ATANA AREA 1- BACKGROUND INFORMATION DOCUMENT

Hadi's World Inc

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HADI'S WORLD INC

Atana Area 1

This Background Information Document (BID) aims to inform stakeholders of the proposed project by Hadi's World Inc. and seeks to:

- ✓ *Provide basic information on the Project*
- ✓ *Explain why an Environmental Management is being undertaken*
- ✓ **Provide information about the Environmental Management process**

1.0 Project Title

Atana Area 1

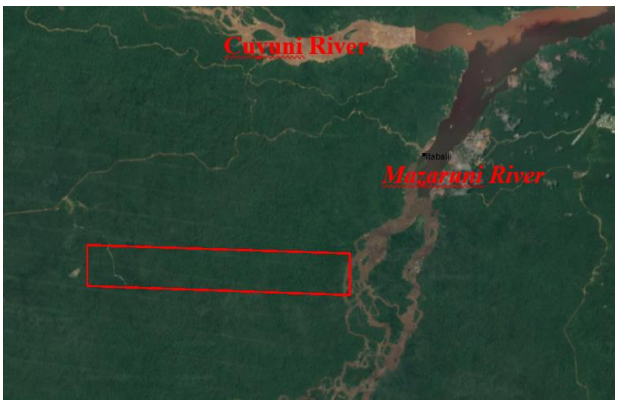
2.0 Company Profile and Contact Details

Atana Area 1 (Project) is owned and will be developed and operated by Hadi's World Inc, a Guyanese registered company under the Laws of Guyana. The company was registered on the 29th September 2009.

Hadi's World Inc
29 Lombard Street,
Werk en Rust
Georgetown
Guyana

3.0 Project Location, Accessibility and Area of Operation

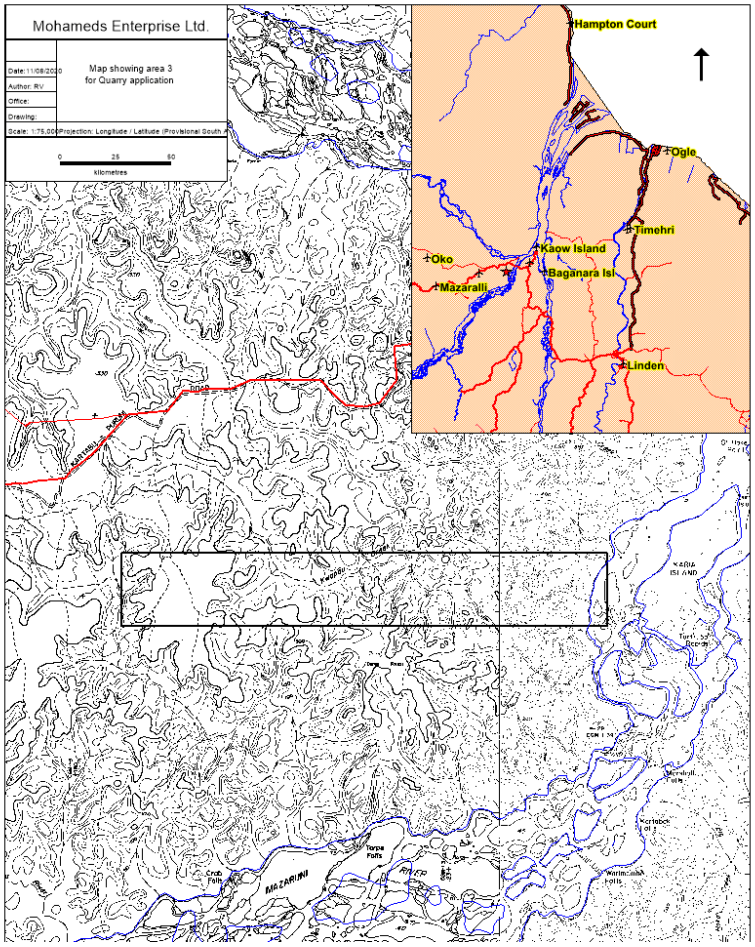
The province is situated in the Mazaruni Mining District No. 3, approximately 81.4 km SW of Georgetown (Fig. 1) centered at geographical coordinates -58° 45' 8.712", 6° 20' 32.3268". The site is bounded East and South by the Mazaruni River, West and North by the Puruni- Itaballi road.



Description of Property

Tract of state land located in the Mazaruni Mining District No. 3 as shown on Terra Surveys Topographic Map 27NE, scale 1: 50,000 with reference point 'X' located at the confluence of the Mazaruni River and the Tepuru River located with geographical co-ordinates of longitude 58° 41' 35"W and latitude 6° 21' 28"N.
Thence at true bearing of 226°, for a distance of approximately 3 miles 964 yards, to point of commencement

Point A, located at geographical coordinates of longitude 58° 43' 48"W and latitude 6° 19' 18"N, thence at true bearing of 180°, for a distance of approximately 1618 yards, to Point B, located at geographical coordinates of longitude 58° 43' 48"W and latitude 6° 18' 30"N, thence at true bearing of 270°, for a distance of approximately 6 miles 223 yards, to Point C, located at geographical coordinates of longitude 58° 49' 10"W and latitude 6° 18' 30"N, thence at true bearing of 0°, for a distance of approximately 1618 yards to Point D, located at geographical coordinates of longitude 58° 49' 10"W and latitude 6° 19' 18"N thence at true bearing of 90°, for a distance of approximately 6 miles 255 yards to the point of commencement at Point A.
Thus, enclosing an area of approximately 3656 acres, save and except all lands lawfully held or occupied.



