Technical Report on the Turmalina Mining Complex, Minas Gerais, Brazil Report for NI 43-101

Jaguar Mining Inc.

SLR Project No: 233.03422.R0000

Effective Date:
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Signature Date:
March 31, 2022

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SLR

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CONTENTS

1.0 SUMMARY 1-11
1.1 Executive Summary 1-11
1.2 Economic Analysis 1-16
1.3 Technical Summary 1-16

2.0 INTRODUCTION 2-1
1.1 Sources of Information 2-1
2.1 List of Abbreviations 2-4

3.0 RELIANCE ON OTHER EXPERTS 3-1

4.0 PROPERTY DESCRIPTION AND LOCATION 4-2
4.1 Mineral Tenure 4-2
4.2 Mineral and Surface Rights in Brazil 4-9

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY 5-1
5.1 Accessibility 5-1
5.2 Climate 5-1
5.3 Vegetation 5-1
5.4 Soil Aspects 5-2
5.5 Local Resources 5-2
5.6 Infrastructure 5-2

6.0 HISTORY 6-1
6.1 Historical Resource Estimates 6-1
6.2 Past Production 6-1

7.0 GEOLOGICAL SETTING AND MINERALIZATION 7-1
7.1 Regional Geology 7-1
7.2 Local Geology 7-3
7.3 Property Geology 7-24
7.4 Mineralization and Individual Orebodies 7-29

8.0 DEPOSIT TYPES 8-1

9.0 EXPLORATION 9-1
9.1 Summary 9-1
9.2 Faina Deposit 9-2
9.3 Pontal Deposits 9-2
9.4 Zona Basal Target 9-0

10.0 DRILLING ... 10-1
10.1 Summary ... 10-1
10.2 Turmalina Mine ... 10-3
10.3 Faina Deposit ... 10-15
10.4 Pontal Deposits ... 10-16
10.5 Zona Basal Target ... 10-18

11.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY ... 11-1
11.1 Sampling ... 11-1
11.2 Sample Preparation and Analysis ... 11-2
11.3 Quality Assurance and Quality Control ... 11-3

12.0 DATA VERIFICATION ... 12-1

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING ... 13-1
13.1 Introduction ... 13-1
13.2 Turmalina Mine Metallurgical Tests ... 13-1
13.3 Faina, Pontal, and Orebody D Testing Programs ... 13-8

14.0 MINERAL RESOURCE ESTIMATE ... 14-1
14.1 Summary ... 14-1
14.2 Turmalina Deposit ... 14-2
14.3 Faina Deposit ... 14-32
14.4 Pontal Deposits ... 14-36

15.0 MINERAL RESERVE ESTIMATE ... 15-1
15.1 Summary ... 15-1
15.2 Dilution and Extraction ... 15-3
15.3 Cut-Off Grade ... 15-3

16.0 MINING METHODS ... 16-1
16.1 Mine Design Parameters ... 16-4
16.2 Mining Method ... 16-5
16.3 Geomechanics ... 16-9
16.4 Ground Support ... 16-16
16.5 Mine Infrastructure ... 16-16
16.6 Personnel ... 16-21
16.7 Mining Equipment ... 16-22
16.8 Life of Mine Plan ... 16-25

17.0 RECOVERY METHODS ... 17-1
17.1 Crushing and Screening ... 17-1
17.2 Grinding, Classification and Thickening ... 17-1

17.3 Leaching Circuit 17-2
17.4 Adsorption Circuit 17-2
17.5 Elution and Electrowinning 17-2
17.6 Acid Washing 17-3
17.7 Detoxification Plant 17-3
17.8 Filter and Paste Fill Plant 17-3
17.9 Energy, Water, and Process Materials Requirements 17-4
17.10 Manpower 17-4

18.0 PROJECT INFRASTRUCTURE 18-1

19.0 MARKET STUDIES AND CONTRACTS 19-1

19.1 Markets 19-1
19.2 Contracts 19-1

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT 20-1

20.1 Environmental Studies 20-1
20.2 Project Permitting 20-1
20.3 Social or Community Requirements 20-5
20.4 Mine Closure Requirements 20-6

21.0 CAPITAL AND OPERATING COSTS 21-1

21.1 Capital Costs 21-1
21.2 Operating Costs 21-2

22.0 ECONOMIC ANALYSIS 22-1

23.0 ADJACENT PROPERTIES 23-1

24.0 OTHER RELEVANT DATA AND INFORMATION 24-1

24.1 Faina and Pontal Deposits 24-1

25.0 INTERPRETATION AND CONCLUSIONS 25-1

25.1 Geology and Mineral Resources 25-1
25.2 Mining and Mineral Reserves 25-1
25.3 Metallurgy and Processing 25-2
25.4 Infrastructure 25-2
25.5 Environment 25-3

26.0 RECOMMENDATIONS 26-1

26.1 Geology and Mineral Resources 26-1
26.2 Mining and Mineral Reserves 26-2
26.3 Mineral Processing 26-3
26.4 Environment 26-3

27.0 REFERENCES 27-1

28.0 DATE AND SIGNATURE PAGE 28-1

29.0 CERTIFICATE OF QUALIFIED PERSON 29-1

29.1 Reno Pressacco 29-1
29.2 Dorota El-Rassi 29-3
29.3 Renan G. Lopes 29-4
29.4 Pierre Landry 29-5
29.5 Stephan R. Blaho 29-6
29.6 Jeff Sepp 29-7
29.7 Brenna J.Y. Scholey 29-8

TABLES

Table 1-1: Summary of Total Mineral Resources – December 31, 2021 1-20
Table 1-2: Mineral Reserve Estimate – Turmalina Mine - December 31, 2021 1-21
Table 1-3: LOM Capital Cost Summary 1-24
Table 1-4: LOM Operating Costs 1-25
Table 2-1: Listing of SLR Qualified Persons 2-3
Table 4-1: Summary of Active Mineral Rights Holdings 4-2
Table 4-2: Summary of Mineral Royalties, Concession No. 812.003/1975 4-3
Table 4-3: Summary of Surface Rights Holdings 4-4
Table 6-1: Production History and Mill Recovery 6-2
Table 7-1: Gold Mode of Occurrence 7-35
Table 9-1: Summary of Positive Trench Sampling Results, Zona Basal 9-0
Table 10-1: Summary of the Diamond Drilling at the Turmalina Complex 10-1
Table 10-2: Significant Intersections from the 2020 and 2021 Underground Drilling Programs 10-3
Table 10-3: Summary of Drill Hole and Channel Samples Completed in 2020 and 2021 10-7
Table 10-4: Summary of Significant Diamond Drilling Intersections, 2021 Drilling Programs 10-9
Table 11-1: List of Certified Standard Reference Materials, 2020–2021 QA/QC Program 11-3
Table 13-1: Leaching and Adsorption Test Conditions 13-6
Table 13-2: Faina Composite Samples (SF1 and SF2) 13-10
Table 13-3: Chemical Analyses of Faina Composite Samples (SF1 and SF2) 13-11
Table 13-4: Summary of Tests on Composite Sample SF1 13-14
Table 13-5: Summary of Tests on Composite Sample SF2 13-15
Table 14-1: Summary of Total Mineral Resources – December 31, 2021 14-1
Table 14-2: Drill Hole Database, Turmalina Deposit 14-3
Table 14-3: Description of the Turmalina Deposit Database as of December 31, 2021 14-3
Table 14-4: Summary of Drill Hole and Channel Samples Excluded from Estimation, Turmalina Deposit 14-4
Table 14-5: List of Wireframe Domain Codes, Turmalina Deposit 14-8
Table 14-6: Descriptive Statistics of the Raw and Capped Gold Assays 14-10
Table 14-7: Descriptive Statistics of the Gold Composites 14-12
Table 14-8: Summary of Density Measurements by Orebody 14-13
Table 14-9: Summary of Variography and Interpolation Parameters 14-17

Table 14-10: Block Model Definition....14-20
Table 14-11: List of Block Model Attributes....14-20
Table 14-12: Summary of the Estimation Strategy....14-21
Table 14-13: Composite versus Block Grades by Orebody....14-22
Table 14-14: Quarterly Production, 2020 and 2021....14-26
Table 14-15: Summary of Mineral Resources as of December 31, 2021 – Turmalina Deposit....14-29
Table 14-16: Summary of Variography and Interpolation Parameters – Faina Deposit....14-33
Table 14-17: Summary of Mineral Resources as of December 31, 2014 – Faina Deposit....14-35
Table 14-18: Descriptive Statistics of the Raw Gold Assays – Pontal Deposits....14-37
Table 14-19: Descriptive Statistics of the Raw Gold Composites – Pontal Deposits....14-38
Table 14-20: Summary of Variography and Interpolation Parameters – Pontal Deposits....14-38
Table 14-21: Summary of Mineral Resources as of December 31, 2014 – Pontal Deposits....14-40
Table 15-1: Mineral Reserve Estimate – December 31, 2021....15-1
Table 15-2: Cut Off Grade Data....15-3
Table 16-1: Mine Design Parameters....16-4
Table 16-2: Rock Material Strengths for Turmalina Mine....16-9
Table 16-3: Ground Support Procedures....16-16
Table 16-4: Mine Infrastructure....16-17
Table 16-5: Personnel....16-21
Table 16-6: Mine Equipment....16-22
Table 16-7: Life of Mine Plan....16-26
Table 16-8: Quarterly Mine Production Reconciliation, Turmalina Mine 2020 and 2021....16-27
Table 17-1: Annual Reagent Consumptions....17-4
Table 20-1: List of Existing Operating Licences....20-2
Table 20-2: List of Water Use Licences....20-3
Table 20-3: Progressive Rehabilitation and Closure Cost Estimates....20-8
Table 21-1: LOM Capital Cost Summary....21-1
Table 21-2: Average Unit Capital Costs Used in the Cut-Off Grade Analysis....21-1
Table 21-3: Life of Mine Operating Costs....21-2
Table 21-4: Unit Operating Costs....21-3

FIGURES

Figure 4-1: Location Map 4-5
Figure 4-2: Property Mineral Rights and Infrastructure 4-6
Figure 4-3: Regional Mineral Rights and Infrastructure 4-7
Figure 4-4: Surface Rights 4-8
Figure 7-1: Regional Geology 7-2
Figure 7-2: Faina Basal Carbonaceous Phyllite Package 7-4
Figure 7-3: Faina BIF-Metachert and Mafic Volcanic Packages 7-5
Figure 7-4: Faina Geological Map 7-6
Figure 7-5: Mafic Metavolcanic Unit Amphibolites in the Faina Open Pit 7-7
Figure 7-6: BIF-Metachert Horizon Metacherts in the Faina Open Pit 7-8
Figure 7-7: Highly Weathered Exposure in the Faina Open Pit 7-9
Figure 7-8: Structural Stereonet 7-10
Figure 7-9: Moderate to High Grade Veined Amphibolite at the Bottom of the Faina Open Pit 7-11
Figure 7-10: Typical High Grade Veined and Silicified Amphibolite of the Faina Deposit 7-12
Figure 7-11: Mineralized Swarms of Quartz Veinlets 7-12
Figure 7-12: Distinct Visual Styles of Gold Mineralization 7-13
Figure 7-13: Geological Map Showing Locations of all Pontal Deposits 7-14
Figure 7-14: 2021 Geological Map of the Pontal Deposits Showing Structural Trends in Drilling 7-15
Figure 7-15: Cross Section Showing Stratigraphic Setting – Pontal South Zone 7-16
Figure 7-16: Sulphidation and Alteration in Pontal Deposit Drill Core 7-17
Figure 7-17: Principal Component Analysis– Correlation Between Au Mineralization and As-Sb Concentrations 7-17
Figure 7-18: Occurrence of the Gold Particles in the Pontal South Mineralization 7-18
Figure 7-19: Silification and Sulphidation Associated with Gold Mineralization – Pontal Deposits 7-19
Figure 7-20: Zona Basal Geological Map 7-20
Figure 7-21: Zona Basal Diamond Drill Hole Structural Data Summary 7-21
Figure 7-22: Sulphidation and Alteration in the Zona Basal Drill Core 7-22
Figure 7-23: Gold Particles Occurrence Associated with Arsenopyrite in Zona Basal Mineralization 7-23
Figure 7-24: Preliminary Leaching Test-Work Results 7-24
Figure 7-25: Property Geology Map 7-26
Figure 7-25A: Property Geology Legend 7-27

Figure 7-26: Orebody A Sample Stereonets....7-28

Figure 7-27: Plan View of the Orebody A....7-28

Figure 7-28: Geological Setting of the Orebody A....7-30

Figure 7-29: Geological Setting of the Orebody C....7-31

Figure 7-30: Example of Two Penetrative Planar Structural Petrofabrics in a Single Underground Exposure of BIFs in Orebody C....7-32

Figure 7-31: Sample Structural Stereonet....7-33

Figure 7-32: Disseminated Sulphide in Altered Drill Core....7-34

Figure 9-1: General Location of LB1 and LB2 Mineralized Zones – Pontal Deposits....9-3

Figure 9-2: Pontal Deposits Geology Map Showing Underground Drift and Ramp....9-4

Figure 9-3: 2018 Zona Basal Trenches and Channel Sampling Results....9-1

Figure 9-4: Area of Geological Mapping, Zona Basal Target....9-2

Figure 9-5: 2021 Zona Basal Soil Sampling Survey....9-3

Figure 10-1: Drill Hole Locations (2005 to 2021)....10-2

Figure 10-2: Longitudinal View of the 2020 and 2021 Drill Hole Locations....10-8

Figure 10-3: Faina Diamond Drilling....10-15

Figure 10-4: Proposed 2022 Faina Diamond Drilling Program....10-16

Figure 10-5: Drill Holes with Geophysical and Soil Geochemistry Exploration Map – Pontal Deposits10-17

Figure 10-6: 2020 to 2021 Zona Basal Diamond Drilling Cross Section....10-18

Figure 10-7: H2 2021 Zona Basal In-Fill Reverse Circulation Drilling Campaign....10-19

Figure 11-1: Control Chart for Blank Samples, January 2020 to December 2021....11-5

Figure 11-2: Control Chart for Certified Reference Material HiSilK4, January 2020 to December 2021 11-6

Figure 11-3: Control Chart for Certified Reference Material RL SK84, January 2020 to December 2021 11-6

Figure 13-1: Test Work Plan for Turmalina Samples....13-2

Figure 13-2: Gold Grade of the Samples....13-3

Figure 13-3: Gold Recovery in Gravity Concentration....13-3

Figure 13-4: Gold Recovery Under Leaching Conditions....13-4

Figure 13-5: Gold Recovery to Tailings Under Leaching Conditions....13-4

Figure 13-6: NaCN Consumption v. Tailings Gold Grade for Orebody A....13-5

Figure 13-7: Test Work Plan for Faina Samples....13-13

Figure 13-8: Proposed Process Flowsheet Options for the Faina Project....13-18

Figure 14-1: Overview of the Mineralized Wireframes – Turmalina Deposit....14-6

Figure 14-2: Example Cross Section, Orebody C 14-7
Figure 14-3: Longitudinal Projection of the Turmalina Mine Excavations 14-9
Figure 14-4: Frequency Histogram of the Raw Gold Assays, Orebody A 14-10
Figure 14-5: Frequency Histogram of the Raw Gold Assays, Orebody B 14-11
Figure 14-6: Frequency Histogram of the Raw Gold Assays, Orebody C 14-11
Figure 14-7: Contoured Composite Grades Orebody A (Domain 1) 14-14
Figure 14-8: Contoured Composite Grades Orebody C (Domain 21)...14-15
Figure 14-9: Major Axis and Semi-Major Axis Variograms, Orebody A...14-18
Figure 14-10: Major Axis and Semi-Major Axis Variograms, Orebody C 14-19
Figure 14-11: Swath Plot by Elevation, Orebody A (20 m bin width) 14-22
Figure 14-12: Swath Plot by Elevation, Orebody B (30 m bin width) 14-23
Figure 14-13: Swath Plot by Elevation, Orebody C (20 m bin width) 14-23
Figure 14-14: Comparison of Composite Gold Grades and Estimated Block Grades, Orebody A (Domain 1)..14-24
Figure 14-15: Comparison of Composite Gold Grades and Estimated Block Grades, Orebody C (Domain 21)..14-25
Figure 14-16: 2020 and 2021 Reconciliation Information by Quarter, Contained Ounces 14-27
Figure 14-17: Quarterly F2 Reconciliation Factors, Model to Plant 14-28
Figure 14-18: Mineral Resource Classification, Turmalina 14-31
Figure 15-1: Turmalina Mineral Reserves 15-2
Figure 16-1: Isometric View of Orebody A 16-2
Figure 16-2: Plan View of Orebody C 16-3
Figure 16-3: Sequencing of Stopes with Transverse SLOS in the Principal Zone, Orebody A 16-6
Figure 16-4: Sequencing of Stopes with Longitudinal SLOS 16-6
Figure 16-5: Typical Drilling Layout with Longitudinal SLOS 16-7
Figure 16-6: Cross Section Showing Longhole Fan with Longitudinal SLOS 16-8
Figure 16-7: RQD Values for Orebody A Footwall and Hanging Wall..16-10
Figure 16-8: RQD Values for Orebody C Footwall and Hanging Wall..16-10
Figure 16-9: Q' values for Ramp and Footwall in Orebody A 16-10
Figure 16-10: Q' values for Main Ramp and Hanging Wall in Orebody C 16-11
Figure 16-11: Geological Strength Index Chart for Foliated Rocks Specifying the Most Suitable Regions for A and C 16-12
Figure 16-12: Proposed Empirical Stable Regions Based on Stability Graphic for Turmalina Mine 16-13

Figure 16-13: Specifications of Cable Bolt Spacing (a) and Length (b) for Geomechanical Conditions... 16-14
Figure 16-14: Paste Fill Strength Determination Results Based on Laboratory UCS Tests............16-15
Figure 16-15: Ventilation System........16-20
Figure 16-16: Mine Dewatering System 16-21
Figure 17-1: Site Plan........17-5
Figure 17-2: Process Flowsheet........17-6

1.0 SUMMARY

1.1 Executive Summary

SLR Consulting (Canada) Ltd (SLR) was retained by Jaguar Mining Inc. (Jaguar) to prepare an independent Technical Report on the Turmalina Mine Complex (Turmalina Complex or the Complex), located in Minas Gerais, Brazil. The purpose of this Technical Report is to support the disclosure of the Mineral Reserves and Mineral Resources as of December 31, 2021. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects. SLR has visited the Turmalina Complex a number of times, with the most recent site visit on January 24 to 28, 2022.

Jaguar is a Canadian listed junior gold mining, development, and exploration company operating in Brazil with three gold mining complexes and a large land package covering approximately 33,000 ha. Jaguar's principal operating assets are located in the Iron Quadrangle, which is a greenstone belt in the state of Minas Gerais. Jaguar's common shares are listed on the Toronto Stock Exchange under the symbol JAG.

The Turmalina Complex is operated by Jaguar's wholly-owned subsidiary, Mineração Serras do Oeste (MSOL). The Complex consists of a number of contiguous mineral rights holdings that cover an area of approximately 7,674 ha, and includes the Turmalina Mine, a processing plant (the Turmalina Plant), and two satellite deposits, Faina and Pontal. The Turmalina Mine consists of several zones grouped into three orebodies – Orebodies A, B, and C. The two satellite deposits, Faina and Pontal, are located along strike to the northwest.

Jaguar acquired the Turmalina Mine from AngloGold Ashanti Ltd. (AngloGold) in September 2004 and commenced mining operations in late 2006. The Turmalina Mine utilizes sublevel open stoping (SLOS) with backfill at a production rate of 1,100 tonnes per day (tpd) and ore is processed at the adjacent 2,000 tpd carbon-in-pulp (CIP) processing plant. At the Turmalina Plant, there are two lines of production that have the ability to run independently or combined in their CIP circuits. The first line consists of two ball mills (Mills #1 and #2), and the second line consists of a third ball mill (Mill #3).

1.1.1 Conclusions

After depletion for 2021 production, estimated Mineral Reserve contained gold ounces have decreased 11% to 256,000 oz Au in 2021 compared to the 2019 Mineral Reserve estimate of 332,000 oz Au less 2020 production (287,000 oz Au).

Mineral Resources are considerably in excess of Mineral Reserves, reflecting good future potential to develop new areas and more fully utilize the capacity of the Turmalina Plant.

The SLR qualified persons (QPs) offer the following conclusions by area:

1.1.1.1 Geology and Mineral Resources

- The Turmalina Complex Mineral Resource estimates were prepared in accordance with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM (2014) definitions).
- Measured and Indicated Mineral Resources total 4.65 million tonnes (Mt) at an average grade of 4.31 g/t Au, containing 645,000 oz Au, and Inferred Mineral Resources total 3.85 Mt at an average grade of 4.86 g/t Au, containing approximately 602,000 oz Au.

- A cut-off grade of 1.49 g/t Au was used to report Mineral Resources for the Turmalina deposit, while cut-off grades of 3.8 g/t Au and 2.9 g/t Au were used to report Mineral Resources for the Faina and Pontal deposits, respectively.
- Reconciliation studies on a quarterly basis demonstrate that the monthly Mine-to-Plant results exhibit a good correlation between the Turmalina Mine and the Turmalina Plant data throughout most of the 2020 and 2021 production periods, with the monthly block model predicted grades being generally greater than those processed by the Turmalina Plant and the block model predicted tonnes being generally less than those processed by the Turmalina Plant.
- Overall, there is good agreement between the Turmalina Plant data and the block model for the 2020 and 2021 period. This agreement suggests that the sampling strategies, assaying methods, and estimation procedures currently used at the Turmalina Mine to prepare the grade block models are producing reasonable predictions of the tonnages, grades, and contained metal being received at the Turmalina Plant.

1.1.1.2 Mining and Mineral Reserves

- The Turmalina Complex Mineral Reserve estimates were prepared in accordance with CIM (2014) definitions.
- Proven and Probable Mineral Reserves total 2.18 Mt at a grade of 3.66 g/t Au, containing 256,000 oz Au.
- The Turmalina deposit is suitable for SLOS, considering the orebody's configuration and geotechnical characteristics. Both transverse and longitudinal SLOS methods are currently used at the Turmalina Mine.
    - Transverse SLOS is used in the wide part of Orebody A known as the Principal Zone.
    - Longitudinal SLOS is used in the remainder of Orebody A and all of Orebodies B and C.
- Orebody C has replaced Orebody A as the Turmalina Mine's principal production source.
- Once mined out, stopes are backfilled with either rockfill or paste fill.
    - Rockfill consists of waste from mine development.
    - Paste fill comes from the paste fill plant located near the Turmalina Plant and is prepared from detoxified CIP tailings.
- Longholes are drilled as upholes.
- Access to the underground levels is via a system of ramps.
- Stopes are accessed via sublevel development driven from the ramp, with a sublevel interval of 20 m.
- The Turmalina Mine's ground support procedures generally require 2.4 m long resin grouted helicoidal bolts to be installed on a 1.5 m x 1.5 m pattern. In addition, cable bolting is required in ore drift hanging walls with blocky ground and at intersections. Screen may also be installed in specific situations and may be pinned to the rock with split sets.
- The Turmalina Mine's ventilation system is pull type with fresh air drawn down the ramp and an intake raise and return air exhausted via three ventilation raises.

- The Turmalina Mine operations area has a workforce of approximately 700 personnel, with Jaguar personnel accounting for approximately 62% of the workforce and the remainder being contractor employees.

1.1.1.3 Mineral Processing

- The Turmalina Plant achieves consistent recoveries between 87% and 92%.
- Production capacity for the Turmalina Plant exceeds the current mine production rate.
- TESTWORK Desenvolvimento de Processo Ltda. (TDP) conducted a series of diagnostic tests on two composite samples to determine the amenability of gold extraction from Faina material using different processes. The highest gold recovery achieved was from a combination of gravity concentration followed by flotation of gravity tails on sample SF1 (92.36% overall gold recovery).
- The SLR QP does not consider TDP's approach to metallurgical testing to be systematic, as not all activities proposed were performed and there was no evidence of mineralogical characterization work or comminution testing having been performed prior to test program development. Full particle size analyses and Bond Ball Mill Work Index (WI) were not reported. In addition, test work proposed for flotation products (settling and filtration tests, classification tests, and acid rock drainage (ARD) tests) were not performed.
- The viability of bioleaching methods for treatment of Faina mineralization has not been reported as test results are pending.
- The SLR QP concurs with TDP that further testing is required to confirm the metallurgical response of the Faina mineralization, however, the SLR QP is of the opinion that representativeness of the samples needs to be confirmed and addressed. Collection of metallurgical samples from the Faina deposit that are representative of the material to be mined over the life of mine (LOM) plan remains a key issue.

1.1.1.4 Infrastructure

- The Complex includes the Turmalina Plant, with a nominal capacity of 2,000 tpd, and tailings disposal area.
- Electrical power is obtained from the national grid.
- The infrastructure at the Complex is sufficient to support current mining operations.

1.1.1.5 Environment

- No environmental issues were identified from the documentation available for the SLR QP's review. The Complex complies with applicable Brazilian permitting requirements. The approved permits and the licence renewals address the Brazilian authority's requirements for mining extraction and operation activities.
- Environmental monitoring is carried out by Jaguar at the Turmalina Complex according to the obligations defined in the environmental permits. These include surface water quality, groundwater quality, air quality, and ambient noise.
- The SLR QP's review of social or community requirements indicates that, at present, the Turmalina Complex represents a positive contribution to sustainability and community well being. Jaguar continues to develop a strong relationship with the nearby communities and stakeholders. Jaguar's commitment to community development and programs is demonstrated through its

ongoing investments in the "Seeds of Sustainability" program. Information on any existing or potential archeological resources was not provided at the time of this review, nor were any site-specific policies or guidelines.

1.1.2 Recommendations

The SLR QPs offer the following recommendations by area.

1.1.2.1 Geology and Mineral Resources

1.1.2.1.1 Exploration

1. Continue planned exploration, targeting shallow extensions to mineralization along the Orebody C trend as well as drilling the down-plunge and along-strike projections of Orebodies A and C.
2. Proceed with the in-fill diamond drilling campaign planned at Faina to upgrade Inferred Resources to the Indicated category.
3. Conduct a diamond drilling campaign and other exploration work at the Pontal deposits.

1.1.2.1.2 Quality Assurance/Quality Control

1. Amend the Quality Assurance/Quality Control (QA/QC) program to include the channel samples.
2. Amend the database as a minimum to improve the data extraction functionality so that standard QA/QC control charts can be prepared. The QA/QC charts must clearly indicate results received from each laboratory.
3. When the assay laboratory automatically re-assays samples containing gold grades greater than 30 g/t Au, report all sample results to the site, without averaging, rather than the average of the re-assays.
4. Modify the drill hole database assay information such that the final gold assay used to prepare grade estimates is the average of all assays for a given sample. At present, only the first assay is used. This information can be captured by creating an additional column in the assay table.
5. Include the certificate number for each assay batch into Jaguar's central database (MX Deposit).
6. Update the MX Deposit database to store drill core recovery, channel sample recovery, and sample tracking (lost sample) information. This will assist in deciding how to address null values in future resource estimates.

1.1.2.1.3 Mineral Resources

1. Continue drill programs to outline the down-plunge continuation of Orebody A and Orebody C as long as drill intercepts continue to demonstrate economic viability.
2. Carry out a review of the surveying practices and quality control procedures to ensure that all drill hole collars are accurately located prior to entry into the final drill hole database.
3. Continue to correct the erroneous or anomalous information (not used in the estimation of Mineral Resources) for older drill holes that are located in the as-yet unmined portions of the Turmalina deposit. Time permitting, the same corrections can be made to the mined out portions of the Turmalina deposit in an effort to improve the quality of the data underlying any multi-year reconciliation analysis.

4. Modify the wireframe construction strategy to use a cut-off grade that more closely reflects the Mineral Resource cut-off grade for each orebody.
5. Re-examine and adjust gold capping values as required based on reconciliation information.
6. Collect bulk density measurements from mineralized drill core samples in future drilling programs.
7. Continue geological mapping of all available underground excavations in the vicinity of the Orebody C mineralized wireframes. Use the results of this geological mapping to prepare a lithological model with the intent of improving the allocation of the density measurements for future Mineral Resource updates.
8. Continue studies to examine the relationship of the gold values to structural, alteration, or lithologic features (such as the presence of quartz veining, for instance) to aid in the understanding of the distribution of the higher grade gold values observed in Orebody C.
9. Consider the use of a dynamic anisotropy method for estimation of gold grades into the model.
10. Review anisotropy ratios on an individual wireframe basis rather than on a deposit basis.
11. When no Cavity Monitoring Survey (CMS) model is available for a given excavation volume, use the design shape for the excavations in question (suitably modified for the estimated amount of overbreak) as a proxy when preparing the reconciliation reports.
12. Conduct a short study to determine the optimum selection of search strategy input parameters to reduce the number of estimation artifacts and reduce the degree of smoothing for these mineralized lenses.
13. Collect additional drill hole information in areas of low drilling density to improve the confidence level of the Mineral Resource estimate, to reduce and remove the estimation artifacts, and to search for the down dip projections of the mineralization.
14. Reconcile the Mineral Resource estimate with ongoing production in 2022 to gain an understanding of the forward looking reliability of the estimate.
15. Adjust Deswik parameters to better align to the local strike and dip variations of the resource wireframes.

1.1.2.2 Mining and Mineral Reserves

1. Consider modelling mining costs by orebody, such that variable and incremental cut-off grades can be determined by orebody and the Mineral Reserve estimate, LOM plan, and processing capacity can be optimized.
2. Balance production levels between Orebody A and Orebody C for improved production stability and a more operationally achievable LOM plan.
3. Consider an annual long term planning cycle inclusive of strategic asset planning and Mineral Resource and Mineral Reserve estimation for all Jaguar operations.
4. Undertake a detailed incremental cost analysis, by orebody, to ensure that uneconomic material is not sent to the Turmalina Plant. Currently, the cost data available from the Turmalina Mine is not easily categorized. Unit mining costs vary between Orebody A and Orebody C, given significant differences between mining width, production rates, ground conditions, and haul distances. The Turmalina Plant has excess production capacity, not otherwise put to use.
5. Complete a preliminary economic assessment (PEA) to define the best approaches for mining and processing the Faina and Pontal deposits. For the Faina deposit, conduct a prefeasibility study (PFS) to demonstrate the deposit's economic viability to declare Mineral Reserves.

1.1.2.3 Mineral Processing

1. Continue to conduct diagnostic metallurgical test work on representative samples from the Turmalina Mine and identify opportunities to improve metallurgical recoveries through modifications in the current plant process flowsheet, as well as assessing potential process options for the treatment of refractory material from Faina and Pontal.
2. Assess options for leveraging excess processing capacity.
3. Once representative samples are collected for the Faina deposit, consider a mineralogical examination in conjunction with additional metallurgical testing of the Faina mineralization to confirm the metallurgical response and gold recoveries observed in preliminary testing of composite samples SF1 and SF2.
4. Conduct metallurgical test work on representative samples of the refractory material from the Pontal deposits.
5. Complete any outstanding work from TDP's proposed test program, including mineralogical evaluation, comminution testing, settling and filtration tests, classification tests, and ARD tests.

1.1.2.4 Environment

1. Consider expanding the air quality monitoring program by adding stations at the Turmalina Mine.
2. Continue to review management and mitigation corrective actions, as applicable, based on the data collected from the environmental monitoring programs.
3. Install piezometers and displacement monitoring instrumentation for the existing and proposed filtered tailings stacks.
4. Monitor the long term displacement and phreatic levels within filtered tailings stacks to observe trends and confirm physical stability.
5. Monitor seepage from all tailings disposal areas to confirm chemical stability.
6. Complete the standardization of management processes in 2022 according to the mapped strategy that was initiated in 2021.

The budget for carrying out the recommendations is included within the LOM capital and operating costs.

1.2 Economic Analysis

This section is not required as Jaguar is a producing issuer, and the property is currently in production and there is no material expansion of current production.

1.3 Technical Summary

1.3.1 Property Description and Location

The Complex is located in the state of Minas Gerais, approximately 120 km northwest of Belo Horizonte and 10 km south of Pitangui, the nearest town of significant size. The Complex is located in the Conceição do Pará municipality.

Jaguar, like other Brazilian mining companies, has large mining concessions, which typically range upwards of 2,000 ha per concession. As a result, a project may have numerous related mineralized zones, extending over many kilometres of strike length, which may eventually have individual mining operations. It is common to group these operations under a single mine name, which is often the first operation put into production. To assist in the definition of the location of the primary operation, the geographic coordinates of this primary operation are listed by latitude and longitude. The Turmalina Complex has geographic coordinates of 19°44’36.96” S latitude and 44°52’36.45” W longitude.

1.3.2 Land Tenure

Jaguar acquired the Turmalina Complex from AngloGold in September 2004. Jaguar, through its wholly-owned subsidiary, MSOL, holds 100% ownership of the Turmalina Complex, subject to a 5% net revenue interest up to $10 million, and 3% thereafter, to an independent third party. In addition, there is a 0.5% net revenue interest payable to the surface landowner.

The Turmalina Complex comprises a number of contiguous mineral rights holdings granted by the Agência Nacional de Mineração (ANM) that, as of Q4 2021, cover an area of 2,932 ha of mining permits (“mining concessions”) and 4,742.5 ha of active exploration permits (“exploration authorizations”).

1.3.3 History

Gold was first discovered in the Turmalina area in the 17th century, and through the 19th century, intermittent small scale production took place from alluvial terraces and outcropping quartz veins. Gold production exploited alluvium or weathered material, including saprolite and saprolite hosted quartz veins. Records from this historical period are few and incomplete.

From 1978 to 2004, AngloGold, through a number of Brazilian subsidiaries, held the mineral rights to the Turmalina Complex. AngloGold explored the Complex area extensively between 1979 and 1988 using geochemistry, ground geophysics, and trenching, which led to the discovery of the Turmalina, Satinoco (now referred to as Orebody C), Faina, and Pontal deposits, and other mineralized zones. Initial exploration work at Orebody A included 22 surface based diamond drill holes, totalling 5,439 m, to test the downward extension of the sulphide mineralized body. At the Satinoco target (Orebody C), a total of 1,523 m was drilled in nine holes.

In 1992 and 1993, AngloGold mined 373,000 t of oxide ore from open pits at the Turmalina, Satinoco (Orebody C), Pontal, and Faina zones, recovering 35,500 oz Au using heap leach technology. Subsequently, AngloGold drove a ramp beneath the Turmalina pit and carried out drifting on two levels in the mineralized zone at approximately 50 m and 75 m below the pit floor to explore the downward extension of the sulphide mineralized body.

Jaguar acquired the Turmalina Complex in 2004 and continued operation of the Turmalina Mine. The Turmalina Mine is accessed from a 5.0 m x 5.5 m primary decline located in the footwall of the main deposit. As of December 31, 2021, the decline has reached Level 15, at a vertical depth of approximately 1,052 m below surface.

1.3.4 Geology and Mineralization

The Turmalina deposits are located in the western part of the Iron Quadrangle, which was the principal region for the Brazilian hard rock gold mining until the early 1980s when the Carajás mineral province, in the state of Pará, attained equal status. Gold was produced from numerous deposits, primarily in the northern and southeastern parts of the Iron Quadrangle, mostly hosted by Archean or Early Proterozoic banded iron formations (BIF) contained within greenstone belt supracrustal sequences.

The Turmalina Complex is underlain by Archaean and Proterozoic age rocks. Archaean units include a granitic basement, overlain by the Pitangui Group, a sequence of ultramafic to intermediate volcanic flows and pyroclastics and associated sediments. The Turmalina deposit is hosted by chlorite-amphibole schist and biotite schist units within the Pitangui Group. A sequence of sheared, banded, sulphide iron formation and chert lies within the stratigraphic sequence. The stratigraphy locally strikes to azimuth 135°. The Turmalina deposits are believed to be typical examples of mesothermal, epigenetic deposits that are enclosed by host rocks that have undergone amphibolite grade metamorphism.

1.3.4.1 Turmalina Mine

The mineralization at the Turmalina deposit consists of a number of stratabound, tabular bodies that are spatially related to either a BIF package or to a package of slightly silicified quartz-muscovite-biotite schists. These tabular bodies are grouped together, according to the host stratigraphy, to the spatial configuration and to the gold content, into Orebodies A, B, and C (together the Orebodies). Gold can occur within the BIF package, but can equally occur in the other host lithologies. Gold mineralization in the Turmalina deposits occurs in fine grains associated with sulphides in sheared schists and BIF sequences. Gold particles are mostly associated with arsenopyrite, quartz, and micas (sericite and biotite). Coarse grained gold, on a millimetre scale, is found locally with discrete quartz veins, but this type of occurrence is minor at the Turmalina deposit.

1.3.4.2 Faina Deposit

The Faina mineralization and mineralized zones hosted by the Mafic Metavolcanic Unit is inferred to be related, in a larger scale, to a regional, northwest-southeast oriented, transpressional faulting event that also generated a coeval smaller-scale system of east-northeast–west-southwest accommodation, transcurrent-movement faults.

The auriferous gold mineralization at the Faina deposit corresponds mainly to swarms of sulphide bearing quartz veinlets (individual veinlets with millimetric to centimetric widths) which are hosted by amphibolitic packages of the Mafic Volcanic Unit. The mineralized swarms of quartz veinlets appear to occur within conformable horizons to the mine stratigraphic package, in at least several distinct "stratigraphic layers" of the Mafic Volcanic Unit.

1.3.4.3 Zona Basal

The Zona Basal hypogenic economic mineralization can be understood as a system that is primarily controlled by a major northwest-southeast oriented transpressive structural movement zone and which is spatially located approximately at the axial-plane setting of the Zona Basal overturned antiform. The Zona Basal "supergene" (or surficial) mineralization appears to concentrate economic gold grades as well as some silver and other base metals in the weathering halo. The more ubiquitous mineralization style recorded at Zona Basal corresponds to fine grained disseminations of sulphides (arsenopyrite, pyrite, and pyrrhotite) hosted by the favorably-replaced volcano-chemical horizons.

1.3.4.4 Pontal Deposits

The current interpretation is that the Pontal gold mineralization event is related to a northwest-southeast semi-regional shear-fault zone and also to more local northeast-southwest or east-northeast–west-southwest fault zones of sinistral transcurrent nature.

Three slightly different styles of gold mineralization have been recorded in the Pontal South target, despite the fact that all of them are gold-arsenic-antimony rich. The more ubiquitous mineralization style recorded at Zonal Basal corresponds to fine grained disseminations of sulphides (arsenopyrite, pyrite, and pyrrhotite) hosted by pyroclastic rocks. The second style corresponds to massive concentrations of sulphides (mainly arsenopyrite and antimony sulphides) located around quartz veins and within highly (or pervasively) silicified domains of the same pyroclastic host rocks. The last style to be considered would be a result of the presence of multiple sulphidized clasts and coarse transported fragments, either primarily mineralized and redeposited, or eventually replaced by the same ore fluids that "sulphidized" the matrix of the pyroclastic host rocks.

1.3.5 Exploration Potential

Jaguar's exploration is focused on brownfields exploration in order to identify new mineral resources that would potentially increase its mineral reserves inventory while utilizing the existing capital infrastructure base, as well continuously growing the mineral resource base in the active mines.

The main brownfields exploration and growth projects currently underway at the Turmalina Complex include the Faina Deposit Area, the Zona Basal Oxide Deposit, and the Pontal South-Pontal Trend. These three targets are in within a few kilometres of the Turmalina Mine and the Turmalina Plant.

Prefeasibility work for the Faina deposit is expected to commence in 2022. A program consisting of 15,000 m of diamond drilling designed to convert Inferred Mineral Resources into Measured and Indicated Mineral Resources was initiated in the first week of January 2022. Mining activities at Faina are expected to be synergistic with the current Turmalina Mine as the deposit can be accessed via the Turmalina underground development, minimizing mine permitting requirements.

Reverse circulation drilling on the Zona Basal target (50 m spacing) yielded encouraging results and warranted a tighter drilling spacing (25 m) in some parts of the deposit. Most of the drilling was accomplished late in Q4 2021. Jaguar plans to incorporate the recent drilling into future Zona Basal Mineral Resource estimates.

In 2022, exploration efforts will be directed across a broad spectrum of Jaguar´s high potential and high quality opportunities, including the emerging Pontal trend. The Pontal trend encompasses a further three to five kilometres of strike potential extending northwest along the same mineralized structural trend that is host to both the mineralization currently being exploited at the Turmalina Mine, and Faina deposit Mineral Resources. Therefore, it will be appropriately investigated during 2022, mainly with additional drilling campaigns which will test the economic continuities (both along strike and down-plunge) of the already delineated, potentially economic footprints at the Pontal North, Pontal, and Pontal South individual targets.

1.3.6 Mineral Resources

Table 1-1 summarizes the Mineral Resources at the Turmalina Complex as of December 31, 2021, based on a US$1,800/oz Au price for the Turmalina deposit and a gold price of US$1,400/oz Au for the Faina and Pontal deposits. A cut-off grade of 1.49 g/t Au was used to report the Mineral Resources for the Turmalina deposit, and cut-off grades of 3.8 g/t Au and 2.9 g/t Au were used to report the Mineral Resources for the Faina and Pontal deposits, respectively. The Mineral Resource estimates for the Faina and Pontal deposits were prepared with an effective date of December 31, 2014, and were first disclosed in RPA (2015).

Table 1-1: Summary of Total Mineral Resources – December 31, 2021
Jaguar Mining Inc. – Turmalina Mine Complex

Category	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
Turmalina			
Measured	1,783	4.73	271
Indicated	2,199	3.59	254
Sub-total M+I	3,982	4.10	525
Inferred	2,176	3.15	221
Faina (2014)			
Measured	72	7.39	17
Indicated	189	6.66	42
Sub-total M+I	261	6.87	58
Inferred	1,542	7.26	360
Pontal (2014)			
Measured	251	5.00	40
Indicated	159	4.28	22
Sub-total M+I	410	4.72	62
Inferred	130	5.03	21
Total Turmalina, Faina, and Pontal Deposits			
Measured	2.106	4.85	328
Indicated	2,547	3.86	318
Total M+I	4,653	4.31	645
Inferred	3,848	4.86	602

Notes:

1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of the Mineral Reserves at Turmalina. No Mineral Reserves are currently present at Faina or Pontal.
3. Mineral Resources are estimated at a cut-off grade of 1.49 g/t Au at Turmalina, 3.8 g/t Au at Faina, and 2.9 g/t Au at Pontal.
4. Mineral Resources at the Faina and Pontal remain unchanged from those stated as of December 31, 2014.
5. Mineral Resources at the Turmalina deposit include all drill hole and channel sample data as of December 12, 2021, and mined out volumes as of December 31, 2021. Mineral Resources at the Faina and Pontal deposits include drill hole information as of December 31, 2014.
6. Mineral Resources are estimated using a long term gold price of US$1,800/oz Au for the Turmalina deposit and US$1,400/oz Au for the Faina and Pontal deposits.
7. Mineral Resources are estimated using an average long term exchange rate of R$5.50 : US$1.00 for the Turmalina deposit and R$2.50 : US$1.00 for the Faina and Pontal deposits.
8. A minimum mining width of 3.5 m was used for Turmalina.
9. Bulk density is 2.83 t/m^3 for Orebodies A and B and 2.91 t/m^3 for Orebody C at the Turmalina deposit. Bulk density is 1.46 t/m^3 and 1.52 t/m^3 for oxidized material, 2.24 t/m^3 and 2.28 t/m^3 for transition, and 2.73 t/m^3 for fresh material for Pontal's LB1 and LB2 deposits, respectively. Bulk density is 1.70 t/m^3 for oxidized material, 2.25 t/m^3 for transition, and 2.85 t/m^3 for fresh material at the Faina Deposit.
10. Gold grades are estimated by the OK interpolation algorithm using capped composite samples.
11. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
12. Numbers may not add due to rounding.

The SLR QPs are not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other factors that could materially affect the Mineral Resource estimates.

1.3.7 Mineral Reserves

Table 1-2 summarizes the Mineral Reserves as of December 31, 2021, based on a US$1,650/oz Au price for the Turmalina Mine. Mineral Reserves are based on the Mineral Resources, mine designs, and external factors.

Table 1-2: Mineral Reserve Estimate – Turmalina Mine - December 31, 2021
Jaguar Mining Inc. – Turmalina Mine Complex

Orebody	Proven Reserves			Probable Reserves			Proven and Probable Reserves		
	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
Orebody A	448	4.81	69	155	3.25	16	603	4.41	85
Orebody B	183	2.88	17	138	3.83	17	321	3.29	34
Orebody C	381	3.27	40	872	3.45	97	1,253	3.40	137
Total	1,012	3.88	126	1,165	3.47	130	2,177	3.66	256

Notes:

13. CIM (2014) definitions were followed for Mineral Reserves.
14. Mineral Reserves were estimated at a break-even cut-off grade of 2.13 g/t Au and an incremental cut-off grade of 1.62 g/t Au.
15. Mineral Reserves are estimated using an average long term gold price of US$1,650/oz Au, and an exchange rate of R$5.50 : US$1.00.
16. A minimum mining width of 2.4 m was used.
17. Bulk density is 2.83 t/m^3 for Orebodies A and B and 2.91 t/m^3 for Orebody C at the Turmalina Mine.
18. Numbers may not add due to rounding.

The Mineral Reserves consist of selected portions of the Measured and Indicated Mineral Resources that are within designed stopes and associated development. Deswik Brazil Holdings Pty Ltd. (Deswik Brazil) was responsible for the mine design. It is the SLR QP's opinion that the Turmalina Mineral Reserves estimate complies with CIM (2014) definitions.

The SLR QP is not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

1.3.8 Mining Method

The Turmalina Mine consists of several zones grouped into three orebodies – Orebodies A, B, and C. Two satellite deposits, Faina and Pontal, are located along strike to the northwest. At present, the Turmalina Mine produces 1,100 tpd from Orebodies A and C.

Orebody A is folded and steeply east dipping, with a strike length of approximately 250 m to 300 m and an average thickness of six metres. Orebody A consists of two parallel narrow veins, however, these veins merge together in the northwestern portion of the deposit, forming a wider zone known as the Principal Zone. Orebody B includes three thinner, lower grade lenses parallel to Orebody A. Two of the lenses are located approximately 50 m to 75 m to the east in the hanging wall and are accessed by a series of crosscuts that are drive from Orebody A. Orebody C is a series of 26 lenses that are located to the southwest in the structural footwall of Orebody A and are generally of lower grade. They strike northwest and dip steeply to the northeast. Orebody C has replaced Orebody A as the Complex's principal production source.

The mining method used at the Turmalina Mine is SLOS with delayed backfill. Both longitudinal and transverse versions of the method are used, depending on the width of the deposit. Access to the stopes is provided by sublevel development driven from the ramp. The sublevel interval is 20 m. The Turmalina deposit is mined in horizons between sublevels. Each horizon is mined in retreating fashion, starting at the end of the mineralized zone and progressing to the central crosscuts. The stope length is typically 40 m along strike, and rib pillars or partial rib pillars separate adjacent stopes. Once mined out, stopes are backfilled with cemented rockfill, unconsolidated rockfill, or cemented paste fill. The horizons are mined in a bottom-up sequence between sill pillars.

The mining method used at Orebody A's Principal Zone is transverse SLOS. Stopes are 50 m to 60 m long along strike, and widths range from seven metres to 20 m. The Turmalina deposit has significant width in this zone due to the merging of two veins. The stopes in the central part of the Principal Zone are mined first, creating a vertical column of stopes from the lower to upper sill pillars. Once mined out, each stope is backfilled with paste fill. This approach creates a central paste fill pillar, which stabilizes the ground for mining the stopes on either side of it. The remaining stopes are mined by retreating towards the access drifts on each end of the Principal Zone. The remaining stopes can use paste fill or rockfill. Partial rib pillars are left between backfilled stopes. The size of the partial rib pillars and thickness of the sill pillars are determined with geotechnical modelling.

Longitudinal SLOS is used in Orebody A outside the Principal Zone and in all of Orebody C. When preparing a stope, a crosscut is driven to the deposit's hanging wall. From there, ore drives are driven in both directions along strike following the hanging wall contact. The hanging wall is supported with cable bolts before stoping begins. If the deposit is wider than five metres, ore is left adjacent to the footwall, which will be slashed after the ore drive is completed.

Though the Turmalina Mine ground support procedures vary based on the type of mine excavation, generally, the procedures consist of 2.4 m long resin grouted helicoidal bolts installed on a 1.5 m x 1.5 m pattern. Cable bolting is required in ore drift hanging walls with blocky ground and at intersections. Screen may also be required in specific situations and may be pinned to the rock with split sets.

The Turmalina Mine is accessed from a 5.0 m x 5.5 m primary decline located in the footwall of Orebody A and a ramp system for Orebody C. The Orebody A ramp portal is located at an elevation of 695 MASL. The Turmalina Mine is divided into levels, with Level 01 established at an elevation of 626 MASL. Ore from the stopes and development is hauled to surface via the ramp system for Orebodies A and C. Turmalina has a paste fill plant that prepares cemented paste fill from detoxified CIP tailings in a plant located near the mill. Turmalina's ventilation is a pull type system whereby fresh air is drawn down the haulage ramps and an intake raise, and return air is exhausted via three ventilation raises. The Turmalina Mine has a simple dewatering system whereby water is pumped from level to level and then to surface using centrifugal pumps.

Turmalina has an extensive fleet of mobile mine equipment. The main units include three longhole drill rigs, two development jumbos, three bolting jumbos, four load-haul-dump units (LHDs), two front end loaders, five dump trucks, and three articulated dump trucks (Volvo A30s). The mine development contractor also has a fleet of two jumbos, plus front end loaders, dump trucks and auxiliary vehicles.

The mining-operations area has a workforce of approximately 700 persons. Jaguar personnel make up about 62% of the workforce, with the remainder being contractor employees. The contractors at the mine include Toniollo Busnello S.A. (mining contractor), Encobras (diamond drilling and truck haulage), Orica (Explosives), and Tracbel S.A. (maintenance of Volvo equipment).

1.3.9 Mineral Processing

The Turmalina Plant has a nominal processing capacity of 2,000 tpd, or 720,000 tonnes per annum (tpa). Since inception, the Turmalina Plant has been achieving annual overall recoveries of between 87% and 92%. The process flowsheet includes two-stage crushing and screening to minus 9.5 mm (-3/8 in.), grinding using ball mills, thickening, cyanide leaching, CIP, elution, electrowinning, and smelting. The tailings are conveyed by gravity to a detoxification unit for arsenic removal and cyanide destruction and then are pumped to the paste fill plant to be used either for mine backfill or deposited on a dry stack storage area. Process tailings have also been dry stacked in completed open pits on the mine site.

At the Turmalina Plant, there are two lines of production that have the ability to run independently or combined in their CIP circuits. The first line consists of two ball mills (Mills #1 and #2), and the second line consists of a third ball mill (Mill #3). In January 2017, Mill #3 was recommissioned with an estimated installed capacity of 1,600 tpd. Using only Mill #3, Turmalina has been able to achieve the entire throughput of the Turmalina Plant with a lower operating cost, through electricity consumption savings, compared to using both Mills #1 and #2 in 2016. Mill #1 is used on an as need basis, while Mill #2 has been taken off-line for maintenance and will be kept on standby mode in the future. Total milling capacity is in excess of 3,000 tpd which allows for a potential future plant expansion.

1.3.10 Project Infrastructure

The Complex includes the Turmalina Plant, with a nominal capacity of 2,000 tpd, and tailings disposal area. Electrical power is obtained from the national grid.

Ancillary buildings located near the mine entrance include the gate house with a reception area and waiting room, administration building, maintenance shops, cafeteria, warehouse, change room, first aid room, and compressor room. The explosives warehouse is located 1.2 km away from the Turmalina Mine area, in compliance with the regulations set forth by the Brazilian Army. There is no camp at the Turmalina Mine site.

Additional ancillary buildings are located near the Turmalina Plant and include an office building, a laboratory, warehousing, and a small maintenance shop.

There is no infrastructure related to the Faina and Pontal historic open pit operations.

1.3.11 Market Studies

Gold is the principal commodity at the Complex and is freely traded at prices that are widely known, so that prospects for sale of any production are virtually assured. A gold price of $1,650/oz Au was used for estimation of Mineral Reserves.

1.3.12 Environmental, Permitting and Social Considerations

Environmental studies pertaining to ARD potential have been carried out as requested by the National Environmental and Sustainable Development Agency (SUPRAM for its acronym in Portuguese), on Operation Licence ('Licença de Operação', or LO) 012/2008. These studies continued from 2007 through 2017. In February 2018, a specialized report from Galapagos Consultoria Ltda was issued (Jaguar, 2022), which indicated low ARD potential of the mined material due to the low concentration of sulphides and the presence of compounds with neutralization potential, such as carbonates. However, the study also indicated arsenic leaching potential and, as a result, Jaguar initiated a contamination plume investigation. Jaguar has officially informed SUPRAM about the arsenic leaching potential.

In 2021, Jaguar developed the "Environmental Performance Assessment Report" as a way to confirm if all the Turmalina operation controls and required best practices were being completed and supervised in accordance with the legal standards. This comprehensive report will be delivered to SUPRAM in 2022, in support of the reassessment process for the LO.

The Turmalina operations are located close to the border of the municipality of Conceição do Pará in the central western part of the state of Minas Gerais, near the town of Casquilho.

Casquilho's community is a district of Conceição do Pará and is in the area that is directly impacted by the operations. There are limited infrastructure services available in the town of Casquilho, due to its size. Services are sourced from Pitangui, located 15 km from Conceição do Pará.

State road MG 423 divides Casquilho's community into Casquilho de Baixo (lower Casquilho) and Casquilho de Cima (upper Casquilho), with a total population of 130 families. The majority of the Casquilho de Cima houses are permanently occupied and most residents work in Pitangui. Only five houses are used as weekend properties.

Casquilho de Cima's community is supplied with water and power by the state-run companies Copasa and Companhia Energetica de Minasa Gerais S. A. (CEMIG). The community does not have any sanitation sewage system. Traditional sanitation holes/ditches, typically built in the backyards, are used. No additional public services are available to the Casquilho de Cima residents.

Since the beginning of the Turmalina Mine operation, dust suppression has been carried out by Jaguar over the mine and plant access roads.

Jaguar has good community relationships with the surrounding communities.

1.3.13 Capital and Operating Cost Estimates

The Turmalina Complex LOM capital and operating costs were estimated in Brazilian Reais (R$) based on recent operating results and Jaguar budgets. The amounts were converted to US$ using an exchange rate of R$5.50 : US$1.00 for 2021. Table 1-3 and Table 1-4 present the estimated capital costs and operating costs over the Turmalina Complex's LOM (including costs to continue the mine life beyond 2025).

Table 1-3: LOM Capital Cost Summary
Jaguar Mining Inc. – Turmalina Mine Complex

Area	Units	Total	2022	2023	2024	2025	2026	2027	2028
Sustaining Capital									
Primary Development	US$ 000	28,127	4,628	8,615	12,847	2,036	-	-	-
Equipment	US$ 000	10,861	2,531	2,082	2,082	2,082	2,082	-	-
Engineering	US$ 000	6,991	1,398	1,398	1,398	1,398	1,398	-	-
Exploration	US$ 000	15,083	3,017	3,017	3,017	3,017	3,017	-	-
Subtotal Sust. Capital	US$ 000	61,062	11,575	15,113	19,344	8,533	6,497	-	-
Other Capital									

Area	Units	Total	2022	2023	2024	2025	2026	2027	2028
Working Capital	US$ 000	-	7,662	879	613	231	(580)	(3,527)	(5,279)
Growth Capital	US$ 000	14,601	7,945	4,312	781	781	781	-	-
ARO/Closure	US$ 000	6,825	4,036	461	139	925	917	346	-
Total Capital	US$ 000	82,489	31,218	20,765	20,878	10,471	7,616	(3,181)	(5,279)

Source: Jaguar, 2022

Table 1-4: LOM Operating Costs
Jaguar Mining Inc. – Turmalina Mine Complex

Area	Units	Total	2022	2023	2024	2025	2026	2027
Mining (Underground)	US$ 000	88,665	16,528	16,490	16,530	16,491	16,618	6,006
Processing	US$ 000	58,819	10,965	10,939	10,966	10,940	11,024	3,984
G&A	US$ 000	15,325	2,857	2,850	2,857	2,850	2,872	1,038
Total Operating Cost	US$ 000	162,809	30,350	30,280	30,354	30,282	30,514	11,029

Source: Jaguar, 2022

1.3.14 Other Relevant Data and Information

1.3.14.1 Faina and Pontal Deposits

The Faina and Pontal deposits are satellite deposits of the Turmalina Mine and lie on strike with Turmalina's mineralized structure. In 1992 and 1993, AngloGold mined oxide ore at Faina and Pontal and recovered the gold with heap leaching. The remaining sulphide mineralization beneath their oxide zones is refractory.

The Mineral Resource estimates for the deposits are based on unoxidized mineralized material being mined by underground methods and transported to the Turmalina Plant for processing. A gold-rich flotation concentrate unit will be constructed at the existing plant. As the mineralization is refractory, the gold-rich concentrate will either be shipped off-site for oxidation and gold recovery by a third party or treated in a pressure-oxidation circuit constructed on-site before processing by CIL.

1.3.14.2 Faina

The Faina deposit is situated adjacent to the Turmalina Mine, and its Mineral Resource will be accessible from the mine's existing underground workings in the near future. The shallow oxide portions of the Faina deposit were previously mined by open pit. Due to the refractory nature of the sulphide mineralization beneath the oxide zone, the deeper portion of the Faina deposit remains to be exploited. Faina has the potential to add ounces to Jaguar´s production profile in the current five year plan. Furthermore, additional drilling and deeper geological investigations will be completed along the down-plunge and strike of the currently defined portion of the Faina deposit.

The Faina deposit has potential for upgrading its Inferred Resources to the Indicated and Measured categories, converting Mineral Resources to Mineral Reserves, and eventually advancing as a mine development project. The Faina deposit has the following favourable aspects:

- It will be accessible from the existing underground workings of the Turmalina Mine.
- The knowledge and experience gained at Turmalina should be transferable to Faina.
- The Turmalina Plant and other surface infrastructure are already available on site, and the Turmalina Plant has available excess crushing and grinding capacity.
- Land usage permitting may be minimal if surface disturbance can be avoided.

The Faina Mineral Resource consists of Measured and Indicated Resources of 261,000 t at a grade of 6.87 g/t Au for a total of 58,000 oz Au and Inferred Mineral Resources of 1.54 Mt at a grade of 7.26 g/t Au for a total of 360,000 oz Au.

Faina mineralized material is refractory and the Turmalina Plant is presently not capable of treating refractory mineralized material. A flotation circuit would be required to concentrate Faina material. The flotation concentrate would either be shipped off site for treatment by a third party or an oxidation circuit would need to be added on site prior to leaching. Faina processing costs per tonne of ore would be higher than for the current non-refractory ores, however, the processing cost per gold ounce would be lower due to the Faina material's higher grade.

1.3.14.3 Pontal Deposits

The Pontal deposits are located approximately four kilometres northwest of the Turmalina Mine and one kilometre northwest of Faina. These encompass three exploration targets: Pontal North, Pontal (historical Mineral Resource), and Pontal South. The Pontal deposit has several advantages as a potential development project.

- The Turmalina Plant and other infrastructure are nearby (approximately four kilometres).
- Faina's metallurgical test work will likely apply to Pontal as well.
- The experience gained developing the Faina deposit will also help advance Pontal.

A significant challenge to developing the Pontal deposits is the refractory nature of its mineralization. The Turmalina Plant is currently not capable of treating refractory mineralization. The Turmalina Plant is currently not capable of treating refractory mineralization. Refractory treatment circuits would need to be installed for treating Faina material, and development of the Pontal deposits would extend the useful life of the refractory circuit or justify an expansion of the refractory circuit.

2.0 INTRODUCTION

SLR Consulting (Canada) Ltd (SLR) was retained by Jaguar Mining Inc. (Jaguar) to prepare an independent Technical Report on the Turmalina Mine Complex (Turmalina Complex or the Complex), located in Minas Gerais, Brazil. The purpose of this Technical Report is to support the disclosure of the Mineral Reserves and Mineral Resources as of December 31, 2021. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects. SLR has visited the Turmalina Complex a number of times, with the most recent site visit on January 24 to 28, 2022.

Jaguar is a Canadian listed junior gold mining, development, and exploration company operating in Brazil with three gold mining complexes and a large land package covering approximately 33,000 ha. Jaguar's principal operating assets are located in the Iron Quadrangle, which is a greenstone belt in the state of Minas Gerais. Jaguar's common shares are listed on the Toronto Stock Exchange under the symbol JAG.

The Turmalina Complex is operated by Jaguar's wholly-owned subsidiary, Mineração Serras do Oeste (MSOL). The Complex consists of a number of contiguous mineral rights holdings that cover an area of approximately 7,674 ha, and includes the Turmalina Mine, a processing plant (the Turmalina Plant), and two satellite deposits, Faina and Pontal. The Turmalina Mine consists of several zones grouped into three orebodies – Orebodies A, B, and C. The two satellite deposits, Faina and Pontal, are located along strike to the northwest.

Jaguar acquired the Turmalina Mine from AngloGold Ashanti Ltd. (AngloGold) in September 2004 and commenced mining operations in late 2006. The Turmalina Mine utilizes sublevel open stoping (SLOS) with backfill at a production rate of 1,100 tonnes per day (tpd) and ore is processed at the adjacent 2,000 tpd carbon-in-pulp (CIP) processing plant. At the Turmalina Plant, there are two lines of production that have the ability to run independently or combined in their CIP circuits. The first line consists of two ball mills (Mills #1 and #2), and the second line consists of a third ball mill (Mill #3). Jaguar acquired the Turmalina Mine from AngloGold Ashanti Ltd. (AngloGold) in September 2004 and commenced mining operations in late 2006. The Turmalina Mine utilizes sublevel open stoping (SLOS) with backfill at a production rate of 1,100 tonnes per day (tpd) and ore is processed at the adjacent 2,000 tpd carbon-in-pulp (CIP) processing plant. At the Turmalina Plant, there are two lines of production that have the ability to run independently or combined in their CIP circuits. The first line consists of two ball mills (Mills #1 and #2), and the second line consists of a third ball mill (Mill #3).

1.1 Sources of Information

Due to travel restrictions imposed by the coronavirus pandemic, a site visit to Turmalina, Faina, Pontal, and Zona Basal was carried out by Mr. Renan G. Lopes, M.Sc, MAusIMM CP(Geo), on behalf of the SLR team, from January 24 to 28, 2022.

During the site visit, Mr. Lopes reviewed the procedures pertaining to mining and geology, collected samples for an external laboratory check, visited the tailings facilities, core shed, mine operation, onsite laboratory, exploration areas, examined drill holes and ore faces at both the Turmalina Mine and Faina historic open pit, and held meetings with key personnel to discuss the workflow and methodology adopted for the estimation of the Turmalina Complex Mineral Resources and Mineral Reserves.

Discussions were held with the following personnel from Jaguar and Deswik Brazil Holdings Pty Ltd. (Deswik Brazil).

- Jonathan Victor Hill, VP, Geology & Exploration, Jaguar

- Armando José Massucatto, Geology & Exploration Manager, Jaguar
- Sergio Yngor Dourado Honorio dos Santos, Technical Services Manager, Jaguar
- Hugo Leonardo de Avila Gomes, Resource Geologist, Jaguar
- Paul Cezanne Pinto, Growth Projects Manager, Jaguar
- Afonso José Guedes Salles, Growth Projects Coordinator, Jaguar
- Vitor Diniz Silveira, Exploration Coordinator (MTL/CCA), Jaguar
- Williams Santos, Geology Coordinator, Jaguar
- Márcio Andre Sales, Mine Geology and Exploration Consultant, Jaguar
- Roberta Cristina Oliveira, Plant Manager (MTL), Jaguar
- Vagno Faustino, Plant Coordinator (MTL), Jaguar
- Gustavo Pereira de Aguiar, Financial Manager, Jaguar
- Francisco Bittencourt Oliveira, Regional Manager, Deswik Brazil
- Bruno Tomaselli, Consulting Manager, Deswik Brazil
- Rayssa Garcia de Sousa, Environmental Manager, Jaguar
- Frederico José da Costa Silva, Financial Coordinator, Jaguar
- Carla Fernandes Moura Tavares, Legal Manager, Jaguar
- Juliana Souza Dolabela, Human Resources Manager, Jaguar
- Ana Thereza Nápoles Balbi, Administrative Manager, Jaguar
- Christiane Delgado Alam, Institutional Relations, Jaguar
- Ana Andrade, Consulting, Deswik Brazil
- Bruna Rozendo, Consulting, Deswik Brazil

Table 2-1 presents a summary of the qualified person (QP) responsibilities for this Technical Report.

Table 2-1: Listing of SLR Qualified Persons
Jaguar Mining Inc. – Turmalina Mining Complex

Qualified Person	Title/Position	Sections
Reno Pressacco, M.Sc.(A)., P.Geo	Associate Principal Geologist	7.2.2, 9.2, 14.3
Dorota El-Rassi, M.Sc., P.Eng.	Consultant Geologist	7.2.3, 9.3, 14.4
Renan G. Lopes, M.Sc., MAusIMM CP(Geo)	Consultant Geologist	7.2.4, 9.4, 10.0, 11.0, 12.0
Pierre Landry, P.Geo.	Consultant Geologist	1.1.1.1, 1.1.2.1, 1.3.1 to 1.3.6, 4.0, to 6.0, 7.1, 7.2.1, 7.3, 7.4, 8.0, 9.1, 14.1, 14.2, 25.1, 26.1
Stephen R. Blaho, MBA, P.Eng.	Principal Mining Engineer	1.1.1.2, 1.1.2.2, 1.2, 1.3.7, 1.3.8, 1.3.11, 1.3.13, 1.3.14, 15.0, 16.0, 18.0, 19.0, 21.0 to 24.0, 25.2, 26.2
Jeff Sepp, P.Eng.	Consultant Mining Engineer	1.1, 1.1.1.4, 1.1.1.5, 1.1.2.4, 1.3.10, 1.3.12, 2.0, 3.0, 20.0, 25.4, 25.5, 26.4
Brenna J.Y. Scholey, P.Eng.	Principal Metallurgist	1.1.1.3, 1.1.2.3, 1.3.9, 13.0, 17.0, 25.3, 26.3
All	-	27.0

The documentation reviewed, and other sources of information, are listed at the end of this Technical Report in Section 27 References.

2.1 List of Abbreviations

Units of measurement used in this Technical Report conform to the metric system. All currency in this Technical Report is US dollars (US$) unless otherwise noted.

μ	micron	kVA	kilovolt-amperes
μg	microgram	kW	kilowatt
a	annum	kWh	kilowatt-hour
A	ampere	L	litre
bbl	barrels	lb	pound
Btu	British thermal units	L/s	litres per second
°C	degree Celsius	m	metre
C$	Canadian dollars	M	mega (million); molar
cal	calorie	m^2	square metre
cfm	cubic feet per minute	m^3	cubic metre
cm	centimetre	MASL	metres above sea level
cm^2	square centimetre	m^3/h	cubic metres per hour
d	day	mi	mile
dia	diameter	min	minute
dmt	dry metric tonne	μm	micrometre
dwt	dead-weight ton	mm	millimetre
°F	degree Fahrenheit	mph	miles per hour
ft	foot	MVA	megavolt-amperes
ft^2	square foot	MW	megawatt
ft^3	cubic foot	MWh	megawatt-hour
ft/s	foot per second	oz	Troy ounce (31.1035g)
g	gram	oz/st, opt	ounce per short ton
G	giga (billion)	ppb	part per billion
Gal	Imperial gallon	ppm	part per million
g/L	gram per litre	psia	pound per square inch absolute
Gpm	Imperial gallons per minute	psig	pound per square inch gauge
g/t	gram per tonne	RL	relative elevation
gr/ft^3	grain per cubic foot	s	second
gr/m^3	grain per cubic metre	st	short ton
ha	hectare	stpa	short ton per year
hp	horsepower	stpd	short ton per day

hr	hour	t	metric tonne
Hz	hertz	tpa	metric tonne per year
in.	inch	tpd	metric tonne per day
in^2	square inch	US$	United States dollar
J	joule	Usg	United States gallon
k	kilo (thousand)	Usgpm	US gallon per minute
kcal	kilocalorie	V	volt
kg	kilogram	W	watt
km	kilometre	wmt	wet metric tonne
km^2	square kilometre	wt%	weight percent
km/h	kilometre per hour	yd^3	cubic yard
kPa	kilopascal	yr	year

3.0 RELIANCE ON OTHER EXPERTS

This Technical Report has been prepared by SLR QPs for Jaguar. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to the SLR QPs at the time of preparation of this Technical Report.
- Assumptions, conditions, and qualifications as set forth in this Technical Report.

For the purpose of this Technical Report, the SLR QPs have relied on ownership information provided by Jaguar. The SLR QPs have not researched property title or mineral rights for the Turmalina Complex and express no opinion as to the ownership status of the property.

The SLR QPs have relied on Jaguar for guidance on applicable taxes royalties, and other government levies or interests, applicable to revenue or income from Turmalina Complex for Section 22 Economic Analysis.

Except for the purposes legislated under provincial securities laws, any use of this Technical Report by any third party is at that party's sole risk.

4.0 PROPERTY DESCRIPTION AND LOCATION

The Complex is located in the state of Minas Gerais, approximately 120 km northwest of Belo Horizonte and 10 km south of Pitangui, the nearest town of significant size (Figure 4-1). The Complex is located in the Conceição do Pará municipality.

Jaguar, like other Brazilian mining companies, has large mining concessions, which typically range upwards of 2,000 ha per concession. As a result, a project may have numerous related mineralized zones, extending over many kilometres of strike length, which may eventually have individual mining operations. It is common to group these operations under a single mine name, which is often the first operation put into production. To assist in the definition of the location of the primary operation, the geographic coordinates of this primary operation are listed by latitude and longitude. The Turmalina Complex has geographic coordinates of 19°44’36.96” S latitude and 44°52’36.45” W longitude.

4.1 Mineral Tenure

Jaguar acquired the Turmalina Complex from AngloGold in September 2004. Jaguar, through its wholly-owned subsidiary, MSOL, holds 100% ownership of the Turmalina Complex, subject to a 5% net revenue interest up to $10 million, and 3% thereafter, to an independent third party. In addition, there is a 0.5% net revenue interest payable to the surface landowner.

The Turmalina Complex comprises a number of contiguous mineral rights holdings granted by the Agência Nacional de Mineração (ANM) that, as of Q4 2021, cover an area of 2,932 ha of mining permits (“mining concessions”) and 4,742.5 ha of active exploration permits (“exploration authorizations”), as summarized in Table 4-1. A summary of the mineral rights royalties and surface rights royalties paid in 2021 is provided in Table 4-2. A summary of the surface rights holdings in 2021 is provided in Table 4-3. The locations of the mineral rights are illustrated in Figure 4-2 and Figure 4-3, in relation to the Turmalina metallurgical plant and the mining industrial facilities, respectively. The surface rights around the Turmalina mining industrial project are illustrated in Figure 4-4.

Table 4-1: Summary of Active Mineral Rights Holdings
Jaguar Mining Inc. – Turmalina Mine Complex

ANM Registry No.	Name of the Mineral Title	Licence Date	Area (ha)	Status
812.003/1975	Caquilho	11/09/1991	980.43	Mining Concession
812.004/1975	Varajo-Pontal e Ltamar	04/09/1991	880.00	Mining Concession
803.470/1978	Rio S. João	25/04/1995	952.00	Mining Concession
830.027/1979	Pontal	26/04/1995	120.00	Mining Concession
930.086/2005	Turmalina Mining Group	26/02/2010	n/a	Group Mining Concessions
	Total Mining Concession		**2,932.43**	
831.125/2018	Zona Basal	06/09/2018	11.68	Exploration Authorization
831.126.2018	Zona Basal	06/09/2018	26.13	Exploration Authorization
831.131/2015	Zona Basal	19/02/2016	131.15	Exploration Authorization

ANM Registry No.	Name of the Mineral Title	Licence Date	Area (ha)	Status
831.617/2003	Rio S. João	21/07/2010	858.71	Exploration Authorization[1]
833.584/2012	Zona Basal	16/04/2018	77.87	Exploration Authorization
830.400/2019	Bom Despacho/Leandro Feirreira	25/05/2020	1,591.9	Exploration Authorization
830.401./2019	Bom Despacho/Leandro Feirreira	25/05/2020	1,213.09	Exploration Authorization
830.402/2019	Conceição do Pará	25/05/2020	21.08	Exploration Authorization
830.093/2020	Pappagaios e Maravilhas	12/08/2020	810.91	Exploration Authorization
	Total Exploration Authorization		**4,742.52**	

Notes:

1. Final Exploration Report Filed at the ANM

Table 4-2: Summary of Mineral Royalties, Concession No. 812.003/1975
Jaguar Mining Inc. – Turmalina Mine Complex

Mineral Rights Royalties				
Holder	**Royalty**	**Orebody**	**Payment Status in R$[1]**	
			Status	**Paid in 2021**
Eduardo C. de Fonseca	5% of the Production Gross Profits until reaching US$10 million during current fiscal year, then 3% of the Production Gross Profit	A, B and C	Inactive	-
Carlos Andraus / Mirra Empreend. E Participações Ltda.			Active (30%)	2,266,909.84
Vera A. Di Pace / Vermar Empreend. E Participações Ltda.			Active (30%)	2,266,909.84
Paulo C. De Fonseca / Sandalo Empreend. E Participações Ltda.			Active (16%)	1,209,018.57
Clara Darghan/Mocla Empreend. E Participações Ltda.			Active (12%)	4,007,658.96
Eduardo Camiz de F. Junior / Agro Pecuária Aldebaram Empreend. Ltda.			Active (12%)	906.763.96

Surface Rights Royalties				
Holder	Refers to	Orebody	Payment Status in R$[1]	
			Base Value	Paid in 2021
José Laeste de Lacerda	Surface	A, B and C	6,868	200,011.33
Wilson Clemente de Faria	Building rent		1,627	163,304.52
	Surface		6,420	
EPAMIG	Surface	Faina	27,250	333,624.39
Familia Freitas	Water pipe	A, B and C	2,574	123,288.00
	Water well		2,143	
	Road access		6,866	

Notes:

2. R$ = Brazilian Reais

Table 4-3: Summary of Surface Rights Holdings
Jaguar Mining Inc. – Turmalina Mine Complex

Name	Registry Number	Location	Area (ha)	Status	20% Area Forest Legal Reserve
Fazenda Caiamal (Fazenda José Maria, Espólio)	Mat. R-01-13.321 – Livro 2 – Área: 40 ha / Mat. R-02- 5.873 – Livro 2 – Área: 31.5 ha	Tailings Dam (partial)	71.5	Active	The legal reserve of a total of 18.81 ha is in good standing but the registration at the public notary is still pending.
Fazenda Caiamal (Fazenda Barbiere)	Mat. 32.288 – Livro 2	Processing Plant, Fill Plant, Tailings Dam and Core shack	96	Active	Legal Reserve is in good standing. Area of 19.50 ha.
Fazenda Irmãos Freitas (Caca / Antônio Carlos Alves De Freitas)	Mat. 30.108 – Livro 2	Orebodies C and D	30	Active	Legal reserve established in name of IBDF (Instituto Brasileiro de Florestas), according to AV – 1 – 30108-03/07/2003, Registration of Legal reserve in name of Jaguar pending.
Fazenda Casquilho (Alexandre Ferreira Da Silva)	-	Office, Mess, Mechanic Shop and Decline Portal	3	Active	No Forest legal reserve registered as the area has no more available forest
Fazenda Tanque	Pending	Down Dip Projection of Orebodies A & B	25		
Fazenda Açoita-Cavalo	Mat. Nº 48.220	Zona Basal Exploration	24.4	Active	

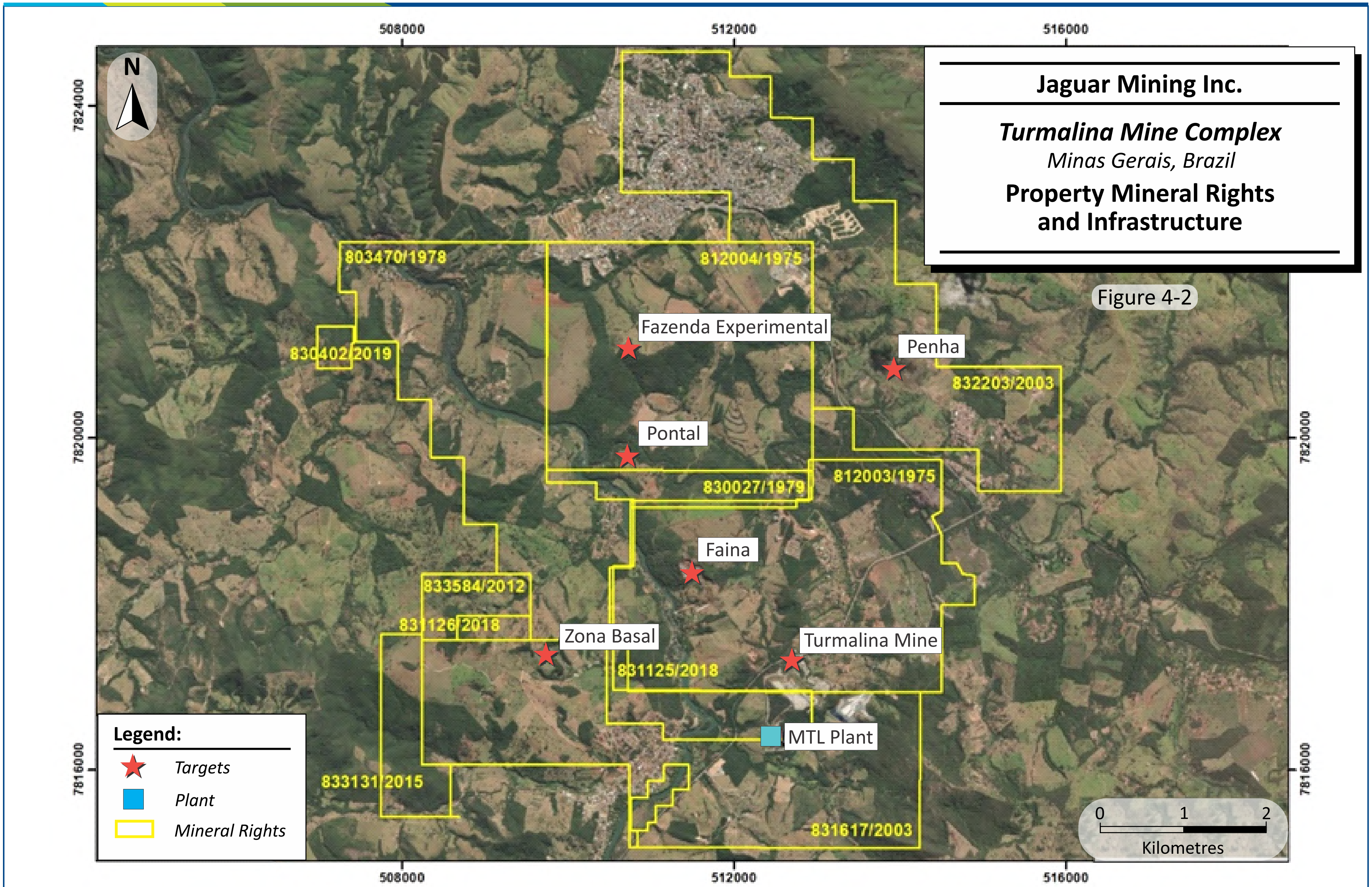
Figure 4-1

Jaguar Mining Inc.

