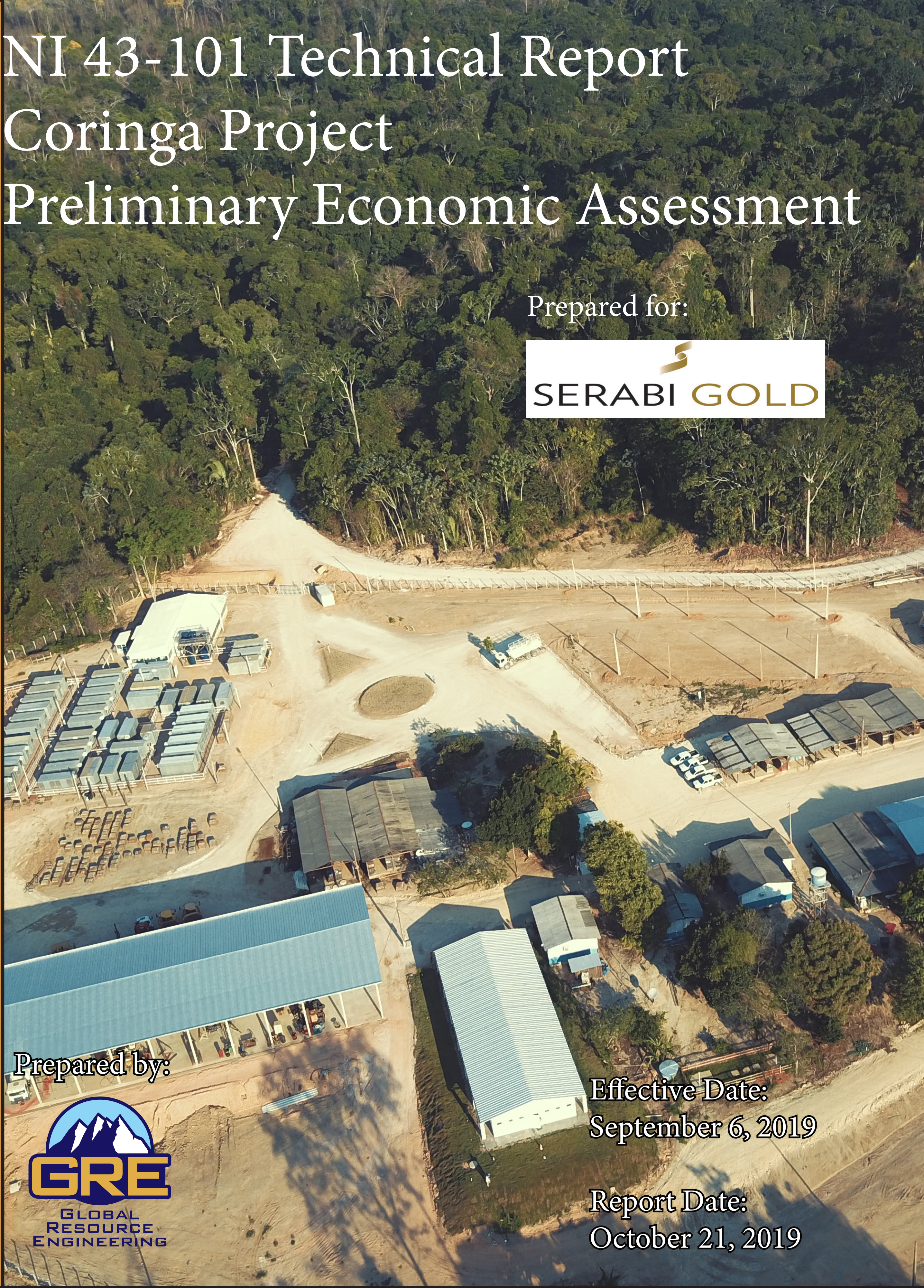
NI 43-101 Technical Report
Coringa Project
Preliminary Economic Assessment



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SERABI GOLD

Prepared by:

GRE
Global Resource Engineering

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Coringa Project

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1.0 Executive Summary

1.1 Introduction

Coringa is located in north-central Brazil, in the State of Pará, 70 kilometres (km) southeast of the city of Novo Progresso. The project is in the south eastern part of the Tapajós gold district and artisanal mining at Coringa produced an estimated 10 tonnes of gold (322,600 ounces) from alluvial and primary sources. Other than the artisanal workings, no other production has occurred at Coringa. Serabi Gold plc (Serabi) acquired Chapleau Exploração Mineral Ltda and its assets including Coringa from Anfield Gold Inc. (Anfield) on 21 December 2017. Management considers that Coringa is very much a “carbon-copy” of Palito in terms of the geology, size and mining operations that will be used.

Serabi engaged Global Resource Engineering Ltd. (GRE) to revise the resource estimate and perform a Preliminary Economic Analysis (PEA) for the Coringa Gold Project in 2019. This technical report provides the results of the updated resource estimate, details the proposed mining plan, and provides the results of the economic analysis.

1.2 Reliance on Other Experts

For the purpose of disclosure relating to ownership of data and information (mineral, surface, and access rights) in this technical report, the authors have relied exclusively on information provided by Serabi. As of the effective date of this report, all concessions owned by Serabi are in good standing, based on a title search conducted with the Ministry of Mines and Energy in Brazil. The authors have not researched the property title or mineral rights for the Coringa Gold Project and express no legal opinion as to the ownership status of the property.

1.3 Property Description and Location

The Coringa Gold Project is located in north-central Brazil, in the Province of Pará (Figure 4-1), 70 km southeast of the city of Novo Progresso. The UTM coordinates for the Coringa Gold Project are 9,166,700 North and 715,500 East (geographic projection: WGS84, Zone 21S). Access to the property is provided by paved (National Highway BR-163) and dirt roads. The Coringa Gold Project concession is situated near a boundary between primary forest areas reserved as an indigenous buffer zone, and land areas previously impacted by government-sponsored agricultural clearances and ongoing agriculture. As of the effective date of this technical report, Serabi is in compliance with all environmental regulations required for the Coringa Gold Project.

The Coringa Gold Project consists of eight exploration concessions or tenements totaling 23,620.03 hectares (ha). All concessions are owned by Chapleau, the 100% owned Brazilian subsidiary of Serabi. In Brazil, surface rights are not associated with title to either a mining lease or a claim and must be negotiated with the landowner. Discussions for long-term land access agreements are underway with INCRA, a government agency which claims ownership of the surface rights where the Coringa Gold Project is situated. The Brazilian government has a 1.5% net smelter return (NSR) on all gold and silver production. In addition, local land owners receive a royalty equal to one half the Brazilian government’s, or 0.75%

NSR. Also, Sandstorm, a gold-streaming and royalty company based in Vancouver, Canada, holds a 2.5% NSR on all production from the Coringa Gold Project.

1.4 Accessibility, Climate, Infrastructure, and Physiography

The climate is tropical and is characterized by high humidity and high temperatures averaging 26°C. Average annual rainfall is between 1,500 millimeters (mm) and 2,000 mm with a wet season from October to April. Work on the property can be carried out year-round. The Coringa Gold Project has deeply incised topography forming northwesterly trending ridges that are 150 meters above the surrounding valleys. Most of the property is covered by tropical jungle with a tree canopy reaching up to 30 meters. Elevations range between 250 and 450 meters above sea level. Minor grazing and small farm agricultural activity is present in the area. Historical artisanal mine workings are common on the property, and they often form elongated trenches along mineralized trends. These trenches are commonly filled with water. Typical fauna for the Amazon jungle are present such as tapir, capybara, monkeys, tropical birds, snakes, and insects.

Access to the property is provided by paved (National Highway BR-163) and dirt roads. Novo Progresso (population approximately 30,000) is the closest major urban centre, and it can provide reasonable accommodation and basic goods and services. It is located along Highway BR-163 which is the main route for trucks carrying soya crops from the Sinop area in Mato Grosso State to ports in Itaituba and Santarem, on the Amazon River. Charter flights are available to and from Novo Progresso.

Mining personnel for Serabi's nearby Palito operation are currently sourced from a mix of close proximity urban centres within the state of Para and other major urban cities throughout the country of Brazil. Serabi anticipates the future operational workforce for the Coringa mine and processing plant will be mostly local Brazilian labor and overseas workers with relevant mining and processing experience.

A 200-person field camp, core logging, and temporary core storage facility are located on the Coringa Gold Project property. Core is later transferred to permanent, secure storage in Novo Progresso. Two water wells provide the camp with drinking water, and septic tanks and leach fields provide for sewage waste disposal. A new sewage treatment plant provides waste disposal for the new camp facilities. Power at the camp is supplied by diesel generators. Telephone and internet service are via radio links to Novo Progresso. Short-wave radios provide communication within the project area.

1.5 History

The Tapajós gold district was Brazil's main source of gold from the late 1970s to the late 1990s. Over 80,000 artisanal miners exploited alluvial deposits, and total gold production estimates range from 5 to 30 M oz, but no accurate totals exist (Santos, et al., 2001; CPRM, 2008).

Other than the artisanal workings, no other production has occurred at Coringa. Artisanal mining activity ceased in 1991 and a local Brazilian company (Tamin Mineração Ltda.) staked the area in 1990. Subsequently, the concessions were optioned to Chapleau (via its Brazilian subsidiary, Chapleau Exploração Mineral Ltda.) in August 2006. On 1 September 2009, Magellan Minerals Lta. (Magellan

Minerals) acquired Chapleau. On 9 May 2016, Anfield acquired Magellan Minerals. Serabi acquired Chapleau and its assets including Coringa from Anfield on 21 December 2017.

1.6 Geological Setting and Mineralization

The Coringa Gold Project is located in the southeastern part of the Tapajós gold district which is located in the central part of the Amazon Craton. Regionally there are over 400 alluvial occurrences (Santos et al., 2001) and over 20 hard rock gold showings (Coutinho, 2008). A regional northwest-southeast-trending shear zone, the Tocantinzinho Trend, is associated with many of the gold occurrences in the district (e.g., Cuiú-Cuiú, Palito, Tocantinzinho, União, Coringa, and Mato Velho) (Reconsult Geofisica, 2008). Mineralization consists of native gold occurring in quartz-carbonate-sulphide veins or with disseminated sulphides. Pyrite is the dominant sulphide with minor sphalerite, chalcopyrite, and galena.

Mineralization at the Coringa Gold Project is associated with a shear/vein system that has a strike length of over 7 km. The mineralized zones vary in thickness from <1 centimeter (cm) up to 14 meters. Gold mineralization is almost exclusively associated with quartz-sulphide veining. Pyrite is the main sulphide, but minor concentrations of chalcopyrite, galena, and sphalerite are common. A genetic study of mineralization indicated that pyrite-chalcopyrite (+/- quartz) mineralization occurred first, followed by gold, with galena and sphalerite introduced late. Gold is typically free (or within electrum) and occupies fractures within sulphide grains.

1.7 Deposit Types

The mineralized veins exposed on the Coringa Gold Project are similar to those found in Orogenic gold deposits. These deposits formed over a 3 Ga time frame with peaks at 3.1 Ga, 2.7 to 2.5 Ga, 2.1 to 1.8 Ga, and 0.6 to 0.05 Ga corresponding to the episodic growth of juvenile continental crust. These deposits were formed during the Achean eon of the Precambian and are commonly referred to as Archean lode gold deposits. A large percentage of the world's gold resource is associated with these periods.

In the Coringa gold deposit, shear zones of anomalously high strain are clearly seen and are mappable units (Global Resource Engineering, 2012). Gold deposition occurs within the quartz veins which were emplaced in the secondary extensional structures associated with the primary shear zones. These shear zones (linear units) occur in generally predictable orientations and are located in certain preferred settings, that is perpendicular to the maximum tension direction.

Ore zones are lenticular, tabular or irregular shaped bodies composed of veins, breccias zones, and/or stockwork systems. Veins transect lithological contacts and are not restricted to a specific rock type. Veins can be classified as replacement, extension, breccias, and fracture type veins. There is also a vertical zonation of the gold deposit, which reflects a change in deformation style, from brittle to brittle-ductile.

Deposits in the Tapajós Gold District that are similar to the Coringa Gold Project include Serabi Gold plc's Palito deposit (Guzman, 2012) and Gold Mining Inc.'s São Jorge deposit (Rodriguez, et al., 2014). Other deposits similar to the Coringa Gold Project can be found in Ontario's Archean Gold District in Canada. One characteristic of the gold deposits in this district is their occurrence within major tectonic zones which comprise linear shear systems.

1.8 Exploration

The Coringa Gold Project property has only seen modern gold exploration since 2007. Highlights of the modern exploration are summarized in Table 1-1.

Table 1-1: Exploration Work Highlights Coringa Property

Year	Owner	Description
January 2007 to June 2007	Chapleau Resources Ltd.	Structural interpretation using satellite images; locate garimpeiro workings; rock, soil, stream sediment samples; 22 HQ drill holes (1,774 m), petrography
June 2007 to March 2008	Chapleau Resources Ltd.	Airborne survey – magnetics, radiometrics (549 km2 with lines spaced at 200 m); IP dipole-dipole (34 km) over Galena-Mãe de Leite; metallurgical testing (SGS); 44 HQ drill holes (5,032 m)
March 2008 to December 2008	Chapleau Resources Ltd.	IP dipole-dipole survey (70.7 km) over Serra, Meio and Come Quieto veins; geotech airborne VTEM-mag (860 km); 15 HQ drill holes (1,979 m)
January 2009 to September 2009	Chapleau Resources Ltd.	Geological mapping, trenching (18 trenches) between Mãe de Leite and Come Quieto; soil sampling
September 2009 to December 2009	Chapleau Resources Ltd.	Soil sampling
January 2010 to December 2010	Magellan Minerals Ltd.	Soil sampling; 28 HQ drill holes (3,396 m)
January 2011 to December 2011	Magellan Minerals Ltd.	Soil sampling; trenching (Valdette – 14, Demetrio – 3); 51 HQ drill holes (11,912 m)
January 2012 to December 2013	Magellan Minerals Ltd.	Soil sampling; 19 HQ drill holes (4,344 m)
2016 to 2017	Anfield Gold	Assaying of soil samples taken previously by Magellan; IP dipole-dipole survey (3.5 km); infill drilling – Serra, Meio veins (180 holes; 25,212 m)
2018 to 2019	Serabi Gold Plc.	Extension drilling- Galena, Serra, and Meio (20 holes; 5,619.83 m)

1.9 Drilling

The following table summarizes the drilling completed on the property to date.

Table 1-2: 2007 to 2019 Drill Program

Date	Zone	No. of Holes	Hole Numbers (BR-COR-DDH#)	Meters drirlled
March 2007-August 2013	Galena-Boca	17	3-4-5-6-23-24-25-26-27-28-29-30-31-34-36-58-60	1956.35
	Eloy-Juara-Mae de Leite	23	17-32-33-35-40-44-51-53-54-56-96-98-99-100-101-102-103-104-105-106-118-176-178	2514.27
	Serra	46	1-2-19-20-37-38-39-41-42-43-45-46-47-48-49-50-52-55-57-59-61-64-66-121-124-127-129-132-135-138-139-141-145-148-150-153-160-161-162-163-164-165-167-168-177-179	8145.16
	Bravo-Escorpion-Peixoto	5	16-22-97-108-109	475.87
	Guaxebinha-Meio-Onza	48	11-12-13-14-62-63-65-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-130-134-137-140-144-149-152-155-156-157-158-159	7660.6
	Come Quieto	12	7-8-9-10-120-122-126-151-154-166-174-175	2519.05
	Fofao	1	15	59
	Pista	2	18-21	105.75
	Acoxadinho	1	107	101.43
	Demetrio	4	111-113-115-116	897.4
	Valdette	11	110-112-114-117-119-123-125-128-131-133-136	2843.1
	Sr. Domingo	4	142-143-146-147	703.58
	Condemnation	5	169-170-171-172-173	455.15
2016-2017	Serra	115	180-181-185-186-187-188-190-192-193-194-195-196-197-198-199-200-201-203-204-206-207-208-210-211-212-213-215-217-218-219-220-222-223-224-225-226-227-228-231-232-233-235-236-237-239-240-241-242-243-244-246-247-248-251-252-253-254-255-257-258-259-260-261-263-264-267-268-270-271-275-276-277-**277-A**-280-281-284-285-286-287-289-293-294-295-300-303-304-308-310-313-316-317-318-320-322-323-325-326-327-330-331-334-335-336-339-340-341-343-344-345-348-349-350-351-352-355	16,574.51
	Meio	65	182-183-184-189-191-202-205-209-214-216-221-229-230-234-238-245-249-250-256-**256-A**-262-265-266-269-272-273-274-278-279-282-283-288-290-291-292-296-297-298-299-301-302-305-306-307-309-311-312-314-315-319-321-324-328-329-332-333-337-338-342-**342-A**-346-347-353-354-356	8,637.05
	Galena	7	357-358-359-360-361-362-363	933.09
2018-2019	Galena	4	364-365-366-367	955.85
2018-2019	Serra	4	368-369-370-371	1,150.59
2018-2019	Meio	12	372-373-374-375-376-377-378-379-380-381-382-383	3,513.39
Total Drilling		**386**		**60,201.19**

1.10 Sampling Preparation, Analyses, and Security

Drilling starts with an HQ size bit in the near surface saprolite materials or altered rocks. After passing this soft material, drilling with NQ size continues to the final depth. Serabi geologists or field assistants check the depth and record the "from" and "to" intervals on the outside of the box on an aluminum plate. The geologist or technician then photographs the core as it is received from the drill rig and collects core recovery information before selecting sample intervals for assay. The geologist marks sample intervals based on lithology, alteration, and mineralization (sulfides). The core is split at mineralized zones with a minimum interval of 0.10 meters. The marked core is cut longitudinally in half using a diamond saw to bisect the mineralization. Half the core is put into a plastic sample bag and the other half is returned to the core box and stored in a core storage facility onsite. Bagged samples are delivered to the Serabi preparation sample laboratory in Novo Progresso, Brazil. Samples are crushed, split, and pulverized at the preparation laboratory. The balance of the coarse crushed material is bagged and stored at the lab. The authors completed an audit of the sample preparation lab during the site visit completed in November 2018. The QPs believe the sample preparation lab provides representative samples that minimize contamination, bias from the preparation procedure, and mislabeling of samples.

A quality control and assurance program has been in place for all stages of exploration. In general, the programs provide standard industry checks for assays that include blanks, duplicates and standards. No issues have been identified in any of the programs to indicate errors, biases, or other factors that would provide unrepresentative samples. The analytical procedures are appropriate and consistent with common industry practice. The sampling has been carried out by trained technical staff under the supervision of the project geologist and in a manner that meets or exceeds common industry standards. Samples are properly identified and transported in a secure manner from the site to the lab. The quality of the assay database supports the estimation of Indicated Resources. There are no fatal flaws that would preclude the calculation of a Mineral Resource.

1.11 Data Validation

GRE has been involved with the Coringa project off and on since 2009. Data verification was completed in 2009, 2012, and 2019. Work completed to verify the integrity of the exploration database included field measurements of the drill hole coordinates, strike, and dip; review of the QA/QC program; independent check assay samples taken by the QPs; and a review of the assay certificates. In all instances, GRE did not encounter significant errors that would material impact the mineral resource estimate.

1.12 Mineral Processing and Metallurgical Testing

Metallurgical testing for the Coringa Gold Project has been performed since 2008 at four laboratories. The following table lists the laboratories and summarizes the types of metallurgical test programs that each completed. Testing results show whole ore carbon in leach with recoveries between 95% and 99% for gold.

Table 1-3: Metallurgical Test Programs

Laboratory (Location)	Dates	Key Testing Programs	Materials Tested
SGS Geosol Mineral Lab (SGS Geosol) (Belo Horizonte, MG, Brazil)	Mar-08	Gravity Concentration	Two Composites (High and Low Grade)
	May-08	Flotation	
		Whole-Ore Leaching	
Resource Development Inc (RDi) (Wheat Ridge, CO,	Mar-10	Grinding Work Index	Two Composites (Serra and Guaxebinha-Meio-Onza Zones)
		Gravity Concentration	

Laboratory (Location)	Dates	Key Testing Programs	Materials Tested
USA)		Flotation	
		Whole-Ore Leaching	
Testwork Desenvolvimento de Processo Ltda (TDP)	Jun-13	Gravity Concentration	Two Composites (Serra-Galena-Mae de Leite and Meio-Come Quieto Zones)
	Nov-13	Whole-Ore Leaching	
(Nova Lima, MG, Brazil)	Dec-13	Gravity-Intensive Leach	
		Flotation, Float-Leach	
		Cyanide Neutralization	
		Settling	
		Grinding Work Index	
C.H. Plenge & CIA. S.A. (Plenge) (Miraflores, Lima, Peru)	May-17	Comminution (UCS, Crush)	1/2 HQ core Master Composite (Serra-Meio Zones)
	Jul-17	Comminution (Abrasion, bond work index [BWi])	1/2 HQ core Variability Composites (8 Serra, 6 Meio)
		Gravity Concentration	Comminution Samples (26 Serra, 26 Meio)
		Gravity-Conc Intensive Leach	Sliced PQ core Variability Composites (4 Serra, 2 Meio)
		Gravity Tails Leach	
		Whole-Ore Leaching	
		Whole-Ore Flotation, Leaching	
		Leach Tails Flotation	
		Cyanide Neutralization	
		Settling	
		Gravity Concentrate Mineralogy	

1.13 Mineral Resource Estimate

The geology of the mineralized areas consists of narrow quartz veins oriented on a general northwest to southeast trend. These veins represent the extensional system created by the shear zone, where hydrothermal fluids were able to infiltrate into the rhyolite and granite rock mass. The mineralized veins contain high grade gold mineralization within the vein, with lower grade mineralization in the altered wall rock surrounding the vein. GRE created geologic models consistent with the geologic interpretation, modeling the high-grade vein area separate from the altered footwall and hanging wall. The models were constructed using a combination of assay and geological information, primarily lithology and alteration. Digital topography was provided by Serabi.

GRE estimated mineral resources at a cutoff grade of 2.0 gpt Au as the base case. The cutoff calculation is based on a gold price of $1,500/troy oz, an operating cost of $100/tonne, and a metallurgical recovery of 95%. The resource statement considered a minimum mining thickness of 0.7 meters. GRE included the previous estimate for the Valdette area from the technical report filed by Anfield Gold dated July 1, 2017. No additional drilling was completed within this area. GRE reviewed the previous vein model and intercepts selected for Valdette and in general agrees with the interpretation and selection.

Table 1-4: Mineral Resource Statement, All Areas

Cutoff (gpt)	Tonnes	Au (gpt)	Au (Troy oz)
Indicated			
1	1,023,000	6.32	208,000
2	735,000	8.24	195,000
3	590,000	9.66	183,000
4	484,000	11.01	171,000
5	414,000	12.11	161,000
Inferred			
1	2,124,000	5.22	356,000
2	1,645,000	6.54	346,000
3	1,068,000	8.64	297,000
4	835,000	10.10	271,000
5	716,000	11.04	254,000

1) The effective date of the Mineral Resource is September 6, 2019.
2) The Qualified Persons for the estimate are Kevin Gunesch, PE, and Hamid Samari QP-MMSA of GRE.
3) Mineral Resources are inclusive of Mineral Reserves; Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
4) Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.
5) The Mineral Resource is based on a gold cutoff grade of 2 gpt, an assumed gold price of 1500 $/tr oz, an assumed operating cost of 100 $/tonne, and an assumed metallurgical recovery of 95%.

1.14 Project Infrastructure

Construction of the process plant and dry stack tailings facility is planned to the east of the Serra resource area. Five separate resources areas are planned to serve as underground mining areas: two in Galena & Mae de Leite (GAMDL), three in Meio & Como Queito (MCQ), and one in Serra. Waste rock will be stored close to each underground mine portal. The existing diesel generator set will be upgraded to provide power for the onsite facilities and with new power lines to distribute power to the resource mining areas. An explosive magazine will be utilized for storage of explosives in compliance with applicable rules and regulations.

1.15 Market Studies and Contracts

The primary metal of economic interest for the Coringa project is gold, which has a readily available market for sale of gold doré or gold concentrates.

1.16 Environmental Studies, Permitting, and Social or Community Impact

On August 9, 2017, Chapleau was awarded environmental approvals for trial mining from SEMAS, including the life of mine plan (LOPM), vegetation suppression, and fauna capture permits (see discussion of Production Permitting in Section 20.3). Subsequent approval is required from the DNPM to sell production, and Chapleau has initiated the process for obtaining this approval. Serabi also can continue to conduct exploration activities.

Relationships with local communities have been managed through regular, ongoing social communication activities, which have included dialogue workshops with community members and site visits with local authorities, business leaders, and media. Serabi has dedicated professionals who manage social outreach and environmental issues, and it has a long history of successful operation in the region.

The first significant baseline studies of water quality, air quality, and flora and fauna within the Coringa Gold Project concession were conducted by Terra and Global Resource Engineering in 2015 and 2016 to support the development of the EIA/RIMA for the Coringa Gold Project. Additional geochemical baseline studies were performed by GRE in 2013, 2015, and 2017 (MTB, 2017). These studies collected geochemical samples of potential mine waste rock and mine tailings to determine the potential to create ARD or other impacts to water quality resulting from mining operations.

1.17 Capital and Operating Costs

A breakdown of initial, sustaining and total capital expenditure is tabulated below:

Table 1-5: Projected Capital Costs

Category	Initial Capital (US$)	Sustaining Capital (US$)	Total Capital (US$)
Mine Equipment	$1,852,000	$4,091,000	$5,943,000
Mine Infrastructure	$6,449,000	$2,993,000	$9,442,000
Site Facilities	$2,262,000	$1,211,000	$3,473,000
Process Plant	$9,353,000	$ –	$9,353,000
Permitting	$300,000	$ –	$300,000
Exploration and Engineering Studies	$500,000	$ –	$500,000
Closure Cost	$ –	$1,000,000	$1,000,000
Working Capital - Recapture at End	$1,775,000	-$1,775,000	$ –
Contingency	$3,983,200	$1,659,000	$5,642,200
Net Pre-production income	$(1,790,636)	$ –	$(1,790,636)
TOTAL	$24,683,564	$9,179,000	$33,862,564

The average operating cash costs, once sustained positive cash flow has been achieved, are tabulated below:

Table 1-6: Projected Operating Costs

Category	US$ / oz	US$ / tonne
Mining Ore	$362	$92
Process Plant	$213	$54
G&A	$40	$10
Op. Cash Costs	$615	$156
Refining Costs	$18	$5
Royalties	$60	$15
Contingency	$123	$31
Total Cash Costs	$816	$207
Capital	$36	$9
Total Cash Costs	$852	$216

1.18 Economic Analysis

The following table summarizes the base case metrics used for the economic analysis.

Table 1-7: Base Case Metrics

Parameter	Unit	Amount
Gold Price	US$/oz	$1,275
Cut-off grade	g/t of gold	6.00
Run of Mine (ROM) Material to process	Tonnes	1,130,298
Mining Method		Open Stoping
Throughput at 100% capacity(1)	Tonnes per annum	170,000
Mining recovery	%	95%
Process Gold recovery	%	95%
Total gold production (recovered)	Ounces	288,046
Mine Life	Years	9
Initial Capital Expenditures	US$M	$24.7
Sustaining capital expenditures	US$M	$9.2
Mine closure costs	US$M	$1.0
Cash Operating Costs (inc. Royalty + TC/RCs)	US$/oz	US$816
All In Sustaining Cost (inc. Royalty + TC/RCs)	US$/oz	US$852
Exchange Rate	R$: US$	3.80
Royalties	%	4.75%
Profits Tax Rate	%	15.25%

(1) Five years following initial ramp-up

This technical report is a preliminary economic assessment and partially utilizes inferred mineral resources. Inferred mineral resources are considered too speculative, geologically, to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability. The following table summarizes the results of the Preliminary Economic Analysis (PEA).

Table 1-8: PEA Results Summary

Gold Price (per ounce)	Units	BASE CASE $1,275	$1,350	$1,450
Pre tax NPV (5%)	US$m	$55.7	$71.3	$92.2
Pre tax NPV (10%)	US$m	$37.2	$49.4	$65.8
Post tax NPV (5%)	US$m	$47.3	$61.3	$79.6
Post tax NPV (10%)	US$m	$30.7	$41.7	$56.1
Post tax IRR	%	31%	37%	46%
Project after tax cash flow	US$m	$71.6	$90.1	$114.0
Average annual free cash	US$m	$11.5	$13.7	$16.6
Average gross revenue	US$m	$43.4	$46.0	$49.4

1.19 Interpretations and Conclusions

Based on the evaluation of the data available and results of the PEA, the QPs have drawn the following conclusions:

- The deposits at the Coringa Gold Project are composed of several semi-continuous, steeply dipping gold-bearing veins and shear zones hosted in granite and rhyolite. The mineralized vein system extends for over 12,000 meters in a northwesterly direction, has variable widths ranging from less than 1 centimeter to over 14 meters, and has been defined to depths of 250 meters. The geological model of the mineralized veins in the Coringa property using Leapfrog shows the maximum true thickness of 1.63 meters in Galena and Mae de Leite, maximum depth of 485 meters in Serra, and maximum length of 2,300 meters in Galena and Mae de Leite.
- Most veins remain open to further expansion through drilling, both along strike and at depth.
- Drilling to date has outlined an Indicated mineral resource estimate (at a cut-off grade of 2 g/t Au) of 735 ktonnes at 8.24 g/t Au, which contains 195 koz of gold.
- Drilling to date has also outlined an Inferred mineral resource estimate (at a cut-off grade of 2 g/t Au) of 1.645 Mtonnes at 6.54 g/t Au, which contains 346 koz of gold.
- The narrow but high-grade veins at the Coringa Gold Project are considered to be amenable to underground extraction methods.
- The results of the PEA using a base price of $1,275/oz gold are an After-Tax Net Present Value @ 10% (“NPV-10”) of $30.7 million, and an After-Tax Internal Rate of Return (“IRR”) of 30.7%. This technical report is a preliminary economic assessment and partially utilizes inferred mineral resources. Inferred mineral resources are considered too speculative, geologically, to have the economic considerations applied to them that would enable them to be categorized as mineral

reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

- Ongoing exploration during the planned mining operation will further define the mineral resources for the Coringa Gold Project. As with other small underground mines, such as Serabi's Palito mine, definition drilling during operations often increases the mineral resources and extents the mine life. The QPs believe that definition drilling will likely increase the mineral resources for Coringa given the multiple intersections indicating parallel vein structures which were not modelled in the current mineral resource. Definition drilling is anticipated to provide sufficient information to determine the geologic and grade continuity of these parallel structures so that they can be incorporated into the mineral resource estimate and mine plan.
- There are no known factors related to metallurgical, environmental, permitting, legal, title, taxation, socio-economic, marketing, or political issues which could materially affect the mineral resource estimate.
- In the QPs' opinion, Serabi's analytical procedures are appropriate and consistent with common industry practice. The laboratories are recognized, accredited commercial assayers. There is no relationship between Serabi and SGS, Geosol Laboratorios Ltda in Vespasiano-Minas Gerais in Brazil. The sampling has been carried out by trained technical staff under the supervision of a QP and in a manner that meets or exceeds common industry standards. Samples are properly identified and transported in a secure manner from the site to the lab.
- Observation of the drilling and core handling procedures during the site visit inspection and validation of the collected data indicate that the drill data are adequate for interpretation.
- In the QPs' opinion, the database management, validation, and assay QA/QC protocols are consistent with common industry practices.
- The metallurgical test work on the Coringa project is extensive and well documented.
- The samples employed for metallurgical testing appear representative of the resource.
- The ore responds well to flotation and concentrate leaching as well as direct whole ore leaching.
- The recommended flowsheet consists of crushing, grinding, gravity separation, and intensive gravity concentrate leaching, pre-aeration, and whole ore CIL.
- The ore is relatively hard with high bond work index ranging from 17 to 25 kwh/t. The crushing work index ranged from 6 to 11 kWh/t, and the abrasion index varied from 0.34 to 0.41. The ore is classified as abrasive.
- Gravity concentration is very effective with good gold recoveries (26% - 68% recovery), but the presence of galena may complicate the cleaning process and should be considered in the final design.
- The ore does not appear grind sensitive for leaching at least between a P80 of 75 and 150 µm. Finer grinds do provide moderate leach recovery improvements.

- There is some active carbon in the ore resulting in "preg-robbing," but it was successfully managed through the use of a carbon in leach (CIL) system.
- Pre-aeration will improve the leach results due to the presence of significant sulfide minerals and should be incorporated into the final flowsheet.
- Whole ore leaching reagent consumptions are reasonable. NaCN consumption was moderately variable and is expected to be in the range of 1 -2 kg/t. Lime consumption showed higher variability, generally in the range of 2 kg/t but increasing in some instances to 10 kg/t. This is likely dependent on the sulfide grades of the ore.
- The use of the SO2/Air systems appears adequate for cyanide destruction. Care will have to be taken in monitoring the quality of recycled water.
- Copper may build up on the activated carbon, and an acid wash circuit should be included to manage this.
- The whole ore CIL recoveries do not appear to be grade sensitive for gold and moderately grade sensitive for silver.
- Results from the Plenge test program are anticipated to be used to project the metallurgical performance of planned materials for processing at the Coringa Gold Project. Results from the earlier RDi and TDP test programs support results from the Plenge program and altogether are useful to support the stated overall representativeness of the samples to the various deposits.

  The anticipated gold and silver recoveries for the Coringa Gold Project deposits are presented below:

  - Serra and Galena deposits – 96% for gold and 57% for silver
  - Meio deposit – 94% for gold and 74% for silver

1.19.1 Risks

- It is unknown how deep historic surface mining has occurred. An allowance for this should be included in future mine plans.
- Brazilian political change, fluctuations in the national, state, and local economies and regulations and social unrest.
- Currency exchange fluctuations.
- Fluctuations in the prices for gold and silver, as well as other minerals.
- Risks relating to being adversely affected by the regulatory environment, including increased regulatory burdens and changes of laws.

1.19.2 Opportunities

- There is a potential for increasing the estimated mineral resources with infill drilling as well as exploration drilling from underground and surface.

- While the mineralized trend of veins is known to extend over a minimum 12 km strike length (Figure 7.2), only in few places has it been drilled sufficiently to identify inferred or higher mineral resources (Serra, Meio, Galena, Mãe de Leite, Come Quieto, Demetrio, and Valdette). Large segments of veins remain untested or partially tested, some with significant mineralized vein intersections that remain open to offset drilling. These zones could yield additional mineralization for the project through discovery or enhancement of currently identified inferred to indicated resources. Highest priority targets for resource expansion include Come Quieto, Mãe de Leite, and Galena, all of which host open Inferred mineral resources and in the case of Galena, Indicted mineral resources. Other zones such as Mato Velho have yielded significant mineral intersections but have not been drilled in sufficient density for inclusion as inferred resource. Enhancement of mineral resources at the Coringa Gold Project has a high probability with additional drilling.
- The project is partially staffed with key management in place. Serabi plans to use experienced mining and supporting personnel from its Palito Operations to further staff Coringa, integrating new employees at Palito. This will provide Coringa with experienced mining personnel minimizing the training requirements of the project and at the same time place new miners with the experienced team at Palito.
- The project is located in an area with existing and active mining operations with similar characteristics to the mining techniques proposed in this study. The mining techniques employed at Serabi's Palito mine are directly applicable to Coringa.

1.20 Recommendations

- Additional engineering studies - $250,000
- Additional extensional drilling along strike and depth - $250,000
- Test geophysical anomalies identified from reprocessing past geophysical data. - $100,000
- Oxygen in leach should be investigated as it may improve the overall leach kinetics and specifically enhance the silver extraction - $20,000
- The gravity recovery system needs to be fully defined, and a method to manage the presence of galena should be considered. Further, the treatment of the intensive leach tails needs to be further developed - $50,000
- The production of additional saleable metal products requires further investigation $50,000
- The primary grind should be optimized to determine the cost benefit of a coarser grind - $25,000

2.0 Introduction

Coringa is located in north-central Brazil, in the State of Pará, 70 kilometres (km) southeast of the city of Novo Progresso. Access to the property is provided by paved (National Highway BR-163) and dirt roads. Coringa is in the south eastern part of the Tapajós gold district and artisanal mining at Coringa produced an estimated 10 tonnes of gold (322,600 ounces) from alluvial and primary sources within the deep saprolite or oxidized parts of shear zones being mined using high-pressure water hoses or hand-cobbing to depths of 15 metres. Other than the artisanal workings, no other production has occurred at Coringa. Artisanal mining activity ceased in 1991 and a local Brazilian company (Tamin Mineração Ltda.) staked the area in 1990. Subsequently, the concessions were optioned to Chapleau Resources Limited (Chapleau) (via its Brazilian subsidiary, Chapleau Exploração Mineral Ltda) in August 2006. On 1 September 2009, Magellan Minerals Ltd. (Magellan Minerals) acquired Chapleau. Between 2007 and 2013, extensive exploration programmes were completed on the property, including airborne magnetic, radiometric and electro-magnetic surveys; surface IP surveys; stream, soil, and rock sampling; and trenching and diamond drilling (179 holes for a total length of 28,437 meters). On 9 May 2016, Anfield Gold Inc. (Anfield) acquired Magellan Minerals. Anfield subsequently completed an infill drill programme (183 holes for a total length of 26,413 meters) for the Serra and Meio veins in 2016 and 2017.

Serabi acquired Chapleau and its assets including Coringa from Anfield on 21 December 2017. Management considers that Coringa is very much a “carbon-copy” of Palito in terms of the geology, size and mining operations that will be used.

2.1 Purpose of the Technical Report

Serabi Gold plc (Serabi) is a London, United Kingdom based precious gold exploration and production company focused on the development of the Coringa Gold Project located in Pará State, Brazil. Serabi acquired the project from Anfield Gold on December 21, 2017 through the purchase of the Brazilian subsidiary, Chapleau Exploração Mineral Ltda, that controls the mining concessions along with all assets related to the property. In late 2018 and early 2019, Serabi completed an exploration drilling program targeting extensional areas of previously defined mineralization.

Serabi engaged Global Resource Engineering Ltd. (GRE) in 2019 to update the resource estimate and perform a Preliminary Economic Analysis (PEA) for the Coringa Gold Project. This technical report provides the results of the updated resource estimate, details the proposed mining plan including methods and equipment, and provides the results from the economic analysis.

2.2 Sources of Information

In preparing this technical report, the authors relied on geological reports, maps, results of the past and new exploration programs, and other technical papers listed in Section 27 (References) of this technical report. The authors have relied on published and unpublished reports and literature for information that is provided in this technical report. Where possible, the authors have confirmed the information provided through technical reviews, spot checks, field audits, comparison of geologic data to the physical core, and independent assay samples. During the course of the work, the authors did not encounter any errors or omissions that would materially affect the results of the mineral resource estimate or PEA.

This technical report has been prepared for Serabi by GRE in support of Serabi's disclosure of scientific and technical information for the Coringa Gold Project. This technical report is based on information known to the authors as of September 6, 2019.

The table below lists the responsible Qualified Persons (QPs) by report section.

Table 2-1 Qualified Persons

Section	Section Name	Qualified Person
1	Summary	ALL
2	Introduction	Kevin Gunesch – P.E.
3	Reliance on Other Experts	Kevin Gunesch – P.E.
4	Property Description and Location	Kevin Gunesch – P.E.
5	Accessibility, Climate, Local Resources, Infrastructure, and Physiography	Kevin Gunesch – P.E.
6	History	Kevin Gunesch – P.E.
7	Geological Setting and Mineralization	Hamid Samari – PhD
8	Deposit Types	Hamid Samari – PhD
9	Exploration	Hamid Samari – PhD
10	Drilling	Hamid Samari – PhD
11	Sample Preparation, Analyses and Security	Hamid Samari – PhD
12	Data Verification	Hamid Samari – PhD
13	Mineral Processing and Metallurgical Testing	J. Todd Harvey – PhD
14	Mineral Resource Estimates	Kevin Gunesch – P.E.; Hamid Samari – PhD
15	Mineral Reserve Estimates	NA
16	Mining Methods	Kevin Gunesch – P.E.
17	Recovery Methods	J. Todd Harvey - PhD
18	Project Infrastructure	Kevin Gunesch – P.E.
19	Market Studies and Contracts	Kevin Gunesch – P.E.
20	Environmental Studies, Permitting and Social or Community Impact	J. Larry Breckenridge - P.E.
21	Capital and Operating Costs	Kevin Gunesch – P.E.
22	Economic Analysis	Kevin Gunesch – P.E.
23	Adjacent Properties	Kevin Gunesch – P.E.
24	Other Relevant Data and Information	Kevin Gunesch – P.E.
25	Interpretation and Conclusions	ALL
26	Recommendations	ALL
27	References	ALL

All measurement units used in this report are metric, and currency is expressed in US dollars, unless stated otherwise. The currency used in Brazil is the Brazilian Reais (R$), but all costs associated with the project are in USD ($).

2.3 Personal Inspection of the Coringa Gold Project

Hamid Samari and Kevin Gunesch visited the Coringa Gold Project from November 10 - 14, 2018. The purpose of this site visit was to verify the project data including the site infrastructure, exploration practices, drill hole locations, geologic logs, and physical drill core. In addition, Messrs. Gunesch and Samari audited the sample preparation lab run by Serabi in the nearby town of Novo Progresso and collected past and new drill core and prepared samples for independent assay analysis in Denver, Colorado, USA.

Kevin Gunesch made a separate visit April 6 - 9, 2019 to the geographically and geologically similar Palito Mine which is also owned by Serabi to review the facilities, mining methods, mining plan, and equipment used for underground development and production. The purpose of the site visit to determine how the mining methods utilized at Palito could be used at Coringa.

Larry Breckenridge visited the Coringa Gold Project from March 3 - 8, 2017. The purpose of the site visit was to inspect and evaluate the environmental network and sampling plan onsite together with Chapleau team, select geochemical samples for analysis, evaluate core drilling results for the waste rock facility, and present hydrological and hydrogeological issues to other consultants that were visiting the site in that period.

2.4 Abbreviations and Acronyms

Abbreviations and acronyms used throughout this report are shown in Table 2-2.

Table 2-2 Acronyms and Abbreviations

Abbreviation	Definition
µm	micron
ACME	ACME Laboratory
Ai	Abrasion Index
ANA	National Water Agency
Anfield	Anfield Gold Inc.
ANP	National Petroleum, Natural Gas, and Biofuels Agency
ARD	Acid Rock Drainage
Boart Longyear	Geoserv Pesquisas Geológicas S.A.
BWi	Bond Work Index
Chapleau	Chapleau Resources Limited
CIL	carbon in leach
cm	centimeter
CNRH	National Commission of Hydric Resources
CONAMA	National Council for the Environment
CWi	Crushing Work Index
DIBK	2.6-dimethyl-4-heptanone
DNPM	Departamento Nacional de Produção Mineral
EIA/RIMA	Estudo de Impacto Ambiental/ Relató rio de Impacto Ambiental
FAA	Atomic absorption
FAI	ICP-OES

Abbreviation	Definition
Foraco	Servitec Foraco Sondagem S.A.
FUNAI	National Indian Foundation
GAMDL	Galena & Mae le Leite
Geologica	Geológica Sondagens Ltda.
Geosol	Geosol-Geologia e Sondagens S.A.
gps	global positioning system
gpt	grams per tonne
GRE	Global Resource Engineering Ltd.
GRE	Global Resource Engineering Ltd.
GTR	Geotechreserves do Brasil – Serviços de Perfurações e Sondagens LTDA
ha	hectare
HCl	hydrochloric acid
HFl	Hydrofluoric acid
HNO3	nitric acid
ICMBio	Chico Mendes Institute for the Conservation of Biodiversity
ICP	Inductively coupled plasma
ID3	inverse distance cubed
IL	intensive leach
INCRA	Instituto Nacional de Colonização e Reforma Agrária
IP	Induced Polarization
IPHAN	National Institute of Historic and Artistic Patrimony
IRR	Internal Rate of Return
ITERPA	Pará Land Institute
kg	kilogram
kg/t	kilograms per tonne
km	kilometers
koz	thousands of ounces
kTonnes	thousands of tonnes
Layne	Layne do Brasil Sondagens Ltda.
LI	installation license
LO	operation license
LOMP	Life of Mine Plan
LP	prior license
Magellan Minerals	Magellan Mineral Ltd.
MCQ	Meio & Como Quieto
ml	Milliliters
mm	millimeters
MPF	Federal Prosecutor
MTB	MTB Project Management Professionals, Inc.
NN	nearest neighbor
NPV	Net Present Value
NSR	net smelter return
OES	optical emission spectrometry
oz	ounce
PCA	Programa de Controle Ambiental

Abbreviation	Definition
PDS	Sustainable Development Project
PEA	Preliminary Economic Assessment
ppb	parts per billion
ppm	parts per million
QA/QC	quality assurance/quality control
QEMSCAN	Quantitative Evaluation of Materials by Scanning Electron Microscopy
QP	Qualified Person
R$	Brazilian Reais
RDi	Resource Development, Inc. (Wheat Ridge, Colorado)
RQD	Rock Quality Designation
SEMAS	State Department of Environment
Serabi	Serabi Gold plc
SGS	SGS Geosol Mineral Services Laboratory Brazil
tpy	tonnes per year
DSTSF	Dry stack tailings storage facility
UCS	Uniform Compressive Strength
USD	United States dollars
UTM	Universal Transverse Mercator
WAD	weak acid dissociable

3.0 Reliance on Other Experts

The authors relied on other experts regarding the legal, tax, environmental, and political issues that may affect the property. The specifics items contained within this report to which this reliance applies are:

The regulatory and legal requirements for environmental reporting in Section 20.

- Source – Serabi

The taxes and royalities section of the Preliminary Economic Assessment detailed in Section 21.

- Source – Serabi

The political issues and their possible impacts listed in Section 25.

- Source – Serabi

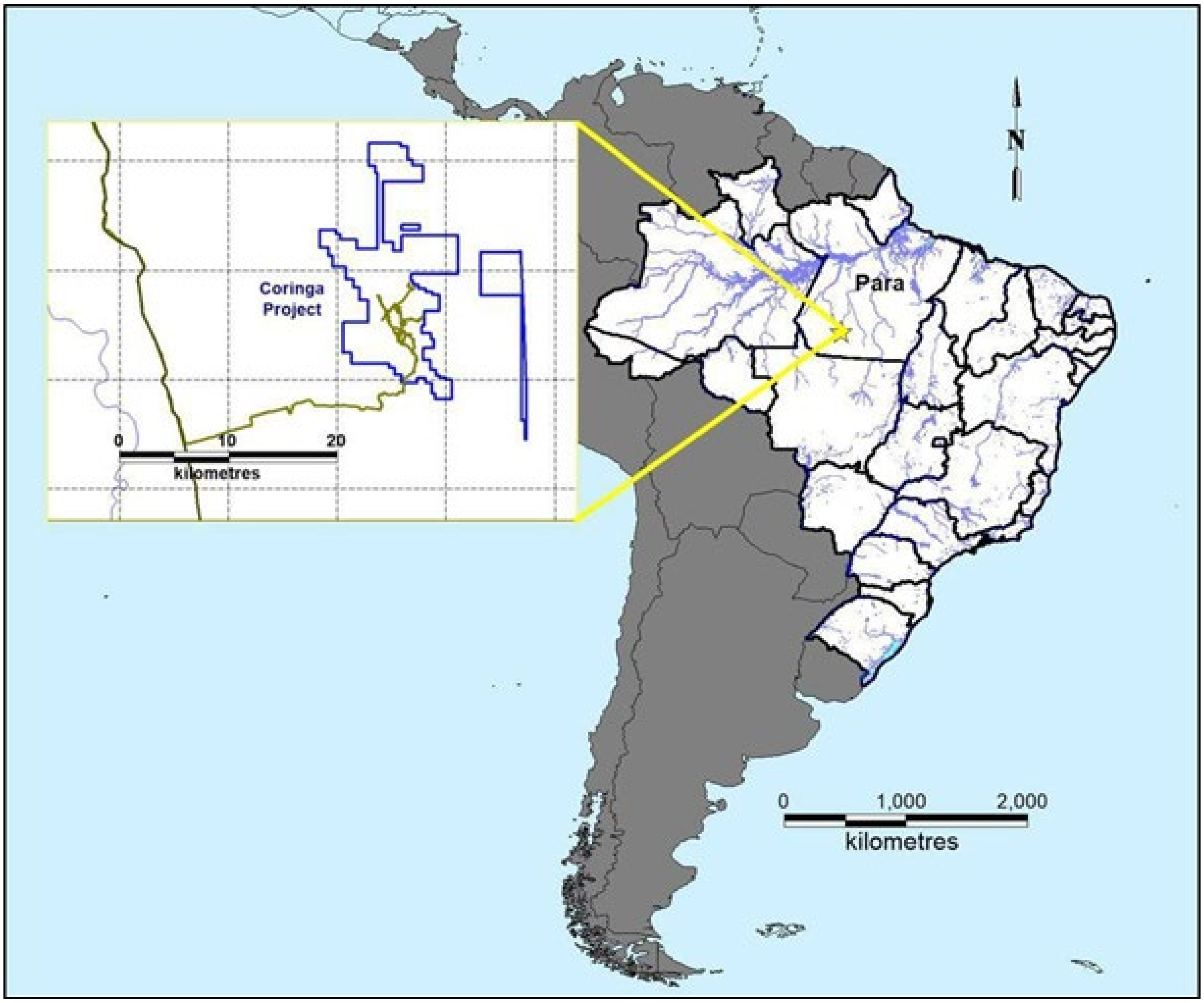
For the purpose of disclosure relating to ownership of data and information (mineral, surface, and access rights) in this technical report, the authors have relied exclusively on information provided by Serabi. As of the effective date of this report all concessions owned by Serabi are in good standing, based on a title search conducted with the Ministry of Mines and Energy in Brazil. The authors have not researched the property title or mineral rights for the Coringa Gold Project and express no legal opinion as to the ownership status of the property.

4.0 Property Description and Location

4.1 Location

The Coringa Gold Project is located in north-central Brazil, in the Province of Pará (Figure 4-1), 70 km southeast of the city of Novo Progresso. The UTM coordinates for the Coringa Gold Project are 9,166,700 North and 715,500 East (geographic projection: WGS84, Zone 21S). Access to the property is provided by paved (National Highway BR-163) and dirt roads.

Figure 4-1: Location Map



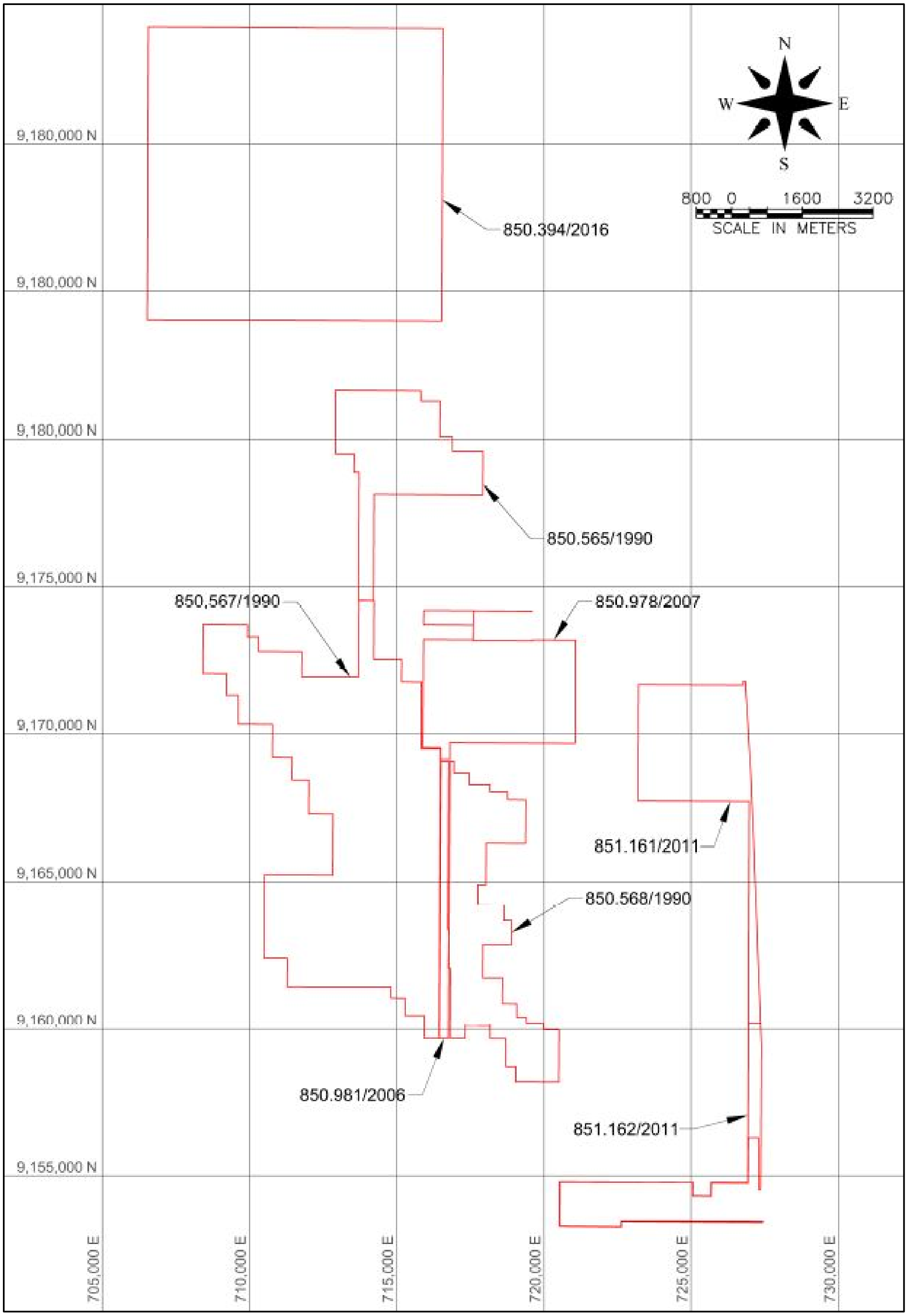
4.2 Land Tenure

The Coringa Gold Project consists of eight exploration concessions or tenements totaling 23,620.03 hectares (ha). All concessions are owned by Chapleau, the 100% owned Brazilian subsidiary of Serabi. The concessions are described in Table 4-1 and shown in Figure 4-2.

Table 4-1: Mining Concessions Coringa Gold Property

Tenure Number	Area (ha)	Phase	Renewal Status	Date of Registration (dd/mm/yyyy)	Expiration Date (dd/mm/yyyy)
851.161/2011	1683.21	Exploration License	In progress	02/10/2015	Pending Approval
851.162/2011	192.31	Exploration Application	No Title granted yet	No Title granted yet	
850.567/1990	6224.23	Exploitation Application	Final report approved	28/09/2006	Being converted to a Mining Concession
850.565/1990	1529.57	Exploitation Application	Final report approved	28/09/2006	
850.568/1990	1840.83	Exploitation Application	Final report approved	14/12/2006	
850.981/2006	259.99	Exploitation Application	Final report approved	13/12/2007	
850.978/2007	1917.64	License Extension requested	Pending Approval	16/09/2009	Pending Approval
850.394/2016	9,972.25	Exploration License	Granted	16/09/2009	8/8/2019

Figure 4-2: Claim Map



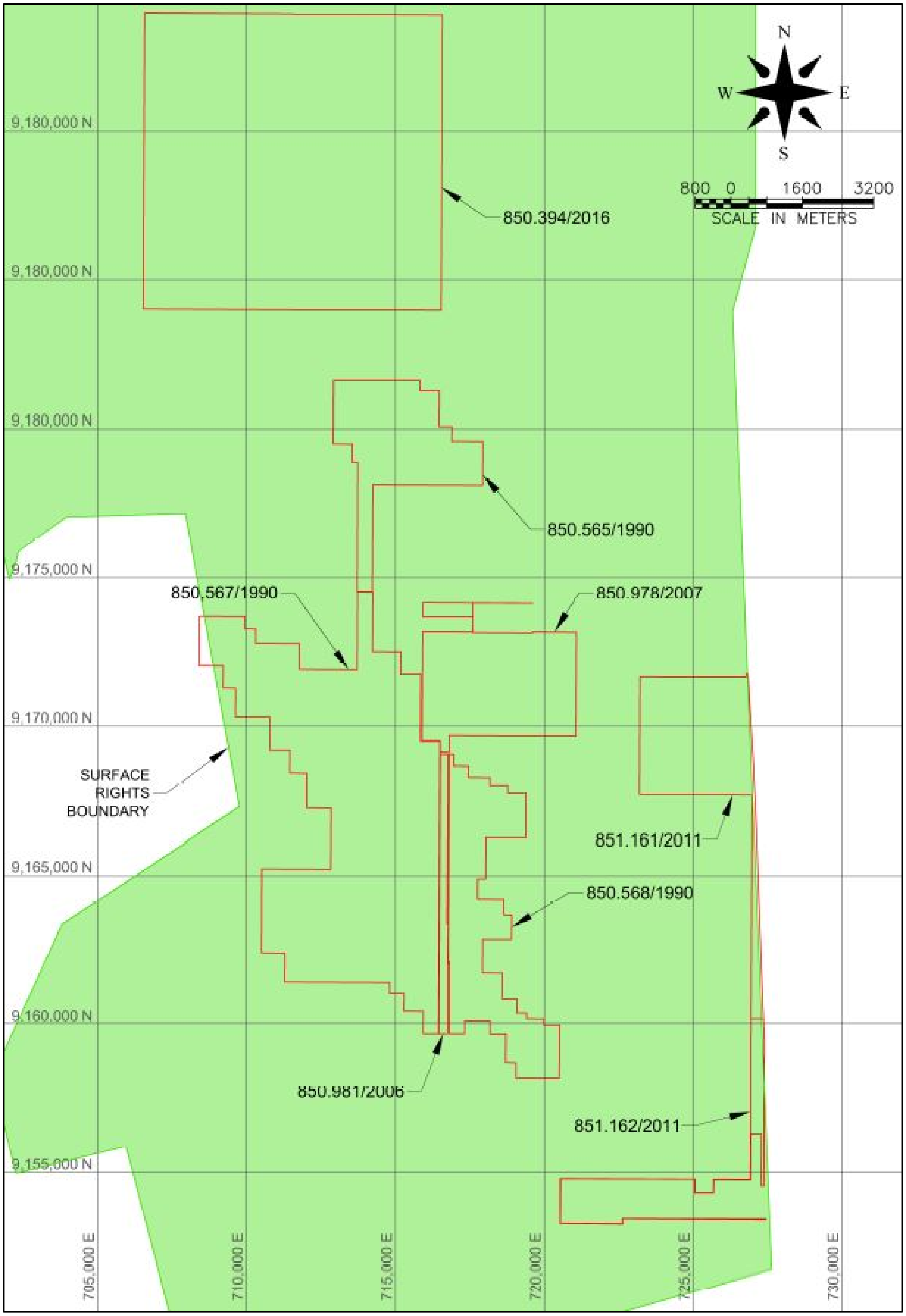
Source: GRE

The maintenance of each exploration license requires an annual payment that is due before January 31st for exploration licenses published between July 1st and December 31st, and due before July 31st for exploration licenses published between January 1st and June 30th. The 2019 fees were paid and all concessions are in good standing.

In Brazil, surface rights are not associated with title to either a mining lease or a claim and must be negotiated with the landowner. The landowner's right to participate in any proceeds from a mine is documented in the Federal Mining Code of Brazil. The relevant text reads as follows: "The participation will be 50% of what is payable to the States, Municipalities, and Administrative Agencies, as a financial compensation for the exploitation of a mineral resource". This financial compensation is calculated from the mineral sales value, minus taxes, transport costs, and insurances. The percentage of financial compensation varies by mineral type, but is 0.75% for gold based on the 1.5% payable to the Brazilian government.

In western Pará state, surface rights are typically not formalized. The land in the Coringa Gold Project area has been owned by a series of individuals. Most recently, the land was owned by two families whose title over the Fazenda Coringa (Coringa Farm) was never formally registered and to whom Magellan Minerals has for years paid surface access payments. In 2006, Instituto Nacional de Colonização e Reforma Agrária (INCRA) established a Sustainable Development Project (PDS) in the area, which included the Coringa and Mato Velho tenement areas. INCRA declared itself the owner of this land and resettled a community called Terra Nossa located along the access road to the Fazenda Coringa (Figure 4-3). The legality of this action and the creation of numerous other PDSs were called into question by the Federal Prosecutor's Office (MPF), which litigated against INCRA to declare the establishment illegal. Serabi is currently negotiating with INCRA the specific terms and conditions under which it will operate on the PDS.

Figure 4-3: Surface Rights



Source: GRE

4.3 Royalties

The Brazilian government has a 1.5% net smelter return (NSR) on all gold and silver production. In addition, local land owners receive a royalty equal to one half the Brazilian government's, or 0.75% NSR. Also, Sandstorm, a gold-streaming and royalty company based in Vancouver, Canada, holds a 2.5% NSR on all production from the Coringa Gold Project.

4.4 Production Permits

On May 10, 2017, Anfield received INCRA's formal consent for the Coringa Gold Project to be permitted by State Department of Environment (SEMAS). INCRA's consent was required by SEMAS as a prerequisite for issuing permits to allow construction and mining operations to begin at the Coringa Gold Project. Serabi continues to communicate with SEMAS as the agency works to finalize and issue the required permits.

Update on Regulatory Compliance Requirements and Permitting Considerations

On August 9, 2017, Chapleau received key permits from SEMAS, which were requirements for commencing major construction of the Coringa Gold Project. These included:

- A license of operation for exploration and trial mining
- A vegetation suppression permit
- A fauna capture and relocation permit.

These SEMAS permits include a number of specific conditions for the conservation and protection of fauna and flora that will be integrated into planning for the Coringa Gold Project.

The Company holds two trial mining licenses for the tenements 850.567/1990 (valid until 25 November 2020) and 850.568/1990 (valid until 25 May 2020), issued by the Departamento Nacional de Produção Mineral (DNPM) and which each authorize mining of up to 50,000 tonnes of ore per annum. The Company also holds an Operating License issued by the Secretaria de Estado de Ambiente e Sustentabilidade (SEMAS) which complements the trial mining licenses and is valid until 8 August 2022. The Company intends to use these licenses to undertake initial underground development to verify the resource estimate, confirm geologic and grade continuity, and provide relevant data on the spatial distribution of underground mining areas to be taken into account during future engineering studies and subsequent mine development. The existing trial mining licenses contain the entirety of the Serra and Galena veins, as well as the bulk of the known Meio resources.

In order to expand to full scale operations (i.e., the processing of up to 465 t/d of ore), Serabi will have to obtain further permits from SEMAS including a license for the construction of the processing plant, and culminating in Operating Licenses for full scale mining, processing operations and dry stack tailings storage facility. An environmental impact study [i.e., the Coringa Gold Project Estudo de Impacto Ambiental/ Relatório de Impacto Ambiental (EIA/RIMA)], was submitted to SEMAS in December 2017 and approved by SEMAS in January 2019. However, the tailings dam collapse of Vale's Brumadinho operation in Minas Gerais prompted the company not to seek a public hearing at that time, but to amend the EIA/RIMA, replacing conventional tailings disposal with a ‘filtration of tailings and dry stacking’ technology instead. This amended EIA/RIMA was submitted and protocoled with SEMAS in September 2019. The company awaits news of an approval.

