

ARISARU NORTH QUARRY PROJECT SUMMARY

Jeanne Disarz – Mining Permit S-194/MP/003



Outcropping gabbro boulders on clear water creek bed.

Mining Permit S-194/MP/003

June, 2024

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Executive Summary

This document presents a Ten-Year Project Summary for the extraction of stone from Medium Scale Mining Permit S-194/MP/003 held by Mrs. Jeanne Disarz in the Arisaru Mountain Area, Region 10, Potaro Mining District 2. The Arisaru North Quarry Project Summary outlines a comprehensive project aimed at the development, operation, and eventual closure of the Arisaru North Aggregate Quarry.

The quarry's primary objective is to meet the growing demand for aggregates in the Guyana market through strategic planning, construction, and operational phases, while ensuring environmental sustainability. This study evaluates a case scenario to ensure an adaptable and effective project implementation strategy.

The immediate goal of this project is to establish an aggregate production facility that matches changing market needs, and gradually increase production as the operation shows more confidence in the forecasted Guyana market growing demand.

This Project Summary outlines production targets, quarry infrastructure to be developed, describes the installation and operation of mining and processing equipment, observing international standards on Environmental Impact Control and Health and Safety practices for the years 2024 to 2033 on the Arisaru North Quarry.

Initially, the project will focus on mining 30,000 tons of fragmented gabbro boulders in the starting year, as the road access to the open-cast mining front is constructed. Exploitation of the massive gabbro and the installation of a mobile processing plant will allow ramp-up production, as aggregate of different sizes will be introduced to reach 150,000 tons at the end of the second year. Systematic operation, in the third year, will make possible double production, to meet immediate market demands. Operational optimization will record the full capacity production of 360,000 tons per year at the fourth year from start.

1. Introduction

The Arisaru North Quarry Project Summary observes the following principles and guidelines to meet the objectives defined above:

- **Guidelines:** This mining plan is based on considerations of the following aspects:
 - Market;
 - Infrastructure and favorable logistics;
 - Geology Mapping and Quarriable Resources Estimates;
 - Configuration and utilization of equipment;
 - Mining Method;
 - Mine operation;
 - Occupational Safety and Health Considerations;
 - Environmental Issues.
- **Principles:**
 - Plan operations on the property strictly in accordance to international standards;
 - Plan the quarry mine and the quarry operations;
 - Tool the operations;
 - Improve efficiencies and overall safety;
 - Install safety practices among workers;
 - Optimize output of crushing plants;
 - Improve blast production and powder factor;
 - Commence rehabilitative works towards closure, since the starting.
- **Mining Method** – The mining method at Arisaru North Quarry will use the traditional open cast practice of drilling and blasting a planned rock bench, loading the material with excavators and front-end loaders, and hauling to the selected destination by off-highway trucks and onto a crushing circuit or directly export sorted boulders to customers.
- **Drilling and Blasting** – Drilling will be done by a rotary-percussive drill to a pre-set blast-hole pattern; the blasting parameters would be designed to suit the rock conditions. The holes are then to be charged with emulsion-in-cartridge explosives as base charge and ANFO (Ammonium Nitrate Fuel Oil) as column charge. Initiation will be by using the EXCEL system towards increased/improved safety.
- **Production of boulder sized rock** – Generally selected from 1.0ton material and loaded by an excavator onto 35 – 45 tons' haul trucks or the large capacity wheel loader to the stockpiles. For the production of smaller boulders (100 kg – 1,000 kg) larger size rocks will be fragmented into smaller sizes using an excavator mounted hydraulic jackhammer.
- **Production of Crushed aggregates** – The typical primary crusher feed is 20 – 500 kg material from the quarry or hopper-feed stockpile loaded by wheel loaders and transported by dump trucks. The material is dumped into the primary crusher hopper and screened within the crushing circuit. The crushing plant will be designed to produce crushed aggregates of any grade of assured quality with minimum modifications on the crushing circuit.
- **Quarry export** – Material from the crushing plant and boulder stockpiles will be loaded by wheel loader onto trucks loaded directly at the quarry site.
- **Management** – The entire production and dispatch process will be managed and supervised by an experienced team of quarry personnel functioning under the

Managing Director.

- **Production Plan** – The budgeted output for starting year 2024 is 30,000 tons with projected sales at an average of 5,000 tons per month, starting 2024, based production from boulder fragments, and increase with the installation of a crushing plant and adequate mining equipment to be completely installed and operating in 2025, producing an average of 12,500 tons monthly. The following year 2026 goal is to double production and from 2027 production will meet full capacity of 30,000 tons per month.

For the following operating years, it is planned to produce an average of 360.000 tons yearly, totaling 3.000.000 tons produced in ten years; production would ramp-up according to the market performance – it could grow exponentially, considering quarriable resources and market expectation.

This relative slow rate of *in-situ* rock resources exploitation, though quite significant to the market, indicates that production can easily scale to more than four (4) times the planned mine reserves and the quarry would still have a long life.

Indeed, the local aggregate market is growing fast, and the boulder for sea defense as well, as ocean level will continue to rise.

This increasing demand is attributed to the following factors:

- (I) Massive infrastructural development in the country;
- (II) Sharp increase in housing and commercial construction;
- (III) Export demand for crushed aggregates from Guyana.

- **Clearing and Stripping** – an area measuring 45 ha will be cleared (de-bushing) and stripped of overburden, which would start yet during the current year.
- **Closure** – Rehabilitation (restoration / reclamation) including backfilling and landscaping will commence at identified sections of the quarry site, starting in 2026.
- **Capital Investment** – Mining equipment corresponds to the main capital expenditure – CAPEX; A processing plant is to be installed to produce aggregate of various sizes; vehicles, drills, generators and other ancillary equipment are also included in budgeted CAPEX of USD7.32M (seven million and three hundred and twenty thousand American dollars).

1.1. History of Quarry Operations in Arisaru Mountain Area

Historically, the Arisaru Mountain's rocks were never mined for aggregate stones until late 2022, when New Thriving Quarry Company started producing crush stone from the gabbro rock massif outcropping in the Arisaru Mountain area. Omai Gold Mines constructed the Arisaru Antenna in 1991. It was first used for radio communication and later updated to cell phone antenna. The road cut to access this antenna is yet the main access road to central part of Arisaru Mountain.

Proposed Operations

Jeanne Disarz proposes to extract, break and crush stone from a major gabbro rock wall and from boulders outcropping adjacent to the planned mining front route, within medium scale mining permit S- 194/MP/003. This site has been identified as Arisaru North Quarry Area.

Quarrying would continue with scavenging boulders during the first two years, followed by limited rock blasting during years 2 and 3. A new crushing circuit would be introduced in the second year of operations.

This Project Summary figures out the implementation and development of an aggregate

stone quarry with continuous production of aggregates for the next ten years, in accordance with the budget of capital investment, project schedule of tasks and milestones, and cash-flow, all presented and part of this document.

1.2. Location and Access

The planned operations will take place in the Arisaru Mountain Region, Potaro Mining District 2 of Guyana. The proposed quarry area can be easily accessed by the Linden-Mabura Road, which is under asphalt paving now.

It is located at the km #60, south of Linden, and 5 km over dirt road to the W (see Location Map on Figure 1 and photos below):



Photo 1: Drone view of Linden-Mabura asphalt road under construction.



Photo 2: New Thriving and Arisaru North Quarry Project access road.



Photo 3: 4 km long old logging road to access Arisaru North Quarry Project area.

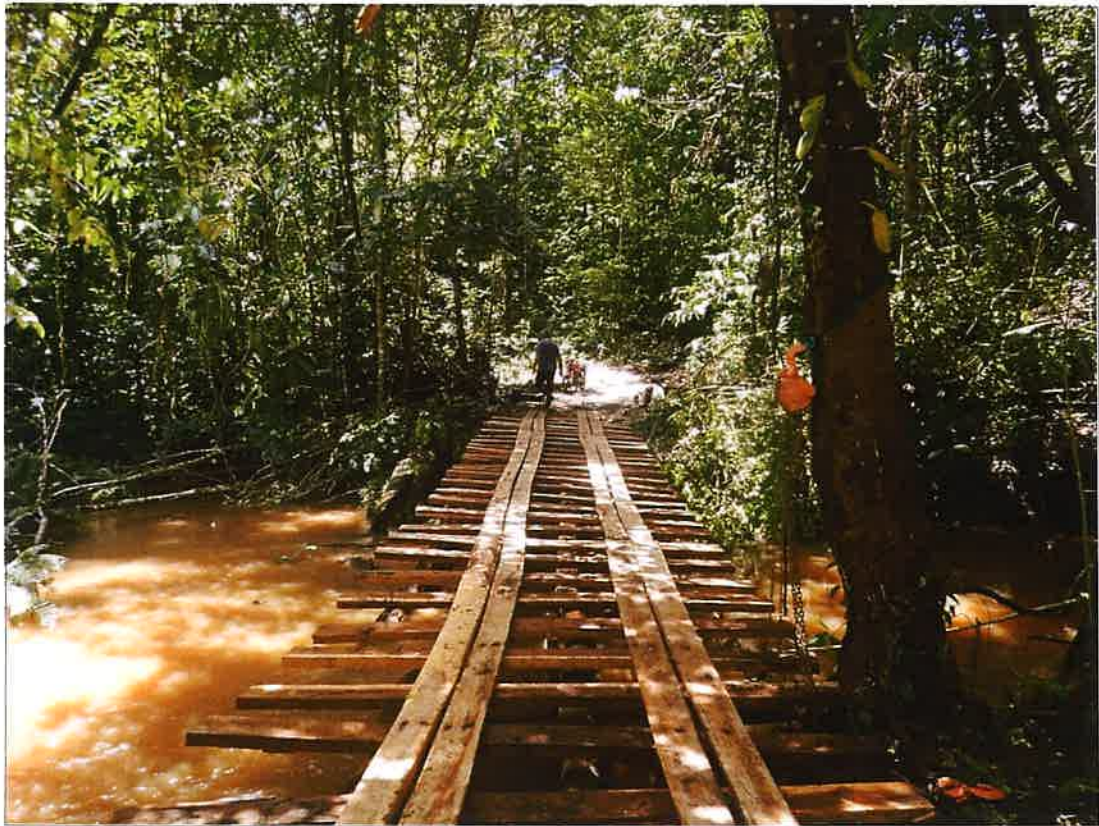


Photo 4: Bridge across Dehalibana Creek tributary to reach Arisaru North Quarry Project.

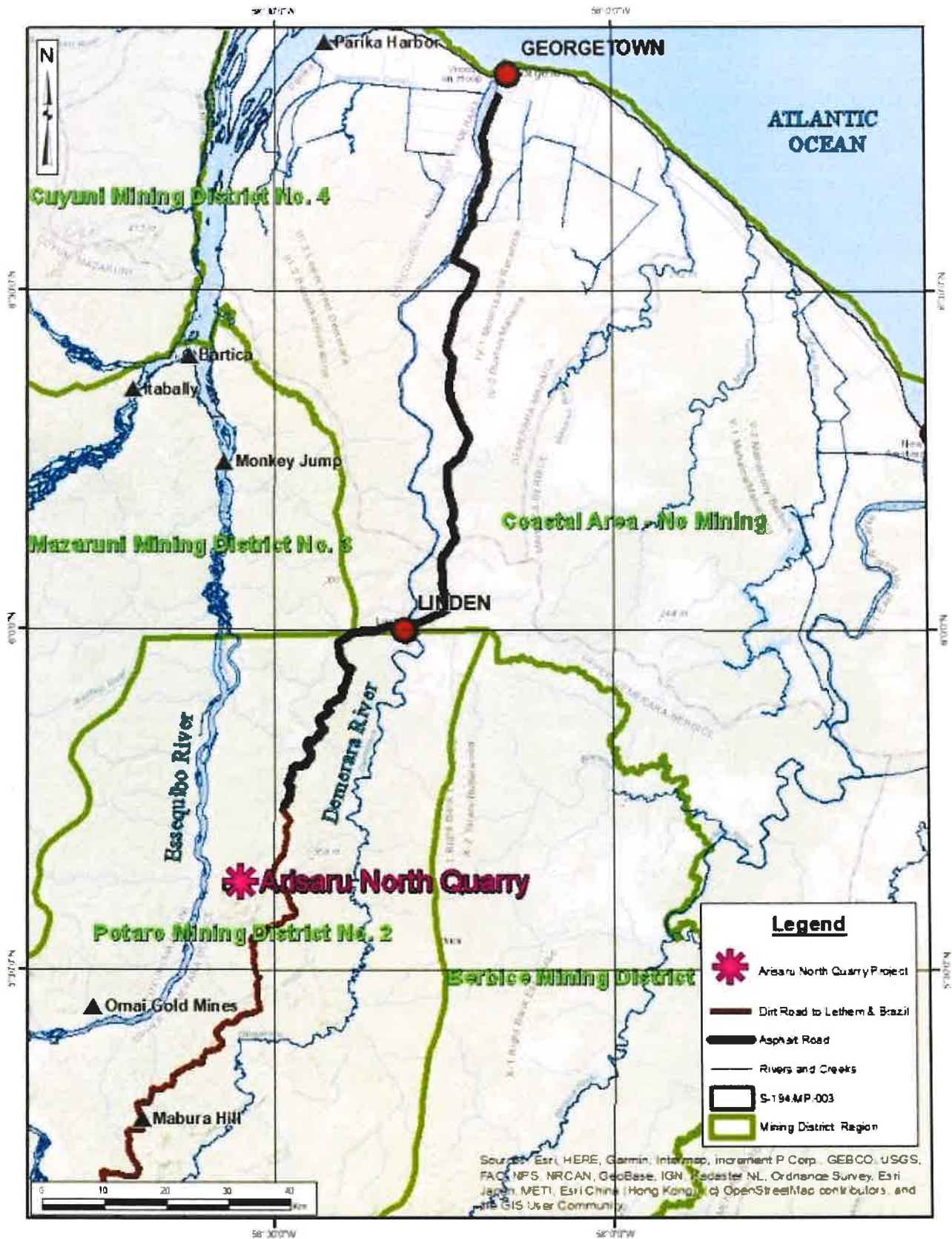


Figure 1: Location of Arisarur North Quarry Project.

1.3 Property Title

The Arisaru North Quarry Project is covered by Medium Scale Mining Permit S-194/MP/003 for the extraction of Quarriable Minerals in the area measuring 1,200 acres. The area is located on GGMC Topographic Map 36SE sheet, over which the mining permit area is displayed by a defined polygon, located and defined as follows:

A tract of state land located in the Potaro Mining District No. 2 as shown on Terra Surveys Topographic Map 36SE, at scale 1: 50,000 with reference point 'X' located at the confluence of the Essequibo and Dehalibana Rivers, with geographical co-ordinates of longitude **58°35'46"W** and latitude **5°39'37"N**.

Thence at true bearing of **46°**, for a distance of approximately **4 miles 243 yards**, to point of commencement:

Point A, located at geographical coordinates of longitude **58°34'1"W** and latitude **5°37'46"N**, thence at true bearing of **39°**, for a distance of approximately **1069 yards**, to **Point B**, located at geographical coordinates of longitude **58°33'41"W** and latitude **5°38'10"N**, thence at true bearing of **91°**, for a distance of approximately **1127 yards**, to **Point C**, located at geographical coordinates of longitude **58°33'7"W** and latitude **5°38'10"N**, thence at true bearing of **100°**, for a distance of approximately **1 mile 130 yards**, to **Point D**, located at geographical coordinates of longitude **58°32'12"W** and latitude **5°38'0"N**, thence at true bearing of **178°**, for a distance of approximately **1541 yards**, to **Point E**, located at geographical coordinates of longitude **58°32'10"W** and latitude **5°37'15"N**, thence at true bearing of **255°**, for a distance of approximately **608 yards**, to **Point F**, located at geographical coordinates of longitude **58°32'28"W** and latitude **5°37'10"N**, thence at true bearing Plan of **357°**, for a distance of approximately **957 yards**, to **Point G**, located at geographical coordinates of longitude **58°32'30"W** and latitude **5°37'38"N**, thence at true bearing of **252°**, for a distance of approximately **1430 yards**, to **Point H**, located at geographical coordinates of longitude **58°33'10"W** and latitude **5°37'25"N**, thence at true bearing of **329°**, for a distance of approximately **426 yards**, to **Point I**, located at geographical coordinates of longitude **58°33'17"W** and latitude **5°37'36"N**, thence at true bearing of **238°**, for a distance of approximately **917 yards**, to **Point J**, located at geographical coordinates of longitude **58°33'40"W** and latitude **5°37'22"N**, thence at true bearing of **248°**, for a distance of approximately **800 yards**, to **Point K**, located at geographical coordinates of longitude **58°34'2"W** and latitude **5°37'13"N**, thence at true bearing of **270°**, for a distance of approximately **831 yards**, to **Point L**, located at geographical coordinates of longitude **58°34'27"W** and latitude **5°37'13"N**, thence at true bearing of **6°**, for a distance of approximately **947 yards**, to **Point M**, located at geographical coordinates of longitude **58°34'24"W** and latitude **5°37'41"N**, thence at true bearing of **78°**, for a distance of approximately **792 yards**, to the point of commencement at **Point A**.

Thus, enclosing an area of approximately **1200 acres**, save and except all lands lawfully held or occupied.

