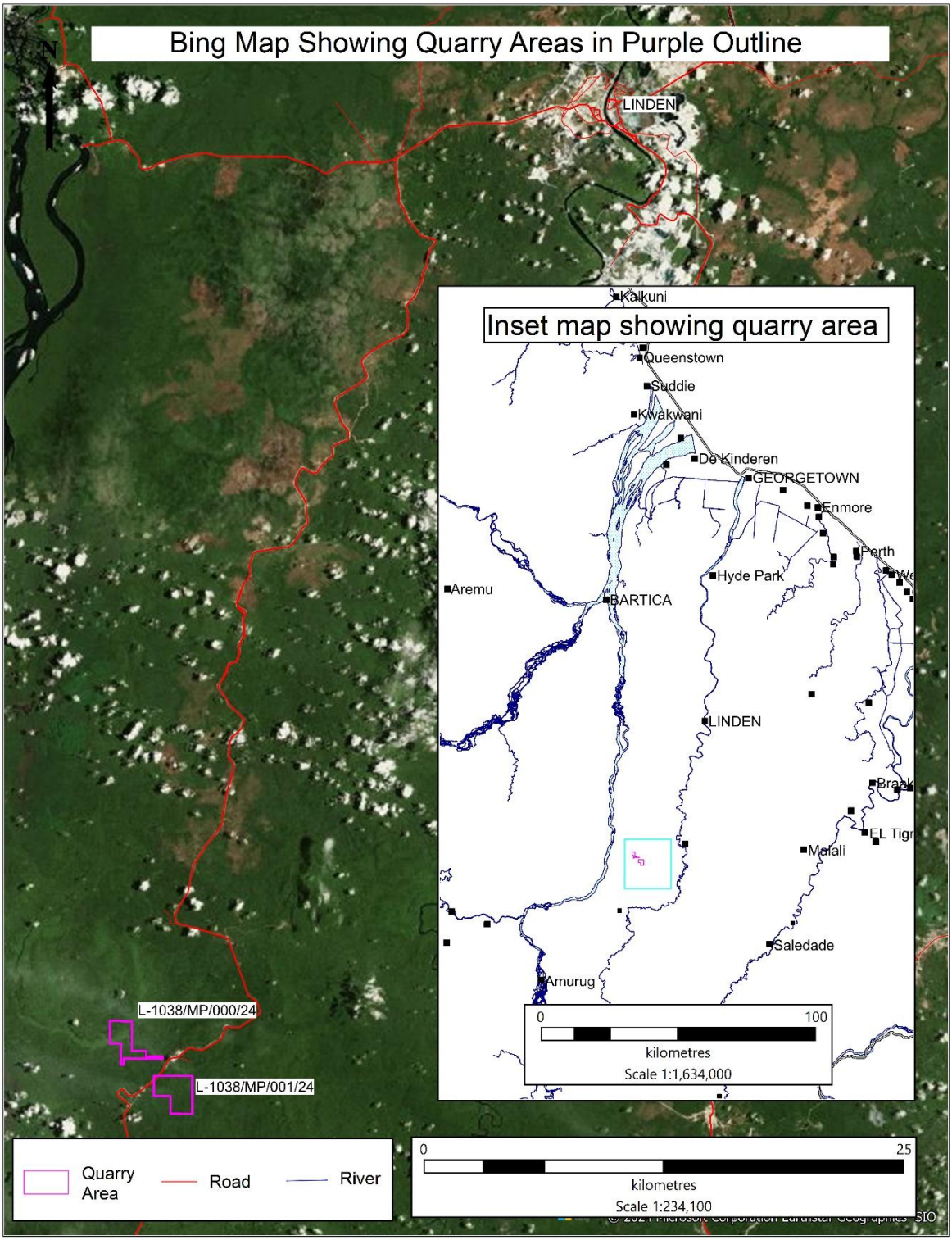
Executive Summary



Executive Summary.
Area: GS**23: L-1038/MP/001/24**

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1.0 Executive Summary

Mr. Kumar Lallbachan has requested a mining permit from the Guyana Geology and Mines Commission (**L-1038/MP/001/24**) to operate a medium-scale stone quarry.

