brasilGRAFITE

AMENDED NI 43-101 TECHNICAL REPORT
PRELIMINARY ECONOMIC ASSESSMENT
BRASIL GRAFITE S.A.
ON THE SANTA CRUZ GRAPHITE PROJECT
ITABELA, BAHIA, BRAZIL

Prepared For
Brasil Grafite S.A.

Report Compilation:
Luiz Eduardo Pignatari, Qualified Person, (Comisión Minera Chile)

Geology and Resource Modeling:
Aldo Moreno, Qualified Person, P. Geologist (CCRRCH)

Mine Planning, Economics:
Dr. Giorgio de Tomi, Qualified Person, CEng, MIMMM

Effective Date: August 21th, 2017

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 SUMMARY

1.1 GENERAL

This NI 43-101 Preliminary Economic Assessment Technical Report - PEA ("PEA") has been prepared at the request of Brasil Grafite S.A. ("BGSA").

BGSA holds 100% interest in the Santa Cruz Graphite Project (the "Project") comprised of 13 mineral rights near the town of Itabela, Bahia, Brazil, totaling approximately 13,000 hectares, containing jumbo and large flake graphite at surface.

The PEA covers technical and financial aspects of the Project, demonstrating the information supports further more advanced mining studies. An indicated resource of 15 million tonnes at a grade of 2.70% Cg and an inferred resource of 3.5 million tonnes ata grade of 2.90% graphite has been defined in accordance with NI 43-101. Mine planning outlines a total of 12.0 million tonnes of potentially mineable resources with a diluted grade of 2.63% Cg, providing support for a 19 year open pit mine with average yearly production of 15,800 tpa. Initial capital expenditure is estimated at US$20.5 million with an average Life of Mine (LOM) operating cost of US$413 per ton produced.

Years 1 through 5 benefit from a higher average grade of 3.15% Cg and lower strip ratio (SR) of 0.45, resulting in average production of 18,900 tpa at US$316 operating costs yielding US$15,800,000 per annum in free cash flow.

The Project has several important competitive advantages that contribute to attractive financial returns and risk – return parameters:

- NPV (5%) of US$117 million, post-tax IRR of 78%, 2 years payback period;
- Free cash flow of US$15,800,000 per annum (p.a.) on years 1-5 and LOM avg. of US$10,400,000 p.a.
- Excellent logistics and infrastructure (nearby major urban centers, power and gas line within 5 km from project, access via paved federal highway);
- At surface oxidized mineralization (no crushing or blasting needed and favorable strip ratio);

- Premium product granulometry; 35-40% of product at +50 mesh (jumbo flakes) and 65-75% of product at +80 mesh (large flakes);
- 88% recovery with 95% concentration using straightforward, proven flotation technology;
- Available skilled and experienced graphite labor within Brazil;
- Tax incentive area (reduction of 75% of federal income tax); and
- Substantial resource expansion potential.

1.2 PROPERTY DESCRIPTION, LOCATION AND TENURE

The Project is located near the town of Itabela in the southern part of the state of Bahia, Brazil. Access is via 90 km of paved federal highways from the International Airport of Porto Seguro, Bahia.

Basic services are available in Itabela (population 28,500), where the company field office is located, while medical services, hospitals, banks, commercial centers, schools and other services are available in the regional main population center of Eunápolis (population 100,200).

The Project is comprised of 13 exploration licenses, all duly registered and in good standing with the Departamento Nacional de Produção Mineral (“DNPM”), the Brazilian mining regulatory body.

1.3 GEOLOGICAL SETTING AND MINERALIZATION

The Project is located in the Araçuaí Orogen, in the central eastern portion of Brazil, which partially covers the states of Bahia, Minas Gerais and Espírito Santo. This Orogen is located on the southern border of the São Francisco Craton and the belt has a long history with many subductions and several developments. Its history begins around 880 Ma, in the Macaúba basin.

The Project origin can be classified as sedimentary. During late Precambrian age, pelites and carbon were deposited at the same time. Later in early Cambrian

age, orogenic movements transformed these sediments to high grade metamorphic rocks, and these movements transformed the carbon to graphite (Kinzigite Complex).

The project is located in Unit 3 of the Kinzigitic Complex with rock assemblages rich in graphitic gneiss and quartzite intercalations, layers and lenses of graphitic gneiss. These are of economic importance because they host some of the most important producing assets of large flake graphite in the Americas.

Mineralization was shifted by a regional fault and is controlled by the presence of soft materials along the shear zone associated with this fault. These soft zones contain many folds that are rich in high grade, large flake graphite deposits. In general, the deposit has a strike following this regional fault and dips from vertical to 65° northeast.

Structural domain varies throughout the Araçuaí Orogen, with the Project being located in the eastern region of the Unit, where higher metamorphism with strong deformation is present and partial melting (anatexis) is observed. It`s possible that the eastern region of the Unit with the higher grades of metamorphism and significant foliation have led to larger flake deposits, when compared to other deposits located further west in the Unit.

Mineralization appears in the soft zones with partial anataxis, following a general NW strike regionally although with variation to EW in localized area such as São Rubens, with high degree of dip (sub vertical to vertical), where high metamorphism and highly deformed granites are most likely responsible for the graphite concentration. In general, mineralization is structurally controlled by the shearing zone along the regional fault.

The main mineralized targets of São Manuel and São Rubens show a continuous strike of approximately 7.5 kilometers in length, and in general, follow the soft material and structural control along the valley floor. Widths vary from 40 to 200m wide in areas where folding is accentuated. Mineralization is easily identified visually with the presence of jumbo, large and medium graphite flakes within the metamorphosed sedimentary rocks.

1.4 EXPLORATION AND DRILLING

Detailed geologic mapping, interpretation of structural controls and extensive sampling has been conducted in the Project identifying 8-10 mineralized targets.

To date, a total of 6601m of drilling have been executed, including 49 reverse circulation drill holes (2,440 m) and 434 rotary drill holes for 4,160 m. Most of the drilling has been concentrated on only two targets; São Rubens & São Manuel, where bulk concentration of current resources lay.

1.5 SAMPLING ANALYSES

All samples collected at the project have been delivered to certified laboratory at SGS Geosol in Belo Horizonte, Brazil or SGS Lakefield in Ontario, Canada. Once sample results are received, company geologist inserts proper grade into each corresponding database sample, thus providing a complete description for each datapoint including X,Y,Z coordinates, lithologic description, sample type, target area and grade result.

Laboratory pulps where then returned to the company and have been stored in a secured facility either at the field office or outside storage facility.

The QA/QC program consisted of:

- 1 standard for every 100 (one hundred) samples in order to test laboratory accuracy;
- 2 blanks for every 100 (one hundred) samples in order to test contamination potential;
- 2 duplicates for every 100 (one hundred) samples in order to test for splitting procedures;

In addition, the QP collected 51 twin samples in order to further check splitting, storage and laboratory efficiency, returning positive and similar results.

Reverse circulation holes had samples collected every meter, resulting in higher average sample of 15-30kg. Quartering was performed in the field using a riffle splitter and later the samples were sent to SGS laboratory in Lakefield, Canada. For

every 100 samples of drilling, 5 duplicated, 3 blanks and 2.5 standards were included.

Other samples including boxes of chip, panel and trench samples have also been collected, following similar sampling and storage procedures.

1.6 METALLURGICAL AND PROCESS TESTING

The principal objective for the metallurgical testing was to produce a final concentrate with Cg ≥ 93-95% using minimal grinding and, as much as practical, to preserve the large and jumbo flake size. To date, several rounds of metallurgical testing have been performed for Santa Cruz´s ore confirming its amenability to simple processing, using proven and straightforward milling and flotation circuits.

Three separate test work rounds have been performed beginning with bench scale tests and ultimately to completion of a bulk sample of over 31,000 kg being tested through a pilot plant. Test work includes:

- Lyntek and RDi (Lakewood, CO – USA) bench scale test work performed in 2013 => aimed at providing initial indications of Santa Cruz´s ore concentration viability;
- CDTN (Belo Horizonte, MG – Brazil) bench scale testwork performed in 2013 => PEA level engineering process work;
- Fundação Gorceix (Ouro Preto, MG – Brazil) bench scale and pilot plant testwork performed in 2014/2015 => large volume feasibility level engineering aimed at providing trade off analysis (reagents, retention times, grinding cycles and media), optimizations and final flow sheet for Santa Cruz.

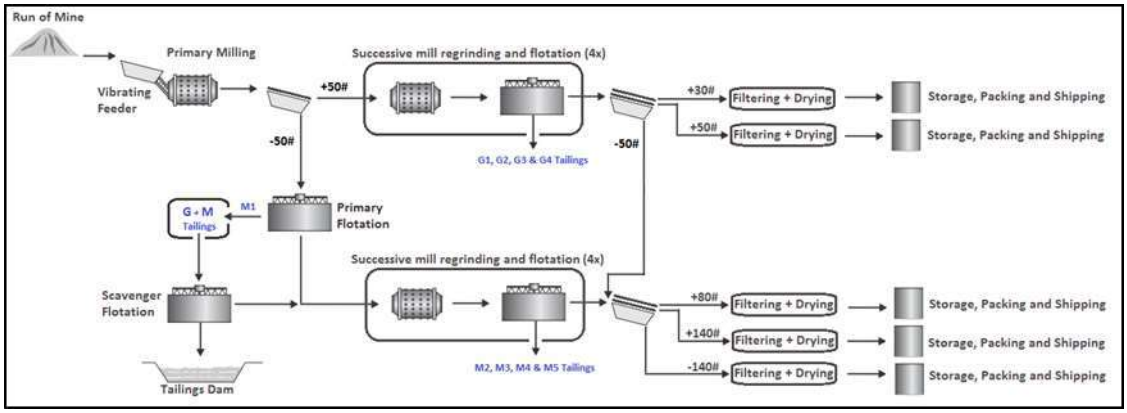


Figure 1 - Final Process Flow Circuit sheet

The results of the bench scale tests showed high quality graphite with recoveries of 88% achieved via simple grind + flotation circuits, indicating no major difficulties in concentrating. Based on the results of the pilot plant tests, a process flow circuit consisting of material homogenization, segregation, grinding, conditioning, flotation, drying and packaging was developed. The circuit is presented in Figure 1.

1.6.1 GRAPHITE CONCENTRATE

Santa Cruz´s concentrate from the pilot plant tests, shown on Table 1, successfully achieved a high quality product with large percentages of jumbo and large flake sizes coupled with high grade Cg (> 95%). The results confirm the Project is able to produce attractive concentrates with a premium product range.

Table 1 - Santa Cruz's Graphite Concentrate

	Santa Cruz´s Final Concentrate:	
	Distribution	*% Cg*
30#	4%	95%
50#	32%	95%
80#	27%	97%
140#	17%	97%
-140#	20%	97%
Recovery 88%		

It is important to note that if a concentrate with minimum of 93% Cg can be marketed and sold, an important gain (~10%) in +50 mesh and +80 mesh distribution can be achieved as less milling is required. In addition, an ultra-pure +99.9% Cg concentrate has also been produced, demonstrating the Project is also able to provide product for the projected high growth battery market.

1.7 MINE DESIGN

Current resources lie within altered, oxidized material that can be excavated without blasting. The mining method selected for the Project is conventional open pit with excavator, dozer and haul trucks. Life of mine strip ratio is favorable at 1.27 tonnes of waste for each tonne of rock mined. An owner's fleet has been sized and priced in the initial capital expenditure.

1.8 MINERAL RESOURCE ESTIMATE

Mineral resource estimation was based on all geologic data collected to date including mapping, sampling, geophysics and drilling. The entire database is kept and updated in MS Excel and Access, while Gems (Gemcom) 6.5 was used to develop the resource estimate based on kriging.

Several graphite targets have been identified and confirmed with drilling, São Manuel and São Rubens are large exploration targets and the Jucurucu target has sufficient drill density to support a resource calculation. A cut off of 1% was defined for this study based on mining experience with similar deposits and general grade distribution curves. Mineralization remains open along strike and at depth, which combined with the additional targets, provides excellent potential for future resource expansion.

Table 2 - Santa Cruz Graphite Mineral Resources Summary – 1% Cut off

Category	Tonnage (t)	C (%)	In-situ Graphite (t)
Measured	0	0	0
Indicated	14,990,400	2.70%	404,741
Inferred	3,572,100	2.90%	103,591

1.9 INFRASTRUCTURE

Mining fleet, ancillary buildings, tailings storage facility, waste rock facilities, closure costs as well as general support services and infrastructure have been included in the engineering design and maiden capital cost estimates for the Project.

The town of Itabela, which is located less than 5 km from the Project, will serve as the base of operations. Proximity to a high tension power line and a gas pipeline, and paved road access, along with potential access to city water and wastewater services, provide a valuable intangible for Capex and Opex reduction. The deepwater port of Ilhéus is located approximately 270 km to the north via paved federal highways and provides favorable access to international markets.

1.10 MARKET STUDY

According to USGS data, China is the world's leading producer of natural flake and amorphous graphite, supplying approximately 67% of the market. Brazil, India, Canada and North Korea collectively contribute an additional 30% of global production.

Global natural graphite production has risen at a CAGR of about 2.3% between 1900 and 2014. Forecast market growth assumes moderate growth in traditional markets such as refractories and significant growth in spherical and expanded graphite. Assuming a balance between supply and demand, the base case market is forecast to reach approximately 1.30 Mt in 2020 up from 1.12 Mt in 2014.

Risks include overproduction of flake graphite in China, a slowing steel industry, slower sales of electric and hybrid vehicles than predicted (hence lower battery production) and battery technology shifts.

The key to a successful graphite project (as with other industrial minerals) is to be able to produce a balanced range of products for a range of markets, ensuring that all production can potentially be sold and dilute risk across market cycles.

Available metallurgical test data indicates that the Santa Cruz project has the potential to supply a range of traditional markets (e.g. refractories, steels and

components) and also to supply growth markets such as spherical graphite and expandable graphite.

According to the pilot plant work completed, there is flexibility to modify flake size distribution by changing the process to either remove coarse flakes at an early stage, or to mill / regrind and screen to achieve a broad range of products.

Based on current pricing and metallurgical test results, a CIF basket price of $1,350 per ton of flake graphite >93% C is used as the base case for a PEA of the Santa Cruz project.

Although the spherical graphite market is small, it is relatively high value with uncoated products worth about $3,000 per ton. Production of value-added products such as spherical and coated graphite may be considered on further studies, as these could add value and help secure long-term sales contracts.

Table 3 - Study Product Prices

Product Description	Average Market Price (USD/t)	Percentage Of Resource
+30 Mesh	$2,500	4%
-30/+50 Mesh	$2,000	32%
-50/+80 Mesh	$1,100	27%
-80/+140 Mesh	$950	17%
-140 Mesh	$775	20%
Average	**$1,354**	**100%**

1.11 FINANCIAL ANALYSIS

The financial analysis shows very favorable and robust results that highlight the Santa Cruz´s projects advantages in the graphite sector.

Key Financial Results:

Post-tax NPV(5%): US$117,00,000

Post-tax all Equity IRR:	78% p.a.
Avg. Post-tax Free Cash Flow (yrs 1-5):	US$15,800,000 p.a.
LOM Avg. Post-tax Free Cash Flow:	US$10,400,000 p.a.
Payback Period:	2 years

Key Parameters:	
Total Indicated Resources:	14,990,400 t @ 2.70% Cg
Total Inferred Resources:	3,572,100 t @ 2.90% Cg
Life of Mine:	19 years
Annual Production (years 1-5):	18,900 t p.a.
Annual Production (year 5-23):	15,800 t p.a
Initial Capital Costs:	US$20,500,000
Avg. Operating Costs(LOM):	US$413 per tonne of concentrate

1.12 CONCLUSIONS AND RECOMMENDATIONS

Based on this technical report the NI 43-101 Preliminary Economic Assessment indicates that the Santa Cruz Graphite Project is a potentially valuable graphite asset. The favorable deposit characteristics and positive project environment further contribute to its competitive advantages. The positive study findings are based on a substantial amount of technical work and financial modeling and support the recommendation for continuation to the next phase of development and project implementation. Highlights include:

- NPV (5%) of US$117 million, post-tax IRR of 78%, & 2 years payback period;
- Low initial Capex of US$20.5 million and first quartile of operation cost US$413/t (comparable to Chinese producers);
- Free cash flow of US$15,800,000 in years 1-5;
- Altered friable indicated resource of 14,990,400 tonnes at 2.70% Cg and inferred resource of 3,572,100 tonnes at 2.90% Cg, both using an 1% Cg cut-off;
- Significant resource upside potential at depth, along strike and on satellite targets.

- Less than 5% of total land package of 13,000 ha has been explored;
- Premium product granulometry of jumbo and large flakes;
- One of the most active and established graphite producing regions in the world with ample skilled labor force and support services;
- Favorable logistics and local infrastructure;
- Favorable alternative analysis completed on implementing a 5,000 tpa pilot plant operation, utilizing simplified trial mining license, thus achieving production within 18 – 24 months; and
- Continuation to Feasibility Study including bulk sampling for process confirmation, engineering, infill drilling, environmental licensing, geotechnical investigations, firm equipment quotes and discussion with strategic partners / off take agreements.

2.0 INTRODUCTION

2.1 GENERAL

This technical report to NI 43-101 Preliminary Economic Assessment ("PEA") standards is a scoping study level evaluation of the Santa Cruz Graphite Project (the "Project") near the town of Itabela in the state of Bahia, Brazil. Itabela is a town with approximately 28,500 inhabitants and is accessible via 90 km of paved federal highways from the International Airport in Porto Seguro, Bahia.

Brazil is the second largest producer of graphite in the world and is home to the largest graphite producer outside of China. Brazil has two producing companies that combined have an approximate annual output of 100,000 tonnes of graphite out of 4 operating mines, which is close to 10% the total world supply. The Project is located in one of the most established and prospective areas in Brazil for graphite with 3 active open pit mines (over 70 years of continuous production) and several development projects and exploration targets located in the region. The Project has excellent infrastructure and logistics and is located in a proven area with historic mining activities and within a state that promotes, supports, and invests in mineral resource development.

The PEA includes an evaluation of:

1.) Regional and local geology along with geologic potential;
2.) Exploration and drilling program completed to date;
3.) Sampling and metallurgical testing programs;
4.) Preliminary mineral resource estimate in accordance with NI 43-101;
5.) Open pit mining method and scheduling;
6.) Process circuit including pilot plant work performed using milling, flotation, thickening, drying and packaging of various potential graphite products;
7.) Infrastructure and civil design;
8.) Capex and Opex

9.) Economic parameters placed on the potential of the project; and
10.) Recommendations for future work.

The information, conclusions, opinions and estimates contained herein are preliminary in nature and are based on:

1.) Information and data generated over the course of this study;
2.) Assumptions, conditions and qualifications as set forth in this document;
3.) Data, information and other relevant data supplied by third party sources, as identified in this report.

2.2 QUALIFIED PERSON AND NI 43-101 GUIDELINES

Information used in this report has been provided by Brasil Graphite and its consultants, with revision, preparation, consolidation and approval by Aldo Moreno, Luiz Eduardo Pignatari and Dr. Giorgio di Tomi, all independent Qualified Persons.

2.3 PREVIOUS REPORTS & INFORMATION SOURCES

In 2013, BGSA completed an internally prepared company preliminary economic assessment report that has served as the basis for this report.

2.4 TERMS OF REFERENCE

The PEA was authorized by the board of directors of BGSA and is undertaken to evaluate the geologic potential of the deposit as well as the technical and economic viability of the Project in order to determine if additional investments are merited.

Mineral Resources, as opposed to Mineral Reserves, do not have demonstrated economic viability and are preliminary in nature. The presented Mineral Resources are estimated based on available drilling, sampling, testing results

and basic project assumptions, as outlined by the authors. While care has been taken to evaluate the mineral resources, technical feasibility and economic viability of the Project within current standards of practice, the estimates and projections presented herein are preliminary and should not be interpreted as a guarantee or warranty of future development, production or economic forecasts.

All measurements used in this report are presented in metric units and monetary units are presented in United States dollars (USD). Geographic units are presented in UTM coordinate system based on SAD 69 Datum with units of meters, except where noted in latitude and longitude. A table of abbreviations is presented in Table 4.

Table 4 - List of Abbreviations

Tonnes or mt	Metric Tonnes
Tpa	Tonnes per Year
Tpd	Tonnes per Day
Kg	Kilograms
Ha	Hectares
m	Meters
Km	Kilometers
m^3	Cubic Meters
ºC	Degrees Celsius
g	Grams
g/t	Grams per Tonne

3.0 RELIANCE ON OTHER EXPERTS

Specific sections of this report, as stated, have had contributions from both internal personnel of BGSA and other independent consultants, including experienced professionals in geology, mining engineering, civil engineering, metallurgy, process design and mineral economics. Principle contributors include:

Mr. Placido Campos – Chapter 12: Mineral Processing and Metallurgical Testing; Mr. Placido is a registered professional mining and process engineer in Brazil with more than 30 years of experience focused on graphite processing. He has spent several years with Nacional de Grafite where his responsibilities included production supervisor for all major operating units of the company, project management, research development, reaching General Manager of the company.

He has also previously worked with Grafite do Brasil (private Brazilian graphite producer) helping optimize their process circuit. Mr. Campos has also provided graphite process consultancy for several other private and listed companies, including current role as Graphite Beneficiation Manager for ASX listed Syrah Resources.

All information and material provided by BGSA personnel and outside consultants was subject to review, revision and approval by the report's designated Qualified Persons.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 PROJECT OWNERSHIP

Brasil Grafite S.A. is a privately held exploration company created in 2011 and focused on developing the Santa Cruz Graphite Project. The Santa Cruz Graphite Project is 100% owned by Brasil Grafite S.A. The current ownership structure of Santa Cruz Project is presented in Figure 2.

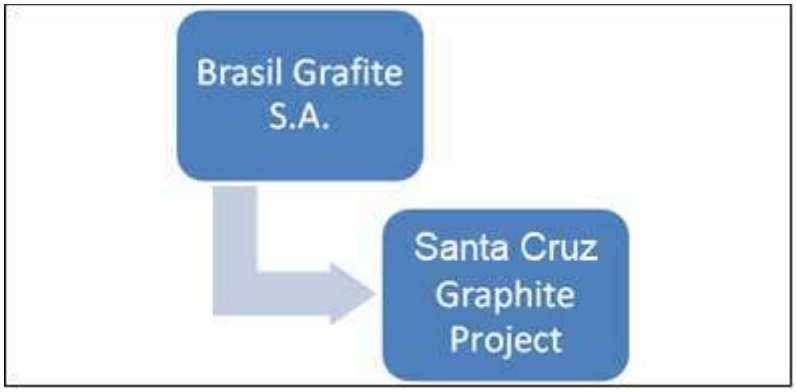


Figure 2 - Santa Cruz Graphite Project Ownership

4.2 PROJECT LOCATION

The Project is located near the town of Itabela in the southern part of the state of Bahia, Brazil. According to the 2010 census, Itabela is a town with approximately 28,500 inhabitants and is accessible via 90 km of paved federal highways from the International Airport in Porto Seguro, Bahia. The airport is served with daily national and international flights. The main mineral target is centered on coordinates UTM : E :435,640 m and N: 8,169,520 m . A location map is presented in Figure 3.

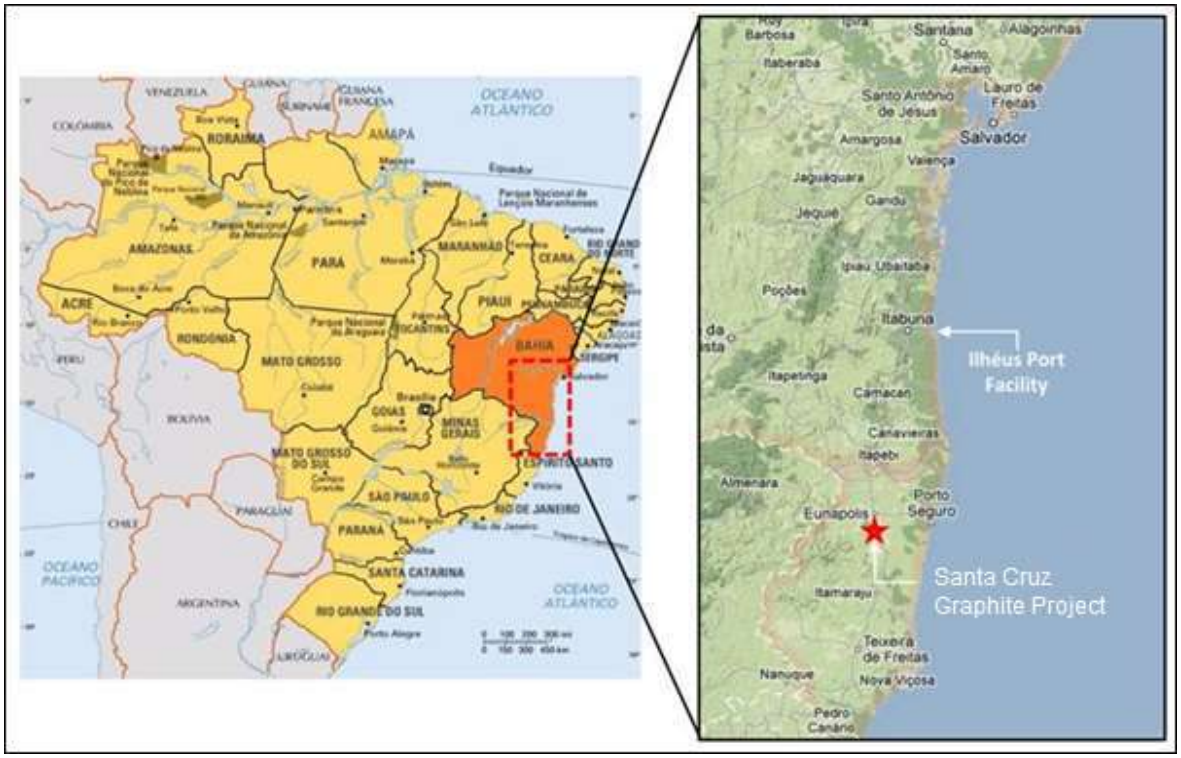


Figure 3 - Project Location Map

4.3 MINING TENURE AND PROPERTY DESCRIPTION

4.3.1 MINING TENURE

Within the 1988 Brazilian Federal Constitution, mineral resources are defined as assets of the Federal Government. The legal right to mine is assigned to the mining company by the Federal Government of Brazil in the form of a Mining Decree in accordance with the Mining Code that was originally established under Decree Law No. 227, dated February 28, 1967. Under Brazilian law there is a separation of the surface rights from the mineral rights. A company or individual may hold valid mining rights from the Federal Government, but must still negotiate legal access with the surface rights holder.

The Mining Code, which has been amended several times since passage, addresses both issuance of exploration permits as well as a Mining Concession permit (Mining Decree), which is issued after the project proponent has demonstrated the technical and economic viability of the project. The Mining Decree, along with the

appropriate environmental permitting forms the basis of the right to mine a mineral deposit. The mining decree is granted for a specific area and for the exploitation of a specific mineral. The Mining Code and taxation regimes are currently under review and will likely be revised and altered in the near future.

EXPLORATION LICENSE

The Federal Department responsible for issuing the mining rights is the National Department of Mineral Production (Departamento Nacional de Produção Mineral, DNPM). Exploration licenses are typically granted for 3 years and can be extended for an additional 3 years maximum, subject to DNPM approval. An exploration license allows the holder to explore for minerals in the granted concession, but not to conduct commercial mining.

License applications must include applicant details, the elements or metals to be explored for, the application license area, and be accompanied by stipulated technical documents that have been prepared under the responsibility of a qualified geologist or mining engineer. Such documents typically include budget forecasts for the planned exploration program, maps of the intended area, payment of governmental fees and taxes, and proof of sufficient funds or financing for the investment forecast set forth in the proposed exploration plan. Licenses are deemed granted when published in the National Official Gazette.

In order to renew the exploration license, the DNPM shall take into consideration the development of the work performed. The request for renewal of the exploration license must be presented 60 days prior to the expiration date of the original license. As to the renewal request, a report must be presented of the work already carried out, indicating the results achieved, as well as reasons justifying continued work. The renewal of the exploration license does not depend on the publication of a new license, but only on the publication of the decision to renew.

A final exploration report summarizing the economic viability and technical feasibility of the claim must be supplied to the DNPM prior to the expiration of the granted time period.

Such report must be prepared under technical responsibility of a legally qualified professional and must also contain:

(i) Information on the area means of access and communication;

(ii) Plan of the geological survey;
(iii) Description of the main aspects of the deposit;
(iv) Quality of the mineral substance and definition of the deposit;
(v) Genesis of the deposit, as well as its qualification and comparison to similar deposits;
(vi) Report of the industrialization assays;
(vii) Demonstration of the economic feasibility of the deposit; and
(viii) Necessary information for the calculation of the reserve, such as the density, area, volume and content.

The final exploration report must be presented independent from the results of the work and shall conclude the existence or non-existence of a mineral deposit that can be further developed and exploited. Approval of the report is not discretionary and as long as a drilled mineral deposit can be confirmed, DNPM shall grant authorization for the company to move forward towards a mining license; typical process period is from 6-12 months. The holder of an exploration license who does not present a final exploration report within the date established by the regulations will be fined. Nevertheless, the exemption from presentation of the report is permitted in certain cases of license relinquishment by the titleholder. The DNPM must confirm the relinquishment, provided it happened in one of the two following instances:

(i) At any time, if the titleholder has not been successful at entering the area, despite all the efforts made, including judicial means; or
(ii) Before one-third (1/3) of the term of duration of the exploration license has passed.

A concession holder has one year from approval of the report to apply for a mining concession or to transfer its right to apply for it to a third party. The application period may be extended for longer than a year at the discretion of the DNPM, if requested by the holder prior to the expiration date, with necessary motivations and justifications (for example more time for obtain environmental approvals, or conduct better studies on economic viability and technical feasibility).

TRIAL MINING LICENSE

It is possible to extract mineral substances before the mining concession is granted, by means of a Trial Mining License ("Guia de Utilização"). Extraction may only occur if the interested party has obtained a proper environmental license, and has entered into an agreement with the surface owner as to the extraction work.

The Trial Mining License may be granted by the DNPM for the extraction of up to 5,000 tons of product per year of graphite, for each exploration license.

The holder of an exploration license in which the Trial Mining License has been granted shall be responsible for the payment of the CFEM.

MINING LICENSE

In cases where the exploration potential of concessions is proven to be economically viable, the exploration license may be converted into a mining concession by completing an exploration study to quantify the existence of mineral resources, a feasibility study to show technical feasibility and economic viability of the project, and the granting of the environmental license to mine the concession.

The DNPM is obliged to grant a mining concession if the required studies have been completed and indicate a commercially viable mining operation. Mining rights can be denied in some circumstances, as for example where a public authority considers that a subsequent public interest exceeds that of the utility of mineral exploration. Where the concession is not granted, the Brazilian Federal Government must compensate the mining concession holder.

Once the legal and regulatory requirements are met, including the proper environmental licensing (which varies according to the State), and the Economic Feasibility Plan is approved by the DNPM, the mining concession is granted through a "Portaria de Lavra". Concessions are deemed granted when published in the National Official Gazette.

Brazilian mineral legislation does not establish the duration of mining concessions. The concessions remain in force until the complete exhaustion of the deposit.

The holder of a mining concession:

(i) Has the exclusive right to execute the mining work for the mineral substances specified and indicated in the concession title and within the authorized area. However, if another substance is found in the authorized area, the titleholder may request an addendum to the concession, so that the new substance is also included in the concession;

(ii) Has the right to temporarily suspend mining work;

(iii) May obtain easements on the property where the mine is located, as well as on bordering and neighboring properties, with prior indemnification; and

(iv) May divide the concession into 2 or more distinct concessions, provided that it is not harmful for the development of the deposit.

The holder of a mining concession has the following obligations:

(i) To start the mining work as per the development plan, within six months from the date of the publication of the concession in the Official Gazette of the Republic;

(ii) To execute the work in accordance with the development plan approved by the DNPM;

(iii) To extract solely the substances indicated in the concession;

(iv) To communicate to the DNPM the discovery of a mineral substance not included in the concession title;

(v) To carry out the work in accordance with regulatory norms;

(vi) To offer the management of the work to a duly qualified technician;

(vii) Not to make it neither difficult nor impossible to use and exploit the deposit in the future;

(viii) To be responsible for the damage and loss caused to third parties, resulting from the mining work;

(ix) To promote and improve safe, healthy lodgings at the location;

(x) To avoid water diversions and to not use an amount that can cause harm and loss to neighbors;

(xi) To avoid air or water pollution resulting from the mining work;

(xii) To protect and preserve the water sources, as well as to use them according to the technical instructions and requirements when dealing with mineral water deposits;

(xiii) To observe and comply with all the provisions of the inspection entities;

(xiv) Not to interrupt the mineral activities without notice to the DNPM;

(xv) To keep the mine in good condition when temporarily suspending the mining work;

(xvi) To restore the areas degraded by the mining work; and

(xvii) Advise of the discovery of radioactive minerals.

4.3.2 PROPERTY DESCRIPTION

Brasil Grafite holds 100% of the mineral rights for the Santa Cruz Graphite Project. The property consists of 13 approved licenses in the State of Bahia totaling 13,316.4 Ha. Twelve of the thirteen licenses were originally granted to a private company owned by one of the Brasil Grafite partners. These were subsequently transferred to Brasil Grafite in 2012. The transfer was approved by the DNPM. The remaining license was directly granted to BGSA in 2013.

A summary table is presented in Table 5. A location map containing all mineral rights is presented in Figure 4. All concessions, taxes and payments are current as of the publication of this report. To the extent known, there are no significant factors or risks besides those noted in the report that may affect access, title, or the right or ability to perform work on the property.

Table 5 - DNPM Claims Summary Table

No. Concession	State	Mineral	Area (ha)	Publication Date	Status
871,722/2010	BA	Graphite	1999.84	15/12/2010	Approved Exploration License – (final exploration report submitted)
872,328/2010	BA	Graphite	948.30	06/04/2011	Approved Exploration License – (final exploration report submitted)
872,329/2010	BA	Graphite	918.21	06/04/2011	Approved Exploration License – (final exploration report submitted)
872,732/2010	BA	Graphite	994.39	13/05/2011	Approved Exploration License – (final exploration report submitted)
872,733/2010	BA	Graphite	988.62	13/05/2011	Approved Exploration License – (final exploration report submitted)
872,734/2010	BA	Graphite	799.99	13/05/2011	Approved Exploration License – (final exploration report submitted)
872,735/2010	BA	Graphite	985.58	26/04/2011	Approved Exploration License – (final exploration report submitted)
872,736/2010	BA	Graphite	931.66	26/04/2011	Approved Exploration License – (final exploration report submitted)
872,737/2010	BA	Graphite	947.57	26/04/2011	Approved Exploration License – (final exploration report submitted)
872,874/2010	BA	Graphite	934.00	26/04/2011	Approved Exploration License – (final exploration report submitted)
871,052/2011	BA	Graphite	979.50	04/07/2011	Approved Exploration License – (final exploration report due Aug17)
871,053/2011	BA	Graphite	936.94	04/07/2011	Approved Exploration License – (final exploration report due Dec17)
871,524/2013	BA	Graphite	951.26	11/12/2013	Approved Exploration License –

					(final exploration report due Dec20)

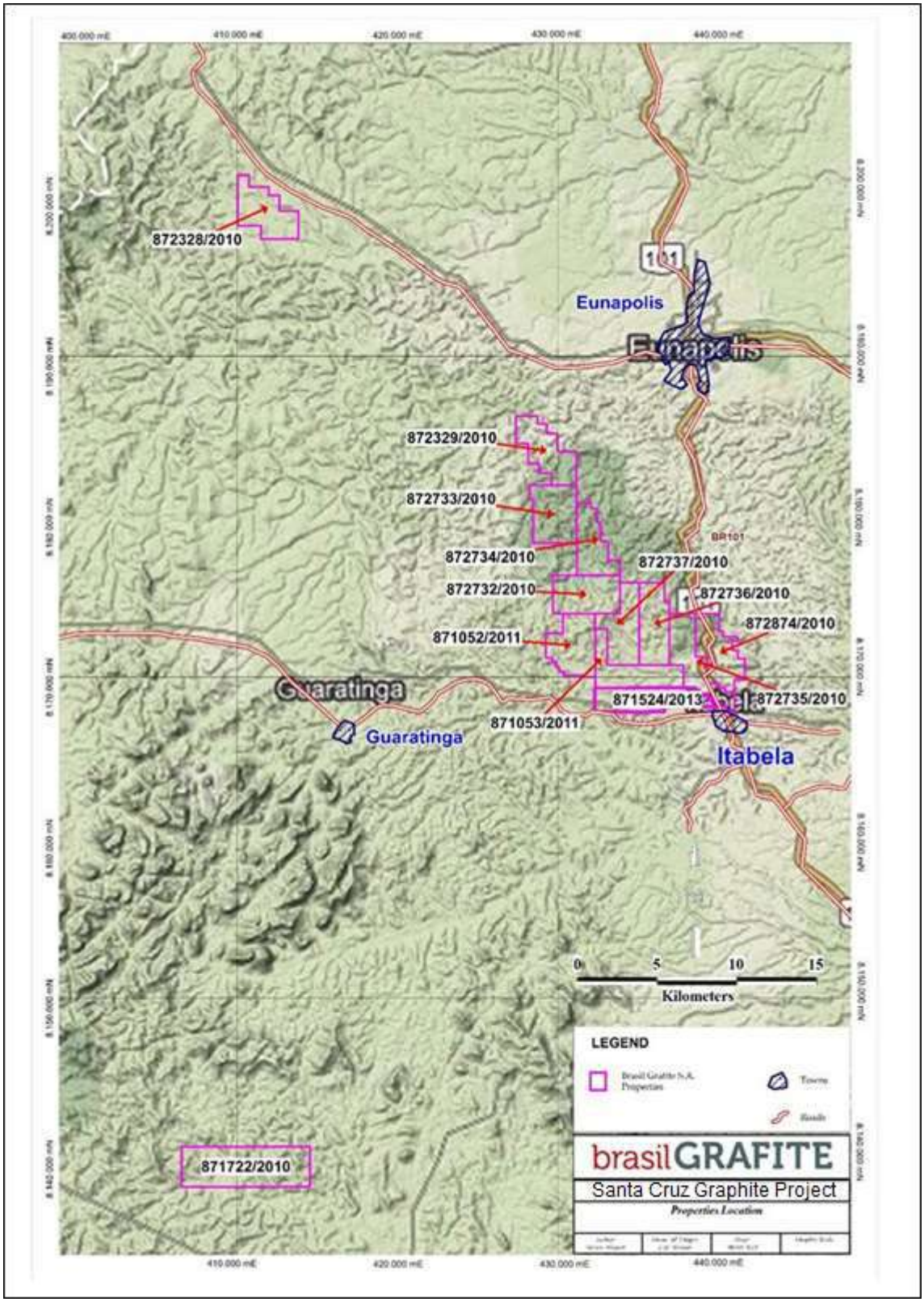


Figure 4 - Claims Location Map

4.4 PROPERTY OWNERSHIP

Under Brazilian law, mineral rights and surface rights are separate. A mining company may hold valid mineral rights, but must still negotiate with the surface rights owner. There is a legal process for the equivalent of condemnation of the surface rights if a negotiated settlement with the surface owner cannot be reached.

For exploration and prospecting licenses, a concession holder may negotiate payment to the surface rights owner as compensation for land use and any damage caused by exploration activities. In cases where an agreement is not reached between the involved parties (mining rights holder and surface rights owner) with regards to the indemnification amounts to be paid and/or the landowner does not allow the company's employees to access the area, the mineral rights holder is guaranteed legal access through a judicial process and court order.

For mining licenses, the holder must pay the surface rights holder 50% of the Financial Compensation for the Exploitation of Mineral Resources (CFEM). Holding a valid agreement with the surface rights holder is a pre-requirement for mining lease grant. If no agreements can be reached, judicial processes can be used.

Agreements are currently in place for exploration activities with the owners of the surface rights for the principal exploration targets. These agreements have been registered with the DNPM.

4.5 ROYALTIES AND AGREEMENTS

There are two main types of levies payable by mining companies: an annual tax per hectare (TAH) and the CFEM (Financial Compensation for the Exploitation of Mineral Resources). The TAH is payable by the exploration license holder annually to the DNPM (Law No. 7,886/1989 and Law No. 9,314/1996). This tax is currently charged on a fixed value set forth in DNPM Ruling No. 163/2014 (Portaria do Diretor-Geral do DNPM), and consists of approximately R$2.61/ha for exploration licenses during the duration of the original license grant term, increasing to R$3.95/ha for licenses where an extension of term has been granted.

The CFEM is based on the net revenue from the sale of a mineral product, defined as the total of sales less taxation, transportation and insurance expenses. The rate to be applied varies according to the mineral product. Currently the DNPM levies are:

- Gold: 1%
- Bauxite, manganese ore, rock salt and potassium: 3%
- Precious carbon, colored, cut table stones and precious metals: 0.2%;
- Iron ore, fertilizers, mineral coal and other mineral substances: 2%.

Graphite is taxed at a 2% rate. Penalties are imposed if either payment is not made, and can vary from a letter notice to concession forfeiture. The CFEM is currently being reevaluated by the Brazilian Congress and may change in the near future. No additional royalty payments, option agreements or encumbrances have been identified at this point.

4.6 ENVIRONMENTAL PERMITS AND LIABILITIES

4.6.1 ENVIRONMENTAL PERMITS

The Brazilian Federal Constitution addresses environmental and social impacts of mining projects. Overall environmental regulations are a federal responsibility developed by the Ministry of Environment (Ministério do Meio Ambiente). Implementation is by the National Council of Environment (Conselho Nacional do Meio Ambiente or CONAMA), which formulates the standards and policies under which environmental regulations are implemented. Control and supervision of the environmental licensing process is with the Brazilian Institute of Environment and Renewable Resources (Instituto Brasileiro do Meio Ambiente e Recursos Naturais Renováveis or IBAMA). While IBAMA is the lead licensing agency and is responsible for overseeing the process, in practice, state environmental protection agencies generally review and authorize the environmental licenses.

Environmental licenses for new mining operations are provided in three stages:

1.) A preliminary license (Licença Prévia - LP) can be awarded at the time the environmental impact analysis has been approved. An Environmental Impact Assessment ("EIA") must be executed, and the respective Environmental Impact Report ("RIMA") must also be produced at this time. An EIA/RIMA submission is required for this permit together with some further documents. This permit approves the project site location and conceptual design while evaluating the social and environmental feasibility of the proposed project. This phase defines the basic design and determining factors to be considered in the subsequent stages of implementation. The permit can be valid for up to five years.

2.) Construction or Installation License (Licença de Instalação - LI) at the time detailed design of the facility is completed and determined to comply with the requirements established in the preliminary license. For this stage, the project proponent has to submit the Environmental Control Plan (Plano de Gestão Ambiental – PGA) and complete other requirements and supply further documentation about the project. This permit provides authorization for the construction of a project and its infrastructure, in accordance with the specifications set out in the approved plans, drawings, and designs including the PGA and all other determining factors that are required for approval. The permit can be valid for a period of up to six years depending on the project schedule.

3.) An operating license (Licença de Operação - LO) at the time the project is constructed and has been determined to comply with the environmental standards. This permit provides authorization for the operation of the facility or project, following verification of effective compliance with the requirements of the Installation Permit (LI). The permit is valid for a minimum of four years and a maximum of ten years, depending on the impact classification and is renewable, based upon the environmental compliance record as determined by IBAMA.

4.6.2 ENVIRONMENTAL PERMITS FOR THE TRIAL MINING LICENSE

As mentioned before, it is possible to extract mineral substances before the mining concession is granted, by means of a Trial Mining License ("Guia de Utilização"), but the extraction may only occur if the interested party has obtained a proper environmental license.

For purposes of obtaining the environmental license, the holder shall request an Environmental Authorization ("Autorização Ambiental"), under the terms of State Law no. 10,431/2006 and its respective Decree no. 14,024/2012 as amended by Decree no. 15,682/2014 (article 142-B 'I').

4.6.3 VEGETATION REMOVAL AUTHORIZATION

If the holder of an exploration license intends to suppress native vegetation in the area of its activities, it shall first obtain the proper environmental license.

For purposes of obtaining the environmental license, the holder shall request an Environmental License ("Licença Ambiental"), under the terms of State Law no. 10,431/2006 and its respective Decree no. 14,024/2012 as amended by Decree no. 15,682/2014 (article 142-B, sole paragraph, 'I')

4.6.4 WATER RIGHTS

Under Brazilian Law No. 9,433/1997, a number of water usages are regulated, including:

- Diversions or impounding of water existing in a water body for final consumption, including public supply or productive process;
- Impounding of water from an underground water body for final consumption or productive process
- Disposal of sewage waste and other liquid or gaseous residues, whether treated or not, into a water body for dilution, transportation or final disposal;
- Other uses that alter the system, quantity or quality of the water existing in a water course or body.

A water permit has a maximum term of 35 years, and can be renewed. Permits typically have conditions attached, which primarily relate to compliance with the Water Resources National Plan and the watercourse quality maintenance. Exploitation of water resources is under the jurisdiction of the DNPM, and is subject to similar reporting and jurisdictional requirements as other mineral types.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES,INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 ACCESSIBILITY

Santa Cruz Graphite Project is located near the town of Itabela in southern Bahia and is accessible via 90 km of paved federal highways BR-367 and BR-101 from the International Airport in Porto Seguro, Bahia. The airport is served with daily national and international flights. A location map is presented in Figure 5.

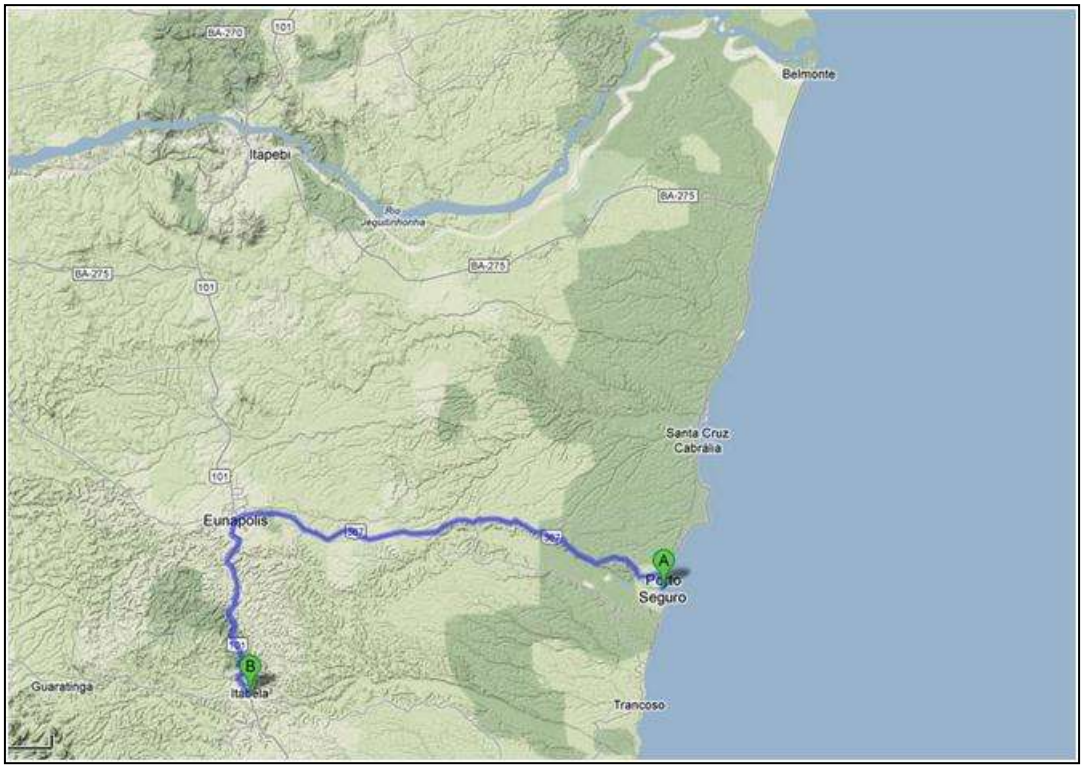


Figure 5 - Accessibility Location Map

5.2 CLIMATE

The climate is greatly influenced by the coastal proximity and the project area is classified as humid-tropical according to the Koppen-Geiger climatological system. Precipitation averages 1238 millimeters a year with rainfall throughout the year, although it is noticeably less in the winter seasons of May through September. Temperatures in general are high with monthly averages varying between 22 ºC to 26 ºC. Average monthly climate data for Itabela is presented in Figure 6.

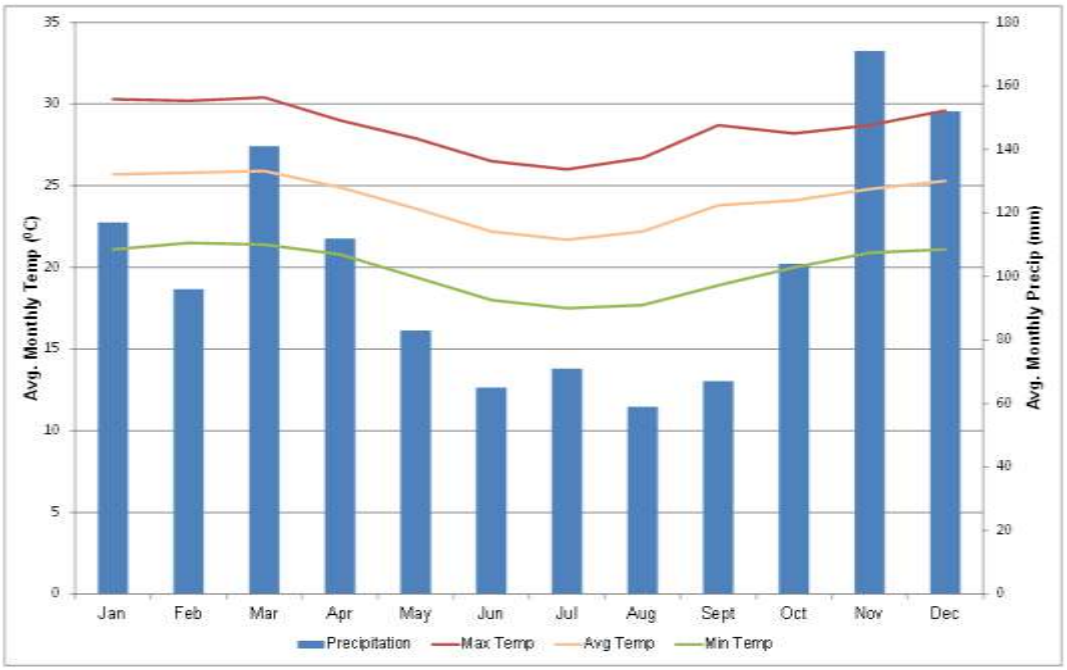


Figure 6 - Average Monthly Precipitation

5.3 LOCAL RESOURCES, INFRASTRUCTURE AND LOGISTICS

The project area is located in a rural area of southern Bahia with the main population center being Eunápolis, which is located approximately 28 km to the north of Itabela. Eunápolis has approximately 100,200 inhabitants, while Itabela has a population of about 28,500, according to the 2010 census data. Basic services are available in Itabela, while medical services, hospitals, banks, commercial centers, schools and other services are available in Eunápolis.

