in Table 18-4.

Table 18-4: Surface Ancillary Mobile Equipment

Type	Quantity	Manufacturer
Fuel Bowser	1	Volvo
Lighting Plant	11	Real Mining (8)
		Atlas Copco (2)
Service Truck	1	Volvo
Hiab Truck	1	Volvo
Telehandler	1	Manitou
Forklift	1	CAT
Loader	1	CAT
Welding Machine	4	Miller
Welding Genset	3	Lincoln (2)
		Miller (1)
Compressor	5	Atlas Copco (3)
		Chicago Compressor (2)
Concrete Mixer	1	Davino
Compactor	1	Bomag
Utilift	2	Ford (1)
		Manitou (1)
Fire Tender	1	Volvo
Backhoe Loader	2	Volvo (1)
		SDLG (1)

18.4 Ancillary Facilities

Ancillary facilities at CGML include equipment refuelling stations, maintenance workshops, explosives magazine, mine services area, utilities, staff accommodations, and storm water control facilities. The mine services area is located immediately north of the plant site and includes the administration office, heavy mining equipment (HME) workshop, light vehicle workshop, wash bays, mine water services, refuelling stations, and mine control facilities.

18.4.1 Mining Equipment Workshops

There are four different workshops at CGML, each dedicated for a specific fleet of mobile machinery. These workshops are:

- Surface operations heavy mining equipment (HME) workshop
- Paboase heavy mining underground equipment (HMUE) workshop
- Light vehicles workshop
- Open pit mining contractor's (Maxmass) workshop

SURFACE OPERATIONS HME WORKSHOPS

The surface HME workshop site is located on reasonably gently sloping ground to the north of the plant site. The workshop is a clad steel framed building with three workshop bays to suit the nominated surface heavy mining equipment. In line with best practice, the workshop area has a concrete floor sloping to the entry side with drains collecting directed runoff which is diverted into an oil-interceptor.

The facilities at the workshop include but are not limited to the following: offices, ablutions, tyre bay, wash bay, welders' workshop, stores and laydown yard.

The heavy vehicle wash bay has been constructed of a heavily reinforced concrete slab, kerbed and contoured to drain to a sump. Steel access platforms have also been constructed on either side of the wash bay. The wash bay has an oil-interceptor fitted with an oil skimmer and silt trap with provision for clean-out. Generated waste oil is regularly collected by EPA certified contractors.

Figure 18-4: Surface HME Workshop

PABOASE HMUE WORKSHOP

The Paboase HMUE workshop is equipped with modern facilities and is sited at the Paboase underground area, to the south-west of the plant site. The workshop is a clad steel framed building with five workshop bays and two lubrication bays to suit the nominated underground heavy mining equipment. The workshop area has a concrete floor with sloping aprons to entry and exit sides with drains collecting directed runoff and diverted into oil-interceptor prior to discharge.

The facilities at the workshop include but are not limited to the following: offices, ablutions, tyre bay, welders' workshop, electrical workshop, repair bay, drill bit sharpening workshop, stores and a laydown yard. Surface operations, technical services and exploration personnel have offices at Paboase underground area. A lamp room and laundry are also situated at the Paboase underground area.

Various OEM and contractors such as Sandvik, Mantrac, HGS (hydraulic hoses), amongst others, have stores at the Paboase underground area to support the mine in maintenance and repair parts.

Figure 18-5: HMUE Workshop at Paboase Underground

LIGHT VEHICLE WORKSHOP

The light vehicle workshop site is located to the north of the plant site. The workshop is a brick and clad steel framed building with 4 workshop bays to suit the nominated light vehicles. The workshop area has a concrete floor sloping to the entry side with drains collecting directed runoff which is diverted into an oil-interceptor prior to discharge.

The facilities at the workshop include but are not limited to the following: offices, ablutions, wash bay, and stores.

Figure 18-6: Light Vehicle Workshop

OPEN PIT MINING CONTRACTOR'S (MAXMASS) WORKSHOP

The mining contractor's workshop site is located to the west of the plant site. The workshop has a clad steel framed roof supported by containerised offices. The workshop area has a concrete floor sloping to the entry side with drains collecting directed runoff.

The facilities at the workshop include but are not limited to the following: offices, ablutions, wash bay, welding bay and stores. These facilities are owned by CGML.

Figure 18-7: Mining Contractor's Workshop

18.4.2 Accommodation

Residential accommodation is provided at CGML in three main areas:

- John Seaward Village (Mine Village) which covers approximately 20.5ha.
- Exploration Camp which covers approximately 3.5ha.
- Paboase Camp which covers approximately 3ha.

Commissary, canteen and bar facilities are provided at the Mine Village and Paboase Camp. There are also a swimming pool, gymnasium and tennis court at the Mine Village. Table 18-5,

Table 18-6 and

Table 18-7 summarises the number of units and rooms available at each of the accommodation areas.

Table 18-5: John Seaward Village (Mine Village) Accommodation

Unit Type	No. of Units	No. of Rooms
2 Bedroom Apartment	9	18
3 Bedroom Apartment	2	6
3 Bedroom Apartment (guests' accommodation)	3	9
Duplex	34	34
Double Room	48	96
Single Man Unit	119	119
20-Man Housing Unit	20	20
Total	**235**	**302**

Table 18-6: Exploration Camp Accommodation

Unit Type	No. of Units	No. of Rooms
4 Bedroom Apartment	2	8
Shared Housing	72	72
Total	**74**	**80**

Table 18-7: Paboase Camp Accommodation

Unit Type	No. of Units	No. of Rooms
8-Man Housing Unit (Shared Housing)	40	40
Single Man Unit (en suite)	48	48
VIP (en suite)	10	10
Total	**98**	**98**

Figure 18-8: Mine Village

18.4.3 Potable Water and Sewage

There are six potable water and sewage treatment plants on site. These facilities are found at the mine village, processing plant, exploration camp, Paboase camp, Akwaaba and Paboase underground area.

Potable water is used for drinking, ablutions, laboratory, buildings and safety showers, and is sourced from nine boreholes. The borehole water is treated by chlorination and ultraviolet sterilization before being distributed to the various areas. Nimaqua 6600 advanced water purification systems are used or the potable water treatment.

Grey water and sewage generated on the mine from the urinal, water closets, kitchens and laundry report at the sewage treatment plants for treatment. Wastewater and sewerage from the mine are treated using Utileco's BIOCAT™ ST compact sewage treatment plants. These technologically advanced systems use the Eco-Bio™ process to rapidly decontaminate sewage water to meet compliance with European Union and EPA discharge guidelines. The treated effluent is discharged into rock fill soak-away.

18.4.4 Medical Centre – Clinic

The medical centre (clinic) facility provides health care services to the workforce, twenty-four hours daily. The facility also attends to emergency medical cases from the community. The facility is located at the Exploration Camp and has been equipped with medical equipment, laboratory unit, radiology unit, and equipped with two ambulances.

18.4.5 General and Plant Administration

A general administration building of approximately 100m² and a plant administration building of approximately 160m² have been constructed at the plant site area. Both structures have been provided with potable water, electricity with an uninterruptible power supply and amenities connected to a sewage treatment plant. Two core sheds are situated opposite the mine administration building.

Figure 18-9: Mine Administration Building

Figure 18-10: Core Shed

18.4.6 Plant Warehouse and Workshop

The plant warehouse /workshop building is a fully clad steel framed building 6.5 metres high and an approximate area of 386 m^2, plus an office mezzanine of approximately 64 m^2. The workshop is equipped with welding outlets, tools, and compressed air and work benches. The warehouse has an outdoor fenced enclosure for a lay down storage area of approximately 2,000 m^2.

18.4.7 Fuel Storage and Fuelling Stations

Zen Petroleum Limited has been contracted by CGML to operate the fuel farms and to supply diesel fuel for mobile mining equipment, diesel powered fixed plant, light vehicles as well as the gensets that provide back-up power in times of power outages.

At the main fuel farm, situated at the mine services area, there are two above ground fuel storage tanks: 15KT01 with capacity of 500,000L and 15TK02 with capacity of 50,000L. The fuel dump has two office rooms, a store, a place of convenience, and 45,000L capacity raw water tank connected to hydrant, firefighting gun, two drums of Ansulite fire foam. The two bulk storage tanks are installed within a bunded area with capacity to contain 110% of the capacities of the two tanks.

There are also two satellite fuel farms at Akwaaba and the Paboase underground area with 61,900 litres and 61,000 litres capacities respectively. All tanks have been installed within a containment area to prevent ground spillage in the event of a tank leak.

Figure 18-11: Fuel Farm at Mine Service Area

18.4.8 Explosive Magazine

Explosives are strategic items that are monitored by the national security apparatus from the source to the final destination and use. Explosives used by the mine are sourced from the Maxam main depot at Tarkwa.

An explosives magazine has been constructed on area of approximately 1.3Ha. The magazine area is located away from the plant site, and approximately 1km north of the mine services area. The site is fenced, bunded, well-lit with 24-hour security and operated in accordance with Minerals and Mining (Explosives) Regulations, 2012, (LI 2177).

The supply and preparation of explosives/emulsion required is contracted to Maxam, a reputable explosives manufacturer and supplier.

Asante is acutely aware of the recent explosives accident that occurred in January 2022 when the vehicle transporting explosives to Chirano collided with a motorbike. This occurred while the Chirano Mine was under Kinross control. Necessary improvements and steps to operations and procedures will be taken by Asante to ensure complete safety in the future.

18.5 Power Supply and Distribution

CGML utilises power supplied from the national grid at 161kV, stepped down at the Asawinso substation and reticulated to the mine substation by a 33kV overhead line for ore crushing and processing, running of underground pumps, ventilation fans and other ancillary facilities, in residential accommodation and offices.

CGML also has twenty Cummins 1.8MW diesel powered main production standby generators, ten at the process plant area, six at the Paboase underground area and four at the Akwaaba underground for use during power failures. These are required to ensure continuity of processing and underground mining operations without interruptions as far as reasonably practicable. Another ten-diesel powered standby generators of various sizes, are strategically placed throughout the mine site at areas such as accommodation camps, tailings dam and fuel farms.

The largest users of energy are the crushing and grinding circuit, followed closely by the processing and underground. Smaller consumers include accommodation and office areas. CGML has a max power demand of approximately 23 MVA and an average monthly consumption of 12 GWh.

Figure 18-12: Gensets at Processing Plant

18.6 Fire Protection and Suppression

CGML concentrates on prevention measures whilst maintaining a response capability in managing fires and explosives on site. Fire prevention measures include regular maintenance of equipment (e.g. hydraulic hose replacement, cleaning of engines, electrical fault finding), housekeeping (e.g. removal of Class A fire hazards) and education of employees in fire awareness, prevention and response. Firefighting equipment such as fire tenders, raw water tanks connected to fire hydrants and fire extinguishers are provided on site to deal with fire outbreaks. There are also early fire detection systems installed in offices and accommodation units to pre-empt fire outbreaks.

Figure 18-13: Fire Suppression System at Mine Service Area Fuel Farm

18.7 Communications

Communications on site includes of a number of media services:

- Internal phones services include an IP telephony system in all office and a UHF handheld and vehicle-mounted 2-way radios are used for communication between personnel of various departments particularly personnel in production
- Mobile communication services are provided by MTN and Vodafone for voice and data. There is also ISDN lines for fixed telephone services. In addition to that, there are two emergency satellite phones available for use in the event of a total GSM outage by the two service providers
- Dedicated internet services are through 45mbps bandwidth primary service from Vodafone and 10mbps backup from MTN. There is also an 8MB MPLS/IPLC for all corporate traffic through Vodafone.

18.8 Underground Infrastructure

18.8.1 Portals

The main portals for the underground mines are fairly similar. The mines' portals are necessary to protect miners and others accessing the mines as well as provide robust access points to the underground mines. The portals are serving as the primary access ramp for travel way for personnel and equipment and also doubling as the fresh air intake for the mines.

Figure 18-14: Suraw and Obra Portals

At each portal, there is a security control point and a lamp room for personnel entering the UG. A tag board can also be found at the portals. All underground personnel are required to lock their access tags to the board, to eliminate the potential for inadvertent removal by others. This method provides a secure system to indicate when persons are still underground.

Figure 18-15: Security Control and Lamp Room Facilities at the Portals

Figure 18-16: Tag Board at the Portal

18.8.2 Mine Dewatering

To make judicious use of underground water, each of the underground mines has surface water storage facilities (WSF). Water obtained from the underground dewatering is pumped into the WSF for sediment settlement and then pumped from the WSF to header tanks, from where it is gravity fed back down the mine for activities such as drilling, and dust suppression. Excess water is either pumped to the plant to supplement process water requirements or to the Sariehu Pit Lake for storage.

Pump stations working in sequence have been established for the underground mines for dewatering. The pump stations are equipped with either two or three 110kW Mono WT 106 challenger pump sets. To provide surge capacity and ensure efficient dewatering system, modified level extended sumps have been planned for every 100m of vertical development and is equipped with either one or two 55kW Mono WT 103 challenger pump sets. Flygt or vertical spindle pumps are used to feed the Mono pumps from the various on-level sumps. Figure 18-17 indicates the mine dewatering single line flow diagram of Akwaaba Mine and Table 18-8, the designed and installed specifications of the mono pumps.

The design of the ore processing plant enables recycling of large amount of the water from the TSF for its re-use and regularly supplemented with water from the Sariehu Pit Lake. The Pit Lake is replenished mostly from rainfall and run-off from its catchment area.

Table 18-8: Mono Pumps Specifications

	Manufacturers' Spec		Installed Spec	
Pump	Head (m)	Flow Rate (l/s)	Head (m)	Flow Rate (l/s)
103 Mono	180	20	150	15
106 Mono	360	20	225	12.5

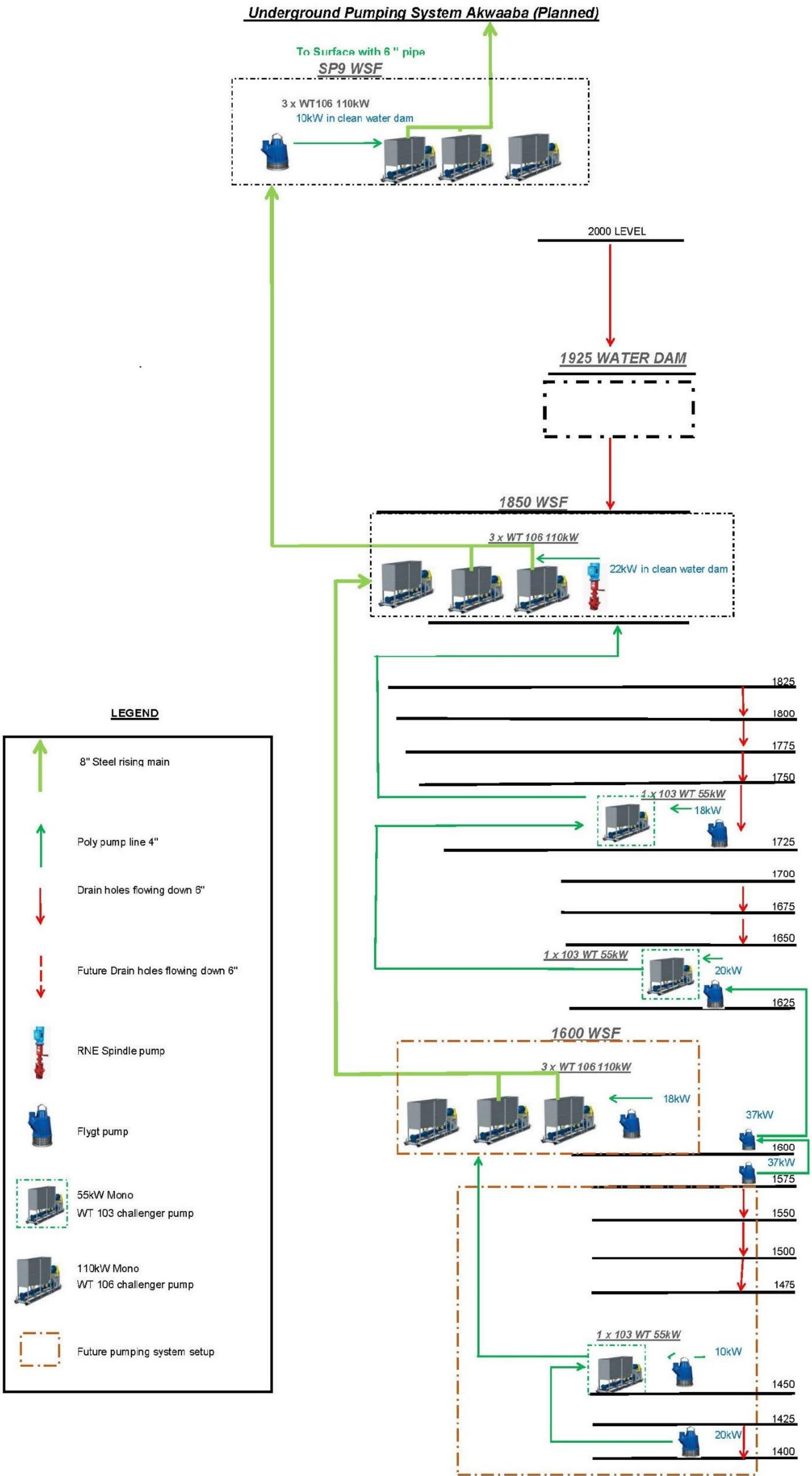


Figure 18-17: Underground Pumping System Akwaaba

18.8.3 Electrical Reticulation

Electrical power is supplied to the underground mines through the portals from an 11kV overhead power line. At the portals, power is taken for the main ventilation fans (1000V) and the communication hut (240V). The 11kV HV Cables are run through services holes to the underground transformers. The underground transformers will step down the voltage to 1000V for use by the underground equipment. The 1000V HV cables are also run through the service holes to the various levels.

Figure 18-18: Underground Transformer at Suraw

Figure 18-19: HV Cables through Service Holes at Suraw

18.8.4 Compressed Air

Compressed air for underground use is supplied by Atlas Copco GA200 compressors which are installed close to the portal of each mine. These compressors are delivering compressed air at a 36m^3/min (capacity) at a nominal pressure of 9.5 bar(e).

Figure 18-20: Compressor at Obra

18.8.5 Refuge Chambers

CGML use mobile refuge chambers supplied by MineARC. The refuge chamber locations vary depending on the position of development faces. The primary reason for refuge chambers is to provide refuge in the event of an emergency underground. Various sizes of the refuge chambers are available at the mine and are selected based on the number of employees working in that specific area. Table 18-9 indicates the current underground refuge chambers as well as their location and capacity.

Each refuge chamber is equipped with the following items:

- Rear escape hatch
- Clear set of user instructions
- Fresh bottled water
- Gas detection tubes or monitor
- O_2 and CO_2 scrubbers
- Filtered and silenced mine compressed air
- Medical grade oxygen cylinders
- Oxygen candle
- Battery backup power for 36 hours
- 2-way radio units tuned to channel 1 at all times.

Table 18-9: Current U/G Refuge Chambers and Location

Mine	Location	Capacity
Akoti	2025 Dec. Cubby	4-Man
	SP 6	12-Man
	1975 E/Way	4-Man
Paboase	2025 LAC	12-Man
	1700 FAB	60-Man
	1550 Dec. SP	30-Man
	1450 Dec. SP	12-Man
Tano	2000 DD1	4-Man
	2075 DD Cubby	12-Man
Akwaaba	2000 LAC SP2	4-Man
	1775 Incl. SP	12-Man
	1600 Dec. Cubby	12-Man
	1550 E/Way	12-Man
Suraw	2150 Decl. SP	12-Man
	2125 Service Drive	4-Man
Obra	SP 2	4-Man
	2175 E/Way	12-Man

18.9 Mine Ventilation

18.9.1 Surface (Primary) Ventilation

Primary ventilation is the supply of bulk air through larger excavations such as portal to ventilate all sections of the decline till the last through ventilation (LTV). CGML utilizes an exhaust ventilation system where used and contaminated air from the underground workings is exhausted through a ventilation raise to surface. The contaminated air is exhausted mechanically using two axial flow fans connected in parallel. Table 18-10 indicates the current installed primary ventilation fans and their specifications.

The primary fans are installed with indicator lights. These indicator lights are positioned at the various portals. A green light indicates the fan is running and a red light that the fan is off. All underground personnel have been educated on the functions of the indicator lights.

Figure 18-21: Primary Fans Indicator Lights

Table 18-10: Current Installed Primary Ventilation Fans

Mine	Make	Size (kW)	Installed Quantity	Duty Quantity	Maximum Pressure (kPa)	Maximum Quantity (m^3/s)
Paboase	Howden	880	2	1	2.56	210
	Swedvent	315	2	2	3	100
Akoti	Swedvent	315	2	2	3	100
Suraw	Epiroc	315	2	1	3	100
Akwaaba	Howden	550	2	2	2	360

Figure 18-22: Howden Primary Ventilation Fans, Paboase Underground Mine

Figure 18-23: Swedvent Primary Ventilation Fans, Akoti Underground Mine

18.9.2 Underground (Secondary) Ventilation

The secondary fan depends on the primary fans supplying air from surface via the decline. These fans mainly supply air to the drives and the stopes which are in operation. The secondary fans are connected with ventilation ducts which convey the fresh air to the workings.

Various secondary fan sizes are available at CGML, i.e. 2x110kW, 2x90kW, 2x55kW, 45kW, 37kW, 15kW and 4kW fans. For development and stoping, the 2x110kW, 2x90kW and 2x55kW are used. The other fans are used for non-diesel equipment activities such as diamond drilling and ITH drilling.

18.10 Underground Communications

Communication in each of the underground mine is provided via handheld radios or fixed radios installed in both light and heavy-duty equipment.

18.11 Engineering and Maintenance Labour

The current headcount for the engineering and maintenance department is 237 CGML employees and 80 contractors. The engineering and maintenance department comprise of the following sub-departments:

- Fixed Plant
- Project and Construction
- HME
- HMUE
- Transport

Figure 18-24 indicates the organisational chart for the engineering and maintenance management and superintendent team. The majority of the employees work on a 2:1 roster (4 weeks on and 2 weeks off or 6 weeks on and 3 weeks off).