The purpose of this document is to describe in full the project's operational characteristics, which include the extraction and removal of Stone found within Mining Permit **L-1038/MP/001/24**

This document would therefore, include, but not be limited to, descriptions of the planned operational procedures for the extraction of the stone, the emergency response measures associated with such mining activities, the measures to manage and mitigate the environmental concerns, and the plans in relation to the proper measures of reclamation and site closure after the mining activities are finished ,along with a blast plan. **This quarry will be referred to as ACK Quarry 2 throughout all the documents submitted.**

ACK quarry is located 80 kilometres South of Linden, approximately 190 kilometres south of Georgetown. The estimated area covers about 778 acres. The intended production rate is 900,000 metric tons per year. The property is located within a designated mining area in Potaro Mining District #2 and corresponds to Guyana's 36SE quarter-degree index sheet. ACK quarry now presents this summary along with an Environmental Response Plan, Blast Management Plan, Mine Closure Plan, and Quarry Mine Plan for approval and issuance of a Mining Permit.

1.1 SALIENT FEATURES OF THE PROJECT

Project name	**ACK Quary 1 1**
Location of mine	**80 Km south of Linden (188 Km south of Georgetown)**
Latitude	**See the map in the appendix for the boundary.**
Longitude	**See the map in the appendix for the boundary.**
Land use	**Mining**
Minerals of mine	**Aggregates (Dolerite/Gabbro)**
Proposed annual production of mines	**900,000 metric tonnes annually**
Life of Mine	**20-25 years**

Method of mine	**semi-mechanized opencast mining method**
Water demand	**10,000 litres per day**
Sources of water	**surface water (Creek)**
Workforce	**103**
Nearest road	**Linden -Mabura access road**
Nearest Major River	**Essequibo river**
Investment	**USD 11,663,462**

Table 1: Summary Overview

1.2. Proposed Mining Method

A semi-mechanized method of opencast mining is proposed to be carried out. Drilling and blasting are involved. Before blasting, Excavation of overburden will be done. This will include the removal of overburden by excavator, dozer, and front-end loader. Proposed mining shall be carried out for a target production of 900,000 MT per year (2800 MT per day). The excavated pits at the conceptual stage shall be backfilled with the overburden generated during overburden removal.

2. Introduction of the project/Background information

2.1. Identification of project and project proponent

The mine lease area of the stone quarry is situated on a survey sheet 36 SE. This area is a designated mining area for minerals. The Guyana Geology and Mines Commission has prospected the lease area, and no known deposit of any economic minerals was identified in this area. Still, it is a general area for quarriable material. Several site visits to the area by ACK Mining Company have helped recognize that this area can be a prolific quarry for producing crushed aggregates for the construction industry.

2.2. Brief description of the nature of the project

The proposed project area comprises boulders and outcrop stones in 1 large field. As per detailed estimation correlating field mapping with SRTM data, the geological resource is approximately 23,466,800 tons of rocks. The annual production is estimated to be 900,000 tonnes. Under reclamation, it is anticipated to place overburden in the lower parts of the project area and

undertake planting of native trees in the applied area, and, at the end of the life of mine, about 1000 trees will be grown in the total area.

2.3. Need for the project and its importance to the country.

The primary need for building stone is its high compressive strength and durability (among the hardest, dimensional, structural rocks). It can effectively withstand the vagaries of nature. Fine-grained granite is employed for ornamental and monumental work and inscription purposes. The mineral-rich colours, hardness, and density make it useful for many applications. Polished slabs and tiles are used in countertops, flooring, retaining walls, landscaping around a centre fountain/ pond, staircase, and many other design elements (residential and commercial applications). It is also known as the maintenance-free stone. The proposed mining project will fulfill its end uses in the construction sector.

The mining and associated activities in the mineral-bearing areas bring about gains in gross domestic product, i.e., a minor contribution by the proposed project. However, they will add to the gains in G.D.P.

A total of 103 people will be employed in this mine full-time. It will create employment for the local population, especially in regions 10 of Guyana.

The applicant will pay a royalty for the mineral produced from the mine (where applicable), and direct and indirect taxes will be paid, thereby contributing to the regional revenue. The public revenue can be put into infrastructural development and other sectors like health, education, and social welfare.

2.4. Demand-Supply Gap

There is an excellent demand for masonry stone for roads, building construction, and rip rap for sea defence. Guyana and the construction sector are on the path of rapid growth. Hence, the demand for aggregates. It is widely known that Guyana cannot currently satisfy its aggregate demand with its current rate of production, hence the reason for aggregate importation over the last two or three years.