In addition, under the trial mining permits, Chapleau is required to comply with various additional regulatory compliance and permitting requirements addressing a wide range of operational needs. These include fuel storage; non-hazardous and hazardous waste accumulation, storage, and disposal; transportation, storage, and safe use of explosives and mineral processing reagents; surface water drainage; archaeological resource assessment; worker health and safety programs; and other needs. None of these permits have been obtained as of the effective date of this technical report. Serabi will also be required to submit regular reports on operational, environmental, occupational health and safety, and social performance.

As of the effective date of this technical report, applications for all required camp and processing start-up water have been submitted, and a dry stack tailings storage facility (DSTSF) permit request is nearing completion and is anticipated to be filed with SEMAS early in Q4 2017. Also, discussions for long-term land access agreements are underway with INCRA, a government agency which claims ownership of the surface rights where the Coringa Gold Project is situated.

The aforementioned conditions and requirements will be systematically addressed through the implementation of appropriately designed management systems, plans, and procedures, as part of the normal course of operations at the Coringa Gold Project. Project management systems will also provide for the legal resources to monitor pending and promulgated regulatory changes that may affect operations at the Coringa Gold Project, as well as standards for regular monitoring to ensure the Coringa Gold Project maintains continued compliance with all applicable regulatory requirements and obligations.

4.5 Environmental Regulations and Permitting

4.5.1 Environmental Regulations and Permitting

Brazilian Federal Law 6938/1981 establishes general environmental policy and permitting requirements for all activities with contamination potential or involving extraction of natural resources. Prior to obtaining a mining concession, project proponents may conduct mineral exploration and limited (trial mining) processing of up to 50,000 tonnes per year (tpy) of ore (in case of gold ore) with a Guia and pre-requisite environmental approval of the Life of Mine Plan (LOMP). Depending on the ecological circumstances, an applicant may also have to obtain authorizations for vegetation suppression/restoration and fauna capture/relocation. Companies may apply for expansions of trial mining ore processing limits once they are in production. Serabi has exercised this trial mining option for tenements 850.567/1990 and 850.568/1990.

Mine developers must also first obtain permits from the respective state permitting authority. In the case of Chapleau, this authority is SEMAS. The environmental permitting process for the full mining operation has three stages, is summarized as follows:

- **Prior License: (LP: Licença Prévia):** this permit confirms the selection of the best place for developing and conducting extractive activities, based on submission of a detailed EIA/RIMA. In addition, in Pará State, public hearings are required to be held by the municipalities whose administrative areas encompass the project's social and environmental Direct Areas of Influence (AIDs). Upon issuing the LP, SEMAS may choose to invoke specific requirements, known as LP conditions, which the applicant must implement before it can obtain its LI. Legislated timing for issuing the LP is twelve months after the date of application, provided no further details and/or supplemental information is required by the regulator.
- **Installation License (LI: Licença de Instalação):** this permit allows the construction of the mine, pursuant to compliance with conditions raised in the LP. It also establishes conditions for obtaining the final LO. The LI application also requires submission of a detailed Environmental Control Program [Programa de Controle Ambiental (PCA)]. The granting of the LI means: (i) approval of the control, mitigation, and compensation measures proposed by the project proponent in the PCA, as well as the timetable for the implementation of such measures, (ii) approval of the characteristics of the specific engineering project, including its timetable for implementation, and, (iii) manifestation of the agreement between the project proponent and the regulatory authorities regarding adherence to the conditions of the LP. Legislated timing for issuing the license is six months after the date of application, provided no further details and/or supplemental information are required by the regulator.
- **Operation License (LO: Licença de Operação):** this permit is issued following demonstration of compliance with LI conditions and allows the mine to commence production operations. The LO may establish additional mandatory conditions. Legislated timing for issuing the LO is six months after the date of application, provided no further details and/or complementary information are required by the regulator.

In actual practice in Pará State, the time required for SEMAS approval may vary from the guidelines in the Federal law, depending on the complexity of the project and availability of review resources, among other factors. In addition, whenever applicable, SEMAS must also assess the opinion reports of other regulatory bodies at the national, state, and municipal levels that are involved in the licensing procedure; these may include INCRA, Pará Land Institute (ITERPA), National Indian Foundation (FUNAI), Chico Mendes Institute for the Conservation of Biodiversity (ICMBio), National Water Agency (ANA), and National Institute of Historic and Artistic Patrimony (IPHAN), among others.

In addition, National Council for the Environment (CONAMA) Resolution 237/1997 is a key component of the environmental licensing process and defines the specific activities or ventures that require an environmental license, including major elements of a mining operation. These include:

- Mineral exploration involving drilling
- Underground mining
- Processing of non-ferrous metals, including gold
- Construction and operation of dry stack tailings storage and water diversion and drainage structures

- Construction and operation of electrical transmission lines and substations
- Construction and operation of water treatment plants
- Construction and operation of sewage treatment plants
- Treatment and disposal of solid wastes
- Transportation, storage, and handling of dangerous material.

Transportation, storage, handling, and usage of explosives and chemical reagents requires separate approval by the Brazilian Army. Depending on the final design characteristics of Coringa Gold Project's fuel depot, additional approvals may be required from the National Petroleum, Natural Gas, and Biofuels Agency (ANP).

Municipal administrations are responsible for participating directly in the environmental licensing process and must issue a document that establishes their position as to whether or not the project is in conformity with municipal soil use, occupation, and other regulations. In the case of the Coringa Gold Project, two municipalities are involved: Altamira, which administers the rural area within which most of the mining concessions and the actual mine and operational infrastructure would be located, and Novo Progresso, which includes part of the concessions as well as the two settlements (Terra Nossa and the town of Novo Progresso) in which most of the social impacts and benefits of the project will be expressed. Other specific federal and Pará State public administration agencies may also engage in various aspects of the licensing process over which they may have technical authority or shared interest.

Environmental laws also provide for the participation of communities during the environmental licensing process. In practice, this occurs during public hearings.

With respect to water usage, the National Commission of Hydric Resources (CNRH) Resolution 55/2005 classifies mining ventures based on their impact on water resources. The Coringa Gold Project will be classified as a Scale 2 venture under this classification scheme, as it would involve:

- Limited use of surface water in the initial start-up of mining operations
- Use of groundwater (collected as mine wastewater) for use in the mineral separation process
- Limited discharges of excess water from the DSTSF in certain high precipitation/wet season conditions.

All uses of superficial water and groundwater at the Coringa Gold Project are therefore subject to a grant or "dispensation" process, which applies to uses that include the construction and operation of water collection ponds, diversion of watercourses, discharge of liquid effluents in watercourses, alteration of the rates of flow of watercourses, and any activities that would impact the level of the water table.

Additional permits required to operate a mine may include:

- **Potable water wells**: the Coringa Gold Project must also obtain permits for all water wells through SEMAS.
- **Fuel storage tanks and refueling stations:** permits must be obtained from the ANP any time installed storage capacity reaches 15,000 L or more.

- **Power transmission system**: installation of a powerline to the project site will require an environmental licensing process that includes LP, LI, and LO phases. It is expected that this process will be implemented by the power utility. As the powerline will follow an existing road ROW, it is likely to have low environmental impact.
- **Airstrip**: permitting is governed by the Brazilian Aeronautical Code. Primary permitting agencies are the ANAC (National Civil Aviation Agency) and the local SEMAS office. The former deals primarily with technical aspects while the latter approves the LP, LI, and LO, which will proceed in accordance with a Simplified Environmental Report (RAS) and PCA.
- **Landfill**: landfill permits are governed by CONAMA Resolution 404, which states that small scale sanitary landfills are those in which 20 tons of solid waste per day are disposed must be classified as not dangerous and inert (also referred to as domestic or urban wastes). This is considered an activity with local environmental impact, so permitting will be governed by the Municipality of Altamira.

The current status of the Coringa Gold Project permitting efforts is elaborated in Section 20.

4.5.2 Environmental Baseline

The Coringa Gold Project concession is situated near a boundary between primary forest areas reserved as an indigenous buffer zone, and land areas previously impacted by government- sponsored agricultural clearances and ongoing agriculture. Forested areas within the Coringa Gold Project and the adjacent buffer zone have also been previously impacted by illegal logging of high-value tree species and by artisanal/small scale garimpeiro mining.

The first significant baseline studies of water quality, air quality, and flora and fauna within the Coringa Gold Project concession were conducted by Terra Meio Ambiente (Terra) in 2015 and 2016 to support the development of the EIA and RIMA for the project, as well as the individual environmental clearance permits required for the construction of specific elements of mine infrastructure. The latter permits typically include specific conditions that must be met as a condition of approval, including the monitoring of fauna displaced by clearance activities, the potential capture and relocation of individuals from specific species, and the collection and replanting of selected floral species.

4.5.3 Other Significant Factors and Risks Affecting Access or Title

The primary environmental, social, and legal risks associated with the Coringa Gold Project are summarized in Section 20.3.3, along with a discussion of Chapleau's general approach to risk mitigation. Additional details on the monitoring, assessment, and management of social risks are addressed in Section 20.

4.6 Environmental Liabilities

Environmental risks and liabilities associated with construction activities at the Coringa Gold Project are minimal but will include areas of forest clearance for construction of access roads and facilities; noise from traffic, construction equipment, and generator operation; dust from roadways and work areas during dry season operation; potential spills of fuel and lubricants, and the potential for grass fires in dry conditions.

The Coringa Gold Project includes a number of historical garimpeiro workings which represent potential physical safety and environmental hazards if field investigations to support detailed design or construction activities are conducted in adjacent areas. Hazards will be clearly marked and physically barricaded where necessary, and no effluents will be permitted to drain from the garimpeiro workings to the exploration site or construction sites, or vice versa.

As of the effective date of this technical report, Serabi is in compliance with all environmental regulations required for the Coringa Gold Project.

4.7 Other Risk Factors

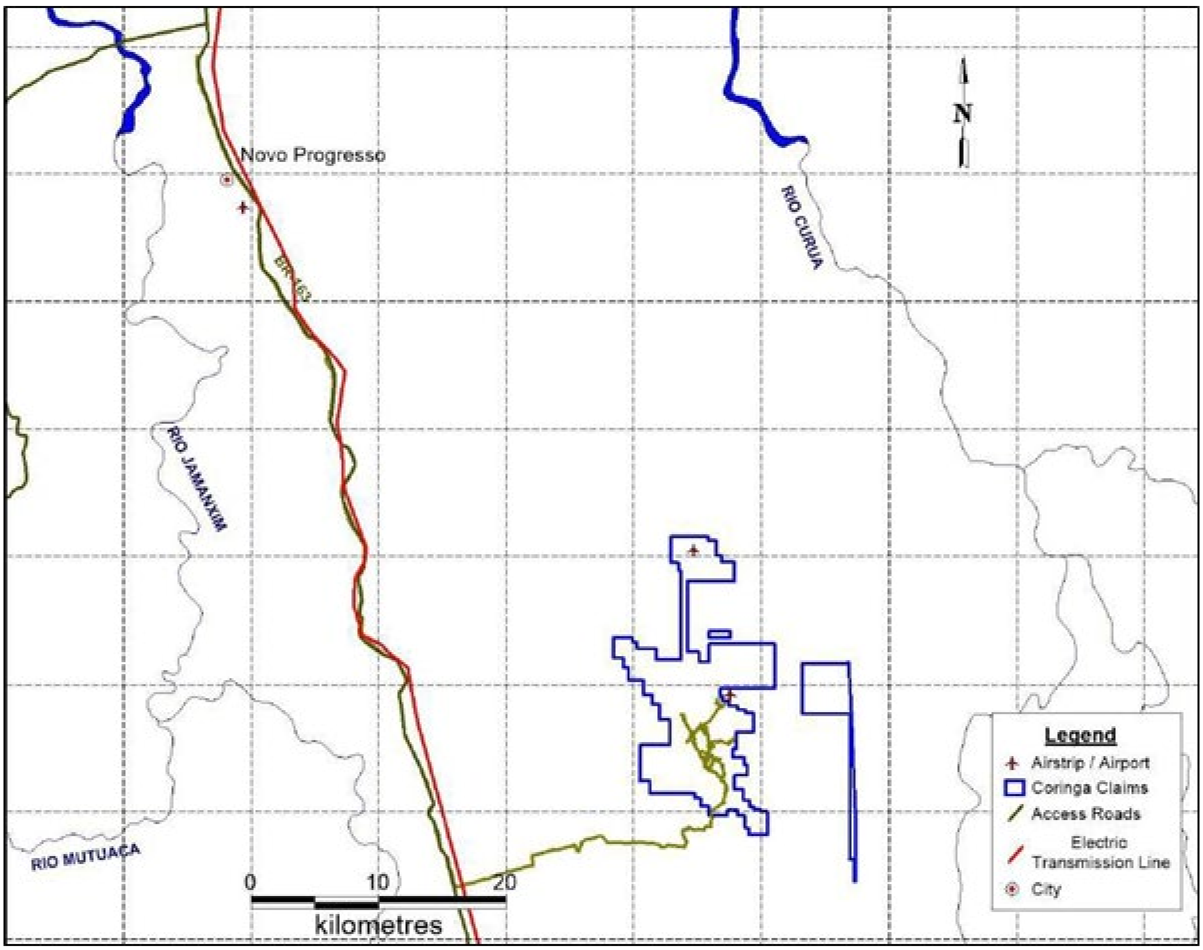
Other than as disclosed in this section of the technical report and elaborated further in Section 25, the QPs are not aware of any other significant factors and risks that may affect access, title, or the ability to perform work on the property.

5.0 Accessibility, Climate, Infrastructure, and Physiography

5.1 Accessibility

The Coringa Gold Project is located in north-central Brazil, approximately 70 km southeast of the city of Novo Progresso. The Coringa Gold Project is accessed by paved Highway BR-163 and dirt roads (Figure 5-1), and the driving time from Novo Progresso to the Coringa Gold Project camp is typically two hours. Surface rights outlined in Section 4 are sufficient to access all pertinent areas of the mining concessions including areas for future infrastructure needed for an operating underground mine and process plant.

Figure 5-1: Access to the Coringa Gold Project



Source: Serabi, 2018

5.2 Climate

The climate is tropical and is characterized by high humidity and high temperatures averaging 26°C. Average annual rainfall is between 1,500 millimeters (mm) and 2,000 mm with a wet season from October to April. Work on the property can be carried out year-round.

5.3 Local Resources and Infrastructure

Novo Progresso (population approximately 30,000) is the closest major urban centre, and it can provide reasonable accommodation and basic goods and services. It is located along Highway BR-163 which is the main route for trucks carrying soya crops from the Sinop area in Mato Grosso State to ports in Itaituba and Santarem, on the Amazon River. Charter flights are available to and from Novo Progresso. A high-voltage powerline which is part of the national electric grid is located along Highway BR-163, 21 km west of the project.

Mining personnel for Serabi's nearby Palito operation are currently sourced from a mix of close proximity urban centres within the state of Para and other major urban cities throughout the country of Brazil. The current workforce at Coringa includes geologists, field technicians, and camp administrative personnel. Workers are on a typical 20 day on 10 day off rotation. Serabi anticipates the future operational workforce for an underground mine and processing plant will be a mixture of Brazilian locals and foreign workers with relevant mining and processing experience.

A 200-person field camp and core logging and temporary storage facility are located on the Coringa Gold Project property. Core is later transferred to permanent, secure storage in Novo Progresso. Two water wells provide the camp with drinking water, and septic tanks and leach fields provide for sewage waste disposal. A new sewage treatment plant provides waste disposal for the new camp facilities. Power at the camp is supplied by diesel generators. Telephone and internet service are via radio links to Novo Progresso. Short-wave radios provide communication within the project area. There is sufficient room in the vicinity of the Serra and Meio veins for tailings, waste rock storage, and a processing plant.

5.4 Physiography and Fauna

The Coringa Gold Project has deeply incised topography forming northwesterly trending ridges that are 150 meters above the surrounding valleys. Most of the property is covered by tropical jungle with a tree canopy reaching up to 30 meters. Elevations range between 250 and 450 meters above sea level.

Minor grazing and small farm agricultural activity is present in the area. Historical artisanal mine workings are common on the property, and they often form elongated trenches along mineralized trends. These trenches are commonly filled with water.

Typical fauna for the Amazon jungle are present such as tapir, capybara, monkeys, tropical birds, snakes, and insects.

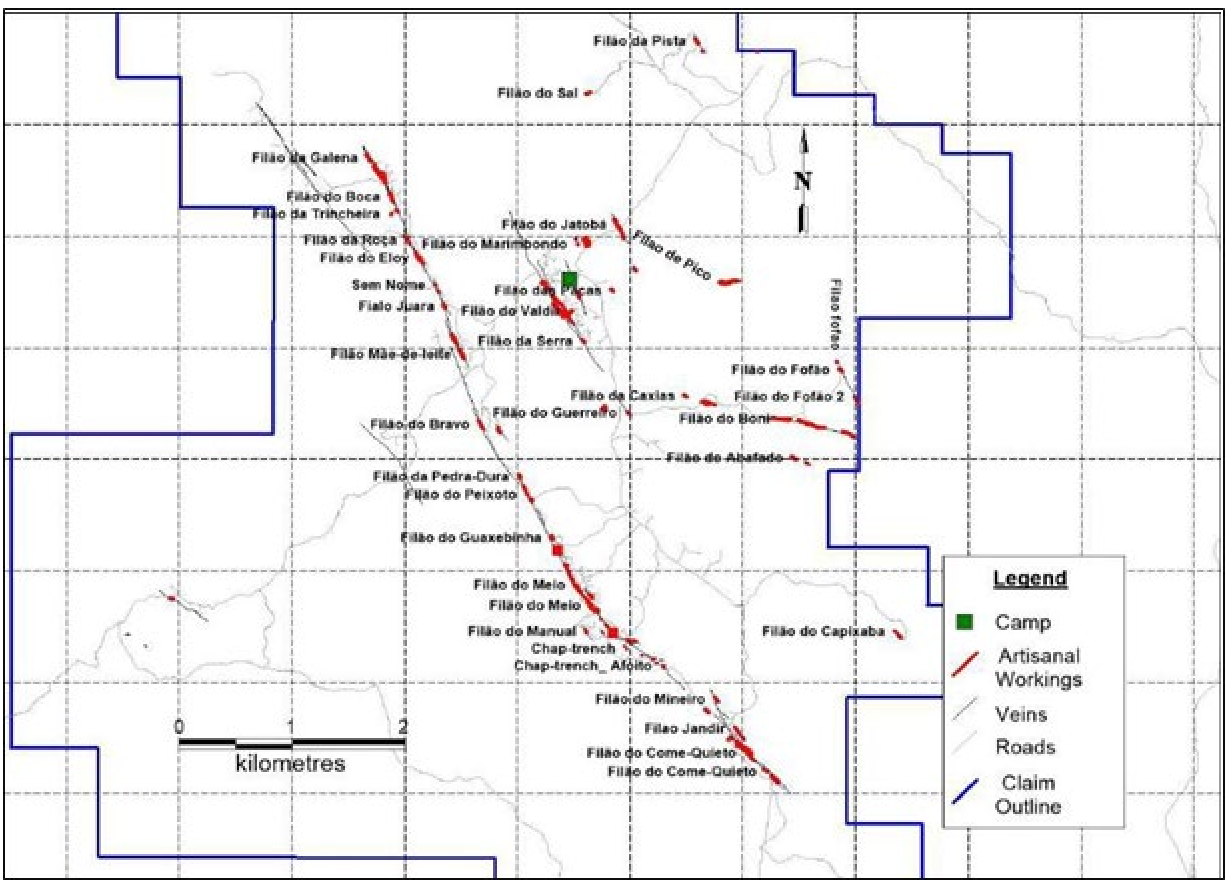
6.0 History

The Tapajós gold district was Brazil's main source of gold from the late 1970s to the late 1990s. Over 80,000 artisanal miners exploited alluvial deposits, and total gold production estimates range from 5 to 30 M oz, but no accurate totals exist (Santos, et al., 2001; CPRM, 2008).

The Coringa Gold Project is located in the southeastern part of the Tapajós gold district. Artisanal mining produced an estimated 10 tonnes of gold (322,600 ounces [oz]) from alluvial and primary sources (Snowden, 2015). Deep saprolite or oxidized parts of shear zones were mined using high-pressure water hoses or hand-cobbing to depths of 15 meters. Artisanal workings are shown in Figure 6-1.

Other than the artisanal workings, no other production has occurred at Coringa. Artisanal mining activity ceased in 1991 and a local Brazilian company (Tamin Mineração Ltda.) staked the area in 1990. Subsequently, the concessions were optioned to Chapleau (via its Brazilian subsidiary, Chapleau Exploração Mineral Ltda) in August 2006. On 1 September 2009, Magellan Minerals acquired Chapleau. On 9 May 2016, Anfield acquired Magellan Minerals. Serabi acquired Chapleau and its assets including Coringa from Anfield on 21 December 2017.

Figure 6-1: Artisanal Workings Coringa Gold Project



Source: Serabi, 2018

Previous exploration and disclosure of prior ownership and changes to ownership at the Coringa Gold Project are summarized in Table 6-1 and discussed in greater detail in past technical reports (Global Resource Engineering, 2009; Global Resource Engineering, 2012; Global Resource Engineering, 2015; Snowden, 2015).

Table 6-1: Exploration History of the Coringa Gold Project

Year	Owner	Description
January 2007 to June 2007	Chapleau Resources Ltd.	Structural interpretation using satellite images; locate garimpeiro workings; rock, soil, stream sediment samples; 22 HQ drill holes (1,774 meters), petrography
June 2007 to March 2008	Chapleau Resources Ltd.	Airborne survey – magnetics, radiometrics (549 square km with lines spaced at 200 meters); IP dipole-dipole (34 km) over Galena-Mãe de Leite; metallurgical testing (SGS); 44 HQ drill holes (5,032 meters)
March 2008 to December 2008	Chapleau Resources Ltd.	IP dipole-dipole survey (70.7 km) over Serra, Meio and Come Quieto veins; geotech airborne VTEM-mag (860 km); 15 HQ drill holes (1,979 meters)
January 2009 to September 2009	Chapleau Resources Ltd.	Geological mapping, trenching (18 trenches) between Mãe de Leite and Come Quieto; soil sampling
September 2009 to December 2009	Chapleau Resources Ltd.	Soil sampling
January 2010 to December 2010	Magellan Minerals Ltd.	Soil sampling; 28 HQ drill holes (3,396 meters)
January 2011 to December 2011	Magellan Minerals Ltd.	Soil sampling; trenching (Valdette – 14, Demetrio – 3); 51 HQ drill holes (11,912 meters)
January 2012 to December 2013	Magellan Minerals Ltd.	Soil sampling; 19 HQ drill holes (4,344 m)
2016–2017	Anfield Gold	Assaying of soil samples taken previously by Magellan; IP dipole-dipole survey (3.5 km); infill drilling – Serra, Meio veins (180 holes; 25,212 meters)
2018-2019	Serabi Gold Plc.	Extension drilling- Galena, Serra, and Meio (20 holes; 5619.83 meters)

7.0 Geological Setting and Mineralization

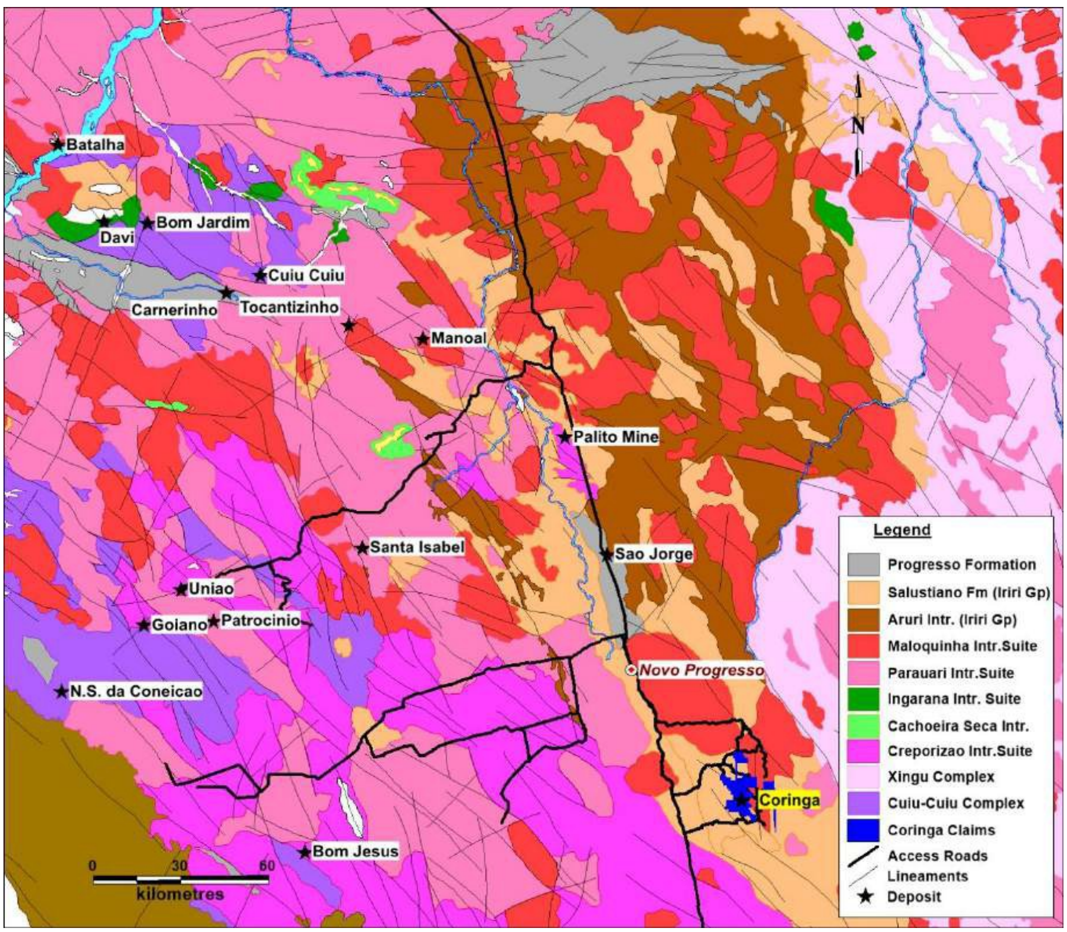
The following description of the regional geology and lithology, structure, mineralization, and alteration specific to the Coringa Gold Project was prepared by Mr. Robert Sim, P.Geo, and is presented here as an excerpt from the 2017 NI 43-101 Technical Report issued by MTB for Anfield Gold Corp.

Dr. Hamid Samari of GRE has reviewed this information and available, associated supporting documentation in detail and finds the discussion and interpretations presented herein to be reasonable and suitable for use in this report.

7.1 Regional Geology

The Coringa Gold Project is located in the southeastern part of the Tapajós gold district which is located in the central part of the Amazon Craton. Regionally there are over 400 alluvial occurrences (Santos et al., 2001) and over 20 hard rock gold showings (Coutinho, 2008), see Figure 7-1.

Figure 7-1: Regional Geology Coringa Gold Project



Source: Anfield, 2017; INDE, 2004

The Tapajós gold district is underlain by the Cuiú-Cuiú (2.0–2.4 Ga) and Jacareacanga (2.1 Ga) metamorphic complexes (Coutinho, 2008). The Cuiú-Cuiú complex consists of granites, gneisses, and amphibolites and the Jacareacanga complex consists of metamorphosed sediments and volcanics. Both are intruded by monzogranites and granodiorites of the Parauari group (2000– 1900 Ma), granodiorites of the Tropas group (1907–1898 Ma), and granitic rocks of the Creporizão group (1893–1853 Ma). Younger felsic to intermediate volcanics of the Iriri group (1.87–1.89 Ga) and alkaline granites of the Maloquinha group (1880 Ma) also crosscut the metamorphic complexes. The Maloquinha granites are the possible source of the gold in the Tapajós gold district.

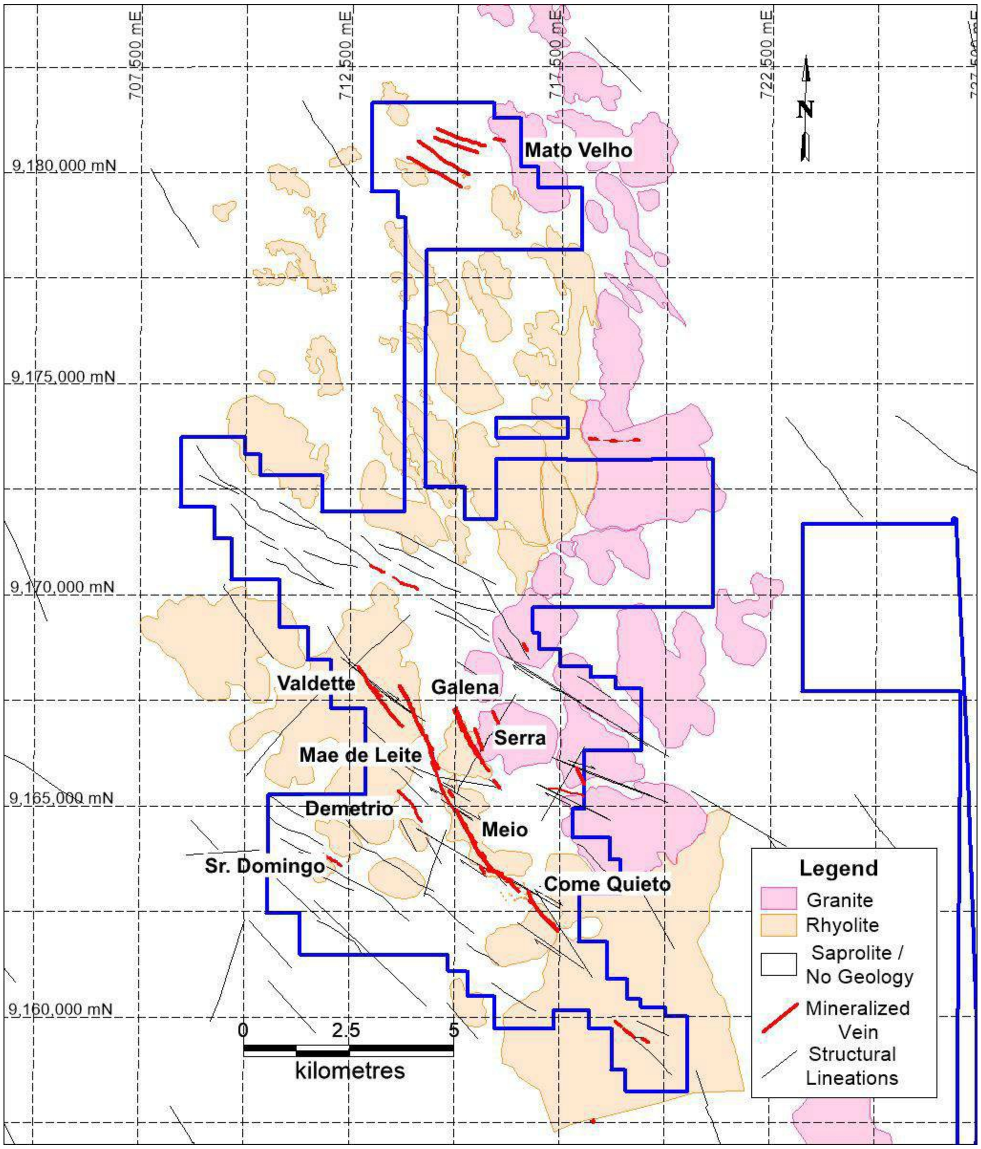
A regional northwest-southeast-trending shear zone, the Tocantinzinho Trend, is associated with many of the gold occurrences in the district (e.g., Cuiú-Cuiú, Palito, Tocantinzinho, União, Coringa, and Mato Velho) (Reconsult Geofisica, 2008). Mineralization consists of native gold occurring in quartz-carbonate-sulphide veins or with disseminated sulphides. Pyrite is the dominant sulphide with minor sphalerite, chalcopyrite, and galena.

7.2 Property Geology

7.2.1 Lithology

The Coringa Gold Project is underlain by granitic intrusions of the Maloquinha group and rhyolites of the Iriri group (Salustiano Formation) (Figure 7-2). The granites are granular, medium-grained, and consist of pink feldspar and quartz. The rhyolites are fine to medium-grained, porphyritic, and strongly magnetic. Sanidine and quartz phenocrysts occur in a fine-grained matrix of sanidine-quartz. Minor amounts of biotite also occur in the matrix which has been altered to chlorite.

Figure 7-2: Local Geology Coringa Gold Project



Source: Anfield, 2017

7.2.2 Structure

There are two dominant structural trends on the Coringa Gold Project property (Figure 7-2):

- The 310° structures are interpreted as strike-slip faults with probably a dextral (right lateral) sense of displacement.
- Structures trending at 345° are interpreted as R-shears.

Mineralized veins at the Coringa Gold Project are associated with the R-shears. The dip of the veins ranges from 75^0 to the east to vertical, but they occasionally dip steeply westward (e.g., Galena Vein).

7.2.3 Mineralization

Mineralization at the Coringa Gold Project is associated with a shear/vein system that has a strike length of over 7 km. The mineralized zones vary in thickness from <1 centimeter (cm) up to 14 meters. Several veins (i.e., Galena, Mãe de Leite, Meio, and Come Quieto) occur along the main mineralized corridor and others, such as Serra, Demetrio, and Valdette, form subparallel zones. The average thicknesses for the veins included in the estimate of mineral resources are: Serra 0.52 m, Galena & Mãe de Leite 0.59 m, Meio & Come Quieto 0.41 m, and Valdette 0.80 m.

Gold mineralization is almost exclusively associated with quartz-sulphide veining. Pyrite is the main sulphide, but minor concentrations of chalcopyrite, galena, and sphalerite are common. A genetic study of mineralization indicated that pyrite-chalcopyrite (+/- quartz) mineralization occurred first, followed by gold, with galena and sphalerite introduced late. Gold is typically free (or within electrum) and occupies fractures within sulphide grains. It is usually very fine grained and visible gold is rare (Boutillier, et al., 2017). Gold in electrum is closely associated with quartz and pyrite. The bulk of the gold has a preference for deposition in the quartz matrix/groundmass (48% locking affinity) and within pyrite (31%) occurring in either fractures or as inclusions, as well as in other sulphides, oxides, and, to a lesser extent and depending on tectonic conditions, in silicates.

7.2.4 Alteration

Almost all the core at the Coringa Gold Project is strongly silicified and hematitic. Distal chlorite-hematite alteration forms wide selvages (50 meters) to veins hosted in rhyolites and narrower selvages (10 meters) to veins hosted in granite. A more proximal pale green sericite-pyrite alteration forms a wider halo in rhyolites (1 meter) compared to granites (0.5 meters).

8.0 Deposit Type

The mineralized veins exposed on the Coringa Gold Project are similar to those found in Orogenic gold deposits. This deposit type has been described by (McCuaig, et al., 1998; Groves, et al., 1998; Goldfarb, et al., 2001). These deposits formed over a 3 Ga time frame with peaks at 3.1 Ga, 2.7 to 2.5 Ga, 2.1 to 1.8 Ga, and 0.6 to 0.05 Ga corresponding to the episodic growth of juvenile continental crust. A large percentage of the world's gold resource is associated with these periods. Orogenic gold deposits are the source of many of the great placer gold districts (e.g., Tapajós; Klondike; Mother Lode, California; East Russia).

Characteristics of an Orogenic gold deposits are as follows:

- Proximity to large scale structures which allow for large scale fluid migration. Deposits are commonly in secondary and tertiary structures.
- Magmatic-meteoric hydrothermal fluids have low salinity and moderate temperatures (200 to 600^{o}C). High concentrations of dissolved sulphur and gold in fluids and overall fluid volumes are critical to the formation of economic deposits.
- These deposits commonly have large vertical extents (1-2 km) and can have extensive down-plunge continuity.
- Gold mineralization is hosted in quartz-dominant vein systems which have low (<3 – 5%) sulphide content. Carbonate content ranges from <5% to 15%. Pyrite is the dominant sulphide.
- Veins have high gold grades (5 to 30 grams per tonne (g/t)).
- Alteration haloes around mineralized veins include carbonate, sulphide, and sericite±chlorite assemblages.

Deposits in the Tapajós Gold District that are similar to the Coringa Gold Project include Serabi Gold plc's Palito deposit (Guzman, 2012) and Gold Mining Inc.'s São Jorge deposit (Rodriguez, et al., 2014). Other deposits similar to the Coringa Gold Project can be found in Ontario's Archean Gold District in Canada. One characteristic of the gold deposits in this district is their occurrence within major tectonic zones which comprise linear shear systems. All of the major gold camps in the Superior Province of Canada, including Rice Lake, Red Lake, Hemlo, Wawa, Timmins, Kirkland Lake, Val D'or – Malartic and Casa Berardi are associated with deformation zones. (Hurst, 1935; Gunning, et al., 1937).

In the Coringa gold deposit, shear zones of anomalously high strain are clearly seen and are mappable units (Global Resource Engineering, 2012). Gold deposition occurs within the quartz veins which were emplaced in the secondary extensional structures associated with the primary shear zones. These shear zones (linear units) occur in generally predictable orientations and are located in certain preferred settings, that is perpendicular to the maximum tension direction. These deposits were formed during the Achean eon of the Precambian and are commonly referred to as Archean lode gold deposits. In these mappable shear zone units, lithologies may be rotated, folded, dislocated, truncated, thinned, thickened, repeated or transposed (MTB, 2017).

These giant quartz vein systems, tens of kilometers in length and up to three kilometers in depth, are hosted in brittle-ductile shear zones and are restricted to terrane boundaries. These vein systems are hosted in regional structures that cut through the lithosphere but are usually recognized as strike-slip faults and associated duplexes along with second- and third-order splays. These veins sporadically contain gold mineralization and have extensive carbonate-alteration halos. Hodgson (1993) stated that gold is hosted in the small-scale structures within regional deformation zones. The occurrence of economic gold mineralization in a deformation zone is often located in places where increased extension has occurred, such as in pull-apart basins.

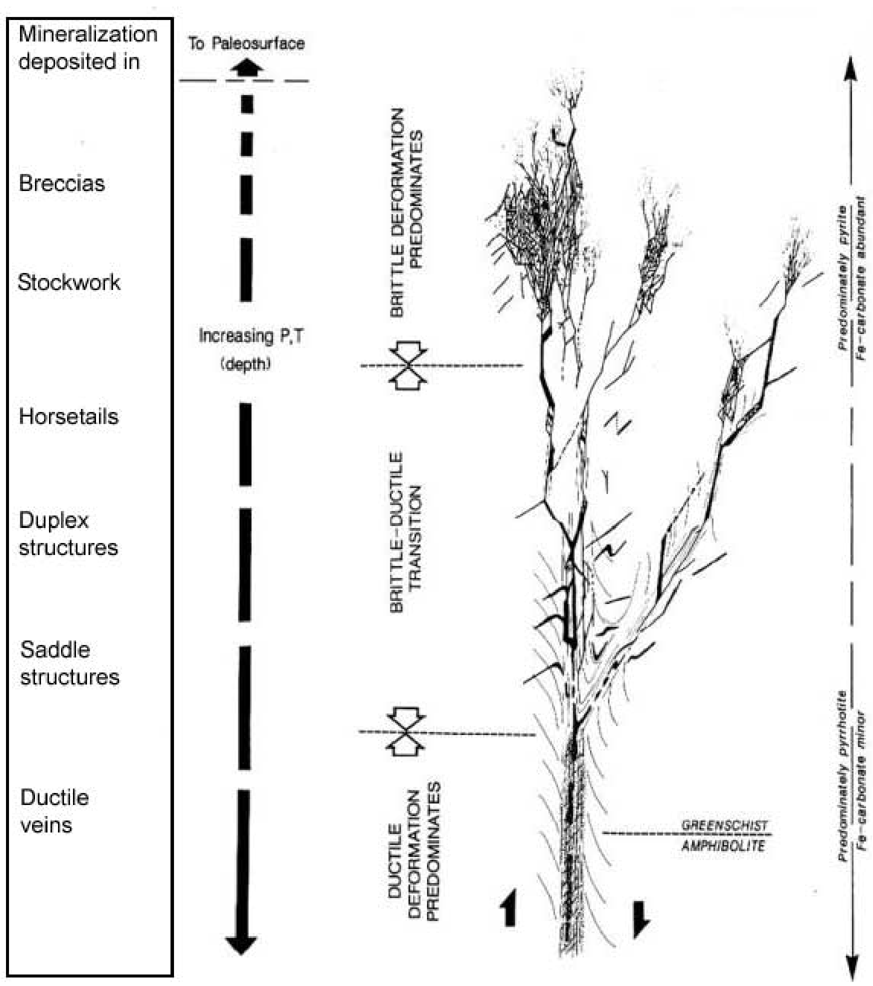
The majority of these veins are one centimeter to one meter thick and are formed locally. Minerals common to the gold related alteration zone include: Carbonates, Potassic phyllosilicates (Sericite and biotite), Alkali feldspar (albite and potash feldspar), Chlorite associated calcite and dolomite, Iron sulfides (pyrite), Quartz, and Chloritoid. The most distinctive occurrence of gold is in quartz veins. However, gold can also be associated with alteration sulfides in the wall rock. Feng, et. al. (1992) make the point that quartz and quartz-carbonate veins are common in metamorphic belts.

Deposits occur where:

- Strain has been anomalously high and brittle and ductile features are found
- Preexisting structural anisotropies exist
- Packages of rock with strong competency contrasts occur: For example, felsic intrusive rocks host mineralization, whereas the surrounding sedimentary rocks do not
- Fold limbs and noses create permeable zones.

A striking feature of these deposits is their great vertical continuity with mineralization occurring in a variety of structures that are dependent on depth (Figure 8-1). For example, mineralization in the Kolar gold field in India is vertically continuous to 3.2 km.

Figure 8-1: Idealized Composite Depositional Model for Archean Lode Gold Deposits

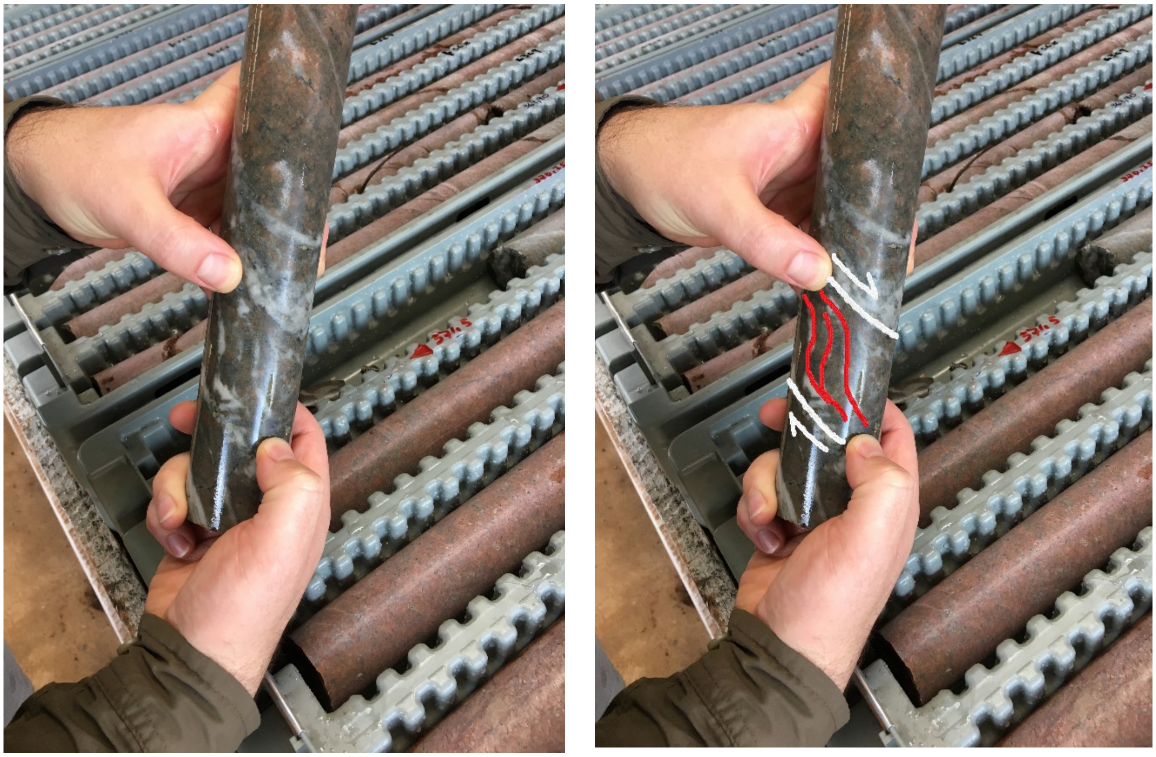


Source: (Colvine, et al., 1988)

Ore zones are lenticular, tabular or irregular shaped bodies composed of veins, breccias zones, and/or stockwork systems. Veins transect lithological contacts and are not restricted to a specific rock type. Veins can be classified as replacement veins, extension veins, and breccias and fracture veins. There is also a vertical zonation of gold deposits, which reflects a change in deformation style, from brittle to brittle-ductile. For example, breccia veins occur principally within brittle deformation and replacement veins typify ductile zones (Figure 8-1).

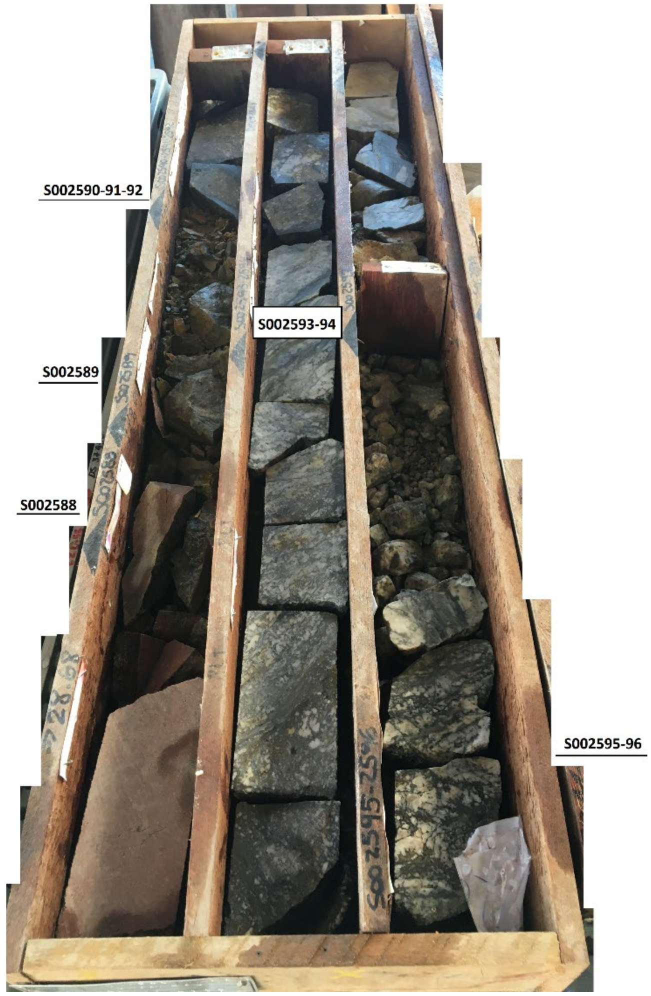
GRE QPs reviewed core boxes belonging to the 2018-2019 drilling campaign in November 2018 which exhibit evidence of duplex structures formed within the brittle-ductile transition zone: drill hole COR 0368 from 371.3-371.5 m (Au=0.26 parts per million (ppm)) (Figure 8-2). Further drilling is required to better define the lower limit of the brittle-ductile transition zones where these duplex structures are formed.

Figure 8-2: Brittle-Ductile Feature in Hole COR-0368 (Interval 371.3-371.5 meters)



It noteworthy to mention, in previous drilling campaigns (before 2018) that targeted the upper region of the deposit, drill core containing breccias and stockworks are abundantly seen which are characteristic features of the brittle deformation zone or upper part of brittle-ductile deformation zone. As seen in (Figure 8-3), sample No. S002593 that taken from hydrothermal breccias in hole COR0269, the interval 29.97-30.47 meters has a high gold grade (Au=133.5 ppm). These high gold grades belong to the shallow-moderately deep sections pertaining to the lower part of brittle or upper part of brittle-ductile deformation zones.

Figure 8-3: Hydrothermal Breccias with Base Metal, hole COR0269



9.0 Exploration

This section has been sourced from previous technical reports and updated with additional exploration completed by Serabi. It provides the relevant exploration work related to the gold mineralization at the Coringa Gold Property. A detailed chronological review of exploration work is provided in Snowden (2015).

The Coringa Gold Project property has only seen modern gold exploration since 2007. Highlights of the modern exploration are summarized in Table 9-1. Since 2007, exploration resulted in the collection of 19,595 soil samples, 757 stream samples, and 1,922 rock samples. Exploration work completed on behalf of Anfield occurred in 2016 to 2017. Exploration work completed by Serabi in 2018 and 2019 includes 20 infill drill holes in Galena, Serra, and Meio as shown in Table 9-1.

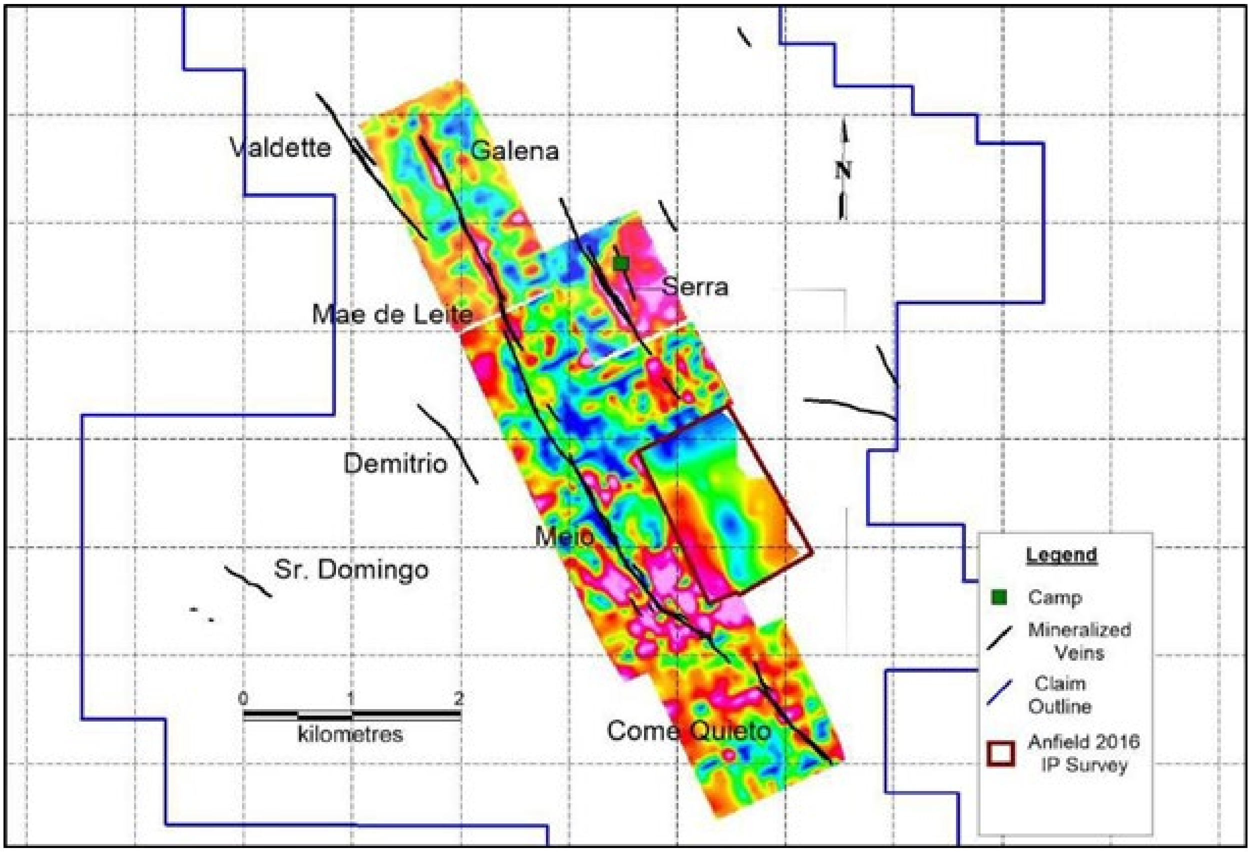
Table 9-1: Exploration Work Highlights Coringa Property

Year	Owner	Description
January 2007 to June 2007	Chapleau Resources Ltd.	Structural interpretation using satellite images; locate garimpeiro workings; rock, soil, stream sediment samples; 22 HQ drill holes (1,774 m), petrography
June 2007 to March 2008	Chapleau Resources Ltd.	Airborne survey – magnetics, radiometrics (549 km2 with lines spaced at 200 m); IP dipole-dipole (34 km) over Galena-Mãe de Leite; metallurgical testing (SGS); 44 HQ drill holes (5,032 m)
March 2008 to December 2008	Chapleau Resources Ltd.	IP dipole-dipole survey (70.7 km) over Serra, Meio and Come Quieto veins; geotech airborne VTEM-mag (860 km); 15 HQ drill holes (1,979 m)
January 2009 to September 2009	Chapleau Resources Ltd.	Geological mapping, trenching (18 trenches) between Mãe de Leite and Come Quieto; soil sampling
September 2009 to December 2009	Chapleau Resources Ltd.	Soil sampling
January 2010 to December 2010	Magellan Minerals Ltd.	Soil sampling; 28 HQ drill holes (3,396 m)
January 2011 to December 2011	Magellan Minerals Ltd.	Soil sampling; trenching (Valdette – 14, Demetrio – 3); 51 HQ drill holes (11,912 m)
January 2012 to December 2013	Magellan Minerals Ltd.	Soil sampling; 19 HQ drill holes (4,344 m)
2016 to 2017	Anfield Gold	Assaying of soil samples taken previously by Magellan; IP dipole-dipole survey (3.5 km); infill drilling – Serra, Meio veins (180 holes; 25,212 m)
2018 to 2019	Serabi Gold Plc.	Extension drilling- Galena, Serra, and Meio (20 holes; 5,619.83 m)

9.1 Induced Polarization Surveys

The mineralized veins are characterized by Induced Polarization (IP) chargeability anomalies as shown in Figure 9-1. In 2016, Anfield completed a 3.5-km IP survey over an area located east of the Meio vein, which is being considered as a dry stack tailings facility. No significant IP anomalies are present within the proposed tailings location.

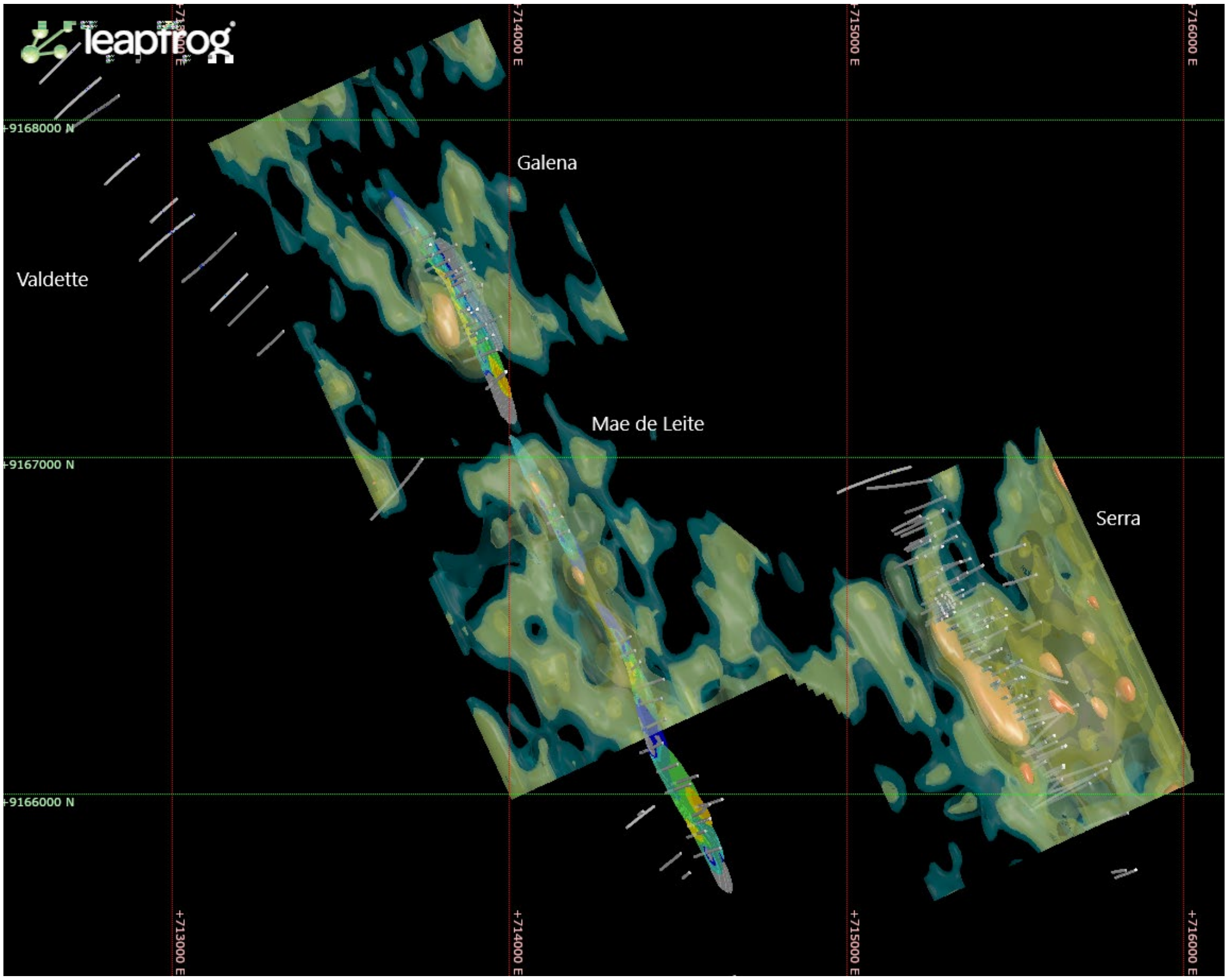
Figure 9-1: IP Chargeability n=4, Main Veins



Source: Anfield, 2017

In 2018, Serabi reprocessed data from the previous IP surveys for the northern end of the property, including all of Galena, the northern half of Mae de Leite, and all of the Serra vein. The results confirmed the correlation between the mineralized veins and high chargeability. In addition, 3D solids were produced from the data showing anomalous areas adjacent to the main veins which have not been drilled to date (Figure 9-2). Adjacent anomalies are present in the Meio vein and are evident when analyzing the different elevation depths of the past chargeability survey.

Figure 9-2: Reprocessed IP Chargeability, Serabi

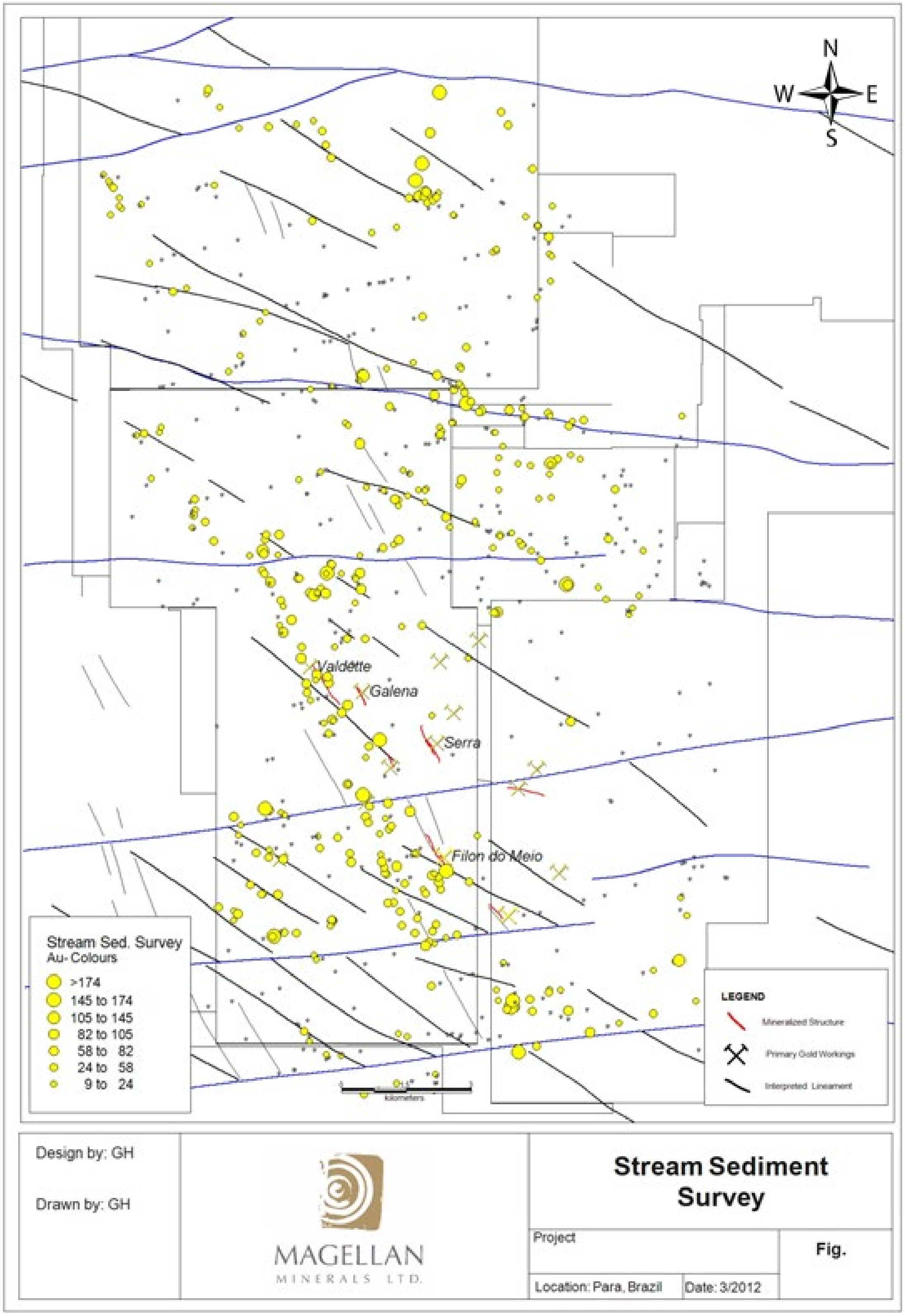


Source: GRE, 2019

9.2 Stream Sediment Sampling

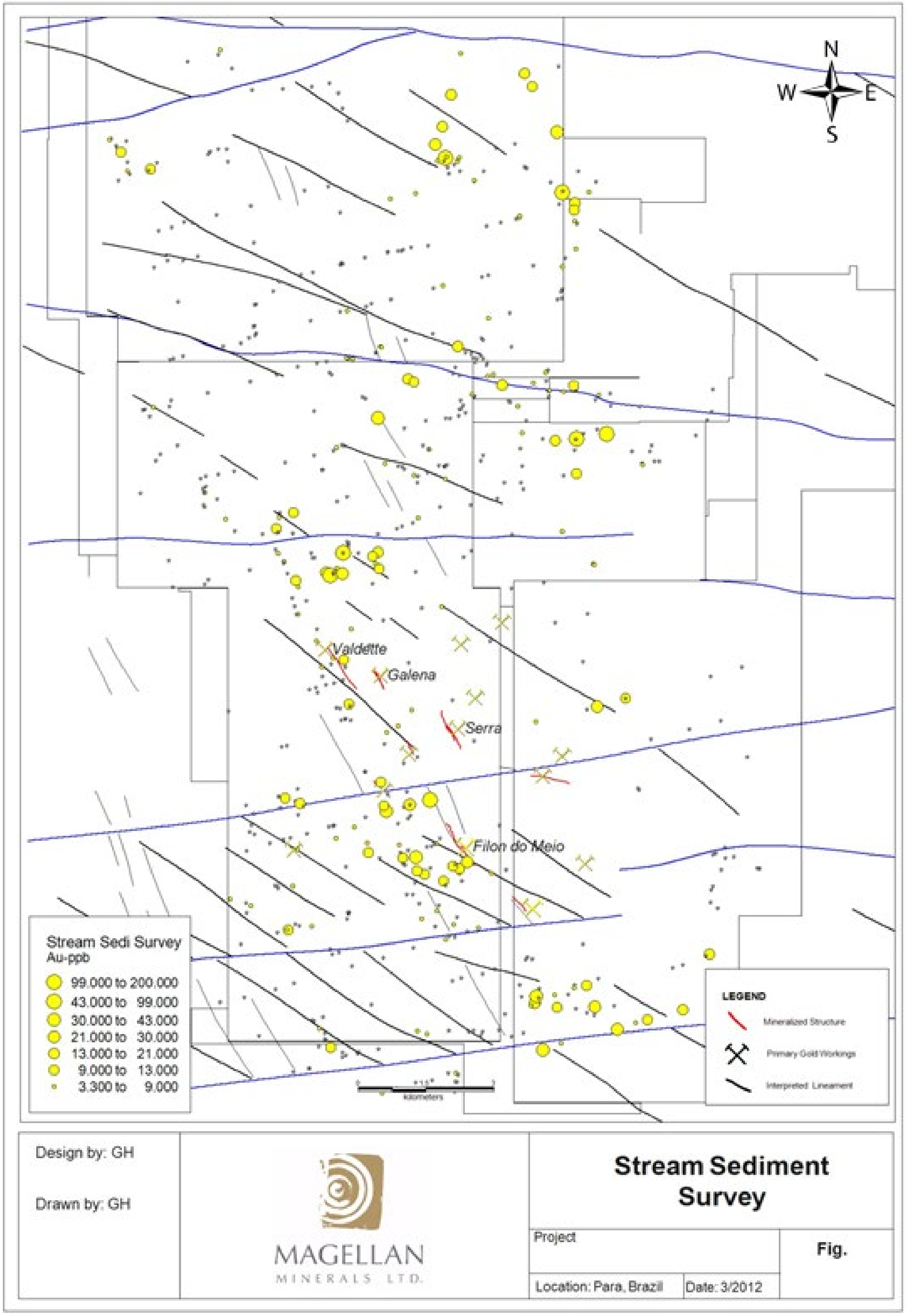
Between March 2007 and 2012, Magellan carried out a stream sediment and soil sampling program. Lines with one-km spacing were laid out across the project boundary, oriented NE-SW, for the stream sediment sampling program. In places where the stream samples contained significant free gold, the drainage was sampled upstream to locate the source. A total of 756 samples were collected. Samples which had over 24 gold color (90th percentile) were considered anomalous. Those that had over 9 ppm Au (90th percentile), were also considered anomalous (see Figure 9-3 and Figure 9-4).

