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Technical Report on the Xavantina Operations, Mato Grosso, Brazil

Report Prepared For:

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APPENDIX	DESCRIPTION
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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The purpose of this report (the “Report” or “Technical Report”) is to set out and provide background and supporting information on the current Mineral Resources and Mineral Reserves for the Xavantina Operations (as defined below), a producing underground gold mining operation located in the State of Mato Grosso, Brazil and wholly-owned by NX Gold S.A. (“NX Gold”, “NX”, “Xavantina”, or the “Company”), a company formed under the laws of Brazil. The effective date of this Report is October 31, 2022 (the “Effective Date”) and the issue date of this Report is May 12, 2023. This Report has been prepared by GE21 Consultoria Mineral Ltda. (“GE21”) on behalf of Ero Copper Corp. (“Ero Copper”) of Vancouver, Canada and existing under the British Columbia *Business Corporations Act*.

Ero Copper is a Vancouver-based publicly listed copper mining company that trades on the Toronto and New York Stock Exchanges under the ticker “ERO” and exists under the British Columbia Business Corporations Act. Ero Copper’s principal asset is its 99.6% ownership interest in Mineração Caraíba S.A. (“MCSA”). MCSA’s predominant activity is the production and sale of copper concentrate from the Caraíba Operations (formerly known as the MCSA Mining Complex), which is located within the Curaçá Valley, northeastern Bahia State, Brazil, with gold and silver produced and sold as by-products. Ero Copper’s wholly owned subsidiary, Ero Gold Corp. (existing under the British Columbia *Business Corporations Act)* currently owns a 97.6% ownership interest in the NX Gold.

The Xavantina Operation was constructed and commenced commercial production in 2012, with the first full year of production occurring in 2013. As of the end of October 2022, approximately 325,000 troy ounces (herein referred to as “oz” or “ounces”) of gold had been produced from the Xavantina Operations. As of the Effective Date of this Report, there are 3 drill rigs operating on the property. Exploration activities are underway on the Santo Antônio and Matinha veins focused on infill drilling and extending the known extent of mineralization to depth and along strike.

Doré bars containing gold and silver, as well as lesser amounts of lead, are shipped from the mine weekly by airplane via a gravel airstrip located on the property. Xavantina’s current Mineral Resources and Mineral Reserves are primarily derived from the Santo Antônio and Matinha veins, which are east-west striking, shear-zone hosted, quartz veins. Currently, all production is from the Santo Antônio vein, accessed from a single mine portal and decline and from the Buracão vein. The updated life-of-mine production plan published in Chapter 16 envisions future production from the Matinha vein commencing in the second half of 2023, in addition to continued production from the Santo Antônio vein.

This Report and estimates herein have been prepared following the guidelines of the Canadian Securities Administrators’ National Instrument 43-101 - *Standard of Disclosure for Mineral Projects* (“NI 43-101”).

The Report provides a summary of the work completed by Xavantina and its independent consultants as of the Effective Date. All dollar amounts presented in the Report are stated in US dollars unless otherwise specified.

1.2 Property Description and Location

NX Gold owns a 100% interest in the Xavantina Operations, located in the eastern portion of the State of Mato Grosso, Brazil. The mine is located 18 km west of the town of Nova Xavantina, with a population of approximately 21,000 people, and approximately 660 km east of Cuiabá, the capital city of Mato Grosso. The total Xavantina Operations property, including exploration licences, measures approximately 133,770 hectares ("ha"). The property is comprised of one mining concession, where all current mining and processing activities occur (registration number 866269/1990), that totals approximately 614 ha and 21 exploration licenses covering an area of approximately 133,156 ha. Within the mining concession, NX Gold holds 100% legal and beneficial ownership, including surface rights. There are no time constraints provisioned with the mining concession; however, operating permits and licenses are extended and renewed under normal course of business according to the nature of each permit and requirements therein. All relevant licenses and operational permits in support of the mine's operation are in good standing.

Within the exploration licences, NX Gold's interests include the right to access the property and to engage in exploration, development, processing, and construction activities in support of mineral exploration and development. Where applicable, compensation is provided to the holder of surface rights for occupation or loss caused by the work. All exploration licenses are currently valid and, for those concessions where expiration dates are approaching, applications have been, or are expected to be submitted for renewal at the time of expiry.

1.3 Geology and Mineralization

Gold and silver mineralization at the Xavantina Operations can be characterized as a shear-zone hosted, sulphide-rich, laminated quartz veins. Economic mineralization on the property, to date, has been hosted within the northeast trending Araés shear zone that cross-cuts the deformed and metamorphosed volcano-sedimentary sequence of the Proterozoic Cuiabá Group and is generally associated with felsic dikes.

Economic gold and silver mineralization at the Xavantina Operations is structurally controlled within the Araés shear zone. Gold and silver are currently mined from a major sulphide-rich, laminated quartz vein dipping approximately 40 degrees to the north-northwest and striking to the west-southwest - the Santo Antônio vein. Prior to the second half of 2019, mining activities occurred in the Brás and Buracão veins, located to the east and west of Santo Antônio, respectively. Vein dimensions are variable throughout the deposit, with an average thickness of 4 meters. Local occurrences of up to 10 meters in vein thickness are common, particularly within the Brás and lower levels of the Santo Antônio veins. The Matinha vein plunges in the same direction as the Santo Antônio vein. Mineralization encountered to date at Matinha is similar to that of the Santo Antônio vein and the economic quartz veins that have been previously mined on the property. Additional work is ongoing to further evaluate continuity of grade and thickness of Matinha and further extend mineralization through exploration drilling. Where gold and silver grades are found in economic concentrations, quartz veins typically contain approximately 2 to 15 percent total sulphide represented mostly by pyrite and galena, as well as minor chalcopyrite, bornite, pyrrhotite, and sphalerite. Higher gold and silver grades are generally associated with galena, chalcopyrite, bornite, and sphalerite.

The known extent of gold mineralization at the Xavantina Operations, both historic and current, is structurally controlled and hosted in four major sulphide-rich quartz veins/bodies, from west to east: Buracão, Santo Antônio, Brás and Matinha. The veins are hosted in strongly deformed metamorphosed sedimentary rock units and diorite that trend generally to the northeast. The veins exhibit a typical laminated pattern parallel with the vein contacts. The laminations are characterized by alternating quartz bands and foliated host rocks indicative of multiple pulses of mineralized fluids during formation.

The Buracão vein is located on the western portion of the mining concession and includes a primary laminated vein measuring 100 meters in length and dipping 45 degrees to the northwest in the upper portion of the mine and 70 meters in length dipping 40 degrees to the northwest in the lower portion of the mine. The Brás vein is located to the east of the Buracão vein and includes a primary laminated vein measuring 220 meters in strike length in the upper part of the mine and 50 meters in strike length in the lower levels of the mine. The Santo Antônio vein is located between the Brás and Buracão veins and currently extends over 350 meters in strike length. The Matinha vein is located east of the Brás, Santo Antônio and Buracão veins and currently extends over 130 meters in strike length. Continued drill-testing of extensions of the Santo Antônio and Matinha veins is planned for 2023 focused on identifying extensions along strike and to depth. To date, the mineralogical characterization of all of the veins containing economic values of gold and silver at the Xavantina Operations are the same.

1.4 Exploration

The occurrence of gold in the Araés shear zone has been known for over 80 years. Although limited information exists, extensive artisanal (“garimpeiro”) mining activity occurred in open pit and in underground operations prior to the formalization of the mine concessions in 1990. Between 1985 and 2004 two companies, Mineração Araés and Mineração Nova Xavantina, conducted geological and metallurgical studies, geological mapping and a total of 2,306 meters of drilling in 8 diamond drill holes. In 2004, MCSA acquired the mineral and surface rights for the property. Between 2006 and 2012, MCSA drilled a total of 43,536 meters in 213 surface diamond drill holes. In 2013, the property was transferred to NX Gold, a subsidiary of MSCA. Between 2013 and 2015, NX Gold drilled a total of 27,802 meters in 104 surface diamond drill holes and a total of 9,426 meters in 107 underground diamond drill holes. In December of 2016, MCSA (and its interest in NX Gold) was acquired by Ero Copper.

Other exploration activities undertaken from 2013 to 2015 included regional geological mapping, soil sampling and a 1,969 line-kilometer airborne magnetic survey completed in 2013.

Following the acquisition of the Company in 2016 by Ero Copper, commencing in 2018, NX Gold initiated the largest series of drill programs undertaken on the property to date, completing a total of 128,875 meters of drilling in 246 surface diamond drill holes and 8,573 meters in 45 underground drill holes, resulting in the discovery and continued delineation of the Santo Antônio and Matinha veins. In total, the 2018-2022 drill programs conducted by the Company represent more than 60% of the total drill meterage drilled on the property. The drill programs followed standard industry procedures including measuring core recovery, rock quality design ("RQD"), taking photos of the core boxes, geological logging of the core, sampling, and assaying. NX Gold inserts a series of certified reference material, blanks, and laboratory duplicates in the stream of samples to verify the assay results as part of its quality assurance, quality control ("QA/QC") procedures.

1.5 Drilling, Sample Preparation, Analysis and Security

Several drill programs have been conducted at the Xavantina Operations. Prior to the 2018-2022 drill programs, the bulk of prior drilling occurred during the period from 2006 to 2012 when the property was held by MCSA. The global drill hole database at the Xavantina Operations includes 746 drill holes, including 183 underground drill holes, totaling 220,011 meters of drilling, of which, 19,798 meters is from underground drilling.

Drilling and assaying undertaken in support of the current Mineral Resource and Mineral Reserve estimate has been carried out using sampling, security and QA/QC procedures that are in line with industry best practices.

Beginning in 2015, a full QA/QC program meeting generally recognized industry best practices has been in use. Standardized procedures are used in all aspects of the exploration data acquisition and management including surveying, drilling, sampling, sample security, assaying, and database management.

QA/QC measures, as part of the routine core sampling procedures, use blank, standard and duplicate samples to allow verification of the fire assay results produced by the Xavantina laboratory. For the 2014 to 2022 drilling programs, control samples were inserted at the frequency of 1 gold certified reference, 1 blank sample and 1 duplicate pulp sample every 30 samples.

The authors of this Report performed an evaluation of the data used in the determination of Xavantina's Mineral Resource estimate and found the results to be in accordance with industry best practice and appropriate for use in the current Mineral Resource estimate.

1.6 Mineral Resource and Mineral Reserve Estimate

<u>Mineral Resources</u>

The Mineral Resource estimate was prepared in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") Definition Standards for Mineral Resources and Mineral Reserves, adopted by the CIM Council on May 10, 2014 (the "CIM Standards"), and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines, adopted by CIM Council on November 23, 2003 (the 'CIM Guidelines"). Grade-shell models using 1.20 grams per tonne ("gpt" or "g/t") were used to generate a 3D model of the Xavantina Operations, and within this, a gold cut-off grade of 1.20 gpt was considered of

Mineral Resources based upon a gold price of US$1,900 per ounce ("oz") of gold and total underground mining and processing costs of US$72 per tonne of ore mined and processed. Mineral Resources have been estimated using ordinary kriging inside block sizes of 10.0 meters (x), by 10.0 meters (y), by 2.0 meters in height (z), a minimum sub-block size of 1.0 meter (x), by 1.0 meter (y), by 0.5 meters in height (z), and a minimum mining stope dimension of 2.00 meters (x), by 2.00 meters (y), by 1.50 meters in height (z).

The Xavantina Operations Mineral Resource estimate was sub-divided in four mineralized veins: Santo Antônio, Matinha, Brás and Buracão.

Mineral Resource effective date of October 31, 2022.

Table 1 - Mineral Resource Estimate

Classification	Tonnage (000 tonnes)	Grade (gpt Au)	Au Contained (000 ounces)
Measured Mineral Resource (inclusive of Reserves)			
Santo Antônio	246.4	13.35	105.8
Total Measured Resource	**246.4**	**13.35**	**105.8**
Indicated Mineral Resource (inclusive of Reserves)			
Santo Antônio	826.1	10.41	276.5
Matinha	185.8	8.92	53.3
Brás	6.9	3.36	0.7
Total Indicated Resource	**1,018.9**	**10.09**	**330.6**
Measured and Indicated Mineral Resource (inclusive of Reserves)			
Santo Antônio	1,072.6	11.09	382.3
Matinha	185.8	8.92	53.3
Brás	6.9	3.36	0.7
Total Measured and Indicated Resource	**1,265.3**	**10.73**	**436.4**
Inferred Mineral Resource			
Santo Antônio	77.1	9.29	23.0
Matinha	207.1	11.03	73.5
Brás	149.3	4.81	23.1
Buracão	7.7	2.77	0.7
Total Inferred Resource	**441.1**	**8.48**	**120.2**

1. Mineral Resource effective date of October 31, 2022
2. Presented Mineral Resources inclusive of Mineral Reserves. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Grade-shell 3D models using 1.20 gpt gold were used to generate a 3D mineralization model of the Xavantina Operations. Mineral Resources were estimated using ordinary kriging within 10.0 meter by 10.0 meter by 2.0 meter block size, with a minimum sub-block size of 1.0 meter by 1.0 meter by 0.5 meter. Mineral Resources were constrained using a minimum stope dimension of 2.0 meters by 2.0 meters by 1.50 meters and a cut-off of 1.20 gpt

based on gold price of US$1,900 per ounce of gold and total underground mining and processing costs of US$72.0 per tonne of ore mined and processed. The Mineral Resource estimates were prepared in accordance with the CIM Standards, and the CIM Guidelines, using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit.

Mineral Reserves

The Mineral Reserve estimate was prepared in accordance with the CIM Standards and the CIM Guidelines, using geostatistical and/or classical methods, plus economic and mining parameters appropriate for the deposit. Mineral Reserves are based on a long-term gold price of US$1,650 per ounce ("oz"), and a USD:BRL foreign exchange rate of 5.29. Mineral Reserves are the economic portion of the Measured and Indicated Mineral Resources. The Mineral Reserve estimate includes operational dilution of 17.4% plus planned dilution of approximately 8.5% within each stope for room-and-pillar mining areas and operational dilution of 3.2% plus planned dilution of 21.2% for cut-and-fill mining areas. It also assumes mining recovery of 92.5% and 94.7% for room-and-pillar and cut-and-fill areas, respectively. Practical mining shapes (wireframes) were designed using geological wireframes / Mineral Resource block models as a guide. The Mineral Reserve estimate for the Xavantina Operations was prepared in accordance with the CIM Guidelines and the CIM Standards by Xavantina Operations engineering personnel under the direct supervision of Guilherme Gomides Ferreira of GE21, an independent qualified person as such term is defined under NI 43-101.

It is the opinion of GE21 that the current Mineral Reserves for the underground operation have been estimated in a manner consistent with industry best practices, CIM Guidelines, and CIM Standards.

Table 2 - Mineral Reserve Estimate

Classification	Tonnage (000 tonnes)	Grade (gpt Au)	Au Contained (000 ounces)
Proven Mineral Reserve			
Santo Antônio	301	10.89	105.4
Matinha	-	-	-
Total Proven Reserve	**301**	**10.89**	**105.4**
Probable Mineral Reserve			
Santo Antônio	799	8.32	213.6
Matinha	213	6.24	42.6
Total Probable Reserve	**1,012**	**7.88**	**256.2**
Total Proven and Probable Reserve	**1,313**	**8.57**	**361.6**

1. Mineral Reserve effective date of October 31, 2022.
2. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Reserve estimates were prepared in accordance with the CIM Standards and the CIM Guidelines,using geostatistical and/or classical methods, plus economic and mining parameters appropriate for the deposit. Mineral

Reserves are based on a long-term gold price of US$1,650 per oz, and a USD:BRL foreign exchange rate of 5.29. Mineral Reserves are the economic portion of the Indicated Mineral Resources. Mineral Reserve estimates include operational dilution of 17.4% plus planned dilution of approximately 8.5% within each stope for room-and-pillar mining areas and operational dilution of 3.2% plus planned dilution of 21.2% for cut-and-fill mining areas. Assumes mining recovery of 92.5% and 94.7% for room-and-pillar and cut-and-fill areas, respectively. Practical mining shapes (wireframes) were designed using geological wireframes / Mineral Resource block models as a guide.

The Mineral Reserves for the Xavantina Operations are derived from the Measured and Indicated Mineral Resource as defined within the resource block model following the application of economic and other modifying factors further described below. Inferred Mineral Resources, where unavoidably mined within a defined mining shape have been assigned zero grade. Dilution occurring from Measured and Indicated resource blocks were assigned grade based upon the current Mineral Resource grade of the blocks included in the dilution envelope. Mineral Reserves were classified according to the CIM Standards and the CIM Guidelines by Guilherme Gomides Ferreira of GE21, an independent qualified person as such term is defined under NI 43-101.

Mineral Reserve cut-off grades and parameters applied to the Mineral Reserve estimate are summarized below:

- 4.17 gpt applied to mining stopes, in both room and pillar and cut and fill mining areas, incorporating mining and development, processing, general and administrative and indirect costs;
- 0.80 gpt applied to gallery development incorporating development and processing costs; and,
- 3.23 gpt applied to mining marginal material adjacent to planned mining stopes incorporating mining, development and processing costs.

Mineral Reserve cost assumptions are based on actual operating cost data during the eighteen-month period from May 1, 2021 to October 31, 2022, expressed in USD per tonne run-of-mine (“ROM”), converted at a USD:BRL foreign exchange rate of 5.29 corresponding to the average foreign exchange rate during this same period.

A summary of the Mineral Reserve estimate parameters is provided below:

Table 3 - Mineral Reserve Cut-off Parameters

Mining Costs (US$/tonne ROM)	$119.62
Processing Costs (US$/tonne ROM)	$36.54
G&A Costs (US$/tonne ROM)	$20.37
Indirect Costs (US$/tonne ROM)	$24.66
Metallurgical Recovery (average)	91.0%

Gold Price (US$/oz)	$1,650
Foreign Exchange Rate (USD:BRL)	*5.29*

Other modifying factors considered in the determination of the Mineral Reserve estimate include:

- A cut-off grade of 4.17 gpt was applied to mining stopes within the room and pillar the cut and fill mining areas, in the determination of planned mining stopes within the Mineral Resource blocks based on actual operating cost data and past operating performance of the mine.

- The mining method employed for the Santo Antônio vein is inclined room and pillar and cut and fill for the thicker lower-panel of the vein and cut and fill for the thinner upper panel of the vein incorporating paste-fill.

- Maximum stope spans in the room and pillar mining area are based on a design stope of 6 m by 4 m between pillars. For cut and fill mining areas the size of stopes are based on a designed stope measuring 20 m along strike with a frontal slice of 3 vertical meters.

- Within designed stopes, all contained material was assumed to be mined with no selectivity. Inferred Mineral Resources, where unavoidably included within a defined mining shape have been included in the Mineral Reserves estimate at zero grade. Mining dilution resulting from Measured and Indicated blocks was assigned the grade of those blocks captured in the dilution envelope using the current Mineral Resource estimate.

Mineral Reserve effective date of October 31, 2022.

1.7 Mining Methods

The mining methods currently used at the Santo Antônio, and envisioned for the Matinha vein beginning in the second half of 2023, are a combination of inclined room and pillar and cut and fill using paste fill as backfill. Prior to commencing operations within the Santo Antônio vein, the mine employed a combination of inclined room and pillar and cut and fill, with backfill requirements generated from waste development. Mining method selection has been based upon desired selectivity, geometry of the orebodies (both planned and previously mined), geotechnical characteristics of the quartz vein as well as the footwall and hanging wall.

For the purposes of the current Mineral Reserve and life-of-mine production plan, the Santo Antônio vein has been divided into two main panels on -65 (upper) and -170 (lower) based upon the relative geomechanical strength characteristics of these zones. In the upper panel, cut and fill utilizing paste backfill will be employed, while inclined room in pillar, the current mining method, will be employed in the lower panel down to level -350. The deeper portion of Santo Antônio and Matinha veins will be mined using ascending cut and fill. Cemented paste will be employed in the lower panel to enhance pillar recovery following primary panel extraction. In support of mining method selection, the Company undertook extensive geomechanical analysis and 3D modeling and applied accumulated operational knowledge gained through prior mining activities within the Brás and Buracão veins. The mine is currently operating within the Santo Antônio vein using the selected mining methods.

The cut and fill method relies upon removing the ore in horizontal slices, advancing from top to bottom, utilizing cemented paste (approximately 7% cement by weight) to provide support to the next series of advances. Each advance will be 3.0 to 5.0 meters. The inclined room and pillar method, currently in use, is based upon excavating parallel rooms, connected with a cross-section of galleries. Each 6-meter room is supported by pillars measuring approximately 4 meters. During the primary extraction stage, room and pillar mine recovery averages approximately 75%, increasing to approximately 92.5% following secondary extraction of pillars from bottom to top, supported with paste fill.

Based on operating experience, mining rates from inclined room and pillar operations average approximately 4,500 tonnes per month per level in operation. The main operational constraint is the number of jackleg operators per shift and number of developed rooms from which to conduct mining operations.

Total production from Santo Antônio mine, incorporating upper and lower panel averages approximately 15,000 tonnes per month over the life of mine in Santo Antônio. For the Matinha vein, cut and fill mining rate has been planned for approximately 1,200 tonnes per month per level. The total tonnage for the combined production sequence in both veins is approximately 17,300 tonnes per month over the life of mine, in-line with current mining rates. Actual operating performance from current mine operations was used to calculate modifying factors applied to the life of mine. Operational dilution of 17.4% plus planned dilution of 8.5% was applied to lower panel stopes utilizing room and pillar mining method. Operational dilution of 3.2% plus planned dilution of 21.2% was assumed for stopes within the upper panel and Matinha vein utilizing cut and fill mining method.

1.8 Recovery Methods

The metallurgical process currently in place has been engineered and subsequently optimized over the years to extract gold from ore containing a high content of preg-robbing units capable of adsorbing gold from cyanide solutions. The primary preg-robbing unit is carbonaceous phyllite that exists throughout the Xavantina Operations orebodies, including at Santo Antônio and Matinha.

Metallurgical recoveries at the Xavantina Operations have been sequentially optimized since commissioning to recover gold and silver from the quartz vein orebodies containing this carbonaceous material. Optimization work has resulted in recoveries increasing from approximately 40% in 2012 when the plant was commissioned, to current metallurgical recoveries in excess of 90% (93.3% average was achieved during third quarter of 2022). 2022 production from the Xavantina Operations to the Effective Date is shown below in Table 4.

Table 4 - Xavantina Operations Plant Performance to Effective Date

	Jan 1st - Oct 31st, 2022
Mill Feed (tonnes)	167,672
Gold Grade (gpt Au)	6.97
Metallurgical Recovery (%)	92.3
Au Production (oz)	**34,684**

Processing takes place at the Xavantina plant. Unit operations include a conventional 3-stage crush, milling and a combination of gravity concentration with intensive leaching and flotation followed by carbon in leach ("CIL") and a desorption circuit. In 2019, a gravity concentrate re-grind mill was added to the circuit to improve gold recoveries and reduce required residence time within the intensive leaching circuit. Gold and silver are produced from solution via electrolysis followed by smelting of doré bars containing both gold and silver. The installed crushing and grinding capacities are approximately 80 tonnes per hour ("tph") and 45 tph, respectively, resulting in an installed annual plant capacity in excess of 300,000 tonnes per annum. The plant is currently forecast to operate at approximately 72% of its installed capacity, on average, over the current life of mine.

In 2018 and 2019, Xavantina conducted gravity concentration tests to assess recovery of the Santo Antônio orebody in advance of mining operations. A composite sample was taken from 9 drill holes and processed in the Falcon concentrator at Xavantina's laboratory. Results from this test work demonstrated that the Santo Antônio orebody features similar metallurgical characteristics as the now historic operations of the Buracão and Brás veins. Upon achieving full production rates from the Santo Antônio vein in 2020, several processing initiatives were implemented to improve metallurgical recoveries. These efforts contributed to achieving 93.3% metallurgical recovery during the third quarter of 2022, in-line with current forecast recoveries over the life of mine.

Based on the current Mineral Reserve estimate, the production plan for the Xavantina Plant is set forth below:

Table 5 - Xavantina Operations Production Plan

	Q4 2022*	2023	2024	2025	2026	2027	2028	LOM
Ore Mined & Processed (kt)	22.1	169.5	221.8	227.3	224.7	215.8	231.4	1,312.5
Au Grade (gpt)	12.43	10.56	9.12	9.09	8.71	7.16	6.88	8.57
Recovery (%)	90.5%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	92.9%
Gold Production (oz)	**7,986**	**53,507**	**60,506**	**61,792**	**58,492**	**46,179**	**47,604**	**336,066**

(*) Q4 2022 production outlines the Mineral Reserve schedule for the two months from the Effective Date of October 31, 2022 to December 31, 2022.

Throughout the life of the Xavantina Operations, the processing plant has successfully processed material with different grades and varying carbon content and has obtained information essential to improving recoveries, under varying operational conditions. The metallurgical recoveries of the Xavantina Operations have increased from 40% in 2012 to up to 93.3% in the third quarter of 2022 (with a 2022 average of approximately 92% prior to the Effective Date), as summarized in the following table.

Table 6 - Historic Production of the Xavantina Operations

Year	Tonnes (t)	Au (oz)	Recovery
2012	137,980	6,654	40%
2013	261,726	26,216	67%
2014	208,259	23,730	83%
2015	226,608	35,115	87%
2016	213,776	29,098	84%
2017	135,013	25,173	88%
2018	117,857	39,808	91%
2019	158,275	29,755	86%
2020	162,642	36,830	91%
2021	171,581	37,798	94%
Jan to Oct 31st 2022	167,672	34,684	92%
Total	**1,961,389**	**324,861**	**82%**

1.9 Project Infrastructure

The facilities at the Xavantina Operations include the mine portal, the processing plant, tailings storage facility, mechanical workshop, administrative offices, metallurgical laboratory, security gate and guard facilities, medical clinic, a cafeteria and a gravel airstrip used to fly out doré bars after production.

National electrical service is available on site from the town of Nova Xavantina, located approximately 18 km from the Xavantina Operations. The mine is supplied through a 34.5 kV power transmission line (600 kVA), owned by the state public utility, ENERGISA S/A. Water in sufficient quantities to support mining and processing operations is sourced primarily from mine dewatering activities with availability, as needed, from surface run-off and a fully permitted water supply system comprised of a water intake from the neighboring Mortes River, with capacity of 150 cubic meters per hour, and a water main connecting the sumps of the underground mine.

Processed tailings are disposed into two ponds in a closed loop with water loss only occurring through evaporation and in the residual moisture content of the tailings. The first pond receives inert-tailings from flotation, and the second pond receives non-inert tailings from the CIL circuit. The latter tailings pond is lined with a double layer of HDPE, including leach detection devices, and allows for natural degradation of residual cyanide through exposure to sunlight, complemented by a cyanide detoxification circuit.

1.10 Permitting, Environmental and Social Considerations

The Xavantina Operations is a fully permitted gold mine currently in operation. An environmental action program was developed for the Company prior to the mine reaching commercial production. Xavantina follows the guidelines set forth in the program to reduce its impact and recover impacted areas within the vicinity of the mine. Xavantina adheres to a program of frequent environmental monitoring including water quality control, as well as re-vegetation of historic artisanal mining areas that pre-date the commissioning of the mine by NX Gold. As part of its preventative environmental management methods, Xavantina manages all of its waste with an emphasis on proper segregation, storage, transport, and disposal at the end of the life cycle. All waste is delivered to a licensed facility.

The mine's closure plan, adapted to the current social and environmental context within the area of the Xavantina Operations, has been designed to maximize the physical, chemical, biological, and socio-economic stability of the area after mining activities have concluded. The current estimated reclamation liabilities are approximately $38.7 million Brazilian Real ("BRL" or "R$").

Xavantina actively maintains excellent relationships with stakeholders of the Nova Xavantina municipality, including community members, social organizations, local government, and landowners near the operation. The Company actively takes part in initiatives supported by regional stakeholders for waste collection, river preservation, educational events, social inclusion, and equity. Xavantina has provided technical and financial support towards the environmental rehabilitation of areas previously impacted by historic artisanal mining activities and has remained an important economic contributor to the region through both direct and indirect jobs, royalties and tax revenue. The Xavantina Operations has all required environmental licenses to conduct its operations. The authors of this Report are not aware of any material environmental or permitting risks to the current operations nor to the envisioned production plan associated with this Mineral Reserves estimate.

1.11 Capital and Operating Costs

Capital and operating costs are shown for 2022 through 2028 reflecting the period of operation from the day immediately following the Effective Date (commencing November 1, 2022). For the purposes of the Technical Report, mine reclamation and closure are assumed to commence on the conclusion of mining of the Mineral Reserves; however, Xavantina is actively undertaking exploration activities to increase the mine's life. It is anticipated that a combination of Mineral Resource conversion, extension of the Santo Antônio and Matinha ore bodies, and delineation of target areas will serve to augment the production profile and increase mine life subject to satisfactory exploration results, as well as technical, economic, legal and environmental conditions.

Total capital costs over the life of mine are estimated at US$53.1 million. Details of these capital expenditures are shown below in Table 7.

Table 7 - Total LOM Capital Expenditure Estimate

Category	LOM Total (USD 000s)*
UG Mine Development	22,516
Infrastructure	17,528
Safety & Environment	5,337
UG Equipment	2,464
Other Capital Costs	5,222
Total Capital Cost	**53,067**

* BRL amounts converted to USD at a USD:BRL foreign exchange rate of 5.29.

An operating cost model was generated based on actual operating performance at the Xavantina Operations, utilizing specific consumption coefficients incorporating historic operational data. Cost estimates have been estimated using first principles incorporating both fixed and variable components to account for year-to-year production rate variations. Costs were adjusted annually based on the changes to ore sources including rock support, transport, and infrastructure requirements. Underground mining costs consist of the operational costs related to ore extraction at the Xavantina Mine. Direct mining costs include drilling, blasting, and mucking. Indirect costs include ore and waste transport and mine services. Processing costs include salaries, operating consumables and power. A summary of the average LOM operating costs is presented in BRL per tonne in Table 8.

Table 8 - Average LOM Operating Costs

Cost Parameter, Average LOM	Cost
Mining Cost *(BRL per tonne mined)*	448.32
Processing Cost *(BRL per tonne processed)*	246.87
Operational Support Costs *(BRL per tonne processed)*	111.73
G&A Cost *(BRL per tonne processed)*	125.55

1.12 Conclusion and Recommendations

The authors of this Report have carried out a review and assessment of the material technical issues that could influence the future performance of the Xavantina Operations and classified the Mineral Resource and Mineral Reserve estimates. The authors found that the procedures and processes adopted by Xavantina personnel to produce geological models were executed according to industry standards. Sampling, QA/QC, security and data control were similarly in line with industry best practices and support the current Mineral Resource and Mineral Reserve estimate. The authors note the following:

a. NX Gold holds the surface rights and permits required to conduct the mining operation as outlined in the Mineral Reserve estimate. Future development beyond the stated Mineral Reserves may require the acquisition of additional surface rights.

b. The authors have carried out the appropriate review to satisfy that the Mineral Reserve can be technically and profitably extracted. Consideration has been given to all technical areas of the operations, the associated capital and operating costs, and relevant factors including marketing, permitting, environmental, land use and social factors. The authors are satisfied that technical and economic feasibility has been demonstrated.

c. The authors have not identified any known mining, metallurgical, infrastructure, permitting, legal, political, environmental or other relevant factors that could materially affect the development or extraction of the stated Mineral Reserves.

Regarding the Mineral Resource and Mineral Reserve estimation process, the authors recommend a work program that includes the following:

- Despite the high variability of gold grades in duplicate samples, results are inside acceptable limits. It is recommended that a study be performed to determine if the variability for field duplicates is an expected characteristic of the deposit or if reference values should be revised.
- The Santo Antônio target remains open at depth. It is recommended that Xavantina conduct a new drilling campaign to test the extension and continuity of mineralization at depth.
- The Xavantina Operations should continue to undertake additional infill drilling campaigns to upgrade the classification of Mineral Resources of the Matinha vein.
- Undertake new drill programs to evaluate the potential of regional exploration targets.
- Geomechanical characterization work should continue to be carried out on an ongoing basis to support mining operations, mine design and update geotechnical support requirements. It is recommended that numerical modeling and stress-displacement analysis be performed to assess stress redistribution and strength factors for both hanging wall and pillars.
- It is recommended that Xavantina conduct additional studies focused on the recovery of pillars included in the Mineral Reserve estimate.
- Xavantina uses a higher cut-off grade for cut and fill mining areas. It is recommend that Xavantina perform a study to better define costs in cut and fill areas to support the cut-off grade.

The hanging wall of the deposit, in the opinion of the authors of this Report, has been demonstrated competent enough the selected mining methods with support implemented as designed. GE21 recommends the Company undertake a third-party geotechnical study to further evaluate the potential of reducing sill pillar thickness with the aim of increasing mine recovery during the primary mining phase of the operations.

A summary of the proposed work program is detailed below. At the time of this Report, 3 drill rigs were active on the property and were undertaking various exploration programs aimed at increasing the current Mineral Resource and Mineral Reserves of the property.

Table 9 - GE21 Recommended Work Program

Program	Budget (US$)
Duplicate samples study	$20,000
Down-plunge exploration drill program in Santo Antônio vein	$5,000,000
Infill Exploration drill program in the Matinha vein	$3,000,000
Potential evaluation on other exploration targets including drill program	$2,000,000
Additional studies regarding the recovery of the pillars	$20,000
Study to refine the cut-off-grade values for cut and fill areas	$20,000
Geomechanical numerical modeling and stress-displacement analysis with finite elements	$100,000
Total	**$10,160,000**

2.0 INTRODUCTION

The purpose of this Report is to set out and provide background and supporting information on the current Mineral Resources and Mineral Reserves for the Xavantina Operations, a producing underground gold mining operation located in the State of Mato Grosso, Brazil and wholly owned by NX Gold, a company formed under the laws of Brazil. This Report has been prepared by GE21on behalf of Ero Copper of Vancouver, Canada and existing under the British Columbia *Business Corporations Act*.

Ero Copper is a publicly listed company that trades on the Toronto Stock Exchange and New York Stock Exchange under the ticker, “ERO”. Ero Copper’s principal asset is its 99.6% ownership interest in Mineração Caraíba S.A. (“MCSA”). MCSA’s predominant activity is the production and sale of copper concentrate from the Caraíba Operations (formerly known as the MCSA Mining Complex), which is located within the Curaçá Valley, northeastern Bahia State, Brazil, with gold and silver produced and sold as by-products. Ero Copper’s wholly owned subsidiary, Ero Gold Corp. (existing under the British Columbia *Business Corporations Act)* currently owns a 97.6% ownership interest in NX Gold.

The Xavantina Operations was constructed and commenced commercial production in 2012, with the first full year of production occurring in 2013. As of the end of October 2022, approximately 325,000 ounces of gold had been produced from the Xavantina Operations, including 34,684 ounces of gold produced in 2022 as of the Effective Date of this Report. As of the Effective Date of this Report, there are 3 drill rigs operating on the property. Exploration activities are underway on the central Santo Antônio and Matinha orebody veins focused on infill drilling and extending the known extent of the veins to depth and along strike.

Doré bars containing gold and silver, as well as lesser amounts of lead, are shipped from the mine weekly by airplane via a gravel airstrip located on the property. Ore is currently produced from the Santo Antônio vein- an east-west striking, shear-zone hosted, quartz vein, accessed from a single mine portal and decline and from the Buracão vein. During the second half of 2019, the mine successfully transitioned the majority of mining activities from the Brás and Buracão veins, into the centrally located Santo Antônio vein.

The Report provides a summary of the work completed by Xavantina and its independent consultants as of the Effective Date. All dollar amounts presented in the Report are stated in US dollars unless otherwise specified.

2.1 Scope of Work

The work undertaken by GE21 includes:

- Review and validate the Company’s QA/QC program and data used to estimate the current Mineral Resource;
- Perform a validation of the Company’s geologic models;
- Update Mineral Resource block models using an industry standard geostatistical approach; and,

- Classify the Company's Mineral Resources into Measured, Indicated and Inferred categories according to GE21 protocols, CIM Standards and CIM Guidelines for the known gold and silver mineralization of the Xavantina Operations.

GE21 was commissioned to prepare the Mineral Resources and Mineral Reserves for this project, and this technical report conforms to the standards set out in NI 43-101 and has been prepared in accordance with Form 43-101F1.

2.2 Qualifications, Experience and Independence

GE21 is an independent mineral consulting firm based in Brazil formed by a team of professionals accredited by the Australian Institute of Geoscientists ("AIG").

Each of the authors of this Report has the appropriate qualifications, experience, competence and independence, to be considered as a Qualified Person ("QP"), as defined under NI 43-101. Neither GE21 nor the authors of this Report have or have had any material interest in NX Gold, Ero Copper, Ero Gold Corp., MCSA or related entities. The relationship between these companies and NX Gold, Ero Copper and MCSA is solely of professional association between client and independent consultant. This Report was prepared in exchange for fees based on hourly rates set by commercial agreement. Payment of these fees is in no way dependent on the results of this Report.

The Lead QP, responsible for the supervision and preparation of the technical content within this Report, is Eng. Porfirio Cabaleiro Rodriguez, a mining engineer with over 40 years of experience in Mineral Resource and Mineral Reserve classification. Eng. Rodriguez is a Professional of the Australian Institute of Geoscientists (FAIG). Eng. Rodriquez was assisted by:

- Geologist Leonardo Moraes Soares, MAIG
- Eng. Guilherme Gomides Ferreira, MAIG

Please refer to Appendix A for additional information regarding the responsible QP for each chapter of this Report. In accordance with NI 43-101 guidelines, each of the QPs, has visited the Xavantina Operations at least one time, with the majority of the QPs visiting on multiple occasions over the past several years, with the most recent visit detailed below:

Table 10 - Qualified Persons

Company	Qualified Person	Most Recent Site Visit	Responsibility
GE21	Porfirio Cabaleiro Rodriguez, FAIG	3 days duration September 28-30, 2020	Mineral Processing, Mining Methods and Planning, Recovery Methods, Infrastructure, Market Studies, Environment and Permitting, Capital and Operating Costs
GE21	Leonardo de Moraes Soares, MAIG	2 days duration September 27-28, 2022	Property Description, Accessibility, History, Geologic Setting, Deposit Types, Exploration, Drilling, Sample Preparation and Analysis, Data Verification, Mineral Resources
GE21	Guilherme Gomides Ferreira, MAIG	2 days duration September 27-28, 2022	Mineral Reserves, Mining Methods and Planning

2.3 Primary Sources of Information

In addition to the work undertaken by GE21 in 2018 corresponding to the first NI 43-101 compliant technical report on the Xavantina Operations and personal inspection of the Xavantina Operations during 2019, 2020 and/or, as the case may be, 2022 by each QP, GE21 continues to be involved in multiple discussions regarding processes and procedures relevant to advancing Xavantina's Mineral Resource and Mineral Reserve estimate, including surveying, sampling, QA/QC, and internal resource estimation methods, resulting in the authoring of this Report. The results of this Report have been generated from information compiled by the Xavantina technical team with review by GE21, which includes:

- Historical Exploration Activities;
- Mineral Processing and Metallurgical test data;
- Mining Methods;
- Data on Xavantina's Drilling Campaigns;
- Mineral Resource and Mineral Reserve estimates compiled by GE21;
- Xavantina databases; and
- Reports prepared by independent consultants. The reports were reviewed by GE21 and used exclusively to provide background on the mine and its operations.

2.4 Effective Date

The Effective Date of this Report is October 31, 2022.

2.5 Units of Measure

Unless otherwise stated, the units of measurement in this Report are all metrics in the International System of Units ("SI"). All monetary units are expressed in BRL or United States Dollars ("US$" or "USD"), unless otherwise indicated. Although substantively all costs are incurred in BRL, where applicable, these amounts have largely been converted to USD for presentation purposes.

3.0 RELIANCE ON OTHER EXPERTS

The authors of this Report are Qualified Persons as defined under NI 43-101, with relevant experience in mineral exploration, data validation, mine planning and Mineral Resource and Mineral Reserve estimation.

The information presented regarding the tenure, status and work permitted by permit type within the Xavantina Operations in Chapter 4 - Property Description and Location, is based on information published by the National Mining Agency of Brazil (Agência Nacional de Mineração, “ANM”) and is available to the public.

The gold market conditions and key contracts included in Chapter 19 - Market Studies and Contracts, and environmental licensing status information and work plans related to community and social outreach included in Chapter 20 - Environmental Studies, Permitting, and Social Impact, were prepared by Xavantina and Ero Copper and reviewed by GE21. GE21 determined that the economic factors used in the determination of specific technical parameters of this Report, including, gold, silver and the USD:BRL assumptions used were in-line with industry norms, broader market consensus and are acceptable for use in the current Mineral Resource and Mineral Reserve estimates presented herein. The authors of this Report have not identified any significant risks in the underlying assumptions, as in addition to the above, the underlying assumptions are in-line with spot market conditions as at the date of this Report.

The forecast capital expenditures and operating costs included in Chapter 21 - Capital and Operating Costs were prepared by Xavantina and Ero Copper based on the operating history of the operations and ongoing nature of the operations. The forecasts were reviewed against historic information and deemed to be reasonable and adequate for the purposes of NI 43-101 by the authors of this Report.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The properties that encompass the Xavantina Operations, and exploration licenses controlled by the Company, are located approximately 18 km from the town of Nova Xavantina in the eastern portion of the State of Mato Grosso, West-Central Brazil. The mine is located approximately 660 km east of Cuiabá, the capital of Mato Grosso and approximately 710 km northwest of Brasília, the capital city of Brazil. The properties are centered at UTM coordinates 339000E, 8381000N (UTM zone 22S, SAD69).

Figure 1 - Xavantina Operations location map (Xavantina, 2022)

Primary access to the properties is from the airport at Barra do Garças, featuring daily flights to Cuiabá, via federal and state highways. From the Barra do Garças airport, it is approximately 150 km to the town of Nova Xavantina (population of approximately 21,000 people) via BR-158. From the center of Nova Xavantina, the mine gate is located approximately 18 km west on a well-maintained year-round dirt road.

4.2 Mineral Title in Brazil

Mining legislation as it relates to mineral title in Brazil has been in place since 1967, and the last significant amendment took place in 1996. In 2017, there were changes to the institutional framework and to statutory royalty (Compensação Financeira pela Exploração de Recursos Minerais, "CFEM") legislation. Institutionally, a new National Mining Agency (Agência Nacional de Mineração, "ANM") was created to replace the National Department for Mineral Production (Departamento Nacional de Produção Mineral, "DNPM"). As it relates to the statutory royalty, new legislation enacted in December 2017 established new rates for mineral substances and excluded deductions previously allowed, such as transportation and insurance costs. The royalty rate on gold production is 1.5% of the gross revenue from sales, with the deduction of marketing taxes. The laws that introduced such changes were enacted prior to the Effective Date of this report.

In addition to the changes in legislation described above, in June 2018, the Federal Government enacted new regulations to the Mining Code. The purpose of the new regulations is to modernize parts of the previous legislation that do not require legislative action (i.e. no amendments to the Mining Code are required). These changes do not affect the methods for granting mineral rights, nor establish investment commitments per license, but rather seek to ease the transition process from Exploration to Mining Licenses in as much as the Mining Code allows, particularly as it relates to supplementary work performed after the submission of a final exploration report. As of the Effective Date of this Report, the authors do not anticipate any significant change in Brazil's mining legislation that would adversely impact the operations of the Company. The new regulations are designed to simplify administrative processes for mining titles with the aim of stimulating the free market and forming new business environments.

4.3 Mining Legislation, Administration and Rights

The primary mining legislations in Brazil are the 1988 Federal Constitution and the 1967 Federal Mining Code (Decree-law No. 227), as amended over time. Minerals on the ground are a property of the Federal Government, and, therefore, mining legislation can only be enacted at the federal level. The ANM is the federal agency entitled to manage, regulate and supervise mining activities in Brazil, along with the Ministry of Mines and Energy ("MME"). Exploration rights are granted by the ANM and, in most of the cases, mining concessions are granted by the MME. Brazilian citizens and legal entities incorporated in Brazil may carry out mineral exploration under authorization of the federal government. In general, there are no restrictions on foreign participation in these entities.

Landowners and governments (municipal, state and federal) are entitled to a royalty. The CFEM rate varies from 1.0% to 3.5%, depending on the substance. If any minerals are extracted from private lands that are not owned by the titleholder, the landowner is entitled to a royalty equal to 50% of the statutory CFEM royalty. Xavantina's operations for gold are subject to a 1.5% royalty on gross metal sales net of taxes levied on sales.

Exploration license holders are entitled to access their license area and work on it whether it is public or privately held, but such holders must compensate the owner or occupier of the surface rights for losses caused by the work (indemnification) and for the occupation of the land (rent). Compensation may be negotiated on a case-by-case basis, but the Mining Code provides that, should a court of law be required to set the amounts, the rent for occupation of the land cannot exceed the maximum net income that the owner or occupier would earn from its agricultural-pasture activity in the area of the property to be explored, and the indemnification cannot exceed the assessed value of the area of the property intended for exploration.

In response to the Brumadinho disaster, new regulations and laws regarding the design, operation, monitoring and security of tailings dams were enacted as described below:

- Federal Law No. 14,066 made public on October 1, 2020, amending the National Dam Safety Policy to regulate control and monitoring actions for mining dams;
- CNRH Resolution No. 223 was published on February 1, 2021, updating the national information system on Dam Safety; and,
- ANM Resolution No. 95 was published on February 16, 2022, consolidating several resolutions about the applicable regulatory measures for mining dams: mining dam national registry; the minimum qualification of the technicians; regular and special safety inspections, the criteria for periodic review, emergency action plan, and dam safety declaration.

As a result of these new regulations, the Xavantina Operations expanded the scope of its dam management and safety system, complying with current regulations and good market practices.

The authors of this report have reviewed these operational conditions and have not identified any risk factors associated with compliance with the new legislation nor any potential impacts on the extraction of the current Mineral Reserves.

4.4 Exploration Licenses and Mining Concessions

Exploration licenses are granted for up to three-year periods and may be renewed for another three years on the approval of an ANM inspection and satisfaction of environmental requirements. The size of an individual license area ranges from 50 ha to 10,000 ha depending on the state and the mineral substance.

Exploration license holders are entitled to access the exploration areas and conduct exploration activities. The holders must compensate landowners and obtain proper environmental licenses prior to conducting work.

If the exploration works are deemed successful with the identification of a resource, the titleholder shall submit to ANM an exploration report. Upon the analysis and approval of the exploration report by the ANM, the titleholder shall have the exclusive right to apply for the mining concession within a one-year term counted as from the publication of the ANM approval.

The application for the mining concession shall include detailed geological and geophysical information of the related area, as long as a mine development plan and a closure plan. The mining concession shall also be granted by the MME once, in addition to the ANM reviewing and approving all technical materials, the titleholder presents the corresponding environmental installation licence of the project.

Annual license fees for Exploration Licenses are based on size and are calculated at R$4.33/ha for the first license term and R$6.48/ha in subsequent terms. Each license holder must submit an exploration plan, budget and timeline, although there is no work or expenditure requirement. Licenses require an interim report two-months prior to license expiration (if an extension is to be applied for), describing exploration results, interpretation and expenditures. The renewal of a license may be granted at the discretion of the ANM considering the exploration works performed by the holder. A final report is due at the end the term or on relinquishment of the license.

In addition to royalty amounts, Xavantina pays a Rural Property Tax (“ITR”) to the Brazilian Federal Government annually based on its total land holdings.

4.5 Xavantina Mineral Rights

As of the Effective Date, properties held by Xavantina consist of one mining concession covering 613.7 ha, 21 adjacent mining exploration licenses covering a total of 133,155.87 and one right to request mining permit covering 17.9 ha. One additional tenement, covering 2,581.4 ha, is currently being tendered/released by Xavantina. The land area encompassing the Xavantina properties is shown below in Figure 2. The mine was granted a mining permit by the ANM under process number 866269/1990, and all of the properties are further detailed below.

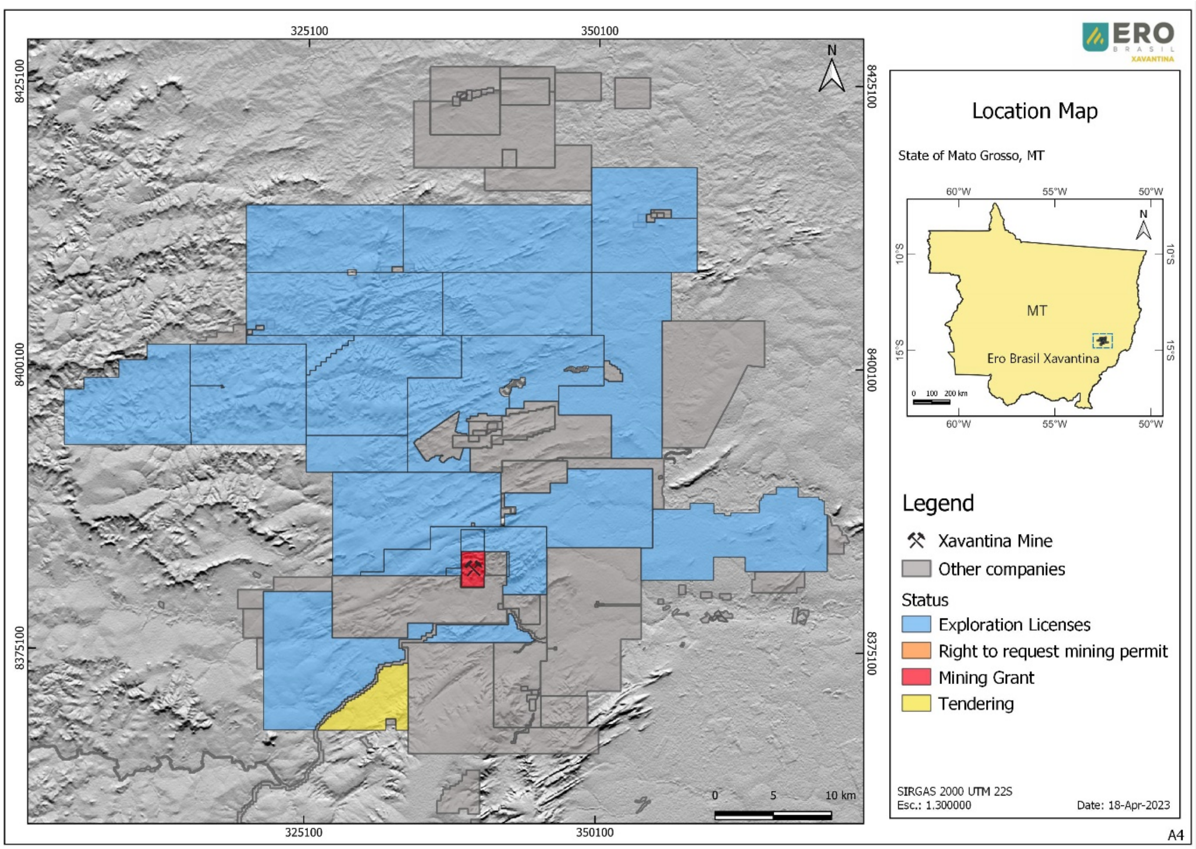


Figure 2 - Xavantina mineral concessions map (Xavantina, 2022)

Table 11 - Xavantina Mineral Concessions

ANM Process Number	Area (ha)	ANM Status	Owner	Expiration
866577/2022	8,644.12	Exploration License	Nx Gold	31-Mar-2026
866576/2022	1,158.30	Exploration License	Nx Gold	31-Mar-2026
866191/2022	9,666.14	Exploration License	Nx Gold	14-Dec-2025
867666/2021	4,571.79	Exploration License	Nx Gold	17-Mar-2024
867091/2021	7,718.85	Exploration License	Nx Gold	03-May-2025
867090/2021	2,827.98	Exploration License	Nx Gold	29-Nov-2024
867089/2021	9,918.57	Exploration License	Nx Gold	29-Nov-2024
867087/2021	8,229.12	Exploration License	Nx Gold	15-Mar-2025
867086/2021	9,669.87	Exploration License	Nx Gold	15-Mar-2025
867085/2021	7,991.81	Exploration License	Nx Gold	15-Mar-2025
867084/2021	7,138.69	Exploration License	Nx Gold	29-Nov-2024
867083/2021	9,337.68	Exploration License	Nx Gold	24-Nov-2024
867082/2021	8,795.77	Exploration License	Nx Gold	29-Nov-2024
866104/2021	1,296.46	Exploration License	Nx Gold	01-Oct-2024
866081/2021	9,693.21	Exploration License	Nx Gold	30-May-2025
866208/2018	394.17	Exploration License	Nx Gold	11-Feb-2023
866207/2018	84.73	Exploration License	Nx Gold	11-Feb-2023
866320/2017	43.99	Exploration License	Nx Gold	30-Mar-2024
866685/2014	9,325.20	Exploration License	Nx Gold	18-Aug-2025
866015/2014	7,098.54	Exploration License	Nx Gold	13-May-2023
866013/2014	9,550.88	Exploration License	Nx Gold	13-May-2023
Sub-total Hectares:	**133,155.87**	**Exploration License**		
866120/2013	17.87	Right to request mining permit	Nx Gold	09-Jan-2024
866269/1990	613.72	Mining Grant	Nx Gold	-
866103/2021	2,581.43	Tendering	Nx Gold	-
Sub-total Hectares:	**3,213.02**			
Total Hectares:	**136,368.89**	**Total area**		

As of the date of this Report, all mineral rights and exploration licenses controlled by the Company were in good standing.

4.6 Land Access

All surface rights for the area encompassing the mine, the current Mineral Resources and Mineral Reserves, and associated infrastructure is owned by Xavantina.

Xavantina does not own surface rights on the Exploration Licenses and as at the Effective Date, there were no contracts or obligations with any of the neighboring landowners. Within the Exploration Licenses, the main activities are concentrated in small rural cattle ranches and farms that occupy approximately 50 percent of the surface area within the Exploration Licenses. Prior to Xavantina conducting any exploration activities within the Exploration Licenses, permission is requested from the landowners. As at the date of this Report, Xavantina has received consent from local landowners to conduct regional exploration activities, and the authors have not identified any risks associated with land access.

4.7 Environmental Permits, Previous Studies and Considerations

All environmental permits supporting the current operations were first filed with the Environmental Secretary of Mato Grosso (SEMA) in 2007. The Environmental Impact Study (EAI; Process number 296438/2007) and Environmental Impact Report (RIMA; 296438/2007) were subsequently approved along with Xavantina's Environmental Control Plan (PCA) by SEMA (217586/2008). Subsequently, the Installation License was received, allowing for construction to commence. Following construction and commissioning of the mine, Xavantina was issued its Operating License. Continuous environmental monitoring associated with the Operating License is mandatory and carried out by the Company in partnership with the State University of Mato Grosso (UNEMAT).

