



**Environmental
Protection
Agency - Guyana**

**ENVIRONMENTAL PROTECTION AGENCY (EPA)-GUYANA
ENVIRONMENTAL AUTHORISATION SCREENING REPORT**

NAME OF COMPANY: Ekaar Hirm Earth Resources Management Inc. (Atlana Quarry)

TYPE OF PROJECT: Stone Quarry

REFERENCE NO.: 20221220-EHRMI

PROJECT LOCATION: E-1001/000/22, confluence of Cuyuni River and Amariwabe River, Region 7, Mazaruni Mining District # 3

1.0 INTRODUCTION

PROJECT OVERVIEW AND DESCRIPTION

The Environmental Protection Agency received an Application from Mr. Jesvin Pradeep Kumar Nathan on December 20, 2022, for Environmental Authorisation of a Stone Quarry to be located at E-1001/000/22, confluence of Cuyuni River and Amariwabe River, Region # 07, Mazaruni Mining District # 03. The following documents were submitted as a part of application's requirement:

- Applicant ID;
- Project Summary;
- Prospecting Mining Licence form GGMC;
- Exploration Summary Report;
- Mine Plan;
- A topographic map showing Block: E-1001/000/22;
- Conceptual Site Plan; and
- Certificate of Incorporation.

The application was submitted and screened and inspections conducted at the project location on May 03, 2023, to verify the information submitted in the Application and Project Summary for Environmental Authorisation. The following details were obtained from the inspection and Exploration Summary Report.

The project occupies ~1,098 acres of Amerindian titled land (Batavia) for the purpose of establishing a Stone Quarry within the assigned block: E-1001/000/22. The Company's intention is to extract approximately ~575,000 metric tons per annum of combined aggregates (1/4" minus, 3/8 " minus, 1/2 " minus, 3/4" minus, 1" minus, rip raps, sifting and boulders) over an estimated fifteen (15) years period.

Mining activities will utilize approximately 32 % of the total project area (350 acres). At the mine site the following buildings and infrastructure will be constructed:

1. Open Pit Mine Area;
2. Haul and Mines Roads;
3. Accommodation building;
4. Crushers;
5. Administrative building;
6. Power Generation (912 and 42 KVA);
7. Mine Water Pond;
8. Workshop/storage bond;
9. Stockpiles and Dumps for ore and overburden;
10. Explosive bond; and
11. A fleet of heavy-duty earthmoving equipment

Land Use

Bartica approximately some 16.4 km east of the proposed mining development. The Mining Block is within Batavia Amerindian Titled Lands which is located on both sides of the Cuyuni River.

The nearest resident within Batavia Amerindian Titled Lands is located approximately 1.2 km outside the boundary of the mining establishment in an easterly direction and downstream of the Cuyuni River with respect to the Project Area.

Karau Amerindian Titled Lands is located approximately 13.9 km east of the mining development. It should also be noted that the Cuyuni River is immediately in the north direction and Atlana River is approximately 2.265 km. Itabali landing located approximately 7.1 km from the project location. Aside from tracks and trails made by small scale loggers. The forest cover has essentially been preserved and only very selective logging practices are carried out in the area. In addition, the area is neighbouring another Stone Quarry owned by Mohamed Qualander-Queensway Flatrock Quarry, as such, there high probability of the cumulative impacts from both operations affecting the environment. Additionally, BK Quarries-Teperu Quarry is the nearest operating Quarry which is approximately 8 km in a south-eastern direction of the project location.

Mine Development

The proposed project will be situated at E-1001/000/22, confluence of Cuyuni River and Amariwabe River, Region 7, Mazaruni Mining District # 3, and will occupy an area that is approximately 1,098 acres in size. In the initial phase of the project the Company's intention is to use approximately 32 % of the project area to extract stones to be processed by crushers and establish infrastructures to support any ancillary facilities located at the site. The materials extracted via excavator and will be transport via trucks to the crusher for processing. Aggregates will be stockpiled on the bank of the Cuyuni River

and then barged to various location for the local market within the construction industry, targeting road infrastructure, house construction etc. in Bartica, West Coast Demerara and Georgetown.

The project will be composed of the following:

1. Land Preparation: stripping of vegetation and top soil, and removal of overburden
2. Extraction of resources via hydraulic excavator
3. Haulage and dispatch by barge

The development phase of the project will entail a construction and an operational stage. The operation is proposed to undertake an open cast semi-mechanism mining pit with benching and blasting. A jack hammer will be used to break oversize boulders in the pit and at the crusher grizzly. The pit will closely follow a north-easterly orientation, and the approximate 60° dip of bedding will affect high-wall and bench construction. The construction stage of the mine will require clearing, grubbing and stripping of the overburden. This is to be done so as to maintain the required supply of aggregates materials. Further, construction detail entails installation of ancillary facilities such as wharf, genset area, processing plant etc.