Figure 9-3: Stream Sediment Samples, Au Colours



Source: Magellan

Figure 9-4: Stream Sediment Samples, Au ppb

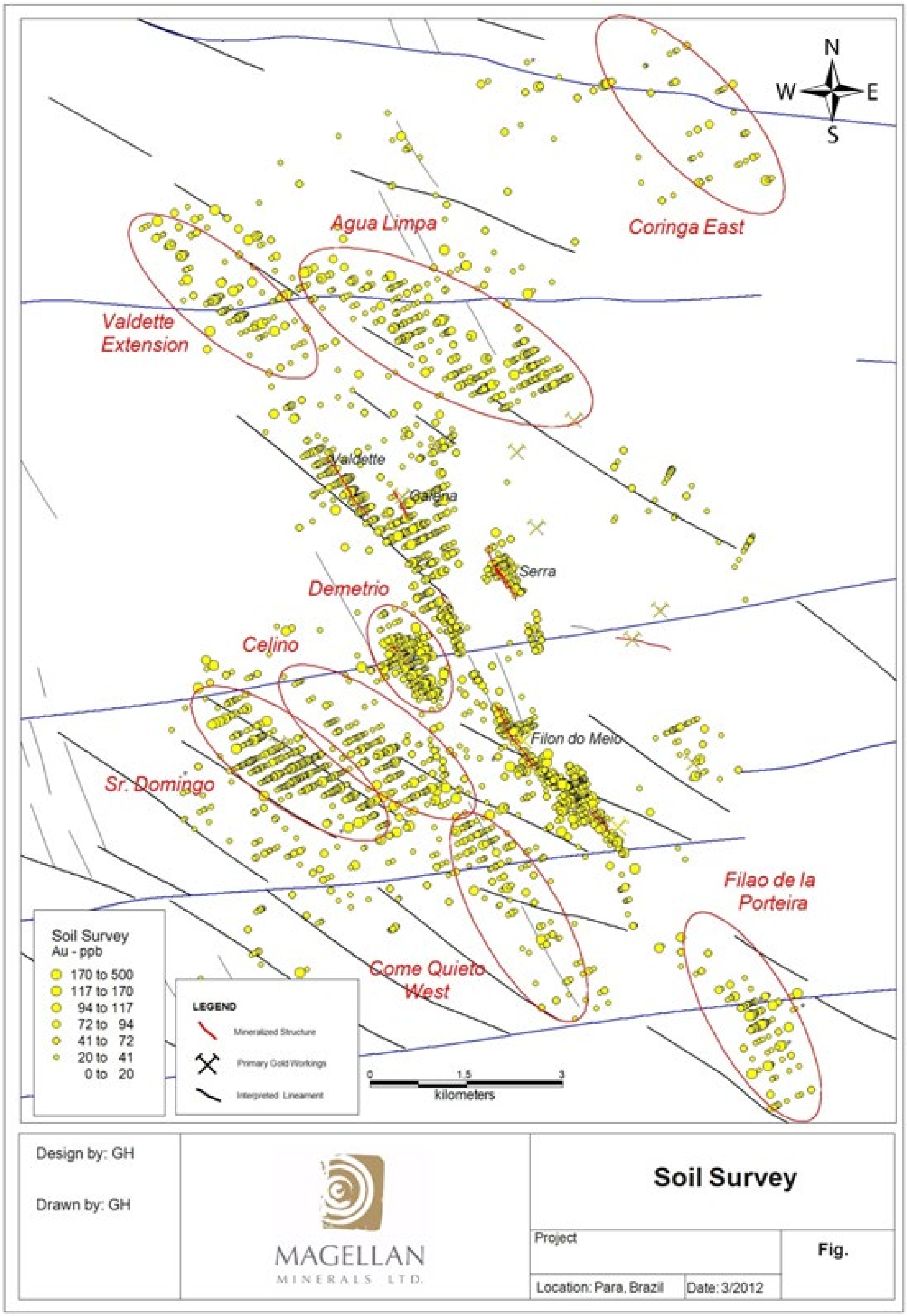


Source: Magellan

9.3 Soil Sampling

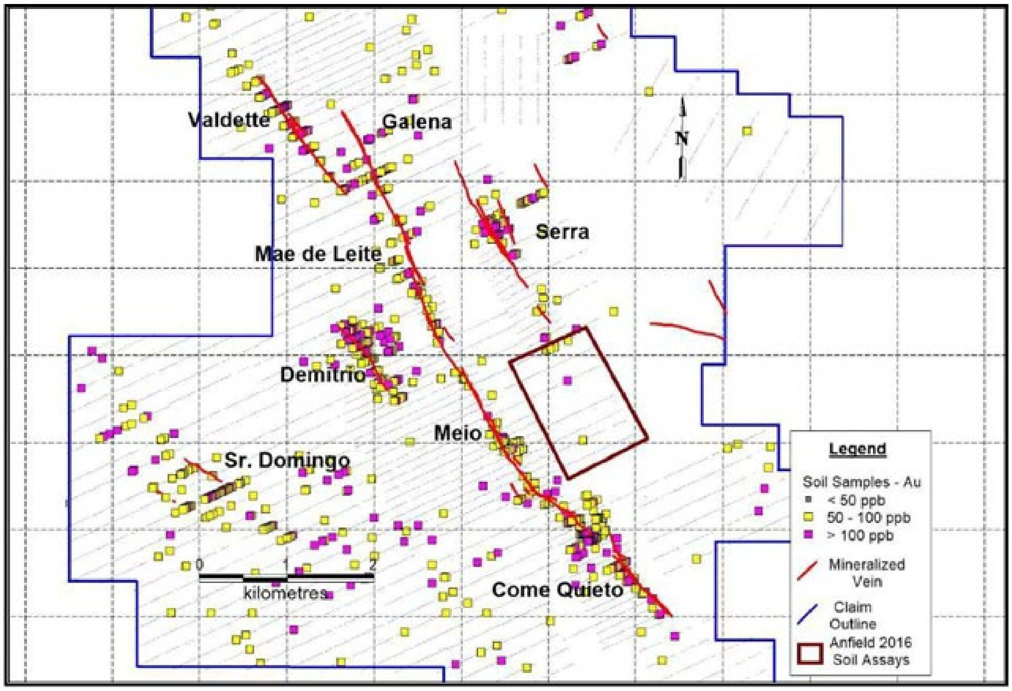
Soil geochemistry is a reliable tool to identify the location of gold-bearing veins. Soil sampling was completed by Magellan using the stream sediment samples as guide (Figure 9-5). Soil samples over 41 ppb (90 percentile) are considered anomalous. In 2016, Anfield re-assayed soil samples taken previously by Magellan Minerals and produced a separate map shown in Figure 9-6.

Figure 9-5: Soil Sampling, Magellan



Source: Magellan

Figure 9-6: Soil Sampling, Anfield



Source: Anfield, 2017

9.4 Sampling Methods

The following subsections detail the sampling procedures, preparation, and analysis of samples other than drill core samples and how these samples were used to help define the location, orientation, and extent of the mineralization that was later explored by diamond core drilling. Details regarding the drill core samples are presented in Section 10.

9.4.1 Soil Sampling

- Location procedure: A base line was set up perpendicular to the soil line orientation. The start point of each soil line was surveyed with a compass, clinometer, and tape. Each sample location was also surveyed with compass, clinometer, and tape by a field technician. The coordinate calculation was carried out by the field geologist in charge of the survey.
- Sample collection procedure: The topsoil (between 0.3 meters and 0.5 meters deep) was removed, and a 0.5 kg to 0.7 kg sample was collected from the following 0.5 meters below the topsoil. Samples were placed in a plastic bag and tagged. A brief description which included color of the sample and percentage of gravel, sand, and silt was carried out.
- Database: All field information was controlled by the geologist in charge of the soil survey and entered into the database before sending the sample to the laboratory for gold analysis.
- Sample preparation and analysis: Sample preparation consists of two stages: drying and screening. Samples were dried at 60°C and screened to -80 mesh. These two stages take place in an area dedicated for these media to avoid contamination. Samples were analyzed for gold by 50-gram fire assay fusion.

- Soil geochemistry results: A soil class map was built based on the 99, 98, 97, 95, 90, and 75 percentiles of the gold values. Samples above the 95th percentile were considered anomalous. This map was used for the interpretation of the mineralization strike and as a guidance to define drilling targets.

9.4.2 Stream Sediment Sampling

- Location procedure: Regional lines were opened through the jungle on a 1,000-meter grid oriented at approximately 60° azimuth. Every stream that the regional line came across was sampled and located with a handheld global positioning system (GPS) unit.
- Sample site selection and collection procedure: Sites were selected by trying to avoid any possible source of contamination (old artisanal workings), and by looking for fine-grained material at the margins of the water course. An approximately 5-kilogram (kg) sample was panned, and a color count was carried out by the geologist in charge. A second 5-kg sample from the same place was collected and panned until a 200-gram to 300-gram sample was left. Samples were placed in a plastic bag and tagged. A brief description was completed, which included number of gold colors, type of channel, stream order, sediment sorting, and grain lithology.
- Database: All field information was controlled by the geologist in charge of the stream sediment survey and entered into the database before sending the sample to the laboratory for gold analysis.
- Sample preparation and analysis: Sample preparation consists of two stages: drying and screening. Samples were dried at 60°C and screened to -80 mesh. These two stages take place in an area dedicated for these media to avoid contamination. Samples were analyzed for gold by 50-gram fire assay fusion.
- Follow up stream sediment sampling: Those streams with positive results were followed up in a second survey using the same methodology as describe before.

9.4.3 Trench Sampling

- Location procedure: A start point was located with a handheld GPS, and azimuth and trench length were estimated with a compass and tape. Sample coordinates were calculated using this base data. Trenches were hand dug to a depth of 1 meter.
- Sample collection procedure: Approximately 2-kg to 3-kg chip channel samples were collected at 1 meter to 1.5-meter intervals. Sample were placed in a plastic bag and tagged. A brief description of the lithology was carried out by the geologist in charge.
- Database: All field information was entered into the database before sending the sample to the laboratory for gold analysis.
- Sample preparation and analysis: Samples were dried and prepared by particle size reduction to produce a homogeneous sub-sample, which is representative of the original sample (crushed and pulverized to 200 mesh). A 30-gram sub sample was analyzed by fire assay fusion.
- Geochemistry results: The results were plotted on the maps to help the interpretation of the mineralization strike and as a guidance to define drilling targets.

10.0 Drilling

The following description of the drilling of the Coringa Gold Project was taken from the 2017 NI 43-101 Technical Report issued by MTB for Anfield Gold Corp and updated with Serabi drilling activities during 2018 and 2019.

Between 2007 and 2013, Magellan Minerals drilled 179 holes (28,437 meters) to test a number of veins on the property comprising the Coringa Gold Project (i.e., the Serra, Meio, Galena, Valdette, Mãe de Leite, Demetrio, Sr. Domingo, and Come Quieto veins).

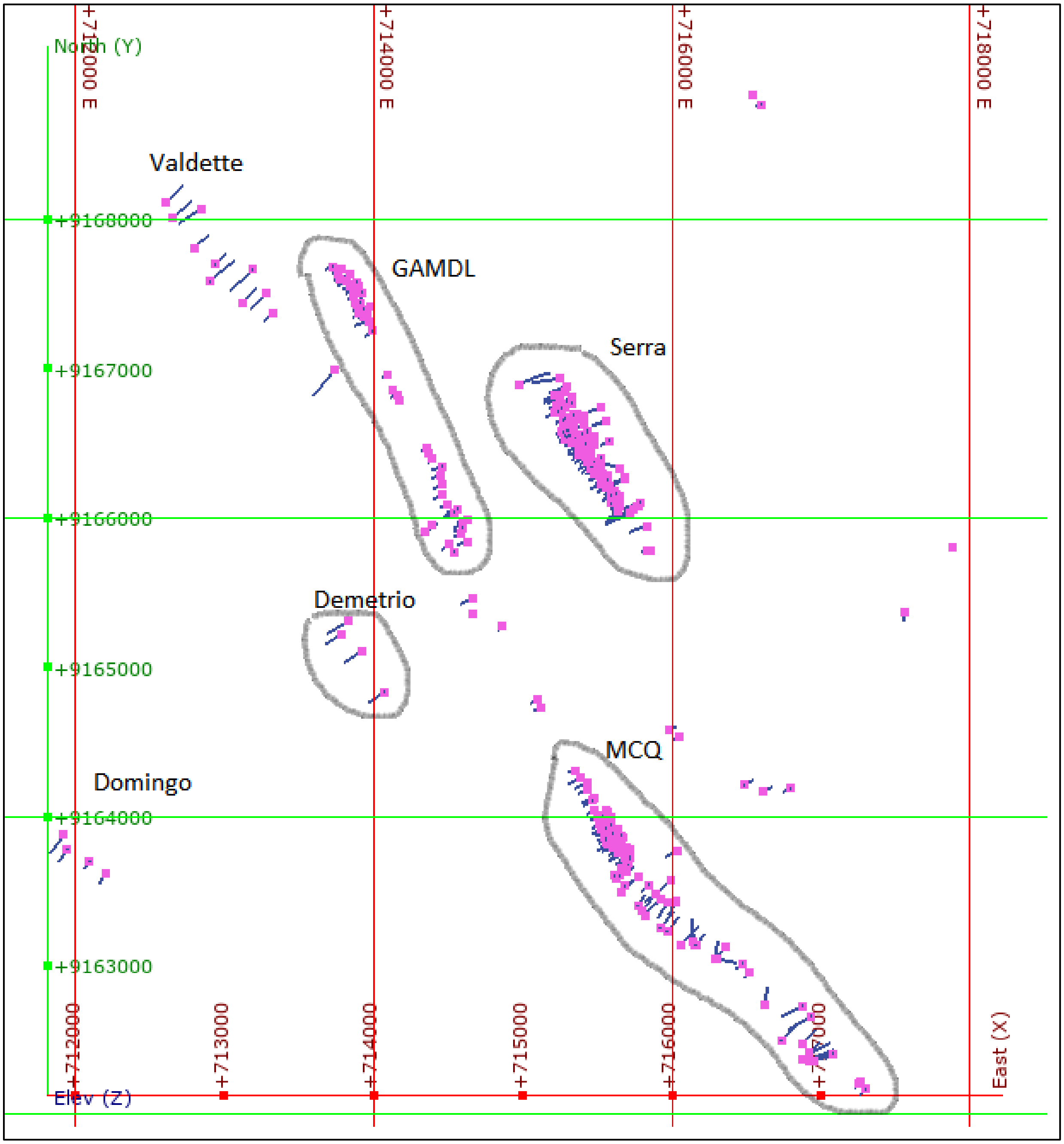
In 2016 and 2017, Anfield completed an infill drill program on the Meio, Serra, and Galena veins to gather the additional information required to develop a mine plan. A total of 183 exploration holes were drilled (26,413.61 meters), most of which produced HQ-size drill core. In addition, four PQ- size drill holes were drilled (284.8 meters) for metallurgical samples.

In 2018 and early 2019, Serabi completed an extensional drill program along strike and depth for the Galena, Serra, and Meio veins. A total of 20 NQ-size drill holes (5,619.83 meters) were completed.

Details of all drill programs from 2007 to 2019 are given in Table 10-1, showing a total of 383 exploration holes (60,201.19 meters). It should be mentioned that Anfield completed seven holes (357, 358, 359, 360, 361, 362, and 363) in the Galena vein that were not included in the 2017 NI43-101 technical report.

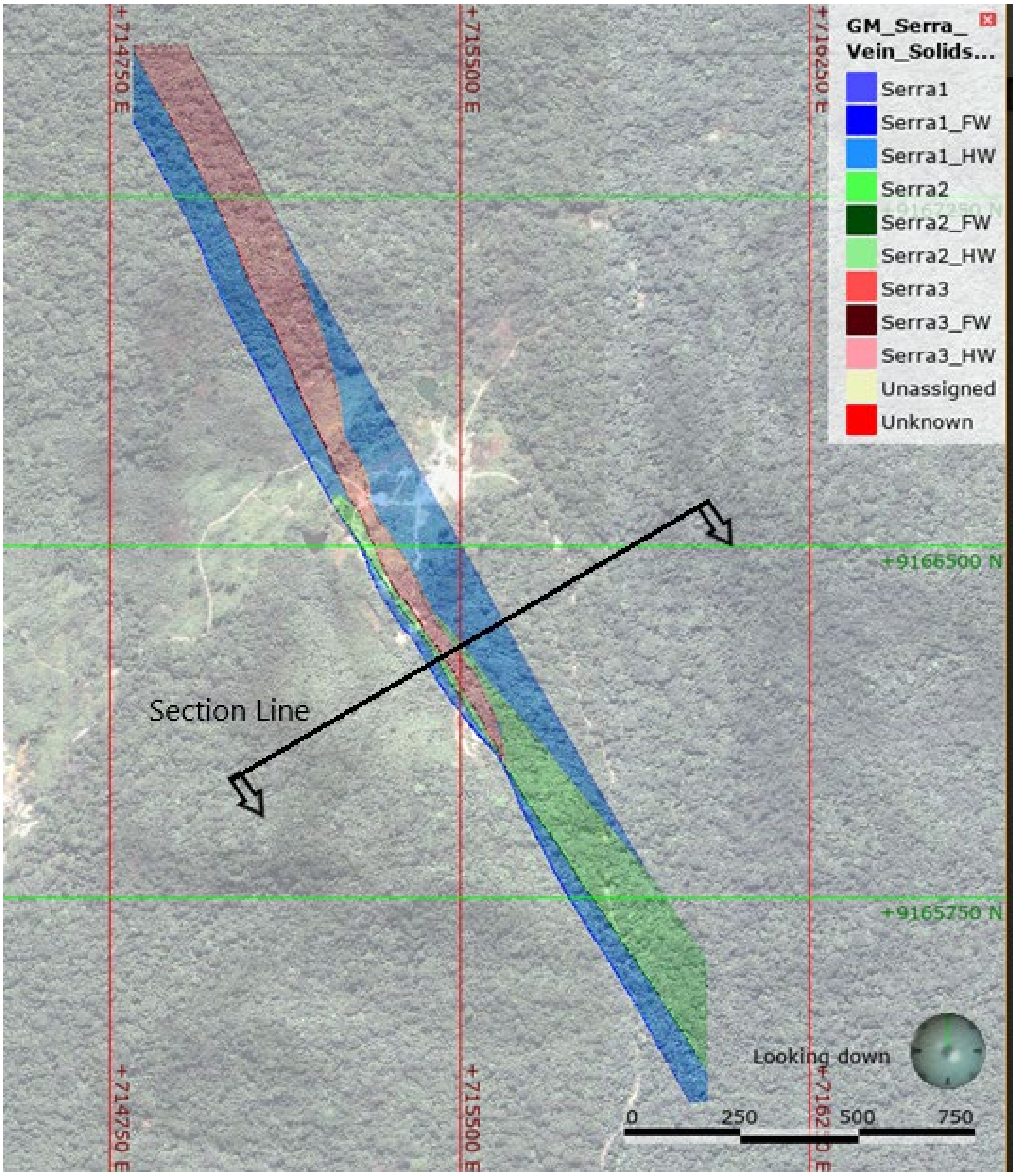
The location of all drill holes completed at the Coringa Gold Project is shown in Figure 10-1. All drill core from the project is temporarily stored in dry, secure buildings located on the property, adjacent to the camp, before being transferred to permanent, secure storage in Novo Progresso. All holes were initially surveyed using a hand-held GPS, followed by a differential GPS or total station to determine the final coordinates for the exploration database.

Figure 10-1: Drill Collar Plan Map Coringa Gold Project



Areas with estimated resources circled; Source: GRE, 2019

Figure 10-2: Serra, Plan View with Section Line



Source: GRE, 2019

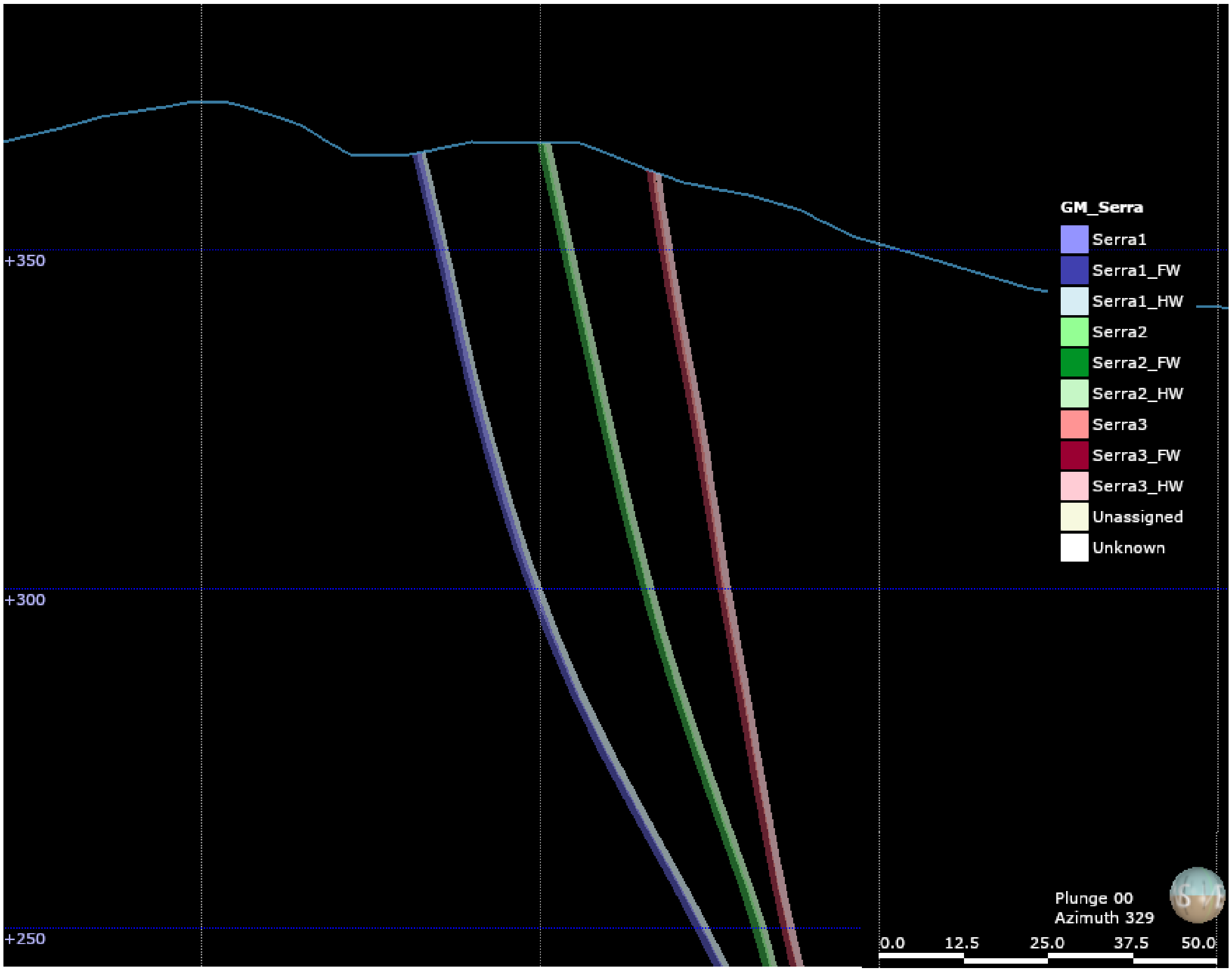
The authors did not encounter any drilling, sampling, or recovery factors that would materially impact the accuracy of the assay results. Overall drill recovery is 98.9%. Example plan and section maps for the Serra veins are shown in Figure 10-1 and Figure 10-2. The section and geologic interpretation correlate well with Orogenic gold deposits showing steeply dipping high grade gold veins.

Table 10-1: 2007 to 2019 Drill Program

Date	Zone	No. of Holes	Hole Numbers (BR-COR-DDH#)	Meters drirlled
March 2007-August 2013	Galena-Boca	17	3-4-5-6-23-24-25-26-27-28-29-30-31-34-36-58-60	1956.35
	Eloy-Juara-Mae de Leite	23	17-32-33-35-40-44-51-53-54-56-96-98-99-100-101-102-103-104-105-106-118-176-178	2514.27
	Serra	46	1-2-19-20-37-38-39-41-42-43-45-46-47-48-49-50-52-55-57-59-61-64-66-121-124-127-129-132-135-138-139-141-145-148-150-153-160-161-162-163-164-165-167-168-177-179	8145.16
	Bravo-Escorpion-Peixoto	5	16-22-97-108-109	475.87
	Guaxebinha-Meio-Onza	48	11-12-13-14-62-63-65-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-130-134-137-140-144-149-152-155-156-157-158-159	7660.6
	Come Quieto	12	7-8-9-10-120-122-126-151-154-166-174-175	2519.05
	Fofao	1	15	59
	Pista	2	18-21	105.75
	Acoxadinho	1	107	101.43
	Demetrio	4	111-113-115-116	897.4
	Valdette	11	110-112-114-117-119-123-125-128-131-133-136	2843.1
	Sr. Domingo	4	142-143-146-147	703.58
	Condemnation	5	169-170-171-172-173	455.15
2016-2017	Serra	115	180-181-185-186-187-188-190-192-193-194-195-196-197-198-199-200-201-203-204-206-207-208-210-211-212-213-215-217-218-219-220-222-223-224-225-226-227-228-231-232-233-235-236-237-239-240-241-242-243-244-246-247-248-251-252-253-254-255-257-258-259-260-261-263-264-267-268-270-271-275-276-277-**277-A**-280-281-284-285-286-287-289-293-294-295-300-303-304-308-310-313-316-317-318-320-322-323-325-326-327-330-331-334-335-336-339-340-341-343-344-345-348-349-350-351-352-355	16,574.51
	Meio	65	182-183-184-189-191-202-205-209-214-216-221-229-230-234-238-245-249-250-256-**256-A**-262-265-266-269-272-273-274-278-279-282-283-288-290-291-292-296-297-298-299-301-302-305-306-307-309-311-312-314-315-319-321-324-328-329-332-333-337-338-342-**342-A**-346-347-353-354-356	8,637.05
	Galena	7	357-358-359-360-361-362-363	933.09
2018-2019	Galena	4	364-365-366-367	955.85
2018-2019	Serra	4	368-369-370-371	1,150.59
2018-2019	Meio	12	372-373-374-375-376-377-378-379-380-381-382-383	3,513.39
Total Drilling		**386**		**60,201.19**

✳(The number of 386 holes is equal to the sum of three bolded holes of 277-A, 256-A, and 342-A in the above table with the number of 383 holes.)

Figure 10-3: Serra, Example Section



Source: GRE, 2019

10.1 Magellan Minerals (2007 – 2013)

Five drill programs were completed at the Coringa Gold Project between 2007 and 2013. Magellan Minerals used several different contractors to do this work:

- 2007 to 2008, Geoserv Pesquisas Geológicas S.A. (Boart Longyear)
- 2010, Layne do Brasil Sondagens Ltda. (Layne)
- 2013, Geosol-Geologia e Sondagens S.A. (Geosol)

Drills were moved between sites using a bulldozer. Detailed descriptions of these drill programs are provided in Snowden (2015).

10.2 Anfield (2016 – 2017)

In 2016 and early 2017, Anfield used Servitec Foraco Sondagem S.A. (Foraco), Layne, Geológica Sondagens Ltda. (Geologica), and Geotechreserves do Brasil – Serviços de Perfurações e Sondagens LTDA (GTR) to complete an infill drill program on the Serra and Meio veins.

To reduce the cost and save time, most of the holes were pre-collared using a reverse circulation (RC) drill. This work was completed by Foraco. Every pre-collared hole was cased with PVC pipe to a depth of 18 meters, below the contact between saprolite and un-weathered bedrock to prevent holes from caving. There were no samples collected from the pre-collar RC drilling.

Layne, Geologica, and GTR re-entered pre-collared holes and finished drilling with HQ core. Layne (CS-10 and CS-14) and Geologica (Sandvik 710) rigs were moved between holes with a dozer or an excavator. Two of the three GTR rigs (LF-90D) were self-propelled.

Details of the 2016 to 2017 infill drill program are summarized in Table 10-2. At both Serra and Meio, a 60-meter by 60-meter grid was drilled on 10-meter centers to assess the variability of the mineralization. Resource drilling was done on a 50-meter grid.

Table 10-2: 2016 - 2017 Drill Program

Vein		# of Holes	Meterage
Serra	Detailed Grid	48	2,711
	Resource Drilling	67	13,877
	Total	**115**	**16,589**
Meio	Detailed Grid	34	2,459
	Resource Drilling	31	6,164
	Total	**65**	**8,623**

Down-hole surveys were completed using the following downhole survey devices: Layne: REFLEX Maxibor, Geologia: DEVICO Deviflex, and GTR: DEVICO Deviflex and SPT North- seeking GyroTracer. Down-hole surveys were collected at 3-meter intervals

10.3 Serabi (2018 – 2019)

In 2018 and early 2019, Serabi used Horizonte Mineiro Servicos Geologicos LTDA to complete an infill drill program on the Coringa project site. Serabi drilled 20 drill holes (5,619.83 m) to test a number of veins on the property comprising the Coringa Gold Project (i.e., the Serra, Meio, and Galena veins). Holes were initially cored to HQ diameter in saprolites materials or altered rocks. After passing this soft material, drilling with NQ size continued to the final depth. Down hole surveys were completed for all holes. Details of the 2018 to 2019 infill drill program are summarized in Table 10-3.

Table 10-3: 2018 - 2019 Drill Program

Vein	# of Holes	Holes numbers	Meters
Galena	4	364 365 366 367	955.85
Serra	4	368 369 370 371	1,150.59
Meio	12	372 373 374 375 376 377 378 379 380 381 382 383	3,513.39
Total	20		**5,619.83**

10.4 Standard Logging Procedure

The following is a summary of the logging protocols in place.

- Core logging took place in a well-lit and secure facility (Figure 10-4).
- The drilling contractor provided core recovery, and the company's technician checked and verified the information.
- Core photography was completed at this stage.
- A project geologist logged lithology, alteration, mineralogy, and structures and marked the core samples.
- Data from the core logging was added to the drill hole data base (Microsoft Access).
- The core was stored in secured, well labeled racks.

Figure 10-4: Core Shack

Drill core logs contain the following information:

- Drilling header information: drill-hole number, collar coordinates and elevation, location, azimuth, dip, length, geologist, drilling dates, and core diameter.
- Core recovery.
- Sample data: sample number with from-to intervals.
- Graphic log: columns for displaying the lithology.

- Letter codes for digital data base for lithology (rock type, composition, form, and texture), alteration (type, style, intensity, and mineralogy), mineralization (type, style, mineralogy, and %), and structures (type and angle to core).

11.0 Sampling Preparation, Analyses, and Security

Sample preparation, analyses, and security procedures used by Magellan and Anfield are taken from the 2017 NI 43-101 Technical Report issued by MTB for Anfield Gold Corp; however, information for 2007 to 2013 is summarized from the 2015 NI 43-101 Technical Report by Snowden. GRE has added the sampling procedures used by Serabi Gold during 2018 and 2019 in this section.

11.1 Magellan Minerals (2007 – 2013)

Snowden (2015) describes in detail the sampling procedures used by Magellan Minerals between 2007 and 2013. A brief summary is as follows.

The core was cut in half using a diamond saw and, mostly, 0.5-meter long samples were sent to the lab. For sample preparation, Magellan Minerals used SGS Geosol (SGS Geosol) laboratories in Belo Horizonte and/or ACME Laboratory (ACME) in Itaituba. Prepared pulps by ACME were sent to ACME's assay laboratory in Santiago, Chile, and pulps prepared by SGS were analyzed in Belo Horizonte, Brazil. Pulps were analyzed for gold using a fire assay procedure with an atomic absorption finish on a 30-gram charge. Some batches of samples were digested in aqua regia and were analyzed by inductively coupled plasma (ICP).

Magellan Minerals tested several samples for coarse gold via a screen fire assay technique and concluded that the Coringa Gold Project does not have a significant quantity of coarse gold.

A duplicate sample was inserted every 20th sample. Blanks were inserted after the occurrence of mineral veins, and a certified gold ore standard from RockLab was inserted every 21 samples (on average).

11.2 Anfield (2016 – 2017)

Anfield used the following procedures for its 2016 to 2017 drill program.

The drillers placed the HQ drill core in wooden boxes (three rows; approximately 3 meters per box in total). Wooden tags marked with the down-hole depth were placed in the box. Lids were placed on the boxes and taped shut. The core was then transported by truck to the core storage facility for geological and geotechnical logging and sampling.

Anfield geologists or field assistants checked the depth and recorded the "from" and "to" intervals on the outside of the box, calculated core recovery, and photographed both dry and wet core.

Anfield geologists examined the core and prepared geotechnical and geological logs. The geotechnical log includes: Rock Quality Designation (RQD), core recovery, fracture and vein quantity, and vein angles. Point-load tests were taken at approximately 10-meter intervals, and density measurements were taken to represent different lithologies, alterations, and veins. This information was entered directly into a spreadsheet for each hole.

After the sample intervals were marked, bar-coded sample tags were stapled to the core box, and the core was photographed again. The core was then cut in half using a diamond saw. Half of the core was placed into a plastic sample bag and the other half was returned to the core box and stored onsite. Bar-coded sample tags were included in each sample bag. Sample bags were secured with a tamper-proof plastic tie and put into larger mesh sacks that were also secured with a tamper-proof nylon tie. These sacks were stored in a secured room in the core storage facility.

When a sample batch was ready for shipment, a representative from ALS picked up the samples from the Anfield camp and transported them to the ALS facility in Belo Horizonte, Brazil. At ALS, samples were checked, dried, crushed, and pulverized to approximately 100 microns (µm). For each sample, approximately 250 grams of pulverized material was placed in a paper craft bag (pulp) and shipped to ALS in Lima, Peru, for analysis. Certified reference standards, purchased from CDN, were inserted systematically into every sample batch to monitor the analytical quality. All samples were analyzed for gold using a fire assay technique on a 30-gram charge. In addition, a 48-element ICP-mass spectrometry (MS) analysis was completed using a 4-acid digestion.

Quality assurance/quality control (QA/QC) samples (standards and duplicates) were inserted after every 20 core samples. These included one of three certified standards (high, medium, and low gold grades) and/or a coarse duplicate. In addition to the regular insertions, after every mineralized interval or quartz vein, a blank sample was inserted in the sample stream. Initially, Anfield used a limited number of pulp blanks that were purchased from CDN but switched to utilizing purchased QA/QC blanks from a Brazilian supplier who also provides blank cleaning material to ALS's lab in Belo Horizonte. These blanks were coarse with fragment sizes up to 3 cm and could be used to test both the crusher and the pulverizer for cross contamination.

During the 2016 to 2017 drill program, a total of 5,850 samples were analyzed at the laboratory: 496 of these were blanks, 282 were certified reference material, 280 were coarse duplicates, and the remaining 4,792 were samples collected from drill core. Assaying of standard material produced only four failures. Each failure was investigated, and no systematic errors were discovered. Blank material assaying indicated no contamination occurred from sample to sample. Coarse reject duplicate assays showed the sample preparation protocol produced sufficiently precise results.

In the opinion of the QP responsible for this section, the analytical procedures were appropriate and consistent with common industry practice. The laboratories are recognized, accredited commercial assayers with ISO 17025:2005 accredited methods and ISO 9001:2008 registration. There is no relationship between Anfield and ALS or CDN. The sampling has been carried out by trained technical staff under the supervision of a QP and in a manner that meets or exceeds common industry standards. Samples are properly identified and transported in a secure manner from site to the lab. The quality of the assay database supports the estimation of Indicated Resources.

11.3 Serabi (2018 – 2019)

11.3.1 Sample Preparation

A summary of sampling procedures for the 2018 to 2019 drilling program by Serabi is presented below. The head geologist, Felix Huber, and drilling technician, Lucir Isotton, have been involved with the project since the beginning of exploration in 2007 and have consistently used the same sampling practices throughout the exploration life of the property.

Drilling starts with an HQ size bit in the near surface saprolite materials or altered rocks. After passing this soft material, drilling with NQ size continues to the final depth. The drillers place the HQ and NQ drill cores in plastic boxes (three rows, approximately 3 meters per box in total for HQ; and four rows, about 4 meters per box in total for NQ). Plastic tags marking the down-hole depth are placed in the box. Lids are placed on the boxes and taped shut. The core is then transported by truck to the core storage facility on the project site for geological and geotechnical logging and sampling (Figure 11-1).

Serabi geologists or field assistants check the depth and record the “from” and “to” intervals on the outside of the box on an aluminum plate. The geologist or technician then photographs the core as it is received from the drill rig and collects core recovery information before selecting sample intervals for assay. The geologist marks sample intervals based on lithology, alteration, and mineralization (sulfides). The core is split at mineralized zones with a minimum interval of 0.10 meters.

Figure 11-1: Drill Rig, HQ, NQ Drill Cores and a Series of Consecutive Core Boxes

The marked core is cut longitudinally in half using a diamond saw to bisect the mineralization. Half the core is put into a plastic sample bag and the other half is returned to the core box and stored in a core storage facility onsite (Figure 11-2). After sample intervals are split, bar-coded sample tags are stapled to the core box, and the half core is sometimes photographed.

Figure 11-2: Marking Core, Cutting Core, and the Core Storage Facility

Bar-coded sample tags are included in each sample bag. Sample bags are secured with tamper-proof plastic ties and placed into larger mesh sacks that are also secured with tamper-proof nylon ties. These sacks are stored in a secure room in the core storage facility. When a sample batch is ready for shipment, it is delivered to the Serabi preparation sample laboratory in Novo Progresso, Brazil, by Serabi personnel. Chain of custody is documented throughout the entire transportation process.

At the sample preparation laboratory, samples are checked, dried (4 hours at 110° Celsius) and crushed to a nominal minus one cm. For each sample, approximately 550 grams of the crushed sample is pulverized (for duplicate samples about 900 grams coarse material is required). The balance of the coarse material is placed in a plastic bag and stored in the Serabi sample preparation laboratory as coarse rejects.

For each sample, 300 grams of pulverized material is placed in a plastic bag and shipped to external lab SGS Geosol Laboratorios Ltda in Vespasiano-Minas Gerais, Brazil, and the rest of the pulverized material (around 150 grams) is sent to the in-house analytical lab at Palito Mine in Brazil for the check assay. The samples are divided by standard riffling techniques. No pulverized materials at this stage are stored in the Serabi sample preparation laboratory in Novo Progresso. All stages of the sample preparation process are shown in Figure 11-3, including: drying, crushing, pulverizing, homogenization, splitting, weighting, and packing.

Figure 11-3: Sample Preparation at Serabi Laboratory, Novo Progresso

11.3.2 Analytical Procedure

At the external laboratory SGS Geosol in Belo Horizonte, gold assays are carried out by fire assay (FAA313) and multi-elements by ICP-optical emission spectrometry (OES).

For fire assay, the following stages are performed:

- Decomposition of the samples (30 grams) by fusion with litharge and fluxes (lead oxide, sodium carbonate, sodium tetraborate decahydreate, silver nitrate, potassium nitrate)

- Cupellation and bead acid digestion by aqua regia (nitric acid [HNO3] and hydrochloric acid [HCl])
- The gold content of the acid solution is determined by Atomic Absorption (FAA) or by ICP-OES (FAI)
- The grade of the sample is calculated based on the weight of the fire assay charge and the gold concentration in acid digestion solution

For ICP analysis of the ore, the following stages are performed:

- A sample of the pulp (10 grams) is digested with four acids (hydrofluoric [HFL]), HCL, and HNO3)
- The acid solution is subjected ICP-OES or ICP-MS to determine up to 37 elements

At the in-house analytical lab at the Palito Mine in Brazil, gold and copper assays are determined by atomic absorption (Spectr AA-55B) as outlined below:

- A sample of the pulp is dissolved using aqua regia that is produced by combining 45 milliliters (ml) of concentrated HCL and 15 ml of concentrated HNO3 with a 3:1 ratio. The mixture is heated on a hot plate at a temperature of 130 º C for a period of 1 hour.
- After acid digestion, the samples are allowed to cool for a period of 20 to 30 minutes and then filtered into an Erlenmeyer flask of 100 ml or 250 ml volume. Distilled water is added to top up the flask to the required level. The flask is manually agitated to ensure good mixing.
- 20 ml of the filtered sample is removed from the flask by pipette and transferred to the separatory funnel containing 20 ml of distilled water and 5 ml of 2.6-dimethyl-4-heptanone (DIBK) with 1% of Aliquat-336. The mixture is manually homogenized for 10 minutes and left to rest for approximately 1 minute for organic separation (water and DIBK).
- Wash solution is then added (490 ml of distilled water, 5 ml of DIBK-1% and 5 ml of HCL), mixed, and left to settle for an additional 10 minutes. After separation, all the aqueous phase drained from the separatory funnel, leaving the DIBK mixture. Ten ml of the DIBK is transferred to a test tube for Atomic Absorption analyses.
- The gold analysis is completed using atomic absorption (Spectr AA-55B) with results reported in ppm (parts per million). The AAS is calibrated using 0.5, 2.5, 5.0, 10.0 and 15 ppm standards. Blanks and ore standards are also processed for QA/QC purposes.
- A 1.0 ml subsample is diluted in a 100-ml flask using distilled water and mixed. The sample is analyzed via atomic absorption (Spectr AA-55B), where the results are reported in ppm. Similar calibration standard increments are employed of 0.5, 1.0, 3.0, 5.0 and 10.0 ppm.
- Sample assays from the AAS are converted back to ore assays using the initial pulp weight, sample AAS assay and dilutions. Gold is reported as grams per tonne and copper as percent.

11.3.3 Sample Security

Serabi maintains formal chain-of-custody procedures during all segments of sample transport. Samples transported to the Serabi sample preparation laboratory in Novo Progresso are bagged and labeled in a manner that prevents tampering and remain in Serabi's control until released to the Serabi preparation laboratory. Upon receipt by the preparation laboratory, samples are tracked and recorded by the Serabi technicians. Pulverized samples are securely bagged, labeled, and sent to the external SGS lab and the

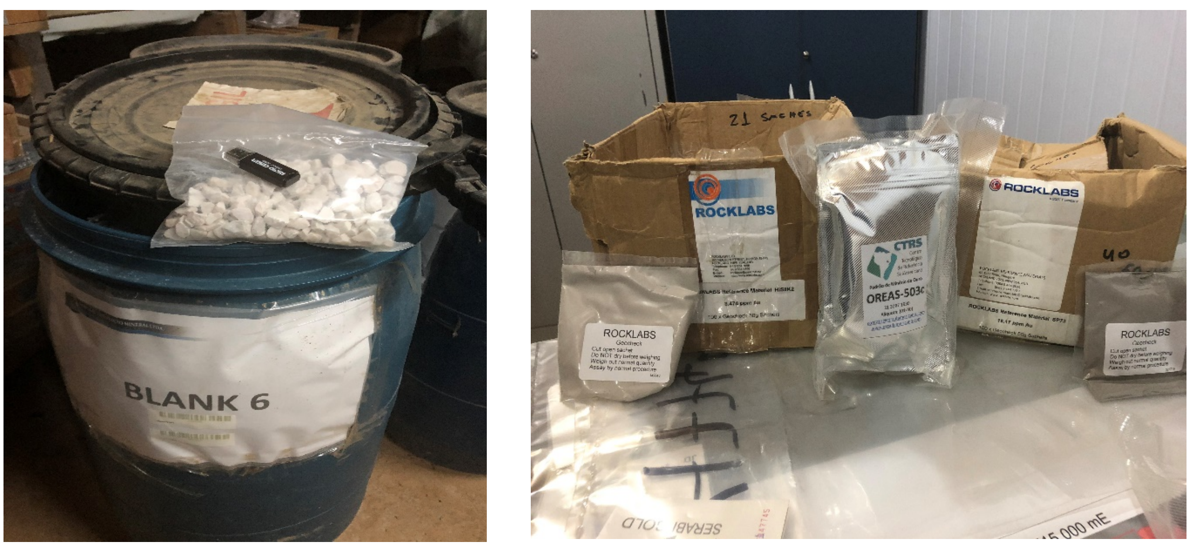
Palito Mine assay lab. Retained half cores are safely stored in the core storage facility at the Serabi Project site, while coarse reject materials are stored at the Serabi laboratory in Novo Progresso. After assay analysis by the external lab, the residual pulps are securely returned and stored at the Serabi sample preparation laboratory in Novo Progresso.

11.3.4 Quality Assurance/Quality Control

This section provides the details of the Serabi QA/QC program, while the following section provides an analysis of all QA/QC samples as a combined sample set. Overall, the Serabi QA/QC program indicates acceptable performance of all blanks, duplicates, and standards for the Serabi campaign with only a few normal minor discrepancies that do not impact the resource calculation.

Serabi's in-house QA/QC procedures consist of the insertion of certified standard references, blanks, and duplicate samples at a rate of one standard, one blank, and one duplicate sample per 20 core samples. These include one of three certified standards purchased from RockLabs (0.698, 3.474 and 18.17 ppm Au) and one coarse blank sample (Figure 11-4). All pulp samples are assayed at Serabi's in-house lab at the Palito mine as well as the external third-party laboratory, the net result is 100% check assays. These assays are reported to correlate very well with the results of the external assay laboratory (currently SGS in Brazil). The authors have spot-checked this assay correlation and confirm this statement. In addition, the independent check assay samples taken by the QPs also show good correlation with the Serabi laboratory assay results.

Figure 11-4: Coarse Grain Blank Sample and Three Standard Samples in Serabi Core Storage Facility

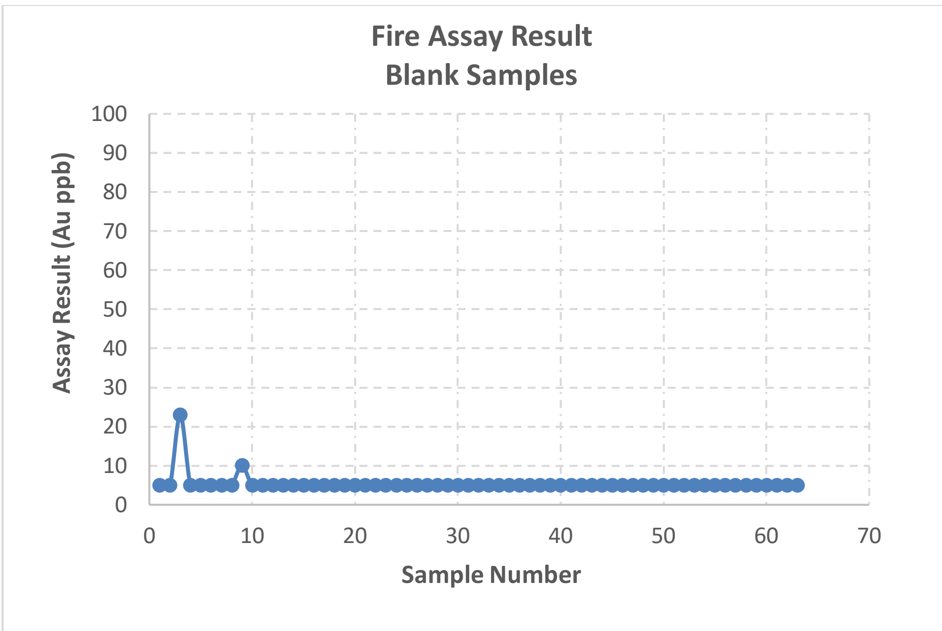


The blank samples are coarse material with fragment sizes up to 3 cm. These coarse samples are crushed and pulverized by the Serabi sample preparation laboratory using the same method as drill core samples. This is done to check for contamination in the sample preparation process. Serabi geologists routinely review the standard and blank sample assay results. To date, these results fall within the anticipated range of variability. The assay results of the QA/QC samples demonstrate that there are no systematic errors that might be due to sample collection or assay procedures. Each control type used by Serabi during the 2018 to 2019 drill program is further discussed in the subsections below.

11.3.4.1 Blanks Analysis

Blank samples are inserted into the sample stream at a rate of one standard for every 20 samples. Since the blank samples are coarse material, they are crushed and pulverized using the same procedure as half-core samples. Figure 11-5 shows the assay results of the blanks by SGS used in the QA/QC program. A total of 63 blanks returned only 2 excursion values, with a maximum value of 24 ppb Au. Considering a 3% excursion rate and that the values of these excursions are well below the probable lower limit of the cutoff grade, the QPs believe the results indicate there is no artificially introduced contamination in the sampling preparation process that would materially affect the mineral resource estimate.

Figure 11-5: Fire Assay Results Blank Samples (2018 - 2019)

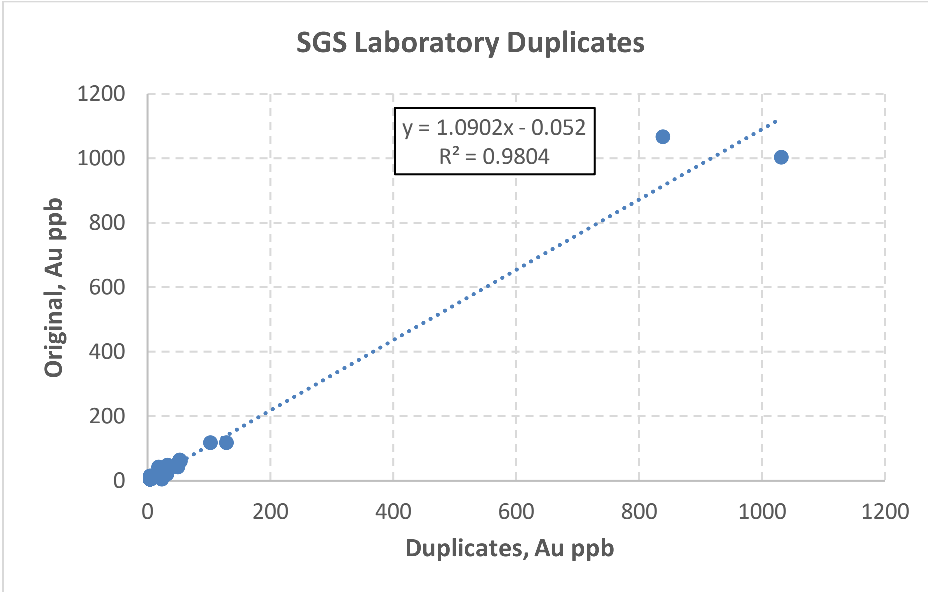


11.3.4.2 Duplicate Analysis

Duplicate samples are inserted into the sample stream at a rate of one standard for every 20 samples. Serabi created the sample duplicates at the Serabi preparation sample laboratory in Novo Progresso. Duplicate samples are prepared in the same manner as all samples, with the duplicate split produced from the pulverized material. For duplicate samples about 900 grams of coarse material is pulverized and then divided and sent in two separate packages with two consecutive numbers to the laboratory. Figure 11-6 shows a comparison graph of the laboratory duplicates.

The Q-Q plots indicate effectively no scatter in the data, with R^2 values of 0.9804. More scatter occurs at the higher-grade values but are still within acceptable ranges in the opinion of the QPs. The largest deviations between the duplicate samples belong to the samples of DS37424-P and DS37820-P, with original grades of 1,067 parts per billion (ppb) and 1,003 ppb and duplicate grades of 839 ppb and 1,031 ppb, respectively.

Figure 11-6: Laboratory Duplicate Comparison (2018 - 2019)



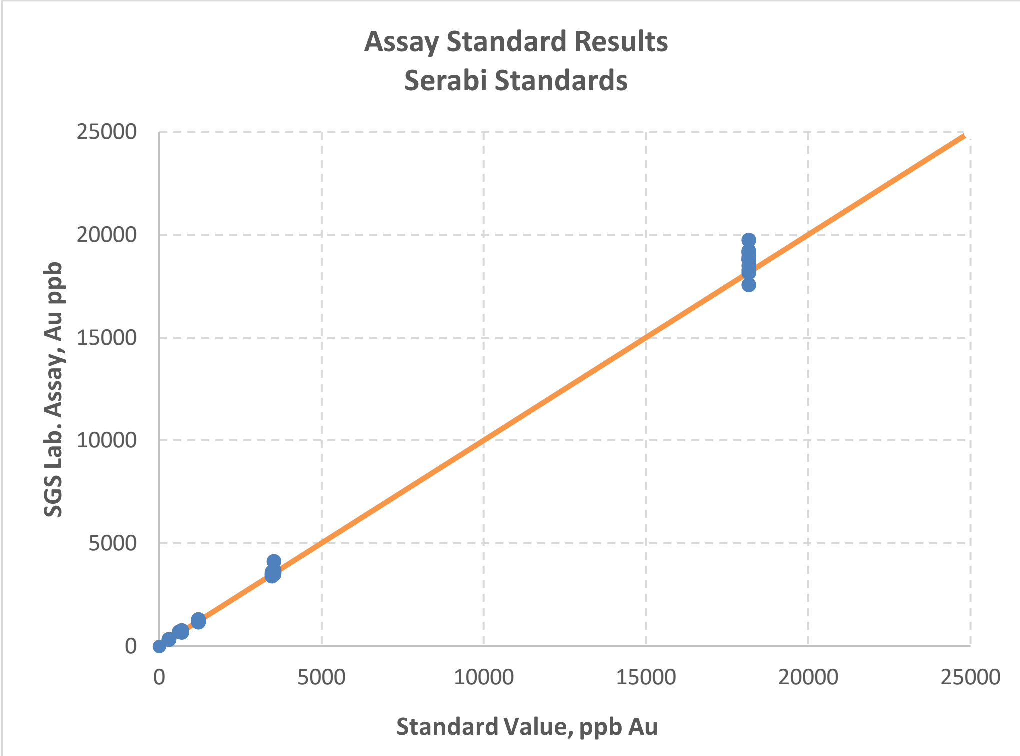
11.3.4.3 Standards Analysis

Commercially prepared standard samples are inserted into the sample stream at a rate of one standard for every 20 samples. Three separate standard samples (low-, medium-, and high-grade), each with a unique and specific certified assay value, are used. The selection of which standard to use is random. The standards are in pulp form, each contained within small individual sample bags. These bags are placed within the Serabi sample bags with company tags inserted along with the standard. Although sample standards are readily identifiable as standards, the assay values are unknown to the analyzing laboratory.

Serabi personnel periodically review the standard sample analytical results. If the laboratory analytical result differs greatly from the certified assay value, the entire associated assay run (set of 20 samples) is submitted for re-assay. During the Serabi 2018 to 2019 drilling campaign no sample batches were rerun due to standard excursions.

Figure 11-7 shows a scatter plot of the certified value for each assay standard compared to the value obtained by SGS. The laboratory's analytical results generally correlate well with the standard values with no outliers. A 45-degree line represents an excellent correlation between the standard assay certified value and actual assay results. This line passes through all of the sample sets, with the majority of the points directly adjacent to the line, indicating acceptable accuracy performance for the standards. Larger scatter is seen for the high-grade sample, but again this scatter is within an acceptable range in the opinion of the QPs.

Figure 11-7: Assay Standard Results, Serabi Standards (2018 - 2019)



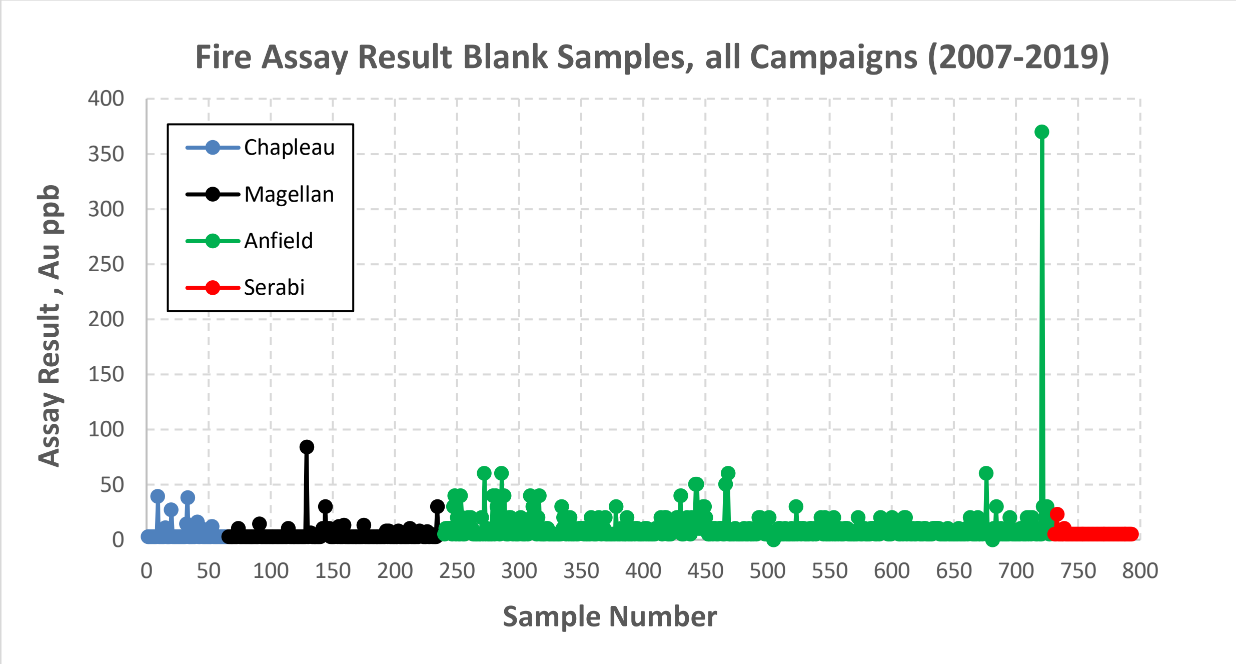
11.4 QA/QC Results, All Drilling Campaigns (2007 - 2019)

This section provides an analysis of the entire QA/QC sample set for the Coringa Gold Project over all drilling campaigns and project owners. The overall view on the QA/QC program indicates acceptable performance of all blanks, duplicates, and standards for all campaigns, with only a few minor discrepancies that do not impact the resource calculation.

11.4.1 Blanks Analysis

A total of 793 blank samples were inserted into the sample stream from 2007 to 2019, including: Chapleau - 65 samples, Magellan - 174 samples, Anfield - 491 samples, and Serabi - 63 samples. Figure 11-8 shows the assay results of the blanks used in the QA/QC all campaigns program. Of the 65 Chapleau blanks, only 3 returned excursion values of more than 20 ppb; of the 174 Magellan blanks, only 3 returned excursion values of more than 20 ppb; of the 491 Anfield blanks, 30 returned excursion values of more than 20 ppb; and of the 63 Serabi blanks, only 2 returned excursion values of more than 20 ppb. These excursion rates represent 4%, 1%, 6%, and 2% of the Chapleau, Magellan, Anfield, and Serabi campaigns, respectively, and are well below the probable lower limit of the cutoff grade. Therefore, the QPs believe the results indicate there is no artificially introduced contamination in the sampling preparation process. It appears that the best QA/QC results were returned to the Serabi campaign, with maximum recorded blank results of 10 and 23 ppb; the remainder of the blank results were less than 10 ppb. In the opinion of the QPs, these discrepancies do not materially affect the resource calculation.

Figure 11-8: Fire Assay Results Blank Samples (2007 - 2019)



11.4.2 Duplicates Analysis

Figure 11-9 shows a comparison graph of the laboratory duplicates. As shown in this figure, despite the wide range of grades, the Q-Q plots indicate effectively no scatter in the data, with R^2 values of 0.9836. The largest deviation belongs to sample S000549 with an original grade of 182,000 ppb and duplicate grade of 231,000 ppb.

In contrast with lab duplicates, half core duplicates show significant deviation (Figure 11-10). This is the result of the taking duplicate samples at a size fraction too large for this type of mineralization. In these drill core samples, the half core was broken at the project site with a hammer and then bagged as two separate samples. For these data, a trend line was generated using polynomial regression, with a R^2 value of 0.4. This low correlation in the results appears to be due to the nature of the narrow vein-type mineralization in that the amount of gold is not evenly distributed in between the two half-cores. The QPs believe it is more appropriate to complete a duplicates analysis at the pulp size fraction, which shows excellent correlation.