Turmalina Mining Complex

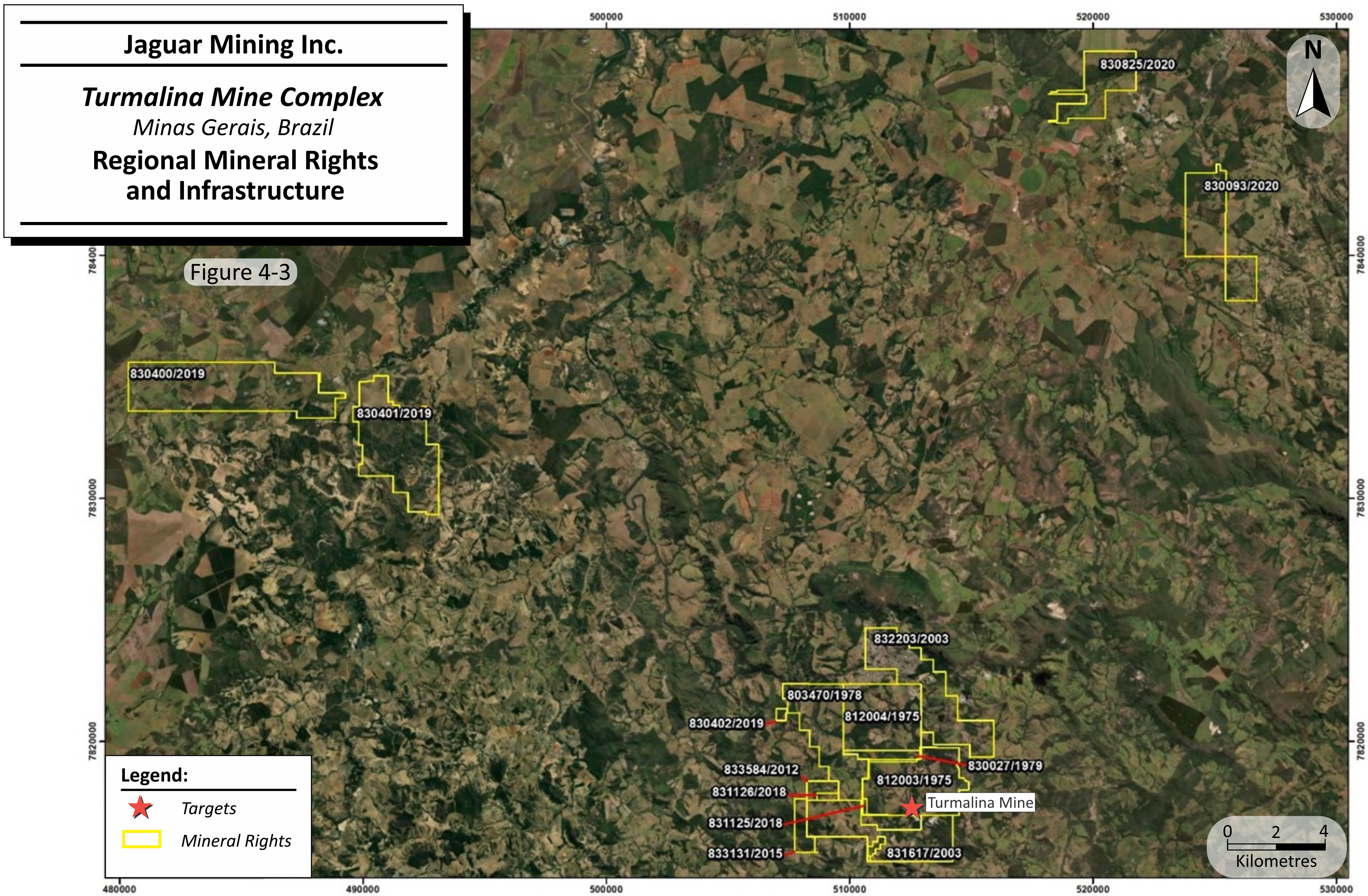
Minas Gerais, Brazil

Location Map



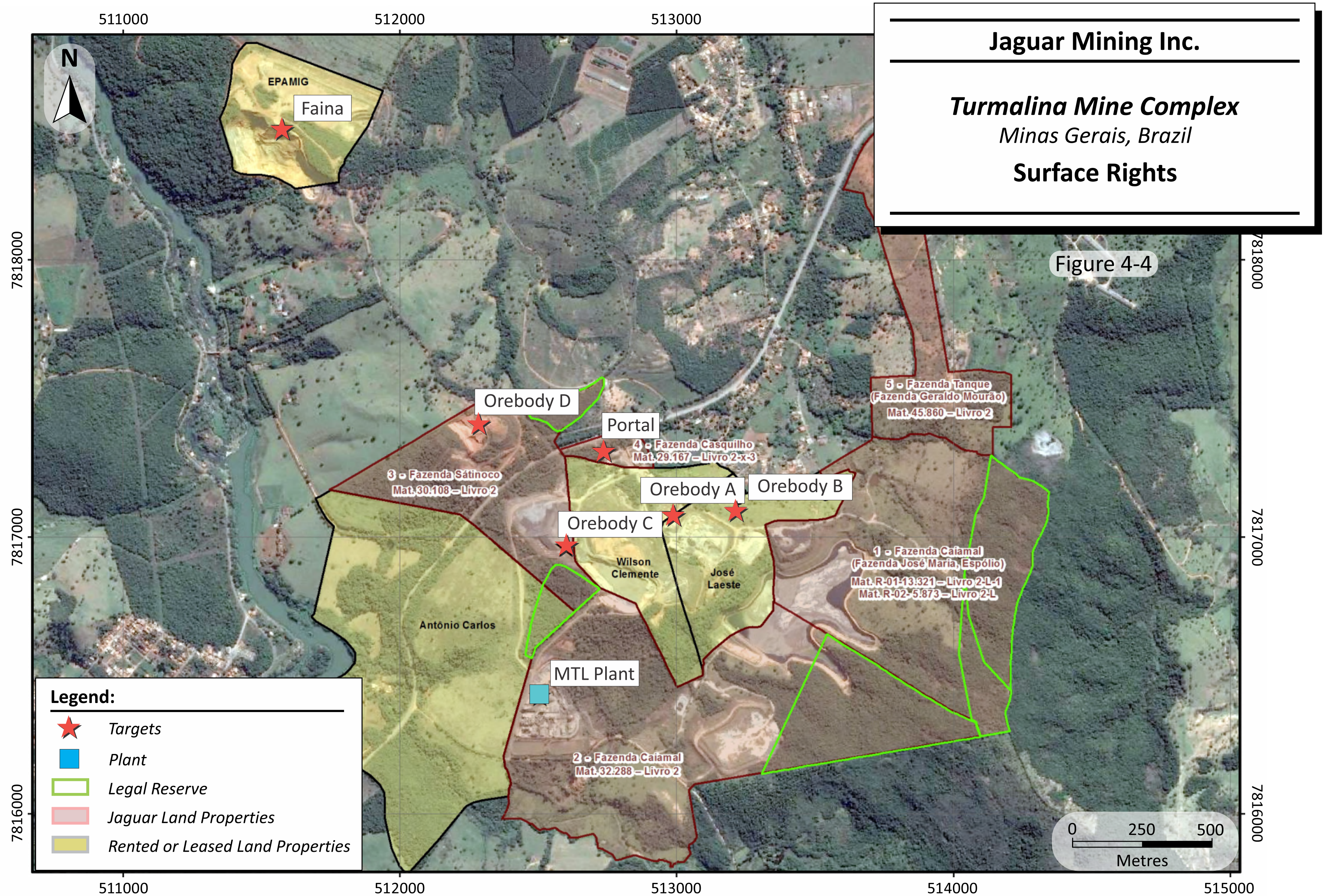
March 2022

Source: Jaguar Mining Inc., 2016.



March 2022

Source: Jaguar Mining Inc., 2016.



March 2022

Source: Jaguar Mining Inc., 2016.

4.2 Mineral and Surface Rights in Brazil

In Brazil, the ANM issues all mining leases and exploration concessions. Mining leases are renewable annually and have no set expiry date. Each year, Jaguar is required to provide information to ANM summarizing mine production statistics to maintain the mining leases and exploration concessions in good standing.

Exploration permits are granted for a period of three years. Once a company has applied for an exploration permits, the applicant holds a priority right to the concession area as long as there is no previous ownership. The owner of the permit can apply to have the exploration permit renewed for a one time extension period up to three years. The fees for holding the permits during this initial three year phase is Brazilian Reais (R$) 4.09/ha, to be paid annually. The fees for holding the permits during the second phase is R$6.13/ha, to be paid annually. Renewal is at the sole discretion of ANM. Granted exploration permits are published in the Official Gazette of the Republic (Diário Oficial da União - DOU), which lists individual concessions and their change in status. The exploration permit grants the owner the sub-surface mineral rights. Surface rights can be applied for if the land is not owned by a third party.

The owner of an exploration concession is guaranteed, by law, access to perform exploration field work, provided adequate compensation is paid to third party landowners and the owner accepts all environmental liabilities resulting from the exploration work. The exploration permits are subject to annual fees based on its size.

In instances where third party landowners have denied surface access to an exploration concession, the owner maintains full title to the concession until such time as the issue of access is negotiated or legally enforced by the courts. Access is guaranteed under law and the owner of an exploration permit will eventually gain easements to access the concession.

Once access is obtained, the owner has three years (or six years after a renewal) to submit an Exploration Report (ER) on the concession. The owner of a mineral concession is obligated to explore the mineral potential of the concession and submit an ER to ANM summarizing the results of the fieldwork and providing conclusions as to the economic viability of the mineralization. The content and structure of the report is dictated by ANM, and a person with suitable professional qualifications must prepare the report.

ANM will review the ER for the concessions and will either:

- Approve the report provided ANM concurs with the report's conclusions regarding the potential to exploit the mineralization.
- Dismiss the report should the report not address all the requirements; in which case the owner is given a term in which to address any identified deficiencies in the report.
- Postpone a decision on the report should it be decided that exploitation of the deposits is temporarily non-economic.

Approval, dismissal, or postponement of the ER is at the discretion of the ANM. There is no set time limit for the ANM to complete the review of the ER. The owner is notified of the ANM's decision on the ER and the decision ID is published in the DOU.

On ANM approval of the ER, the owner of an exploration concession has one year to apply for a mining lease. The application must include a detailed Development Plan (DP) outlining how the deposit will be mined.

ANM reviews the DP and decides whether or not to grant the application. The decision is at the discretion of ANM, but approval is virtually assured unless development of the project is considered harmful to the public or the development of the project compromises interests more relevant than industrial exploitation. Should the application for a mining lease be denied for exploration concessions for which the ER has been approved, the owner is entitled to government compensation.

On approval of the DP, ANM grants the mining licence, which remains in force until the depletion of the mineral resource. Mining concessions remain in good standing subject to submission of annual production reports and payments of royalties to the federal government.

The SLR QP is not aware of any environmental liabilities on the property. Jaguar has all required permits to conduct the proposed work on the property. The SLR QP is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the property.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The Complex is accessed from Belo Horizonte by 130 km of paved highways (BR-262 and MG-423) to the town of Pitangui. The Turmalina deposits are located approximately 10 km south of the town of Pitangui and less than one kilometre from highway MG-423.

Belo Horizonte is the commercial center for Brazil's mining industries and has excellent infrastructure to support world-class mining operations. This mining region has historically produced significant quantities of gold and iron from open pit and large-scale underground mining operations operated by AngloGold, VALE, CSN, and Eldorado. The city of Belo Horizonte has a population of approximately 2.5 million residents, and has substantial infrastructure including two airports, an extensive network of paved highways, a fully developed and reliable power grid, and ready access to processed and potable water.

Pitangui is a town of approximately 25,000 people. The local economy is based on agriculture, cattle breeding, and a small pig iron plant. Manpower, energy, and water are readily available.

5.2 Climate

The Complex is at an elevation of approximately 700 MASL. The Pitangui area terrain is rugged in places, with numerous rolling hills incised by deep gullies along drainage channels. Farming and ranching activities are carried out in approximately 50% of the region.

The dominant climate in the region is temperate, with average annual temperatures hovering around 26°C. In the winter period, minimum temperatures of 10°C are noted. In the summer, there are a few records above 32°C. According to the Köppen classification, the regional climate is classified as Cwb, mesothermal, with mild summers and dry autumn and winter seasons.

There are two distinct seasons: the rainy summer, usually from October to March, and the dry winter, from April to September. The average annual rainfall is around 1,650 mm and the rainiest months are December and January. The relative humidity of the air ranges from 75% to 85%. Operations take place year round.

5.3 Vegetation

The region is located in the western portion of the Atlantic Province, also known as the Atlantic Morphoclimatic Domain or Atlantic Forest Biome. In the Vegetation Map of Brazil (IBGE, 1993) this region ranges from seasonal semideciduous forest and cerrado (woodland savannah).

The forests of this area, when fully grown and depending on the soil, have trees up to 30 m in height. At this stage, they have a defined stratification, with a low dense understory composed of shrubs and trees.

The predominant vegetation is the cerrado, with small trees and shrubs. Large areas are now transformed into pastures. Along the Pará River and its tributary streams, riparian forests are characterized by medium-sized trees.

Due to long term and ongoing human settlement in the region, the vegetation cover has generally been replaced with secondary formations and pastures. The various forest fragments still observed in the region are at a secondary stage, resulting from regeneration.

5.4 Soil Aspects

Where well defined, the soils have little variability in appearance, with a clear predominance of silty-clayey soils with a pink to brownish color, resulting from the decomposition of phyllites/schists, widely distributed in the area.

The soils are better exposed on the slopes of the valleys, due to colluvium concentrations. In the higher lands, where the most widely spaced vegetation predominates, there are little developed and stony soils.

5.5 Local Resources

Belo Horizonte is one of the world's mining capitals, with a regional population of approximately six million people. Automobile manufacturing and mining services dominate the economy. Mining activities in Belo Horizonte and the surrounding area have been carried out for over 300 years. The Complex is within two and a half hours by road from Belo Horizonte.

5.6 Infrastructure

The Complex includes the Turmalina Plant, with a nominal capacity of 2,000 tpd, and tailings disposal area. Electrical power is obtained from the national grid.

Most ancillary buildings, including the gate house including a reception area and waiting room, administration building, maintenance shops, restaurant, warehouse, change room, first aid, and compressor room, are located near the mine entrance. The explosives warehouse is located 1.2 km away from the mine area, in compliance with the regulations set forth by the Brazilian Army.

Other ancillary buildings are located near the Turmalina Plant and include an office building, a laboratory, warehouse, and a small maintenance shop. There is currently no infrastructure related to the Faina and Pontal historic open pit operations.

6.0 HISTORY

Gold was first discovered in the Turmalina area in the 17th century, and through the 19th century, intermittent small scale production took place from alluvial terraces and outcropping quartz veins. Gold production exploited alluvium or weathered material, including saprolite and saprolite hosted quartz veins. Records from this historical period are few and incomplete.

From 1978 to 2004, AngloGold , through a number of Brazilian subsidiaries, held the mineral rights to the Turmalina Complex. AngloGold explored the Complex area extensively between 1979 and 1988 using geochemistry, ground geophysics, and trenching, which led to the discovery of the Turmalina, Satinoco (now referred to as Orebody C), Faina, and Pontal deposits, and other mineralized zones. Initial exploration work at Orebody A included 22 surface based diamond drill holes totalling 5,439 m to test the downward extension of the sulphide mineralized body. At the Satinoco target (Orebody C), a total of 1,523 m was drilled in nine holes.

In 1992 and 1993, AngloGold mined 373,000 t of oxide ore from open pits at the Turmalina, Satinoco (Orebody C), Pontal, and Faina zones, recovering 35,500 oz Au using heap leach technology. Subsequently, AngloGold drove a ramp beneath the Turmalina pit and carried out drifting on two levels in the mineralized zone at approximately 50 m and 75 m below the pit floor to explore the downward extension of the sulphide mineralized body.

Jaguar acquired the Turmalina Complex in 2004 and continued operation of the Turmalina Mine. The Turmalina Mine is accessed from a 5.0 m x 5.5 m primary decline located in the footwall of the main deposit. As of December 31, 2021, the decline has reached Level 15, at a vertical depth of approximately 1,052 m below surface.

6.1 Historical Resource Estimates

SLR is not aware of any historical Mineral Resource estimates prepared by previous owners of the land holdings.

6.2 Past Production

In 2021, the Turmalina Plant processed approximately 410,000 t at an average feed grade of 3.12 g/t Au to produce 37,505 oz Au. In total, the Turmalina Plant has processed approximately 7.3 million tonnes (Mt) of ore to produce a total of approximately 783,200 oz Au at an average recovered grade of 3.27 g/t Au (Table 6-1). This production includes a small quantity of material that was processed prior to Jaguar's ownership, the sulphide material extracted by Jaguar from Orebodies A, B, and C, and the oxide portions of the Orebody D, Faina, and Pontal deposits that were amenable to treatment at the existing plant.

Production from the Faina deposit open pit mine took place intermittently over a three year period between June 2010 and June 2013.

Table 6-1: Production History and Mill Recovery
Jaguar Mining Inc. – Turmalina Mine Complex

Year	Tonnage Milled (000 t)	Feed Grade (g/t Au)	Recovered Grade (g/t Au)	Recovery (%)	Gold Produced (oz)
1992-1993	373	-	2.96	-	35,500
Q4 2006	9	2.58	-	91.5	678
2007	347	5.08	4.40	86.6	44,515
2008	481	5.46	4.83	88.5	72,514
2009	588	4.81	4.29	89.1	73,589
2010	692	3.20	2.80	87.4	61,860
2011	655	3.32	2.96	89.2	61,676
2012	473	2.48	2.21	89.2	37,840
2013	457	3.24	2.87	88.7	43,424
2014	442	3.69	3.32	90.0	47,993
2015	406	4.14	3.77	91.0	50,658
2016	502	3.89	3.56	91.5	63,258
2017	427	3.48	3.17	91.0	45,466
2018	322	3.44	3.12	90.7	33,261
2019	334	3.15	2.83	89.9	33,400
2020	370	3.65	3.26	89.3	40,067
2021	410	3.12	2.76	88.6	37,505
Total	**7,288**	**3.54**	**3.27**	**-**	**783,204**

7.0 GEOLOGICAL SETTING AND MINERALIZATION

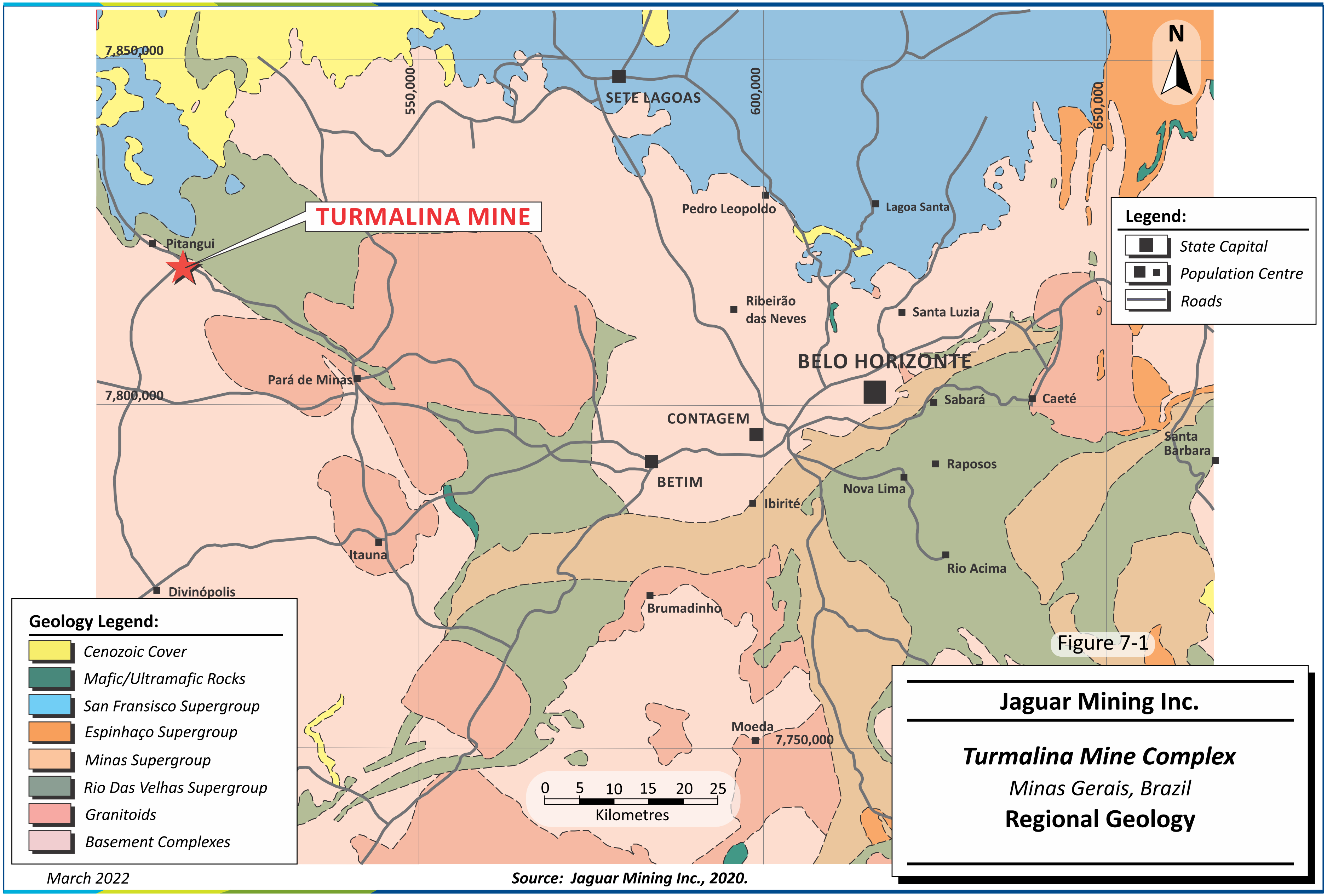
7.1 Regional Geology

The Turmalina deposits are located in the western part of the Iron Quadrangle, which was the principal region for Brazilian hard rock gold mining until the early 1980s, when the Carajás mineral province, in the state of Pará, attained equal status. Many commodities are mined in the Iron Quadrangle, the most important being gold, iron, manganese, bauxite, imperial topaz, and limestone. Until the early 1980s the Iron Quadrangle accounted for approximately 40% of Brazil's total gold production. Gold was produced from numerous deposits, primarily in the northern and southeastern parts of the Iron Quadrangle, hosted by Archean or Early Proterozoic banded iron formations (BIF) contained within greenstone belt supracrustal sequences.

In the type-locality Brumal-Pilar region (in Santa Bárbara County, where Jaguar´s Pilar mine is located), outcrops belonging to the granitic gneissic basement, and to the Nova Lima and Quebra-Ossos groups of the Rio das Velhas Supergroup occur. The granitic gneissic basement consists of leucocratic and homogeneous gneisses and migmatites, making up a complex of an initial tonalitic composition intruded by Archean rocks of granitic composition. The upper contact of the sequence is discordant and tectonically induced by reverse faulting. The Rio das Velhas Supergroup is represented in the region by meta-mafic, meta-volcaniclastic and meta-epiclastic schists of the Nova Lima Group, and by meta-ultramafic and meta-mafic rocks of the Quebra-Ossos Group including serpentinites, talc schists, and metabasalts.

"Algoma-type" iron formations occur as the more prominent volcanogenic-sedimentary rocks in the Nova Lima Group, as individual layers with thicknesses of up to 15 m. The Nova Lima Group can be subdivided into three units: a) A basal unit composed of mafic (basic) to intermediate meta-volcanic rocks interlayered with meta-pelites, Algoma-type BIFs, and rare acidic meta-volcaniclastic rocks; b) An intermediate unit represented by mafic to felsic volcanic rocks and volcaniclastic rocks interlayered with graphitic phyllite and horizons of Algoma-type BIF; and c) An upper unit composed of meta-pelites interlayered with felsic meta-volcanic rocks and meta-volcaniclastic rocks, quartzites, and meta-conglomerates.

The broad regional geology of the Iron Quadrangle is shown in Figure 7-1.


TURMALINA MINE
7,850,000
7,800,000
7,750,000
550,000
600,000
650,000
N
SETE LAGOAS
Pedro Leopoldo
Lagoa Santa
Pitangui
Ribeirão das Neves
Santa Luzia
BELO HORIZONTE
Pará de Minas
Sabará
Caeté
CONTAGEM
Santa Barbara
Raposos
BETIM
Nova Lima
Ibirité
Itauna
Rio Acima
Divinópolis
Brumadinho
Moeda
Legend:
State Capital
Population Centre
Roads
Geology Legend:
Cenozoic Cover
Mafic/Ultramafic Rocks
San Fransisco Supergroup
Espinhaço Supergroup
Minas Supergroup
Rio Das Velhas Supergroup
Granitoids
Basement Complexes
0 5 10 15 20 25
Kilometres
Figure 7-1
Jaguar Mining Inc.
Turmalina Mine Complex
Minas Gerais, Brazil
Regional Geology
March 2022
Source: Jaguar Mining Inc., 2020.

7.2 Local Geology

7.2.1 Turmalina Mine

The Pitangui area, where the Complex is located, is underlain by rocks of Archaean and Proterozoic ages. Archaean units include a granitic basement, which is overlain by the Pitangui Group, a sequence of ultramafic to intermediate volcanic flows and pyroclastics and associated sediments. The Turmalina deposit is hosted by chlorite-amphibole schists and silicified biotite schist units within the Pitangui Group. A sequence of sheared, banded, sulphide-facies and silicate-facies iron formations and cherts lies within the stratigraphic sequence. The stratigraphy broadly strikes towards an azimuth of 135°.

Proterozoic units include the Minas Supergroup and the Bambuí Group. The former includes basal quartzites and conglomerates as well as phyllites. Some phyllites, stratigraphically higher in the sequence, are hematitic in nature. The Bambuí Group is composed of calcareous sediments and slates.

The local geology in the Complex and adjacent exploration areas was defined by geologists from Unigeo Geologia e Mineração, a former subsidiary of Mineração Morro Velho and AngloGold, during the initial exploration field work phase. At that time, the mapped lithologies and stratigraphy were defined and classified as a greenstone belt sequence, within a possible western extension of the Archean portions of the Iron Quadrangle terrain.

7.2.1.1 Stratigraphic Setting

The stratigraphic column defined by Unigeo in the Pitangui region, from bottom to the top was as follows:

Basement: The basement is composed of a foliated, leucocratic granites and gneisses. Locally, it has been defined by its migmatite portions with porphyry crystals of quartz and K-feldspars. Granitic intrusions with fine-to-medium grained textures, and diabase dikes, are also common.

Pitangui Group: The Pitangui Group is defined as a greenstone-belt sequence, of Archean age. It shows the following stratigraphic sequence (from the base to the top):

- Meta-Ultramafic and Meta-Mafic Volcanic Unit (Basal Unit): constituted by interlayered igneous ultramafic and mafic flows represented by serpentinites, chlorite-actinolite schists and amphibolites with layers of talc schists, oxide-facies BIFs and carbonaceous phyllites
- Meta-Mafic and Meta-Sedimentary Unit (Middle Unit): constituted by interlayered meta-mafic rocks (chlorite-actinolite schists with dacitic intrusions at the top)
- Meta-Sedimentary: cummingtonite BIFs and meta-chert rich horizons interlayered with carbonaceous and chlorite schists. Locally, layers of meta-arkoses can be observed
- Meta-Mafic: alternation of layers of amphibolite and chlorite-actinolites
- Pyroclastic and Meta-Pelites: volcanic meta-conglomerates at the base, transitioning to, or alternating with, foliated meta-lapilli tuffs and meta-tuffs at the top of the sequence, where the meta-tuffs become predominant
- Meta-Sedimentary Unit (Upper Unit): narrow and numerous interlayered layers of quartz-sericite schists, quartz-chlorite schists, quartz-sericite-chlorite schists, and carbonate-rich schists

Minas Supergroup: The Minas Supergroup is defined as clastic and chemical sediments in a Proterozoic sequence composed by thin-to-coarse quartzites with layers of a basal conglomerate. The quartzites are covered by grey carbonatic phyllites and white sericitic phyllites which present hematite contents increasing towards the stratigraphic top of the sequence.

Intrusive Rocks: The intrusive rocks are defined as granitic and mafic-to-ultramafic rocks and rocks assemblages.

7.2.2 Faina Deposit

7.2.2.1 Stratigraphic Setting

Within the Faina deposit area, the general lithostratigraphic column of the mine package has been defined by Jaguar's geological team as follows (from the base to the top, however not necessarily in an upright stratigraphic sequence):

Basal Carbonaceous Phyllite Package: The Faina deposit mineralized package starts with a basal package of very dark-colored, carbonaceous chlorite-sericite-quartz phyllites. These rocks are barren in terms of economic grades for gold. Figure 7-2 illustrates Basal Carbonaceous Phyllite Package in the Faina open pit.

Figure 7-2: Faina Basal Carbonaceous Phyllite Package

"BIF-Metachert" Horizon: The Carbonaceous Phyllite Package is overlain by a horizon of bedded, siliceous "chertic" rocks with local total thicknesses of up to 10 m to 12 m (Figure 7-3). Lithologically, this horizon corresponds to a rhythmically bedded "volcano-chemical" deposition, with alternating siliceous/chertic beds and carbonate-silicate beds (ankerite, chlorite, amphiboles).

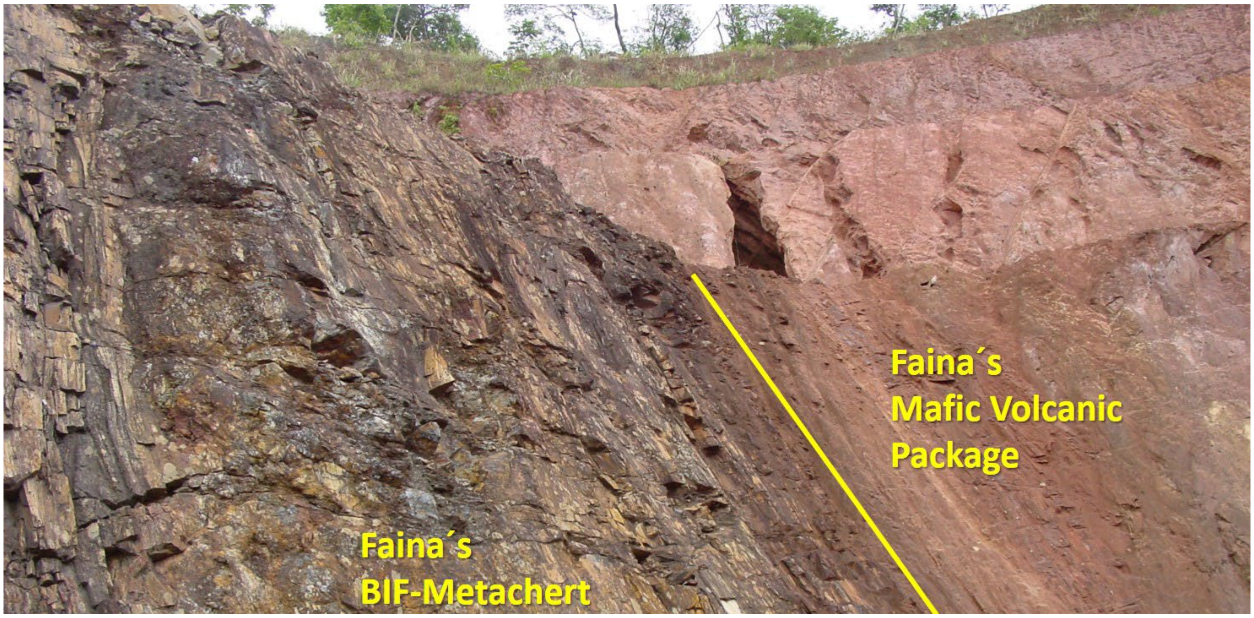


Figure 7-3: Faina BIF-Metachert and Mafic Volcanic Packages

Mafic Metavolcanic Unit: This is the stratigraphic package that hosts the economic mineralized bodies of the Faina deposit. The Mafic Metavolcanic Unit is composed of amphibolites and amphibole greenschists.

7.2.2.2 Structural Geology

The Faina mineralization and mineralized zones hosted by the Mafic Metavolcanic Unit is inferred to be related, in a larger scale, to a regional, northwest-southeast oriented, transpressional faulting event that also generated a coeval smaller-scale system of east-northeast–west-southwest accommodation, transcurrent-movement faults.

Bedding surfaces are easily recorded both in open pit exposures and in drill cores (with the use of the IQ-logger technique) of rocks of the Basal Carbonaceous Phyllite Package and of the BIF-Metachert Horizon. Conversely, bedding surfaces have rarely been confidently observed in amphibolites and greenschists of the Mafic Metavolcanic Unit. The study of the trajectories of the bedding surfaces for the entire length of the Faina open pit (and its immediate extensions) indicates the framework and geometry of a relatively open, deposit-scale fold with its two limbs dipping (i) 50° towards an azimuth of 74° and, (ii) 57° towards an azimuth of 6°. The fold axis attitude has been inferred to be a plunge of 45° towards an azimuth of 53°.

The main penetrative tectonic foliation mapped in amphibolites and amphibole greenschists of the Mafic Metavolcanic Unit (the Sn cleavage) has also been folded. The mean attitudes/dips of these tectonic planar surfaces (maximums) are: (i) 54° towards an azimuth of 94° and, (ii) 56° towards an azimuth of 24° (therefore, close to parallel to the orientation of the bedding surfaces recorded in bedded rocks of the Basal Carbonaceous Phyllite Package and of the BIF-Metachert Horizon). The inferred attitude for the axis of the folded Sn surfaces mapped along entire length of the Faina open pit (and its immediate extensions) is around 49° towards an azimuth of 70°.

Figure 7-4 shows a geological map of the Faina deposit area, indicating the presence of a larger-scale, northwest-southeast oriented, transpressional compressional fault event (Section 7.2.4.2) that appears to have generated a coeval smaller-scale system of east-northeast–west-southwest-oriented accommodation, transcurrent-movement faults. The outline of the previously modelled individual economic mineralized zones, as shown in yellow in Figure 7-4, had already indicated the existence of a relative open, high-amplitude fold for the Faina mine package. Such a fold would have one limb dipping towards the east-northeast, and the other one dipping approximately towards the north. A synthesis of the structural readings collected in drill cores (with the use of the IQ-logger technique) during the more recent 2020 and 2021 Faina drilling campaign is presented in Figure 7-4.

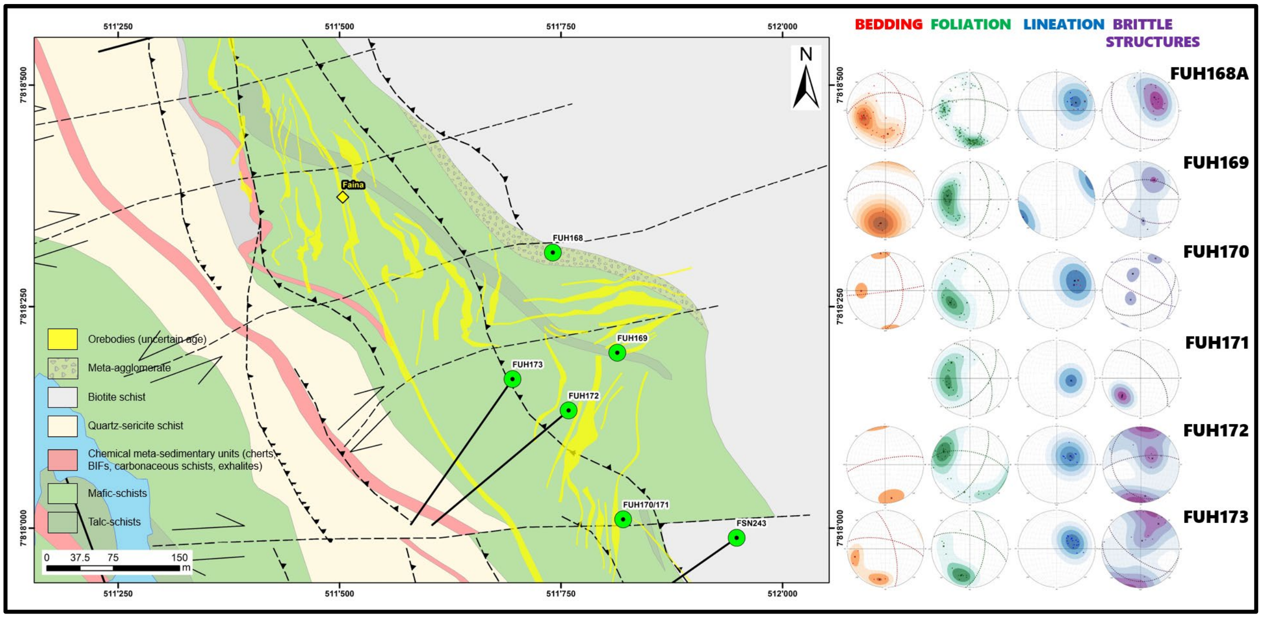


Figure 7-4: Faina Geological Map

Figure 7-5 shows an exposure of amphibolites of the Mafic Metavolcanic Unit in the Faina open pit exhibiting two distinct penetrative planar petrofabrics. The "coarser" planar fabric has been interpreted as the bedding surfaces (S0); the finer-spaced one has been inferred to be the Sn tectonic cleavage/foliation.

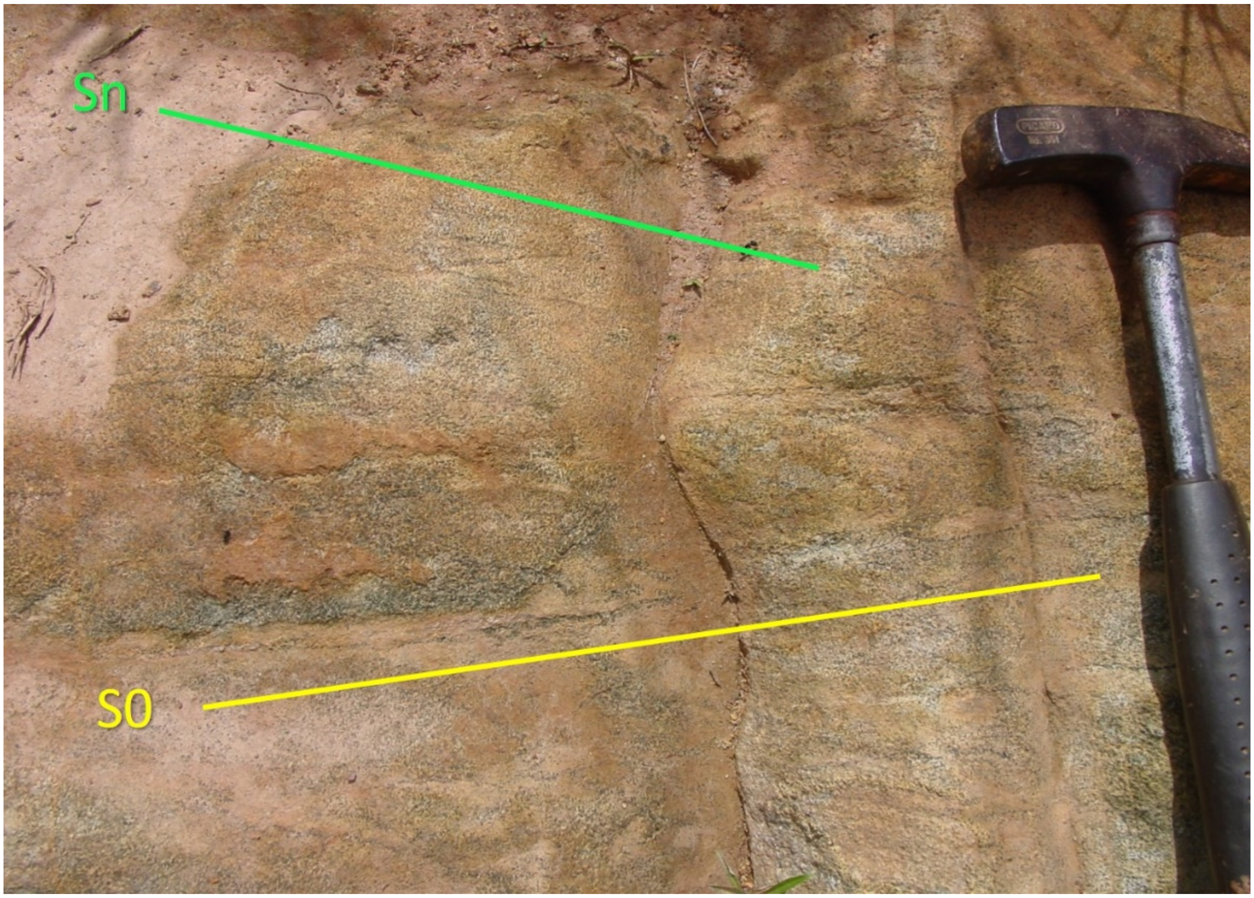


Figure 7-5: Mafic Metavolcanic Unit Amphibolites in the Faina Open Pit

The main penetrative linear petrofabrics observed in rocks from the Basal Carbonaceous Phyllite Package, from the BIF-Metachert Horizon, and from the Mafic Volcanic Unit at Faina are mesoscopic fold axes and intersection lineations. In a general sense, it has been observed and inferred that both kinds of linear structures plunge in depth with the same average attitude (bearing of the lines pointing to the 65° to 75° azimuth, and the plunge of the lines approximately at 55°).

At the Faina open pit (mainly in rock exposures of the BIF-Metachert Horizon), the generated intersection lines between bedding planes and the Sn cleavage/foliation planes represent beautiful penetrative intersection lineations, and eventually also build domains with "text-book" pencil structures in highly weathered, more surficial domains.

Figure 7-6 shows an exposure of metacherts of the BIF-Metachert Horizon in the Faina open pit exhibiting penetrative intersection lineations (intersection lines between the bedding planes (S0) and the Sn cleavage/foliation planes).

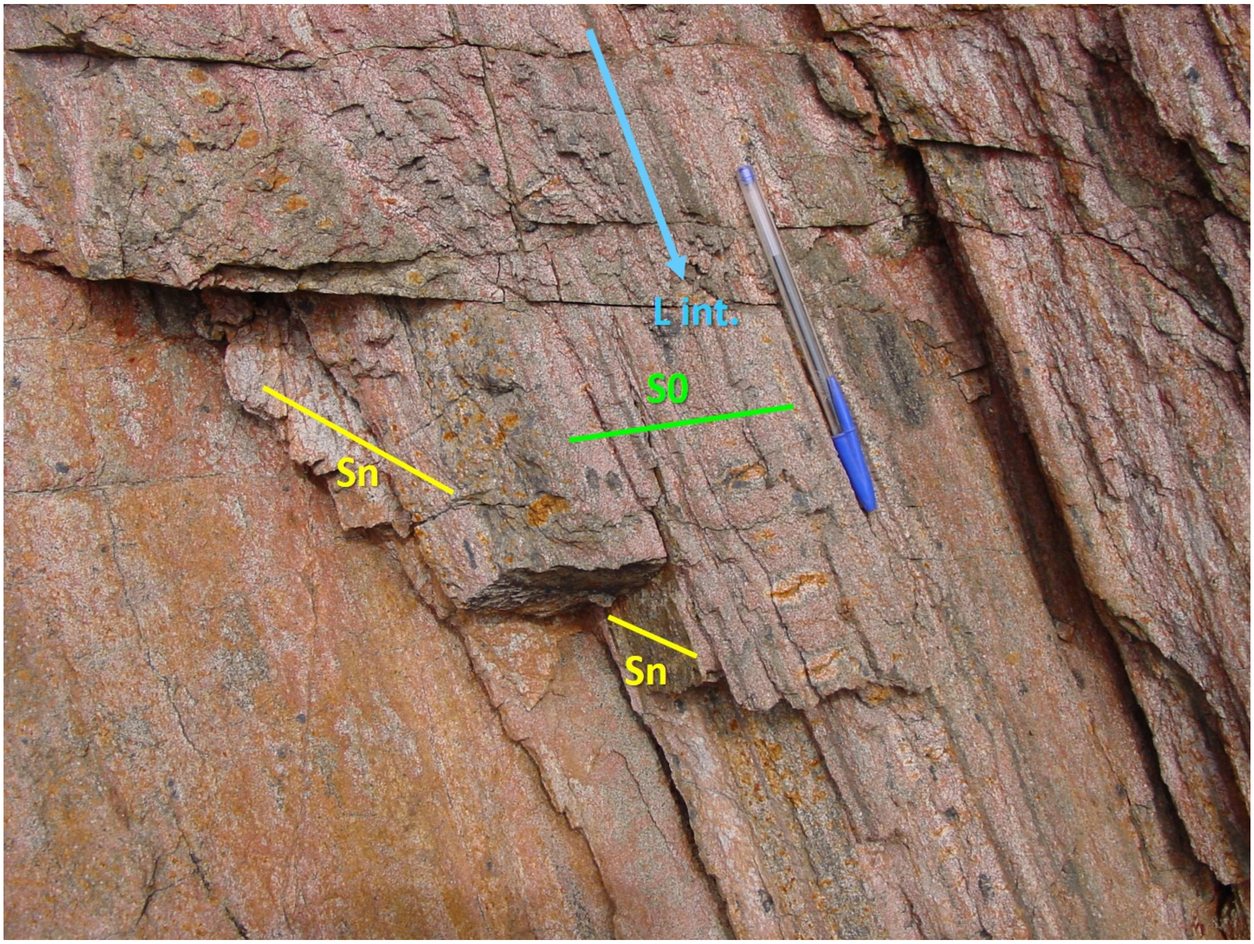


Figure 7-6: BIF-Metachert Horizon Metacherts in the Faina Open Pit

Figure 7-7 shows a highly weathered exposure in the Faina open pit exhibiting penetrative intersection lineations (intersection lines between the bedding planes and the Sn cleavage/foliation planes) as “text-book” pencil structures.

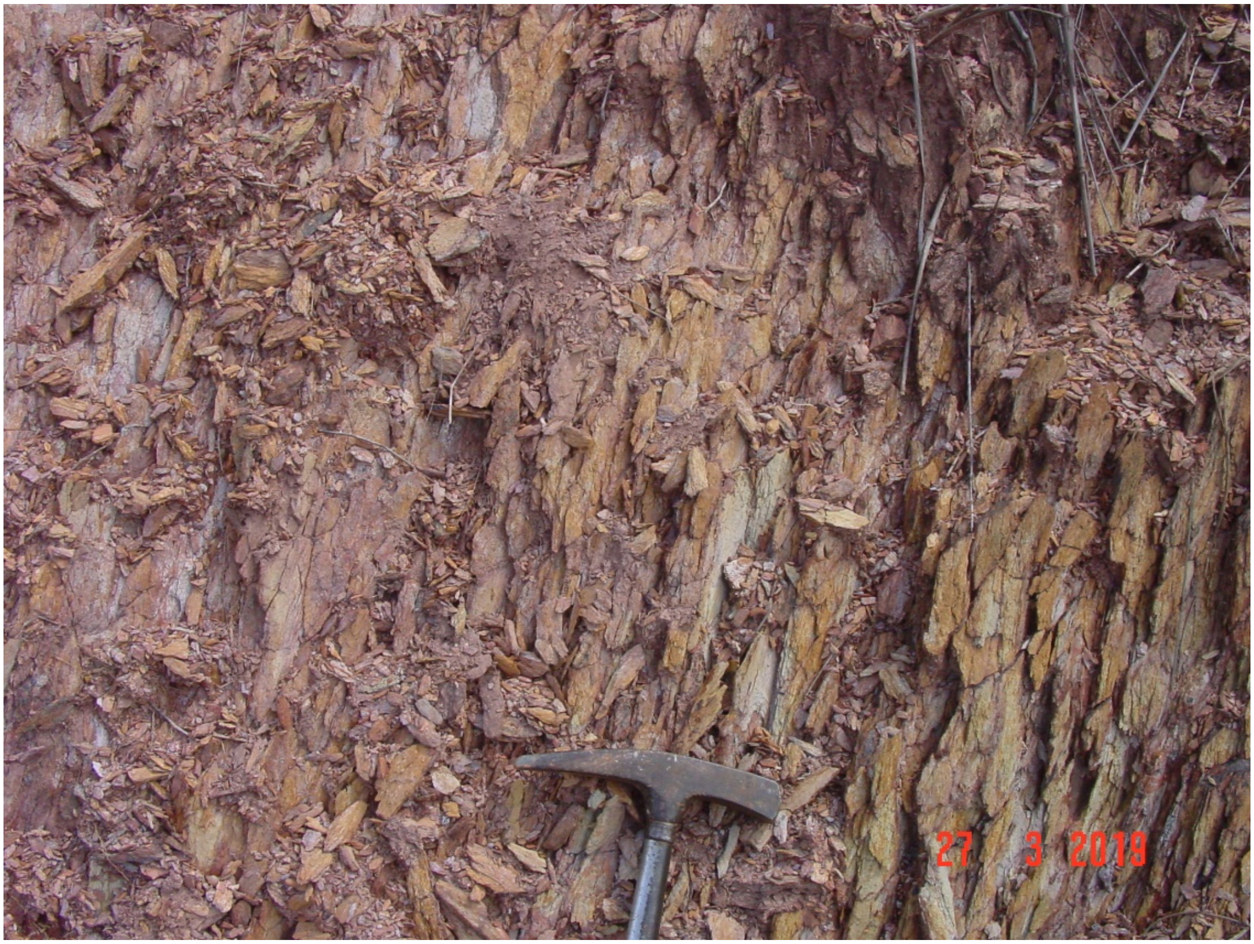


Figure 7-7: Highly Weathered Exposure in the Faina Open Pit

The structural stereonet presented in Figure 7-8 shows the statistical distribution of the penetrative intersection lineation related to the Dn/Sn deformation event, mapped in rock packages of the Faina open pit. Such penetrative lineation of great exploration importance corresponds to the intersecting lines between bedding planes/S0 and the main penetrative tectonic cleavage/Sn. Moreover, extensive field exploration and mapping activities completed in the region in past (by Unigeo/AngloGold and by Jaguar) have clearly demonstrated the fact that this intersection lineation mimics, in terms of orientation, the average orientation of the down-plunge continuity of the mineralized zones and Turmalina Orebodies A, B, and C.

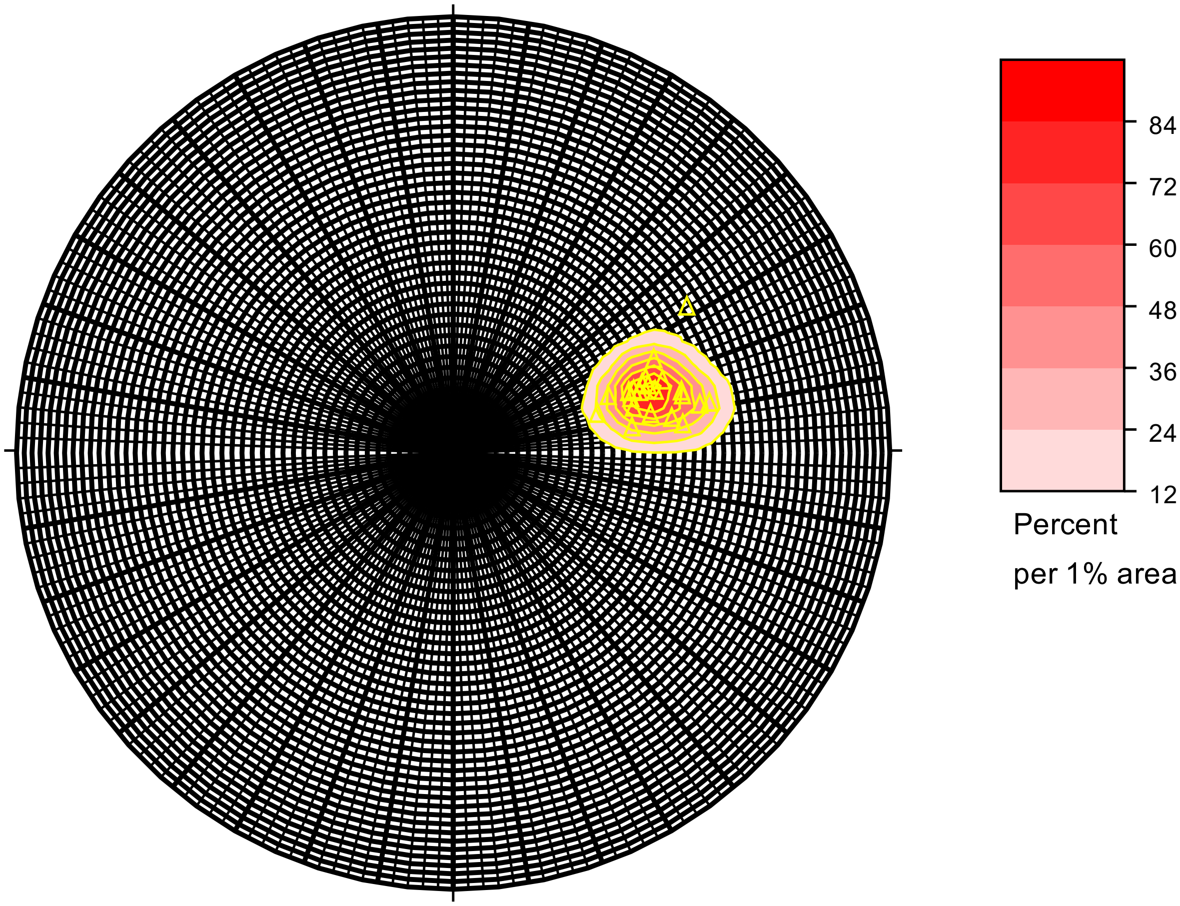


Figure 7-8: Structural Stereonet

7.2.2.3 Mineralization

The auriferous gold mineralization at the Faina deposit corresponds mainly to swarms of sulphide bearing quartz veinlets (individual veinlets with millimetric-to-centimetric widths) which are hosted by amphibolitic packages of the Mafic Volcanic Unit. The mineralized swarms of quartz veinlets appear to occur within conformable horizons to the mine stratigraphic package, in at least several distinct "stratigraphic layers" of the Mafic Volcanic Unit. Moreover, the mineralized quartz veinlets have locally been mesoscopically folded, in the same manner as the bedding/S0 surfaces and the Sn cleavage planes locally were folded. The mineralized quartz veinlets and the pervasive silicification hosted by amphibolitic packages at Faina are accompanied by disseminated sulphides (pyrite, arsenopyrite, pyrrhotite, and berthierite), however, these accessory mineral phases rarely exceed 5% of the mineralized/economic rock volume.

Exposure of moderate-to-high grade veined amphibolite at the bottom of the Faina open pit is presented in Figure 7-9. Figure 7-10 presents the typical high grade veined and silicified amphibolite of the Faina deposit. Figure 7-11 presents the mineralized swarms of quartz veinlets.

The past open pit operation indicated that the individual economic zones and lenses of the Faina deposit have dimensions of 20 m to 140 m along the S0//Sn strike, of 1 m to 15 m in thickness, and very reliable continuities down-plunge, noting the maximum attitude of 50° towards an azimuth of 73° for the intersection lineations inside the Faina open pit.

The economic mineralization at the Faina deposit is continuous down-plunge from surface for at least 680 m in length, as verified by the results of the deepest available drill hole, FUH-114, that intercepted the economic mineralized zone between 488 m and 492 m below the surface.

Figure 7-9: Moderate to High Grade Veined Amphibolite at the Bottom of the Faina Open Pit

Figure 7-10: Typical High Grade Veined and Silicified Amphibolite of the Faina Deposit

Figure 7-11: Mineralized Swarms of Quartz Veinlets

Figure 7-12 presents distinct visual styles of/for the gold mineralization that can be recognized in a single diamond drill hole targeting the Faina mine package (e.g., hole FUH-168A). "HDM" has been, since 2020, the field lithologic name for the high grade Faina mineralization/veining/alteration. At the same time, "AXS" has been the field name for a weaker, non-economic manifestation of the Faina mineralization/alteration environment overprinting the amphibolites and amphibole schists of the Mafic Volcanic Unit.

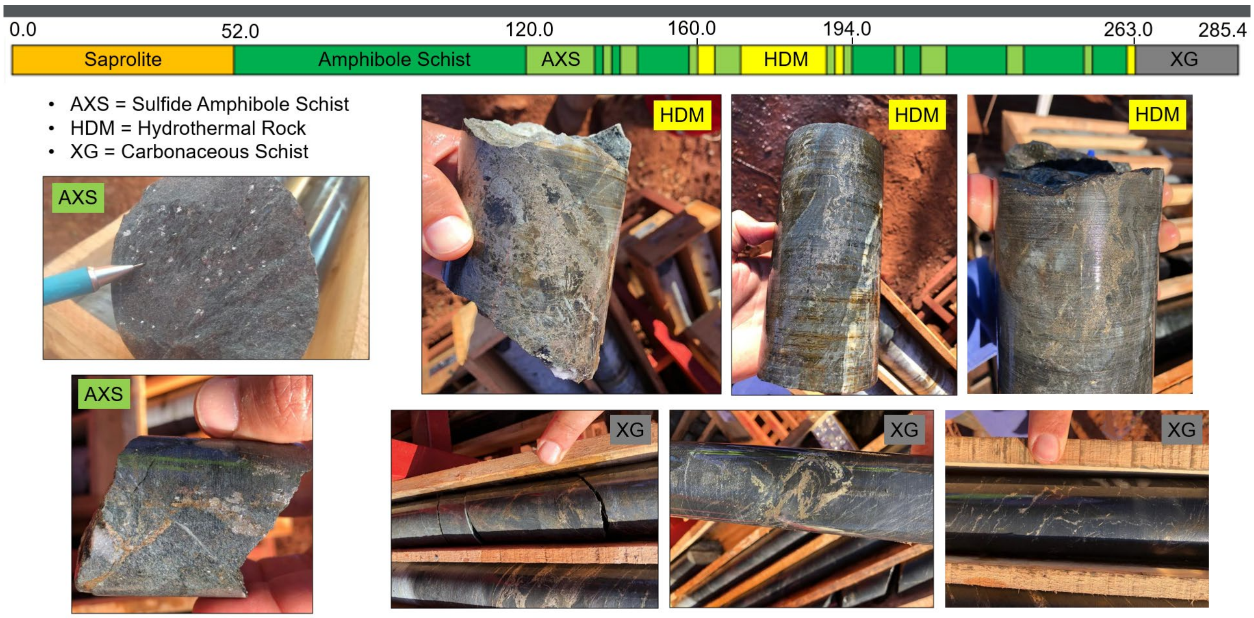


Figure 7-12: Distinct Visual Styles of Gold Mineralization

7.2.3 Pontal Deposits

The targeted Pontal stratigraphic package in the Pitangui greenstone belt is mainly composed of quite unique acidic metatuffs, of meta-agglomerates, and of metamorphosed "chaotically-redeposited conglomeratic" acidic or intermediate volcanic packages. This package gradates laterally and vertically into the usual lithologies of the Pitangui greenstone belt (the more common volcanic amphibolites and meta-andesitic sequences).

The apparently stratabound main mineralized horizon at the Pontal deposits has up to 50 m to 60 m in true thickness, and has been confirmed to depths in the order of 250 m to date (e.g., hole PTL-85, which intercepted the mineralized zone between 204.2 m and 238.2 m below the surface). Drilling information and more recent fieldwork suggest that the down-plunge continuity of these somewhat laterally discontinuous mineralized lenses is along the orientation of an azimuth of 70°, thus, mimicking in attitude both the local and semi-regional orientation of the penetrative intersection lineations and of the average down-plunge orientation of the well-known economic zones at the Turmalina Mine. It has been estimated that strike length for each individual lens may be several hundred meters.

Figure 7-13 shows locations of the newly discovered Pontal South target in relation to the previously delineated Pontal and Pontal North targets.

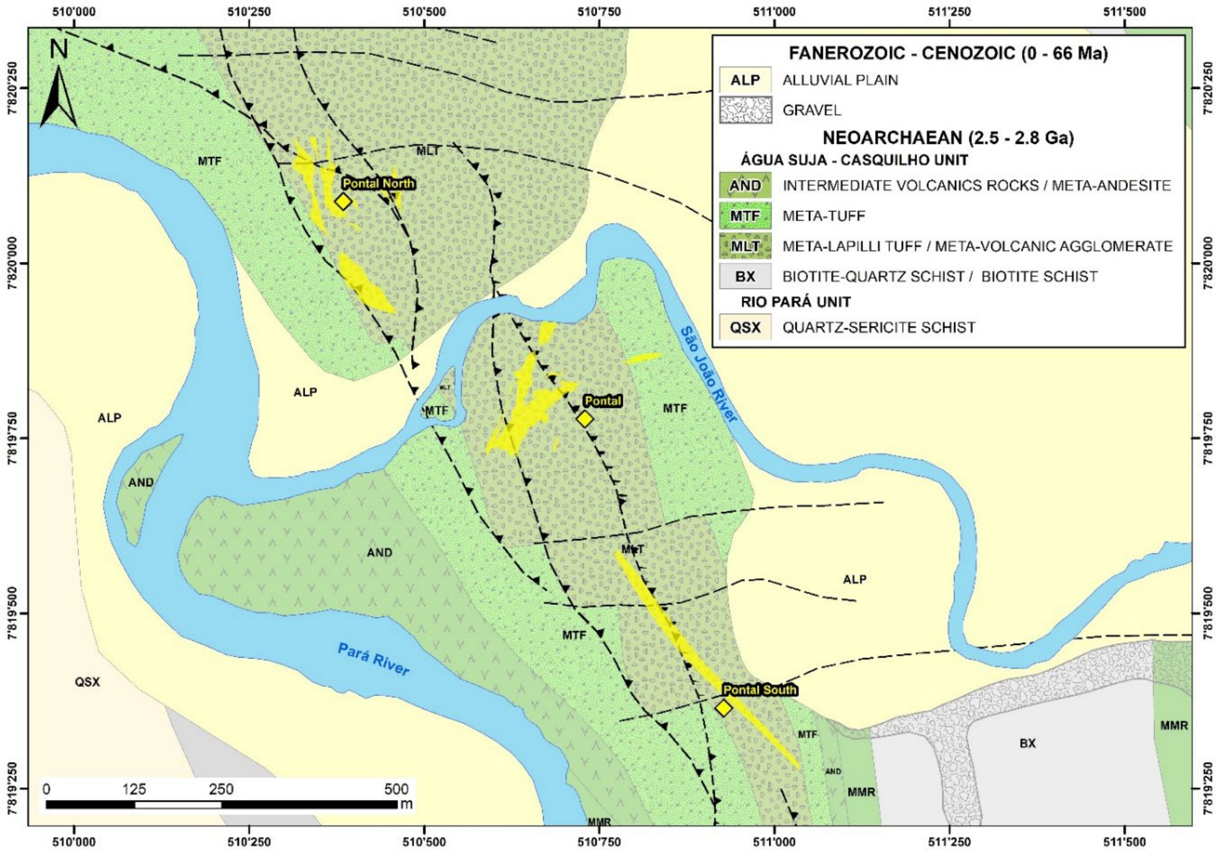


Figure 7-13: Geological Map Showing Locations of all Pontal Deposits

7.2.3.1 Stratigraphic Setting

Internally, Jaguar´s exploration team correlates (stratigraphically) the targeted Pontal mineralized horizon to part of the "Água Suja – Casquilho" geological unit. This unit is composed mainly of stratovolcano packages; of oligomictic and polymictic pyroclastic flows; of chaotic, explosive-type volcanogenic depositions; and also shows the very localized presence of narrow horizons or bodies of volcanogenic-looking massive sulphides. The frequent presence of individual glassy-textured blue quartz crystals, the conspicuously observed erosion and/or sedimentary-reworked structures within the package, and the presence of agglomerates and immature volcanic conglomerates support the interpretation that the main Pontal deposit is hosted by a unit that records an important pyroclastic and high-energy magmatic event in the Pitangui greenstone belt.

7.2.3.2 Structural Geology

The current interpretation is that the Pontal gold mineralization event is related to a northwest-southeast semi-regional shear-fault zone and also to more local northeast-southwest or east-northeast–west-southwest fault zones of sinistral transcurrent nature.

Bedding surfaces are not easily distinguishable in drill cores, primarily due to the pyroclastic and conglomeratic nature of the host stratigraphic package. More tuffaceous horizons of the Pontal package, however, are well-banded, showing visible compositional and granulometric variations. In most areas, an average dip of 50° to 55° towards an azimuth of 50° to 65° is representative of the attitude of the bedding surfaces of the Pontal package (all structural information gathered in drill cores, with the systematic use of the IQ-logger technique). Figure 7-14 illustrates a synthesis on the penetratic structural petrofabrics gathered in the six 2021 drill holes that ultimately discovered the new Pontal South mineralized zone.

The main and continuous penetrative tectonic cleavage/schistosity mapped in the Pontal rocks (Sn) dips at an average of 50° towards an azimuth of 100°. More locally, this continuous penetrative schistosity can be crenulated and/or folded by a younger deformation episode. The main linear structures and petrofabrics recorded in drill cores are stretched pyroclasts on Sn planes (average attitude at 51° towards an azimuth of 86°), fold axes (average attitude at 62° towards an azimuth of 106°), intersection lineations (between the bedding and Sn planes), and a younger crenulation lineation on Sn planes.

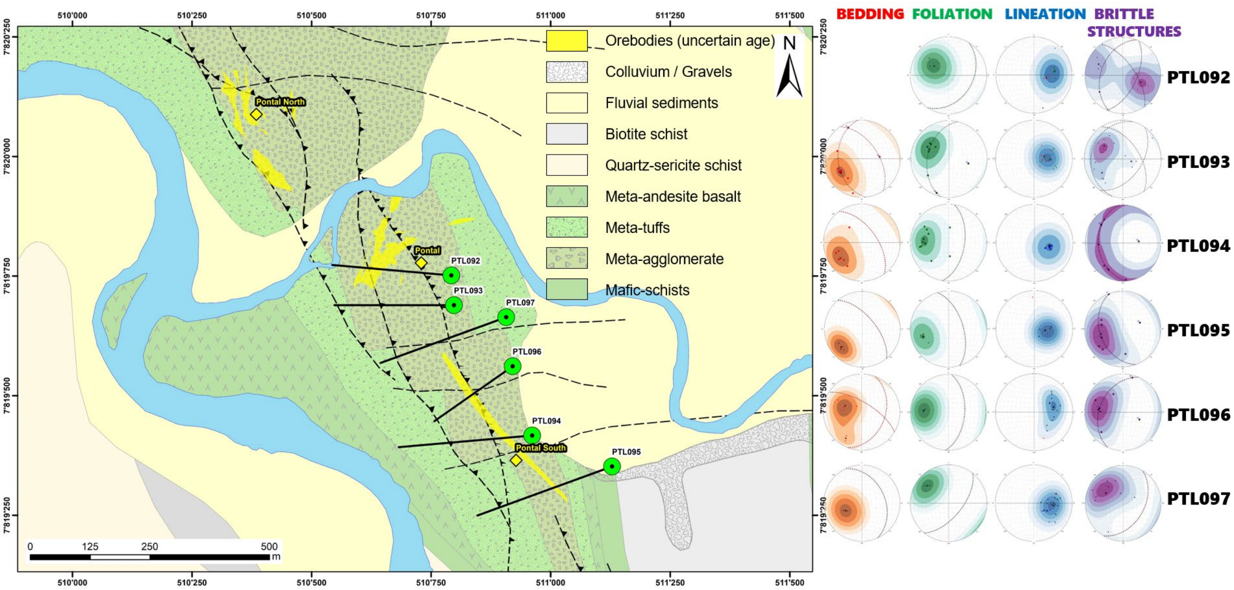


Figure 7-14: 2021 Geological Map of the Pontal Deposits Showing Structural Trends in Drilling

7.2.3.3 Mineralization

The potentially economic mineralization at the newly discovered Pontal South target corresponds to a prospective stratigraphic horizon that is more than 30 m thick, with a minimum length of 350 m along the strike, and with average composite gold grades at the minimum range of 2.5 g/t to 3.5 g/t delineated to date. Figure 7-15 represents a cross section showing the general stratigraphic setting of the Pontal South mineralized zone.

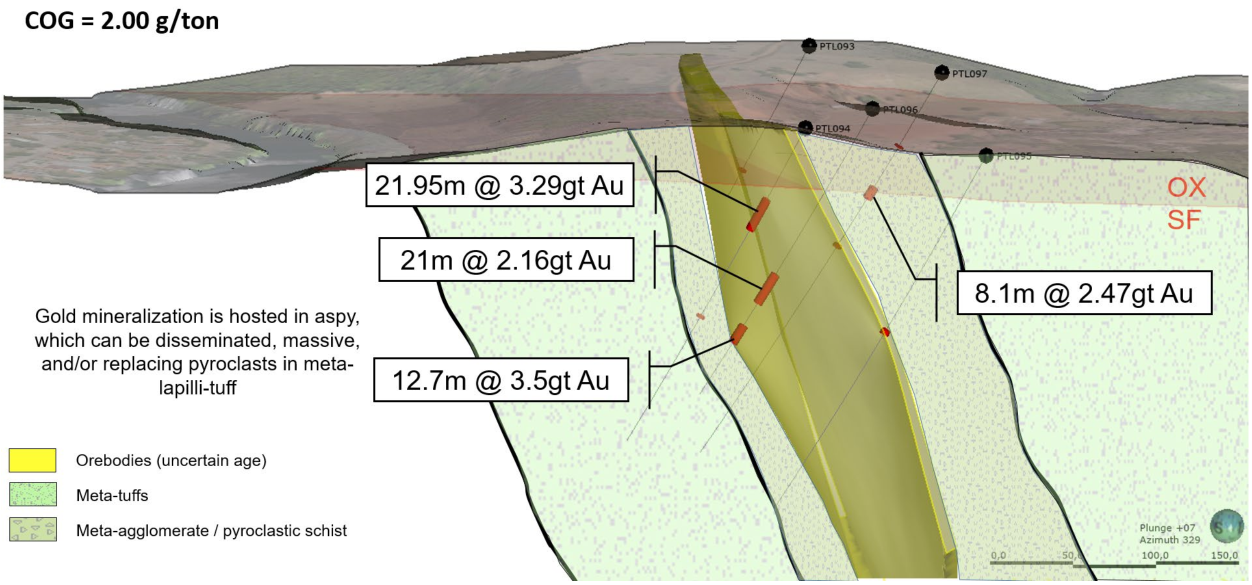


Figure 7-15: Cross Section Showing Stratigraphic Setting – Pontal South Zone

Three slightly different styles of gold mineralization have been recorded in the Pontal South target, all are gold-arsenic-antimony-rich (Figure 7-16 to Figure 7-18). The most common style consists of fine grained disseminations of sulphides (arsenopyrite, pyrite, and pyrrhotite) hosted by the pyroclastic rocks. The second style is made up of massive concentrations of sulphides (mainly arsenopyrite and antimony sulphides) located around quartz veins and within highly (or pervasively) silicified domains of the same pyroclastic host rocks. The last "style" to be considered would be a result of the presence of multiple sulphidized clasts and coarse transported fragments, either primarily mineralized and redeposited, or eventually replaced by the same ore fluids that "sulphidized" the matrix of the pyroclastic host rocks.

In the Pontal area, the exploration team has recently been recording the subordinate presence of an "exotic" base metal metallic mineral assemblage spatially and genetically related to the economic gold mineralization (e.g., galena, berthierite, stibnite, bornite and covellite, among other metallic mineral phases of difficult identification during the core-logging activities).