Figure 2 below shows the Mining Permit S-194/MP/003 polygon area plotted over the Terra Surveys Topographic Map Sheet 36SE. Figure 3 shows this polygon area over October/2023 Planet.com satellite image:

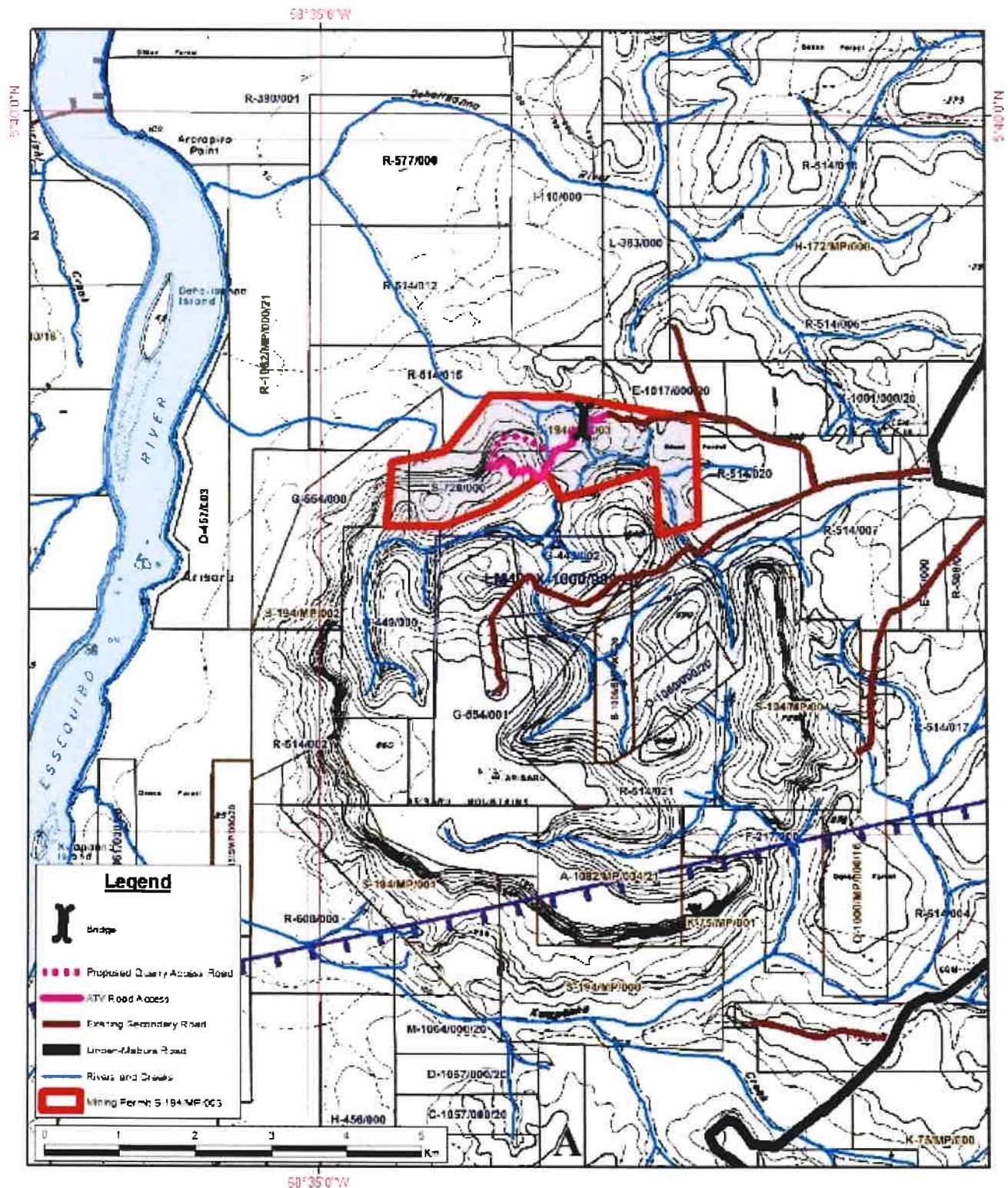


Figure 2: Location of Medium Scale Mining Permit S-194/MP/003 over GGMC Stock Sheet 36SE.

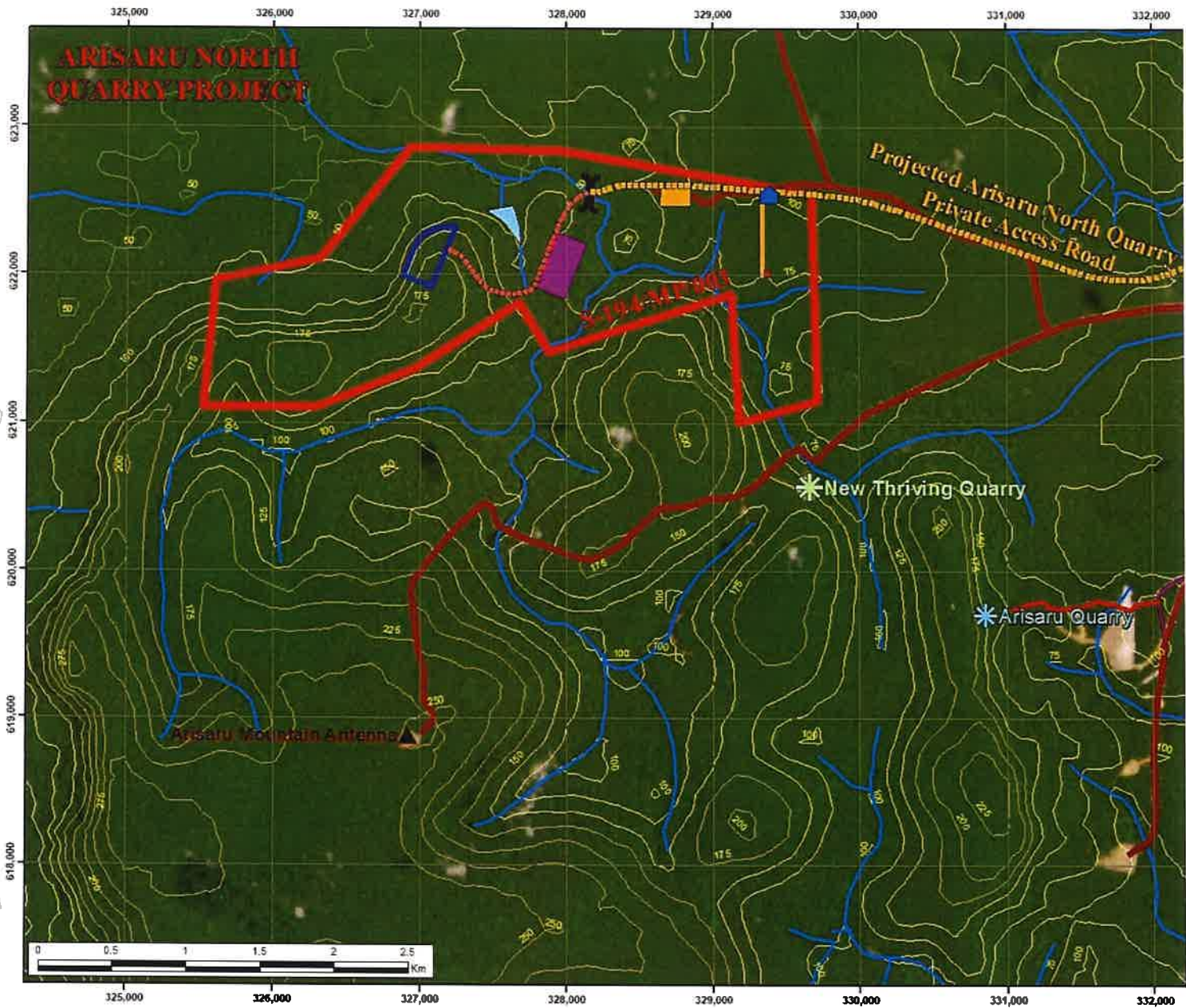


Figure 3: Location of Mining Permit S-194/MP/003 over October/2023 Planet.com satellite image.

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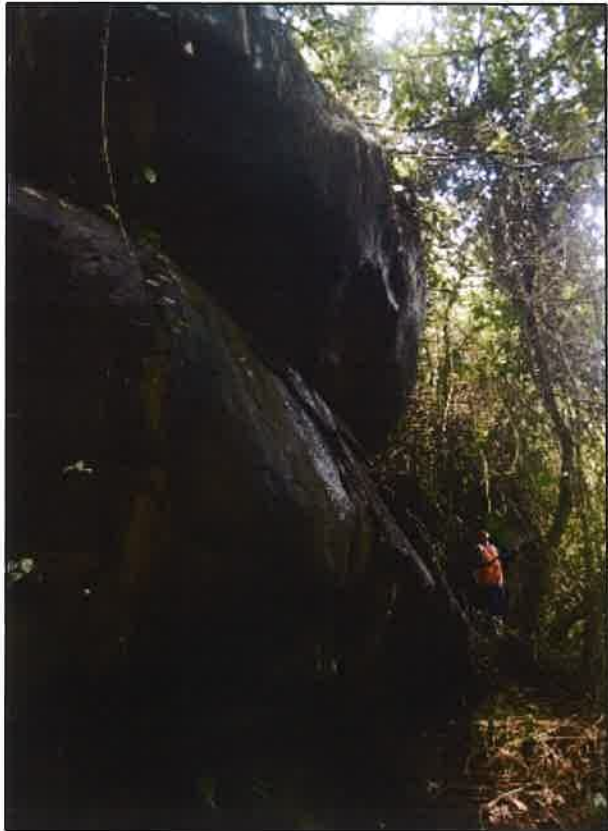


Photo 5: Gabbro outcrop.



Photo 6: Gabbro rock wall in S-194/MP/003.

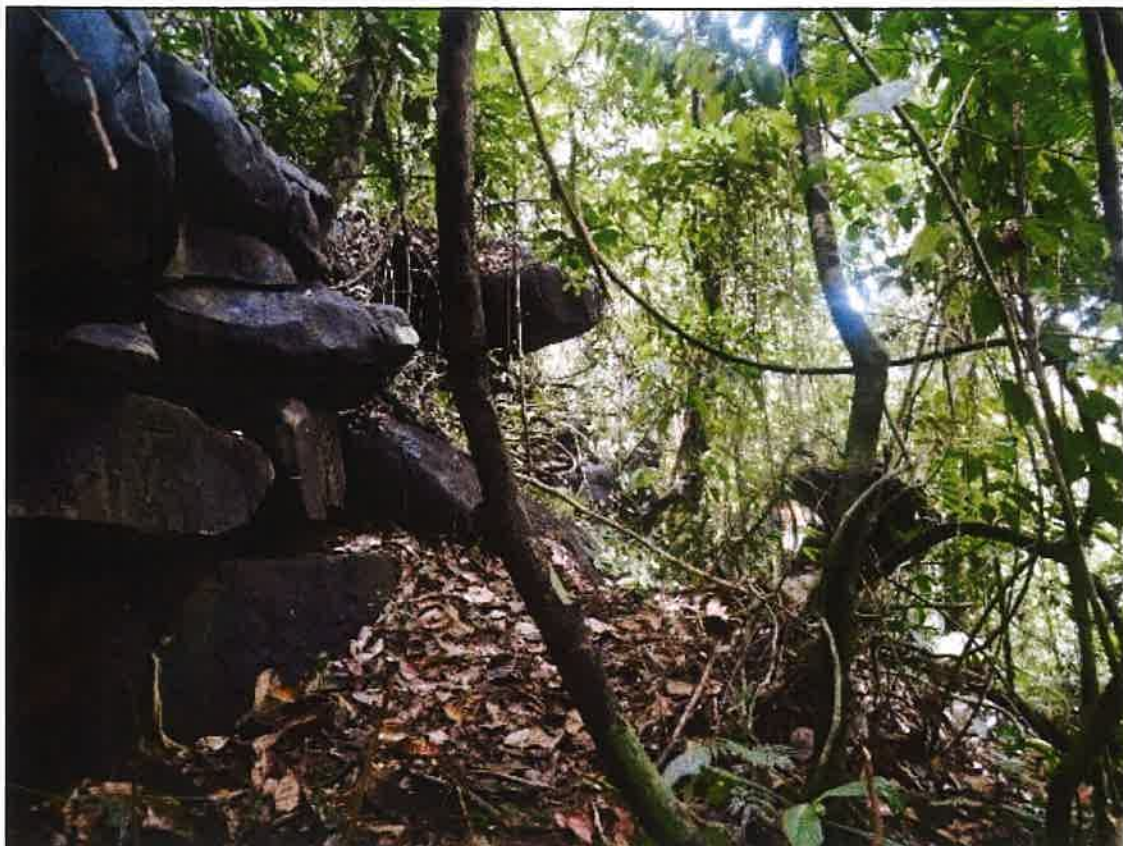


Photo 7: Dislocated fractured blocks of gabbro outcrop within Mining Permit S-194/MP/003.

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1.4. Local Infrastructure and Services

Regional Setting and Communication

The project area lies within the Upper Demerara - Bartica Administrative Region 10. The Region is administered out of the town of Linden, located 60km north of the Arisaru North Quarry Project access road junction, where Digicel and GT&T mobile phone servers are available.

The closest village to Arisaru North Project area, at which there are basic supplies and services is the 58 Mile Guy-oil Gas Station, 42 km south of the Project area road junction, along the Linden-Mabura Road, where Digicel mobile phone service is available. At the Project area, only GT&T mobile service is available, enabled by antenna installed at the Arisaru Mountain top.

Road Transportation

The Project area centered at Arisaru North Quarry is connected to nearby communities and to the capital city Georgetown via unpaved dry-weather 5 km long logging road that links it to the Linden-Mabura Hill Road, a 155 km long road, which is now undergoing asphalt paving.

River Transportation

Heavy supplies and machinery can be transported by boat from Linden via Fluvial harbor straight to the Atlantic Ocean. Nevertheless, the transportation of rock produced by this Arisaru North Quarry Project does not contemplate any transportation of the quarry products out of its production site. Crushed stone production is intended to be delivered at the Quarry site.

Transportation of heavy equipment and rock on the Essequibo River is not possible because of the non-navigable rapids close to Rock Stone Landing, 40 km north of Arisaru North Quarry Project.

Social Services

The Linden community is equipped with Public Hospital with free medical services; there are schools for basic levels of educational training (nursery/primary/secondary); there is a commercial district, where telephone, internet, and radio communication is readily available. The photos below illustrate local support points for the Arisaru North Quarry Project area:

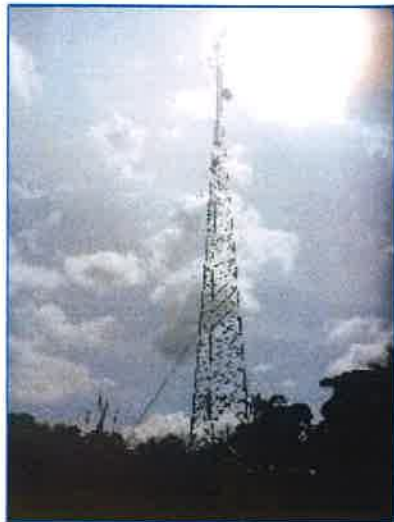


Photo 8: Antenna (GT&T) at Arisaru Mountain top.



Photo 9: 58 Mile Gas Station, where some basic services and supplies can be found.

The Figure 4 below shows the Local Access Map for the Arisaru North Quarry Project area:

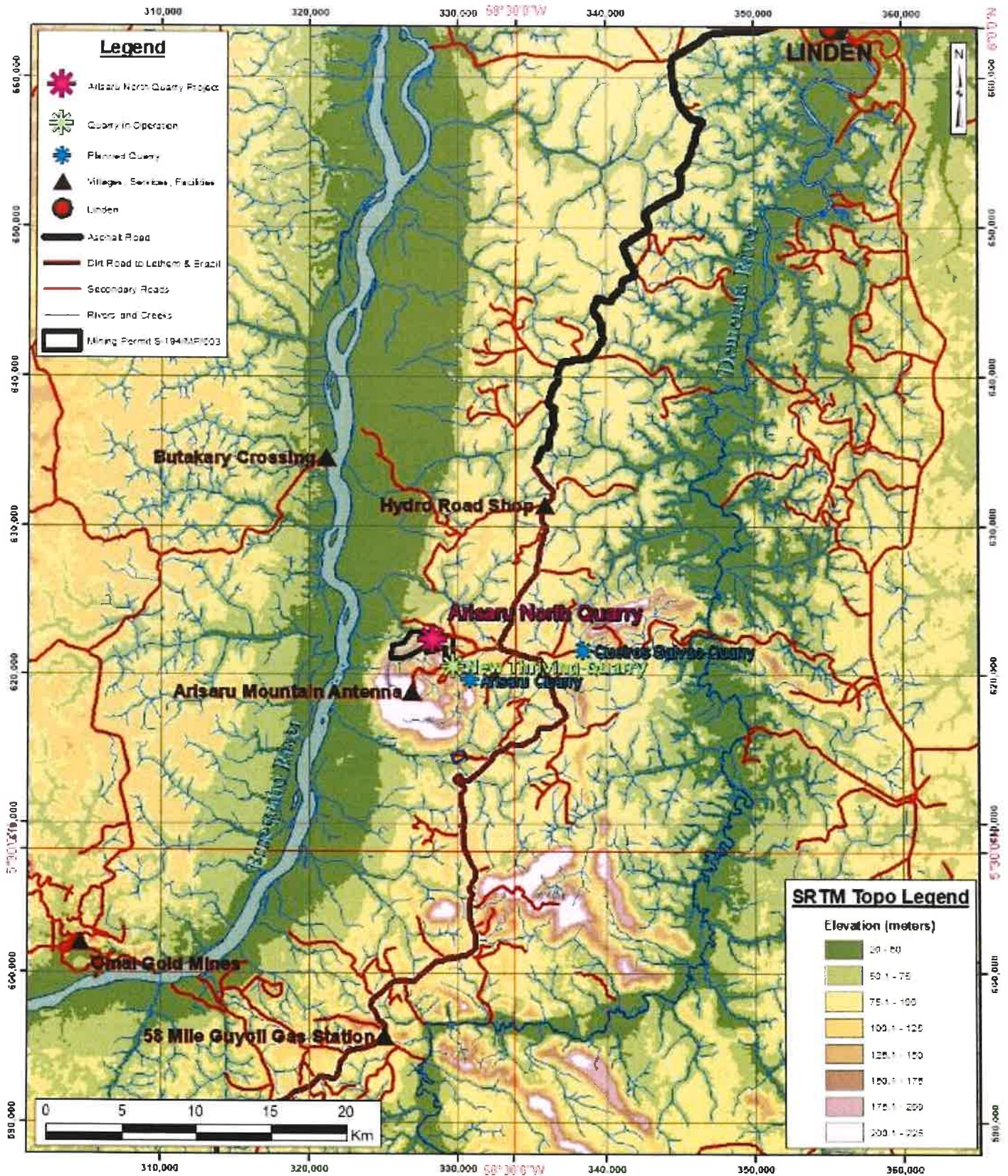


Figure 4: Arisaru North Quarry Project over SRTM topographic image.