Accessibility

The area can be accessed by road from Georgetown to Parika, then from Parika by boat, up the Essequibo and Mazaruni Rivers (Fig 1.) to the site. Alternatively, the area can be accessed by road from Georgetown to Linden, hence along the Linden Sherima road, crossing at Sherima by a pontoon fitted with a tug, over the Essequibo River, hence along the Itaballi road, crossing the Mazaruni River at Itaballi landing. Thereafter the site can be reached by off road trails. Total journey time varies from ranging from 2-3 hours by boat from Parika, and 3-4 hours by road depend on the scheduled crossing time at the locations. A second route is by chartered Cessna or Islander aircraft or passenger seat, from Eugene F. Correia International Airport to Bartica township, hence by boat from Bartica to the site. Note by air the journey can take one-two hours to the site.

4.0 Geological Setting

The rocks of the region, collectively known as the Barama-Mazaruni Supergroup, are Paleoproterozoic in age and comprise an east-west trending series of a series of mafic through felsic volcanic flows with intercalated clastic sediments (Gibbs, 1980; Gibbs and Barron, 1993, Persaud E, 2018).

The area in discussing is part of the Kartabu Granite which is a pseudo-elliptical body the major axis of which trends approximately NE-SW from Kaow Island in the north to Marshall Falls in the south.

Differentiation of the granites were discussed by Cannon 1955 having two main facies; Grey granite and Leucocratic granites.

The granite is well jointed, having a general north-easternly trend which correlates to the regional jointing observable within the assemblage particularly along the Cuyuni River. Local Geology can be observed at the old Kartabu and St. Edward's quarries have been non-operational for many years, there is however still fresh rock to be observed in the area.

The general geology has been described by H.Schielly as uniformly massive leucocratic muscovite granite which contains a few angular, black xenoliths of Biotite hornblende hornfels (less that 1%). R.T. Cannon (1964) in his detailed study of "the Geology of the "BARTICA ASSEMBLAGE" has covered area close to the deposit. Cannon described the granite as a Muscovite-Biotite Granite. Grey granite, a biotite-muscovite granite; and Leucocratic granite, a muscovite-biotite granite.

This classification is true from visual inspection of the granite and also that the grey granite is more fine grained and uniform in texture than the leucocratic granite which has larger crystals of quartz visible – this supports the theory that the granite is Igneous in origin with Leucocratic granite later than the grey granite which obviously crystallized closer to the surface.

5.0 Project Plan

The total disturbance footprint of the operation including the road network corridor is estimated to be approximately 150 acres of state lands.

The Atana area 1 Project will be developed as a rock quarry. The Project will produce more than 1.275 million tons of aggregate and boulders for the five years period.

Approximately 100 people will be employed full time, drawn from a largely locally available pool of workers.

Quarrying will be through conventional open-pit mining techniques using buldozers to clear the mining area and remove the topsoil which will be loaded with front end loaders and transported by haul trucks to top soil storage areas. The overburden will be stripped by excavators, loaded into haul trucks and transported to the waste dumps. The exposed rocks will be drilled, blasted and transported by haul trucks to the crushing plant stockpile. After crushing, the material will be stockpiled for later transportation to the market (Georgetown) via tugs and barges.

5.1 Quarry Plan

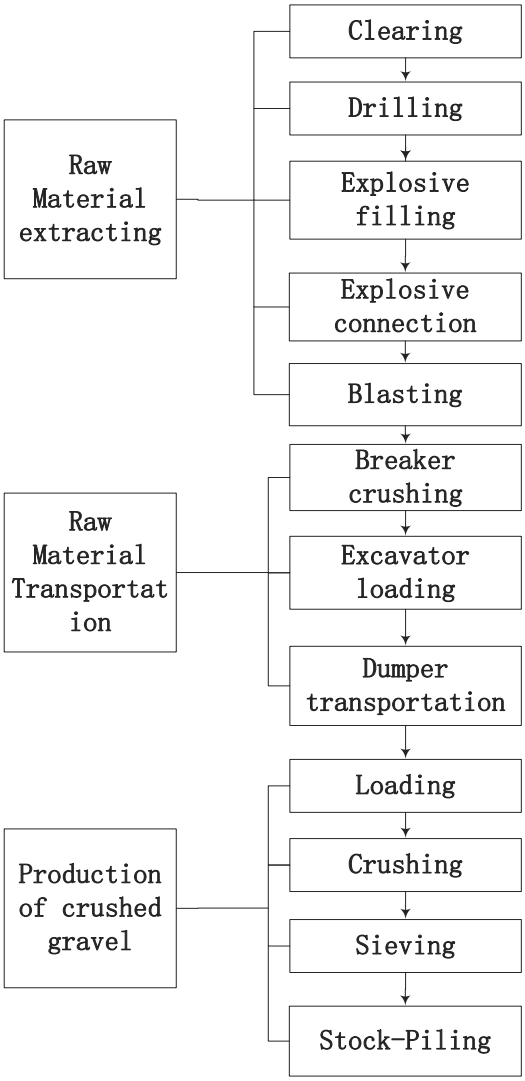
The ultimate extent of the pit is based on long-range price forecasts for aggregates and boulders, as well as engineering estimates of operating costs, transportation and payment terms. The design of the open pit and internal mining phases incorporates geotechnical recommendations for safe slope angles, internal ramp development for access to all working areas, and pit wall smoothing to enhance stability and operator safety.