2.5. Export Possibility

It is a category material to procure from the local market. Export may not be feasible at this current time.

2.6. Domestic/Export Markets

There is a demand for masonry stone for roads, buildings, construction piers, etc.; hence, ACK Mining Company has no intention to export any of the aggregates produced in the early life of the mine.

2.7. Employment Generation (Direct and Indirect) due to the project

The project will create direct and indirect employment opportunities within the surrounding region. The company will use reasonable faith efforts to employ local people from the nearby villages (Rockstone, Malali and Linden), depending upon the availability of skilled and unskilled workforce surrounding the project site. In the operation phase, the proposed project would require a significant workforce of non-technical and technical persons listed in Table 1. About One hundred and three (103) people will get direct employment. Many people will also benefit indirectly and be employed with allied and related industries, such as transportation, maintenance, supply of food items, fuel, etc.

NO	STAFF	NO OF EMPLOYEES
1	Quarry Master/Manager	1
2	Mining engineers	2
3	Supervisors	3
4	Compressor operator	1
5	Excavator Operator	3
6	Drill crew	16
7	Heavy duty operator	7
8	Heavy-duty drivers' truck	25
9	Storekeeper	3
10	Electrician	2
11	Labourers	10
12	Blasting Services	8
13	Cooks	4

14	Cleaners	2
15	Police officers	2
16	Security	2
17	Medic/ health and safety	2
18	Barge crew	5
19	Mechanic	5
Total		103

Table 2:categories and number of workers

3. Project Description

The proposed project is the mining/quarrying of Stone on a mining permit measuring 778 acres, situated 80 kilometres south of Linden. ACK intends to produce 900,000 Mt /year of aggregate, at minimum, during a 20-25-year period of mine life.

3.2. Location

The project area can be accessed from Georgetown via the Georgetown to Linden–Mabura road using ATV/pick up or trucks to the project area. The complete journey takes approximately 5 hours from Georgetown. From Linden to the project area(80km), the roads are in good condition and are currently being paved with asphalt.

3.3. Details of alternate sites

Mining is site-specific; hence, one large distinct area was identified for quarry mining. This 1 location comprises a total acreage of 200 acres of stone. This will be the mineable area within the 778 acres of land.

3.4 Potential Size or magnitude of operation.

The quarry can produce 23,466,800 tonnes of stone from 200 acres by open-cast semi-mechanized mining. The inferred reserve can be calculated accordingly as more detailed work is done.

3.5. Project description with process details

3.5.1. Method of mining

The proposed method of mining will be semi-mechanized open-cast mining. The primary mining techniques adopted will be the use of machines. The main development work will be forming systematic benching for the routine working of open-cast mines. The height of the bench will not be kept more than 5.0m at a time, and the bench's width will always be kept safe according to provisions. The Mining will be done with the help of tools such as drills, jackhammers, compressors, hand shovels, picks, excavators, etc. The targeted annual production of Stone is about 900,000 MTA in the first to five years, as shown in the table below.

Year	Average (Mt/year)
1	900,000
2	900,000
3	900,000
4	900,000
5	900,000
Average annual production	900,000

Table 3:Estimated annual production.

3.5.1.1. Drilling:

Aggregate excavation is planned using excavators. The mineral undergoes fracturing through explosives, after which it becomes exploitable through rock breakers and excavators. The extraction of hard strata is intended after drilling a 3-inch blast hole to a depth of 5m, after which blasting will be conducted.

3.5.1.2. Blasting:

The proposed controlled blasting adheres to all safety measures per the blasting regulations by Guyana's laws. It will be conducted with the permission of the Guyana Geology and Mines Commission. The predominant rock types in the area are granite, basalt, and granodiorite, which will undergo the comminution process. Blasting is scheduled once per week, while drilling will be a continuous process. To achieve the desired fragmentation, multiple blast holes, each 5 to 7 meters deep, will be drilled using a 3-inch diameter drill rod, a jackhammer, and an Air Compressor with a capacity of 100 cfm. It is estimated that approximately 12.6 kg of explosives (Senatel Magnafrac) per hole will be required. Around 612 blast holes per week are necessary to achieve the desired daily production rate. The average depth of each blast hole is 5 meters. The quarry aims to achieve a powder factor of 0.9 using the pre-split method, adding a booster if necessary. This goal will be pursued through trial and error, as the properties of the rock are not uniform throughout the quarriable area."