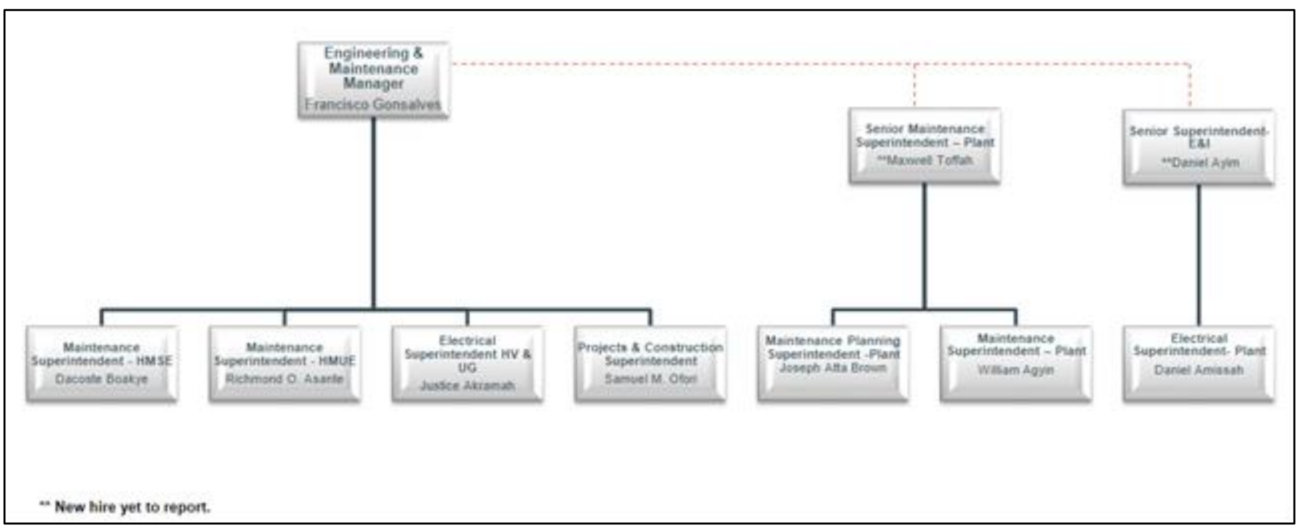


Figure 18-24: Organisational Chart, Engineering and Maintenance

18.12 Planned Maintenance

CGML' planned maintenance system is well established and in line with what is expected from a mine of this size. CGML uses Oracle's JD Edwards software for their planned maintenance. Compliance to the planned maintenance is high and random internal quality audits are performed by the QC/QA team. Maintenance analyses are also performed and reported on a monthly basis. The 2021 average availability for excavators and ADTs were 82% and 70% against a budget of 80% and 75% respectively.

18.13 Tailings Facility

18.13.1 Background

Mine tailings generated from the 3.5Mtpa CGML gold processing plant is contained in purpose-built tailings storage facilities situated to the southeast of the plant, namely, TSF 1, TSF 1 NE, TSF 2 and TSF 1 South Extension (TSF 1 SE). TSF 1, which is situated upstream of the Asanteman stream valley, was developed and commissioned at Stage 1 with a crest elevation of 2289.3 m RL in 2005 and has been expanded in stages to a closure elevation of 2305.0 m RL in 2020.

TSF 2, which is situated downstream of TSF 1, within the Suraw catchment, was commissioned after Stage 1 (starter dam) construction to crest elevation 2278.5 m RL in May 2012. The crest elevation of TSF 2 embankments is presently 2293.6 m RL which is the final elevation for early closure. TSF 2 has been decommissioned and rehabilitated with indigenous economic timber trees since 2018.

TSF 1 NE, which was commissioned in 2016 was operational until March 2022 when the facility was decommissioned and slated for final closure even though there is speculation that it might be recommissioned in future.

Construction of TSF 1 SE was completed in the third quarter of 2021. The TSF was commissioned for tailings deposition on 24th January 2022 and currently provides containment for tailings generated from the processing plant. Figure 18-25 shows TSF 1 SE design.

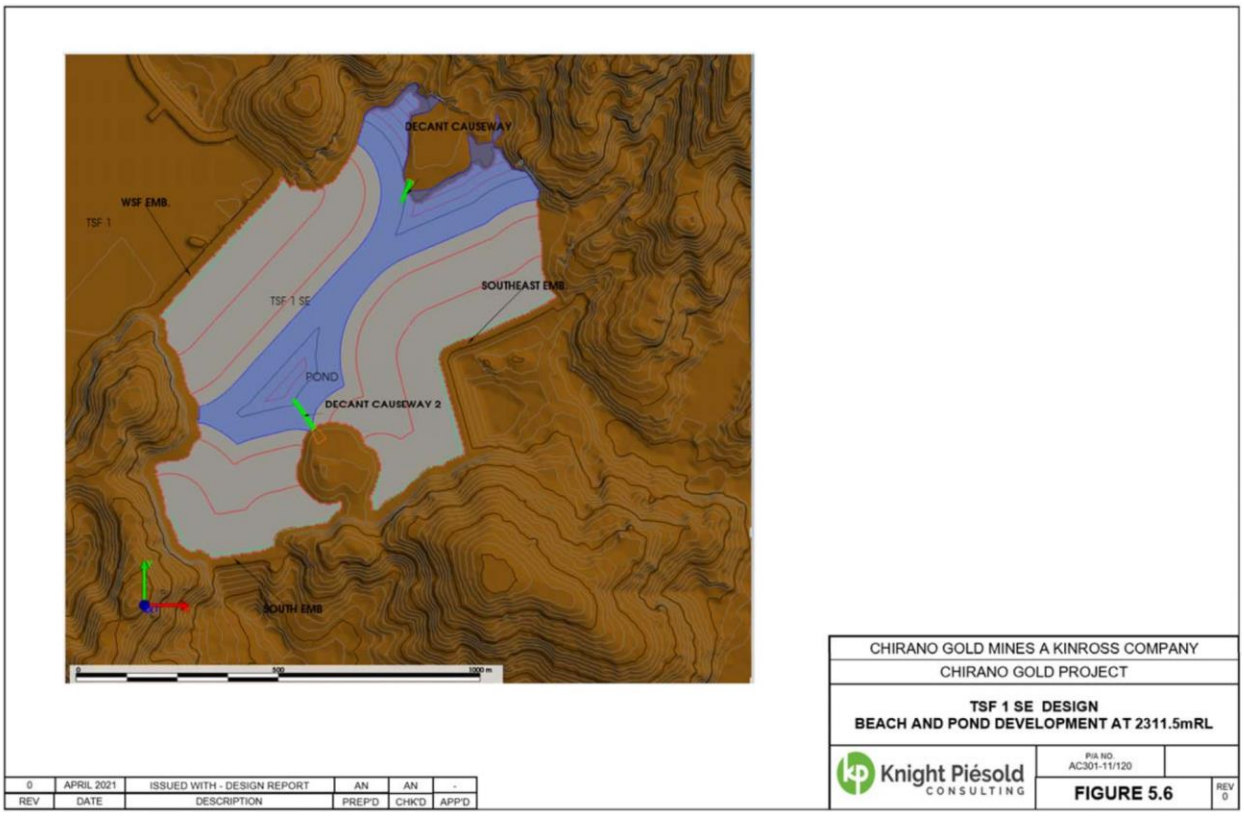


Figure 18-25: Chirano TSF 1 SE Configuration

(Source: KP 2021)

The TSFs making up the TSF complex are contiguous, with three shared embankments. TSF 1 and TSF 1 NE share the North Forest Boundary Embankment (NFBE) while TSF 1 and TSF 2 share the TSF 1 main embankment (ME). TSF 1 and TSF 1 SE also share the Water Storage Facility Embankment (WSFE). TSF 1 SE is enclosed by 4 embankments viz: South Embankment (SE), Southeast Embankment (SEE), Natural High Ground, and TSF 1 Water Storage Facility Embankment (WSFE).

EMBANKMENTS

Embankments are generally designed zoned construction using the downstream construction method. The zones are:

1. Zone E Rip Rap;
2. Zone A low permeability section for containment;
3. Zone J Transition Material; and
4. Downstream Zone C rock buttress.

Embankments are usually topped with a wearing course placed with a crossfall of 2% toward the upstream section with safety berms lining the edges of the driving surface.

BASIN LINER

TSF 1 SE basin, just like all TSFs, has been lined with a 300mm thick CSL in areas with natural permeability greater than 10-8 m/s. The top 300mm of the basin in areas with natural permeability less than 10-8m/s was ripped and compacted as part of basin preparation.

STORAGE, DEPOSITION AND DECANT

The tailings storage capacity of TSF 1 SE is designed for 13.8Mt which provides approximately 47 months of storage at a tailings production rate of 3.5 Mtpa. Tailings is delivered to the TSF via two discharge pipelines and deposited along the South, Southeast and WSF embankments. The deposition of tailings into the facility is by sub-aerial methods from multiple spigots placed along the tailings distribution line spaced at approximately 15m centres.

Water from the supernatant pond is decanted using a floating barge equipped with pumps. In order to increase tailings consolidation and to comply with storm analysis requirements, the supernatant pond is to be maintained with a Maximum Normal Operating Elevation (MNOPE) of 2310.0m RL during operations.

WATER MANAGEMENT SYSTEMS

The TSF 1 SE water management and relief systems consist of Ground water drainage system including sump, Under Drainage, with Toe Drains, system including sump, Secondary confinement systems including sumps, Decanting supernatant water from TSF 1 SE to the Plant, Diversion of storm flows from external catchments, and Emergency Spillway.

DRAINAGE SYSTEM

TSF 1 SE is designed with drainage systems that will divert storm runoff, collect and direct groundwater flows and tailings under drainage and reduce and collect potential seepage through the embankments. All drainage systems, except the storm diversion, fall to sumps where the water is collected and pumped to the surface of TSF 1 SE.

EMERGENCY SPILLWAY

The spillway has been constructed through natural ground near the eastern end of the South Embankment to direct flows to an existing low area which will act as a catch basin.

19. MARKET STUDIES AND CONTRACTS

19.1 Introduction

The primary commodity produced by CGML at its operations is gold. Table 19-1 shows the budgeted LoM gold production from 2022 to 2026.

Table 19-1: LoM Gold Production

Year	2022	2023	2024	2025	2026	Total LOM
Gold Produced (Oz)	160,050	185,250	185,165	185,208	158,048	873,721

19.2 Marketing Contracts

Chirano Gold Mines Limited entered into a refining contract with Metalor Technologies SA, on 1st March 2015. Metalor are a Swiss based company for the refining, sampling and assaying for gold. The original contract was valid for a period of three years and was renewed for a second term expiring on 30th June 2021. The contract was renewed on the 1st February 2021 and is due to expire on 31st December, 2023.

Terms of the contract are confidential and are not reported in this document for confidentiality reasons.

19.3 Pricing

Resource estimates were undertaken as a gold price of US$1,600/oz. Reserves were calculated at a gold price of US$1,200 oz. As at the date of this report the 3-year trailing average is US$1,730/oz. In 2021 the average realised price for gold sales was US$1,800/oz.

CGML have a assumed a variable gold pricing structure for LoM operations as shown in Table 19-2.

Table 19-2: CGML Forecast Gold Price

Year	2022	2023	2024	2025	2026
US$/Oz	1,797	1,738	1,708	1,669	1,601

Figure 19-1: Gold Price 2018 – 2022

19.4 Product Specification

Product specifications is defined in the refining contract.

19.5 Shipping Storage and Distribution

CGML has a “Door to Door” contract with Brinks Global Services International Inc for the transport of doré to the Metalor refinery in Switzerland. The contact was signed on 21st December, 2021.

19.6 QP Opinion on Gold Price Applied

The realised gold prices as shown in Table 19-2 was used as the gold prices for economic evaluation. BARA considers this price appropriate for the Technical Report.

19.7 Material Contracts

As Chirano has been operating over a period of almost 2 decades, the suppliers are well established. Contracts are in place for all materials and services required for the projects operation. Contracts are generally for a duration of two years, although there are some exceptions. At the end of term, the contract is either renegotiated with the incumbent supplier or re-tendered.

Contracts are tendered with a Request for Proposal (RFP) issued to relevant suppliers. Proposals are then reviewed based on their merits and contracts subsequently signed.

It must be noted that not all contracts were reviewed by Bara Consulting. Contract terms and pricing for those that were reviewed were deemed to be to industry standard.

A list of existing larger material contracts is shown in Table 19-3.

Table 19-3: Material Contracts

Current Contractor	Type of Goods/ Services	Goods/ Services	Start Date	End Date	Tender Status
Maxmas	Open Pit mining	Services	01 Feb 21	31 Jul 23	Active
Zen Petroleum	Fuel and lubricants	Goods/Services	01 Dec 17	30 Jun 22	RFP for the LBI/Paboase fuel awaiting final award
Bilal	Drill and blasting related services for open pit	Services	01 Jan 21	31 Oct 21	RFP for LBI/Open pit mining awaiting final management decision
Sandvik Mining	Supply, storage and management of spare parts (jumbo drills and spare parts)	Goods	01 Sep 21	31 Aug 23	Complete / Signed
Kai Tire	Consignment agreement for tires	Goods	01 Jun 20	31 May 22	RFP in progress
Mantrac Ghana	Caterpillar Spares	Goods	01 Oct 19	25 Feb 22	Negotiations in progress
Movis Ghana Ltd	Freight forwarding	Services	01 Jan 20	31 Dec 21	RFP in progress – Possibly that new contract will be for 1 year only and global RFP with Taslast will be carried out by end of year
Caldor Africa Ltd	Grinding Media	Goods	01 Mar 22	28 Feb 24	Going through approvals
ALS	Laboratory services	Services	01 Sep 21	31 Aug 22	Not started
HGS Ltd	Provision of hydraulic Hose, fittings, ancillary equipment, lubrication and supervision of fire suppression system	Services	01 Jan 21	31 Dec 21	RFP in progress
Tega Industries Ltd	Consignment Agreement for mill liners	Goods	01 Oct 20	30 Sep 22	Not started
Maxam	Explosives	Goods/Services	01 Jan 15	01 May 23	RFP issued; Parties negotiating with shortlist; will proceed with award unless instructed otherwise
Cyanco	Cyanide	Goods	01 Jan 18	31 Dec 22	RFP being issued April 8th

20. ENVIRONMENTAL STUDIES, PERMITTING & SOCIAL COMMUNITY IMPACT

Chirano Gold Mines Ltd, poured its first gold in 2005 after obtaining permits, licences and certificates from relevant regulators, legislative bodies and governmental agencies and signing a Social Responsibility Agreement (SRA) in 2004 with catchment communities and traditional authorities represented by the Community Consultative Committee. CGML has subsequently conducted Environmental Impacts Assessments (EIAs) for project expansions and submitted Environmental management plans (EMPs) triennially to the Environmental Protection Agency (EPA) in compliance with the requirements of the Environmental Impacts Assessments regulations, 1999 (LI 1652). The mine complies with the requirements of Minerals and Mining (Health, Safety and Technical) regulations (LI 2182) by acquiring mining operating permits annually through submissions of updated Mine operating plans (MOP). CGML also complies with other permit requirements from relevant regulatory bodies and carries out environmental and social monitoring within their operations and catchment communities to ensure good environmental stewardship and community sustainability. This chapter summarises CGML environmental management practices including permitting and environmental and social monitoring programmes.

20.1 Ghanaian Policy, Legal and Regulatory Framework

Ghana has well-established mining-related policies, laws, guidelines, and regulations to promote and regulate the extraction of minerals in the country. These policies, regulations and guidelines are to ensure environmental and social sustainability, effective and safe extraction of minerals and to guide social issues such as labour and employment, compensations, resettlement etc. Those policies, regulations and guidelines applicable to CGML operations are tabulated in Table 20-1.

Table 20-1: Legal Framework of Mining-Related Projects in Ghana

Category	Title
Constitution	Constitution of the Republic of Ghana, 1992
Policies	Minerals and Mining Policy, 2014 National Environmental Policy, 2012 National Water Policy, 2007 National Land Policy, 1999 Ghana Climate Change Policy, 2013 Ghana Forest and Wildlife Policy, 2012 Buffer Zone Policy, 2013
Acts	Environmental Protection Agency, 1994 (Act 490) Minerals and Mining Act, 2006 (Act 703) Public Health Act, 2012 (Act 851) Water Resources Commission Act, 1996 (Act 522) Local Governance Act, 2016 (Act 936) Minerals Development Fund Act, 2016 (Act 912) Minerals Income Investment Fund Act, 2018 (Act 978) Forestry Commission Act, 1999 (Act 571)
Regulations	Environmental Assessment Regulations, 1999 (LI 1652) Fees and Charges (Amendment) Instrument, 2019 (LI 2386) Minerals and Mining (Local Content and Local Participation) Regulations, 2020 (LI 2431) Minerals and Mining (Mineral Operations-Tracking of Earth Moving and Mining Equipment) Regulations 2020 (LI 2404) Minerals and Mining (Local Content and Local Participation) Regulations, 2020 (LI 2431) Minerals and Mining (General) Regulations, 2012 (LI 2173) Minerals and Mining (Support Services) Regulations, 2012 (LI 2174) Minerals and Mining (Licensing) Regulations, 2012 (LI 2176) Minerals and Mining (Explosives) Regulations, 2012 (LI 2177) Minerals and Mining (Health, Safety and Technical) Regulations, 2012 (LI 2182) Mineral (Royalties) Regulations, 1987 (LI 1349) Minerals and Mining (Compensation and Resettlement) Regulations, 2012 (LI 2175) Wildlife Conservation (Amendment) Regulations, 1989 (LI 1452) Water Use Regulations, 2001 (LI 1692)
Standards and Guidelines	Ghana Standard for Environment and Health Protection - Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236: 2019) Ghana Standard for Environmental Protection - Requirements for Effluent Discharge (GS 1212: 2019) Ghana Standard for Health Protection - Requirements for Ambient Noise Control (GS 1222: 2018) Ghana Standard for Water Quality - Specification for Drinking Water (GS 175: 2017) Environmental Guidelines for Mining in Production Forests in Ghana (2001) Mining and Environmental Guidelines, 1994 Global Industry Standard on Tailings Management (GISTM), 2020

(Source: Geosystems Consulting, 2022)

20.2 Project Permitting Process in Ghana

Permitting and Permit approvals in Mining are under the coordination of the Minerals Commission with the support of the Environmental Protection Agency, the Water Resources Commission (WRC) and the Forestry Commission (FC) (for companies operating with production forest reserves). The generalised process is as follows:

- Project Registration/Notification with the Approving Agent by the proponent
- Initial Project Assessment/Review by respective agency
- Environmental-related impacts review and advice by the EPA
- Health & Safety and Technical reviews by the Inspectorate Division of the Minerals Commission
- Forestry-related impacts and advice by the Forestry Commission
- Water Rights approval by the Water Resources Commission
- Mine Closure and relinquishment/surrendering of Title Rights to Minerals Commission in collaboration with the EPA and in consultation with the local government and the local traditional authorities.

20.2.1 Chirano Mine Permitting Process

Chirano Gold Mines Ltd operates with four key permits aside the mining lease. These are the Mine Operating Permit, the Environmental Permit, the Water Use Permit and the Forest Entry Permit. Other permits that are specific to project expansion or special/critical projects also exist. The Tailings Storage Facilities , since 2014 have been given special environmental permits from the EPA. The current operational TSF, TSF 1 South Extension, was permitted in 2021. Other areas of the project that require environmental permitting are the underground complex for which an Environmental Impacts Statement (EIS) has been completed and is undergoing review by the EPA.

Water Use permit has three components, these are the water abstraction for domestic use, water abstraction for production and water abstraction through pit dewatering. Permit for explosive storage and use have also been obtained from the Minerals Commission. Currently, all permits are up to date. Some permits have not yet been obtained even though payments have been made to the relevant regulator. Table 20-2 shows the CGML permits register.

The Environment Health and Community Relations department is responsible for permit acquisition for the mine. The department initiates and manages the permitting process through preparation of EIS, EMPs, applications etc and submitting same to the relevant permitting agencies. The Mining Operating Permit is renewed annually, Water Use Permits triennially, while the Environmental Permits are renewed upon permit expiration. However, the mine is required to revise and submit an Environmental Management Plan (EMP) triennially to the EPA. Permits for the acquisition, onsite storage and use of explosives is handled by the explosive's supplier, Maxam. An Environmental Permit was issued in 2015 to CGML for prospecting and underground exploration activity on its Chirano Concession. CGML was granted another Environmental Permit in 2015 to continue operating the existing Fuel Depot located at Chirano mine site which was previously operated by Shell Ghana Limited.

Chirano remains in full compliance with the principles of the Cyanide Management Code and standards of practice and was recertified in November 2016 by the International Cyanide Management Institute (ICMI) following initial certification in August 2014. CGML was recertified as ICMC compliant on 3rd April 2020 for three years following the Code Recertification Audit in November 2019. Cyanide-related facilities are under constant surveillance to ensure protection of workers, the community, and the environment, including primary environmental receptors of air, water (surface water and groundwater), soil, flora and fauna in line with International Cyanide Management Code (ICMC) certification obligations. The Ghana National Fire Service (GNFS) issued the yearly-renewable Fire Service Certificate, and this is renewed when it expires.