Pit slope angles will vary according to soil strength, lithology and structural controls, but are expected to range between 28° and 48°.

The basis for mine planning was the US$40/ton with the area containing an estimated 3.756 Mt of rock and 840,000 t of waste material.

At the rim, the initial open pit will be 200 metres across east to west, 100 metres across north south, and will be about 15-20 feet deep. The pit area totals about 90 hectares, and an additional 150 hectares will be disturbed for access/haul roads, ore stockpiles, the primary crusher and secondary crusher, screens and truck shop, and storage of fuel and lubricants etc.

The activities that are involved in developing and operating a quarry is shown in the schematic below



Schematic showing stages in developing and operating a quarry

The construction stage is expected to last for three months and will include all the infrastructure works (roads, bridges, houses for accommodation, generator room, wells for domestic water etc.

The development stage will be conducted simultaneously with the construction and includes setting up the crusher circuit, clearing and removal and storage of topsoil and stripping and removal of overburden. This aspect of the operation will take approximately 4 months.

The quarry will be operated for 12 years. Progress closure activities will be ongoing throughout the life of the quarry. Post closure activities will be carried out at least two years after closure.

5.1.1 Pit Production Schedule

Quarry Schedule

Crushing` and screening is scheduled for 24 hours per day, 6 days per week, and 312 days per year at an average processing rate of 1000 tpd, or 312,000 Mt per annum. The Project will use two rotating crews, each working 12-hour shifts, to provide continuous operator coverage.

The Project's production schedule is presented in Table 1. Preproduction stripping will require 3 months lead to prepare for full-scale mine operations, training work crews, constructing access and haul roads, and clearing and grubbing the pit and waste rock storage areas that will be disturbed during the initial years of operation.

It is expected that Quarrying Operation will commence between and July 1, 2021. It is therefore estimated that for 2021, 130,000 tons with 80 tons being aggregate. From 2022 to 2025, the estimated production (finial Product) will be 312,000 tons annually with 100,000 tons being Rip-Rap and 212,000 tons being aggregate. The table below gives a proposed breakdown.

TABLE (1) (000's)- 5 years plan

Product	2021 (Months)	Years				TOTAL
(1,000 tons * 103	July-December 2021	2022	2023	2024	2025	
Rip-Rap	50	100	100	100	100	350
Aggregates	80	212	212	212	212	928
TOTAL	130	312	312	312	312	1,278

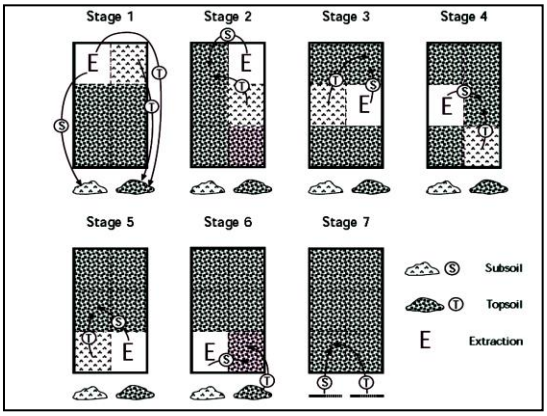
5.1.2 Topsoil and overburden management

Adequate topsoil management was 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. The topsoil contains the majority 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. Research data now available from other quarry sites demonstrate that in some areas, waste rock weathers rapidly to form suitable materials for re-vegetation.

The topsoil will be removed by bulldozers, loaded by front-end loaders to haul trucks and transported to areas to be specified for topsoil storage

Waste material will be managed in areas located to the south of the initial open pit. The placement of the overburden is strategic to allow progressive reclamation. After replacement, the topsoil will be spread and re-vegetated.

Schematic of strategy is illustrated below.



Schematic showing Topsoil and overburden strategy

6.0 Staffing

The estimated staffing requirement for the Atana Quarry is 100 employees, which is considered average staffing level for the quarry life.

The respective roles of the employees break down as follows:
General & Administrative 10
Quarry Operations 30
Plant Operations 30
Camp support staff 14
Security 16

These employees are for the most part salary and will be working on a 40-hour per week work schedule, Monday through Friday.

On average, the quarry and plant operation will employ 45 hourly employees and 15 salaried employees. The shift supervisors will work 12-hour shifts on a four-days-on/four-days-off schedule.

The quarry hourly employees consist of operations employees such as excavator operators, haul truck drivers, drill operators, blasters, and other quarry operating support, while the maintenance crews will consist of electricians, mechanics, and welders. The schedule for the operation crews will be two 12-hour shifts per day, seven days a week. A maintenance crew will work one 12-hour shift per day, seven days a week on day shift. In addition, there will be a small night shift maintenance crew that will work one 12-hour shift per day on a seven-day work week.

The security will consist of 16 persons working on 12-hour shifts, seven days per week and 52 weeks per year.