The deepwater port of Ilhéus is approximately 270 km to the north on paved federal highways BR-101 and BR-415. The port is administered by the Companhia das Docas do Estado da Bahia (CODEBA) whose capacity is currently being expanded in order to accommodate the new West-East Railway ("FIOL"). This will serve as the basis for potential graphite exports.

Energy in the region is administered by Companhia de Electricidade do Estado da Bahia (COELBA) and there is a high tension line within 1 km of the plant site. Natural gas can be supplied by truck and stored in large tanks on site. In addition, one of the most important natural gas pipelines in Brazil ("GASENE") passes within 5 km of the Project, and it may be possible to supply the Project demand from the pipeline.

Project water supply will be provided from on-site sources. The TSF will be the primary water supply dam with basin inflows being captured and stored for use as fresh water make-up for plant demand. The tailings slurry water and process water will also be captured and re-circulated. Drinking water shall be provided by wells or there may be a possibility of bringing a treated water line from Itabela, which will be investigated at future project stages. A small wastewater facility may be constructed on site or a septic system installed with waste trucked to Itabela for treatment. Solids waste will be trucked to the Itabela landfill for disposal.

Project infrastructure will be discussed in further detail later in the report, but includes the construction or improvement of the following:

1.) Access roads;
2.) Power supply and substation;

3.) Natural gas supply and storage;
4.) Water supply and waste management;
5.) Plant facilities;
6.) Administrative and ancillary installations;
7.) Telecommunication systems;
8.) Tailings storage facility (TSF);
9.) Waste storage facility (WSF); and
10.) Open Pit.

5.4 PHYSIOGRAPHY

The project area lies within the Southeast Atlantic hydrographical basin, which incorporates parts of the states of Sergipe, Bahia, Minas Gerais and Espirito Santos. The principal rivers include the Paraguaçu de Contas, Salinas, Pardo, Jequitinhonha, Mucuri and Itapicuru. The main project area is located between the Rivers Jequitinhonha and Mucuri in relatively hilly terrain with elevations varying between 125 m and 280 m. The area around the principal target has suffered from extensive anthropogenic disturbances and little native vegetation remains. Currently, land use is mostly rural pasture land for cattle along with some small-scale agriculture and eucalyptus plantations. There are also several small dams constructed for watering livestock. The principal geologic target is in the lower portions of the valley and mineralization appears to follow the low laying areas and valley bottoms. Direct project access is good via unpaved gravel roads.

6.0 HISTORY

The Santa Cruz Graphite Project is a recent discovery with no known exploration work or previous reports currently identified in the project claims area. The Project lies within one of the most active graphite provinces in the world with 3 operating mines: Pedra Azul, MG (~36,000 t/year), Salto da Divisa, MG (~18,000 t/year), and Maiquininque, BA (~30,000 t/year) along with several development projects and exploration targets.

According to the most recent edition of the Brazilian Mineral Yearbook, which was published in 2010, Brazil has approximately 119,000,000 tonnes of graphite mineral resources identified with 95 percent of this vast reserve being within a 170 km radius of the Santa Cruz Graphite Project. Table 6 provides a summary of the Brazilian graphite estimates by region and Figure 7 presents the project along with other mines and development or exploration projects in the area.

Table 6 - Brazilian Graphite Resources (2009)

Municipality	State	Resource (Tonne)
Eunápolis	BA	404,547
Guaratinga	BA	3,136,913
Maiquinique	BA	8,566,228
Total:		**12,107,688**
Baturité	CE	1,040,000
Total:		**1,040,000**
Almenara	MG	5,329,833
Arcos	MG	3,157
Cachoeira de Pajeú	MG	218,715

Carmo da Mata	MG	423,136
Itapecerica	MG	1,222,952
Itaúna	MG	126,733
Jordânia	MG	751,512
Mateus Leme	MG	1,994,367
Pedra Azul	MG	29,793,054
Salto da Divisa	MG	64,918,692
Santo Antônio do Monte	MG	657,754
São Francisco de Paula	MG	33,404
Total:		**105,476,311**
Total Brazil:		**118,620,999**

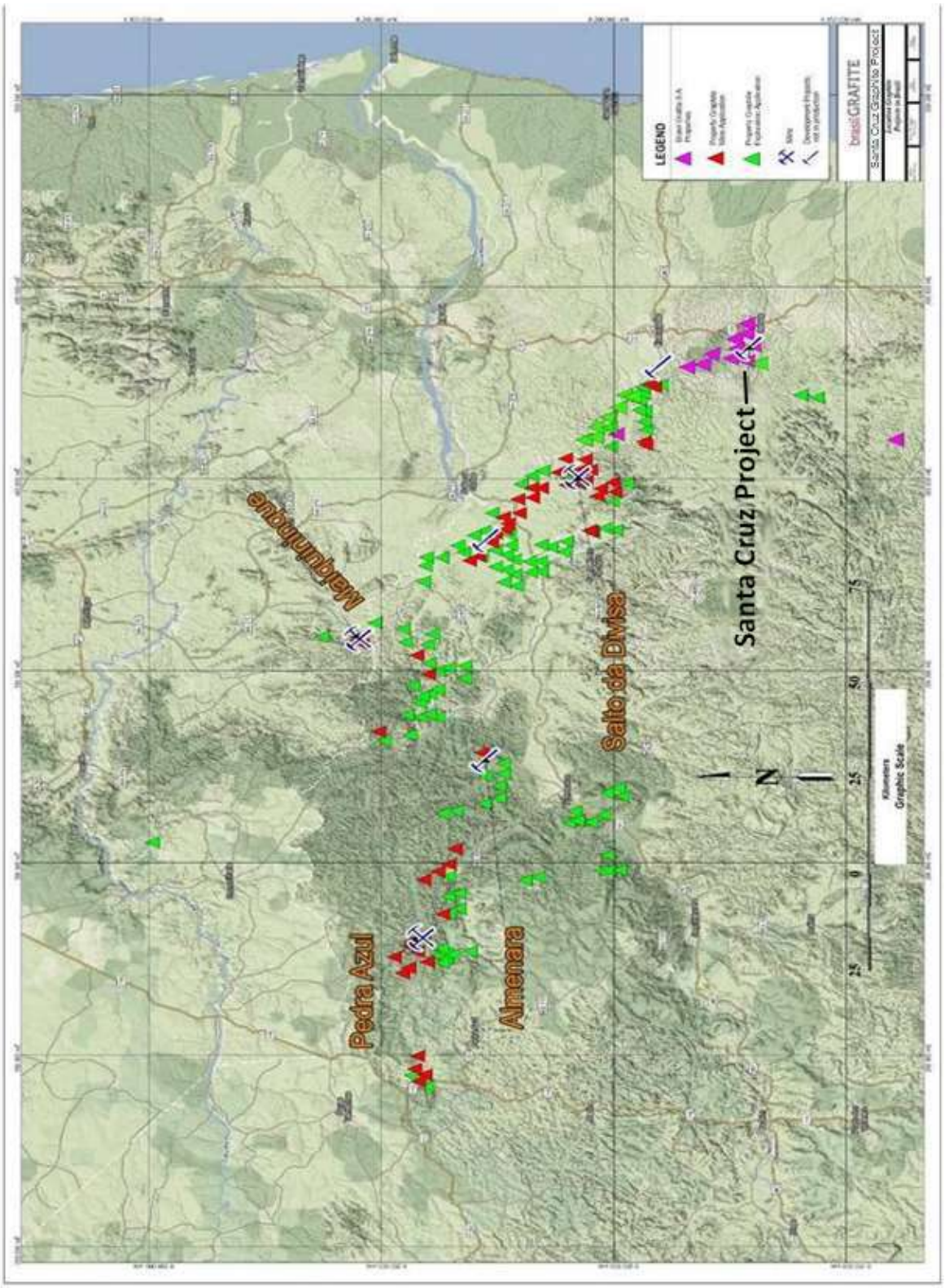


Figure 7 - Nearby Mines, Development Projects and Exploration Target

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 REGIONAL GEOLOGY

The Project is located in the belt known as the Araçuaí Orogen, (Bahia State, Brazil). The Araçuaí Belt is a Brazilian orogenic domain developed along the southeastern margin of the San Francisco Craton and is now viewed as part of the external zone of the so called Araçuaí - West Congo orogen. The terrain between the Araçuaí Belt and the Brazilian continental margin exhibits a whole series of complex features that is confined to a tongue-shaped enclave between the San Francisco and Congo Cratons.

The Araçuaí - West Congo Orogen can be subdivided into ten compartments with the project hosted within the core zone.

The tectonic evolution of the Araçuaí - West Congo orogen can be best explained by a model that involves the closure of the Macaúbas basin which is partially floored by oceanic crust. It began around 880 Ma through a mechanism that resembles the operation of a nutcracker. The San Francisco and Congo cratons acted like the pincers of the nutcracker.

The Project is hosted in the core of this orogen, and the metamorphism of this area is the highest inside this region, reaching the amphibolite - granulite grade with anatexis reached in some areas. Different authors mention that the age for this metamorphism ranges from 585 to 560 Ma, related to the syncollisional stage (Carlos Mauricio Noce, Antonio Carlos Pedrosa - Soares and other et al 2016 Jequitinhonha Complex). In these zones, there are many outcrops of gneisses and paragneisses assigned to the Jequitinhonha or Paraiba do Sul complex. In this group, we can see the development of a granite body synkinematic to the regional foliation.

The complex of paragneisses, known as Kinzigitic, are rocks composed essentially of paragneisses with variable contents of peraluminous silicates, such as biotite, almandine, cordierite, sillimanite, kinzigite (stricto sensu is the graphite) -

sillimanite - cordierite - garnet - biotite gneiss and the rock composed of different amount of these peraluminous silicate associated to quartz - K - feldspar, plagioclase and a trace of graphite. The Kinzigite protolith is a pelite rich in aluminous clay fraction, with minor carbonaceous material, such as paragneiss. The kinzigite characterizes the metamorphism of pelites in the high amphiolite - granulite facies. It is generally accompanied by a profuse partial melting as shown in Figure 8.

Finally, in the Cretaceous age there was sedimentation of unconsolidated sandstone and basal conglomerate that covered the top of small hills that in Brazilian geology is called Barreira formation.

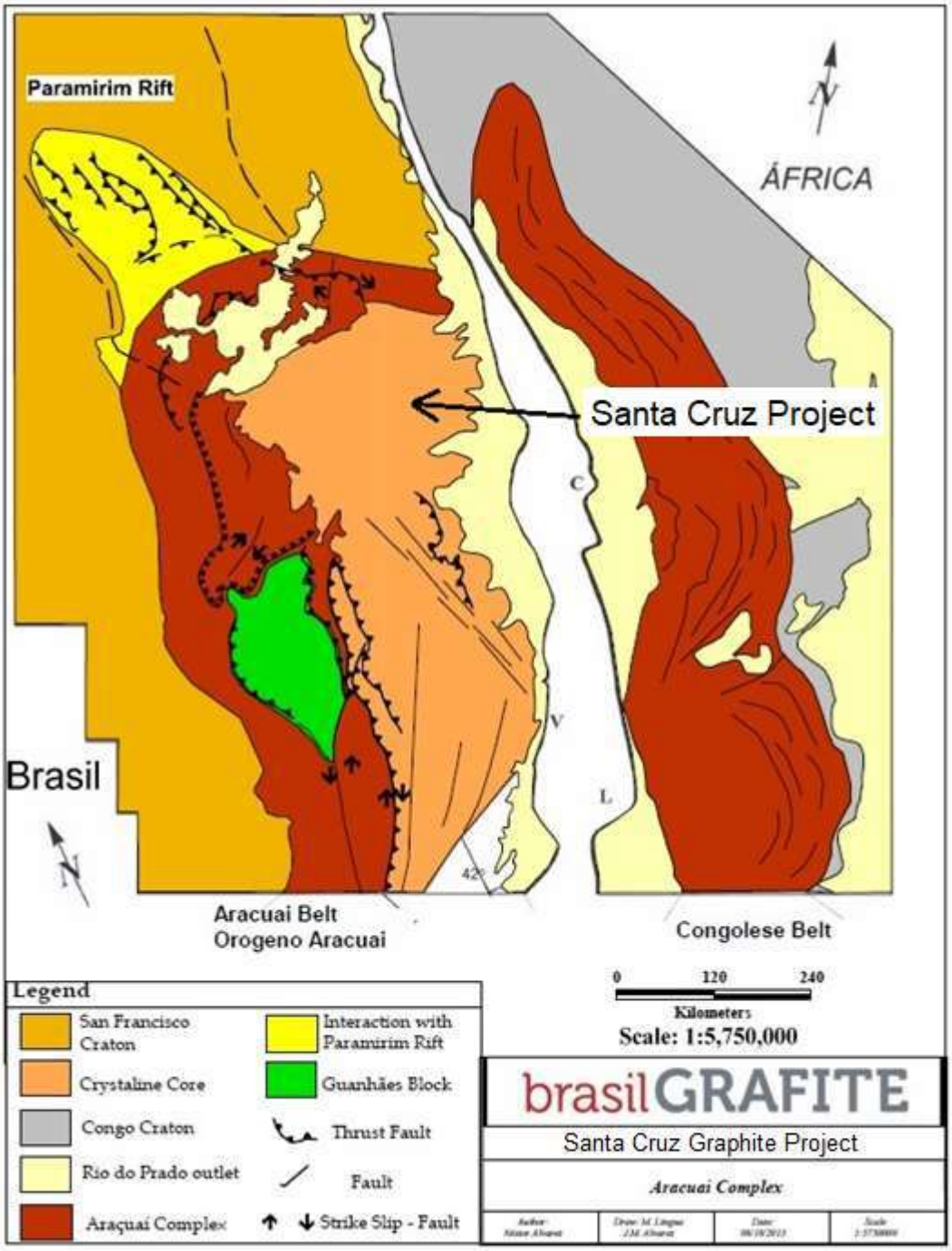


Figure 8 - Project locations in the Araçuaí Orogen

The Kinzigitic complex is subdivided into three main units: Unit a) is the rock assemblage of the Kinzigitic Complex exposed in the southern region of Espirito Santo State, south of Victoria City, this sub-unit is characterized by thick layers of marble enveloped by paragneisses.

Unit b) is the rock assemblage of the Kinzigitic complex exposed in the northern region of Espirito Santo State and eastern Minas Gerais State, particularly in the region of the Doce and Mucuri Rivers. The geologic section that has been studied by Pedrosa - Soares and collaborators, suggests that this sub unit is rich in Kinzigite, has lesser aluminous paragneisses and is very poor in the other rocks referred to above.

Unit c) is exposed in the northeastern region of Minas Gerais State (north of Mucuri River) and the southernmost region of Bahia State. This unit comprises the rock assemblage of the Kinzigitic Complex, rich in graphite gneiss and quartzite intercalations. The layers and lenses of graphite gneiss are of major economic importance because they include the most important deposits of flake graphite that have been explored and mined in South America, including where the project is located.

As shown in figure 8 there is a large belt with development of different graphite deposits and projects between the Bahia and Minas Gerais State in Brazil, but with an important difference: the sector location towards east developed a higher grade metamorphism, as mentioned before, and also have the best large flake deposits in Brazil. This sector is where the Santa Cruz Project is located.

The structural domain varies through the Araçuaí Orogen. The Project is located in a zone of higher metamorphism with strong deformation, which has attained a degree of partial melting (anatexis). Regionally, an overturned fold can be recognized, especially in the Jequitinhonha Group, which has been affected by thrust and transtentional faults and can be recognized in a large lineament via satellite imagery that points towards the main deposit and other mineralized target areas.

For this reason the main and higher grade mineralization appear in lenses associated with the bedded and folded structure, especially in the anticline zone. In the regional domain the structure can have a N-S strike to NW-SE with overturn folds.

In the district and the regional zone there is much evidence of anatexis, as showed in the following image. This figure demonstrates the type of folds of second or third order in the large structure. Figure 10 displays the regional geology.

Figure 9 - Second order folds that affects the rocks

Regional and detailed local geologic maps and cross-sections for the mineralized areas are presented in Appendix 2.

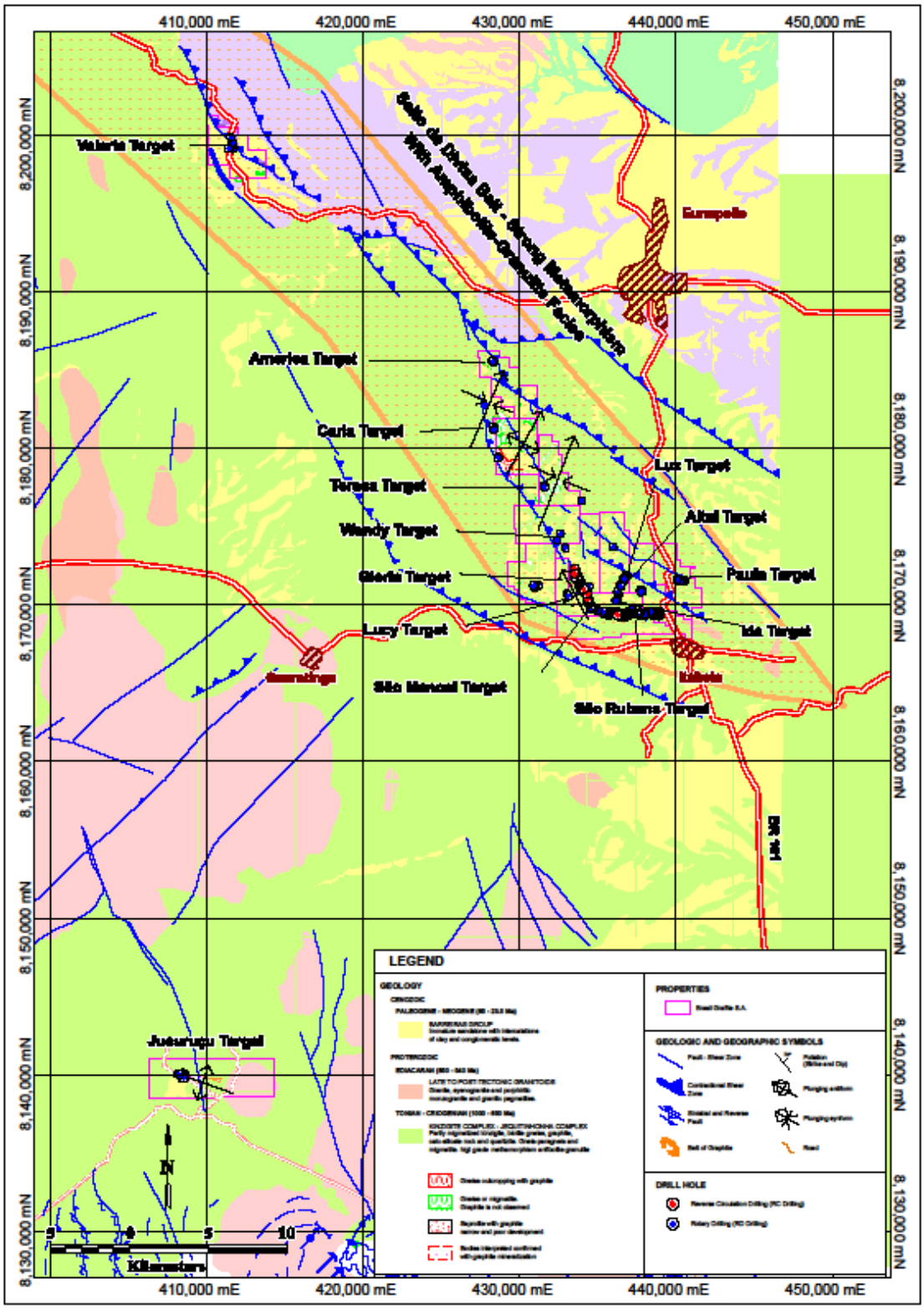


Figure 10 - Regional Geology and Projects

7.2 LOCAL GEOLOGY

The main target area is located near the town of Itabela and is comprised of two continuous mineralized zones denominated as São Manuel and São Rubens. The southernmost claim (871,722/2010) has a large mineralized target denominated Jucuruçu. Local geologic mapping was focused on the main target areas with less detail available on secondary targets and throughout the main properties.

The main targets of São Manuel and São Rubens show a continuous strike of approximately 7.5 kilometers in length, and in general mineralization follows the soft material and structural control along the valley floor. Secondary targets have been identified and include Paula, Altai, Ida Gloria and Lucy, amongst others. Many of the hillsides are covered with the Barreiras Formation, which is not mineralized, while towards the creek and valley bottoms some outcrops of gneiss and migmatite from the Jequitinhonha complex or Kinzigitic complex are present. To the east there are strongly foliated granites, which are likely of similar age to the Kinzigitic Complex. In general, the migmatite is located below the Barreiras Formation with an angular unconformity. In the district, there are other intrusive bodies present with strong foliation. To the north of the district there is a contact with the Rio Pardo Group (composed of meta-limestone, meta-dolomite, quartzite and phyllite) and the Kinzigitic Complex. The Rio Pardo Group is assigned an early Precambrian age, around 800 Mya.

The district where the Salto da Divisa operating mine and Santa Cruz Project are located has a complex and long structural history, but the main, significant control is a regional fault with a NW-SE strike. This control is a sinistral thrust fault, based on the presence of second order folds on the São Manuel target, and, in general, the fault dips N-E, depending on the strike position. This fault likely controls the graphite mineralization as well as the granite and granodiorite intrusion of Cambrian age.

This regional fault has an Az 350° strike in the São Manuel target changing to Az 290° strike in the São Rubens target. This fault and the presence of soft materials appear to provide a structural control for mineralization (see cross-sections in Appendix B).

The southernmost Jucuruçu property is mainly composed of granites and granodiorites along the ridges, which are generally pink feldspar and biotite.

These outcrops are Cambrian Age, or Suite 4 as commonly referred to by the Brazilian geologic community. Some folds with NE-SW strikes that plunge to the north are present along the north of the property. These folds are an anticline and syncline dome zone.

7.3 MINERALIZATION

As previously noted the Project is located within a region where mineralized deposits are hosted in paragneisses with higher degrees of metamorphism between amphibolite and granulite with intense anatexis. In general, the mineralization is structurally controlled by the shearing zone along the regional fault and the presence of softer materials.

The Project has disseminated mineralization that is easily identified visually with +65% of flake size granulometry +80 mesh (large flake) including ~35% +50 mesh (jumbo flake) (see Figures 11, 12, 13, 14 and 15), important to note both numbers are for final concentrates, hence one can assume run of mine ore has an even bigger amount of +80# flakes. Moreover, the mineralization is present in massive stratus layers found in strong association with the main structure control.

Initially, the mineralization appeared to be quite simple, and was thought to be sedimentary in nature, but after further field investigations, drilling, mapping and literature review, it is now believed that the mineralization is structurally controlled and is hosted in the many folds, shearing zones and mylonitic gneisses.

Figure 11 - Mineralized Sample - São Rubens and São Manuel.

Figure 12 - Mineralized Samples - São Rubens and São Manuel

Figure 13 - Lump Samples - São Rubens and São Manuel

Figure 14 - Typical Mineralization São Rubens and São Manuel - Graphite layers in Dark Colors and Disseminated Graphite in Lighter Colors

Figure 15 - Jumbo and Large Flakes- São Rubens and São Manuel

In general, the larger flake size appears to be associated with the higher degrees of metamorphism, while large volumes of high grade mineralized material are often concentrated in the many folds.

The mineralized zone in the main target areas of São Rubens and São Manuel is located in the friable upper layers close to surface. There is approximately 7.5 km long continuous strike with widths varying from 30 to 200 meters, with some depositional areas much wider because of the presence of significant folds. Mineralization is oriented sub vertical to vertical and is in evidence down to a drilled depth of approximately 80 meters. The ore body is open at depth and along strike. There is also the presence of disseminated mineralization in several of the channel samples taken from rock outcrops in the São Rubens target as well as in various road cuts throughout the region. São Manuel target shows foliated gneisses with Az 330°/ 90° to Az 350°/80° East strike. To the south, the bedding changes from being 90° to 65° East.

There are various secondary targets near the main target area (See Appendix 2) that are also promising:

- Paula´s target is located to the east of property. It is characterized by banded and disseminated mineralization in the gneisses that strike Az

290°/ 90°. 49 rotary holes were drilled in this target intercepting a mineralized zone that is 490 meters long and 20 meters wide with a general E-W strike. The samples display strong flakes with high carbon grade (And these samples have not been considered in the resource calculation because they presented a series of inconsistencies in their sample collection) This area was affected by post - mineralized faults.

- Luz´s target is located toward the west of Paula's, and is composed of graphitic gneisses with a N-S/60° E strike. This zone has been less explored.
- Altai´s target is located to the south west of Luz target and shows strong graphite mineralization with thick flakes. The zone has been less explored.
- Ida´s target is located towards the south of Altai and shows strong graphite mineralization and thick flakes striking N-S/90°. In this area 27 Rotary holes were drilled with 11 of them showing thick and medium flakes. These were not included in the resources because they were done during the earliest phase of exploration and were not subject to standardized sampling methods.
- Lucy target is located to the west of the São Manuel target. There are 47 Rotary Drilling holes in this area with three of them showing encouraging results: FTB-004 with 3.4 meters @ 4.67% C; FTB-005 with 6.2 meters @ 3.4% C and FTB-015 with 3 meters @ 3.42% C. These holes display thick to medium flakes. This target area is 900 meters long and 20 meters wide. It is located to the west of São Manuel.
- Gloria target is located between the São Manuel and the Lucy target with a 350°/90° strike. It appears to be part of the São Manuel´s antiform. The area is 280 meters long by 25 meters wide. The outcrops display thick flakes. The initial exploration results are encouraging but it is currently not part of the resource calculation.

Other interesting targets are located towards the north of São Manuel

and are hosted along the regional master fault. It is important to note that all of these targets have positive exploratory holes with encouraging assay results demonstrating significant resource upside potential.

Figure 16 - Rotary Drilling Team

Figure 17 - Sample Collection

Figure 18 - RC Drill Equipment

8.0 DEPOSIT TYPES

The Project can be classified as sedimentary - metamorphic. During late Precambrian age, pelites and carbon were deposited at the same time. Later in early Cambrian age, Orogenic movements transformed these sediments to high grade metamorphic rocks, and these movements transformed the carbon and the hosted rock to gneiss with graphite (this type of mineralization with the different metamorphic minerals is known as the Kinzigite Complex).

The mineralization was shifted by a regional fault, which dictated alignment of the host rock (gneisses and paragneisses) and coupled with the soft nature of the graphite, made the association of such strike and fold (anticlines) changes to host mineralized zones and thicker lenses. Several deposits, including the Santa Cruz Graphite Project, are hosted in this regional area that covers over 25,000 km².

9.0 EXPLORATION

9.1 GENERAL EXPLORATION

An extensive exploration program has been completed to date resulting in the areas where current resources are defined in this report as well as confirming several other mineralized targets. Channel samples, trenches, mapping and drilling have been performed and include:

1) Geologic surface mapping at a scale of 1:5,000 in the main sectors of São Manuel and São Rubens and at a scale of 1:50,000 over the regional claims.
2) Geophysics program, conducted in March 2013.
3) Some channel samples (these were not used in the resource calculations)
4) Rotary Drilling holes (with several twin holes drilled for confirmation), conducted between 2012 and 2014.
5) Reverse circulation holes in the São Manuel and São Rubens target areas conducted in March, 2016.

In August of 2015, BGSA entered into a four month option agreement with Sayona Mining Limited, an ASX-listed company, pursuant to which Sayona could potentially acquire the project subject to a period of additional due diligence. The option was subsequently extended for six months in December 2015. After completing a 2500 meter drilling program in March of 2016 with the results confirming mineralization extension and grade, Sayona determined that the project did not fit their current internal strategy, which had shifted focus to lithium, and declined to exercise the option. The results from that drilling program are included in the Itabela data base and incorporated in the current resource calculation.

9.2 GEOPHYSICS

A geophysics campaign has been started in the main target zone with one 460-meter-long section in the São Manuel target completed as of the publication of this report. The resistivity equipment is made by a Brazilian manufacturer and is powered by a 12-volt motorcycle battery. The current configuration can penetrate to approximately a depth of 30 - 40 meters depending on field conditions and groundwater levels, although noise and interference increases significantly in the final 10 - 15 meters. The completed cross-section location is presented in Figure 19 along with the interpretation of the section, which is presented in Figure 20.

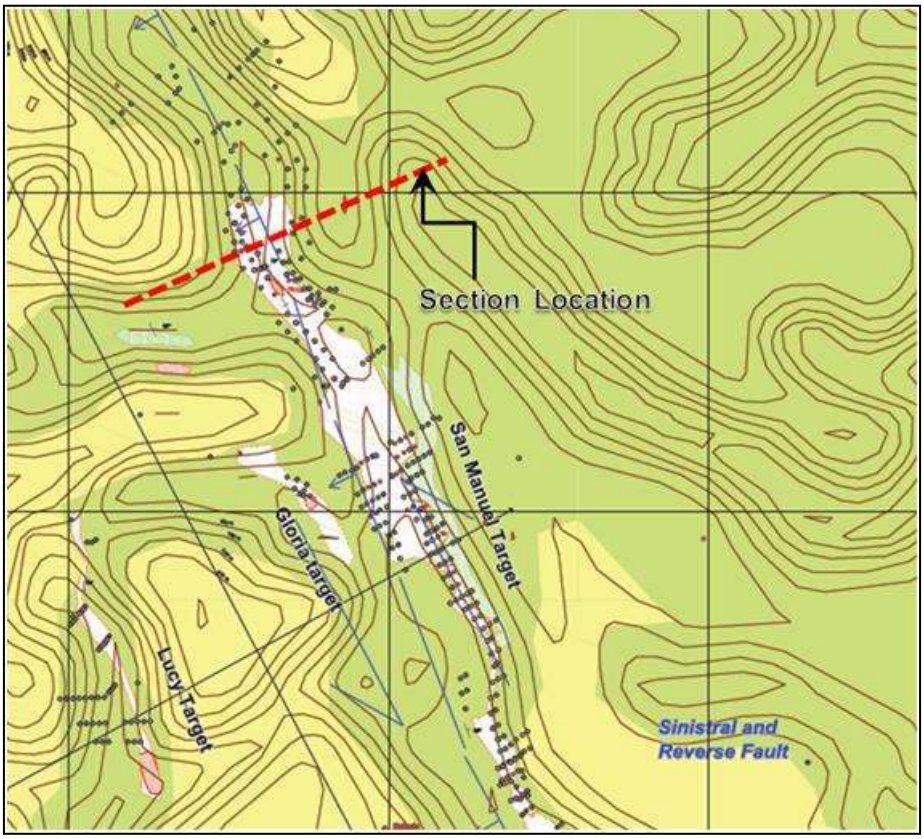


Figure 19 - Geophysics Cross-Section Location

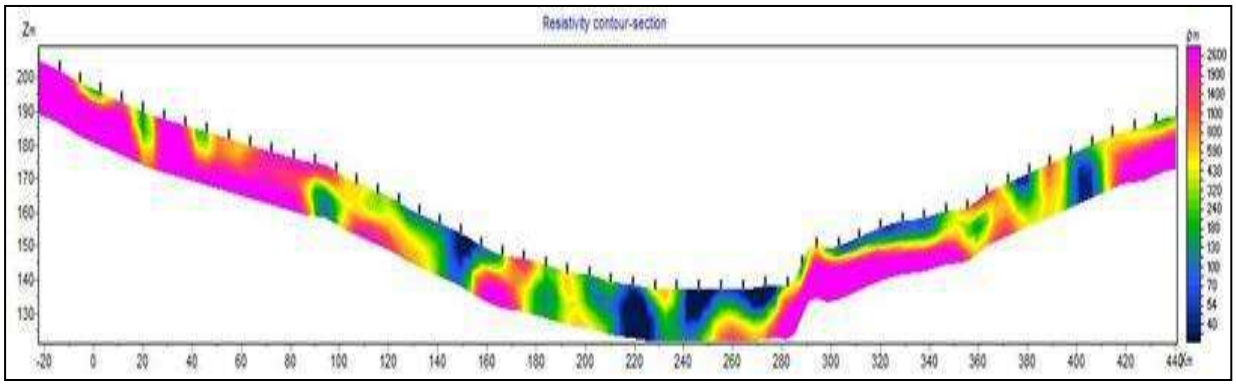


Figure 20 - Geophysics Cross-Section

The initial geophysics results are good when compared to the geologic cross-section with strong mineralization in the central zone of the section with some additional potential targets identified between stations 140 and 160 as well at 400 and 420. Additional sections will be completed once the main target is drilled out. Moving forward, geophysics will be a valuable tool to identify additional targets while cutting down on the number of holes.

10.0 DRILLING

In total 483 holes were done, totaling 6,601 meters. Drilling objectives were as follows:

a) Exploration and new target generation: after detailed mapping with surface and trench sampling, short (~10m) holes were drilled to confirm existence of mineralization beyond surface;

b) Increase resources in São Manuel, Sao Ruben and Jucuruçu areas, always complying with QA/ QC protocols.

As resource definition progressed parallel lines with holes spaced every 25 meters were drilled on section, followed by 50 meters spacing along strike. Samples were collected every meter, weighting around 10 kg each.

Samples were described in the field by its mineralization and a visual flake size was assigned with a number that could vary from 0 to 3. Taking into consideration that 0 represents no visible graphite, 1 represents small flakes, 2 represents medium flakes and 3 represents large flakes.

Tables 7, 8, 9 and 10 shows the holes used in evaluation, 398 holes totaling 5,850.2 meters.

Table 7 - Rotary Drilling São Manuel Summary - Hole Location used in evaluation

Hole ID	East	North	RL	Azimuth True	Dip	total_depth
AD-FTM-001	433,709.17	8,171,592.44	146.00	0	-90	10.00
AD-FTM-003	433,706.17	8,171,726.44	152.40	0	-90	10.50
AD-FTM-006	433,681.16	8,171,743.44	150.40	0	-90	10.00
AD-FTM-010	433,736.17	8,171,698.45	148.05	0	-90	13.50
AD-FTM-025	433,621.17	8,171,733.44	140.50	0	-90	7.00
AD-FTM-026	433,599.17	8,171,761.44	144.50	0	-90	11.00
AD-FTM-030	433,539.17	8,171,874.44	146.50	0	-90	7.00

AD-FTM-031	433,540.17	8,171,845.45	143.80	0	-90	7.60
AD-FTM-035	433,556.17	8,171,829.44	141.00	0	-90	4.50
AD-FTM-036	433,590.17	8,171,809.44	140.00	0	-90	5.00
AD-FTM-037	433,548.17	8,171,926.44	145.00	0	-90	13.00
AD-FTM-039	433,518.17	8,171,904.45	158.00	0	-90	10.00
AD-FTM-041	433,530.17	8,171,959.44	153.00	0	-90	9.00
AD-FTM-082	433,740.17	8,171,564.44	150.00	0	-90	14.00
AD-FTM-083	433,768.17	8,171,535.44	149.50	0	-90	5.00
AD-FTM-088	433,771.17	8,171,479.44	157.50	0	-90	20.00
AD-FTM-092	433,829.17	8,171,417.44	161.50	0	-90	26.40
AD-FTM-111	433,959.16	8,171,177.44	137.50	0	-90	6.00
AD-FTM-112	434,004.17	8,171,219.45	138.50	0	-90	9.00
AD-FTM-136	433,994.17	8,171,017.45	140.30	0	-90	11.40
AD-FTM-149	434,035.17	8,170,855.44	136.70	0	-90	10.00
AD-FTM-160	434,046.17	8,171,047.44	137.60	0	-90	5.00
AD-FTM-167	434,086.17	8,170,977.45	135.72	0	-90	6.30
AD-FTM-171	434,133.17	8,170,941.44	145.41	0	-90	10.00
AD-FTM-189	434,192.17	8,170,715.45	139.60	0	-90	2.70
AD-FTM-191	434,227.17	8,170,735.44	149.00	0	-90	9.00
AD-FTM-192	434,244.16	8,170,744.44	153.00	0	-90	9.50
AD-FTM-194	434,238.17	8,170,696.44	149.00	0	-90	5.20
AD-FTM-195	434,256.17	8,170,706.44	154.00	0	-90	6.50
AD-FTM-197	434,267.17	8,170,666.45	154.00	0	-90	7.30
AD-FTM-198	434,285.16	8,170,676.45	157.80	0	-90	9.00
AD-FTM-199	434,313.17	8,170,647.44	162.83	0	-90	7.80
AD-FTM-201	434,296.17	8,170,636.44	157.50	0	-90	8.00
AD-FTM-202	434,307.17	8,170,597.44	152.87	0	-90	6.50

AD-FTM-205	434,342.17	8,170,569.45	157.00	0	-90	4.00
AD-FTM-210	434,324.17	8,170,468.44	143.00	0	-90	4.00
AD-FTM-212	434,318.17	8,170,418.44	140.00	0	-90	7.00
AD-FTM-215	434,319.17	8,170,371.45	133.50	0	-90	6.50
AD-FTM-221	434,325.16	8,170,324.45	145.22	0	-90	5.50
AD-FTM-224	434,341.17	8,170,290.45	144.00	0	-90	6.00
AD-FTM-238	433,579.17	8,171,757.45	152.50	0	-90	13.00
AD-FTM-239	433,611.17	8,171,766.44	141.20	0	-90	8.00
AD-FTM-240	433,611.17	8,171,766.44	141.20	0	-90	5.50
AD-FTM-244	434,417.17	8,170,303.44	164.76	0	-90	10.00
AD-FTM-251	434,010.16	8,171,113.45	133.20	0	-90	4.00
AD-FTM-252	433,918.17	8,171,465.45	134.00	0	-90	3.30
AD-FTM-253	433,936.17	8,171,478.44	140.00	0	-90	5.00
AD-FTM-257	433,748.17	8,171,665.44	136.40	0	-90	6.00
AD-FTM-258	433,769.17	8,171,652.45	137.00	0	-90	7.00
AD-FTM-262	433,851.17	8,171,571.44	133.50	0	-90	3.70
AD-FTM-263	433,868.17	8,171,415.45	151.70	0	-90	14.00
AD-FTM-264	433,856.17	8,171,404.45	159.00	0	-90	21.00
AD-FTM-265	433,805.16	8,171,394.44	166.74	0	-90	15.00
AD-FTM-270	433,519.17	8,172,147.45	147.50	0	-90	7.40
AD-FTM-271	433,508.17	8,172,130.44	155.00	0	-90	10.40
AD-FTM-284	434,341.17	8,170,199.44	138.50	0	-90	6.00
AD-FTM-285	434,356.17	8,170,206.44	142.93	0	-90	11.00
AD-FTM-286	434,380.16	8,170,217.44	148.09	0	-90	10.40
AD-FTM-287	434,394.16	8,170,226.45	151.06	0	-90	10.40
AD-FTM-290	434,361.16	8,170,152.44	142.35	0	-90	11.40
AD-FTM-291	434,382.17	8,170,158.44	145.65	0	-90	11.00

AD-FTM-294	434,381.17	8,170,098.45	140.81	0	-90	5.40
AD-FTM-295	434,397.17	8,170,105.44	143.16	0	-90	10.40
AD-FTM-296	434,418.17	8,170,116.44	148.36	0	-90	10.40
AD-FTM-299	434,429.17	8,170,066.44	143.06	0	-90	10.40
AD-FTM-301	434,526.16	8,170,014.44	146.17	0	-90	10.40
AD-FTM-303	434,569.17	8,169,983.45	141.10	0	-90	6.00
AD-FTM-307	434,571.17	8,169,892.45	122.00	0	-90	5.00
AD-FTM-308	434,610.16	8,169,850.45	122.40	0	-90	10.40
AD-FTM-309	434,592.16	8,169,877.44	122.00	0	-90	10.00
AD-FTM-310	434,506.17	8,169,859.44	123.00	0	-90	10.40
AD-FTM-311	434,602.17	8,169,831.45	123.80	0	-90	11.00
AD-FTM-313	434,591.17	8,169,808.44	132.80	0	-90	19.00
AD-FTM-315	434,651.16	8,169,837.45	121.00	0	-90	10.40
AD-FTM-319	434,688.17	8,169,800.45	121.00	0	-90	10.40
AD-FTM-320	434,678.17	8,169,785.45	121.72	0	-90	10.40
AD-FTM-321	434,668.17	8,169,769.44	124.65	0	-90	16.00
AD-FTM-322	434,657.17	8,169,749.45	130.40	0	-90	10.40
AD-FTM-325	434,741.17	8,169,790.45	120.00	0	-90	5.00
AD-FTM-326	434,732.17	8,169,773.44	120.50	0	-90	8.00
AD-FTM-327	434,720.16	8,169,755.45	121.80	0	-90	10.00
AD-FTM-328	434,782.16	8,169,762.44	120.20	0	-90	6.00
AD-FTM-330	434,820.17	8,169,728.44	120.00	0	-90	7.00
AD-FTM-331	434,862.17	8,169,741.45	124.00	0	-90	6.00
AD-FTM-333	434,978.17	8,169,693.45	130.00	0	-90	4.00
AD-FTM-335	434,962.16	8,169,657.45	118.20	0	-90	4.00
AD-FTM-337	434,062.17	8,170,999.44	134.80	0	-90	8.40
AD-FTM-338	434,071.17	8,171,014.45	143.00	0	-90	10.40

AD-FTM-339	434,062.17	8,171,029.44	143.38	0	-90	10.40
AD-FTM-340	434,050.17	8,171,018.45	136.30	0	-90	7.40
AD-FTM-341	434,052.17	8,171,053.44	140.63	0	-90	10.40
AD-FTM-342	434,007.17	8,171,017.45	133.20	0	-90	7.40
AD-FTM-343	433,995.17	8,171,052.44	134.47	0	-90	7.40
AD-FTM-344	433,976.17	8,171,118.45	133.80	0	-90	6.40
AD-FTM-345	433,743.16	8,171,572.44	145.00	0	-90	10.40
AD-FTM-346	433,679.17	8,171,613.44	141.50	0	-90	9.90
AD-FTM-347	433,691.17	8,171,622.44	138.00	0	-90	6.90
AD-FTM-348	433,631.17	8,171,885.44	139.20	0	-90	3.90
AD-FTM-349	433,621.17	8,171,689.44	141.50	0	-90	9.00
AD-FTM-350	433,620.17	8,171,712.44	142.20	0	-90	9.00
AD-FTM-353 P	433,525.17	8,171,926.44	156.00	0	-90	19.00
AD-FTM-354 P	433,502.17	8,171,874.44	163.60	0	-90	24.00
AD-FTM-359 P	433,783.17	8,171,467.44	158.20	0	-90	23.00
AD-FTM-361 P	433,564.17	8,171,779.44	154.00	0	-90	18.40
AD-FTM-362 P	433,680.17	8,171,837.44	161.51	0	-90	17.40
AD-FTM-363	433,951.17	8,170,985.44	158.85	0	-90	10.40
AD-FTM-364	434,341.17	8,170,327.45	148.77	0	-90	12.00

Table 8 - Rotary Drilling São Rubens - Holes Location used in evaluation

Hole ID	East	North	RL	Azimuth True	Dip	total_depth
AD-FTR-056	438,048.17	8,169,387.44	138.00	0	-90	14.00
AD-FTR-057	438,018.16	8,169,364.45	123.00	0	-90	7.40
AD-FTR-062	437,930.16	8,169,357.45	106.00	0	-90	15.40
AD-FTR-063	437,949.17	8,169,392.45	119.00	0	-90	7.40

AD-FTR-064	438,064.16	8,169,429.44	157.00	0	-90	11.40
AD-FTR-067	437,987.16	8,169,493.45	174.00	0	-90	11.40
AD-FTR-068	437,968.16	8,169,427.44	145.00	0	-90	9.40
AD-FTR-070	437,888.16	8,169,448.45	138.00	0	-90	7.60
AD-FTR-079	437,869.16	8,169,413.45	119.47	0	-90	9.40
AD-FTR-080	437,850.16	8,169,378.44	106.67	0	-90	10.70
AD-FTR-100	437,658.16	8,169,527.44	131.58	0	-90	5.90
AD-FTR-199	438,020.16	8,169,396.45	142.54	0	-90	8.40
AD-FTR-200	437,841.16	8,169,370.44	110.00	0	-90	19.40
AD-FTR-206	438,280.16	8,169,494.45	135.87	0	-90	10.40
AD-FTR-207	438,300.16	8,169,487.45	137.13	0	-90	10.40
AD-FTR-212	438,356.16	8,169,520.44	156.48	0	-90	10.40
AD-FTR-215	438,375.16	8,169,573.44	172.54	0	-90	15.90
AD-FTR-220	438,527.16	8,169,369.44	127.81	0	-90	10.40
AD-FTR-225	438,543.16	8,169,465.44	157.54	0	-90	11.40
AD-FTR-229	438,558.16	8,169,542.45	179.16	0	-90	20.40
AD-FTR-230	438,564.17	8,169,556.45	182.43	0	-90	11.40
AD-FTR-232	438,883.16	8,169,282.44	121.33	0	-90	10.40
AD-FTR-234	438,869.16	8,169,316.44	128.65	0	-90	10.40
AD-FTR-237	438,841.16	8,169,369.44	142.39	0	-90	10.40
AD-FTR-239	438,834.16	8,169,404.45	148.46	0	-90	25.40
AD-FTR-246	438,874.16	8,169,506.45	127.00	0	-90	7.80
AD-FTR-247	438,873.16	8,169,526.44	139.00	0	-90	10.40
AD-FTR-248	438,880.16	8,169,486.45	131.73	0	-90	10.40
AD-FTR-254	438,850.16	8,169,569.44	141.58	0	-90	11.00
AD-FTR-255	438,866.16	8,169,579.44	150.33	0	-90	5.00

AD-FTR-256	438,922.16	8,169,511.45	157.44	0	-90	10.00
AD-FTR-258	438,946.16	8,169,506.45	165.00	0	-90	10.40
AD-FTR-260	438,900.16	8,169,589.45	174.29	0	-90	8.40
AD-FTR-262	438,917.16	8,169,533.44	163.76	0	-90	10.40
AD-FTR-266	438,940.16	8,169,530.44	171.68	0	-90	10.00
AD-FTR-267	438,924.16	8,169,549.45	173.52	0	-90	10.40
AD-FTR-268	438,920.16	8,169,570.44	180.00	0	-90	10.40
AD-FTR-269	438,912.16	8,169,595.45	183.00	0	-90	10.40
AD-FTR-270	438,929.16	8,169,605.45	194.00	0	-90	10.40
AD-FTR-271	438,920.16	8,169,624.44	195.55	0	-90	10.40
AD-FTR-272	438,941.16	8,169,581.44	192.00	0	-90	10.40
AD-FTR-275	437,192.17	8,169,543.45	118.49	0	-90	6.40
AD-FTR-276	437,207.16	8,169,524.44	121.48	0	-90	10.40
AD-FTR-277	437,165.16	8,169,632.44	125.40	0	-90	8.40
AD-FTR-278	437,169.16	8,169,650.45	128.14	0	-90	6.40
AD-FTR-279	437,184.17	8,169,686.45	133.62	0	-90	10.40
AD-FTR-282	437,210.17	8,169,499.45	138.00	0	-90	10.40
AD-FTR-283	437,237.16	8,169,494.45	137.00	0	-90	10.40
AD-FTR-284	437,261.17	8,169,491.45	129.00	0	-90	10.40
AD-FTR-285	437,285.16	8,169,475.44	130.00	0	-90	11.00
AD-FTR-287	437,337.16	8,169,470.44	140.00	0	-90	10.40
AD-FTR-289	437,383.16	8,169,464.44	139.00	0	-90	10.40
AD-FTR-290	437,403.16	8,169,456.45	133.00	0	-90	11.40
AD-FTR-291	437,423.16	8,169,454.45	134.00	0	-90	10.80
AD-FTR-292	437,443.16	8,169,452.45	134.00	0	-90	10.40
AD-FTR-293	437,459.17	8,169,446.45	128.00	0	-90	10.40

AD-FTR-294	437,479.16	8,169,440.45	121.00	0	-90	10.40
AD-FTR-295	437,499.17	8,169,438.45	125.00	0	-90	10.40
AD-FTR-296	437,519.16	8,169,432.44	125.00	0	-90	10.40
AD-FTR-297	437,543.17	8,169,429.44	143.00	0	-90	10.40
AD-FTR-298	437,562.16	8,169,419.44	140.00	0	-90	10.40
AD-FTR-299	437,580.16	8,169,414.44	140.00	0	-90	10.40
AD-FTR-300	437,595.16	8,169,400.45	138.00	0	-90	10.40
AD-FTR-301	437,604.16	8,169,379.44	125.00	0	-90	10.40
AD-FTR-302	437,617.16	8,169,363.45	152.00	0	-90	10.40
AD-FTR-303	436,660.16	8,169,400.45	119.00	0	-90	10.40
AD-FTR-304	436,675.16	8,169,412.45	120.00	0	-90	10.40
AD-FTR-305	436,686.16	8,169,424.44	133.00	0	-90	10.40
AD-FTR-307	436,693.16	8,169,377.44	128.00	0	-90	10.40
AD-FTR-308	436,682.16	8,169,394.45	123.00	0	-90	10.40
AD-FTR-309	436,694.17	8,169,406.45	140.00	0	-90	10.40
AD-FTR-311	436,719.16	8,169,351.45	120.00	0	-90	7.00
AD-FTR-312	436,724.17	8,169,372.44	132.00	0	-90	10.40
AD-FTR-314	435,511.16	8,169,529.44	128.00	0	-90	10.00
AD-FTR-315	435,517.16	8,169,548.45	132.00	0	-90	10.40
AD-FTR-316	436,773.16	8,169,369.44	133.00	0	-90	7.00
AD-FTR-317	435,526.17	8,169,565.44	135.00	0	-90	10.40
AD-FTR-318	436,768.16	8,169,386.44	140.00	0	-90	10.40
AD-FTR-320	436,822.17	8,169,391.45	120.00	0	-90	6.40
AD-FTR-321	436,813.16	8,169,407.45	142.00	0	-90	10.40
AD-FTR-322	435,485.16	8,169,526.44	138.00	0	-90	10.40
AD-FTR-323	435,488.16	8,169,545.45	142.00	0	-90	10.40

