

January 22, 2021

Mr. Newell Dennison
Commissioner
Guyana Geology and Mines Commission
Brickdam
Georgetown

Dear Mr. Dennison,

Application for Quarry Licence

I hereby apply for Prospecting License for the area designated as **Turiruba Quarry**.

This application is accomplished by this project document, which provides information on the geology of the area, the work program for the first year, exploration budget and other related details.

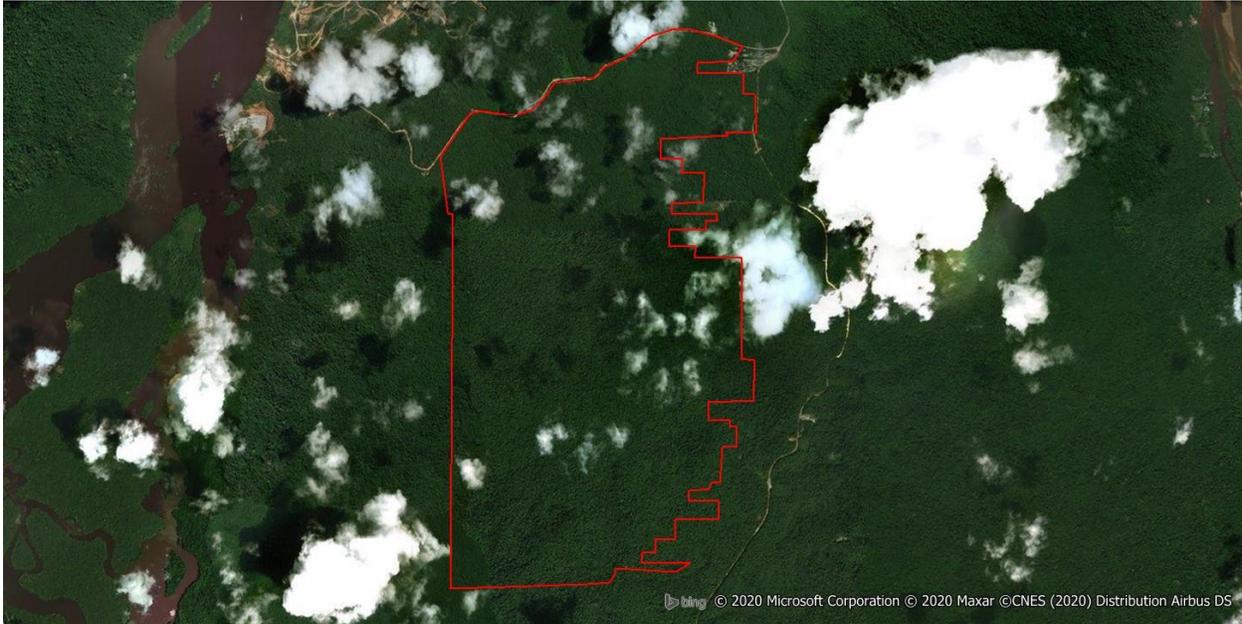
We are also requesting that all relevant concessions related to this location and the sector in general be available to us so as to maximize our possibilities through this investment.

Yours sincerely,

.....
Zhi Rong Su (Director)

Turiruba Quarry Project

2021



Turiruba, Mazaruni Mining District #3

PROJECT SUMMARY

for the Application for Environmental Authorization

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Summary

- Southern Canton International Trading Inc. is applying for the areas of 2,289 acres for quarry potential referred to as Turiruba
- Southern Canton International Trading Inc. will produce 200,000 metric ton of stone yearly and will mine on the area of 20 acres at a time.
- The area has an estimated volume of 6,039,397 with an estimated 9,838,178 metric tons of stone.
- Southern Canton International Trading Inc. is looking to invest more than \$3 million USD to get the project started.
- A total of \$11.7 million USD for capital Investment and Life of Mine.
- The Payback Period is approximately a year and the open pit operating cost is \$3.99 per ton and crushing cost is \$2.25 per ton

2.0 Introduction

The Southern Canton International Trading Inc. is looking to get into the quarrying business based on these factors:

- Massive infrastructural development in the country
- Sharp increase in housing and commercial construction
- Export demand for crushed aggregates from Guyana

The development of the road network approved by European union for the Lethem/Georgetown road and export directly to China is the main focus of the company. The company has the financial Capabilities to fund such a project and has enlisted the help of the technical expertise to determine the feasibility of this project.

The company is applying for the area known as Turrialba, Durban Quarry is actively been mined for quarriable material presently. The pre-feasibility study shows the area has approximately 9,838,178 tons. The cash flow shows that the project can be profitable once detailed drilling program is done to confirm the initial appraisal.

The Blasting Proximity puts every one out of the radius, so no harm will come to anyone. To produce a ton of material it is going to cost approximately \$1375 Guyana dollars and the company will probably make approximately make \$6.9 million USD in the first year of production.

3.0 Location, Physiography & Access

The Property is located approximately 115 km SW from Georgetown and 9 km S from Bartica (Figure 1). It can be accessed by boat and the trip is approximately 2 hours from Parika.

It is about a half day worth of travelling and the easiest access route when compared to others. The Mazaruni/Essequibo river area experience on average 6-34mm rainfall monthly and temperatures between 21 degree Celsius – 35 degree Celsius. The area is covered in tall evergreen flooded riparian forest that is very dense and the area is hilly with most hills belong to mature age Terrain (Figure 2).

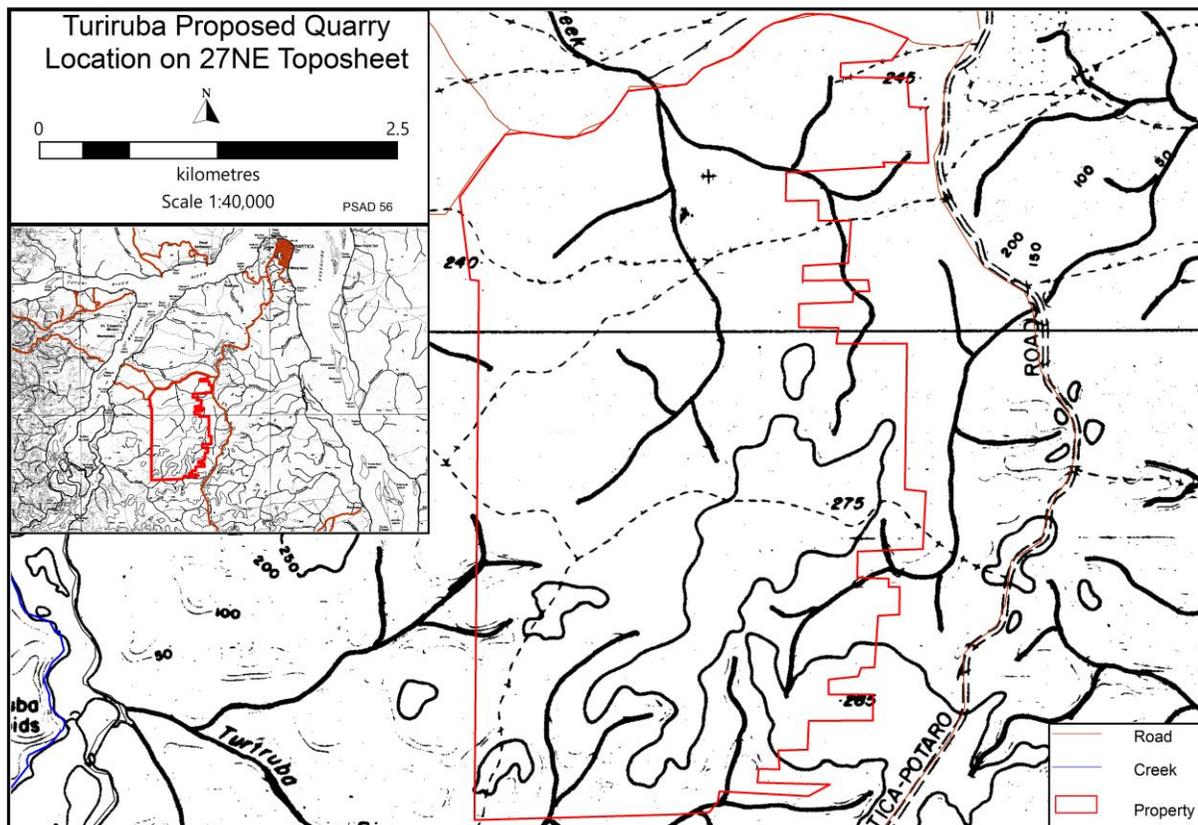


Figure 1. Location & Access Map

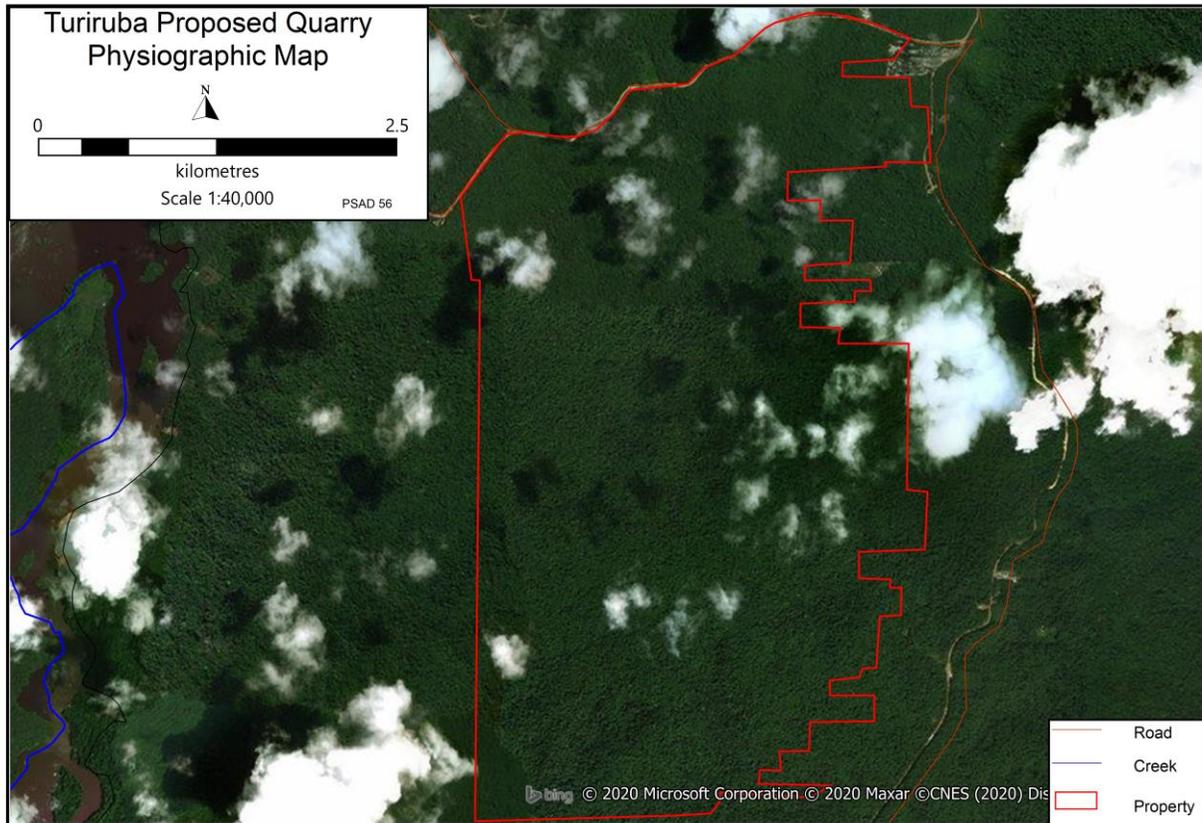


Figure 2. Physiographic Map

4.0 Property Description & Property Status

Tract of state land located in the Mazaruni Mining District No. 3 as shown on Terra Surveys Topographic Map 27NE, at scale 1: 25,000. Table 1 has the list of co-ordinates for the proposed property and it covers 3456 acres. The proposed Turiruba Quarry is located directly east of Durban Quarry and directly north of Black Jaguar Inc. Quarry (Figure 3).