Figure 11-9: Laboratory Duplicates Comparison, All Campaigns

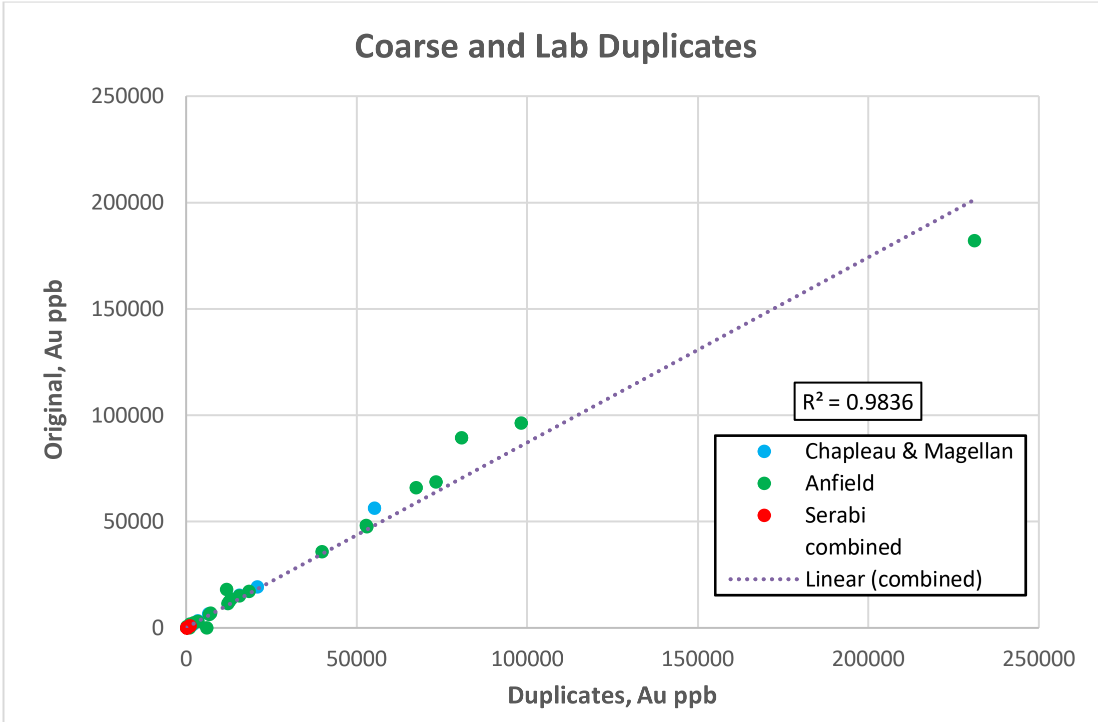
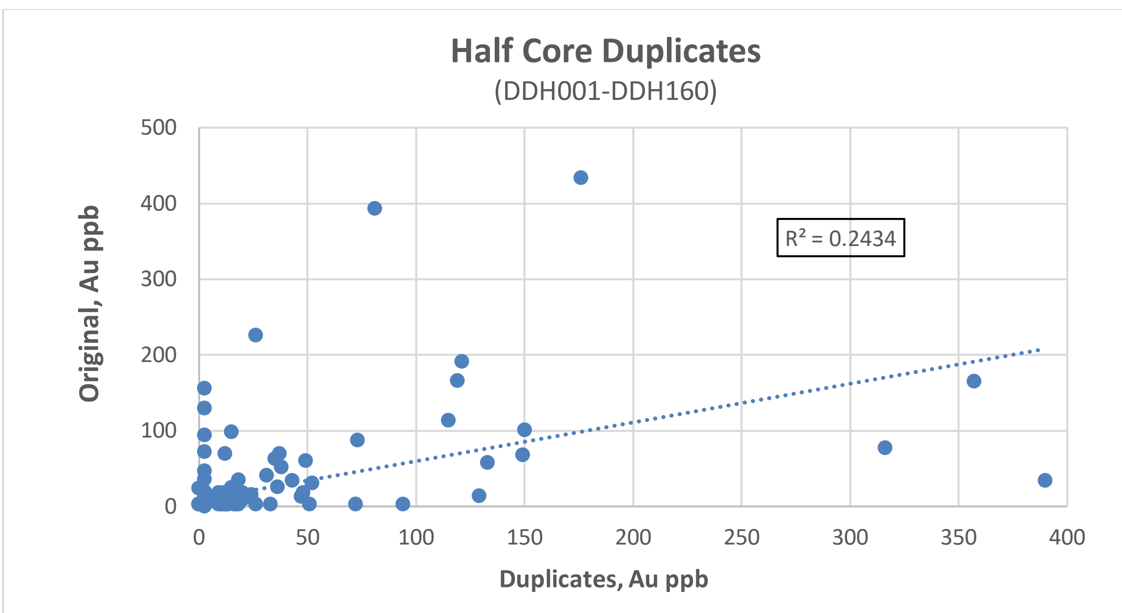


Figure 11-10: Half Core Duplicates Comparison

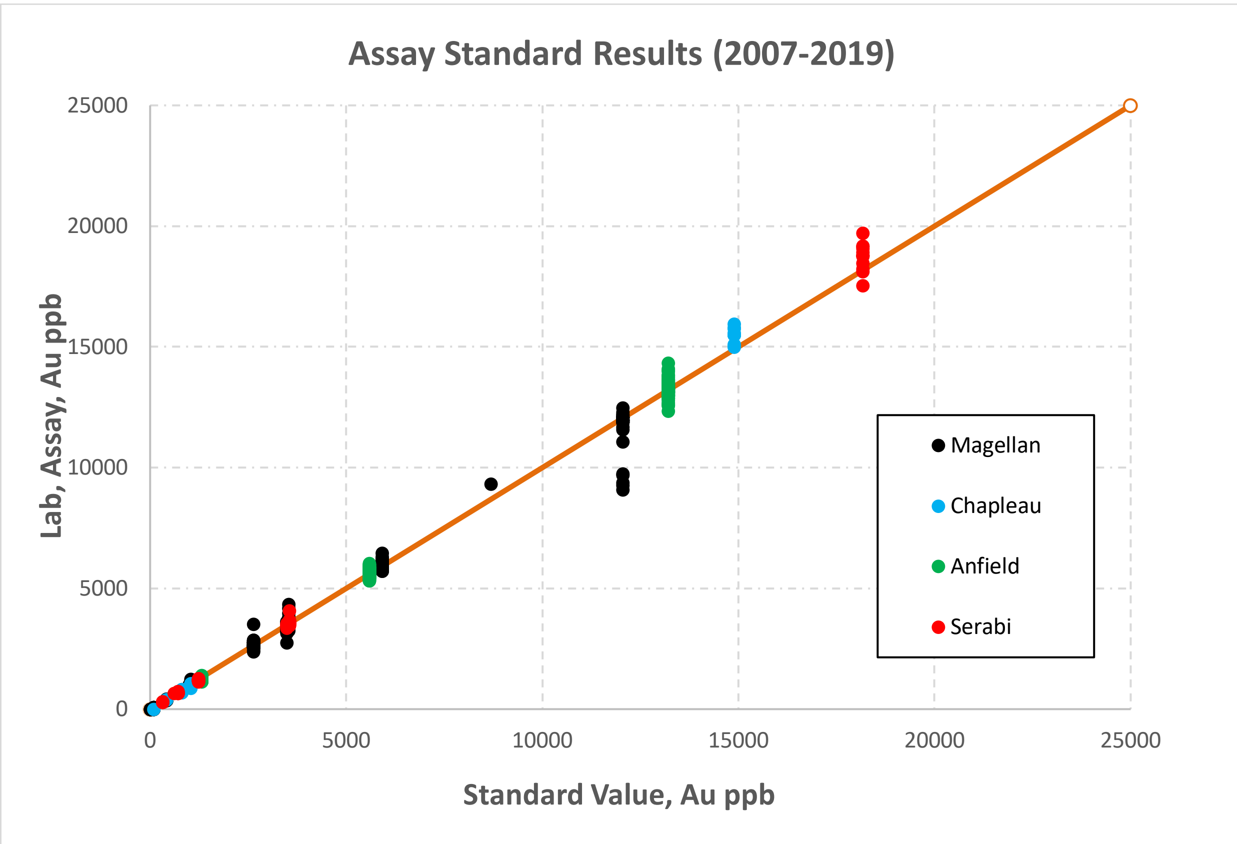


11.4.3 Standards Analysis

Figure 11-11 shows a scatter plot of the certified value for each assay standard compared to the value obtained from the external laboratory for all campaigns. A total of 802 standard samples were inserted into the sample stream from 2007 to 2019, including: Chapleau - 126 samples, Magellan - 320 samples, Anfield - 270 samples, and Serabi - 86 samples.

A 45-degree line represents the optimum correlation (Figure 11-11). The only notable deviation occurred during the Magellan drilling campaign where it appears the standard sample was incorrectly labeled during the process. This occurred when the 8,685 ppb Au sample standard was likely mislabeled as the 12,050 ppb Au standard.

Figure 11-11: Assay Standard Results, All Campaigns Standards (2018-2019)



11.4.4 QP Opinion on Adequacy

QA/QC samples (standards, duplicates, and blanks) were inserted after every 20 core samples. The program protocol of one standard (random choice one of three certified standards of high, medium, and low gold grades), one duplicate, and one blank sample inserted every 20 core samples is within industry standards, and the 100% check assay of all samples using Serabi's in-house lab at the Palito Mine is excellent.

During the 2018 to 2019 drill program, a total of 1,664 samples were analyzed at the SGS laboratory: 63 of these were blanks, 73 were certified reference material, 68 were coarse duplicates, and the remaining 1,460 were samples collected from drill core. Assaying of standard material produced no systematic errors. Blank material assays indicated no contamination occurred from sample to sample. Coarse reject duplicate assays showed the sample preparation protocol produced sufficiently precise results.

In the opinion of the QP responsible for this section, the analytical procedures were appropriate and consistent with common industry practice. The sampling has been carried out by trained technical staff under the supervision of the project geologist and in a manner that meets or exceeds common industry standards. Samples are properly identified and transported in a secure manner from the site to the lab. The quality of the assay database supports the estimation of Indicated Resources. There are no fatal flaws that would preclude the calculation of a Mineral Resource.

The QPs believe the following recommendations should be considered for future drilling activities:

- Review and evaluation of laboratory process in Novo Progresso, Palito, and at the external lab should be an on-going process, including occasional visits to the laboratories involved.
- Although sending pulp samples rather than core or chip samples to the outside lab for analysis is less common, the QPs did not observe any practices that would cause concern. For this type of mineralization, inhomogeneous gold distribution in quartz veins, preparing homogenous coarse and pulp samples at a single lab is highly recommended. The QPs recommend sending spot check quarter-core samples to the external laboratory to periodically check the process of preparation of samples at the company-run lab in Novo Progresso.

12.0 Data Verification

12.1 Database Validation

12.1.1 Collar Coordinate Validation

GRE used a handheld GPS, model Garmin 64st, to check the coordinates at each drill location, while a Brunton Compass was used to measure the azimuth and dip of the PVC markers left at each site. The PVC markers consisted of a PVC tube placed in the upper 1 meter of the drill hole and cemented in place, providing a physical record of the hole's orientation.

Geographic coordinates for 28 of the 366 existing drill hole collar locations (2007 to 2017) were recorded in the field using a hand-held GPS unit. The average variance between field collar coordinates and collar coordinates contained in the project database is roughly 5.6 meters, which is within the expected margin of error (Table 12-1). The average variance between field collars' elevation, azimuth, and dip with those contained in the project database are 4.2 meters, 8.4 degrees, and 6.5 degrees, respectively, which are within the expected margin of error. Many of these discrepancies could be due to movement of the PVC marker within the saprolite over time and/or the PVC marker being cemented in place slightly outside of the actual drill rig orientation or greatly affected by weather conditions such as heavy rain (Figure 12-1).

Although most of the drill hole collars are well marked in the field, some have no marker at all, and some have broken PVC. Figure 12-1 shows that three of the 28 holes were not found due to being removed by new road construction activity. Also due to fertile conditions found in the Amazon jungle, new vegetation can quickly cover old drill locations, which made locating some collars difficult (Figure 12-2).

The QPs recommend that future drill holes be surveyed using a "differential GPS." These points should then be compared to the digital topography in areas where LIDAR data is available. Any inconsistencies between the data set should then be reconciled. In areas where only topography data from the magnetic VTEM survey was complete, the differential GPS would likely provide a more accurate representation of the terrain and should be added to the data set to generate the topography in these areas.

Table 12-1: Collar Coordinates Inspections

General holes information			Differnces					
No.	DDH	Zone	Easting	Northing	Elevation	Azimuth	Dip	Distance
1	COR0001	Serra	3.5	3.7	1.6	34.0	23.0	5.1
2	COR0005	Galena-Boca	3.8	0.9	11.3	6.0	5.0	3.9
3	COR0017	Eloy-Juara-Mae de Leite	1.4	0.9	9.0	26.0	5.0	1.6
4	COR0020	Serra	3.4	3.3	3.0	11.0	3.0	4.7
5	COR0042	Serra	0.8	1.8	0.5	5.0	1.0	1.9
6	COR0062	Guaxebiha-Meio-Onza	12.3	0.3	8.7	4.0	8.0	12.4
7	COR0095	Guaxebiha-Meio-Onza	3.6	1.7	1.7	1.0	10.0	3.9
8	COR0106	Eloy-Juara-Mae de Leite	0.7	1.7	8.7	9.0	4.0	1.9
9	COR0124	Serra	1.3	2.1	0.2	3.0	20.0	2.5
10	COR0126	Come Quieto	1.0	2.5	5.5	11.0	12.0	2.7
11	COR0139	Serra	0.8	5.9	1.0	39.0	0.0	5.9
12	COR0176	Serra	1.1	1.9	6.1	9.0	1.7	2.2
13	COR0184	Meio	2.5	9.9	7.7	1.0	13.8	10.2
14	COR0185	Serra	3.6	0.2	0.3	1.0	3.0	3.6
15	COR0189	Meio	2.6	10.0	7.7	1.0	14.0	10.3
16	COR0191	Meio	2.0	9.7	7.7	1.0	14.0	9.9
17	COR0192	Serra	3.2	0.0	0.3	1.0	4.0	3.2
18	COR0252	Serra	24.3	0.2	1.1	6.0	1.4	24.3
19	COR0269	Meio	Not found in the field					
20	COR0289	Meio	1.8	0.2	0.0	9.0	5.4	1.8
21	COR0293	Serra	0.9	0.2	2.9	1.0	2.6	0.9
22	COR0304	Serra	2.1	0.2	3.0	9.0	0.8	2.7
23	COR0322	Serra	0.6	0.2	1.5	9.0	1.0	0.7
24	COR0325	Serra	Not found in the field					
25	COR0331	Serra	2.4	5.2	7.6	13.5	0.8	5.7
26	COR0335	Serra	6.3	9.3	2.1	1.7	2.3	11.2
27	COR0351	Serra	Not found in the field					
28	COR0356	Meio	1.0	5.9	6.6	0.3	8.8	6.0
			Easting	Northing	Elevation	Azimuth	Dip	Distance
		Maximum Differnce	24.3	10.0	11.3	39.0	23.0	24.3
		Minimum Differnce	0.60	0.04	0.03	0.03	0.00	0.70
		Average Difference	3.5	3.1	4.2	8.5	6.6	5.6

Figure 12-1: Collar Survey and Dip/Azimuth Measurement COR0001

A dip of 73^{o} is seen in the compass

Figure 12-2: Collar Inspection

12.1.2 Down-Hole Survey Validation

The down-hole survey data were validated by identifying any large discrepancies between sequential dip and azimuth readings. No significant discrepancies for drilled holes in 2018 and 2019 were noted.

12.1.3 Assay Verification

12.1.3.1 Assay Database Verification

May 2009

GRE reviewed the original sample control sheets that were used to insert two duplicates, two standards, and one blank every 42 samples and compared these to the samples analyzed. No discrepancies were found; however, the sample control sheet for drill hole 52 could not be located. Magellan sent sample “blanks” to the lab in the form of pulverized cement powder. Previously pulverized blank samples cannot confirm that the sample preparation method was free of contamination. GRE recommended using inert rock material from a local quarry borrow for blank samples in future QA/QA programs.

January 2012

GRE again reviewed the original sample control process along with the quality control sheets used to determine the insertion of duplicates, standards, and blanks. Two standards and one blank were inserted every 42 samples. Duplicates appeared to be chosen at random with zero to three duplicates every 42 samples. It was noted that one sample, DS30091, had been previously identified as incorrectly labeled and had not been updated in the database to reflect that sample contained 0.0811 ppm Au standard and not 4.113 ppm Au standard. GRE reviewed the standards and material for blanks used for the quality control program. Standards consisted of two forms, bulk powder and individual sample packets, both prepared by Rock Labs Ltd. in New Zealand. Approximately 100 grams or two packets of material were sent to the labs as standard samples. Material for blanks was sourced from a local granite quarry and sent in aggregate form to the lab as blank samples. This material had previously been analyzed and returned results below the detection limit for gold. Sending blank material in aggregate form and not powder provides a means to check cross contamination between samples due to the laboratory sample preparation process.

March 2019

In 2019 GRE completed a manual audit of the original assay database from Anfield’s 2016 to 2017 and Serabi’s 2018 to 2019 drill programs to evaluate the integrity of data from a data entry perspective. The manual audit by QPs responsible for this section identified no errors.

12.1.3.2 Check Assay Analysis

A check assay program was started by QPs when they were onsite from November 10 through November 14, 2018. After checking 154 core sample intervals from twenty separate drill holes (2007 to 2017) and six 2018 drill holes (COR0364 to COR0369), 30 check samples were selected. All core sample intervals selected by the QPs for check assay were selected from nine holes by taking ¼ splits of the remaining half cores in the core boxes. All core samples were bagged and labeled by the Serabi drill technicians at the project site under the QP’s supervision (Figure 12-3).

Figure 12-3: Final Inspection of Preparation of Check Samples

A total of 30 check samples including 11 core sample intervals, 18 pulp samples, and one chip sample were selected, packed, and delivered by the QPs to Hazen Research Inc. (Hazen) in Golden, Colorado, USA, for analysis using the same sample preparation and analytical procedures as were used for the original samples (Figure 12-3). Samples were transported by the QPs in checked luggage from Rio de Janiero Brazil to Denver, Colorado, USA.

As shown in Table 12-2, no samples were taken from six holes (COR0001, COR0005, COR0017, COR0042, COR062, and COR0106). These intervals only contain a quarter core remaining and taking a sample would have removed the drill record for that interval. GRE attempted to find pulp samples for the selected intervals where only quarter core remained; however, for these intervals, no pulp samples were located. All 30 check samples were delivered to Hazen in Golden, Colorado, USA by GRE (Figure 12-4).

Table 12-2: Check Samples Submitted to Hazen Labs

ICP-Assay Excel Spreadsheet, Anfield Gold Database (2007-2018)						Selected Sample Intervals for Check Assay by QPs			Comment
No.	DDH	From	To	Int#	Sample No.	Type of Sample			
						Pulp	Core	Chip	
1	COR0001	34	34.5	0.5	DS0021138				no sample was taken
2	COR0005	37	27.5	0.5	DS0027192				no sample was taken
3	COR0017	52	52.5	0.5	DS0028828				no sample was taken
4	COR0020	38.00	38.50	0.5	DS0029507		☑		
5	COR0042	39.00	39.50	0.5	DS0023751				no sample was taken
6	COR0062	57.50	58.00	0.5	DS0024503				no sample was taken
7	COR0095	64.70	65.20	0.5	DS0030768	☑			
8	COR0106	110.20	110.80	0.6	DS0031078				no sample was taken
9	COR0124	100.00	100.50	0.5	DS0032472	☑			
10	COR0124	100.50	101.00	0.5	DS0032473		☑		
11	COR0126	130.50	131.00	0.5	DS0032727	☑			
12	COR0139	168.10	168.70	0.6	DS0033745	☑			
13	COR0176	207.05	207.55	0.5	DS0037141	☑	☑		
14	COR0189	54.65	55.10	0.45	S000219	☑			
15	COR0192	21.47	22.06	0.59	S000316	☑			
16	COR0252	119.10	119.20	0.1	S001752	☑			
17	COR0269	29.28	29.97	0.69	S002590	☑			
18	COR0325	188.25	188.68	0.43	S002901	☑	☑		
19	COR0335	264.77	265.31	0.54	S003068		☑		
20	COR0335	265.31	265.90	0.59	S003071	☑	☑		
21	COR0351	281.36	281.87	0.51	S004375	☑			
22	COR0356	274.00	274.26	0.26	S004561	☑			
23	COR0364	124.00	125.00	1.00	DS37206	☑	☑		
24	COR0365	225.30	226.00	0.70	DS37239	☑	☑		drilled in 2018
25	COR0366	74.50	75.00	0.50	DS37310	☑	☑		drilled in 2018
26	COR0368	244.70	245.20	0.50	DS37436	☑	☑		drilled in 2018
27	COR0368	370.15	370.75	0.60	DS37489	☑	☑		drilled in 2018
28	GR01001	Surface sample						☑	exposed Q-vein

Figure 12-4: Sample Verification at GRE's Denver office

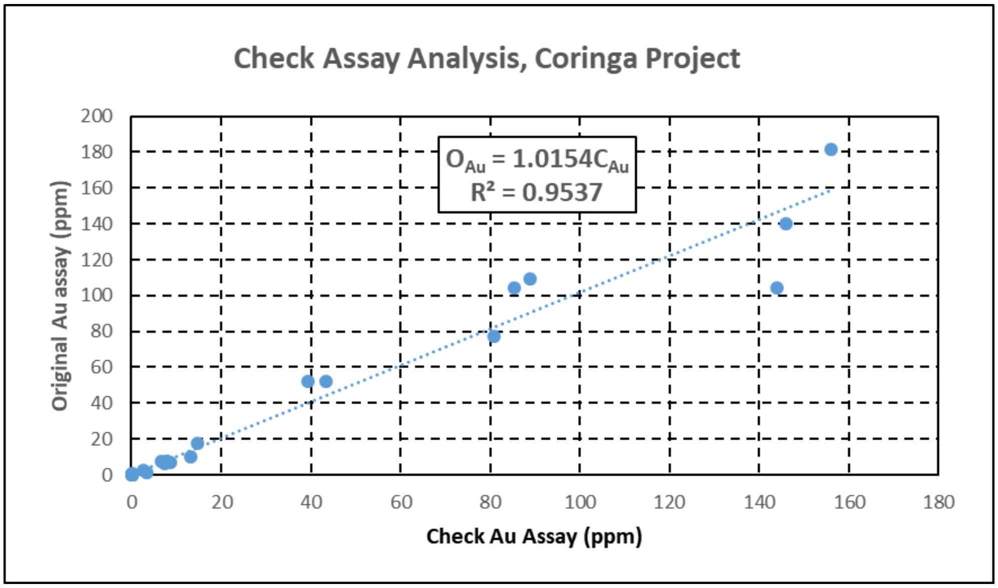
On January 3, 2019, GRE received Hazen's analytical report on 30 selected samples by fire assay method for both gold and silver. The certificate of analysis from Hazen is given in Table 12-3; GRE selected 50% of the check samples as duplicate samples.

A comparison of the original versus check assay values for all 30 samples shows good correlation between the results, with an R^2 of 0.9539 (Figure 12-5). Standard t-Test statistical analysis was completed to look for any significant difference between the original and check assay population means. The results of the t-Test showed no statistically significant difference between the means of the two trials (original versus check assay).

Table 12-3: Summary Table of Hazen Results with Original Assays

No.	Sample No.	Type of Sample	Request Analysis		Original Au Assay ppm	Hazen Au Assay ppm	Hazen Duplicate Au Assay ppm	Hazen Ag Assay ppm	Hazen Duplicate Ag Assay ppm
			Fire Assay Au-Ag	Duplicate Fire Assay					
1	DS0037489	1/4 Core	☑	☑	0.10	<0.2	<0.2	<3.00	<3.00
2	DS0037239	1/4 Core	☑		0.005	<0.2	NR	<3.00	NR
3	S002901	1/4 Core	☑	☑	104.5	85.50	92.60	129.00	147.00
4	DS0037436	1/4 Core	☑		0.005	<0.2	NR	<3.00	NR
5	S003068	1/4 Core	☑	☑	1.22	3.33	3.57	13.40	17.70
6	DS0037141	1/4 Core	☑		52.2	43.50	NR	34.70	NR
7	DS0032473	1/4 Core	☑	☑	0.011	<0.2	<0.2	<3.00	<3.00
8	DS0029507	1/4 Core	☑		0.074	0.206	NR	<3.00	NR
9	DS0037206	1/4 Core	☑	☑	0.64	<0.2	<0.2	<3.00	<3.00
10	DS0037310	1/4 Core	☑		0.02	<0.2	NR	<3.00	NR
11	S003071	1/4 Core	☑	☑	7.27	7.92	6.79	21.80	19.10
12	DS0032727-p	Pulp (plastic bag)	☑		9.861	13.30	NR	22.50	NR
13	DS0033745-p	Pulp (plastic bag)	☑	☑	17.6	14.80	15.60	33.40	32.00
14	DS0037489-p	Pulp (plastic bag)	☑		0.10	<0.2	NR	<3.00	NR
15	DS0037206-p	Pulp (plastic bag)	☑	☑	0.365	0.206	<0.2	<3.00	<3.00
16	DS0037239-p	Pulp (plastic bag)	☑		0.005	<0.2	NR	<3.00	NR
17	DS0037436-p	Pulp (plastic bag)	☑	☑	0.005	<0.2	<0.2	<3.00	<3.00
18	DS0037310-p	Pulp (plastic bag)	☑		0.02	<0.2	NR	<3.00	NR
19	DS0037141-p	Pulp (plastic bag)	☑	☑	52.2	39.40	39.90	32.90	31.10
20	DS0032472-p	Pulp (plastic bag)	☑		6.495	7.37	NR	13.40	NR
21	DS0030768-p	Pulp (plastic bag)	☑	☑	6.82	8.57	8.84	27.70	23.10
22	S004375-p	Pulp (paper bag)	☑		2.69	2.74	NR	7.25	NR
23	S000219-p	Pulp (paper bag)	☑	☑	109.5	88.80	103.00	125.00	138.00
24	S003071-p	Pulp (paper bag)	☑		7.27	6.68	NR	32.60	NR
25	S002901-p	Pulp (paper bag)	☑	☑	104.5	144.00	106.00	149.00	134.00
26	S004561-p	Pulp (paper bag)	☑		7.64	7.99	NR	18.70	NR
27	S002590-p	Pulp (paper bag)	☑	☑	140	146.00	136.00	134.00	128.00
28	S000316-p	Pulp (paper bag)	☑		181.5	156.00	NR	369.00	NR
29	S001752-p	Pulp (paper bag)	☑	☑	77.1	80.80	85.50	30.20	35.60
30	GR01001	Surface sample(chip)	☑		………	7.73	NR	6.25	NR

Figure 12-5: Sample Correlation Plot



12.2 Geological Data Verification and Interpretation

12.2.1 Geological Map Accuracy

Field observations during the site visit on November 13, 2018, generally confirm previous reports and maps on the geology of the project area. The lithology of exposed bedrocks, alteration types, and significant structural features are all consistent with descriptions provided in previous project reports (technical reports of 2015 and 2017). Dr. Samari did not see any evidence in the field that might significantly alter or refute the current interpretation of the local geologic setting (Figure 12-6).

Figure 12-6: Geological Inspections

Exposure of granite and rhyolite along the access roads, newly constructed trenches, exposed quartz vein in Serra mineralization zone, and two artisanal workings (south of Galena and within the Meio mineralization zones).

12.2.2 Geological Logging Accuracy

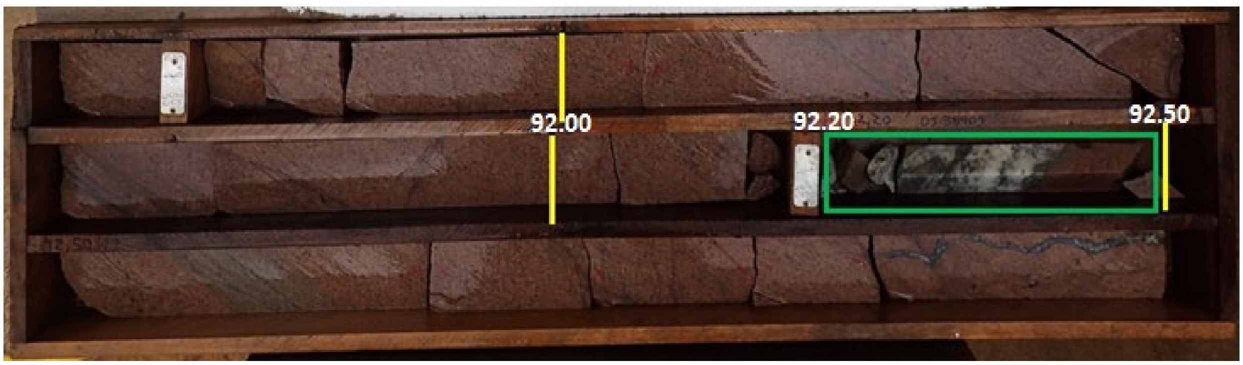
The QPs started their work by comparing the core sample intervals to the geologic logs. One hundred fifty-four core sample intervals from 20 separate drill holes (2007 to 2017) were selected for visual inspection and selection of check samples based on a review of all drill hole logs and original assay results. In addition, the majority of the core intervals from six 2018 drill holes (COR0364 to COR0369) were reviewed. The sample intervals selected contained a range of assay values, alteration, and quartz veins, and included hanging wall and foot wall intervals around the quartz vein. Although most of the core sample intervals inspected accurately reflect the lithologies and sample descriptions recorded on the associated drill hole logs and within the project database, some inconsistencies were noted, including: quartz veins have not been logged; a series of small quartz veins were incorrectly logged as one continuous quartz vein; and in some core intervals, stockwork, chloritic-hematite alteration was logged as quartz veins.

The QPs believe that these quartz veins with moderate to high gold grade are the critical targets for future exploration and exploitation. To achieve the most representative three-dimensional model of these veins, The QPs recommended relogging and resampling of significant quartz vein intervals where previous sampling was done primarily on a fixed interval length (i.e, 2m, 1m and 0.5m). .

Serabi geologists completing resampling of core boxes from 2007 to 2013 which included 41 boreholes (103 intervals) using the methodology for drilling 2016-2017 which honored the geologic contacts. New samples were taken with a maximum interval 1.5m and minimum interval 0.1m (Figure 12-7).

The resampled intervals more accurately represent the thinner and higher grade of gold-bearing quartz veins. The results of the resampling effort were incorporated into the updated mineral resource estimate. The figure below provides an example of the resampling work completed for drill hole COR-0055. The original sampled interval spanned 92 to 92.50 meters and contained a significant portion of unmineralized wall rock from the hanging wall surrounding the quartz vein. The new sample, from 92.2 to 92.5 meters, more accurately represents the quartz vein and mineralized rock within the footwall.

Figure 12-7: An example of re-sampling results



OLD SAMPLING							
Hole_ID	From	To	Int	Certificated_External	Sample_Ext	Au_ppm_Ext	Cu_ppm_Ext
COR0055	92.00	92.50	0.50	SG1237-MAR08	DS0024288	**3.782**	32

RESAMPLING - SERABI							
Hole_ID	From	To	Int	Certificated_Serabi	Samples_Serabi	Au_ppm_Serabi	Cu_ppm_Serabi
COR055	92.20	92.50	0.30	16385	DS38909	**6.23**	18.9

RESAMPLING - SGS							
Hole_ID	From	To	Int	Certificated_External	Sample_Ext	Au_ppm_Ext	Cu_ppm_Ext
COR0055	92.20	92.50	0.30	GQ1902559	DS38909-P	**5.849**	-

In the above photo, yellow lines show the old sampling intervals, and the green box is for resampling interval, which is confined to the quartz vein. The information about intervals, depths, and amounts of assays for old sampling and resampling are given in the above table.

12.3 QP Opinion on Adequacy

Based on the results of the QP's check of the sampling practicing, verification of drill hole collars in the field, results of the check assay analysis, visual examination of selected core intervals, and the results of both manual and mechanical database audit efforts, the QP considers the collar, lithology, and assay data contained in the project database to be reasonably accurate and suitable for use in estimating mineral resources.

The database audit work completed to date indicates that occasional inconsistencies and/or erroneous entries are in the data entry process. The QP recommends that Serabi establish a routine, internal mechanical audit procedure to check for overlaps, gaps, total drill hole length inconsistencies, and non-numeric assay values or any missing information in the database. The internal mechanical audit should be carried out after any significant update to the database. The results of each audit, including any corrective actions taken, should be documented to provide a running log of the database validation.

13.0 Mineral Processing and Metallurgical Testing

13.1 Introduction

Metallurgical testing for the Coringa Gold Project has been performed since 2008 at four laboratories. Table 13-1 lists the laboratories and summarizes the types of metallurgical test programs that each completed. The results of the various programs are described in detail in Section 13.3.

Table 13-1: Metallurgical Test Programs

Laboratory (Location)	Dates	Key Testing Programs	Materials Tested
SGS Geosol Mineral Lab (SGS Geosol) (Belo Horizonte, MG, Brazil)	Mar-08	Gravity Concentration	Two Composites (High and Low Grade)
	May-08	Flotation	
		Whole-Ore Leaching	
Resource Development Inc (RDi) (Wheat Ridge, CO, USA)	Mar-10	Grinding Work Index	Two Composites (Serra and Guaxebinha-Meio-Onza Zones)
		Gravity Concentration	
		Flotation	
		Whole-Ore Leaching	
Testwork Desenvolvimento de Processo Ltda (TDP)	Jun-13	Gravity Concentration	Two Composites (Serra-Galena-Mae de Leite and Meio-Come Quieto Zones)
	Nov-13	Whole-Ore Leaching	
Nova Lima, MG, Brazil	Dec-13	Gravity-Intensive Leach	
		Flotation, Float-Leach	
		Cyanide Neutralization	
		Settling	
		Grinding Work Index	
C.H. Plenge & CIA. S.A. (Plenge) (Miraflores, Lima, Peru)	May-17	Comminution (UCS, Crush)	1/2 HQ core Master Composite (Serra-Meio Zones)
	Jul-17	Comminution (Abrasion, bond work index [BWi])	1/2 HQ core Variability Composites (8 Serra, 6 Meio)
		Gravity Concentration	Comminution Samples (26 Serra, 26 Meio)
		Gravity-Conc Intensive Leach	Sliced PQ core Variability Composites (4 Serra, 2 Meio)
		Gravity Tails Leach	
		Whole-Ore Leaching	
		Whole-Ore Flotation, Leaching	
		Leach Tails Flotation	
		Cyanide Neutralization	
		Settling	
		Gravity Concentrate Mineralogy	

Results from the most recent Plenge test program will be used to project the metallurgical performance of materials planned for mining and processing at the Coringa Gold Project. Results from the earlier RDi and TDP test programs support results from the Plenge program and altogether are useful to support the stated overall representativeness of the samples to the various deposits.

The projected gold and silver recoveries for the main deposits at the Coringa Gold Project are presented below:

- Serra and Galena Deposits – 96% for gold and 57% for silver
- Meio Deposit – 94% for gold and 74% for silver

The above recoveries are the average results, after an applied discount, from Plenge's testing of variability composites when subjected to gravity concentration, intensive leach (IL) of gravity concentrates, and CIL processing of gravity tails. The recoveries were discounted 3% for gold and 5% for silver to reflect typical losses experienced in industrial process plants, such as less efficient gravity concentration, solution losses, carbon losses, lower silver carbon-loading than anticipated, and grind variations. The recoveries compare well with the results from Plenge's whole-ore CIL processing tests as well as the gravity/IL/CIL tests run in 2013 by TDP.

13.2 Metallurgical Samples

13.2.1 Metallurgical Sample Locations

Drill holes and sample intervals for the materials selected for the four test programs are shown Figure 13-1 through Figure 13-3. The samples tested are spatially representative of the zones for mining and processing. Results from the test programs are acceptable to project the metallurgical response of the materials planned for processing. The details of the drill hole intervals for the 2017 samples were not readily available for incorporation into the figures below.

Figure 13-1: Plan View – All Metallurgical Sample Locations

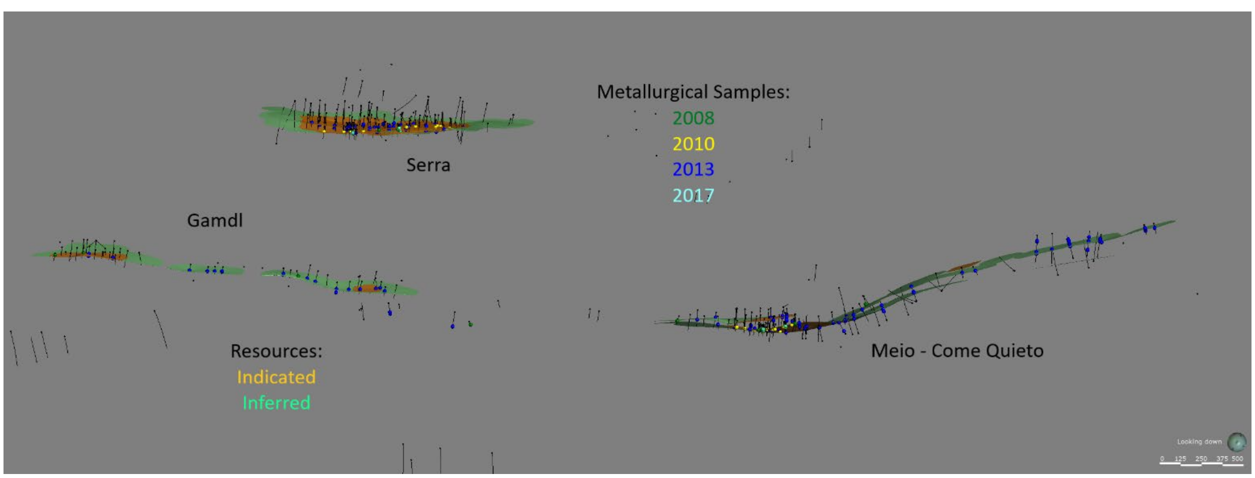


Figure 13-2: Long Section – Meio Metallurgical Sample Locations

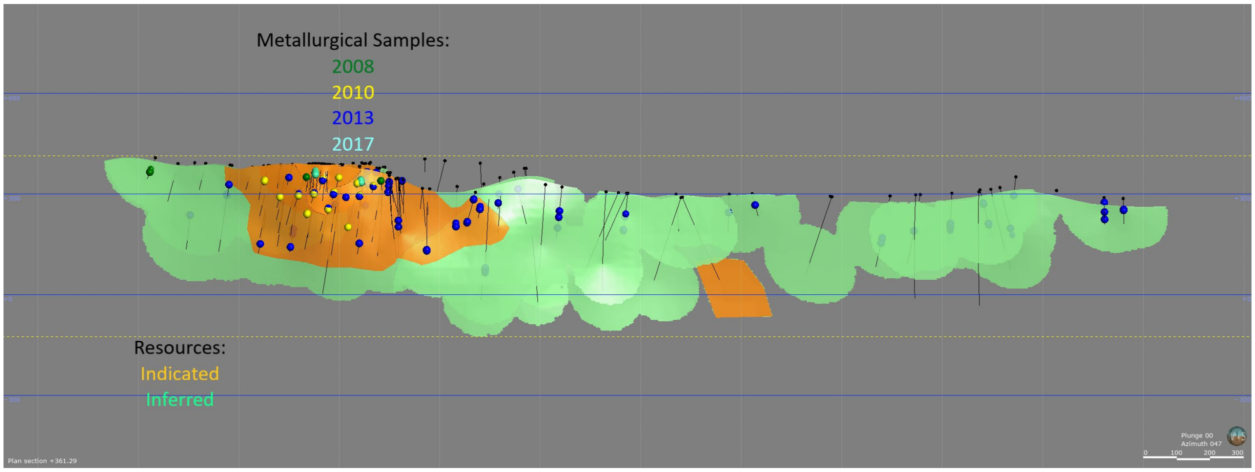
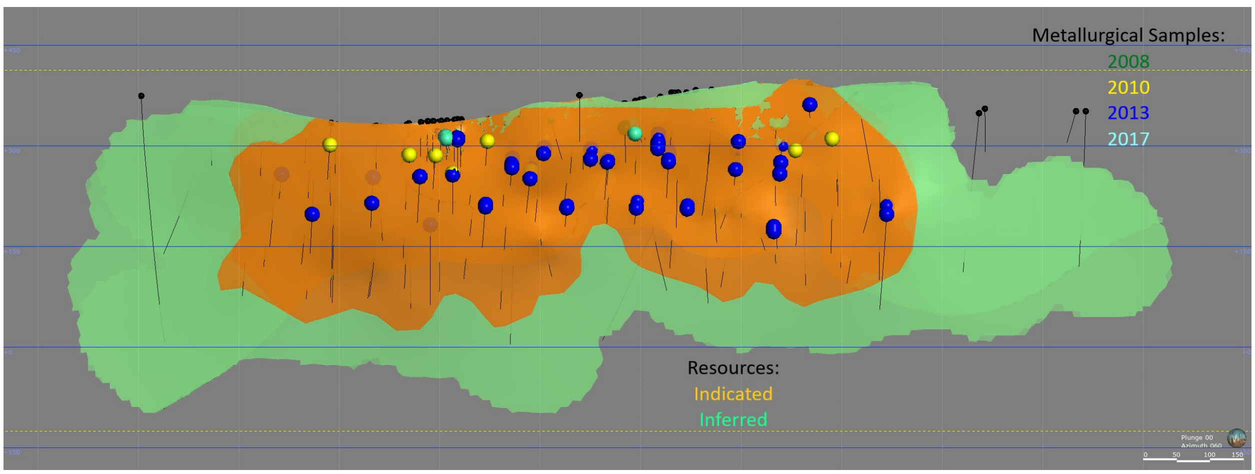


Figure 13-3: Long Section – Serra Metallurgical Sample Locations



13.2.2 Metallurgical Sample Mineralogy

In February 2017, ten samples of drill core from the Coringa Gold Project were sent to Camborne School of Mines in Cornwall, United Kingdom, to complete a petrographic and Quantitative Evaluation of Materials by Scanning Electron Microscopy (QEMSCAN) study. Seven samples were from the Serra zone and three from the Meio zone. Polished thin sections of each sample were prepared and then examined optically and photographed. Three samples (two from Meio and one from Serra) were then selected based on their gold potential and variations in mineralogy to be run on QEMSCAN in 10-µm field scan mode. The results are reported in the March 2017 report entitled "A Petrographic and QEMSCAN Study of Drill Core Samples from the Coringa Gold Project, Tapajos Region, Brazil" authored by Dr. Nicholas Le Boutillier with Dr. Gavyn Rollinson, and a summary of the findings includes:

- Gold, within electrum (Au, Ag), was found optically in two of the ten samples.
- Three samples were selected, including the above two, for QEMSCAN analysis.
- Gold was found in all three samples selected by QEMSCAN.
- Electrum is closely associated with quartz (48%).

- Quartz is the dominant gangue phase with electrum residing in fractures and as inclusions.
- Electrum is also closely associated with pyrite (31%) within fractures and along grain margins.
- Chalcopyrite, galena, hematite, and chlorite are also repositories for electrum.
- A total of 363 grains of electrum were found in the study.
- Of those found, 296 (81.5%) were less than 15 µm in size.
- 347 electrum grains (95%) were less than 35 µm in size.
- Electrum grain sizes ranged from 75 µm to < 15 µm.
- Gold content in the electrum particles ranged from 71% to 90% and averaged 81%.

13.3 Metallurgical Testing

13.3.1 SGS Geosol

In 2008, SGS Geosol of Belo Horizonte, MG, Brazil issued reports describing very preliminary test programs that investigated size-by-size gold analysis, gravity concentration, flotation, and cyanide leaching of samples from the Coringa Gold Project. Samples were collected from 20 different drill holes and used to prepare two composites: a high-grade composite contained 23 gpt gold and a low-grade composite contained 3 gpt gold.

Size-by-size analyses, at five separate size fractions (+300 µm to -38 µm), indicated that the gold assay values were very similar in each size fraction, indicating that the gold appears evenly disseminated. The combined assays also compared well to the initial assays of each composite.

Gravity concentration was performed using a Knelson concentrator, with the tails being treated on a Mozley table. Results were similar for each composite, with about 40% of the gold being recovered into a combined Knelson and Mozley concentrate weighing about 7% of the feed material weight.

Cyanide leaching of the Mozley table middling and tails for each composite, after grinding to less than one mm, resulted in gold recoveries from the middling ranging from 40% to 64% and from the tails ranging from 34% to 87%.

Flotation of Mozley table tails and middling materials, for each composite, after grinding to 150 µm, resulted in gold recoveries of 93% from the middling and 86% from the tails. Concentrate weights ranged from 6% to 12% of the feed weights. Silver, lead, zinc, and copper recoveries in the flotation concentrates were similar to gold recoveries. Cleaner concentrate assays ranged from 2% to 11% lead and about 3% zinc.

The SGS Geosol test program results indicated that there was potential for reasonable metal recoveries being obtained from the materials from the Coringa Gold Project. Further programs were deemed necessary to refine the processing schemes and recovery projections. Those programs are discussed below.

13.3.2 RDi

In 2010, RDi of Wheat Ridge, Colorado, USA, issued a report that presented results from a scoping-level metallurgical test program. Two composite samples were prepared using 114 kg of analytical reject materials from drill holes of the Serra and Guaxenbinha-Meio-Onza (Meio) Zones. The composites were subjected to indirect ball mill work index determinations, gravity concentration, flotation, and whole-ore cyanide leaching. The Serra composite was made from 19 drill hole samples, while the Meio composite consisted of 52 samples.

Head assays of the Serra and Meio composites were:

- Serra - 8.2 gpt gold, 14.9 gpt silver, 0.26% lead, 0.13% zinc
- Meio - 11.1 gpt gold, 16 gpt silver, 1.6% lead, 0.52% zinc

Indirect ball mill work index determinations were performed due to lack of coarse material available to perform standard BWi tests. It was estimated that Serra had a BWi of 18.8 and Meio had a value of 22.3, both very hard materials.

Gravity concentration testing was performed on both composites via a 3.5-inch diameter Knelson concentrator with initial rougher concentrates cleaned on a Gemini table. The samples were ground to three size fractions (P80s of 210, 150, and 105 µm) prior to gravity testing. Gold recoveries ranged from 37% to 68% into concentrates with approximately 1% mass pull. Silver recoveries ranged from 10% to 23%. Final tabled gravity concentrates assayed over 400 gpt gold and 260 gpt silver.

Two flotation test series were performed on the composites, including bulk-sulfide flotation and differential flotation. Bulk-sulfide flotation recovered 90% to 95% of the gold and 70% to 80% of the silver into a concentrate assaying over 90 gpt gold and 106 gpt silver. Concentrate weights ranged from 8% to 12% of the feed weights. Differential flotation resulted in the precious metals distributed across the lead, zinc, and pyrite concentrates with perhaps only the lead concentrates being of sufficient quality for marketing.

Whole-ore cyanide leaching of the composites was performed using cyanide with and without activated carbon (CIL Process). Without carbon, gold recoveries from the Serra and Meio composites were 92% and 87% and silver recoveries were 63% and 60%, respectively. Using CIL, gold recoveries for Serra and Meio composites were 99% and 86%, respectively, while silver recoveries were 74% and 63%, respectively. NaCN consumptions ranged from 1.8 to 2.7 kilograms per tonne (kg/t) and lime consumptions ranged from 6.8 to 10.2 kg/t.

Additional CIL tests were performed to investigate pre-aeration prior to leaching and a coarser grind size. For Serra, the coarser grind resulted in a reduced gold recovery of 2% (decreasing from 99% to 97%), with similar silver recoveries (92%), and a lower NaCN consumption of 1.1 kg/t. For Meio, the coarser grind resulted in a reduced gold recovery of 5% (decreasing from 98% to 93%), and silver recoveries were similar for each grind size. The pre-aeration prior to leaching improved gold recovery from 86% in the earlier work to 98% and silver recovery greatly improved from 63% to 93%. NaCN consumption was 1.4 kg/t. The whole-ore CIL test metal recoveries were very good at a grind size P80 of 74 µm, and a pre-aeration step prior to leaching provided additional improvement. Table 13-2 presents the whole-ore cyanide leach results.

Table 13-2: RDi Whole-Ore Cyanide Leach Results

Composite	Grind p80 (µm)	Leach Time (Hours)	Carbon Addition	Pre-Air (4 hours)	Gold Rec (%)	Silver Rec (%)	NaCN (kg/t)	Lime (kg/t)
Serra	74	48	No	No	91.7	63.4	1.8	10.2
Serra	74	48	Yes	No	98.9	74.3	2.0	7.7
Serra	74	48	Yes	Yes	99.0	92.2	1.2	N/A
Serra	150	48	Yes	Yes	97.2	92.2	1.1	N/A
Meio	74	48	No	No	86.5	60.4	2.4	6.8
Meio	74	48	Yes	No	86.0	63.2	2.7	7.8
Meio	74	48	Yes	Yes	97.7	93.2	1.8	N/A
Meio	150	48	Yes	Yes	93.2	93.2	1.1	N/A

13.3.3 TDP

During 2013, TDP of Nova Lima, MG, Brazil, issued reports that presented results of tests performed on two composites. Composite 1 was made from 10 samples, weighed 244 kg, and represented the Galena-Mãe de Leite-Serra zones (Serra). Composite 2 was made from 11 samples, weighed 281 kg, and represented the Meio-Come Quieto zones (Meio). Composite 1 contained approximately 20% of its material from the Galena zone, 20% from the Mãe de Leite zone, and 60% from the Serra zone.

Head assay analyses of the composites were:

- Composite 1 (Serra) - 3.2 gpt gold, 9.3 gpt silver, 0.15 % lead, 0.07 % zinc, 0.04 % copper
- Composite 2 (Meio) – 2.7 gpt gold, 5.8 gpt silver, 0.23 % lead, 0.20 % zinc, 0.04 % copper.

The TDP testing program included:

- gravity concentration and IL of gravity concentrates
- whole-ore and gravity tails cyanide leaching with and without activated carbon
- flotation of gravity tails and cyanide leaching of flotation concentrates
- cyanide neutralization
- settling
- BWi tests

Gravity concentration testing was performed on each composite at three grind sizes. Table 13-3 shows the results of the gravity concentration, at a water fluidization flow of 5 liters per minute, followed by IL of the gravity concentrates. Gravity recoveries ranged from 52% to 66% for gold and 24% to 34% for silver. IL extractions ranged from 95% to 99% for gold and 54% to 72% for silver. The high leach recoveries of gold indicate that the gold particles are likely free in the concentrates, with the finer the grind producing the higher recoveries.

Table 13-3: Gravity Concentration and Intensive Leach Tests

Composite	Grind p80 (microns)	Gravity Mass Rec (%)	Gravity Gold Rec (%)	Gravity Silver Rec (%)	Int. Leach Gold Rec (%)	Int. Leach Silver Rec (%)
Serra	150	2.2	64.4	34.3	94.9	60.7
Serra	106	1.7	65.8	33.0	99.1	70.7
Serra	75	1.4	57.8	24.6	99.3	67.0
Meio	150	2	56.2	30.3	95.8	53.7
Meio	106	1.7	58.4	27.5	98.1	62.5
Meio	75	1.3	52.2	24.5	98.9	72.2

Whole-ore cyanide leaching tests, with and without activated carbon, were performed on both composites. Test results are presented in Table 13-4 and indicate that gold recoveries improve with finer grinding and when using activated carbon (CIL process). At the finest grinds and when using carbon, gold recoveries were 99% for Serra and 97% for Meio while silver recoveries were both at about 77%. The average cyanide and hydrated lime consumptions for all tests were 0.52 kg/t and 0.4 kg/t, respectively.

Table 13-4: TDP – Whole Ore Cyanide Leach Tests

Composite	Grind p80 (microns)	Carbon Addition	Gold Rec (%)	Silver Rec (%)
Serra	150	No	91.1	62.8
Serra	150	Yes	96.7	46.6
Serra	106	No	91.7	77.4
Serra	106	Yes	98.0	76.0
Serra	75	No	93.0	70.7
Serra	75	Yes	99.0	78.0
Meio	150	No	89.2	62.7
Meio	150	Yes	92.3	68.0
Meio	106	No	91.1	76.6
Meio	106	Yes	94.8	64.8
Meio	75	No	90.7	69.3
Meio	75	Yes	96.7	76.7

Additional testing included gravity concentration, IL of the gravity concentrates and leaching of the combined gravity tailing and IL tailings, as shown in Table 13-5. The gravity concentrates masses, prior to intensive cyanidation, were all in the range of 1.3% of the feed weight. When using activated carbon, the overall gold recovery for Composite 1 (Serra) was 98% and for Composite 2 (Meio) was 97%, both 1% to 2% higher than the tests run without carbon. Silver recoveries were 66% for Serra and 53% for Meio when using carbon. Cyanide consumptions were reasonable and ranged from 0.5 kg/t to 1.3 kg/t for all tests.

Table 13-5: Gravity Concentration, Intensive Cyanidation, and Tails Leaching (at 75 micron grinds)

Composite	Int. Leach Au Rec. (%)	Int. Leach Ag Rec. (%)	Carbon (gpl)	Leach Density (%)	Tails Leach Au Rec. (%)	Tails Leach Ag Rec. (%)	Total Au Rec. (%)	Total Ag Rec. (%)
Serra	63.8	16.3	0	40	33.3	53.8	97.1	70.1

Composite	Int. Leach Au Rec. (%)	Int. Leach Ag Rec. (%)	Carbon (gpl)	Leach Density (%)	Tails Leach Au Rec. (%)	Tails Leach Ag Rec. (%)	Total Au Rec. (%)	Total Ag Rec. (%)
Serra	60.5	15.5	0	50	36.9	58.0	97.3	73.5
Serra	68.3	18.3	18	40	29.8	46.3	98.2	64.6
Serra	63.7	17.3	18	40	34.8	51.4	98.4	68.7
Meio	44.3	11.9	0	40	50.6	48.5	94.9	60.4
Meio	37.5	12.8	0	50	57.4	49.5	94.9	62.3
Meio	48.1	14.4	18	50	48.6	37.3	96.7	51.7
Meio	39.6	16.7	18	50	57.7	37.5	97.3	54.1

After the successful gravity and cyanidation test results, it was decided to investigate the possibility of using flotation to produce a concentrate from the combined gravity tails and IL residues and then leach that flotation concentrate to reduce the amount of overall material that might be leached.

The two composites were first subjected to gravity concentration at three different grind sizes, with the gravity concentrates then cyanide leached. Results of these tests were similar to the gravity/IL tests shown in Table 13-4. Gold recoveries for Serra ranged from 62% to 68% and for Meio from 44% to 51%. Silver recoveries after IL were also similar to previous tests and ranged from 14% to 20%. The gravity tails combined with IL leach residues from the above tests were then subjected to flotation.

Results were positive with Serra gold and silver recoveries into the concentrates averaging 98% and 93%, respectively. Meio gold and silver flotation recoveries averaged 96% and 89%, respectively. Concentrate mass pulls averaged about 12% for all tests. Four flotation confirmation tests were performed at those optimum conditions, with gold and silver recoveries averaging 97% and 93%, respectively, which is about the same as the previous tests.

Flotation concentrates from each composite were then cyanide leached. Gold and silver flotation concentrate leach recoveries for Serra were 95% and 43%, respectively, and for Meio were 93% and 37%, respectively.

The overall gold and silver recoveries for the Serra composite using gravity, IL, flotation, and concentrate leach tests were 95.5% for gold and 48% for silver. Meio recoveries overall were 92.4% for gold and 42.1% for silver. These overall recoveries are slightly lower than the tests that used gravity, IL, and leaching of gravity tails with IL residues due the recovery loss in flotation.

Cyanide neutralization tests were performed on whole-ore leach tailings of both composites with the starting cyanide concentrations ranging from 56 mg/l to 132 mg/l. Tests employing higher ratios of SO2 to CN reduced CN levels to less than 1 mg/l in one to two hours; the lower dosage tests reached 5 mg/l in 2.5 hours. The tests are considered preliminary; however, they do confirm that CN levels can be reduced effectively using a standard treatment process in a reasonable time period.

Settling tests were performed on the two composites to determine settling (thickener) requirements for finely ground material prior to leaching. To achieve a targeted 50% solids in the thickener underflow and a clear overflow from a feed density of 21% solids, the unit settling area for both composites was 0.13 m2/t/d of feed.

A BWi test was performed on each composite. The work index values for the Serra and Meio composites were 20.3 kWh/t and 25.2 kWh/t, respectively; both very hard.

TDP showed that the samples all responded very well to gravity concentration, whole-ore cyanidation, and flotation. Results from TDP's tests were used to design the Plenge test program discussed below.

13.3.4 Plenge

In May and July 2017, Plenge of Miraflores, Lima, Peru issued reports that presented results of metallurgical tests performed on samples of recently drilled core from the Serra and Meio deposits. In February 2017, a total of 659 kg of samples were received at the lab, with 71 samples being from Serra and 50 from Meio. A total of 61 samples of ½ HQ core were used to prepare a master composite and eight variability composites. A total of 52 samples from whole HQ drill core were used for comminution testing. Sliced PQ core samples were used to prepare six composites for additional variability and comminution testing.

The Plenge test programs consisted of the following:

- Comminution and physical properties
- Whole-ore cyanidation
- Gravity concentration, IL of concentrates, leaching of gravity tails
- Whole-ore flotation
- Cyanide neutralization
- Flotation of detoxified leach tails
- Settling
- Variability sample testing
- Gravity concentrate mineralogy
- Produce a representative tails sample for tailings characterization by others

A 100 kg master composite was prepared using 50 kg each of Serra (39 samples) and Meio (22 samples). The head assays of the ½ HQ core master composite, eight ½ HQ core variability composites, and six sliced PQ core variability composites are presented in Table 13-6 and Table 13-7.

Table 13-6: Plenge – ½ HQ Core Master and Variability Composite Heads

Element	Units	Master Composite Assay	Serra High Grade Assay	Serra Mid Grade Assay	Serra Low Grade Assay	Serra Mine Grade Assay	Meio High Grade Assay	Meio Mid Grade Assay	Meio Low Grade Assay	Meio Mine Grade Assay
Au	gpt	13.6	44.3	13.3	2.9	7.8	24.9	12.3	3.1	8.8
Ag	gpt	24	120	34	3	14	26	13	3	10
Cu	%	0.11	0.20	0.09	0.02	2.00	0.24	0.16	0.03	0.09
Cu CN	%	0.04	0..08	0.04	0.01	0.03	0.04	0.08	0.01	0.02
Hg	ppm	0.32	0.21	0.15	0.05	0.11	1.18	0.25	0.10	0.17
S (total)	%	1.85	1.55	1.91	0.25	0.74	3.83	0.97	0.71	2.88
C (total)	%	0.09	0.14	0.07	0.09	0.08	0.07	0.12	0.05	0.12
C (org)	%	0.08	0.08	0.06	0.07	0.06	0.06	0.10	0.04	0.10
Sp. Grav.	g/cc	2.65	2.58	2.54	2.47	2.42	2.65	2.60	2.56	2.60
Fe	%	2.45	2.88	2.53	1.16	1.71	3.30	2.11	1.90	3.52
Pb	%	0.93	0.42	0.30	0.04	0.23	3.27	1.00	0.26	1.22
Zn	%	0.5	0.14	0.18	0.03	0.13	1.85	1.08	0.17	0.28
Bi	ppm	30	196	59	9	25	6	<5	5	<5
Cd	ppm	27	10	16	3	9	94	64	7	15
Co	ppm	3	8	6	4	4	2	1	2	3
Mo	ppm	<5	<5	<5	<5	<5	<5	<5	<5	<5
Sb	ppm	<5	<5	<5	<5	<5	<5	<5	<5	<5

Table 13-7: Sliced PQ Core Variability Composite Head Assays

Element	Units	Serra Met 17-2 HV Assay	Serra Met 17-2 FV Assay	Serra Met 17-4 MV Assay	Serra MET 17-4 FV Assay	Meio Met 17-1 Assay	Meio Met 17-3 Assay
Au	gpt	1.89	0.35	0.07	1.92	7.15	19.3
Ag	gpt	11.20	1.04	<0.2	4.70	35.90	19.34
Cu	%	0.01	0.01	0.01	0.02	0.28	0.29
Cu CN	%	0.00	0.00	0.00	0.01	0.12	0.06
Hg	ppm	<0.02	<0.02	0.02	0.02	0.94	0.35
S (total)	%	0.45	0.29	0.06	0.21	3.25	3.07
C (total)	%	0.07	0.06	0.05	0.09	0.16	0.08
C (org)	%	0.04	0.03	0.04	0.04	0.05	0.05
Sp. Grav.	g/cc	2.59	2.62	2.51	2.65	2.79	2.69
Fe	%	1.26	1.03	0.87	1.08	2.73	2.94
Pb	%	0.05	0.26	.01	0.06	5.00	1.73
Zn	%	0.02	0.06	0.01	0.04	1.47	0.82
Bi	ppm	12	<5	<5	<5	<5	<5
Cd	ppm	3	6	3	5	90	47
Co	ppm	2	1	1	1	<1	<1
Mo	ppm	6	5	5	6	9	9
Sb	ppm	<5	<5	<5	<5	24	18

Comminution Testing

Comminution testing of the Serra and Meio samples was performed to determine Uniform Compressive Strength (UCS), Crushing Work Index (CWi), Abrasion Index (Ai), and BWi. Results are presented in Table 13-8. Serra has the higher UCS, CWi, and Ai, but both have similar BWis at about 18.6 kWh/t.

The Bond work index matches closely with the numbers produced by RDi.

Table 13-8: Plenge – Comminution Results

Samples	UCS (Mpa)	CWi kWh/t	Ai* (grams)	BWi* kWh/t
Meio	26.2	6.5	0.3422	19.0
No. Samples tested	14	23	26	26
Serra	63.5	10.9	0.4114	18.2
No. Samples tested	13	24	26	26
Average	44.9	8.7	0.3768	18.6

* Abrasion and Bond Work Index tests for each deposit were performed on 2 composites. Each composite contained 13 samples.

Whole Ore Cyanidation

An initial whole-ore standard cyanidation test was performed on the master composite. Gold and silver recoveries were 98.3% and 58.7%, respectively, with leaching mostly completed within 24 hours. Cyanide and lime consumptions were 2.2 and 3.4 kg/t, respectively.

Gravity Concentration

Three-stage gravity concentration was performed on the master composite at decreasing P80 grind sizes. The samples were coarse ground and then passed through a lab scale Falcon DB-4 centrifugal concentrator, with the concentrates passed over a Mozley table for cleaning. Falcon tails from each stage were then reground and passed again through the Falcon concentrator. All three Mozley concentrates were IL cyanide leached for 24 hours. The results of the staged tests are presented in Table 13-9.