7.0 Mining Camps and Associated Facilities

The living accommodation will be constructed with logs form the project site. Ten bungalows will be constructed to accommodate eight persons each. Each one will have two toilets and bath facilities and will have cupboards for each occupant. Each will have a table for dining and reading. There will be special quarters for management and senior personnel.

A kitchen/restaurant will be built to prepare meals and for dining. Breakfast will be served between 4.00 am and 7.00 am, lunch between 11.00 am and 1.00 pm at the various locations and dinner between 5.00 pm and 8.00 pm. Light snack swill be available throughout the day up to 10.00 pm.

The Company will cater for all the laundry# requirements of the staff and will employ six persons to execute these tasks along with cleaning the camps. A small truck will be used to transport garbage from the camp site to the dump.

A recreation building will also be established and will have a table tennis table, pool table, tables for dominoes, cards etc. There will also be a mini bar for refreshments and other toiletries. A large screen TV and DVD player will be available with cable television. There are plans to develop an area for cricket, football and other outdoor activities.

A guest house will be built for visitors and university students wishing to conduct research in any aspect of geology, mining and processing engineering or environmental sciences.

7.1 Haul and other Roads

In-site roads will generally measure 10-m wide with 0.5-m wide drainage channels, as required, along both sides of the road.

Haul roads will generally be 20 m wide inclusive of safety berms and ditches. Haul trucks will have the right-of-way and all other traffic crossing the haul roads must yield to the haul trucks.

7.2 Electrical Power Supply

The company will generate all the electrical power to operate the crushing plant will use solar technologies to provide the required power for non-production units such as camps and administrative offices. The company will use two Caterpillar generating sets for the required electrical power and will have two on standby to ensure continuous power.

7.3 Water Supply

For domestic water requirements the company plans to drill a well in the project area and set up a filtration and treatment plant
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TABLE 2 PROPOSED ENVIRONMENTAL MONITORING PLANS

8.0 Environmental Issues

Parameter	Institution Responsible	Frequency of Monitoring	Location of monitoring
Physical environment			
Weather Rainfall Temperature Humidity Evaporation Wind	HWI	**Daily**	Mazaruni at fixed location where monitoring station is installed
Biological environment			
Air Quality Total Suspended Particles (TSPs)	HWI	Quarterly	Stockpile areas and at the boundaries of the operations site, roads, blasting areas
Noise Decibels	HWI	Quarterly	Stockpile areas where loading takes place and along the haulage path, drilling and blasting areas
Water Quality Ph Turbidity COD Heavy Metals TSS Conductivity, DO	HWI	Biannually	Points of site drainage into area drainage and 500m downstream and upstream of waterway (s)
Stream Flows	HWI	Quarterly	Main Creeks and Waterways including Mazaruni River
Waste Management	HWI	Weekly Biannually	Waste receptacles and large storage container, incinerator and general project area
Socio-economic environment			
Health and Safety	HWI	Biannually Monthly	Use of protective gear by staff Condition of fire-fighting stations and equipment Adequate and appropriate signage for emergencies Location of Emergency Procedures In house training to keep employees up to date with various safety procedures. Health conditions of staff, in particular as it relates to respiratory ailments
Employment and Benefits	HWI	Biannually Biannually	Number of persons from the region employed Conditions of employment Assistance to regional residence by company

Hadi's World's Inc plans to develop a medium scale quarry, in the lower Mazaruni River. As part of the licensing process, the company requires to fulfill all the necessary environmental permitting obligations before quarrying could commence. As such, the company has applied for Environmental Authorization simultaneously with the Quarry License application. The company will acquire baseline information to be able to effectively monitor the environment for any potential impacts. Some of the parameters to be monitored are found in Table 6.1 above.

8.1. Objectives of Environmental Management

The objectives of the effective Environmental Management are to:

- ✓ Thoroughly document ecological baseline conditions (pre-quarrying conditions) of the study area and the socio-economic conditions of the effected communities.
- ✓ Place the ecological baseline conditions of the concession area in the context of the surrounding region.
- ✓ Inform, obtain and address contributions from stakeholders including relevant authorities and the public.
- ✓ Assess in detail, the environmental and social impact that would result from the project
- ✓ Identify mitigation measures that would reduce the significance of predicted negative impacts or enhanced predicted benefits of the proposed mining projects
- ✓ Develop an appropriate Monitoring Plan for the proposed mining project based on the Mining Plan of Operation.
- ✓ Develop a Conceptual Closure and Rehabilitation Plan for the proposed mining project addressing issued of post closure land use and projected effectiveness of rehabilitation.
- ✓ Meet the requirements of the environmental regulatory agencies (EPA and GGMC) in Guyana as well as international best practice for project of this nature.