1.5. Physiography

Topography and Geomorphology

The topography of the Arisar Mountain region is characterized by a 7.5 km diameter circular plateau bordered by over 100 meters tall exposed gabbro rock cliffs.

The Arisar North Quarry Project is located at the northern part of the Arisar Mountain and it is comprised of a 1.5 km long East-Western hill and 100 meters (175 m AMSL) high, constituted of gabbro rock, partially covered by a laterite layer.

This gabbro rock hill is bordered to the North by an extensive white sands layer regionally deposited across the low-lands around the Arisar Mountain and other locally elevated terrains in northern Guyana. The topographic maps of Figures 2 and 3 above and the geologic maps on Figures 5 and 6 below show the Arisar North Quarry Project Area.

Vegetation

Dense Rain-Forest can be described as the dominant vegetation type within the property, as well as in the whole Potaro Mining District area. Forestry logging have been harvesting some selected species during the last decades.

There are two different assemblages of plant species that can be recognized in the property: one associated to the Arisar Mountain Gabbro rocks and the other to the white sands widespread along the lower topographic ground.

Climate

The Arisar North Quarry Project is situated on Guyana's equatorial rainforest climate type region and it annually experiences two wet seasons: One from May to July and another from November to January, and two dry seasons from August to October and from February to April.

On average, rainfall occurs daily with the duration and intensity varying between the wet and the dry seasons. The Hydro-meteorological Office reported that the annual precipitation averaged 2,200 mm with the highest generally occurring in the October to January wet seasons (338 mm in October 2019 and 344 mm in January 2020), and the lowest during the August to September dry season (73.91 in August 2019 and 86.87 in September 2020).

The winds are consistent from the East-Southeast direction with higher wind speed recorded from July to December. The average wind speed is approximately 1.46 m/s with maximum of 15.12 m/s during the windy months and less than 0.5 m/s during the calmer months.

Though daytime temperatures are hot, nights tend to be cooler. The average monthly maximum is generally registered in April (43.7°C), and the average monthly minimum in June (19.8°C). Relative humidity average 87.4% and the variation is approximately 18.8% throughout the year, with the monthly averages ranging between 76.6% in March to 94.4% in June.

Drainage

The Project Area is drained by the Essequibo River right margin affluent Dehallbanna River southern tributaries, that envelop the EW Gabbro Hill on its the Eastern Northern sides. All these creeks present regularly flowing water all year around. Nevertheless, it is recommended that a dam should be built for industrial and clean water reservoir, to face eventual extreme dry seasons.

Land Use

There are no land users within the Arisar North Quarry Project Area, covered by the Medium Scale Mining Permit Area S-194/MP/003.

1.6. Geological Setting

1.6.1. Regional Geology

The area is located in the Barama-Mazaruni Supergroup, Trans-Amazonian Tectono-Thermal Province, Guyana Shield, part of the Amazonian Craton. The Barama-Mazaruni Supergroup rocks are Paleoproterozoic in age (2.018-2.145 Ga) and comprise an East-West trending series of mafic through felsic volcanic flows with intercalated clastic sediments (Gibbs, 1980, Gibbs and Barron, 1993).

The Barama-Mazaruni Supergroup sequences formed through orogenic collision events, to which development juvenile plate tectonic processes were associated to (Gibbs and Barron, 1993). These rocks were deformed by the Trans-Amazonian Tectono-Thermal Episode (2.130Ga).

These strata were subsequently intruded by granite intrusions known as the Younger Granite Group, which probably were emplaced coevally with a regional sub-greenschist facies metamorphic event (William et al. 1967). Ultramafic intrusives also cut the metamorphosed early Paleoproterozoic Barama- Mazaruni Group rocks at about the same age as the Younger Granites. These are included in the Appinitic Intrusive Suite (1.9 Ga).

With similar age to the Younger Granites are also the Bartica Assemblage (2,080 Ga), which consists of ortho- and paragneiss's amphibolite's, generally metamorphosed in the almandine facies (Gibbs and Barron, 1993).

Mafic dykes belonging to the Younger Basic Group or Avanavero Suite (1.78 Ga) cut the metamorphosed early Paleoproterozoic rocks. This unit include the gabbro rocks, which exploitation is the object of this mining venture.

Northeast trending tholeiitic basalt dykes and sills of Jurassic age (191-202 Ma) are reassembled into the Younger Basic Dykes unit.

The Cenozoic (66 Ma to present) units, are represented by widespread Pleistocene laterite and an extensive unconsolidated beach placer that locally cover all the preceding geological units, especially close to the sea. Quaternary alluvial sediments are observed along the river valleys.

The following units are represented in the Regional Geology Map of Figure 5 below:

- Younger Basic Dykes: Dykes, and sills, mostly mafic, ultramafic, and gabbroic intrusions, ranging from a fine grain matrix to a coarse grain matrix;
- Avanavero Suite: Plutons, sills and dykes of mafic, gabbro-norite intrusions ranging from a fine grain matrix to a coarse grain matrix; this is the unit in which the Arisaru North Mountain Project is inserted in;
- Appinitic Suite: Localized ultramafic complexes (gabbros and diorites, anorthosites) intrusives Barama-Mazaruni Group sequence;
- Younger Granites: Paleoproterozoic phaneritic (grains visible to the naked eye), intrusive granite and granodiorite, present all along central to northern Guyana, from East to West;
- Bartica Assemblage: granulite and gneissic terranes that host all the later units, also present all along central to northern Guyana, from East to West;
- Barama-Mazaruni Supergroup Metasediments: Paleoproterozoic intercalated metasediment layers tightly folded, corresponding to the upper member of the greenstone belt sequence;
- Barama-Mazaruni Supergroup: Paleoproterozoic metabasic to metafelsic (andesite, rhyolite, dacites) volcanic flows, corresponding to the lower member of the greenstone belt sequence.

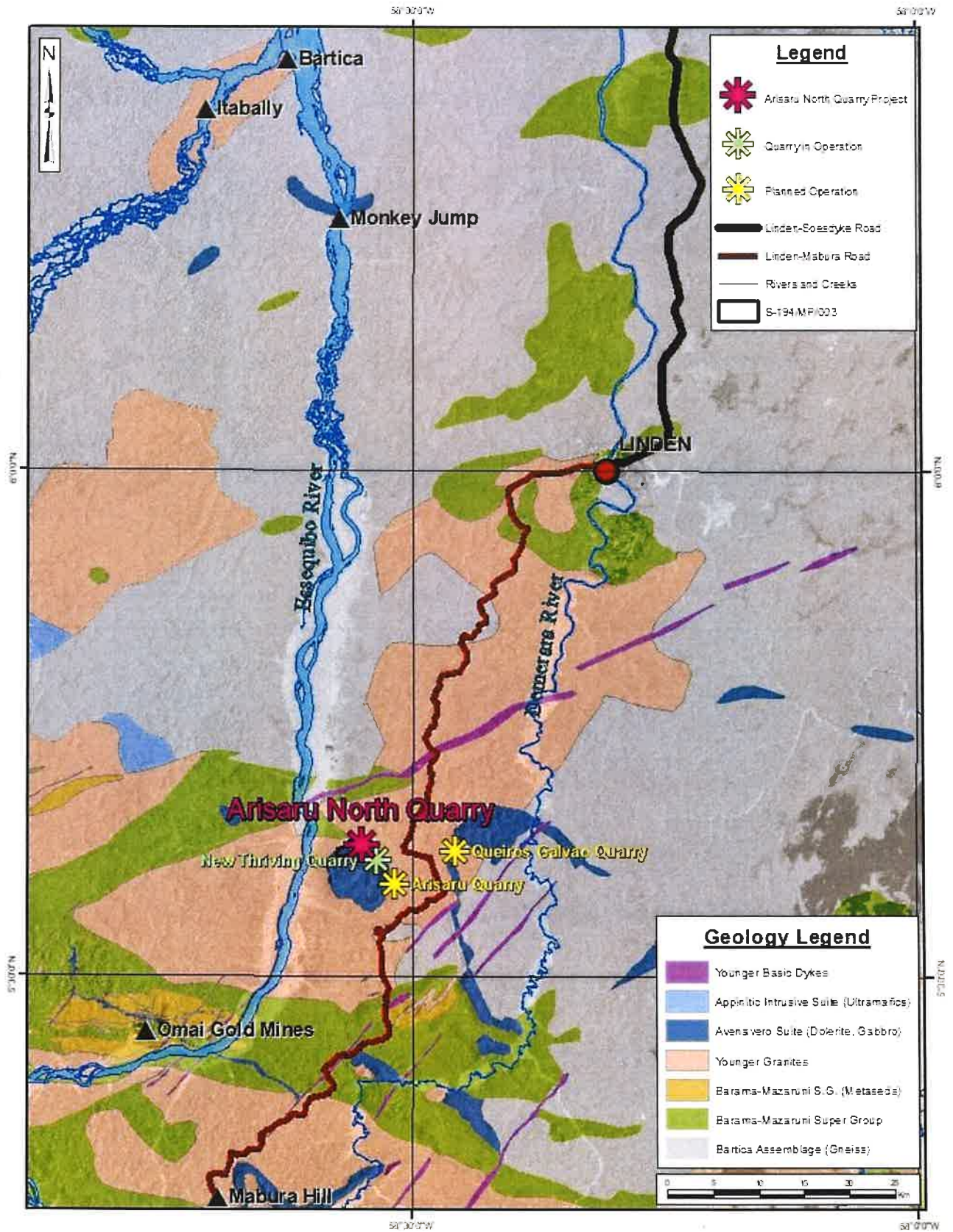


Figure 5. Regional Geology Map over radar image.

1.6.2. Local Geology

Geological Mapping

An exhaustive geological program was organized to produce a geological map at a scale greater than 1:10,000 on the northern part of the Arisaru Mountain and fully map the extension of gabbro or any other quarriable rock in the Mine Permit Block S-194/MP/003.

Gabbro belonging to the Avanavero Suite prevail as the most abundant rock type outcropping in the northern part of the Arisaru Mountain area.

The rocks pertaining to the Young Granites Group that envelops the Arisaru Mountain gabbro pluton, and the Barama-Mazaruni metamorphic sequences and the Bartica Assemblage gneisses as well, are distributed along the extensive topographically lower terrain all around the Arisaru Mountain, with higher elevations on the landscape.

Nevertheless, granite and metamorphic rocks outcrops are very rare, because the low lands are covered by a widespread post-Pleistocene placer white sand.

Property Geology

The gabbro massive pluton occurs in 70% plus of the Mining Permit S-194/MP/003 area, dominantly in its southern part. It is enveloped by a gabbro boulder field, formed from the dismantling of the gabbro pluton by weathering. White sands cover all the lower topography ground to the north. A gabbro rock wall outcrops at the Arisaru Mountain northern border. The southern portion of the mountain is covered by laterite, embedding gabbro boulders and forming a boulder field.

The Quarriable Rock

Gabbro is a dark coarse-grained rock that constitutes the Arisaru Mountain. Due to its hardness and weather proof property, and its opportune availability at the Arisaru Mountain, it is becoming the most used material for building roads and infrastructure development all over Guyana.

The abundance of Gabbro within the property and its growing demand has prompted Jeanne Disarz to operate a stone quarry in this area.

Mining Permit S-194/MP/003 presents significant quarriable resources, which are classified in the four different categories:

- Outcropping gabbro quarriable resources: Represents *in-situ* fresh, outcropping gabbro resources. In the field, identified by vertical walls of fresh gabbro;
- Laterite covered quarriable resources: Represents fresh gabbro resources that have been subject to laterite-related weathering processes, and present a laterite layer overburden;
- Boulder field quarriable resources: Represents boulder fields that are derived directly from the outcropping gabbro resources;
- Laterite covered boulder field quarriable resources: Represents a mixture of boulders that were subject to laterite-related weathering processes. For this category, a conservative 50-50 ratio boulder/laterite was considered.

The Local Geology Map (Figure 6) shows the distribution of outcropping rocks and sediments:

ARISARU NORTH QUARRY PROJECT SUMMARY

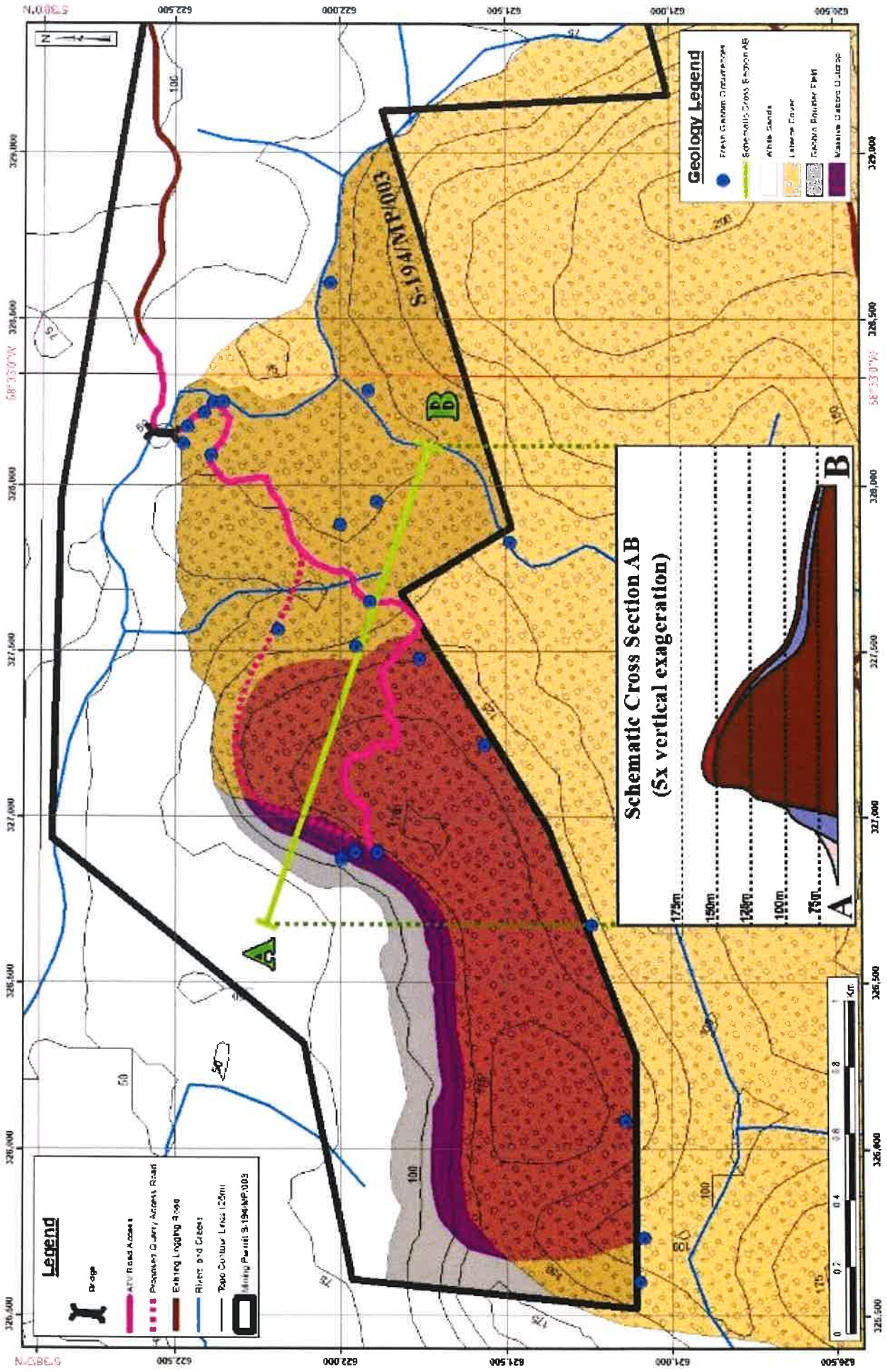


Figure 6: Geological Map of Mining Permit Area S-194/MP/003, showing Quarriable Gabbro Jeanne

1.6.3. Quarriable Rock Petrography

Medium-grained gabbro and dolerite forms the pluton and associated sills and dykes of the Avanavero Suite at the Arisaru North Quarry Project area. The photo below shows a typical natural sample of the gabbro occurring at Arisaru North Project area:



Photo 10: Gabbro fragment broken boulder shows its fresh texture.

Gabbro is a phaneritic (coarse-grained), mafic intrusive igneous rock formed from the slow cooling of magnesium-rich and iron-rich magma into a holocrystalline mass deep beneath the Earth's surface. Slow-cooling, coarse-grained gabbro is chemically equivalent to rapid-cooling, fine-grained volcanic rock basalt.

It is composed of pyroxene (mostly clinopyroxene) and calcium-rich plagioclase, with minor amounts of hornblende, olivine, orthopyroxene and accessory minerals.

It is a dense, massive, hard, homogeneous textured, and exceptionally resistant to weathering rock, which assigns gabbro a safe ground for the production of top-quality aggregate stone.