Table 13-9: Plenge – Gravity Concentration & Intensive Leaching of Master Composite by Stages

Grind Size by Stage	Product	Wt %	Conc Assay (gpt)	Gravity Rec (%)	Leach Rec (%)	Total Rec (%)	NaCN (kg/t)	Lime (kg/t)
Au								
100% < 800 microns	Cleaned Conc.	0.21	1720	26.5	85.8	22.7	0.034	0.006
60% < 75 microns	Cleaned Conc.	0.14	2096	21.9	93.0	20.4	0.026	0.006
80% < 75 microns	Cleaned Conc.	0.16	1290	15.2	94.7	14.4	0.027	0.006
Totals		**0.51**		**63.6**	**90.4**	**57.5**	**0.087**	**0.018**
Ag								
100% < 800 microns	Cleaned Conc.	0.21	1658	12.9	61.4	7.9	0.034	0.006
60% < 75 microns	Cleaned Conc.	0.14	1680	8.9	79.8	7.1	0.026	0.006
80% < 75 microns	Cleaned Conc.	0.16	1166	6.9	78.9	5.5	0.027	0.006
Totals		**0.51**		**28.7**	**71.4**	**20.5**	**0.087**	**0.018**

Flotation Testing

Two bulk rougher flotation tests were performed on the master composite followed by cyanidation of the flotation cleaner concentrates, cleaner tails, and rougher tails. The average results for the two tests are shown in Table 13-10. Combining all leach results indicates that 97% of the gold and 50% of the silver can be recovered.

Table 13-10: Plenge – Whole Ore Flotation and Cyanidation of Concentrates

Product	Wt (%)	Assays		Float Recovery		Leach Recovery		Total Recovery	
		Au (gpt)	Ag (gpt)	Au (%)	Ag (%)	Au (%)	Ag (%)	Au (%)	Ag (%)
Clean Conc.	7.0	172	313	91.0	91.8	98.5	51.7	89.7	47.4
Clnr Tails	12.1	6.5	8.3	5.9	4.2	86.4	8.8	5.1	0.4
Tails	80.9	0.51	1.19	3.1	4.0	80.1	52.9	2.5	2.1
Feed	100	13.4	24.0						

Gravity and Leach Optimization

A total of 18 cyanide leach tests were performed to investigate the following seven conditions and their impacts on metal recoveries and consumptions of cyanide and lime:

- P80 grind sizes of 74 and 105 µm
- With and without gravity concentration prior to leaching
- With and without activated carbon addition during leaching
- With and without pre-aeration prior to leaching
- Cyanide strengths of 200 and 800 ppm in leach solutions
- With and without the addition of lead nitrate in leaching
- pH levels 10.5 to 11.5 during leaching

Table 13-11 presents the results from those tests.

Table 13-11: Plenge – Summary of 18 Gravity, Leach Tests on Master Composite

Test No.	Gravity	Pre-Ox	Carbon (CIL)	Grind (P80)	pH	NaCN (ppm)	PbNO3 (gpt)	Grav + Leach Au Rec (%)	Grav + Leach Ag Rec (%)	NaCN (kg/t)	Lime (kg/t)
1	yes	no	no	74	11.5	200	0	97.4	60.5	0.6	1.2
2	no	no	no	105	11.5	800	80	97.5	56.7	1.2	1.3
3	yes	no	no	105	10.5	800	27	97.5	63.7	1.5	1.0
4	yes	yes	no	74	10.5	800	80	97.5	62.5	1.3	0.8
5	yes	yes	no	74	10.5	800	80	97.5	63.2	1.3	0.8
6	no	no	no	105	11.5	800	80	97.5	57.8	1.2	1.2
7	yes	no	yes	105	10.5	200	80	97.1	54.5	0.7	0.6
8	yes	yes	yes	105	11.5	800	0	97.7	57.9	1.3	1.6
9	yes	yes	yes	105	11.5	800	0	97.8	56.8	1.3	1.6
10	no	yes	no	74	11.5	800	0	98.4	54.0	1.0	1.4
11	no	no	no	74	10.5	200	53	97.3	48.3	0.7	0.6

Test No.	Gravity	Pre-Ox	Carbon (CIL)	Grind (P80)	pH	NaCN (ppm)	PbNO3 (gpt)	Grav + Leach Au Rec (%)	Grav + Leach Ag Rec (%)	NaCN (kg/t)	Lime (kg/t)
12	yes	no	no	74	11.5	200	0	97.4	60.8	0.7	1.3
13	no	no	yes	74	10.5	800	0	98.3	54.2	1.8	0.6
14	no	yes	no	105	10.5	200	0	96.7	50.3	0.4	0.8
15	no	yes	yes	74	11.5	200	80	96.9	46.0	0.6	1.6
16	yes	yes	no	105	11.5	200	80	97.0	61.8	0.5	1.1
17	yes	no	yes	74	11.5	800	53	98.1	59.4	1.7	1.2
18	no	yes	yes	74	11.5	200	80	96.9	47.0	0.6	1.6
Average								**97.5**	**56.4**	**1.0**	**1.1**

Based on analysis of the test results, the following observations were made:

- Gold recoveries averaged 97%, and silver recoveries averaged 56% for all tests
- Cyanide and lime consumptions averaged 1.0 kg/t and 1.1 kg/t for all tests, respectively
- Gravity concentration prior to leaching improves silver recoveries by about 9%
- Grinding to 74 µm may provide a marginal improvement in gold recovery
- Carbon addition (CIL) improves recoveries but increases cyanide consumption (likely unrelated)
- Pre-aeration decreases NaCN consumption
- Higher NaCN concentrations improve metal recoveries
- Lead nitrate addition had no impact
- Higher pH increases recoveries while lowering cyanide consumption

Four master composite confirmation tests were performed using the following optimum conditions developed in the previous 18 tests:

- Gravity concentration prior to leaching at a grind P80 of 210 µm
- Intensive cyanidation of gravity concentrates
- Re-grinding gravity tails to a p80 of 74 µm
- Pre-aeration prior to leaching
- pHs of 11.5 for leaching
- 24-hours leach time
- Carbon addition (CIL) in the leaching of gravity tails
- Initial cyanide concentrations of 800 ppm

The total gold and silver recoveries for the four tests were all close and averaged 98% and 61%, respectively. The gravity recoveries were 63% for gold and 37% for silver, in concentrates with a 0.55% mass pull. The average cyanide and lime addition in the four tests were 1.1 kg/t and 1.3 kg/t, respectively. Solution analyses of CIL leach tails slurry averaged 90 ppm of copper.

Gravity concentrate leach residues contain some gold and silver, plus lead. An assay analysis was performed on one concentrate to determine its potential for marketing after intensive leaching. The assay results are shown below.

- Gold – 35 ppm (ranges from 10 to 50 ppm, depending on head grades)
- Silver – 537 ppm (ranges from 100 to 800 ppm, depending on head grades)
- Lead – 29%
- Copper – 0.33%
- Iron – 31%
- Zinc – 2%
- Sulfur (total) – 37%

Based on these assays and the mass pull of the concentrate there is no commercial value in selling a gravity lead concentrate without further upgrading and detoxification.

Detoxification

To supply sufficient material for cyanide neutralization (detox) tests, a large-scale whole-ore CIL cyanide leach test was performed using the optimized conditions. No gravity concentration prior to CIL was performed. The gold and silver recoveries were 98% and 55%, respectively. Cyanide and lime consumptions were 1.5 kg/t and 1.4 kg/t, respectively. The gold recovery was similar to the previous gravity/leach tests; however, the silver recovery was lower, likely due to lack of gravity concentration.

Five cyanide detox tests were performed, three in batch mode and two in continuous mode, using the standard SO2/Air process technique with SMBS as the oxidant. The best results were obtained from a continuous test treating a feed slurry containing weak acid dissociable (WAD) CN of 378 ppm and CN (Total) of 412 ppm. After two hours of treatment, the solution analyses are shown below.

- PH = 8.1
- ORP = 133 mV
- Dissolved Oxygen = 4 mg/l
- Iron = 0.2 mg/l
- Free CN = 0.6 mg/l
- WAD CN = 1.4 mg/l
- Total CN = 2.9 mg/l
- SCN = 110 mg/l

Reagent Consumptions: 3.9 kg/t SMBS, 0.5 kg/t lime, 0.2 kg/t copper sulfate

Byproduct Production

Flotation of a concentrate was performed on a sample of detoxified tails to determine the potential for recovering and marketing by-products. A bulk lead/zinc concentrate was produced with a mass pull of 1.5% and assayed 401 gpt silver, 1.7 gpt gold, 31% lead, and 31% zinc. The metal recoveries, based on the original head grade prior to leaching, were 32% for silver, 0.4% for gold, 72% for lead, and 88% for zinc. This concentrate may be marketable to an Imperial Smelter process with further upgrading.

Settling Tests

Three settling tests, using the standard Kynch Method, were performed on a sample of the gravity tails to determine thickening requirements prior to pre-aeration and CIL. The tests compared three flocculants at a dosage of 10 g/t, pH of 11.0, a feed density of 15% solids, and underflow density of 44%. The best results were obtained when using the Praestol Flocculant 3130, a medium weight non-ionic polymer, which created the lowest area requirement of 0.139 m2/t/d of feed. Higher underflow densities (to 51%) would require an increased area of 0.180 m2/t/d.

Variability Testing

Four ½ HQ core variability composites were formed for each of the deposits. Composites represented gold and silver grades that were high, medium, low, and mine grade. The head grades were shown in Table 13-6. Each composite was subjected to standard whole-ore CIL leaching and gravity/IL/CIL of tails testing for comparison of results.

Results of the four Serra whole-ore CIL tests are shown in Table 13-12, and results of the Serra gravity/IL/leach tests are shown in Table 13-13. Gold and silver recoveries in the whole-ore tests averaged 98.4% and 43.3%, respectively. Gold and silver recoveries in the gravity/IL/leach tests averaged 99.3% and 62%, respectively.

Table 13-12: Plenge – Serra Variability Tests – Whole-Ore CIL Leach

Serra Composite	Feed Au (gpt)	Feed Ag (gpt)	Residue Au (gpt)	Residue Ag (gpt)	Rec Au (%)	Rec Ag (%)	NaCN (kg/t)	Lime (kg/t)
High Grade	40.0	122	0.507	75.8	98.7	37.8	1.6	1.5
Medium Grade	12.7	36	0.093	23.1	99.3	34.8	1.3	1.6
Low Grade	2.8	3	0.083	1.2	97.1	58.7	1.1	1.6
Mine Grade	7.2	13	0.102	7.6	98.6	41.8	1.3	1.1
Average	**15.7**	**43**	**0.196**	**26.9**	**98.4**	**43.3**	**1.3**	**1.5**

Table 13-13: Plenge – Serra Variability Tests – Gravity/IL/CIL Tails Leach

Serra Composite	Heads Au (gpt)	Heads Ag (gpt)	Grav Rec Au (%)	Grav Rec Ag (%)	CIL Rec Au (%)	CIL Rec Ag (%)	Total Rec Au (%)	Total Rec Ag (%)	NaCN (kg/t)	Lime (kg/t)
High Grade	44.3	120	68.5	34	31.0	22	99.5	56	1.7	1.8
Medium Grade	13.3	34	66.0	39	33.2	20	99.2	59	1.4	1.8
Low Grade	2.9	3	69.0	48	30.2	24	99.3	71	1.1	1.8
Mine Grade	7.9	14	67.1	42	32.1	21	99.1	62	1.2	1.6
Average	**17.1**	**43**	**67.7**	**41**	**31.6**	**22**	**99.3**	**62**	**1.4**	**1.7**

The results of the four Meio whole-ore CIL tests are shown in Table 13-14, and results of the Meio gravity/IL/leach tests are shown in Table 13-15. Gold and silver recoveries in the whole-ore tests averaged 94.5% and 73.5%, respectively. Gold and silver recoveries in the gravity/leach tests averaged 97.2% and 78.5%, respectively.

Table 13-14: Plenge – Meio Variability Tests – Whole-Ore CIL Leach

Meio Composite	Heads Au (gpt)	Heads Ag (gpt)	Residue Au (gpt)	Residue Ag (gpt)	Rec Au (%)	Rec Ag (%)	NaCN (kg/t)	Lime (kg/t)
High Grade	26.2	27.6	1.84	8.2	93.0	70.2	1.6	2.1
Medium Grade	12.8	13.0	0.35	2.8	97.3	78.4	2.8	2.3
Low Grade	3.3	2.6	0.18	0.7	94.6	74.8	1.2	2.3
Mine Grade	8.5	8.6	0.59	2.5	93.1	70.7	1.2	2.0
Average	**12.7**	**12.9**	**0.74**	**3.6**	**94.5**	**73.5**	**1.7**	**2.2**

Table 13-15: Plenge – Meio Variability Tests – Gravity/IL/CIL Tails Leach

Meio Composite	Heads Au (gpt)	Heads Ag (gpt)	Grav Rec Au (%)	Grav Rec Ag (%)	CIL Rec Au (%)	CIL Rec Ag (%)	Total Rec Au (%)	Total Rec Ag (%)	NaCN (kg/t)	Lime (kg/t)
High Grade	25.6	28.9	38.4	24.3	59.5	51.6	97.8	75.8	1.6	2.0
Medium Grade	12.7	14.3	57.7	41.9	40.2	41.4	97.9	83.3	2.6	2.0
Low Grade	3.4	3.1	34.7	29.0	60.9	49.7	95.6	78.8	1.3	1.9
Mine Grade	8.9	9.1	43.2	34.2	54.3	42.0	97.5	76.2	1.2	1.8
Average	**12.6**	**13.8**	**43.5**	**32.3**	**53.4**	**41.9**	**97.2**	**79**	**1.7**	**1.9**

There does not appear to be a relationship between gold and silver head grades to recoveries in any of the above variability tests. Serra samples, however, have a 4% higher gold recovery than Meio samples. Silver recoveries from Serra samples are lower than Meio, probably due to the higher silver grades and different silver mineralogy.

A gravity/CIL tails leach test was performed on the Serra and Meio variability composites that examined coarsening the grind size to a P80 of 150 µm from 74 µm. For the coarse grind, gold and silver recoveries for Serra samples were 98% and 59%, respectively, versus 99% and 62% for the finer grind size. For coarse-ground Meio samples, gold and silver recoveries were 92% and 72%, respectively, versus 97% and 79% for the finer grind. Reduced recoveries are more evident in the Meio samples.

Two composites, one for Serra and one for Meio, were prepared using samples from 13 separate ½ HQ drill cores. Each composite was subjected to gravity concentration in a Falcon 4B concentrator after an initial grind P80 of 210 µm. Concentrates from each composite were collected and separated into three size fractions (-2mm to +150 µm, -150 to +74 µm, and -74 to +15 µm), passed over a Mozley table and the concentrates subjected to optical mineralogical examination. Observations are noted below for each composite:

- Serra – The gold particles are mostly liberated, with colors ranging from yellow (high grade) to white (electrum). The yellow gold particles are the most abundant, rounded, of various size (up to 2 mm) and are either free and/or associated peripherally with sulfide particles such as sphalerite, galena, or hematite and oxides. The white gold particles are less abundant, generally elongated and locked mostly in sulfides like pyrite and galena, which are the most abundant minerals.

- Meio – The gold particles are primarily electrum, with minor yellow gold, and are associated with sulfides and gangue as inclusions of various size. Pyrite and galena are the most abundant minerals.

Six additional variability composites were prepared using the sliced PQ core, four for Serra and two for Meio. The head grades for the six composites were presented in Table 13-7. The Serra composites are lower in grade compared to the four previous Serra variability composites, while the Meio composites are comparable to the previous high-grade Meio variability composite with even higher values indicated for lead and silver. The composites were subjected to gravity/IL/CIL leaching of gravity tails (at various grind sizes and leach densities) and comminution tests.

Average comminution test results for all six sliced PQ core variability composites are presented below and are comparable to results presented earlier in Table 13-8:

- CWi – 10.95 kWh/t
- Ai – 0.3604 g
- BWi – 16.85 kWh/t

Gravity concentration of the six composites yielded the following results:

- Serra composites – 0.56% weight in concentrates, with gold and silver recoveries for all four tests averaging 63.2% and 43.9%, respectively. Gold recoveries ranged from 45% to 79%, while silver recoveries ranged from 34% to 53%.
- Meio composites – 0.56% weight in concentrates, with gold and silver recoveries for both tests averaging 40.7% and 20%, respectively. Gold recoveries ranged from 33% to 48%, while silver recoveries ranged from 7% to 33%.

Gravity concentrates from each composite were subjected to intensive cyanide leaching. The results of the IL tests are presented below:

- Serra composites – Gold and silver recoveries averaged 98.5% and 26.4%, respectively. Gold recoveries ranged from 98% to 99%, while silver recoveries ranged from 20% to 57%.
- Meio composites - Gold and silver recoveries averaged 55.3% and 59.3%, respectively. Gold recoveries ranged from 53% to 64%, while silver recoveries ranged from 56% to 68%.

Cyanide leaching of the gravity tailings was performed on the six composites. Metal recoveries for the four Serra composites and one of the Meio composites were comparable to previous variability leach tests when using typical leach densities of 45% solids at a grind P80 of 74 µm. Low recoveries were experienced when leaching gravity tailings for Meio sample Met 17-1 (high silver, copper, and lead) but improved significantly when leached at lower slurry densities.

Gravity tailings leach results are discussed below:

- Serra composites - Gold and silver recoveries averaged 90% and 41%, respectively, for all four composites. Gold recoveries ranged from 88% to 93%, while silver recoveries ranged from 36% to

51%. At a grind P80 of 105 µm for one test, the gold and silver recoveries were lower at 83% and 46%, respectively.

- Meio composite (Met 17-1) - Gold and silver recoveries, when leached at a density of 45% solids and grind p80 of 74 µm, were 67% and 61%, respectively. At a grind P80 of 105 µm and the same density, gold and silver recoveries dropped to 43% and 58%, respectively. At a grind p80 of 74 µm and lower leach densities (16% to 21% solids), gold and silver recoveries for two tests averaged 94% and 73%, respectively. Thus, for samples with high precious metals and sulfides (particularly copper and zinc) it is best to leach at lower densities or blend with lower grade materials.
- Meio composite (Met 17-3) – Gold and silver recoveries were 96% and 68%, respectively, comparable to results obtained from Met 17-1 composite when it was leached at the lower densities.

Overall metal recoveries for the six additional variability composites are discussed below:

- Serra composites – Total gold and silver recoveries (after gravity and CIL leaching) averaged 96% and 67%, respectively, for all four composites.
- Meio composites – Total gold and silver recoveries averaged 97% and 76%, respectively, for both composites at optimum conditions.
- The above total recovery results compare reasonably well to the earlier master composite and variability composite test results.

13.3.5 Summary of Test Results

Selected results from the RDi, TDP, and Plenge test programs are presented in Table 13-16.

Table 13-16: Selected Laboratory Results

Laboratory	Test	Deposit Composite	Au Rec (%)	Ag Rec (%)	NaCN (kg/t)	Lime (kg/t)	Comments
RDI – 2010	CIL, Pre-Air, 48 hours, 74 microns	Serra	99	92	1.2		
	CIL, Pre-Air, 48 hours, 74 microns	Meio	98	93	1.8		
	Gravity Concentration at 210 microns	Serra	62	20			
	Gravity Concentration at 210 microns	Meio	48	23			
TDP - 2013	CIL, 48 hours, 74 microns	Serra	99	78	0.5	0.4	
	CIL, 48 hours, 74 microns	Meio	97	77	0.5	0.4	
	CIL, 48 hours, 105 microns	Serra	98	76	0.5	0.4	
	CIL, 48 hours, 105 microns	Meio	95	65	0.5	0.4	
	Gravity Concentration at 150 microns	Serra	66	34			
	Gravity Concentration at 150 microns	Meio	56	30			
	Gravity/IL/CIL tails leach, 24 hours, 74 microns	Serra	98	66	0.5	1.3	

Laboratory	Test	Deposit Composite	Au Rec (%)	Ag Rec (%)	NaCN (kg/t)	Lime (kg/t)	Comments
	Gravity/IL/CIL tails leach, 24 hours, 74 microns	Meio	97	53	0.5	1.3	
	Bond Ball Mill Work Index (Bwi in kwh/t)	Serra	20.3				one test
	Bond Ball Mill Work Index (Bwi in kwh/t)	Meio	25.2				one test
Plenge - 2017	CIL, 24 hours, 74 microns	Serra-Meio	98	57	1.0	1.1	10 tests
	CIL, 24 hours, 105 microns	Serra-Meio	97	56	1.0	1.1	8 tests
	Gravity/CIL tails leach, 24 hours, 74 microns	Serra-Meio	98	55	1.5	1.4	1 test to supply detox
	Gravity Concentration	Serra-Meio	64	29			3 tests @ 3 sizes
	Gravity/IL/CIL tails leach, 24 hours, 74 microns	Serra-Meio	98	61	1.1	1.3	4 tests Ave.
	Gravity/IL/CIL tails leach, 24 hours, 74 microns	Serra	99	62	1.4	1.7	4 Variability Ave.
	Gravity/IL/CIL tails leach, 24 hours, 74 microns	Meio	97	78	1.7	1.9	4 Variability Ave.
	CIL,24 hours, 74 microns	Serra	98	43	1.3	1.5	4 Variability Ave.
	CIL,24 hours, 74 microns	Meio	95	74	1.7	2.2	4 Variability Ave.
	CIL,24 hours, 74 microns	Serra	99	62			1 Variability
	CIL,24 hours, 150 microns	Serra	98	59			1 Variability
	CIL,24 hours, 74 microns	Meio	97	79			1 Variability
	CIL,24 hours, 150 microns	Meio	92	72			1 Variability
	Bond Ball Mill Work Index (Bwi in kwh/t)	Serra	18.2				2 comps w/26 samples
	Bond Ball Mill Work Index (Bwi in kwh/t)	Meio	19.0				2 comps w/26 samples

13.4 Projected Metallurgical Performance

Results from the Plenge test program have been used to project the metallurgical performance of the Coringa Gold Project. Results from the RDi and TDP programs effectively support results from the Plenge program and altogether are useful to support the stated overall representativeness of the samples to the various deposits.

The projected metallurgical responses are presented in Table 13-17. The gold and silver recoveries shown are the average results from Plenge's eight ½ HQ core variability composites subjected to gravity/IL/CIL tails leach processing. A suitable discount has been applied. The recoveries are each discounted 3% for gold and 5% for silver to reflect typical losses experienced in these types of process plants, such as less efficient gravity concentration, solution losses, carbon losses, lower silver carbon-loading than anticipated, and grind variations. The recoveries compare well with the results from whole-ore CIL leaching as well as similar tests run in 2013 by TDP. Galena zone recoveries are estimated to be similar to

Serra recoveries based on results from TDP's testing of Composite 1, a mixture of Galena, Mãe de Leite, and Serra zone materials.

Cyanide and lime consumptions shown in Table 13-17 are also averages from the eight ½ HQ core variability tests. BWi values shown are also from Plenge's testing as this was the most extensive comminution work performed.

Table 13-17: Projected Metallurgical Response for Coringa Deposits

Deposit	BWi (kWh/t)	Au Rec (%)	Ag Rec (%)	NaCN (kg/t)	Lime (kg/t)
Serra & Galena	18.2	96	57	1.3	1.6
Meio	19.0	94	74	1.7	2.0

14.0 Mineral Resource Estimate

This mineral resource estimate was completed by Kevin Gunesch, PE, and Hamid Samari, QP-MMSA of Global Resource Engineering (GRE). This is the second mineral resource estimate completed by Serabi for the project. This revised resource estimate was performed in order to take into account the drill core re-sampling performed in 2019 at the recommendation of GRE. The geologic model, statistical analysis, and block model resource estimate were completed in Leapfrog Geo™ and Leapfrog EDGE™ software (Leapfrog), version 4.5.1.

14.1 Drill hole Database

GRE received the original drill hole database in MS Access format from Serabi, with tables containing drill collar, assay, survey, recovery, alteration, lithology, and rock density information. The database contains 381 diamond drill core holes consisting of 59,786 meters drilled and 15,586 assays pertaining to the resource areas of Valdette, Galena, Mae de Leite, Serra, Como Quieto, Demetrio, and Domingo. All data was imported to Leapfrog and checked for missing intervals, duplicate records, interval overlaps, and non-numeric or less than zero values. No errors were encountered in the database. Missing assay values were set to the detection limit of 0.005 gpt Au based on the assumption that the geologist logging did not identify any lithology, alteration, or mineralization that warranted assay of the core and therefore the core is assumed to be barren.

GRE received the re-sampled database from Serabi in Excel format with tables including collar, interval, sample type, assay, sample id, internal assay certification, and external assay certificates. The database contained 41 drill holes, 6 blanks, 4 standards, and 92 resampled assays. Additionally GRE received an excel database containing the old sampling, internal re-sampling, external re-sampling and photographs of the specified intervals of the relevant core. Data was then imported into Leapfrog and merge tables were used to update the old data base with the re-sampled assays. If an old assay interval was split in length by re-sampled interval, the portions outside of the new interval were assigned new assay values based upon adjacent assay values to avoid overestimating the gold content of the sample.

14.2 Geologic Model

The geology of the mineralized areas consists of narrow quartz veins oriented on a general northwest to southeast trend. These veins represent the extensional system created by the shear zone, where hydrothermal fluids were able to infiltrate into the rhyolite and granite rock mass. The mineralized veins contain high grade gold mineralization within the vein, with lower grade mineralization in the altered wall rock surrounding the vein. GRE created geologic models consistent with the geologic interpretation, modeling the high-grade vein area separate from the altered footwall and hanging wall. The models were constructed using a combination of assay and geological information, primarily lithology and alteration. Digital topography was provided by Serabi.

14.2.1 Exploratory Data Analysis

GRE completed an exploratory data analysis to determine the correlation of lithology and alteration types to mineralized intercepts. Quartz veins and breccias were combined into a single category for the analysis.

Figure 14-1 shows a box plot indicating elevated gold values in the quartz veins and breccias as well as fault locations. Figure 14-2 contains a similar box plot for alteration type indicating the gold mineralization is primarily associated with sericitic and siliceous alteration. Chloritic and hematitic alteration also shows elevated gold values but to a lesser extent.

Figure 14-1: Box Plot, Au Assays by Lithology Group

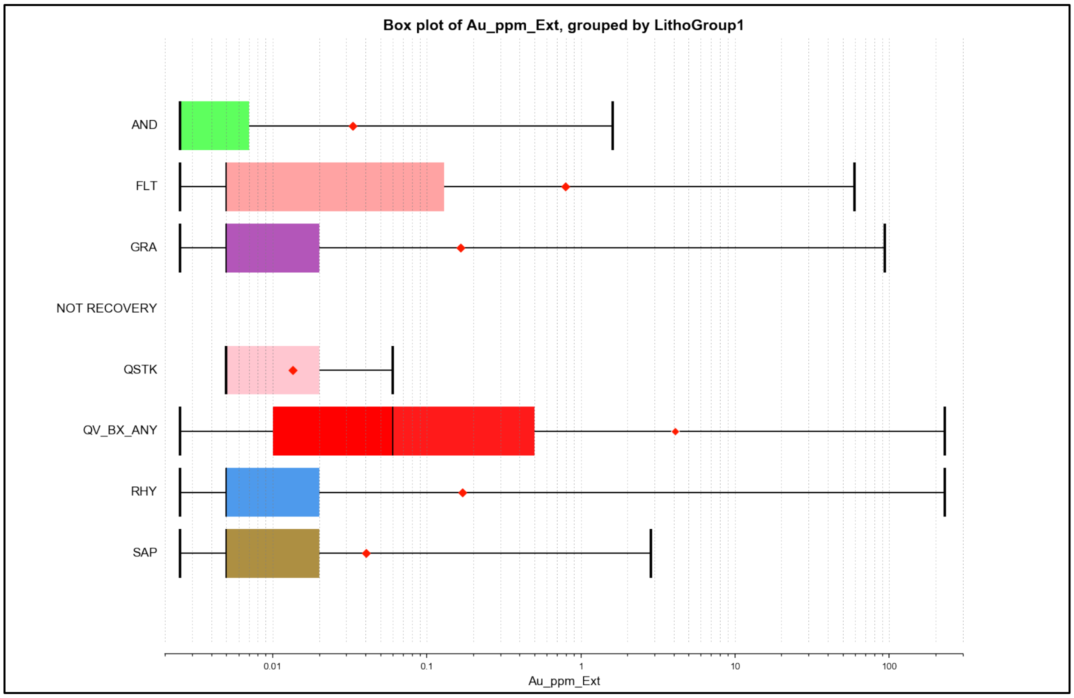
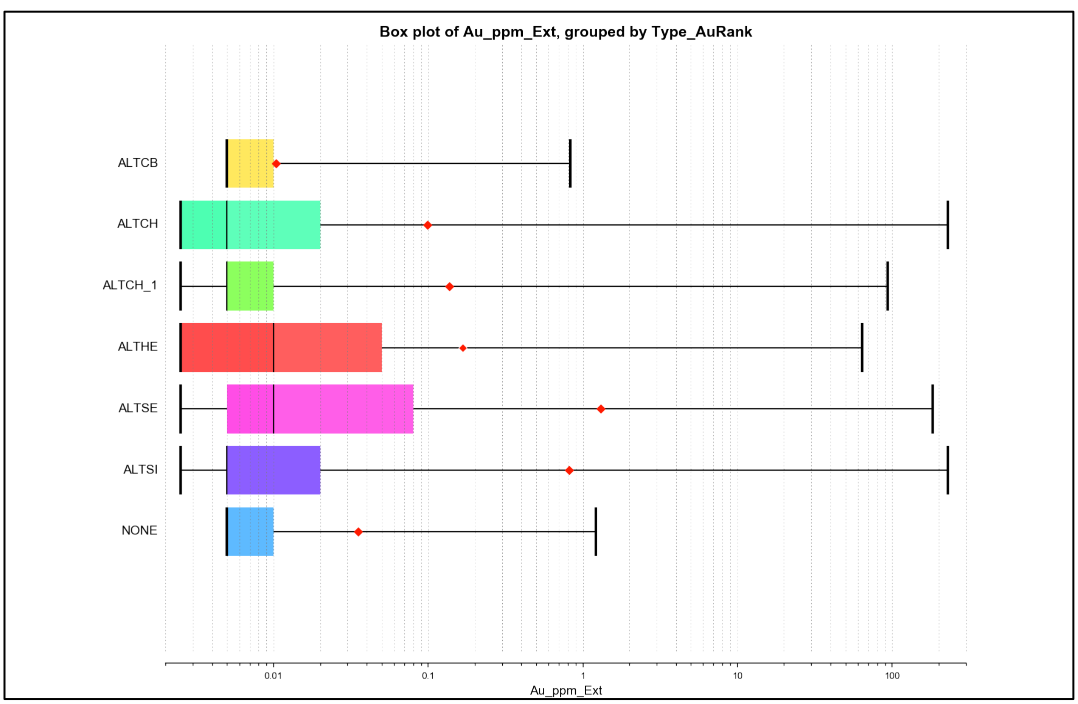


Figure 14-2: Box Plot, Au Assays by Alteration Type



14.2.2 Domain Analysis

Domains were created for each contiguous vein system along strike which are listed below and shown in Figure 14-3:

- GAMDL – Galena & Mae de Leite
- MCQ – Meio & Como Queito
- Serra – Serra
- Demetrio – Demetrio

Vein systems were modeled within each domain defining the primary vein, hanging wall, and footwall. Some models have multiple veins, such as Serra (veins 1-3). The primary vein dimensions were determined by the drillhole interval selection, which took into account correlating information for gold assays, lithology, and alteration. The hanging wall and footwall portion of the vein were modeled as a 1-meter true thicknesses adjacent to the center line of the vein for a total thickness of 2 meters. Figure 14-4 provides an example of the modeled vein, hanging wall, and footwall for vein 1 in MCQ showing correlation between alteration, lithology, and assay values. Figure 14-5 and Figure 14-6 illustrate the solid model and cross section of the Serra vein domain, where the main vein, footwall, and hanging wall are modeled as separate domains.

Figure 14-3: Modeled Domain Areas

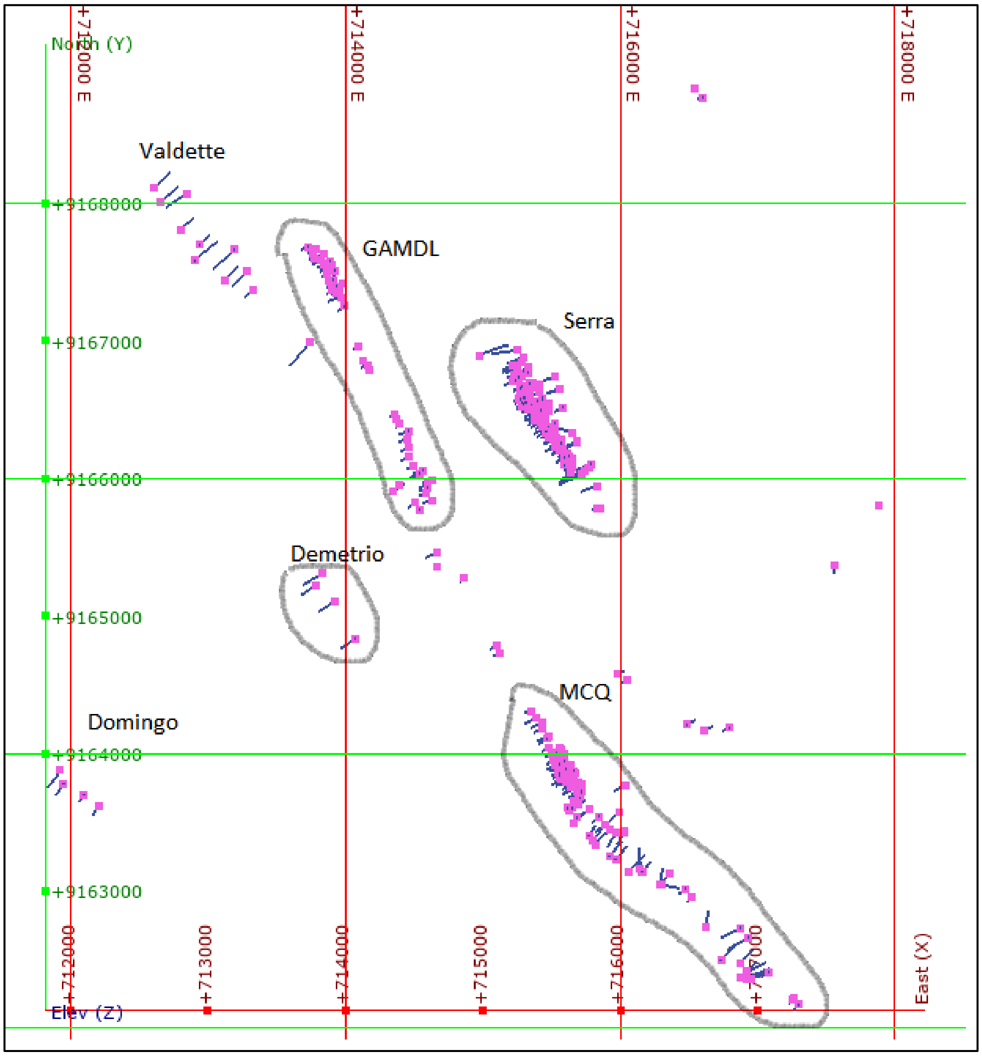


Figure 14-4: Example Modeled Vein Section, MCQ1, Drill Hole 04

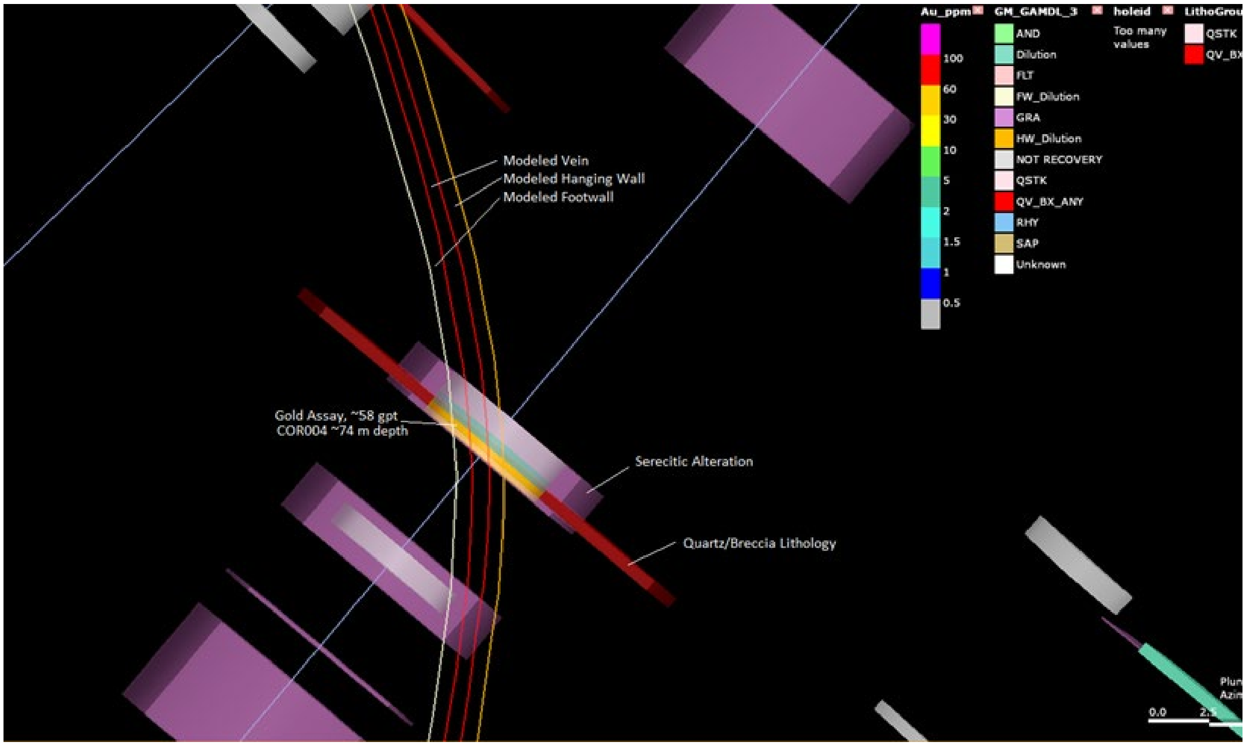


Figure 14-5: Oblique View, Serra Vein System, Main Veins Only

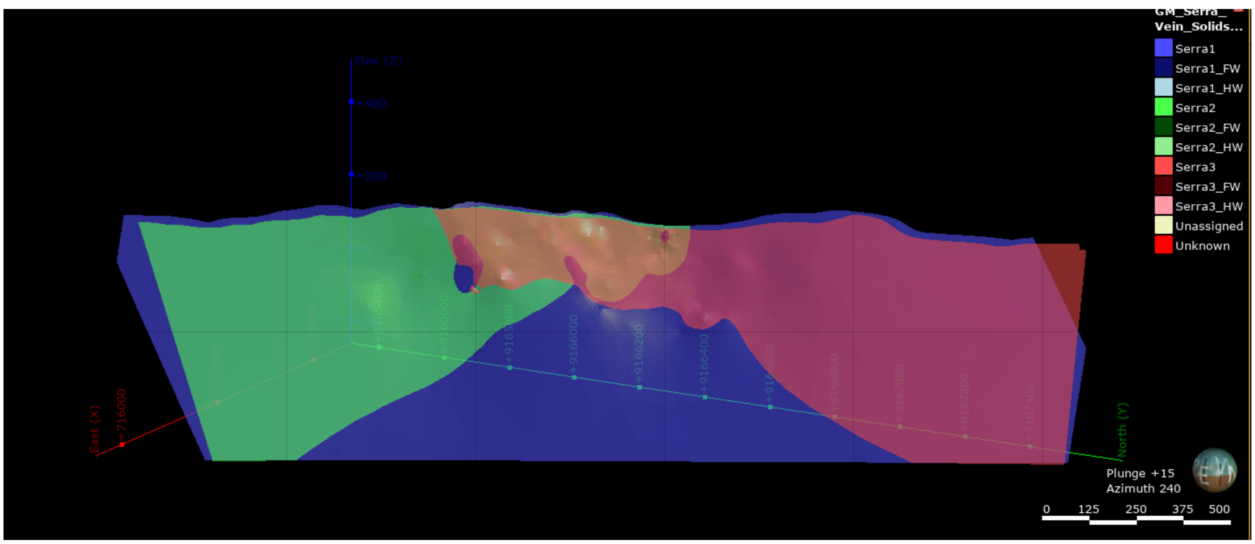
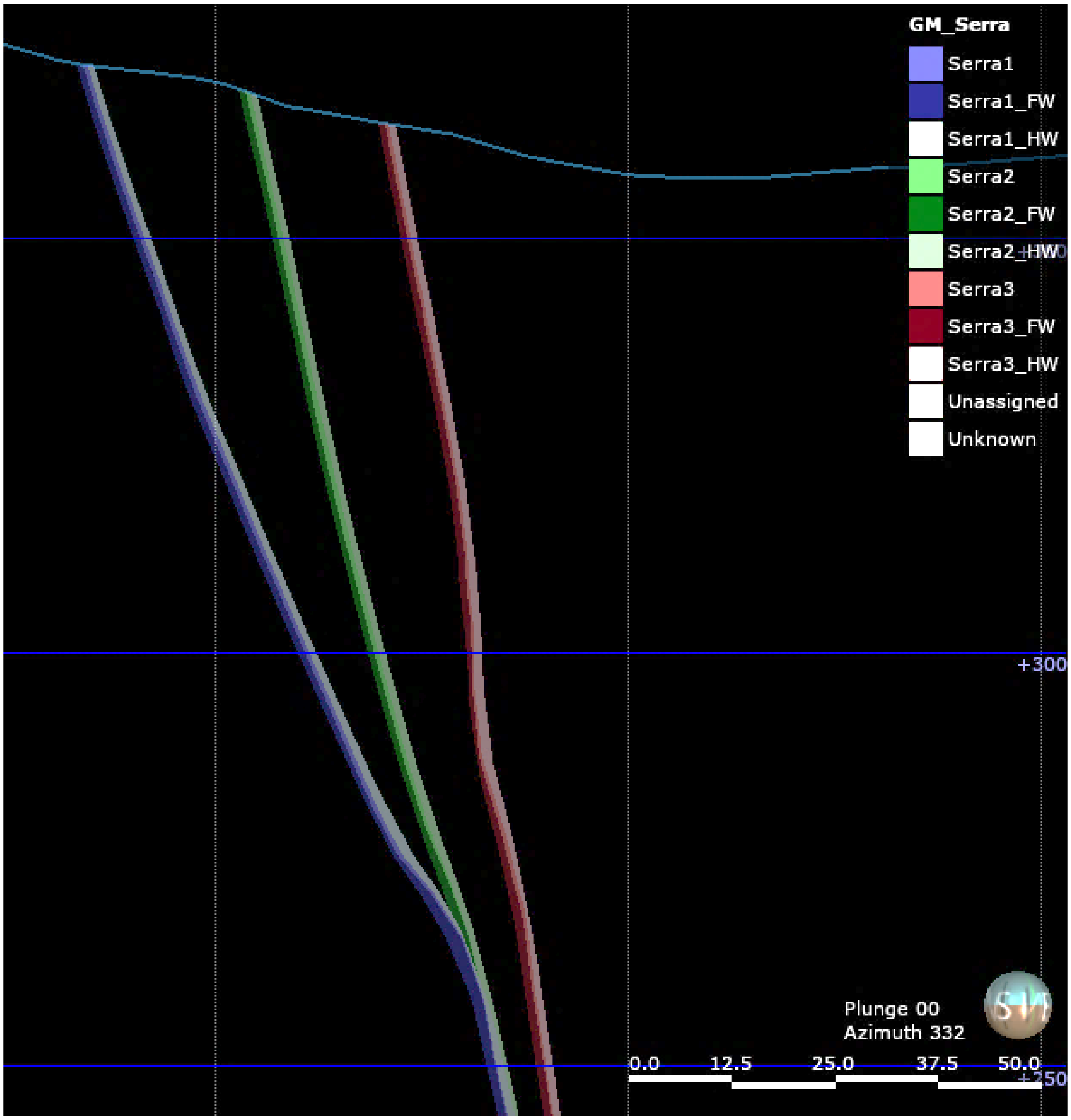


Figure 14-6: Section, Serra Vein System, Vein and Dilution Model



Box plots show grade distribution with typically elevated gold in the quartz and breccia vein in each of the vein systems in Figure 14-7 through Figure 14-10.

Figure 14-7 Box Plot, Au Assays by GAMDL Domain

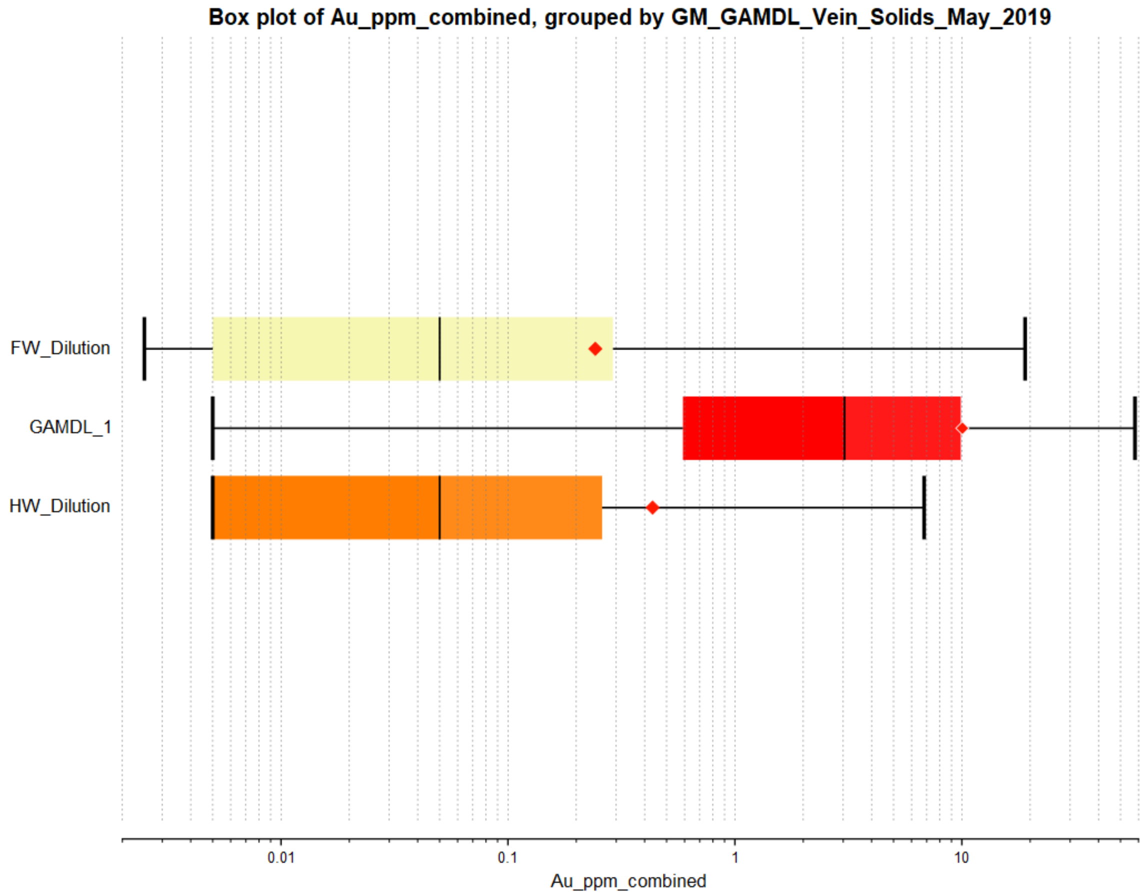


Figure 14-8 Box Plot, Au Assays by MCQ Domain

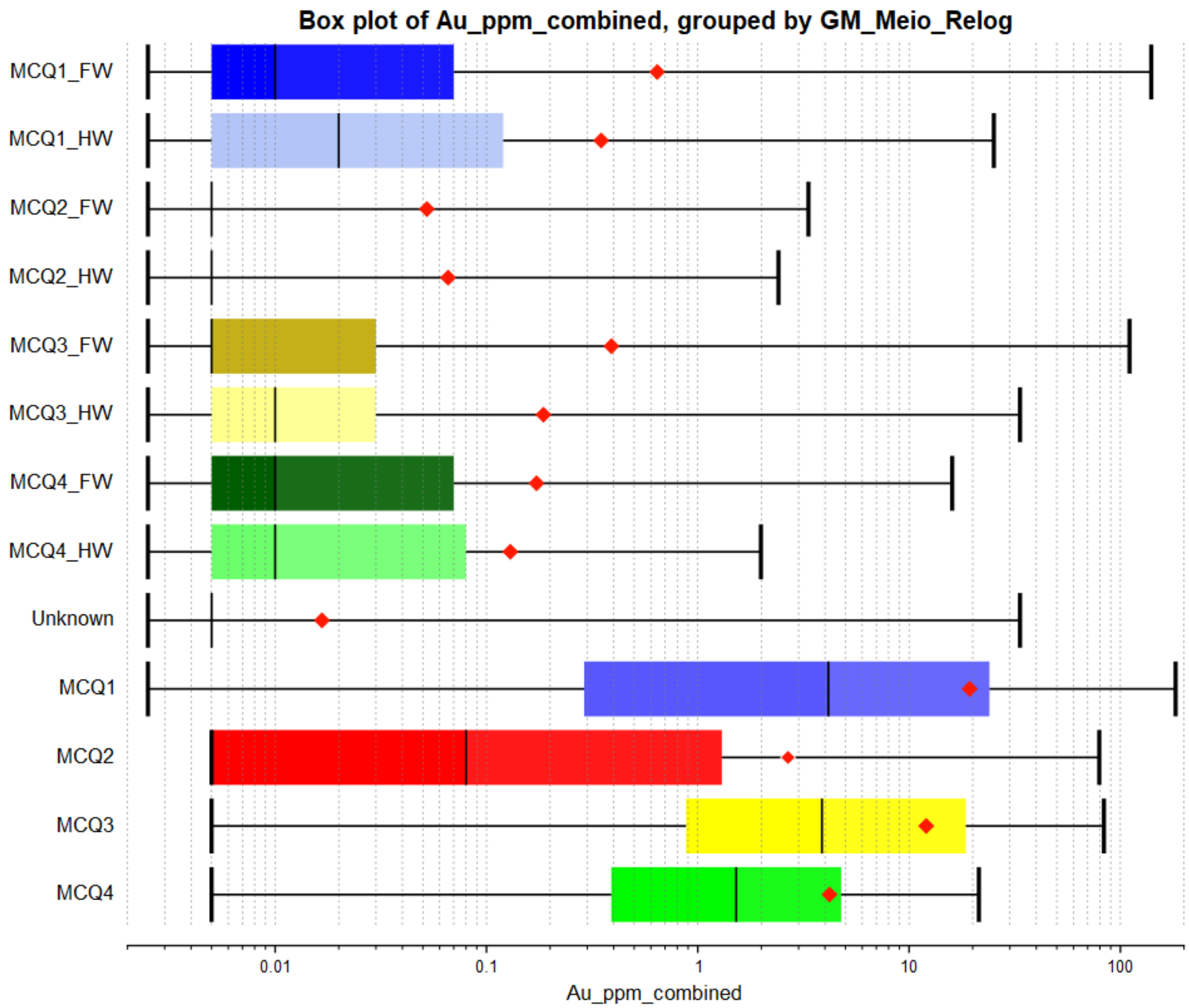


Figure 14-9 Box Plot, Au Assays by Serra Domain

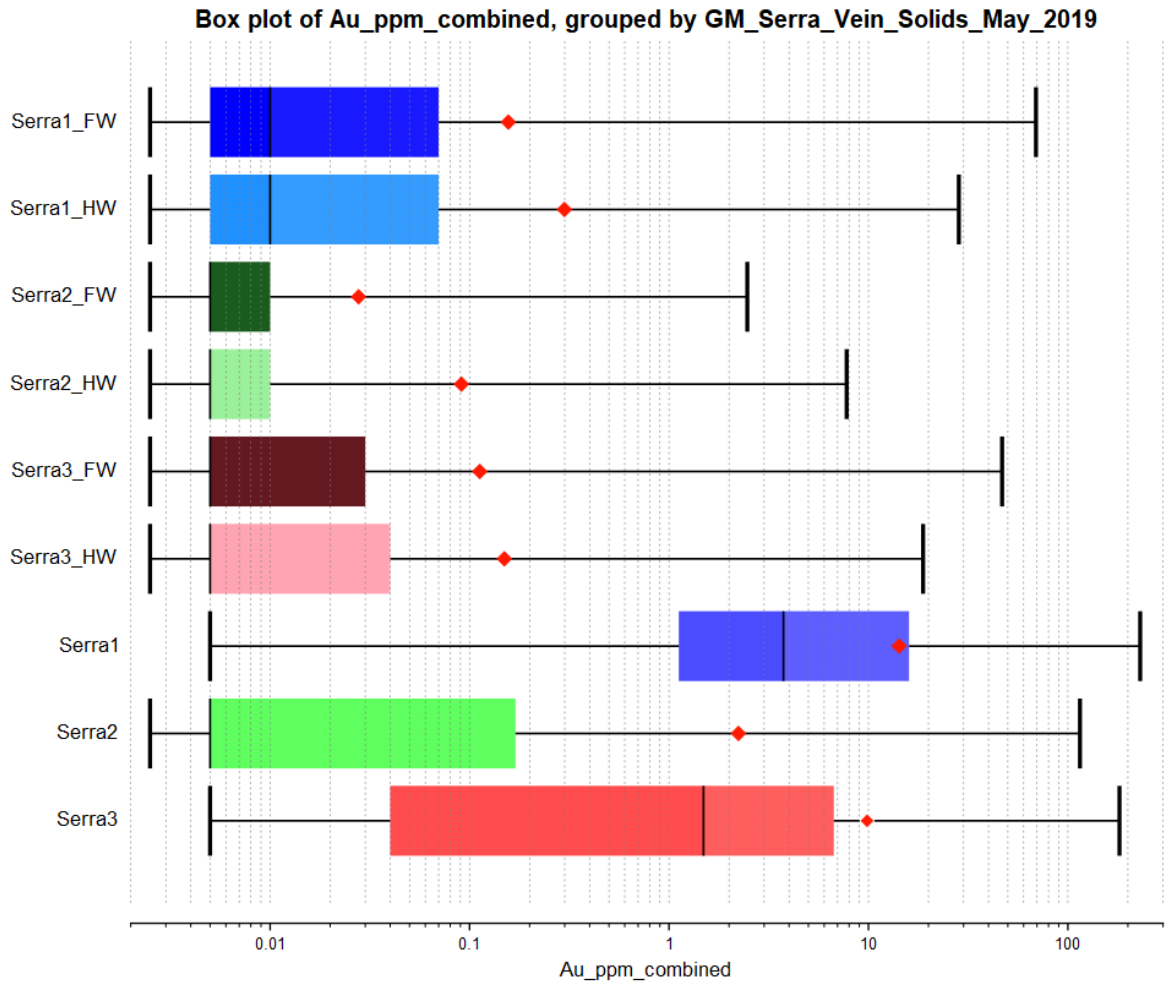
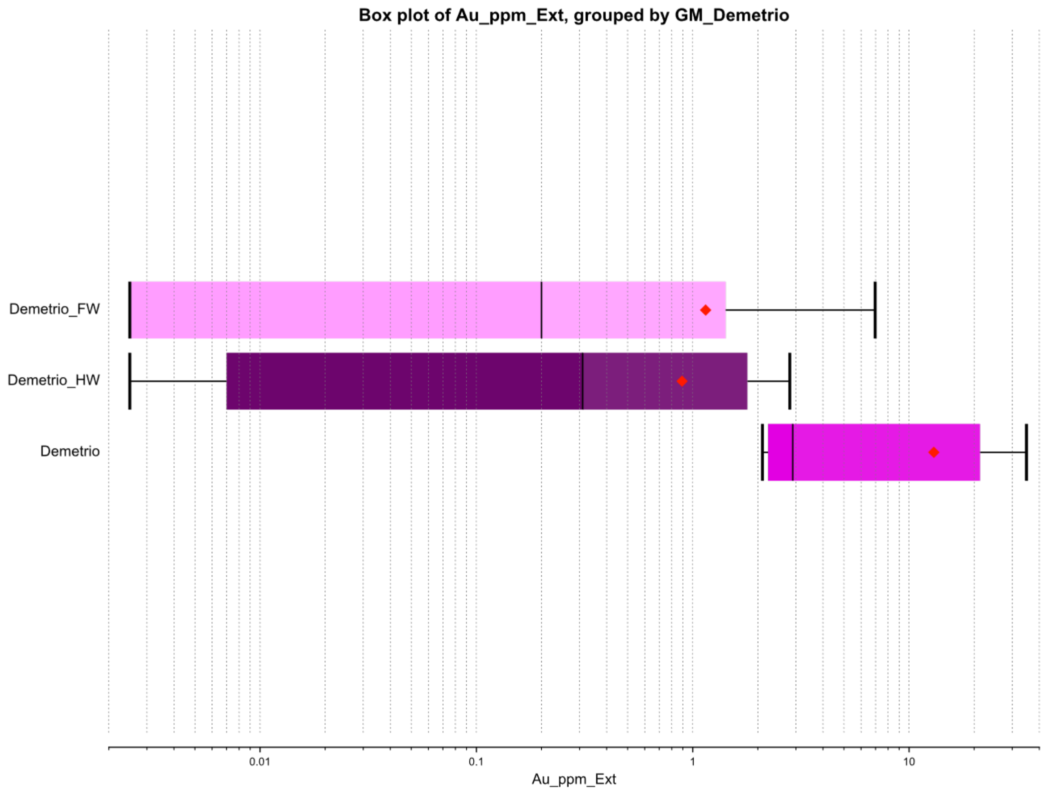
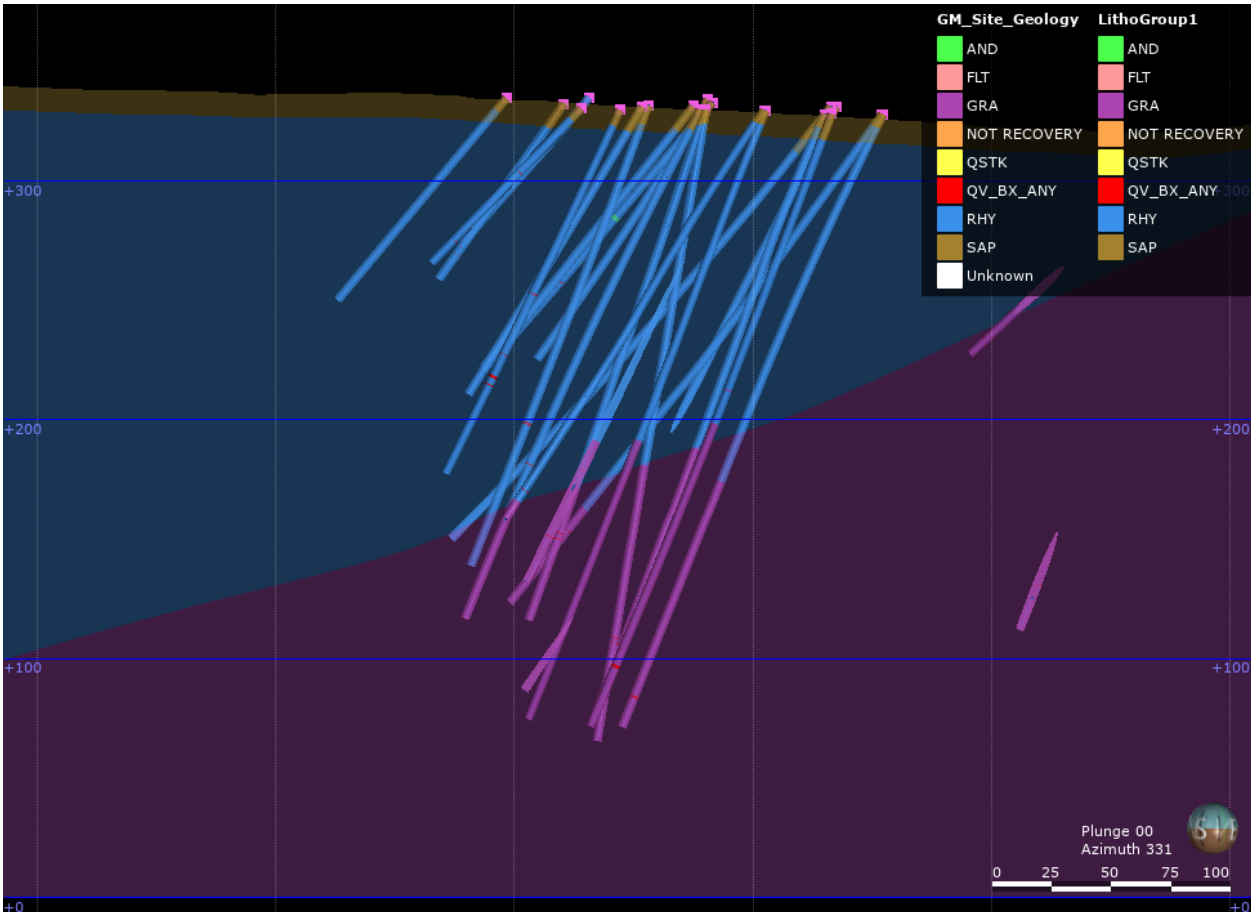


Figure 14-10 Box Plot, Au Assays by Demetrio Domain



GRE created a site-wide geology model from the lithology information showing a surficial layer of saprolite with a variable thickness, typically 10-20 meters, that overlies rhyolite with granite at depth. The contact between the rhyolite and granite is apparent in the Serra drill holes, with granite outcropping at surface on the east side of property. Figure 14-11 shows a typical cross section of the site-wide geology through the Serra domain area. The site geology model was combined with the geologic model for each domain to determine the portion of each vein within the saprolite horizon.

Figure 14-11: Site Geology Cross Section



After modeling each vein system, a boundary analysis was performed to validate that the selected assay intervals accurately represented the high-grade gold mineralization within the vein. Figure 14-12 through Figure 14-14 show the contact plots for the primary vein domains of GAMDL, MCQ1, and Serra1. All domains were estimated with hard boundaries.