The environmental study will identify the potential impacts associated with the development and then provide the measures that will be required to manage those impacts, which will be incorporated into an Environmental Management and Monitoring Plan. The assessment, will be conducted by a multi-disciplinary team of experts with the stages identified as follows:

8.2 Specific Issues to be addresses by the Environmental Management Plan

- The consultant team will address the full range of issues as it pertains to the proposed project. Specific issues include:
- A detailed description of the project area including maps showing the boundaries of the Project area, layout of current land uses of the surrounding areas and network of drainage systems.
- Previous and current water quality data from surrounding streams which include pH, TSS or turbidity, conductivity, TDS, ammonia and sulphates and the establishment of fixed stations for continuous monitoring include the Mazaruni River
- Details on transport arrangements from extraction site to crushing plant and stockpiles to loading
- Dust in particular from haul roads, crushing plant and stockpiles
- Noise from drilling, blasting and equipment
- Impacts to aquatic and terrestrial flora and fauna
- Water Use and effluent management
- Waste management
- Land use
- Cultural and arcaeological resources
- Occupational Health and Safety
- Social and economic impacts to the local communities of Region 7 including direct benefits such as jobs, royalties and tributes, possible scholarships and apprentice schemes and other benefits.
- Cumulative Impacts of the project
- Presentation of the proposed Quarry Plan with all relevant information concerning potential impacts on the environment and develop mitigation strategies to reduce the identified impacts.
- Presentation of a Sediment Control Plan as part of the Quarry Plan
- A Monitoring Plan with focus on reclamation efforts and on discharge and receiving water quality limits with provisions for effluent discharge monitoring.
- A detailed Mine Reclamation Plan to encourage progressive rehabilitation with consideration for the eventual return of the land to the regional/governmental authorities.
- A Detailed Emergency Response Plan to respond to environmental emergencies and issues with respect to worker's safety as well as residents. The Plan will consider identification of emergencies, response mechanisms, personnel responsibilities and equipment and training requirements.

8.2.1 Summary of Atmosphere and Air Quality

ACTIVITY OR PROJECT COMPONENT	ASPECT	+VE(P) OR -VE (N)	IMPACT	MITIGATION MEASURES	IMPACT AFTER MITIGATION
CONSTRUCTION PHASE					
Quarry, haul roads and associated infrastructure	Construction activity, including excavation of borrow pit and construction of haul road	N	Reduced air quality due to the generation and exhaust fumes may affect other quarry owners and businesses	Water surface regularly Maintain vehicle engines Vegetation will restrict dispersion	Minimal impact expected
Haul roads	Construction and rehabilitation of existing haul road	N	Reduced air quality due to the generation of dust and exhaust fumes may affect other miners	Water surface regularly Maintain vehicle engines Vegetation will restrict dispersion	Minimal impact expected
Haul roads	Excavation of laterite and other road building material	N	Reduced air quality due to the generation of dust and exhaust fumes, but no human receptors	Water surface regularly Maintain vehicle engines Vegetation will restrict dispersion	Minimal impact expected
OPERATION PHASE					
Transport operations	Transport on haul road.	N	Reduced air quality due to dust generation and exhaust fumes possible affecting miners	Water surfaces regularly, with greater intensity Enforce lower speed limits near mining areas Maintain engine and exhaust systems Vegetation may restrict dispersion to some extent.	Some dust generation may still occur that may reach miners
	Transport elsewhere	N	Reduced air quality due to dust generation and exhaust fumes	Water surface regularly Maintain engines and exhaust system Vegetation will restrict dispersion	Minimum impact expected, no external receptors.
Overburden and ore excavator and ore hauling	Dust generation	N	Reduced air quality due to dust generation and exhaust fumes	Water surfaces regularly	Minimum impact expected, no external receptors
OPERATIONS PHASE CONTD					
Crushing Plant	Dust Generation	N	Reduced air quality due to dust generation but no external human receptors	Enclosed crusher building Water surfaces regularly with water sprays.	Some dust generation may still occur that may reach residence
CLOSURE AND POST CLOSURE PHASE					
Demolition and removal of infrastructure	Dust generation	N	Reduced air quality due to dust generation but no external human receptors	Water surfaces regularly	Minimum impact expected, no external receptors
Transport for closure activities and material removal	Dust generation	N	Reduced air quality due to dust generation and exhaust fumes possible affecting miners	Water surfaces regularly, with greater intensity Enforce lower speed limit near mines Maintain exhaust and engine systems Vegetation restricts dispersion	Some dust generation may still occur that may reach miners
All exposed surfaces	Dust generation	N	Reduced air quality due to dust generation but no external human receptors	Promote rapid generation	Minimum impact expected, no external receptors

8.2.2 Summary of impacts on Geomorphology, Soils & Land Use

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION PHASE					
Haul road	Construction	N	Cessation of some mining activities	Allow the other miners to recommence as soon after closure as is appropriate	Temporary cessation of mining activities
Haul road	Construction	P	Increase in commercial land use	None	Increase in commercial land use
CLOSURE AND POST CLOSURE					
Mines	Pit excavation	P	Diversification of land use	Ensure pits are backfilled	Diversification of land use
Haul road and bridge	Access and land use after closure	P	Diversification of land use potential to the area	Maintain access roads in suitable condition until after post closure Assignment of formal concession and enforcement of responsible forestry by GFC Formal and consultative planning of post-closure usage and development, involving Hadi's World Inc and other stakeholder	Diversification of regulated land use potential