3.5.1.3. Loading and Transportation:

An excavator will load the aggregates and send them to the existing crushing unit within the complex. For transportation of aggregates from the mine site, trucks or tippers with a capacity of 40 metric tons will be utilized. It is anticipated that 88 truck trips will be required daily. Each truck is expected to make four daily trips to Linden, averaging 40 tons per trip, seven days a week. The movement of trucks from the mine will likely result in a dusty environment. However, ACK Mining Company is fully aware of this issue and plans to mitigate it by using a water truck to spray roads for dust suppression.

The subgrade mineral and waste materials will be stored within the perimeter of the permit area. Before the rainy season, ACK Quarry will increase production rates to maximize stockpiles at all wharf and storage locations. This strategy is in place because, during the rainy season, the quarry will reduce its production rate to avoid using roads that become slippery and hazardous for drivers.

In addition, ACK Mining Company is committed to not engaging in any activities that would deteriorate the main access road. Furthermore, the quarry will assign a team dedicated to maintaining the road for the duration of the mine's operational life.

3.5.3. Proposed Rate of Production and Expected Life of Mine-

The proposed rate of production for the mine is 900,000 tonnes per year. As per geological resources, the life of the mine is expected to be 20 to 25 years, depending on demand.

3.5.4. Opencast Mines

3.5.4.1. Salient Features of Mode of Working-

The mining will be done open-cast semi-mechanized. The work will be done by forming benches of 5.0m (Average) height. The mining proposals for the subsequent five-year workings are given in the table. Stone production will start in the first year of the systematic work of open cast mines; the main development work will be forming systematic benching. The height of the bench will not be kept more than 5.0m at a time, and the bench's width will always be kept safe according to provisions. The Mining will be done with the help of tools such as drills, jackhammers, compressors, hand shovels, picks, excavators, etc.

Loading of Stone will be done with a front-end loader and excavators at the face and stockyard. Crushed stone will be loaded manually into a truck/tipper. The truck/tipper will transport boulders and crushed aggregate from the mine site to the wharf. The cost of the Stone is directly dependent on the size of the material mined. First, the stone bench will be opened by removing the soil / overburden, and the stone will be removed using an excavator and dozer.

3.5.5. Proposed overburden production in the first five years.

Total O.B./Waste will be generated in 5 years =450,000 cubic meter

Cubic meter of Overburden /year			
Year	Average (Mt/year)	cubic meter of overburden	Stripping ratio (cubic meter/ton of aggregate)
1	900,000	90,000	0.1
2	900,000	90,000	0.1
3	900,000	90,000	0.1
4	900,000	90,000	0.1
5	900,000	90,000	0.1
Average annual production	900,000	90,000	0.1

Table 4:Overburden volume

3.5.6. Extent of Mechanization -

Mechanization will be deployed as per the requirement to meet the production target. Brief details of the machinery are as follows:

EQUIPMENT LIST (Price Used)	QUANTITY
Trucks (CAT 740)	25
365 Hydraulic Excavators (Caterpillar)	3
980B & 980C Wheel Loader (Caterpillar)	3
Bulldozer (Caterpillar - D8)	2
Mobile Crusher (100t/hr)	3
Ingersol Rand Drill (ECM 590)	3
Generator (650KVA.) Caterpillar	2
Caterpillar Hydraulic Hammer (130s)	2
Cat Water Tanker	2
Service Truck (Mac RD 690)	1
Compressor	1
Forklift	1
Tower Light	4
Welding Plant	1
Rubber Wheel Roller	2
Steel Wheel Roller	1
Tugboats	2
6000 m^3 Barges	2
Toyota Land cruiser	5
Toyota 4x4 Hilux	5

Table 5:List of machines

3.5.6.1. Loading Equipment

Mechanical loading equipment such as front-end loaders and excavators will be used for removal and loading of the mineral at the face and stockyard.

3.5.8. Post Mining Reclamation Plan, including afforestation.

Planting of trees at 3 m. x 3 m. grid will be done. Planting will be done every year. Saplings of local plants will be produced per the consultation of the local Forests Department Officers.

3.7. Resource optimization/recycling and reuse envisaged in the project.

It is proposed that topsoil be removed during mining operations. The topsoil excavated from the quarry will be dumped separately at a pre-determined place and used to spread over reclaimed areas for plantation. Precautions will be taken to limit the height of the topsoil dump to 5 to 6 meters to preserve its fertility and shelf life. Planting fodder grass and leguminous plants during temporary storage will protect it from soil erosion and infertility.