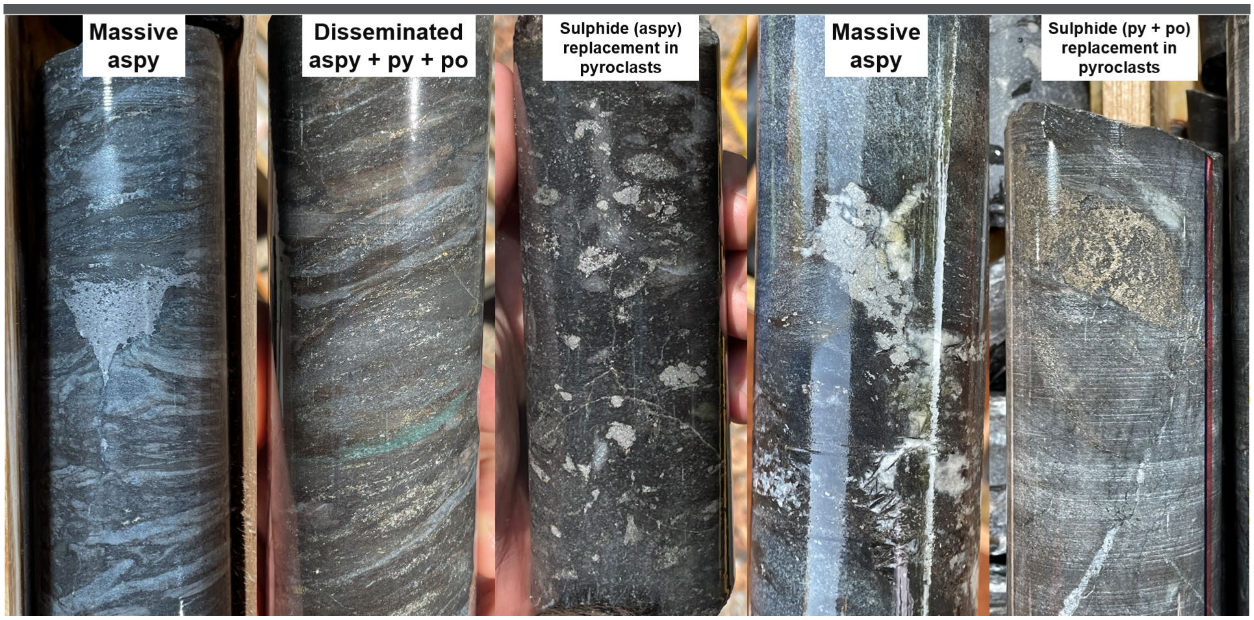
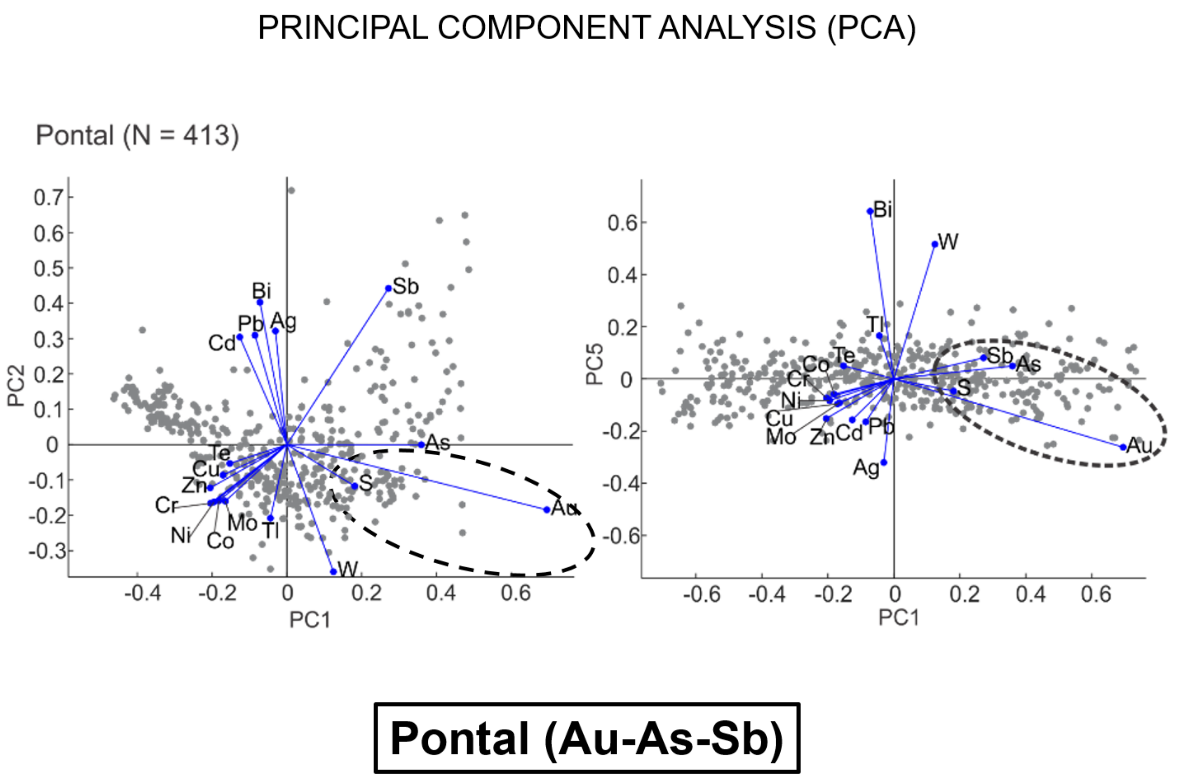
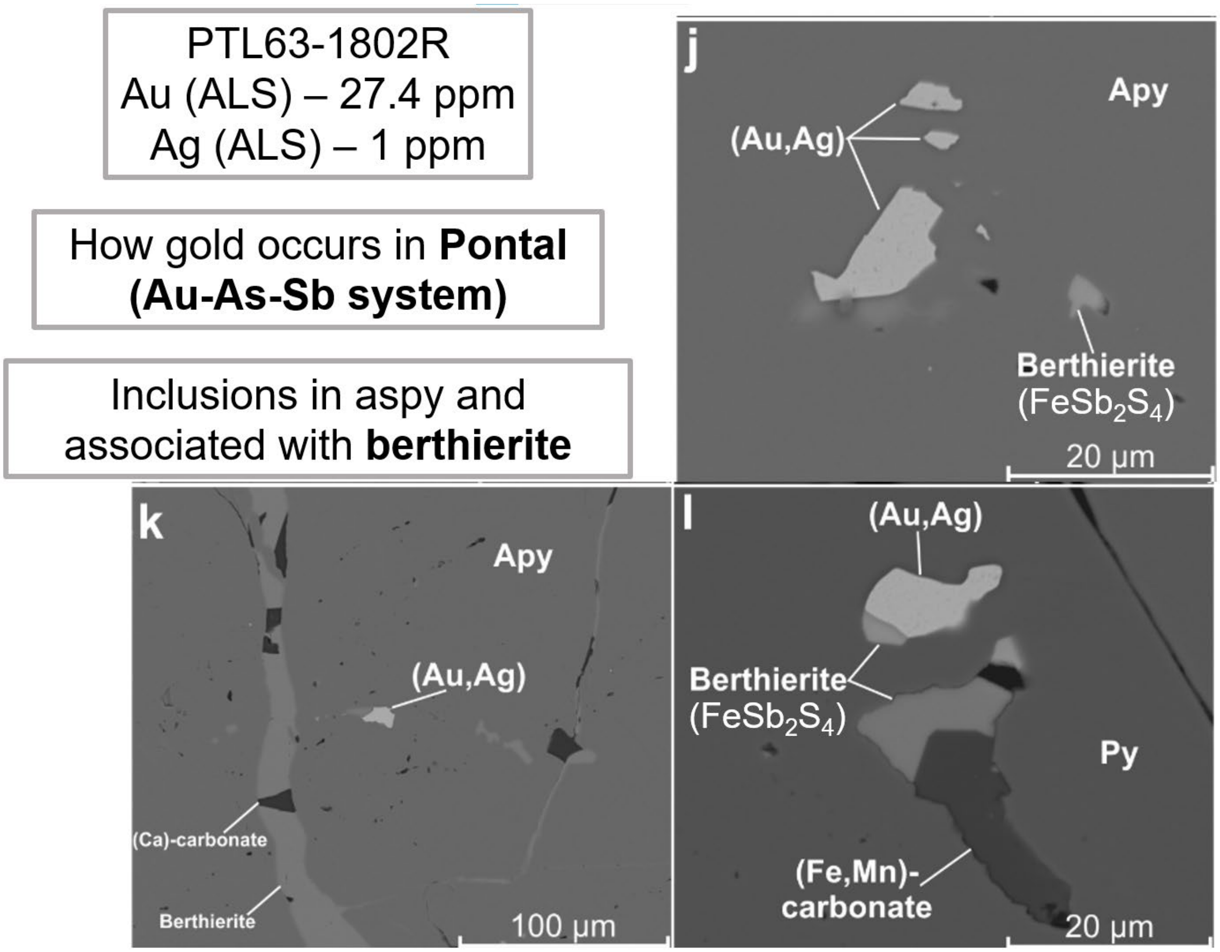


Figure 7-16: Sulphidation and Alteration in Pontal Deposit Drill Core



Source: Alves, Unpublished

Figure 7-17: Principal Component Analysis– Correlation Between Au Mineralization and As-Sb Concentrations



Source: Alves, Unpublished

Figure 7-18: Occurrence of the Gold Particles in the Pontal South Mineralization

"Metallogenically", the lapilli-tuffs and agglomerates of the Pontal mineralized package are being loosely interpreted as a more permeable unit that could receive and host the mineralization-forming fluids coming from the high-profile, semi-regional northwest-southeast shear zone. However, it is also noteworthy mentioning that the silicification event which is spatially and genetically related to the sulphidation and the gold mineralization at the Pontal prospective environment appears to show quartz veining swarms that show visible and persistent crustiform textures (Figure 7-19). Crustiform textures in veins from gold bearing alteration systems very often are strong indications of the existence of shallow-crust conditions and/or epithermal metallogenic environments.

Figure 7-19: Silification and Sulphidation Associated with Gold Mineralization – Pontal Deposits

7.2.4 Zona Basal

7.2.4.1 Stratigraphic Setting

The stratigraphy of Zona Basal can be understood as a general package of amphibolites (whose protoliths were mafic volcanic rocks) interlayered with talc-chlorite schists (ultramafic protoliths) and some undifferentiated meta-mafic volcanic rocks (MVI), with minor horizons of ferruginous metacherts and carbonaceous phyllites towards the top of the sequence.

The "transitional" stratigraphic portion of the Basal Zone, a portion that is mainly characterized by the MVI volcanic rocks in close association with the volcano-sedimentary lithologies (metacherts and carbonaceous phyllites), hosts both the targeted assumed epigenetic gold mineralization and the disseminated and massive manifestations of a volcanogenic sulphidation event also recorded in the target (pyrite, arsenopyrite, pyrrhotite, galena, sphalerite, tungsten, and antimony accessory mineral phases). This exotic "lithology" (MVI) would correspond to a transitional and interlayered zone between amphibolitic rocks (mafic volcanism) and the mineralized cherty-rich horizons (volcano-chemical sedimentary rocks).

The host package of the Zona Basal mineralization appears to delineate an overturned and reclined antiform structure, and good average gold grades would tend to occur more in the major hinge zone of the interpreted structure.

Figure 7-20 presents a geological map of the Zona Basal target area, illustrating the general package of amphibolites (mafic volcanic protolithic rocks) interlayered with talc-magnesium chlorite schists (ultramafic volcanic protolithic rocks) and some undifferentiated meta-mafic volcanic rocks (MVI), and with minor horizons of ferruginous metacherts (BIF) and carbonaceous phyllites towards the top of the sequence. The host package of the Zona Basal mineralization appears to delineate an overturned and reclined antiform structure.

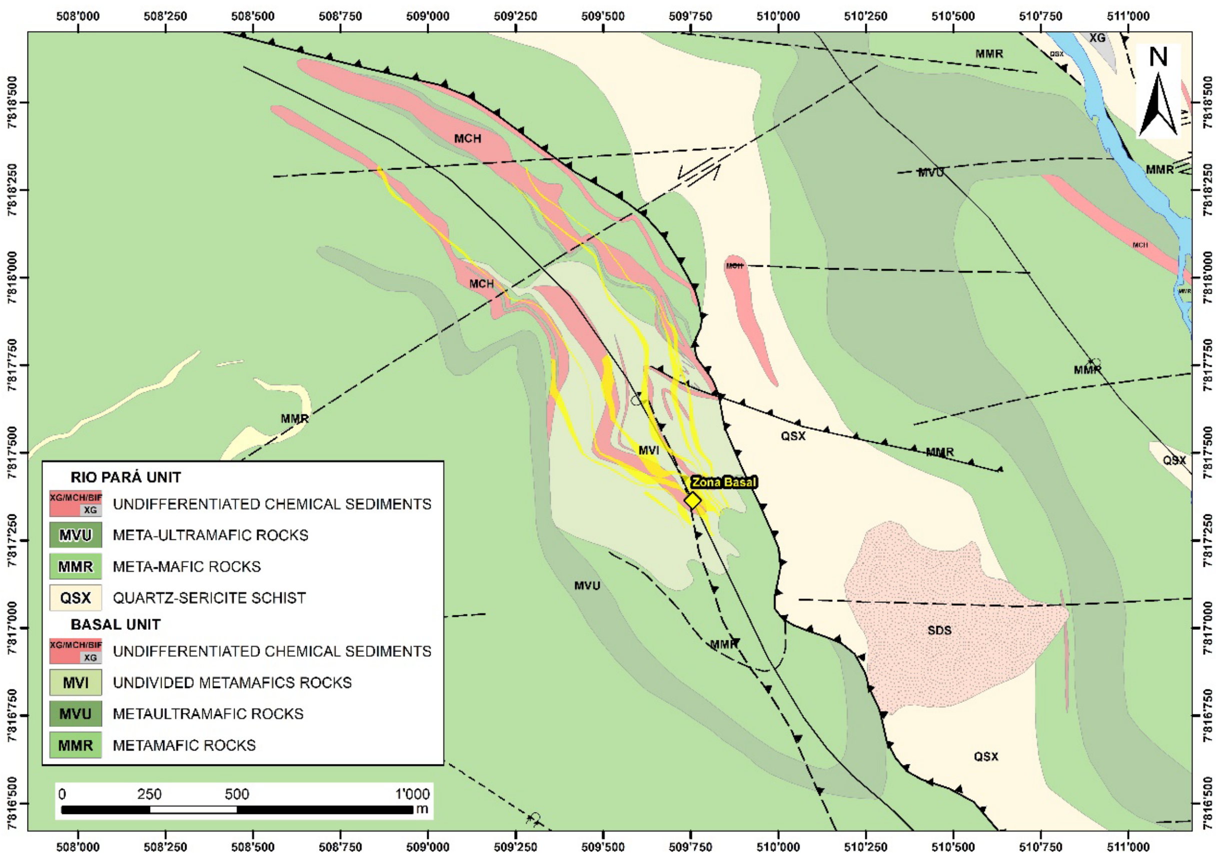


Figure 7-20: Zona Basal Geological Map

7.2.4.2 Structural Geology

The current interpretation is that the Zona Basal stratigraphic package delineates a southwest-verging overturned and reclined antiformal folded structure that has an east-northeast-plunging axis. With the oriented diamond drill cores (IQ-logger technique), a structural geometric analysis was made, mainly with the use of the S0/bedding readings, wherever they have been of easy identification. As a result of this work, a total of four distinct structural-spatial sectors have been delineated for the inferred Zona Basal folded structure: the NE, SE, SW, and NW domains. Figure 7-21 shows the four distinct structural geometric domains generated using the statistical S0/bedding readings from oriented drill cores.

The SE domain corresponds to the hinge zone of the major antiform; the SW domain would correspond to a local asymmetrically folded portion of the SW limb of the major antiform, adjacent to its closure. The NW and NE sectors correspond to the two limbs of the major antiform, away from the closure zone. The three statistical main/maximum dip orientations of the bedding readings at the distinct domains of the Zona Basal folded structure are: 59° towards an azimuth of 31°; 51° towards an azimuth of 117°; and 42° towards an azimuth of 87° (for the SE, NW, and NE domains, respectively).

The visible and continuous tectonic Sn foliation/cleavage is also locally folded (average axis attitude of 50° towards an azimuth of 65°). The two main average orientations identified for the dip of Sn planes are 58° towards an azimuth of 23°, and 55° towards an azimuth of 102°. The main penetrative linear petrofabrics observed in drill cores are intersection lineations and mineral lineations. As an average, the two types of lineation show the same attitude, plunging 46° towards an azimuth of 68°.

Veins, fractures and small faults at the drill core scale have also been recorded, with the following inferred main orientations for their dipping planes: 54° towards an azimuth of 212°, 58° towards an azimuth of 139°, and 57° towards an azimuth of 25°.

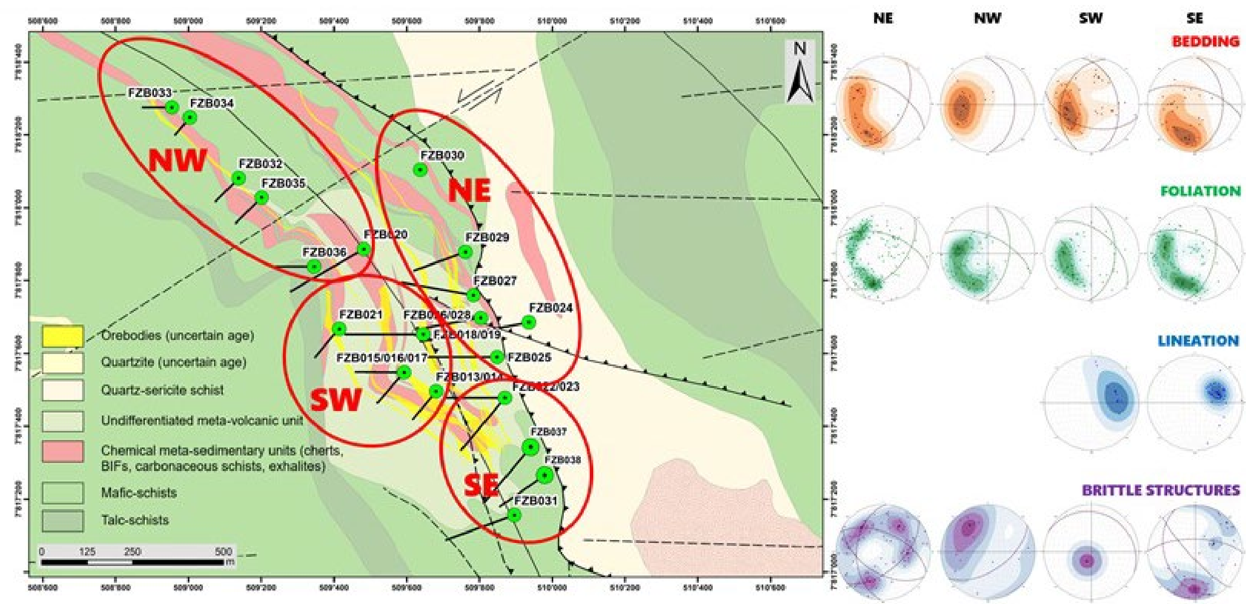


Figure 7-21: Zona Basal Diamond Drill Hole Structural Data Summary

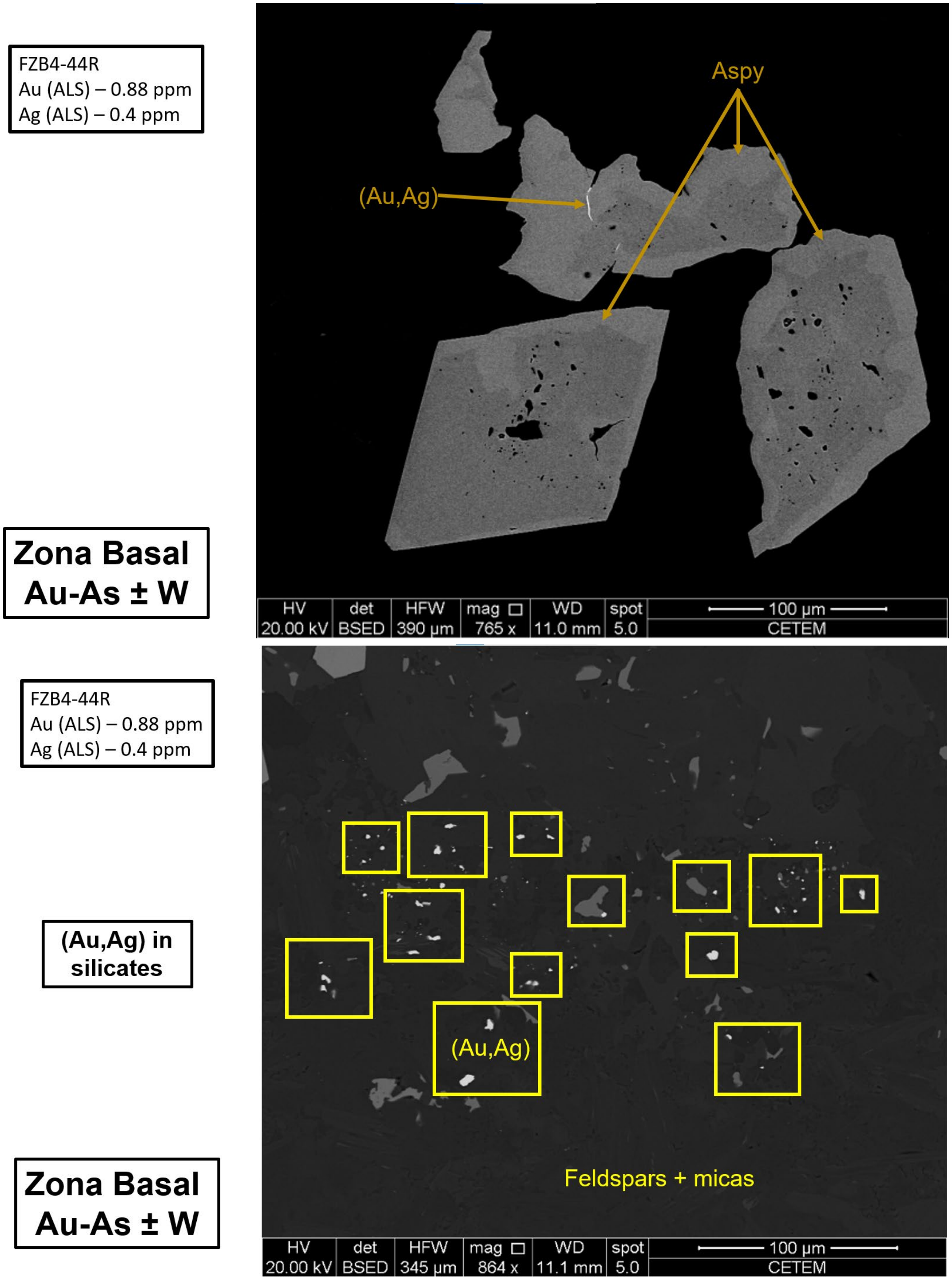
7.2.4.3 Mineralization

The Zona Basal hypogenic economic mineralization can be understood as a system that is primarily controlled by a major northwest-southeast oriented transpressive structural movement zone and which is spatially located approximately at the axial-plane setting of the Zona Basal overturned antiform (Figure 7-20). According to this interpretation, northwest oriented secondary sheared planes originating from this major structural zone had driven ore-forming hydrothermal fluids that ultimately replaced the "more favorable" portions of the Zona Basal stratigraphic package (the volcano-chemical, more "reactive" sedimentary horizons: ferruginous metacherts and carbonaceous phyllites).

The Zona Basal "supergene" (or surficial) mineralization appears to concentrate economic gold grades as well as some silver and other base metals in the weathering halo. The more ubiquitous mineralization style recorded at Zona Basal corresponds to fine grained disseminations of sulphides (arsenopyrite, pyrite, and pyrrhotite) hosted by the favorably replaced volcano-chemical horizons (Figure 7-22).

Figure 7-22: Sulphidation and Alteration in the Zona Basal Drill Core

Gold particles occur both as inclusion in arsenopyrite crystals and in association with the matrix of silicate minerals from the arsenopyrite-rich samples examined (Figure 7-23). Preliminary leaching test-work completed on weathered samples from positive drilling intersections (e.g., holes FZB014 and FZB026) clearly demonstrate that the economic material is free milling/non-refractory, with recoveries of the order of 90% after cyanidation metallurgical routes (Figure 7-24).



Source: Alves, unpublished

Figure 7-23: Gold Particles Occurrence Associated with Arsenopyrite in Zona Basal Mineralization

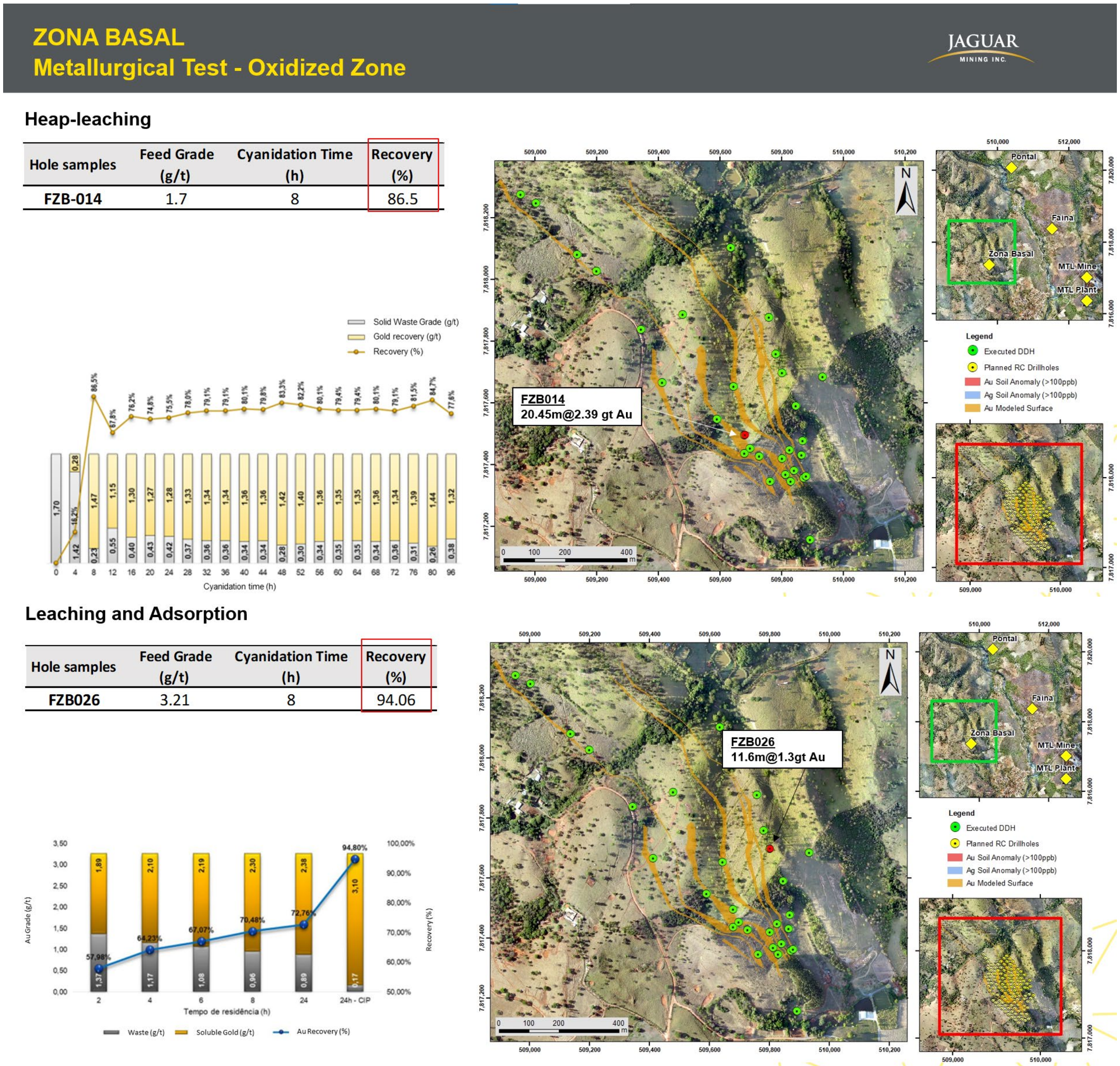


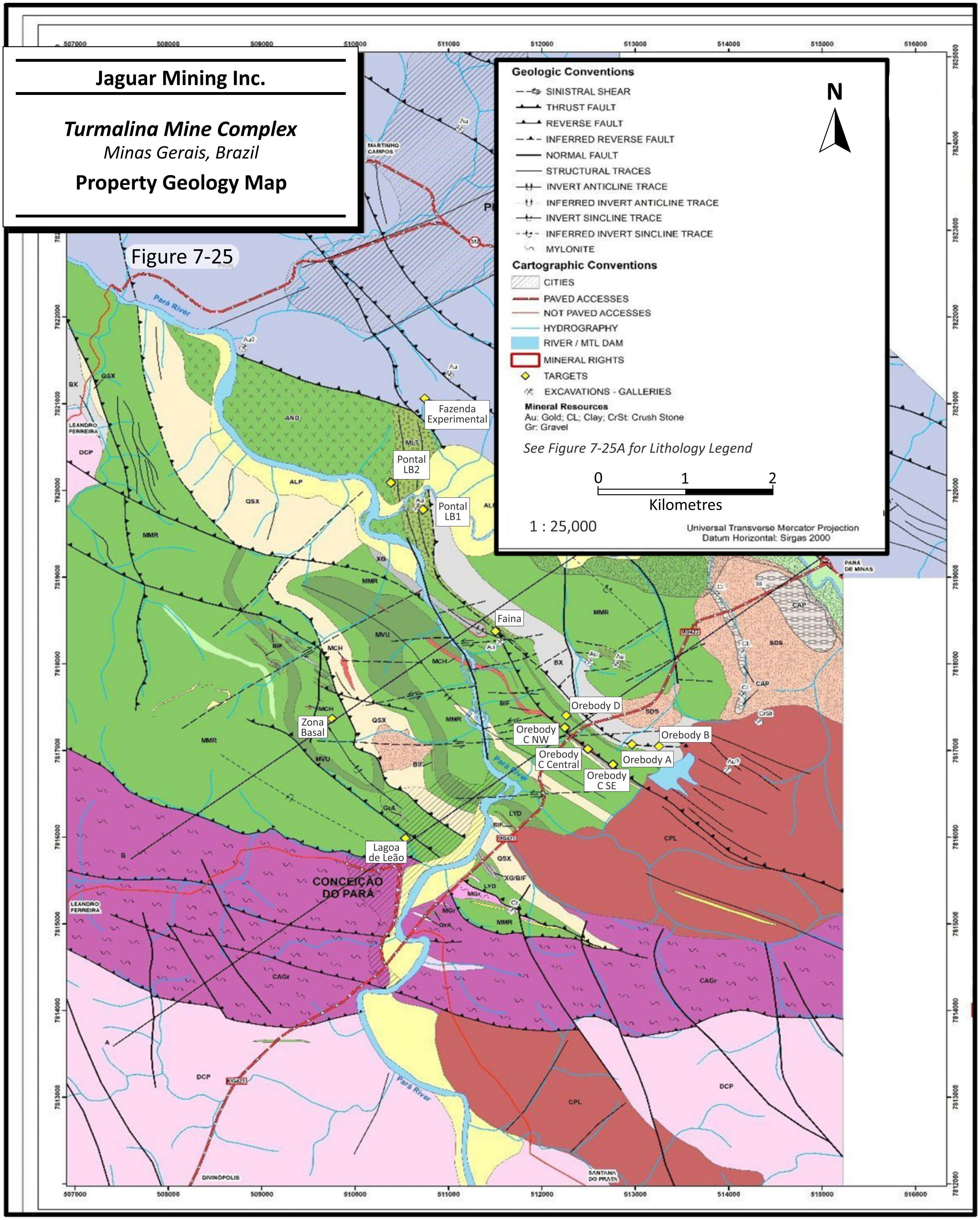
Figure 7-24: Preliminary Leaching Test-Work Results

7.3 Property Geology

A 2020 detailed surface map of the property geology of the Turmalina Complex area is presented in Figure 7-25 (legend in Figure 7-25A). The mine sequence (part of the Pitangui Group) consists of bedded metasediments including quartz-sericite schists and sericite-chlorite-biotite schists, mafic volcanic rocks including amphibole-plagioclase-quartz-chlorite schists, and horizons of meta-cherts, banded ironstones (BIFs), and black carbonaceous schists. All lithologic types of the stratigraphic units of the Turmalina deposit have been metamorphosed to the amphibolite facies.

The underground geological-structural mapping activities completed in the last two years indicate that the rock packages of the Turmalina deposit were penetratively deformed by two distinct, successive tectonic events (the Dn and the Dn+1 events). The Dn deformation event is mainly recorded by a conspicuous penetrative tectonic cleavage (Sn), and also by a somewhat subtle, but highly important, intersection lineation that can be seen in both of their forming planes - the bedding (S0) surfaces and the Sn cleavage planes. The Sn cleavage, a petrofabric that records a moderate-to-high intensity compressional regional tectonic event, is generally observed as sub-parallel to oblique surfaces to the bedding plane. The Dn+1 deformation event is interpreted to be a mild regional tectonic event in the immediate surroundings of the Complex. The presence of this later event is mainly recognized by pervasive micro-crenulations overprinting the Sn cleavage planes, by the local development of crenulation cleavage planes in more incompetent (phyllosilicate-rich) lithologies, and by the localized presence of kink-style, largely gentle folds with variable amplitude and scale.

The bedding (S0) surfaces of the mine package consistently strike at 315° and dip 50° to 60° towards an azimuth of 45°. The consistent average strike orientation of the Sn cleavage is 290° to 300°, with a dip of approximately 60° to 65° towards an azimuth of 20° to 30°. The highly important intersection lineation plunges approximately 45° to 50° towards an azimuth of 65° to 75°. As a direct result of the above-mentioned recent mapping activities underground, it is now postulated that the down-plunge continuity of the stratabound, tabular economic bodies of the Turmalina deposit mimics, in terms of geographic orientation, the attitude of the intersection lineation, which has been identified and statistically measured underground (intersection lines between bedding planes/S0 and the main penetrative tectonic cleavage/Sn). This interpreted spatial "linear control" would also correspond to the orientation of axes of hypothetical (plunging and overturned) major amplitude Dn/Fn overturned folds that deformed regional stratigraphic packages of the Pitangui greenstone belt.



March 2022 **Source: Jaguar Mining Inc., 2020.**

Legend

FANEROZOIC-CENOZOIC (0 - 66 Ma)

ALP ALLUVIAL PLAIN

GRAVEL

Layer up to 1.5 m thick. Outcrop area of the São João River conglomerate.

CAP CLAY AND PEAT

SDS SANDSTONE

Immature sandy sediments with spaced clasts, silt and clay.

UNCERTAIN AGE

QUARTZ VEINS

NEOARCHEAN (2.5 - 2.8 Ga)

Granite Units

GrA GRANITE APOPHYSES

MGr MUSCOVITE GRANITE

CPL CASQUILHO PLUTON

Biotite granite, leucocratic, medium to coarse granulation, locally foliated (2.711 ± 4 Ma).

CAGr CORREGO DO ARRUDA GRANITE

Biotite monzogranite, medium to coarse granulation, generally porphyritic and mylonitic.

Pitangui Unit

PIUN METAGREYWACKE - PHYLLITE

Intercalations of metagreywacke, phyllite and carbonaceous phyllite.

Água Sija - Casquilho Unit

QCLSX QUARTZ-CHLORITE-SERICITE SCHIST

Greenish schist with porphyroblast of sericite.

AND INTERMEDIATE VOLCANIC ROCKS - METATUFF

Metandesite basalt. Fine grain rocks, massive and laminated. Generally dark. Blue quartz and spaced clast present in places.

MLT METALAPILLI TUFF - METAVOLCANIC AGGLOMERATE

Generally 2-64 mm clasts, more rarely > 64 mm bombs.

BX BIOTITE-QUARTZ SCHIST - BIOTITE SCHIST

Metagreywacke and acid volcanic rocks?

QSX QUARTZ-SERICITE SCHIST

Fine quartz-sericite schist with medium to coarse sericite quartzite.

Basal Unit

BIF/MCH BANDED IRON FORMATION AND METACHERT

XC CARBONACEOUS SCHIST

MMR METAMAFIC ROCKS

Amphibolite with or without feldspar, massive and laminated, with metagabbros, metabasalt, greenschists and quartz amphibolite. Less frequent CLX, CLSX and BACLX. When weathered, shows shades of ocher, violaceous, rosy and white. Often with kaolin clay and quartz. Layered units occur.

MVU METAULTRAMAFIC ROCKS

Talc schists and serpentine-amphible-talc schists. Remains of ultramafic rocks rich in magnetite.

MESOARCHEAN (2.8 - 3.2 Ga)

DCP DIVINÓPOLIS COMPLEX

Gneisses and migmatites with granite composition, medium to coarse granulation.

Figure 7-25A

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Property Geology Legend

March 2022 ***Source: Jaguar Mining Inc., 2020.***

Figure 7-26 presents an example of intersection lineations between bedding planes/S0 and the main penetrative tectonic cleavage/Sn, observed and mapped underground in all orezones of the Turmalina deposit. This interpreted spatial “linear control” for the orezones of the Turmalina deposit would also correspond to the orientation of axes of hypothetical (plunging and overturned) major/high-amplitude Dn/Fn folds that deformed regional stratigraphic packages of the Pitangui greenstone belt.

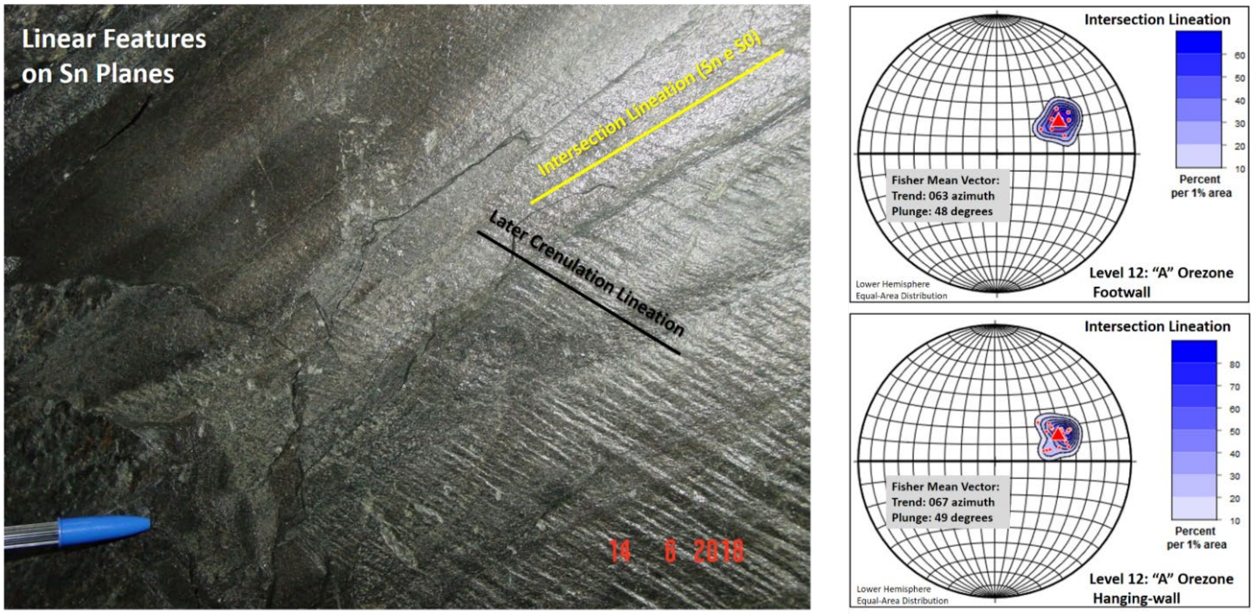


Figure 7-26: Orebody A Sample Stereonets

Figure 7-27 shows an integrated, composite plan view of the economic Orebody A of the Turmalina Mine, from the shallow operational Level 2 into the deep operational Level 14.

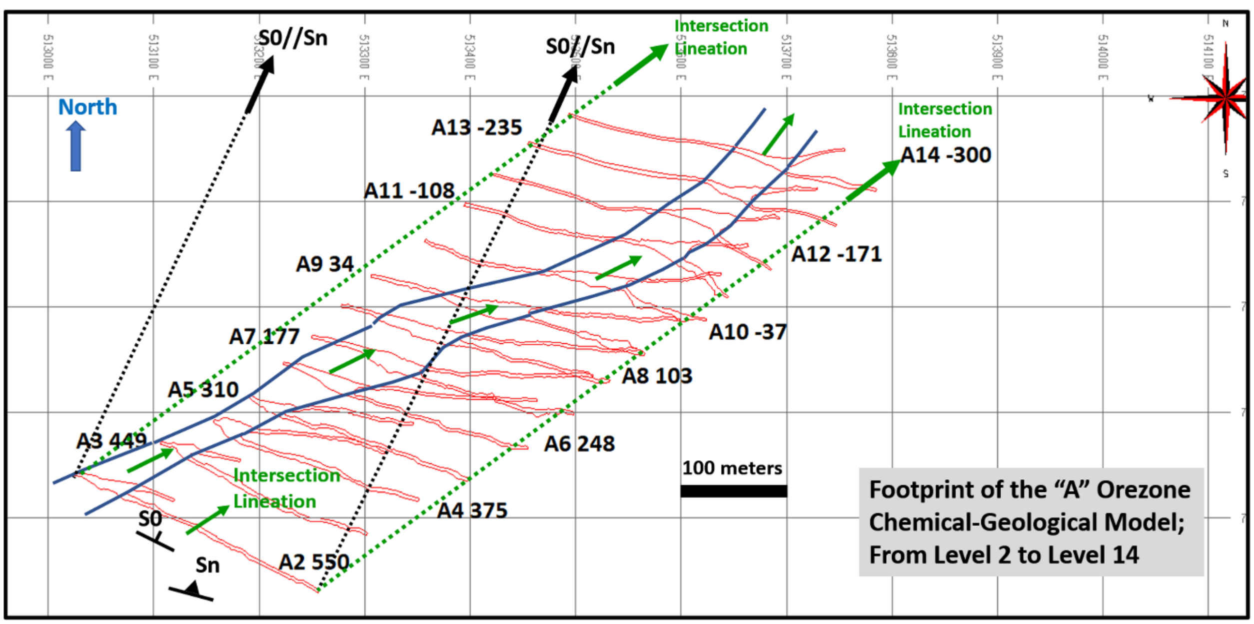


Figure 7-27: Plan View of the Orebody A

7.4 Mineralization and Individual Orebodies

The mineralization at the Turmalina deposit consists of a number of stratabound, tabular bodies that are spatially related to either a BIF package or to a package of slightly silicified quartz-muscovite-biotite schists. These tabular bodies are grouped together, according to the host stratigraphy, to the spatial configuration and to the gold content, into Orebodies A, B, and C (together the Orebodies). Gold can occur within the BIF package, but can equally occur in the other host lithologies. The down-plunge continuity of mineralization within the Orebodies follows the intersection between bedding planes/S0 and the main penetrative tectonic cleavage/Sn and the attitude of this intersection lineation has been identified and statistically measured underground.

The main past production of the mine has been from Orebody A (Figure 7-28), which is mostly comprised of slightly silicified and “veined” quartz-muscovite-biotite schist host rocks (swarms of small, prevalent, quartz veinlets that are centimetres in width). The economic mineralization in this zone has been outlined along a strike length of approximately 350 m to 400 m (with an average thickness of 6 m) and to depths of approximately 1,150 m to 1,200 m below surface. The southeastern portion of Orebody A is composed of two parallel narrow veins. The northwestern portion of Orebody A is much the same as the southeastern, however, the two parallel zones nearly or completely merge and therefore the economic zone is much wider overall to the northwest direction (locally up to 10 m to 15 m in thickness). Orebody A is mostly comprised of slightly silicified (with swarms of thin quartz veinlets) biotite-muscovite-quartz schist host rocks (a metasedimentary package).

Orebody B is located in the hanging wall of the Orebody A, and is geologically somewhat similar to Orebody A, both in terms of the type of the host package and of the visual style of the gold mineralization. The Orebody B corresponds to two or three lower grade, tabular-shaped lenses that are generally parallel to Orebody A. These lenses are located approximately 50 m to 75 m in the structural hanging wall and are accessed by a series of crosscuts that are driven from Orebody A in the upper levels of the mine. The mineralization in this zone has been outlined along a strike length of approximately 350 m to 400 m and to depths of 950 m to 1000 m below surface.

Orebody C is a mineralized structure located to the southwest, in the structural footwall of Orebody A. At least three individual economic zones (Orebodies CSE, C Central, and CNW) have been delineated in this zone along a strike length of a bit more than one kilometre and to depths of 850 m to 900 m below the surface. The three individual stratabound economic orebodies are generally represented by 2 m to 10 m thick, pervasively altered/silicified/replaced lenses hosted by the unique Orebody C Iron Formation horizon (Figure 7-29). Its auriferous silicification is quite distinctive, being dark gray in colour and sulphide bearing (pyrite, pyrrhotite, and arsenopyrite constituting up to 5% to 12% in volume of the host rocks), and characteristically causes a marked obliteration of the original bedding lamination of the iron formations. The silicification zones are stratabound in relation to the host iron-formation layer. It is observed that the high grade economic zones are generally confined to the silicification zones.

The quality of the average gold grades of the mineralized zones of Orebodies C, A, and B, is a direct function of the relative amount of arsenopyrite that is present in the total modal concentration of disseminated sulphides present in altered/silicified rock specimens.

Two recently discovered mineralized lenses are located between the Orebody A and the previously known lenses comprising Orebody C. These new lenses were discovered as a result of recent exploration drilling that was carried out from the underground drill bays to define and evaluate the lower portions of the Orebody CSE mineralized lenses. As these are newly discovered mineralized lenses, their full limits and economic potential are not fully understood at the moment. The presence of potentially economic mineralization therefore is, very likely, not restricted to only the previously defined mineralized horizons and orezones. The possibility of additional mineralized zones being located elsewhere in the mine stratigraphy must be considered and evaluated as exploration targets.

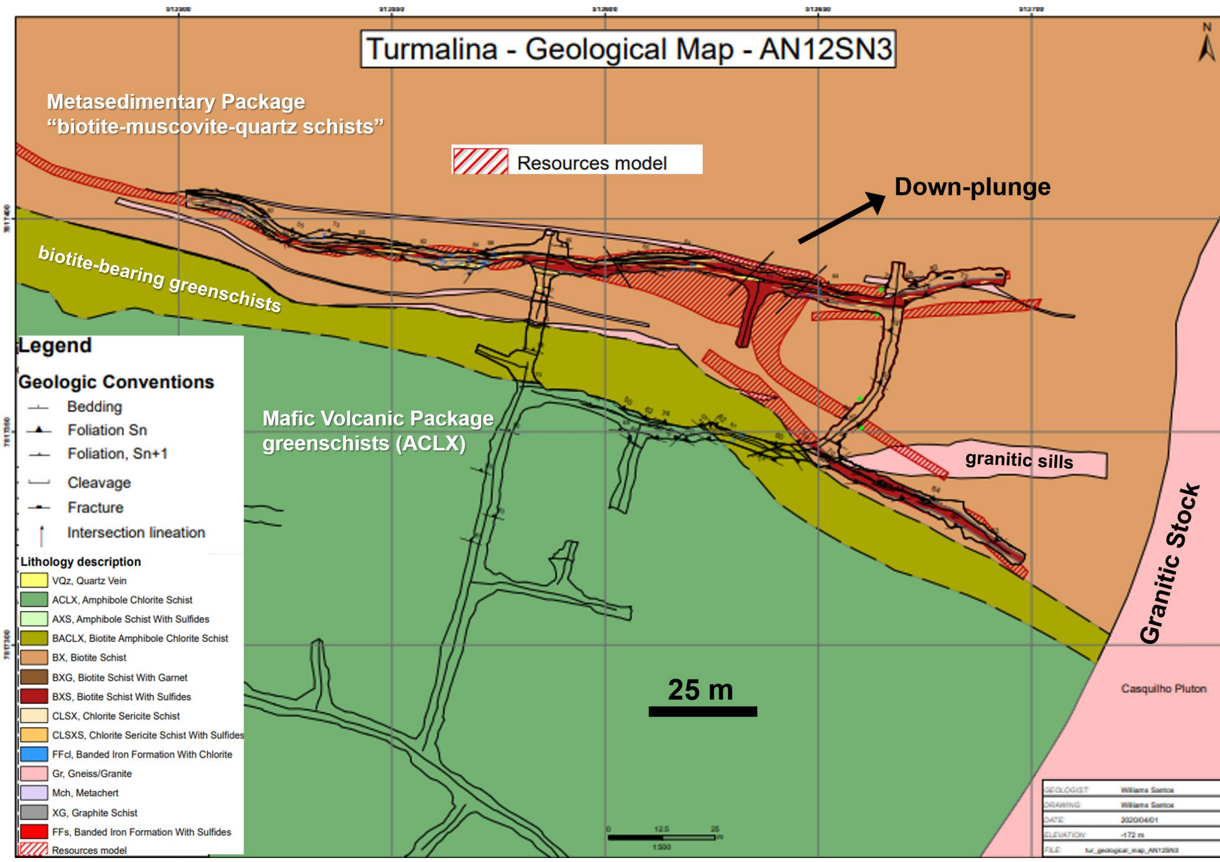


Figure 7-28: Geological Setting of the Orebody A

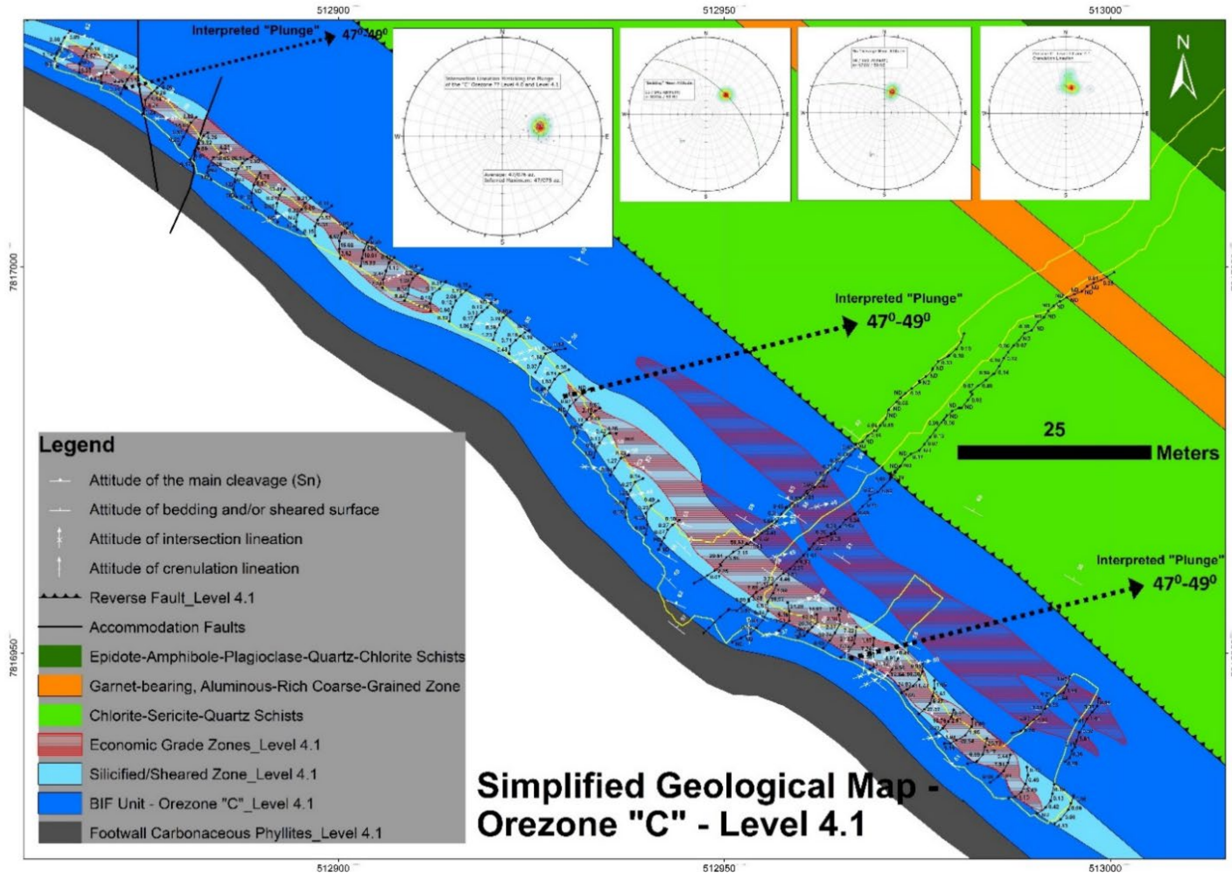
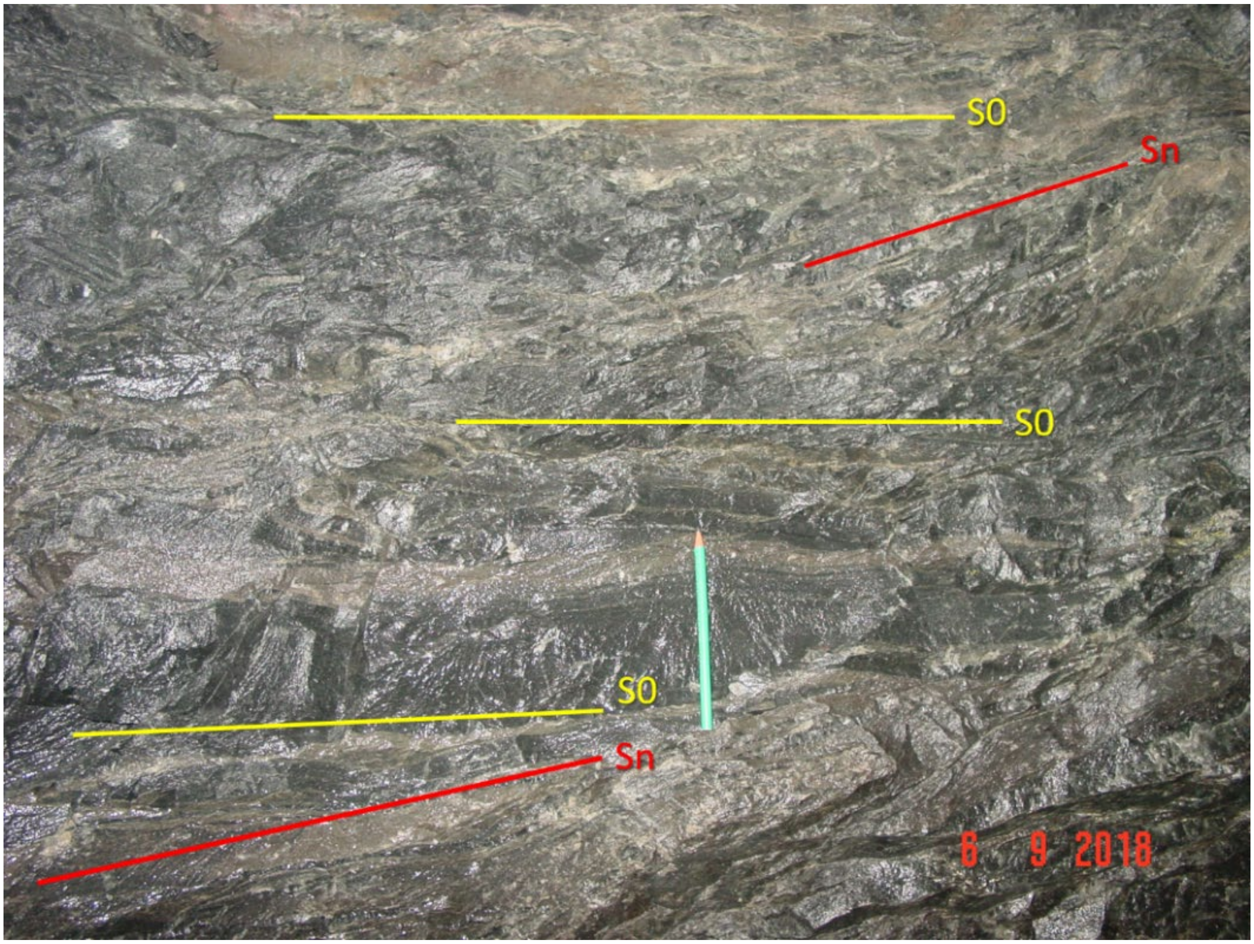


Figure 7-29: Geological Setting of the Orebody C

Gold mineralization in the Turmalina orebodies occurs as very fine gold grains associated with sulphides in sheared/foliated and silicified schists and BIF sequences (Figure 7-30). Gold particles average 10 µm to 20 µm in size, and are mostly associated with arsenopyrite, quartz, and micas (sericite and biotite) as presented in Table 7-1. Coarse grained gold, on a millimetre scale, is found locally with discrete quartz veins, but this type of occurrence is minor at the Turmalina deposit.



Notes:

1. S0: bedding; Sn: main tectonic cleavage.

Figure 7-30: Example of Two Penetrative Planar Structural Petrofabrics in a Single Underground Exposure of BIFs in Orebody C

Figure 7-31 presents a sample stereonet showing the statistical attitude of the intersection lineations measured underground (intersection lines between the bedding planes/S0 and the main penetrative tectonic cleavage/Sn) at a single operational level. This highly important penetrative lineation plunges approximately 45° to 50° towards an azimuth of 65° to 75° at the Turmalina Mine.

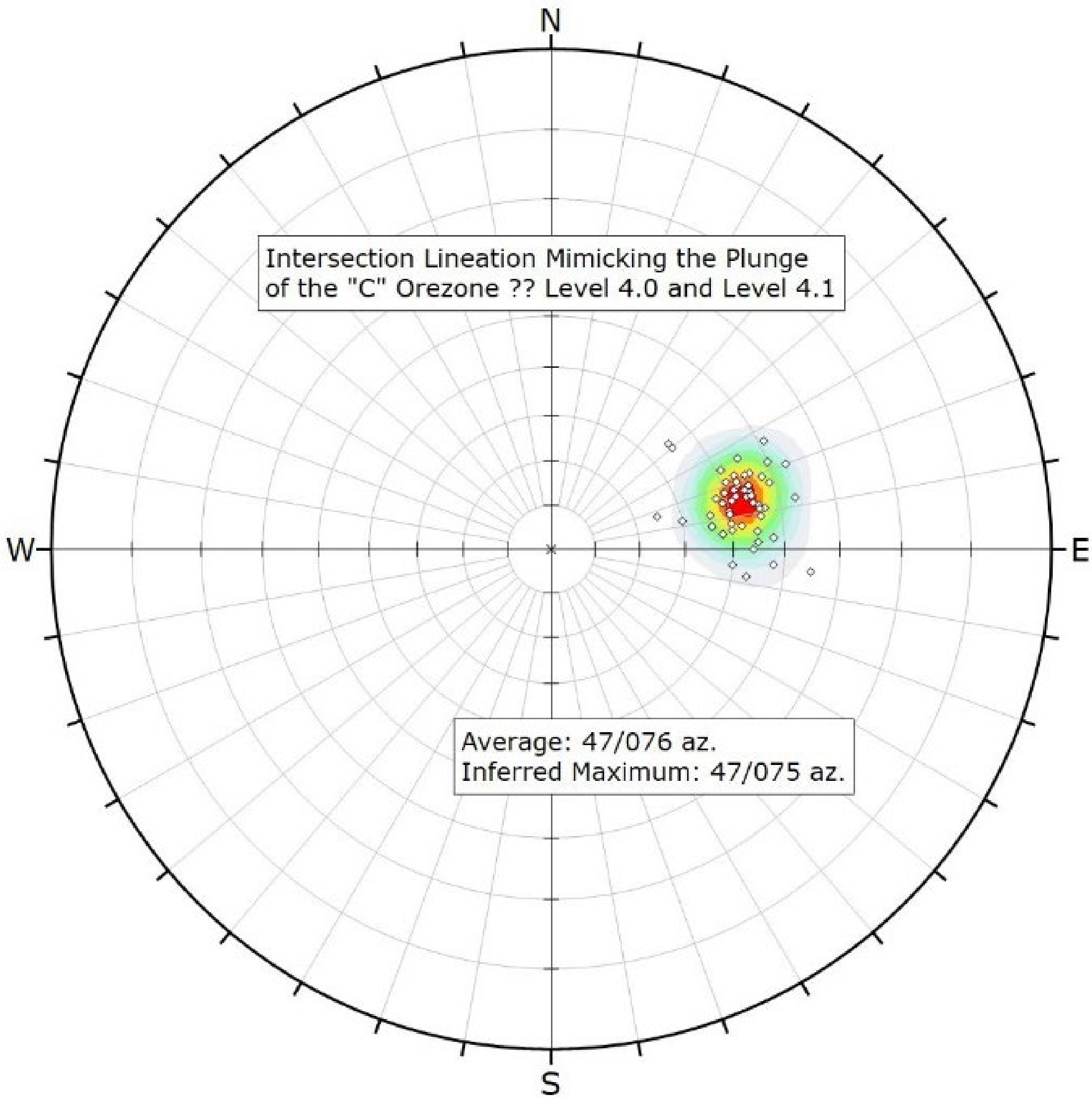


Figure 7-31: Sample Structural Stereonet

The quality of the average gold grades of the economic zones of Orebody C, Orebody A and Orebody B is a direct function of the relative amount of arsenopyrite that is present in the total modal concentration of disseminated sulphides in altered/silicified rock specimens (Figure 7-32).

Figure 7-32: Disseminated Sulphide in Altered Drill Core

Table 7-1: Gold Mode of Occurrence
Jaguar Mining Inc. – Turmalina Mine Complex

Associated with:	% of Gold Content	Notes
Arsenopyrite	61	Occurring both inside and at the borders of the mineral
Quartz	26	Occurring both inside and at the borders of the mineral
Micas	9	Occurring both inside and at the borders of the mineral
Pyrite + Pyrrhotite	4	Occurring only at the borders of the mineral

8.0 DEPOSIT TYPES

The gold metallogeny in the Iron Quadrangle district is complex. In a more general sense, gold mineralization has been found mainly within three general types of deposits and/or styles:

- Archean-age, invariably stratabound-like, Algoma-type BIF deposits
- "Quartz vein swarms-style", clearly mesothermal deposits
- Early-Proterozoic, Witwatersrand-type paleo-placer deposits

At the Complex, Orebody A and Orebody B are understood to be typical examples of mesothermal, epigenetic, and veined deposits that are enclosed by sedimentary host rocks that have undergone amphibolite-facies metamorphism. The origin of the three individual economic zones of Orebody C is a bit more controversial, as they are hosted by a stratigraphic horizon composed essentially of unique volcano-chemical BIFs and black carbonaceous schists. A summary of some of the main and common geological characteristics of these two potentially distinct groups of Archean gold deposits present in the Iron Quadrangle district follows.

The main host, fertile Algoma-type BIF units, and other sedimentary packages that host the economic mineralization are generally stratigraphically located at (or adjacent to) the waning stages of the major volcanic cycles of the Rio da Velhas greenstone belt. Economic host units are invariably overlain by later, thick packages of sedimentary rocks composed of greywackes and turbidites.

The mineralization style consists of either mainly "lateral" replacements and sulphidations of the iron carbonate-rich bands of the host Algoma-type BIF units, or swarms of quartz veins and siliceous alteration overprinting metasedimentary packages. There is a clear temporal-spatial-genetic relationship between the replacement/sulphidation of the host BIFs and/or of the host sedimentary packages and the onset of a structurally controlled, district-scale silicification and veining event that brings sulphide phases to the system. Economic gold grades are directly associated with the presence of sulphide phases, mainly pyrite, pyrrhotite, and arsenopyrite.

The dimensions of the economic orebodies possess strike-lengths ranging between 50 m to 350 m for individual mined zones. Average thicknesses of the orebodies may range from 2 m to 20 m.

The down-plunge continuities of the orebodies are directly related to structural geometric controls. Orebodies plunge with the orientation of an intersection lineation (between bedding planes and a tectonic cleavage) that mimics the orientation of axes of major (high-amplitude) or deposit-scale reclined folds. Increased gold grades and higher sulphide concentrations are typically mapped in association with fold hinge zones, wherever deposit-scale reclined, overturned folds can be mapped.

Orebodies and underground operations show consistent continuities for many kilometres down-plunge, despite the relatively small lateral dimensions (along the strike of the host units). Continuity can be greater than five kilometres along the plunge, similar to the main zones of the AngloGold Morro Velho and Cuiabá mines. All major orebodies are open at depth and warrant additional deep drilling to expand resources.

Where grades and thicknesses permit, gold deposits of these types and styles are amenable to both bulk mining and more selective high grade underground operations.

9.0 EXPLORATION

9.1 Summary

AngloGold performed a regional geochemistry survey covering an area of 430 km^2 in the Turmalina region. A total of 875 stream sediments and 446 pan concentrate samples were collected. Stream sediment samples were assayed for Au, Cu, Zn, Pb, Cr, Sb, and As. Pan concentrate samples were assayed for Au only.

Soil geochemistry sampling was executed by AngloGold in both the Faina and Pontal areas with grids varying from 100 m x 20 m to 10 m x 10 m. At Faina, 1,272 soil samples were collected and 16,900 m of lines were opened. At Pontal, 1,698 soil samples were collected and 28,000 m of lines were opened.

Several samples returned gold grades greater than 300 ppb. A significant portion of the soil samples collected from these targets were also assayed for As and Sb. There is a strong relation between gold and As/Sb since gold is associated directly with quartz veins with arsenopyrite and/or berthierite in the region.

Upon acquisition of the Turmalina Complex in 2004, Jaguar began its exploration activities focusing on the re-interpretation of the AngloGold data (trenches, soil geochemistry, and drilling) to better understand the local geology. These efforts were concentrated on the targets previously identified by AngloGold.

An exploration program was carried out at the Satinoco (Orebody C) target by Jaguar from March 2006 to April 2008 in order to collect sufficient information to prepare an estimate of the Mineral Resources in accordance with CIM (2014) definitions in NI 43-101. This program included the opening of about 700 m of trenches and the collection of 146 channel samples crossing the mineralized zone and a complementary diamond drill program.

Jaguar's exploration is focused on brownfields exploration in order to identify new mineral resources that would potentially increase its mineral reserves inventory and utilize existing capital infrastructure base, as well continuously growing the mineral resource base in the active mines.

The main brownfields exploration and growth projects currently underway at the Turmalina Complex include the Faina Deposit Area, the Zona Basal Oxide Deposit, and the Pontal South-Pontal Trend. These three targets are in within a few kilometres of the Turmalina Mine and the Turmalina Plant (Figure 4-2).

From 2019 to 2021, drone based magnetic aerial surveys were completed for Jaguar, covering portions of the Zona Basal, Faina, and Pontal Trends. The new airborne magnetic datasets were acquired using a drone (hexacopter) with GEM magnetometer as part of an Avant Geofisica's DRONEmagTMsystem survey. Southern Geoscience Consultants (SGC) has produced an integrated interpretation of the magnetic data for Jaguar and has proposed targets for follow up testing, either by surface geological mapping activities or by diamond drilling. The highest priority geophysical targets suggested were commonly those coincident with gold in soil anomalies.

Magnetic data was initially collected over lines with 100 m spacing. Some tie lines were also acquired. Small areas with promising results were covered with tighter 25 m spaced lines. The drone flew at an average height of 50 m, at an average speed of 8 m/s with measurements every 0.2 seconds.

9.2 Faina Deposit

Information relating to early exploration work carried out at the Faina deposits is limited. Exploration by AngloGold in 1980 included ground geophysical survey with grids size of 40 m x 100 m with 24 lines covering about 130 ha completed. Several geophysical anomalies were defined by both methods and most of them showed a strong relation with the geochemical anomalies. This information was used for the planning of trench locations.

In 1986 AngloGold, collected 1,272 soil samples using grids varying from 100 m x 20 m to 10 m x 10 m. Several samples returned gold grades greater than 300 ppb. A significant portion of the soil samples collected from these targets were also assayed for As/Sb.

Jaguar continued collection of soil samples through to 2009. Several samples returned gold grades greater than 300 ppb and were successful in outlining the surface expression of the Faina deposit. A significant portion of the soil samples collected from these targets were also assayed for As and Sb. A strong correlation between gold and As/Sb were observed as gold is associated directly with quartz veins with arsenopyrite and/or berthierite in the region.

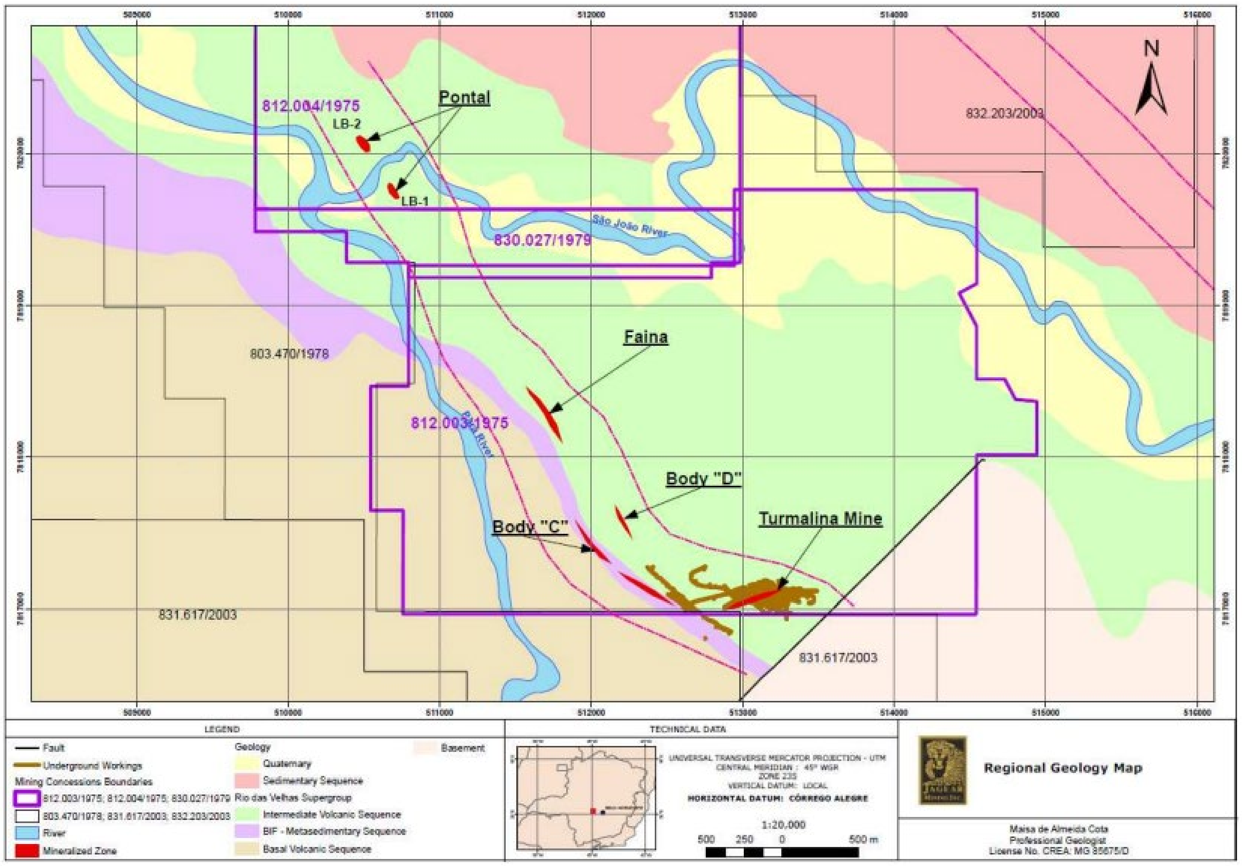
9.3 Pontal Deposits

The Pontal deposit area is located on Mineral Tenements 812.004/1975 and 830.027/1979, approximately four kilometres northwest of the Turmalina mining facilities (Figure 9-1), and includes the Pontal (LB1) and Pontal North (LB2) mineralized zones, as well as the recent exploration target Pontal South.

During the 1980s and 1990s, the Pontal, Faina, and Turmalina target areas were surveyed by Mineração Morro Velho Ltda. (MMV) and by Unigeo, both of which are former AngloGold subsidiaries. These companies executed an aggressive exploration program in the Pitangui and Conceição do Pará townships, and defined gold mineral resources, which enabled the implementation of several open pit mines and a heap leaching plant project. This initial open pit/heap-leaching operation was shut down in 1993.

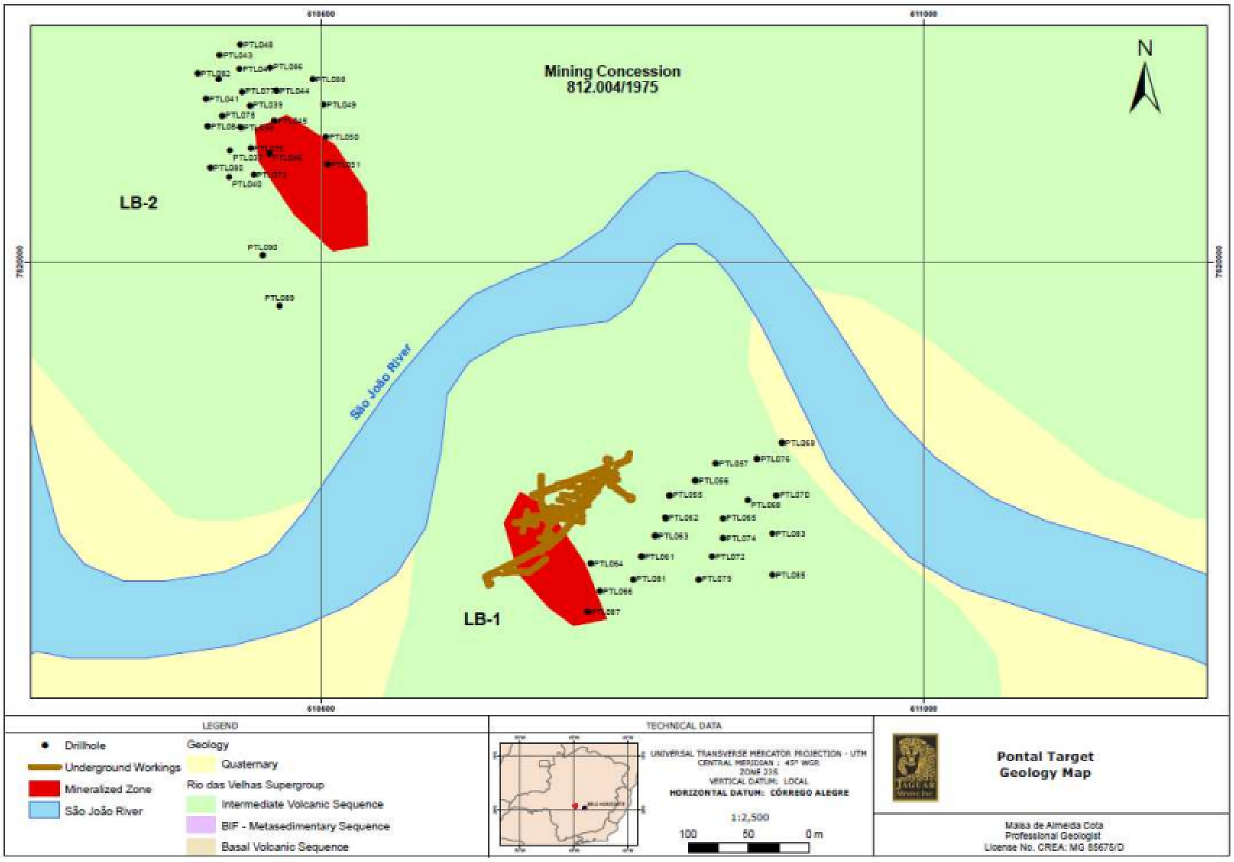
During that exploration phase, AngloGold´s subsidiaries executed a horizontal drift and a ramp at the Pontal LB1 target (Figure 9-2), aimed at accessing the mineralization below the weathered zone. The goal was to evaluate the economic shoot continuities and to collect fresh mineralized samples for the initial metallurgical studies.

In September 2004, Jaguar purchased the Complex from AngloGold, and started a complementary exploration program aimed at evaluating the gold resources and exploration potential. In 2006, Jaguar commenced the implementation of the Turmalina underground project, and an exploration program in some nearby sectors inside its mineral concession which also covered the Pontal area. Until 2010, at the Pontal deposits, the LB1 mineralized body had been drilled to a depth of only 200 m, while the LB2 mineralized body had been drilled to a depth of only 100 m.



Source: Machado, 2011

Figure 9-1: General Location of LB1 and LB2 Mineralized Zones – Pontal Deposits



Source: Machado, 2011

Figure 9-2: Pontal Deposits Geology Map Showing Underground Drift and Ramp

9.4 Zona Basal Target

The Zona Basal target area is located on Mineral Tenements 803.470/1978, 831.126/2018, 831.617/2003 and 833.584/2012, approximately 3.0 km to 3.5 km west of the Turmalina mining facilities (Figure 9-4).

Following the exploratory soil geochemistry sampling in 2018, a total of 14 trenches were excavated, totaling 1,434 m in length. These trenches were geologically mapped, and samples were collected of any material that was believed to contain gold mineralization. A total of 1,055 channel samples were collected, and the best results/intercepts initially obtained are presented in Table 9-1. The location of the trenches is illustrated in Figure 9-3.

Channel and trenches sampling was performed on outcrops and artificial exposures, usually of saprolite, as fresh rock is rare. The exposure is initially "cleaned", removing any superficial material (approximately 5 cm) which might contain non-representative transported particles and is most exposed to weathering, including rain leaching. Then, channel sample limits are marked by a technician or a geologist with small wood stakes (using spray paint if necessary), in an orientation to obtain the best knowledge about the outcrop being sampled, usually crosscutting the target feature and respecting lithological contacts. The sampler and an assistant collect the sample along the defined channel, with a duck head hammer and a clean aluminum tray, extracting material from an approximately five centimetre wide and three centimetre deep band. The total weight of a one metre sample is approximately three kilograms. It is bagged and identified. Geologic description and structural bearings are taken by a geologist, along with a field sketch.

Table 9-1: Summary of Positive Trench Sampling Results, Zona Basal
Jaguar Mining Inc. – Turmalina Mine Complex

Trench	Composite
TZB034	8.65 m at 0.70 g/t Au
	4.8 m at 0.82 g/t Au
TZB037	8.70 m at 0.87 g/t Au
TZB041	17.80 m at 1.29 g/t Au
	7.30 m at 0.97 g/t Au
TZB042	4.50 m at 1.03 g/t Au
TZB047	1.50 m at 18.60 g/t Au
	7.90 m at 3.78 g/t Au

Geological mapping activities were carried out by Jaguar's exploration team in 2018 over an area of approximately 78 ha – at a scale of 1:2,500 – in the vicinity of the Zona Basal target. This mapping program discovered numerous occurrences of outcrops, mostly located along the various drainages and streams in the area. The 2018 exploration program carried out over the Zona Basal target discovered gold mineralization over an area of approximately 1,000 m to 1,250 m along strike and approximately 500 m wide across the strike. This target area of the Turmalina Complex was not previously considered as having high potential for hosting economic gold mineralization.

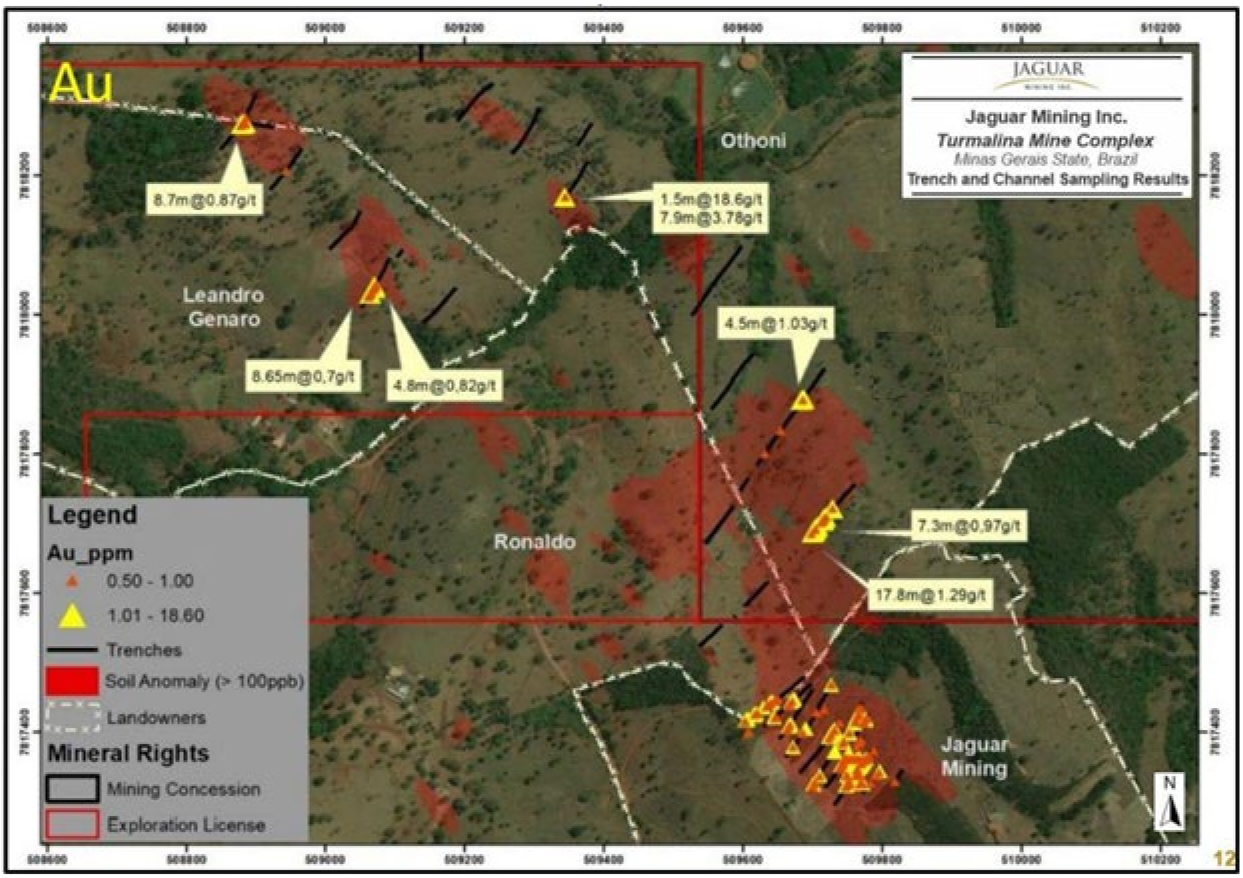


Figure 9-3: 2018 Zona Basal Trenches and Channel Sampling Results

In 2021, Jaguar also carried out a program of soil sampling, chip sampling, trenching, and geological mapping on the Zona Basal target, which is located approximately four kilometers to the west of the Turmalina Mine.