Figure 14-12: Contact Plot, GAMDL

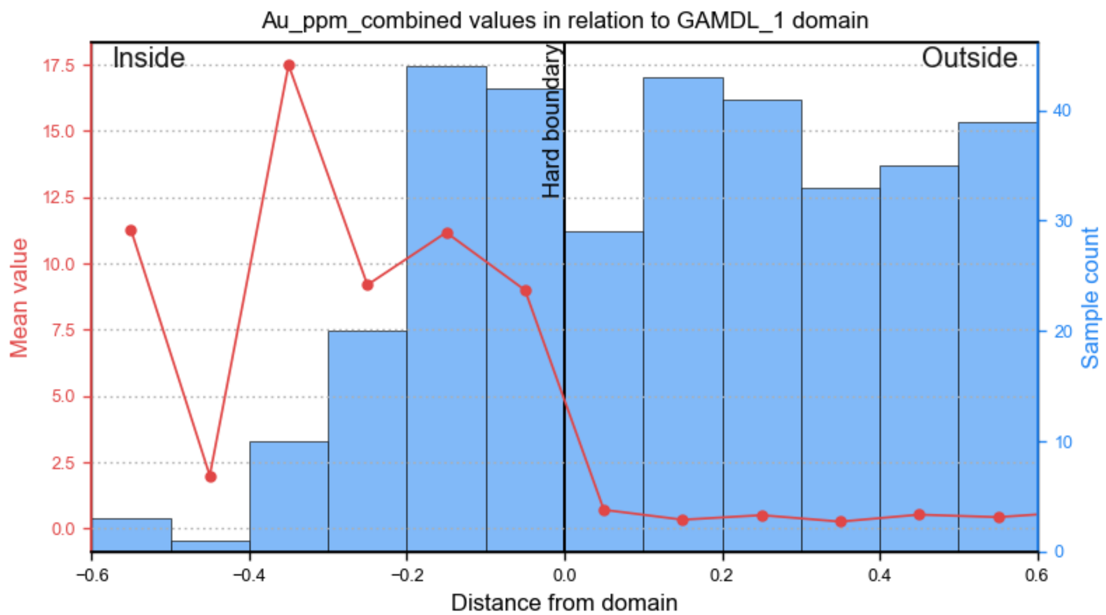


Figure 14-13: Contact Plot, MCQ1

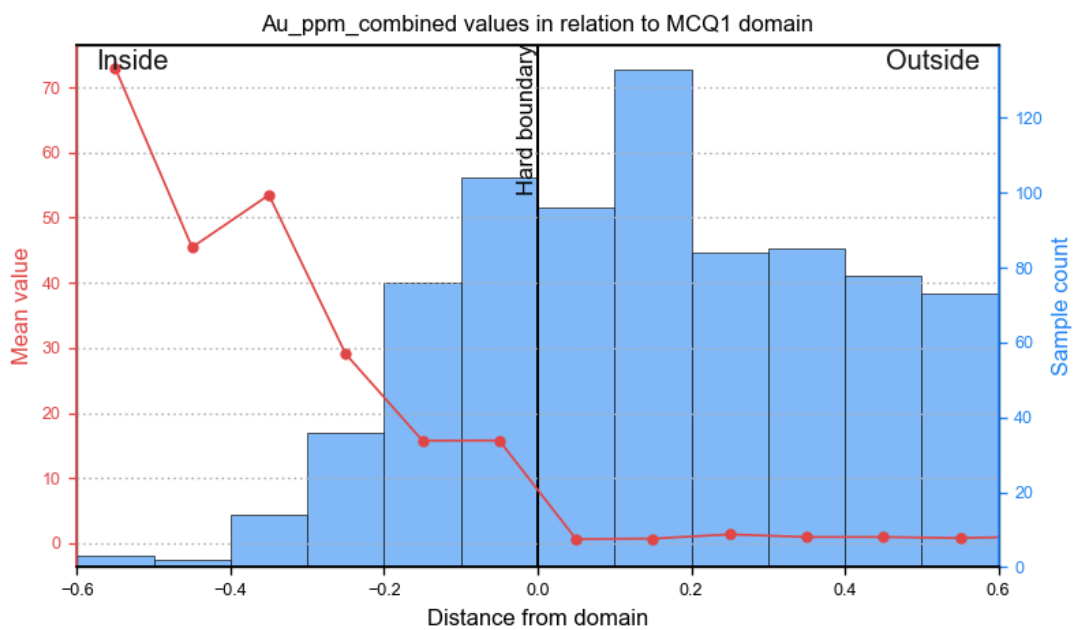
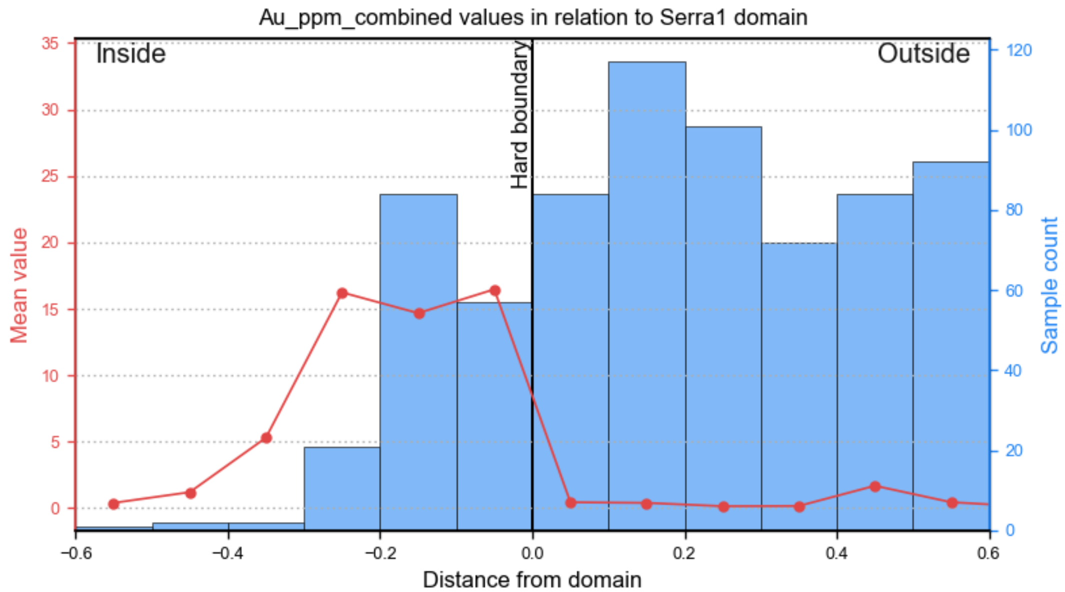


Figure 14-14: Contact Plot, Serra1



14.3 Assay Compositing and Outliers

Samples within each domain were composited across the entire vein intercept to appropriately represent the mineralization across the vein. Each sample was length weighted to mitigate bias due to different length assay intervals. Composite lengths within each domain have a nominal length of approximately 0.5 meters and a 90th percentile around 1.0 meters, see Figure 14-15. Due to the compositing methodology, there is no potential risk of artificially increasing the number of high grade samples by dividing high grade samples in the compositing process. Nonetheless, GRE examined the relationship between length and gold grade for all samples contained in the database to determine high grade bias at composite intervals above 1.0 meter. The analysis shows that sample lengths above 1.0 meter have a maximum gold grade around 2.0 gpt Au, see Figure 14-16. An example of sample and composite statistics is shown in Table 14-1.

Figure 14-15: Example Composite Length Analysis, Serra 1

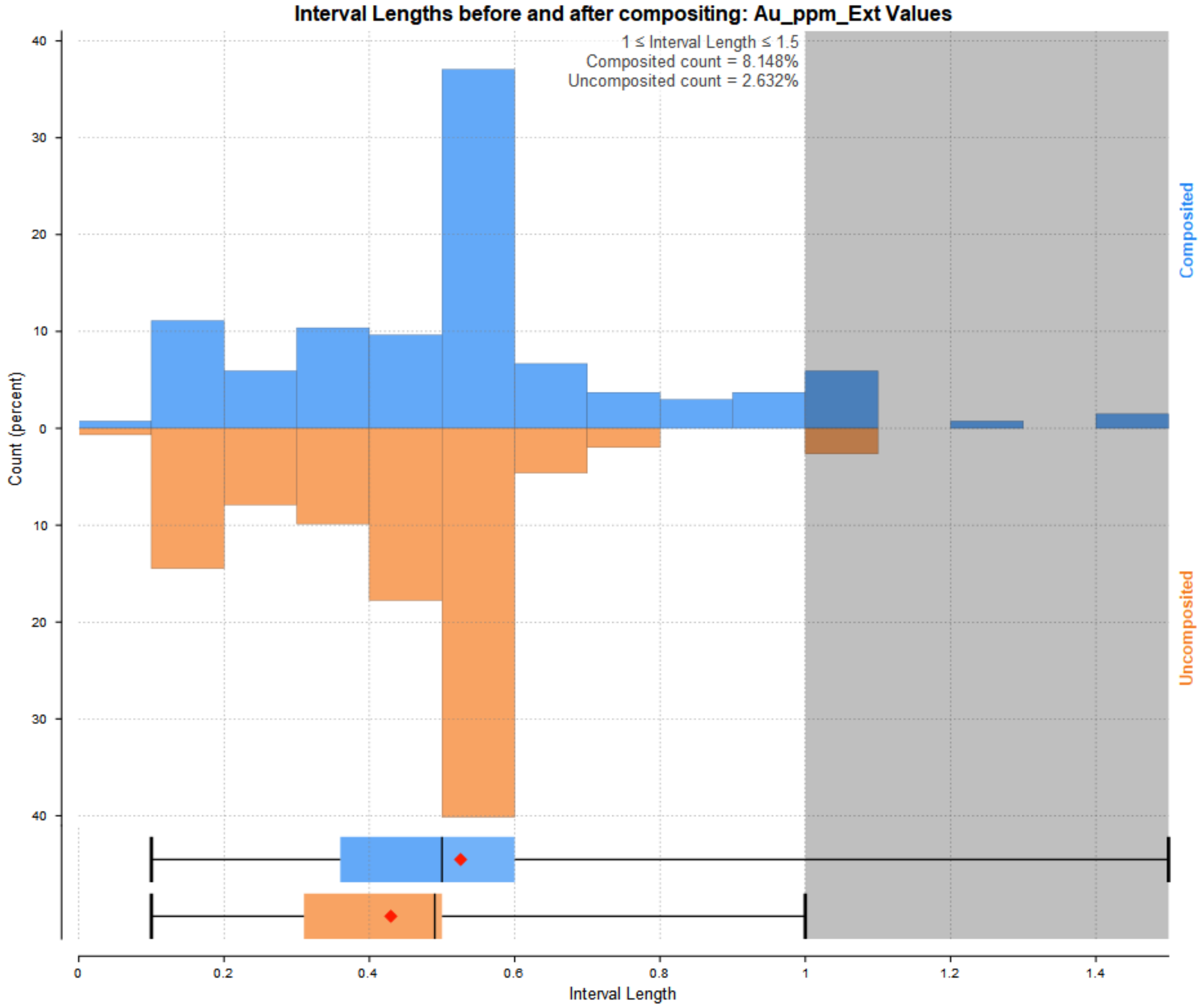


Figure 14-16: Sample Length vs. Gold Grade, All Samples

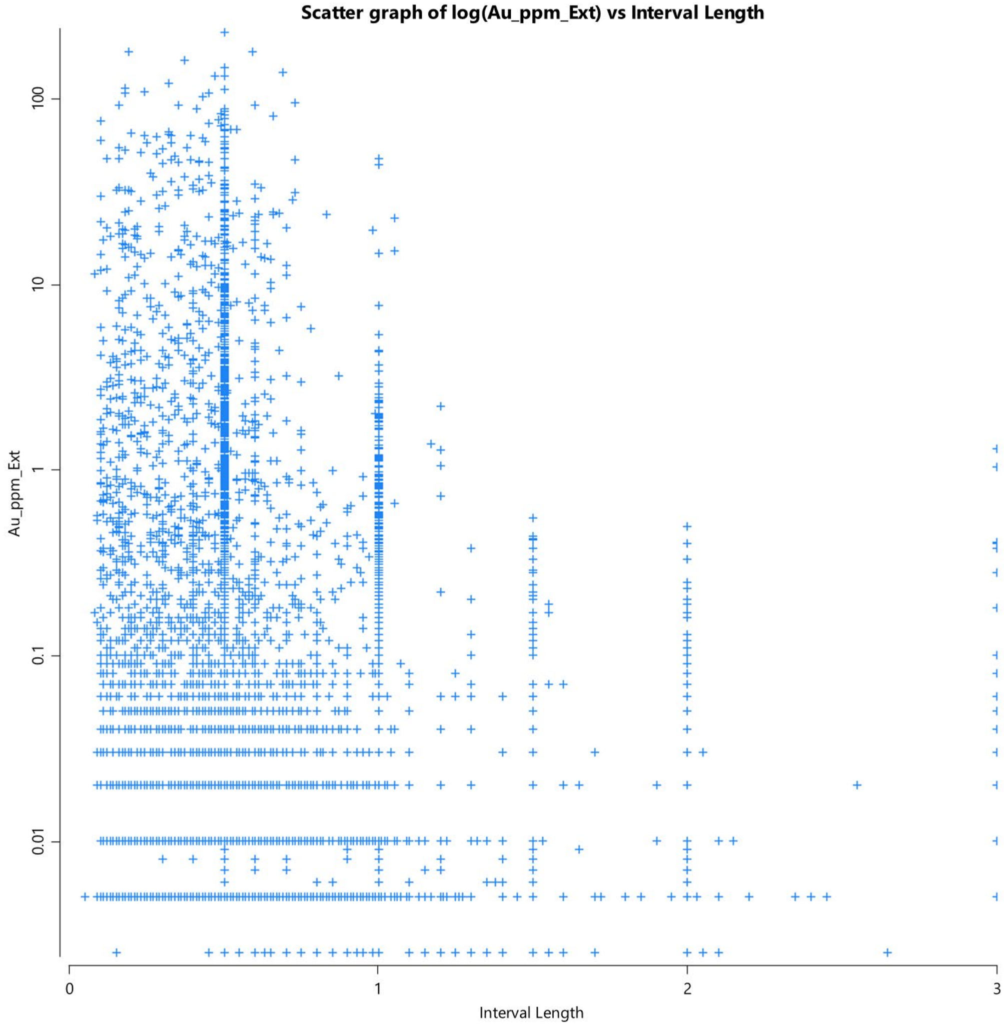


Table 14-1: Example Composite Statistics, Serra 1

Serra 1	Au gpt		Interval Length	
	Composited	Uncomposited	Composited	Uncomposited
Count	135	170	135	170
Length	66.73	65.07	66.73	65.07
Mean	14.26	14.63	0.49	0.38
SD	27.53	28.33	0.28	0.20
CV	1.93	1.94	0.56	0.51
Variance	757.75	802.39	0.08	0.04
Minimum	0.00	0.01	0.10	0.00
Q1	1.31	1.31	0.32	0.21
Q2	3.40	4.42	0.50	0.43
Q3	16.35	16.35	0.57	0.50
Maximum	230.50	230.50	1.50	1.00

GRE completed an outlier analysis on each individual vein domain using the composited sample data. Outliers were determined by examining the log probability plot for each domain to visually determine the grade threshold for different populations, especially at high grade values. Samples above the defined threshold were either clamped (restricting the sample value beyond a defined distance) or clipped (discarding the sample value beyond a defined distance). An example of the analysis performed for Serra 1, showing a threshold value of 100 gpt Au, is shown below in Figure 14-17. Parameters for all veins with outlier restrictions are shown in Table 14-2.

Figure 14-17: Example Outlier Threshold Determination, Serra 1

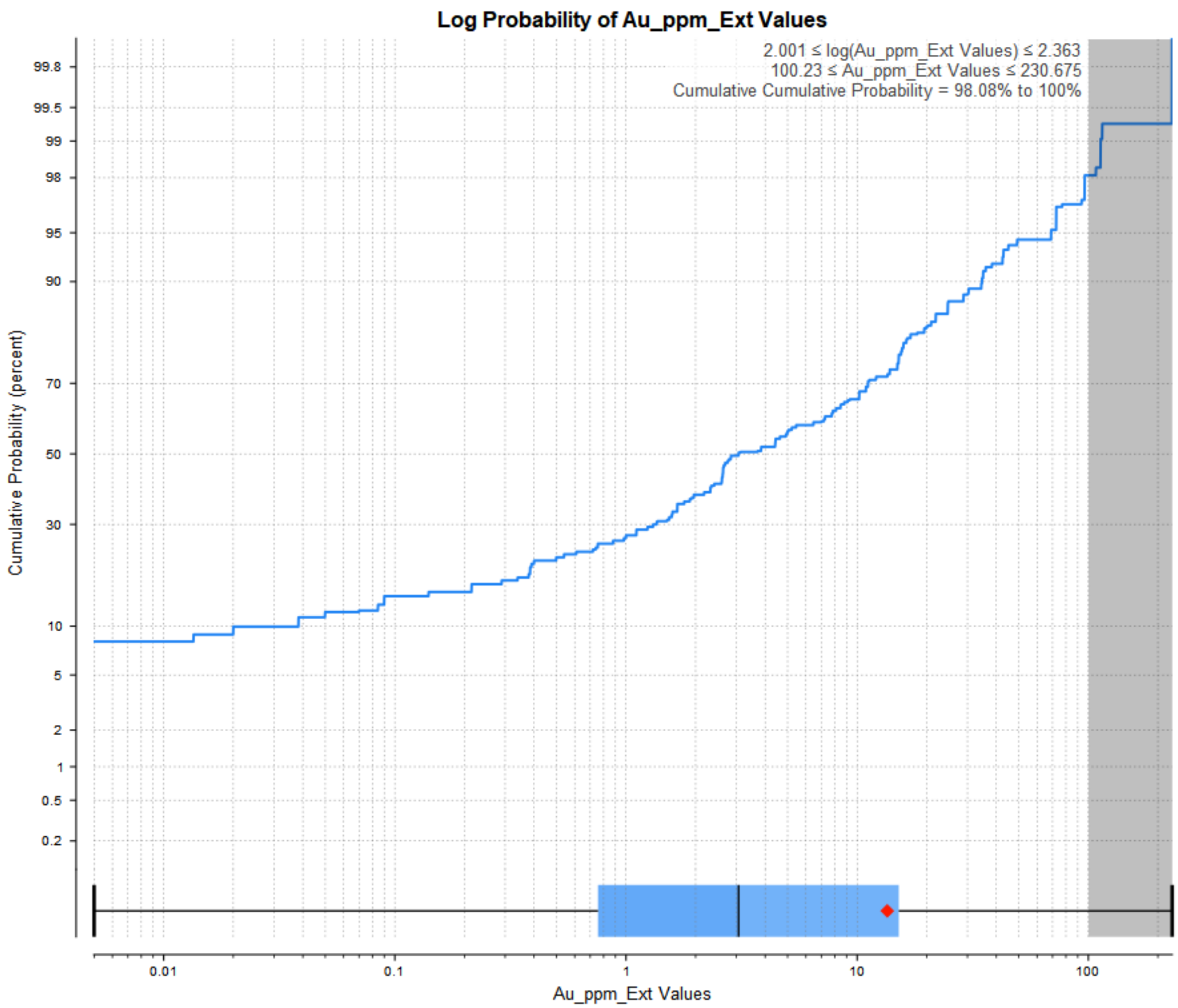


Table 14-2: Outlier Parameters by Domain

Domain	Outlier Restriction	Outlier Distance (% of search distance)	Outlier Threshold (Au gpt)
GAMDL	Discard	50%	25
SERRA 1	Clamp	10%	100
SERRA 2	Clamp	10%	30
SERRA 3	Clamp	10%	90
MCQ 1-4	None	NA	NA

NOTE: MCQ cumulative log probability charts of Au ppm values showed no need for outlier restrictions.

14.4 Density

A total of 828 density samples were included in the database. These samples were discretized by the lithology and alteration downhole information to create a merged dataset. GRE then compiled the length-weighted density statistics by lithology group and alteration, which are the primary geologic indicators of gold mineralization. Tables for each grouping are shown below. As previously mentioned, quartz/breccia lithology and sericitic and siliceous alteration are closely correlated with the mineralization. Average density within these types range from 2.73 to 2.79. GRE selected a constant density of 2.7 for mineralized areas of hard rock.

Table 14-3: Density by Lithology Group

Lithology	Count	Length	Mean	Std Deviation	Minimum	Median	Maximum
ALL	1,167	325.05	2.71	0.16	2.10	2.68	3.85
AND	6	1.30	2.78	0.09	2.68	2.82	2.96
FLT	39	13.14	2.78	0.20	2.62	2.73	3.80
GRA	239	45.13	2.64	0.15	2.10	2.61	3.30
QV_BX_ANY	257	60.77	2.79	0.24	2.23	2.71	3.85
RHY	618	203.91	2.70	0.11	2.46	2.68	3.75

Table 14-4: Density by Alteration Type

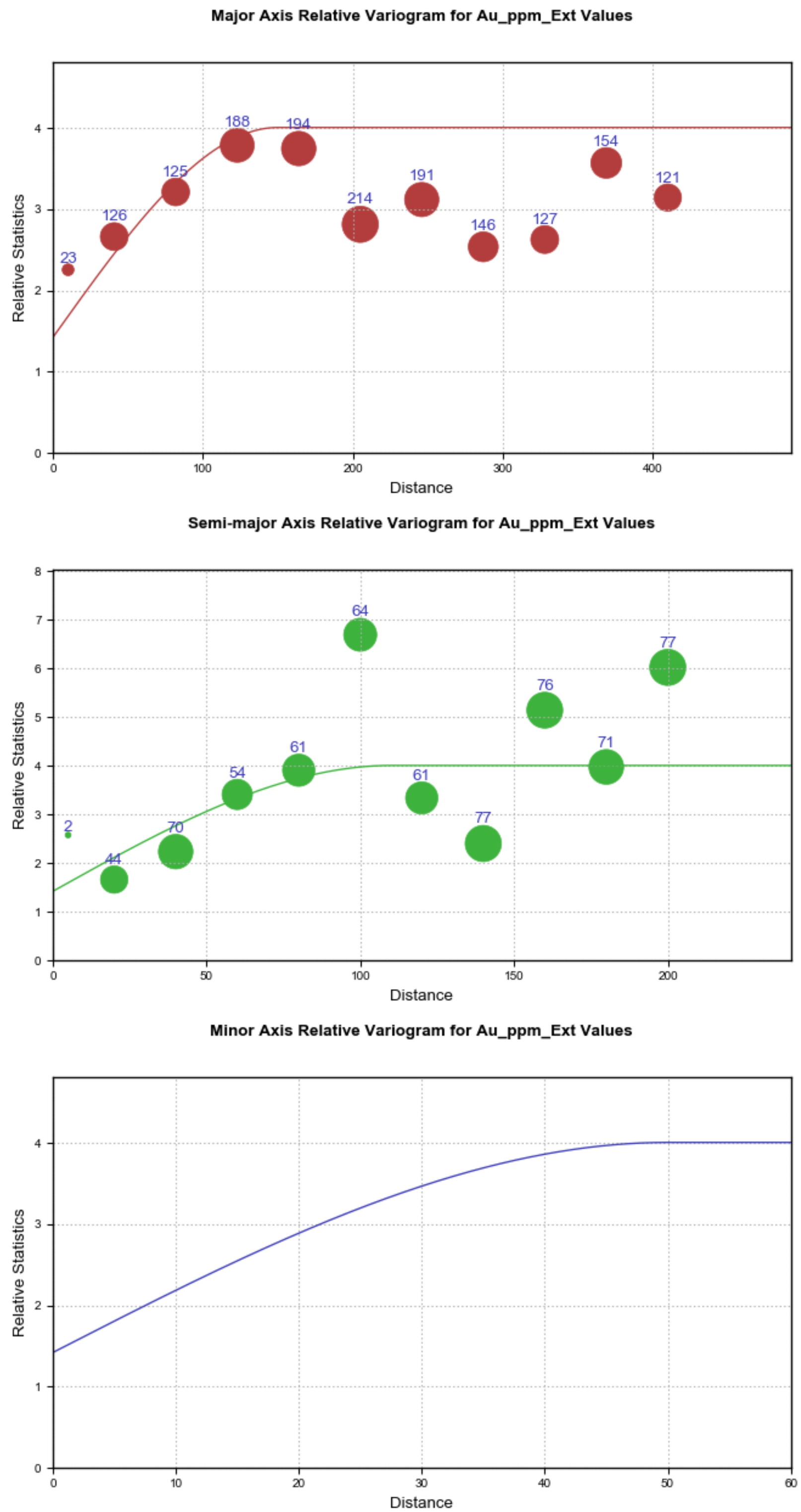
Alt Type	Count	Length	Mean	Std Deviation	Minimum	Median	Maximum
ALL	1,167	325.05	2.71	0.16	2.10	2.68	3.85
ALTCB	4	0.77	2.66	0.07	2.55	2.70	2.70
ALTCH	414	138.08	2.68	0.09	2.48	2.67	3.46
ALTCH_1	80	12.60	2.61	0.08	2.23	2.60	2.86
ALTHE	41	9.27	2.64	0.08	2.26	2.66	2.84
ALTSE	326	86.24	2.75	0.17	2.50	2.72	3.80
ALTSI	186	46.72	2.73	0.19	2.10	2.68	3.73

GRE also received density data on the property saprolite from test pits completed in 2016. A total of 13 density samples were taken with a range of 1.18 to 1.7 and an average of 1.4. GRE selected 1.4 as the density for mineralized areas within the saprolite horizon.

14.5 Variogram Analysis

GRE completed a variogram analysis on the Serra 1 vein domain. This vein was selected for analysis due to the abundance of sample data within the domain. Other veins have a limited number of intercepts which lead to poor variograms. GRE used the analysis for Serra 1 to determine search distance parameters for the estimate since all mineralization is similar in type, strike orientation, and is likely related to the same mineralization event. GRE selected the relative variogram for the analysis, which provides the best correlation of pairs within the domain. The variogram search ellipse was oriented along the strike of the vein, with the semi major axis oriented along the dip of the vein. The analysis shows a range of grade correlation of 150 meters along the major axis and 100 meters along the semi-major axis. No pairs were calculated along the minor axis due to the inherent properties of a narrow vein deposit and the compositing methodology selected. Figure 14-18 presents the variograms for all principle directions.

Figure 14-18: Variogram Analysis, Serra 1



14.6 Block Model Parameters

Block models for each resource area were oriented along the strike of the vein system and rotated so that the z-axis was coincident with the general true thickness orientation of the veins. Models were sub-blocked along the z-axis to provide dimensions with sufficient detail to model the vein, footwall, and hanging wall as separate domains. Coordinates, dimensions, and orientations for each block model are presented in Table 14-5.

Table 14-5: Block Model Parameters, GAMDL

Parameter	Domain			
	GAMDL	MCQ	Serra	Demetrio
Base point	713586.013, 9168041.522, 391.505	714975, 9164855, 426	714753.684, 9167618.174, 429.778	714133.325, 9164614.331, 379.203
Parent block size	5 × 5 × 5	5 × 5 × 5	5 × 5 × 5	5 × 5 × 5
Dip	73°	88°	73.1°	81.29°
Azimuth	65°	48°	59.07°	235.25°
Boundary size	2800 × 490 × 130	3890 × 625 × 335	2635 × 705 × 160	945 × 435 × 65
Sub-blocking	1 × 1 × variable (minimum height 0.1)	1 × 1 × variable (minimum height 0.1)	1 × 1 × variable (minimum height 0.1)	1 × 1 × variable (minimum height 0.01)

14.7 Estimation Methodology

GRE selected the inverse distance to the third power (ID3) method to estimate grade for all block models. Estimation parameters were based on the variogram and outlier analyses previously described. Table 14-6 lists the estimation parameters for all domains.

Table 14-6: ID3 Estimation Parameters, All Domains

Domain	Maximum	Intermediate	Minimum	Dip	Dip-Azimuth	Pitch	Minimum Samples	Maximum Samples	Outlier Restriction	Outlier Distance	Outlier Threshold
GAMDL	150	110	50	75	65	145	1	8	Discard	50%	25
GAMDL HW	150	110	50	75	65	145	1	8			
GAMDL FW	150	110	50	75	65	145	1	8			
MCQ1	150	110	50	87	235	33	1	8			
MCQ1 HW	150	110	50	87	235	33	1	8			
MCQ1 FW	150	110	50	87	235	33	1	8			
MCQ2	150	110	50	87	235	33	1	8			
MCQ2 HW	150	110	50	87	235	33	1	8			
MCQ2 FW	150	110	50	87	235	33	1	8			
MCQ3	150	110	50	87	235	33	1	8			
MCQ3 HW	150	110	50	87	235	33	1	8			
MCQ3 FW	150	110	50	87	235	33	1	8			

Domain	Maximum	Intermediate	Minimum	Dip	Dip-Azimuth	Pitch	Minimum Samples	Maximum Samples	Outlier Restriction	Outlier Distance	Outlier Threshold
MCQ4	150	110	50	86	47	160	1	8			
MCQ4 HW	150	110	50	86	47	160	1	8			
MCQ4 FW	150	110	50	86	47	160	1	8			
Serra1	150	110	50	73	60	147	1	8	Clamp	10%	100
Serra1 HW	150	110	50	73	60	147	1	8			
Serra1 FW	150	110	50	73	60	147	1	8			
Serra2	150	110	50	73	60	147	1	8	Clamp	10%	30
Serra2 HW	150	110	50	73	60	147	1	8			
Serra2 FW	150	110	50	73	60	147	1	8			
Serra3	150	110	50	73	60	147	1	8	Clamp	10%	90
Serra3 HW	150	110	50	73	60	147	1	8			
Serra3 FW	150	110	50	73	60	147	1	4			
Demetrio	150	150	50	83	240	160	1	20			
Demetrio HW	150	150	50	83	240	160	1	20			
Demetrio FW	150	150	50	83	240	160	1	20			

14.8 Model Validation

GRE validated the block model for each area through various methods which included a visual comparison of the composites versus the estimated blocks; a statistical comparison between samples composites, nearest neighbor block estimate, and ID3 block estimate; and swath plots. A discussion of each model validation method is presented in the following subsections. Validation was focused on the main vein models with a cursory check of the dilution models for the hanging wall and footwall to ensure that an appropriate dilution grade was being used for the minimum mining thickness.

14.8.1 Visual Comparison

GRE compared the block models for the main veins with the intercepts to ensure good correlation between the sample composites and the block model estimate. Each section shows good correlation between the sample composites and the block model estimates. The search distances, orientation, and outlier restrictions were also visually verified in the long section. For example, the maximum search distance of 150 meters and the general orientation of the maximum ellipse axis at 30 degrees below the horizontal is evident in each long section. The outlier restriction for GAMDL that discards high grade samples is evident in the two high grade intercepts at depth on the north and south ends of the section. These samples have been restricted to 50% of the search distance (75 meters) to limit their influence to a general maximum limit of the surrounding samples and thus forcing the estimate to use at least two samples for the block model estimate. Figure 14-19 through Figure 14-21 present the visual comparison for the for main veins GAMDL, MCQ1, and Serra 1. Figure 14-22 provides an example of the dilution areas added to the estimate to obtain the minimum mining thickness.

Figure 14-19: Long Section Visual Comparison Sample Composites to Block Estimate, GAMDL

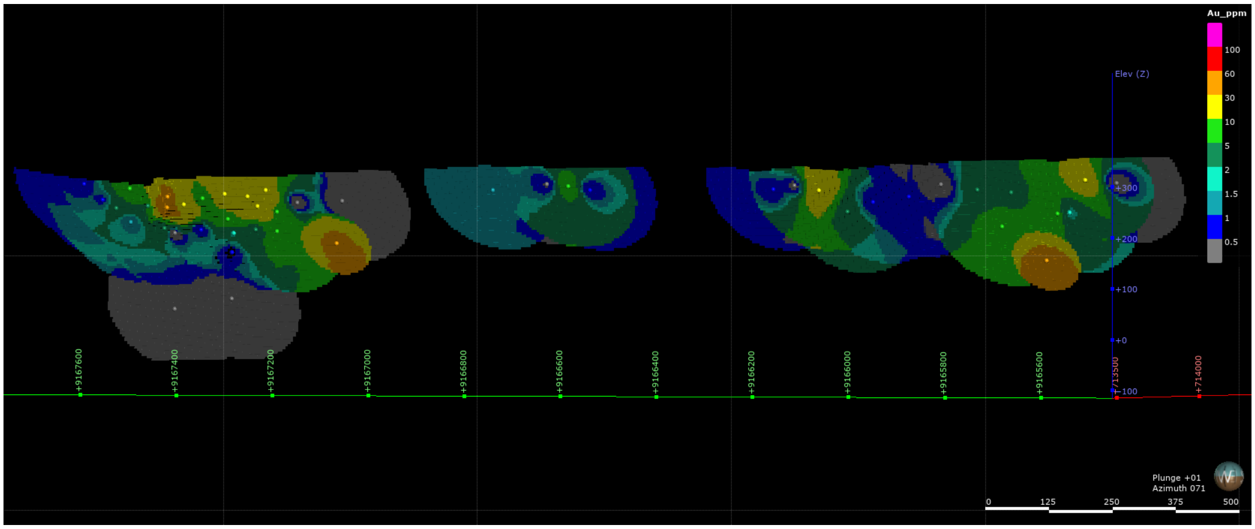


Figure 14-20: Long Section Visual Comparison Sample Composites to Block Estimate, MCQ1

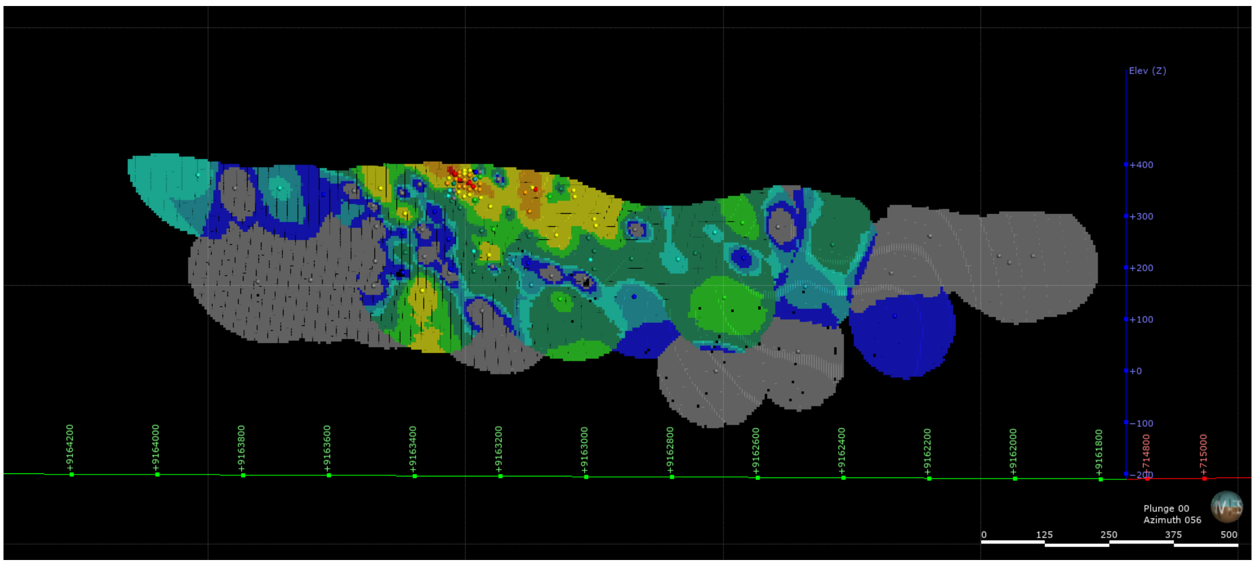


Figure 14-21: Long Section Visual Comparison Sample Composites to Block Estimate, Serra 1

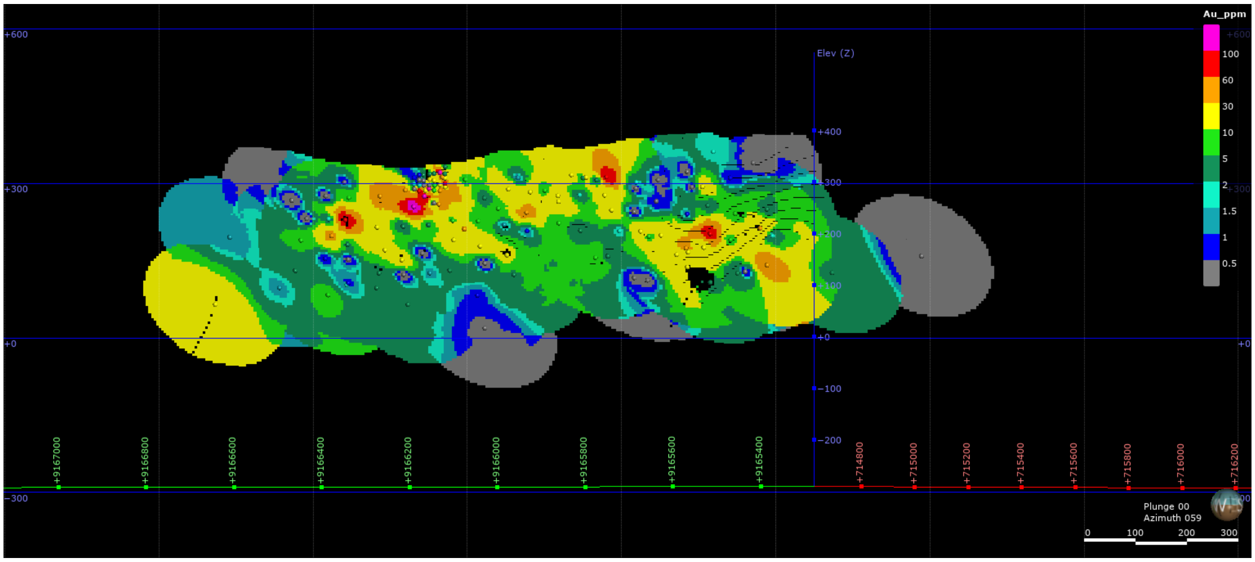
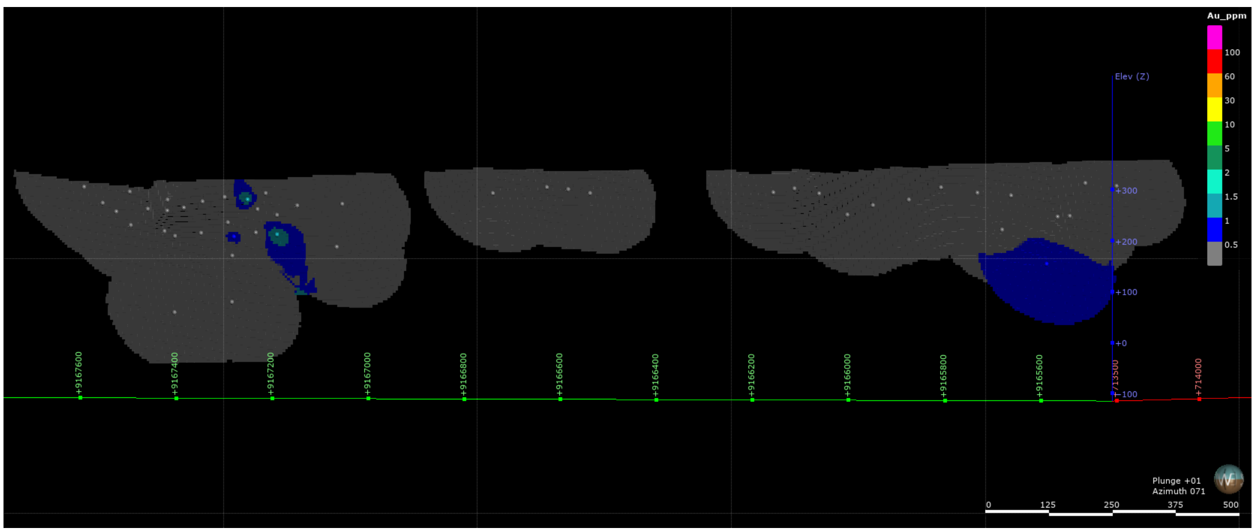


Figure 14-22: Long Section Visual Comparison Sample Composites to Block Estimate, GAMDL FW



14.8.2 Statistical Comparison

GRE compared the statistics for each main vein to evaluate the quality of the block model estimate. Table 14-7 through Table 14-9 present a comparison of composites samples, nearest neighbor (NN) block estimate, and ID3 block estimate. Composite samples show a higher mean grade than the NN and ID3 block estimates due to spatial distribution of high grade samples included in the data set. The NN mean provides an estimate of the declustered composite mean showing that the influence of these high-grade samples should be limited in the block model estimate. The ID3 mean is generally in line with or lower than the NN mean, showing that the estimate does limit the influence of the high-grade samples. Additionally, the coefficient of variation between the NN and ID3 estimates indicates that the ID3 estimate provides an additional degree of smoothing of the block model grade. Finally, a comparison of the upper quartile and maximum values for the ID3 estimate indicate that the maximum block grades represent a small portion of the overall block model. An additional check for the Serra 1 vein shows a grade of 90 gpt Au for the 99.9% percentile of the ID3 block model estimate.

Table 14-7: Statistical Comparison, GAMDL, Au gpt

Composite Parameter	Composites	Block Model Parameters	NN	ID3
	Weighted Value		Weighted Value	
Count	47	Block Count	20351	19256
Length	34.35	Volume	246,457	232,370
Mean	10.05	Mean	7.84	5.40
SD	12.43	SD	12.25	8.19
CV	1.24	CV	1.56	1.51
Variance	154.53	Variance	150.09	67.01
Minimum	0.01	Minimum	0.01	0.01
Q1	0.59	Q1	0.51	0.61
Q2	4.93	Q2	1.06	2.04
Q3	21.03	Q3	7.47	6.41
Maximum	57.91	Maximum	57.91	57.34

Table 14-8: Statistical Comparison, MCQ1, Au gpt

Composite Parameter	Composites	Block Model Parameters	NN	ID3
	Weighted Value		Weighted Value	
Count	116	Block Count	28,578	28,578
Length	99.85	Volume	251,735	251,735
Mean	19.37	Mean	2.88	2.98
SD	25.04	SD	8.24	7.22
CV	1.29	CV	2.86	2.42
Variance	627.23	Variance	67.94	52.11
Minimum	0.00	Minimum	0.00	0.00
Q1	0.40	Q1	0.01	0.01
Q2	7.28	Q2	0.09	0.47
Q3	31.25	Q3	1.17	2.32
Maximum	93.48	Maximum	93.48	87.52

Table 14-9: Statistical Comparison, Serra 1, Au gpt

Composite Parameter	Composites	Block Model Parameters	NN	ID3
	Weighted Value		Weighted Value	
Count	135	Count	23764	23764
Length	70.95	Volume	175,759	175,759
Mean	13.49	Mean	8.08	8.02
SD	27.54	SD	18.50	11.33
CV	2.04	CV	2.29	1.41
Variance	758.25	Variance	342.29	128.38
Minimum	0.01	Minimum	0.00	0.00
Q1	0.76	Q1	0.39	2.32
Q2	3.07	Q2	2.69	4.22

Composite Parameter	Composites Weighted Value	Block Model Parameters	NN	ID3
			Weighted Value	
Q3	15.13	Q3	7.27	10.86
Maximum	230.50	Maximum	230.50	228.40

GRE also tabulated the hanging wall and footwall grades used in the main vein dilution models. Table 14-10 shows that mean dilution grade within these domains is generally around 0.2 gpt Au. Again, a comparison of the upper quartile and maximum values shows that high grade dilution values are limited to a small percentage of the block model. An additional check of the MCQ1_FW shows a grade of 10 gpt Au for the 99.3% percentile.

Table 14-10: Block Model Dilution Grades, Main Veins, Au gpt

Domain	Block Count	Volume	Mean	Std Deviation	Min	Lower quartile	Median	Upper quartile	Max
MCQ1_FW	21,957	409,924	0.18	0.79	0.00	0.01	0.02	0.09	33.24
MCQ1_HW	21,970	410,284	0.15	0.49	0.00	0.01	0.02	0.13	12.05
Serra1_FW	24,868	470,379	0.2	0.25	0.00	0.03	0.13	0.26	2.81
Serra1_HW	25,187	469,160	0.29	0.55	0.00	0.02	0.12	0.34	7.27
GAMDL_FW	21,431	359,720	0.22	0.29	0.00	0.02	0.07	0.33	1.22
GAMDL_HW	21,205	357,155	0.24	0.39	0.00	0.03	0.09	0.28	4.40

14.8.3 Swath Plots

Swath plots provide a graphical method of comparing composite grades with the NN, ID2, and ID3 block model estimates. Figure 14-23 through Figure 14-25 present swath plots along the X-axis of the block model for all main veins. Similar to the statistical comparison, the swath plots show good correlation of grade values between the NN, ID2, and ID3 block estimates. Composite values have high-grade spikes throughout the model due to spatial concentrations of high-grade samples. These concentrations are appropriately handled in the model estimate showing that they do not influence a large population of the block model and are adequately constrained by surrounding composite samples. This is evident in the swath plots where the composite sample spikes in grade are limited in the ID3 estimate.

Figure 14-23: Swath Plot along X-axis, GAMDL

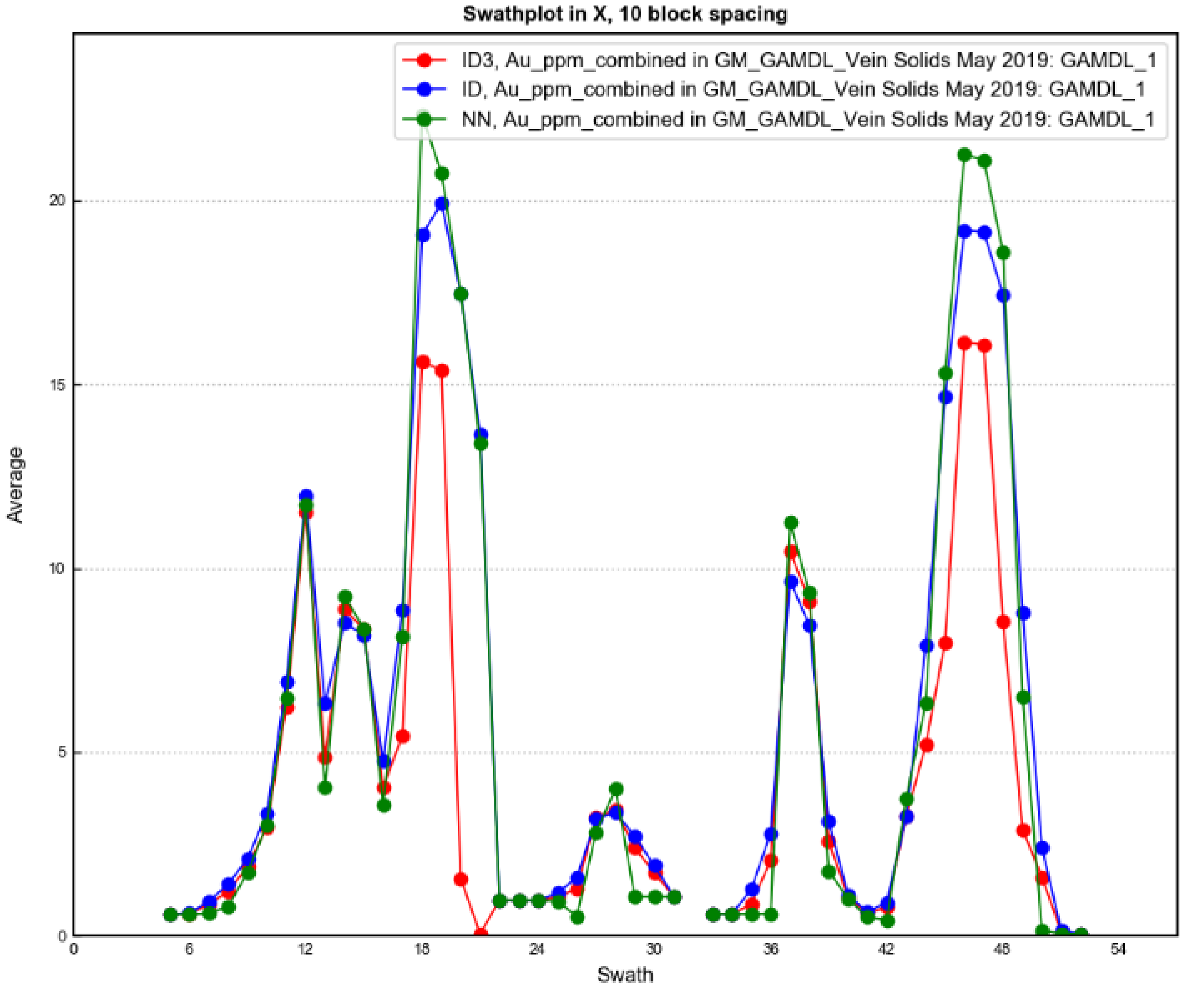


Figure 14-24: Swath Plot along X-axis, MCQ1

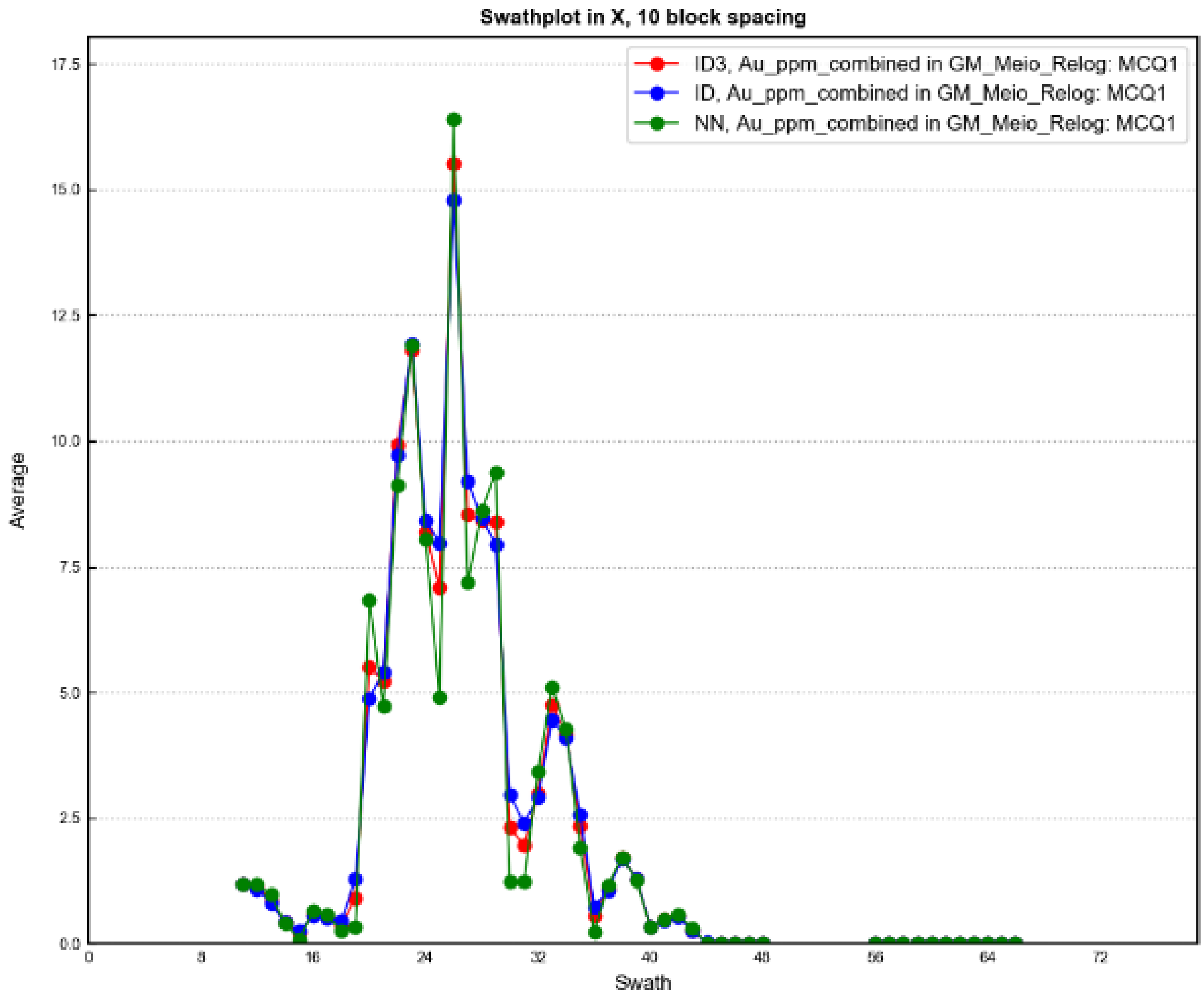
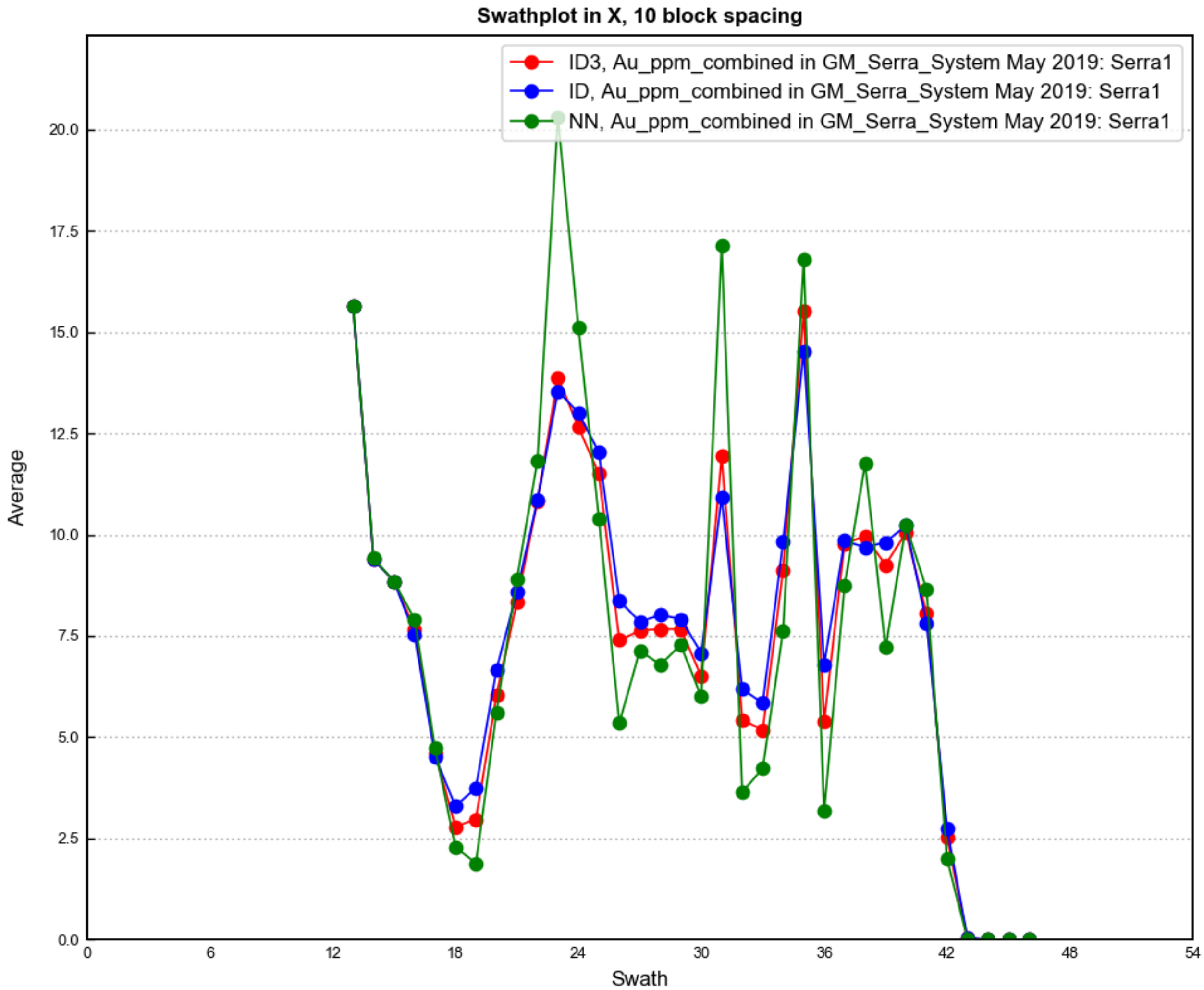


Figure 14-25: Swath Plot along X-axis, Serra 1



14.9 Resource Classification

Resource classification was determined based on the number of samples and minimum distance to the nearest sample. GRE did not classify any portion of the mineral resource estimate as measured. Typical industry practice for underground mines only classify measured resources where underground workings provide closely spaced channel samples. GRE classified indicated and inferred resources based on the parameters listed below.

- Indicated
  - Minimum number of samples = 5
  - Distance to closest sample <= 50 meters
- Inferred
  - Minimum number of samples = 1

- Distance to closest sample <= 150 meters

Using these parameters, GRE inspected the long section of the block model and visually enclosed areas for indicated resources using the calculated block determinations as a guide. This procedure permits the elimination of sporadic discontinuous sections, which appear when applying the calculated methodology described above. This refined interpretation was flagged into the block model to determine the mineral resource category of the block estimate. Figure 14-26 through Figure 14-28 present long sections of the mineral resource classification for the main vein domains.

Figure 14-26: Resource Classification, GAMDL

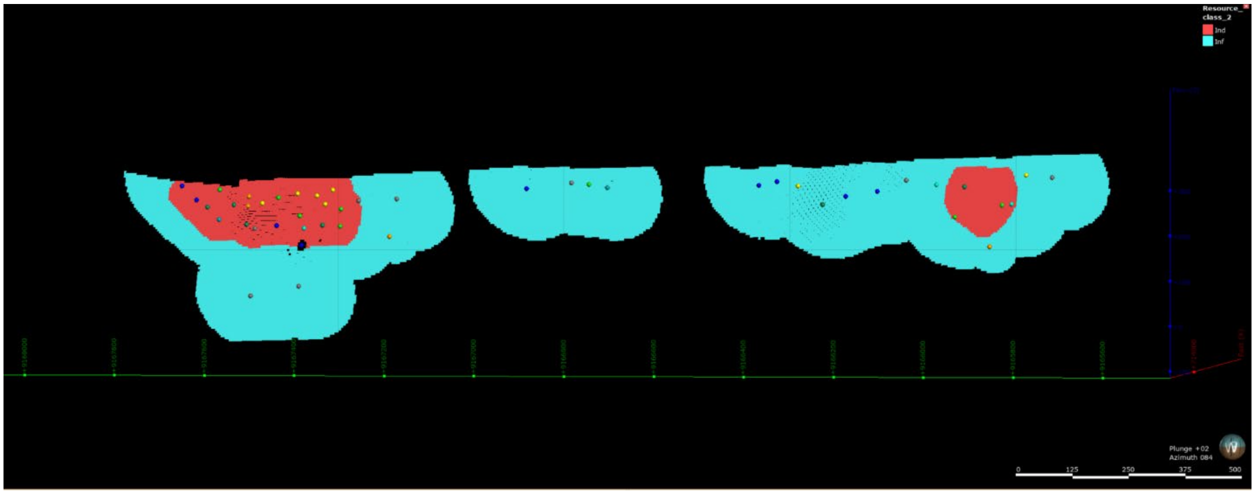


Figure 14-27: Resource Classification, MCQ1

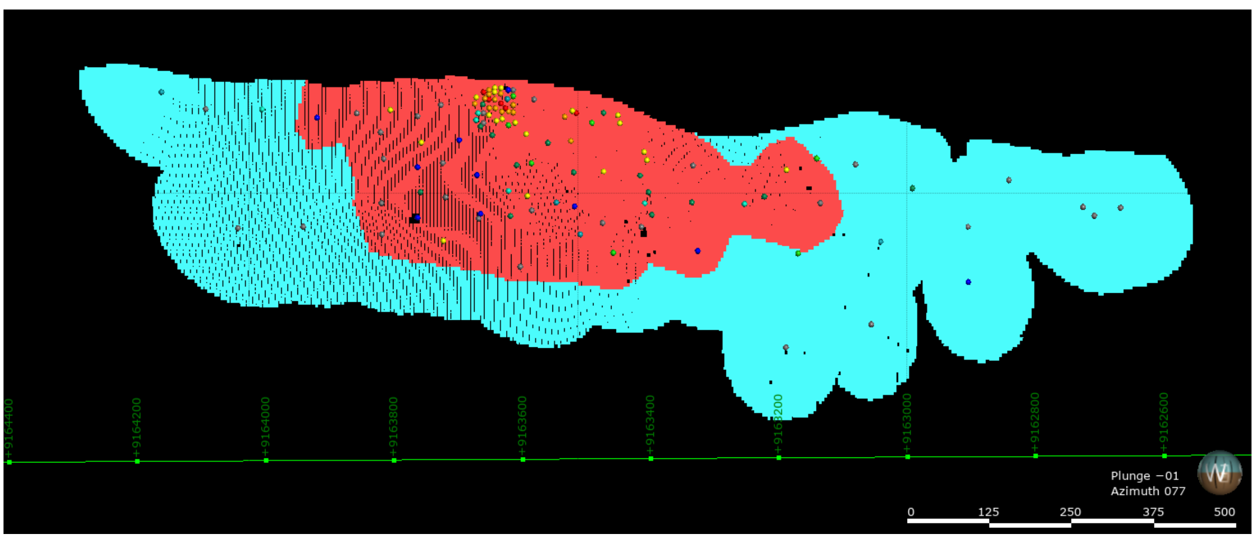
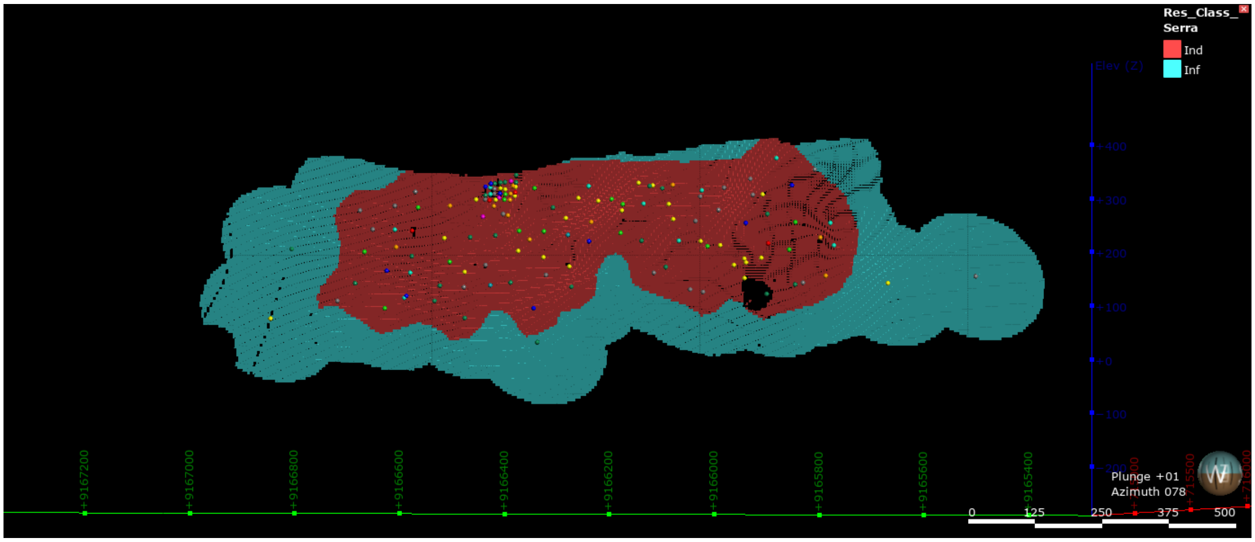


Figure 14-28: Resource Classification, Serra 1



14.10 Mineral Resource Statement

GRE tabulated the mineral resources at a cutoff grade of 2.0 gpt Au as the base case (Table 14-11). The cutoff calculation is based on a gold price of $1,500/troy oz, an operating cost of $100/tonne, and a metallurgical recovery of 95%. The resource statement considered an average minimum mining thickness of 0.7 meters. GRE included the previous estimate for the Valdette area from the technical report filed by Anfield Gold dated July 1, 2017. No additional drilling was completed within this area. GRE reviewed the previous vein model and intercepts selected for Valdette and in general agrees with the interpretation and selection.

Table 14-11: Mineral Resource Statement, All Areas

Cutoff (gpt)	kTonnes	Au (gpt)	Au (Troy oz)
Indicated			
1	1,023,000	6.32	208,000
2	735,000	8.24	195,000
3	590,000	9.66	183,000
4	484,000	11.01	171,000
5	414,000	12.11	161,000
Inferred			
1	2,124,000	5.22	356,000
2	1,645,000	6.54	346,000
3	1,068,000	8.64	297,000
4	835,000	10.10	271,000
5	716,000	11.04	254,000

1) The effective date of the Mineral Resource is September 6, 2019.
2) The Qualified Persons for the estimate are Kevin Gunesch, PE, and Hamid Samari QP-MMSA of GRE.
3) Mineral Resources are inclusive of Mineral Reserves; Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
4) Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.