The ramps and haul roads will be designed with an operating width of 9 m for double lane traffic. The quarry will be operated 8 hours a day (plant operation). Out-loading will be done initially by two (1500 tons and 1000 tons) barges (one equipped with extremely heavy metal decking for rip-rap). There will be thirty six (36) employees (skilled and unskilled) for construction and operation of the Stone Quarry.

Waste material will be hauled to an out-of-pit waste dump until sufficient pit floor space is developed to allow for in-pit backfilling if needed. Overburden Stockpile Dump will be located ~500m west of the Pit.

Blasting will be done using ANFO (ammonium nitrates and fuel oil) explosives which are readily available locally and the blast pattern proposed will be a standard 6 x 7 matrix.

Geology

The Atlana Quarry Project deposit consists of a Biotite Gneiss basement that was intruded by an intrusive pluton and then these were later intruded by several gabbroic dykes as seen to the east. The diorite is generally fresh and relatively unaltered, with a few zones of fracturing and shearing.

Regionally, the geology of the area is similar to that seen in other parts of the greenstone belts of Guyana with the oldest rocks consisting of gneisses of the Lower Proterozoic Barama-Mazaruni-Supergroup, intruded by Younger Granites, and both units intruded by the Younger Basic Rocks. Locally, the geology of the area consists of the Bartica Gneiss Complex which has been intruded by the younger granites of the Kartabu Granite suite to the south-east of the proposed area.

The mappable rock units based on outcrops and drill coring are the Biotite-gneiss of the Bartica Assemblage basement, intruded by the younger intrusives (Diorite), all overlain by saprolite and White sand of the Berbice formation with weathered Fe-rich duricrust (formed from the weathering of the mafic dyke) in some sections. Thus, the Geologic sequence is interpreted to be as follows:

1. Deposition of the greenstone basement, medium to fine grained.
2. Intrusion produced by a granodiorite pluton, resulting metamorphism in the volcanic

sequence (metavolcanism), alteration by sericite, carbonate, epidote, biotite, deformation (folding and shearing).

3. Intense erosion of the greenstone basement rocks.
4. The structural events that produce shearing and faulting shown by the in brittle-ductile fabrics of the host rocks (greenstone rocks and granodiorite), are a result of the tensional and compressional straining, caused by the intrusion of small mafic dykes. These structural events with general trend NE-SW, N and NW-SE generate Graben/Horst and minor Fold structures in the regional area, as a part of a sequential fault system.

Soils

The proposed Stone Quarry is located in the north east of the Hilly Sand and Clay Region on the left bank of the Cuyuni River. The soil type of the project area consists of red yellow latosols, steep phase including red yellow podzolic intergrades to red yellow latosols. These soils are largely very deep, well drained sands over sandy clays of low fertility with limitations of fertility and low water holding capacity but which have favorable physical properties that could be ameliorated by land management and irrigation. These are further classified as follows: ferralic Cambisols, dystric Leptosols, lithic Leptosols, acric-haplic ferralsols, albic arenosols, caJCIc podsols, ferralic/luvic Arenosols, acric-haplic/acric-xanthic Ferrasols, terric Histosols, terric Histosols/gleyic Cambisols, gleyic Cambisols, and Fluvisols

Hydrology and Drainage

The area is drained via the Cuyuni and Atlana Rivers in various parts of the Quarry. The area is mostly surrounded by primary and secondary forests. However, the project site itself is drained by a small unnamed seasonal creek as can be seen on map “[Maps showing the project area and surrounding Land Uses](#)”. There is no other significant stream/creek within the project site. Runoffs from the project area flows directly towards these water bodies.

Flora and Fauna

The natural landscape of the project site consists of vegetation type characteristic of riparian forest habitats of the hilly sand and clay region and the Cuyuni River. Research shows that the immediate landscape area of the project is characterized by extensive tall, evergreen, flooded riparian mixed forest (including Mora Forest) existing along flood plains of the Cuyuni River and tall evergreen, seasonally flooded and non-flooded low land mixed forest existing inland of the riparian areas. The extensive riverine mixed forest habitats are characterized by species of that are generally found along major rivers, having significant canopy association with species of the Mora Forest inclusive of *Eschweilera wachenheimii*, *Eschweilera sagotiana*, *Clathrotropis brachypetala*, *Clathrotropis macrostachya*, *Eperua falcata*, *Eperua rubiginosa*, *Catostemma spp*, etc. The habitats are interlocked among aquatic environments in the form of the Cuyuni River and small creeks.