About 450,000 cubic meters of overburden will be generated within the first five years. This waste will be utilized within the pit for laying haul roads. At the end of its use, the overburden will be reutilized as a soil base for planting.

3.8. Availability of water and its source, Energy/ power requirement and source

The project area has no main transmission line for water or electricity. The company will use a generator or solar power to fulfil this requirement. Regarding water, the creek water will be utilized using a purification system, and if necessary, a well will be constructed.

3.8.1. Water requirement

The overall water demand is approximately 16,000 Liters per day, with 5,000 Liters allocated for domestic usage, 10,000 Liters for dust suppression, and 1,000 Liters for re-vegetation purposes. This water will be sourced from a creek water supply.

3.8.2. Power requirement

Power from the leading power company, Guyana Power and Light, is not required for mining operations. For the power requirements of the mine's office and other ancillary facilities, power shall be supplied by a Diesel Generator.

3.9. Quantity of waste to be generated (liquid and solid) and scheme for their Management/disposal.

3.9.1. Solid Wastes:

The mine waste and others are proposed to be stacked in the dump area specially provided. Care has

They have been taken in selecting the site for the stacking yards for the stacking purpose. It will be in a secure place with a solid base and a non-used zone. The walls will protect these dump yards. The toe walls will be constructed during the first year period. The height of these dumps will also be restricted and benched. A retaining wall of 0.5 m x 1.0 m will be made on the low-altitude side of the dump.

4.2.2. Land use

All the lands around the proposed quarry mine are solely for mining purposes.

4.3. Topography/ Vegetation

The land in the proposed area is mainly covered with native trees, shrubs, herbs, grass, climbers, bushes etc. The highest elevation of the lease area is 785 m. MSL and the lowest is 100 m MSL. As the proposed area is hilly, the drainage of the lease area is in a western direction. The dendritic drainage system flows into the Essequibo River near Kwapanna island.

4.3.1. Geology

4.3.1.1. Regional and Local Geology

Regionally, the area is part of a northwest-trending Paleo-Proterozoic granite-greenstone terrane, locally termed the Barama-Mazaruni Supergroup (BMSG). The rocks of the BNSG, which are dominated by metamorphosed mafic volcanics at the base and metasediments of various suites on top, are deformed and intruded by various granitoids of the Trans Amazonian Techno Thermal Event and later basic dolerite sills and dykes of the Avanavero suites. The rocks of the BMSG are believed to have been metamorphosed and gave rise to Bartica Assemblage (Gibbs, 1973), which covers the Bartica area, south to the southeast to Kaburi- Omai areas, and north-north-east to the Buckhall project area. Regionally, the youngest rock units are the Tertiary to quaternary sediments, including laterites, clays, and sand deposits.

The area is relatively small and does not show various lithologies at the scale on the attached geological maps. The following units, from oldest to youngest, are displayed tentatively to show the local geology of the area.

In this region, the geological composition mirrors that found in other sections of Guyana's greenstone belts. The oldest formations belong to the Lower Proterozoic Barama-Mazaruni-Supergroup, which are intruded by more recent granites and basic rocks. Granite, greenstone, and gabbro dominate vast expanses, with geological features evident in the rugged terrain, where outcrops are visible in ravines, creeks, and along ridges.

Locally, the geological makeup comprises gabbro-norite dykes intruded by younger granites from the Mariaba Granodiorite suite, some of which exhibit foliation. The predominant rock types in the proposed area are gabbro, dolerite, and granodiorite (Allen, 1963). Mapping efforts have pinpointed a gabbroic plug that correlates to the Avanavero Suite measuring approximately 7km by 6km, alongside numerous gabbro outcrops (refer to Figure 5).Part of this section is where the quarry is located .

Bartica Assemblage/ Gneissic Assemblage: - Generally postulated to have been generated from the greenstone belts of the Barama Mazaruni Greenstone Belts, rocks of the Bartica Assemblage do occur in the project area. Gibbs (1973) described these rocks as orthogneisses, paragneisses, and amphibolites. According to the author, these rocks are altered to the almandine amphibolite facies, while some bands develop hypersthene, suggesting even higher grades of metamorphism (granulite). They generally display an ENE-WSW trend similar to other rocks in the region. Rock samples from the mining areas are usually basalt, granite,dolerite and granodiorite.