5) The Mineral Resource is based on a gold cutoff grade of 2 gpt, an assumed gold price of 1500 $/tr oz, an assumed operating cost of 100 $/tonne, and an assumed metallurgical recovery of 95%.

14.11 Mineral Resource Sensitivity by Domain

Table 14-12 through Table 14-15 present the mineral resource variability by domain.

Table 14-12: Mineral Resource Statement, GAMDL

Cutoff (gpt)	Tonnes	Au (gpt)	Au (oz)
Indicated			
1	138,000	7.58	34,000
2	115,000	8.79	33,000
3	101,000	9.67	31,000
4	84,000	10.91	30,000
5	73,000	11.95	28,000
Inferred			
1	316,000	6.78	69,000
2	220,000	9.10	64,000
3	166,000	11.27	60,000
4	131,000	13.32	56,000
5	113,000	14.75	54,000

1) The effective date of the Mineral Resource is September 6, 2019.
2) The Qualified Persons for the estimate are Kevin Gunesch, PE, and Hamid Samari QP-MMSA of GRE.
3) Mineral Resources are inclusive of Mineral Reserves; Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
4) Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.
5) The Mineral Resource is based on a gold cutoff grade of 2 gpt, an assumed gold price of 1500 $/tr oz, an assumed operating cost of 100 $/tonne, and an assumed metallurgical recovery of 95%.

Table 14-13: Mineral Resource Statement, MCQ

Cutoff (gpt)	Tonnes	Au (gpt)	Au (oz)
Indicated			
1	244,000	6.51	51,000
2	155,000	9.43	47,000
3	122,000	11.31	44,000
4	103,000	12.78	42,000
5	91,000	13.9	41,000
Inferred			
1	820,000	5.38	142,000
2	562,000	7.22	131,000
3	469,000	8.15	123,000
4	386,000	9.16	114,000
5	324,000	10.05	105,000

1) The effective date of the Mineral Resource is September 6, 2019.
2) The Qualified Persons for the estimate are Kevin Gunesch, PE, and Hamid Samari QP-MMSA of GRE.
3) Mineral Resources are inclusive of Mineral Reserves; Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
4) Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.

5) The Mineral Resource is based on a gold cutoff grade of 2 gpt, an assumed gold price of 1500 $/tr oz, an assumed operating cost of 100 $/tonne, and an assumed metallurgical recovery of 95%.

Table 14-14: Mineral Resource Statement, Serra

Cutoff	Tonnes	Au gpt	Au oz
Indicated			
1	642,000	5.98	123,000
2	465,000	7.7	115,000
3	367,000	9.1	107,000
4	297,000	10.42	100,000
5	251,000	11.51	93,000
Inferred			
1	626,000	3.26	66,000
2	384,000	4.43	55,000
3	237,000	5.69	43,000
4	125,000	7.78	31,000
5	90,000	9.06	26,000

1) The effective date of the Mineral Resource is September 6, 2019.
2) The Qualified Persons for the estimate are Kevin Gunesch, PE, and Hamid Samari QP-MMSA of GRE.
3) Mineral Resources are inclusive of Mineral Reserves; Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
4) Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.
5) The Mineral Resource is based on a gold cutoff grade of 2 gpt, an assumed gold price of 1500 $/tr oz, an assumed operating cost of 100 $/tonne, and an assumed metallurgical recovery of 95%.

Table 14-15: Mineral Resource Statement, Demetrio

Cutoff	Tonnes	Au gpt	Au oz
Inferred			
1	361,000	6.86	80,000
2	230,000	9.84	73,000
3	197,000	11.15	71,000
4	193,000	11.30	70,000
5	189,000	11.46	69,000

1) The effective date of the Mineral Resource is September 6, 2019.
2) The Qualified Persons for the estimate are Kevin Gunesch, PE, and Hamid Samari QP-MMSA of GRE.
3) Mineral Resources are inclusive of Mineral Reserves; Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
4) Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.
5) The Mineral Resource is based on a gold cutoff grade of 2 gpt, an assumed gold price of 1500 $/tr oz, an assumed operating cost of 100 $/tonne, and an assumed metallurgical recovery of 95%.

14.12 Relevant Factors

GRE is not aware of any adverse factors that would materially affect the statement of mineral resources.

15.0 Mineral Reserve Estimates

This section is not applicable.

16.0 Mining Method

16.1 Selection of Mining Method

The underground mining method at Coringa will involve driving vertical raises from drifts driven through the vein, and subsequently breasting along the strike of the vein on each side of the vertical raise. The primary equipment used for production will be jackleg and stoper drills. This method was chosen due to its ability to effectively mine the narrow vein deposit while minimizing dilution. Although this mining method does utilize a large number of drillers which leads to a higher labor cost, it does eliminate the larger initial capital investment needed when using more advanced mining equipment. This proven mining method is currently in use at the geographically and geologically similar Palito mine, which is also owned by Serabi.

16.2 Mine Schedule

The mine will operate three six-hour shifts per day for a total of 18 working hours per day, 365 days per year.

16.3 Mining Areas

Vein systems have been broken into separate mining areas as detailed in Table 16-1 below. This separation was based upon a trade-off analysis between a separate portal and ramp versus drifting over to the adjacent continuous stope area within each vein system. The trade-off analysis was completed at a cutoff grade of 4gpt. Each mining area will require its own portal, ramp, ventilation, dewatering, and underground utilities. The Serra vein system requires only one portal due to the continuous grade distribution within the planned stopes.

Table 16-1 Mining Area by Stationing and Vein System

Mining Sub Area	Beginning Stationing (meters)	Ending Stationing (meters)
GAMDL-A	0	1000
GAMDL-C	1600	2600
MCQ-A	0	1500
MCQ-B	1500	2600
MCQ-C	2600	3650
SERRA	800	1950

16.4 Production

16.4.1 Sequence

The production sequence was determined by mining the higher grade resource areas first. The sequence by mining area is presented in Table 16-2 below.

Table 16-2 Mining Area Sequence

Mining Area	Mining Order
GAMDL-A	1
GAMDL-C	2
MCQ-A	3
MCQ-B	4
MCQ-C	5
Serra	6

NOTE: GAMDL-B is not economic to mine at the specified cutoff so it has been excluded from this table and the report.

1. Within each mining area, levels are developed from the uppermost level downward.
2. Within each level, veins are mined in numerical sequence i.e. 1-4.
3. Stopes progress within a specified vein and level along stationing from lowest to highest, which when viewed in long section corresponds from left to right.

16.4.2 Dimensions

Stopes are 30 meters vertical along dip and 32 meters horizontal along strike. Stopes are mined from a vertical raise driven from drifts. Each stope will contain eight stope raises. Access to these vertical raises is accomplished by a installing a series of ladders and timber stulls from the bottom of the production drift upwards. Two drifts will be driven through the vein in each stope. Drifts will be spaced at 15 meters vertically. Development of the vertical raises is accomplished with stoper drills with the subsequent horizontal breasting by jackleg drills. For each stope, a sill pillar approximately 1.5 meters thick spanning the length of the stope will be left in place, resulting in an extraction ratio of 95%. GRE has not examined the option of pillar robbing at the end of the mine life to recover the additional 5% of the resource. Within a stope, the lower drift and ore passes are developed before main production begins on the upper drift. This permits main production from multiple stopes through tramming of mineralized rock on the main production drift to ore passes spaced every 2 stope lengths. Table 16-3 below lists the dimensions of a typical stope which is illustrated in Figure 16-1 Dimensions of Typical Stope. Figure 16-2 shows a typical stope layout in relation to the 6 and 8 gpt cutoff grades.

Table 16-3 Typical Underground Production Dimensions

Production Type	Height (meters)	Width (meters)	Thickness (meters)
Stope	30	32	~0.7 average
Stope Raise	10.5-12	3	0.8 minimum
Breasting Out	10.5-12	2.5	0.6 minimum

NOTE: The exact stope dimensions will change to fit the local geometry of the ore body.

Figure 16-1 Dimensions of Typical Stope

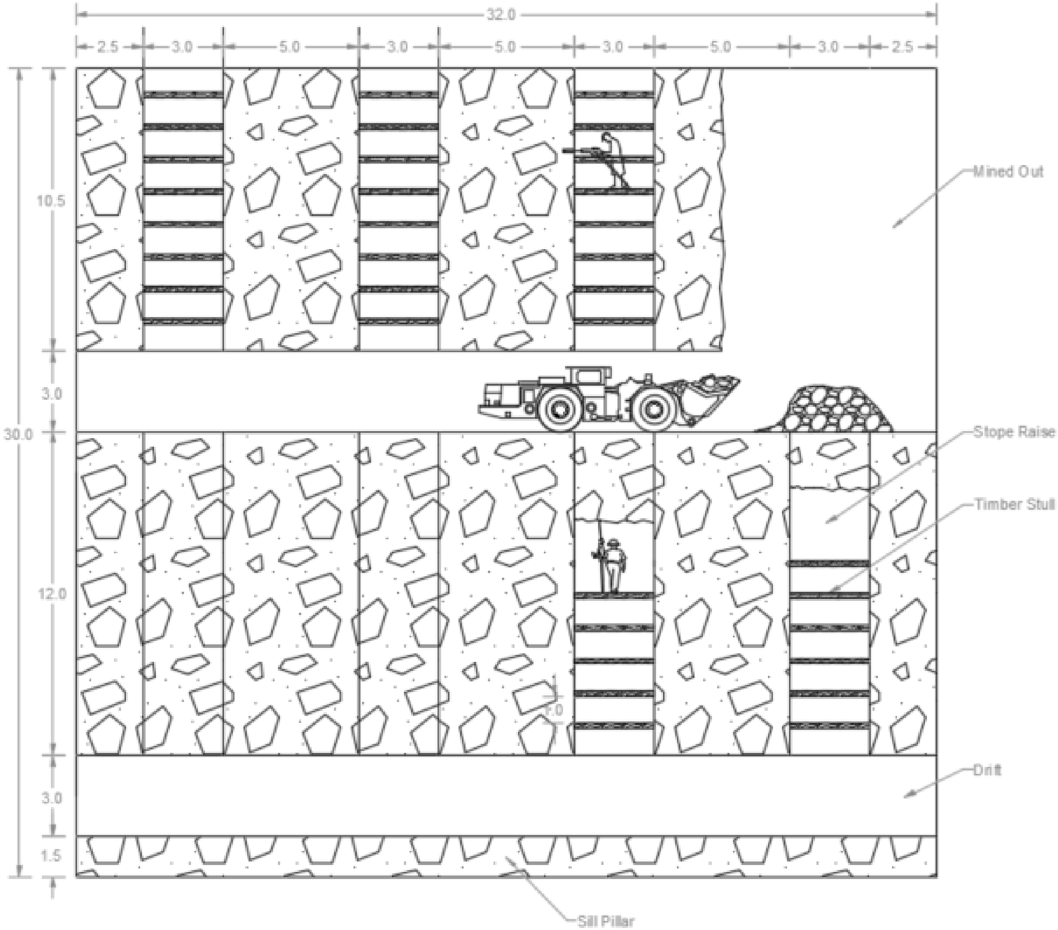
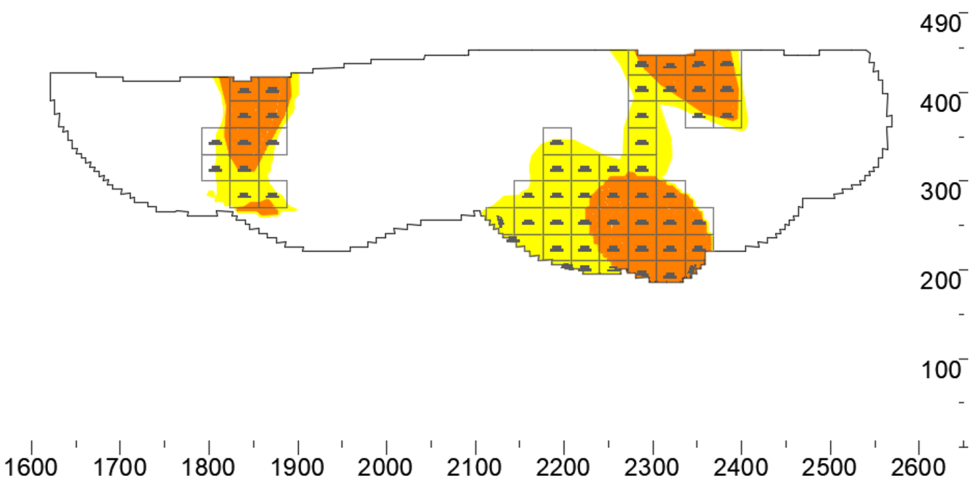


Figure 16-2 Long View Production Example GAMDL-C



Note: Yellow represents the outline of the 6gpt cutoff grade and orange represents the 8 gpt cutoff grade.

It is important to note that the stope design for the PEA used a uniform rectangular stope shape and grid pattern. This approach included additional dilution along the periphery of each designed stope area. It also excluded areas above the cutoff grade. (See Figure 16-2). Actual production planning for operations will be more detailed that this simplified approach. Once complete, the detailed operational mine plan will both minimize the amount of dilution and include adjacent areas above the cutoff grade with a minimal amount of additional development.

16.4.3 Dilution

The typical planned dilution percentages using the selected mining method are provided in Table 16-4 below. These percentages were calculated based on the average vein thickness of 0.62 meters.

Table 16-4 Typical Dilution Factors for Production

Development Type	Planned Percentage Dilution
Raise	22.5%
Breasting Out	0%
Development Drift Full Face	79.3%
Development Drift Resue Method	0%

An additional 10% dilution factor was allotted to account for overbreak which will create unplanned waste. The resue mining method will be used approximately 50% of the time when driving ore drifts and will effectively average the dilution between the two drifting methods. Overall dilution for the planned underground mining operation is 40%.

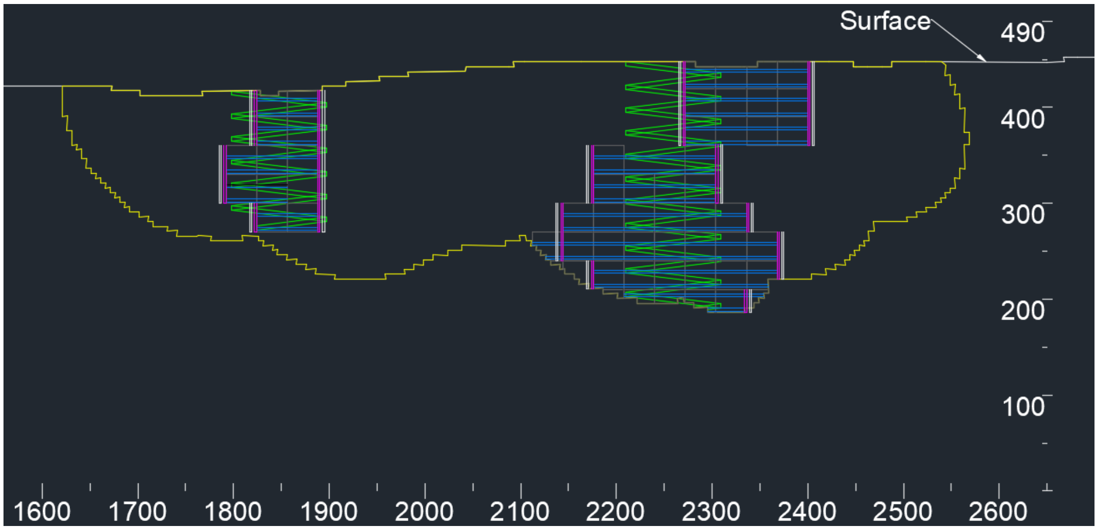
16.5 Development

The development sequence was designed to ensure that all required development for a level is completed before the stopes on that level are scheduled for production. This was done in order to avoid access and equipment conflicts between production and development on a level simultaneously. The development sequence is listed below in Table 16-5, and a typical development long section is provided in Figure 16-3.

Table 16-5 Underground Development Sequence

Type of Development	Order of Development
Ramp	First
Ramp X-cut	Second
Drifts	Third
Drift X-Cut	Fourth
Vent Raise	Fifth
Escapeway	Fifth
Ore Chute	Sixth
Stope Raise	Seventh
Breasting Out	Last

Figure 16-3 Development Long Section GAMDL C



Note: The colors represent the following development: green – ramp, blue – drift, purple – vent, white – secondary escapeway, yellow – estimation boundary.

Dimensions of underground development are broken out by type in Table 16-6.

Table 16-6 Underground Development Cross Section Dimensions

Development Type	Height (meters)	Width (meters)	Cross Section (meters^2)
Ramp	4.5	4.5	20.25
Ramp X-cut	4.5	4.5	20.25
Drifts	3	3	9
Drift X-Cut	3	3	9
Vent Raise	2	2.5	5
Secondary Escapeway	2	2	4
Ore Chute	1.5	1.5	2.25

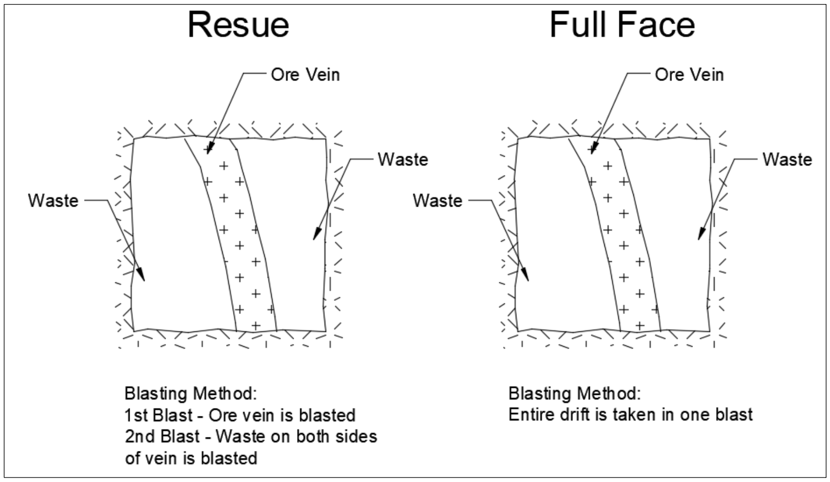
16.5.1 Ramp

Ramps will be driven at a 12% decline, this means that approximately 252 linear meters of ramp are driven for each 30 meter level. A 10% allotment was included for muck bays, cutouts and passing areas to alleviate potential vehicle congestion. Ramps will be spaced far enough from stopes to not cause geotechnical issues and will be driven in the waste rock of the footwall. Ramp crosscuts will connect the ramp decline to the footwall of the vein. One ramp crosscut will be developed per level of each mining sub area.

16.5.2 Drifts

Two methods are available for advancing drifts. The first method consists of full face blasting where the vein is diluted to the full volume or rock required to advance the drift. The second method of resue mining involves driving the drifts in two separate blasts. The first blast removes the vein. After the broken vein is mucked out, the second blast removes the waste rock inside the drift heading. GRE estimated that resue mining will be used approximately 50% of the time when driving ore drifts, and that the full face blasting method will be used 100% of the time when driving waste drifts. These assumptions are based on Serabi's mining experience at their Palito Mine. Figure 16-4 illustrates the details between both methods.

Figure 16-4 Drifting Methods Illustration



The relative advantage of the full face drifting method is that the production rate is faster. The advantage of the resue mining technique is reduced dilution and higher grade material for the process plant; however, the advance rate is cut in half by adding a second blast.

16.5.3 Muck Bays

Muck bay development was accounted for as an additional 10% of the total drift length per level. Muck bays will also be utilized as definition drilling stations; however, additional drilling stations may be developed as needed.

16.5.4 Secondary Escapeway and Ventilation Raises

It is assumed that secondary escapeways and vent raises can be driven at the same time since they are both located at the ends of the mining blocks. Both the escapeway and vent raises will be driven outside of the mineralized vein in the hanging wall. In some cases vent raises will also be used as secondary escape ways. Escapeways will have ladders with landings spaced as required by applicable regulations.

16.5.5 Ore Chute

Ore chutes will be spaced approximately every 60 meters along levels where they connect vertically to the level below. Ore chutes will be driven outside of the vein in waste rock of the footwall.

16.6 Unit Operations

The unit operations described below closely approximate the actual operations at Serabi's Palito Mine.

16.6.1 Drill

Horizontal development such as ramps, ramp cross cuts, drifts, and drift cross cuts will be developed with jumbo drill rigs. Vertical development such as secondary escapeways, vent raises, ore chutes, stope raises, and breasting will be developed with stoper or jackleg drills.

16.6.2 Blast

Blasting will utilize a mixture of bagged ANFO prills and emulsion. The ANFO will be loaded into holes using a pneumatic loader, and the emulsion will be packaged in sticks to allow loading. Blasting will be initiated using blasting caps, boosters, and detonation cord. Blasting should be timed so that it coincides with entry and exit of employees to allow sufficient time for the ventilation system to clear contaminated air from the previous blast.

16.6.3 Muck

Mucking within drifts will be performed with narrow vein load-haul-dump (LHD) equipment. LHDs will haul mineralized rock to ore passes. The rock will then be re-handled and loaded by a front end loader into a haul truck where the ore pass meets the ramp.

16.6.4 Loading Haul

A single model of haul trucks will be utilized both underground and on surface roads. The selected Volvo FMX 460hp dump truck has a tipper volume capacity of 19.5 cubic meters, and a weight capacity of 44 tonnes. Each load is expected to average 30 tonnes of rock. Truck traffic in the underground mines will be limited to the decline and ramp cross cut. A Volvo L90 model front end loader will load each truck in designated loading areas with additional height allowing full lift of the loader bucket.

16.7 Productivity and Fleet Size

Table 16-7 summarizes the estimated productivity for major mining equipment per operating hour based on GRE's analysis of actual production data from Serabi's Palito mine. All advance rates have been presented in a tonne equivalent basis rather than meters.

Table 16-7 Estimated Productivity by Equipment Type

Equipment Type	Activity	Estimated Productivity (tonnes/op hour)
Loader Haul Dump – ST2G	Mucking	30
Front End Loader – Volvo L90	Re-mucking	60
Dump Truck – Volvo FMX 460	Haul	30
Jackleg Drill – Board Longyear Seco 250	Breasting out	3.5
Jumbo Drill	Ramp	82
Jumbo Drill	Drift	36.5
Stoper Drill	Vent Raise	11
Stoper Drill	Secondary Escapeway	9
Stoper Drill	Ore Chute	5
Stoper Drill	Stope Raise	5

Productivity estimates and tonnages were used to determine the number of operating hours required by equipment type. Equipment quantities were then estimated based upon the number of required operating hours and the number of hours each piece of equipment can operate during a period, see Table 16-8.

Table 16-8 Summary of Major Mining Equipment Fleet Requirements

Average Fleet Requirement		Years											
Mine Production	**Equip Type**	**-3**	**-2**	**-1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Production Stopes	Jackleg	0	1	3	4	7	7	7	7	7	7	7	5
Mucking	LHD	0	1	1	1	1	1	1	1	1	1	1	1
Re-Mucking	FEL	0	1	1	1	1	1	1	1	1	1	1	1
Re-Mucking	Dump truck	0	1	1	1	1	1	1	1	1	1	1	1
Mine Development													
All	Jumbo Drill	1	2	2	3	3	3	3	3	3	3	1	0
All	Jackleg	0	2	2	2	2	2	2	2	2	2	1	0
Mucking	LHD	1	2	3	3	3	5	5	5	5	5	1	0
Re-Mucking	FEL	1	1	2	2	3	3	3	3	3	3	1	0
Re-Mucking	Dump truck	1	2	3	3	3	5	5	5	5	5	1	0
Definition Drilling	Core Drill	0	1	1	1	2	2	2	2	2	2	1	0

The mining fleet requirements were used in conjunction with the on-hand equipment numbers to determine the necessary initial mining equipment purchases. Subsequently, operating hours were used with equipment lifetimes to determine equipment replacement over the life of the mine.

16.8 Manpower

The summary of the number of employees for each category and the total number of employees needed for the operation is listed below in Table 16-9.

Table 16-9 Annual Labor Requirements

	Years											
Category	**-3**	**-2**	**-1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Admin	7	10	20	26	24	36	27	20	16	14	8	2
Mine Operations	50	80	120	186	198	237	208	170	155	148	108	50
Mine Maintenance	41	55	55	55	55	55	55	55	55	55	55	41
Plant Operations	6	13	21	29	29	34	29	24	23	23	13	10
Plant Maintenance	2	4	10	19	14	22	21	12	9	8	5	2
Corporate	0	0	0	0	0	0	0	0	0	0	0	0
Electrical	3	5	9	12	11	16	12	9	8	7	4	2
Assay Lab	10	13	13	13	13	13	13	13	13	13	13	10
Health/Safety/Environ	10	13	13	13	13	13	13	13	13	13	13	10
Total	129	193	261	352	356	426	377	316	293	281	219	126

Staffing was designed to meet the schedule demand of operating the plant and mine 365 days per year with three shifts per day for the mine and two shifts per day for the plant. An allowance was made for shift rotation shift, vacations, and holidays.

16.9 Development and Production Scheduling

The mine production schedule utilizes 7 simultaneous stopes during 100% mining capacity with a ramp up period of 2 years. During full production the mine will produce approximately 465 tonnes per day, or 170,000 tonnes annually, at an average grade of 8.34 gpt. The 7 simultaneous stopes at 100% mining capacity will each produce 25 tonnes per day (175 tpd total), with the remaining 290 tonnes per day coming from mine development. When operating at 100% mining capacity, the mine averages approximately 38,000 troy ounces annually. Table 16-10 below summarizes plant tonnes, Au ounces, and waste tonnes from production and development annually.

Table 16-10 Annual Ore, Waste, Au Oz

Year	Waste Tonnes	Plant Tonnes	Au Grams	Au Troy Oz.	Plant Tonnes Per Day	Avg Grade gpt
-3	137,000	17,000	113,000	4,000	46	6.6
-2	200,000	30,000	295,000	9,000	81	9.9
-1	339,000	87,000	760,000	24,000	240	8.7
1	327,000	174,000	1,284,000	41,000	476	7.4
2	269,000	125,000	1,361,000	44,000	343	10.9
3	423,000	205,000	1,403,000	45,000	563	6.8
4	147,000	188,000	1,186,000	38,000	514	6.3
5	10,000	101,000	939,000	30,000	278	9.3
6	5,000	81,000	900,000	29,000	222	11.1
7	5,000	71,000	674,000	22,000	194	9.5
8	-	40,000	399,000	13,000	110	9.9
9	-	11,000	118,000	4,000	29	11.0
Total	1,862,000	1,130,000	9,431,000	303,000	282	8.3

Table 16-11 below summarizes annual development totals broken down by development type.

Table 16-11 Annual Development Meters By Development Type

Years	Ramp	Ramp X-Cut	Ore Drift	Waste Drift	Drift X-cut	Vent Raise	Secondary Escapeway	Ore Chute	Stope Raise
-3	2,001	180	1,155	250	-	27	-	-	-
-2	3,285	30	829	19	-	393	240	330	1,728
-1	4,254	510	3,977	1,059	-	540	411	420	1,901
1	2,093	600	7,287	1,686	1,950	675	549	1,110	5,111
2	4,051	30	2,048	38	180	585	556	1,209	6,585
3	3,771	840	7,795	2,982	-	660	774	1,101	6,187
4	210	210	6,732	986	470	720	651	1,112	6,144

Years	Ramp	Ramp X-Cut	Ore Drift	Waste Drift	Drift X-cut	Vent Raise	Secondary Escapeway	Ore Chute	Stope Raise
5	-	-	-	-	-	-	120	1,505	8,233
6	-	-	-	-	-	-	120	563	4,940
7	-	-	-	-	-	-	180	480	3,427
8	-	-	-	-	-	-	-	-	384
Total Length	19,665	2,400	29,823	7,020	2,600	3,600	3,600	7,830	44,640

16.10 Geotechnical Conditions for Underground Development

Ground conditions with the underground mine are anticipated to be very competent and require minimal bolting, shotcrete, and wire mesh. This assumption is based on the QPs review of the Coringa core and site visit to Serabi's Palito and Sao Chico mines.

16.11 Groundwater

Underground development and production will take place below the groundwater table. It is expected that as the workings progress deeper the flow rate will increase. It is also noted that seasonal changes will affect the groundwater inflow but that this will be largely limited to shallower workings. Dewatering pumps will be needed in order to remove the groundwater. Groundwater discharge will need to be managed as per applicable local laws and regulations.

16.12 Ventilation System

The current ventilation plan is designed to supply fresh air down the ramp to active areas, and to exhaust through vent raises using two 150hp main fans per mining area. The number and size of ventilation fans is based upon the current operational practices in place at the similar Palito Mine. When headings cannot be ventilated by the main fans, the vent bag and auxiliary fans will be utilized.

17.0 Recovery Methods

17.1 Process Summary

The processing facility for the Coringa Gold Project is a conventional gold cyanidation plant. It has been designed to treat 645 tpd (212,000 tpa) of ore containing 7.5 gpt gold with minor silver over a 11-year period. Annual gold production at full capacity will average 38,000 ozs. The gold doré product will be shipped to a refinery for further processing.

The process plant will be a combination of new and refurbished equipment, tanks and structures. A similar sized crush/grind/gravity/leach gold ore process facility, located in Brazil, was purchased and relocated to the Coringa Gold Project site for re-use of the suitable equipment and materials.

Metallurgical test results of representative material from the Coringa Gold Project deposits were utilized to develop the final process flowsheet and plant design criteria.

The process plant incorporates the following standard unit process operations:

- ROM ore stockpile area and reclaim hopper
- Primary and secondary crushing with screening
- Ore stockpile with reclaim feeders
- Parallel single-stage ball milling in closed-circuit with cyclones
- Knelson gravity concentrator and Acacia IL reactor for concentrate leaching
- Cyclone overflow to trash removal screen
- A lime/pre-aeration mix tank prior and cyanide leach tanks
- CIP tanks equipped with carbon screens and a safety screen
- Cyanide destruction tank using SO_2/Air process
- Tailings thickening and filtration followed by dry stacking of the filtered tailings
- Carbon wash/elution/strip/regeneration circuit with a 1.5 t carbon capacity
- Reagent storage, mixing, and distribution systems
- Electrowinning cells for Acacia and stripped carbon solutions to recover gold and silver
- Smelting and doré handling and security systems

A brief description of the process facilities and the estimated consumptions of energy, water and process plant consumables are also presented below.

17.2 Process Description

The ROM ore is stockpiled and then reclaimed by front-end loader. The loader dumps the ore into a hopper equipped with a vibrating feeder that discharges into an 800 mm by 600 mm primary jaw crusher.

The jaw crusher product discharges onto a conveyor that feeds a 4 m long by 1.5 m wide double-deck vibrating screen. The oversize from the top and middle decks are combined and fed via a conveyor to two 3-foot diameter cone crushers, operating in parallel. The crushed material from the secondary crushers is recirculated via conveyor back to the vibrating screen. The final crushed product (undersize from the screen bottom deck), at an average particle size of 80% passing 12 mm, discharges onto a conveyor that feeds the fine ore storage bin.

Crushed ore is reclaimed from the fine ore bin via a belt feeder and conveyors that feed two ball mills operating in parallel - a 4.3 m long by 3.15 m diameter ball mill equipped with a 720 kW motor, and a 3.6m long by 2.7m diameter ball mill equipped with a 355 kW motor.

The ball mill grinding operates in closed circuit with a cyclone pack which classify the ground ore to a final particle size of 80% passing (P_{80}) 75 microns. The cyclone overflow at a target 40% solids by weight, is passed over a trash screen and then is directed to the carbon-in-pulp (CIP) circuit. The cyclone underflow is split and returned back to the ball mills.

A bleed of the mill discharge slurry is pumped to a centrifugal gravity concentrator for free gold and silver recovery. The concentrator tails are returned to the mill discharge hopper. The gravity concentrates flow to an Acacia intensive leach reactor (ILR). Acacia leach tails are returned to the grinding circuit and the ILR leach solutions are pumped to a tank feeding a dedicated electrowinning cell.

The CIP circuit consists of one pre-aeration tank, two leach tanks and seven adsorption tanks all in series. The pre-aeration tank receives slurry from the grinding circuit for aeration and pH adjustment to about 10.5 using hydrated lime. The slurry then flows to the leaching tanks where cyanide is added and the gold and silver are extracted into solution.

After leaching, the slurry flows downstream from tank to tank through a series of seven adsorption tanks. Each adsorption tank, containing granular activated carbon, is equipped with a static intertank screen. The leached gold and silver are adsorbed by the activated carbon present within the tanks.

The metal-loaded carbon is transferred countercurrent to the slurry flow from the last tank forward. The highest metal loaded carbon resides in the first CIP tank. From the first tank the carbon is transferred to a vibrating screen for washing, then directed to the desorption column for further washing and metal stripping. The screen underflow returns to the first CIP tank. Total leaching residence time is 27 hours and total adsorption residence time is 19.5 hours at the designed flows and slurry density.

In the desorption column, the carbon is first acid washed with a weak solution of hydrochloric acid and then rinsed in a caustic soda solution. A Zadra stripping system is employed. In practice, a solution containing about 1% sodium hydroxide and 0.1% sodium cyanide at about 280 deg-F and 65 PSIG, is circulated through a pressure vessel filled with loaded carbon at a flow rate of 2.0 bed volumes per hour. The time required for pressure stripping is generally from 10 to 14 hours.

This strip (pregnant) solution is pumped through a dedicated electrowinning cell where gold and silver are deposited on cathodes. The cathodes are periodically removed from the cells and washed to recover the gold/silver sludge. The precious metal sludge is dried, mixed with flux reagents and then smelted to produce a doré product. The doré bar is then sampled and shipped offsite for final refining. The barren electrowinning solution is then recycled to the leaching circuit.

After stripping, carbon is washed with water and transferred to the regeneration kiln. The carbon is heat-treated in the kiln and then returned to the last adsorption tank after screening for particle size control.

The slurry from last CIP tank, after passing through the carbon safety screen, is pumped to the cyanide neutralization circuit that utilizes the SO_2/Air process to destroy cyanide in the tailing slurry. Copper sulphate and SMBS are added to the aerated mix tank to destroy the cyanide.

The detoxified slurry is pumped to a 15m diameter hi-rate thickener where the slurry is thickened to 60% solids. The thickened solids are pumped via surge tanks to a filter press where they are filtered to remove residual process solution. The process solution is recycled back to the process and the filtered tailings, containing approximately 15% moisture, are conveyed to a load-out shed. The filtered tailings are loaded and transported, using a front-end loader and truck, to a remote dry stacking tailings storage facility.

Any make-up water requirements will be provided from local sources of fresh water including mine water and site runoff collection.

Figure 17-1 presents the process flow diagram of the recovery process. Figure 17-2 illustrates the general arrangement of the process plant, related infrastructure, and ancillary facilities.

17.3 Key Process Design Criteria

The key process design criteria are listed in Table 17-1 and formed the basis for the detailed process design criteria and the mechanical equipment list developed for the study.

Table 17-1: Process Design Criteria

Criteria	Units	Design Value	Source
Plant Throughput	tpd	645	Client
Plant Throughput	tpa	212,000	Client
Plant Throughput	tph	24.2	Calc for Design
Head Grade	gpt Au	7.5	Client
Ore Specific Gravity	g/cc	2.7	Testwork
Gravity Gold Recovery	%	36.3	Calc from Testwork
Gravity Silver Recovery	%	16.4	Calc from Testwork
CIP Gold Recovery	%	90.7	Calc from Testwork
CIP Silver Recovery	%	52.7	Calc from Testwork
Overall Gold Recovery	%	94.1	Calc from Testwork
Overall Silver Recovery	%	60.4	Calc from Testwork
Crushing Plant Availability	%	65	Client
Grind/Recovery Plant Availability	%	90	Client
Uniform Compressive Strength (UCS)	Mpa	44.9	Testwork - Average
Crushing Work Index (CWi)	kWh/t	8.7	Testwork - Average
Bond Ball Mill Work Index (BWi)	kWh/t	18.6	Testwork - Average
Bond Abrasion Index (Ai)	g	0.377	Testwork - Average
Grind Size (p80)	microns	75	Testwork
Leach (CIL) Retention Time	hours	27.3	Basic Engineering

Criteria	Units	Design Value	Source
Leach Slurry pH	pH	10.5	Testwork
Leach Slurry Density	% Solids	40	Client
Number of Pre-Aeration Tanks	value	1	Basic Engineering
Number of Leach Tanks	value	2	Basic Engineering
Number of Adsorption Tanks	value	7	Basic Engineering
Cyanide Destruction Method	process	SO2/Air	Testwork
Detox Tank Retention Time	hours	3.4	Testwork

NOTE: Annual Plant throughput is estimated based upon an average full production rate of the mine. Tonnes per day and Tonnes per hour are estimated assuming a 90% availability for the plant.

Figure 17-1: Process Plant Flowsheet

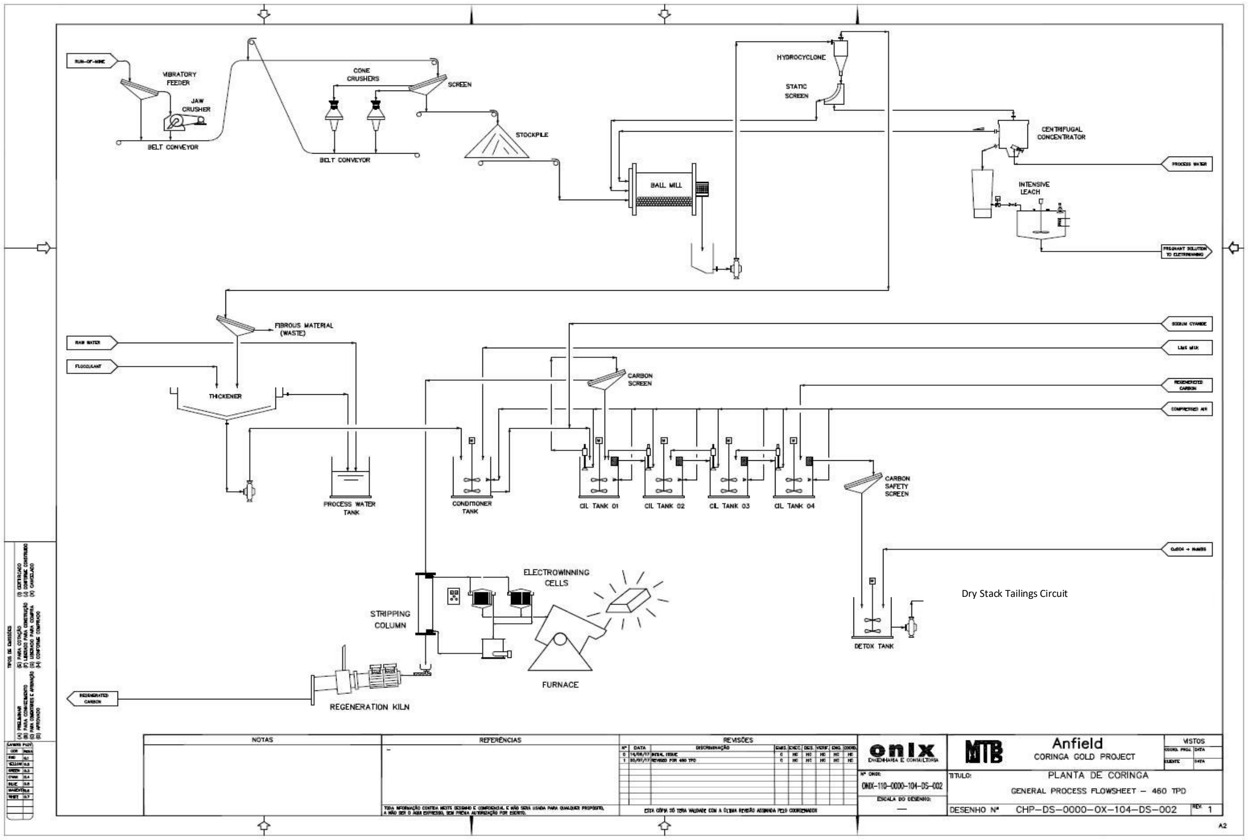
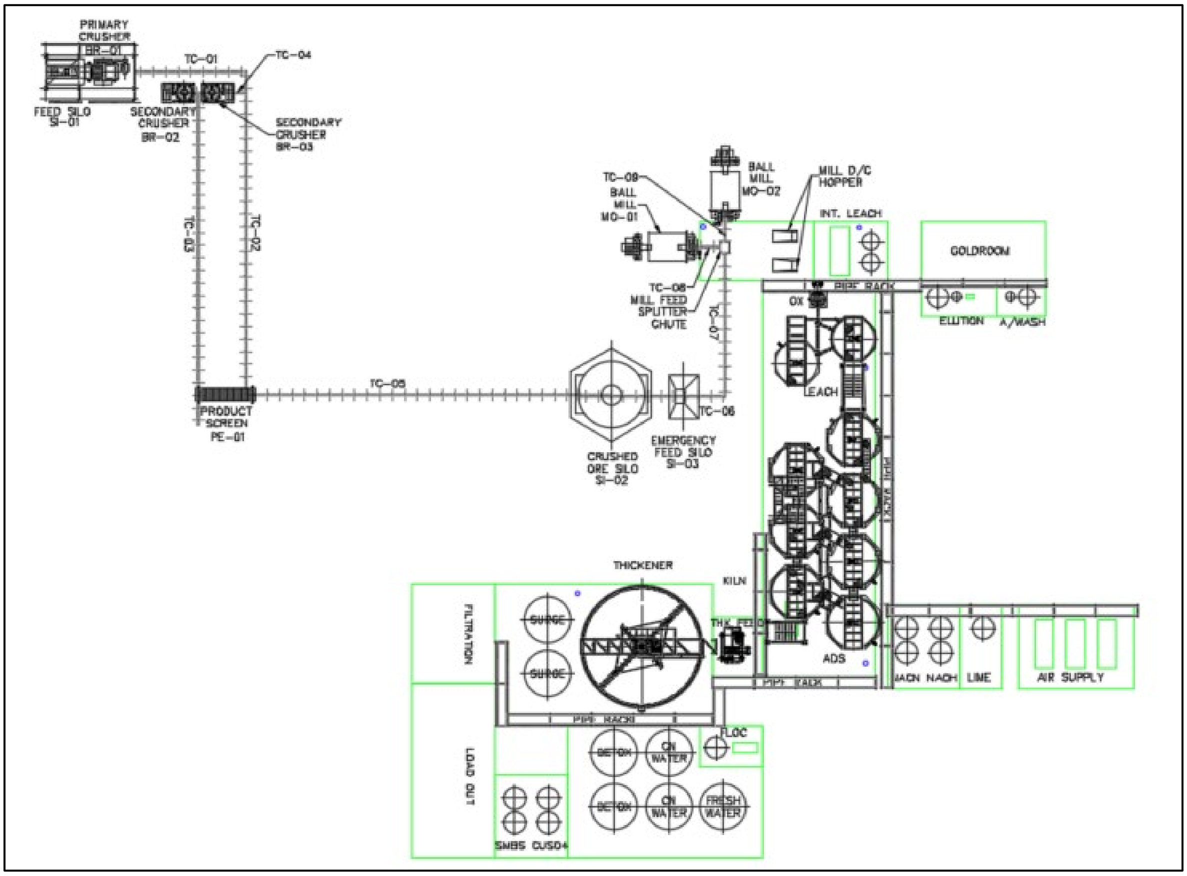


Figure 17-2: Process Plant General Arrangement



17.3.1 Energy Consumption

Power for the project will be generated onsite via diesel generators. Diesel power will be generated at an estimated cost of US$0.19 / kWh. Table **17**-**2** presents the estimated electrical power demand for the Coringa Gold Project at full operation by area (processing, mining, and camp) and totals 3.09 megawatts (MW). The estimated process plant total power demand at full production is 1.67 MW.

Table 17-2: Site Power Demand

Area	Demand MW*
Process Plant	1.67
Mining Operation	1.05
G&A	0.37
Total (Full Operation)	3.09
* megawatts	

17.4 Process Water Requirements

The tailings filtration circuit will internally recycle 85% of the process plant water. The additional 15% of make-up water will be sourced from a raw water pond that is filled from run-off and mine operations. Other planned sources are discussed in Section 18.4

17.5 Process Plant Consumables

Table 17-3 presents the estimated process plant consumables for a typical year of operation and includes reagents, grinding media, mill liners, and crusher liners.

Table 17-3: Process Consumables at 170,000 TPA

Consumables	Unit Cons. (kg/t)	Annual Cons. (kg)
Primary Crusher Liners	0.016	2,720
Secondary Crusher Liners	0.016	2,720
Ball Mill Liners	0.055	9,350
Grinding Balls	1.21	205,700
Sodium Metabisulfite	1.30	221,000
Activated Carbon	0.05	8,500
Hydrochloric Acid	0.30	51,000
Flocculant	0.01	1,700
Hydrated Lime	3.58	608,600
Sodium Cyanide	1.10	187,000
Copper Sulfate	0.20	34,000
Sodium Hydroxide	0.18	30,600
Smelting Reagents	0.01	1,700

17.6 Process Plant Manpower

The plant will operate 24 h/d, 365 d/y on a two 12 hour shifts per day. Three shift crews will work fourteen days on and seven days off. Table 17-4 through Table 17-7 tabulate the required staffing levels for process operations, process maintenance, laboratory operations, and all site electrical staff, including power station.

Table 17-4: Process Staffing

Position	per Shift	Total
Process Superintendent	N/A	1
Process Coordinator/Metallurgist	N/A	1
Process Shift Supervisor	1	3
Process Operator	7	24
Mobile Equipment Operator	0.5	2
Elution/Goldroom Operator	1	3
Subtotal		**34**

Table 17-5: Process Maintenance Staffing

Position	per Shift	Total
Maintenance Superintendent	N/A	1
Maintenance Supervisor	N/A	2
Maintenance Planner	1	3
Fitter	2	6
Boilermaker	1	3
Crane Operator / TA / Greaser	1	3
Lathe Operator	0.5	2
Subtotal		**20**

Table 17-6: All Site Electrical Staffing

Position	per Shift	Total
Electrical Coordinator	N/A	1
Electrical Supervisor / Planning	N/A	2
Process Plant Electrician	1	3
Mine Operations Electrician	1	4
Power Station Electrician	2	6
Subtotal		**16**

Table 17-7: Laboratory Operations Staffing

Position	per Shift	Total
Laboratory Supervisor	N/A	1
Laboratory Chief Technician	1	3
Laboratory Technician	3	9
Subtotal		**13**

Figure 17-3 through Figure 17-8 present the process flow diagrams of the crushing plant, grinding and classification circuit, CIP circuit, and tailings cyanide neutralization, thickening and filtration.

Figure 17-3: Crushing Circuit

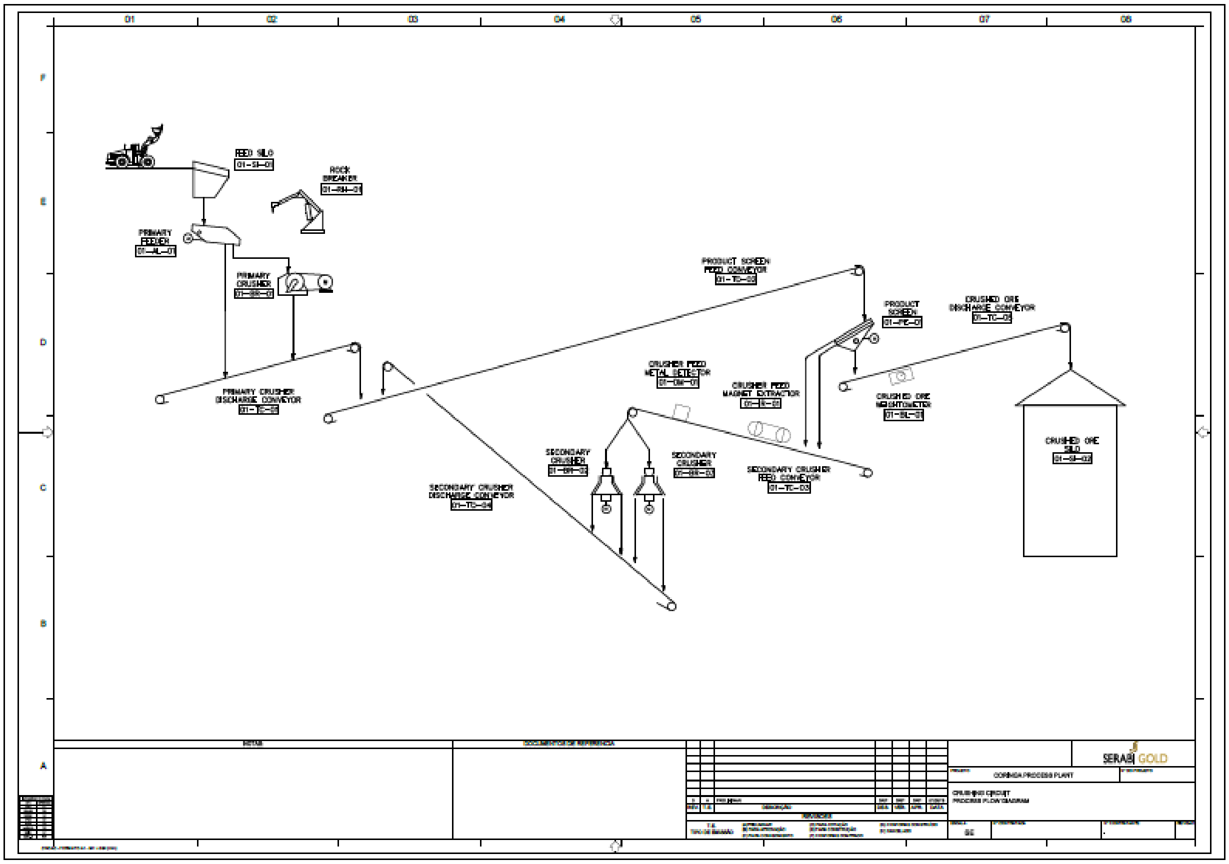


Figure 17-4: Grinding and Classification Circuit

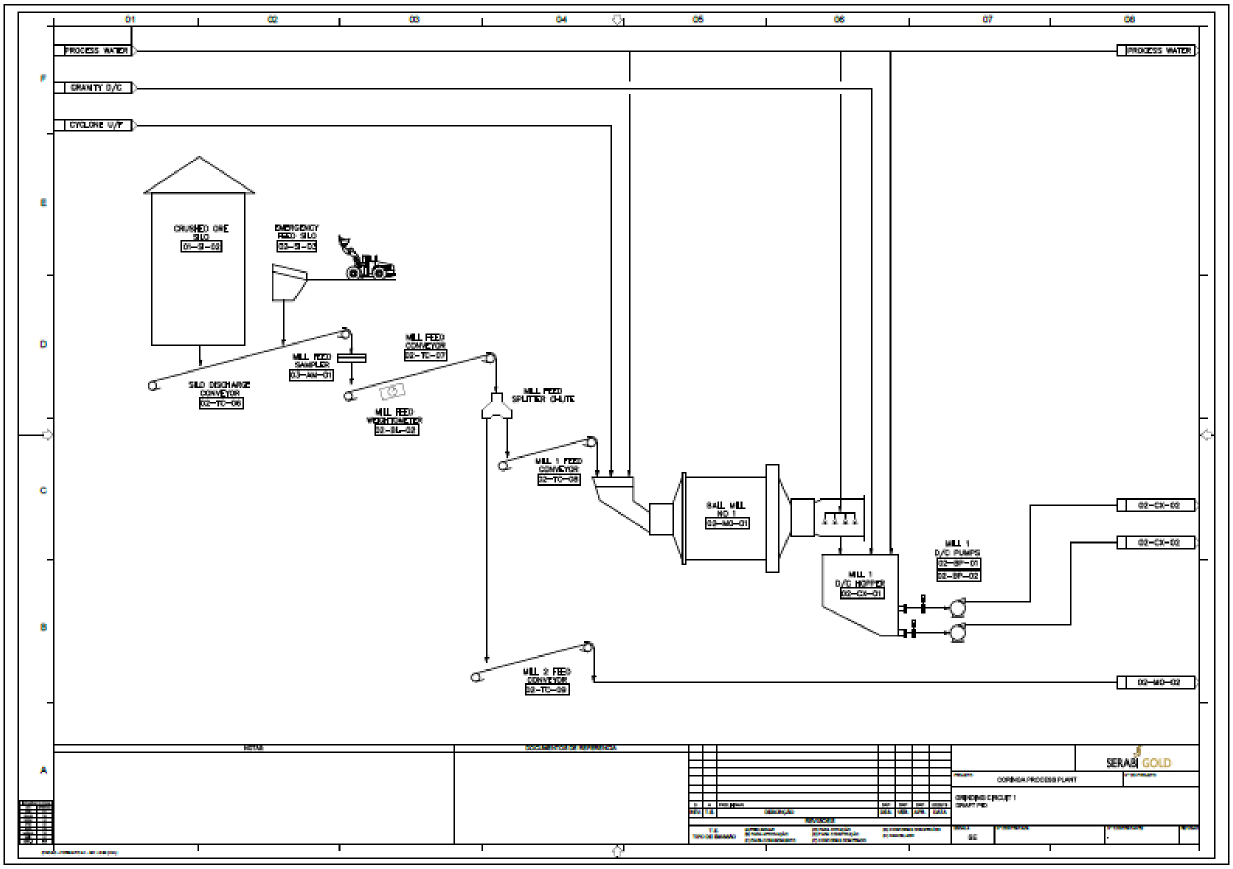


Figure 17-5: Grinding & Classification Circuit cont'd

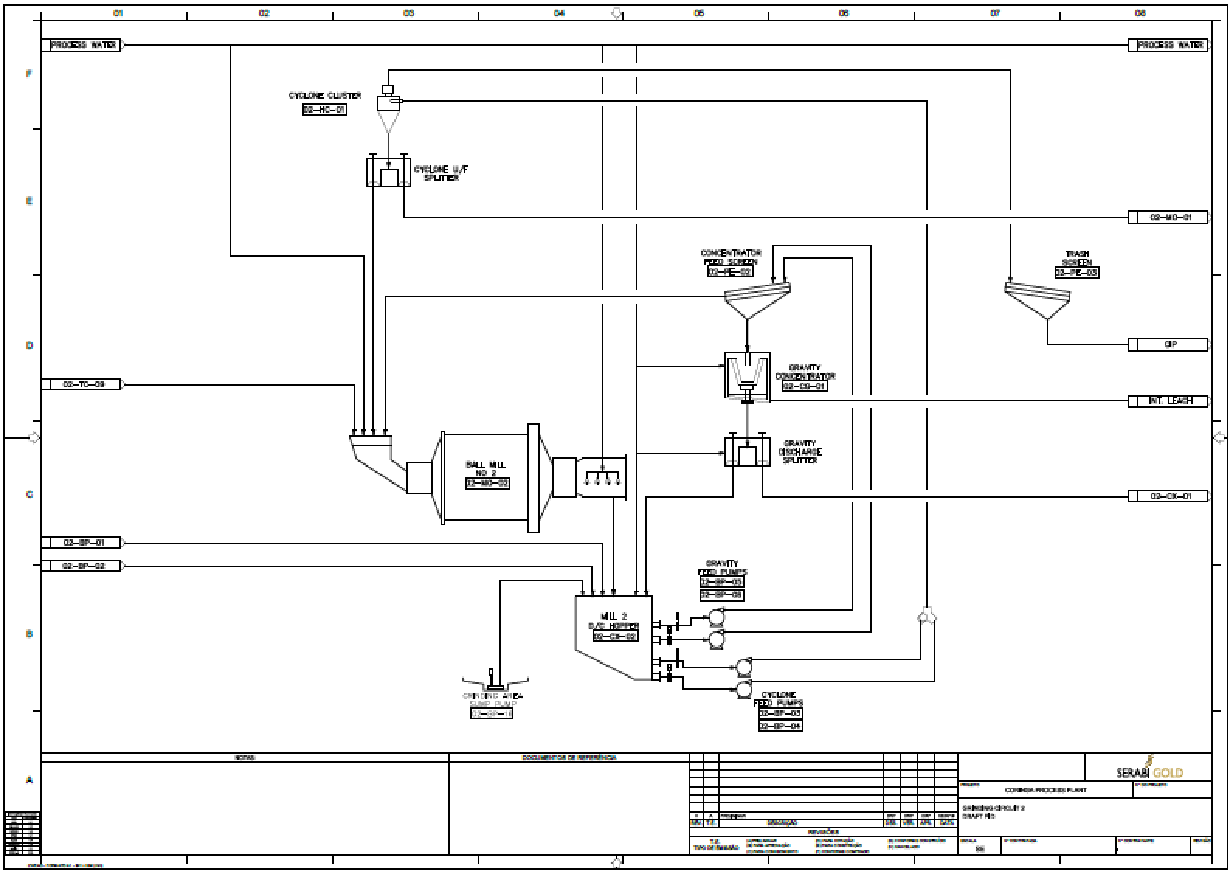


Figure 17-6: CIP Circuit

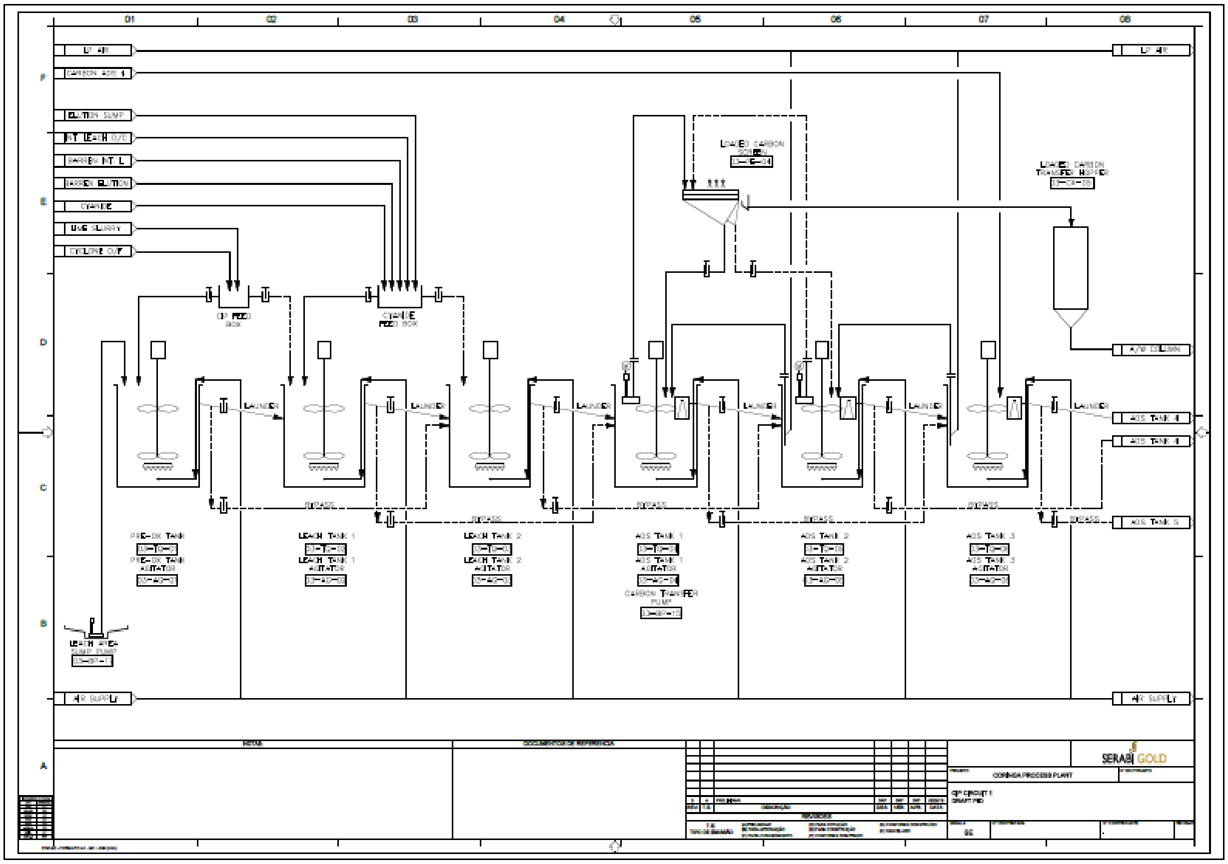


Figure 17-7: CIP Circuit cont'd

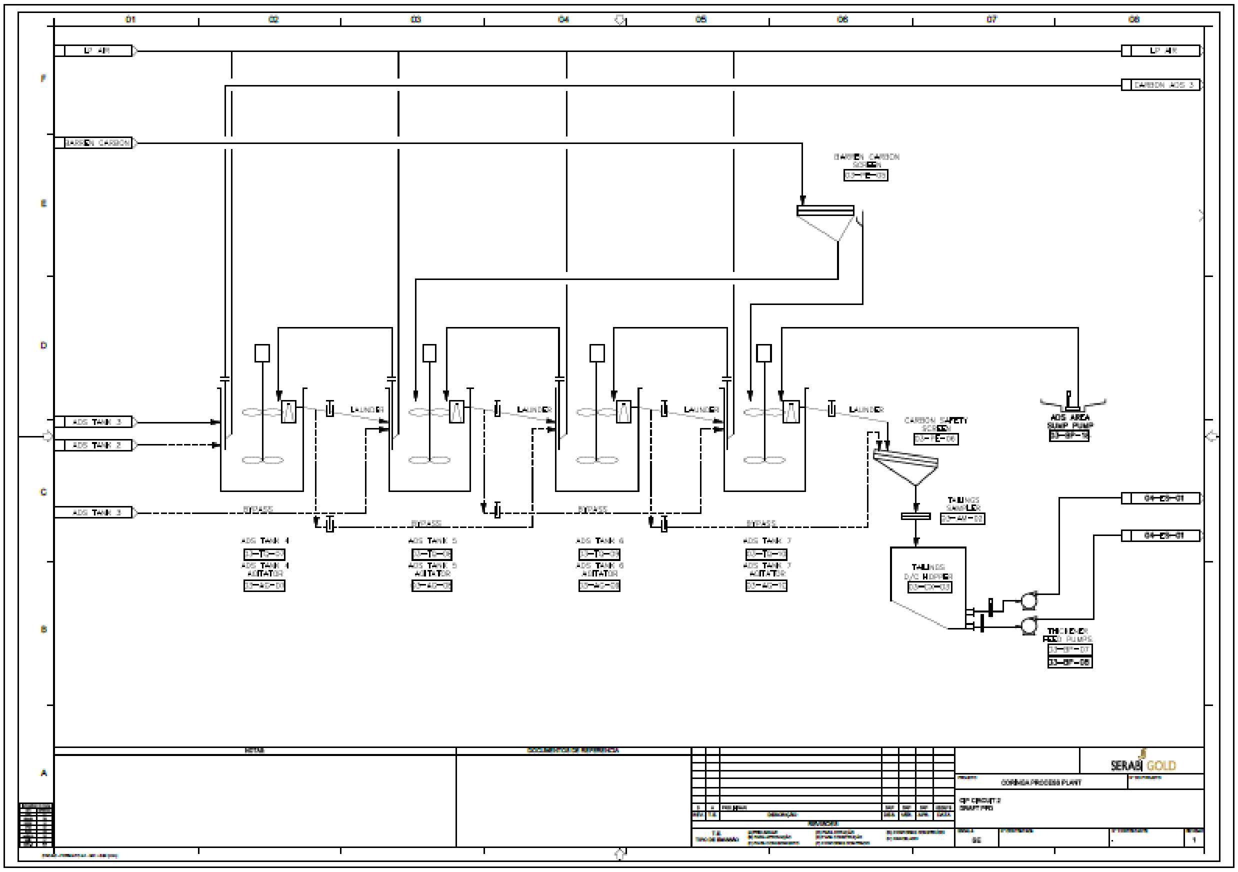
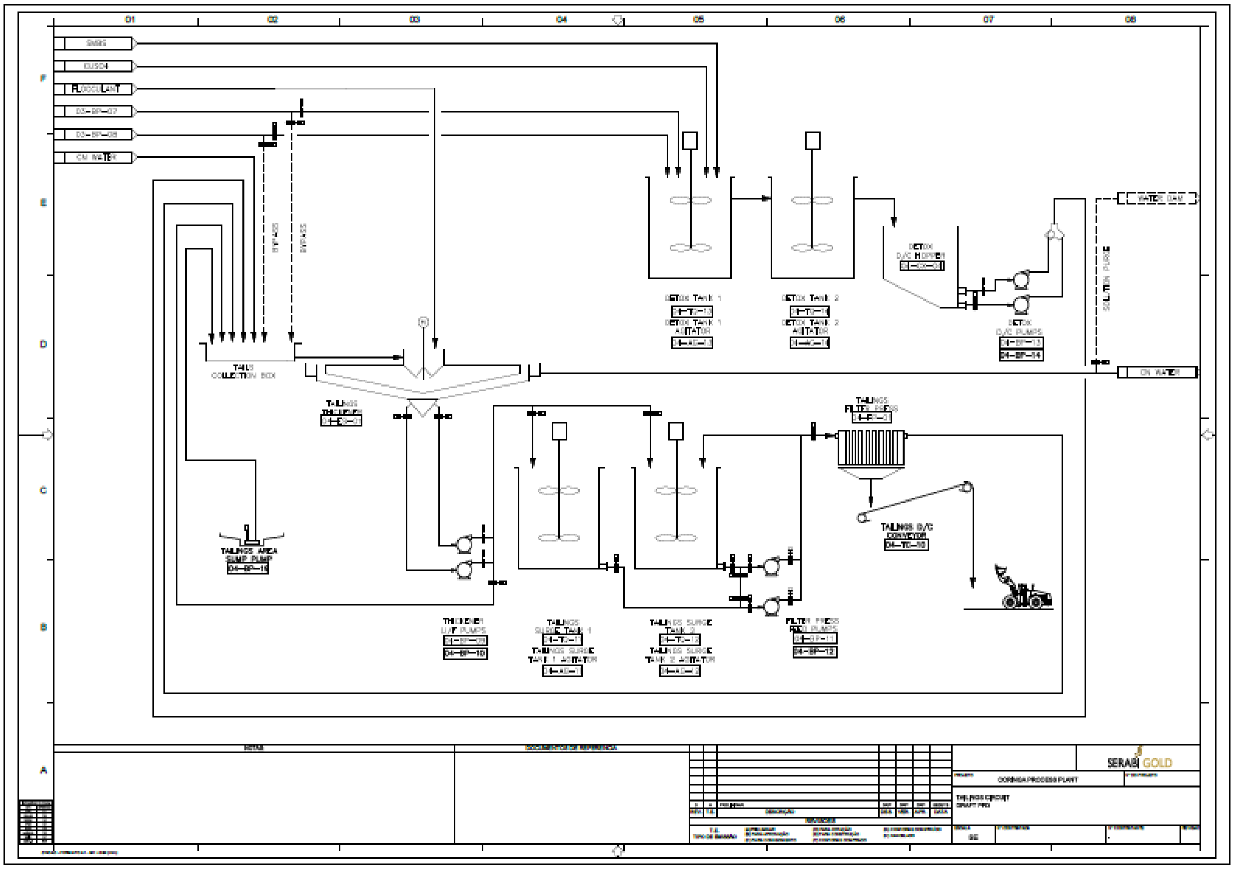


Figure 17-8: Tailings Circuit



18.0 Project Infrastructure

Access to the property is provided by paved (National Highway BR-163) and dirt roads. Novo Progresso (population approximately 30,000) is the closest major urban centre, and it can provide reasonable accommodation and basic goods and services. It is located along Highway BR-163 which is the main route for trucks carrying soya crops from the Sinop area in Mato Grosso State to ports in Itaituba and Santarem, on the Amazon River. Charter flights are available to and from Novo Progresso.