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Points	Longitude	Latitude	Points	Longitude	Latitude
1	-58.6836	6.299459	38	-58.6688	6.299943
2	-58.6833	6.316667	39	-58.6631	6.330408
3	-58.6833	6.333334	40	-58.6598	6.337095
4	-58.6839	6.333382	41	-58.6619	6.338374
5	-58.6845	6.338572	42	-58.6619	6.337088
6	-58.6817	6.342501	43	-58.66	6.334444
7	-58.6804	6.34264	44	-58.6629	6.334267
8	-58.6783	6.34235	45	-58.6629	6.333336
9	-58.6767	6.34282	46	-58.6592	6.333482
10	-58.6749	6.34382	47	-58.6588	6.333377
11	-58.6739	6.34525	48	-58.6597	6.332663
12	-58.6702	6.34567	49	-58.6597	6.332006
13	-58.6692	6.34666	50	-58.6631	6.331886
14	-58.6673	6.34743	51	-58.6606	6.330361
15	-58.6663	6.34821	52	-58.6608	6.329377
16	-58.6654	6.34913	53	-58.6563	6.32939
17	-58.6641	6.34961	54	-58.6605	6.346122
18	-58.6627	6.350091	55	-58.6601	6.3499
19	-58.6639	6.340119	56	-58.6615	6.35008
20	-58.664	6.33834	57	-58.6585	6.34944
21	-58.6658	6.301808	58	-58.6564	6.348762
22	-58.6584	6.309055	59	-58.6572	6.347172
23	-58.6592	6.309025	60	-58.6605	6.346997
24	-58.6594	6.308477	61	-58.6563	6.346053
25	-58.6613	6.30828	62	-58.6562	6.344248
26	-58.6613	6.307349	63	-58.6551	6.344196
27	-58.6585	6.307331	64	-58.655	6.340722
28	-58.6585	6.305716	65	-58.6568	6.314095
29	-58.6625	6.305676	66	-58.6564	6.320225
30	-58.6624	6.30393	67	-58.6551	6.320095
31	-58.6645	6.303831	68	-58.6553	6.31648
32	-58.6644	6.302636	69	-58.6594	6.31633
33	-58.6657	6.302673	70	-58.6595	6.314688
34	-58.6612	6.301699	71	-58.6575	6.314612
35	-58.6626	6.300952	72	-58.6575	6.314092
36	-58.6682	6.301264	73	-58.6568	6.312371
37	-58.6683	6.300604	74	-58.6581	6.312284

Table 1. List of Co-ordinates

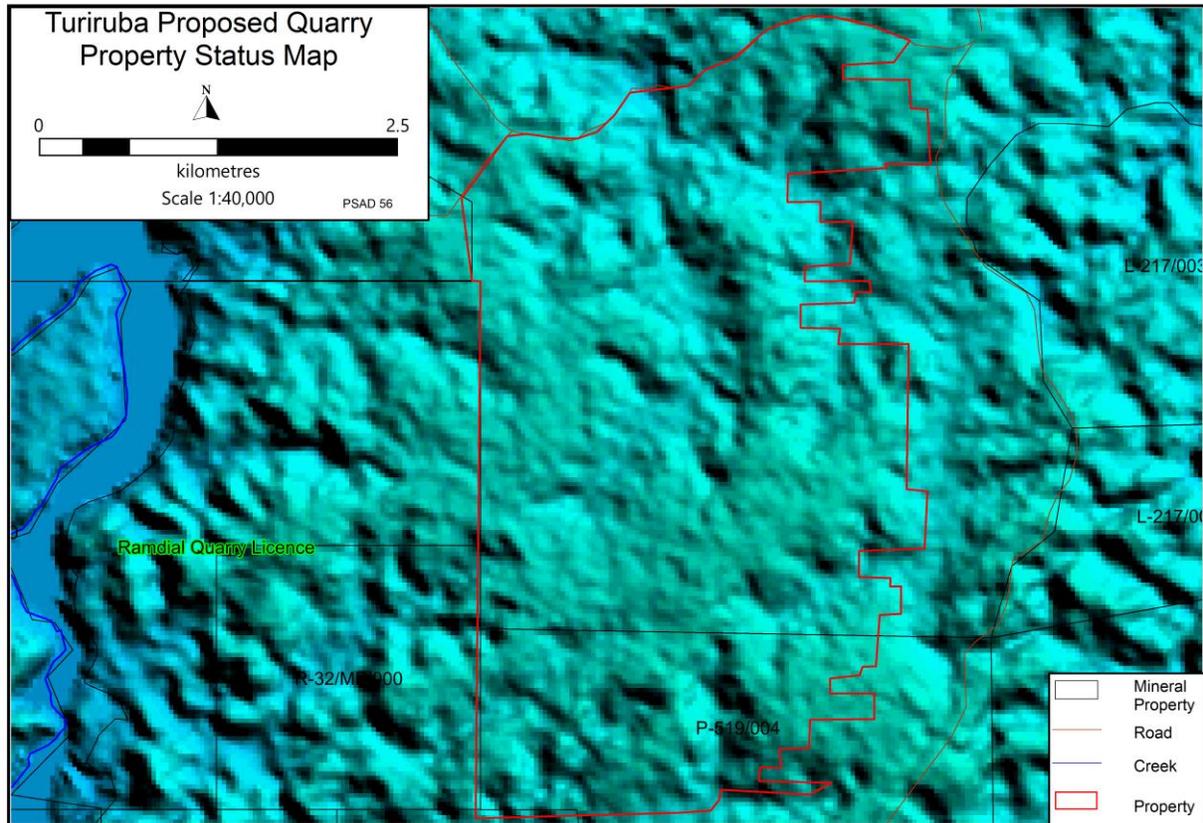


Figure 3. Property Status Map

5.0 Previous Work of the Surrounding Areas

Initial Investigation of the area was undertaken by C.B Brown and J.W Sawkins in 1875 were originality investigating rumors of gold along the Mazaruni River. J.B Harrison (1908), identified the granite in the area. “It was the largest development of true granite in the part of the Colony, I have visited is the mass at the Junction of Mazaruni, Cuyuni and Essequibo. Specific Gravity 2.59 to 2.63 grey colored medium to fine grained texture. Containing Biotite, Sphegne muscovite and oligoclase.” Grantham (1935) did some river traverses in the area. Dixon (1948) describe the granites as non-porphyritic hornblende granite with sharp contact with the gneissose granite. The initial 6,000,000 tons of hard rock reserve that was estimated by Dr. Schielly of the Geological Survey of Guyana in 1968 has been dramatically depleted due to production by Edgeworth Construction. Production by Edgeworth Construction and Mazaruni Granite Products Ltd. totaled approximately 450,000 tons between 1995 and 2003 at the current location of BK Inc. Quarry at Teperu. For the period January 2007 to December 2016 BK Quarries Inc. has produced a combined total of 2.7 million tons of stone, loam and sand at the same location. Palmer’s is likely to have the same amount of stone given the proximity to Teperu.

6.0 Geology & Petrography

6.1 Regional Geology

The Guiana Shield is the northern part of the Amazonian craton in South America and includes parts of Venezuela, Colombia, Guyana, Brazil, Suriname, and French Guiana. The importance of the knowledge of the Guiana Shield lies mainly on its vast mineral potential (Figure 4).

Simplistically, the main geologic divisions are; the Precambrian Archean Imata basement composed of gneisses, amphibolites, itaberites and intrusive granites; the overlying Barama-Mazuruni Supergroup composed of metasedimentary and metavolcanic rock units that are intruded by acid, basic and ultrabasic rocks, the whole referred to as a volcanic series or greenstones, and; the middle Proterozoic Roraima Supergroup. The latter unconformably overlies the Barama-Mazaruni and covers an area of approximately 65,000 square miles in Guyana, Venezuela and Brazil ((A.K, 1980).

Roraima Supergroup and Avanavero Basic Intrusives: The Roraima is composed of approximately 2,000 meters of flat-lying continental sedimentary silica-cemented sandstone's, minor shale's, jaspers and cherts and conglomerates that were deposited in fluvio-deltaic and lacustrine environments. The conglomerate horizons interspersed within the Roraima range in thickness from less than 50 cms. to over 20 meters. The constituent clasts are mostly pebbles of sandstone and white quartz ranging in size up to 16 cms. in length. Descriptions of the conglomerates invariably mention that they do not contain any clastic elements derived from the igneous and metamorphic basement rocks. The Roraima is intruded by the Avanavero Suite consisting of dikes and massive sills of gabbro and norite. Some attaining thickness of hundreds of feet and occupying large areas. The Group is also intruded by the Apatoe Suite of NE/ SW-trending diabase dikes of Triassic-Jurassic age.

A large part of the northern Guiana Shield is underlain by metavolcanic and metasedimentary sequences steeply folded and metamorphosed in the greenschist facies during the 2000 Ma old Trans-Amazonian orogeny. It is suggested that this extensive early Proterozoic belt represents a back-arc basin environment marginal to a supercontinent; that is to say, this belt was possibly intercratonic with respect to existing Archaean basements, whereas elsewhere in the interior of the continent, as in Brazil, fold belts of identical age were intracratonic. The formation of the volcano-sedimentary pile and subsequent orogeny to which the Guiana belt was subjected to plate convergence and subduction. This interpretation is supported by the nature of the volcanic pile and the presence of a possible fossil suture in northern Guiana.

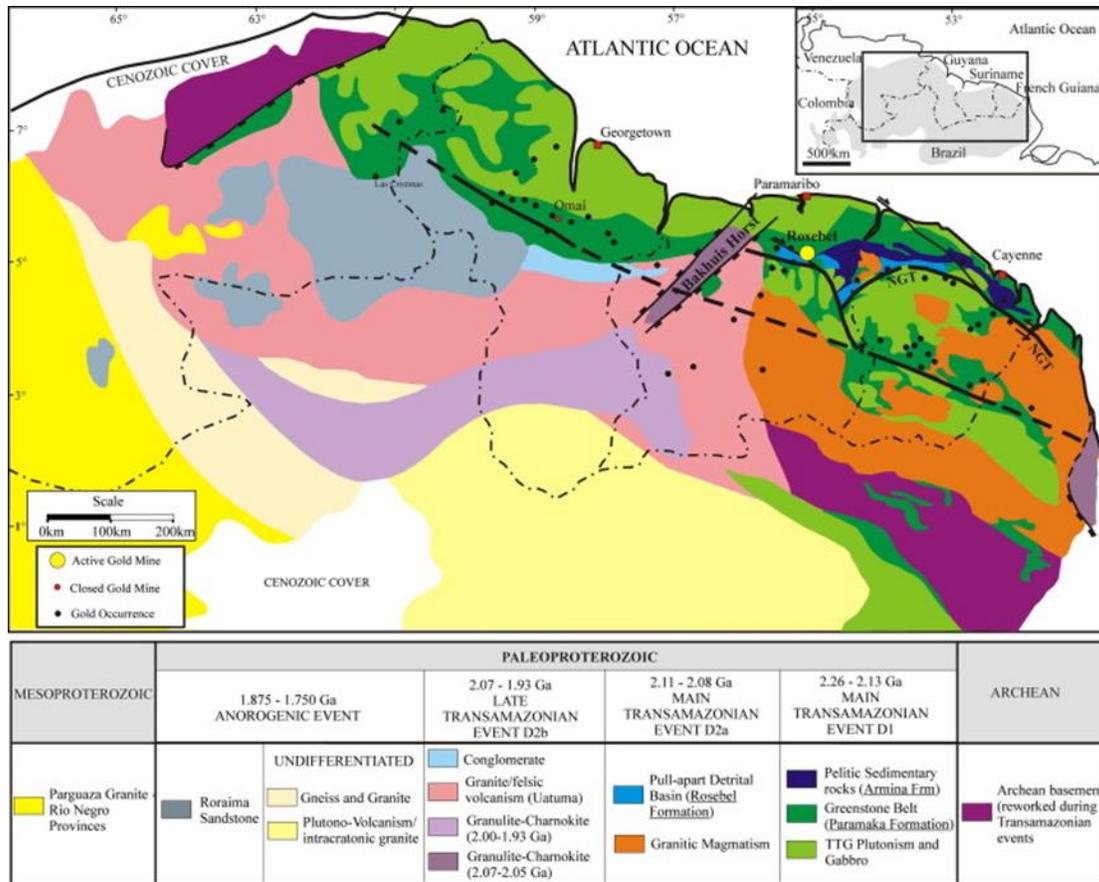


Figure 4. Showing regional geology of the Guiana shield

6.2 Local Geology

The local geology of the area has two distinct lithologies; Younger Granites and Bartica Gneiss Complex (Figure 5).

Younger Granites

Non-foliated Granites

The rock is uniformly massive, leucocratic muscovite granite which contains a few angular, black xenoliths of biotite hornblende hornfels (less than 1%). The rock is heavily jointed, but there is no cleavage nor is the regional foliation present

Bartica Gneiss Complex

Gneiss Metamorphic rocks.

In that area distinct gneisses are present, but occur in narrow zones within a belt of syntectonic granites with amphibolitic xenoliths and amphibolite slivers. It consists of various ortho and paragneisses and amphibolites, generally metamorphosed in the almandine amphibolite facies.

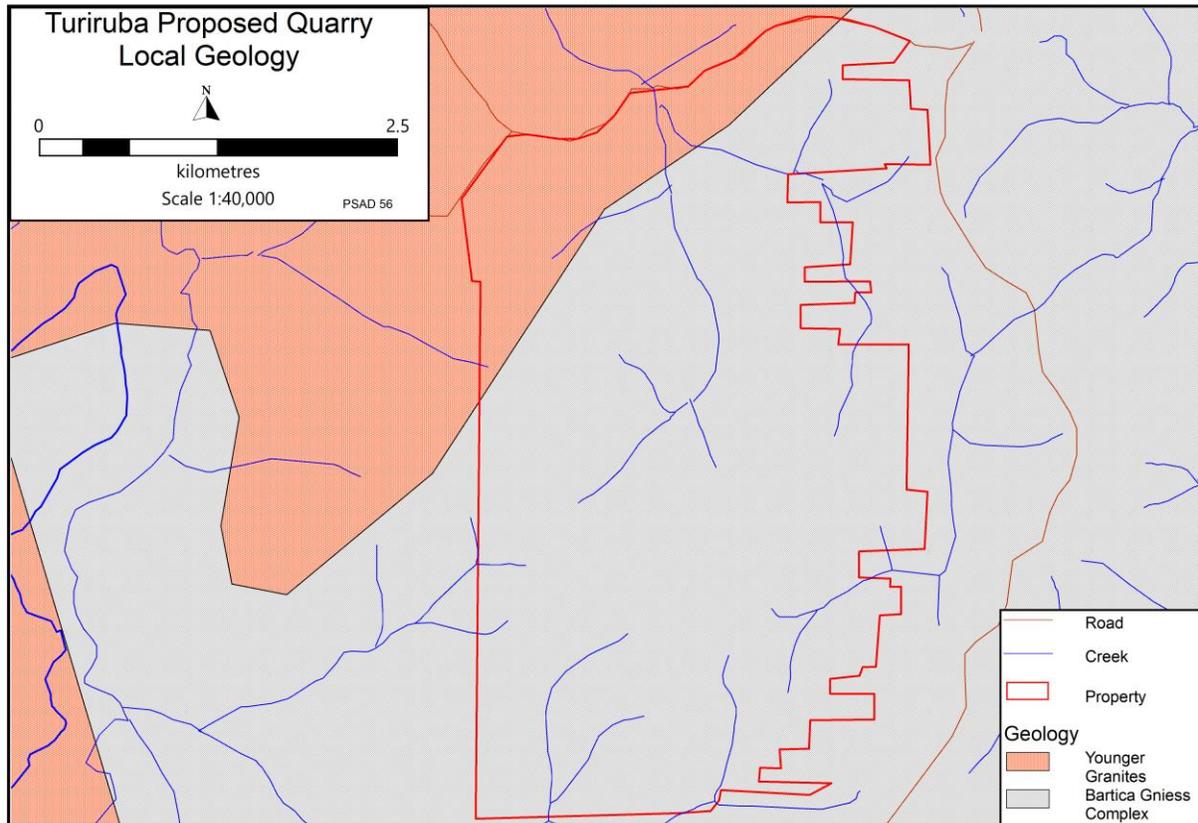


Figure 5. Local Geology Map of Turiruba

6.3 Petrography

Granite is a medium-to coarse-grained leucocratic granite, which contains two micas. It belongs to peraluminous granite and has primary muscovite as aluminous minerals. two-mica granite can be classified into five types on the basis of textural criteria: (1) occurring as intergrowth with or across biotite filling the interstices or as overgrowth of other minerals, (2) as euhedral crystals including small biotite, (3) as single euhedral to subhedral crystals without inclusions, (4) as subhedral crystal within plagioclase, (5) as lath-shaped crystals.