AD-FTR-324	436,808.17	8,169,429.44	145.00	0	-90	10.40
AD-FTR-325	435,491.17	8,169,570.44	142.00	0	-90	10.40
AD-FTR-328	436,870.17	8,169,420.44	128.00	0	-90	8.40
AD-FTR-329	436,861.16	8,169,437.45	131.00	0	-90	25.40
AD-FTR-331	436,887.16	8,169,486.45	129.00	0	-90	10.40
AD-FTR-332	436,879.16	8,169,450.45	141.00	0	-90	10.40
AD-FTR-333	436,874.16	8,169,464.44	135.00	0	-90	10.40
AD-FTR-336	436,922.16	8,169,461.45	126.00	0	-90	10.40
AD-FTR-337	436,909.16	8,169,478.44	126.00	0	-90	10.40
AD-FTR-338	436,654.17	8,169,382.44	135.00	0	-90	6.00
AD-FTR-339	436,898.16	8,169,489.45	142.00	0	-90	10.40
AD-FTR-340	436,888.17	8,169,502.45	143.00	0	-90	10.40
AD-FTR-342	436,884.17	8,169,549.45	151.00	0	-90	8.00
AD-FTR-343	436,954.17	8,169,497.45	137.00	0	-90	10.40
AD-FTR-344	436,333.16	8,169,341.45	113.00	0	-90	7.40
AD-FTR-346	436,270.17	8,169,406.45	121.70	0	-90	10.40
AD-FTR-347	436,268.16	8,169,388.45	123.70	0	-90	10.40
AD-FTR-348	436,253.16	8,169,372.44	124.70	0	-90	10.40
AD-FTR-349	436,250.16	8,169,351.45	123.00	0	-90	15.00
AD-FTR-350	436,238.16	8,169,332.44	117.50	0	-90	8.40
AD-FTR-351	436,221.16	8,169,426.44	118.00	0	-90	9.40
AD-FTR-352	436,216.16	8,169,404.45	125.40	0	-90	10.40
AD-FTR-353	436,214.17	8,169,386.44	128.40	0	-90	16.40
AD-FTR-354	436,212.16	8,169,366.44	126.00	0	-90	10.40
AD-FTR-355	436,171.17	8,169,441.45	126.00	0	-90	6.40
AD-FTR-356	436,171.17	8,169,424.44	132.00	0	-90	10.40

AD-FTR-357	436,169.16	8,169,400.45	140.00	0	-90	10.40
AD-FTR-358	436,169.16	8,169,381.44	137.00	0	-90	10.40
AD-FTR-359	436,168.16	8,169,361.45	137.00	0	-90	10.40
AD-FTR-360	436,122.16	8,169,439.45	122.00	0	-90	7.40
AD-FTR-361	436,120.17	8,169,416.44	134.00	0	-90	10.40
AD-FTR-362	436,118.16	8,169,399.45	133.00	0	-90	10.40
AD-FTR-367	435,913.16	8,169,434.44	124.00	0	-90	8.00
AD-FTR-368	435,915.17	8,169,414.45	132.00	0	-90	10.40
AD-FTR-371	435,768.17	8,169,428.44	134.00	0	-90	7.00
AD-FTR-372	435,767.16	8,169,408.45	138.00	0	-90	10.40
AD-FTR-373	435,763.16	8,169,391.45	143.00	0	-90	10.40
AD-FTR-374	435,759.16	8,169,374.44	149.00	0	-90	10.40
AD-FTR-375	435,756.16	8,169,359.45	153.00	0	-90	10.40
AD-FTR-378	435,664.16	8,169,449.45	131.00	0	-90	8.00
AD-FTR-379	435,668.16	8,169,430.44	139.00	0	-90	10.40
AD-FTR-380	435,618.17	8,169,444.45	130.00	0	-90	9.00
AD-FTR-381	435,616.16	8,169,425.44	136.00	0	-90	10.40
AD-FTR-382	435,617.16	8,169,407.45	144.00	0	-90	10.40
AD-FTR-383	435,613.16	8,169,386.44	148.00	0	-90	10.40
AD-FTR-384	435,572.16	8,169,456.45	130.00	0	-90	8.00
AD-FTR-385	435,565.16	8,169,437.45	137.00	0	-90	10.40
AD-FTR-386	435,558.16	8,169,418.44	141.00	0	-90	10.40
AD-FTR-387	435,481.16	8,169,473.44	134.00	0	-90	4.00
AD-FTR-388	435,482.17	8,169,456.45	130.00	0	-90	10.40
AD-FTR-390	435,435.17	8,169,475.44	128.00	0	-90	8.00
AD-FTR-391	435,432.17	8,169,455.45	133.00	0	-90	10.40

AD-FTR-392	435,428.17	8,169,435.44	136.00	0	-90	10.40
AD-FTR-393	435,426.16	8,169,415.44	145.00	0	-90	10.40
AD-FTR-394	435,384.17	8,169,476.44	135.00	0	-90	7.00
AD-FTR-395	435,381.17	8,169,458.45	132.00	0	-90	10.40
AD-FTR-396	436,367.16	8,169,289.44	134.00	0	-90	7.90
AD-FTR-397	436,417.16	8,169,284.44	128.00	0	-90	5.90
AD-FTR-399	436,419.17	8,169,261.45	133.00	0	-90	9.90
AD-FTR-400	436,464.17	8,169,296.45	132.00	0	-90	5.00
AD-FTR-401	436,613.17	8,169,412.45	122.00	0	-90	7.40
AD-FTR-402	436,564.16	8,169,434.44	121.00	0	-90	5.40
AD-FTR-403	436,514.16	8,169,437.45	123.00	0	-90	9.90
AD-FTR-404	436,456.17	8,169,455.45	137.00	0	-90	10.40
AD-FTR-405	436,409.17	8,169,475.44	117.00	0	-90	7.90
AD-FTR-406	436,352.16	8,169,486.45	119.50	0	-90	9.40
AD-FTR-407	436,297.16	8,169,475.44	116.50	0	-90	9.40
AD-FTR-408	436,214.17	8,169,501.45	122.50	0	-90	4.40
AD-FTR-409	436,165.16	8,169,514.44	119.00	0	-90	10.40
AD-FTR-410	436,158.16	8,169,517.44	118.00	0	-90	6.40
AD-FTR-411	436,105.17	8,169,536.45	122.00	0	-90	6.40
AD-FTR-412	436,055.16	8,169,534.44	124.00	0	-90	10.40
AD-FTR-414	435,951.17	8,169,531.44	128.00	0	-90	7.40
AD-FTR-416	435,842.17	8,169,536.45	121.00	0	-90	8.00
AD-FTR-418	435,741.16	8,169,519.44	130.00	0	-90	7.00
AD-FTR-419	435,686.16	8,169,531.44	131.00	0	-90	7.00
AD-FTR-420	435,638.16	8,169,516.44	151.00	0	-90	10.40
AD-FTR-421	435,589.17	8,169,507.45	127.00	0	-90	8.00

AD-FTR-422	435,598.16	8,169,525.44	133.00	0	-90	10.40
AD-FTR-425	436,511.17	8,169,299.45	128.00	0	-90	4.90
AD-FTR-426	436,469.16	8,169,276.44	114.00	0	-90	10.40
AD-FTR-427	436,521.16	8,169,281.44	119.00	0	-90	10.40
AD-FTR-428	436,523.16	8,169,264.45	125.00	0	-90	10.40
AD-FTR-430	436,524.16	8,169,249.45	135.00	0	-90	10.40
AD-FTR-431	436,561.16	8,169,310.45	129.00	0	-90	4.90
AD-FTR-432	436,578.16	8,169,241.45	141.00	0	-90	10.40
AD-FTR-433	436,522.17	8,169,227.44	146.00	0	-90	10.40
AD-FTR-434	436,519.17	8,169,210.45	148.00	0	-90	10.40
AD-FTR-435	436,570.17	8,169,285.44	131.00	0	-90	10.40
AD-FTR-436	436,570.17	8,169,263.45	138.00	0	-90	10.40
AD-FTR-437	436,614.17	8,169,308.45	122.00	0	-90	4.90
AD-FTR-438	436,610.17	8,169,293.45	134.00	0	-90	10.40
AD-FTR-439	436,607.16	8,169,271.44	140.00	0	-90	10.40
AD-FTR-440	436,580.17	8,169,221.44	148.00	0	-90	10.40
AD-FTR-441	436,613.17	8,169,250.45	142.00	0	-90	10.40
AD-FTR-442	436,616.16	8,169,234.44	141.00	0	-90	10.40
AD-FTR-444	436,660.16	8,169,298.45	128.00	0	-90	5.90
AD-FTR-445	436,657.17	8,169,281.44	131.00	0	-90	10.40
AD-FTR-446	436,658.17	8,169,258.45	138.00	0	-90	17.00
AD-FTR-447	436,713.17	8,169,292.45	131.00	0	-90	5.90
AD-FTR-448	436,712.17	8,169,278.44	125.00	0	-90	10.40
AD-FTR-449	436,806.16	8,169,272.44	128.00	0	-90	7.90
AD-FTR-451	436,804.17	8,169,254.45	128.00	0	-90	10.40
AD-FTR-452	436,851.17	8,169,287.44	124.00	0	-90	7.90

AD-FTR-454	436,951.16	8,169,342.45	123.00	0	-90	7.90
AD-FTR-455	436,988.16	8,169,374.44	122.00	0	-90	9.90
AD-FTR-458	437,119.17	8,169,472.44	123.00	0	-90	8.90
AD-FTR-462	437,244.16	8,169,513.44	121.00	0	-90	7.90
AD-FTR-464	438,846.16	8,169,553.45	169.00	0	-90	10.40
AD-FTR-466	438,901.16	8,169,448.45	128.00	0	-90	10.40
AD-FTR-467	438,886.16	8,169,444.45	133.00	0	-90	10.40
AD-FTR-468	438,873.16	8,169,453.45	157.00	0	-90	10.40
AD-FTR-469	438,916.16	8,169,397.45	129.85	0	-90	10.40
AD-FTR-470	438,901.16	8,169,400.45	124.62	0	-90	10.40
AD-FTR-471	438,887.16	8,169,409.45	126.48	0	-90	10.40
AD-FTR-472	438,913.16	8,169,354.45	113.13	0	-90	10.40
AD-FTR-473	438,922.16	8,169,316.44	112.65	0	-90	10.40
AD-FTR-474	438,901.16	8,169,321.44	118.02	0	-90	10.40
AD-FTR-475	438,693.16	8,169,519.44	172.00	0	-90	10.40
AD-FTR-477	438,730.16	8,169,546.45	171.00	0	-90	10.40
AD-FTR-481	438,474.16	8,169,370.44	123.00	0	-90	10.40
AD-FTR-482	438,477.16	8,169,390.45	134.00	0	-90	10.40
AD-FTR-483	438,482.16	8,169,410.45	134.00	0	-90	10.40
AD-FTR-484	438,485.16	8,169,424.44	141.00	0	-90	8.40
AD-FTR-485	438,492.16	8,169,453.45	148.00	0	-90	10.40
AD-FTR-486	438,494.16	8,169,480.44	167.00	0	-90	10.40
AD-FTR-487	438,499.16	8,169,501.45	189.00	0	-90	10.40
AD-FTR-488	438,601.16	8,169,499.45	188.00	0	-90	10.40
AD-FTR-489	438,422.16	8,169,442.45	143.00	0	-90	10.40
AD-FTR-490	438,427.16	8,169,460.45	147.00	0	-90	8.50

AD-FTR-491	438,431.16	8,169,482.44	154.00	0	-90	10.40
AD-FTR-492	438,435.16	8,169,497.45	170.00	0	-90	10.40
AD-FTR-493	438,644.16	8,169,491.45	172.00	0	-90	10.40
AD-FTR-494	438,626.16	8,169,500.45	169.00	0	-90	10.40
AD-FTR-496	436,572.16	8,169,452.45	135.00	0	-90	10.40
AD-FTR-499	436,454.16	8,169,475.44	141.00	0	-90	10.40
AD-FTR-502	436,383.17	8,169,495.45	121.00	0	-90	9.90
AD-FTR-503	436,383.17	8,169,479.44	115.00	0	-90	10.40
AD-FTR-504	436,382.16	8,169,528.44	139.50	0	-90	22.00
AD-FTR-506	436,356.16	8,169,505.45	126.00	0	-90	10.40
AD-FTR-507	436,362.16	8,169,523.44	137.00	0	-90	10.40
AD-FTR-510	436,248.17	8,169,505.45	125.00	0	-90	10.40
AD-FTR-513	436,099.16	8,169,547.45	137.00	0	-90	10.40
AD-FTR-514	436,048.16	8,169,551.45	130.00	0	-90	10.40
AD-FTR-516	435,951.17	8,169,544.45	136.00	0	-90	10.40
AD-FTR-524	435,348.17	8,169,576.44	142.00	0	-90	10.40

Table 9 - Rotary Drilling Summary - Jucurucu holes Location used in evaluation

Hole ID	East	North	RL	Azimuth True	Dip	total_depth
AD-FTJ-001	408,625.20	8,140,003.48	91.00	0	-90	6.00
AD-FTJ-002	408,617.20	8,140,024.49	95.00	0	-90	5.40
AD-FTJ-003	408,637.20	8,140,006.48	88.00	0	-90	5.00
AD-FTJ-004	408,219.20	8,140,069.49	119.00	0	-90	10.40
AD-FTJ-005	408,239.19	8,140,064.49	110.00	0	-90	7.00
AD-FTJ-006	408,172.20	8,140,072.49	165.62	0	-90	10.40
AD-FTJ-007	408,150.20	8,140,066.49	114.00	0	-90	10.40

AD-FTJ-008	408,152.20	8,140,049.48	128.00	0	-90	10.40
AD-FTJ-009	408,237.20	8,140,032.49	122.00	0	-90	10.40
AD-FTJ-010	408,612.19	8,140,004.48	101.00	0	-90	10.40
AD-FTJ-011	408,584.20	8,139,987.49	111.00	0	-90	10.40
AD-FTJ-012	408,573.20	8,139,802.48	99.00	0	-90	9.00
AD-FTJ-013	408,526.20	8,139,797.49	100.00	0	-90	9.00

The RC and RD holes coordinates were taken with a hand held GPS and each one was marked in the field with a stake indicating its number.

Table 10 - Reverse circulation Summary - Hole Location

Hole ID	East	North	RL	Azimuth True	Dip	total_depth
SIAC001	433,832.17	8,171,416.45	161.33	336	-90	84.00
SIAC002	433,831.16	8,171,417.44	161.33	60	-57	66.00
SIAC003	433,816.16	8,171,414.45	164.00	240	-54	56.30
SIAC004	433,802.17	8,171,399.44	166.90	336	-90	58.00
SIAC005	433,797.17	8,171,399.44	167.00	240	-60	49.50
SIAC006	433,811.17	8,171,406.45	165.30	60	-60	72.00
SIAC007	433,587.17	8,171,798.45	141.20	336	-90	42.00
SIAC008	433,640.17	8,171,719.44	137.22	336	-90	44.00
SIAC009	433,637.16	8,171,719.44	137.40	260	-60	50.00
SIAC010	433,647.17	8,171,723.44	137.35	80	-60	42.00
SIAC011	433,553.17	8,171,929.44	143.80	336	-90	60.00
SIRC012	433,523.17	8,172,022.44	146.00	260	-60	49.00
SIRC013	433,524.17	8,172,022.44	145.80	264	-85	62.00
SIAC014	433,532.17	8,172,021.44	143.70	80	-60	36.00
SIAC015	433,523.17	8,171,928.44	156.11	196	-84	48.00

SIAC016	433,491.17	8,171,821.44	167.33	336	-90	42.00
SIAC017	433,494.17	8,171,825.44	166.60	80	-60	42.00
SIAC018	433,505.17	8,171,985.44	156.00	336	-90	36.00
SIRC019	433,505.17	8,171,983.44	156.20	336	-90	43.00
SIRC020	433,547.17	8,172,073.44	141.50	336	-90	31.00
SIRC021	433,545.17	8,172,069.44	142.00	260	-60	25.00
SIRC022	433,550.17	8,171,838.44	141.40	0	-90	43.00
SIRC023	433,632.17	8,171,817.44	142.64	0	-90	25.00
SIRC024	433,634.17	8,171,818.44	143.70	64	-55	37.00
SIAC025	433,509.16	8,172,299.44	151.10	0	-90	17.80
SIAC026	433,587.17	8,171,795.45	141.70	240	-55	43.00
SIAC027	433,875.16	8,171,134.44	167.50	70	-60	69.00
SIAC028	433,756.17	8,171,530.44	153.30	60	-60	61.00
SIAC029	433,754.16	8,171,529.44	153.90	60	-90	84.50
SIAC030	433,745.17	8,171,527.44	155.80	239	-60	53.20
SIAC031	433,754.16	8,171,694.44	149.20	270	-60	37.00
SIAC032	433,735.17	8,171,761.44	165.40	260	-55	57.00
SIRC033	433,737.17	8,171,761.44	165.60	260	-90	73.00
SIAC034	433,757.17	8,171,698.45	148.00	81	-88	37.00
SIAC035	434,044.17	8,171,145.44	150.00	230	-60	55.00
SIAC036	434,085.17	8,171,014.45	144.80	230	-60	70.00
SIRC037	434,082.16	8,171,018.44	150.00	230	-90	42.00
SIAC038	434,083.16	8,171,018.45	144.87	230	-90	66.00
SIAC039	434,329.17	8,170,383.45	136.21	260	-90	31.00
SIAC040	434,327.17	8,170,383.45	135.60	260	-60	28.00
SIAC041	434,351.17	8,170,394.44	143.00	96	-85	53.00

SIAC042	434,309.17	8,170,713.44	155.20	230	-60	49.00
SIAC043	436,338.16	8,169,353.45	114.41	200	-60	36.00
SIAC044	436,341.16	8,169,361.45	115.20	19	-60	60.00
SIAC045	436,348.16	8,169,386.44	115.80	0	-90	60.00
SIAC046	436,360.16	8,169,418.44	115.25	20	-60	38.00
SIAC047	436,359.16	8,169,411.45	114.80	200	-60	73.00
SIRC048	436,267.16	8,169,399.45	123.14	271	-86	58.00
SIRC049	436,256.16	8,169,364.45	124.80	0	-90	46.00

Table 11 - Rotary Drilling Jucurucu Intercepts Summary

Hole_Id	From	To	Interval	C %
AD-FTJ-001	0.00	5.40	5.40	3.64
AD-FTJ-002	0.00	5.40	5.40	2.29
AD-FTJ-003	1.40	4.40	3.00	3.26
AD-FTJ-004	0.00	10.40	10.40	2.56
AD-FTJ-005	0.00	6.40	6.40	2.64
AD-FTJ-006	1.40	10.40	9.00	2.75
AD-FTJ-007	0.00	3.40	3.40	1.67
AD-FTJ-007	4.40	10.40	6.00	1.50
AD-FTJ-010	1.00	10.40	9.40	4.60
AD-FTJ-011	0.00	10.40	10.40	3.78

Table 12 - Rotary Drilling São Manuel Intercepts Summary

Hole_Id	From	To	Interval	C %
AD-FTM-001	0.00	4.00	4.00	1.19
AD-FTM-003	6.00	10.50	4.50	4.83
AD-FTM-006	2.00	9.00	7.00	4.48
AD-FTM-010	2.00	13.00	11.00	4.28
AD-FTM-025	0.00	7.00	7.00	2.28
AD-FTM-026	3.30	6.00	2.70	3.11
AD-FTM-026	7.00	11.00	4.00	2.95
AD-FTM-030	2.70	5.00	2.30	1.63
AD-FTM-030	5.60	7.00	1.40	2.86
AD-FTM-031	4.00	4.70	0.70	1.47
AD-FTM-031	5.80	6.60	0.80	1.88
AD-FTM-035	2.00	3.10	1.10	3.57
AD-FTM-035	3.90	4.50	0.60	2.81
AD-FTM-036	0.00	5.00	5.00	4.21
AD-FTM-037	1.00	12.50	11.50	4.16
AD-FTM-039	1.00	10.00	9.00	2.84
AD-FTM-041	3.00	4.70	1.70	1.95
AD-FTM-041	7.00	9.00	2.00	1.71
AD-FTM-082	0.50	14.00	13.50	1.83
AD-FTM-083	3.00	5.00	2.00	2.22
AD-FTM-088	8.30	20.00	11.70	1.41
AD-FTM-092	6.80	26.40	19.60	4.08
AD-FTM-111	1.00	6.00	5.00	3.84
AD-FTM-136	9.40	11.40	2.00	1.25
AD-FTM-171	3.40	9.00	5.60	1.10

AD-FTM-189	1.60	2.70	1.10	1.26
AD-FTM-191	3.50	5.00	1.50	1.02
AD-FTM-191	7.50	9.00	1.50	1.07
AD-FTM-199	2.50	7.80	5.30	1.55
AD-FTM-205	2.00	4.00	2.00	2.05
AD-FTM-215	3.50	6.50	3.00	4.57
AD-FTM-221	3.40	5.50	2.10	4.85
AD-FTM-224	1.50	6.00	4.50	3.60
AD-FTM-238	3.70	7.00	3.30	1.17
AD-FTM-238	11.70	12.00	0.30	1.55
AD-FTM-239	1.00	2.70	1.70	3.48
AD-FTM-239	3.60	8.00	4.40	3.50
AD-FTM-240	0.00	5.50	5.50	2.53
AD-FTM-251	3.00	4.00	1.00	3.77
AD-FTM-253	4.50	5.00	0.50	1.82
AD-FTM-257	3.00	6.00	3.00	3.06
AD-FTM-258	5.00	7.00	2.00	4.08
AD-FTM-263	0.00	14.00	14.00	3.63
AD-FTM-264	6.30	12.70	6.40	2.05
AD-FTM-264	15.30	21.00	5.70	1.60
AD-FTM-265	12.00	13.00	1.00	2.37
AD-FTM-284	2.80	3.30	0.50	2.56
AD-FTM-285	3.40	6.40	3.00	2.76
AD-FTM-290	3.80	6.00	2.20	2.38
AD-FTM-291	4.80	5.80	1.00	1.76
AD-FTM-291	6.80	10.80	4.00	2.38

AD-FTM-295	2.40	3.40	1.00	1.19
AD-FTM-295	4.40	6.40	2.00	2.39
AD-FTM-296	3.80	5.40	1.60	1.90
AD-FTM-299	6.40	8.40	2.00	1.42
AD-FTM-301	0.00	4.40	4.40	2.75
AD-FTM-303	2.40	3.40	1.00	1.12
AD-FTM-303	4.40	5.40	1.00	1.63
AD-FTM-308	7.40	10.40	3.00	2.18
AD-FTM-309	1.40	9.40	8.00	2.74
AD-FTM-311	4.40	5.40	1.00	1.82
AD-FTM-313	4.40	16.40	12.00	2.68
AD-FTM-320	2.70	10.40	7.70	1.33
AD-FTM-321	1.40	15.40	14.00	3.39
AD-FTM-322	8.40	10.40	2.00	4.74
AD-FTM-333	0.00	3.40	3.40	1.90
AD-FTM-335	2.70	3.40	0.70	1.03
AD-FTM-338	9.40	10.40	1.00	1.39
AD-FTM-339	7.40	8.40	1.00	3.24
AD-FTM-343	4.40	6.40	2.00	1.17
AD-FTM-344	4.40	5.40	1.00	1.11
AD-FTM-346	8.40	9.40	1.00	1.07
AD-FTM-347	5.40	6.40	1.00	2.23
AD-FTM-348	0.00	3.40	3.40	1.65
AD-FTM-349	7.40	8.40	1.00	1.12
AD-FTM-350	4.40	8.40	4.00	2.01
AD-FTM-353 P	7.40	8.40	1.00	1.07

AD-FTM-353 P	9.40	18.40	9.00	4.13
AD-FTM-354 P	20.40	21.40	1.00	1.19
AD-FTM-359 P	7.40	11.40	4.00	2.76
AD-FTM-359 P	12.40	21.40	9.00	3.00
AD-FTM-361 P	5.40	6.40	1.00	1.29
AD-FTM-361 P	10.40	15.40	5.00	2.18
AD-FTM-361 P	17.40	18.40	1.00	1.48
AD-FTM-364	9.40	11.40	2.00	3.79

Table 13 - Rotary Drilling Sao Rubens Intercepts Summary

Hole_Id	From	To	Interval	C %
AD-FTR-056	4.40	6.60	2.20	1.40
AD-FTR-056	7.80	12.70	4.90	1.61
AD-FTR-062	8.40	15.40	7.00	2.54
AD-FTR-063	2.60	7.00	4.40	1.24
AD-FTR-064	5.60	10.40	4.80	1.17
AD-FTR-067	3.60	11.40	7.80	2.34
AD-FTR-068	3.90	7.70	3.80	2.10
AD-FTR-079	0.00	5.40	5.40	3.94
AD-FTR-080	1.70	7.00	5.30	5.00
AD-FTR-080	9.00	9.70	0.70	1.31
AD-FTR-100	0.50	3.40	2.90	4.90
AD-FTR-100	4.40	5.40	1.00	6.44
AD-FTR-206	9.40	10.40	1.00	1.28
AD-FTR-207	7.80	8.70	0.90	1.23
AD-FTR-215	9.40	10.40	1.00	2.76
AD-FTR-215	12.40	13.90	1.50	1.36
AD-FTR-229	9.40	12.40	3.00	2.15
AD-FTR-230	9.40	10.40	1.00	1.87
AD-FTR-237	3.40	5.40	2.00	1.04
AD-FTR-237	9.40	10.40	1.00	1.06
AD-FTR-239	7.90	9.90	2.00	2.35
AD-FTR-248	5.60	9.50	3.90	1.42
AD-FTR-255	0.50	4.60	4.10	2.67
AD-FTR-256	5.00	9.00	4.00	1.54

AD-FTR-258	7.40	10.40	3.00	4.14
AD-FTR-260	1.40	7.40	6.00	3.06
AD-FTR-262	5.40	10.40	5.00	2.05
AD-FTR-266	5.00	7.00	2.00	1.73
AD-FTR-266	8.00	10.00	2.00	2.50
AD-FTR-267	3.40	4.40	1.00	1.32
AD-FTR-267	5.40	8.40	3.00	1.78
AD-FTR-268	4.40	8.40	4.00	1.67
AD-FTR-269	2.40	10.40	8.00	2.85
AD-FTR-270	2.40	10.40	8.00	3.25
AD-FTR-271	9.40	10.40	1.00	1.40
AD-FTR-301	2.40	4.40	2.00	3.99
AD-FTR-301	8.40	9.40	1.00	1.02
AD-FTR-303	5.40	6.40	1.00	1.12
AD-FTR-311	1.40	4.40	3.00	1.05
AD-FTR-311	5.40	6.40	1.00	1.11
AD-FTR-315	6.40	7.40	1.00	1.15
AD-FTR-337	3.40	5.40	2.00	1.55
AD-FTR-344	0.00	6.40	6.40	3.28
AD-FTR-346	3.40	10.40	7.00	4.66
AD-FTR-347	3.40	9.40	6.00	1.64
AD-FTR-348	3.40	10.40	7.00	3.04
AD-FTR-349	1.40	14.40	13.00	2.95
AD-FTR-350	4.40	6.40	2.00	1.64
AD-FTR-403	2.40	5.40	3.00	1.29
AD-FTR-406	2.40	8.40	6.00	3.50
AD-FTR-407	2.50	8.40	5.90	3.67
AD-FTR-410	4.40	5.40	1.00	4.91
AD-FTR-416	1.40	2.40	1.00	1.06
AD-FTR-427	4.40	7.40	3.00	1.34
AD-FTR-445	2.40	5.40	3.00	3.00
AD-FTR-458	4.40	6.40	2.00	2.92
AD-FTR-470	8.40	9.40	1.00	1.04
AD-FTR-471	6.40	7.40	1.00	2.98
AD-FTR-488	3.40	4.40	1.00	2.05
AD-FTR-496	8.40	10.40	2.00	3.30
AD-FTR-502	5.40	9.40	4.00	3.80
AD-FTR-503	3.40	4.40	1.00	1.52
AD-FTR-503	6.40	10.40	4.00	2.87
AD-FTR-504	3.40	21.40	18.00	3.71
AD-FTR-506	2.40	10.40	8.00	2.76
AD-FTR-507	6.40	10.40	4.00	3.04

10.1 DRILLING RESULTS – REVERSE CIRCULATION

A reverse circulation drilling campaign was also conducted in 2016 with objective to test down depth mineralization as well as firm up resources in key areas for initial resource estimation in accordance with NI 43-101. A total of 49 holes resulting in 2,440m of RC drilling were completed. Recovery proved to absolute with a very high degree of efficiency and drilling speed. Drill collars have been marked at the field with hole number, azimuth, inclination, length, date, description, lithology and lab results being inserted into the database.

Table 14 - Reverse circulation Intercepts Summary

Hole ID	East	North	RL	Azimuth True	Dip	Main Intercepts
SIAC001	433,832.17	8,171,416.45	161.33	336	-90	77 m @ 2.9% Cg
SIAC002	433,831.16	8,171,417.44	161.33	60	-57	48 m @ 0.6% Cg
SIAC003	433,816.16	8,171,414.45	164.00	240	-54	41 m @ 2.3% Cg
SIAC004	433,802.17	8,171,399.44	166.90	336	-90	25 m @ 2.96% Cg
SIAC005	433,797.17	8,171,399.44	167.00	240	-60	13 m @ 3.16 % Cg
SIAC006	433,811.17	8,171,406.45	165.30	60	-60	39 m @ 3.0% Cg
SIAC007	433,587.17	8,171,798.45	141.20	336	-90	19 m @ 3.32% Cg
SIAC008	433,640.17	8,171,719.44	137.22	336	-90	12 m @ 2.7 % Cg
SIAC009	433,637.16	8,171,719.44	137.40	260	-60	15 m @ 1.9% Cg and 28 m @ 2.81% Cg (including 13 m @ 3.73%)
SIAC010	433,647.17	8,171,723.44	137.35	80	-60	8 m @ 1.73% Cg
SIAC011	433,553.17	8,171,929.44	143.80	336	-90	16 m @ 1.5% Cg and 16 m @ 2.0% Cg and 10 m @ 2.78% Cg
SIRC012	433,523.17	8,172,022.44	146.00	260	-60	18 m @ 2.5% Cg (including 9 m @ 3.1% Cg and 4 m @ 3.6% Cg)

SIRC013	433,524.17	8,172,022.44	145.80	264	-85	43 m @ 3.1% Cg (including 29 m @ 4.0% Cg)
SIAC014	433,532.17	8,172,021.44	143.70	80	-60	No significant mineralized intersection
SIAC015	433,523.17	8,171,928.44	156.11	196	-84	24 m @ 3.2% Cg (including 15 m @ 4.17%)
SIAC016	433,491.17	8,171,821.44	167.33	336	-90	No significant mineralized intersection
SIAC017	433,494.17	8,171,825.44	166.60	80	-60	No significant mineralized intersection
SIAC018	433,505.17	8,171,985.44	156.00	336	-90	8 m @ 0.7% Cg
SIRC019	433,505.17	8,171,983.44	156.20	336	-90	20 m @ 0.9% Cg (including 3 m @ 3.6% Cg)
SIRC020	433,547.17	8,172,073.44	141.50	336	-90	No significant mineralized intersection
SIRC021	433,545.17	8,172,069.44	142.00	260	-60	No significant mineralized intersection
SIRC022	433,550.17	8,171,838.44	141.40	0	-90	29 m @ 2.0% Cg
SIRC023	433,632.17	8,171,817.44	142.64	0	-90	6 m @ 3.4% Cg
SIRC024	433,634.17	8,171,818.44	143.70	64	-55	35 m @ 3.8% Cg (including 11 m @ 5.0% Cg
SIAC025	433,509.16	8,172,299.44	151.10	0	-90	No significant mineralized intersection)
SIAC026	433,587.17	8,171,795.45	141.70	240	-55	41 m @ 2.8% Cg (including 10 m

						@ 3.5% Cg)
SIAC027	433,875.16	8,171,134.44	167.50	70	-60	No significant mineralized intersection
SIAC028	433,756.17	8,171,530.44	153.30	60	-60	55 m @ 0.6% Cg (including 10 m @ 1.5% Cg)
SIAC029	433,754.16	8,171,529.44	153.90	60	-90	81 m @ 1.9% Cg (including 37 m @ 3% Cg)
SIAC030	433,745.17	8,171,527.44	155.80	239	-60	15 m @ 4.32% Cg
SIAC031	433,754.16	8,171,694.44	149.20	270	-60	17 m @ 3.6% Cg (including 6 m @ 4.5% Cg)
SIAC032	433,735.17	8,171,761.44	165.40	260	-55	6 m @ 3.7% Cg
SIRC033	433,737.17	8,171,761.44	165.60	260	-90	4 m @ 2.8% Cg
SIAC034	433,757.17	8,171,698.45	148.00	81	-88	9 m @ 3.4% Cg
SIAC035	434,044.17	8,171,145.44	150.00	230	-60	10 m @ 0.5% Cg
SIAC036	434,085.17	8,171,014.45	144.80	230	-60	12 m @ 3.37% Cg
SIRC037	434,082.16	8,171,018.44	150.00	230	-90	No significant mineralized intersection
SIAC038	434,083.16	8,171,018.45	144.87	230	-90	No significant mineralized intersection
SIAC039	434,329.17	8,170,383.45	136.21	260	-90	9 m @ 3.65% Cg
SIAC040	434,327.17	8,170,383.45	135.60	260	-60	4 m @ 5.1% Cg
SIAC041	434,351.17	8,170,394.44	143.00	96	-85	13 m @ 2.7% Cg
SIAC042	434,309.17	8,170,713.44	155.20	230	-60	12 m @ 0.7% Cg
SIAC043	436,338.16	8,169,353.45	114.41	200	-60	20 m @ 3.4% Cg
SIAC044	436,341.16	8,169,361.45	115.20	19	-60	57 m @ 3.2% Cg (including 7 m @ 4.1% Cg and 19 m

						@ 5.0% Cg)
SIAC045	436,348.16	8,169,386.44	115.80	0	-90	45 m @ 2.6% Cg (including 23 m @ 3.1% Cg and 7 m @ 4.1% Cg)
SIAC046	436,360.16	8,169,418.44	115.25	20	-60	37 m @ 3.3% Cg
SIAC047	436,359.16	8,169,411.45	114.80	200	-60	All mineralized Hole - 73 m @ 2.7% (including 21 m @ 3.5% Cg and 27 m @ 3.5% Cg)
SIRC048	436,267.16	8,169,399.45	123.14	271	-86	12 m @ 2.5% Cg
SIRC049	436,256.16	8,169,364.45	124.80	0	-90	9 m @ 3.5% Cg

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 SAMPLE PREPARATION

All drilling conducted at the project were collected, logged and supervised by trained geologists. For RC drilling, samples were collected directly into bags from the cyclone averaging 15-30kg, collected every meter. For RD drilling, samples were collected at the drilling head averaging 8-10kg.

All meters were properly placed in plastic bags being numbered and easily identified with proper hole number, depth interval and ID. Material was then transported to the field office where geologists logged and described each meter, inserting them digitally onto the project database.

Splitting was then performed at the field office, using a riffle splitter which were then divided into 2 samples; one for laboratory testing and one for storage at the project storage facility to serve as future duplicates and sample security for further potential QA/QC audits and procedures. Samples are stored into barrels, properly labeled, numbered and catalogued, stored in a specific designated area.

11.2 LABORATORY ASSAY

All samples collected at the project have been delivered to certified laboratory at SGS Geosol in Belo Horizonte, Brazil or SGS Lakefield in Ontario, Canada, both with ISO 9001:2015, ISO 14001:2015 and ISO/IEC 17025:2005 certifications. Once sample results are received, company geologist inserts proper grade into each corresponding database sample, thus providing a complete description for each datapoint including X,Y,Z coordinates, lithologic description, sample type, target area and grade result.

Laboratory pulps where then returned to the company and have been stored in a secured facility either at the field office or outside storage facility.

Neither BGSA, the Issuer or the QP have any relationship with the respective laboratories.

11.3 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

An internal QA/QC revised and approved by the Qualified Person, Mr. Aldo Moreno, has been developed and implemented by the company in order to guarantee correct procedures and safe sample handling and preparation has been achieved. The QA/QC program consisted of:

- 1 standard for every 100 (one hundred) samples in order to test laboratory accuracy;
- 2 blanks for every 100 (one hundred) samples in order to test contamination potential;
- 2 duplicates for every 100 (one hundred) samples in order to test for splitting procedures;

In addition, the QP collected 51 twin samples in order to further check splitting, storage and laboratory efficiency, returning positive and similar results. An in depth summary of the QA/QC program can be found on chapter 12 below.

Reverse circulation holes had samples collected every meter, resulting in higher average sample of 15-30kg. Quartering was performed in the field using a riffle splitter and later the samples were sent to SGS laboratory in Lakefield, Canada. For every 100 samples of drilling, 5 duplicated, 3 blanks and 2.5 standards were included.

Other samples including boxes of chip, panel and trench samples have also been collected, following similar sampling and storage procedures.

12.0 DATA VERIFICATION

12.1 DATABASE

The mineral resource estimate was calculated using the data collected throughout the previous 5 years. All information has been reviewed and analyzed. Only verifiable and certified QA/QC data was incorporated into the resource estimate.

12.1.1 SAMPLE ASSAYS

The assay database was manually verified as well via Mapinfo by checking SGS certificates (Excel and Pdf) with proper drill coordinates being inserted.

Some minor issues were noted with sample identification and non-consecutive sample numbering about trench and surface chip samples.

12.1.2 DRILL HOLE COORDINATES

Drill hole coordinates were checked in the field by a Qualified Person using a hand-held GPS (Garmin 60Csx). The differences between the coordinates taken by Brasil Grafite personnel and the coordinates taken by the Qualified Person were reconciled resulting in an acceptable deviation for the eastings and northings, and an already expected less correlative numbers among the elevation data.

12.1.3 DRILL CORE INSPECTION

The Qualified Person Mr. Aldo Moreno checked the sample chips from the RC and RD drill holes. Such samples were stored in plastic bags with the correspondent description and protected from weather conditions at the Company´s warehouse. Few inconsistencies were found while checking the database and the drill hole logs.

12.1.4 DUE DILIGENCE SAMPLES

Independent twin samples were collected by geologist Aldo Moreno by sampling selected intervals of RC and RD holes. These samples were bagged by the QP and shipped to ALS Minerals in Belo Horizonte to be analyzed by ALS Laboratory, which holds ISO 9001 and ISO 17025 certifications. One CRM standard was added to the sample batch for QA/QC purposes.

At the request of Aldo Moreno, Brasil Grafite collected 51 duplicate samples. These samples, together with CRM standards, were submitted to ALS Laboratory in Belo Horizonte for analysis.

The duplicate samples and the ones taken by the QP showed in a few cases some minor differences that were within expectations.

Neither BGSA, the Issuer or the QP have any relationship with the respective laboratory.

12.2 QA/QC OVERVIEW

The Quality control and assurance program was implemented by Brasil Grafite for the whole drilling campaign, which includes:

- 89 drill duplicates representing 1 sample per 50 samples about 2.07% from total samples
- 91 blanks representing 1 sample per 50 samples about 2.07% from total samples
- 74 standard representing 0.7 samples per 100 samples about 1.84% from total samples

Samples were inserted in the RC program but not in the RD program. A summary of the QA/QC program for the original sample assay program samples is presented in Table 15.

Table 15 - Summary of QA/QC program

SAMPLE TYPE	#SAMPLES

	ANALYSED
RD SAMPLES	2304
RC SAMPLES	1961
DUPLICATES	89
BLANK	91
STANDARD	74

12.3 CERTIFIED STANDARDS, BLANKS AND DUPLICATES

Standard samples were purchased from Geostats Pty Ltda, an Australian Certified Reference Material manufacturing company. Five different grades were bought, from 0.13% Cgr to 13.53% Cgr. The deviation between the duplicates and the drill holes samples were less than 0.3%, which is a good result.

Two duplicates were inserted every hundred samples. The blanks were made by milling graphite-free granite.

Standard certificates are included in appendix 04.

Table 16 – List of Blanks and Standards

Sample N	RESULTS % C	TYPE SAMPLE		# SIFTING	LAB	ALS LAB % C CONTROL
20100	5.29	Standard	5.29			5.09
20101	Blank			# 150		0.03
20102	Blank			#150		0.03
20103	2.95	Standard	2.41			2.69
20104	Blank			#150		0.04
20105	Blank			#150		0.03
20106	Blank			#150		0.04
20107	2.95	Standard	2.41			2.64
20108	Blank			#150		0.03
20109	Blank			# 150		0.06
20110	Blank			#150		0.07
20111	Blank			#150		0.03
20112	Blank			#150		0.05
20113	Blank			#100		<0.02
20114	Blank			#100		0.05
20115	5.6	33082			GQ1600952	5.88

20116	5.18	33073			GQ1600952	5.49
20117	5.11	33080			GQ1600952	5.58
20118	5.07	33074			GQ1600952	5.48
20119	4.77	33145			GQ1600955	4.94
20120	4.75	33072			GQ1600952	5.11
20121	4.51	33087			GQ1600952	4.94
20122	4.49	33146			GQ1600955	4.68
20123	4.09	33084			GQ1600952	4.41
20124	3.76	33180			GQ1600955	3.93
20125	2.26	33055			GQ1600952	2.42
20126	2.25	33153			GQ1600955	2.37
20127	2.18	33155			GQ1600955	2.45
20128	2.11	33183			GQ1600955	2.2
20129	2.09	33176			GQ1600955	2.32
20130	1.98	33050			GQ1600952	2.07
20131	1.91	33048			GQ1600952	1.91
20132	1.91	33165			GQ1600955	2.07
20133	1.88	33168			GQ1600955	2.00
20134	1.69	33051			GQ1600952	1.85
20135	0.79	33097			GQ1600954	0.85
20136	0.78	33124			GQ1600954	0.85
20137	0.74	33102			GQ1600954	0.78
20138	0.72	33127			GQ1600954	0.85
20139	0.71	33114			GQ1600954	0.70
20140	0.69	33139			GQ1600955	0.65
20141	0.64	33138			GQ1600955	0.55
20142	0.62	33118			GQ1600954	0.73
20143	0.57	33135			GQ1600955	0.50
20144	0.56	33126			GQ1600954	0.67
20145	Blank					0.02
20146	Blank					0.04
20147	Blank					0.03
20148	Blank					0.10
20149	Blank					0.02
20150	Blank					0.03

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 INTRODUCTION

The overall approach to the process plant design was to focus on the following fundamentals:

1.) Take advantage of the abundant, high quality, shallow friable material with traditional milling and flotation circuits;

2.) Concentrate the graphite to a minimum of 93-95% Cg while maintaining the natural presence of jumbo/large flake size and other favorable physical characteristics so that Brasil Grafite products compare favorable with current market products;

3.) Keep construction costs low and design the circuit based on straightforward, proven technology that can mostly be fabricated in country, can be brought on-line quickly, and has been shown to be successful in other Brazilian operating mines; and

4.) Keep operating costs to a minimum and focus on quickly achieving consistent, positive cash flow while maintaining a favorable, sustainable operating margin.

13.2 PRELIMINARY METALLURGICAL SAMPLING AND TESTWORK

Bench scale metallurgical testwork was performed in February of 2013 at the mineral process laboratory of the Centro de Desenvolvimento da Tecnologia Nuclear (CDTN) located on the Federal University of Minas Gerais in Belo Horizonte, MG, Brazil.

Mr. Placido Campos was the engineer responsible for the work program; Mr. Campos is a registered professional mining and process engineer in Brazil with more than 30 years experience focused on graphite processing. He has spent several years with Nacional de Grafite, the world largest graphite producer, where his responsibilities included production supervisor for all major operating units of the company, project management, research development, reaching General Manager of the company. He has also previously worked with Grafite do Brasil (private Brazilian graphite producer) helping optimize their process circuit. Mr. Campos has also provided graphite process consultancy for several other private and listed companies.

The preliminary testing program focused on small scale laboratory testing in order to determine material characteristics and suitability for flotation. 3 liter float cells were used for the testing.

Prior to the testing at CDTN, preliminary process work has also been conducted at Lyndtek Inc. facilities in Lakewood, CO – USA.

13.2.1 SAMPLE PREPARATION

Two bulk samples of 1 kg from the São Manuel target were delivered to the laboratory for preliminary testing. Hole FTM 06 is located in the northern part of the primary target location in São Manuel. The 10 m deep hole was almost entirely mineralized and has a geologic description of gneiss saprolite with graphite – high grade with mid to large flake size. A composite sample from throughout the hole was separated and prepared. L100 was a large bulk sample that was taken from an exposed road cut in the middle portion of the primary target of São Manuel near the existing small dam used for watering cattle. Again the material was described as

gneiss saprolite with graphite – high grade and large flake size. Sample preparation included drying, quartering and homogenization. The two prepared composite samples were then screened, separated into fractions and tested for grade. The results are presented in Tables 17 and 18.

Table 17 - Ore Size Fractions and Grade – Test A - FTM 06 with % C = 4.1%

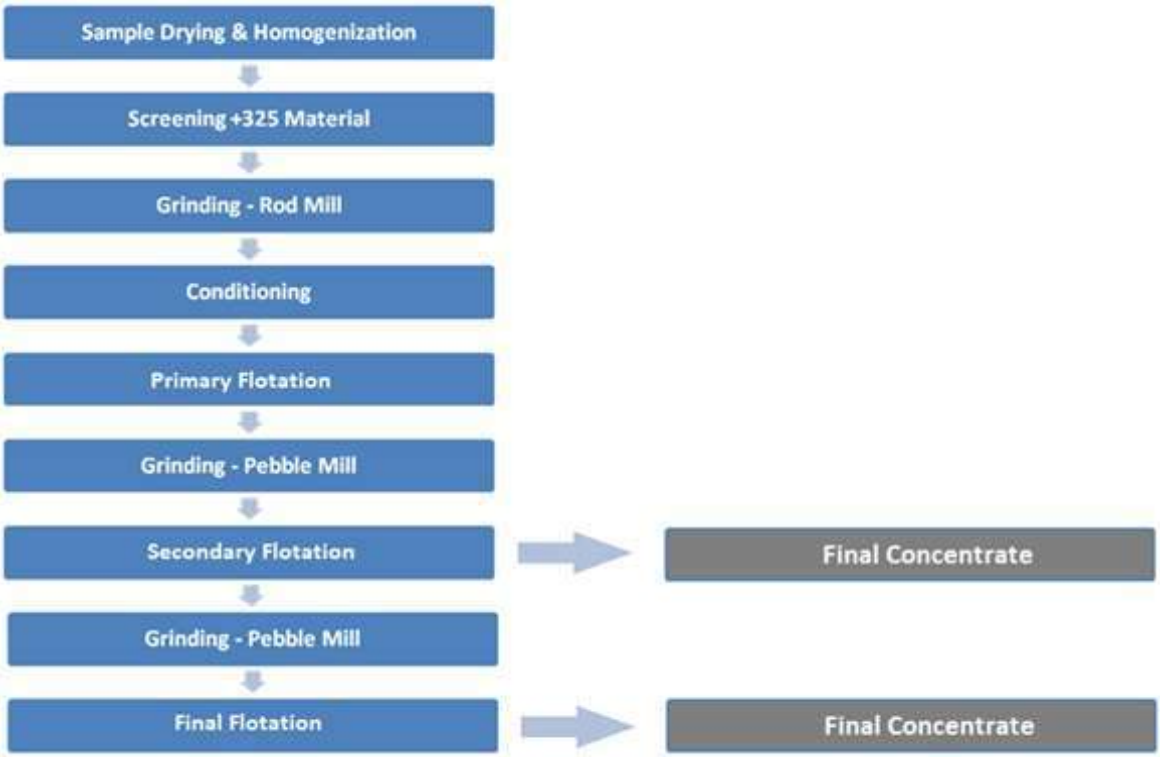
Screen No.	Screen Size (mm)	Distribution %	Cumulative % Distribution	% C
20	0.853	16.7	16.7	3.62
30	0.599	8.5	25.2	8.59
50	0.297	8.4	33.6	8.37
80	0.177	6.9	40.5	6.54
100	0.149	6.1	46.6	6.88
140	0.105	5.2	51.8	6.35
200	0.074	4.8	56.6	6.84
325	0.044	3.9	60.5	4.20
-325	-0.044	39.5	100.0	0.90

Table 18 - Ore Size Fractions & Grade – Test B - L100 with %C = 5.3%

Screen No.	Screen Size (mm)	Distribution%	Cumulative % Distribution	% C
20	0.853	13.6	13.6	3.97
30	0.599	10.2	23.8	11.13
50	0.297	14.5	38.3	14.8
80	0.177	8.6	46.9	11.75
100	0.149	4.0	50.9	9.32
140	0.105	3.3	54.2	6.99
200	0.074	2.9	57.1	5.7
325	0.044	3.2	60.3	4.22
-325	-0.044	39.7	100.0	0.65

13.2.2 CDTN INITIAL BENCH SCALE PROCESS TESTING

Table 19 - Process Testing Procedures



The reagents used in the flotation tests were pine oil and kerosene applied at 7 kg/t and 2 kg/t, respectively.

13.2.3 CDTN INITIAL BENCH SCALE TESTING RESULTS

Table 20 - Final Concentrate - Test A Results – FTM 06

Screen No.	Retained %	Cumulative %	% C
20	1.6	1.6	95.4
30	5.0	6.6	94.6
50	35.4	42.0	93.5
80	30.5	72.5	90.2
100	9.5	82.0	88.6
-100	18.0	100.0	87.4
		Average Grade:	91.01

Table 21 - Final Concentrate - Test B Results – L100

Screen No.	Retained %	Cumulative %	% C
20	8.0	8.0	94.4
30	10.1	18.1	94.3
50	38.8	56.9	94.2
80	22.3	79.2	92.4
100	8.0	87.2	90.2
-100	12.8	100.0	88.9
		Average Grade:	92.8

Table 22 - Final Concentrate – Weighted Average

Screen No.	Retained %	Cumulative %
20	4.8	4.8
30	7.6	12.4
50	37.1	49.5
80	26.4	75.9

100	8.8	84.6
-100	15.4	100

Results of this initial bench scale tests yielded a concentrate of excellent quality, indicating Santa Cruz´s material is easily processed and upgraded using conventional mill and float process. Based on these results, a more comprehensive, pilot plant test was warranted and recommended.

13.3 BULK SAMPLE PILOT PLANT TEST

13.3.1 INTRODUCTION

During 2014, BGSA conducted a complete, full scale pilot plant graphite testwork in order to optimize and upgrade BGSA´s Santa Cruz Graphite Project concentration circuit, explore process tradeoffs and finalize the flowsheet. This chapter presents a detailed summary on the procedures and testwork performed, including observations, results, interpretations and conclusions.