Table 20-2: Chirano Permits Register

Permit Type	Status	Issuing Body	Issue Date	Expiry Date	Remarks/Progress Report
Environmental Certificates	Waiting	Environmental Protection Agency	31-Oct-17	30-Oct-20	EMP for the mine submitted to EPA in April,2020 for 2020-2022
Mining Lease	In Place	Ministry of Lands & Natural Resources	22-Dec-19	22-Dec-34	The lease is for a 15-year period
Mining Permit (Open Pit & UG)	In Place	Minerals Commission	8-Mar-22	31-Dec-22	Renewable annually
Water Use Permit (Groundwater Abstraction)	In Place	Water Resources Commission	25-Aug-20	31-Dec-22	Renewable every 3 years
Water Use Permit (Surface Abstraction for Processing)	In Place	Water Resources Commission	25-Aug-20	31-Dec-22	Renewable every 3 years
Water Use Permit (Pit Dewatering)	In Place	Water Resources Commission	25-Aug-20	31-Dec-22	Renewable every 3 years
Forest Entry Permit	In Place	Forestry Commission	9-May-22	9-May-23	Renewable annually

(Source: Geosystems Consulting, 2022)

20.2.2 Minerals Commission Permitting Process

MINE OPERATING PERMIT

Chirano mine operates under a 15-year mining lease granted by the Minister of Lands and Natural Resources on 23rd December 2019 and a Mine Operating Permit which is renewed annually. The processes for acquiring the Mine Operating Permit are stated in Regulation 8 of the Minerals and Mining (Health, Safety and Technical) Regulations, 2012, (LI 2182). The Holder of a mining lease will have to apply to the Inspectorate Division of the Minerals Commission before commencement of mining and submit a Main Mining Operating Plan (MOP) based on which the Chief Inspector of Mines will issue a Mine Operating Permit. Regulation 9 of LI 2182 details the content of the MOP. Thereafter a Yearly MOP will be submitted for approval and a Mining operating permit granted. Currently CGML has an operating permit that will expire at the end of 2022 and thereafter the MOP will be updated and the Operating Permit renewed.

EXPLOSIVES PERMIT AND BLASTING LICENCES

The Transportation, storage and use of explosives are regulated by Minerals and Mining (Explosives) Regulations, 2012, (LI 2177). CGML explosives management has been contracted to the explosive's supplier, Maxam. However, CGML mining personnel who are required to have blasting licences for their operations are managed by the Mine Manager. The CGML procedure for obtaining a blasting certificate is through training sessions for all prospective candidates and thereafter through an examination by the Inspector of Mines. Those who pass the examination are given a 5-year blasting licence specific to either surface or underground operations.

EXPLORATION LICENCES

Chirano currently has 4 sites where active exploration is ongoing. Three of them were acquired by Red Back Mining Ghana Ltd, the original owners of Chirano Mine, while one was acquired by CGML. The four sites are Ahwiam, Anansu, Amafie, and Chirano North. Three of them have prospecting licences that will expire in 2023 except Ahwiam whose prospecting licence expired in 2021 and is yet to be renewed. However, an application for renewal of Environmental permit for Ahwiam exploration has been submitted to the EPA.

20.2.3 EPA Permitting Process

The administrative procedures for environmental permitting in Ghana through the conduct of an Environmental Impacts Assessment (EIA) and preparation of an Environmental Impacts Statement (EIS) is shown in Figure 20-1. The permitting procedure is guided by the Environmental Assessments Regulations, 1999 (LI 1652). The document provides the necessary specific and complete legal backing for the EIA procedure/system in Ghana and has three (3) distinct parts with a total of 30 regulations and five (5) schedules.

The acquisition of an environmental permit in Ghana involves the following processes:

PROJECT REGISTRATION

An application for an Environmental Permit must be formally submitted to the EPA using either form EA1 or EA2 depending on the size and magnitude of the proposed development. Form EA2 is applicable to larger projects and those for mining projects where in almost all instances an EIA would be required. On receipt of the application, the EPA screens the application and confirms whether the application is approved, objected to, requires submission of Preliminary Environmental Report (PER), or requires the submission of an Environmental Impact Statement (EIS). The purpose of PER is to provide the EPA with more information from which the need for an EIS would be evaluated. Project registration procedure is in Regulations 5-7 of LI 1652.

SCOPING PHASE

The Scoping phase will include stakeholder identification and initial stakeholder consultations. It will also define the Scope of work for the project and terms of reference (TOR) for the EIA. The Scoping Report will be submitted to the authorities for review and the public through channels provided in regulation 16 of LI 1652 for comments.

PROJECT ADVERTISEMENT

Regulation 15 of LI 1652 requires that notice of the proposed undertaking is made to the relevant Ministries, government departments and organisations and the relevant Metropolitan, Municipal or District Assembly, advertised in at least one national newspaper and a newspaper of any circulating in the locality where the proposed undertaking is to be situated; and make available for inspection by the general public in the locality of the proposed undertaking, copies of the scoping report.

IMPACT ASSESSMENT PHASE

Detailed specialist studies on the physical, biological and social environment will be undertaken to establish baseline conditions against which potential positive and negative impacts of the project will be assessed. The findings will be compiled into the EIS and EMP which will be made available for public review for a specified period.

CONTENT OF THE EIS

The EIS provides a detailed description of the project and gives a justification for undertaking the project, provides identification of existing environmental conditions including social, economic and other aspects of major environmental concern. These will form the benchmark against which mitigation measures will be developed. The EIS also provides information on potential positive and negative impacts of the proposed undertaking from the environmental, social, economic and cultural aspect in relation to the different phases of development of the undertaking, potential impact on the health of people, and cumulative impacts. The document also proposes measures to mitigate impacts and Monitoring programmes to monitor predictable environmental and social impacts and proposed mitigating measures. The EIS also provides information on a Provisional EMP which will guide mine operations for 18 months until an EMP is prepared, and a Rehabilitation and Decommissioning plan indicating end use of various infrastructure and a cost for rehabilitation. A record of the Stakeholder engagements conducted for the project.

PUBLIC HEARING

A public hearing will be held for projects that fall within the categories defined in Regulation 17 of LI 1652. The outcomes of the public hearing will be used to review the draft EIS.

DECISION-MAKING PHASE

The EIA and EMP reports will be submitted to the authorities for decision making. The decision will be made known to all stakeholders.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Once an environmental permit is granted for the project, the Owner is enjoined to prepare and present an Environmental Management Plan within 18 months of commencement of operations and thereafter every 3 years according to Regulation 24 of LI 1652. The EMP details the operational impacts of the project on the physical, biological and socioeconomic environments and provide information on how these impacts are managed during operations. The EMP also contains an Environmental action plan, Occupational Health and safety action plan and Rehabilitation and Decommissioning plan.

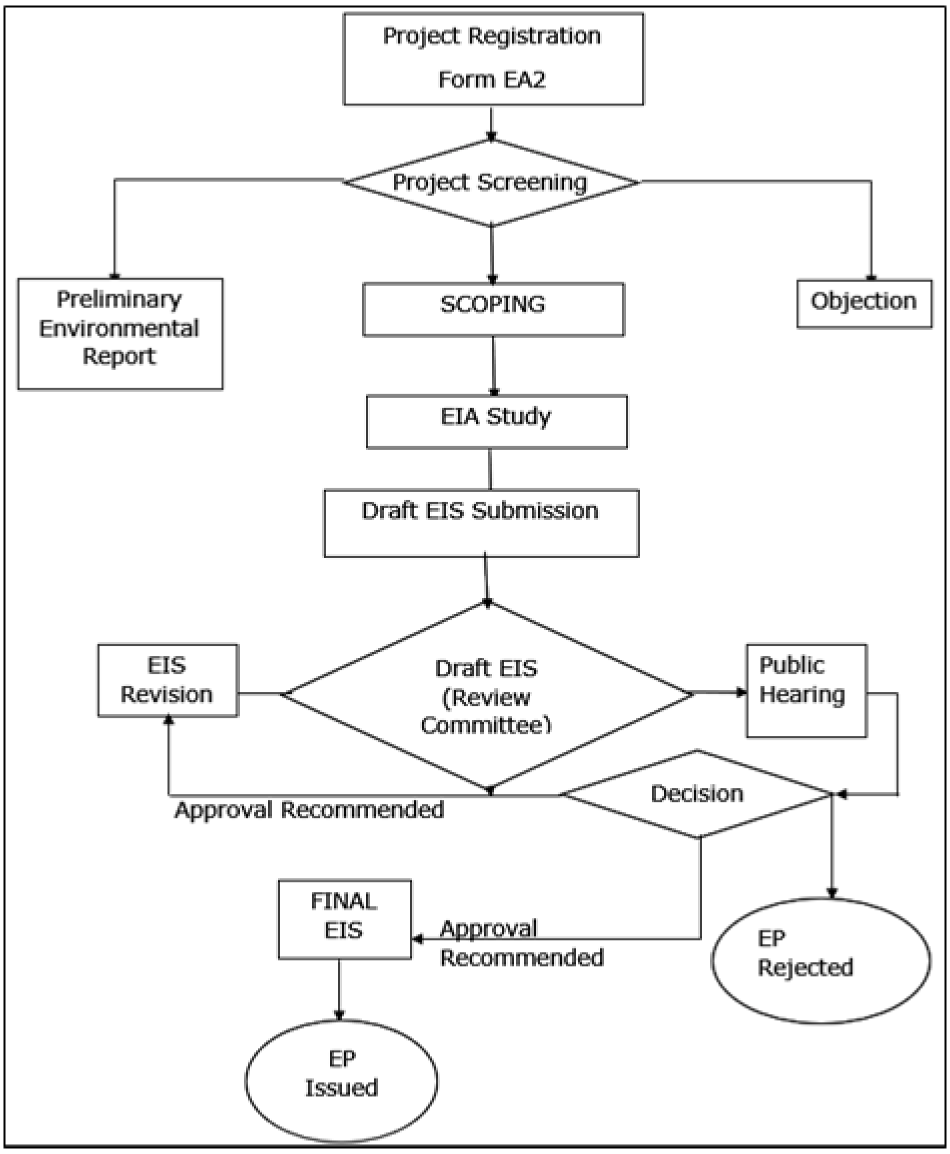


Figure 20-1: Administrative Flow Chart of EIA Procedures in Ghana

(Source: Geosystems Consulting, 2022)

20.3 Stakeholder Engagement

Consultation of the members of the public who are likely to be affected by the operations of a proposed project is a requirement of the EIA process (LI 1652 Regulation 12(k)). This Public consultation process is also called Stakeholder engagements or public participation process (PPP). Stakeholder consultation is a major component of the EIA process and is generally completed to guide impact assessments on those issues of most concern and inform Project planners and decision-makers on the sustainability of the project. Effective stakeholder consultation helps build trust and credibility, provides a platform for effective information management, and facilitates the development of positive, long-term relationships with the Project proponent, its neighbours, and other stakeholders in the quest for sustainable Project development and implementation.

20.3.1 Guiding Principles of Stakeholder Engagement

The consultation approach is guided by the core values of the International Association of Public Participation (IAP2) which are built on the following tenets:

- The public should have a say in decisions about actions that could affect their lives
- Public participation includes the understanding that the public's contribution may influence decisions. Public participation promotes sustainable decisions by recognising and communicating the needs and interests of all participants, including decision-makers
- Public participation seeks and facilitates the involvement of those potentially affected by or interested in a decision
- Public participation provides participants with the information they need to engage in a meaningful way; and
- Public participation provides feedback to participants on how their inputs affect a decision.

20.3.2 Engagement Objectives

The general objective of Stakeholder consultations is to share detailed project information with Project stakeholders and solicit their views, inputs and concerns regarding the Project. It is also to inform stakeholders, including the communities in the Project area, about the project's potential impacts and to recommend mitigation measures while encouraging their active involvement in the EIA process and the Project. Specific objectives of the consultations are, therefore, to:

- Provide adequate and accessible information to stakeholders to enable them to:
  - Understand the context of the EIA process
  - Be informed and educated on the Project and its potential impacts
  - Identify issues of concern, comment on alternatives and make suggestions for improved benefits.
- Provide opportunities for stakeholders to comment and provide input (local knowledge and experience) to be documented for consideration as part of the EIA process
- Build community understanding and support for the EIA process and the Project in general and to factor stakeholders' comments and views into project planning and decision making.

20.3.3 Stakeholder Identification

The initial EIS for the Chirano Gold mine was completed and submitted to the EPA by the Environment Division of SGS Laboratory Services Ghana Limited (SGS) in February 2004 on behalf of Redback Mining NL, the then Project Owner. As part of the EIA, a detailed PPP was completed and presented as a chapter in the EIS. Thereafter several stakeholder engagements have taken place as part of the EIAs done for project expansions, special projects and some socioeconomic studies carried out at various times as social monitoring programmes. CGML continues to engage the stakeholders through the Community Consultative Committee (CCC) and through regular perception studies conducted by the mine.

Two broad classifications of stakeholders are: Government and Non-governmental stakeholders.

20.3.4 Governmental Group Stakeholders

Governmental or Institutional stakeholders include the host administrative authorities, Bibiani-Anhwianso-Bekwai Municipal Assembly and Sefwi Wiawso Municipal Assembly. The regulatory stakeholders are Inspectorate Division of the Minerals Commission, Environmental Protection Agency, Water Resources Commission and Forestry Commission. Other governmental bodies like the Lands commission, Geological survey, Ghana National Fire Service, Ghana Police Service, etc are also consulted during the implementation of any expansion project.

THE MINERALS COMMISSION

The Minerals Commission (MC) is a government agency established under Article 269 of the 1992 Constitution and the Minerals Commission Act 1993, Act 450. The Minerals Commission as the main promotional and regulatory body for the minerals sector in Ghana is responsible for "the regulation and management of the utilization of the mineral resources of Ghana and the coordination and implementation of policies relating to mining. It also ensures compliance with Ghana's Mining and Mineral Laws and Regulation through effective monitoring.

FORESTRY COMMISSION

The Forestry Commission (FC) is a public service institution, set up subject to the provisions of the 1992 Constitution. The Forestry Commission was re-established by Act 571 of 1999 in order to bring under the Commission the main public bodies and agencies implementing the functions of protection, development, management and regulation of forests and wildlife resources and to provide for related matters. Forestry Commission is to provide services that guarantee the conservation, sustainable management and development of Ghana's forests and wildlife resources for the maintenance of environmental quality and to optimize their contribution to national socio-economic development for the benefit of all segments of society". Its core values include active promotion of stakeholder involvement in the sustainable management and development of national forest and wildlife resources.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

The Environmental Protection Agency is the leading public body for protecting and improving the environment in Ghana. The mission of the EPA of Ghana is to co-manage, protect and enhance the country's environment, in particular, as well as seek common solutions to global environmental problems. The accomplishment of the mission is to be achieved inter alia through research, scientific, technological, and innovative approaches, and good partnerships.

20.3.5 Non-Governmental Stakeholders

Non-Governmental and non-regulatory key stakeholders include:

- Senior Leadership Team of Kinross
- The Board of Directors of Chirano Gold Mines
- Employees of Chirano Gold Mines
- Host-Communities and The Opinion Leaders
- Local Traditional Authorities: Custodians of lands and overlords of the locality.
- The Community Consultative Committee (CCC) of Chirano Gold Mines.

20.3.6 Community Consultative Committee

CGML, as part of its Corporate Social Responsibility (CSR) towards the communities in its area of operations established, in 2004, a Community Consultative Committee (CCC) to liaise between the Company and its various stakeholders and established a Trust Fund to be managed by "Trustees" or "Board" with the following objectives:

- To promote Cooperation and Understanding between CGML and its various stakeholders
- To ensure that the Company lives up to its Corporate Social Responsibility to the communities in particular, and the country at large.

Membership consists of the traditional authorities (3 paramount chiefs and selected sub-chiefs) and leaders of catchment communities and PACs, governing municipal assemblies and some departments within the assembles.

The CCC meets quarterly and is the most effective means of engaging stakeholders outside formal stakeholder engagements. During CCC meetings CGML General Manager and Heads of departments take turns to update the committee on developments in the operations of the mine. Outstanding and contentious issues are solved through sub committees such as the Alternative Dispute Resolutions (ADR) Committee.

OUTCOME OF SPECIAL CCC MEETING ON PROPOSED MINE CLOSURE
The meeting was convened on 16th July 2017 on the proposed Mine closure. Three key proposals were considered for implementation in the advent of the closure of the mine as follows:

1. Management and use of the immovable assets of the company:
    a. To ensure a smooth and effective transfer and proper protection of the Assets to be left behind by the Mining Company, an Interim Management Committee (IMC) should be established immediately to accept, hold and secure the Assets until a permanent body is set up to manage them.
    b. An Escrow Account forthwith to be established and used by the Interim Management Committee
    c. The buildings and other immovable assets that the company will leave behind should be used to establish a fully-fledged University.
    d. Before the projected plan is implemented, the Interim Management Committee (IMC) may lease the assets temporarily for hire at a reasonable fee.
2. **Establishment of a quarry industry**: The CGML's Aggregate Rock Crushing Plant with 1,000 tons per day production capacity and the numerous rock waste should be turned into a quarry
3. **Trust Fund**: The three groups accepted and were appreciative of the establishment of a Trust Fund
4. **Scholarship Scheme**: A Scholarship scheme for use and benefit by all possibly with a special dispensation for children from communities within the immediate catchment area.

20.3.7 Summary of Stakeholders Key Issues

The most recent formal Stakeholder engagements were conducted for the Construction of the TSF 1 North Extension in 2016 by Golder Associates (Golder, 2016) and for the TSF 1 South Extension in 2021 (Geosystems, 2021) Key issues and concerns raised are summarised as:

- Employment: opportunities, allocation ratios, youth skills training;
- Project benefits;
- Sensitisation on the project and engagement with communities; and
- Health and safety of communities.

20.4 Environmental Baseline

The environmental baseline provided in this report is based on the specialised studies conducted for the first EIA in 2009 with updated studies carried out by different Specialists (Golder, (2016), Geosystems (2017)) during the years of operations.

20.4.1 Climate

CGML project area falls within the wet semi-equatorial climatic zone of Ghana. It is characterised by an annual double maxima rainfall pattern occurring in the months of March to July and from September to mid-November. Approximately 55 to 60% of the total rainfall is recorded during the first rainy season. The mean annual rainfall varies widely from year to year (74-year data period) with a mean of 1472.7mm and a range of 1056.2mm (1977) to 1929.0mm (1968). The annual mean air temperature is about 26.9°C. In general, March is the hottest month of the year with a mean temperature of 28.3°C. August is the coolest month with a mean temperature of 25.3°C. 3.2.

20.4.2 Air Quality

CGML's concession area is entirely rural and ambient air quality is considered good within the context of the region. As a characteristic of this geographical part of the continent, the area is under the influence of the dust-laden Harmattan winds. This seasonal particulate pollution occurs principally during the three months of the dry season, from December to February. Review of representative of baseline levels across the CGML operational area indicates that current annual baseline levels are below the guideline levels recommended by the Ghana EPA, although short-term peaks may occur.

20.4.3 Hydrology and Surface Water Quality

CGML Project Area lies partly within the Suraw sub-basin of the Tano river basin and partly in the main Ankobra basin. These two major rivers drain the southwestern parts of Ghana into the Atlantic Ocean. The Project Area is drained principally by the main Suraw River and its tributaries. Smaller catchments include the Mamnao stream in the north and the Paboase stream to the south. The streams and rivers draining the Project Area receive flow contributions, which originate from sites where future mining activities will be developed. Therefore, the main mining area is comprised of headwaters for these tributaries. Within the Project Area, most of these water bodies are devoid of major pollution problems. They are used, mainly during the rainy season, as sources of potable water by the inhabitants of the settlements located near their banks. These streams are very seasonal, and dry completely except during exceptionally wet years. Most settlements have access to an alternative source of water.

The hydrological resources of the Project Area have been characterised through direct observations of the surface water catchment and physical state of relevant streams at relevant locations within the Project Area and by the assessment of surface water flow by the measurement of instantaneous discharges and use of the area ratio method in relation to the catchment area of the Tano River at Wiawso and Ankobra River at Ankwaso. Results of sampled water analyses have been compared to the WHO guidelines for drinking water purposes and the EPA proposed effluent guidelines. The pH was generally near neutral to slightly acidic depending on the water body and the sampling period with values ranging from 5.2 to 7.4 and a mean of 6.5. Apparent colour and turbidity were very high for most of the samples and always exceeded the WHO guideline values. Levels of suspended solids (TSS) were generally high, though a few samples had concentrations below the 20-ppm quoted by the WHO guideline values. Concentrations of nutrients were low and close to the natural background for all the water samples analysed. Concentrations of total iron (Fe) were high (0.02 to 831ppm) and exceeded by up to 8310 times the WHO guideline values of 0.10ppm. The most recent maximum discharge value proposed by the Ghanaian EPA is 10.0ppm. This guideline value was exceeded 20% of the time. Manganese (Mn), aluminium (Al) and zinc (Zn) were also detected in concentrations often higher than the WHO guidelines values. Very low concentrations of arsenic (As) were found in most of the samples and for all the sampling periods. The highest value of 0.027ppm was detected in the Asanteman stream in December 2000 (SW2). Microbiological counts were high in all the sampled streams. This shows that the surface-waters of the Project Area are contaminated by both total and faecal coliforms and, hence, not fit for human consumption without prior treatment. These coliforms may have several origins: 1) poor or non-existent sewage systems for all the settlements, 2) extensive bathing in the streams and 3) zoological.

20.4.4 Hydrogeology and Groundwater Quality

Studies have identified two aquifer units at Chirano:

Shallow aquifer: located in the weathered rock of the Oxide Zone and the Transition Zone, it is heterogeneous and unconfined, with permeability varying from 10-9 to 10-7ms-1 (Golder, 2013).

Deep aquifer: located in the unweathered Fresh Zone and, where not differentiated by rock type, the deep aquifer has a permeability range of 10-7ms-1 (unfractured) to 10-6ms-1 (shear zone and karstified sediments) (Golder, 2013) and transmissivity range of 1.3 m2d-1 (volcanics) to 16.5 m2d-1 m2d-1 (sediments) (GCS, 2009). The water table in the shallow groundwater, mimics the topography. The deeper aquifer based on analysis of existing boreholes are about 26 – 38mbgl and appears to flow in the south-westerly direction similar to the shallow aquifer.