Figure 6. Example of Rock from Turiruba

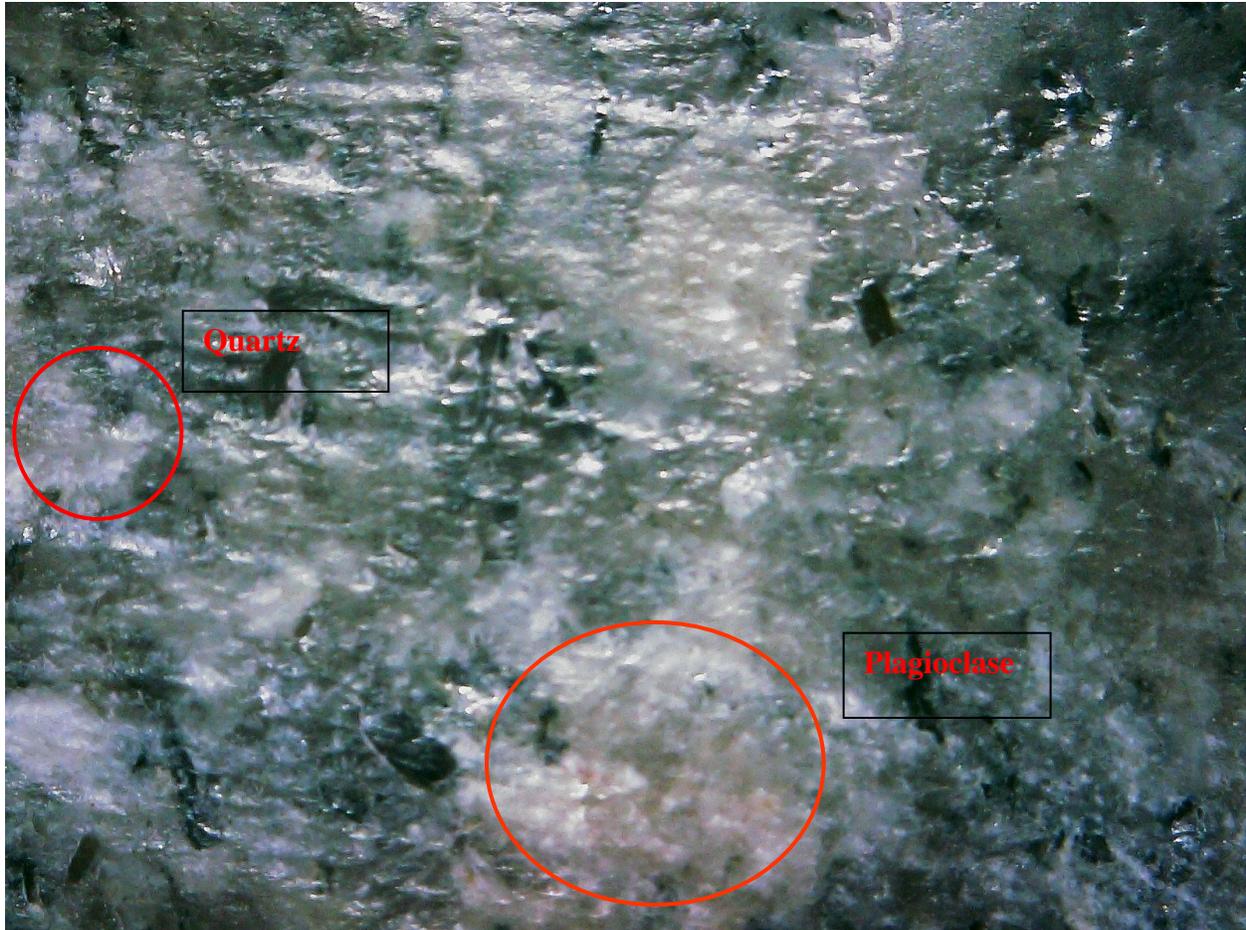


Figure 7. Plagioclase and Quartz can be seen up close



Figure 8. The biotite minerals are needle like in appearance where the muscovite is very platy



Figure 9. This leuco-granite sample is very weather but the large muscovite minerals are visible

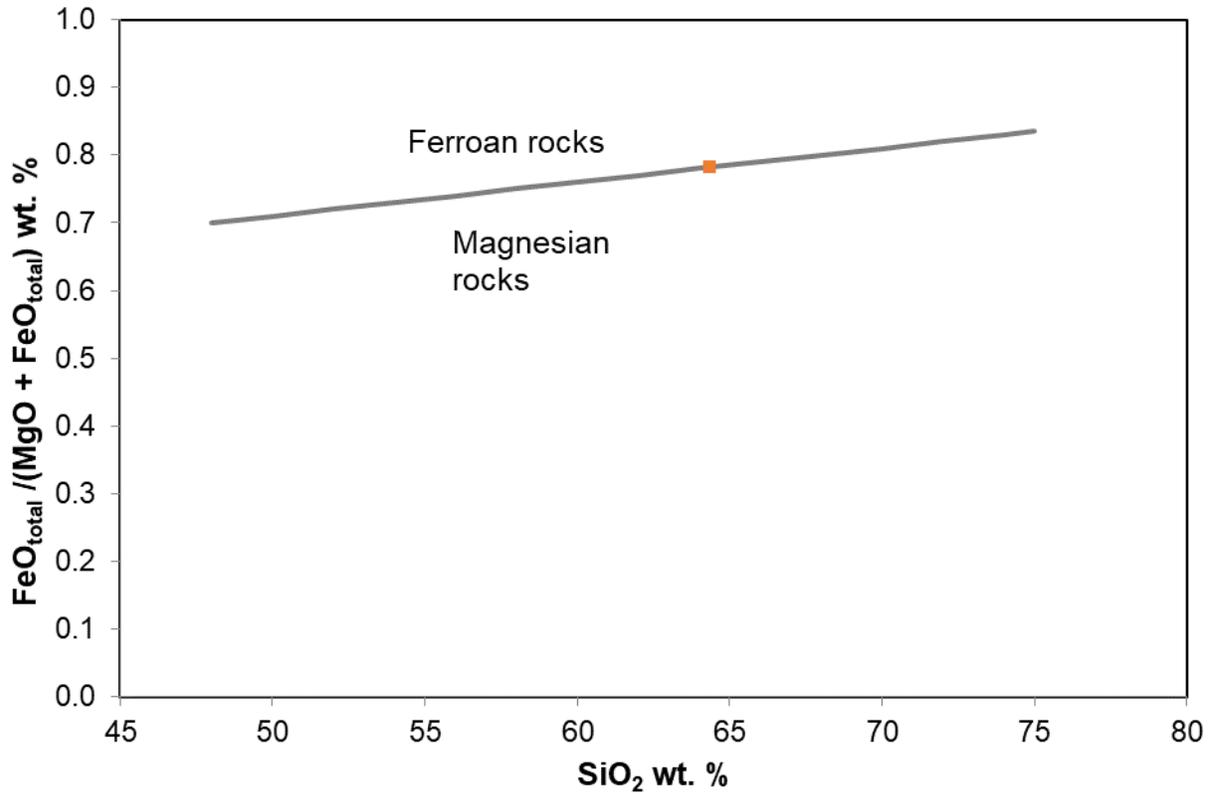


Figure 10. Rock Composition shows it has an intermediate composition

7.0 Geophysics

The Aeromagnetic maps reveal good values of NT, which correlates to Iron rich minerals and sediments. The underlying rock structure correlates with that of a granitic intrusion and it is deep seated. From the aeromagnetic, it shows good downwards continuity of the structure and its trending NE-SW (Figure 11).

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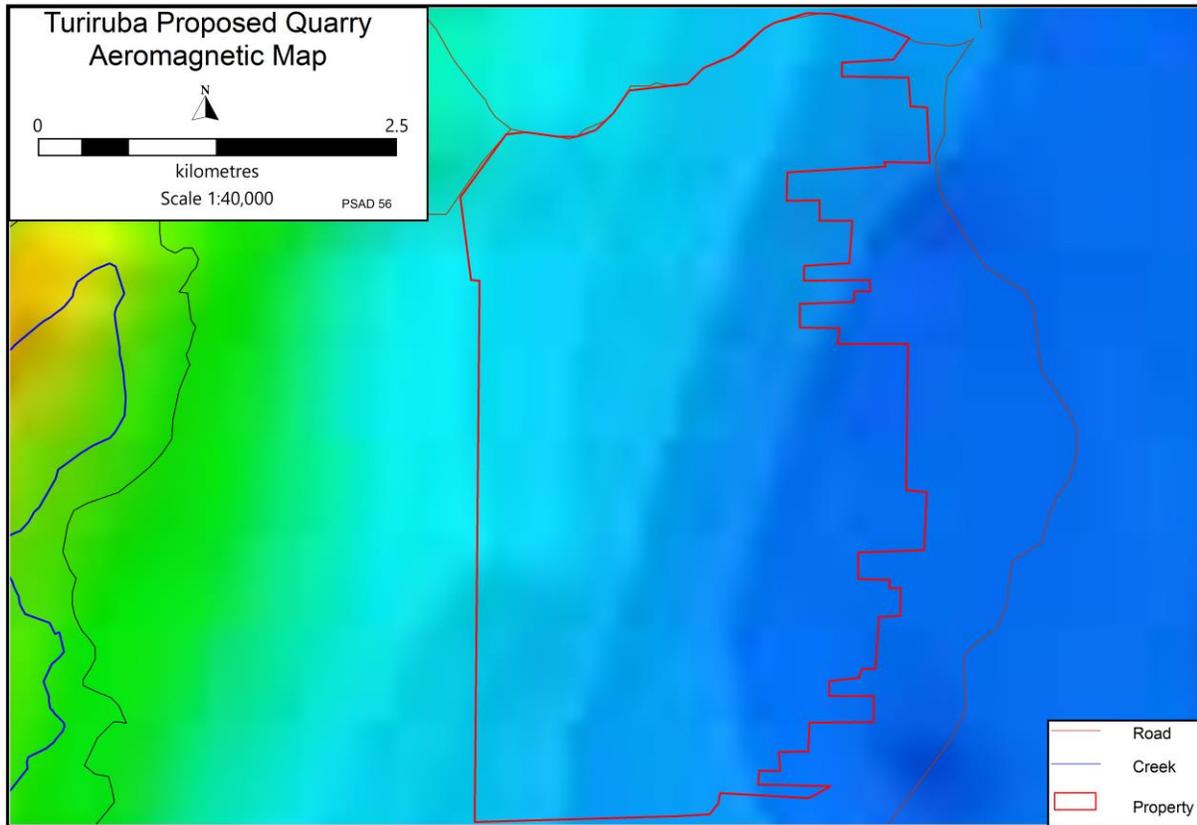


Figure 11. Aeromagnetic map of the area

Based on observation from the site visit, the underlying structures are roughly 5- 25m below the surface. The topography reveals there is generous elevation difference (Figure 12 & 13). The 3D rendered of the area shows there is likely good continuous structures under the top soil.

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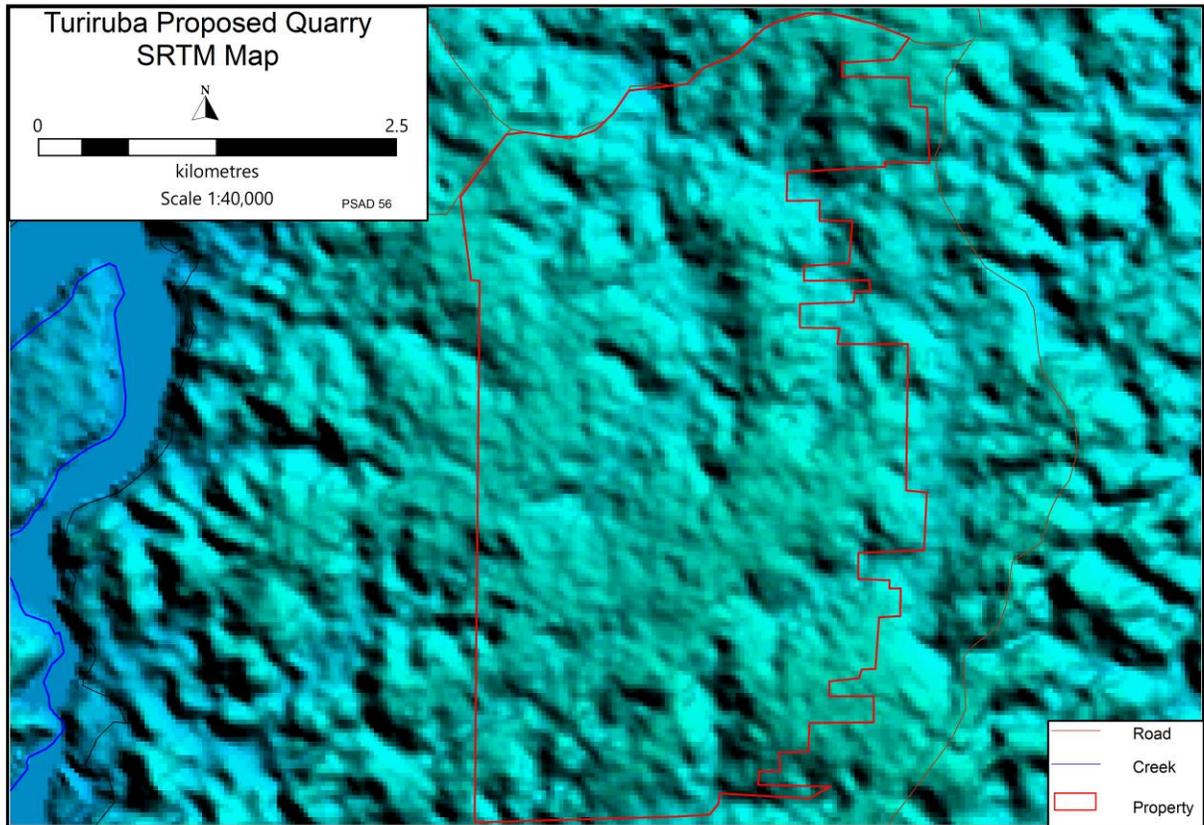


Figure 12. SRTM Map.