Principal pilot plant testwork objectives were :

1.) To optimize and develop the process flowsheet at scale using the CDTN bench scale results;
2.) To produce final concentrates with a minimum of 93-95% Cg while minimizing fines and preserving the abundant large and jumbo size flake distribution naturally available in the Project`s ore;
3.) To generate samples of concentrate for client testing; and
4.) To develop detailed equipment lists and reagents use, which will serve as a basis for detailed plant CAPEX & OPEX estimates.

It is important to note that the graphitic province where the Project is located is the 2nd largest graphite producing region in the world (after China) and has a long history of over 70 years of continuous production. As a result, there are highly trained and experienced professionals with excellent knowledge of graphite processing using local material. The pilot plant testwork benefits from this experience and generally follows the standard Brazilian graphite plant flowsheets with similar material from mines currently in operations. The pilot plant work program consisted mainly of:

1.) Optimizing the milling approach in order to maximize the natural large flake grain size distributions and separate the large/jumbo flakes from circuit with minimal amounts of processing at the beginning of the circuit;
2.) Classifying and screening the flakes and fines;
3.) Optimizing the successive milling and flotation for various size flake distribution;
4.) Optimizing the successive milling and flotation for the fines.

13.3.2 WORK PROGRAM OVERSIGHT AND CHIEF GRAPHITE PROCESS SPECIALIST

The pilot plant testwork was performed in Minas Gerais at Fundação Gorceix, one of the premier mineral processing plant facilities in Brazil, which operates at the Federal University of Ouro Preto (UFOP). Mr. Placido Campos was the engineer overseeing the work program (see above qualifications).

13.3.3 BULK SAMPLES

A total of 3 (three) different bulk samples were prepared in order to accurately simulate the various types of Project mineralization exposed at surface:

- Sample Type 1 (AM01) – lower grade material with a high presence of clay, collected from the São Rubens target;

- Sample Type 2 (AM02) – higher grade, large flake material with higher quantity of sand and some kaolin like material, collected from São Rubens target; and
- Sample Type 3 (AM03) – medium and large flake material with high quantity of sand like material and oxidation like structure, collected at São Manuel target.

The bulk samples are representative of the Project`s deposit and include the following general material characteristics: very friable saprolitic like mineralization with large quantities of +50 mesh and +80 mesh flakes coupled with very fine (-325 mesh) clay material. A total of 31 t of run of mine ("ROM") material were excavated, loaded in big bags, each weighting approximately 1500kg, and shipped by truck to Fundação Gorceix for testing.

Table 23 - Received Bulk Samples Description

Sample ID	Location	Weight	Avg. (%Cg)
AM01	São Rubens	6,000 kg	1.6%
AM02	São Rubens	9,000 kg	5.1%
AM03	São Manuel	16,000 kg	4.0%
Total Weight:		31,000 kg	

Once the bulk samples arrived at Fundação Gorceix, the samples were individually dried to a total humidity below 10%, followed by sample homogenization, disaggregation and screening that resulted in a total bulk sample mass of 100% below 6,25mm

13.3.4 PHYSICAL AND CHEMICAL ANALYSIS OF CONCENTRATE AND MINERALIZED ROCK

All samples were pulverized and subjected to chemical analysis, following the standard procedure of loss on ignition (LOI), as described below. No sample was analyzed for the occurrence of possible other contaminants, such as sulfur, which can occur normally in graphite material both in ROM or flotation concentrate.

The presented methods were performed on all samples. There was no need to determine crystalline water on high grade materials. The laboratory oven temperature

and the samples burning time were higher than usual, as it was noticed that the graphite was not completely burned due to its size.

13.3.5 MOISTURE DETERMINATION

100 grams of samples were dried for 2 hours at 100°C and weighed after cooling. The following equation was used to determine the percentage of moisture in the sample:

$$\%\text{moisture} = \frac{100 - \text{dry weight X } 100\%}{100}$$

ORE BULK DENSITY DETERMINATION

The following procedure was used to determine the sample bulk density:

1.) Zero the scale and weigh the cuvette (CV) then position it underneath the funnel (volume of the cuvette known);
2.) Pour the dried sample into the funnel until the cuvette is completely filled;
3.) Note the sample weight (CA);
4.) Repeat three times and use the arithmetic mean; and
5.) Return sample to bulk sample.

The following equation was used to determine the sample bulk density (BD):

$$BD(g/cm^3) = \frac{CA - CV}{\text{Cuvette Volume}}$$

DENSITY DETERMINATION

The following procedure was used to determine the sample density:

1.) Pour 50g of dry sample (MA) in a 100ml graduated cylinder;
2.) Add 25 ml of water and mix to eliminate any gas bubbles;

3.) Wash the inside of the graduated cylinder with 25 ml of water (V2) and then with 10ml of alcohol (V3) to remove the natural floatability of graphite; and

4.) Note the total volume (VT).

The following equation was used to determine the sample density (dr):

$$dr = \frac{50}{VT - 60}$$

DETERMINATION OF THE WATER-SOLUBLE MINERAL SALTS

The following procedure was used to determine the water soluble salts:

1.) Weigh 50 grams of dry ore (MA) in an analytical scale with +-0.1 mg accuracy. Pour the sample into an one liter beaker containing 0.5 litre of water;

2.) Mix mechanically for 30 minutes to create a solution;

3.) Weigh the filter funnel and note the weight (FV);

4.) Place the filter funnel into a vacuum flask;

5.) Pour the solution on the funnel, washing the walls of the beaker with a wash bottle;

6.) Connect the vacuum pump into the vacuum flask, filter the solution, note the pH of the filtrate and discard. Then wash the cake with 0.5 liters of water;

7.) Place the funnel with the cake in oven to dry at 100 °C; and

8.) After drying, let the cake cool and weigh the funnel with the solids (FA).

The following equation was used to determine the percentage of soluble mineral salts:

$$\%SS = (50 - (FA - FV)) \times 2$$

DETERMINATION OF HCL SOLUBLE ORE

The following procedure was used to determine the HCl Soluble Ore:

1.) Weigh 20 grams of dry ore on an analytical scale;

2.) Pour the ore in a 250 ml volume beaker and add 20 ml of distilled water and 20 ml of concentrated HCl, covering with a watch glass;
3.) Leave the beaker on a hot plate for 30 minutes;
4.) Fill the beaker with hot water to the 100 ml mark, always washing the watch glass and the inside of the beaker;
5.) Weight a filter funnel (FV) and place the filter funnel into a vacuum flask;
6.) Pour the solution into the funnel, washing the beaker with hot water;
7.) Filter and wash the cake with distilled water until total neutralization;
8.) Place the cake with the filter funnel in an oven to dry at 100° C; and
9.) After drying and cooling, weigh the setting (FA).

The following equation was used to determine the percentage of soluble HCl (% S-HCl):

$$\%S\text{-}HCl = [20 - (FA - FV)]x5$$

DETERMINATION OF CRYSTALLINE WATER AND ASH IN TOTAL SAMPLE

The following procedure was used to determine the crystalline water and ash:

1.) Take one porcelain combustion boat (CV);
2.) Weigh 1.0 gram of dry sample (CA) on an analytical balance;
3.) Leave in an oven for 10 minutes at 700 °C, remove, cool and weigh (CS); and
4.) Leave in an oxygen-enhanced combustion furnace for 30 minutes at 1050 °C. Remove, cool and weigh (CQ).

The following equation was used to determine the the percentage of crystalline water (% H20C):

$$\%H20C = \frac{CS - CV}{CA - CV} x100$$

The following equation was used to determine the ash content (% Ash):

$$\%Ash = \frac{CQ - CV}{CA - CV} x100$$

SIZE AND GRADE DISTRIBUTION

The following procedure was used to determine the size and grade distribution:

1.) Weigh 50 grams of dry sample and place it on a 325 mesh sieve;
2.) Wash with a gentle jet of water to remove all passing material;
3.) Pour the retained material into a 500 ml beaker, rinsing the sieve;
4.) Stack sieves of 30, 50, 80, 100 and 325 mesh, placing the biggest mesh sieve (30#) at the top and the smallest mesh sieve (325#) at the bottom;
5.) Wash the material from each screen successively until complete elimination of the passing material of one sieve to the next;
6.) After washing the material from the last sieve (325#), leave each retained fraction in an oven at 100 °C for 1 hour to dry;
7.) After drying and cooling, collect, weigh and store each fraction for analysis of carbon content;
8.) Add the weight of material retained in each sieve, and the balance of the 50 grams will be the material passing through the 325 mesh sieve;
9.) Calculate the particle size distribution, dividing the weight retained on each sieve by 50, and multiplying by 100; and
10.) The content of the passing fraction in 325 mesh is calculated as follows: Multiply the percentage retained and respective grade in each fraction, up to 325 mesh. Sum the products of all multiplications (S). Note the average ample grade (TG). Note the passing percentage in 325 mesh (P).

The following equation was used to determine the grade of the fraction less than 325 mesh:

$$\%Cg = \frac{TG - S}{P} x100$$

BENCH SCALE PREPARATORY TESTWORK

With the objective to characterize and better understand Santa Cruz's material, thus preparing and indicating more precise process alternatives for the pilot plant, a bench scale testwork was performed with the samples received.
Bench scale testwork analyzed the following variables:

- Optimal milling cycles;
- Optimal milling body (rod, balls, small balls, pebble, etc);
- Flotation optimization, including retention times and reagents usage;
- Final product concentration vs. granulometry analysis and tradeoffs.

BENCH SCALE MILLING

Bar/rod mills were used for primary milling. Different retention times of 5, 10, 15, 20 and 30 minutes were applied. Table 24 below shows granulometry distribution for the various cycles using +30#, +50#, +80#, +100#, +325# and -325# screens.

Table 24 - Granulometry and Cg distribution post milling for AM03

Milling is a critical step in preserving the natural large and jumbo flake, and as demonstrated by the results presented on Table 26, excessive cycle times can be extremely destructive for the premium larger flake ore. A balance between recoveries and the material granulometry coming out of the comminution circuit is essential in optimizing the flowsheet, and experienced management and careful production controls are important once commercial production begins. The primary process goal is to have the minimal amount of milling, which preserves the natural flake size (+80#) while achieving the desired Cg concentration. The secondary process goal then becomes optimizing the full circuit to take advantage of the largest amount of material across the full grain size distributions while maintaining good recoveries.

Table 25 below shows the results of a milling and rougher flotation simulation. The results clearly show that the 5 min cycle time not only preserved large and jumbo flakes, but also achieved the highest concentration at this stage (78.7% Cg).

Table 25 - Granulometry and Cg % for Primary 5 Minute Milling and Rougher Float

Mesh	5min Grinding					10min Grinding					30min Grinding				
	Feed		Conc Rougher			Feed		Conc Rougher			Feed		Conc Rougher		
	% simples	teor C (%)	% simples	teor C (%)	distrib. C %	% simples	teor C (%)	% simples	teor C (%)	distrib. C %	% simples	teor C (%)	% simples	teor C (%)	distrib. C %
30	3,1	35,2	27	89,1	30,6	1,5	60	22	90,1	27,1	0,2	85	4	96,0	5,9
50	8,2	12,3	25	84,3	26,8	4,8	16,3	19	85,1	22,1	0,6	52,6	8	94,0	11,6
80	12,2	5,9	18	80,3	18,4	10,2	8,2	20	80,1	21,9	9,8	5,69	14	90,0	19,4
100	10,2	1,91	5	78,5	5,0	9,7	1	2	76,2	2,1	12	5,44	16	86,0	21,2
325	16,7	1,55	6	65,3	5,0	18,4	2,4	11	63,4	9,5	14,2	3	10	55,6	8,6
-325	49,6	1,67	20	56,2	14,3	55,4	1,88	25	50,5	17,3	63,2	3,13	48	45,3	33,4
Global	100	4,1	100	78,67	100,0	100	4,1	100	73,13	100,0	100	4,1	100	65,02	100,0

BENCH SCALE FLOTATION

After sample preparation consisting of drying, disaggregation and screening, samples were submitted to primary milling to 2.0mm as previously indicated. Material was then used for bench scale flotation tests (10kg) using Outotec TankCells, with samples subdivided into 1kg lots. Several different retention times were tested as well as reagents usage to generate a final product with +93-95% while maximizing recoveries.

Figure 21 - Bench Scale Flotation Tests

Pine oil (Rescol 60F) and kerosene were selected as reagents for the float tests. This matches well with reagents that are inexpensive, readily available in Brazil and are commonly used in other graphite mines operating in the region with similar mineralogical characteristics. Based on the tests, the ideal dosage for the rougher float stage was 0.09 gram per kg of material, which results in an average total usage of 3.0 kg of pine oil per tonne of final product. With additional usage in later float stages, a total average dose of approximately 5.0 kg per tonne of final product was achieved. Similarly, a total average dose of 2 kg of kerosene per tonne of final product was used.

Because of the amount of fines in the material, sodium silicate was used as a dispersant to clay and depressant to silicate minerals, resulting in an average consumption of 500 grams per tonne of material (10 kg per tonne of final product). The pH of the pulp was 8.0 using this dosage. Flotation cycles times for all phases were less than 10 minutes. Results are shown on Table 26.

Table 26 - Total Rougher Float Reagents

PHASE	Dosage (g/t) PINE OIL + KEROSENE (100%)	SODIUM SILICATE
Rougher Flotation: -	1280	-
Flotation Recovery	640	400
Cleaner Flotation 1	430	-
Cleaner Flotation 2	430	200
Cleaner Flotation 3	215	200
Cleaner Flotation 4	215	200
Rougher	1280	-
Cleaner Flotation 1	430	-
Cleaner Flotation 2	215	-
Cleaner Flotation 3	215	-

GRIND MEDIA ANALYSIS AND FLAKE SIZE PRESERVATION

As previously mentioned, the Brazilian graphite mining industry benefits from over 70 years of continuous production, and perhaps one of the most important and relevant results of this experience is the selection of the grinding media for post primary milling. Specific technologies developed by the industry in Brazil have been experimented with and are currently being used in production facilities. This media includes small “steel shot” balls and pebbles. Examples are presented in Figure 22.

Figure 22 - Grinding Media Steel Shot ("granalha") on Left and Pebbles on Right

The use of grinding media based on the Brazilian operating experience are a crucial step in increasing concentrations for friable material above 90%, while preserving the higher value large and jumbo flake granulometry. Table 28 shows the results from processing the output presented in Table 27 (5 min grind + primary float), before and after it has been run through a secondary pebble mill grinding stage.

Table 27 - Granulometry and Cg % After Secondary Grinding Using Pebbles Media

Mesh	Rougher Concentrate				Grinding using Pebble Media (20)			
	% simples	Cg (%)	distrib. C %	distrib. acumul C %	% simples	Cg (%)	distrib. C %	distrib. acumul C %
30	26,0	89,1	30,0	30,0	23,0	94,0	28,0	28,0
50	24,0	84,3	26,2	56,2	21,0	93,0	25,3	53,3
80	16,0	80,3	16,6	72,9	14,0	90,0	16,3	69,6
100	4,0	78,5	4,1	76,9	6,0	89,0	6,9	76,5
325	6,0	65,3	5,1	82,0	8,0	68,0	7,0	83,6
-325	24,0	56,2	17,5	99,5	26,2	48,0	16,3	99,9

The results clearly indicate the efficiency of this grinding media as there was minimal destruction of +80 mesh flakes when compared to the substantial concentration improvement of these fractions.

A second analysis for the -50 mesh was also performed to assist in defining the optimal grinding media. In the case of selected parts of Santa Cruz's material, graphite particles are associated with limonite attached to its edges, and steel shot media has proved more efficient in its cleaning and concentration, resulting in a +95% Cg high quality product. The results are presented in Table 28

Table 28 - Granulometry and Cg % for -50# after Secondary Grinding Using Steel Shot Media

Mesh	Fraction-50# CRG				Grinding Using Steel Shot (20)			
	Held	% C	distrib. C %	distrib. Acumul C%	Held	% C	distrib. C %	distrib. Acumul C%
80	47,1	89	51,9	51,9	34	95	41,8	41,8
100	17,7	80	17,6	69,5	13	88	14,8	56,7
325	18,9	72	16,8	86,3	21	65	17,7	74,3
-325	16,3	68	13,7	100	32	62	25,7	100

Based on the various trade-off studies of grinding media tests, the following relationships have been drawn from the results:

- 80-90% Cg range - For every 1% gained in concentration there is a 1% destruction on the +80 mesh flakes;
- +90% Cg - For every 1% gained in concentration, there is a 2.5% destruction of the +80 mesh flakes.

These relationships are reasonable given the expected difficulties in marginal gains for higher concentrations (+95) and the requirements for stronger and more destructive grinding to liberate gangue elements.

13.3.6 PILOT PLANT TESTWORK

OBJECTIVES

The results of the bench scale tests were used to develop a pilot plant circuit and generate, at scale, a final concentrate with Cg ≥ 93-95% using minimal grinding to preserve the large and jumbo flake size granulometry while optimizing recoveries. The three representative bulk samples, totaling 31,000kg (31t), were used to upgrade the understanding of process requirements and to develop a final flowsheet. It is important to note that the pilot plant work confirmed the bench scale optimizations.

Figure 23 - Pilot Plant In Development at Fundação Gorceix

METHODOLOGY

Pilot plant testwork was performed in phases. Initially, the three bulk samples were treated separately in a primary bar mill circuit and then stored in plastic sealed barrels. After initial 6,25mm disaggregation and classification, material was ground to 2.0mm. The output from the mill was wet screened into two different decks, allowing for +50 mesh flakes (0.3mm) to be immediately removed from circuit via screening to preserve its high-quality size.

-50 mesh material was passed through a primary rougher float, then successive additional grinding and float circuits with each stage seeking to increase the concentrate grade to the minimum of 93-95% Cg. The secondary grinding used pebbles and steel shot for rougher and cleaner concentrates, respectively, on the +50 mesh circuit, while just steel shot was used on the -50 mesh concentrate circuit.

Alternatives investigated included hydrocyclone tests in order to investigate graphite loss on overflow, as well as concentrating using a Humphreys Spiral to investigate whether large flake could be obtained without the use of grinding.

Figure 24 shows the final flow sheet for Santa Cruz Graphite composed of feeder, screens, successive grind and float circuits, drying and packaging. As described on chapter 12.3.5.3, this flowsheet structure and the use of alternative grinding media shot is based on the decades of graphite experience developed in Brazil.

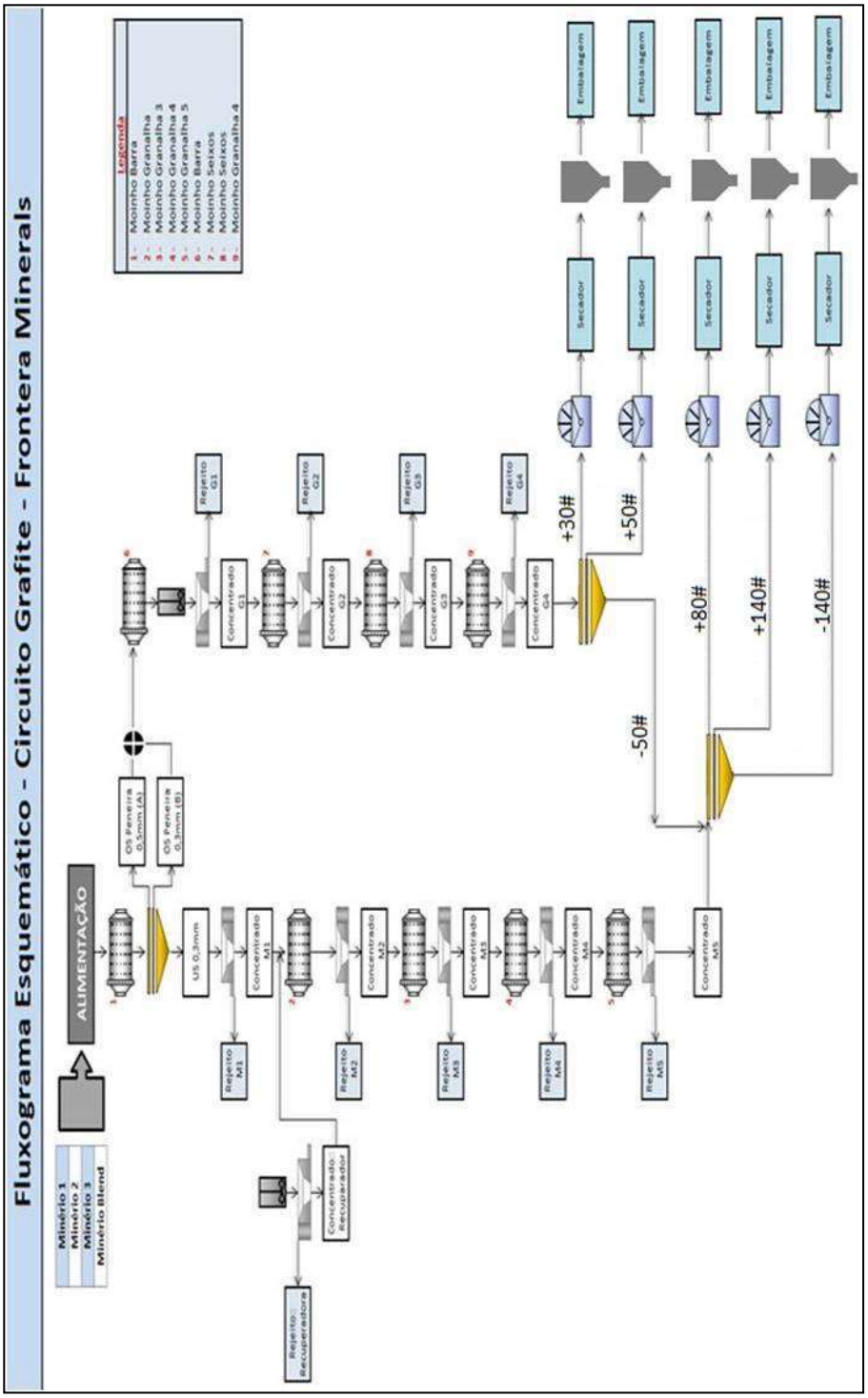


Figure 24 - Schematic of Pilot Plant Process Circuit

FLOWSHEET SEQUENCE

Based on the investigations, alternatives analyses and extensive testwork performed to date, the Project`s flowsheet can be detailed as follow:

I) ROM is placed on a vibrating feeder where material is disaggregated to -6.25mm;
II) Material is treated in a bar mill to -2.00mm;
III) A wet screen separates material into two different circuits: +50 mesh & -50mesh;
IV) The +50 mesh circuit follows:

a. Four successive series of grinding (using ball, steel shot and pebbles) + flotation;
b. After 4th series and final cleaning flotation, a screen separates +30 mesh and +50 mesh to be filtered, dried and packaged;
c. The under after the 4th series are directed to tailings reprocess tank, to be mixed with -50 mesh final tailings and reprocessed in the -50 mesh circuit for optimal recovery.

V) The -50 mesh circuit follows:

a. Primary flotation, then (4) four series of grinding (using steel shot) + flotation;
b. After 4th series and final cleaning flotation, a screen separates +80 mesh, +140 mesh and -140 mesh to be filtered, dried and packaged;
c. Tailings of the five flotations are directed to tailings reprocess tank, to be mixed to +50 mesh circuit final tailings and reprocessed in this circuit for optimal recovery.

The Figure 25 below shows a simplified version of the Project`s flow sheet.

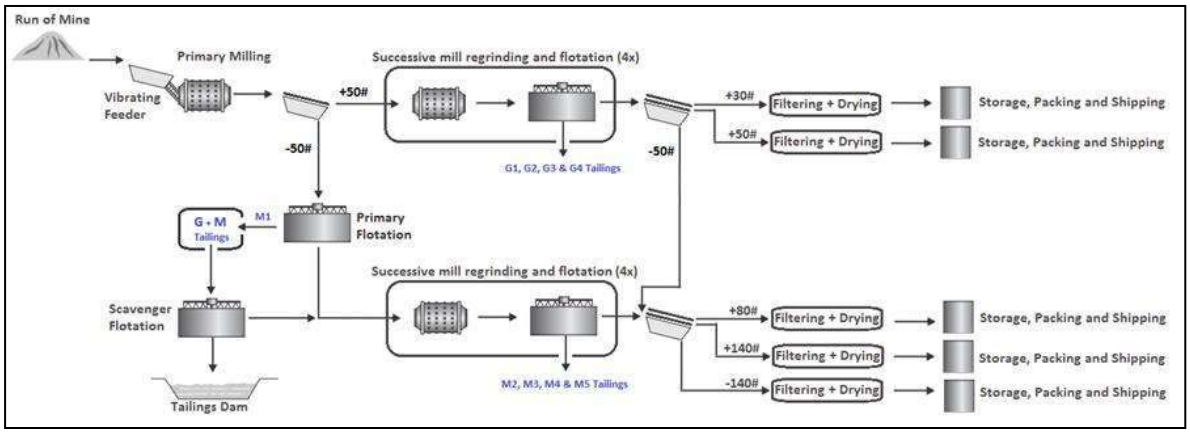


Figure 25 - Santa Cruz Project Simplified Flow Sheet

PILOT PLANT CONCENTRATES

+50 MESH (0, 3 MM) CONCENTRATES

Jumbo flake concentrate is finalized after the 4th flotation composed of 0,5mm oversize and 0,3mm undersize. Under this jumbo flake circuit, after the primary rod milling, an initial flotation was conducted, followed by a sequence of two grinding+milling using pebbles. This product was then submitted to the 4th and final step of flotation, reground with steel shot media.

+80 MESH (0, 18 MM) CONCENTRATE

Large flake +80 mesh is a combination of the 0,3mm undersize material generated from the jumbo flake circuit, together with the 0,18mm oversize material from the 4th grind+float stage. In this circuit, all grinding used steel shot media.

-80 MESH (0,18 MM) CONCENTRATE

Finally, -80 mesh concentrate is obtained from the undersize of the 0.18mm screen after the 4th grind+float sequence.

FILTER PRESS, DRYING, FINAL CLASSIFICATION AND PACKAGING

All three product streams incorporate a filter press, dryer and packaging system. The filter press will reduce product moisture content to approximately 17%, and the water will be recirculated back into the process water. Gas dryers will

receive the product from the filter press and reduce product moisture to maximum 1%. Final product classification will be made with dry screens depending on client demand and product specifications. Silos will store final blends and supersacks or 25kg bags will be used to package final products for shipping.

Figure 26 below shows an illustrative sample of the various concentrates produced:

Figure 26 - Concentrates in different mesh sizes

PILOT PLANT CONCLUSION AND RESULTS

INDIVIDUAL SAMPLE RESULTS

Table 29 shows the recovery, granulometry and Cg concentration grades for each individual sample.

Table 29 - Bulk Samples Summary Results

	AM1		AM2		AM3	
	Granulometry	% Cgr	Granulometry	% Cgr	Granulometry	% Cgr
30#	2%		3%		7%	
50#	25%	95%	32%	95%	40%	95%
80#	31%	98%	20%	97%	29%	96%
140#	21%		21%		8%	
-140#	21%	97%	24%	95%	16%	98%
Recovery		88%		88%		87%

FINAL SANTA CRUZ CONCENTRATES

FINAL CONCENTRATE +95% CG

Finally, in order to produce a representative Project concentrate, a blend of the three individual bulk samples was prepared, and the results are presented in Table 30.

Table 30 - Representative Project Concentrate Results

	Santa Cruz Graphite	
	Distribution	*% Cg*
30#	4%	95%
50#	32%	95%
80#	27%	97%
140#	17%	97%
-140#	20%	97%
Recovery 88%		

FINAL CONCENTRATE +93% CG

As an alternative to the final concentrate presented in Section 12.3.6.7, a +93% Cg concentrate was also investigated and produced for potential clients and markets that accept the slightly lower grade (93% Cg vs. 95% Cg). An important

granulometry gain occurs at the +50 mesh and +80 mesh sizes as flakes are subject to smaller and lower cycles of milling. The results are presented in Table 31.

Table 31 - Final +93% Cg concentrate achievable at Santa Cruz

	Santa Cruz Graphite	
	Distribution	*% Cg*
30#	4%	95%
50#	37%	93%
80#	32%	93%
140#	12%	97%
-140#	15%	97%
Recovery 88%		

13.3.7 HIGH AND ULTRA PURITY CONCENTRATES

After the completion of the pilot plant testwork, BGSA received requests for product testing from selected potential clients. In order to meet the ultra purity concentrate product quality and specifications for high end applications, bench testwork was performed on selected final concentrates focusing on upgrading the Project´s potential product line. The following products were generated:

a. +50 mesh with 98% Cg, including 531 cm^3/g expansivity;

b. After the final +50mesh 97% Cg concentrate was reached, part of this product was set aside and submitted to an additional grind (using pebble mill) + float circuit, yield a high purity 5098 concentrate.

c. A base product of +95-97% Cg was submitted to treatment with fluoridric and sulphuric acid, thus removing impurities and upgrading the product to the ultra-purity +99.9% Cg concentrate.

13.4 FINAL CONSIDERATIONS

The Pilot Plant scale testwork using a total of 31,000kg (31t) significantly benefited from the bench scale indications, which were then optimized for larger volumes, confirming that a high-quality concentrate can be achieved from the Project´s material. The selection of the grinding media (steel shot vs. pebble) is essential to maintaining the advantages associated with the large flake graphite while also achieving the desired concentrations.

All concentrates achieved a final 93-95% Cg minimum, thus meeting the current markets value adding premium product specs while maintaining reasonable recoveries. The results indicate an efficient flotation scheme and reagents use. A few observations follow:

1.) Brief primary bar mill at 2.0 mm and immediate classification using 0.5 and 0.3 mm screens proved to be essential in preserving jumbo flake granulometry as this material avoided going through unnecessary successive grinding stages;
2.) Clay removal prior to flotation proved to be unnecessary given the high selectivity and results achieved on the flotation cells;
3.) The flow sheet shows that the Project can take advantage of the abundant, high quality, shallow friable material with traditional, proven milling and flotation circuits;
4.) The simple flow sheet based on straightforward, proven technology derived from the extensive Brazilian operating experience can mostly be fabricated in-country, will keep construction costs low and can be brought on-line quickly.
5.) The process flow sheet will generate a diverse group of highly valued, large flake products as well as a broad range of products across grain size distributions.
6.) The products can also be upgraded to the ultra-purity value added concentrates required for certain potential growth markets like batteries, amongst others.

14.0 MINERAL RESOURCE ESTIMATES

14.1 DATA

Block model data is Excel based, consecutively incorporated into Access and include location, orientation, results and lithology of all drill holes; Geological maps were done using Mapinfo, as well as interpretation, structures and cross sections. Following this preliminary work, geologic model and drill hole coordinates/results were inserted into Gems for resource calculation.

Resources database incorporates 49 reverse circulation holes totaling 2,440 meters and 349 rotary drill holes totaling 3,409.90 meters which were used for resource estimation. Due to the simple structural geology, model and resource estimates were developed as one domain for the mineralized gneiss. The mineralized body was identified with the color code N 5 in Gems 6.5 software.

Table 32 - Reverse Circulation and Rotary Drill holes used in resources model

	Drill holes	Evaluated Meters	Evaluated Samples
RD	349	3,409.90	1,824
RC	49	2,440.30	1,879
Total	398	6,601.00	3,703

14.2 GEOLOGICAL MODEL

14.2.1 DIGITAL EVALUATION MODEL

Initially a handheld GPS Dakota 20 was used at the Project, which was then upgraded to an Orthorectified GeoTiffs imagery and detailed topography. These were developed using Stereo Pleiades-1 Satellite Sensor (1m) coupled with ground point verification provided via a GNSS RTK GPS. T opography is in UTM (meters) coordinate system with SAD 69, Zone 24 - South Datum.

14.2.2 GEOLOGICAL MODEL ZONES

The method used to assemble geologic model was lines and ties; it was chosen as the best way to model the deposit because of the current understanding of characteristics, structural controls and data available at this point. Some general points of the modeling strategy are summarized below:

1. Deposit is integrated into one main body due to its verified simplicity;
2. Geologic solids were not extended beyond the lowest mineralized intersection;
3. Generally, mineralized gneiss was modeled with the reverse circulation and rotary drilling intersections, and then clipped on the contact with non-mineralized gneiss and the topography;
4. On each different block an independent variogram was used to follow in accordance with the strike mineralization.

Figures 27 and 28 bellow illustrates the general view of the model.

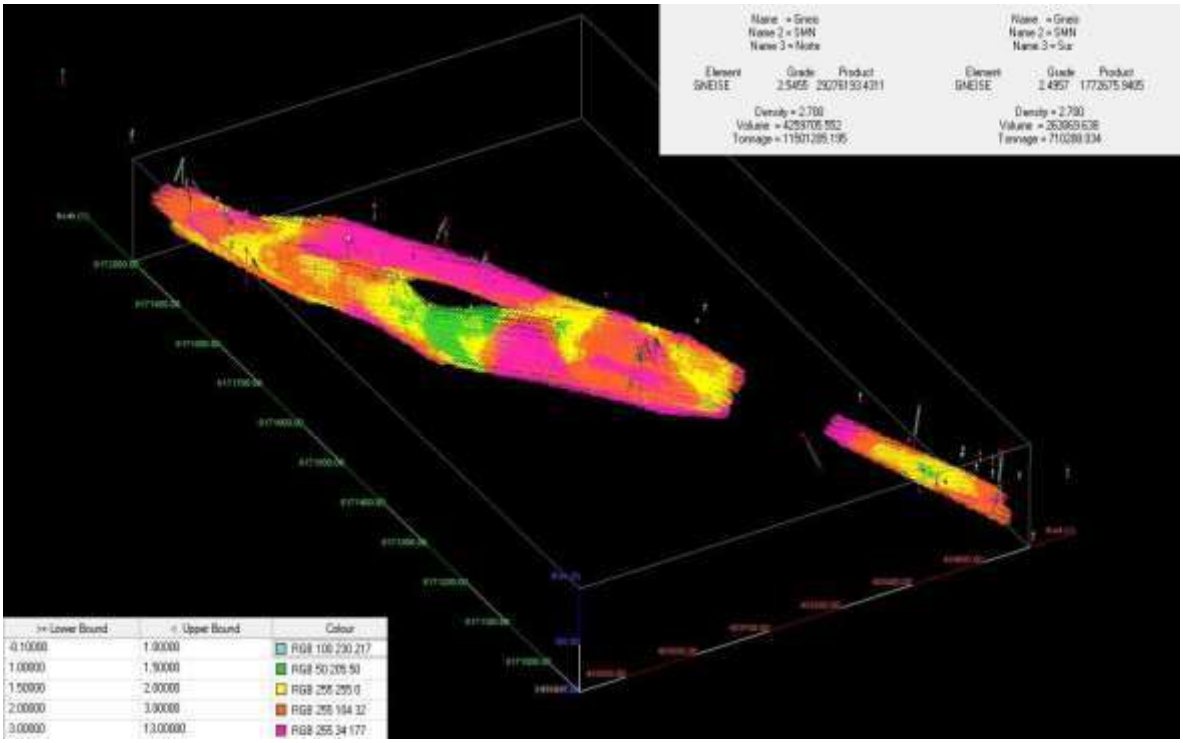


Figure 27 - São Manuel north mineralization

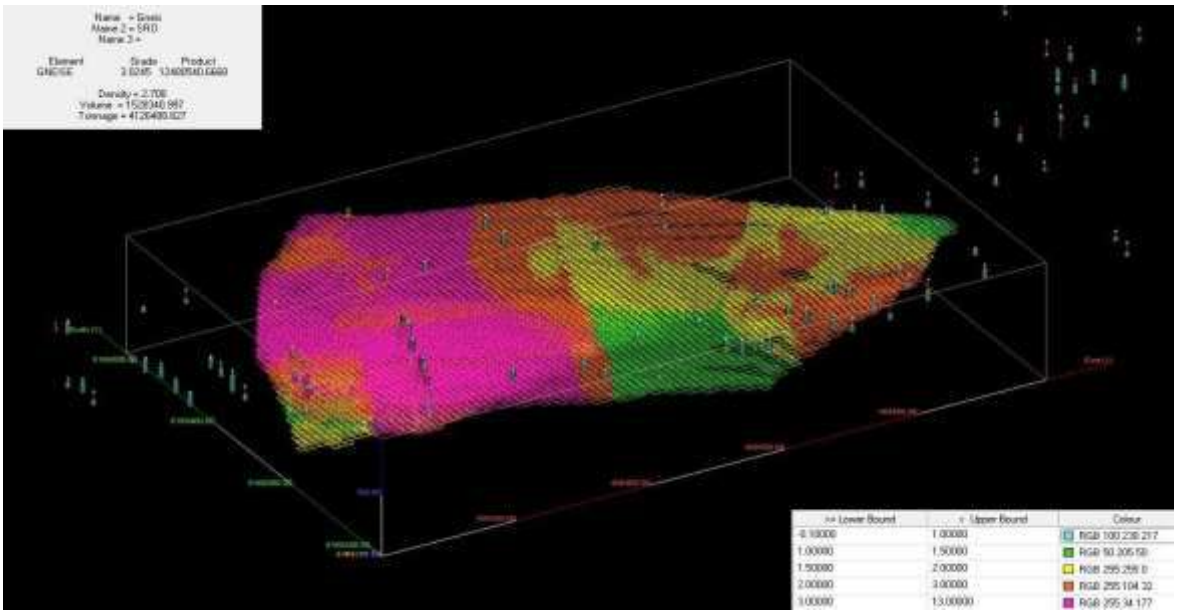


Figure 28 - Sao Rubens East Mineralization

14.3 BLOCK MODEL AND RESOURCES ESTIMATION

14.3.1 BLOCK MODEL LIMITS

Once the geologic interpretation and the solids were completed, a block model was created. Blocks are all sized at 4m x 4m x 4m. Table 33 shows the coordinate limits for each mineralized wireframe block name .

Table 33 - Coordinate limits of Block Resources Itabela Graphite

		UTM Easting (X) (m)		UTM Northing (Y) (m)		Elevation (Z) (m)	
Target	Block Name	Min.	Max.	Min.	Max.	Min.	Max.
São Manoel North	BLKSMN	433,4	434,2	8,170,800	8,172,100	200	400
São Manoel South	BLKSMS	434,25	434,69	8,169,695	8,170,400	150	225
São Rubens East	BLKSRE	438,75	438,95	8,169,200	8,169,600	200	350
São Rubens Center	BLKSRC	437,75	438,1	8,169,250	8,169,500	200	450
São Rubens West	BLKSRO	436,15	436,9	8,169,100	8,169,600	200	400
Jucuruçu	BLKJU	408	408,7	8,139,700	8,140,100	200	350

14.3.2 DENSITY

Forty nine samples were analyzed for density at Lenc Laboratory, a French-based multinational part of Egis Group. This Laboratory has ISO/IEC 17025 certification.

Table 34 shows the samples that were analyzed and its results.

Table 34 - Density results and samples location

Sample Number	Density g/cm3	East	North
11,197	2.706	433,05	8,170,704
11,254	2.675	433,045	8,170,697
11,392	2.710	433,032	8,170,682

11,597	2.628	433,126	8,170,612
11,603	2.655	433,119	8,170,602
11,814	2.678	433,106	8,170,585
11,816	2.707	440,497	8,171,567
11,819	2.670	440,477	8,171,581
11,82	2.653	436,656	8,171,724
11,821	2.661	433,736	8,171,698
11,823	2.685	433,539	8,171,874
11,849	2.698	433,548	8,171,926
11,872	2.722	433,74	8,171,564
11,89	2.695	433,771	8,171,479
11,971	2.664	433,829	8,171,417
11,986	2.748	434,192	8,170,715
11,992	2.715	434,319	8,170,371
12,029	2.673	433,748	8,171,665
12,061	2.693	433,856	8,171,404
12,094	2.680	434,356	8,170,206
12,116	2.695	434,418	8,170,116
12,134	2.704	434,526	8,170,014
12,176	2.737	434,61	8,169,850
12,2	2.695	434,592	8,169,877
12,205	2.760	434,591	8,169,808
12,213	2.798	434,668	8,169,769
12,228	2.651	434,962	8,169,657
12,26	2.677	434,062	8,171,029
12,265	2.753	433,743	8,171,572
12,274	2.799	437,93	8,169,357
12,308	2.771	438,064	8,169,429
12,407	2.715	437,987	8,169,493
12,413	2.722	437,869	8,169,413
12,416	2.638	438,3	8,169,487
12,459	2.681	438,375	8,169,573
12,574	2.682	438,564	8,169,556
12,763	2.787	438,922	8,169,511
12,86	2.811	436,333	8,169,341
12,881	2.809	436,253	8,169,372
12,91	2.720	436,25	8,169,351
12,936	2.737	436,297	8,169,475
13,106	2.741	436,57	8,169,285

13,115	2.710	436,657	8,169,281
13,206	2.874	436,806	8,169,272
13,32	2.625	436,951	8,169,342
13,349	2.745	438,626	8,169,500
13,356	2.714	436,454	8,169,475
13,595	2.694	436,382	8,169,528
13,634	2.754	436,382	8,169,528

14.3.3 GEOSTATISTICAL ANALYSIS

A summary of statistical analysis for the resource estimate is presented in Table 35.

Table 35 - Statistical Analysis

Statistic	Value
Valid Samples	4141
Minimum	0.05
Maximum	13.17
Mean	1.36
Natural log mean	-0.48
Variance	2.32
Standard	1.52
Coefficient of	1.12

14.4 HISTOGRAMS

Histograms of original data, composites created by GEMS, and the export of the non-zero blocks from the block model were compiled and are presented below.

The valid assay data histogram (4,141 assays) shows a highly normal log distribution and is presented in Figure 30.

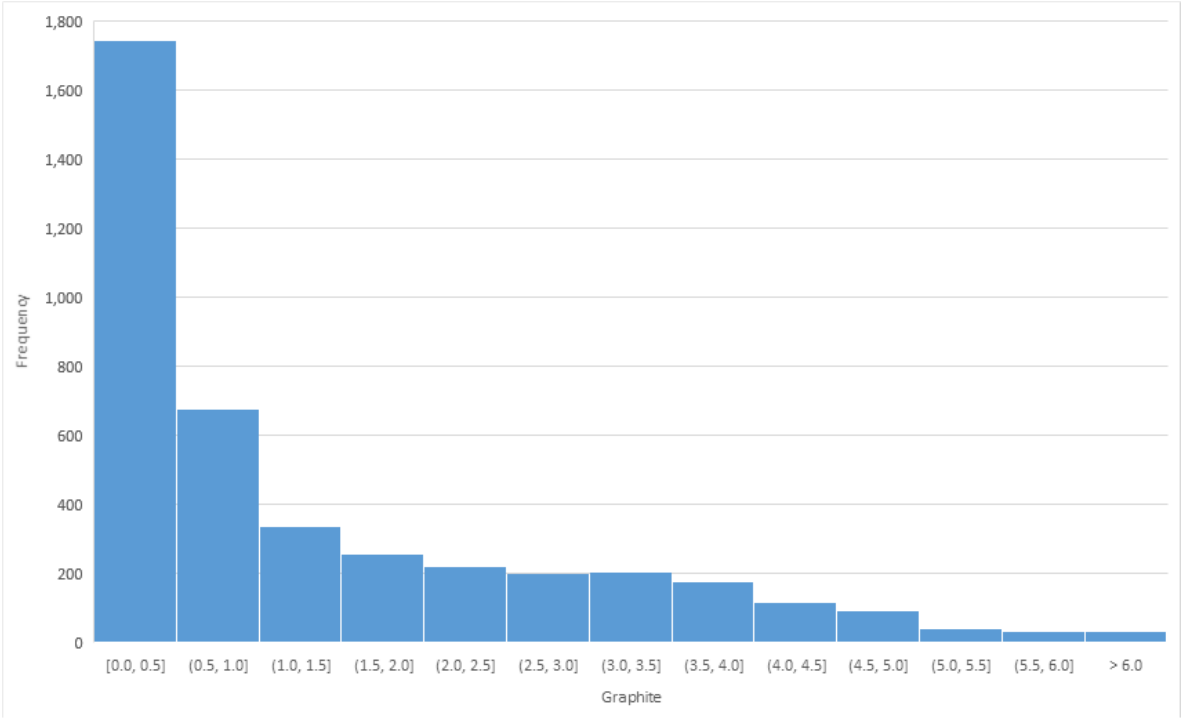


Figure 29 - Frequency x number of samples histogram

SUMMARY DISCUSSION OF GEOLOGICAL MODEL

Project geology is very simple but at different targets, the strike of the mineralized zone changes, thus resource estimation was divided into different blocks controlled by mineralized strike orientation. Following this, different variograms were created for each block (São Manuel, São Rubens and Jucuruçu areas).

It is important to note that resource calculations for each block does not exceed the limit of a particular block, thus the resource calculation is controlled by geological interpretation.

14.5 VARIOGRAPHY AND SEARCH ELLIPSE

Ordinary kriging was used for resource estimation and table 36 shows search parameters for each mineralized block as well as variograms.

Table 36 - Variograms

Target	SEARCH PARAMETERS				KRIGING TYPE	VARIOGRAM MODEL			C VALUE	RANGE	AZIMUTH	PLUNGE	DIP	BLOCK VARIANCE
	Max search distance of major axis	Max vertical search distance	Maximum number of informing samples	Minimum number of informing samples		Type	Cumulative sill	Nugget effect						
São Manoel North Body 1	55	2.1	4	1	ORDINARY KRIGING	Spherical	1.101	0.586	0.516	293.669	160.000	0.000	0.000	0.499
São Manoel North Body 2	55	2.1	4	1	ORDINARY KRIGING	Spherical	3.222	0.210	3.011	300.000	144.070	0.000	75.234	2.918
São Manoel South	55	2.1	4	1	ORDINARY KRIGING	Spherical	1.075	0.065	1.009	191.796	150.000	0.000	0.000	0.961
São Rubens East	70	4.5	4	1	ORDINARY KRIGING	Spherical	0.577	0.227	0.350	290.289	0.000	0.000	-20.000	0.339
São Rubens Center	70	4.5	4	1	ORDINARY KRIGING	Spherical	1.603	0.000	1.603	197.109	90.000	0.000	-25.610	1.527
São Rubens West	55	2.1	4	1	ORDINARY KRIGING	Spherical	1.173	0.000	1.173	144.384	90.000	0.000	-10.000	1.097
Jucurucu	55	3.1	4	1	ORDINARY KRIGING	Spherical	1.145	0.000	1.145	525.000	100.000	0.000	10.000	1.125

14.6 RESOURCES ESTIMATE

The resource estimate was calculated using ordinary kriging based on parameters given previously. Graphitic carbon grade was interpolated for all mineralized domains, using a partial block model for each one. Domain tonnes and grade were updated using the appropriate geological solids. A cut-off of 1% Cg was used.

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. Resources are classified using the 2014 CIM definitions for resources and reserves. CIM definitions are as follows:

INFERRED MINERAL RESOURCE

An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological

evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.

An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An Inferred Mineral Resource is based on limited information and sampling gathered through appropriate sampling techniques from locations such as outcrops, workings and Rotary drilling holes. Inferred Mineral Resources must not be included in the economic analysis, production schedules, or estimated mine life in publicly disclosed Pre-Feasibility or Feasibility Studies, or in the Life of Mine plans and cash flow models of developed mines. Inferred Mineral Resources can only be used in economic studies as provided under NI 43-101.

INDICATED MINERAL RESOURCE

An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.

Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation.

An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

Mineralization may be classified as an Indicated Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such as to allow confident interpretation of the geological framework and to reasonably assume the continuity of mineralization. The Qualified Person must recognize the

importance of the Indicated Mineral Resource category to the advancement of the feasibility of the project. An Indicated Mineral Resource estimate is of sufficient quality to support a Pre-Feasibility Study which can serve as the basis for major development decisions.

MEASURED MINERAL RESOURCE

A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.

Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation.

A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

Mineralization or other natural material of economic interest may be classified as a Measured Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such that the tonnage and grade or quality of the mineralization can be estimated to within close limits and that variation from the estimate would not significantly affect potential economic viability of the deposit. This category requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit.

Table 37 shows a breakdown summary of Santa Cruz´s current resources

Table 37 – Santa Cruz Graphite Resources estimate

	Tonnage (t)	C (%)	In-situ Graphite (t)
Measured	0	0	0
Indicated	14,990,400	2.70%	404,741
Inferred	3,572,100	2.90%	103,591

Table 38 shows the resources divided by target and category.

Table 38 - Resources by Target and Category

	Tonnage	Grade (%)	Product (Tn)	Product (Tn)
São Manoel North B1	10,130,400.00	2.60	263,390.40	Indicated
São Manoel North B2	572,400.00	2.50	14,310.00	Indicated
São Manoel South	1,309,500.00	2.80	36,666.00	Indicated
São Rubens West	2,978,100.00	3.10	92,321.10	Indicated
São Rubens Center	785,700.00	3.90	30,642.30	Inferred
São Rubens East	631,800.00	1.70	10,740.60	Inferred
Total Main Rock	16,407,900.00	2.73	448,070.40	
Jucuruçu	2,154,600.00	2.90	62,483.40	Inferred
Total	18,562,500.00	2.75	510,553.80	

15.0 MINERAL RESERVE ESTIMATES

There are no mineral reserves estimated for the Project during this study phase.

Calculated mineral resources were submitted to a mine plan, sequencing and economic parameters, resulting in mineable mineral resources used for the financial model and analysis of this report.

16.0 MINING METHODS

The current resources are generally within a shallow, oxidized zone that is amenable to excavation without the requirement for drilling and blasting. The method selected for the Project is conventional open pit mining using hydraulic excavator, dozer and haul trucks. For this study, the mining fleet is assumed owner operated.

16.1 GEOTECHNICAL ASSUMPTIONS AND PIT GEOMETRIES

Detailed geotechnical investigations and analyses have not been performed for this phase of the Project. The Project study is using assumed parameters and geometries from similar operations in similar conditions. The pit optimization assumes an overall pit slope of 45 degrees. Detailed geotechnical investigations and analyses will be undertaken in future study phases.

The resource body and pit meander along the bottom of a valley, and surface water controls and pit dewatering will be important elements for successful operations. The current project includes a provision in the CAPEX for surface water controls, check dams, along with pumps and pipelines to dewater pit sumps. Detailed hydrological and hydrogeological investigations and analyses will be undertaken in future study phases.

16.2 MINE OPERATIONS

The mine production was scheduled at a mining rate of 650,000 tons of mineralized material per annum, and resulted in an average LOM strip ratio of 1.27:1 (waste to mineralized material). The mine life given the current resources and plant design is 18.5 years, and the maximum depth of the pit is approximately 40 meters.