Quarriable Rock Physical and Quality Tests

Several tests were conducted on the rock samples obtained from the property. The following results are recorded:

- Specific gravity tests averaging 2.97:
 - Values of aggregates normally used in construction range from about 2.5 to 3.0, with an average of about 2.68. The specific gravity of aggregates is used to indicate strength; higher specific gravity generally means higher strength (IRICEN website).
- Aggregate impact value test averaging 2.71%:
 - The impact test is a type of quality control test for highway pavements that is used to determine the suitability of aggregates for use in highway pavement construction.

The table below shows the classification of aggregates based on its physical impact value:

Aggregate Impact Value	Classification
<10% Exceptionally Strong	Exceptionally Strong
10 – 20% Strong	Strong
20 – 30% Satisfactory for road surfacing	Satisfactory for road surfacing
>35% Weak for road surfacing	Weak for road surfacing

Table 1. Classification of Aggregates Based on Aggregate Impact Value.

- Los Angeles abrasion tests averaging 3.96%, ideal for road construction:
 - The test reports loss of mass due to abrasion and impact, expressed as a percentage of initial sample mass. The maximum acceptable loss for the base course of the road is 45%; the more demanding surface course must be 35% or less (Wolf & Runner 1935).
- Aggregate crushing value tests averaging 6.33%:
 - The aggregate crushing value gives a relative measure of the resistance of an aggregate to crushing under a gradually applied compressive load. For strong aggregate, crushing value should be low. For surface courses, this value should not exceed more than 30%. For courses, the value should not exceed 45%.

The table below shows the aggregate crushing value standards:

Type of road construction		Aggregate crushing value not more than
1	Flexible Pavements	
	a) Soling	50
	b) Water-bound-macadam	40
	c) Bituminous macadam	40
	d) Bituminous surface-dressing or thin premix carpet	30 30
	e) Dense-mix carpet	
2	Rigid Pavements	
	Boulders / Rip Rap	45
	Boulders / Rip Rap	30

Table 2: Specified Limits of Percent Aggregate Crushing Value.

- Compressive strength of gabbro rock, used for blasting design:
 - This information has been used to approximate the optimal blast pattern to obtain the particle size required to feed the crusher with properly sized blasted rock. In order to obtain the best control on oversized rocks, as well as to control fly rock projections, a drill pattern using 4.5” (114 mm) holes has been chosen.

The table below shows averaged values for the physical properties of a gabbro rock:

Gabbro Properties	Value	Source
Density	2.95	ASTM C127 Test made by client
Compressive Strength	160 MPa	Average value from MatWeb https://www.matweb.com/search/GetReference.aspx?matid=193)

Young Modulus	90 Gpa	Average value from MatWeb (https://www.matweb.com/search/GetReference.aspx?matid=193)
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Table 3: Gabbro physical properties.

2. Quarry Operation Plan

This Project Summary report to 10 (ten) years long period, from 2024 to 2033, with an average yearly production of 300,000 tons/year, totaling 3 million tons in 10 years. This quarry intends to supply boulders, gabions and crushed aggregates to the local Guyanese market in the following fractions: 2" (50mm), 7/8" (25mm), 3/4" (19mm), and 1/2" (12.7mm).

2.2. Exploitation Method

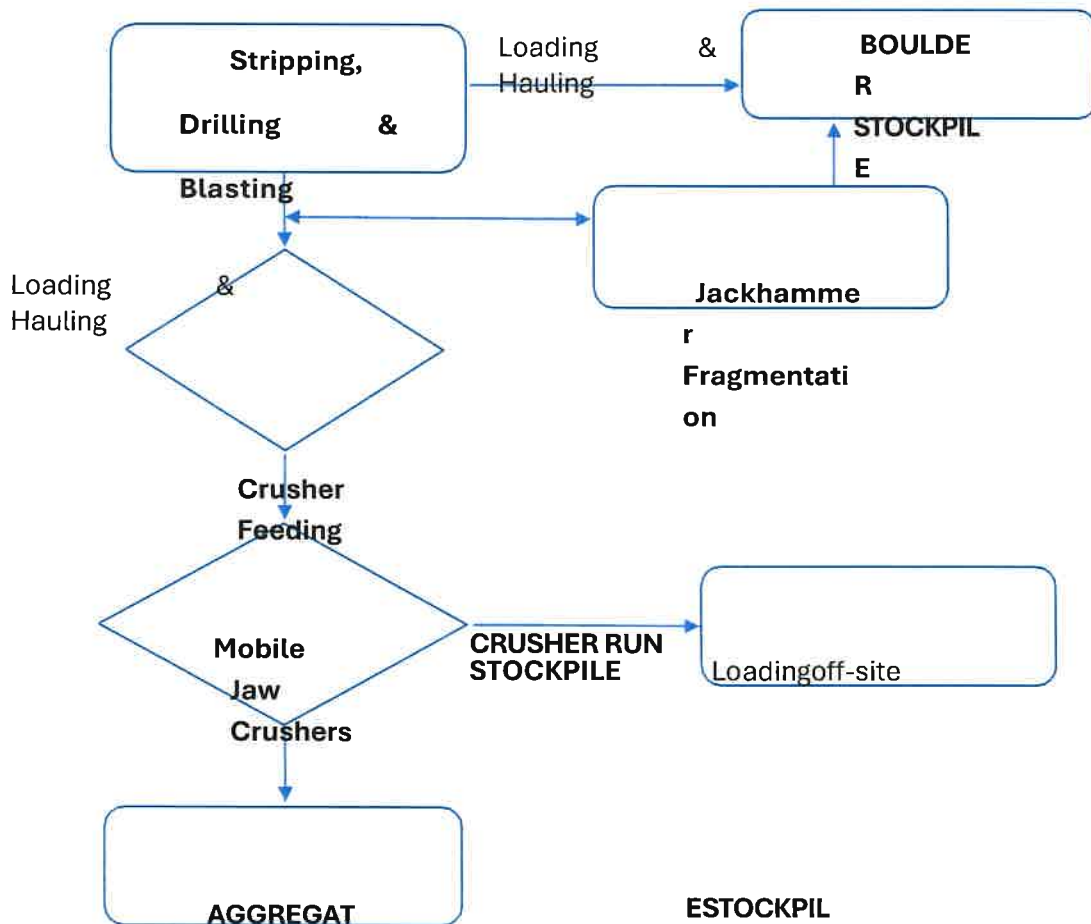
The recommended mining method for the Arisaru North Quarry Project is the Open Cast Mining, typical for an aggregate quarry at a topographical positive elevation configuration, which is the case for exposed rock on an elevated topographic setting.

The exploitation method will involve a combination of benching, controlled drilling and blasting techniques, followed by systematic loading and hauling of the extracted materials to the processing plant, and loading off-site product transportation at their stockpiles (sized boulders and classified aggregate crushed stone).

Excavations would start along the route to the planned mining front using bulldozers and excavators, which will be equipped with jackhammers to brake and assort sized boulders.

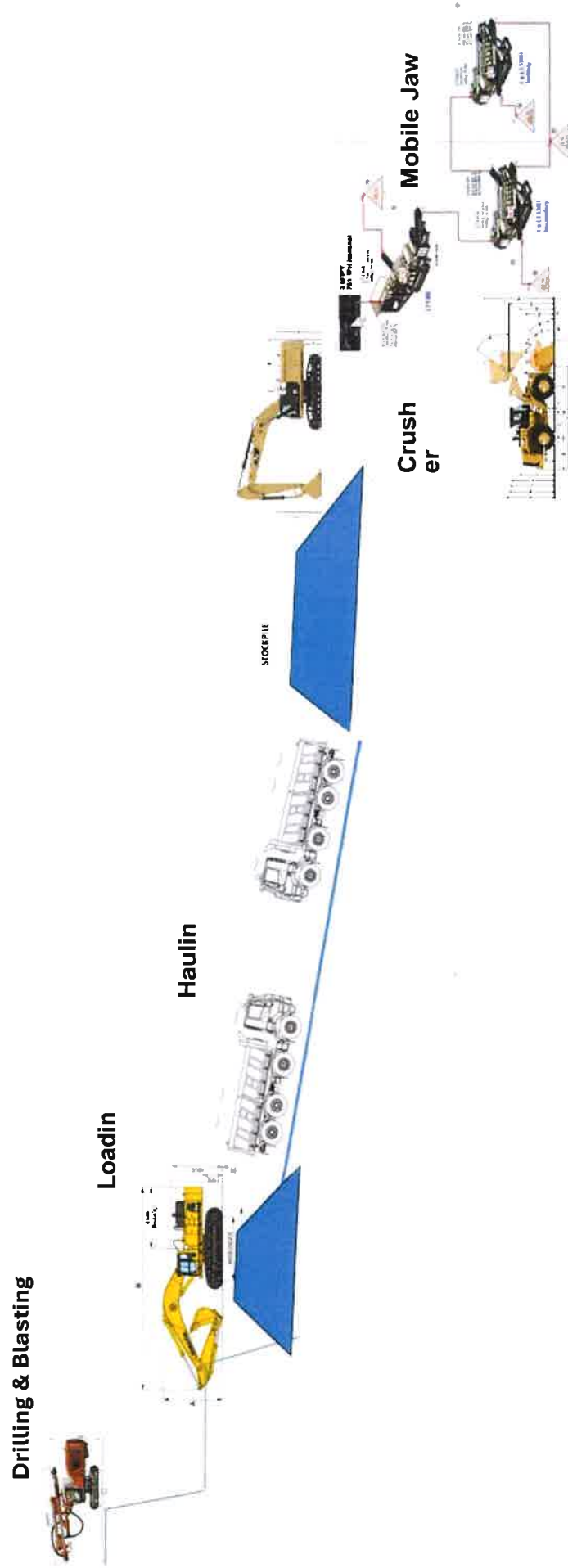
The quarry site is covered by dense tropical vegetation that will be de-bushed. Clearing and the topsoil removal will be done in different stages following detailed mining plans.

The flow-chart below illustrates the schematic quarry exploitation method:



Loading off-site
Figure 7: Quarry Exploitation Flow Chart.

The schematic figure below illustrates the Quarry Operation Plan:



Loading Off Site

Figure 8: Quarry Operation Plan schematic illustration.

2.3. Quarry Operation Process

The quarry exploitation process encompasses the following stages:

- Stage 1: de-bushing or land clearing the mining site and subordinated terrain;
- Stage 2: rock overburden stripping;
- Stage 3: drilling and blasting the rock;
- Stage 4: out loading of fragmented rock to the crushing plant or directly to the boulders stock pile to be loaded for off-site transportation;
- Stage 5: processing the mined material by the crushing plant;
- Stage 6: out loading the crushed and classified material to the stockpiles of processed material to be loaded for off-site transportation.

2.3.1. Stage 1: De-bushing or Land Clearing

Land Clearing

The quarry is planned to occupy approximately one hundred and thirteen (113) acres of de-bushed land, which corresponds to the processing plant compound with personnel accommodation and G&A buildings, the explosive magazine, the police headquarters area, the industrial water reservoir, road access, and the area to be mined.

Except for the open cast mine area, de-bushing is estimated to last two (2) months of operation, which should be done in 2024. As works proceeds on the developing open cast mine front, new de-bushing area will precede mine front advancement.

Topsoil Management: Removal, Storage and Rehabilitation

The reclamation approach dictates that the topsoil be removed and ultimately replaced whenever the quarry is exhausted or wherever possible during operations.

Adequate topsoil management is considered the most important factor in successful rehabilitation of the project since the objective is to restore the native ecosystem of the project area. The topsoil from all areas being cleared would be retained for subsequent rehabilitation. It will be stockpiled at sites sufficiently far from the clearing limits to ensure that the material can be accessed for later distribution.

The topsoil contains many of the seeds and other plant propagules (such as rhizomes, lignotubers, roots etc.), soil micro-organisms, organic matter and much of the more labile (more readily cycled) plant nutrients.

Waste rock weathers rapidly to form suitable materials for re-vegetation. The topsoil referred to as the A1 horizon is usually darker than the underlying soil because of the accumulation of organic matter. The complete A1 horizon would be removed.

In areas where the A1 horizon is not obvious, the top 100-300 mm of soil would be removed. Double stripping the topsoil, where the top 50-100 mm of soil is removed, and returning it separately on top of the remaining topsoil may be warranted, particularly since the aim is to restore the native flora. Most of the seeds are stored in this top layer of soil, and its removal and return as a thin layer on the surface will maximize the contribution of these seeds to the post-mining flora.

The topsoil will be removed by a D8R Caterpillar dozer or similar, loaded to haul trucks by front-end loaders, and transported to areas to be specified for topsoil storage. Topsoil would not be stockpiled on the crest of the quarry but outside the pit limit in sterile locations which would not be mined.

The table below lists the areas to be cleared and de-bushed:

DEBUSHING AREA	
Area Description	Area (m²)
Open Cast Area	100,000
Open Cast Access Road	115,000
Quarry Site Access Road	125,000
Quarry Compound	24,000
Explosives Magazine	3,000
Police Headquarters	3,000
Processing Plant and Stockpile Yard	80,000
TOTAL	450,000

Table 5: Planned clearing and de-bushing area.

2.3.2. Stage 2: Overburden Ripping and Stripping

Overburden Characterization and Volume Estimation

The results of the geological exploration program indicate that the waste rock on top of the gabbro massif is constituted of laterite. This lateritic layer has a number of gabbro boulders of various sizes immersed in it. Its average thickness is estimated 2 to 4 meters and it is partially eroded and weathered. So, this overburden is not sterile, it is not waste.

Overburden Management Strategy

Temporary storage and utilization of overburden material:

Quantities of overburden material comprising of various proportions of loam and laterite would be partially sold as quarry products. Some laterite would also be used on site for paving internal roads and facilities installations.

Overburden would not be stockpiled on the crest of the quarry but outside the mining front, in sterile locations which would not be mined. The waste rock is non-acid generating (NAG), though Acid Rock Drainage – ARD potential has been factored into the design.

Stripping will be assigned to a D8R Caterpillar dozer or similar, the same that will be used for de-bushing and land clearing (stage 1). Overburden will be loaded by front-end loaders to haul trucks, and then transported to areas to be specified for storage.

The table below shows the volume of overburden to be stripped and ripped off:

OVERBURDEN VOLUME ESTIMATION	
Area Description	Area (m³)
Bench 1 - Hill top	84,000
Bench 2	41,200
Bench 3	55,200
Bench 4	62,000
Bench 5	78,800
TOTAL	321,200

Table 6: Overburden volume estimation.

2.3.3. Stage 3: Drilling and Blasting

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.

Drilling

A percussive blast hole drill rig will be utilized at this location to drill 3 ½ inch diameter holes. Tovex will be used as the primary explosive, initiated by primer cord and 25 millisecond delay detonators.

Angular rock fragment should be used as stemming instead of drill cuttings. A.N.F.O. can be utilized as secondary explosive during dry season but will not be used during the rainy season.

A program for dry season drilling and blasting only will not be possible at this or any other location in Guyana since the rainy season is now indefinite, therefore drilling and blasting will also have to be done during the rainy season.

Rock Blasting Parameters

The hard strata will be exploited by drilling and blasting. The broad parameters for blasting (based upon the work at similar quarries in Guyana):

- 1) About 30 to 50 holes per blast of 32mm diameter and to a depth of 1.5m to 2.5m would be adopted;
- 2) It is estimated about 2 to 3 tons' production per hole;
- 3) The number of planned / scheduled blasts would depend upon the workable area and production target to be achieved;
- 4) Spacing of 1.0m to 1.5m between holes would be adopted;
- 5) About 250g per hole of explosives will be used; however, 10kg would be budgeted for each blast;
- 6) Millisecond electric blasting will be adopted to limit the PPV and to reduce noise levels within the stipulated environmental standards.

The excavation of rock access on the mining front, as well as around boulders partially buried in laterite will be done by excavators.

The rock would be already fractured (boulders) and easily exploitable by rock breakers and excavators.

Blasting Pattern

The blasting pattern entirely depends on the situation of the joints present in the rocks. The drilling is done as per the requirement of the rock fragmentation with desired production of sized rock fragments.

The drill pattern currently being used is 1.5 to 1.8 meters, as this spacing has proven to improve fragmentation.

Blasting will be supervised by a trained and certified blaster. The storage and handling of explosives are done under the supervision of the Guyana Police Force.

ANFO (Ammonium Nitrate Fuel Oil) explosives and emulsion cartridges will be used as the main blasting agents. The usual pattern uses 17 millisecond delays between holes and 75 millisecond delays between rows.

Initiation

The current system utilizes electric means of initiation. There are plans to upgrade the system to non-electric initiation soon.

Secondary Blasting and Boulder Breaking

Secondary blasts would be kept to a minimum as steps are in place to improve fragmentation during the primary blasts. In addition, larger boulders will be broken by a hydraulic hammer mounted on the Cat 330 excavator or similar.

Blast Production

It is planned that the capacity of the crushing plant will be upgraded to cater for the increase blast production. It is estimated that about 10,000 tons of rock would be blasted per week at an average fragmentation of 85%. The powder factor is estimated at 3 tons per pound of explosive.

2.3.4. Stage 4: Out Loading Mined Rock to Crushing Plant / Boulders Stockpile

Blasted Material Hauling and Stockpiling

Blasted material will be loaded and transferred to the processing plant or to the rock stockpile yard up to 1.2 kilometers away from the open cast mining site, using articulated dump trucks type CAT 740 or similar 40-tons' trucks, while the crushing unit will be loaded using an excavator type CAT 330 or similar.

The material sizes ranging from 18 inches to 4 feet will not feed the aggregate plant and will be classified for boulders and sold separately.

Anything below 18 inches will go through the aggregate plant and be stockpiled. using a wheel loader type CAT 966 or similar.

Boulder Management

The boulders can be handled in different ways, like using an excavator type CAT 330 or similar with fixed thumb, drilling and blasting, or an excavator with hydraulic hammer attachments. They will then be transferred to the infrastructure pad for the selection process and stockpiled at the boulder yard.