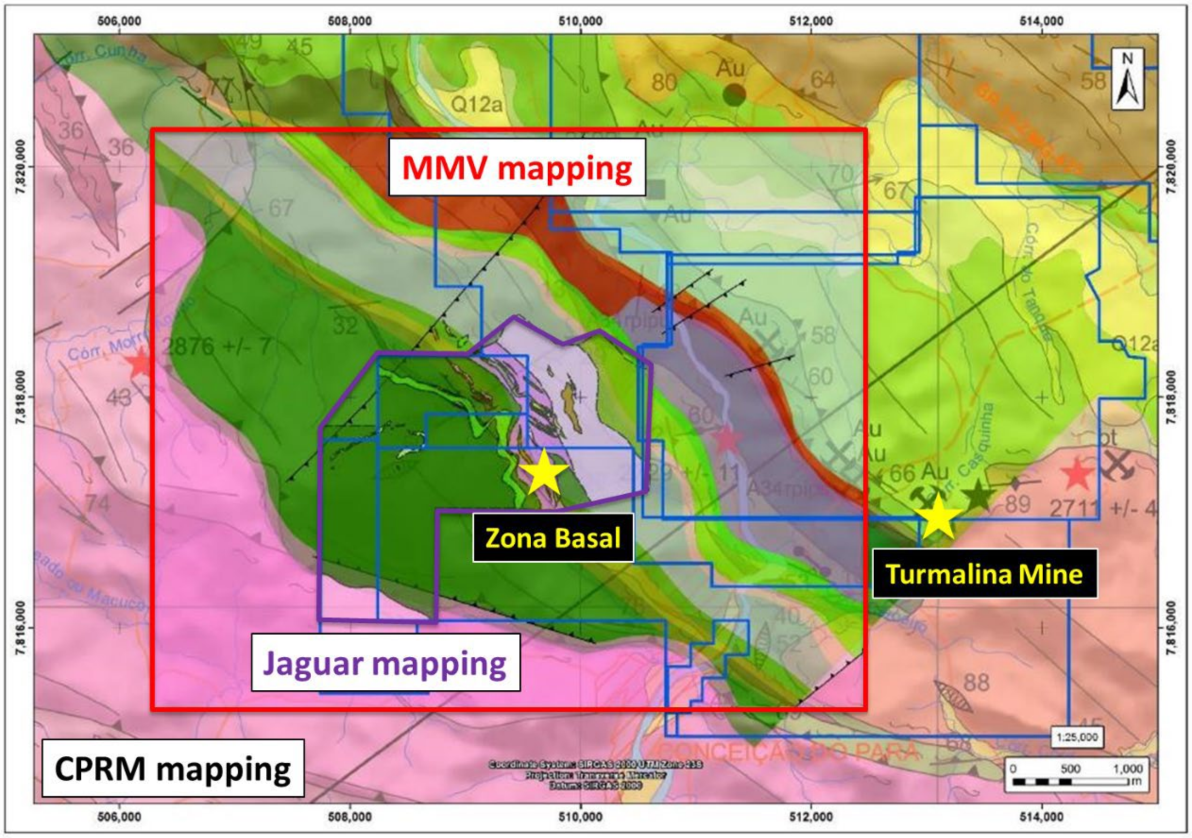


Figure 9-4: Area of Geological Mapping, Zona Basal Target

The soil sampling program involved the collection of 670 soil samples, which were analyzed for gold and 48 other elements by the ALS Chemex laboratory located in Vespasiano, Minas Gerais state. This soil sampling program was carried out along a series of 12 sampling lines that were spaced approximately 50 m apart. The soil sampling program detected the presence of two gold anomalies that are oriented in a northwest-southeast direction, approximately parallel to the regional stratigraphic trends. The gold anomalies also contain elevated values of arsenic and antimony. Detailed mapping completed in the area of the soil anomalies also found several small, gossanous outcrops where grab samples yielded grades between 1.38 g/t Au and 26.5 g/t Au.

Figure 9-5 presents the results of the 2021 exploratory soil geochemistry campaign that highlighted the surficial anomaly related to the Zona Basal gold deposit.

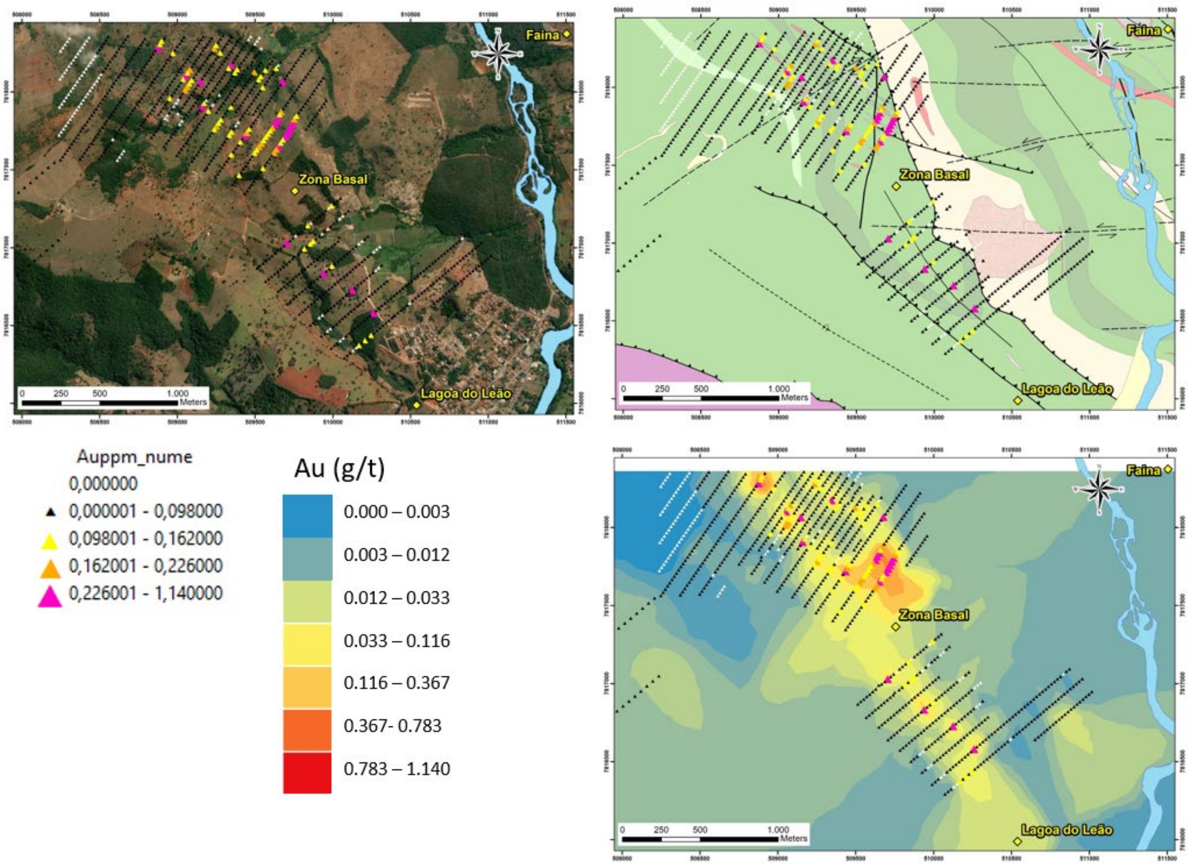


Figure 9-5: 2021 Zona Basal Soil Sampling Survey

The soil sampling grid was planned based on local geological knowledge, orientating the lines to best crosscut the geologic structures which are expected to host gold mineralization. With the aid of a handheld global positioning system (GPS) unit, the exploration team opened trails to reach the established sampling sites. Samples were collected from the B soil horizon using a post hole digger. For each sample site, the depth of the B soil horizon is reached in different depths depending on the geomorphological setting. If rock bedding is reached, it was penetrated in order to collect the underlying residual soil. For each sample, one kilogram to two kilograms of B horizon soil is withdrawn and placed over a clean PVC canvas. The sample is described, bagged, and identified. If necessary, the sample is disaggregated and sieved to remove the coarse material (> 2 mm).

10.0 DRILLING

10.1 Summary

Collar locations for the holes were established by theodolite surveys. All holes were drilled within three metres of the planned location. Azimuth and inclination for angle holes were set by Brunton compass, deemed accurate to within 2° azimuth and <1° inclination.

Following completion of the holes, the collars were resurveyed with theodolite and cement markers emplaced. Downhole surveys were completed in all holes with length greater than 100 m, using Sperry-Sun or Maxibor equipment.

The average core recovery was greater than 90%. Core samples were collected during these phases and sent to laboratories for gold assays (as discussed in Section 11.0).

Jaguar has continued to carry out drilling and channel sampling programs on the orebodies. Current drilling and sampling practices involve the initial delineation of the location of the mineralized lenses using either surface-based or underground-based drill holes as appropriate. Once sufficient primary underground access has been established, the mineralized lenses are further outlined by underground-based drill holes at a nominal spacing of 25 m to 50 m. For the 2021 drilling program, all drilling was completed from underground stations. Table 10-1 summarizes the drilling carried out at the Turmalina Complex to date. Figure 10-1 presents the location of the Turmalina Complex drill holes drilled to date.

Table 10-1: Summary of the Diamond Drilling at the Turmalina Complex
Jaguar Mining Inc. – Turmalina Mine Complex

Year	Number of Holes	Total Length (m)
2005	83	22,721
2006	38	8,793
2007	51	13,401
2011	316	20,963
2012–2015	1,095	80,437
2016	254	17,167
2018	318	26,781
2019	258	21,360
2020–2021	749	73,416
Total	**3,162**	**285,039**

In 2021, a total of 154 reverse circulation (RC) holes to an average depth of 50 m (totalling 8,508 m) were completed in the Zona Basal Target area.

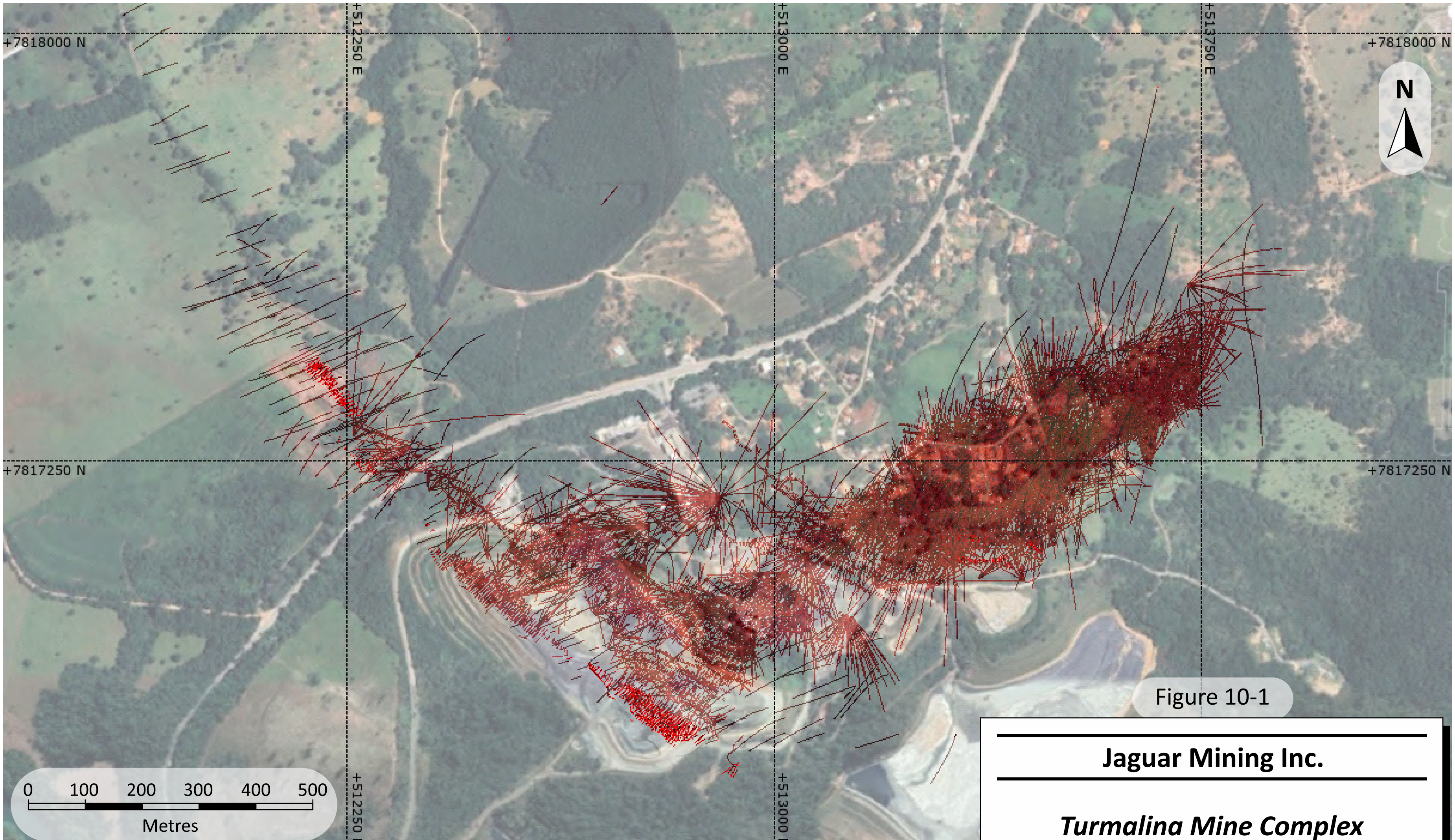


Figure 10-1

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Drill Hole Locations (2005 to 2021)

March 2022

Source: SLR, 2022.

10.2 Turmalina Mine

Jaguar completed a program of delineation diamond drilling in 2020 and 2021 from underground stations where 208 holes with a total combined length of approximately 25,760 m were completed. The drill holes mostly tested the down-plunge continuation of Orebodies A, B, and C. Significant intersections from the more recent delineation drilling programs have been disclosed in news releases issued by Jaguar on May 25, 2021, and on June 20, 2021.

A selection of the significant intersections encountered during the 2020 and 2021 underground drilling campaigns, using the uncapped gold assay values, is provided in Table 10-2.

Table 10-2: Significant Intersections from the 2020 and 2021 Underground Drilling Programs Jaguar Mining Inc. – Turmalina Mine Complex

Hole ID	From (m)	To (m)	Downhole Interval (m)	Estimated True Width (m)	Grade (g/t Au)
FTS1891	70.26	75.21	4.95	4.75	4.82
FTS1900	46.43	51.88	5.45	5.31	1.45
	54.10	58.41	4.31	4.26	6.04
FTS1927	80.60	90.38	9.78	9.62	9.03
FTS1921	63.94	71.86	7.92	7.81	1.62
	80.26	83.51	3.25	3.15	2.36
	104.86	113.67	8.81	8.10	5.58
FTS1923	99.41	111.08	11.67	8.25	5.13
FTS1925	110.64	117.34	6.70	5.35	19.65
FTS1951	134.19	148.07	13.88	11.75	6.25
FTS1952	144.81	156.06	11.25	9.99	7.54
FTS1897	56.51	62.32	5.81	3.96	12.56
FTS1900	46.43	58.41	11.98	9.35	2.89
FTS1907	51.97	58.06	6.09	5.25	1.62
	67.93	71.89	3.96	2.71	10.49
FTS1908	49.94	54.97	5.03	4.75	0.97
	60.02	65.12	5.10	4.91	4.55
FTS1929	100.59	118.45	17.86	14.25	4.86
FTS1909	50.41	66.48	16.07	15.25	3.99
FTS1930	109.12	116.44	7.32	6.78	5.32
FTS1933	116.46	127.88	11.42	10.25	6.07
FTS1937	121.60	125.04	3.44	2.95	8.71
FTS1946	73.24	81.00	7.76	6.51	3.13

Hole ID	From (m)	To (m)	Downhole Interval (m)	Estimated True Width (m)	Grade (g/t Au)
	110.68	111.75	1.07	0.82	4.02
FTS1887	55.99	57.86	1.87	1.42	12.62
	69.40	70.26	0.86	0.65	3.97
	83.30	90.50	7.20	6.55	4.30
FTS1849	175.40	190.69	15.29	4.94	9.22
FTS1851	72.79	92.85	20.06	11.50	1.39
	113.88	116.90	3.02	1.73	2.62
	161.30	168.36	7.06	4.04	9.21
FTS1855	45.75	54.50	8.75	6.18	6.08
	78.80	80.40	1.60	1.54	39.85
	110.80	114.95	4.15	3.97	4.75
	118.08	121.30	3.22	3.10	1.75
FTS1856	82.85	87.10	4.25	4.12	10.55
	139.70	141.70	2.00	1.85	2.01
FTS1857	65.40	69.75	4.35	4.15	3.27
	84.45	90.85	6.40	5.95	5.38
FTS1858	33.75	44.40	10.65	8.72	5.53
	77.20	86.85	9.65	6.82	3.07
	93.05	96.50	3.45	1.72	4.10
FTS1859	43.40	54.05	10.65	8.39	3.95
	61.85	66.80	4.95	3.50	7.82
	118.15	123.90	5.75	4.40	5.60
FTS1865	27.25	39.35	12.10	11.50	5.98
	45.60	47.55	1.95	1.94	4.84
	71.90	79.95	8.05	7.97	2.61
	85.30	87.70	2.40	2.39	3.86
FTS1866	48.65	51.75	3.10	3.01	14.48
FTS1966	36.45	50.50	14.05	10.59	5.00
	84.00	87.00	3.00	2.91	2.06
	88.45	95.50	7.05	5.15	3.50
FTS1967	62.80	68.10	5.30	4.95	11.31
FTS1978	23.60	25.60	2.00	1.84	1.60

Hole ID	From (m)	To (m)	Downhole Interval (m)	Estimated True Width (m)	Grade (g/t Au)
	27.65	38.20	10.55	8.04	2.23
	47.00	49.45	2.45	2.22	2.73
	73.50	75.45	1.95	1.04	0.64
	83.25	88.95	5.70	4.88	12.07
	35.00	40.60	5.60	5.31	6.69
FTS1979	43.40	47.55	4.15	3.30	1.48
	103.00	104.95	1.95	1.68	3.97
	38.95	51.00	12.05	8.68	4.13
FTS1983	62.80	66.50	3.70	2.75	8.45
	86.65	93.90	7.25	5.79	3.73
	101.85	106.95	5.10	3.88	2.83
FTS2018	83.04	86.60	3.56	3.15	1.87
	93.92	104.65	10.73	8.85	5.61
FTS1889	51.59	55.88	4.29	3.10	4.50
	75.06	77.12	2.06	1.06	2.57
FTS2019	112.92	121.40	8.48	7.32	5.62
	77.59	80.64	3.05	2.85	1.04
FTS2020	115.20	117.86	2.66	1.99	13.87
	141.92	146.05	4.13	3.97	3.86
	151.30	154.37	3.07	2.81	6.08
FTS2021	98.69	100.39	1.70	1.25	3.39
	118.57	130.24	11.67	10.29	4.39
	64.40	75.15	10.75	7.77	1.71
FTS2022	95.77	99.15	3.38	2.64	1.35
	121.28	127.86	6.58	5.23	6.61
FTS2023	131.51	134.75	3.24	2.95	4.07
	139.25	144.87	5.62	4.89	6.15
FTS2025	119.68	126.59	6.91	5.25	1.78
	132.16	149.77	17.61	15.15	3.68
	44.59	52.19	7.60	6.37	2.46
FTS2027	113.49	115.41	1.92	1.66	2.53
	130.03	136.99	6.96	6.18	2.36

Hole ID	From (m)	To (m)	Downhole Interval (m)	Estimated True Width (m)	Grade (g/t Au)
FTS2029	145.05	146.13	1.08	0.96	2.90
	131.97	132.76	0.79	0.63	2.48
	176.91	189.03	12.12	9.94	3.06
FTS2043	73.26	75.11	1.85	1.74	1.90
	80.36	81.41	1.05	0.99	3.54
	94.06	98.68	4.62	4.36	4.97
FTS2030	45.43	47.68	2.25	1.75	2.14
	80.11	88.66	8.55	6.85	3.47
	115.62	119.90	4.28	3.64	1.63
	171.86	176.50	4.64	3.99	2.60
FTS2031	162.90	175.13	12.23	10.45	7.52
FTS2032	109.11	112.83	3.72	3.21	10.58
	135.23	141.66	6.43	5.67	2.15
FTS2033	172.16	177.28	5.12	4.03	6.84
	190.31	193.81	3.50	2.80	2.89
FTS2004	109.09	112.49	3.40	3.10	3.44
	146.77	156.10	9.33	8.25	3.52
	202.36	204.70	2.34	2.15	3.45
	210.18	218.83	8.65	7.95	2.67
FTS2097	97.37	99.49	2.12	1.82	1.82
	129.66	139.86	10.20	9.82	4.96
FTS2136	81.26	82.27	1.01	0.92	1.32
	111.30	118.53	7.23	6.90	7.38
	147.52	148.32	0.80	0.70	2.60
	159.49	160.39	0.90	0.65	5.28
FTS2135	71.80	74.12	2.32	2.25	3.58
	77.71	79.92	6.16	6.05	6.16
	148.37	149.44	1.07	0.91	5.76
FTS2005	3.47	5.53	2.06	1.92	5.65
	93.59	102.30	8.71	8.15	3.83
	139.51	141.40	1.89	1.65	1.96
	174.34	175.34	1.00	0.86	5.70

Hole ID	From (m)	To (m)	Downhole Interval (m)	Estimated True Width (m)	Grade (g/t Au)
FTS1919	191.83	195.44	3.61	3.10	5.54
	3.70	13.40	9.70	6.43	3.26
	311.65	312.55	0.90	0.60	1.12
FTS1915	36.60	46.40	9.80	8.81	22.05
	43.00	46.40	3.40	3.05	59.93
	101.65	103.40	1.75	1.53	5.82
FTS1987	109.50	120.35	10.85	9.82	3.20
	259.40	263.65	4.25	3.87	4.39
FTS2060	55.15	66.75	11.60	8.97	5.04
FTS2118	96.80	104.40	6.75	6.21	3.01
	107.30	115.50	8.20	7.48	5.94
FTS2119	113.95	123.80	9.85	8.75	4.74
	126.80	128.80	2.00	1.69	3.36
FTS2121	152.70	158.30	5.60	4.97	7.61
FTS2123	147.80	158.15	12.50	10.37	3.05

An additional 328 definition drill holes, totalling 8,451 m, were completed to provide detailed information in support of final stope planning and production. A summary of the drilling and channel sample information that was gathered at Turmalina Mine during 2020 and 2021 is provided in Table 10-3. The 3D locations of the drill holes completed in 2020 and 2021 are illustrated in Figure 10-2. Additional detailed information is provided in Section 14 of this Technical Report.

Table 10-3: Summary of Drill Hole and Channel Samples Completed in 2020 and 2021
Jaguar Mining Inc. – Turmalina Mine Complex

Category	Number	Total Length (m)
Drill Holes – Definition	328	8,451
Drill Holes – Delineation	208	25,760
Collars, Channel Samples	3,204	18,216

The past surface-based diamond drilling programs were carried out by the drilling contractor Mata Nativa using HQ and NQ tools. HQ-sized equipment was used for the portion of the hole that traverses the saprolite horizon, and the hole diameter was then reduced to NQ when the fresh rock was reached. The diamond drill core procedures adopted by Jaguar are described below:

- Only drill holes with more than 85% core recovery from the mineralized zone were accepted.
- Drill hole deviations (surveys) were measured by Sperry-Sun or DDI/Maxibor equipment.

- The cores were stored in wooden boxes of one metre length with three metres of core per box (HQ diameter) or four metres of core per box (NQ diameter). The hole's number, depth, and location were identified in the boxes by an aluminum plate on the front of the box and by a water-resistant ink mark on its side. The progress interval and core recovery are identified inside the boxes by small wooden or aluminum plates.

The underground-based drill holes shown in Figure 10-2 for the 2020 and 2021 drilling programs were completed by Jaguar and drilling contractor, Major Drilling, in Q1 2020. The drilling was carried out using NQ, BQ, and LTK core diameters and followed Jaguar's established drilling procedures.

The down-plunge limits of the gold grades and the economic ore zones of the Turmalina deposit have not been defined by the drilling completed to date. The SLR QP notes that there is a possibility of discovering additional mineralized zones in the mine stratigraphy and supports Jaguar's plans to target shallow extensions to mineralization along the Orebody C trend as well as exploration drilling targeting the down-plunge and along-strike projections of Orebodies A and C. The SLR QP is of the opinion that Jaguar should continue drill programs to outline the along-strike and down-plunge continuation of Orebody A and Orebody C while drill intercepts continue to demonstrate economic viability.

The SLR QP notes that the deposits are well drilled and well sampled. The drilling and sampling protocols permit the identification and delineation of the mineralized areas with confidence. The drilling and sampling practices are carried out to a high standard. The SLR QP has not identified any drilling, sampling, or core recovery issues that could materially affect the accuracy or reliability of the core samples and drill holes from both the underground and surface/exploration drilling initiatives.

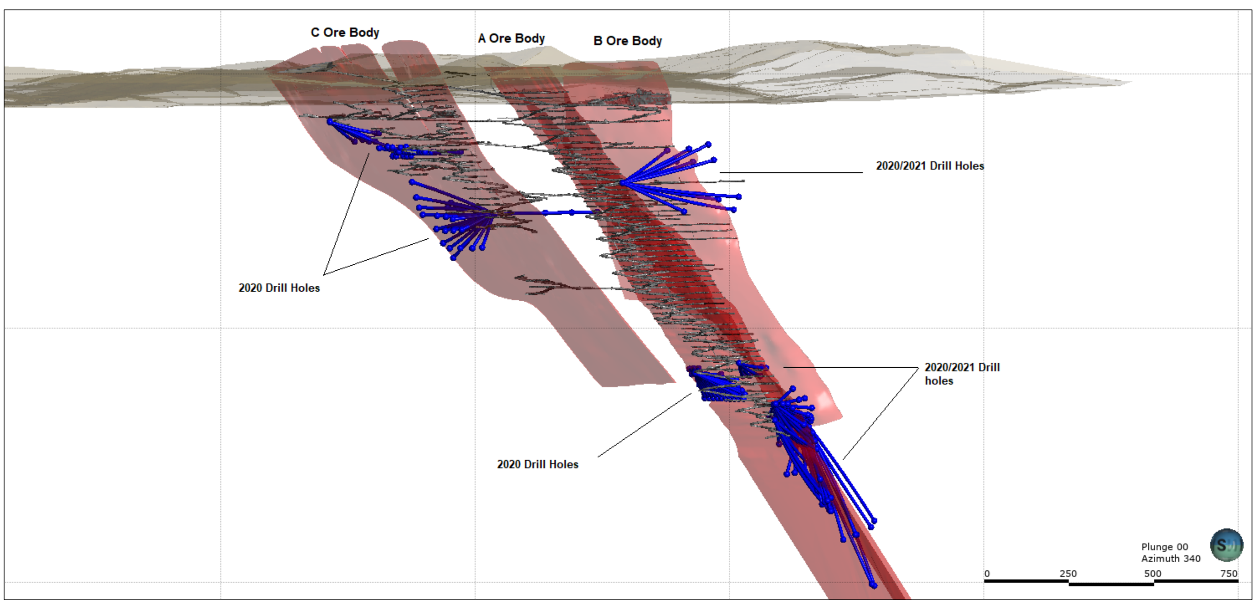


Figure 10-2: Longitudinal View of the 2020 and 2021 Drill Hole Locations

A selection of the significant intersections encountered during the 2020 and 2021 surface brownfields exploration drilling campaigns at Faina and Pontal, is provided in Table 10-4. The surface-based exploration and exploratory drill holes completed in the 2020 and 2021 drilling programs were completed by the contractor Major Drilling, using international quality standards and practices. The drilling was carried out using HQ and NQ core diameters.

Table 10-4: Summary of Significant Diamond Drilling Intersections, 2021 Drilling Programs
Jaguar Mining Inc. – Turmalina Mine Complex

Hole ID	Exploration Target	Easting (m)	Northing (m)	Elevation (m)	Total Depth (m)	From (m)	To (m)	Downhole Interval (m)	Gold Grade (g/t Au)
FFP001	FAINA-PONTAL	511,424.45	7,818,871.47	695.70	277.00	7.35	8.1	0.75	1.81
FFP002	FAINA-PONTAL	511,556.26	7,818,776.44	695.16	331.10	106.3	107.3	1	0.25
						141.95	142.65	0.7	0.32
						165	166.1	1.1	1.28
						312.3	313.3	1	0.21
FFP003	FAINA-PONTAL	511,594.59	7,818,635.63	718.65	351.40	0	5.8	5.8	0.24
						9.6	10.85	1.25	0.23
						15.1	16.4	1.3	0.26
						83.3	84.15	0.85	1.62
						174.4	182.9	8.5	0.21
FFP004	FAINA-PONTAL	511,320.51	7,818,940.58	688,95	256,80	94	95	1	0.22
FSN243	CNW-FAINA	511,975.18	7,817,996.15	699.54	300.55	61.65	62.65	1	0.36
						69.65	71.1	1.45	0.25
						75	75.85	0.85	0.25
						279.15	280.15	1	0.22
FSN244	CNW-FAINA	512,031.85	7,817,819.44	715.30	351.65	276.15	277.15	1	0.21
						290.2	295.2	5	0.41
						301.15	301.85	0.7	0.2
						334.9	339.9	5	0.43

Hole ID	Exploration Target	Easting (m)	Northing (m)	Elevation (m)	Total Depth (m)	From (m)	To (m)	Downhole Interval (m)	Gold Grade (g/t Au)
FSN245	CNW-FAINA	512,130.39	7,817,682.99	702.48	349.15	130.4	131.43	1.03	0.46
						134.35	135.4	1.05	0.32
						144	150.5	6.5	0.21
						192.65	197.75	5.1	0.56
						278.94	279.9	0.96	0.32
						289.46	290.48	1.02	2.52
FSN246	CNW-FAINA	512,313.37	7,817,542.77	704.48	301.05	58.1	59.15	1.05	0.44
						160.35	163.95	3.6	6.93
						161.2	163.95	2.75	8.96
						186.51	187.67	1.16	0.31
						262.7	263.65	0.95	0.24
						266.2	268.3	2.1	0.27
FUH168A	FAINA	511,766.38	7,818,316.66	722.83	285.40	109.63	111.65	2.02	0.83
						134.75	141.5	6.75	2.18
						135.5	139.4	3.9	3.24
						162	192.8	30.8	5.38
						162	190	28	5.86
						162	164	2	17.73
						173.05	190	16.95	7.35
						207	213.9	6.9	0.48
						207	208	1	2.51

Hole ID	Exploration Target	Easting (m)	Northing (m)	Elevation (m)	Total Depth (m)	From (m)	To (m)	Downhole Interval (m)	Gold Grade (g/t Au)
						235	237	2	0.57
						262	263.35	1.35	0.35
FUH169	FAINA	511,839.09	7,818,206.38	710.10	120.00	0	14.5	14.5	1.08
						8.5	11.5	3	3.78
						37.5	38.5	1	2.51
						37.5	38.5	1	2.51
						47.85	54.4	6.55	2.8
						49	54.4	5.4	3.21
FUH170	FAINA	511,848.41	7,818,019.47	700.97	59.05	19	21	2	0.31
						27	30	3	0.5
						38.5	39.5	1	0.34
FUH171	FAINA	511,852.59	7,818,012.32	701.09	82.65	0	16.5	16.5	6.04
						7	16.5	9.5	10.32
						7	16.5	9.5	10.32
						22.3	36	13.7	8.54
						22.3	34	11.7	9.81
						22.3	35	12.7	9.17
						53.3	56	2.7	0.32
FUH172	FAINA	511,785.48	7,818,139.84	711.41	201.90	0	1.5	1.5	0.29
						24	29	5	2.1
						24	29	5	2.1

Hole ID	Exploration Target	Easting (m)	Northing (m)	Elevation (m)	Total Depth (m)	From (m)	To (m)	Downhole Interval (m)	Gold Grade (g/t Au)
						133	142.8	9.8	0.45
						92	93.1	1.1	0.42
FUH173	FAINA	511,722.24	7,818,175.17	703.60	198.10	101	104	3	2.64
						101	102.85	1.85	4.15
						3.4	11.9	8.5	1.56
						7.15	9.45	2.3	3.83
						32.6	33.7	1.1	0.52
						42.05	67.4	25.35	0.32
						84.4	104	19.6	1.01
						88.25	91.95	3.7	2.14
						97.15	99.45	2.3	3.09
PTL092	PONTAL SOUTH	510,819.18	7,819,758.40	647.86	252.15	120.15	195	74.85	1.17
						125.45	126.2	0.75	3.02
						145	160.1	15.1	2.8
						186.2	192.3	6.1	3.6
						210.5	212.2	1.7	0.95
						224.7	227.2	2.5	0.82
						236.2	237.6	1.4	0.36
						4.65	5.65	1	1.15
PTL093	PONTAL SOUTH	510,824.89	7,819,696.26	650.15	252.25	31.45	32.65	1.2	1.05
						43.25	46.5	3.25	0.48

Hole ID	Exploration Target	Easting (m)	Northing (m)	Elevation (m)	Total Depth (m)	From (m)	To (m)	Downhole Interval (m)	Gold Grade (g/t Au)
						72.85	73.85	1	0.22
						74.85	75.8	0.95	0.24
						77.8	78.8	1	0.23
						90.1	96.65	6.55	0.8
						91.05	91.9	0.85	3.28
						102.7	103.95	1.25	1
						110	110.7	0.7	0.26
						117.6	119.55	1.95	0.48
						175.85	177.95	2.1	0.27
PTL094	PONTAL SOUTH	510,988.33	7,819,423.76	637.90	229.00	2	3.5	1.5	0.35
						10.65	11.75	1.1	0.32
						47	80.1	33.1	2.28
						51	72.95	21.95	3.19
						130.3	139.05	8.75	1.03
						134.95	136.75	1.8	2.86
						149	150	1	0.26
						156.9	164	7.1	0.39
PTL095	PONTAL SOUTH	511,155.44	7,819,359.09	637.48	251.00	22.4	23.45	1.05	0.28
						73	74	1	0.39
						112.25	131.9	19.65	0.72
						122.9	126.1	3.2	2.51

Hole ID	Exploration Target	Easting (m)	Northing (m)	Elevation (m)	Total Depth (m)	From (m)	To (m)	Downhole Interval (m)	Gold Grade (g/t Au)
						171.7	172.8	1.1	1.01
						115.7	165.1	49.4	1.95
						115.7	138.75	23.05	1.93
						115.7	120.45	4.75	2.82
PTL096	PONTAL SOUTH	510,947.52	7,819,568.40	631.42	202.05	129	136.7	7.7	3.39
						145.5	165.1	19.6	2.6
						152.4	165.1	12.7	3.5
						177.7	178.45	0.75	0.42
						52.15	54.1	1.95	4.53
						52.15	53.05	0.9	9.57
						52.15	54.1	1.95	4.79
						52.15	53.05	0.9	10.13
						80.05	95.3	15.25	1.83
						81.05	90.2	9.15	2.41
PTL097	PONTAL SOUTH	510,932.75	7,819,673.65	643.06	279.90	118.15	130.75	12.6	0.51
						123.8	125.8	2	2.33
						143.25	144.95	1.7	1.11
						162.15	163.15	1	0.28
						182.1	193.05	10.95	0.8
						189.7	190.8	1.1	2.43
						220.95	221.95	1	0.32

10.3 Faina Deposit

Following the initial discovery, several drilling programs were initiated. Holes FUH-001 to FUH-026 were completed in 1987 by AngloGold. Jaguar drilled holes FUH-027 to FUH-167 between 2009 and 2013; and holes FUH-168 to FUH-173 were completed from late 2020 to 2021 (Figure 10-3).

These programs resulted in the mining of the shallow oxide portions of the Faina deposit via an open pit, but due to the refractory nature of the sulphide mineralization beneath the oxide zone, the un-weathered deeper portion of the deposit remains to be exploited. The limits of the gold mineralization at the Faina deposit remain untested by drilling both along strike and at depth.

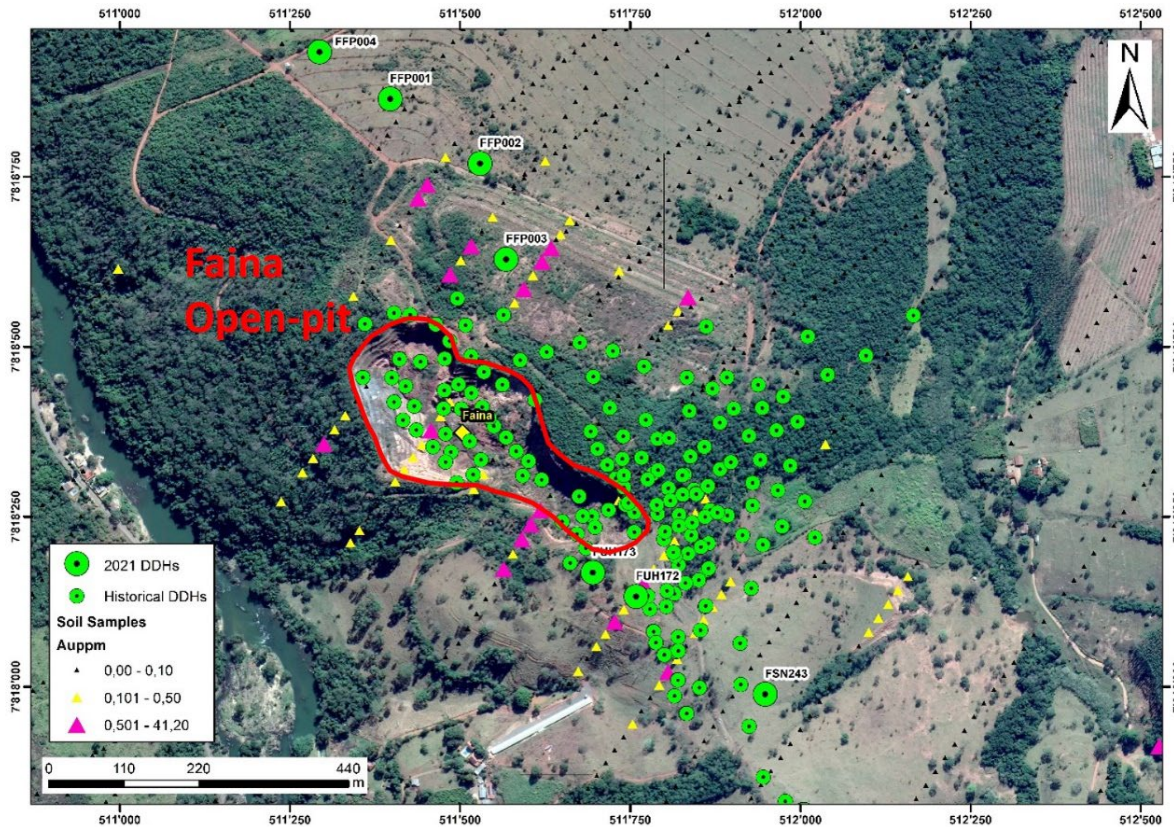


Figure 10-3: Faina Diamond Drilling

10.3.1 Faina Drilling Potential

Prefeasibility work for the Faina deposit is expected to commence in 2022. A program consisting of 15,000 m of diamond drilling to convert Inferred Mineral Resources into Measured and Indicated Mineral Resources was initiated in the first week of January 2022 (Figure 10-4). The drilling is designed to provide additional metallurgical samples for the prefeasibility metallurgical study to enhance production at the Turmalina Plant.

Mining activities at Faina are expected to be synergistic with the current Turmalina Mine as the Faina deposit can eventually be accessed via the Turmalina underground development in the near future, minimizing mine permitting requirements. Further step out drilling along strike is planned to investigate the potential of mineralized structures extending northwest between Orebody C-NW and the Faina mineralization approximately 1,000 m further along strike.

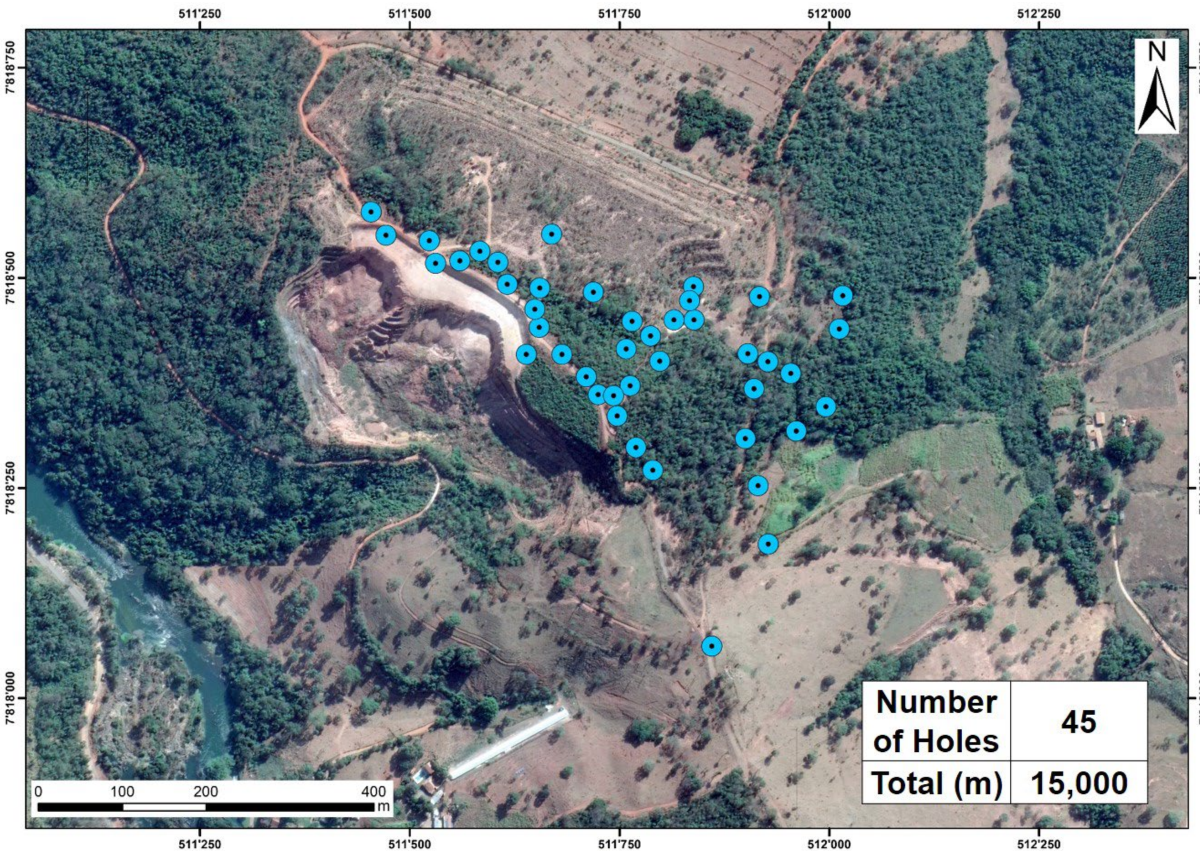


Figure 10-4: Proposed 2022 Faina Diamond Drilling Program

10.4 Pontal Deposits

Exploratory drilling targeting the mineralized Pontal stratigraphic package was resumed during the second half of 2021, with six diamond drill holes totalling 1,466 m. These new holes tested southern extensions of the known Pontal mineralized trend that had been highlighted as magnetically anomalous (or as “peculiarly magnetic”) by the drone-based magnetic aerial survey discussed in Section 9.1.

The geophysical anomalies highlighted by the high-resolution magnetic anomaly, together with some subtle soil geochemistry anomalies, led to the investigation and further discovery of the Pontal South Mineralized Zone (first intercepted by hole PTL094, with 28.8 m at 2.67 g/t Au, including 21.95 m at 3.29 g/t Au - Figure 10-5). All exploratory diamond drill core samples from the Pontal South target were analyzed at ALS laboratory in Belo Horizonte using the fire assay for gold – 50 g analytical method. These initial diamond drill holes at the Pontal South target show that there is a positive gold exploration correlation between contrasting neighbouring high and low magnetic signals, in locations also roughly evidenced by gold anomalies in soils (Figure 10-5).

These new holes at the Pontal South target have shown quite encouraging complementary results for the major Pontal exploration trend/environment as a whole.

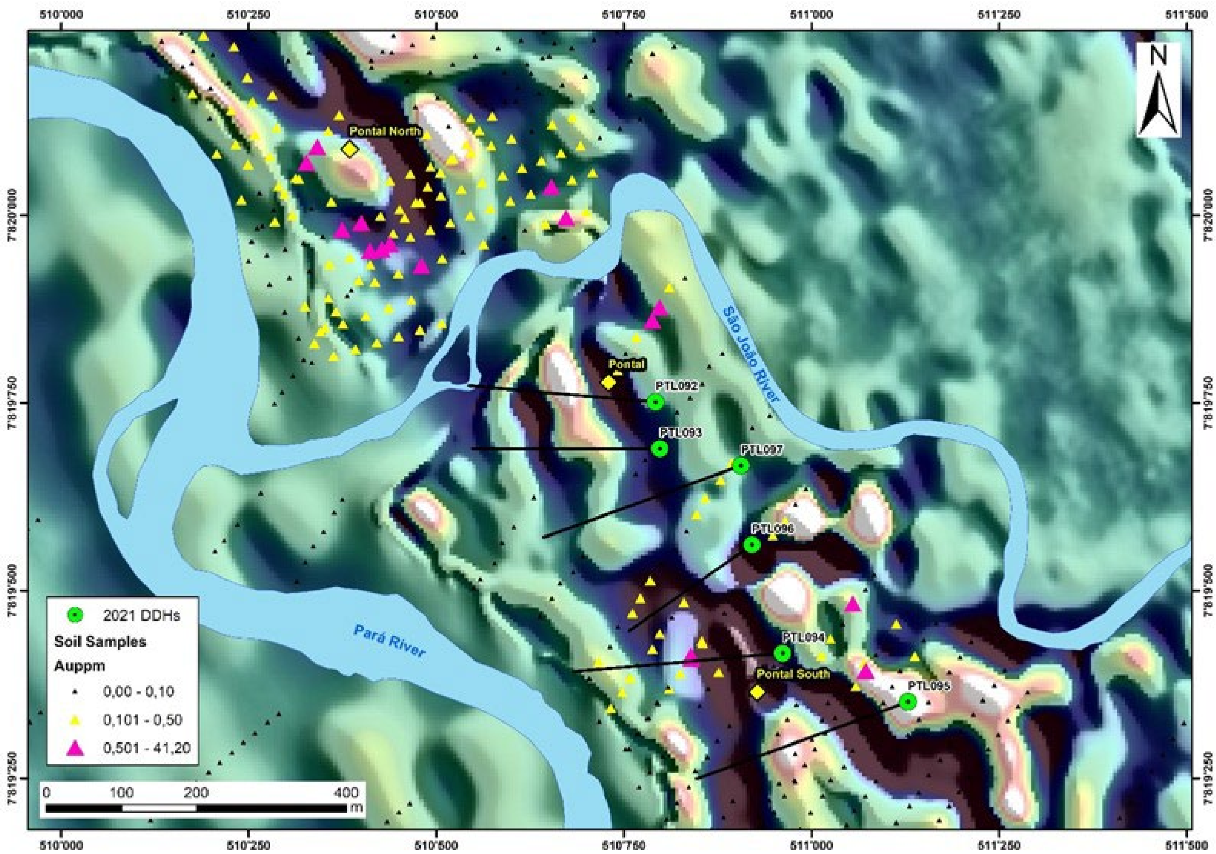


Figure 10-5: Drill Holes with Geophysical and Soil Geochemistry Exploration Map – Pontal Deposits

10.4.1 Pontal Drilling Potential

In 2022, exploration efforts will be directed across a broad spectrum of Jaguar´s high potential and high quality opportunities, including the emerging Pontal trend. The Pontal trend encompasses a further three to five kilometres of strike potential extending northwest along the same mineralized structural trend that is host to both the mineralization currently being exploited at the Turmalina Mine, and Faina deposit Mineral Resources. Therefore, it will be appropriately investigated during 2022, mainly with additional drilling campaigns which will test and follow the economic continuities (both along strike and down-plunge) of the already delineated potentially economic footprints at the Pontal North, Pontal, and Pontal South individual targets.

10.5 Zona Basal Target

In late 2020 and early 2021, a total of 26 exploratory/reconnaissance diamond drill holes (totalling 3,830.8 m) were completed at the Zona Basal target. This reconnaissance drilling at the target initially focused on a program of wide-spaced holes following up and targeting near surface oxide and potential deeper, structurally controlled sulphide extensions to the greenstone bedrock gold intersections from surface trenching (both within the footprint, and along the margins of the extensive 100 ppb Au in soil anomaly).

All exploratory diamond drill core samples from the Zona Basal target were analyzed at the ALS laboratory in Belo Horizonte using the PREP-31 method for preparation and Au-AA26 (fire assay for gold – 50 g) analytical method.

Results reported from the 2020 and 2021 diamond drilling campaign include both encouraging oxide and sulphide intercepts of 2.39 g/t Au over a drilled width of 20.45 m from surface in hole FZB014; of 2.00 g/t Au over a drilled width of 15.40 m in hole FZB013; and of 1.30 g/t Au over a drilled width of 11.60 m (including 1.78 g/t Au over 8.2 m) in hole FZB026. Of further interest is the oxide intersection in hole FZB014 which falls within a wider intersection interval that contains anomalous silver grading 7.81 g/t Ag over a drilled width of 27.5 m. The presence of anomalous silver values associated with high gold values in the oxide-saprolite zone clearly points to the potential for an extensive supergene deposit within the footprint of the Au soil anomaly.

This exploration campaign was also aimed at further defining structural controls of the sulphide mineralization, and will aid the delineation of potentially higher grade plunging mineralized zones, as seen nearby at the Turmalina Mine.

Figure 10-6 shows an interpretive cross section showing a portion of the exploratory diamond drilling activities completed at Zona Basal in 2020 to 2021, the mineralized horizons targeted, and the general quality of the initial intercepts (for gold and silver) obtained.

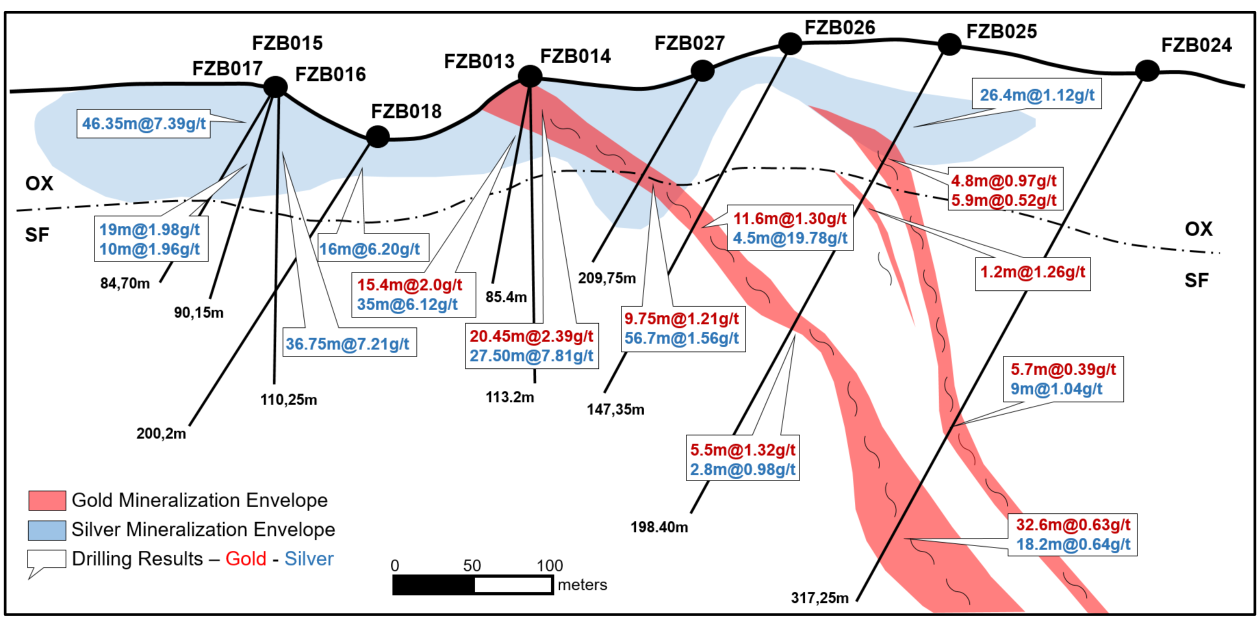


Figure 10-6: 2020 to 2021 Zona Basal Diamond Drilling Cross Section

In the second half (H2) of 2021, the initial RC drilling campaign commenced at the Zona Basal target. The RC drilling campaign targeted a shallow oxide maiden resource within the surface exposure and shallow supergene (oxide-saprolite) regolith profile within a central area which extends approximately 1,000 m along strike by 200 m width (across strike) and to a depth of 30 m to 50 m. As part of this initial RC drilling campaign, a total of 119 RC holes to an average depth of 50 m (totalling 6,756 m) were completed along a 50 m x 50 m grid pattern. By December 2021, a more localized and supplementary RC campaign, on a 25 m x 25 m ultimate grid pattern, was also completed focusing on two of the more promising individual areas. This drill program included 35 drill holes totalling 1,752 m.

Figure 10-7 presents a panorama of the RC drilling campaign completed over the Zona Basal target area in 2021. Green dots indicate holes drilled as part of the initial 50 m x 50 m grid pattern campaign; Blue dots indicate holes at the 25 m x 25 m grid pattern; Red dots indicate drill holes which were not completed due to specific logistic reasons.

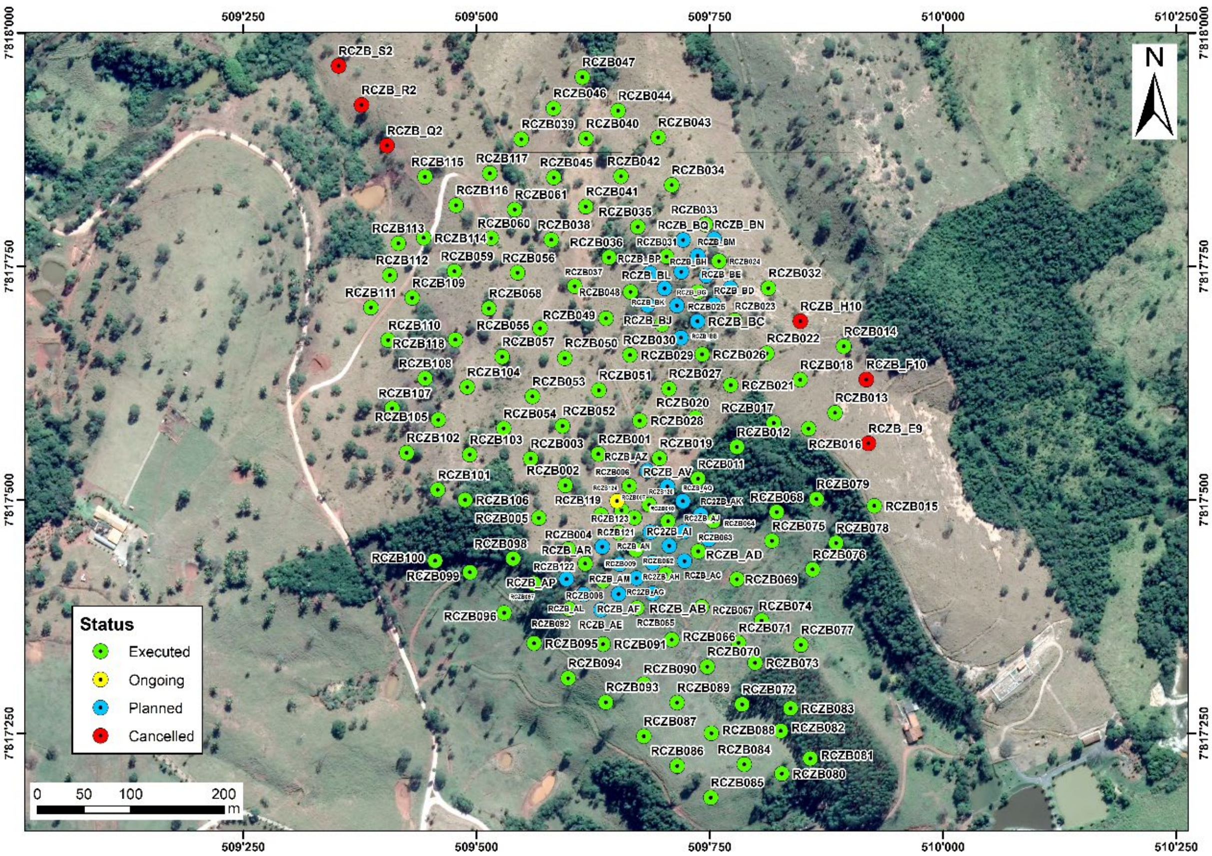


Figure 10-7: H2 2021 Zona Basal In-Fill Reverse Circulation Drilling Campaign

10.5.1 Zona Basal Drilling Potential

The Zona Basal soil geochemistry anomaly continues to the north of the currently drilled area and high potential to extend the deposit remains. Zona Basal is less than four kilometers from the Turmalina Plant and Jaguar expects that the higher grade material could be processed at the Turmalina Plant with very little modification. The heap leach option for processing of the lower grade material is planned to be evaluated by Jaguar in the future. Permitting will be critical for the future of the Zona Basal target.

11.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

11.1 Sampling

The sample collection and preparation procedures used by Jaguar are as follows.

11.1.1 Surface/Exploration Channel Sampling

- Channel samples are regularly collected from outcrops and trenches.
- The sites to be sampled are cleaned with a hoe, exposing the material by scraping it.
- Structures are mapped and the lithologic contacts defined, and samples marked so that no sample has more than one lithology.
- Samples have a maximum length of one metre and are from one kilogram to two kilograms in weight.
- Each sample is collected manually in channels with average widths between five centimetres and ten centimetres, and about three centimetres deep, using a hammer and a chisel.
- Either an aluminum tray or a thick plastic canvas drop sheet is used to collect the material.
- The samples are then stored in a thick plastic bag and identified by a numbered label, which is protected by a thin plastic cover and placed with the sample.
- At the sampling site, samples are identified by small aluminum plates, labels, or small wooden poles.
- Sketches are drawn with lithological and structural information. The sample locations are then surveyed and are entered into the master database.

11.1.2 Diamond Drilling Core Sampling

- Surface drilling is performed by contractors with holes in HQ or NQ diameters.
- Underground drilling was performed either by Jaguar or contractors with NQ, BQ, or LTK core diameters.
- Drill holes are accepted only if core recovery from the mineralized zone exceeds 85%.
- All the drill holes have their deviations measured by a Reflex Gyro TM or an equivalent surveying tool.
- The cores are stored in wooden boxes of one metre length, and with three metres of core per box (HQ and NQ diameter) or with four metres of core per box (BQ or LTK diameters).
- The code number, length, and location of each hole are identified in the boxes by an aluminum plate or by a water-resistant ink mark in front of the box.
- The progress intervals and core recoveries are identified inside the boxes using aluminum plates that show the data, attached to small wooden blocks.
- During logging, all geological information and the recovery measurements are verified and the significant intervals for sampling are defined.
- Individual samples are identified in the boxes by highlighting/labeling their numbers at the edges of the wood boxes.
- Core samples are cut lengthwise into approximately equal halves, with the use of a diamond saw.

- The half core sample for analysis is placed in a highly resistant plastic bag, identified by a label, and the other half is kept in the box at an offsite secure location close to the mine.
- For the shorter-length, bazooka-type drill holes completed from underground set-ups (the LM-series drill holes), the whole core is sampled as the core diameter does not permit splitting into halves.

11.1.3 Underground Production Channel Sampling

- The sector of wall to be sampled is cleaned with pressurized water. Structures are mapped and lithologic contacts defined, and samples marked with boundaries at lithology contacts. Samples have a maximum length of one metre and are from two to three kilograms in weight.
- Channel samples were collected by manually opening the channels, using a hammer and a little steel pointer crowned by carbide or a small jackhammer.
- The channel samples have lengths ranging from 50 cm to one metre, average widths between five centimetres and ten centimetres, and about three centimetres deep.
- Two sets of channel samples on the face are regularly collected. One set of channel samples are collected from the top of the muck pile once the work area has been secured. The second set of channel samples are collected at waist height once the heading has been mucked clean and secured.
- At approximately five metre intervals, the walls and back are sampled by channel sampling. The channel samples are collected starting at the floor level on one side and continue over the drift back to the floor on the opposite side.
- Either an aluminum tray or a thick plastic canvas is used to collect the sample material. The samples are then stored in a thick plastic bag and identified by a numbered label, which is protected by a thin plastic cover and placed with the sample.
- At the sampling site, samples are identified by small aluminum plates, labels, or small wooden poles.
- Sketches are drawn with lithological and structural information. The sample locations are then surveyed and are entered into the master database.

11.2 Sample Preparation and Analysis

For exploration drill holes prior to 2016, samples were prepared and analyzed at the SGS Geosol Laboratory in Belo Horizonte. From 2016, exploration samples from auger, drill holes, chip, and RC drilling were analyzed at Jaguar's onsite Caeté laboratory to quickly determine grades, and by the ALS laboratory, located in Belo Horizonte, for the official grades and assay certificate. These duplicate assays allowed for quality control checks of the onsite laboratory.

The ALS and SGS Geosol laboratories are independent of Jaguar and meet international analytical standards and ISO 17025 compliance protocols.

For in-fill drill holes and channels collected prior to 2015, samples were prepared at Jaguar's Caeté laboratory by drying, crushing to 90% minus 2 mm, quartering with a Jones splitter to produce a 250 g sample, and pulverizing to 95% minus 150 mesh. Analysis for gold was by standard fire assay procedures, using a 50 g or 30 g sample with an atomic absorption (AA) finish.

All samples from 2015 to 2021 sent to and analyzed at Jaguar's Caeté laboratory were analyzed according to the following workflow. A one kilogram sub-sample of the crushed material is selected for pulverization to approximately 70% minus 200 mesh. The ring-and-puck pulverisers are cleaned after each sample using compressed air and a polyester bristle brush. The analytical protocol for all samples employs a standard fire assay fusion using a standard 30 g aliquot, with the final gold content being determined by means of AA. The detection limit for fire assay analyses is 0.05 g/t Au. A second cut from the pulps is collected and re-assayed for those drill core samples where the grade is found to be greater than 30 g/t Au. If the two assays are in good agreement, only the first assay is reported. The AA unit is calibrated to directly read gold grades up to 3.3 g/t Au; samples with grades greater than this are re-assayed by diluting the solute until it falls within the direct-read range.

Turmalina Mine has a process control laboratory that analyzes the shifts and plant samples.

The SLR QP has reviewed the field and underground sampling procedures and is of the opinion that they meet accepted industry standards. In the SLR QP's opinion, the sample preparation, analysis, and security procedures at the Turmalina Complex are adequate for use in the estimation of Mineral Resources.

11.3 Quality Assurance and Quality Control

The geology team at the Complex has carried out a Quality Assurance and Quality Control (QA/QC) program over the past years that has monitored the analytical results of samples from the diamond drilling program.

In total, 1,394 blank samples and 799 samples of Certified Reference Materials (CRM) were inserted into the sample stream in 2020 and 2021. Approximately 5% of pulps from the 2020 to 2021 drilling program has been sent to an external laboratory for duplicate analysis. These controls, blanks, and CRM samples were sent to and analyzed at Jaguar's onsite Caeté and ALS laboratories, and QA/QC results for these samples are presented in Figure 11-1, Figure 11-2 and Figure 11-3.

Commercially sourced CRMs obtained from Rocklabs are inserted by the Turmalina geological team into their sample stream at a frequency of one every 45 to 50 samples. A list of the CRMs that were used is provided in Table 11-1.

Table 11-1: List of Certified Standard Reference Materials, 2020–2021 QA/QC Program
Jaguar Mining Inc. – Turmalina Mine Complex

Standard No.	Recommended Value	Standard Deviation	Number Analyzed
HiSilK4	3.463	0.09	72
SE114	0.634	0.016	49
SG84	1.026	0.084	14
Si81	1.79	0.03	369
SF100	0.860	0.016	21
SK78	4.134	0.138	114
SL76	5.96	0.192	61
SH82	1.333	0.027	99

Blank samples are inserted at a rate of one in every 20 samples, representing an insertion frequency of 5%. Blank samples are composed of crushed, barren quartzite or gneiss and are used to check for contamination and carry-over during the crushing and pulverization stage.

The results of the blanks, duplicates, and standards are forwarded to Jaguar's head office monthly for insertion into Jaguar's internal database (referred to as the M database). The results from the standards samples are scanned visually for out-of-range values on a regular basis. When failures are detected, a request for re-analysis is sent to the laboratory. Only those assays that have passed the validation tests are accepted into the main database.

The Caeté laboratory carried out an internal, separate, and distinct program of QA/QC for all drill core samples and channel samples as well. In total, the Caeté laboratory analyzed 296 blank samples for Turmalina Mine for the January 2020 to December 2021 period.

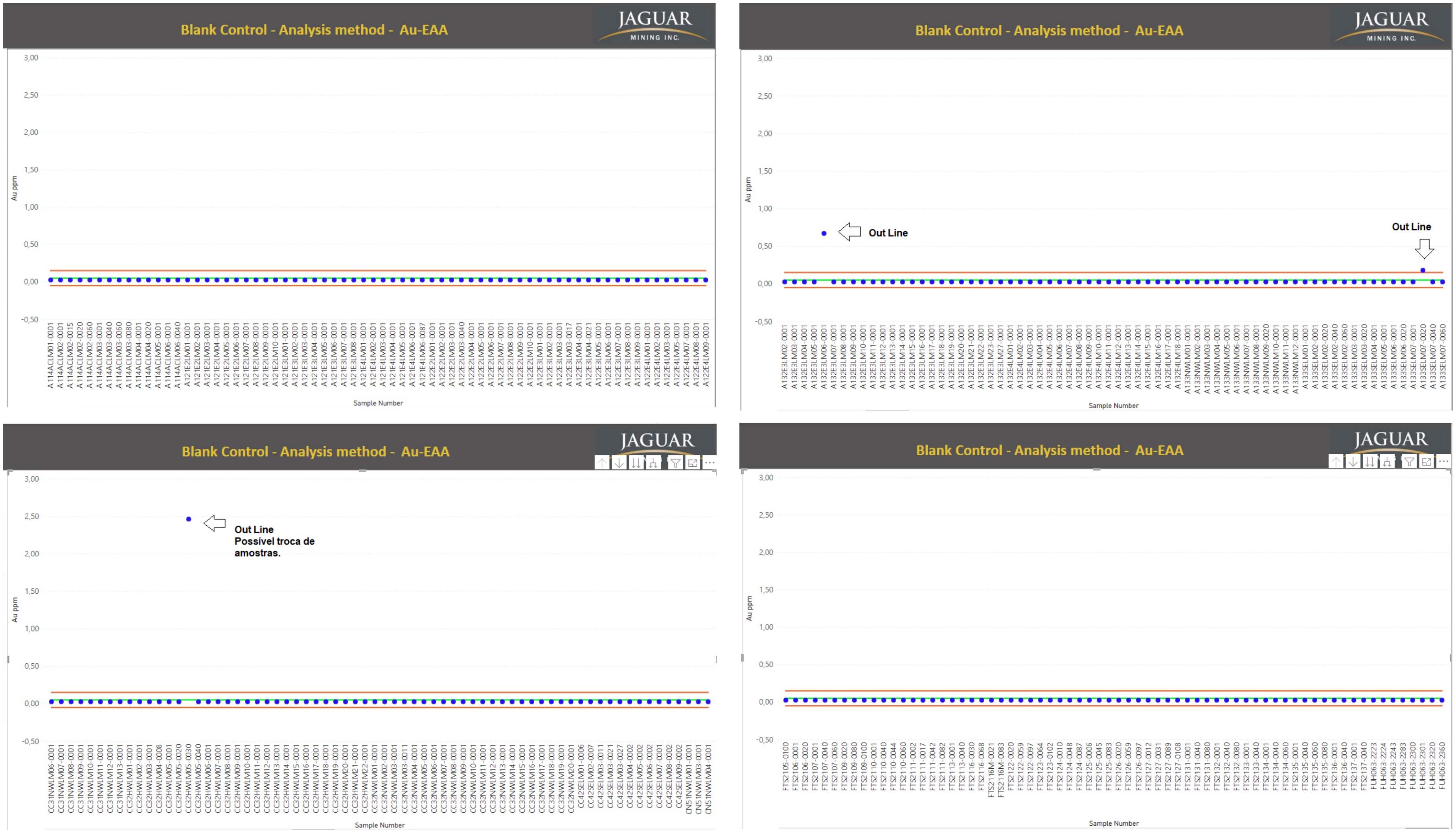


Figure 11-1: Control Chart for Blank Samples, January 2020 to December 2021

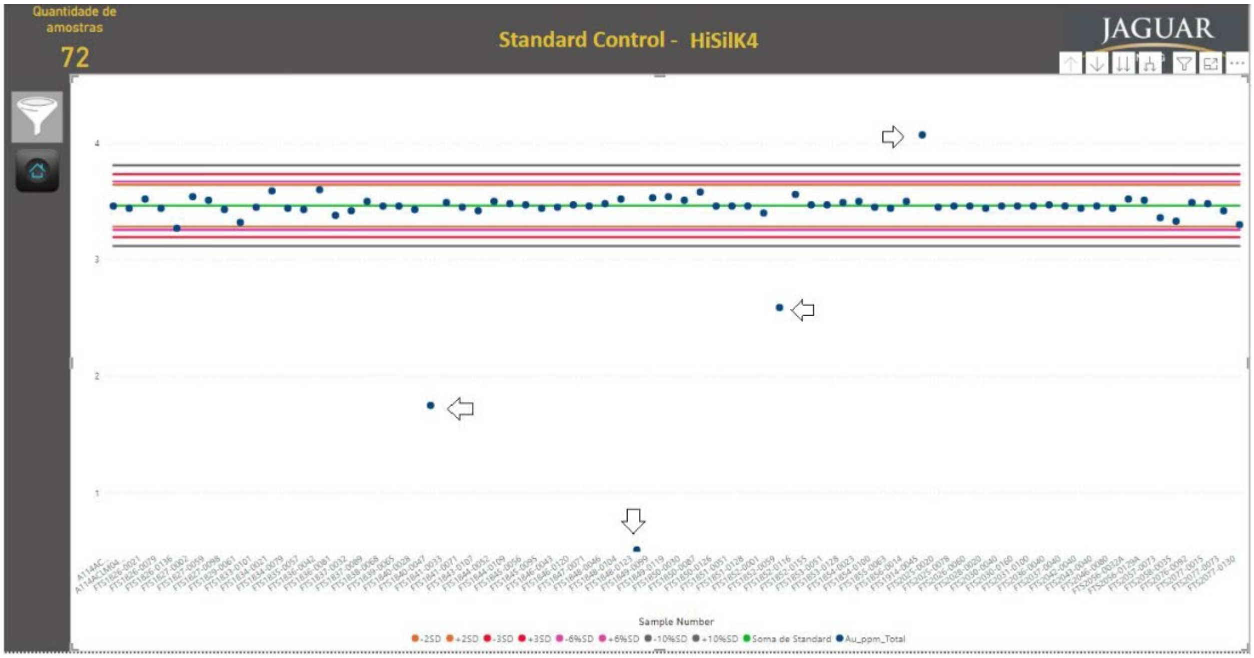


Figure 11-2: Control Chart for Certified Reference Material HiSilK4, January 2020 to December 2021

Figure 11-3: Control Chart for Certified Reference Material RL SK84, January 2020 to December 2021

In the SLR QP's opinion, the QA/QC program as designed and implemented by Jaguar is adequate and the assay results within the database are suitable for use in a Mineral Resource estimate.

12.0 DATA VERIFICATION

The SLR QP's validation checks on the Turmalina deposit drilling and sampling database provided by Jaguar in support of the 2021 Mineral Resource estimate included:

- Conducted site visits in 2014, 2017, and 2022 to personally inspect the style and structural complexity of the gold mineralization and its host rocks.
- Carried out a site visit to the Jaguar assay laboratory where the sample preparation and analytical procedures and equipment were reviewed.
- Performed field work inspections for ore control, geological mapping, drilling and mining activities.
- Completed field work inspection for the auger samples collection.
- Carried out independent validation of the 2015 and 2016 drill hole databases as described in RPA (2016 and 2017).
- Carried out independent validation of the drill hole database by means of spot checking of 13 drill holes completed in 2018 (approximately 10% of the newly completed drill holes) which intersected significant gold mineralization in both Orebodies A and C.
- Carried out independent validation of the drill hole database for the Faina deposit by means of spot checking the assays for approximately 5% of the drill holes that intersected significant gold mineralization.
- Carried out independent validation of the drill hole database for the Turmalina deposit by means of spot checking 53 of the 1,074 total drill holes of the FTS series.
- Checked collar locations relative to either the digital topographic surface or the location of the underground excavation digital model as appropriate.
- Reviewed drill hole and sample orientations (azimuth/dip) relative to the location of the mineralized zones.
- Completed validity checks for out-of-range values, overlapping intervals, and mismatched sample intervals.
- Reviewed the reasonableness of the geological interpretations relative to the nature of the previously extracted mineralization and the newly discovered mineralized intervals.
- Reviewed the geological wireframes to ensure that a minimum mining width was honoured.
- Reviewed the coding of the mined out material in the block model to ensure a reasonable match with the excavation model.

No significant errors were noted for the collar, survey, lithology, or assay records reviewed. The SLR QP did observe some minor discrepancies on the order of one metre between the location of the collars of some underground-based drill holes and the excavation models. These discrepancies are likely due to survey errors in the determination of either the drill hole collars or the excavation models and may contribute to errors in the mine design and excavation phases of the mining operation. The SLR QP recommends that Jaguar carry out a review of its surveying practices and quality control procedures to ensure that all drill hole collars are accurately located prior to entry into the final drill hole database.

The surface and underground drill hole collar locations are reasonable and channel samples are appropriately located with respect to the existing underground infrastructure.

The SLR QP is of the opinion that the drilling and sampling database is appropriate to be used in the preparation of Mineral Resource and Mineral Reserve estimates.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

Historical metallurgical test work programs and results were previously reported (Hill and Tomaselli, 2020). The SLR QP reviewed the following data provided by Jaguar:

- Reports related to recent metallurgical test work programs
- Historical mill production and recovery data

The metallurgical recoveries used for estimating Mineral Resources in this Technical Report are based primarily on historical operating data.

13.2 Turmalina Mine Metallurgical Tests

Test work programs, both external and internal, continue to be performed to support current operations and potential improvements, including:

- TESTWORK Desenvolvimento de Processo Ltda. (TDP), located in Nova Lima, Minas Gerais, Brazil:
  - Metallurgical studies were completed with samples of material from Orebody A, B, C-Central (CC), C Lavra, CSE, and C8. The test work (the TDP-MTL Test Program) included chemical and mineralogical characterization, comminution, gravity concentration, and cyanidation (TDP, 2020).
- Jaguar Mining Inc., Process Laboratory (JPL), located in Caeté, Minas Gerais, Brazil:
  - Leaching of Turmalina ore samples from Orebody CNW (Barros, 2021a)
  - Cyanide leaching of miscellaneous Turmalina mine samples (Barros, 2021b)
  - Study of gravity concentration and cyanidation for plant circuit metallurgy (Barros, 2021c)
  - Cyanidation of ore samples from Orebody A and C (Barros, 2022).

13.2.1 TDP-MTL Test Program

In 2020, external laboratory test work was conducted by TDP on samples of material received from the Turmalina Mine (Orebody A, B, CC, C Lavra, CSE, and C8). The objectives of the work were:

- To determine the expected gold recovery when processing materials from different ore bodies
- To identify any requirements for circuit changes, due to new ore characteristics
- To identify opportunities to optimize existing processes.

A general test plan was systematically followed for all samples (TDP, 2020) and is illustrated in the schematic shown in Figure 13-1. The test plan included sample preparation, crushing, grinding, chemical and mineralogical analysis, gravity concentration, intensive leaching, simulation of the current plant circuit, and leaching. TDP confirmed the representativeness of the ore samples provided by Jaguar for testing. The key results, as summarized in the TDP-MTL Report (TDP-MTL, 2020), are presented in Figure 13-2 through Figure 13-6.