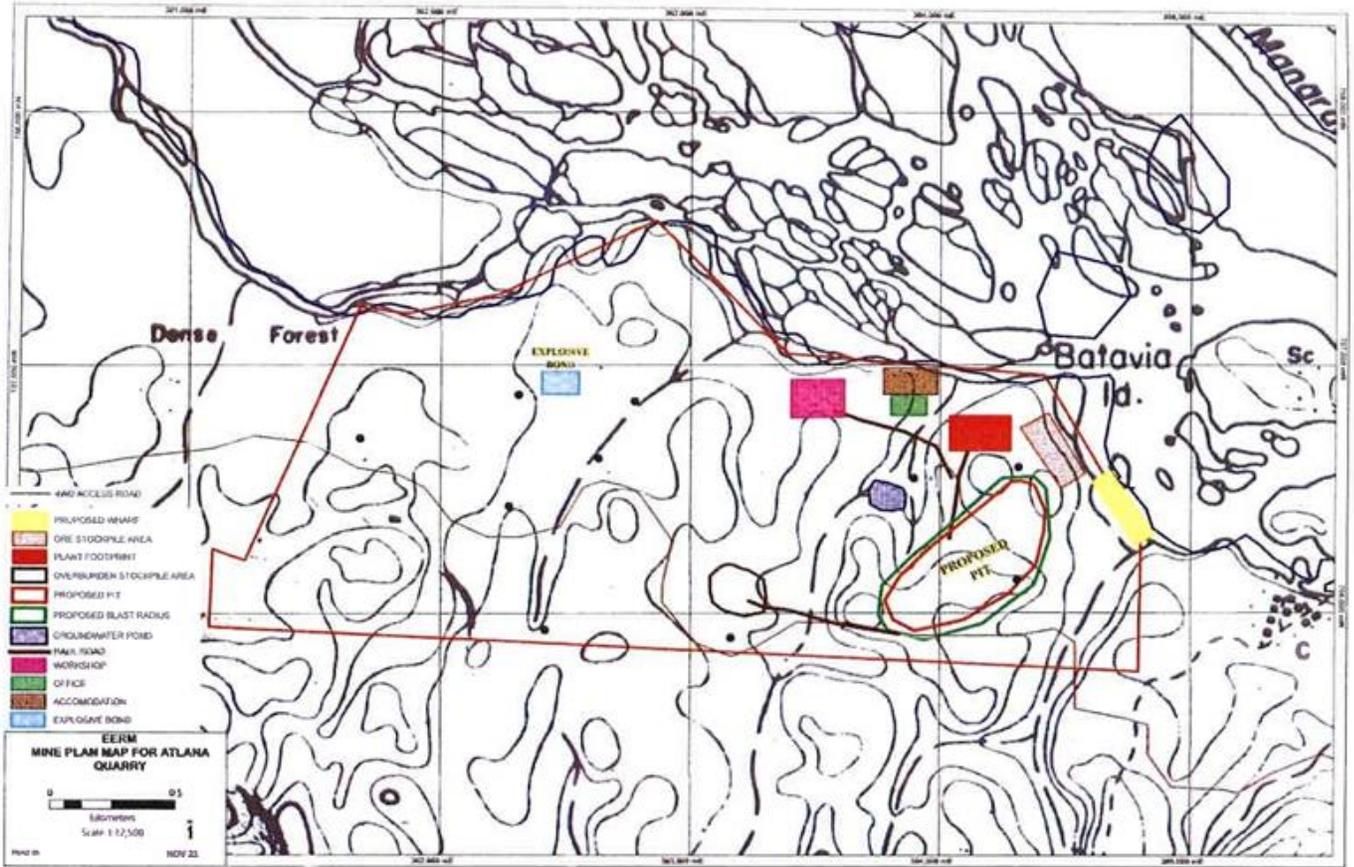
These forest ecosystems support a large diversity of widespread humid forest fauna typical of the neotropics, the Guiana Shield and Amazonia lowlands, and the lowland forest regions of Guyana. These species typically include fishes like the freshwater barracudas or Hourii (*Hoplias malabaricus*), and the himara (*Hoplias aimara*), caimans (*Caiman crocodylus*), and mammals such as the Red-Rumped Agouti (*Dasyprocta agouti*), the Labba (*Agouti paca*), Deer (*Odoceilus virginianus*) and the Peccary.

Review of the IUCN Red List revealed no critically endangered or endangered plant and animal species that is known to occur with the project landscape.



Mining process for Atlana Quarry

The mining block is covered with dense forest with supporting covers up to 250 ft amsl. Run-off from precipitation and dewatering of the mine will be directed to pit sump and channel into the settling ponds to reduce the turbidity of the discharge.



Map Showing the site plan for Atlana Quarry

PROJECT LOCATION

BLOCK: E-1001/000/22

A Tract of state land located in the Cuyuni Mining District No. 4 as shown on Terra Surveys Topographic 1:50,000 Map 27NW, at scale 1:50,000 with reference point 'X' located at the Cuyuni River and Amariwabe River with geographical coordinates of longitude **58°45'23.587"W** and latitude **6°23'3.97"N** within the following boundaries.