Excavation will be carried out by hydraulic excavators and a dozer, which may be required in the less weathered ore zones. Loading and hauling will be carried out by hydraulic excavator and conventional 10-15 ton trucks that will transport the mineralized material to the plant. Waste removal will be coordinated so all waste is accommodated in the older pits in the neighboring areas mined out or at the designated waste pile, always seeking to minimize environmental footprint.

Grade control will be coordinated through a full-time grade control crew of technicians that will use channel samples taken at the pit face to identify the ore zones. When required, the grade control crew will execute drill holes at the mining faces to determine grade control parameters.

Auxiliary equipment include one bulldozer CAT D8 or equivalent, one grader, one wheel dozer, water truck, maintenance vehicles and service vehicles.

Other mining infrastructure includes mine offices, change house facilities and maintenance facilities. The mine office will provide for mine management, engineering, geology, and mine maintenance services. Other infrastructure required included a maintenance workshop for use by the mining contractor and fuel storage facilities.

16.3 PRODUCTION SCHEDULE

The mine production schedule for the Project is shown in Table 39. The mining rate is 650,000 tons of mineralized material per annum with a mine life of 18.5 years. The LOM average stripping ratio is 1.27:1.

Table 39 - Mine production schedule for the Santa Cruz property

Year	Ore (t/year)	Waste (t/year)	Stripping Ratio (t ore/t waste)	Avg Grade (%)	Average Haulage Distance (m)	Mining Phase
1	650 005	107 235	0.16	3.12	675	1.00
2	650 025	1 603	0.00	3.28	661	1.00
3	650 018	283 200	0.44	3.70	727	1.00
4	650 032	645 895	0.99	3.32	733	1.00
5	650 008	429 740	0.66	2.32	702	1.00
6	650 055	880 929	1.36	1.89	640	1.00
7	650 014	2 342 888	3.60	2.47	1263	2.00
8	650 048	1 369 327	2.11	2.11	1798	3.00
9	650 028	860 560	1.32	1.97	2463	4.00
10	650 077	1 061 593	1.63	3.08	2455	4.00
11	650 008	1 203 657	1.85	2.42	2444	4.00
12	650 027	2 505 491	3.85	2.28	2466	5.00
13	650 016	64 459	0.10	2.38	4021	5.00
14	650 014	48 640	0.07	2.48	4073	5.00
15	650 070	267 617	0.41	3.08	4092	5.00
16	650 066	547 617	0.84	3.02	4025	5.00
17	650 002	767 456	1.18	2.65	4105	5.00
18	650 028	845 581	1.30	2.13	4029	5.00
19	319 408	972 584	3.04	1.87	4070	5.00
TOTAL	**12 019 948**	**15 206 074**	**1.27**	**2.63**	**2345**	-

16.4 MINE LAYOUT AND DESIGN

The mine production schedule was based on a mine sequencing that has been established using the standard Lerchs-Grossman pit optimization method using Micromine software. The following files, information and parameters have been used in the optimization runs:

Input file parameters:

- Number of records: 395,274 records
- Origin in X: 433,402.10 m
- Origin in Y: 8.169,155.0 m
- Origin in Z: 78.75 m
- Standard block size: 5 x 5 x 5 m

- Minimum Block size in X: 0.42 m
- Maximum Block size in X: 5.00 m
- Minimum Block size in Y: 2.00 m
- Maximum Block size in Y: 5.00 m
- Minimum Block size in Z: 2.50 m
- Maximum Block size in Z: 5.00 m

Dilution and recovery:

- Mining dilution: 5%
- Mining recovery: 95%

Costs & Revenue:

- Mining cost (ore): $ 1.06/t mined
- Mining cost (waste): $ 1.06/t mined
- Reference processing cost: $ 4.88/t processed
- Reference G&A cost: $ 1.02/t processed
- Concentrate price: $ 367/t concentrate

Geometrical and geotechnical parameters:

- Bench height: 5 m
- Global slope angle: 45°
- Maximum pit depth: 40 m

Material Properties:

- Ore density: 2.7 t/m³
- Waste density: 2.7 t/m³

The mine sequencing process used for scheduling the Santa Cruz property is illustrated in Figure 30.

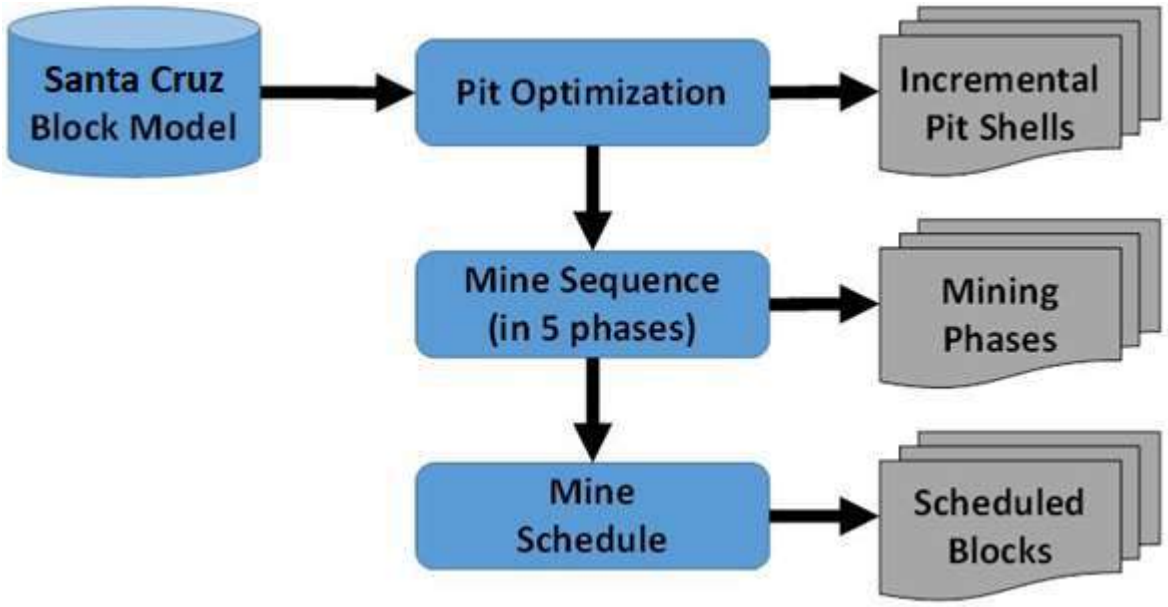


Figure 30 - Mine scheduling process for the Santa Cruz property

The average haulage distance shown in the Santa Cruz production schedule has been calculated for each block in the block model using a reference point in the BR 283 federal road nearby the Santa Cruz property. This average haulage distance was used to sequence the mining blocks within each incremental pit shell within each of the 5 mining phases. Figure 31 shows the location of the reference point used for the calculation of the average haulage distance.

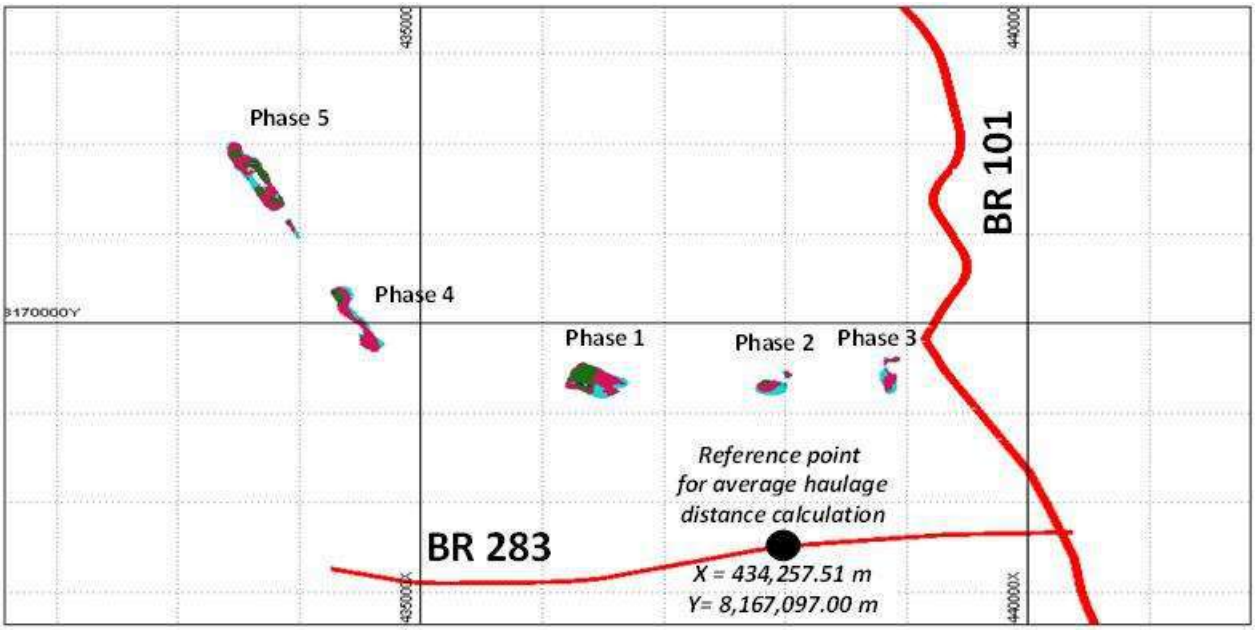


Figure 31 - Reference point for the calculation of the average hauling distance in the Santa Cruz property.

Figure 32 shows a plan view of the incremental pit shells from the Santa Cruz block model divided into 5 mining phases. Table 40 shows the results of the evaluation of the 5 mining phases.

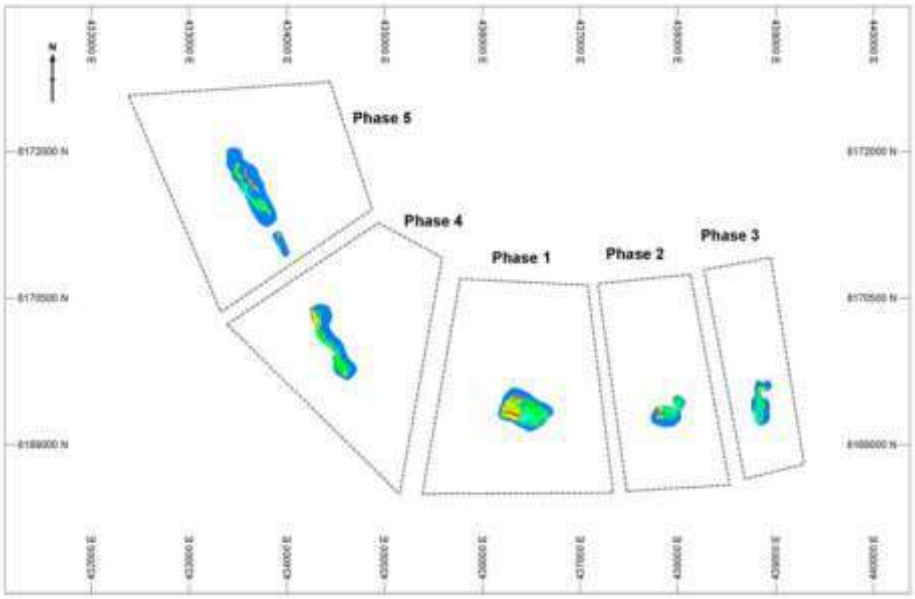


Figure 32 - Blocks within the incremental pit shells from the Santa Cruz block model divided into 5 mining phases.

Table 40 - Evaluation of the mining phases for the Santa Cruz property

Mining Phase	Ore (t)	Waste (t)	Stripping Ratio (t ore/t waste)	Average Grade (%)	Average Haulage Distance (m)
1	4 052 784	2 951 854	0.73	2.89	675
2	836 237	2 840 725	3.40	2.53	1544
3	782 670	1 108 408	1.42	1.77	2455
4	2 124 585	4 781 898	2.25	2.61	2438
5	4 223 673	3 523 189	0.83	2.57	4048
TOTAL	**12 019 948**	**15 206 074**	**1.27**	**2.63**	**2348**

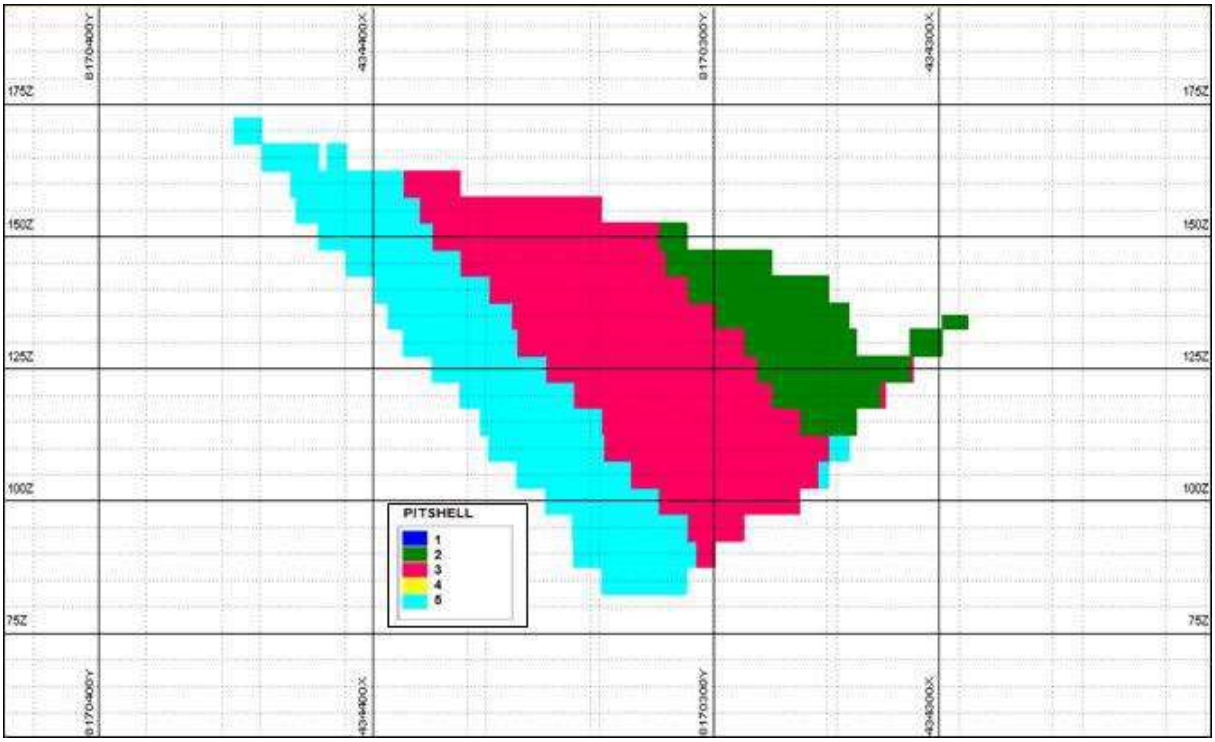


Figure 33 - Cross section of the incremental pit shells in Phase 4.

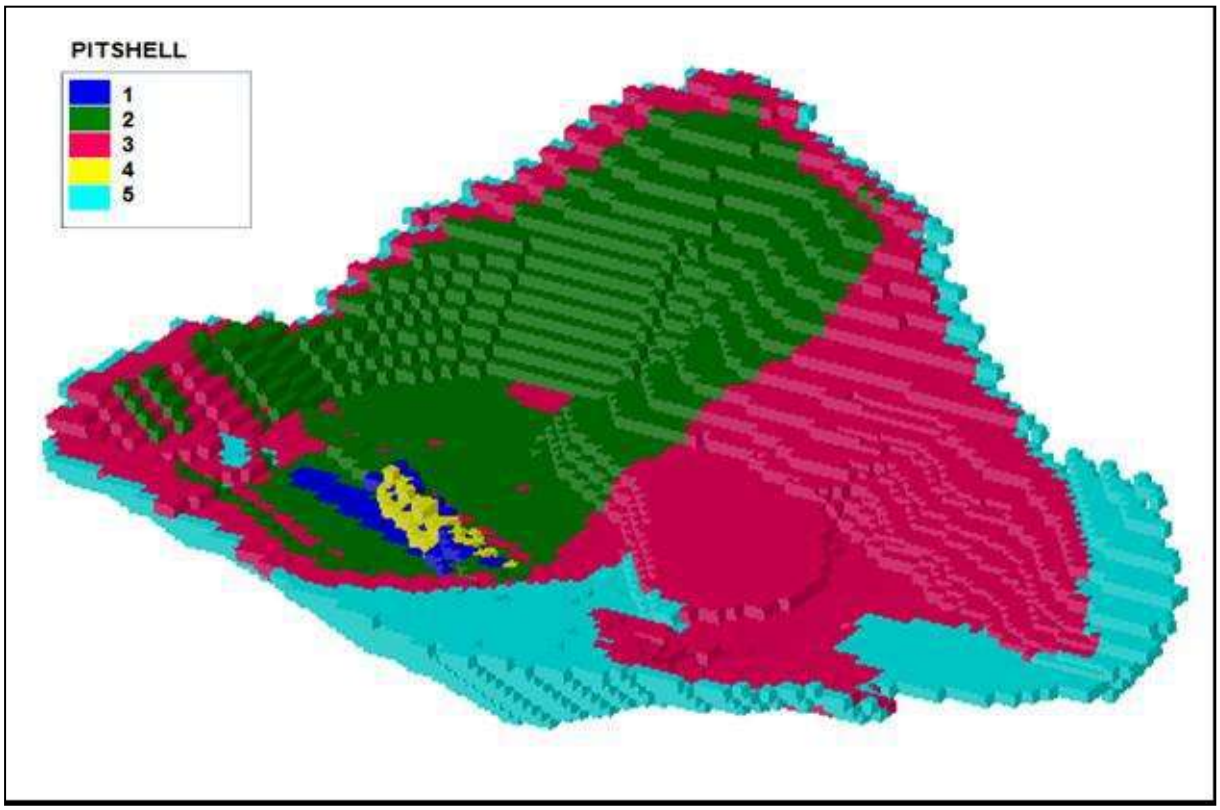


Figure 34 - Isometric views of the incremental pit shells in Phase 1

17.0 RECOVERY METHODS

There is no specific processing plant design available during this phase of the project, and therefore there are no results available to assess the recovery of graphite.

18.0 PROJECT INFRASTRUCTURE

18.1 GENERAL INFRASTRUCTURE

General infrastructure costs include site grading, construction of access roads, buildings, equipment and furniture, power, water and gas supply and distribution, communication and IT systems, fencing, security systems and fire protection.

18.1.1 SITE GRADING AND ACCESS ROADS

Detailed site grading plans will be developed in future study phases, but costs were estimated for inclusion in the CAPEX. Approximately 1.0 km of main access for the plant site will be required and connect to the paved road Av. Porto Seguro. The access road will be 12 m wide gravel road, with no significant drainage structures and grades should be limited to no more than 8%. Approximately 7 kilometers of 15 m wide gravel roads will be required within the mine site for access to pit, wasterock facilities and other structures.

18.1.2 POWER SUPPLY AND DISTRIBUTION

A 13kV high tension power line is approximately 1.6 km from the plant site running parallel to the paved road Av. Porto Seguro. A 13.8 kV (2000 kVA) transmission line will run to the substation on site and step down for distribution within the mine. Natural gas for the dryers will be stored on-site in a large tank and filled periodically by trucks. In addition, one of the most important natural gas lines in Brazil (“GASENE”) passes within 5 km of the Project, and it may be possible to supply the Project demand from the pipeline. This option will be investigated further in next phase.

18.1.3 WATER SUPPLY

Water supply for plant operations will come from the TSF facility with plant and slurry water recirculated as much as possible. Plant freshwater make-up will come from TSF basin inflows. A water tank at the plant will provide approximately 1 hour of plant operations with a standby pump and generator on site in case of emergency. Potable water will either be treated on site or a connection to Itabela's water distribution line will be investigated.

18.2 WASTE DISPOSAL

18.2.1 TAILINGS STORAGE FACILITY

A tailings storage facility (TSF) will be constructed on site and consist of a dam and unlined reservoir area near the plant. The facility will serve two functions in storing traditional pulp tailings with approximately 28% solids delivered in a slurry pipeline as well as accumulating and storing water for plant operations. Slurry water will be recirculated via a barge pump. No field investigations or materials characterization have been completed for this study. Assumed design criteria are presented in Table 41.

Table 41 - TSF Design Criteria

Item	Criteria
Tailings Disposal Method	Traditional Slurried Tails @ approx. 28% solids
Tailings Delivery System	HDPE pipe with spigots
Tailings Geochemical Characterization	Inert
Average Tailings Density	1.7 t/m^3 in situ
Return water system	Barge pump with HDPE pipe
Dam Construction Material	Staged, compacted earthfill with chimney and blanket drain
Spillway Type	Trapezoidal concrete open channel and stilling basin
Spillway Design Storm Event	Operations: 1,000-year return period

	Closure: PMP or 10,000-year return period
Freeboard	4 meters
Total Dam Height	22 meters
Crest Elevation	162 m
Crest Width	7 m with gravel access road
TSF Storage Capacity	17,500,000 m^3 @ El 158m
Upstream Slope	1H:1V with Riprap Protection
Downstream Slope	1.5H:1V with berms every 10 meters, drainage and revegetation
Closure Concept	Cover with wasterock and soils, revegetate and install drainage channels leading to closure spillway

18.2.2 WASTEROCK STORAGE FACILITY

Two wasterock storage facilities (WRF) are planned in this study and located to minimize transport distances and haul costs. A dedicated fleet will haul wasterock and a dozer will spread and compact. Assumed design criteria are presented in Table 42.

Table 42 - WRF Design Criteria

Item	Criteria
Wasterock Disposal Method	Dedicated excavator, haul trucks and dozer – owners fleet
Wasterock Density	2.0 t/m^3 in situ
Internal Drainage System	Granular underdrains in main thalwegs, as necessary
Surface Drainage	Open channels with riprap drop structures
Maximum Height	70 m
Placement Method	End dumped in 5 meter lifts and compacted by dozer passes
Lift Heights	10 m
Berm Widths	4 meters
Lift Face Angle	1.5H:1V

North WRF Volume Capacity	9,500,000 m^3
South WRF Volume Capacity	8,500,000 m^3
Closure Concept	Progressive reclamation with placement of soils cap, revegetation and internal drainage structures leading to peripheral drainage channels

18.2.3 SOLIDS WASTE AND WASTEWATER

Solids waste service will be contracted and hauled to the town dump for disposal. Wastewater can either be collected on site in tanks or trucked to nearby wastewater treatment plant or a direct connection to Itabela's wastewater plant will be investigated.

18.3 PLANT DESIGN

As previously noted, the plant design is based on simple, proven technology that can mostly be fabricated in country, can be brought on-line quickly, and has been shown to be successful in other Brazilian operating mines. Principle structures include:

1.) A large, metallic covered patio will be constructed to maintain stockpiles of blended ore for feeding the plant;

2.) Covered, metallic plant facility to house mills and screening facilities, flotation cells, filters, dryers, and packaging equipment as well as appurtenant mechanical, electrical and control systems;

3.) Concrete block construction buildings that will house maintenance and repair shops; laboratory; administrative offices; warehouse; kitchen and cafeteria as well as showers and changing rooms;

4.) Tailings Storage Facility (TSF) and appurtenant mechanical, electrical and control systems; and

5.) Fueling station.

18.3.1 MAJOR EQUIPMENT AND CONSUMABLES

A list of main equipment and estimated energy consumption is summarized in Table 43. Principle consumables will include energy, water, reagents, grinding rods and balls, dryer gas.

Table 43 - Major Plant Equipment List and Monthly Energy Consumption

Model No.	Electric Consumption (kVA)	No. Units	Total Consumption (kVA)
Feed Bin/Hopper	6.0	1	6.0
Conveyors/Feeders	12.0	1	12.0
Scrubbers	48.7	2	97.4
Wet Screens	11.5	3	34.5
Dry Screens	16.7	2	33.4
Misc. Pumps	16.7	20	334.0
Conditioners	16.7	4	66.8
Mills	58.2	4	232.8
Flotation Cells	25.8	8	206.4
Filter Press	30.5	3	91.5
Dryers	22.1	3	66.3
Screw Conveyers	6.0	6	36.0
Elevators	6.0	6	36.0
Packaging Units	6.0	6	36.0
Water Pump	141.3	2	282.6
Compressors	72.2	2	144.4
Total:			1716.1

19.0 MARKET STUDIES AND CONTRACTS

19.1 MARKET OUTLOOK

19.1.1 GRAPHITE PRODUCTION

Global graphite production has risen tenfold from about 90,000 tpa in the early 1900s to an estimated 1.2 Mt in 2014, at a compound annual growth rate (CAGR) of 2.3%. While production remained relatively flat until the mid-20th century, production increased markedly from about 1950 to achieve an annual CAGR of 3.1%.

According to USGS data, China is the world's leading producer of natural flake and amorphous graphite, supplying approximately 67% of the market. India, Brazil, Canada and North Korea collectively contribute an additional 30% of global production, although Indian production is believed to be significantly less than claimed. Natural graphite production is estimated to comprise flake (72%), amorphous (28%) and vein graphite (<1%) by tonnage.

19.1.2 GRAPHITE MARKET

World natural graphite demand is directly linked to industrial applications, including refractories, steel making, automotive parts, batteries and lubricants (see figure 35 below).

The largest natural graphite market is in refractories which account for approximately 35% of total graphite consumption. Metallurgy is the second largest market for natural graphite and is estimated to account for approximately 23% of total graphite output.

Batteries are estimated to be the third largest graphite market, consuming around 12% of worldwide graphite production. This is potentially the fastest growing market requiring more specialist grades of graphite to manufacture spherical graphite. Production is currently dominated by China which produced about 30,000 tonnes of uncoated product in 2014.

The fourth largest market for both flake and amorphous graphite is in components, which includes motor vehicle brake pads, carbon brushes for electric motors and pencils and is estimated to account for about 10% of total consumption. Solid lubricants based mainly on amorphous graphite consume a further 10% of production.

Other markets such as expandable graphite account for approximately 10% of consumption. Expandable graphite markets are anticipated to grow, in applications such as fire retardation to replace halogenated retardants, insulation and heat transmission applications. These markets are likely to require large flake products.

Most forecasters are predicting growth in battery anodes. Forecast market growth assumes that there are three to four Tesla-style 'gigafactories' operational by 2020, moderate growth in traditional markets such as refractories and growth in expanded graphite (from a low base). Based on these assumptions, the flake graphite market is estimated to grow from approximately 0.8 Mt in 2014 to approximately 1.12 Mt by 2020 (additional 0.32 Mtpa compared with 2014).

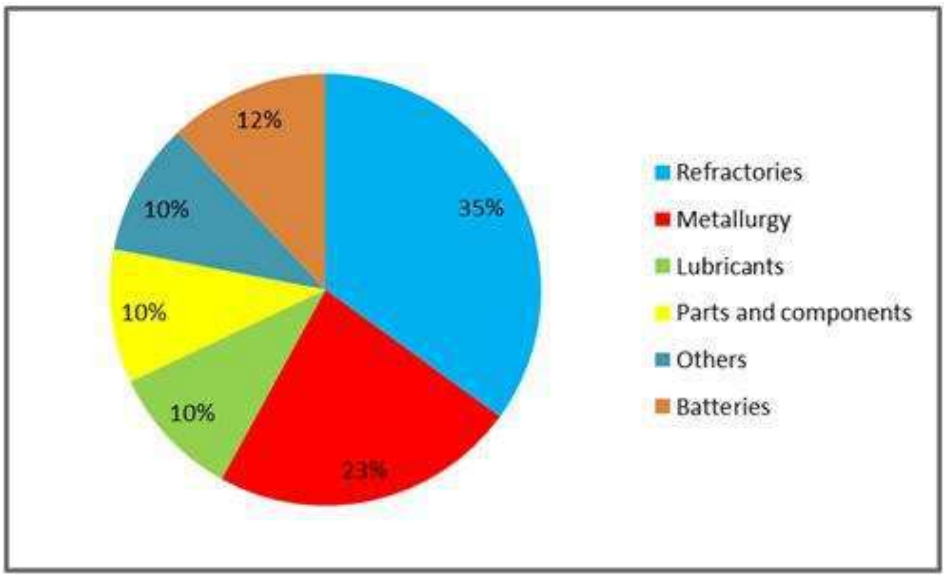


Figure 35 - Natural Graphite Market

19.1.3 GRAPHITE QUALITY AND SPECIFICATIONS

Key quality aspects are generally considered to be flake size distribution and carbon content (purity) of a concentrate product. As a general rule, flake concentrate products should have a minimum graphitic carbon content of 90% total graphitic

carbon (“TGC”), also referred to as Carbon content (“C”) although 94% TGC is often quoted as a minimum for entry into markets such as batteries.

There are no set industry specifications for graphite, although in countries such as China the government has established national standards. As with other industrial minerals, independent graphite producers typically establish their own specifications, in conjunction with customers.

Refractories are the main flake graphite consuming market, for which flake size distribution and purity vary according to application. For example, magnesia carbon bricks may use 90-95% C graphite, with a broad flake distribution -100 to +50 mesh.

Chinese producers use minus 100 mesh (94% C) small flake for making spherical graphite (for battery anode applications), although many listed graphite explorers have had the perception that large flake (+80 mesh) probably works better due to higher purity and lower process losses.

The key to a successful graphite project (as with other industrial minerals) is to be able to produce a balanced range of products to supply a range of markets, ensuring that all production (the basket of products) can hopefully be sold and spreading risk across market cycles.

19.1.4 OPPORTUNITIES IN NATURAL GRAPHITE MARKETS

Battery anode markets are the biggest known existing opportunity for natural graphite. Graphene applications are expected to grow. While the graphene market is in its infancy and is unlikely to become a volume consumer of natural graphite, the value-added potential of the industry is considerable.

Expandable graphite markets are anticipated to grow, for applications such as fire retardants to replace halogenated retardants, insulation and heat transmission applications. These markets are likely to require large flake products.

19.1.5 RISKS TO NATURAL GRAPHITE MARKETS

Risks include overproduction of flake graphite in China, a slowing steel industry, slower uptake of electric vehicles than predicted (hence lower battery

production) and battery technology shifts. Battery technologies are continually evolving, driven by the need to find more efficient (energy dense), reliable and quicker charging batteries – especially for automotive use. Li-ion storage batteries that rely on spherical graphite anodes may be replaced. New technologies, such as aluminium and titanium yolk-shell nanoparticles are one example of many. A shift in battery technology that replaces natural graphite is seen as a high risk to emerging producers.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

These themes were not developed in this report.

21.0 CAPITAL AND OPERATING COSTS

21.1 CAPITAL COSTS ESTIMATE

Capital costs (CAPEX) are presented in US Dollars and are based on an exchange rate of R$3.30. Working capital includes 3 months of operational expenses. Engineering, Procurement and Construction Management includes the basic and detailed engineering along with procurement services and Owners construction support services. Mine closure and reclamation consists of rehabilitation of disturbed areas as well as general site remediation and post closure reclamation and monitoring activities. Progressive reclamation is planned for the facility and was staged to occur every 3 years in the model. CAPEX and sustaining capital are summarized in Table 44. The total capital costs considered in the model including CAPEX and sustaining capital is $27,759,998.

Table 44 - CAPEX & Sustaining Capital

Capital Expenditures	**CAPEX (US$ 000)**	
Access Roads	$	363,636
Power Supply	$	378,788
TSF Construction	$	1,060,606
TSF Pumping System	$	93,333
Owners Fleet & Equipment	$	2,397,394
Infrastructure/Civil	$	4,607,576
Plant Construction & Equipment	$	6,973,761
Warehouse/Initial Inventory/Commissioning	$	242,424
Total Initial CAPEX (excl. WC)	**$**	**16,117,519**
Pre-Stripping	$	112,888
EPCM	$	1,060,606
Working Capital	$	1,494,005

Contingencies (10%)	$	1,729,101

Total Start Up Costs	**$**	**20,514,119**
Sustaining Capital	**(US$ 000)**	
Mine Closure	$	3,030,303
Tailings Dam Raises	$	1,818,182
Fleet Replacement	$	2,397,394
Total Sustaining	**$**	**7,245,879**

21.2 OPERATIONAL COSTS ESTIMATE

LOM operational costs (OPEX) are also presented in US Dollars and are based on an exchange rate of R$3.30. OPEX is based on cost models, price indexes and general knowledge with recent similar projects. Average OPEX over LOM is US$413 /t of processed ore. OPEX is summarized in Table 45.

Table 45 - OPEX

Item	OPEX
Mining Mineralized Rock ($/t mined)	$1.05
Mining Waste ($/t Mined)	$1.05
Processing ($/t of processed ore)	$5.39
G&A ($/t of processed ore)	$2.29

Opex costs were created using a bottom up approach. Mining costs derive from owners fleet maintenance, diesel and consumables, staffing and corresponding wages and tonnes moved. Processing costs are based on pilot plant reagent consumption, grinding media and process design. G&A has also gone through a full staffing and wage calculation thus providing a full construction of operating costs better reflecting project reality.

21.3 FLEET

The mining operations will be completed with an owners fleet. Excavation will be performed primarily with excavators and a dozer can be used to rip material if more compact material is periodically encountered. The mining fleet will be separated into dedicated equipment for ore and waste rock. Haul trucks will be loaded in the pit with the excavators. The list of equipment is presented in Table 46.

Table 46 - Owners Fleet

Model No.	Description	No. Units
Cat 336 D2L		2
Cat D6K Bulldozer	Tractor, crawler, 125 hp	1
Cat 930G Wheel Loader	2.7 m³ Bucket, 180 hp	2
Fuel & Lube Truck	Complete Unit	1
Water Truck	25,000 liter tank	1
CAT 120K Motor Grader		1
Forklift		1
Crane Truck		1
Scania Haul Truck	480G, 6x4, rear-dump	5
Mechanics Truck	Complete unit	1
Toyota Hilux 4x4		3
Volkswagen Gol		1

21.4 MANPOWER

The mine operations will be 1 8-hour shift daily during week and half day on Saturdays, while the plant will be continuous with 24-hour operations per day in 3 shifts.

The total project manpower is estimated at 130 people and is summarized in Table 47.

Table 47 - Manpower

Office	
Job Function	**Nº Employees**
General Manager	1
Project Supervisor	1
Sales Manager	1
HR/Safety Coordinator	1
Financial Coordinator	1
Environmental/Community Relations Manager	1
Logistics Coordinator	1
Security	5
Cooks/Cleaning	8
Product Procurement Manager	1
Commercial/Sales Analyst	4
Commercial/Sales Assistant	4
General Helper	3
Bilingual Secretary/Receptionist	1
Total	33

Plant	
Job Function	**Nº Employees**
Health and Safety Technician	1
Logistics Analyst Jr	1
Mill Operator	8
Flotation Operator	8
Screening Operator	4
Packing Operator	12
Process Technician	1
Laboratory Coordinator	1
Laboratory Analyst	4
Maintenance Supervisor	4
Maintenance Technician	8
Electrician	4
Maintenance Planner	4
Warehouse Keeper	4
Warehouse Helper	4
General Helper	2
Total	70

Mine	
Job Function	**Nª Employees**
Mining Engineer	1
Mining Technician	1
Equipment Operator	15
Geology Technician	2
Surveyor	1
Surveyor - Assistant	1
General Helper	2
Geologist	1
Mechanic	3
Total	27

22.0 ECONOMIC ANALYSIS

The financial analysis is based on indicated and inferred resources and is preliminary in nature. The current project incorporates a mine life of 19 years based on a total indicated resource of 14,990,400 t @ 2.70% Cg and a total inferred resource of 3,572,100 t @ 2.90% Cg, which has resulted in an optimized sequenced open pit of 12,000,000 t of ore containing approximately 292,000 t of premium graphite. Average annual throughout is 650,000 t. Product prices are based on recent price data as summarized in Table 48.

Table 48 - Product Prices

Product Description	Average Market Price (USD/t)	Percentage Of Resource
+30 Mesh	$2,500	4
-30/+50 Mesh	$2,000	32
-50/+80 Mesh	$1,100	27
-80/+100 Mesh	$950	17
-100 Mesh	$775	20

CAPEX, sustaining capital and OPEX are as detailed in previous sections.

In Brazil, the base corporate income tax rate is set at 25% of profits (the “Base Rate”). Additionally, there is a tax known as the “Contribuição Social sobre Lucro Líquido” (“CSLL”) that is calculated at the rate of 9% of profits. Together, these taxes amount to an effective tax rate of 34%. However, owing to regional governmental economic development policies for the area where the project is located (SUDENE), a project considered to be of priority interest is entitled to a reduction of 75% in the effective income tax rate. The Santa Cruz Graphite Project qualifies for this reduction and therefore the corporate income tax rate is eligible to be reduced by 75% to 6.25% for a period of 10 years. Therefore, the effective tax rate on project profits will

be 15.25% for the first ten years of operations and 34 % for remainder of the project life cycle. There is also the possibility of renewing this tax incentive after 10 years, although it has not been incorporated into the current scenario.

For tax calculation purposes, the economic model uses a straight-line depreciation method based on the mine life. Under Brazilian tax rules accelerated depreciation rates can be used, but these alternatives have not been studied or incorporated into the DCF, but may provide enhanced economic benefits to the Project.

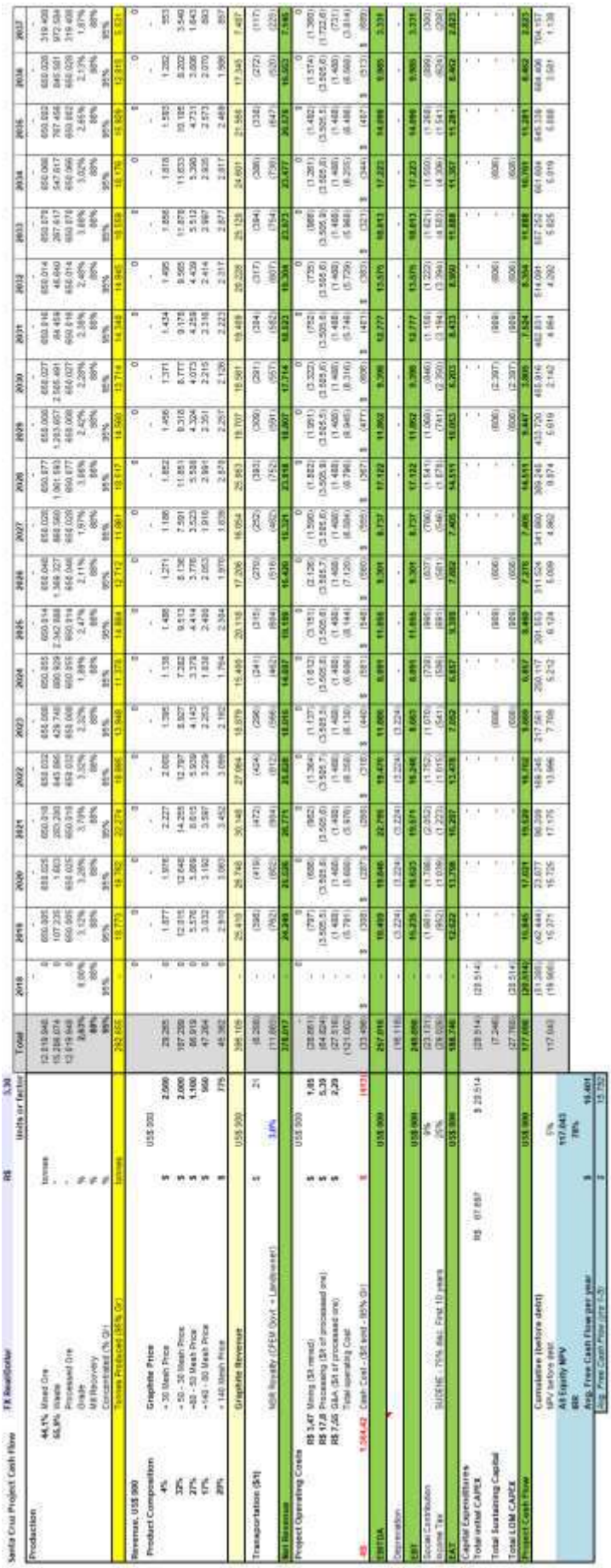
The Project post-tax IRR is 78% with a NPV (5%) of $ 117,043,000. Payback period is approximately 2 years. A summary discounted cash flow is presented in Table 49 and model detail is presented in Appendix 6.

The design criteria for the current scenario are:

1.) Approximately 19 year mine life;
2.) Nominal ore throughput of approximately 1850 tpd (650,000tpa);
3.) Monthly graphite production of 1,300 t/month;
4.) An average ROM graphite grade of approximately 2.63%;
5.) Recovery of 88% C;
6.) Final minimum concentrate values of 95% C;
7.) 6 % ore moisture;
8.) 2.7 ore specific gravity;
9.) 350 operating days per year;
10.) 8 hrs of mine operations per day in 1 shift + half day Saturday;
11.) 24 hrs of plant operations per day in 3 shifts; and
12.) 89% plant availability.

General facilities arrangement and conceptual design drawings are presented in Appendix 1.

Table 49 - DCF Model Summary



Note: This PEA is considered by BGSA to meet the requirements of a Preliminary Economic Assessment as defined by Canadian Securities Administrators' National Instrument 43-101 ("NI 43-101") Standards of Disclosure for Mineral Projects. The economic analysis contained in the technical report is based, in part, on Inferred Resources (as defined in NI 43-101) and is preliminary in nature. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. There is no guarantee that all or any part of the Mineral Resource will be converted into a Mineral Reserve. Inferred Resources are considered too geologically speculative to have mining and economic considerations applied to them and to be categorized as Mineral Reserves (as defined in NI 43-101). Additional trenching and/or drilling will be required to convert Inferred Mineral Resources to Measured or Indicated Mineral Resources. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. There is no certainty that the reserve's development, production and economic forecasts on which the PEA is based will be realized.

22.1 SENSITIVITY ANALYSIS

The parameters in the sensitivity analysis were chosen based on their potential impact on the economic evaluation. Key economics were examined by running cash flow sensitivities against:

- Capital Cost (CAPEX);
- Operating cost (OPEX);
- Graphite Prices;
- USD/BRL FX Rate.

Sensitivity calculations were performed on the project's after-tax NPV (5%), IRR and Free Cash Flow per Year by applying a range of variation to the parameter values (from -30% to +30%). Effects on NPV, IRR and Free Cash Flow are shown graphically in Figures 36, 37 and 38.

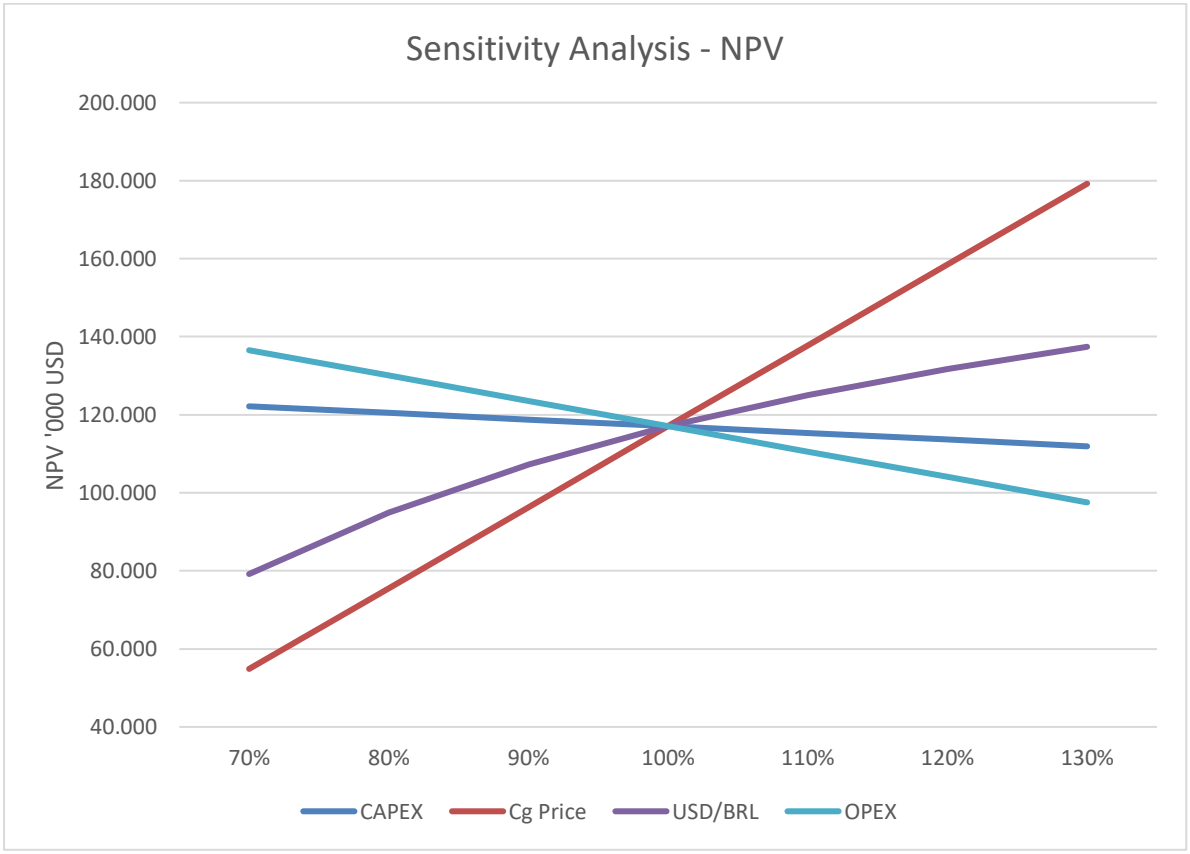


Figure 36 - Sensitivity analysis of CAPEX, OPEX, Cg Price and FX Rate, after-tax NPV at 5%

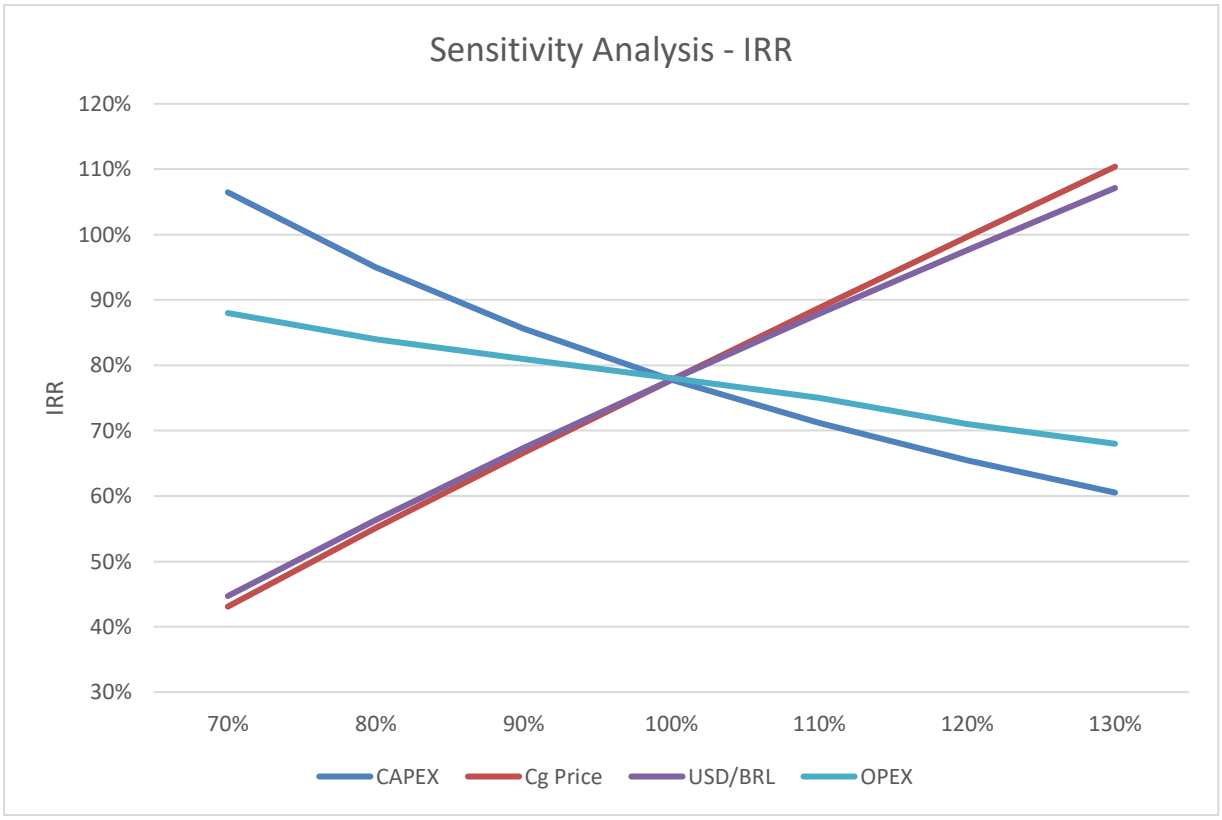


Figure 37 - Sensitivity analysis of CAPEX, OPEX, Cg Price and FX Rate, after-tax IRR

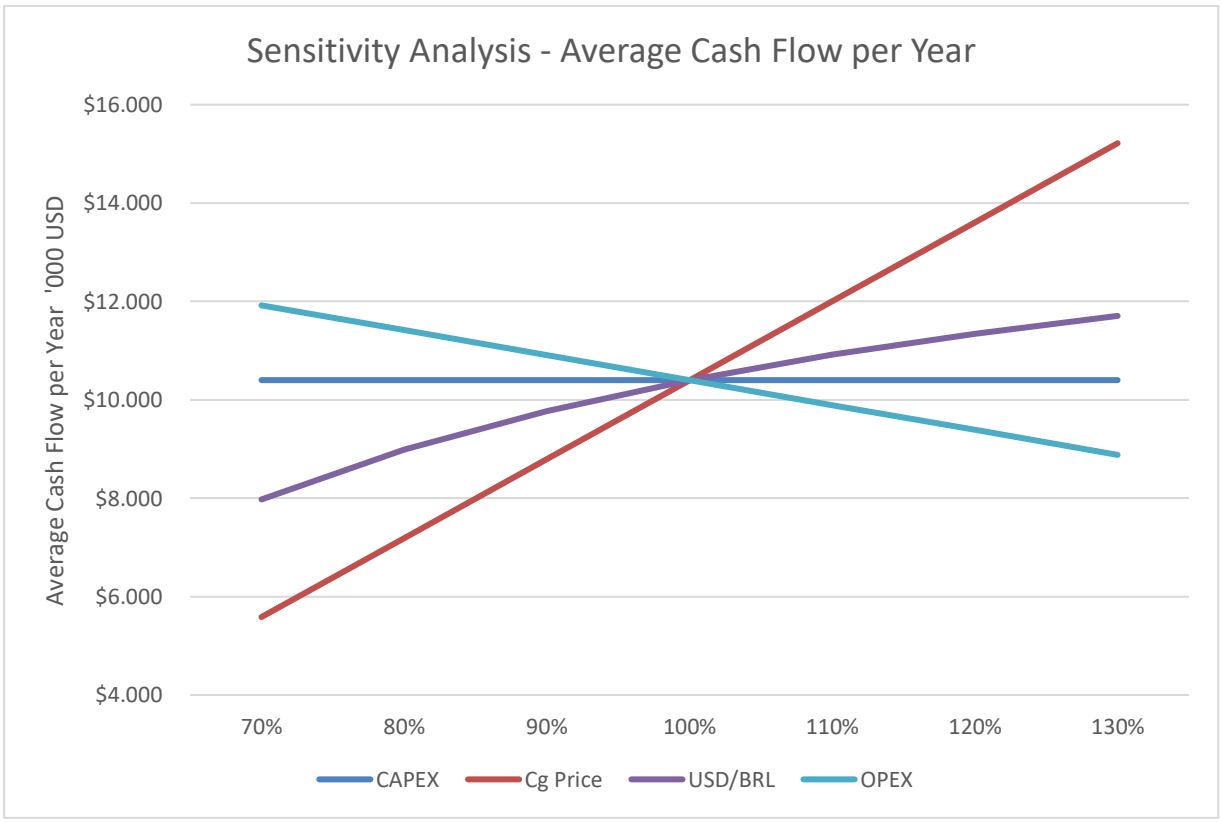


Figure 38 - Sensitivity analysis of CAPEX, OPEX, Cg Price and FX Rate, free cash flow per year

23.0 ADJACENT PROPERTIES

The project area is generally rural, agricultural land used mostly for cattle grazing, small crops with some lumber interests. The main ore bodies of São Manuel and São Rubens are open to the east, south and northwest, which are currently being evaluated for further drilling and resource upgrade. Other large companies and operators like “Nacional de Grafite” and “Magnesita Refratários” also have mineral rights in the area where Brasil Grafite has a dominant key strategic position. A summary map is presented in Figure 39.