8.2.3 Summary of Impacts to Surface Water

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION PHASE					
Quarry perimeter dewatering	Discharge of elevated TDS water into river	N	Change water chemistry at discharge	Natural dilution in receiving water and close to river water interface	None
Construction of pit ring dykes	Interruption of local drainage	N	Back up of water, raising local levels	Install or improve drainage channels around pits to convey water away	Improvement to exiting drainage
Haul roads	Interruption of local drainage	N	Back up water, raising local levels especially in the small Creek and killing vegetation Prevention of movement of aquatic life	Culverts through all low points in road embankment Monitoring Ongoing maintenance to keep culverts clear	Improvement to existing drainage Requirement to keep culverts clear as ongoing activity
OPERATION PHASE					
Pit perimeter dewatering	Elevated TDS groundwater into creek	N	Change of water chemistry at discharge	Natural dilution in receiving water and close to river water interface	None
Pit sump dewatering	High SS in sump water	N	High SS if discharged to river	Settlement pond before discharge and dilution	Discharge quality acceptable
Pit dewatering	Discharge of elevated TDS groundwater into swamp drainage	N	Change of water chemistry at discharge. Magnitude of change unknown	Natural dilution in receiving water Discharge to more than one point depending on volumes	Change of water chemistry at discharge. Magnitude of change unknown
Pit backfilling	Erosion of surface	N	Elevated TDS in surrounding water	Re-vegetation	Progressive improvement to good quality

Haul roads	Interruption of local drainage	N	Back up of water, raising local levels especially in small Creek and killing vegetation Prevention of movement of aquatic life	Culverts through all low points in road embankment Monitoring On-going maintenance to keep culverts clear	Improvement to existing drainage Requirement to keep culverts clear as on-going activity
CLOSURE AND POST CLOSURE PHASE					
Infrastructure and haul roads	Interruption of local drainage	N	Back up of water	Monitor removal of infrastructure Clear hand over of need for maintenance of culverts	Requirement to keep culverts clear as on-going activity

8.2.4 Summary of Impacts to Groundwater

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION AND OPERATIONS PHASE					
Mine	Dewatering pit	N	Regional drawdown in aquifers could cause interference with existing groundwater users	Natural hydraulic boundary of river will prevent extension of drawdown across river Monitoring to confirm	No impacts expected
Mine	Dewatering pit	N	Regional drawdown in aquifers could affect vertical recharge to aquifer from surface water	Natural mitigation due to overlying clays Monitor to confirm	No impacts expected
Mine	Dewatering pit		Reduction in head in overlying formations could cause settlement of ground surface due to consolidation	Monitoring	Lowering of ground surface and inundation

8.2.5 Summary of Impacts on Ecology

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION PHASE					
Haul roads, mines, waste dumps and other infrastructure	Land clearance and construction	N	Loss of vegetation of moderate to low conservation value	Restrict width of road corridor as far as possible Minimize deviation from alignment to temporary access road Minimize area of dumps and locate in areas of low conservation value Selectively clear only large trees with chainsaw (safety permitting) in safety zone along road margins Facilitate commercial use of felled timber where possible Promote re-vegetation following closure by ripping any compacted areas and spreading cut vegetation over these	Permanent loss of existing ecosystems (natural re-vegetation will occur but ecosystem quality will be lower)

				Promote drainage of any acid off spoil areas to increase rate of re-vegetation Consult with GFC and comply with relevant permitting requirements prior to commencing tree felling and site clearance	
Quarry; waste dumps; haul roads and other infrastructure	Land clearance and construction	N	Loss of habitat and disturbance of fauna and avian species, some of high conservation value	Land area of disturbance Establish site presence prior to commencement of clearing in order to give fauna time to migrate Control hunting/fishing and killing of fauna in quarry area by project personnel	Loss of habitat and disturbance of fauna and avian species, some of high conservation value
Haul-roads and other infrastructure	Drainage	N	Raised water levels due to obstruction of flows in some areas could result in dieback of dryland and marsh vegetation	Provide adequate culverts to maintain flow paths and ensure these remain unobstructed Monitor water levels with gauging boards Monitor vegetation condition	Raised water levels, although unlikely, would result in significant impact on vegetation
Haul-roads and other infrastructure	Drainage	N	Structures in swamp could restrict movement of aquatic fauna	Provide adequate culverts (preferably concrete box culverts) to maintain flow paths and allow movement of aquatic fauna	Minimal effect
Borrow pits	Extraction of sand material for construction	N	Loss of forest	Minimize amount of sand obtained from this source to restrict loss of forest Facilitate rehabilitation of all borrow areas by ripping underlying hard-cap material and spreading cut vegetation over ripped areas	Permanent loss of some forest areas unavoidable
OPERATION PHASE					
Dewatering	Disposal of water into small creek	N	Disposal of groundwater into small area at mine site may alter pH of water and affect vegetation and aquatic fauna	Not available at this time	Vegetation is likely to be affected, but magnitude of impact not known
All development on right bank	Access during operations	N	Increased access to forest resources (fauna and flora) via haul-road	Control road access Unauthorized access and forest usage to be reported to GFC	Some localized effects on fauna and flora could be experienced, but unlikely to occur
Haul roads and other infrastructure	Mine transport	N	Dust generated by road transport could cause smothering of adjacent vegetation	Road watering to minimize dust Enforce speed limits	Only vegetation immediately adjacent to road likely to be affected
POST CLOSURE PHASE					
Haul road	Access and land usage after closure	N	Possible increase in commercial forestry usage on right bank and commercial logging concessions	Assignment of formal concessions and enforcement of responsible forestry by GFC	Formal concessions may help to control impacts of logging
		N	Possible formal development if land becomes available as a result of mine waste disposal would result in additional clearing and possible hunting and logging	Formal and consultative planning of post-closure usage and development, involving Hadi's World Inc and other stakeholders	Could result in additional land clearance and harvesting of forest products