All environmental monitoring required to be carried out by Xavantina is in good standing, and no new licenses are required to conduct the contemplated operations and work programs described in this Report. The authors of this Report are not aware of any material environmental or permit risks to the current operations nor the forecasted production plan associated with the current Mineral Reserves. In addition, GE21 is not aware of any other significant risks that may affect access, title, or the right or ability to perform the recommended work program on the property.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

5.1 Accessibility

Primary access to the properties is from the airport at Barra do Garças, featuring daily flights to Cuiabá, via federal and state highways. From the Barra do Garças airport, it is ~150 km to the town of Nova Xavantina (population of approximately 21,000 people) via BR-158. From the center of Nova Xavantina, the mine gate is located approximately 18 km west on a well-maintained year-round dirt road.

The proximity of the mine gate to the town of Nova Xavantina provides ample housing for mine employees as well as third-party contractors. There is daily bus service from town to the mine site. The town of Nova Xavantina has several hotels, elementary and secondary schools, a university, athletic facilities, medical facilities, as well as numerous shops and restaurants.

5.2 Physiography

The properties comprising the Xavantina Operations exhibit a rugged relief featuring erosional controlled valleys and slopes with localized topographic variations of more than 50 meters, with the highest elevations at the northern center of the properties. Vertical relief in the southern-most portions of the properties, closer to the Mortes River is less rugged, with vertical relief of less than 10 meters. Drainage across the properties is from the North to South (towards the Mortes River).

5.3 Climate

The local climate in the region of Nova Xavantina and its surroundings can be classified as monsoon-influenced humid subtropical, or Cwa per the Köppen climate classification system. The region can be further characterized as having two well-defined seasons: (i) a relatively dry and cooler period extending between April and September with average temperatures of approximately 19.5°C and (ii) a wet and hot period from October to March with average temperatures of approximately 33.2 °C.

Average annual precipitation in the region is approximately 1,540 mm per annum. The distribution of rainfall is axiomatic of the Cerrado (“Savanna”) region of Mato Grosso, where approximately 92% of the precipitation occurs during the rainy season from October to March. The operating season at the Xavantina Operations is year-round, including exploration activities.

5.4 Vegetation

The primary type of vegetation in the vicinity of the mine is a subsystem called “cerrado sensu stricto”, which can be classified by having two primary types of vegetaton: dense semi-tropical trees growing up to 6 meters in height and intercollated grasslands. Trees typically grow in dense patches primarily on the flat to gently undulating relief as well as on hillsides. Areas of open grasses are found on steeper hillsides where soils are shallow, or flat lying areas where soil depth is limited. Along watercourses, mainly the Santo Antônio

Stream and the Mortes River, gallery forests are observed, which provides a stark contrast with the trees typical of the region.

5.5 Infrastructure

The mine infrastructure is entirely contained within the Company's single Mining Concession where surface rights are held by the Company. Primary infrastructure associated with mining and processing operations includes the mine portal, processing plant, waste piles, paste fill plant, tailings ponds, an area of operational support (laboratory, maintenance, supplies among others), administrative offices, security gate, medical clinic, cafeteria, surface water runoff capture site, groundwater well and a gravel airstrip used for doré transport from site. The layout of the mine with key infrastructure is shown in Figure 3.

Figure 3 - Xavantina Operations property layout (Xavantina, 2022)

5.5.1 *Mine Ramp*

The underground mine is accessed via a single primary ramp to surface (which intersects a crosscut between the Brás and Buracão veins). The ramp contains fixed structures such as electrical infrastructure, pumps, compressors, exhaust fans, cooling fans, and ducts and pipelines for ventilation and water. The mine portal is shown below in Figure 4.

Figure 4 - Mine Portal (Xavantina, 2022)

5.5.2 *Processing Plant*

The Xavantina Plant processes ore produced from the mine into finished doré bars containing gold and silver. This plant occupies a large portion of the primary Mining Concession and is subdivided into specific areas of processing. The plant area is composed of primary and secondary crushers, conveyor belts, an apron feeder, grinding facilities, gravity separation, a recently installed regrind mill, flotation, carbon-in-leach (CIL), elution, desorption, electrodeposition, and a foundry.

5.5.3 *Waste Piles*

Inert waste rock and dried inert process tailings (removed periodically from the inert tailings pond) are stored in historically mined areas (garimpeiro open pit workings) which are prevalent throughout the area, as well as in a fully-permitted permanent dried-tailings storage facility north of the mine, which is currently in use.

5.5.4 *Tailings Storage Facilities*

There are two separate tailings storage facilities on the property. Tailings generated from flotation, that have not been in contact with cyanide solution are disposed of into a pond near the mine designed for inert tails. The inert tailings pond is designed with two cells which allows coarse and fine suspended solids to preferentially settle within the cell in operation. Water at the far end of each cell is collected and recycled for use in the processing plant resulting in approximately 90% recovery of process water. Cells from the inert tailings pond are periodically cleaned by removing the thickened tails. Thickened inert tails historically have been deposited within the historic garimpeiro open pit workings, which are subsequently revegetated and reclaimed by the Company. A fully-permitted permanent dried-tailings storage facility for inert tailings storage north of the processing facility is currently in use.

Tailings from the CIL process are comprised of a mix of solids and a solution that is elevated in cyanide. As a result, these tails are disposed of in an impervious dam constructed with a double layer of high-density polyethylene membranes (“HDPE”). Between the HDPE membranes, there is a system for leak detection and sand drainage so that if any leaks occur, the solution will be transported by gravity to a secondary containment pond where the solution would be pumped back into the primary dam. Clarified water is transported by gravity from the dam to the Company’s cyanide detoxification plant, which reduces the cyanide concentration in solution. After detoxification, water is transported to a separate process water storage unit where the detoxified water is ultimately recycled to the process plant for use along with reclaimed water from the inert tailings pods and captured surface run-off.

As a result of changes to the national dam safety policy in October of 2020, the operating freeboard level of the non-inert tailings dam was lowered by approximately five meters.

5.5.5 *Paste Fill Plant*

The paste fill plant was implemented in 2021, and the filling of the first stopes commenced during the first quarter of the same year. The final product of the system has geomechanical characteristics that ensure the stability and mechanical strength of the pillars, as required.

5.5.6 *Operational Support*

The operational support area includes the Company’s laboratory, supplies warehouse, fuel station, storerooms for explosives, an industrial maintenance facility as well as a fleet and equipment maintenance facility.

5.5.7 *Administrative Offices and Support*

The administrative offices and ancillary support buildings include the Company's primary administrative offices, security gate, occupational health and medicine, human resources, cafeteria, and technical support offices including geology and mine planning.

5.5.8 *Medical Clinic*

The medical clinic located on site provides simple and emergency stabilizing care. The medical clinic has a fully equipped ambulance to transport employees and contractors from site to the municipal hospital in Nova Xavantina (approximately 18 km from Xavantina) for medical emergencies.

5.5.9 *Water Supply*

Water is available in sufficient quantities to support the contemplated mining and processing operations of the mine. While in excess of 90% of the Company's mining and processing water use is derived from mine dewater and surface run-off capture, a water station for the mine's primary fresh water source is located along the banks of the Mortes River. The water supply along the river consists of an electric gen-set and a 150 hp water pump. The pumping capacity of the water station is 150 m^3/h, Water is fed via pipeline from the Mortes River to a storage reservoir located at the mine. As of the Effective Date of this Report, the operations are not using any water from the Mortes River.

In addition, the Company maintains an underground water well for fresh water that supplies the Company's non-industrial facilities including administrative offices. The well has a capacity to provide approximately 5.0 m^3/h of water.

5.5.10 *Gravel Airstrip*

The gravel airstrip located on the mine property measures 1,200 meters in length and is used to fly out doré bars produced by the Company. The airstrip is maintained by Xavantina.

5.5.11 *Energy Supply Infrastructure*

Electrical power is provided to the mine from the substation in Nova Xavantina via a 34.5 kV power line (with the potential for 600 kVA) installed and maintained by the Energy Supply Company of Mato Grosso (ENERGISA S/A).

6.0 HISTORY

The documented knowledge of gold occurrences near the Nova Xavantina Mine dates back to the middle of the 17th century during early exploration by the Bandeirantes. Historically, the area was known as Garimpo do Aráes, and was the subject of significant garimpeiro mining activity that first focused on secondary gold deposits/alluvium near the Mortes River, and later the extraction of primary ore from weathered outcropping of gold-bearing quartz veins. During the 1980's, a gold rush in Brazil brought up to an estimated 5,000 artisanal miners (garimpeiros) to extract gold in several sectors of the property, initially in open pits targeting the weathered gold-bearing quartz vein to a maximum depth of approximately 50 meters. Additionally, garimpeiros dug over 70 small shafts and adits to a depth of approximately 70 meters. Occurrences of historic mine shafts reaching over 100 meters have been found on the property.

In the late 1980's garimpeiro activity declined due to the depth of the shafts, the cost of pumping, and low gold prices.

In 1990, engineering company Paulo Abib Engineering carried out geological and metallurgical studies and initiated negotiations with the remaining garimpeiros on site. Mineração Nova Xavantina Ltda. was then co-founded by Paulo Abib Engineering, Andrade Gutierrez Group, and Brazilian Copper Company (CBC) to formalize exploration and development of the project. In 1992, the Andrade Gutierrez Group took the lead in the area by carrying out topographic surveys and geological mapping.

In 1995, under a new company name, Nova Xavantina Mineração Ltda., testwork was performed to test the continuity of the veins to a depth of up to 300 meters. Drill company GEOSOL completed 8 diamond drill holes for a total of 2,306 meterrs in the Brás and Buracão veins.

In 2003, Nova Xavantina Mineração Ltda., despite having received authorization for mining from the DNPM, failed to submit the Economic Development Plan (PAE) related to social stability in the region, and as a result, the mineral rights became available.

In May 2004, following the release of the *Availability Notice nº 162/2004, DNPM - MT released, DNPM process nº 866.269/1990*, whereby the property had become available for application, six companies applied for the mineral exploration and mining rights at the Xavantina Operations. The list included IMS Empreendimentos Ltda, Sertão Mineração Ltda, Brazmin Ltda, São Bento Mineração Ltda, Coopermine (Ore Producers Cooperative of Nova Xavantina, MT) and MCSA. The mineral exploration and mining rights for the Mining Concession were granted to MCSA.

Between 2007 and 2009, MCSA conducted a new drilling program to confirm the continuity of the Buracão and Brás veins and to increase the quality of the geological information. The drill program(s) undertaken by MCSA included 29,649 meters in 153 diamond drill holes. In September 2009, MCSA commenced construction of the mine portal and primary ramp and commercial production commenced in May 2012. During 2012, MCSA drilled a total of

11,486 meters in 51 surface drill holes and 1,895 meters in 32 underground drill holes in support of the mining operations.

In 2013, the property was transferred to NX Gold S/A, a subsidiary of MCSA. Between 2013 and 2015, the Company drilled a total of 27,822 meters in 104 surface diamond drill holes and an additional 9,427 meters in 107 underground diamond drill holes. Other exploration activities during this period included geological mapping and a 1,969 line-kilometer airborne magnetic survey.

6.1 Previous Mineral Resource and Mineral Reserve Estimates

2018 Mineral Resource and Mineral Reserve Estimate

In 2018, Ero Copper released a Mineral Resource and Mineral Reserve estimate for the Xavantina Operations in a report titled "Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina", dated January 21, 2019 with an effective date of August 31, 2018, prepared by Porfirio Cabaleiro Rodrigues, MAIG, Leonardo Apparicio da Silva, MAIG, and Leonardo de Moraes Soares, MAIG, all of GE21 (the "2018 Technical Report"). Each of Porfirio Cabaleiro Rodrigues, MAIG, Leonardo Apparicio da Silva, MAIG, and Leonardo de Moraes Soares, MAIG was a "qualified person" and "independent" of Ero Copper within the meanings of NI 43-101.

The detailed economic, geotechnical and engineering parameters used for the Mineral Resource and Mineral Reserve estimates are described in detail in the 2018 Technical Report. The 2018 historical Mineral Resource and Mineral Reserve estimate has been provided for reference purposes only. Ero Copper is not treating this 2018 estimate as the current Mineral Resources or Mineral Reserves.

Table 12 - 2018 Mineral Resource Estimate

Deposit	Classification	Tonnes (kt)	Au (g/t)	Au (koz)
Brás Vein	Indicated	80.9	15.04	39.1
	Inferred	*39.6*	*18.96*	*24.1*
Buracão Vein	Indicated	4.8	30.39	4.7
	Inferred	*1.7*	*23.54*	*1.3*
Total	**Indicated**	**85.7**	**16.01**	**44.1**
	Inferred	***41.3***	***19.13***	***25.4***

1. Effective date of August 31, 2018.
2. Presented Mineral Resources inclusive of Mineral Reserves. All figures have been rounded to reflect the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Cut-off gold grade of 1.40 g/t.
4. Mineral Resource estimated by ordinary kriging inside 10m by 10m by 2m blocks (sub-blocks of 2.5m by 2.5m by 0.5m).

Table 13 - 2018 Mineral Reserve Estimate

Deposit	Probable Reserves	Tonnage (kt)	Au Grade (g/t)	Au Total (koz)
Brás Vein	Planned Stopes	60.9	11.40	22.4
	Gallery Development	2.5	11.00	0.9
	Probable Reserves	**63.4**	**11.40**	**23.3**
Buracão Vein	Planned Stopes	1.9	13.80	0.8
	Gallery Development	0.5	6.60	1.1
	Probable Reserves	**2.4**	**12.30**	**1.9**
Total Probable Reserves		**65.8**	**11.40**	**25.2**

1. Effective date of August 31, 2018.
2. All figures have been rounded to reflect the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Reserve cut-off gold grade of 3.2 g/t.
4. The Mineral Reserve estimates are prepared in accordance with the CIM Standards, and Guidelines, using geostatistical and/or classical methods, plus economic and mining parameters appropriate for the deposit. Mineral Reserves are based on a long-term gold price of US$1,250 per oz, and a USD:BRL foreign exchange rate of 3.20. Mineral Reserves are the economic portion of the Indicated Mineral Resources. Mineral Reserve estimates include mining dilution at 5% grading 0.5g/t Au and 7% grading 0.5g/t Au for the Brás and Buracão veins, respectively. Practical mining shapes (wireframes) were designed using geological wireframes / Mineral Resource block models as a guide.
5. Assumes mining dilution of 5% grading 0.5g/t Au and 7% grading 0.5g/t Au for the Brás and Buracão veins, respectively.
6. Mining recovery of 95%.

2019 Mineral Resource and Mineral Reserve Estimate

In 2019, Ero Copper released a Mineral Resources and Mineral Reserves estimate for the Xavantina Operations in a report titled “Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina”, dated February 3, 2020 with an effective date of September 30, 2019, prepared by Porfirio Cabaleiro Rodrigues, MAIG, Leonardo de Moraes Soares, MAIG, and Paulo Roberto Bergmann, FAusIMM, all of GE21 (the “2019 Technical Report”). Each of Porfirio Cabaleiro Rodrigues, MAIG, Leonardo de Moraes Soares, MAIG and Paulo Roberto Bergmann, FAusIMM, was a “qualified person” and “independent” of Ero Copper within the meanings of NI 43-101.

The detailed economic, geotechnical and engineering parameters used for the Mineral Resource and reserve estimates are described in detail in the 2019 Technical Report. The 2019 historical Mineral Resource and Mineral Reserve estimate has been provided for reference purposes only. Ero Copper is not treating this 2019 estimate as the current Mineral Resources or Mineral Reserves.

Table 14 - 2019 Mineral Resource Estimate

Deposit		Classification	Tonnes (kt)	Au (g/t)	Au (koz)
Brás	Zone 1	Indicated	26.3	8.32	7.0
		Inferred	-	-	-
	Zone 2	Indicated	6.9	3.36	0.7
		Inferred	*149.3*	*4.81*	*23.1*
	Total	**Indicated**	**33.2**	**7.29**	**7.8**
		Inferred	***149.3***	***4.81***	***23.1***
Buracão	Zone 1	Indicated	5.8	23.08	4.3
		Inferred	-	-	-
	Zone 2	Indicated	-	-	-
		Inferred	*7.7*	*2.77*	*0.7*
	Total	**Indicated**	**5.8**	**23.08**	**4.3**
		Inferred	***7.7***	***2.77***	***0.7***
Santo Antônio		**Indicated**	**403.7**	**12.53**	**162.6**
		Inferred	***164.2***	***11.31***	***59.7***
Matinha		**Indicated**	**-**	**-**	**-**
		Inferred	***149.0***	***12.15***	***58.2***
Total		**Indicated**	**442.6**	**12.28**	**174.7**
		Inferred	***470.2***	***9.37***	***141.7***

1. Mineral Resource effective date of August 31, 2019.
2. Presented Mineral Resources inclusive of Mineral Reserves. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Resource gold cut-off grade of 1.20 gpt gold. Mineral Resources have been estimated using ordinary kriging inside 10.0m x 10.0m x 2.0m block sizes with minimum sub-block sizes of 1.25m x 1.25m x 0.5m. Mineral Resource estimates were prepared in accordance with the CIM Standards, and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines, adopted by CIM Council on November 23, 2003 (the 'CIM Guidelines"), using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit.

Table 15 - 2019 Mineral Reserve Estimate

Deposit		Reserve Class	Tonnes (kt)	Au (g/t)	Au (koz)
Brás	Zone 1	Proven	-	-	-
		Probable	3.0	3.83	0.4
Buracão	Zone 1	Proven	-	-	-
		Probable	2.7	5.42	0.5
Santo Antônio		Proven	-	-	-
		Probable	373.2	11.45	137.4
Total		**Proven**	**-**	**-**	**-**
		Probable	**378.9**	**11.35**	**138.2**

1. Mineral Reserve effective date of September 30, 2019.
2. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Reserve estimates were prepared in accordance with the CIM Standards and the CIM Guidelines, using geostatistical and/or classical methods, plus economic and mining parameters appropriate for the deposit. Mineral Reserves are based on a long-term gold price of US$1,350 per oz, and a USD:BRL foreign exchange rate of 3.80. Mineral Reserves are the economic portion of the Indicated Mineral Resources. Mineral Reserve estimates include operational dilution of 10% plus planned dilution of approximately 10% within each stope. Assumes mining recovery of 90% and pillar recovery of 60%. Practical mining shapes (wireframes) were designed using geological wireframes / Mineral Resource block models as a guide.

2020 Mineral Resource and Mineral Reserve Estimate

In 2020, Ero Copper released a Mineral Resources and Mineral Reserves estimate for the Xavantina Operations in a report titled “Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina”, dated January 8, 2021 with an effective date of September 30, 2020, prepared by Porfirio Cabaleiro Rodrigues, FAIG, Paulo Roberto Bergmann, FAusIMM, Bernardo Horta de Cerqueira Viana, MAIG and Leonardo de Moraes Soares, MAIG, all of GE21 for technical information and assumptions related to the 2020 Mineral Reserve and Mineral Resource estimate (the “2020 Technical Report”). Each of Porfirio Cabaleiro Rodrigues, MAIG, Paulo Roberto Bergmann, FAusIMM, Bernardo Horta de Cerqueira Viana, MAIG and Leonardo de Moraes Soares, MAIG, was a “qualified person” and “independent” of Ero Copper within the meanings of NI 43-101.

The detailed economic, geotechnical and engineering parameters used for the Mineral Resource and reserve estimates are described in detail in the 2020 Technical Report. The 2020 historical Mineral Resource and Mineral Reserve estimate has been provided for reference purposes only. Ero Copper is not treating this 2020 estimate as the current Mineral Resources or Mineral Reserves.

Table 16 - 2020 Mineral Resource Estimate

Deposit	Classification	Tonnes (kt)	Au (g/t)	Au (koz)
Brás	Indicated	6.9	3.36	0.7
	Inferred	*149.3*	*4.81*	*23.1*
Buracão	Indicated	-	-	-
	Inferred	*7.7*	*2.77*	*0.7*
Santo Antônio	Indicated	763.3	10.97	269.2
	Inferred	*267.8*	*13.08*	*112.6*
Matinha	Indicated	-	-	-
	Inferred	*149.0*	*12.15*	*58.2*
Total	**Indicated**	**770.2**	**10.90**	**269.9**
	Inferred	***573.8***	***10.55***	***194.6***

1. Mineral Resource effective date of August 31, 2020.
2. Presented Mineral Resources inclusive of Mineral Reserves. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Resource gold cut-off grade of 1.20 gpt gold. Mineral Resources have been estimated using ordinary kriging inside 10.0m x 10.0m x 2.0m block sizes with minimum sub-block sizes of 1.25m x 1.25m x 0.2m. The Mineral Resource estimates were prepared in accordance with the CIM Standards, and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines, adopted by CIM Council on November 23, 2003 (the ‘CIM Guidelines”), using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit.

Table 17 - 2020 Mineral Reserve Estimate

Deposit	Reserve Class	Tonnes (kt)	Au (g/t)	Au (koz)
Brás	Proven	-	-	-
	Probable	-	-	-
Buracão	Proven	-	-	-
	Probable	-	-	-
Santo Antônio	Proven	-	-	-
	Probable	862.1	8.83	244.7
Total	**Proven**	**-**	**-**	**-**
	Probable	**862.1**	**8.83**	**244.7**

1. Mineral Reserve effective date of September 30, 2020.
2. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Reserve estimates were prepared in accordance with the CIM Standards and the CIM Guidelines, using geostatistical and/or classical methods, plus economic and mining parameters appropriate for the deposit. Mineral Reserves are based on a long-term gold price of US$1,650 per oz of gold, and a USD:BRL foreign exchange rate of 5.00. Mineral Reserves are the economic portion of the Indicated Mineral Resources. Mineral Reserve estimates include operational dilution of 17.4% plus planned dilution of approximately 8.5% within each stope for room-and-pillar mining areas and operational dilution of 3.2% plus planned dilution of 21.2% for cut-and-fill mining areas. Assumes mining recovery of 92.5% and 94.7% for room-and-pillar and cut-and-fill areas, respectively. Practical mining shapes (wireframes) were designed using geological wireframes / Mineral Resource block models as a guide

2021 Mineral Resource and Mineral Reserve Estimate

In 2021, Ero Copper released a Mineral Resources and Mineral Reserves estimate for the Xavantina Operations in a press release titled “Ero Copper announces updated Mineral Reserves and resources for the MCSA Mining Complex and the NX Gold Mine”, dated January 6, 2022 (the “2021 Mineral Resource and Mineral Reserve Press Release”). Mineral Resource and Mineral Reserves have an effective date of September 30, 2021, and were prepared by Estimates for the MCSA Mining Complex and the NX Gold Mine are prepared by or under the supervision of and verified by Mr. Emerson Ricardo Re, MSc, MBA, MAusIMM (CP) (No. 305892), Registered Member (No. 0138) (Chilean Mining Commission) and former Resource Manager of the Company, who is a Qualified Person as such term is defined under NI 43 101.

The detailed economic, geotechnical and engineering parameters used for the Mineral Resource and reserve estimates are described in detail in the 2021 Mineral Resource and Mineral Reserve Press Release. The 2021 historical Mineral Resource and Mineral Reserve estimate has been provided for reference purposes only. Ero Copper is not treating this 2021 estimate as the current Mineral Resources or Mineral Reserves.

Table 18 - 2021 Mineral Resource Estimate

Deposit	Classification	Tonnes (kt)	Au (g/t)	Au (koz)
Brás & Buracão	Measured	-	-	-
	Indicated	7	3.36	0.7
	Inferred	*157*	*4.71*	*23.8*
Santo Antônio	Measured	-	-	-
	Indicated	950	10.56	322.4
	Inferred	*248*	*2.99*	*23.9*
Matinha	Measured	-	-	-
	Indicated	124	8.55	34.1
	Inferred	*310*	*10.47*	*104.2*
Total	**Measured**	**-**	**-**	**-**
	Indicated	**1,081**	**10.28**	**357.3**
	Inferred	***714***	***6.61***	***151.9***

1. Mineral Resource effective date of September 30, 2021.
2. Presented Mineral Resources inclusive of Mineral Reserves. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Resource gold cut-off grade of 1.20 gpt gold. Mineral Resources have been estimated using ordinary kriging inside 10.0m x 10.0m x 2.0m block sizes with minimum sub-block sizes of 1.25m x 1.25m x 0.5m. The Mineral Resource estimates were prepared in accordance with the CIM Standards, and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines, adopted by CIM Council on November 23, 2003 (the

'CIM Guidelines"), using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit.

Table 19 - 2021 Mineral Reserve Estimate

Deposit	Reserve Class	Tonnes (kt)	Au (g/t)	Au (koz)
Brás & Buracão	Proven	-	-	-
	Probable	-	-	-
Santo Antônio	Proven	-	-	-
	Probable	958	9.01	277.5
Matinha	Proven	-	-	-
	Probable	146	6.26	29.4
Total	**Proven**	**-**	**-**	**-**
	Probable	**1,104**	**8.64**	**306.8**

1. Mineral Reserve effective date of September 30, 2021.
2. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Reserve estimates were prepared in accordance with the CIM Standards and the CIM Guidelines, using geostatistical and/or classical methods, plus economic and mining parameters appropriate for the deposit. Mineral Reserves are based on a long-term gold price of US$1,650 per oz of gold, and a USD:BRL foreign exchange rate of 5.00. Mineral Reserves are the economic portion of the Indicated Mineral Resources. Mineral Reserve estimates include operational dilution of 17.4% plus planned dilution of approximately 8.5% within each stope for room-and-pillar mining areas and operational dilution of 3.2% plus planned dilution of 21.2% for cut-and-fill mining areas. Assumes mining recovery of 92.5% and 94.7% for room-and-pillar and cut-and-fill areas, respectively. Practical mining shapes (wireframes) were designed using geological wireframes / Mineral Resource block models as a guide.

6.2 Exploration and Drilling

There has been a considerable amount of both surface and underground drilling performed on the property during pre-production and after the start of commercial production. Pre-production drilling totalled 161 surface drill holes for a total of 31,955 meters, and after the start of commercial production in 2012 an additional 402 drill holes were drilled from surface and 183 drill holes were drilled from underground in support of the operations. Total drilling on the property prior to the Effective Date is 200,213 meters from surface and 19,798 meters from underground, as summarized in Table 17.

Table 20 - Historical Drilling

17	Surface Drilling			Underground Drilling		
Year	**Drill Holes**	**Meters**	**Core Size**	**Drill Holes**	**Meters**	**Core Size**
2006	8	2,306	NQ	-	-	-
2007	81	17,619	NQ	-	-	-
2008	70	11,531	NQ	-	-	-
2009	2	499	NQ	-	-	-
2010	-	-	-	-	-	-
2011	-	-	-	-	-	-
2012	52	11,581	NQ	31	1,799	NQ/BQ
2013	37	9,514	NQ/BQ	63	4,893	NQ/BQ
2014	43	12,494	NQ/BQ	29	2,752	NQ/BQ
2015	24	5,794	NQ/BQ	15	1,781	NQ/BQ
2016	-	-	-	-	-	-
2017	-	-	-	-	-	-
2018	59	25,697	NQ/BQ	-	-	-
2019	58	27,798	HQ/NQ/BQ	13	2,437	NQ/BQ
2020	37	20,639	HQ/NQ/BQ	-	-	-
2021	61	38,012	HQ/NQ/BQ	-	-	-
2022	31	16,729	NQ/BQ	32	6,136	NQ/BQ
Total	**563**	**200,213**		**183**	**19,798**	

6.3 Historical Production

The Xavantina Operations started production in May 2012 and poured its first bullion in June of the same year. The mine has been in continuous production since 2012, processing approximately 1.96 million tonnes of ore, resulting in a cumulative production of 324,861 ounces of gold, as summarized in Table 22.

Table 21 - Historic Production of the Xavantina Operations

Year	Tonnes (t)	Au (oz)	Recovery
2012	137,980	6,654	40%
2013	261,726	26,216	67%
2014	208,259	23,730	83%
2015	226,608	35,115	87%
2016	213,776	29,098	84%
2017	135,013	25,173	88%
2018	117,857	39,808	91%
2019	158,275	29,755	86%
2020	162,642	36,830	91%
2021	171,581	37,798	94%
Jan to Oct 31st 2022	167,672	34,684	92%
Total	**1,961,389**	**324,861**	**82%**

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Xavantina property is located in the Paraguay Belt, part of the Tocantins Geological Province. This fold belt was formed during the Neoproterozoic era at the south-east margin of the Amazon Craton during the Brasiliano cycle and is characterized by a series of tectonic events. The Paraguay Belt represents an arcuate shaped tectonic domain extending for 1,500 km in a NE-SE to E-W direction with an average width of 300 km.

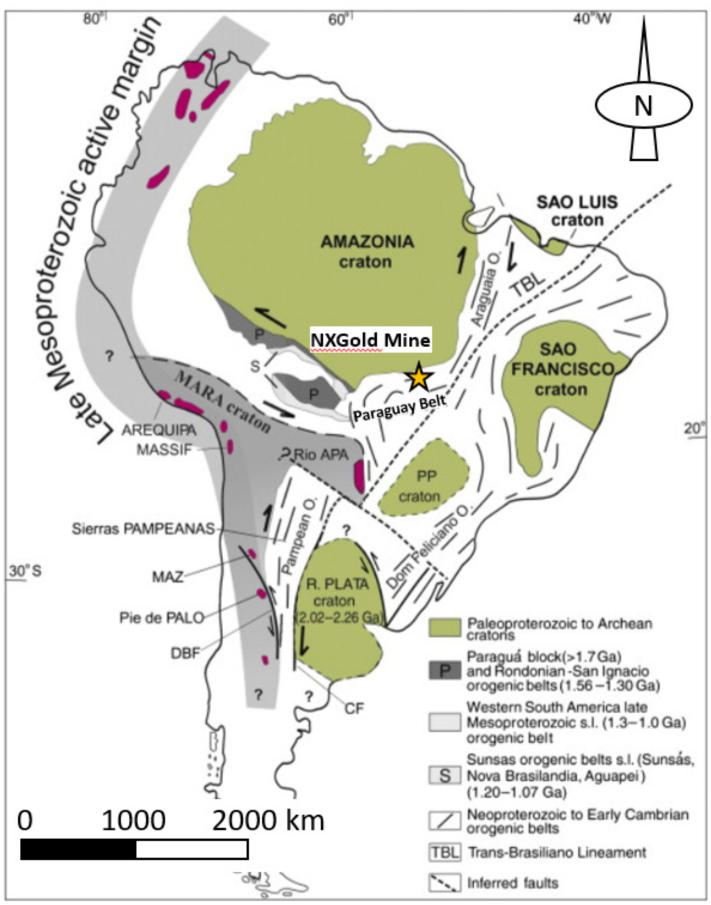


Figure 5 - Sketch of South America with Archean cratons and Middle-to-Late Mesoproterozoic and Neoproterozoic to Early Cambrian orogenic belts (Casquet et al., 2016)

The Paraguay Belt is a sequence of metamorphosed and folded volcanic and sedimentary rock units presenting deformation and metamorphic variations in the direction of the craton. The belt can be subdivided into three main structural domains: (i) the Internal Structural Zone characterized by intensely folded and metamorphosed volcano-sedimentary sequences intruded by granite and referred to as the Cuiabá Group, (ii) the External Structural Zone consisting of folded sedimentary sequences affected by low metamorphic grade and referred to as the Alto Paraguay Group and (iii) the Sedimentary cover referred to as the Parecis and Paraná basins (Almeida, 1984, Alvarenga and Trompette, 1993, and Alvarenga et al., 2000).

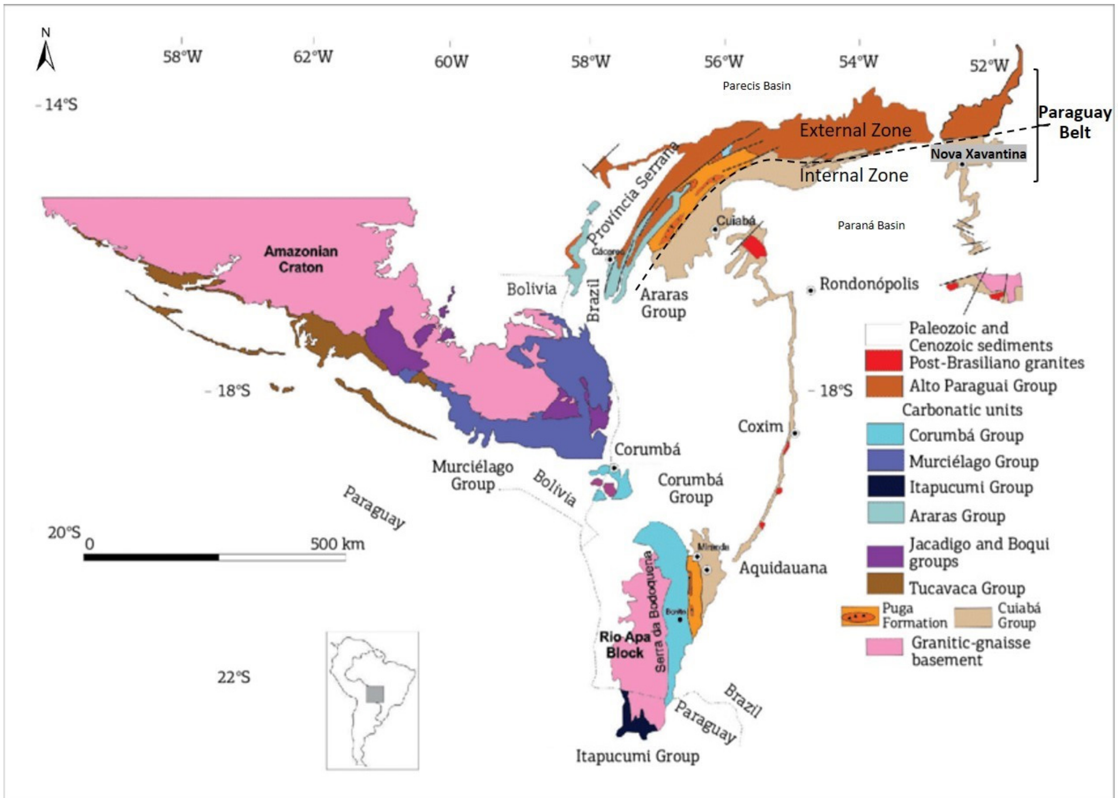


Figure 6 - Simplified geological map of the Paraguay Belt showing the areas of outcrop of the Araras, Cuiabá, Corumbá, Itapucumi and the Murciélago groups (Sial et al. 2016, modified from Boggiani et al. 2010)

The Nova Xavantina region, which has been described as a possible basal sequence of the internal zone of the Paraguay Belt, comprises meta-volcanic and meta-sedimentary rocks, and was initially defined as the Cuiabá Group by Ameida (1984). Pinho (1990) further characterized the rock units in the region of the Xavantina Operations as the Nova Xavantina Volcano-Sedimentary Sequence.

Pinho (1990) interpreted the Nova Xavantina Volcano-Sedimentary Sequence as a sub-marine environment in a back-arc basin setting; however, the geochemical analysis performed by Silva (2007) suggests the rock units of this sequence were generated in an intracontinental rift environment involving bimodal magmatism with the presence of a mantle plume at the base of the continental crust. The model formulated by Silva (2007) further included the opening and formation of an oceanic crust during the evolution of the rift.

7.2 Local Geology

7.2.1 *Lithologic Units*

The rock units present within the Xavantina Operations belong to the Nova Xavantina Volcano-Sedimentary Sequence as defined by Pinho (1990), part of the upper regional Cuiabá Group.

In subsequent geological classification surrounding the mining area, the Nova Xavantina Volcano-Sedimentary Sequence was renamed the Araés Volcano-Sedimentary Sequence and was further subdivided into three lithological associations (Martinelli *et al.* 1997; Martinelli 1998; Martinelli and Batista 2007; Socio 2008; Martinelli 2010). From the base to the top of the sequence these lithological associations are:

i. basic and intermediate metavolcanic association represented by meta-basalt, meta-andesite, meta-tuff, and meta-lapilli-tuff;
ii. chemical metasedimentary rock association containing meta-chert and meta-banded iron formation;
iii. clastic sedimentary rock association such as meta-sandstone, metasiltite, and meta-phyllite.

In more recent work, the rock units of the Xavantina Operations have been re-defined into metavolcanic, metasedimentary, and intrusives by Desrochers (2017). The volcanic units include massive to fragmental basalt with frequent amygdules.

The sedimentary units include (i) debris flow characterized by centimetric subangular to angular fragments of volcanic rock units and fragments of black calcareous phyllite, (ii) siliceous siltstone with poorly developed bedding which may contain pyrite-rich layers parallel to bedding, (iii) siliceous to magnetite-rich chert, (iv) thinly laminated carbonaceous phyllite.

The intrusive units include two types of diorite dyke and one type of felsic dyke. The diorite dyke units can be classified as either foliated or cross-cutting and the felsic dyke units are classified as cross-cutting. Cross-cutting diorite and felsic dykes post-date the main deformation event.

All rock units have been metamorphosed to greenschist facies as indicated by chlorite, sericite and calcite assemblages.

Table 22 - Simplified Lithologic Categories (Desrochers, 2017)

Volcanic rock units	Sedimentary rock units	Intrusive rock units	Vein and breccias
Basalt (amygdular, massive to flow breccia)	Debris flow	Diorite dykes	Quartz vein
	Siltstone	Felsic dykes	Silica matrix breccia
	Carbonaceous phyllite		Carbonaceous matrix breccia
	Laminated chert		

7.2.2 *Structural Geology*

The volcano-sedimentary rock units, and some diorite dykes, are strongly foliated and frequently display intense transposition. There are two main phases of folding recognized at the Xavantina Operations (Campos Neto, 2013, Desrochers, 2017).

The first phase of folding is associated with a variably oriented, shallowly to moderately dipping schistosity (S1). The S1 schistosity is deformed by a crenulation cleavage (S2) oriented generally 234/66 but varying in strike from 190 to 270 degrees with westerly to northerly dips varying between 30 and 80 degrees. Both foliations (schistosity and cleavage) are present at the mine and have been documented as far as the Cristal vein located approximately 1,800 meters northeast of the mine (Campos Neto 2013).

The development of the S2 cleavage is heterogeneous and is generally better developed near the mine to a point where the S1 is completely re-oriented along the S2 foliation planes. This S2 cleavage is attributed to the Araés Shear zone by Xavantina geologists and by Martinelli and Batista (2007).

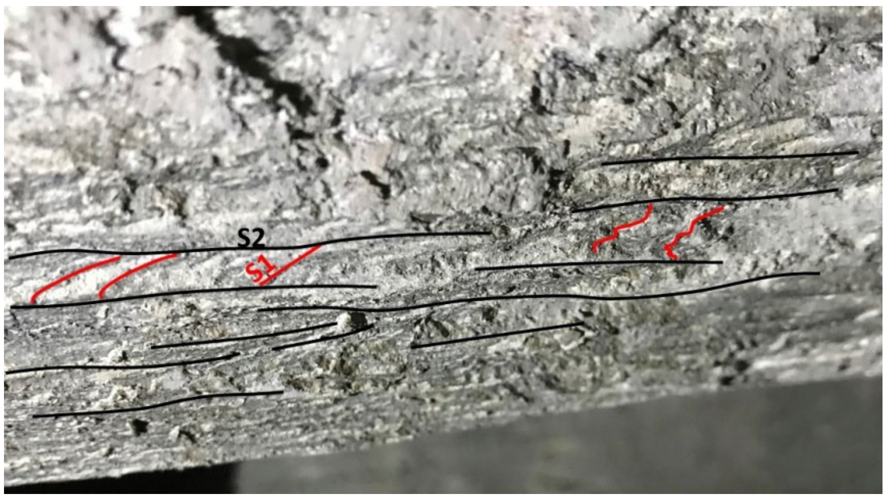


Figure 7 - Photograph of S1 and S2 foliations. Access ramp to Buracão vein (Xavantina, 2018)

7.3 Mineralization

Known gold mineralization at the Xavantina Operations is structurally controlled and hosted in four major sulphide-rich quartz veins, with hyaline quartz druse, dipping approximately 40 degrees to the north-northeast and striking between east-west and west-southwest. The veins are hosted in strongly deformed metamorphosed sedimentary rock units and meta-volcanic units that trend to the northeast with a 30 to 65-degree dip to the northwest. The veins exhibit a typical laminated pattern in parallel with the vein contacts. The laminations are characterized by alternating centimeter to decimeter quartz bands and foliated host rocks indicating multiple pulses of mineralized fluids during their formation.

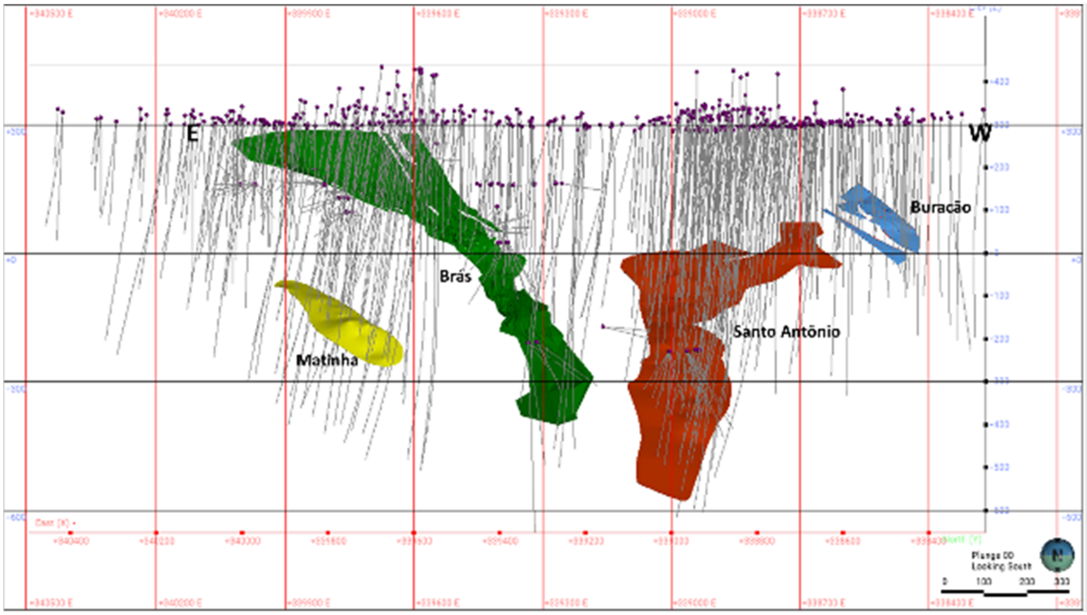


Figure 8 - Main Ore Bodies in the Xavantina Property

The Buracão vein is located on the western part of the property and includes a primary laminated vein measuring 100 meters along strike, dipping 45 degrees to the northwest in the upper portion of the mine and 70 meters along strike dipping 40 degrees to the northwest in the lower portion of the mine (as is shown in Figure 9). The average thickness of the vein is 4.5 meters with a maximum thickness of up to 6 meters.

The Brás vein is located to the east of the Buracão vein and includes a primary laminated vein measuring 220 meters along strike length in the upper part of the mine and 50 meters along strike in the lower levels of the mine. The average thickness of the vein is 5 meters with a maximum thickness of up to 10 meters.

The Santo Antônio vein is located centrally between the Brás and Buracão veins, within the same structural corridor. The vein has the same geologic characteristics of the Brás and Buracão veins and similar mineralization characteristics, including range of gold grades and sulphide concentrations. The primary difference between the Santo Antônio vein and the historically mined veins of Brás and Buracão, is that mineralization does not outcrop at surface and the dominant plunge direction, to date, is opposite of that the Brás and Buracão veins, particularly within the upper panel of the Santo Antônio vein.

The Matinha vein is located at the eastern extent of known mineralization. The Matinha vein plunges in the same direction as the Santo Antônio vein. Mineralization encountered to date is similar to the other veins. Additional work in this area is planned to further evaluate continuity of grade and thickness.

Gold mineralization in all veins is associated with sulphides that are primarily disseminated within the quartz but can also be associated with minor gold bearing sulphides disseminated within the host rock. The veins generally contain 2 to 15 percent total sulphide represented largely by pyrite and galena, with minor chalcopyrite, bornite, pyrrhotite, and sphalerite.

Higher gold grades are generally associated with galena, chalcopyrite, bornite, and sphalerite.

The veins are typically bordered on the eastern and western edges by discontinuous breccias of less than 2 meters in thickness. Breccias can be described as those with a siliceous matrix containing angular fragments of quartz veins, a matrix containing pyrite and galena typically containing gold grades less than 5 grams per tonne, and as breccias with a carbonaceous matrix containing sub-rounded to sub-angular fragments of meta-volcanic rocks and quartz vein.

Figure 9 - Laminated quartz vein inside the Buracão mine (Xavantina, 2018)

Figure 10 - Quartz vein with high sulfidation (Pyrite and Galena) and high gold grade (Xavantina, 2018)

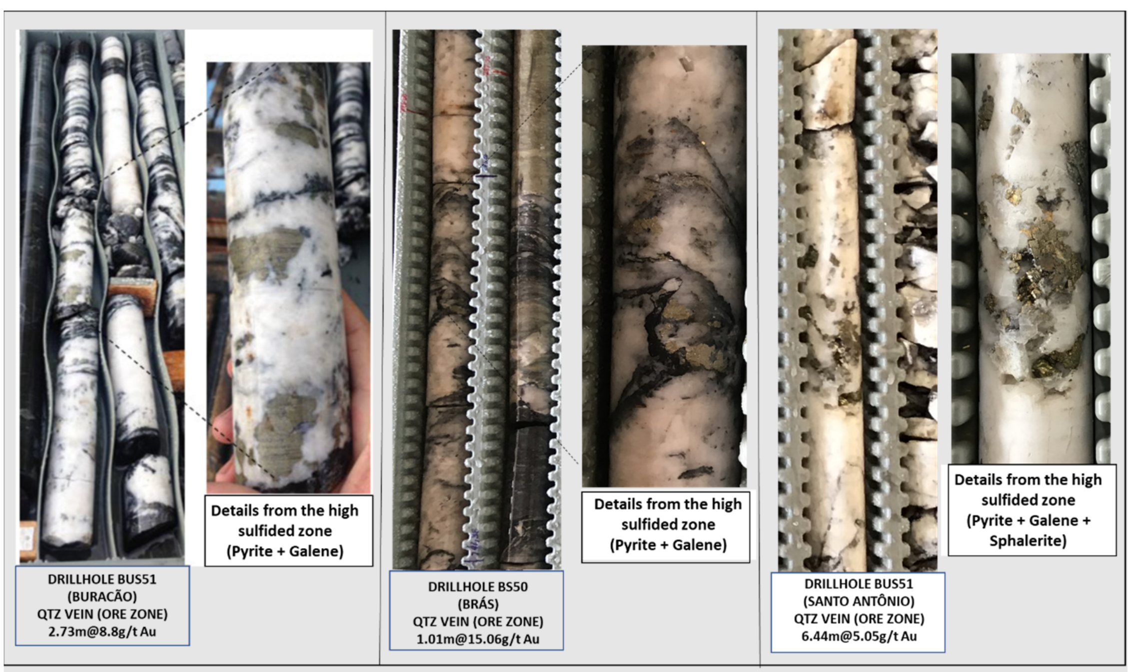


Figure 11 - Buracão, Brás and Santo Antônio quartz veins with Pyrite, Galena, Sphalerite and high gold grade

8.0 DEPOSIT TYPES

The geology of the property can be characterized by strongly deformed volcano-sedimentary rocks altered to greenschist metamorphic grade. Gold mineralization is structurally controlled and hosted in sulphide-bearing, laminated shear veins that cross-cut the previously deformed and metamorphosed volcanic and sedimentary rock. The laminated nature of the veins indicates multiple pulses of quartz intruding a shear zone.

The characteristics of the gold mineralization at Xavantina are similar to orogenic gold described by Groves et al. 1998. Those deposits represent the main source of gold in deformed Precambrian metavolcanic environments and are characterized by high gold grades that range from 5 grams per tonne to over 10 grams per tonne and are hosted in quartz-carbonate veins associated with shear zones. Well-known examples of important gold deposits of this type include the Yilgarn Craton in Australia (Golden Mile and Norseman mines) and the Superior Province in Canada (McIntyre-Hollinger and Kerr-Addison mines).

9.0 EXPLORATION

Historical exploration work completed on the property prior to NX Gold and MCSA is discussed in greater detail in Chapter 6, History.

9.1 Geological Mapping

In 2011, Callori and Maronesi (2011) mapped the project area at a scale of 1:10,000 in one of the first detailed geologic maps completed on the property. Their work shows the folding of the volcano-sedimentary units hosting the Xavantina deposit together with an ENE-striking thrust fault running parallel to the deposit as shown in Figure 12.

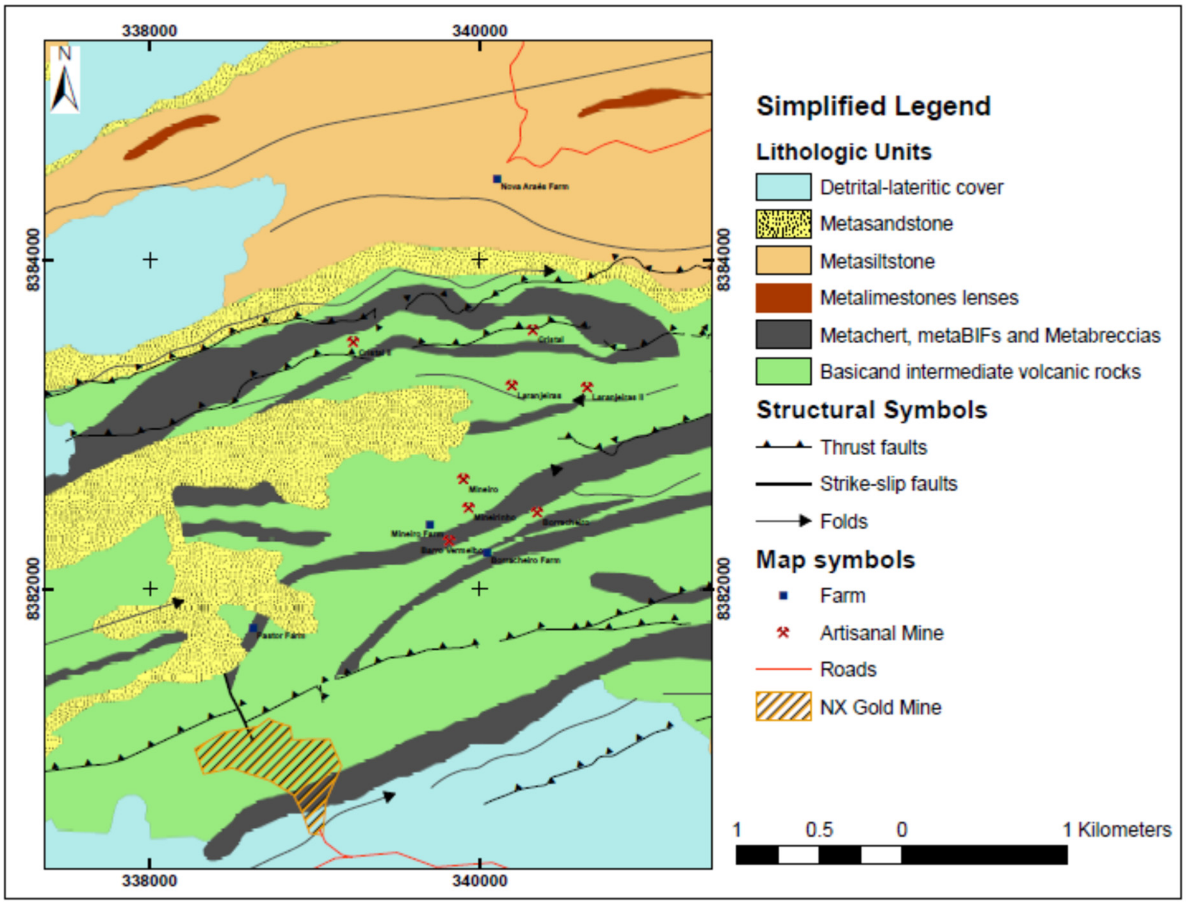


Figure 12 - Geological map in the area of the Xavantina Operations at a scale of 1:10,000 showing the folded volcano-sedimentary sequence (Callori, D. and Maronesi, M., 2011)

In 2014, geologists from the General Geological Department of the Federal University of Mato Grosso ("UFMT"), with the assistance of geologists from the Xavantina Operations, mapped an area beginning at the mine property to the north, approximately 35 kilometers from the mine at a scale of 1:50,000. In 2013, University professor and structural geologist, Campos Neto, conducted detailed structural mapping within the underground mine, along surface expressions of the gold bearing quartz veins and in other quartz veins distributed throughout the property (in showings mapped over approximately 1.8 km). Neto divided the area into 2 structural sectors with the southern sector being the most deformed and culminating along the Araés shear zone located approximately 80 meters to the south of the known gold-bearing veins of the Xavantina Operations. The map produced is shown in Figure 13.

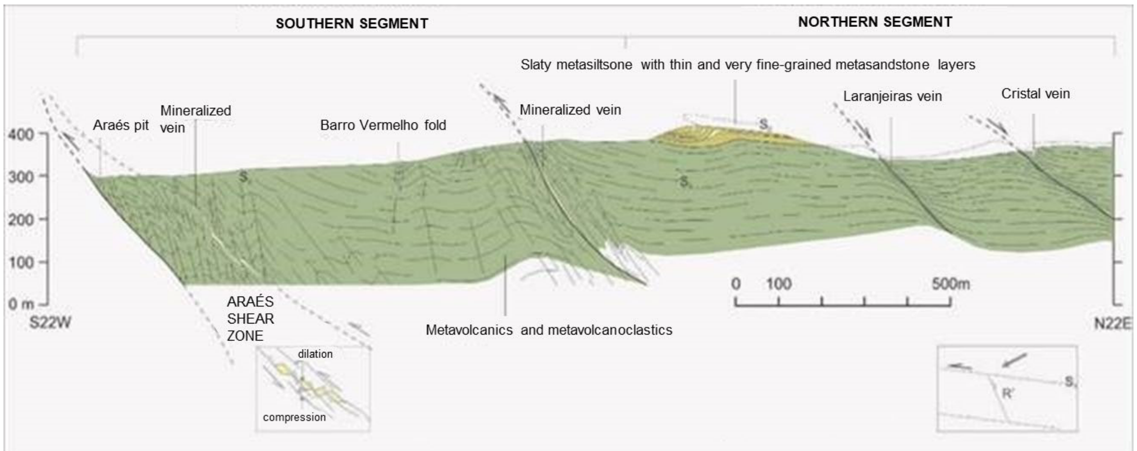


Figure 13 - Composite vertical cross-section looking west. The northern segment (segment meridional) demonstrates less deformed rock units when compared to the southern segment (segment meridional). The foliation of the rock units become progressively more developed towards the Araés shear zone that marks the southern limit of the section (Campos Neto, 2013)

Beginning in 2018, Xavantina geologists started to generate detailed underground geological maps for each mine level to support geological controls of mineralization and 3D geological data integration. Figure 14 provides an illustrative map prepared during face mapping of the -320 and -330 level within the underground mine at the Santo Antônio.