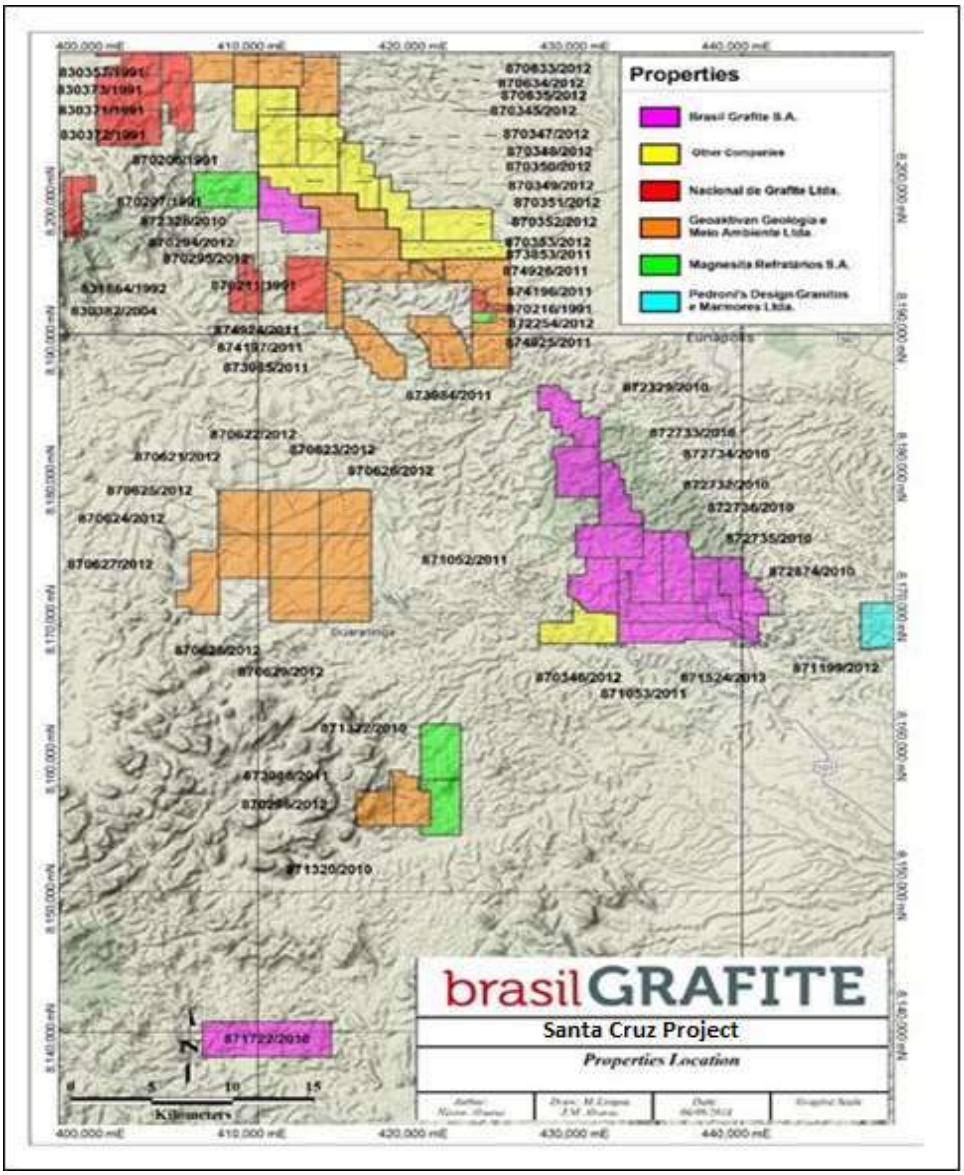


Figure 39 - Adjacent Areas

24.0 OTHER RELEVANT DATA AND INFORMATION

There is no other data or information considered by the authors to be relevant for the purposes of this report.

25.0 INTERPRETATION & CONCLUSIONS

This PEA is based on the technical information, financial analysis and project assumptions presented in the previous sections. The Santa Cruz Graphite Project shows robust results, that contain substantial results that support further more advanced mining studies. In addition, further upside potential exists to increase resources and grade, with mineralized material that has excellent characteristics that can demand superior prices within the market place. Important deposit characteristics are highlighted below:

- Located in one of the highest quality, prospective graphite regions in the world;
- Shallow, friable material that can be mined without explosives or crushing;
- Excellent recoveries and concentration properties using proven technology;
- Large percentage of high quality, large flake graphite in deposit;
- Favorable logistics and infrastructure;
- Potential commercial production within 24-36 months;
- Large, quality geologic targets identified to expand resource and improve overall average grade.

Graphite is a growing global market place with increased demand for high quality product being developed at a rapid pace. The project has a combination of unique competitive advantages that make it a highly attractive asset, capable of producing premium quality graphite concentrate with a cost profile within the 1st quartile (comparable to Chinese production) and excellent unleveraged post tax IRR of 78% per annum. Financial highlights include:

- Altered friable indicated resource of 14,990,400 tonnes at 2.70% Cg and inferred resource of 3,572,100 tonnes at 2.90% Cg, both using an 1% Cg cut-off;
- Production of 18,900 tpa for years 1-5 and 15,800 tpa over the 19 years mine life;

- After tax free cash of US$15,800,000 per year on 1-5 and LOM avg. of US$10,400,000;
- Approximately 88 percent recovery with 93-95% minimum concentration values;
- Low initial capex at US$20.5 million and first quartile of operation cost US$316/t for years 1-5 and US$413/t LOM; and
- NPV(5%) of US$117 million, post-tax IRR of 78%, 2 years payback period.

The study is preliminary in nature and project estimates are subject to change and revision as more information becomes available. Principal project risks include variations in average project graphite grade, average project flake size distribution, environmental and mine licensing, CAPEX and OPEX costs, exchange rate fluctuations and price of graphite products.

26.0 RECOMMENDATIONS

In order to advance the project to the next level of study, a recommended work program is presented in the following sections. Total cost of work program entails a budget of C$1,500,000 to C$3,000,000 pending total meters of drilling and scope of licensing study and engineering details.

26.1 GEOLOGY AND MINERAL RESOURCE ESTIMATE

- Additional 2,000 – 4,000 meters of drilling in main resource areas in order to increase measured and indicated resources as well as expand current known resource;
- Additional 1,000 to 3,000 meters of drilling in satellite targets;
- Further rotary drilling for exploration potential;
- Investigate further use of geophysics;
- Geologic mapping and preliminary investigations of satellite targets within the proposed mine footprint;
- Develop and carry out condemnation drilling once preliminary layouts are finalized; and
- Revise resource estimate to incorporate additional information.
- Total budget drilling & resource/reserve estimate update of C$750,000 to C$1,750,000 pending meters drilled (3,000 – 7,000m)

26.2 MINE DESIGN AND SEQUENCING

- Collect and perform basic geotechnical characterization of the pit ore, host rock and waste materials;
- Install piezometers and begin to collect periodic data on variations in groundwater levels over seasons;

- Complete detailed mine plan and sequencing incorporating updated future drilling and reserves;
- Complete preliminary investigations into pit dewatering characteristics and diversion plans;
- Make preliminary contact with contract miners to determine if contract mining services is a cost-effective alternative; and
- Develop more detailed mining cost estimate based on proposed mine plan and sequencing.
- Total budget forecast budget for mine design and sequencing of C$200,000 to C$400,000.

26.3 MINERAL PROCESSING AND METALLURGY

- Collect and perform further density analysis with representative samples from throughout the entire ore body and waste;
- Develop tailings samples so that the material can be tested for geotechnical and geochemical characterization; and
- Finalize the process circuit and develop more detailed electrical, mechanical and civil engineering design projects and cost estimates.
- Total budget forecast for mineral processing & metallurgy of C$100,000 – C$150,000.

26.4 CIVIL AND INFRASTRUCTURE

- Start preliminary conversations with companies, as well as government and regulatory agencies so that requirements and conceptual agreements for power, access, water, fuel, wastewater, and gas can be better defined and incorporated into schedule and budget;
- Develop more detailed civil engineering and infrastructure testing and field investigations programs, design projects and cost estimates.

- Total forecast budget for next round of civil & infrastructure work of C$150,000 to C$300,000.

26.5 MARKETS

- Develop preliminary samples of products from large scale tests and begin conversations with buyers and traders so that the quality of the product and deposit can be shown as well as hear critical feedback;
- Investigate potential joint venture and R&D partners for investigating advanced graphite uses; and
- Perform more detailed price and supply/demand analysis in Brazilian market place.
- Total cost of an updated market study of C$50,000.

26.6 ENVIRONMENTAL AND PERMITTING

- Complete and submit application for a trial mining license;
- Develop preliminary environmental monitoring program and complete EIA-RIMA study so that the LP license can be applied for;
- Begin preliminary consultations with local, state and federal officials so that the project can be introduced.
- Trade off analysis for strategic landowners acquisitions.
- Total licensing costs of C$250,000 to C$350,000 pending final terms of reference with state environmental agency.

27.0 REFERENCES

Alkmain, F.F., Pedrosa-Soares, A.C., Noce, C.M., Pereira Cruz, S.A. (2007), “Sobre Evolução Tectônica do Orógeno Araçuaí - Congo Ocidental”, Genomos 15 (1). UFMG – Belo Horizonte, MG.

Caterpillar Performance Handbook (April, 2006), Peoria, IL.
DNPM Regional Geologic Maps (1:50,000 scale).

Industrial Minerals (2012), Natural Graphite Report 2012, London, UK. (http://www.indmin.com/downloads/Reports/Graphite2012.pdf).

Industrial Minerals (May, 2013), “Flake Prices Settle Higher than Expected,” London, UK. (http://www.indmin.com/Graphite/Article/3206277/Graphite-Analysis/Flake-prices-settle-higher-than-expected.html)

Infomine, Mining Equipment Costs Database, 2012.

Noce, C.M.; Pedrosa-Soares, A.C.; Piuzana, D.; Armstrong, R.; Laux, J H; Campos, C.M.; Medeiros, S. R., (2004). “Ages of sedimentation of the kinzigitic complex and of a late orogenic thermal episode in the Araçuaí orogen, Northern Espírito Santo State, Brazil: Zircon and monazite U-Pb SHRIMP and IDTIMS data”. Revista Brasileira de Geociências, 34:587-592.

Pedrosa-Soares, A. C., Wiedmann-Leonardos, C. M. 2000. “Evolution of the Araçuaí Belt and its connections to the Ribeira Belt”, Cordani, U. G., Thomaz Filho, A., Campos Neto, D. A. (eds.). Tectonic Evolution of South America, Rio de Janeiro, 31 IGC, 265-268.

Peres, G.G., Alkmain, F.F., Jordt, H., (2004). “The Southern Araçuaí Belt and The Don Silverio Group: Geologic Architecture and Tectonic Significance”, Anais da Academia Brasileira de Ciências (2004) 76(4): 771-790.

Teixeira, L.R. (2002). “Projeto Extremo Sul da Bahia - Relatorio Temático de Litogeoquímica”. Companhia Baiana de Pesquisa Mineral, Salvador, BA.

28.0 DATE AND SIGNATURE PAGE

Effective Date: 21st of August, 2017.
Signature Date: February 8th, 2018.

_____

Aldo Moreno, P. Geologist (CCRRCH)

Geologist

Geology and Resource Modeling

_____

Giorgio de Tomi, PhD, C.Eng, MIMMM

Mining Engineer

Mine Planning and Economics

_____

Luiz Eduardo Pignatari, Qualified Person, (Comisión Minera Chile)

Mining Engineer

Overall Report Consolidation and Compilation

APPENDIX 1: DRAWINGS

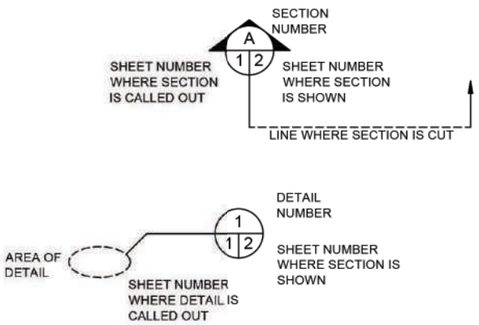
DRAWING No.	TITLE
BGR-SCG-PEA -DE-001-R0	PEA Title Page
BGR-SCG-PEA -DE-002-R0	Site Plan View & General Facilities Arrangement
BGR-SCG-PEA -DE-003-R0	Project Geologic Plan View
BGR-SCG-PEA -DE-004-R0	Process Flow Sheet
BGR-SCG-PEA -DE-005-R0	Plant – Plan View & Typical Sections
BGR-SCG-PEA -DE-006-R0	TSF – Plan View & Typical Sections
BGR-SCG-PEA -DE-007-R0	Open Pit Extents & Typical Section
BGR-SCG-PEA -DE-008-R0	WRF – Plan View & Typical Sections

SANTA CRUZ GRAPHITE PROJECT
PEA DESIGN DRAWINGS
ITABELA, BA - BRAZIL

MAP OF BRAZIL
NOT TO SCALE

BAHIA
NOT TO SCALE

LIST OF DRAWINGS:



REFERENCE	Rev.	Description	BY	Date
	0	DESIGN IN PROGRESS	RLP	09/13

REVISIONS

Scale: As Shown
Designed by: RLP/PC
Drawn by: BR
Checked by: RLP
Approved by: FHA

Issued for:
PRELIMINARY ECONOMIC ASSESSMENT STUDY

Issued by:
brasilGRAFITE

Title:
TITLE PAGE WITH DRAWINGS LIST

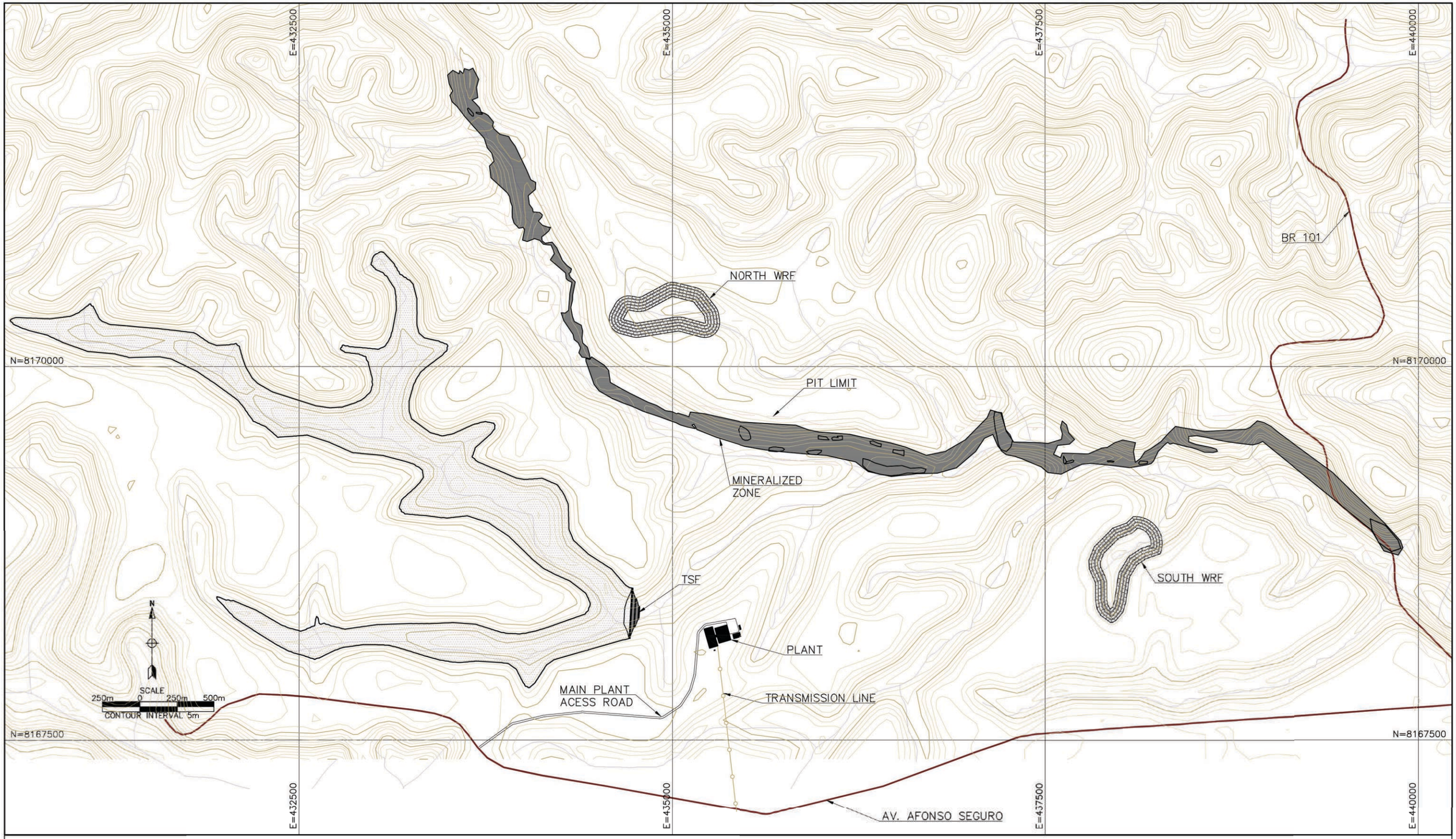
0
REVISION

Project: Santa Cruz Graphite Project
Project No.: BGC-PEA-DE-001-R0
01

Location: BAHIA BRAZIL
Date: 09/13
SHEET 1 OF 8

PADRÃO DE PLOTAGEM
INSTRUCTIONS TO PLOT

COR/COLOR	ESP. THICKN.
COR/COLOR 8	0,05
VERMELHO/RED	0,1
AMARELO/YELLOW	0,2
VERDE/GREEN	0,3
CIANO/CYAN	0,4
AZUL/BLUE	0,5
MAGENTA	0,6
BRANCA/WHITE	0,7



PADRÃO DE PLOTAGEM	
INSTRUCTIONS TO PLOT	
COR/COLOR	ESP. THICKN
COR/COLOR 8	0,05
VERMELHO/RED	0,1
AMARELO/YELLOW	0,2
VERDE/GREEN	0,3
CIANO/CYAN	0,4
AZUL/BLUE	0,5
MAGENTA	0,6
BRANCA/WHITE	0,7

Rev.	Description	BY	Date
0	DESIGN IN PROGRESS	RLP	09/13

REFERENCE

REVISIONS

Scale: As Shown
Designed by: RLP/PC
Drawn by: BR
Checked by: RLP
Approved by: FHA

Issued for:
PRELIMINARY ECONOMIC ASSESSMENT STUDY

Issued by:
brasilGRAFITE

Title:
GENERAL FACILITIES ARRANGEMENT

0
REVISION

Project: Santa Cruz Graphite Project

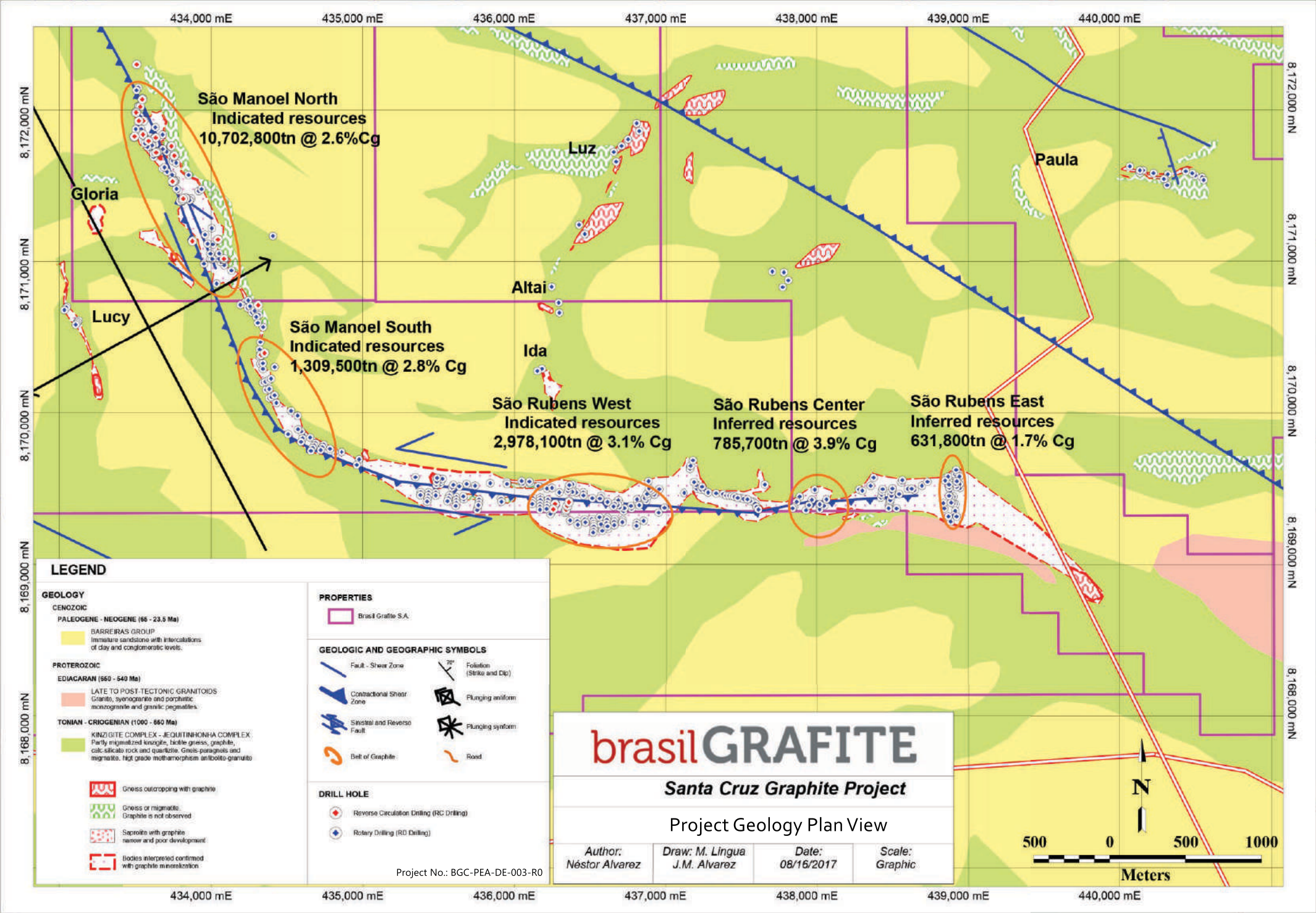
Project No.: BGC-PEA-DE-002-R0

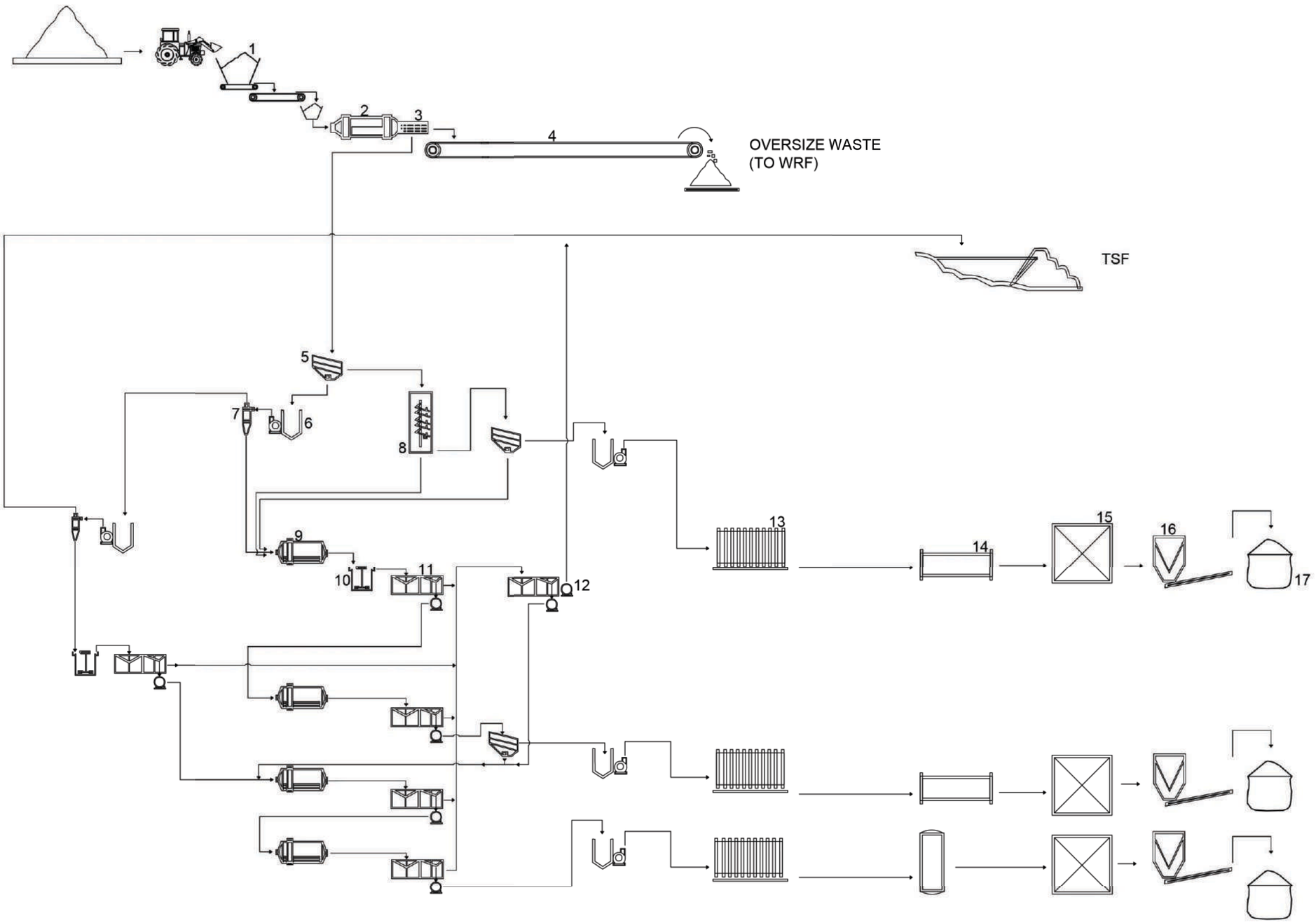
01

Location: BAHIA BRAZIL

Date: 09/13

SHEET 2 OF 8


434,000 mE
435,000 mE
436,000 mE
437,000 mE
438,000 mE
439,000 mE
440,000 mE
8,172,000 mN
8,171,000 mN
8,170,000 mN
8,169,000 mN
8,168,000 mN
São Manoel North
Indicated resources
10,702,800tn @ 2.6%Cg
Gloria
Luz
Paula
Altai
Lucy
São Manoel South
Indicated resources
1,309,500tn @ 2.8% Cg
Ida
São Rubens West
Indicated resources
2,978,100tn @ 3.1% Cg
São Rubens Center
Inferred resources
785,700tn @ 3.9% Cg
São Rubens East
Inferred resources
631,800tn @ 1.7% Cg
LEGEND
GEOLOGY
CENOZOIC
PALEOGENE - NEOGENE (66 - 23.5 Ma)
BARREIRAS GROUP
Immature sandstone with intercalations of clay and conglomeratic levels.
PROTEROZOIC
EDIACARAN (650 - 540 Ma)
LATE TO POST-TECTONIC GRANITOIDS
Granite, syenogranite and porphiritic monzogranite and granitic pegmatites.
TONIAN - CRIOGENIAN (1000 - 650 Ma)
KINZIGITE COMPLEX - JEQUITINHONHA COMPLEX
Partly migmatized kinzigite, biotite gneiss, graphite, calc-silicate rock and quartzite. Gneis-paragneis and migmatite. higt grade methamorphism anfibolito-granulito
Gneiss outcropping with graphite
Gneiss or migmatite. Graphite is not observed
Saprolite with graphite narrow and poor development
Bodies interpreted confirmed with graphite mineralization
PROPERTIES
Brasil Grafite S.A.
GEOLOGIC AND GEOGRAPHIC SYMBOLS
Fault - Shear Zone
Foliation (Strike and Dip)
Contractional Shear Zone
Plunging antiform
Sinistral and Reverse Fault
Plunging synform
Belt of Graphite
Road
DRILL HOLE
Reverse Circulation Drilling (RC Drilling)
Rotary Drilling (RD Drilling)
Project No.: BGC-PEA-DE-003-R0
brasilGRAFITE
Santa Cruz Graphite Project
Project Geology Plan View
Author: Néstor Alvarez
Draw: M. Lingua J.M. Alvarez
Date: 08/16/2017
Scale: Graphic
N
500 0 500 1000
Meters



01.) FEED BIN
02.) SCRUBBER
03.) TROMMEL
04.) CONVEYOR
05.) WET SREEN
06.) RADIAL PUMP
07.) HYDROCYCLONE
08.) SPIRAL SEPERATOR
09.) POLISHING MILL
10.) CONDITIONER
11.) FLOTATION CELL
12.) SLURRY PUMP
13.) FILTER PRESS
14.) DRYER
15.) DRY SCREEN
16.) PRODUCT SILO
17.) PACKAGING

Rev.	Description	BY	Date
0	DESIGN IN PROGRESS	RLP	09/13

REFERENCE | REVISIONS

Scale: As Shown
Designed by: RLP/PC
Drawn by: BR
Checked by: RLP
Approved by: FHA

Issued for: PRELIMINARY ECONOMIC ASSESSMENT STUDY

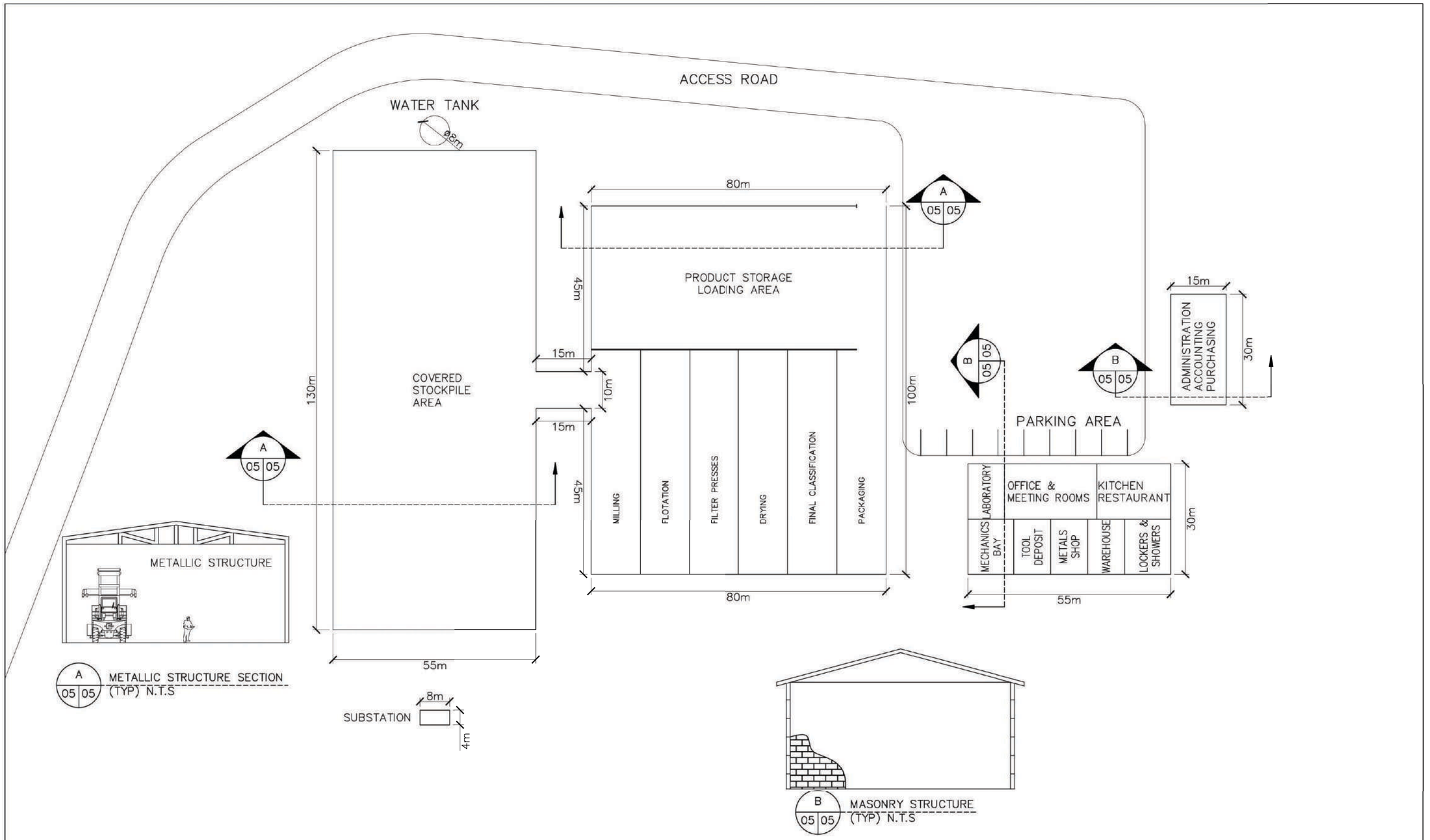
Issued by: brasilGRAFITE

Title: PROCESS FLOW SHEET

0 REVISION

Project: Santa Cruz Graphite Project
Project No.: BGC-PEA-DE-004-R0
01
Location: BAHIA BRAZIL
Date: 09/13
SHEET 4 OF 8

PADRÃO DE PLOTAGEM	
INSTRUCTIONS TO PLOT	
COR/COLOR	ESP. THICKN
COR/COLOR 8	0,05
VERMELHO/RED	0,1
AMARELO/YELLOW	0,2
VERDE/GREEN	0,3
CIANO/CYAN	0,4
AZUL/BLUE	0,5
MAGENTA	0,6
BRANCA/WHITE	0,7



PADRÃO DE PLOTAGEM	
INSTRUCTIONS TO PLOT	
COR/COLOR	ESP. THICKN
COR/COLOR 8	0,05
VERMELHO/RED	0,1
AMARELO/YELLOW	0,2
VERDE/GREEN	0,3
CIANO/CYAN	0,4
AZUL/BLUE	0,5
MAGENTA	0,6
BRANCA/WHITE	0,7

Rev.	Description	BY	Date
0	DESIGN IN PROGRESS	RLP	09/13

REFERENCE | REVISIONS

Scale: As Shown
Designed by: RLP/PC
Drawn by: BR
Checked by: RLP
Approved by: FHA

Issued for:
PRELIMINARY ECONOMIC ASSESSMENT STUDY

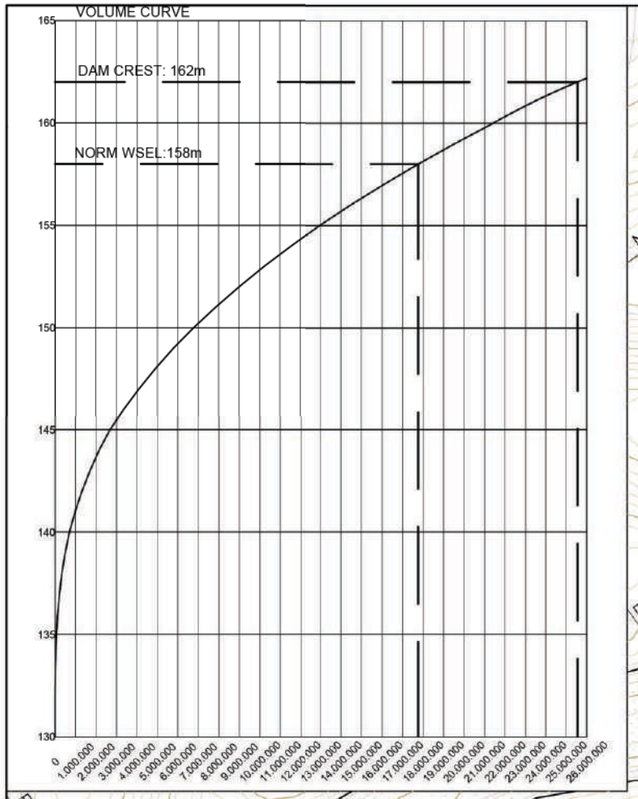
Issued by:
brasilGRAFITE

Title:
PLANT - PLAN VIEW WITH TYPICAL SECTIONS

0
REVISION

Project: Santa Cruz Graphite Project
Project No.: BGC-PEA-DE-005-R0
01

Location: BAHIA BRAZIL
Date: 09/13
SHEET 5 OF 8



A / 6|6 TSF DAM SECTION (TYP) N.T.S

PADRÃO DE PLOTAGEM / INSTRUCTIONS TO PLOT	
COR/COLOR	ESP. THICKN.
COR/COLOR 8	0,05
VERMELHO/RED	0,1
AMARELO/YELLOW	0,2
VERDE/GREEN	0,3
CIANO/CYAN	0,4
AZUL/BLUE	0,5
MAGENTA	0,6
BRANCA/WHITE	0,7

Rev.	Description	BY	Date
0	DESIGN IN PROGRESS	RLP	09/13

REFERENCE — REVISIONS

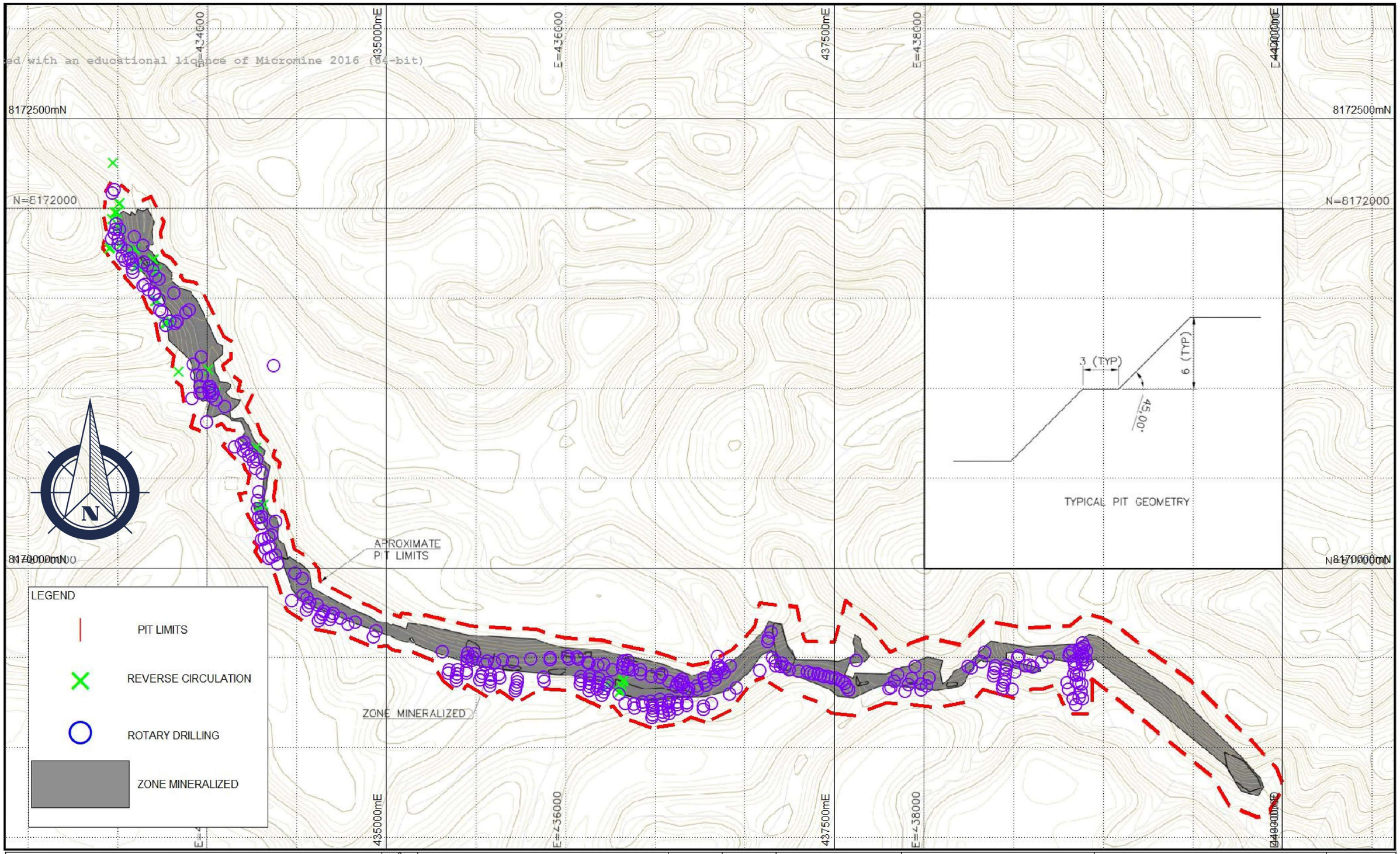
Scale: As Shown
Designed by: RLP/PC
Drawn by: BR
Checked by: RLP
Approved by: FHA

Issued for:
PRELIMINARY ECONOMIC ASSESSMENT STUDY

Issued by:
brasilGRAFITE

Title:
TSF - PLAN VIEW WITH TYPICAL SECTION

Project:	Project No.:	REVISION
Santa Cruz Graphite Project	BGC-PEA-DE-006-R0	0
Location: BAHIA BRAZIL	Date: 09/13	01
		SHEET 6 OF 8



PADRÃO DE PLOTAGEM / INSTRUCTIONS TO PLOT	
COR/COLOR	ESP. THICKN
COR/COLOR 8	0,05
VERMELHO/RED	0,1
AMARELO/YELLOW	0,2
VERDE/GREEN	0,3
CIANO/CYAN	0,4
AZUL/BLUE	0,5
MAGENTA	0,6
BRANCA/WHITE	0,7

Rev.	Description	BY	Date
0	DESIGN IN PROGRESS	RLP	09/13

REFERENCE | REVISIONS

Scale: As Shown
Designed by: RLP/PC
Drawn by: BR
Checked by: RLP
Approved by: FHA

Issued for:
PRELIMINARY ECONOMIC ASSESSMENT STUDY

Issued by:
brasilGRAFITE

Title:
PIT EXTENTS WITH TYPICAL SECTION

0
REVISION

Project: Santa Cruz Graphite Project
Project No.: BGC-PEA-DE-007-R0
01

Location: BAHIA BRAZIL
Date: 09/13
SHEET 7 OF 8

	0	DESIGN IN PROGRESS	RLP	09/13
	Rev.	Description	BY	Date
REFERENCE	REVISIONS			

Scale: As Shown
Designed by: RLP/PC
Drawn by: BR
Checked by: RLP
Approved by: FHA

Issued for:
PRELIMINARY ECONOMIC ASSESSMENT STUDY

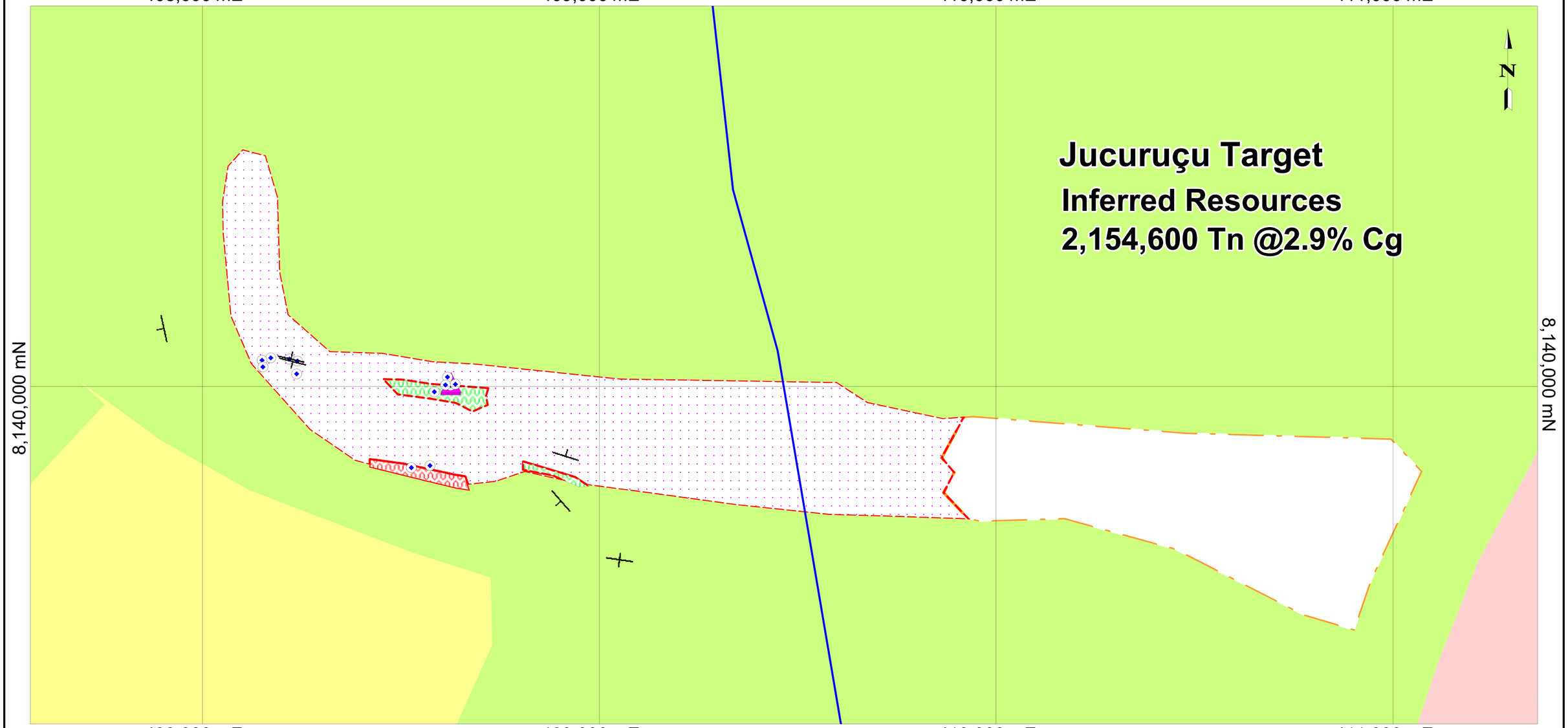
Issued by:
brasilGRAFITE

Title:
WRF - PLAN VIEW WITH TYPICAL SECTION

Project:	Project No.:	REVISION
Santa Cruz Graphite Project	BGC-PEA-DE-008-R0	0 / 01
Location: BAHIA BRAZIL	Date: 09/13	SHEET 8 OF 8

PADRÃO DE PLOTAGEM	
INSTRUCTIONS TO PLOT	
COR/COLOR	ESP. THICKN
COR/COLOR 8	0,05
VERMELHO/RED	0,1
AMARELO/YELLOW	0,2
VERDE/GREEN	0,3
CIANO/CYAN	0,4
AZUL/BLUE	0,5
MAGENTA	0,6
BRANCA/WHITE	0,7

APPENDIX 2: GEOLOGIC MAPS & SECTIONS



LEGEND

GEOLOGY

CENOZOIC

PALEOGENE - NEOGENE (65 - 23.5 Ma)

BARREIRAS GROUP
Immature sandstone with intercalations of clay and conglomeratic levels.

PALEOZOIC

CAMBRIAN (542 - 488 Ma)

POST-TECTONIC GRANITOIDS
Syeno to monzogranite.

PROTEROZOIC

EDIACARAN (650 - 540 Ma)

LATE TO POST-TECTONIC GRANITOIDS
Granite, syenogranite and porphiritic monzogranite and granitic pegmatites.

TONIAN - CRIOGENIAN (1000 - 650 Ma)

KINZIGITE COMPLEX - JEQUITINHONHA COMPLEX
Partly migmatized kinzigite, biotite gneiss, graphite, calc-silicate rock and quartizite. Gneis-paragneis and migmatite. higt grade methamorphism anfibolite-granulite

ANOROGENICS GRANITOIDS
Foliated charnokite-monzodiorite-granite, quartz monzonite tonalite

PEGMATITE
Pegmatite with prescence of vermiculite and quarzt

RHYACIAN (2800 - 2050 Ma)

MIGMATITIC ORTHOGNEISSES
Migmatitic horblenda-biotite gneiss and biotite-gneiss intersected by basic dikes.

Gneiss outcropping with graphite

Gneiss or migmatite.
Graphite is not observed

Bodies interpreted confirmed with graphite mineralization

Graphite body with low mineralization

DRILL GEOLOGY

Soil

Gneiss with graphite

Gneiss, graphite is not observed

GEOLOGICAL SYMBOLS

Fault - Shear Zone - Lineament

Foliation (Strike and Dip) — 70°

Contractional Shear Zone

Plunging antiform

Sinistral and Reverse Fault

Plunging synform

Graphite Belt

GEOGRAPHIC SYMBOLS

Road

Active Mine

Inactive Mine

PROPERTIES

Brasil Grafite S.A.