Natural discharges (or springs), which are usually linked to the geomorphology of the area were not identified in any parts of the Project Area. The flow regime direction is considered to follow the natural topography from the hill to the valley bottom. Use of groundwater resources, mainly for domestic purposes, is common in the Bibiani-Anwiaso-Bekwai Municipality. Shallow wells have been dug down to about 20ft (7m). Deep wells have also been bored to provide potable water. All the main villages of the Project Area have access to at least one borehole equipped with hand-activated pump. Results of groundwater analysis undertaken as part of the baseline survey exhibit values for pH ranging from 5.5-7.8, a medium hardness, a medium to high alkalinity and a low mineral content, except that at Paboase which recorded low values for both hardness and alkalinity. Of fifteen heavy metals analysed, iron, manganese and zinc were detected in the majority (93%) of the samples analysed. Arsenic was also detected in some of the samples (approximately 43%). Concentrations of iron and occasionally manganese were higher than the level recommended for potable water as proposed by GWCL (Fe: 0.30ppm Mn: 0.10ppm) or WHO (Fe: 0.10ppm Mn: 0.05ppm). Concentration of arsenic was generally well below GWCL and WHO guideline values (0.010ppm). The highest value of 0.009ppm was found in sample G5 representing the Obra mining area. Microbiological examination of the boreholes used for drinking purposes revealed the presence of total and faecal coliforms. These boreholes can be considered from a microbiological point of view nonacceptable for human consumption without prior treatment.

20.4.5 The Ecological Environment

The entire CGML Project Area of about 36 km^2 falls within the Celtis-Triplochiton association of Taylor (1952). Its vegetation has been classified by Taylor (1952) as "Semi-deciduous" and by Hall & Swain (1981) as "Moist Semi-deciduous - South East Subtype" - MS (SE). Structurally, the forest sub-type is characterised by a 3-layered tree strata, a shrub layer and an herbaceous layer. The vegetation type and habitat conditions of the Tano Suraw and Tano Suraw Extension Forest Reserves (TSFR and TSEFR) are identical. In addition, both Forest Reserves have some significant portions that have been degraded through logging, hunting and farming. The TSFR has a history of extensive encroachment or illegal farming by cocoa farmers and fire outbreaks sometimes initiated by hunters. The same area has been extensively logged in the past and very few commercial timber species can be found. Notwithstanding the obvious degradation, there is still very good forest rated Grade 3 on the hilly and steep slopes in the Reserves.

No "Black star" species were encountered in the TSFR areas inspected or surveyed neither were any reported as being on record by the District Forestry Office. No areas in the entire CGML Project Area are listed as protected, as provenance areas, as special biological or institutional research plots. Outside the Forest Reserves, the vegetation of the Project Area has been considerably disturbed through human activities, such as farming and logging. Off-reserve areas comprise mainly cocoa and food crop farms and farm fallows created from the original forest vegetation as is evident from relict trees and regrowth vegetation. Thus, the current vegetation is very much degraded and has been reduced to a mosaic of secondary vegetation at different stages of succession.

Fauna surveys of the two Forest Reserves indicate that the area has relatively good faunistic diversity for both avifauna (birds) and mammals, but many recordings are hearsay only, particularly with regard to the presence of endangered species. Twenty faunal species of conservation concern were confirmed or were considered likely to occur within the project area. All of these are protected under legislation, except for an un-identified shrew species and the Allen's River Frog. The Near-Threatened Allen's River Frog, which was recorded during the 2015 baseline surveys, is of priority conservation concern for the impact assessment, followed by the Slender-tailed squirrel (Data Deficient) which was also observed during the baseline survey. Tree Pangolin (Vulnerable), which is considered to have a high likelihood of occurrence within Tano-Suraw Extension Forest Reserve, was also of significant concern for the impact assessment.

20.4.6 The Soils of the Project Area

The soil resources of the CGML concession area were mapped at a detailed level inside and outside the Forest Reserves and the soils described in detail according to the FAO (1990) method. The soils were further evaluated for their suitability for agricultural production as prescribed by the FAO (1976). The intensive farming activities for both plantation crops, mostly cocoa, and food crops, mostly plantain, cocoyam and maize, outside the Forest Reserves, and forest degradation, slash and burn farming activities and other human activities have influenced the natural conditions of the soils and have resulted in nutrient depletion, soil erosion and land degradation in some parts of the Project Area. The study encountered seven (7) different soil units belonging to two main soils Association (Atukrom and Bekwai), which have developed on weathered products of Lower and Upper Birimian rocks and colluvio-alluvial sediments along the valleys. Soils of the former cover the whole of the western portions of the Project Area under the Tano Suraw Forest Reserve, are generally heavy-textured, deep to very deep (150-200 cm), are acidic in reaction, occur on steep to very steep mountain slopes, liable to erosion if vegetation is cleared and should not be cultivated. The soils of the Bekwai Association are separated from the Atukrom Association by the valley of the Suraw River. They are generally medium to heavy textured, gravely and acidic in reaction and are moderately to marginally suitable for agricultural production.

20.4.7 Land Use

The Project Area falls within the cocoa-based farming system of the Semi- Deciduous Forest zone of Ghana. Both agricultural and non-agricultural land uses are found within the Project Area. The non-agricultural land uses include human settlements and undeveloped inland swamps with swamp vegetation. Outside the Forest Reserves, agriculture is the predominant form of land use with the majority of people living in the area depending on farming for their livelihood and as the principal means of employment.

20.5 Social Baseline

CGML operational areas lie within three paramountcies (Anhwiaso, Wiawso and Chirano), and two municipalities (Bibiani-Anhwiaso-Bekwai and Wiawso) with 20 catchment communities (Etwebo, Akoti, Paboase, Lawerkrom, Kwanikrom, Ntrentreso, Appiakrom, Ahwiaa, Futa, Nsuosua, Anglo, Kwawkrom, Anyinasie, Surano A, Akaaso, New Obrayeko, Chirano, Subiri, Aboduabo and Chine).

This section discusses the Regional and Local profile of the study areas. The regional profile comprises the Municipal and District information, and the local study area comprises the six (6) project affected communities.

20.5.1 Sefwi Wiawso Municipality

The Sefwi Wiawso Municipal Assembly was established under Legislative Instrument, LI 1386 on November, 23rd 1988 under the PNDC Law 207. It was elevated to a municipal status in March, 2012 under Legislative Instrument, LI 2015. The Municipal capital is Sefwi Wiawso. The Municipality has one constituency, with a political Head, who is the Municipal Chief Executive and an Administrative Head who is the Municipal Coordinating Director. The Assembly has five Area Councils which are Anhwia, Dwinase, Boako, Asafo and Asawinso and one Town Council which is Wiawso. The General Assembly is made up of 45 Government Appointees. The municipality lies in the North Eastern part of the Western North Region and is bordered to the north by the Brong Ahafo Region, to the west by Juabeso and Bia Districts and by Aowin-Suaman to the South and by Bibiani-Anhwiaso-Bekwai to the east and Wassa Amenfi to the south-east. The major ethnic group in the municipality is the Sefwi Akan (73.4% of the population). Other ethnic groups include Mole-Dagbani, Krobos, Ewes and Nzemas. Most of the people are Christians (81.7%); other religious groups are Islam and traditional African beliefs.

The population of the Sefwi Wiawso Municipality is 151,220 and population density of 152.4/km^2.

Agriculture is the major economic activity in the municipality in terms of employment and income generation, with about 80% of the working population engaged in this sector, which constitutes the main source of household income in the municipality. Cash crops, food crops and livestock farming are the main farming activities. The most prominent cash crop cultivated is cocoa. Food crops cultivated include plantain, cassava, cocoyam, maize and yam. Livestock farming is undertaken on a limited scale as compared to cash and food crop farming. Gold is mined in commercial quantities by Chirano.

The Sefwi Wiawso district is one of the largest producers of timber in the Western region.

CULTURE

The cultural practice of the people of the Municipality is not different from the rest of the Akan speaking communities in the country. There is one Traditional Council, the Sefwi Wiawso Traditional Council, which is headed by the Paramount Chief of the Traditional Area, (Omanhene)'. The traditional area covers the whole of the political districts of Juaboso, Bodi, Akontombra, Bia East and West. The traditional council has a membership of 65 Chiefs. The inheritance system is matrilineal. The Omanhene and the people of the traditional area celebrate yam festival or 'Aluelue' which is celebrated in December.

SERVICES AND INFRASTRUCTURE

The municipality has one hundred and nineteen (119) primary schools; one hundred and fourteen (114) nursery schools, 156 junior high schools; four (4) senior high schools; one (1) vocational school; one (1) teacher training college and a health assistants' training school (The Composite Budget of the Sefwi-Wiawso District Assembly 2014 Fiscal Year). There are 18 health facilities, two of which are Government hospitals. Malaria is the most common disease in the municipality and is the main cause of deaths recorded in the health facilities. Other reported diseases include diabetes, hypertension and skin diseases. There are vibrant markets operating in urban areas like Wiawso and Boako that serve neighbouring towns. There are also small-scale agro processing facilities for oil palm and cassava. The main source of water supply is groundwater which is accessed through boreholes. Other sources include hand dug wells and a small-town water system. Most of the households (71 percent) in the municipality dispose of solid waste at the public dump (open space), while in the rural areas, households dump solid waste indiscriminately. Liquid waste is thrown outside onto the streets but mostly, into gutters. The Sefwi Wiawso Muncipality has access to modern information and communication technology due to the presence of some cellular communication network service providers, including MTN, Tigo, Vodafone Ghana, Airtel Ghana and Globacom Ghana (The Composite Budget of the Sefwi-Wiawso District Assembly 2014 Fiscal Year).

20.5.2 Bibiani-Anhwiaso-Bekwai Municipality

The Bibiani-Anhwiaso-Bekwai District was established in 1988 by the Local Government Legislative Instrument (LI 1387 under the then Local Government Law, 1988 PNDC Law 297 now replaced by the Local Government Act 1993, Act 462.

The Municipal capital is Bibiani. The total land area of the district is 873 sq. km. The municipality is bounded on the north by the Atwima Mponua District in the Ashanti Region, south by the Wassa Amenfi Central and Wasa Amenfi West Districts in the Western Region, west by the Sefwi Wiawso Municipality in the Western North Region and east by the Upper Denkyira West and Amansie West in the Central Region and Ashanti Region respectively. The Municipality has a population of 123,727 people based on the 2010 Population and Housing Census (PHC, 2010). Agriculture is the highest sector employer with a share of over 65.4% of the labour force with females accounting for 3% of this number. Activities undertaken in this sector include crop and livestock production. Major cash crops cultivated include cocoa, coffee and oil palm, whilst food crops such as cassava, plantain, rice, maize, cocoyam and vegetables are also grown. The district is endowed with mineral resources such as gold, bauxite and clay. Large scale goldmining is taking place at Bibiani and Chirano and bauxite mining at Awaso. Illegal mining along riverbeds also takes place in some areas of the district. The Bibiani-Anhwiaso-Bekwai District is one of the largest producers of timber in the Western Region and Ghana as a whole.

SERVICES AND INFRASTRUCTURE

There are three classes of roads in the district, namely: primary roads (trunk/highways); secondary and feeder roads. The total length of roads in the district is 309km with 71.7% being feeder roads. The primary road (asphalt road) which spans from Bibiani through Sefwi Bekwai is in good condition. Feeder roads link most of the communities, but these roads sometimes become bad during the rainy seasons and need constant reshaping and rehabilitation. The district has a total of 162 pre-schools made up of 98 public and 64 private schools. There are a total of 161 primary schools with the private sector accounting of 64 of this number with 97 being public schools Junior High Schools amount to 98 with the private sector accounting for 30 whilst the public schools account for 68. There are currently three senior high schools, one of which was absorbed into the public system by the Ghana Education Service. There are four (4) hospitals serving the district made up of one Government Hospital, one private hospital and two other hospitals owned by mining companies. There are also three (3) heath centres and seven (7) CHPS zones.

20.5.3 Project Affected Communities

Six (6) communities are identified as Project Affected Communities (PACs), these are Akoti, Etwebo, Paboase, Kwawkrom, Obrayako (resettled community), Abodeabo and Chine. The closest communities are Kwawkrom, Etwebo and Akoti, which are about 1km or less from the TSF complex. The local chiefs or "Odikros" of the six communities fall under three paramount chiefs. The Chiefs of Akoti and Paboase, pay allegiance to the Sefwi Wiawso paramount chief, Kwawkrom, Obrayeko and Etwebo pay allegiance to Chirano paramount Chief, whilst the chiefs of Aboduabo and Chine pay allegiance to the Anwhiaso paramount chief. The following sections discuss some of the communities identified.

ETWEBO

Etwebo, the closest community to the proposed project, is approximately two kilometres south-west to the proposed project site and is under the Bibiani Ahwiaso Bekwai District. The population of Etwebo is not stated in the 2010 Population and Housing Census (PHC), however, the elders estimate the population to be approximately 2000 people. The community falls under the Chirano traditional paramount chief. The settlement layout is haphazard and buildings are very close to each other. The community has been in existence for over 100 years and, according to the elders, the population has increased tremendously over the past ten years due to the activities of the Chirano Gold Mine. The dominant ethnic group in the community, as pertaining in the district, is the Sefwi (Akans). Other minority groups include Mole-Dagbani, Krobos, Ewes and Nzemas. Christianity forms the majority of the religious group in the community followed by Islam and traditionalist. Like all the Sefwi Akans in the District, the people in Etwebo celebrate the annual 'Aluelue' yam festival in March. People in the community mostly engage in farming and trading activities. Their major cash crop is cocoa and food crops are plantain, cassava, and cocoyam. Other agricultural activities include small scale animal husbandry. Most of the houses in the community are made of cement blocks/concrete, while some are made of mud brick/walls.

AKOTI

Akoti falls under the Sefwi Wiawso Municipal Assembly and traditionally is under the Sefwi-Wiawso Paramountcy.The population is estimated by the elders to be approximately 1,500. According to interviewees, the population of the community has increased significantly due to the activities of the Chirano Gold Mine and an increase in birth rate. The dominant ethnic group in the community is the Sefwi (Akans). Other minority groups include Mole Dagbani, Krobos, Ewes and Nzemas. Christianity forms the majority of the religious group in the community followed by Islam and traditionalist. Like all the Sefwi Akans in the District, the people in Akoti celebrate the annual 'Aluelue' yam festival in December. People in the community mostly engage in farming and trading activities. Their major cash crop is cocoa and other food crops cultivated are plantain, cassava, and cocoyam. Other agricultural activities include small scale animal husbandry. Most of the houses in the community are made of cement blocks/concrete, while some are made of mud brick/walls. The main construction materials for the floor of buildings are cement/concrete. All the building structures are roofed with metal sheets. Most households in the community occupy compound houses occupied by an extended family or tenants. Most of the houses have shared bathrooms or separate bathrooms, for males and females, which are separate from the houses.

The main source of water supply in the community is groundwater. There are five boreholes in the community with three in use during the time of study. Another source of water is from rivers around the community.

KWAWKROM
Kwawkrom is in the Bibiani Anhwiaso Bekwai District and falls under the Chirano traditional council. Elders interviewed estimated the population of the community to approximately 300 people. The population has increased over the last 10 years due to migration of people from other parts of the country, especially, the Brong Ahafo Region and the Northern Region. The dominant people, the indigenes, are the Sefwi Akan. Other people living in the community are the Krobos, Nzemas, Ewes and the Mole Dagbaani. The community has 3 boreholes, 1 kindergarten, 2 churches and 2 refuse damp sites. Major rivers in the community include the 'Suraw', 'Anamon' and 'Esuofri' rivers. The people are mostly engaged in farming with cocoa being their main cash crop. They also cultivate cassava, cocoyam, yam and plantain. Other economic activities are animal rearing and dressmaking. There is only one school in the community which is a kindergarten therefore, children access primary and JHS at Akoti, Bekwai and Anyinase. There is no building for the kindergarten, therefore, the children learn under a temporary shelter which belongs to the church of Pentecost. The District Assembly is, however, constructing a new classroom block for the kindergarten. There is no health facility or public toilet in the community. People access their health services at the CHIPS compound in Akoti. Some individuals have latrine pit facilities in their homes and others practice open defecation. The community is connected to the national electricity grid and therefore has electricity. There is no market in Kwawkrom.

PABOASE
The settlement was founded about 250 years ago by Nana Kwadwo Aka. The local population is dominated by Sefwis. There are other ethnic groups including Asantes, Bonos, Krobos, Ewes, Northerners (Kusasis, Dagartis, and Mamprusis) who are all settler farmers. Subsistence farming is the predominant preoccupation. The main cash crop is cocoa whereas the second cash crop is cashew. Plantain is the main food crop with cassava being the second food crop. Other farmers do engage in cocoa and oil palm plantations. In addition to boreholes, they also rely on streams as sources of water. The inhabitants rely on two pit latrines and a Ventilated Improved Pit Latrine (KVIP). Some of the common diseases in the village include the following, fever, diarrhoea, measles, cough, skin ailment, epilepsy, piles, diabetes hypertension, convulsion, bilharzia.

20.5.4 General Socio-Economic Baseline of Selected Local Communities

CGML conducts periodic socioeconomic and perceptions studies within its catchment communities to assess the impacts of mining on these communities. The most recent study was conducted in 2017 by Geosystems (Geosystems, 2017). Another study is currently being conducted. The results of the 2017 study are summarised below:

LITERACY AND SKILLS TRAINING
As usually observed in most rural areas, literacy levels in the sampled communities were very low. Results indicate that three (3) out of every ten (10) respondents were literate thus about 70% of the sampled respondents were illiterate (could not read or write the English language). The statistics was worse when disaggregated on gender basis. Only one (1) out of every ten (10) females was literate while for the male gender, five (5) out of every ten (10) males were literate. On community basis, the big communities of Akoti, Chirano, Etwebo and Paboase had close to a hundred percent school enrolment levels while the small communities of Kwanikrom, Kwawkrom and New Obrayeko had less than average.

Of the 30% literate respondents, majority (45%) had obtained the middle school level certificate. Close to 14% had been educated to tertiary level (including teacher and nursing trainees as well as University Graduates) while the Senior High School (SHS) graduate constituted about 21%. One's educational level was linked to the age and thus younger adults had attained the highest education levels with the older adults being either middle school levels or primary level. On the household level, majority of the population (33.1%) of the sampled households had been educated to the Junior High School (JHS) level while about 26.4% of the population of the sampled households had been educated to primary level with about 11% being SHS graduates. There were about 2.4% who had been educated to the tertiary level and about 1.2% having obtained some vocational education. The study further revealed that, about 87% of the children of school going age who were not in school had been enrolled into such skills acquisition schemes. Also, all persons who had dropped out of JHS and SHS, were now apprentices learning one trade or the other.

DIRECT EMPLOYMENT
Records from the Human Resource Department of CGML indicates that as at August 2017, a total number of indigenes of the seven sampled communities who had been employed directly by CGML was 164 comprising 10 senior staff members and 154 junior staff. Of the 10 senior staff members with direct CGML employment, 5 were from Paboase with the remaining 5 from Chirano. About 40 of the junior staff who had obtained direct employment were from Akoti while 42 persons were from Paboase and 33 each from Chirano and Etwebo. The records indicate that no body had been employed from Kwanikrom while CGML has employed 2 and 4 persons from New Obrayeko and Kwawkrom respectively.

HOUSING TENANCY AND HOUSE TYPE

About 75.6% of the respondents stayed in their own houses. This was expected given the very low rate of immigration into the area. Tenants who by definition have leased the house for longer periods accounted for 10.7% while renters who have short-term lease of one or three months accounted for 9.6% with caretakers being in the minority with less than 5%. The tenants were mostly CGML Staff while the renters were often workers of some CGML's subcontractors.

The housing types identified were detached, semi-detached and compound houses. Most of the houses were found to be semi-detached (36%), followed by detached (33.8%) and the compound houses accounting for the remaining 30.2%.

The main building materials used for the construction of the walls of the buildings in the sampled communities were sandcrete blocks, landcrete blocks, bricks, Atakpame and Water and Daub. Sandcrete buildings represent 51.5%, followed by landcrete blocks (33.3%), Atakpame (10.4%) and 3.7% were in bricks respectively. The Atakpame houses were mostly found in Kwanikrom with a few in Chirano whilst the brick houses were found in Etwebo, Paboase and Akoti.

SANITATION

The study found that about 75.4% of the sampled population use communal dumpsites where skip containers have been placed to collect solid waste. Also, 14.2% of the respondents use the burning method of solid waste management. Of course, there are the incidence of indiscriminate dumping which for instance in Chirano the community leaders are struggling to deal with by setting up a committee to "police" the community and apprehend recalcitrant offenders. Normally refuse dump sites are located at the outskirts of the community. However, with the expansion of these communities, the approved dumpsites are now within the community, for instance, in Paboase the communal dumpsite is located at the outskirt of the old town but within the environs of the new site just before the CGML Paboase camp. Also, in New Obrayeko, the communal dumpsite is located off the resettlement lands but because of unregulated expansion, it is now almost in the centre. Hence, the management of these dumpsites have become a huge challenge to the leaders of these communities.

It was observed that open defecating and the use of pit latrine were the most dominant means used. In Chirano, for instance, about 53.1% of the respondents used pit latrines while 31.7% patronize the two KVIPs (one for the school) with remaining 15.2% using WC or aqua privy type of toilets. To those using the pit latrine and KVIP, the condition of the toilet facilities was unsatisfactory.

EDUCATION

Evidence on the ground indicates that CGML has not only provided a number of educational infrastructure but also a number of scholarship schemes. For instance, the educational facilities provided by CGML for Akoti, were 1 Primary and School. Etwebo has 1 basic education facilities including: 1 Primary School; Paboase has 1 Primary and School and rehabilitation of Chirano R/C School and ICT/Library centre library. Kwawkrom has been provided with a 2-unit KG block.

HEALTH

In general, CHPS compounds are the main health facility patronized by majority (72.0%) of the population while 17.1% attend the various community clinics available with 10.9% accessing the services of the hospital either in Wiawso or Bekwai. All the health facilities identified were public owned except for the drug stores/chemical shops in Akoti/Etwebo and Paboase.