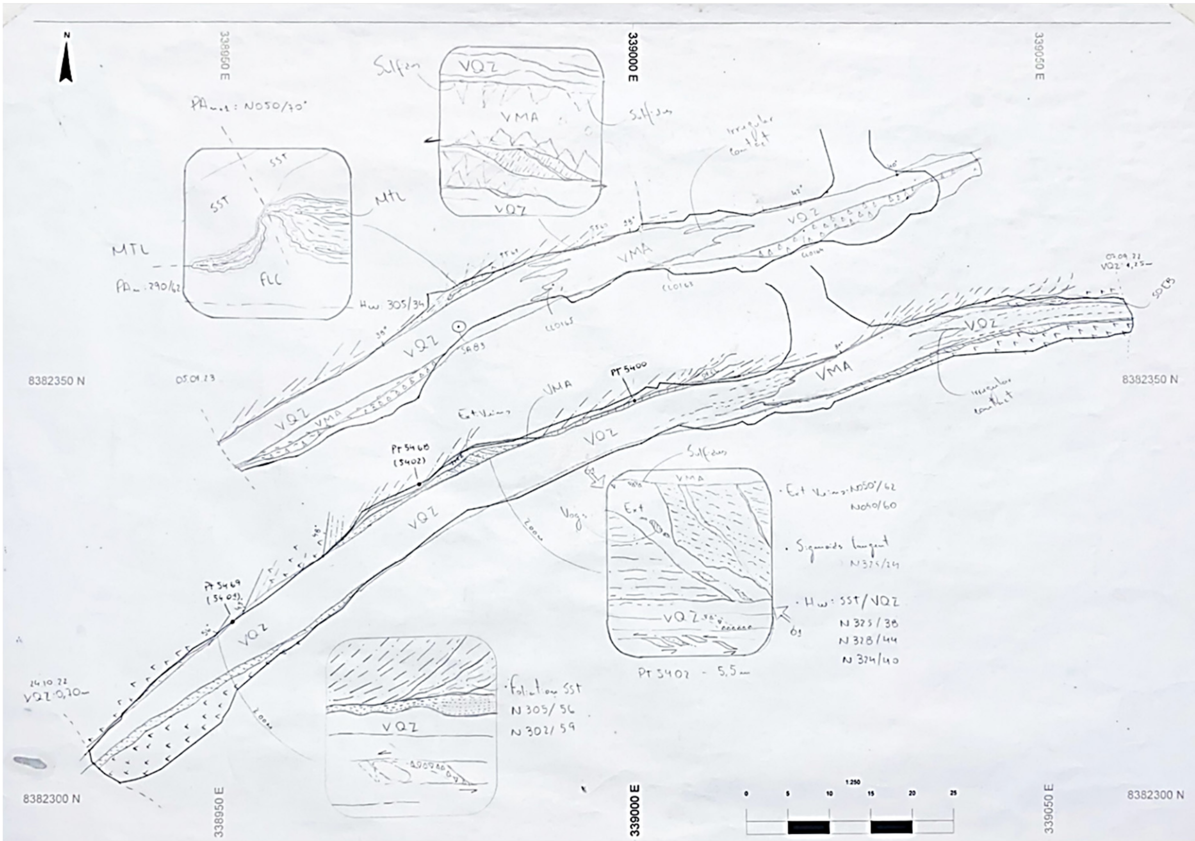


Figure 14 - Illustrative geological map produced by the Xavantina technical team within the Santo Antônio vein (Xavantina, 2022)

In 2022, Xavantina exploration geologists continued to improve geologic mapping throughout the property and sought to integrate surface mapping, geology logs from drilling and underground mapping. The interpreted map and cross-sections produced (Figure 15 and Figure 16) suggest two deformational regimes.

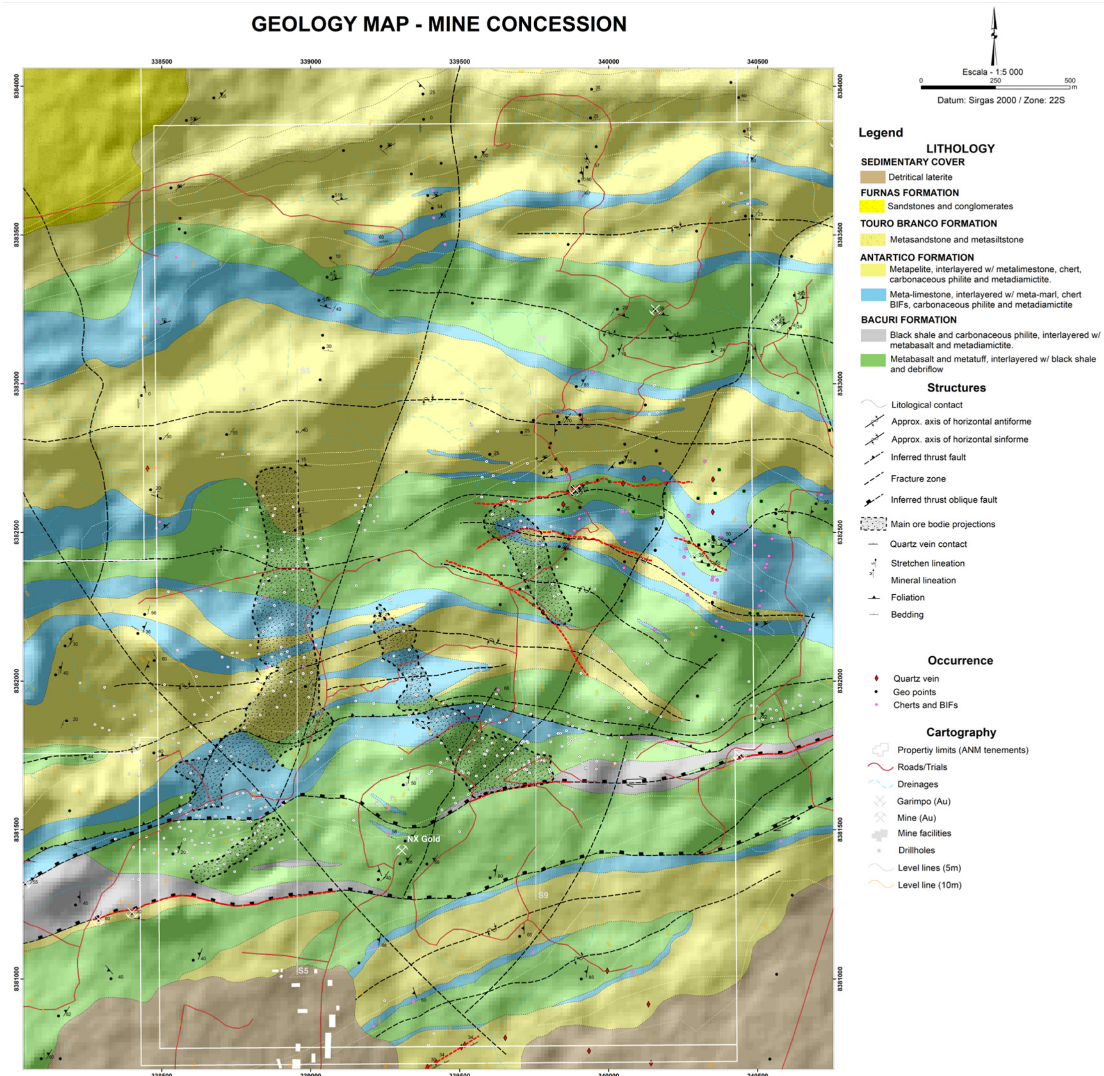


Figure 15 - Geological map produced by the Xavantina technical team for Mine Concession Area (Xavantina, 2022)

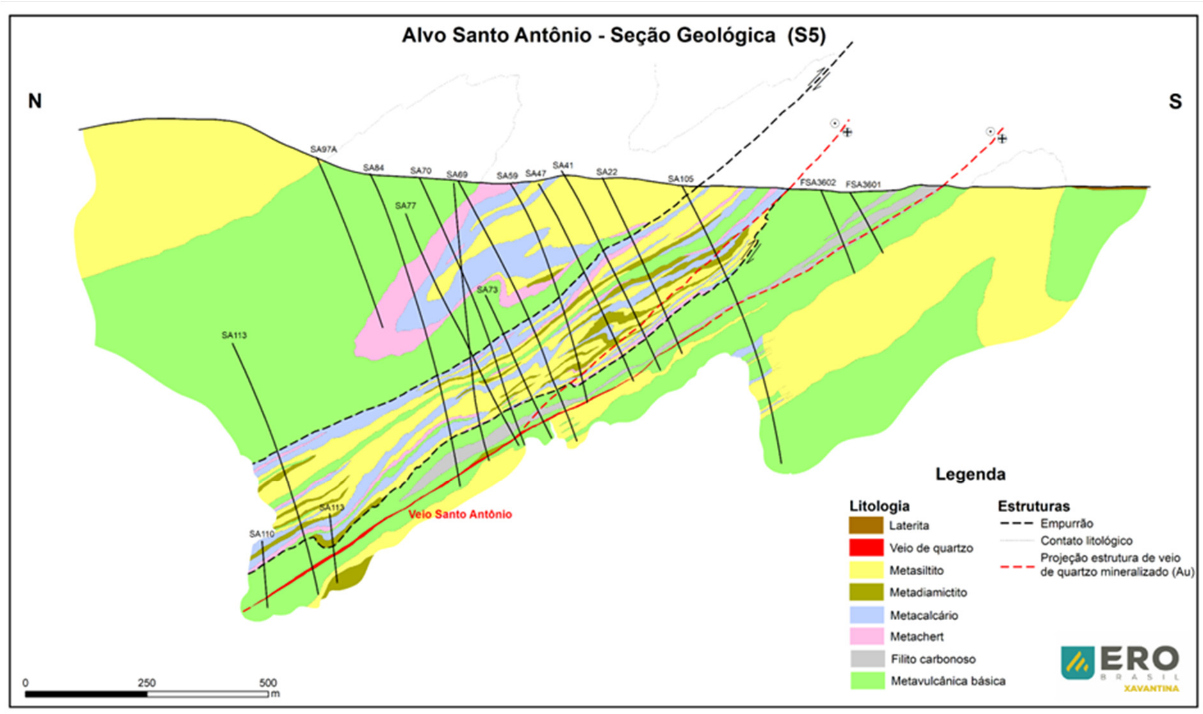


Figure 16 - Illustrative cross-section produced by the Xavantina technical team within the Santo Antônio vein (Xavantina, 2022)

9.2 Stream Sediments and Heavy Mineral Sampling

In 2021 a regional exploration program to establish brown-field exploration targets was initiated using stream sediments and heavy mineral sampling. As of the Effective Date, a total of 922 stream samples and 691 heavy mineral samples have been collected throughout Xavantina's tenements (866013/2014, 866015/2014, 866269/1990, 866104/2021, 866081/2021, 867082/2021, 867089/2021 and 866090/2021).

As of the Effective date, 274 stream samples and 152 heavy mineral samples, of the total collected, were sent to ALS Chemex Laboratories ("ALS Chemex", or "ALS") for multi-element analysis, while another 648 stream samples and 524 heavy mineral samples were sent to SGS GEOSOL for multi-element analysis. A total of 15 heavy mineral samples were analyzed for gold in the Xavantina laboratory.

9.3 Soil Sampling

Between 2012 and 2015, Xavantina collected a total of 2,271 soil samples to evaluate the potential for additional gold mineralization on the property. In 2012, a total of 776 samples were sent were sent to ALS for multi-element analysis. In 2014, a total of 37 samples were sent to ACME labs for multi-element l analysis.

In late 2014, Xavantina collected 828 soil samples that were sent to SGS GEOSOL for gold analysis and an additional 117 samples that were sent to SGS GEOSOL for multi-element analysis. In 2015, Xavantina collected 513 samples that were sent to SGS GEOSOL for multi-element analysis. ALS, ACME labs and SGS GEOSOL are independent of the Company as such term is defined under NI 43-101.

The results of the soil sampling program continues to inform priority target areas within exploration licences. A comprehensive soil geochemistry and regional exploration survey covering the extent of the Company's exploration licenses commenced in 2021 and is expected to continue through the end of 2023. Since, 2021, a total of 14,319 new soil samples were collected in the regional exploration program. From this total, 7,473 samples were sent to ALS Minerals for multi-element analysis, another 6,833 samples were sent to SGS GEOSOL for multi-element analysis, and a total of 13 samples were sent to the Company's internal lab for exclusive gold analysis.

9.4 Auger Sampling

Since 2021, in support of soil and stream sediment programs, the Company executed 1,295 auger samples designed to further investigate areas where collecting soil samples was impractical – predominantly in areas disturbed by ranching.

Xavantina geologists collected 1,295 auger samples. A total of 1,017 samples were sent to SGS GEOSOL for multi-element analysis. An additional 72 samples were sent to ALS for multi-element analysis. Infill auger sampling, conducted during 2021 and 2022 collected an additional 206 samples, which were sent to SGS GEOSOL for multi-element analysis.

9.5 Channel Sampling

Channel samples from production drives are routinely taken from the galleries for geological control and mapping purposes. Sampling is designed to crosscut the entire thickness of the quartz vein wherever possible. The channel sampling database includes sampling lines that are spaced at approximately 3 meters and sample lengths that vary from 0.5 meters to 1.0 meter. The procedure of channel sampling in the Xavantina Operations involves collecting chips from a rectangular zone along the sampling line. The average weight of samples utilized by the Company for grade control and planning purposes is approximately 4.0 kg for each sample line.

A photographic register of the drift channels is taken for each channel sample to improve geological information and inform detail on mineralization controls. Channel sampling is performed in conjunction with geological mapping in all underground drives within the orebodies to improve geologic understanding of primary mineralization controls and to support geological data integration (Figure 17).

Figure 17 - Procedure of channel sampling in Santo Antônio vein (Xavantina, 2022)

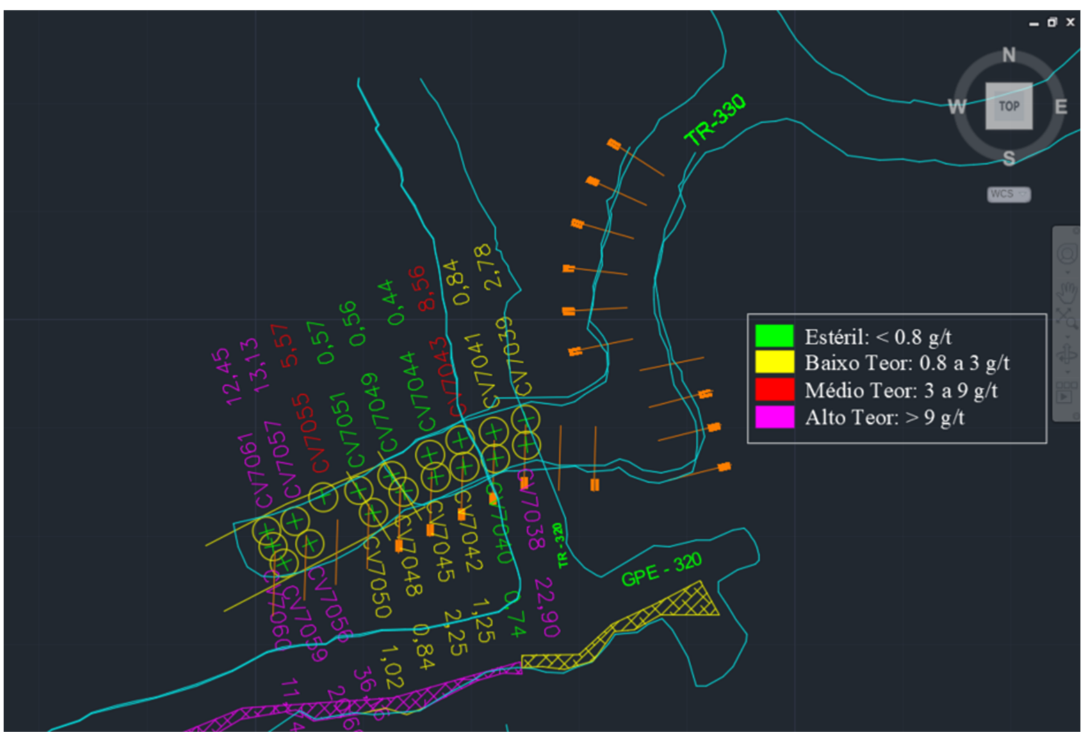


Figure 18 - Channel sampling in Santo Antônio vein (Xavantina, 2022)

9.6 Geophysical Survey

In August 2013, MCSA contracted Lasa Prospecções S.A to execute an airborne magnetic and gamma-spectrometry survey in the Nova Xavantina area, including the Xavantina Operations as shown in Figure 19. The survey totaled 1,969.40 line-km flown at a nominal 100 meters above ground and covered a total area of 156 km^2. The north-south flight lines were flown at 100 meter spacing and the East-West tielines were flown with 1,000 meter spacing.

The data processing was completed by FUGRO-LASA using Oasis Montaj software developed by GEOSOFT. The effort produced maps showing total magnetic intensity, magnetic analytical signal, and magnetic first vertical derivative as well as maps of the potassium, uranium, and thorium concentrations and ratios as well as a digital topographic map.

The analytical signal of the magnetic data shows a strong lineament to the south of the gold-bearing lenses that corresponds to the Araés shear zone. The magnetic highs located near the known mineralized veins of the Xavantina Operations are interpreted to be folded magnetic banded iron formations.

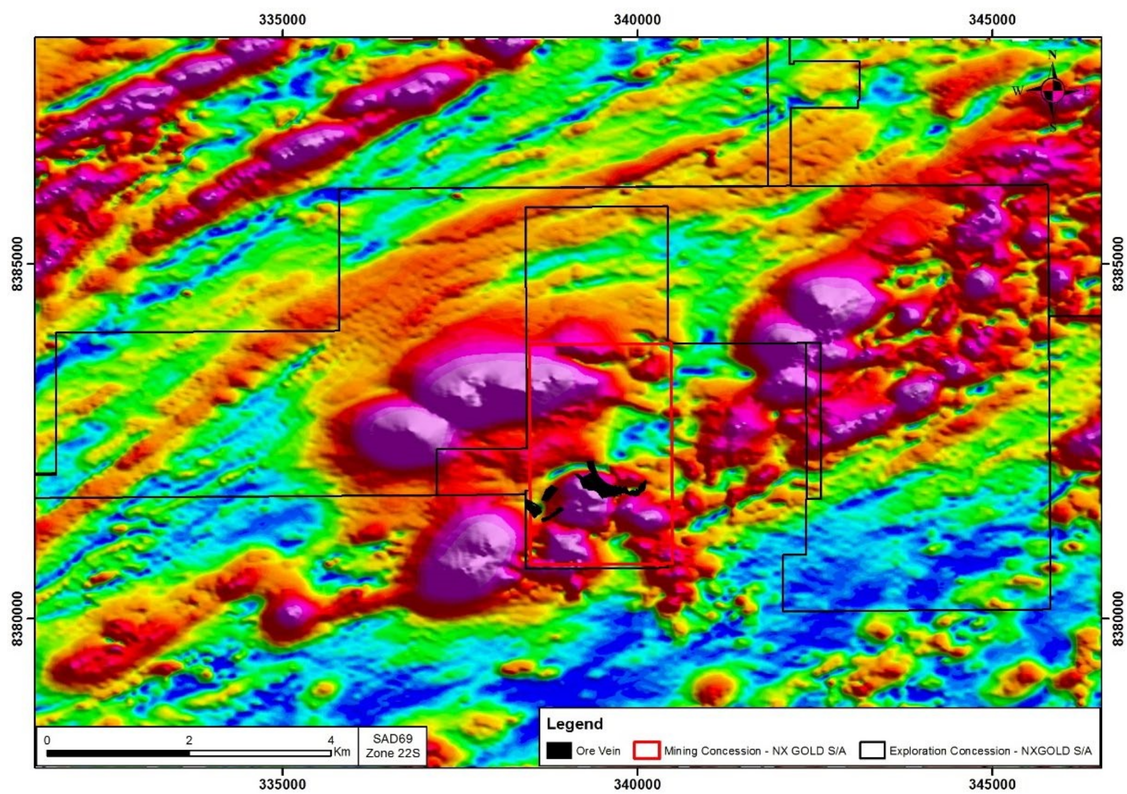


Figure 19 - Airborne geophysical magnetic data of Xavantina Operations (Xavantina, 2018)

9.7 Densities

Drill core density measurements of the quartz veins are routinely taken during drilling campaigns at the Xavantina Operations. Segments of drill core are coated with wax and their bulk densities determined using the buoyancy method. The average density of all rock types in the area of the Xavantina Operations, based on a density database that includes over 2,600 samples of drill core, is approximately 2.83 grams per cubic centimeter . For the purposes of the current Mineral Resource estimate, Santo Antônio density data from drilling within the veins established a density of 2.68 grams per cubic centimeter within the mineralized vein at Santo Antônio and 2.65 grams per cubic centimeter within the mineralized vein at Matinha.

A Summary of density data by Rock Type from drilling performed at the Xavantina Operations is presented in Table 20.

Table 23 - Density data (Santo Antônio and Matinha Veins)

	Santo Antônio		Matinha	
Lithology	**Samples**	**Density (g/cm^3)**	**Samples**	**Density (g/cm^3)**
Chert	148	2.82	7	2.68
Felsic dike	304	2.83	68	2.82
Diorite	26	2.81	15	2.71
Carbonaceous phyllite	172	2.70	86	2.69
Meta Volcanic	300	2.80	273	2.78
Debris Flow	214	2.78	48	2.78
Sandstone/siltstone	318	2.78	38	2.79
Quartz vein	111	2.68	45	2.65
Carbonaceous matrix breccia	2	2.69	5	2.71
Silica matrix breccia	3	2.66	2	2.69
Total	**1598**	**2.75**	**587**	**2.73**

9.8 Drone Survey

A 37 line-kilometer drone survey covering an area of 14.5 km^2 was completed June 2018. This survey produced a high-quality image with a 17 cm spatial resolution as well as a Digital Elevation Model (spatial resolution of 1 m and a vertical precision of 2 m). The survey covers the mine area and the area of the planned 2018 drilling program. The primary use of the survey results was for planning access roads and drill platform locations.

9.9 Sampling Method and QA/QC

During drilling campaigns undertaken by Xavantina since 2013 in support of the exploration programs and current Mineral Resource estimate, Xavantina personnel performed gold assays on stream sediment sampling, soil sampling and drill core in accordance with written sampling procedures, which are further described below.

9.9.1 *Stream Sediments Sampling*

- Stream sediment sampling incorporated the use of GIS data used to identify drainages. During the program planning, drainage junctions and headsprings were prioritized. All samples represent a composite of sediments over a 50-meter stream segment.

- First, the pH of the water within the stream segment is measured.

- Sediment samples are collected with a plastic shovel.

- The material is sifted with a 1-millimeter sieve into a bucket with a capacity of 10 liters until 2 to 3 kilograms of sample material has been collected.

- All samples are shipped to the lab with the sample number written directly on the bag and on an internal tag.

- For every 50 samples, a standard is inserted into the batch for QA/QC purposes. At least one duplicate is inserted into the batch to reinforce quality control.

9.9.2 *Heavy Mineral Sampling*

- Heavy mineral sampling incorporated the use of GIS data used to identify drainages. During the program planning, drainage junctions and headsprings were prioritized.

- First, the pH of the water within the stream segment is measured.

- Sediment is collected 30 centimeters below surface at the meander to assure the concentration of heavy minerals.

- The material is collected with a plastic shovel.

- The material is sifted with a 2-millimeter sieve into a bucket with capacity of 10 liters. The material is sifted until the bucket is full.

- After the sampling, the material is driven to a sink to be pan-concentrated. The samples are pan-concentrated to concentrate the heavy minerals to a volume of 125 milliliters.

- All samples are shipped to the lab with the sample number written directly on the bag and on an internal tag.

- For every 50 samples, a standard is inserted into the batch for QA/QC purposes. At least one duplicate is inserted into the batch to reinforce quality control.

9.9.3 *Soil Sampling*

- Soil sampling programs are performed after defining a sample grid based on GIS data incorporating previous results from both stream and heavy mineral sampling. Geological information and rock sampling results are also used to define the best sampling grid for soil sample campaigns.

- At each sampling location, a hole measuring approximately 40 centimeters is dug. At this depth, soil material is sampled. The remaining soil (from surface to 40 centimeters depth) is discarded.
- The soil material is sifted with an 80 mesh sieve and is then homogenized. An aliquot of 800 milliliters is collected to form the sample.
- All samples are shipped to the lab with the sample number written directly on the bag and on an internal tag.
- For every 50 samples, a standard is inserted into the batch for QA/QC purposes. At least one duplicate is inserted into the batch to reinforce quality control.

9.9.4 *Drill Core Sampling*

The core is stored on-site in core boxes on covered metal racks. The majority of holes drilled by MCSA and Xavantina that intersect gold-bearing quartz veins are NQ diamond core size, with the balance being of either HQ or BQ diamond core size. Preparation of selected core intervals to be sampled is completed using the following method (summarized in Figure 20):

- Core boxes are delivered to the core logging facility by the drilling crew where the core is laid out in sequence. The core is checked by Xavantina technicians before logging to ensure that core has been correctly placed in boxes by the drillers.
- The core is then marked on 1-meter depth intervals allowing for better depth precision between the 3-meter core markers inserted by the drillers. The core boxes are labelled with the start and end of the interval for the box and the range of sample numbers and subsequently photographed.
- Core is then logged by a geologist to record features including structure, veining, lithology, and mineralization. Geotechnical logging is carried out, including measurements of total core recovery, rock quality designation (“RQD”), Bieniawski system - rock mass ratio (RMR), Barton system (Q) and fracture angle and type.
- Samples are selected for bulk density measurements and measurements are performed on site with wax coated core using the water displacement method.
- Intervals of core selected for sampling are marked using a red pencil showing arrows that indicate the “from” and “to” range of each sample interval and a reference line drawn parallel to the core axis and through the approximate center of the core.
- Samples are defined on a geological basis to respect lithological or structural contacts. Samples are collected with a minimum length of 0.2 meters and a maximum length of 2 meters with an average length of 0.5 meters. As much as is geologically reasonable, the sample lengths were 0.5 meters in mineralized section and 1 meter in host rock.
- Core marked and tagged for sampling is moved to a different location to be cut using diamond bladed rock saws. A technician saws and samples the core one sample at a time, starting with the first tag and following through the sample number sequence until the end of the sampled interval.

- Half-core samples are taken for sampling and the remaining half-core is carefully stored. Sampling commences at least 1 meter before the start of the mineralized zone and extends at least 1 meter beyond the mineralized vein.
- Control samples (blanks, duplicates and reference material) are inserted as core is sampled to ensure that sample numbers are in sequence and to ensure drill core samples cannot be identified based on sample numbers.
- Unbiased sampling is managed by consistent selection of the left half from each split core. The left half of core samples are placed in transparent plastic bags and the right half is placed back into its original position in the core box. Broken core, such as fault gouge or fault breccia, is sampled by scooping the left half into a sample bag while the right half remains in the core box.
- Packets of certified gold reference standards are assigned by the core-logging geologist and verified by the technicians.
- Each sample shipment to the assay laboratory comprises samples from only one drillhole; this practice allows laboratory batches to be tracked for quality control as well as facilitate requests for batch re-assays in the event of an identified QA/QC issue.

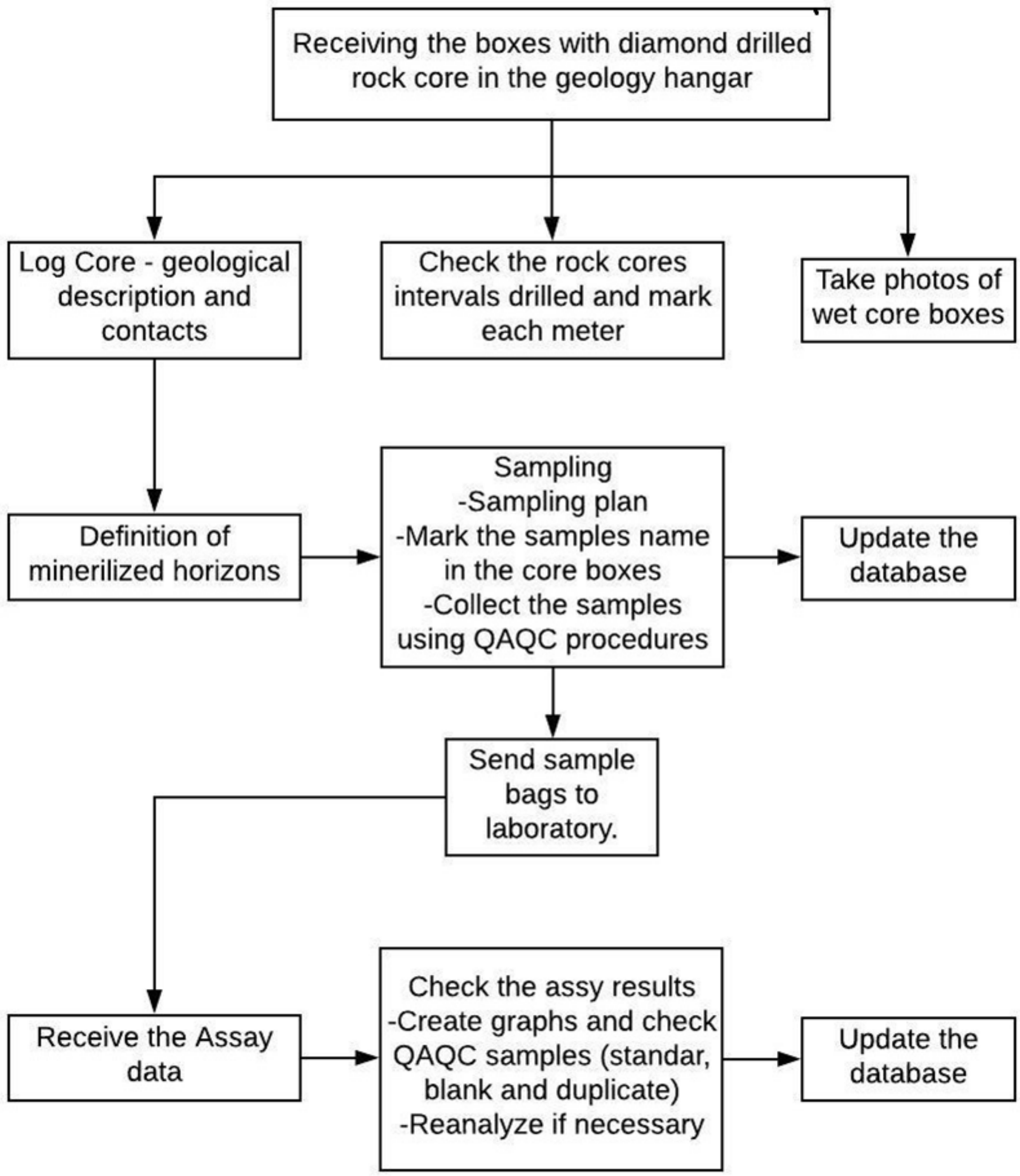


Figure 20 - Flowchart with sample preparation and analysis

Figure 21 details the individual unit operations of the work being performed on site under standard operating procedures.

Figure 21 - Pictures of the work site and standard operating procedure:

(A) Geological description and geotechnical selection of the best intercepts for laboratory analysis; (B) Density Assay; (C) Cutting the rock cores; (D) Sampling; (E) batch ready to send to laboratory; (F) Hangar to file the core boxes (Xavantina, 2022)

9.10 GE21 Comment

GE21 reviewed the sampling methods and quality control methods used by Xavantina with a focus on sources of information used in the exploration works and in the current Mineral Resource and Mineral Reserve estimate. The review concluded that:

- Stream sediments, heavy mineral sampling and soil sampling procedures are aligned with industry standard procedures.
- Drill core sampling procedures are in accordance with industry standards. Channel sampling procedures were classified as having a moderate confidence level for resource estimation, primarily due to a lack of information on crosscut sampling

10.0 DRILLING

Between 2018 and 2022, in support of the current Mineral Resource estimate, Xavantina drilled 246 surface diamond drill holes totaling approximately 128,850 meters and 49 underground diamond drill holes totaling approximately 8,575 meters on the property. The total drill holes at Santo Antônio and Matinha drilled on the property between 2018 and the Effective Date of this report is 291, totaling approximately 137,430 meters. Additionally, between 2018 and 2022, approximately 3,931 channel samples were collected totaling approximately 8,815 meters.

The total drilling length in the project from 1995 to 2022 is 822 drill holes and approximately 248,500 meters, including underground mining drilling and exploration drill holes (Figure 22, Table 24,

Table 25 and Table 26).

Xavantina initiated a drill program in early 2018 with the objective of testing the down-plunge extension of the Buracão and Brás veins, as well as the area between the two veins, and below the existing access ramp connecting the two veins. The Santo Antônio and Matinha veins were discovered and further delineated during the subsequent drilling campaigns from 2018 to 2022.

The Mineral Resource evaluation presented considers only a part of the drilling completed by Xavantina in 2015 and from the 2018/2019 campaigns, as a large portion of the Brás and Buracão veins had been mined out at the Effective Date. The majority of the Company's current Mineral Resource estimate and all of the Company's current Mineral Reserve estimate are contained within the Santo Antônio and Matinha veins (Figure 22).

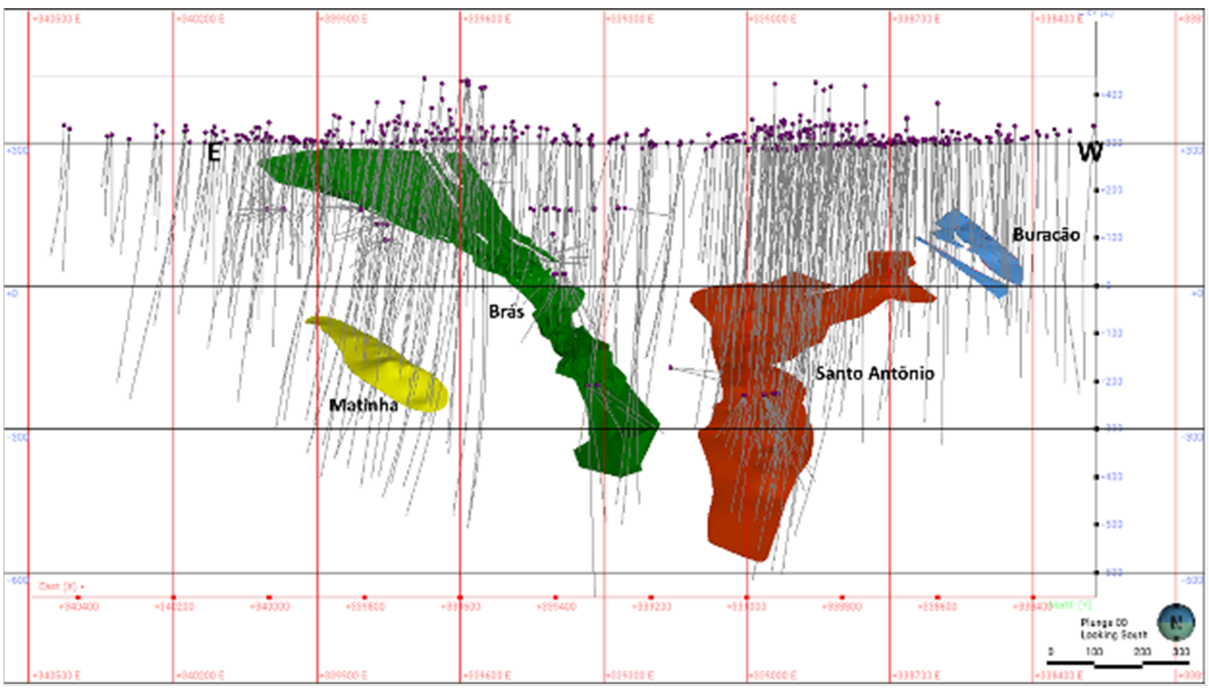


Figure 22 - All holes drilled at the Xavantina Operations (Xavantina, 2022)

Table 24 - Surface Drilling Summary

SURFACE DRILLING					
Company	**Year**	**Hole IDs**	**Number of Holes**	**Meters**	**Core Size**
Andrade Guitierrez	1995	SAR1 - SAR8	8	2306.3	
Caraíba S/A	2007	FSA3001,FSA3101,FSA3201,FSA3202,FSA3203,FSA3301,FSA3302,FSA3303,FSA3401,FSA3401A,FSA3402,FSA3501,FSA3501A,FSA3502,FSA3502A,FSA3601,FSA3602,FSA3603,FSA3702,FSA3702A,FSA3902,FSA4002,FSA4102,FSA4102A,FSA41501,FSA41502,FSA41503,FSA4201,FSA4202,FSA4203,FSA4204,FSA42501,FSA42502,FSA42503,FSA4301,FSA4302,FSA4303,FSA4303A,FSA43501,FSA43502,FSA43503,FSA4401,FSA4401A,FSA4402A,FSA4402B,FSA4403,FSA44501,FSA44501A,FSA44501B,FSA447502,FSA4501A,FSA4501B,FSA4502,FSA45501,FSA45501A,FSA45502,FSA457501,FSA457503,	81	17,618.6	NQ

SURFACE DRILLING					
Company	Year	Hole IDs	Number of Holes	Meters	Core Size
		FSA457504,FSA4601,FSA4602,FSA4603,FSA46501,FSA46502,FSA4701,FSA4702,FSA4702A,FSA4801,FSA4801A,FSA4802,FSA4802A,FSA4901,FSA4901A,FSA4902,FSA4902A,FSA5001,FSA5002,FSA5002A,FSA5101 ,FSA5101A,FSA5102			
Caraíba S/A	2008	FSA3201A,FSA3203A,FSA3204,FSA3301A,FSA3301B,FSA3303B,FSA33501,FSA33502,FSA33503,FSA33504,FSA3401B,FSA3402A,FSA34501,FSA34502,FSA34503,FSA3501B,FSA35501,FSA35501A,FSA4003,FSA40503,FSA4103,FSA412501,FSA412502,FSA412503,FSA41501A,FSA417501,FSA417502,FSA417503,FSA417503A,FSA417504,FSA4201A,FSA4204A,FSA422501,FSA422501A,FSA422502,FSA422503,FSA42501A,FSA42503A,FSA427501,FSA427502,FSA427503,FSA427504,FSA432501,FSA432501A,FSA432502,FSA432503,FSA437501,FSA437502,FSA437502A,FSA437503,FSA442501,FSA442502,FSA447501,FSA4703,MCA40501,MCA4101,MCA4101A,MCA41501,MCA4201,MCA42501,MCA42501A,MCA4301,MCA43501,MCA43501A,MCA4401,MCA44501,MCA4501A,MCA45501,MCA4601,REV01	70	11,530.7	NQ
Caraíba S/A	2009	FSA3102, FSA3903	2	498.9	NQ
Caraíba S/A	2012	BP1001, BP1002, FSA3102A,FSA312501,FSA312502,FSA31501,FSA317501,FSA317502,FSA317502A,FSA317502B,FSA322501,FSA322502,FSA322503,FSA322504,FSA317502A,FSA317502B,FSA322501,FSA322502,FSA322503,FSA322504,FSA32501,FSA32502,FSA32503,FSA327501,FSA327502,FSA327502A,FSA327503,FSA332501,FSA332502,FSA332503,FSA332503A,FSA337501,FSA337502,FSA337502A,FSA337503,FSA342502,FSA342503,FSA342503A,FSA347501,FSA347,FSA502,FSA347503,FSA352501,FSA352501A,FSA352502,FSA357501,FSA442503,FSA442504,FSA443701,FSA443702,FSA44502,FSA44503,FSA447503,FSA447504,FSA4503B,FSA452501,FSA45503,FSA45504,FSA458701	52	11,581.8	NQ
NXGold S/A	2013	BS01 - BS17, BUS01 -BUS16, FSBVE01, RB01 - RB02	37	9,513.6	NQ/BQ
NXGold S/A	2014	BS18 - BS36, BUS17 - BUS35, MS01 - MS04, RB04	43	12,494.3	NQ/BQ
NXGold S/A	2015	BS37 - BS39, BUS36 - BUS55, RS01	24	5,814.1	NQ/BQ
NXGold S/A	2018	BS40 - BS52, BUS58 - BUS65 - BUS76, SA01 - SA32	59	25,696,6	NQ/BQ
NXGold S/A	2019	BS53 - BS54, MAT01 - MAT09, SA20, SA25, SA29 -SA31, SA33-SA72	58	27,798.1	HQ/NQ/BQ
NXGold S/A	2020	SA73-SA94, MAT10-MAT17, RC01-RC02	37	20,639.4	HQ/NQ/BQ
NXGold S/A	2021	MAT18-MAT45, SA87B, SA94A-SA112	61	38,012.4	HQ/NQ/BQ
NXGold S/A	2022	MAT46-MAT63, MATGEOT01- MATGEOT02, SA108-SA113A	31	16,728.9	HQ/NQ/BQ
TOTAL			563	200,213.9	-

Table 25 - Underground Drilling Summary

UNDERGROUND DRILLING					
Company	**Year**	**Hole IDs**	**Number of Holes**	**Meters**	**Core Size**
Caraíba S/A	2012	BP1E01 - BP1E04, BP2001-BP2015, BP2015A, BP2015B, BP2016, BP2016A, BP2017, BP2017A, BP2017B, BP2018, BP3001, BP3002, BP3002A, BP3003	31	1,799.1	NQ/BQ
NXGold S/A	2013	BP3003A,BP3003B,BP3007,BP3013,BP3013A,BP3013B,BP3014,BP3014A,BP3015,BP3015A,BP3015B,BP3016,BP3017,BP3017A,BP3017C,BP3017D,BP3018,BP3019,BP3020,BP3022,BP3022A,BP3023,BP3024A,BP3025,BP3026,BP3027,BP3028,BP3029,BP3029A,BP3031,BP3032,BP3033,BP3034,BP3034A,BP3035,BP3040,BP3041,BP3041A,BP3041B,BP3042,BP3043,BP3044,BP3045,BP3052,BP3053,BP3054,BP4002,BP4002A,BP4003,BP4004,BP4005,BP4006,BP4007,BP4010,BP4011A,BP4012,BP4013,BP4014,BP4015,BP4015A, BP4016,BP4017A,BP4018,	63	4,893.5	NQ/BQ
NXGold S/A	2014	BP3046,BP3047,BP3048,BP3049,BP3050,BP3051,BP3055,BP3055A,BP3056, BP3057,BP 3058,BP3059,BP3060, BP3061, BP3062,BP3063,BP3064,BP3064A,BP3065, BP4021,BP4022,BP4023,BP4024,BP4025,BP4026,BP4027,BP4028,BP4029,BP4030	29	2,752.3	NQ/BQ
NXGold S/A	2015	BP3046,BP3047,BP3048,BP3049,BP3050,BP3051,BP3055,BP3055A,BP3056, BP3057,BP3058,BP3059,BP3060,BP3061,BP3062	15	1,781.4	NQ/BQ
NXGold S/A	2019	BSUG01 - BSUG11, SAUG01 - SAUG02	13	2,437.2	NQ/BQ
NXGold S/A	2022	SAUG03-SAUG34	32	6,136.36	NQ/BQ
TOTAL			183	19,799.8	-

Table 26 - Regional Drilling Summary

EXPLORATION DRILLING					
Company	**Year**	**Hole IDs**	**Number of Holes**	**Meters**	**Core Size**
NXGold S/A	2020	MTV01 - MTV15	15	5,657.5	HQ/NQ
NXGold S/A	2021	MTV16 - MTV29, CRS01 - CRS04, SC01 - SC05, SLU01 - SLU02	27	8,962.3	HQ/NQ
NXGold S/A	2022	SLU03 - SLU17, BTR01 - BTR02, CHA01 - CHA03, JAP01 - JAP02, JUR01 - JUR02, MCH01 - MCH07, QTE01 - QTE08, VHL01 - VHL06	45	13,922.9	HQ/NQ
TOTAL			183	28,542.8	-

10.1 Nova Xavantina Mineração Ltda. (1995)

In 1995, Nova Xavantina Mineração Ltda. tested the extension of the veins to a maximum depth of 200 meters below surface. Drill company GEOSOL completed 8 diamond drill holes for a total of 2,306 meters in the Brás and Buracão sectors, including one drill hole testing the continuity between the two veins.

The sampling method and approach used by Nova Xavantina Mineração Ltda in 1995 is unknown and the core is not available.

10.2 Mineração Caraíba S/A (2007-2014)

Mineração Caraíba S/A drilled a total of 204 surface diamond drill holes totaling 41,134 meters and 32 underground drill holes totaling 1,895 meters in the period from 2007 to 2014. These holes were drilled to a vertical depth of 380 meters below surface in the Brás vein and to a vertical depth of 200 meters below surface in the Buracão vein. All surface drill holes were drilled using NQ size and underground drill holes were drilled using NQ and BQ size.

Collar locations were measured using differential GPS with a precision of less than 1 centimeter by surveyors from the mine. Borehole deviation data was collected at intervals of 3 meters with a Maxibor tool for the surface drill holes and with an EZ-track tool for the underground drill holes.

10.3 NX Gold (2013-2014)

After the property was transferred to NX Gold, the company drilled a total of 22,008 meters in 80 surface diamond drill holes and a total of 7,645 meters in 92 underground diamond drill holes. The drilling tested the Buracão vein to a depth of 240 meters below surface and the Brás vein to a depth of 420 meters below surface. All surface drill holes were drilled using NQ size and underground drill holes were drilled using NQ and BQ size.

Collar locations were measured with a precision of less than 1 centimeter by surveyors from the mine. Borehole deviation data was collected at intervals of 3 meters with a Maxibor tool for the surface drill holes and with an EZ-track tool for the underground drill holes. The drilling program consisted of infill drilling and drilling at depth to evaluate the depth extension of the two veins.

10.4 NX Gold (2015)

In 2015 NX Gold drilled a total of 5,814 meters in 24 surface diamond drill holes and 1,781 meters in 15 underground holes. All surface drill holes were drilled using NQ size and underground drill holes were drilled using NQ and BQ size. Only 5 surface drill holes in the Buracão sector and 2 surface drill holes in the Brás sector drilled in 2015 are used in the current resource calculation.

Collar locations were measured with a precision of less than 1 centimeter by surveyors from the mine. Borehole deviation data were collected at intervals of 3 meters with a Maxibor tool for the surface drill holes and with an EZ-track tool for the underground drill holes. The drilling program consisted of testing the extension of the Brás vein to a depth of 440 meters below surface and the Buracão vein to a depth of 320 meters below surface.

10.5 NX Gold (2018 and 2019)

In the 2018 and 2019 exploration program, NX Gold drilled a total of 45,055 meters in 96 surface NQ-size diamond drill holes plus an additional 8 underground holes (total of 1,315 meters, both NQ and BQ-sized). The 2018 and 2019 drill holes were used in the current resource estimate. The primary objective of this drilling was the discovery and delineation of a new mineralized vein - Santo Antônio.

Collar locations were measured with a precision of approximately 1 centimeter by survey. Downhole deviations were monitored during drilling using a DeviShot tool to control and, if necessary, compensate for drift. After completion of drilling, all boreholes were surveyed at 3-meter intervals with a DeviShot tool.

In 2019, NX Gold drilled a total of 9 drill holes (3,945 m) to test extensions of the Matinha vein located to the east of the Brás vein. As most of the drilling conducted in prior campaigns (pre-2015), only a selection of more recent drill data was used in the calculation of the current Mineral Resource estimate.

10.6 NX Gold (2020)

In the 2020 exploration program NX Gold drilled a total of 18,143 meters in 33 surface NQ and BQ-size diamond drill holes plus an additional 3 underground holes, totalling 571 meters, BQ-size. All drill holes completed during 2018, 2019 and 2020 on the Santo Antônio vein were used in the current Mineral Resource estimation. The primary objective of the drilling was to expand the know limits of the Santo Antônio Vein. Also, in 2020, NX Gold drilled a total of 3 drillholes (1,362 m) to test extensions of the Matinha vein located to the east of the Bras vein. The Company also drilled 2 drillholes (1,278 m) in the Rocinha target, located east of the Matinha vein, and initiated a preliminary regional exploration program with 7 wide-spaced drillholes (2,551 m) to test the Mata Verde target area.

Collar locations were measured with a precision of approximately 1 centimeter by survey. Downhole deviations were monitored during drilling using a REFLEX GIRO tool at each 30 meters of drill hole advance, and, if necessary, to compensate for drift. After completion of drilling, all boreholes were surveyed at 3-meter intervals with a REFLEX GIRO tool.

10.7 NX Gold (2021 and 2022)

The 2021 and 2022 drilling campaign has been updated for Matinha and Santo Antônio targets. Drilling at the Matinha vein totaled 58 drill holes totaling approximately 35,515 meters, consisting of 32 drill holes from the 2021 campaign and 26 drill holes from 2022 campaign. Drilling at the Santo Antônio vein totaled 65 drill holes totaling approximately 25,340m, consisting of 34 drill holes from surface and 30 drill holes from underground. In addition to the diamond holes, underground channels were sampled at Santo Antônio target, totaling approximately 540 meters.

The Matinha target drilling length since 2019 is 43,955.61 in 75 holes, all from surface and the total length in Santo Antônio mine since 2018 is 71,691.81 m in 164 holes, with 133 holes from surface totaling 65,577.68 meters and 34 underground holes totaling 6,517.57 meters.

The regional exploration drilling program from the 2021 and 2022 drilling campaign included 72 drill holes from surface totaling approximately 22,885 meters. The total drilling length in regional exploration targets is 87 holes amounting 28,543 meters in HQ-NQ size.

Collar locations were measured with a precision of approximately 1 centimeter by survey. Downhole deviations were monitored during drilling using a REFLEX GYRO tool at each 30 meters of drill hole advance, and, if necessary, to compensate for drift. After completion of drilling, all boreholes were surveyed at 3-meter intervals with a REFLEX GYRO tool.

The Company is currently conducting directional drilling with a third-party contractor to further evaluate the continuity of mineralization at depth in Santo Antônio and Matinha.

10.8 QP Opinion

Down-plunge mineralization at the Santo Antônio target remains open with potential for extension. It is recommended to undertake a new drilling campaign to test the continuity of down-plunge mineralization.

Infill drilling of the Matinha target is recommended to increase confidence of grade and continuity, as well as to test for extensions of mineralization down-plunge.

11.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

Drilling sampling programs undertaken by MCSA and NX Gold were prepared and assayed by external laboratories of ALS Chemex, SGS-GEOSOL as well as the Xavantina laboratory. ALS is the primary laboratory for sample preparation used by the Company, with sample preparation and analysis performed in Goiânia (ALS preparation code PREP-33D). Routinely, samples are sent to Chile or Peru for gold analysis using metallic screen and fire assay procedures with an atomic absorption finish on 50-g charges (ALS code AU-SCR21, Au-AA25 and ME-ICP61). Sample preparation uses the same parameters as ALS PREP-33D (PREPCL_NX 90%2) in Goiania. The samples analyzed for gold have the same parameters as the primary laboratory using metallic screen and fire assay procedure with atomic absorption finish on a 50-g charge (SGS code FAASCR_150 90%, FAA313 and ICP40B).

The management systems of ALS and SGS GEOSOL laboratories are ISO-9001 certified. Both are independent of the Company as such term is defined under NI 43-101.

A brief synopsis of the sampling, analyses and security for each of the drill programs has been provided below.

11.1 Historical Sampling (1995)

The drill hole sampling preparation, analyses, and security procedures utilized by Nova Xavantina Mineração Ltda. during 1995 are unknown. There is no core remaining from this drilling program and no historical samples have been incorporated into the Company's current Mineral Resource estimate.

11.2 Mineração Caraíba Sampling (2007-2012)

All selected core samples were assayed for gold using fire assay procedures. The analyses were performed in the Xavantina laboratory and at ACME Labs as required. The sampling and operational procedure are described in Chapter 9.

11.3 NX Gold Sampling (2013-2015)

All selected core samples were sent to the Xavantina laboratory. On a few occasions, the samples were sent to ACME Labs or SGS GEOSOL, both are independent of the Company. The sampling and operational procedure are described in Chapter 9.

11.4 NX Gold Sampling (2018-2020)

All selected core samples were sent to the ALS laboratory, which is independent of the Company. In rare events, the core samples were analyzed at the Xavantina laboratory, however those assay data were not included in the database for the 2018-2020 campaign, and those samples were reanalyzed at the ALS laboratory. The sampling and operational procedure are described in Chapter 9.

11.5 NX Gold Sampling (2020-2022)

All selected core samples were sent to the ALS laboratory and SGS Geosol, in the period from November 2020 to October 2022. The sampling and operational procedure are described in Chapter 9.

11.6 Quality Assurance and Quality Control Programs for 2013 to 2022 Exploration Programs

In 2013, NX Gold implemented QA/QC procedures to verify the use of exploration datasets used in estimating Mineral Resources and evaluating exploration potential. These include written field procedures and independent verifications of aspects such as drilling, surveying, sampling and assaying, data management, as well as database integrity and sample security.

Analytical control measures include both internal and external laboratory control checks implemented to monitor the precision and accuracy of the sampling, preparation, and assaying, as well as prevent sample mix-up and to monitor contamination of samples and their results. Assaying protocols involve regular duplicate and replicate assays as well as insertion of quality control samples. Check assaying is performed as an additional reliability test of assaying results and includes the routine re-assaying a set number of rejects and pulps at a second umpire laboratory.

11.6.1 *Soil Sampling Analytical Quality Control*

NX Gold's analytical quality control for soil sampling was carried out using a QA/QC control program that meets generally recognized industry best practices. NX Gold has used the integration of duplicate and standard reference sampling, as discussed in greater detail below.