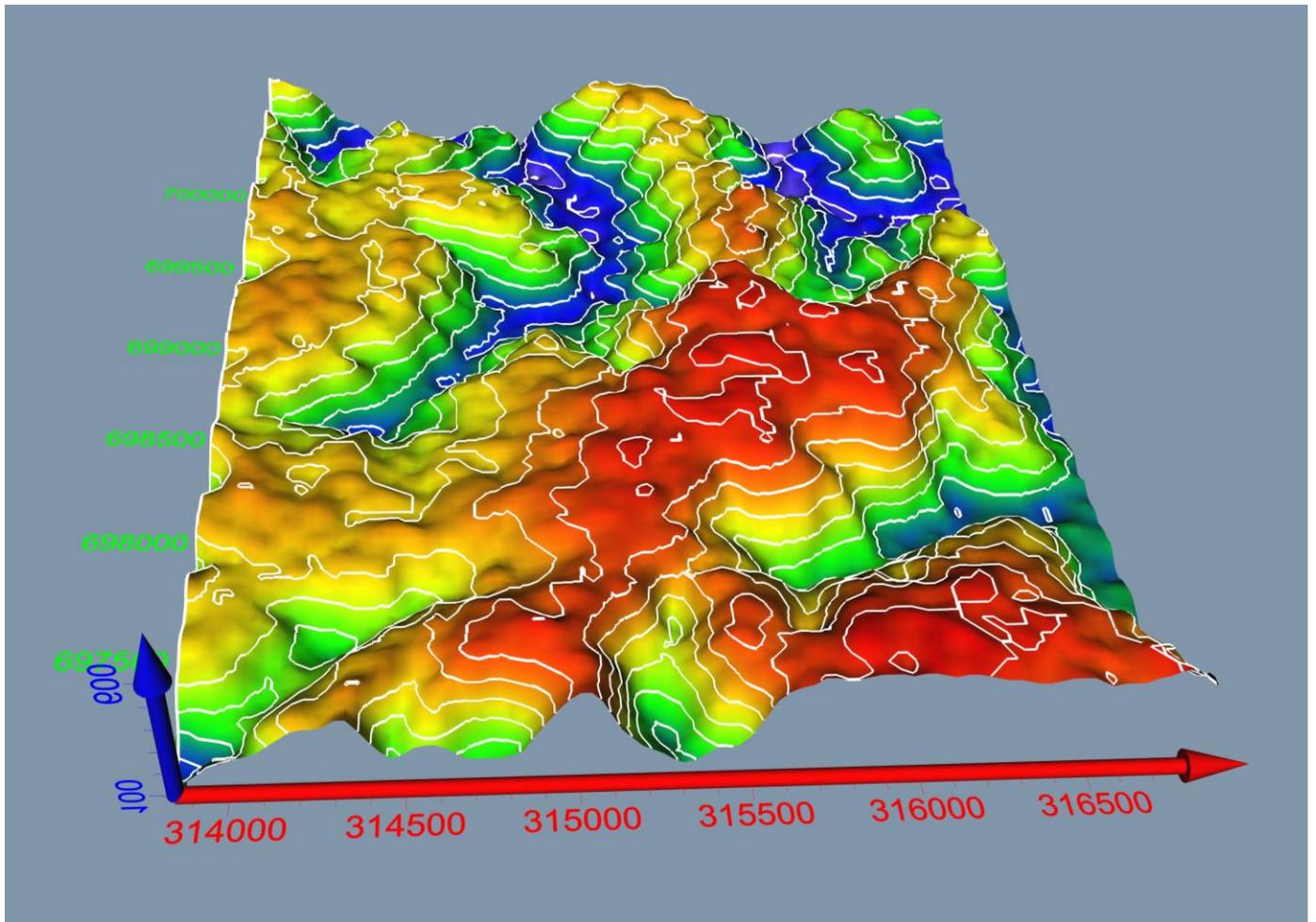


Figure 13. 3D View of the Area.

8.0 Quarrying

8.1 Geotechnical

The Quarry will be developed within the hard rock zone. The Quarry design criteria will be based on the structural nature of the rock mass rather than the strength of material. With bench face angles varying from 70° to 75°, catch bench widths vary from 6m to 10m and final bench heights of 10m.

The overburden soils are made of typically 5m to 25m lateritic material. A bench face angle of 65° is recommended, with bench heights of 10m.

8.2 Quarry Mineral Reserve Estimate and Production Schedule

Southern Canton International Trading Inc. Quarry has planned all its work activities for the next five years. It has plan to acquire one mobile crusher for its planned activities. The pits are located further back from the river front (Figure 22). 4.5 km of haulage road network will be constructed at the various stages of development mine plan. A waste material dump site is also staged for development in 2021 to stockpile gangue material. This quarry supplies boulders, gabions and crushed aggregates in the following fractions 7/8”, 3/4”, 5/8”, 1/2”, 1/4” minus, sifting and quarry cleaning. Based on the volumetric calculations the total tonnage of each pit was calculated. Based on the on the timeline of Pit production a total of quarriable material for each year was determine by percentage of time (months of production for that fiscal year) multiply by total tonnage of that pit. Using all this information a quarry resource estimate was made and therefore an estimate production of quarriable material from Southern Canton International Trading Inc. Quarry. A total of 3,358,623 tons of granitic material is available for road construction, sea defenses, aggregates etc. in Pit 1 alone (Figure 15).

Property	Volume	S.G	Overbuden	Estimated Reserves
Pit 1	2,061,770.00	2.715	40%	3358623
Pit 2	1,274,583.00	2.715	40%	2076296
Overall	6,039,397.00	2.715	40%	9838178

Table 2. Estimation of Quarriable Material of the Area

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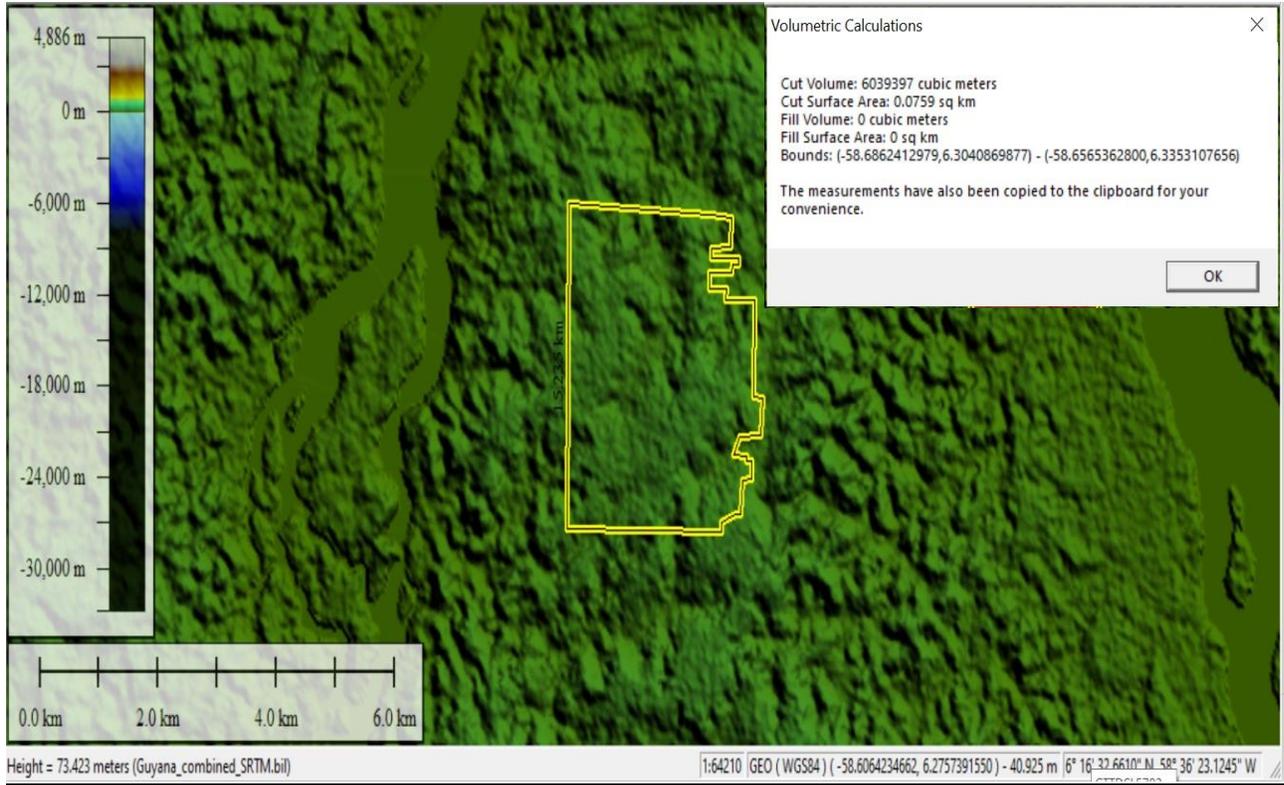


Figure 14. Volumetric Calculations of the entire proposed quarry

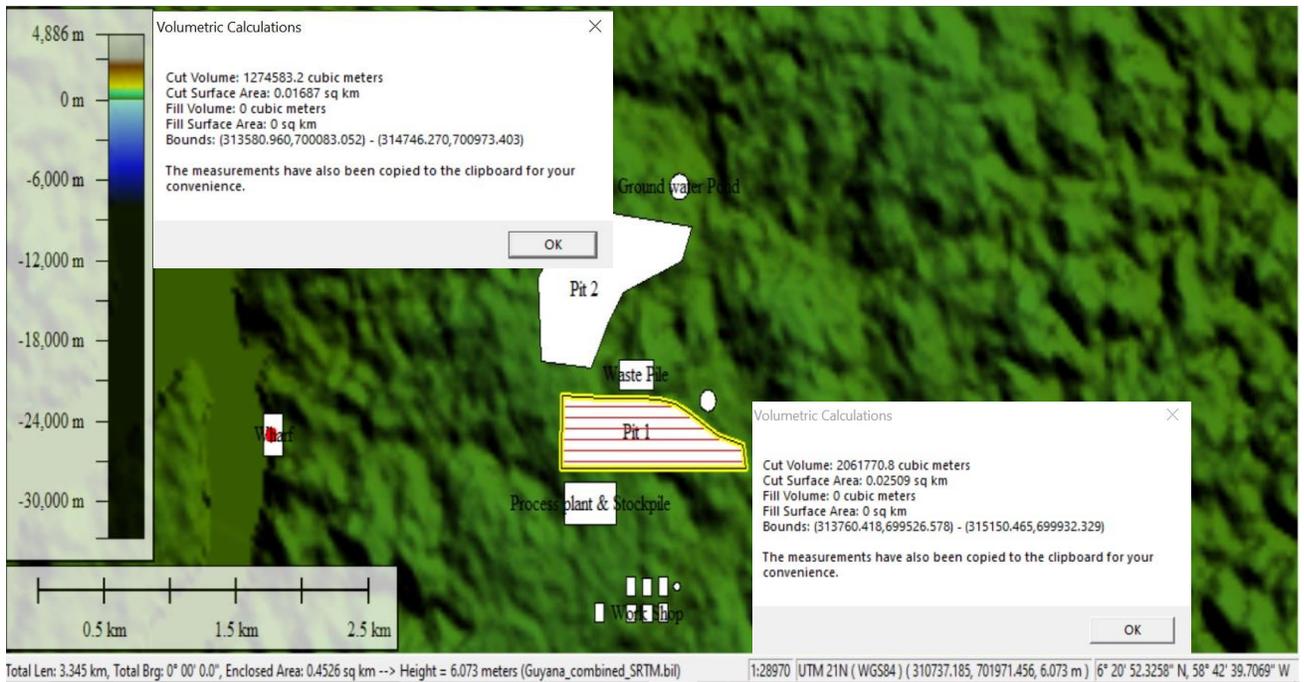


Figure 15. Volume Calculations of Pit 1 and Pit 2

8.3 Manpower

NO	STAFF	NO OF EMPLOYEES
1	Quarry Master/Manager	1
	Engineers	
2	Mining	1
3	Mechanical/ Mechanic	1
	Supervisors and others	
4	Compressor operator	2
5	Excavator Operator	1
6	Drill operator	1
7	Heavy duty operator	2
8	Heavy duty drivers	4
9	Store Keeper	1
10	Electrician	1
11	Laborers	6
	Services	
12	Blasting Services	4
	Auxillary Staff	
13	Cooks	2
14	Cleaners	1
15	Police officers	1
16	Security	1
17	Medic	1
		31

Table 3. Required Staff for Turiruba Proposed Quarry

8.4 Production Schedule

The overall Quarry production mining schedule was developed in order to meet the demands of New infrastructure development. Two pits may be mined simultaneously, to meet the required fresh rock ore. The Quarry production schedule is summarized in Table below:

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ITEM	PERCENTAGE	Year 1	Year 2	Year 3	Year 4	Year 5
1ST Grade Crusher Run	10%	17500	17500	20000	20000	20000
2nd Grade Crusher Run	2%	3500	3500	4000	4000	4000
7/8" Aggregate	2%	3500	3500	4000	4000	4000
3/4" Aggregate	40%	70000	70000	80000	80000	80000
5/8" Aggregate	2%	3500	3500	4000	4000	4000
1/2" Aggregate	15%	26250	26250	30000	30000	30000
Sifting	4%	7000	7000	8000	8000	8000
Underlayer	10%	17500	17500	20000	20000	20000
Boulder	10%	17500	17500	20000	20000	20000
Sand	5%	8750	8750	10000	10000	10000
Total	100%	175000	175000	200000	200000	200000

Table 4. Showing the predicted distribution of aggregates.