ECONOMIC ACTIVITIES

The Agricultural sector employed more than 78.5% of the labour force in the sampled communities followed by the services sector which employed 9.1%. followed by the Industrial and Mining sectors with 5.7% and 3.8% respectively.

Farming is the major activity of most respondents and they do so on subsistence level. Food crop such as plantain, cassava, cocoyam, yam, oil palm, etc are cultivated by most of the respondents. There were few livestock farmers in Etwebo and Paboase communities.

20.6 Environmental and Social Impacts Identified

All phases of mining operations have potential to impact on the external environment. The mine has, through scientific modelling and qualitative analyses, identified potential impacts to the external environment and developed methods to manage these impacts. This chapter provides information on the impacts and their management plan as provided in CGML current EMP (2020-2023).

20.6.1 Potential Releases into the External Environmental Media

AIR

Potential releases into air from operations include the following:

- Gaseous emissions such as carbon monoxide, carbon dioxide, nitrogen dioxide, and nitrous fumes from open cut and underground mining activities such as blasting and emissions from machinery
- Hydrogen cyanide gas at the Tailings Storage Facility, mixing areas and on top of CIL tanks
- Smoke from incineration of waste at Process plant; e.g. clinical waste, wood, papers and cardboards Noise from blasting activities; processing plant; loading, haulage and dumping of mineralised material and waste rock by heavy mining equipment; drilling activities; and vehicular movement
- Dust from:
    - Ore stockpiling and crushing at the ROM Pad
    - Haulage trucks on the haul road
    - Fugitive dust from bare or un-vegetated lands
    - Vehicular movement
    - Mining and exploration drilling activities
    - Vegetation clearing and topsoil stockpiling
    - Dust storms from pits, haul roads.

WATER

Key potential releases into surface and underground water sources as a result of mining activities include but not limited to the following:

- Sediment load from exploration drilling, pit or underground dewatering, run-off from haul and access roads, and run-offs from fresh topsoil stockpiles, and waste rocks
- Spillages of fuel, oil, and liquid reagents
- Cyanide-laden Tailings leaks/spills from HDPE pipeline
- Tailings from TSF failure or dam break
- Leakages of sewage from septic tank
- Accidental spillages of fuel and chemical in transit to and from mine site.

LAND

Potential impacts on the land medium from mining activities include but not limited to the following:

- Leakages from sewage storage (septic tanks)
- Spillages of fuel, oil, and liquid reagents
- Accidental spillages of fuel and chemical in transit to and from mine site
- Tailings deposition through TSF failure or dam break
- Silt wash down from active mining areas
- Solid waste disposal; e.g. waste rock, used tyres, cans and tins, pieces of metal, and plastic containers
- Vibration from blasting activities.

20.6.2 Potential Releases into the External Environment

ATMOSPHERIC EMISSIONS

Generally, potential sources of dust generation on the mine include but not limited to the following activities:

- Drilling and blasting
- Loading and hauling of mineralised material and waste rock
- Topsoil stripping and dumping
- Movement of other mobile equipment and vehicles
- Crushing of mineralised material
- Stacking of crushed mineralised material at the ROM pad.

DUST

Dust is a nuisance and inhalation of dust is likely to cause health problems such as lungs and respiratory diseases. Dust films reduce the aesthetic value of both fixed and movable assets, and in plants, crop yields are reduced due to decrease in photosynthetic activity. CGML is implementing measures for the control of fugitive dust such as regular watering of mine access roads and community roads by water bowsers/tankers, control of vehicles speed limit, and installation of dust scrubbers in the crushing circuit of the mill. The ROC plant also has sprinklers that suppress dust. In addition, regular monitoring of airborne particulates is undertaken at thirteen locations across the mine. Use of appropriate PPE is being enforced in high-risk dust prone areas. The level of dust pollution in underground operations is highly dependent upon the quality of ventilation. There are methods however which can either limit the amount of dust being put into the air, the basis of which is the ability of water to entrap particles and bond them together, making them no longer airborne. This is being achieved through the use of water sprays on blasted material before loading and hauling. Water is also applied at the point sources of dust (i.e., high speed drills and cutters) at or near the point of contact between metal and stone, thus not allowing the dust into the air in the first place.

FUMES AND GASES

Some of the dangerous gases which occur underground as result of combustion from diesel engine equipment include Carbon Monoxide, Nitrogen Dioxide, Nitrous Fumes, and Carbon Dioxide and radioactive gases. These gases can be very harmful when inhaled in quantities exceeding threshold limit values and may even result in fatality. Underground booster fans are being used to ventilate the mine. Airflow and contaminant analysis is carried out on a regular basis to ensure a satisfactory system is operating and working conditions are safe. It is usually quite easy to predict where nitrogen oxides will occur as they are by product of blasting and diesel engines. As a result, workers are evacuated from areas where blasting is being carried out and are only allowed to return when ventilation is adequate. There are monthly measurements of fumes from equipment and vehicle exhaust to determine the level of poisonous gases for corrective action to be taken. Catalytic converters are fitted on equipment and vehicles to lessen the amount of harmful gases they emit. Regular servicing of equipment and vehicles is being undertaken to ensure machine efficiency and reduction in levels of gaseous emissions.

Fresh air raises have been developed closer to all workings to ensure that there is sufficient fresh air at all workings at all times to take control of all gaseous emissions. Regular gas monitoring is ongoing and will continue and forms part of standard operating practice for the underground operation. Exclusion zone of 500m is maintained before detonation of explosives at the open pit to ward off encroachers against looming dangers associated with blasting.

NOISE

Mining, hauling and processing activities associated with operations may increase the general level of noise in the project area. Haulage increases road traffic and associated noise levels. Noise monitoring done at nights covering Etwebo-Akoti community was within an average range of 74.78 dB and 78.92 dB. The exercise was conducted in order to understand the annoyance acceptable levels for both real and perceived risks related issues. Specific instructions are issued to drivers to avoid over-speeding, so road speed checks are conducted to ensure compliance. The company continues to pay more attention to the maintenance of machinery by applying proper greasing procedures to all moving parts of the crushing plant in order to keep friction very low and thus reduce noise generation to the barest minimum. CGML also ensures regular supply of ear mufflers/plugs and their proper use by the employees and contractors through induction and training programs. Assessment has identified noise arising from blasting operations as the main source of impact requiring specific mitigation measures. Noise arising from blasting operations generally has a psychological impact on some of the people which regularly results in confusion between air over pressure and vibration. Therefore, CGML is implementing a blasting programme to ensure that both noise (air over pressure) and vibration are minimized. Specific mitigation measures consist of:

- Earth mass above the underground workings will serve as damping material and will attenuate significantly the effect of noise and blast induced vibration
- Establishment of a safe blasting perimeter of 500 metres around all blasting sites. This value of 500 m was obtained applying operational best practice on safe distances for blasting activities with charges being shot at once lower than 0.5 tonnes of explosives; making blasting times known to the general public and nearby communities to avoid the surprise effect
- Posting of blasting times on community notice boards
- Monitoring, as a best practice requires, noise levels for every blast on site and around other active project areas
- Deliberate planting of intervening trees as part of waste rock dump rehabilitation to dampen noise emanating from the load-haul and dumping activities.

20.6.3 Solid Waste Generation

Various types of wastes are generated on the mine site during operations. These include but not limited to the waste rock from mining activities, tailings slurry from ore processing, disused tyres, scrap metals, food waste from kitchens, sewage, metal containers and tins, split sets, waste oil, filters, cartons, cardboards, and boxes. Table 3-11 of the Mines current EMP provides a summary of waste types generated from various activities on the mine and how the waste is disposed of in environmentally friendly and responsible manner.

20.6.4 TSF Monitoring

A monitoring programme for the TSF, which includes both physical stability monitoring and chemical stability monitoring, is in place to monitor for potential problems which may arise during operations. This programme will continue to be reviewed, evaluated and updated by Asante as information becomes available and the facility performance is understood.

Survey Settlement Pins, Piezometers, and Monitoring Boreholes are employed to monitor the performance of TSF 1 SE and its impounding structures. Per data provided by CGML, forty-two (42) standpipe piezometers have been installed on the TSF Complex and nine (9) vibrating wire piezometers installed on the newly constructed embankments of TSF 1 SE. The piezometers are so arranged to provide cross sectional readings.

20.6.5 TSF Closure

Detailed closure planning and design are beyond the scope of this Report. As closure approaches, a detailed closure plan and design will be developed by Asante.

The development of the Closure Plan and implementation strategy for the TSF 1 SE will take place in the context of the proposed next land use, CGML's commitment to meeting regulatory requirements, and the key environmental issues as identified during the Environmental Impact Assessments.

Rehabilitation activities that have to be carried out concurrently with the development and operation of the facility include:

- The stripping of soil materials from the footprint of the facility. These are to be stockpiled; thereby creating soil resources to be placed as soil cover on the outer embankments and surfaces of the facility;
- The placement of a mixture of soils and selected erosion control and propagation materials to the outer slopes of the embankments, in preparation for the establishment of vegetation to the slopes;
- The supply and planting of vegetation to the outer slopes of the embankments to assist in the prevention of erosion of the slopes;
- The after care and maintenance of the cover layers and vegetation, including intervention as appropriate, to achieve the closure objectives;
- Conduct and monitoring of in-situ rehabilitation trials at CGML Ghanaian operations.

20.6.6 State of the CGML TSF

CGML, in line with permitting conditions and the desire to ensure good environmental stewardship, conducts quarterly third-party audits of the facility for submission to the Environmental Protection Agency (EPA).

The current state of the TSF complex is provided by the first quarter 2022 TSF audit conducted by Geosystems and some points are summarised below.

The structural integrity of the embankments and all ancillary earthen structures were assessed under the following headings:

CRACKING AND BULGING
No major cracks were observed on the crest and slope faces of all embankments inspected during the audit. Crest surfaces of all constructed embankments are generally overlain with gravel sized soil aggregates to improve motor ability.

There were no issues of bulging, sliding or settlement observed in embankment sections (crest and slope faces) examined, neither did any part of the embankments show signs of structural distress.

DRAINAGE, SEEPAGE AND PIPING
It is essential that operators of the facility continue the monitoring and dewatering process to avoid an increase in phreatic surface within the embankments.

Operators of the facility are encouraged to continuously monitor and frequently pump out water from the decommissioned facility to enhance drainage and consolidation of tailings and prevent water build up and rise in phreatic levels.

SUBSIDENCE, MOVEMENT AND SLIDING
There were no signs of subsidence, movement and/or sliding in any of the embankments. However, these phenomena are best monitored using appropriate monitoring devices such as settlement pins and prisms. Monitoring devices are essential because they give early warning signs in case of imminent movement/settlement of the embankment. Data provided did not indicate any movements.

TAILINGS DELIVERY INFRASTRUCTURE AND DEPOSITION
Tailings slurry from the process plant is delivered to the TSF through pipelines laid in HDPE geomembrane lined trenches. At the time of the inspection, the delivery pipes and the HDPE lined trench were assessed and found generally to be in good condition. The audit team observed that management had initiated processes to remove silt and vegetation within the tailings pipeline corridor.

SUPERNATANT POND AND WATER MANAGEMENT
Water from the supernatant pond of TSF 1 and TSF 2 is removed through decant towers located within the pond area and accessible by causeways that lead to the towers.

Water from the TSF 1 NE supernatant pond is lifted to TSF 1 by means of a diesel pump. At the time of the inspection, water level in the TSF 1 NE pond was very low.

Supernatant pond within the decommissioned TSF 2 had been obscured by overgrown vegetation at the time of the inspection.

The pond area within the TSF 1 SE basin was observed to be large, covering more than half of the basin area, per visual estimation. This has the potential to negatively affect tailings consolidation. The audit team was made to understand that the installed decant tower on TSF 1 SE is yet to be operationalised due to the low level of the supernatant pond relative to the intake level of the decant tower, hence the relatively large supernatant pond area observed.

OVERTOPPING AND SPILL MANAGEMENT

TSF 1 was designed to store 1: 100 year, 24-hour storm event above the maximum normal operating pond elevation (MNOPE) with over 1m freeboard from storm pond water elevation to embankment crest, without spill through the spillway (Knight Piesold, 2017: Chirano Gold Mine Limited Tailing storage facility 1 south extension detailed design report Rev B)

The emergency spillway of TSF 1 is located at the northern end of the Main Embankment which is a natural high ground; TSF 1 NE spillway is located at the northern end of the West embankment while the spillway of TSF 1 SE is located at the northern end of the South embankment. The TSF 2 closure spillway is located at the eastern end of the Northern embankment.

At the time of the inspection, the emergency spillways were generally in good condition and did not show any signs of deterioration.

Conclusions and Recommendations

The Geosystems audit recorded in summary that no high-risk issues, that are a cause for concern with respect to the operation of the facility, were observed.

20.6.7 Blast Induced Vibration

CGML is concerned with the blast induced vibration impacts especially on buildings and structures in the communities around the mine. In line with this, appropriate blast hole charges and delay times are being used to reduce this phenomenon to environmentally acceptable levels. This involves:

- Use of delay blasting to reduce amount of explosive detonated at any time
- Use of stemming material of sufficient length and quality
- Avoidance, as much as possible, of explosive firing without confinement
- Reduce the amount of charge per delay using separate delays for each blast hole in order to minimize the blast induced vibration phenomenon Reduction in number of blast holes
- Observation of favourable weather condition before blasting; and
- Carrying out periodic monitoring of the ground vibration resulting from its blasting activities.

20.6.8 Visual Intrusion

Some portions of the secondary forest and other vegetation cover have been cleared for the development of mining infrastructure in the Chirano Gold Project. The areas affected by project operations have a lesser aesthetic appeal than in its vegetated state. Though some project components such as the underground site and its associated infrastructure are not visible to the nearby communities, others such as the waste rock dumps, especially Akoti waste rock dump, and the tailings storage facility are visible to the Akoti-Etwebo community. Clearing of vegetation is restricted to areas required for the project and its allied facilities in order to minimize visual intrusion. CGML proposes the following long-term measures to minimize this effect:

- There is permitting system in place for Vegetation Clearance and Tree Felling
- All the waste rock dumps will be sloped to fit in with the natural terrain. Meanwhile, ground cover is being established on waste rock dumps that are easily visible to the community
- Whenever feasible, fast growing tree species are planted along the roads to minimize the visual impact; and
- As part of the CGML reclamation plan, rehabilitation and re-vegetation of sites to be disturbed by mining activities will start at an early stage thus minimizing long term impact on the landscape of the area.

The eastern slope of Suraw waste rock dump has been revegetated with a mixture of both indigenous and exotic species after ground cover establishment. The tailings dam walls are progressively stabilized with the establishment of ground covers during operations as the raising of dam walls allow. The 45 Hectare TSF2 has successfully been rehabilitated with both indigenous and exotic species that are doing very well and has become a model TSF rehabilitated site.

20.6.9 Fly Rock

Fly rock from blasting activities can impact on local infrastructure and individuals who are close to the mining site. It has the potential for causing injuries, fatalities or equipment damage. The incidence of fly rock depends on factors such as type of material being blasted (rock or oxide); whether material being blasted is a mass of rock, boulder or toe; whether blasting is primary or secondary; quantity of explosives being used in blasting (powder factor); and the stemming material and stemming height. As a requirement and in order to ensure the safety of personnel and equipment during blasting no personnel is allowed 500 meters radius within the blasting zone, and no equipment is parked within 300 meters in the blasting area. The following measures are undertaken to enforce the above requirements:

All personnel are cleared within 500 meters blast exclusion zone, and guards posted at vantage points to ensure non-encroachment of personnel in the blasting zone.

- Every blast is posted on site notice boards at least four hours before the blast
- Red flags are hoisted on routes leading to blasting areas to alert the community of impending blast. This practice has been communicated to the community as part of company community education on blasting
- Blast notice boards have been installed in nearby communities and these are updated whenever there is a blast
- Audible siren is blown as a precursor to every blast.

20.6.10 Socioeconomic Impacts

The presence of CGML has brought about profound socio-economic transformation of the communities in the catchment area and beyond. Since 2010, CGML has spent approximately US$250 million (CGML, 2021) in the local area and the region. CGML interventions on Education, Health, Water and Sanitation and Capacity building has all contributed to a positive turnaround in the lives of the people. Some notable areas that have been impacted include:

Employment: The company employs a substantial number of staff from the local communities. This has significantly contributed to the reduction of unemployment by providing a means of livelihood to many families. Currently, about 40% of staff are from communities in the catchment area, with priority given to locals when they qualify for a vacancy. Over 500 people from the communities have also been engaged by companies which provide services to the company as contractors.

Population Growth: The population of the area started to grow several decades ago due to settler farmers moving into the area. In addition to natural population growth, mineworkers from various parts of the country have settled in the area, contributing to the growth of trading and other commercial activities. This has resulted in the expansion of these communities as residents build accommodation to rent out to staff. The high rate of population growth has resulted in a high youth population, with consequent unmet demand for jobs.

Quality Healthcare: The provision of health facilities and medical supplies, and the malaria control program have brought quality health care to the doorstep of the people. Quality healthcare has a strong link to the economic wellbeing of people. Scarce resources are no longer expended on ailments that used to plague the area, such as malaria, gastrointestinal tract infection, etc.

Education: The provision of educational infrastructure, learning items, sponsorship packages awarded students, extra classes and many other interventions made towards education has led to an increased pass rate among basic school students from the area. It was difficult for the Mine, in the Converting Environmental Liability into A Viable, Functional Self-Sustaining Asset beginning, to find qualified people from the communities to fill some positions. Many years on, the youth have taken advantage of the educational interventions to become more employable.

Local Contractors: CGML's policy of awarding contracts to companies indigenous to Sefwi has improved on the economic well-being of residents. All projects undertaken in the communities are awarded to local contractors who in turn hire locals.

Transportation and Commercial Activities: The routine maintenance of roads in the local communities has resulted in a rise in the number of commercial vehicles operating in the area. Residents now have easy access to vehicles to travel to and from their communities for trading and other activities.

Provision of Social Amenities: Through its Corporate Responsibility projects, all the towns in the catchment area have access to clean potable water, a necessity of live, humane places of convenience and sanitation services. The company has also funded the extension of electricity from the national grid into some communities, transforming the socio-economic wellbeing of the people.

Sport and Recreation: There is an increase in sports and recreational activities following the rehabilitation of community football parks. CGML also organizes on an annual basis inter-community football competition for the communities within the area. Beyond recreation, it has the added effect of fostering unity among residents. The continuous existence of Chirano Gold Mines Limited in the area will further consolidate these socio-economic gains in the years to come.

Land Compensation: Absolute counting was introduced during the first phase of compensation from October 2004 to June 2007. Farm produce was counted one by one by the enumeration team in the presence of the farmers. From July 2007 however, the acreage method was adopted based on several deliberations with chiefs, farmers' representatives, and opinion leaders. With the acreage method, assessment is based on the land size occupied by the crops. Payments to affected farmers are done through the banks. Since the inception of the mine, the Company executed more than 4,150 crop compensation agreements covering an area of ~2,000 acres. Farmers have been assessed and received fair compensation for their crops for a total cost of over US$ 6.5M.

Provision of Institutional Services: Several services have been established in the area since CGML began operations including telecommunications (MTN and Vodafone), banking through ATMs, Insurance companies and stable electrical power.

20.7 Environmental and Social Monitoring

CGML conducts environmental and social monitoring not just to be compliant with permitting conditions but to ensure good environmental stewardship. For this reason, CGML has developed an Environmental Management Plan which is renewed periodically to guide the monitoring programs of the mine. The objectives of the monitoring plan are summarised as:

- Verify and support compliance with applicable state, cooperate and local environmental laws, regulations and permits
- Monitor environmental components predicted to be significantly affected, and to measure changes that occur
- Establish baselines and characterize trends in the physical, chemical and biological condition of effluent and environmental media
- Assess the adequacy of environmental monitoring such as selected monitoring locations, schedule, monitoring methods, as well as required supervision, and to suggest improvement, if appropriate, in the light of the results
- Identify potential environmental problems and evaluate the need for remedial actions or measures to mitigate the problem
- Detect, characterize and report unplanned releases
- Evaluate the effectiveness of effluent treatment and control and pollution abatement program; Determine compliance with commitments made in environmental impact statements, environmental assessments, documented safety analyses, or other official CGML documents
- Ensure that environmental management is being performed effectively in accordance with technical requirement and relevant laws and regulations. This Environmental Monitoring Plan (EMP) explains the rationale and design.

The information provided in this section is derived from the 2021 environmental Monitoring report which has been submitted to the EPA this report in fulfilment of regulatory requirements of Regulation 25(1) of the Environmental Assessment Regulation 1999 (LI 1652)

20.7.1 Environmental Monitoring

AIR QUALITY

Dust Emission Monitoring

Ambient air quality monitoring is routinely done on the mine site to evaluate the effects of particulate dust on human health and on the environment. The effect of particulates on human health and the environment varies with the physical and chemical make-up of the particulates; the finer the particles, the greater its propensity to get to the delicate portions of the respiratory system. The effect of dust on the environment has to do mainly with aesthetics as it degrades the value of infrastructure. The areas monitored included both operational and non-operational or residential sites. The operational sites included the ROM Pad, Processing Plant, Akwaaba Underground area, Paboase Underground area, Exploration Pad, Rock Crusher Plant and Fuel Farm/Heavy Mining Equipment workshop. The Non-operational sites comprised the Mine Village, Exploration Camp, Paboase Camp, Paboase, Akoti and Etwebo Communities. Parameters monitored are Total Suspended Particulate Matter (TSP), which generically refers to all the particulate matter in the atmosphere, and PM10 as required by EPA's Akoben Environmental Performance framework. The PM10 on the other hand refers to fraction of the TSP with size equal or less than 10 micrometres. All locations mentioned above were monitored routinely and reported to EPA and other regulatory authorities monthly. All locations were within EPA's ambient air quality threshold limits for industrial/operational areas (TSP: 230ug/m3 and PM10:70ug/m^3) and residential/non-operational areas (TSP: 150ug/m^3 and PM10: 70ug/m^3). Mitigation measures undertaken to address potential significant impacts of dust emissions in line with EPA's Environmental Certificate on the mine included but not limited to the following:

- Restricting clearing of vegetation to only areas needed for operations in order to limit the company's footprints of wind-blown surfaces that result in fugitive dust
- Dust suppression on public roads leading to the mine site and haul roads
- Progressive rehabilitation of non-active but exposed surfaces and maintaining vegetative cover around facilities such as Tailing Dams
- Enforcement of posted vehicular speed limits through regular spot checks on all mine access roads and haul roads in addition to speed ramps at certain portions
- Implementation of Planned Maintenance of fleet of all equipment/machinery and light vehicles
- Use of scrubber units in the crushing circuit at the Process Plant.