Laboratories that conducted the assaying were ALS Minerals, SGS GEOSOL, ACME Lab, and rarely the NX Gold laboratory.

Prior to 2014 there was no analytical quality control for soil sampling. During the 2020 to 2022, control samples were used to check the QA/QC, however not all control samples were checked because of lack of systematic procedure. Nevertheless, the NX Gold team is working on implementing a procedure similar to what is used for drill holes.

11.6.2 *NX Gold Analytical Quality Control*

The exploration work conducted by NX Gold since 2014 has been carried out using a QA/QC program in accordance to industry best practices. Standardized procedures were used in all aspects of the exploration data acquisition and management including surveying, drilling, sampling, sample security, assaying, and database management.

NX Gold has included analytical quality control measures as part of the routine standard core sampling procedures since 2014 and, in addition, has used the integration of blank and standard samples to allow for the verification of fire assay analysis in the laboratory.

Analytical quality control measures for the 2014, 2015, 2018, 2019, 2020, 2021 and 2022 drilling programs included inserting quality control samples (comprised of blank and standard reference material) within all sample batches submitted for assaying. The control samples were inserted at the frequency of one gold-certified reference material every 30 samples and one blank sample every 30 samples. The Company also requested that the laboratory prepare a duplicate sample every 30 samples.

NX Gold used certified reference materials procured from OREAS, ROCKLABS and ITAK (Table 24). During the course of the 2014 to 2022 soil, rock chip and drill campaigns a total of 1,651 blank, 1,272 duplicate and 1,785 standard samples were analyzed.

Table 27 - Analytical data table showing quantities of blank, standard and duplicate samples.

Sample Type	Year	Blank	Duplicate	Standard	Standard Type
Soil	2014	47	36	46	**ROCKLABS** (OxC88, OxD108, OxE86, SG66, SJ80)
	2015	25	13	25	**ROCKLABS** (OxG103, SG66, SI64, SJ80)
	2021-2022	4	381	269	**ITAK** (ITAK-646, ITAK-637, ITAK-621) **OREAS** (OREAS-250b, OREAS-254b, OREAS-230)
Stream	2021-2022	-	32	19	**ITAK** (ITAK-646) **OREAS** (OREAS-250b, OREAS-254b, OREAS-230)
Heavy Mineral	2021-2022	-	24	16	**ITAK** (ITAK-646) **OREAS** (OREAS-250b, OREAS-230)
Rock Chip	2014	18	8	17	**ROCKLABS** (OxC88, OxD108, OxH112, SG66, SH69, SJ80)
	2015	8	4	7	**ROCKLABS** (OXG103, SI64, SJ80)
	2018 - 2020	104	136	115	**ITAK** (ITAK-527, ITAK-567, ITAK-586, ITAK-591)
Drillhole Samples	2011	5	5	5	**ROCKLABS** (SL51, SK52)
	2012	33	33	33	**ROCKLABS** (SK52, SJ53, SK62, SI64, SH55, SL51, SH41)
	2013	90	84	88	**ROCKLABS** (SG56, SG66, SK62)
	2014	59	42	88	**ROCKLABS** (OxD108,SG66,SJ80, SK78)
	2015	188	105	114	**ROCKLABS** (OxG103, SJ80, SK78, SI64)
	2018 - 2020	147	84	138	**ITAK** (ITAK-527, ITAK-567,ITAK- 586, ITAK-591)
	2020 - 2022	923	285	805	**ITAK** (ITAK-524, ITAK-527, ITAK-567, ITAK-586, ITAK-591, ITAK-621, ITAK-637, ITAK-646) **OREAS** (OREAS-230, OREAS-234, OREAS-235, OREAS-238, OREAS-240, OREAS-242, OREAS-250b, OREAS254b)
TOTAL		**1,651**	**1,272**	**1,785**	

11.7 Sample Security

The sample security procedures for the pre-2013 sample preparation, analyses and transportation is unavailable. However, all drill cores, including the remaining half core of the sampled intervals, are stored in an orderly fashion at a secure facility at the Xavantina Operations. It should be further noted that no pre-2013 samples were used in the determination of the current Mineral Resource estimate.

For the exploration conducted by NX Gold in 2015, 2018 and 2019, all drilling assay samples were prepared by NX Gold personnel. Where applicable, sample batches were shipped from the property to the ALS Minerals laboratory in Goiânia by a reliable third-party transportation company, trusted by NX Gold. Preparation of exploration samples from the 2020 drilling campaign was prepared by ALS Minerals laboratory. NX Gold also requested that the laboratory prepare duplicate samples.

For the exploration conducted by NX Gold in 2020 to 2022, all drilling assay samples were prepared by NX Gold personnel. Where applicable, sample batches were shipped from the property to the ALS Minerals laboratory in Goiânia-GO and SGS GEOSOL in Vespasiano-MG, a reliable third-party transportation company trusted by NX Gold. Preparation of exploration samples from the 2022 drilling campaign was prepared by ALS Minerals laboratory and SGS GESOSOL. NX Gold also requested that the laboratory prepare duplicate samples.

The core sample batches from NX Gold’s drilling were typically shipped either the same day or the day following the completion of the sampling. Samples awaiting transport were assembled in an area of the core shack until they were ready to be taken to the laboratories for preparation and assaying. The core shack was locked after hours and the samples were always secured, from splitting to delivery to the laboratory by an NX Gold employee. Transportation of the samples from the property to the laboratories was performed by a reliable transportation company trusted by NX Gold.

11.8 Verifications by GE21

To validate the data for use in the current Mineral Resource estimate, GE21 selected a series of QA/QC samples from those performed by NX Gold. A set of samples were taken from the current Mineral Resource estimate corresponding to samples taken from the 2018-2022 drilling campaign.

The results of the blank, duplicate and standard control samples are discussed in the following sections.

11.8.1 *Blanks*

GE21 validated the pre-2020 QAQC program in Xavantina’s most recent Mineral Resource estimate. The blanks analyzed in the period from October 1, 2020 to October 31, 2022 contain 923 samples, 779 from the diamond drilling and 144 from channel sampling.

Figure 23 shows the result of the blank sample analysis for drill hole and channel samples. All results were within the acceptance limit. No contamination issues were detected in the samples and chemical analyses.

The blank sample results are within the acceptable limits for the classification of Mineral Resources at the Xavantina Operations.

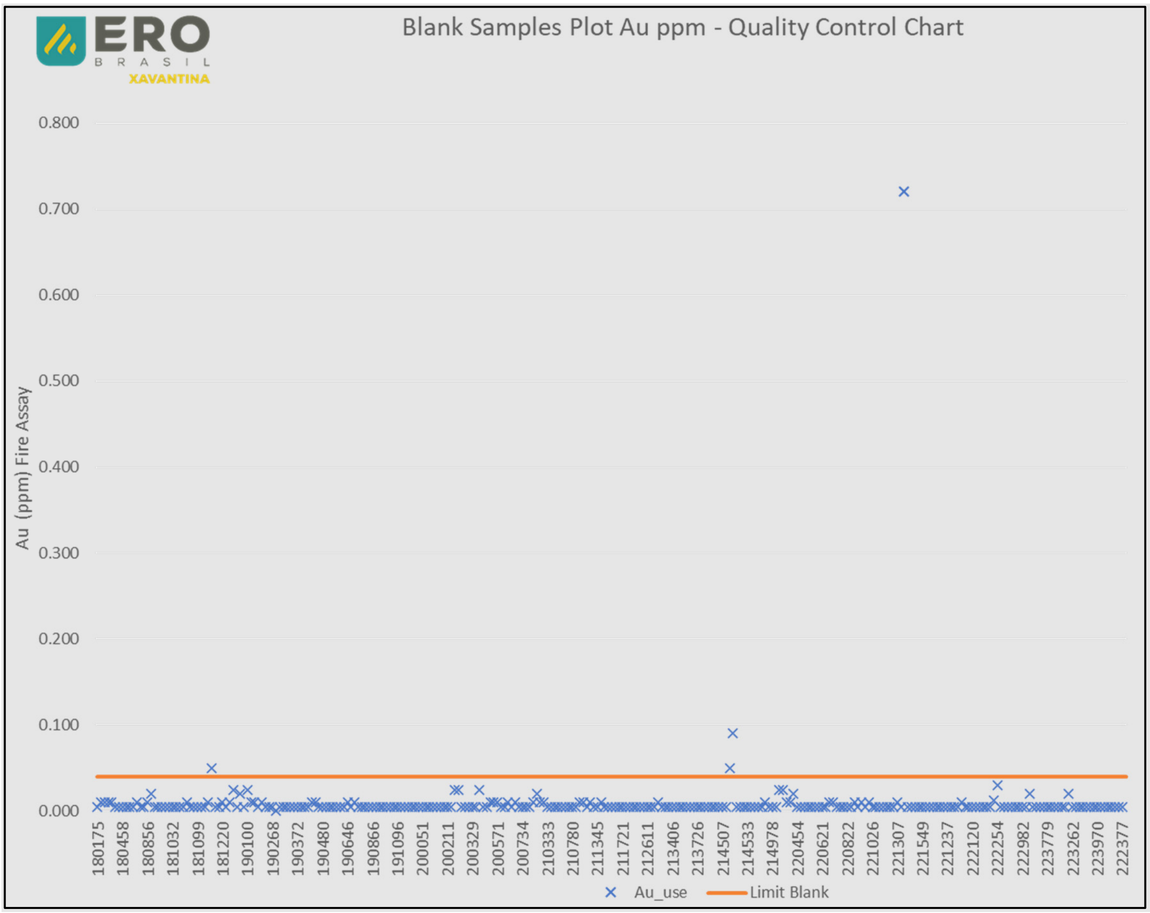


Figure 23 - Blank sample analysis for drill holes and channel samples from 2018 to 2022 (Xavantina, 2022)

11.8.2 *Standard Sample Analysis*

NX Gold's pre-2020 QAQC program was validated by GE21 in the previous Mineral Resource estimate. The Standards from November 1, 2020 to October 31, 2022 contain 913 samples, 779 from the diamond drilling and 134 from channel sampling. Table 28 and Table 29 list the standard types used in this period, as well as the quantity of each. The number of sample results outside the expected standard deviation limit is listed in the same table. NX Gold checked all samples detected outside acceptable limits with the laboratories and with the sampling team. Figure 24 to Figure 26 presents examples of results for the standard sample analysis. The majority of the standard samples demonstrate results within the two standard deviation limit of the expected value. The standard sample results are considered to be within the acceptable accuracy limits for classifying the current Mineral Resources at the Xavantina Operations.

Table 28 - Diamond Drilling program Standard samples: 2020-2022

Standard	Reference value (ppm)	Standard deviation (STD) (ppm)	Number of samples	Samples out of 2SD limit	Samples out of 3SD limit
ITAK-524	8.48	0.42	45	7	2
ITAK-527	8.75	0.45	15	2	-
ITAK-567	4.31	0.16	43	6	2
ITAK-586	1.723	0.058	24	3	-
ITAK-591	2.66	0.17	162	4	-
ITAK-621	0.273	0.022	9	2	-
ITAK-637	1.659	0.064	101	24	3
ITAK-646	0.432	0.013	7	1	1
OREAS-230	0.337	0.013	90	5	1
OREAS-234	1.2	0.03	45	2	-
OREAS-235	1.59	0.038	53	7	6
OREAS-238	3.03	0.08	73	8	3
OREAS-240	5.51	0.139	62	3	4
OREAS-242	8.67	0.215	32	5	2
OREAS-250b	0.332	0.011	15	-	-
OREAS-254b	2.53	0.061	3	-	-

Table 29 - Channel program Standard samples: 2020-2022

Standard	Reference value (ppm)	Standard deviation (STD) (ppm)	Number of samples	Samples out of 2SD limit	Samples out of 3SD limit
ITAK-524	8.48	0.42	4	1	1
ITAK-527	8.75	0.45	45	2	1
ITAK-567	4.31	0.16	14	4	1
ITAK-586	1.723	0.058	5	1	-
ITAK-591	2.66	0.17	25	-	-
ITAK-621	0.273	0.022	6	3	2
ITAK-637	1.659	0.064	-	-	-
ITAK-646	0.432	0.013	-	-	-
OREAS-230	0.337	0.013	1	1	1
OREAS-234	1.2	0.03	4	-	-
OREAS-235	1.59	0.038	-	-	-
OREAS-238	3.03	0.08	6	-	-
OREAS-240	5.51	0.139	13	1	-
OREAS-242	8.67	0.215	11	-	-
OREAS-250b	0.332	0.011	-	-	-
OREAS-254b	2.53	0.061	-	-	-

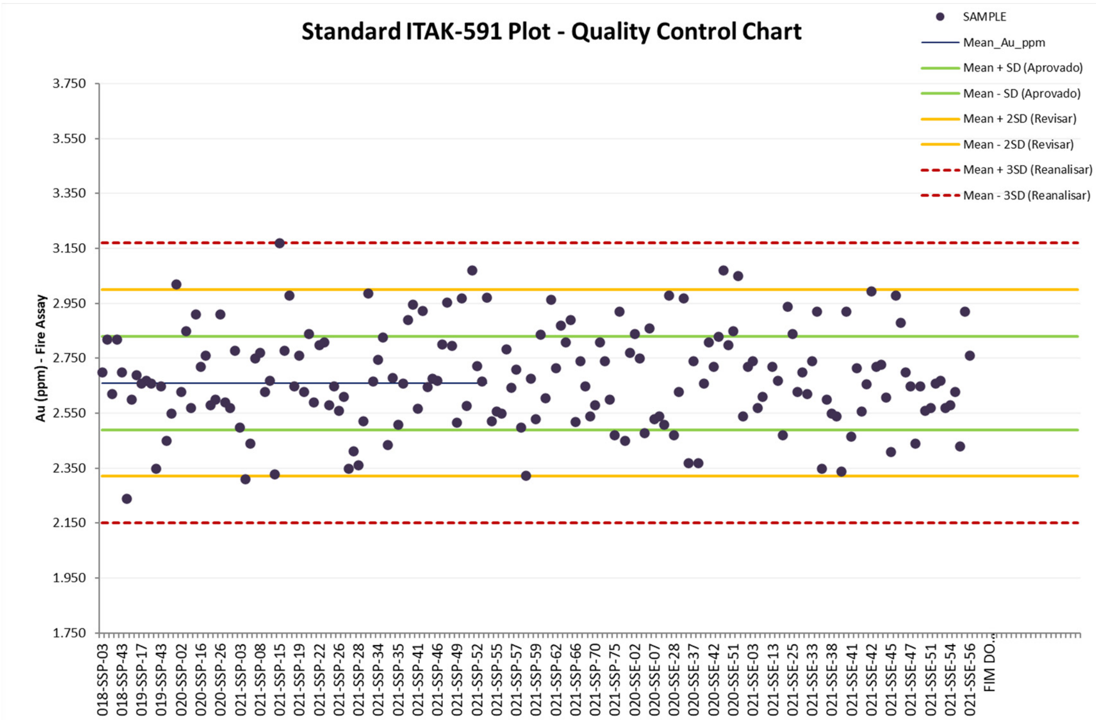


Figure 24 - Standard sample analysis - MRC-ITAK-591 for drill holes

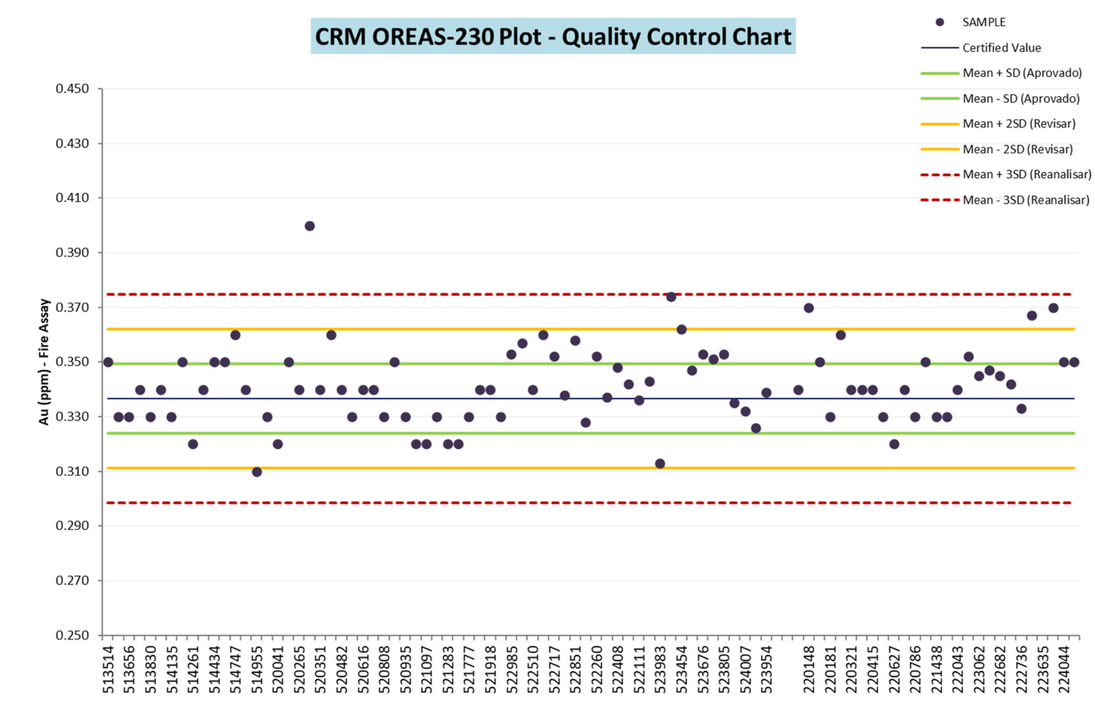


Figure 25 - Standard sample analysis - MRC-OREA-230 for drill holes

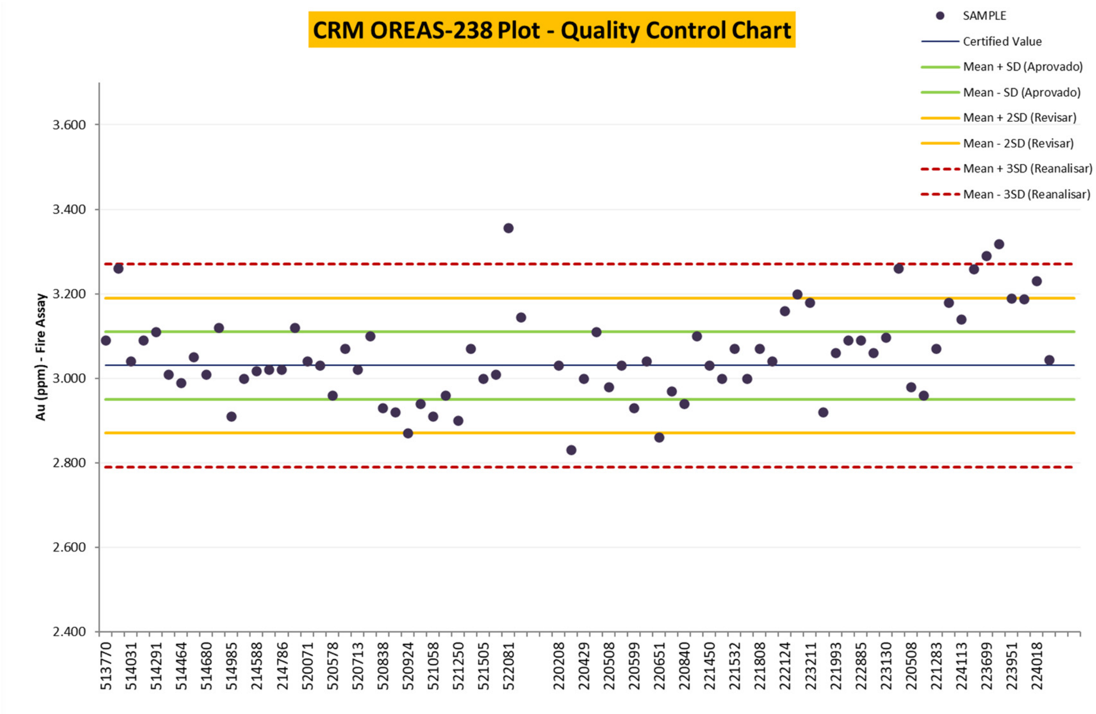


Figure 26 - Standard sample analysis - MRC-OREA-238 for drill holes

11.8.3 *Duplicate Samples*

Duplicate samples were analyzed separately for drill core samples and channel samples. The results of the duplicate sample analysis for drill hole and channel samples are presented in Figure 27. Limits for the analysis were set at 20% relative standard deviation ("RSD").

The duplicates show that 75% of the samples are within the 20% RSD limits (as shown in Figure 27). The duplicates for channel samples show that 70% of the samples are within the 20% RSD. Xavantina carried out a study to evaluate whether the high variability of gold grades on duplicate samples is an expected characteristic of the deposit. Additional work to refine the precision of duplicate samples is ongoing.

In 2021, Xavantina adopted the methodology of only sampling duplicates in non-mineralized domains to preserve all half core in high-grade intervals. GE21 considers that the change in methodology qualifies the study of the precision of the low-grade domains. In order to improve validation of precision in the medium and high-grade Au ranges. GE21 recommends that Xavantina implement duplicate samples from the coarse samples and pulp reserves with medium and high Au grade sample intervals.

Target	All core samples
Reference	sample
Variable	Au_ppm
Accuracy limit	20%
Number of pairs	285

	Sample	Duplicate
Minimum	0.005	0.005
Maximum	15.05	17.3
Average	0.23	0.239
Median	0.02	0.02
HARD median		13.3

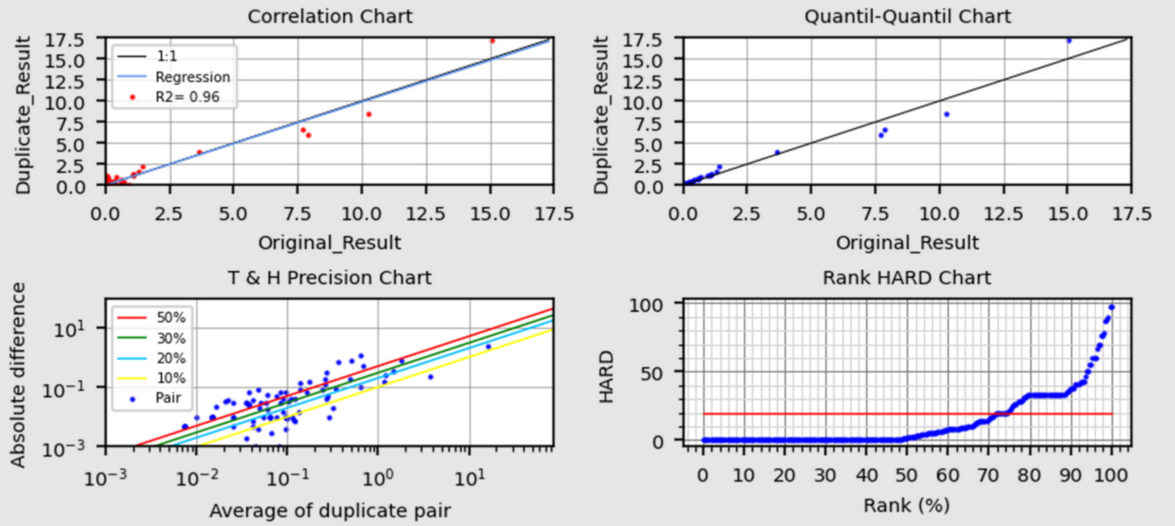


Figure 27 - Duplicate sample analysis for drill hole samples from 2020 to 2022

Target	Channel samples
Reference	sample
Variable	Au_ppm
Accuracy limit	20%
Number of pairs	137

	Sample	Duplicate
Minimum	0.025	0.025
Maximum	303.0	138.5
Average	15.327	13.176
Median	4.8	3.74
HARD median		20.6

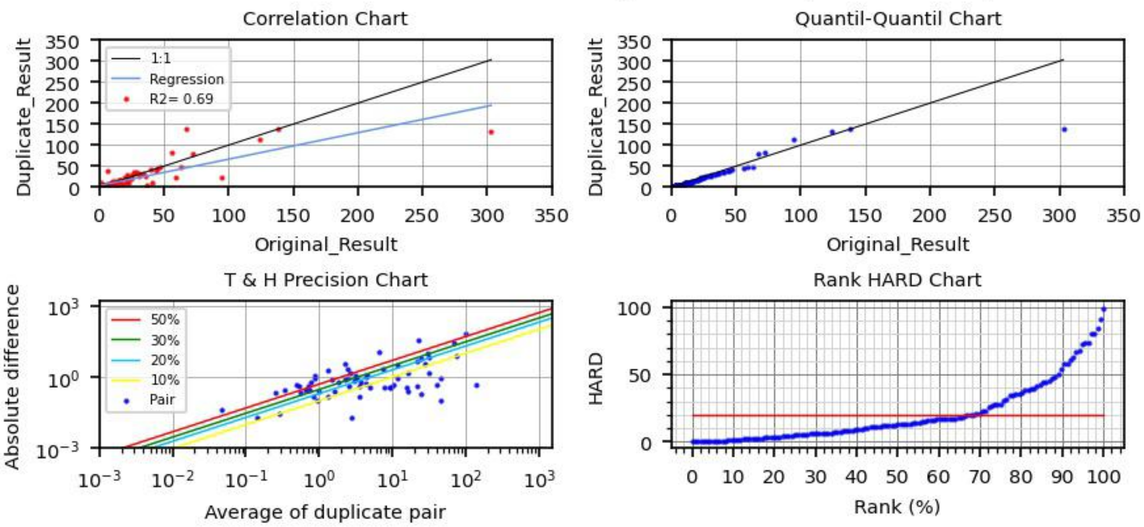


Figure 28 - Duplicate sample analysis for channel samples from 2020 to 2022

11.9 QP Opinion

It is the opinion of the authors of this Report that the data used in the current Mineral Resource and Mineral Reserve estimate, which have been verified by the QPs, is in-line with standard industry practices and adequate for this Report, considering blank and standard sample controls.

Duplicate sample analysis results are considered inside acceptance limits, despite the high variability of gold levels in duplicate samples. It is recommended to carry-out further studies to conclude if the accuracy for field duplicates is an expected characteristic of the deposit and to confirm if the reference value should be revised.

12.0 DATA VERIFICATION

The Xavantina Operations closely monitors the real-time analytical quality control data on a real-time basis from laboratory samples. Failures of quality control samples were investigated and appropriate actions were taken, including re-assaying of certain sample batches, if required. Where appropriate, results from re-assayed batches replaced the original assay of the failed batch.

12.1 GE21 Site Review

In addition to the blank, standard and duplicate analysis as more fully described in Chapter 11, a site review was carried out by all QPs in 2020, and in September 2022 the QP Leonardo Soares carried out a new site review. Xavantina allowed unlimited access to the Company's facilities during this time.

Authors of this report inspected property on follow dates:

- Porfirio Rodriguez personally inspected the property from September 17-18, 2018, September 18-19, 2019 and September, 28-30, 2020.
- Leonardo de Moraes Soares personally inspected the property that is the subject of this Technical Report from February 19-22, 2018, May 14-18, 2018, September 18-19, 2019 and September 27-28, 2022.
- Guilherme Gomides Ferreira personally inspected the property that is the subject of this Technical Report from September 27-28, 2022.

The location of drill rigs, several survey markers, the Company's core shed, underground mine and plant facilities were reviewed for sampling, preparation, mining methods and the verification of mineralization styles at Santo Antônio and Matinha targets.

GE21 visited the Xavantina core shed and observe sampling procedures. Sampling procedures were found to be in accordance with industry standards and are within accepted limits of quality, to guarantee correct sample splitting, and avoid sample contamination.

External monthly assaying checks were performed, and certified standard samples were applied on QA/QC procedures.

Exploration program and QA/QC sampling procedures and result analysis were found to be performed according to industry standards.

Photos of each area reviewed are shown below:

- Overview point of project area (Figure 28)
- Drill hole survey landmark (Figure 29);
- Drill rig site (Figure 30)
- Drill core shed (Figure 31and Figure 31);
- Drilling sampling plan sheet (Figure 33);

- Drill core saw (Figure 34)
- Underground mine (Figure 35 to Figure 38)
- Processing plant (Figure 39)

Figure 28 - Data verification: Overview point of project area

Figure 29 - Data verification: Drill hole collar landmark location

Figure 30 - Data verification: Exploration drill rig

Figure 31 - Data verification: Sampling procedures

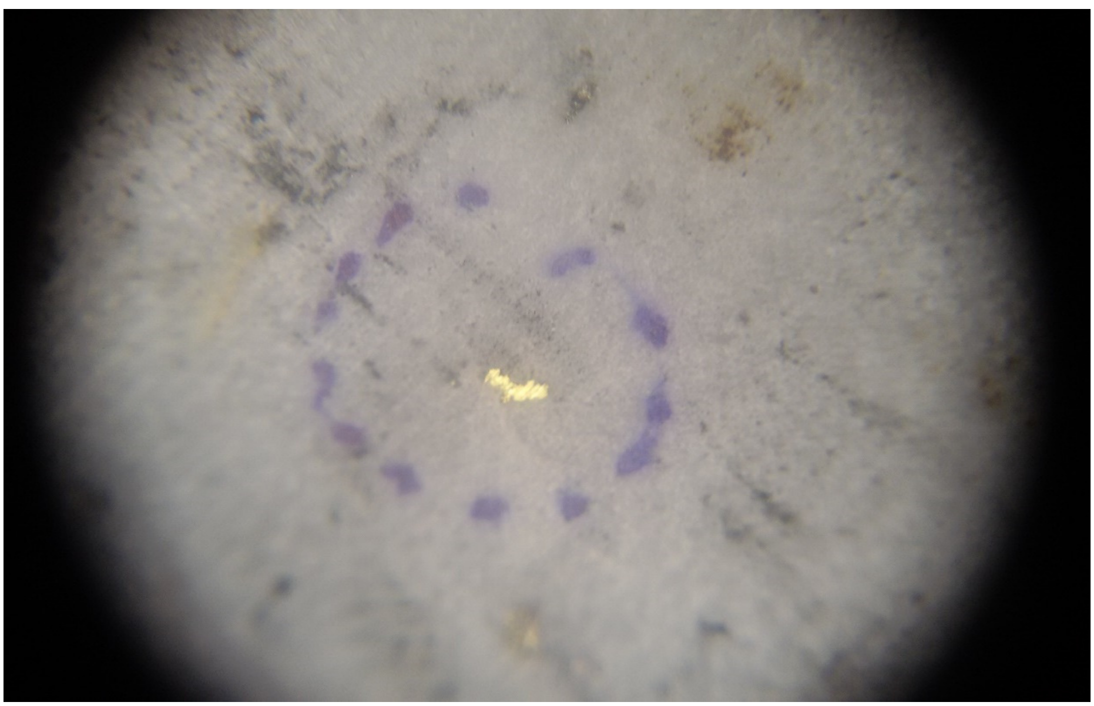
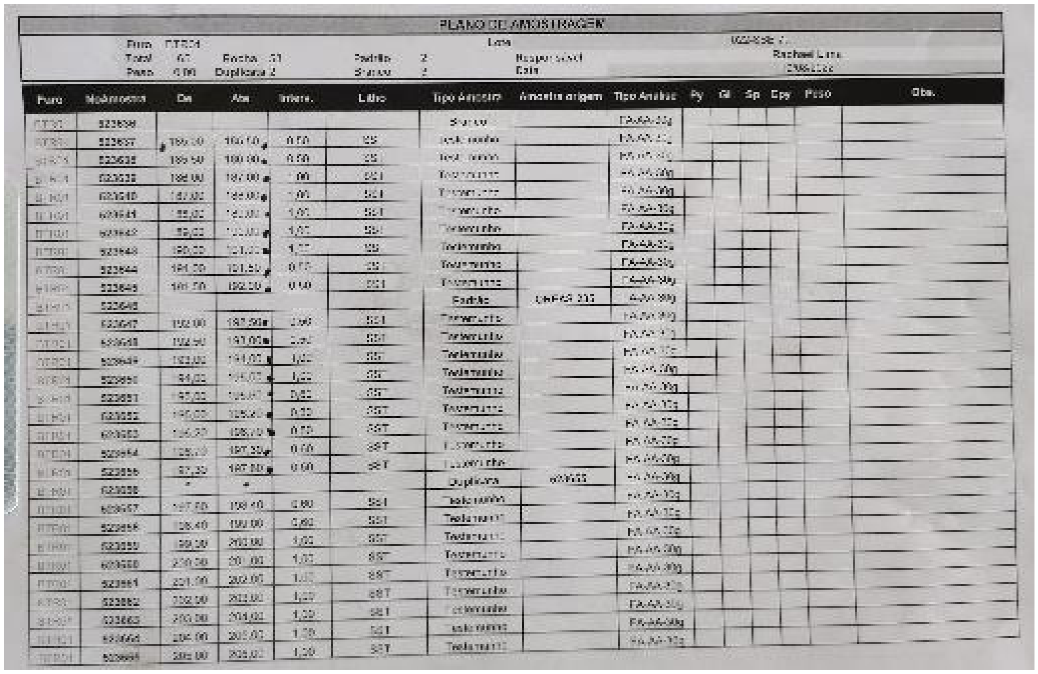


Figure 32 - Data verification: Visible gold in drill core (2020 site visit)



PLANO DE AMOSTRAGEM

Furo [illegible] Total 67 Rocha 31 Peso 0.00 Duplicata 2 Padrão 2 Branco 2 Lote Responsável Rachael Lima Data [illegible]

Furo	NoAmostra	De	Ate	Interv.	Litho	Tipo Amostra	Amostra origem	Tipo Analise	Py	Gl	Sp	Cpy	Peso	Obs.
[illegible]	523636					Branco		FA-AA-30g						
[illegible]	523637	185.00	185.50	0.50	SS	Testemunho		FA-AA-30g						
[illegible]	523638	185.50	186.00	0.50	SS	Testemunho		FA-AA-30g						
[illegible]	523639	186.00	187.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523640	187.00	188.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523641	188.00	189.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523642	189.00	190.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523643	190.00	191.00	1.00	SS	Testemunho		FA-AA-30g						
[illegible]	523644	191.00	191.50	0.50	SS	Testemunho		FA-AA-30g						
[illegible]	523645	191.50	192.00	0.50	SST	Testemunho		FA-AA-30g						
[illegible]	523646					Padrão	OREAS 235	FA-AA-30g						
[illegible]	523647	192.00	192.50	[illegible]	SST	Testemunho		FA-AA-30g						
[illegible]	523648	192.50	193.00	[illegible]	SST	Testemunho		FA-AA-30g						
[illegible]	523649	193.00	194.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523650	194.00	195.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523651	195.00	[illegible]	0.60	SST	Testemunho		FA-AA-30g						
[illegible]	523652	[illegible]	[illegible]	[illegible]	SST	Testemunho		FA-AA-30g						
[illegible]	523653	[illegible]	[illegible]	[illegible]	SST	Testemunho		FA-AA-30g						
[illegible]	523654	[illegible]	197.30	0.60	SST	Testemunho		FA-AA-30g						
[illegible]	523655	197.30	[illegible]	0.60	SST	Testemunho		FA-AA-30g						
[illegible]	523656	*	*			Duplicata	523655	FA-AA-30g						
[illegible]	523657	[illegible]	198.40	0.80	SST	Testemunho		FA-AA-30g						
[illegible]	523658	198.40	199.00	0.60	SST	Testemunho		FA-AA-30g						
[illegible]	523659	199.00	200.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523660	200.00	201.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523661	201.00	202.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523662	202.00	203.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523663	203.00	204.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523664	204.00	205.00	1.00	SST	Testemunho		FA-AA-30g						
[illegible]	523665	205.00	206.00	1.00	SST	Testemunho		FA-AA-30g						

Figure 33 - Data verification: Drilling sampling plan sheet

Figure 34 - Data verification: Drill core saw

Figure 35 - Data verification: Sulfide quartz vein in underground mine

Figure 36 - Data verification: Underground mine stope and pillars

Figure 37 - Data verification: Underground drill rig

Figure 38 - Data verification: Underground front of ore access drift

Figure 39 - Data verification: Processing plant

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

The Xavantina Operations is currently in operation and achieving metallurgical recoveries in excess of 90%. This Chapter provides an overview of prior testwork performed in support of mine development. The Company's forecast recovery of approximately 92.6% is based on actual plant performance and modeled reserve grades as set out in the production plan herein. Average metallurgical recoveries of approximately 93% were achieved during the third quarter of 2022 on ore mined and processed from the Santo Antônio vein.

Prior to the transition of the Xavantina Operations to NX Gold S.A in 2019, MCSA requested that Amdel Mineral Laboratories investigate the metallurgical response of samples from the Xavantina Operations in support of its development.

The aim of the testwork was to investigate processing options and to optimise gold recovery. The test work included:

- Sample characterisation;
- Gravity separation;
- Cyanide leach tests;
- Flotation optimisation; and,
- Bulk processing under optimised conditions.

The test work, described in greater detail below, showed that despite preg-robbing characteristics, the combination of gravity, flotation and CIL leaching resulted in overall gold recoveries of 96% being achievable at a target grind size of 106 micron ("µm"). The results of the optimization test work evaluating varying process routes is shown below in Table 30.

Table 30 - Processing Route results

Processing Route	Au Calc Head (g/t)	Gravity Con 1 (dist %)	Float Con (dist %)	Gravity Con 2 (dist %)	Process Recovery (%)
Gravity- Float (regrind cons) - CIL – Gravity Float tails	2.44	73.0	24.9	1.01	96.4
Gravity - Deslime - Float (regrind cons) - CIL	2.58	70.2	16.3	-	86.6
Gravity-Float (regrind cons) - CIL	2.41	71.4	25.7	-	96.0
Gravity-CIL	3.11	66.1	-	-	96.2

Additional evaluation showed that a simple gravity/CIL circuit resulted in similar recoveries as gravity, flotation, followed by CIL of the flotation concentrate. Kerosene addition of 3 kg/t was required to optimise CIL recovery from the float concentrate. Regrinding the flotation concentrate, from 106µm to 30µm, resulted in an additional 1% gold recovery.

13.1 Metallurgical Test work

13.1.1 *Sample Characterisation*

A sub sample of the Nova Xavantina/Araés Composite was assayed in duplicate to determine the head grade. A summary of these results can be found in Table 31.

Table 31 - Assayed Head Grades

Assay	Au (g/t)				As	S	Org C (%)
					(ppm)		
Original	3.55	3.11	4.04	2.00	21	8700	0.48
Duplicate	5.36	2.40	2.81	-	19	8800	0.49

In initial characterization work, the gold grade in the Nova Xavantina/Araés Composite ranged from 2.00 g/t to 5.36 g/t while the average grade was 3.32 g/t. The discrepancy indicated the presence of coarse gold in the sample. In addition, significant amounts of organic carbon were found to be present in the sample (approximately 0.5%), indicating that preg-robbing was likely to occur in leaching stages.

ICP analysis was also conducted on the composite sample, as shown below in Table 32. The assay data indicated significant quantities of lead were present, approximately 0.14%, while only trace quantities of arsenic and antimony were present.

Table 32 - ICP Composite Characterization

Element	Unit	Detection Limit	Assay
Ag	ppm	0.5	3.25
Pb	ppm	1	1385
As	ppm	1	20
Sb	ppm	0.2	3.5
Fe	%	0.01	1.56
Si	%	0.1	43.95
CO_2	%	0.1	1.05
Tot C	%	0.01	0.77
Na	%	0.01	0.01
Mg	%	0.01	0.295
Ca	%	0.01	0.58

13.1.2 *Sequential Leach*

For sequential leach test work, a 1-kg composite sample charge was ground to 80% passing 106µm, and subjected to a sequential leach analysis, involving gravity concentration, leaching of the concentrate and tails, followed by a regrind and re-cyanidation step, and finally aqua regia digestion to determine final recoveries.

High final tail gold grades, and lower than expected recovery from the first three stages of the diagnostic test, indicated that preg-robbing may have occurred. To confirm this, a portion of the tailings from the reground intense cyanidation test were subjected to acetonitrile leaching, followed by roasting for 2 hours at 900°C to remove the carbonaceous component. The roast residue was then subjected to aqua regia digestion.

Based on the acetonitrile leaching, it was determined that only 1% of the gold was found to have preg-robbed in the first two stages. Recovery in the aqua regia digest was significantly higher on the roasted product, indicating that carbonaceous material was interfering with the aqua regia digestion, which is a known phenomenon, whereby the gold chloride produced can be reduced to metallic gold by the natural carbon in the ore.

In summary, the diagnostic test work indicated:

- 57% gold is gravity recoverable;
- 29% gold is recoverable by CIL (with slight benefit from regrinding);
- 5% of the gold is refractory gold associated with sulphides; and,
- 7% of the gold is associated with silica or silicates.

Table 33 - Diagnostic leach summary results

Diagnostic Step	Au Dist'n	Acetonitrile Leach	After Roasting	Generic Mineral Associations
Gravity / Amalgam	57%			Free gold
Intense Cyanide Leach	28%			Partially liberated gold and gold accessible by cyanide
Intense Cyanide Leach after grinding	0%	1%		Fine encapsulated gold
Aqua Regia Soln	1%		5%	Gold associated with sulfides
Aqua Regia Res	13%		7%	Gold encapsulated in fine grained silicates

13.1.3 *Preg-Robbing Factor Tests*

Preg-robbing factor ("PRF") tests were conducted on whole ore samples, as well as rougher flotation concentrate from the sequential leach test work. The test involved subjecting the pulverized sample to a 40 mg/L gold solution for 1 hour. %PRF is expressed as the percentage of gold in solution that was removed by the ore.

Table 34 - Preg-robbing factor test summary

Sample	% solids	% PRF
Whole ore	23	5.0
Whole ore	15	2.2
Rougher con	33	80.1

The results of the tests confirmed that the whole ore sample exhibits mild preg-robbing characteristics, with the flotation concentrate having significantly stronger preg-robbing properties, likely due to the concentration of organic carbon into the flotation concentrate (refer to float test data where total organic carbon ("TOC") levels ranged from ~4 to 5% in the concentrates).

13.1.4 *Whole Ore Leaching*

A bottle roll cyanide leach test was conducted on whole ore composite sample at a grind size of 80% passing 106 µm. Figure 40 shows the recovery plateaus at 8 hours, then slowly declines to 24 hours. This indicates that a portion of the leached gold is being lost to the carbonaceous component of the ore.

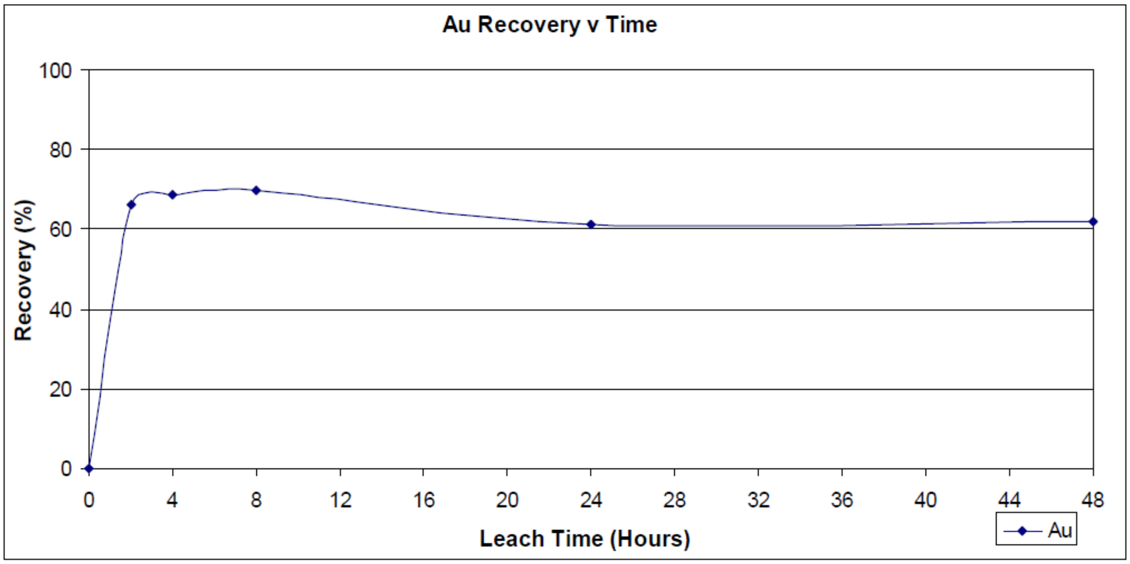


Figure 40 - Results from bottle roll tests

Whole ore CIL tests were conducted at three grind sizes to determine the relationship between recovery and grind size. The test conditions are summarized as follows:

- 33 g/L Activated Carbon;
- 750 ppm NaCN initial dose;
- 500 ppm NaCN maintained;
- pH 10-10.5 adjusted with Lime;
- 40% Solids;
- Dissolved Oxygen > 10 ppm; and,
- 48-hour total leach time.

Test work demonstrated that gold recoveries increased with finer grind size, as illustrated in the results tabulated below. Where the use of fresh carbon was employed, higher recoveries were achieved compared with the use of "aged carbon" (test CIL1.4). It is hypothesized that the aged carbon had less ability to counter-act the natural adsorption properties of the ore and this became an important process design consideration.

Table 35 - Summary of whole of ore leach tests

Test Parameter	Leach Test	Grind Size (µm)	Gold			
			Recovered (%)	Residue (g/t)	Calc Head (g/t)	Assay Head (g/t)
Grind Size	CIL 1.1	106	93.0	0.23	3.27	3.32
Grind Size	CIL 1.2	75	94.8	0.12	2.25	
Grind Size	CIL 1.3	53	96.1	0.12	3.09	
Aged Carbon	CIL 1.4	106	87.8	0.41	3.37	

13.1.5 *Flotation Optimisation*

Flotation test work was conducted on 1kg charges under the following conditions:

- 2.5L flotation cell
- 750 RPM
- 100 g/t PAX
- 30-60 g/t IF50 as required
- 14.5 minutes cumulative flotation time

A total of 7 rougher flotation tests were performed, examining the effect of grind size, copper sulfate addition and desliming on gold recovery. Table 36 summarizes the results obtained.

Table 36 - Summary of Flotation Test Results

Test Number	Grind Size (µm)	$CuSO_4$ Addition	Mass Pull (%)	Gold			
				Recovery (%)	Con. Grade (g/t)	Residue Grade (g/t)	Calc Head (g/t)
1.1	106	-	6.85	97.6	50.88	0.09	3.57
1.2	75	-	7.13	98.6	40.17	0.05	2.91
1.3	53	-	8.06	98.6	32.35	0.04	2.64
1.4	106 (deslimed)†	-	4.80	89.1	59.51	0.07	3.59
1.5	150	50g/t	7.36	97.3	36.73	0.08	2.78
1.6	212	50g/t	7.65	97.9	35.82	0.07	2.80
1.7	106	50g/t	7.14	98.8	44.70	0.04	3.23

The flotation test work results demonstrated that the samples were amenable to beneficiation by flotation, with greater than 97% of gold recovered into the flotation concentrate. Test 1.4 was conducted on a de-slimed flotation feed and showed significant losses of gold (approximately 9%) to the slimes fraction.

13.1.6 *Gravity Grind Optimisation*

Two 1kg lots were ground to different grind sizes and passed once through a Knelson concentrator to determine the optimum grind size for gravity separation. The results of the tests are summarized in Table 37. The results indicated that the samples were highly amenable to gravity recovery, with gold recoveries ranging from 65.1 to 77.9% into the gravity concentrate.

Table 37 - Results of gravity testwork

Grind Size p80 (µm)	Gravity Concentrate			Gravity Tails Grade (g/t)	Head Grade (g/t)	
	Recovery		Grade		Calculated (g/t)	Assayed (g/t)
	Mass (%)	Au (%)	Au (g/t)			
150	3.24	77.9	65.3	0.62	2.72	3.32
106	2.95	67.2	61.2	0.73	2.51	
75	2.12	65.1	65.2	0.76	2.12	
53	1.20	68.7	121	1.09	2.54	

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13.1.7 *Bulk Composite Testwork*

Three process routes were evaluated at a selected optimum grind size of 106 µm. The process routes evaluated were:

- **Test 1:** Gravity, Rougher Flotation, CIL of concentrate, Gravity separation of flotation tails.
- **Test 2:** Gravity, Deslime, Rougher Flotation, CIL of concentrate, Gravity separation of flotation tails.
- **Test 3:** Gravity, CIL of gravity tail.
- **Test 2.1:** Repeat of Test 2; non-deslimed Kerosene addition optimization.

Results of the bulk composite testwork program indicated that Knelson gravity recovery of 106 µm feed is approximately 67% at a 1% mass pull. As was noted previously, high intensity leach tests on the gravity concentrate resulted in gold recoveries from gravity concentrate of approximately 98%.

Subsequent flotation of the gravity tails without desliming was able to further recover approximately 25% of the gold, leaving between 1.5% and 3.0% of the gold in the flotation tails.

Recovery of gold from the flotation concentrate improved with regrinding, to a recovery of 90% after a 15 minute regrind (P80 after a 15 minute regrind of 30 µm).

Kerosene addition for optimization on the CIL test work conducted on non-deslimed flotation concentrates indicate that 3 kg/t of kerosene was sufficient to passivate the naturally occurring carbonaceous material that reported to the flotation concentrate.

Table 38 below shows the deportment of the gold into different concentrate streams in each 10 kg test, along with calculated gold head grade, and overall process recovery.

Table 38 - Bulk testing summary data

Bulk Test No.	Au Calc Head (g/t)	Gravity Con 1 (dist %)	Float Con (dist %)	Gravity Con 2 (dist %)	Process Recovery (%)
2.1	2.44	73.0	25.0	1.01	96.1
2.2	2.58	70.2	16.3	-	86.6[†]
2.3	2.41	71.4	25.7	-	96.0
3.1	2.95	64.2	-	-	96.2

The methods and results of the bulk composite test work is described below in greater detail.

13.1.8 *Gravity - Flotation - Gravity Process Tests*

For the Gravity - Flotation - Gravity tests, a 10kg sample was ground to 80% passing 106 µm and passed through a Knelson concentrator. The concentrate was leached, and the tails floated. The flotation tails were then passed through a Knelson concentrator and leached in the same manner as the first gravity concentrate. The flotation concentrate was then wet split into four, and reground for 0, 5, 10 and 15 minutes. The milled concentrate was conditioned for 30 minutes with 33 kg/t kerosene.

The excess kerosene was removed with activated carbon. The carbon was screened out, and 20 g of fresh carbon added back to the slurry. 48 h CIL tests were conducted and the final concentrate and carbon assayed to determine recovery. Table 39 summarizes the key recovery data from the test.

Table 39 - Test concentrate grinding optimisation

1st Pass Gravity Con Au Dist	Assumed Gravity High Intensity Leach Recovery	2nd Pass Gravity Con Au Dist	Assumed Gravity High Intensity Leach Recovery	Flot Con Au Dist	Test	Concentrate Grind time	CIL Recovery (%)	Overall Process Recovery (%)
						(minutes)	Au	
73.0%	98%	1.01%	90%	24.7%	CIL 2.1	5	90.9	94.9
					CIL 2.2	10	93.0	95.4
					CIL 2.3	15	95.9	96.1
					CIL 2.4	0	90.5	94.8

The gravity leach recovery was lower than would be expected in an Acacia leach process, so an assumed recovery of 98% and 90% was applied to the two gravity concentrates in calculating the overall process recovery.

Additional flotation concentrate was generated to perform kerosene addition optimization tests. In each case the flotation concentrate was ground for 15 minutes. In subsequent tests, gravity concentrate leach conditions were conducted using conditions that were more aligned with full scale processes. Test conditions were 50 °C, 2.5% NaCN, 0.25% LeachWELL, 0.25% NaOH, 10% solids. The leach was monitored at 1, 2, 4, 6, 8 and 24 hours. Recovery was found to be 98.0%, with the leach being essentially complete after 4 hours.

Table 40 - Concentrate kerosene addition optimization

1st Pass Gravity Con Au Dist	Actual Gravity High Intensity Leach Recovery	Flot Con Au Dist	Test	Kerosene	CIL Recovery (%)	Overall Recovery (%)
				(kg/t)	Au	
73.2%	98.0%	24.1%	CIL 2.8	0	72.4	89.1
			CIL 2.9	3.5	90.1	93.4
			CIL 2.10	6.6	88.6	93.0
			CIL 2.11	9.12	83.4	91.8

Kerosene addition to the float concentrate leach improved gold recovery by ~18%. Optimum kerosene addition was 3.5kg/t of concentrate, with higher addition rates providing no benefits in gold recovery. Note, lower addition rates than 3.5 kg/t were not tested.

Laser sizing analysis of the CIL residues was carried out, indicating the P80 of the concentrate after a 15 minute regrind to be 30 microns.

13.1.9 *Gravity - Deslime - Flotation - Gravity Process Tests*

Ten kilograms was ground to 80% passing 106 microns and passed through a Knelson concentrator. The concentrate was leached, and the tails deslimed before being subjected to flotation. The flotation concentrate was then wet split into three, and reground for 0, 7.5 and 15 minutes in a rod mill. The milled concentrate was conditioned for 30 minutes with 33 kg/t kerosene.

Note: this test was conducted prior to the kerosene optimization tests discussed previously. The excess kerosene was removed with activated carbon. The carbon was screened out, and 20 g of fresh carbon added back to the slurry. 48 h CIL tests were conducted and the final concentrate and carbon assayed to determine recovery.

Table 41 summarizes the key recovery data from the test.

Table 41 - Test Summary

1st Pass Gravity Con Au Dist	Assumed Gravity High Intensity Leach Recovery	2nd Pass Gravity Con Au Dist	Assumed Gravity High Intensity Leach Recovery	Flot Con Au Dist	Test	Concentrate Grind time	CIL Recovery (%)	Overall Process Recovery (%)
						(minutes)	Au	
70.2%	98.0%	0.74%	90%	19.6%	CIL 2.5	0	59.3	81.0
					CIL 2.6	7.5	76.8	84.5
					CIL 2.7	15	86.4	86.4

13.1.10 *Gravity - Leach Process Tests*

Ten kilograms was ground to 80% passing 106 micron and passed through a Knelson concentrator. The concentrate was leached at 50 °C, and the gravity tails split into 9 samples approximately of 1.1 kg each. CIL tests were conducted with interim and final solids sampling and the final and carbon assayed to determine recovery kinetics. Table 42 summarizes the key recovery data from the test.