The table below shows the blasting design figures for the boulders management:

Blast Design		Imperial
Hole Diameter	102 mm	4.0 "
Bench Height	3.0 m	9.8 '
Hole Angle	0°	0°
Burden	2.0 m	6.6 '
Spacing	2.0 m	6.6 '
Drill Accuracy SD	0.3 m	1.0 '
Stemming	2.3 m	7.5 '
Stemming Material Size	20 mm	0.8 '

Table 7: Boulder blast design.

2.3.5. Stage 5: Processing the Mined Material

Processing Method – The Crushing and Screening Circuit

The processing line designed to meet an annual production of 300,000 to 360,000 tons of aggregate rock in 50mm, 25mm, 19mm, and 12.7mm fractions needs a capacity of 100 tons per hour crushing and screening capacity working 12 hours per day for 300 days per year.

The chosen processing method to obtain the desired aggregates involves a two-stage mobile crushing circuit, a primary jaw crusher stage and a secondary multi cylinder cone crusher stage.

A vibration feeder, a vibrating screen and three conveyor belts are also specified in this circuit. The figure below represents the layout for the chosen processing plant:

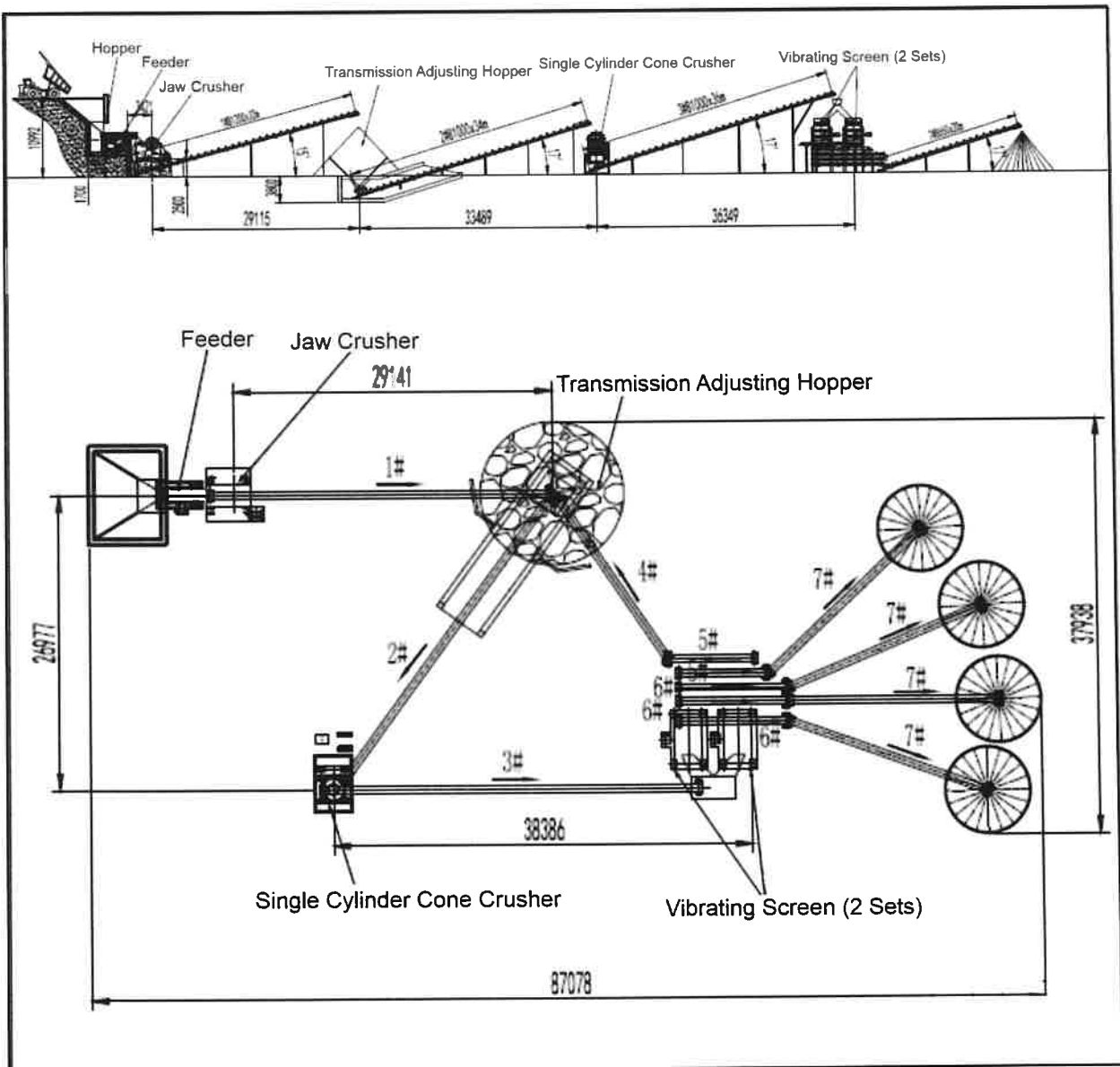


Figure 9: Processing plant schematic layout.

Mobile Crushers

The crusher primary stage consists of one Hubei Jaw Crusher model PE-600 × 900 (75 kW power). The mined rocks up to 750mm size fragments will be distributed to the feeder at a rate of up to 100 tons/hour and will be crushed and conveyed by an integrated conveyor to the second stage.

The second stage consists of one Single Cone Crusher model GP 300 (220 KW). The aggregates will be crushed, and the product will be distributed into four stockpiles by the integrated two deck-screen and seven (7) conveyor belts in the mobile unit.

This crushing circuit is designed to produce four stockpiles of crushed and classified aggregate rock. The first stockpile, which represents 25% of the total products, consists of aggregates of sizes 1/2” to 3/4”, which will produce these sizes fractions after screening. The other 75% will generate size fractions of 7/8” to 2” stockpiles after screening.

Annex 1 shows the details of the specified processing plant, and mining equipment, as well.

Due to the heavy wear and tear which this equipment is subject to, it is recommended by the factory representative to replace the equipment every 4 years.

The figure below illustrates the processing plant Flow Diagram:

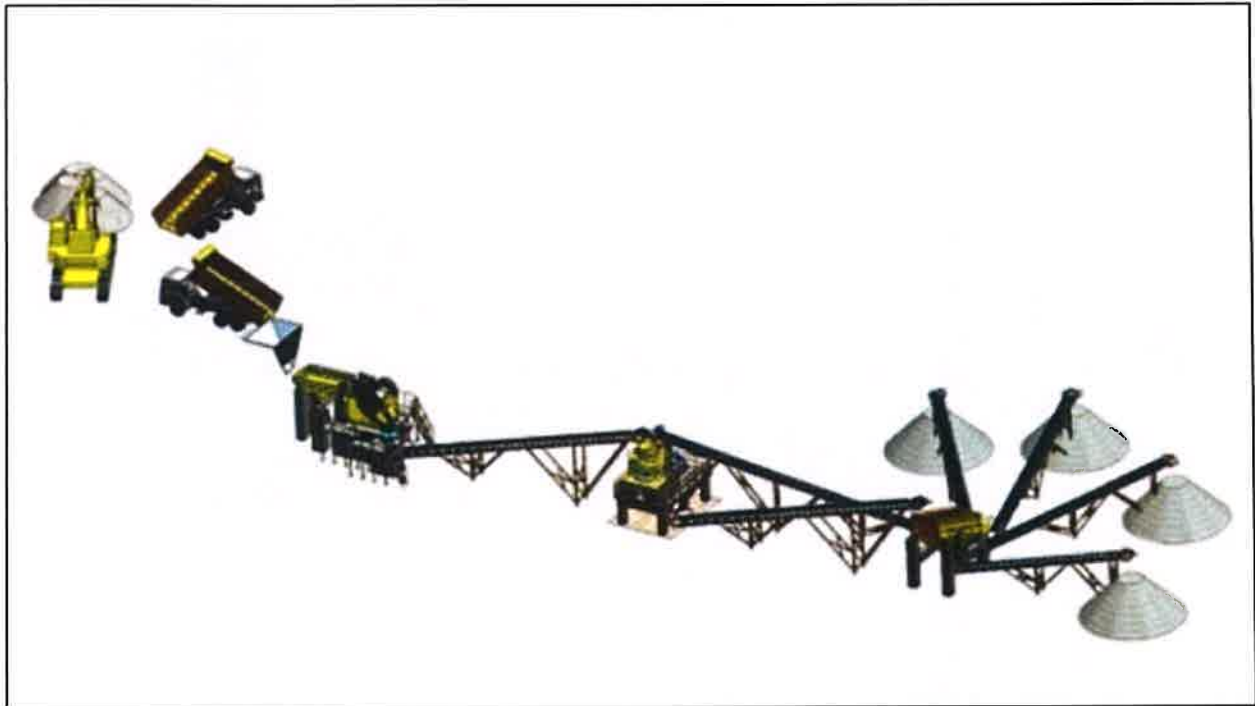


Figure 10: Schematic process flow diagram of the recommended crushing line.

2.3.6. Stage 6: Loading Aggregate and Boulder for Off-Site Transportation

Aggregate and Boulder Loading

Loading into the customers’ trucks will be performed by the aggregates processing team, following scale measurement done before entry to the industrial area. Once loaded, the payload will be measured again on the scale to acknowledge the quantity sold.

Boulders will be loaded by excavator and/or loader on platforms designed to transport oversized material.

The photos below illustrate the aggregate stockpiles at the side of the processing plant (crushers and screeners), where the trucks are loaded for off-site transportation:



Photo 11: Crushers and screeners line, and classified aggregate rock stockpiles.



Photo12: Front-end loader loading 30 tons’ truck for off-site transportation.



Photo 13: Fully loaded 30 tons’ truck being weighted on a scale.

2.4. Production Plan

As already mentioned in this Mining Plan, it is intended to mine three million (3,000,000) tons of rock in a ten (10) years' timeframe.

The planned ramp-up production scheduled for this timeframe is forecasted in the following table:

Year	Amount (ton)
2024	30,000
2025	150,000
2026	300,000
2027	360,000
2028	360,000
2029	360,000
2030	360,000
2031	360,000
2032	360,000
2033	360,000
TOTAL	3,000,000

Table 8: Planned quarry production.

Notice that the planned production of 60,000 tons for the year 2024 is represented by gabbro rock boulders and limited crushed rock, considering that the processing plant is planned to be installed only in January, 2025.

2.4.1. Quarry General Layout

The quarry general layout outlines the following elements:

- open cast mine polygon limits;
- the processing plant and aggregate stockpiles yard;
- the compound infrastructure area;
- the explosive magazine;
- the police headquarter.

The map of figure below and also shown in Annex 2 illustrate the general quarry layout:

ARISARU NORTH QUARRY PROJECT SUMMARY

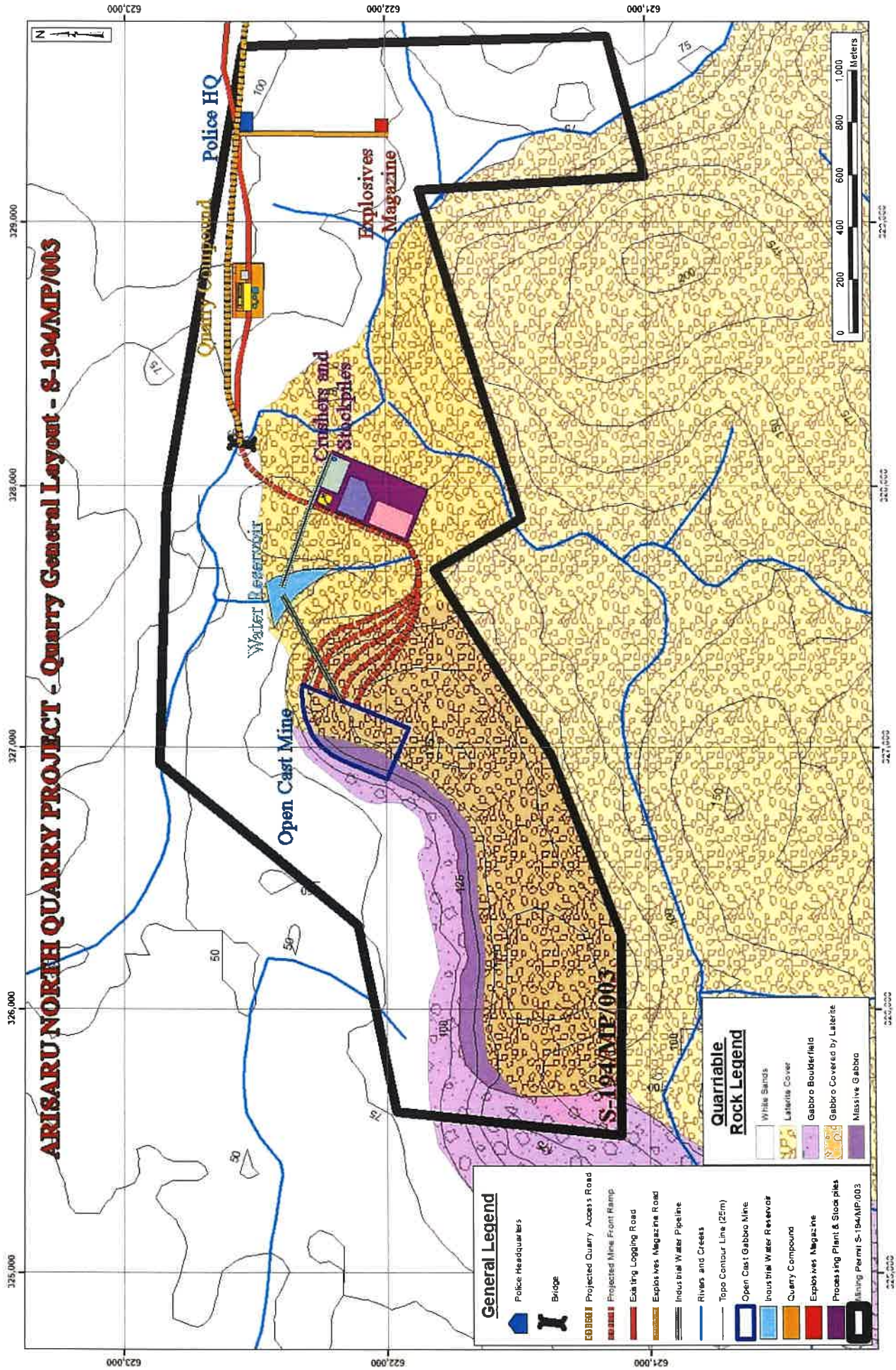


Figure 11: Arisaru North Quarry Project general layout, over quarryable rock map.

2.4.2. The Open Cast Quarry Design

The figure below represents the open cast rock quarry design:

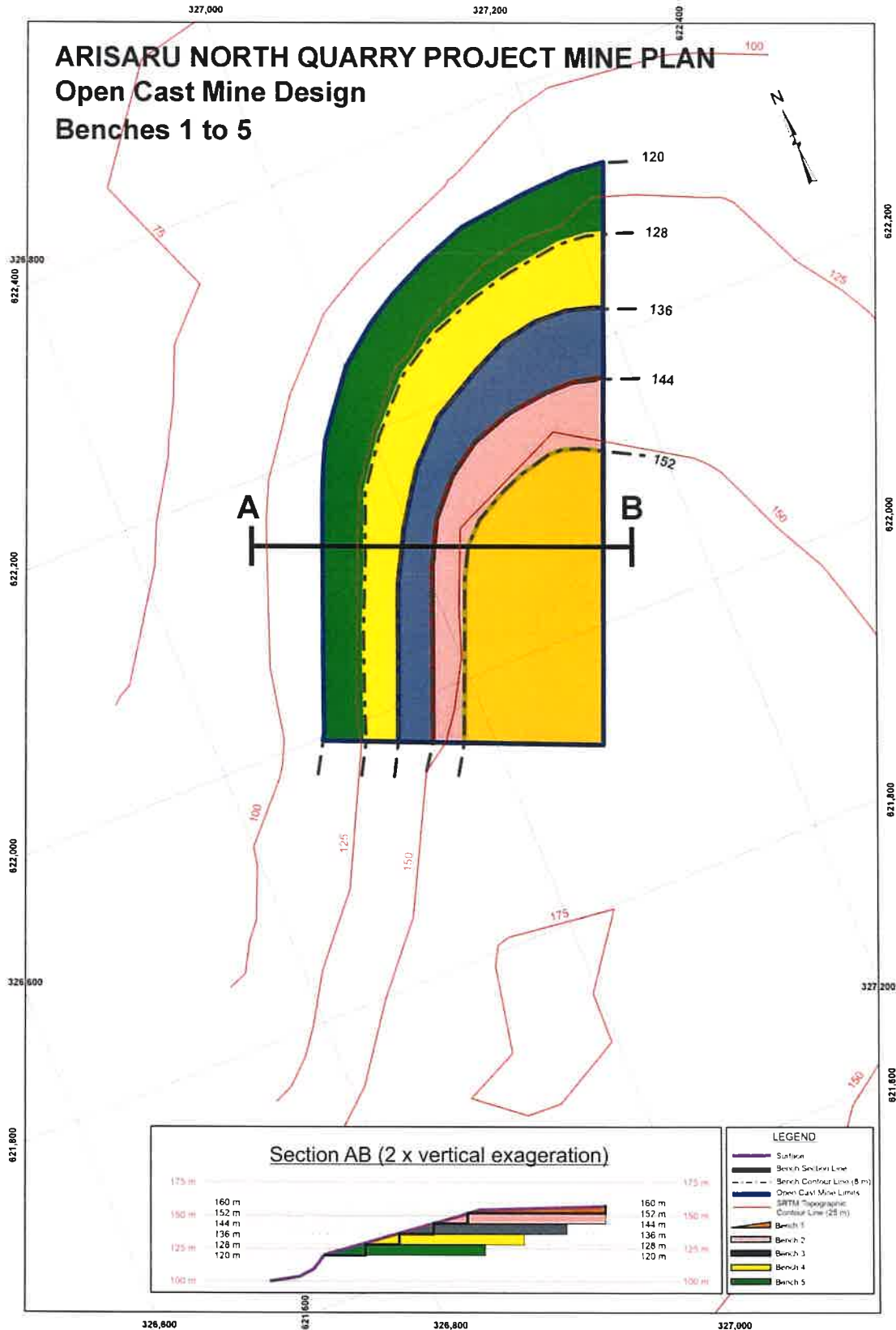


Figure 12: Open cast rock mine Design.