DRILL HOLE

Reverse Circulation Drilling (RC Drilling)

Rotary Drilling (RD Drilling)

SECTION

Section Line

N8185458 Section Number

200 0 200 400 600

Meters

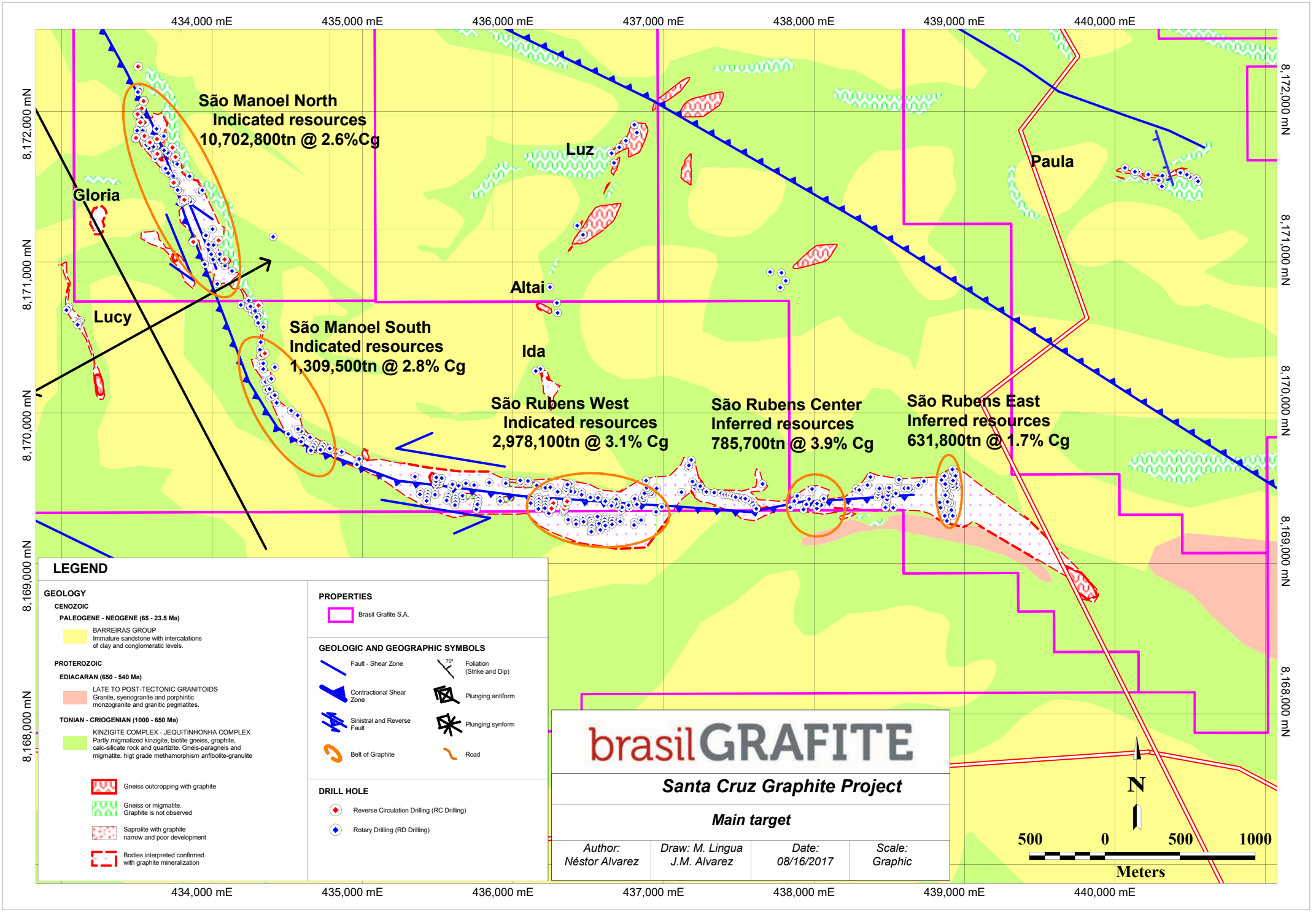
Scale: 1:10,000

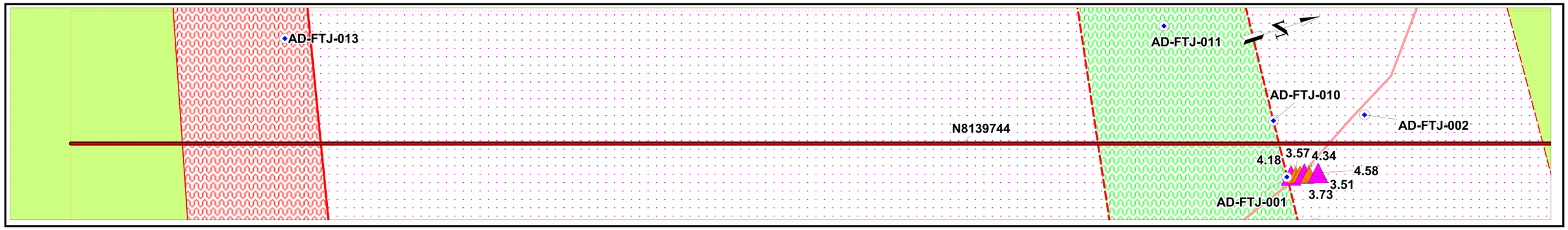
brasilGRAFITE

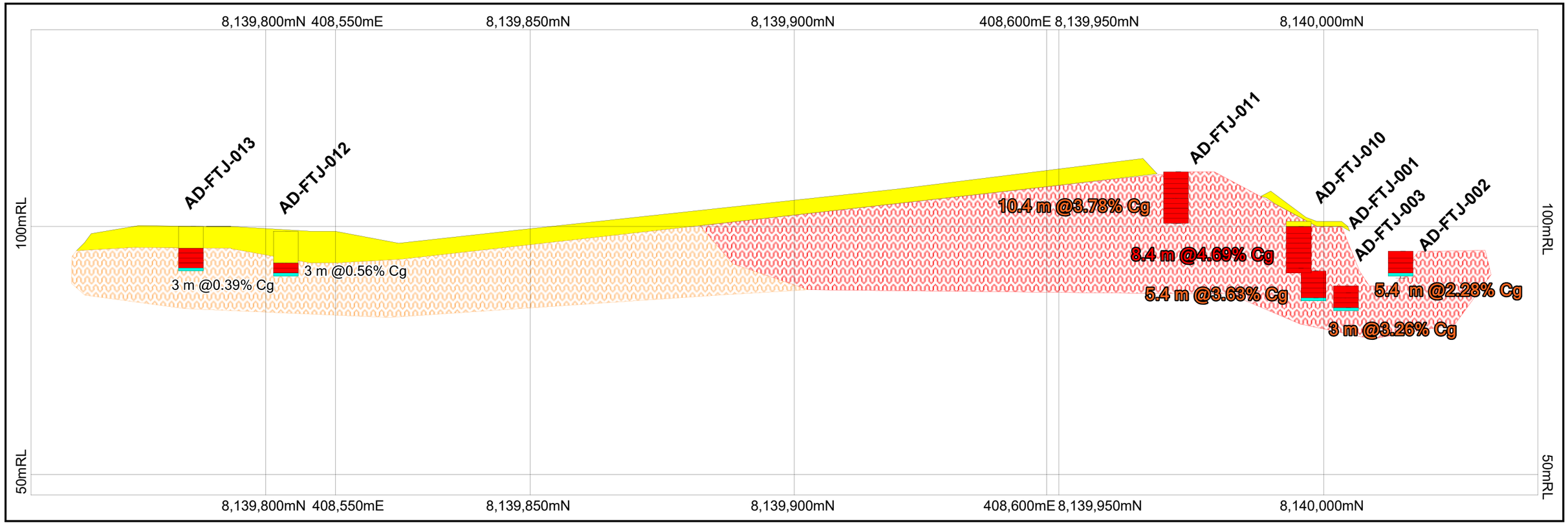
Santa Cruz Graphite Project

Jucuruçu Target

Author:	*Draw:*	*Date:*	*Scale:*
Néstor Alvarez	*M. Lingua J.M. Alvarez*	*16/08/2017*	*1:10000*


434,000 mE
435,000 mE
436,000 mE
437,000 mE
438,000 mE
439,000 mE
440,000 mE
8,172,000 mN
8,171,000 mN
8,170,000 mN
8,169,000 mN
8,168,000 mN
São Manoel North
Indicated resources
10,702,800tn @ 2.6%Cg
Gloria
Luz
Paula
Altai
Lucy
São Manoel South
Indicated resources
1,309,500tn @ 2.8% Cg
Ida
São Rubens West
Indicated resources
2,978,100tn @ 3.1% Cg
São Rubens Center
Inferred resources
785,700tn @ 3.9% Cg
São Rubens East
Inferred resources
631,800tn @ 1.7% Cg
LEGEND
GEOLOGY
CENOZOIC
PALEOGENE - NEOGENE (65 - 23.5 Ma)
BARREIRAS GROUP
Immature sandstone with intercalations of clay and conglomeratic levels.
PROTEROZOIC
EDIACARAN (650 - 540 Ma)
LATE TO POST-TECTONIC GRANITOIDS
Granite, syenogranite and porphiritic monzogranite and granitic pegmatites.
TONIAN - CRIOGENIAN (1000 - 650 Ma)
KINZIGITE COMPLEX - JEQUITINHONHA COMPLEX
Partly migmatized kinzigite, biotite gneiss, graphite, calc-silicate rock and quartizite. Gneis-paragneis and migmatite. higt grade methamorphism anfibolite-granulite
Gneiss outcropping with graphite
Gneiss or migmatite. Graphite is not observed
Saprolite with graphite narrow and poor development
Bodies interpreted confirmed with graphite mineralization
PROPERTIES
Brasil Grafite S.A.
GEOLOGIC AND GEOGRAPHIC SYMBOLS
Fault - Shear Zone
Foliation (Strike and Dip)
70°
Contractional Shear Zone
Plunging antiform
Sinistral and Reverse Fault
Plunging synform
Belt of Graphite
Road
DRILL HOLE
Reverse Circulation Drilling (RC Drilling)
Rotary Drilling (RD Drilling)
brasilGRAFITE
Santa Cruz Graphite Project
Main target
Author: Néstor Alvarez
Draw: M. Lingua J.M. Alvarez
Date: 08/16/2017
Scale: Graphic
N
500 0 500 1000
Meters





LEGEND

GEOLOGY

CENOZOIC

PALEOGENE - NEOGENE (65 - 23.5 Ma)

BARREIRAS GROUP
Immature sandstone with intercalations of clay and conglomeratic levels.

PALEOZOIC

CAMBRIAN (542 - 488 Ma)

POST-TECTONIC GRANITOIDS
Syeno to monzogranite.

PROTEROZOIC

EDIACARAN (650 - 540 Ma)

LATE TO POST-TECTONIC GRANITOIDS
Granite, syenogranite and porphiritic monzogranite and granitic pegmatites.

TONIAN - CRIOGENIAN (1000 - 650 Ma)

KINZIGITE COMPLEX - JEQUITINHONHA COMPLEX
Partly migmatized kinzigite, biotite gneiss, graphite, calc-silicate rock and quartizite. Gneis-paragneis and migmatite. higt grade methamorphism anfibolite-granulite

ANOROGENICS GRANITOIDS
Foliated charnokite-monzodiorite-granite, quartz monzonite tonalite

PEGMATITE
Pegmatite with prescence of vermiculite and quarzt

RHYACIAN (2800 - 2050 Ma)

MIGMATITIC ORTHOGNEISSES
Migmatitic horblenda-biotite gneiss and biotite-gneiss intersected by basic dikes.

Gneiss outcropping with graphite

Gneiss or migmatite. Graphite is not observed

Bodies interpreted confirmed with graphite mineralization

Graphite body with low mineralization

DRILL GEOLOGY

Soil

Gneiss with graphite

Gneiss, graphite is not observed

GEOLOGICAL SYMBOLS

Fault - Shear Zone - Lineament

Contractional Shear Zone

Sinistral and Reverse Fault

Graphite Belt

70° Foliation (Strike and Dip)

Plunging antiform

Plunging synform

GEOGRAPHIC SYMBOLS

Road

Active Mine

Inactive Mine

PROPERTIES

Brasil Grafite S.A.

DRILL HOLE

Reverse Circulation Drilling (RC Drilling)

Rotary Drilling (RD Drilling)

SECTION

Section Line

N8185458 Section Number

16 0 16 32 48

Meters

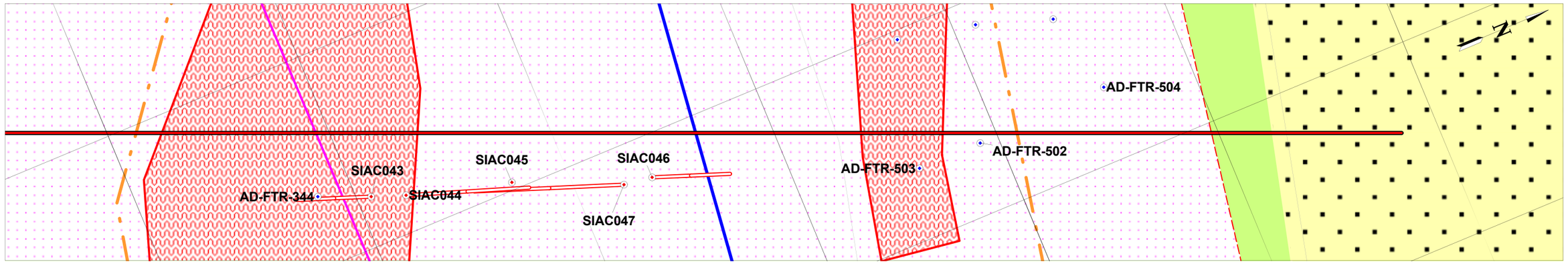
Scale: 1:800

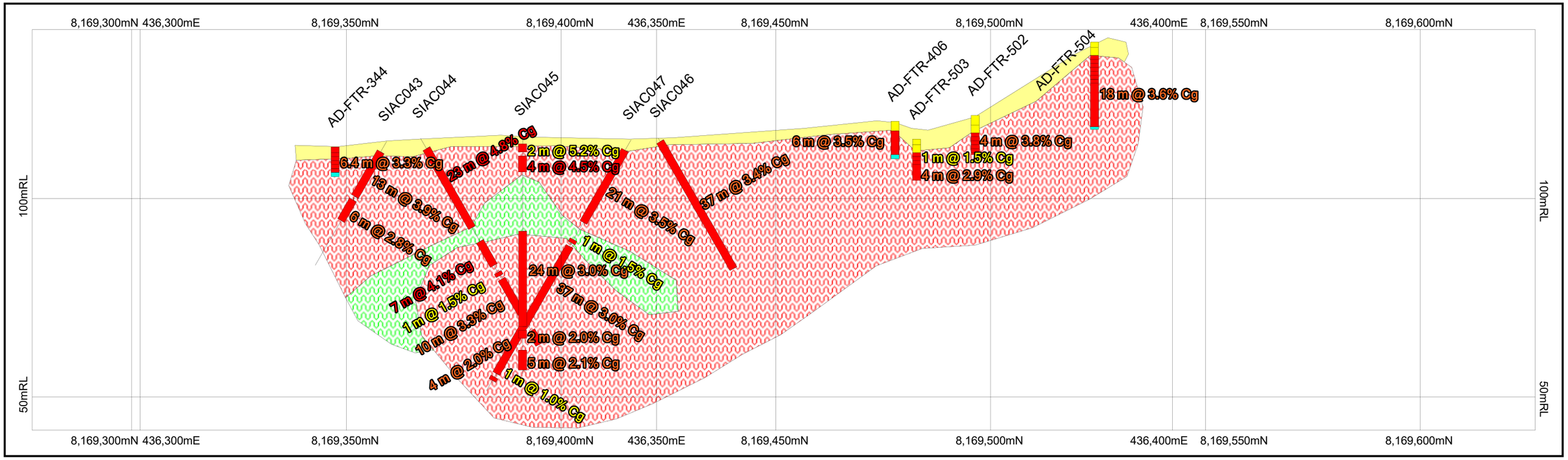
brasilGRAFITE

Santa Cruz Graphite Project

N 8,139,741

Author:	*Draw:*	*Date:*	*Scale:*
Néstor Alvarez	*M. Lingua J.M. Alvarez*	*16/08/2017*	*1:800*





LEGEND

GEOLOGY

CENOZOIC

PALEOGENE - NEOGENE (65 - 23.5 Ma)

BARREIRAS GROUP
Immature sandstone with intercalations of clay and conglomeratic levels.

PALEOZOIC

CAMBRIAN (542 - 488 Ma)

POST-TECTONIC GRANITOIDS
Syeno to monzogranite.

PROTEROZOIC

EDIACARAN (650 - 540 Ma)

LATE TO POST-TECTONIC GRANITOIDS
Granite, syenogranite and porphiritic monzogranite and granitic pegmatites.

TONIAN - CRIOGENIAN (1000 - 650 Ma)

KINZIGITE COMPLEX - JEQUITINHONHA COMPLEX
Partly migmatized kinzigite, biotite gneiss, graphite, calc-silicate rock and quartizite. Gneis-paragneis and migmatite. higt grade methamorphism anfibolite-granulite

Gneiss outcropping with graphite

Gneiss or migmatite. Graphite is not observed

Bodies interpreted confirmed with graphite mineralization

Graphite body with low mineralization

ANOROGENICS GRANITOIDS
Foliated charnokite-monzodiorite-granite, quartz monzonite tonalite

PEGMATITE
Pegmatite with prescence of vermiculite and quarzt

RHYACIAN (2800 - 2050 Ma)

MIGMATITIC ORTHOGNEISSES
Migmatitic horblenda-biotite gneiss and biotite-gneiss intersected by basic dikes.

DRILL GEOLOGY

Soil

Gneiss with graphite

Gneiss, graphite is not observed

GEOLOGICAL SYMBOLS

Fault - Shear Zone - Lineament

Contractional Shear Zone

Sinistral and Reverse Fault

Belt of Graphite

70° Foliation (Strike and Dip)

Plunging antiform

Plunging synform

GEOGRAPHIC SYMBOLS

Road

Active Mine

Inactive Mine

PROPERTIES

Brasil Grafite S.A.

DRILL HOLE

Reverse Circulation Drilling (RC Drilling)

Rotary Drilling (RD Drilling)

SECTION

Section Line

N8185458 Section Number

20 0 20 40 60

Metros

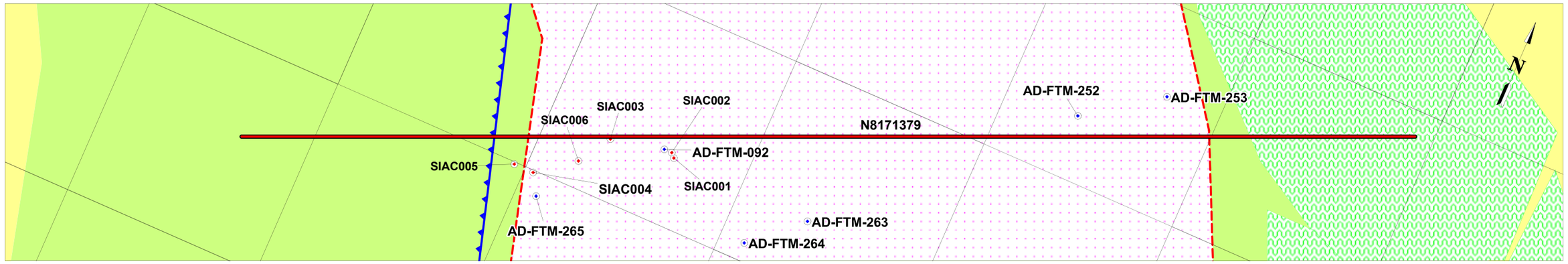
Escala: 1:1,000

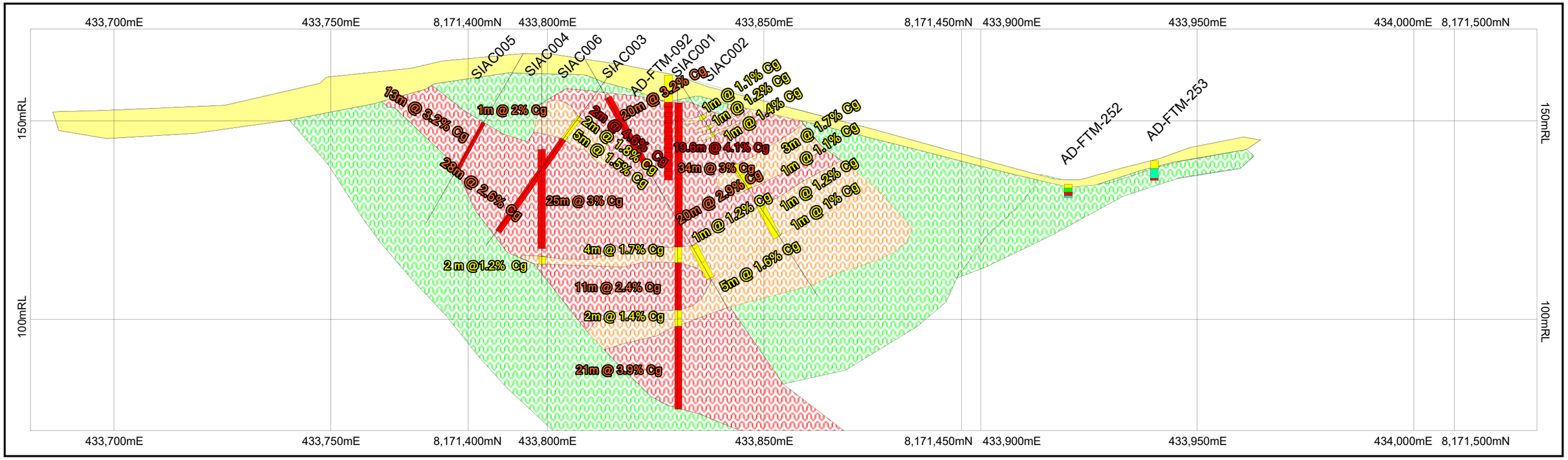
brasilGRAFITE

Santa Cruz Graphite Project

Section N 8,168,129

Author:	*Draw:*	*Date:*	*Scale:*
Néstor Alvarez	*M. Lingua J.M. Alvarez*	*08/16/2017*	*1:1000*





LEGEND

GEOLOGY

CENOZOIC

PALEOGENE - NEOGENE (65 - 23.5 Ma)

BARREIRAS GROUP
Immature sandstone with intercalations of clay and conglomeratic levels.

PALEOZOIC

CAMBRIAN (542 - 488 Ma)

POST-TECTONIC GRANITOIDS
Syeno to monzogranite.

PROTEROZOIC

EDIACARAN (650 - 540 Ma)

LATE TO POST-TECTONIC GRANITOIDS
Granite, syenogranite and porphiritic monzogranite and granitic pegmatites.

TONIAN - CRIOGENIAN (1000 - 650 Ma)

KINZIGITE COMPLEX - JEQUITINHONHA COMPLEX
Partly migmatized kinzigite, biotite gneiss, graphite, calc-silicate rock and quartizite. Gneis-paragneis and migmatite. higt grade methamorphism anfibolite-granulite

Gneiss outcropping with graphite

Gneiss or migmatite.
Graphite is not observed

Bodies interpreted confirmed with graphite mineralization

Graphite body with low mineralization

ANOROGENICS GRANITOIDS
Foliated charnokite-monzodiorite-granite, quartz monzonite tonalite

PEGMATITE
Pegmatite with prescence of vermiculite and quarzt

RHYACIAN (2800 - 2050 Ma)

MIGMATITIC ORTHOGNEISSES
Migmatitic horblenda-biotite gneiss and biotite-gneiss intersected by basic dikes.

GEOLOGY OF DRILL

Soil

Gneiss with graphite

Gneiss, graphite is not observed

GEOLOGIC SYMBOLS

Fault - Shear Zone - Lineament

Contractional Shear Zone

Sinistral and Reverse Fault

Belt of Graphite

70° Foliation (Strike and Dip)

Plunging antiform

Plunging synform

GEOGRAPHIC SYMBOLS

Road

Active Mine

Inactive Mine

PROPERTIES

Brasil Grafite S.A.

DRILL HOLE

Reverse Circulation Drilling (RC Drilling)

Rotary Drilling (RD Drilling)

SECTION

Section Line

N8185458 Section Number

20 0 20 40 60

Metros

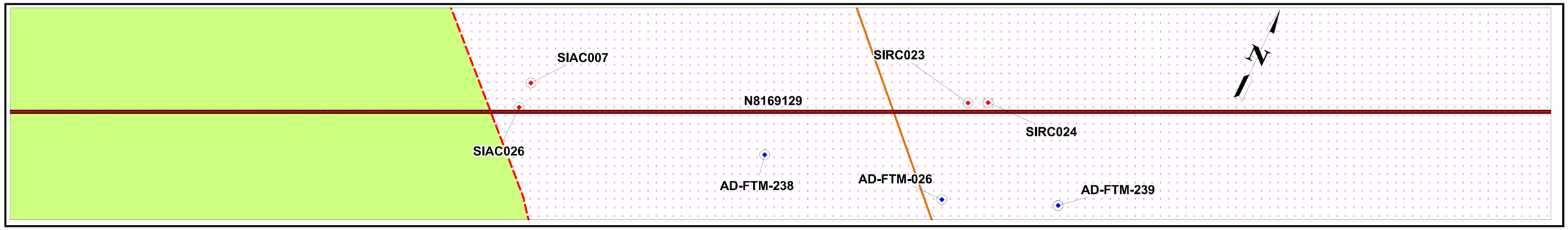
Escala: 1:1,000

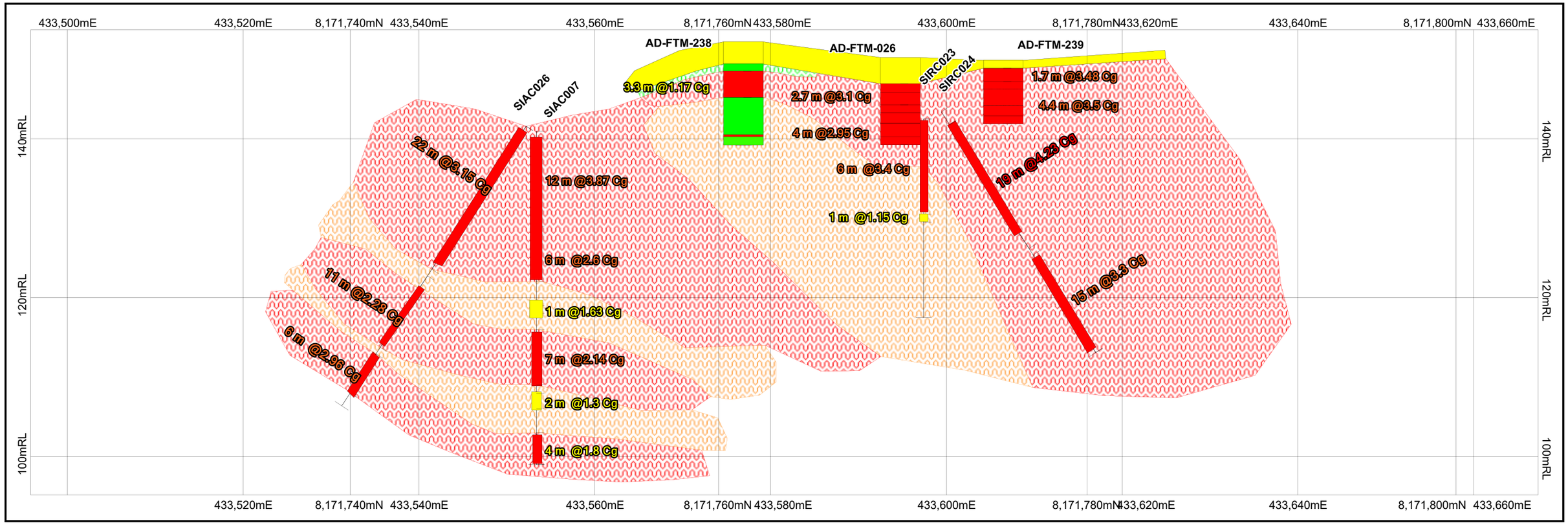
brasilGRAFITE

Santa Cruz Graphite Project

Section N 8,171,379

Author:	*Draw:*	*Date:*	*Scale:*
Néstor Alvarez	*M. Lingua J.M. Alvarez*	*16/08/2017*	*1:1,000*





LEGEND

GEOLOGY

CENOZOIC

PALEOGENE - NEOGENE (65 - 23.5 Ma)

BARREIRAS GROUP
Immature sandstone with intercalations of clay and conglomeratic levels.

PALEOZOIC

CAMBRIAN (542 - 488 Ma)

POST-TECTONIC GRANITOIDS
Syeno to monzogranite.

PROTEROZOIC

EDIACARAN (650 - 540 Ma)

LATE TO POST-TECTONIC GRANITOIDS
Granite, syenogranite and porphiritic monzogranite and granitic pegmatites.

TONIAN - CRIOGENIAN (1000 - 650 Ma)

KINZIGITE COMPLEX - JEQUITINHONHA COMPLEX
Partly migmatized kinzigite, biotite gneiss, graphite, calc-silicate rock and quartizite. Gneis-paragneis and migmatite. higt grade methamorphism anfibolite-granulite

ANOROGENICS GRANITOIDS
Foliated charnokite-monzodiorite-granite, quartz monzonite tonalite

PEGMATITE
Pegmatite with prescence of vermiculite and quarzt

RHYACIAN (2800 - 2050 Ma)

MIGMATITIC ORTHOGNEISSES
Migmatitic horblenda-biotite gneiss and biotite-gneiss intersected by basic dikes.

Gneiss outcropping with graphite

Gneiss or migmatite. Graphite is not observed

Bodies interpreted confirmed with graphite mineralization

Graphite body with low mineralization

DRILL GEOLOGY

Soil

Gneiss with graphite

Gneiss, graphite is not observed

GEOLOGICAL SYMBOLS

Fault - Shear Zone - Lineament

Foliation (Strike and Dip)

Contractional Shear Zone

Plunging antiform

Sinistral and Reverse Fault

Plunging synform

Graphite Belt

GEOGRAPHIC SYMBOLS

Road

Active Mine

Inactive Mine

PROPERTIES

Brasil Grafite S.A.

DRILL HOLE

Reverse Circulation Drilling (RC Drilling)

Rotary Drilling (RD Drilling)

SECTION

Section Line

N8185458 Section Number

10 0 10 20 30

Meters

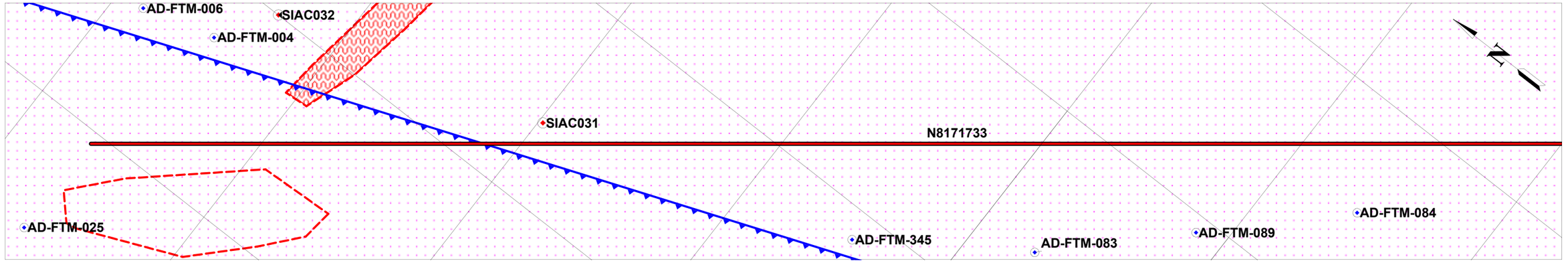
Scale: 1:500

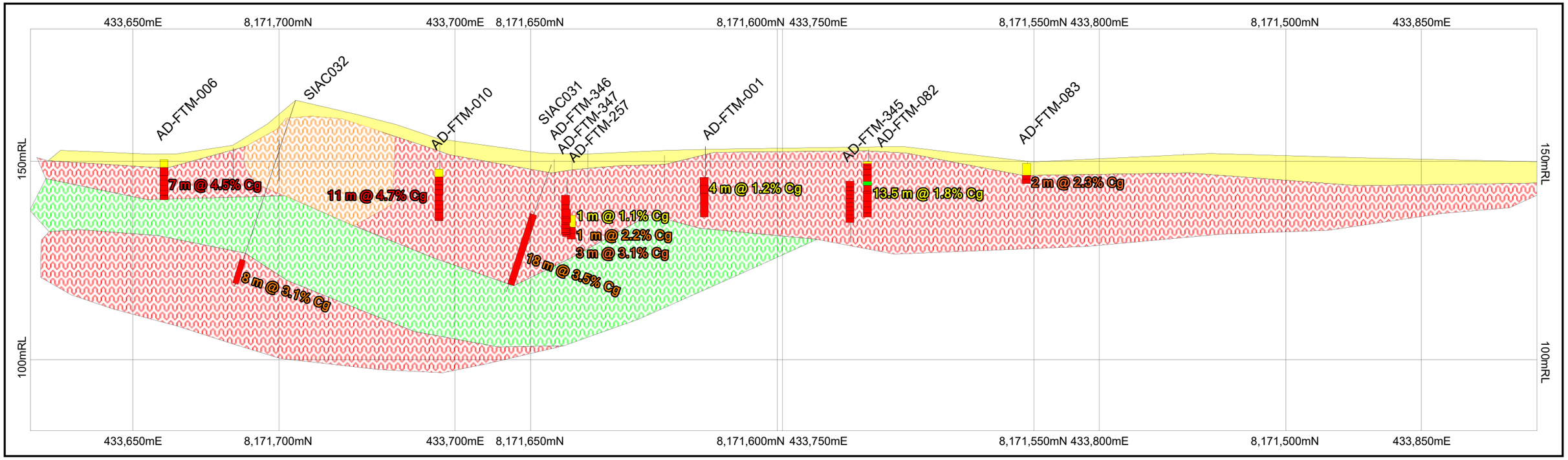
brasilGRAFITE

Santa Cruz Graphite Project

N 8,171,710

Author:	*Draw:*	*Date:*	*Scale:*
Néstor Alvarez	*M. Lingua J.M. Alvarez*	*16/08/2017*	*1:500*





LEGEND

GEOLOGY

CENOZOIC

PALEOGENE - NEOGENE (65 - 23.5 Ma)

BARREIRAS GROUP
Immature sandstone with intercalations of clay and conglomeratic levels.

PALEOZOIC

CAMBRIAN (542 - 488 Ma)

POST-TECTONIC GRANITOIDS
Syeno to monzogranite.

PROTEROZOIC

EDIACARAN (650 - 540 Ma)

LATE TO POST-TECTONIC GRANITOIDS
Granite, syenogranite and porphiritic monzogranite and granitic pegmatites.

TONIAN - CRIOGENIAN (1000 - 650 Ma)

KINZIGITE COMPLEX - JEQUITINHONHA COMPLEX
Partly migmatized kinzigite, biotite gneiss, graphite, calc-silicate rock and quartizite. Gneis-paragneis and migmatite. higt grade methamorphism anfibolite-granulite

Gneiss outcropping with graphite

Gneiss or migmatite. Graphite is not observed

Bodies interpreted confirmed with graphite mineralization

Graphite body with low mineralization

ANOROGENICS GRANITOIDS
Foliated charnokite-monzodiorite-granite, quartz monzonite tonalite

PEGMATITE
Pegmatite with prescence of vermiculite and quarzt

RHYACIAN (2800 - 2050 Ma)

MIGMATITIC ORTHOGNEISSES
Migmatitic horblenda-biotite gneiss and biotite-gneiss intersected by basic dikes.

GEOLOGY OF DRILL

Soil

Gneiss with graphite

Gneiss, graphite is not observed

GEOLOGIC SYMBOLS

Fault - Shear Zone - Lineament

Contractional Shear Zone

Sinistral and Reverse Fault

Belt of Graphite

70° Foliation (Strike and Dip)

Plunging antiform

Plunging synform

GEOGRAPHIC SYMBOLS

Road

Active Mine

Inactive Mine

PROPERTIES

Brasil Grafite S.A.

DRILL HOLE

Reverse Circulation Drilling (RC Drilling)

Rotary Drilling (RD Drilling)

SECTION

Section Line

N8185458 Section Number

20 0 20 40 60

Metros

Escala: 1:1,000

brasilGRAFITE

Santa Cruz Graphite Project

Section N 8,171,733

Author:	*Draw:*	*Date:*	*Scale:*
Néstor Alvarez	*M. Lingua J.M. Alvarez*	*16/08/2017*	*1:1,000*

APPENDIX 3: CERTIFIED PULP GRAPHITE REFERENCE MATERIAL

GGC -04

GGC-06

GGC-07

GGC-08

GGC-10

GEOSTATS PTY LTD

Mining Industry Consultants
Reference Material Manufacture and Sales

Certified Pulp Graphite Reference Material

GGC-04

Certified Control Values

Element	Units	Grade	Standard Deviation	No of Analyses	95% Confidence Interval
Graphitic Carbon	%	13.53	0.64	50	+/- 0.18
Total Carbon	%	14.24	0.97	50	+/- 0.28
Total Sulphur	%	0.05	0.02	50	+/- 0.005

CRM Details

Control Statistic Details

Control values for this material were determined during a certification program.

Certification Date

This material was certified with the above values on:
20/05/2013

Source Material

Prior to homogenisation and testing, this material was sourced from:
Graphite, Eyre Peninsula, South Australia

Material Type

Pulp Graphite Ore, 10g samples.

Usage

This product is for use in the mining industry as reference materials for monitoring and testing the accuracy of laboratory assaying.

Preparation and Packaging

This reference material was dried in an oven for a minimum of 8 hours at 90C. The dry material is then pulverised in a bowl and puck mill and homogenised in a vee-blender. The material is then stored in a sealed, stable container ready for final packaging.

Materials are statistically sampled from stores, then packaged into heat sealed, air tight, plastic packets ready for distribution. All packaging has been chosen to ensure minimal contamination from outside sources during shipment, use and storage.

Assay Testwork

This standard was tested in a dedicated certification program. 10 x 10g samples were sent to 5 laboratories for analysis using a leach process (for graphitic carbon) and a carbon / sulphur analyser. Assay distributions are checked and processed statistically, producing monitoring statistics for these standards. Materials are tested regularly to ensure stability and homogeneity.

10A Marsh Close, O'Connor, Western Australia 6163
Phone : +61 8 9314 2566, Fax : +61 8 9314 3699
e-mail : pjh@geostats.com.au, srr@geostats.com.au
Website http://www.geostats.com.au

GGC-04

Geostats Pty Ltd, Certified GRaphite Reference Material, Product Code:

GEOSTATS PTY LTD

Mining Industry Consultants
Reference Material Manufacture and Sales

Certified Pulp Graphite Reference Material

GGC-06

Certified Control Values

Element	Units	Grade	Standard Deviation	No of Analyses	95% Confidence Interval
Graphitic Carbon	%	7.68	0.38	49	+/- 0.11
Total Carbon	%	8.16	0.24	49	+/- 0.07
Total Sulphur	%	0.05	0.02	50	+/- 0.005

CRM Details

Control Statistic Details

Control values for this material were determined during a certification program.

Certification Date

This material was certified with the above values on:
20/05/2013

Source Material

Prior to homogenisation and testing, this material was sourced from:
Graphite, Eyre Peninsula, South Australia

Material Type

Pulp Graphite Ore, 10g samples.

Usage

This product is for use in the mining industry as reference materials for monitoring and testing the accuracy of laboratory assaying.

Preparation and Packaging

This reference material was dried in an oven for a minimum of 8 hours at 90C. The dry material is then pulverised in a bowl and puck mill and homogenised in a vee-blender. The material is then stored in a sealed, stable container ready for final packaging.

Materials are statistically sampled from stores, then packaged into heat sealed, air tight, plastic packets ready for distribution. All packaging has been chosen to ensure minimal contamination from outside sources during shipment, use and storage.

Assay Testwork

This standard was tested in a dedicated certification program. 10 x 10g samples were sent to 5 laboratories for analysis using a leach process (for graphitic carbon) and a carbon / sulphur analyser. Assay distributions are checked and processed statistically, producing monitoring statistics for these standards. Materials are tested regularly to ensure stability and homogeneity.

10A Marsh Close, O'Connor, Western Australia 6163
Phone : +61 8 9314 2566, Fax : +61 8 9314 3699
e-mail : pjh@geostats.com.au, srr@geostats.com.au
Website http://www.geostats.com.au

GGC-06

Geostats Pty Ltd, Certified GRaphite Reference Material, Product Code:

GEOSTATS PTY LTD

Mining Industry Consultants
Reference Material Manufacture and Sales

Certified Pulp Graphite Reference Material

GGC-07

Certified Control Values

Element	Units	Grade	Standard Deviation	No of Analyses	95% Confidence Interval
Graphitic Carbon	%	0.13	0.04	48	+/- 0.01
Total Carbon	%	0.56	0.03	50	+/- 0.01
Total Sulphur	%	0.51	0.03	40	+/- 0.01

CRM Details

Control Statistic Details

Control values for this material were determined during a certification program.

Certification Date

This material was certified with the above values on:
20/05/2013

Source Material

Prior to homogenisation and testing, this material was sourced from:
Flake graphite, Halls Creek, Western Australia

Material Type

Pulp Graphite Ore, 10g samples.

Usage

This product is for use in the mining industry as reference materials for monitoring and testing the accuracy of laboratory assaying.

Preparation and Packaging

This reference material was dried in an oven for a minimum of 8 hours at 90C. The dry material is then pulverised in a bowl and puck mill and homogenised in a vee-blender. The material is then stored in a sealed, stable container ready for final packaging.

Materials are statistically sampled from stores, then packaged into heat sealed, air tight, plastic packets ready for distribution. All packaging has been chosen to ensure minimal contamination from outside sources during shipment, use and storage.

Assay Testwork

This standard was tested in a dedicated certification program. 10 x 10g samples were sent to 5 laboratories for analysis using a leach process (for graphitic carbon) and a carbon / sulphur analyser. Assay distributions are checked and processed statistically, producing monitoring statistics for these standards. Materials are tested regularly to ensure stability and homogeneity.

10A Marsh Close, O'Connor, Western Australia 6163
Phone : +61 8 9314 2566, Fax : +61 8 9314 3699
e-mail : pjh@geostats.com.au, srr@geostats.com.au
Website http://www.geostats.com.au

GGC-07

Geostats Pty Ltd, Certified GRaphite Reference Material, Product Code:

GEOSTATS PTY LTD

Mining Industry Consultants
Reference Material Manufacture and Sales

Certified Pulp Graphite Reference Material

GGC-08

Certified Control Values

Element	Units	Grade	Standard Deviation	No of Analyses	95% Confidence Interval
Graphitic Carbon	%	0.39	0.06	49	+/- 0.02
Total Carbon	%	1.03	0.04	48	+/- 0.01
Total Sulphur	%	1.57	0.07	49	+/- 0.02

CRM Details

Control Statistic Details

Control values for this material were determined during a certification program.

Certification Date

This material was certified with the above values on:
20/05/2013

Source Material

Prior to homogenisation and testing, this material was sourced from:
Flake graphite, Halls Creek, Western Australia

Material Type

Pulp Graphite Ore, 10g samples.

Usage

This product is for use in the mining industry as reference materials for monitoring and testing the accuracy of laboratory assaying.

Preparation and Packaging

This reference material was dried in an oven for a minimum of 8 hours at 90C. The dry material is then pulverised in a bowl and puck mill and homogenised in a vee-blender. The material is then stored in a sealed, stable container ready for final packaging.

Materials are statistically sampled from stores, then packaged into heat sealed, air tight, plastic packets ready for distribution. All packaging has been chosen to ensure minimal contamination from outside sources during shipment, use and storage.

Assay Testwork

This standard was tested in a dedicated certification program. 10 x 10g samples were sent to 5 laboratories for analysis using a leach process (for graphitic carbon) and a carbon / sulphur analyser. Assay distributions are checked and processed statistically, producing monitoring statistics for these standards. Materials are tested regularly to ensure stability and homogeneity.

10A Marsh Close, O'Connor, Western Australia 6163
Phone : +61 8 9314 2566, Fax : +61 8 9314 3699
e-mail : pjh@geostats.com.au, srr@geostats.com.au
Website http://www.geostats.com.au

GGC-08

Geostats Pty Ltd, Certified GRaphite Reference Material, Product Code:

GEOSTATS PTY LTD

Mining Industry Consultants
Reference Material Manufacture and Sales

Certified Pulp Graphite Reference Material

GGC-10

Certified Control Values

Element	Units	Grade	Standard Deviation	No of Analyses	95% Confidence Interval
Graphitic Carbon	%	4.79	0.29	50	+/- 0.08
Total Carbon	%	5.22	0.18	49	+/- 0.05
Total Sulphur	%	4.40	0.19	49	+/- 0.06

CRM Details

Control Statistic Details

Control values for this material were determined during a certification program.

Certification Date

This material was certified with the above values on:
20/05/2013

Source Material

Prior to homogenisation and testing, this material was sourced from:
Flake graphite, Halls Creek, Western Australia

Material Type

Pulp Graphite Ore, 10g samples.

Usage

This product is for use in the mining industry as reference materials for monitoring and testing the accuracy of laboratory assaying.

Preparation and Packaging

This reference material was dried in an oven for a minimum of 8 hours at 90C. The dry material is then pulverised in a bowl and puck mill and homogenised in a vee-blender. The material is then stored in a sealed, stable container ready for final packaging.

Materials are statistically sampled from stores, then packaged into heat sealed, air tight, plastic packets ready for distribution. All packaging has been chosen to ensure minimal contamination from outside sources during shipment, use and storage.

Assay Testwork

This standard was tested in a dedicated certification program. 10 x 10g samples were sent to 5 laboratories for analysis using a leach process (for graphitic carbon) and a carbon / sulphur analyser. Assay distributions are checked and processed statistically, producing monitoring statistics for these standards. Materials are tested regularly to ensure stability and homogeneity.