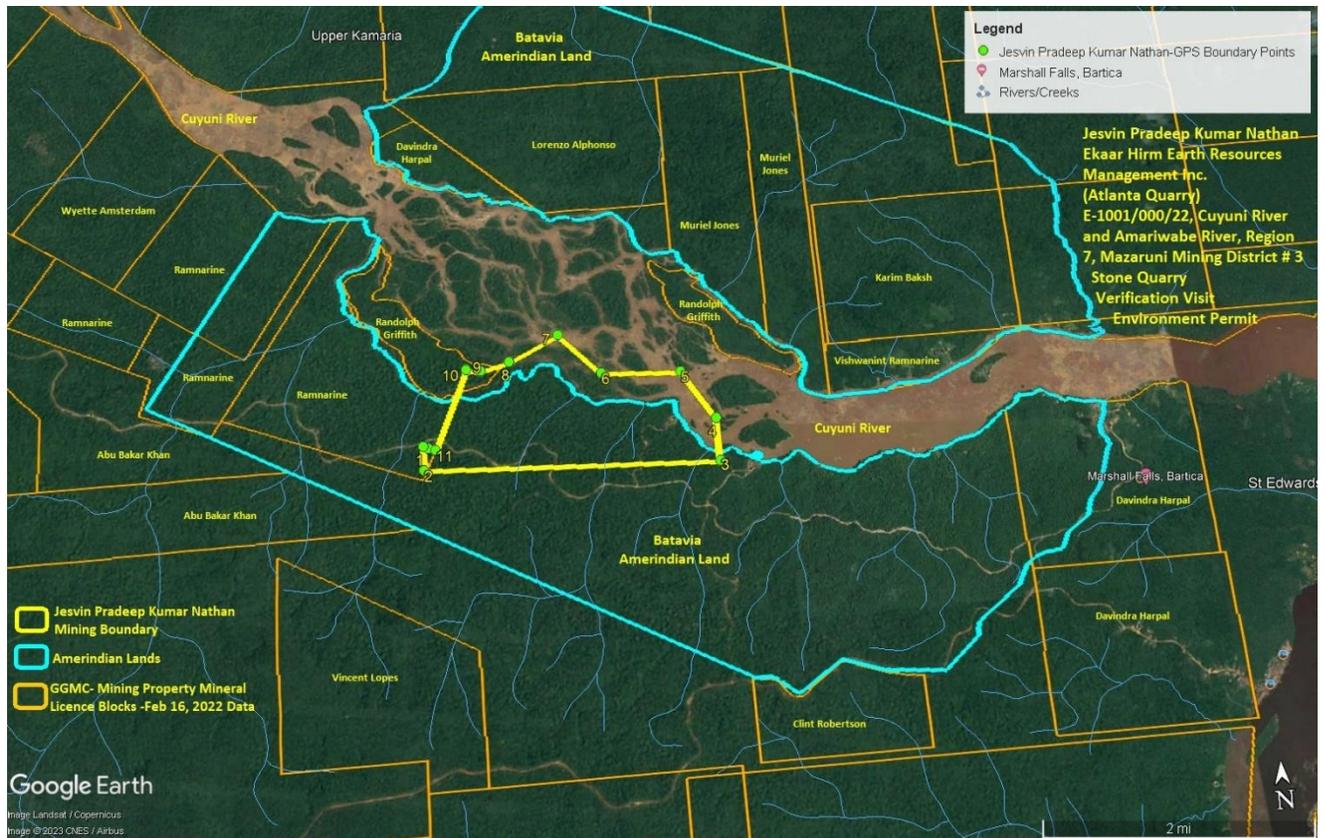
Commencing from a reference point located at the confluence of the Mazaruni and the Cuyuni Rivers located at geographical coordinates of longitude **58°41'31.2"W** and latitude **6°23'18.6"N**,thence at true bearing of **268.4°**, for a distance of approximately **5.32 miles** to **Point 1**, located at geographical coordinates of longitude **58°47'54"W** and latitude **6°23'11" N**, thence *at* true bearing of **182°**, for a distance of approximately **342 yards**, to **Point 2**, located at geographical coordinates of longitude **58°47'S4"W** and latitude **6°23'1"N**, thence at true bearing of **93°**, for a distance of approximately **2 miles 536 yards**, to **Point 3**, located at geographical coordinates of longitude **58°45'53"W** and latitude **6°22'55"N**, thence at true bearing of **1°**, for a distance of approximately **592 yards**, to **Point 4**, located at geographical coordinates of longitude **58°45'53"W** and latitude **6°23'13"N**, thence at true bearing of **31°**, for a distance of approximately **831 yards**, to **Point 5**, located at geographical coordinates of longitude **58°46'6"W** and latitude **6°23'34"N**, thence at true bearing of **85°**, for a