EMISSIONS OF FUMES AND GASES

Carbon monoxide and nitrous fumes levels in the exhaust of equipment used for underground operations are monitored at the main decline to ensure levels of these gases in the equipment exhaust are within threshold limit. This is to ensure air quality at the underground operation is clean and safe for employees to work within. These gases can be harmful when inhaled in quantities exceeding threshold limit values and could result in asphyxia especially in confined spaces. They are generated through exhausts from various diesel engines used underground. Measures undertaken to reduce the emission of fumes and gases in the underground operations include the following:

- Installation of booster fans to improve mine ventilation
- Fitting of catalytic converters on equipment and vehicles to lessen the amount of harmful gases they emitted
- Enforcement of Planned maintenance of equipment and vehicles to enhance their efficiency
- Provision of Refuge Chambers
- Water blasting activities to suppress dust and create congenial working environment
- Use of appropriate respiratory protective devices at active working faces where there is a possibility of harmful gases or fumes
- Periodic measurement of gases and fumes by the Occupational Hygienist.

NOISE AND VIBRATION

Noise and Blast induced vibration are monitored for the open pit operations at Akoti South Pit. The following measures have been implemented to reduce the impact of noise, vibration and fly rock:

- Conducted review of all mandatory hearing protection use zones for compliance
- Appropriate maintenance of machinery and equipment
- Ensuring that the noisy areas are designated as 'Hearing Protection Zone'
- Ensuring sufficient information, training, instruction and supervision are given to workers
- Choice of appropriate work equipment emitting the least possible noise
- Insulation – creation of barrier between the source of noise and receiver
- Blast notice boards have been set up in the communities which are updated daily to show when and where blasting would occur
- Providing workers with hearing protection such as earmuffs and plugs.

WATER QUALITY MONITORING

Surface water, groundwater, potable/drinking water as well as effluents quality are monitored monthly to evaluate the effect of the company's activities on them. The focus of the water quality monitoring are targeted towards achieving the following objectives:

- Compliance monitoring to conform to EPA Surface Water quality standards
- Surveillance monitoring to pre-empt and forewarn of any potential seepages and/or pollution
- Health monitoring designed to ensure the safety of drinking water sources of the company and the community
- To guarantee the health and safety of downstream users.

Water samples are collected monthly and analysed for all monitoring sites within and around the project area. The monitoring sites covered included but not limited to the potable drinking water supply, wastewater treatment plant, Tailings Storage Facility, community bores supplied by the company, and surface drainage within the project area. Analysis of the water samples are performed by SGS environmental laboratory for regulatory reporting and an in- house Environmental Laboratory for emergencies. The company's operations have not caused any significant impact on water resources, public health or the environment. CGML is thus in full compliance with EPA and Water Resources Commission's standards and permit conditions.

SURFACE WATER

CGML is drained principally by the main Suraw and Mamnao streams which are tributaries of the Tano and Ankobra rivers respectively. Mamnao stream is located in the north and the Paboase stream to the south of the operation. As a result, control monitoring stations which are outside the zone of impact of the mining operation have been established upstream for Suraw (S1) and Mamnao (MR1) except Paboase stream whose upstream remains a base flow and only emerges outside the company's operational area. Compliance monitoring was carried out at Suraw stream Abstraction Point (SR1), Paboase stream at Paboase Village (AKW2), and Mamnao stream (MR2) about 0.5km downstream of Mamnao Central Pit to determine the quality of water leaving the operations into the environment. Except for Total Suspended Solids (TSS) and Colour which exceeded the EPA Discharge Guidelines during rainy seasons. Otherwise, all other analytical results obtained indicated that all parameters tested for were within the Ghana EPA Mining Surface Water Quality Guidelines.

Mined-out Pits: Water quality monitoring is carried out in some inactive pits namely Sariehu, Akoti North, Suraw and Mamnao Central and results returned confirmed that there is no Acid Mine Drainage (AMD) concerns on site.

Waste Rock Dumps: Silt Traps/Sediment Control Dams have been constructed at the toe of waste dumps which collect silt-laden runoff water. These containments allow settling of silt and improve the quality of storm water that flows in the streams and water bodies on the mine site. Water samples are taken from the Silt Traps at the toe of Tano, Obra and Akoti waste rock dumps to determine the potential level of some heavy metals namely Arsenic, Cadmium, Copper and Mercury. Results also confirmed that there are no acid mine drainage issues from the sampled waste rock dumps.

Control Boreholes: Monitoring boreholes have been drilled at the downstream toes of TSF2, TSF1NE and TSF1 SE from which water samples are collected on monthly basis to check the possibility of tailings seepage escaping from the facilities to contaminate groundwater. Sample results show that all parameters analysed are within Ghana EPA Water Quality and Best Applicable International Standards.

Company Potable Water: CGML monitors company drinking water sources monthly for potability; with water quality monitoring done at the Mine Village, Exploration Camp, Akwaaba Area, Paboase Camp, Paboase Underground Area and Process Plant. All the water quality results for the potable water sampled at the various sites on the mine are within the GWCL Drinking Water Standards and EPA Drinking Water Quality Guidelines.

Community Borehole Water: Boreholes provided by CGML for the communities for potable water are monitored to ensure the water quality has not been compromised. All parameters analysed are within the WHO Drinking Water Guidelines, except for pH at G4 and G6 which have been found to be slightly lower than the minimum Guideline for drinking water and which also do not have any health implications. However, this trend is in line with the baseline hydrological studies of the groundwater quality in the company's mining lease. This could be because of geochemical characteristics of the project area which reflects in the background readings (pH values) and not as a result of Chirano Gold Mines operations.

Effluents: Quality of effluents from equipment washing bays, sewage treatment plants and all other water discharges across the mine are monitored to ensure their quality was within EPA Effluent Guidelines. Important parameters tested on these samples include pH, TSS, Turbidity, and Oil and Grease. Oil interceptors usually contain traces of oil on the surface of the chambers that represents a localized contamination. Except for occasional exceedance of Total Suspended Solids (TSS) at few monitoring points, all parameters monitored at effluent compliance points are, generally in compliance with the Ghanaian EPA Effluent Discharge Guidelines- Mining Sector.

20.7.2 Social Monitoring

CGML carries out periodic perception studies within the catchment communities to monitor social impacts on the communities because of CGML operations. The objectives of such studies include:

- Undertake a situational analysis of the current socio-economic characteristics of selected catchment communities and understand its dynamics pertaining to the role of CGML
- Inform CGML on the perceptions of citizens of the selected communities on the impact of CGML operations on their socio-economic wellbeing
- Ascertain the relevance of CGML in the social, economic and human fibre of the communities;
- Recommend to CGML a management plan for mitigating the perceived negative impacts based on historically implemented policies (international best practices)
- Itemize the benefits and negative effects of CGML operations from the views of citizens in mine communities to feed into the social closure plan of the Mine; and
- Understanding people's perceptions regarding the sustainability of the communities with the departure/closure of CGML.

The outcomes of the most recent socioeconomic and perceptions studies are summarised below:

COMMUNITY FEARS, ASPIRATIONS AND NEEDS

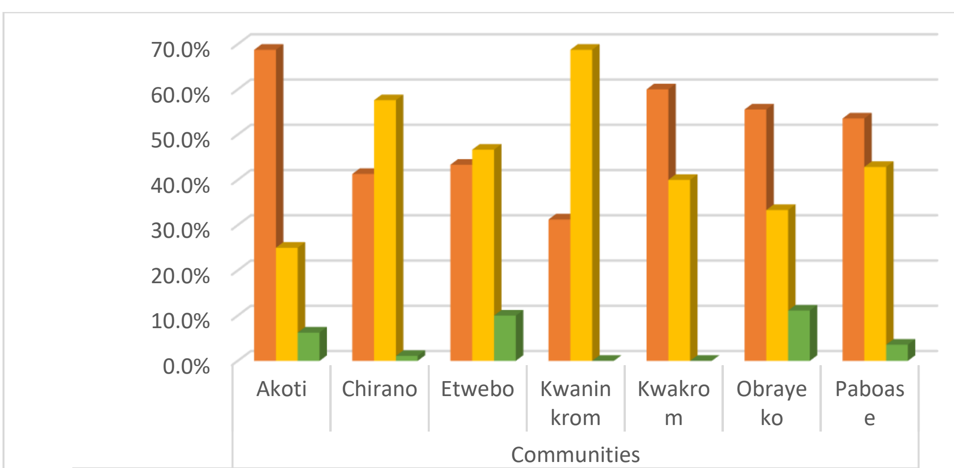
According to some respondents, members in the community have no security fear except the fear of theft or having their items stolen which generally are not reported. This was confirmed by the District Police Command as available statistic indicated that theft was the least reported case in the District. It was also observed that the fear of high price hikes which is associated to the mining operations were mostly unjustified in the rural areas. In the urban centres however, the concerns ranged from increased rents, increased housing values, increase food prices and the overall increase in the cost of living.

Respondents feared job insecurity and a reduction in employment opportunities for the communities. While some expressed this through concern over the future, others feared that the impact will be immediate. The loss of job and employment opportunities, according to some, will most likely result in the breakdown of relationships, difficulty in taking care of their families and breakdown in social order.

QUALITY OF LIFE

About 49.8% approximately half of the sampled respondents held the opinion that the quality of life within their communities was good. Meaning that they could afford the basic necessities of life such as food, clothing and shelter. The education and health needs of their family was well catered for. Though they have little or no savings. On the other hand, 46.3% held the view that quality of life was poor and fact is, it had worsened over the past five years. To these individuals, the cost of living had become so high and unbearable. Their monthly incomes could not last till the end of the month and constant increases in utility prices and food stuff meant that they could not even meet their basic needs. Majority of the respondents who believed the quality of life was good were gainfully employed while majority of persons who held the opinion that quality of life was poor were mostly subsistence farmers who were engaged in other menial jobs during the off seasons.

On community basis, 68.8% of the respondents in Kwanikrom held the view that the quality of life was good. This was the highest proportion of such respondents. The least proportion was recorded in Akoti (25%). On the other hand, Akoti recorded the highest proportion of respondents saying that the quality of life was poor. In Chirano, about 57.6% of the sampled respondents believed that the quality of life was good while 41.3% said it was poor. As shown in Figure 20-2, there was almost a 50-50 split between respondents who alleged that quality of life in the community had worsened and those who believed that it was good. In Kwawkrom, it was a 60-40 split in favour of those who held the opinion that quality of life was poor.



	Akoti	Chirano	Etwebo	Kwanin krom	Kwakro m	Obraye ko	Paboas e
Poor %	68.8%	41.3%	43.3%	31.3%	60.0%	55.6%	53.6%
Good %	25.0%	57.6%	46.7%	68.8%	40.0%	33.3%	42.9%
Very Good %	6.3%	1.1%	10.0%	0.0%	0.0%	11.1%	3.6%

Figure 20-2: Rating of Quality of Life

(Source: Field Study, August 2017)

Some of the positive commentary on the impact of CGML on local development were:

- CGML has helped improving our roads
- CGML has provided some Infrastructure
- CGML has provided some job opportunities with improved household income
- CGML has provided some scholarships to School Children.

The main disappointments related to lack of greater employment creation. For instance, comments such as:

- 'The Mine is not employing our youth and they have taken our farmland'
- 'A few infrastructures have been provided but we need money in our pocket'

- 'What they have done is not enough'
- 'The Local economy has not improved significantly and our expectations have not been met.'

21. CAPITAL AND OPERATING COSTS

21.1 Basis of Cost Estimate

21.1.1 Base Date and Terms

The mining cost estimate for the Chirano Gold Mine is based on costs and information as of March 2022. All monetary values are presented United States Dollars (US$) and in real money terms, free of escalation or inflation.

21.1.2 Estimating Methodology

The capital and operating cost estimates have been determined through the application of current actual mine costs and quotations to bills of quantities, material take offs and estimate quantities. Most of the capital cost and operating cost is related to the mine design and mine plan physicals, the quantities of which were computationally modelled and scheduled in three-dimensional space.

21.1.3 Exclusions

No specific exclusions are noted for capital or operating cost. No provisions have however been allowed for escalation of any costs over LoM as the capital and operating cost estimate is in real terms.

21.2 Mining and Cost Schedule

The table below is a summary of the Kinross financial model for the Chirano project (Warrior – 2022.03F – External). The financial model was checked and validated by Bara International.

Table 21-1: Mining and Cost Schedule

		2022+	2022	2023	2024	2025	2026	2027	2028
PRODUCTION (100%)									
MINING									
Tonnes Ore Mined	kt	14,937	3,453	3,704	4,994	1,930	855	-	-
Tonnes Waste Mined	kt	17,598	4,965	9,084	3,540	8	-	-	-
Au Grade (g/t)	g/t	1.99	1.72	1.86	1.87	2.76	2.58	-	-
PROCESSING									
Mill									
Tonnes Processed	kt	16,101	3,300	3,400	3,400	3,400	2,601	-	-
Au Grade	g/t	1.90	1.71	1.90	1.92	1.89	2.15	-	-
Au Contained	oz	985,221	181,456	207,152	209,588	206,998	180,027	-	-
Au Recovery	%	88.7	88.2	89.4	88.3	89.5	87.8	-	-
Total Au Produced - 100% Basis	oz	873,720	160,050	185,250	185,165	185,208	158,048	-	-
OPERATING COSTS (100%)									
Mining Cost									
Total Mining Cost	US$ '000	444,645	109,220	109,095	103,029	68,037	55,265	-	-
Total Mining Cost (US$/t)	US$/t	14.71	14,74	10.03	12.07	35.11	64.63	-	-
Processing Cost									
Total Mining Cost	US$ '000	247,067	51,493	51,171	52,246	51,746	40,410	-	-
Total Mining Cost (US$/t)	US$/t ore	15.35	15.60	15.05	15.37	15.22	15.54	-	-
Site Administration									
Total Site Admin Cost	US$ '000	111,699	25,356	24,154	23,276	22,221	16,693	-	-
Total Site Admin Cost (US$/t)	US$/t ore	6.94	7.68	7.10	6.85	6.54	6.42	-	-
Royalties, Poduction Taxes and Other									
Total Royalties, Poduction Taxes and Other	US$ '000	115,473	17,648	22,163	14,709	27,184	33,769	-	-
Total Cost (US$000s)	US$ '000	918,885	203,717	206,583	193,261	169,187	146,137	-	-
Total Operating Costs (US$/t)	US$/t ore	57.07	61.73	60.76	56.84	49.76	56.19	-	-
Total Cash Cost	US$/oz AuEq Sold	1,030	1,273	1,115	1,044	913	830	-	-
AISC	US$/oz AuEq Sold	1,112	1,409	1,276	1,108	948	848	-	-
All-In Cost	US$/oz AuEq Sold	1,130	1,501	1,281	1,108	948	848	-	-
CAPITAL COSTS (100%)									
Capital Expenditures									
Total Capital Expenditures	US$ '000	65,080	28,199	26,425	7,745	2,711	($0)	-	-
Cash Reclamation Costs									
Total Reclamation Costs	US$ '000	39,881	837	1,318	1,172	2,208	2,153	16,901	15,291
INCOME & CASH FLOW (100%)									
Revenue									
Total Revenue	US$ '000	1,516,906	287,610	321,964	316,261	309,112	281,959	-	-
Expenses									
Total Expenses	US$ '000	1,302,572	286,105	291,846	290,428	253,787	180,406	-	-
Earning Before Tax	US$ '000	214,334	1,505	30,117	25,834	55,325	101,553	-	-
Taxes Payable	US$ '000	158,060	17,089	28,482	32,163	40,809	39,518	-	-
Net Earnings	US$ '000	56,274	($15,584)	1,636	($6,330)	14,516	62,036	-	-
EBITDA at 100%		584,635	77,700	113,184	120,820	138,339	134,593	-	-

21.3 Capital Costs

21.3.1 Definition of Capital Cost

Capital costs have been defined in terms of non-sustaining capital cost and sustaining capital cost. Non-sustaining capital cost include:

- Primary, initial, mine development
- Initial mobile equipment required for underground operations.

Sustaining capital includes:

- Ongoing mine development
- Expansion to underground infrastructure
- Process plant upgrades
- Surface infrastructure upgrades
- Equipment replacements
- Capital repairs.

21.3.2 Structure of Estimate

The capital estimate structure is as per the definition of capital cost discussed in the preceding section.

21.3.3 Summary of Capital Estimate

A summary of the Total Capital Cost is presented in Table 21-2. The table presents the Non-Sustaining Capital, Sustaining Capital and Total Capital cost against the first tier of the WBS.

Table 21-2: Summary of Capital Cost

Cost Centre	Non-Sustaining Capital Cost (US$)	Sustaining Capital Cost (US$)	Total (US$)
Underground Mine Development	11 689 621	23 053 173	34 742 793
Underground Mobile Equipment	4 230 702	-	4 230 702
Underground Infrastructure	-	285 310	285 310
Process Plant Upgrades	-	3 255 062	3 255 062
Mine/Camp/Infrastructure Upgrades	-	154 500	154 500
Equipment Replacements	-	4 335 850	4 335 850
Capital Repairs	-	19 149 685	19 149 685
Total	**15 920 322**	**50 233 580**	**66 153 903**

21.3.4 Capital Cost Cashflow

Capital expenditure through LoM is presented in Figure 21-1. The capital cashflow expenditure was approximated through the distributing the total capital costs over periods provided by the mining plan and implementation schedule.

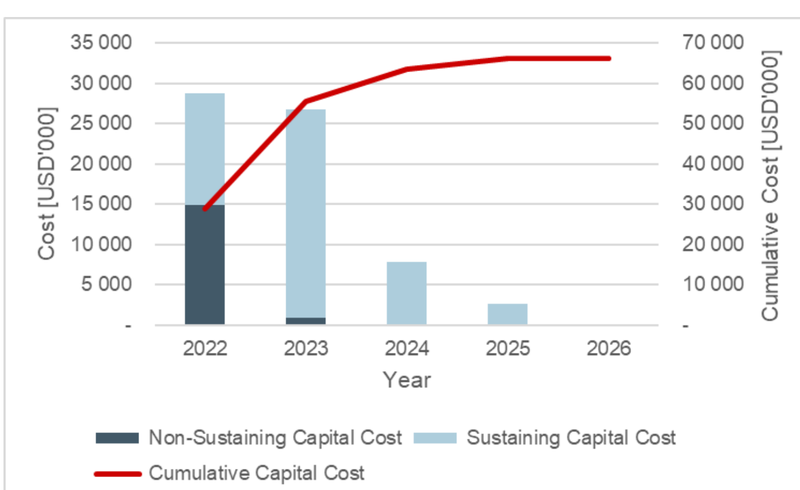


Figure 21-1: Capital Cost Cashflow and Cumulative Capital Cost

(Source: BARA, 2022)

21.4 Operating Costs

21.4.1 Definition of Operating Cost

Direct operating costs have been defined as the cost all activities related to mining, processing and site administration, including;

- All mining costs relating to the contract mining of mineralised material and waste from the open pits
- All mining costs relating to ore mining from the underground sources, including the cost of consumables (explosives, drilling consumables, fuel, etc.), labour and power
- Treatment costs relating to the processing plant, including the cost of reagents, labour and power required to process the mineralised material from open pit and underground sources
- Site supervision and administration cost, including the cost for technical services and mine management labour
- Royalties, relating to the payment of a percentage of revenue for Government and Forestry royalties due.

In addition to the above direct operating costs, additional costs considered as extra-over costs include:

- Exploration costs
- Stockpile reclamation and closure costs

21.4.2 Structure of Estimate

The operating cost estimate has been structured according to activity type, namely;

- Mining
- Processing
- Site Administration
- Exploration
- Reclamation and Closure Costs.

21.4.3 Summary of Operating Cost Estimate

The operating cost estimate is presented in Table 21-3. The table presents the LoM total and the unit operating cost per tonne milled and per ounce of gold recovered, by activity.

Table 21-3: Summary of Operating Cost

Operating Cost Centre	LoM Total (US$)	Cost/t ROM (US$)	Cost/oz Au (US$)
Open Pit Mining	138 528 293	8.60	155
Underground Mining	306 117 011	19.01	343
Processing	247 066 778	15.35	277
Site Administration	111 699 484	6.94	125
Royalties	115 472 974	7.17	129
Cash Costs	**918 884 539**	**57.07**	**1 030**
Exploration	13 385 778	0.83	15
Stockpile Reclamation and Closure	39 881 036	2.48	45
Total Operating Costs	**972 151 353**	**60.38**	**1 090**

Open pit mining costs have been determined through application of actual open pit contractor costs to physical drivers such as waste and ore tonnes mined from the pit. Similarly, underground mining costs have been determined through application of actual underground mine costs to physicals drivers such as access development metres and production tonnes.

Processing costs have been determined through application of actual costs obtained from the operational processing plant to the physical ore tonnes reporting to the plant as per the mine plan.

Site administration costs have been determined through application of actual site costs over the remaining LoM period.

Royalty costs include payment of a percentage of revenues for Government and Forestry royalties due. Forestry royalties equate to 0.6% of revenue, while the Ghanaian government leverages 6% of revenue as a royalty.

21.4.4 Operating Cost Cashflow

LoM operating cost cashflow per annum presented in Figure 21 2 with the unit cash operating cost per tonne on the secondary axis. The operating cost cashflow is largely estimated by applying unit rates to the mine production schedule, with fixed costs applied over the LoM where appropriate.