2.4.3. Exploitable Rock Reserves

The reserves indicated to be mined for producing three (3) million tons during a 10 years' timeline was selected taking in consideration the certitude of top quality mineable Massive Gabbro at the defined mining site, its physiographic situation (availability of water, topography) and logistics for quarry operation (rock blasting, hauling, processing and transportation).

Extractable massive rock reserves measuring approximately 3.4 Mt were selected in order to assure the 3.0Mt ten years planned production.

These indicated reserves are planned to be mined in five (5) superposed (8) meters high benches, with a minimum left berm of 25 meters between benches.

The table below shows the calculated recoverable rock reserves in the planned benches:

BENCH H	BENCHES LEVELS		MASSIVE ROCK		
	Topo Contour Line FROM (m)	Topo Contour Line TO (m)	Bench height (m)	Bench area (m ²)	Bench volume (m ³)
1	160	152	4.0	21,000	84,000
2	152	144	8.0	21,000	168,000
3	144	136	8.0	23,400	187,200
4	136	128	8.0	23,600	188,800
5	128	120	8.0	25,600	204,800
			TOTALS	m³	832,800
				d	2.93
			TOTALS	ton	2,440,104

Table 9: Recoverable Reserves of Massive Rock.

These indicated reserves are planned to be mined in five (5) superposed (8) meters high benches, with a minimum left berm of 25 meters between benches.

BENCH H	BENCHES LEVELS		OVERBURDEN / BOULDER FIELD ROCK		
	Topo Contour Line FROM (m)	Topo Contour Line TO (m)	Boulder height (m)	Boulder area (m ²)	Boulder volume (m ³)
1	172	152	4.0	21,000	84,000
2	152	148	4.0	10,300	41,200
3	148	144	4.0	13,800	55,200
4	144	140	4.0	15,500	62,000
5	140	136	4.0	19,700	78,800
			TOTALS	m³	321,200
				d	2.93
			TOTALS	ton	941,116

Table 10: Recoverable Reserves of Rock in laterite overburden and/or boulder field.

The planned mine total indicated reserves measures 3.38 million tons of quarriable gabbro rock. These indicated reserves are represented in the maps of Annex 3.

2.4.4. Production Startup Schedule

The installation and startup schedule planned for the Arisaru North Quarry Project is illustrated in the following Gant Chart:

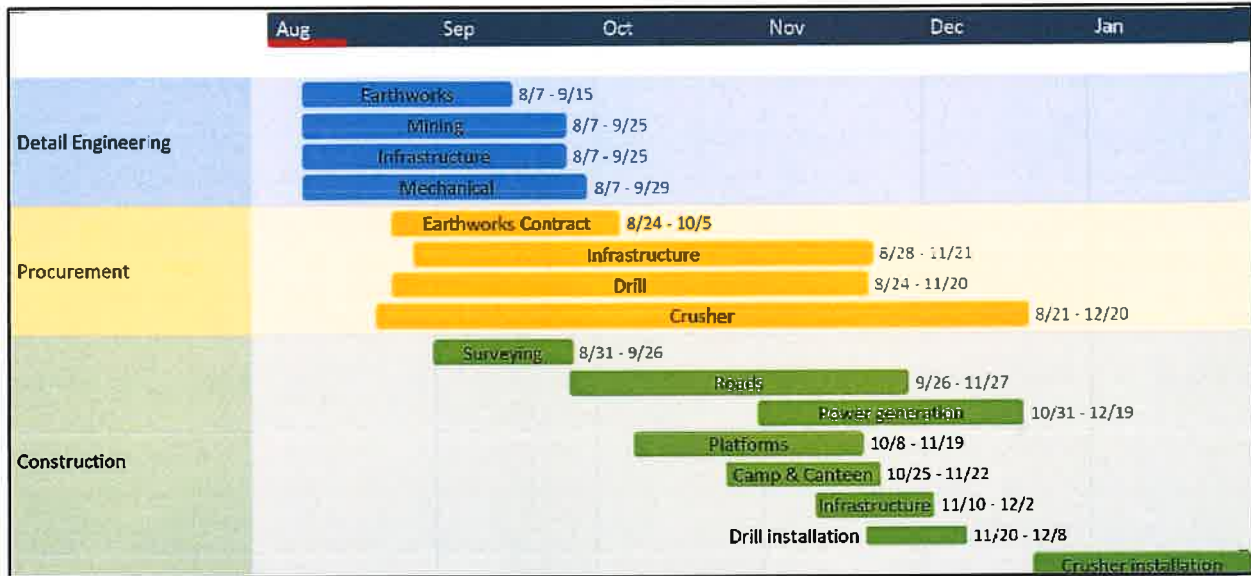


Figure 13: Startup schedule for the Arisaru North Quarry project.

All the detailed engineering work about earthworks, mining, infrastructure and mechanical works is planned to happen in the first two months from project start. Procurement of mining equipment related to earthworks, infrastructure, drilling, and processing will start at the second month from start and finish in 4 months.

Construction of roads, power generation system, stockpiles yards and platforms, camp & canteen, and all related to mining and processing ore infrastructural works are planned to start at the second month from start and finish after six months from start.

2.4.5. Mining Operation Organization

The mining equipment was chosen for its availability on the market. Operations, as well as maintenance, can therefore start promptly. It is planned to operate two (2) shifts per day to reach the estimated 360,000 tons per year. Shifts of 12 paid hours have been considered.

The use of Top Hammer drill is assumed:

- This drill will be ideal to operate in initial conditions, without any flat benches, requiring less earthworks for preparation;
- This type of drill will also offer the flexibility for secondary / boulder blasting;
- It performs well in 4.5”-hole sizes, which allow control of fragmentation as well as fly rocks.

In order to reach a maximum of 360 KTPY, 2 (two) units of loading will be necessary, 2 (two) shifts per day. Haul trucks will carry the rocks from the quarry to the crushing pad.

In Appendix 3 of this report are drawings showing the open cast quarry design throughout the life-of-mine, with five superposed benches 8 (eight) meters high each. These specific drawings consider a scenario of 30 KTPY of aggregate production for the first year, 150 KTPY for the second year, 300 KTPY for the third year, and 360 KTPY subsequently.

The photos and following figures illustrate recommended camp accommodations:



Photo 26: Pre-camp Modules available in the local market.

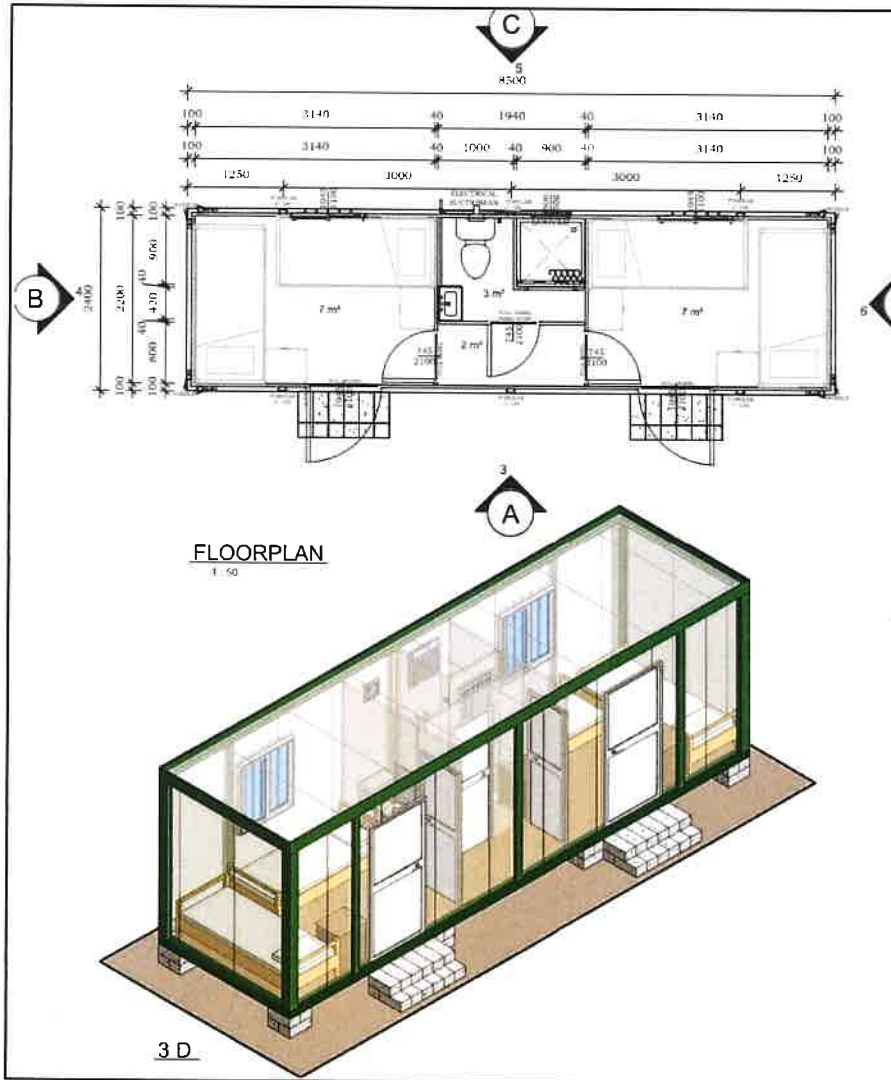


Figure 16: Workers – Modular Camps from Preliminary Layout.

The requirements for the camp need to be reassessed when the asphalted road will be available. When the road is complete, it might be possible to lodge workers in Linden and transport them by bus to and from the site on a daily basis.

Canteen

A canteen is planned for the project. This facility will only be to serve food from a catering service (ideally from Linden). No installations will be available for food preparation. Pre-camp provided a budgetary quote for a combined modular building setup that will allow seating for 18 people.

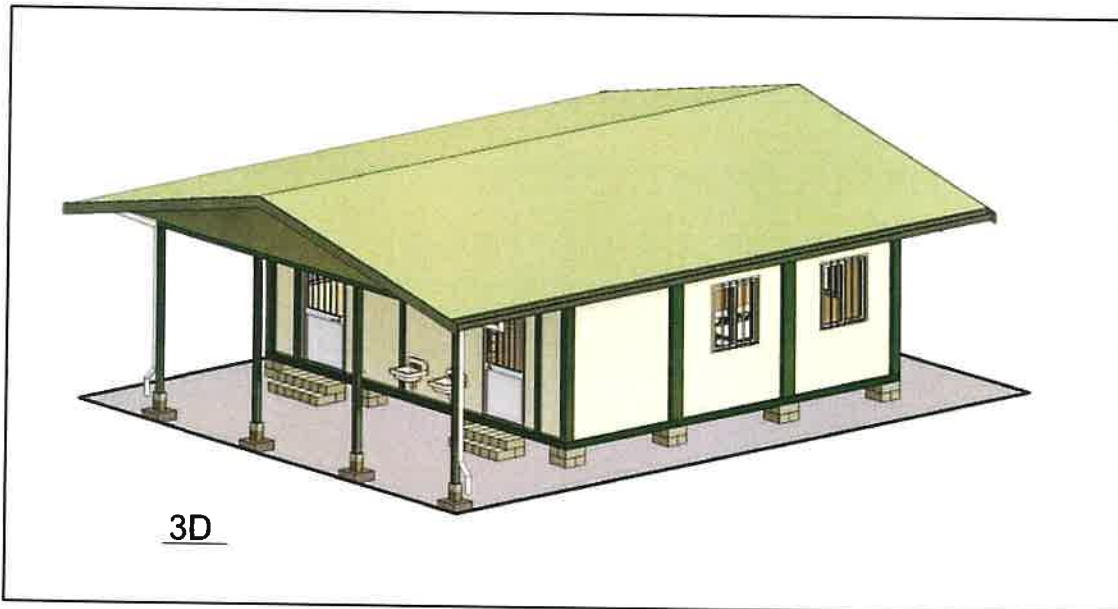


Figure 17: 3D Layout of Canteen – Exterior View.

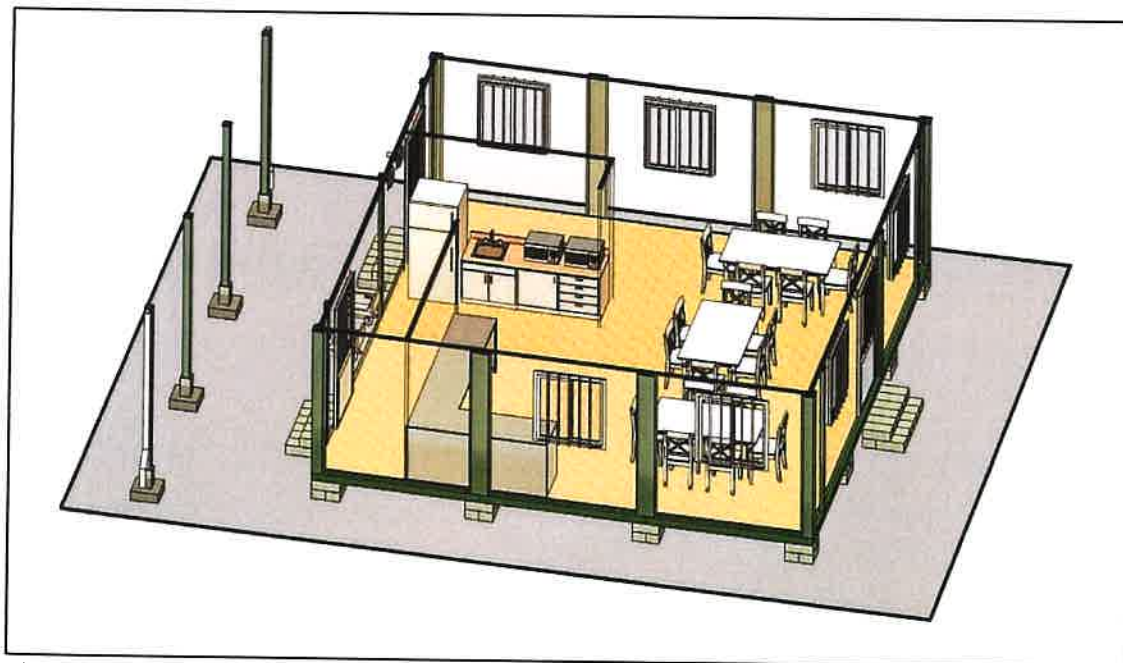


Figure 18: 3D Layout – Interior View.

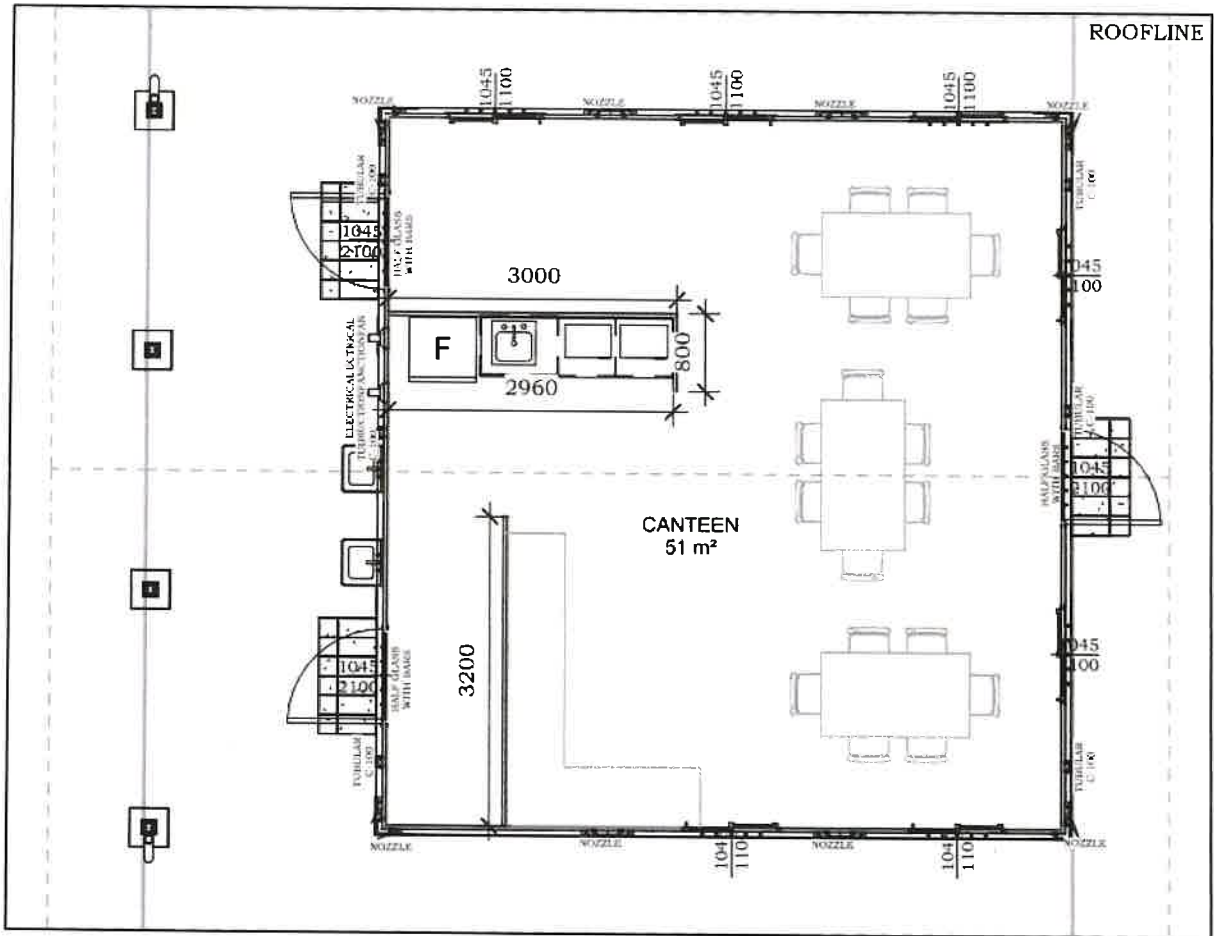


Figure 19: Canteen Plan View.