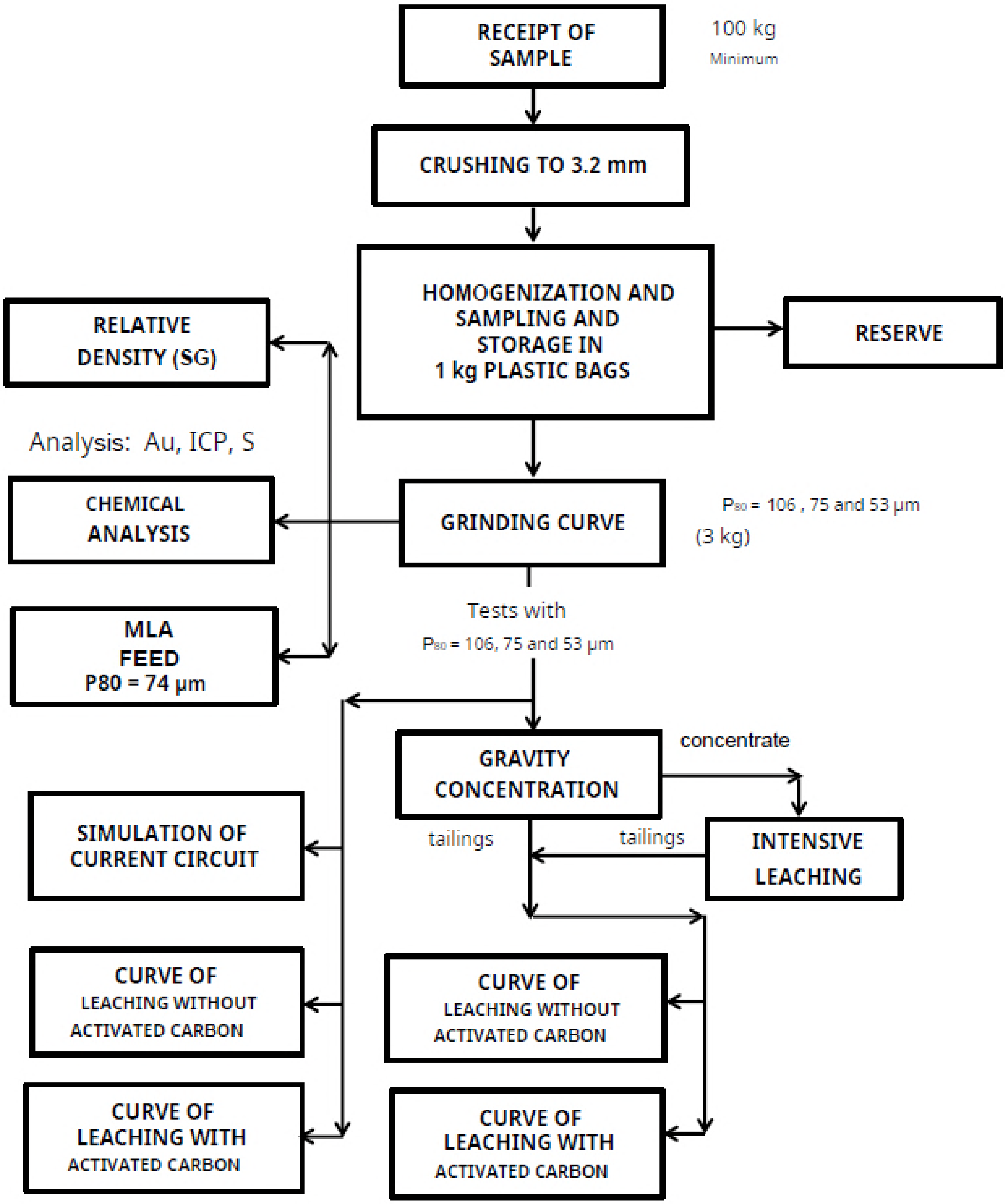


Figure 13-1

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Test Work Plan for Turmalina Samples

March 2022 ***Source: TDP, 2020.***

Figure 13-2 compares the gold head grades of the analysed samples and the average of all head grades recalculated from all the leach tests.

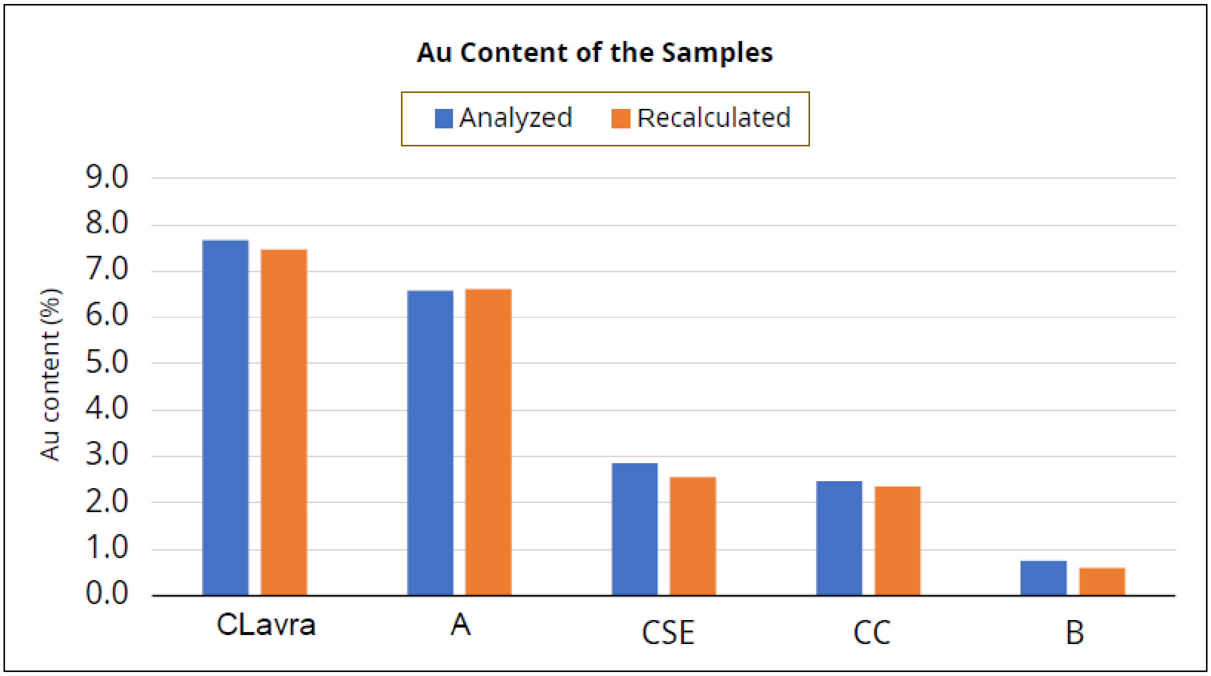


Figure 13-2: Gold Grade of the Samples

Figure 13-3 depicts the averages of all gravity concentration test results performed prior to the leaching tests.

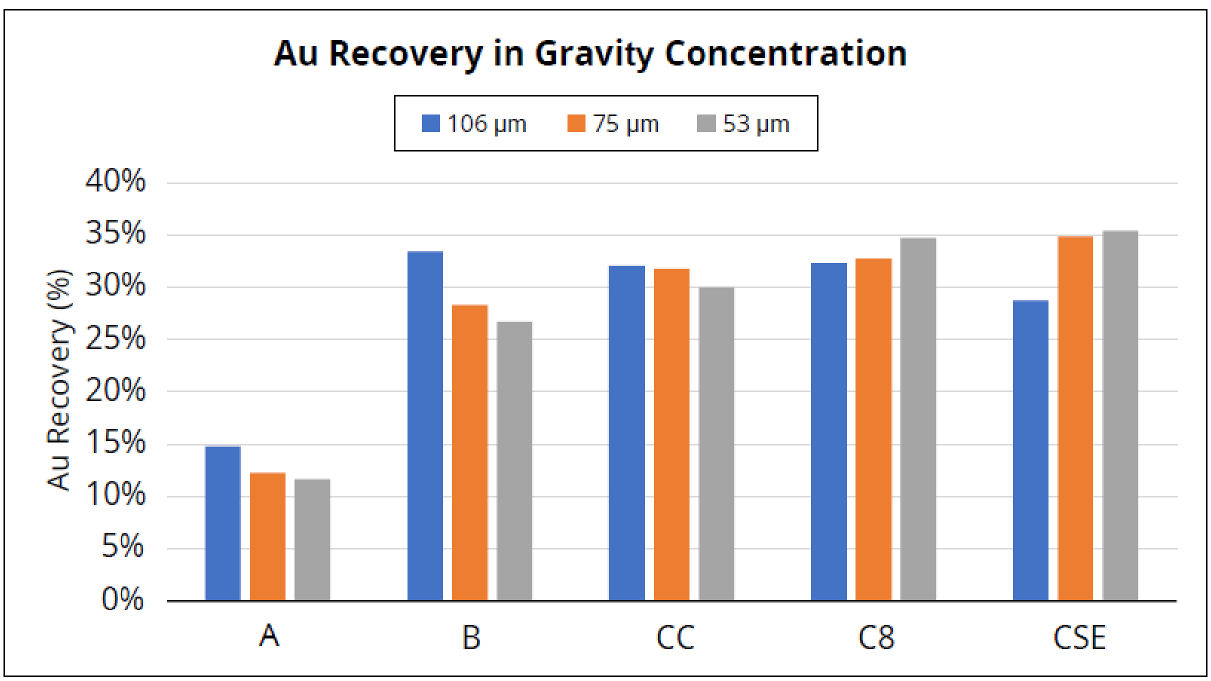


Figure 13-3: Gold Recovery in Gravity Concentration

Leaching tests were carried out simulating a CIL circuit (as the Turmalina Plant has the potential to use this type of circuit) and the current circuit. From the leach tests, the overall averages of gold recovery and gold recovery to tailings are shown in Figure 13-4 and Figure 13-5.

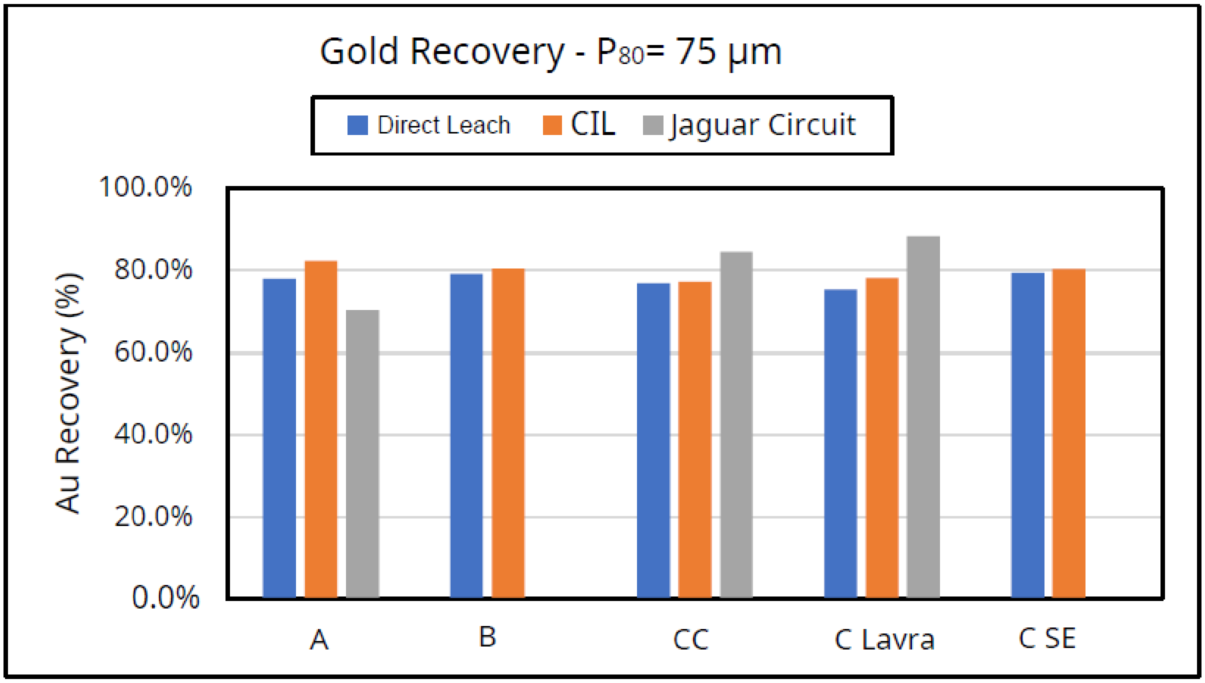


Figure 13-4: Gold Recovery Under Leaching Conditions

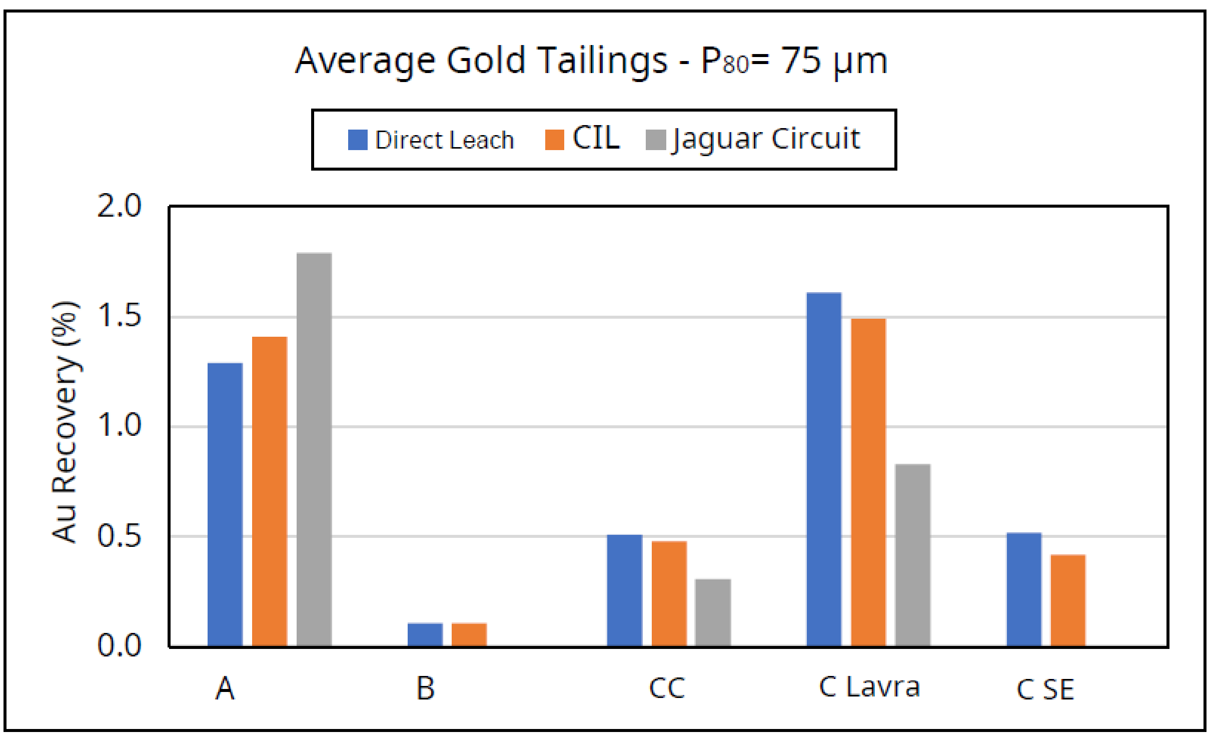


Figure 13-5: Gold Recovery to Tailings Under Leaching Conditions

TDP observed that the sample from Orebody A exhibited a different behaviour in testing and that the recovery is dependent on the consumption of cyanide, as illustrated in Figure 13-6.

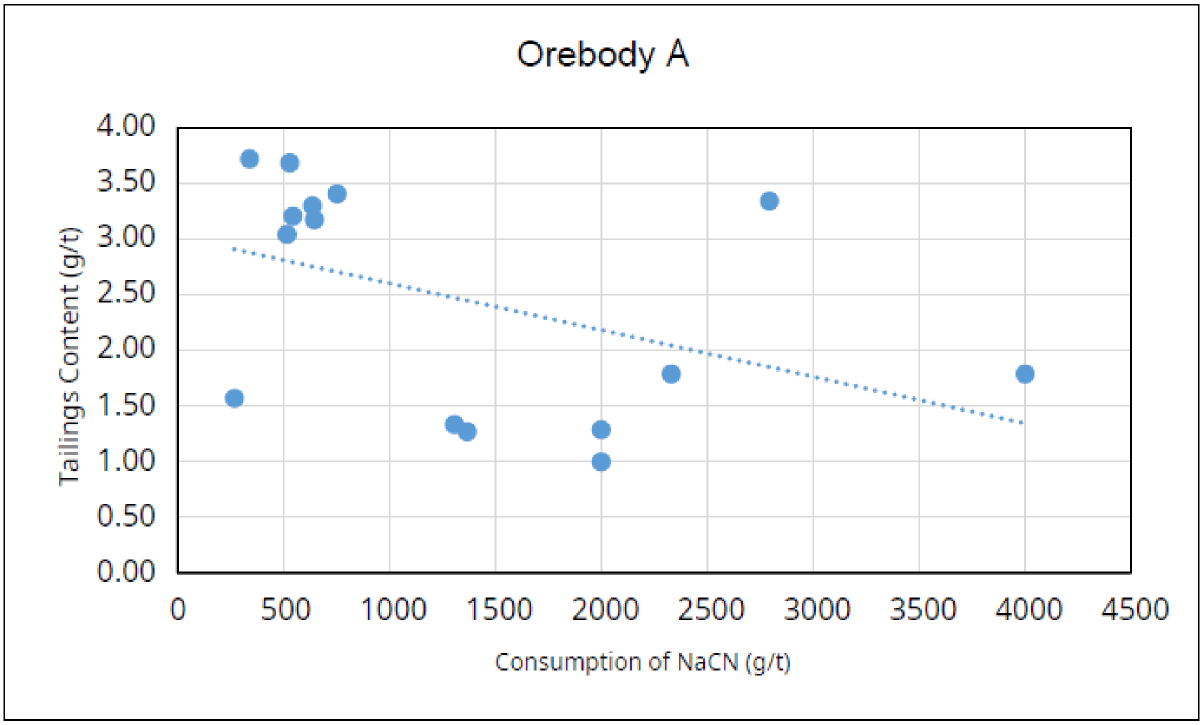


Figure 13-6: NaCN Consumption v. Tailings Gold Grade for Orebody A

Initial tests support further study, using plant samples, of exchanging the current circuit for a CIL circuit with a shorter contact time. The exchange could lead to a reduction in energy costs (for compressed air and agitators) and a reduction in the number of elution steps. TDP reported that gravity concentration did not show any advantage in laboratory tests, however, in practice, gravity concentration can stabilize the content of the leach feed and reduce the amount of gold in tailings.

13.2.1.1 Conclusions

TDP concluded that:

- Turmalina ores were not refractory, but they were different from each other and needed to be studied in advance to optimize recovery in the Turmalina Plant.
- Gravity concentration can provide advantages.
- A CIL circuit can be studied to replace the current configuration.

13.2.2 JPL Test Programs

From 2021 to 2022, the following internal laboratory test work programs were undertaken by JPL on Turmalina feeds:

- Leaching of ore samples from Orebody CNW (Barros, 2021a)
- Cyanide leaching of miscellaneous ore samples (Barros, 2021b)
- Study of gravity concentration and intensive leaching (Barros, 2021c)

- Cyanidation of ore samples from Orebody A and C (Barros, 2022).

Barros reported standardized test conditions being followed to replicate the Turmalina plant conditions in both sample preparation and laboratory testing, however, SLR could not confirm the representativeness of the ore samples collected for testing due to the limited sample information and description. A head sample was collected for gold analysis and the leaching tests were performed in duplicates according to the standard conditions shown in Table 13-1 (Barros, 2021a, 2021b, and 2022). In all tests the concentration of cyanide, dissolved oxygen, gold in solution, and pH were monitored. A brief description of each of the test work programs and the key results are summarized in the sub-sections below.

Table 13-1: Leaching and Adsorption Test Conditions
Jaguar Mining Inc. – Turmalina Mine Complex

Phases	Condition 1	Condition 2	Condition 3	Condition 4
Pre-lime				
Lead nitrate dosage	-	30	30	-
%Solids	50	50	50	-
pH	9	8.5	8.5	-
Residence time (h)	4	12	12	-
Alkaline Pre-lime				
Lead nitrate dosage	-	-	-	30
%Solids	-	-	-	50
pH	-	-	-	10.5
Residence time (h)	-	-	-	12
Leaching				
pH	10.3	10.5	10.5	10.5
Cyanide concentration (ppm)	300	350	500	350
Residence time (h)	23.5	12	12	12
Adsorption				
pH	10.3	10.5	10.5	10.5
Cyanide concentration (ppm)	300	350	350	350
Residence time (h)	9	24	24	24

13.2.2.1 Leaching of Orebody CNW Samples

Because lower recoveries were observed during previous processing of Orebody CNW material, laboratory testing was conducted on ore samples to better understand leaching and adsorption behaviour (Barros, 2021a). Variables impacting the kinetics and recovery of the leach process were studied, including leaching time, lime addition, cyanide concentration during leaching, and percentage of solids. Based on the test work results, Barros concluded that the low grade of the Orebody CNW material (< 0.50 g/t) contributed largely to the low gold recovery. It was recommended that grade variability along the extension of Orebody CNW be evaluated and that representative samples be collected for future testing. The tests showed that a re-adjustment in the leaching route can provide improvements in circuit optimization and cost reduction (e.g., a reduction in leaching time from 24 hours to 12 hours could reduce cyanide consumption).

13.2.2.2 Leaching of Miscellaneous Samples

Laboratory cyanide leaching was conducted on five miscellaneous Turmalina ore samples labelled A132 NW BL02, A142 NW, CC 42 SE BL01, C 6 3 HW NW BL01, and D51 NW BL01 (Barros, 2021b). Variables impacting the kinetics and recovery of the leach process were studied, including leaching time, lime addition, and cyanide concentration during leaching. Based on the test work results, Barros' key conclusions were as follows:

- Depending on orebody location, the Turmalina samples exhibit different leaching behaviour, may present refractory characteristics, and vary in cyanide consumption.
- The standard conditions of leaching and adsorption for the Turmalina Plant did not prove to be the most suitable for maximum gold recovery for any of the test samples, indicating that there is an opportunity for process optimization. This performance was strongly associated with long leaching time which results in the coating of gold-containing particles by a stable layer of hydroxides and difficulty in gold solubilization.
- Cyanide consumption in these samples was not related to the gold head grade. The presence of gangue minerals is a variable with the greatest influence on leaching.
- Samples A132 NW BL02 and A142 NW showed very good response to cyanidation and gold recoveries above 92% were achieved.
- Sample CC 42 SE BL01, although high in gold head grade (3.90 g/t to 5.09 g/t), showed refractory characteristics. Recoveries between 67% and 68% were achieved and the highest consumption of sodium cyanide (1.21 kg/t to 1.66 kg/t) was observed. It was reported that gold in this sample may include mineralogical phases that react strongly to cyanide.
- Sample C 6 3 HW NW BL01 was lowest in gold head grade compared to the other samples. The recovery under different conditions was directly impacted by the variations in the recalculated gold head grade and the presence of gangue minerals in the sample.
- Sample D51 NW BL01 showed large variations in the recalculated gold head grade that directly impacted gold recoveries (between 80% and 90%).

13.2.2.3 Gravity Concentration and Cyanidation Study

The application of gravity concentration and intensive leaching was studied as an alternative to the current Turmalina plant circuit (Barros, 2021c), which includes grinding, classification, thickening, leaching, and CIP. The presence of gravimetric gold has been studied by TDP and JPL and the addition of a gravimetric circuit before leaching was considered. Approximately 100 kg of mill feed sample was collected in October 2021 for laboratory testing of gravity concentration using a Falcon concentrator and intensive leaching tests. Based on the test work results, Barros concluded that gravity concentration resulted in a recovery of 29.84% and intensive leaching of the gravity concentrate was 87.28%. The overall recovery from gravity concentration, intensive leaching of the gravity concentrate, and cyanidation of the gravity tailing was between 82.94% and 88.68%. Conventional processing resulted in gold recoveries of 91.65% to 92.60%. It was recommended that a more detailed study should be carried out to assess the technical and financial feasibility of including gravity concentration and intensive leaching in the current plant flowsheet.

13.2.2.4 Cyanidation of Orebody A and C Samples

The objective of the study was to evaluate the leaching performance of ore samples from Orebody A and C and were labelled A 14-2 NW LD, A 14-346, and C62 NW 08 to 14 (Barros, 2022). Variables impacting the kinetics and recovery of the leach process were studied, including leaching time, lime addition, and cyanide concentration during leaching. Based on the test work results, Barros concluded that there were opportunities to increase metallurgical recovery for the samples tested through adjustment in the leaching and adsorption parameters, particularly a reduction in time for cyanidation. Regardless of the gold head grade, cyanide consumption was close to 1.0 kg/t, therefore, further work was recommended in order to reproduce the laboratory conditions in the process plant.

13.3 Faina, Pontal, and Orebody D Testing Programs

13.3.1 Oxide Mineralization

In August 2009, direct cyanidation testing was performed by JPL on oxide mineralization from the Faina deposit. This cyanidation testing resulted in an average gold extraction of 96.1% on a sample of approximately 83% minus 200 mesh.

In August 2011, direct cyanidation testing was performed by JPL on oxide mineralization from the Orebody D target. The results indicate that the Orebody D target oxide mineralization is amenable to cyanidation.

In February 2010, direct cyanidation testing was performed by JPL on oxide mineralization from the Pontal deposits. The cyanidation testing resulted in an average gold extraction of 94.1%.

13.3.2 Sulphide Mineralization

In May 2008, direct cyanidation testing was performed by JPL on a sample of sulphide mineralization from the Faina deposit. The testing resulted in an average gold extraction of 42.91% at 80% minus 200 mesh and an average gold extraction of 42.99% at 80% minus 270 mesh, indicating that a portion of the Faina deposit sulphide mineralization is refractory. In November 2008, direct cyanidation testing was performed by JPL on sulphide mineralization from Orebody D. The cyanidation testing resulted in an average gold extraction of 60.0% at 90% minus 200 mesh, indicating that a portion of Orebody D sulphide mineralization is refractory (Machado, 2011).

In October 2010, Jaguar engaged Resource Development Inc. (Rdi) to complete a metallurgical test program on a 150 kg composite sample from the Faina and Orebody D deposits. The objective of this test program was to identify and develop the best processing route for the extraction of gold from the refractory sulphide deposits. This metallurgical test program included grinding test work, gravity concentration, whole ore cyanidation, CIL, flotation and pressure oxidation of whole ore, and flotation concentrate. The Rdi test program indicated that 45% of the gold in the composite sample was free milling and the remaining gold was refractory. Rdi concluded the best treatment route for the composite sample tested was to float the sulphides, pressure oxidize the flotation concentrate, and treat the oxidized material and flotation tailings in a CIL circuit to recover gold. In this manner, the overall gold extraction for the refractory gold mineralization from the Faina and Orebody D deposits combined mineralized material is projected to be approximately 87.4% (Machado, 2011).

In September 2011, Rdi completed a metallurgical test program on an approximately 50 kg sample of refractory sulphide mineralization from the Pontal deposits. The objective of the testing was to determine if the metallurgical recovery of the refractory sulphide mineralization can be improved by roasting and subsequent cyanidation over direct cyanidation. Direct cyanidation resulted in a gold extraction of 58.0% and cyanidation of the roasted mineralization improved the gold extraction to 80.3% (Machado, 2011).

13.3.2.1 Faina Test Program

In 2021, the SLR QP carried out a preliminary review of the 2021 metallurgical test work program completed for the Faina deposit and the processing options under consideration. The objective of the test program was to perform laboratory tests to determine the best treatment route for the Faina mineralization. SLR reviewed the available process documentation provided by Jaguar as of July 2021, which included the following key documents:

- Preliminary Report by TDP (TDP, 2021a)
- Jaguar Mining Metallurgical Testing: Faina Project, presentation of preliminary results (TDP, 2021b)

13.3.2.1.1 Sample Preparation

TDP reported receiving samples of Faina material labelled Oxide (OX), Transition (TR), and Sulfide (SF) from Jaguar, however only the TR and SF material types were used in sample preparation. The TR and SF samples were obtained from only two drill holes, FUH168A and FUH171, and no other descriptions of the individual samples were provided. Individual samples from these drill holes were combined to produce two composite samples, SF1 and SF2, for test work, with average gold grades of 7.35 g/t Au and 8.50 g/t Au, respectively, as presented in Table 13-2. Composite sample SF1 consisted of individual samples of the SF type, however, two TR samples were combined with eight SF samples to prepare composite sample SF2. For composite sample SF2, no rationale was provided regarding the method of sample selection or combination. While the weights of individual samples from drill hole FUH169 were also provided, TDP provided no explanation as to why these samples were not used in composite sample preparation.

In the SLR QP's opinion, there is insufficient information from the TDP Report to evaluate whether the metallurgical samples selected for blending are representative of the material that will be mined and processed. The spatial representativeness of the drill hole locations of the metallurgical samples selected could not be confirmed by the SLR QP, as the drill holes were not included in the database provided for the Mineral Resources. TDP also did not provide specific details as to the procedures undertaken to prepare the samples and composites.

Table 13-2: Faina Composite Samples (SF1 and SF2)
Jaguar Mining Company – Turmalina Mine Complex

Composite Sample	Drill Hole	Sample Number	Average Grade (g/t Au)	Material Type	Sample Weight (g)
SF1			**7.35**		
	FUH168A	FUH168A-0138	6.59	SF	8,275
	FUH168A	FUH168A-0139	1.565	SF	7,355
	FUH168A	FUH168A-0140	2	SF	6,990
	FUH168A	FUH168A-0141	8.47	SF	7,500
	FUH168A	FUH168A-0142	6.23	SF	7,205
	FUH168A	FUH168A-0143	4.63	SF	7,105
	FUH168A	FUH168A-0144	11.15	SF	7,785
	FUH168A	FUH168A-0145	7.76	SF	7,710
	FUH168A	FUH168A-0146	18.45	SF	7,885
	FUH168A	FUH168A-0147	1.37	SF	7,560
	FUH168A	FUH168A-0148	2.09	SF	8,210
	FUH168A	FUH168A-0149	4.7	SF	7,900
	FUH168A	FUH168A-0150	2.9	SF	8,375
	FUH168A	FUH168A-0151	13.25	SF	8,025
	FUH168A	FUH168A-0152	11.1	SF	7,680
	FUH168A	FUH168A-0154	11.9	SF	7,610
	FUH168A	FUH168A-0155	10.75	SF	7,365
SF2			**8.50**		
	FUH168A	FUH168A-0126	11.75	SF	7,125
	FUH168A	FUH168A-0127	23.7	SF	7,905
	FUH171	FUH171-0031	3.39	TR	5,395
	FUH171	FUH171-0032	11.35	TR	6,930
	FUH171	FUH171-0033	3.1	SF	6,295
	FUH171	FUH171-0034	4.26	SF	7,120
	FUH171	FUH171-0035	9.54	SF	5,390
	FUH171	FUH171-0036	4.08	SF	7,365
	FUH171	FUH171-0037	9.17	SF	6,140
	FUH171	FUH171-0038	1.73	SF	7,040

13.3.2.1.2 Head Analyses

All chemical analyses on samples SF1 and SF2 were performed by SGS Geosol in Vespasiano, Minas Gerais, Brazil, and results are presented in Table 13-3. The average gold grade of sample SF1 was 6.88 g/t Au, while Sample SF2 was higher in gold grade and averaged 9.13 g/t Au. Possible deleterious elements in the Faina mineralization include arsenic and antimony. Concentrations of arsenic were high in both composite samples and averaged more than 10,000 ppm As. Concentrations of antimony were also higher in sample SF1 (1,647 ppm Sb) in comparison to sample SF2 (45 ppm Sb).

Table 13-3: Chemical Analyses of Faina Composite Samples (SF1 and SF2)
Jaguar Mining Company – Turmalina Mine Complex

Element	Units	SF1	SF2	Element	Units	SF1	SF2
Au	g/t	6.88	9.13				
S	%	3.21	3.36				
			ICP Analyses				
Ag	ppm	< 3	< 3	Ni	ppm	96	56
Al	%	5.66	5.44	P	%	0.03	0.04
As	ppm	> 10,000	> 10,000	Pb	ppm	23	< 8
Ba	ppm	146	180	S	%	3.14	3.15
Be	ppm	< 3	< 3	Sb	ppm	1,647	45
Bi	ppm	< 20	< 20	Sc	ppm	34	29
Ca	%	5.64	5.74	Se	ppm	< 20	< 20
Cd	ppm	< 3	< 3	Sn	ppm	< 20	< 20
Co	ppm	47	38	Sr	ppm	137	107
Cr	ppm	56	28	Th	ppm	< 20	< 20
Cu	ppm	136	97	Ti	%	0.42	0.53
Fe	%	8.16	7.75	Tl	ppm	< 20	< 20
K	%	1.39	1.89	U	ppm	< 20	< 20
La	ppm	< 20	< 20	V	ppm	204	238
Li	ppm	39	54	W	ppm	266	526
Mg	%	2.45	2.54	Y	ppm	16	21
Mn	%	0.15	0.2	Zn	ppm	71	145
Mo	ppm	< 3	< 3	Zr	ppm	36	41
Na	%	0.79	0.52				

13.3.2.1.3 Metallurgical Testing

Figure 13-7 presents a flowchart prepared by TDP outlining the general scope of work for testing the Faina composite samples. The SLR QP notes that not all activities proposed were performed by TDP. There was no evidence of mineralogical characterization work or comminution testing having been performed prior to the design of the test program. The SLR QP is of the opinion that conducting a mineralogical examination of representative samples of a statistically reliable size prior to conducting any testing would help to identify gold grain size distribution, gold mineral type, liberation characteristics of all valuable minerals, and the nature and concentrations of minerals detrimental to processing (e.g., cyanide consuming minerals, clays, etc.), and avoid unnecessary test work. Full particle size analyses and Bond Ball Mill Work Index (WI) were also not reported. The SLR QP also notes that test work proposed for flotation products (settling and filtration tests, classification tests, and ARD tests) were not performed.

TDP conducted a series of diagnostic tests on composite samples SF1 and SF2 to determine the amenability of gold extraction using different techniques, including:

- Gravity concentration tests using a Knelson MD3 concentrator
- Bottle roll simulated intensive leaching tests of gravity concentrate
- Bottle roll direct leaching tests
- Bottle roll simulated carbon-in-leach (CIL) tests (cyanide leaching with activated carbon)
- Alkaline leaching (NaOH digestion) and cyanide leaching tests on gravity concentrate
- Flotation tests on the combined gravity and intensive leach tails to produce a rougher concentrate
- Alkaline leaching and cyanide leaching tests on flotation concentrate
- Bioleaching tests

All test parameters and procedures were reported by TDP, except for the bioleaching tests (results are pending). The total quantity of sample SF2 was smaller than sample SF1, therefore, some tests were only performed using sample SF1. Table 13-4 summarizes the results demonstrating the best gold recoveries reported for composite sample SF1 from various tests. Table 13-5 summarizes the results demonstrating the best gold recoveries for composite sample SF2 from various tests.

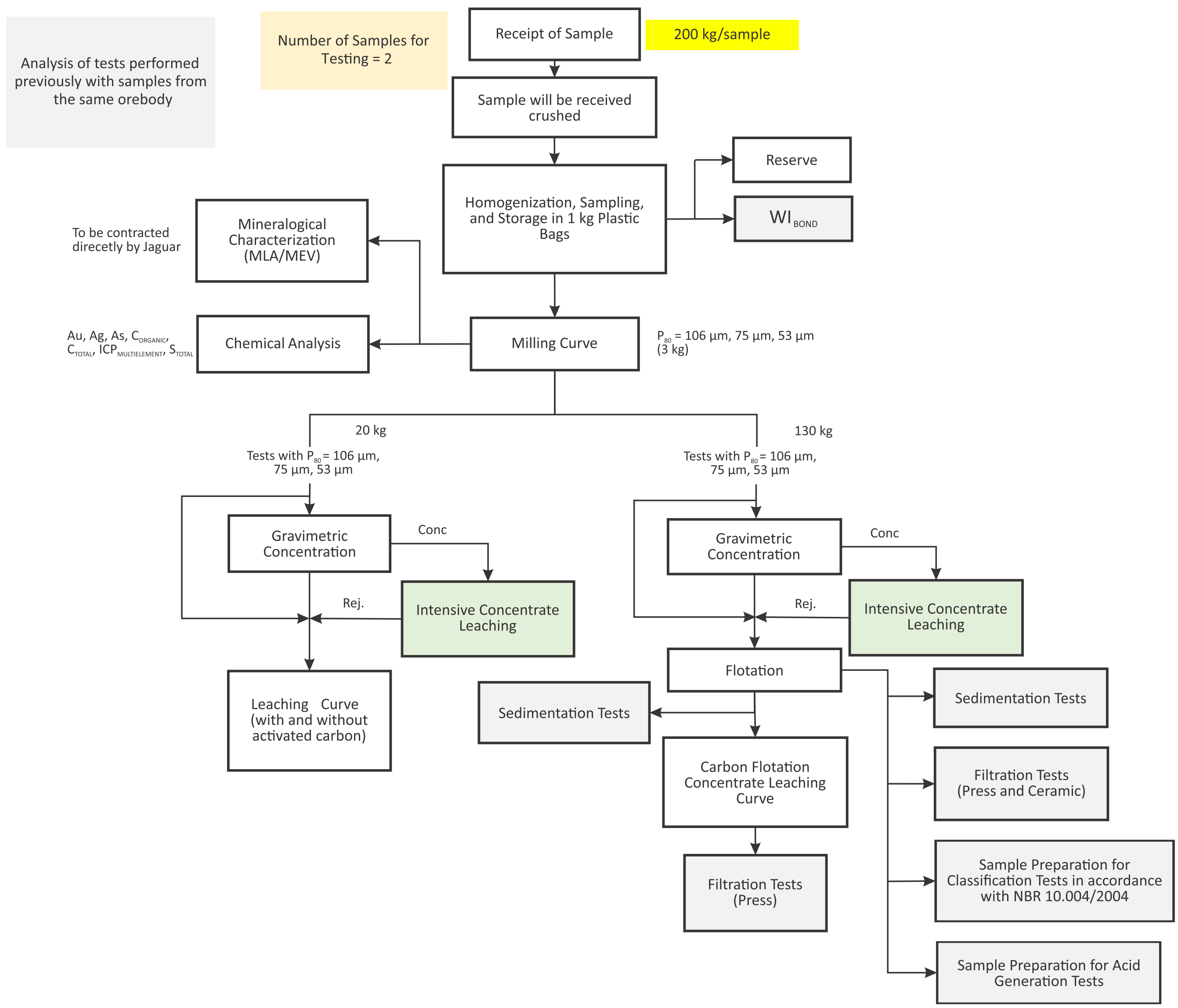


Figure 13-7

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Test Work Plan for Faina Samples

March 2022 ***Source: Modified from TDP, 2022.***

Table 13-4: Summary of Tests on Composite Sample SF1
Jaguar Mining Company – Turmalina Mine Complex

TDP Test No.	Sample No.	Estimated Head Grade (g/t Au)	Test Description	Particle Size (P_{80}µm)	Calculated Head Grade (g/t Au)	Overall Recovery (%Au)
LT2	SF1	6.88	Direct Leaching	106	7.45	49.1
LT4	SF1	6.88	Direct Leaching	75	7.63	49.85
LT6	SF1	6.88	Direct Leaching	53	7.51	53.51
LT7	SF1	6.88	CIL	106	6.89	45.28
LT10	SF1	6.88	CIL	75	7.03	46.09
LT11	SF1	6.88	CIL	53	6.91	48.97
LT13	CG1	6.88	Knelson Gravity Concentration	75	7.07	16.96
LT13	SF1-CG1-CT1	6.88	Intensive Leaching of Gravity Concentrate	75	7.07	53.52
LT14	SF1	6.88	NaOH Digestion + Cyanide Leach of Gravity Concentrate	53	7.52	54.27
LT15	CG1	6.88	Knelson Gravity Concentration	53	7.02	7.3
LT15	SF1-CG1-CT2	6.88	Intensive Leaching of Gravity Concentrate (LT15)	53	7.02	100
LT17	SF1-RG-CT2	6.88	Gravity Concentration (LT15) + Cyanide Leaching of Gravity Tails	53	6.27	56.32
FT3	SF1	6.88	Flotation of Gravity Tails	106	7.03	86.83
FT10	SF1	6.88	Flotation of Gravity Tails	75	6.9	89.12
FT15	SF1	6.88	Flotation of Gravity Tails	53	7.06	88.88
FT20	SF1-RG-CT3	6.88	Gravity Concentration + Flotation of Gravity Tails	53	6.7	92.36
FT22	SF1	6.88	Secondary Flotation Test of Gravity Tails	53	6.46	90.93
FT25	SF1	6.88	Flotation of Gravity Tails	53	7.21	91.66
LT19	SF1-CF-FT25	25.3	NaOH Digestion + Cyanide Leach of Flotation Concentrate (FT25)	53	25.79	46.28

Table 13-5: Summary of Tests on Composite Sample SF2
Jaguar Mining Company – Turmalina Mine Complex

TDP Test No.	Sample No.	Estimated Head Grade (g/t Au)	Test Description	Particle Size (P_{80} µm)	Calculated Head Grade (g/t Au)	Overall Recovery (%Au)
LT1	SF2	9.13	Direct Leaching	106	8.47	62.76
LT4	SF2	9.13	Direct Leaching	75	8.14	61.25
LT6	SF2	9.13	Direct Leaching	53	8.98	59.78
LT7	SF2	9.13	CIL	106	7.97	61.05
LT9	SF2	9.13	CIL	75	7.83	62.27
LT12	SF2	9.13	CIL	53	7.39	60.27
LT13	CG1	9.13	Knelson Gravity Concentration	75	7.8	29.54
LT13	SF2-CG1-CT1	9.13	Intensive Leaching of Gravity Concentrate	75	7.8	75.38
LT14	SF2	9.13	NaOH Digestion + Cyanide Leach of Gravity Concentrate	53	8.04	69.84
LT15	CG1	9.13	Knelson Gravity Concentration	53	8.01	21.56
LT15	SF2-CG1-CT2	9.13	Intensive Leaching of Gravity Concentrate (LT15)	53	8.01	100
LT16	SF2-RG-CT2	9.13	Gravity Concentration (LT15) + Cyanide Leaching of Gravity Tails	53	6.04	52.97
FT5	SF2	9.13	Flotation of Gravity Tails	106	7.9	86.25
FT10	SF2	9.13	Flotation of Gravity Tails	75	7.81	88.49
FT15	SF2	9.13	Flotation of Gravity Tails	53	7.82	87.72
FT17	SF2	9.13	Secondary Flotation Test of Gravity Tails	53	7.66	89.72

Key findings from preliminary testing are summarized as follows:

Sample SF1

- The estimated gold grade in testing was 6.88 g/t Au.
- The average calculated head grade was 7.40 g/t Au in cyanide leaching tests and 6.90 g/t Au in CIL tests.
- Actual gold recovery from gravity concentration was 6.25%.
- Cyanide leaching recoveries were low. TDP considers the material to be refractory.
- The highest gold recovery in direct leaching (53.51%) was obtained at a particle size of 80% passing (P_{80}) = 53 µm (test LT6).
- The highest gold recovery in CIL tests (48.97%) was obtained at a particle size of P_{80} = 53 µm (test LT11).
- At a P_{80} of 75 µm and 53 µm, the best flotation performance was achieved using the following combination of reagents: potassium amyl xanthate (PAX, a collector), A208 (alkyl dithiophosphate, a collector), and Flottec INT_102 (frother). Gold recoveries in flotation test FT10 (P_{80} = 75 µm) and flotation test FT15 (P_{80} = 53 µm) were 89.12% and 88.88%, respectively.
- Test FT22 was a secondary flotation test of gravity tails conducted using different reagents (copper sulphate, dithiophoshate, sodium isobutyl xanthate (SIBX) and Flottec INT_102 frother) to improve recoveries, which resulted in 90.93% gold recovery.
- The highest gold recovery of 92.36% was achieved in test FT20 from a combination of gravity concentration followed by flotation of gravity tails.

Sample SF2

- The estimated gold grade in testing was 9.13 g/t Au.
- The average calculated head grade was 8.34 g/t Au in cyanide leaching tests and 7.79 g/t Au in CIL tests.
- Actual gold recovery from gravity concentration was 22.27%.
- Cyanide leaching recoveries were low. TDP considers the material to be refractory.
- The highest gold recovery in direct leaching (62.76%) was obtained at a particle size of P_{80}= 106 µm (test LT1).
- The highest gold recovery in CIL tests (62.27%) was obtained at a particle size of P_{80} = 75 µm (test LT9).
- At a P_{80} of 75 µm and 53 µm, the best flotation performance was achieved using the following combination of reagents: PAX, A208, and Flottec INT_102. Gold recoveries in flotation test FT10 (P_{80} = 75 µm) and flotation test FT15 (P_{80} = 53 µm) were 89.49% and 87.72%, respectively.
- Test FT17 was a secondary flotation test conducted using different reagents (copper sulphate, dithiophoshate, SIBX, and Flottec INT_102) to improve recoveries, which resulted in 89.72% gold recovery.

13.3.2.1.4 Conclusions

Based on the results from preliminary testing, TDP proposed a possible processing route, illustrated in Figure 13-8, for Faina mineralization (assuming the material has similar characteristics to sample SF2):

- Crushing and grinding to achieve a particle size of P_{80} = 53 µm

- Gravity concentration and intensive leaching
- Flotation of gravity tails using a combination of flotation reagents (copper sulphate, dithiophosphate, PAX, and Flottec INT_102) to produce a concentrate
- Concentrate sale to a third party for treatment via pressure oxidative (POX) leaching or consider concentrate treatment using a small autoclave installed at Jaguar's plant site

TDP also proposed that further testing should focus on:

- Leaching analysis
- Mineralogy of Flotation Concentrate and Leach Tails
- Cleaner Flotation Tests to verify final concentrations of gold and sulphur in products
- Laboratory Autoclave Tests
- Sedimentation Tests and Filtration Testing of the concentrate and flotation tailings

The SLR QP agrees with TDP's general approach. The SLR QP concurs with TDP that further testing is required to confirm the metallurgical response of the Faina mineralization, however, the SLR QP is of the opinion that sample representativeness needs to be confirmed and addressed. Collection of metallurgical samples from the Faina deposit that are representative of the material to be mined over the life of mine (LOM) plan remains a key issue.

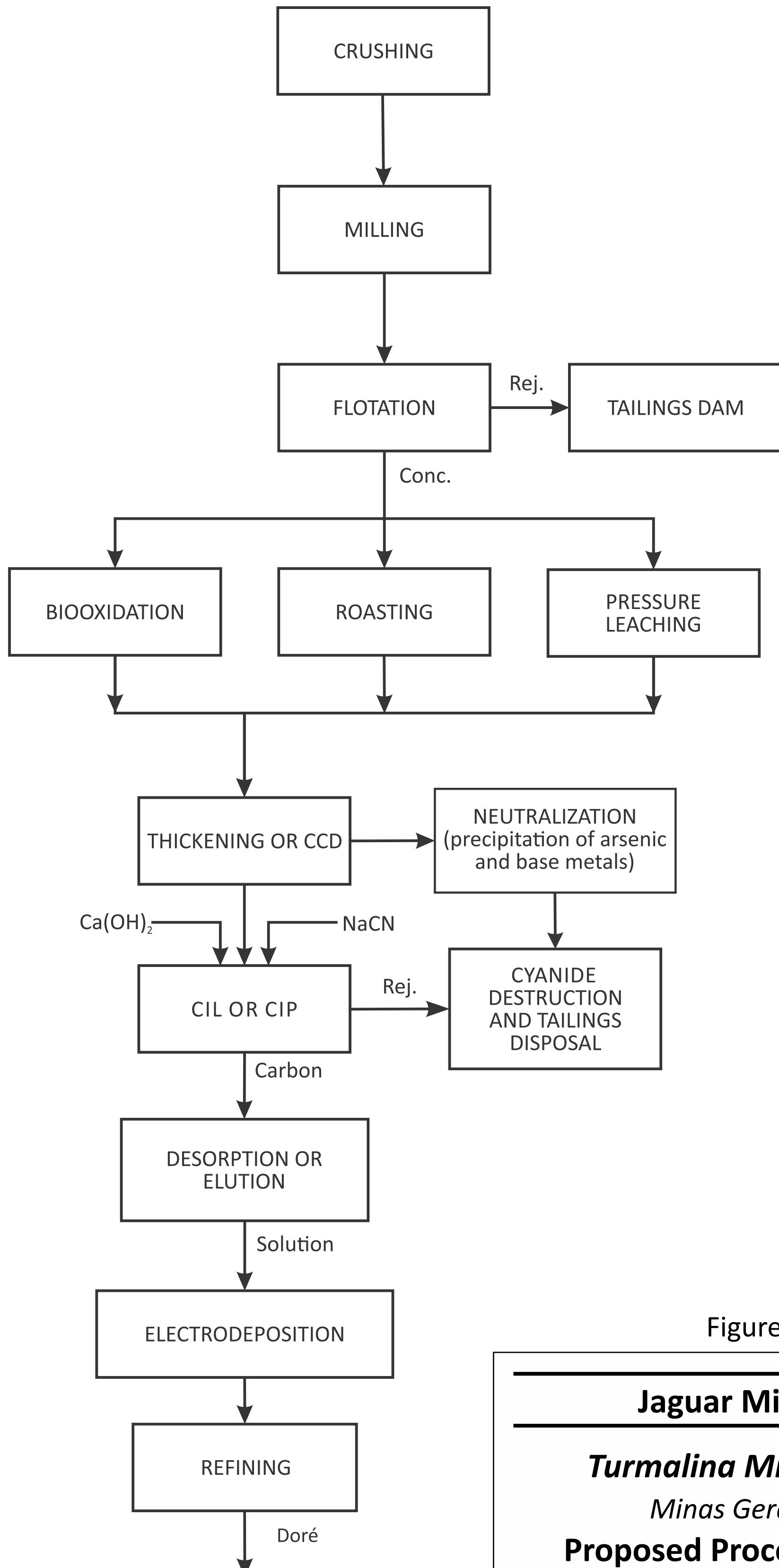


Figure 13-8

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Proposed Process Flowsheet Options for the Faina Project

March 2022 ***Source: Modified from TDP, 2022.***

14.0 MINERAL RESOURCE ESTIMATE

14.1 Summary

SLR has audited and accepted the Turmalina, Faina, and Pontal Mineral Resource estimates prepared by Jaguar. Table 14-1 summarizes the Mineral Resources as of December 31, 2021, based on a US$1,800/oz Au price for the Turmalina deposit and a gold price of US$1,400/oz Au for the Faina and Pontal deposits. A cut-off grade of 1.49 g/t Au was used to report the Mineral Resources for the Turmalina deposit, and cut-off grades of 3.8 g/t Au and 2.9 g/t Au were used to report the Mineral Resources for the Faina and Pontal deposits, respectively. The Mineral Resource estimates for the Faina and Pontal deposits were prepared with an effective date of December 31, 2014, and were first disclosed in RPA (2015).

The updated block model for the Turmalina deposit is based on drilling and channel sample data using a data cut-off date of December 12, 2021. The database comprises 5,019 drill holes (including underground Jumbo drill holes and open pit blast holes) and 20,423 channel samples. The estimate was generated from a block model constrained by three-dimensional (3D) wireframe models that were constructed using a minimum width of two metres. The gold grades are interpolated using the Ordinary Kriging (OK) algorithm using capped composited assays. A capping value of 50 g/t Au was applied for all three deposits. The wireframe models of the mineralization and excavated material for the Turmalina, Faina, and Pontal deposits were constructed by Jaguar.

The mineralized material for each deposit was initially classified into the Measured, Indicated, or Inferred Mineral Resource categories based on the search ellipse ranges obtained from the variography and the estimation passes. These preliminary classifications were subsequently modified to reflect the continuity of the mineralization, the sample density, and previous production experience with these deposits to smooth the classification. After smoothing, a potentially mineable shape was generated using the input parameters from the current operations. Only those Mineral Resources that displayed spatial continuity were reported within a potentially mineable shape.

Table 14-1: Summary of Total Mineral Resources – December 31, 2021
Jaguar Mining Inc. – Turmalina Mine Complex

Category	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
	Turmalina		
Measured	1,783	4.73	271
Indicated	2,199	3.59	254
Sub-total M+I	3,982	4.10	525
Inferred	2,176	3.15	221
	Faina (2014)		
Measured	72	7.39	17
Indicated	189	6.66	42
Sub-total M+I	261	6.87	58
Inferred	1,542	7.26	360

Category	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
		Pontal (2014)	
Measured	251	5.00	40
Indicated	159	4.28	22
Sub-total M+I	410	4.72	62
Inferred	130	5.03	21
		Total Turmalina, Faina, and Pontal Deposits	
Measured	2.106	4.85	328
Indicated	2,547	3.86	318
Total M+I	4,653	4.31	645
Inferred	3,848	4.86	602

Notes:

1. CIM (2014) definitions were followed for the classification of Mineral Resources.
2. Mineral Resources are inclusive of the Mineral Reserves at Turmalina. No Mineral Reserves are currently present at Faina or Pontal.
3. Mineral Resources are estimated at a cut-off grade of 1.49 g/t Au at Turmalina, 3.8 g/t Au at Faina, and 2.9 g/t Au at Pontal.
4. Mineral Resources at Faina and Pontal remain unchanged from those stated as of December 31, 2014.
5. Mineral Resources at the Turmalina deposit include all drill hole and channel sample data as of December 12, 2021, and are depleted using mining excavations as of December 31, 2021. Mineral Resources at the Faina and Pontal deposits include drill hole information as of December 31, 2014.
6. Mineral Resources are estimated using a long term gold price of US$1,800/oz Au for the Turmalina deposit and US$1,400/oz Au for the Faina and Pontal deposits.
7. Mineral Resources are estimated using an average long term exchange rate of R$5.50 : US$1.00 for the Turmalina deposit and R$2.50 : US$1.00 for the Faina and Pontal deposits.
8. A minimum mining width of 3.5 m was used for Turmalina.
9. Bulk density is 2.83 t/m^3 for Orebodies A and B and 2.91 t/m^3 for Orebody C at the Turmalina deposit. Bulk density is 1.46 t/m^3 and 1.52 t/m^3 for oxidized material, 2.24 t/m^3 and 2.28 t/m^3 for transition, and 2.73 t/m^3 for fresh material for Pontal's LB1 and LB2 deposits, respectively. Bulk density is 1.70 t/m^3 for oxidized material, 2.25 t/m^3 for transition, and 2.85 t/m^3 for fresh material at Faina Deposit.
10. Gold grades are estimated by the OK interpolation algorithm using capped composite samples.
11. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
12. Numbers may not add due to rounding.

The SLR QPs are not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other factors that could materially affect the Mineral Resource estimates.

14.2 Turmalina Deposit

14.2.1 Resource Database

Jaguar maintains an internal database in MX Deposit software, which is used to store and manage all of the digital information for all of its operations. The drill hole database contains drill hole and channel sample information, coded according to the naming conventions provided in Table 14-2.

Table 14-2: Drill Hole Database, Turmalina Deposit
Jaguar Mining Inc. – Turmalina Mine Complex

Hole Series	Description
FSN	Jaguar Drill Holes, Orebody C
FMT	Jaguar Drill Holes, Orebodies A and B
FTS	Jaguar Drill Holes
LM	Jaguar Drill Holes
FC	Jaguar Drill Holes
JM[1]	Jumbo Drill Holes
SMB[1]	Blast Holes (open pits)

Note:

1. JM-series and SMB-series drill hole and assay information are not used for construction of mineralized wireframes or grade estimation purposes.

The drill hole and channel sample information for the Turmalina deposit was extracted from this internal database into separate files for use in preparation of the Mineral Resource estimates. The cut-off date for the drill hole database is December 12, 2021. The drilling and sampling data was carried out using the UTM Datum Córrego Alegre, Zone 23S grid coordinate system.

A summary of the drilling and channel sampling information is provided in Table 14-3.

Table 14-3: Description of the Turmalina Deposit Database as of December 31, 2021
Jaguar Mining Inc. – Turmalina Mine Complex

Table Name	Records	Length (m)
Collar (5,019 drill holes and 20,423 channel samples)	25,442	483,131
survey	199,159	373,470
assay_minesight_raw	448,324	483,130
litho	147,350	483,117
weather	192,246	483,130
composites_minesight	88,625	82,309

This drill hole information was modified slightly to be compatible with the format requirements of the Hexagon HxGN MinePlan 3D v.15.30 (MinePlan 3D) mine planning software and was then imported into that software package. A number of new tables were created during the estimation process to capture such information as the intersection information between the drill holes and the wireframe models, density readings, capped assay records, and composited assay records.

The database included assay records (approximately 3% to 5% of the assays contained within the mineralization wireframes) which contained entries of negative values to represent intervals of no sampling, lost core, lost sample, or no core recovery, some of which are contained within the mineralized wireframes. Depending upon the specific local conditions, these null values can introduce an undesired positive bias upon the grade estimations. Jaguar therefore elected to pursue a conservative approach by inserting a very low gold value of 0.01 g/t Au for these intervals of null values.

The Turmalina deposit database also contains a large number of entries for older channel sample and drill hole information which are either clearly in error or for which the confidence of the mineralized intervals is uncertain due to conflicts with more current and accurate information. In these cases, the erroneous and uncertain drill holes and channel samples are flagged and are not used in the preparation of the grade estimation. A summary of the excluded sample information is presented in Table 14-4.

Table 14-4: Summary of Drill Hole and Channel Samples Excluded from Estimation, Turmalina Deposit
Jaguar Mining Inc. – Turmalina Mine Complex

Sample Type	Number of Channels or Drill Holes
Channel Samples	1,869
FMT-series Drill Holes	70
FSN-series Drill Holes	57
Drill Holes, Other	309
Total	2,305

The SLR QP recommends that the erroneous or anomalous information be corrected for those drill holes that are located in the un-mined portions of the Turmalina deposit. Time permitting the same corrections can be made to the mined-out portions of the Turmalina deposit to improve the quality of the data underlying any multi-year reconciliation analysis. For those drill holes and channel samples that remain, the SLR QP recommends that they be removed from the active database into a database that is dedicated specifically for these records.

The SLR QP is of the opinion that the drill hole and sampling database is suitable for use in preparation of Mineral Resource estimates.

14.2.2 Mineralization Wireframes

The interpreted 3D wireframe models of the gold mineralization have been created using the assay values from all sample types. Wireframe models of the gold distribution for the three orebodies were created using MinePlan 3D and Leapfrog Geo version 2021.1 software packages.

The wireframe limits were drawn using a cut-off grade of 0.50 g/t Au and a nominal minimum width of 2.0 m. Some lower grade gold values were included inside the wireframes to preserve the continuity of the interpretation. The wireframe models were clipped to the original, pre-mining topography surface.

The SLR QP recommends that Jaguar slightly modify the wireframe construction strategy to use a cut-off grade that more closely reflects the Mineral Resource cut-off grade for each Orebody. The SLR QP anticipates that this will increase the average grades of the mineralized wireframes by reducing the amount of internal dilution that is currently being included.

Until 2017, the main production of the mine has been from Orebody A, which is dominated by a steeply northeast dipping tabular deposit that is located in a biotite schist host rock. Contouring activities have shown that the gold grades are oriented along a steep southeasterly plunge within this main, folded portion of the deposit. Additional, smaller mineralized zones also contribute to the production from

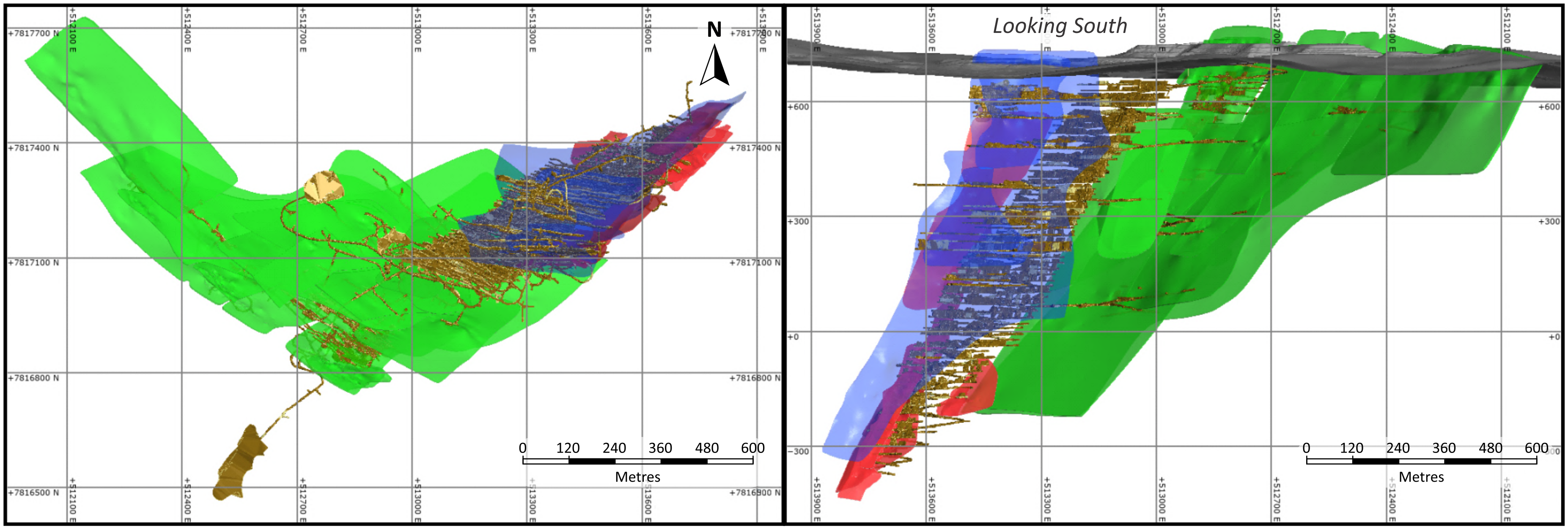
Orebody A. These zones occur mostly as steeply dipping, tabular zones that are oriented either sub-parallel with or at a slight angle with the axis of Orebody A. In total, Orebody A is comprised of 10 separate mineralized zones. The drilling results from the 2021 program have continued to be successful in intersecting the down-plunge extension of Orebody A. Better gold grades and mineralized widths are found with increased abundances of quartz and pyrite-arsenopyrite in the nose area of this structure, however, good gold grades can also be found as steeply plunging shoots along the limbs. The mineralization in this deposit has been outlined along a strike length of approximately 350 m to 400 m and to depths of 1,150 m to 1,200 m below surface. The deposit is accessed by a ramp system that has supported production over a vertical distance of approximately 1000 m. The mineralization in Orebody A has been defined by drilling below the lowest working level and good potential remains for discovering additional mineralization along the down-plunge projection with additional drilling.

Orebody B includes two lower grade lenses that are oriented approximately parallel to Orebody A. They are located approximately 50 m to 75 m in the structural hanging wall of Orebody A and are accessed in the upper levels of the mine by a series of crosscuts that are driven from Orebody A development. The mineralization in this deposit has been outlined along a strike length of approximately 350 m to 400 m and to depths of 650 m to 700 m below surface.

As a result of the drilling campaigns carried out in 2019, additional mineralized zones have been discovered such that Orebody C has now increased to include a series of 14 lenses that are located to the west in the structural footwall of Orebody A (Figure 14-1). The mineralization occurs as a number of tabular sheets that strike in a northwesterly direction and dip steeply to the northeast. The lower portions of the Orebody C mineralization are accessed by two crosscuts from the main ramp, while access to the upper levels is via ramp access from the southwest. While historically a minor amount of production has been achieved from these lenses to date, the increasing successes of Jaguar’s drilling programs are leading to production plans where an increasing proportion of the production is being sourced from Orebody C. To date, the mineralization in this deposit has been outlined along a strike length of approximately 1,400 m and to a depth of 1,000 m below surface.

An example cross sectional view of the mineralized wireframes for Orebody C is presented in Figure 14-2.

Plan View   Isometric View



Legend:
- *Orebody A*
- *Orebody C*
- *Orebody B*
- *As-Mined Excavations*

Figure 14-1

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Overview of the Mineralized Wireframes - Turmalina Deposit

March 2022

Source: SLR, 2022.

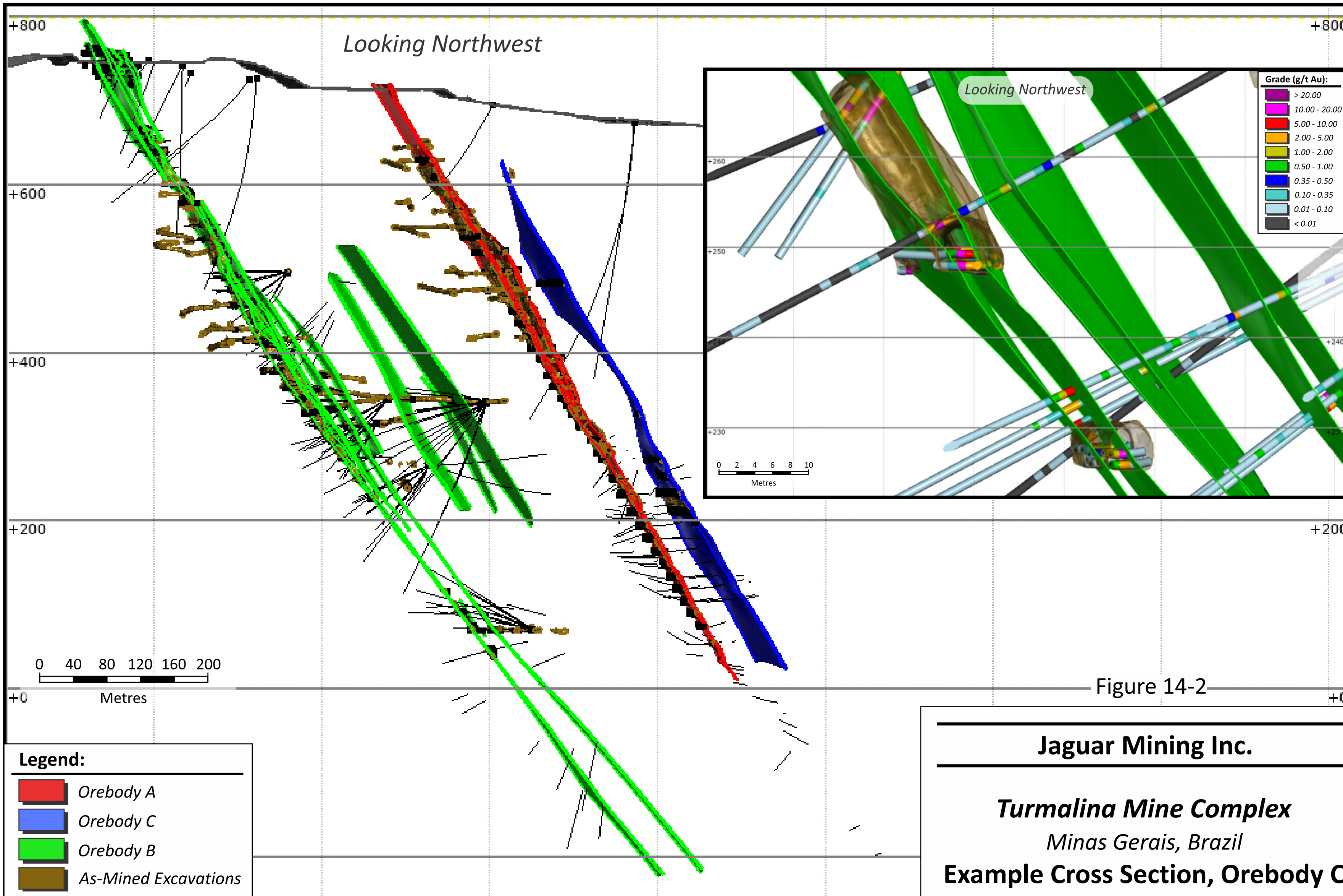


Figure 14-2

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Example Cross Section, Orebody C

March 2022

Source: SLR, 2022.

Review of the wireframes by the SLR QP reveals that the interpretations are reasonable and appropriate. The wireframes were grouped into Orebody A, B and C for statistical analysis and capping. Integer codes were assigned to each domain and coded to the block model. The coding provided the means to customize grade interpolation parameters for each domain and to ensure a hard boundary constraint on sample selection. A list of the domain codes is provided in Table 14-5.

Table 14-5: List of Wireframe Domain Codes, Turmalina Deposit
Jaguar Mining Inc. – Turmalina Mine Complex

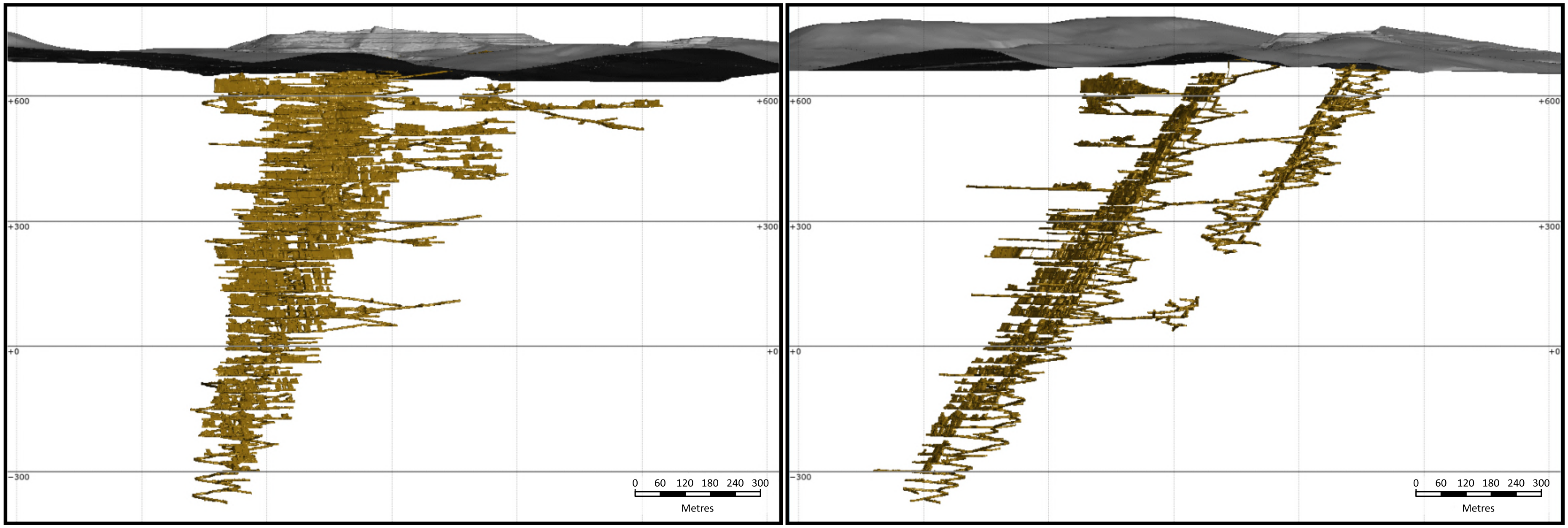
Domain Code	Name	Orebody
1	ANW	Orebody A – Portion NW
4	ASE01-L01	Orebody A – Portion SE
5	ASE01-L02	Orebody A – Portion SE
6	ASE02	Orebody A – Portion SE
7	ASE03	Orebody A – Portion SE
8	AGRANADA	Orebody A – Portion SE – associated with Garnets
9	MVU	Ultramafic Hosted Zone
10	AXS-FW	Orebody A
11	AXS-HW	Orebody A
12	ANW-L01	Orebody A
15	B	Orebody B
16	BHW	Orebody B Hang wall
21-29	CSE	Orebody C – Portion SE
31-34	CCE	Orebody C – Center Portion – CE “Central”
42-43	CNW	Orebody C – Portion NW

14.2.3 Topography and Excavation Models

A topographic surface of the immediate mine area that is current as of October 2013 was used to code the block model for those portions of Orebodies A, B, and C that have been excavated by means of open pit mining methods. Wireframe models of the underground workings as of December 31, 2021, were prepared and used to code the block model (Figure 14-3).

Looking to Azimuth 220°

Looking to Azimuth 130°



Legend:
As-Mined Excavations

Figure 14-3

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Longitudinal Projection of the Turmalina Mine Excavations

March 2022

Source: SLR, 2022.

14.2.4 Sample Statistics and Grade Capping

The mineralization wireframe models were used to code the drill hole database and identify the resource related samples. These samples were extracted from the database into their respective domains, and then subjected to statistical analyses by means of histograms, probability plots, and decile analyses. A total of 79,607 samples were contained within the mineralized wireframes. The sample statistics are summarized in Table 14-6. Frequency histograms of the gold grade distribution are presented in Figure 14-4 to Figure 14-6.

Table 14-6: Descriptive Statistics of the Raw and Capped Gold Assays
Jaguar Mining Inc. – Turmalina Mine Complex

Item	Orebody A		Orebody B		Orebody C	
	Uncapped	Capped	Uncapped	Capped	Uncapped	Capped
Count	41,808	41,808	8,543	8,543	29,256	29,256
Length-Weighted Average (g/t Au)	5.99	5.90	2.73	2.72	2.87	2.85
Minimum (g/t Au)	0.01	0.01	0.01	0.01	0.01	0.01
Maximum (g/t Au)	315.00	50.00	76.83	50.00	184.00	50.00
SD (g/t Au)	9.88	9.16	5.19	5.04	5.74	5.39
Variance (g/t Au)	97.60	83.87	26.90	25.41	33.00	29.06
CV	1.65	1.55	1.90	1.85	2.00	1.89

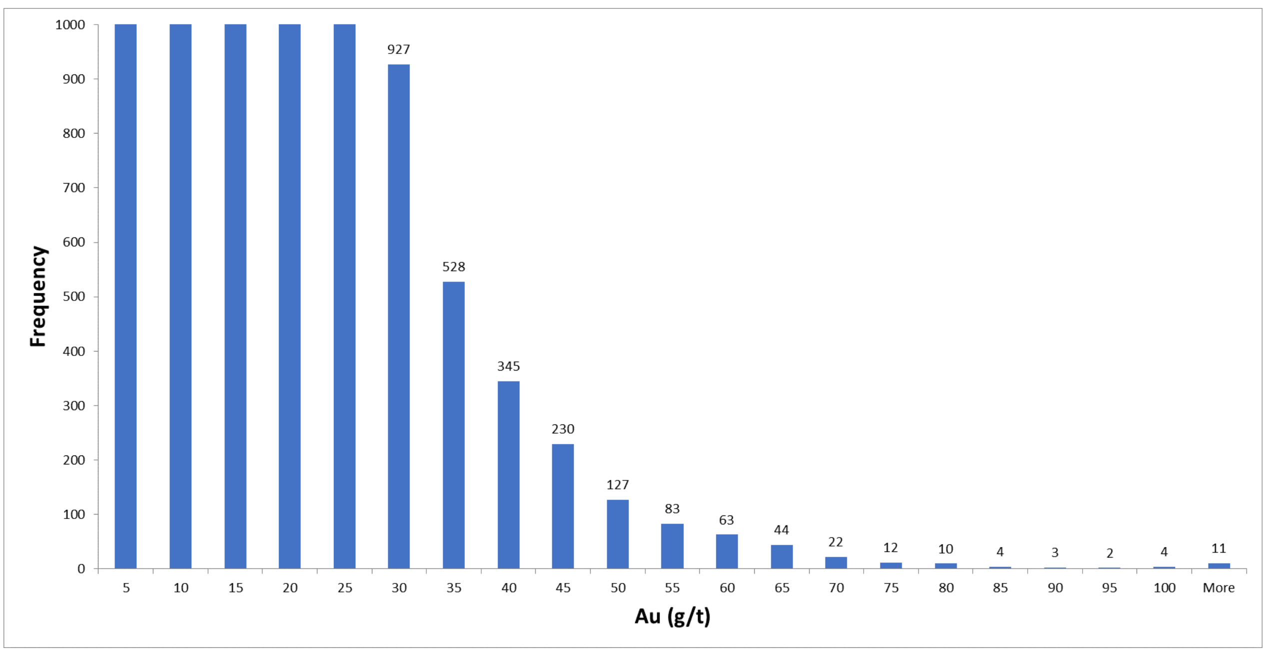


Figure 14-4: Frequency Histogram of the Raw Gold Assays, Orebody A

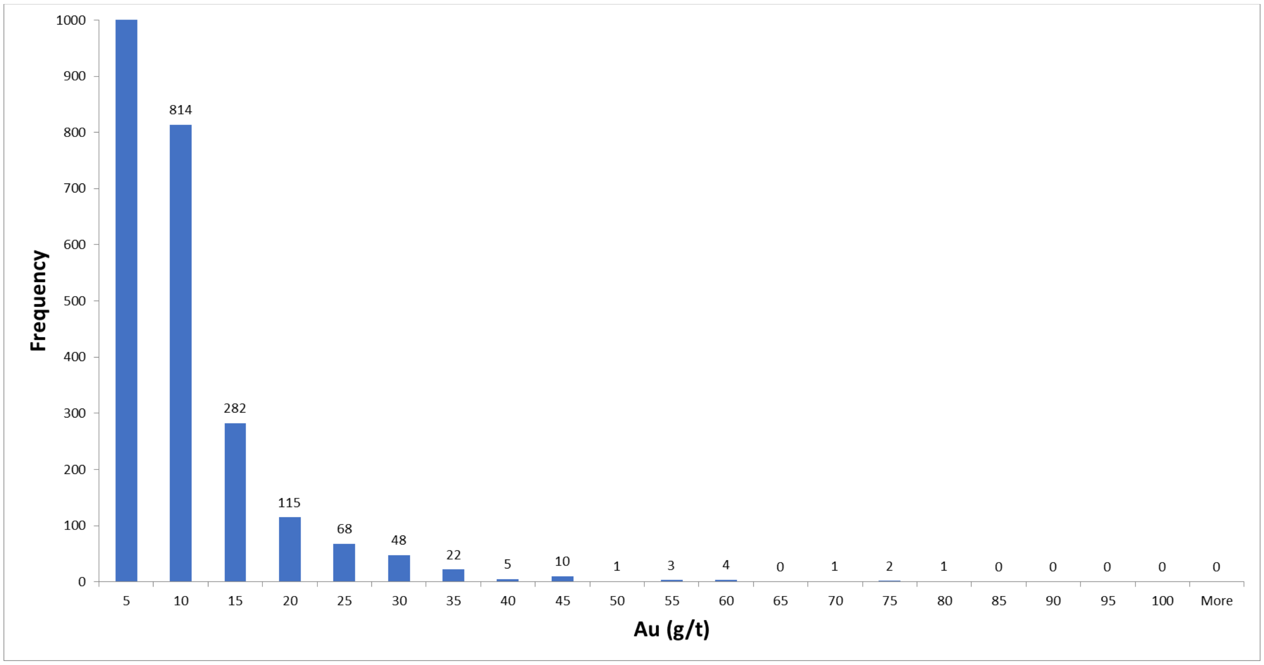


Figure 14-5: Frequency Histogram of the Raw Gold Assays, Orebody B

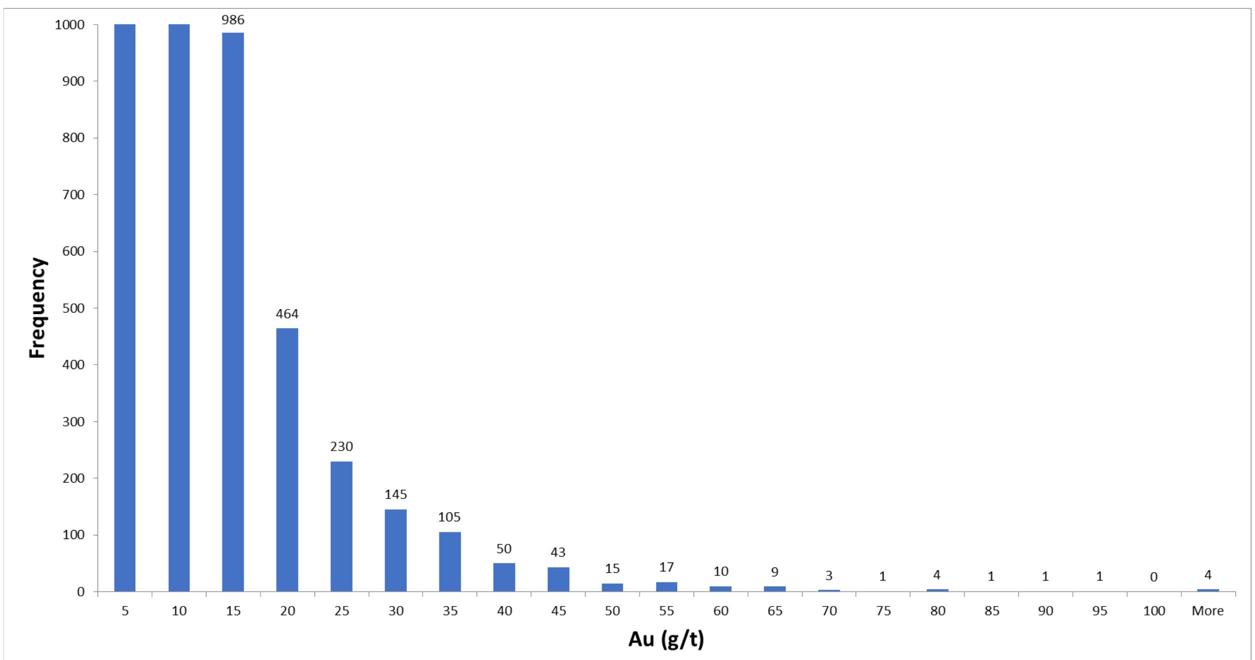


Figure 14-6: Frequency Histogram of the Raw Gold Assays, Orebody C

Based on their review of the assay statistics, the SLR QP is of the opinion that a capping value of 50 g/t Au remains appropriate for each of the three orebodies, which is unchanged from the recommended capping values presented in RPA (2017). This capping value has been applied to all gold assays prior to compositing.