CIL tests showed that recovery of gold proceeded rapidly, with maximum recoveries achieved in as little as 4 hours. Subsequently recovery appeared to decline significantly, however this may well be an artifact of interim sampling. Lead nitrate dosed at 1 kg per tonne appeared to have a deleterious effect on final gold recovery.

Table 42 - Test Knelson Tail CIL Summary Data

Gravity Con Au Dist	Actual Gravity High Intensity Leach Recovery	Gravity Tail Au Dist	Test	Total Leach Time	Initial CN: Test CN	Cyanide Consumption	CIL Recovery (Au)	Overall Recovery (%)
				Hours	ppm	kg/t	%	
64.2%	98.2%	35.8%	3.1.2	24	750:500	1.14	82.67	92.6
			3.1.3	24	500:250 lead nitrate	1.02	73.39	89.3
			3.1.4	24	500:250	0.92	80.63	91.9
			3.1.5	8	1250:1000	1.23	92.72	96.2
			3.1.6	8	1000:750	0.86	91.24	95.7
			3.1.7	8	750:500	0.75	90.73	95.5
			3.1.8	6	1000:750 1110g/t Au on carbon 40 kg/t Carbon	0.49	86.95	94.2
			3.1.9	6	1000:750 1110g/t Au on carbon 60 kg/t Carbon	0.64	85.96	93.8
			3.1.10	6	1000:750 1110g/t Au on carbon 20 kg/t Carbon	0.56	88.07	94.6

Final gold recovery increased with increasing cyanide levels, however cyanide consumption rose by 0.47 kg/t between test 3.1.5 and 3.1.7, while overall gold recovery increased by 0.03 g/t.

It was found that extended leach times had a deleterious effect on recovery, as shown by Figure 41 below representing gold recovery in the first three 24h CIL tests.

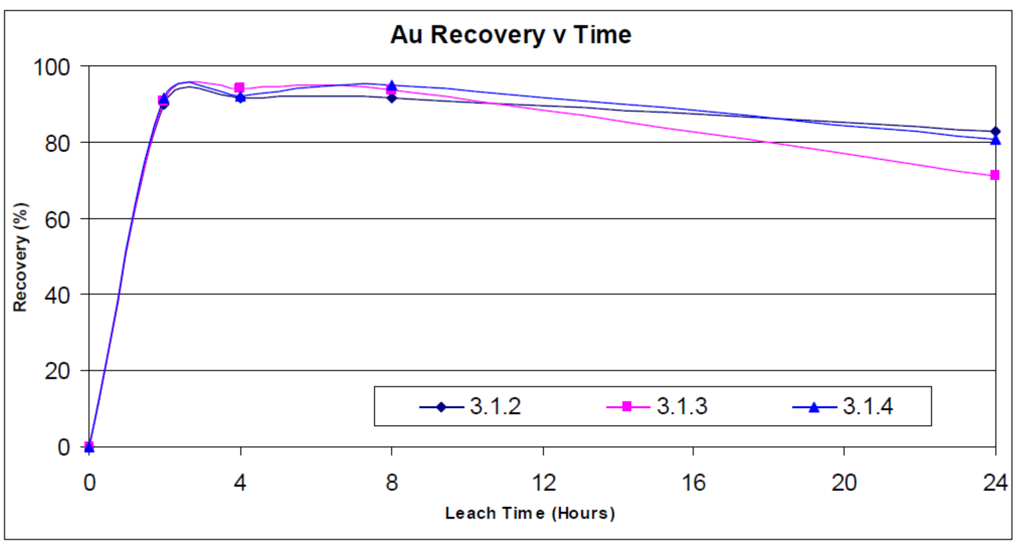


Figure 41 - Comparison of 24h leach tests

The results suggest that the addition of lead in 3.1.3 results in an increase in preg-robbing. Given the natural content of lead in the ore, this may explain the observed decrease in calculated recoveries between 8 and 24 hours.

Further tests were conducted with an 8-hour residence time, with kinetic recovery data presented below in Figure 42.

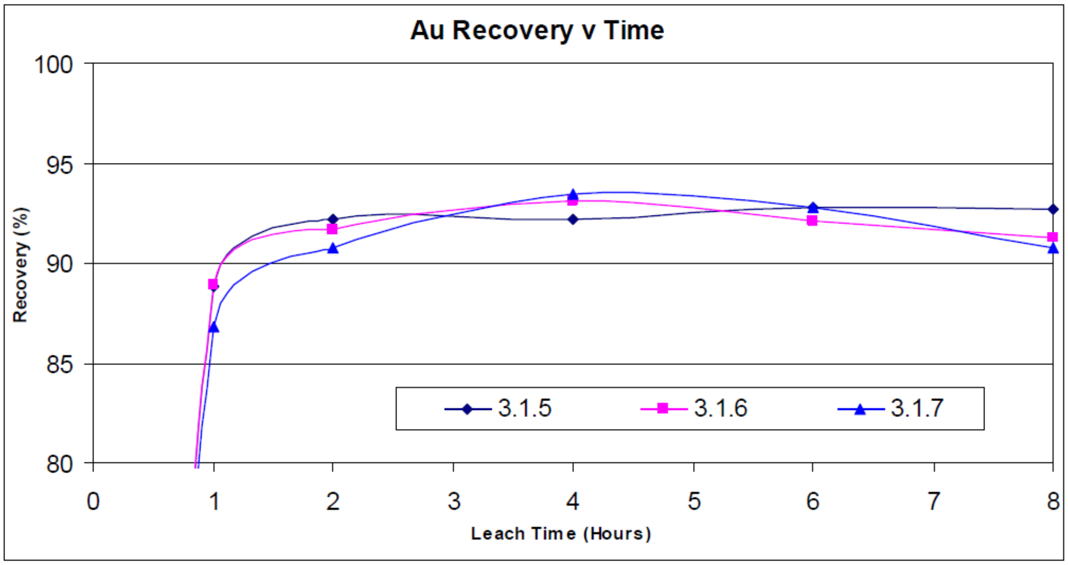


Figure 42 - Comparison of 8h leach tests

The highest cyanide addition test (3.1.5) appears to have had the lowest losses of gold, while at the lower addition rate (3.1.7), losses appear to have been significant.

The 8-hour tests provide a level of confidence in the interim data for the 24 hour tests and show that leaching was essentially complete after only two hours using an initial cyanide dose of 1000 ppm.

A further three CIL tests were conducted at 20, 40 and 60 kg/t of carbon preloaded to 1110 g/t Au and employing a shorter residence time of 6 hours (Figure 43).

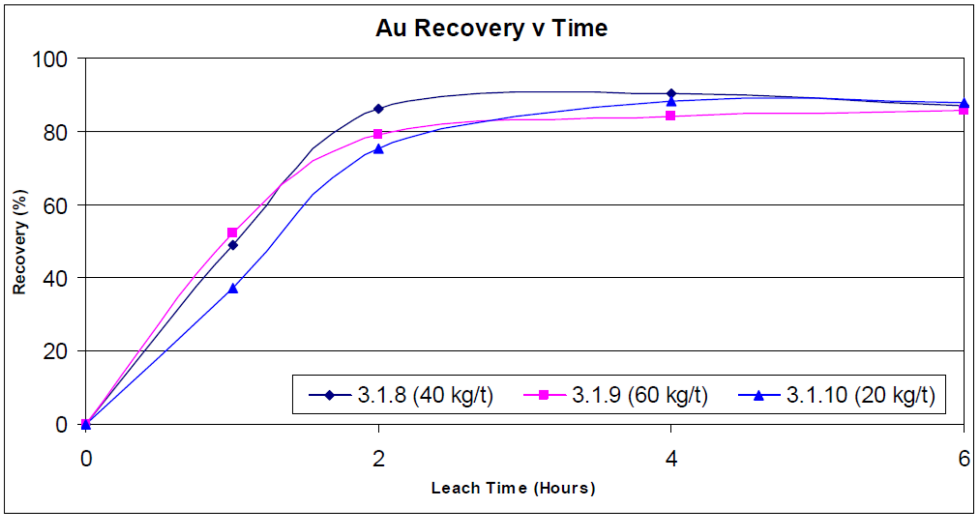


Figure 43 - Comparison of 6h leach tests

Differences in the kinetics of each test are explained by interim sampling error. By comparison to recoveries achieved using fresh carbon, the leach recovery decreased by approximately 4%.

13.1.11 *Gravity Test - Santo Antônio*

Similar to the Buracão and Brás veins, as detailed more fully in Chapter 7, the Santo Antônio vein is hosted in deformed metamorphosed sedimentary rock units, which belongs to the Nova Xavantina Volcano-Sedimentary Sequence which have been metamorphosed to greenschist facies (indicated by chlorite, sericite and calcite assemblages). The Buracão, Brás and Santo Antônio veins are associated with the Araés shear zone and they are frequently bordered on the eastern and western edges by discontinuous tectonic/hydrothermal breccias.

The gold mineralization on Santo Antônio is structurally controlled and hosted in sulphide-bearing, laminated shear veins that crosscut the previously deformed and metamorphosed volcanic and sedimentary rock. The laminated nature of the veins indicates multiple pulses of quartz intruding Araés shear zone.

The gold mineralization in Santo Antônio vein is associated with sulphides, containing between 2% to 8% total sulphides, mainly pyrite and galena, with minor chalcopyrite, bornite, pyrrhotite, and sphalerite. Similar to previously mined ore bodies, higher gold grades are generally associated with higher concentrations of pyrite and galena.

In order to evaluate the metallurgical performance of the Santo Antônio vein, prior to commencing operations within the orebody in 2019, the Company conducted gravity concentration tests. A composite sample was taken from 9 drillholes from within the current Mineral Reserves of Santo Antônio. The average gold grade of the composite sample was 9.38 g/t.

The gravity tests were conducted in a bench-scale Falcon concentrator, model L40, shown in Figure 44.

Figure 44 - Falcon Concentrator L40 - Laboratory Size

The sample preparation process and laboratory testing flow-sheet is depicted below in Figure 45.

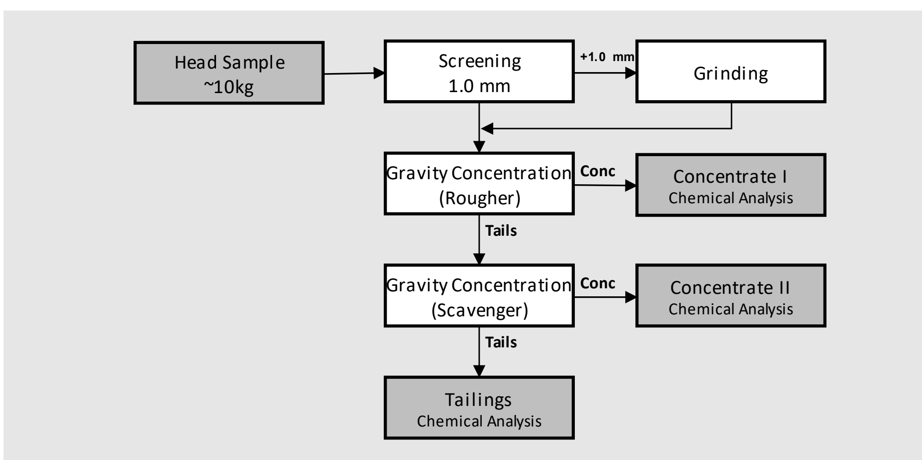


Figure 45 - Test work block diagram

During the gravity concentration test work, the laboratory set conditions aimed to mirror that of previous test work and simulate actual plant performance.

- Slurry flow: 5.0 liters per minute
- Solids Concentration: 25%
- G-Force: 150 G

- Duration: 2.0 minutes
- Flush Water: 12.0 liters per minute

Results of the Santo Antônio test work is shown below in Table 43.

Table 43 - Gravity test work results

		Au Grade (g/t)	Mass Distribution (%)	Au Distribution (%)	Enrichment Factor
Sample 1	Feed	8.44	100.0	100.0	26.6
	Concentrate	142.82	3.75	63.5	
	Tailings	3.2	96.25	36.5	

Based on the geologic consideration that the ore from Santo Antônio and Matinha has the same structure, lithology and mineralogy of the ores in the other ore bodies (Brás and Buracão), the company assumed that the metallurgical recoveries for ore mined and processed from the Santo Antônio and Matinha veins would be similar to the current recovery rates, processing the Brás and Buracão ores. This assumption is corroborated by operational results of tests, (conducted in 2018), and by actual operational results, whereby excellent metallurgical recoveries, in excess of 90% have been achieved from the Santo Antônio orebody in 2019, 2020, 2021 and 2022 prior to the Effective Date.

13.2 QP Opinion Summary

The recovery rates for the Santo Antônio and Matinha veins are based on processing operational records. As noted, prior test work, actual plant performance to date and geologic evidence demonstrate continuity of mineralization styles, supporting that ore produced from the Santo Antônio and Matinha vein will continue to have the same mineralogical characteristics as the ore previously mined and processed from the mine.

Metallurgical recoveries from ore mined and processed from the Santo Antônio vein have achieved 93.3% during the most recent full quarter of production (third quarter of 2022), in-line with the forecast metallurgical recoveries in the current life-of-mine production plan.

14.0 MINERAL RESOURCE ESTIMATES

14.1 Database

GE21 received data from Xavantina in table in text file format (".CSV") that detailed the results of sampling and survey works conducted at the Xavantina Operations. These files contained data that included X and Y coordinates, dimensions, final depth of the drill holes, geological description of the drilling intervals, thickness of the sampled interval, chemical analysis of the mineralized grades, as well as measurements of borehole deviation and density. Data collected from underground channel samples was also included in the database.

This database contained the data summarized in Table 44.

Table 44 – Xavantina Operations Database Summary

Summary	Drilling Campaign 2018/2019	Drilling Campaign 2020	Drilling Campaign 2021/2022	TOTAL
Number of Drill holes	78	17	128	223
Total Length (m)	34,030	10,592	72,100	116,723
Number of Sample Assays	1,025	381	6,068	7,474
Number of Underground Channel Sample Lines	7	66	46	119
Total Length of Channels (m)	30	282	232	543
Number of Channel Samples	46	454	387	892

An automatic validation was performed in the project database using Seequent's Leapfrog Geo database audit tool. This tool validates:

- Final Depth - Validates if the final depth in the Sampling, Geology and Survey tables does not exceed the value set as maximum depth in the collar table
- Overlapping - Validates whether there is an overlap between sample intervals in the same drillhole
- Collar - Validates if all key information such as coordinates, and final depth are complete
- Assay - Validates if all the assay values are being correctly handled

GE21 validated the database using Leapfrog Geo 2022.1 software and found a small number of inconsistencies in the database that were subsequently revised by the Xavantina technical team prior to geological modeling and grade estimation for the current Mineral Resource estimate.

14.2 3D Model

The 3D model for the mineralization of the Xavantina Operations (grade shell) was generated on Leapfrog Geo 2022.1 based on drillhole and channel samples with grades above 1.20 g/t Au. This grade was selected based on cut-off calculation resulting in a reasonable prospect for eventual economical extraction. This grade is considered the geological modeling cut-off grade. Low grades located between samples of high grade were included in the 3D model and the internal dilution was assumed as part of the mineralization zone. Figure 46, Figure 47 and Figure 48 highlight the statistical analysis applied to the data before for compositing.

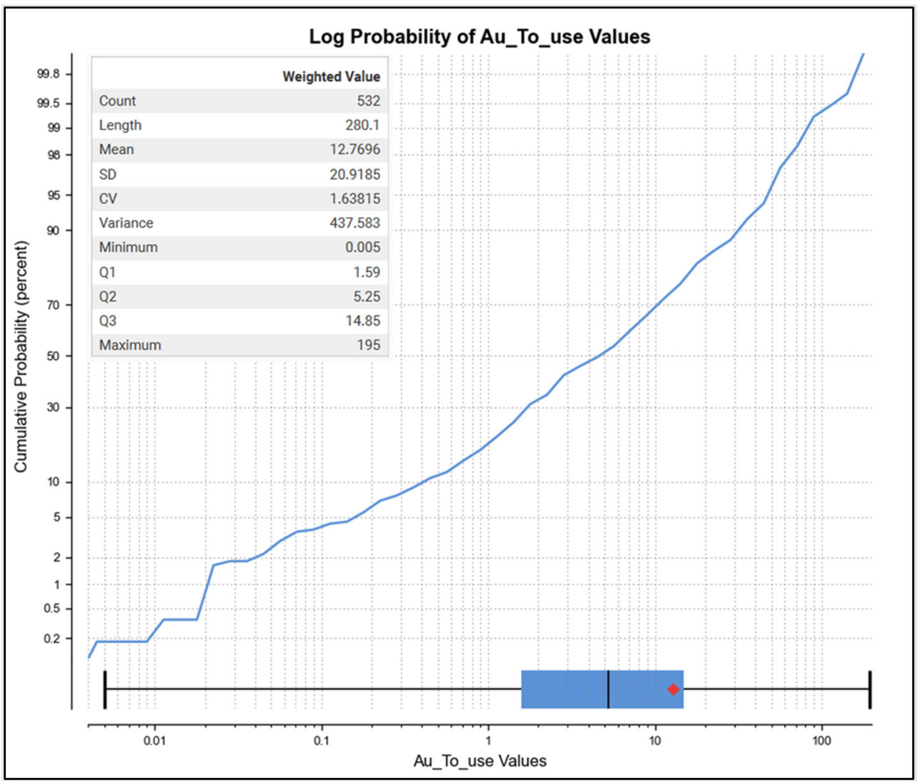


Figure 46 - Statistical analysis of mineralized drillhole intercepts before compositing economic compositing parameters, Santo Antônio drilling

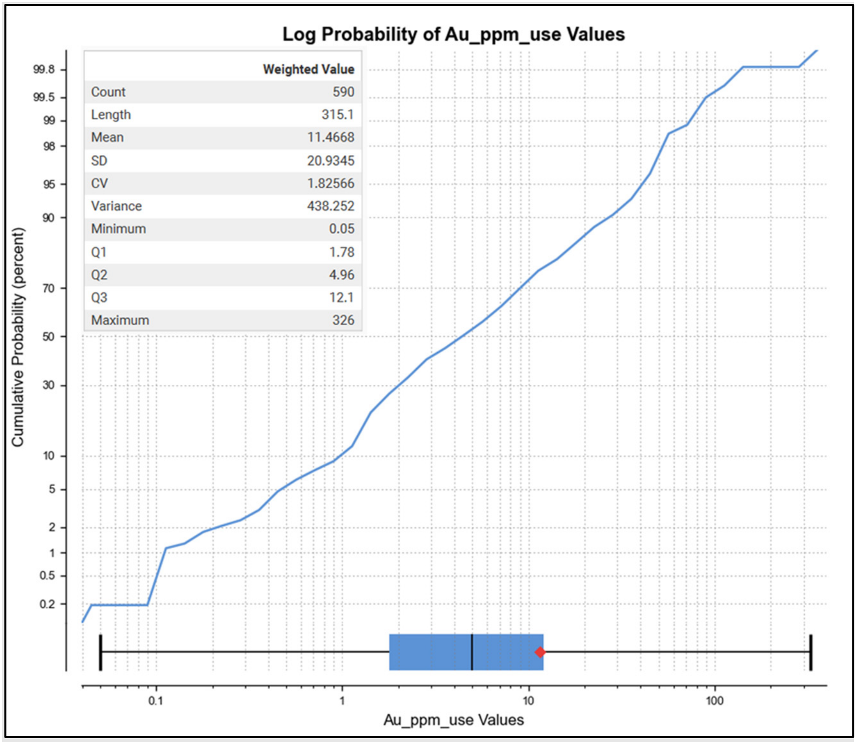


Figure 47 - Statistical analysis of channel samples before compositing, Santo Antônio

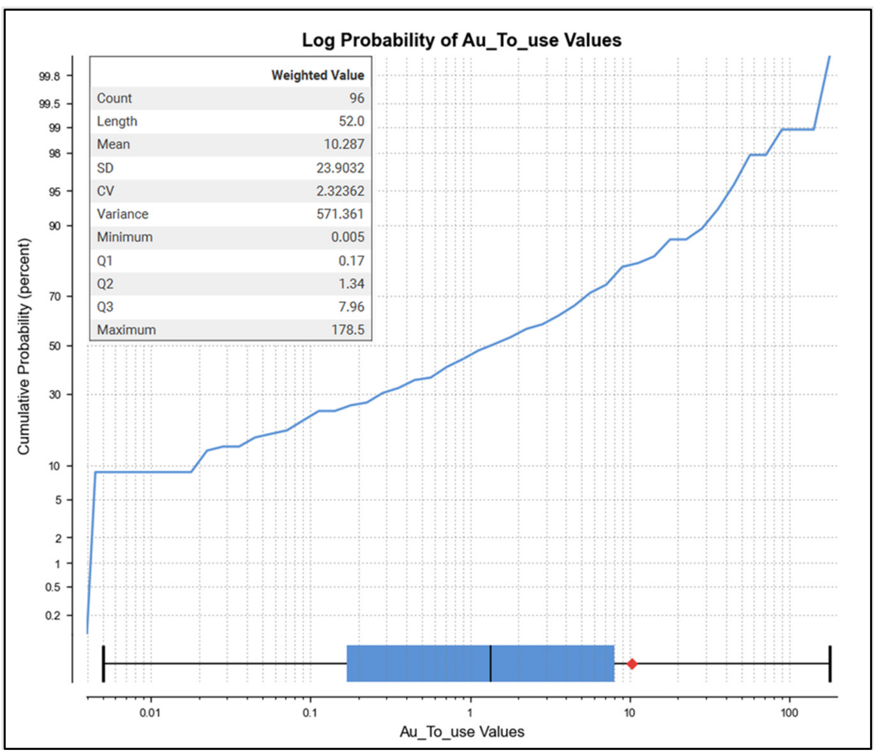


Figure 48 - Statistical analysis of mineralized drillhole intercepts before compositing, Matinha drilling

A topographic audit was performed during 2020 to identify and correct local issues on sample locations previously to the mineralization zone modeling.

The Santo Antônio and Matinha 3D mineralization zones were modeled using Leapfrog software based on drillhole and channel sample intercepts over a single declined horizon. Figure 49 and Figure 50 show the 3D mineralization model of the Santo Antônio vein. Lateral extensions of the 3D mineralization model were defined by occurrence of mineralized intervals defined in parameters presented in Figure 46, Figure 47 and Figure 48 and in interpretation of structural controls of mineralization, as presented in Figure 51. Mineralization within the Santo Antônio vein was divided into two different domains (Upper and Lower) defined by structural control interpretation.

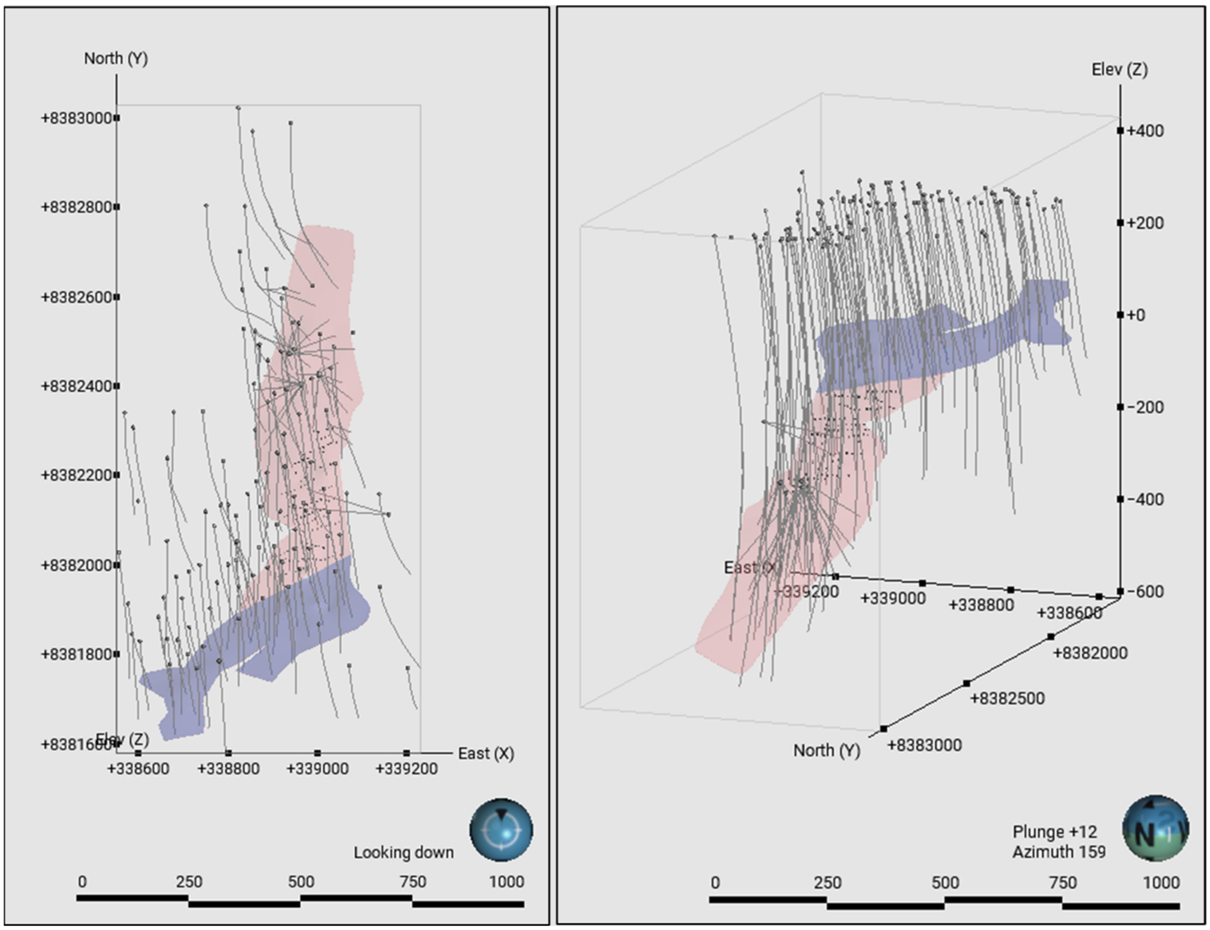


Figure 49 - Santo Antônio 3D mineralization model produced using Leapfrog software

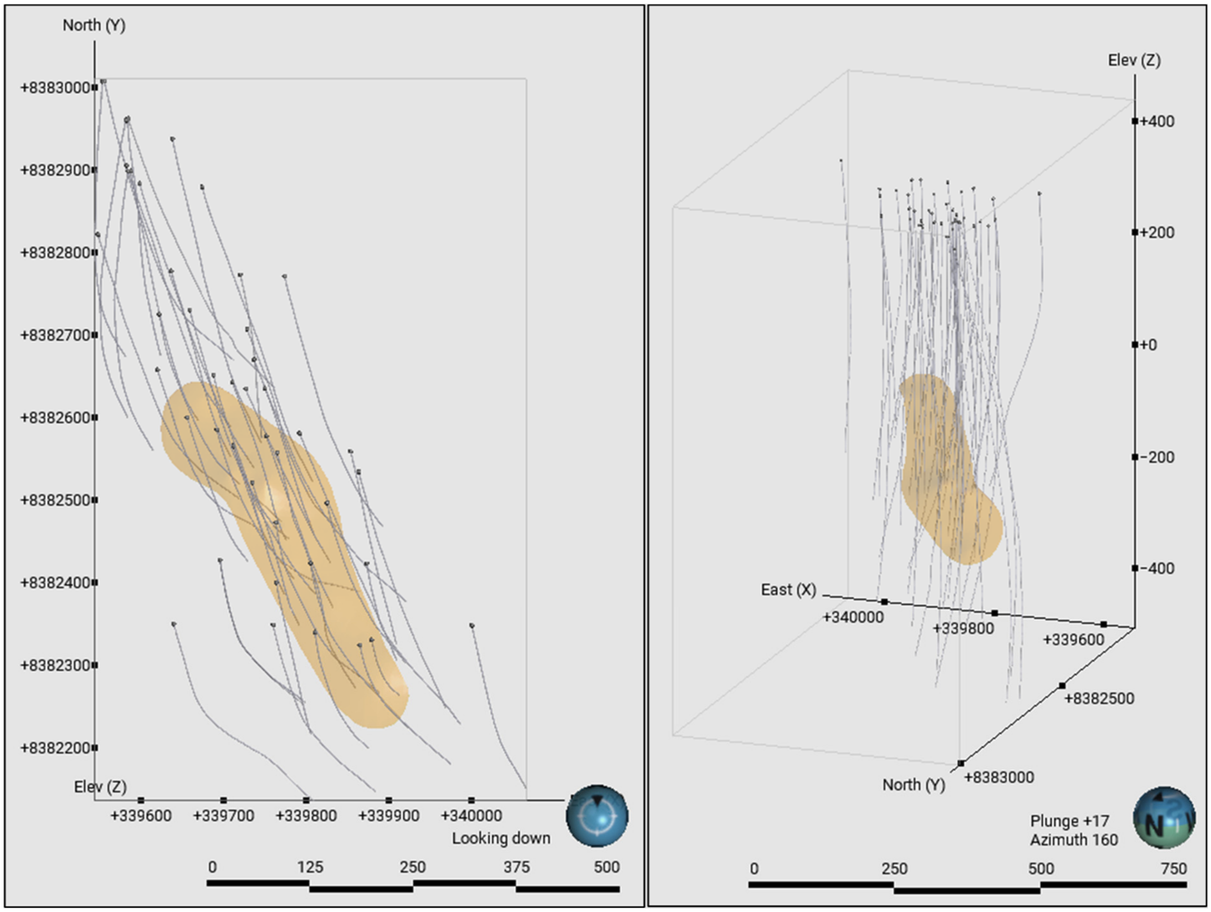


Figure 50 - Matinha 3D mineralization model produced using Leapfrog software

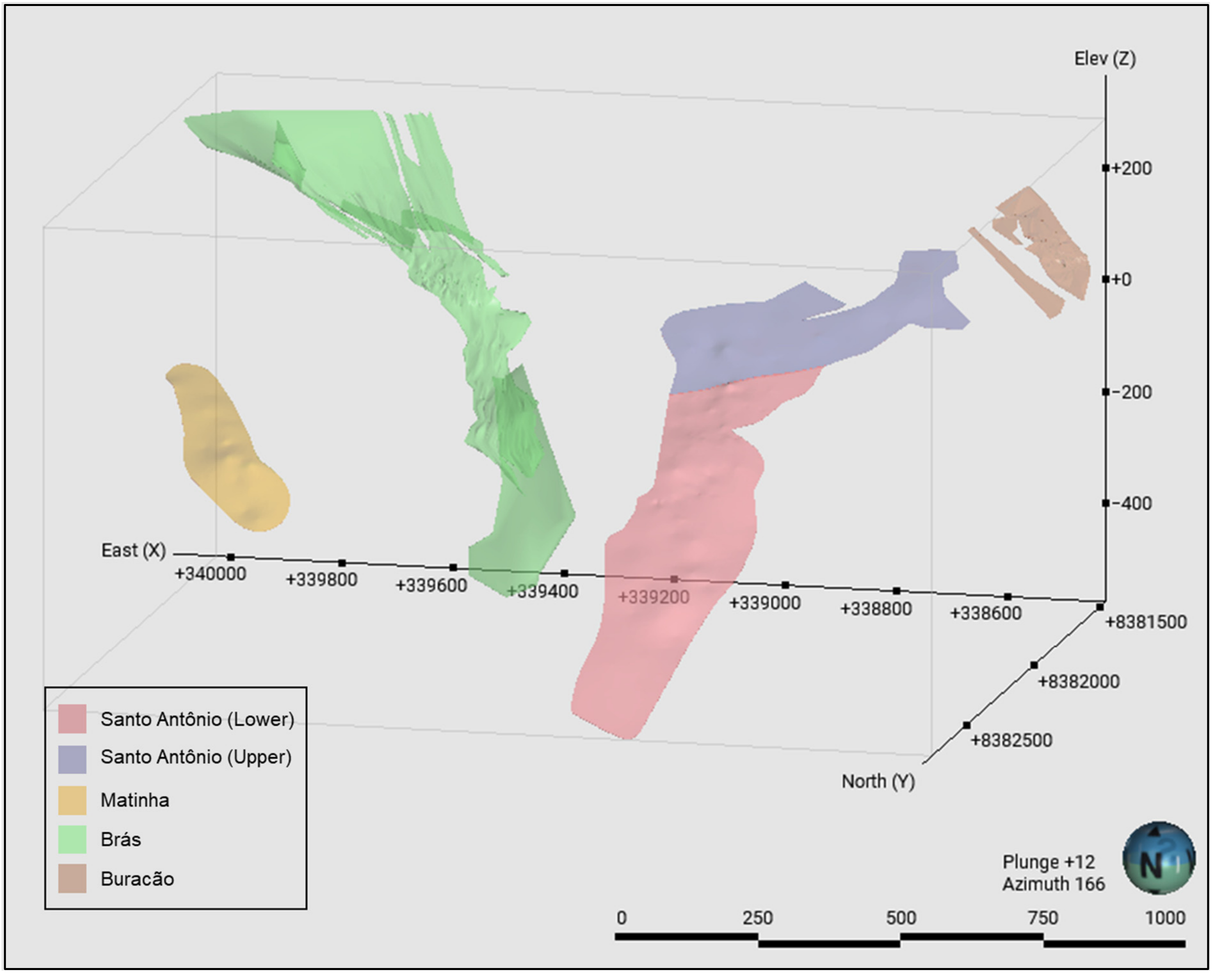


Figure 51 - Xavantina Operations 3D model, highlighting the location of the Santo Antônio and Matinha veins relative to the Brás and Buracão veins. Colors denote different vein domains for ease of reference only

14.3 Block Model

A block model was created for the Mineral Resource estimate using the parameters set out in Table 45. The block model was created in LeapFrog Edge software for Matinha and Santo Antônio.

Table 45 - Block model dimensions

Target		Y	X	Z
Matinha	Minimum coordinates	8382196	339609	-328
	Maximum coordinates	8382686	339969	1606
	Parent block sizes (m)	10.0	10.0	2.0
	Sub-block sizes (m)	1.0	1.0	0.5
	Rotation (°)	-	-	-
Santo Antônio	Minimum coordinates	8381505	338575	-619
	Maximum coordinates	8382895	339145	109
	Parent block sizes (m)	10.0	10.0	2.0
	Sub-block sizes (m)	1.0	1.0	0.5
	Rotation (°)	-	-	-

Each block of the model was characterized by a series of attributes, as described in Table 46.

Table 46 - Attributes of the Xavantina block model

Target	Attribute Name	Type	Description
Santo Antônio	Class	Category attribute	Resource Class: Medido= Measured; Indicado= indicated; inferido=inferred
	Deplete	Category attribute	Deplete outside mineralization: 0=Outside; 1=Inside
	OK_Dom	Category attribute	Estimation domain: DH CH Lower; DH Lower; DH Upper.
	OK_Est	Category attribute	Estimation passes
	NN	Numeric attribute	Au (ppm) nearest neighbor estimation
	OK	Numeric attribute	Au (ppm) ordinary kriging estimation
	OK_AvgD	Numeric attribute	Ordinary kriging average euclidean distance
Matinha	Class40	Category attribute	Resource Class: Indicado= indicated; inferido=inferred
	Combined Estimator P1-P5	Numeric attribute	Au (ppm) ordinary kriging estimation
	Combined Estimator P1-P5: AvgD	Numeric attribute	Ordinary kriging average euclidean distance
	Combined Estimator P1-P5: KV	Numeric attribute	Kriging variance
	Combined Estimator P1-P5: NS	Numeric attribute	Number of samples
	Id	Numeric attribute	Identification number
	NN_Au_To_ use in Matinha Oreshell_Agosto2022	Numeric attribute	Au (ppm) nearest neighbor estimation

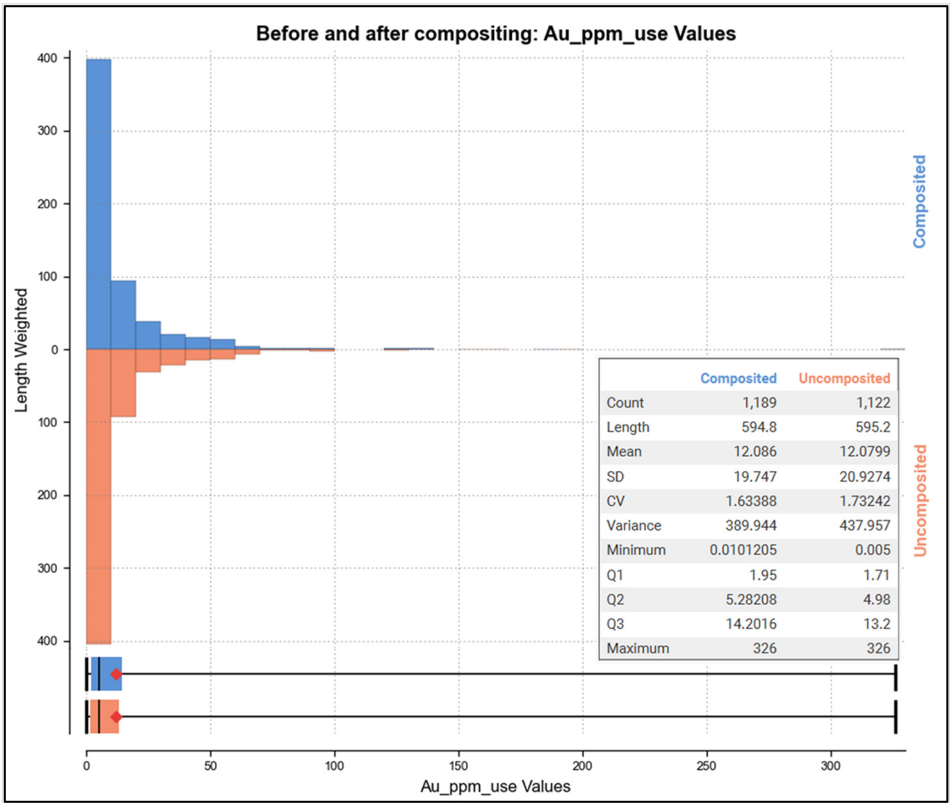
14.4 Sample Compositing

Composition consists of standardizing the size of the sample intervals. The objective is to achieve uniform sampling, reducing the impact of random variability, and minimizing the effect of different sample sizes on the sample mean. Each standardized sample is considered a composite. After analysis of the mean length of the sampled intervals, it was verified that the appropriate length for the drilling samples is 0.5 meters, which may vary in analysis by up to 70% of the nominal length after adjusting the samples to account for the start / end of each interval within the mineralized zone.

14.5 Exploratory Data Analysis ("EDA")

The composite samples were assessed, following a classical statistical approach.

LeapFrog Edge software was used for statistical analysis. Statistical analysis allows inference on distributions, modals and anomalous values of the studied variables, in order to assist in structural analysis (variography). Figure 52 to Figure 55 present the EDA for the composites grades of Santo Antônio and Matinha Mineralization Zones.



	Composited	Uncomposited
Count	1,189	1,122
Length	594.8	595.2
Mean	12.086	12.0799
SD	19.747	20.9274
CV	1.63388	1.73242
Variance	389.944	437.957
Minimum	0.0101205	0.005
Q1	1.95	1.71
Q2	5.28208	4.98
Q3	14.2016	13.2
Maximum	326	326

Figure 52 - EDA - Au (ppm), Santo Antônio vein

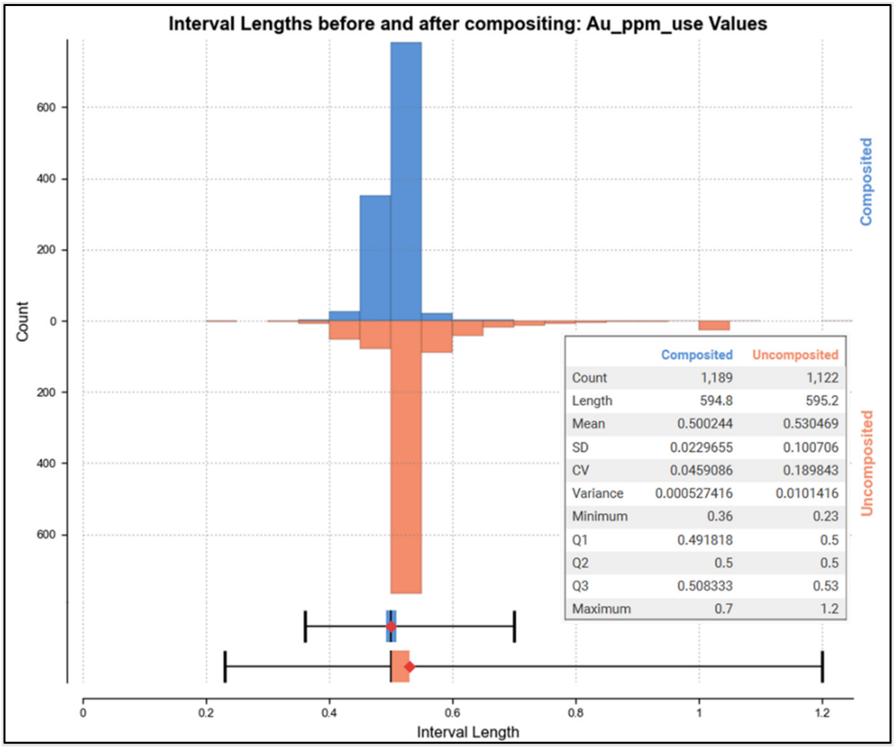


Figure 53 - EDA - Interval length, Santo Antônio vein

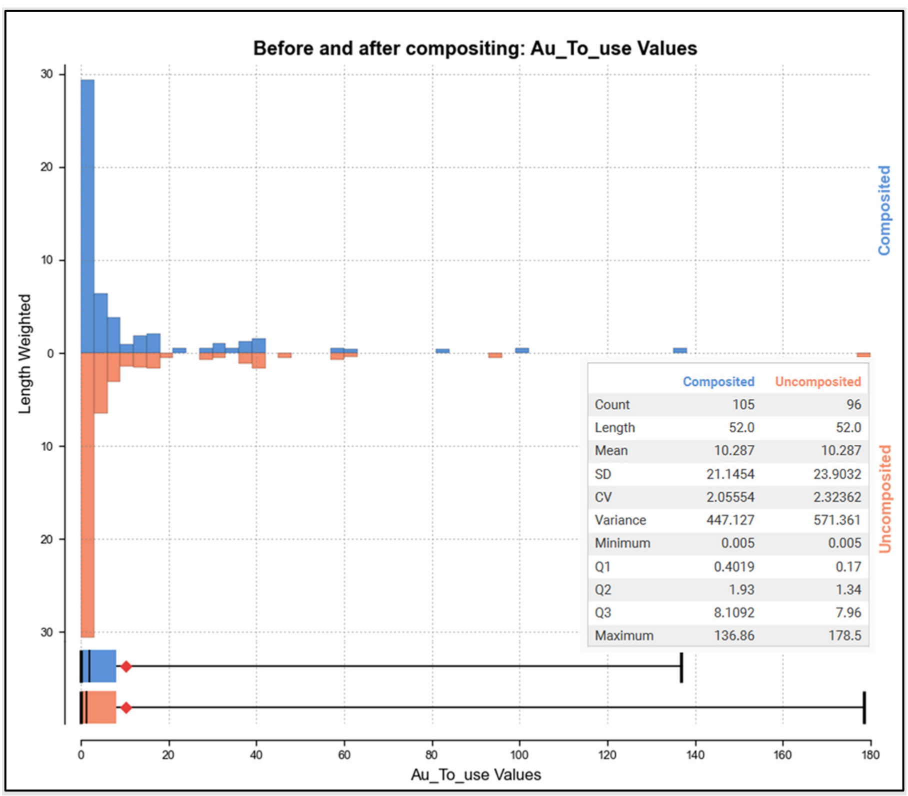


Figure 54 - EDA - Au (ppm), Matinha vein

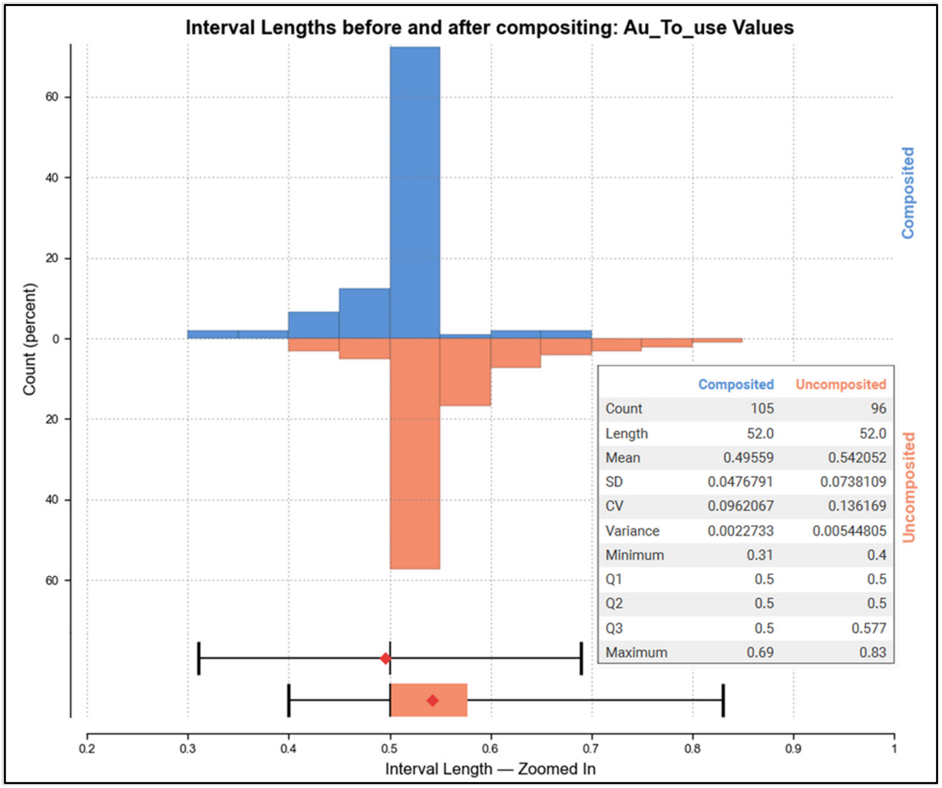


Figure 55 - EDA - Interval length, Matinha vein

An outlier treatment was applied to reduce high grade values over the local and global average. Samples with grades higher than the outlier limit were filtered out from estimate on distances over an established limit. 70 gpt gold was selected as the limit for outlier treatment for Santo Antônio based on the log-normal distribution analysis (Figure 52). 99.5% of the grade distribution within Santo Antônio falls below this limit. 40 gpt gold was selected as the limit for outlier treatment for Matinha based on the log-normal distribution analysis (Figure 54). 97% of the grade distribution within Matinha falls below this limit.

Structural / geotechnical domains within the Santo Antônio vein were defined by the Xavantina technical team and evaluated separately for EDA parameters (Figure 56). There is no meaningful difference in the median, mean, variability and distribution of the grades within the domains as highlighted in Figure 57 and Figure 58.

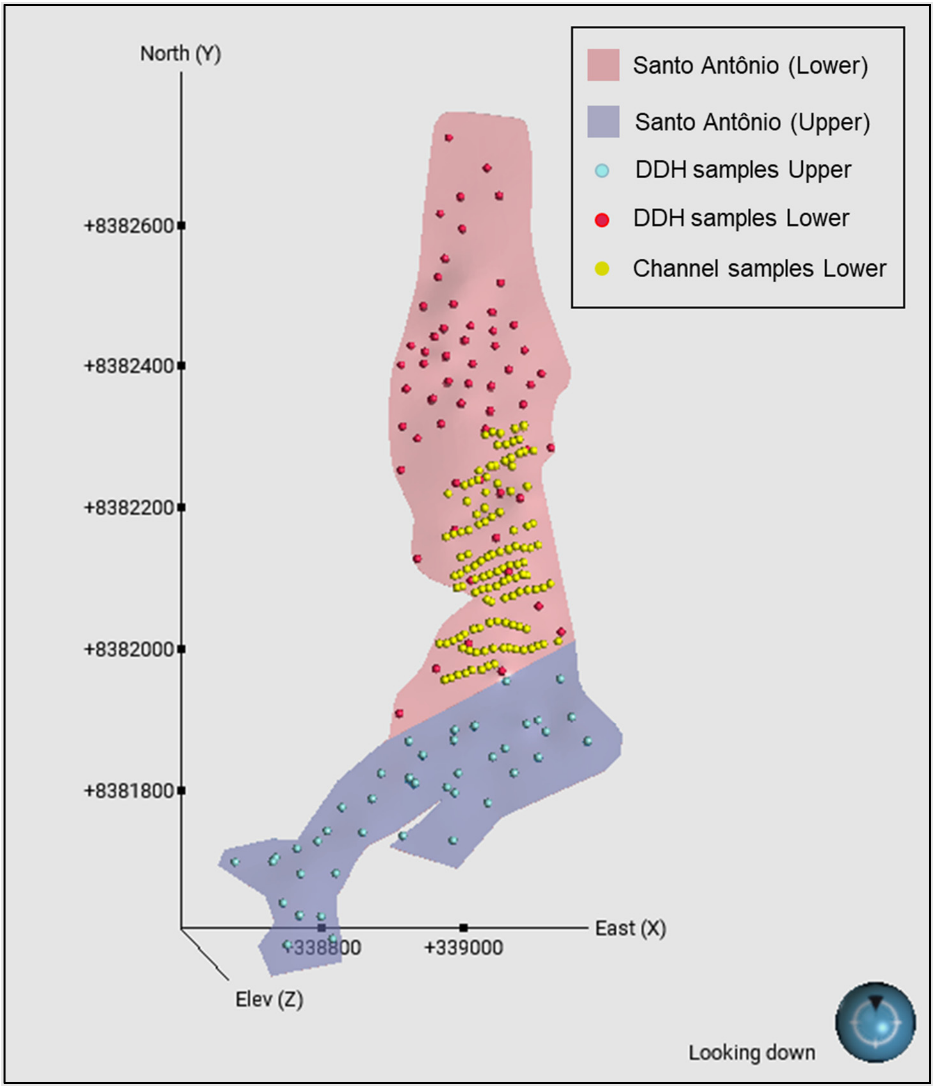


Figure 56 - Structural domains applied for geostatstical analysis

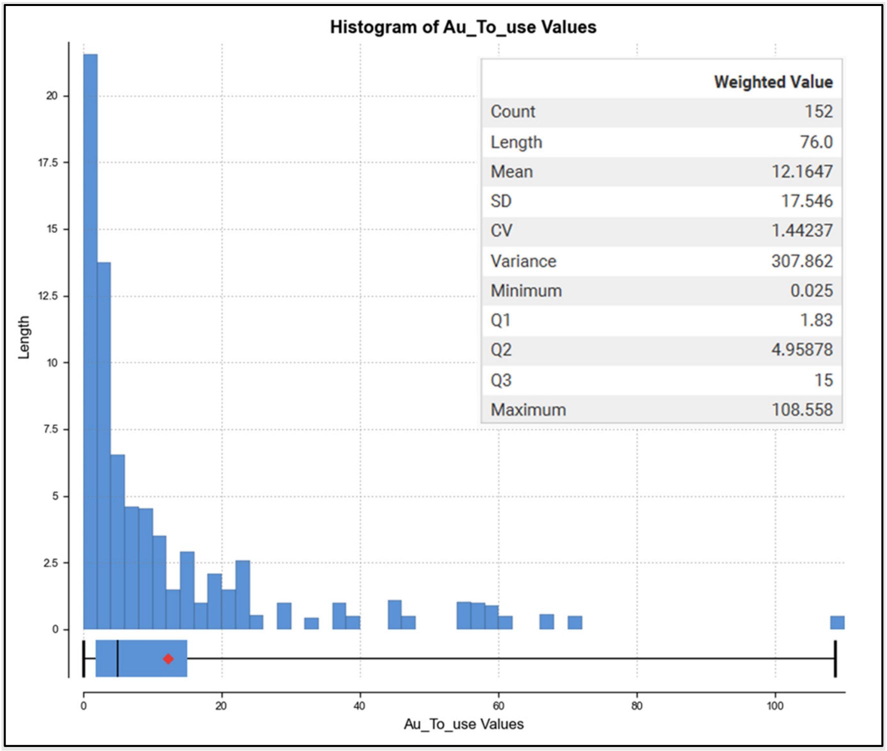


Figure 57 - EDA, Au (ppm) - Santo Antônio vein, Upper

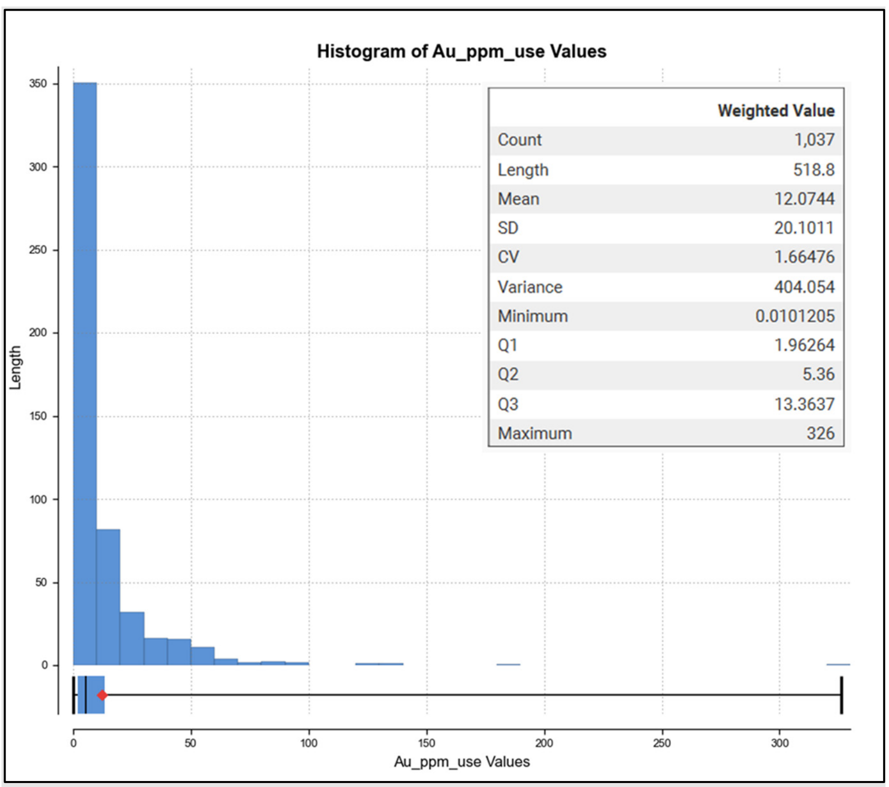


Figure 58 - EDA, Au (ppm) - Santo Antônio vein, Lower

14.6 Variography

Geostatistics aims at two main objectives:

- To mathematically structure the variability relationship between pairs of points in space. That is, to measure the zone of influence, and the degree and type of variability restricted to a homogeneous field.
- To establish a model of spatial distribution of a regionalized variable with a measure of the accuracy of its estimate.