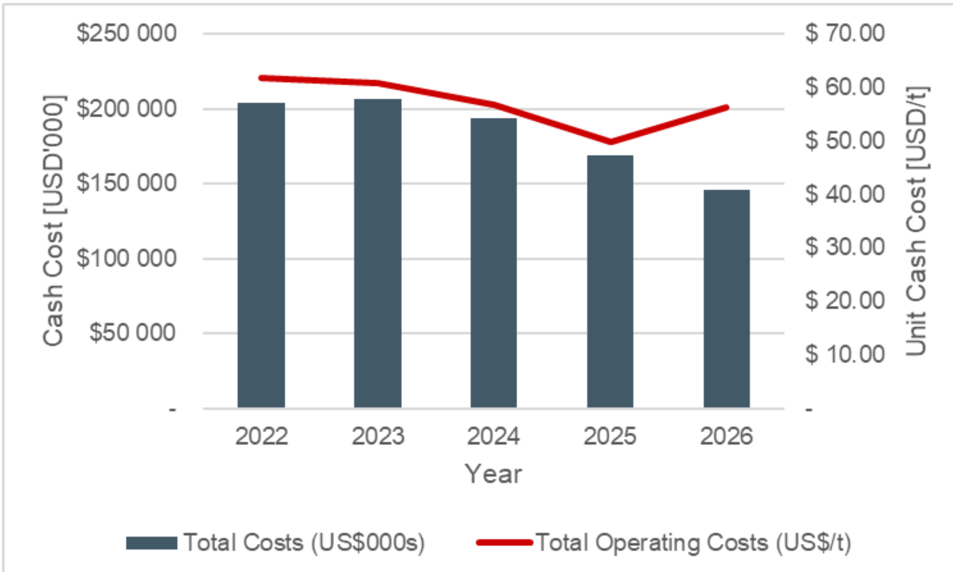


Figure 21-2: Operating Cost Cashflow and Unit Operating Cost

(Source: BARA, 2022)

22. ECONOMIC ANALYSIS

22.1 Evaluation Methodology

The economic evaluation of Chirano was undertaken through a discount cashflow (DCF) modelling approach. This approach includes determining cashflows through deduction of capital and operating costs from operational revenues. The resulting cashflows are used to determine key financial metrics such as payback period, peak funding requirement, net present value (NPV) and internal rate of return (IRR).

22.2 Disclosure

Only the calculated Mineral Reserves have been used for the purposes of the economic analysis. Inferred Mineral Resources have a lower level of confidence than that applying to Indicated Mineral Resources and have not been converted to Mineral Reserves.

22.3 Revenue

The revenue was calculated by applying the gold price to the respective quantity of gold recovered from the processing facility. The sales pricing of gold applied in the evaluation is based on a consensus gold price outlook provided by CIBC for 2022 and is tabulated in Table 22-1.

Table 22-1: CIBC 2022 Consensus Gold Pricing

Year	Gold Price (US$/oz)
2022	1 797
2023	1 738
2024	1 708
2025	1 669
2026	1 601

Assumed process recovery and physicals which drive the calculation of revenue is presented in Table 22-2. A total revenue of US$ 1,5 billion has been calculated over the LoM.

Table 22-2: Calculation of Revenue

Description	Unit	Value
Processed Tonnes	t	16 100 678
Processed Gold (Au) Content	oz	985 221
Processed Gold (Au) Grade	g/t Au	1.9
Process Recovery (LoM Average)	%	88.7
Recovered Content	oz	873 720
FG Inventory Adjustment	oz	12 221
Total Sold Oz	oz	885 940
Gold Price (LoM Average)	US$/oz	1 712
Total Revenue	**US$**	**1 516 905 796**

22.3.1 Tax

Taxation calculations are based on a 35% mining corporate tax rate with a 20 per cent deductibility rate on capital additions claimable as depreciation. A summary of the tax calculation is presented in Table 22-3.

Table 22-3: Calculation of Project Tax

Description	Unit	Value
Revenue	US$	1 516 905 796
Less: Operating Costs (Incl. Exploration)	US$	(932 357 689)
Less: Inter Company Finance Expense	US$	(32 500 000)
Less: Tax Depreciation Claimed	US$	(102 768 472)
Less: Cash Reclamation Costs	US$	(39 881 036)
Taxable Income	US$	409 398 599
Corporate Income Tax Rate	%	35
Cash Income Taxes	US$	158 060 181

22.3.2 Principal Assumptions used in Evaluation

The table below shows a summary of the principal assumptions used for the economic analysis.

Table 22-4: Summary of the Principal Assumptions

Techno-Economic Assumption	Unit	Value	Source/Justification
Tonnes mined (Ore and waste)	Mt	33.7	Mining schedule
Tonnes milled	MT	16.1	Mining Schedule
Milled grade	g/t	1.9	Mining and processing schedule
Process Recovery	%	88.7	Metallurgical testwork
Gold Price	US$/oz	1,701	Asante
Operating Cost	US$M	972.1	Estimates (Section 21, Table 21-2)
Capital Cost	US$M	66.1	Estimates (Section 22, Table 21-2)
Steady state processing rate	Mtpa	3.4	Design for steady state (Section 17)
Royalty rate	%	6.6	Ghana Revenue Authority https://gra.gov.gh/
Tax rate	%	35	Ghana Revenue Authority https://gra.gov.gh/
Discount rate	%	5	Asante

22.3.3 Discounted Cashflow Analysis

The table below shows that the post-tax NPV is US$ 258 million at a discount rate of 5% Post-tax.

Table 22-5: Summary of Discount Cashflow Analysis

Metrics	Units	Value (LoM / Avg)
Physicals		
Tonnes Milled	t	16 100 678
Gold Produced	oz	985 221
Recovered Grade	g/t	1.90
Life of Mine (Incl. Closure)	years	7
Capital Cost		
Non-Sustaining Capital Cost	US$	15 920 322
Sustaining Capital Cost	US$	50 233 580
Total Capital Cost	US$	66 153 903
Operating Cost		
Total Operating Cost	US$	972 151 353
Cash Cost	US$/t ROM	57
AISC	US$/t ROM	62
AISC	US$/oz	1 112
Economics		
Revenue	US$	1 516 905 796
EBITDA	US$	584 635 479
Free Cashflow	US$	331 056 152
Post-Tax NPV_5	US$	258 270 316
Operating Margin	%	39

The graph below shows the post-tax cashflow for current LoM. The final two years (2027-2028) show a negative cashflow due to the material movements related to stockpile reclamation and closure costs. Processing ceases in 2026 in the current business plan.

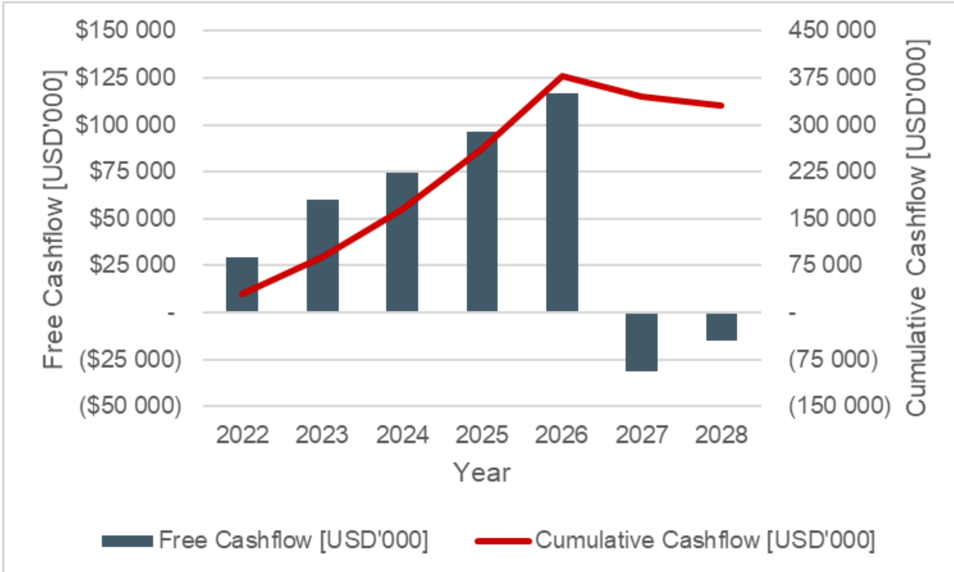


Figure 22-1: Post Tax Project Cashflow Over LoM

(Source: BARA, 2022)

22.3.4 Sensitivity Analysis

A sensitivity analysis was performed on the financial model in order to determine the effect of likely variances on the capital cost, operating cost and revenue on project. The analysis determined that the project is mostly sensitive to changes in operating cost and revenue. The results of the analysis are presented in Figure 22-2. The figure presents post-tax NPV in relation to changes in capital cost, operating cost, and revenue respectively.

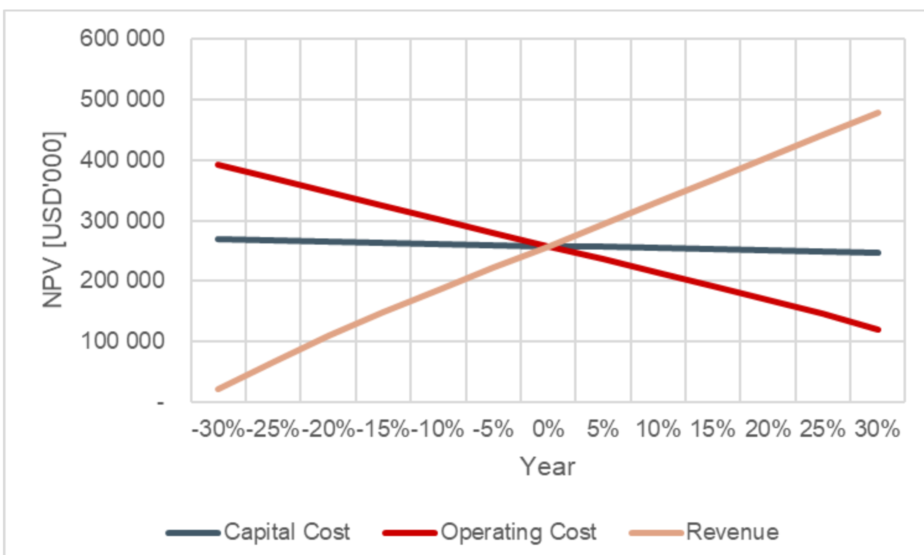


Figure 22-2: Post Tax NPV Sensitivity

(Source: BARA, 2022)

23. ADJACENT PROPERTIES

BIBIANI GOLD MINE

The closest mines to Chirano include the Bibiani Mine situated approximately 37km by road to the north-east. Bibiani Mine is also owned and operated by Asante Gold Corporation (Figure 23-1) and has a recently published Measured and Indicated Resource of 20.78Mt @ 2.71g/t Au for 1.81Moz Au as at December 2021. The Inferred Resource reported was 8.41Mt @ 2.78g/t Au for 0.75Moz Au. This Resource Estimate was also compiled by Snowden Optiro in October 2021 (Asante Gold Corporation, Technical Report on the Bibiani Gold Mine, Ghana", November 2021, Optiro). Asante has a 100% equity interest in the Bibiani Project, through its subsidiary company Mensin Gold Bibiani Limited and in the Exploitation Permit on which it is based. MGBL is a 100% owned Ghana incorporated subsidiary of Asante Gold Corporation, the parent company, which is based in Canada. The Ghana Government has a 10% free carried interest in the Bibiani Mining Lease.

The Bibiani Gold Mine has a long history of gold mining, with commercial production starting in the early 1900s, continuing intermittently up to 2012 and historic production of near 5Moz Au. Bibiani Project is also situated in the western Ashanti region of Ghana. The concessions lie 80km southwest of the Ashanti capital, Kumasi. The Bibiani Mine is located at approximately 6˚27' latitude north and 2˚17' longitude west

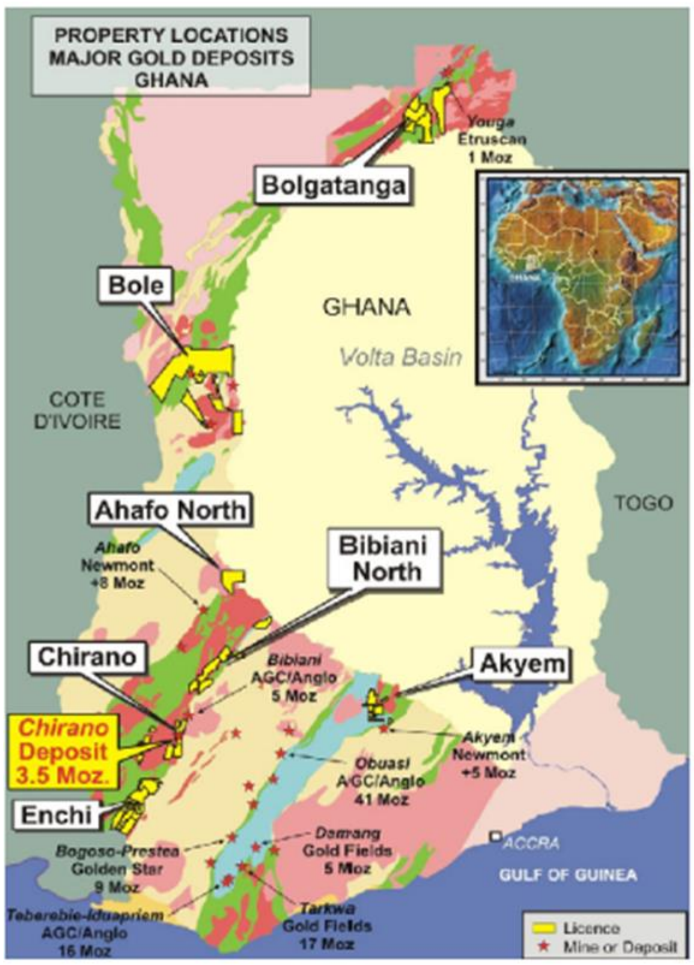


Figure 23-1: Position of Bibiani Mine in Relation to Chirano Mine

(Source: Technical Report on the Chirano Gold Mine, 2009)

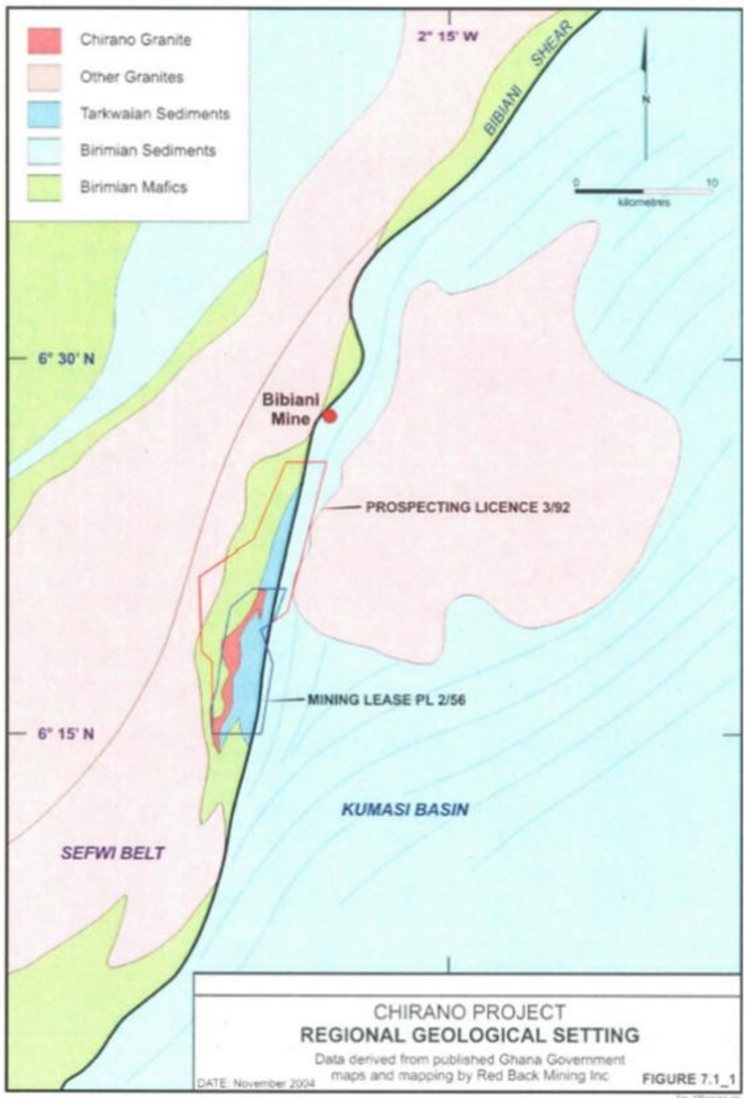


Figure 23-2: Chirano Gold Mine Regional Geological Setting in Relation to Bibiani Mine

(Source: Technical Report on the Chirano Gold Mine, 2009)

The Author has visited Bibiani Mine and its related mineralised deposits owned by Asante Gold Corporation and can therefore verify the information extracted from public sources. Properties adjacent to the Chirano operation have however had no material impact on the Mineral Resources as reported in this ITR.

ENCHI GOLD PROJECT

The Enchi Gold project owned by Newcore Gold (TSX-V: NCAU; OTCQX: NCAUF) lies approximately 50km south of Chirano Mine. It is situated on the same regional structure as Chirano with comparable geology, alteration and mineralisation. The Enchi Gold Project hosts an Inferred Mineral Resource of 70.4Mt @ 0.62g/t Au for 1.4Moz Au. The 216km² land package covers 40km along the same Bibiani Shear that is important to both the neighbouring Chirano and Bibiani mineral deposits. The property remains substantially underexplored, with several geochemical and geophysical anomalies yet to be investigated with more detailed exploration.

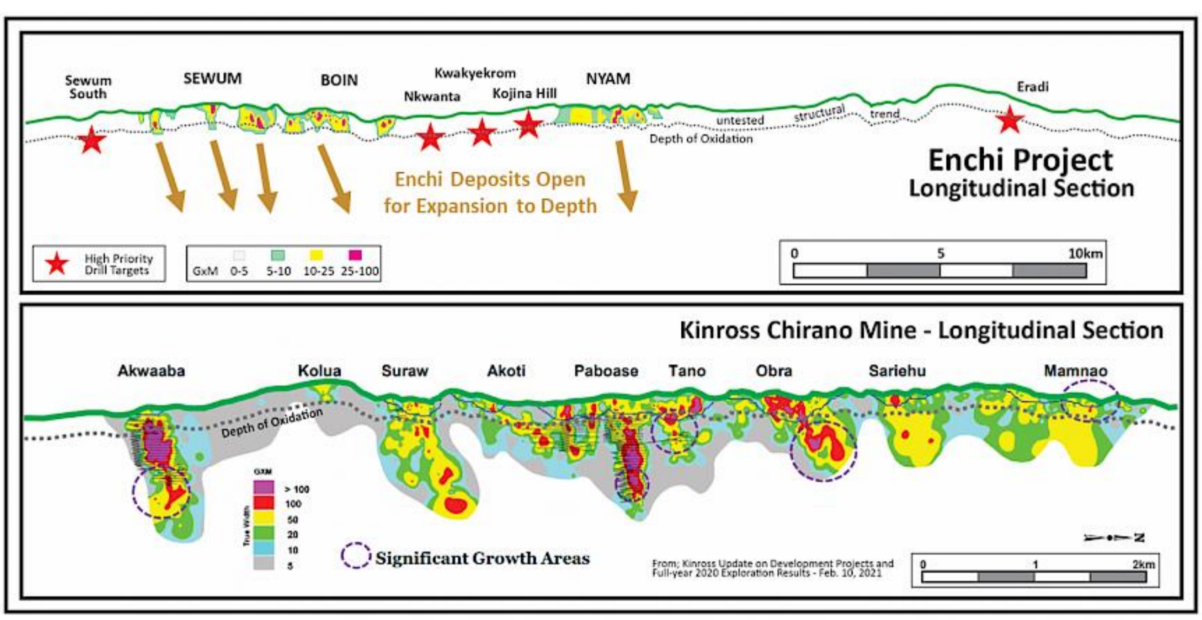


Figure 23-3: Similarities between Enchi Gold Project and Chirano Gold Mine

(Source: Newcore 2021)

Information has been extracted from Newcore Gold – "NI43-101 Technical Report, Preliminary Economic Assessment for the Enchi Gold Project, Enchi, Ghana; June 8, 2021."

The Chirano Gold Mine hosts plunging zones of high-grade gold mineralization (see diagram above). The Chirano zones are like those found at Enchi, including known zones Sewum, Boin, Nyam and Kwakyekrom. Like Chirano, the zones at Enchi have broad lower grade gold at surface with higher grade core structure extending to depth.

The Author has not visited the Enchi Gold Project, or its related mineralised deposits owned by Newcore Gold and cannot verify the information extracted from public sources. Properties adjacent to the Chirano Operation have however had no material impact on the Mineral Resources as reported in this ITR.

24. OTHER RELEVANT DATA AND INFORMATION

24.1 General Comment

It must be noted that Asante Gold purchased the neighbouring Bibiani Mine in August 2021. Since that time the Company has completed and submitted on Sedar an updated NI43-101 compiled by Snowden Optiro in November 2021. The Authors of this Chirano Technical Report were also involved in the compilation of an updated NI43-101 Technical Report for the full Bibiani Mine operation on behalf of Asante.

Chirano Gold Mine is a well-established mining operation that is currently in production and therefore has all the necessary operational processes, facilities and management in place and fully functional. The purchase by Asante Gold Corporation is in fulfilment of a wider strategy to consolidate the potential gold resources of this region of the Sefwi Gold belt and to benefit from economies of scale between the two sizable mining operations.

To the Authors knowledge there remains no other relevant data or information that would affect the readers understanding of the Chirano Gold Project that is not covered in the Technical Report.

24.2 Security

No further security measures are required on the Chirano Gold Mine project site.