The SLR QP recommends that the capping values be reviewed periodically to reflect production reconciliation.

14.2.5 Compositing Methods

The selection of an appropriate composite length began with examination of the descriptive statistics of the raw assay samples and preparation of sample length frequency histograms. Consideration was also given to the size of the blocks in the model. The SLR QP is of the opinion that a composite length of one metre for all samples is reasonable. This composite length remains unchanged from that described in RPA (2017). All samples contained within the mineralized wireframes were composited to a nominal one metre length using the best-fit function of the MinePlan 3D software package. The composite descriptive statistics are provided in Table 14-7.

Table 14-7: Descriptive Statistics of the Gold Composites
Jaguar Mining Inc. – Turmalina Mine Complex

Item	Orebody A		Orebody B		Orebody C	
	Uncapped	Capped	Uncapped	Capped	Uncapped	Capped
Count	45,999	45,999	9,327	9,327	33,287	33,287
Length-Weighted Average (g/t Au)	6.04	5.96	2.72	2.71	2.90	2.87
Minimum (g/t Au)	0.01	0.01	0.01	0.01	0.01	0.01
Maximum (g/t Au)	315.00	50.00	66.78	50.00	144.53	50.00
SD (g/t Au)	9.10	8.46	4.75	4.63	5.36	5.05
Variance (g/t Au)	82.84	71.65	22.58	21.42	28.69	25.51
CV	1.51	1.42	1.75	1.71	1.85	1.76

14.2.6 Bulk Density

Jaguar continued its program of systematic determination of the bulk densities of the various mineralized zones through 2021 using samples of ore and waste collected from drill holes. The bulk density values were determined by the water displacement method on selected pieces of drill core by Jaguar's laboratory staff at the Caeté site. In 2021, Jaguar determined the bulk densities of 130 ore and waste samples from Orebodies A and C. To date, a total of 2,060 bulk density samples have been collected at Turmalina over the life of the project (Table 14-8). The average bulk density for the mineralized material in both orebodies remains essentially unchanged from that presented in RPA (2017). There are no new results for Orebody B thus the available historical density was used. The average density values for these mineralized wireframes were coded into the block model.

Examination of the distribution of the density measurements presented in RPA (2020) from the mineralized wireframes for Orebody A suggests that the distribution is approximately a Gaussian distribution centred on a mean value that is consistent with a silicate host rock. The distribution of density measurements from the mineralized wireframes for Orebody C suggests that, while for the most part the density values are consistent with a silicate host rock, the presence of a weakly developed shoulder in the range of 3.1 t/m^3 to 3.4 t/m^3 suggests the presence of a second lithological unit of higher density. This could be due to the presence of an iron formation unit within the mineralized wireframes.

The SLR QP recommends that geological mapping of all available underground excavations in the vicinity of the Orebody C mineralized wireframes be conducted. The results of this geological mapping should be used to prepare a lithological model to be used to improve the allocation of the density measurements for future Mineral Resource updates.

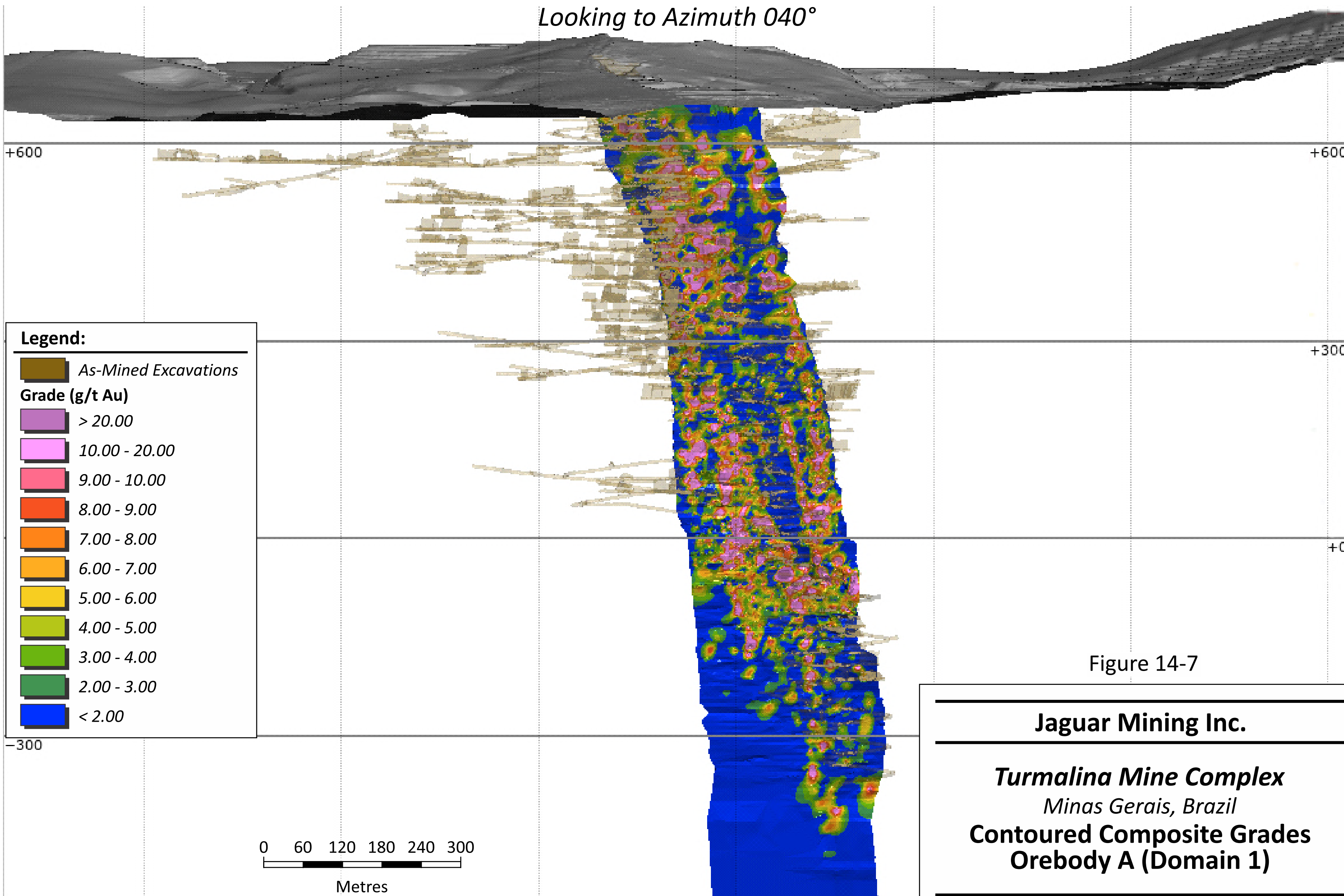
Table 14-8: Summary of Density Measurements by Orebody
Jaguar Mining Inc. – Turmalina Mine Complex

Material	Number of Samples	Average Bulk Density (t/m^3)
	Orebody A	
Mineralized	368	2.83
Waste	448	2.82
Sub-total	816	
	Orebody C	
Mineralized	430	2.91
Waste	814	2.83
Sub-total	1,244	

The SLR QP recommends that additional bulk density measurements continue to be collected from any mineralized drill core samples in any future drilling programs.

14.2.7 Trend Analysis

As an aid in carrying out variography studies of the distribution and continuity of the gold grades in the mineralized domain models, a short study to examine the overall trends was carried out for selected mineralized lenses. For this exercise, the composite gold values for each lens were contoured using the Leapfrog Geo software package (Figure 14-7 and Figure 14-8). The results are consistent with those presented in RPA (2019), which produced contours of full width composite grades.



March 2022

Source: SLR, 2022.

Figure 14-7

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Contoured Composite Grades Orebody A (Domain 1)

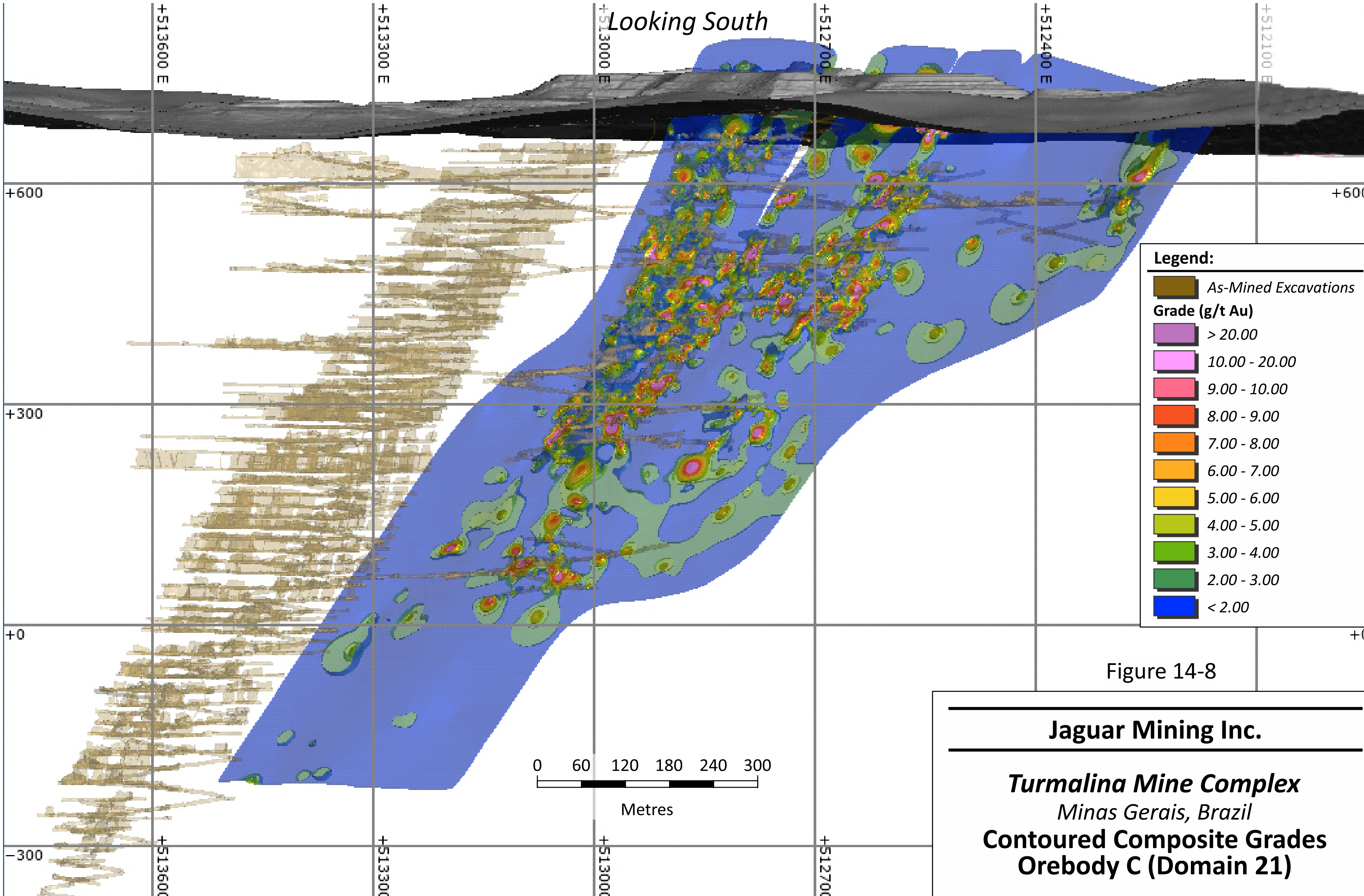


Figure 14-8

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Contoured Composite Grades
Orebody C (Domain 21)

March 2022

Source: SLR, 2022.

The pronounced southeasterly down-plunge orientation of the higher grade gold grades initially discussed in RPA (2016) can be seen to persist in both the hanging wall and footwall limbs of Orebody A. The down-plunge continuity of the high grade shoots within the limbs are likely related to the same intersection lineation that acts as a structural geometric control for the hinge mineralization. As the lower limit of the gold mineralization remains undefined below the deepest drill hole, additional work to outline the down-plunge continuation of the gold grades in Orebody A is warranted.

Although less well defined than at Orebody A, narrow, steep plunging, high grade ore shoots are also found in the lenses of Orebody C and additional tight spaced sampling is required to further define them

The SLR QP recommends that geological mapping, along with structural and alteration studies, be undertaken to understand the nature of the gold mineralization and the structural and stratigraphic controls on the distribution of the gold values for Orebody C. The results of these studies will be of great use in understanding the controls on the distribution of the higher grade pods and will aid in developing exploration targets in this area of the mine property.

14.2.8 Variography

Figure 14-9 and Figure 14-10 show the analysis, completed in 2019, of the spatial continuity of the gold grades that remain effectively unchanged from the conclusions presented in RPA (2015). A summary of the variogram parameters derived for each of the three orebodies is presented in Table 14-9. The spatial continuity of the gold grades in Orebodies A, B, and C is currently being re-examined in light of Jaguar’s increasing understanding of the distribution of the gold grades for these three orebodies.

Table 14-9: Summary of Variography and Interpolation Parameters
Jaguar Mining Inc. – Turmalina Mine Complex

Item	Orebody A			Orebody B	Orebody C		
	Group 1	Group 2	Group 3		Group 1	Group 2	Group 3
Rock Code	1 ,4 ,5 ,6, 8, 9 ,12	2	7,10,11	15,16	21, 22, 23, 24, 25, 26, 27, 31, 32, 33, 34, 41, 42, 43	28	29
Nugget (C0)		22		5		8	
Sill Major Axis (C1)		38.4		8.4		11	
Sill Major Axis (C2)		22.2		5.8		3.54	
Model Type		Spheroidal		Spheroidal		Spheroidal	
Orientation (Az/Dip/Plunge)	050/-55/47	047/-55/40	058/-55/40	030/-65/40	060/-55/35	037/-58/40	051/-53/10
Anisotropy Ratio (Major/Semi-Major)		1.5		3.3		1.7	
Anisotropy Ratio (Major/Minor)		5.0		5.0		5.0	
Distances							
Structure1 Major (m)		5		27		8	
Structure1 Semi-Major (m)		4		4		7	
Structure1 Minor (m)		3		3		5	
Structure2 Major (m)		30		50		50	
Structure2 Semi-Major (m)		20		15		30	
Structure2 Minor (m)		6		10		10	

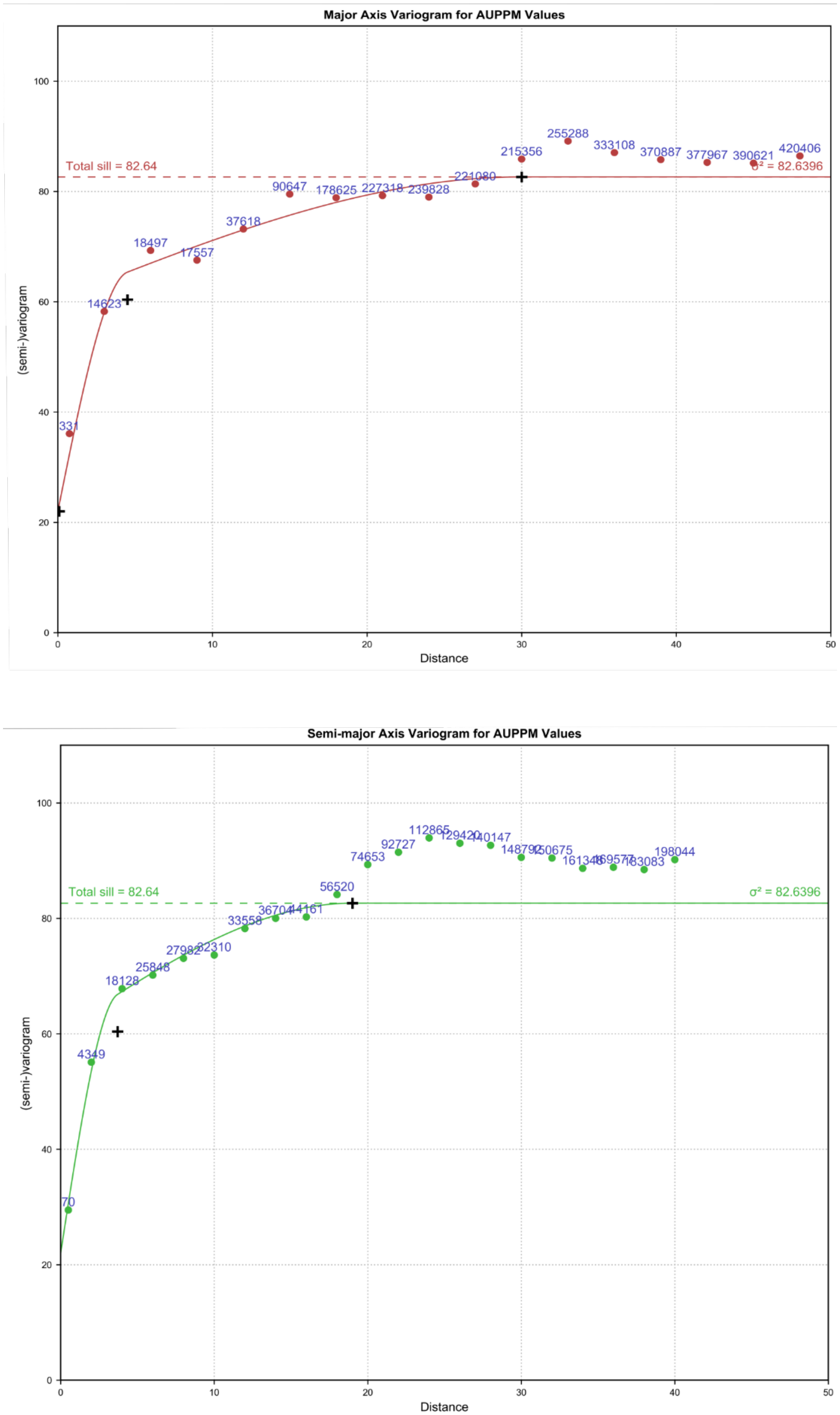


Figure 14-9: Major Axis and Semi-Major Axis Variograms, Orebody A

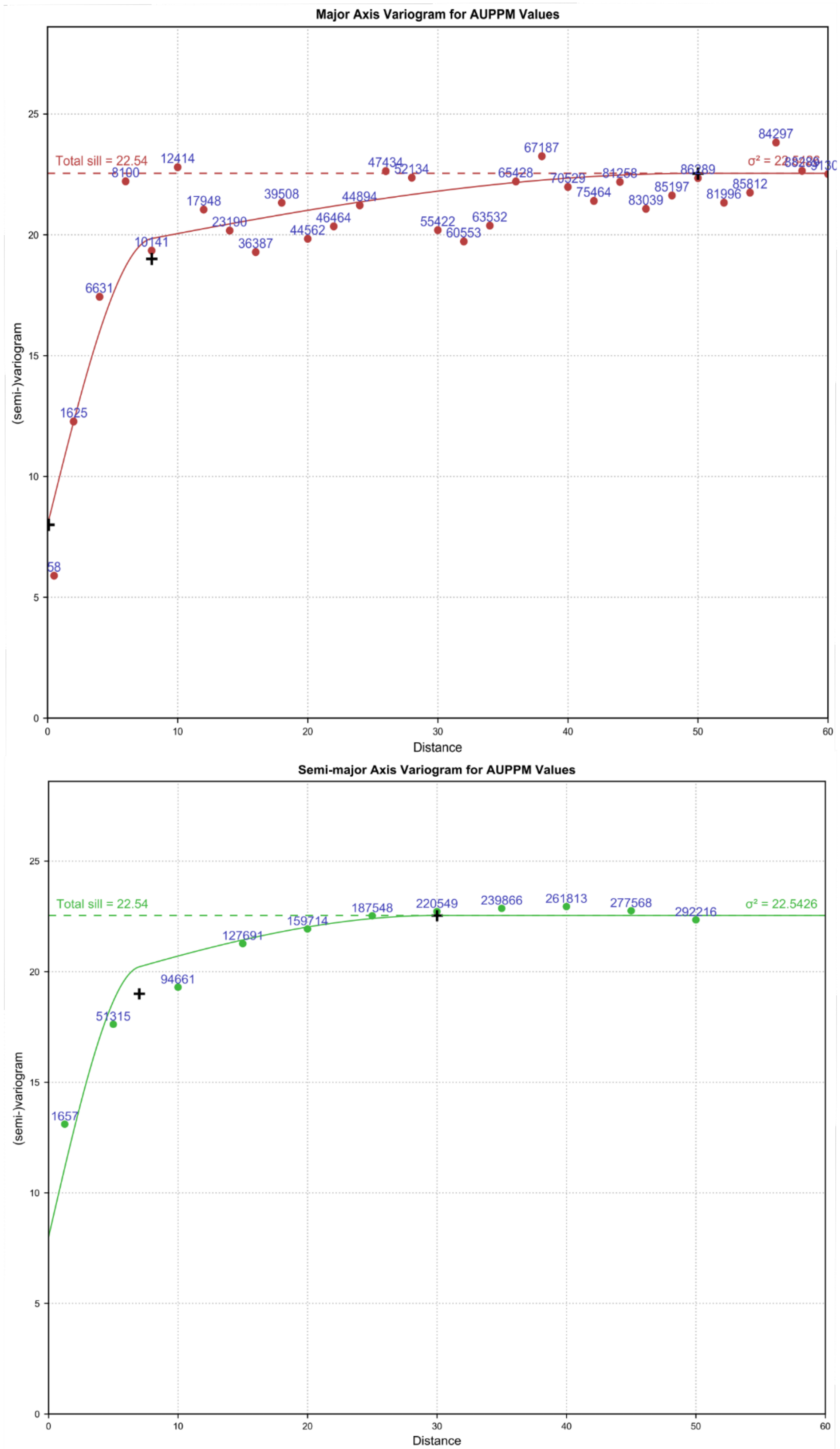


Figure 14-10: Major Axis and Semi-Major Axis Variograms, Orebody C

14.2.9 Block Model Construction

The block model construction strategy was modified from what was previously employed at Turmalina. The block model was constructed using the MineSight 3D software package and comprised an array of 4 m x 4 m x 4 m sized parent blocks, sub-blocked to a minimum block size of 1 m x 1 m x 1 m. The model is oriented parallel to the coordinate grid system (i.e., no rotation or tilt). The block sizes for this model were selected to minimize the variation when compared with the block model strategy previously employed at Turmalina. The block model origin, dimensions, and attribute list are provided in Table 14-10.

Table 14-10: Block Model Definition
Jaguar Mining Inc. – Turmalina Mine Complex

Type	Northing (Y)	Easting (X)	Elevation (Z)
Minimum Coordinates (m)	7,816,600	514,200	-600
Maximum Coordinates (m)	7,818,100	514,200	800
User Block Size (m)	4	4	4
Min. Block Size (m)	1	1	1
Rotation (°)	0.000	0.000	0.000

Attributes were created to store information such as rock code, material densities, estimated gold grades, mineral resource classification, and mined out material (Table 14-11).

Table 14-11: List of Block Model Attributes
Jaguar Mining Inc. – Turmalina Mine Complex

Variable Name	Description
auokc	Gold by OK
avd	Average Distance of Informing Samples
class	Pass Number, OK (1=Half of Variogram Range, 2=Variogram Range, 3=2x Range, 4=4x Range)
clod	Distance to Closest Informing Sample
dens	Material Density
ndh	Number of Drill Holes for Estimation
nq	Number of Quadrants with Information
nsmp	Number of Informing Samples
fthd	Distance to Farthest Informing Sample
rclass	Mineral Resource Classification (1=measured, 2=indicated, 3=inferred)
rock	Material Code
topo%	Percent of Block Below Topography Surface
var	Variance

14.2.10 Grade Estimation

Gold grades were estimated into the blocks by means of inverse distance cubed (ID^3) and the OK interpolation algorithms. A total of four interpolation passes at different ranges were carried out using distances derived from the variography results and the search ellipse parameters presented above. The orientations of the search ellipses were varied for Orebodies A and C so as to provide a better alignment with the spatial orientations of the individual mineralized wireframes. In total, three different search ellipse orientations (Groups 1 to 3) were used to estimate the gold grades for Orebody A. Three different search ellipse orientations were also used to estimate the gold grades for Orebody C. The SLR QP recommends that the Jaguar team consider the use of a dynamic anisotropy method for estimation of gold grades into the model. The SLR QP also recommends that Jaguar review the anisotropy ratios on an individual wireframe basis rather than on an orebody basis.

In general, "hard" domain boundaries were used along the contacts of the mineralized domain models for all of the mineralized lenses. Only data contained within the respective wireframe model were allowed to be used to estimate the grades of the blocks within the wireframe in question, and only those blocks within the wireframe limits were allowed to receive grade estimates. The block grades were estimated in four estimation passes using the parameters presented in Table 14-12.

Due to the unique geometry of Orebody A, three sub-domains were created for the main mineralized lens. Domain ANW was created for the "hinge" portion of the mineralized wireframe, and separate domains were created for the northern and southern "limbs" of the mineralization (ASE II and ASE, respectively). Soft boundaries were used for the composite data in these three sub-domains when interpolating the gold grades to permit a smooth transition of grades between the three sub-domains.

Table 14-12: Summary of the Estimation Strategy
Jaguar Mining Inc. – Turmalina Mine Complex

Parameters	Orebody	Pass 1	Pass 2	Pass 3	Pass 4
Minimum No. of Composites	A, B, C	3	2	1	1
Maximum No. of Composites	A, B, C	16	16	16	16
Maximum No. Composites per Drill Hole	A, B, C	2	2	4	8
Maximum No. Composites per Quadrant	A, B, C	2	2	4	8
Minimum No. Quadrant with Composites	A, B, C	2	2	1	1
Major Ellipse Dimension (m)	A	15	30	60	120
	B	25	50	100	200
	C	25	50	100	200
Semi-Major Ellipse Dimension (m)	A	10	20	40	80
	B	10	15	30	60
	C	15	30	60	120
Minor Ellipse Dimension (m)	A	3	6	12	24
	B	5	10	20	40
	C	5	10	20	40

14.2.11 Block Model Validation

14.2.11.1 Global Estimate

Validation of the estimated block model grades included a comparison of the average of all estimated block grades to the average of the composites (Table 14-13). In consideration of such items as the volume-variance effect, projection of estimated grades beyond the limits of the drill hole information and the effect of clustered data, the average estimated block grades agree reasonably well with the average grades of the informing composites.

Table 14-13: Composite versus Block Grades by Orebody
Jaguar Mining Inc. – Turmalina Mine Complex

Item	Orebody A (g/t Au)	Orebody B (g/t Au)	Orebody C (g/t Au)
Composite Average	5.90	2.72	2.85
Block Grade Average	4.32	2.07	1.74

14.2.11.2 Local Estimate

A series of swath plots were prepared in which the average grade of the channel and drill hole composites and the block grades were compared by elevation (Figure 14-11 through Figure 14-13). For the swath plots, OK block grades are shown in black (Au OK), Nearest Neighbour (NN) block grades are shown in yellow (Au NN), and the composites (channels and drill holes) are shown in red (Au DH).

There is generally a good agreement between the estimated block grades and the informing composites in areas where the density of the sample data is low, while greater variances are observed in those areas with regular, systematic channel or drill hole composites. This high variance is in agreement with the differences in average grades shown in Table 14-13 but the trend is the same for composites and the block models.

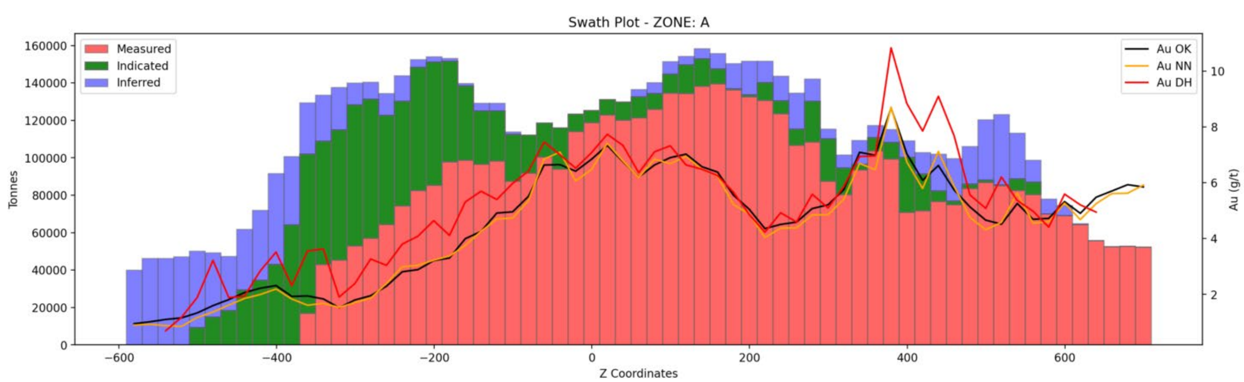


Figure 14-11: Swath Plot by Elevation, Orebody A (20 m bin width)

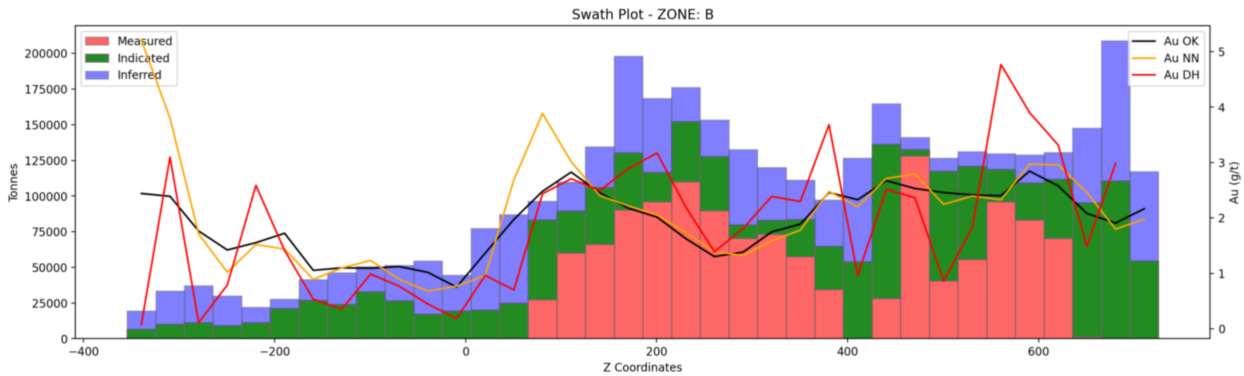


Figure 14-12: Swath Plot by Elevation, Orebody B (30 m bin width)

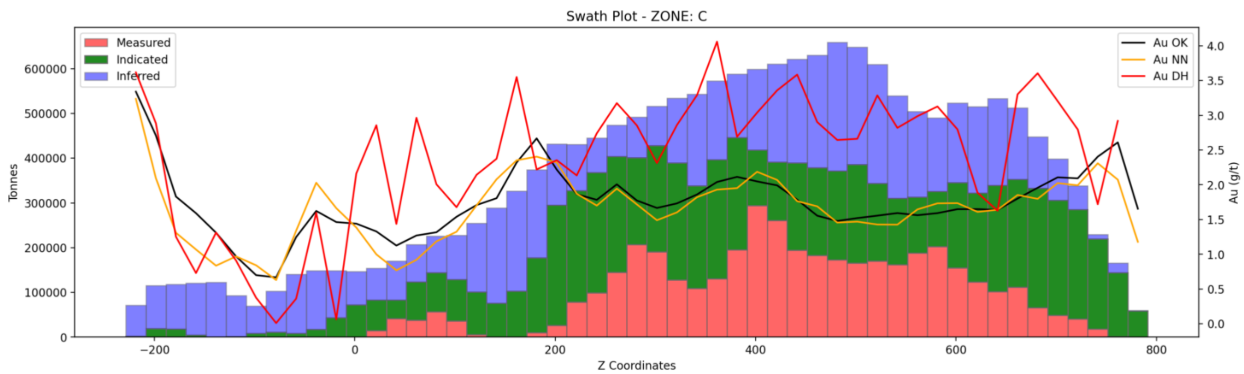


Figure 14-13: Swath Plot by Elevation, Orebody C (20 m bin width)

Evaluation of the accuracy of the local estimate was also carried out by visually comparing the contoured gold grades against the estimated block grades in longitudinal views. Examples are presented in Figure 14-14 and Figure 14-15. While variances were observed at a local scale, in general a good correlation was observed for those areas of higher sample data density. Estimation artifacts were observed in several of the mineralized lenses in Orebody C in areas of lower sample data density. The SLR QP suspects that these artifacts are the result of using the same search strategy and parameter selection in areas of tightly spaced data (areas containing channels, underground and surface drill holes) and relatively widely spaced data (areas containing only underground and surface drill holes). The SLR QP recommends that a short study be carried out to determine the optimum selection of search strategy input parameters to reduce the number of estimation artifacts for these mineralized lenses. The study should begin with the examination of the relative spacing of the informing samples and the resulting impacts that spacing has on the number of informing samples per quadrant and on the resulting estimate. This study could also help reduce the variances observed in the swath plots by reducing the degree of smoothing in both the lower (<0.50 g/t Au) and upper portions (> 10 g/t Au) of the grade distribution. The SLR QP also recommends that additional drill hole information be collected in these areas to improve the confidence level of the Mineral Resource estimate, to reduce and remove the estimation artifacts, and to search for the down-dip projections of the mineralization.

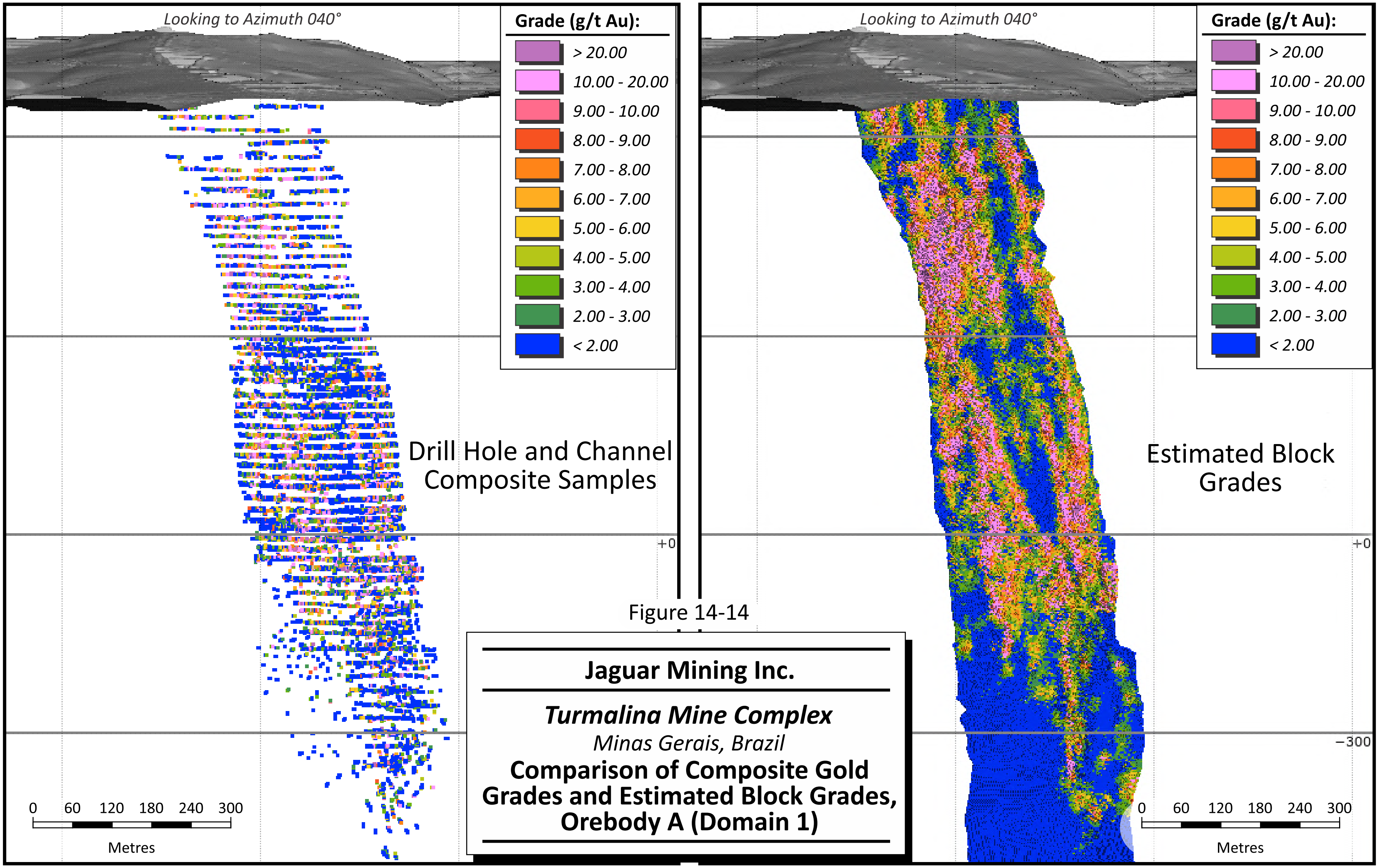


Figure 14-14

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Comparison of Composite Gold Grades and Estimated Block Grades, Orebody A (Domain 1)

March 2022

Source: SLR, 2022.

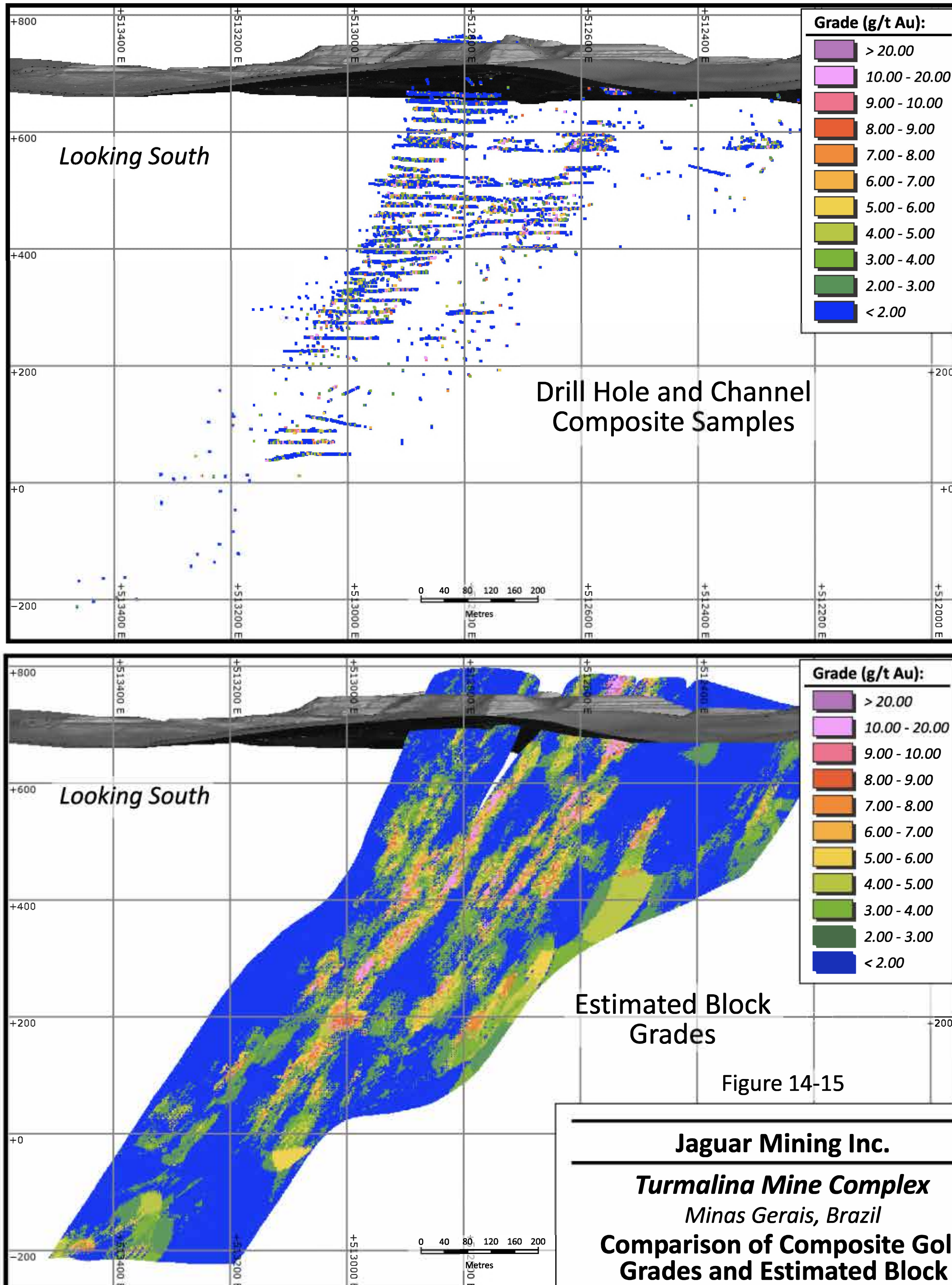


Figure 14-15

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Comparison of Composite Gold Grades and Estimated Block Grades, Orebody C (Domain 21)

March 2022 ***Source: SLR, 2022.***

14.2.11.3 Reconciliation

Validation exercises also consisted of comparing the revised block model estimated grades and tonnes against the 2020 and 2021 mine and plant production data on a quarterly basis (Table 14-14, Figure 14-16). In brief, the broken muck from the development headings and stopes is brought to surface and transported by truck to the stockpile area at the Turmalina Plant. Samples are collected for each truck load to determine the grade of the material that was excavated from the mine. From the stockpile area, the broken muck is then fed into the Turmalina Plant.

The Turmalina Plant tonnages are derived from weightometer measurements on the feed belt and the plant feed grades are determined from direct sampling of material in the Turmalina Plant prior to the leaching circuit. The mine tonnages are derived from truck counts and the mine grade information is derived from stockpile samples. The trucks are tallied daily. Considering that the updated block model incorporated all drill hole and channel sample information up to December 12, 2021, this comparison is closer to an F2 (Mine-to-Plant) reconciliation as described in Parker (2014) because the resource model has data support equivalent to a grade control model.

Table 14-14: Quarterly Production, 2020 and 2021
Jaguar Mining Inc. – Turmalina Mine Complex

Period	Mine Report			Plant Feed Grade			Block Model		
	Tonnage (t)	Grade (g/t Au)	Contained (oz Au)	Tonnage (t)	Grade (g/t Au)	Contained (oz Au)	Tonnage (t)	Grade (g/t Au)	Contained (oz Au)
2020/Q1	75,049	4.51	10,875	74,582	3.86	9,247	68,276	4.54	9,969
2020/Q2	103,188	3.46	11,480	103,503	3.22	10,707	100,050	3.51	11,288
2020/Q3	81,991	4.38	11,557	81,176	4.18	10,905	81,007	4.31	11,220
2020/Q4	92,894	3.64	10,880	90,272	3.87	11,235	81,522	3.79	9,928
Total, 2020	**353,121**	**3.94**	**44,792**	**349,533**	**3.75**	**42,094**	**330,855**	**3.99**	**42,406**
2021/Q1	107,671	2.86	9,895	105,049	2.72	9,196	95,570	2.97	9,123
2021/Q2	95,954	3.21	9,906	100,202	2.78	8,964	84,631	3.39	9,223
2021/Q3	104,588	3.71	12,485	103,150	3.42	11,336	100,792	3.94	12,771
2021/Q4	100,479	3.70	11,962	101,257	3.58	11,653	96,016	4.04	12,477
Total, 2021	**408,692**	**3.37**	**44,247**	**409,658**	**3.12**	**41,149**	**377,009**	**3.60**	**43,595**

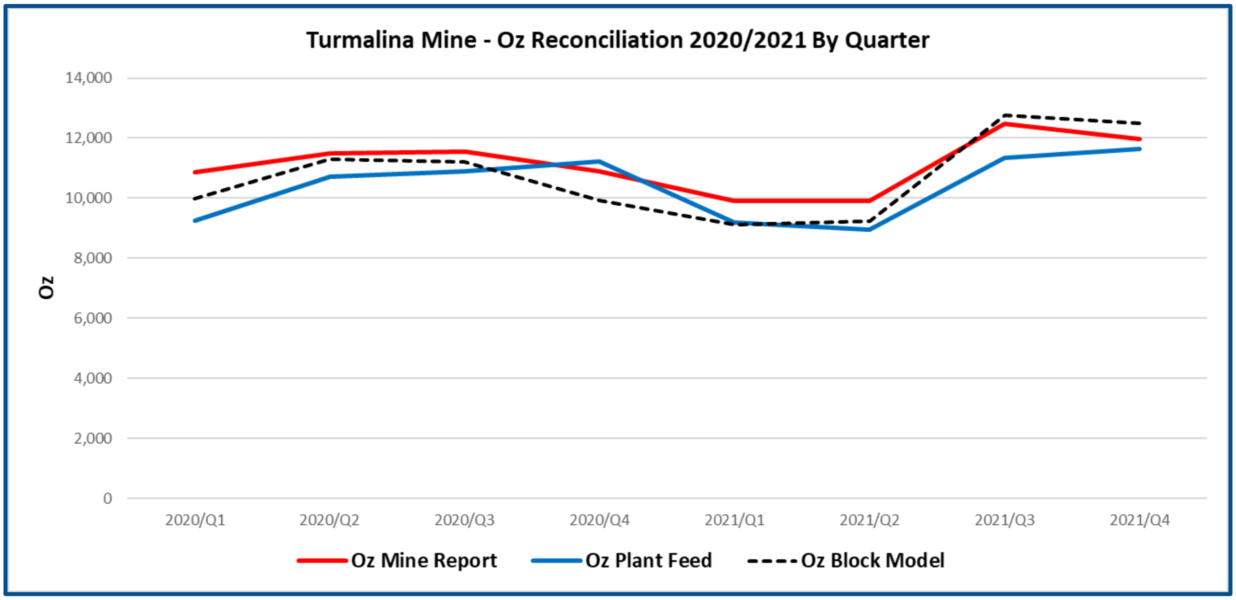


Figure 14-16: 2020 and 2021 Reconciliation Information by Quarter, Contained Ounces

The monthly tonnage and grade figures derived from the year-end 2021 block model utilized the as-mined excavation solids models for the development and stopes completed in 2020 and 2021 to constrain the reports. The mined out volumes were created using data collected using a Cavity Monitoring Survey (CMS) and/or Total Station survey equipment. In a small number of cases, the shape and size of the excavated volumes could not be surveyed due to equipment failures, timing, or safety issues. This is likely the main reason why the model tonnes are less than the mined tonnages in Table 14-14. The SLR QP recommends that when no CMS model is available for a given excavation volume, the design shape for the excavations in question be used as a proxy when preparing the reconciliation reports.

The grade of all blocks that are located outside of the mineralized wireframe models (ostensibly the waste materials) has been set to a value of zero for the 2021 block model. This approach will then result in the inclusion of all waste tonnes (both planned and unplanned dilution) along with the recovered ore tonnes. The data then represent the fully diluted, recovered tonnes and grade as predicted from the block model and so will be appropriate for comparison with plant feed grade. The quarterly F2 reconciliation results are presented in Figure 14-17.

In general terms, the SLR QP observes that there is good agreement between the Turmalina Plant data and the block model for the 2020 and 2021 period. The SLR QP is of the opinion that this agreement suggests that the sampling strategies, assaying methods, and estimation procedures currently used at the mine to prepare the grade block models are producing reasonable predictions of the tonnages, grades, and contained metal being received at the Turmalina Plant.

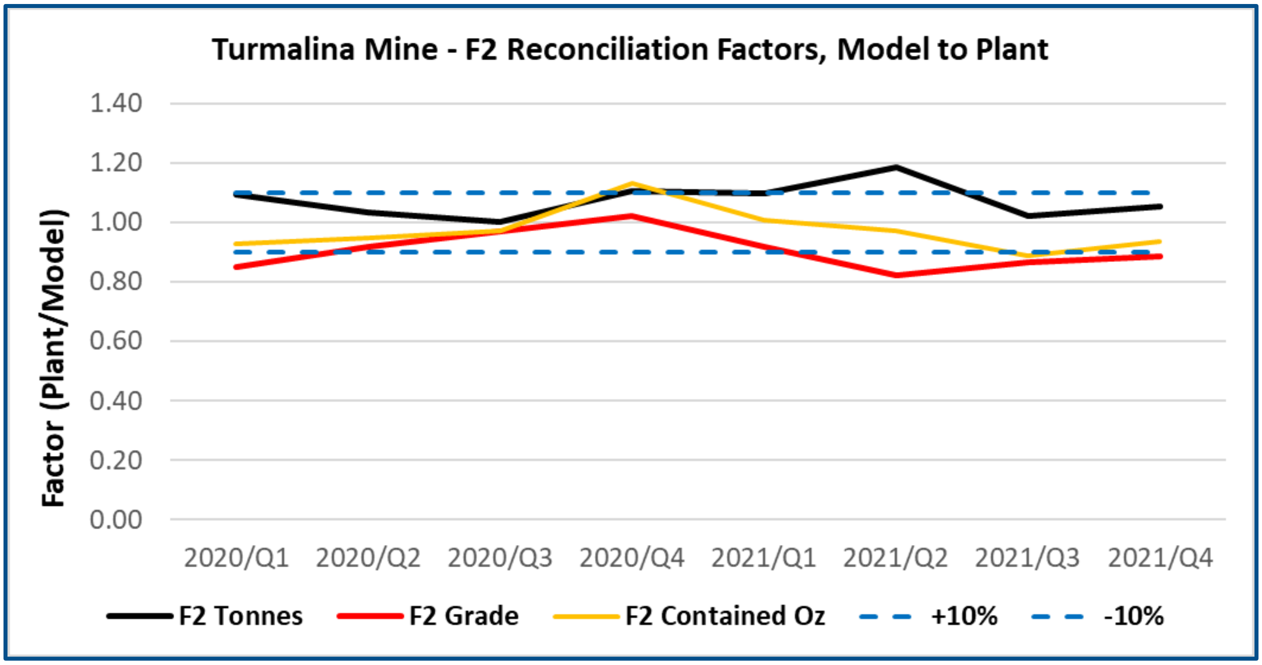


Figure 14-17: Quarterly F2 Reconciliation Factors, Model to Plant

The reconciliation information presented above utilizes the grade block model that was prepared using the drill hole and channel sample information that was available as of December 31, 2021. The estimated grades are then compared to the production information for the previous periods, thus allowing an analysis of the effectiveness of the sampling, assaying, and estimation protocols.

The SLR QP recommends that Jaguar reconciles the Mineral Resource estimate with on going production in 2022 to gain an understanding of the forward looking reliability of the estimate. This will provide greater insight into the performance of the estimation strategy and parameters, and the reliability of the Mineral Reserve estimate that stems from this model.

14.2.12 Mineral Resource Classification Criteria

The Mineral Resources in this Technical Report were estimated in accordance with the definitions contained in CIM (2014).

The mineralized material for each wireframe was classified into the Measured, Indicated, or Inferred Mineral Resource category based on the search ellipse ranges obtained from the variography study, the continuity of the gold mineralization, the density of samples, and the presence of underground access.

On the basis of these criteria, Measured Mineral Resources comprise material that has been estimated using Pass #1 and that is located between developed levels. Indicated Mineral Resources comprises material that has been estimated using Pass #2, and Inferred Mineral Resources comprise material that has been estimated using Pass #3. Clipping polygons were used to smooth the final classification and ensure continuity and consistency of the classified blocks.

14.2.13 Cut-Off Grade

A cut-off grade of 1.49 g/t Au is used for reporting of Mineral Resources at the Turmalina deposit. This cut-off grade was calculated using a gold price of US$1,800/oz, average gold recovery of 87%, and 2021 long term costs for mining, processing, general and administration, taxes, and refining of US$74.80/t. Gold prices are based on consensus, long term forecasts from banks, financial institutions, and other sources.

Only those Mineral Resources that displayed spatial continuity were reported within a potentially mineable shape created in Deswik software. Constraining volumes (potentially mineable shapes) for the reporting of Mineral Resources were created using data from the current operations.

The parameters used in Deswik Stope Optimizer are:

- 20 m high by 5 m on strike
- Thickness is variable with a minimum width of 3.5 m
- Shapes were created using the resource cut-off grade
- Minimum dip of 45°

The SLR QP recommends that Deswik parameters be adjusted to better align to the local strike and dip variations of the resource wireframes. This would allow the inclusion of additional material to the Mineral Resource.

For the 2021 Mineral Resource estimate, Jaguar has used a nominal cut-off grade of 0.50 g/t Au to prepare the interpreted outlines of the mineralized domains, which is below either the economic or incremental cut-off grades. The SLR QP recommends that Jaguar use a stope incremental cut-off grade in future updates of the Mineral Resource estimate to better reflect the grades of the material that may be mined and processed.

14.2.14 Mineral Resource Estimate

The Mineral Resources are inclusive of Mineral Reserves. The Mineral Reserve reporting panels include some areas of internal dilution that was excluded from the Mineral Resource reporting panels. This material has been added to the Mineral Resource and accounts for less than 5% of the total Mineral Resource. The final Mineral Resource classification was applied to material within mineable stope panels, on a majority basis.

The Mineral Resources are presented in Table 14-15 and are illustrated in Figure 14-18. It is important to note that the Mineral Resources include remnant material for those areas in the upper portions of the mine where potentially economic grade material has been left behind. These areas were scrutinized and evaluated for their potential of being recoverable prior to being categorized as Mineral Resources.

Table 14-15: Summary of Mineral Resources as of December 31, 2021 – Turmalina Deposit
Jaguar Mining Inc. – Turmalina Mine Complex

Category	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
	Orebody A		
Measured	989	5.85	186
Indicated	263	3.49	30
Sub-total M+I	1,251	5.36	216
Inferred	211	3.73	25

Category	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
		Orebody B	
Measured	264	3.19	27
Indicated	337	4.11	44
Sub-total M+I	601	3.70	72
Inferred	267	4.10	35
		Orebody C	
Measured	530	3.41	58
Indicated	1,600	3.49	180
Sub-total M+I	2,130	3.47	238
Inferred	1,697	2.93	160
		Total Turmalina Deposit	
Total, Measured	1,783	4.73	271
Total, Indicated	2,199	3.59	254
Total M+I	3,982	4.10	525
Total Inferred	2,176	3.15	221

Notes:

1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 1.49 g/t Au for the Turmalina deposit.
4. Mineral Resources at the Turmalina deposit include all drill hole and channel sample data as of December 12, 2021, and are depleted using mined out volumes as of December 31, 2021.
5. The effective date of the Mineral Resources is December 31, 2021. Mineral Resources are estimated using a long term gold price of US$1,800/oz Au.
6. Mineral Resources are estimated using an average long term foreign exchange rate of R$5.50 : US$1.00.
7. A minimum mining width of approximately two metres was used.
8. Bulk density is 2.83 t/m^3 for Orebodies A and B and 2.91 t/m^3 for Orebody C at the Turmalina deposit.
9. Gold grades are estimated by the OK interpolation algorithm using capped composite samples.
10. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
11. Numbers may not add due to rounding.

The SLR QP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other factors that could materially affect the Mineral Resource estimates.

It is the SLR QP's opinion that the Turmalina deposit Mineral Resource estimate was prepared in a professional and diligent manner by qualified professionals and that the estimate complies with CIM (2014).

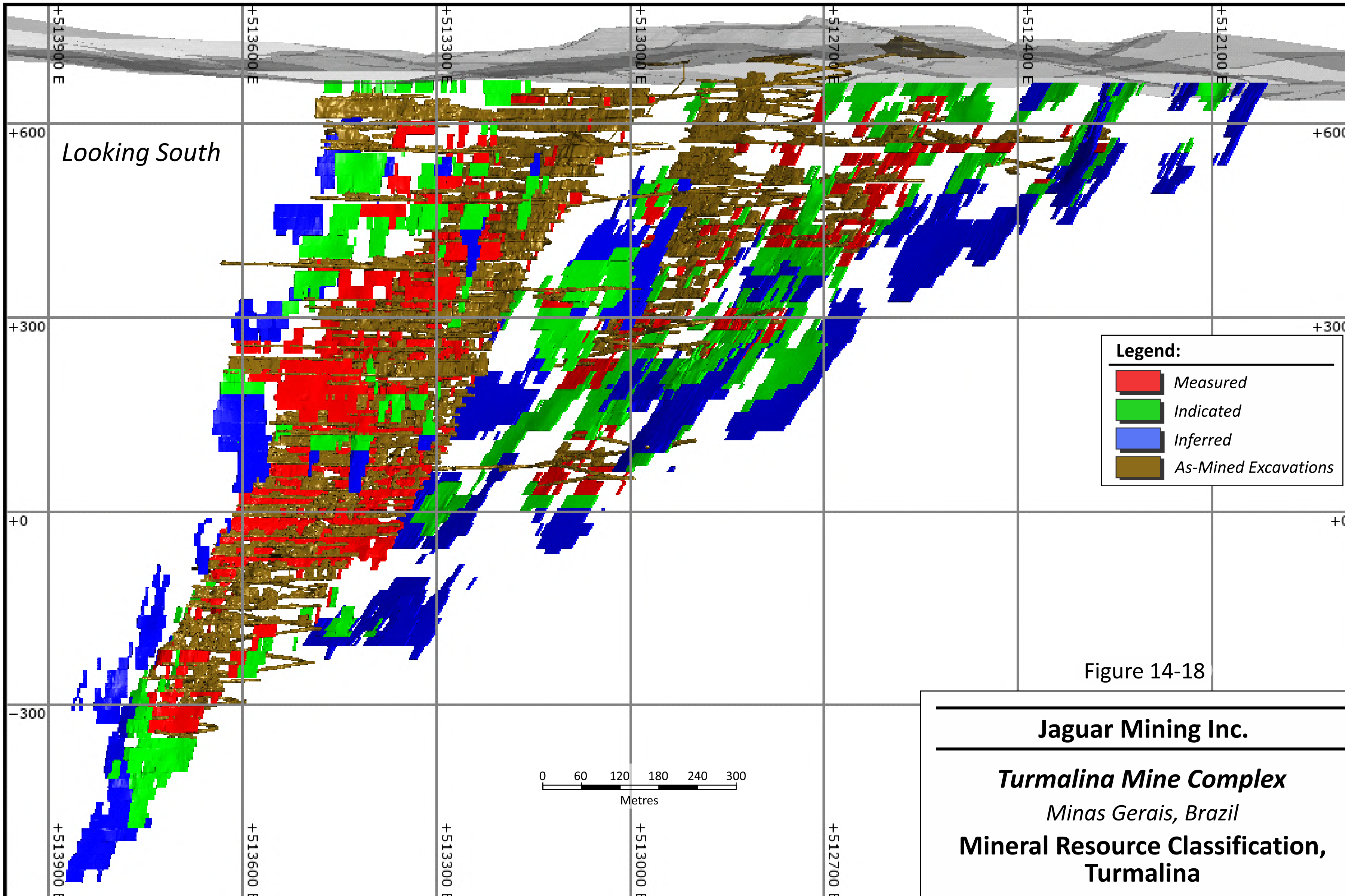


Figure 14-18

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Mineral Resource Classification, Turmalina

March 2022

Source: SLR, 2022.

14.3 Faina Deposit

An updated Mineral Resource estimate for the Faina deposit was prepared in early 2015. A detailed description of the data and procedures to prepare the Mineral Resource estimate has been presented in RPA (2015). A summary of the salient items relating to that Mineral Resource estimate is presented below.

14.3.1 Resource Database

The drill hole database for the Faina deposit includes surface and underground drill holes along with surface trench and underground channel samples collected from the open pit and underground excavations, respectively. The drill hole and trench/channel sample data include both historical-based samples collected by MMV, along with more recently completed drill holes and samples collected by Jaguar. In total, 3,992 diamond drill hole, chip, and trench samples were included in the drill hole database, along with a total of 47,667 assay records. The locations of the drill holes have been presented in RPA (2015).

14.3.2 Mineralization Wireframes

The interpreted 3D wireframe models of the gold mineralization have been created using the assay values from surface and underground drill holes, channel sample data as available, and the detailed geological mapping information contained on the historical plan maps of the underground excavations. Wireframe models of the gold distribution were created using the Leapfrog Geo version 2.0.2 software package. The wireframe limits were drawn using a cut-off grade of 0.50 g/t Au and a nominal minimum width of 2.0 m.

A total of 39 individual wireframe models were created along a strike length of approximately 750 m and to a vertical depth of approximately 500 m from surface. In general, the wireframe models display a general northwest strike and plunge to the northeast at approximately 40°.

Wireframe surfaces were also created for oxidized and transitional weathering volumes using all available drill hole, channel, and trench sample information.

14.3.3 Topography and Excavation Models

Two topography surfaces have been created that provide coverage over the area of the Faina deposit. The first surface represents the limit of open pit excavation, and was used to properly code the block model with the mined out volume. The second surface represents the current topography surface and accounts for the volume in the southeast portion of the mined out pit that was filled in with backfill material. The depth of the backfilled area is estimated at approximately 20 m.

A solid model of the underground excavation volume was created using existing centre-line survey data and a general arched cross section profile of 3 m x 3 m.

14.3.4 Sample Statistics, Grade Capping, and Composites

The mineralization wireframe models were used to code the drill hole database and identify the resource-related samples. These samples were extracted from the database into their respective domains, and then subjected to statistical analyses by means of histograms, probability plots, capping curves, and decile analyses. A total of 12,419 samples were contained within the mineralized wireframes.

On the basis of its review of the assay statistics, the SLR QP is of the opinion that a capping value of 30 g/t Au for channel samples and 25 g/t Au for drill hole samples is appropriate for each of the three domains at Faina – NW, Central, and SE.

The selection of an appropriate composite length began with examination of the descriptive statistics of the raw assay samples and preparation of frequency histograms. Consideration was also given to the size of the blocks in the model. On the basis of the available information, the SLR QP is of the opinion that a composite length of one metre for all samples is reasonable. All samples contained within the mineralized wireframes were composited to a nominal one metre length using the best-fit function of the MineSight version 7.60 software package (MineSight).

14.3.5 Variography

Jaguar carried out an analysis of the spatial continuity by constructing separate omnidirectional variograms using the composites for each of the three domains, with the objective of determining an appropriate value for the global nugget (C0) using MineSight. The analysis proceeded with the evaluation of any anisotropies that may be present in the data which resulted in successful variograms with reasonably good model fits for the down-plunge direction. Due to the spatial complexities inherent in the mineralized wireframe models, poor model fits were obtained for the along-strike and across-dip directions. A summary of the variography and interpolation parameters for the Faina deposit is presented in Table 14-16.

Table 14-16: Summary of Variography and Interpolation Parameters – Faina Deposit
Jaguar Mining Inc. – Turmalina Mine Complex

Item	NW Domain	Central Domain	SE Domain
Nugget (C0)	5.0	6.0	4.0
Sill, Major Axis (C1)	5.45 (40 m)	4.28 (30 m)	6.62 (65 m)
Model Type	Spherical	Spherical	Spherical
Orientation*	070/-50/15	60/-55/-45 & 60/-55/60	60/-50/-25
Anisotropy Ratio (Major/Semi-Major)	2.67	1.88	1.91
Anisotropy Ratio (Major/Minor)	6.67	6.0	3.61
Minimum Number of Samples	3	3	3
Maximum Number of Samples	8	8	8
Maximum Number of Samples per Hole	2	2	2
Maximum Number of Samples per Quadrant	2	2	2

14.3.6 Block Model Construction

The block model was constructed using MineSight and comprised an array of 2 m x 2 m x 2 m sized blocks using a partial percentage attribute. The model is oriented parallel to the coordinate grid system (i.e., no rotation or tilt). The selection of the block size for this model was based upon the block size employed at the mine.

Gold grades were estimated into the blocks by means of ID^2, ID^3, OK, and NN interpolation algorithms. A total of four interpolation passes were carried out using distances derived from the variography results and the search ellipse parameters presented above. Pass #1 used search ellipses that were one-half of the variogram ranges, Pass #2 used search ellipses with the variogram ranges as defined, Pass #3 used twice the variogram ranges, and Pass #4 used four times the variogram ranges. A single search ellipse orientation was used for the NW Domain and SE Domain, however, two search ellipse orientations were used for the Central Domain due to the complex spatial geometry in this area. The number of samples per quadrant was relaxed from two to one for Passes #3 and #4, and the maximum number of composites per hole was relaxed from two to one for Pass #4.

Hard domain boundaries were used along the contacts of each of the 39 individual mineralized domain models. Only data contained within the respective individual wireframe model were allowed to be used to estimate the grades of the blocks within the wireframe in question, and only those blocks within the wireframe limits were allowed to receive grade estimates.

14.3.7 Cut-Off Grade

The conceptual operational scenarios considered during preparation of previous Mineral Resource estimates envisioned that the fresh, unoxidized mineralization from the Faina deposit would be excavated on a satellite deposit basis and transported by truck to the existing Turmalina Plant for processing. Preliminary metallurgical tests have been completed on samples of fresh, unoxidized mineralization from the Faina deposit from that conceptual perspective. They have yielded unacceptably low recoveries when the material is considered as potential feed to the existing Turmalina Plant, and it has been concluded that the mineralization at the Faina deposit is refractory. While the arsenical nature of the mineralization at Faina is suspected to play a role in the poor recoveries, the SLR QP is of the opinion that the test work completed to date has not definitively supported this conclusion.

An alternative conceptual operational scenario was developed for the 2015 Mineral Resources in which the mineralized material will be excavated by means of underground mining methods and transported to the Turmalina Plant for processing. A gold-rich flotation concentrate is envisioned to be generated after appropriate upgrades have been made to the existing plant. The gold-rich flotation concentrate would then be shipped or sold to a domestic source for recovery of the gold.

Input parameters to the estimate of an appropriate reporting cut-off grade considered this revised conceptual operating scenario along with the potential mining methods that are suitable for the narrow widths, short strike-length lenses, and highly convoluted nature of the mineralized wireframes at the Faina deposit. Consideration was also given to the actual costs incurred at the Turmalina Plant where appropriate.

A cut-off grade of 3.8 g/t Au is used for reporting of Mineral Resources. This cut-off grade was calculated using a gold price of US$1,400/oz, average gold recovery of 85% to flotation concentrate, 2014 actual cost data for the Turmalina Mine, along with estimated transportation and treatment charges. The SLR QP is of the opinion that the stated cut-off grade remains reasonable considering the relatively stable Mineral Resource cut-off grades at the Turmalina Mine between 2014 and 2018.

14.3.8 Mineral Resource Estimate

At the Faina deposit, the Mineral Resources are dominated by fresh, unoxidized material, but also contain a small proportion of oxide and transition hosted weathered material.

At a cut-off grade of 3.8 g/t Au, the Mineral Resources at the Faina deposit total 262,000 t at an average grade of 6.89 g/t Au containing 57,500 oz Au in the Measured and Indicated Mineral Resource category and 1.54 Mt at an average grade of 7.3 g/t Au containing 360,200 oz Au in the Inferred Mineral Resource category (Table 14-17). The SLR QP recommends that the Mineral Resource estimate for the Faina deposit be re-evaluated if any material changes occur to the values of the cut-off grade input parameters.

No Mineral Reserves are present at the Faina deposit.

Table 14-17: Summary of Mineral Resources as of December 31, 2014 – Faina Deposit
Jaguar Mining Inc. – Turmalina Mine Complex

Category	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
	Oxidized		
Measured	11	6.81	2
Indicated	7	6.48	2
Sub-total M+I	18	6.68	4
Inferred	3	5.65	1
	Transition		
Measured	5	6.65	1
Indicated	3	6.20	1
Sub-total M+I	8	6.48	2
Inferred	2	6.30	0
	Fresh		
Measured	56	7.51	14
Indicated	179	6.85	39
Sub-total M+I	235	6.88	52
Inferred	1,537	7.27	359
	Total: Oxidized, Transition and Fresh		
Measured	72	7.39	17
Indicated	189	6.66	42
Sub-total M+I	261	6.87	58
Inferred	1,542	7.26	360

Notes:

1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are estimated at a cut-off grade of 3.8 g/t Au.

3. Mineral Resources are estimated using a long term gold price of US$1,400/oz Au.
4. Mineral Resources are estimated using an average long term foreign exchange rate of R$2.50 : US$1.00.
5. A minimum mining width of two metres was used.
6. Bulk density is 1.70 t/m^3 for oxidized material, 2.25 t/m^3 for transition, and 2.85 t/m^3 for fresh, unweathered material.
7. Gold grades are estimated by the ID^3 interpolation algorithm.
8. No Mineral Reserves are reported for the Faina deposit.
9. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
10. Numbers may not add due to rounding.

The SLR QP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other factors that could materially affect the Mineral Resource estimates.

14.4 Pontal Deposits

An updated Mineral Resource estimate for the Pontal deposits was prepared in early 2015. A detailed description of the data and procedures to prepare the Mineral Resource estimate has been presented in RPA (2015). A summary of the salient items relating to that Mineral Resource estimate is presented below.

14.4.1 Resource Database

The drill hole database for the Pontal deposits includes surface and underground drill holes along with surface trench samples and underground channel samples. The drill hole and trench/channel sample data include both historical-based samples collected by MMV and samples more recently collected by Jaguar. In total, 3,590 drill hole, chip, and trench samples were included in the drill hole database, along with a total of 17,043 assay records.

14.4.2 Mineralization Wireframes

The interpreted 3D wireframe models of the gold mineralization have been created using the assay values from surface and underground drill holes, trench, and channel sample data, as available, and the detailed geological mapping information contained on the historical plan maps of the underground excavations. The gold values are hosted in two principal deposits known as LB1 and LB2.

Wireframe models of the gold distribution were updated using MineSight. The wireframe limits were drawn using a cut-off grade of 0.50 g/t Au and a nominal minimum width of 2.0 m. The wireframe models were clipped to the as-mined surface. A total of 16 individual wireframe models were created, including seven wireframes for the LB1 deposit and nine wireframes for the LB2 deposit.

In general, the LB1 wireframe models measure approximately 250 m x 250 m in plan view and continue downwards to a vertical depth of approximately 300 m from surface. The mineralization at the LB1 deposit has been traced by drilling along a dip of approximately -60° to the east.

The mineralization wireframes at the LB2 deposit display a general northwesterly strike of approximately 335° and have been traced by drill hole and trench sampling along a strike length of approximately 300 m. The wireframes generally dip at approximately -45° to the northeast and extend to a depth of approximately 100 m from surface.

Wireframe surfaces were also created for oxidized and transitional weathering volumes using all available drill hole, channel, and trench sample information.

14.4.3 Topography and Excavation Models

Two topography surfaces were created that covered the local area of each of the two deposits using contour lines from available topography maps along with local spot heights derived from the locations of any drill hole or trench sample data.

An approximation of the underground excavations was created by digitizing the outlines in plan view from historical underground mapping and sampling programs carried out at the LB1 deposit. The digitized plan view strings were projected upwards by a constant distance of 3.0 m to create the solid model of the underground excavations. In total, two levels were excavated – the upper level was excavated at a toe elevation of approximately 609 m and the lower level was excavated at a toe elevation of approximately 603 m.

14.4.4 Sample Statistics, Grade Capping, and Composites

The mineralization wireframe models were used to code the drill hole database and identify the resource-related samples. These samples were extracted from the database into their respective domains, and then subjected to statistical analyses by means of histograms, probability plots, capping curves, and decile analyses. A total of 6,569 samples were contained within the LB1 mineralized wireframes and a total of 1,308 samples were contained within the LB2 mineralized wireframes. The sample statistics are summarized in Table 14-18.

Table 14-18: Descriptive Statistics of the Raw Gold Assays – Pontal Deposits
Jaguar Mining Inc. – Turmalina Mine Complex

Item	LB1 Deposit		LB2 Deposit	
	Uncapped	Capped	Uncapped	Capped
Length-Weighted Mean (g/t Au)	1.56	1.47	1.32	1.28
Median (g/t Au)	0.88	0.88	0.71	0.71
Standard Deviation (g/t Au)	5.68	2.62	2.24	1.56
Coefficient of Variation	3.64	1.79	1.7	1.22
Sample Variance (g/t Au)	32.31	6.87	5.03	2.44
Minimum (g/t Au)	0.01	0.01	0.01	0.01
Maximum (g/t Au)	352.00	30.00	57.60	10.00
Count	6,569	6,569	1,308	1,308

Based on its review of the assay statistics, the SLR QP is of the opinion that a capping value of 30 g/t Au is appropriate for the LB1 wireframes, and a capping value of 10 g/t Au is appropriate for the LB2 wireframes.

14.4.5 Compositing Methods

The selection of an appropriate composite length began with examination of the descriptive statistics of the raw assay samples and preparation of frequency histograms. Consideration was also given to the size of the blocks in the model. Based on the available information, the SLR QP is of the opinion that a composite length of one metre for all samples is reasonable. All samples contained within the mineralized wireframes were composited to a nominal one metre length and residuals less than 0.5 m were added to the previous interval. The composite descriptive statistics are provided in Table 14-19.

Table 14-19: Descriptive Statistics of the Raw Gold Composites – Pontal Deposits
Jaguar Mining Inc. – Turmalina Mine Complex

Item	LB1 Deposit		LB2 Deposit	
	Uncapped	Capped	Uncapped	Capped
Length-Weighted Mean (g/t Au)	1.65	1.56	1.38	1.34
Median (g/t Au)	0.85	0.85	0.80	0.80
Standard Deviation (g/t Au)	5.98	2.47	2.04	1.46
Coefficient of Variation	3.62	1.59	1.47	1.09
Sample Variance (g/t Au)	35.81	6.11	4.15	2.13
Minimum (g/t Au)	0.01	0.01	0.01	0.01
Maximum (g/t Au)	352.00	30.00	51.26	10.00
Count	5,511	5,511	1,304	1,304

14.4.6 Variography

Jaguar verified the analysis of the spatial continuity of the mineralization contained within the LB1 wireframe models as presented in Machado (2011) using the variography package contained in the SgeMS software package. Its work resulted in construction of a successful omnidirectional variogram using the composite data. The analysis proceeded with the evaluation of any anisotropies that may be present in the data which resulted in a successful variogram with reasonably good model fits for the down-plunge direction.