distance of approximately **1124 yards**, to **Point 6**, located at geographical coordinates of longitude **58°46'39"W** and latitude **6°23'36"N**, thence at true bearing of **45°**, for a distance of approximately **819 yards**, to **Point 7**, located at geographical coordinates of longitude **58°46'56"W** and latitude **6°23'64"N**, thence at true bearing of **244°**, for a distance of approximately **753 yards**, to **Point 8**, located at geographical coordinates of longitude **58°47'17"W** and latitude **6°23'44"N**, thence at true bearing of **258°**, for a distance of approximately **414 yards**, to **Point 9**, located at geographical coordinates of longitude **58°47'29"W** and latitude **6°23'41"N**, thence at true bearing of **83°**, for a distance of approximately **205 yards**, to **Point 10**, located at geographical coordinates of longitude **58°47'35"W** and latitude **6°23'42"N**, thence at true bearing of **204°**, for a distance of approximately **1219 yards**, to **Point 11**, located at geographical coordinates of longitude **58°47'49"W** and latitude **6°23'9"N**, thence at true bearing of **72°**, for a distance of approximately **88 yards**, to **Point 12**, located at geographical coordinates of longitudes **58°47'52"W** and latitude **6°23'10"N**, thence at true bearing of **68°**, for a distance of approximately **62 yards**, to the point of commencement at **Point 1**, thus enclosing an area of approximately **1098 acres** , save and except all lands lawfully held or occupied.

The project area is located in the Amazon rainforest of Guyana. It is bracketed to the north by the Cuyuni River. To the east, west and south are forested areas. The location of the project site is shown in the Map below.



Map Showing interpretation of local Geology projected to surface based on field mapping and drilling



Google Image 1: Illustrating the Project Location

2.0 CHARACTERISTICS OF POTENTIAL IMPACTS

Surface Water Quality

Resulting from the field inspection conducted for this project and the information submitted in the various submissions, surface water quality can be affected during the Mine development and operational phases of the proposed project. It is noted that land clearing and earthmoving activities associated with development of the quarry infrastructure, including the water management ponds may increase the potential for erosion and the associated increase in sediment being transported to waterways and cause sedimentation of the waterways within the Project area. Additionally, during the construction and operation of the mine site along with facilities there is potential for accidental discharges of fuel, oils and grease from operating equipment, acid mine drain from stock pile runoff, increase sediment loads from construction activities. The foregoing activities and synonymous with mining and are mitigable.

Mitigation Measures - Water Quality

The key objective of the mitigation measures is to protect existing waterways and groundwater resources from impacts from the mining and mining related activities. The

mitigation measures that can be considered for water quality improvement include:

- Implementation of the Water Management Plan and Erosion and Sediment Control Plan, channeling storm water discharge from fuel storage areas to an oil water separator.
- **Drainage flow** - As far as possible, drainage should follow existing drainage lines with vegetation along the drainage lines retained.
- **Cut-off drainage** - Cut-off drains or diversion banks can prevent surface flows from entering the quarry works areas. These should discharge into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- **Sedimentation ponds** - Run-off from work areas should be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the stone quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- **Flow barriers** - Additional methods for trapping sediments include using barriers to flow such as silt fences, crushed rock filters, hay bales, logs, or sandbags.
- **Vegetation buffer** - A vegetated buffer strip around the perimeter of the site where surface water flow passes through can be effective, and should be provided along any significant waterways passing through the site.

Impact Significance

The potential for negative impacts to fauna, flora and aquatic life is considered to be low and can only occur if no mitigative or corrective action is taken by the Project proponents to address any foreseeable impacts.

Further, and based on the fact that the area is surrounded by trees/vegetation that will act as natural filters of storm water runoff and as such will result in the reduction of sediment flow and as such sedimentation of surface water is going to be low. Apart from the above, the Developer has no intention to alter any of the major existing drainage systems within the area. It is also the intent of the Developer to develop Spill Prevention and Contingency Plan, installation of sedimentation ponds and flow barriers, silt fence etc. Implementation of these mitigation measures will further mitigate any project related impact that maybe experienced on water quality during construction and operation (low likelihood of occurring, low severity).

Ground Water

Ground water dewatering may be required during construction of foundations for project infrastructure. Spills of fuel and oils may occur within the vicinity of foundation excavations etc. During operation spills of fuel and oils may occur from equipment, fuel storage, hazardous storage areas and from servicing areas. During Mine closure, surface and groundwater quality can be affected if water management/sedimentation ponds fail. In addition, the dismantling and cleanup of fuel storage tanks, hazardous waste receptacles, and other accumulated materials during closure can lead to spills which could contaminate surface water and/ or groundwater as well as soils. It should be noted that the forgone impacts would be localized to the immediate area of impact, would be low in nature and would have a low level of significance if no mitigative measure is applied.