9.0 Drilling and Blasting

9.1 Drilling

The drilling and blasting plan cater for efficient rock excavation. A tried, tested and proven delay design will be implemented to achieve the best fragmentation, heave and muck pile profile. The blast patterns to be used will be multi-row staggered rectangular arrangements.

To meet productions goals, 11 holes are needed to be drilled per day. Two drills are needed to meet this target. ECM590 will be used because of its relatively low cost and their ability to drill holes in a single pass, reducing drilling times. Penetration rates for blast hole drills were assumed to be 132 feet per hour and a set up time between holes of 4 minutes. The average depth of the holes is 34.4 feet. The drill time for each hole including set up time is 13 min per hole. With the 50-minute hour operating time it is estimated that each drill will complete an average of 40 holes per 12-hour shift. Table shows the drills that will be on site by year 2.

Group	Equipment	Manufacturer	Cost
<i>Drill</i>	Rand drill (ECM 590)	Ingersol	\$ 400,000

Table 5. Drilling Equipment needed

9.2 Blasting Methods

The design of a blast depends on its location, geological structures in that area, volume of rock in the target area, end product requirements and any limiting factors in relation to potentially sensitive locations (including residences and infrastructure).

9.3 Blast Layout Calculations

MAGNAFRAC 2.5" X 16' was selected based on weather conditions. The specific gravity of the explosive was assumed to be 1.2 g/cc. The rock mass at the site was given at 2.715 ton/yd³ (Granite). A blasthole diameter of 3 inches was selected. It should be noted that it is within the range of hole sizes that the drill rig, an ECM590 is capable of drilling. The bench height was set at 32.8 feet to best accommodate the equipment fleet.

<i>Blast Dimensions</i>	
Burden	5.2 ft.
Spacing	8.7 ft.
Subdrill	1.6 ft.
Hole Depth	34.4 ft.
Stemming Length	4 ft.
Explosive Column length	32.8 ft.

Table 6. Description of Blasting Parameter

9.4 Typical Dimensions for Production Blasts

A blast with the aforementioned dimensions can be expected to liberate 54.6 Yd³ (113.35 tons) of material per blast hole.

9.5 Yearly Blast Production Requirements

The explosives column weight required per hole will be 78.5 lbs., which equates to a powder factor of 1.44 lbs./yd³. Each hole will be initiated with a combination of Excel Handi Dets and Electric detonators. The time delay between holes will be 11.2ms to ensure good fragmentation, and a time delay between rows will be 18.2ms. As a further precaution, no two holes will be allowed to detonate within 8ms of each other to reduce the impact vibration.

Year	Time	Total Fresh Ore & Rock to be Blasted (Tons)	Volume of Rock (m ³)	No. Of Blast Holes	Total Explosives (kg/Magnafrac)	Total Drilling & Blasting Cost
2021	Year 1	350,000.00	128,913.44	3,088	110,233	787,500
2022	Year 2	385,000.00	141,804.79	3,397	121,256	866,250
2023	Year 3	423,500.00	155,985.27	3,736	133,381	952,875
2024	Year 4	465,850.00	171,583.79	4,110	146,720	1,048,163
2025	Year 5	512,435.00	188,742.17	4,521	161,392	1,152,979
Totals		2,136,785.00	787,029.47	18,851	672,981	4,807,766

Table 7. Blasting Parameters Cost Yearly

9.6 Fragmentation

The Kuz-Ram Model was used to predict the expected fragmentation for production blasting within the Quarry mine. The figure shows the expected blast fragmentation for the mine site. It should be noted that this calculated fragmentation curve is similar enough to existing fragmentation curves as to give reasonable confidence in the design.

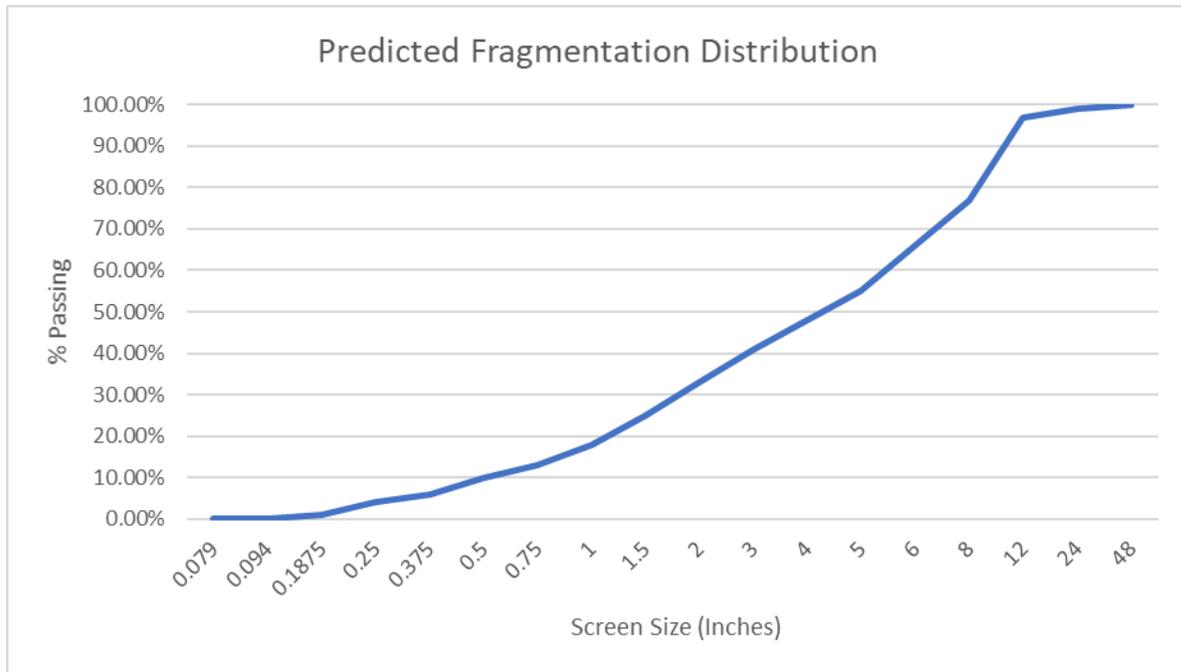


Table 8. Particle size distribution

9.7 Blast Safety Considerations

It was important to consider safety factors in the production blast design for the Turiruba Quarry Project. Only trained members of the powder crew will be allowed on blast patterns that have been or are being loaded. Whenever possible, blasting should occur after the production shift has ended.

9.8 Blasting Personnel Requirements

It was assumed that the blasting crew will spend 6 minutes on each hole. This time takes into account placing of MAGNAFRAC, HANDI-DET/EXCEL HTD, all in one combination of electric detonators at 10ms and 20ms delay connectors with Cordtex of suitable lengths, placement of stemming, maneuver time between holes and the time taken to tie in the pattern. All the blasters will place the explosives, detonators and DET cords into the holes and one will place stemming into the holes using a skid steer loader. Once all the holes are loaded all three blasters will tie in the pattern and retreat to a safe distance for detonation.

10.0 Regulatory Requirements

10.1 General Regulations

The maintenance and operation of explosives magazines and use of explosives are subjected to The Explosives Act: Chapter 16:06 and The Blasting Operations Act Chapter 65:03 of the Laws of Guyana. Construction, storage and management of the explosive magazine, and use of explosives will be in accordance with the relevant sections of 'The explosives Act: Cap.16:06 and 'The Blasting Operations Act: Cap. 65:03.'

10.2 Magazine Licenses

When a magazine is constructed onsite, general rules for a magazine construction and upkeep under Section 6 of The Explosives Act Cap. 16:06 will be observed and implemented.

10.3 Storage

Explosives will be stored in an approved, licensed and properly constructed magazine under suitable conditions to:

- Comply with statutory regulations;
- Minimize the risk of accidental spills and explosions;
- Minimize deterioration that may adversely affect safety or performance;
- Provide separation of incompatible explosives;
- Prevent unauthorized access and theft;
- Provide safety distances from 'protective works';
- Maximize shelf life; and
- Enable ready access to products when required.

10.4 Location of Magazine

The explosives magazine will be located approximately 1000 feet from the plant and dwellings structures. The site will be cleared so that there is no danger from bush fires and the local fire authority at Bartica will be informed of the location of the magazine.

The detonator magazine will be located at the legally prescribed distance (approx. 100 ft.) from the explosive's magazine in accordance with The Explosives Act Cap. 16:06.

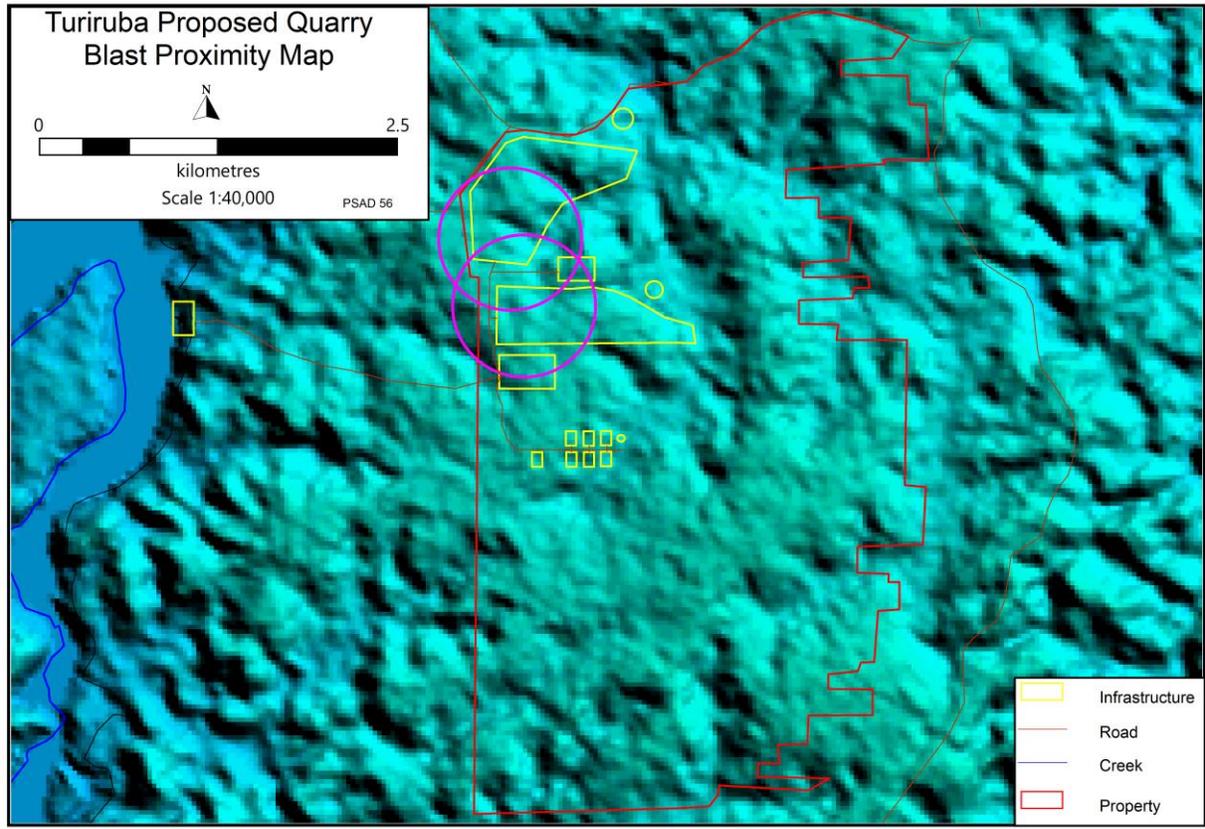


Figure 16. Proximity Map of Mine Site with regards to blasting

10.5 Construction of Magazine

The magazine will be constructed in accordance with Section 6 of The Explosives Act Cap. 16:06 and will be weather, fire and projectile resistant. The magazine will be constructed of metal or concrete and provided with lightning protection. The doors to the magazine will be provided with tamper proof locking to prevent theft. Warning signs, "Explosive," will be placed on magazines and a "No Smoking," sign placed on the door. All brass nails and screws will be countersunk to prevent them from coming into contact with the stored material.

The magazine will be constructed to prevent water from entering and causing stored explosives to deteriorate. The outside walls and roof of the magazine will be painted with a reflective color (silver frost on metal surfaces or with or light grey on masonry surfaces).

Ventilation will be provided to allow air to circulate freely through the magazine, thus reducing high temperature and humidity. All external vents will be screened to prevent the entrance of sparks and airborne debris from bush fires.

10.6 Operation of Magazine

The explosives magazine will be operated in accordance with Section 6 of The Explosives Act Cap. 16:06. An Officer designated by the minister in accordance with Section 5 of The Explosives Act Cap. 16:06 will be in charge of The Magazine. Four (4) members of the Guyana Police Force would be charged to secure the magazine at the mine site.

10.7 Transport of Explosive

Explosives will be transported in accordance with The Explosives Act Cap. 16:06. A license or permit will be applied for under Section 24 or 25 and acquired under Section 24 or 26 of The Explosives Act Cap. 16:06. Explosives will be transported in accordance with Section 26-28 of The Explosives Act Cap. 16:06. Explosives of different compatibility groups will be transported in separate compartments sufficiently separated to prevent fire from spreading.

A competent person must be appointed and have responsibility to ensure that explosive products are transported safely. Explosives would be transported under the supervision and security from The Guyana Police Force. A suitable vehicle is proposed to facilitate transport.

10.8 Delivery of Explosives to Turiruba Quarry Project

Explosives will be stored at the National Magazine, Makouria in accordance with Section 8 of The Explosives Act Cap. 16:06. They will then be transported under GPF escort on the Mazaruni River to Turiruba Quarry Project.