At a production of 4 MTPY, it will be necessary to reassess the seating capacity for this canteen. This has not been considered in the current study.

Office and Clinic

Similar to the camp and canteen, a module will be planned for offices and a clinic, with one room for offices in addition to the other one for medical consultation and first aid.

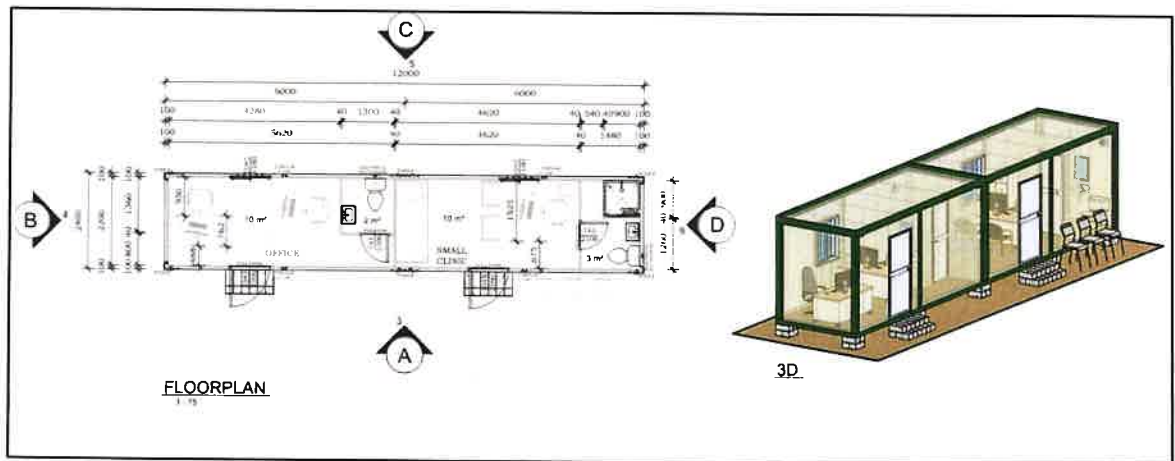


Figure 20: Offices and Clinic Plan View and 3D.

Maintenance Shop and Warehouse

A simple building consisting of containers supporting a shelter is planned for the equipment maintenance. In the containers, space will be available for a tool crib and warehouse.

The dimensions of the building are 25 m x 36 m. Ablution units could be included in the building.

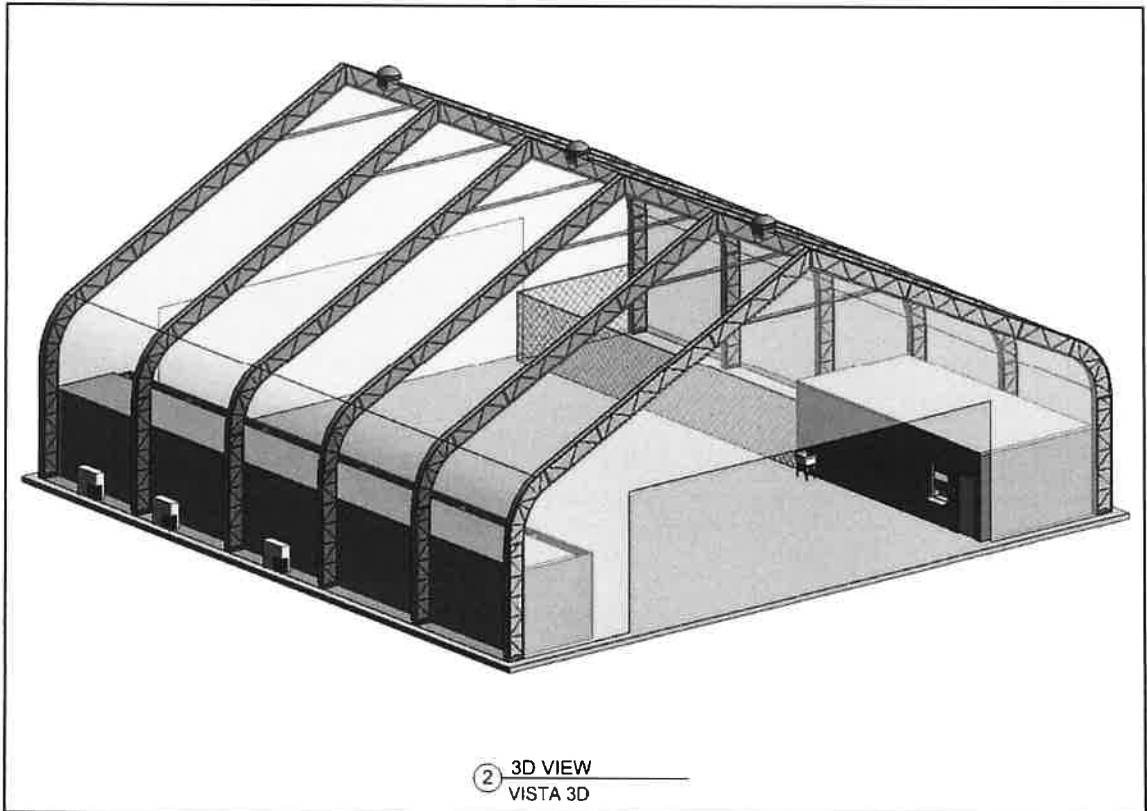


Figure 21: Maintenance & Warehouse – 3D Layout.

3.5. Other Buildings, Communication and Energy Supply

Management Fuel Storage

No fuel storage is planned.

A fuel truck will be permanently on site to distribute the fuel. Another fuel truck will be making daily deliveries or as per site requirements.

Laboratory

Quality assurance and quality control will be required after a year of operations to ensure road grade products and concrete aggregates are meeting quality requirements. This lab will consist of a small container to house the minimal equipment required.

Allowances were considered for a guard shelter at the site entrance, for a truck scale to control the weight of the trucks going onsite and offsite, for ablution units and for recycling / domestic waste facilities.

Electric Power

Two (2) diesel generators will be stationed on site to supply electricity for the crushing plant, mechanical workshop, and worker's accommodation. One generator will provide the power requirements when all equipment is in operation.

A smaller generator will act as an emergency power source to supply camp lighting and necessary power to auxiliary equipment.

The power and electrical scope of work consists of the following equipment:

- Camp: One (1) genset;
- Crushing area: One (1) small genset;
- Explosive magazine: One (1) small genset;
- Police camp: One (1) small genset;
- Water well: One (1) small genset.

Communication Network

The communication network includes the following equipment and set up:

- Star link Internet Business Solution for 35 people at 200 MBPS;
- Network Equipment:
 - Mikrotik firewall;
 - 2 switches;
 - 10 WIFI access points.
- 30-metre tower site;
- Basic Analog Radio System with base repeater, 3 radios, antennas.

Fire Protection

The Fire Protection system only consists of fire extinguishers, as required. There is no fire suppression system considered that includes water tanks and/or pumps.

3.6. Water and Waste Management Surface

Water Control

There is no water body located nearby the projected mining front nor to the Outcropping Massive Gabbro which reserves are enough for the whole ten-year long planned operation.

The Dehalibana River southern tributaries' that flow to the north at the eastern side of the Outcropping Massive Gabbro occurrence are safe from contamination by blasting and hauling.

Groundwater Management

The groundwater table is observed at a depth of 12m near a culvert in nearby creek. As mining is proposed at an elevation 20m higher than the lower topographic surface level, it may not disturb the groundwater table.

Wells would be sunk at suitable locations for the supply of safe water to worker's domestic use. There would be (a) shallow wells dug by excavators and deep wells (greater than 100 feet deep) which will be drilled. These structures would be suitably protected e.g., cased, and

disinfected periodically. The deep wells will be fitted with submersible pumps.

3.6.1. Mine Drainage

Domestic Water

Safe water for human consumption would be harvested by container tanks (450 gallon) collecting rainwater from roof tops of the several buildings on campsite. This would be complemented by water supplied from deep wells, whenever needed. Water for use in dust control and for washing vehicles would be collected from nearby creek by mobile water tank.

Freshwater Intake / Wells

There are two (2) sources of freshwater intake, one for industrial water being used at the crushing plant, and one for domestic water being used at the camp. The industrial water intake consists of a pumping system at the event pond, an HDPE pipeline to the crushing plant, and a 10,000 L holding tank at the crushing plant. The domestic water intake consists of two submersible pumps inside a well that will be drilled close to the camp.

Industrial Water

The industrial water system will serve to bring water from the event pond to the crushing plant for dust suppression in the crushers. There will be a self-priming pumping system at the event pond which will direct the industrial water through an HDPE pipeline towards the 10,000 L final holding tank, located beside the crushing plant.

Domestic Water

The domestic water treatment plant will be a containerized system accompanied by two (2) 10,000 L water tanks, one (1) for raw water and one (1) for treated water. The raw water is pumped from the water well to the raw water holding tank. The water is then treated and stored in the water tanks for distribution towards the camp.

This domestic water treatment system will have the capacity to provide the daily water requirements for the projected amount of people staying in the camp. Each person is estimated to consume 200 L/person/day.

Sewage Water

Domestic wastewater will be directed to a soak-away filter treatment system before discharge to the nearby creek. Discharges to the stream will be in accordance with the EPA domestic wastewater discharge limits. All sewage will be directed to septic tanks with filter bed treatment installed.

The sewage treatment system will be a standard containerized system. The wastewater produced from the camp will undergo biological treatment, clarification and sedimentation, and finally chemical treatment before being discharged back into the environment.

The sewage treatment plant will have the capacity to adequately treat the wastewater of the camp occupancy, based on the assumption of 40 g BOD/person/day.

3.6.2. Waste

Management

Solid Waste

Project activities are expected to produce both liquid and solid waste, which, if not correctly stored and or disposed of, can lead to pollution of receiving water bodies or accumulate on-site, creating an unhygienic and un-aesthetic environment.

Sanitary Waste and Ablution Facilities

Improper domestic waste and sewage management can pollute land and water resources in the area, resulting in health impacts on the 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.

Sanitary waste at the Project will be handled by septic systems, with septic tanks located in the vicinity of each building. During the construction phase, and where necessary during operations, portable toilets will be used in various locations throughout the plant and mine sites. Sanitary wastes will be collected periodically by a camp sanitation crew and removed for disposal to a site about 2 km from the mine site.

Hazardous Materials

Diesel fuel and lubricants will be the significant hazardous materials present at the mining site. Care will be taken so that equipment lubricants, powers, 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 refuses containers will be positioned at the site for the collection of hazardous waste materials.

No hazardous waste is produced at the mining. Any waste rock products will consist mostly of gabbro fragments and their weathering derived products.

4. Environmental, Health, Safety and Security Issues

4.2. Occupational Safety and Health Plan

The following rules and procedures will be implemented to maintain a safe working environment to minimize the frequency and severity of accidents. A Work-site Safety Committee will be formed to include the general manager and other supervisors.

The safety measures promoted as follows:

- 1) Appropriate safety equipment/materials or protective clothing will be provided for certain categories of workers as recommended by the Safety Committee / Management;
- 2) Employees are required to wear safety equipment or protective clothing provided by the Management in designated areas as and when directed by the Management;
- 3) Employees will be expected to take care of items of safety equipment and protective clothing issued to them;
- 4) Employees not wearing issued safety clothing and associated equipment in an area where the use of such in mandatory will be required to leave such designated areas and will be subjected to appropriate disciplinary measures;
- 5) Employees who abuse the safety equipment and protective clothing or fail to comply with requirements to wear such in designated areas shall be subject for disciplinary action;
- 6) Machinery/Equipment are to be operated only:
 - a) By competent and authorized operators/personnel;
 - b) When safety gears are in position;
 - c) In a manner that does not endanger other employees or Company property;
 - d) When they are fully serviceable;
 - e) When due consideration for the safety of others in the vicinity.
- 7) Smoking is not permitted anywhere inside or near the power plant / generating set, fuel depot area or in any other designated non-smoking areas.
- 8) First Aid Kits: First aid kits shall be provided on the mining site and camps.
- 9) Protective Clothing:
 - a) The operator shall endeavor to provide masks, face shields, gloves, fireproof garments, welding shields, steel hard toe boots, ear covers, chain saw chaps /leggings and goggles as protective measures as is considered necessary. Employees required to work under the rain will be provided with wet weather gear;
 - b) Overalls, safety helmets and one pair of safety boots shall be provided to employees as is considered necessary;
 - c) When an employee requires replacement of safety boots due to loss or misused thereof, it is agreed that the employee shall bear the cost of replacement. The cost of such boots will be recovered in instalment by deduction made from employee's wages;
 - d) The operator reserves the right to arrange to test any employee and the employees agrees to the following tests when necessary:
 - Breathalyzer tests, blood tests or urine tests to determine if they are under

the influence of alcohol or drugs;

- Tests for visual or hearing impairment if required to determine the employee`s suitability to operate any plant or equipment safety.

10) Warning signs:

Warning signs will be installed around areas that have potentials for danger, such as the fuel storage area and around the crushing plant area. The Explosives Magazine will be established, and the necessary safeguards shall be implemented.

11) Fire Safety:

- a) The mine operator will ensure that safety drills are held at regular intervals for persons that work in the mine. These safety drills are intended to foster a culture of mine safety and will train mine workers to be prepared and take appropriate actions in an emergency including, where appropriate, the correct use of emergency equipment; and, to train and check skills of such persons to whom specific duties involving the use, handling or operation of such equipment will be assigned in the event of an emergency;
- b) The operator will ensure that no person at work at the mine uses a naked flame or carries out any work which could give rise to a risk of unintended explosion or fire unless sufficient measures to prevent such an explosion or fire are taken. No person will smoke in any part of the quarry. Appropriate signage would be posted to inform workers on the restrictions and areas of influence. Hot work will not be permitted near closed vessels which contain, or have contained, flammable substances including lubricating oil, grease, diesel and hydraulic fuel. Hot work will also be prohibited on close pressurized systems, which could explode or fail because of heat;
- c) The installation of fire protection equipment would include fire sprinkler systems for the underground operation, water mist systems, foam systems, breathing apparatus, gas detection units and portable fire equipment. Access is a critical consideration when installing fire protection equipment. Staff awareness and alertness will be promoted as it is important, they can access equipment quickly and easily;
- d) While appropriate fire protection equipment is vital, it is rendered useless if not in proper working order. Fire protection equipment would be regularly inspected and replaced or repaired as necessary. Other equipment, such as hoses, pipes and machinery, would also be cleaned regularly as build-up of dust and dirt can increase the risk of malfunction.

12) Vector Control

The camp will be fogged weekly, to control mosquitoes and other insects. All workers will be issued Long Lasting Insecticide Nets (LLINs) to reduce insect population in the accommodation areas.

The following additional steps will be taken to control the vector population around the camp areas:

- a) All water storage containers at the camp site will be covered;
- b) All garbage will be burned or buried;
- c) Workers will be instructed to use insect repellents and mosquito nets when sleeping;

- d) Workers will be instructed to wear light colored clothing and long-sleeved clothing; and, the campgrounds will be kept clean to destroy breeding grounds for mosquitoes.

4.3. Security Plan

Security

For the Arisaru North Quarry operations to run smoothly, it is important that the site be secure. Theft and vandalism could potentially have a negative effect on worker safety and on operating efficiency. Therefore, access to the site will be controlled by fencing, security patrols and by limiting locations for officially entering and leaving the property.

Operations will be conducted around the clock and guard buildings will be located at the official entrances. Other guards will conduct mobile patrols of the perimeter fence to ensure that no one is accessing the site unlawfully. Signs will be posted along the fence and at strategic locations along roads warning people that the entering the site is prohibited.

Public Safety

In addition to protecting the site from potential vandalism or theft, it is also important to protect the public from interfacing with the mine operations and to prevent potential injury. Hazards of a typical quarry operation include but are not limited to: traumatic injury from large equipment, getting entangled in machinery, driving over steep embankments, slipping or falling on uneven ground or slippery surfaces, encountering high voltage electricity, exposure to chemicals or reagents while not wearing proper personal protective equipment, and exposure to loud noises while not wearing hearing protection.

Employees working at the site are required to receive specific training in accordance with the Occupation Health and Safety Rules, covering all aspects of site safety. Therefore, it is imperative that access is controlled and that trespassing rules are enforced.

The same fencing, patrols and signage discussed in this section will serve to warn miners and others in potential dangers. In addition, employees will be trained to be aware of trespassers in the course of their normal duties and report any suspicious activity to the safety and property departments.

The facilities will be designed to minimize the need for visitors to drive or walk in hazardous areas. Most visitors will come and go from the administration building or an administrative area within the warehouse/receiving building located near the guard house at the entrance of the facility. Supply route drivers will receive site orientation training and be familiarized with their specific loading/unloading locations and procedures.

A professional security service will be contracted to provide 24-hr security services at the main camp site. In the event of assets being stationed off-main camp then security guards will be deployed to protect these assets.

Overall, these services would entail roving patrols within the quarry locations; manning of checkpoints at the entrances / exits of the main camp site; providing communications channels to the Guyana Police Force and senior company officials; identification of persons authorized to being on company sites; and to maintain lawful activities on company property.