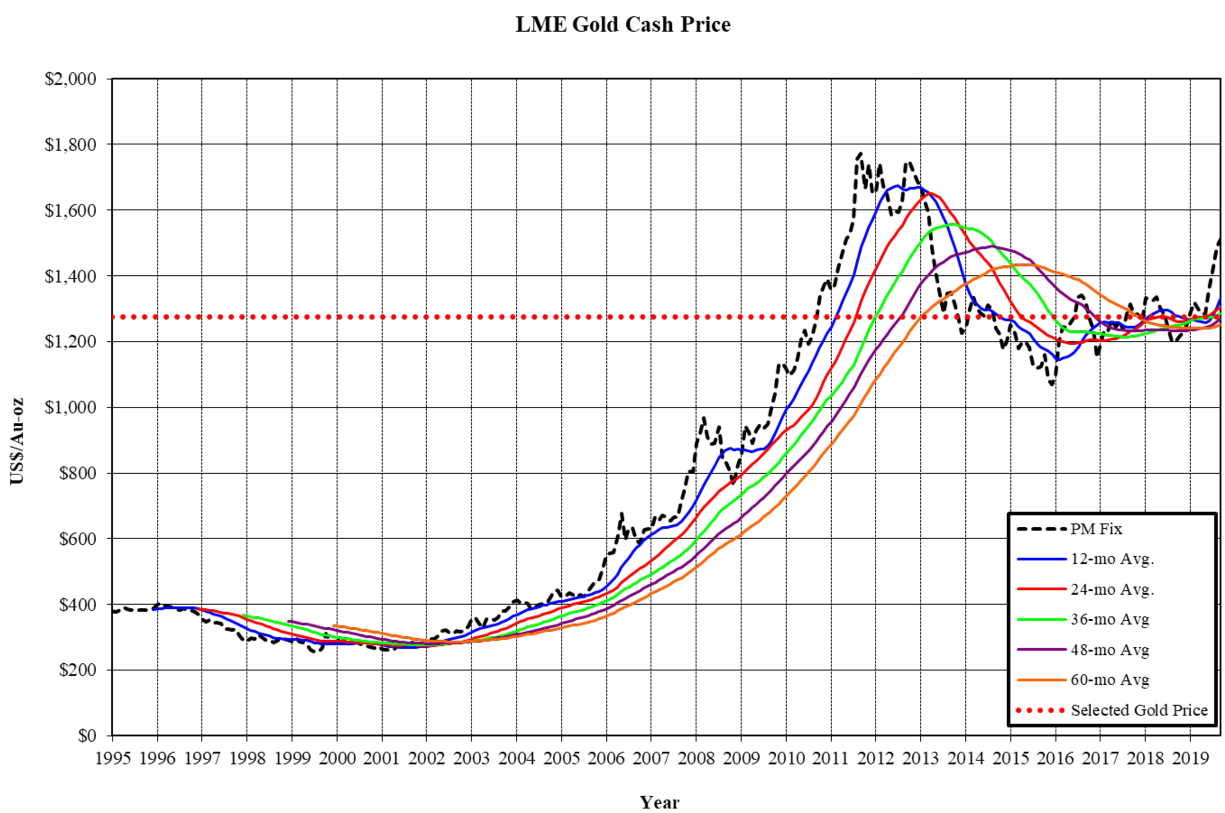
Existing facilities at the project include a 200-person field camp, core logging and temporary core storage facility, and dirt airstrip which can accommodate 4-6 person light aircraft locally referred to as areo-taxis. Two water wells provide the camp with drinking water, and septic tanks and leach fields provide for sewage waste disposal. A new sewage treatment plant provides waste disposal for the new camp facilities. Power at the camp is supplied by diesel generators. Telephone and internet service are via radio links to Novo Progresso. Short-wave radios provide communication within the project area.

Planned facilities include the construction of the process plant and dry stack tailings facility to the east of the Serra resource area. Five separate resources areas are planned to serve as underground mining areas: two in Galena & Mae de Leite (GAMDL), three in Meio & Como Queito (MCQ), and one in Serra. Waste rock will be stored close to each underground mine portal. The existing diesel generator set will be upgraded to provide power for the onsite facilities and with new power lines to distribute power to the resource mining areas. An explosive magazine will be utilized for storage of explosives in compliance applicable rules and regulations. A fuel depot will be required for light vehicles and mobile mining equipment.

19.0 Market Studies and Contracts

The primary metal of economic interest for the Coringa project is gold. Gold has a readily available market for sale in the form of gold doré or gold concentrates. Brazil is a significant producer of gold with several well-known gold companies currently operating in the country. Gold has become Brazil's second most important mining export after iron ore. There are smaller firms which are currently focused on developing projects in the state of Para, the same host state as the Coringa project. Figure 19-1 presents the gold market London PM fixed pricing through September 6th, 2019. The selected Gold price for the PEA is $1,275/oz which represents the 3-year trailing average through August 2016.

Figure 19-1: London Metals Exchange PM Gold Price



20.0 Environmental Studies, Permitting, and Social or Community Impact

On August 9, 2017, Chapleau was awarded environmental approvals for trial mining from SEMAS, including the LOPM, vegetation suppression, and fauna capture permits (see discussion of Production Permitting in Section 20.3). Subsequent approval is required from the DNPM to sell production, and Chapleau has initiated the process for obtaining this approval. Serabi also can continue to conduct exploration activities.

On May 10, 2017, Anfield received formal consent for the Coringa Gold Project from INCRA. INCRA's consent was required by SEMAS as a prerequisite to the issuance of the trial mining license and related permits needed to begin construction and operations at the Coringa Gold Project. Pursuant to the terms of that consent, the Company must negotiate a long-term land access agreement with INCRA, which is ongoing.

Relationships with local communities have been managed through regular, ongoing social communication activities, which have included dialogue workshops with community members and site visits with local authorities, business leaders, and media. Serabi has dedicated professionals who manage social outreach and environmental issues, and it has a long history of successful operation in the region.

Efforts are focused primarily on the community of PDS Terra Nossa and the nearby Municipality of Novo Progresso. In addition, Serabi must obtain some permits from the Altamira Municipality, where the Coringa Gold Project is located, and the sub-district of Castelo dos Sonhos. Serabi must also co-ordinate certain matters with stakeholders in Castelo dos Sonhos and in smaller towns located along the main highway that provides access to the project site.

20.1 Project Setting

As noted in Section 4 and Figures 4.2 and 4.3, the Coringa Gold Project concession is located within the boundaries of a farm (the Fazenda Coringa) situated along a boundary area between primary forest areas reserved as an indigenous buffer zone, and land impacted by decades-old government-sponsored agricultural clearance programs. Forested areas within the Coringa Gold Project concession and the adjacent buffer zone have also been previously impacted by illegal logging of high-value tree species and by artisanal/small scale "garimpeiro", mining. Chapleau controls the surface area required for the construction and operation of the Coringa Gold Project from the Fazenda Coringa, and no garimpeiro mining, logging, or agriculture will be permitted within the boundaries of the project during the construction, operation, and decommissioning/closure phases of mine life.

20.2 Environmental Studies

The first significant baseline studies of water quality, air quality, and flora and fauna within the Coringa Gold Project concession were conducted by Terra and Global Resource Engineering in 2015 and 2016 to support the development of the EIA/RIMA for the Coringa Gold Project. This work included studies in support of the individual environmental clearance permits required for the construction of specific elements of mine infrastructure. The latter permits typically include specific conditions that must be met as a condition of approval, including the monitoring of fauna displaced by clearance activities, the potential capture and relocation of individuals from specific species, and the collection and replanting of selected floral species.

The results of these studies and clearance actions will are detailed and summarized in the amended EIA/RIMA submitted to SEMAS in September 2019. Draft results available as of the effective date of this technical report confirm that although the Coringa Gold Project is located in areas previously impacted by intrusive human activities, forested areas still support a wide range of floral and faunal species. In keeping with these findings (and in addition to the relocation and replanting efforts required as part of the aforementioned permitting actions), Chapleau will establish a comprehensive Environmental Monitoring Plan as an element of its HSES management system, in order to assess the ongoing impact of Project operations on surface and groundwater quality and the key indicator species. The Environmental Monitoring Plan is designed to systematically prompt corrective and preventive action in response to any observations of negative trends detected from environmental monitoring.

Additional geochemical baseline studies were performed by GRE in 2013, 2015, and 2017 (MTB, 2017). These studies collected geochemical samples of potential mine waste rock and mine tailings to determine the potential to create ARD or other impacts to water quality resulting from mining operations.

20.3 Permitting

20.3.1 Legal and Regulatory Framework

Brazilian Federal Law 6938/1981 spells out general environmental policy and permitting requirements for all activities with contamination potential or involving extraction of natural resources. Prior to obtaining a mining concession, project proponents may conduct mineral exploration and limited (trial mining) processing of up to 50,000 t/y of ore with a Guia and pre-requisite environmental approval, the LOPM. Depending on the ecological circumstances, an applicant may also have to obtain authorizations for vegetation suppression/restoration and fauna capture/relocation. Companies may apply for expansions of trial mining ore processing limits once they are in production. As previously discussed, the Coringa Gold Project exercised this trial mining option and on August 9, 2017, was awarded an LOPM and accompanying fauna capture and relocation and vegetation suppression permits.

Chapleau is also engaged in a three-part environmental permitting process, which is required for the approval of the full mining operation. This process is summarized as follows:

- **Prior License (LP: "Licenca Previa"):** this permit confirms the selection of the best place for developing and conducting extractive activities, based on submission of a detailed EIA and RIMA, respectively. In addition, in Para State, public hearings are required to be held by the municipalities whose administrative areas encompass the project's social and environmental AIDs. Upon issuing the LP, SEMAS may choose to invoke specific requirements, known as LP conditions, which the applicant must implement before it can obtain its Installation License. Legislated timing for issuing the LP is nominally twelve months after the date of application, provided no further details and/or supplemental information is required by the regulator.

- **Installation License (LI: "Licenca de Instalacao"):** this permit allows the construction of the mine, pursuant to compliance with conditions raised in the LP. It also establishes conditions for obtaining the final Operations License. The LI application also requires submission of a detailed PCA. The granting of the LI means: (i) approval of the control, mitigation, and compensation measures proposed by the project proponent in the PCA, as well as the timetable for the implementation of such measures, (ii) approval of the characteristics of the specific engineering project, including its timetable for implementation, and, (iii) manifestation of the agreement between the project proponent and the regulatory authorities regarding adherence to the conditions of the LP. Legislated timing for issuing the license is nominally six months after the date of application, provided no further details and/or supplemental information are required by the regulator.
- **Operations License (LO: "Licenca de Operacao"):** this permit is issued following demonstration of compliance with LI conditions and allows the mine to commence production operations. The LO may establish additional mandatory conditions. Legislated timing for issuing the LO is six months after of the date of application, provided no further details and/or complementary information are required by the regulator.

In actual practice in Pará State, the time required for SEMAS approval may vary from the guidelines in the Federal law, depending on the complexity of the project and availability of review resources, among other factors. SEMAS will typically conduct the licensing process once it has evaluated the technical examination that was completed by the environmental agencies of the municipalities administering the areas in which the project is located. In addition, whenever applicable, SEMAS must also assess the opinion reports of other regulatory bodies at the national, state, and municipal levels that are involved in the licensing procedure; these may include INCRA, ITERPA, FUNAI, ICMBio, ANA, and IPHAN, among others.

In addition, CONAMA Resolution 237/1997 is a key component of the environmental licensing process and defines the specific activities or ventures that require an environmental license, including major elements of a mining operation. These include:

- mineral exploration involving drilling
- underground mining
- processing of non-ferrous metals, including gold
- construction and operation of dry stack tailings facilities and water diversion and drainage structures
- construction and operation of electrical transmission lines and substations
- construction and operation of water treatment plants
- construction and operation of sewage treatment plants
- treatment and disposal of solid wastes
- transportation, storage, and handling of dangerous materials.

Transportation, storage, handling, and usage of explosives requires separate approval by the Ministry of Defense. Depending on the final design characteristics of the Coringa Gold Project's fuel depot, additional approvals may be required from ANP.

Municipal administrations are responsible for participating directly in the environmental licensing process and must issue a document that establishes their position as to whether or not the project is in conformity with municipal soil use, occupation, and other regulations. In the case of the Coringa Gold Project, two municipalities are involved: Altamira, which administers the rural area within which most of the mining concessions and the actual mine and operational infrastructure are located, and Novo Progresso, which includes part of the concessions as well as the two settlements (Terra Nossa and the town of Novo Progresso) in which most of the social impacts and benefits of the project will be expressed. Other specific federal and Pará State public administration agencies may also engage in various aspects of the licensing process over which they may have technical authority or shared interest.

Environmental laws also provide for the participation of communities during the environmental licensing process. In practice, this occurs during public hearings.

With respect to water usage, the CNRH Resolution 55/2005 classifies mining ventures based on their impact on water resources. The Coringa Gold Project would be classified as a Scale 2 venture under this classification scheme, as it would involve:

- Limited use of surface water in the initial start-up of mining operations
- Use of groundwater (collected as mine dewatering water) for use in the mineral separation process
- Use of groundwater to supply the needs of the mining camp
- Discharges of excess water from in high precipitation/wet season conditions.

All uses of superficial water and groundwater at the Coringa Gold Project are subject to a grant process; such uses include the construction and operation of water collection ponds, diversion of watercourses, discharge of liquid effluents in watercourses, alteration of the rates of flow of watercourses, and any activities that would impact the level of the water table. Additionally, project proponents must also permit all water wells.

20.3.2 Regulatory Reporting Requirements

Once the mine is operating, Chapleau must file regular reports on environmental and operational performance, as suggested in the RCA/PCA and RIAA, and as may be confirmed or elaborated in the LO. Examples could include air quality or water quality monitoring reports; fuel, explosives, reagent usage data; and workforce illness/injury statistics.

20.3.3 Risks and Liabilities

Primary risks and liabilities associated with the Coringa Gold Project are summarized as follows, along with Serabi's general approach to risk mitigation:

- **Environmental risks**: Environmental risks and liabilities associated with exploration activities are minimal, but will include limited areas of forest clearance for construction of access roads; the construction of drilling pads; noise from traffic, drill rig, and generator operation; dust from roadways during dry season operation, erosion form disturbed ground, potential spills of fuel, lubricants, and drilling mud; and the potential for grass fires in dry conditions.

Risks during operations include potential reagent spills, generation of ARD, improper management of mine water, and fugitive dust emission.

- **Artisanal/small-scale mining**: As previously noted, Chapleau's concession area includes a number of historical garimpeiro workings which represent potential physical safety and environmental hazards if exploration sampling, trenching, core drilling, engineering field investigations, or construction activities are conducted in adjacent areas. Physical hazards will be clearly marked and physically barricaded where necessary.

  There are two areas of garimpeiro mine waste on the site. One is the Mãe de Leite area located along the road between the Serra and Galena portals. This is an area of intensive historical garimpeiro activity including about 2.3 ha of tailings deposition. The Mãe de Leite tailings are acid-generating and contain elevated concentrations of mercury from historical amalgamation processing. In the wet season, the Mãe de Leite area produces acidic leachate and runoff, typically with a pH of between 3.5 and 4.0. This water could potentially cross the access road to the Galena portal and flow to the northwest. In addition, the Come Quieto garimpeiro area lies adjacent to the current access road at the point where the Meio vein crosses the road. This area is smaller (approximately 0.5 ha of exposed tailings) and also produces acidic leachate. Due to its presence within the immediate zone of activity, Chapleau will evaluate alternatives for managing these environmental tailings.

  While illegal miners are no longer operating at the Coringa Gold Project, the threat of garimpeiro influx to Serabi's concessions remains, and Chapleau must therefore maintain an effective and vigilant security program. In addition, possible garimpeiro activity near the property or upriver from its operations could impact local stakeholders and possibly generate social and/or environmental problems for Serabi.

- **Indigenous peoples**: The project is located near a 10-km buffer zone that surrounds a Kayapo indigenous land reserve. The nearest Kayapo village is about 40 km northeast from the project in a straight line, and access by road or river from the Coringa Gold Project area takes several hours. Because these villages are located far from the Coringa Gold Project, they will not incur any negative impacts; there will be no mine-related traffic near them, and they will not experience noise, water, or dry season dust impacts. Unauthorized travel or interaction with the Kayapo by Chapleau's workforce or contractors will be strictly prohibited. For these reasons, Serabi's position is that risks are minimal and under current Brazilian legislation the Company does not anticipate that any special social studies are required. Nonetheless to comply with good international practice the Company expects to work closely with SEMAS on this matter to ensure that any concerns that are raised during the licensing process are adequately addressed, and if required, appropriate consultation undertaken with relevant parties.

21.0 Capital and Operating Costs

Capital and operating costs were estimated by GRE using previous years of actual operational expenses (OPEX) as well as capital expenses (CAPEX) for the Palito Gold Mine which is very similar both geologically and geographically to the Coringa Project. In cases where past actual costs were not available or comparable to the Coringa Project, GRE used cost data from Infomine and the experience of senior staff to estimate costs. The project was credited capital costs for equipment that has already been purchased. An exchange rate of 3.8 Brazilian Real to 1 USD was used to convert all costs to USD.

21.1 Capital Cost Estimates

Table 21-1 breaks down the costs by initial, sustaining, and total capital costs. Initial capital costs are defined as all costs until a sustained positive cash flow is reached. This includes labor and development costs in pre-production years; however, this is offset by revenue from gold recovered during development through the ore body. Sustaining capital costs are defined as capital costs incurred after sustained positive cash flow until the end of mine life.

Table 21-1 Coringa Capital Costs

Category	Initial Capital (US$m)	Sustaining Capital ($US)	Total Capital ($US)
Mine Equipment	$1,852,000	$4,091,000	$5,943,000
Mine Infrastructure	$6,449,000	$2,993,000	$9,442,000
Site Facilities	$2,262,000	$1,211,000	$3,473,000
Process Plant	$9,353,000	$0	$9,353,000
Permitting	$300,000	$0	$300,000
Exploration and Engineering Studies	$500,000	$0	$500,000
Closure Cost	$0	$1,000,000	$1,000,000
Working Capital - Recapture at End	$1,775,000	-$1,775,000	$0
Contingency	$3,983,200	$1,659,000	$5,642,200
Net Pre-production income	-$1,790,636		-$1,790,636
TOTAL	$24,683,564	$9,179,000	$33,862,564

All In Sustaining Costs (AISC) is broken down by both ounce and tonne in Table 21-2below. Note that this cost breakdown includes labor.

Table 21-2 All In Sustaining Costs (AISC)

Category	US$ / oz	US$ / tonne
Mining Ore	$362.45	$91.84
Process Plant	$212.88	$53.94
G&A	$40.11	$10.16
Op. Cash Costs	$615.44	$155.94
Refining Costs	$17.87	$4.53
Royalties	$59.71	$15.13

Category	US$ / oz	US$ / tonne
Contingency	$123.09	$31.19
Capital	$36.37	$9.21
Total Cash Costs	$852.48	$216.00

21.1.1 Surface and Underground Facilities

Facilities on the surface and underground are permanent or semi-permanent installations. These facilities are as follows:

- Portal development capital cost includes clearing and grubbing the ground, excavation of soil and loose rock, and reinforcement of the ground surrounding the mine entrance.
- Ventilation fan housing is placed over the top of a completed ventilation raise.
- Compressors have a small structure and pad in addition to a power source.
- Power lines are laid out from generators to portals, office buildings, process plant, and shop.
- Power plant capital includes a foundation, housing, and maintenance area.
- Maintenance shop capital includes the building, equipment, and tools/materials contained within the building.
- Tailings storage facility is a dry stack system. The capital includes clearing the land, earthworks, and liner placement.
- Office costs include buildings, utilities, furniture, equipment, and vehicles.
- Sewage treatment consists of existing septic tanks and leach fields
- A raw water reservoir will be located near the process plant
- Fuel depot will be built near the existing camp
- Existing roads will be upgraded and connect the camp facilities to the mine portal areas
- Underground store rooms will provide immediate access to supplies frequently used during mining

The capital costs for surface and underground facilities are listed in Table 21-3 below.

Table 21-3 Surface and Underground Facilities Capital Cost

Description	Cost
Portal	$87,000
Ventilation	$21,000
Compressors	$295,000
Power Lines	$220,000
Power Plant	$1,052,000
Maintenance Shop	$380,000
Dry Stack Tailings Storage Facility	$2,742,000
Office	$505,000
Water Treatment	$53,000
Sewage Treatment	$79,000
Water Reservoir	$158,000

Description	Cost
Fuel Depot	$79,000
Roads	$66,000
Underground Store Room	$62,000

21.1.2 Process Plant

The $5,479,000 initial capital cost of the plant utilizing the small milling circuit is incurred during year -3. An additional cost of $3,874,000 to install the large mill and associated equipment is incurred in year -1. Costs of various units of the processing plant are listed below in Table 21-4.

Table 21-4 Unit Costs of Processing Plant

Description	Cost
Equipment	
Crushing	$165,000
Grinding	$191,000
Gravity and Leach	$94,000
Elution and Carbon Handling	$556,000
Reagents	$33,000
Dry Stack Tailings	$1,514,000
Laboratory	$242,000
Utilities	$93,000
Mobile Equipment	$358,000
General Refurbishment	$263,000
Subtotal	$3,510,000
Installation	
Installation Labor	$2,500,000
Concrete	$807,000
Piping and Valves	$500,000
Structural Steel	$200,000
Instrumentation	$100,000
Electrical	$600,000
Coatings and Sealants	$106,000
Spares and First Fill	$526,000
Engineering/Management	$1,000,000
Subtotal	$6,339,000
Total	$9,849,000

21.1.3 Initial Mine Equipment

Table 21-5 below provides the initial quantity and unit cost of mining equipment required for startup. For the purpose of this report, the initial quantity includes year -3 to year 1. Initial units on hand that were already purchased by Serabi are shown in Table 21-6 below and have already been credited to the project capital costs. Major mobile equipment will be purchased under a "lease to own" contract to reduce initial capital costs. The interest rate of 6.85% and lease duration of 36 months was based upon previous rental contracts for major mobile equipment at Serabi's Palito mine.

Table 21-5 Initial Equipment Purchase

Description	Quantity	Cost Each	Total
Boart Longyear Seco 250	6	$8,947	$53,684
ST2G	4	$320,416	$1,281,663
FEL VOLVO L90	3	$103,291	$309,872
Dump truck Volvo FMX 460	5	$110,291	$551,453
Anfo loader	8	$3,158	$25,263
Boomer T1D	0	$446,526	$0
Diamec 232	1	$126,000	$126,000
Telehandler - CAT TL	0	$35,721	$0
Fuel/lube truck	1	$69,026	$69,026
Personnel truck	1	$92,105	$92,105
Pickup truck	1	$142,105	$142,105
Bit sharpening machine	1	$20,000	$20,000
Water Truck	1	$58,921	$58,921
Gators - ATV	1	$94,737	$94,737
Total			**$2,824,829**

Table 21-6 Equipment Previously Purchased

Description	Quantity	Credit
ST2G	1	$320,416
Boomer T1D	2	$893,053
telehandler - CAT TL	1	$35,721
Main fans - 150 hp	3	$134,211
Auxilary fans - 50 hp	4	$57,895
DOZER Komatsu D61EX	1	$113,158
Excavator PC200	1	$83,347
Multiple, smaller gen sets equivalent to a single, larger	1	$1,052,316
pickup	4	$426,316
Total		**$3,116,431**

21.1.4 Working Capital

Working capital is the necessary cash on hand for the next period's operating cost. The estimated total is $1,775,000. Note that this costs is recovered at the end of the project.

21.1.5 Closure

Closure costs were estimated to be $1,000,000 for the Coringa Project. These cost will be incurred in the final year of production.

21.2 Operating Cost Estimates

21.2.1 Controllable Operating Costs

Controllable operating costs are those that can be adjusted in the short term based on the operator's business decisions.

21.2.1.1 Labor

Labor for the mine includes both hourly and salaried employees. Salaried positions are generally middle management and above. The quantity of required personnel per piece of equipment, number of meters driven in a period, and number of shifts per day were used to estimate the number of hourly employees needed. In addition to the number of positions filled, and the rate of pay, a burden of 68% was added to the labor cost. Burden covers the benefits of employment including paid leave, sick days, etc. The required number of employees required by year is listed below in Table 21-7 and the annual wages are listed in Table 21-8.

Table 21-7 Annual Manpower and Labor Costs

Year	-3	-2	-1	1	2	3	4	5	6	7	8	9
Admin	7	10	20	26	24	36	27	20	16	14	8	2
Mine Operations	50	80	120	186	198	237	208	170	155	148	108	50
Mine Maintenance	41	55	55	55	55	55	55	55	55	55	55	41
Plant Operations	6	13	21	29	29	34	29	24	23	23	13	10
Plant Maintenance	2	4	10	19	14	22	21	12	9	8	5	2
Corporate	0	0	0	0	0	0	0	0	0	0	0	0
Electrical	3	5	9	12	11	16	12	9	8	7	4	2
Assay Lab	10	13	13	13	13	13	13	13	13	13	13	10
Health/Safety/Environ	10	13	13	13	13	13	13	13	13	13	13	10
Total # of Employees	**129**	**193**	**261**	**352**	**356**	**426**	**377**	**316**	**293**	**281**	**219**	**126**

Table 21-8 Annual Wages

Year	Mine	Plant	Admin
-3	$1,959,000	$395,000	$477,000
-2	$2,883,000	$775,000	$638,000
-1	$3,603,000	$1,133,000	$840,000
1	$4,893,000	$1,496,000	$954,000
2	$5,303,000	$1,373,000	$903,000
3	$5,945,000	$1,739,000	$1,143,000
4	$5,435,000	$1,528,000	$962,000
5	$4,750,000	$1,214,000	$836,000
6	$4,489,000	$1,126,000	$759,000
7	$4,344,000	$1,083,000	$719,000
8	$3,522,000	$787,000	$601,000
9	$1,989,000	$517,000	$377,000

21.2.1.2 Mining

The average $91.84 per tonne mining cost was determined by summing the costs of equipment, consumable materials, maintenance, and labor costs and dividing by the number of tonnes mined during the life of mine.

21.2.1.3 Process Plant

The per tonne processing cost of $53.94 was determined by considering the costs related to equipment, materials, electricity, labor, and maintenance costs associated with the plant, dry stack facilities, and laboratory.

21.2.2 Non-Controllable Operating Costs

Operating costs imposed upon the mine by an outside influence are non-controllable operating costs.

21.2.2.1 Taxes and Royalties

GRE relied upon Serabi to determine applicable taxes and royalty rates for the project. Taxes incurred are based on Brazil's federal tax rates applied after standard deductions (loss carry forward, depreciation, etc.). Corporate income tax, or Imposto sobre a Renda das Pessoas Jurídicas (IRPJ) & social contribution on net income, or Contribuição Social sobre o Lucro Líquido das Pessoas Jurídicas (CSLL) amount to a tax rate of 34%. Beginning in year 2, an incentive, the Superintendency of Development for the Amazon, or Superintendência do Desenvolvimento da Amazônia (SUDAM) adjusts the tax rate down by 18.75%. The total royalty rate for the Coringa project is 4.75%. This consists of a 2.50% royalty to Sandstorm, 1.5% owed to the federal government, and a 0.75% owed to the landowner(s) of the mine site.

21.2.2.2 Exploration and Permit Fees

Direct operating costs of exploration are limited to definition drilling. The cost of operating the diamec drill to update the resource model prior to secondary development and production is the only planned exploration activity in the model. Permitting cost estimates are based upon recommendations from Serabi to be a one-time capital cost of $300,000.

21.2.2.3 General and Administrative

Corporate costs for the project were set to $0 to avoid double counting existing corporate costs that are already split between other existing properties owned by Serabi.

22.0 Economic Analysis

22.1 Project Forecast Summary

Information contained and certain statements made herein are considered forward-looking within the meaning of applicable Canadian securities laws. These statements address future events and conditions and so involve inherent risks and uncertainties. Actual results could differ from those currently projected.

The Project is planned to be an underground mine with carbon and pulp leaching of the ore. Gold recovery is expected to average 95%. The mine and mill will operate 365 days per year. The mill will run two 12 hour shifts per day, and the mine will run three 6 hour shifts per day. The cutoff grade used during stope evaluation is 6 gpt, this leads to an average grade of 8.3 gpt for the life of mine.

This technical report is a preliminary economic assessment and partially utilizes inferred mineral resources. Inferred mineral resources are considered too speculative, geologically, to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

Economic analysis of the base case scenario for the Project uses a price of US$1,275/oz for gold, which is the 36-month trailing average price through August 2019 and $250/oz less than the closing spot price at the beginning of September 2019. The economic model shows an After-Tax Net Present Value @ 10% (“NPV-10”) of $30.7 million, and an After-Tax Internal Rate of Return (“IRR”) of 30.7%. Table 22-1 summarizes the projected NPV-10 Pre-tax, NPV-10 Post-tax, Internal Rate of Return (IRR), years of positive cash flows to repay the negative cash flow (“payback period) for the Coringa Project.

Table 22-1 Summary of Coringa Economic Results

Parameter	Value
Annual IRR	30.7%
NPV @ discount rate (Pre TAX) 10%	$37,190,000
NPV @ discount rate 10%	$30,696,000
Payback Period (years)	2.25
Maximum Cumulative Negative Cashflow	$(24,684,000)
Typical Full Production Period AU oz	38,000
Typical Full Production Annual Tonnes	170,000

NOTE: All NPV, cashflow, ounces, and tonnages are rounded to the nearest thousand.

All in Sustaining Cost (AISC) was calculated on a both on an ounce basis and on a tonne basis. The AISC was further broken down into categories to show the individual contribution of mining, processing, overhead, operating, refining, royalties, contingency, and capital costs.

Table 22-2 AISC Breakdown

AISC including labor	US$ / oz	US$ / tonne
Mining Ore	$362.45	$91.84
Process Plant	$212.88	$53.94
G&A	$40.11	$10.16
Op. Cash Costs	$615.44	$155.94
Refining Costs	$17.87	$4.53
Royalties	$59.71	$15.13
Contingency	$123.09	$31.19
Capital	$36.37	$9.21
Total Cash Costs	$852.48	$216.00

22.2 Taxes, Royalties

Total royalties for the project are 4.75%. Royalties consist of 2.5% Sandstorm NSR, 1.5% Brazil Government NSR, and 0.75% Land Owner NSR. Taxes for the project consist of 25% IRPJ, 9% CSLL, and 18.75% SUDAM Incentive which is subtracted from the tax rate after production begins.

22.3 Mine Life

The 11.5 year mine life has been categorized into pre-production, full-production, declining production & closure.

22.3.1 Preproduction (Year -3 to Year -1)

Preproduction is defined as the period of time it takes to develop the mines to the point that bulk tonnage can start to be produced from the stopes. Preproduction starts the beginning of year -3 and ends at the beginning of year 1. During this time period relatively low tonnage is produced as result of development of the deposit. Tonnes steadily increase during preproduction due to a larger number of ore drifts and stope raises occurring as needed before stope production begins. The revenue from gold mined during development helps offset the development costs which are defined as an initial capital expenditure for the project. The maximum negative cumulative cashflow is -$24,684,000.

22.3.2 Full Production (Year 1- Year 4)

Full stope production starts year 1 and continues till year 4. It is important to note that within this period of full production a ramp up period of 2 years has been applied to the stope production in order to allow for the miners and equipment operators to gain the skills and efficiency needed to operate at 100% bulk stope production capacity. The payback period occurs during year 2.

22.3.3 Declining Production and Closure (Year 5- Year 9)

Production begins declining in year 5 when it drops to 101,000 tonnes and continues until Year 9 when tonnage is only 11,000 for the year. Closure costs of $1,000,000 are expected to occur during Year 9.

22.4 Economic Model Optimization

The economic model was optimized by using a multivariable data table which examined almost 200 scenarios varying: cutoff grade, number of simultaneous stopes, drifting method, and ramp up period. Once the data table was run, the economic model was analyzed according to: years of mine life, payback period, NPV, IRR, AISC, and maximum cumulative negative cashflow.

These parameters were used to pick a scenario with a fixed cutoff grade, simultaneous number of stopes, drifting method, and ramp up period. Once a base case was selected from the data table, case specific edits to the mine plan and model were made in order to best represent the specific scenario chosen.

22.5 Economic Model Results

Table 22-3 Coringa Project Economic Model Summarized By Year

	Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Recovered Gold (troy oz)	**3,000**	**9,000**	**23,000**	**39,000**	**42,000**	**43,000**	**36,000**	**29,000**	**27,000**	**21,000**	**12,000**	**4,000**
Gold Production Revenue	**$4,381,000**	**$11,470,000**	**$29,586,000**	**$50,018,000**	**$52,989,000**	**$54,620,000**	**$46,179,000**	**$36,566,000**	**$35,043,000**	**$26,254,000**	**$15,554,000**	**$4,599,000**
Transportation/Security	-$33,000	-$85,000	-$220,000	-$373,000	-$395,000	-$407,000	-$344,000	-$272,000	-$261,000	-$196,000	-$116,000	-$34,000
Refining Charge	-$13,000	-$34,000	-$87,000	-$147,000	-$155,000	-$160,000	-$135,000	-$107,000	-$103,000	-$77,000	-$46,000	-$13,000
Other Charges	-$16,000	-$42,000	-$107,000	-$182,000	-$192,000	-$198,000	-$168,000	-$133,000	-$127,000	-$95,000	-$56,000	-$17,000
Sandstorm NSR	-$108,000	-$283,000	-$729,000	-$1,233,000	-$1,306,000	-$1,346,000	-$1,138,000	-$901,000	-$864,000	-$647,000	-$383,000	-$113,000
Brazil Government NSR	-$65,000	-$170,000	-$438,000	-$740,000	-$784,000	-$808,000	-$683,000	-$541,000	-$518,000	-$388,000	-$230,000	-$68,000
Land Owner NSR	-$32,000	-$85,000	-$219,000	-$370,000	-$392,000	-$404,000	-$341,000	-$270,000	-$259,000	-$194,000	-$115,000	-$34,000
OPEX Mine Equip&Materials	-$2,276,000	-$3,968,000	-$7,596,000	-$9,580,000	-$8,441,000	-$11,378,000	-$7,750,000	-$4,911,000	-$3,399,000	-$2,594,000	-$1,846,000	-$916,000
OPEX Plant Equip&Materials	-$779,000	-$1,364,000	-$4,012,000	-$7,339,000	-$5,469,000	-$8,458,000	-$7,646,000	-$4,648,000	-$3,725,000	-$3,250,000	-$1,843,000	-$492,000
OPEX Admin Equip&Materials	-$193,000	-$257,000	-$331,000	-$373,000	-$356,000	-$444,000	-$377,000	-$331,000	-$302,000	-$287,000	-$245,000	-$156,000
OPEX Mine Labor	-$1,959,000	-$2,883,000	-$3,603,000	-$4,893,000	-$5,303,000	-$5,945,000	-$5,435,000	-$4,750,000	-$4,489,000	-$4,344,000	-$3,522,000	-$1,989,000
OPEX Plant Labor	-$395,000	-$775,000	-$1,133,000	-$1,496,000	-$1,373,000	-$1,739,000	-$1,528,000	-$1,214,000	-$1,126,000	-$1,083,000	-$787,000	-$517,000
OPEX Admin Labor	-$477,000	-$638,000	-$840,000	-$954,000	-$903,000	-$1,143,000	-$962,000	-$836,000	-$759,000	-$719,000	-$601,000	-$377,000
OPEX Corp Labor	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
OPEX Contingency	-$1,216,000	-$1,977,000	-$3,503,000	-$4,927,000	-$4,369,000	-$5,821,000	-$4,740,000	-$3,338,000	-$2,760,000	-$2,455,000	-$1,769,000	-$889,000
EBITA	**-$3,180,000**	**-$1,090,000**	**$6,767,000**	**$17,413,000**	**$23,550,000**	**$16,368,000**	**$14,932,000**	**$14,313,000**	**$16,350,000**	**$9,924,000**	**$3,995,000**	**-$1,017,000**
Depreciation	-$226,000	-$290,000	-$1,403,000	-$2,039,000	-$2,317,000	-$2,548,000	-$2,641,000	-$2,685,000	-$2,708,000	-$2,771,000	-$2,495,000	-$421,000
Loss Carry Forward (LCF)	-$8,000	-$367,000	-$1,609,000	-$4,612,000	-$6,370,000	-$4,146,000	-$3,687,000	-$3,489,000	-$4,093,000	-$2,146,000	-$451,000	-$60,000
Tax Basis	$19,000	$857,000	$3,755,000	$10,762,000	$14,863,000	$9,674,000	$8,603,000	$8,140,000	$9,549,000	$5,007,000	$1,053,000	$140,000
Tax - IRPJ & CSLL	-$6,000	-$292,000	-$1,277,000	-$3,659,000	-$5,053,000	-$3,289,000	-$2,925,000	-$2,768,000	-$3,247,000	-$1,703,000	-$358,000	-$48,000
SUDAM Incentive	$4,000	$161,000	$704,000	$2,018,000	$2,787,000	$1,814,000	$1,613,000	$1,526,000	$1,791,000	$939,000	$197,000	$26,000
Add back Depreciation	$226,000	$290,000	$1,403,000	$2,039,000	$2,317,000	$2,548,000	$2,641,000	$2,685,000	$2,708,000	$2,771,000	$2,495,000	$421,000
Add back LCF	$8,000	$367,000	$1,609,000	$4,612,000	$6,370,000	$4,146,000	$3,687,000	$3,489,000	$4,093,000	$2,146,000	$451,000	$60,000
Profit	**-$3,183,000**	**-$1,221,000**	**$6,195,000**	**$15,772,000**	**$21,284,000**	**$14,893,000**	**$13,620,000**	**$13,072,000**	**$14,894,000**	**$9,161,000**	**$3,834,000**	**-$1,039,000**

	Year -3	**Year -2**	**Year -1**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**
CAPEX Mine Equipment	-$465,000	-$544,000	-$843,000	-$994,000	-$686,000	-$1,074,000	-$423,000	-$329,000	-$80,000	-$9,000	-$496,000	$0
CAPEX Mine Infrastructure	-$3,168,000	-$442,000	-$2,839,000	-$254,000	-$2,258,000	-$362,000	-$119,000	$0	$0	$0	$0	$0
CAPEX Site Facilities	-$2,262,000	$0	$0	-$624,000	$0	$0	$0	$0	-$587,000	$0	$0	$0
CAPEX Process Plant	-$5,479,000	$0	-$3,874,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
CAPEX Permitting	-$300,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CAPEX Exp. and Eng. Studies	-$500,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CAPEX Closure Cost	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	-$1,000,000
CAPEX Working Capital	-$1,179,000	-$178,000	-$418,000	-$690,000	$0	$0	$0	$0	$0	$0	$0	$2,465,000
CAPEX Contingency	-$2,275,000	-$197,000	-$1,511,000	-$374,000	-$589,000	-$287,000	-$108,000	-$66,000	-$133,000	-$2,000	-$99,000	$0
Cash Flow	**$18,811,000**	**-$2,582,000**	**-$3,290,000**	**$12,835,000**	**$17,751,000**	**$13,170,000**	**$12,969,000**	**$12,677,000**	**$14,094,000**	**$9,150,000**	**$3,239,000**	**$426,000**
Cumulative Cash Flow	**$18,811,000**	**$21,393,000**	**-$24,684,000**	**-$11,848,000**	**$5,903,000**	**$19,072,000**	**$32,041,000**	**$44,718,000**	**$58,812,000**	**$67,962,000**	**$71,201,000**	**$71,627,000**

NOTE: Numbers have been rounded to the nearest thousand and may not total due to rounding.

This technical report is a preliminary economic assessment and partially utilizes inferred mineral resources. Inferred mineral resources are considered too speculative, geologically, to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability. The following table summarizes the results of the PEA.

22.6 Economic Model Sensitivity

Table 22-4 below summarizes the sensitivity to: Au Price, Capital Costs, and Operating Costs.

Table 22-4: PEA Sensitivity Summary

Gold Price (per ounce)	Units	BASE CASE $1,275	$1,350	$1,450
Pre tax NPV (5%)	US$m	$55.7	$71.3	$92.2
Pre tax NPV (10%)	US$m	$37.2	$49.4	$65.8
Post tax NPV (5%)	US$m	$47.3	$61.3	$79.6
Post tax NPV (10%)	US$m	$30.7	$41.7	$56.1
Post tax IRR	%	31%	37%	46%
Project after tax cash flow	US$m	$71.6	$90.1	$114.0
Average annual free cash	US$m	$11.5	$13.7	$16.6
Average gross revenue	US$m	$43.4	$46.0	$49.4

Table 22-5 provides an expanded sensitivity to: Au Price, Capital Costs, and Operating Costs.

Table 22-5 Model Sensitivity: Au Price, OPEX, CAPEX

	Metal Price	Operating Expenditure		Capital Expenditure		NPV (post tax) -10%	NPV (post tax) -5%	IRR (post tax)
Sensitivity to Gold Price	USD/oz (gold)	USD / tonne ROM	USD / oz (AuEq)	Initial USD(m)	Sustaining USD(m)	USD(m)	USD(m)	
	$1,550	$207	$866	$16,201,000	$9,179,000	$70,173,000	$97,567,000	54.0%
	$1,450	$204	$861	$19,286,000	$9,179,000	$56,070,000	$79,647,000	45.8%
	$1,350	$202	$856	$22,370,000	$9,179,000	$41,683,000	$61,327,000	37.4%
	$1,275	$200	$852	$24,684,000	$9,179,000	$30,696,000	$47,278,000	30.7%
	$1,200	$198	$849	$27,020,000	$9,179,000	$19,680,000	$33,196,000	23.8%
Sensitivity to Opex								
10%	$1,550	$207	$927	$19,300,000	$9,179,000	$60,119,000	$84,977,000	47.3%
10%	$1,450	$204	$922	$22,385,000	$9,179,000	$45,916,000	$66,933,000	39.2%
10%	$1,350	$202	$918	$25,475,000	$9,179,000	$31,259,000	$48,194,000	30.6%
10%	$1,275	$200	$914	$27,814,000	$9,179,000	$20,241,000	$34,109,000	23.8%
10%	$1,200	$198	$910	$30,192,000	$9,179,000	$9,183,000	$19,975,000	16.5%
-10%	$1,550	$207	$804	$13,102,000	$9,179,000	$80,207,000	$110,143,000	60.9%
-10%	$1,450	$204	$799	$16,186,000	$9,179,000	$66,134,000	$92,245,000	52.7%
-10%	$1,350	$202	$794	$19,271,000	$9,179,000	$52,011,000	$74,309,000	44.2%
-10%	$1,275	$200	$791	$21,584,000	$9,179,000	$41,113,000	$60,405,000	37.7%
-10%	$1,200	$198	$787	$23,898,000	$9,179,000	$30,126,000	$46,356,000	30.9%
Sensitivity to Capex								
10%	$1,550	$207	$869	$18,193,000	$10,009,000	$67,894,000	$95,051,000	50.9%
10%	$1,450	$205	$864	$21,277,000	$10,009,000	$53,791,000	$77,130,000	43.1%
10%	$1,350	$203	$859	$24,362,000	$10,009,000	$39,404,000	$58,810,000	34.9%
10%	$1,275	$201	$856	$26,675,000	$10,009,000	$28,416,000	$44,761,000	28.5%
10%	$1,200	$199	$852	$29,012,000	$10,009,000	$17,401,000	$30,679,000	21.7%
-10%	$1,550	$206	$862	$14,210,000	$8,350,000	$72,452,000	$100,084,000	57.3%
-10%	$1,450	$203	$858	$17,294,000	$8,350,000	$58,349,000	$82,164,000	48.8%
-10%	$1,350	$201	$853	$20,379,000	$8,350,000	$43,962,000	$63,844,000	40.0%
-10%	$1,275	$199	$849	$22,692,000	$8,350,000	$32,975,000	$49,795,000	33.2%
-10%	$1,200	$197	$846	$25,029,000	$8,350,000	$21,959,000	$35,713,000	26.0%

23.0 Adjacent Properties

There is no information and no published reserves for any garimpeiro operations adjacent to the Coringa Gold Project.

24.0 Other Relevant Data

Mato Velho is another zone of garimpeiro workings separate from the main Coringa veins. It is located in the northern part of the Coringa Gold Project property. In 2007, Chapleau carried out mapping, soil sampling, and diamond drilling in the area (13 holes; 1,980 m). This area contains potential targets for future exploration to further expand the defined mineral resources for the Coringa Gold Project.

25.0 Interpretations and Conclusions

Based on the evaluation of the data available from the FS, the QPs have drawn the following conclusions:

- The deposits at the Coringa Gold Project are composed of several semi-continuous, steeply dipping gold-bearing veins and shear zones hosted in granite and rhyolite. The mineralized vein system extends for over 12,000 meters in a northwesterly direction, has variable widths ranging from less than 1 centimeter to over 14 meters.
- The geologic model of the vein system has an average thickness of 0.5 meters true thickness and a strike length of approximately 7,000 meters when GAMDL, SERRA, and MCQ are included.
- Most veins remain open to further expansion through drilling, both along strike and at depth.
- Drilling to date has intersected the vein at a maximum depth of 350 meters.
- Drilling to date has outlined an Indicated mineral resource estimate (at a cut-off grade of 2 g/t Au) of 735 ktonnes at 8.24 g/t Au, which contains 195 koz of gold.
- Drilling to date has also outlined an Inferred mineral resource estimate (at a cut-off grade of 2 g/t Au) of 1.645 Mtonnes at 6.54 g/t Au, which contains 346 koz of gold.
- The narrow but high-grade veins at the Coringa Gold Project are considered to be amenable to underground extraction methods.
- The results of the PEA using a base price of $1,275/oz gold are an After-Tax Net Present Value @ 10% (“NPV-10”) of $30.7 million, and an After-Tax Internal Rate of Return (“IRR”) of 30.7%. This technical report is a preliminary economic assessment and partially utilizes inferred mineral resources. Inferred mineral resources are considered too speculative, geologically, to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.
- Ongoing exploration during the planned mining operation will further define the mineral resources for the Coringa Gold Project. As with other small underground mines, such as Serabi’s Palito mine, definition drilling during operations often increases the mineral resources and extents the mine life. The QPs believe that definition drilling will likely increase the mineral resources for Coringa given the multiple intersections indicating parallel vein structures which were not modelled in the current mineral resource. Definition drilling is anticipated to provide sufficient information to determine the geologic and grade continuity of these parallel structures so that they can be incorporated into the mineral resource estimate and mine plan.
- There are no known factors related to metallurgical, environmental, permitting, legal, title, taxation, socio-economic, marketing, or political issues which could materially affect the mineral resource estimate.
- In the QPs’ opinion, Serabi’s analytical procedures are appropriate and consistent with common industry practice. The laboratories are recognized, accredited commercial assayers. There is no relationship between Serabi and SGS, Geosol Laboratorios Ltda in Vespasiano-Minas Gerais in Brazil. The sampling has been carried out by trained technical staff under the supervision of a QP

and in a manner that meets or exceeds common industry standards. Samples are properly identified and transported in a secure manner from the site to the lab.

- Observation of the drilling and core handling procedures during the site visit inspection and validation of the collected data indicate that the drill data are adequate for interpretation.
- In the QPs' opinion, the database management, validation, and assay QA/QC protocols are consistent with common industry practices.
- The metallurgical test work on the Coringa project was extensive and well documented.
- The samples employed for metallurgical testing appear representative of the resource.
- The ore responds well to flotation and concentrate leaching as well as direct whole ore leaching.
- The recommended flowsheet consists of crushing, grinding, gravity separation, and intensive gravity concentrate leaching, pre-aeration, and whole ore CIL.
- The ore is relatively hard with high bond work index ranging from 17 to 25 kwh/t. The crushing work index ranged from 6 to 11 kWh/t, and the abrasion index varied from 0.34 to 0.41. The ore is classified as abrasive.
- Gravity concentration is very effective with good gold recoveries (26% - 68% recovery), but the presence of galena may complicate the cleaning process and should be considered in the final design.
- The ore does not appear grind sensitive for leaching at least between a P80 of 75 and 150 µm. Finer grinds do provide moderate leach recovery improvements.
- There is some active carbon in the ore resulting in "preg-robbing," but it was successfully managed through the use of a carbon in leach (CIL) system.
- Pre-aeration will improve the leach results due to the presence of significant sulfide minerals and should be incorporated into the final flowsheet.
- Whole ore leaching reagent consumptions are reasonable. NaCN consumption was moderately variable and is expected to be in the range of 1 -2 kg/t. Lime consumption showed higher variability, generally in the range of 2 kg/t but increasing in some instances to 10 kg/t. This is likely dependent on the sulfide grades of the ore.
- The use of the SO2/Air systems appears adequate for cyanide destruction. Care will have to be taken in monitoring the quality of recycled water.
- Copper may build up on the activated carbon, and an acid wash circuit should be included to manage this.
- The whole ore CIL recoveries do not appear to be grade sensitive for gold and moderately grade sensitive for silver.
- Results from the Plenge test program are anticipated to be used project the metallurgical performance of planned materials for processing at the Coringa Gold Project. Results from the earlier RDi and TDP test programs support results from the Plenge program and altogether are useful to support the stated overall representativeness of the samples to the various deposits.

The anticipated gold and silver recoveries for the Coringa Gold Project deposits are presented below:

- Serra and Galena deposits – 96% for gold and 57% for silver
- Meio deposit – 94% for gold and 74% for silver

25.1 Risks

- It is unknown how deep historic surface mining has occurred. An allowance for this should be included in future mine plans.
- Brazilian political change, fluctuations in the national, state, and local economies and regulations and social unrest.
- Currency exchange fluctuations.
- Fluctuations in the prices for gold and silver, as well as other minerals.
- Risks relating to being adversely affected by the regulatory environment, including increased regulatory burdens and changes of laws.

25.2 Opportunities

- There is a potential for increasing the estimated mineral resources with infill drilling as well as exploration drilling from underground and surface.
- While the mineralized trend of veins is known to extend over a minimum 12 km strike length (Figure 7.2), only in few places has it been drilled sufficiently to identify inferred or higher mineral resources (Serra, Meio, Galena, Mãe de Leite, Come Quieto, Demetrio, and Valdette). Large segments of veins remain untested or partially tested, some with significant mineralized vein intersections that remain open to offset drilling. These zones could yield additional mineralization for the project through discovery or enhancement of currently identified inferred to indicated resources. Highest priority targets for resource expansion include Come Quieto, Mãe de Leite, and Galena, all of which host open Inferred mineral resources and in the case of Galena, Indicted mineral resources. Other zones such as Mato Velho have yielded significant mineral intersections but have not been drilled in sufficient density for inclusion as inferred resource. Enhancement of mineral resources at the Coringa Gold Project has a high probability with additional drilling.
- The project is partially staffed with key management in place. Serabi plans to use experienced mining and supporting personnel from its Palito Operations to further staff Coringa, integrating new employees at Palito. This will provide Coringa with experienced mining personnel minimizing the training requirements of the project and at the same time place new miners with the experienced team at Palito.
- The project is located in an area with existing and active mining operations with similar characteristics to the mining techniques proposed in this study. The mining techniques employed at Serabi’s Palito mine are directly applicable to Coringa.

26.0 Recommendations

- Additional engineering studies - $250,000
- Additional extensional drilling along strike and depth - $250,000
- Test geophysical anomalies identified from reprocessing past geophysical data. - $100,000
- Oxygen in leach should be investigated as it may improve the overall leach kinetics and specifically enhance the silver extraction - $20,000
- The gravity recovery system needs to be fully defined, and a method to manage the presence of galena should be considered. Further, the treatment of the intensive leach tails needs to be further developed - $50,000
- The production of additional saleable metal products requires further investigation $50,000
- The primary grind should be optimized to determine the cost benefit of a coarser grind - $25,000.

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CERTIFICATE of AUTHOR

I, Kevin J. Gunesch do hereby certify that:

1. I am currently employed as Principal Mining & Civil Engineer by Global Resource Engineering, Ltd at:

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2. I am a graduate of the Colorado School of Mines with a Bachelor of Science degree in Mining Engineering (2000).
3. I am a registered Professional Engineer in the State of Alabama (27448).
4. I have worked as a Mining Engineer for a total of 19 years since my graduation from university, as an employee as of several mining companies and as a consulting engineer. During that time, I have completed numerous resource estimates, mine plans, reclamation plans, economic evaluations, operating budgets, production reconciliations, tailings storage facility designs, heap leach pad designs, and waste rock facility designs for many operating mines and mining projects including coal, industrial minerals, and precious metals.
5. 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.
6. I am responsible for the preparation of the technical report titled "Preliminary Economic Assessment Technical Report, Coringa Project, Pará, Brazil" with an effective date of September 6th, 2019 (the "Technical Report") with specific responsibility for Sections 1-6, 14-16, 18-19, 21-27. I conducted a personal 4 -day visit of the subject property in November 2018.
7. I have personally completed an independent review and analysis of the data and written information contained in this Technical Report.
8. I have previously had involvement with the properties that are the subject of the Technical Report as an Independent Qualified Person for prior reports completed in 2009, 2012, 2015, and 2019.
9. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43- 101.

10. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchanges or other regulatory authority and any publication by them, including electronic publication in the public company files on the websites accessible by the public, of the Technical Report.
12. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 21st day of October 2019

Kevin J. Gunesch (Signature)

Signature of Qualified Person

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CERTIFICATE of AUTHOR

I, Jeffrey Todd Harvey, PhD DO HEREBY CERTIFY THAT:

1. I am currently employed as Principal Metallurgist by Global Resource Engineering, Ltd at:

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1. I am a Society of Mining Engineers (SME) Registered Member Qualified Professional in Mining/Metallurgy/Mineral Processing, #04144120.
2. I hold a degree of Doctor of Philosophy (PhD) (1994) in Mining and Mineral Process Engineering from Queen’s University at Kingston. As well as an MSc (1990) and BSc (1988) in Mining and Mineral Process Engineering from Queen’s University at Kingston.
3. I have practiced my profession since 1988 in capacities from metallurgical engineer to senior management positions for production, engineering, mill design and construction, research and development, and mining companies. My relevant experience for the purpose of this Mineral Resource Estimate is as the test work reviewer, process designer, process cost estimator, and economic modeler with 25 or more years of experience in each area.
4. I have taken classes in mineral processing, mill design, cost estimation and mineral economics in university, and have taken several short courses in process development subsequently.
5. I have worked in mineral processing, managed production and worked in process optimization, and I have been involved in or conducted the test work analysis and flowsheet design for many projects at locations in North America, South America, Africa, Australia, India, Russia and Europe for a wide variety of minerals and processes.
6. I have supervised and analyzed test work, developed flowsheets and estimated costs for many projects including International Gold Resources Bibiani Mine, Aur Resources Quebrada Blanca Mine, Mineracao Caraiba S/A, Avocet Mining Taror Mine, Mina Punta del Cobre Pucobre Mine, and others, and have overseen the design and cost estimation of many other similar projects.
7. I have worked or overseen the development or optimization of mineral processing flowsheets for close to one hundred projects and operating mines, including copper flotation and acid heap leach SX/EW processes.
8. I have been involved in or managed many studies including scoping studies, prefeasibility studies, and feasibility studies.
9. I have been involved with the mine development, construction, startup, and operation of several mines.

10. I have read the definition of "Qualified Person" set out in National Instrument 43-101 and certify that by reason of my education, affiliation with a professional organization (as defined in National Instrument 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of National Instrument 43-101.
11. I have not visited the project.
12. I am responsible for Sections 13 and 17 of the technical report titled "Preliminary Economic Assessment Technical Report, Coringa Project, Pará, Brazil" with an effective date of September 6th, 2019 (the "Technical Report") and have contributed to Sections 1, 2, 3, 24, 25, 26, and 27.
13. I am independent of the issuer as described in section 1.5 by National Instrument 43-101.
14. I have previously had involvement with the properties that are the subject of the Technical Report as an Independent Qualified Person for the prior report completed in 2019.
15. I have read National Instrument 43-101 and Form 43-101F1. The Resource Estimate has been prepared in compliance with the National Instrument 43-101 and Form 43-101F1.
16. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 21st day of October 2019

J. Todd Harvey (Signature)

Signature of Qualified Person

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CERTIFICATE of AUTHOR

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1. I am currently employed as Principal Environmental Engineer by Global Resource Engineering, Ltd at:

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2. I graduated from Dartmouth College and the Colorado School of Mines.
3. I am a member, in good standing, of the Board of Colorado Professional Engineers.
4. I have 22 years of experience in environmental engineering, mine water management, and geochemistry.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. I am responsible for the preparation of Sections 20 and portions of Sections 1, 4, 16, 18, 25, 26 and 27 of the technical report titled "Preliminary Economic Assessment Technical Report, Coringa Project, Pará, Brazil" with an effective date of September 6th, 2019 (the "Technical Report").
7. I most recently visited the Coringa Gold Project from March 1st to March 8th 2017.
8. I am independent of the issuer applying all of the tests in Section 1.5 of NI 43-101.
9. I have previously had involvement with the properties that are the subject of the Technical Report as an Independent Qualified Person for prior reports completed in 2012, 2015, and 2019.
10. My prior involvement with the project has been as a technical consultant on prior Feasibility Study work performed on the project.
11. I have read NI 43-101, Form 43-101F1 and the Technical Report and confirm the Technical Report has been prepared in compliance with that instrument and form.
12. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Sections of the Technical Report for which I am responsible contain all scientific and

technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 21st day of October 2019

Larry Breckenridge (Signature)

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2. I am a MMSA Qualified Professional in Geology, #01519QP.
3. I hold a degree of PhD of Science (2000) in geology (Tectonics - structural geology) from Tehran Azad University (Sciences & Research Branch).
4. I have practiced my profession since 1994 in capacities from expert of geology to senior geologist and project manager positions for geology, seismic hazard assessment and mining exploration.
5. I have been involved with many studies including scoping studies, prefeasibility studies, and feasibility studies.
6. I have read the definition of “Qualified Person” set out in National Instrument 43-101 and certify that by reason of my education, affiliation with a professional organization (as defined in National Instrument 43-101) and past relevant work experience, I fulfill the requirements to be a “Qualified Person” for the purposes of National Instrument 43-101.
7. I conducted a personal 4 -day visit of the subject property in November 2018
8. I am responsible for Sections 7, 8, 9, 10, 11, and 12 of the technical report titled “Preliminary Economic Assessment Technical Report, Coringa Project, Pará, Brazil” with an effective date of September 6th, 2019 (the “Technical Report”) and parts of Sections 1, 2, 3, 24, 25, and 26.
9. I am independent of the issuer as described in section 1.5 by National Instrument 43-101.
10. I have previously had involvement with the properties that are the subject of the Technical Report as an Independent Qualified Person for the prior report completed in 2019.
11. I have read National Instrument 43-101 and Form 43-101F1. The Resource Estimate has been prepared in compliance with the National Instrument 43-101 and Form 43-101F1.
12. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 21st day of October 2019

Hamid Samari (Signature)

Signature of Qualified Person

"Hamid Samari"

Print name of Qualified Person