		N	Possible informal strip development along access road and increased access to forest resources	Access control	Reduced impact of strip development and access to forest resources

8.2.6 Summary of Noise, Vibration and Associated Noise

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION AND OPERATION PHASE					
Haul roads and transport	Use of right bank haul-road during construction phase and haulage during operations phase	N	Noise increase at Atana and possible disturbance of miners and businesses	Maintain engines and exhaust systems Minimize duration of construction activities and keep within daylight hours Realign road so that it is at least 200m from miners	No person exposed to noise
Drilling and blasting	Drilling of blast holes, explosive charge and detonation firing	N	Noise from blasting will be spontaneous and last for a maximum of two minutes. Noise from drilling will be periodic. Both will cause disturbances of persons in the vicinity and beyond	Blasting will be limited to two per month, blast pattern will be design to minimize airblast and vibration, persons that will be affected will be informed at least a week in advance of the potential blasting activities, blasting will br done during 12:00-13;00 during week days when most persons are active, use of love density explosives	A brief exposure to noise

8. 2.7 Summary of Impacts on Traffic and Transport

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION AND OPERATIONS PHASE					
Haul roads	Construction of road and transport of materials		Effects on miners and businesses resulting from increased traffic	Illuminate road intersections with solar powered light fixtures Restrict access of construction and haul vehicles through the other mining areas, and ensure that all project vehicles operate only on private quarry roads	Access for other businesses slightly affected
Haul-roads	Transport of materials		Impacts resulting from spillage of materials, fuels and oils	Train contractors and staff in transport safety Enforce speed limits Ensure that bulk materials are covered if liable to generate dust Minimize unnecessary use and transport of hazardous substances	Some splits may still take place, but frequency will be considerably reduced by management of risk

				Ensure relevant hazardous data sheets on site for all hazardous substances being transported Ensure vehicles are roadworthy and well maintained and Inspect route regularly for signs of split materials Conduct periodic assessments of road quality and re-grade/re-profile as required	

8.2.8 Summary of Impacts to the Social Environment

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION PHASE					
Haul roads	Construction of road	N	Increased nuisance and safety risk to businesses	Assist with removal/relocation of camp if necessary	No impact
Haul-road	Construction of road	N	Nuisance and possible safety hazard to businesses	Restrict access to all construction vehicles and staff Notify businesses in good time of any out of hours work Incorporate junction control into design to minimize safety risks Maintain dialogue with affected persons	
Land clearing and construction of haul-road and bridge	Introduction of external labour force to community	P	Social upliftment as a result of increase in commercial activity	Support small businesses were feasible	District social upliftment
OPERATION PHASE					
Mining	All operations	P	Social upliftment result of employment	Employ regional labour where feasible	Employ regional labour where feasible
CLOSURE AND POST CLOSURE PHASE					
Closure of mining operation	Cessation of operations	N	Loss of employment when mining operation closes	Develop a detailed closure plan in consultation with affected workforce Assist where possible with redundancy and retirement Retrain workers where possible	Most workers likely to find alternative employment as there are other major employment sources in the area

8.2.9 Summary of Impacts to the Economy and Local Businesses

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION AND OPERATION PHASE					
All construction and operational activities	Purchase of goods and services	P	Increase in economic activity	If possible ensure that the Regional Administration has a share in the tax income generated by the exploitation of the district's natural resources Where feasible source goods and services regionally to maximize local benefits, and Use tendering (procurement) processes which favour Small, Medium and Micro Enterprises	Greater emphasis on regional economic activity
All operational activities	Employment	P	Creation of approximately 100 direct jobs and several indirect jobs	Use labour-intensive methods where possible, and Use transparent employment procedures	Tendency towards regional rather than national job creation
CLOSURE AND POST CLOSURE PHASE					
Purchase of goods and services	Cessation of operations	N	Economic decline as a result of the termination of production	No mitigation	
Employment	Cessation of operations	N	Retrenchment of 100 workers	Develop a detailed closure plan in consultation with affected workforce Assist where possible with redundancy and retirement Retrain workers where possible	
Haul road	Access and land usage after closure	P	Increased production in commercial forestry operations as a result of increased access	Maintain the condition of the haul road into the post-closure phase	Formal concession may promote sustainable logging

9.0 Environmental Monitoring Strategies

Parameter	Institution Responsible	Frequency of Monitoring	Location of monitoring
Physical environment			
Weather Rainfall Temperature Humidity Evaporation Wind	Hadi's World Inc	Daily	Mazaruni at fixed location where monitoring station is installed
Biological environment			
Air Quality Total Suspended Particles (TSPs)	Hadi's World Inc	Quarterly	Stockpile areas and at the boundaries of the operations site
Noise Decibels	Hadi's World Inc	Quarterly	Stockpile areas where loading takes place and along the haulage path, drilling and blasting areas.
Water Quality Ph Turbidity COD Heavy Metals TSS Conductivity, DO	Hadi's World Inc	Biannually	Points of site drainage into area drainage and 500m downstream of waterway (s)
Stream Flows	Hadi's World Inc	Quarterly	Main Creeks and Waterways including Mazaruni River
Waste Management	Hadi's World Inc	Weekly Biannually	Waste receptacles and large storage container, incinerator, and general project area
Socio-economic environment			
Health and Safety	Hadi's World Inc	Biannually Monthly	Use of protective gear by staff Condition of fire-fighting stations and equipment Adequate and appropriate signage for emergencies Location of Emergency Procedures In house training to keep employees up to date with various safety procedures. Health conditions of staff, in particular as it relates to respiratory ailments
Employment and Benefits	Hadi's World Inc	Biannually Biannually	Number of regional residents employed Conditions of employment Assistance to regional residents by company