Unfortunately, no successful model fits were possible for the LB2 deposit due to the lack of sufficient sample pairs.

A summary of the variography and interpolation parameters for the two deposits is presented in Table 14-20.

Table 14-20: Summary of Variography and Interpolation Parameters – Pontal Deposits
Jaguar Mining Inc. – Turmalina Mine Complex

Item	LB1 Deposit	LB2 Deposit
Nugget (C0)	3.0	3.0
Sill, Major Axis (C1)	2.9 (90 m)	2.9 (30 m)
Model Type	Spherical	Spherical
Orientation*	115/-60/-15	0/0/0
Anisotropy Ratio (Major/Semi-Major)	2.37	1.0
Anisotropy Ratio (Major/Minor)	9.0	3.0
Minimum Number of Samples	3	3

Item	LB1 Deposit	LB2 Deposit
Maximum Number of Samples	8	8
Maximum Number of Samples per Hole	2	2
Maximum Number of Samples per Quadrant	2	2

14.4.7 Block Model Construction

The block model was constructed using MineSight and comprised an array of 2 m x 2 m x 2 m sized blocks using a partial percentage attribute. The selection of the block size for this model was based upon the block size employed at the mine.

Gold grades were estimated into the blocks by means of ID^2, ID^3, OK, and NN interpolation algorithms. A total of four interpolation passes were carried out using distances derived from the variography results and the search ellipse parameters presented above. Pass #1 used search ellipses that were one-half of the variogram ranges, Pass #2 used search ellipses with the variogram ranges as defined, Pass #3 used twice the variogram ranges, and Pass #4 used four times the variogram ranges. The number of samples per quadrant was relaxed from two to one for Passes #3 and #4, and the maximum number of composites per hole was relaxed from two to one for Pass #4.

In general, "hard" domain boundaries were used along the contacts of each of the 16 individual mineralized domain models. Only data contained within the respective individual wireframe model were allowed to be used to estimate the grades of the blocks within the wireframe in question, and only those blocks within the wireframe limits were allowed to receive grade estimates.

14.4.8 Cut-Off Grade

The conceptual operational scenarios considered during preparation of previous Mineral Resource estimates envisioned that the fresh, unoxidized mineralization from the Pontal deposits would be excavated on a satellite deposit basis and transported by truck to the existing Turmalina Plant for processing. Preliminary metallurgical tests have been completed on samples of fresh, unoxidized mineralization from the Pontal deposits from that conceptual perspective. They have yielded unacceptably low recoveries when the material is considered as potential feed to the existing Turmalina Plant, and it has been concluded that the mineralization at the Pontal deposits is refractory. While the arsenical nature of the mineralization at Pontal is suspected to play a role in the poor recoveries, the SLR QP is of the opinion that the test work completed to date has not definitively supported this conclusion.

An alternative conceptual operational scenario was developed for the 2015 Mineral Resources in which the mineralized material will be excavated by means of underground mining methods and transported to the Turmalina Plant for processing. A gold-rich flotation concentrate is envisioned to be generated after appropriate upgrades have been made to the existing plant. The gold-rich flotation concentrate would then be shipped or sold to a domestic source for recovery of the gold.

Input parameters to the estimate of an appropriate reporting cut-off grade considered this revised conceptual operating scenario along with the potential mining methods that are suitable for the mineralized wireframes at the Pontal deposits. Consideration was also given to the actual costs incurred at the Turmalina Plant where appropriate.

A cut-off grade of 2.9 g/t Au is used for reporting of Mineral Resources. This cut-off grade was calculated using a gold price of US$1,400/oz, average gold recovery of 87% to flotation concentrate, 2014 actual cost data for the Turmalina Mine, along with estimated transportation and treatment charges. The SLR QP is of the opinion that the stated cut-off grade remains reasonable considering the relatively stable Mineral Resource cut-off grades at the Turmalina Mine between 2014 and 2018.

14.4.9 Mineral Resource Estimate

The Mineral Resources are dominated by fresh, unoxidized material, but also contain a small proportion of oxide and transition hosted weathered material.

At a cut-off grade of 2.9 g/t Au, the Mineral Resources at the Pontal deposits total 410,000 t at an average grade of 4.72 g/t Au containing 62,200 oz Au in the Measured and Indicated Resource category and 130,000 t at an average grade of 5.0 g/t Au containing 21,000 oz Au in the Inferred Mineral Resource category (Table 14-21). The SLR QP recommends that the Mineral Resource estimate for the Pontal deposits be re-evaluated if any material changes occur to the values of the cut-off grade input parameters.

No Mineral Reserves are present at the Pontal deposits.

Table 14-21: Summary of Mineral Resources as of December 31, 2014 – Pontal Deposits
Jaguar Mining Inc. – Turmalina Mine Complex

Category	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
Oxide			
Measured	30	4.13	4
Indicated	1	3.41	0
Sub-total M+I	31	4.11	4
Inferred	9	6.24	2
Transition			
Measured	9	4.33	1
Indicated	2	3.34	0
Sub-total M+I	11	4.17	1
Inferred	2	7.28	1
Fresh			
Measured	212	5.16	35
Indicated	157	4.29	22
Sub-total M+I	369	4.79	57
Inferred	119	4.89	19
Total: Oxidized, Transition and Fresh			
Measured	251	5.00	40
Indicated	159	4.28	22
Sub-total M+I	410	4.72	62
Inferred	130	5.03	21

Notes:

1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are estimated at a cut-off grade of 2.9 g/t Au.
3. Mineral Resources are estimated using a long term gold price of US$1,400/oz Au.
4. Mineral Resources are estimated using an average long term foreign exchange rate of R$2.50 : US$1.00.
5. A minimum mining width of approximately two metres was used.

6. Bulk density is 1.46 t/m^3 and 1.52 t/m^3 for oxidized material, 2.24 t/m^3 and 2.28 t/m^3 for transition, and 2.73 t/m^3 for fresh, unweathered material for LB1 and LB2 deposits, respectively.
7. Gold grades are estimated by the OK interpolation algorithm.
8. No Mineral Reserves are reported for the Pontal deposits.
9. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
10. Numbers may not add due to rounding.

The SLR QP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other factors that could materially affect the Mineral Resource estimates.

15.0 MINERAL RESERVE ESTIMATE

15.1 Summary

SLR has audited and accepted the Turmalina Mineral Reserves estimate prepared by Jaguar. Table 15-1 summarizes the Mineral Reserves as of December 31, 2021, based on a US$1,650/oz Au price for the Turmalina Mine. Mineral Reserves are based on the Mineral Resources, mine designs, and external factors.

Table 15-1: Mineral Reserve Estimate – December 31, 2021
Jaguar Mining Inc. – Turmalina Mine Complex

Orebody	Proven Reserves			Probable Reserves			Proven and Probable Reserves		
	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)	Tonnage (000 t)	Grade (g/t Au)	Contained Metal (000 oz Au)
Orebody A	448	4.81	69	155	3.25	16	603	4.41	85
Orebody B	183	2.88	17	138	3.83	17	321	3.29	34
Orebody C	381	3.27	40	872	3.45	97	1,253	3.40	137
Total	1,012	3.88	126	1,165	3.47	130	2,177	3.66	256

Notes:

1. CIM (2014) definitions were followed for Mineral Reserves.
2. Mineral Reserves were estimated at a break-even cut-off grade of 2.13 g/t Au and an incremental cut-off grade of 1.62 g/t Au.
3. Mineral Reserves are estimated using an average long term gold price of US$1,650/oz Au, and an exchange rate of R$5.50 : US$1.00.
4. A minimum mining width of 2.4 m was used.
5. Bulk density is 2.83 t/m^3 for Orebodies A and B and 2.91 t/m^3 for Orebody C at the Turmalina Mine.
6. Numbers may not add due to rounding.

The Mineral Reserves consist of selected portions of the Measured and Indicated Mineral Resources that are within designed stopes and associated development. Deswik Brazil was responsible for the mine design. It is the SLR QP's opinion that the Turmalina Mineral Reserves estimate complies with CIM (2014) definitions.

The SLR QP is not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

The Mineral Reserves are illustrated in Figure 15-1.

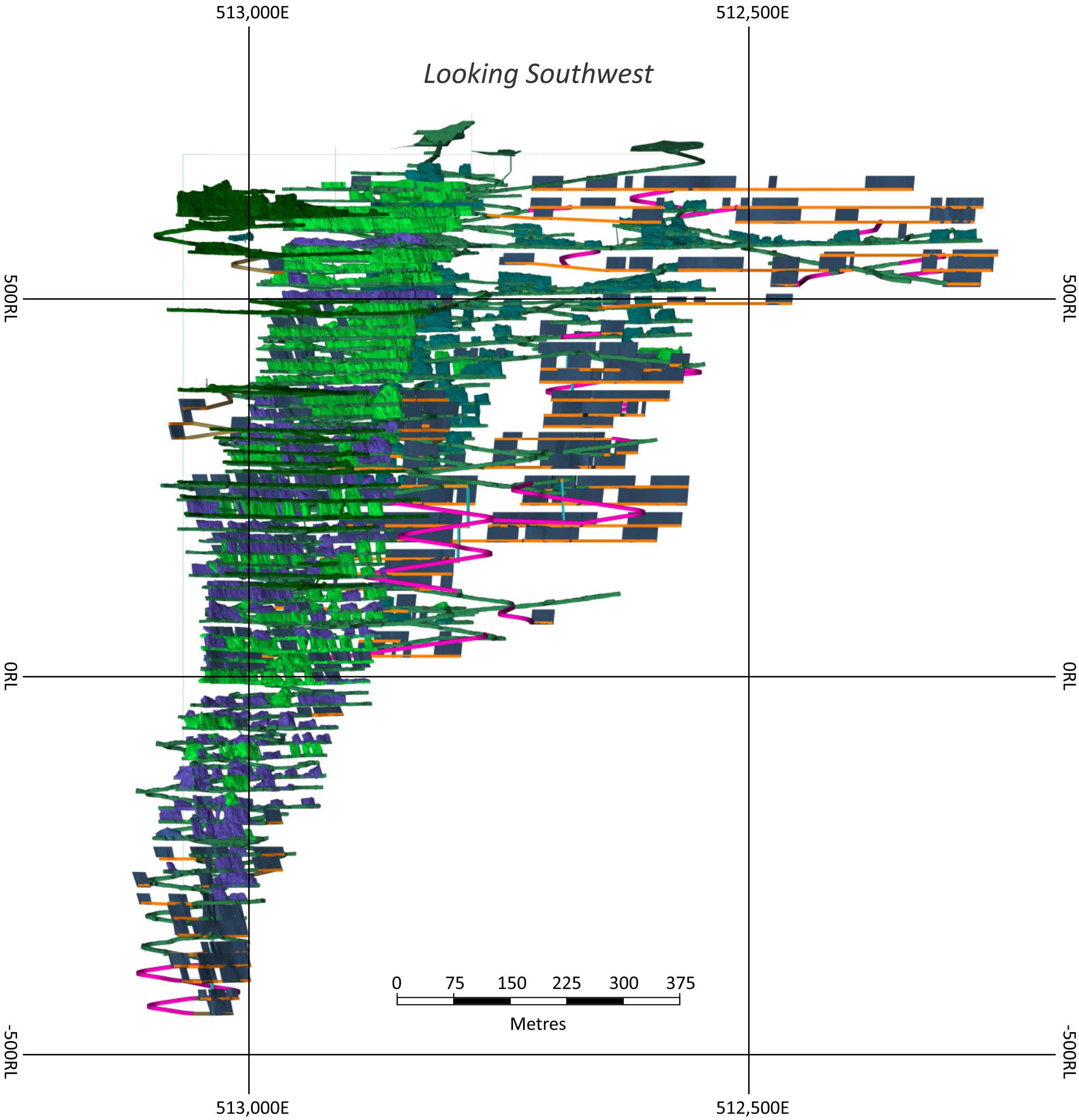


Figure 15-1

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Turmalina Mineral Reserves

March 2022

Source: SLR, 2022.

15.2 Dilution and Extraction

Dilution is addressed by extending 0.5 m for both hanging wall and footwall beyond the resource wireframe. Mining shapes are designed to be operationally achievable and respect minimum mining widths.

Total dilution included in Reserves averages 23%.

Extraction (mining recovery) is assumed to be 95% for most stopes, 90% for blind stopes and remnant areas, 50% for rib pillars, and 100% for development.

15.3 Cut-Off Grade

A break-even cut-off grade of 2.13 g/t Au was estimated for Mineral Reserves, using a gold price of US$1,650/oz, an average gold recovery of 87%, and 2022 cost data for the Turmalina Mine (Table 15-2) with an 8% increase. Gold prices used for Mineral Reserves are based on consensus, long term forecasts from banks, financial institutions, and other sources.

Cost data was converted into US dollars, using an exchange rate of R$5.50 : US$1.00. The majority of the Turmalina costs are denominated in R$. An operating cost of US$92/t was used for the cut-off grade calculation.

Table 15-2: Cut Off Grade Data
Jaguar Mining Inc. – Turmalina Mine Complex

Item	Value (US$)
Mining	40.73
Processing	27.02
G&A	6.75
Refinery	0.30
Royalties	6.20
Total	98.08

The minimum cut-off grade that defines boundary material which should be mined is the mine cut-off grade, and is estimated using the following formula:

$$COG = \frac{(Mining\ Cost\ +\ Processing\ Cost\ +\ G\&A\ Cost)}{(Au\ Recovery\ \times (Au\ Price - Selling\ Costs))}$$

Based on these numbers, a cut-off grade of 2.13 g/t was used for stope optimization. An incremental cut-off grade of 1.62 g/t Au was estimated using variable costs only, and is applied for development and stopes in which the infrastructure to access it is already in place. Although the cost data available from Turmalina is not easily categorized, unit mining costs vary between Orebody A and C, given significant differences between mining widths, production rates, ground conditions, and haul distances. The mill has excess production capacity, not otherwise put to use.

16.0 MINING METHODS

The Turmalina Mine consists of several zones grouped into three orebodies – Orebodies A, B, and C. Two satellite deposits, Faina and Pontal, are located along strike to the northwest. At present, the Turmalina Mine produces 1,100 tpd from Orebodies A and C.

Orebody A is folded and steeply east dipping, with a strike length of approximately 250 m to 300 m and an average thickness of six metres. Mineralization has been outlined to depths of 900 m below surface. The southern portion of Orebody A is composed of two parallel narrow veins. The northern portion of Orebody A is much the same as the southern portion, however, the two parallel zones nearly, or completely, merge, forming a wider zone (up to 10 m) known as the Principal Zone.

Orebody B includes three thinner, lower grade lenses parallel to Orebody A. Two of the lenses are located approximately 50 m to 75 m to the east in the hanging wall and are accessed by a series of crosscuts that are driven from Orebody A. The mineralization in this deposit has been outlined along a strike length of approximately 350 m to 400 m and to depths of 900 m below surface. Orebody B is narrow along its entire strike length. No mining is currently carried out in Orebody B.

Orebody C is a series of 26 lenses that are located to the southwest in the structural footwall of Orebody A and are generally of lower grade. They strike northwest and dip steeply to the northeast. Orebody C has replaced Orebody A as the Complex's principal production source. The mineralization in this deposit has been outlined along a strike length of approximately 800 m to 850 m and to depths of 700 m to 750 m below surface.

Figure 16-1 and Figure 16-2 present mining in Orebodies A and C, respectively. No mining is currently carried out in Orebody B.

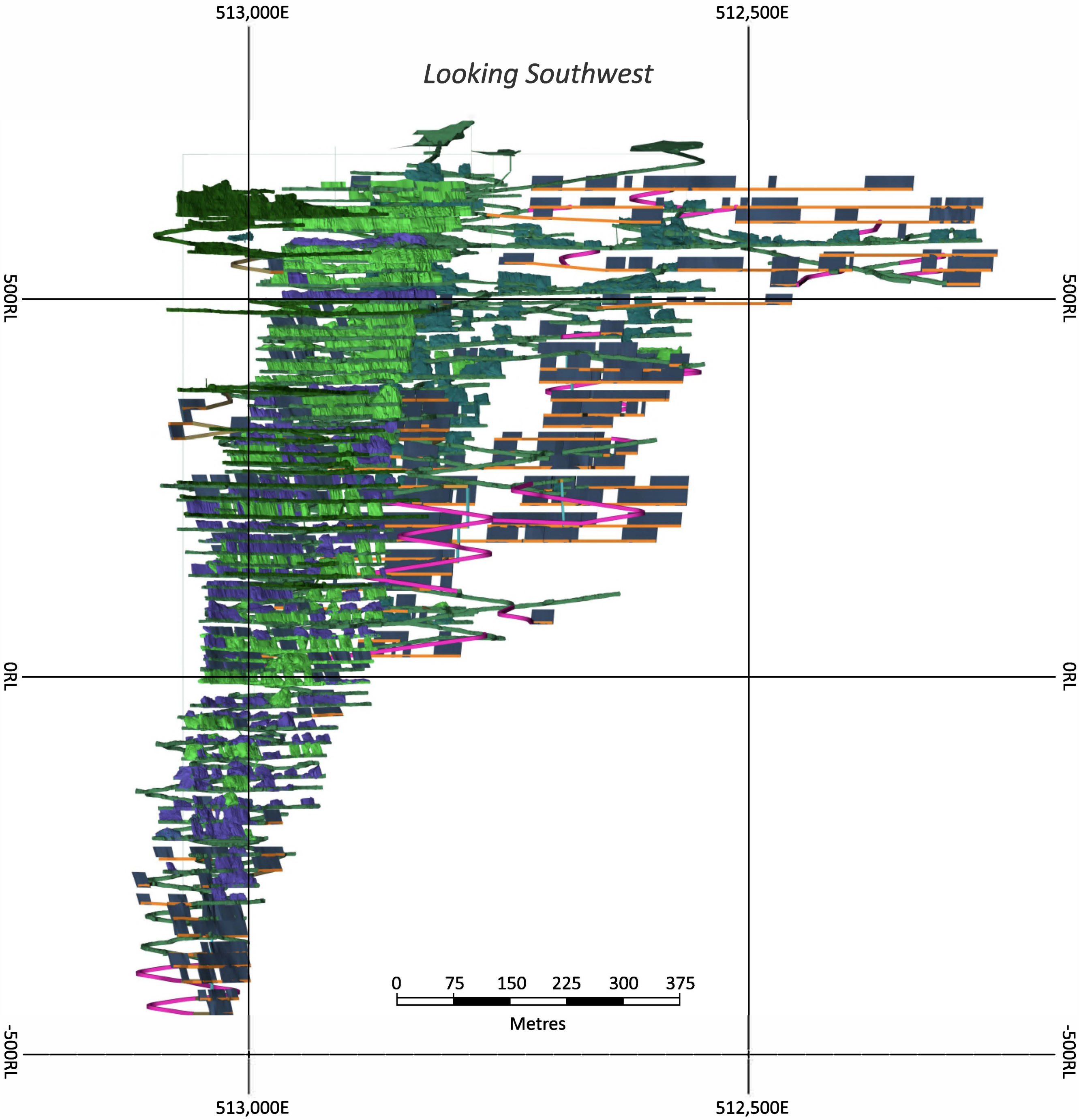


Figure 16-1

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Isometric View of Orebody A

March 2022

Source: SLR, 2022.

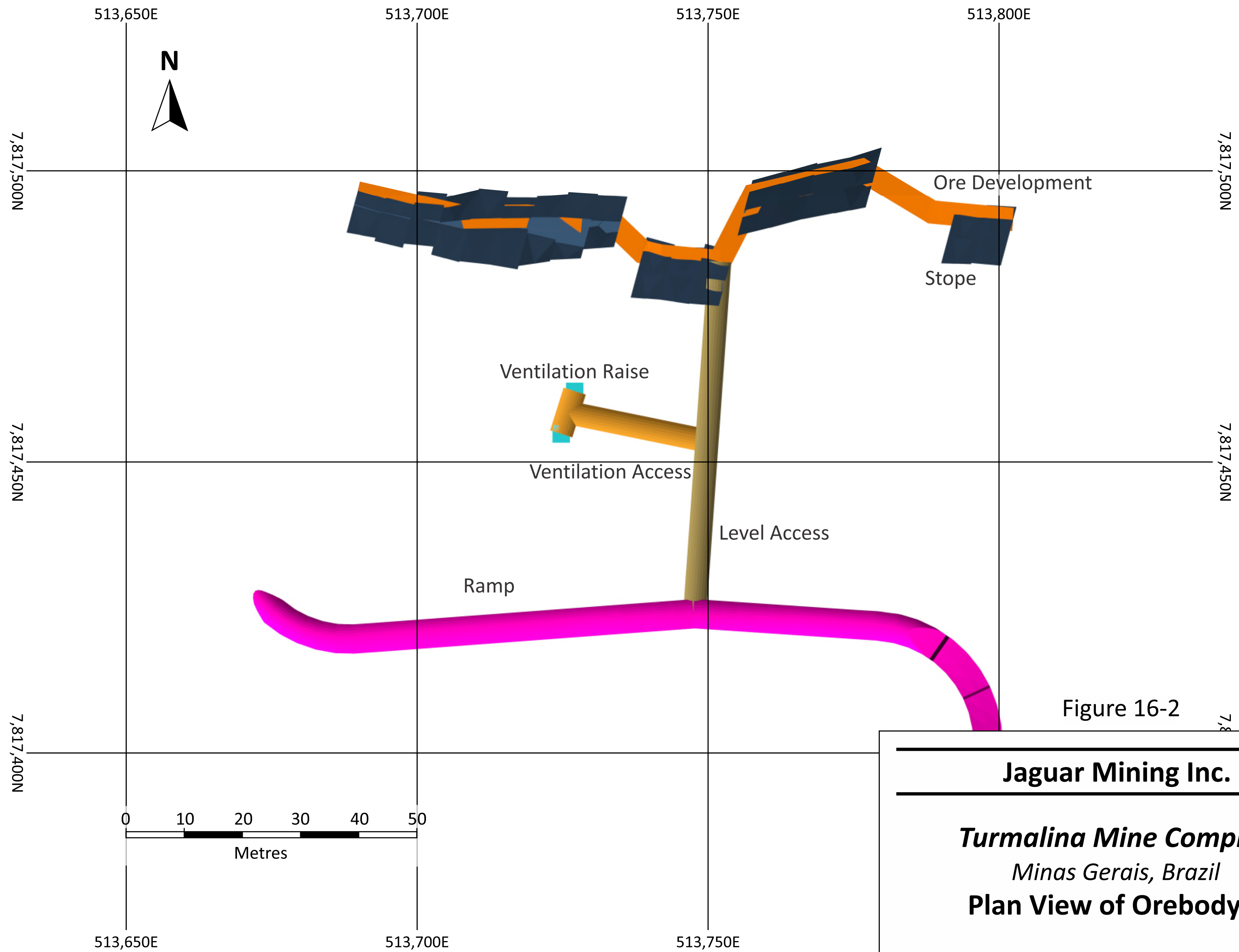


Figure 16-2

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Plan View of Orebody C

March 2022

Source: SLR, 2022.

16.1 Mine Design Parameters

Table 16-1 lists the parameters used in designing the mine plan for the Mineral Reserve estimate. The design was completed using Deswik software.

Table 16-1: Mine Design Parameters
Jaguar Mining Inc. – Turmalina Mine Complex

Parameters	Units	Values
	Stope Design	
Mining method		Sublevel Stoping
Default density – A	t/m^3	2.81
Default density – B	t/m^3	2.83
Default density – C	t/m^3	2.83
Stope height	m	20 / 15 (blind)
Stope length	m	5
Stope width minimum	m	3.5
Stope width maximum	m	18
Stope pillar minimum	m	15
Dilution	m	0.5 (FW) / 0.5 (HW)
Minimum Dip	degrees	45°
	Mine Design	
Rib pillar width	m	5
Maximum span	m	25
Maximum span – side	m	40
Level Height	m	63.7
Sill Height	m	8.7
Distance stope – ramp	m	60 (A) / 50 (C)
Distance between tunnels	m	10
Decline/Incline maximum grade	%	15.0%
Minimum ramp turning radius	degrees	25
Ore drive maximum grade	%	3 to 5%
	Development Cross Sections	
Ramp	m	5.0 X 5.5
Crosscut	m	4.5 X 5.0
Ore drive	m	4.3 X 4.8
Ventilation drive	m	4.0 X 4.0

Parameters	Units	Values
Raise	m	3.1 (diameter)
	Mine Factors	
Overbreak stope:	%	0%
Overbreak development:	%	0%
Extraction	%	95%
Extraction – blind stope/remnant	%	90%
Extraction – rib pillar	%	50%
Extraction – development (slash)	%	100%
Metallurgical recovery:	%	87.00%
	Productivities	
Backfilling	t/day	700
Ramp	m/month	50
Crosscut	m/month	40
Ore drive	m/month	40
Ventilation drive	m/month	40
Raise	m/day	5

16.2 Mining Method

The mining method used at the Turmalina Mine is SLOS with delayed backfill. Both longitudinal and transverse versions of the method are used, depending on the width of the deposit. Access to the stopes is provided by sublevel development driven off the ramp. The sublevel interval is 20 m. The Turmalina deposit is mined in horizons between sublevels. Each horizon is mined in retreating fashion, starting at the end of the mineralized zone and progressing to the central crosscuts. The stope length is typically 40 m along strike, and rib pillars or partial rib pillars separate adjacent stopes. Once mined out, stopes are backfilled with cemented rockfill, unconsolidated rockfill, or paste fill. The horizons are mined in a bottom-up sequence between sill pillars.

The mining method used at Orebody A's Principal Zone is transverse SLOS. Stopes are 50 m to 60 m long along strike, and widths range from seven metres to 20 m. The Turmalina deposit has significant width in this zone due to the merging of two veins.

Figure 16-3 illustrates the sequencing of stopes in the Principal Zone using transverse SLOS. The stopes in the central part of the Principal Zone are mined first, creating a vertical column of stopes from the lower to upper sill pillars. Once mined out, each stope is backfilled with paste fill. This approach creates a central paste fill pillar, which stabilizes the ground for mining the stopes on either side of it. The remaining stopes (stopes 4 to 15 in Figure 16-3) are mined in retreating fashion towards the access drifts on each end of the Principal Zone. The remaining stopes can use paste fill or rockfill. Partial rib pillars are left between backfilled stopes. The size of the partial rib pillars and thickness of the sill pillars are determined with geotechnical modelling.

Longitudinal SLOS is used in Orebody A outside the Principal Zone and in all of Orebody C. Figure 16-4 illustrates the sequencing of stopes with Longitudinal SLOS. When preparing a stope, a crosscut is driven to the deposit's hanging wall. From there, ore drives are driven in both directions along strike following the hanging wall contact. The hanging wall is supported with cable bolts before stoping begins. If the deposit is wider that five metres, ore will be left adjacent to the footwall, which will be slashed after the ore drive is completed. Figure 16-5 illustrates the typical layout for drilling a stope with Longitudinal SLOS. Figure 16-6 provides an example of a typical fan drilled with upholes.

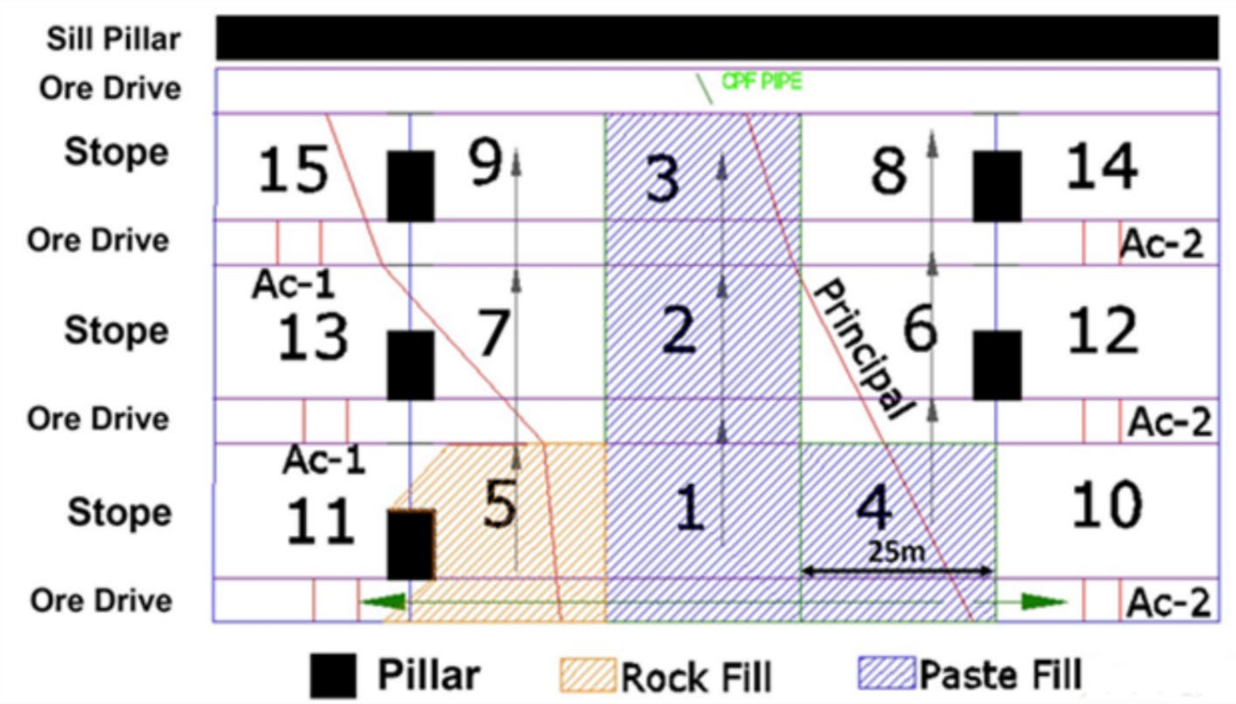


Figure 16-3: Sequencing of Stopes with Transverse SLOS in the Principal Zone, Orebody A

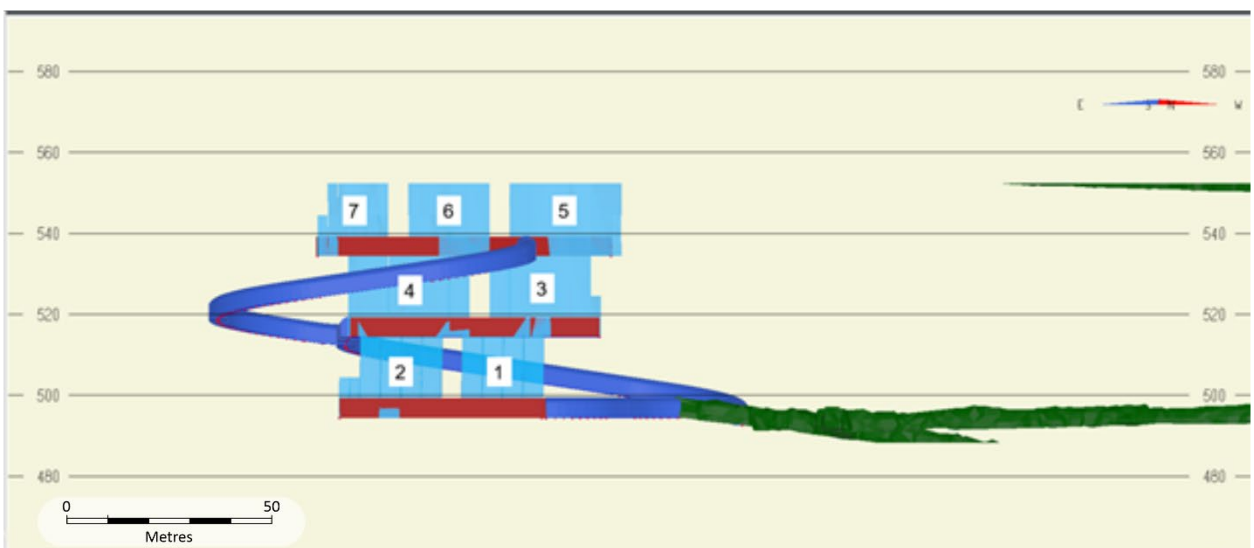


Figure 16-4: Sequencing of Stopes with Longitudinal SLOS

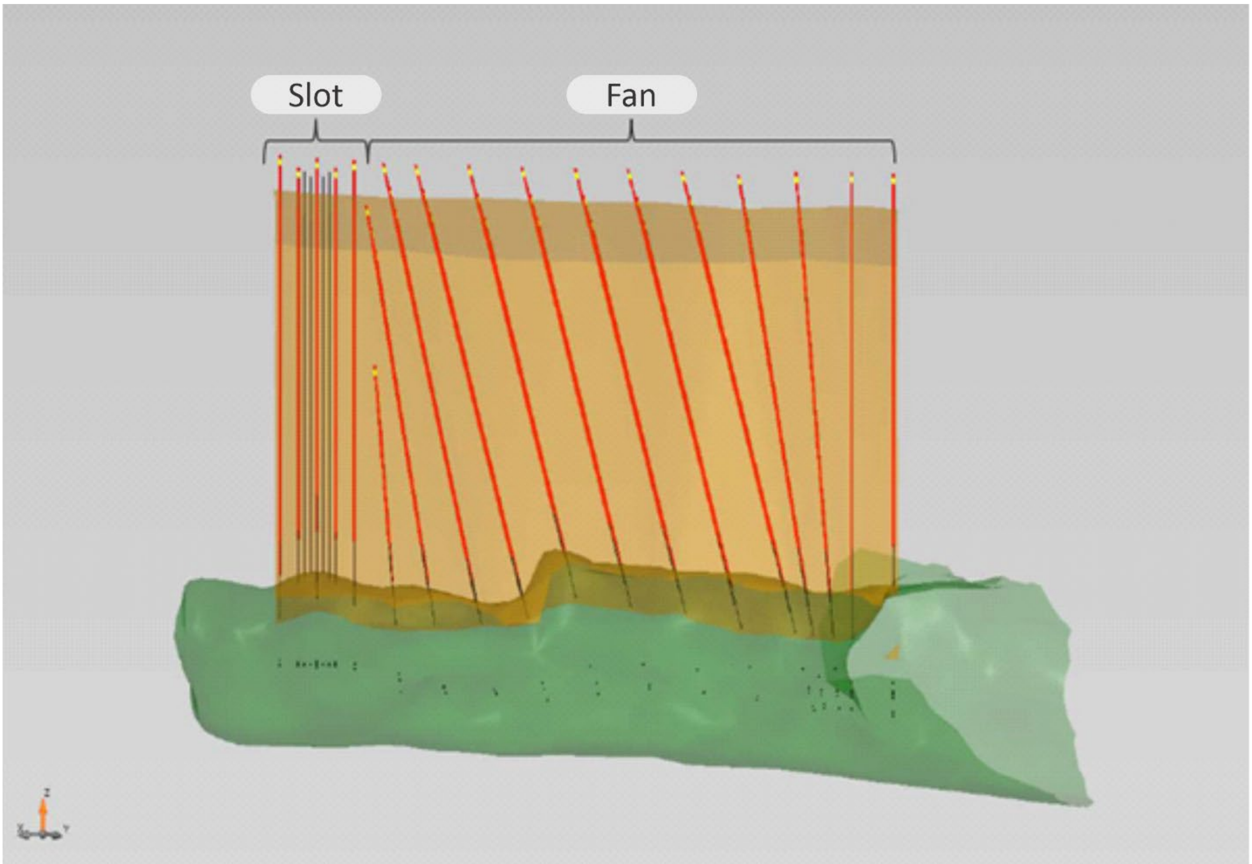


Figure 16-5: Typical Drilling Layout with Longitudinal SLOS

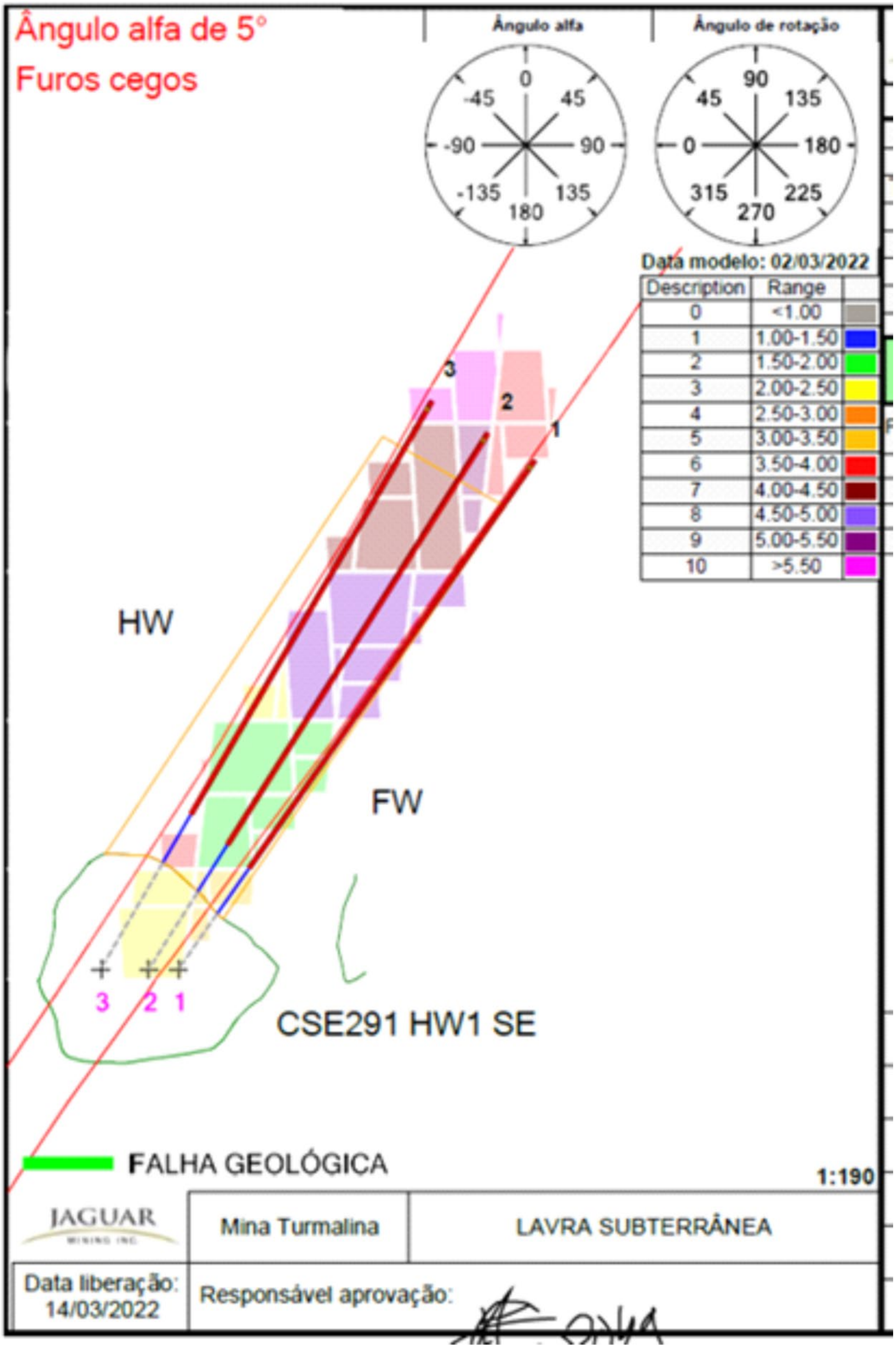


Figure 16-6: Cross Section Showing Longhole Fan with Longitudinal SLOS

16.3 Geomechanics

The following review of geomechanics summarizes the analysis described in the report *Geotechnical properties of Turmalina Mine*, 2018, by Jaime A. Corredor H (Corredor H., 2018). The report analyzes the rock mechanics parameters of Orebodies A and C based on geological information from Orebody A level 11 and Orebody C level 4. Furthermore, it provides recommendations for ground support procedures, stope design, and paste fill preparation.

Table 16-2 presents the rock material strengths, expressed as averages from UCS and tensile-strength tests, for Turmalina's predominant lithological units. Figure 16-7 and Figure 16-8 show the percentage distribution of RQD values for the footwalls and hanging walls of Orebodies A and C, respectively. Figure 16-9 and Figure 16-10 show the Q Index values for the main ramp and hanging wall in Orebodies A and C, respectively. Figure 16-11 indicates the geological strength index for each of the two orebodies. Figure 16-12 the empirical stable-regions graph prepared for stope design at Turmalina. It shows that a hydraulic radius ranging from 5 m to 7 m is appropriate for determining stope height and the distance between rib pillars. Based on the graph in Figure 16-13, the geotechnical report recommends that cable bolts have an effective length of nine metres and a 2.0 m x 2.0 m spacing pattern.

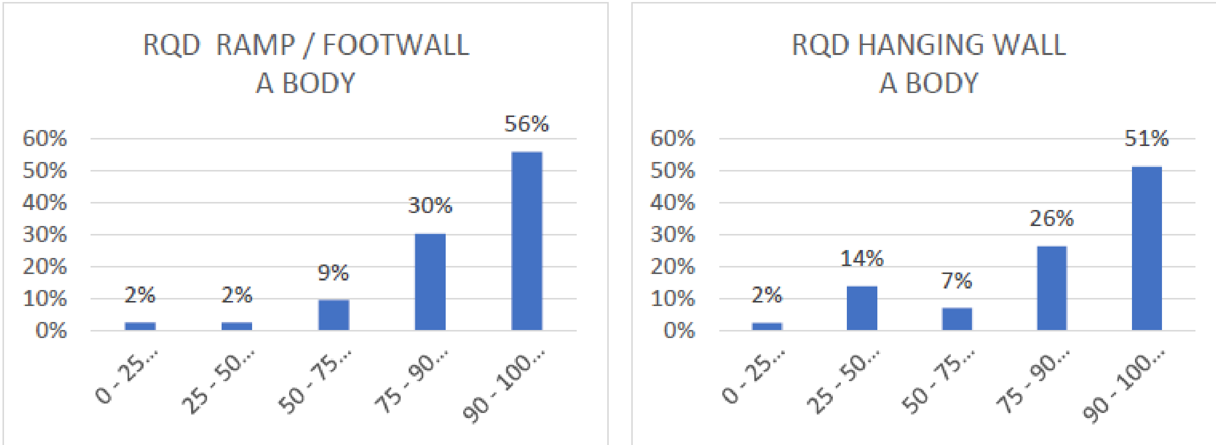
The report recommends the following procedures for determining the optimal paste fill recipe, based on laboratory UCS tests for paste fill strength (Table 16-2):

- Determine stope geometry (Height and Length) and Factor of Safety (FoS).
- Determine required paste strength using Belem & Benzaazoua´s formula for determining paste fill strength.
- Compare with Stope Length and FoS expressed using the graph of required paste fill strength versus stope length.
- Find the strength values in Figure 16-14.
- Determine the optimum cure time column (7, 28, or 56 days)
- Find the Solid % / Cement % composition.

Table 16-2: Rock Material Strengths for Turmalina Mine
Jaguar Mining Inc. – Turmalina Mine Complex

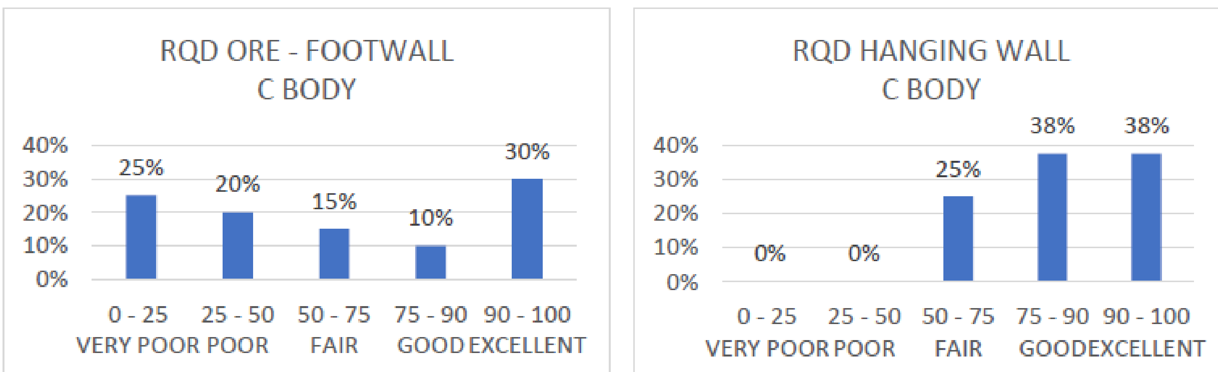
Lithology	UCS (Mpa)	Elastic Modulus E (Gpa)	Poisson Ratio (v)	Tensile Strength (Mpa)
Amphibolite – Chloritic Schist	197.2	87.1	0.213	17.5
Biotite – Quartz schist (HW)	81.7	52.6	0.272	7.8
Bedded Iron Formation	142.8	72.7	0.154	8.2
Chloritic Schist (HW)	182.8	106.6	0.209	13.0
Granite	200.02	59.11	0.13	

Source: Corredor H., 2018



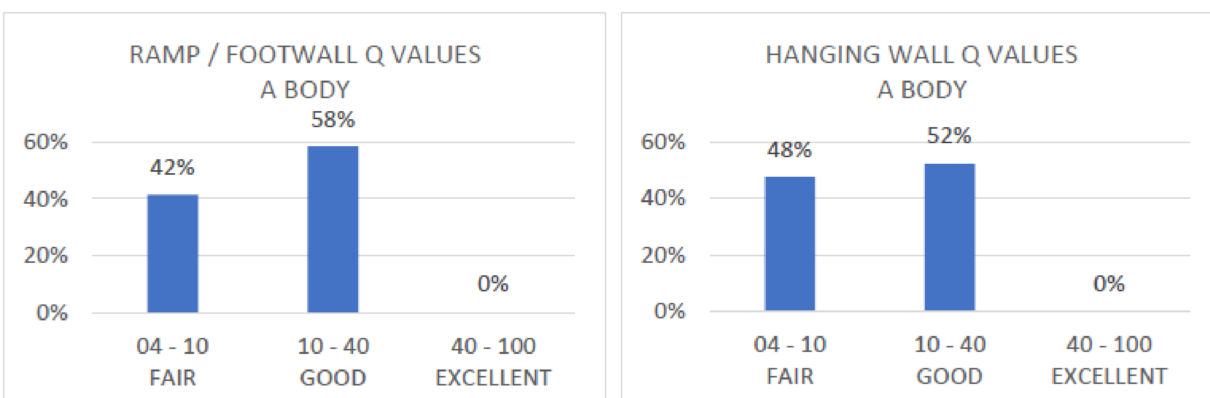
Source: Corredor H., 2018

Figure 16-7: RQD Values for Orebody A Footwall and Hanging Wall



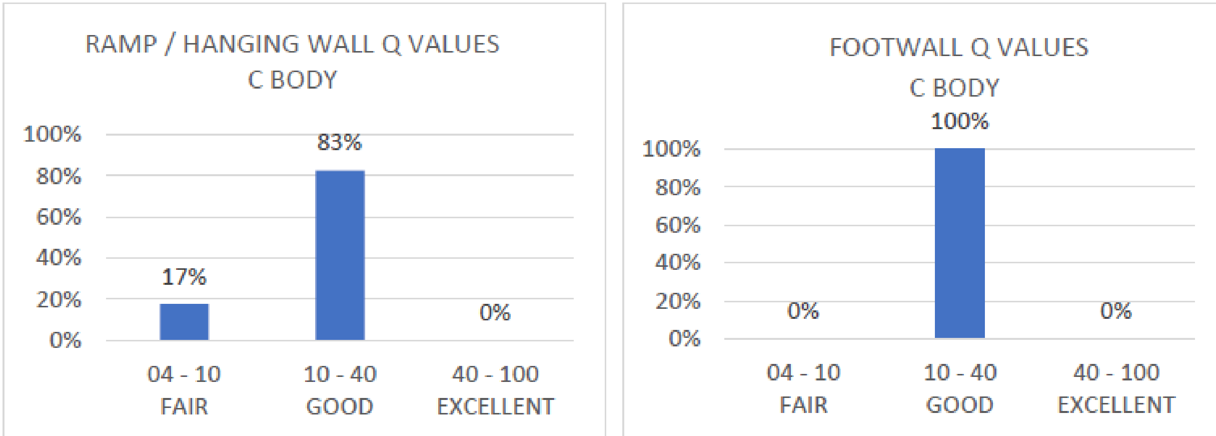
Source: Corredor H., 2018

Figure 16-8: RQD Values for Orebody C Footwall and Hanging Wall



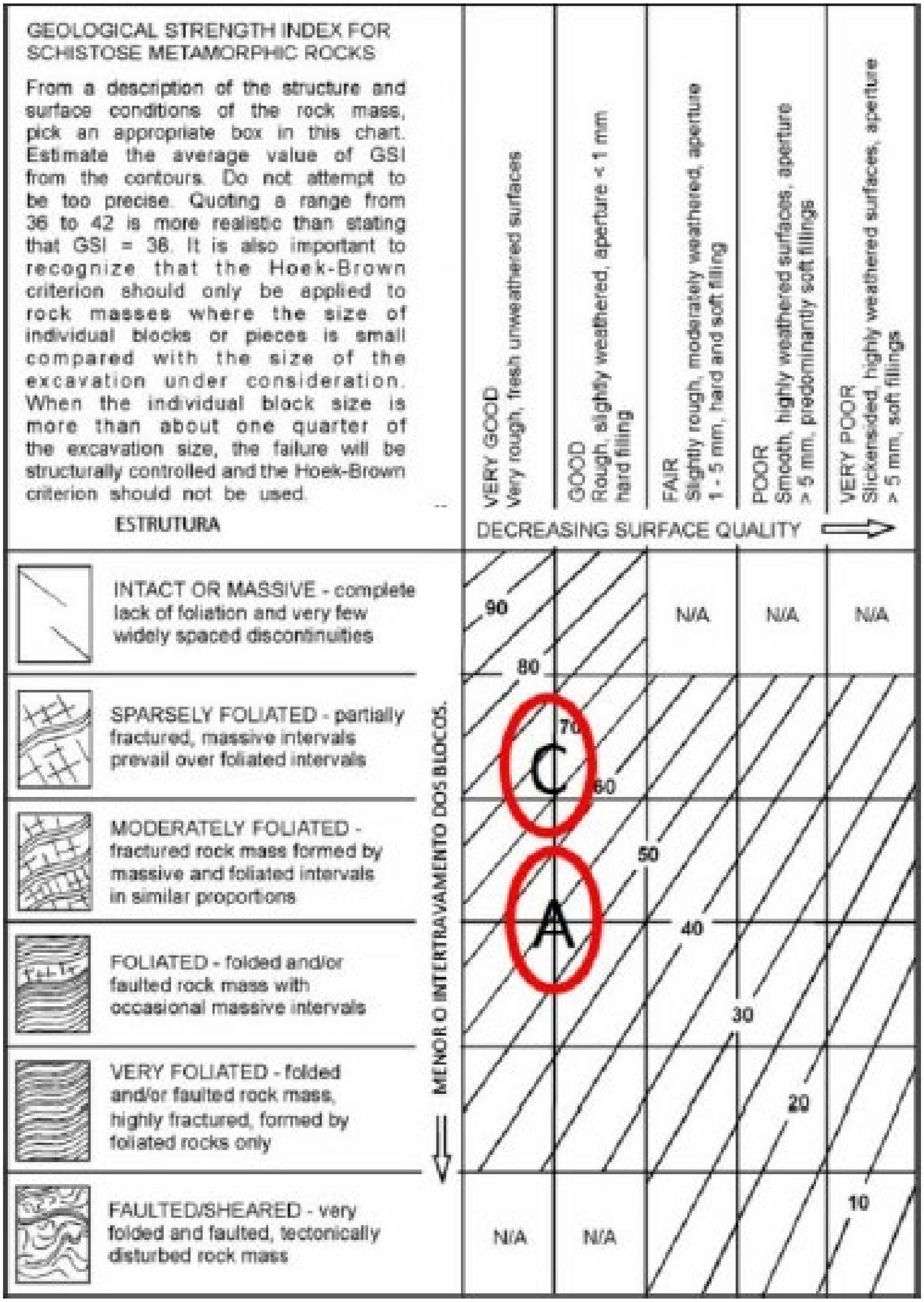
Source: Corredor H., 2018

Figure 16-9: Q' values for Ramp and Footwall in Orebody A



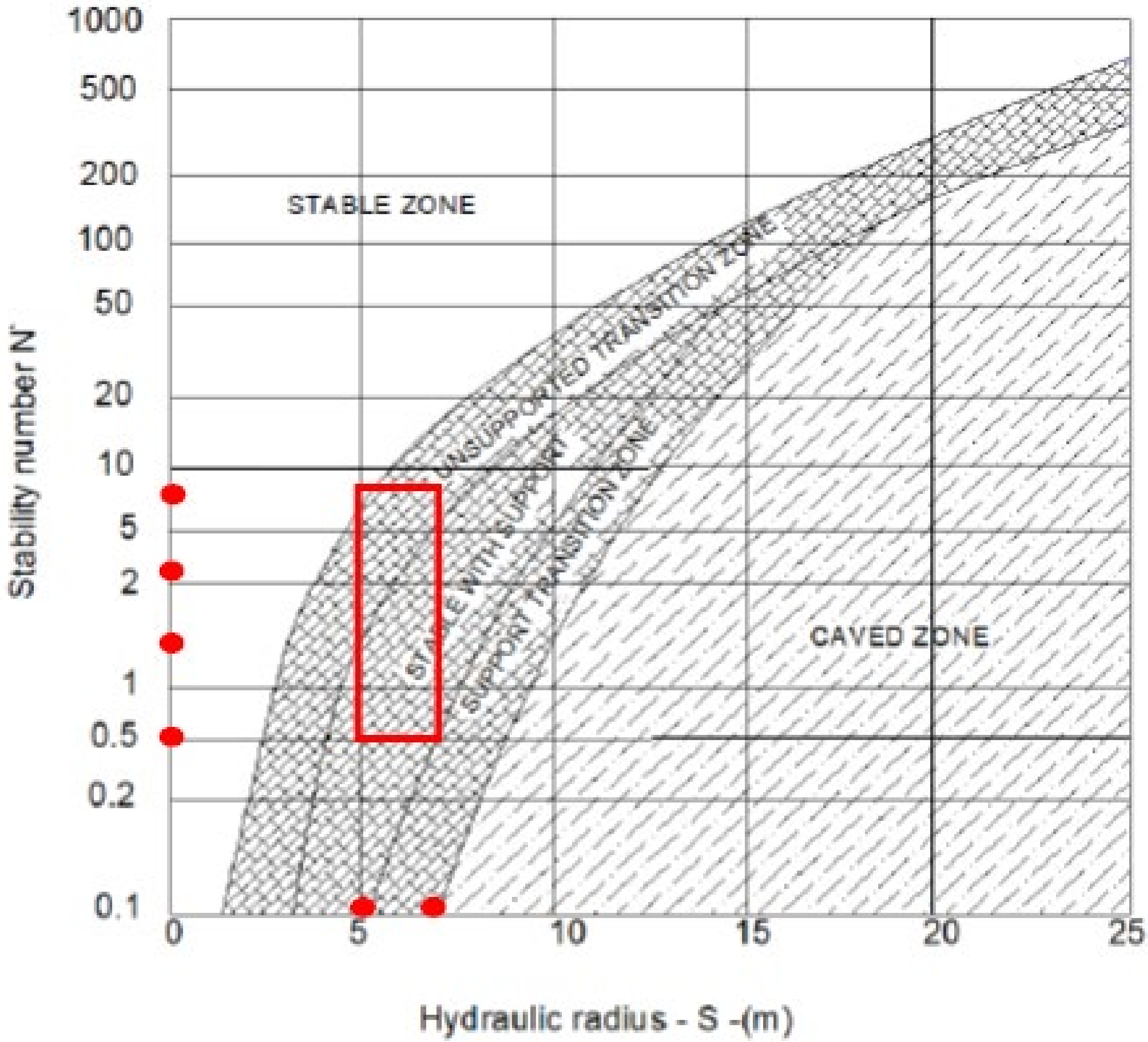
Source: Corredor H., 2018

Figure 16-10: Q' values for Main Ramp and Hanging Wall in Orebody C



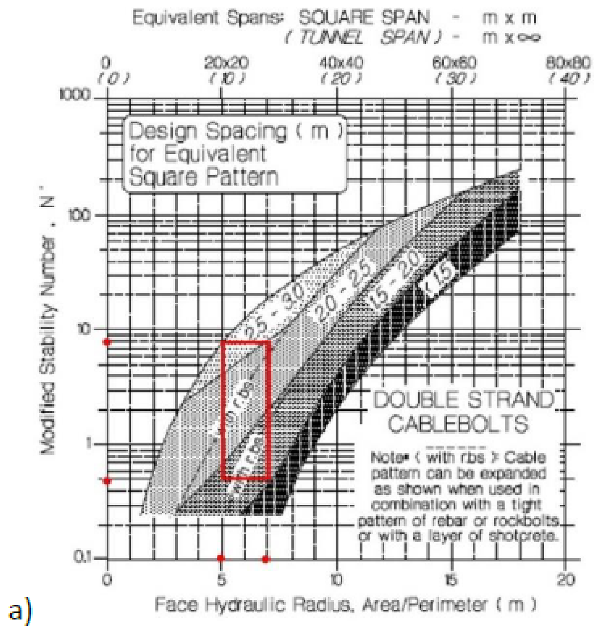
Source: Corredor H., 2018

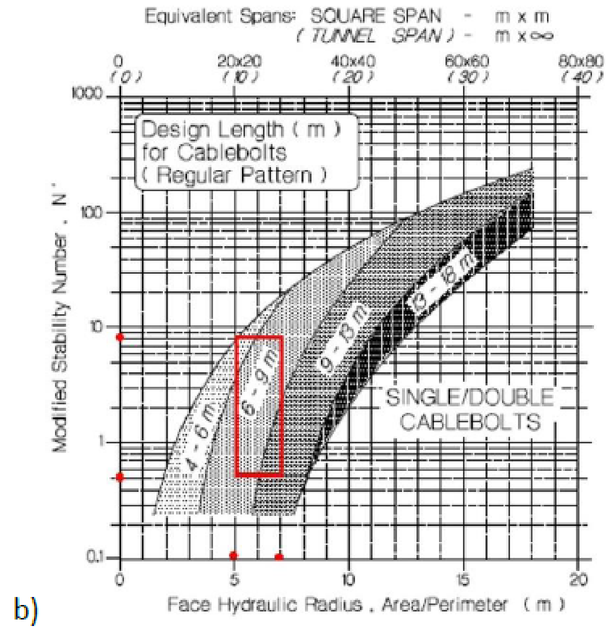
Figure 16-11: Geological Strength Index Chart for Foliated Rocks Specifying the Most Suitable Regions for A and C



Source: Corredor H., 2018

Figure 16-12: Proposed Empirical Stable Regions Based on Stability Graphic for Turmalina Mine





Source: Corredor H., 2018

Figure 16-13: Specifications of Cable Bolt Spacing (a) and Length (b) for Geomechanical Conditions

Tempo de Cura		7 dias	28 dias	56 dias
% de Sólidos	% de Cimento	Ensaio de Resistência (kPa)		
CIMENTO TIPO CP II E32				
63%	3%	61,3	112,6	101,75
	5%	102,6	180,2	146,71
	8%	173,5	292,3	262,26
	10%	255,5	345,8	369,51
	12%	324,4	508,6	549,05
65%	3%	59,4	74,5	92,46
	5%	89,5	134,4	184,89
	8%	134,3	204,9	285,51
	10%	168,6	331,9	393,41
	12%	257,3	465,9	659,58
67%	3%	53,0	86,0	104,44
	5%	87,8	160,0	195,95
	8%	185,1	381,2	442,10
	10%	237,0	393,1	653,94
	12%	229,1	532,2	864,25
69%	2%	30,7	137,3	117,87
	4%	86,9	187,7	178,91
	5%	93,4	240,3	225,23
	6%	107,8	280,1	314,84
	8%	148,9	406,0	517,79
CIMENTO TIPO CP V ARI-RS				
65%	2%	64,2	100,9	88,64
	4%	123,5	214,4	187,21
	5%	138,5	221,1	252,72
	6%	209,3	258,2	389,23
	8%	340,3	604,3	824,14

Source: Corredor H., 2018, from Ausenco internal report, 2011.

Figure 16-14: Paste Fill Strength Determination Results Based on Laboratory UCS Tests

16.4 Ground Support

Table 16-3 summarizes the Turmalina Mine's ground support procedures according to the type of mine excavation. The procedures generally call for 2.4 m long resin grouted helicoidal bolts be installed on a 1.5 m x 1.5 m pattern. Cable bolting is required in ore drift hanging walls with blocky ground and at intersections. Screens may also be required in specific situations and may be pinned to the rock with split sets.

Table 16-3: Ground Support Procedures
Jaguar Mining Inc. – Turmalina Mine Complex

Excavation Type	Ground Support
Ramp	• 2.4 m long x 22 m dia. Resin grouted helicoidal bolts on 1.5 m x 1.5 m pattern
Sublevel Development	• 2.4 m long x 22 m dia. Resin grouted helicoidal bolts on 1.5 m x 1.5 m pattern
Intersections	• 2.4 m long x 22m dia. Resin grouted helicoidal bolts on 1.5m x 1.5m pattern • Cement grouted cable bolts, 4, 7, or 10 m long. The pattern, angle, and length depend on the particular situation.
Crosscut	• 2.4 m long x 22 m dia. Resin grouted helicoidal bolts on 1.5 m x 1.5 m pattern
Ore Drift	• 2.4 m long x 22 m dia. Resin grouted helicoidal bolts on 1.5 m x 1.5 m pattern • Cable bolting of hanging wall in areas with blocky ground.

16.5 Mine Infrastructure

Table 16-4 lists Turmalina's mine infrastructure, stationary equipment, and mine services

Mine development. The Turmalina Mine is accessed from a 5.0 m by 5.5 m primary decline located in the footwall of Orebody A, and a ramp system for Orebody C. The Orebody A ramp portal is located at an elevation of 695 MASL. The Turmalina Mine is divided into levels with Level 01 established at an elevation of 626 MASL. Ore from the stopes and development is hauled to surface via the ramp system for Orebodies A and C.

Backfill. Turmalina has a paste fill plant that prepares cemented paste fill from detoxified CIP tailings in a plant located near the mill.

Ventilation. As illustrated in Figure 16-15, Turmalina's ventilation is a pull type system whereby fresh intake is drawn down the haulage ramps and return air is exhausted via three vent raises.

Mine dewatering. As illustrated in Figure 16-16, Turmalina has a simple dewatering system whereby water is pumped from level to level and then to surface using centrifugal pumps.

Table 16-4: Mine Infrastructure
Jaguar Mining Inc. – Turmalina Mine Complex

Infrastructure Item	Description	Location
	Surface Installations	
Offices	1,145 m^2	Surface
Warehouse	420 m^2	Surface
Paste plant	100 t/h	Surface
Maintenance shop	2,395 m^2	Surface
	Compressors	
• Compressor	90 kW	A3.5 level
Compressor	90 kW	A9.1 level
Compressor	90 kW	A11.2 level
Compressor	90 kW	C5.3 level
	Development	
Ramps	5.0 m W x 5.5 m H	
Level development	4.3 m W x 4.8 m H	
Ventilation raise	994 m x 3.0 m diameter	
Ventilation raise	914 m x 3.0 m diameter	
Escapeway raise	3.0 l x 5.3 h / 3.0 l x 3.0 h	
	Ventilation System	
Main ventilation fans	2 ea. X 448 kW	Surface
Main ventilation fans	2 ea. X 224 kW	Surface
Vent ducting	800, 1,000 & 1,200 mm dia.	
	Electrical Installations	
Electrical Substation	8,750 kVA 13,800KV	Surface
Electrical Substation	500 kVA 13,800V/460V	B.0 level
Electrical Substation	500 kVA 13,800V/460V	A3.5 level
Electrical Substation	750 kVA 13,800V/460V	A7.3 level
Electrical Substation	500 kVA 13,800V/460V	A9.0 level
Electrical Substation	500 kVA 13,800V/460V	A12.3 level
Electrical Substation	500 kVA 13,800V/460V	A13.2 level
Electrical Substation	750 kVA 13,800V/460V	A14.3 level
Electrical Substation	500 kVA 13,800V/460V	C1 level
Electrical Substation	500 kVA 13,800V/460V	C2.3 level

Infrastructure Item	Description	Location
Electrical Substation	500 kVA 13,800V/460V	CC4.3 level
Electrical Substation	500 kVA 13,800V/460V	C4.1 level
Electrical Substation	500 kVA 13,800V/460V	C5.3 level
Electrical Substation	500 kVA 13,800V/460V	C5.1 level
Electrical Substation	750 kVA 13,800V/460V	C82 level
	Dewatering System	
Pumping Station	37 kW / 50 m^3/h	640 level
Pumping Station	37 kW / 50 m^3/h	B.0 level
Pumping Station	37 kW / 50 m^3/h	A2.3 level
Pumping Station	37 kW / 50 m^3/h	A2.3 level
Pumping Station	37 kW / 50 m^3/h	A2.1 level
Pumping Station	37 kW / 50 m^3/h	A2.1 level
Pumping Station	37 kW / 50 m^3/h	A3.4 level
Pumping Station	37 kW / 50 m^3/h	A3.4 level
Pumping Station	37 kW / 50 m^3/h	A3.1 level
Pumping Station	37 kW / 50 m^3/h	A3.1 level
Pumping Station	37 kW / 50 m^3/h	A4.2 level
Pumping Station	37 kW / 50 m^3/h	A4.2 level
Pumping Station	37 kW / 50 m^3/h	A5.3 level
Pumping Station	37 kW / 50 m^3/h	A5.3 level
Pumping Station	37 kW / 50 m^3/h	A6.3 level
Pumping Station	37 kW / 50 m^3/h	A6.3 level
Pumping Station	37 kW / 50 m^3/h	A7.3 level
Pumping Station	37 kW / 50 m^3/h	A7.3 level
Pumping Station	37 kW / 50 m^3/h	A8.4 level
Pumping Station	37 kW / 50 m^3/h	A8.4 level
Pumping Station	37 kW / 50 m^3/h	A9.3 level
Pumping Station	37 kW / 50 m^3/h	A9.3 level
Pumping Station	37 kW / 50 m^3/h	A10.3 level
Pumping Station	37 kW / 50 m^3/h	A10.3 level
Pumping Station	37 kW / 50 m^3/h	A11.3 level
Pumping Station	37 kW / 50 m^3/h	A11.3 level
Pumping Station	37 kW / 50 m^3/h	A12.3 level

Infrastructure Item	Description	Location
Pumping Station	37 kW / 50 m³/h	A12.3 level
Pumping Station	37 kW / 50 m³/h	A12.1 level
Pumping Station	37 kW / 50 m³/h	A13.1 level
Pumping Station	37 kW / 50 m³/h	C5.3 level
Pumping Station	37 kW / 50 m³/h	C5.1 level
	Powder Magazines	
Explosives magazine	85,000kg capacity	Surface
Cap magazine		Surface
	Communications System	
Leaky feeder	10 km of coaxial cable	
	Pipe	
Water	HDPE 2" – 4"	
Compressed air	HDPE 2" – 4"	
Dewatering	HDPE 2" – 4"	
Paste fill	HDPE 4" – 6"	

Source: Jaguar, 2022

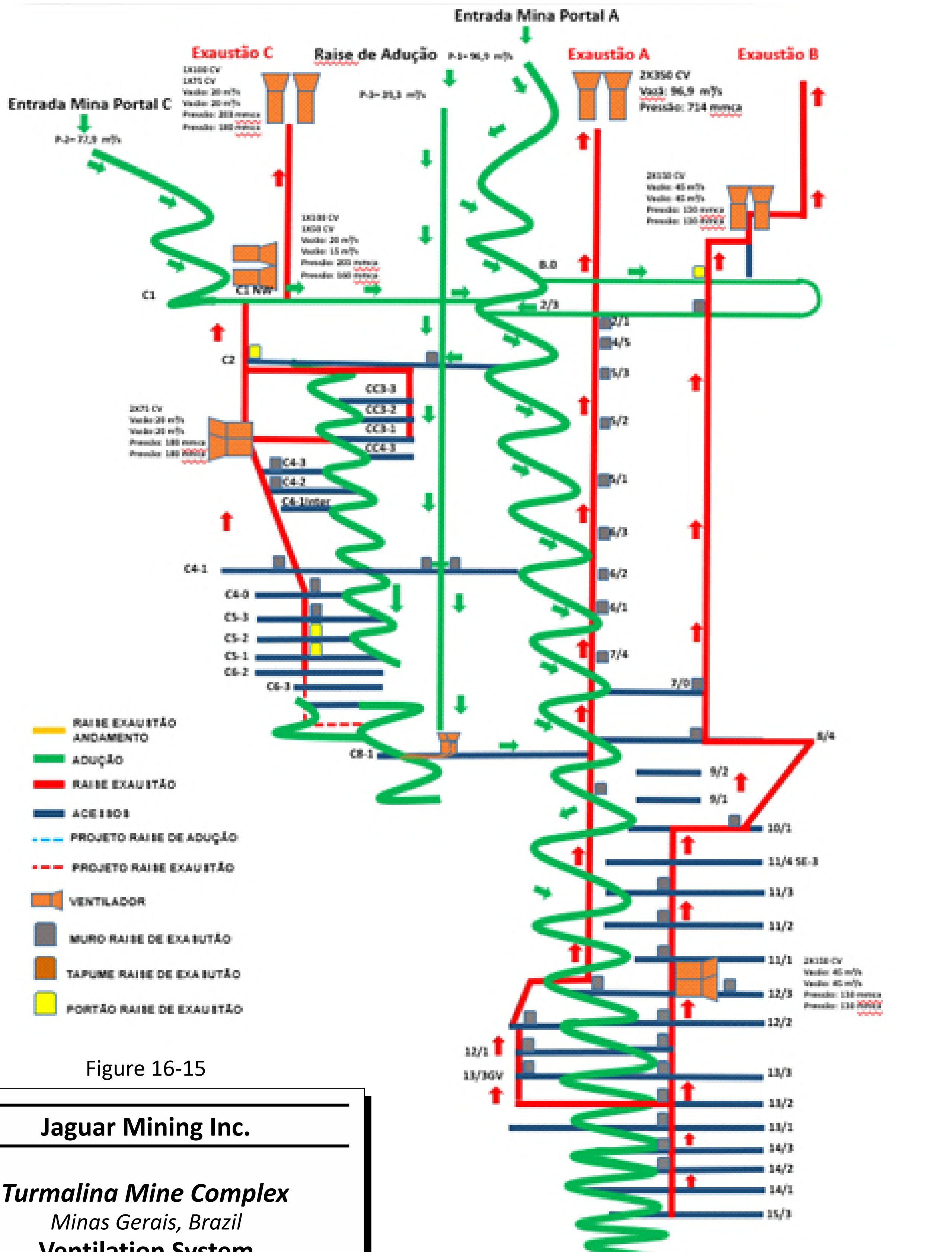


Figure 16-15

Jaguar Mining Inc.

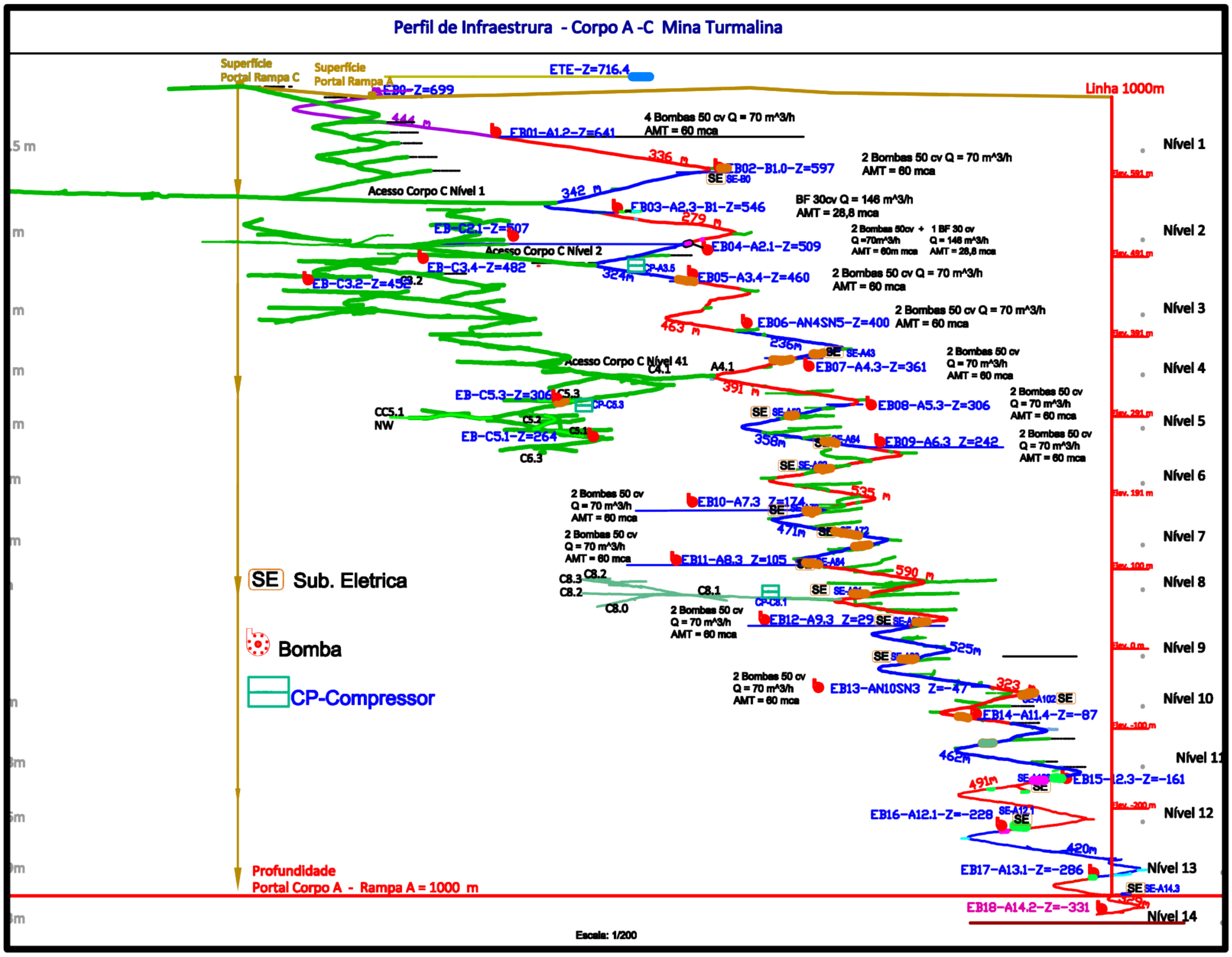
Turmalina Mine Complex

Minas Gerais, Brazil

Ventilation System

March 2022

Source: SLR, 2022.



Source: Jaguar, 2022.

Figure 16-16: Mine Dewatering System

16.6 Personnel

Table 16-5 lists the number of Jaguar personnel and contractor employees that work at the Turmalina Mine. The contractors at the mine include Toniollo Busnello S.A. (mining contractor), Encobras (diamond drilling and truck haulage), Orica (Explosives), and Tracbel S.A. (maintenance of Volvo equipment).

Table 16-5: Personnel
Jaguar Mining Inc. – Turmalina Mine Complex

Area	Number of Personnel	
	Jaguar	Contractors
Management/Supervision/Safety	51	-
Geology & Technical Services	71	35
Mine Operations	41	2
Mine Development	64	132

Area	Number of Personnel	
	Jaguar	Contractors
Mine Services	43	17
Haulage	76	2
Mine Maintenance	57	14
Other	31	60
Total	**434**	**262**

16.7 Mining Equipment

Table 16-6 lists the mobile mine equipment operating at the Turmalina Mine, including make and model. Some of the equipment listed belongs to mining contractor Toniollo Busnello S.A.