The composite gold sample results in ppm (g/t) variographic analysis conducted in LeapFrog Edge software are presented in Figure 59, Figure 60, Figure 61 and Table 47.

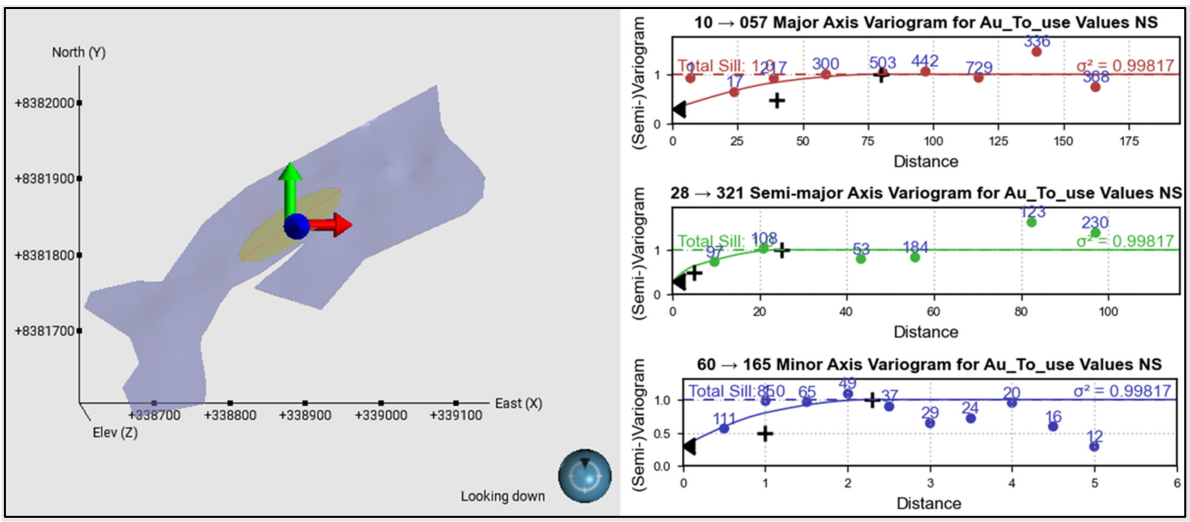


Figure 59 - Variogram, Au (ppm) - Santo Antônio vein, Upper

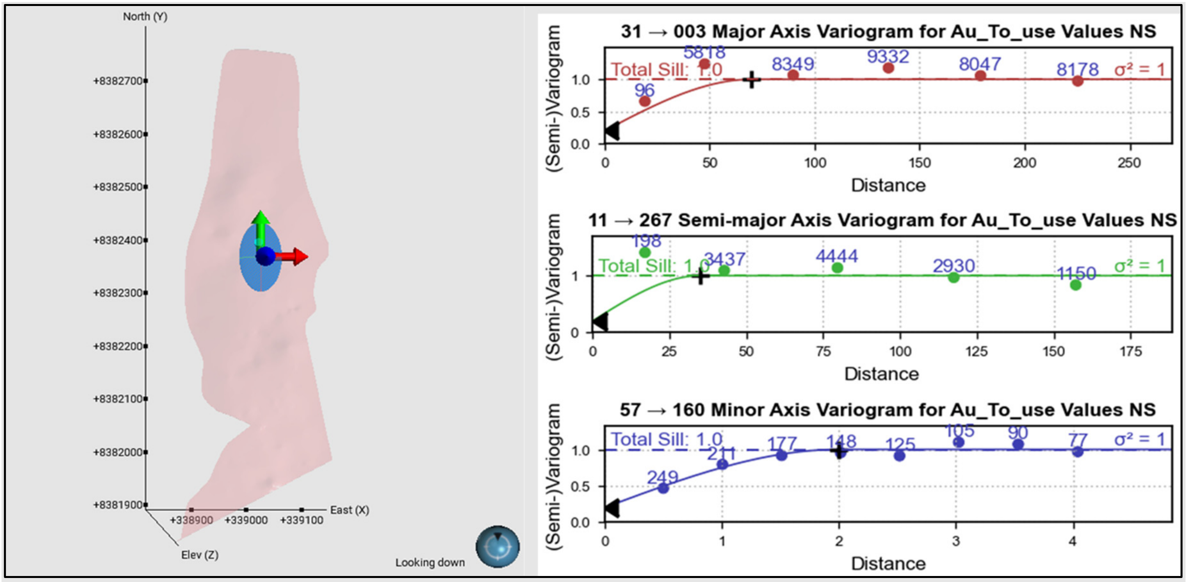


Figure 60 - Variogram, Au (ppm) - Santo Antônio vein, Lower

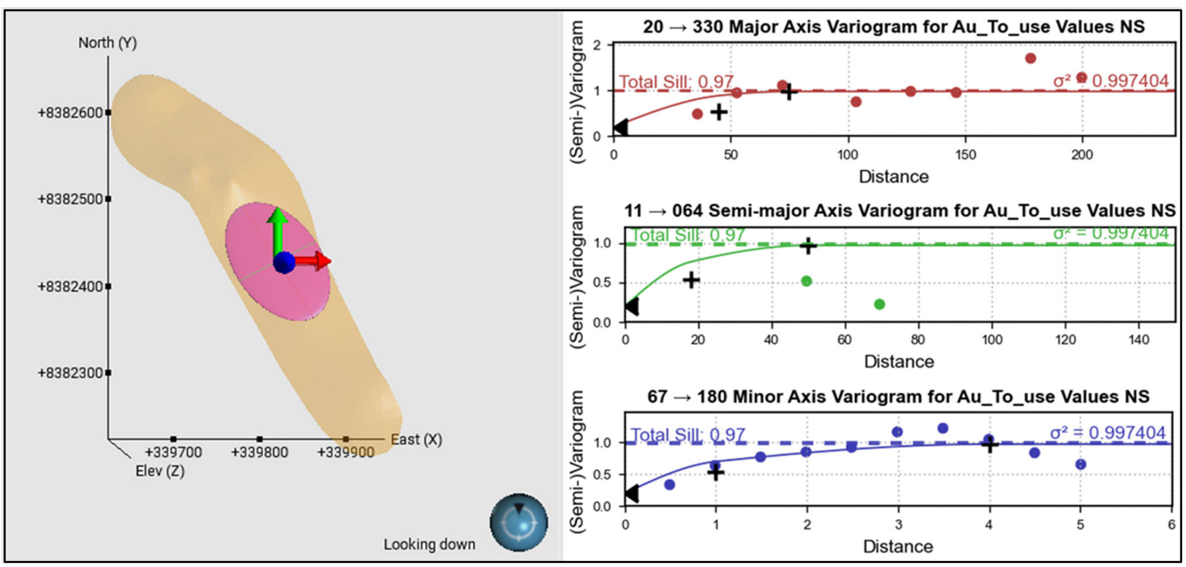


Figure 61 - Variogram, Au (ppm) - Matinha vein

Table 47 - Variogram model - Matinha and Santo Antônio veins

	Structure	Sill	Normalised Sill	Model	Major	Semi-Major	Minor
Matinha	Nugget	91.34	0.2				
	Structure 1	155.3	0.34	Spherical	45	18	1
	Structure 2	196.4	0.43	Spherical	75	50	4
	Total Sill:	442.97	0.97				
Santo Antônio (Upper)	**Structure**	**Sill**	**Normalised Sill**	**Model**	**Major**	**Semi-Major**	**Minor**
	Nugget	91.93	0.3				
	Structure 1	57	0.19	Spherical	40	5	1
	Structure 2	157.5	0.51	Spherical	80	25	2.3
	Total Sill:	306.44	1				
Santo Antônio (Lower)	**Structure**	**Sill**	**Normalised Sill**	**Model**	**Major**	**Semi-Major**	**Minor**
	Nugget	87.98	0.2				
	Structure 1	351.7	0.79	Spherical	70	35	2
	Total Sill:	439.68	0.99				

14.6.1 *QP Opinion*

A maximum search ellipse range of 80 meters was applied for Santo Antônio (Upper), 70 meters was applied for Santo Antônio (Lower) and 75 meters was applied for Matinha. Although GE21 considers the robustness of the variographic analysis as low to medium, GE21 views the analysis as sufficient for Mineral Resource classification in the measured, indicated and inferred categories due to operating history within the modeled vein.

14.7 Grade Estimate

The Ordinary Kriging Method ("OK") was used to generate the Au grade estimate for each parental block within the Mineral Resource wireframe. Grade estimation was performed in Leapfrog Edge software.

14.7.1 *Ordinary Kriging*

OK is arguably one of the most common geostatistical methods for estimating block model grades. In this interpolation technique, the composite contributing samples are identified by a search applied from the center of each block. The weights are determined in order to minimize the statistical variance, considering the spatial location of the selected composites and the modeled variogram. Variography describes the correlation between composite samples as a function of distance and direction. The content of the weighted composite sample (in composite files) is then combined to generate the block estimate and the kriging variance.

The kriging strategy used for the Xavantina Operations' Mineral Resource considered up to 5 estimation passes, each relating to the degree of confidence for each pass, as presented in Table 48.

Table 48 - Kriging Strategy

Matinha											
Variable	Pass	Search Distance			Search Type	Number of samples		Outlier Restrictions			Drillhole Limit
		Max. (m)	Interm. (m)	Min. (m)		Min. N°of samples	Max. N° of samples	Method	Distance	Threshold	Max Samp per Hole
Au g/t	1	25	17	1.5	Ellipsoid	4	8	None	-	-	2
	2	37.5	25	2	Ellipsoid	4	8	Discard	66	40	2
	3	75	50	4	Ellipsoid	4	8	Discard	33	40	2
	4	150	100	8	Ellipsoid	4	8	Discard	16	40	2
	5	7500	5000	400	Ellipsoid	4	8	Discard	0.33	40	2
Ellipsoid Orientation and Anisotropy Dip Azimuth= 0; Dip= 23; Pitch= 62											
Santo Antônio - Upper											
Variable	Pass	Search Distance			Search Type	Number of samples		Outlier Restrictions			Drillhole Limit
		Max. (m)	Interm.(m)	Min. (m)		Min. N° of samples	Max. N° of samples	Method	Distance	Threshold	Max Samp per Hole
Au g/t	1	27	9	0.8	Ellipsoid	4	8	None	-	-	2
	2	40	13	1.15	Ellipsoid	4	8	Discard	66	70	2
	3	80	25	2.3	Ellipsoid	4	8	Discard	33	70	2
	4	160	50	4.6	Ellipsoid	4	8	Discard	16	70	2
	5	8000	2500	230	Ellipsoid	4	8	Discard	0.33	70	2
Ellipsoid Orientation and Anisotropy Dip Azimuth= 345; Dip= 30; Pitch= 159											
Santo Antônio - Lower											
Variable	Pass	Search Distance			Search Type	Number of samples		Outlier Restrictions			Drillhole Limit
		Max. (m)	Interm.(m)	Min. (m)		Min. N° of samples	Max. N° of samples	Method	Distance	Threshold	Max Samp per Hole
Au g/t	1	23	12	0.65	Ellipsoid	4	8	None	-	-	2
	2	35	17	1	Ellipsoid	4	8	Discard	66	70	2
	3	70	35	2	Ellipsoid	4	8	Discard	33	70	2
	4	140	70	4	Ellipsoid	4	8	Discard	16	70	2
	5	7000	3500	200	Ellipsoid	4	8	Discard	0.33	70	2
Ellipsoid Orientation and Anisotropy Dip Azimuth= 340; Dip= 33; Pitch= 110											

14.8 Mineral Resource Classification

Mineral Resource classification was based on the following criteria:

- Measured Resources: blocks estimated in the same continuity considered in passes 1 and 2 of kriging strategy, only using drill hole samples, corresponding to a drilling grid size of 30 m by 30m, and the kriging average Euclidean distance <45 m.
- Indicated Resources: Blocks estimated in the same continuity considered in a drilling grid size less or equal to 60 m x 60 m, with drill hole and channel sample composites considered.
- Inferred Resources: Any other block estimated within the same continuity of the mineralized zone, using drill hole and channel samples.
- Classifications were revised using modeled boundaries to standardize classification zones within the resource.
- Mined stopes were depleted from the model to avoid Mineral Resource classification of these volumes.

Figure 62 and Table 63 present the distribution of resource classification within the classified block models for Santo Antônio and Matinha.

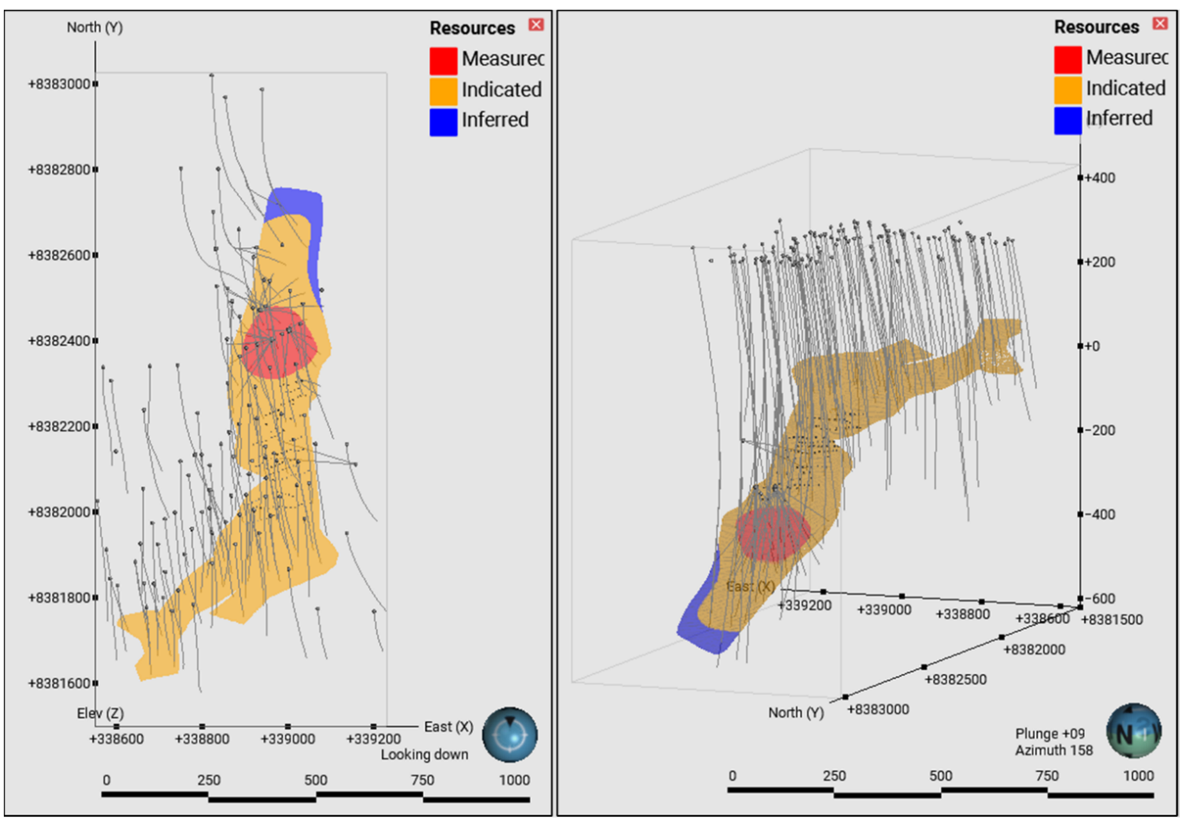


Figure 62 - Block model classified by resource category, Santo Antônio vein

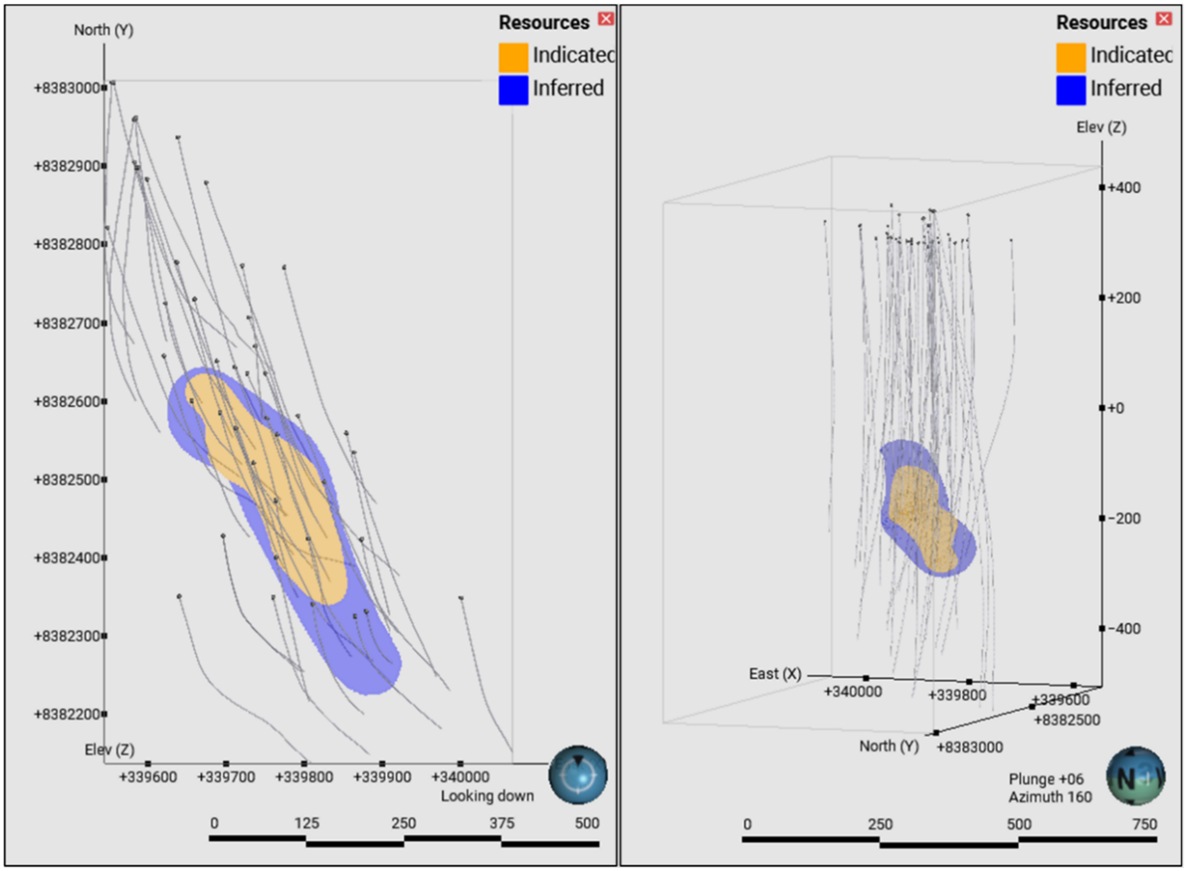


Figure 63 - Block model classified by resource category, Matinha vein

14.8.1 *Density (Specific Gravity):*

Density values from laboratory testwork and stored within the drill hole database were selected inside the 3D model of the mineralized zone of the current Mineral Resource Estimate. The average density values, as presented in Table 49, were applied to the Mineral Resource estimate block model. Density was determined by average value applied in block model, as presented in the histograms show in Figure 64 and Figure 65.

Table 49 - Density Summary

Target	Average Density (t/m^3)
Matinha	2.65
Santo Antônio	2.68

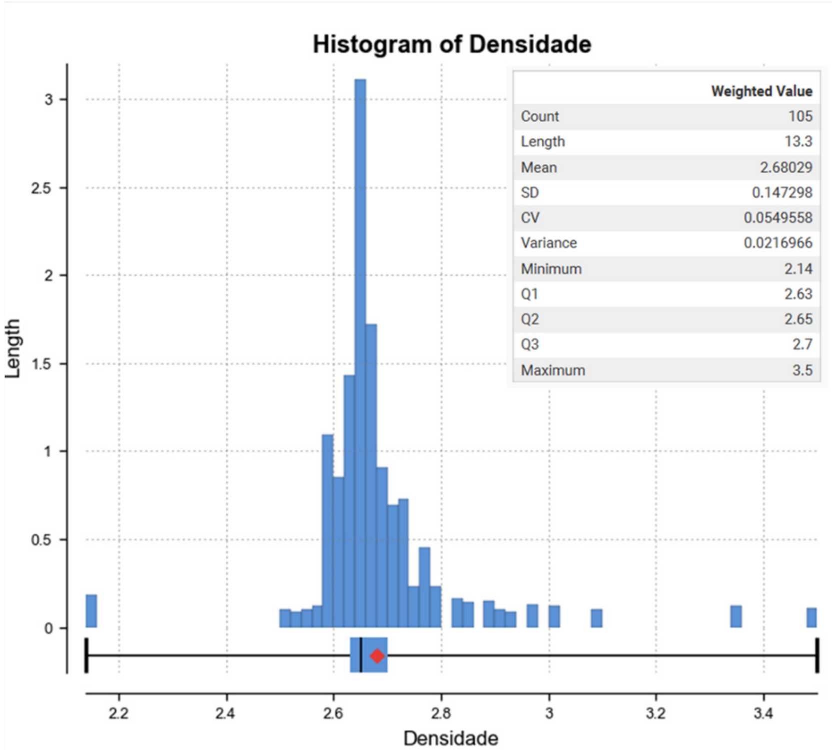


Figure 64 - Density Histogram, Santo Antônio vein

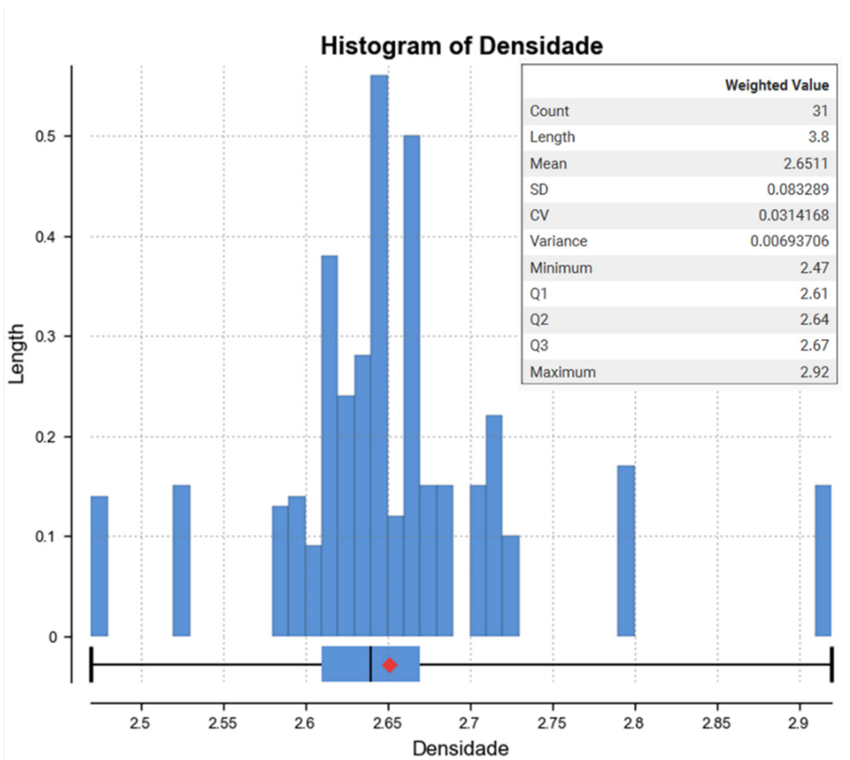


Figure 65 - Density Histogram, Matinha vein

14.8.2 *Mineral Resource Statement*

In order to determine the quantities of material with reasonable prospects for eventual economic extraction (or "RPEE") GE21 used the grade shell method for bodies that would demand underground mining. The cut-off estimates took into consideration the extraction costs, whereby a 1.20 gpt Au cut-off was assumed for underground mining. The main parameters used to define the underground stopes, for purposes of Mineral Resource estimation, are listed in Table 50, below:

Table 50 - RPEE factors used in the current Mineral Resources Estimate

RPEE Factors	Input
Gold Price ($US/oz)	$1,900
UG Mining & Processing ($US/tonne)	$72.0

For the blocks amenable to underground mining, GE21 used the MSO - Datamine software, conducting neighborhood analysis of each sub-block. The main geometric and economic parameters for defining the underground mine stopes are presented in Table 51.

Table 51 - Underground Mining Geometrical Grade Shell Parameters

Stope Optimization Parameters	
Cut-off grade	1.20 gpt Au
Default density value	2.68 t/m^3
Minimum X axis length	2.00 m
Minimum Y axis length	2.00 m
Minimum Z axis length	1.50 m

The detailed Mineral Resource Estimate for the Xavantina Operations, with the effective date of October 31, 2022, is shown in Table 52 below.

Table 52 - Mineral Resource Table, Xavantina Operations, 2022

Classification	Tonnage (000 tonnes)	Grade (gpt Au)	Au Contained (000 ounces)
Measured Mineral Resource (inclusive of Reserves)			
Santo Antônio	246.4	13.35	105.8
Total Measured Resource	**246.4**	**13.35**	**105.8**
Indicated Mineral Resource (inclusive of Reserves)			
Santo Antônio	826.1	10.41	276.5
Matinha	185.8	8.92	53.3
Brás	6.9	3.36	0.7
Total Indicated Resource	**1,018.9**	**10.09**	**330.6**
Measured and Indicated Mineral Resource (inclusive of Reserves)			
Santo Antônio	1,072.6	11.09	382.3
Matinha	185.8	8.92	53.3
Brás	6.9	3.36	0.7
Total Measured and Indicated Resource	**1,265.3**	**10.73**	**436.4**
Inferred Mineral Resource			
Santo Antônio	77.1	9.29	23.0
Matinha	207.1	11.03	73.5
Brás	149.3	4.81	23.1
Buracão	7.7	2.77	0.7
Total Inferred Resource	**441.1**	**8.48**	**120.2**

1. Mineral Resource effective date of October 31, 2022
2. Presented Mineral Resources inclusive of Mineral Reserves. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Grade-shell 3D models using 1.20 gpt gold were used to generate a 3D mineralization model of the Xavantina Operations. Mineral Resources were estimated using ordinary kriging within 10.0 meter by 10.0 meter by 2.0 meter block size, with a minimum sub-block size of 1.0 meter by 1.0 meter by 0.5 meter. Mineral Resources were constrained using a minimum stope dimension of 2.0 meters by 2.0 meters by 1.50 meters and a cut-off of 1.20 gpt based on gold price of US$1,900 per ounce of gold and total underground mining and processing costs of US$72.0 per tonne of ore mined and processed. The Mineral Resource estimates were prepared in accordance with the CIM Standards, and the CIM Guidelines, using geostatistical and/or classical methods, plus economic and mining parameters appropriate to the deposit.

14.9 Grade Estimate Validation

14.9.1 *Nearest Neighbor ("NN") Check*

The validation of the resource estimation process was carried out by comparative methods. The estimation of the sample grade Au by the nearest neighbor (NN) method applied to the block model was considered the reference for the ordinary kriging estimation (OK).

NN check is a comparative exploratory data analysis used to validate the global bias and smoothing effect in the estimative. The grade estimate validation was performed by comparing the results obtained from kriging and the NN estimation methods. Quantile-quantile plots were designed to verify no occurrences of global bias and to limit the smoothing of grade estimates within the estimated volumes.

Figure 66 and Figure 67 present the comparison of estimated Au (ppm) levels for NN-Check validation throughout the deposit. The results of the NN analysis show that smoothing of the Au grade estimate by kriging is within an acceptance limit for the degree of reliability attributed to Indicated Mineral Resources for the Matinha vein and Measured and Indicated Mineral Resources for the Santo Antônio vein and, in the opinion of the authors of this report, is in accordance with industry standards for this type of deposit.

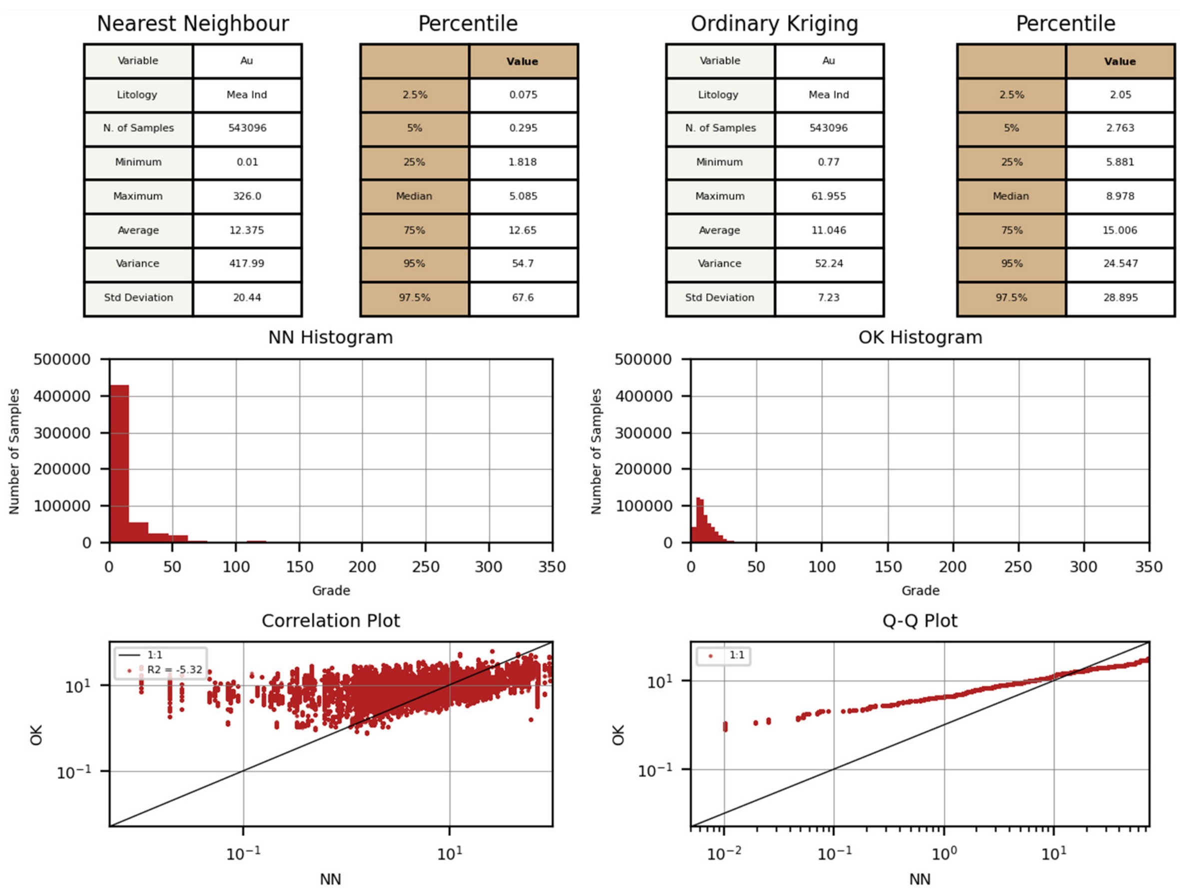


Figure 66 - NN Check for measured and indicated resources, Santo Antônio vein

Nearest Neighbour

Variable	Au
Litology	Indicated
N. of Samples	146797
Minimum	0.005
Maximum	136.86
Average	8.758
Variance	169.32
Std Deviation	13.01

Percentile

	Value
2.5%	0.013
5%	0.03
25%	0.723
Median	3.193
75%	9.59
95%	40.0
97.5%	40.0

Ordinary Kriging

Variable	Au
Litology	Indicated
N. of Samples	146797
Minimum	0.167
Maximum	52.041
Average	9.002
Variance	31.74
Std Deviation	5.63

Percentile

	Value
2.5%	1.057
5%	1.545
25%	5.712
Median	8.661
75%	10.519
95%	17.208
97.5%	21.326

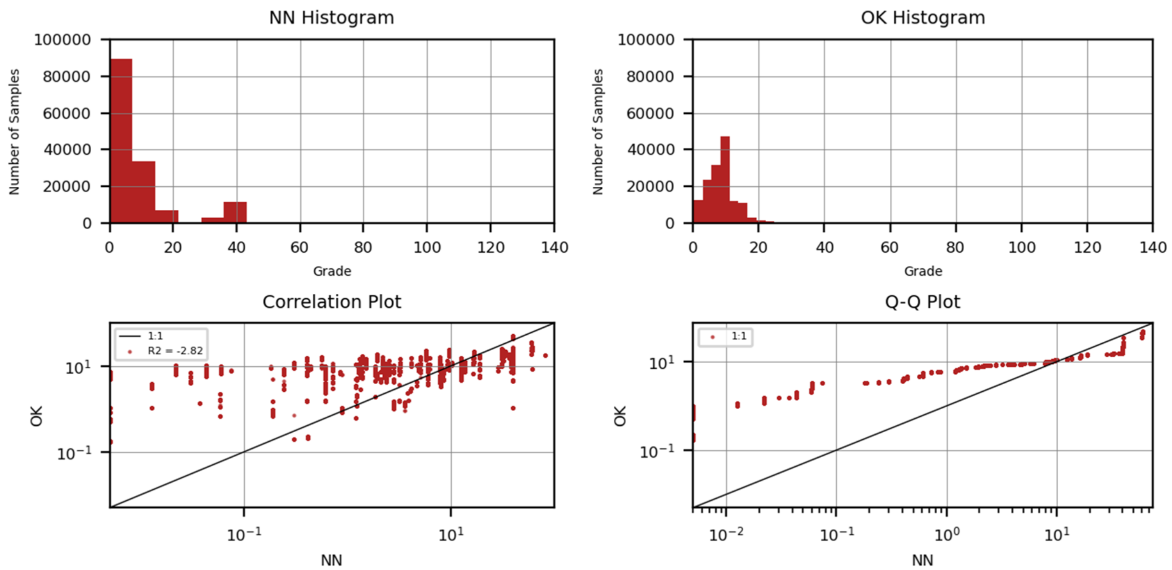


Figure 67 - NN Check for measured and indicated resources, Matinha vein

14.9.2 *Swath Plot Check*

Swath Plot is a graphical comparison over the range along the X, Y and Z coordinate axis used to validate local biases and the smoothing effect on the grade estimation. The local validation aims to analyze the occurrence of specific biases, comparing the average of the grades estimated for the model obtained by OK method with the grades that were estimated by NN method for the same X, Y or Z. The grade estimate validation was carried out comparing the local average grade results obtained by OK and NN estimation methods. Line plots along three coordinate axes were designed to test of the occurrence of any local bias and the smoothing of the grade estimate locally.

Figure 68 and Figure 69 show the graphical validation results for gold for measured and indicated resources. Bias and the smoothing effect can be considered within the acceptance limits and in accordance with industry standards for the deposit type for Mineral Resource estimation based on the Swath Plot analysis results.

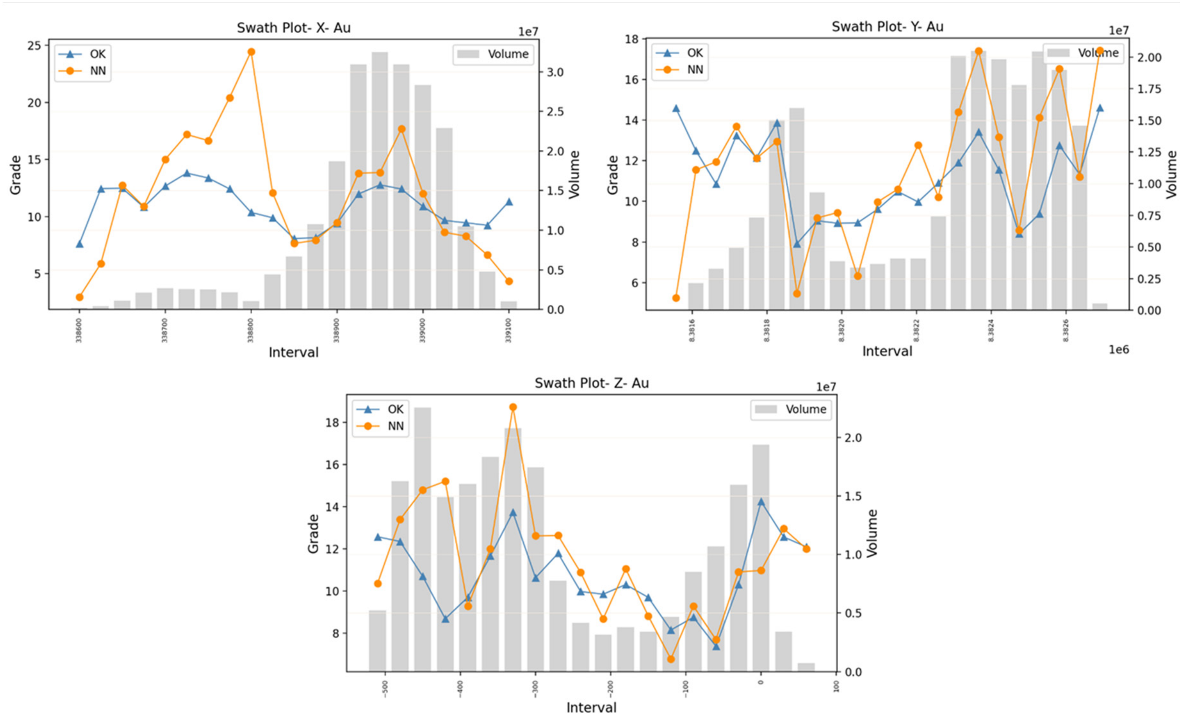


Figure 68 - Swath Plot for Measured and Indicated Resources, Santo Antônio vein

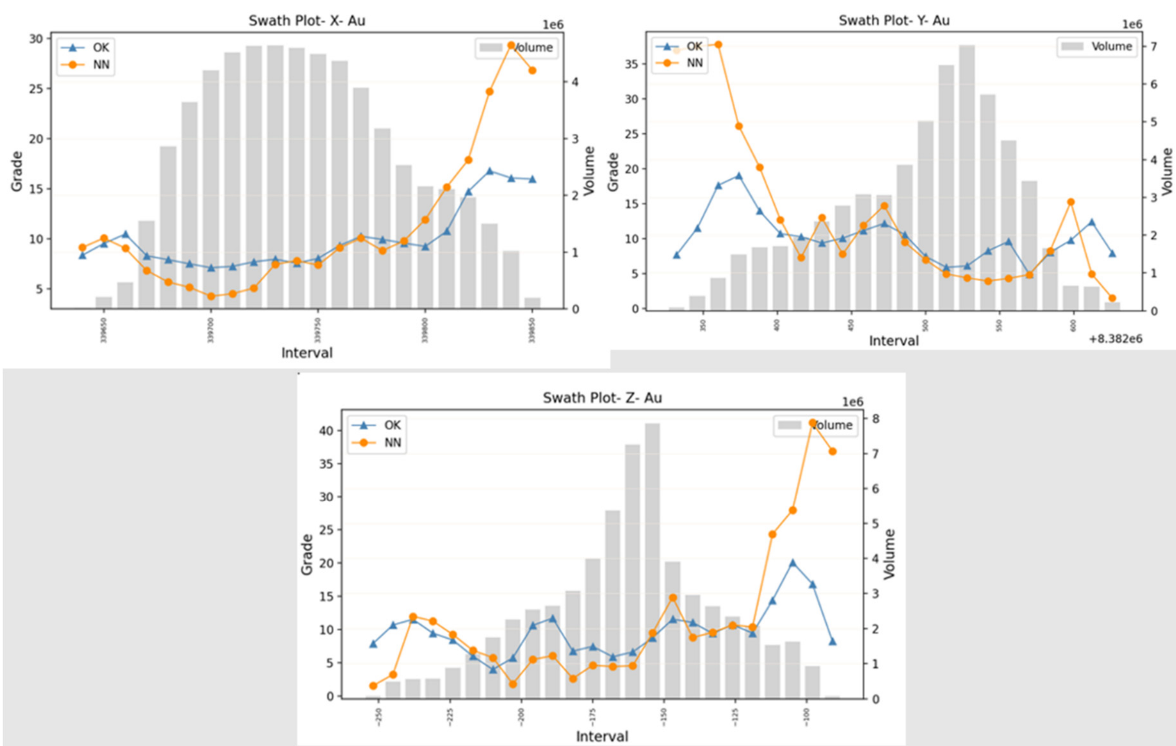


Figure 69 - Swath Plot for Indicated Resources, Matinha vein

14.9.3 *Qualified Person Opinion*

The Mineral Resource estimate methods adopted by Xavantina personnel and the resultant models were executed according to proper industry standards and support the current Mineral Resources and Reserve estimate.

The QP recommends the following:

- Undertake additional infill drilling campaigns to upgrade the classification of Indicated Mineral Resources into Measured Mineral Resources and Inferred Mineral Resources into Indicated Mineral Resources at the Matinha vein
- Down-plunge mineralization at the Santo Antônio vein remains open for potential. It's recommended to undertake a new drilling campaign to test the mineralization continuity on down-plunge mineralization zone.

15.0 MINERAL RESERVE ESTIMATES

The Mineral Reserve estimates for the Xavantina Operations were prepared in accordance with the guidelines of NI 43-101 and the CIM Standards.

GE21 is of the opinion that the October 31, 2022 Mineral Reserves relating to the underground operations of the Xavantina Operations have been estimated in a manner that is consistent with industry best practices and NI 43-101 guidelines.

The gold grade data (undiluted) was provided within the Measured and Indicated Mineral Resource block model were used to develop the current Mineral Reserve estimates. The grades were modified to account for mining dilution and the block volumes were modified to allow for dilution and mining recovery. No Inferred Mineral Resources were used in the determination of the current Mineral Resource estimate.

A cutoff grade for reserves was calculated based on the current and name plate operating costs, and an estimated long-term price of gold. The following parameters were used:

Table 53 - Parameters for cut-off grade definition

Parameter	Units	Value
Plant Feed	tonnes/annum	190,980
Gold Price	USD/oz	1,650
Metallurgical Recovery	%	91.0

Other modifying cost factors considered in the determination of the Mineral Reserve estimate, are shown below expressed as per tonne of ore mined and processed ROM:

Table 54 - Operating cost parameters for Mineral Reserve estimates

Parameter (US$/tonne ROM)	Value
G&A Costs	$20.37
Mining Costs	$119.62
Indirect Costs	$24.66
Processing Costs	$36.54
Total	**$201.18**

Based on these cost parameters, cut-off grades applied to the Mineral Reserve estimate are summarized below:

- 4.17 gpt applied to mining stopes, in both room and pillar and cut and fill mining areas, incorporating mining and development, processing, general and administrative and indirect costs;
- 0.80 gpt applied to gallery development incorporating development and processing costs; and,
- 3.23 gpt applied to mining marginal material adjacent to planned mining stopes incorporating mining, development and processing costs.

The Mineral Reserve estimate of the Xavantina Operations is detailed below:

Table 55 - Mineral Reserve Estimate

Classification	Tonnage (000 tonnes)	Grade (gpt Au)	Au Contained (000 ounces)
Proven Mineral Reserve			
Santo Antônio	301	10.89	105.4
Matinha	-	-	-
Total Proven Reserve	**301**	**10.89**	**105.4**
Probable Mineral Reserve			
Santo Antônio	799	8.32	213.6
Matinha	213	6.24	42.6
Total Probable Reserve	**1,012**	**7.88**	**256.2**
Total Proven and Probable Reserve	**1,313**	**8.57**	**361.6**

1. Mineral Reserve effective date of October 31, 2022.
2. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding.
3. Mineral Reserve estimates were prepared in accordance with the CIM Standards and the CIM Guidelines, using geostatistical and/or classical methods, plus economic and mining parameters appropriate for the deposit. Mineral Reserves are based on a long-term gold price of US$1,650 per oz, and a USD:BRL foreign exchange rate of 5.29. Mineral Reserves are the economic portion of the Indicated Mineral Resources. Mineral Reserve estimates include operational dilution of 17.4% plus planned dilution of approximately 8.5% within each stope for room-and-pillar mining areas and operational dilution of 3.2% plus planned dilution of 21.2% for cut-and-fill mining areas. Assumes mining recovery of 92.5% and 94.7% for room-and-pillar and cut-and-fill areas, respectively. Practical mining shapes (wireframes) were designed using geological wireframes / Mineral Resource block models as a guide.

Other modifying factors considered in the determination of the Mineral Reserve estimate include:

- A cut-off grade of 4.17 gpt was applied to mining stopes within the room and pillar the cut and fill mining areas, in the determination of planned mining stopes within the Mineral Resource blocks based on actual operating cost data and past operating performance of the mine.

- The mining method employed for the Santo Antônio vein is inclined room and pillar and cut and fill for the thicker lower-panel of the vein, and cut and fill for the thinner upper panel of the vein incorporating paste-fill.

- Maximum stope spans in the room and pillar mining area are based on a design stope of 6 m by 4 m between pillars. For cut and fill mining areas the size of stopes are based on a designed stope measuring 20 m along strike with a frontal slice of 3 vertical meters.

  Within designed stopes, all contained material was assumed to be mined with no selectivity. Inferred Mineral Resources, where unavoidably included within a defined mining shape have been included in the Mineral Reserves estimate at zero grade. Mining dilution resulting from Indicated blocks was assigned the grade of those blocks captured in the dilution envelope using the current Mineral Resource estimate.

15.1 QP Opinion

GE21 presents the following comments to the Mineral Reserve estimate:

- Xavantina holds the surface rights and requisite permits required to support the mining operation as outlined in the Mineral Reserve estimate. Future development beyond the stated Mineral Reserves may require the acquisition of additional surface rights.
- GE21 has not identified any known mining, metallurgical, infrastructure, permitting, legal, political, environmental, title, taxation, socio-economic, marketing or other relevant factors that could materially affect the development or extraction of the stated Mineral Reserves.
- GE21 has carried out the appropriate review to satisfy that the Mineral Reserve can be technically and profitably extracted. Consideration has been given to all technical areas of the operations, the associated capital and operating costs, and relevant factors including marketing, permitting, environmental, land use and social factors. GE21 is satisfied that technical and economic feasibility has been demonstrated.

15.2 Study Level Consideration

GE21 adheres to the general industry guidelines for feasibility level studies. Feasibility study level indicates a comprehensive study of a mineral deposit in which all geological, engineering, legal, operating, economic, social, environmental and other relevant factors are considered in sufficient detail so that it could reasonably serve as the basis for a final decision by a financial institution to finance the development of the deposit for mineral production. In a feasibility study, the declaration of Mineral Reserves would be expected, and the economic viability of the mineral deposit must be demonstrated with sole reliance on the depletion of the Mineral Reserves without inclusion of Mineral Resources.

The classification of the studies completed to date are dependent upon a combination of the scope completed, the availability of site-specific information, reliance on generic technical-economic assumptions and the degree of site-specific engineering design work completed. The Xavantina Operations is a fully permitted mine, operating since 2012. Consequently, the authors of the Report have assigned the current Mineral Reserve estimate to be at the feasibility level.

16.0 MINING METHODS

Commercial mining operations commenced in 2012 under NX Gold ownership, and the cumulative production since the commencement of commercial production is over 325,000 ounces of gold. As of the Effective Date, development of the underground mine reached level -310 in the Santo Antônio vein. The Santo Antônio vein achieved first production during the fourth quarter of 2019.

Two mining methods will be employed within the Santo Antônio vein. The current method, inclined room and pillar, will continue throughout the life of mine in the upper levels of the mine, down to level -350. Cut and fill utilizing cemented paste backfill will be employed in the lower levels of the mine. Cut and fill is expected to start in the second half of 2023.

16.1 Geotechnical Characterization

A geotechnical model for the Santo Antônio and Matinha veins was developed utilizing Rock Quality Designation (“RQD”) as determined by drill hole logging. Missing RQD values from original logging were determined using core photographs in Micromine software.

16.1.1 *Lithological Domains*

Geotechnical characterization was performed for each of the three primary lithological / structural units of the orebody, including the quartz vein, the hanging wall and the footwall. A summary of the predominant rock types and geomechanical strength characteristics is provided below. Where applicable, uniaxial compressive strength (“UCS”) refers to the intact rock mass. Meta lavas within the hanging wall present the highest competence and geomechanical strength. The mineralized quartz vein or ore zone, while of high compressive strength, is typically of low competence due to intense fracturing.

- Quartz Vein / Ore Zone: Predominantly comprised of Breccias - BRX (UCS = 111 MPa) and quartz vein - VQZ (UCS = 101 MPa)
- Hanging wall: The predominant rock consists of Metalavas - MTL (UCS = 84 MPa), Diorite - DIO (UCS = 28 MPa), Siltstone - SST (UCS = 40 MPa) and Carbonaceous Phyllite - FLC (UCS = 44 MPa)
- Footwall: similar to hanging wall, predominantly consists of Metalavas - MTL (UCS = 21 MPa), Diorite - DIO (UCS = 28 MPa), Siltstone - SST (UCS = 40 MPa) and Carbonaceous Phyllite - FLC (UCS = 44 MPa)

16.1.2 *Major Discontinuities and Structural Families*

There are 3 main faults that have been mapped within the Santo Antônio vein to date and five discontinuity families. Both the faults and the discontinuities are visible within the quartz vein, hanging wall and footwall.

Table 56 - Main faults within the Santo Antônio vein

Fault ID	Dip (°)	Dip Direction (°)
1	64	18
2	52	72
3	74	288

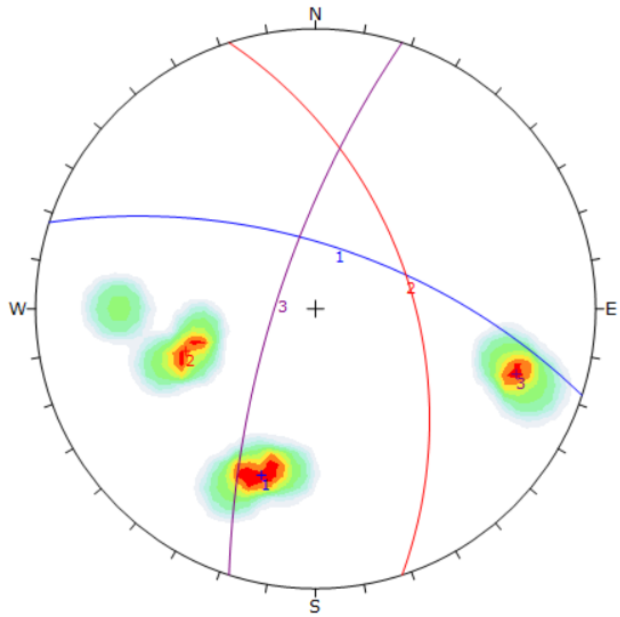


Figure 70 - Stereographic projection of main faults within the Santo Antônio vein

In addition to the 3 primary faults, there are five discontinuity families that have been mapped within the vein.

Table 57 - Discontinuity families within the Santo Antônio vein

Discontinuity ID	Dip (°)	Dip Direction (°)
1	55	050
2	75	069
3	34	333
4	83	229
5	63	235
6	24	038

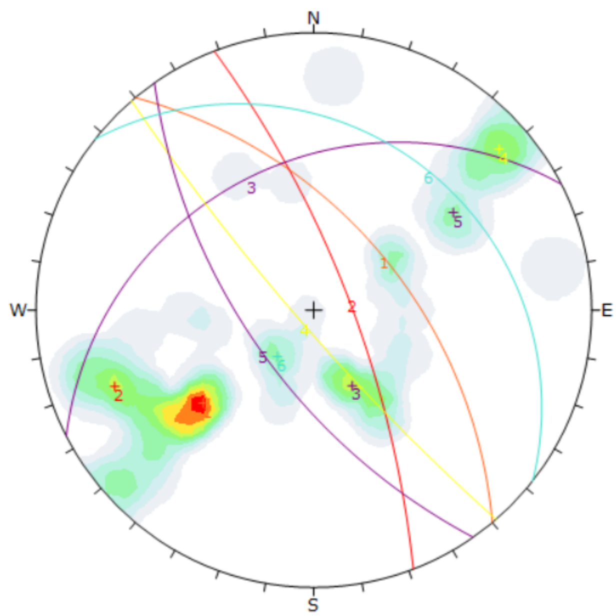


Figure 71 - Stereographic projection of main discontinuity families within the Santo Antônio vein

16.2 Geotechnical Model

A geostatistical model based upon RQD of the Santo Antônio vein, including the hanging wall and footwall was developed to evaluate areas of weakness for planning purposes - principally to define the transition between mining methods employed throughout the life of mine.

RQD is a measure that represents the proportion of drill core over 10 centimeters, expressed as a percentage and is a proxy for the competency of the rock mass. RQD values below 25% are considered very poor, between 25% and 50% poor, between 50% and 75% fair, between 75% and 90% good, and any value above 90% is considered excellent.