Mitigation Measures – Ground Water Quality

- Implementation of the Emergency Response Plan (ERP); including measures such as siting of fuel containment tanks on impervious bases located within an impermeable enclosure designed to hold 120% of the contents in the tank.
- The ERP will detail plans for utilization of sorbents, biological agents, chemical dispersants and gelling agents.
- Enforcement of a program to check for equipment leaks.
- Impermeable liners will be placed over the base of the water management/sediment ponds during construction. This will reduce recharge to ground water.
- Installation / implementation of drip pans on all equipment.
- Periodic monitoring of surface and groundwater conditions in the of the sedimentation and water management ponds.

Impact Significance

There is potential for negative impact on ground water during all phases of the project if no mitigative or corrective action is taken by the Project proponents to address any foreseeable impact. There is little to no potential for fuel spills accidental release, seepage of waste water contained in sedimentation/water management ponds, contamination of groundwater within solid waste disposal pits at the project site if the necessary precautionary measure and taken and implemented. Once the necessary measures are taken and implemented then the potential for occurrence will be rated as having (low

likelihood of occurring, low severity) to groundwater quality.

SOIL IMPACTS

Soil Erosion and Sedimentation

The potential for impacts to soil may emanate from the clearing of vegetation, landscape grading, and re-contouring to ensure proper drainage, and other construction activities. These impacts are expected in steeply sloping areas and where the soils erosion potential is severe. If not mitigated, soil erosion can also lead to the cumulative effects of siltation and sedimentation in streams and rivers downstream as well as reduced depth of riverbeds and watercourses, which inhibits navigation low-lying areas. Further, any disturbance of the in-situ soil will elevate the potential for increased soil erosion and run-off in particular steep faces that are typical of open pit operations and areas very prone to erosion

Mitigation Measures – Soil Impacts (*not limited to*)

- Implementation of best management practices in a Storm Water Management Plan for soil erosion, storm water runoff, and sedimentation control.
- **Sedimentation ponds** - Provision of sedimentation ponds based on the finalized mine plan to capture material eroded at the site before discharge.
- **Ground cover** - Design of surface ground cover to minimise soil exposure to intense rainstorm. Adequate soil compaction works should be conducted at the end of each working day to reduce soil erosion.
- **Retain vegetation** - Retain existing or re-plant the vegetation at the site wherever possible.
- **Run-off diversion** - Minimise or divert high velocity runoff away from sensitive/ easily prone to erosion areas through provision of proper drainage systems.
- **Drainage** - Construction of high-volume drainage systems conforming to site conditions to handle concentrated or increased runoff from intense rainstorms.
- **Monitoring and maintenance** - Regular monitoring and maintenance of erosion control systems so that they perform as specified.
- **Benching** - Provision for slope benching system at the quarry face.
- **Turfing** - Turfing should be carried out to establish vegetation on the slope making it more stable.
- **Weather condition** - Blasting activities and related earthworks should not be carried out during wet and rainy weather conditions.
- **Retain vegetation** - Existing vegetation on hill slopes especially on undeveloped areas are to be retained as much as possible to act as natural buffers.
- **Checking slope areas** - Regular checking of the slope surface and surrounding areas for signs of possible slope failure and soil erosion should be carried out.

Impact Significance

Significant impacts to soils are only expected to occur in steeply sloping areas and where the soils erosion potential is severe such as the mine pits and overburden stockpiles only if no mitigative or corrective action is taken by the Project proponents to address any foreseeable impacts. Additionally, the implementation of best management practices in a Storm Water Management Plan and Erosion and Sediment Control Plan for soil erosion, storm water runoff, and sedimentation control and the segregation of topsoil or surface soil from subsurface layers during construction activities will all aid in making the potential impact to soil having low likelihood of occurring and a low severity.

AIR POLLUTION

Dust generation has a low likelihood of occur during construction and operation activities from the movement of vehicles and machinery, land clearing, blasting and excavation and loading and unloading of soil, crushed rocks, etc. In the operation phase of the project, one is expected to see some level of dust generation and combustion emissions from activities such as:

- stripping of topsoil and overburden;
- drilling and blasting;
- loading and unloading of haul trucks;
- Transport of extracted ore materials;
- Vehicle traversing site roads;
- Wind erosion of stockpiles; and
- Operation of heavy-duty equipment/machinery.