11.0 Blast Area Safety

Suitable barricades, cautionary signs and sirens will serve as direct communication to prevent personnel from entering a blast area at firing time.

11.1 Blast Pattern Design

A Mining Engineer will design each blast. A blaster with a certificate of competency granted under Section 4 of The Blasting Operations Act Cap. 65:03, by the Commissioner, Guyana Geology and Mines Commission is proposed to perform blasting at the Mine Site. Geology-Granite density 2.715.

Based on information from previous mining and testing, a one pattern blast design was completed for the hard rock ore horizon, as shown in the figure below:

Material	Bench Height (ft.)	Hole Diameter (in.)	Burden (ft.)	Spacing (ft.)	Subdrill (ft.)	Stemming (ft.)	Explosive Density	Powder factor (lbs./yd ³)
Ore/Overburden	32.8	3	5.2	8.7	1.6	4	1.2	1.44

Table 9. Blasting Parameters

11.2 Blast Vibration

It was assumed that the closest any blast will be to the plant structures and dwellings is 500 meters. Based on the particle velocity calculations, the current blast design is sufficient to prevent damages to infrastructure, as shown in figure below.

<i>Vibration Analysis</i>	
<i>Damage</i>	<i>USBM Value (in/sec)</i>
Lowest Cracking Value	0.53
Crack extension in plaster	0.75
Crack extension in wallboard	0.77
Crack in CMU	6.37
Turiruba Quarry Project, 500 feet from structures	0.1134

Table 10. Vibration Analysis

11.3 Airblast

In the case of the Turiruba Quarry Project, using 250m as the distance from sensitive sites, in order to comply with the 115dB limit for 9 out of 10 consecutive blasts, this would require a maximum charge weight per 200ms delay of approximately 392lbs, or 5 holes. This would be very challenging to achieve using standard non electric delays. Airblast is directional however, so it is possible to greatly reduce the levels detected at monitoring points by altering the firing direction.

11.4 Flyrock

Stemming should be loaded at a rate that ensures no bridging of the material occurs inside the blasthole to reduce flyrock. The blast management plan outlines the precautions to reduce flyrock, Maximum distance Is 541 m.

Where possible blasts should be fired to a free face with timing used to promote movement. Centre lift timing should be minimized.

Blast designs should be created by an experienced and qualified blast designer and based on accurate survey pick up.

11.5 Loading

The blasting crew, led by the Blaster-in-Charge, will have the necessary tools and equipment to safely and efficiently load the explosives according to the plan.

11.6 Detonator Safety

The Blaster-in-Charge must be knowledgeable of all safety precautions regarding the detonator and the associated initiating system components before loading begins. All initiation systems must be used in accordance with the methods prescribed by the manufacturer.

11.7 Electrical Detonator Safety

Electric detonators must be checked with a proper test instrument before primer makeup. To ensure that the detonators have not been damaged during loading, they should be rechecked before stemming.

11.8 Non-electric Detonator Safety

Nonelectric initiation systems must be used in accordance with methods prescribed by the manufacturer.

12.0 Blasting Criteria

The Turiruba Quarry Project shall ensure that blasting on site does not exceed the criteria at any residence on privately-owned land.

The air blast overpressure level from blasting operations must not exceed:

- 115 decibel (dB) (Lin Peak) for more than five per cent of the total number of blasts over each reporting period
- 120 dB (Lin Peak) at any time.

The ground vibration peak particle velocity from blasting operations must not exceed:

- 0.197 inch per second (in./s) for more than five per cent of the total number of blasts over each reporting period
- 0.394 in./s at any time
- at any point within one metre of any affected residential boundary or other noise sensitive area in the vicinity of the plant.

12.1 Blast Management Controls

Southern Canton International Trading Inc. must implement reasonable and feasible best practice blast impact mitigation measures at the Turiruba Quarry Project.

12.2 Hours of Operation

Impacts to public amenity for sensitive receivers in the vicinity of the Turiruba Quarry Project have been managed through the design of the operation, including the restrictions on the hours of operation for the facility. The operating hours for the Turiruba Quarry Project are described in Table 11 below. The Turiruba Quarry Project will operate in accordance with the operating hours defined in Table 11.

Activity	Operation Hours
Extraction Operations	6 am to 6 pm Monday to Saturday
Loading and Dispatch	6 am to 6 pm Monday to Saturday
Construction and Maintenance activities	6 am to 6 pm Monday to Saturday
Blasting	9 am to 5 pm Monday to Saturday

Table 11. Blasting Schedule

Note: The Applicant may carry out maintenance activities after hours.

12.3 General Controls

Control measures that have been considered as a standard part of the operation of the Turiruba Quarry Project and incorporated include:

- All relevant quarry personnel will be trained on the environmental obligations in relation to blasting controls.
- The surrounding landowners/miners will be notified prior to undertaking a blast.
- The date, location of blast holes and quantity of explosive used each day will be documented.
- Blasts will be designed to comply with overpressure and vibration criteria.

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- Monitoring will be undertaken at the nearest residence and/or other sensitive locations (as required) to verify compliance with the relevant criteria.
- The maximum number of holes to be detonated in a blast is 150.
- Sufficient distance will be maintained between the blast hole and the mine face.
- Appropriate delays will be used.
- All blasts will be monitored and recorded.
- Blast monitoring data will be used on an ongoing basis to further refine the blast design and management.
- Blast design and blast management procedures will be periodically reviewed to evaluate performance and identify corrective action, if required.
- Blasting will be undertaken between 9.00 am and 5.00 pm, Monday to Saturday inclusive, except under apparent temperature inversions conditions when blasting shall only occur between 11.00 am and 1.00 pm Monday to Saturday. No blasting is undertaken on Sundays or public holidays, without approval of the Guyana Police Force (GPF).
- Southern Canton International Trading Inc. will undertake consultation with miners whose properties are adjacent to the development, with a view to determining the most appropriate blasting times for the development. The applicant shall, in accordance with the requirements of the GPF, give notice of proposed blasting times.
- Not blast more than twice a week unless an additional blast is required following a blast misfire.
- Design all blasts to minimize airblast overpressure and vibration using the NONEL system of equivalent.
- Design all blasts based on the results of monitored blasts and modelled predictions in **Table 10**. This will minimize airblast overpressure and vibration such that any one blast has less than a five per cent probability of exceeding airblast overpressure and vibration goals as set by the Environment Protection Authority (EPA) for affected property.
- EPL noise limits of 115 dB/120 dB are likely to be exceeded.
- Undertake detailed designs for each blast in order to maximize the blast efficiency, minimize dust, fumes, ground vibration and airblast, the potential for flyrock and to ensure compliance with site specific blasting conditions.

- Southern Canton International Trading Inc. undertake a pre-blast meteorological assessment in order to confirm the applicability of blasting during the proposed blasting times. The pre-blast meteorological assessment will inform the likelihood of potential blast impacts as a result of forecasted adverse wind inversion weather conditions.
- Monitor blasts as quarrying progresses utilizing the adaptive management techniques, so that blast prediction site laws can be further refined and future blast designs can be optimized based on more detailed site information. By adopting this approach, in conjunction with the adoption of improved blasting products and methods, as they are introduced, it is anticipated that blast emissions criteria can be met without imposing any significant constraints on blast designs throughout the operation of the Turiruba Quarry Project. Southern Canton International Trading Inc. will design all blasts to comply with the project specific vibration and airblast criteria and to protect public and private infrastructure and property from any damage as a result of flyrock. Future updates of this plan will include any additional management requirements, taking into account the results of blast monitoring undertaken.
- The blasting site design will be regularly reviewed using site-specific blast monitoring data. This process will provide Southern Canton International Trading Inc. with flexibility to design blasts to best meet production requirements while complying with relevant criteria for residential receivers.
- All blast configurations and delays used will be thoroughly checked by the Mine Manager before the blasts are detonated.

12.4 Blast Fume Protocol

Blast fume development and migration will be observed and managed. With regard to Blast Fume

Management, the following management controls include:

- use of appropriately qualified personnel. This includes an assessment of whether the contractor is appropriately trained to undertake the drill and blast works
- use of appropriate blast design as approved by the site drill and blast coordinator or his or her delegate appropriate dewatering of drill hole prior to loading

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- minimization of ‘sleep time’ between loading and blasting, where practical
- prior to blasting, a visual weather assessment of meteorological conditions will be undertaken by the mine Manager to confirm that weather conditions are not conducive to fume migration
- in the event that blast fume generated by the blast, an investigation into the causes of the blast fume will be undertaken.

13.0 Blast Monitoring

Southern Canton International Trading Inc. will monitor blasts as mining progresses in accordance with the existing blast monitoring system so that blast performance and design can be further refined and future blast designs can be optimized based on more detailed site information.

Blast monitoring for airblast and vibration will continue to be undertaken at strategically identified locations to ensure compliance with the Guyana EPA Environmental Permit and the GPF Permit to transport, store and use explosives.

13.1 Blast Data

Data collected for each blast will include:

- measured vibration
- measured overpressure
- maximum instantaneous charge
- number of holes
- blast type
- meteorological conditions.

13.2 Blast Fume Monitoring

Fume monitoring and post-blasting investigation into fume events will be undertaken at the Turiruba Quarry Project. Fume monitoring requirements include:

- visual assessment and analysis of each blasting event to determine whether excessive fume was
- generated as a result of the blast. All blasts undertaken at the Turiruba Quarry Project will be video recorded to provide a record of the blast
- in the event that any blast at the Turiruba Quarry Project leads to the development of excessive fume an analysis of the blast will be undertaken to determine the cause of the blast fume development and whether the blast fume travelled off site
- analysis of meteorological conditions to determine the likely, if any, offsite impact of NOx fume events post-blasting.

13.3 Standards Relevant to Blast Monitoring/ Management

Southern Canton International Trading Inc. will undertake blast monitoring at the Turiruba Quarry Project in accordance with the policies, principles, regulations and guidelines contained within:

- The Environmental Permit, Guyana EPA
- Guyana Geology and Mines Commission Guidelines; and
- The Permit to transport, store and use explosives.

13.4 Independent Review

In the event that a neighboring landowner, the EPA, GGMC and GPF considers that the Turiruba Quarry Project is exceeding blast Criteria at the mine or neighboring property, they may request an independent review of the blast impacts at the project or property.

14.0 Proposed Fuel Consumption

Item	Gallon Consumption per annum	Price per Gallon
Diesel	200,000	555
Gasoline	1,000	592
Lubricant oil	5,000	2590
Hydraulic oil	5,000	4,995
Grease	1000	2201.5

Table 12. Projected Fuel Consumption Annually

Rental		2021	2022	2023	2024	2025
Capacity Utilization	100%	50%	60%	70%	80%	90%
Diesel	111,000,000	55,500,000	66,600,000	77,700,000	88,800,000	99,900,000
Gasoline	592,000	296,000	355,200	414,400	473,600	532,800
Lubricant oil	12,950,000	6,475,000	7,770,000	9,065,000	10,360,000	11,655,000
Hydraulic oil	24,975,000	12,487,500	14,985,000	17,482,500	19,980,000	22,477,500
Grease	2,201,500	1,100,750	1,320,900	1,541,050	1,761,200	1,981,350
Total	\$ 151,718,500.00	\$ 75,859,250.00	\$ 91,031,100.00	\$ 106,202,950.00	\$ 121,374,800.00	\$ 136,546,650.00

Table 13. Showing cost related to proposed fuel consumption

15.0 Proposed Equipment List

Southern Canton International Trading Inc. will procure all the equipment necessary for the Quarry Project Operation. All the equipment is necessary to ensure smooth operations and produce at least 1250 ton of ore daily. The proposed fleet of equipment comprises of the following:

EQUIPMENT LIST	QUANTITY
Trucks (CAT 720)	2
245 & 236 Hydraulic Excavators (Caterpillar)	1
980B & 980C Wheel Loader (Caterpillar)	1
Bulldozer (Caterpillar - D8)	1
Mobile Crusher (200t/hr)	1
Ingersol Rand Drill (ECM 590)	1
Generator (650KVA.) Caterpillar	2
Cat Water Tanker	1
Service Truck	1
Compressor	1
Fork Lift	1
Tower Light	2
Welding Plant	2
Cat Scraper	1
Rubber Wheel Roller	1
Steel Wheel Roller	1
Skidder	1
Tug Boats	2
1000 ton Barges	2
Pick-up	2

Table 14. List of Equipment

16.0 Proposed Staffing & Infrastructure

The company intends that the Quarry Project will be a model complex with facilities that are comparable with other regional and international. The topography is ideal with housing etc. overlooking the operation. The mine will have a full-time sanitation crew and a medic will always be on site with adequate medical supplies. Because of the threat of malaria in the area, the company will work closely with the Ministry of Health to maintain a malaria free environment at the quarry and nearby communities. A small water treatment plant for potable water supply will be constructed near at a suitable area within the quarry and water will be supplied from the treatment plant to the various sectors of the quarry. The company will employ hire 31 personnel, broken down as follows:

16.1 Staffing

NO	STAFF	NO OF EMPLOYEES
1	Quarry Master/Manager	1
	Engineers	
2	Mining	1
3	Mechanical/ Mechanic	1
	Supervisors and others	
4	Compressor operator	2
5	Excavator Operator	1
6	Drill operator	1
7	Heavy duty operator	2
8	Heavy duty drivers	4
9	Store Keeper	1
10	Electrician	1
11	Laborers	6
	Services	
12	Blasting Services	4
	Auxillary Staff	
13	Cooks	2
14	Cleaners	1
15	Police officers	1
16	Security	1
17	Medic	1
		31