The RQD dataset for the Santo Antônio vein is comprised of 2,000 samples collected from drill holes. 102 samples are from the quartz vein, 855 from the footwall and 1,043 from the hanging wall. RQD values in the Santo Antônio vein have a mean of 63.0% and a standard deviation of 28.0%. Representative samples from each zone within the vein were selected for inclusion in the model. The following figures detail the location of samples included in the RQD geotechnical model:

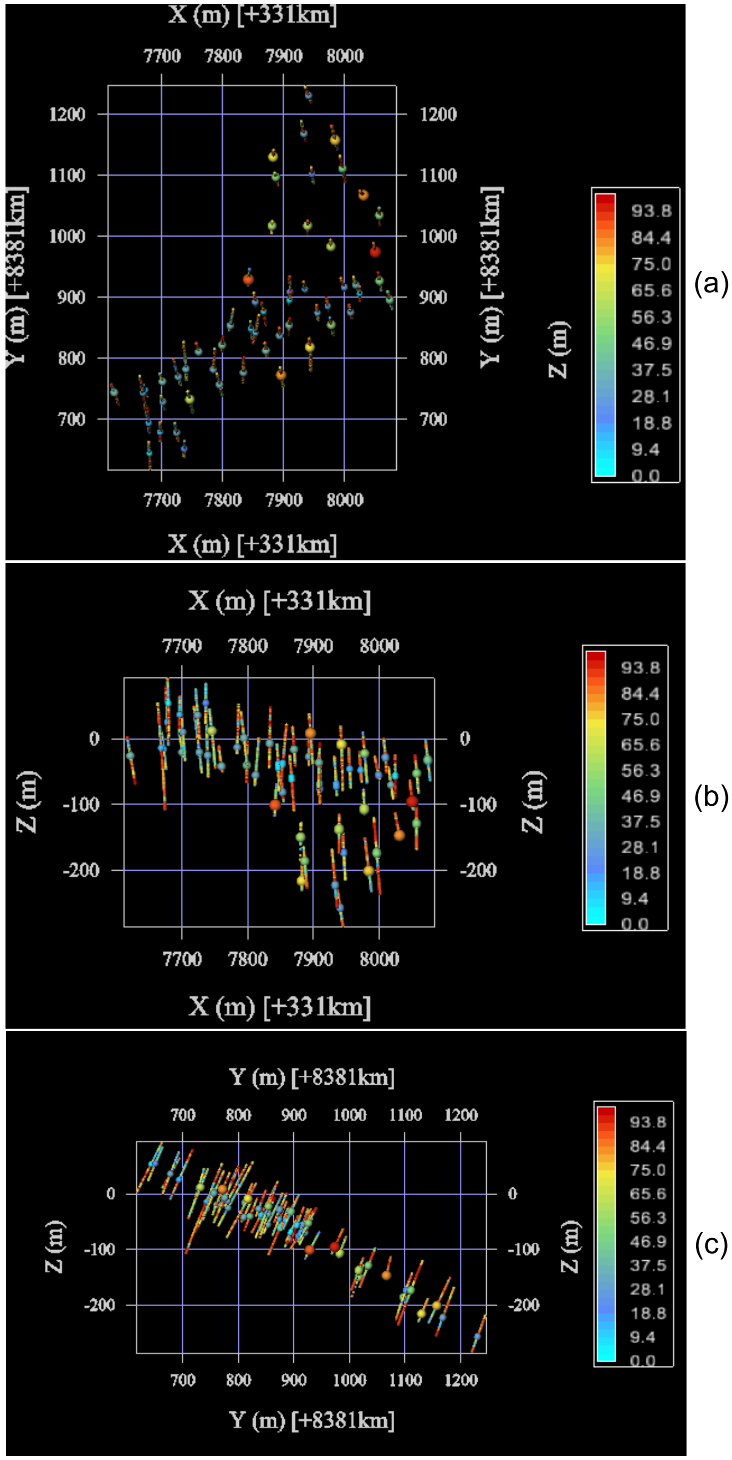


Figure 72 - Location of drill core RQD samples used in geotechnical model (RQD shown in %), detailing the (a) XY plane, (b) XZ plane and (c) YZ plane

The RQD dataset for the Matinha vein is comprised of 902 samples collected from drill holes. 57 samples are from the quartz vein, 483 from the footwall and 362 from the hanging wall. RQD values in the Matinha vein have a mean of 87.6% and a standard deviation of 22.7%. Representative samples from each area of the vein were selected for inclusion in the model. Figure 73 details the location of samples included in the RQD geotechnical model.

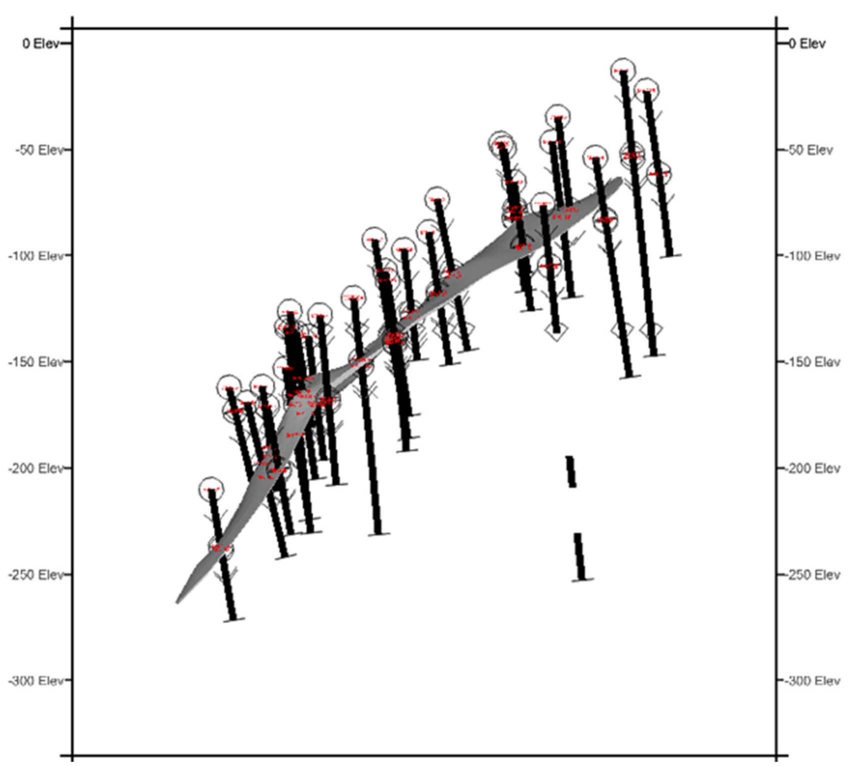


Figure 73 - Location of drill core RQD samples used in geotechnical model of the Matinha vein, North-South section N-S.

Using the sample dataset, a discrete RQD model was built for the hanging wall, quartz vein and footwall utilizing the ordinary kriging (OK) method to interpolate RQD. Variographic analysis, performed in 8 different directions to test spatial anisotropy, was used after de-clustering of the original dataset to reduce the impact of outlier values within the database.

16.2.1 *Variographic Spatial Analysis*

For the quartz vein model in Santo Antônio, 3 nested structures were considered. The first corresponds to a nugget effect of 138.42, representing 25% of the total set variance; the second corresponds to a spherical structure with a sill value of 323, representing 59% of the set variance; and the third also corresponds to a spherical structure with a sill value of 84, representing 16% of the data set variance. The major spatial continuity is in the N67 direction and dip equal to 0 degrees, with a range of 373 meters.

For the footwall model in Santo Antônio, three nested structures were also considered. The first is the nugget effect with a sill value of 61, representing 10% of the total set variance;

the second, a spherical structure with a sill value of 250, representing 42% of the set variance with a range of 30 m in the major anisotropy direction (N67), a 10 m range in the perpendicular direction (N167) and a vertical range of 22 meters; the third structure is spherical with a range of 125 m in the N67 direction, a range of 70 m in the N167 direction and a vertical range of 28 meters. The sill value of the third structure was 290, representing 48% of the total set variance. The variogram model for the hanging wall in Santo Antônio also considers three nested structures in the same orientation the footwall data set, that is, the major anisotropy direction is N67, the average anisotropy direction is N157 and the minor anisotropy direction is vertical. The sill value of each structure is, respectively, 60 for the nugget effect, representing 8% of the total set variance; 340 for the first spherical structure, representing 43% of the total set variance and 383 for the second spherical structure, representing 49% of the total set variance. In addition, the ranges were 40 meters in the N67 direction and 55 meters for the structure in the N157 direction, as well as 20 meters in the vertical direction. The second structure has a range of 120 meters in the N67 direction, 70 meters in the N157 direction and 28 meters in the vertical direction.

The quartz vein model in Matinha considered one structure. The nugget effect corresponds to 0.3 (normalized). The major spatial continuity is in the N20 direction and dip equal to 10 degrees, with a range of 64 meters.

The footwall model in Matinha considered one structure. The nugget effect corresponds to 0.3 (normalized). The major spatial continuity is in the N70 direction and dip equal to 20 degrees, with a range of 87 meters.

The variogram for the hanging wall in Matinha considered one structure, the major anisotropy direction is N10, the average anisotropy direction is N320 and the minor anisotropy direction is vertical. The nugget effect corresponds to 0.3 (normalized). In addition, the ranges were 40 meters in the N320 direction and 94 meters for the structure in the N10 direction, as well as 15 meters in the vertical direction.

16.2.2 *Geotechnical Block Model Parameters*

Block model values were generated using ordinary kriging (OK) within a developed block model, based upon variographic analysis. Details of the block model parameters for Santo Antônio are provided in Table 58 and Table 59.

Table 58 - Santo Antônio Block Model Parameters (Quartz Vein)

Block model definition	East-West	North-South	Vertical
Minimum	338622	8381643	-258
Maximum	339074	8382230	62
Block size (m)	5	5	5
Number of blocks	100	125	64

Table 59 - Santo Antônio Block Model Parameters (Hanging wall / Footwall)

Block model definition	East-West	North-South	Vertical
Minimum	338622	8381619	-285
Maximum	339074	8382244	142
Block size (m)	5	5	5
Number of blocks	100	125	80

Estimation passes were used to interpolate RQD throughout the block models. For the quartz vein, a long search radius of 120 meters was used, with a short search radius of 90 meters. A minimum of 4 samples at a maximum distance of 50 meters between samples was applied. Outlier values at the high-end of the range were replaced with the upper limit (defined as 70.83%). For the hanging wall and footwall, a long search radius of 120 meters was applied with a short search radius of 70 meters. Similarly, a minimum of 4 samples at a maximum distance of 50 meters between samples was applied. No values within the dataset were calculated to be outliers that required capping as limited sample bias was observed.

Block model values for RQD in Matinha were generated using IPD estimator within a developed block model, based upon variographic analysis to define the search volume. Details of the block model parameters for Matinha are provided in Table 60.

Table 60 - Matinha Block Model Parameters (Quartz Vein)

Block model definition	East-West	North-South	Vertical
Minimum	338622	8381619	-285
Maximum	339074	8382244	142
Block size (m)	5	5	5
Number of blocks	100	125	80

16.2.3 *Geotechnical Block Model Results*

The quartz vein RQD block model for the Santo Antônio Vein highlights an overall improvement in rock mass quality to depth, with a separation from very good to fair rock quality grading to poor quality at higher elevations. The suitability and design of pillars and open spans within the vein to support the hanging wall as the vein is mined is a key factor in the overall mine design. Analysis on section highlights that, overall, characteristics of the rock mass within the to-be-extracted ore zone (quartz vein) can be further defined as good quality below level -100, and of poor quality above level -100, as further demonstrated in the following figures. This delineation in the rock mass, as well as further evaluation of the strength of the hanging wall and footwall were used to define the limits of the inclined room and pillar mining method, currently in use, and zones where paste back fill will be required. Development within this portion of the orebody and operational experience throughout the mine confirms the modeled rock quality of the ore zone.

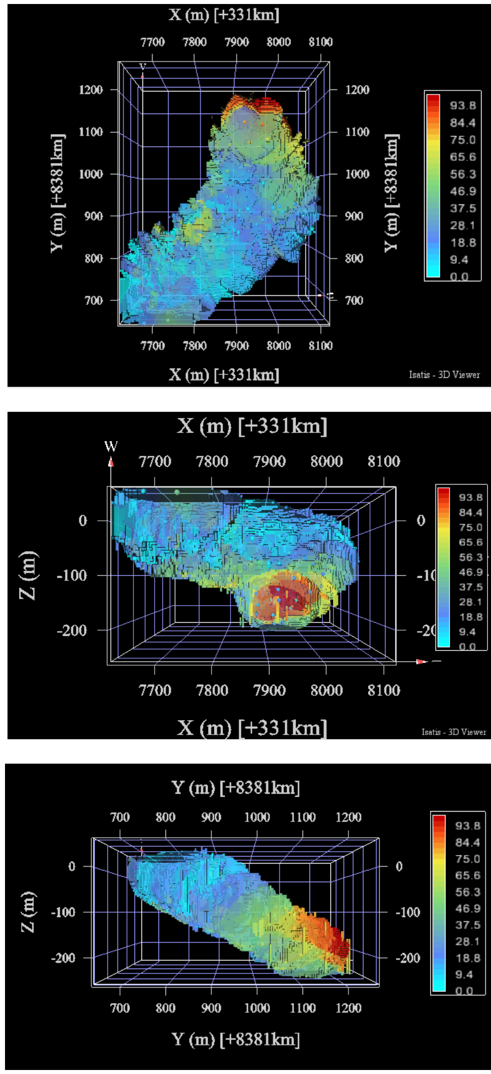
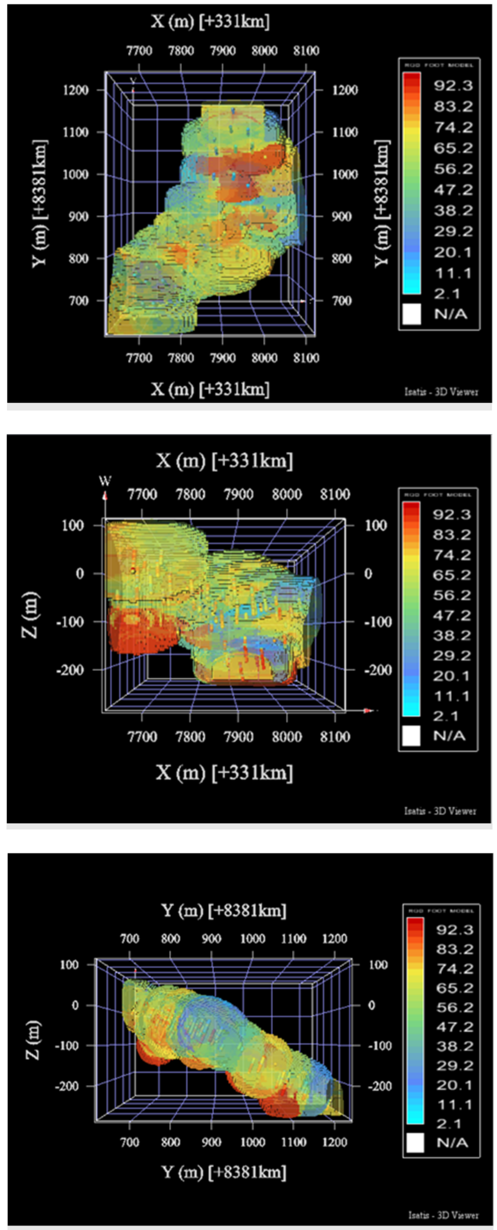


Figure 74 - Santo Antônio quartz vein RQD block model (RQD shown in %), detailing the (a) XY plane, (b) XZ plane and (c) YZ plane

Within the footwall of the modeled mining area of Santo Antônio, important for determining pillar strength and support requirements, it can be observed that in the North-Northeast portion of the footwall, below the modeled quartz vein, as well as along the eastern and western edges, rock quality is between 2% and 40%, characterized as being poor or very poor; however, rock quality tends to improve centrally within the footwall, where interpolated values typically exceed 55%, and local interpolated values are between 65% and 90%. All permanent mine infrastructure including primary ramp development occurs within the footwall of the current and planned mining areas.



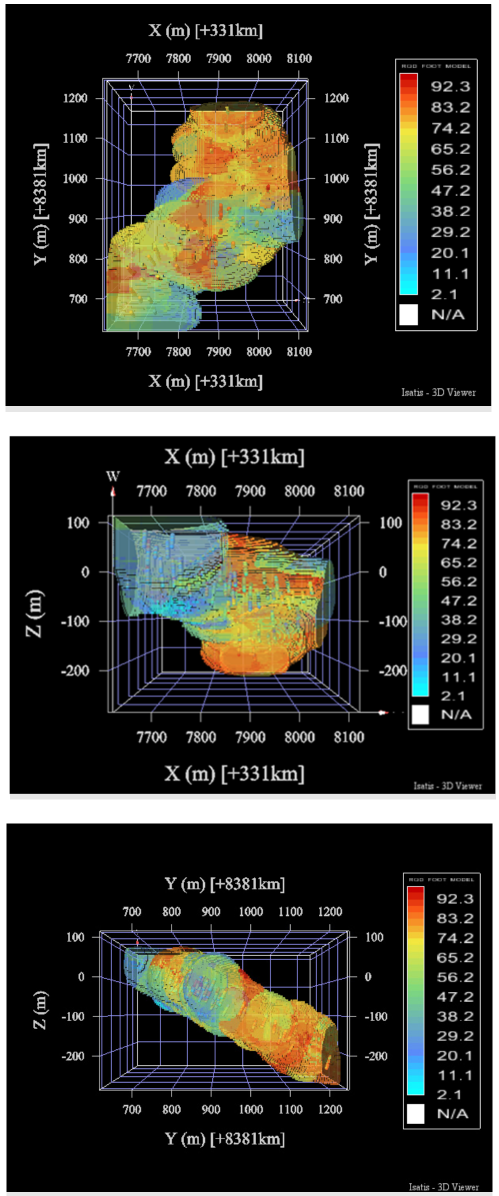
(a)

(b)

(c)

Figure 75 - Santo Antônio footwall RQD block model (RQD shown in %), detailing the (a) XY plane, (b) XZ plane and (c) YZ plane

For the hanging wall model, critical in determining pillar strength, as well as overall mine design, including span widths and support requirements, the lowest quality rock mass was observed in the upper levels of the mine, and in particular at the southwest limits of the modeled mining area. Within the central and northern extent of the Santo Antônio vein mine design area, RQD values are generally above 55%, indicating a good quality rock mass within the hanging wall.



(a)

(b)

(c)

Figure 76 - Santo Antônio hanging wall RQD block model (RQD shown in %), detailing the (a) XY plane, (b) XZ plane and (c) YZ plane

The RQD block model for the Matinha Vein highlights ground conditions in footwall and hanging wall with predominance of good and excellent classification and for ore vein a predominance of poor classification. The average value of RQD in the ore zone is 41.4%, for the hang wall zone is 85.2% and finally for footwall the average value is 83.4%. Figure 77 to Figure 79 detail the location and RQD values of the Matinha orebody.

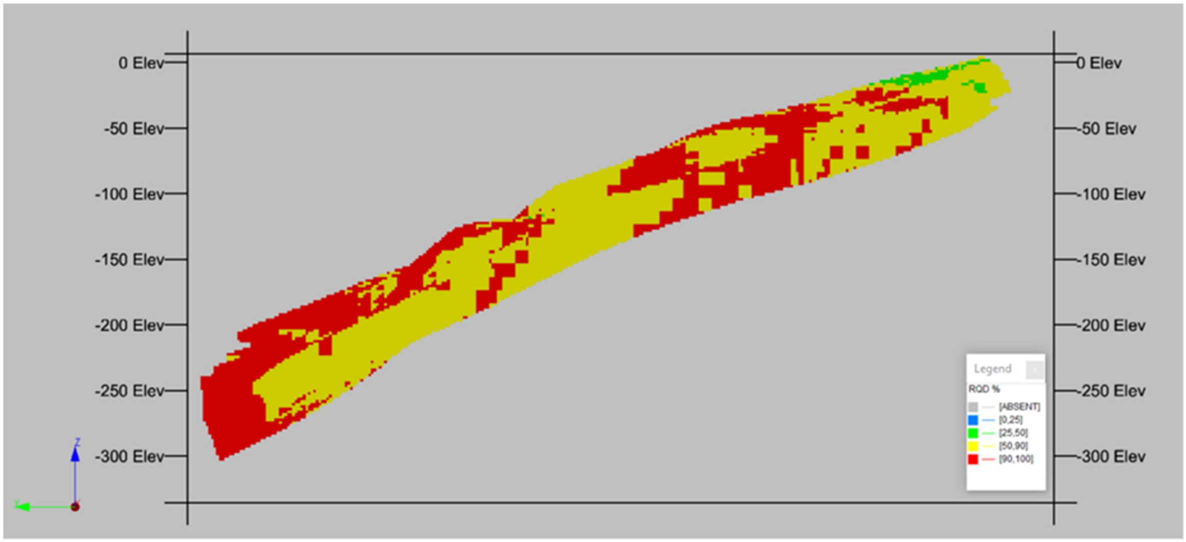


Figure 77 - Matinha hanging wall RQD values demonstrating high-quality rock mass, North-South section

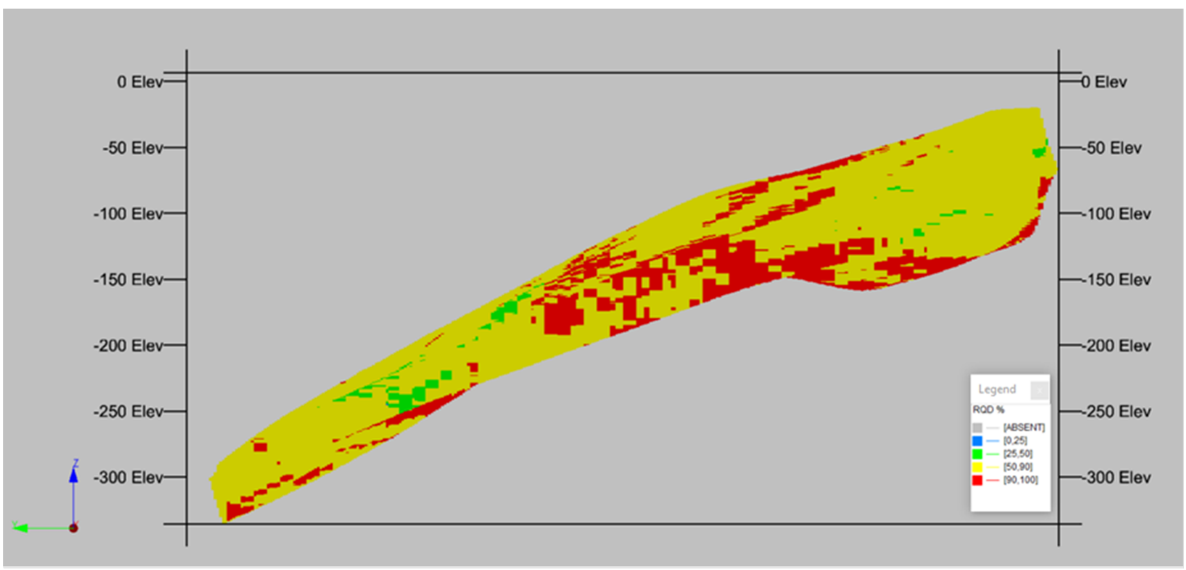


Figure 78 – Matinha footwall RQD values demonstrating high-quality rock mass, North-South section

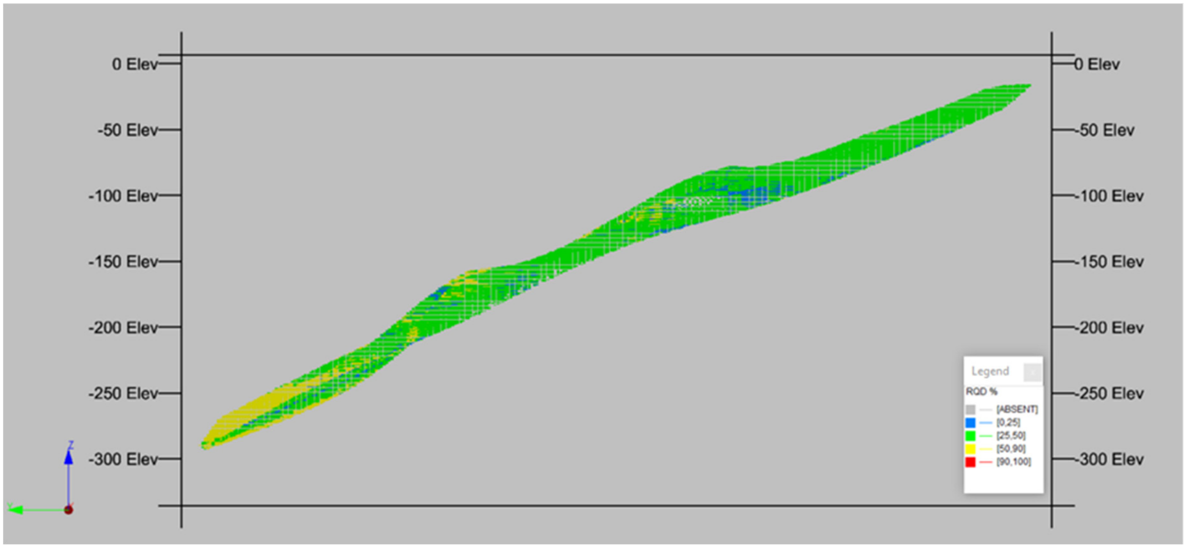


Figure 79 - Matinha vein RQD values demonstrating weaker rock mass, North-South section

16.3 Paste Backfill: Paste Characterization, Testwork & Design

Due to the poor rock quality of the upper portion of the Santo Antônio vein, as detailed in section 16.2, particularly for the ore zone in the upper panel (above level -100) as confirmed through actual development completed during the first half of 2020, the cut and fill mining method, incorporating paste backfill was selected to facilitate production from this area. The selection of the cut and fill method, incorporating paste backfill was selected for two primary reasons: (i) historically within the Brás and Buracão veins, the cut and fill mining method utilizing waste rock as backfill was previously used across a variety of rock mass qualities and (ii) the integration of cemented paste to provide stability to the poor-quality rock mass was confirmed through characterization work undertaken in 2020.

The physical, chemical and mineralogical characteristics of tailings generated by the Xavantina Operations were studied to confirm viability paste backfill. The following section details this work as well as design and implementation of paste backfill into the operations.

16.3.1 *Tailings Characterization*

The Xavantina Operations process plant, on average, processes 42 tonnes per hour (tph) of ore, generating approximately 39 tph of combined tailings. Only inert tailings generated from the flotation process which do not come into contact with cyanide were studied for suitability of paste material. In practice, non-inert tailings will be disposed of within the non-inert tailings dam, as is currently performed in practice.

Final flotation tailings are passed through a hydrocyclone prior to deposition within the inert tailings ponds, generating fine tailings (overflow) and coarse tailings (underflow) products. During the first quarter of 2020, two 5 kilogram samples, one of each coarse and fine tailings samples were sent to the Technological Characterization Laboratory (LCT) of Sao Paulo University, and an additional two 100 kilogram samples, one of each coarse and fine tailings samples were sent to the Laboratory of Mineral Research and Mine Planning (LPM) of the Federal University of Rio Grande do Sul.

Optical laser particle sizing of the samples was used to further classify each of the coarse and fine tailings samples by LCT, as shown in Figure 80. In paste-fill applications, particle sizes below 20 microns (0.020 mm) is generally considered as the fine fraction and above 20 microns the coarse fraction.

Table 61 - Particle Size Distribution (LCT, 2020)

Sample	Size (µm)			
	D (0.1)	D (0.2)	D (0.5)	D (0.9)
Fine Tailings	4.5	8.4	26.8	77.0
Coarse Tailings	13.0	44.8	103.2	240.5

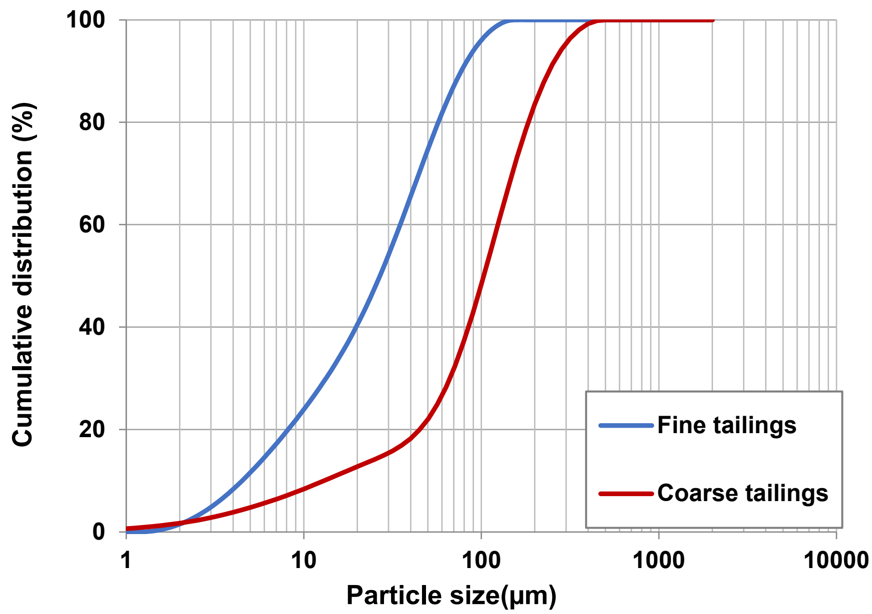


Figure 80 - Particle size distribution(s), coarse and fine tailings fractions (LCT, 2020)

Fines content in the tailings to be used for paste backfill must be controlled to achieve desired engineering properties. Strength capacity, sedimentation, transport efficiency and solid phase surface area of the mixture are important design parameters in determining the optimal "coefficient of uniformity", or optimal particle size distribution. The coefficient of uniformity is defined as the particle size at which 60% of the material passes ("P60") divided by the particle size at which 10% of the material passes ("P10"). In practice, the best quality paste, providing maximum strength while minimizing cement requirements, have coefficient of uniformities between 10 and 20.

To optimize the coefficient of uniformity for Xavantina paste, a blend of the coarse hydrocodone underflow combined with the fine hydrocyclone overflow at a ratio of 75% to 25%, respectively resulted in a calculated coefficient of uniformity of 13.5, within the recommended range. The particle size distribution of the blended material is shown below.

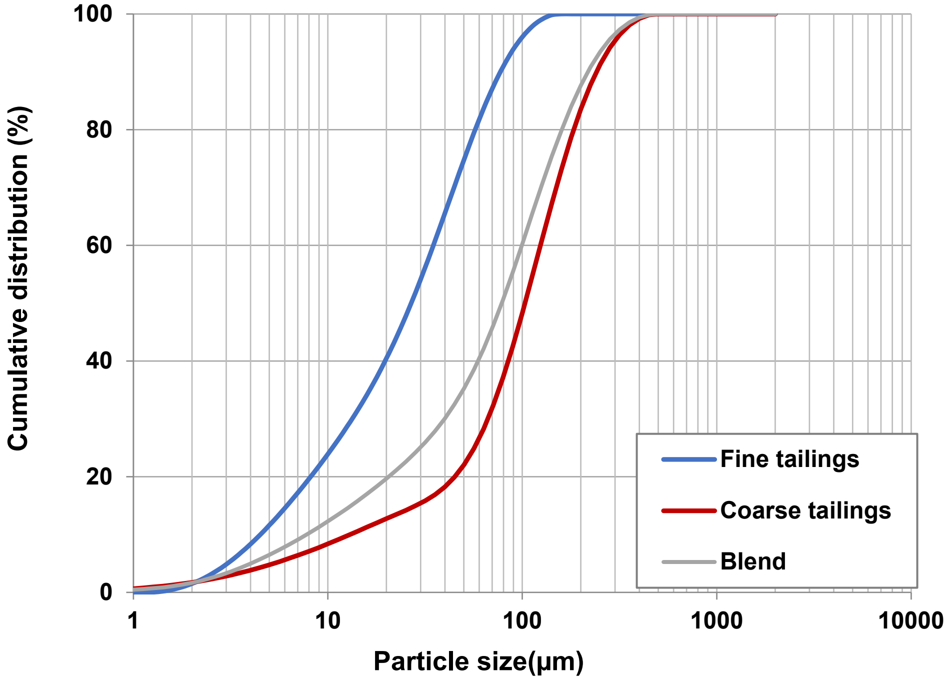


Figure 81 - Particle size distribution(s), coarse and fine tailings fractions as well as the 75%/25% blended tailings product (LCT, 2020)

16.3.2 *Tailings Blend Physical Properties*

Physical properties of the 75% coarse, 25% fine tailings product, including true density, apparent density, porosity and void ratio was determined using a blend of the samples provided. True density was determined using helium gas pycnometetry in a Micromeritics model AccuPyc II 1340, with 10 purging cycles and 10 measurement cycles. Apparent density was determined by the T.A.P. (Transverse Axial Pressure) method, in a Micromeritics model GeoPyc 1360, with 7 measurement cycles. The axial force applied was 21 N in a 38.1 mm camera. The samples were dried in an oven at 105°C for 12 h prior to physical property testing.

Table 62 - Physical properties of 75% coarse / 25% fine tailings blend (LCT, 2020)

	Mean	Std. Dev.
True density (g/cm³)	2.751	0.002
Apparent density (g/cm³)	1.732	0.032
Porosity	37%	
Void ratio	0.59	

16.3.3 *Tailings Blend Mechanical Properties Testing*

Paste strength at a variety of cement (binder) content and flow behavior was evaluated to further advance the integration of paste fill as well as design of pumping and piping solutions for the Xavantina Operations. UCS and ultrasonic wave measurements were used to evaluate the mechanical and curing properties of the paste while slump tests were used to evaluate flow and pumping characteristics.

The UCS required for paste fill varies and depends on support requirements. For the Xavantina Operations, where paste will be used in pillar recovery, values of over 1Mpa are recommended due to the primary support requirements of the paste. To achieve this strength, Portland cement was chosen for binding material as it is commonly available in Brazil and is currently used in shotcrete applications throughout the mine. A 45kg sample of cement from the mine's supply warehouse was sent to the LPM of the Federal University of Rio Grande do Sul along with the tailings samples for further evaluation.

16 samples were prepared utilizing 7% cement by weight and 16 samples utilizing 9% cement by weight were prepared for UCS testing and ultrasonic velocity tests. Samples measured 15cm in length and 7cm in diameter. An additional 28 samples utilizing 7% cement by weight and 28 samples utilizing 9% cement by weight were prepared for triaxial compressive tests. Triaxial samples measured 10cm in length and 4.40cm in diameter.

(a)  (b) 

Figure 82 - Sample preparation for 9% cement (a) and 7% cement (b) (LCT, 2020)

UCS results are shown as a function of curing time and cement addition below. The lowest obtained strength value occurred with 7% cement after 7 days cure time at 1.47Mpa, whereas the highest strength was achieved with 9% cement after 28 days of curing, which produced a UCS of 3.43Mpa. For the 7% cement sample, a marginally higher strength was achieved after 21 days of curing compared to 28 days of curing, which could be explained by irregularities in the 28 day samples such as air bubbles. In either case, UCS results show Xavantina paste can achieve high compressive strength at both 7% and 9% cement additions.

Table 63 - UCS Results at 7% and 9% by weight (LCT, 2020)

Cement content	Curing time (days)	UCS (MPa)
7%	7	1.47
	14	1.49
	21	2.41
	28	2.10
9%	7	1.89
	14	2.03
	21	3.35
	28	3.43

A corresponding increase in ultrasonic pulse velocity ("UPV") was achieved over the curing time, as moisture content is reduced. The 9% cement sample exhibited higher UPV throughout the curing time, as expected, and as shown in Figure 83.

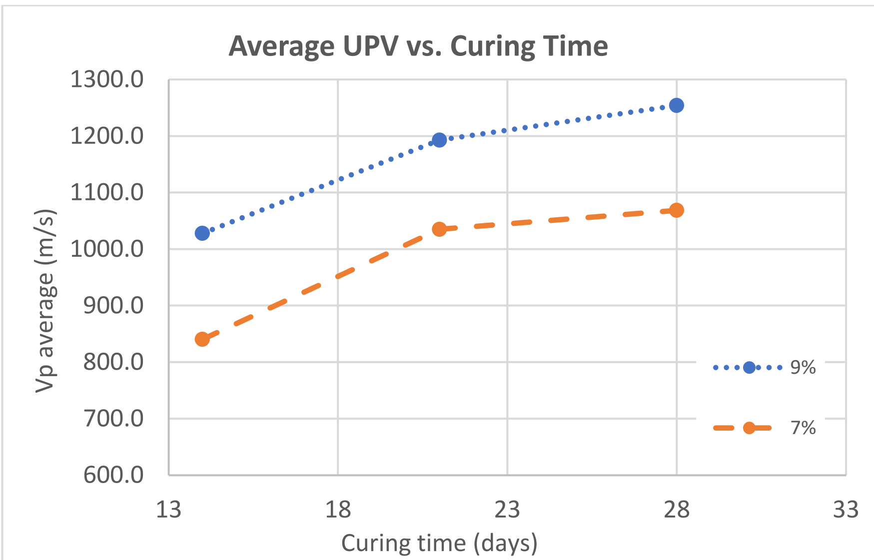


Figure 83 - UPV Results (LCT, 2020)

Triaxial tests were performed on the cured samples to obtain cohesion (C) and friction angle results for the 7% and 9% samples. Cohesion typically forms in paste-fill through intra-particle bonding with the cement hydration products, and is typically time dependent, similar to UPV, increasing with cure time. Friction angle, on the other hand decreases over the cure time. The reasons for this are not well known, but are believed to be as a result of cement hydroxides and paste surface oxidation. In either case, the triaxial results obtained from the Xavantina Operations are in-line with expectations, and confirm the suitability of either 7% or 9% cement addition to achieve desired results.

Table 64 - UCS Results at 7% and 9% by weight (LCT, 2020)

Cement content	Curing time (days)	Friction angle (°)	Cohesion (MPa)
7%	7	38.94	0.49
	14	37.5	0.55
	21	34.85	0.65
9%	7	42.83	0.38
	14	36.39	0.48
	21	37.76	0.77
	28	31.29	0.89

Slump tests were performed according to the Brazilian Standard NBR NM 67 (1998) and produced a 155mm slump for the 7% cement sample and a 175mm slump for the 9% cement sample. Water to cement (w/c) ratios obtained from the slump tests were 4.87 and 3.77 for the 7% and 9% cement samples, respectively.

16.3.4 *Paste Fill Plant & Equipment Selection*

Following the completion of physical and mechanical properties testing, the paste-fill equipment was designed with the following objectives:

- Design productivity of 35m³/h of paste fill;
- Total pumping distance of 1,300 m over the life-of-mine plan, 6-inch diameter tubes (metallic) with 311 meters vertical drilling to be performed from surface;
- HDPE tubes to be used on development areas within the underground mine; and
- Initiated backfilling of first stopes during the first quarter of 2021.

The total segment design, incorporating 33 segments, that will be required to deliver paste throughout the mine in support of the current life of mine plan is detailed below in Table 65.

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Table 65 - Pumping Segment Design, Life of Mine Plan

Segment	Length (meters)	Inclination (degrees)	Connection Type
1	311	-90	Straight
2	1.6	-8.5	90 degrees
3	223.6	-8.5	Straight
4	1.6	-8.5	90 degrees
5	70	-8.5	Straight
6	2	-8.5	50 degrees
7	110	-37	Straight
8	2	-17.4	118 degrees
9	74	-17.4	Straight
10	2	-21	42 degrees
11	13	-21	Straight
12	2	-3	103 degrees
13	47	-3	Straight
14	2	-23.7	135 degrees
15	48.2	-23.7	Straight
16	2	-17.5	90 degrees
17	26.6	-17.5	Straight
18	2	-23.1	157 degrees
19	25.4	-23.1	Straight
20	2	-32.5	90 degrees
21	20	-32.5	Straight
22	2	-47.5	132 degrees
23	32	47.5	Straight
24	2	-27.1	157 degrees
25	80	-27.1	Straight
26	2	-30	162 degrees
27	45	-30	Straight
28	2	-29.8	165 degrees
29	40	-29.8	Straight
30	2	-27.1	170 degrees
31	38	-27.1	Straight
32	2	-23.7	150 degrees
33	40	-23.7	Straight

Pumpability tests on Xavantina flotation tailings were performed by Schwing Stetter on site, who was selected to deliver the turn-key modular paste fill plant for Xavantina. A maximum pressure of 90 bar for 5% cement and 80 bar for 7% cement was determined.

Based upon the design specification, and future needs of the Xavantina Operations, the HN2 paste fill model was selected. The model features a nominal productive capacity of 35m³ / h and is equipped with double 2.0 m³ horizontal shaft mixers. Schwing Stetter MC 150 BR Control and Supervision System to monitor material consumption as well as weight deviations, integrated slump meter and humidity sensor will be installed. The turn-key modular unit includes a 440V / 60Hz electrical panel, CCM and 230Vac relays, complete control and automation CPL Siemens S7 1500 with SIWAREX 24Vcc weighing modules (accuracy of dosage according to NBR 7212). Installed power of 250 kVA.

Figure 84 - Xavantina paste fill plant (Xavantina, 2022)

A Piston Pump Duplex KSP 220XL + EHS 4500 (2x315kW) was selected for pumping to meet the current life of mine plan as well as support future expansions of the underground mine activities, beyond the current Mineral Reserves. The nominal pumping capacity of the pump is 50m³ / h. The pumping system features an open hydraulic circuit, poppet suction and pressure valves with CPR, capable of producing maximum of 120bar in operation. Heat exchangers with hydraulic drive for operation at room temperature up to 45 °C are included as well as Siemens HMI touch panel operation panel, 440V / 60Hz power panel, CCM and 230Vac relays, complete control, and automation Siemens S7-300 / 24Vcc CPL. Installed power of 850 kVA. This positive displacement pump has been specified to suit all phases of the project.

Figure 85 - Xavantina paste fill plant, Piston Pump Duplex KSP 220XL + EHS 4500 (Xavantina, 2022)

16.4 Geotechnical Design Parameters

Based upon the geotechnical model developed and the mechanical properties testing of the main units within the Santo Antônio vein, maximum self-supported spans were calculated for mine planning purposes. Support requirements were determined based upon hydraulic radius and quality of the underlying rock mass rating ("RMR") after taking into account adjustments for blasting, induced stresses and joint orientation ("MRMR"). As development has occurred throughout the Santo Antônio vein, these empirical methods were evaluated alongside observations and operating practice.

Within the upper panel of the Santo Antônio vein, the hanging wall has been determined to have an average RMR value of 63. After adjusting for blasting (94%), joint orientation (80%) and induced stress (90%), the adjusted MRMR is 42.6, indicating openings with hydraulic radius (defined as the area divided by the perimeter of the opening) of up to 10.0 meters are stable without the need of systemic support. Between 10.0 meters and 19.0 meters of hydraulic radius, support is required and hydraulic radii values above 19.0 meters are unstable.

The use of cut-and-fill, with a maximum advance rate of 4.0 meters in Santo Antônio and 2.0 meters in Matinha, indicates that even if the entirety of the vein strike length within the upper panel, approximately 300 meters, the hydraulic radius of 2.70 meters would still be within the design limit for an unsupported span. In the portion of the upper panel, where room and pillar mining is expected to occur, rooms have been designed utilizing 6.0 meter rooms between sill pillars in 90 meter panels, with the application of paste to recover the panels.

Within the lower panel of the Santo Antônio vein, strength has been demonstrated to improve, both in geotechnical modelling of the vein, and in practice, where the majority of the mine's current production activity occurs. MRMR values for the hanging wall within the lower have been calculated to be 55.5, a considerable improvement, as expected, over the upper panel. Within this mining area, cut and fill has been selected to increase recovery and avoid a stage of pillar recovery in the future.

Factor of safety values for the expected design, incorporating the worst geomechanical results of the orebody range from 1.2 to 7.0 within the upper panel, and 2.9 to 5.7 within the lower panel of Santo Antônio.

16.5 Mining Methods

Incorporating geotechnical design parameters, the Santo Antônio vein was sub-divided into two main panels on level -65 (upper) and level -170 (lower) corresponding to the delineation between rock mass quality of the vein. As discussed in prior sections of this Report, the upper level is, in general, of lower rock quality, thus cut and fill has been selected as the mining method of choice, incorporating the use of cemented paste backfill. The lower panel, which exhibits better rock quality and strength characteristic, will continue to employ the use of inclined room and pillar down to level -350 and converted to cut and fill in the lower levels to increase ore recovery without adding an additional stage of pillar recovery. Recovery of pillars in Santo Antônio room and pillar will utilize cemented paste in an ascending operation.

The Santo Antônio vein measures, on average, over a total strike length ranging from 150 meters to 300 meters, features an average dip ranging from 32 to 40 degrees and has an average thickness of 3.0 meters. Localized thickening of between 5.0 and 6.0 meters has been observed within the lower panel during operations.

Matinha orebody vein measures, on average, over a total strike length of 120 meter, features average dip from 18 to 35 degrees and has an average thickness of 2.2 meters.

Table 66 - Santo Antônio and Matinha orebody dimensions

Target	DIP (°)	Extension along strike (m)	Avg. Thickness (m)
Santo Antônio	32 to 40	300	3.0
Matinha	18 to 35	120	2.2

Mine layout schematics are provided in Figure 86 and Figure 87.

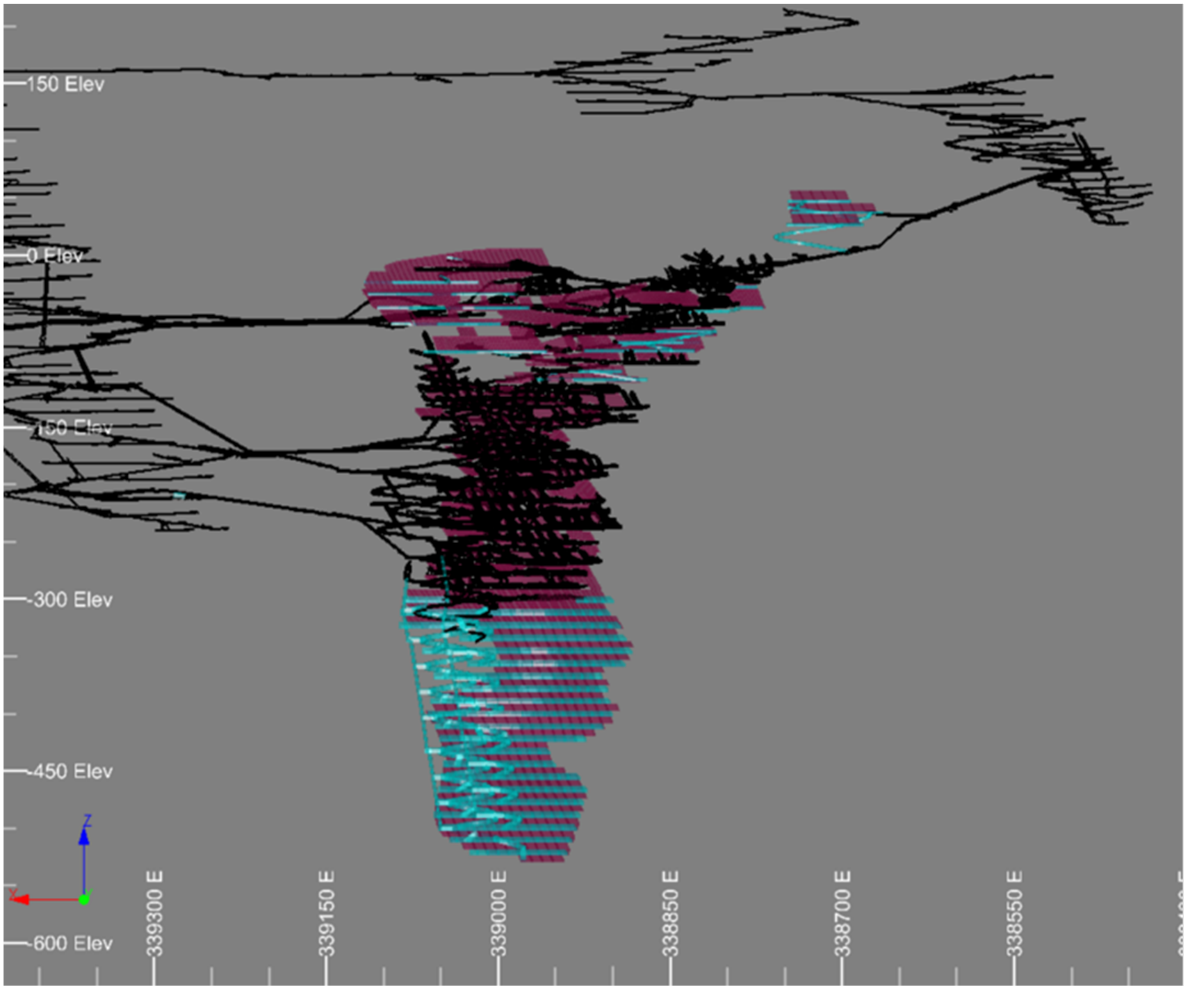

Figure 86 - Santo Antônio mine plan, East-West section. Black contour shows actual completed development (blue is planned) as of the Effective Date.

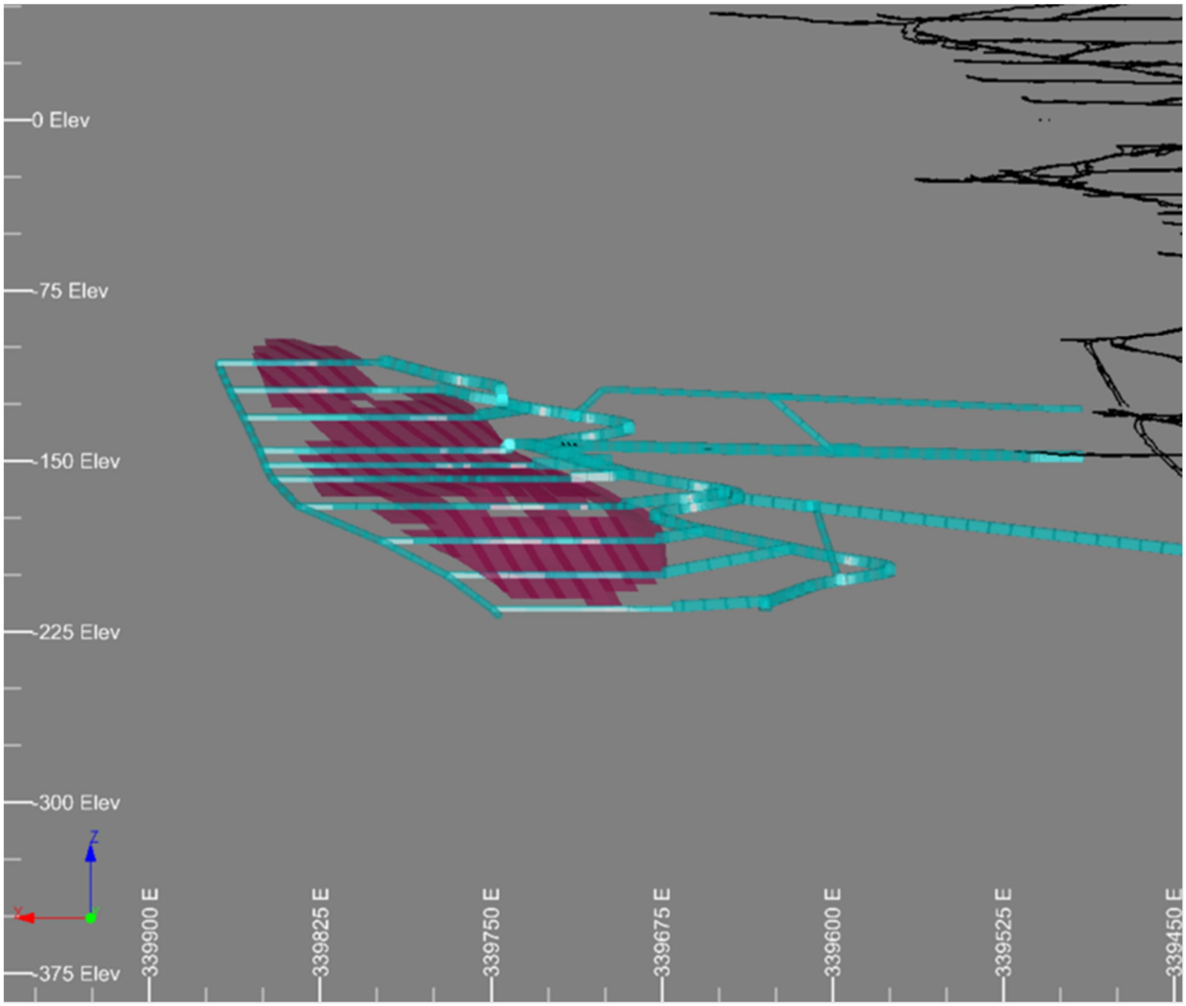

Figure 87 - Matinha mine plan, East-West section. Black contour shows actual completed development (blue is planned) as of the Effective Date.

16.5.1 *Mining cycles*

The mining cycle for inclined room in pillar operations within the lower panel of the Santo Antônio vein can be described as follows:

1. 40 mm diameter blasthole drilling at 1.4m depth using jackleg hammers;
2. Installation and blasting of cartridge explosives with a charge ratio of 1.35 kg per blasted tonne of ore / waste;
3. Loading and transport of material with 2-tonne loader to mucking bay;
4. Loading and transportation of the ore to the surface using 6-tonne capacity LHD loaders and 20-tonne capacity haul trucks;
5. Manual scaling;
6. Drilling for rock support and installation of resin bolts using jackleg hammers according to geotechnical support requirements;
7. Paste fill used as backfill following the primary stage of mining; and,

8. Pillar recovery

The mining cycle for cut-and-fill operations within the upper panel of the Santo Antônio vein and Matinha vein can be described as follows:

1. 40 mm diameter blasthole drilling at 1.4m depth using jackleg hammers;
2. Installation and blasting of cartridge explosives with a charge ratio of 1.35 kg per blasted tonne of ore / waste;
3. Loading and transport of material with 2-tonne loader to mucking bay;
4. Loading and transportation of the ore to the surface using 6-tonne capacity LHD loaders and 20-tonne capacity haul trucks;
5. Manual scaling;
6. Drilling for rock support and installation of splitsets using jackleg hammers according to geotechnical support requirements;
7. On completion of mining, backfill the stope using cemented paste; and,
8. Frontal attack of the next 3.0 meter slice.

16.5.2 *QP Opinion*

Despite the poor to very poor rock mechanics of the hanging wall of the Santo Antônio vein, and in particular the upper panel of the vein, the long operational history of Buracão and Brás ore bodies, where cut and fill operations previously occurred, supports the mining method selection for the Santo Antônio vein, including the proposed mining methods for the upper and lower zones and support requirements. This is supported by operations in practice and development within the vein.

The design of the paste fill system for the Xavantina Operations is adequate for the Report at feasibility level and provides support for the current Mineral Reserves and life of mine plan. Geomechanical characterization work should continue to be carried out on an ongoing basis to support mining operations, mine design and update geotechnical support requirements. Numerical modeling and stress-displacement analysis with finite elements is recommended to access stress redistribution and strength factors for both hanging wall and pillars, and the support system requirements.

It is also recommended to carry out additional studies regarding the recovery of the pillars included in the Mineral Reserve estimate.

Xavantina uses a higher cut-off grade for cut and fill areas. A study is recommended to effectively account for the costing in these areas to better support the cut-off grade.

16.6 Life-of-Mine Production Mine Plan

Based on operational experience, a productive mining rate of 4,500 tonnes/month per level was assumed for the inclined room and pillar mining method. The constraint for production using this method is based on number of jackleg operators per shift and developed rooms available for production. For the current reserve schedule and life of mine plan, 9 jackleg machines operating per shift has been assumed. The rate considered on mechanized development was 40 meters per month and 25 meters per month on jackleg development. The mining rate applied for cut and fill areas were 3200 tonnes/month per stope.