10.0 Closure Concepts

The proposed reclamation plan for the Atana Area 1 Project site has several key components, referred to as initiatives. These initiatives provide the physical and philosophical foundation for the reclamation plan and will remain constant throughout the operational life of the facility. These initiatives include: design of the facilities with closure goals in mind; concurrent reclamation practices; constraining disturbances to a single drainage; minimizing downstream hydrologic disturbances; preparing a comprehensive drainage plan; using modern technology to minimize the generation of impacted water; managing operations to minimize environmental impacts; reclaiming the facilities to blend with surrounding topography; constructing an outer facility shell to reduce visual impacts of the mining operations; salvaging soil resources; performing selective vegetation removal; revegetating reclaimed surfaces; and, preparing an estimated closure cost. One of the major initiatives of the Plan will be to facilitate concurrent reclamation of the outer shell of the waste and tailings storage areas and to provide a perimeter buttress to mitigate the visual impact of the Project. It is envisioned that the selection of seedbed preparation, species, and site revegetation will be on a research agreement with the University of Guyana where the Project will provide a research grant to the Faculty of Technology or Agriculture.

10.1 The Closure Planning Process

Ideally a quarry operation, as a temporary use of land, should not impose any permanent constraints on the options for future beneficial use of the site, nor have any permanent effects on the local water resources, biodiversity and overall landscape quality or associated socio-economic development.

This conceptual Closure and Decommissioning Plan (CDP) wil be developed for the future operations of HWI. The CDP details in conceptual form the measures that will be employed at closure, to ensure that the sites are rehabilitated to an appropriate level and outlines preliminary performance criteria and monitoring requirements. This plan will be developed and finalized in consultation with relevant authorities and stakeholders in advance of closure.

In the context of this Plan, the term 'closure' is taken to encompass decommissioning, demolition and rehabilitation activities prior to close out of the site. References to 'post closure' relate to the period following termination of closure activities (for example, ongoing monitoring, and after-care

As a part of the legal requirement of Guyana, the company embarked on a project to identify suitable closure and decommissioning methods for the project. The widely accepted 'de facto' standards of the World Bank Group and the corporate standards were used in compiling this preliminary. The minimum standard will dictate that all operations have closure plans that are regularly reviewed and updated and which identify, mitigate where possible, and manage both current and future health, safety, environment, community, and other business risks associated with closure.

Compiling of the CDP is the first stage of closure process. The CDP will addresse individual closure issues and action required, including details of performance criteria and monitoring so that the company can prepare financial provisions for the process.

More specifically, the objectives of the overall closure planning process, and the specific provisions within that process, are to:

- ✓ Contribute to the management of environmental issues during planning and operational phases as a means of facilitating the effective closure.
- ✓ Identify post-closure land use objectives through a process of consultation with stakeholders, communities and land owners;
- ✓ Identify suitable best practice measures that are appropriate to the project context and that are able to:
- ✓ Satisfy the requirements of existing Guyana legislation, specifically the Environmental Protection Act and the Mining Act;
- ✓ Meet the corporate requirements of HWI.
    - satisfy the standards set out in relevant World Bank documentation.
    - through consultation, obtain stakeholder acceptance of closure proposals.
    - return land and water resources to pre-mining or otherwise agreed conditions.
    - minimize the potential for any negative post-closure impacts and liabilities.
    - minimize the requirement for active management of the post-closure environment; and;
    - maximize the potential for post-closure environmental and socio-economic benefit.

11.0 Summary of Financial Analysis

Hadi's World Inc ("HWI" or the Company) is presenting the development scernario from the recently completed Atana Area 1 Project feasibility. Atana Project is located in the Lower Mazaruni area and has a resource estimate that contains 3.796 million tons of rock. The annual production is anticipated to be 312,000 initially and adjustments to the quarry design, crushing plant and transportation capabilities to cater for increased demands.

The section of the study provides a clear indication that Atana Area 1 could be developed as an economically robust, and medium scale operation to provide boulders and aggregates.

HWI has taken the decision to accelerate the development of the mining development following the strength of the results generated by studies to date. Significantly, the report has highlighted several areas where the project can be further enhanced to improve the efficiencies and economics surrounding the quarrying proposal of this scale.

The estimated price for stone was USD$40/ton and operating expenditure of USD$28 including depreciation. The anticipated surplus is USD$12 per ton. The initial capital investment is estimated to be USD$3.0 M The rate of return on investment is expected to be 1.5 years.

12.0 CONCLUSION

The quarrying industry's role is to provide a reliable supply of construction materials for road making, building construction, and the maintenance of road networks on which other industries depend.

As observed in other industries, successful market leaders are those who provide an efficient and effective service and are mindful of all aspects of their public image. The modern community demands that these premises be managed carefully with consideration of the needs of the environment, neighbours and employees.

The general objective in planning for the provision of these materials is to ensure that the supply is managed in a sustainable way, so the best balance is obtained between environmental, economic, and social considerations.