Table 15. Staff list

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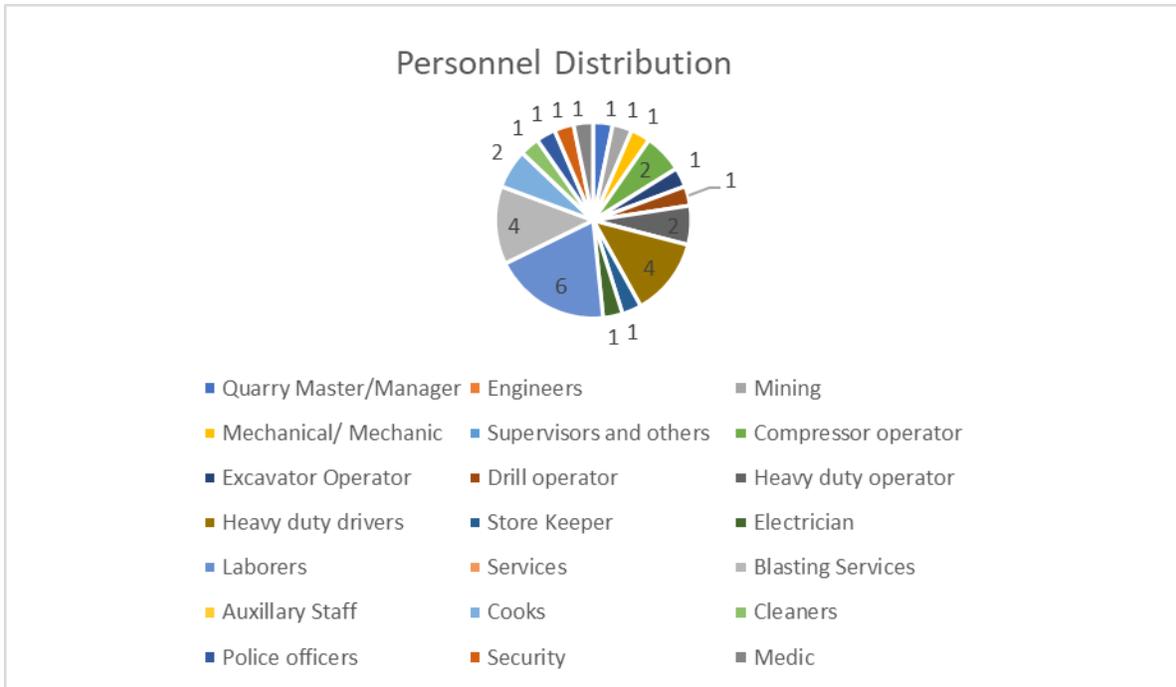


Figure 17. Personnel Distribution for Quarry Project

This labor force is expected to be increased by 50% or about 15 persons for the next five years.

16.2 Proposed Infrastructure

Detail of Building and Civil Works		
Description	Covered Area sq ft	Cost GUY\$
Offices/Prefabricated Containers	500	\$1,000,000.00
Workshop/Bond	1500	\$3,000,000.00
Residential Setup	1,500	\$3,000,000.00
/Prefabricated Containers		
Haul Road	5000	\$3,000,000.00
Total	8,500	\$10,000,000.00

Table 16. Total Cost for Infrastructure

17.0 Capital and Cost Estimates

17.1 Capital Cost Estimates

Life-of-Mine (LOM) Project Capital is summarized in Table 17. Initial capital Costs is USD \$3.209 Million. Therefore, a total working capital of USD \$11.736 Million for total cost.

ITEM	COST (GUY\$)
Plant, Machinery and Equipment	\$457,500,000.00
Mine development expenses	\$30,000,000.00
Building and civil works	\$1,000,000.00
Furniture and Fixtures	\$3,000,000.00
Vehicles	\$20,000,000.00
Reclamation & Closure	\$20,000,000.00
TOTAL	\$531,500,000.00
NET INITIAL WORKING CAPITAL	\$132,875,000.00
PROJECT COST	\$664,375,000.00
USD COST	\$3,209,541

Table 17. Initial Capital Cost

17.2 Operating Cost Estimates

LOM operating costs are summarized in Table 18. Operating costs are estimated at USD \$11.736 million. Quarry mining will average USD 3.99/ t ore and waste moved. Processing is estimated at USD 2.25/ t ore crushed. G & A costs are estimated at USD 0.56/t ore and waste moved.

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Cost Item	LOM Costs \$USD	Unit Cost \$/ton-moved (USD)	Unit Cost \$/ton- crushed (USD)
Open Pit Mining	2,528,641.67	1.18	
Open Pit Drilling & Blasting	4,807,766.25	2.25	
Processing	3,209,541.06		1.50
G & A	1,190,476.00	0.56	
Totals	11,736,424.98	3.99	1.50

Table 18. Operating Cost

Quarry mining costs are estimated for total amount of saprolite and fresh rock mined. Quarry drilling and blasting costs had to be separated from these costs and applied to total fresh rock mined.

17.3 Financial analysis

Economic Results are summarized in Table 19; the analysis suggests the following conclusions assuming no gearing:

Mine Life: 5 Years

Pre-Tax NPV_{1%}: USD

\$53,319,345.24

Post Tax NPV_{1%}: \$ \$41,109,145.24

Pay-Back Post Tax: 1 year

Total Taxes Paid: USD \$12,210,200.00

Peak Funding of Initial Project Capital: USD \$11,736,424.98

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	Year 1 (GUY\$)	Year 2(GUY\$)	Year 3 (GUY\$)	Year 4 (GUY\$)	Year 5 (GUY\$)
SALES	\$ 2,100,000,000. 00	\$ 2,310,000,000. 00	\$ 2,541,000,000. 00	\$ 2,795,100,0 00.00	\$ 3,074,610,000 .00
Operating cost	(\$225,000,000. 00)	(\$247,500,000 .00)	(\$272,250,00 0.00)	(\$299,475, 000.00)	(\$329,422,50 0.00)
GROSS PROFIT	\$ 1,875,000,000.0 0	\$ 2,062,500,000. 00	\$ 2,268,750,000. 00	\$2,495,625, 000.00	\$ 2,745,187,500 .00
Administration, Rehabilitation and other expenses	\$50,000,000. 00	\$50,000,0 00.00	\$50,000,0 00.00	\$50,00 0,000.00	\$50,000, 000.00
NET PROFIT BEFORE TAX	\$ 1,825,000,000.0 0	\$ 2,012,500,000. 00	\$ 2,218,750,000. 00	\$2,445,625, 000.00	\$ 2,695,187,500 .00
Provision for taxation 20%	\$420,000,000 .00	\$462,000,00 0.00	\$508,200,00 0.00	\$559,020, 000.00	\$614,922,0 00.00
PROFIT / (LOSS) AFTER TAX	\$ 1,405,000,000.0 0	\$ 1,550,500,000. 00	\$ 1,710,550,000. 00	\$1,886,605, 000.00	\$ 2,080,265,500 .00
USD PROFIT/LOSS After tax	\$ 6,690,476.19	\$ 7,383,333.33	\$ 8,145,476.19	\$ 8,983,833.3 3	\$ 9,906,026.19

Table 19. Cash flow for Turiruba

17.0 Environmental issues

Southern Canton International Trading Inc. quarry will carry out its operations in an environmentally responsible manner and will address all pertinent issues to insure proper stewardship of public lands and preservation of wildlife. A separate environmental assessment will be completed to further address the following and other issues of environmental concern. Details of the environmental mitigation measures to be employed at the quarry will be provided in the Environmental Management Plan (EMP). The EMP will address potential impacts of the design, construction, operation and closure phases of the quarry.

Air Quality: Dust and diesel emissions are the main elements of air quality concern at the quarry. To limit dust formation during mining and transport of materials at the site, water will be periodically sprayed on roadways, process areas and accessible working faces. Dust suppressants will also be used as required. Appropriate speed limits (30-15 mph) will be enforced within the

quarry and access road to limit fugitive dust, and spray bars will be installed at several points on crushing equipment to limit dust generation. Combustion emissions will result from the use of diesel and gasoline fueled equipment. Due to the small nature of the operation and the small number of heavy equipment to be used very minor changes in air quality resulting from equipment emissions is anticipated. Fueled equipment will be maintained according to the manufacturer's manual and kept in good working order.

Storm Water Runoff: Surface water from disturbed surfaces of industrial sites can cause pollution down gradient from areas of disturbance. The most likely form of down-gradient pollution is siltation caused as fine materials washed away from active mine operations are deposited in areas where such deposition is harmful to plants and wildlife. Because much storm water runoff is or will be captured by internal drainages associated with quarries, large amounts of storm water will not flow from the area of mining operations. Untreated discharge can result in increased turbidity in the receiving water bodies. Dewatering of the quarry of accumulated water resulting from surface runoff or ground water infiltration will require pumping excess water to the nearby creeks and may potentially impact surface water turbidity. Surface run-off will be directed to a settling pond. Excess water from the settling pond will be discharged to the Mazaruni River through site drains to prevent overflowing and overtopping. Discharge from the settling pond under these circumstances will be monitored to ensure the compliance with water quality standards established by the EPA.

Ground Water: Southern Canton International Trading Inc. Quarry use only clean water and processes inert materials in his operations, it will not release pollutants into the ground-water table. Because it is planned that crushing equipment will be electric powered, fuel spill exposure on mining areas should be from mobile equipment only. Fuel, lubricants, coolant, waste oil, waste chemicals and hazardous materials will be stored in suitable clearly marked containers or surface tanks within impervious clay and or concrete bund walls to contain spillage. The storage areas will be completely covered to prevent any entry of rain and located away from operating areas, waterways and drainage lines and areas prone to flooding. The fuel and hazardous materials storage areas will be constructed with a containment capacity of 130% of the largest container stored. Discharges from the fuel storage and workshop areas will be directed to an oil/water separator before discharge to the environment.

Fire Safety and General Safety: Approved fire extinguishers will be located on all pieces of mobile equipment and in process control rooms. Heavy equipment and water will be available on site to assist in firefighting. Police and emergency medical services are readily available.

Cellular telephone service is available at Southern Canton International Trading Inc. quarry. All employees are trained in proper emergency response, incident reporting and general health and safety. The emergency response plan will outline the measures to respond to possible emergencies such as the unintended release of hazardous materials, fire and accidents at the site. Southern Canton International Trading Inc. Quarry also ensure that all employees are trained in emergency response scenarios.

Southern Canton International Trading Inc. Quarry maintains an emergency response outfit, which will be located at a strategic location within the Mine Site and equipped with communication equipment as well as equipment to respond to potential emergencies. The outfit will have the following equipment readily available at their disposal for emergency response:

- Designated evacuation vehicle; boat. Transport vehicles will be provided with emergency communication equipment.
- Earth Moving Equipment.
- Pumps.
- Earthen gravel; sand, clay.
- Booms and absorbents.

In the event of an emergency, an emergency alarm will be raised to alert all persons likely to be affected and to summon the emergency coordinator and crew. All personnel within the affected area will be evacuated to an established emergency assembly point. Emergency assembly areas will be clearly identified and communicated to all employees and visitors of the mine site.

In the event of a spill, the spill response and clean up procedures will be initiated. If there is a release of fuel oil or other hazardous material, all persons living downstream and downwind of the release will be notified. Spills will be contained by deploying relevant equipment such as

booms in water and earthen material on land. In the event of a fire, water and/or other fire suppressants shall be used. In the event of an accident, a first aider will render first aid care. The emergency response coordinator will make contact with the Bartica Public Hospital and inform them of the estimated time of arrival of the injured person. Details of the injuries sustained, and the state of the injured will also be communicated. The Coordinator will complete an accident report to be provided to the hospital on arrival of the injured. Emergency contact numbers/radio frequencies/satellite phone numbers/etc and for identified medical personnel, hospital, and police will be clearly posted at the mine and camp. An accident report will be prepared describing the cause and nature of the accident, and the remedial actions taken to prevent the reoccurrence of the accident. This report will be forward to the relevant regulatory agencies on request. For effective implementation of the EMP and for a safe and healthy work environment, training will be provided to all workers. A site induction will be conducted for all new workers. This policy will ensure that employees become familiar with potential hazards and safety precautionary measures in a quarry environment. The training program will be coordinated and implemented by the Environmental Manager.

Hazardous Materials: Diesel fuel and lubricants will be the major hazardous materials present at the quarry site. Care will be taken so that equipment lubricants, fuels and other industrial liquids do not drip or flow onto natural surfaces. Waste oil, other related fluids, filters, oily rags, etc., will be collected and disposed of properly. Large metal refuse containers will be positioned at the site for collection of hazardous waste materials.

Hazardous Waste: No hazardous waste is produced at the quarry. Any waste rock products will consist chiefly of biotite and hornblende.

Mine Safety: The quarry will be inspected periodically and will operate under applicable EPA and Guyana safety and health regulations. All employees will receive initial training before commencing work and annual refresher safety training. Impacts from blasting will be mitigated by:

- Ensuring prescribed procedures for blasting are followed, which include (1) assessing the type of rock formation; (2) determining the depth of drill holes and (3) determining the Frequency of Blasting and Type of Explosives used.

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- Careful design of the blast sequence and ensuring detonation is designed using appropriate delay intervals for charge ignition to avoid detonation of large unconfined charges and to reduce air-blast and vibration effects. The use of electronic detonators will also be employed to reduce vibrations. The number of explosives used in the blast will be carefully administered to reduce fly rock.
- Ensuring that blast safe zones are established during blasting.
- Informing the residents in the vicinity of blasting times in advance.
- Strict procedures for transport, storage and handling of explosive and blasting will be implemented in accordance with Mining regulations and the GGMC Code of Practice for Quarrying.
- A Certified Blaster will be recruited to supervise the blasting exercise, as required by law.
- Blasting will be done according to the Blasting Plan approved by the GGMC.

Blasting: Blasting will periodically be required at the quarry. All blasting will be conducted by qualified individuals in compliance with Guyana Laws. A buffer zone was created for the Bartica Airstrip and the outlying houses at minimum of 500 meters. Bartica is 9km away from the quarry. Blasting will occur only during workdays during daylight working hours such as to minimize impact to surrounding area. Noise limiting methodologies will also be used to lessen noise impact. Stakeholder consultations will be conducted with communities such as Bartica. Stakeholder engagement is an on-going process of sharing information and knowledge, seeking to understand the concerns of others and building relationships based on collaboration and partnership. Developing relationships with stakeholders is a long-term process, which will take place throughout the lifetime of the Quarry. The ultimate aim is to engage stakeholders as part of the project process to ensure that issues and concerns can be dealt with as quickly as possible thereby avoiding any potential conflict, and to build a general sense of goodwill towards the project.