10A Marsh Close, O'Connor, Western Australia 6163
Phone : +61 8 9314 2566, Fax : +61 8 9314 3699
e-mail : pjh@geostats.com.au, srr@geostats.com.au
Website http://www.geostats.com.au

GGC-10

Geostats Pty Ltd, Certified GRaphite Reference Material, Product Code:

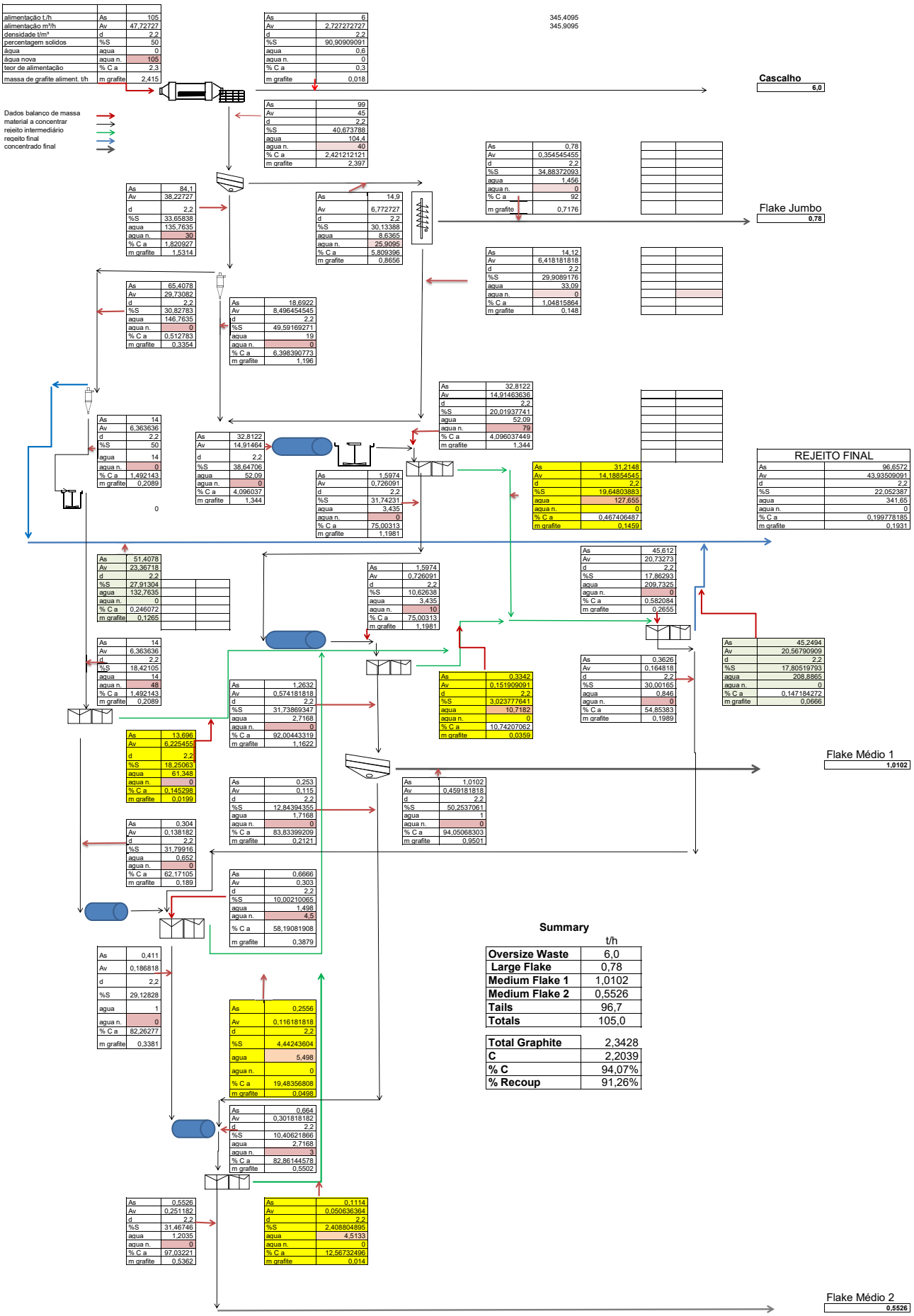
APPENDIX 4: PROCESS TESTWORK & DESIGN METHODOLOGY

CDTN – Belo Horizonte MG, Brazil at Federal University of Minas Gerais

Photo 1 – Sample Preparation Lab

Photo 2 – Sample Preparation Lab

Photo 3 – Pilot Plant with Float Cells


alimentação t/h 105
alimentação m³/h 47,72727
densidade t/m³ 2,2
percentagem solidos 50
água 0
água nova 105
teor de alimentação 2,3
massa de grafite aliment. t/h 2,415
As 6
Av 2,727272727
d 2,2
%S 90,90909091
agua 0,6
agua n. 0
% C a 0,3
m grafite 0,018
345,4095
345,9095
Cascalho
6,0
Dados balanço de massa
material a concentrar
rejeito intermediário
rejeito final
concentrado final
As 99
Av 45
d 2,2
%S 40,673788
agua 104,4
agua n. 40
% C a 2,421212121
m grafite 2,397
As 0,78
Av 0,354545455
d 2,2
%S 34,88372093
agua 1,456
agua n. 0
% C a 92
m grafite 0,7176
Flake Jumbo
0,78
As 84,1
Av 38,22727
d 2,2
%S 33,65838
agua 135,7635
agua n. 30
% C a 1,820927
m grafite 1,5314
As 14,9
Av 6,772727
d 2,2
%S 30,13388
agua 8,6365
agua n. 25,9095
% C a 5,809396
m grafite 0,8656
As 14,12
Av 6,418181818
d 2,2
%S 29,9089176
agua 33,09
agua n. 0
% C a 1,04815864
m grafite 0,148
As 65,4078
Av 29,73082
d 2,2
%S 30,82783
agua 146,7635
agua n. 0
% C a 0,512783
m grafite 0,3354
As 18,6922
Av 8,496454545
d 2,2
%S 49,59169271
agua 19
agua n. 0
% C a 6,398390773
m grafite 1,196
As 32,8122
Av 14,91463636
d 2,2
%S 20,01937741
agua 52,09
agua n. 79
% C a 4,096037449
m grafite 1,344
As 14
Av 6,363636
d 2,2
%S 50
agua 14
agua n. 0
% C a 1,492143
m grafite 0,2089
0
As 32,8122
Av 14,91464
d 2,2
%S 38,64706
agua 52,09
agua n. 0
% C a 4,096037
m grafite 1,344
As 1,5974
Av 0,726091
d 2,2
%S 31,74231
agua 3,435
agua n. 0
% C a 75,00313
m grafite 1,1981
As 31,2148
Av 14,18854545
d 2,2
%S 19,64803883
agua 127,655
agua n. 0
% C a 0,467406487
m grafite 0,1459
REJEITO FINAL
As 96,6572
Av 43,93509091
d 2,2
%S 22,052387
agua 341,65
agua n. 0
% C a 0,199778185
m grafite 0,1931
As 51,4078
Av 23,36718
d 2,2
%S 27,91304
agua 132,7635
agua n. 0
% C a 0,246072
m grafite 0,1265
As 1,5974
Av 0,726091
d 2,2
%S 10,62638
agua 3,435
agua n. 10
% C a 75,00313
m grafite 1,1981
As 45,612
Av 20,73273
d 2,2
%S 17,86293
agua 209,7325
agua n. 0
% C a 0,582084
m grafite 0,2655
As 14
Av 6,363636
d 2,2
%S 18,42105
agua 14
agua n. 48
% C a 1,492143
m grafite 0,2089
As 1,2632
Av 0,574181818
d 2,2
%S 31,73869347
agua 2,7168
agua n. 0
% C a 92,00443319
m grafite 1,1622
As 0,3342
Av 0,151909091
d 2,2
%S 3,023777641
agua 10,7182
agua n. 0
% C a 10,74207062
m grafite 0,0359
As 0,3626
Av 0,164818
d 2,2
%S 30,00165
agua 0,846
agua n. 0
% C a 54,85383
m grafite 0,1989
As 45,2494
Av 20,56790909
d 2,2
%S 17,80519793
agua 208,8865
agua n. 0
% C a 0,147184272
m grafite 0,0666
As 13,696
Av 6,225455
d 2,2
%S 18,25063
agua 61,348
agua n. 0
% C a 0,145296
m grafite 0,0199
Flake Médio 1
1,0102
As 0,253
Av 0,115
d 2,2
%S 12,84394355
agua 1,7168
agua n. 0
% C a 83,83399209
m grafite 0,2121
As 1,0102
Av 0,459181818
d 2,2
%S 50,2537061
agua 1
agua n. 0
% C a 94,05068303
m grafite 0,9501
As 0,304
Av 0,138182
d 2,2
%S 31,79916
agua 0,652
agua n. 0
% C a 62,17105
m grafite 0,189
As 0,6666
Av 0,303
d 2,2
%S 10,00210065
agua 1,498
agua n. 4,5
% C a 58,19081908
m grafite 0,3879
As 0,411
Av 0,186818
d 2,2
%S 29,12828
agua 1
agua n. 0
% C a 82,26277
m grafite 0,3381
As 0,2556
Av 0,116181818
d 2,2
%S 4,44243604
agua 5,498
agua n. 0
% C a 19,48356808
m grafite 0,0498
As 0,664
Av 0,301818182
d 2,2
%S 10,40621866
agua 2,7168
agua n. 3
% C a 82,86144578
m grafite 0,5502
Summary
t/h
Oversize Waste 6,0
Large Flake 0,78
Medium Flake 1 1,0102
Medium Flake 2 0,5526
Tails 96,7
Totals 105,0
Total Graphite 2,3428
C 2,2039
% C 94,07%
% Recoup 91,26%
As 0,5526
Av 0,251182
d 2,2
%S 31,46746
agua 1,2035
agua n. 0
% C a 97,03221
m grafite 0,5362
As 0,1114
Av 0,050636364
d 2,2
%S 2,408804895
agua 4,5133
agua n. 0
% C a 12,56732496
m grafite 0,014
Flake Médio 2
0,5526

APPENDIX 5: FINANCIAL ANALYSES

Parameters

Adjustments

OPEX Adjustment	100%
Prices Adjustment	100%
CAPEX Adjustment	100%

Waste/Ore Strip Ratio	1,27			
Average Mining Grade	2,63%			
Average Recovery	88%			
Average Concentrate %	95%			
Products & Prices	4%	+ 30 Mesh Price	$	2.500
	32%	+ 50 - 30 Mesh Price	$	2.000
	27%	+80 - 50 Mesh Price	$	1.100
	17%	+100 - 80 Mesh Price	$	950
	20%	< 100 Mesh Price	$	775
Average Throughput (t/yr)	649.727		$	1.354

Mining ($/t mined)	R$ 3,47
Processing ($/t of processed ore)	R$ 17,80
G&A ($/t of processed ore)	R$ 7,55
Loss Carryforward	0%
Discount on NPV	5%

Real/Dollar Currency Exchange	R$	3,30		
Social Contribution		9%		
Income Tax		25%		
Capital Expenditures (US$ 000)	**Original CAPEX**		**Adjusted CAPEX**	
Access Roads	R$	1.200.000	R$	1.200.000
Power Supply	R$	1.250.000	R$	1.250.000
TSF Construction	R$	3.500.000	R$	3.500.000
TSF Pumping System	R$	308.000	R$	308.000
Owners Fleet & Equipment	R$	7.911.400	R$	7.911.400
Infrastructure/Civil	R$	15.205.000	R$	15.205.000
Plant Construction & Equipment	R$	23.013.412	R$	23.013.412
Warehouse/Initial Inventory/Commissioning	R$	800.000	R$	800.000
Total Initial CAPEX (excl. WC)	**R$**	**53.187.812**	**R$**	**53.187.812**
Pre-Stripping	R$	372.530	R$	372.530
EPCM	R$	3.500.000	R$	3.500.000
Working Capital	R$	4.930.216	R$	4.930.216
Contingencies (10%)	R$	5.706.034	R$	5.706.034
Total Start Up Costs	**R$**	**67.696.592**	**R$**	**67.696.592**

Sustaining Capital

Mine Closure	R$	10.000.000
Tailings Dam Raises	R$	6.000.000
Fleet Replacement	R$	7.911.400
Total Sustaining	**R$**	**23.911.400**

Summary

Production		
Avg. Throughput (t ore/yr)	649.727	
Avg. Strip Ratio	1,27	
Avg. Grade	2,63%	
Avg. Recovery	88%	
Concentrated (% Gr)	95%	
Avg. Production t/yr Conc.	15.819	
Operating Costs	Dollar	Real
Mining ($/t mined)	$ 1,05	R$ 3,47
Processing ($/t processed)	$ 5,39	R$ 17,80
G&A ($/t processed)	$ 2,29	R$ 7,55
Total $/t sold	$ 413	R$ 1.364
Capex	Dollar	Real
Initial Capex (incl. WC; excl. sustaining)	$ 16.118	R$ 53.188
Capex/t sold	$ 1.019	R$ 3.362
NPV **5%**	**$117.043**	**R$ 386.242**
IRR	**78%**	**78%**

Reserves & Resources	
P+P	-
P+P Grade	-
M+I	14.990.400
M+I Grade	2,70%
Inferred	3.572.100
Inferred Grade	2,90%
Total R&R	18.562.500
Average Grade R&R	2,74%
Mineable Scheduled Resources	
Total Scheduled Resources	12.019.948
Average Grade	2,63%

Santa Cruz Project Cash Flow

	FX Real/Dollar		**R$**	**3,30**																					
				Units or factor	**Total**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**
Production					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44,1%	Mined Ore		tonnes		12.019.948	0	650.005	650.025	650.018	650.032	650.008	650.055	650.014	650.048	650.028	650.077	650.008	650.027	650.016	650.014	650.070	650.066	650.002	650.028	319.408
55,9%	Waste		"		15.206.074	0	107.235	1.603	283.200	645.895	429.740	880.929	2.342.888	1.369.327	860.560	1.061.593	1.203.657	2.505.491	64.459	48.640	267.617	547.617	767.456	845.581	972.584
	Processed Ore		"		12.019.948	0	650.005	650.025	650.018	650.032	650.008	650.055	650.014	650.048	650.028	650.077	650.008	650.027	650.016	650.014	650.070	650.066	650.002	650.028	319.408
	Grade		%		**2,63%**	0,00%	3,12%	3,28%	3,70%	3,32%	2,32%	1,89%	2,47%	2,11%	1,97%	3,08%	2,42%	2,28%	2,38%	2,48%	3,08%	3,02%	2,65%	2,13%	1,87%
	Mill Recovery		%		**88%**	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
	Concentrated (% Gr)		%		**95%**	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
	Tonnes Produced (95% Gr)		tonnes		292.655	-	18.773	19.762	22.274	19.995	13.948	11.378	14.864	12.712	11.861	18.517	14.560	13.714	14.340	14.945	18.559	18.176	15.929	12.815	5.531
Revenue, US$ 000						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Product Composition	**Graphite Price**			US$ 000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4%	+ 30 Mesh Price		**$**	**2.500**	29.265	0	1.877	1.976	2.227	2.000	1.395	1.138	1.486	1.271	1.186	1.852	1.456	1.371	1.434	1.495	1.856	1.818	1.593	1.282	553
32%	+ 50 - 30 Mesh Price		**$**	**2.000**	187.299	0	12.015	12.648	14.255	12.797	8.927	7.282	9.513	8.136	7.591	11.851	9.318	8.777	9.178	9.565	11.878	11.633	10.195	8.202	3.540
27%	+80 - 50 Mesh Price		**$**	**1.100**	86.919	0	5.576	5.869	6.615	5.939	4.143	3.379	4.414	3.776	3.523	5.500	4.324	4.073	4.259	4.439	5.512	5.398	4.731	3.806	1.643
17%	+140 - 80 Mesh Price		**$**	**950**	47.264	0	3.032	3.192	3.597	3.229	2.253	1.838	2.400	2.053	1.916	2.991	2.351	2.215	2.316	2.414	2.997	2.935	2.573	2.070	893
20%	< 140 Mesh Price		**$**	**775**	45.362	0	2.910	3.063	3.452	3.099	2.162	1.764	2.304	1.970	1.839	2.870	2.257	2.126	2.223	2.317	2.877	2.817	2.469	1.986	857
	Graphite Revenue			US$ 000	396.109	-	25.410	26.748	30.148	27.064	18.879	15.400	20.118	17.206	16.054	25.063	19.707	18.561	19.409	20.228	25.120	24.601	21.560	17.345	7.487
Transportation ($/t)			$	21	(6.208)	-	(398)	(419)	(472)	(424)	(296)	(241)	(315)	(270)	(252)	(393)	(309)	(291)	(304)	(317)	(394)	(386)	(338)	(272)	(117)
	NSR Royalty (CFEM Govt + Landowner)			**3,0%**	(11.883)	-	(762)	(802)	(904)	(812)	(566)	(462)	(604)	(516)	(482)	(752)	(591)	(557)	(582)	(607)	(754)	(738)	(647)	(520)	(225)
Net Revenue					**378.017**	**-**	**24.249**	**25.526**	**28.771**	**25.828**	**18.016**	**14.697**	**19.199**	**16.420**	**15.321**	**23.918**	**18.807**	**17.714**	**18.523**	**19.304**	**23.973**	**23.477**	**20.576**	**16.553**	**7.145**
Project Operating Costs				US$ 000	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R$ 3,47	Mining ($/t mined)		**$**	**1,05**	(28.661)	-	(797)	(686)	(982)	(1.364)	(1.137)	(1.612)	(3.151)	(2.126)	(1.590)	(1.802)	(1.951)	(3.322)	(752)	(735)	(966)	(1.261)	(1.492)	(1.574)	(1.360)
R$ 17,8	Processing ($/t of processed ore)		**$**	**5,39**	(64.824)	-	(3.505,5)	(3.505,6)	(3.505,6)	(3.505,7)	(3.505,5)	(3.505,8)	(3.505,6)	(3.505,7)	(3.505,6)	(3.505,9)	(3.505,5)	(3.505,6)	(3.505,6)	(3.505,6)	(3.505,9)	(3.505,8)	(3.505,5)	(3.505,6)	(1.722,6)
R$ 7,55	G&A ($/t of processed ore)		**$**	**2,29**	(27.516)	-	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(1.488)	(731)
	Total operating Cost				(121.002)	-	(5.791)	(5.680)	(5.976)	(6.358)	(6.130)	(6.606)	(8.144)	(7.120)	(6.584)	(6.796)	(6.945)	(8.316)	(5.746)	(5.729)	(5.960)	(6.255)	(6.486)	(6.568)	(3.814)
-R$ 1.364,42	Cash Cost - ($/t sold - 95% Gr)		**$**	**(413)**	(33.496)	$ -	$ (308)	$ (287)	$ (268)	$ (318)	$ (440)	$ (581)	$ (548)	$ (560)	$ (555)	$ (367)	$ (477)	$ (606)	$ (401)	$ (383)	$ (321)	$ (344)	$ (407)	$ (513)	$ (689)
EBITDA				**US$ 000**	**257.016**	**-**	**18.459**	**19.846**	**22.795**	**19.470**	**11.886**	**8.091**	**11.055**	**9.301**	**8.737**	**17.122**	**11.862**	**9.398**	**12.777**	**13.575**	**18.013**	**17.223**	**14.090**	**9.985**	**3.331**
Depreciation					(16.118)	-	(3.224)	(3.224)	(3.224)	(3.224)	(3.224)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBT				**US$ 000**	**240.898**	**-**	**15.235**	**16.623**	**19.571**	**16.246**	**8.663**	**8.091**	**11.055**	**9.301**	**8.737**	**17.122**	**11.862**	**9.398**	**12.777**	**13.575**	**18.013**	**17.223**	**14.090**	**9.985**	**3.331**
Social Contribution				9%	(23.131)	-	(1.661)	(1.786)	(2.052)	(1.752)	(1.070)	(728)	(995)	(837)	(786)	(1.541)	(1.068)	(846)	(1.150)	(1.222)	(1.621)	(1.550)	(1.268)	(899)	(300)
Income Tax	SUDENE - 75% disc. First 10 years			25%	(29.026)	-	(952)	(1.039)	(1.223)	(1.015)	(541)	(506)	(691)	(581)	(546)	(1.070)	(741)	(2.350)	(3.194)	(3.394)	(4.503)	(4.306)	(1.541)	(624)	(208)
EAT				**US$ 000**	**188.740**	**-**	**12.622**	**13.798**	**16.297**	**13.478**	**7.052**	**6.857**	**9.369**	**7.882**	**7.405**	**14.511**	**10.053**	**6.203**	**8.433**	**8.960**	**11.888**	**11.367**	**11.281**	**8.462**	**2.823**
Capital Expenditures					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total initial CAPEX	**$**	**67.697**	**$**	**20.514**	(20.514)	(20.514)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Sustaining Capital					(7.246)	-	-	-	-	-	(606)	-	(909)	(606)	-	-	(606)	(2.397)	(909)	(606)	-	(606)	-	-	-
Total LOM CAPEX					(27.760)	(20.514)	-	-	-	-	(606)	-	(909)	(606)	-	-	(606)	(2.397)	(909)	(606)	-	(606)	-	-	-
Project Cash Flow				**US$ 000**	**177.098**	**(20.514)**	**15.845**	**17.021**	**19.520**	**16.702**	**9.669**	**6.857**	**8.460**	**7.276**	**7.405**	**14.511**	**9.447**	**3.805**	**7.524**	**8.354**	**11.888**	**10.761**	**11.281**	**8.462**	**2.823**
	Cumulative (before debt)					(51.285)	(42.444)	23.877	98.209	169.245	217.561	250.117	281.553	311.524	341.860	389.245	433.720	455.916	482.831	514.091	557.252	601.684	645.339	684.406	704.157
	NPV before debt			5%	117.043	(19.900)	15.371	15.725	17.175	13.996	7.708	5.212	6.124	5.009	4.862	9.074	5.619	2.142	4.064	4.292	5.825	5.019	5.008	3.581	1.138
	All Equity NPV			**117.043**																					
	IRR			**78%**																					
	Avg. Free Cash Flow per year		**$**	**10.401**																					
	Avg. Free Cash Flow (yrs 1-5)		*$*	*15.752*																					

CAPEX

TOTAL CAPEX

Infrastructure/Civil	R$	17.655.000	
Owners Fleet & Equipment	R$	7.911.400	
TSF Pumping System	R$	3.808.000	
Warehouse/Initial Inventory/Commissioning	R$	800.000	
Plant Construction & Equipment	R$	23.013.412	
Total Initial Capex	R$	53.187.812	

EPCM	R$	3.500.000	
Pre-Stripping	R$	372.530	
Working Capital	R$	4.930.216	3 months of operating costs
10% **Contingencies (10%)**	R$	5.706.034	
Total Start Up Costs	R$	67.696.592	

Sustaining Capital

Mine Closure (on going - every 3 yrs)
R$ 2.000.000
Tailings Dam Raises (every 6 yrs)
R$ 3.000.000
Fleet Replacement
R$ 7.911.400

Infrastructure

Item	Description	Unit	No. Units	Unit Price	Total Price
Access roads	10 km + largura de 12 m	km	10	R$ 120.000	R$ 1.200.000
Power Supply - Transmission Line	13,8 kV - 3000kva	R$ 0,35 / kWh	km	10	R$ 100.000	R$ 1.000.000
Power Supply - Power transformer + Service		unid	1	R$ 250.000	R$ 250.000
Buildings and Equipments					
	Administration, offices	m²	450	R$ 1.200	R$ 540.000
	Laboratory	m²	450	R$ 1.200	R$ 540.000
	Restaurant/Warehouse/Mechanics Shops/Changing Areas	m²	1200	R$ 1.200	R$ 1.440.000
	Covered Stockpile Area	m²	7150	R$ 300	R$ 2.145.000
	Plant Civil - Construction	m²	8000	R$ 1.200	R$ 9.600.000
Others					
	Fences	m	10000	R$ 10	R$ 100.000
	Earthworks/Grading	m³	140000	R$ 6	R$ 840.000
Subtotal					R$ 17.655.000

Owners Fleet

Item	Description	Unit	No. Units	Unit Price	Total Price
CAT 336 D2L		#	2	R$ 700.000	R$ 1.400.000
Cat 930 Wheel Loader	2,3 m³ Bucket	#	2	R$ 576.000	R$ 1.152.000
Scania 38t Haul Trucks		#	5	R$ 550.000	R$ 2.750.000
CAT 120K Motor Grader		#	1	R$ 550.000	R$ 550.000
Crane Truck		#	1	R$ 200.000	R$ 200.000
Forklift	2,500 kg / Diesel	#	1	R$ 100.000	R$ 100.000
Cat D6 Track Dozer	125 hp	#	1	R$ 552.000	R$ 552.000
Fuel & Lube Truck		#	1	R$ 218.400	R$ 218.400
Water Truck	25,000 l	#	1	R$ 300.000	R$ 300.000
Mechanics Truck		#	1	R$ 186.000	R$ 186.000
Toyota Hilux 4x4		#	3	R$ 156.000	R$ 468.000
Volkswagen Gol		#	1	R$ 35.000	R$ 35.000
Subtotal					R$ 7.911.400

TSF Pumping System

Item	Description	Unit	No. Units	Unit Price	Total Price
Tailings HDPE Pipe	6m and 8" pipes - 1 km	unit	180	R$ 300	R$ 54.000
Return Water Pipe	6m and 8" pipes - 1 km	unit	180	R$ 300	R$ 54.000
Pump	Water pump - 150cv	unit	2	R$ 20.000	R$ 40.000
Electric	150hp motor, panel, etc.	unit	2	R$ 60.000	R$ 120.000
Pump Barge	Floating System	unit	1	R$ 40.000	R$ 40.000
Initial TSF Dam Construction		unit	1	R$ 3.500.000	R$ 3.500.000
Subtotal					R$ 3.808.000

Plant Construction & Equipment

Item	Description		Unit	No. Units	Unit Price	Total Price	
Project							Subtotal
Electrical Equipment	Energy, lighting, wiring, motors, panels, etc.	-	unit	1	R$ 3.000.000	R$ 3.000.000	
Feed							R$ 3.000.000
Feed Hopper			unit	1	R$ 78.400	R$ 78.400	
Scrubber			unit	1	R$ 39.200	R$ 39.200	Feed
Conveyor Belt			unit	2	R$ 122.500	R$ 245.000	R$ 362.600
Milling & Segregation							
Ball Mill - MQT2130 - 210 kw			unit	7	R$ 620.189	R$ 4.341.322	
Rod Mill - MB2740 - 400 kw			unit	1	R$ 1.286.894	R$ 1.286.894	
Conditioner			unit	2	R$ 25.500	R$ 51.000	
Mill Circuit Screens			unit	2	R$ 42.000	R$ 84.000	Milling & Segregation
Slurry Pump			unit	10	R$ 8.000	R$ 80.000	R$ 5.843.216
Flotation							
Flotation Cell - Rougher - Model DR500 - Macdarma			unit	1	R$ 3.380.000	R$ 3.380.000	
Flotation Cell - Cleaner - Model DR24/DR18 - Macdarma			unit	7	R$ 78.857	R$ 552.000	
Flotation Cell - Scavenger - Model DR500/08 - Macdarma			unit	1	R$ 2.490.000	R$ 2.490.000	Flotation
Sand Pump			unit	10	R$ 15.000	R$ 150.000	R$ 6.572.000
Filter Press							
Inox Feed Hopper			unit	5	R$ 25.000	R$ 125.000	
Inox Auger Conveyor			unit	5	R$ 25.000	R$ 125.000	
Homogenizer Tank			unit	5	R$ 50.000	R$ 250.000	Filter Press
Automatic Filter Press - Model FPI-1000D-CR-80/80-AHE/80	http://www.grabe.com.br		unit	5	R$ 540.300	R$ 2.701.500	R$ 3.201.500
Drying							
Flash Dryer			unit	2	R$ 1.000.000	R$ 2.000.000	
Inox Auger Conveyor			unit	3	R$ 20.300	R$ 60.900	Drying
Inox Feed Hopper			unit	2	R$ 7.000	R$ 14.000	R$ 2.074.900
Screening							
Vibrating Screen - Model 2YK2160 - 22 kw			unit	1	R$ 220.440	R$ 220.440	
Vibrating Screen - Model 3YK1848 - 18,5 kw			unit	1	R$ 173.514	R$ 173.514	Screening
Vibrating Screen - Model 2YK1548 - 15 kw			unit	1	R$ 125.242	R$ 125.242	R$ 519.196
Other							
Water Reservoir	-	250000	liters	1	R$ 690.000	R$ 690.000	R$ 690.000
Storage Silos (reagents, other)			unit	3	R$ 250.000	R$ 750.000	
Subtotal						R$ 23.013.412	

Working Capital

Initial Working Capital (3 Months Operations)			unit	1	R$ 4.930.216	R$ 4.930.216
Item Subtotal						$ 4.930.216

Exchange Rate	R$	3,30

Annual Total Mined Tonnes	1.541.506	tonnes
Monthly Total Mined Tonnes	128.459	tonnes
Annual Processed Tonnes	650.034	tonnes
Monthly Processed Tonnes	54.169	tonnes

G = G&A **M = Mining** **P = Processing**

G&A	Monthly Costs		Annual Costs	
Office Rental	R$ 5.000	$ 1.515	R$ 60.000	$ 18.182
Law Firm	R$ 10.000	$ 3.030	R$ 120.000	$ 36.364
Accountancy	R$ 5.000	$ 1.515	R$ 60.000	$ 18.182
Travel	R$ 20.000	$ 6.061	R$ 240.000	$ 72.727
Community & Marketing	R$ 25.000	$ 7.576	R$ 300.000	$ 90.909
Consumables, phone, etc.	R$ 15.000	$ 4.545	R$ 180.000	$ 54.545
G&A Salaries	R$ 329.216	$ 99.762	R$ 3.950.592	$ 1.197.149
Total	R$ 409.216	$ 124.005	R$ 4.910.592	$ 1.488.058

Process	Monthly Costs		Annual Costs	
Pine Oil	R$ 7.223	$ 2.189	$ 86.670	$ 26.264
Kerosene	R$ 39.724	$ 12.038	$ 476.685	$ 144.450
Sodium Silicate	R$ 4.845	$ 1.468	$ 58.140	$ 17.618
Power Consumption	R$ 392.000	$ 118.788	$ 4.704.000	$ 1.425.455
Rods	R$ 15.510	$ 4.700	$ 186.120	$ 56.400
Pebbles	R$ 3.500	$ 1.061	$ 42.000	$ 12.727
Balls	R$ 33.660	$ 10.200	$ 403.920	$ 122.400
Plant Maintenance	R$ 83.333	$ 25.253	$ 1.000.000	$ 303.030
Process Salaries	R$ 384.264	$ 116.444	$ 4.611.168	$ 1.397.324
Total	R$ 964.059	$ 292.139	$ 11.568.703	$ 3.505.668

Mining	Monthly Costs		Annual Costs	
Diesel, Maintenance, Tires and Wear Parts Costs	R$ 297.713	$ 90.216	R$ 3.572.551	$ 1.082.591
Mining Salaries	R$ 148.548	$ 45.015	R$ 1.782.576	$ 540.175
Total	R$ 446.261	$ 135.230	R$ 5.355.127	$ 1.622.766

G&A Costs /t processed	R$	7,55	$	2,29
Processing Costs /t processed	R$	17,80	$	5,39
Mining Costs /t mined	R$	3,47	$	1,05

Total Mining Costs Breakdown

	Monthly Costs		Annual Costs	
Diesel, Maintenance, Tires and Wear Parts Costs	R$ 297.713	$ 90.216	R$ 3.572.551	$ 1.082.591
Mining Salaries	R$ 148.548	$ 45.015	R$ 1.782.576	$ 540.175
Total	R$ 446.261	$ 135.230	R$ 5.355.127	$ 1.622.766
			R$ 5,23	

Diesel, Maintenance, Tires, Parts Costs

Equipment	As described in CostMine		CAPEX $/Unit	CAPEX R$/Unit
CAT 336 D2L		2	$ 212.121	R$ 700.000
CAT 930G Wheel Loader	**2.7 cm bucket, 180 hp, 15059 kg**	2	$ 174.545	R$ 576.000
CAT D6K Bulldozer	**Tractor, Crawler 125 hp, 12886 kg**	1	$ 167.273	R$ 552.000
CAT 120K Motor Grader		1	$ 166.667	R$ 550.000
Forklift		1	$ 30.303	R$ 100.000
Crane Truck		1	$ 60.606	R$ 200.000
Scania Haul Truck	**480G 6x4, rear-dump, articulated**	5	$ 200.000	R$ 660.000
4 x 4 Toyota Hilux Pickup	**3/4 ton 5 speed**	3	$ 47.273	R$ 156.000
25 kL water Truck	**25L water tanker**	1	$ 318.182	R$ 1.050.000
Fuel/Lube Truck	**Complete Unit**	1	$ 66.182	R$ 218.400
Mechanic's Truck	**Complete Unit**	1	$ 56.364	R$ 186.000
Total			**$ 1.499.515**	**R$ 4.948.400**

Cost per hour	R$	2.082	/h
Cost/day	R$	13.532	/day
Cost/month	R$	297.713	/month
Cost/year	R$	3.572.551	/year

Operating Costs - R$/h

Inspection		Maintenance						Cost/hour
Parts	Labor	Parts	Labor	Fuel	Lubricant	Tires	Wear Parts	Total/Unit	Total Mine
R$ 34,95	R$ 34,56	R$ 52,43	R$ 51,82	R$ 139,31	R$ 17,00	R$ -	R$ 11,04	R$ 341,11	R$ 682
R$ 3,88	R$ 4,49	R$ 7,23	R$ 8,32	R$ 57,02	R$ 4,80	R$ 8,61	R$ 0,87	R$ 95,22	R$ 190
R$ 4,20	R$ 5,54	R$ 6,31	R$ 8,32	R$ 43,90	R$ 4,17	R$ -	R$ 16,95	R$ 89,39	R$ 89
R$			7,40	R$			73,80	R$ 81,20	R$ 81
R$ 0,50	R$ 0,70	R$ 0,90	R$ 1,50	R$			25,00	R$ 28,60	R$ 29
R$ 1,53	R$ 1,77	R$ 2,85	R$ 3,30	R$ 26,58	R$ 1,93	R$ 1,43	R$ -	R$ 39,39	R$ 39
R$ 4,46	R$ 6,63	R$ 8,32	R$ 12,30	R$ 59,93	R$ 10,03	R$ 14,12	R$ -	R$ 115,79	R$ 579
R$ 0,53	R$ 0,77	R$ 0,98	R$ 1,43	R$ 31,52	R$ 2,77	R$ 0,53	R$ -	R$ 38,52	R$ 116
R$ 8,53	R$ 12,65	R$ 15,84	R$ 23,47	R$ 117,64	R$ 8,71	R$ 12,22	R$ -	R$ 199,06	R$ 199
R$ 1,53	R$ 1,77	R$ 2,85	R$ 3,30	R$ 26,58	R$ 1,93	R$ 1,43	R$ -	R$ 39,39	R$ 39
R$ 1,29	R$ 1,50	R$ 2,40	R$ 2,77	R$ 26,58	R$ 1,72	R$ 1,43	R$ -	R$ 37,70	R$ 38
									R$ 2.082

*based on Diesel price of R$2,77/l

Mining Salaries Breakdown

PPR/PL

Job Function	Monthly Salary	Total Remuneration	Social Charges 100,00%	Total Cost per Employee (R$)	N³ Employees	Total
Mine						
Mining Engineer	R$ 8.500	8.500	8.500	R$ 17.000	1	R$ 17.000
Mining Technician	R$ 3.200	3.200	3.200	R$ 6.400	1	R$ 6.400
Equipment Operator	R$ 2.000	2.000	2.000	R$ 4.000	15	R$ 60.000
Geology Technician	R$ 4.000	4.000	4.000	R$ 8.000	2	R$ 16.000
Surveyor	R$ 3.954	3.954	3.954	R$ 7.908	1	R$ 7.908
Surveyor - Assistant	R$ 1.270	1.270	1.270	R$ 2.540	1	R$ 2.540
General Helper	R$ 1.100	1.100	1.100	R$ 2.200	2	R$ 4.400
Geologist	R$ 8.900	8.900	8.900	R$ 17.800	1	R$ 17.800
Mechanic	R$ 2.750	2.750	2.750	R$ 5.500	3	R$ 16.500
Total		35.674	35.674	R$ 71.348	27	R$ 148.548

Average Brazilian Salaries

Job Function	Average Salary	Minimum	Maximum
General Helper	R$ 929	R$ 758	R$ 1.100
Mining Technician	R$ 2.600	R$ 2.000	R$ 3.200
Geologist	R$ 6.450	R$ 4.000	R$ 8.900
Geology Technician*	R$ 4.000		
Surveyor	R$ 3.954	R$ 3.470	R$ 5.000
Surveyor - Assistant	R$ 1.270	R$ 780	R$ 2.000
Maintenance Technician/Mechanic	R$ 2.175	R$ 1.600	R$ 2.750
Equipment Operator*	R$ 2.000		
Mining Engineer	R$ 6.750	R$ 5.000	R$ 8.500

Source: http://www.catho.com.br/profissoes/cargo/

*BGSA Estimation based on current market

Total Process Costs Breakdown

	Monthly Costs		Annual Costs	
Pine Oil	R$ 7.223	$ 2.189	$ 86.670	$ 26.264
Kerosene	R$ 39.724	$ 12.038	$ 476.685	$ 144.450
Sodium Silicate	R$ 4.845	$ 1.468	$ 58.140	$ 17.618
Power Consumption	R$ 392.000	$ 118.788	$ 4.704.000	$ 1.425.455
Rods	R$ 15.510	$ 4.700	$ 186.120	$ 56.400
Pebbles	R$ 3.500	$ 1.061	$ 42.000	$ 12.727
Balls	R$ 33.660	$ 10.200	$ 403.920	$ 122.400
Plant Maintenance	R$ 83.333	$ 25.253	$ 1.000.000	$ 303.030
Process Salaries	R$ 384.264	$ 116.444	$ 4.611.168	$ 1.397.324
Total	R$ 964.059	R$ 292.139	R$ 11.568.703	R$ 3.505.668

Process Salaries Breakdown

Job Function	Monthly Salary	Total Remuneration	Social Charges 100,00%	Total Cost per Employee (R$)	N³ Employees	Total
Plant						
Health and Safety Technician	R$ 2.300	2.300	2.300	R$ 4.600	1	R$ 4.600
Logistics Analyst Jr	R$ 3.500	3.500	3.500	R$ 7.000	1	R$ 7.000
Mill Operator	R$ 2.500	2.500	2.500	R$ 5.000	8	R$ 40.000
Flotation Operator	R$ 2.500	2.500	2.500	R$ 5.000	8	R$ 40.000
Screening Operator	R$ 2.500	2.500	2.500	R$ 5.000	4	R$ 20.000
Packing Operator	R$ 2.500	2.500	2.500	R$ 5.000	12	R$ 60.000
Process Technician	R$ 3.200	3.200	3.200	R$ 6.400	1	R$ 6.400
Laboratory Coordinator	R$ 5.700	5.700	5.700	R$ 11.400	1	R$ 11.400
Laboratory Analyst	R$ 2.600	2.600	2.600	R$ 5.200	4	R$ 20.800
Maintenance Supervisor	R$ 5.000	5.000	5.000	R$ 10.000	4	R$ 40.000
Maintenance Technician	R$ 2.750	2.750	2.750	R$ 5.500	8	R$ 44.000
Electrician	R$ 3.400	3.400	3.400	R$ 6.800	4	R$ 27.200
Maintenance Planner	R$ 3.900	3.900	3.900	R$ 7.800	4	R$ 31.200
Warehouse Keeper	R$ 2.308	2.308	2.308	R$ 4.616	4	R$ 18.464
Warehouse Helper	R$ 1.100	1.100	1.100	R$ 2.200	4	R$ 8.800
General Helper	R$ 1.100	1.100	1.100	R$ 2.200	2	R$ 4.400
Total		46.858	46.858	R$ 93.716	70	R$ 384.264

Average Brazilian Salaries

Job Function	Average Salary	Minimum	Maximum
Health and Safety Technician	R$ 1.750	R$ 1.200	R$ 2.300
Logistics Analyst Jr*	R$ 3.500		
Machine Operator	R$ 1.612	R$ 724	R$ 2.500
Lab Coordinator	R$ 4.150	R$ 2.600	R$ 5.700
Lab Technician	R$ 2.100	R$ 1.600	R$ 2.600
Maintenance Assistant	R$ 1.214	R$ 928	R$ 1.500
Electrician	R$ 2.475	R$ 1.550	R$ 3.400
General Helper	R$ 929	R$ 758	R$ 1.100
Mining Technician	R$ 2.600	R$ 2.000	R$ 3.200
Geologist	R$ 6.450	R$ 4.000	R$ 8.900
Security	R$ 1.413	R$ 1.026	R$ 1.800
Maintenance Planner	R$ 2.428	R$ 1.560	R$ 3.900
Warehouse Keeper	R$ 1.532	R$ 1.009	R$ 2.308
Logistics Assistant	R$ 1.441	R$ 1.082	R$ 1.800
Maintenance Supervisor*	R$ 5.000		
Maintenance Technician	R$ 2.175	R$ 1.600	R$ 2.750
Truck Driver	R$ 1.372	R$ 1.073	R$ 1.670
Mining Engineer	R$ 6.750	R$ 5.000	R$ 8.500

Source: http://www.catho.com.br/profissoes/cargo/

*BGSA Estimation based on current market

Flotation Chemical Products Consumption

kg per month

	Pine Oil	Kerosene	Sodium Silicate
Rougher Fines	1.920	1.920	
Scavenger	960	960	600
Cleaner 1	645	645	
Cleaner 2	645	645	300
Cleaner 3	323	323	300
Cleaner 4	323	323	300
Rougher Large	1.920	1.920	
Cleaner 1	645	645	
Cleaner 2	323	323	
Cleaner 3	323	323	
TOTAL	8.025	8.025	1.500
TOTAL ton/month	8	8	2
Product cost/t	$ 900	$ 4.950	$ 3.230
R$/month	$ 7.223	$ 39.724	$ 4.845
Total Cost/produced t	R$ 0,1	R$ 0,7	R$ 0,1

Power Consumption

		1.120.000	kWh/month
	R$	0,35	R$/kWh
Total costs	R$	392.000	R$/month
Total costs	R$	2	R$/t of sold product

Rods, Pebbles and Balls Consumption		Price/t	t/month	Total/month		
Rods	R$	3.300	5	R$	15.510	47
Pebbles	R$	350	10	R$	3.500	34
Balls	R$	3.300	10	R$	33.660	102
Total costs				R$	52.670	
Total costs				R$	1	R$/t of sold product

Maintenance

Percentage on Plant Equipment Capex		10%	/year
Plant Equipment Capex	R$	10.000.000	
Total costs	R$	83.333	R$/month
Total costs	R$	2	R$/t of processed ore

Total G&A Costs Breakdown

	Monthly Costs		Annual Costs	
Office Rental	R$ 5.000	$ 1.515	R$ 60.000	$ 18.182
Law Firm	R$ 10.000	$ 3.030	R$ 120.000	$ 36.364
Accountancy	R$ 5.000	$ 1.515	R$ 60.000	$ 18.182
Travel	R$ 20.000	$ 6.061	R$ 240.000	$ 72.727
Community & Marketing	R$ 25.000	$ 7.576	R$ 300.000	$ 90.909
Consumables, phone, etc.	R$ 15.000	$ 4.545	R$ 180.000	$ 54.545
G&A Salaries	R$ 329.216	$ 99.762	R$ 3.950.592	$ 1.197.149
Total	R$ 409.216	$ 124.005	R$ 4.910.592	$ 1.488.058

G&A Salaries Breakdown

PPR/PL

Job Function	Monthly Salary	Total Remuneration	Social Charges 100,00%	Total Cost per Employee (R$)	N³ Employees	Total
Office						
General Manager	R$ 35.000	35.000	35.000	R$ 70.000	1	R$ 70.000
Project Supervisor	R$ 20.000	20.000	20.000	R$ 40.000	1	R$ 40.000
Sales Manager	R$ 12.000	12.000	12.000	R$ 24.000	1	R$ 24.000
HR/Safety Coordinator	R$ 10.000	10.000	10.000	R$ 20.000	1	R$ 20.000
Financial Coordinator	R$ 10.000	10.000	10.000	R$ 20.000	1	R$ 20.000
Environmental/Community Relations Manager	R$ 10.000	10.000	10.000	R$ 20.000	1	R$ 20.000
Logistics Coordinator	R$ 8.000	8.000	8.000	R$ 16.000	1	R$ 16.000
Security	R$ 1.800	1.800	1.800	R$ 3.600	5	R$ 18.000
Cooks/Cleaning	R$ 1.350	1.350	1.350	R$ 2.700	8	R$ 21.600
Product Procurement Manager	R$ 8.000	8.000	8.000	R$ 16.000	1	R$ 16.000
Commercial/Sales Analyst	R$ 4.007	4.007	4.007	R$ 8.014	4	R$ 32.056
Commercial/Sales Assistant	R$ 1.620	1.620	1.620	R$ 3.240	4	R$ 12.960
General Helper	R$ 1.100	1.100	1.100	R$ 2.200	3	R$ 6.600
Bilingual Secretary/Receptionist	R$ 6.000	6.000	6.000	R$ 12.000	1	R$ 12.000
Total		128.877	128.877	R$ 257.754	33	R$ 329.216

Average Brazilian Salaries

Job Function	Average Salary	Minimum	Maximum
General Mine Manager*	R$ 35.000		
Project Supervisor*	R$ 20.000		
HR Coordinator*	R$ 10.000		
Financial Coordinator*	R$ 10.000		
Environmental/Community Relations Manager*	R$ 10.000		
Commercial/Sales Analyst	R$ 2.531	R$ 1.500	R$ 4.007
Commercial/Sales Assistant	R$ 1.183	R$ 934	R$ 1.620
Security	R$ 1.413	R$ 1.026	R$ 1.800
Cook	R$ 1.105	R$ 860	R$ 1.350
Bilingual Secretary*	R$ 4.500	R$ 3.000	R$ 6.000
Product Procurement Manager*	R$ 8.000		
General Helper	R$ 929	R$ 758	R$ 1.100
Logistics Coordinator	R$ 8.000		

Source: http://www.catho.com.br/profissoes/cargo/

*BGSA Estimation based on current market

Year	Ore (t/yr)	Waste (t/yr)	W:O Ratio (t ore/t waste)	Average Grade (%)	Average Transport Distance (m)
1	650.005	107.235	0,16	3,12	675
2	650.025	1.603	0,00	3,28	661
3	650.018	283.200	0,44	3,70	727
4	650.032	645.895	0,99	3,32	733
5	650.008	429.740	0,66	2,32	702
6	650.055	880.929	1,36	1,89	640
7	650.014	2.342.888	3,60	2,47	1263
8	650.048	1.369.327	2,11	2,11	1798
9	650.028	860.560	1,32	1,97	2463
10	650.077	1.061.593	1,63	3,08	2455
11	650.008	1.203.657	1,85	2,42	2444
12	650.027	2.505.491	3,85	2,28	2466
13	650.016	64.459	0,10	2,38	4021
14	650.014	48.640	0,07	2,48	4073
15	650.070	267.617	0,41	3,08	4092
16	650.066	547.617	0,84	3,02	4025
17	650.002	767.456	1,18	2,65	4105
18	650.028	845.581	1,30	2,13	4029
19	319.408	972.584	3,04	1,87	4070
TOTAL	**12.019.948**	**15.206.074**	**1,27**	**2,63**	**2345**

APPENDIX 6: CERTIFICATE OF AUTHOR – QUALIFIED PERSON

Certificate of Author

Luiz Eduardo Campos Pignatari - Comisión Calificadora de Recursos y Reservas Mineras Chile (Chilean Commission for the Qualification of Competencies in Mineral Resources and Reserves) – CH 20.235 No 288

Av. Jacutinga, 493, apto 42 – São Paulo, SP – 04515-030 – Brazil

luizeduardopignatari@gmail.com +55 11 99950-4854

I, Luiz Eduardo Pignatari, do hereby certify that:

1 - I graduated with a degree in Mining Engineer from the University of São Paulo (1978) with Post Graduation in Mining Operations from the same institution. Has wide experience of operations, manufacturing, research, technical evaluation, economic and financial viability studies, with a focus on techlonogy and operational intelligence, in the Gold, Phosphate and Cement industries, in major corporations such as Bunge Fertilizers, Yamana Gold and Camargo Correa Cement. Certified as a Qualified Person according to Comisión Minera CH-20.235 No288, accepted by NI 43-101 and JORC.

2 - I have participated in the preparation of the technical report titled "Amended NI 43-101 Technical Report, Preliminary Economic Assessment, Brasil Grafite SA, on the Santa Cruz Graphite Project, Itabela, Bahia, Brazil" dated August 21st, 2017. I am independent of Brasil Grafite SA as that term is defined in section 1.5 on NI 43-101.

I have had no prior involvement with the Santa Cruz Graphite Project. I have read NI 43-101 and the technical report on the Santa Cruz Graphite Project and certify that the portions of the technical report for which I am responsible were prepared in compliance with NI 43-101.

As at the date of the technical report on the Santa Cruz Graphite Project, to the best of my knowledge, information, and belief, the portions of the technical information required to be disclosed to make the technical report not misleading.

I have not visited the Santa Cruz Graphite Project.

I was responsible for the overall consolidation and compilation of the Technical Report.

3 - Qualified Person (QP) responsible for reserve according to CH20235 codes, with acceptance to NI 43-101 and JORC:

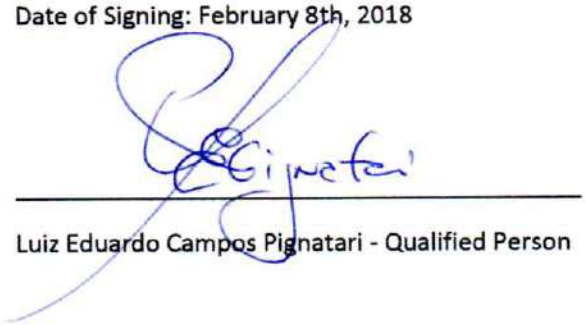
- Reconciliation Works in Gold Mine Operations, establishing sampling protocols, MCF (Mine Call Factor) analysis and operational dilution controls for the following mines Sçao Vicente and São Francisco from Santa Elina's group; Mineração Maracá, MASA (Gualcamayo-Argentina), Pilar de Goiás, Jacobina, MFB and EPP from Yamana Gold.

- Mineable resources evaluation, reserve calculations, mining sequencing and LOM calculation for Yamana mines: Maracá, Jacobina, Gualcamayo (Argentina), MFB, Pilar, C1 and EPP, Santa Elina mines: São Francisco and São Vicente and Aura Gold: EPP Project, Almas Project.

I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Effective Date: August 21st, 2017

Date of Signing: February 8th, 2018



Luiz Eduardo Campos Pignatari - Qualified Person

Certificate of Author

Giorgio de Tomi

Rua Corgie Assad Abdalla, 655A, São Paulo. SP, Brazil 05622-010

Telephone: +55 11 99900-4480

Fax: +55 11 3771-4937

Email: giorgio.de.tomi@gmail.com

I, Giorgio de Tomi, C.Eng MIMM, do hereby certify that:

a) I am a mining engineering consultant associated to:

DT Engenharia

Rua Corgie Assad Abdalla

São Paulo, SP, Brazil

05622-010

b) I have participated in the preparation of the technical report titled "Amended NI 43-101 Technical Report, Preliminary Economic Assessment, Brasil Grafite S.A., on the Santa Cruz Graphite Project, Itabela, Bahia, Brazil" dated August 21st, 2017.

c) I graduated with a degree in Mining Engineer from the University of São Paulo, Brazil in 1983. In addition, I have obtained a PhD in 1995 degree from the Imperial College/UK and an MSc degree in 1989 from Southern Illinois University/USA. I am a Professional Member of the Institute of the Institute of Materials, Minerals & Mining (UK) with membership no. 461723. I am a hartered Engineer with the Engineering Council of the UK. I am a Member of the Society for Society for Mining, Metallurgy, and Exploration in the USA with membership no. 793700. I have worked as a mining engineer for a total of 31 years since my graduation from university. 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.

d) I visited the Santa Cruz Graphite property on October 26th, 2015 for 3 days.

e) I am responsible for the preparation of the following sections of the Technical Report:

- Section 15.0 Mining Methods
- Section 19.0 Capital and Operating Costs

• Section 20.0 Economic Analysis

f) I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.

g) I have not had prior involvement with the property that is the subject of the Technical Report.

h) 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.

i) At the effective date of the technical report, to the best of my knowledge, information, and belief, the part of the Technical Report that I am the is responsible for, contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Effective Date: August 21st, 2017

Date of Signing: February 8th, 2018

_____

Giorgio de Tomi – Qualified Person

CERTIFICATE OF QUALIFIED PERSON

Aldo Moreno Salinas, RUT: 7.366.833-6, Persona Competente Calificada Reg. Nº 328. (Comisión Calificadora de Recursos y Reservas Mineras Chile).

La Fragua 1247, Barrio Industrial, Coquimbo. Chile

Tel: +59 992940207

Email: morenoaldoivan@gmail.com

I, Aldo Moreno Salinas, CCRRCH Nº328, do hereby certify that:

1) I am an independent Geologist and a partner of AMS Asesorías Geológicas Limitada since 2011, whose main office is located at La Fragua 1247, Barrio Industrial, Coquimbo, Chile.

2) I have the following academic and professional qualifications and experience:

A. I am a graduate of Universidad de Chile, Facultad de Ciencias Fisicas y Matemáticas with a B.Sc. Geologist obtained in 1984 and Title of Geologist obtained in the University of Chile.

B. I have worked in geology and mineral exploration continuously since graduation from university.

C I have a certification of Colegio de Geologos de Chile for 30 year of geological work.

D. I am a member of the Comision Calificadora de Recursos y Reservas Mineras de Chile (Reg Nº 328)

E. I have experience relevant to the matters of this Report.

F. I have a good understanding of the geology and mining of mineral deposits of graphite and associated minerals.

G. Over 10 years accumulated experience in non metallic deposits.

H. Over 20 years in the exploration of strata bound, IOCG and porphyry copper deposits.

I. Over 10 years of experience in exploration and project evaluation.

3) 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 by NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101 because I have the appropriate level of

membership in one of the Accepted Foreign Associations and Membership Designations as indicated in Appendix A of NI 43-101;

4) I visited the Itabela Project in December 2016.

5) I reviewed the report entitled "Amended NI 43-101 Technical Report, Preliminary Economic Assessment, Brasil Grafite S.A., on the Santa Cruz Graphite Project, Itabela, Bahia, Brazil" dated August 21st, 2017. I approved for the technical review and preparation of all sections of this Report.

6) I am independent of Brazil Grafite SA.

7) I have had no relationship with the property of graphite Itabela, belonging to Brazil Grafite before the preparation of this report.

8) I state that, as at the date of this certificate, to the best of my qualified 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;

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

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;

Effective Date: August 21st, 2017

Date of Signing: February 8th, 2018

Original signed

Aldo Moreno Salinas

CCRRCh N° 328