Modifying factors employed in the development of the mine plan are based on actual operational performance of mining within the Santo Antônio vein to date. Operational dilution of 17.4% plus planned dilution of 8.5% was applied to each stope within the room and pillar operational area of the lower panel. Operational dilution of 3.2% plus planned dilution of 21.2% was applied to each stope for cut and fill operations in the upper panel of the vein.

The life of mine production schedule for the Xavantina Operations is detailed below:

Table 67 – Mining and Processing Operational Summary

	Q4 2022*	2023	2024	2025	2026	2027	2028	LOM
Ore Mined & Processed (kt)	22.1	169.5	221.8	227.3	224.7	215.8	231.4	1,312.5
Au Grade (gpt)	12.43	10.56	9.12	9.09	8.71	7.16	6.88	8.57
Recovery (%)	90.5%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	92.9%
Gold Production (oz)	**7,986**	**53,507**	**60,506**	**61,792**	**58,492**	**46,179**	**47,604**	**336,066**

Note: summed amounts may not add due to rounding
*Q4 2022 denotes the period from November 1, 2022 to December 31, 2022

16.7 Underground Equipment Fleet, Xavantina Operations

The fleet of equipment currently in use at the Xavantina Operations as at the Effective Date, including equipment rentals, is shown in Table 68 and Table 69. The Xavantina Operations currently has all equipment needed to support the contemplated production plan as set forth in this Technical Report.

Table 68 - Fleet of equipment used for development and production in the lower levels of the underground mine at Xavantina

Category	Code/TAG	Type	Manufacturer	Model
Loading	LHD-01	Loader	Caterpillar	R1600G
	LHD-03	Loader	Caterpillar	R1600G
	CG-08	Loader	Caterpillar	950
	LHD 11	Loader	Caterpillar	R1600G
Rock Support and Infrastructure	BET-06	Concrete Mixer	Fiori	DB260SL
	BET-07	Concrete Mixer	Fiori	DB260SL
	PRJ-01	Shotcreet	Putzmeister	SPM 4210 wetkret
	PRJ-03	Shotcreet	Putzmeister	SPM 4210 wetkret
	RE-06	Backhoe loader	Caterpillar	120K
	RE-07	Backhoe loader	Caterpillar	120K
	MN-01	Motor Grader	Caterpillar	416E
	MN-01	Motor Grader	Caterpillar	416E
	PLT-20	telehandler	Manitou	MTX1041A
	PLT-21	telehandler	Manitou	MTX1041A
	PLT-22	telehandler	Manitou	MTX1041A
	PLT-23	telehandler	Manitou	MTX1041A
Drilling	JB-01	Jumbo	Atlas Copco	S1D
	JB-02	Jumbo	Atlas Copco	S1D
	JB-03	Jumbo Drill	Atlas Copco	Boomer 282
	JB-08	Jumbo Drill	Atlas Copco	Boomer 282
	JB-09	Jumbo Drill	Atlas Copco	Boomer 282

Table 69 - Fleet of equipment for Upper Levels of Santo Antônio mine

Category	Code/TAG	Type	Manufacturer	Model
Loading	LHD 12	LHD	Atlas copco	ST2G
	LHD 10	Loader	Sandvik	LH410
	Winch and Scraper - 01	Scraper	Bafotech	LF230 M (37 KW)
Rock Support	Stope Support Drill 01	Jackleg	Tornibras	TB 46WS-8
	Stope Support Drill 02	Jackleg	Tornibras	TB 303 HW
	Stope Support Drill 03	Jackleg	Tornibras	TB 303 HW
Drilling	Stoping Drill 01	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 02	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 03	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 04	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 05	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 06	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 07	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 08	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 09	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 10	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 11	Jackleg	Tornibras	TB 303 AM
	Stoping Drill 12	Jackleg	Tornibras	TB 303 AM

16.8 Dewatering

The dewatering infrastructure of the mine has been designed to collect water from within the underground mine. Water egress occurs primarily within the mining levels (quartz veins), as the country host rocks generally do not have properties that allow their fractures to connect. Within each level of the mine, water collection points (sumps), each using a Flygt pump with 15 or 30 horsepower, are installed. These pumps are designed to pump water into the main pumping boxes which are interconnected by 6-inch pipelines with a vertical spacing of 60 m. Each main pumping box has one or two Metso HM100 pumps with a pumping capacity of 100 m^3/h each. At the final collection point, particulate matter is removed from the collected water by decantation, enabling the water to be recycled and used in other parts of the mine including the processing plant. The total output of mine dewatering at the time of the Effective Date was 200 m^3/h.

Santo Antônio uses the Brás dewatering system, which is already in place. Water from lower levels will be drained to the pumping stations along the main ramp. The two primary panels on level -65 and level -170 will be dewatered by the pumping stations located on level -85 and level -200, respectively.

Table 70 - Dewatering infrastructure for Xavantina Operations

Level	Number of
217	3
155	3
93	3
36	3
-29	3
-85	3
-145	3
-200	1
-220	2
-270	1
-320	1
-340	1

16.9 Drilling and Blasting

The mechanized development is performed using Atlas Copco S1D and 282 jumbos, both with 14-foot drills. The holes drilled are 51 mm in diameter and 3.8 m in depth with one meter spacing and separation, regardless of the section size. Holes with a diameter of 102 mm are used to drill the free face.

Jackleg drilling is used for development and mining. Holes with a diameter of 40 mm are used for both loaded holes and free face holes. Drilling planes are spaced at 50 cm.

Production drilling and development drilling utilize the same equipment, in both the mechanized and jackleg mining processes. The pattern for production drilling consists of 51 mm holes drilled in a fan shape. Spacing and separation between the holes is 1.0 m and 0.8 m for mechanized drilling and for jackleg drilling respectively.

Rock blasting is performed with SENATEL MAGNAFRAG 38X600 1.5” x 24” cartridge explosives for mechanized mining, and with SENATEL MAGNAFRAG 1” x 24” cartridge explosives for jackleg mining. Ignition of explosives is done using BRINEL wires with timing delays ranging from 1 microsecond to 332 microseconds, distributed in an increasing order from the inside to the outside of the section. Other accessories used in the process include NP 5, NP 10 and NP60 detonating cord along with 2.5-meter No. 8 blasting caps. This configuration allows an average charge ratio of 1.35 kg/t to be defined.

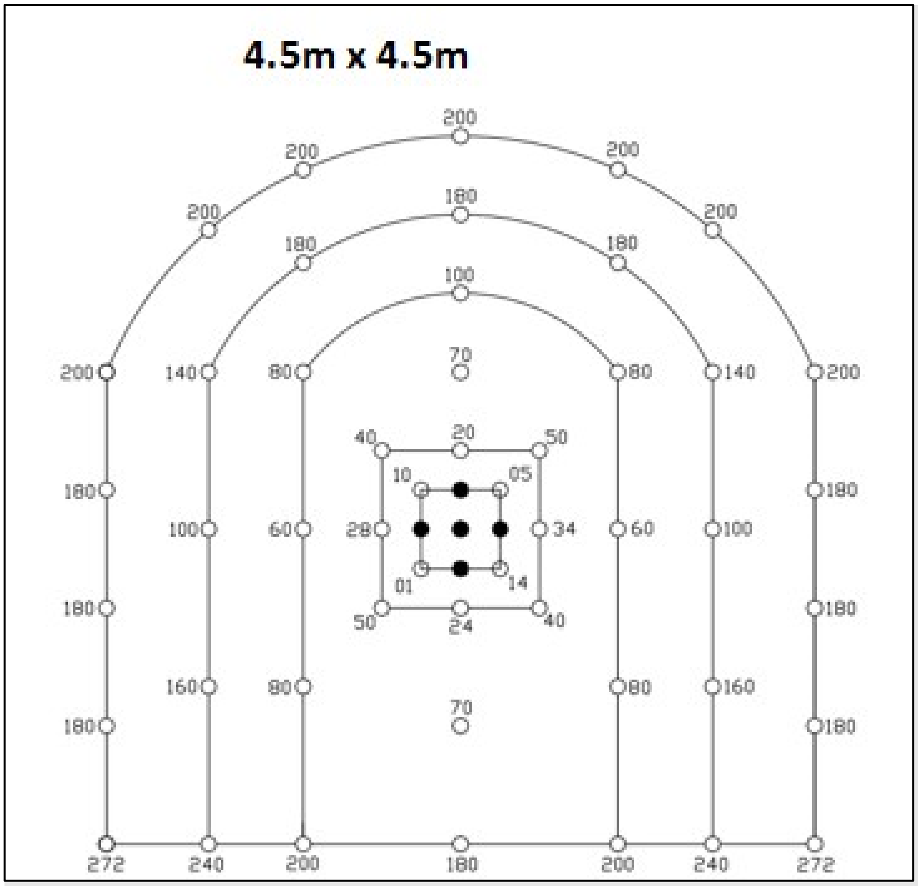

Figure 88 - Drill and blast plan for mine development

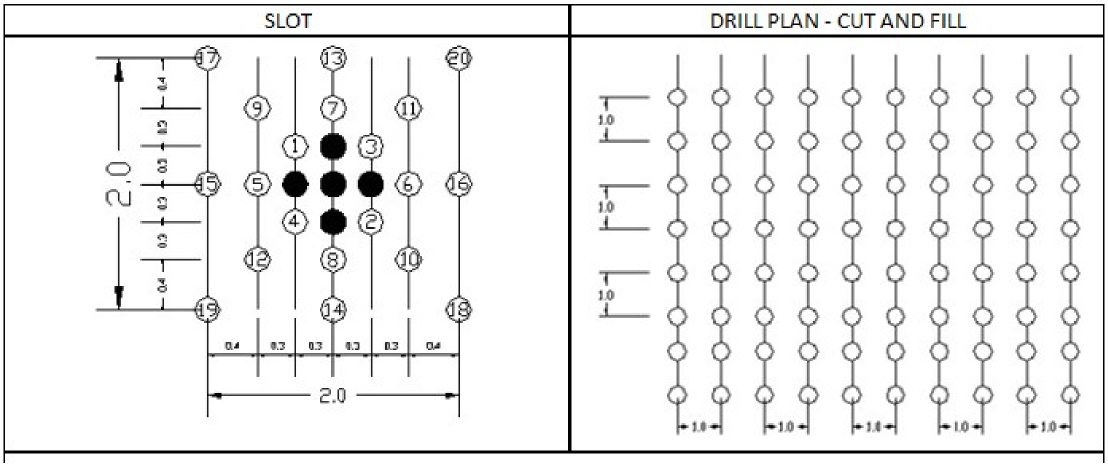

Figure 89 - Drill and Blast plan for cut-and-fill mining

Table 71 - Drilling equipment

Model	Fleet Size
Atlas Copco 282 Jumbo	3
Atlas Copco S1D Jumbo	2
Pneumatic hammer	12

Table 72 - Dimension and blast hole requirements of development mining

Development Face Dimension	Required blast holes
4.5m x 4.5m	61
4.0m x 4.5m	55
4.5m x 5.5m	70
2.2m x 1.8m	25
2.2m x 2.8m	35

16.10 Load and Dump

Loading and transportation of both ore and waste follow the same procedure. Loading is performed using LHDs with capacity of 3 m^3. Transportation is performed by 6 Mercedes 3131 trucks with a maximum capacity of 20 tonnes or 12 m^3.

Xavantina has active LHDs. At jackleg mining areas, loading and transportation are performed using small-sized LHDs, to move material to the stockpile area from where it is transported to the surface using LHDs and trucks.

Loading and hauling from the mine uses a system based LHD loaders and 20 tonne 6x4 trucks.

Table 73 - Loading and Dumping equipment

Loading equipment	
Model	**Fleet Size**
LHD Caterpillar R1600	3
Dumping equipment	
Mercedes 3131 Trucks	5

16.11 Ventilation and Emergency Exit

Currently, the main ventilation circuit is composed of five raises connecting the underground mine to the surface. This includes two exhaust raises and three intake raises. The current intake of fresh air into the mine is 155.4m^3/s.

To meet the current air demand, three exhaust fans with 150 hp motors are installed at the surface providing air flow of 45 m3/s at a static pressure of 1,500 Pa each. Secondary ventilation includes sixteen fans underground: ten with 100 hp motors, two with 75 hp motors, one with a 50 hp motor, and one with a 175 hp motor. Current consumption of electric power is on the order of 864 MWh/ month for the underground mine operations.

Emergency escapeways are located within the fresh-air intake raises and are interconnected down to level -315, and will continue to extend to depth throughout the life-of-mine. The Santo Antônio vein has two rescue chambers installed, one at level -70 and the other at level -270 as at the Effective Date.

16.12 Staff Table

The underground mine has a total of 234 staff on its roster, including 138 permanent employees and 96 third-party employees.

Table 74 - Underground mine staff

Company	Headcount
NX Gold S.A. Employees	138
Minere Ltda. Employees (mining contractor)	48
July Quartzo (ore and waste haulage)	48

16.13 Summary and Qualified Person's Opinion

After analyzing the documents and plans presented during a technical site visit to the site in September 2022, the authors of this Report make the following comments on the underground mining operations at Xavantina:

- The Xavantina Operations is a small operation (reaching a maximum of approximately 230,000 tonnes per annum as currently envisioned) with the possibility to increase production;

- Modifying factors and assumed productivity rates are based on actual operating performance within the Santo Antônio vein and can be applied as a guide to Matinha mining method within a high confidence level based on Xavantina's operating experience.
- The Matinha area should undergo additional studies to improve the knowledge related to the mining factors and geomechanical characterization;
- The selection of cut-and-fill mining method for the upper panel of the Santo Antônio vein is adequate given the nature of the deposit and geomechanical characterization work performed;
- The cemented paste fill to support the stability of hanging wall is considered a good industry practice, however, it is recommended to carry out of numerical modeling and stress-displacement analysis with finite element analysis to access stress redistribution and strength factors for both hanging wall and pillars, and evaluate the required support system; and,

17.0 RECOVERY METHODS

The Xavantina plant includes a conventional 3-stage crush; ball milling; centrifugal gravity concentration (Falcon); intensive cyanidation - ILR (GEKKO); hydrocyclones; flotation (rougher, scavenger and cleaner); pre-lime and CIL of the flotation concentrate; desorption (atmospheric pressure Zadra stripping); acid washing (before and after desorption); and smelting. The Nova Xavantina Plant has been in operation since 2012.

Currently, all units of the plant operate in 3 shifts for 24 hours per day, seven days per week. The crushing rate is 60 tph with fully capacity of 80 tph, and the grinding rate is 40.0 toph with full capacity of 45.0 tph. Average utilization is currently 36.5 for crushing and approximately 60.0% for grinding due to low mine feed. The plant has the capacity to process in excess of 300,000 tonnes of ore per year as compared to current maximum achieved rates of approximately 230,000 tonnes per year in the current life of mine plan.

The plant's operational staff currently includes 53 direct staff plus 27 more people for regular maintenance of mechanical and electrical parts. Overall plant recovery averages approximately 92%, with more than 75% of the gold is being recovered through gravity and ILR.

Ore feed into the Xavantina plant averages 12 g/t gold and 6 g/t silver. The ore of the Xavantina Operations contains high carbonaceous content of approximately 6% carbon. Due to the efforts of the processing team over the years, recovery through CIL at Xavantina has improved significantly over the years to current levels of approximately 93%, and is markedly higher than that of similar carbonaceous ores.

Following the plant there are two tailings ponds, one that receives the tailings from flotation, and another that receives tailings from CIL. The latter is coated with double layer of HDPE for natural degradation of residual cyanide, complemented by the addition of hydrogen peroxide in order to adjust cyanide levels as required. The tailings circuit is a closed loop with water loss only occurring through evaporation and in the residual moisture content of the tailings. Process water is supplied via pumping from the underground mine.

The current capacity of the CIL tailings pond is approximately 450,000 tonnes, sufficient for an estimated 16 years of operation and while the flotation tailings pond has storage capacity of 104,000 tonnes for about 8 months of operation. Thickened inert tails are routinely removed from the pond and used to reclaim the artisanal open pit mines within the Xavantina mining concession as well as deposited in a fully permitted dry tailings storage facility with sufficient capacity to meet the life-of-mine requirements. Figure 91 shows the characteristics and process flowsheet for both tailing dams.

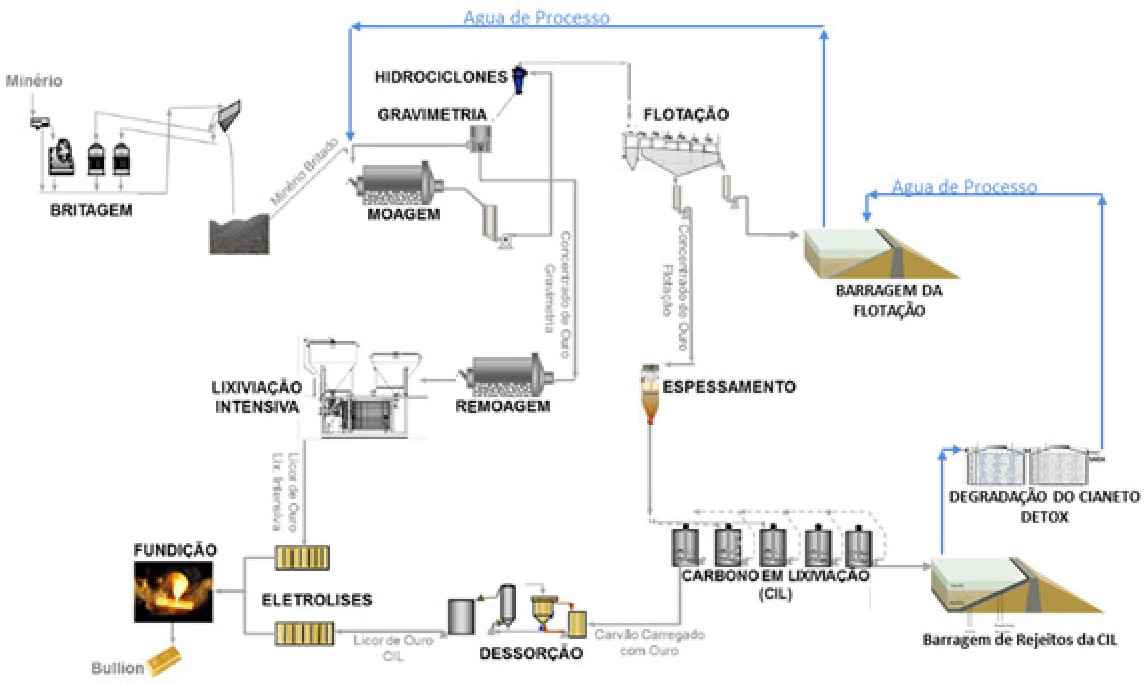

Figure 90 - Process flowsheet

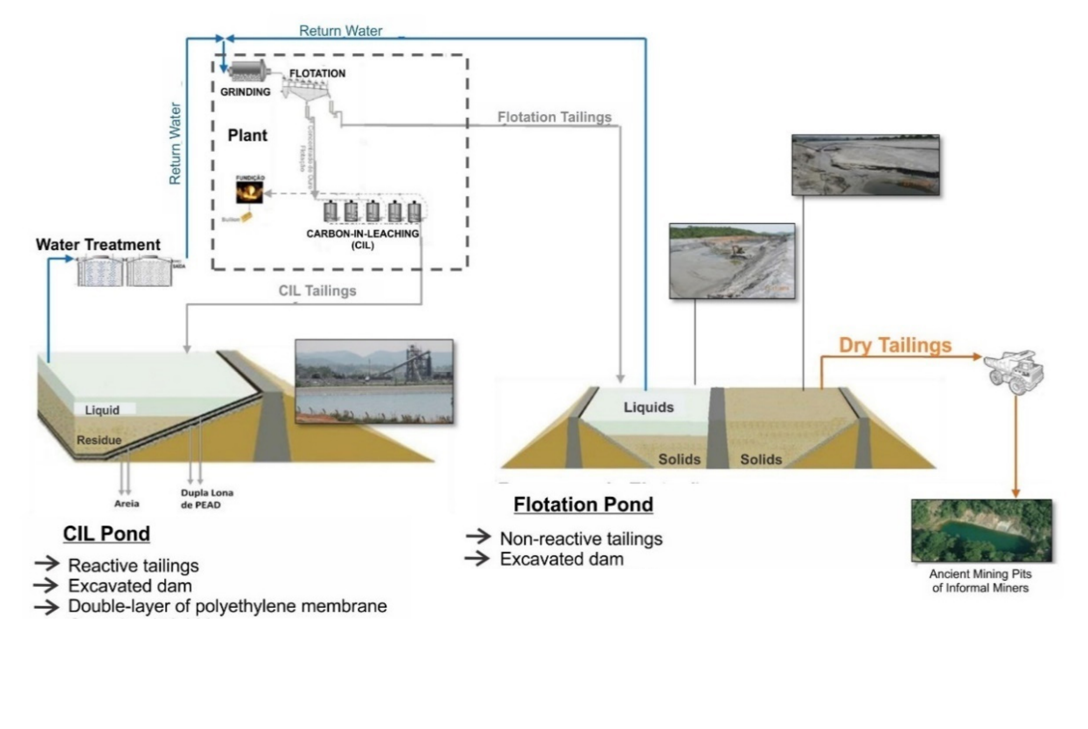

Figure 91 - Tailings disposal

17.1 Crushing

The nominal rate of the crushing unit is 80tph.

ROM material is transported by trucks from the underground mine and stored in surface buffer piles, with a storage capacity of 3,000 tonnes. From there it is taken up a loader to the feed hopper.

Using an apron feeder, the 100mm to 500mm coarse material is loaded into a Simplex SXBM 9060 jaw crusher with a closed-side setting ("CSS") of 60 mm for primary crushing. Undersize material (sub 60mm) is conveyed to the SIMPLEX SXPL 6024/2D double-deck classification screen, with mixed screening media using polyurethane and stainless steel, by a belt feeder for further separation of particle sizes of 22mm to 10mm.

Oversize fractions (greater than 20mm) and the fractions between 20mm and 10mm are conveyed to the secondary and tertiary cone crushers, respectively. The secondary cone crusher is a SIMPLEX SXBC 12194 CS with a CSS of 20mm, and the tertiary cone crusher is a SIMPLEX SXBC 12194 CC with a CSS of 12mm. Ore from secondary and tertiary crushers is discharged onto the first screening belt which closes the crushing circuit.

Undersized material (sub 10mm) with Bond Work Index of 22.4 kWh is placed on the second belt feeder to feed the ball mill.

Three operators per shift are required to operate the crushing unit (photo shown in Figure 92).

Figure 92 - Crushing Unit overview

17.2 Grinding

The nominal rate of the grinding unit is 40.0 tph. Grinding consists of a 12 ft by 19 ft, 1,044 kW ball mills (Figure 93), loaded with a 30% charge of medium chromium steel balls of up to 80 mm in diameter. The ball mill operates in a closed circuit with a 15-inch diameter hydro-cyclone. The circulating load within the milling circuit is approximately 400%.

Figure 93 - Ball mill overview

In the milling circuit, hydro-cyclone underflow passes through a 2mm aperture screen, with the oversize returning to the mill. Approximately one-third of underflow is used as feed for the Falcon centrifugal concentrator and the balance is returned to the mill. The Falcon centrifugal concentrator (Figure 94) operates at 60 G forces and in 16-minute-long cycles.

The daily production of gravity concentrate delivered into intensive cyanidation - IRL (GEKKO) (Figure 95) is 1,500 kg per batch (approximately 10 hours of operation). More than 80% of the gold is recovered during centrifugal concentration/IRL.

The feed grade of the Falcon concentrator typically averages 43.0 g/t gold, while the concentrate has an average grade of approximately 3,000 g/t gold.

Figure 94 - Falcon centrifugal concentrator overview

Figure 95 - Intensive cyanidation - IRL

Hydro-cyclone overflow with a target P_{80} of 150 microns is used as flotation feed after passing through a 1m x 1.5m vibrating screen with aperture of 1 mm.

17.3 Flotation

The flotation unit operation (Figure 96) consists of 3 rougher cells, 3 scavenger cells, and 1 cleaner circuit. Each cell is a FLSmidth tank cell with a volume of 10 m^3. Flotation feed averages approximately 2.5 g/t gold while the concentrate grade averages approximately 79 g/t.

Current flotation operations target a solids ratio of 30% by weight. Reagent dosages include 78 g/t of the collector potassium amyl xanthate and 0.016 L/t of Flomin as a frothing reagent. Flotation mass pull is approximately 2%, and gold recovery is approximately 76%. Tailings from flotation have a gold grade of approximately 0.4 g/t and are stored in the flotation pond.

The flotation concentrate is transferred to the CIL unit operation.

Figure 96 - Flotation Unit overview

17.4 Carbon-in-Leaching (CIL)

The CIL unit operation (Figure 97), which further processes the flotation concentrate, is comprised of a series of 7 agitating tanks, each with 12 m^3 of capacity. The first tank in the series is only used for a pre-lime step, with no carbon added, while the other five cells utilize carbon addition. Target carbon concentration in the 6 tanks is 10% by volume, and the calculated residence time in CIL is 60 hours.

Average gold feed grade is approximately 64 g/t compared to discharge grades of approximately 20 g/t, implying an average recovery of 64%, which is widely considered to be a good recovery level for the high-carbonaceous ores of the Xavantina Operations.

Loaded carbon with an average grade of 1,000 g/t is then pumped from the first CIL tank to the Desorption Unit. NaOH is used during the CIL process to control pH.

The concentration of cyanide contained in the slurry in the first tank approaches 1,200 ppm of CN, whereas the last tank has a concentration of 300 ppm. The slurry from the CIL process is then pumped to the respective tailings pond after passing through a small screen to ensure the retention of fine carbon. Typically, no additional detoxication steps are used in the procedure for cyanide degradation. Cyanide degradation occurs naturally through exposure to UV light in the tailings dam where concentrations of cyanide are within acceptable levels. When reusing water from the CIL tailings dam in the plant, a hydrogen peroxide system is used to ensure complete destruction of cyanide.

Figure 97 - CIL (Carbon-in-leach) Unit overview

17.5 Desorption, Electrowinning, Acid Washing, and Smelting

The desorption column has capacity for 2 tonnes of carbon, with three batches of desorption performed per week. The process applies Zadra stripping at atmospheric pressure. This consists of batch elution with 0.2% of NaCN and 2% of NaOH for a 16-hour period at 95 °C. Desorption is followed by acid washing at room temperature with 3% HCl followed by a final acid wash. There are three GEKKO Zadra electrowinning cells: two for processing the solution derived from intensive cyanidation unit operation ILR processing, and another for processing the desorption solution.

After electrowinning, the plated cathodes are removed and sent to the NX Gold Plant smelting unit operation where 25 litre crucibles are used to produce bullion that average 60% by mass gold and 30% silver. Borax, potassium nitrate, sodium carbonate, and silica are used as smelting fluxes.

17.6 Reagent, power and water use

The Xavantina Operations is an established operating mine for which average use and consumption metrics of key process inputs are readily available. The water usage is shown in Table 75. The operation at this stage is using no fresh water from the river, only freshwater makeup water are supplied from dewatering operations in the mine. The average consumption of freshwater is around 0.3 m^3/tonne treated and is aligned with best practice.

The power consumption of the mine is shown in Table 75. The power consumption per tonne treated has been stable since 2020 and was measured at 50.28 kWh/t from January 1, 2022 to the Effective Date of this Report. Power consumption averages approximately 9,500 MWh per annum.

Critical process reagents described in this chapter have been forecast using per tonne consumption metrics on a go-forward basis. The authors of this Report have not identified any material risks with the continued supply of water, power nor supply of reagents to support the continued operations of the mine.

Table 75 - Power and Water Usage

	2019	2020	2021	Jan 1, 2022 to Oct 31, 2022
Tonnes treated	154,351	162,642	171,581	167,672
Freshwater consumption (m^3)	52,034	54,829	57,842	55,666
Average power consumption per month (MWh)	1,000	802	797	843
Power consumption per annum (MWh)	12,000	9,624	9,564	8,430
Power consumption per tonne (kWh/t)	77.74	59.17	55.74	50.28

17.7 Process Plant Equipment and Simplified Plant Metrics

The equipment list for the process plant has been provided in Table 76 while a simplified information table on each of the process plant's key operating metrics at an assumed 10.0 gram per tonne feed has been provided in Table 77.

Table 76 - Processing Plant Equipment

PROCESSING EQUIPMENT		
Description	**Manufacturer**	**Function**
TC-06 CONVEYOR BELT	SIMPLEX	FEED TC-06
JAW PRIMARY CRUSHER	SIMPLEX	PRIMARY CRUSHING
CONE SECONDARY CRUSHER	SIMPLEX	SECONDARY CRUSHING
CONE TERTIARY CRUSHER	SIMPLEX	TERTIARY CRUSHING
DOUBLE-DECK INCLINED SCREEN	SIMPLEX	ORE CLASSIFICATION FROM 0 TO 8 MM
SPARE CYCLONE FEED PUMP	METSO	SLURRY PUMPING TO HYDROCYCLONES TRAIN
CLASSIFICATION HYDROCYCLONE	FLSMIDTH	CLASSIFICATION OF ORE FROM THE MILL
SPARE CLASSIFICATION HYDROCYCLONE	FLSMIDTH	CLASSIFICATION OF ORE FROM THE MILL
CENTRIFUGAL CONCENTRATOR	SEPRO	METAL CONCENTRATION OF UNDERFLOW SLURRY FROM HC
BALL MILL	METSO	ORE COMMINUTION
MAIN ENGINE OF BALL MILL	WEG	DRIVE BALL MILL
VIBRATORY SCREEN FOR OVERFLOW FROM HC	SIMPLEX	CLASSIFICATION OF OVERFLOW ORE FROM HC
VIBRATORY SCREEN FOR CENTRIFUGAL CONCENTRATOR	LUDOWICI	CLASSIFICATION OF UNDERFLOW ORE FROM HC
INTENSIVE LEACHING IRL	GEKKO	REACTOR FOR INTENSIVE LEACHING
ROUGHER FLOTATION CELL	FLSMIDTH	FLOTATION OF OVERFLOW MATERIAL FROM HC
ROUGHER FLOTATION CELL	FLSMIDTH	FLOTATION OF OVERFLOW MATERIAL FROM HC
ROUGHER FLOTATION CELL	FLSMIDTH	FLOTATION OF OVERFLOW MATERIAL FROM HC
ROUGHER FLOTATION CELL	FLSMIDTH	FLOTATION OF OVERFLOW MATERIAL FROM HC
ROUGHER FLOTATION CELL	FLSMIDTH	FLOTATION OF OVERFLOW MATERIAL FROM HC
ROUGHER FLOTATION CELL	FLSMIDTH	FLOTATION OF OVERFLOW MATERIAL FROM HC
ROUGHER FLOTATION CELL	FLSMIDTH	FLOTATION OF OVERFLOW MATERIAL FROM HC
SAFETY SCREEN	NX GOLD	CLASSIFICATION AND RECOVERY OF LOADED CARBON FROM CIL TAILINGS
CIL TANK 01	NX GOLD	STORAGE OF MATERIAL IN ACTIVATED CARBON LEACHING
CIL TANK 02	NX GOLD	STORAGE OF MATERIAL IN ACTIVATED CARBON LEACHING
CIL TANK 03	NX GOLD	STORAGE OF MATERIAL IN ACTIVATED CARBON LEACHING
CIL TANK 04	NX GOLD	STORAGE OF MATERIAL IN ACTIVATED CARBON LEACHING
CIL TANK 05	NX GOLD	STORAGE OF MATERIAL IN ACTIVATED CARBON LEACHING

Table 77 - Simplified Key Operating Metrics

PLANT INFORMATION CHART	
Rate	**(tph)**
Crushing	60
Grinding	40
Current Utilization	**(%)**
Crushing	37
Grinding	60
Unit operation (average gold grade)	**(g/t)**
Plant Feed	10.00
Gravity concentrate	3,000
Flotation Feed	2.70
Flotation Concentrate	79.00
Flotation Tailings	0.40
CIL Tailings	20.00
Loaded carbon	1,000
Recovery	**(%)**
Gravity and IRL	>75
Flotation	~76
CIL	~64
Overall	**~92**
CN Concentration	**(ppm)**
CIL Feed	1,200
Dam Discharge	300
Recycled water	<0.005
Flotation Mass (%)	**2.0**
CIL Feed Rate (tph)	**0.9**
CIL Feed Flux (m^3/h)	**1.2**
Cyanidation Residence Time (h)	**60**

18.0 INFRASTRUCTURE

The facilities at the Xavantina Operations include the mine portal, the Nova Xavantina Plant, tailings storage, mechanical workshop, administrative offices, metallurgical laboratory, security gate and guard facilities, medical clinic, cafeteria and gravel airstrip used to fly out doré bars after production. Please refer to Figure 3 for the layout of the Xavantina Operations.

National electrical service is available on site from the town of Nova Xavantina, located approximately 18 km from the Xavantina Operations. Water in sufficient quantities to support mining and processing operations is sourced from mine dewatering and a fully permitted groundwater well located on the property.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Market Studies

Ero Copper presently sells gold, and silver as a by-product, from its Xavantina Operations. As such, the Company has not conducted any formal marketing studies for future gold production from its operations. The Xavantina Operations currently sell gold to a preferred customer. During the first nine months of 2022, the average realized selling price for gold was US$1,827 per troy ounce.

The profitability and cash flow from the Xavantina Operations largely depend on the price of gold. As a result, the financial performance of the Xavantina Operations has been and will likely continue to be closely linked to gold prices. Mineral Reserves have been determined at a price of $1,650 per troy ounce. Gold and silver prices have experienced significant fluctuations in recent months and years. Table 78 displays the spot gold and silver prices as of October 31, 2022, along with the average prices for the previous two and five years.

Table 78 - Gold and Silver Prices

Metal	Unit	Spot(1)	Two-Year Avg.	Five-Year Avg.
Gold	($/oz)	$1,635	$1,808	$1,590
Silver	($/oz)	$19.17	$23.65	$19.6817.30

1. Spot pricing as of October 31, 2022

19.2 Contracts

Although the gold produced by the Xavantina Operations is currently sold to a preferred customer, gold and silver are widely produced precious metals in Brazil, offering numerous refining and sales options.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL IMPACT

20.1 Environment and Permitting

The Xavantina Operations is a fully permitted gold mine currently in operation. An environmental action program was developed for the Company prior to the mine reaching commercial production. The Company follows the guidelines set forth in the program to reduce its impact and recover impacted areas within the vicinity of the mine. Xavantina adheres to a program of frequent environmental monitoring including water quality control, as well as re-vegetation of historic artisanal mining areas that pre-date the Company. As part of its preventive environmental management methods, Xavantina manages all of its waste with an emphasis on proper segregation, storage, transport, and disposal at the end of the life cycle. All waste is delivered to a licensed facility.

The tailings that are not utilized in the mining fronts are internally stored in structures built and designed specifically with this function in mind. Xavantina regularly has a third party examine and audit how these disposition structures are run and managed. Independent reviews have and continue to confirm the stability of the company’s tailings structures.

Xavantina focuses on the reduction of the usage of freshwater and on the recirculating techniques in terms of water management. Moreover, Xavantina runs routine environmental monitoring campaigns to check on the effluents, groundwater, and river water quality.

NX Gold is situated at the Cerrado Biome, sometimes referred as the Brazilian savannah, it is regarded as the second-largest biome in Brazil and one of the biologically diverse savannah ecosystems in the entire globe. There were already artisanal mining operations taking place at the location before the Xavantina Operations commenced. On surrounding properties, the Company has been offering professional assistance for the environmental rehabilitation of regions affected by previous artisanal mining. Using seedlings of native Cerrado species grown in its own nursery, it maintains a program for revegetation and monitoring of degraded regions, maximizing the recovery of impacted areas.

Operations carried out at NX Gold are fully covered by environmental licenses issued by the Mato Grosso State Secretariat for the Environment (SEMA). The first licensing was to obtain the Environmental Preliminary License approved in 2007, based on the Environmental Impact Study (EIA; 296438/2007) and the Environmental Impact Report (RIMA; 296438/2007). The subsequent permit named Installation License was authorized in 2008 after the Environmental Control Plan (PCA;217586/2008) was approved. Subsequently completing the environmental and social programs and controls required by SEMA, and the conclusion of the mine's implementation, NX Gold received the Operating License in 2011, valid for 3 years. This permit was successively renewed in 2014, 2018, and 2021. The Operation License is valid until February 4, 2024. The controls, conditions, and environmental and social programs report required by the Operation License is periodically presented to SEMA.

Subsequent key environmental permits received following receipt of the Operating License are listed below and remain in good standing:

- Aerodrome permit: Obtained in 2016 and renewed in 2019 and 2021 and remains valid until December 19, 2026

- Waste and waste treatment plant permit: Obtained in 2020 and is effective until March 18, 2023. Upon approval of SEMA's Technical Opinion (PT 132963-CMIN-SUIMIS-2020), the operation of this treatment plant was transferred to the main Operating License for Xavantina

- Surface water withdrawal permit: Obtained through the publication of Permit No. 086 on February 8, 2022 and remains valid until November 5, 2028

- Groundwater withdrawal permit: Obtained through the publication of Permit No. 016 on January 13, 2022 and remains valid until January 9, 2024

- Fuel station permit: Obtained on March 5, 2021 and remains valid until September 13, 2027.

The mine’s closure plan, adapted to the current social and environmental context within the area of the Xavantina Operations, has been designed to maximize the physical, chemical, biological, and socio-economic stability of the area after mining activities have concluded. The current estimated reclamation liabilities are approximately R$38.7 million BRL.

20.2 Social or Community Impact

Xavantina actively maintains excellent relationships with stakeholders of the Nova Xavantina municipality, including community members, social organizations, local government, and landowners near the operation. The company actively takes part in initiatives supported by regional stakeholders for waste collection, river preservation, educational events, social inclusion, and equity. Every year, Xavantina promotes the Sustainability Gymkhana, which involves schools in Nova Xavantina, focused on raising awareness of environmental issues and educating local schools on environmental best practices.

Xavantina donates both time and money to a local organization that supports vulnerable youth, contributing to the growth of skills and competencies (arts, music, seedling production, recycling, cooking workshops, events, and local sports teams).

Through royalties and taxes, the Xavantina Operations provide significant economic contribution to the region. Xavantina prioritizes hiring locals and supports both direct and indirect employment.

21.0 CAPITAL AND OPERATING COSTS

21.1 Introduction

The capital and operating costs outlined in Chapter 21 correspond to the Mineral Reserves LOM Production Plan as outlined in Chapter 16 of this Report. The capital and operating cost estimates were prepared based on operating performance of the Xavantina operation.

The Authors reviewed the capital and operating cost estimates prepared by Xavantina and found them to be in accordance with industry norms, and sufficient for use in support of the current Mineral Reserve estimate.

21.2 Capital Cost Estimates

The total capital cost estimate for the Mineral Reserve LOM Production Plan is approximately US$53.1M and is based on supporting the requirements for the mining and processing operations of the current Mineral Reserves over the 6-year estimated operating life of the Xavantina Operations. Total capital investments include capitalized mine development as well as ongoing sustaining capital requirements. Capital cost projections are based upon vendor quotes and management estimates incorporating historical operating data and previously supplied quotes from the current operations. Capital expenditure estimates reflect the total cost for developing and extracting the current Mineral Reserves included in the Mineral Reserve LOM Production Plan. Total estimates by category are presented in USD in Table 79.

Table 79 - Total LOM Capital Expenditure Estimate

Category	LOM Total (USD 000s)*
UG Mine Development	22,516
Infrastructure	17,528
Safety & Environment	5,337
UG Equipment	2,464
Other Capital Costs	5,222
Total Capital Cost	**53,067**

*BRL amounts converted to USD at a USD:BRL foreign exchange ratio of 5.29.

The capital cost breakdown can be described as follows:

- Underground capitalized development includes underground horizontal development required to access the Santo Antônio and Matinha orebodies
- Capitalized infrastructure includes all pumping, electrical, civil and mechanical works to expand and sustain the underground operations and processing facility.
- Underground equipment costs include all costs related to purchases of mobile equipment necessary for development and extraction of ore.
- Safety and environmental costs include all requirements for mine, tailings and waste dump recoveries, licensing and permitting expenditures, and safety investments

(refuge chambers, materials, escape ways, fire suppression systems, and other protection systems).

- Other capital consists primarily of equipment rebuilds and ongoing reclamation work.
- Capital costs do not include project financing and interest charges, working capital, or capitalized exploration.

21.3 Operating Cost Estimates

An operating cost model was generated based on actual historic operating performance at the Xavantina Operations, utilizing specific consumption coefficients based on operational data. Cost estimates are built using first principles incorporating both fixed and variable components to account for production rate variations. Costs were adjusted annually based on the changes to ore sources including rock support, transport, and infrastructure requirements.

Underground mining costs consist of the operational costs related to ore extraction at the Xavantina Mine. Direct mining costs include drilling, blasting, and mucking. Indirect costs include ore and waste transport and mine services.

Processing costs include salaries, operating materials, and power.

The operating cost estimates rely on the following assumptions:

- The specific consumption coefficients for all consumables for mining and processing were analyzed based on historical usage over the last 24 months and projected forward incorporating changes in the production plan, as well as continuous improvement projects, assuring alignment with the mine production and capital improvement projects.
- Power costs were calculated based on power capacity load of each equipment and area, considering the availability, utilization, and power factor. The prices were based on the existing contract for demand and supply.
- General and administrative (G&A) costs consider supporting functions for the mine, such as human resources, accounting, HSEC, IT, general services, security and procurement. It also includes sales expenses related to assaying, insurance, other sales related expenditures and administrative expenses related to sale of doré.
- Contractor costs are based on existing contracts, where the most relevant costs are related to the underground mining contract. The costs for the mining contract were calculated considering contract rates, mining productivity, and necessary working hours to support the mine plan, including fixed contract costs.

Table 80 - Average LOM Operating Costs

Cost Parameter, Average LOM	Cost in BRL
Mining Cost *(BRL per tonne mined)*	448.32
Processing Cost *(BRL per tonne processed)*	246.87
Operational Support Costs *(BRL per tonne processed)*	111.73
G&A Cost *(BRL per tonne processed)*	125.55

22.0 ECONOMIC ANALYSIS

Financial information has been excluded as Ero Copper is a producing issuer, as such term is defined under NI 43-101. The Xavantina Operations are currently in production and no material expansion of operations is currently planned.

23.0 ADJACENT PROPERTIES

There are no relevant adjacent properties to the Xavantina Operations.

24.0 OTHER RELEVANT DATA AND INFORMATION

There is no other relevant data available regarding the Xavantina Operations.

25.0 INTERPRETATION AND CONCLUSIONS

The authors of this Report have carried out a review and assessment of the material technical issues that could influence the future performance of the Xavantina Operations and classified the Mineral Resource and Mineral Reserve estimates. The authors found that the procedures and processes adopted by Xavantina personnel to produce the geological models were executed according to proper industry standards. Sampling, QA/QC, security and data control were similarly in line with industry best practices and support the current Mineral Resource and Mineral Reserve estimate.

A 3D model for mineralization was developed for the Xavantina Operations using Leapfrog Geo 5.1 software based on drill hole and channel sampling constrained to grades above 1.20 gpt gold. This grade was selected based on reasonable prospect for economic extraction considering the current mining methods and operational history of the mine.

The authors note the following:

a. NX Gold holds the surface rights and permits required to conduct the mining operation as outlined in the Mineral Reserve estimate. Future development beyond the stated Mineral Reserves may require the acquisition of additional surface rights;

b. The Mineral Resource estimate methods adopted by Xavantina and the resultant models were executed according to industry standards and support the current Mineral Resource and Mineral Reserve estimate.

c. The Xavantina Operations are small (reaching a maximum of approximately 230,000 tonnes per annum as currently envisioned) with the possibility to increase production;

d. Modifying factors and assumed productivity rates are based on actual operating performance within the Santo Antônio vein and can be applied as a guide to Matinha mining method within a high confidence level based on Xavantina's operating experience.

e. The Matinha area should undergo additional studies to improve the knowledge related to the mining factors and geomechanical characterization;

f. The selection of the cut-and-fill mining method for the upper panel of the Santo Antônio vein is adequate given the nature of the deposit and geomechanical characterization work;

g. The design of the paste fill system for the Xavantina Operations is adequate for the Report at feasibility level and provides support for the current Mineral Reserves and life of mine production plan.

h. The authors have carried out the appropriate review to satisfy that the Mineral Reserve can be technically and profitably extracted. Consideration has been given to all technical areas of the operations, the associated capital and operating costs, and relevant factors including marketing, permitting, environmental, land use and social factors. The authors are satisfied that technical and economic feasibility has been demonstrated.

i. The authors have not identified any known mining, metallurgical, infrastructure, permitting, legal, political, environmental or other relevant factors that could materially affect the development or extraction of the stated Mineral Reserves.

26.0 RECOMMENDATIONS

Regarding the Mineral Resource and Mineral Reserve estimation process, and to continue to ensure the continuity of mining operations, the authors recommend a work program that includes the following:

- Despite the high variability of gold grades in duplicate samples, results are inside acceptable limits. It is recommended that a study be performed to determine if the variability for field duplicates is an expected characteristic of the deposit or if reference values should be revised.
- The Santo Antônio target remains open at depth. It is recommended that Xavantina conduct a new drilling campaign to test the extension and continuity of mineralization at depth.
- The Xavantina Operations should continue to undertake additional infill drilling campaigns to upgrade the classification of Mineral Resources of the Matinha vein.
- Undertake new drill programs to evaluate the potential of regional exploration targets.
- Geomechanical characterization work should continue to be carried out on an ongoing basis to support mining operations, mine design and update geotechnical support requirements. It is recommended that numerical modeling and stress-displacement analysis be performed to assess stress redistribution and strength factors for both hanging wall and pillars.
- It is recommended that Xavantina conduct additional studies focused on the recovery of pillars included in the Mineral Reserve estimate.
- Xavantina uses a higher cut-off grade for cut and fill mining areas. It is recommend that Xavantina perform a study to better define costs in cut and fill areas to support the cut-off grade.

The hanging wall of the deposit, in the opinion of the authors of this Report, has been demonstrated competent enough the selected mining methods with support implemented as designed. GE21 recommends the Company undertake a third-party geotechnical study to further evaluate the potential of reducing sill pillar thickness with the aim of increasing

A summary of the proposed work program aimed at increasing the current Mineral Resource and Mineral Reserves of the property is detailed in table below.

Table 81 - GE21 Recommended Work Program

Program	Budget (US$)
Duplicate sample study	$20,000
Down-plunge exploration drill program in Santo Antônio vein	$5,000,000
Infill Exploration drill program in the Matinha vein	$3,000,000
Potential evaluation on other exploration targets including drill program	$2,000,000
Additional studies regarding the recovery of the pillars	$20,000
Study to refine cut-off-grade values for cut and fill areas	$20,000
Geomechanical numerical modeling and stress-displacement analysis with finite elements	$100,000
Total	**$10,160,000**

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Effective Date: October 31, 2022

Report Date: May 12, 2023

<signed & sealed in the original>

Porfirio Cabaleiro Rodriguez, FAIG

<signed & sealed in the original>

Leonardo de Moraes Soares, MAIG

<signed & sealed in the original>

Guilherme Ferreira Gomides, MAIG

APPENDIX A

Technical Report QP Certificates

I, Porfirio Cabaleiro Rodriguez, FAIG, (#3708), as an author of the technical report titled "Technical Report on the Xavantina Operations, Mato Grosso, Brazil", dated May 12, 2023 with an effective date of October 31, 2022 (the "Technical Report"), prepared for Ero Copper Corp. (the "Issuer"), do hereby certify that:

1. I am a Mining Engineer and Director for GE21 Consultoria Mineral Ltda., which is located on Avenida Afonso Pena, 3130, 12th floor, Savassi, Belo Horizonte, MG, Brazil - CEP 30130-910.

2. I am a graduate of the Federal University of Minas Gerais, located in Belo Horizonte, Brazil, and hold a Bachelor of Science Degree in Mining Engineering (1978). I have practiced my profession continuously since 1979.

3. I am a Professional enrolled with the Australian Institute of Geoscientists ("AIG") - ("FAIG") #3708.

4. I am a professional Mining Engineer, with more than 42 years' relevant experience in Mineral Resource and Mineral Reserves estimation, which includes numerous mineral properties in Brazil, including gold properties.

5. I have read the definition of "qualified person" set out in National Instrument 43-101 - *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association as defined in NI 43-101, and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

6. I have supervised the preparation of the Technical Report. I am responsible for Chapters 13, 17, 18, 19, 20, 21, 22, 23, and jointly responsible for Chapters 16, 24 and 27. I am also responsible for the corresponding sections within Chapters 1, 25 and 26 that are related to the foregoing Chapters of this Technical Report.

7. I have had prior involvement with the property that is the subject of this Technical Report as an author of the independent technical report titled "Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina", dated January 21, 2019 with an effective date of August 31, 2018, as an author of the technical report titled "Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina", dated February 3, 2020 with an effective date of September 30, 2019, and as an author of the technical report titled "Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina", dated January 8, 2021 with an effective date of September 30, 2020, prepared for the Issuer. The relationship with the Issuer was solely for professional works in exchange for fees based on rates set by commercial agreement. Payment of these fees is in no way dependent on the results of the Technical Report.

8. I personally inspected the property that is the subject of this Technical Report from the 28th to 30th of September, 2020; 18th to 19th of September, 2019; and 17th to 18th of September, 2018.

9. As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the sections of the Technical Report that I have authored and

am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

10. I have no personal knowledge, as of the date of this certificate, of any material fact or material change which is not reflected in this Technical Report.

11. I am independent of the Issuer, applying all the tests in section 1.5 of NI 43-101.

12. I have read NI 43-101 and Form 43-101F1 - Technical Report, and the Technical Report has been prepared in compliance with such instrument and form.

Belo Horizonte, Brazil, May 12, 2023

<signed & sealed in the original>

Porfírio Cabaleiro Rodriguez, FAIG

I, Leonardo de Moraes Soares, MAIG (#5180), as an author of the technical report titled "Technical Report on the Xavantina Operations, Mato Grosso, Brazil", dated May 12, 2023 with an effective date of October 31, 2022 (the "Technical Report"), prepared for Ero Copper Corp. (the "Issuer"), do hereby certify that:

1. I am a Geologist for GE21 Consultoria Mineral Ltda., which is located on Avenida Afonso Pena, 3130, 12th floor, Savassi, Belo Horizonte, MG, Brazil - CEP 30130-910.

2. I am a graduate of the Federal University of Minas Gerais, located in Belo Horizonte, Brazil, and hold a Bachelor of Science Degree in Geology (2002). I have practiced my profession continuously since 2002.

3. I am a Professional enrolled with the Australian Institute of Geoscientists ("AIG") - ("MAIG") #5180.

4. I am a professional Geologist, with more than 21 years' relevant experience in Mineral Resource and Mineral Reserves estimation, which includes numerous mineral properties in Brazil, including gold properties.

5. I have read the definition of "qualified person" set out in National Instrument 43-101 - Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association as defined in NI 43-101, and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

6. I am responsible for Chapters 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 14 and jointly responsible for Chapters 24 and 27. I am also responsible for the corresponding sections within Chapters 1, 25 and 26 that are related to the foregoing Chapters of this Technical Report.

7. I have had prior involvement with the property that is the subject of this Technical Report as an author of the independent technical report titled "Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina", dated January 21, 2019 with an effective date of August 31, 2018, as an author of the technical report titled "Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina", dated February 3, 2020 with an effective date of September 30, 2019, and as an author of the technical report titled "Mineral Resource and Mineral Reserve Estimate of the NX Gold Mine, Nova Xavantina", dated January 8, 2021 with an effective date of September 30, 2020, prepared for the Issuer. The relationship with the Issuer was solely for professional works in exchange for fees based on rates set by commercial agreement. Payment of these fees is in no way dependent on the results of the Technical Report.

8. I personally inspected the property that is the subject of this Technical Report from the 27th to 28th of September, 2022; 18th to 19th of September, 2019; 14th to 18th of May, 2018; and 19th to 22nd of February, 2018.

9. As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the sections of the Technical Report that I have authored and

am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

10. I have no personal knowledge, as of the date of this certificate, of any material fact or material change which is not reflected in this Technical Report.

11. I am independent of the Issuer, applying all the tests in section 1.5 of NI 43-101.

12. I have read NI 43-101 and Form 43-101F1 - Technical Report, and the Technical Report has been prepared in compliance with such instrument and form.

Belo Horizonte, Brazil, May 12, 2023

<signed & sealed in the original>

Leonardo de Moraes Soares, MAIG

Guilherme Gomides Ferreira, MAIG

I, Guilherme Gomides Ferreira, MAIG (#7586), as an author of the technical report titled "Technical Report on the Xavantina Operations, Mato Grosso, Brazil", dated May 12, 2023 with an effective date of October 31, 2022 (the "Technical Report"), prepared for Ero Copper Corp. (the "Issuer"), do hereby certify that:

1. I am a Mining Engineer for GE21 Consultoria Mineral Ltda., which is located on Avenida Afonso Pena, 3130, 12th floor, Savassi, Belo Horizonte, MG, Brazil - CEP 30130-910.

2. I am a graduate of the Federal University of Minas Gerais, located in Belo Horizonte, Brazil, and hold a Bachelor of Science Degree in Mining Engineering (2005). I have practiced my profession continuously since 2005.

3. I am a Professional enrolled with the Australian Institute of Geoscientists ("AIG") - ("MAIG") #7586.

4. I am a professional Mining Engineer, with more than 17 years' relevant experience in Mineral Resource and Mineral Reserves estimation, which includes numerous mineral properties in Brazil, including gold properties.

5. I have read the definition of "qualified person" set out in National Instrument 43-101 - Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association as defined in NI 43-101, and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

6. I am responsible for Chapter 15 and jointly responsible for Chapters 16, 24 and 27. I am also responsible for the corresponding sections within Chapters 1, 25 and 26 that are related to the foregoing Chapters of this Technical Report.

7. I have no prior involvement with the property that is the subject of this Technical Report.

8. I personally inspected the property that is the subject of this Technical Report from the 27th to 28th of September, 2022.

9. As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the sections of the Technical Report that I have authored and am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

10. I have no personal knowledge, as of the date of this certificate, of any material fact or material change which is not reflected in this Technical Report.

11. I am independent of the Issuer, applying all the tests in section 1.5 of NI 43-101.

12. I have read NI 43-101 and Form 43-101F1 - Technical Report, and the Technical Report has been prepared in compliance with such instrument and form.

Belo Horizonte, Brazil, May 12th, 2023

<signed & sealed in the original>

Guilherme Gomides Ferreira, MAIG