Mitigation Measures – Air Quality (*not limited to*)

- **Location of stockpiles** - At the planning stage, there should be an assessment of prevailing winds, and this should guide the location of stockpiles, spoil mounds, conveyors, and others to minimize dust being blown outside the site boundary.
- **Vegetation barriers** - These consist of dense stands of mature trees, can act as windbreaks to help alleviate dust generation.
- **Dust control for crusher plant** - Conveyors and transfer points can be major sources of dust generation. Acceptable mitigation measures for these can be any or all the following:
 1. Enclosures, Mist sprays,
 2. Dust extraction equipment.
- **Minimising distance** - Minimising the distance between the discharge point and the top of the stockpile can reduce dust generation.
- **Cease operations** - During periods of high wind speeds operations may be ceased or curtailed to prevent excessive dust leaving the site.
- **Water spraying** - Grounds of the quarry site and stockpiles including overburden

areas and access roads may be regularly sprayed with water to reduce dust generation. The frequency should be determined based on-site conditions.

- **Wheel washing facility** - Provide a wheel washing facility at site exit points to avoid dirt being carried out of the project area. Water from the washing facility should be changed regularly to ensure clean water (without silt) at all times. The facilities should be connected to the sedimentation basin to treat dirty water, prior to final discharge.
- **Speed limit** - Speed limits should be applied to unsealed roads to limit dust generation (as well as noise, and maintenance requirements).
- **Material cover** - Dust can also be reduced during the transportation of materials by covering loads on trucks. Less effective, but still useful is to limit the fill height of material in the tray to the level of the top of the tray.
- **Site Entrance** - Quarry entrance can be sealed/ layered with aggregates to minimize dirt carried offsite on vehicle tyres.

Impact Significance moderate

There is the potential for negative impact on employees within the confines of the project area if no mitigative or corrective action is taken by the Project proponents to address any foreseeable impacts that may arise. Other pollutants such as VOCs, SO₂, etc. can be generated from the power generating equipment, machinery and explosive materials used for blasting. These emissions will be short-term and may only occur via the use of certain equipment. Further, the impact to air may only occur during the dry weather season with a low likelihood of occurring and at low severity.

NOISE POLLUTION

Construction and operation activities are expected to create a high threshold of noise. These activities include the operation of heavy earthmoving machinery. During the quarrying (crushing and screening operations) high noise levels are also expected. Periodic elevated noise levels will also be generated from blasting activities and loading and transporting of quarry materials. Primary noise receptors in the area will be individuals involved in construction activities at the site. Elevated noise levels will also have an effect on many species of wildlife that are sensitive to increased noise levels.

Mitigation Measures - Noise Pollution (not limited to)

The mitigation measures that can be considered for noise pollution control include (but are not limited to):

- **Vehicles/Equipment** - Avoid deployment of poorly maintained, or old transport vehicles and equipment.
- **Physical Barriers** - Noise attenuation may be achieved to some degree by barriers. These may be bund walls installed at the site, zinc hoardings, vegetation

barriers, or natural topographic features.

- **Vegetation barriers** - If trees are being considered as effective noise attenuation means, the trees need to be mature, the plantings relatively dense, and the width of the barrier greater than 20 meters. The stand of trees also needs to extend to well above the point source of the noise.
- **Silencers** - Machinery such as compressors, engines, generators, and exhausts may be fitted with silencers to reduce their impact, if necessary.
- **Speed limit** - Truck noise on access roads and haulage roads can be reduced by maintaining low speeds and through regular vehicle maintenance. Proper selection of access roads can also reduce noise impacts.

Impact Significance

Noise and vibration will be emitted during all phases of the project. There is the potential for negative impact on employees and fauna within the confines of the project area if no mitigative or corrective action is taken by the Project proponents to address any foreseeable impacts. Noise and vibration will be from blasting, heavy machinery movement and operation of genset. Noise impact will also be localized. Further, there is no person or communities that would be proximity to the area of noise impacted. The project is with the Amerindian Titled Land (Batavia) and four (4) persons from the community live an estimated 1.4 km from the project boundary. This impact will be direct and short term to the project site only with a low (low likelihood of occurring, low severity) significance.

WASTE MANAGEMENT

Large quantities of waste will be generated throughout the lifetime of the quarry (construction and operation phases) Operation. The operation is expected to generate different streams of waste, both solid and liquid (non-hazardous and hazardous/toxic). Waste generated by quarry activities include:

- Sludge (usually clay/ silt) materials collected in sedimentation ponds.
- Waste oils or chemicals from vehicle, machinery, or other uses.
- Domestic wastes (sewage, drainage) from on-site sanitary or kitchen facilities.
- Vegetative waste from site clearing activities.

If not properly managed, this waste can lead to contamination of soils and water, as well as the generation of odors, attraction of vermin and the creation of human health and safety hazards.

Mitigation measures (not limited to)

- Implementation of a Waste Management Plan for each type of waste anticipated to be generated by the quarry operation, during construction and operation.