Younger Granites: - Younger granitoid rocks are prominent in the project area. The greenstone belts of the Barama-Mazaruni Supergroup are intruded by these granitoids, and Gibbs (1973) described folding during the intrusion, followed by transverse faulting and shearing. Granitoid bodies are expected to be rimmed by contact aureoles of amphibolites in the western part of the project area. Contacts of the granitic intrusions with the greenstone belt rocks are sharp and concordant with the general WNW foliation.

A reconnaissance team, comprising a geologist technician and three samplers, conducted a three-day expedition in the designated area to undertake mapping and prospecting. Their activities involved cutting lines along ridges and spurs while inspecting creeks and ravines for quarriable rock outcrops,

such as gabbro and granodiorite and dolerite.Throughout the expedition within the property, there were many outcrops with minimal overburden thickening, as seen in the photographs attached in the appendix.

Based on observations of creek and ravine erosion, the estimated overburden thickness in these areas is approximately 3m, consistent with historical depths ranging from 2m to 10 m across the region. Further investigation, particularly through drilling, is anticipated to ascertain the exact extent of overburden within the surveyed area.

4.5 Social Infrastructure

The infrastructure like toilets, first aid stations, etc., will be developed at the mine site.

- There are no medical facilities or primary health care centres close to the quarry area. Hence, ACK will have its team of medical personnel and the required medical evacuation procedures in place.
- Communication services like post office and telephones are not available in the nearby village. Some of the villagers have mobile phones.
- An occupational health unit will be organized, and the proposed measures will be adopted:
- Pre- and periodical medical checkup programs for all the workers.
- Compulsory medical checkup program and first-aid box with necessary equipment will be provided.
- Training for workers regarding occupational hazards.
- Safety equipment, i.e., dust mask, safety shoes, gloves, etc.

5.0. Planning Brief

5.2. Population Projection

The workforce requirement for mining is estimated to be 103 people. Most of the employees will be recruited from neighbouring villages depending upon the availability of skilled and unskilled people. Migration of highly educated and qualified persons will occur, but temporary. So, there will be no permanent migration of people; hence, there will be no population projection.

5.4. Amenities/Facilities

A rest shelter with a first aid kit, toilets, and drinking water facilities shall be provided within the project area.

- First-aid boxes should be provided and maintained with specified medicines. These will be readily accessible during all working hours.
- Enough toilets will be provided and maintained clean and sanitary.

1. 6.0. Proposed Infrastructure

6.1. Industrial Area (Processing Area)

Temporary arrangements like site offices, rest shelters, and approach roads will be constructed.

6.2. Residential Area (Non-Processing Area)

No residential area/ housing(scheme) is proposed.

6.3. Afforestation Program

6.3.1. Program of afforestation

In the year-long program of eco-restoration for the life of the mine, about 1000 native trees will be planted in an area of 200 acres—biological reclamation / ecological restoration for the mined area by planting the species per the schedule. The species selection is based on high dust capture, soil holding capacity, groundwater recharge capacity, etc. Mine restoration and reclamation will begin after the first year of mine.

6.3.2. Plantation program

Planting along the boundary of the lease area, i.e., within a 7.5 m barrier of the lease area boundary, has been proposed, which will help to improve the environment and ecology. Planting will be done around offices, roadside, fencing boundaries, etc. Further afforestation programs up to the conceptual plan period will be similar to the above five-year program, which will be repeated yearly.

6.3.3. Post-planting care

Post-planting care is essential for the healthy growth of vegetation. This will comprise: -

I. Replacement of causalities at the first opportunity itself.
II. Weeding monthly for the first two months and later every six months.
III. Irrigation fortnightly from March to October, once every ten days between April and June.
IV. Soil working and mulching, etc., twice a year.

7.0. Rehabilitation and Resettlement (R&R) Plan

There is no habitation/population in the mine lease area, displacement of population, and hence.

Rehabilitation and resettlement are not involved.

8.0. Project Schedule & Cost Estimates.

A total sum of USD 11,663,462 will be expended to make this project a reality upon approval.

ITEM	COST (GUY$)
Plant, Machinery, and Equipment	2,293,000,000
Mine development expenses	50,000,000
Building and civil works	10,000,000
Furniture and Fixtures	3,000,000
Reclamation & Closure	20,000,000
TOTAL	3,000,000,000
NET INITIAL WORKING CAPITAL	50,000,000
PROJECT COST	3,050,000,000
USD COST	11,663,462

Table 6:Total finance to materialize the project.