24.3 Logistics

Fully developed logistics and supply chain management processes and procedures are already in place at the Chirano Gold Mine.

25. INTERPRETATION AND CONCLUSIONS

The Authors and QPs involved in the compilation of this Technical Report on the Chirano Gold Mine Project have submitted inputs to the conclusion and recommendations relevant to their specific sections and pertaining to the visited operations. Chirano has a long history of exploration and mining and as such is considered a well-developed, well maintained, brownfields mining project. At the issue date, processing, underground mining and open pit mine production, infrastructure and other related Company processes were well established with ongoing gold production.

25.1 Mineral Titles and Agreements

The mineral rights for Chirano Gold Mine, which include the Mining Lease and the Prospecting Licenses, granted under the Minerals and Mining Act 2006 (Act 703) are in good standing. Chirano holds the relevant mining lease, surface rights, major approvals and permits required for the ongoing mining operations.

CGBL is subject to a 5% royalty on gross revenue payable quarterly to the Government of Ghana.

25.2 Geology, Exploration, Drilling and Analytical Data Collection

The Chirano mineralisation is part of a well explored regional structure and is not the only deposit of its type in the region. The nature of the mineralisation style and setting are well understood and support the declared Mineral Resource and further exploration potential. Exploration completed to date is exercised to acceptable industry standards and is appropriately planned to the style of deposits investigated. The Authors are of the opinion that there remains significant potential for resource additions and extensions both near mine and on a more regional level.

The Mineral Resource potential has been indicated, through continued geophysical investigations and drilling exercises, to exist within the Project along strike and down dip of all identified resource sources and as such the Authors conclude that the Company strategy to maintain ongoing exploration and tighter spaced infill drilling is warranted and will continue to enlarge, upgrade and reduce potential risk for the current Mineral Resources.

Sampling methods, preparation, analysis and security have been developed over a number of years under the management of Kinross Gold and as such are performed to Industry Standards and subsequent data is fit for use in MRE and MRev Estimation. Appropriate QA/QC programs, to address precision and accuracy of information, are adhered to by the Company geologists and exploration teams.

25.3 Mineral Resources

Snowden has reviewed the Mineral Resources for the Chirano operations which are estimated by the company's employees. Snowden was afforded sufficient access to supporting data, block models and Chirano employees responsible for generating and reporting the Mineral Resource estimates to follow the process from exploratory data analysis, estimation, classification, and reporting.

Snowden did not identify any material issues with the Mineral Resource estimation and in general considers the standard procedures, and internal controls in place at Chirano to be transparent and robust. Snowden's validations of the Mineral Resources agree with those undertaken by Chirano; that the estimates are a reasonable representation of the grade distributions evident by the composite database informing the estimates. However, it is Snowden's opinion that generally there is room for some improvement with respect the classification of Chirano's Mineral Resource classification system.

25.4 Mineral Reserves

The six underground and three open pit mines have had a long history of mining activities. The mineralised deposits are well understood with over a decade of historic mining. Extensive diamond drilling has been completed at operations to further define resources. Mining methods have proven to be appropriate for the mineralisation and mining costs are established via contractual agreements or well-established accounting systems.

Cut off grades have been determined via a robust process for each of the mining operations and detailed mine plans exist for LoM operations.

The US$1,200/oz gold price used for reserve calculations is well under the three-year trailing average of US$1,730/oz and is deemed conservative.

Bara Consulting is of the opinion that the Mineral Reserve estimates are appropriate and are supported by all information provided by CGML for review.

25.5 Mining Method

All open pit mines are developed using traditional drill and blast, load and haul. A Ghanaian mining contractor has been engaged based on a schedule of rates to complete the pits over a 30-month term. The mining contractor supplies all mobile machinery, personnel and maintenance facilities.

Underground mines are operated by Chirano employees. At fleet of modern trackless equipment (Caterpillar, Sanvik, Volvo) is operated by CGML. It was noted that all mobile machinery is at the upper range of equipment sizing, thus does not allow for narrower development in areas of narrower mineralisation.

Underground mining operations have been using a combination of Sub Level Cave (SLC) and Sub Level Open Stoping (SLOS). The SLC operation works in conjunction with waste fill to ensure wall stability and to allow for a high degree of ore recovery. The SLOS mining is generally using a bottom-up approach, with each mining block filled, prior to the level above being excavated. Due to the higher dilution incurred with SLC, the newer operations are utilising the SLOS method. This method is appropriate for the size and geometry of mineralisation.

A Technical Services department is well equipped, and adequate mine systems are established to manage short and long term planning, ensuring a continuity of ore supply to the process plant.

25.6 Processing

The decline in the average head grade value in 2019 from 2.49g/t Au to an average head grade of 1.36g/t Au, over the past 6 months, has resulted in a drop in gold recovery from 92% to 87%. When the tailings grades of 0.20g/t Au at the higher 92% average recovery and low recovery is compared against the tailings grade of 0.18g/t Au at the lower 87% average recovery they are close in value which shows the operational efficiency has been consistent irrespective of the lower head grade.

Bulk mineralogy that has been done on the Chirano mineralised material showed there is pyrite present and gold mineralisation has detected ultra-fine grains of native gold are locked in the pyrite. This is confirmed by diagnostic tests on the tailings that show the gold losses are related to the sulphide minerals that contain unliberated gold. Tailings values at Chirano are limited by the non-extraction of gold from the sulphide minerals.

The absence of gravity concentration test work for the past 10 years indicates gold extraction was efficient with the direct cyanidation treatment on the whole ore.

25.7 Environment, Permitting and Social

CGML has acquired all the necessary permits to continue to operate the mine and its ancillary facilities. The Mine lease has been renewed and is valid till 2034. CGML is aware of all procedures required to renew permits, certificates and licences that will enable the mine to operate in compliance with all the requirements of the requisite Acts, legislative instruments and guidelines provided by the regulatory agencies.

CGML normally carries out formal stakeholder engagements through the preparations of EIAs for project expansions or special projects. It also engages its key stakeholders quarterly through the Community Consultative Committee (CCC). Out of these engagements, the ADR committee was formed for amicable dispute resolutions.

Key issues and concerns raised during the most recent EIAs are summarised as:

- Employment: opportunities, allocation ratios, youth skills training
- Project benefits
- Sensitisation on projects being executed and engagement with communities; and
- Health and safety of communities.

CGML maintains and regularly updates its environmental and social baseline to enable efficient impacts assessments and mitigations. Environmental baseline conditions have not deviated much since the first baseline study was conducted in 2004 except further degradation of the forests due to logging and farming activities. Further degradation of the TSEFR due to clearing for mine projects such as the TSF has also taken place. No Black star species occur in the forests.

There are no exceedances in water quality. Dust and noise levels are within guideline levels of the Ghana standards.

Key impacts to the physical and biological environments identified by CGML include dust, gaseous emissions, releases into surface and water bodies, increased noise levels from mining operations. CGML operations have brought direct and indirect employment to the catchment communities, improved education and healthcare, general improved lifestyle, institutionalised services and socioeconomic activities in the area. The establishment of the Chirano Sefwiman Foundation has provided funding for community development within the catchment communities.

CGML conducts Environmental and Social monitoring not only for compliance with permitting conditions but to ensure good environmental stewardship. Environmental parameters are monitored within the mining areas and the communities to evaluate the levels of impacts caused by the mining activities. Where there are exceedances, measures are initiated to manage them to prevent future occurrences. Monitoring of run offs from waste rock dumps and mined out pits show there are no issues Acid Mine Drainage. Monitoring of CGML potable and community boreholes show that water quality generally meets the requirements of GWCL drinking water standards. Social monitoring through perception studies indicates that there is majority agreement from stakeholders that the quality of life, economic activities, education etc in the catchment communities has improved greatly due to the presence of CGML in the area.

25.8 Infrastructure

CGML is a well-established operation that has been producing gold since 2005. All infrastructure is in place and planning for upgrades and expansions is well advanced for current and future operations.

All infrastructure is well maintained via the maintenance department. The limited new infrastructure required has been adequately provided for in capital estimates.

25.9 Economic Analysis Outcomes

The discounted cashflow model for the ongoing operation demonstrates that the Project is robust under the current techno-economic assumption described in the report. The analysis supports the declared Mineral Reserve and supports Asante Golds decision to acquire the CGML operation.

25.10 Risks

The mine and relevant exploration projects have many of the normal risks associated with mining operations but also has inherent risks associated with its location and proximity to community settlements, people and skills. The following are highlighted for consideration.

25.10.1 Resources

The current mine life of 5 years needs to be urgently augmented with additional Mineral Resources. There are a number of identified opportunities within the current mining operations and surrounding regional exploration for Asante to investigate in the short to medium term to mitigate this risk.

25.10.2 Ground Conditions

All the underground operations have to be very aware of the geotechnical difficulties and challenges. The ground conditions are expected to be stable and geotechnical designs are planned to be re- investigated by appropriate consultants.

Open pit mining carries the same geotechnical risks and pit slopes and water management is key to long term sustainability and optimised Reserve extraction.

Mine planning has implemented all recommendations. With sound geotechnical planning and execution, the following risks will be managed:

- Slope stability
- Dilution
- Mining recovery
- Flooding.

25.10.3 Mining

Chirano extracts mineralised material from both underground and open pit mining operations. Apart from the normal risks associated with both these mining methods the main risk for Chirano is the management of the waste development underground and waste stripping on surface to ore ratio and the maintenance of a consistent run of mine grade to the processing facility considering the number of material sources and secondary handling that is currently experienced.

Strong grade control measures, both underground and in pit, are essential to the economic success of the operations. Reconciliation is complicated when material is being delivered from many different sources which includes stockpiles.

The correct selection of appropriate mining design, extraction methods, transport and handling for each operation is critical to the success of the mine.

25.10.4 Processing

Operational risks such as chemical spills, accidents and throughput are well managed. The plant has been operational over many years and some degree of refurbishment and upgrades may be required in the short term.

Recovery has the largest direct effect on the project success and economic viability.

The sulphide content in the process feed is a critical parameter as it drives the potential to improve recovery efficiency. Flotation extraction technology has the potential to improve gold recovery with investigative test work.

Consistent and reliable availability of electrical power remains a risk to production throughput. Backup generators are installed to ensure continuous operation of critical components in the process.

25.10.5 Economic Analysis

CAPITAL COST

Given the project is well established and there is limited capital expenditure required other than sustaining capital, there is minimal capital risk associated with the project.

OPERATING COSTS

The risk in operating costs include fluctuations in costs of:

- Fuel
- Explosives
- Power
- Labour

At the effective date world prices of oil and power are particularly volatile and difficult to predict.

25.11 Opportunities

MINERAL RESOURCE UPSIDE

Historical and current exploration has identified numerous potential extensions and parallel mineralised zones that could result in positive resource expansion both for the current underground operations and the new development of open pits on additional mineralised bodies that have been identified.

MINING

The future development of underground mining operations on identified mineralised deposits remains a positive opportunity for extending the mine life.

PROCESSING

The introduction of gravity gold recovery technology within the current process flow.

OPERATIONS OPTIMISATION

The proposed internal audit to be carried out by Asante and appointed personnel to fully understand the current operating conditions, parameters, shortcomings and inefficiencies will result in the implementation of innovations and improvements in the short to medium term that will benefit the economic expectations.

OPERATIONAL SYNERGY

The fact that Asante owns and operates the neighbouring Bibiani Gold Mine, now in production, may allow the introduction of useful synergies between the two mining operations.

26. RECOMMENDATIONS

The technical review has shown the Chirano is a viable operation but has a short remaining LoM. To extend the LoM the emphasis must be on-mine exploration which aims to improve the confidence of the inferred resources near the current workings, bringing these resources into the Measured and Indicated category which will support a mine plan for a longer LoM. The current underground and open pit mining methods have proven successful and viable and can be continued although a continued focus on operational improvements should deliver cost and efficiency improvements.

It would be recommended that an optimisation study is conducted to identify areas in all the mining operations, whether underground or surface, where the effective utilisation of infrastructure, equipment and machinery can be increased and subsequently reduce the associated operating costs.

Grade controls and tighter reconciliations between run of mine production and final gold smelted need to be introduced. This is made difficult by the numerous sources and double handling that is experienced at present.

A re-estimation of appropriate cut-off grades at current gold prices for each of the individual operations will have a positive effect on underground Reserves. The application of a US$1,200 gold price into mine planning is considered conservative.

A performance audit of the milling circuit by a comminution consultancy would optimise the milling performance according to the comminution characteristics of the current mill feed and future ore reserves with the objective of achieving a finer grind size for cyanidation.

Gravity gold recovery test work on the current feedstocks and future reserves will ascertain if there is potential for incremental gold extraction. This test work must be done according to gravity recoverable gold protocols by accredited laboratories so that the results can be modelled by gravity experts to ratify the gravity gold extraction.

An intensive test work program should be undertaken on the Mamnao mineralised material to improve gold extraction.

Further pre-oxidation test work should be done to validate the results of a 5.3% gold extraction improvement that was measured by a previous pre-oxidation test work on the Chirano ore samples.

Focused and well-planned exploration programmes to improve the Resources available, both for the underground and open pit operations, to extend the LoM should be initiated immediately.

All possible operational synergies with the neighbouring, Asante owned, Bibiani Gold Mine must be investigated.

27. CERTIFICATES OF QUALIFIED PERSONS

David Michael Begg

This Certificate of Author has been prepared to meet the requirements of National Instrument 43-101 Standards of Disclosure for Minerals Projects as published 30th June, 2011, Part 8.1.

a) Name, Address, Occupation

David Michael Begg
38 Gemsbok Street, Scarborough, Western Cape, 7985, South Africa.
Director, dMb Management Services Pty Ltd.

b) Title And Effective Date of Technical Report

National NI43-101 Technical Report, Chirano Gold Mines Limited.
Effective Date – 31st December, 2021.

c) Qualifications

Honours Degree in Geology from University of Cape Town (UCT) (BSc Hons Geology). Registered with the Geological Society for South Africa (GSSA).
Registered with the South African Council of Natural Scientists (SACNASP).
Registered with the South African Institute of Mining & Metallurgy (SAIMM).
I have over 25 years' gold experience in exploration and mining operations; senior and executive management; project planning and execution; technical due diligence; mineral resource and reserve estimation.
I have read the definition of "qualified person" set out by National Instrument 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 am a "Qualified Person" for the purpose of NI 43-101.

d) Site Inspection

I have visited the Chirano Gold Mine on the 2nd May 2022.

e) Responsibilities

I am responsible for Sections 1-10, 23-27 and for the compilation of this NI43-101 document in collaboration with relevant Qualified Persons and technical experts from other consultancies.

f) Independence

I am currently Director of dMb Management Services Pty Ltd and have no connection to Asante Gold Corporation or Chirano Gold Mine.

g) Prior Involvement

I have been involved with Asante Gold Corporation previously in the compilation of the NI43-101 Technical Reports for the Kubi Gold Project and the Bibiani Gold Project, Ghana, West Africa. I have not had prior involvement in the Project that is the subject of this Technical Report. I am independent of the issuer as described in section 1.5 of NI 43-101.

h) Compliance with NI 43-101

I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with same.

i) Disclosure

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Issue Date: 31st May, 2022

David Michael Begg

BSc (Hons) Geology. Pr.Sci.Nat, GSSA, SACNASP, SAIMM

CERTIFICATE OF QUALIFIED PERSON

Dominic Claridge

This Certificate of Author has been prepared to meet the requirements of National Instrument 43-101 Standards of Disclosure for Minerals Projects as published 30th June 2011, Part 8.1.

a) Name, Address, Occupation

Dominic Claridge
Cherry Tree Cottage, Easton, Hants, SO21 1EG, United Kingdom
Principal Consultant Bara **International**

b) Title and Effective Date of Technical Report

NI43-101 Technical Report, Chirano Gold Mines Limited
Effective Date – 31st December, 2021.

c) Qualifications

Bachelor of Engineering University of Sydney (BE Mining).
Registered with: Fellow of the Australian Institute of Mining and Metallurgy (FAusIMM).
I have 30 years' experience in mining operations, senior and corporate mine management, project planning and execution, technical due diligence and mineral reserve estimation. My experience includes underground gold projects.
I have read the definition of "qualified person" set out by National Instrument 43-101 and certify that, by reason of my education, affiliation with a professional associations and relevant work experience. I am a "Qualified Person" for the purpose of NI 43-101.

d) Site Inspection

Dates for most recent visits to site: 19th to 21st April, 2022 and 27th April to 2nd May, 2022.

e) Responsibilities

I am responsible for Sections 15-16, 18-19, 21-22, 25-27 in this Technical Report.

f) Independence

As Principal Consultant of Bara I**nternational** I have no connection to Asante Gold Corporation or Chirano Gold Mine.

g) Prior Involvement

I have been involved with Asante Gold Corporation previously in the compilation of the NI43-101 Technical Report, Kubi Gold Project, Ghana, West Africa. I have not had prior involvement with the property that is the subject of the Technical Report. I am independent of the issuer as described in section 1.5 of NI 43-101.

h) Compliance with NI 43-101

I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with same.

i) Disclosure

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dominic Claridge **Issue Date: 31st May, 2022**

BE Mining Engineering, Fellow AusIMM

CERTIFICATE OF QUALIFIED PERSON

Glenn Bezuidenhout

This Certificate of Author has been prepared to meet the requirements of National Instrument 43-101 Standards of Disclosure for Minerals Projects as published 30th June 2011, Part 8.1.

a) Name, Address, Occupation

Glenn Bezuidenhout
50 Fisant Avenue, Boskriun, Randburg, 2188, South Africa.
Senior Process Consultant and Director of GB Independent Consulting (Pty) Ltd

b) Title and Effective Date of Technical Report

NI43-101 Technical Report, Chirano Gold Mines Limited
Effective Date – 31st December, 2021.

c) Qualifications

I am a Fellow Member of the South African Institute of Mining and Metallurgy – FSAIMM nr. 705704.
I graduated from the Witwatersrand Technicon of Johannesburg, South Africa with a National Diploma in Extractive Metallurgy (1979).
I am a practicing process engineer and have practiced in my profession continuously since 1979, and my relevant experience for the purpose of this Technical Report is as follows:
30 years of engineering involvement on 18 mineral processing and mining projects and 13 years' operations experience.
Seven continuous years of gold operational experience in South Africa including refractory ore processing in Barberton and conventional CIL and heap leaching on the Witwatersrand.
Since 2012 gold study experience in Central and West Africa as a process consultant on Essase, Obitan, Ahafo South in Ghana, New Liberty and Dugbe in Liberia, Kibali in the DRC, Yaramoko in Burkina Faso, Kalana and Fekola in Mali, including B2 Gold's Otjikoto Gold Plant in Namibia (2013).
Gold project experience as a lead process engineer and commissioning manager on the Perseus Edikan Project in Ghana (2011) and the Aureus New Liberty Gold Project in Liberia (2015).
I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and by reason of my education, affiliation with a professional association (as defined in NI 43-101), and past work experience, I fulfil the requirements of a Qualified Person as defined in NI 43-101.

d) Site Inspection

Date of visit to the Chirano Gold Plant was 20th to 24th May, 2022.

e) Responsibilities

I am responsible for and have contributed to this Technical Report and the following sections of this Technical Report: Section 13, Section 17 and part of Section 25-27.

f) Independence

I am independent of the issuer as described in section 1.5 of NI 43-101.

g) Prior Involvement

I have not had prior involvement with the Company or Property that is the subject of the Technical Report.

h) Compliance with NI 43-101

I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with same.

i) Disclosure

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Glenn Bezuidenhout **Issue Date:** **31st May, 2022**
Nat Dip, (Ex Met), FSAIMM

CERTIFICATE OF QUALIFIED PERSON

Senzeni Maggie Mandava

This Certificate of Author has been prepared to meet the requirements of National Instrument 43-101 Standards of Disclosure for Minerals Projects as published 30th June, 2011, Part 8.1.

a) Name, Address, Occupation

Senzeni Maggie Mandava
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Principal Resource Geologist at SnowdenOptiro

b) Title and Effective Date of Technical Report

National Instrument 43-101 Technical Report, Chirano Gold Project, Ghana, West Africa.
Effective date: 31st December, 2021.

c) Qualifications

Master of Science in Engineering from University of the Witwatersrand (Wits) (MSc Eng), Post Graduate Diploma in Engineering from University of the Witwatersrand (Wits) (GDE), Bachelor of Science in Geology and Chemistry from the University of Zimbabwe (UZ) (BSc Geology & Chemistry). Registered with the Geological Society for South Africa (GSSA). Registered with the South African Council of Natural Scientists (SACNASP).

I have worked as a geologist for 20 years since graduation, in a range of commodities including Gold, PGM, Base metals, Iron Ore and Manganese in the field of mine geology, geological modelling and Mineral Resource estimation. I have 15 years' gold experience in exploration and mining specialising in Mineral Resource modelling and estimation. I have worked extensively in due diligence audits, Mineral Resource estimation process audits, and reviews and formulation of quality assurance and control systems for exploration and operating mines.

I have read the definition of "qualified person" set out by National Instrument 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 am a "Qualified Person" for the purpose of NI 43-101.

d) Site Inspection

I visited the Chirano Gold Project from the 4th to 7th May, 2022.

e) Responsibilities

I am responsible for Sections 11, 12 and 14 in collaboration with other relevant technical experts from Snowden Optiro.

f) Independence

I am independent of Asante Gold Corporation or the Chirano Gold Mine. I am independent of the issuer as described in section 1.5 of NI 43-101

g) Prior Involvement

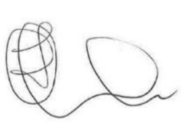
I have been involved with Asante Gold Corporation previously in the compilation of the NI43-101 Technical Report, Bibiani Gold Project, Ghana, West Africa. I have not had prior involvement in the Project that is the subject of this Technical Report.

h) Compliance with NI 43-101

I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with same.

i) Disclosure

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.



Issue Date: **31st May 2022**

Senzeni Maggie Mandava
MSc, GDE, BSc Geol & Chem, MGSSA, SACNASP

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