- **Minimise waste** - All efforts must be made to minimise the amount of waste generated through recycling and prudent procurement and operation. Where feasible, waste should be removed to public waste disposal sites. Where this is not feasible, pits may be dug at safe distances from water bodies and to a depth that does not pose any instability to slopes or offer opportunities to wildlife or pests to dig it up. It is imperative that groundwater is not impacted by the disposal of wastes in these pits.
- **Zero burning** - Biomass waste from site clearing may not be burned but can be left for natural decomposition. The environmental consultant should emphasise options for better utilisation of smaller dimensions of woody biomass (such as small trees and branches) from site clearing.
- **Provision of waste bins** - Provision for sufficient waste bins for collection of solid waste generated onsite. These bins should be emptied on a regular basis and the waste collected should be disposed of at the local authority's approved disposal sites.
- **Housekeeping** - Good housekeeping practice onsite (wastes should be properly disposed of at designated containers/ areas).
- **Location of facilities** - The location of workshops and fuel/ lubricant storage facilities (if any) should be at least 50 metre distance from the nearest natural waterway and installed with proper oil traps and spill containment.
- **Oily/scheduled waste** - Collect used oil and oily wastes from machinery and transportation vehicles and store and label in proper containers for disposal. A temporary storage facility should be constructed within the project site, and should be fenced, covered, bunded, sign posted, have impervious flooring, and be provided with spill containment, proper drainage and oil trap. The facility should be sited more than 50 m away from any river, stream or sensitive area.
- Overburden will be placed in spoil piles in the mined-out area.

Impact Significance

During all phases of the project waste will be generated. Vegetation and overburden/topsoil will be generated from the construction and operation phases of the project. Non-hazardous solid waste will also be generated more so during operation such as trash, scrap metal, rubble, domestic wastes. Hazardous waste such as waste oil will be generated at each phase of the project from the use and serving of machinery, equipment and vehicles. Explosives and fuel will be stored, transported and handle during operation. If no mitigative or corrective action is taken by the Project proponents improper

management of solid waste will affect employees of the Quarry. This impact is rated as low (low likelihood of occurring, low severity).

Further, it is noted that non-hazardous solid waste will be disposed of in a controlled and lined solid waste pit. Plan to implement proper collection and storage of waste oil on site such as leak-proof containers, construct impervious base for storage and storage distance from waterways. Establishing a storage bond with impervious base for explosives. With implementation of these measures the impact associated with hazardous and non-hazardous waste generation is considered to be minor (low likelihood of occurring, low severity).

Social Impact

The project is located within an Amerindian Titled Land where forest and forest resources are used by the community members for varying purposes such as farming, hunting, logging and fishing. As a result of the implementation of this project, the are excised area will not be used for the aforementioned activities. It is also envisioned that there will be no land-use conflicts since the area is owned by the Community of Batavia. However, the transportation of quarried materials and materials for the operation by barges along the Cuyuni River can or may comprise the safety of other river users.

3.0 PROJECT SIGNIFICANCE

Criterion 1 Project Location (e.g., a densely populated area; or high-density industrial zone)

To this end, the project area can be considered suitable for quarrying. The proposed project location is on the left bank of the Cuyuni River, within Batavia Amerindian Tittle Lands. The closest Community to the project site is approximately 16.4 km away from the area. The landscape is dominated with active forest concession that are operating on Laterite and Saprolite soils. The nearest populated area within Batavia Amerindian Titled Lands is located approximately 1.2 km east downstream the Cuyuni River with respect to the project area.

Criterion 2 Environmental Sensitivity: Will the project be located in an environmentally sensitive area?

The project is located within Batavia Amerindian Tittle Lands; however, it is not in close proximity to any environmentally sensitive areas and the Project Area is influenced by a logging concession, creeks within the Cuyuni River watershed area in the northern direction. The immediate surroundings are forested areas comprised of known commercial forest species and lesser-known forest species that are historically known to be subjected to logging, thus the habitats and biodiversity components within the site are largely modified/human disturbed habitats. Vegetation coverage is dense, remote and subject to small scale artisanal mining activities. It is not envisioned that this Project will not have significant impact on any natural resources in any way that may be deemed environmentally sensitive.

Criterion 3 Level of Public Concern

Level of Public Concern is considered Moderate. The closest residents to the project are approximately 1.2 km east downstream the Cuyuni River with respect to the project location. Further, the immediate surrounding land use are vacant forested areas. Additionally, mitigation measures were developed for potential identified impacts for the project.

4.0 RECOMMENDATIONS/CONCLUSION:

It can be concluded based on the existing data, technical review, observations/field inspections and exercise of discretion that the impacts from the proposed Stone Quarry activity would be considered to be low, minimal and acceptable due to the **scale and nature** of the activity; which is confined to the Project Area. It is not envisioned that any significant environmental impacts will occur once mitigation measures outlined in **section 2** of this report are implemented.

It is therefore recommended that this project be placed on 30 days' Public Notice no EIA required in keeping with supporting information and thereafter be moved to permitting once no objections are raised during the publication timeline. However, the project would require to develop an Environmental Assessment Management Plan that will address all components of the project.