Vibration and Noise: In addition to blasting, other mine operations including mechanical excavation, crushing and processing can produce significant noise and vibration. Best available practices of noise and vibration reduction will be utilized at the quarry and noise monitoring will

be conducted during initial mine operations. The project's operations will be associated with noise and vibration generating activities – excavation with machinery, drilling and blasting of rock, transport of boulders within the site and loading of barges are the critical noise generating activities. Excessive noise can affect workers and give rise to hearing loss, sleep disturbance and can also affect wildlife within the project area.

Noise will be mitigated by installing sound suppression equipment on vehicles, e.g. mufflers and ensuring vehicles are maintained according to the manufacturer's manual and are kept in good working order. Operators will be equipped with PPEs such as air plugs or ear muffs. Generators will be installed with sound proofing or at a safe distance away and downwind from the living quarters. Blasting will be implemented in accordance with Mining regulations and the GGMC Code of Practice for Quarrying. Careful design of the blast sequence and the use of electronic detonators will be employed to reduce vibrations. Quarry operations will comply with the decibel limits outlined in the GNBS Noise Emission Standard.

General Housekeeping: Operational litter will be collected in appropriate containers and removed as required from the site. No waste will be buried on site. A septic system on the land will be utilized

Waste and Ablution Facilities: Project activities is expected to produce both liquid and solid waste which, if not properly stored and or disposed can lead to pollution of receiving water bodies or accumulate on site creating an unhygienic and un-aesthetic environment. Improper management of domestic waste and sewage can pollute land and water resources in the area, resulting in health impacts on site. Waste generated will be collected, segregated, stored and transported to an on-site landfill constructed in accordance with the EPA Guidelines for establishing landfills. Domestic wastewater will be directed to a soak-away filter treatment system prior to discharge to the Turiruba River. Discharges to the river will be in accordance with the EPA domestic wastewater discharge limits. All sewage will be directed to septic tanks with filter bed treatment installed.

18.0 Reclamation with limited backfilling

Reclamation at the Southern Canton International Trading Inc. quarry Expansion will proceed concurrently with mining wherever possible and shall be conducted in accordance with reclamation guidelines. As valuable material is mined out, those areas not to be affected by future quarrying operations will be reclaimed. Although it will be impossible to restore the land surface to its exact original configuration, it should be possible to reclaim the disturbed surface such that it closely matches the natural surface expression of adjacent undisturbed land. At closure, most pit walls will be reduced to a safe slope by such mechanisms as illustrated in the figure below

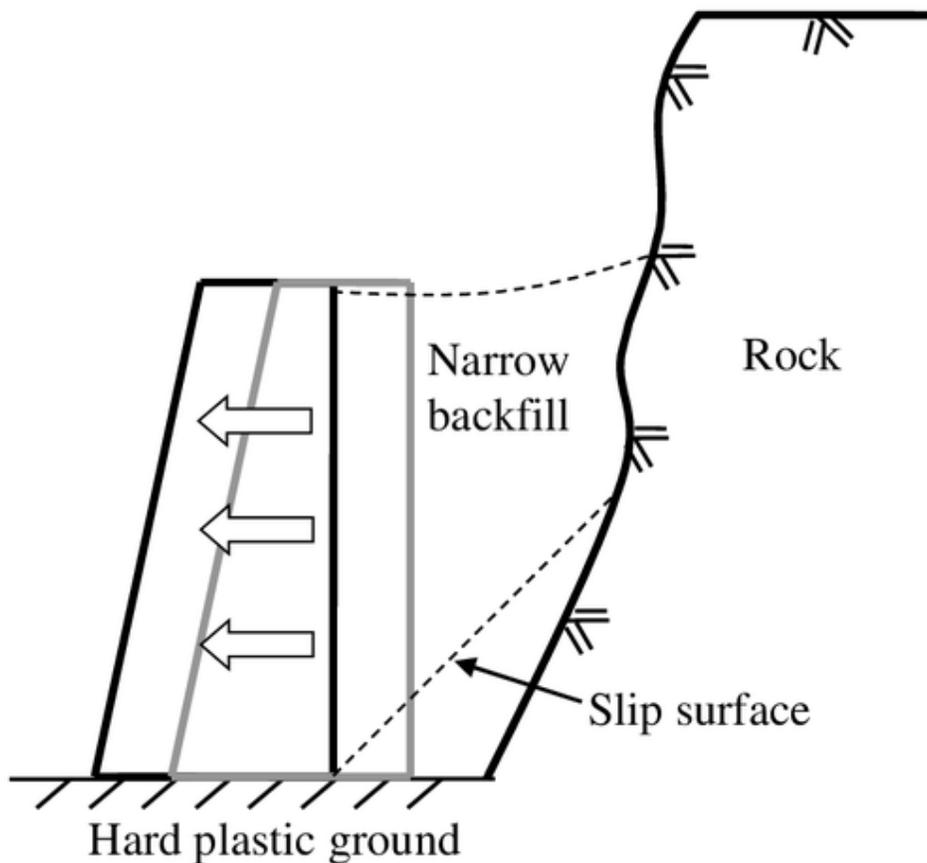


Figure 18. Example of Limited Backfilling

19.0 Approach and haul road maintenance

Approach and haul road and landing will be continually maintained throughout the life of the quarry. Roadside ditch line through the area will be re-established and grubbed out to convey surface flow so as to minimize erosion

20.0 Site clean up

Site cleanup works to be undertaken after cessation of extractive operations include;

- Removal of all fixed and mobile plant
- Removal of all temporary and permanent structures unless required for an agreed future use
- Leveling of noise control bunds
- Removal and burial of concrete slabs
- Rehabilitation of surplus roads, office sites and hard standing areas
- Identification of any hazardous or contaminated materials
- Approval to retain any of the infrastructure, which may be consistent with the proposed final land use, would be sought from the regulatory authority.

Appendix: Closure & Rehabilitation

The principal closure related issues relate to the quarry have been identified as:

Final voids (pits) arising from the rock extraction; Waste dumps and disposal areas; Surface water management, Infrastructure (general, haul roads, plant, buildings, tank farms etc.); and Retrenchment of employees.

Subsequent refinements of the closure plan will be influenced by consultations and will address in more details specific to closure issues and proposed options. It is anticipated that these will address, amongst other items, the following areas:

Pits: detailed proposals for the rehabilitation of the mined-out areas including the manner in which the actual site of the pit will be restored for future use. The proposal will be supported with relevant plans sections depicting the method of land restoration and rehabilitation.

Water quality management: detailed proposals for post-closure prevention and control of erosion, sedimentation, siltation and leaching to ensure appropriate water quality standards are achieved.

Waste management: description of the type, quantity and quality of overburden and other waste, their disposal, and detailed proposals for utilization and/or stabilization to prevent siltation, erosion, dust generation and maximize integration with surrounding land.

Infrastructure: facilities such as roads, power lines, buildings and structures and their future utilization will be evaluated and where relevant the measures for their maintenance will be described. If decommissioning is proposed, the dismantling and disposal of building structures, support facilities and other infrastructure (such as electric power lines, water pipelines, underground tanks, transformers etc.) will be discussed in detail. Retrenchment: description of the socio-economic opportunities in the area, inventory of employees and associated skills, formation of a plan to retrain and re-skill employees and facilitate re-employment to minimize impacts of retrenchment and to ensure facilities and services provided are supported.

In the specific environmental and socio-economical context of the site, options for post closure land use with respect to these issues will be limited and technical constraints at the time of this assessment and the potential for long term quarrying activities in the surrounding areas. The first priority therefore must be to protect the environment and public health and safety by using safe and responsible closure practices. For each principal component of the project plan, a base case for post-closure land use has been identified, taking into account technical designs, the views of the stakeholders and emphasizing productive end use of each project area following appropriate rehabilitation.

Appendix: Gant Chart of Activities & Conceptual Flow chart



Figure 19. Planned Activities for the Five years

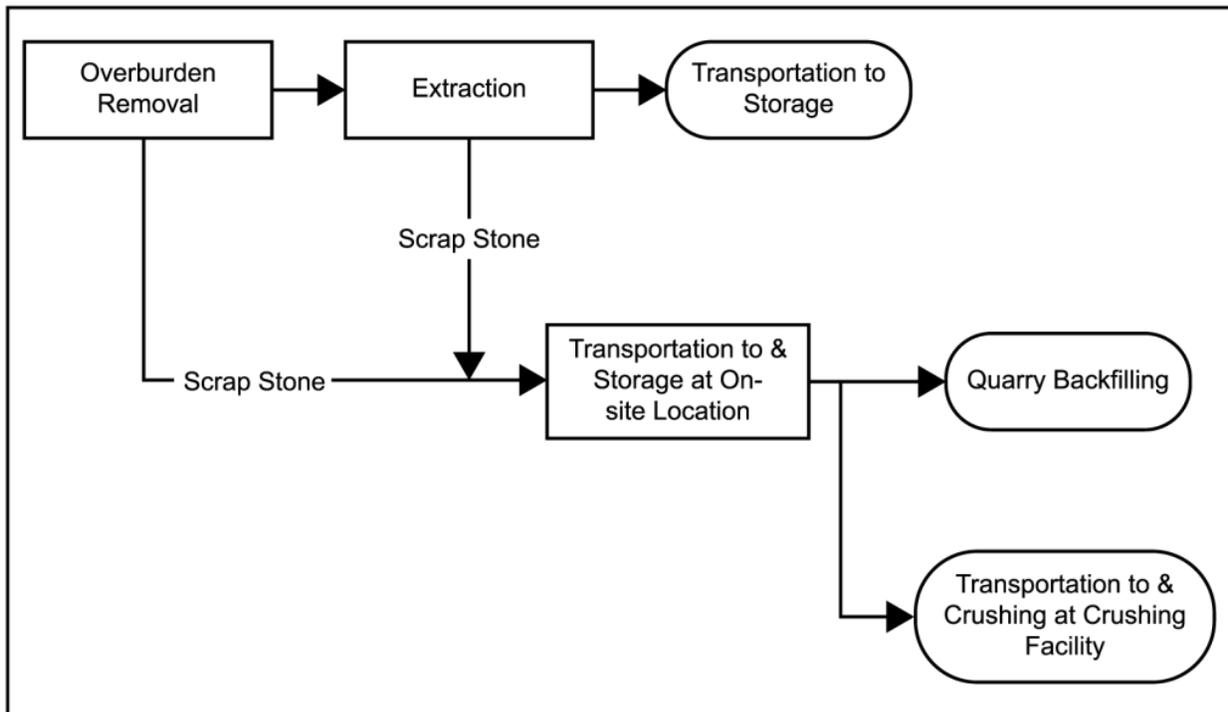


Figure 20. Conceptual Flow chart of Proposed Quarry

Appendix: Mine Layout Plan

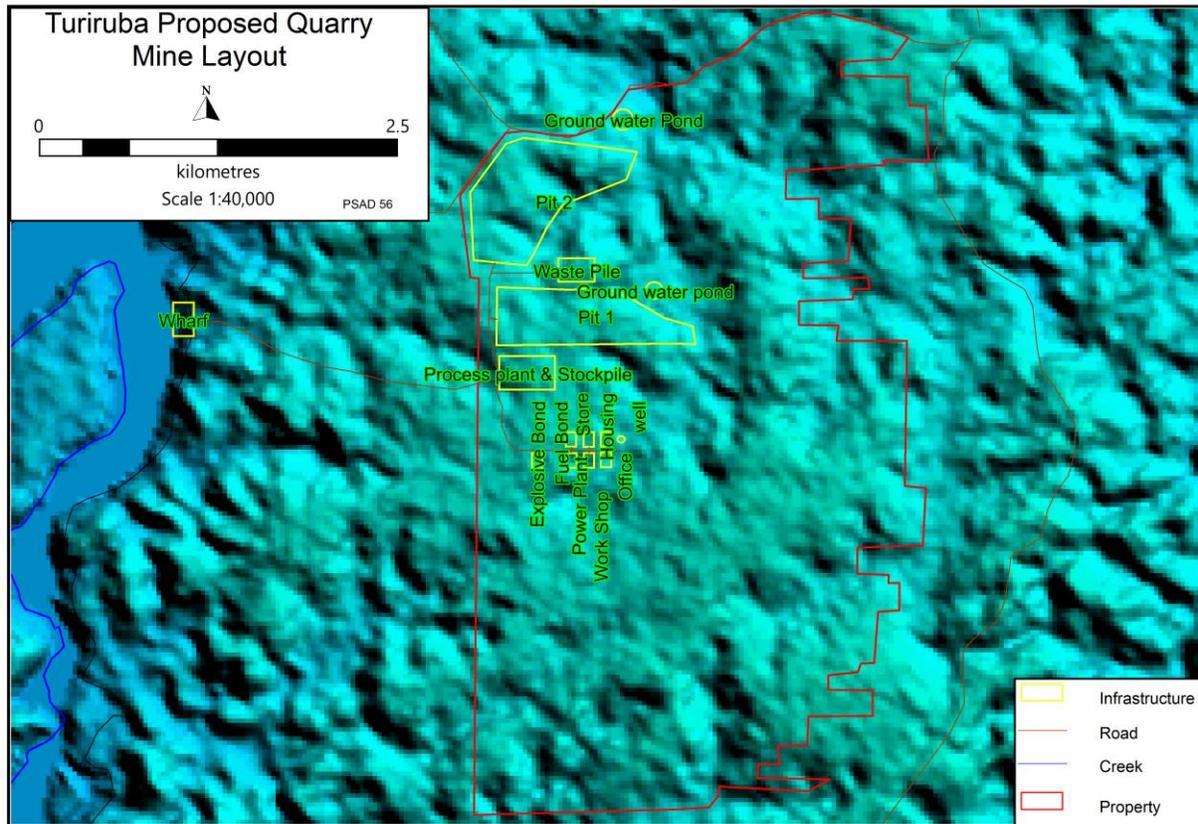


Figure 21. Mine Plan Layout