Fire and Emergency Planning

Planning for emergencies will be an important part of establishing operations for the Arisaru North Quarry Project. Several types of plans will be prepared prior to start up. These plans will include a Spill Prevention Control and Countermeasure (SPCC) Plan, an Emergency Response (Section 9) and Contingency Plan, a Storm Water Pollution Prevention Plan (SWPPP), a Fire Plan, and others.

These plans will identify emergency preparedness and emergency contact protocols for any conceivable situation.

As project planning continues to develop, the specifics of the emergency planning process will also advance. In addition, extensive training of personnel and the availability of appropriate equipment and supplies will insure a successful emergency management program.

Staffing for the Arisaru North Quarry includes safety, industrial hygiene, and environmental technical professionals.

Some of the facilities and equipment for emergency planning include: a fully equipped environmental sampling and spill response station, waste storage and accumulation areas, safety and training building, and a special vehicle for emergency.

Of special concern will be preventing wildfires. Mine vehicles will be equipped with, at a minimum, fire extinguishers, shovels and first aid kits.

Policies, such as prohibiting parking on top of vegetation, and properly disposing of cigarette butts, will be established, and enforced to minimize fire potential.

Water and Chemical Supply Systems

Fresh water for the Arisaru North Quarry Project will be supplied from a dedicated well located on the property.

Water from the wells will report to the freshwater tank. Water will be pumped from the tank by vertical turbine pumps. It will travel through a common pipeline and a system of water booster tanks and horizontal centrifugal pump systems, installed in series, to the plant area fresh/fire water tank.

Fresh water and fire water will be supplied from the fresh/fire water tank to the facility by gravity. The fire water distribution system will be in the plant site area and the foam fire system in the solvent extraction area.

Emergency Lighting and Exit Signs

Adequate and reliable illumination will be installed and maintained for all exits. Battery powered back up must provide a minimum of 60 minutes of illumination and will be standard for all emergency lighting and exit signs.

Maintenance inspections will be conducted monthly. Emergency and exit lighting systems will be tested annually.

Fire and Smoke Alarms

Fire and smoke alarms will be installed in all employee work areas including the camps and kitchen. Systems and components will receive inspection monthly.

Annual testing and maintenance will be conducted for systems and components. Records of inspections will be kept on site for the duration of the project.

Fire Extinguishers

The Project will conduct an analysis of the type, size, placement, and minimum number of extinguishers required for each building. Fire extinguishers will be installed in accordance with the local fire standard.

Standpipe Fire Hose Stations

In addition to portable fire extinguishers, standpipe fire hose stations will be provided for defend-in-place fire protection.

This equipment is designed to protect individuals from initial developing fires and will be installed at Project Summary site areas where fire response time exceeds five minutes.

Explosives Management

Special arrangements shall be in place for the storage of explosives in the Explosive Magazine.

Safety in Blast Areas

A siren is mounted on the crushing plant to give warning signals whenever blasting is about to occur. Caution and danger signs or barriers will be erected around the blast area when drilling of the holes is completed and blasting is imminent.

All entrances to the blast site are secured and secured by the Guyana Police Force prior to blasting. The quarry has in place a shelter at safe position from the mining faces, after blasting the site is checked by the Blaster-in-Charge for any misfires.

Explosives Magazine

The present building was constructed by the Company and is secured by the Guyana Police Force. The magazine occupies approximately 100 feet by 100 feet and it is planned to extend the capacity of the magazine by including two additional 40-foot containers for this purpose.

This expansion has become necessary as the shipment of explosives into Guyana is done every 4 months and the Quarry will need ample inventory of explosives to meet increasing demand.

The Quarry Operations Manager routinely monitors the consumption, condition of packaging, humidity, and safe shelf-life of explosives; and explosives are issued as FIFO (first-in-first-out).

Precautions

- 1) Proper and safe storage of explosives in approved and Licensed Magazine;
- 2) Proper, safe, and careful handling and use of explosives by competent Blasters having Blaster's Certificate of Competency issued by GGMC;
- 3) Proper security system to prevent theft/ pilferage, unauthorized entry into the Magazine area and checking authorized persons to prevent carrying of ignition agents such as match box, lights, mobile phones, etc.;
- 4) The explosives of class 2 will be used in their original cartridge packing and such cartridge shall not be cut to remove explosive for making cartridge of different sizes;
- 5) Detonators will be conveyed in special containers. These will not be carried with other explosives;
- 6) Explosives and detonators shall be stored in separate magazines;
- 7) The holes which have been charged with explosives will not be left unattended until blasting is completed;

- 8) Before the start of charging, clear audible warning signals by sirens will be given so that people nearby can take shelter;
- 9) Blasting operations will be carried out in day times only. Also, in this quarry project, the mining operations are proposed to be carried out in day times.

4.4. Environmental Issues, Reclamation and Closure

An Environmental Assessment Management Plan (EAMP) has been prepared for the Arisaru North Quarry.

Dust is the key factors addressed in the EMP. Dust is expected to be generated from drilling, crushing, hauling roads, excavation, etc. will be suppressed by periodical wetting of land by spraying using water.

Wet drilling and dust extractor arrangements will be provided to drilling units to control raise of dust from the site of drilling.

Operators, those exposed directly to such conditions will be provide such protective equipment e.g., mask, ear plug, helmet, glove, etc. as per the Mining Regulations.

Jeanne Disarz will comply with all legal obligations and aims to maintain high environmental standards.

Although all reasonable steps are taken to protect the environment and minimize risks. In the events of environmental crisis, the objectives are to ensure a prompt and effective response, and to minimize the effects of any crisis.

The Emergency Plan to be implemented in case of environmental crisis is described in detail in the **CERP – Contingency and Emergency Response Plan** that has been prepared for the Arisaru North Quarry Project. It describes the general types of emergency and actions to be followed, should an emergency occur during the mobilization and operational phase of the project.

The CERP includes:

- Emergency Contact Details;
- Emergency Procedures;
- Description of an Emergency;
- Authority of Control;
- Scenario Description and Response;
- Materials Inventory;
- Incident Reporting.

The above information will be provided to employees and placed at strategic locations within the project site. Such locations will include the site office, workshop, storage bond and loading area for trucks.

It is critical that the staffs are adequately and well trained about safety. A detailed emergency procedure protocol will be established, and frequent event simulations will be designed to train employees for emergency crisis.

A Health Safety and Environment Officer who would have the responsibility for the coordination and execution of actions as they relate to health, safety, and the environmental protection management will assure the maintenance of all these issues at the international accepted standards.

4.4.1. Emergency Response

A Contingency and Emergency Response Plan (CERP) envisaged for the stone quarry operations on the medium scale mining permit S-194/MP/003 for quarriable minerals held by Jeanne Disarz has been prepared to satisfy the conditions of the Mining Act and Regulations.

This CERP lists procedures developed to provide the basis for effective actions at the operations to treat with various categories of incidents which are likely to occur at the Quarry. This relates to good preparation for sudden, unexpected events and to several legal requirements, such as The Occupational Health and Safety act: Chapter 99:10; Laws of Guyana, the Fire Prevention Act: Chapter 22:01; Laws of Guyana, and Contingency and Emergency response plan in accordance with Regulation 228, of the Mining Act 1989.

4.4.2. Reclamation and Closure

A **Rehabilitation and Closure Plan (R&CP)** has been prepared to satisfy the conditions of the Mining Act and Regulations by submission of a Rehabilitation and Closure Plan in accordance with Mining Regulation 227 (1); and caters for a ten-year period of mining.

The following summarizes the proposed approach to closure:

- 1) Re-profiling of dump area as appropriate;
- 2) Removal or maintenance of surface water management features as appropriate;
- 3) Natural re-vegetation of mine waste facilities, with assistance as necessary;
- 4) Backfilling of pits where practical and economically feasible, replacing topsoil and natural re-vegetation;
- 5) Demolition and removal of all buildings and infrastructure;
- 6) Removal of scrap and rubbish;
- 7) Access roads to be left in place if agreed with the government, otherwise ripped and allowed to re-vegetate naturally, with assistance if necessary;
- 8) Bridges and other useful public infrastructure to be left in place if agreed with the government, otherwise removed and scrapped or sold;
- 9) Retrenched workers adequately compensated and trained to perform other livelihood activities;
- 10) From observation of other worked out areas near the property that were mined, it was observed that the waste dumps can rapidly recover to integrate with the existing natural environment. There are no long-term closure issues that cannot be successfully managed by Jeanne Disarz.

5. Economic Analysis, Capital and Operating Costs

In order to assess the financial impact of production being limited by market demand, a production scenario was evaluated. This scenario includes an initial production capacity and basic infrastructure for 360,000 tons per year of boulder and crushed aggregate materials, for a ten years long mine timeline, according to this Mining Plan.

As the market demands, the quantity of equipment, schedule of expansions and the hours of operations per day can be modified to increase production and meet the market requirements.

The Capital Cost (CAPEX), Sustaining Expenditure (SUSEX), Operating Cost (OPEX) for a 360,000 tons per year scenario is summarized in the following paragraphs.

5.2. SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats)

It is a strategic planning and management technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning. It is also called situational assessment or situational analysis.

5.2.1. Strength

- The main long access road is already open and it's under paving with asphalt;
- Quick production schedule scope (45-60 days);
- Government understands the needs for good quality production and is supportive;
- Minimum concrete shall be used;
- Easy to develop.

5.2.2. Weakness

- Other Quarry in the region might want to compete;
- No big excavator in the country on rental;
- Might have a shortage of water during dry season (pumping industrial water from Dehalibana Creek, well and reservoir needs to be planned);
- Shortage of Labor force, especially skilled professionals.

5.2.3. Opportunity

- Material to produce is relatively standard;
- Direct sales to road construction available, no major transportation issues;
- Potential direct aggregate sales to road asphalt company would be an added demand;
- Potential sale direct from stockpile to reduce investment scope;
- Fuel consumption could be managed with a fuel truck instead of a fuel station;
- Lots of laterite to develop the site;
- Rapid availability of equipment according to suppliers of new equipment;
- Easy access for boulder mining for immediate aggregate production support;
- Komatsu dealer can offer an almost complete solution to self-perform with a good service reputation;
- Price of stone might continue to be high in medium term;
- Contracting transport would reduce the CAPEX (15 to 30 trucks for 30-45 loads per day), and unloading material in Georgetown implies development there in high-value lands;

- Should only concentrate on production at the beginning.

5.2.4. Threats

- Salaries are going up in the country;
- Need to get operator in a market where oil company are putting pressure;
- Competition will eventually lower the price to industry standards;
- Competition is already in the region, production of lesser quality material;
- The actual cost seems unsustainable for the country, and slow the development;
- Material coming from quarry nearby (Chinese) is mainly chipped rock with low strength.

5.3. Basis of Estimates

The basis and methodology used to compile the capital cost estimate considers the initial and sustaining capital requirements, including direct, indirect, and contingency.

The capital cost estimate provides a substantiated assessment of capital requirements for the defined scope to provide a basis to allow project economic evaluation and provide a budget for project implementation.

5.3.1. Pricing Basis

Estimate pricing was determined from a combination of firm quotations, budget quotations, historical data, benchmarked industry factors and allowances.

The basis for the capital cost estimate is summarized in Table 14 below:

CAPEX Description	Basis
Mine Equipment – Drills	Budget Quotations
Mine Materials	Historical pricing
Bulk Earthworks	Unit rates for rental provided by a local supplier
Truck Shop Building	Historical pricing
Modular Buildings (camp, canteen, offices)	Budget Quotation received by mail
Crushers	Firm Quotations
Water Treatment	Historical pricing
Water Services	Historical pricing & ratio
Surface Operation Equipment, Construction Equipment, Mobile Equipment	Unit rates for rental provided by a local supplier
Electrical	Historical pricing
IT, Communications	Historical pricing
General & Administrative	Historical pricing & ratio
Fuel	Unit rates provided by a local supplier

Table 14: Basis for Capital Cost Estimate – CAPEX.

5.3.2. General & Administrative (G&A)

For CAPEX estimation, the G&A component was a factor of direct cost, depending on the scenario and the timing:

Phases	Percentage of Direct
Initial CAPEX	30%
Expansion (SUSEX)	10%
Year with Replacement of equipment only (SUSEX)	5%

Table 15: Basis of Estimate for G&A by Phases.

For OPEX estimation, the G&A cost consists of the following components:

- G&A Personnel: Management, commercial, logistics, accounting, HSE (Health, Safety and Environment), and administration staff;
- General Management costs: catering, medical services, office supplies, etc.;
- Insurance;
- Finance and accounting;
- Supply Chain;
- Surface operations support: buildings and infrastructure maintenance, G&A mobile equipment maintenance and fuel;
- Information technology: communications, internet and computer equipment;
- HR Cost;
- Security cost.

The crushing plant's operational expenses for essential factors like spare parts, wear components, and regular maintenance, for each of the equipment in the crushing circuit were captured to ensure continuous operation. Fuel consumption and labor has also been captured in the OPEX.

5.4. Simulated Scenario / Scoping Study

This simulated scenario includes:

- Year 0: 30,000 TPY boulders; equipment cost included in the initial CAPEX;
- Year 1: Increase to 150,000 TPY crushed plus boulders;
- Year 3 and 4: Adjustment in products ratios by purchasing additional cones / screens for each circuit (SUSEX) to meet 360,000 TPY;
- Planned Life of Mine: 10 years, extendable according to market demand;
- Replace crushers every 4 years in SUSEX;
- Replace drills every 12,000 hours in SUSEX;
- Exploration and expansion preparation costs of US\$2M (two million American dollars) are to be considered at year 4;
- Operations on day shift and night shift;
- Closure cost is estimated at US\$2 (two million American dollars).

5.4.1. Capital and Operating Costs – Scenario: 360,000 TPY

Capital expenditures – CAPEX is described on the table below:

DESCRIPTION	AMOUNT (USD)
INFRASTRUCTURE	820,000
POWER & ELECTRICAL	135,000
WATER MANAGEMENT SYSTEM	120,000
ANCILLARY EQUIPMENT	156,500
MINING EQUIPMENT	4,636,000
PROCESSING PLANT EQUIPMENT	232,000
CONTINGENCY (20%)	1,219,900
CAPEX TOTAL	GRAND 7,319,400

Table 16: CAPEX, scenario 360,000 tons per year.

5.4.2. Sustaining Expenditures – Scenario: 360,000 TPY

Sustaining expenditures – SUSEX are described on the table below:

DESCRIPTION	AMOUNT (USD)
INFRASTRUCTURE	360,000
POWER & ELECTRICAL	130,000
MINING	740,000
PROCESSING PLANT	3,480,000
CONTINGENCY (20%)	942,000
SUSEX TOTAL	5,652,000

Table 17: Sustaining Expenditures – SUSEX, scenario 360,000 tons per year.

5.4.3. Operating Expenditures – Scenario: 360,000 TPY

Operating expenditures – OPEX are described on the table below:

DESCRIPTION	AMOUNT (USD)	AMOUNT per ton (USD)
OPEX shared by both Aggregates & Boulders		
Drilling	10,000	0.34
Blasting	40,000	2.13
Topsoil Stripping	60,000	0.00
Excavation and Load to Crusher	10,860,000	0.63
Stockpiling	3,160,000	0.18
Fuel and Fuel Truck Rental	14,940,000	0.87
Gensets (Electrical)	690,000	0.04
General & Administration	46,010,000	2.67
Royalties	105,740,000	6.13
Transfer to CAPEX	-60,000	0.00
Subtotal	181,450,000	12.98
OPEX associated to Boulders Only		
Boulder Loading	13,210,000	2.30
Boulder Selection & Truck Loading	8,930,000	1.55
Subtotal	22,140,000	3.85
OPEX associated to Aggregates Only		
Aggregate Truck Loading	4,220,000	0.37
Processing (including fuel)	12,570,000	1.09
Laboratory	410,000	0.04
Subtotal	17,200,000	1.50
Total OPEX	220,790,000	15.26 (Weighted)

Table 18: OPEX, scenario 360,000 tons per year.

Conclusions

This Arisaru North Quarry Project Summary describes the property, its location, accessibility, climate, existing infrastructure, exploration and resource estimate, market targets and requirements to install and operate a rock mine.

The main operation for the quarry was designed to include activities including topsoil stripping, drilling, blasting, excavation & hauling to crushers, aggregates & boulder loading, boulder selection, stockpiling, crushing, and loading to trucks ready for shipment.

The operation activities in the study considers that the buyers would come and purchase from the quarry directly. The infrastructure such as the roads, pads, platforms, buildings, water management, laboratory, power & the communication network were designed and costed. The General & Administrative (G&A) areas were conceptualized, and the costs were factored in.

Based on the designs described above, the initial Capital Costs, sustaining Capital Costs, and Operational Costs were developed for the scoping study.

The economic model simulation of 360,000 tons per year production gives the project the flexibility to adapt to an evolving market and provide insight for business strategy.

Given the quantity of resources available at the property and the current market demands in Guyana and CARICOM, it is concluded that the project is profitable for this simulated scenario of production.

In addition, not only is there a large supply of potential aggregate and boulder at Arisaru North, the high quality and hardness of the rock differentiates the site from other producers and may result in higher market take-offs prices.

On the other hand, this Mining Plan describes the environmental and social impact the quarry will involve, and outlines the measures to be observed to mitigate such impacts. It also treats about Health and Safety, security, emergency plan, and refers to the Blasting Plan, the CERP – Contingency and Emergency Response Plan, as well as a Rehabilitation and Closure Plan (R&CP), as separate documents that address these aspects of the Project Summary related to the project.

Date & Signature

Respectfully submitted to the attention of the Commissioner of the Guyana Geology and Mines Commission (GGMC) and Mines Manager, Mines Division for approval, yours truly,

The thirteenth of June, 2024.

Jeanne Disarz – S-194/MP/003 Owner

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