8.1. Likely date of start of construction and likely date of completion

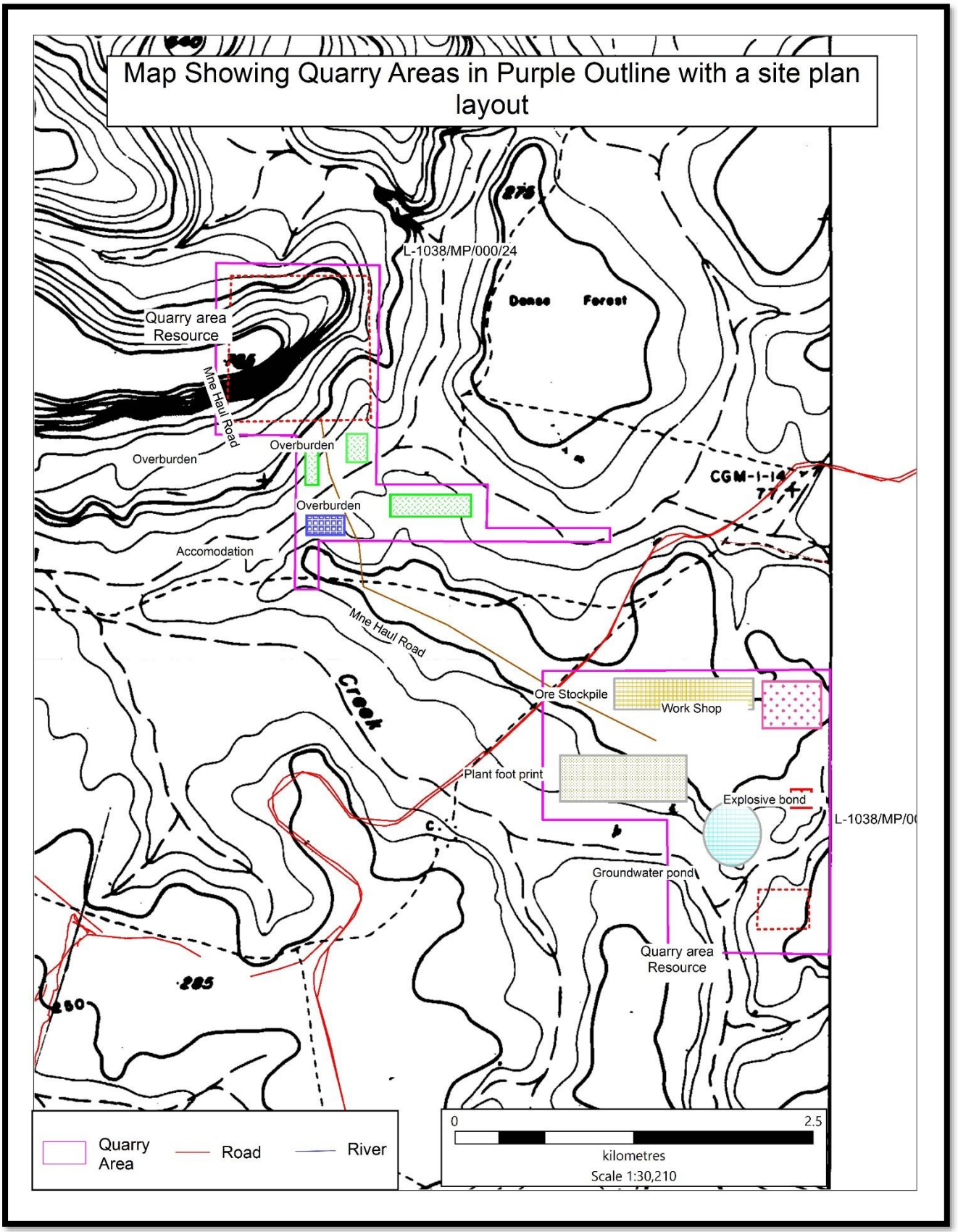
The construction work at the mine mainly comprises the construction of an access road. The mining shall be started after all clearances. ACK is eagerly awaiting its license to start mining.