Table 16-6: Mine Equipment
Jaguar Mining Inc. – Turmalina Mine Complex

Equipment No.	Equipment Type	Make	Model	Year	Owner	Quantity
FD21	Longhole drill rig	Epiroc	1 Boom H1257	2008	Jaguar	1
FD 37	Longhole drill rig	Epiroc	1 Boom S7D	2016	Jaguar	1
FD 38	Longhole drill rig	Epiroc	1 Boom DL 420-7C	2011	Jaguar	1
JE 23	Jumbo	Epiroc	H282	2008	Jaguar	1
JE 35	Jumbo	Epiroc	1 Boom DL 420-7C	2007	Jaguar	1
JE 36	Jumbo	Joy Global	2 Boom DR 2SB	2018	Jaguar	1
JE 37	Jumbo	Joy Global	2 Boom DR 2SB	2018	Jaguar	1
JEAL 01	Jumbo	Epiroc	Boomer H282	2012	Jaguar	1
CE 01	Explosives truck	Ford	F400 MCU	2017	Jaguar	1
CM 16	Explosives truck	Ford	Ford Cargo 1722E	2018	Jaguar	1
CM26	Boom truck	Mercedes Benz	L1618/51CC	2007	Jaguar	1
CM 27	Personnel carrier truck	Volkswagen	17250E	2006	Jaguar	1
CM 49	Articulated dump truck	Volvo	A30 E	2010	Jaguar	1
CM 51	Articulated dump truck	Volvo	A30 E	2010	Jaguar	1
CM 52	Articulated dump truck	Volvo	A30 E	2010	Jaguar	1
CM 70	Dump truck	Volvo	TRAKKER 380T/42 – 6X4	2012	Jaguar	1
CM 88	Articulated dump truck	Volvo	A30 F	2017	Jaguar	1
CM 89	Articulated dump truck	Volvo	A30 F	2015	Jaguar	1
CM 95	Dump truck	Iveco		2019	Jaguar	1
CM 99	Explosives truck	Iveco	170E21 (4X2)	2019	Jaguar	1

Equipment No.	Equipment Type	Make	Model	Year	Owner	Quantity
CM101	Dump truck	Volvo	FM 500 6X4R	2021	Jaguar	1
CM102	Dump truck	Volvo	FM 500 6X4R	2021	Jaguar	1
CM103	Dump truck	Volvo	FM 500 6X4R	2021	Jaguar	1
CM104	Dump truck	Volvo	FM 500 6X4R	2021	Jaguar	1
CM105	Dump truck	Volvo	FM 500 6X4R	2021	Jaguar	1
CMB 01	Concrete mixer truck	Mercedes Benz			Jaguar	1
CMAL23	Explosives truck				Jaguar	1
CG 42	Load-haul-dump unit (LHD)	Epiroc	ST2G	2011	Jaguar	1
CG 47	LHD	Epiroc	LHD ST14	2011	Jaguar	1
CG 48	LHD	Epiroc	ST1030	2011	Jaguar	1
CG 50	LHD	Epiroc	ST-1030	2011	Jaguar	1
CG 55	Wheel loader	New Holland	W190	2012	Jaguar	1
CG 60	Wheel loader	New Holland	W190	2012	Jaguar	1
CG 61	LHD	Epiroc	ST1030	2016	Jaguar	1
CG 63	Wheel loader	Volvo	L120 F	2018	Jaguar	1
CG 69	Wheel loader	Volvo	L120 F	2021	Jaguar	1
PT 29	Wheel loader	New Holland	W130	2011	Jaguar	1
PT 32	Backhoe loader	New Holland	B95B T	2012	Jaguar	1
MT05	Telescopic handler	JCB	540-170	2019	Jaguar	1
ES 01	Crawler excavator	Case	CX220 B	2009	Jaguar	1
ES 08	Crawler excavator	Case	CX220 C	2019	Jaguar	1
RE 11	Backhoe loader	JCB	ICX	2009	Jaguar	1
RE 22	Backhoe loader	New Holland	B95B T	2012	Jaguar	1
RE 26	Backhoe loader	New Holland	B110B T	2014	Jaguar	1
RE 33	Backhoe loader	New Holland	B95B T	2019	Jaguar	1
RE 34	Backhoe loader	New Holland	B95B T	2019	Jaguar	1
MCG 02	Slid steer loader	New Holland	L220	2012	Jaguar	1
MCG 04	Slid steer loader	New Holland	L220	2012	Jaguar	1
MN 07	Motor grader	New Holland		2012	Jaguar	1
MN 08	Motor grader	Caterpillar	120	2021	Jaguar	1
BOB 01	Slid steer loader	New Holland	4103	2009	Jaguar	1
SC 01	Scaler	RDH	BM150DEH		Jaguar	1
VL 19	Ambulance	Fiat		2007	Jaguar	1

Equipment No.	Equipment Type	Make	Model	Year	Owner	Quantity
VLAL48	Pickup truck	Toyota	Hilux CS 4X4		Rented	1
VL 55	Ambulance	Toyota		2011	Jaguar	1
VL185AL	Sedan	Toyota	Etios	2019	Rented	1
VL186AL	Sedan	Toyota	Etios	2019	Rented	1
VL187AL	Sedan	Toyota	Etios	2019	Rented	1
VL188AL	Sedan	Toyota	Etios	2019	Rented	1
VL189AL	Sedan	Toyota	Etios	2019	Rented	1
VL190AL	Sedan	Toyota	Etios	2019	Rented	1
VL191AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL192AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL193AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL194AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL195AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL196AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL197AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL198AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL199AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL200AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL202AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL203AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL204AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL205AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL206AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL207AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL208AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL210AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL220AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL223AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL224AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL225AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL226AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL227AL	Pickup truck	Toyota	Hilux CS 4X4	2019	Rented	1
VL228AL	Pickup truck	Toyota	Hilux CD 4X4	2019	Rented	1

Equipment No.	Equipment Type	Make	Model	Year	Owner	Quantity
SD 02	Diamond drill	Atlas Copco	DIAMEC 252	2007	Rented	1
SD 08	Diamond drill	Atlas Copco	LM 30	2010	Rented	1
SD 13	Diamond drill	Epiroc	Diamec Smart 4	2020	Rented	1
SD 14	Diamond drill	Epiroc	Diamec Smart 4	2020	Rented	1
-	Jumbo	Sandvik	DD-320 26X		Contractor	1
-	Jumbo	Sandvik	DD-321 40-C		Contractor	2
-	Wheel loader	Volvo	L120F		Contractor	2
-	LHD	Sandvik	LH307		Contractor	1
-	Telescopic handler	JCB	TH535 125		Contractor	3
-	Mobile diesel compressor	Atlas Copco	XAS 420		Contractor	3
-	Drill wagon	Sandvik	PHW-5000		Contractor	2
-	Hydraulic breaker	Atlas Copco	SB202		Contractor	3
-	Wheel excavator	Doosan	DX53W		Contractor	1
-	Sedan	Volkswagen	Gol 1.6L HB5		Contractor	1
-	Sedan	Renault	Duster Zen 1.6		Contractor	1
-	Dump truck	Mercedes Benz	Axor 2831		Contractor	2
-	Dump truck	Mercedes Benz	Axor 3131		Contractor	5
-	Flatbed truck	Mercedes Benz	Acello 815		Contractor	1
-	Minibus	Volare	V8L 4x4		Contractor	1
-	Lubrication truck	Mercedes Benz	Atego 1518		Contractor	1
-	Backhoe loader	Caterpillar	416-e		Contractor	2
-	Pickup truck	Mitsubishi	L200 Triton		Contractor	2
-	Pickup truck	Toyota	Hilux CDLOWM4FD		Contractor	3

16.8 Life of Mine Plan

Stope and development designs, and production scheduling were carried out by Deswik Brazil using the Deswik mine design software. Mined out stopes and existing tunnels as of December 31, 2021, were supplied by Jaguar, to deplete them from the current mining plan.

The production schedule is summarized in Table 16-7 and covers a mine life of six years based on Mineral Reserves.

Table 16-7: Life of Mine Plan
Jaguar Mining Inc. – Turmalina Mine Complex

	Unit	Total	2022	2023	2024	2025	2026	2027
Total Mill Feed	000 t	2,177	406	405	406	405	408	147
Grade	g/t Au	3.66	3.70	3.71	3.69	3.71	3.34	4.11
Contained Ounces	000 oz Au	256	48	48	48	48	44	19
Recovery	%	87.0	87.0	87.0	87.0	87.0	87.0	87.0
Production	000 oz Au	223	42	42	42	42	38	17
Primary Development	m	9,337	1,536	2,860	4,264	676	-	-
Secondary Development	m	12,122	4,301	3,125	1,658	2,983	55	-
Total Development	m	21,458	5,837	5,985	5,922	3,659	55	-

Source: Jaguar, 2022

Scheduling is based on productivities currently achieved at the Turmalina operation. Development was limited to 50 m per month on the main ramp, 40 m per month on the ore drives and 50 m per month on any single heading elsewhere. Stope scheduling is based on retreat mining and includes delays for backfilling and cement curing. Remnant areas were left to be mined at the end of the LOM.

In 2021, Turmalina produced 408,692 t and 44,247 oz Au, as presented in Table 16-8. Production in 2020 was interrupted due to the COVID 19 pandemic. The current production of 1,100 tpd has been demonstrated to be achievable in the short term and, in the SLR QP's opinion, this rate can be maintained over the LOMP time period.

The previously publicly disclosed Mineral Reserve, effective December 31, 2019, was 2.397 Mt with an average grade of 4.31 g/t Au, containing approximately 332,000 oz Au . After depletion for 2021 production, estimated Mineral Reserve contained gold ounces have decreased 11% to 256,000 oz Au in 2021 compared to the 2019 Mineral Reserve estimate of 332,000 oz Au less 2020 production (287,000 oz Au).

Table 16-8: Quarterly Mine Production Reconciliation, Turmalina Mine 2020 and 2021
Jaguar Mining Inc. – Turmalina Mine Complex

Period	Mine Report		
	Tonnes (t)	Grade (g/t Au)	Production (oz Au)
2020/Q1	75,049	4.51	10,875
2020/Q2	103,188	3.46	11,480
2020/Q3	81,991	4.38	11,557
2020/Q4	92,894	3.64	10,880
2020	353,121	3.94	44,792
2021/Q1	107,671	2.86	9,895
2021/Q2	95,954	3.21	9,906
2021/Q3	104,588	3.71	12,485
2021/Q4	100,479	3.70	11,962
2021	408,692	3.37	44,247

17.0 RECOVERY METHODS

During 2021, the Turmalina Plant processed approximately 409,700 t at an average grade of 3.12 g/t Au compared to 370,000 t at 3.65 g/t Au in 2020. Overall, the Turmalina Plant recovery was 88.6% in 2021, which is slightly lower than the 89.3% recovery rate for 2020.

The Turmalina Plant has a nominal processing capacity of 2,000 tpd, or 720,000 tpa. Since inception, the Turmalina Plant has been achieving annual overall recoveries of between 87% and 92%. The process flowsheet includes two-stage crushing and screening to minus 9.5 mm (-3/8 in), primary grinding, thickening, cyanide leaching, CIP, elution, electrowinning, and smelting. The tailings flow by gravity to a detoxification unit for arsenic removal and cyanide destruction and then are pumped to the paste fill plant to be used either for mine backfill or deposited on a purpose-built dry stack storage area. Process tailings have also been stored in completed open pits on the mine site (Figure 17-1).

A process control system has been established at the supervisory level via a conventional programmable logic controller (PLC) system. It is based on a process control philosophy that is compatible to harbor an online optimizing system (Advanced Control System, or ACS) in the future. The ACS entails both Expert and AI-based levels, the highest objective function being throughput. It is envisioned that a production information management system (PIMS), laboratory information management system (LIMS), and manufacturing execution system (MES) will be implemented when appropriate. The control room is located close to the hydrometallurgical plant. Three dedicated PLCs control the crushing and screening plant, the thickener, grinding plant, hydrometallurgical plant, the paste fill plant, and the Detox plant.

The current flowsheet is illustrated in Figure 17-2 and is described below. A summary of the mill production history and recovery has been presented in Table 6-1 in Section 6 of this Technical Report.

17.1 Crushing and Screening

Ore produced at the Turmalina Mine is transported to the Turmalina Plant.

ROM material is stored in a surge pile and fed to the primary jaw crusher using a front end loader at a nominal rate of 140 tonnes per hour (tph). The crushing plant has a design capacity of 180 tph (3,700 tpd at 85% operating time). Oversized material is managed with a grizzly and rock breaker. The primary crusher product is fed to secondary cone crushers. The final product, minus 9.5 mm (-3/8 in), is stored in a grinding plant surge bin. The fine ore storage bin allows the crushing plant to operate only the number of hours per day to satisfy daily mine tonnage available to conserve energy and costs while the grinding and CIP circuit runs continuously.

17.2 Grinding, Classification and Thickening

The Turmalina Plant has been operating one of three installed ball mills since 2017 to conserve energy and reduce costs. Mill #3, with a capacity of 70 tph (1,500 tpd at 92% operating time), has more than sufficient capacity for current and planned mined ore tonnage of 1,100 tpd.

Mill#1 is 3.2 m diameter (ø) x 4.7 m (10.5 ft ø x 15.5 ft) in size with a maximum capacity of 25 tph and is operated by a 745 kW (1,000 HP) motor. Mill #2 is 3.8 m ø x 5.5 m (12.5 ft ø x 18 ft) in size with a maximum capacity of 60 tph and is operated with a 1,342 kW (1,800 HP) motor. Mill #3 is 4 m ø x 6.6 m (13 ft ø x 21.8 ft) in size with a maximum capacity of 70 tph and is operated by a 1,491 kW (2,000 HP) motor. The Turmalina Plant combined grinding capacity of all three mills, 3,400 tpd at 92% operating time, could facilitate a production expansion if required.

The feed grade to the grinding mills is determined by sampling with an automatic sampler. Material is fed from the surge bin to the grinding circuit. Lead nitrate ($Pb(NO_3)_2$) is added at a rate of 50 g/t in the grinding feeds in order to avoid excessive NaCN consumption by the formation of thiocyanides (SCN), ferrocyanides $(Fe(CN)_6)^{4-}$, and ferricyanides $(Fe(CN)_6)^{3-}$.

The milling products are sized with cyclones to 80% passing 200 mesh (P_{80} = 200 mesh), with the overflow passing on to the thickener and the underflow recycled. The grinding circuit is automated.

The secondary cyclone overflow stream is fed to a 30.5 m ø (100 ft ø) thickener where flocculants are added to optimize the settling rate of the pulp. The thickener underflow, 53% solids by weight, is pumped to the pulp conditioning system of the CIP plant, which is instrumented to maintain the pulp at a density of approximately 48% to 50% solids by weight. The water addition flow rate is monitored and controlled by a magnetic flow meter and pulp densitometer. The thickener overflow is directed to the process water tank as make-up water.

17.3 Leaching Circuit

The leaching circuit consists of seven agitation tanks. Lime is added to the first tank to adjust the pH. Cyanidation begins in the first tank with the addition of sodium cyanide (NaCN). Lead nitrate is also added in the grinding circuit to control excessive NaCN consumption. Compressed air is injected in the bottom of all the tanks at a rate of 0.94 m^3/s and at a pressure of 3.5 kg/cm^2, as the process consumes large amounts of oxygen. The residence time in the leaching circuit is approximately 25 hours.

17.4 Adsorption Circuit

The adsorption circuit is a conventional CIP circuit. The gold bearing pulp passes through five adsorption tanks arranged in series. Activated carbon with a size range of 2.4 mm to 1.19 mm and a minimum pulp concentration of 20 g/L is added to the last in the series of tanks and is pumped from tank to tank in the opposite direction from the slurry flow. Thus, the carbon adsorbs the gold from the pulp as the process continues. When the adsorption cycle is completed, approximately ten hours, the loaded carbon, containing approximately 1.5 kg of gold per tonne of carbon, is pumped from the bottom of the first tank in the series to the elution and electrowinning circuit.

17.5 Elution and Electrowinning

The loaded carbon is screened and the minus 28 mesh material is redirected back to the adsorption circuit. The screen oversize feeds the elution circuit, comprising four columns operating in batch mode, two of which are stripping while the other two are loading. The estimated carbon load in each column (1.25 m in diameter and 6.25 m high) is approximately 2.7 t. Loaded carbon is stripped using caustic soda, injected into the elution columns from bottom to top at a concentration of 1% by weight with 200 L of ethylic alcohol (per batch) kept at 95°C. The pregnant solution is stored in a tank, with overflow to feed the electrowinning circuit. The electrowinning circuit consists of six cathodes and seven anodes, energized with a 360 A current and a voltage of 3.5 V to 4.0 V.

Jaguar ships the electrowinning sludge to a third party for smelting and refining.

17.6 Acid Washing

The activated carbon first undergoes a stripping process in the elution columns, where the adsorbed gold is removed by a 1% (by weight) NaOH solution at 95°C. It is then conveyed to a surge tank via an ejector directed towards a 28 mesh screen for the removal of fines (undersize). The screen oversize is conveyed to an 8 m^3 fibreglass acid washing tank. Acid washing is necessary to maintain the loading capacity of the activated carbon since the mineral matrix possesses other cations such as calcium, iron, copper, zinc, and lead that compete with gold in the interstices of the activated carbon. The acid washing is completed by passing an acid solution of HCl at 10%, removing the impurities that diminish the capacity of the carbon to adsorb gold, mainly carbonates and basic metals.

The acid solution of HCl at 10% (by weight) is prepared in a fibreglass HCl solution tank by adding water and HCl at 33% by weight. This solution is injected at the bottom and discharged at the top of the acid washing tank by overflow, returning to the HCl solution tank by gravity. The time involved in the acid washing is approximately 16 hours.

Once acid washing is completed, the acid solution is drained towards a neutralization tank. The carbon will be neutralized with a 1% (by weight) NaOH solution using a procedure identical to the one used for the acid solution. The neutralization time ranges from one to two hours, depending on the pH control of the recycled solution. The remaining solution is also drained to the neutralization pond. Thereafter, the carbon is washed with water in an open circuit with regards to the neutralization pond. This operation lasts approximately two hours. After these stages, the carbon is transferred to the 28 mesh screen and can be conveyed to the carbon addition circuit in the volumetric control vessel, and then to the last adsorption tank in the CIP circuit. A furnace is not employed for carbon regeneration as the expected performance in regeneration was not successfully achieved.

17.7 Detoxification Plant

The CIP adsorption tank tailings (86 tph at 42% solids) are conveyed by gravity to a belt screen to avoid carbon loss and then to a tailings pulp treatment plant (TPTP or Detox plant) and then to the filter and paste fill plant. Caro's acid (a mixture of concentrated sulphuric acid and hydrogen peroxide) is used in the Detox plant for cyanide destruction.

17.8 Filter and Paste Fill Plant

The treated tailings from the Detox plant, a pulp at 42% solids by weight, are conveyed to a pumping station where they are sent by rubber lined centrifugal pumps (75 HP – one operating and one standby) to the filter and paste fill plant, which is located about one kilometre away from the pumping station. The slurry is received in a pulp storage tank, from which it is pumped to a hydrocyclone cluster, and the overflow feeds a thickener. The cyclone underflow, together with thickener underflow, feeds three drum filters (3.0 m ø x 4.9 m, 10 ft ø x 16 ft). The filtration process generates a cake and a filtrate (liquid phase). The thickener overflow is recycled to the industrial water tank for process water. The filtrate, less than 3% of the total tailings, as ultra-fines is pumped to the tailings dam for polishing and water management.

The cake from the filters, after having gone through the stages of the filtration cycle (cake formation, washing, drying, blow, and discharge), contains approximately 30% moisture. The filter cake is either conveyed to the paste fill circuit or transported by truck and placed in a dry stack filtered tailings storage facility if it is not needed for mine backfill.

The filter cake conveyed to the paste fill circuit is used for cemented underground paste backfill. It is conveyed with a 914.4 mm (36 in) wide x 27 m long conveyor belt to the cake preconditioning hopper, after which the cake is sent to the weigh hopper where additives such as Portland cement or, alternatively, "Fosbinder" are added in proportion to the cake mass flow. Other binders aimed to impart structural properties to the paste, as well as to neutralize excess acidity due to the binders high carbonate content, can also be added. The cake is then directed to the paste mixer for the final paste production. The paste is then used as fill in the underground mine.

The paste fill plant uses a batch process, which allows better control of the paste characteristics for backfill than a continuous process.

17.9 Energy, Water, and Process Materials Requirements

Power requirements for the processing facilities are not anticipated to change significantly in the foreseeable future from the current energy requirements (approximately 51,200 MWh).

Water consumption is not expected to change significantly from the recent historical water usage (1.94 million m^3) and no supply concerns have been noted.

Key reagents used in the process include hydrated lime, cyanide, caustic soda, hydrochloric acid, sulphuric acid, liquid oxygen, and hydrogen peroxide.

The annual reagent consumptions are presented in Table 17-1.

Table 17-1: Annual Reagent Consumptions
Jaguar Mining Inc. – Turmalina Mine Complex

Reagent	Units	Quantity
Grinding media	t	613
Hydrochloric acid	kg	172,540
Caustic soda	kg	46,725
Sulphuric acid	kg	348,559
Lead nitrate	kg	5,200
Carbon	kg	22,000
Sodium cyanide	t	689
Liquid oxygen	m^3	1,038,273
Hydrated lime	t	469
Hydrogen peroxide	kg	324,789
Flocculant	kg	6,475

17.10 Manpower

The total number of Plant personnel is 100 (60 plant and 40 maintenance).

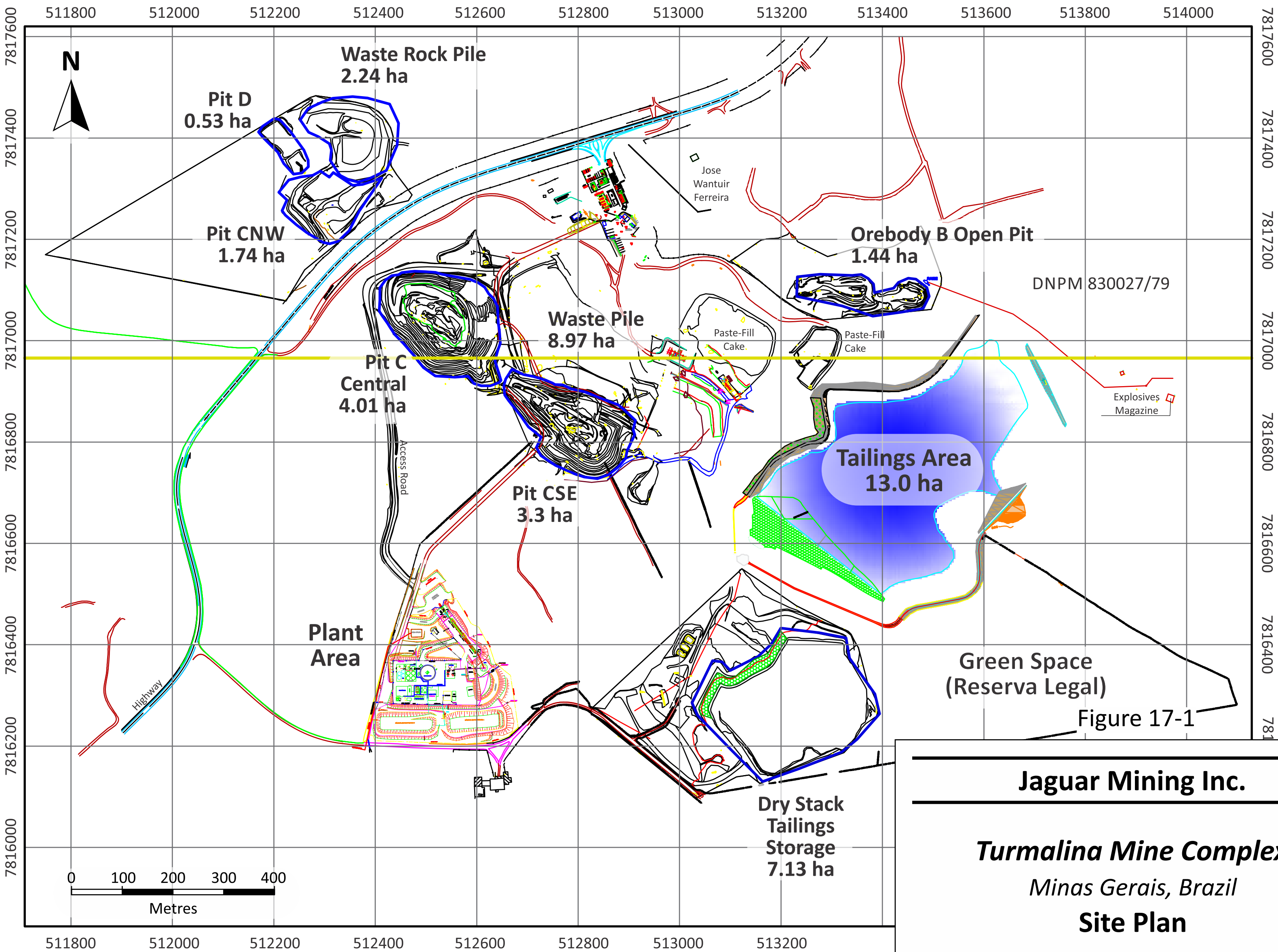


Figure 17-1

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Site Plan

March 2022

Source: Jaguar Mining Inc., 2020.

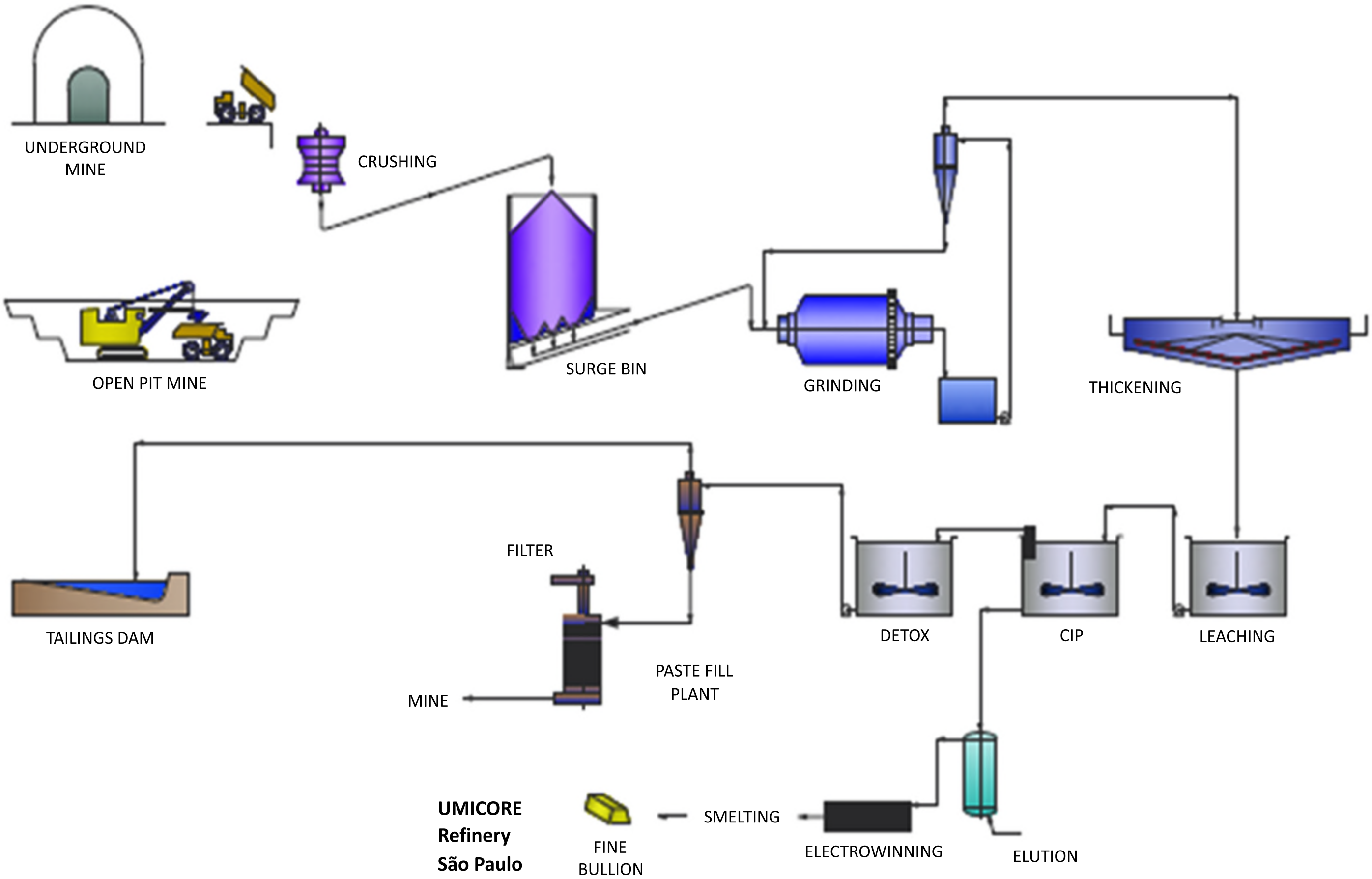


Figure 17-2

Jaguar Mining Inc.

Turmalina Mine Complex

Minas Gerais, Brazil

Process Flowsheet

March 2022

Source: Jaguar Mining Inc., 2020.

18.0 PROJECT INFRASTRUCTURE

The Complex includes the Turmalina Plant, with a nominal capacity of 2,000 tpd, and tailings disposal area. Electrical power is obtained from the national grid.

Ancillary buildings located near the mine entrance include the gate house with a reception area and waiting room, administration building, maintenance shops, cafeteria, warehouse, change room, first aid room, and compressor room. The explosives warehouse is located 1.2 km away from the Turmalina Mine area, in compliance with the regulations set forth by the Brazilian Army. There is no camp at the Turmalina Mine site.

Additional ancillary buildings are located near the Turmalina Plant and include an office building, a laboratory, warehouse, and a small maintenance shop.

There is no infrastructure related to the Faina and Pontal historic open pit operations.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Markets

Gold is the principal commodity at the Turmalina Complex and is freely traded at prices that are widely known, so that prospects for sale of any production are virtually assured. A gold price of $1,650/oz Au was used for estimation of Mineral Reserves.

19.2 Contracts

The SLR QP reviewed recent costs for transportation, security, insurance, and sales of doré, and considers them to be within industry norms.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 Environmental Studies

Environmental studies pertaining to acid rock drainage (ARD) potential have been carried out as requested by the National Environmental and Sustainable Development Agency (SUPRAM for its acronym in Portuguese), on Operation Licence ('Licença de Operação', or LO) 012/2008. These studies continued from 2007 through 2017. In February 2018, Galapagos Consultoria Ltda issued a specialized report, which indicated low ARD potential for the mined material due to the low concentration of sulphides and the presence of compounds with neutralization potential, such as carbonates (Galapagos, 2018). However, the study also indicated arsenic leaching potential and, as a result, Jaguar initiated a contamination plume investigation. Jaguar has officially informed SUPRAM about the arsenic leaching potential.

In 2021, Jaguar developed the "Environmental Performance Assessment Report" as a way to confirm if all the Turmalina operation controls and required best practices were being completed and supervised in accordance with the legal standards. This comprehensive report will be delivered to SUPRAM in 2022, in support of the reassessment process for the LO.

20.2 Project Permitting

20.2.1 Original Turmalina Project Licences

In 2005, Jaguar applied for a Preliminary Licence ('Licença Prévia', or LP) related to the original Turmalina Gold Project, for both the open pit and underground exploitation of the sulphide mineralized body on Mining Concession ANM 812.003/75 and the mineral processing plant. LP 078/2005 was granted to Jaguar in October 2005. Along with the LP application, an environmental study was submitted which formed an Environmental Control Report ('Relatório de Controle Ambiental', or RCA). In November 2005, Jaguar applied for an Installation Licence ('Licença de Instalação', or LI) for the Turmalina Gold Project. In August 2006, COPAM, the State Environmental Policy Council, granted Jaguar the LI (LI 114/2006) upon review of the Environmental Control Plan ('Plano de Controle Ambiental, or PCA). An Operation Licence for the Turmalina Gold Project was applied for in February 2007 and was granted in June 2008 (LO 012/2008).

Jaguar applied for the revalidation of the LO in March 2012, renovating all the operations at the Complex, including the tailings disposal system, the Turmalina Plant, and Turmalina Mine, which are currently under review by SUPRAM under process 01154/2005/012/2012. In August 2018, Jaguar submitted an additional information report as requested by SUPRAM. A list of the existing permits is presented in Table 20-1 and Table 20-2.

Table 20-1: List of Existing Operating Licences
Jaguar Mining Inc. – Turmalina Mine Complex

Enterprise	Certificate Number	Process Number (PA COPAM)	ANM	Granting Date	Expiration Date (DD/MM/YYYY)	Observation
Plant, waste pile, open pit and underground mine	LO 012/2008	01154/2005/003/2007	812.003/1975	19/06/2008	19/06/2012	This licence is in revalidation process since 2012 (PA COPAM 01154/2005/012/2012).
Tailings dam	LO 012/2009	01154/2005/008/2009	812.003/1975	17/12/2009	17/12/2013	This licence is in revalidation process since 2012 (PA COPAM 01154/2005/012/2012).
Expansion Project – plant, waste pile, open pit and underground mine	LOC 076/2009	01154/2005/007/2009	812.003/1975	17/12/2009	17/12/2013	The LOC 076/2009 improved the first licence (LO 012/2008). This licence is in revalidation process since 2012 (PA COPAM 01154/2005/012/2012).

Note:

1. Application to renew these permits has been submitted; renewal approvals are pending.
2. Some complementary information was requested by SUPRAM and has been supplied by Jaguar environmental personnel. According to the law (Deliberação Normativa COPAM 17/1996) the licences remain valid.

Table 20-2: List of Water Use Licences
Jaguar Mining Inc. – Turmalina Mine Complex

Ordinance	Grant Date (DD/MM/YYYY)	Expiration Date (DD/MM/YYYY)	Procedure Number	Watercourse	Permitted Rates	Status	Revalidation Process Number
00716/2011	05/04/2011	17/03/2017	12594/2010	Pará river	Surface water – 28.3 L/s	In revalidation process	45241/2016
00579/2009	10/03/2009	09/03/2014	07142/2008	Dam	24 L/s	In revalidation process	5360/2014
1207694/2020	10/10/2020	10/10/2030	13594/2017	Lowering water Level for Mining	470.9 m^3/h	Valid	NA
1207435/2019	27/08/2019	27/08/2024	11549/2014	Water well	4.6 m^3/h	Valid	NA
02783/2009	20/10/2009	20/10/2013	01170/2008	Water well	6.77 m^3/h	In revalidation process	20869/2013

20.2.2 Expansion Project Licences

Minas Gerais State Decree 44.844/2008 of June 25, 2008, states that given the operating situation and production status at the Turmalina Mine, Jaguar was allowed to apply directly for an LO for the Expansion Project, which was granted in December 2009 (LO-C 076/2009). To be able to start the development works at the Expansion Project, Jaguar applied for an Environmental Authorization for Operation (AAF), as reported below.

In April 2008, Jaguar applied for two AAFs, one for underground and the other for open pit operations in Orebody C, located on ANM 803.470/1978. The AAF for the underground operations was granted by SUPRAM in September 2008 (AAF 04524/2008) and the AAF for the open pit was granted in January 2009 (AAF 00001/2009).

For the open pit operations at Faina, located on ANM 812.003/1975, an AAF was applied for in September 2009 and granted by SUPRAM in June 2010 (AAF 01822/2010).

The AAFs for an open pit mine allow for the mining of 50,000 tpa at each of Orebody C and Faina, while the AAF for an underground mine permits mining of 100,000 tpa.

An LP and LI for the Expansion Project was applied for in November 2009, and granted in February 2011 (LP+LI 001/2011). In June 2013 the open pit operations at Faina were suspended.

20.2.3 Turmalina and Turmalina Expansion Tailings Disposal System Licences

All tailings are either dry stacked on surface or used as cemented paste fill underground. A facility which includes a dam was in use until September 2021, and is now in the process of closure.

The upper portion of the central Orebody C was mined using the open pit method, which is now complete. Part of the mine surface area does not belong to Jaguar. The benches were designed to have a slight incline (1.0%) from slope crest to toe to allow drainage of storm and ground water. Benches between elevations 750 m and 720 m also had an incline of 1% to their toes at the natural ground level. Below elevation 720 m, sumps were constructed to collect all ground and storm water, which was then pumped to the mine’s water treatment system.

Orebody C is currently being mined using SLOS. Underground mining of Orebody C was fully integrated with the remainder of Turmalina’s underground mining operations, including the opening of a ramp and access drifts to the bodies from the main decline. After being mined, panels are filled with paste fill from the current Turmalina paste backfill plant. This underground method is considered to be favourable from an environmental impact perspective, since placing paste backfill in the stope panels reduces the requirement for surface tailings storage.

Jaguar applied for an LI for the tailings disposal system in November 2007, along with the Environmental Impact Assessment/Report of Impacts on the Environment (EIA/RIMA) and the PCA. The application and pertinent documents were reviewed by SUPRAM, and LI 005/2009 was granted in August 2009. The LO for the tailings disposal system operations was applied for in September 2009 and granted in December 2009 (LO 012/2009).

All dams are inspected by an external geotechnical consultant. There are semi-annual geotechnical stability inspections done by an external geotechnical consultant. The stability consultant for the first inspection in 2021 was DAM Engenharia and for the second was GEOHIDROTECH Engenharia.

The tailings system is a single downstream step with a full capacity of 790,682 m^3. The detailed engineering for the tailings disposal system was completed by the local consulting company Engeo Ltda (ENGEO).

All tailings are first detoxified in a Caro's acid detoxification plant (CyPlus technology – "cold"). The detoxification plant was constructed by EVONIK in Mobile, Alabama, USA. The process was conceived by CyPlus, a Degussa technology company that specializes in the application of peroxide, SO_2, and/or Caro's acid to detoxify cyanide residue and arsenic from the tailings of gold processing plants. The selected treatment uses Caro's acid as a reagent to promote the decomposition of cyanide to cyanate and to reduce the concentration of arsenic in the tailings that will be used in the production of the paste fill.

In order to generate Caro's acid, concentrated sulphuric acid is mixed with 50% oxygenized water in a Teflon/stainless steel reactor. Caro's acid promotes the oxidation of cyanide to cyanate, and cyanate is considered to be 1,000 times less toxic than cyanide. The cyanate then decomposes into carbon dioxide and ammonia by hydrolysis.

Caro's acid acts with efficiency to eliminate arsenic while in solution, causing the oxidation of As(III) to As(IV); As(IV) is easily precipitated with ions from iron, calcium, and magnesium. Under these conditions, the used metal becomes immobilized in the paste fill, neither interacting with the environment nor undergoing any type of leaching being dissolved by the underground water or by rainfall (if the paste is not contained and piled outside).

After the detoxification process, the pulp is sent to two 0.25 m (10 in.) cyclones, where it is either thickened to make paste fill or, if there is no current need for paste, sent to the tailings disposal system.

When required for use as backfill, the cyclone underflow from the Turmalina Plant, with 70% solids, is used in the production of the paste fill and then returned to the mine as fill to the mining stopes. The overflow, with fine solid particles and the majority of the water, is thickened and also used in the production of the paste fill. In the event of a temporary malfunction of the process, the referred material is sent to the emergency chambers or to the tailings disposal system. The detoxified solution, separated from the tailings, is then recirculated for use in the Turmalina Plant, thus closing the circuit for the process water.

MSOL/Jaguar stopped the hydraulic release of tailings at the Turmalina dam on September 27, 2021, with the shutdown and inactivation of the Usina-Dam transport line, and with the activation of the pumping line for the Usina-Pond, a reactivated pond located inside the beneficiation plant.

A new waste stockpile has been designed for waste rock storage adjacent to the existing Turmalina waste stockpile. It has the same configuration as the existing stockpile, with a bench height of 10 m, bench width of 5 m, slope face angle of 30°, and overall stockpile angle of 26°.

20.3 Social or Community Requirements

The Turmalina operations are located close to the border of the municipality of Conceição do Pará in the central western part of the state of Minas Gerais, near the town of Casquilho.

Casquilho's community is a district of Conceição do Pará and is in the area that is directly impacted by the operations. There are limited infrastructure services available in the town of Casquilho, due to its size. Services are sourced from Pitangui, located 15 km from Conceição do Pará.

State road MG 423 divides Casquilho's community into Casquilho de Baixo (lower Casquilho) and Casquilho de Cima (upper Casquilho), with a total population of 130 families. The majority of the Casquilho de Cima houses are permanently occupied and most residents work in Pitangui. Only five houses are used as weekend properties.

Casquilho de Cima's community is supplied with water and power by the state-run companies Copasa and Companhia Engergetica de Minas Geraise S. A. (CEMIG). The community does not have any sanitation sewage system. Traditional sanitation holes/ditches, typically built in the backyards, are used. No additional public services are available to the Casquilho de Cima residents.

Since the beginning of the Turmalina Mine operation, dust suppression has been carried out by Jaguar over the mine and plant access roads.

Jaguar has good community relationships with the surrounding communities.

20.4 Mine Closure Requirements

Six months before the mine is exhausted, Jaguar must submit the Mining Closure Plan ('Plano de Fechamento de Mina', or PAFEM) to SUPRAM for approval, according to the "Deliberação Normativa COPAM nº 220/2018". This regulation also enforces that all mining activities in the state of Minas Gerais include the rehabilitation plan of disturbed areas.

In 2021, Jaguar developed the internal procedures for the "Mined Areas Management (PGS-MA-23.7-JAG)" plan This initiative (and its main document) compiled all the current legislation and defined the steps and necessary actions to maintain suspended areas in good standing, to make all the necessary recovery works, and to shut down the mining operations accordingly in the future. The company Brandt was contracted to develop the Closure Plan for all the mining rights belonging to Jaguar until 2024 and to review the Asset Retirement Obligation (ARO).

The actions and steps for the environmental recovery of the areas impacted by mining activity were adopted when the LI was granted and will continue until after the mine is exhausted.

The recovery of the surface areas will follow the following steps:

- Removal and stockpiling of the fertile soil layer
- Waste and backfill paste disposal
- Rehabilitation of the mined areas
- Topographical regularization
- Re-vegetation of the impacted areas, mainly those resulting from open pit mining
- Rehabilitation of drainage ditches, contention sumps, contention dikes, etc.

The following actions will be required with regard to the underground mine:

- Gradual refill of the exhausted panels
- Obstruction of the initial 50 m of the ramp with waste, to be stockpiled near the mine entrance in advance
- Construction of a cut at the mine entrance at an inclination of 35° to fill the opening created during the mine entrance development with the removed material. It will be completely filled, and the cut and fill re-vegetated.

- Obstruction of the entrances to the ventilation and emergency raises with a 10 m deep reinforced concrete wall. This will be done with waste material, to be stockpiled for this purpose in advance. The related surface areas will be re-vegetated.

20.4.1 Turmalina Dam Closure

Jaguar started the closure process for the Turmalina tailings dam in 2021. The project was developed by the Geohydrotech Engenharia, and was divided into three stages as follows:

- Stage 1 – install tailings cover (waste rock and HDPE geomembrane) and construct the spillway
- Stage 2 – place soil on top of the cover, construct the drainage channels and revegetate
- Stage 3 – construct the perimeter channel and widen crest

In 2021, Jaguar completed recontouring of the tailings surface and installation of the HDPE geomembrane to limit water infiltration. A spillway with capacity to convey the peak flow resulting from the 10,000 year return period event was constructed.

As of December 31, 2021, Jaguar estimated rehabilitation and reclamation costs to be US$7.08 million, on an undiscounted, uninflated basis as shown in Table 20-3.

Table 20-3: Progressive Rehabilitation and Closure Cost Estimates
Jaguar Mining Inc. – Turmalina Mine Complex

Description	2022	2023	2024	2025	2026	2027	2028	2029	Total
				US$ 000					
Waste Pile	23	82	74	340	165	47	21	9	761
Pit	23	11	8	0	0	0	0	0	42
Dam	4,113	311	0	0	0	0	0	0	4,425
Infrastructure	8	9	0	189	137	26	15	7	390
Plant	0	0	6	163	367	19	11	6	571
G&A	0	32	28	80	78	30	38	63	349
Contingency	23	33	28	189	205	30	19	19	546
Total	4,188	479	145	960	952	152	103	104	7,083

Notes:

1. Numbers may not add due to rounding.
2. No inflation or discount factors applied.

21.0 CAPITAL AND OPERATING COSTS

The Turmalina Complex LOM capital and operating costs were estimated in R$ based on recent operating results and Jaguar's budgets. The amounts were converted to US$ using an exchange rate of R$5.50 : US$1.00 for 2021.

21.1 Capital Costs

Table 21-1 presents the estimated capital and closure costs for Turmalina over the LOM. Table 21-2 presents the average unit capital costs used in the cut-off grade analysis. SLR notes that the capital costs include investments to continue operations beyond the Mineral Reserve-based mine life.

Table 21-1: LOM Capital Cost Summary
Jaguar Mining Inc. – Turmalina Mine Complex

Area	Units	Total	2022	2023	2024	2025	2026	2027	2028
Sustaining Capital									
Primary Development	US$ 000	28,127	4,628	8,615	12,847	2,036	-	-	-
Equipment	US$ 000	10,861	2,531	2,082	2,082	2,082	2,082	-	-
Engineering	US$ 000	6,991	1,398	1,398	1,398	1,398	1,398	-	-
Exploration	US$ 000	15,083	3,017	3,017	3,017	3,017	3,017	-	-
Subtotal Sust. Capital	US$ 000	61,062	11,575	15,113	19,344	8,533	6,497	-	-
Other Capital									
Working Capital	US$ 000	-	7,662	879	613	231	(580)	(3,527)	(5,279)
Growth Capital	US$ 000	14,601	7,945	4,312	781	781	781	-	-
ARO/Closure	US$ 000	6,825	4,036	461	139	925	917	346	-
Total Capital	US$ 000	82,489	31,218	20,765	20,878	10,471	7,616	(3,181)	(5,279)

Source: Jaguar, 2022

Table 21-2: Average Unit Capital Costs Used in the Cut-Off Grade Analysis
Jaguar Mining Inc. – Turmalina Mine Complex

Cost Category	US$/t
Primary Development	23.28
Exploration / Brownfield	1.25
Equipment / Engineering	8.95
Reclamation/Closure (ARO)	6.41
Non Sustaining	32.54
Total Capital Costs	72.43

Source: Jaguar, 2022

21.2 Operating Costs

Table 21-3 presents the estimated LOM operating costs for Turmalina in USD. Operating cost estimates include mining and processing, and general and administration (G&A). There are additional corporate overhead costs associated with the Belo Horizonte and Toronto offices, as well as royalties and refining costs, which are not included in the operating cost estimate.

Table 21-4 presents the unit operating costs that were used in the cut-off grade analysis and to calculate the values in Table 15-2 Cut-Off Grade Data. Operating costs are estimated as the unit costs multiplied by the tonnages in the LOM production schedule in Section 16 of this Technical Report.

All-In Sustaining cost (as defined by the World Gold Council) for the Turmalina Mine is $1,105/oz Au, including reclamation and closure.

Table 21-3: Life of Mine Operating Costs
Jaguar Mining Inc. – Turmalina Mine Complex

	Units	Total	2022	2023	2024	2025	2026	2027
Mining (Underground)	US$ 000	88,665	16,528	16,490	16,530	16,491	16,618	6,006
Processing	US$ 000	58,819	10,965	10,939	10,966	10,940	11,024	3,984
G&A	US$ 000	15,325	2,857	2,850	2,857	2,850	2,872	1,038
Total Operating Cost	US$ 000	162,809	30,350	30,280	30,354	30,282	30,514	11,029

Source: Jaguar, 2022

Table 21-4: Unit Operating Costs
Jaguar Mining Inc. – Turmalina Mine Complex

By Cost Type	US$/t Milled
Mining	
Labour	11.48
Maintenance	8.18
Electricity	1.76
External Services	5.09
Mining Materials	7.68
Mining Taxes	6.54
Subtotal Mining	40.73
Processing	
Labour	4.87
Maintenance	2.68
Electricity	4.49
External Services	4.04
Plant Consumables	10.94
Subtotal Processing	27.02
G&A	7.04
Total	74.79

Source: Jaguar, 2022

22.0 ECONOMIC ANALYSIS

This section is not required as the property is currently in production, Jaguar is a producing issuer, and there is no material expansion of current production. The SLR QP has verified the economic viability of the Mineral Reserves via cash flow modelling, using the inputs discussed in this Technical Report.

23.0 ADJACENT PROPERTIES

There are no adjacent properties relevant to the Turmalina Complex.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 Faina and Pontal Deposits

The Faina and Pontal deposits are satellite deposits of the Turmalina Mine and lie on strike with Turmalina's mineralized structure.

AngloGold explored the project area extensively between 1979 and 1988 using soil geochemistry sampling, ground geophysics surveys, and trenching. This exploration work led to the discovery of the project's mineralized zones, including Faina and Pontal. AngloGold subsequently drilled on these mineralized bodies to test their downward extension. In 1992 and 1993, it mined oxide ore at Faina and Pontal and recovered the gold with heap leaching. The remaining sulphide mineralization beneath their oxide zones is refractory.

The Mineral Resource estimates for the deposits are based on unoxidized mineralized material being mined by underground methods and transported to the Turmalina Plant for processing. A gold-rich flotation concentrate unit will be constructed at the existing plant. As the mineralization is refractory, the gold-rich concentrate will either be shipped off-site for oxidation and gold recovery by a third party or treated in a pressure-oxidation circuit constructed on-site before processing by CIL.

24.1.1 Faina

The Faina deposit is situated adjacent to the Turmalina Mine, and its Mineral Resource will be accessible from the mine's existing underground workings in the near future. The shallow oxide portions of the Faina deposit were previously mined by open pit. Due to the refractory nature of the sulphide mineralization beneath the oxide zone, the deeper portion of the Faina deposit remains to be exploited. Faina has the potential to add ounces to Jaguar´s production profile in the current five-year plan. Furthermore, additional drilling and deeper geological investigations will be completed along the down-plunge and strike of the currently defined portion of the Faina deposit.

The Faina deposit has potential for upgrading its Inferred Resources to the Indicated and Measured categories, converting Mineral Resources to Mineral Reserves, and eventually advancing as a mine development project. The Faina deposit has the following favourable aspects:

- It is accessible from the existing underground workings of the Turmalina Mine.
- The knowledge and experience gained at Turmalina should be transferable to Faina.
- The Turmalina Plant and other surface infrastructure are already available on site, and the Turmalina Plant has available excess capacity.
- Land usage permitting may be minimal if surface disturbance can be avoided.

The Faina Mineral Resource consists of Measured and Indicated Resources of 261,000 t at a grade of 6.87 g/t Au for a total of 58,000 oz Au and Inferred Mineral Resources of 1.542 Mt at a grade of 7.26 g/t Au for a total of 360,000 oz Au.

Faina mineralized material is refractory and the Turmalina Plant is presently not capable of treating refractory mineralized material. A flotation circuit would be required to concentrate Faina material. The flotation concentrate would either be shipped off site for treatment by a third party or an oxidation circuit would need to be added on site prior to leaching. Faina processing costs per tonne of ore would be higher than for the current non-refractory ores, however, the processing cost per gold ounce would be lower due to the Faina material's higher grade.

The SLR QP recommends that Jaguar implement the following measures to advance the Faina project and upgrade its mineral inventory:

1. Proceed with the in-fill diamond drilling campaign planned to commence in Q1 2022 to upgrade Inferred Resource to the Indicated category.
2. Complete a preliminary economic assessment (PEA) to define the best approaches for mining the deposit and treating its mineralized material, then conduct a prefeasibility study (PFS) to demonstrate the deposit's economic viability to declare Mineral Reserves.
3. Continue with metallurgical test work on the Faina deposit's refractory material.

24.1.2 Pontal Deposits

The Pontal deposits are located approximately four kilometres northwest of the Turmalina Mine and one kilometre northwest of Faina. It encompasses three exploration targets: Pontal North, Pontal (historical Mineral Resource) and Pontal South. The Pontal deposits have several advantages as potential development projects.

- The Turmalina Plant and other infrastructure are nearby (approximately four kilometres).
- Faina's metallurgical test work will likely apply to Pontal as well
- The experience gained developing the Faina deposit will also help advance Pontal

A significant challenge to developing the Pontal deposits is the refractory nature of its mineralization. The Turmalina Plant is currently not capable of treating refractory mineralization. Refractory treatment circuits would need to be installed for treating Faina material and development of the Pontal deposits would extend the useful life of the refractory circuit or justify an expansion of the refractory circuit.

The SLR QP recommends that Jaguar implement the following measures to convert Inferred Resources at Pontal to the Measured and Indicated categories:

1. Conduct a PEA to define the best approaches for mining and processing the mineralized material.
2. Conduct a diamond drilling campaign and other exploration work at the Pontal deposits. The six holes drilled in 2021 focused on Pontal's southern extension.
3. Conduct metallurgical test work on Pontal's refractory material.

25.0 INTERPRETATION AND CONCLUSIONS

After depletion for 2021 production, estimated Mineral Reserve contained gold ounces have decreased 11% to 256,000 oz Au in 2021 compared to the 2019 Mineral Reserve estimate of 332,000 oz Au less 2020 production (287,000 oz Au).

Mineral Resources are considerably in excess of Mineral Reserves, reflecting good future potential to develop new areas and more fully utilize the capacity of the Turmalina Plant.

The SLR qualified persons (QPs) offer the following conclusions by area:

25.1 Geology and Mineral Resources

- The Turmalina Complex Mineral Resource estimates were prepared in accordance with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM (2014) definitions).
- Measured and Indicated Mineral Resources total 4.65 million tonnes (Mt) at an average grade of 4.31 g/t Au, containing 645,000 oz Au, and Inferred Mineral Resources total 3.85 Mt at an average grade of 4.86 g/t Au, containing approximately 602,000 oz Au.
- A cut-off grade of 1.49 g/t Au was used to report Mineral Resources for the Turmalina deposit, while cut-off grades of 3.8 g/t Au and 2.9 g/t Au were used to report Mineral Resources for the Faina and Pontal deposits, respectively.
- Reconciliation studies on a quarterly basis demonstrate that the monthly Mine-to-Plant results exhibit a good correlation between the Turmalina Mine and the Turmalina Plant data throughout most of the 2020 and 2021 production periods, with the monthly block model predicted grades being generally greater than those processed by the Turmalina Plant and the block model predicted tonnes being generally less than those processed by the Turmalina Plant.
- Overall, there is good agreement between the Turmalina Plant data and the block model for the 2020 and 2021 period. This agreement suggests that the sampling strategies, assaying methods, and estimation procedures currently used at the Turmalina Mine to prepare the grade block models are producing reasonable predictions of the tonnages, grades, and contained metal being received at the Turmalina Plant.

25.2 Mining and Mineral Reserves

- The Turmalina Complex Mineral Reserve estimates were prepared in accordance with CIM (2014) definitions.
- Proven and Probable Mineral Reserves total 2.18 Mt at a grade of 3.66 g/t Au, containing 256,000 oz Au.
- The Turmalina deposit is suitable for SLOS, considering the orebody's configuration and geotechnical characteristics. Both transverse and longitudinal SLOS methods are currently used at the Turmalina Mine.
    - Transverse SLOS is used in the wide part of Orebody A known as the Principal Zone.
    - Longitudinal SLOS is used in the remainder of Orebody A and all of Orebodies B and C.
- Orebody C has replaced Orebody A as the Turmalina Mine's principal production source.

- Once mined out, stopes are backfilled with either rockfill or paste fill.
  - Rockfill consists of waste from mine development.
  - Paste fill comes from the paste fill plant located near the Turmalina Plant and is prepared from detoxified CIP tailings.
- Longholes are drilled as upholes.
- Access to the underground levels is via a system of ramps.
- Stopes are accessed via sublevel development driven from the ramp, with a sublevel interval of 20 m.
- The Turmalina Mine's ground support procedures generally require 2.4 m long resin grouted helicoidal bolts to be installed on a 1.5 m x 1.5 m pattern. In addition, cable bolting is required in ore drift hanging walls with blocky ground and at intersections. Screen may also be installed in specific situations and may be pinned to the rock with split sets.
- The Turmalina Mine's ventilation system is pull type with fresh air drawn down the ramp and an intake raise and return air exhausted via three ventilation raises.
- The Turmalina Mine operations area has a workforce of approximately 700 personnel, with Jaguar personnel accounting for approximately 62% of the workforce and the remainder being contractor employees.

25.3 Metallurgy and Processing

- The Turmalina Plant achieves consistent recoveries between 87% and 92%.
- Production capacity for the Turmalina Plant exceeds the current mine production rate.
- TESTWORK Desenvolvimento de Processo Ltda. (TDP) conducted a series of diagnostic tests on two composite samples to determine the amenability of gold extraction from Faina material using different processes. The highest gold recovery achieved was from a combination of gravity concentration followed by flotation of gravity tails on sample SF1 (92.36% overall gold recovery).
- The SLR QP does not consider TDP's approach to metallurgical testing to be systematic, as not all activities proposed were performed and there was no evidence of mineralogical characterization work or comminution testing having been performed prior to test program development. Full particle size analyses and Bond Ball Mill Work Index (WI) were not reported. In addition, test work proposed for flotation products (settling and filtration tests, classification tests, and acid rock drainage (ARD) tests) were not performed.
- The viability of bioleaching methods for treatment of Faina mineralization has not been reported as test results are pending.
- The SLR QP concurs with TDP that further testing is required to confirm the metallurgical response of the Faina mineralization, however, the SLR QP is of the opinion that representativeness of the samples needs to be confirmed and addressed. Collection of metallurgical samples from the Faina deposit that are representative of the material to be mined over the life of mine (LOM) plan remains a key issue.

25.4 Infrastructure

- The Complex includes the Turmalina Plant, with a nominal capacity of 2,000 tpd, and tailings disposal area.

- Electrical power is obtained from the national grid.
- The infrastructure at the Complex is sufficient to support current mining operations.

25.5 Environment

- No environmental issues were identified from the documentation available for the SLR QP's review. The Complex complies with applicable Brazilian permitting requirements. The approved permits and the licence renewals address the Brazilian authority's requirements for mining extraction and operation activities.
- Environmental monitoring is carried out by Jaguar at the Turmalina Complex according to the obligations defined in the environmental permits. These include surface water quality, groundwater quality, air quality, and ambient noise.
- The SLR QP's review of social or community requirements indicates that, at present, the Turmalina Complex represents a positive contribution to sustainability and community well being. Jaguar continues to develop a strong relationship with the nearby communities and stakeholders. Jaguar's commitment to community development and programs is demonstrated through its ongoing investments in the "Seeds of Sustainability" program. Information on any existing or potential archeological resources was not provided at the time of this review, nor were any site-specific policies or guidelines.

26.0 RECOMMENDATIONS

The SLR QPs offer the following recommendations by area.

26.1 Geology and Mineral Resources

26.1.1 Exploration

1. Continue planned exploration, targeting shallow extensions to mineralization along the Orebody C trend as well as drilling the down-plunge and along-strike projections of Orebodies A and C.
2. Proceed with the in-fill diamond drilling campaign planned at Faina to upgrade Inferred Resources to the Indicated category.
3. Conduct a diamond drilling campaign and other exploration work at the Pontal deposits.

26.1.2 Quality Assurance/Quality Control

1. Amend the Quality Assurance/Quality Control (QA/QC) program to include the channel samples.
2. Amend the database as a minimum to improve the data extraction functionality so that standard QA/QC control charts can be prepared. The QA/QC charts must clearly indicate results received from each laboratory.
3. When the assay laboratory automatically re-assays samples containing gold grades greater than 30 g/t Au, report all sample results to the site, without averaging, rather than the average of the re-assays.
4. Modify the drill hole database assay information such that the final gold assay used to prepare grade estimates is the average of all assays for a given sample. At present, only the first assay is used. This information can be captured by creating an additional column in the assay table.
5. Include the certificate number for each assay batch into Jaguar's central database (MX Deposit).
6. Update the MX Deposit database to store drill core recovery, channel sample recovery, and sample tracking (lost sample) information. This will assist in deciding how to address null values in future resource estimates.

26.1.3 Mineral Resources

1. Continue drill programs to outline the down-plunge continuation of Orebody A and Orebody C as long as drill intercepts continue to demonstrate economic viability.
2. Carry out a review of the surveying practices and quality control procedures to ensure that all drill hole collars are accurately located prior to entry into the final drill hole database.
3. Continue to correct the erroneous or anomalous information (not used in the estimation of Mineral Resources) for older drill holes that are located in the as-yet unmined portions of the Turmalina deposit. Time permitting, the same corrections can be made to the mined out portions of the Turmalina deposit in an effort to improve the quality of the data underlying any multi-year reconciliation analysis.
4. Modify the wireframe construction strategy to use a cut-off grade that more closely reflects the Mineral Resource cut-off grade for each orebody.

5. Re-examine and adjust gold capping values as required based on reconciliation information.
6. Collect bulk density measurements from mineralized drill core samples in future drilling programs.
7. Continue geological mapping of all available underground excavations in the vicinity of the Orebody C mineralized wireframes. Use the results of this geological mapping to prepare a lithological model with the intent of improving the allocation of the density measurements for future Mineral Resource updates.
8. Continue studies to examine the relationship of the gold values to structural, alteration, or lithologic features (such as the presence of quartz veining, for instance) to aid in the understanding of the distribution of the higher grade gold values observed in Orebody C.
9. Consider the use of a dynamic anisotropy method for estimation of gold grades into the model.
10. Review anisotropy ratios on an individual wireframe basis rather than on a deposit basis.
11. When no Cavity Monitoring Survey (CMS) model is available for a given excavation volume, use the design shape for the excavations in question (suitably modified for the estimated amount of overbreak) as a proxy when preparing the reconciliation reports.
12. Conduct a short study to determine the optimum selection of search strategy input parameters to reduce the number of estimation artifacts and reduce the degree of smoothing for these mineralized lenses.
13. Collect additional drill hole information in areas of low drilling density to improve the confidence level of the Mineral Resource estimate, to reduce and remove the estimation artifacts, and to search for the down dip projections of the mineralization.
14. Reconcile the Mineral Resource estimate with ongoing production in 2022 to gain an understanding of the forward looking reliability of the estimate.
15. Adjust Deswik parameters to better align to the local strike and dip variations of the resource wireframes.

26.2 Mining and Mineral Reserves

1. Consider modelling mining costs by orebody, such that variable and incremental cut-off grades can be determined by orebody and the Mineral Reserve estimate, LOM plan, and processing capacity can be optimized.
2. Balance production levels between Orebody A and Orebody C for improved production stability and a more operationally achievable LOM plan.
3. Consider an annual long term planning cycle inclusive of strategic asset planning and Mineral Resource and Mineral Reserve estimation for all Jaguar operations.
4. Undertake a detailed incremental cost analysis, by orebody, to ensure that uneconomic material is not sent to the Turmalina Plant. Currently, the cost data available from the Turmalina Mine is not easily categorized. Unit mining costs vary between Orebody A and Orebody C, given significant differences between mining width, production rates, ground conditions, and haul distances. The Turmalina Plant has excess production capacity, not otherwise put to use.
5. Complete a preliminary economic assessment (PEA) to define the best approaches for mining and processing the Faina and Pontal deposits. For the Faina deposit, conduct a prefeasibility study (PFS) to demonstrate the deposit's economic viability to declare Mineral Reserves.

26.3 Mineral Processing

1. Continue to conduct diagnostic metallurgical test work on representative samples from the Turmalina Mine and identify opportunities to improve metallurgical recoveries through modifications in the current plant process flowsheet, as well as assessing potential process options for the treatment of refractory material from Faina and Pontal.
2. Assess options for leveraging excess processing capacity.
3. Once representative samples are collected for the Faina deposit, consider a mineralogical examination in conjunction with additional metallurgical testing of the Faina mineralization to confirm the metallurgical response and gold recoveries observed in preliminary testing of composite samples SF1 and SF2.
4. Conduct metallurgical test work on representative samples of the refractory material from the Pontal deposits.
5. Complete any outstanding work from TDP's proposed test program, including mineralogical evaluation, comminution testing, settling and filtration tests, classification tests, and ARD tests.

26.4 Environment

1. Consider expanding the air quality monitoring program by adding stations at the Turmalina Mine.
2. Continue to review management and mitigation corrective actions, as applicable, based on the data collected from the environmental monitoring programs.
3. Install piezometers and displacement monitoring instrumentation for the existing and proposed filtered tailings stacks.
4. Monitor the long term displacement and phreatic levels within filtered tailings stacks to observe trends and confirm physical stability.
5. Monitor seepage from all tailings disposal areas to confirm chemical stability.
6. Complete the standardization of management processes in 2022 according to the mapped strategy that was initiated in 2021.

The budget for carrying out the recommendations is included within the Life of Mine capital and operating costs presented in this Technical Report.

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Thorman, C.H., and Ladeira, E.A., 1991, Introduction to a workshop on gold deposits related to greenstone belts in Brazil--Belo Horizonte, Brazil, 1986 in Thorman, C.H. Ladeira, E.A., and Schnabel, D.C., eds., Gold deposits related to greenstone belts in Brazil —Deposit modeling workshop, Part A--Excursions: U.S. Geological Survey Bulletin 1980-A, pp. A5-A22.

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28.0 DATE AND SIGNATURE PAGE

This report titled "Technical Report on the Turmalina Mine Complex, Minas Gerais, Brazil" with an effective date of December 31, 2021 was prepared and signed by the following authors:

(Signed & Sealed) ***Reno Pressacco***

Dated at Toronto, ON March 31, 2022	Reno Pressacco, M.Sc., (A)., P.Geo. Associate Principal Geologist

(Signed & Sealed) ***Dorota El-Rassi***

Dated at Toronto, ON March 31, 2022	Dorota El-Rassi, M.Sc., P.Eng. Consultant Geologist

(Signed & Sealed) ***Renan G. Lopes***

Dated at Toronto, ON March 31, 2022	Renan G. Lopes, M.Sc., MAusIMM CP(Geo) Consultant Geologist

(Signed & Sealed) ***Pierre Landry***

Dated at Victoria, BC March 31, 2022	Pierre Landry, P.Geo. Consultant Geologist

(Signed & Sealed) ***Stephen R. Blaho***

Dated at Toronto, ON March 31, 2022	Stephen R. Blaho, MBA, P.Eng. Principal Mining Engineer

(Signed & Sealed) ***Jeff Sepp***

Dated at Toronto, ON March 31, 2022	Jeff Sepp, P.Eng. Consultant Mining Engineer

(Signed & Sealed) ***Brenna J.Y. Scholey***

Dated at Toronto, ON
March 31, 2022

Brenna J.Y. Scholey, P.Eng.
Principal Metallurgist

29.0 CERTIFICATE OF QUALIFIED PERSON

29.1 Reno Pressacco

I, Reno Pressacco, M.Sc.(A)., P.Geo., as an author of this report entitled "Technical Report on the Turmalina Mine Complex, Minas Gerais, Brazil", with an effective date of December 31, 2021, prepared for Jaguar Mining Inc., do hereby certify that:

1. I am an Associate Principal Geologist with SLR Consulting (Canada) Ltd, of Suite 501, 55 University Ave., Toronto, ON, M5J 2H7.
2. I am a graduate of Cambrian College of Applied Arts and Technology, Sudbury, Ontario, in 1982 with a CET Diploma in Geological Technology, Lake Superior State College, Sault Ste. Marie, Michigan, in 1984, with a B.Sc. degree in Geology and McGill University, Montreal, Québec, in 1986 with a M.Sc.(A) degree in Mineral Exploration.
3. I am registered as a Professional Geologist in the Province of Ontario (Reg. #939). I have worked as a geologist for a total of 36 years since my graduation. My relevant experience for the purpose of the Technical Report is:

- Preparation, reviews and reporting as a consultant for Mineral Resource estimates on numerous exploration and mining projects around the world.
- Numerous assignments in North, Central and South America, Europe, Russia, Armenia and China for a variety of deposit types and in a variety of geological environments; commodities including Au, Ag, Cu, Zn, Pb, Ni, Mo, U, PGM, REE, and industrial minerals.
- Vice president positions with Canadian mining companies.
- A senior position with an international consulting firm, and
- Performing as an exploration, development, and production stage geologist for a number of Canadian mining companies.
- Preparation of Mineral Resource estimates for open pit and underground mines for the three prior years.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I most recently visited Turmalina Mine on December 13, 2017. I had previously visited the Turmalina Mine on November 20, 2014.
6. I am responsible for Sections 7.2.2, 9.2, and 14.3 and contributions to Section 27 of the Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have previously prepared public domain Mineral Resource estimates and Technical Reports for the properties that are the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Sections 7.2.2, 9.2, and 14.3 of the Technical Report, for which I am responsible, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 31st day of March, 2022

(Signed & Sealed) ***Reno Pressacco***

Reno Pressacco, M.Sc.(A)., P.Geo

29.2 Dorota El-Rassi

I, Dorota El-Rassi, M.Sc., P.Eng., as an author of this report entitled “Technical Report on the Turmalina Mine Complex, Minas Gerais, Brazil”, with an effective date of December 31, 2021, prepared for Jaguar Mining Inc., do hereby certify that:

1. I am Consultant Geologist with SLR Consulting (Canada) Ltd, of Suite 501, 55 University Ave., Toronto, ON M5J 2H7.
2. I am a graduate of the University of Toronto in 1997 with a B.A.Sc.(Hons.) degree in Geological and Mining Engineering and in 2000 with a M.Sc. degree in Geology and Mechanical Engineering.
3. I am registered as a Professional Geological Engineer in the Province of Ontario (Reg.# 100012348). I have worked as a geologist for a total of 25 years since my graduation. My relevant experience for the purpose of the Technical Report is:

- Review and report on exploration and mining projects for due diligence and regulatory requirements
- Mineral Resource estimates on a variety of commodities including gold, silver, copper, nickel, zinc, PGE, and industrial mineral deposits
- Experienced user of Gemcom, Leapfrog, Phinar’s x10 Geo, and Gslib software

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I did not visit the Project.
6. I am responsible for Sections 7.2.3, 9.3, and 14.4 and contributions to Section 27 of the Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Sections 7.2.3, 9.3, and 14.4 of the Technical Report, for which I am responsible, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of March, 2022

(Signed & Sealed) ***Dorota El-Rassi***

Dorota El-Rassi, M.Sc., P.Eng.

29.3 Renan G. Lopes

I, Renan G. Lopes, M.Sc., MAusIMM CP(Geo) as an author of this report entitled "Technical Report on the Turmalina Mine Complex, Minas Gerais, Brazil", with an effective date of December 31, 2021, prepared for Jaguar Mining Inc., do hereby certify that:

1. I am Consultant Geologist with SLR Consulting (Canada) Ltd, of Suite 501, 55 University Ave Toronto, ON M5J 2H7.
2. I am a graduate of University of São Paulo, São Paulo, Brazil, in 2010 with a Bachelor of Science degree in Geology and in 2016 with a Master of Science degree.
3. I am registered as a Chartered Professional with the Australasian Institute of Mining and Metallurgy (AusIMM CP(Geo)) (Reg.# 328085). I have worked as a geologist for a total of 11 years since my graduation. My relevant experience for the purpose of the Technical Report is:

- The preparation of mineral resources of gold and copper projects and operations in South America.
- Senior Geologist responsible for peer reviewing the geological modelling, estimative workflow, and mineral resources classification of several projects for precious and base metals and industrial minerals.
- Responsible for the implementation of geological modelling and estimation best practices on various mining projects.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I visited Turmalina, Faina, and Zona Basal from January 24 to 28, 2022.
6. I am responsible for Sections 7.2.4, 9.4, 10.0, 11.0, and 12.0 and contributions to Section 27 of the Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Sections 7.2.4, 9.4, 10.0, 11.0, and 12.0 of the Technical Report, for which I am responsible, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 31st day of March, 2022

(Signed & Sealed) *Renan G. Lopes*

Renan G. Lopes, M.Sc, MAusIMM CP(Geo)

29.4 Pierre Landry

I, Pierre Landry, P.Geo., as an author of this report entitled "Technical Report on the Turmalina Mine Complex, Minas Gerais, Brazil", with an effective date of December 31, 2021, prepared for Jaguar Mining Inc., do hereby certify that:

1. I am Consulting Geologist of SLR Consulting (Canada) Ltd. My office address is 3960 Quadra Street, Unit 303, Victoria, BC V8X 4A3.
2. I am a graduate of Queen's University, Kingston, Ontario, in 2006 with a B.Sc.H degree in Geological Science (Major) and Economics (Minor).
3. I am registered as a Professional Geologist in the Province of British Columbia (Licence #47339), and in the Province of Newfoundland and Labrador (Reg. #10431). I have worked as a geologist for a total of 15 years since my graduation. My relevant experience for the purpose of the Technical Report is:

- Review and creation of block models as part of NI 43-101 Mineral Resource estimates, audits, and due diligence reports.
- Mine Exploration Geologist at operations and mine development projects in Canada, Africa, and South America.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Turmalina Complex.
6. I am responsible for Sections 1.1.1.1, 1.1.2.1, 1.3.1 to 1.3.6, 4.0, to 6.0, 7.1, 7.2.1, 7.3, 7.4, 8.0, 9.1, 14.1, 14.2, 25.1, and 26.1 and contributions to Section 27 of the Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Sections 1.1.1.1, 1.1.2.1, 1.3.1 to 1.3.6, 4.0, to 6.0, 7.1, 7.2.1, 7.3, 7.4, 8.0, 9.1, 14.1, 14.2, 25.1, and 26.1 of the Technical Report, for which I am responsible, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of March, 2022

(Signed & Sealed) ***Pierre Landry***

Pierre Landry, P.Geo.

29.5 Stephan R. Blaho

I, Stephan R. Blaho, MBA, P.Eng., as an author of this report entitled "Technical Report on the Turmalina Mine Complex, Minas Gerais, Brazil", with an effective date of December 31, 2021, prepared for Jaguar Mining Inc., do hereby certify that:

11. I am Principal Mining Engineer with SLR Consulting (Canada) Ltd, of Suite 501, 55 University Ave., Toronto, ON M5J 2H7.
12. I am a graduate of the Queen's University, Kingston, Ontario, Canada, in 1980 with a Bachelor of Science degree in Mining Engineering, and Western University, London, Ontario, Canada in 1984 with a Master of Business Administration degree.
13. I am registered as a Professional Engineer in the Province of Ontario (Licence Number: 90252719). I have worked as a mining engineer for more than 35 years since my graduation. My relevant experience for the purpose of the Technical Report is:

- Managing underground mining operations with a variety of mining methods in Canada and internationally.
- Planning and managing underground mining projects around the world.
- Managing technical studies for underground mines and mining projects, including scoping, PFS, and FS studies.

14. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
15. I have not visited the Turmalina Complex.
16. I am responsible for Sections 1.1.1.2, 1.1.2.2, 1.2, 1.3.7, 1.3.8, 1.3.11, 1.3.13, 1.3.14, 15.0, 16.0, 18.0, 19.0, 21.0 to 24.0, 25.2, and 26.2 and contributions to Section 27 of the Technical Report.
17. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
18. My involvement with the property prior to this technical report consists of two earlier technical reports that SLR carried out for the company.
19. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
20. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, 1.1.1.2, 1.1.2.2, 1.2, 1.3.7, 1.3.8, 1.3.11, 1.3.13, 1.3.14, 15.0, 16.0, 18.0, 19.0, 21.0 to 24.0, 25.2, and 26.2 of the Technical Report, for which I am responsible, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of March, 2022

(Signed & Sealed) *Stephan R. Blaho*

Stephan R. Blaho, MBA, P.Eng.

29.6 Jeff Sepp

I, Jeff Sepp, P.Eng., as an author of this report entitled “Technical Report on the Turmalina Mining Complex, Minas Gerais, Brazil”, with an effective date of December 31, 2021, prepared for Jaguar Mining Inc., do hereby certify that:

21. I am a Consultant Mining Engineer with SLR Consulting (Canada) Ltd, of Suite 501, 55 University Ave., Toronto, ON M5J 2H7.
22. I am a graduate of Laurentian University, Sudbury, Ontario in 1997 with a B.Eng. degree in Mining.
23. I am registered as a Professional Engineer in the Province of Ontario (Reg.# 100139899). I have worked as a mining engineer for a total of 25 years since my graduation. My relevant experience for the purpose of the Technical Report is:

- Mine planning, open pit and underground mine design and scheduling, ventilation design and implementation for numerous projects in Canada, USA, Turkey, Saudi Arabia, United Kingdom, Mali, Tanzania, Ghana, and Sweden.
- Senior mining consultant at MineRP Canada Limited.
- Mining engineer/ventilation specialist for a number of Canadian mining companies, including CVRD Inco (now Vale) and Cameco Corp.

24. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
25. I visited the Turmalina Complex on December 11, 2018.
26. I am responsible for Sections 1.1, 1.1.1.4, 1.1.1.5, 1.1.2.4, 1.3.10, 1.3.12, 2.0, 3.0, 20.0, 25.4, 25.5 and 26.4, and contributions to Section 27 of the Technical Report.
27. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
28. I have had no prior involvement with the property that is the subject of the Technical Report.
29. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
30. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Sections 1.1, 1.1.1.4, 1.1.1.5, 1.1.2.4, 1.3.10, 1.3.12, 2.0, 3.0, 20.0, 25.4, 25.5 and 26.4 of the Technical Report, for which I am responsible, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of March, 2022

(Signed & Sealed) ***Jeff Sepp***

Jeff Sepp, P.Eng.

29.7 Brenna J.Y. Scholey

I, Brenna J.Y. Scholey, P.Eng., as an author of this report entitled "Technical Report on the Turmalina Mine Complex, Minas Gerais, Brazil", with an effective date of December 31, 2021, prepared for Jaguar Mining Inc., do hereby certify that:

1. I am Principal Metallurgist with SLR Consulting (Canada) Ltd., of Suite 501, 55 University Ave., Toronto, ON M5J 2H7.
2. I am a graduate of The University of British Columbia in 1988 with a B.A.Sc. degree in Metals and Materials Engineering.
3. I am registered as a Professional Engineer in the Province of Ontario (Reg. #90503137) and British Columbia (Reg. #122080). I have worked as a metallurgist for a total of 34 years since my graduation. My relevant experience for the purpose of the Technical Report is:

- Reviews and reports as a metallurgical consultant on numerous mining operations and projects for due diligence and regulatory requirements.
- Senior Metallurgist/Project Manager on numerous base metals and precious metals studies for an international mining company.
- Management and operational experience at several Canadian and U.S. milling, smelting and refining operations treating various metals, including copper, nickel, and precious metals.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I did not visit the Turmalina Mine Complex.
6. I am responsible for Sections 1.1.1.3, 1.1.2.3, 1.3.9, 13.0, 17.0, 25.3, and 26.3, and contributions to Section 27 of the Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Sections 1.1.1.3, 1.1.2.3, 1.3.9, 13.0, 17.0, 25.3, and 26.3of the Technical Report, for which I am responsible, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 31st day of March, 2022

(Signed & Sealed) *Brenna J.Y. Scholey*

Brenna J.Y. Scholey, P.Eng.

www.slrconsulting.com