9.0. Analysis of Proposal (Final Recommendations).

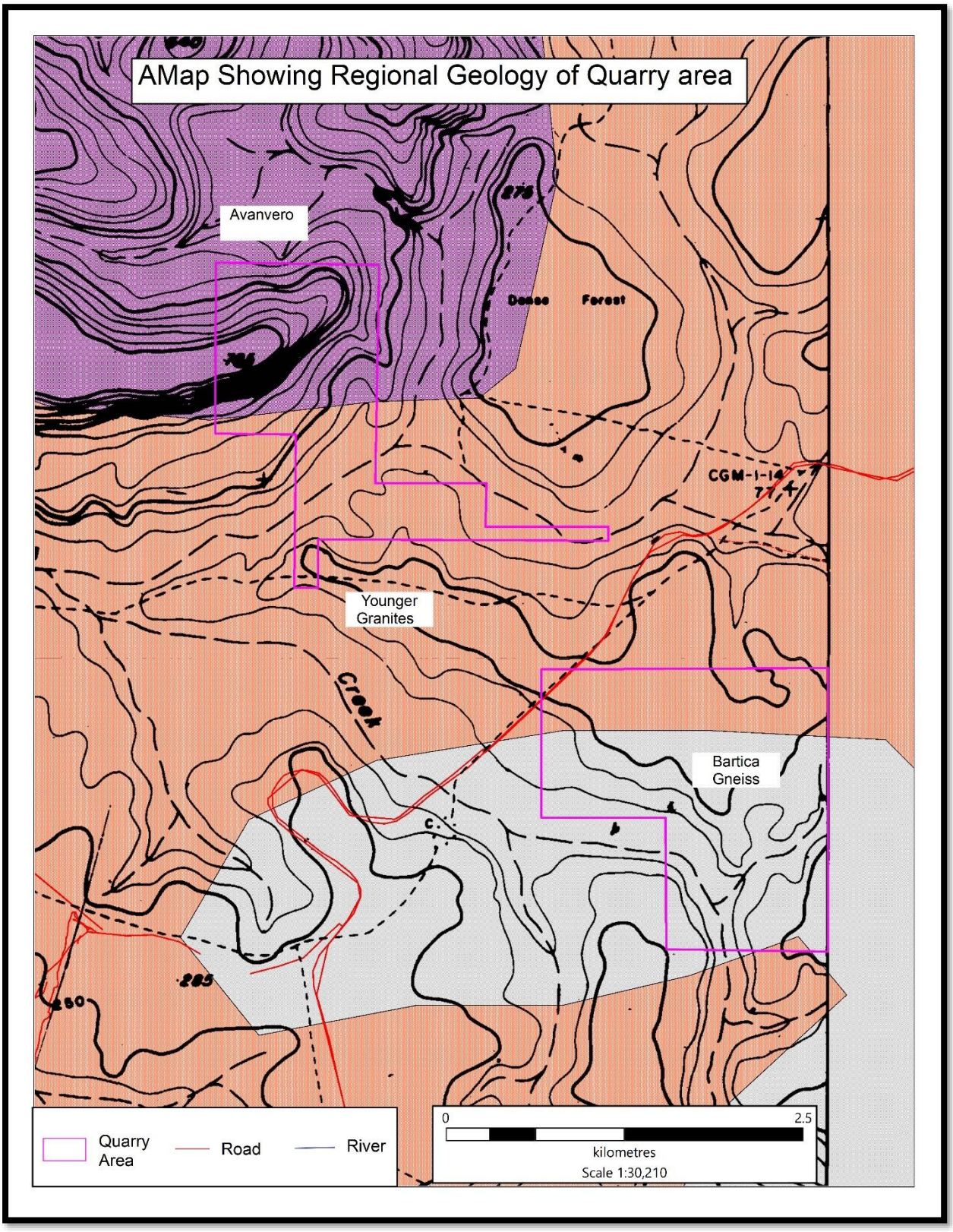
This mine will help create jobs in region 10 . It will assist in satisfying the local stone demand, reducing stone costs.

9.1. Financial and social benefits with particular emphasis on the benefit to the local people, including the tribal population.

No tribal population is residing in the study area. There will be social benefits from the mining operations. The core benefit of the proposed expansion is the availability of stone in construction industries.



Map 1:Location and proposed layout of Quarry.



Map 2: Showing geology of the area. The Purple area within the project area is the Avanvero complex in which 90 percent of the resource is concentrated